

Enclosure 7

Example of
Job Order Contract (JOC)

Volume I

ISLANDS OF OAHU AND HAWAII, HAWAII

INDEFINITE QUANTITY CONSTRUCTION,
MAINTENANCE, AND REPAIR CONTRACT
FOR

VARIOUS AREAS UNDER THE
JURISDICTION OF DIRECTORATE OF
PUBLIC WORKS (DPW), U.S. ARMY
GARRISON - HAWAII (USAG-HI)
JOB ORDER CONTRACT,

VOLUME 1 TECHNICAL SPECIFICATIONS



**US ARMY CORPS
of Engineers,
Honolulu District**

PARTIAL DOCUMENT
Complete document on file at CEHNC-ED-ES-G

DATE: FEBRUARY, 1995

JOB ORDER CONTRACT

Specifications

Divisions 1 Through 19

Volume I



U.S. Army COE - Pacific Ocean Division

September 9, 1994

ZERO ACCIDENTS

SECTION 01200 WARRANTY OF CONSTRUCTION

INDEX

1.0 Warranty of Construction
(Apr 1984)

2.0 Warranty Service Calls

1.0 WARRANTY OF CONSTRUCTION (APR 1984):

1.1 In Addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph 1.10 below, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workman-ship performed by the Contractor or any subcontractor or supplier at any tier.

1.2 This Warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

1.3 The Contractor shall remedy at the Contractor's expense any failure to conform, or any defect. In addition, the Contractor shall remedy at the Contractor's expense any damage to Government-owned or controlled real or personal property, when that damage is the result of-

1.3.1 The Contractor's failure to conform to contract requirements; or

1.3.2 Any defect of equipment, material, workmanship, or design furnished.

1.4 The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

1.5 The Contracting Officer shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage.

1.6 If the Contractor fails to remedy any failure, defect, or damage within a time as specified in paragraph: WARRANTY SERVICE CALLS after receipt of notice, the Government shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

1.7 With Respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall—

1.7.1 Obtain all warranties that would be given in normal commercial practice;

1.7.2 Require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer, and

1.7.3 Enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

1.8 In the Event the Contractor's warranty under paragraph 1.2 above has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

1.9 Unless a Defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

1.10 This Warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

1.11 Defects in Design or manufacture of equipment specified by the Government on a "brand name and model" basis, shall not be included in this warranty. In this event, the Contractor shall require any subcontractors, manufacturers, or suppliers thereof to execute their warranties, in writing, directly to the Government. (Based on FAR 52.246-21)

2.0 **WARRANTY SERVICE CALLS:** The Contractor shall furnish to the Contracting Officer the names of local service representatives and/or Contractors that are available for warranty service calls and who will respond to a call within the time periods as follows: 4 hours for heating, air-conditioning, refrigeration, air supply and distribution, and critical electrical service systems and food service equipment, and 24 hours for all other systems. The names, addresses, and telephone numbers for day, night, weekend, and holiday service responses shall be furnished to the Contracting Officer and also posted at a conspicuous location in each mechanical and electrical room or close to the unit.

SECTION 01900

MISCELLANEOUS PROVISIONS

1.0 DESCRIPTION OF WORK: This specifications covers miscellaneous provisions. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

1.1 Protection: The Contractor shall take all necessary precautions to insure that no damages to private or public property will result from his operations. Any such damages shall be repaired or property replaced by the Contractor without delay and at no cost to the Government.

1.1.1 Warning Signs and Barricades: The Contractor shall be responsible for posting warning signs or erecting temporary barricades to provide for safe conduct of work and protection of property.

1.1.2 Protection of Grassed and Landscaped Areas: The Contractor's vehicles shall be restricted to paved roadways and driveways. Vehicles shall not be driven or parked on grassed and/or landscaped areas except when absolutely necessary for the performance of the work and approved in advance by the Contracting Officer. Grassed or landscaped areas damaged by the Contractor shall be restored to their original condition without delay and at no cost to the Government.

1.1.3 Protection of Trees and Plants: Where necessary, tree branches and plants interfering with the work may be temporarily tied back by the Contractor to permit accomplishment of the work in a convenient manner, so long as they will not be permanently damaged thereby. If this is not feasible, they may be pruned, subject to written approval by the Contracting Officer.

1.2 Restoration Work: Existing conditions or areas damaged or disturbed by the Contractor's operations shall be restored to their original condition, or near original condition as possible, to the satisfaction of the Contracting Officer.

1.3 Removal and Disposal:

1.3.1 Title to Materials: Title to all materials and equipment to be removed, except as indicated or specified otherwise, is vested in the Contractor. The Government will not be responsible for the condition, loss or damage to such property. Items indicated to be removed shall be removed and disposed of by the Contractor outside the limits of Government-controlled property at the Contractor's responsibility and expense before the completion and final acceptance of the work, and such materials shall not be sold on the site.

1.3.2 Rubbish and Debris: Rubbish and debris shall be removed from Government-controlled property daily unless otherwise directed, so as not to allow accumulation. Materials that cannot be removed daily shall be

stored in areas designated by the Contracting Officer.

1.4 Interference With Government Operations: The Contractor shall establish work procedures and methods to prevent interference with existing operations within or adjacent to the construction area. Free passage into adjoining or adjacent buildings not in the contract will not be permitted except as approved by the Contracting Officer. Procedures and methods shall also provide for safe conduct of work and protection of property which is to remain undisturbed.

1.4.1 Utilities and Facilities: All utilities and facilities within the area shall remain operable and shall not be affected by the Contractor's work, unless otherwise approved in writing in advance by the Contracting Officer.

1.4.2 Staking and Flagging Existing Utilities: The Contractor, prior to start of any excavation or trenching work, shall verify the location of all utility lines within the areas of work, and shall mark, stake, or flag each utility line along trench alignments and under areas of excavation, as approved.

1.4.3 Toning for Utilities: As required by the Contracting Officer, existing utility lines shall be located by walking trench alignments with approved equipment for locating underground pipes and cables. Utility lines so located shall be noted on the drawings.

1.4.4 Smoking: Tripler Army Medical Center has been designated a NO SMOKING area. At no time will smoking be allowed within the hospital, including all construction areas within the hospital. Smoking will be allowed only on the exterior ground level of the hospital.

SECTION 02012

STANDARD PENETRATION TESTS

1.0 **DESCRIPTION OF WORK:** This specification covers core drilling and borings for subsurface investigation of soils.

2.0 **PRODUCTS:** (Section not used.)

3.0 **EXECUTION:**

3.1 Auger Borings: ASTM D 1452.

3.2 Soil Samples: ASTM D 1586, ASTM D 1587.

3.3 Rock Cores: ASTM D 2113, Size BX and NX.

3.4 Bearing Capacity: ASTM D 1194.

3.5 Soils Classification: ASTM D 2487, D 2488, MIL-STD-619.

3.6 Boring Logs: Boring report shall include, but not be limited to, a boring location plan locating and numbering boring and boring logs. Log of borings shall have boring number; date of start and finish of boring; rig type, job number and name; sample number, depth, and type; depth of strata changes, soil description and classification, surface elevation, depth of boring, and depth of water table.

SECTION 02050

DEMOLITION

1.0 **DESCRIPTION OF WORK:** This specification covers demolition and removal of resulting rubbish and debris. Rubbish and debris shall be removed daily, unless otherwise directed, to avoid accumulation at the demolition site.

1.1 **Dust Control:** The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as flooding and pollution. Measures shall also be taken for dust control along haul routes and equipment parking areas.

1.2 **Protection of Existing Property:** Before beginning any demolition work, the Contractor shall carefully survey the site to determine the extent of the work. The Contractor shall take all necessary precautions to avoid damage to existing items to remain in place, or to be reused, and any damaged items shall be repaired or replaced. The Contractor shall carefully coordinate demolition work with all other work and shall construct and maintain shoring, bracing and supports, as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work.

1.3 **Burning:** The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.4 **Use of Explosives:** Use of explosives will not be permitted.

2.0 **PRODUCTS** (Section not used.)

3.0 **EXECUTION**

3.1 **Disposition of Material:** Title to materials and equipment to be demolished is vested in the contractor.

3.2 **Clean-up:** Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

SECTION 02075

CONCRETE CORE DRILLING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing of equipment and labor for core drilling of existing concrete. Procedures shall be in accordance with the equipment manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: (Section not used)

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Equipment shall be of shot-drill or diamond-drill type and shall be acceptable to the Contracting Officer. Shot drilling shall be used on horizontal surfaces only.

3.1.2 Location and Size of Cores shall be as directed by the Contracting Officer.

3.2 Core Drilling:

3.2.1 Drilling shall be performed in a neat manner providing a smooth, clean hole perpendicular to the surface.

3.2.2 Equipment shall be rigidly affixed to the surface to prevent drifting or misalignment of the hole.

3.2.3 Work shall be planned and executed so that dust and rubble are held to a minimum.

3.2.4 Surrounding Surfaces, Material, and Equipment shall be protected from damage from dust, water, and flying debris.

3.3 Test Samples:

3.3.1 Where Cores from Drilling are to be used for testing of existing concrete, the resulting core shall meet the requirements of ASTM C 42.

3.3.2 Test Cores shall be taken at locations as directed by the Contracting Officer.

SECTION 02080

ASBESTOS REMOVAL AND DISPOSAL

1.0 APPLICABLE PUBLICATIONS: The publications listed below form a part of this specification to the extent referenced. References to these publications in the text will be by basic designation only. State and Local laws and regulations shall also apply.

1.1 U.S. Government Code of Federal Regulations (CFR):

29 CFR 1910 Occupational Safety and Health Standards

29 CFR 1926 Safety and Health Regulations for Construction

40 CFR 61 National Emission Standards for Hazardous Air Pollutants, Subpart A General Provisions

40 CFR 61 National Emission Standards for Hazardous Air Pollutants, Subpart M National Emission Standard for Asbestos

40 CFR 241 Guidelines for the Land Disposal of Solid Wastes

40 CFR 257 Criteria for Classification of Solid Waste Disposal Facilities and Practices

1.2 American National Standards Institute (ANSI) Publications:

Z9.2 Fundamentals Governing the Design and Operation of Local Exhaust Systems

Z88.2 Practices for Respiratory Protection

1.3 National Institute of Occupational Safety and Health (NIOSH):

Manual of Analytical Methods, 2nd Ed., Vol. 1, Physical and Chemical Analysis Methods (P&CAM):

Method 239 Asbestos Fibers in Air

Method 7400 Fibers (N1, 3rd Ed., Vol. 1)

1.4 Underwriters' Laboratories, Inc. (UL):

586 Test Performance of High Efficiency. Particulate.
Air Filter Units

2.0 **GENERAL REQUIREMENTS:** This specification covers the removal and disposal of asbestos materials performed under this contract.

2.1 **Work Required:** Asbestos containing materials (ACM) present within and upon the structures, materials, and equipment to be altered, demolished, or repaired shall be removed and disposed of prior to demolition, alteration, or repair of the structures, materials, and equipment involved.

2.1.1 **Locations:** Asbestos containing materials shall be removed from the structures, materials, and equipment to be demolished, altered, or repaired, and from all other site locations where directed. Asbestos materials to be removed shall be as identified in the appropriate "Asbestos Sampling Report" provided by the Government or as shown on the drawings or written descriptions which form a part of the construction documents. This shall not relieve the Contractor from the responsibility of notifying the Contracting Officer or his representative of the discovery of suspected additional asbestos during the course of contract performance. Upon notification by the Contractor of suspected additional ACM, the Contracting Officer shall be responsible for the verification of existence and extent of additional work. Should the suspected material prove not to be ACM, the Contracting Officer shall so notify the Contractor.

2.1.2 **Debris:** All debris located within the project limits for asbestos removal and disposal work shall be considered as containing, or having been contaminated with asbestos, and shall be treated, handled, removed and disposed of in accordance with applicable regulations. Any miscellaneous debris located outside of the requested work area which is determined to contain asbestos shall also be disposed of in accordance with the applicable regulations.

2.1.3 **Structures, Materials, and Equipment Surfaces:** Interior building surfaces, including supporting structure surfaces or equipment shall be considered as contaminated with asbestos containing dust. Surfaces shall be cleaned in accordance with the regulations prior to demolition, alteration, or repair of the structures, materials, and equipment.

3.0 **CONTRACTOR COMPLIANCE AND RESPONSIBILITY:**

SECTION 02740

SEPTIC TANKS AND GREASE TRAPS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of septic tanks and grease traps. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Concrete Repair Material shall be epoxy type grout in compliance with Fed. Spec. MMM-A-001993.

3.0 EXECUTION:

3.1 Septic Tanks and Grease Traps shall be drained and cleaned.

3.2 Adequate Ventilation shall be provided and precautions against the presence of explosive vapors shall be taken if it is necessary to enter the septic tank.

3.3 Soil Absorption System: Remove and dispose of vegetation roots impeding the flow of water in the soil absorption system properly. Restore all noticeable irregularities in the ground surface, caused by removal, by filling with soil that matches surrounding soil.

3.4 Filling Abandoned Septic Tanks and Grease Traps: Clean and fill abandoned septic tanks and grease traps with compacted soil.

SECTION 02742

SIPHON TANK AND SIPHONS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant dosing siphon tanks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Tank Repair Material shall be epoxy type grout complying with Fed. Spec. MMM-A-001993.

