EXCHANGE

You save, we give back.

FORT MYER
JBMHH-MYER, ARLINGTON, VIRGINIA
PROJECT #0330-10-000001

FOR BID

April 11, 2012

BOWEN
RICHARD L. BOWEN + ASSOCIATES INC.
13000 SHAKER BOULEVARD
CLEVELAND, OH 44120
T: 216.491.9300

PROJECTMANUAL

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SUBSTITUTION REQUEST FORM

TO _____

PROJECT _____

1. We hereby submit for your consideration the following product instead of the specified item for the above project:

Section	Page	Line/Paragraph	Specified Item

2. Proposed Substitution: _____

3. Reason for Substitution: _____

4. Attach complete technical data, including laboratory tests, if applicable.

5. Include complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

6. Does the substitute affect dimensions shown on Drawings? _____

6a. If so, how? _____

7. Will the undersigned pay for changes to the building and systems design, including engineering and detailing costs caused by the requested substitution? _____

8. Describe the effect substitution has on other trades: _____

9. Differences between proposed substitution and specified item: _____

10. Manufacturer's guarantees of proposed and specified items are: ☐ Same ☐ Different (explain on attachment)

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item.

SUBMITTED BY:

_____
Signature

_____
Firm

_____
Mailing Address

_____
City State Zip

_____
Telephone

_____
Date

☐ Please check if there are attachments.

FOR USE BY REVIEWER:

☐ Accepted ☐ Accepted as Noted

☐ Not Accepted ☐ Received Too Late

☐ Approved for Bidding subject to review and approval of Submittals.

By _____

Date _____

Remarks _____

***** Answer all questions ***** Fill in all blanks ***** Use back of form & attachments as needed *****

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SECTION 01 10 00

SUMMARY

PART 1 - GENERAL

1.1 PROJECT INFORMATION

A. Project Identification: Fort Myer Main Store Image and Branding Project.

1. Project Location: #0330-10-00001.

B. Owner: EXCHANGE.

1. EXCHANGE Contracting Office: The Exchange (AAFES), Attn: Tommy G. Hodge, Sr. REZC, 3911 Walton Walker Blvd, Dallas, TX 75236.

C. Architect: Richard L. Bowen + Associates, Inc., 13000 Shaker Blvd, Cleveland, OH 44120, 216-491-9300.

D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Richard L. Bowen + Associates, Inc.,13000 Shaker Blvd, Cleveland, OH 44120, 216-491-9300.

a. Structural – Richard L. Bowen + Associates
b. Mechanical – Richard L. Bowen + Associates
c. Electrical – Richard L. Bowen + Associates

E. Other EXCHANGE Consultants:

1. Transystems – Brian Metz.

F. EXCHANGE Project Manager: Mike Williams, AIA.

G. Project Web Site: Administered by EXCHANGE.

1.2 STATEMENT OF WORK

A. Scope: The work covered by these specifications consists of furnishing all plant, supervision, labor, equipment, and materials as necessary to perform all operations required to complete renovation and addition of an existing building. The work is to be performed in accordance with the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

B. Location: The work to be performed is located at Fort Myer in Arlington, Virginia.

C. Principal Features:

1. The project consists of an addition to and remodeling of a Main Exchange Shopping Center Complex through phased construction.
2. The completed facility will include a Main Exchange retail store, food court, service mall, outdoor garden sales area, shipping and receiving areas.
3. Existing site improvements, including asphalt concrete, paving, curbs and walks, will be removed and/or modified through this contract.
4. Existing on-site utilities will be modified. The work must be planned to provide continuous service to existing on-site buildings while they are occupied.

D. General Provisions: The Contractor is advised to take note of the following General Provisions of the Contract: Cleaning up; Material and Workmanship; Accident Prevention; Protection of Existing Vegetation, Structures, Utilities and Improvements; Operation and Storage Areas; Site Investigation; Permits and Responsibilities. A copy of the General Provisions is provided in the solicitation documents.

E. Type of Contract: Single prime contract.

F. Phased Construction: Phased as scheduled on Drawings.

1.3 SPECIAL REQUIREMENTS

A. Regular business hours during the week for the Department of Public Works are 7:00AM to 4:00PM, Monday through Friday, excluding Federal Holidays. The Exchange normal business hours of operation are 9:00AM to 8:00PM, Monday through Friday, 9:00AM to 7:00PM Saturday and 10:00AM to 6:00PM on Sundays. On Holidays the Exchange is open from 10:00AM to 4:00PM. Due to the unique nature and aggressive schedule of this project, the Contractor may be required to work 24 hours a day / 7 days a week. Also, many items of work can only be performed at night after hours once the Exchange is closed to customers. The Exchange will be available to the Contractor on a 24/7 basis. A 24-hour advance notice to the Exchange General Manager is required to confirm on site security is available during non-operation hours. Failure on the part of the Contractor to give this advance notice may result in the facility not being accessible for work. The Contractor shall coordinate his work schedule closely with the AAFES store manager and notify the Installation Military Police prior to performing work after normal business hours.

B. The Contractor is to familiarize themselves with the requirements for gaining daily access to the base. All workers, subcontractors and material deliveries will require permits to gain site entry

C. Ft. Myer may require special access requirements during times of heightened security measures and/or force protection events requiring the Contractor to adjust schedules and access accordingly. Advance notice will be given to the Contractor as soon as possible in the event of such an occurrence.

D. Equipment Cut Sheets will be provided by the Exchange during the solicitation period.

1.4 UTILITIES (WATER, GAS AND ELECTRICITY)

A. Existing hose bibbs and hydrants will be used to obtain water for this project. The Contractor will not be charged for consumption of utilities (water, gas and electricity).

B. The Contractor shall provide and use the proper backflow prevention devices. The Contractor shall provide documentation of proper/current certification of the devices and proper/current certification of the installer.

1.5 LAYING OUT WORK

A. Layout: Dimensions and elevations indicated in layout of work shall be verified by the Contractor. Discrepancies between Drawings, specifications, and Conditions shall be referred to the Contracting Officer in writing for adjustment before work affected is performed. Failure to make such notifications shall place responsibility upon the Contractor to carry out work in a satisfactory and workmanlike manner.

B. The Contractor shall be held responsible for the location and elevation of all the construction contemplated by the construction documents.

C. Prior to commencing work, the Contractor shall carefully compare and check all Architectural, Structural, Mechanical, and Electrical drawings, each with the other, that in any way affect the locations of elevation of the work to be executed by him, and should any discrepancy be found, he shall immediately report the same to the Contracting Officer for verifications and adjustment. Any duplication of work made necessary by failure or neglect on the Contractor's part to comply with this function shall be done at his sole expense.

D. Field Dimensions: The drawings accompanying these specifications indicate generally the design and arrangement of all apparatus, fixtures, accessories, etc. necessary to complete the work required. The exact location or arrangement of equipment is subject to minor changes necessitated by field conditions and shall be made as required without additional cost to EXCHANGE. Measurements shall be verified by actual observations at the construction site, and the Contractor shall be responsible for all work fitting into place in a satisfactory and workmanlike manner meeting the approval of the Contracting Officer.

1.6 EXISTING OVERHEAD OR UNDERGROUND WORK

A. Carefully check the site where this project is to be erected and observe any overhead wires and equipment. Any such work shall be moved, replaced or protected, as required, whether or not shown or specified.

B. Attention is directed to the existence of pipe and other underground improvements which are shown on the drawings. All reasonable precautions shall be taken to preserve and protect all such improvements shown on the drawings.

C. Locations of underground lines, shown on the drawings, are based on the best available sources, but are to be regarded as approximate only. Exercise extreme care in locating and identifying these lines before excavating in adjacent areas.

1.7 INTERRUPTION OF EXISTING UTILITIES SERVICES

A. The Contractor shall perform the work under this Contract with a minimum of outage time for all utilities. Interruption shall be by approved section of the utility. In some cases, the Contractor may be required to perform the work while the existing utility is in service. The existing utility services may be interrupted only when approved by the Contracting Officer. When it is necessary to interrupt the existing utilities, the Contractor shall notify the Contracting Officer and facilities engineer in writing at least seven work days in advance of the time he desires the existing service to be interrupted. The interruption time shall be kept to a minimum. Depending upon the activities at the facility which require continuous service from the existing utility, an interrup-

tion may not be subject to schedule at the time desired by the Contractor. In such cases the interruption may have to be scheduled at a time of minimum requirement of demand for the utility. The amount of time requested by the Contractor for interruption of existing utility services shall be as approved by the Contracting Officer.

1.8 EXCAVATION

A. Contractor shall obtain a valid Army Authorization Form, "1254 Excavation Permit," from the Ft. Myer Department of Public Works at least 28 days before the construction date.

1. Contact Mr. Anthony Taylor: 703-696-33820; Anthony.taylor3@us.army.mil and copy Ramon Nieves: ramon.nieves@us.army.mil and Keith.m.Gentles@us.army.mil.

1.9 WELDING PERMIT

A. Prior to commencing any welding, the Contractor shall obtain a welding permit from the Fort Myer Fire Department.

1.10 BARRICADES AND WARNING DEVICES

A. The Contractor shall provide barricades and lighting devices, in accordance with Manual for Uniform Traffic Control Devices by Department of Transportation, latest Edition, at all points of excavation and construction in vehicle traffic areas.

1.11 PROTECTION FOR OPEN FLAME DEVICES

A. When open flame and/or spark producing devices, i.e., acetylene oxygen welding equipment, electric arc welding, etc., are employed for job accomplishment, the following procedures are mandatory:

1. Inspect all surroundings and equipment to insure that combustible substances are not present in any area where contact of metal at a temperature above the flashpoint of any compound is possible.
2. Ensure that no open containers or spills of combustible substances are present.
3. Ensure that ignition is not possible by conduction, convection, radiation, or dispersion of molten metal.
4. Proper protection equipment and practices will be used, i.e., fireproof blankets, wetting of surrounding area, removal o combustible materials where practicable, earth filled backing and portable fire extinguishers of proper type on hand.
5. When the above devices are being used notify the Base Fire Department 24 hours ahead of usage.

1.12 FIRE PROTECTION

A. The Contractor shall at all times maintain good housekeeping practices to reduce the risk of fire damage. All scrap materials, rubbish, and trash shall be removed daily from in and about the building and shall not be permitted to be scattered on adjacent property.

B. Suitable storage space shall be provided 50 feet minimum outside the building area for storing flammable materials and paints; no storage will be permitted in the building. Excess flammable

liquids being used inside the building shall be kept in closed metal containers and removed from the building during unused periods.

C. A contractor shall provide a fire extinguisher at each location where cutting and welding is being performed. Where electric or gas welding or cutting is done, interposed shields of incombustible material shall be used to protect against fire damage due to sparks and hot metal. When temporary heating devices are used, a watchman shall be present to cover periods when other workmen are not on the premises.

D. The Contractor shall provide fire extinguishers in accordance with the recommendations of NFPA Nos. 10 and 241. However, in all cases a minimum of four fire extinguishers shall be available for each building.

E. Fire Codes: The Contractor shall obey all requirements of the National Fire Codes, (Army or Air Force) Fire Regulations and Base Fire Regulations, as they relate to this work on base.

1.13 WORK BY OTHERS

A. Work not included: Except for such auxiliary work as is shown or specified or is necessary as a part of the construction, the following work is not included in the Contract:

1. Any work shown, but marked "NOT IN CONTRACT" (N.I.C.).
2. Any work indicated to be furnished and installed by the Exchange.
3. Any work indicated to be furnished and installed by the Vendors or Concessionaires.

1.14 EXCHANGE FURNISHED AND INSTALLED EQUIPMENT

A. See Specification Section 01 10 17: EXCHANGE Furnished and Installed Equipment.

1.15 EXCHANGE FURNISHED-CONTRACTOR INSTALLED EQUIPMENT

A. See Specification Section 01 10 18: EXCHANGE Furnished Contractor Installed Equipment.

1.16 ALIGNMENT OF JOINTS IN FINISH MATERIALS

A. It shall be the responsibility of the Contractor to make certain in the installation of jointed floor, wall, and ceiling materials that:

1. The joints align through in a straight line and in both directions wherever possible.
2. The joints relate to all openings and breaks in the structure and be symmetrically placed wherever possible. This includes heating registers, light fixtures, equipment, etc.
3. If, because of the non-related sizes of the various materials and locations of openings, etc., it is not possible to accomplish the above, the Contractor shall meet with the Contracting Officer to determine the most satisfactory arrangement. The Contractor shall establish center lines for all trades.

1.17 INTEGRATING WORK

A. All streets, buildings, and other improvements shall be protected from damage.

B. Contractor's operations shall be confined to the immediate vicinity of the project work and shall not in any way interfere with or obstruct the ingress or egress to and from street or adjacent property.

C. If new work is to be connected to existing work, special care shall be exercised not to disturb or damage the existing work more than necessary. All damaged work shall be replaced, repaired, and restored to its original condition at no cost to the Exchange Service.

1.18 HEADROOM UNDER PIPES

A. All horizontal runs of plumbing and heating pipes and/or electrical conduit suspended from ceilings shall provide for a maximum headroom clearance, but in no case shall this clearance be less than 7'-0" without written consent from the Contracting Officer. Where piping or conduit is left exposed within a room, the same shall run true to plumb, horizontal or intended planes. Where possible, uniform margins are to be maintained between parallel lines and/or adjacent wall, floor, or ceiling surfaces.

1.19 PATCHING GOVERNMENT-OWNED FACILITIES

A. Government-owned structures, facilities, streets, curbs, walks, etc., that are damaged or removed due to required excavations or other construction work, shall be patched, repaired or replaced, and be left in their original state of repair by the Contractor, to the satisfaction of the Contracting Officer and of authorities having jurisdiction thereover.

1.20 LOCATION OF EQUIPMENT AND PIPING

A. Drawings showing location of equipment, piping, ductwork, etc., are diagrammatic and job conditions shall not always permit their installation in the location shown.

B. When this situation occurs, it shall be brought to the Contracting Officer's attention immediately and the relocation determined in a joint conference. The Contractor will be held responsible for the relocating of any items without first obtaining the Contracting Officer's approval. He shall remove and relocate such items at his own expense if so directed by the Contracting Officer.

1.21 OVERLOADING

A. The Contractor shall be responsible for overloading any part or parts of structures beyond their safe calculated carrying capacities by placing of materials, equipment, tools, machinery, or any other item thereon. No loads shall be placed on floors or roofs before they have attained their permanent and safe strength.

1.22 STANDARDS

A. Any material specified by reference to the number, symbol, or title of a specific standard such as Commercial Standard, a Federal Specification, a trade association standard, or other similar standard shall comply with the requirements in the latest revision thereof, and any amendment or supplement thereto, in effect on the date of invitation for proposals, except as limited to type, class, or grade, or modified in such reference, and except as otherwise indicated.

1. The standard referred to, except as modified in the specifications, shall have full force and effect as though printed in these specifications. These standards are not furnished to bidders for the reason that the manufacturers and trades involved are assumed to be familiar with their requirements.

   a. Where Federal Specifications are referred to as a measure of quality and standard, they refer to Federal Specifications established by the Procurement Division of the United States Government and are available from the Superintendent of Documents, U.S. Government Printing Office.
   b. Where Federal Specification numbers are used, they refer to the latest edition including amendments thereto.
   c. Where Commercial Standards are referred to as a measure of quality, standard, and method of fabrication, they refer to Commercial Standards issued by the U.S. Department of Commerce.
   d. Where A.S.T.M. Serial Numbers are used, they refer to the latest tentative specifications, standards specifications, standards methods, or standard method of testing issued by the American Society for Testing and Materials.

1.23 CERTIFICATE OF CONFORMANCE

A. Except where tests and/or inspections in connection with structural materials are specified or required by applicable laws, rules, and regulations, manufacturer's certificate covering conformance with the requirements of the above mentioned Federal Specifications and Commercial Standards may be acceptable in lieu of such items. Such certificates shall be furnished to the Contracting Officer for all items so specified.

1.24 OCCUPANCY BY THE EXCHANGE

A. The Exchange shall reserve the right and privilege of partial occupancy during and prior to the absolute completion of the total work. Access shall be allowed at all times to the Exchange and its own Contractors in the endeavor.

1.25 TESTS AND REPORTS

A. See Specification Section 01 40 00: Quality Requirements.

1.26 REFERENCES

A. All references to the word "Government" in the specifications shall mean EXCHANGE.
B. Wherever the word "provide" is used in the Contract Documents as a directive, it shall be interpreted as meaning "provide and install completely and ready for use".

C. Definitions:

   1. Vendor: Person or persons selling any material item.
   2. Base or Facility: Location on which Exchange is being remodeled.
   3. Concessionaire: Person who is directly responsible for the lease of and operation of the concessions such as Beauty Shop and Barber Shop.
   4. Architect-Engineer: That person or firm responsible for preparing the working drawings and specifications.
   5. EXCHANGE: Army and Air Force Exchange Service.

6. Inspection Agency: Project Inspector contracted by EXCHANGE.

1.27 TOXIC MATERIALS

A. Removal and disposal of asbestos is included in this contract. If the contractor encounters toxic materials outside the areas requiring abatement that are identified in the asbestos survey provided, he shall immediately stop work and notify the Contracting Officer.

1.28 SUBMISSION OF PHOTOGRAPHS

A. Contractor shall submit to the Contracting Officer digital photographs taken on or about the first of every month, showing the general conditions of the work as viewed from the north, south, east, west and interior. Photographs (minimum of 20) must accompany each Application for Payment. Each print shall be identified by date of exposure, project title, and EXCHANGE Project Number, location and direction taken. The Contractor may also submit a video of the above requirements as an option to photographs.

1.29 COPIES OF DOCUMENTS FURNISHED

A. After contract award, and for construction purposes only, the General Contractor will be provided with a record set of drawings and specifications, and a CD of the drawings and specifications. Additional copies will be the responsibility of the General Contractor.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 10 00

SECTION 01 10 17

EXCHANGE FURNISHED AND INSTALLED EQUIPMENT (EF/EI)

PART 1 - GENERAL

1.1 SUMMARY

A. Certain items of equipment will be furnished and installed by EXCHANGE. See drawings references to (AF/AI)

B. The Contractor shall provide for and cooperate with personnel installing EXCHANGE furnished materials and equipment, should overlap of work occur.

C. Schedule: Contractor shall schedule early completion of designated areas for beneficial occupancy by EXCHANGE usage prior to completion of entire project.

D. EXCHANGE will furnish and install equipment as indicated.

E. Contractor's Duties:

1. Provide access for EXCHANGE personnel.
2. Coordinate work and cooperate with the installers of the property so that installation can be accomplished in accordance with construction schedule.
3. Provide mechanical and electrical connections to equipment and building systems where indicated on the drawings and in the specification.
4. Provide security of designated areas.

F. EXCHANGE Duties:

1. Inspect designated area prior to use and issue statement of acceptance of area for installation of property.
2. Make final mechanical and electrical connections between property and building systems where indicated on the drawings and/or in the specifications.
3. Provide custodial services for designated areas during use after beneficial occupancy.

1.2 DELIVERY DATE CHANGES

A. Requests by Contractor to change designated delivery dates shall be made in writing at least 30 days in advance of the designated delivery date. If the Contractor is not ready to accept delivery of EXCHANGE furnished property the Contractor shall be responsible for storage and redelivery cost. Should EXCHANGE be unable to effect the change, or should the Contractor fail to submit his request within the time stated above, the Contractor's obligation under this contract and as stated herein shall not be relieved and further, the Contractor will have no basis upon which he can file a claim under these conditions.

1.3 EXCHANGE ACTIVITIES AFFECTING PROGRESS OF WORK:

A. Retail Sales Areas: Schedule date of installation of fixturing and possession of these areas 120 days prior to completion of project.

B. Serving Areas & Food Preparation Areas: Schedule date of use and possession of food preparation serving areas 60 days prior to completion of project.

C. MPA: Schedule date of installation of storage shelving and equipment 90 days prior to completion of project.

D. Construction in each area at date scheduled for its use and possession by EXCHANGE shall be sufficiently complete, in accordance with Contract Documents, so the EXCHANGE may occupy the area for the use for which it is intended. Comply with Contract Clauses titled inspection of Construction, and Use and Possession Prior to Completion.

1.4 ACCEPTANCE OF AREAS FOR BENEFICIAL OCCUPANCY

A. Inspection: Prior to acceptance by EXCHANGE of an area for beneficial occupancy, the Contracting Officer will conduct an inspection of the specific area. A list of deficiencies will be provided to the Contractor.

B. Acceptance: If the Contracting Officer determines the specific area is sufficiently complete for beneficial occupancy by EXCHANGE, the area will be accepted in writing with the exception of the deficiencies listed. The deficiencies listed shall be completed or corrected prior to final acceptance at the completion of the project.

C. Damage: Damage resulting from EXCHANGE' use will not be considered the Contractor's responsibility.

D. Refer to clause entitled "Final Inspection and Acceptance" of the EXCHANGE "General Provisions".

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT (AF/AI):

A. Equipment or material to be furnished and installed by EXCHANGE is as follows and as indicated on the Drawings:

1. All store shelving, fixtures, service counters, and work stations in Mall Services and Retail Sales. (Electrical & Mechanical service, connections, lighting and fire protection by Contractor.)
2. Barber Shop: Work stations, fixtures, equipment and furnishings. (Storage Room built-in shelving by Contractor.)
3. Optometry Care/Optical Center: Fixtures, equipment and furnishings. (Built-in casework, plumbing fixtures, storage shelving and vent hood by Contractor.)
4. Floral Shop: Fixtures, equipment and furnishings. (Work Room built-in casework, plumbing fixtures and storage shelving by Contractor.) Floral Cooler to be AF/CI.
5. Alterations: Fixtures, equipment and furnishings.
6. MCSS: Fixtures, equipment and furnishings. (MCSS MPA Break Room built-in casework and plumbing fixtures by Contractor.)
7. Concessions: Fixtures, equipment and furnishings. (Storage Room built-in shelving by Contractor.) This includes planned services such as GNC, Game Stop, etc.
8. Kiosks, Benches and ATM machines in Mall and Retail Sales.
9. Food Court: Beverage/condiment stations, furnishings, fixtures and equipment.
10. Food Concepts/Kitchen: Fixtures, food service/prep equipment, dry storage shelving, safes, cash registers, metal wall panels, menu boards, concept signage, decorative lighting fixtures, and small wares packages. (Built-in service counters, casework and exhaust vent hoods by Contractor unless noted otherwise on individual Food Concept Equipment Schedules.)
11. Walk-in Coolers & Freezers. (Electrical & Mechanical service, connections, lighting and fire protection by Contractor.)
12. Office furniture & reception stations.
13. Retail Sales:

a. VIRA Clipless wall system and cornice lights in Softlines area. (Wall mounting strips to be furnished and installed by Contractor.)
b. Specialty ceiling suspended accent fixtures/soffits.
c. Modular Dressing Rooms with benches, mirrors & light fixtures.

14. MPA: Storage shelving and wire mesh partitions
15. ELCC Communications Center Equipment. (Rough-ins and final points of connection by Contractor.)
16. Satellite Dish
17. Telephone system equipment, devices and cabling. (Rough-ins and final points of connection by Contractor.)
18. EVSS (Cabinetry to be furnished and installed by Contractor.)
19. Graphic Signage at main Entry and at Check-out in Retail Sales.
20. Intrusion Detection System

PART 3 - EXECUTION

1.3 FINAL CONNECTIONS:

A. All final electrical connections to EXCHANGE furnished and installed equipment shall be made by the Contractor as part of the construction contract. The GC shall construct all openings, furnish and install required sleeves and conduit, and furnish and install all reinforcing, miscellaneous supports, angles, plates, anchors, and bolts necessary to secure EXCHANGE-furnished equipment in place.

END OF SECTION 01 10 17

SECTION 01 10 18

EXCHANGE FURNISHED, CONTRACTOR INSTALLED EQUIPMENT (AF/CI)

PART 1 - GENERAL

1.1 SUMMARY:

A. The material noted below will be furnished by the Exchange and shall be installed by the Contractor. See drawing references to (AF/CI). The Contractor shall provide for and cooperate with personnel furnishing the designated material.

B. All food service equipment must be approved by the National Sanitation Foundation, NSF.

C. Contractor's Duties:

1. Designate required delivery date for each product. Notify the Contracting Officer in writing at least 60 days in advance of the date that EXCHANGE furnished equipment and furnishings will be needed. Shop drawings indicating dimensional locations of all plumbing and electrical rough-ins will be furnished by EXCHANGE.
2. The equipment will be received at the job site by a representative of EXCHANGE who will jointly, with the Contractor, verify condition and quantities. The representative will then affect receipted transfer of custody of the equipment to the Contractor.
3. Unload, handle, store (on-site), protect, uncrate, assemble, install set in final position, align, join, level, and make all utility connections to all items of equipment. Installation shall be performed in accordance with the specifications, equipment plans, and schedules shown on the Drawings and the rough-in drawings provided by EXCHANGE.
4. Construct all openings, furnish and install required sleeves and furnish and install all reinforcing, miscellaneous supports, angles, plates, anchors, and bolts necessary to secure EXCHANGE furnished equipment in place.
5. Repair or replace items damaged as a result of Contractor's operations.
6. Apply finish indicated, if any.
7. The installation shall be complete in all respects, including mechanical and electrical hook ups, and put into good operating condition.

D. EXCHANGE Duties:

1. Deliver all EXCHANGE furnished items to the job site. Schedule delivery date with supplier in accordance with Progress Chart.
2. Provide Contractor with installation drawings and instructions.
3. Provide Contractor with shop drawings indicating dimensional locations of all plumbing and electrical rough-ins.

1.2 DELIVERY:

A. Contractor shall unload, handle, store, protect, uncrate, assemble, set in final position, align, join, and level all Exchange-Furnished material, and shall make all utility connections thereto. EXCHANGE will provide supervision for installation of the material.

B. The material will be received at the job site by a representative of the local EXCHANGE who, together with the Contractor, will jointly verify conditions and quantities. The

representative of the local EXCHANGE will then affect receipted transfer of custody of the material to the Contractor. Material damaged by or during construction operations shall be replaced at no additional cost to EXCHANGE.

1.3 FAILURE TO VERIFY:

A. Failure to execute above required verification shall not relieve the Contractor of responsibility for proper installation of the material, which shall be installed without additional cost to EXCHANGE.

1.4 DELIVERY DATE CHANGES:

A. Requests by Contractor to change designated delivery dates shall be made in writing at least 60 days in advance of the designated delivery date. If the Contractor is not ready to accept delivery of EXCHANGE furnished equipment the Contractor shall be responsible for storage and delivery cost. Should EXCHANGE be unable to effect the change, or should the Contractor fail to submit his request within the time stated above, the Contractor's obligation under his contract and as stated herein shall not be relieved and further, the Contractor will have no basis upon which he can file a claim under these conditions.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT (AF/CI):

A. Contractor shall install the following EXCHANGE furnished items at locations indicated on drawings:

1. Carpet (Contractor to supply all installation and accessory materials)
2. Mall, Food Court & Exterior Signage
3. Interior Shopping Cart Corrals (05 50 00)
4. PA System and speakers.

Contractor is responsible to provide all MEP connections and final hook-ups of all AF/AI equipment and fixtures as required.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The GC shall construct all openings, furnish and install required sleeves and conduit, and furnish and install all reinforcing, miscellaneous supports, angles, plates, anchors, and bolts necessary to secure EXCHANGE-furnished equipment in place. All final electrical connections to EXCHANGE furnished equipment shall be made by the Contractor as part of the Construction Contract.

END OF SECTION 01 10 18

SECTION 01 10 60

SAFETY POLICIES AND PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Contractor required health and safety plan.

1. Contractor is responsible for reading the Risk Assessment Plan and following the directions therein.
2. Contractor must maintain OSHA permissible exposure limits related by the risk assessment: That is, 25 ppm (170 mg/cubic meter) during any 8 hour work shift for a 40-hour week

B. Construction Hazard Plan.

1.2 RELATED SECTIONS

A. Submittals - Section 01 33 00 (Construction Hazard Plan, Job Safety and Health Plan, Emergency Response Plan).

B. Record Documents - Section 01 78 39.

C. Environmental Protection – Section 0135 43

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1. OSHA 1910 R.E.G. - 29CFR, OSHA 1910.120
2. U.S. Army Corps of Engineers and Publications EM-385-1-1, Safety and Health Requirements manual. (Most current version).

1.4 SUBMITTALS

A. Submittals for EXCHANGE approval - The following items shall be submitted for EXCHANGE approval:

1. Designation of Safety Representative: The Contractor shall designate in writing a qualified employee OSHA Trained under 1910.120 responsible for the overall supervision of all accident prevention activities. Duties shall include ensuring applicable safety requirements are incorporated into work methods and inspecting the job site to ensure that safety measures and instructions are actually being applied. This person shall be on site at all times that work is in progress.
2. The Contractor shall be trained/certified in OSHA 1910.120 procedures. All other employees performing site work will meet OSHA 1910 training requirements for their job capacity.

B. Submittals for Information Only - The following items shall be Contractor certified:

1. Job Hazard Analysis: Contractor shall develop a job hazard analysis for presentation at the pre-construction conference. The Contractor's job hazard analysis shall list potential hazards that could arise during the course of the work.

2. Job Safety and Health Plan.

   a. The Contractor shall develop a Job Safety and Health Plan for presentation at the Pre-construction conference. The Contractor's Safety Plan shall make whatever provisions are necessary to conduct his work in accordance with current OSHA standards.
   b. The safety and health plan must specifically address the excavation portion of construction and will be specific to perchloroethylene (tetrachloroethylene) (PCE), and incorporate decontamination procedures for personnel and equipment, continuous vapor monitoring, a prohibition against eating in proximity to the site, and a prohibition against the smoking of tobacco products in the proximity to the site.
   c. The following are minimum requirements for the health and safety plan:

      1. The Contractor is responsible for all compounds and degradation products addressed by the Risk Assessment Plan.
      2. Specialized Designs: Specialized designs will be provided when the situation requires. Examples of such designs include, but are not limited to, vapor barriers in areas of known vapor hazard.
      3. Safety Plans: Safety Plans will be the responsibility of the Contractor for construction areas identified by the installation and/or EXCHANGE as areas of known hazards only. These plans are required by 29 CFR 1910 and are the responsibility of the Contractor. This requirement will be coordinated through the Health and Safety Program of the military installation by the Contractor.
      4. Minimum Requirements for the Health and Safety Plan are as follows:

         (a) Must be kept on site, and must be written.
         (b) Will contain a hazard analysis (safety and health risk) for each site task and operation (to be supplied by the installation).
         (c) Will include employee training (per paragraph (3) of 1910.120).
         (d) Will include personal protective equipment to be used by employees for each of the site tasks and operations (paragraph (g) (5) of 1910.120).
         (e) Will include provision for medical surveillance (paragraph (f) of 1910.120).
         (f) Will include the frequency and types of air monitoring, personal monitoring, environmental sampling techniques, instruments to be used (their maintenance and calibration).
         (g) Will include a site control program (per paragraph (d) of 1910.120) to be coordinated with the installation.
         (h) Will include a decontamination procedure (per paragraph (k) of 1910.120).
         (i) Will include an emergency response plan (per paragraph (1) of 1910.120).
         (j) Will include a confined space entry procedure (per 1910.146, 147 or program equivalent).
         (k) Will include provision for spill containment (per paragraph (j) of 1910.120).
         (l) Will include pre-entry briefings (prior to each site task activity) for all employees involved in the task, supervision, or emergency response.

(m) Written verification of adherence to the "plan" by a Safety and Health Supervisor is required (the supervisor must meet the 1910.120 training requirements for supervisors).

(n) Deficiencies will be corrected immediately upon discovery and after consultation with the EXCHANGE Contracting Officer.

d. Hazard Response Plan: The unplanned or non-predicted discovery of such hazards as transite pipe, contaminated soils, and other possible hazards will be addressed within an Emergency Response Plan (EMR) by all contractors. This requirement will be coordinated through the Health and Safety Program of the military installation by the contractor (sample provided).

e. Material Safety Data Sheets will be maintained at the site for all hazardous materials in use.

1.5 MONTHLY SAFETY MEETINGS

A. The Base will schedule subsequent safety meetings with Contractor and subcontractor personnel on a monthly basis. Minutes of safety meetings shall be prepared and signed by the Contractor. Concurrence signed by Inspection Section and the original submitted to the Contracting Officer for inclusion in the contract file.

1.6 ACCIDENT REPORTING AND RECORD KEEPING

A. Accident reporting and record keeping shall be in accordance with Base requirements. Telephonic reports of injuries or property damage will be made as soon as possible after the incident and will be followed by a copy of an Accident Report.

1.7 LIFE OF CONTRACT REQUIREMENTS

A. The Contractor shall comply with all provisions of this section during the life of the contract.

1.8 HEAD PROTECTION (HARD HATS)

A. All work sites under this contract are designated Hard Hat Areas. The Contractor shall post the area and shall ensure that all personnel, vendors and visitors use hard hats while within the limits of the work site.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 10 60

SECTION 01 13 00-0

SAFETY REGULATIONS AND CODES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

A. Reference Standards.

B. Licenses and Permits

C. Safety.

D. Fire Safety.

E. Affirmative Procurement Program

F. Industrial Ventilation

G. Use of Ionizing Radiation (IR).

H. Use of Lasers.

I. Use of Radioactive Materials

J. Use of Radio Frequency (RF) Radiation.

K. Use of Ultraviolet (UV) Radiation.

L. Protection of Nesting Birds

M. Historical or Cultural Artifacts

N. Ozone Depleting Substances.

O. Lead Base Paint.

P. Cleaning & Debris Control

Q. Nuisance Dumping & Polluting Activities

R. Stormwater Pollution Prevention

S. Excavation at IRP Sites

T. Contaminated Soil

U. Suspected Hazardous Materials

V. Oil-Filled or Impregnated Electrical Components

W. Hazardous Waste Testing

X. Hazardous Material Inventory

Y. Spill Response and Reporting

Z. Waste Disposal and Environmental Protection.

1.2 REFERENCE STANDARDS

A. Federal, State and Local Codes and Ordinances take precedence over these Specifications and Drawings where conflicts occur, unless the Drawings or Specifications call for more stringent requirements. Notify the Contracting Officer in writing of conflicts.

B. Comply with all applicable laws, building and construction codes, OSHA Safety and Health Regulations and applicable requirements of any governmental agency under whose jurisdiction this Work is being performed.

C. Obtain a copy of standards referenced in the various Specification Sections. Maintain a copy at the jobsite during execution of Work to which the standard applies.

D. Construction that is not governed by the contract specifications will be governed by the more stringent provisions of the latest published edition or statute adopted edition, of the following applicable codes, regulations and standards.

ADA	Americans With Disabilities Act Accessibility Guidelines
AFR	Air Force Regulations
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
FAR	Federal Acquisition Regulations
IBC	International Building Code
IMC	International Mechanical Code
IPC	International Plumbing Code
NEC	National Electrical Code
NFPA	National Fire Code
OSHA	Occupational Safety and Health Act

Other applicable codes and standards as applicable or as referenced by the individual specification Sections.

1.3 LICENSES AND PERMITS

A. The Contractor shall obtain and maintain current for the duration of this Contract, all required Federal, State and local licenses and permits. All associated fees and taxes shall be paid by the Contractor without additional cost to the Government.

B. Obtain from base security all required vehicle and entry permits.

C. Obtain from the Contracting Officer any additional Ft. Myer required permits. Current permit requirements shall be provided to the Contractor at the preconstruction conference.

1.4 SAFETY

A. Comply with all Federal and State regulations concerning safety of personnel and equipment. All Contractor personnel shall wear hard hats and steel toe safety shoes while on the project site. In addition, all personnel shall wear hearing protection (ear muffs or ear plugs) when inside the power plant, excluding office areas, restrooms, break rooms and other "quiet" areas.

B. Ensure that lock out, tag out procedures are established and used as directed by 29 CFR 1910.145. Comply with the lock out, tag out procedures in use by CH&PP personnel. Ensure that contractor's personnel on site are trained on the government's procedures.

C. Comply with all safety, traffic and protection requirements in effect on Ft. Myer. Government will brief the Contractor on these requirements at the preconstruction conference.

D. Work areas in this Project may be classified as "permit-required confined spaces" or "non-permit required confined spaces." The Contractor's Certified Industrial Hygienist will determine the confined space status of the Project areas. Regulations and procedures for entry into "permit-required confined spaces" are contained in 29 CFR 1910.146 and 8 AAC 61.010.14. The Contractor is responsible for ensuring the safety of his employees in confined spaces according to these regulations.

E. Provide safety barriers around open excavations, openings in floors and other hazards created by the Contractor's activities.

F. The Contracting Officer may direct the Contractor to cease activities which, in their opinion, are unsafe.

1.5 FIRE SAFETY

A. Comply with all fire safety and protection requirements in effect on Ft. Myer. Government will brief the Contractor on these requirements at the preconstruction conference.

B. Prior to beginning any welding, use of open flame device, or any activity that produces sparks, obtain a "hot work permit" from Ft. Myer Fire Department. The permit shall be **renewed each day** welding or open flame devices will be used. Contact Ft. Myer Fire Department at (703) 696-3483 or go to Ft. Myer Fire Department between 7:00am and 8:00pm current local time.

C. If the contract work requires numerous days of hot work, the Contractor may elect to have one of his on-site personnel designated as a Permit Authorizing Individual (PAI). The Contractor's PAI may issue hot work permits at the work site, thus avoiding the requirement for daily permits issued by the Fire Department.

D. The Contractor's PAI shall be the on-site superintendent, a foreman, the Contractor's Safety Manager, or other individual with sufficient knowledge and experience to recognize unsafe work practices or conditions and having authority to stop work immediately if such unsafe practices or conditions are observed. To be designated as a PAI, a person must

schedule and successfully complete PAI certification training offered by the Base Fire Department. PAI certification training is estimated to last 60 to 90 minutes.

E. Fire Department personnel may periodically visit the site to ensure the Contractor is complying with fire safety requirements. A PAI's certification may be revoked if the PAI has failed to issue permits on days when hot work is performed, or if unsafe practices or conditions are observed.

F. Questions concerning these requirements may be directed to Chief, Ft. Myer Fire Department.

G. The Contractor shall notify the Fire Department at (703) 696-3483 a minimum of 48 hours before, and again immediately prior to, temporarily closing any street or paved building access, interrupting water service to any fire hydrant or interrupting the operation of any fire detection, alarm or suppression system. The fire Department shall be immediately notified upon reopening closed areas, restoration of water service to any fire hydrant, or reactivation of any detection, alarm or suppression system. This notification requirement is in addition to other contract requirements.

H. Provide a 10 lb, ABC fire extinguisher at all work stations.

I. Report a fire: Dial 911.

1.6 AFFIRMATIVE PROCUREMENT PROGRAM

A. These standards apply to all new construction, demolition, rehabilitation, alteration, modification, repair, and maintenance of existing facilities.

B. In an effort to comply with the affirmative procurement requirements of Section 6002 of the Resource Conservation Recovery Act (RCRA) and Executive Order 13101, the government strongly promotes the use of the recycled and recovered materials and products identified in the Environmental Protection Agency's Comprehensive Procurement Guidelines.

C. Recycled and recovered materials and products must be considered first before any other materials and products will be accepted. Recycled and recovered materials and products must be used throughout the project unless they either do not meet the requirements of this specification, delay the progress of the work, or are cost prohibitive.

D. Examples of these materials and products are detailed below. These are recommended quantities and represent minimum compliance. The actual requirement is to use the maximum amount of recycled material possible, while meeting the performance specifications.

Type	Material	Recycled Material	%
Insulation	Rock wool	Slag	75
	Fiberglass	Glass cullet	20-25
	Loose fill & spray on (cellulose)	Postconsumer paper	75
	Perlite composition board	Postconsumer paper	23
	Plastic rigid foam	Recovered material	9
	Foam-in place	Recovered material	5
	Glass fiber reinforced	Recovered material	6
	Phenolic rigid foam	Recovered material	5
Wall Board	Structural fiberboard		80-100
	Laminated paperboard	Postconsumer paper	100
Carpet	Polyester carpet face fiber	Excludes severe wear applications	25-100
	Playground surfaces	Rubber or plastic	90-100
	Running tracks	Rubber or plastic	90-100
Cement/Concrete	Concrete & cement	Coal fly ash	15-35
	Concrete & cement	Ground granulated blast furnace (GGBF)	25-50
Flooring/Patio	Patio blocks	Plastic or plastic blends	90-100
	Patio blocks	Rubber or rubber blends	90-100
	Floor tiles	Rubber	90-100
	Floor tiles	Plastic	90-100
Landscaping	Paper based hydraulic mulch	Postconsumer paper	100
	Wood based hydraulic mulch	Recoverd wood and/or paper	100
	Compost		100

1.7 INDUSTRIAL VENTILATION

A. Contact the Contracting Officer 10 working days prior to any industrial ventilation systems (systems which control a hazard) being evaluated for acceptance. Advance notification is required by Bioenvironmental Engineering (BE) to allow performance or observation of tests of any new or renovated system prior to initial startup to verify the system will control the hazard. BE will be present for tests of fan speed and rotation, fan motor load, and air flow in all hoods or branches.

1.8 USE OF IONIZING RADIATION (IR)

A. Submit a written request for approval at least 30 calendar days before commencement of activities which require the use of IR generating devices.

B. Submit request to the Base Radiation Safety Officer (RSO) with a courtesy copy to the Contracting Officer. Request shall include:

1. Description/Characteristics:

a. X-ray unit manufacturer
b. Model number
c. Serial number

d. Maximum kVp, mA, Sec
e. Ionizing radiation source/emitter (electron tube)

2. The part of the EXCHANGE contract describing work to be done at the base and the inclusive dates of such work.
3. An acknowledgment that the RSO may make initial and periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Post or Base personnel.

1.9 USE OF LASERS

A. Submit a written request for approval at least 30 calendar days before commencement of activities which require the use of a laser.

B. Submit request to the RSO with a courtesy copy to the Contracting Officer. Request shall include:

1. Description/Characteristics:

a. Manufacturer.
b. Model.
c. Number of same units.
d. Serial number(s).
e. Laser medium.
f. Mode of operation (i.e. continuous wave (CW), single pulse, multiple pulse).
g. Maximum exposure time (train length).
h. Ime (sec) & wave length.
i. Energy/pulse (J) or CW power (W).
j. Pulse repetition frequency.
k. Pulse width.
l. Beam diameter (at 1/e point).
m. Beam divergence (at 1/e point).

2. The part of the EXCHANGE contract describing work to be done and the inclusive dates of such work.
3. An acknowledgment that the RSO may make initial and periodic checks to ensure the contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Post or Base personnel.

1.10 USE OF RADIOACTIVE MATERIALS (RAM):

A. Prior to bringing RAM onto Ft. Myer property, the Contractor shall obtain permission from the RSO. To obtain approval, forward an application to the RSO, and a courtesy copy to the Contracting Officer at least 30 calendar days before the planned date for commencement of activities on the installation. Requests shall include:

1. A description of the proposed activities on NRC Form 241, Report of Proposed Activities in Non-Agreement States, (the 180-day limitation on the form does not apply to organizations holding an NRC license). Contractors possessing Agreement State Licenses shall also submit an NRC Form 241 to NRC in compliance with 10 CFR 150.21. Contractors requiring more than 180 days of operation per calendar year on the installation shall possess an NRC license.
2. The procedures established to ensure radiological health and safety of Base personnel and the public while on Army or Air Force installations on site and the name of the responsible Contractor representative.

3. A current copy of the applicable NRC, or Agreement State license. Expired licenses are unacceptable. To be valid at the installation, the license must either specifically state the installation by name on the license or state approval for work at temporary job sites anywhere in the United States where the NRC or Agreement State maintains jurisdiction. DOE or DOE prime contractors must provide, in lieu of a license, written certification of their exemption from NRC licensing requirements and cite the applicable exemption of 10 CFR.
4. The part of the EXCHANGE contract describing work to be done and the inclusive dates of such work
5. An acknowledgment that the Base RSO may make periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Army or Air Force personnel and prevent potential contamination of Government property.

1.11 USE OF RADIO FREQUENCY (RF) RADIATION

A. Prior to using equipment generating RF Radiation in excess of seven watts peak power and a frequency of 1000 MHz or greater on Ft. Myer must submit a written request for approval at least 30 calendar days before commencement of activities which require the use of the RF generating device.

B. Submit request to the RSO, with a courtesy copy to the Contracting Officer. Submittal shall include:

1. Description.
2. Nomenclature.
3. Location of emitters.
4. Quantity.
5. Frequency (Mhz).
6. Pulse width (microsec.).
7. Pulse repetition freq. (pps).
8. Peak power (kW).
9. Antenna size (feet--horizontal/vertical).
10. Antenna band width (degrees-- horizontal/vertical).
11. Antenna gain (dB).
12. Scan rate (rpm).

C. The part of the EXCHANGE contract describing work to be done at the base and the inclusive dates of such work.

D. An acknowledgment that the RSO may make initial and periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Post or Base personnel.

1.12 USE OF ULTRAVIOLET (UV) RADIATION

A. Submit a written request for approval at least 30 calendar days before commencement of activities which require the use of UV generating devices on Ft. Myer.

B. Submit request to the RSO, with a courtesy copy to the Contracting Officer. Request shall include:

1. The part of the EXCHANGE contract describing work to be done at the base and the inclusive dates of such work.

2. An acknowledgment that the RSO may make initial and periodic checks to ensure the Contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Post or Base personnel.

1.13 PROTECTION OF NESTING BIRDS

A. Federal law prohibits disturbing bird nests containing eggs or birds too young to fly. Harassment of birds to force them to abandon an occupied nest is also illegal. If the Contractor removes nests or harasses birds in violation of federal and state law, the Contractor is responsible for any charges filed by U.S. Fish and Wildlife Service or State of Virginia and is the liable party.

B. If an occupied bird nest is discovered, the contractor shall cease activities in the vicinity of the bird nest until the young birds are able to fly and leave the nest under their own power.

C. Cliff swallow nests are usually the greatest threat to construction projects. As a general rule, cliff swallows can begin nest construction any time between 10 May and 21 July.

D. The Government is responsible for removing new nests in the vicinity of the work area prior to Notice to Proceed.

E. The Contractor shall be responsible for control of new nest construction after issuance of NTP. The contractor shall survey the work area **daily** for new nest construction. To avoid project delays, the contractor shall remove all nests discovered before the nests have been completed and occupied.

F. The contractor shall be responsible for any increased cost or delay resulting from a nest constructed and occupied in the work area after NTP has been issued.

1.14 DISCOVERY OF HISTORICAL OR CULTURAL ARTIFACTS

A. Should any historical artifacts or cultural resources be unearthed, stop excavating and immediately notify the Contracting Officer.

1.15 OZONE DEPLETING SUBSTANCES

A. No ozone depleting substances (refrigerants or any other compounds) shall be used in any capacity on this project unless specifically approved by the HazMart.

1.16 LEAD BASE PAINT

A. No paint with a lead content of 0.06 percent or greater shall be used in any capacity on this project unless specifically approved by the HazMart.

1.17 CLEANING AND DEBRIS CONTROL

A. During the term of this Contract, the Contractor shall remove any materials and equipment that are not required for the completion of the work as promptly as possible. All debris shall be removed from the site and legally disposed. The Contractor shall take particular care to eliminate any hazards created by his operations.

B. The Contractor is responsible for any damage caused by his debris without additional cost to the Government.

C. The Contractor shall maintain at all times during his work at this Project Site a strict windblown debris control program. This program shall ensure no windblown debris or other debris from his work shall contaminate or interfere with any access to or operation of any facility or any parking area, road or street.

1.18 NUISANCE DUMPING AND POLLUTING ACTIVITIES

A. Polluting, dumping, or discharging of any harmful, nuisance, or regulated materials (such as concrete truck washout, vehicle maintenance fluids, residue from saw cutting operations, solid waste or hazardous substances) into building drains, site drains, streams, waterways, holding ponds or to the ground surface is not permitted. The contractor shall be responsible for any and all damages resulting from dumping or discharges. Further, the Contractor shall conduct activities in such a fashion to avoid creating any legal nuisance, including but not limited to, suppression of noise and dust, control of erosion, and implementation of other measures as necessary to minimize off site impacts of work activities.

B. Fugitive Dust emissions (airborne dust generated by vehicles operating on unpaved surfaces, transfer or transport of dust producing materials, etc.) shall be controlled at the construction site, along haul routes and at staging areas. Water spraying shall be conducted as necessary to minimize fugitive dust generation.

1.19 STORMWATER POLLUTION PREVENTION

A. No stormwater permit is needed for this project. Ensure that asphalt removal does not result in any releases of sediment or debris to storm drains that may be in the area. Provide inlet protection during asphalt removal.

1.20 CONTAMINATED SOIL

A. If unexpected contaminated soil is encountered while performing work, stop work immediately and contact the Contracting officer. Do not resume work until approved by the Contracting Officer.

1.21 SUSPECTED HAZARDOUS MATERIALS

A. Removal and disposal of asbestos is included in this contract. Any other suspect hazardous materials encountered during demolition or construction shall immediately be brought to the attention of the Contracting Officer's representative. Work shall not resume until the Contracting Officer is satisfied that the materials are not hazardous. Should they be found to be hazardous, the contractor shall immediately take steps to contain the material, so further damage and contamination does not occur. The contractor shall then submit a proposal for removal.

1.22 OIL-FILLED OR IMPREGNATED ELECTRICAL COMPONENTS

A. Notify (Post or Base Environmental Safety Office and phone number) before demolition or installation of any oil-filled electrical equipment (for example: transformers and regulators). All transformers (both PCB and non-PCB-containing) and light ballasts (unless labeled “No PCBs”) shall be disposed through the Ft. Myer Hazardous Material and Waste Handling facility.

1.23 HAZARDOUS WASTE TESTING

A. The Contractor shall subject a representative sample of each type of hazardous waste, or potentially hazardous waste, generated to TCLP (Toxic Characteristic Leaching Procedure) testing. Sampling and testing for appropriate metals, and volatile and semi-volatile chemicals shall be performed by an independent test agency that is regularly engaged in the sampling and testing of hazardous materials and waste. Provide the test results to Post or Base Hazardous Waste Facility before transferring the waste to the facility.

1.24 HAZARDOUS MATERIAL INVENTORY

A. Contractor must submit an inventory of all hazardous materials to be used to include quantities. Inventory must be updated at completion of the project to indicate quantities used, spilled, and disposed of, etc.

B. The Contractor shall provide the Hazardous Materials Pharmacy (HazMart) a list and quantity of all hazardous materials that the Contractor intends to bring onto Government property. The Contractor shall provide the HazMart with copies of all MSDSs and an inventory for each Hazardous chemical listed in OSHA Hazard Communication Standard 29 CFR 1910.1200 intended to be used. Each MSDS shall be on file prior to use of the chemical, and shall be maintained for all chemicals. Once the hazardous material is used, its quantity of use shall be reported to the HazMart along with the disposition of the container.

C. Submit a completed Hazardous and Related Material Identification Form, and an MSDS for all materials listed on the form and brought on Base, to the (office and phone).

D. If hazardous materials are not in their original container, the container containing the substance must be labeled.

1.25 SPILL RESPONSE AND REPORTING

A. Spills of hazardous waste, hazardous materials or non-regulated substances such as oils, antifreeze, grease, latex paint, hydraulic fluid, etc. shall immediately be reported to DPW for reporting purposes to local, state and federal agencies and proper clean-up action. If a spill occurs after normal working hours, or on a weekend or holiday, report spills to the Ft. Myer Fire Department and request they contact DPW.

B. The contractor is encouraged to have a supply of absorbent pads on-site to aid in immediate clean-up of smaller spills, such as oil, coolant or hydraulic fluid leaks from vehicles or equipment.

C. Spill notification placards are to be placed on the job site (CEV or DPW) will provide format and required locations prior to construction.

D. The contractor shall develop a spill plan. The format for the plan will be provided by (CEV or DPW) prior to construction.

1.26 WASTE DISPOSAL AND ENVIRONMENTAL PROTECTION

A. The Contractor shall comply, and ensure that all subcontractors comply, with all Federal, State, local laws, and regulations, ordinances and standards related to environmental pollution control and abatement in effect and the specific requirements stated elsewhere in the Contract Documents.

B. All hazardous wastes as defined in 40 CFR, Part 261, shall be collected and disposed of in accordance with 40 CFR, Parts 260-268, and Ft. Myer Regulations. The Contractor is responsible for properly storing, marking, labeling, securing and transporting hazardous wastes. All hazardous wastes shall be collected in contractor furnished DOT/UN approved containers and taken to Ft. Myer Hazardous Waste Facility for disposal. Call the Hazardous Waste Facility prior to transporting wastes to the facility to coordinate delivery of the waste materials. The Contractor shall not store hazardous waste on base for more than 30 days.

C. Any previously unidentified suspected hazardous materials encountered during performance of the work of the contract shall immediately be brought to the attention of the Contracting Officer.

D. All general construction wastes, other than those specifically allowed, or required, to be disposed of on-base shall be legally disposed at an off-base sanitary landfill.

E. Comply with the requirements of “Section 01 13 00-1 Waste Disposal” immediately following this Section.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION - (Not Used)

END OF SECTION 01 13 00

SECTION 01 13 00-1

WASTE DISPOSAL

PART 1 – GENERAL

1.1 The Contractor shall obtain all permits required by federal, state and local laws for the construction activities involved. The Contractor shall perform all work in such a manner as to minimize the polluting of air, water or land and shall, within reasonable limits, control noise and the disposal of solid waste materials, as well as other pollutants. The Contractor shall ensure that all construction, repair, maintenance operations and practices and waste disposal performed under this contract shall be in strict compliance with all applicable city, county, state, and federal environmental laws and regulations.

A. Hazardous and Non-hazardous Waste Disposal:

1. There are existing sources of hazardous waste involved with this project.

2. The Contractor shall submit an implementation plan for disposing hazardous and non-hazardous material. Prior to on-site construction the Contractor shall submit the implementation plan for approval. The plan should include storing, characterizing, and disposing of hazardous and non-hazardous waste materials resulting from the work under this contract. Waste includes, but is not limited to, paint waste, paint equipment cleaners, and used paint containers.