2.2 Concrete Coatings:

2.2.1 Outside and Above Grade shall be epoxy type in compliance with Mil. Spec. MIL-P-24441.

2.2.2 Inside and Below Grade shall be coal-tar epoxy type in compliance with SSPC-PAINT 16.

2.3 Steel Repair Material shall be steel plate or epoxy cement and fiberglass cloth.

2.4 Corroded or Defective Siphons: Replace those parts corroded or defective with new parts compatible with the unit, as recommended by the manufacturer.

2.5 Steel Coatings:

2.5.1 Red-Lead Base Coat shall comply with Fed. Spec. TT-P-86, Type I.

2.5.2 Aluminum Paint shall comply with Fed. Spec. TT-P-38.

3.0 EXECUTION:

3.1 Corroded or Broken Pipe and Fittings: Replace as required.

3.2 Minor Leaks: Repair minor leaks in the tank using material and surface preparation and application methods recommended by the material manufacturer.

3.3 Spalled Areas: Repair as required.

3.4 Cleaning and Coating:

3.4.1 Interior Concrete Surfaces of the tank shall be cleaned with high pressure water or steam to remove all dirt and residue, allowed to dry, and brush sandblasted in compliance with SSPC-SP 7.

3.4.2 The Exterior Concrete Surfaces of the tank shall be cleaned by means of brush sandblasting in compliance with SSPC-SP 7. The surfaces shall be blown down with air to remove the blasting residue and dust, and two coats of epoxy-polyamide paint shall be applied.

3.4.3 Holes and Voids in the concrete surfaces left from the blast cleaning shall be filled by means of troweling and squeeze application of an epoxy filler. The surfacing material shall be allowed to cure overnight, and then two coats of coal-tar epoxy complying with SSPC-PAINT 16 shall be applied.

3.4.4 Submerged Ferrous Metal Surfaces that are exposed to the sewage shall be sandblasted in compliance with SSPC-SP 10 and coated with two coats of coal-tar epoxy.

3.4.5 Ferrous Metal Surfaces that are not submerged shall be cleaned by means of sandblasting in compliance with SSPC-SP 6. Surfaces inaccessible to sandblasting shall be power tool cleaned in compliance with SSPC-SP 3. Surfaces shall be coated with one coat of red-lead base paint. After the base paint has dried sufficiently, two coats of aluminum finish paint shall be applied.

SECTION 02744

GREASE INTERCEPTORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of grease interceptors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Semi-Automatic Grease Draw-Off: Unit shall be on-floor type, cast iron, porcelain, or painted inside and out, with internal air relief, grease draw-off piping, and valve with flow control fitting. Draw-off piping and nozzle may be interchanged in field to make unit a right- or left-handed installation. Unit shall also have double wall trap with removable baffles and gasketed cover with low pressure chamber. The pipe size of the influent line shall be based on the influent flow rate and grease capacity

2.2 Manual Grease Draw-Off: Unit shall be on-floor type, partially recessed or flush-with-floor type, cast iron, porcelain, or painted inside and out, with internal air relief and flow control fitting. Unit shall have double wall trap, removable baffles, gasketed cover bearing plumbing, and drainage seal of approval. The pipe size of the influent line shall be based on the influent flow rate and grease capacity.

2.3 Manual Grease Draw-Off, Coated Steel Type: Unit shall be high volume on floor or partially recessed, with internal air relief, double wall trap, removable baffles, gasketed non-skid cover, and flow control fitting. The pipe size of the influent line shall be based on the influent flow rate and grease capacity.

3.0 EXECUTION: The unit shall be placed in the influent line of the waste water disposal and treatment system.

SECTION 04210

BRICKWORK

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of brickwork. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Face Brick: Compatible with existing in mechanical characteristics, permeability, and appearance and shall comply with ASTM C 216.

2.2 Common Brick: Compatible with existing in mechanical characteristics, permeability, and appearance and shall comply with ASTM C 62.

2.3 Concrete Brick: ASTM C 55.

2.4 Mortar Materials and Mixing:

2.4.1 Hydrated Lime: ASTM C 207, Type S or N.

2.4.2 Admixtures: Fed. Spec. SS-C-1960/1 and consisting of water-repellent stearates and pozzolanic plasticizers in powder form.

2.4.3 Portland Cement shall comply with ASTM C 150, Type I or II. Masonry cement shall comply with ASTM C 91.

2.4.4 Coarse Aggregate for Masonry-Grout shall comply with ASTM C 404. Do not use aggregate containing any substance that will stain masonry.

2.4.5 Sand shall comply with ASTM C 144.

2.4.6 Colored Masonry Cement shall be a factory formulated mixture complying with Fed. Spec. SS-C-1960/1.

2.4.7 Mortar shall comply with ASTM C 270 and in the proportions, measured in parts by volume, as required for the application.

2.5 Masonry Accessories:

2.5.1 Reinforcement Bars for lintels, bond beams, pilasters, and other masonry reinforcement shall comply with ASTM A 615, Grade 40.

2.5.2 Joint Reinforcement shall be prefabricated from zinc-coated, cold drawn steel wire complying with ASTM A 641, Class 2 or 3 coating. Side wires shall be 8-gauge deformed wire; truss rods shall be 9-gauge smooth or deformed wire.

2.5.3 Wire-Mesh Ties shall be 16-gauge or larger diameter, zinc-coated steel wire woven into 1/2-inch mesh and cut into strips 1 inch narrower than the width of walls in which they are used. Zinc-coated wire shall comply with ASTM A 641, Class 2 or 3 coating.

2.5.4 Rigid Steel Anchors shall be a minimum of 1 inch x 1/4 inch x 26 inches long with each end turned up not less than 2 inches. Anchors shall be zinc-coated complying with ASTM A 615, Class 2 or 3.

2.5.5 Seals and Gaskets for Control and Expansion Joint shall be of closed cell natural or synthetic rubber.

2.5.6 Nylon Rope for weep holes shall be 3/8 inch diameter by 12 inches long.

2.5.7 Wire Brick Ties shall be fabricated from 3/16-inch diameter zinc-coated steel wire conforming to ASTM A 641, Class 2 or 3 coating. Ties shall be at least 4 inches wide and embedded 4 inches into backup material.

2.6 Flashing:

2.6.1 Through-Wall Flashing shall be one of the following:

2.6.1.1 Five-Ounce Copper Sheet shall comply with ASTM B 370, cold-rolled temper, coated both sides with a factory-applied elastic asphalt compound complying with ASTM D 449.

2.6.1.2 Ten-Ounce Rib-Formed Copper Sheet shall comply with ASTM B 370, cold-rolled temper, with ribs approximately 3/16-inch high and spaced not more than 3 inches apart.

2.6.1.3 Rib-Formed 32-Gauge, Type 302 or 304 Stainless Steel Sheet shall comply with ASTM A 167. Deformations shall be approximately 3/16 inch high and shall be spaced not more than 3 inches apart.

2.6.2 Flashing beneath coping stone shall be one of the following:

2.6.2.1 Stainless Steel Sheet shall comply with ASTM A 167, Type 302 or 304, finish No. 2P, dull, 26-gauge.

2.6.2.2 Copper Sheet shall comply with ASTM B 370, cold-rolled temper, 16-ounce per square foot.

2.6.2.3 Aluminum-Sheet shall comply with ASTM B 209, alloy 3003, temper H-14, .032 inch thick.

2.6.2.4 Galvanized Steel Sheet, 26-gauge, shall comply with ASTM A 527, and coating shall comply with ASTM A 525, designation G90.

2.7 Caulking and Sealants shall comply with Fed. Spec. TT-S-00227, Type II, Class A or Fed. Spec. TT-S-00230, Type II, Class A.

2.7.1 Backup Material for sealants shall be closed-cell resilient urethane or polyvinyl-chloride foam, closed-cell polyethylene foam, closed-cell sponge of vinyl or rubber, polychloroprene tubes or beads, polyisobutylene extrusions, oilless dry jute, or rope yarn.

2.7.2 Bond Preventative Material shall be pressure sensitive polyethylene tape, aluminum foil, or wax paper.

2.8 Water-Repellent Materials for Facing Brick Masonry shall be solvent type silicone complying with Fed. Spec. SS-W-110; transparent, nonstaining, 5 percent silicone resin.

3.0 EXECUTION:

3.1 Brick shall be laid with completely filled mortar joints in line with and of equal width to existing jointing.

3.2 3/8-inch Nylon Weep Rope, 24 inches apart, shall be provided in the head mortar in the first course above the top of steel lintels, shelf angles, and ledge supports and where flashings and waterproofing terminate in horizontal joints.

3.3 Water Repellent Application shall be spray or brush in a single coat, using not less than one gallon for each 100 square feet covered. A flood coating with a rundown of material on the surface of from 6 inches to one foot shall be produced.

SECTION 04215

EXPOSED AGGREGATE SURFACE CONCRETE WALLS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of exposed aggregate surface concrete walls. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Materials and Mixing:

2.1.1 Portland Cement: ASTM C 150, Type I or IA.

2.1.2 Shrinkage-Compensating Cement: Portland cement containing a stable expansive chemical compound such as calcium sulfoaluminate.

2.1.3 Aggregate: ASTM C 33; aggregate for exposed aggregate concrete shall match existing, if appropriate.

2.1.4 Admixtures: Submit manufacturer's literature for all fixtures proposed for the work.

2.1.5 Curing Compounds: ASTM C 309, Type 1.

2.1.6 Epoxy Bonding Agent: ASTM C 932.

2.2 Concrete Formwork, Reinforcement, and Accessories:

2.2.1 Formwork: Plywood form and liners shall be minimum grade B-B High Density Concrete Form Overlay, Class I, complying with APA.

2.2.2 Reinforcement:

2.2.2.1 Reinforcement Bars: ASTM A 615, Grade 40 or Grade 60.

2.2.2.2 Welded Wire Fabric: ASTM A 185. Where welded wire fabric is needed, use No. 6 gauge wire at 6-inch spacing in each direction.

2.2.2.3 Accessories for proper installation of reinforcement shall comply with CRSI "Manual of Standard Practice for Reinforced Concrete Construction."

2.2.2.4 Reinforcement Fabrication shall comply with ACI 318 and ACI 315.

2.3 Curing and Climatic Conditions:

2.3.1 Comply with ACI 306 and ACI 305 for protecting and curing concrete in cold and hot weather.

2.3.2 Immediately after finishing, begin curing slatwork by covering with constantly saturated moisture retaining fabrics, impervious sheeting, or membrane curing compounds.

2.3.3 Apply membrane curing compounds as required.

3.0 EXECUTION:

3.1 Preparation when Attaching to Existing Surfaces:

3.1.1 Remove All Defective Material by chipping and cutting to sound concrete in order to secure a solid foundation.

3.1.2 Square Cut or undercut the edges to a minimum depth of one inch to form a key.

3.1.3 Cut Concrete out from behind exposed reinforcing bars and rods.

3.1.4 All exposed reinforcing shall be cleaned of rust and primed.

3.2 Installation:

3.2.1 Formwork Requirements:

3.2.1.1 Formwork shall comply with ACI 347. Joints in forms shall be horizontal or vertical.

3.2.1.2 Use plywood, fiberglass, or metal forms.

3.2.2 Reinforcement shall be repaired when rusted through. Rods at least 12 inches long shall be wired to the failed rods. In closing gaps, rods shall lap existing rods by at least 12 inches or 30 diameters, whichever is greater.

3.2.3 Mixing and Transporting Concrete: Ready-mixed concrete shall be mixed and delivered to the project in compliance with ASTM C 94. Job-mixed concrete shall comply with the requirements of ACI 318.

3.2.4 Mixing Epoxy-Resin Patching Mortar: Mix thoroughly with a power mixer at low speeds (150 - 400 rpm) until material attains uniform color and consistency (minimum time of two to three minutes at 70 F).

SECTION 05720

ORNAMENTAL HANDRAIL AND RAILINGS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of ornamental handrail and railings. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Tubing, Bars, and Shapes:

2.1.1 Aluminum: ASTM B 221, 6063-T6, T-52.

2.1.2 Steel: ASTM A 36, A 500, A 501.

2.1.3 Bronze: ASTM B 135, Alloy C23000.

2.1.4 Stainless Steel: ASTM A 554, Grade MT304; ASTM A 312, Grade TP304; ASTM A 167, Type 304.

2.1.5 Brass: ASTM B 135, Alloy C28000 and ASTM B 455, Alloy C38500.

2.2 Castings:

2.2.1 Aluminum: ASTM B 26, 356-T6.

2.2.2 Steel: Gray Iron, ASTM A 48, Class 30; Malleable Iron, ASTM A 47.

2.2.3 Bronze: ASTM B 584, Alloy C92300.

2.2.4 Stainless Steel: ASTM A 743, Grade CF8 or CF20.

2.2.5 Brass: ASTM B 584, Alloy C85700.

2.3 Wood Handrails shall be hardwood handrail of species and profile selected from manufacturer's standards, bonded to metal subrail, with manufacturer's standard transparent finish, unless otherwise directed.

2.4 Fasteners: Furnish fasteners of basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise directed. Unless otherwise directed provide Phillips flat-head screws for exposed fasteners.

2.5 Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

2.6 Fabrication: Stainless steel and steel handrails shall have welded connections. Aluminum handrails shall be either welded or non-welded. Bronze and brass handrail shall have non-welded connections.

2.6.1 Welded Connections: Fabricate handrails and railings of materials indicated for interconnections of members by welding. Preassemble railing units, to maximum extent practicable, consistently with shipping and handling limitations. Welding shall comply with applicable AWS specifications, using method appropriate for metal and finish indicated. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.

2.6.2 Nonwelded Connections: Fabricate railings and handrails for interconnection of members by means of railing manufacturer's standard concealed mechanical fasteners and fittings unless otherwise directed. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

2.6.3 Protective Lacquer: Metal handrails shall be shop-coated with clear non-yellowing lacquer, of type recommended for protection of the finished metal surface.

3.0 EXECUTION:

3.1 Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.2 Expansion Joints: Provide expansion joints at locations directed or at intervals not to exceed 40 feet. Provide internal sleeve type slip-joint extending 2 inches beyond joint on either side; fasten internal sleeve securely to one side, locate joint within 6 inches of post.

3.3 Provide Anchorage Devices and Fasteners where necessary for securing ornamental metal items to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

3.4 Form Tight Joints with exposed connections accurately fitted with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for proper shop fitting and jointing of the work, restore finishes to eliminate any evidence of such corrective work.

SECTION 05730

ORNAMENTAL SHEET METAL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of ornamental sheet metals. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Materials:

2.1.1 Steel Sheet: ASTM A 527, galvanized.

2.1.2 Aluminum Sheet: ASTM B 209, Alloy 5052-H32.

2.1.3 Extruded Aluminum: ASTM B 221, Alloy 6063-T6, T-52.

2.1.4 Bronze: ASTM B 455, Alloy C38500 and ASTM B 135, Alloy C8000.

2.1.5 Stainless Steel: ASTM A 554, Grade MT304; ASTM A 312, Grade TP304; ASTM A 167, Type 304.

2.2 Wall Louvers: Weather-resistant type, with bird screens and made to withstand a wind load of not less than 30 lb/sf. Wall louvers shall bear the AMCA certified rating program seal for air performance and water penetration in accordance with AMCA-500 and AMCA-511. The rating shall show a water penetration of 0.20 or less at 800 fpm.

2.2.1 Extruded Aluminum Louvers: Fabricated of extruded 6063-T6 or 6063-T52 aluminum with a wall thickness of not less than 0.080 inch thick.

2.2.2 Formed Metal Louvers: Formed of zinc-coated steel sheet not thinner than 16 U.S. gauge, or aluminum sheet not less than 0.08 inch thick.

2.2.3 Mullions: Same material and finish as louvers.

2.2.4 Screens and Frames: Minimum 1/4-inch square mesh and minimum 16-gauge aluminum bird screen. Mount screens in removable, rewirable frames of same material and finish as the louvers.

2.3 Door Louvers: Inverted "Y" or "V" sightproof type not less than 1-3/8 inch thick with matching metal trim. Louvers for exterior doors shall be weather-resistant type.

2.3.1 Extruded Aluminum Door Louvers: Minimum 0.050 inch thick 6063-T6 or 6063-T52 aluminum alloy. Frame and trim shall be clamp-in "L" type.

2.3.2 Formed Metal Door Louvers: Minimum 20 U.S. gauge steel sheet or minimum 0.050 inch thick sheet aluminum. Trim shall be beveled "Z" molding both sides.

2.3.3 Screens and Frames: Screen shall be aluminum, RR-W-365, Type VII. Mount screens in removable, rewirable frames of same material and finish as the louvers.

2.4 Fasteners: Stainless steel screws and fasteners as required.

2.5 Finishes:

2.5.1 Aluminum: Factory-applied anodic coating or organic coating.

2.5.1.1 Anodic Coating: AA-M10-C22-A31, Architectural Class II, clear finish or AA-M10-C22-A32, Architectural Class II, integral color finish.

2.5.1.2 Organic Coating: AAMA 605.2, 0.8 mil minimum dry film thickness, baked enamel finish.

2.5.2 Steel: Factory-applied coating, rust-inhibitive primer and baked enamel finish coat, 1 mil minimum total dry film thickness.

2.6 Motorized Louvers: Electric motor shall be completely encased in the louver sill. Motor shall be U.L. approved, 120 volt, 60 hertz with a transformer.

3.0 EXECUTION:

3.1 Copper or Copper-Bearing Alloys: Paint copper or copper-bearing alloys in contact with dissimilar metal with heavy-bodied bituminous paint or separate with inert membrane.

3.2 Aluminum: Where aluminum contacts metal other than zinc, paint the dissimilar steel with a primer and two coats of aluminum paint.

3.3 Metal: Paint metal in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.4 Wood: Paint wood or other absorptive materials that may become repeatedly wet and in contact with metal with two coats of aluminum paint or a coat of heavy-bodied bituminous paint.

SECTION 06145

TIMBER BRIDGE COMPONENTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of timber bridge components. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Timber for Bridges shall comply with the specifications for timber bridges contained in the state's standard specifications.

2.2 Preservative Treatment shall comply with the specifications for preservative treatment contained in the state's standard specifications. All timber shall be treated unless specified otherwise.

2.3 Hardware and Castings:

2.3.1 Castings: Cast steel shall comply with ASTM A 27, Grade 70-36, or gray iron castings shall comply with AASHTO M105 Class No. 30, unless otherwise specified.

2.3.2 Hardware:

2.3.2.1 Machine Bolts, Drift-Bolts, and Dowels may be either wrought iron or rolled steel. Machine bolts shall have the square heads and nuts unless otherwise specified.

2.3.2.2 Cast Washers shall be made of malleable or gray iron. The outside diameter shall not be less than 3 1/2 times the bolt diameter and its thickness equal to the bolt diameter. Plate washers shall be made of wrought iron or rolled steel. The outside diameter shall not be less than 3 1/2 times the bolt diameter, and they shall not be less than 1/4 inch thick.

2.3.2.3 Nails and Spikes shall comply with Fed. Spec. FF-N-105.

2.3.2.4 Finish: Unless otherwise specified, all hardware for treated timber bridges shall be galvanized or cadmium-plated. Galvanizing shall comply with ASTM A 123 or A 153. Cadmium plating of steel shall comply with ASTM B 766.

2.4 Timber Connectors shall be ring type or plate type and shall be galvanized in compliance with ASTM A 123 or A 153.

2.4.1 Split Ring: SAE 1010 hot-rolled carbon steel of standard manufacture.

2.4.2 Tooth Ring: Stamped cold form 16-gauge steel sheet complying with SAE 1010 hot-rolled carbon steel of standard manufacture.

2.4.3 Shear-Plate Timber Connectors:

2.4.3.1 Pressed Steel Type shall be SAE 1010 hot-rolled carbon steel of standard manufacture.

2.4.3.2 Malleable Iron Type shall be ASTM A 47. Grade No. 36018 of standard manufacture.

2.5 Structural Glue-Laminated Timber shall comply with ANSI/AITC A190.1. Lumber for laminating shall be of such stress grade as to provide glue-laminated members with allowable stress values of 2,000 psi in bending, 1,600 psi in tension, 1,500 psi in compression parallel to grain, and 385 psi in compression perpendicular to grain for dry condition of service.

2.5.1 Adhesives shall meet requirements for wet condition of service.

2.5.2 Surfaces of Members shall be sealed with a penetration sealer or sealed with a sealer coat.

2.6 Ties: Comply with Section 3.1.1 of AREA-01 Manual. Ties shall be treated with creosote, creosote-petroleum solution, or pentachlorophenol in compliance with Section 3.9 of AREA-01 .

2.7 Asphalt Cement shall comply with AASHTO M20, penetration grade 85-100.

2.8 Surface Coat Aggregate shall be ASTM D 692, except the gradation shall be as follows:

Sieve Size	Percent Passing (Wt.)
1/2 in.	100
3/8 in.	94-100
No. 4	15-45
No. 16	0-4

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Traffic Control: When traffic is maintained on bridge under repair or is directed over a temporary run-around, furnish, erect, and maintain all barricades, flags, torches, lights, guardrails, temporary pavement markings, and traffic control signs required for the protection of the public and for the direction of traffic. Number, type, color, size and placement of all traffic control color, size, and placement of all traffic control devices and the use of a flagman shall comply with USDOT FHA MUTCD "Traffic Controls for Highway Construction and Maintenance Operations." All traffic control devices in advance of the construction limits shall also be the responsibility of the Contractor.

3.1.2 Treated Timber: Give all cuts, abrasions, and holes made after treatment 2 applications of 60 percent creosote oil and 40 percent roofing pitch or brush coat with 2 applications of hot creosote oil and covered with hot roofing pitch. Any unfilled holes, after being treated with preservative oil, shall be plugged with treated plugs.

3.2 Erection:

3.2.1 Holes:

3.2.1.1 Drift Bolts and Dowels: Bore holes for round drift bolts and dowels with a bit 1/16 inch less in diameter than the bolt or dowel to be used. The diameter of holes for square drift bolts or dowels shall be equal to the least dimension of the bolt or dowel.

3.2.1.2 Machine Bolts and Rods: Bore holes for field fabrication with a bit the same diameter as the bolt. Holes for fabrication prior to treatment shall be 1/16 inch larger than the bolt diameter.

3.2.1.3 Lag Screws: Bore hole with a bit not larger than the body of the screw at the base of the thread.

3.2.2 Nuts and Washers: Use a washer of the size and type specified under all bolt heads and nuts except carriage bolts. The nuts of all bolts shall be locked by scoring threads after they have been finally tightened.

3.2.3 Countersinking: Paint all recesses in treated timber formed for countersinking with hot creosote oil. Fill recesses likely to collect injurious materials with hot pitch.

3.2.4 Framing: All lumber and timber shall be accurately cut and framed to a close fit in such manner that the joints will have even bearing over the entire contact surfaces. Place stringers in position so that knots near edges will be in the top portions of the stringer. Screw type fastenings shall be screwed into place for the

entire length of the fastener. Install the split ring and the shear plate in grooves cut by the Contractor. Force the toothed ring into the contact surfaces of the timbers jointed by means of pressure equipment.

3.2.5 Nailing: Nails and spikes shall be driven with just sufficient force to set the heads flush with the surface of the wood.

3.3 Maintenance and Repair Methods:

3.3.1 Timber Deck:

3.3.1.1 Remove Existing Plank Floor Deck and Fasteners and replace with new planks and fasteners. Lay the floor planks at 45 degrees to centerline of roadway. When more than one length of plank is required, stagger joints between abutting ends at least 3 feet in any two-adjacent lines of plank.

3.3.1.2 Standard Wrought Washers shall be used under the heads of all lag screws and under the heads or nuts of all machine bolts. Where machine bolts are used for fastening the floor plank all nuts used shall be locknuts. Countersink heads of all lag screws and bolts in the surface of the floor. Fill recesses formed for countersinking with hot pitch.

3.3.1.3 Bituminous Surface Coat: Clean the floor of foreign materials. Apply asphalt cement at a temperature of 275 F to 350 F and at a rate of approximately 1/4 gallon per square yard of surface. The deck shall be dry at the time of bitumen application. Cover the entire surface with a thin coating of aggregate in a sufficient quantity to take up any free bitumen.

3.3.2 Hardware: Remove all corrosion by sandblasting or wire brushing. Replace all loose bolts and screws, adding washers as required. Replace deteriorated hardware.

3.3.3 Metal Tread Plates: Remove and replace treads as directed. Before installing treads, remove high spots and rough spots in the plank floor so that the treads will be in contact with the floor for their full length and width. Treads shall be laid in a heavy mop coat of asphalt filler. Treads shall be laid with a space of 1/4 inch between adjacent ends and shall be fastened by means of 3/8-inch galvanized bolts. Where bolts cannot be used, use 3/8-inch by 3-inch galvanized lag screws.

3.3.4 Timber Railroad Bridge Deck: Remove defective ties and guardrail, including fasteners, and replace with similar ties, guardrail, and fasteners as directed.

3.3.5 Repair of Structural Timber Members: Repair, including removal and replacement, shall be as directed.

SECTION 06220

MILLWORK

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of millwork. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 General: All millwork products shall be marked with manufacturer's identification and grade, in compliance with Architectural Woodwork Institute (AWI) quality grade. Products shall conform to applicable requirements of AWI Architectural Woodwork Quality Standards, Guide Specifications, and Quality Certification Program and Woodwork Institute of California (WIC) Manual of Millwork.

2.2 Millwork: Millwork shall include the following representative examples of architectural woodwork:

- a. Exterior cornices, fasciae, and soffits.
- b. Trim for exterior and interior openings.
- c. Frames for exterior and interior doors and other openings.
- d. Casework.
- e. Wood shelving.

2.3 Wood Moisture Content: Lumber for millwork shall be kiln-dried to an average moisture content range of 9 percent to 13 percent for exterior work and 6 percent to 11 percent for interior work.

2.4 Grade of Work: Interior millwork surfaces that are to receive transparent finishes shall be premium grade of the species selected. Millwork surfaces that are to be painted shall be custom grade of the species selected.

2.5 Fire-Retardant Marking: Each unit of fire-retardant treated wood and plywood shall be marked with the producer's label and UL label showing grade and rating.

2.6 Preservative Treatment: Exterior millwork and designated interior millwork shall be preservative-treated in accordance with NWWDA I.S.4. Use a preservative that will

not interfere with the designated finish. Apply brush coat on surfaces cut after treatment.

3.0 EXECUTION: Millwork shall be installed plumb, level, true, and straight with no distortions. Millwork that abuts adjoining work shall be scribed and cut to fit. Millwork shall be installed with a minimum number of joints, coped at returns, mitered at corners, and shall comply with quality standards for joinery.

SECTION 07605

SHEET METAL

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of sheet metal. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Materials and fabrication shall comply with applicable recommendations and details of SMACNA Architectural Sheet Metal Manual.