3. If any waste material is dumped in unauthorized areas, the Contractor shall remove the materials and restore the area to the condition of the adjacent undisturbed areas. Where directed and approved by the Contracting Officer, contaminated ground shall be excavated, characterized, stored, disposed of, and replaced with suitable fill material at the expense of the Contractor.

4. All waste disposal shall be in strict accordance with local, state and federal requirements and regulations. Waste paint, paint equipment cleaners and used paint containers shall be disposed of off base by the Contractor, at the Contractors' expense. Any soil contaminated through spillage shall be removed and disposed of in accordance with the requirements specified herein. Soil that is required to be removed shall be replaced by similar soil approved by the Contracting Officer.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 13 00-1

SECTION 01 14 20

CONSTRUCTION PHASING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Format.

B. Content.

C. Revisions to schedules.

D. Submittals.

1.2 RELATED SECTIONS

A. Exhibit "A" - General Conditions of the EXCHANGE Contract for Construction, Article entitled: "Schedule and Progress".

B. Section 01 10 00 - Summary

C. Section 01 33 00 - Submittals: Construction Progress Schedules.

D. Section 01 31 00 - Progress Management and Coordination.

1.3 GENERAL

A. The construction phasing shall serve as a guide in managing the construction progress.

B. In preparing this system, the scheduling of construction shall be the responsibility of the contractor.

1.4 COORDINATION

A. Construction shall be phased and coordinated with the Contracting Officer in order to keep to a minimum, any disruption of, or interference with, the operation of the existing retail facility. The Contractor shall notify the contracting officer, within 15 days of notice to proceed, if any problems concerning specified construction phasing occur. The (exchange) will be in operation, throughout this contract. Contractor shall submit, in accordance with Section 01 32 00, Contractors prepared progress chart system, a detailed schedule of work utilizing the priority and sequence of work shown on the Construction Phasing Plan. The Contractor shall keep the Contracting Officer advised of any anticipated changes in the work schedule in sufficient time to permit adjustment of store operations, without adversely affecting the ability of the (exchange) to function as necessary.

B. Schedule: The phasing as shown on the drawings is the required sequence. The Contractor must submit the schedule, for review, to the Contracting Officer within 15 days after execution of a contract. Items specified herein are complementary to work items shown on the drawings schedule.

C. Beneficial occupancy inspection (finishes only) will be made at the end of each work item, to allow early access for fixture installations.

1.5 BARRIERS:

A. Building areas adjacent to areas to be renovated will not be vacated by the Exchange; therefore, barriers shall be erected by the Contractor as work progresses. Provide barriers as specified in Section 01 50 50 Temporary Facilities, Barriers and Controls in the locations indicated, and as required, from floor to ceiling or from floor to underside of roof deck, to seal operational portions of the retail facility from areas of construction. Security walls, however, shall be secured up to the bottom of roof deck. Temporary barriers exposed to customer view shall be painted with two coats of color as approved by the Contracting Officer.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. All isolation valves and temporary ductwork used to keep system on line in occupied phases for mechanical systems (air-handling units, supply piping, water lines, sprinklers, and other similar items) shall be included by the Contractor at no additional cost to the Exchange.

2.2 GENERAL:

A. Site Preparation: Site preparation includes but is not limited to the relocation of utilities, the demolition of existing paved areas, regrading and paving to establish new parking areas, and the relocation and/or demolition of existing utilities as scheduled. Temporary construction barriers for site security must generally follow the project limit line.

1. Construction and Safety Fence: Enclose the contractor staging area with a 2.5 m (8-foot) high chain-link construction fence incorporating plastic fabric mesh screening (UV light resistant, dark brown, similar to tennis court screening) and include associated gate(s). Vinyl inserts are not allowed. The intent is to block construction activities from public view. The construction fence shall be supported and tightly secured to steel posts located on minimum 3 m (10 foot) centers either set in concrete or provided concrete block bases (depending upon anticipated heavy wind conditions). The Contractor shall also provide temporary safety fencing and warning signs at the construction site prior to the start of work to protect the public from immediate construction activities deemed hazardous. The safety fence will enclose those hazardous areas both within and outside of the visually-screened construction site. The safety fence, fabricated from high-density polyethylene grid (minimum 1.1m (42-inches) high, will meet OSHA and AFOSH color standards (typically bright orange for excavated trenches). The Contractor shall remove both the fence and screening from the work site upon completion of the contract.

B. Electrical Systems:

1. Install electrical distribution and telephone to existing construction.
2. All of the above work shall be completed without disruption of exchange operation during normal business working hours.

C. Plumbing System:

1. Install all required piping and valves at the connection points. Shutdown of the plumbing systems to make necessary connections and extensions shall be

accomplished at a time so as not to interfere with operation of the exchange, and shall be of minimum duration. All proposed shutdowns of the plumbing systems shall be coordinated with the exchange management.

D. Electrical Security Systems:

1. Temporarily modify the alarm system to allow access during working hours to the temporary entrances.

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 14 20

SECTION 01 14 50

CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Requirements and limitations for cutting and patching of Work.

1.2 RELATED SECTIONS

A. Section 01 10 00 - Summary.

B. Section 01 33 00 - Submittals.

C. Individual Product Specification Sections:

1. Cutting and patching incidental to work of the section.
2. Advance notification to other sections of openings required in work of those sections.
3. Limitations on cutting structural members.

1.3 SUBMITTALS

A. Submit written request in advance of cutting or alteration which affects:

1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of EXCHANGE or separate contractor.

B. Include in request:

1. Identification of Project.
2. Location and description of affected Work.
3. Necessity for cutting or alteration.
4. Description of proposed Work and Products to be used.
5. Alternatives to cutting and patching.
6. Effect on work of EXCHANGE or separate contractor.
7. Written permission of affected separate contractor.
8. Date and time work will be executed.

1.4 MATERIALS

A. Primary Products: Those required for original installation.

1.5 EXAMINATION

A. Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

B. After uncovering existing Work, assess conditions affecting performance of work.

C. Beginning of cutting or patching means acceptance of existing conditions.

1.6 PREPARATION

A. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

B. Provide protection from elements for areas which may be exposed by uncovering work.

1.7 CUTTING

A. Execute cutting and fitting to complete the Work.

B. Uncover work to install improperly sequenced work.

C. Remove and replace defective or non-conforming work.

D. Remove samples of installed work for testing when requested.

E. Provide openings in the Work for penetration of mechanical and electrical work.

F. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

1.8 PATCHING

A. Execute patching to complement adjacent Work.

B. Fit Products together to integrate with other Work.

C. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.

D. Employ original installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.

E. Restore work with new Products in accordance with requirements of Contract Documents.

F. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.

H. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 14 50

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

A. Unit price shall be added to Contractor's proposal on EXCHANGE Solicitation Form 4450-024, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if concealed conditions cause quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Refer to Section 033540, Interior Concrete Slab Repair & Joint Filler Replacement for detailed description of work and method for computing cost for the following items:

1. Joint filler removal and replacement.
2. Spalled joint repair or joint with metal keyway (less than ¾").
3. Spalled joint repair with metal keyway or self leveling compound (greater than 3/4").
4. Crack repair.
5. Surface defect repair, including pop-outs, spalls and gouges.
6. Surface embed repair including cleanouts, in-floor electrical outlets and Walker Duct access holes.
7. Large area surface repair, existing underlayment removal and replacement.
8. Grout coat surface enhancement, including micro-pin holes, pitting and other shallow surface deficiencies.
9. Fully grind, densify, dye and polish portions of the project not currently indicated on the drawings.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 22 00

SECTION 01 23 00

OPTIONS

PART 1 - GENERAL

1.1 DEFINITIONS

A. Options: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each option is the net addition to or deduction from the Contract Sum to incorporate option into the Work. No other adjustments are made to the Contract Sum.

1.2 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the option into Project.

1. Include as part of each option, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of the options.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each option. Indicate if options have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to options.

C. Execute accepted options under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Options is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each option.

1.3 SCHEDULE OF OPTIONS

A. Option No. 1:

1. Base Bid: Provide resilient tile flooring.
2. Option: Provide polished concrete floor finish.

B. Option No. 2:

1. Base Bid: Existing “Area C – Main Floor” to remain “as is”. Install relocated stock doors scheduled on Drawings and infill existing opening to “Area C”.
2. Option: Renovate Existing “Area C” – Main Floor to incorporate new MCSS, Alterations, Alterations Work Room, MCSS Office, MCSS Break Room, MCSS Unisex Restroom and MCSS Janitor Closet. See drawings for full extent of proposed work.

C. Option No. 3:

1. Base Bid: Existing Fluorescent Fixtures to remain or be relocated as shown on Drawings.
2. Option: Upgrade 2' x 4' Fluorescent Fixtures with Retrofit Kits as shown on Drawings.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 23 00

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 CONTRACTING OFFICERS APPROVAL

A. The contract is based on materials and methods described in the contract document.

B. The Contracting Officer will consider proposals for substitution of materials, equipment and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Contracting Officer to evaluate the proposed substitution.

C. Do not substitute materials or equipment, unless such substitution has been specifically approved for this Work by the Contracting Officer.

D. Requests for substitution shall be made no less than 10-days prior to solicitation closing date.

1.2 TERM OR “EQUAL”

A. What the term “or equal” or “or equal as approved in advance by the Contracting Officer” occurs in the Contract Documents:

1. Do not assume that other non-specified materials or equipment will be approved as equal by the Contracting Officer.
2. All items shall be specifically approved, in writing, by the Contracting Officer if not set forth in detail in the Contract Documents.

B. The decision of the Contracting Officer shall be final.

1.3 AVAILABILITY OF SPECIFIED ITEMS

A. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the Work.

B. In the event specified item or items will not be so available, notify the Contracting Officer prior to receipt of bids.

C. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will be back-charged as necessary and shall not be borne by EXCHANGE.

1.4 CONTRACT AWARD

A. No further substitutions will be permitted after contract award.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 25 00

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 REQUESTS FOR INFORMATION (RFIs)

A. RFI Forms: Software-generated form acceptable to Architect and EXCHANGE Project Manager.

B. Architect's Action: Allow seven working days for Architect's response for each RFI.

C. RFI Log: Maintain a tabular log of RFIs. Submit log weekly.

1.2 PROJECT WEB SITE

A. Use EXCHANGE' Project Web site for project communication and documentation.

B. EXCHANGE to provide up to seven Project Web site user licenses for use of, EXCHANGE's Commissioning Authority, Contractor, Architect, and Architect's consultants. EXCHANGE to provide eight hours of software training at Architect's office for Project Web site users.

C. Project Web site software package:

1. Autodesk, Constructware.

1.3 PRECONSTRUCTION MEETING

A. The Contracting Officer and/or Contracting Officer's representative will schedule and preside at preconstruction meeting.

B. Attendance Required:

1. Contracting Officers and/or Contracting Officer's representative and other Headquarters EXCHANGE representatives.
2. Local and regional EXCHANGE representatives.
3. Installation representative (Engineering, Fire Marshall, Security, etc.)
4. Contractor
5. Major Sub-contractors

C. Agenda:

1. Execution of Notice to Proceed.
2. Distribution of Contract Documents.
3. Submission of list of sub-contractors.
4. Review of EXCHANGE checklist of contract requirements.
5. Discussion of Schedule.
6. Discussion of critical sequencing.
7. Designation of responsible personnel.
8. Processing of field decisions and change orders.
9. Submission of applications for payment.
10. Submittal of shop drawings.

11. Procedures for maintaining record documents.
12. Fire and safety procedures.
13. Security procedures.
14. Accident prevention and reports.
15. Housekeeping procedures.
16. Use of premises

    a. Office and storage locations.
    b. Personnel parking.

17. Major equipment deliveries.
18. Other issues pertinent to completing the contract.

D. Meeting minutes: Minutes will be taken by the A/E and distributed to EXCHANGE, Contractor, and Installation Engineer.

1.4 PROGRESS MEETINGS

A. The contractor shall schedule and preside at monthly progress meetings.

B. The contractor shall make arrangements for meetings, prepare agenda with copies for participants.

C. Location of Meetings: Construction office, or as directed in the notice.

D. Attendance Required:

1. Contractor's project manager.
2. Contractor's superintendent.
3. Major sub-contractors and suppliers.
4. EXCHANGE representative.

E. Agenda:

1. Review minutes of previous meetings.
2. Review of work progress.
3. Field observations, problems and decisions.
4. Identification of problems which impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Coordination of projected progress.
10. Maintenance of quality and work standards.
11. Effect of proposed changes on progress schedule and coordination.
12. Other business relating to work.

F. Meeting Minutes: A/E shall record meeting minutes, and distribute copies to the participants (including the EXCHANGE Contracting Officer, within three (3) business days of the meeting.

1.5 PROJECT MEETINGS

A. The Contractor shall schedule and preside at other project meetings when required.

B. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and EXCHANGE' Commissioning Authority of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. LEED requirements/Sustainable design requirements.
    i. Review of mockups.
    j. Possible conflicts.
    k. Compatibility requirements.
    l. Time schedules.
    m. Weather limitations.
    n. Manufacturer's written instructions.
    o. Warranty requirements.
    p. Compatibility of materials.
    q. Acceptability of substrates.
    r. Temporary facilities and controls.
    s. Space and access limitations.
    t. Regulations of authorities having jurisdiction.
    u. Testing and inspecting requirements.
    v. Installation procedures.
    w. Coordination with other work.
    x. Required performance results.
    y. Protection of adjacent work.
    z. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

C. Coordination Meetings: At weekly intervals, in addition to specific meetings held for other purposes.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 31 00

SECTION 01 32 00

CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Related Requirements Specified Elsewhere:

1. Section 01 10 00 – Summary of Work.
2. Section 01 14 20 – Construction Phasing.
3. Section 01 31 00 – Project Management and Coordination.
4. Section 01 33 00 – Submittal Procedures.

B. Provide projected construction schedules for entire work, update monthly.

1.2 SCOPE

A. The Contractor shall prepare a Progress Chart System to serve as a guide in managing the construction progress. Reference General Provisions clause entitled, “Schedule and Progress”.

1.3 GENERAL

A. The progress chart shall be prepared by the contractor and shall consist of a bar chart as described in this section. In preparing this system, the scheduling of construction shall be the responsibility of the contractor and shall be developed in accordance with the phasing plan shown on the construction drawings. The requirement for the system is included to assure adequate planning and execution of the work and to assist the Contracting Officer in appraising the reasonableness of the proposed schedule and evaluating progress of the work.

1.4 PROGRESS CHART SYSTEM

A. The system consists of keeping a record of the time allotted for each activity and the actual progress of the activity.

B. Activities shall be listed vertically and shall include the units of work required for the project.

C. All activities of EXCHANGE which affect progress and Contract required dates for completion shall be shown. Include activities for EXCHANGE FURNISHED/EXCHANGE INSTALLED ITEMS.

D. The selection and number of activities shall be subject to the Contracting Officer’s approval.

1.5 A SCALE OF TIME

A. A scale of time, from date of the beginning of the contract work to the date of completion of the contract work, shall be indicated horizontally on the chart. The units of time indicated shall be days.

1.6 ACTIVITY TIMES

A. Activity shall be indicated in the form of scaled time bars. The bars shall indicate the following:

1. The schedule of time allotted for the activity.
2. The actual progress of the activity including the actual time of the activity start, the time spent to date or to the finish of the activity.

1.7 SUBMISSION AND APPROVAL

A. Submission and approval of the system shall be as follows:

1. A preliminary bar chart defining the contractor's planned operations during the first sixty (60) calendar days after notice to proceed shall be submitted within ten (10) days. The Contractor's general approach for the balance of the project shall be indicated. Cost of the activities expected to be completed or partially completed before submission and approval of the complete bar chart should be included.

1.8 THE COMPLETE BAR CHART

A. The complete bar chart shall be submitted within ten (10) calendar days after receipt of notice to proceed.

1.9 CONTRACTOR

A. The Contractor shall submit at intervals of thirty (30) calendar days a copy of the complete bar chart with the current activity progress clearly indicated. Cost of each activity completed and each partially completed shall be included.

B. The contractor shall also submit a narrative report with the updated bar chart, including a description of problem areas current and anticipated) delaying factors and their impact, and an explanation of corrective actions taken or proposed.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 32 00

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Shop Drawings.

D. Samples.

E. Product Data.

F. Certificates.

1.1 RELATED SECTIONS

A. Section 01 10 00 - Summary of Project.

B. Section 01 32 00 – Construction Progress Documentation

C. Section 01 77 00 – Closeout Procedures.

D. Section 01 78 39 - Project Record Documents.

1.3 SUBMITTAL PROCEDURES

A. Electronic copies of digital data files of the Contract Drawings will not be provided by Architect for Contractor's use.

B. Processing Time:

1. Initial Review: 15 days.
2. Resubmittal Review: 15 days.
3. Sequential Review: 21 days.
4. Concurrent Consultant Review: 15 days.

C. Electronic Submittal:

1. Post as PDF files directly to Architect's FTP site.
2. Submit via email as PDF files.

D. Contractor's Review:

1. Submittals: Marked with approval stamp before submitting to the Contracting Officer.

E. Transmit each submittal with EXCHANGE Form 4450-48.

F. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

G. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.

H. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

I. Schedule submittals to expedite the Project, and in accordance with the List of Required Submittals in this section. Transmit submittals to Contracting Officer. Coordinate submission of related items.

J. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work. Failure to identify such variations will not relieve the Contractor of the responsibility for completing the work in full accordance with the Contract Documents even though such submittals are approved by the Contracting Officer.

K. Prior to approval of the material/product submitted, the contractor shall include with the submittal a written certification that the material/product contains no asbestos. This certificate is mandatory before approval will be issued.

L. Provide space for Contractor and Contracting Officer review stamps.

M. When revised for resubmission, identify all changes made since previous submission.

N. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit preliminary Progress Schedule within ten (10) days of the Notice to Proceed.

B. Submit complete (final) Progress Schedule within thirty (30) days of the Notice to Proceed.

C. Submit monthly revisions of Progress Schedule.

D. Refer to Section 01 32 00 – Construction Progress Schedules.

1.5 SHOP DRAWINGS

A. Shop Drawings For Review:

1. Submitted to Contracting Officer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. Shop drawings shall be prepared by a qualified detailer.
3. Minimum sheet size for shop drawings shall be 8 1/2" x 11".
4. After review, and distribute copies in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 - Project Closeout.

B. Shop Drawings For Project Close-out:

1. Submitted for the EXCHANGE' benefit during and after project completion.

C. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

1. Submit the number of opaque reproductions which Contractor requires, plus three (four on structural, mechanical, and electrical submittals) copies which will be retained by Contracting Officer.

1.6 SAMPLES

A. Samples For Review:

1. Submitted to Contracting Officer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
2. After review, produce duplicates and distribute in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 - Project Closeout.

B. Samples For Information:

1. Submitted for the Contracting Officer's knowledge as project administrator or for EXCHANGE.

C. Samples For Selection:

1. Submitted to Contracting Officer for aesthetic, color, or finish selection.
2. Submit samples of finishes from the full range of manufacturers' standard colors, or in custom colors (if so stated in the product specification section), textures, and patterns for Contracting Officer selection.
3. After review, distribute in accordance with Submittal Procedures article above and for record documents purposes described in Section 01 77 00 - Project Closeout.

D. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

E. Include identification on each sample, with full Project information.

F. Submit the number of samples specified in individual specification sections; two of which will be retained by Contracting Officer.

G. Reviewed samples which may be used in the Work are indicated in individual specification sections.

H. Coordinate sample submittals with respective shop drawings.

1.7 PRODUCT DATA

A. Submit Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, specifications, illustrations, and other descriptive data.

B. Product data that relates to shop drawings or samples must be submitted with the respective shop drawings or samples.

1.8 CERTIFICATES

A. Delegated-Design Services Certification: In addition to other required submittals, submit a certificate, signed and sealed by the responsible design professional.

B. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Contracting Officer, in quantities specified for Product Data.

C. Certify that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, test results, affidavits, and/or certifications as appropriate.

D. Certificates may be recent or previous test results on material or Product, but must be acceptable to Contracting Officer/Engineer.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 33 00

SECTION 01 33 10

WEATHER TABLE

PART 1 - GENERAL

1.1 INFORMATION AND DATA

A. Information and data furnished or referred to in the weather table is furnished for the Contractor's information.

1.2 CONTRACT TIME LIMITS

B. The contract time limits include weather conditions that are shown in the table listed herein.

1.3 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER

A. This provision specifies the procedure for the determination of time extensions for unusually severe weather affecting exterior work in accordance with the Contract. The following listing defines the monthly anticipated adverse weather for the contract period and is based on NOAA data for the geographic location of the project.

B. Weather Table:

MONTHLY ANTICIPATED ADVERSE WEATHER CALENDAR DAYS
Ft. Myer, Arlington, Virginia

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2	2	2	2	2	2	3	3	3	3	2	2

This listing of anticipated adverse weather will constitute the base line monthly weather time evaluations. Throughout the contract each month, actual adverse weather days will be recorded on a calendar basis (including weekends and holidays) and compared to the monthly anticipated adverse weather in this listing. The term "actual adverse weather days" shall include days impacted by actual adverse weather. The number of actual adverse weather days affecting exterior work shall be calculated chronologically from the first to the last day in each month. Adverse weather days must prevent work for 50 percent or more of the contractor's work day and delay work critical to the timely completion of the project. If the number of actual adverse weather days exceeds the number of days anticipated in the above listing, the Contractor may submit in writing to the Contracting Officer a request for a time extension within 30 days of the adverse weather. Based upon the above NOAA data the Contracting Officer will determine if the time extension for the Contractor is warranted. The Contracting Officer will then convert any qualifying delays to calendar days and issue a modification in accordance with the contract. **Any Time extensions granted under this provision will be at no cost to AAFES.**

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SECTION 01 35 43

ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The work covered by this section consists of furnishing all labor, materials, and equipment and performing all work required for the prevention of environmental degradation during and as a result of construction operations under this contract. These requirements are in addition to any environmental protection requirements elsewhere in these specifications. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents, not naturally occurring at the site, which adversely affect human health or welfare; unfavorably alter ecological balances important to human life; affect other species of importance to humans; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution by the contractor requires consideration of air, water, and land, and involves noise control, solid waste management and management of radiant energy and radioactive materials, as well as other pollutants. This section also requires the protection of cultural and historic resources.

B. Contractor shall coordinate the work of this section with the work called for under the various Earthwork and Utilities sections.

1.2 CONTRACTOR'S GENERAL ENVIRONMENTAL COMPLIANCE OBLIGATIONS.

Work under this contract is to be performed on a government facility. All environmental rules applying to contractor operations elsewhere will also apply on the government facility. Contractor (and any subcontractor, agent or representative) shall comply with all Applicable Federal, State, and local laws and regulations providing for environmental protection and pollution control and abatement. These include but are not limited to: the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act, Toxic Substances Control Act, Federal Insecticide Fungicide and Rodenticide Act, Coastal Zone Management Act, Endangered Species Act, National Historic Preservation Act, Safe Drinking Water Act, Emergency Planning and Community Right-to-Know Act, Oil Pollution Act, Archeological Resources Protection Act, and Pollution Prevention Act. Contractor has the duty to determine for itself where such laws and regulations apply. Although the Contractor may request assistance from the Contracting Officer in delineating applicable environmental laws and regulations, Contractor has an independent responsibility to make its own determination and to do so in a timely fashion.

1.3 FINES OR PENALTIES FOR ENVIRONMENTAL NON-COMPLIANCE.

The Contractor shall be responsible for paying any fines or penalties assessed against AAFES or the installation or the Army or the Air Force for violations of environmental laws or regulations resulting from acts or omissions of the contractor or its employees, subcontractors, or agents. This obligation is in addition to any fines or penalties that may be assessed against the contractor for the same conduct. Contractor may either reimburse these fines or penalties through the Contracting Officer, or with the consent of the Contracting Officer, the Contractor may pay such fines or penalties directly to the regulatory agency or agencies concerned.

1.4 CONTRACTOR'S LIABILITY FOR ENVIRONMENTAL DAMAGES

Contractor agrees to hold harmless and indemnify AAFES (which includes the Army, Air Force, or other Department of Defense component, as appropriate) for any and all damages of any kind resulting from environmentally harmful activities by the contractor, contractor's employees or agents or subcontractors. "Damages" includes but is not limited to personal injury, property damage (including diminution of value), or death, environmental restoration and response costs, natural resource damages, expert witness and attorney's fees, and reimbursement of any and all expenses incurred to obtain permits as a result of Contractor's failure to identify or obtain permits for itself or AAFES.

1.5 CONTACTS WITH ENVIRONMENTAL REGULATORY OFFICIALS.

Contractor shall immediately advise the Contracting Officer and the installation environmental office of the content of all contacts with federal, state, or local environmental regulators, before, during, and after the performance of this contract concerning the performance of this contract.

PART 2 - PERMITS

2.1 PERMITS FOR EQUIPMENT USED BY CONTRACTOR IN PERFORMING AAFES CONTRACTS.

For equipment used in the performance of this contract, Contractor shall obtain in Contractor's name and at no additional expense to AAFES, all permits, coordinations, certifications or other regulatory authorization necessary to perform and complete the work required by this contract under applicable environmental laws and regulations. “Applicable environmental laws and regulations" includes but is not limited to: the Clean Air Act, Clean Water Act, Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Toxic Substances Control Act, Federal Insecticide Fungicide and Rodenticide Act, Coastal Zone Management Act, Endangered Species Act, National Historic Preservation Act, Safe Drinking Water Act, Emergency Planning and Community Right-to-Know Act, Oil Pollution Act, and Pollution Prevention Act and State, County, and Local laws and regulations on the same subjects.

2.2 PERMITS NEEDED FOR CONSTRUCTION, EXCAVATION, MODIFICATION, RENOVATION, DEMOLITION, INSTALLATION, OR OTHER ALTERATION OF BUILDINGS, STRUCTURES, EQUIPMENT, INSTALLATIONS, REAL PROPERTY OR SYSTEMS

Contractor shall identify all Federal, State, County, or local, permits, coordinations, certifications or other regulatory authorization requirements under all applicable environmental laws and regulations as defined in (a.) above. Contractor shall then prepare and submit in draft all applicable permit applications, coordinations, notices, or other required filings, together with all supporting data to the contracting officer for review. Permit applications or notifications or other documents that must be submitted by AAFES will be submitted by AAFES, and any documents that must be submitted by the contractor will be returned after review to the contractor for submission. No work requiring permit or other written authorization shall proceed before the Contractor has the permit or authorization or a copy thereof in its possession.

PART 3 - MATERIALS

3.1 RECYCLED MATERIALS.

Materials used in this contract shall be, to the greatest extent practicable and consistent with financial prudence, made of recycled materials or of materials that are recyclable. Where construction debris such as concrete or asphalt or wood can be recycled, this alternative will be considered.

3.2 ASBESTOS

Asbestos will not be used or included in this project.

3.3 POLYCHLORINATED BIPHENYL'S (PCBs)

PCBs will not be used or included in this project.

3.4 LEAD-BASED PAINT

Lead-based paint will not be used included in this project.

3.5 OZONE-DEPLETING SUBSTANCES.

A. "Class I substance," as used in this clause, means any substance designated as class I by the Environmental Protection Agency (EPA)(40 CFR Part 82), including but not limited to chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform.

B. "Class II substance," as used in this clause, means any substance designated as class II by EPA (40 CFR Part 82), including but not limited to, hydrochlorofluorocarbons.

C. As required by 42 USC 7671j(b), c, and (d) and 40 CFR Part 82, Subpart E, the Contractor shall label products which contain class I or class II ozone-depleting substances or are manufactured with a process that uses class I or class II ozone-depleting substances, or containers of class I or class II ozone-depleting substances, as follows:

"WARNING: Contains (or manufactured with, if applicable)
_____*_____, (a) substance(s) which harm(s)public health
and the environment by destroying ozone in the upper atmosphere."
*The Contractor shall insert the name of the substance(s).

D. The contractor shall comply with the applicable requirements of Sections 608 and 609 of the Clean Air Act (42 USC 7671g, National Recycling and Emission Reduction Program and 7671h, Servicing of Motor Vehicle Air Conditioners) as each or both apply to the contract.

3.6 PESTICIDES

Except as may be specified elsewhere in this contract, Contractor will not use or apply pesticides (such as herbicides or weed-killers, insecticides, or rodenticides) without the specific written prior approval of the Contracting Officer.

PART 4 - EXECUTION (WORK PRACTICES)

4.1 GENERAL: SITE DISTURBANCE DURING CONSTRUCTION ACTIVITIES.

Contractor shall use industry-recognized best management practices to avoid creation of fugitive dust emissions and to avoid and control storm water runoff from the construction site and any temporary roads that may be used for access to it. Water sprinkling may be used to control dust. Contractor shall perform all work under this contract in such a manner that no pollutants of any kind are released into ditches, storm drains, streams, lakes, or other surface waters on or connected to the site.

4.2 PROTECTION OF WATER RESOURCES

A. General: The General Contractor shall not pollute storm drainage, streams, lakes, or reservoirs with fuels, oils, bitumens, calcium chloride, acids, construction wastes or other harmful materials or pollutants. It is the responsibility of the General Contractor to determine and comply with all applicable federal, state, regional, municipal, and other regulations.

B. Spillage: The General Contractor shall take special measures to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, herbicides, cement, and surface drainage from entering public waters. In the event of a spill, the contractor must make all required notifications to federal, state or local authorities and will notify the Contracting Officer immediately.

C. Washing and Curing Water: Water used in aggregate processing, concrete curing, foundation, and concrete lift clean-up and other waste water shall not be allowed to enter the storm drainage system.

4.3 PROTECTION OF LAND RESOURCES

A. General: It is intended that the land resources within the project boundaries and outside the limits of permanent work performed under this contract be preserved in their present condition or be restored to a condition after completion of construction that will appear to the natural and not detract from the appearance of the project. The General Contractor shall limit his construction activities to areas defined by the Drawings or Specifications.

B. Prevention of Landscape Defacement: Except in areas marked on the plans to be cleared, the General Contractor shall not deface, remove, cut, injure or destroy trees or shrubs without specific written authority. Trees designated to be saved shall be protected from either excavation or filling within the root zone. No ropes, cables, or guys shall be fastened or attached to any existing trees for anchorage unless specifically authorized by the Contracting Officer. The General Contractor shall in any event be responsible for any damage resulting from such use.

C. Restoration of Landscape Damage: Any trees or other landscape features scarred or damaged by the General Contractor's equipment or operations shall be restored as nearly as possible to the original condition at the General Contractor's expense. The Contracting Officer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of under requirements for clearing and grubbing (Section 31 10 00). All scars made on trees not designated on the plans to be removed by equipment construction operations, or by the removal of limbs larger than 1-inch in diameter shall be coated immediately with an approved tree wound dressing. All trimming or pruning shall be performed in an approved manner by experienced landscape personnel. Tree trimming with axes shall not be permitted. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the General Contractor and are beyond

saving in the opinion of the Contracting Officer, shall be immediately removed and replaced with a nursery-grown tree of the same species.

4.4 CONTROL OF AIR EMISSIONS.

Contractor's actions shall conform to all federal, state, and local requirements for the control of air emissions during work under this contract. Trucks leaving the site will be brushed or washed to remove all practicable amounts of dust or other material that may become airborne. Contractor will ensure that all internal construction vehicles and equipment used will have the lowest practicable emissions characteristics and be maintained in optimum operating condition for the reduction of air emissions. Where use of electric motors instead of internal combustion engines is feasible, electric motors will be used during construction.

PART 5 – POLLUTION PREVENTION AND WASTE DISPOSAL

5.1 POLLUTION PREVENTION

The contractor should use prior planning to find those materials that will minimize the creation of waste in general and hazardous waste in particular. Recycling should be considered and implemented at every practicable stage of the project.

5.2 WASTE DISPOSAL

A. Pollution Prevention: The contractor should use prior planning to find those materials and work practices that will minimize the creation of waste in general and hazardous waste in particular.

B. Hazardous Waste Generation, Handling, and Disposal. Work done under this contract is to be performed on a government facility. According to rules and procedures of the United States Environmental Protection Agency, the federal facility is required to have a generator identification number under the Resource Conservation and Recovery Act (RCRA) and to be responsible for wastes (as defined under RCRA) produced, managed, stored, disposed on, or transported from the facility. Accordingly, Contractor will, to the greatest extent practicable, use materials, processes, and techniques that will avoid the creation of hazardous waste. Contractor shall prepare and follow a written waste management and disposal plan for all hazardous wastes generated on the site. Prior to generation of any hazardous wastes, contractor will coordinate planned activities regarding hazardous materials and hazardous waste with the Contracting Officer. Contractor shall submit a written waste management plan, through the contracting officer, to installation environmental office. Contractor shall follow this plan once it has been approved by the contracting officer. Under no circumstances will contractor bring onto the site hazardous waste that has been generated elsewhere. All hazardous waste will be properly disposed of by the Contractor in accordance with all federal, state, and local requirements.

C. Disposal of Non-RCRA Wastes.

All non-hazardous wastes generated on the site as a result of this contract must be disposed of properly, in accordance with all federal, state and local requirements. Materials will be recycled whenever practicable. Prior to creation of such wastes, the contractor shall submit to the installation environmental management function, through the Contracting Officer, a plan for disposal of wastes. Such plan shall include the types of waste to be created, how they shall be stored, managed and disposed. Contractor shall follow this plan once it has been approved by the installation and contracting officer. Such wastes will not be created until approved by the Contracting Officer.

D. Construction Debris.

1. Debris from demolition of existing structures will ordinarily be removed to a location on the installation, as designated by the installation authorities.
2. If a location on the installation is not available, other sections in this contract may require the contractor to remove clean construction debris from the site to a location of the contractor's choosing off the installation. (Site soil or other site media are not covered by this paragraph.) Debris will be recycled or disposed of in accordance with all applicable federal, state and local rules. Such debris must be free of all contamination, including but not limited to, lead paint, asbestos, and insecticides. Prior to removal of any construction debris, that debris must be certified by the installation to be free of contamination and of no value to the United States, and this certification must be provided to the contracting officer. To expedite work, this may be accomplished by a telecopier or other suitable electronic means, however, the original certification form must be provided to the contracting officer. No form is prescribed for this certification so long as all necessary information is provided and the document is signed by an authorized installation representative. However, an example is provided at **page 7** and this form may be used. All construction debris removed from the installation must be covered by a certification. The contractor must arrange with the installation POC whether all debris will be covered by one certification or if several certifications will be required.

E. Consolidated Waste Disposal Plans: Contractor may, at contractor's option, submit for approval as specified above one consolidated plan for handling hazardous and non-hazardous wastes.

F. Earthwork and Removal of Potentially Contaminated Media:

1. Unless otherwise specified elsewhere in this contract, the site has been inspected and is, consistent with best professional judgment, free of environmental contamination or pollution. However, work under this contract will be performed on a military installation, where the history of prior military and industrial activities is not necessarily completely known. The following provisions prohibit the removal from the installation of soil or other materials found on site and are included, in an abundance of caution, for the protection of AAFES, the installation, and the contractor.
2. Notwithstanding any other clause in this contract, including but not limited to all standard site work general provisions (02010-02900); no media by-product resulting from site preparation, construction or excavation shall be moved off the post, base, or installation where the construction is occurring. If the construction is off the post, base or installation, no media by-product shall be moved off the construction site.
3. The contractor shall: (1) leave the media in place at the site, subject to appropriate erosion control; or (2) haul the media to and place it at a location on the installation that has been designated either in this contract or in writing by the contracting officer; and (3) if unforeseen difficulties arise, such as excessive quantity of media is generated, the contractor shall advise the contracting officer and shall not remove media from the site without written authorization from the contracting officer.

DEFINITIONS

Media - Any soil, water, or air, moved, disturbed or released from a site.

The terms hazardous, waste, pollutant, contaminate, substance have the same meanings and usage here as they commonly do in CERCLA, RCRA, FWPCA, CAA, TSCA, and SDWA respectively."

INSTALLATION CERTIFICATION FOR CLEAN CONSTRUCTION DEBRIS TO BE REMOVED FROM AAFES PROJECT SITE

As representative of _____ (insert name of installation), I am authorized to certify, and hereby do so certify, that the construction debris to be removed from the AAFES project site at _____ (describe project and list address, for example Main Exchange Project, 111 Road A, X installation) has been inspected and is of no value to the United States and is free of all contamination, including but not limited to: lead paint, asbestos, PCBs, and pesticides.

CERTIFICATION:

Signed: _____ Date: _____

Printed Name, Rank or Grade, and Duty Title:

_____

ORIGINAL OF THIS FORM MUST BE PROVIDED TO CONTRACTING OFFICER

PART 6 - UNEXPECTED SITE CONDITIONS

6.1 CONTAMINATED SOIL OR GROUNDWATER.

Unless otherwise specified elsewhere in this contract, site has been inspected and is, consistent with best professional judgment, free of environmental contamination or pollution. However, unexpected conditions can always arise. Contractor or subcontractor personnel may encounter soil or groundwater that is suspected to be contaminated, either because of odors, colors, free liquids, unexpected construction debris, or other suspicious conditions. Should this occur, contractor will immediately notify the Contracting Officer and the installation environmental office and take necessary initial measures to protect workers, the site, and other personnel.

6.2 UNEXPECTED ARTIFACTS OR RELICS

Should contractor employees in the course of site preparation or other work on this contract find unexpected historic or archeological remains, such as bones, arrow points, pottery remnants, foundations, or other evidence of previous uses of the site, contractor will cease further site-disturbing activity and immediately notify the Contracting Officer and installation environmental office.

END OF SECTION 01 35 43

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

A. The Contractor shall establish a quality control system to perform sufficient inspection and tests of all items of work, including that of his subcontractor(s) to insure conformation to applicable specifications and drawings with respect to the materials, workmanship, construction, finish and functional performance. Tests of materials and/or special inspections will be made, when required by these specifications, by applicable law, rules and regulations in accordance with respective Sections of the specifications. Where required, the Contractor shall employ and pay for the services of an independent agency to perform specific services and testing. Examples of such services are tests of fill materials, concrete materials, concrete mix design, asphalt concrete laboratory testing of materials proposed and calculations for asphalt concrete mixtures, etc.

B. The Contractor shall arrange and pay for all services and testing which are not specifically indicated to be provided by EXCHANGE.

C. If a material is not required to be field tested, the Contracting Officer may require the supplier to furnish with each delivery of such material, a certificate bearing legal signature of said supplier, stating that such material complies with specification requirements.

D. If any work or material requiring tests and inspections is executed, enclosed or covered before tests are made, or test reports distributed, then the Contractor shall, at his own expense, uncover such part of this work or material and keep it uncovered until such tests and inspections have been made and test reports distributed. If work or material so tested and inspected shall not be found to conform to the requirements of the Construction Documents, it shall be deemed and construed to be defective materials or faulty workmanship and the Contractor, at his own expense, shall replace work or material removed and repair all work disturbed thereby.

1.2 EXCHANGE RESPONSIBILITY

A. EXCHANGE will employ and pay for the services of an Independent Testing Agency to perform specified quality control testing during construction indicated in the following sections:

1. Rough Grading: Section 31 20 00.
2. Utility Excavation: Section 31 20 00.
3. Aggregate Base Course: Section 32 12 16, 32 13 13 and 31 20 00.
4. Backfilling: Section 31 20 00.
5. Flexible Paving Section 32 12 00.
6. Curbs and Gutters: Section 32 13 13.
7. Storm Drainage Utilities: Section 33 30 00.
8. Cast-in-Place Concrete: Section 03 30 00.
9. High Strength Bolted Connections: Section 05 12 00.
10. Field Welding: Section 05 12 00.
11. Testing Adjusting and Balancing for HVAC: Section 23 05 93.

1.3 CONTRACTORS RESPONSIBILITY

A. Cooperate with the Contracting Officer and laboratory personnel and provide access to work an to manufacturer's operations. Provide samples of materials to be tested, in required quantities. Furnish casual labor and facilities required to provide access to work to be tested; to obtain and handle samples at the site; to facilitate inspections and tests; and for laboratory's exclusive use for storage and curing of test samples. Notify laboratory sufficiently in advance of operations to allow for its assignment of personnel and scheduling of tests.

B. The use of EXCHANGE' or Contractor's independent testing services shall in no way relieve the Contractor of his responsibility to furnish materials and construction in full compliance with the plans and specifications.

C. The Contractor shall coordinate with both EXCHANGE and his own testing laboratories so that the work will be inspected and tested according to contract requirements. This coordinately includes notification of when tests should be taken, easy access to the work, and general cooperation in every way to insure proper control of the work.

D. Upon completion of the project the Contractor shall submit a signed certificate stating tests for this work were made in accordance with provisions of these specifications and, further, all such tests and reports made were reported as required. This certificate shall list all tests and dates when work was completed.

1.4 AGENCY RESPONSIBILITIES

A. Test samples of mixes submitted by Contractor.

B. Provide qualified personnel at site. Cooperate with Contracting Officer and Contractor in performance of services.

C. Perform specified sampling and testing of Products in accordance with specified standards.

D. Ascertain compliance of materials and mixes with requirements of Contract Documents.

E. Promptly notify Contracting Officer, and Contractor of observed irregularities or non-conformance of Work or Products.

F. Perform additional tests required by Contracting Officer.

G. Provide Contracting Officer with three (3) copies of each written test report, and the Contractor each with one copy of each test report. Each report shall include:

1. Date issued.
2. Project title and number.
3. Testing Laboratory name, address and telephone number.
4. Name and signature of laboratory inspector.
5. Date and time of sampling or inspection.
6. Record of temperature.
7. Date of test.
8. Identification of product and specification section.
9. Location of sample or test in the project.
10. Type of inspection or test.
11. Results of tests and compliance with Contract Documents.
12. Interpretation of test results, when requested by the Contracting Officer.

H. Upon completion of the project, the testing agency shall prepare a certificate, certified in the presence of a Notary Public, stating testing for this work was conducted in accordance with the provisions of these specifications, and further, all tests and reports were provided for this job were reported as required.

1.5 LIMITS ON TESTING AUTHORITY

A. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Agency or laboratory may not approve or accept any portion of the Work.

C. Agency or laboratory may not assume any duties of Contractor.

D. Agency or laboratory has no authority to stop the Work.

1.6 RELATED REQUIREMENTS

A. Required Submittals Section 01 33 00.

B. Related requirements and tests specified in Division 2 through 33.

PART 2 – PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 40 00

SECTION 01 51 00

TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water and sanitary facilities.

1.2 RELATED SECTIONS

A. Section 01 55 00 – Temporary Facilities, Barriers and Controls.

1.3 TEMPORARY ELECTRIC

A. The contractor shall furnish and install a complete, temporary electric service for construction needs throughout the construction period.

1. The electrical contractor shall be responsible for furnishing and installing all fused cutouts, conductors, disconnects, and miscellaneous hardware.
2. The temporary electric service shall be a 120/208 volt, 3 phase, 4 wire, 200 amp service for construction operations.
3. Provide power centers, located such that all points of the construction area can be reached with extension cords no more than 100 feet long. Provide 20 amp, 120 and 208 volt grounded outlets, for use by all trades, each protected by a circuit breaker.
4. The Contractor is allowed to utilize the existing utilities of Fort Myer without cost. The general contractor shall designate a representative to monitor use and ensure usage is not excessive. The designee shall check for instances of over usage and will be responsible to remedy the situation. Excessive use shall be defined as use for an operation that exceeds the use of a base employee performing the same task.
5. Use of electric resistance heating devices is not permitted.
6. Unusually heavy electric loads, such as electric welding equipment, and other equipment with special power requirements shall not be connected to the existing system.

B. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of five (5) foot candles.

1. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
2. Provide guarded lighting sockets and lamps. Use 100 watt lamps, minimum. Maintain 110 volts in lighting system.
3. Maintain lighting and provide routine repairs.
4. Permanent building lighting may be utilized during final stages of construction.

C. Field Offices and Sheds: Provide electric service to the field office(s) and shed(s) to meet the requirements listed in Section 01 59 00 - Field Offices and Sheds.

D. Standards: the temporary electric service shall comply with the National Electric Code. Extension cords used by any and all trades, shall be UL approved.

1.4 TEMPORARY HEATING

A. The Contractor shall provide, maintain and pay for temporary heating equipment of adequate capacity to provide temporary heat meeting the requirements of this section.

B. The Contractor shall pay for the fuel consumed by the temporary equipment.

C. The Contractor may use the new permanent heating system for construction purposes during the finish work stage under the following conditions:

1. The Contractor shall verify the system is approved for operation, equipment is lubricated and proper filters are in place.
2. The Contractor shall provide and pay for operation maintenance, and shall provide new filters and replace any damaged or worn parts immediately prior to when the equipment is accepted by EXCHANGE.
3. The Contractor will not be charged for a reasonable amount of fuel or energy consumed by the permanent heating equipment. The Contractor shall maintain strict conservation measures to prevent the waste of fuel or energy.

D. Requirements: The Contractor shall provide and maintain temporary heat meeting the following requirements:

1. As required under each individual specification section for proper placement, setting, and curling of materials.
2. Maintain a minimum temperature of 40 degrees F. (5 degrees C.) For twenty four (24) hours a day during placing, setting, and curing of cementitious materials.
3. Maintain a minimum temperature of 50 degrees F. (28 degrees C.), or as required under each individual specification section, for twenty four (24) hours a day, seven (7) days prior to, and during installation of all finish materials, including but not limited to: resilient flooring and base, carpet, paint and wall covering, tile work, acoustic ceilings, and all finish woodwork.
4. Maintain a minimum temperature of 65 degrees F. (28 degrees C.) For twenty four (24) hours a day from the time of placement until beneficial occupancy, all finish materials, including but not limited to: resilient flooring and base, carpet, paint and wall covering, tile work, acoustic ceilings and all finish woodwork.

1.5 TEMPORARY VENTILATION

A. The Contractor shall provide adequate ventilation to:

1. Aid in curing installed materials.
2. Dispersal of humidity.
3. Ventilation of temporary sanitary facilities.
4. Prevent hazardous accumulations of dust, fumes, mists, vapors, or gases in areas occupied during construction.

B. The Contractor shall employ the use of temporary ventilating equipment, adequately sized to accomplish the required ventilation.

C. The Contractor may use the existing, permanent ventilating equipment, supplemented by temporary equipment, if required, under the following conditions:

1. Use of the existing, permanent equipment does not spread hazardous or objectionable dust, fumes, mists, vapors, gases, or odors into areas of the building occupied by EXCHANGE personnel or customers.
2. Use of the existing, permanent equipment does not cause damage to equipment.
3. The Contractor shall provide and pay for operation, maintenance, and replacement of filters and worn or damaged parts on the equipment used.

1.6 TELEPHONE SERVICE

A. Provide, maintain, and pay for telephone service to field office and Contracting Officer's field office at time of project mobilization.

B. Refer to Section 01 59 00 - Field Offices and Sheds.

1.7 TEMPORARY WATER SERVICE

A. Connect to existing water source for construction operations at time of project mobilization.

B. The Contractor will not be charged for a reasonable amount of water consumed for construction purposes. The Contractor shall maintain strict conservation measures to prevent waste of water.

C. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

D. The Contractor shall provide and install proper backflow prevention devices on all water service lines. Contractor shall provide documentation of proper/current certification of the devices and proper/current certification of the installer.

1.8 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide at time of project mobilization.

B. Furnish, install, and maintain adequate portable chemical toilets for use by construction personnel.

C. Provide regular maintenance service to maintain clean and sanitary conditions.

1.9 DUMPSTERS

A. Provide and maintain dumpsters. Equip dumpsters with a secure cover and paint the Standard Fort Myer color.

1. The cover shall be closed at all times, except when being loaded with trash and debris.

B. Locate dumpsters behind the construction fence and out of the public view.

C. Empty dumpsters at least once a week or as needed to keep the site free of debris and trash.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 51 00

SECTION 01 55 00

TEMPORARY DUST AND SECURITY WEATHER BARRIER DETAILS

PART 1 - GENERAL

1.1 SUMMARY

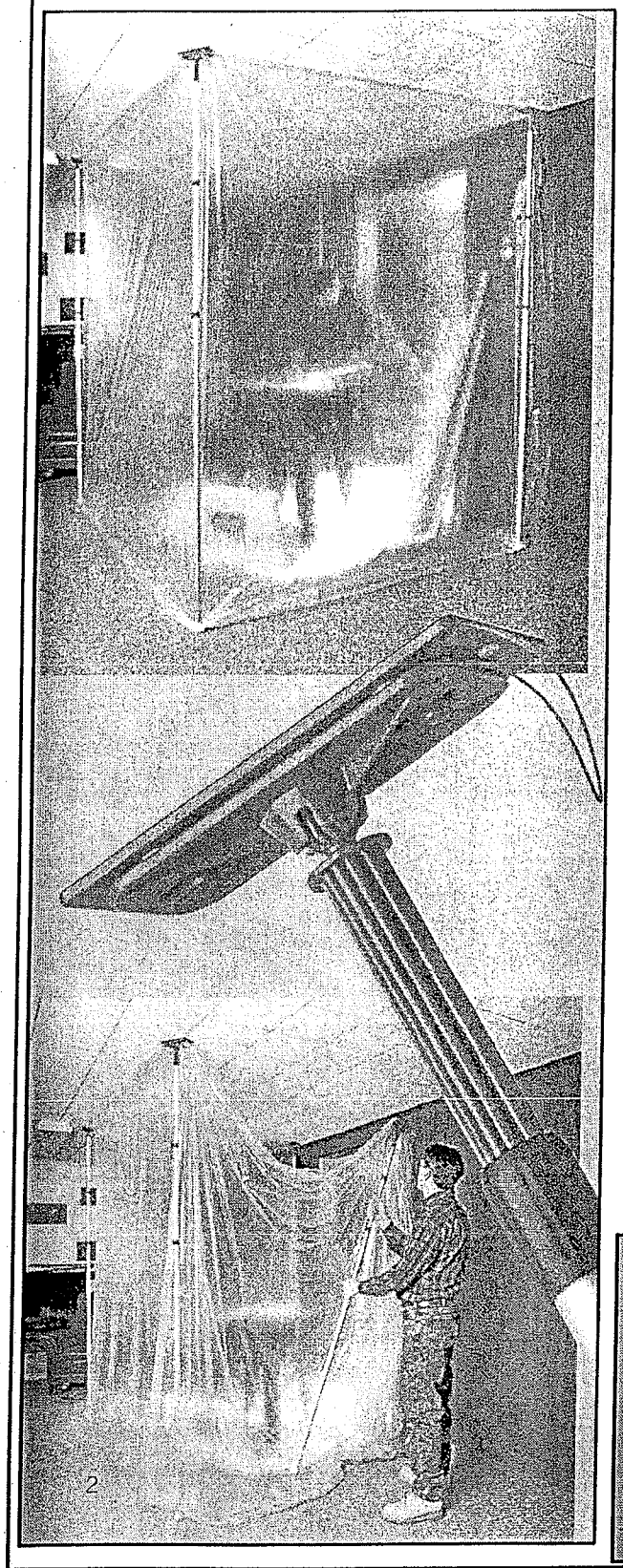
A. Section Includes:

1. Weather Barrier Products Details

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 55 00



ZIPWALL®

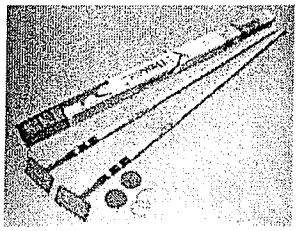
Award winning barrier products

1 800 718 2255 • WWW.ZIPWALL.COM

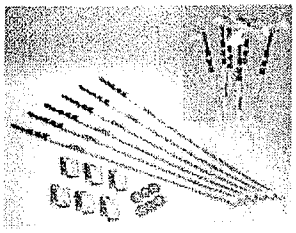
CLARIFICATION #				
DATE 00/00/00	DRAWN XXX	DWG. NO. 1	JOB NO. 0000	REF. SHT. A-000
DESCRIPTION ZIPWALL				

THE ZIPWALL® LINE OF AWARD-WINNING E

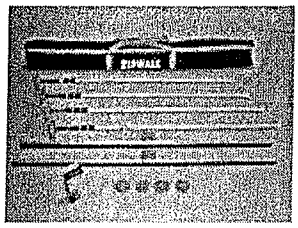
ZipWall® SLP 2 Pack
Two Spring Loaded Poles, extends from 4' 7" to 12', includes two sets of parts (head, plate, tether, GripDisk™).
Item #SLP2



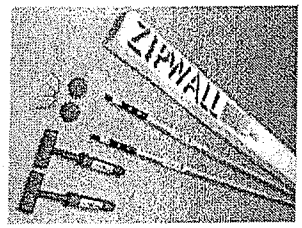
SLP 6 Pack
Six Spring Loaded Poles and six individual bags of parts (head, plate, tether and GripDisk™). Can be snapped onto poles for individual display.
Item #SLP6



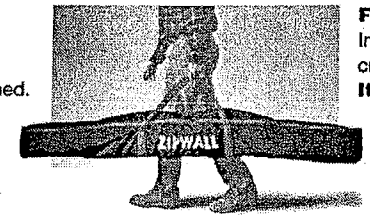
4 Pack Plus
Four Spring Loaded Poles, four sets of parts (head, plate, tether, GripDisk™), two Foam Rails, box of two Standard Zippers, one Carry Bag.
Item #4PL



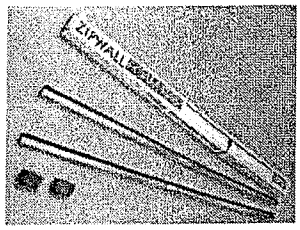
Kit 20 2 Pack
Two Poles that extend from 6' 9" to approximately 21', includes two jacks and two sets of parts (head, plate, tether, GripDisk™).
Item #KT20



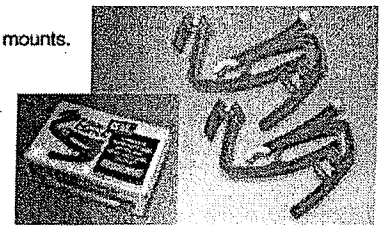
Carry Bag
Sturdy, durable, can hold twelve SLPs or six 20 foot poles with Jacks unattached.
Item #CB1



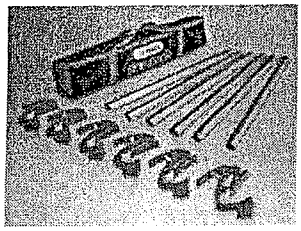
Foam Rail™ 2 Pack
Includes two 5' long Foam Rail cross bars and two T-Clips.
Item #FR2



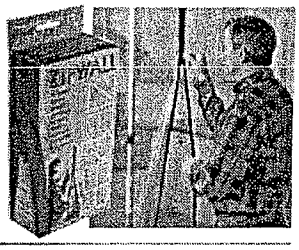
Side Clamps™
Two Side Clamp wall mounts.
Item #SC2



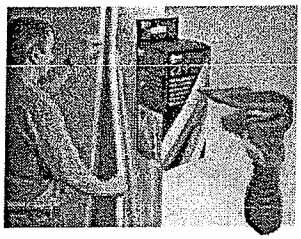
Side Pack
Includes six Side Clamp™ wall mounts, six 3' Foam Rail™ cross bars, and a custom bag.
Item #SDPK



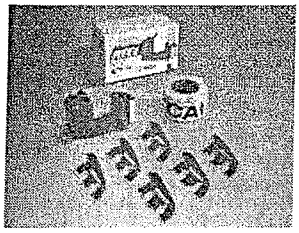
ZipWall® Standard Zippers includes two self adhesive zippers and two cords for tying up a plastic flap. For indoor use only.
Item #AZ2



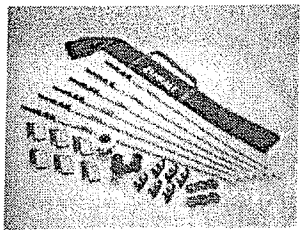
ZipWall® Heavy Duty Zippers includes two self adhesive zippers, two cords for tying up a plastic flap, and the innovative ZipWall® Zipper Knife (patent pending). Can be used in freezing temperatures.
Item #HDAZ2



Reel Pack
One Caution Tape Reel, one 300' roll of 4 mil Caution Tape, six Tape Clips.
Item #RLPK



Facility Pack
Includes one Caution Tape Reel, one 300' roll of 4 mil Caution Tape, six Tape Clips, six Spring Loaded Poles with six sets of parts poly bagged (head, plate, tether, GripDisks™).
Item #RLFP



CLARIFICATION #				
DATE	DRAWN	DWG. NO.	JOB NO.	REF. SHT.
00/00/00	XXX	2	0000	A-000
DESCRIPTION ZIPWALL				

SECTION 01 58 00

CONSTRUCTION SITE SIGN

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Project identification sign.