2.1 Shop- and Job-Fabricated Sheet Metal Items may include the following:

- a. Downspouts with clips, anchors, straps, and leaders.
- b. Edge strip.
- c. Flashings, including base, cap, eave, stepped, valley, apron, collar, through-wall and coping flashings.
- d. Gravel stops and fasciae, extruded or formed.
- e. Gutters, with continuous cleats, hangers, and cover plates.
- f. Louvers.
- g. Pitch pans.
- h. Reglets.
- i. Scuppers.
- j. Splash pans.
- k. Roofing, including batten seam, flat seam, standing seam, and bermuda seam types.

2.2 Aluminum:

2.2.1 Mill Finished Sheets: ASTM B 209, Alloy 3003, temper H14.

2.2.2 Colored Sheets: ASTM B 209, alloy Alclad 3003, temper H14.

2.3 Brass: ASTM B 36, copper alloy No. 260, rolled half-hard temper.

2.4 Copper: ASTM B 370, light cold-rolled temper, mill finish.

2.5 Lead Coated Copper: Cold-rolled sheet copper complying with ASTM B 370, coated with not less than 0.06 pounds per square foot of lead per side. Lead coating shall comply with ASTM B 101, Type I.

2.6 Stainless Steel: ASTM A 167, corrosion-resistant steel, annealed, AISI Type 301, No. 1 finish.

2.7 Copper Clad Stainless Steel: ASTM B 506, stainless steel sheet metal, coated with metallurgically-bonded cladding of copper on each face amounting to 10 percent of thickness (80 percent stainless steel, 20 percent copper). Core shall comply with ASTM A 176, AISI Type 430. Copper cladding shall have mill finish.

2.8 Lead-Coated Copper Clad Stainless Steel: ASTM B 506, copper clad stainless steel sheet metal, coated on one side with 0.06 pounds per square foot of lead complying with ASTM B 101, Type I.

2.9 Terne-Coated Stainless Steel: Stainless steel core complying with ASTM A 167, AISI Type 304, with terne coating of 20 percent tin and 80 percent lead on both faces.

2.10 Terne-Coated Steel: Fed. Spec QQ-T-201, Type 1 commercial quality steel sheet core with 1.45 ounces coating of 20 percent tin and 80 percent lead on both faces.

2.11 Galvanized Steel: ASTM A 526, commercial quality carbon steel sheets with minimum 0.20 percent copper content, hot-dipped galvanized to comply with ASTM A 525, G 90 coating designation. Galvanized steel designated to be finished shall be mill phosphatized and coated with manufacturer's standard baked-on finish.

2.12 Zinc-Alloy: ASTM B 69, containing not less than 0.6 percent copper and 0.14 percent titanium, standard temper.

2.13 Lead Sheet: Fed. Spec. QQ-L-201, Grade B, formed from common desilverized pig lead, complying with ASTM B 29.

2.14 Fasteners:

2.14.1 General Use Fasteners: Same material as sheet metal to which attached, or as recommended by sheet metal manufacturer.

2.14.2 Fasteners for Copper Items: Bronze, brass, or copper types.

2.14.3 Fasteners for Aluminum:

2.14.3.1 Rivets: ASTM B 316, alloy 1100, temper H14, minimum shank diameter of 0.187 inch, length as required to form a head.

2.14.3.2 Screws and Bolts: ASTM B 211, alloy 6061, temper as appropriate for particular use.

2.14.3.3 Washers: Alloy 1100, temper H18 or same aluminum alloy as aluminum sheet or fasteners being used.

2.14.3.4 Noncorrosive Fasteners: Stainless steel, AISI Type 304.

2.14.3.5 Cleats: Formed of same material and thickness as sheet metal being installed, minimum 2 inches wide and long enough to be fully incorporated into work.

2.15 Solder: ASTM B 32, of type best suited for intended purpose.

2.16 Welding Electrodes:

2.16.1 Aluminum: Welding electrodes and filler alloy of type best suited for alloy of aluminum being welded. Paste flux shall be used in welding aluminum.

2.16.2 Stainless Steel: Type recommended by stainless steel producer for type of metal sheet furnished.

2.17 Burning Rods for Lead shall be same composition as lead sheet.

2.18 Miscellaneous Materials:

2.18.1 Felt: ASTM D 226, No. 15 asphalt-saturated organic felt, unperforated.

2.18.2 Sheathing Paper: Rosin-sized paper weighing not less than 6 pounds per square.

2.18.3 Bituminous Plastic Cement: Fed. Spec. SS-C-153, Type I for use with asphaltic roofing materials and Type II for use with coal-tar roofing materials.

2.18.4 Bituminous Coating: Fed. Spec. TT-C-494, Type II, cold-applied solvent type bituminous mastic coating for application in minimum dry film thickness of 12 mils per coat.

2.18.5 Primer Paint: Fed. Spec. TT-P-645, alkyd type zinc chromate.

2.18.6 Zinc Dust Paint: Mil. Spec. MIL-P-21035 galvanized sheet metal touchup paint.

2.18.7 Sealants: Non-drying mastic type as recommended for particular joint being sealed and anticipated movement within joint. One-part sealant shall be Fed. Spec. TT-S-00230, Type II, Class A. Two-component sealant shall be Fed. Spec. TT-S-00227, Type II, Class A.

2.18.8 Wood Nailers and Edge Blocking: Non-stress graded wood members, moisture-resistant, treated with waterborne preservative in compliance with AWPB LP-2 standard. Nominal dimensions of nailers shall be 1 inch by 3 inches, unless otherwise required.

2.18.9 Nonmetallic Through-Wall Flashing: Nonreinforced, homogeneous, waterproof, impermeable elastomeric sheeting having not less than 1,000 psi tensile strength nor more than 7 percent tension set at 50 percent elongation when tested in accordance with ASTM D 412. Sheetting shall resist exposure without visible deterioration when tested not less than 400 hours in accordance with ASTM D 822. Sheetting shall not crack or flake when exposed to low temperatures.

2.18.10 Miscellaneous Sheet Metal Roofing Materials:

2.18.10.1 Wood Batten Strips shall be non-stress graded wood members of nominal 2 inches by 2 inches, pressure-treated with waterborne preservatives in compliance with AWPB LP-2, or other material that is compatible with sheet metal.

2.18.10.2 Polyethylene Underlayment shall be a minimum of 6 mil chlorinated polyethylene film.

3.0 EXECUTION: Installation of sheet metal materials shall comply with applicable recommendations and details of SMACNA Architectural Sheet Metal Manual.

3.1 Nailing Strips and Edge Blocking: When deck surface is non-nailable, nailing strips and edge blocking shall be installed over surface of deck for anchorage of sheet metal materials.

3.2 Substrate Conditions: Surfaces to receive sheet metal materials shall be even, smooth, sound, thoroughly clean and dry, and free from defects that might affect application.

3.3 Fasteners shall be concealed wherever possible in exposed work.

3.4 Dissimilar Surfaces:

3.4.1 Separate Dissimilar Metals by painting each metal surface in areas of contact with bituminous coating, or provide a layer of waterproof sheathing paper or asphalt-coated felt between contact surface.

3.4.2 Separate Metal Items from treated wood and cementitious materials with bituminous coating, applied either to substrate or metal.

3.4.3 Aluminum shall not be used when it will be in contact with copper or where it will contact water that flows over copper surfaces. Protect aluminum surface in contact with wet or pressure treated wood, cementitious materials, or ferrous metals from galvanic or corrosive action by applying one coat of zinc chromate primer and one coat of aluminum paint, or by placing layer of nonabsorptive tape or gasket between adjoining surfaces.

3.4.4 Where Asphalt-Saturated Felt has been applied under sheet metal that will be soldered or welded, cover felt with one layer of sheathing paper before installing sheet metal.

3.5 Sheet Metal Roofing:

3.5.1 Removing Existing Sheet Metal Roofing: Remove sheet metal roofing in full sections or cut damaged sections where possible to make watertight joints between existing roofing and new materials to be installed.

3.5.2 Preparing Existing Surfaces: Bent or raised portions of existing roofing shall be nailed down and repaired to extent necessary to provide smooth surface for sheet metal roofing.

3.5.3 Application of Underlayment:

3.5.3.1 Felt Underlayment: Apply one layer of asphalt-saturated roofing felt over deck surface and cover with one layer of sheathing paper. Underlayment plies shall be installed with mechanical fasteners spaced 6 inches in center at laps or adhesives as appropriate for substrate conditions.

3.4.3.2 Polyethylene Film Underlayment: Install one layer of polyethylene film underlayment over deck surface with adhesive. Cover polyethylene film with one layer of sheathing paper applied with adhesive. Mechanical fasteners shall be installed only where deck surface presents nailable conditions.

3.5.4 Coating Backside of Metal Sheets:

3.5.4.1 Bituminous Coating: Coat back side of metal roofing with bituminous coating wherever metal will be in contact with wood, ferrous metal, or cementitious construction.

3.5.4.2 Painting: Paint back side of metal roofing with zinc chromate type primer, minimum 2-mil dry film thickness.

3.5.5 Expansion Seams: Provide loose lock or slip seams, as designated. Seams shall allow 1/2-inch for expansion and shall be sealed with sealant.

3.5.6 Penetrations Through Roofing shall be flashed with sheet metal material to match roofing material.

SECTION 07705

ROOF ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of heat and smoke vents, roof hatches, gravity ventilators, prefabricated curbs and equipment supports, and curb-set expansion joints. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Comply with SMACNA Architectural Sheet Metal Manual details for fabrication of units, including flanges and capflashing to coordinate with type of roofing indicated.

2.1 Zinc-Coated Steel: Commercial quality with 0.20 percent copper, ASTM A 525, G90 hot-dip galvanized, mill phosphatized.

2.2 Stainless Steel: AISI Type 302/304, ASTM A 167, 2D annealed finish except as otherwise indicated, tempered as required for forming and performance.

2.3 Aluminum Sheet: ASTM B 209, Alloy 3003, tempered as required for forming and performance; AA-C22A41 clear anodized finish, except mill finish prepared for painting where designated for field painting.

2.4 Extruded Aluminum: Alloy 6063-T52; 0.078 inch minimum thicknesses for primary framing and curb member legs, 0.062 inch for secondary legs; AA-C22A41 clear anodized finish on exposed members, except as otherwise designated.

2.5 Insulation: Rigid or semi-rigid board of glass fiber.

2.6 Wood Nailers: Softwood lumber, pressure-treated with water-borne preservatives for above ground use, complying with AWPB LP-2; not less than 1-1/2 inches thick.

2.7 Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal. Match finish of exposed fasteners with finish of material being fastened. Where removal of exterior exposed fasteners affords access to building, provide non-removable fastener heads.

2.8 Gaskets: Tubular or fingered design of neoprene or polyvinyl chloride, or block design of sponge neoprene.

2.9 Bituminous Coating: Fed. Spec. TT-C-494 or SSPC-Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coating.

2.10 Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

2.11 Elastomeric Sealant: Type that is compatible with joint surfaces; Fed. Spec. TT-S-00227, TT-S-00230, or TT-S-001543.

2.12 Roofing Cement: ASTM D 2822, asphaltic.

2.13 Prefabricated Heat/Smoke Vents: Provide units that have been tested, listed, and labeled by UL (Class A) or FM, as designated. Except as otherwise designated, fabricate for 40 lbs/sq ft external loading and 20 lbs/sq ft internal loading pressure. Fabricate framing of the following materials as designated, with manufacturer's standard welded or sealed mechanical corner joints, including cap flashing:

- a. Formed or extruded aluminum.
- b. Zinc-coated steel.
- c. Formed or extruded aluminum or zinc-coated steel.

2.13.1 Hatch-Lid Type Units: Fabricate with single or double aluminum covers with 1 inch integral insulation and gaskets. Equip units with automatic self-lifting mechanisms and fusible links or other heat-sensitive or smoke-sensitive release devices as indicated, and with complete hardware including hold-open devices and independent manual release devices for inside and outside operation of covers.

2.13.2 Fusible-Dome Type Units: Provide manufacturer's standard shrinkback/drop-out polyvinyl chloride sheet dome unit for 210 F activation; with light transmittance of 40 percent, proven 10-year weather resistance, exterior acrylic protective coating, and maximum flame spread rating of 25 (UL 723). Equip each unit with external safety grid capable of supporting 200 pound loading. Provide glazing system for easy replacement of activated domes and for drainage of condensation to exterior.

2.14 Prefabricated Roof Hatches: Fabricate units as single-leaf type unless otherwise directed, for 40 lbs/sq ft external loading and 20 lbs/sq ft internal

loading pressure. Frame with 9-inch high integral-curb double-wall construction with 1-1/2 inch insulation, cant strips, and cap flashing, with welded or sealed mechanical corner joints. Provide double-wall cover construction with 1 inch insulation core. Equip units with complete hardware set including hold-open devices, interior padlock hasps, and both interior and exterior latch handles. Provide gasketing. Fabricate units of following materials as designated:

- a. Aluminum sheets and extrusions.
- b. Zinc-coated steel sheets.
- c. Zinc-coated steel sheet curbs and aluminum covers.
- d. Aluminum or zinc-coated steel, or in combination.

2.15 Louvered Penthouse Gravity Ventilators: Provide units fabricated with weatherproof aluminum extrusion louvered walls with mitered or boxed corner construction; with aluminum sheet cover and 1 inch insulation adhesively applied on underside; and with extruded aluminum base and cap flashing for mounting on curbs which are not integral with units. Equip units with manual dampers designed for operation from floor directly below ventilator unit. Equip unit with bird or insect screens as directed, located internally to discourage nesting.