1.2 RELATED SECTIONS

A. Section 01 10 00 – Summary: Responsibility to provide signs

1.3 QUALITY ASSURANCE

A. Design sign and structure to withstand American Society of Civil Engineers (ASCE) Standard 7, 100 miles/hr wind velocity @ 3 seconds.

B. Sign Painter: Experienced as a professional sign painter for minimum three years.

C. Finishes, Painting: Adequate to withstand weathering, fading and chipping for duration of construction.

1.4 SUBMITTALS

A. See Section 01 33 00 – Submittals for submittal procedures.

B. Attached sign exemplars are current proposed templates from AAFES. Obtain most recent sign template from AAFES prior to producing sign layout.

C. Shop Drawing: Show content, layout, lettering, color, structure, sizes and grades of members.

PART 2 – PRODUCTS

2.1 SIGN MATERIALS

A. Structure and Framing: New, wood, structurally adequate.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch thick, 48 inches x 96 inches.

C. Rough Hardware: Galvanized.

D. Paint and Primers: Exterior quality, two coats, colors as selected.

E. Lettering: Exterior quality paint, colors as selected.

2.2 PROJECT IDENTIFICATION SIGN

A. One painted sign of construction, design and content shown on Attachment “A”, location designated.

B. Graphic Design, Colors, Style of Lettering: Designated by Contracting Officer’s Representative.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install project identification sign within 30 days after date fixed by Notice to Proceed.

B. Erect at designated location.

C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.

D. Install sign surface plumb and level, with butt joints. Anchor securely.

E. Paint exposed surfaces of sign, supports, and framing.

3.2 MAINTENANCE

A. Maintain signs and supports clean, repair deterioration and damage.

3.3 REMOVAL

A. Remove signs, framing, supports and foundations at completion of Project and restore the area.

3.4 ATTACHMENTS

A. Alternate sign.

END OF SECTION 01 58 00

8'-2"
4'-2"
4"
5"
3"
5"
5 1/2"
1" 2"
2"
4"
1'-3 1/2"
PROJECT NAME
INSTALLATION LOCATION
CONTRACTOR'S NAME
CITY, STATE
ARCHITECT'S NAME
CITY, STATE
EXCHANGE
You save, we give back.
Another project funded using earnings from your Exchange purchases.

Alternate

SECTION 01 59 00

FIELD OFFICES AND SHEDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary field offices and sheds.

1. Coordinate location with AAFES Project Manager and Base Officials.

B. Maintenance and cleaning.

C. Removal.

1.2 RELATED SECTIONS

A. Section 01 10 00 - Summary.

B. Section 01 51 00 - Temporary Utilities.

PART 2 - PRODUCTS

2.1 MATERIALS, EQUIPMENT, FURNISHINGS

A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

2.2 CONSTRUCTION

A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.

B. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove at completion of Work.

C. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.

D. Exterior Materials: Weather resistant, finished in one color acceptable to Contracting Officer.

E. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.

F. Lighting for Offices: 50 ft-C (538 lx) at desk top height, exterior lighting at entrance doors.

G. Fire Extinguishers: One 10# standard dry chemical (ABC) type fire extinguisher at each office and each storage area.

H. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

2.3 ENVIRONMENTAL CONTROL

A. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain 68 degrees F (20 degrees C) heating and 76 degrees F (23 degrees C) cooling.

B. Storage Spaces: Heating and ventilation as needed to maintain Products in accordance with Contract Documents; adequate lighting for maintenance and inspection of Products.

2.4 CONTRACTOR OFFICE AND FACILITIES

A. Size: For Contractor's needs and to provide space for project meetings. Minimum size: 150 square feet.

B. Telephone: The Contractor shall install, maintain and pay for telephone service for the Contractor's field office including an answering device and outside bell.

C. Internet, E-Mail and Fax: Install, maintain and pay for services for the Contractor's Field Office.

D. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.

E. Other Furnishings: Contractor's option.

F. Equipment: Six (6) adjustable band protective helmets for visitors, one 10 inch (250 mm) outdoor weather thermometer and a weather protected bulletin board for posting information required by the contract.

2.5 CONTRACTING OFFICER'S FIELD OFFICE

A. Separate space for sole use by the EXCHANGE Contracting Officer, with separate entrance door with new lock and two keys.

B. Area: Minimum 150 sq ft (14 sq m), minimum dimension 8 ft (2.4 m).

C. Windows: Minimum three minimum total area of 10 percent of floor area, with operable sash and insect screens. Locate to provide views of construction area.

D. Electrical Distribution Panel: Two circuits minimum, 110 volt, single phase service.

E. Minimum four 110 volt duplex convenience outlets, one on each wall.

F. Telephone: The Contractor shall install, maintain and pay for telephone service to the Contracting Officer's field office, including an answering device. The Contractor shall pay for basic service and local calls only, but will not pay for long distance calls.

G. Furnishings:

1. One desk 54 x 30 inch (1.4 x 0.75 m), with three drawers.
2. One drafting table 36 x 72 inch (one x 1.8 m), with one equipment drawer.
3. Plan rack to hold working Drawings, shop drawings, and record documents.
4. One standard four-drawer legal size metal filing cabinet with locks and two keys per lock.
5. Six linear ft (2 m) of metal bookshelves.
6. Two swivel arm chairs.
7. Two straight chairs.
8. One drafting table stool.

9. One tackboard 36 x 30 inch (1 x 0.75 m).
10. One waste basket per desk and table.

2.6 STORAGE AREAS AND SHEDS

A. Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products.

PART 3 - EXECUTION

3.1 PREPARATION

A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.2 INSTALLATION

A. Install office spaces ready for occupancy 15 days after date of Notice to Proceed.

B. Employee Residential Occupancy: Not permitted on Installation property.

3.3 MAINTENANCE AND CLEANING

A. Weekly cleaning services for offices; periodic cleaning and maintenance for office and storage areas.

B. Maintain approach walks free of mud, water, and snow.

3.4 REMOVAL

A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

END OF SECTION 01 59 00

SECTION 01 65 00

STARTING OF SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Department of Defense Instruction, Pages 1-11.
2. DD For 1354, Pages i-iii; Page 1 – 37.
3. Form 1354 Checklist for Buildings, Page 1-11.
4. Form 1354 Example, Pages 1-2.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 65 00

REPRINT
(with Change 1, July 28, 1967)
NUMBER 4165.40
DATE November 14, 1961#

Department of Defense Instruction

ASD(COMP)

SUBJECT

Form for Transfer and Acceptance of Military Real Property (DD Form 1354)

References: (a) DoD Instruction 4165.3, "Department of Defense Facility Classes and Construction Categories," October 13, 1966 *
(b) DoD Instruction 4165.14, "Inventory of Military Real Property," December 20, 1966 *
(c) DoD Directive 7040.2, "Program for Improvement in Financial Management in the Area of Appropriations for Acquisition and Construction of Military Real Property," January 18, 1961

I. PURPOSE

This Instruction prescribes DD Form 1354 for the recording of primary documentation upon transfer and acceptance of real property.

II. APPLICABILITY

This Instruction is applicable to the three military departments and any other component organization of the Department of Defense which may establish its own entity for the recording and reporting of real property under references (a) and (b).

III. PROCEDURES

A. DD Form 1354 will be used as the primary control documentation and official dollar cost recording medium for all transfers and acceptances of real property between the military departments and to or from other government agencies.

B. DD Form 1354 supersedes ENG Forms 290 and 290-B (prescribed for use by the Departments of the Army and Air Force) and NAVDOCKS Form 2317 (prescribed for use by the Department of the Navy).

C. DD Form 1354 will be adopted by the military departments as soon as possible but no later than 1 July 1962. Suggested instructions for use in implementation of DD Form 1354 are attached as Enclosure 2.

#First amendment (Ch 1, 7/28/67)

IV. EFFECTIVE DATE AND IMPLEMENTATION

This Instruction is effective immediately. Two copies of the implementing instructions will be furnished to the Office of the Assistant Secretary of Defense (Comptroller/Management), Directorate for Statistical Services, within 90 days after the issuance date of this Instruction.

Assistant Secretary of Defense
(Comptroller)

Enclosures - 2
1. DD Form 1354
2. Suggested Instructions

SUGGESTED INSTRUCTIONS FOR PREPARING DD FORM 1354
(TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY)

1. The page number and the total number of pages comprising each transfer shall be shown in the space provided at the top right-hand part of the form.

2. When two or more pages are required, Items 27 through 29 shall be completed only on the final page. In such cases, the bottom portion of the form shall be torn off of all pages, except the final page, at the line above Items 27 and 28.

ITEM 1 - Self – explanatory

ITEM 2 - Primarily for Navy use, the district number will be assigned by area or district public works office in accordance with coding pattern set forth in NAVEXOS P-1570, par. 3805-7, Item 6. For Army use, enter appropriate Army Engineer district where construction is performed and/or from which the transfer is made. For transfer of construction to the Air Force, enter appropriate Army Engineer district or the district number assigned by area, or Naval district public works office from which the construction transfer is made.

ITEM 4 - For Navy use only, see NAVEXOS P-1570, par. 3805-7, Item 5.

ITEM 5 - Enter date of preparation.

ITEM 6 – For Army use, enter appropriate Army job and directive number. For Air Force use, enter base job number, as appropriate, when form is used for transfer within the Air Force.

ITEM 7 – For Army use, or for transfer of construction to the Air Force, enter separate series of numbers, by fiscal year, for each installation to which real property is transferred; e.g., for FY 1962 show 62-1, 62-2, etc. For Navy use, this serial number will be assigned by respective area or district public works office and will represent the numerical sequence of submissions by respective contract number.

ITEM 8 – Insert appropriate contract number.

ITEM 9 – Self-explanatory.

ITEM 10 – 12: Instructions for Items 2,3 and 4 apply. (not applicable for Air For Use.)

ITEM 13 – For Navy use only. Insert the accounting number assigned to or used by the activity named in accordance with Item 9. See NAVEXOS P-1570, par. 3805-7, Item 10.

ITEM 14 – For Navy use only. Insert the accounting number assigned to the activity performing the official property accounting for the activity shown in Item 9. See NAVCompt Manual, Vol. 2, Chapter 5, for accounting numbers.

ITEM 15 – Insert an “X” in the appropriate box of block (A) to indicate whether the transfer involves new construction, existing facilities or capital improvements to existing facilities. If the “other” category is used, explain in remarks, Item 31. Additionally, insert an “X” in the appropriate box of block (B) to indicate whether transfer is being made at time of beneficial occupancy, physical completion or financial completion (with respect to new construction). If the “other” category is used, explain in remarks, Item 31.

ITEM 16 – Enter the code number assigned to identify the project with the appropriate construction authorization law.

ITEM 17 – Each single entry will be identified as an item number and this item number will be shown in this column.

ITEM 18 – 19: Category Code and Description. Enter the category code and description (see DoD Instruction 4165.3 (reference (a)) or attachment 1 to enclosure 1 to DoD Instruction 4165.14 (reference (b)) that appropriately describes the primary use for which the facility (buildings, structures, utilities) is designed. Not more than one category code (Item 18) will be listed as a line item (Item 17).

ITEM 20 – Number of Units in terms of buildings or other structures.

ITEM 21 – Type – enter type of construction; i.e., “P” for permanent, “S” for semipermanent or “T” for temporary.

ITEM 22 – Enter the unit of measure abbreviation, such as “SF” for square feet, etc. (see attachment 2 to enclosure 1 to DoD Instruction 4165.14 (reference (b)).

ITEM 23 – Enter total quantity as described In Item 22.

ITEM 24 –Indicate by item number, category code, and description the appropriate cost. In those instances where a document is prepared which lists items carrying costs which, in some cases, may be final and in others may be preliminary, each cost figure by line item will carry an alphabetical suffix of (P) for preliminary or (F) for final.

ITEM 25 – 31: Self-explanatory.

#First amendment (Ch 1, 7/28/67)

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

PAGE OF PAGES

1. FROM: (Installation/Activity/Service)	2. OPERATING UNIT	3. DIS TRICT CODE	4. OPER ATING AGENCY	5. DATE	6. JOB NUMBER	7. SERIAL NUMBER	7. CONTRACT NUMBER

1. FROM: (Installation/Activity/Service)	2. OPERATING UNIT	11. DIS-TRICT CODE	12. OPER ATING AGENCY	13. AC COUNTING NUMBER	14. AC COUNT-OFFICE NUMBER	15. TYPE OF TRANSACTION		16. PROJECT NUMBER
						❑ NEW CONSTR ❑ EXISTING FAC ❑ CAPITAL IMP ❑ OTHER (SPECIFY)	❑ BENF/O ❑ PHYSICAL COM ❑ FIN. COM ❑ OTHER (SPECIFY)	

ITEM NO. 17	CATEGORTY CODE 18	FACILITY (category description) 19	NO. OF UNITS 20	TYPE 21	UNIT OF MEAS 22	TOTAL QUANTITY 23	COST 24	DRAWING NUMBERS 25	REMARKS 26
									4165

27. STATEMENT OF COMPLETION: The facilites listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.

TRANSFERRED BY (Signature)	DATE	28. ACCEPTED BY (Signature)	DATE
Title (Area Engr./Base Engr/ DPWO)		TITLE (Post Engr./Base Engr./Navy Rep.)	29. PROPERTY VOUCHER NUMBER

DD FORM 1 N0V 61 **1354**

SUPERSEDES ENG FORMS 290 AND 290B
AND NAVDOCKS FORM 2317

30. CONSTRUCTION DEFICIENCIES	
31. REMARKS	
This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or form other government agencies. It supersedes ENG Forms 290 and 290B (formerly used by the Army and Air Force) and NAVDOCKS Form 2317 (formerly used by the Navy). Existing instruction issued by the military departments relative to the preparation of the three superseded forms are applicable to this form to the extent that the various items and	columns on the superseded forms have been retained. Additional instructions, as appropriate, will be promulgated by the military departments in connection with any new items appearing hereon. With the issuance of this DD form, it is not intended that the department shall revise and reprint manuals and directives simply to show the number of this DD form. Such action can be accomplished through the normal course of revision for other reasons.

ITEMS FOR DD FORM 1354

CATEGORY CODES: VERIFY FOR ARMY FACILITIES AND AIR FORCE FACILITIES OF THE SAME DESCRIPTION • • • (ABBREVIATION-NOMENCLATURE)

*	DESCRIPTION:	ARMY		AIR FORCE	
	SHOPPING CENTER:	(EXCH MAIN RETL)	: 740-53	(EXCH SALES STORE)	740111
	SHOPPETTE	(EXCHANGE BRANCH)	:740-50	(EXCH BRANCH)	740382
	CLASS SIX	(CLASS VI)	:740-84	(BSE PACKAGE STORE)	740269
	CAR CARE CENTER	(EXCH SVC STA)	:740-52	(EXCH SVC STN)	740383
	BURGER KING	(POST RESTAURANT)	:740-64	(EXCH CAFE SNK BAR)	722345

CATEGORY CODE DESCRIPTION COST

1. BUILDING SQUARE FOOTAGE:

A.RETAIL AREAS:_____SF B. ADMIN/EMPLOYEE AREA_____SF
C. MPA:_____SF D. SERVICES ACTIVITIES: _____SF
E. FOOD ACTIVITIES_____SF. F. MALL/PUBLIC TOILETS: _____SF
G. MERCH. EQUIP. RM_____SF H. TOTAL BLDG:_____SF

2. BUILDING $ _____
(TOTAL CONTRACT PRICE LESS THE SUM OF THE FOLLOWING)

3. HEATING, VENTILATION & AIR CONDITIONING SYSTEM $ _____

TOTAL:_____TONS

(AR)826-11	OVER 100 TONS	(AC PL OV 110 TN)
(AF)826123	OVER 100 TONS	(A/C PLT OVET 100 TN)
(AR)826-12	26-100 TONS	(AC PL-26-100 TN)
(AF)826122	25-100 TONS	(A/C PLT 25<100 TN)
(AR)826-13	6-25 TONS	(AC PL 6-25- TN)
(AF)890121	5-25 TONS	(A/C PL 5 TO 25 TN)

4. FIRE PROTECTION SYSTEM (FIRE ALARM SYS)

AUTOMATIC SPRINKLER SYSTEM $_____
(AR)880-50 (AUTO SPNLKR SYS)
(AF)880221 (AUTO FR DTECTN SYS)
TOTAL:NUMBER OF HEADS_____
FOAM FIRE SPRINKLER SYSTEM
(AR)880-60 (AUTO SPNKLR SYS) $_____
(AF)980235 (DRY CHEM SYS)
TOTAL:NUMBER OF HEADS_____
(AR)843-11 FIRE HYDRANTS $_____
(AF)843315 (FR HYDR)

5. UNDERGROUND ELECTRICAL SYSTEM (INCLUDE. METER $_____
(AR)812-42 UNGD ELEC DISTR)
(AF) (SEC DISTR LNE UG)
(AF)890181 (UTIL LNE DUCTS)
TOTAL SERVICE TO BUILDING:_____L.F OF____IN. CONDUIT
AND_____CONDUCTOR

ITEMS FOR DD FORM 1354 (CONTINUED)

CATEGORY CODE	DESCRIPTION	COST
	6. ELECTRICAL TRANSFORMER	$_____
(AR)813-60	(TRANSFORMER)	
(AF)812225	(PRIM DISTR LNE UG)	
	PAD MOUNTED TRANSFORMER_____KVA	
	7. NATURAL GAS LINE TO BUILDING (INC. METER)	$_____
(AR)824-10	(GAS PIPE LIBE)	
(AF)824464	(GAS MAINS)	
	TOTAL SERVICE TO BUILDING:_____L.F. OF_____IN. PIPE	
	(MATERIAL:_____)	
	8. UNDERGROUND TELEPHONE	$_____
(AR).....	(UNDG TELEPHONE)	
(AF)135583	(TEL DUCT FCLTY)	
(AF)890181	(UTIL LNE DUCTS)	
	TOTAL SERVICE TO BUILDING: _____L.F. OF_____IN. CONDUIT	
	9. SANITARY SEWER SYSTEM	$_____
(AR)832-10	(SANITARY SEWER)	
(AF)932267	(SAN SEWAGE MAIN)	
	TOTAL SERVICE TO BUILDING: _____L.F. OF_____IN. PIPE	
	(MATERIAL: _____)	
	10. GREASE INTERCEPTOR	$_____
(AR)833-90	(LOCAL DESCRIPTION)	
	CAPACITY _____GALLONS	
	11. STORM SEWER SYSTEM	
(AR)871-10	(STORM SEWER)	
(AF)871183	(STRM DRN DSPL)	
	TOTAL SERVICE TO BUILDING:_____L.F. OF_____IN. PIPE	
	(MATERIAL:_____) TOTAL NUMBER OF DROP INLETS:_____	
	12. DOMESTIC WATER SYSTEM	$_____
(AR)842-10	(WATER PIPE LN P)	
(AF)842245	(WTR DISTR MAINS)	
	TOTAL SERVICE TO BUILDING :_____L.F. OF_____IN. PIPE	
	(MATERIAL:_____) (INCLUDING METER & BACK FLOW PREVENTER)	
	13. LANDSCAPE IRRIGATION SYSTEM	$_____
	(INCLUDING METER & BACK FLOW PREVENTER)	
(AR)871-30	(IRRIGATION FAC)	
	TOTAL NUMBET OF HEADS_____	
	14. DUMPSTER ENCLOSURE	$_____
(AR)833-12	(REFUSE COLL BLD)	
	TOTAL AREA:_____S.F.	

ITEMS FOR DD FORM 1354 (CONTINUED)

CATEGORY CODE	DESCRIPTION	COST
	15. PAVING (NON ORGANIZATION VEHICLE PARKING)	$_____
(AR)852-15	(NON ORG VEH PRK)	
(AF)852262	(VEH PKING N/ORGN)	
	TOTAL ASPHALT PAVING:_____S.Y. OF _____IN. THICK W/_____IN. _____BASE MATERIAL	
	TOTAL CONCRETE PAVING:_____ S.Y. OF _____IN. THICK W/_____IN. _____BASE MATERIAL	
	16. CONCRETE WALKS, SLABS & PADS	$_____
(AR)852-20	(SIDEWALK)	
(AF)852289	(SIDEWALK) PEDESTRIAN TRAFFIC	
	TOTAL AREA:_____S.F. (EXCLUDING PAVER TILES)	
	17. CONCRETE CURBS & GUTTERS	$_____
(AR)851-10	(ROADS PAVED)	
(AF)851143	(CURBS & GUTTERS)	
	TOTAL AREA:_____L.F.	
	18. EXTERIOR SITE LIGHTING (EXT LIGHTING)	$_____
(AR)812-30	(EXT LIGHTING)	
(AF)812926	(EXTERIOR AREA LTG)	
	TOTAL NUMBER OF POLES_____	
	19. LANDSCAPING (RELATED LAND IMPROV NB)	$_____
(AR)871-75	(RELATED LAND INPROV NB)	
	20. GASOLINE DISPENSING SYSTEMS	$_____
(AR)411-90	(LOCAL DESCRIPTION)	
	UNDERGROUND STORAGE TANKS:	
	NUMBER OF TANKS:_____ SIZE:_____ GALLONS	
	NUMBER OF DISPENSERS:_____	
	NUMBER OF HOSES:_____	
	CANOPY SIZE:_____ SF $_____	
	KIOSKS: NUMBER_____MGFR_____ COST	$ _____
	21. CHAIN LINK FENCING (FENCE OR WALLS)	$_____
(AR)872-10	(FENCE OR WALLS)	
(AF)872248	(FENCE INTERIOR)	
	TOTAL LINEAR FEET:_____L.F.	
	22. TOTAL CONSTRUCTION COSTS:	$_____

ITEMS FOR DD FORM 1354 (CONTINUED)

ADDITIONAL INFORMATION REQUIRED

MECHANICAL SYSTEMS

H.V.A.C. UNITS

#	MANUFACTURER	MODEL #	CAPACITY	SERIAL #
1.				
2.				
3.				
4.				

EXHAUST FANS

#	MANUFACTURER	MODEL #	CAPACITY	SERIAL # ___
1.				
2.				
3.				
4.				

SUPPLY FANS

#	MANUFACTURER	MODEL #	CAPACITY	SERIAL #
1.				
2.				
3.				
4.				

CHILLER
BOILER
HEAT PUMP
ROOFTOP A/C UNITS
DOCK LEVELERS
DOCK SHELTERS

ELECTRICAL
DISTRIBUTION PANELS / LIGHT FIXTURES

ITEM NO	MANUFACTURER	MODEL NUMBER	QUANTITY	DESCRIPTION

PLUMBING

#	MANUFACTURER	MODEL #	CAPACITY	SERIAL # ___
WATER HEATER				
WATER CLOSET				
WATER CLOSET (H.C.)				
URINAL				
LAVATORY				
LAVATORY (H.C.)				
FLOOR SINKS(___#)				
FLOOR DRAINS(___#)				
MOP SINK				
ROOF DRAINS (___#)				

ITEMS FOR DD FORM 1354 (CONTINUED)

ADDITIONAL INFORMATION REQUIRED

FIRE PROTECTION SYSTEMS FOR FOOD ACTIVITIES

ANSUL CHEMICAL FIRE SUPPRESSION SYSTEM
TYPE OF SYSTEM:_____
TOTAL NUMBER OF:
HEADS_____ AUTOMAN RELEASE_____
REMOTE MANUAL PULL STATIONS_____
SNAP ACTION ASSEMBLIES_____
MECHANICAL GAS SHUTOFF VALVES_____'

ITEMS REQUIRED IN CLOSE OUT DOCUMENTS

1. GENERAL CONTRACTOR'S TESTING / TRAINING REPORTS:
   A. TEST AND BALANCE REPORT ON MECHANICAL SYSTEMS
   B. CERTIFICATION OF GROUNDING (RESISTANCE) POWER TRANSMISSION
   C. INSTRUCTION / TRAINING SESSIONS ON ALL MECH/ELEC/EQUIPMENT (INCLUDING PARTICIPANTS' ROSTER)
2. GENERAL CONTRACTOR'S WARRANTY
3. ROOF(S) WARRANTY
4. ELECTRIC WARRANTY
5. HVAC WARRANTY
6. GREENHOUSE WARRANTY
7. TERMITE PROTECTION GUARANTEE
8. GENERAL CONTRACTOR'S STATEMENT ON "NO ASBESTOS BEARING MATERIALS" USED IN CONSTRUCTION

DD FORM 1354

Transfer and Acceptance of Military Real Property

Users Handbook

30 August 2002

FINAL VERSION

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Chapter 1 Overview of DD Form 1354, Transfer and Acceptance of Military Real Property

Purpose

The purpose of this DD Form 1354 handbook is to establish a process to transfer and accept real property accountability and costs for capital improvement projects in a timely and consistent manner throughout the Department of Defense (DoD) and between Military Services. Another purpose is to ensure the timely and consistent posting of newly constructed and transferred facilities and their costs into the real property database. This handbook provides a consolidated reference that

- Provides the many uses of the DD Form 1354 and describes how to use it as part of a real property inventory system,
- Explains who should fill out the DD Form 1354 and when,
- Provides instructions for preparing the DD Form 1354, Transfer and Acceptance of Military Real Property, dated August 2002,
- Explains how the preparer of a completed form uses the DD Form 1354 to document credit to the Construction-in-Progress (CIP) Account and,
- Provides objective standards that, when met, allow timely acceptance of the 1354.

Overview

This handbook describes five different job positions that perform the required tasks. In reality, the staffs that work for the holders of these positions do much of the work required. The approach in this handbook is to clarify the process, not to dictate how an installation should assign job responsibilities. The five positions are: construction agent project manager who prepares the DD Form 1354, Real Property Accountable Officer (RPAO) who accepts and accounts for individual facilities, Real Property Specialist (RP Specialist) who enters real property data into the real property database, Director of Public Works (DPW) who is involved in master planning, construction, real property maintenance, and real property accountability; and the funding organization/activity who is the customer for the facility or project. With all five functions (e.g., project manager, RPAO, RP Specialist, DPW and customer), and their respective staffs, working together early on in the project life cycle, the project has an excellent chance of achieving overall success. Part of a successful project is timely and accurate documentation. By working together and following the procedures in this handbook, real property assets should be transferred and accepted in a timely manner, and costs transferred from CIP accounts to general property, plant, and equipment (PP&E) accounts at the time they are placed in service. In addition, real property facilities would be listed on the DD Form 1354 in a standard format such that facilities are accurately posted to the real property database.

This handbook recognizes that the construction agent project manager responsible for preparing the single DD Form 1354 (multiple versions) for any project could in practice

be an onsite project manager assigned to a Resident or Area Office, or a manager who spends most of his/her time at the District or Division. He/she could also be a member of the DPW if the installation is managing its own project. This handbook uses the term construction agent project manager to mean the designated person to whom the construction organization assigns the responsibility to prepare the DD Form 1354.

This handbook also recognizes that final/turnover inspections are done differently throughout DoD. In an ideal situation, the turnover inspection for quality workmanship with the contractor, the facility acceptance inspection with the RPAO, and the facility turnover with the occupant all occur simultaneously and the DPW or Base Civil Engineer (BCE) and the RPAO are present. In actual practice, this combined inspection may not always occur and designated representatives may attend different inspections or facility turnover events. Different Services may name these inspections differently and conduct them in different order. This handbook does not dictate when, how, or who attends these inspections. Since the RPAO may not be an engineer, an engineer should first make a determination of quality workmanship and that the facility(ies) is/are physically complete and available for use or beneficial occupancy. This determination is normally made on the basis of an inspection where the construction contractor is present. However, the DD Form 1354 deals with the transfer and acceptance of accountability for real property, therefore the facility transfer inspection in this handbook refers to a meeting event involving the construction agent project manager (or losing accountable officer for transfers of existing facilities) and the gaining RPAO to transfer accountability for a facility(ies). The gaining RPAO should exchange his/her Accepted By signature on the DD Form 1354 for permission to occupy the facility, often signified by the passing of keys.

Scope

Chapter 1 covers the target audience for this handbook, the various usages of the DD Form 1354, and who prepares it. Chapter 2 describes the data required to prepare a completed form. Chapter 3 describes the three different versions of the DD Form 1354 and when to use each version. Chapter 4 explains how the RP Specialist uses the data from the completed form to enter data into the real property database and how the construction agent project manager uses the data to manage the CIP Account. Chapter 4 also explains how to document various real estate transactions. Chapter 5 provides guidance to the construction agent project manager to ensure that total project cost equals the sum of individual facilities costs. Chapter 6 lists the standard attachments to the 1354 and sets acceptance standards for completeness, timeliness and accuracy to help the accepting official know whether the DD Form 1354 should be accepted or rejected based on objective standards. There is a glossary of terms and appendices showing the DD Form 1354, instructions for each block or data field, a building information checklist, and a list of fund codes.

Although related to the transfer and acceptance of military real property, this handbook does not address U.S. Army Corps of Engineers (USACE)/ Naval Facilities Command (NAVFAC)/ DPW/Director of Installations Services (DIS) procedures for:

- Tracking planning and design costs for a construction project or
- Entering project costs in the CIP account.

Target Audience

The target audience expected to use this DD Form 1354 handbook are the persons who prepare and accept DD Forms 1354 and those who enter data from the 1354 into real property databases for military installations of all Services. Preparers can include construction agent project managers at DoD construction agencies such as USACE Districts/Resident/Area offices, NAVFAC Engineering Field Divisions and Activities; installation DPW and DIS; and engineer troop construction organizations. Also part of the target audience are installation RPAO who accept accountability for facilities on their installations and RP Specialists who input data into the real property database and voucher register. Construction agent project managers should share the information in this handbook with their Contracting Officers to ensure that all data requirements for the DD Form 1354 are written into every construction contract as a specific deliverable. Appendix C provides a sample Building Information Checklist that should be specified as a deliverable in the construction contract. Each Service may have a different format.

Applicability

This handbook guidance applies to DoD installations and USACE/NAVFAC construction agencies that prepare DD Forms 1354. Installation customers should use this handbook to specify requirements for the preparation of DD Forms 1354 from DoD construction agents, including USACE, NAVFAC, Army and Air Force Exchange Service (AAFES), and the Defense Commissary Agency (DeCA). All measurements on the 1354 should be in English measurement units since the DODI 4165.14 prescribes English units.

Usages and Purposes of DD Forms 1354

The DD Form 1354, Transfer and Acceptance of Military Real Property, is used to record transfers, changes, additions or deletions of real property owned by the Military Services. The DD Form 1354 is used for a diverse number of real property transactions. The primary purpose of this form is to document, transfer, and accept accountability for completed new construction and real estate, and to document and accept capital improvements on existing structures. The installation RPAO also uses this form as a basis for recording changes in the real property database. There are many other uses for the DD Form 1354 and a more extensive list of uses follows:

1. Transfer accountability for new construction and/or capitalization projects from the construction agent (e.g., USACE District/NAVFAC Division) to the installation RPAO.
2. Transfer accountability for new construction and/or capitalization projects from the installation DPW/DIS project manager to the installation RPAO.
3. Transfer and accept accountability of real property (land and other facilities) acquired on behalf of an installation from the private sector, other military services or other Federal agencies by acquisition or grant.

4. Transfer and accept administrative accountability of real property from tenant organizations to installation RPAO, e.g., DLA, DeCA, ARMS, and Energy Savings Performance Contractors; for real property accountability purposes only. Control remains with the funding organization.
5. Transfer real property accountability for usable research and development structures at the end of the research project.
6. Reassign accountability of real property between services, commands, and installations.
7. Document the total cost of a new facility or a capital improvement in the installation's real property database.
8. Document disposals of real property.
9. Document real estate transactions, e.g., purchases, sales, leases, licenses, permits.
10. Document adjustments caused by damage to real property in the real property records.
11. Document real property accountability changes to make the real property database agree with physical inventory results, e.g., found on post.
12. Document changes in unit of measure values (area or capacity/other), dimensions, costs, and design use category codes for an existing facility.
13. Document approved facility conversions.
14. Document credit to the Construction-in-Progress (CIP) account for USACE/NAVFAC.

Who Prepares the DD Form 1354?

The DPW construction project manager is responsible for determining whether repair projects should be capitalized or not by applying the rules in the DOD Financial Management Regulation (FMR) 7000.14-R, volume 4, chapter 6, (Improvement to Existing General PP&E) para 060205 or volume 11B, paragraph 58, (Accounting for Capital Assets-WCF), as well as service guidance (e.g., DA PAM 405-45, Real Property Inventory Management). This determination should be made and documented at the start of the project design/scoping phase of the project development. For projects funded by Defense Agencies, the funding agency has final approval of the capitalization decision.

Construction Agent Project Manager Prepares the DD Form 1354 for New Construction

The Government construction agent, e.g., USACE District or NAVFAC Division, will prepare a DD Form 1354 for transfer of completed construction and capital improvement projects which they manage, and furnish the completed DD Form 1354 to the RPAO at the time of beneficial occupancy and property transfer. The USACE District/NAVFAC Division construction manager will also list the construction contract deficiencies in block 25, on the reverse side of the DD Form 1354, after the turnover inspection with the construction contractor and installation representatives. No beneficial occupancy of new construction improvements should occur without providing and accepting a completed and signed DD Form 1354.

Similarly, the installation construction project manager prepares and furnishes the DD Form 1354 for installation managed projects, both new construction and capital improvement projects. The installation DPW/DIS must provide the necessary systems support to allow the DPW/DIS construction project manager to track construction costs and to prepare a DD Form 1354 for installation-managed projects. The installation construction project manager signs and furnishes the interim or final DD Form 1354 to the RPAO at the time of project transfer.

The Real Estate Representative Prepares the DD Form 1354 for Grants

The real estate representative is normally from a USACE District /NAVFAC Division and this USACE/NAVFAC representative prepares the DD Form 1354 along with other purchase or grant real estate documentation.

The Losing RPAO Prepares the DD Form 1354 for Transfers

The RPAO that maintains the real property database for the losing installation prepares the DD Form 1354 for any transfer of real property from the installation. Similarly this office also prepares any DD Form 1354 required for the transfer of an entire installation (or sub-installation) such as transfer of an entire installation to a different component of the service.

The Installation RPAO Prepares the DD Form 1354 for Real Property Adjustments

The DD Form 1354 is also used to document real property adjustments, even in cases when there are no construction or transfers involved. The RPAO and staff must prepare and sign the DD Form 1354. Since there is only one party involved in such a transaction, the RPAO must attach sufficient documentation to justify the changes described on the DD Form 1354.

The Construction Agent Project Manager Follows the Building Information Checklist

A Building Information Checklist is at Appendix C. The amount of detailed building information required from a construction project should be determined during the design phase of the project by the design agent, working in coordination with the installation DPW/RPAO team, using this checklist. When architect-engineers (A-E) are preparing the design or cost estimate for a project, the building information checklist information should be written into the scope of services to be provided as a deliverable from the design agent or A-E contractor. The checklist is not a form to be filled out and there are

several mechanisms to transmit such data to the RP Specialist electronically. Some Architect-Engineers tag individual systems with very detailed information in eXtensible Markup Language (XML) that can be accessed via the Internet.

Chapter 2 How to Prepare a DD Form 1354, Transfer and Acceptance of Military Real Property

Format and Instructions

The DD Form 1354, Transfer and Acceptance of Military Real Property, was revised to better meet the requirements of the Chief Financial Officers Act (CFOA), implement audit recommendations, and ensure consistent reporting of the cost of facilities. The revised DD Form 1354 is provided as Appendix A. The guidance in Appendix B of this handbook is provided to replace the previous instructions for filling out the DD Form 1354 that are currently contained in FMR 7000.14-R, Volume 3, Chapter 17, Appendix B.

This chapter provides more detailed block-by-block instructions for each data element, with examples. An introduction to this chapter provides a description of "where the data come from."

Required Data

The essential information required for the transfer and acceptance of real property is documented on the DD Form 1354 and this information supports entries into the installation's real property accounting system. The format has 26 data blocks. Because this form is used for the variety of purposes described in Chapter One, not all of the data blocks are required for each usage. When a block is not to be filled out for a particular usage, simply enter N/A for "not applicable." There should be no blank data fields except in the block 21, Item Remarks column, where blanks are allowed.

Where Do DD Form 1354 Data Come From?

The construction agent and the installation team must work together to collectively provide the data to accurately prepare a DD Form 1354 at the right time. Most of these data are first available during the design phase of a project, and the draft DD Form 1354 should be included in the design scope of services to the construction agent as a required deliverable. Installations should review and approve the draft DD Form 1354 as part of their review of other design deliverables.

The DD Form 1354, Transfer and Acceptance of Military Real Property, requires the preparer to provide specific information about the project. Information such as description of the real property facilities, category codes and sizes, costs, fund source(s), contract number(s), facility numbers, and as built drawing numbers, is typically required. For real estate transactions, the real estate instrument (document) contains much of the required information.

For Military Construction projects the DD Form 1391, Military Construction Project Data, and the project folder contain some of the information that is needed on the DD Form 1354. Table 2-2 shows a crosswalk from equivalent data fields in the DD Form 1391 to the DD Form 1354. Remember to check the accuracy of the DD Form 1391

before using any data from it. DD Forms 1391 are often prepared years in advance of project initiation and sometimes do not contain the latest category code data, and seldom contain 'item-level' detail. For minor construction projects, the work request should provide similar data needed to complete the 1354.

DD Form 1391		DD Form 1354	
Block Number	**Block Name**	**Block Number**	**Block Name**
3	INSTALLATION & LOCATION	6	SITE/INSNO
6	CATEGORY CODE	12	CATEGORY CODE
7	PROJECT NUMBER	3	PROJECT/JOB NUMBER
9	COST ESTIMATES		
	ITEM	10	ITEM NO.
	U/M	15/17	UNIT OF MEAS.-1 or 2
	QUANTITY	16/18	TOTAL QUANTITY 1 or 2
	COST	19	COST
10	DESCRIPTION OF PROPOSED CONSTRUCTION	26	PROJECT REMARKS. Helps overall project understanding

Table 2-1 Crosswalk from 1391 to 1354

Instructions to Prepare DD Form 1354 Data Fields

The page number and the total number of pages comprising each 1354 project or transaction shall be shown in the space provided at the top right-hand corner of the form. When two or more pages are required to describe the information required for blocks 1 through 21, then blocks 22 through 24 (signatures and voucher number) shall be completed only on the first or signature page. Signing officials should initial subsequent or unsigned pages and line through the Property Voucher Number block on all except the signed page.

The remainder of this chapter explains in detail what the data are and where data come from to complete the individual data element blocks on the DD Form 1354. A single example is used for all the example entries to the DD Form 1354 data fields in the remainder of this chapter. The example is a Military Construction, Army (MCA) project to construct a new battalion headquarters and classroom, and associated structures and utilities. A summary of these instructions is provided as Appendix B for quick reference and for publishing in the FMR.

Block 1. [FROM]

Enter in block 1 the name of the construction or transfer agent the organization, installation DPW/DIS, USACE District/NAVFAC Division Office, or other organizations such as the Army Air Force Exchange Service (AAFES) or Defense Commissary Agency (DeCA). You should include the full address and zip code. Simply, use this block to identify the organization accomplishing the new construction or capital improvement of existing facilities, or initiating the transfer of existing real property.

Example: U.S. Army Corps of Engineers
Kansas City District
Area Engineer, Fort Riley
Fort Riley, KS 66442-6000

Block 2. [DATE FORM PREPARED]

Enter the date the DD Form 1354 is prepared. Use DD-MMM-YYYY format for all dates. This is the date used to track different editions when revisions are necessary. The form is considered prepared when it is ready for signatures in blocks 21 and 22.

Example: 15 JAN 2002

Block 3. [PROJECT/JOB NUMBER]

Enter the project number assigned to identify the project on a DD Form 1391 for new military construction (MILCON) and the job order number. The project number may also come from the installation master plan or long-range construction program. For projects generated by the installation DPW/DIS, the DD Form 1354 JOB NUMBER is the Individual Job Order (IJO) number associated with the Facility Engineer Work Request or equivalent system. The job number will allow you to track the capital improvement back to the actual work performed, which is important since many projects, even MILCON, originate as a work request. Work requests at the installation DPW/DIS are entered directly into the Integrated Facilities System (IFS) or other work management system. Typically, work requests follow the format (AAA-SSSSS-FP), where A is a two or three character customer ID, S is a five character serial number, F is the last digit of the fiscal year, and P is the type of project. Coordinate with the customer service branch of the DPW/DIS prior to preparation of the DD Form 1354 to validate the work request or job number. The project number is the same for all versions of the 1354 for a single capitalization project. Use this number to search for the different versions if necessary.

Examples: DD Form 1391 project number might be 20027. Project initiated by IFS Work Request - FE-00028-3P

Block 4. [SERIAL NUMBER]

This is the document number assigned to the 1354 by the construction agent organization originating the 1354, e.g., USACE District/NAVFAC Division, DPW/DIS, etc. Each different version of the 1354 for the same project has a new Serial Number. Each originating organization has its own sequence of serial numbers. The Serial Number consists of the 4-digit fiscal year and a sequential number (within their own organization) that starts over each fiscal year. Use the next sequential number for each DD Form 1354

originated. Installation DPW/DIS and USACE/NAVFAC will use their own sequence as the next Serial Number in their sequence of DD Forms 1354. For example, if the last DPW/DIS serial number is 2002-0003 and they receive a DD Form 1354 from the District, that 1354 would use the District's sequence number. The next DPW/DIS serial number would then be 2002-0004. The 1354 Serial Number facilitates tracking of all 1354 originated by an organization/activity. The Serial Number is in no way related to the Voucher Number (block 24).

Example: 2002-0001, 2002-0002; where 2002 is the fiscal year and the last four are the sequence number.

Block 5. [TO]

Enter the name of the receiving organization or agency to which the transfer will be made. This receiving organization could be the DPW/DIS on a DoD installation that has been assigned the responsibility for accounting for the real property. Always include the address, zip code, and installation number – the unique identifier of the installation - which the RPAO represents. Installation numbers are available from individual service databases of installations or can be provided by the gaining installation RP Specialist.

Example: Engineering Plans & Services Division
Directorate of Public Works
Fort Riley, KS 66442-6000
INSNO 20605

Block 6. [SITE/INSNO]

Site number or installation number of the actual facility physical location is one of the first points of entry into the database. Enter in block 6 the site number identifier or installation number (INSNO) where the facility being transferred/accepted is located. Enter this number regardless of whether it is the same or different from the location of the RPAO (which is identified in block 5).

Example: 20605 (In this example it happens to be the same as the identifier in block 5).

Block 7. [CONTRACT NUMBER]

If a project has been awarded to a contractor by either the installation Director of Contracting (DOC), USACE District/NAVFAC Division, or other contracting office, then enter the associated contract number (multiple contract numbers if applicable) from the DOC or District Engineer contracting office in this block. Include the delivery order number in addition to the contract number if the contract could authorize work under different delivery orders that are not related to the project described in the final DD Form 1354.

Example: DACA31-98-D-0052

Block 8. [DRAWING NUMBERS]

Enter the drawing number(s) or CAD identifier(s) of the construction agent for the project components. In some cases an installation assigns a specific consecutive drawing number to each project that is initiated. Use that number to identify the project. USACE

drawings have a Drawing Code which may also be used as a reference. All drawing numbers that may be needed as a future reference to the project should be identified in this block.

NOTE. There is not a one-to-one correspondence between drawings and Item Numbers in column 10. For example, HVAC system drawings should be identified in block 8, but the HVAC system is not listed as a separate Item Number. Identify the facility or system associated with the drawing number or use a range of drawing numbers if consecutive and more than one drawing. Use Project Remarks, block 26, for additional space.

Example: B-9301 through B-9309; 47-018-1234; F 711-13-01

Block 9. [TRANSACTION DETAILS]

This block is divided into four subparts. Subpart A identifies the type of construction activity for this project. Subpart B identifies when in terms of an event that the DD Form 1354 is being issued. You must explain an "other" check for either section A or B in block 26, Project remarks, on the back of the form. Subpart C identifies the version of this DD Form 1354. Subpart D identifies the Effective Date for the transaction described by the checkboxes in block 9.

[Subpart A of Block 9] Type of Construction Activity

Insert an X in the appropriate box of subpart A to indicate whether the transaction involves acceptance of new construction, transfer of existing facilities, capital improvements to existing facilities, or some other type transaction. **Check only one box.** Definitions follow:

- New construction – acceptance of accountability for a facility that did not previously exist
- Existing facility – transfer of accountability for an existing facility
- Capital improvement of an existing facility – increases the facility size or capacity, useful life, or operating efficiency of an existing facility
- Other - if the "Other" checkbox is checked, the preparer explains the transaction in Project Remarks (block 26), on the back of the DD Form 1354. Examples for marking "Other" are for occurrences such as real property physical inventory adjustment or capital decrease.

[Subpart B of Block 9] When/Event

Insert an X in the appropriate box of subpart B to indicate when (in terms of an event) the DD Form 1354 is issued. The checkboxes are arranged in order of which box you should use with the first box being the most desirable, if it applies. **Check only one box and the first box that applies.**

- Physical Completion/Available for Use - check this box when the entire facility(ies) described on the DD Form 1354 is substantially complete (except for deficiencies noted on the back) and the entire facility(ies) is being made available for use at the time of transfer. If beneficial occupancy is occurring at the same time or later than

physical completion, check this box for physical completion/available for use. If beneficial occupancy occurs before the facility is complete, check BENF/O for BOD or Partial BOD as explained below.

- BENF/O – (Beneficial Occupancy) check this box when the transfer or acceptance documented by this interim DD Form 1354is for the whole project **and** occurs prior to physical completion of the project. Partial Beneficial (BOD) is explained below.

- Partial BOD – (Partial Beneficial Occupancy) check this box when the transfer or acceptance documented by this interim DD Form 1354 is for only a portion of a facility (such as a hospital) or is for a phased turnover of one or more facilities in a multiple facilities project. Turnover of each phase at partial BOD would have its own interim 1354 and unique Property Voucher Number. Partial BOD DD Forms 1354 will all have the same project number.

- Financial Completion - check this box when the DD Form 1354 is used to change costs on an interim 1354 to reflect the final costs against the project. Project financial completion occurs after all of the project costs have been accumulated. This may occur many months or years after a project's physical completion. Checking financial completion means that the contractors have received final payment for the project, all project management costs are included, and no additional costs will be incurred against this project. If final costs are available at physical completion or BOD, do not check this box and indicate final costs by checking "Final" in subpart C.

- Other - check the "Other" box when the transfer or acceptance occurs at an event time other than the four cases described above; explain the "Other" checkbox for the event in Project Remarks (block 26) on the back of the DD Form 1354.

[Subpart C of Block 9] Version

Use the DD Form 1354 subpart C to indicate quickly whether the DD Form 1354 is a draft, interim, or final version. Costs on a draft or interim 1354 are assumed to be preliminary costs. Costs on the final DD Form 1354 are the final costs. If the 1354 were issued for financial completion only, use the checkbox for financial completion in subpart 9B and check "Final" in subpart 9C. If the 1354 is issued at Physical Completion with final costs, then check Physical Completion in 9B and check "Final" in 9C; there would be no reason to create an additional 1354 for financial completion since the final costs would already be documented.

[Subpart D of Block 9] Effective Date of Transaction

Enter the effective date for the transfer or acceptance in format DD-MMM-YYY.
NOTE. The effective date of the transaction is the earlier of BOD or Date Available For Use, and is the date from which the accounting system should depreciate the cost of the facility.

Example: 15 JAN 2002

Block 10. [ITEM NUMBER]

A key step in the preparation of a DD Form 1354 is to identify the various components or items of the project. Enter a separate Item Number line for each new facility, and for each facility addition, capital improvement, or deletion, including additions to or deletions from utility systems or other previously existing facility records. If there are more items than fit on a single page, use additional DD Forms 1354.

Do not create an excessive level of detail in the item listings. As a minimum, observe the following rules for determining individual items.

- Identify each facility and its category code as a unique item number.
- Identify major portions of any multi-purpose facility with appropriate facility category codes and units of measure for each portion. List these multiple uses such that the multi-purpose facility has one item number and several different lines, one for each category code.
- If land is purchased as part of the project, show land as a separate line item.
- If demolition is within the footprint of a new construction project, then demolition costs are included as part of the new individual facility costs. If demolition is not in the footprint of new construction, the demolition cost is expensed and does NOT get included as part of the capitalized cost of the project. There are two ways to account for the demolition portion of the project and to document the reduction of real property. You may either attach an Authorization for Demolition (e.g., DA Form 337 or equivalent form for other Services) to document category codes and quantities of demolished real property separately from constructed/transferred Item Numbers or, in lieu of this attachment, indicate as additional DD Form 1354 Item Numbers, all demolished real property facility numbers and category codes using negative numbers (shown in parenthesis) for units of measure. Do not show demolished facilities on the 1354 if the attached demolition document has all the required information to subtract demolished facilities from the real property inventory.
- Attach separate lists of installed building equipment (IBE) (real property) and equipment in place (EIP) (personal property) to the DD Form 1354. This allows for the detailed equipment listings without cluttering up the 1354. The preparer, in conjunction with the RP Specialist, should use judgment in determining the amount of detail provided.

Block 11. [FACILITY NUMBER]

Enter the Facility Number (FACNO) assigned to each Item Number. The Facility Number is a unique, real property accountability alphanumeric, for each facility on an installation according to the Installation Master Numbering Plan. Some installations have consolidated records for pavements and utilities and the additional pavements and utility distribution lines must be added to an existing facility number. The installation RPAO provides these numbers to the construction agent early in the design phase.

Block 12. [CATEGORY CODE]

In block 12, record the five or six digit design use category code for each affected facility usage itemized in block 10. When a constructed facility has more than one design use, each usage over 1,000 SF must be identified as a separate line under the same Item Number. Facilities listed may be land, buildings, utilities, or structures and must be classified as the correct facility category in accordance with the service implementation of DODI 4165.3 (e.g., Army real property classification system prescribed in DA Pamphlet 415-28, Guide to Army Real Property Category Codes or Air Force Handbook 32-1084, Facility Requirements). These reference documents provide the facility category code, category description, and the various units of measures associated with each facility category. Prior to initiating any work on a DD Form 1354, the construction agent should coordinate with the receiving agency RPAO and develop a draft category code/real property classification plan that can be used for development of the various items on the DD Form 1354 for this project. A draft 1354 should be identified as a deliverable from the design process and this draft reviewed and approved by the installation DPW along with other design documents. The best time to prepare this draft is during the design phase. Identification of items and their category codes is more important; estimated costs are less important for the draft 1354.

Block 13. [CATEGORY CODE DESCRIPTION]

Use the service implementation of DODI 4165.3 (e.g., DA PAM 415-28 or Air Force Handbook 32-1084, Facility Requirements) to determine the correct facility category code short title as the verbatim description that corresponds to the category code entered in block 12.

Block 14. [TYPE]

Indicate the type of construction: P = Permanent, S = Semi-permanent, and T = Temporary. For definitions of each type of construction see DODI 4165.14, DOD Real Property Inventory Reporting and Forecasting.

NOTE. For Blocks 15 through 18.

Each Service category code reference stipulates an area or a capacity/other unit of measure, or both. If both units of measure are stipulated in the reference, then both are required on the DD Form 1354. If only one measure is required, place N/A in the other two columns.

Block 15. [UNIT OF MEASURE-1; AREA]

Enter in this column the appropriate Unit of Measure 1 for area for each design use category code for each item of real property, i.e., only SF, SY, or AC. The service implementation of DODI 4165.3 (e.g., DA Pamphlet 415-28) identifies the appropriate area unit of measure for each real property category code.

Block 16. [TOTAL QUANTITY-UM 1]

Enter the total quantity of area for the Unit of Measure-1 for each item of real property. For buildings, enter the gross area. For demolition, enter negative numbers in parenthesis or attach an Authorization for Demolition.

Block 17. [UNIT OF MEASURE-2; CAPACITY/OTHER]

Enter in this column the appropriate Unit of Measure-2 for capacity/other for each design use category code for each item of real property. The service implementation of DODI 4165.3 (e.g., DA Pamphlet 415-28) identifies the appropriate capacity/other unit of measure for each real property category code.

Block 18. [TOTAL QUANTITY-UM 2]

Enter the total quantity of capacity/other for the Unit of Measure-2 for each item of real property. For demolition, enter negative numbers in parenthesis or attach an Authorization for Demolition.

Block 19. [COST]

One of the primary purposes of the DD Form 1354 is to identify the cost of individual facilities of the construction project. These costs are required as part of the Army's Financial Statements and General Ledgers. The preparer must identify the total project cost as well as costs assigned to each facility that is part of the project. Only one cost per item number (facility) is allowed in column 19. All costs of a multi-purpose facility should be shown against the primary category code for that facility, and the other categories of the multi-purpose facility should be annotated as N/A in column 19.

The construction agent must provide distinct break out costs for each different building, utility, and structure constructed as part of this project. For example, if the project consists of two buildings, parking, sidewalks, water supply branch lines, sewer branch lines, and exterior lighting, you need seven different costs for items in block 19. Each building and structure (parking and sidewalks) and each utility would have a cost in block 19.

The real property accounting system should record only capital costs in the general ledger Plant, Property, and Equipment (PP&E) account for financial statements. Therefore, for capital improvements to existing facilities, preparers should only record the capital costs for the capital improvements to the existing facility. Do not enter any repair work costs on the 1354 since repair costs are not capitalized.

Costs provided in a DD Form 1354 can be either preliminary or final. Costs on the draft (if any) and interim version DD Forms 1354 are preliminary costs. Costs on a final version DD Form 1354 are the final costs. The office preparing an interim 1354 will create a suspense file to ensure that the accepting RPAO is furnished an updated DD Form 1354 with the final construction costs upon financial closeout. Final costs are generally available in several months or, if legal claims are involved, one or more years after physical completion and facility transfer. Use estimated costs only for real property assets found on post, or for other existing facilities with unknown original construction costs. In these cases, the estimates are the final costs.

To demonstrate compliance with the CFOA, the preparer should place the total project cost and the four components of total project costs in the Project Remarks (block 26) on the back of the form. The four components of total project cost are: (1) planning and design (P&D) including project management costs (pre-award), (2) construction contract supervision and administration (S&A) (also known as supervision, inspection, and overhead (SIOH) and including post-award project management costs); (3) the construction costs (including site preparation which also includes demolition of footprint facilities), and (4) project funded equipment costs. The sum of these four cost elements is the total project cost and should equal the sum of the individual facility costs shown in column 19 on the front of the 1354 plus the equipment-in-place costs that are transferred as personal property. The construction agent prorates P&D and S&A costs among the facilities comprising the project and includes the prorated P&D and S&A costs in the facility costs in column 19 for each facility. Estimated costs may be used to prorate P&D and S&A costs to the individual Item Number in column 10.

For real estate acquisitions, the preparer should list the cost in column 19 as the sum of real estate transaction costs and the actual purchase or fee costs. Show these two components of real estate costs in Project Remarks (block 26).

For real estate transfers, the preparer should list the cost in column 19 as the sum of real estate transaction costs and the actual costs that were on the losing agency's facility records. Show these two components of real estate costs in Project Remarks (block 26).

Block 20. [FUND SOURCE]

When recording costs, the preparer needs to identify the types of funds obligated. It is important for compliance with CFOA to identify each facility fund source in this column. Each Item Number could be funded from a different fund source and some facilities could even have a combination of fund sources. When there is more than one fund source for a single facility, show both fund sources with percentages of each. The construction authorization document usually identifies the fund source(s). Typical fund types for construction include, but are not limited to: Military Construction Army (MCA), Military Construction Army Reserve (MCAR), Military Construction National Guard (MCNG), Non-Appropriated Fund (NAF), Operations and Maintenance, Army (OMA), Operations and Maintenance, Army Reserve (OMAR), Family Housing Maintenance Account (FHMA), and Department of Defense Dependent Schools System (DODDS). Appendix D provides a more complete list of standard abbreviations for DoD and Army fund sources.

Example: MILCON 75%/OMA 25%

Block 21. [ITEM REMARKS]

Use this column to note any information or remarks about the specific Item Number from column 10. There is no need to duplicate the project level remarks that appear in the Project Remarks (block 26) on the back. You should explain any prorating of costs among various items. Also explain any removals or demolitions, such as demolition to make room for footprint construction. Also use space in Project Remarks (block 26) for continuation of data that does not fit in column 21.

Block 22. [STATEMENT OF COMPLETION]

This block is for the signature and title of the individual in the construction agent organization that is responsible for the transfer of accountability for the facility to the installation. The signing authority is certifying that the following Statement of Completion printed on the DD Form 1354 is true: "The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side." Normally the construction agent project manager, whether for the USACE District/NAVFAC Division or DPW/DIS, signs and dates block 22 for new construction and capital improvements. The RPAO normally signs when transferring real property from one installation to another. Enter the title of the signing official. Enter the date at the time of signature. The date must be prior to, or the same as, the date of acceptance in block 23 on the DD Form 1354 in order to simultaneously transfer property responsibility and accountability. The date should be in the format DD-MMM-YYYY.

Block 23. [ACCEPTED BY]

This block is for the signature and title of the individual responsible for accepting accountability for the properties described on the DD Form 1354. Normally, the RPAO accepts all the property for which he/she is accountable and therefore signs and dates in block 23. Enter the title of the actual signing official. Enter the date at the time of signature. The date must be after, or the same as, the date of transference in block 22 on the DD Form 1354. The date should be in the format DD-MMM-YYYY. Once the 1354 is signed, the RPAO will provide the 1354 to the RP Specialist on the day of acceptance for entry into the real property database.

The signing authority is accepting accountability for the real property facilities described on this DD Form 1354 in the quantities and for the costs listed in columns 10 through 20. The facilities accepted should have been inspected and determined to meet standards except for the deficiencies listed in block 25 on the reverse side. For real property adjustments signed by the RPAO in block 22, enter N/A in the three blocks for acceptance (Accepted by, Title, and Date Signed).

Block 24. [PROPERTY VOUCHER NUMBER]

The preparer of the document should leave this field blank. The receiving installation RPAO will fill in the property voucher number when the DD Form 1354 information is recorded in the installation real property voucher register, such as a Register of Vouchers to a Stock Record Account, DA Form 272 for the Army. This voucher number is the next sequential number assigned in the register by the Real Property Office. For additional information concerning vouchers and voucher registers, see DA PAM 405-45, Real Property Inventory Management or other service publication.

Example: V-20020023 where V indicates a voucher number and the first four digits (2002) is the fiscal year and the last four digits (0023) is a four-digit sequence number.

Block 25. [CONSTRUCTION DEFICIENCIES]

Enter any significant construction deficiencies for the project. Do not list any perceived deficiencies in the scope or design of the project on this document, as this transfer document identifies only deficiencies in the awarded construction contract performance that the Government needs completed before declaration of completion of the contracted work. If there are more entries than fit on a single page, use additional DD Forms 1354.

Examples: Restore all grassed areas disturbed by construction
Replace/repair iron rod fence that was damaged during construction

Block 26. [PROJECT REMARKS]

This block is primarily for project level remarks. Enter any project explanations that would help others understand the real property transaction identified on the 1354. Fully describe any capital improvements. Remarks that pertain to only one Item should be listed in column 21, not in Project Remarks. In addition, if the "Other" checkbox is checked in block 9 (subpart A or B) an explanation is mandatory in this "Project Remarks" block. Also use Project Remarks (block 26) for continuation of data that does not fit in blocks 1 through 8, and columns 20 or 21. Also, enter in Project Remarks (block 26) the total project cost and four individual components of total project cost: P&D, S&A, construction, and equipment as described for Cost [block 19]. Use Project Remarks (block 26) to indicate which attachments are included with the 1354 (e.g., Building Information Checklist). If there are more remarks than fit in block 26 on a single page, use additional DD Forms 1354. The preparer should also list his/her name and phone number in the Project Remarks (block 26) space in case there are questions.

Examples: Military Construction, Army (MCA) project to construct a new battalion headquarters and classroom, and associated structures and utilities on Fort Riley, KS.

P&D Costs	$ 1,250,000	
S&A Costs	$ 1,000,000	
Construction Costs	$25,000,000	
Subtotal		$27,250,000
Equipment Costs	$ 2,500,000	
Total Project Cost		$29,750,000

Subtotal matches sum of individual item costs in column 19.
Equipment hand receipted to CWO Anthony Gerard, PBO for 24th INF DIV (M).
Block 7 Drawing Numbers continued: 47-018-1235, 47-018-1236, and 47-018-1237.
Attachments to this 1354: Building Information Checklist prepared by Jawhawk Constructors, Inc.
DD Form 1354 was prepared by Thomas Gerard, 703-683-7100.

Chapter 3 Draft, Interim and Final Versions of the DD Form 1354, Transfer and Acceptance of Military Real Property

For real property transfers, only the final version DD Form 1354 is normally required. The losing organization should prepare the form to be ready for signature at the time of transfer. However, do not hold up preparation of the transfer document for lack of actual costs. In that case, prepare an interim version with estimated costs and prepare a final DD Form 1354 later when final costs associated with the transferred real property are determined.

Because final costs for new construction and revitalization projects are typically not available when the facility is available for use (beneficial occupancy), this handbook has established three versions: a draft, interim, and final; for the DD Form 1354 for a single construction/revitalization project. All three versions must have the same project/job number (block 3) so that all versions of the DD Forms 1354 associated with the single project can be correlated. However, all three versions must have their own unique serial number (block 4) so that the preparing agency can track all versions of the DD Form 1354. This chapter explains the usage for each version. To help the accepting official quickly identify the version of the DD Form 1354, there is a subpart C (checkbox for Draft/Interim/Final) of Block 9 (Transaction Details) for the preparer to identify the version type.

There should be only one draft and only one final version of a DD Form 1354 for a single construction/revitalization project. If there are updates to the draft version, you simply have an adjusted draft version with a later date prepared (block 2) and the same serial number (block 4). However, you can have multiple valid interim DD Forms 1354 for a phased turnover of facilities, each with its own serial number (block 4).

Draft Version

The purpose of the draft 1354 is to establish in writing the level of detail and the different components of a project early in the project lifecycle. Such usage helps to ensure a timely and accurate delivery of both the final project and final documentation. Careful review of the draft 1354 improves the subsequent versions of the DD Form 1354 and ensures a correct final version.

The Project Delivery Team, consisting of persons from the construction agent and customer organizations, prepares a draft DD Form 1354 for client review prior to the final design submittal, so that all of the client comments are addressed in the final project design. Some installations may take a more proactive approach and actually list the items that should appear on the draft 1354 and allow the construction agent project manager to input the area/capacity as the design matures. The draft DD Form 1354 should incorporate information from the DD Form 1391 and the project folder, if either exists. While preparing the 1354, the preparer pays particular attention to the level of detail of the items in column 10, their associated category codes, units of measure, and quantities.

The Design Team provides the draft DD Form 1354 to the construction agent project manager and construction team members administering the contract at least 60 days prior to construction contract award, in order to allow all parties to review the draft version prior to award.

The draft 1354 captures all the expected project costs, including costs for P&D and S&A, and estimated construction contract costs. These costs, plus any others (e.g., contingency), become the construction working estimate (CWE) at award. Post-award project management costs are included in S&A. For design/build projects, the P&D costs should include those contract management costs required for the preparation of the request for proposal (RFP), solicitation, negotiation, and any other engineering and project management costs through award of the design/build project, separate from the CWE. The draft DD Form 1354 should not be used as a voucher because the construction costs are only estimates with no acceptable accounting basis.

Interim Version

The purpose of the interim DD Form 1354 is to provide in writing to the accepting RPAO, a transfer and acceptance document with auditable costs on the day of facility transfer. The interim DD Form 1354 is prepared after substantial completion of construction, in preparation for the facility transfer on the Date Available For Use and before, or coincident with, beneficial occupancy.

The requirement is to have a complete interim DD Form 1354 signed by the transferring and accepting officials on the Date Available for Use or the Beneficial Occupancy Date (BOD), whichever comes first. The interim form includes actual planning and design (P&D) costs, actual project management costs, actual S&A costs, and actual construction contract costs to date. The actual construction costs are what has been obligated and expended to date and therefore are not estimates. The interim 1354 should also have the Construction Deficiencies, on the back of the form in block 25, filled out based on the acceptance inspection with the construction contractor. The CIP Account is credited in the construction agent's system and PP&E is entered into the installation's real property system upon RPAO acceptance of the interim 1354.

The construction agent project manager prepares the interim form and sends it to the accepting agency for review at least 21 calendar days prior to the anticipated transfer. The construction agent project manager should follow up with the accepting agency to ensure that the DD Form 1354 is complete and acceptable prior to the facility turnover day. The construction agent project manager determines the Date Available For Use as the day the facility is physically complete except for correction of deficiencies documented in Construction Deficiencies (block 25) of the 1354. The construction agent project manager should deliver operations and maintenance manuals and as-built drawings to the accepting agency at facility turnover.

The installation RPAO, or delegated representative, accepts the facility(ies) at turnover by signing and dating the interim DD Form 1354 in block 23 and adding any construction deficiencies not previously identified as Construction Deficiencies (block 25). The accepting official hands over a copy of the signed interim 1354 to the construction agent

project manager at the conclusion of the turnover. The accepting agency shall not occupy the facility before the interim DD Form 1354 is signed and returned to the construction agent project manager. If the accepting official or representative cannot immediately accept the 1354, he/she must notify the construction agent project manager immediately and provide the reason he/she cannot accept the military property described on the DD Form 1354. This failure to accept accountability for the facilities documented on the DD Form 1354 precludes any user occupancy of those facilities, and should be fully coordinated before the RPAO acceptance inspection.

A large construction project may contain multiple facilities, each with its own date of substantial physical completion and turnover, or beneficial occupancy for only a portion of a single large facility (i.e., Partial BOD). For these situations, the construction agent project manager prepares one and only one interim DD Form 1354 for each project phase, building, or portion of a building to be turned over and accepted separately. Use the same project/job number for each interim 1354 so that it is possible to correlate all the interim DD Forms 1354 for a single project. Each interim 1354 would have its own unique Serial Number (block 4) and Effective Date of Transaction (block 9D) and would show only costs for the facilities turned over, including their P&D and S&A costs. The construction agent project manager uses the signed interim 1354 to document credit to the CIP account appropriate for the accepted phase. The installation uses the interim DD Forms 1354 to record, in the real property system database, the real property assets as they are turned over and accepted in piecemeal fashion.

Final Version

When the final project costs are not known at the time of transfer, the construction agent project manager provides an interim DD Form 1354 based on the costs obligated and expended to date. When the actual cost of construction is ascertained, the USACE District/NAVFAC Division/DPW/DIS project manager furnishes the final DD Form 1354, which reflects the actual cost of construction, to replace the preliminary cost vouchered by the interim DD Form 1354 previously furnished.

There is only one final project 1354, even where there are multiple interim DD Forms 1354. The purpose of the final DD Form 1354 is to establish in writing the final total cost for each facility in a project. This final accounting can occur only after all costs are finalized. Prior to determining the final costs, the construction agent project manager, in conjunction with the project delivery team, corrects the deficiencies noted on the punch list, ensures warranties are in place, processes claims, resolves any labor or legal issues, and ensures final payments to the contractors. The importance of the final 1354 is that it documents the final facility cost, which may be different from that listed on the interim 1354, and such difference would cause the RP Specialist to make a correction to the real property database facility cost.

The construction agent project manager ensures that all financial accounts are balanced and closed and then prepares the final DD Form 1354 for the project. The final project cost contains the final/actual P&D, S&A, and construction costs. The construction agent project manager updates the costs from the interim DD Form 1354 with the final actual total costs and provides a signed (block 22) final 1354 to the RPAO of the accepting

organization. The RPAO signs the final 1354 in block 23. The accepting official's signature on the final 1354 indicates that he/she accepts the final costs and provides feedback to the preparer that the final 1354 has been received. The RPAO gives the final DD Form 1354 to the RP Specialist to establish as a voucher and ensures that the RP Specialist inputs the final facility cost into the real property database. Upon receipt of the final 1354, the installation RP Specialist will adjust the costs in the real property database which were based on the interim and voucher the final DD Form 1354. The construction agent project manager uses the signed final 1354 to document a credit adjustment based on the final cost differentials from the CIP account, assuming a previous CIP credit based on the interim 1354 costs occurred earlier.

The interim and final DD Forms 1354 refer to the same Transaction Type (i.e., new construction or capital improvement as shown in block 9A), will have the same Effective Date (block 9D), and the same Project/Job Number (block 3). The RP Specialist can identify all 1354 versions pertaining to the same capitalization event by the Project/Job Number. The interim and final versions will have different Dates Form Prepared (block 2) and different Serial Numbers (block 4), and possibly different item costs (column 19).

The Effective Date (block 9D) on the final DD Form 1354 for a project consisting of multiple individual facility turnovers on different dates must include the different effective date for each facility. These different dates may be shown in Project Remarks (block 26) with a "See Remarks" in block 9D. The Effective Date for a single facility with a phased turnover is the date the construction agent project manager declares the entire facility is available for use.

Chapter 4 How to Use DD Form 1354 Data

This chapter explains what actions the RP Specialist and the construction agent project manager must perform after the real property is accepted and the DD Form 1354 is signed by both parties. This chapter explains how the RP Specialist files the DD Form 1354 as a voucher and enters information into the real property database. This chapter also explains how the construction agent project manager uses the 1354 to maintain the CIP account, to close out new construction documentation, and to provide documentation for real estate transfers. The Army's Management Controls typically allow the RP Specialist ten days to enter the information from DD Forms 1354 into the real property database. The other Services establish their own management controls and timelines to ensure that DoD PP&E does not double-, or under-count real property assets.

Vouchers and Journal Entries

A voucher is required to document the cost of each new facility or capital improvement. Due to differences among the Military Services' real property systems, there is a separate paragraph describing how each Service complies with the CFOA regarding vouchers. For projects funded by Defense Agencies, the RP Specialist shall provide a copy of all vouchers to the agency funding the project for their records and capital depreciation process.

Army IFS uses the DD Form 1354 as a Voucher

After the RPAO accepts a facility on a DD Form 1354, and provides a signed copy to the construction agent project manager, he/she passes the original DD Form 1354 to the RP Specialist to use as the voucher for the following: to document additions and deletions of real property, to transfer and accept new construction changes to existing facilities, and to adjust real property records resulting from physical inventories. Regardless of who fills out the DD Form 1354, the RP Specialist receives the 1354, assigns the next sequential voucher number to the interim/final DD Form 1354 in block 24 (Property Voucher Number), and records the property voucher number in the Voucher Register. The RP Specialist inputs the data from the 1354 into the IFS real property database. He/she then files the original 1354 in the voucher file and files a copy in Building Information File. If more than one facility number is listed on the DD Form 1354, the RP Specialist makes copies of the original 1354 with the same voucher number and files a copy of the 1354 in each affected facility Building Information File. As additional DD Forms 1354 are accepted for this same project (i.e., partial BOD or final 1354), the RP Specialist enters a unique property voucher number for each version (interim and final) of the 1354 and makes the new entry in the voucher register. The RP Specialist also files these subsequent DD Forms 1354 in the voucher file and Building Information File(s).

Navy FIS automatically creates a Journal Entry

The Navy Facilities Information System (FIS) tracks all Navy- and Marine Corps-managed MILCON projects. The Navy FIS provides information to the Navy's single accounting system (STARSFL). The project manager at a NAVFAC District goes into

FIS, creates an electronic Accounting Adjustment Standard Form 1080 as a journal entry to transfer funds from the NAVFAC CIP. The FIS has the facility details similar to a property record card and makes up the Navy Facilities Asset Database, which is the official Navy RPI. For a MILCON project, the facility is described in FIS. When the project is completed, the project manager creates a journal entry to both transfer funds from CIP and to serve as a voucher. The detailed property record card information is already in FIS from the MILCON phase.

Air Force ACES creates Journal Entries for MILCON projects

The Air Force Automated Civil Engineer System (ACES) assigns journal entries instead of voucher numbers. All DD Forms 1354 referring to the same capitalization event, i.e., Partial BOD and final 1354, will carry the same parent journal number within ACES. Using ACES at base level, cost account assignments and transfers between GLACs are accomplished programmatically. Therefore the RP Specialist will pick up a facility on the Real Property Report upon beneficial occupancy (BOD) based on a total cost estimate provided to real estate by the construction project engineer. The RP Specialist would modify facility costs upon receipt of an accepted DD Form 1354. When another 1354 is received later, the RP Specialist would modify/update the facility cost through ACES based on the latest DD Form 1354 received.

Enter Information from DD Form 1354 into the Real Property Database

The RP Specialist enters newly constructed real property as reportable facilities upon acceptance of the interim DD Form 1354. Key information needed to create the facility record is included on the 1354 and attachments ;see Appendix C, Building Information Checklist. Coordination with the construction agent project manager early on will ensure use of the proper facility numbers and category codes. The preparer should ensure that these facility numbers, as well as the fund sources, are properly recorded on the 1354, because both data are mandatory items for capitalization projects. The RP Specialist enters the new facility information, capitalization data, voucher number, and transaction effective date for each facility into IFS/ACES in the appropriate fields/screens or into another real property database system.

Facility Record

The DD Form 1354 contains the essential information to create a new facility record in IFS, FIS, ACES or other real property inventory system. The facility and use records should match the category codes and quantities as shown on the DD Form 1354. Some of the detailed data for a new facility record comes from the attachments to the 1354; see Chapter 6. The RP Specialist shall use the Effective Date (block 9D) to determine the Year Built for new construction and Year Acquired by DoD for transfers into DoD (Military Service). Do not use the Effective Date on the 1354 to determine Year Acquired for transfers between Military Services. When a physical inventory determines a different quantity, the RPAO creates an adjustment 1354 to document such changes. The RP Specialist notes the date of the physical inventory and updates the real property database.

Capital Improvements

The DPW appoints a project engineer to determine whether the project is a capital improvement or a repair project. One project can be part capital improvement and part repair. In this case the project engineer would determine which part. See the definition of capital improvement in the glossary of this handbook and examples in the FMR. The RP Specialist is NOT responsible for making the determination. However, he/she must record any capital improvement into IFS, ACES, or other real property database system, if the capital improvement exceeds the reporting threshold. The Date of Capitalization is the Effective Date of Transaction in block 9D. The description of the capitalization should be in Project Remarks, block 26. For projects funded by Defense Agencies, the funding agency has final approval of the capitalization decision.

Transfer Equipment Information to the Property Book Officer

The DD Form 1354 attaches two lists of equipment: installed building equipment (IBE), which is real property, and equipment-in-place (EIP), which is personal property. The preparer must not combine both types of equipment in a single list. Because the difference between IBE and EIP requires engineering judgment, the construction agent project manager must clearly identify the items of equipment as either IBE or EIP. Definitions and examples of each follow.

Installed Building Equipment

IBE is an item of equipment that is affixed and built into the facility as an integral part of that facility. To qualify as IBE the equipment must be necessary to make the facility complete, and if removed, would destroy or severely reduce the usefulness of the facility. IBE costs are included as a funded construction cost and should have itemized costs listed separately on an attachment to the DD Form 1354. Account for IBE as real property with an equipment asset record, but do not create separate facility records in the real property database for IBE. Examples of IBE and their Army category codes are:

- Heat plant (821XX)
- Refrigeration source (826XX)
- Fire alarm system (88010)
- Automatic water sprinkler system (88110)
- Special fire extinguishing system (88120)
- Standpipe system (88130)

Equipment-in-Place

EIP is a special category of personal property (not real property). EIP consists of capital equipment and other nonexpendable equipment of a movable nature that has been fixed in place or attached to real property, but not as an integral part of the facility, and therefore may be severed or removed from a facility without severely damaging, destroying or reducing the usefulness of the facility. EIP does not include installed building equipment, is personal property, and is accounted for on property book records (not real property

records). Do not account for EIP as real property and do not create separate facility records in the real property database even though some EIP items have real property category codes. EIP costs may be included as a funded construction cost and if so, must be attached as a separate EIP listing with costs itemized separately and attached to the DD Form 1354. For real property capitalization purposes, the cost of EIP is subtracted from total project/construction costs. Transfer accountability for EIP personal property by providing the EIP documentation to the appropriate Property Book Officer, who will enter the newly acquired EIP into the appropriate property book and include the EIP in the personal property hand receipt of the facility occupant using the Service hand receipt form, i.e., DA Form 3161. Examples of EIP personal property fixed and their Army category codes are:

- Conveyor system
- Closed circuit television system
- Watch reporting system (88020
- Air raid alarm system (88030)
- Intrusion alarm system (88040)
- Lightning protection system (89280)

Use the DD Form 1354 Cost Data to Maintain the Construction-in-Progress Account

CIP is a material component of the DoD property, plant and equipment (PP&E) line item. Expenses incurred during construction of PP&E assets should be recorded as CIP until the assets are placed in service. When an asset is completed or placed in service, the cost of the capitalized property is credited to the CIP account and this cost is transferred to the real property account as the acquisition cost of the property. The recording of costs in the CIP Account brings construction costs under financial control during the construction period (which may take years) and segregates capital costs from expenses.

FMR Volume 4, Chapter 6 provides detailed guidance on accounting for PP&E, and FMR Volume 3, Chapter 17, which covers accounting requirements for military construction projects, directs the use of DD Form 1354 (para 170502) for transferring projects. Appendix B provides instructions for each block of the DD Form 1354.

All construction costs accumulated during the life of any USACE or NAVFAC managed project are captured in the CIP account as a Debit Balance. For projects, which proceed to normal construction, this includes all costs for planning and design (P&D) including project management costs (pre-award), construction contract supervision and administration (S&A) including post-award project management costs, construction costs (including site preparation, which also includes demolition of footprint facilities), and project-funded equipment costs. Once the project is physically complete/available for use or beneficial occupancy obtained, the construction agent project manager uses the expenses in the CIP account for a given project to establish the DD Form 1354 capitalization costs. He/she also uses the interim 1354 total cost to document credit to the

CIP account and to establish the asset value to be added to the installation's real property account.

Installation DPW/DIS Construction Office project managers are likewise responsible for accounting and reporting work-in-progress expenses on non-MILCON projects that are capitalized. These expenses are accounted for as work-in-progress general ledger accounts at the installation similar to the CIP process. These expenses must be promptly credited once the projects are substantially completed, available for use or beneficial occupancy, and turned over to the installation for use and to the RPAO for recording in the real property database.

The construction agent project manager should use the interim DD Form 1354 costs to credit those costs in CIP (i.e., as a credit to the CIP account) within 10 days after RPAO acceptance. Any USACE/NAVFAC delay in closing out the CIP account after customer acceptance on a DD Form 1354 may cause double accounting in the general ledger PP&E because the gaining RPAO should enter this same value into the real property database within 10 days of facility acceptance.

The construction agent project manager is also responsible for the closeout of the capitalized property costs from the CIP account. The construction agent project manager closes out the project in the CIP account based on the costs in the final DD Form 1354 after all contractor costs, litigation, and warranty work have been completed. However it is not necessary to complete all warranty work before doing a final 1354. USACE goals for financial closeout and final DD Form 1354 transfer are 180 days for CONUS projects and 360 days for OCONUS projects from receipt of the RPAO acceptance (evidenced by his/her signature in block 23) to transfer the capitalized project costs out of the CIP account. NAVFAC has corresponding timeframes.

For projects turned over in phases, the construction agent project manager should credit the CIP account based on the acceptance of each phase, as documented in the interim DD Form 1354 for the phase. The final project 1354 can adjust costs, including construction, P&D, S&A or equipment, for any of the phases turned over previously.

To credit the CIP, the construction agent project manager forwards a copy of the signed and accepted interim or final DD Form 1354 to his/her Finance and Accounting Office for processing the credit to the CIP account. Similarly, the installation DPW/DIS project manager forwards a copy of the signed and accepted interim or final DD Form 1354 to the Installation Finance and Accounting Office to document credit for the installation work-in-progress account.

In accordance with this guidance, for work managed by USACE, the Corps of Engineers Financial Management System (CEFMS) keeps an accounting on a general ledger basis for CIP costs separately from other costs that are "Construction Expensed," i.e., not considered investments to be capitalized, but rather expenses, e.g., repairs. Both USACE/NAVFAC and the installations comply with CIP accounting rules for capturing costs incurred for construction or acquisition of a capital asset such as real property. DoD requires that the total costs of a construction project be accounted for, and recorded in the accountable installation's real property records, at the completion of a project. The DD Form 1354 is used to transfer real property accountability and the cost associated with

that transfer and acceptance, indicated by the signatures in blocks 22 and 23, with an effective date as shown in block 9D, Effective Date.

Closeout New Construction Documentation

The construction agent project manager is responsible for the financial closeout of all the projects he/she manages. Closeout occurs after design and construction contracts are closed. Closeout of the project, financial, and cost accounts by the construction agent project manager allows return of excess funds from USACE/NAVFAC (or other construction agents) to the funding agencies. The construction agent project manager also ensures that project capitalization costs, accounted for by USACE/NAVFAC (or other construction agents) in their accounting system, are properly identified by individual facility in order that they may be properly recorded in the installation real property database.

In summary, the construction agent project manager should ensure that:

- The Project Cost Estimate (PCE) is current, that the PCE corresponds with costs in the financial accounting system of the specific construction agent, such as the Corps of Engineers Financial Management System (CEFMS) for USACE or STARSFL for NAVFAC, and that any construction expenses that need to be excluded/expensed are deducted from the CIP or work-in-progress account.
- For Military Construction projects managed by USACE/NAVFAC, all P&D, S&A and construction costs are included in the CIP account, with the exception of Lost Design or Breakage.
- Any costs for repairs on construction projects, which the installation project manager determines should not be capitalized, are not added to the project DD Form 1354, but are expensed. Therefore, only the PCE costs documented in the CIP or work-in-progress account may be shown on the interim DD Form 1354.
- Total project cost equals the sum of P&D, S&A, construction costs, EIP, minus lost design or breakage and expensed items. Show the total project cost and its four components separately in the Project Remarks (block 26). Site preparation costs, including footprint demolition costs, are included in the construction costs and capitalized as part of the total facility costs. Total project cost must equal the sum of all costs in column 19 on the final DD Form 1354, or the discrepancy must be explained in Project Remarks (block 26).
- The PCE costs documented in the CIP or work-in-progress account are equal to or less than the project funds received. Funds may be received on a Funding Authorization Document (FAD) or Military Interdepartmental Purchase Request (MIPR), or both. For example, the construction agent project manager may know that some of the funds received will be returned and, therefore, the project cost estimate will be less than the funds received at that time. However, when additional funds are required, and not yet received, the additional required value will not be included in the project cost estimate until the funds are actually

received. The final DD Form 1354, at project closeout, would include only those funds actually received, obligated and expended against that specific project.

- At financial closeout, the final DD Form 1354 reflects the final project capitalized costs. Return any excess MILCON-funded project funds to USACE/NAVFAC. Reconcile the project cost, CIP transfers, and the costs shown on the final 1354.
- If there are real estate transfers related to the construction project, then include the cost of the transaction as well as the cost of the real estate on the DD Form 1354. Real estate transfers may, or may not, be related to the construction project, depending on the nature of the project and the appropriations.

Document Real Estate Transfers and Enter into the Real Property Database

Real Estate transfers typically involve the USACE or NAVFAC real estate specialist and involve one of the following actions: reassignment of accountability, transfer of accountability, and transfer of purchased/leased military real property.

Reassignment of Accountability

A reassignment of accountability is a change to the administrative or command jurisdiction over a given tract of real property within a single Service. After receiving approval from the Service Secretary for the proposed reassignment, the losing installation RPAO prepares a DD Form 1354 for the real property and delivers the signed (block 22) DD Form 1354, together with the real property records, to the installation RPAO designated to accept the reassigned real property. The preparer annotates in the "Project Remarks" section (block 26) of the 1354 the type of real estate transaction, e.g., transfer of Vancouver Barracks from Fort Lewis to the Army's 70th Reserve Support Command.

The gaining installation RPAO accepts and signs (block 23) the 1354 and assigns a voucher number to be entered into block 24 of the 1354. The gaining installation RP Specialist creates new facility records and enters the voucher number and transaction date into IFS or other real property database system. When reassignment of real property has been completed, the gaining installation RPAO verifies the Transaction Effective Date (block 9D) and provides a copy of the signed and dated (blocks 22 and 23) DD Form 1354 to higher headquarters and the supporting USACE District/NAVFAC Division.

Transfer of Accountability

A transfer of accountability is a change to the administrative or command jurisdiction over a given tract of real property from one military Service to another within DoD (i.e., from Navy to Air Force), or from one Federal agency to another (i.e., from BLM to DoD). Upon receipt of approval from the Service Secretary (both Secretaries when transfer is between Military Services), document the property to be transferred using a DD Form 1354. The losing Service installation prepares the form as prescribed in Chapter Two with the preparer using his/her Service's category codes. The preparer identifies the transferring parties in the "Project Remarks" section (block 26) of the DD Form 1354. Also, include the authority for the transfer in the Project Remarks. When the transfer has been completed, the gaining installation RPAO verifies the Effective Date of the transfer in block 9D and provides a copy of the signed and dated (blocks 22 and 23) DD Form

1354 to the losing installation or Service, higher headquarters of the gaining installation, and the supporting USACE District/NAVFAC Division. The gaining/losing installation RPAO posts additions/deletions to the real property records from his/her copy of the 1354.

Note. Although not strictly a transfer of accountability, for sales and transfers outside the Federal government, the losing DoD installation would prepare a 1354 as prescribed in this paragraph.

Transfer of Administrative Accountability

A transfer of administrative accountability is a change to the real property accountability over a given tract of real property from one military Service to another within DoD (i.e., from Navy to Air Force), or from one Federal agency to another (i.e., from BLM to DoD), without the gaining Service accepting any other responsibility or liability for the property. The transferring Service or agency must document the property to be transferred using a DD Form 1354 and complete the form as prescribed in Chapter Two, using the losing Service's category codes. In addition, there are certain criteria that apply only to a transfer of administrative accountability. Compliance with these criteria must be documented and will be attached to the DD Form 1354 documenting the real property to be transferred for administrative accountability. The following criteria are based on the draft Air Force policy on *Accountability for Real Property*:

--The transferring Service/agency provides documentation that the environmental impact analysis process required by the National Environmental Protection Act and Council of Environmental Quality directives has been accomplished for the intended use of the property.

--The transferring Service/agency provides a base, site, or installation environmental baseline survey (EBS or BES) that documents the condition of the property at beneficial occupancy or transfer, with an acknowledgement that the gaining Service could not be a Potential Responsible Party (as defined by CERCLA) in the activity to be accomplished on the property.

--The transferring Service/agency provides data for the real property inventory that accurately reflects the category codes, units of measure, accumulated cost to government, and a statement that the gaining Service has no responsibility for sustainment, replacement, or recapitalization of the asset.

--The transferring Service/agency offers an office of contact for further information and agrees to reconcile its property records with the gaining Service when requested in order to ensure the accuracy of the administrative accountability and conformance with the Chief Financial Officers' Act of 1990.

Transfer of Purchased and Granted Real Property

For real property acquired by purchase, grant or condemnation proceedings, the supporting USACE District/NAVFAC Division will transfer the property by deed, grant real estate instrument, and/or a DD Form 1354. The 1354 will include a list of facilities, reproducible prints of project maps, and certified copies of pertinent real estate documents, such as deeds of acquisition, leases or judgments from condemnation

proceedings. If the USACE District/NAVFAC Division has performed initial alterations or improvements to the land, the construction agent (or real estate specialist) project manager should enter on the 1354 the appropriate "Items" and required information for each initial alteration or improvement as a separate Item Number in blocks 10 through 21.

The USACE District/NAVFAC Division responsible for execution of the real property grant will conduct a complete inventory of the granted real property (consistent with the terms of the grant), prepare the necessary real property records annotated "Leased/Permitted/Licensed Property Records," and furnish the originals of such records (to include the DD Form 1354) to the gaining installation RPAO. The Engineer District/Division/Activity will also provide copies of the executed grant authorizing the use and occupancy of the real property to the higher headquarters of the accepting installation and coordinate the transfer of accountability between the appropriate RPAOs. The Engineer District/Division/Activity will also administer grants of real property acquired by the Military Service from private individuals, corporations, or local governments. The Engineer District/Division/Activity will retain copies of any records required for use in making settlement with the grantor upon expiration of the grant.

At the time of transfer, the gaining installation RPAO will make a physical inventory, including a component condition inspection of the real property being accepted. The results of this physical inventory will be compared with the property as listed on the DD Form 1354 and the grant authorizing the use and occupancy of the real property. The gaining installation RPAO should sign the DD Form 1354 annotating any discrepancies in block 25. The transfer of accountability statements will be worded to conform to the statements in AR 735-5, Policies and Procedures for Property Accountability, or other Services equivalent accountability regulation, except that the term "real property record" will be substituted for "stock record account." The statement of transfer will include the Effective Date (block 9D) of transfer and reference in Project Remarks (block 26) to the grant identification (i.e., USACE Savannah District real estate license DACA 31-V-10764 to the State of Georgia dated 30 Aug 2002), and be supported by a detailed listing of the real property records transferred. The completed statements of transfer will be distributed in accordance with AR 735-5 or corresponding Service regulation. Upon expiration, termination or revocation of the grant, the Engineer District/Division/Activity will furnish the installation RPAO with copies of the notice of expiration or termination of the grant; and, if there is a continuing need to use and occupy the property for mission purposes, reissue the grant in accordance with Service procedures for ingrants or outgrants as appropriate. The RP Specialist will enter the data from the DD For 1354 and real estate instrument (i.e., deed, lease, license, permit, or easement) into the real property database.

Chapter 5 Project Cost versus Facilities Costs

This chapter provides guidance to the construction agent project manager on how to determine the capitalization costs which are vouchered against the facilities described on the DD Form 1354. Facility acquisition and capital improvement data in the real property accounting system must be substantiated by the costs on DD Forms 1354, and the costs on the 1354 must be reconcilable to the overall project costs. This chapter provides a methodology to ensure that DoD uses a consistent method of calculating these costs and to ensure correlation between costs recorded in the real property database for real property and 1354-documented project costs. The preparer of the DD Form 1354 must allocate or prorate P&D and S&A costs among the facilities in the project. Only facility costs appear as items in column 10 of the 1354. Indicate P&D, S&A, construction, equipment-in-place (EIP) costs, and total project costs in Project Remarks (block 26). The total project cost must equal the sum of the costs of individual facilities plus EIP costs. The preparer must explain any difference.

Depending on the method of item pricing on the construction contract, some facility costs may translate directly from the contractor's facility cost. Other costs, such as total project P&D and S&A may have to be prorated or allocated among several facilities.

The following step-by-step procedure is recommended:

1. Identify all the facilities on the DD Form 1354 and their associated construction costs, i.e., within the 5-foot line of the facility.
2. Identify any site preparation costs including footprint demolition, equipment (if project funded), or other costs that roll up with the costs directly attributable to those facilities.
3. Identify costs associated with those facilities that should be rolled up to existing consolidated facility records, such as utility lines or pavements.
4. Allocate the total planning and design (P&D) and supervision and administration (S&A) costs (including project management costs) among the facilities listed on the 1354. If P&D and S&A costs are known for the entire project but are not known for individual facilities, prorate total P&D and S&A costs among the different facilities. Prorate based on either individual area of the facility or individual facility construction working estimates. Annotate in Project Remarks (block 26) which basis you used to prorate or allocate P&D and S&A costs to individual facilities.
5. Compute the individual facility and incremental consolidated facility costs by summing the actual and allocated costs computed in steps one through four.
6. Check to ensure the sum of the individual facility costs (column 19) equals the total project cost. List in Project Remarks (Block 26) the total project cost and the individual total project cost contributions of construction, P&D, S&A, EIP, and any non-allowable costs. If the sum of the individual facilities on the

1354 does not equal the project total, explain in the Project Remarks (Block 26).

Chapter 6 Acceptance Standards for Interim and Final DD Forms 1354, Transfer and Acceptance of Military Real Property

The following standards are provided to help the accepting official determine whether to accept or reject the DD Form 1354. Standards are applicable only to the interim and final versions, not the draft version of the 1354. Consider the draft 1354 to be a working document that can be improved by staff coordination early on in the project. Draft DD Forms 1354 are not signed or "Accepted By" nor are they vouchered.

For a facility that is substantially completed and declared available for use/beneficial occupancy by the construction agent project manager, the listing of construction deficiencies in block 25 is not an acceptable reason by itself to not accept the facility. Consider resolution of the punch list to be a separate action from accepting the facility and signing the DD Form 1354.

One standard for acceptance is that the required attachments are present with the final 1354. Not all items on the following list must be attached to every 1354 for it to be acceptable. Conversely, this list may not include everything required for a specific project. The Project Delivery Team should determine early in the design process which attachment items are required and which are not required for the specific project. Since many of the attachments go directly to the building occupant, the customer's needs are paramount in this determination.

Since one goal is to have an interim 1354 available and signed (accepted) at facility transfer, the construction agent project manager, RPAO and customer must decide ahead of time which of the required attachments must absolutely be delivered with the interim 1354 and when the customer can expect the other items on the agreed list of attachments.

Attachments to DD Form 1354

1. Pictures before and after construction
2. Request for Demolition, e.g., DA Form 337, if demolition is part of the project
3. As-built drawings
4. Schematics of systems
5. Information formerly contained in the DA Form 2877 Building Record and codified as the Building Information Checklist; see Appendix C.
6. Reproducible prints of project contract drawings (format to be determined at the pre-design meeting)
7. List of Installed Building Equipment (IBE) with models and serial numbers and warranty information
8. List of Equipment in Place (EIP) with models and serial numbers and warranty information provided

9. Equipment operations and maintenance (O&M) manuals and systems operating manuals.
10. Test results of mechanical and electrical systems.
11. Systems warranty information
12. Certified copies of pertinent real estate documents, such as deeds of acquisition, leases or judgments from condemnation proceedings.
13. Contract information (e.g., submittals and specifications)
14. Backup cost basis documentation such as records of payment – see note at end of this chapter
15. Wiring diagrams.
16. Piping layouts.
17. Color codes for wiring and piping.
18. Valve charts and tags.
19. Spare parts catalogs.
20. List of special handles and tools required
21. Properly tagged keys

Completeness Standards

Use the following standards as a guide to determine whether the DD Form 1354 is complete and should be signed, or possesses a specific deficiency that would cause rejection. These are guidelines for both the preparer as a self-check and the accepting official. The exchange of a 1354 prior to date of transfer should allow sufficient time for a review and feedback on any possible shortcomings to allow the preparer an opportunity to "fix" the 1354 so it can be signed by both parties during the actual transfer. The completeness standards are:

1. Every block is filled out, checked, or N/A. The only blanks allowed are in Item Remarks (column 21).
2. Blocks 1 and 5 (FROM and TO) contain the appropriate installations or organizations and zip codes for the transferring and accepting RPAOs.
3. Block 6 contains the Installation Number of the actual facility location.
4. Block 9, Transaction Details, exactly one checkbox is checked for subparts 9A, 9B, and 9C. There can be no multiple checkboxes.
5. If "Other" is checked in either 9A or 9B there is an explanation in Project Remarks (block 26).
6. Effective Date must be shown in subpart 9D.

7. All facilities included in this project and the different category codes within each facility (over 1,000 GSF) are separately identified with one Item Number per facility in column 10.
8. No quantities of a single category code physically located in different buildings are combined into a single Item Number in column 10.
9. Each column 10 Item Number has an appropriate entry in columns 11 through 20 . N/A is acceptable for either area or other measurement when both are not prescribed and for cost and fund source of multipurpose buildings if they are already listed for that facility.
10. Columns 16 and 18 have quantities for both area and capacity/other measurements for categories when both units of measure are prescribed (e.g., in DA PAM 415-28).
11. Column 19 has costs assigned to each facility Item Number.
12. Column 20 has an appropriate Fund Source corresponding to every cost in column 19.
13. Column 21, Item Remarks, pertain specifically to the Item Number. Project Remarks are placed on the backside of the form in block 26.
14. There is NO separate Item Number (block 10) or line for planning and design (P&D) or for construction supervision and administration (S&A).
15. Interim and final DD Forms 1354 have signatures, titles and dates in both blocks 22 and 23. Interim and final versions have the same Project/Job Number (block 3), when applicable.
16. Block 25 contains all major construction deficiencies identified during the turnover inspection.
17. Block 26 contains project remarks appropriate to the entire project or transaction described in this DD Form 1354. Contains a description of the capitalization improvement when applicable. Shows the total project cost and individual components (S&A, P&D, construction and equipment) of total project cost. These amounts should match the column 19 totals on the front of the 1354 or explain any differences.
18. All previously agreed required attachments are provided. See typical attachments listed in this chapter.

Accuracy Standards

1. Quantities listed are within 2% of actuals.
2. Category codes on 1354 match category codes as listed in Service database, e.g., DA PAM 415-28 for Army.
3. Units of measure match category codes units listed in Service database, e.g., DA PAM 415-28.

4. Costs are broken out separately for each facility.
5. If checkbox "Final" in block 9C is checked, then all costs shown are final costs.

Timeliness Standards

1. For new construction, the preparer provides a draft DD Form 1354 along with the plans and specifications for the design review.
2. The preparer provides a review copy of the 1354 prior to the date when the gaining RPAO must sign to accept the facilities.
3. Preparer signs block 22 within 10 days of Effective Date (block 8) and before occupancy.
4. The receiving RPAO signs block 23 prior to occupying the facility.
5. Construction agent credits CIP account within 10 days of RPAO accepting the facility as indicated by the date in block 23.
6. RP Specialist records property in real property database within 10 days of RPAO accepting the facility as indicated by the date in block 23.

NOTE. The above standards apply regardless of construction agent organization and whether that agent is from an external organization or an internal one, i.e., DPW.

The following standard only applies to in-house projects managed by DPW personnel. The audit community has determined that backup documentation to establish cost data for projects executed by the installation DPW is essential since the in-house procedures for tracking work-in-progress may not be accredited for reporting project costs. Also when the DPW controls both the construction project manager and the RPAO, the following documentation may be required to substantiate DD Form 1354 costs for in-house projects: contracts, in-progress payments, in-house labor rates and in-house payments.

GLOSSARY

AAFES- Army and Air Force Exchange Service – Inter-service agency responsible for Exchange stores and related facilities. AAFES is responsible for construction and operations and maintenance of their facilities in CONUS.

ACES – Automated Civil Engineer System – Real Property – Air Force Base Civil Engineer management system. Repository for Air Force Real Property Data

Accountability – the responsibility of the single agency designated to hold property, keep records and report as the Executive Agent of the United States of America. The United States of America, not the individual Service, owns all government-owned property; however in this handbook accountability and ownership are generally considered to be interchangeable. Administrative accountability refers to the case where the accountable Service does not use the real property for which it is accountable, i.e., another Service or agency controls the use of the property.

AFH – Army Family Housing – A separate appropriation used to construct, operate and maintain Army Family Housing and supporting facilities. The construction agency (usually USACE or NAVFAC) is responsible for generating the DD Form 1354 for new housing construction or major renovation, usually paid for by Family Housing-Construction (FH-C) funds, which are appropriated on a project-by-project basis by Congress in the same manner as Military Construction (MILCON) funds. Renovations or capital improvements using Family Housing -Operations (FH-O) funds are usually executed by the DPW, and the DPW will prepare the DD Form 1354.

Approval Authority – The individual authorized to sign the DD Form 1354. For new construction or alteration executed with MILCON this is a senior representative of the construction agent such as the District Engineer. Approval authority for conversion, diversion, alteration, minor construction and inventory adjustments is the installation/garrison commander and often this authority has been delegated to DPW/DIS.

AR – Army Regulation

BOD - Beneficial Occupancy Date – the date a facility is first occupied. BOD normally refers to occupancy of a building before it is substantially complete and therefore is not typically the date the occupant accepts a facility from the DPW/Engineer District.

Capital Improvement - Initial acquisition of or improvements to real property that increase the real property asset's square footage, size, capacity, efficiency, or useful life; i.e., if a replacement was undertaken to improve or expand the efficiency of an asset that was in good working order then the replacement is a capital improvement. When a facility (or facility component) is replaced that has failed, is in the incipient stages of failing, or is no longer performing the functions for which it was designated, such replacement is NOT a capital improvement and do not record that project (or the repair costs portion of that project) in the real property inventory. References: DODI 4165.14 para E4.2 and FMR 7000.14-R, Volume 4, para 060205.

CFOA – Chief Financial Officers Act – Congressional law requiring government agencies to produce auditable financial statements and timely, accurate financial data. This includes accounting for costs spent on construction and capital improvements of government facilities.

CIP-Construction In Progress (Account) –The USACE/NAVFAC account which accumulates emplaced costs for MILCON (including unspecified minor construction) projects during construction. This account includes the cost of equipment that is installed as an integral part of the real property, as well as the actual cost of direct labor, direct materials, overhead, and contractor costs, incurred in the construction of real property. Contractor costs are valued at requests for progress payments and other invoices. See work in progress.

CWE- Current Working Estimate –The estimated cost of a new construction project. As the design process proceeds the current working estimate will change and only becomes fixed when a construction bid is accepted.

DA PAM – Department of the Army Pamphlet

DeCA- Defense Commissary Agency – the Defense agency responsible for commissary operations. DeCA programs funds for construction and operation of commissary facilities and may maintain facilities through reimbursement to the DPW, at their discretion.

DEL- Director(ate) of Engineers and Logistics (instead of DPW at some locations) – This organization is a consolidation of the Directorate of Public Works and Directorate of Logistics. See DPW.

DIS- Director(ate) of Installation Services (instead of DPW at some locations) – This organization is a consolidation of the Directorate of Public Works and Directorate of Logistics. This occurs primarily at smaller installations and industrial installations where garrisons are small. See DPW.

DoD-Department of Defense

DPW-Director of Public Works – Garrison Staff Director and Directorate responsible for operations and maintenance of facilities on Army installation(s). Has responsibility for real property management and planning, and requesting funds for operations and maintenance including minor construction. Has responsibility for preparing DD Form 1391 for requesting Military Construction. See DEL and DIS.

EIP – Equipment in Place - EIP is a special category of personal property (not real property). EIP consists of capital equipment and other nonexpendable equipment of a movable nature that has been fixed in place or attached to real property, but not as an integral part of the facility, and therefore may be severed or removed from a facility without severely damaging, destroying or reducing the usefulness of the facility. EIP is personal property and does not include installed building equipment. It is accounted for on property book records (not real property records). EIP costs may be included as a funded construction cost.

FAD – Funding Authorization Document – The document that transfers authority to obligate and expend government funds from higher headquarters to a lower level for execution of a mission.

FMR – the DoD Financial Management Regulation 7000.14-R that prescribes accounting rules and use of the DD Form 1354.

IBE – Installed Building Equipment - IBE is an item of equipment that is affixed and built into the facility as an integral part of that facility. To qualify as IBE the equipment must be necessary to make the facility complete, and if removed, would destroy or severely reduce the usefulness of the facility. IBE costs are included as a funded construction cost. Account for IBE as real property with an equipment asset record, but do not create separate facility records in the real property database for IBE.

IFS-Integrated Facilities System (Army) – The Army's standard automated engineering management system for installation operations. Modules include real property, work management, cultural resources, contract management and supply management.

IJO -Individual Job Order – DA Form 4283 – This form is prepared to request and record approval of a repair, maintenance, alteration or minor construction projects within the installation approval limitations. The form is automated as part of IFS.

IMA – Installation Management Agency (Army) – The Installation Management Agency is a Field Operating Agency (FOA) of the Assistant Chief of Staff for Installations Management (ACSIM) at Headquarters Department of the Army. IMA was established to resource and provide oversight to support functions on Army installations/garrisons. The IMA reports to the ACSIM.

MILCON-Military Construction – The appropriation for the construction of new military facilities. It is also the appropriation for certain major renovations of facilities.

MIPR – Military Interdepartmental Purchase Request – DD Form 448 - This form is used to transfer funding from one service, command or agency to another. The transfer may be within a service or between services.

NAVFAC-Naval Facilities Engineering Command – Navy agency responsible for supervising construction and operation and maintenance of facilities and utility services for Navy and Marine Corps installations.

PCE – Project Cost Estimate – The estimated costs for the entire project (up to the limit of funds received), to include planning and design, site preparation, construction and overhead. The PCE may include costs that will not be capitalized such as any work designated as repairs or design breakage. The construction agent project manager uses the PCE to manage the project against funds available.

P&D – Planning & Design– Costs associated with the planning and design of military construction projects. These costs are accounted for separately since Congress funds them as a separate line item for future Military Construction projects. P&D is one of the four cost components (along with S&A, construction, and equipment costs) reflected in Project Remarks (block 26) on the DD Form 1354.

PP&E – Plant, Property & Equipment - The account to which real property construction is debited upon acceptance of real property. Construction costs are credited to the CIP or work-in-progress account and debited to the appropriate PP&E account. The majority of project costs are real property, however some Equipment-in-Place is included in the CIP account and must be transferred to a personal property account of the facility owner.

RFP-Request for Proposal – A formal request from a government Contracting Office for proposals to accomplish a specific statement of work. Qualified contractors then respond by submitting their proposal to the government to accomplish the work. The Contracting Office selects the best value for award.

RPAO-Real Property Accountable Officer – The individual appointed by the garrison commander to account for all real property on an installation.

S&A-Supervision and Administration – Costs incurred by the construction agent for managing a construction or rehabilitation contract. S&A is one of the four cost components (along with P&D, construction, and equipment costs) reflected in total project cost as shown in Project Remarks (block 26) on the DD FORM 1354.

USACE-US Army Corps of Engineers- Construction Agent for the US Army, US Air Force, DoD and other Federal government agencies.