2.16 Prefabricated Vertical-Type Gravity Ventilators: Provide units fabricated from the following materials and including the following features, as designated:

- a. Zinc-coated steel sheet, prime painted.
- b. Aluminum sheet, prime painted.
- c. Aluminum sheet, mill finish.
- d. Equip with bird screens.
- e. Equip units with dampers, with manual operation device extended to 6 ft 6 in above floor.

2.17 Prefabricated Curbs/Equipment Supports: Comply with loading and strength requirements designated where units support other work. Coordinate dimensions with rough-in sheets or shop drawings of equipment to be supported. Fabricate of structural quality sheet steel (ASTM A 570) that has been prepared for painting, factory-primed, and painted with 2-mil thickness of baked-on synthetic enamel, after fabrication. Fabricate with welded or sealed mechanical corner joints and with cant strips and base profile coordinated with roof insulation thickness. Except as otherwise designated or required for strength, fabricate units of minimum 14-gauge metal and to minimum height of 12 inches.

2.18 Curb-Set Expansion Joints: Provide extruded aluminum expansion joint units designed for installation on raised curbs. Equip with curb cap, cap flashing, and waterproof bellows of 30- or 60-mil elastic flashing sheet of neoprene, EPDM, butyl rubber, or chlorinated polyethylene. Provide mineral-fiber insulation, concealed under curb cap between curbs, to form a waterproof, airtight, insulated, expansion joint system. Provide units in styles required for roof-to-roof, roof-to-wall, and wall-to-wall applications as required; complete with prefabricated corner and intersection units as required; equipped with special field-splice provisions to ensure permanent continuous waterproof installation of expansion joint system.

3.0 EXECUTION: Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures. Except as otherwise designated, install roof accessory items in accordance with construction details of NRCA Roofing and Waterproofing Manual.

3.1 Isolation: Where metal surfaces of units are to be installed in contact with noncompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces or provide other permanent separation.

3.2 Flange Seals: Except as otherwise directed, set flanges of accessory units in a thick bed of roofing cement to form a seal.

3.3 Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing. Seal with thick bead of mastic sealant, except where overlap is required to be left open for ventilation.

SECTION 08412

ENTRANCES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of entrance assemblies. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Entrance shall be a complete unit produced by one manufacturer recognized as producer of glass entrance panels with glass doors, weatherstripping, and hardware on operating door panel.

2.2 Extrusions for Door Construction shall be AA 6063-T5 alloy with clear anodized 204-R1-A1 finish and 22,000 psi ultimate tensile strength. Main member extrusions shall be not less than 0.125 inch in wall thickness.

2.3 Aluminum Sheet Material for Door Construction shall be plain flat sheet for exposed faces of flush and panel doors of not less than 0.062-inch thickness.

2.4 Fasteners shall be aluminum, stainless steel, or other non-corrosive metal fasteners compatible with the framing material. Exposed fasteners shall be Phillips flat-head screws matching fastened material.

2.5 Steel Reinforcement and Brackets shall be manufacturer's special formed units with 2.0 ounce hot-dip zinc coating complying with ASTM A 153, applied after fabrication.

2.6 Frames shall be extruded tube sections manufactured from AA 6063-T5 alloy with clear anodized 204-R1-A1 finish, not less than 0.125 inch in thickness. Frames to receive fixed glass shall have removable glass stops and beads.

2.7 Door shall be fabricated from extruded aluminum seamless tubular shapes. Top and bottom rails shall be welded to stiles with corner reinforcement. Joints shall be milled to hairline watertight fit. Welding shall be done on concealed surfaces and shall not blemish exposed surfaces. Door shall have extruded aluminum snap-in type glass stop with integral vinyl glazing insert.

2.8 Weatherstripping shall be manufacturer's standard compression type neoprene gasket. Weatherstripping shall be easily replaced without special tools. Weatherstripping at meeting rails of pairs of doors shall be adjustable. Weatherstripping shall be applied to stiles, heads, and bottoms of doors.

3.0 EXECUTION: Entrance assemblies shall be installed or repaired by the manufacturer or an authorized representative.

SECTION 08470

REVOLVING DOORS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of revolving doors. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: Door units shall be fabricated from extruded aluminum tube sections of AA 6063-T5 alloy, clear 204-RI-A1 anodized finish. Door framing members shall be 0.375-inch minimum wall thickness. Enclosure framing members shall be 0.125-inch minimum wall thickness. Snap-in type glass stops shall be minimum 0.050-inch thickness.

2.1 Fabricate Assembly with welded and mechanical construction; concealed, reinforced joints; and corners with flush hairline joints.

2.2 Provide Weatherstripping at stiles, head, and bottom of door wings.

2.3 Door Wings shall be arranged to collapse and fold to the emergency exit position when a pressure of not less than 100 pounds nor more than 140 pounds is applied to the outer door stile at the push bar height of 3 feet, 10 inches. No visible external braces or collapsing plates will be permitted.

2.4 Door Unit shall be provided with a mechanical floor-mounted speed control sealed unit to control the revolving door up to a maximum of 12 revolutions per minute.

2.5 All Work Performed shall meet the requirements of local codes and regulations.

3.0 EXECUTION: Doors shall be installed or repaired by the manufacturer or an authorized representative.

SECTION 08510
METAL WINDOWS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of steel, stainless steel, and bronze windows. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Fixed Windows, Hopper Vent: Window units shall comply with SWI-01, The Specifier's Guide to Steel Windows, for standard intermediate windows with bottom hinged, swing-in type ventilator hopper sash. Bottom rails of ventilators shall have an outside drip. Hardware shall be manufacturer's standard type for each window. Ventilator shall have one pair of hinges or pivots, two stay arms, and a cam-type lever handle latch. Sash and hardware shall be designed to permit easy removal of sash from inside the building.

2.2 Fixed Windows: Fixed windows shall comply with the requirements of SWI-01, for standard intermediate windows.

2.3 Projected Windows: Projected windows shall comply with the requirements of SWI-01, for commercial projected windows, with project-out type ventilators, top-hinged.

2.4 Continuous Top-Hinged Windows: Continuous windows shall comply with SWI-01 continuous type with manual operation.

2.5 Casement Windows: Casement windows shall comply with SWI 01, for standard intermediate windows. Hardware for operative sash shall provide for cleaning of both sides of the sash from the inside. Operating devices shall include underscreen type rotary operators of the worm-gear type with adjustable operating arms. A continuous drip molding shall be provided above operable sash. Abutting units or combination units shall have manufacturer's stock standard mullion.

2.6 Awning Windows: Awning windows shall comply with the SWI-01, for architectural awning intermediate type frame and ventilator members. Ventilators in same frame shall operate in unison. Hardware for operative sash

shall provide for cleaning of both sides of the sash from the inside. Operating devices shall include underscreen type rotary operators of the worm-gear type, with adjustable operating arms. The operator shall securely close the ventilators without using additional locking devices. Ventilators shall be designed to close and be weathertight to adjoining ventilators or frame. Window frame shall be designed with rebate to receive screens.

2.7 Reversible Windows: Reversible horizontal pivoted windows shall comply with SWI-01, for commercial type.

2.8 Hinged Emergency Windows: Hinged emergency type windows shall comply with SWI Recommended Specifications for Steel Windows, for commercial type, with manual operation side- or hinged for swing-out emergency exit, pivots or hinges for 90 degrees swing-out. Window shall be equipped with push-release type lever operator on window latch, complying with the requirements of local regulations for "panic hardware".

2.9 Double/Single Hung Windows: Double and single hung windows shall comply with SWI Recommended Specifications for steel windows for commercial type. Two spiral type removable sash balances shall be provided for each sash. Balances shall be adjustable without removing sash from frame and without use of special tools. Each window 40 inches wide or less shall be provided with one sweep sash lock. Each window over 40 inches wide shall be provided with two sweep sash locks. Lower sash shall have one continuous integral lift at the bottom of the sash. The upper sash shall have a continuous integral pull down member on the meeting rail.

2.10 Operating Hardware: Hardware shall be provided for all operable, ventilating sash units of manufacturer's standard for the function of each individual window type specified. All operable sash shall have a latch or locking device. Hardware shall be securely attached to the window with noncorrosive bolts or machine screws.

2.11 Miscellaneous Hardware shall comply with ANSI A156.16. All metal hardware for stainless steel windows shall be non-corrodible. All hardware items for bronze windows shall match window finish.

2.12 Screens: Insect screens shall be full size of the operable unit. Screens shall comply with SWI-01 and shall have removable splines of steel or vinyl. Screening shall be 18 x 14 mesh, complying with Fed. Spec. RR-W-365 for wire fabric or Fed. Spec. L-S-125, Type II.

2.13 Weatherstripping shall be the standard type for use with the window unit supplied and shall be easily replaceable.

2.14 Materials for Steel Windows shall comply with the requirements of the following:

- a. Sheet steel: Fed. Spec. QQ-S-700.
- b. Zinc-coated steel: ASTM A 90 or A 123.
- c. Zinc-coating on hardware: ASTM A 153.
- d. Corrosion-resistant steel: Fed. Spec. QQ-S-766.

2.15 Materials for Stainless Steel Windows shall comply with the requirements of ASTM A 167.

2.16 Materials for Bronze Frames shall comply with the requirements of ASTM B 96, ASTM B 100, ASTM B 150 or ASTM B 169.

3.0 EXECUTION: Window units shall be installed complete with all necessary anchors, hardware, and other accessories and shall be plumb, square, and level in alignment, and braced and stayed properly to prevent distortion and misalignment.

SECTION 09405

TERRAZZO

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for terrazzo floors and stairs. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Terrazzo Materials and Installation shall comply with specifications and recommendations of The National Terrazzo and Mosaic Association, Inc. (NTMA)

2.2 Underbed Reinforcement shall be 2-inch by 2-inch by 16-gauge welded wire mesh, ASTM A 185, galvanized.

2.3 Isolation Membrane shall be polyethylene film, complying with ASTM D 2103, not less than 4.0 mils thick.

2.4 Cast-In-Place Terrazzo Materials:

2.4.1 Portland Cement shall conform to ASTM C 150, Type I, except as modified to comply with NTMA requirements for compressive strength. Provide non-staining white cement for terrazzo matrix. Provide standard gray cement for underbed.

2.4.2 Sand shall conform to ASTM C 33.

2.4.3 Aggregate shall be natural, sound, crushed marble chips without excessive flats or flakes, complying with NTMA requirements.

2.4.4 Monolithic Terrazzo shall be 1/2-inch total thickness over concrete slab.

2.4.5 Bonded Terrazzo shall be 1/2-inch terrazzo over a 1-1/4 inch minimum underbed.

2.5 Thinset Epoxy and Polyester Materials:

2.5.1 **Polyacrylate-Modified Cementitious Terrazzo Matrix:** Polyacrylate and color pigment complying with NTMA "Guide Specification for Polyacrylate Modified Terrazzo."

2.5.2 **Polyester Resin Terrazzo Matrix:** Two-component polyester resin and hardener, mineral filler, and color pigment, complying with NTMA "Guide Specification for Polyester Terrazzo."

2.5.4 **Epoxy Resin Terrazzo Matrix:** Thermosetting, amine-cured epoxy resin and hardener, mineral filler, and color pigment, complying with NTMA "Guide Specification for Epoxy Terrazzo."

2.5.5 **Conductive Terrazzo with Resinous Matrix:** Electricity conductance shall conform to resistance levels established by the UL 779.

2.6 **Precast Terrazzo:** Precast terrazzo base and stair units shall comply with NTMA.

2.7 **Sealer:** Colorless, slip-and stain-resistant, non-yellowing penetrating sealer that will not disturb color or physical properties of terrazzo surface; pH factor between 7 and 10.

2.8 **Plywood:** DOC PS 1, "C-C EXT-APA" or "Underlayment C-C Plugged EXT-APA", 3/4 inch thick unless otherwise noted.

2.9 **Nails:** Fed. Spec. FF-N-105 annular, screw or ring type.

2.10 **Elastomeric Sheet:** 40 mil thick extruded, homogeneous, waterproof, impervious, nonplasticized chlorinated polyethylene sheet, complying with ASTM D 2103.

2.11 **Curing Materials:**

2.11.1 **Polyethylene Film:** Non-staining type.

2.11.2 **Paper:** Non-staining, heavy building paper.

2.11.3 **Curing Compound:** Liquid membrane-forming compound, complying with ASTM C 309, Type I.

2.12 **Cleaner:** Neutral liquid chemical cleaner, biodegradable, free from crystalline salts, phosphate or water soluble alkaline salts, formulated for terrazzo, pH factor between 7 and 10.

3.0 EXECUTION:

3.1 Preparation: Clean and prepare substrate to comply with NTMA specifications for type of terrazzo application indicated. Clean area to receive terrazzo of loose chips and all foreign matter. Grind concrete substrate as required to provide surfaces within tolerances required by NTMA.

3.2 Installation:

3.2.1 Comply with NTMA and manufacturer's recommendations for proportioning mixes, for installation of strips, and for placing, curing, grinding, grouting, and finishing.

3.2.2 Provide terrazzo bases, thresholds, stair treads, and landings as required.

3.2.3 Install Divider and Accessory Strips in an adhesive setting bed, without voids below strips. Provide mechanical anchorage for adequate attachment of strips to substrate.

3.2.4 Provide Control Joints by installing angle type divider strips back-to-back with neoprene rubber filler cemented between strips, flush with finish floor.