Work-in-Progress–The accumulated costs for emplaced elements of construction or renovation projects funded by other than MILCON during construction; also used to accumulate costs of capital improvements for additions, alterations, improvements, and rehabilitations. It includes direct labor, direct materials, contractor costs, and other agency costs, along with an allocation for indirect costs and G&A expenses, whose expenses are not included in CIP. Contractor costs are valued at requests for progress payments and other invoices. See CIP.

APPENDIX A DD Form 1354 (August 2002)

Front side blank DD Form 1354 - see separate attachment in pdf format.

Backside of DD Form 1354 (August 2002)

25. CONSTRUCTION DEFICIENCIES.
26. PROJECT REMARKS

INSTRUCTIONS

This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B *(formerly used by the Army and Air Force)* and NAVDOCKS Form 2317 *(formerly used by the Navy)*.

Existing instructions issued by the military departments relative to the preparation of the three supersede forms are applicable to this form to the extent that the various items and columns on the superseded forms have been retained. Additional instructions, as appropriate, will be promulgated by the military departments in connection with any new items appearing hereon.

With the issuance of this DD form, it is not intended that the departments shall revise and reprint manuals and directives simply to show the number of this DD form. Such action can be accomplished through the normal course of revision for other reasons.

DD Form 1354 Reverse, August 2002

APPENDIX B Summary Instructions for DD Form 1354

ITEM NUMBER	ITEM NAME	DESCRIPTION
ITEM 1	FROM	Name of the transferring agency: organization, installation, USACE District, NAVFAC Division/Activity, etc. Include address and zip code.
ITEM 2	DATE FORM PREPARED	Date the DD Form 1354 is prepared. Use DD-MMM-YYYY format.
ITEM 3	PROJECT/JOB NUMBER	The project number assigned to identify the project on a DD Form 1391 for new construction and the DPW/DIS Individual Job Order (IJO) number from work management system. Use both numbers when they exist.
ITEM 4	SERIAL NUMBER	Serial number assigned in sequence by the preparing organization. Identify the fiscal year, and sequence number; for example, 2002-0001, 2002-0002, etc.
ITEM 5	TO	Name of the receiving installation, activity, and service. Include address and zip code and installation number (INSNO) of receiving installation which the RPAO represents.
ITEM 6	SITE/INSNO	Site or installation number where the facility being transferred/accepted is located.
ITEM 7	CONTRACT NUMBER	Contract number(s) if any project work is performed under a contract.
ITEM 78	DRAWING NUMBERS	Enter the drawing number(s) or CAD identifier(s) for the project components.
ITEM 9	TRANSACTION DETAILS	Has four subparts
SUBPART 9A	TYPE of TRANACTION	Checkbox to indicate whether the DD Form 1354 applies to acceptance of new construction, transfer of existing facilities, a capital improvement to existing facilities, or other. Enter remarks in block 26 "Project Remarks" if "other" is specified.

ITEM NUMBER	ITEM NAME	DESCRIPTION
SUBPART 9B	WHEN/EVENT	Checkbox to indicate when, in terms of event type, the transfer and acceptance documented by this 1354 occurs, e.g., at the time of physical completion/available for use date, beneficial occupancy date (BOD), partial BOD, financial completion or "other." Enter remarks in block 26 "Project Remarks" if "other" is specified.
SUBPART 9C	VERSION	Checkbox to indicate whether this version is a draft, interim, or final DD Form 1354.
SUBPART 9D	EFFECTIVE DATE	Effective date for the transaction being described in block 9. This is the start date for depreciation. Also known as the Capitalization Date.
ITEM 10	ITEM NUMBER	Use a separate Item Number for each facility. Do not use more than one Item Number for multiple category codes within the same facility. Assign item numbers in column 10 sequentially starting with the number one (1).
ITEM 11	FACILITY NUMBER	The unique 5-character facility number to be assigned to a new facility, or existing facility number for existing or consolidated facilities. This number is assigned by the installation and provided to the construction agent early in the design process.
ITEM 12	CATEGORY CODE	The category code that appropriately describes the facility (land, building, structure, utility or portion thereof) design-use. List only one category code per line and do not add another item number (column 10) for multi-use facilities. Category codes and descriptions should be consistent with service implementation of DODI 4165.3, Department of Defense Facility Classes and Construction Categories (e.g., DA PAM 415-28, "Guide to Army Real Property Category Codes" and Air Force Handbook 32-1084, Facilities "Requirements").
ITEM 13	CATCODE DESCRIPTION	The category code short description that corresponds to the category code for the item number (Item 10).
ITEM 14	TYPE	The type of construction: use "P" for permanent, "S" for semi permanent, or "T" for temporary.

ITEM NUMBER	ITEM NAME	DESCRIPTION
ITEM 15	UNIT OF MEAS-1; AREA	The Unit of Measure 1 for area. Use abbreviations "SF" for square feet, "SY" for square yards, and "AC" for acres per DODI 4165.3/DODI 4165.14, with Service implementation thereof (e.g., DA PAM 415-28).
ITEM 16	TOTAL QUANTITY-UM1	The total area for the measure identified in Item 14. Use negative numbers for demolition.
ITEM 17	UNIT OF MEAS-2; OTHER	The Unit of Measure 2 for capacity/other. Use abbreviations, such as "MB" for millions of BTU, found in DODI 4165.3/DODI 4165.14.
ITEM 18	TOTAL QUANTITY-UM2	The total capacity/other for the measure identified in Item 16. Use negative numbers for demolition.
ITEM 19	COST	The cost for each facility (Item-block 10). For capital improvements to existing facilities, enter only the amount by which the general ledger balance is to be increased. Costs on interim DD Forms 1354 are actual costs to date, but considered preliminary; costs on final DD Forms 1354 are always final costs.
ITEM 20	FUND SOURCE	Fund source for this Item. Use the Item Remarks (column 21) to explain funding for this Item if necessary.
ITEM 21	ITEM REMARKS	Include any clarifying remarks pertaining only to the item number identified in column 10. Also summarize any cost sharing or prorating logic that would document how you derived the item cost.
ITEM 22	STATEMENT OF COMPLETION	Signature, title and date of signature by the individual responsible for the transfer of the properties.
ITEM 23	ACCEPTED BY	Signature, title and date of signature by the RPAO or delegated individual responsible for accepting the property.
ITEM 24	PROPERTY VOUCHER NUMBER	Next sequential number assigned by the RPAO in the Register of Vouchers to a Stock Record Account (e.g., DA Form 272 or Navy system assigned number).
ITEM 25	CONSTRUCTION DEFICIENCIES	All construction deficiencies in the project known or identified during the construction contractor turnover inspection.

ITEM NUMBER	ITEM NAME	DESCRIPTION
ITEM 26	PROJECT REMARKS	Any information to explain "other" entries in blocks 9A or 9B and other information that would be helpful in understanding the transaction. Also used for project level remarks and continuation where more space is needed.

Table 2-1 Summary Instructions for DD Form 1354

APPENDIX C Building Information Checklist

Use Appendix C as a checklist of required information to be entered into the real property database. Provide this information for each Real Property Facility listed on the DD Form 1354 in a format that allows easy data entry into the real property system. Normally this information is provided by the A-E electronically, often in XML format or GIS compatible format.

BUILDING IDENTIFICATION for this 5-Part CHECKLIST				
Facility Number	**Building Name**	**Number of Floors**	**Gross SF**	**Net SF**

1. Building Dimensions and Construction Materials

Building Outside Dimensions	**Length (SF)**	**Width (SF)**
Main Building		
Wings		
Offsets		
Basement		
Attic		
Porches, covered		

Construction Materials	**Type**
Foundations (such as concrete)	
Floors (such as wood, concrete)	
Exterior Walls (such as wood siding)	
Roof (such as built-up, shingle)	

2. Utility Connections, Information and Fuel Data

Utility Connections	Number of pipes	Diameter of each pipe	Capacity of all inlet pipes
Water			
Gas			
Sewer			
Steam			
Condensate			

Electric	Phase	Voltage	Wire Size	Connected Load

System	Energy Source	Fuel
Heating		
Air Conditioning		
Electrical		
Hot Water		
Steam		

3. Building Systems

Nomenclature	UM	Amount of UM	Cost	Description
Fire Protection System				
Closed Head Auto Sprinkler	HD			
Open Head Deluge System	HD			
Auto Fire Detection System	HD			
Manual Fire Alarm System	EA			
CO2 Fire System	EA			
Foam Fire System	EA			
Other Fire System	EA			
Halon 1301 Fire System	EA			
Security System				
Security Alarm System	EA			
Heating System				
Heating Plant	MB			
Storage Tank for Heating Fuel	GA			

Nomenclature	UM	Amount of UM	Cost	Description
Air Conditioning System				
Central A/C Plant	TN			
Electrical System				
Emergency Electric Power Generator	KW/KVA			
Storage Tank for Generator Fuel	GA			
Hot Water				

4. Installed Building Equipment (Real Property)

Item	Size/Quantity	Units	Model	Description
Evaporative Coolers		CFM		
Hot Water Heater		GA		
Exhaust Fan		CFM		
Wash Basin		EACH		
Water Closet		EACH		
Urinal		EACH		
Utility Sink		EACH		
Refrigerated Drinking Fountain		EACH		
Heating Plant under 750 MB/Hr		MB		
Forced Air Heating		BTU		
Other Heating		BTU		
Dehumidifiers		GPM		
Elevators		LBS & PN		
Theater-type Seats, bolted to floor		PN		
Other (SPECIFY)				

5. Associated Utilities and Structures

Nomenclature	UM	Amount of UM	Cost	Description
Primary Elec. Distr Line OH	LF			
Transformers	KVA			
Power Poles	EA			
Secondary Elec. Dist Line OH	LF			
Primary Elec. Distr Line UG	LF			
Secondary Elec. Distr Line UG	LF			
Exterior Street Lighting or Parking Area Lights	EA			
Gas Mains	LF			
Septic Systems	KG			
Sanitary Sewer	LF			
Water Distr Mains	LF			
Fire Hydrants	EA			
Curbs & Gutters	LF			
Driveway	SY			
Roadway	SY			
Vehicle Parking	SY			
Storm Drain	LF			
Fence, Security	LF			
Fence, Interior	LF			
Sidewalk	SY			
Transformer Vault (four or more transformers)	SF			
Telephone Duct	LF			
Telephone Pole	LF			

APPENDIX D Fund Source

Use the Fund Source abbreviations in block 20 for Army projects.

FUND SOURCE	DESCRIPTION
ACFT	Aircraft Procurement, Army
AFH	Army Family Housing Operations
AFHC	Army Family Housing Construction
BRAC	Base Realign/Closure Account (I-IV)
CAMDA	Chemical Agent & Munitions Destruction, Army
DBOF	Army Working Capital Fund
DECA	Defense Commissary Agency
DERA	Defense Environmental Restoration Act
DERF	Defense Emergency Response Fund
DHP	Defense Health Program
DODEA	DOD Education Activity
DOIRA	DOD Overseas Investment Recovery Account
DWCF	Defense Working Capital Fund-DOD Agencies
ECIP	Energy Conservation Incentive Program
FHF	Federal Highway Funds
MCA	Military Construction, Army
MCAR	Military Construction, Army Reserve
MCNG	Military Construction, National Guard
MPA	Military Personnel, Army
MSLS	Missile Procurement, Army
MWRCS	MWR Commercial Sponsorship
NAF	Non-Appropriated Fund
NATO	North Atlantic Treaty Organization
NFPPV	NAF Public-Private Ventures
NGPA	National Guard Personnel, Army
OMA	Operation & Maintenance, Army
OMAF	Operation & Maintenance, USAF
OMAR	Operation & Maintenance, Army Reserve
OMD	Operation & Maintenance, Defense
OMN	Operation & Maintenance, Navy
OMNG	Operation & Maintenance, Army National Guard

FUND SOURCE	DESCRIPTION
ONFED	Other Non-Federal Agencies
OPA	Other Procurement, Army
OTFED	Other Federal Agencies
PAA	Procurement Of Ammunition, Army
PD	Procurement Defense
PIK	Payment In Kind
PPV	Public-Private Ventures
PRD	Private Donations
QOLED	Quality Of Life Enhancement Defense
RDTE	Research, Development, Test and Evaluation
RKDCF	Rep Of Korea Defense Construction Fund
RPA	Reserve Personnel, Army
RPMD	Real Property Maintenance, Defense
UMMCA	Unspecified Minor Military Construction Army
WTCV	Weapons & Tracked Vehicles, Army

Checklist for Buildings
Info for DD Form 1354 & Real Property Card
18 January 2005

Project Title:_____
Contract Number/ Work Order#_____
2. Brief Description of Project Scope:
_____
_____
_____
_____
_____

3. Type of Building:_____
(i.e. Administration, Classroom, Pump Station, Maintenance Shop, etc.)

4. Building Number: _____
(If not known, give detailed location for easier Identification)

5. Building Dimensions (new construction):
Exterior Gross Measurements: _____ Total Square Feet: _____
Main Bldg: _____
Wing/Offsets: _____
Basement: _____
Ceiling Height (max): _____
Max Door Height: _____ Number of Floors:_____

6. Drawing Numbers: _____
Mechanical: _____ Electrical: _____
Structure: _____ Architectural: _____

7. Month/Year Construction Completed: _____
8. Construction Materials:
A. Material Code (exterior surface material of facility) - circle one:

Wood	Brick (brick veneer)	Concrete Block
Concrete	Structural Tile	Combination Concrete Block & Steel
Stone	Aluminum Siding	Screening
EIFS	Steel Siding	Plastic Siding
Screening (chain link)		Combination Brick & Wood

Glass; Plastic or Translucent Material (circle one)
Other: _____

8. Construction Material (continued)
   B. Foundation: (circle one)

Abbreviation	Description
PL	Pile: All piles will be assumed to be with continuous footing.
PP	Pier
CON	Continuous footings of various shapes & sizes
NF	No foundation
SL	Slab

Pile or Foundation Material Abbreviation	(circle one) Descriptions
ADB	Adobe
BK	Clay or concrete block
CN	Concrete
CR	Concrete, Reinforced
BLK	Slag, or concrete block
ST	Steel
STN	Stone
TST	Tile, structural
WD	Wood
NF	No Foundation Material
CB	Cinder Block
CM	Cinders & Mud Sill
CRS	Concrete, Stone
LG	Logs
MAS	Masonry
MS	Mud Sill
PLK	Planks
PT	Posts
RRT	Railroad Ties
SKD	Skids
WDP	Wood Pillars
WSD	Wood Sills on Dirt
WSR	Wood Sills on Rock

8. Construction Material (continued)
C. Structure:

Circle & indicate with a "P" the item which best describes the primary structural material of the building. This is generally the frame material of the bldg or supporting walls when there is no separate frame.

Next, circle & indicate with an "S" the category which describes the secondary material of the building. Example of a building with secondary structural material: Concrete block first story with a frame upper floor. If only one basic material is used in the building, circle " No Secondary Structure" - NSS

(Two entries are required)

Abbreviations	Descriptions
ADB	Adobe
AL	Aluminum
CI	Cast Iron
BK	Clay or Concrete Brick
CN	Concrete
CR	Concrete, Reinforced
GL	Glass, Plastic, Transparent or Transparent Material
BLK	Slag or Concrete Block
ST	Steel
STN	Stone
TST	Tile, Structural
WD	Wood
STN	Stone
TWS	Tile, Steel, Wood
WAL	Wood & Aluminum
WAS	Wood & Steel
BR	Brick
BRT	Brick, Tile
CA	Concrete, Corrugated Asbestos
CM	Concrete & Metal
CS	Concrete & Stone

8. Construction Material (continued)

Abbreviation	Description
MTL	Metal
NSS	No Secondary Structure
PL	Plywood
REC	Reinforced Columns
RRT	Railroad Ties
SHM	Sheet Metal
SPL	Split Logs

d. Walls: Circle & indicate with an "O" the outer wall material & with an "I" the inner wall material. If only one material is used, both will be the same. If there are no interior walls, so indicate. (Two Entries Required)

Abbreviations	Descriptions
ADB	Adobe
BK	Clay or Concrete Brick
BLK	Slag or Concrete Block
CN	Concrete
CR	Concrete, Reinforced
GL	Glass, Plastic, Transparent, Translucent Material
ST	Steel
STN	Stone
TST	Tile, Structural
WD	Wood
AL	Aluminum
BR	Brick
BRT	Brick Tile
CA	Concrete Corrugated Metal
CM	Concrete & Metal
CMB	Combination Brick & Wood or Shingles
COB	Composition Shingle
CS	Concrete & Stone
CRI	Corrugated Iron
CWA	Concrete, Wood
GAI	Galvanized Iron
MAP	Masonite Paneling

d. Walls (continued)

Abbreviations	Description
MTL	Metal
PLP	Plywood Paneling
PL	Plywood
PBW	Plaster board on Wood Frame
PBF	Plaster board on Fired Masonry
PSS	Painted Steel Siding
RCP	Roll, Composition
REC	Reinforced Columns
RRT	Railroad Ties
SCR	Screening
SHM	Sheet Metal
SPL	Split Log
STC	Stucco
STN	Stone
TSW	Tile, Steel, Wood
WAL	Wood, Aluminum
WAS	Wood & Steel
WDS	Wood Sheathing
WPL	Wood Panel
WSH	Wood Shingles
WWS	Wood Wainscot
VCA	Vinyl Coated Aluminum
VCS	Vinyl Coated Steel

Construction Materials (continued)

E. Roof:

Roof Support (type of roof & material used) circle one:

Abbreviations	Description
NRO	No Roof
CRJ	Joist or Beam- Concrete, Pre-stressed
CRF	Flat Truss- Concrete, Reinforced
CRG	Gable or Arch Truss- Conc. Reinforced
CRJ	Joist or Beam- Concrete, Reinforced
CRS	Slab, Concrete, Reinforced
NSR	Arch, No Support Required
RAF	Rafters
STA	Gable or Arch Truss – Steel
STF	Flat Truss –Steel
STJ	Joist or Beam – Steel
WDF	Flat Truss – Wood
WDG	Gable or Arch Truss –Wood
WDJ	Joist or Beam – Wood

Roof Deck: circle one:

0	No Roof
1	Plywood
2	Asphalt Protected Metal
3	Gypsum or Light Weight Concrete
4	Masonry Arch
5	Metal
6	Reinforced Concrete
7	Wood (less than 2 " thick)
8	Wood (2" or more thick)
A	Wood Fiber Cement
C	Concrete Arch
G	Glass, Plastic, Transparent, Translucent Material
S	Steel Arch

Roof Surface: circle one:

Abbreviations	Descriptions
NS	No Surface
AL	Aluminum, Copper or Lead
CRS	Roll – Composition
GL	Glass, Plastic, Transparent, Translucent Material

Construction Material (continued)

Roof Surface: (circle one)

Abbreviations	Descriptions
PRB	Roll –building Paper
REU	Built-Up Roll Roofing
SC	Shingles Composition
SL	Shingles, Slate
STG	Steel, Galvanized
TL	Tile
TS	Tar or Silicone
ASH	Asphalt
AST	Asphalt Shingle
BU	Built- Up
BUG	Built- Up Gravel
CO	Concrete
CA	Corrugated Aluminum
CM	Corrugated Sheet Metal
CMC	Corrugated Sheet Steel
DC	Dirt Covered
RB	Rubber (EPDM)
SH	Shingles
ST	Steel
STS	Strip Shingles

F. Floors:

Floor Surface: (material used in construction of floor surface - circle one)

AL	Aluminum
APB	Acid Proof Brick
BRK	Brick
CKT	Cork Tile
CPT	Carpet
COL	Conductive Linoleum
COR	Conductive Rubber
COT	Conductive Tile
GAC	Galvanized iron
HWD	Hardwood
LIN	Linoleum
MAS	Mastic

Construction Materials (continued)

Floor Surface: (circle one)

Abbreviation	Descriptions
MAT	Marble, Tile
NS	No Floor Surface
PWD	Plywood
VCT	Vinyl Composition Tile
VT	Vinyl Tile

Sub Floor Material (circle one)

BLT	Blacktop, Flexible Pavements, Macadam
CDR	Cinders
CON	Concrete
CR_	Concrete, Reinforced
DRT	Dirt
GRL	Gravel
NF	No Sub-Floor
STL	Steel
WD	Wood

9. Utility Connections:

A. Water: Yes No
If yes, Potable Non-potable
Pipe size:_____ inch

B. Sewer: Yes No
If yes, Sanitary Industrial Storm Combined
Pipe size: _____ inch

C. Electricity: Yes No
If yes, Wire size:_____
Phase:_____
Voltage Capacity:_____
Amperage Capacity:_____
KVA Rating:_____

Utility Connections (continued)

D. Steam Pipe: Yes No
If yes, Pipe Size;_____ inch
Pressure (PSI): _____

E. Condensate Pipe: Yes No
If yes, Pipe Size: _____

F. Gas Pipe: Yes No
If yes, Pipe Size: _____
Pressure (PSI): _____

10. Other Utility Data Within Buildings:
A. Air Conditioning: Yes No
If Yes, A/C Type (circle one) Window unit
Evaporative Cooling Central Chilled Water Central Direct Expansion
A/C Area (SF): _____
A/C Capacity (BTU's): _____

B. Hot Water Facilities: Yes No
If Yes, Capacity:_____ Gallons, Temperature Rise: _____ F

C. Heating:_____
> Heat Type (circle one) Electric Warm Air Steam Glycol
Radiator Other: _____

- Heat Source (circle one):
- Central Heating & Power Plant – Bldg 3595
Own Source (individual Heat Plant)
>Heat Capacity: (complete one item):
MegaBTU'S of individual Heat Plant_____
If heated from CH & PP. MegaBTU's the design heating requirements for bldg
_____
>Heating Fuel Type Code (circle one), if individual ht plant only):

1. Coal, Stoker Fuel
2. Coal
3. Oil No. 2, 4
4. Oil No. 5, 6
5. Natural Gas
6. Manufactured Gas

D. Fire Protection: (check appropriate type):_____
Automatic Sprinkler System (circle one):

10. Other Utility Data Within Buildings: continued

Wet pipe Deluge Pre-action Dry Pipe Local Signal
Transmitted Signal

Special Fire Extinguishing System (circle two: agent & type)
Carbon dioxide agent Dry chemical agent
Halogenated agent High-expansion foam agent

Fixed temp detection system w/ Local signal
Fixed temp detection sys w/ transmitted signal
Rate-of-rise detection sys w/ local local signal
Rate-of-rise detection sys w/ transmitted signal
Combination fixed temp & Rate-of-rise detection w/local signal
Combination fixed temp & Rate-of-rise detection w/ transmitted Signal
Smoke or products of combustion Detection system w/local signal
Smoke or products of combination detection sys w/trans signal

_____ Standpipe systems: size of fire hose connection
_____ Automatic Fire Detection (circle two: type & signal identification):
Fixed temperature system
Rate-of-rise system
Combination of fixed temperature & rate-of-rise system
Smoke or products of combustion system

_____

Local Signal Transmitted Signal

11. Installed Equipment Included in projects? Attach listing of equipment complete w/ model, serial numbers, sizes, etc. _____

12. Utilities Distribution Systems: (i.e. Natural Gas line, Electric Power Transmission & distribution lines, Sewer Collection Systems & Lines, & any Other Pavement - including sidewalks & separate parking Lots.)

> Overhead Electrical Distributions: # of LF_____
> Underground Electrical Distribution: # of LF_____
> Distribution Transformer: # of KV_____
# of EACH_____
> Sanitary Sewer: # of LF_____
- Water Pipe Line Potable: # of LF_____
- Water Pipe Line Non-potable: # of LF_____
> Sidewalk: # of SY_____
# of LF_____
Dimensions: _____ft wide x _____ ft long

SUBMITTALS REQUIRED WITH 1354

Items required with the final 1354:

- Punch list with dates to be completed
- Installed Equipment list (models, makes, installing contractor, locations, etc. - on contractor letterhead)
- Warranties and Warranty List (for all equipment - with contact names, phone numbers, etc. - on contractor letterhead).
- As-Built drawings - final set (approved and reviewed by us)
- Copy of all approved submittals

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

Form Approved
OMB No. 07404-0188

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for information Operations and Reports, 1215, jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.
PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THIS ADDRESS.

1 FROM (Installation/Activity/District and ZIP Code)
Army & Air Force Exchange Service
3911 S. Walton Walker BLVD
Dallas, TX 75236

2. DATE PREPARED (YYYY/MM/DD)
20070718

3. PROJECT/JOB NUMBER
9184-03-000002

4. SERIAL NUMBER

5 TO (Installation/Activity/Service, ZIP Code & INSNO)
3 CES
6326 Arctic Warrior Drive
Elmendorf AFB, AK 99506

6. SITE/INSNO/NAME
3829 Westover Ave., Elmendorf AFB, Alaska

7. CONTRACT NUMBER(S)
AAFES-REZC-95-026-06-019

8. DRAWING NUMBER(S)

9 TRANSACTION DETAILS

a. [x] NEW CONSTRUCTION
[ ] EXISTING FACILITY
[ ] CAPITAL IMPROVEMENTS
[ ] OTHER (Specify)

b. [ ] PHYS.COM.AVAIL.
[ ] BENIF/O
[ ] PARTIAL BOD
[ ] FINANCIAL COM.
[ ] OTHER (Specify)

c. [ ] DRAFT [ ] FINAL
[X] INTERIM

d. EFFECTIVE DATE(YYYYMMDD)
20070820

10 ITEM NO.	11 FACILITY NO.	12 CATEGORY CODE	13 CATECODE DESCRIPTION	14 TYPE	AREA 15. UNIT OF MEAS 1	AREA 16. TOTAL QUANTITY UM 1	OTHER 17. UNIT OF MEAS 2	OTHER 18. TOTAL QUANTITY UM 2	19 COST	20 FUND SOURCE	21 FUNDING ORG	22 INTEREST CODE	23 ITEM REMARKS
1	3829	211111	SHOPPETTE		SF	23,600			3,981,525.00	11	60	01	
			AUTO SERVICE		SF	5,549							
			RETAIL		SF	9,348							
			LAUNDRY		SF	1,280							
			STORAGE		SF	6,359							
			ADMINISTRATION OFFICES		SF	1,064							
2	81110	812225	PRIM DISTR LNE UG				LF	120	191,245.00	11	60	01	
3	3829	211111	INTERIOR DUPLEX RECEPTACLES & EXTERIOR GFI's				EA	91	189,893.00	11	60	01	
4	3829	812926	EXTERIOR AREA LTG				EA	10	32,165.00	11	60	01	
5	3829	821115	PLANT HEATING		SF	23,600			1,097,600.00	11	60	01	
6	83150	832266	SAN SEWAGE MAIN				LF	93	33,040.00	11	60	01	
7	84110	842245	WTR DISTR MAINS				LF	255	67,144.00	11	60	01	
8	84115	842246	WTR HYDRANTS				EA	1	12,560.00	11	60	01	
9	85240	852262	VEH PKNG N/ORGN (Asphalt 3" / with 6" Gravel Base)		SY	7,904			157,920.00	11	60	01	
10	85190	852289	SIDWALK		SY	531			33,010.00	11	60	01	
11	87100	871183	STRM DRN DSPL				LF	52	46,480.00	11	60	01	
12	3829	880211	CLSD HD A/SPRINK		SF	23,600			157,920.00	11	60	01	
13	81110	812225	300 KVA TRANSFORMER				EA	1	38,000.00	11	60	01	
14	85110	851143	CURB & GUTTER				LF	801	21,280.00	11	60	01	
15	76580	135583	BURIED TELEPHONE CABLE - 200 PAIR				LF	820	35,284.00	11	60	01	
16	76580	135583	BURIED FIBEROPTICS LINE - 12 STRAND				LF	720	24,640.00	11	60	01	
17	3829	880221	FIRE DETECTION & ALARM SYSTEM		SF	23,600			5,000.00	11	60	01	
18	3829	211111	SOIL STABILIZATION/SEEDING						24,640.00	11	60	01	
19	85120	851145	CONCRETE PAVING (DRIVEWAY)		SY	59			14,800.00	11	60	01	
20	82185	824461	NATURAL GAS LINE				LF	125	1,140.00	11	60	01	AAFES provides & Install Equipment
21	3829	872841	INTRUSION SECURITY SYS				EA	17	4,914.00	11	60	01	
22													
23			Modifications to Date						9,951.19	11	60	01	
			The above construction line items include:										
			Supervision & Administration Costs which have been prorated into the individual consturction line items.										
									$ 6,180,151.19	TOTAL COST			

AUTHORIZED REPRESENTATIVE

24. STATEMENT OF COMPLETION. The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.

a. TRANSFERRED BY (Typed Name and Signature)
Robert I. Sennet

b. DATE SIGNED
30 Oct 07

c. TITLE (Area Engr./Base Engr./DPW)
Vice President, Real Estate Design 7 Construction Division

25. a. ACCEPTED BY (Typed Name and Signature)

b. DATE SIGNED

c. TITLE (DPW/RPAO)

26. PROPERTY VOUCHER NUMBER

27. CONSTRUCTION DEFICIENCIES *(Attach blank sheet for continuations)*

1. Work is scheduled to be completed on November 6, 2007. Additional changes with possible implications to the property list might be encountered.

28. PROJECT REMARKS *(Attach blank sheet for continuations)*

1. Please review Interim 1354 for compliance with AAFES and Base requirements.

INSTRUCTIONS

GENERAL. This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B (formerly used by the Army and Air Force) and NAVDOCKS Form 2317 (formerly used by the Navy).

Existing instructions issued by the military departments relative to the preparation of DD Form 1354 are applicable to this revised form to the extent that the various items and columns on the superseded forms have been retained. The military departments may promulgate additional instructions as **SPECIFIC DATA ITEMS.**

1. From. Name and address of the transferring agency.

5. To. Name and address of the receiving installation, activity, and service of the Real Property Accountable Officer (RPAO).

6. Site/INSNO and Name. Site or installation number and site name where the constructed facility is located.

7. Contract Number(s). Contract number(s) for this project.

8. Drawing Number(s). Drawing number(s) or CAD identifier(s) for project components.

9. Transaction Details.
a. Type of Transaction. Mark (X) only one box.
b. When/Event. When or event causing preparation of DD Form 1354. X only one box.
c. Version. Draft, interim, or final DD Form 1354 X only one box.
d. Effective Date. Effective date for transaction; start date for depreciation.

10. Item Number. Use a separate item number for each facility, no item number for additional usages.

11. Facility Number. Unique facility number identified in Real Property Inventory.

12. Category Code. The category code describes the facility usage.

13. Catecode Description. The category code name which describes the facility usage.

14. Type. Type of construction: P for Permanent; S for Semipermanent; T for Temporary.

15. Area: Unit of Meas 1. Area unit of measure; use SF, SY, AC only.

17. Other: Unit of Meas 2. Unit of Measure 2 is the capacity or other measurement unit (e.g., LF, MB, EA, etc.).

21. Funding Organization. Organization resopnsible for replacing facility at end of useful life (e.g., Army, Air Force, Navy, Marine Corps (specify component for each service), DLA, DECA, TMA, etc.).

22. Interest Code. Reflects government interest or ownership in facility (e.g., DoD owned, leased, State owned, privately owned, etc.).

23. Item Remarks. Remarks pertaining only to the item number identified in Item 10; show cost sharing.

24. Statement of Completion. Typed name, signature, title, and date of signature by the responsible transferring individual or agent.

25. Accepted By. Typed name, signature, title, and date of signature by the RPAO in voucher register.

26. Property Voucher Number. Next sequential number assigned by the RPAO in voucher register.

27. Construction Deficiencies. List construction deficiencies in project during contractor turnover inspection.

28. Project Remarks. Project level remarks, continuation of blocks, and used to explain "other" entries in Item 9.

REPRINT
(with Change 1, July 28, 1967)
NUMBER 4165.40
DATE November 14, 1961#

Department of Defense Instruction

ASD(COMP)

SUBJECT

Form for Transfer and Acceptance of Military Real Property (DD Form 1354)

References: (a) DoD Instruction 4165.3, "Department of Defense Facility Classes and Construction Categories," October 13, 1966 *
(b) DoD Instruction 4165.14, "Inventory of Military Real Property," December 20, 1966 *
(c) DoD Directive 7040.2, "Program for Improvement in Financial Management in the Area of Appropriations for Acquisition and Construction of Military Real Property," January 18, 1961

I. PURPOSE

This Instruction prescribes DD Form 1354 for the recording of primary documentation upon transfer and acceptance of real property.

II. APPLICABILITY

This Instruction is applicable to the three military departments and any other component organization of the Department of Defense which may establish its own entity for the recording and reporting of real property under references (a) and (b).

III. PROCEDURES

A. DD Form 1354 will be used as the primary control documentation and official dollar cost recording medium for all transfers and acceptances of real property between the military departments and to or from other government agencies.

B. DD Form 1354 supersedes ENG Forms 290 and 290-B (prescribed for use by the Departments of the Army and Air Force) and NAVDOCKS Form 2317 (prescribed for use by the Department of the Navy).

C. DD Form 1354 will be adopted by the military departments as soon as possible but no later than 1 July 1962. Suggested instructions for use in implementation of DD Form 1354 are attached as Enclosure 2.

#First amendment (Ch 1, 7/28/67)

IV. EFFECTIVE DATE AND IMPLEMENTATION

This Instruction is effective immediately. Two copies of the implementing instructions will be furnished to the Office of the Assistant Secretary of Defense (Comptroller/Management), Directorate for Statistical Services, within 90 days after the issuance date of this Instruction.

Assistant Secretary of Defense
(Comptroller)

Enclosures - 2
1. DD Form 1354
2. Suggested Instructions

SUGGESTED INSTRUCTIONS FOR PREPARING DD FORM 1354
(TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY)

1. The page number and the total number of pages comprising each transfer shall be shown in the space provided at the top right-hand part of the form.

2. When two or more pages are required, Items 27 through 29 shall be completed only on the final page. In such cases, the bottom portion of the form shall be torn off of all pages, except the final page, at the line above Items 27 and 28.

ITEM 1 - Self – explanatory

ITEM 2 - Primarily for Navy use, the district number will be assigned by area or district public works office in accordance with coding pattern set forth in NAVEXOS P-1570, par. 3805-7, Item 6. For Army use, enter appropriate Army Engineer district where construction is performed and/or from which the transfer is made. For transfer of construction to the Air Force, enter appropriate Army Engineer district or the district number assigned by area, or Naval district public works office from which the construction transfer is made.

ITEM 4 - For Navy use only, see NAVEXOS P-1570, par. 3805-7, Item 5.

ITEM 5 - Enter date of preparation.

ITEM 6 – For Army use, enter appropriate Army job and directive number. For Air Force use, enter base job number, as appropriate, when form is used for transfer within the Air Force.

ITEM 7 – For Army use, or for transfer of construction to the Air Force, enter separate series of numbers, by fiscal year, for each installation to which real property is transferred; e.g., for FY 1962 show 62-1, 62-2, etc. For Navy use, this serial number will be assigned by respective area or district public works office and will represent the numerical sequence of submissions by respective contract number.

ITEM 8 – Insert appropriate contract number.

ITEM 9 – Self-explanatory.

ITEM 10 – 12: Instructions for Items 2,3 and 4 apply. (not applicable for Air For Use.)

ITEM 13 – For Navy use only. Insert the accounting number assigned to or used by the activity named in accordance with Item 9. See NAVEXOS P-1570, par. 3805-7, Item 10.

ITEM 14 – For Navy use only. Insert the accounting number assigned to the activity performing the official property accounting for the activity shown in Item 9. See NAVCompt Manual, Vol. 2, Chapter 5, for accounting numbers.

ITEM 15 – Insert an “X” in the appropriate box of block (A) to indicate whether the transfer involves new construction, existing facilities or capital improvements to existing facilities. If the “other” category is used, explain in remarks, Item 31. Additionally, insert an “X” in the appropriate box of block (B) to indicate whether transfer is being made at time of beneficial occupancy, physical completion or financial completion (with respect to new construction). If the “other” category is used, explain in remarks, Item 31.

ITEM 16 – Enter the code number assigned to identify the project with the appropriate construction authorization law.

ITEM 17 – Each single entry will be identified as an item number and this item number will be shown in this column.

ITEM 18 – 19: Category Code and Description. Enter the category code and description (see DoD Instruction 4165.3 (reference (a)) or attachment 1 to enclosure 1 to DoD Instruction 4165.14 (reference (b)) that appropriately describes the primary use for which the facility (buildings, structures, utilities) is designed. Not more than one category code (Item 18) will be listed as a line item (Item 17).

ITEM 20 – Number of Units in terms of buildings or other structures.

ITEM 21 – Type – enter type of construction; i.e., “P” for permanent, “S” for semipermanent or “T” for temporary.

ITEM 22 – Enter the unit of measure abbreviation, such as “SF” for square feet, etc. (see attachment 2 to enclosure 1 to DoD Instruction 4165.14 (reference (b)).

ITEM 23 – Enter total quantity as described In Item 22.

ITEM 24 –Indicate by item number, category code, and description the appropriate cost. In those instances where a document is prepared which lists items carrying costs which, in some cases, may be final and in others may be preliminary, each cost figure by line item will carry an alphabetical suffix of (P) for preliminary or (F) for final.

ITEM 25 – 31: Self-explanatory.

#First amendment (Ch 1, 7/28/67)

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

PAGE OF PAGES

1. FROM: (Installation/Activity/Service)	2. OPERATING UNIT	3. DIS TRICT CODE	4. OPER ATING AGENCY	5. DATE	6. JOB NUMBER	7. SERIAL NUMBER	7. CONTRACT NUMBER

1. FROM: (Installation/Activity/Service)	2. OPERATING UNIT	11. DIS-TRICT CODE	12. OPER ATING AGENCY	13. AC COUNTING NUMBER	14. AC COUNT-OFFICE NUMBER	15. TYPE OF TRANSACTION		16. PROJECT NUMBER
						❑ NEW CONSTR ❑ EXISTING FAC ❑ CAPITAL IMP ❑ OTHER (SPECIFY)	❑ BENF/O ❑ PHYSICAL COM ❑ FIN. COM ❑ OTHER (SPECIFY)	

ITEM NO. 17	CATEGORTY CODE 18	FACILITY (category description) 19	NO. OF UNITS 20	TYPE 21	UNIT OF MEAS 22	TOTAL QUANTITY 23	COST 24	DRAWING NUMBERS 25	REMARKS 26
									4165

27. STATEMENT OF COMPLETION: The facilites listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.

TRANSFERRED BY (Signature)	DATE	28. ACCEPTED BY (Signature)	DATE
Title (Area Engr./Base Engr/ DPWO)		TITLE (Post Engr./Base Engr./Navy Rep.)	29. PROPERTY VOUCHER NUMBER

DD FORM 1 N0V 61 **1354**

SUPERSEDES ENG FORMS 290 AND 290B
AND NAVDOCKS FORM 2317

30. CONSTRUCTION DEFICIENCIES	
31. REMARKS	
This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or form other government agencies. It supersedes ENG Forms 290 and 290B (formerly used by the Army and Air Force) and NAVDOCKS Form 2317 (formerly used by the Navy). Existing instruction issued by the military departments relative to the preparation of the three superseded forms are applicable to this form to the extent that the various items and	columns on the superseded forms have been retained. Additional instructions, as appropriate, will be promulgated by the military departments in connection with any new items appearing hereon. With the issuance of this DD form, it is not intended that the department shall revise and reprint manuals and directives simply to show the number of this DD form. Such action can be accomplished through the normal course of revision for other reasons.

ITEMS FOR DD FORM 1354

CATEGORY CODES: VERIFY FOR ARMY FACILITIES AND AIR FORCE FACILITIES OF THE SAME DESCRIPTION • • • (ABBREVIATION-NOMENCLATURE)

*	DESCRIPTION:	ARMY		AIR FORCE	
	SHOPPING CENTER:	(EXCH MAIN RETL)	: 740-53	(EXCH SALES STORE)	740111
	SHOPPETTE	(EXCHANGE BRANCH)	:740-50	(EXCH BRANCH)	740382
	CLASS SIX	(CLASS VI)	:740-84	(BSE PACKAGE STORE)	740269
	CAR CARE CENTER	(EXCH SVC STA)	:740-52	(EXCH SVC STN)	740383
	BURGER KING	(POST RESTAURANT)	:740-64	(EXCH CAFE SNK BAR)	722345

CATEGORY CODE DESCRIPTION COST

1. BUILDING SQUARE FOOTAGE:

A.RETAIL AREAS:_____SF B. ADMIN/EMPLOYEE AREA_____SF
C. MPA:_____SF D. SERVICES ACTIVITIES: _____SF
E. FOOD ACTIVITIES_____SF. F. MALL/PUBLIC TOILETS: _____SF
G. MERCH. EQUIP. RM_____SF H. TOTAL BLDG:_____SF

2. BUILDING $ _____
(TOTAL CONTRACT PRICE LESS THE SUM OF THE FOLLOWING)

3. HEATING, VENTILATION & AIR CONDITIONING SYSTEM $ _____

TOTAL:_____TONS

(AR)826-11	OVER 100 TONS	(AC PL OV 110 TN)
(AF)826123	OVER 100 TONS	(A/C PLT OVET 100 TN)
(AR)826-12	26-100 TONS	(AC PL-26-100 TN)
(AF)826122	25-100 TONS	(A/C PLT 25<100 TN)
(AR)826-13	6-25 TONS	(AC PL 6-25- TN)
(AF)890121	5-25 TONS	(A/C PL 5 TO 25 TN)

4. FIRE PROTECTION SYSTEM (FIRE ALARM SYS)

AUTOMATIC SPRINKLER SYSTEM $_____
(AR)880-50 (AUTO SPNLKR SYS)
(AF)880221 (AUTO FR DTECTN SYS)
TOTAL:NUMBER OF HEADS_____
FOAM FIRE SPRINKLER SYSTEM
(AR)880-60 (AUTO SPNKLR SYS) $_____
(AF)980235 (DRY CHEM SYS)
TOTAL:NUMBER OF HEADS_____
(AR)843-11 FIRE HYDRANTS $_____
(AF)843315 (FR HYDR)

5. UNDERGROUND ELECTRICAL SYSTEM (INCLUDE. METER $_____
(AR)812-42 UNGD ELEC DISTR)
(AF) (SEC DISTR LNE UG)
(AF)890181 (UTIL LNE DUCTS)
TOTAL SERVICE TO BUILDING:_____L.F OF____IN. CONDUIT
AND_____CONDUCTOR

ITEMS FOR DD FORM 1354 (CONTINUED)

CATEGORY CODE	DESCRIPTION	COST
	6. ELECTRICAL TRANSFORMER	$_____
(AR)813-60	(TRANSFORMER)	
(AF)812225	(PRIM DISTR LNE UG)	
	PAD MOUNTED TRANSFORMER_____KVA	
	7. NATURAL GAS LINE TO BUILDING (INC. METER)	$_____
(AR)824-10	(GAS PIPE LIBE)	
(AF)824464	(GAS MAINS)	
	TOTAL SERVICE TO BUILDING:_____L.F. OF_____IN. PIPE	
	(MATERIAL:_____)	
	8. UNDERGROUND TELEPHONE	$_____
(AR).....	(UNDG TELEPHONE)	
(AF)135583	(TEL DUCT FCLTY)	
(AF)890181	(UTIL LNE DUCTS)	
	TOTAL SERVICE TO BUILDING: _____L.F. OF_____IN. CONDUIT	
	9. SANITARY SEWER SYSTEM	$_____
(AR)832-10	(SANITARY SEWER)	
(AF)932267	(SAN SEWAGE MAIN)	
	TOTAL SERVICE TO BUILDING: _____L.F. OF_____IN. PIPE	
	(MATERIAL: _____)	
	10. GREASE INTERCEPTOR	$_____
(AR)833-90	(LOCAL DESCRIPTION)	
	CAPACITY _____GALLONS	
	11. STORM SEWER SYSTEM	
(AR)871-10	(STORM SEWER)	
(AF)871183	(STRM DRN DSPL)	
	TOTAL SERVICE TO BUILDING:_____L.F. OF_____IN. PIPE	
	(MATERIAL:_____) TOTAL NUMBER OF DROP INLETS:_____	
	12. DOMESTIC WATER SYSTEM	$_____
(AR)842-10	(WATER PIPE LN P)	
(AF)842245	(WTR DISTR MAINS)	
	TOTAL SERVICE TO BUILDING :_____L.F. OF_____IN. PIPE	
	(MATERIAL:_____) (INCLUDING METER & BACK FLOW PREVENTER)	
	13. LANDSCAPE IRRIGATION SYSTEM	$_____
	(INCLUDING METER & BACK FLOW PREVENTER)	
(AR)871-30	(IRRIGATION FAC)	
	TOTAL NUMBET OF HEADS_____	
	14. DUMPSTER ENCLOSURE	$_____
(AR)833-12	(REFUSE COLL BLD)	
	TOTAL AREA:_____S.F.	

ITEMS FOR DD FORM 1354 (CONTINUED)

CATEGORY CODE	DESCRIPTION	COST
	15. PAVING (NON ORGANIZATION VEHICLE PARKING)	$_____
(AR)852-15	(NON ORG VEH PRK)	
(AF)852262	(VEH PKING N/ORGN)	
	TOTAL ASPHALT PAVING:_____S.Y. OF _____IN. THICK W/_____IN. _____BASE MATERIAL	
	TOTAL CONCRETE PAVING:_____ S.Y. OF _____IN. THICK W/_____IN. _____BASE MATERIAL	
	16. CONCRETE WALKS, SLABS & PADS	$_____
(AR)852-20	(SIDEWALK)	
(AF)852289	(SIDEWALK) PEDESTRIAN TRAFFIC	
	TOTAL AREA:_____S.F. (EXCLUDING PAVER TILES)	
	17. CONCRETE CURBS & GUTTERS	$_____
(AR)851-10	(ROADS PAVED)	
(AF)851143	(CURBS & GUTTERS)	
	TOTAL AREA:_____L.F.	
	18. EXTERIOR SITE LIGHTING (EXT LIGHTING)	$_____
(AR)812-30	(EXT LIGHTING)	
(AF)812926	(EXTERIOR AREA LTG)	
	TOTAL NUMBER OF POLES_____	
	19. LANDSCAPING (RELATED LAND IMPROV NB)	$_____
(AR)871-75	(RELATED LAND INPROV NB)	
	20. GASOLINE DISPENSING SYSTEMS	$_____
(AR)411-90	(LOCAL DESCRIPTION)	
	UNDERGROUND STORAGE TANKS:	
	NUMBER OF TANKS:_____ SIZE:_____ GALLONS	
	NUMBER OF DISPENSERS:_____	
	NUMBER OF HOSES:_____	
	CANOPY SIZE:_____ SF $_____	
	KIOSKS: NUMBER_____MGFR_____ COST	$ _____
	21. CHAIN LINK FENCING (FENCE OR WALLS)	$_____
(AR)872-10	(FENCE OR WALLS)	
(AF)872248	(FENCE INTERIOR)	
	TOTAL LINEAR FEET:_____L.F.	
	22. TOTAL CONSTRUCTION COSTS:	$_____

ITEMS FOR DD FORM 1354 (CONTINUED)

ADDITIONAL INFORMATION REQUIRED

MECHANICAL SYSTEMS

H.V.A.C. UNITS

#	MANUFACTURER	MODEL #	CAPACITY	SERIAL #
1.				
2.				
3.				
4.				

EXHAUST FANS

#	MANUFACTURER	MODEL #	CAPACITY	SERIAL # ___
1.				
2.				
3.				
4.				

SUPPLY FANS

#	MANUFACTURER	MODEL #	CAPACITY	SERIAL #
1.				
2.				
3.				
4.				

CHILLER
BOILER
HEAT PUMP
ROOFTOP A/C UNITS
DOCK LEVELERS
DOCK SHELTERS

ELECTRICAL
DISTRIBUTION PANELS / LIGHT FIXTURES

ITEM NO	MANUFACTURER	MODEL NUMBER	QUANTITY	DESCRIPTION

PLUMBING

#	MANUFACTURER	MODEL #	CAPACITY	SERIAL # ___
WATER HEATER				
WATER CLOSET				
WATER CLOSET (H.C.)				
URINAL				
LAVATORY				
LAVATORY (H.C.)				
FLOOR SINKS(___#)				
FLOOR DRAINS(___#)				
MOP SINK				
ROOF DRAINS (___#)				

ITEMS FOR DD FORM 1354 (CONTINUED)

ADDITIONAL INFORMATION REQUIRED

FIRE PROTECTION SYSTEMS FOR FOOD ACTIVITIES

ANSUL CHEMICAL FIRE SUPPRESSION SYSTEM
TYPE OF SYSTEM:_____
TOTAL NUMBER OF:
HEADS_____ AUTOMAN RELEASE_____
REMOTE MANUAL PULL STATIONS_____
SNAP ACTION ASSEMBLIES_____
MECHANICAL GAS SHUTOFF VALVES_____'

ITEMS REQUIRED IN CLOSE OUT DOCUMENTS

1. GENERAL CONTRACTOR'S TESTING / TRAINING REPORTS:
   A. TEST AND BALANCE REPORT ON MECHANICAL SYSTEMS
   B. CERTIFICATION OF GROUNDING (RESISTANCE) POWER TRANSMISSION
   C. INSTRUCTION / TRAINING SESSIONS ON ALL MECH/ELEC/EQUIPMENT (INCLUDING PARTICIPANTS' ROSTER)
2. GENERAL CONTRACTOR'S WARRANTY
3. ROOF(S) WARRANTY
4. ELECTRIC WARRANTY
5. HVAC WARRANTY
6. GREENHOUSE WARRANTY
7. TERMITE PROTECTION GUARANTEE
8. GENERAL CONTRACTOR'S STATEMENT ON "NO ASBESTOS BEARING MATERIALS" USED IN CONSTRUCTION

DD FORM 1354

Transfer and Acceptance of Military Real Property

Users Handbook

30 August 2002

FINAL VERSION

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Chapter 1 Overview of DD Form 1354, Transfer and Acceptance of Military Real Property

Purpose

The purpose of this DD Form 1354 handbook is to establish a process to transfer and accept real property accountability and costs for capital improvement projects in a timely and consistent manner throughout the Department of Defense (DoD) and between Military Services. Another purpose is to ensure the timely and consistent posting of newly constructed and transferred facilities and their costs into the real property database. This handbook provides a consolidated reference that

- Provides the many uses of the DD Form 1354 and describes how to use it as part of a real property inventory system,
- Explains who should fill out the DD Form 1354 and when,
- Provides instructions for preparing the DD Form 1354, Transfer and Acceptance of Military Real Property, dated August 2002,
- Explains how the preparer of a completed form uses the DD Form 1354 to document credit to the Construction-in-Progress (CIP) Account and,
- Provides objective standards that, when met, allow timely acceptance of the 1354.

Overview

This handbook describes five different job positions that perform the required tasks. In reality, the staffs that work for the holders of these positions do much of the work required. The approach in this handbook is to clarify the process, not to dictate how an installation should assign job responsibilities. The five positions are: construction agent project manager who prepares the DD Form 1354, Real Property Accountable Officer (RPAO) who accepts and accounts for individual facilities, Real Property Specialist (RP Specialist) who enters real property data into the real property database, Director of Public Works (DPW) who is involved in master planning, construction, real property maintenance, and real property accountability; and the funding organization/activity who is the customer for the facility or project. With all five functions (e.g., project manager, RPAO, RP Specialist, DPW and customer), and their respective staffs, working together early on in the project life cycle, the project has an excellent chance of achieving overall success. Part of a successful project is timely and accurate documentation. By working together and following the procedures in this handbook, real property assets should be transferred and accepted in a timely manner, and costs transferred from CIP accounts to general property, plant, and equipment (PP&E) accounts at the time they are placed in service. In addition, real property facilities would be listed on the DD Form 1354 in a standard format such that facilities are accurately posted to the real property database.

This handbook recognizes that the construction agent project manager responsible for preparing the single DD Form 1354 (multiple versions) for any project could in practice

be an onsite project manager assigned to a Resident or Area Office, or a manager who spends most of his/her time at the District or Division. He/she could also be a member of the DPW if the installation is managing its own project. This handbook uses the term construction agent project manager to mean the designated person to whom the construction organization assigns the responsibility to prepare the DD Form 1354.

This handbook also recognizes that final/turnover inspections are done differently throughout DoD. In an ideal situation, the turnover inspection for quality workmanship with the contractor, the facility acceptance inspection with the RPAO, and the facility turnover with the occupant all occur simultaneously and the DPW or Base Civil Engineer (BCE) and the RPAO are present. In actual practice, this combined inspection may not always occur and designated representatives may attend different inspections or facility turnover events. Different Services may name these inspections differently and conduct them in different order. This handbook does not dictate when, how, or who attends these inspections. Since the RPAO may not be an engineer, an engineer should first make a determination of quality workmanship and that the facility(ies) is/are physically complete and available for use or beneficial occupancy. This determination is normally made on the basis of an inspection where the construction contractor is present. However, the DD Form 1354 deals with the transfer and acceptance of accountability for real property, therefore the facility transfer inspection in this handbook refers to a meeting event involving the construction agent project manager (or losing accountable officer for transfers of existing facilities) and the gaining RPAO to transfer accountability for a facility(ies). The gaining RPAO should exchange his/her Accepted By signature on the DD Form 1354 for permission to occupy the facility, often signified by the passing of keys.

Scope

Chapter 1 covers the target audience for this handbook, the various usages of the DD Form 1354, and who prepares it. Chapter 2 describes the data required to prepare a completed form. Chapter 3 describes the three different versions of the DD Form 1354 and when to use each version. Chapter 4 explains how the RP Specialist uses the data from the completed form to enter data into the real property database and how the construction agent project manager uses the data to manage the CIP Account. Chapter 4 also explains how to document various real estate transactions. Chapter 5 provides guidance to the construction agent project manager to ensure that total project cost equals the sum of individual facilities costs. Chapter 6 lists the standard attachments to the 1354 and sets acceptance standards for completeness, timeliness and accuracy to help the accepting official know whether the DD Form 1354 should be accepted or rejected based on objective standards. There is a glossary of terms and appendices showing the DD Form 1354, instructions for each block or data field, a building information checklist, and a list of fund codes.