3.2.5 Provide for Expansion Joints by installing angle type divider strips back-to-back, with removable filler of the width shown (but not less than 1/4 inch wide) between strips.

3.2.6 Install Abrasive Inserts where required.

SECTION 09510

ACOUSTICAL CEILINGS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of acoustical units in suspended ceilings. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Acoustical Units shall conform to ASTM E 1264, Class A, and the following requirements:

2.1.1 Acoustical Panel Units for Exposed Grid System shall be the type and pattern required, NRC grade of 55 minimum when tested on mounting No. 7, trimmed and butt, with a LR coefficient of .75 and a STC range of 40-44. Nominal size shall be 24 inches by 48 inches or 24 inches by 24 inches. Finish shall be factory-applied white finish.

2.1.2 Acoustical Panel Units for Semi-Exposed Grid System shall be the type and pattern required, NRC grade of 55 minimum when tested on mounting No. 7, trimmed and butt, with a coefficient of .75 and a STC range of 40-44. Nominal size shall be 12 inches by 24 inches or 12 inches by 12 inches. Finish shall be factory-applied white finish.

2.1.3 Acoustical Tile Units for Concealed Grid System shall be the type and pattern as required, NRC grade of 55 minimum when tested on mounting No. 7. LR grade shall be 1, and STC range shall be 40-44. Edge detail shall be beveled or square, and joint detail shall be kerfed and rabbeted or as required. Nominal size shall be 12 inches by 12 inches, and finish shall be factory-applied white finish.

2.1.4 Metal Ceiling System: Pans shall be type required, and acoustical insulation pads shall be NRC grade 55 minimum when tested on mounting No. 7. The pattern shall be "c," with a nominal size of 12 inches by 24 inches. Edge detail shall be manufacturer's standard, and joint detail shall be beveled or cross-scored to simulate 12-inch by 12-inch units. Finish shall be factory-applied white baked enamel, two coats on exposed surfaces, one coat on edges and backs. Pads shall be completed enclosed, of material and thickness required for acoustical and fire test ratings, with a LR grade of 2.

2.1.5 **Fire Resistive Ceilings:** Acoustical fire resistive ceiling systems shall be rated for fire endurance when tested in accordance with ASTM E 119. Suspended ceiling shall have been tested with a specimen roof and/or floor assembly representative of the construction, including 09510-mechanical and electrical work within ceiling space openings for light fixtures, air outlets, and access panels.

2.1.6 **Ceiling Sound Transmission Class and Test:** STC range of acoustical units, when required, shall be determined in accordance with Ceiling Sound Transmission Test by Two-Room Method and reported in accordance with the appendix to ASTM E 90 for 11 frequency data or ASTM E 413 for 16 frequency data.

2.2 **Suspension System** shall be of the type required and shall conform to ASTM C 635 for intermediate- or heavy-duty systems. Surfaces exposed to view shall be aluminum or steel with a factory-applied white baked enamel finish, aluminum with a clear anodized finish as required or aluminum with colored factory-applied vinyl paint finish. Wall molding shall have a flange of not less than 15/16 inch and shall be provided with inside and outside corner caps.

2.3 **Hangers** shall be galvanized steel wire. Hangers and attachment shall support a 300-pound vertical load without failure of supporting material or attachment.

2.4 **Access Panels** shall match adjacent acoustical tiles and shall be designed and equipped with suitable framing and fastenings for removal and replacement without damage. Panel shall be not less than 12 inches by 12 inches or more than 12 inches by 24 inches. An identification plate of 0.032-inch thick aluminum, 3/4 inch in diameter, stamped with the letters "AP" and finished the same as the unit shall be attached near on corner on the face of each access panel.

2.5 **Fire Hazard Classification:** All acoustical unit materials shall bear the UL label and marking, indicating fire hazard classification of acoustical unit materials as determined by ASTM E 84. Provide materials with the following fire hazard classifications:

Flame spread not more than 25.
Smoke developed not more than 50.

3.0 EXECUTION:

3.1 Acoustical Work shall be provided complete with all necessary fastenings, clips, and other accessories required for a complete installation.

3.2 Suspension System shall be installed in accordance with ASTM C 636 and as specified herein.

3.3 Wall Molding shall be provided where ceilings abut vertical surfaces.

3.4 Ceiling Tiles: Panels in exposed-grid system shall be held in place with manufacturer's standard hold-down clips.

SECTION 10671

METAL STORAGE SHELVING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of metal storage shelves. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Metal Storage Shelvings: Fed. Spec. AA-S-1048, Carbon Steel, baked enamel finish or ASTM A 167, stainless steel, a minimum no. 3 polished finish or a satin finish.

2.1.1 Shelves: Form of 0.0478-inch thick steel with front and rear faces double flanged and box channeled.

2.1.2 Brackets: Cantilever design, steel not less than 0.1046 inch thick and of hook-in-lift-off design, adjustable without use of tools.

2.1.3 Anchorage: 1/4-inch size bolts with standard nuts and lock washers.

3.0 EXECUTION: Storage shelvings shall be installed in accordance with the designated arrangement, securely anchored in position, and accurately aligned vertically and horizontally.

SECTION 10805

TOILET ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of toilet accessories other than porcelain type tile wall accessories. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Finishes: Finishes on metal shall be provided as follows:

2.1.1 On Stainless Steel: No. 4 general-purpose polished.

2.1.2 On Carbon Steel, Copper Alloy, and Brass: Chromium-plated, bright.

2.2 Miscellaneous Accessory Items:

2.2.1 Mirror, Glass (MG): Glass mirror shall conform to Fed. Spec DD-M-411.

2.2.2 Mirror, Metal (MM): Metal mirror shall be stainless steel or chromium-plated steel, mirror quality, 0.037-inch minimum thickness, edges turned back 1/4 inch and recess fitted with fiberboard backing, mounted with concealed theftproof fastening. Size shall be as required.

2.2.3 Grab Bar (GB): Grab bar shall conform to Fed. Spec. WW-P-541. Grab bar shall be form and length as required. Flange shall have screw mounting holes concealed on the lip of the flange. Installed bars shall be capable of withstanding a 500-pound vertical load without becoming loose from the fastenings and without obvious permanent deformation.

2.2.4 Shelf, Glass (SG): Glass shelf shall conform to Fed. Spec. WW-P-541 and shall be supported between brackets or on brackets. Shelf shall be plate or float glass, width and length as required. Separate supports shall be stainless steel

2.2.5 Shelf, Metal, Heavy-Duty (SMHD): Heavy-duty metal shelf shall be stainless steel supported between brackets or on brackets not more than two feet on center. Thickness of shelf and brackets shall be not less than 0.07

inches. Shelf shall have rounded corners with minimum 1/2-inch lipped front edge, designed to support 60 pounds per linear foot. Width and length shall be as required.

2.2.6 Shelf, Metal, Light-Duty (SMLD): Light-duty metal shelf shall conform to Fed. Spec. WW-P-541. Shelf shall be supported between brackets or on brackets. Width and length shall be as required. Shelf and separate supports shall be stainless steel.

2.2.7 Soap and Grab Bar Combination, Recess-Mounted (SGR): Recess-mounted soap and grab bar combination shall conform to Fed. Spec. WW-P-541, stainless steel, modified to provide a grab bar. Plastic insert dish shall be furnished.

2.2.8 Towel Bar (TB): Towel bar shall conform to Fed. Spec. WW-P-541, stainless steel, length as required. Bar shall be minimum 3/4 inch in diameter.

2.2.9 Towel Pin (TP): Towel pin shall have concealed wall fastenings; pin shall be integral with or permanently fastened to wall flange, approximately 4-inch projection.

2.3 Dispensers and Receptacles:

2.3.1 Paper Towel Dispenser (PTD): Paper towel dispenser shall conform to Fed. Spec. WW-P-541.

2.3.1.1 Mounting S, Surface: Style N or O.

2.3.1.2 Mounting R, Recessed: Style P, Q, or T.

2.3.2 Sanitary Napkin and Tampon Disposer (SND): Sanitary napkin and tampon disposer shall conform to Fed. Spec. WW-P-541, stainless steel. Reusable liner of the type standard with the manufacturer shall be provided.

2.3.3 Sanitary Napkin and Tampon Dispenser (SNTD): Sanitary napkin and tampon dispenser shall conform to Fed. Spec. WW-P-541.

2.3.4 Waste Receptacle (WR) shall conform to Fed. Spec. WW-P-541.

2.3.5 Facial Tissue Dispenser (FTD) shall conform to Fed. Spec. WW-P-541.

2.3.6 Toilet Tissue Dispenser (TTD) shall conform to Fed. Spec. WW-P-541.

2.3.7 Toilet Paper Holder (TPH) shall conform to Fed. Spec. A-A-2524, roller mounted, 2 support brackets.

2.3.8 Toothbrush and Tumbler Holder (TTH) shall conform to Fed. Spec. WW-P-541.

2.3.9 Soap Dispenser (SD) shall be liquid type consisting of a stainless steel tank with hold capacity of 40 fluid ounces.

2.3.10 Soap Holder (SH) shall conform to Fed. Spec. WW-P-541.

2.4 Medicine Cabinets:

2.4.1 Medicine Cabinet (MC) shall conform to Fed. Spec. WW-P-541. Width, height, and depth of cabinet shall be as required.

2.4.2 Sliding Door Cabinet, Class 1, assembly shall be surface-mounted vanity or recessed cabinet with design and lighting arrangement as required.

2.4.3 Swinging Door Cabinet, Class 2, Design and assembly, including the lighting arrangement, shall be as required. Assembly shall be surface or recess-mounted.

2.5 Shower Curtains and Rods:

2.5.1 Shower Curtain (SC) shall conform to Fed. Spec. A-A-2398, size as required to suit conditions.

2.5.2 Shower Curtain Rods (SCR) shall be stainless steel 1 inch OD by 0.049 inch minimum, straight or bent as required to meet installation conditions.

2.6 Hand Dryer shall be electrically operated conforming to Fed. Spec. W-H-50. Unit shall be surface-mounted, semi-recessed or flush-mounted as required. Cover face shall be polished aluminum, cadmium-plated, polished chrome, stainless steel, or porcelain. Fan shall deliver a minimum of 150 cfm at the discharge end of the nozzle.

2.7 Ash Urn shall be wall-mounted, paraboloidal shape, two quart capacity conforming to Fed. Spec. RR-A-1255. Urn shall be 22-gauge type 304 stainless steel with satin finish or satin bronze finish.

2.8 Janitorial Material:

2.8.1 Mop and Broom Holder shall be 18-gauge stainless steel, satin finish, 8 inches deep in standard lengths as required.

2.8.2 Utility Shelf with mop and broom holders shall be 18-gauge stainless steel, satin finish, 8 inches deep in standard lengths as required.

2.8.3 Pail or Ladder Hook shall be 12-gauge stainless steel, bright polished finish projecting 8 inches from wall, 6 inches high, and 1 inch wide.

2.9 Hospital Accessories:

2.9.1 Foot Operated Soap Dispenser: Dispensing mechanism shall be non corroding containing a stainless steel hood and shatter-proof container. The unit shall contain a molded rubber foot pump with non-slip base.

2.9.2 Bed Pan Storage Rack: Rack shall be stainless steel surface-mounted providing storage for bed pans and urinals.

3.0 EXECUTION: Anchors and fasteners shall be capable of developing a restraining force commensurate with the strength of the accessory to be mounted and shall be well suited for use with the supporting construction. Where exposed fasteners are permitted, they shall have oval heads and finish to match the accessory, except exposed fasteners in designated areas shall be of tamper-proof design.

SECTION 10900

WARDROBES

1.0 **DESCRIPTION OF WORK:** This specification covers the furnishing and installation of wood or steel wardrobes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

1.1 **Design:** Wardrobes shall be constructed of either wood or steel at the Contractor's option except when necessary to match existing or where one type is better suited for locality and intended usage. The material selected shall be used throughout the project. Design of wardrobes shall be by the Contractor using specified requirements as a minimum of acceptability. Each wardrobe shall be a complete unit capable of relocation without modifying or adding components, except for anchors and scribes. Common sides or backs between adjacent units are not permissible. The dimensions indicated are for the purpose of establishing general layout. Minor variations necessary to coordinate the details of construction will be permitted. All parts shall be manufactured to standards that will permit replacement without modifying of remaining parts.

2.0 PRODUCTS

2.1 Hardware:

2.1.1 Hinges shall be brass or steel, not less than 0.062 inch thick, 5 knuckle, tamper-proof institutional type, joint length not less than 2-1/2 inches, chromium finish or primed for paint finish. When doors are closed, only a smooth beveled and rounded joint shall be exposed. Doors 42 inches and less on the hinged side shall have two hinges; doors more than 42 inches on the hinged side shall have three hinges.

2.1.2 Latches: The active door of double doors on the clothes hanging compartment shall be provided with a three-point latching and locking mechanism. The handle shall be of the lever type, of cast brass or bronze, and shall be designed to permit locking by padlocking the handle to a steel keeper with a matching hole. A 14-gauge rectangular corrosion resisting steel shield shall be provided to protect the door from damage at the handle and padlock area. The interior components of the mechanism shall include locking bars or rods not less than 1/2-inch thick, two steel upper guides and two steel lower

SECTION 11335

ROTATING BIOLOGICAL FILTERS

1.0 **DESCRIPTION OF WORK:** This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant rotating biological filters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 **Steel Parts:** Steel parts shall be fabricated from new stock conforming to ASTM A 366.

2.2 Hardware:

2.2.1 Bolts and Nuts: ASTM A 307.

2.2.2 Washers, Flat and Lock Type: ANSI B18.22.1.

2.3 **Rust Inhibitive Primer:** Fed. Spec. TT-P-664.

2.4 **Galvanizing:** ASTM A 123 and A 153.

3.0 EXECUTION:

3.1 **Welding:** Welding shall be in conformance with the AWS D1.1. Galvanized or painted surfaces destroyed by welding shall be restored to original surface for corrosion protection.

3.2 **Shop Coating:** All structural and miscellaneous metal items shall be painted or galvanized as required.

3.3 **Lubrication:** Lubricate all motors, chains, drive units, and bearings in compliance with the equipment manufacturer's instructions.

SECTION 11340

VACUUM FILTERS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of sewage treatment plant vacuum filters. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Ferrous Metal Surfaces Not Exposed to Sewage shall be coated with red-lead paint complying with Fed. Spec. TT-P-86, Type 1, with finish coats of aluminum paint complying with Fed. Spec. TT-P-38.

2.2 Ferrous Metal Surfaces Exposed to Sewage shall be coated with a coal-tar epoxy-polyamide paint complying with SSPC Paint 16.

3.0 EXECUTION:

3.1 Preparation:

3.1.1 Cleaning: Prior to removing parts or components of the vacuum filter or appurtenant equipment, clean dust, dirt, grime, and other foreign matter from the surfaces.

3.1.2 Interruption of Treatment: Provide temporary bypass piping required during the performance of the work, and remove when no longer required.

3.2 Installation:

3.2.1 Openings in Exterior Walls or floor left by removal of a piece of equipment shall be closed to the weather. Remove temporary closures upon installation of the equipment.

3.2.2 Ferrous Metal Surfaces Exposed to Sewage shall be sandblasted in compliance with SSPC-SP 10. After the necessary surface preparation has been accomplished, apply two coats of coal-tar epoxy to a dry film thickness of 10 mils per coat.

3.2.3 Ferrous Metal Surfaces Not Exposed to Sewage shall have a surface preparation in compliance with the manufacturer's instructions and be coated with a primer and finish coat.

3.4 Testing: Test leak repairs by hydrostatic pressure or by pneumatic pressure if the leak is in the tank air space. Test sequence controls, solenoid valves, and backwash equipment to ensure that they operate at design conditions.

3.5 Cleaning: Clean tank interior of all sediment and foreign matter after completion of repair and testing. Clean sequence controls and associated electrical contacts.

3.6 Painting: Exposed metal surfaces shall be painted.

3.7 Disinfection: Disinfect piping and filters in accordance with AWWA B100.

SECTION 13152

SWIMMING POOL ACCESSORIES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of swimming pool equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Diving Stands shall be fabricated of 1-1/2 inch Schedule 40 stainless steel pipe. Their use shall be directed by facility dimensional requirements and shall comply with APHA, USS, NCAA, AAU, and FINA.

2.2 Diving Boards shall be fabricated of all aluminum or of laminated wood and fiberglass. All upper surfaces shall be non-skid, and all edges shall be rounded and sealed.

2.3 Ladders shall be fabricated from low carbon Type 304 stainless steel and have raised non-skid treads. Quantities, locations, and clearances shall comply with National Spa and Pool Institute standards.

2.4 Lifeguard Chairs shall be fabricated from Type 304 stainless steel (framework and handrails) and have raised non-skid treads and non-skid platforms. Units shall comply with Safety Requirements, published by the National Swimming Pool Institute, and OSHA standards.

2.5 Underwater Lights of not less than 0.5 watts per square foot of pool area shall be provided in accordance with Lighting and Wiring, published by the National Spa and Pool Institute, and Article No. 68D of the National Electrical Code.

2.6 Pool Covers shall be polyethylene, having a flame spread rating of "0" as per ASTM E 84. Materials shall be non-toxic, non-absorbent, non-permeable, chemical-resistant and have an upper service limit of 110 F. Storage reels shall be constructed of Type 304 stainless steel.

2.7 Slides shall consist of fiberglass bodies with integral continuous flowing water supply, Type 304 stainless steel frames and raised non-skid ladder treads.

3.0 EXECUTION: (Section not used.)

SECTION 13182

SLUDGE INCINERATORS

1.0 DESCRIPTION OF WORK. This specification covers the furnishing and installation of materials for the repair and maintenance of sewage treatment plant incinerators. Products shall match existing materials and/or as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Refractory Materials shall comply with ASTM C 27.

2.2 Sand for Fluidized Bed shall be high silica sand having an effective size of 0.20 mm. and a uniformity coefficient of 1.8.

2.3 Repair and Replacement Parts for Burners shall be compatible with the existing burners.

3.0 EXECUTION:

3.1 Cleaning, Lubrication, and Adjustments: Thoroughly clean fan, blower, motor, and damper of dirt, dust, and other foreign material. Parts shall be lubricated and adjusted for proper operation.

3.2 Burner Parts shall be cleaned and primary and secondary air openings shall be adjusted as required for good combustion and to meet the design requirements for excess air to the burner. Adjustments shall be made with the incinerator in normal operation.

3.3 Cleaning of Fuel and Atomizing Lines: Gas, oil, air, and steam lines connected to the burner shall be disconnected, cleaned, and reconnected.

3.4 Startup: After completion of maintenance and repairs, the incinerator shall be started up and operating adjustments shall be made by the Contractor as required to achieve the design flow rate and emission quality of the incinerator.

SECTION 13205

SETTLING CHAMBER

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of water treatment plant settling chambers and weirs. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS: (Section not used.)

3.0 EXECUTION:

3.1 Interruptions of Treatment: Not more than one settling chamber shall be taken out of service at a time.

3.2 Installation:

3.2.1 Painting: Exposed new surfaces and surfaces marred during the work shall be painted to match existing color.

3.2.2 Startup: Final adjustments and startup shall be made in such a way as to ensure that all equipment operates at design conditions and rated capacity.

3.2.3 Weir Adjustment: Adjust existing weirs that have a top edge elevation variation of more than 1/32 inch, and all new weirs, to be level throughout their length at the elevation specified.

3.2.4 Weir Repair: Grind metal weir plates smooth and even, if grinding does not exceed amount of available equipment.

SECTION 13221

WATER TREATMENT PLANT FILTERS

1.0 **DESCRIPTION OF WORK:** This specification covers the furnishing and installation of materials for repair and maintenance of gravity and pressure filters for water treatment plants. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Concrete Repair Materials shall be epoxy type grout in compliance with Fed. Spec. MMM-A-001993.

2.2 Steel Plate, Welding Rods, and Welding Electrodes shall be of a composition that complies with Section II of ASME Boiler and Pressure Vessel Code.

2.3 Sequencing Controls and Solenoid Valves shall comply with NEMA ICS and UL 508.

2.4 Filter Media shall comply with the requirements of AWWA B100 and shall be equivalent to the existing filter materials.

2.5 Replacement Weirs and Troughs may be steel, conforming to ASTM A 36, or glass fiber reinforced plastic, in compliance with ASTM D 3841.

3.0 EXECUTION:

3.1 Tank and Trough Repair: Welding repairs shall comply with Paragraph UF-37 of Section VIII of the ASME Boiler and Pressure Vessel Code or AWS D1.1.

3.2 Weirs: Adjust weirs to the elevation required. Weirs may not have a top edge elevation variation of more than 1/32 inch throughout their length. Eroded top edges of metal weir plates shall be ground smooth and even, if grinding does not exceed amount of available adjustment.

3.3 Filter Media: Filtering materials shall be replaced in accordance with AWWA B100.

SECTION 11330

COMMINUTORS AND BAR SCREENS

1.0 **DESCRIPTION OF WORK:** This specification covers the furnishing and installation of materials for repair and maintenance of sewage treatment plant comminutors and bar screens. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 **Motor:** Unless otherwise directed, replacement motors shall be rated for continuous operation.

2.2 **Electrical Work:** Electrical wiring shall comply with the requirements of NFPA 70.

2.3 **Cutter Blades** shall be cobalt-chromium-tungsten alloy faced.

2.4 **Fasteners** shall be stainless steel.

3.0 EXECUTION:

3.1 **Motor Bearings** shall be lubricated or replaced.

3.2 **Welding** shall be done by qualified welders in compliance with AWS D1.1.

SECTION 14580

PNEUMATIC MESSAGE SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of pneumatic message systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Pneumatic Message System: System shall be computer-controlled pneumatic tube type to permit automatic unattended transmission of carriers from any station to any other station. System components shall be designed and located in such a manner that in the event of a defect, components may readily be removed and replaced. Failure of one station shall not interfere with normal functioning of any other station. Number of stations and zones shall be as directed.

2.2 Tubing: Tubing for carrier transmission lines shall be not lighter than 16-gauge cold-rolled-electric-welded steel, manufactured for pneumatic systems. Air lines shall be sized as required for proper system operation.

2.3 Fittings and Hangers: Fittings shall be cast iron, cast aluminum, or fabricated steel. Box connectors, close elbows, tees, coupling sleeves, other fittings, hangers, and supports required for proper installation of the system shall be provided.

2.4 Power Unit: Power units shall be provided for each zone. Power units shall be capable of operating all lines simultaneously and producing an average carrier speed of 25 feet per second. Power units shall be complete with vibration isolators, intake and exhaust mufflers, intake and exhaust piping, screen box, and air valves, if required, and shall be designed for easy access.

2.5 Control Center: The system shall be controlled by a software sensitive, magnetic core or complementary metal oxide semi-conductor memory computer. Computer shall perform logic, control, supervisory, and alarm functions and provide permanent storage for system operating program. Program memory protection shall be provided during power loss.

2.6 Carriers: Three carriers shall be furnished for each station provided. Carriers shall be side opening of full access type, bi-directional.

2.7 Painting:

2.7.1 Sending and Receiving Units shall receive factory- or field-finish standard with the manufacturer. Field finish shall match adjacent surfaces.

2.7.2 Tubing shall be field-painted, when exposed, to match adjacent surfaces.

2.8 Electrical Work: Pneumatic message system shall be provided complete with motors, motor starters, and controls and shall comply with NEMA MG 1. Electrical equipment and wiring shall be in accordance with the National Electrical Code. Motor starters shall be provided complete with properly sized thermal-overload protection. Each motor shall be sized to drive the equipment at the specified capacity without exceeding the nameplate rating of the motor when operating at proper electrical system voltage.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of pneumatic message system, check measurements of spaces for equipment and means of access for installation and operation.

3.2 Fireproofing: Where holes are required in fire and smoke walls for the passage of piping and other accessories, the holes shall be filled with UL approved fireproofing material that equals the wall fire or smoke rating.

3.3 Tests: Test installed system in the presence of the Contracting Officer to determine that the system is functional, operational, and installed in accordance with the specifications. Tests shall be conducted in accordance with the following:

- a. Computer simulation and interrogation.
- b. Consecutive dispatching to random stations within the zone.
- c. Consecutive dispatching to random stations outside the zone.
- d. Multi-station dispatching within the zone where all dispatchers are loaded with carriers, random stations are selected, and dispatching begins.

e. Multi-station dispatching outside the zone where all dispatchers are loaded with carriers, random stations are selected, and dispatching begins.

f. Two stations in each zone will be randomly selected to dispatch carriers into other zones.

SECTION 14583

PNEUMATIC TRASH AND LINEN CHUTES

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of pneumatic trash and linen chutes. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work. Contact the fire protection engineering branch for the specific requirements of fire protection.

2.0 PRODUCTS:

2.1 General: Pneumatic waste and linen systems shall be vertical, horizontal, or inclined duct systems, having sufficient mechanically-applied airflow to convey refuse or linen to point of disposition without clogging. Systems shall have stations and configurations as directed. Systems shall be in accordance with the standards of NFPA 82.

2.2 Air Velocity: The minimum air velocity in the system shall be 5,000 feet per minute. Blower system shall be designed to provide continuous air supply at no less than the minimum velocity.

2.3 Tubes: Tubes for system shall be a minimum of 16 inches in diameter. Tubes shall be galvanized, aluminized, or stainless steel. Material-conveying lines shall be not lighter than 20 gauge and charging stations or changes in direction of conveying lines shall be not lighter than 16 gauge. In all cases, steel shall be of sufficient thickness to retain its design shape under all operating conditions.

2.4 Fire Protection: Automatic fire dampers shall be installed at all points where the system penetrates fire-resistant partitions or floor assemblies. The system shall shut down automatically upon closing of one of the fire dampers. Sprinklers shall be provided in accordance with the requirements of NFPA 82. Fire separation at service openings and terminal rooms shall be as required by NFPA 82.

2.5 Service Openings: Service openings shall be sized and designed in accordance with NFPA 82. Doors shall bear UL Class B 1-1/2 hour rating.

2.6 Wiring: All wiring necessary to connect motors, switches, and controls shall be provided. Wiring shall be in accordance with the National Electrical Code, and shall be installed in conduit, electrical metallic tubing, or metal wireways, except that flexible conduit may be used for short runs.

3.0 EXECUTION:

3.1 Preparation: Prior to installation of pneumatic trash and linen chutes, ensure that shafts and openings are plumb, level, and in line. Check measurements of space for equipment, accessibility for installation, and clearances for operation.

3.2 Installation: Install machinery, tubes, controls, equipment, and accessories in accordance with the manufacturer's instructions and applicable codes and standards. Install fire protection sprinklers in accordance with NFPA 13. Complete installation shall operate properly without undue noise or vibration. Ensure that installation procedures maintain required fire resistance ratings.