Although related to the transfer and acceptance of military real property, this handbook does not address U.S. Army Corps of Engineers (USACE)/ Naval Facilities Command (NAVFAC)/ DPW/Director of Installations Services (DIS) procedures for:

- Tracking planning and design costs for a construction project or
- Entering project costs in the CIP account.

Target Audience

The target audience expected to use this DD Form 1354 handbook are the persons who prepare and accept DD Forms 1354 and those who enter data from the 1354 into real property databases for military installations of all Services. Preparers can include construction agent project managers at DoD construction agencies such as USACE Districts/Resident/Area offices, NAVFAC Engineering Field Divisions and Activities; installation DPW and DIS; and engineer troop construction organizations. Also part of the target audience are installation RPAO who accept accountability for facilities on their installations and RP Specialists who input data into the real property database and voucher register. Construction agent project managers should share the information in this handbook with their Contracting Officers to ensure that all data requirements for the DD Form 1354 are written into every construction contract as a specific deliverable. Appendix C provides a sample Building Information Checklist that should be specified as a deliverable in the construction contract. Each Service may have a different format.

Applicability

This handbook guidance applies to DoD installations and USACE/NAVFAC construction agencies that prepare DD Forms 1354. Installation customers should use this handbook to specify requirements for the preparation of DD Forms 1354 from DoD construction agents, including USACE, NAVFAC, Army and Air Force Exchange Service (AAFES), and the Defense Commissary Agency (DeCA). All measurements on the 1354 should be in English measurement units since the DODI 4165.14 prescribes English units.

Usages and Purposes of DD Forms 1354

The DD Form 1354, Transfer and Acceptance of Military Real Property, is used to record transfers, changes, additions or deletions of real property owned by the Military Services. The DD Form 1354 is used for a diverse number of real property transactions. The primary purpose of this form is to document, transfer, and accept accountability for completed new construction and real estate, and to document and accept capital improvements on existing structures. The installation RPAO also uses this form as a basis for recording changes in the real property database. There are many other uses for the DD Form 1354 and a more extensive list of uses follows:

1. Transfer accountability for new construction and/or capitalization projects from the construction agent (e.g., USACE District/NAVFAC Division) to the installation RPAO.
2. Transfer accountability for new construction and/or capitalization projects from the installation DPW/DIS project manager to the installation RPAO.
3. Transfer and accept accountability of real property (land and other facilities) acquired on behalf of an installation from the private sector, other military services or other Federal agencies by acquisition or grant.

4. Transfer and accept administrative accountability of real property from tenant organizations to installation RPAO, e.g., DLA, DeCA, ARMS, and Energy Savings Performance Contractors; for real property accountability purposes only. Control remains with the funding organization.
5. Transfer real property accountability for usable research and development structures at the end of the research project.
6. Reassign accountability of real property between services, commands, and installations.
7. Document the total cost of a new facility or a capital improvement in the installation's real property database.
8. Document disposals of real property.
9. Document real estate transactions, e.g., purchases, sales, leases, licenses, permits.
10. Document adjustments caused by damage to real property in the real property records.
11. Document real property accountability changes to make the real property database agree with physical inventory results, e.g., found on post.
12. Document changes in unit of measure values (area or capacity/other), dimensions, costs, and design use category codes for an existing facility.
13. Document approved facility conversions.
14. Document credit to the Construction-in-Progress (CIP) account for USACE/NAVFAC.

Who Prepares the DD Form 1354?

The DPW construction project manager is responsible for determining whether repair projects should be capitalized or not by applying the rules in the DOD Financial Management Regulation (FMR) 7000.14-R, volume 4, chapter 6, (Improvement to Existing General PP&E) para 060205 or volume 11B, paragraph 58, (Accounting for Capital Assets-WCF), as well as service guidance (e.g., DA PAM 405-45, Real Property Inventory Management). This determination should be made and documented at the start of the project design/scoping phase of the project development. For projects funded by Defense Agencies, the funding agency has final approval of the capitalization decision.

Construction Agent Project Manager Prepares the DD Form 1354 for New Construction

The Government construction agent, e.g., USACE District or NAVFAC Division, will prepare a DD Form 1354 for transfer of completed construction and capital improvement projects which they manage, and furnish the completed DD Form 1354 to the RPAO at the time of beneficial occupancy and property transfer. The USACE District/NAVFAC Division construction manager will also list the construction contract deficiencies in block 25, on the reverse side of the DD Form 1354, after the turnover inspection with the construction contractor and installation representatives. No beneficial occupancy of new construction improvements should occur without providing and accepting a completed and signed DD Form 1354.

Similarly, the installation construction project manager prepares and furnishes the DD Form 1354 for installation managed projects, both new construction and capital improvement projects. The installation DPW/DIS must provide the necessary systems support to allow the DPW/DIS construction project manager to track construction costs and to prepare a DD Form 1354 for installation-managed projects. The installation construction project manager signs and furnishes the interim or final DD Form 1354 to the RPAO at the time of project transfer.

The Real Estate Representative Prepares the DD Form 1354 for Grants

The real estate representative is normally from a USACE District /NAVFAC Division and this USACE/NAVFAC representative prepares the DD Form 1354 along with other purchase or grant real estate documentation.

The Losing RPAO Prepares the DD Form 1354 for Transfers

The RPAO that maintains the real property database for the losing installation prepares the DD Form 1354 for any transfer of real property from the installation. Similarly this office also prepares any DD Form 1354 required for the transfer of an entire installation (or sub-installation) such as transfer of an entire installation to a different component of the service.

The Installation RPAO Prepares the DD Form 1354 for Real Property Adjustments

The DD Form 1354 is also used to document real property adjustments, even in cases when there are no construction or transfers involved. The RPAO and staff must prepare and sign the DD Form 1354. Since there is only one party involved in such a transaction, the RPAO must attach sufficient documentation to justify the changes described on the DD Form 1354.

The Construction Agent Project Manager Follows the Building Information Checklist

A Building Information Checklist is at Appendix C. The amount of detailed building information required from a construction project should be determined during the design phase of the project by the design agent, working in coordination with the installation DPW/RPAO team, using this checklist. When architect-engineers (A-E) are preparing the design or cost estimate for a project, the building information checklist information should be written into the scope of services to be provided as a deliverable from the design agent or A-E contractor. The checklist is not a form to be filled out and there are

several mechanisms to transmit such data to the RP Specialist electronically. Some Architect-Engineers tag individual systems with very detailed information in eXtensible Markup Language (XML) that can be accessed via the Internet.

Chapter 2 How to Prepare a DD Form 1354, Transfer and Acceptance of Military Real Property

Format and Instructions

The DD Form 1354, Transfer and Acceptance of Military Real Property, was revised to better meet the requirements of the Chief Financial Officers Act (CFOA), implement audit recommendations, and ensure consistent reporting of the cost of facilities. The revised DD Form 1354 is provided as Appendix A. The guidance in Appendix B of this handbook is provided to replace the previous instructions for filling out the DD Form 1354 that are currently contained in FMR 7000.14-R, Volume 3, Chapter 17, Appendix B.

This chapter provides more detailed block-by-block instructions for each data element, with examples. An introduction to this chapter provides a description of "where the data come from."

Required Data

The essential information required for the transfer and acceptance of real property is documented on the DD Form 1354 and this information supports entries into the installation's real property accounting system. The format has 26 data blocks. Because this form is used for the variety of purposes described in Chapter One, not all of the data blocks are required for each usage. When a block is not to be filled out for a particular usage, simply enter N/A for "not applicable." There should be no blank data fields except in the block 21, Item Remarks column, where blanks are allowed.

Where Do DD Form 1354 Data Come From?

The construction agent and the installation team must work together to collectively provide the data to accurately prepare a DD Form 1354 at the right time. Most of these data are first available during the design phase of a project, and the draft DD Form 1354 should be included in the design scope of services to the construction agent as a required deliverable. Installations should review and approve the draft DD Form 1354 as part of their review of other design deliverables.

The DD Form 1354, Transfer and Acceptance of Military Real Property, requires the preparer to provide specific information about the project. Information such as description of the real property facilities, category codes and sizes, costs, fund source(s), contract number(s), facility numbers, and as built drawing numbers, is typically required. For real estate transactions, the real estate instrument (document) contains much of the required information.

For Military Construction projects the DD Form 1391, Military Construction Project Data, and the project folder contain some of the information that is needed on the DD Form 1354. Table 2-2 shows a crosswalk from equivalent data fields in the DD Form 1391 to the DD Form 1354. Remember to check the accuracy of the DD Form 1391

before using any data from it. DD Forms 1391 are often prepared years in advance of project initiation and sometimes do not contain the latest category code data, and seldom contain 'item-level' detail. For minor construction projects, the work request should provide similar data needed to complete the 1354.

DD Form 1391		DD Form 1354	
Block Number	**Block Name**	**Block Number**	**Block Name**
3	INSTALLATION & LOCATION	6	SITE/INSNO
6	CATEGORY CODE	12	CATEGORY CODE
7	PROJECT NUMBER	3	PROJECT/JOB NUMBER
9	COST ESTIMATES		
	ITEM	10	ITEM NO.
	U/M	15/17	UNIT OF MEAS.-1 or 2
	QUANTITY	16/18	TOTAL QUANTITY 1 or 2
	COST	19	COST
10	DESCRIPTION OF PROPOSED CONSTRUCTION	26	PROJECT REMARKS. Helps overall project understanding

Table 2-1 Crosswalk from 1391 to 1354

Instructions to Prepare DD Form 1354 Data Fields

The page number and the total number of pages comprising each 1354 project or transaction shall be shown in the space provided at the top right-hand corner of the form. When two or more pages are required to describe the information required for blocks 1 through 21, then blocks 22 through 24 (signatures and voucher number) shall be completed only on the first or signature page. Signing officials should initial subsequent or unsigned pages and line through the Property Voucher Number block on all except the signed page.

The remainder of this chapter explains in detail what the data are and where data come from to complete the individual data element blocks on the DD Form 1354. A single example is used for all the example entries to the DD Form 1354 data fields in the remainder of this chapter. The example is a Military Construction, Army (MCA) project to construct a new battalion headquarters and classroom, and associated structures and utilities. A summary of these instructions is provided as Appendix B for quick reference and for publishing in the FMR.

Block 1. [FROM]

Enter in block 1 the name of the construction or transfer agent the organization, installation DPW/DIS, USACE District/NAVFAC Division Office, or other organizations such as the Army Air Force Exchange Service (AAFES) or Defense Commissary Agency (DeCA). You should include the full address and zip code. Simply, use this block to identify the organization accomplishing the new construction or capital improvement of existing facilities, or initiating the transfer of existing real property.

Example: U.S. Army Corps of Engineers
Kansas City District
Area Engineer, Fort Riley
Fort Riley, KS 66442-6000

Block 2. [DATE FORM PREPARED]

Enter the date the DD Form 1354 is prepared. Use DD-MMM-YYYY format for all dates. This is the date used to track different editions when revisions are necessary. The form is considered prepared when it is ready for signatures in blocks 21 and 22.

Example: 15 JAN 2002

Block 3. [PROJECT/JOB NUMBER]

Enter the project number assigned to identify the project on a DD Form 1391 for new military construction (MILCON) and the job order number. The project number may also come from the installation master plan or long-range construction program. For projects generated by the installation DPW/DIS, the DD Form 1354 JOB NUMBER is the Individual Job Order (IJO) number associated with the Facility Engineer Work Request or equivalent system. The job number will allow you to track the capital improvement back to the actual work performed, which is important since many projects, even MILCON, originate as a work request. Work requests at the installation DPW/DIS are entered directly into the Integrated Facilities System (IFS) or other work management system. Typically, work requests follow the format (AAA-SSSSS-FP), where A is a two or three character customer ID, S is a five character serial number, F is the last digit of the fiscal year, and P is the type of project. Coordinate with the customer service branch of the DPW/DIS prior to preparation of the DD Form 1354 to validate the work request or job number. The project number is the same for all versions of the 1354 for a single capitalization project. Use this number to search for the different versions if necessary.

Examples: DD Form 1391 project number might be 20027. Project initiated by IFS Work Request - FE-00028-3P

Block 4. [SERIAL NUMBER]

This is the document number assigned to the 1354 by the construction agent organization originating the 1354, e.g., USACE District/NAVFAC Division, DPW/DIS, etc. Each different version of the 1354 for the same project has a new Serial Number. Each originating organization has its own sequence of serial numbers. The Serial Number consists of the 4-digit fiscal year and a sequential number (within their own organization) that starts over each fiscal year. Use the next sequential number for each DD Form 1354

originated. Installation DPW/DIS and USACE/NAVFAC will use their own sequence as the next Serial Number in their sequence of DD Forms 1354. For example, if the last DPW/DIS serial number is 2002-0003 and they receive a DD Form 1354 from the District, that 1354 would use the District's sequence number. The next DPW/DIS serial number would then be 2002-0004. The 1354 Serial Number facilitates tracking of all 1354 originated by an organization/activity. The Serial Number is in no way related to the Voucher Number (block 24).

Example: 2002-0001, 2002-0002; where 2002 is the fiscal year and the last four are the sequence number.

Block 5. [TO]

Enter the name of the receiving organization or agency to which the transfer will be made. This receiving organization could be the DPW/DIS on a DoD installation that has been assigned the responsibility for accounting for the real property. Always include the address, zip code, and installation number – the unique identifier of the installation - which the RPAO represents. Installation numbers are available from individual service databases of installations or can be provided by the gaining installation RP Specialist.

Example: Engineering Plans & Services Division
Directorate of Public Works
Fort Riley, KS 66442-6000
INSNO 20605

Block 6. [SITE/INSNO]

Site number or installation number of the actual facility physical location is one of the first points of entry into the database. Enter in block 6 the site number identifier or installation number (INSNO) where the facility being transferred/accepted is located. Enter this number regardless of whether it is the same or different from the location of the RPAO (which is identified in block 5).

Example: 20605 (In this example it happens to be the same as the identifier in block 5).

Block 7. [CONTRACT NUMBER]

If a project has been awarded to a contractor by either the installation Director of Contracting (DOC), USACE District/NAVFAC Division, or other contracting office, then enter the associated contract number (multiple contract numbers if applicable) from the DOC or District Engineer contracting office in this block. Include the delivery order number in addition to the contract number if the contract could authorize work under different delivery orders that are not related to the project described in the final DD Form 1354.

Example: DACA31-98-D-0052

Block 8. [DRAWING NUMBERS]

Enter the drawing number(s) or CAD identifier(s) of the construction agent for the project components. In some cases an installation assigns a specific consecutive drawing number to each project that is initiated. Use that number to identify the project. USACE

drawings have a Drawing Code which may also be used as a reference. All drawing numbers that may be needed as a future reference to the project should be identified in this block.

NOTE. There is not a one-to-one correspondence between drawings and Item Numbers in column 10. For example, HVAC system drawings should be identified in block 8, but the HVAC system is not listed as a separate Item Number. Identify the facility or system associated with the drawing number or use a range of drawing numbers if consecutive and more than one drawing. Use Project Remarks, block 26, for additional space.

Example: B-9301 through B-9309; 47-018-1234; F 711-13-01

Block 9. [TRANSACTION DETAILS]

This block is divided into four subparts. Subpart A identifies the type of construction activity for this project. Subpart B identifies when in terms of an event that the DD Form 1354 is being issued. You must explain an "other" check for either section A or B in block 26, Project remarks, on the back of the form. Subpart C identifies the version of this DD Form 1354. Subpart D identifies the Effective Date for the transaction described by the checkboxes in block 9.

[Subpart A of Block 9] Type of Construction Activity

Insert an X in the appropriate box of subpart A to indicate whether the transaction involves acceptance of new construction, transfer of existing facilities, capital improvements to existing facilities, or some other type transaction. **Check only one box.** Definitions follow:

- New construction – acceptance of accountability for a facility that did not previously exist
- Existing facility – transfer of accountability for an existing facility
- Capital improvement of an existing facility – increases the facility size or capacity, useful life, or operating efficiency of an existing facility
- Other - if the "Other" checkbox is checked, the preparer explains the transaction in Project Remarks (block 26), on the back of the DD Form 1354. Examples for marking "Other" are for occurrences such as real property physical inventory adjustment or capital decrease.

[Subpart B of Block 9] When/Event

Insert an X in the appropriate box of subpart B to indicate when (in terms of an event) the DD Form 1354 is issued. The checkboxes are arranged in order of which box you should use with the first box being the most desirable, if it applies. **Check only one box and the first box that applies.**

- Physical Completion/Available for Use - check this box when the entire facility(ies) described on the DD Form 1354 is substantially complete (except for deficiencies noted on the back) and the entire facility(ies) is being made available for use at the time of transfer. If beneficial occupancy is occurring at the same time or later than

physical completion, check this box for physical completion/available for use. If beneficial occupancy occurs before the facility is complete, check BENF/O for BOD or Partial BOD as explained below.

- BENF/O – (Beneficial Occupancy) check this box when the transfer or acceptance documented by this interim DD Form 1354is for the whole project **and** occurs prior to physical completion of the project. Partial Beneficial (BOD) is explained below.

- Partial BOD – (Partial Beneficial Occupancy) check this box when the transfer or acceptance documented by this interim DD Form 1354 is for only a portion of a facility (such as a hospital) or is for a phased turnover of one or more facilities in a multiple facilities project. Turnover of each phase at partial BOD would have its own interim 1354 and unique Property Voucher Number. Partial BOD DD Forms 1354 will all have the same project number.

- Financial Completion - check this box when the DD Form 1354 is used to change costs on an interim 1354 to reflect the final costs against the project. Project financial completion occurs after all of the project costs have been accumulated. This may occur many months or years after a project's physical completion. Checking financial completion means that the contractors have received final payment for the project, all project management costs are included, and no additional costs will be incurred against this project. If final costs are available at physical completion or BOD, do not check this box and indicate final costs by checking "Final" in subpart C.

- Other - check the "Other" box when the transfer or acceptance occurs at an event time other than the four cases described above; explain the "Other" checkbox for the event in Project Remarks (block 26) on the back of the DD Form 1354.

[Subpart C of Block 9] Version

Use the DD Form 1354 subpart C to indicate quickly whether the DD Form 1354 is a draft, interim, or final version. Costs on a draft or interim 1354 are assumed to be preliminary costs. Costs on the final DD Form 1354 are the final costs. If the 1354 were issued for financial completion only, use the checkbox for financial completion in subpart 9B and check "Final" in subpart 9C. If the 1354 is issued at Physical Completion with final costs, then check Physical Completion in 9B and check "Final" in 9C; there would be no reason to create an additional 1354 for financial completion since the final costs would already be documented.

[Subpart D of Block 9] Effective Date of Transaction

Enter the effective date for the transfer or acceptance in format DD-MMM-YYY.
NOTE. The effective date of the transaction is the earlier of BOD or Date Available For Use, and is the date from which the accounting system should depreciate the cost of the facility.

Example: 15 JAN 2002

Block 10. [ITEM NUMBER]

A key step in the preparation of a DD Form 1354 is to identify the various components or items of the project. Enter a separate Item Number line for each new facility, and for each facility addition, capital improvement, or deletion, including additions to or deletions from utility systems or other previously existing facility records. If there are more items than fit on a single page, use additional DD Forms 1354.

Do not create an excessive level of detail in the item listings. As a minimum, observe the following rules for determining individual items.

- Identify each facility and its category code as a unique item number.
- Identify major portions of any multi-purpose facility with appropriate facility category codes and units of measure for each portion. List these multiple uses such that the multi-purpose facility has one item number and several different lines, one for each category code.
- If land is purchased as part of the project, show land as a separate line item.
- If demolition is within the footprint of a new construction project, then demolition costs are included as part of the new individual facility costs. If demolition is not in the footprint of new construction, the demolition cost is expensed and does NOT get included as part of the capitalized cost of the project. There are two ways to account for the demolition portion of the project and to document the reduction of real property. You may either attach an Authorization for Demolition (e.g., DA Form 337 or equivalent form for other Services) to document category codes and quantities of demolished real property separately from constructed/transferred Item Numbers or, in lieu of this attachment, indicate as additional DD Form 1354 Item Numbers, all demolished real property facility numbers and category codes using negative numbers (shown in parenthesis) for units of measure. Do not show demolished facilities on the 1354 if the attached demolition document has all the required information to subtract demolished facilities from the real property inventory.
- Attach separate lists of installed building equipment (IBE) (real property) and equipment in place (EIP) (personal property) to the DD Form 1354. This allows for the detailed equipment listings without cluttering up the 1354. The preparer, in conjunction with the RP Specialist, should use judgment in determining the amount of detail provided.

Block 11. [FACILITY NUMBER]

Enter the Facility Number (FACNO) assigned to each Item Number. The Facility Number is a unique, real property accountability alphanumeric, for each facility on an installation according to the Installation Master Numbering Plan. Some installations have consolidated records for pavements and utilities and the additional pavements and utility distribution lines must be added to an existing facility number. The installation RPAO provides these numbers to the construction agent early in the design phase.

Block 12. [CATEGORY CODE]

In block 12, record the five or six digit design use category code for each affected facility usage itemized in block 10. When a constructed facility has more than one design use, each usage over 1,000 SF must be identified as a separate line under the same Item Number. Facilities listed may be land, buildings, utilities, or structures and must be classified as the correct facility category in accordance with the service implementation of DODI 4165.3 (e.g., Army real property classification system prescribed in DA Pamphlet 415-28, Guide to Army Real Property Category Codes or Air Force Handbook 32-1084, Facility Requirements). These reference documents provide the facility category code, category description, and the various units of measures associated with each facility category. Prior to initiating any work on a DD Form 1354, the construction agent should coordinate with the receiving agency RPAO and develop a draft category code/real property classification plan that can be used for development of the various items on the DD Form 1354 for this project. A draft 1354 should be identified as a deliverable from the design process and this draft reviewed and approved by the installation DPW along with other design documents. The best time to prepare this draft is during the design phase. Identification of items and their category codes is more important; estimated costs are less important for the draft 1354.

Block 13. [CATEGORY CODE DESCRIPTION]

Use the service implementation of DODI 4165.3 (e.g., DA PAM 415-28 or Air Force Handbook 32-1084, Facility Requirements) to determine the correct facility category code short title as the verbatim description that corresponds to the category code entered in block 12.

Block 14. [TYPE]

Indicate the type of construction: P = Permanent, S = Semi-permanent, and T = Temporary. For definitions of each type of construction see DODI 4165.14, DOD Real Property Inventory Reporting and Forecasting.

NOTE. For Blocks 15 through 18.

Each Service category code reference stipulates an area or a capacity/other unit of measure, or both. If both units of measure are stipulated in the reference, then both are required on the DD Form 1354. If only one measure is required, place N/A in the other two columns.

Block 15. [UNIT OF MEASURE-1; AREA]

Enter in this column the appropriate Unit of Measure 1 for area for each design use category code for each item of real property, i.e., only SF, SY, or AC. The service implementation of DODI 4165.3 (e.g., DA Pamphlet 415-28) identifies the appropriate area unit of measure for each real property category code.

Block 16. [TOTAL QUANTITY-UM 1]

Enter the total quantity of area for the Unit of Measure-1 for each item of real property. For buildings, enter the gross area. For demolition, enter negative numbers in parenthesis or attach an Authorization for Demolition.

Block 17. [UNIT OF MEASURE-2; CAPACITY/OTHER]

Enter in this column the appropriate Unit of Measure-2 for capacity/other for each design use category code for each item of real property. The service implementation of DODI 4165.3 (e.g., DA Pamphlet 415-28) identifies the appropriate capacity/other unit of measure for each real property category code.

Block 18. [TOTAL QUANTITY-UM 2]

Enter the total quantity of capacity/other for the Unit of Measure-2 for each item of real property. For demolition, enter negative numbers in parenthesis or attach an Authorization for Demolition.

Block 19. [COST]

One of the primary purposes of the DD Form 1354 is to identify the cost of individual facilities of the construction project. These costs are required as part of the Army's Financial Statements and General Ledgers. The preparer must identify the total project cost as well as costs assigned to each facility that is part of the project. Only one cost per item number (facility) is allowed in column 19. All costs of a multi-purpose facility should be shown against the primary category code for that facility, and the other categories of the multi-purpose facility should be annotated as N/A in column 19.

The construction agent must provide distinct break out costs for each different building, utility, and structure constructed as part of this project. For example, if the project consists of two buildings, parking, sidewalks, water supply branch lines, sewer branch lines, and exterior lighting, you need seven different costs for items in block 19. Each building and structure (parking and sidewalks) and each utility would have a cost in block 19.

The real property accounting system should record only capital costs in the general ledger Plant, Property, and Equipment (PP&E) account for financial statements. Therefore, for capital improvements to existing facilities, preparers should only record the capital costs for the capital improvements to the existing facility. Do not enter any repair work costs on the 1354 since repair costs are not capitalized.

Costs provided in a DD Form 1354 can be either preliminary or final. Costs on the draft (if any) and interim version DD Forms 1354 are preliminary costs. Costs on a final version DD Form 1354 are the final costs. The office preparing an interim 1354 will create a suspense file to ensure that the accepting RPAO is furnished an updated DD Form 1354 with the final construction costs upon financial closeout. Final costs are generally available in several months or, if legal claims are involved, one or more years after physical completion and facility transfer. Use estimated costs only for real property assets found on post, or for other existing facilities with unknown original construction costs. In these cases, the estimates are the final costs.

To demonstrate compliance with the CFOA, the preparer should place the total project cost and the four components of total project costs in the Project Remarks (block 26) on the back of the form. The four components of total project cost are: (1) planning and design (P&D) including project management costs (pre-award), (2) construction contract supervision and administration (S&A) (also known as supervision, inspection, and overhead (SIOH) and including post-award project management costs); (3) the construction costs (including site preparation which also includes demolition of footprint facilities), and (4) project funded equipment costs. The sum of these four cost elements is the total project cost and should equal the sum of the individual facility costs shown in column 19 on the front of the 1354 plus the equipment-in-place costs that are transferred as personal property. The construction agent prorates P&D and S&A costs among the facilities comprising the project and includes the prorated P&D and S&A costs in the facility costs in column 19 for each facility. Estimated costs may be used to prorate P&D and S&A costs to the individual Item Number in column 10.

For real estate acquisitions, the preparer should list the cost in column 19 as the sum of real estate transaction costs and the actual purchase or fee costs. Show these two components of real estate costs in Project Remarks (block 26).

For real estate transfers, the preparer should list the cost in column 19 as the sum of real estate transaction costs and the actual costs that were on the losing agency's facility records. Show these two components of real estate costs in Project Remarks (block 26).

Block 20. [FUND SOURCE]

When recording costs, the preparer needs to identify the types of funds obligated. It is important for compliance with CFOA to identify each facility fund source in this column. Each Item Number could be funded from a different fund source and some facilities could even have a combination of fund sources. When there is more than one fund source for a single facility, show both fund sources with percentages of each. The construction authorization document usually identifies the fund source(s). Typical fund types for construction include, but are not limited to: Military Construction Army (MCA), Military Construction Army Reserve (MCAR), Military Construction National Guard (MCNG), Non-Appropriated Fund (NAF), Operations and Maintenance, Army (OMA), Operations and Maintenance, Army Reserve (OMAR), Family Housing Maintenance Account (FHMA), and Department of Defense Dependent Schools System (DODDS). Appendix D provides a more complete list of standard abbreviations for DoD and Army fund sources.

Example: MILCON 75%/OMA 25%

Block 21. [ITEM REMARKS]

Use this column to note any information or remarks about the specific Item Number from column 10. There is no need to duplicate the project level remarks that appear in the Project Remarks (block 26) on the back. You should explain any prorating of costs among various items. Also explain any removals or demolitions, such as demolition to make room for footprint construction. Also use space in Project Remarks (block 26) for continuation of data that does not fit in column 21.

Block 22. [STATEMENT OF COMPLETION]

This block is for the signature and title of the individual in the construction agent organization that is responsible for the transfer of accountability for the facility to the installation. The signing authority is certifying that the following Statement of Completion printed on the DD Form 1354 is true: "The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side." Normally the construction agent project manager, whether for the USACE District/NAVFAC Division or DPW/DIS, signs and dates block 22 for new construction and capital improvements. The RPAO normally signs when transferring real property from one installation to another. Enter the title of the signing official. Enter the date at the time of signature. The date must be prior to, or the same as, the date of acceptance in block 23 on the DD Form 1354 in order to simultaneously transfer property responsibility and accountability. The date should be in the format DD-MMM-YYYY.

Block 23. [ACCEPTED BY]

This block is for the signature and title of the individual responsible for accepting accountability for the properties described on the DD Form 1354. Normally, the RPAO accepts all the property for which he/she is accountable and therefore signs and dates in block 23. Enter the title of the actual signing official. Enter the date at the time of signature. The date must be after, or the same as, the date of transference in block 22 on the DD Form 1354. The date should be in the format DD-MMM-YYYY. Once the 1354 is signed, the RPAO will provide the 1354 to the RP Specialist on the day of acceptance for entry into the real property database.

The signing authority is accepting accountability for the real property facilities described on this DD Form 1354 in the quantities and for the costs listed in columns 10 through 20. The facilities accepted should have been inspected and determined to meet standards except for the deficiencies listed in block 25 on the reverse side. For real property adjustments signed by the RPAO in block 22, enter N/A in the three blocks for acceptance (Accepted by, Title, and Date Signed).

Block 24. [PROPERTY VOUCHER NUMBER]

The preparer of the document should leave this field blank. The receiving installation RPAO will fill in the property voucher number when the DD Form 1354 information is recorded in the installation real property voucher register, such as a Register of Vouchers to a Stock Record Account, DA Form 272 for the Army. This voucher number is the next sequential number assigned in the register by the Real Property Office. For additional information concerning vouchers and voucher registers, see DA PAM 405-45, Real Property Inventory Management or other service publication.

Example: V-20020023 where V indicates a voucher number and the first four digits (2002) is the fiscal year and the last four digits (0023) is a four-digit sequence number.

Block 25. [CONSTRUCTION DEFICIENCIES]

Enter any significant construction deficiencies for the project. Do not list any perceived deficiencies in the scope or design of the project on this document, as this transfer document identifies only deficiencies in the awarded construction contract performance that the Government needs completed before declaration of completion of the contracted work. If there are more entries than fit on a single page, use additional DD Forms 1354.

Examples: Restore all grassed areas disturbed by construction
Replace/repair iron rod fence that was damaged during construction

Block 26. [PROJECT REMARKS]

This block is primarily for project level remarks. Enter any project explanations that would help others understand the real property transaction identified on the 1354. Fully describe any capital improvements. Remarks that pertain to only one Item should be listed in column 21, not in Project Remarks. In addition, if the "Other" checkbox is checked in block 9 (subpart A or B) an explanation is mandatory in this "Project Remarks" block. Also use Project Remarks (block 26) for continuation of data that does not fit in blocks 1 through 8, and columns 20 or 21. Also, enter in Project Remarks (block 26) the total project cost and four individual components of total project cost: P&D, S&A, construction, and equipment as described for Cost [block 19]. Use Project Remarks (block 26) to indicate which attachments are included with the 1354 (e.g., Building Information Checklist). If there are more remarks than fit in block 26 on a single page, use additional DD Forms 1354. The preparer should also list his/her name and phone number in the Project Remarks (block 26) space in case there are questions.

Examples: Military Construction, Army (MCA) project to construct a new battalion headquarters and classroom, and associated structures and utilities on Fort Riley, KS.

P&D Costs	$ 1,250,000	
S&A Costs	$ 1,000,000	
Construction Costs	$25,000,000	
Subtotal		$27,250,000
Equipment Costs	$ 2,500,000	
Total Project Cost		$29,750,000

Subtotal matches sum of individual item costs in column 19.
Equipment hand receipted to CWO Anthony Gerard, PBO for 24th INF DIV (M).
Block 7 Drawing Numbers continued: 47-018-1235, 47-018-1236, and 47-018-1237.
Attachments to this 1354: Building Information Checklist prepared by Jawhawk Constructors, Inc.
DD Form 1354 was prepared by Thomas Gerard, 703-683-7100.

Chapter 3 Draft, Interim and Final Versions of the DD Form 1354, Transfer and Acceptance of Military Real Property

For real property transfers, only the final version DD Form 1354 is normally required. The losing organization should prepare the form to be ready for signature at the time of transfer. However, do not hold up preparation of the transfer document for lack of actual costs. In that case, prepare an interim version with estimated costs and prepare a final DD Form 1354 later when final costs associated with the transferred real property are determined.

Because final costs for new construction and revitalization projects are typically not available when the facility is available for use (beneficial occupancy), this handbook has established three versions: a draft, interim, and final; for the DD Form 1354 for a single construction/revitalization project. All three versions must have the same project/job number (block 3) so that all versions of the DD Forms 1354 associated with the single project can be correlated. However, all three versions must have their own unique serial number (block 4) so that the preparing agency can track all versions of the DD Form 1354. This chapter explains the usage for each version. To help the accepting official quickly identify the version of the DD Form 1354, there is a subpart C (checkbox for Draft/Interim/Final) of Block 9 (Transaction Details) for the preparer to identify the version type.

There should be only one draft and only one final version of a DD Form 1354 for a single construction/revitalization project. If there are updates to the draft version, you simply have an adjusted draft version with a later date prepared (block 2) and the same serial number (block 4). However, you can have multiple valid interim DD Forms 1354 for a phased turnover of facilities, each with its own serial number (block 4).

Draft Version

The purpose of the draft 1354 is to establish in writing the level of detail and the different components of a project early in the project lifecycle. Such usage helps to ensure a timely and accurate delivery of both the final project and final documentation. Careful review of the draft 1354 improves the subsequent versions of the DD Form 1354 and ensures a correct final version.

The Project Delivery Team, consisting of persons from the construction agent and customer organizations, prepares a draft DD Form 1354 for client review prior to the final design submittal, so that all of the client comments are addressed in the final project design. Some installations may take a more proactive approach and actually list the items that should appear on the draft 1354 and allow the construction agent project manager to input the area/capacity as the design matures. The draft DD Form 1354 should incorporate information from the DD Form 1391 and the project folder, if either exists. While preparing the 1354, the preparer pays particular attention to the level of detail of the items in column 10, their associated category codes, units of measure, and quantities.

The Design Team provides the draft DD Form 1354 to the construction agent project manager and construction team members administering the contract at least 60 days prior to construction contract award, in order to allow all parties to review the draft version prior to award.

The draft 1354 captures all the expected project costs, including costs for P&D and S&A, and estimated construction contract costs. These costs, plus any others (e.g., contingency), become the construction working estimate (CWE) at award. Post-award project management costs are included in S&A. For design/build projects, the P&D costs should include those contract management costs required for the preparation of the request for proposal (RFP), solicitation, negotiation, and any other engineering and project management costs through award of the design/build project, separate from the CWE. The draft DD Form 1354 should not be used as a voucher because the construction costs are only estimates with no acceptable accounting basis.

Interim Version

The purpose of the interim DD Form 1354 is to provide in writing to the accepting RPAO, a transfer and acceptance document with auditable costs on the day of facility transfer. The interim DD Form 1354 is prepared after substantial completion of construction, in preparation for the facility transfer on the Date Available For Use and before, or coincident with, beneficial occupancy.

The requirement is to have a complete interim DD Form 1354 signed by the transferring and accepting officials on the Date Available for Use or the Beneficial Occupancy Date (BOD), whichever comes first. The interim form includes actual planning and design (P&D) costs, actual project management costs, actual S&A costs, and actual construction contract costs to date. The actual construction costs are what has been obligated and expended to date and therefore are not estimates. The interim 1354 should also have the Construction Deficiencies, on the back of the form in block 25, filled out based on the acceptance inspection with the construction contractor. The CIP Account is credited in the construction agent's system and PP&E is entered into the installation's real property system upon RPAO acceptance of the interim 1354.

The construction agent project manager prepares the interim form and sends it to the accepting agency for review at least 21 calendar days prior to the anticipated transfer. The construction agent project manager should follow up with the accepting agency to ensure that the DD Form 1354 is complete and acceptable prior to the facility turnover day. The construction agent project manager determines the Date Available For Use as the day the facility is physically complete except for correction of deficiencies documented in Construction Deficiencies (block 25) of the 1354. The construction agent project manager should deliver operations and maintenance manuals and as-built drawings to the accepting agency at facility turnover.

The installation RPAO, or delegated representative, accepts the facility(ies) at turnover by signing and dating the interim DD Form 1354 in block 23 and adding any construction deficiencies not previously identified as Construction Deficiencies (block 25). The accepting official hands over a copy of the signed interim 1354 to the construction agent

project manager at the conclusion of the turnover. The accepting agency shall not occupy the facility before the interim DD Form 1354 is signed and returned to the construction agent project manager. If the accepting official or representative cannot immediately accept the 1354, he/she must notify the construction agent project manager immediately and provide the reason he/she cannot accept the military property described on the DD Form 1354. This failure to accept accountability for the facilities documented on the DD Form 1354 precludes any user occupancy of those facilities, and should be fully coordinated before the RPAO acceptance inspection.

A large construction project may contain multiple facilities, each with its own date of substantial physical completion and turnover, or beneficial occupancy for only a portion of a single large facility (i.e., Partial BOD). For these situations, the construction agent project manager prepares one and only one interim DD Form 1354 for each project phase, building, or portion of a building to be turned over and accepted separately. Use the same project/job number for each interim 1354 so that it is possible to correlate all the interim DD Forms 1354 for a single project. Each interim 1354 would have its own unique Serial Number (block 4) and Effective Date of Transaction (block 9D) and would show only costs for the facilities turned over, including their P&D and S&A costs. The construction agent project manager uses the signed interim 1354 to document credit to the CIP account appropriate for the accepted phase. The installation uses the interim DD Forms 1354 to record, in the real property system database, the real property assets as they are turned over and accepted in piecemeal fashion.

Final Version

When the final project costs are not known at the time of transfer, the construction agent project manager provides an interim DD Form 1354 based on the costs obligated and expended to date. When the actual cost of construction is ascertained, the USACE District/NAVFAC Division/DPW/DIS project manager furnishes the final DD Form 1354, which reflects the actual cost of construction, to replace the preliminary cost vouchered by the interim DD Form 1354 previously furnished.

There is only one final project 1354, even where there are multiple interim DD Forms 1354. The purpose of the final DD Form 1354 is to establish in writing the final total cost for each facility in a project. This final accounting can occur only after all costs are finalized. Prior to determining the final costs, the construction agent project manager, in conjunction with the project delivery team, corrects the deficiencies noted on the punch list, ensures warranties are in place, processes claims, resolves any labor or legal issues, and ensures final payments to the contractors. The importance of the final 1354 is that it documents the final facility cost, which may be different from that listed on the interim 1354, and such difference would cause the RP Specialist to make a correction to the real property database facility cost.

The construction agent project manager ensures that all financial accounts are balanced and closed and then prepares the final DD Form 1354 for the project. The final project cost contains the final/actual P&D, S&A, and construction costs. The construction agent project manager updates the costs from the interim DD Form 1354 with the final actual total costs and provides a signed (block 22) final 1354 to the RPAO of the accepting

organization. The RPAO signs the final 1354 in block 23. The accepting official's signature on the final 1354 indicates that he/she accepts the final costs and provides feedback to the preparer that the final 1354 has been received. The RPAO gives the final DD Form 1354 to the RP Specialist to establish as a voucher and ensures that the RP Specialist inputs the final facility cost into the real property database. Upon receipt of the final 1354, the installation RP Specialist will adjust the costs in the real property database which were based on the interim and voucher the final DD Form 1354. The construction agent project manager uses the signed final 1354 to document a credit adjustment based on the final cost differentials from the CIP account, assuming a previous CIP credit based on the interim 1354 costs occurred earlier.

The interim and final DD Forms 1354 refer to the same Transaction Type (i.e., new construction or capital improvement as shown in block 9A), will have the same Effective Date (block 9D), and the same Project/Job Number (block 3). The RP Specialist can identify all 1354 versions pertaining to the same capitalization event by the Project/Job Number. The interim and final versions will have different Dates Form Prepared (block 2) and different Serial Numbers (block 4), and possibly different item costs (column 19).

The Effective Date (block 9D) on the final DD Form 1354 for a project consisting of multiple individual facility turnovers on different dates must include the different effective date for each facility. These different dates may be shown in Project Remarks (block 26) with a "See Remarks" in block 9D. The Effective Date for a single facility with a phased turnover is the date the construction agent project manager declares the entire facility is available for use.

Chapter 4 How to Use DD Form 1354 Data

This chapter explains what actions the RP Specialist and the construction agent project manager must perform after the real property is accepted and the DD Form 1354 is signed by both parties. This chapter explains how the RP Specialist files the DD Form 1354 as a voucher and enters information into the real property database. This chapter also explains how the construction agent project manager uses the 1354 to maintain the CIP account, to close out new construction documentation, and to provide documentation for real estate transfers. The Army's Management Controls typically allow the RP Specialist ten days to enter the information from DD Forms 1354 into the real property database. The other Services establish their own management controls and timelines to ensure that DoD PP&E does not double-, or under-count real property assets.

Vouchers and Journal Entries

A voucher is required to document the cost of each new facility or capital improvement. Due to differences among the Military Services' real property systems, there is a separate paragraph describing how each Service complies with the CFOA regarding vouchers. For projects funded by Defense Agencies, the RP Specialist shall provide a copy of all vouchers to the agency funding the project for their records and capital depreciation process.

Army IFS uses the DD Form 1354 as a Voucher

After the RPAO accepts a facility on a DD Form 1354, and provides a signed copy to the construction agent project manager, he/she passes the original DD Form 1354 to the RP Specialist to use as the voucher for the following: to document additions and deletions of real property, to transfer and accept new construction changes to existing facilities, and to adjust real property records resulting from physical inventories. Regardless of who fills out the DD Form 1354, the RP Specialist receives the 1354, assigns the next sequential voucher number to the interim/final DD Form 1354 in block 24 (Property Voucher Number), and records the property voucher number in the Voucher Register. The RP Specialist inputs the data from the 1354 into the IFS real property database. He/she then files the original 1354 in the voucher file and files a copy in Building Information File. If more than one facility number is listed on the DD Form 1354, the RP Specialist makes copies of the original 1354 with the same voucher number and files a copy of the 1354 in each affected facility Building Information File. As additional DD Forms 1354 are accepted for this same project (i.e., partial BOD or final 1354), the RP Specialist enters a unique property voucher number for each version (interim and final) of the 1354 and makes the new entry in the voucher register. The RP Specialist also files these subsequent DD Forms 1354 in the voucher file and Building Information File(s).

Navy FIS automatically creates a Journal Entry

The Navy Facilities Information System (FIS) tracks all Navy- and Marine Corps-managed MILCON projects. The Navy FIS provides information to the Navy's single accounting system (STARSFL). The project manager at a NAVFAC District goes into

FIS, creates an electronic Accounting Adjustment Standard Form 1080 as a journal entry to transfer funds from the NAVFAC CIP. The FIS has the facility details similar to a property record card and makes up the Navy Facilities Asset Database, which is the official Navy RPI. For a MILCON project, the facility is described in FIS. When the project is completed, the project manager creates a journal entry to both transfer funds from CIP and to serve as a voucher. The detailed property record card information is already in FIS from the MILCON phase.

Air Force ACES creates Journal Entries for MILCON projects

The Air Force Automated Civil Engineer System (ACES) assigns journal entries instead of voucher numbers. All DD Forms 1354 referring to the same capitalization event, i.e., Partial BOD and final 1354, will carry the same parent journal number within ACES. Using ACES at base level, cost account assignments and transfers between GLACs are accomplished programmatically. Therefore the RP Specialist will pick up a facility on the Real Property Report upon beneficial occupancy (BOD) based on a total cost estimate provided to real estate by the construction project engineer. The RP Specialist would modify facility costs upon receipt of an accepted DD Form 1354. When another 1354 is received later, the RP Specialist would modify/update the facility cost through ACES based on the latest DD Form 1354 received.

Enter Information from DD Form 1354 into the Real Property Database

The RP Specialist enters newly constructed real property as reportable facilities upon acceptance of the interim DD Form 1354. Key information needed to create the facility record is included on the 1354 and attachments ;see Appendix C, Building Information Checklist. Coordination with the construction agent project manager early on will ensure use of the proper facility numbers and category codes. The preparer should ensure that these facility numbers, as well as the fund sources, are properly recorded on the 1354, because both data are mandatory items for capitalization projects. The RP Specialist enters the new facility information, capitalization data, voucher number, and transaction effective date for each facility into IFS/ACES in the appropriate fields/screens or into another real property database system.

Facility Record

The DD Form 1354 contains the essential information to create a new facility record in IFS, FIS, ACES or other real property inventory system. The facility and use records should match the category codes and quantities as shown on the DD Form 1354. Some of the detailed data for a new facility record comes from the attachments to the 1354; see Chapter 6. The RP Specialist shall use the Effective Date (block 9D) to determine the Year Built for new construction and Year Acquired by DoD for transfers into DoD (Military Service). Do not use the Effective Date on the 1354 to determine Year Acquired for transfers between Military Services. When a physical inventory determines a different quantity, the RPAO creates an adjustment 1354 to document such changes. The RP Specialist notes the date of the physical inventory and updates the real property database.

Capital Improvements

The DPW appoints a project engineer to determine whether the project is a capital improvement or a repair project. One project can be part capital improvement and part repair. In this case the project engineer would determine which part. See the definition of capital improvement in the glossary of this handbook and examples in the FMR. The RP Specialist is NOT responsible for making the determination. However, he/she must record any capital improvement into IFS, ACES, or other real property database system, if the capital improvement exceeds the reporting threshold. The Date of Capitalization is the Effective Date of Transaction in block 9D. The description of the capitalization should be in Project Remarks, block 26. For projects funded by Defense Agencies, the funding agency has final approval of the capitalization decision.

Transfer Equipment Information to the Property Book Officer

The DD Form 1354 attaches two lists of equipment: installed building equipment (IBE), which is real property, and equipment-in-place (EIP), which is personal property. The preparer must not combine both types of equipment in a single list. Because the difference between IBE and EIP requires engineering judgment, the construction agent project manager must clearly identify the items of equipment as either IBE or EIP. Definitions and examples of each follow.

Installed Building Equipment

IBE is an item of equipment that is affixed and built into the facility as an integral part of that facility. To qualify as IBE the equipment must be necessary to make the facility complete, and if removed, would destroy or severely reduce the usefulness of the facility. IBE costs are included as a funded construction cost and should have itemized costs listed separately on an attachment to the DD Form 1354. Account for IBE as real property with an equipment asset record, but do not create separate facility records in the real property database for IBE. Examples of IBE and their Army category codes are:

- Heat plant (821XX)
- Refrigeration source (826XX)
- Fire alarm system (88010)
- Automatic water sprinkler system (88110)
- Special fire extinguishing system (88120)
- Standpipe system (88130)

Equipment-in-Place

EIP is a special category of personal property (not real property). EIP consists of capital equipment and other nonexpendable equipment of a movable nature that has been fixed in place or attached to real property, but not as an integral part of the facility, and therefore may be severed or removed from a facility without severely damaging, destroying or reducing the usefulness of the facility. EIP does not include installed building equipment, is personal property, and is accounted for on property book records (not real property

records). Do not account for EIP as real property and do not create separate facility records in the real property database even though some EIP items have real property category codes. EIP costs may be included as a funded construction cost and if so, must be attached as a separate EIP listing with costs itemized separately and attached to the DD Form 1354. For real property capitalization purposes, the cost of EIP is subtracted from total project/construction costs. Transfer accountability for EIP personal property by providing the EIP documentation to the appropriate Property Book Officer, who will enter the newly acquired EIP into the appropriate property book and include the EIP in the personal property hand receipt of the facility occupant using the Service hand receipt form, i.e., DA Form 3161. Examples of EIP personal property fixed and their Army category codes are:

- Conveyor system
- Closed circuit television system
- Watch reporting system (88020
- Air raid alarm system (88030)
- Intrusion alarm system (88040)
- Lightning protection system (89280)

Use the DD Form 1354 Cost Data to Maintain the Construction-in-Progress Account

CIP is a material component of the DoD property, plant and equipment (PP&E) line item. Expenses incurred during construction of PP&E assets should be recorded as CIP until the assets are placed in service. When an asset is completed or placed in service, the cost of the capitalized property is credited to the CIP account and this cost is transferred to the real property account as the acquisition cost of the property. The recording of costs in the CIP Account brings construction costs under financial control during the construction period (which may take years) and segregates capital costs from expenses.

FMR Volume 4, Chapter 6 provides detailed guidance on accounting for PP&E, and FMR Volume 3, Chapter 17, which covers accounting requirements for military construction projects, directs the use of DD Form 1354 (para 170502) for transferring projects. Appendix B provides instructions for each block of the DD Form 1354.

All construction costs accumulated during the life of any USACE or NAVFAC managed project are captured in the CIP account as a Debit Balance. For projects, which proceed to normal construction, this includes all costs for planning and design (P&D) including project management costs (pre-award), construction contract supervision and administration (S&A) including post-award project management costs, construction costs (including site preparation, which also includes demolition of footprint facilities), and project-funded equipment costs. Once the project is physically complete/available for use or beneficial occupancy obtained, the construction agent project manager uses the expenses in the CIP account for a given project to establish the DD Form 1354 capitalization costs. He/she also uses the interim 1354 total cost to document credit to the

CIP account and to establish the asset value to be added to the installation's real property account.

Installation DPW/DIS Construction Office project managers are likewise responsible for accounting and reporting work-in-progress expenses on non-MILCON projects that are capitalized. These expenses are accounted for as work-in-progress general ledger accounts at the installation similar to the CIP process. These expenses must be promptly credited once the projects are substantially completed, available for use or beneficial occupancy, and turned over to the installation for use and to the RPAO for recording in the real property database.

The construction agent project manager should use the interim DD Form 1354 costs to credit those costs in CIP (i.e., as a credit to the CIP account) within 10 days after RPAO acceptance. Any USACE/NAVFAC delay in closing out the CIP account after customer acceptance on a DD Form 1354 may cause double accounting in the general ledger PP&E because the gaining RPAO should enter this same value into the real property database within 10 days of facility acceptance.

The construction agent project manager is also responsible for the closeout of the capitalized property costs from the CIP account. The construction agent project manager closes out the project in the CIP account based on the costs in the final DD Form 1354 after all contractor costs, litigation, and warranty work have been completed. However it is not necessary to complete all warranty work before doing a final 1354. USACE goals for financial closeout and final DD Form 1354 transfer are 180 days for CONUS projects and 360 days for OCONUS projects from receipt of the RPAO acceptance (evidenced by his/her signature in block 23) to transfer the capitalized project costs out of the CIP account. NAVFAC has corresponding timeframes.

For projects turned over in phases, the construction agent project manager should credit the CIP account based on the acceptance of each phase, as documented in the interim DD Form 1354 for the phase. The final project 1354 can adjust costs, including construction, P&D, S&A or equipment, for any of the phases turned over previously.

To credit the CIP, the construction agent project manager forwards a copy of the signed and accepted interim or final DD Form 1354 to his/her Finance and Accounting Office for processing the credit to the CIP account. Similarly, the installation DPW/DIS project manager forwards a copy of the signed and accepted interim or final DD Form 1354 to the Installation Finance and Accounting Office to document credit for the installation work-in-progress account.

In accordance with this guidance, for work managed by USACE, the Corps of Engineers Financial Management System (CEFMS) keeps an accounting on a general ledger basis for CIP costs separately from other costs that are "Construction Expensed," i.e., not considered investments to be capitalized, but rather expenses, e.g., repairs. Both USACE/NAVFAC and the installations comply with CIP accounting rules for capturing costs incurred for construction or acquisition of a capital asset such as real property. DoD requires that the total costs of a construction project be accounted for, and recorded in the accountable installation's real property records, at the completion of a project. The DD Form 1354 is used to transfer real property accountability and the cost associated with

that transfer and acceptance, indicated by the signatures in blocks 22 and 23, with an effective date as shown in block 9D, Effective Date.

Closeout New Construction Documentation

The construction agent project manager is responsible for the financial closeout of all the projects he/she manages. Closeout occurs after design and construction contracts are closed. Closeout of the project, financial, and cost accounts by the construction agent project manager allows return of excess funds from USACE/NAVFAC (or other construction agents) to the funding agencies. The construction agent project manager also ensures that project capitalization costs, accounted for by USACE/NAVFAC (or other construction agents) in their accounting system, are properly identified by individual facility in order that they may be properly recorded in the installation real property database.

In summary, the construction agent project manager should ensure that:

- The Project Cost Estimate (PCE) is current, that the PCE corresponds with costs in the financial accounting system of the specific construction agent, such as the Corps of Engineers Financial Management System (CEFMS) for USACE or STARSFL for NAVFAC, and that any construction expenses that need to be excluded/expensed are deducted from the CIP or work-in-progress account.
- For Military Construction projects managed by USACE/NAVFAC, all P&D, S&A and construction costs are included in the CIP account, with the exception of Lost Design or Breakage.
- Any costs for repairs on construction projects, which the installation project manager determines should not be capitalized, are not added to the project DD Form 1354, but are expensed. Therefore, only the PCE costs documented in the CIP or work-in-progress account may be shown on the interim DD Form 1354.
- Total project cost equals the sum of P&D, S&A, construction costs, EIP, minus lost design or breakage and expensed items. Show the total project cost and its four components separately in the Project Remarks (block 26). Site preparation costs, including footprint demolition costs, are included in the construction costs and capitalized as part of the total facility costs. Total project cost must equal the sum of all costs in column 19 on the final DD Form 1354, or the discrepancy must be explained in Project Remarks (block 26).
- The PCE costs documented in the CIP or work-in-progress account are equal to or less than the project funds received. Funds may be received on a Funding Authorization Document (FAD) or Military Interdepartmental Purchase Request (MIPR), or both. For example, the construction agent project manager may know that some of the funds received will be returned and, therefore, the project cost estimate will be less than the funds received at that time. However, when additional funds are required, and not yet received, the additional required value will not be included in the project cost estimate until the funds are actually

received. The final DD Form 1354, at project closeout, would include only those funds actually received, obligated and expended against that specific project.

- At financial closeout, the final DD Form 1354 reflects the final project capitalized costs. Return any excess MILCON-funded project funds to USACE/NAVFAC. Reconcile the project cost, CIP transfers, and the costs shown on the final 1354.
- If there are real estate transfers related to the construction project, then include the cost of the transaction as well as the cost of the real estate on the DD Form 1354. Real estate transfers may, or may not, be related to the construction project, depending on the nature of the project and the appropriations.