SECTION 14602

CRANES AND HOISTS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of cranes and hoists. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Crane: Crane Manufacturers Association of America (CMAA) 70 for electric overhead traveling cranes or ANSI MH27.1 for underhung cranes and monorail systems.

2.2 Hoist: Electric wire rope type, ANSI/ASME HST-4M.

3.0 EXECUTION: The derrick shall be assembled and installed with the guy wires placed in position, hoisting ropes installed, and the derrick made ready for regular operation. Equipment installed outdoors shall be primed and finish-painted with a suitable corrosion-resistant paint on all parts and components not otherwise made of corrosion-resistant materials or otherwise protected.

SECTION 15573

DRAFT CONTROL EQUIPMENT

1.0 **DESCRIPTION OF WORK.** This specification covers the furnishing and installation of draft control equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Structural Steel shall comply with ASTM A 36.

2.2 Steel Pipe shall comply with ASTM A 53.

2.3 Piping Components shall comply with ASTM A 105.

2.4 Flanges, Fittings, and Valves shall comply with ASTM A 181.

2.5 Seamless Copper Tube shall comply with ASTM B 75.

2.6 Insulation shall comply with ASTM C 547.

2.7 Thermal Insulation and Finishing Cement shall comply with ASTM C 449.

2.8 Welding and Brazing Materials shall be as specified in Section II of the ASME Boiler and Pressure Vessel Code.

3.0 EXECUTION:

3.1 Safety: Adequate natural or forced ventilation shall be provided during repair activities conducted in confined spaces. Forced or induced draft fans shall be rendered inoperable before performing internal repairs to the fan casing or adjacent ductwork.

3.2 Repairs shall be accomplished in compliance with NFPA 70.

3.3 Welding and Brazing shall be performed in accordance with Section IX of the ASME Boiler and Pressure Vessel Code.

3.4 Drive Train Components shall be repaired or replaced to transmit power free from vibration at the required torque.

SECTION 15576

BREECHING

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of breeching. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Metal Breeching:

2.1.1 Carbon Steel shall comply with ASTM A 568.

2.1.2 Galvanized Steel shall be carbon steel complying with ASTM A 568, galvanized in compliance with ASTM A 123.

2.1.3 Stainless Steel shall comply with ASTM A 167.

2.1.4 High Heat Insulating Refractory shall be an alumina-silica-base castable refractory complying with ASTM C 27.

2.1.5 Acid Resistant Liner shall be phenolic, rubber, and polyester resin liner.

2.1.6 Insulation: Calcium silicate block type insulation shall comply with ASTM C 533. Mineral fiber insulation shall be block type complying with ASTM C 612, Class 1.

2.1.7 Bolts and Nuts: Where breeching is connected to stack by means of a flange, bolts shall be high temperature alloy steel bolts complying with ASTM A 193, with hex nuts complying with ASTM A 194.

2.1.8 Paint for prime coats and finish coats for touchup or refinishing shall be of the high heat-resistant type.

2.2 Masonry:

2.2.1 Mortar and Grout for repair of cracks in reinforced concrete shall comply with ASTM C 476. Mortar for use in the repair or replacement of brick lining in high heat breeching shall be ground fire clay complying with ASTM C

27. Chemical-resistant mortar shall be resin mortar complying with ASTM C 396.

2.2.2 Brick for lining of high heat breeching requiring acid resistance shall be refractory brick complying with ASTM C 27. Brick for breeching requiring acid resistance shall be chemical-resistant brick complying with ASTM C 279, type H.

2.2.3 Inspection Doors shall be heavy-duty cast iron or steel, lined on interior with insulating, castable refractory complying with ASTM C 64.

2.2.4 Insulation: Calcium silicate block type insulation shall comply with ASTM C 533. Mineral fiber insulation shall be block type complying with ASTM C 612, Class 1.

2.3 Refractory Brick:

2.3.1 Brick shall be high heat refractory type complying with ASTM C 27.

2.3.2 Mortar: Fire clay mortar shall be of high heat, ground type complying with ASTM C 27. Chemical-resistant mortar shall be the silica type complying with ASTM C 466.

2.3.3 Refractory shall be of the insulating, castable type complying with ASTM C 27. Chemical-resistant type castable refractory shall be in compliance with ASTM C 401.

2.3.4 Inspection Doors shall be heavy-duty cast iron or cast steel, lined on the interior with insulating castable refractory complying with ASTM C 64.

3.0 EXECUTION:

3.1 Flame Cutting: No cutting by torch shall be done without authorization from the Contracting Officer.

3.2 Welding: All welding shall be performed in compliance with AWS D1.1.

3.3 Installation of Breechings shall be in compliance with NFPA 211.

SECTION 15577

STACKS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of stacks. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Metal Stacks:

2.1.1 Carbon Steel shall comply with ASTM A 568.

2.1.2 Galvanized Steel shall be carbon steel complying with ASTM A 568, galvanized in compliance with ASTM A 123.

2.1.3 Stainless Steel shall comply with ASTM A 167.

2.1.4 Insulating Refractory shall be alumina-silica base castable refractory complying with ASTM C 27.

2.1.5 Acid-Resistant Liner shall be phenolic, rubber, and polyester resin liner.

2.1.6 Insulation: Calcium silicate block type insulation shall comply with ASTM C 533. Mineral fiber insulation shall be block type complying with ASTM C 612, Class 1.

2.1.7 Insulation Jacket: Canvas jacket shall be 8-ounce standard proprietary canvas jacket. Aluminum jacket shall be 0.016 inch thick, corrugated, embossed, or smooth, complying with ASTM B 209, temper H14, Type 3003 or 5010 with 50-pound polyethylene vapor barrier. Supports for aluminum jacket shall be stainless steel Z-clips and bands 0.016 inch thick by 3/4 inch wide.

2.1.8 Bolts and Nuts: Where breeching is connected to stack by means of a flange, bolts shall be high temperature alloy steel bolts complying with ASTM A 193, with hex nuts complying with ASTM A 194.

2.1.9 Steel Rivets shall comply with ASTM A 502.

2.1.10 Steel Structural Wire Rope shall be zinc-coated and shall comply with ASTM A 603.

2.1.11 Paint For Prime Coats and Finish Coats for touchup or refinishing shall be of the high-heat-resistant type.

2.2 Masonry Stacks:

2.2.1 Ceramic Glazed Clay Brick shall comply with ASTM C 126.

2.2.2 Chemical-Resistant Masonry Units shall comply with ASTM C 279.

2.2.3 Castable Refractory shall comply with ASTM C 401.

2.2.4 Mortar for Fireclay Brick shall comply with ASTM C 27. Mortar for chemical-resistant applications shall comply with ASTM C 395. Mortar and grout for reinforced masonry shall comply with ASTM C 476.

2.3 Prefabricated Stacks shall consist of ~~double-wall vent~~ pipe and fittings. All components shall be UL-listed and shall comply with NFPA 211.

3.0 EXECUTION:

3.1 Installation or Repair of all stacks shall be in accordance with NFPA 211.

3.2 Flame Cutting: No cutting by torch shall be done without authorization from the Contracting Officer.

3.3 Welding: All welding shall be performed in compliance with AWS D1.2.

SECTION 15580

BOILER FEEDWATER EQUIPMENT

1.0 **DESCRIPTION OF WORK.** This specification covers the furnishing and installation of boiler feedwater equipment. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Specialty Components and Parts shall be in accordance with applicable requirements of the ASME Boiler and Pressure Vessel Code.

2.2 Welding and Brazing Materials shall be as specified in Section II of the ASME Boiler and Pressure Vessel Code.

3.0 EXECUTION:

3.1 Repairs shall be accomplished with either the entire feedwater system or applicable portions isolated from service and drained.

3.2 All Isolation Valves shall be secured in the closed position, all drain valves secured in the open position, and pumps rendered inoperative before and during repairs to the deaerators, softeners, and chemical feeders.

3.3 Welding shall be performed in accordance with Section IX of the ASME Boiler and Pressure Vessel Code.

3.4 Electrical Work shall comply with the requirements of NFPA 70.

3.5 Drive Train Components shall be repaired or replaced to transmit power free from vibration at the required torque.

3.6 Repair Procedures for receiver vessels shall provide structural integrity as specified in NB-23.

SECTION 16370

OVERHEAD ELECTRICAL DISTRIBUTION SYSTEMS

1.0 DESCRIPTION OF WORK: This specification covers the furnishing and installation of materials for repair and maintenance of overhead electrical distribution systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 Conductors: ANSI C8.35, QQ-W-343; ANSI/IEEE C2, ASTM B 8, B 228, B 229, B 230, B 231, B 232; NEMA WC3, WC5, and WC7.

2.2 Insulators: ANSI C29.1, C29.2, C29.3, C29.4, C29.5, C29.6, C29.7, C29.8, C29.9, and NEMA HV 2.

2.3 Poles: ANSI 05.1; AWP A C4, C25, P1, P8, P9; and CSA A14.

2.4 Crossarms: REA DT-5B, AWP A C25, ANSI C2, ANSI C135.33.

2.5 Hardware: EEI TDJ-1, TD-2, TDJ-3, TD-4, TDJ-5, TDJ-6, TDJ-7, TDJ-9, TDJ-10, TD-11, TD-12, TDJ-17, TDJ-22, and TDJ-23 as applicable.

3.0 EXECUTION:

3.1 Scheduling and Coordination: Contractor shall ensure that power interruptions and blocking of thoroughfares have been scheduled and approved.

3.2 Line Clearing: Chemicals used in line clearing operations shall be in compliance with the latest federal and state requirements.

3.3 Safety Precautions: Precautions shall be taken to prevent injury to personnel and to avoid damage to equipment and other property in compliance with ANSI/IEEE C2.

SECTION 16375

UNDERGROUND ELECTRICAL DISTRIBUTION SYSTEMS

1.0 **DESCRIPTION OF WORK:** This specification covers the furnishing and installation of materials for repair and maintenance of underground electrical distribution systems. Products shall match existing materials and/or shall be as directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 PRODUCTS:

2.1 **Conductors:** Fed. Spec. J-C-30, W-S-610, ASTM D 4727, ASTM D 1352, ASTM D 1679, ACIE NO. 1-68, ICEA NO. S-19-81, NO. S-66-524, and NO. S-68-516, NEMA WC 7 and NEMA WC 8, and UL 854, as applicable.

2.2 **Conduits:** Fed. Spec. W-C-571, W-C-586, W C 1094, W-F-406, W-F-408, W-J-800, UL 797, WW-C-566, NEMA TC 2 and NEMA TC 6, UL 6, UL 514B, and UL 543 as applicable.

2.3 **Tape:** Fed. Spec. HH-I-553, Mil. Spec. MIL-I-3825, MIL-I-15126F, and MIL-I-24391.

2.4 **Insulators:** ANSI C29 8 and C29 9.

2.5 **General Electrical:** ANSI C2, NFPA 70.

2.6 **Testing:** IEEE 48.

2.7 **Concrete:** Aggregate, ASTM C 33; Portland cement, ASTM C 150, Type 1; compressive strength 4,000 psi at 28 days.

3.0 EXECUTION:

3.1 **Coordination:** Contractor shall ensure that power interruptions and blocking of thoroughfares have been scheduled and approved.

3.2 **Tests:** All underground lines, splices, and terminations that have undergone maintenance, repair, or are new installation shall be tested before placement in service.

3.3 Ductbank: No dips or low points that retain water are permissible. Conduit shall be encased with not less than 3 inches of concrete when not direct-buried.

3.4 Manholes and Handholes shall be spaced and installed so as not to exceed the pulling tensions of the cables to be pulled. Maximum pulling tensions shall be as recommended by the cable manufacturer.

SECTION 16390

ELECTRICAL DISTRIBUTION SYSTEM GROUNDING

1.0 **DESCRIPTION OF WORK:** This specification covers the furnishing and installation of electrical distribution system grounding. Products shall match existing materials and/or shall be directed by the Contracting Officer. Installation procedures shall be in accordance with the product manufacturer's recommendations. Demolition and removal of materials shall be as required to support the work.

2.0 **PRODUCTS:** (Section not used.)

3.0 **EXECUTION:**

3.1 **Coordination and Scheduling:** Contractor shall ensure that power interruptions have been scheduled and approved.

3.2 **Outages:** Service interruptions shall be limited in number and duration, and the extent of lines involved shall be held to a minimum.

3.3 **Protection:** Take precautions, in compliance with ANSI C2, to prevent injury to personnel and to avoid damage to equipment and other property.

3.4 **Workmanship:** Installation shall be in compliance with IEEE 80 and 142. Install protective moulding, staples and conduit as recommended by these standards.

3.5 **Trenching:** Exercise care when digging trenches for installation or testing of ground equipment. Protect adjacent structures and properly shore excavations.

3.6 **Grounding** shall comply with NFPA 70, ANSI C2, and IEEE 80 and 142. Ground neutral conductors, cable shields, metallic cable sheaths and armor, metallic conduits, pothead bodies, junction boxes, lightning arresters, fence enclosures, and noncurrent-carrying metallic parts of equipment. Ground rods shall be made of copper, or copper-clad steel not less than 1-inch by 8 feet long and, except those installed in manholes, shall be driven into the earth at least 9 feet. Ground connections in earth shall not be backfilled until after inspection by the Contracting Officer. Repairs and maintenance of the grounding system shall include resistance measurements and tightening of all bolted connections.