Document Real Estate Transfers and Enter into the Real Property Database

Real Estate transfers typically involve the USACE or NAVFAC real estate specialist and involve one of the following actions: reassignment of accountability, transfer of accountability, and transfer of purchased/leased military real property.

Reassignment of Accountability

A reassignment of accountability is a change to the administrative or command jurisdiction over a given tract of real property within a single Service. After receiving approval from the Service Secretary for the proposed reassignment, the losing installation RPAO prepares a DD Form 1354 for the real property and delivers the signed (block 22) DD Form 1354, together with the real property records, to the installation RPAO designated to accept the reassigned real property. The preparer annotates in the "Project Remarks" section (block 26) of the 1354 the type of real estate transaction, e.g., transfer of Vancouver Barracks from Fort Lewis to the Army's 70th Reserve Support Command.

The gaining installation RPAO accepts and signs (block 23) the 1354 and assigns a voucher number to be entered into block 24 of the 1354. The gaining installation RP Specialist creates new facility records and enters the voucher number and transaction date into IFS or other real property database system. When reassignment of real property has been completed, the gaining installation RPAO verifies the Transaction Effective Date (block 9D) and provides a copy of the signed and dated (blocks 22 and 23) DD Form 1354 to higher headquarters and the supporting USACE District/NAVFAC Division.

Transfer of Accountability

A transfer of accountability is a change to the administrative or command jurisdiction over a given tract of real property from one military Service to another within DoD (i.e., from Navy to Air Force), or from one Federal agency to another (i.e., from BLM to DoD). Upon receipt of approval from the Service Secretary (both Secretaries when transfer is between Military Services), document the property to be transferred using a DD Form 1354. The losing Service installation prepares the form as prescribed in Chapter Two with the preparer using his/her Service's category codes. The preparer identifies the transferring parties in the "Project Remarks" section (block 26) of the DD Form 1354. Also, include the authority for the transfer in the Project Remarks. When the transfer has been completed, the gaining installation RPAO verifies the Effective Date of the transfer in block 9D and provides a copy of the signed and dated (blocks 22 and 23) DD Form

1354 to the losing installation or Service, higher headquarters of the gaining installation, and the supporting USACE District/NAVFAC Division. The gaining/losing installation RPAO posts additions/deletions to the real property records from his/her copy of the 1354.

Note. Although not strictly a transfer of accountability, for sales and transfers outside the Federal government, the losing DoD installation would prepare a 1354 as prescribed in this paragraph.

Transfer of Administrative Accountability

A transfer of administrative accountability is a change to the real property accountability over a given tract of real property from one military Service to another within DoD (i.e., from Navy to Air Force), or from one Federal agency to another (i.e., from BLM to DoD), without the gaining Service accepting any other responsibility or liability for the property. The transferring Service or agency must document the property to be transferred using a DD Form 1354 and complete the form as prescribed in Chapter Two, using the losing Service's category codes. In addition, there are certain criteria that apply only to a transfer of administrative accountability. Compliance with these criteria must be documented and will be attached to the DD Form 1354 documenting the real property to be transferred for administrative accountability. The following criteria are based on the draft Air Force policy on *Accountability for Real Property*:

--The transferring Service/agency provides documentation that the environmental impact analysis process required by the National Environmental Protection Act and Council of Environmental Quality directives has been accomplished for the intended use of the property.

--The transferring Service/agency provides a base, site, or installation environmental baseline survey (EBS or BES) that documents the condition of the property at beneficial occupancy or transfer, with an acknowledgement that the gaining Service could not be a Potential Responsible Party (as defined by CERCLA) in the activity to be accomplished on the property.

--The transferring Service/agency provides data for the real property inventory that accurately reflects the category codes, units of measure, accumulated cost to government, and a statement that the gaining Service has no responsibility for sustainment, replacement, or recapitalization of the asset.

--The transferring Service/agency offers an office of contact for further information and agrees to reconcile its property records with the gaining Service when requested in order to ensure the accuracy of the administrative accountability and conformance with the Chief Financial Officers' Act of 1990.

Transfer of Purchased and Granted Real Property

For real property acquired by purchase, grant or condemnation proceedings, the supporting USACE District/NAVFAC Division will transfer the property by deed, grant real estate instrument, and/or a DD Form 1354. The 1354 will include a list of facilities, reproducible prints of project maps, and certified copies of pertinent real estate documents, such as deeds of acquisition, leases or judgments from condemnation

proceedings. If the USACE District/NAVFAC Division has performed initial alterations or improvements to the land, the construction agent (or real estate specialist) project manager should enter on the 1354 the appropriate "Items" and required information for each initial alteration or improvement as a separate Item Number in blocks 10 through 21.

The USACE District/NAVFAC Division responsible for execution of the real property grant will conduct a complete inventory of the granted real property (consistent with the terms of the grant), prepare the necessary real property records annotated "Leased/Permitted/Licensed Property Records," and furnish the originals of such records (to include the DD Form 1354) to the gaining installation RPAO. The Engineer District/Division/Activity will also provide copies of the executed grant authorizing the use and occupancy of the real property to the higher headquarters of the accepting installation and coordinate the transfer of accountability between the appropriate RPAOs. The Engineer District/Division/Activity will also administer grants of real property acquired by the Military Service from private individuals, corporations, or local governments. The Engineer District/Division/Activity will retain copies of any records required for use in making settlement with the grantor upon expiration of the grant.

At the time of transfer, the gaining installation RPAO will make a physical inventory, including a component condition inspection of the real property being accepted. The results of this physical inventory will be compared with the property as listed on the DD Form 1354 and the grant authorizing the use and occupancy of the real property. The gaining installation RPAO should sign the DD Form 1354 annotating any discrepancies in block 25. The transfer of accountability statements will be worded to conform to the statements in AR 735-5, Policies and Procedures for Property Accountability, or other Services equivalent accountability regulation, except that the term "real property record" will be substituted for "stock record account." The statement of transfer will include the Effective Date (block 9D) of transfer and reference in Project Remarks (block 26) to the grant identification (i.e., USACE Savannah District real estate license DACA 31-V-10764 to the State of Georgia dated 30 Aug 2002), and be supported by a detailed listing of the real property records transferred. The completed statements of transfer will be distributed in accordance with AR 735-5 or corresponding Service regulation. Upon expiration, termination or revocation of the grant, the Engineer District/Division/Activity will furnish the installation RPAO with copies of the notice of expiration or termination of the grant; and, if there is a continuing need to use and occupy the property for mission purposes, reissue the grant in accordance with Service procedures for ingrants or outgrants as appropriate. The RP Specialist will enter the data from the DD For 1354 and real estate instrument (i.e., deed, lease, license, permit, or easement) into the real property database.

Chapter 5 Project Cost versus Facilities Costs

This chapter provides guidance to the construction agent project manager on how to determine the capitalization costs which are vouchered against the facilities described on the DD Form 1354. Facility acquisition and capital improvement data in the real property accounting system must be substantiated by the costs on DD Forms 1354, and the costs on the 1354 must be reconcilable to the overall project costs. This chapter provides a methodology to ensure that DoD uses a consistent method of calculating these costs and to ensure correlation between costs recorded in the real property database for real property and 1354-documented project costs. The preparer of the DD Form 1354 must allocate or prorate P&D and S&A costs among the facilities in the project. Only facility costs appear as items in column 10 of the 1354. Indicate P&D, S&A, construction, equipment-in-place (EIP) costs, and total project costs in Project Remarks (block 26). The total project cost must equal the sum of the costs of individual facilities plus EIP costs. The preparer must explain any difference.

Depending on the method of item pricing on the construction contract, some facility costs may translate directly from the contractor's facility cost. Other costs, such as total project P&D and S&A may have to be prorated or allocated among several facilities.

The following step-by-step procedure is recommended:

1. Identify all the facilities on the DD Form 1354 and their associated construction costs, i.e., within the 5-foot line of the facility.
2. Identify any site preparation costs including footprint demolition, equipment (if project funded), or other costs that roll up with the costs directly attributable to those facilities.
3. Identify costs associated with those facilities that should be rolled up to existing consolidated facility records, such as utility lines or pavements.
4. Allocate the total planning and design (P&D) and supervision and administration (S&A) costs (including project management costs) among the facilities listed on the 1354. If P&D and S&A costs are known for the entire project but are not known for individual facilities, prorate total P&D and S&A costs among the different facilities. Prorate based on either individual area of the facility or individual facility construction working estimates. Annotate in Project Remarks (block 26) which basis you used to prorate or allocate P&D and S&A costs to individual facilities.
5. Compute the individual facility and incremental consolidated facility costs by summing the actual and allocated costs computed in steps one through four.
6. Check to ensure the sum of the individual facility costs (column 19) equals the total project cost. List in Project Remarks (Block 26) the total project cost and the individual total project cost contributions of construction, P&D, S&A, EIP, and any non-allowable costs. If the sum of the individual facilities on the

1354 does not equal the project total, explain in the Project Remarks (Block 26).

Chapter 6 Acceptance Standards for Interim and Final DD Forms 1354, Transfer and Acceptance of Military Real Property

The following standards are provided to help the accepting official determine whether to accept or reject the DD Form 1354. Standards are applicable only to the interim and final versions, not the draft version of the 1354. Consider the draft 1354 to be a working document that can be improved by staff coordination early on in the project. Draft DD Forms 1354 are not signed or "Accepted By" nor are they vouchered.

For a facility that is substantially completed and declared available for use/beneficial occupancy by the construction agent project manager, the listing of construction deficiencies in block 25 is not an acceptable reason by itself to not accept the facility. Consider resolution of the punch list to be a separate action from accepting the facility and signing the DD Form 1354.

One standard for acceptance is that the required attachments are present with the final 1354. Not all items on the following list must be attached to every 1354 for it to be acceptable. Conversely, this list may not include everything required for a specific project. The Project Delivery Team should determine early in the design process which attachment items are required and which are not required for the specific project. Since many of the attachments go directly to the building occupant, the customer's needs are paramount in this determination.

Since one goal is to have an interim 1354 available and signed (accepted) at facility transfer, the construction agent project manager, RPAO and customer must decide ahead of time which of the required attachments must absolutely be delivered with the interim 1354 and when the customer can expect the other items on the agreed list of attachments.

Attachments to DD Form 1354

1. Pictures before and after construction
2. Request for Demolition, e.g., DA Form 337, if demolition is part of the project
3. As-built drawings
4. Schematics of systems
5. Information formerly contained in the DA Form 2877 Building Record and codified as the Building Information Checklist; see Appendix C.
6. Reproducible prints of project contract drawings (format to be determined at the pre-design meeting)
7. List of Installed Building Equipment (IBE) with models and serial numbers and warranty information
8. List of Equipment in Place (EIP) with models and serial numbers and warranty information provided

9. Equipment operations and maintenance (O&M) manuals and systems operating manuals.
10. Test results of mechanical and electrical systems.
11. Systems warranty information
12. Certified copies of pertinent real estate documents, such as deeds of acquisition, leases or judgments from condemnation proceedings.
13. Contract information (e.g., submittals and specifications)
14. Backup cost basis documentation such as records of payment – see note at end of this chapter
15. Wiring diagrams.
16. Piping layouts.
17. Color codes for wiring and piping.
18. Valve charts and tags.
19. Spare parts catalogs.
20. List of special handles and tools required
21. Properly tagged keys

Completeness Standards

Use the following standards as a guide to determine whether the DD Form 1354 is complete and should be signed, or possesses a specific deficiency that would cause rejection. These are guidelines for both the preparer as a self-check and the accepting official. The exchange of a 1354 prior to date of transfer should allow sufficient time for a review and feedback on any possible shortcomings to allow the preparer an opportunity to "fix" the 1354 so it can be signed by both parties during the actual transfer. The completeness standards are:

1. Every block is filled out, checked, or N/A. The only blanks allowed are in Item Remarks (column 21).
2. Blocks 1 and 5 (FROM and TO) contain the appropriate installations or organizations and zip codes for the transferring and accepting RPAOs.
3. Block 6 contains the Installation Number of the actual facility location.
4. Block 9, Transaction Details, exactly one checkbox is checked for subparts 9A, 9B, and 9C. There can be no multiple checkboxes.
5. If "Other" is checked in either 9A or 9B there is an explanation in Project Remarks (block 26).
6. Effective Date must be shown in subpart 9D.

7. All facilities included in this project and the different category codes within each facility (over 1,000 GSF) are separately identified with one Item Number per facility in column 10.
8. No quantities of a single category code physically located in different buildings are combined into a single Item Number in column 10.
9. Each column 10 Item Number has an appropriate entry in columns 11 through 20 . N/A is acceptable for either area or other measurement when both are not prescribed and for cost and fund source of multipurpose buildings if they are already listed for that facility.
10. Columns 16 and 18 have quantities for both area and capacity/other measurements for categories when both units of measure are prescribed (e.g., in DA PAM 415-28).
11. Column 19 has costs assigned to each facility Item Number.
12. Column 20 has an appropriate Fund Source corresponding to every cost in column 19.
13. Column 21, Item Remarks, pertain specifically to the Item Number. Project Remarks are placed on the backside of the form in block 26.
14. There is NO separate Item Number (block 10) or line for planning and design (P&D) or for construction supervision and administration (S&A).
15. Interim and final DD Forms 1354 have signatures, titles and dates in both blocks 22 and 23. Interim and final versions have the same Project/Job Number (block 3), when applicable.
16. Block 25 contains all major construction deficiencies identified during the turnover inspection.
17. Block 26 contains project remarks appropriate to the entire project or transaction described in this DD Form 1354. Contains a description of the capitalization improvement when applicable. Shows the total project cost and individual components (S&A, P&D, construction and equipment) of total project cost. These amounts should match the column 19 totals on the front of the 1354 or explain any differences.
18. All previously agreed required attachments are provided. See typical attachments listed in this chapter.

Accuracy Standards

1. Quantities listed are within 2% of actuals.
2. Category codes on 1354 match category codes as listed in Service database, e.g., DA PAM 415-28 for Army.
3. Units of measure match category codes units listed in Service database, e.g., DA PAM 415-28.

4. Costs are broken out separately for each facility.
5. If checkbox "Final" in block 9C is checked, then all costs shown are final costs.

Timeliness Standards

1. For new construction, the preparer provides a draft DD Form 1354 along with the plans and specifications for the design review.
2. The preparer provides a review copy of the 1354 prior to the date when the gaining RPAO must sign to accept the facilities.
3. Preparer signs block 22 within 10 days of Effective Date (block 8) and before occupancy.
4. The receiving RPAO signs block 23 prior to occupying the facility.
5. Construction agent credits CIP account within 10 days of RPAO accepting the facility as indicated by the date in block 23.
6. RP Specialist records property in real property database within 10 days of RPAO accepting the facility as indicated by the date in block 23.

NOTE. The above standards apply regardless of construction agent organization and whether that agent is from an external organization or an internal one, i.e., DPW.

The following standard only applies to in-house projects managed by DPW personnel. The audit community has determined that backup documentation to establish cost data for projects executed by the installation DPW is essential since the in-house procedures for tracking work-in-progress may not be accredited for reporting project costs. Also when the DPW controls both the construction project manager and the RPAO, the following documentation may be required to substantiate DD Form 1354 costs for in-house projects: contracts, in-progress payments, in-house labor rates and in-house payments.

GLOSSARY

AAFES- Army and Air Force Exchange Service – Inter-service agency responsible for Exchange stores and related facilities. AAFES is responsible for construction and operations and maintenance of their facilities in CONUS.

ACES – Automated Civil Engineer System – Real Property – Air Force Base Civil Engineer management system. Repository for Air Force Real Property Data

Accountability – the responsibility of the single agency designated to hold property, keep records and report as the Executive Agent of the United States of America. The United States of America, not the individual Service, owns all government-owned property; however in this handbook accountability and ownership are generally considered to be interchangeable. Administrative accountability refers to the case where the accountable Service does not use the real property for which it is accountable, i.e., another Service or agency controls the use of the property.

AFH – Army Family Housing – A separate appropriation used to construct, operate and maintain Army Family Housing and supporting facilities. The construction agency (usually USACE or NAVFAC) is responsible for generating the DD Form 1354 for new housing construction or major renovation, usually paid for by Family Housing-Construction (FH-C) funds, which are appropriated on a project-by-project basis by Congress in the same manner as Military Construction (MILCON) funds. Renovations or capital improvements using Family Housing -Operations (FH-O) funds are usually executed by the DPW, and the DPW will prepare the DD Form 1354.

Approval Authority – The individual authorized to sign the DD Form 1354. For new construction or alteration executed with MILCON this is a senior representative of the construction agent such as the District Engineer. Approval authority for conversion, diversion, alteration, minor construction and inventory adjustments is the installation/garrison commander and often this authority has been delegated to DPW/DIS.

AR – Army Regulation

BOD - Beneficial Occupancy Date – the date a facility is first occupied. BOD normally refers to occupancy of a building before it is substantially complete and therefore is not typically the date the occupant accepts a facility from the DPW/Engineer District.

Capital Improvement - Initial acquisition of or improvements to real property that increase the real property asset's square footage, size, capacity, efficiency, or useful life; i.e., if a replacement was undertaken to improve or expand the efficiency of an asset that was in good working order then the replacement is a capital improvement. When a facility (or facility component) is replaced that has failed, is in the incipient stages of failing, or is no longer performing the functions for which it was designated, such replacement is NOT a capital improvement and do not record that project (or the repair costs portion of that project) in the real property inventory. References: DODI 4165.14 para E4.2 and FMR 7000.14-R, Volume 4, para 060205.

CFOA – Chief Financial Officers Act – Congressional law requiring government agencies to produce auditable financial statements and timely, accurate financial data. This includes accounting for costs spent on construction and capital improvements of government facilities.

CIP-Construction In Progress (Account) –The USACE/NAVFAC account which accumulates emplaced costs for MILCON (including unspecified minor construction) projects during construction. This account includes the cost of equipment that is installed as an integral part of the real property, as well as the actual cost of direct labor, direct materials, overhead, and contractor costs, incurred in the construction of real property. Contractor costs are valued at requests for progress payments and other invoices. See work in progress.

CWE- Current Working Estimate –The estimated cost of a new construction project. As the design process proceeds the current working estimate will change and only becomes fixed when a construction bid is accepted.

DA PAM – Department of the Army Pamphlet

DeCA- Defense Commissary Agency – the Defense agency responsible for commissary operations. DeCA programs funds for construction and operation of commissary facilities and may maintain facilities through reimbursement to the DPW, at their discretion.

DEL- Director(ate) of Engineers and Logistics (instead of DPW at some locations) – This organization is a consolidation of the Directorate of Public Works and Directorate of Logistics. See DPW.

DIS- Director(ate) of Installation Services (instead of DPW at some locations) – This organization is a consolidation of the Directorate of Public Works and Directorate of Logistics. This occurs primarily at smaller installations and industrial installations where garrisons are small. See DPW.

DoD-Department of Defense

DPW-Director of Public Works – Garrison Staff Director and Directorate responsible for operations and maintenance of facilities on Army installation(s). Has responsibility for real property management and planning, and requesting funds for operations and maintenance including minor construction. Has responsibility for preparing DD Form 1391 for requesting Military Construction. See DEL and DIS.

EIP – Equipment in Place - EIP is a special category of personal property (not real property). EIP consists of capital equipment and other nonexpendable equipment of a movable nature that has been fixed in place or attached to real property, but not as an integral part of the facility, and therefore may be severed or removed from a facility without severely damaging, destroying or reducing the usefulness of the facility. EIP is personal property and does not include installed building equipment. It is accounted for on property book records (not real property records). EIP costs may be included as a funded construction cost.

FAD – Funding Authorization Document – The document that transfers authority to obligate and expend government funds from higher headquarters to a lower level for execution of a mission.

FMR – the DoD Financial Management Regulation 7000.14-R that prescribes accounting rules and use of the DD Form 1354.

IBE – Installed Building Equipment - IBE is an item of equipment that is affixed and built into the facility as an integral part of that facility. To qualify as IBE the equipment must be necessary to make the facility complete, and if removed, would destroy or severely reduce the usefulness of the facility. IBE costs are included as a funded construction cost. Account for IBE as real property with an equipment asset record, but do not create separate facility records in the real property database for IBE.

IFS-Integrated Facilities System (Army) – The Army's standard automated engineering management system for installation operations. Modules include real property, work management, cultural resources, contract management and supply management.

IJO -Individual Job Order – DA Form 4283 – This form is prepared to request and record approval of a repair, maintenance, alteration or minor construction projects within the installation approval limitations. The form is automated as part of IFS.

IMA – Installation Management Agency (Army) – The Installation Management Agency is a Field Operating Agency (FOA) of the Assistant Chief of Staff for Installations Management (ACSIM) at Headquarters Department of the Army. IMA was established to resource and provide oversight to support functions on Army installations/garrisons. The IMA reports to the ACSIM.

MILCON-Military Construction – The appropriation for the construction of new military facilities. It is also the appropriation for certain major renovations of facilities.

MIPR – Military Interdepartmental Purchase Request – DD Form 448 - This form is used to transfer funding from one service, command or agency to another. The transfer may be within a service or between services.

NAVFAC-Naval Facilities Engineering Command – Navy agency responsible for supervising construction and operation and maintenance of facilities and utility services for Navy and Marine Corps installations.

PCE – Project Cost Estimate – The estimated costs for the entire project (up to the limit of funds received), to include planning and design, site preparation, construction and overhead. The PCE may include costs that will not be capitalized such as any work designated as repairs or design breakage. The construction agent project manager uses the PCE to manage the project against funds available.

P&D – Planning & Design– Costs associated with the planning and design of military construction projects. These costs are accounted for separately since Congress funds them as a separate line item for future Military Construction projects. P&D is one of the four cost components (along with S&A, construction, and equipment costs) reflected in Project Remarks (block 26) on the DD Form 1354.

PP&E – Plant, Property & Equipment - The account to which real property construction is debited upon acceptance of real property. Construction costs are credited to the CIP or work-in-progress account and debited to the appropriate PP&E account. The majority of project costs are real property, however some Equipment-in-Place is included in the CIP account and must be transferred to a personal property account of the facility owner.

RFP-Request for Proposal – A formal request from a government Contracting Office for proposals to accomplish a specific statement of work. Qualified contractors then respond by submitting their proposal to the government to accomplish the work. The Contracting Office selects the best value for award.

RPAO-Real Property Accountable Officer – The individual appointed by the garrison commander to account for all real property on an installation.

S&A-Supervision and Administration – Costs incurred by the construction agent for managing a construction or rehabilitation contract. S&A is one of the four cost components (along with P&D, construction, and equipment costs) reflected in total project cost as shown in Project Remarks (block 26) on the DD FORM 1354.

USACE-US Army Corps of Engineers- Construction Agent for the US Army, US Air Force, DoD and other Federal government agencies.

Work-in-Progress–The accumulated costs for emplaced elements of construction or renovation projects funded by other than MILCON during construction; also used to accumulate costs of capital improvements for additions, alterations, improvements, and rehabilitations. It includes direct labor, direct materials, contractor costs, and other agency costs, along with an allocation for indirect costs and G&A expenses, whose expenses are not included in CIP. Contractor costs are valued at requests for progress payments and other invoices. See CIP.

APPENDIX A DD Form 1354 (August 2002)

Front side blank DD Form 1354 - see separate attachment in pdf format.

Backside of DD Form 1354 (August 2002)

25. CONSTRUCTION DEFICIENCIES.
26. PROJECT REMARKS

INSTRUCTIONS

This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B *(formerly used by the Army and Air Force)* and NAVDOCKS Form 2317 *(formerly used by the Navy)*.

Existing instructions issued by the military departments relative to the preparation of the three supersede forms are applicable to this form to the extent that the various items and columns on the superseded forms have been retained. Additional instructions, as appropriate, will be promulgated by the military departments in connection with any new items appearing hereon.

With the issuance of this DD form, it is not intended that the departments shall revise and reprint manuals and directives simply to show the number of this DD form. Such action can be accomplished through the normal course of revision for other reasons.

DD Form 1354 Reverse, August 2002

APPENDIX B Summary Instructions for DD Form 1354

ITEM NUMBER	ITEM NAME	DESCRIPTION
ITEM 1	FROM	Name of the transferring agency: organization, installation, USACE District, NAVFAC Division/Activity, etc. Include address and zip code.
ITEM 2	DATE FORM PREPARED	Date the DD Form 1354 is prepared. Use DD-MMM-YYYY format.
ITEM 3	PROJECT/JOB NUMBER	The project number assigned to identify the project on a DD Form 1391 for new construction and the DPW/DIS Individual Job Order (IJO) number from work management system. Use both numbers when they exist.
ITEM 4	SERIAL NUMBER	Serial number assigned in sequence by the preparing organization. Identify the fiscal year, and sequence number; for example, 2002-0001, 2002-0002, etc.
ITEM 5	TO	Name of the receiving installation, activity, and service. Include address and zip code and installation number (INSNO) of receiving installation which the RPAO represents.
ITEM 6	SITE/INSNO	Site or installation number where the facility being transferred/accepted is located.
ITEM 7	CONTRACT NUMBER	Contract number(s) if any project work is performed under a contract.
ITEM 78	DRAWING NUMBERS	Enter the drawing number(s) or CAD identifier(s) for the project components.
ITEM 9	TRANSACTION DETAILS	Has four subparts
SUBPART 9A	TYPE of TRANACTION	Checkbox to indicate whether the DD Form 1354 applies to acceptance of new construction, transfer of existing facilities, a capital improvement to existing facilities, or other. Enter remarks in block 26 "Project Remarks" if "other" is specified.

ITEM NUMBER	ITEM NAME	DESCRIPTION
SUBPART 9B	WHEN/EVENT	Checkbox to indicate when, in terms of event type, the transfer and acceptance documented by this 1354 occurs, e.g., at the time of physical completion/available for use date, beneficial occupancy date (BOD), partial BOD, financial completion or "other." Enter remarks in block 26 "Project Remarks" if "other" is specified.
SUBPART 9C	VERSION	Checkbox to indicate whether this version is a draft, interim, or final DD Form 1354.
SUBPART 9D	EFFECTIVE DATE	Effective date for the transaction being described in block 9. This is the start date for depreciation. Also known as the Capitalization Date.
ITEM 10	ITEM NUMBER	Use a separate Item Number for each facility. Do not use more than one Item Number for multiple category codes within the same facility. Assign item numbers in column 10 sequentially starting with the number one (1).
ITEM 11	FACILITY NUMBER	The unique 5-character facility number to be assigned to a new facility, or existing facility number for existing or consolidated facilities. This number is assigned by the installation and provided to the construction agent early in the design process.
ITEM 12	CATEGORY CODE	The category code that appropriately describes the facility (land, building, structure, utility or portion thereof) design-use. List only one category code per line and do not add another item number (column 10) for multi-use facilities. Category codes and descriptions should be consistent with service implementation of DODI 4165.3, Department of Defense Facility Classes and Construction Categories (e.g., DA PAM 415-28, "Guide to Army Real Property Category Codes" and Air Force Handbook 32-1084, Facilities "Requirements").
ITEM 13	CATCODE DESCRIPTION	The category code short description that corresponds to the category code for the item number (Item 10).
ITEM 14	TYPE	The type of construction: use "P" for permanent, "S" for semi permanent, or "T" for temporary.

ITEM NUMBER	ITEM NAME	DESCRIPTION
ITEM 15	UNIT OF MEAS-1; AREA	The Unit of Measure 1 for area. Use abbreviations "SF" for square feet, "SY" for square yards, and "AC" for acres per DODI 4165.3/DODI 4165.14, with Service implementation thereof (e.g., DA PAM 415-28).
ITEM 16	TOTAL QUANTITY-UM1	The total area for the measure identified in Item 14. Use negative numbers for demolition.
ITEM 17	UNIT OF MEAS-2; OTHER	The Unit of Measure 2 for capacity/other. Use abbreviations, such as "MB" for millions of BTU, found in DODI 4165.3/DODI 4165.14.
ITEM 18	TOTAL QUANTITY-UM2	The total capacity/other for the measure identified in Item 16. Use negative numbers for demolition.
ITEM 19	COST	The cost for each facility (Item-block 10). For capital improvements to existing facilities, enter only the amount by which the general ledger balance is to be increased. Costs on interim DD Forms 1354 are actual costs to date, but considered preliminary; costs on final DD Forms 1354 are always final costs.
ITEM 20	FUND SOURCE	Fund source for this Item. Use the Item Remarks (column 21) to explain funding for this Item if necessary.
ITEM 21	ITEM REMARKS	Include any clarifying remarks pertaining only to the item number identified in column 10. Also summarize any cost sharing or prorating logic that would document how you derived the item cost.
ITEM 22	STATEMENT OF COMPLETION	Signature, title and date of signature by the individual responsible for the transfer of the properties.
ITEM 23	ACCEPTED BY	Signature, title and date of signature by the RPAO or delegated individual responsible for accepting the property.
ITEM 24	PROPERTY VOUCHER NUMBER	Next sequential number assigned by the RPAO in the Register of Vouchers to a Stock Record Account (e.g., DA Form 272 or Navy system assigned number).
ITEM 25	CONSTRUCTION DEFICIENCIES	All construction deficiencies in the project known or identified during the construction contractor turnover inspection.

ITEM NUMBER	ITEM NAME	DESCRIPTION
ITEM 26	PROJECT REMARKS	Any information to explain "other" entries in blocks 9A or 9B and other information that would be helpful in understanding the transaction. Also used for project level remarks and continuation where more space is needed.

Table 2-1 Summary Instructions for DD Form 1354

APPENDIX C Building Information Checklist

Use Appendix C as a checklist of required information to be entered into the real property database. Provide this information for each Real Property Facility listed on the DD Form 1354 in a format that allows easy data entry into the real property system. Normally this information is provided by the A-E electronically, often in XML format or GIS compatible format.

BUILDING IDENTIFICATION for this 5-Part CHECKLIST				
Facility Number	**Building Name**	**Number of Floors**	**Gross SF**	**Net SF**

1. Building Dimensions and Construction Materials

Building Outside Dimensions	**Length (SF)**	**Width (SF)**
Main Building		
Wings		
Offsets		
Basement		
Attic		
Porches, covered		

Construction Materials	**Type**
Foundations (such as concrete)	
Floors (such as wood, concrete)	
Exterior Walls (such as wood siding)	
Roof (such as built-up, shingle)	

2. Utility Connections, Information and Fuel Data

Utility Connections	Number of pipes	Diameter of each pipe	Capacity of all inlet pipes
Water			
Gas			
Sewer			
Steam			
Condensate			

Electric	Phase	Voltage	Wire Size	Connected Load

System	Energy Source	Fuel
Heating		
Air Conditioning		
Electrical		
Hot Water		
Steam		

3. Building Systems

Nomenclature	UM	Amount of UM	Cost	Description
Fire Protection System				
Closed Head Auto Sprinkler	HD			
Open Head Deluge System	HD			
Auto Fire Detection System	HD			
Manual Fire Alarm System	EA			
CO2 Fire System	EA			
Foam Fire System	EA			
Other Fire System	EA			
Halon 1301 Fire System	EA			
Security System				
Security Alarm System	EA			
Heating System				
Heating Plant	MB			
Storage Tank for Heating Fuel	GA			

Nomenclature	UM	Amount of UM	Cost	Description
Air Conditioning System				
Central A/C Plant	TN			
Electrical System				
Emergency Electric Power Generator	KW/KVA			
Storage Tank for Generator Fuel	GA			
Hot Water				

4. Installed Building Equipment (Real Property)

Item	Size/Quantity	Units	Model	Description
Evaporative Coolers		CFM		
Hot Water Heater		GA		
Exhaust Fan		CFM		
Wash Basin		EACH		
Water Closet		EACH		
Urinal		EACH		
Utility Sink		EACH		
Refrigerated Drinking Fountain		EACH		
Heating Plant under 750 MB/Hr		MB		
Forced Air Heating		BTU		
Other Heating		BTU		
Dehumidifiers		GPM		
Elevators		LBS & PN		
Theater-type Seats, bolted to floor		PN		
Other (SPECIFY)				

5. Associated Utilities and Structures

Nomenclature	UM	Amount of UM	Cost	Description
Primary Elec. Distr Line OH	LF			
Transformers	KVA			
Power Poles	EA			
Secondary Elec. Dist Line OH	LF			
Primary Elec. Distr Line UG	LF			
Secondary Elec. Distr Line UG	LF			
Exterior Street Lighting or Parking Area Lights	EA			
Gas Mains	LF			
Septic Systems	KG			
Sanitary Sewer	LF			
Water Distr Mains	LF			
Fire Hydrants	EA			
Curbs & Gutters	LF			
Driveway	SY			
Roadway	SY			
Vehicle Parking	SY			
Storm Drain	LF			
Fence, Security	LF			
Fence, Interior	LF			
Sidewalk	SY			
Transformer Vault (four or more transformers)	SF			
Telephone Duct	LF			
Telephone Pole	LF			

APPENDIX D Fund Source

Use the Fund Source abbreviations in block 20 for Army projects.

FUND SOURCE	DESCRIPTION
ACFT	Aircraft Procurement, Army
AFH	Army Family Housing Operations
AFHC	Army Family Housing Construction
BRAC	Base Realign/Closure Account (I-IV)
CAMDA	Chemical Agent & Munitions Destruction, Army
DBOF	Army Working Capital Fund
DECA	Defense Commissary Agency
DERA	Defense Environmental Restoration Act
DERF	Defense Emergency Response Fund
DHP	Defense Health Program
DODEA	DOD Education Activity
DOIRA	DOD Overseas Investment Recovery Account
DWCF	Defense Working Capital Fund-DOD Agencies
ECIP	Energy Conservation Incentive Program
FHF	Federal Highway Funds
MCA	Military Construction, Army
MCAR	Military Construction, Army Reserve
MCNG	Military Construction, National Guard
MPA	Military Personnel, Army
MSLS	Missile Procurement, Army
MWRCS	MWR Commercial Sponsorship
NAF	Non-Appropriated Fund
NATO	North Atlantic Treaty Organization
NFPPV	NAF Public-Private Ventures
NGPA	National Guard Personnel, Army
OMA	Operation & Maintenance, Army
OMAF	Operation & Maintenance, USAF
OMAR	Operation & Maintenance, Army Reserve
OMD	Operation & Maintenance, Defense
OMN	Operation & Maintenance, Navy
OMNG	Operation & Maintenance, Army National Guard

FUND SOURCE	DESCRIPTION
ONFED	Other Non-Federal Agencies
OPA	Other Procurement, Army
OTFED	Other Federal Agencies
PAA	Procurement Of Ammunition, Army
PD	Procurement Defense
PIK	Payment In Kind
PPV	Public-Private Ventures
PRD	Private Donations
QOLED	Quality Of Life Enhancement Defense
RDTE	Research, Development, Test and Evaluation
RKDCF	Rep Of Korea Defense Construction Fund
RPA	Reserve Personnel, Army
RPMD	Real Property Maintenance, Defense
UMMCA	Unspecified Minor Military Construction Army
WTCV	Weapons & Tracked Vehicles, Army

Checklist for Buildings
Info for DD Form 1354 & Real Property Card
18 January 2005

Project Title:_____
Contract Number/ Work Order#_____
2. Brief Description of Project Scope:
_____
_____
_____
_____
_____

3. Type of Building:_____
(i.e. Administration, Classroom, Pump Station, Maintenance Shop, etc.)

4. Building Number: _____
(If not known, give detailed location for easier Identification)

5. Building Dimensions (new construction):
Exterior Gross Measurements: _____ Total Square Feet: _____
Main Bldg: _____
Wing/Offsets: _____
Basement: _____
Ceiling Height (max): _____
Max Door Height: _____ Number of Floors:_____

6. Drawing Numbers: _____
Mechanical: _____ Electrical: _____
Structure: _____ Architectural: _____

7. Month/Year Construction Completed: _____
8. Construction Materials:
A. Material Code (exterior surface material of facility) - circle one:

Wood	Brick (brick veneer)	Concrete Block
Concrete	Structural Tile	Combination Concrete Block & Steel
Stone	Aluminum Siding	Screening
EIFS	Steel Siding	Plastic Siding
Screening (chain link)		Combination Brick & Wood

Glass; Plastic or Translucent Material (circle one)
Other: _____

8. Construction Material (continued)
   B. Foundation: (circle one)

Abbreviation	Description
PL	Pile: All piles will be assumed to be with continuous footing.
PP	Pier
CON	Continuous footings of various shapes & sizes
NF	No foundation
SL	Slab

Pile or Foundation Material Abbreviation	(circle one) Descriptions
ADB	Adobe
BK	Clay or concrete block
CN	Concrete
CR	Concrete, Reinforced
BLK	Slag, or concrete block
ST	Steel
STN	Stone
TST	Tile, structural
WD	Wood
NF	No Foundation Material
CB	Cinder Block
CM	Cinders & Mud Sill
CRS	Concrete, Stone
LG	Logs
MAS	Masonry
MS	Mud Sill
PLK	Planks
PT	Posts
RRT	Railroad Ties
SKD	Skids
WDP	Wood Pillars
WSD	Wood Sills on Dirt
WSR	Wood Sills on Rock

8. Construction Material (continued)
C. Structure:

Circle & indicate with a "P" the item which best describes the primary structural material of the building. This is generally the frame material of the bldg or supporting walls when there is no separate frame.

Next, circle & indicate with an "S" the category which describes the secondary material of the building. Example of a building with secondary structural material: Concrete block first story with a frame upper floor. If only one basic material is used in the building, circle " No Secondary Structure" - NSS

(Two entries are required)

Abbreviations	Descriptions
ADB	Adobe
AL	Aluminum
CI	Cast Iron
BK	Clay or Concrete Brick
CN	Concrete
CR	Concrete, Reinforced
GL	Glass, Plastic, Transparent or Transparent Material
BLK	Slag or Concrete Block
ST	Steel
STN	Stone
TST	Tile, Structural
WD	Wood
STN	Stone
TWS	Tile, Steel, Wood
WAL	Wood & Aluminum
WAS	Wood & Steel
BR	Brick
BRT	Brick, Tile
CA	Concrete, Corrugated Asbestos
CM	Concrete & Metal
CS	Concrete & Stone

8. Construction Material (continued)

Abbreviation	Description
MTL	Metal
NSS	No Secondary Structure
PL	Plywood
REC	Reinforced Columns
RRT	Railroad Ties
SHM	Sheet Metal
SPL	Split Logs

d. Walls: Circle & indicate with an "O" the outer wall material & with an "I" the inner wall material. If only one material is used, both will be the same. If there are no interior walls, so indicate. (Two Entries Required)

Abbreviations	Descriptions
ADB	Adobe
BK	Clay or Concrete Brick
BLK	Slag or Concrete Block
CN	Concrete
CR	Concrete, Reinforced
GL	Glass, Plastic, Transparent, Translucent Material
ST	Steel
STN	Stone
TST	Tile, Structural
WD	Wood
AL	Aluminum
BR	Brick
BRT	Brick Tile
CA	Concrete Corrugated Metal
CM	Concrete & Metal
CMB	Combination Brick & Wood or Shingles
COB	Composition Shingle
CS	Concrete & Stone
CRI	Corrugated Iron
CWA	Concrete, Wood
GAI	Galvanized Iron
MAP	Masonite Paneling

d. Walls (continued)

Abbreviations	Description
MTL	Metal
PLP	Plywood Paneling
PL	Plywood
PBW	Plaster board on Wood Frame
PBF	Plaster board on Fired Masonry
PSS	Painted Steel Siding
RCP	Roll, Composition
REC	Reinforced Columns
RRT	Railroad Ties
SCR	Screening
SHM	Sheet Metal
SPL	Split Log
STC	Stucco
STN	Stone
TSW	Tile, Steel, Wood
WAL	Wood, Aluminum
WAS	Wood & Steel
WDS	Wood Sheathing
WPL	Wood Panel
WSH	Wood Shingles
WWS	Wood Wainscot
VCA	Vinyl Coated Aluminum
VCS	Vinyl Coated Steel

Construction Materials (continued)

E. Roof:

Roof Support (type of roof & material used) circle one:

Abbreviations	Description
NRO	No Roof
CRJ	Joist or Beam- Concrete, Pre-stressed
CRF	Flat Truss- Concrete, Reinforced
CRG	Gable or Arch Truss- Conc. Reinforced
CRJ	Joist or Beam- Concrete, Reinforced
CRS	Slab, Concrete, Reinforced
NSR	Arch, No Support Required
RAF	Rafters
STA	Gable or Arch Truss – Steel
STF	Flat Truss –Steel
STJ	Joist or Beam – Steel
WDF	Flat Truss – Wood
WDG	Gable or Arch Truss –Wood
WDJ	Joist or Beam – Wood

Roof Deck: circle one:

0	No Roof
1	Plywood
2	Asphalt Protected Metal
3	Gypsum or Light Weight Concrete
4	Masonry Arch
5	Metal
6	Reinforced Concrete
7	Wood (less than 2 " thick)
8	Wood (2" or more thick)
A	Wood Fiber Cement
C	Concrete Arch
G	Glass, Plastic, Transparent, Translucent Material
S	Steel Arch

Roof Surface: circle one:

Abbreviations	Descriptions
NS	No Surface
AL	Aluminum, Copper or Lead
CRS	Roll – Composition
GL	Glass, Plastic, Transparent, Translucent Material

Construction Material (continued)

Roof Surface: (circle one)

Abbreviations	Descriptions
PRB	Roll –building Paper
REU	Built-Up Roll Roofing
SC	Shingles Composition
SL	Shingles, Slate
STG	Steel, Galvanized
TL	Tile
TS	Tar or Silicone
ASH	Asphalt
AST	Asphalt Shingle
BU	Built- Up
BUG	Built- Up Gravel
CO	Concrete
CA	Corrugated Aluminum
CM	Corrugated Sheet Metal
CMC	Corrugated Sheet Steel
DC	Dirt Covered
RB	Rubber (EPDM)
SH	Shingles
ST	Steel
STS	Strip Shingles

F. Floors:

Floor Surface: (material used in construction of floor surface - circle one)

AL	Aluminum
APB	Acid Proof Brick
BRK	Brick
CKT	Cork Tile
CPT	Carpet
COL	Conductive Linoleum
COR	Conductive Rubber
COT	Conductive Tile
GAC	Galvanized iron
HWD	Hardwood
LIN	Linoleum
MAS	Mastic

Construction Materials (continued)

Floor Surface: (circle one)

Abbreviation	Descriptions
MAT	Marble, Tile
NS	No Floor Surface
PWD	Plywood
VCT	Vinyl Composition Tile
VT	Vinyl Tile

Sub Floor Material (circle one)

BLT	Blacktop, Flexible Pavements, Macadam
CDR	Cinders
CON	Concrete
CR_	Concrete, Reinforced
DRT	Dirt
GRL	Gravel
NF	No Sub-Floor
STL	Steel
WD	Wood

9. Utility Connections:

A. Water: Yes No
If yes, Potable Non-potable
Pipe size:_____ inch

B. Sewer: Yes No
If yes, Sanitary Industrial Storm Combined
Pipe size: _____ inch

C. Electricity: Yes No
If yes, Wire size:_____
Phase:_____
Voltage Capacity:_____
Amperage Capacity:_____
KVA Rating:_____

Utility Connections (continued)

D. Steam Pipe: Yes No
If yes, Pipe Size;_____ inch
Pressure (PSI): _____

E. Condensate Pipe: Yes No
If yes, Pipe Size: _____

F. Gas Pipe: Yes No
If yes, Pipe Size: _____
Pressure (PSI): _____

10. Other Utility Data Within Buildings:
A. Air Conditioning: Yes No
If Yes, A/C Type (circle one) Window unit
Evaporative Cooling Central Chilled Water Central Direct Expansion
A/C Area (SF): _____
A/C Capacity (BTU's): _____

B. Hot Water Facilities: Yes No
If Yes, Capacity:_____ Gallons, Temperature Rise: _____ F

C. Heating:_____
> Heat Type (circle one) Electric Warm Air Steam Glycol
Radiator Other: _____

- Heat Source (circle one):
- Central Heating & Power Plant – Bldg 3595
Own Source (individual Heat Plant)
>Heat Capacity: (complete one item):
MegaBTU'S of individual Heat Plant_____
If heated from CH & PP. MegaBTU's the design heating requirements for bldg
_____
>Heating Fuel Type Code (circle one), if individual ht plant only):

1. Coal, Stoker Fuel
2. Coal
3. Oil No. 2, 4
4. Oil No. 5, 6
5. Natural Gas
6. Manufactured Gas

D. Fire Protection: (check appropriate type):_____
Automatic Sprinkler System (circle one):

10. Other Utility Data Within Buildings: continued

Wet pipe Deluge Pre-action Dry Pipe Local Signal
Transmitted Signal

Special Fire Extinguishing System (circle two: agent & type)
Carbon dioxide agent Dry chemical agent
Halogenated agent High-expansion foam agent

Fixed temp detection system w/ Local signal
Fixed temp detection sys w/ transmitted signal
Rate-of-rise detection sys w/ local local signal
Rate-of-rise detection sys w/ transmitted signal
Combination fixed temp & Rate-of-rise detection w/local signal
Combination fixed temp & Rate-of-rise detection w/ transmitted Signal
Smoke or products of combustion Detection system w/local signal
Smoke or products of combination detection sys w/trans signal

_____ Standpipe systems: size of fire hose connection
_____ Automatic Fire Detection (circle two: type & signal identification):
Fixed temperature system
Rate-of-rise system
Combination of fixed temperature & rate-of-rise system
Smoke or products of combustion system

_____

Local Signal Transmitted Signal

11. Installed Equipment Included in projects? Attach listing of equipment complete w/ model, serial numbers, sizes, etc. _____

12. Utilities Distribution Systems: (i.e. Natural Gas line, Electric Power Transmission & distribution lines, Sewer Collection Systems & Lines, & any Other Pavement - including sidewalks & separate parking Lots.)

> Overhead Electrical Distributions: # of LF_____
> Underground Electrical Distribution: # of LF_____
> Distribution Transformer: # of KV_____
# of EACH_____
> Sanitary Sewer: # of LF_____
- Water Pipe Line Potable: # of LF_____
- Water Pipe Line Non-potable: # of LF_____
> Sidewalk: # of SY_____
# of LF_____
Dimensions: _____ft wide x _____ ft long

SUBMITTALS REQUIRED WITH 1354

Items required with the final 1354:

- Punch list with dates to be completed
- Installed Equipment list (models, makes, installing contractor, locations, etc. - on contractor letterhead)
- Warranties and Warranty List (for all equipment - with contact names, phone numbers, etc. - on contractor letterhead).
- As-Built drawings - final set (approved and reviewed by us)
- Copy of all approved submittals

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY

Form Approved
OMB No. 07404-0188

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for information Operations and Reports, 1215, jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.
PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THIS ADDRESS.

1 FROM (Installation/Activity/District and ZIP Code)
Army & Air Force Exchange Service
3911 S. Walton Walker BLVD
Dallas, TX 75236

2. DATE PREPARED (YYYY/MM/DD)
20070718

3. PROJECT/JOB NUMBER
9184-03-000002

4. SERIAL NUMBER

5 TO (Installation/Activity/Service, ZIP Code & INSNO)
3 CES
6326 Arctic Warrior Drive
Elmendorf AFB, AK 99506

6. SITE/INSNO/NAME
3829 Westover Ave., Elmendorf AFB, Alaska

7. CONTRACT NUMBER(S)
AAFES-REZC-95-026-06-019

8. DRAWING NUMBER(S)

9 TRANSACTION DETAILS

a. [x] NEW CONSTRUCTION
[ ] EXISTING FACILITY
[ ] CAPITAL IMPROVEMENTS
[ ] OTHER (Specify)

b. [ ] PHYS.COM.AVAIL.
[ ] BENIF/O
[ ] PARTIAL BOD
[ ] FINANCIAL COM.
[ ] OTHER (Specify)

c. [ ] DRAFT [ ] FINAL
[X] INTERIM

d. EFFECTIVE DATE(YYYYMMDD)
20070820

10 ITEM NO.	11 FACILITY NO.	12 CATEGORY CODE	13 CATECODE DESCRIPTION	14 TYPE	AREA 15. UNIT OF MEAS 1	AREA 16. TOTAL QUANTITY UM 1	OTHER 17. UNIT OF MEAS 2	OTHER 18. TOTAL QUANTITY UM 2	19 COST	20 FUND SOURCE	21 FUNDING ORG	22 INTEREST CODE	23 ITEM REMARKS
1	3829	211111	SHOPPETTE		SF	23,600			3,981,525.00	11	60	01	
			AUTO SERVICE		SF	5,549							
			RETAIL		SF	9,348							
			LAUNDRY		SF	1,280							
			STORAGE		SF	6,359							
			ADMINISTRATION OFFICES		SF	1,064							
2	81110	812225	PRIM DISTR LNE UG				LF	120	191,245.00	11	60	01	
3	3829	211111	INTERIOR DUPLEX RECEPTACLES & EXTERIOR GFI's				EA	91	189,893.00	11	60	01	
4	3829	812926	EXTERIOR AREA LTG				EA	10	32,165.00	11	60	01	
5	3829	821115	PLANT HEATING		SF	23,600			1,097,600.00	11	60	01	
6	83150	832266	SAN SEWAGE MAIN				LF	93	33,040.00	11	60	01	
7	84110	842245	WTR DISTR MAINS				LF	255	67,144.00	11	60	01	
8	84115	842246	WTR HYDRANTS				EA	1	12,560.00	11	60	01	
9	85240	852262	VEH PKNG N/ORGN (Asphalt 3" / with 6" Gravel Base)		SY	7,904			157,920.00	11	60	01	
10	85190	852289	SIDWALK		SY	531			33,010.00	11	60	01	
11	87100	871183	STRM DRN DSPL				LF	52	46,480.00	11	60	01	
12	3829	880211	CLSD HD A/SPRINK		SF	23,600			157,920.00	11	60	01	
13	81110	812225	300 KVA TRANSFORMER				EA	1	38,000.00	11	60	01	
14	85110	851143	CURB & GUTTER				LF	801	21,280.00	11	60	01	
15	76580	135583	BURIED TELEPHONE CABLE - 200 PAIR				LF	820	35,284.00	11	60	01	
16	76580	135583	BURIED FIBEROPTICS LINE - 12 STRAND				LF	720	24,640.00	11	60	01	
17	3829	880221	FIRE DETECTION & ALARM SYSTEM		SF	23,600			5,000.00	11	60	01	
18	3829	211111	SOIL STABILIZATION/SEEDING						24,640.00	11	60	01	
19	85120	851145	CONCRETE PAVING (DRIVEWAY)		SY	59			14,800.00	11	60	01	
20	82185	824461	NATURAL GAS LINE				LF	125	1,140.00	11	60	01	AAFES provides & Install Equipment
21	3829	872841	INTRUSION SECURITY SYS				EA	17	4,914.00	11	60	01	
22													
23			Modifications to Date						9,951.19	11	60	01	
			The above construction line items include:										
			Supervision & Administration Costs which have been prorated into the individual consturction line items.										
									$ 6,180,151.19	TOTAL COST			

AUTHORIZED REPRESENTATIVE

24. STATEMENT OF COMPLETION. The facilities listed hereon are in accordance with maps, drawings, and specifications and change orders approved by the authorized representative of the using agency except for the deficiencies listed on the reverse side.

a. TRANSFERRED BY (Typed Name and Signature)
Robert I. Sennet

b. DATE SIGNED
30 Oct 07

c. TITLE (Area Engr./Base Engr./DPW)
Vice President, Real Estate Design 7 Construction Division

25. a. ACCEPTED BY (Typed Name and Signature)

b. DATE SIGNED

c. TITLE (DPW/RPAO)

26. PROPERTY VOUCHER NUMBER

27. CONSTRUCTION DEFICIENCIES *(Attach blank sheet for continuations)*

1. Work is scheduled to be completed on November 6, 2007. Additional changes with possible implications to the property list might be encountered.

28. PROJECT REMARKS *(Attach blank sheet for continuations)*

1. Please review Interim 1354 for compliance with AAFES and Base requirements.

INSTRUCTIONS

GENERAL. This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from other government agencies. It supersedes ENG Forms 290 and 290B (formerly used by the Army and Air Force) and NAVDOCKS Form 2317 (formerly used by the Navy).

Existing instructions issued by the military departments relative to the preparation of DD Form 1354 are applicable to this revised form to the extent that the various items and columns on the superseded forms have been retained. The military departments may promulgate additional instructions as **SPECIFIC DATA ITEMS.**

1. From. Name and address of the transferring agency.

5. To. Name and address of the receiving installation, activity, and service of the Real Property Accountable Officer (RPAO).

6. Site/INSNO and Name. Site or installation number and site name where the constructed facility is located.

7. Contract Number(s). Contract number(s) for this project.

8. Drawing Number(s). Drawing number(s) or CAD identifier(s) for project components.

9. Transaction Details.
a. Type of Transaction. Mark (X) only one box.
b. When/Event. When or event causing preparation of DD Form 1354. X only one box.
c. Version. Draft, interim, or final DD Form 1354 X only one box.
d. Effective Date. Effective date for transaction; start date for depreciation.

10. Item Number. Use a separate item number for each facility, no item number for additional usages.

11. Facility Number. Unique facility number identified in Real Property Inventory.

12. Category Code. The category code describes the facility usage.

13. Catecode Description. The category code name which describes the facility usage.

14. Type. Type of construction: P for Permanent; S for Semipermanent; T for Temporary.

15. Area: Unit of Meas 1. Area unit of measure; use SF, SY, AC only.

17. Other: Unit of Meas 2. Unit of Measure 2 is the capacity or other measurement unit (e.g., LF, MB, EA, etc.).

21. Funding Organization. Organization resopnsible for replacing facility at end of useful life (e.g., Army, Air Force, Navy, Marine Corps (specify component for each service), DLA, DECA, TMA, etc.).

22. Interest Code. Reflects government interest or ownership in facility (e.g., DoD owned, leased, State owned, privately owned, etc.).

23. Item Remarks. Remarks pertaining only to the item number identified in Item 10; show cost sharing.

24. Statement of Completion. Typed name, signature, title, and date of signature by the responsible transferring individual or agent.

25. Accepted By. Typed name, signature, title, and date of signature by the RPAO in voucher register.

26. Property Voucher Number. Next sequential number assigned by the RPAO in voucher register.

27. Construction Deficiencies. List construction deficiencies in project during contractor turnover inspection.

28. Project Remarks. Project level remarks, continuation of blocks, and used to explain "other" entries in Item 9.

SECTION 01 71 00

CLEANING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Progress Cleaning.

B. Final Cleaning.

1.2 RELATED SECTIONS

A. General Provisions of the Contract.

B. Section 01 10 00 - Summary.

C. Section 01 14 50 - Cutting and Patching.

D. Section 01 55 00 – Temporary Dust and Security Weather Barrier Details.

E. Individual Specification Sections - Cleaning Requirements.

1.3 SAFETY REQUIREMENTS

A. Standards: Maintain project in accordance with the following safety and insurance standards:

1. The Corps of Engineers Manual, EM 385-1-1, latest edition, entitled: "General Safety Requirements", as referred to in General Provisions, Paragraph: Accident Prevention.

B. O.S.H.A. Standards:

1. The Contractor shall be required to comply with OSHA Requirements in 29 CFR 1926 and 29 CFR in 1910. The OSHA Standards are subject to change, and such changes may affect the Contractor in his performance under the contract. It is the Contractor's responsibility to know such changes, effective dates of changes, and comply with all requirements.

C. Hazards Control:

1. Store volatile wastes in covered metal containers and remove from premises daily.
2. Prevent accumulation of wastes which create hazardous conditions.
3. Provide adequate ventilation during the use of volatile or noxious substances.

D. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on the installation.
2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
3. Do not dispose of wastes into streams or waterways.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

A. Execute cleaning to ensure that the building, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.

B. Maintain site in a clean and orderly condition.

C. Wet down dry materials and rubbish to lay dust and prevent blowing dust.

D. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off of Government property.

E. Vacuum clean interior building areas when ready to receive finish painting, and continue cleaning to eliminate dust.

F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights. Open free-fall chutes are not permitted.

G. Schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.

3.2 FINAL CLEANING

A. Employ professional cleaners for final cleaning.

B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and of concealed spaces.

C. Remove grease, dust, dirt, stains, temporary labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine; finish vacuum carpeted and soft surfaces.

D. Repair, patch, and touch-up marred surfaces to specified finish, to match adjacent surfaces.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Broom clean paved surfaces; rake clean other surfaces of grounds.

G. Clean all glass.

H. Replace air conditioning filters if units were operated during construction.

I. Clean ducts, blowers, and coils, if air H.V.A.C. units were operated without filters during construction.

J. Maintain cleaning until project, or portion thereof, is occupied by EXCHANGE.

END OF SECTION 01 71 00

SECTION 01 77 00

PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Substantial Completion.

B. Final Inspections.

C. Closeout Submittals.

1. Operation and Maintenance Manuals.
2. Operation and Maintenance Instruction.

1.2 RELATED SECTIONS:

A. General Provisions of the Contract: Final Acceptance and Payment.

B. Section 01 33 00 – Submittal Procedures.

C. Section 01 71 00 - Cleaning.

D. Section 01 65 00 – Starting of Systems.

E. Section 01 78 39 - Project Record Documents.

1.3 SUBSTANTIAL COMPLETION:

A. Preliminary Procedures: Before requesting inspection, complete the following.

1. Contractor's list of incomplete items (punch list) prepared.

   a. Submit PDF electronic file.
   b. Submit paper copies.

2. Owner advised of pending insurance changeover.
3. Warranties, maintenance service agreements, and similar documents submitted.
4. Releases, occupancy permits, and operating certificates submitted.
5. Project Record Documents submitted.
6. Tools, spare parts, and extra materials delivered.
7. Final changeover of locks performed.
8. Startup testing completed.
9. Test/adjust/balance records submitted.
10. Temporary facilities removed.
11. Owner advised of heat and utility changeover.
12. Changeover information for use, operation, and maintenance submitted.
13. Owner's personnel instructed in operation, adjustment, and maintenance of equipment and systems, including demonstration and training videotapes submitted.

B. Contractor:

1. Submit written certification to Contracting Officer that project, or designated portion of Project, is substantially complete.
2. Submit list of major items to be completed or corrected.

C. Contracting Officer will make an inspection after receipt of certification.

D. Should Contracting Officer consider that work is substantially complete:

1. Contractor shall prepare, and submit to Contracting Officer, a list of items to be completed or corrected, as determined by the inspection.
2. Contracting Officer will prepare and issue a Certificate of Substantial Completion, containing:

   a. Date of Substantial Completion.
   b. Contractor's list of items to be completed or corrected, verified, and amended by Contracting Officer.
   c. The time within which Contractor shall complete or correct work of listed items.
   d. Time and date EXCHANGE will assume possession of work or designated portion thereof.
   e. Responsibilities of EXCHANGE and Contractor for:
      (1) Utilities.
      (2) Operation of mechanical, electrical, and other systems.
      (3) Maintenance and cleaning.
      (4) Security.
   f. Signatures of:

      (1) Contracting Officer.
      (2) Contractor.

3. EXCHANGE occupancy of project or designated portion of project:

   a. Contractor shall:

      (1) Perform final cleaning in accordance with Section 01 71 00.

   b. EXCHANGE will occupy project, under provisions stated in Certificate of Substantial Completion.

4. Contractor: Complete work listed for completion or correction, within designated time.

E. Should Contracting Officer consider that work is not substantially complete:

1. He shall immediately notify Contractor, in writing, stating reasons.
2. Contractor: Complete work, and send second written notice to contracting officer, certifying that project, or designated portion of project, is substantially complete.
3. Contracting Officer will reinspect work.

1.4 FINAL INSPECTION

A. Contractor shall submit written certification that:

1. Contract documents have been reviewed.
2. Project has been inspected for compliance with contract documents.

3. Work has been completed in accordance with Contract Documents.
4. Equipment and systems have been tested in presence of Facility Representatives and are operational.
5. Project is completed and ready for final inspection.

B. Contracting Officer will make final inspection after receipt of certification.

C. Should the Contracting Officer consider that work is finally complete in accordance with requirements of contract documents, he shall request contractor to make project closeout submittals.

D. Should the Contracting Officer consider that work is not finally complete:

1. He shall notify contractor, in writing, stating reasons.
2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to the Contracting Officer certifying that work is complete.
3. The Contracting Officer will reinspect work.

1.5 PROJECT RECORD DOCUMENTS:

A. Project Record Documents: Specified requirements of Section 01 78 39.

1.6 OPERATION AND MAINTENANCE MANUALS:

A. Submit data bound in 8-1/2 x 11 inch text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "Operation and Maintenance Manuals", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, typed on 20 pound white paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Value chart.
   f. Maintenance instructions for equipment and systems.
   g. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:

   a. Shop drawings and product data.
   b. Air and water balance reports.

c. Certificates.
d. Photocopies of warranties.
e. Training Sessions attendance roster.
f. Warrantees.

E. Submit six (6) copies of the operation and maintenance manuals to the Contracting Officer.

1.7 OPERATION AND MAINTENANCE INSTRUCTION:

A. The Contractor shall provide, at his expense, manufacturer's representatives to completely check out all mechanical and electrical systems and items covered by the drawings and specifications. This requirement shall be scheduled just prior to, and during the initial start up. After all systems are functioning properly, the representatives shall instruct Facility Maintenance Personnel in the proper operation and maintenance of each item. In addition to instructions given at the project, the Facility Maintenance Personnel shall be given a classroom instruction course on operation and maintenance of the systems. Training sessions shall be limited to four (4) continuous hours where practical. Schedule additional four (4) hour sessions as required.

1.8 DD FORM 1354:

A. Preparation of DD Form 1354 "Transfer and Acceptance of Military Real Property": At the conclusion of the project the Contractor will compile and furnish to the Contracting Officer certain costs and quantity data of materials and systems furnished and installed. A list of items for which the costs and quantity data are required will be furnished to the Contractor. Such information will be returned to the Contracting Officer within 10 days from the receipt of the list. Form is attached at the end of Division 1.

1.9 WARRANTY AND EXTENDED WARRANTIES:

A. Upon completion of project, prior to final payment, guarantees required by technical divisions of Specifications shall be properly executed in quadruplicate by subcontractors and submitted to Contracting Officer. Delivery of guarantees shall not relieve contractor from any obligation assumed under contract.

B. Submit guarantee covering entire project for one year. In addition, where separate guarantees, for certain portions of work, are for longer periods, General Contractor's guarantee shall be extended to cover such longer periods.

C. Guarantees shall become valid and operative upon issuance of Certificate of Inspection and Acceptance by EXCHANGE. Guarantees shall not apply to work where damage is a result of abuse, neglect by EXCHANGE, or his successor(s) in interest.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 77 00

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Submittals: Section 01 33 00 – Submittal Procedures.

1.2 RECORD FIELD DATA

A. General: Maintain at job site, two complete sets of Contract Documents. During construction, both sets shall be marked to show all deviations in actual construction from the Contract Documents.

1. Red Markers: Indicate all additions.
2. Green Markers: Indicate all deletions.

B. Record Documents: The drawings shall show, but no be limited to, the following information:

1. Locations and description of any utility lines and other installations of any kind or description known to exist within the construction area. Include dimensions and/or survey coordinates to permanent features.
2. Locations and dimensions of any changes within the building or structure and the accurate location and dimension of all underground utilities and facilities.
3. Correct grade or alignment of roads, structures and utilities if any changes were made from Contract Drawings.
4. Correct elevations if changes were made in site grading.
5. Changes in details of design or additional information obtained from shop drawings prepared or furnished by the Contractor including, but not limited to:

   a. Fabrication erection
   b. Installation and placing details
   c. Pipe sizes
   d. Insulation materials
   e. Equipment pad dimensions

6. Topography and grades of all drainage.
7. All changes or modifications from the original design.
8. Where contract drawings or specifications allow options, only the option actually used in the construction shall be shown on the Record Drawings. The option not used shall be deleted.

C. Record Field Data: All deviations shall be shown in the same general detail utilized in the Contract Documents. Marking of the documents shall continue throughout construction to keep the documents up to date.

1. Additional Data: The Contractor shall maintain the following:

   a. Full size marked-up drawings.
   b. Survey notes
   c. Sketches
   d. Nameplate data
   e. Pricing information
   f. Description and serial number of all equipment

2. Record field data shall be available for inspection by the Contracting Officer whenever requested and shall be jointly inspected for accuracy and completeness by the Contracting Officer and Contractor. Failure to keep record field data current shall be sufficient justification to withhold a retained percentage from the monthly Application for Payment.

D. Submittal of Record Field Data:

1. Submit two sets to the Contracting Officer a minimum of 20 calendar days prior to the date of final inspection.
2. The Contractor shall make all corrections identified during Contractor Officer review and resubmit corrected data within ten (10) calendar days of receipt.
3. When data is accepted as complete, one set of documents will be returned to the Contractor for completion of the Record Documents.

1.3 RECORD ELECTRONIC FILE DOCUMENTS

A. Electronic File Format: No earlier than 30 days after award, the Contracting Officer will provide one set of AutoCAD electronic file format contract drawings to be used for preparation of Record Drawings.

1. Media: ISO – 9660 CD
2. The Contractor shall verify usability of AutoCAD files and notify the Contracting Officer of any discrepancies within 30 calendar days of receipt. Any discrepancies will be corrected and files returned to the Contractor.
3. The Contractor shall incorporate all deviations from the original Contract Documents as recorded in the approved “Record Field Data” as indicated in Paragraph 1.2.C above.
4. The Contractor shall also incorporate all written modifications to the Contract Documents which were issued by amendment or contract modification.
5. All revisions and changes shall be incorporated:

   a. Items marked deleted shall be deleted.
   b. Clouds around new items shall be removed.

B. Electronic File Submittal: Submit a complete set of Record Drawings in AutoCAD electronic file format no later than 30 days after final acceptance. The Record Drawings shall be done in equal quality to the originals, including line work, line weights, lettering and symbols. Identify each drawing with the word “RECORD” in block letters at least 3/8” high above the title block. The date of completion and the words “Revised Record” shall be placed in the revision block above the latest revision notation.

1. Format: AutoCAD Release 2005 ‘DWG’ format. All support files required to display or plot the files in the same manner as they were developed shall be delivered along with the files, including but not limited to:

   a. Font files
   b. Menu files
   c. Plotter setup
   d. Referenced files

2. Layering: Conform to AIA Standard Document, “CAD Layer Guidelines,” latest version. An explanatory list of which layer is used at which drawing and an explanatory list of all layers which do not conform to the standard AIA CAD Layer Guidelines including any user definable fields permitted by the guidelines shall be provided with each submittal.

3. Electronic File Deliverable Media: ISO 9660 Format CD-ROM. Submit three (3) complete sets of disks and one complete set of full size reproducible prints taken from the disks. Each disk shall have a clearly marked label stating the Contractor’s firm name, project name and location, submittal type (record) and date. Each submittal shall be accompanied by a hard copy transmittal sheet that contains the above information along with tabulated information about each file as shown below:

Electronic File Name	Plate Number	Drawing Title

a. Include electronic version of the table.

4. Submit one copy of the CD-Rom and one set of full-size Mylar reproducibles of the drawings to (Building Records staff person) at (Post or Base).

1.4 SUBMITTAL OF FINAL RECORD DRAWINGS

A. Complete and return the final record documents and the approved preliminary record documents to the Contracting Officer within 30 calendar days of final acceptance.

1. All drawings from the original contract documents shall be included, including drawings where no changes were made.
2. The drawings will be returned to the Contractor if corrections are necessary.
3. The Contractor shall make all corrections and shall return the drawings to the Contracting Officer within seven (7) calendar days of receipt.

1.5 RECORD DOCUMENT COST

A. All costs incurred by the Contractor in the proportion and furnishing of record documents, including electronic file format, shall be included in the contract price and no separate payment will be made for this work.

1. Approval and acceptance of the final record documents shall be accomplished before final payment is made to the Contractor.

1.6 SYSTEM ACCEPTANCE TESTING

A. Provide one set of marked-up record drawings at the time of system acceptance testing. These record drawings shall be in addition to the submittal of marked-up record drawings specified elsewhere in the contract.

PART 2 – PRODUCTS (Not Applicable)

PART3 – EXECUTION (Not Applicable)

END OF SECTION 01 78 39

SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Commissioning Team:

1. Members representing contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists.
2. Members representing Owner, including Commissioning Authority (CxA), facility user and operation and maintenance personnel, and Architect and engineering design professionals.

B. EXCHANGE' Responsibilities:

1. Provide Operating (OPR) and Basis of Design (BoD) documentation.
2. Assign operation and maintenance personnel and schedule them for commissioning activities.

C. Contractor's Responsibilities: Assign personnel and schedule them for commissioning activities.

D. CxA's Responsibilities:

1. Organize and lead commissioning team.
2. Provide commissioning plan.
3. Convene commissioning team meetings.
4. Provide Project-specific checklists and test procedures.
5. Verify the execution of commissioning process activities using random sampling.
6. Prepare and maintain Issues Log.
7. Prepare and maintain completed construction checklist log.
8. Witness systems, assemblies, equipment, and component startup.
9. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 91 13

SECTION 01 99 99

ASBESTOS FLOOR TILE MASTIC ABATEMENT (CLASS II ABATEMENT WORK)

PART 1 – GENERAL

1.1 CONTRACT DOCUMENTS AND RELATED REQUIREMENTS

A. Drawings, general provisions of the contract, including general and supplementary conditions and other Division 01 specifications, shall apply to the work of this section. The contract documents show the work to be done under the contract and related requirements and conditions impacting the project. Related requirements and conditions include applicable codes and regulations, notices and permits, existing site conditions and restrictions on use of the site, requirements for partial owner occupancy during the work, coordination with other work and the phasing of the work. In the event the Asbestos Abatement Contractor (Contractor) discovers a conflict in the contract documents and/or requirements or codes, the conflict must be brought to the immediate attention of the Contracting Officer for resolution. Whenever there is a conflict or overlap in the requirements, the most stringent shall apply.

B. Any actions taken by the Contractor without obtaining guidance from the Contracting Officer shall become the sole risk and responsibility of the Contractor. All cost incurred due to such action are also the responsibility of the Contractor.

1.2 EXTENT OF WORK

A. Below is a brief description of the estimated quantities of asbestos flooring materials to be abated. These quantities are for informational purposes only and are based on the best information available at the time of the specification preparation. The Contractor shall satisfy himself as the actual quantities to be abated. Nothing in this section may be interpreted as limiting the extent of work otherwise required by this contract and related documents.

B. Removal and clean-up of ACM flooring in an appropriate regulated area in the following approximate quantities: **18,650** square feet of mastic and associated flooring. Laboratory analytical results indicate that the white floor tile mastic located on the main floor in the sales area contains between 2% and 5% chrysotile asbestos. Work methods can be found in Part 3.

C. Laboratory analytical results indicate that no asbestos is present in the other samples collected. The floor tile and mastic located in other areas of the building did not contain asbestos.

1.3 RELATED WORK – Not Applicable

1.4 TASKS – The work tasks are summarized briefly as follows:

A. Pre-work activities including pre-abatement meeting(s) and submittals, inspection(s), notifications, permits, submittal approvals, work-site preparations, equipment testing, emergency procedures arrangements, and standard operating procedures for Class II asbestos abatement work.

B. Abatement activities including removal, clean-up and disposal of ACM waste, recordkeeping, security, monitoring, and inspections.

C. Cleaning and decontamination activities including final visual inspection, air monitoring and certification of decontamination.

1.5 ABATEMENT CONTRACTOR USE OF PREMISES

A. The Contractor and Contractor's personnel shall cooperate fully with the Exchange representative/consultant to facilitate efficient use of buildings and areas within buildings. The Contractor shall perform the work in accordance with the specifications, drawings, phasing plans and in compliance with all applicable Federal, State and Local regulations and requirements.

B. The Contractor shall use the existing facilities in the building strictly within the limits indicated in contract documents as well as the approved pre-abatement work plan. Asbestos abatement drawings will show the limits of regulated areas; the placement of decontamination facilities; the temporary location of bagged waste ACM; the path of transport to outside the building; and the temporary waste storage area for each building/regulated area. Any variation from the arrangements shown on drawings shall be secured in writing from the Exchange contracting officer representative through the pre-abatement plan of action.

1.6 VARIATIONS IN QUANTITY

A. The quantities and locations of ACM as indicated on the drawings and the extent of work included in this section are estimates which are limited by the physical constraints imposed by occupancy of the buildings. Variations on the order of 5% more or less should be expected.

1.7 STOP ASBESTOS REMOVAL

A. If the Contracting Officer or contracting officer representative or installation environmental office presents a written **Stop Work Order**, the Contractor shall immediately stop all asbestos removal and adequately wet any exposed ACM. The Contractor shall not resume any asbestos removal activity until authorized to do so by the Contractor Officer or Contracting Officer Representative. A stop work order may be issued at any time the abatement conditions or activities are not within specification requirements. Work stoppage will continue until conditions have been corrected to the satisfaction of the Contracting Officer.

B. Standby time and costs for corrective actions will be borne by the Contractor, including the industrial hygienist's time. The occurrence of any of the following events shall be reported immediately by the Contractor in writing to the Exchange representative and shall require the Contractor to immediately stop asbestos removal activities and initiate fiber reduction activities:

1. Asbestos =/> 0.01 f/cc outside a regulated area or >0.05 f/cc inside a regulated area;
2. Breach/break in regulated area critical barrier(s)/floor;
3. Serious injury at the site;
4. Fire/safety emergency at the site;
5. Respiratory protection system failure;

6. Power failure loss of wetting agent; or
7. any visible emissions observed outside the regulated area.

1.8 GENERAL

A. Definitions and explanations here are neither complete nor exclusive of all terms used in the contract documents, but are general for the work to the extent they are not stated more explicitly in another element of the contract documents or applicable regulations. Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated therein.

1.9 GLOSSARY

Abatement - Procedures to control fiber release from asbestos-containing materials, typically during removal. Includes removal, encapsulation, enclosure, demolition and renovation activities related to asbestos.
ACE - Asbestos contaminated elements.
ACM - Asbestos containing material.
Aerosol - Solid or liquid particulate suspended in air.
Adequately wet - Sufficiently mixed or penetrated with liquid to prevent the release of particulates. If visible emissions are observed coming from the ACM, then that material has not been adequately wetted.
Aggressive method - Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact ACM.
Aggressive sampling - EPA AHERA defined clearance sampling method using air moving equipment such as fans and leaf blowers to aggressively disturb and maintain in the air residual fibers after abatement.
AHERA - Asbestos Hazard Emergency Response Act. Asbestos regulations for schools issued in 1987.
Aircell - Pipe or duct insulation made of corrugated cardboard which contains asbestos.
Air monitoring - The process of measuring the fiber content of a known volume of air collected over a specified period of time. The NIOSH 7400 Method, Issue 2 is used to determine the fiber levels in air.
Air sample filter - The filter used to collect fibers which are then counted. The filter is made of mixed cellulose ester membrane for PCM (Phase Contrast Microscopy) and polycarbonate for TEM (Transmission Electron Microscopy)
Amended water - Water to which a surfactant (wetting agent) has been added to increase the penetrating ability of the liquid.
Asbestos - Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated or altered. Asbestos also includes PACM, as defined below.
Asbestos-containing material (ACM) - Any material containing more than one percent asbestos.
Asbestos contaminated elements (ACE) - Building elements such as ceilings, walls, lights, or ductwork that are contaminated with asbestos.
Asbestos-containing waste material - Asbestos-containing material or asbestos contaminated objects requiring disposal.
Asbestos waste decontamination facility - A system consisting of drum/bag washing facilities and a temporary storage area for cleaned containers of asbestos waste. Used as the exit for

waste and equipment leaving the regulated area. In an emergency, it may be used to evacuate personnel.

Authorized person - Any person authorized by the Exchange, the Contractor, or government agency and required by work duties to be present in regulated areas.

Authorized visitor - Any person approved by the Exchange; the contractor; or any government agency having jurisdiction over the regulated area.

Barrier - Any surface that isolates the regulated area and inhibits fiber migration from the regulated area.

Containment Barrier - An airtight barrier consisting of walls, floors, and/or ceilings of sealed plastic sheeting which surrounds and seals the outer perimeter of the regulated area.

Critical Barrier - The barrier responsible for isolating the regulated area from adjacent spaces, typically constructed of plastic sheeting secured in place at openings such as doors, windows, or any other
opening into the regulated area.

Primary Barrier - Barriers placed over critical barriers and exposed directly to abatement work.

Secondary Barrier - Any additional sheeting used to isolate and provide protection from debris during abatement work.

Breathing zone - The hemisphere forward of the shoulders with a radius of about 150 - 225 mm (6 - 9 inches) from the worker's nose.

Bridging encapsulant - An encapsulant that forms a layer on the surface of the ACM.

Building/facility owner - The legal entity, including a lessee, which exercises control over management and recordkeeping functions relating to a building and/or facility in which asbestos activities take place.

Bulk testing - The collection and analysis of suspect asbestos containing materials.

Certified Industrial Hygienist (CIH) - One certified in practice of industrial hygiene by the American Board of Industrial Hygiene. An industrial hygienist Certified in Comprehensive Practice by the American Board of Industrial Hygiene.

Class I asbestos work - Activities involving the removal of Thermal System Insulation (TSI) and surfacing ACM and Presumed Asbestos Containing Material (PACM).

Class II asbestos work - Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic.

Clean room/Changing room - An uncontaminated room having facilities for the storage of employee's street clothing and uncontaminated materials and equipment.

Clearance sample - The final air sample taken after all asbestos work has been done and visually inspected. Performed by the Exchange industrial hygiene consultant (EPIH).

Closely resemble - The major workplace conditions which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

Competent person - In addition to the definition in 29 CFR 1926.32(f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f); in addition, for Class I and II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

Contractor's Professional Industrial Hygienist (CPIH) - The Contractor's industrial hygienist. The industrial hygienist must meet the qualification requirements of the PIH.

Count - Refers to the fiber count or the average number of fibers greater than five microns in length per cubic centimeter of air.

Decontamination area/unit - An enclosed area adjacent to and connected to the regulated area and consisting of an equipment room, shower room, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Demolition - The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Disposal bag - Typically 6 mil thick siftproof, dustproof, leaktight container used to package and transport asbestos waste from regulated areas to the approved landfill. Each bag/container must be labeled/marked in accordance with EPA, OSHA and DOT requirements.
Disturbance - Activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. Disturbance includes cutting away small amounts of ACM or PACM, no greater than the amount that can be contained in one standard sized glove bag or waste bag in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or disposal bag which shall not exceed 60 inches in length or width.
Drum - A rigid, impermeable container made of cardboard fiber, plastic, or metal which can be sealed in order to be siftproof, dustproof, and leaktight.
Employee exposure - The exposure to airborne asbestos that would occur if the employee were not wearing respiratory protection equipment.
Encapsulant - A material that surrounds or embeds asbestos fibers in an adhesive matrix and prevents the release of fibers.
Encapsulation - Treating ACM with an encapsulant.
Enclosure - The construction of an air tight, impermeable, permanent barrier around ACM to control the release of asbestos fibers from the material and also eliminate access to the material.
Equipment room - A contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.
Exchange representative Industrial Hygienist (EPIH/CIH) – Exchange-retained or post or base Professional Industrial Hygienist.
Exchange Representative - The Exchange official responsible for on-going project work. Normally the Contracting Officer or Contracting Officer Representative.
Fiber - A particulate form of asbestos, 5 microns or longer, with a length to width ratio of at least 3 to 1.
Fibers per cubic centimeter (f/cc) - Abbreviation for fibers per cubic centimeter, used to describe the level of asbestos fibers in air.
Filter - Media used in respirators, vacuums, or other machines to remove particulate from air.
Firestopping - Material used to close the open parts of a structure in order to prevent a fire from spreading.
Friable asbestos containing material - Any material containing more than 1 percent asbestos as determined using the method specified in Appendix A, Subpart F, 40 CFR 763, Section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
Glovebag - Not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which materials and tools may be handled.
High efficiency particulate air (HEPA) filter - A filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 microns or greater in diameter.
HEPA vacuum - Vacuum collection equipment equipped with a HEPA filter system capable of collecting and retaining asbestos fibers.
Homogeneous area - An area of surfacing, thermal system insulation or miscellaneous ACM that is uniform in color, texture and date of application.
HVAC - Heating, Ventilation and Air Conditioning
Industrial hygienist - A professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards. Meets definition requirements of the American Industrial Hygiene Association (AIHA).
Industrial hygienist technician - A person working under the direction of an IH or CIH who has special training, experience, certifications and licenses required for the industrial hygiene work assigned.

Intact - The ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.
Lockdown - Applying encapsulant, after a final visual inspection, on all abated surfaces at the conclusion of ACM removal prior to removal of critical barriers.
National Emission Standards for Hazardous Air Pollutants (NESHAP's) -
EPA's rule to control emissions of asbestos to the environment.
Negative initial exposure assessment - A demonstration by the employer which complies with the criteria in 29 CFR 1926.1101 (f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PEL's.
Negative pressure - Air pressure which is lower than the surrounding area, created by exhausting air from a sealed regulated area through HEPA equipped filtration units. OSHA requires maintaining -0.02" water gauge inside the negative pressure enclosure.
Negative pressure respirator - A respirator in which the air pressure inside the facepiece is negative during inhalation relative to the air outside the respirator.
Non-friable ACM - Material that contains more than 1 percent asbestos but cannot be crumbled, pulverized, or reduced to powder by hand pressure.
Organic vapor cartridge - The type of cartridge used on air purifying respirators for organic vapor exposures.
Outside air - The air outside buildings and structures, including, but not limited to, the air under a bridge or in an open ferry dock.
Owner/operator - Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.
Penetrating encapsulant - Encapsulant that is absorbed into the ACM matrix without leaving a surface layer.
Personal sampling/monitoring - Representative air samples obtained in the breathing zone of the person using a cassette and battery operated pump to determine asbestos exposure.
Permissible exposure limit (PEL) - The level of exposure OSHA allows for an 8 hour time weighted average. For asbestos fibers, the PEL is 0.1 fibers per cc.
Polarized light microscopy (PLM) - Light microscopy using dispersion staining techniques and refractive indices to identify and quantify the type(s) of asbestos present in a bulk sample.
Polyethylene sheeting - Strong plastic barrier material 4 to 6 mils thick, semi-transparent, sometimes flame retardant in compliance with NFPA 241.
Positive/negative fit check - A method of verifying the fit of a respirator by closing off the filters and breathing in or closing off the exhalation valve and breathing out while detecting leakage of the respirator.
Presumed ACM (PACM) - Thermal system insulation, surfacing, and flooring material installed in buildings prior to 1981. If the building owner has actual knowledge, or should have known through the exercise of due diligence that other materials are ACM, they too must be treated as PACM. The designation of PACM may be rebutted pursuant to 29 CFR 1926.1101 (k)(5).
Professional IH - An IH who meets the definition requirements of AIHA; meets the definition requirements of OSHA as a "Competent Person" at 29 CFR 1926.1101 (b); has completed two specialized EPA approved courses on management and supervision of asbestos abatement projects; has formal training in respiratory protection and waste disposal; and has a minimum of four projects of similar complexity with this project of which at least three projects serving as the supervisory IH.
Project designer - A person who has successfully completed the training requirements for an asbestos abatement project designer as required by 40 CFR 763 Appendix C, Part I; (B)(5).
Protection factor - A value assigned by OSHA/NIOSH to indicate the assigned protection a respirator should provide if worn properly. The number indicates the reduction of exposure level from outside to inside the respirator.
Qualitative fit test (QLFT) - A fit test using a challenge material that can be sensed by the wearer if leakage in the respirator occurs.

Quantitative fit test (QNFT) - A fit test using a challenge material which is quantified outside and inside the respirator thus allowing the determination of the actual fit factor.
Regulated area - An area established by the employer to demarcate where Class I, II, III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work may accumulate; and a work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed the PEL.
Regulated ACM (RACM) - Friable ACM; Category I nonfriable ACM that has become friable; Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or; Category II nonfriable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of the demolition or renovation operation.
Removal - All operations where ACM, PACM and/or RACM is taken out or stripped from structures or substrates, including demolition operations.
Renovation - Altering a facility or one or more facility components in any way, including the stripping or removal of asbestos from a facility component which does not involve demolition activity.
Repair - Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.
Shower room - The portion of the PDF where personnel shower before leaving the regulated area. Also used for bag/drum decontamination in the EDF.
Standard operating procedures (SOP's) - Asbestos work procedures required to be submitted by the contractor before work begins.
Supplied air respirator (SAR) - A respirator that utilizes an air supply separate from the air in the regulated area.
Surfacing ACM - A material containing more than 1 percent asbestos that is sprayed, troweled on or otherwise applied to surfaces for acoustical, fireproofing and other purposes.
Surfactant - A chemical added to water to decrease water's surface tension thus making it more penetrating into ACM.
Thermal system ACM - A material containing more than 1 percent asbestos applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.
Transmission electron microscopy (TEM) - A microscopy method that can identify and count asbestos fibers.
Visible emissions - Any emissions, which are visually detectable without the aid of instruments, coming from ACM/PACM/RACM or ACM waste material.
Waste/Equipment decontamination area (W/EDA) – The area in which waste is packaged and equipment is decontaminated before removal from the regulated area.
Waste generator - Any owner or operator whose act or process produces asbestos-containing waste material.
Waste shipment record - The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.
Wet cleaning - The process of thoroughly eliminating, by wet methods, any asbestos contamination from surfaces or objects.

1.10 GENERAL APPLICABILITY OF CODES, REGULATIONS, AND STANDARDS

A. All work under this contract shall be done in strict accordance with all applicable federal, State, and local laws and regulations.

B. The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirement(s) shall be used.

C. Contractor will have copies of all standards, regulations, codes and other applicable documents, available at the worksite in the clean change area of the worker decontamination system.

1.11 CONTRACTOR RESPONSIBILITY

A. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State and Local regulations related to any and all aspects of the abatement project. The Contractor is responsible for providing and maintaining training, accreditations, medical exams, medical records, personal protective equipment as required by applicable Federal, State and Local regulations. The contractor shall hold the Exchange and EPIH/CIH consultants harmless for any failure to comply with any applicable work, packaging, transporting, disposal, safety, health, or environmental requirement on the part of himself, his employees, or his subcontractors. The contractor will incur all costs of the CPIH, including all sampling/analytical costs to assure compliance with OSHA/EPA/State requirements.

1.12 FEDERAL REQUIREMENTS

A. Federal requirements which govern some aspect of asbestos abatement include, but are not limited to, the following regulations.

1. Occupational Safety and Health Administration **(OSHA)**

a. Title 29 CFR 1926.1101 - Construction Standard for Asbestos
b. Title 29 CFR 1910.132 - Personal Protective Equipment
c. Title 29 CFR 1910.134 - Respiratory Protection
d. Title 29 CFR 1926 - Construction Industry Standards
e. Title 29 CFR 1910.20 - Access to Employee Exposure and Medical Records
f. Title 29 CFR 1910.1200 - Hazard Communication
g. Title 29 CFR 1910.151 - Medical and First Aid

2. Environmental Protection Agency (EPA)

a. 40 CFR 61 Subpart A and M (Revised Subpart B) - National Emission Standard for Hazardous Air Pollutants - Asbestos.
b. 40 CFR 763.80 - Asbestos Hazard Emergency Response Act (AHERA)

3. Department of Transportation (DOT) Title 49 CFR 100 - 185 - Transportation

1.13 STATE REQUIREMENTS

A. State requirements that apply to the asbestos abatement work, disposal, clearance, etc., include, but are not limited to, the following:

1. 18 VAC 15-20 -10 thru 880 – Virginia Board for Asbestos, Lead, and Home Inspectors Virginia Asbestos Regulations

1.14 LOCAL REQUIREMENTS

A. If applicable local requirements are more stringent than federal or state standards, the local standards are to be followed.

Not Applicable

1.15 STANDARDS

A. Standards which govern asbestos abatement activities include, but are not limited to, the following:

1. American National Standards Institute (ANSI) Z9.2-79 – Fundamentals Governing the Design and Operation of Local Exhaust Systems Z88.2 -Practices for Respiratory Protection.

2. Underwriters Laboratories (UL)586-90 - UL Standard for Safety of HEPA filter Units, 7th Edition.

B. Resilient Floor Covering Institute (RFCI):

1. Recommended work practices for Removal of Resilient Floor Coverings.

1.16 NOTICES

A. State and Local agencies: Send written notification 20 calendar days prior to the start date of the removal as required by Virginia Department of Labor and Industry regulations including the base or post environmental office prior to beginning any work on ACM as follows:

Submit Notification to: **ASBESTOS PROGRAM**
Department of Labor and Industry
Powers-Taylor Building
13 South Thirteenth Street
Richmond, VA 23219
FAX (804) 371-7634

B. A fee is required at the time of notification per the following schedule:

1. $50 for each project equal to or greater than 10 linear feet or 10 square feet up to and including 260 linear feet and 160 square feet.

2. $160 for each project equal to or greater than 260 linear feet or 160 square feet up to and including 2600 linear feet and 1600 square feet.

3. $470 for each project equal to or greater than 2600 linear feet or 1600 square feet.

4. If the amount of the asbestos is reported in both linear feet and square feet the amounts will be added and treated as if the total were in all square feet for this subsection.

5. $15 for each amended notification.

6. Notifications required by the United States Environmental Protection Agency's NESHAPS regulation must be sent to the Department as described above except the notification period is 10 working days. *Note: EPA does not allow facsimile transmission. NESHAPS required notifications must also be sent to EPA at the address below:

Asbestos Coordinator
USEPA
Region III
Mail Code 3LC62
1650 Arch Street
Philadelphia, PA 19103-2029

C. Copies of notifications shall be submitted to the Exchange Contracting Officer and post or base environmental office for the facility's records in the same time frame notification is given to EPA, State, and Local authorities.

1.17 PERMITS/LICENSES

A. The contractor shall apply for and have all required permits and licenses to perform asbestos abatement work as required by Federal, State, and Local regulations as follows:

Virginia Department of Professional and Occupational Regulation:
DPOR – Asbestos Contractor's License
DPOR – Asbestos Supervisor's License
DPOR – Asbestos Worker's License

1.18 POSTING AND FILING OF REGULATIONS

A. Contractor will maintain two (2) copies of applicable federal, state, and local regulations. Post one copy of each at the regulated area where workers will have daily access to the regulations and keep another copy in the Contractor's office.

1.19 Exchange RESPONSIBILITIES

Prior to commencement of work:

A. Notify occupants adjacent to regulated areas of project dates and requirements for relocation, if needed. Arrangements must be made prior to starting work for relocation of desks, files, equipment and personal possessions to avoid unauthorized access into the regulated area.

Note: Notification of adjacent personnel is required by OSHA in 29 CFR 1926.1101 (k) to prevent unnecessary or unauthorized access to the regulated area.

1.20 SITE SECURITY

A. Regulated area access is to be restricted only to authorized, trained/accredited and protected personnel. These may include the Contractor's employees, employees of

Subcontractors, authorized Exchange employees and representatives, post or base State and local inspectors, and any other designated individuals. A list of authorized personnel shall be established prior to commencing the project and be posted in the clean room of the decontamination unit.

B. Entry into the regulated area by unauthorized individuals shall be reported immediately to the Competent Person by anyone observing the entry. The Competent person shall immediately notify the Contracting Officer's Representative.

C. A log book shall be maintained in the clean room of the decontamination unit. Anyone who enters the regulated area must record their name, affiliation, time in, and time out for each entry.

D. Access to the regulated area shall be through of a critical barrier doorway. All other access (doors, windows, hallways, etc.) shall be sealed or locked to prevent entry to or exit from the regulated area. The only exceptions for this requirement are the waste/equipment loadout area which shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits. Emergency exits shall not be locked from the inside, however, they shall be sealed with poly sheeting and taped until needed.

E. The Contractor's Competent Person shall control site security during abatement operations in order to isolate work in progress and protect adjacent personnel. A 24 hour security system shall be provided at the entrance to the regulated area to assure that all entrants are logged in/out and that only authorized personnel are allowed entrance.

F. The Contractor will have the Exchange's assistance in notifying adjacent personnel of the presence, location and quantity of ACM in the regulated area and enforcement of restricted access by the Exchange associates or representatives.

G. The regulated area shall be locked during non-working hours and secured by the Exchange.

1.21 EMERGENCY ACTION PLAN AND ARRANGEMENTS

A. An Emergency Action Plan shall be developed by the Contractor prior to commencing abatement activities and shall be agreed to by the Contractor and the Exchange. The Plan shall meet the requirements of 29 CFR 1910.38 (a);(b).

B. Emergency procedures shall be in written form and prominently posted and available in the regulated area. Everyone, prior to entering the regulated area, must read and sign these procedures to acknowledge understanding of the regulated area layout, location of emergency exits and emergency procedures.

C. Emergency planning shall include written notification of police, fire, and emergency medical personnel of planned abatement activities; work schedule and layout of regulated area, particularly barriers that may affect response capabilities.

D. Emergency planning shall include consideration of fire, explosion, hazardous atmospheres, electrical hazards, slips/trips and falls, confined spaces, and heat stress illness. Written procedures for response to emergency situations shall be developed and employee training in procedures shall be provided.

E. Employees shall be trained in regulated area/site evacuation procedures in the event of workplace emergencies.

1. For non life-threatening situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers, if necessary, before exiting the regulated area to obtain proper medical treatment.

2. For life-threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, remove them from the regulated area, and secure proper medical treatment.

F. Telephone numbers of all emergency response personnel shall be prominently posted in the clean room, along with the location of the nearest telephone.

G. The Contractor shall provide verification of first aid/CPR training for personnel responsible for providing first aid/CPR. OSHA requires medical assistance within 3 minutes of a life-threatening injury/illness. Bloodborne Pathogen training shall also be verified for those personnel required to provide first aid/CPR.

H. The Emergency Action Plan shall provide for a Contingency Plan in the event that an incident occurs that may require the modification of the standard operating procedures during abatement. Such incidents include, but are not limited to, fire; accident; and power failure. The Contractor shall detail procedures to be followed in the event of an incident assuring that work is stopped and wetting is continued until correction of the problem.

1.22 PRE-START MEETING

A. Prior to commencing the work, the Contractor shall meet with the VPCIH to present and review, as appropriate, the items following this paragraph. The Contractor's Competent Person(s) who will be on-site shall participate in the pre-start meeting. The pre-start meeting is to discuss and determine procedures to be used during the project. At this meeting, the Contractor shall provide:

1. Proof of Contractor licensing.

2. Proof the Competent Person is trained and accredited and approved for working in this State. Verification of the experience of the Competent Person shall also be presented.

3. A list of all workers who will participate in the project, including experience and verification of training and accreditation.

4. A list of and verification of training for all personnel who have current first-aid/CPR training. A minimum of one person per shift must have adequate training.

5. Current medical written opinions for all personnel working on-site meeting the requirements of 29 CFR 1926.1101 (m).

6. Current fit-tests for all personnel wearing respirators on-site meeting the requirements of 29 CFR 1926.1101 (h) and Appendix C.

7. A copy of the Contractor's Standard Operating Procedures for Asbestos Abatement. In these procedures, the following information must be detailed, specific for this project:

   a. Regulated area preparation procedures;
   b Notification requirements procedure of Contractor as required in 29 CFR 1926.1101 (d);
   c and Decontamination procedures for employees;
   d Class II abatement methods/procedures and equipment to be used;
   e Personal protective equipment to be used;

8. At this meeting the Contractor shall provide all submittals as required.

9. Procedures for handling, packaging and disposal of asbestos waste.

10. Emergency Action Plan and Contingency Plan procedures.

11. Copies of Notification to State and local authorities as may be required.

12. Information of waste disposal site and hauler.

1.23 PERSONNEL

A. Administrative and supervisory personnel shall consist of a qualified Competent Person as defined by OSHA in the Construction Standards and the Asbestos Construction Standard; Contractor Professional Industrial Hygienist and Industrial Hygiene Technicians. These employees are the Contractor's representatives responsible for compliance with these specifications and all other applicable requirements.

B. Non-supervisory personnel shall consist of an adequate number of qualified personnel to meet the schedule requirements of the project. Personnel shall meet required qualifications. Personnel utilized on-site shall be pre-approved by the Exchange representative. A request for approval shall be submitted for any person to be employed during the project giving the person's name; social security number; qualifications; accreditation card with picture; Certificate of Worker's Acknowledgment; and Affidavit of Medical Surveillance and Respiratory Protection and current Respirator Fit Test.

C. Minimum qualifications for Contractor and assigned personnel are:

1. The Contractor has conducted within the last three (3) years, three (3) projects of similar complexity and dollar value as this project; has not been cited and penalized for serious violations of asbestos regulations in the past three (3) years; has adequate liability/occurrence insurance for asbestos work; is licensed in applicable states; has adequate and qualified personnel available to complete the work; has comprehensive standard operating procedures for asbestos work; has adequate materials, equipment and supplies to perform the work.

2. The Competent Person has four (4) years of abatement experience of which two (2) years were as the Competent Person on the project; meets the OSHA definition of a Competent Person; has been the Competent Person on two (2) projects of similar size and complexity as this project; has completed EPA AHERA/OSHA/State/Local training requirements/accreditation(s) and refreshers;

and has all required OSHA documentation related to medical and respiratory protection.

3. The Contractor Professional Industrial Hygienist (CPIH) shall have five (5) years of monitoring experience and supervision of asbestos abatement projects; has participated as senior IH on five (5) abatement projects, three (3) of which are similar in size and complexity as this project; has developed at least one complete standard operating procedure for asbestos abatement; has trained abatement personnel for three (3) years; has specialized EPA AHERA/OSHA training in asbestos abatement management, respiratory protection, waste disposal and asbestos inspection; has completed the NIOSH 582 Course, Contractor/Supervisor course; and has appropriate medical/respiratory protection records/documentation.

4. The Abatement Personnel shall have completed the EPA AHERA/OSHA abatement worker course; have training on the standard operating procedures of the Contractor; has one year of asbestos abatement experience; has applicable medical and respiratory protection documentation; has certificate of training/current refresher and State accreditation/license.

1.24 GENERAL - RESPIRATORY PROTECTION PROGRAM

A. The Contractor shall develop and implement a Respiratory Protection Program (RPP) which is in compliance with the January 8, 1998 OSHA requirements found at 29 CFR 1926.1101 and 29 CFR 1910.132;134. ANSI Standard Z88.2-1992 provides excellent guidance for developing a respiratory protection program. All respirators used must be NIOSH approved for asbestos abatement activities. The written respiratory protection shall, at a minimum, contain the basic requirements found at 29 CFR 1910.134 (c)(1)(i - ix) - Respiratory Protection Program.

1.25 RESPIRATORY PROTECTION PROGRAM COORDINATOR

A. The Respiratory Protection Program Coordinator (RPPC) must be identified and shall have two (2) years experience coordinating the program. The RPPC must provide a signed statement attesting to the fact that the program meets the above requirements.

1.26 SELECTION AND USE OF RESPIRATORS

A. The procedure for the selection and use of respirators must be submitted to the Exchange as part of the Contractor's qualification. The procedure must written clearly enough for workers to understand. A copy of the Respiratory Protection Program must be available in the clean room of the decontamination unit for reference by employees or authorized visitors.

1.27 MINIMUM RESPIRATORY PROTECTION

A. Minimum respiratory protection shall be a half face, HEPA filtered, air purifying respirator when fiber levels are maintained consistently at or below 0.1 f/cc. A higher level of respiratory protection may be provided or required, depending on fiber levels. Respirator selection shall meet the requirements of 29 CFR 1926.1101 (h); Table 1, except as indicated in this paragraph. Abatement personnel must have a respirator for their exclusive use.

1.28 MEDICAL WRITTEN OPINION

A. No employee shall be allowed to wear a respirator unless a physician has determined they are capable of doing so and has issued a current written opinion for that person.

1.29 RESPIRATOR FIT TEST

A. All personnel wearing respirators shall have a current qualitative/quantitative fit test which was conducted in accordance with 29 CFR 1910.134 (f) and Appendix A. Fit tests shall be done for PAPR's which have been put into a failure mode.

1.30 RESPIRATOR FIT CHECK

A. The Competent Person shall assure that the positive/negative fit check is done each time the respirator is donned by an employee. Headcoverings must cover respirator headstraps. Any situation that prevents an effective facepiece to face seal as evidenced by failure of a fit check shall preclude that person from wearing a respirator until resolution of the problem.

1.31 MAINTENANCE AND CARE OF RESPIRATORS

A. The Respiratory Protection Program Coordinator shall submit evidence and documentation showing compliance with 29 CFR 1910.134 (h) Maintenance and care of respirators.

1.32 TRAINING OF ABATEMENT PERSONNEL

A. Prior to beginning any abatement activity, all personnel shall be trained in accordance with OSHA 29 CFR 1926.1101 (k)(9) and any additional State/Local requirements. Training must include, at a minimum, the elements listed at 29 CFR 1926.1101 (k)(9)(viii). Training shall have been conducted by a third party, EPA/State approved trainer meeting the requirements of EPA 40 CFR 763 Appendix C (AHERA MAP). Initial training certificates and current refresher and accreditation proof must be submitted for each person working at the site.

1.33 MEDICAL EXAMINATIONS

A. Medical examinations meeting the requirements of 29 CFR 1926.1101 (m) shall be provided for all personnel working in the regulated area, regardless of exposure levels. The physician's written opinion as required by 29 CFR 1926.1101 (m)(4) shall be provided for each person and shall include in the opinion the person has been evaluated for working in a heat stress environment while wearing personal protective equipment and is able to perform the work.

1.34 PERSONAL PROTECTIVE EQUIPMENT

A. Provide whole body clothing, head coverings, foot coverings and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA at 29 CFR 1910.132 (d). The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the project. Duct tape shall be used to secure all suit sleeves to wrists and to secure foot coverings at the ankle.

1.35 REGULATED AREA ENTRY PROCEDURE FOR CLASS II NON-FRIABLE WORK

A. Worker protection shall meet the most stringent requirements. The Competent Person shall ensure that each time workers enter the regulated area, they remove ALL street clothes in a designated space for storage of personal belongings and put on new disposable coveralls, head coverings, a clean respirator, and then proceed through the an air lock to the regulated area.

1.36 DECONTAMINATION PROCEDURE

A. The Competent Person shall require all personnel to adhere to following decontamination procedures whenever they leave the regulated area.

1. When exiting the regulated area, remove all disposable PPE and dispose of in a disposal bag provided in the regulated area.

2. Carefully decontaminate and clean the respirator. Put in a clean container/bag.

1.37 REGULATED AREA REQUIREMENTS

A. The Competent Person shall meet all requirements of 29 CFR 1926.1101 (o) and assure that all requirements for Class I glovebag regulated areas at 29 CFR 1926.1101 (e) are met applicable to Class II work. All personnel in the regulated area shall not be allowed to eat, drink, smoke, chew tobacco or gum, apply cosmetics, or in any way interfere with the fit of their respirator.

1.38 DESCRIPTION:

A. Provide each regulated area with a fiber drum with a disposal bag in it for personnel waste materials.

1.39 WASTE/EQUIPMENT DECONTAMINATION AREA (W/EDA):

A. The Competent Person shall provide a W/EDA for removal of all waste, equipment and contaminated material from the regulated area.

1.40 WASTE/EQUIPMENT DECONTAMINATION PROCEDURES:

A. Contain all waste in 6 mil poly bags. Clean/decontaminate bags and pass through a double 6 mil flap doorway into another bag or fiber drum. Remove to disposal dumpster/gondola/vehicle. At no time shall unprotected personnel from the clean side be allowed to enter the regulated area.

PART 2 – PRODUCTS

2.1 GENERAL REQUIREMENTS (ALL ABATEMENT PROJECTS)

A. Prior to the start of work, the Contractor shall provide and maintain a sufficient quantity of materials and equipment to assure continuous and efficient work throughout the duration of the project. Work shall not start unless the following items have been delivered to the site and the CPIH has submitted verification to the Exchange representative to this effect:

1. All materials shall be delivered in their original package, container or bundle bearing the name of the manufacturer and the brand name (where applicable).
2. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Flammable materials cannot be stored inside buildings. Replacement materials shall be stored outside of the regulated/work area until abatement is completed.
3. The Contractor shall not block or hinder use of buildings by Exchange associates, patrons, or other visitors to the facility in partially occupied buildings by placing materials/equipment in any unauthorized place.
4. The Competent Person shall inspect for damaged, deteriorating or previously used materials. Such materials shall not be used and shall be removed from the worksite and disposed of properly.
5. Poly sheeting for critical barriers/floors in the regulated area shall be 6 mil.
6. If required, the method of attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and the Exchange representative and selected to minimize damage to equipment and surfaces.
7. An adequate number of infra-red heating units, HEPA vacuums, scrapers, sprayers, nylon brushes, brooms, disposable mops, rags, sponges, staple guns, shovels, ladders and scaffolding of suitable height and length as well as meeting OSHA requirements shall be provided. Fall protection devices, water hose to reach all areas in the regulated area, airless spray equipment, and any other tools, materials or equipment required to conduct the abatement project shall also be provided. All electrically operated hand tools, equipment, electric cords shall be equipped with GFCI protection.
8. Special protection for objects in the regulated area shall be detailed. (e.g., plywood over carpeting or hardwood floors to prevent damage from scaffolds, water, and falling material.)
9. Impermeable fiberboard drums and disposal bags 2 layers of 6 mil, for asbestos waste shall be pre-printed with labels, markings and address as required by OSHA, EPA and DOT regulations.
10. The Exchange shall be provided a copy of the MSDS as required for all hazardous chemicals under OSHA 29 CFR 1910.1200 - Hazard Communication. Chlorinated compounds shall not be used with any spray adhesive or other product. Appropriate encapsulant(s) shall be provided.
11. OSHA DANGER demarcation signs, as many and as required by OSHA 29 CFR 1926.1101(k)(7) shall be provided and placed by the Competent Person. All other posters and notices required by Federal and State regulations shall be posted in the Clean Room.
12. Adequate and appropriate PPE for the project and number of personnel/shifts shall be provided. All personal protective equipment issued must be based on a hazard assessment conducted under 29 CFR 1910.132(d).

2.2 CONTAINMENT BARRIERS AND COVERINGS IN THE REGULATED AREA

A. Using critical barriers, seal off the perimeter to the regulated area to completely isolate the regulated area from adjacent spaces. All horizontal surfaces, as required, in the regulated area must be covered with 2 layers of 6 mil fire retardant poly to prevent contamination and to facilitate clean-up. Should adjacent areas become contaminated, immediately stop work and clean up the contamination at no additional cost to the Government. Provide firestopping and identify all fire barrier penetrations due to abatement work as specified in Section 2.2.8; Section 07 92 00, FIRESTOPPING. 2.2.2 PREPARATION PRIOR TO SEALING THE REGULATED AREA

B. Place all tools, scaffolding, materials and equipment needed for working in the regulated area prior to erecting any plastic sheeting. Remove all uncontaminated removable furniture, equipment and/or supplies from the regulated area before commencing work, or completely cover with two layers of 6-mil fire retardant poly sheeting and secure with duct tape. Lock out and tag out any HVAC systems in the regulated area.

2.3 CONTROLLING ACCESS TO THE REGULATED AREA

A. Access to the regulated area is allowed only through the personnel decontamination facility (PDF), if required. All other means of access shall be eliminated and OSHA DANGER demarcation signs posted as required by OSHA. If the regulated area is adjacent to or within view of an occupied area, provide a visual barrier of 6 mil opaque fire retardant poly sheeting to prevent building occupant observation. If the adjacent area is accessible to the public, the barrier must be solid.

2.4 CRITICAL BARRIERS

A. Completely separate any openings into the regulated area from adjacent areas using fire retardant poly at least 6 mils thick and duct tape. Individually seal with two layers of 6 mil poly and duct tape all HVAC openings into the regulated area. Individually seal all lighting fixtures, clocks, doors, windows, convectors, speakers, or any other objects in the regulated area. Heat must be shut off any objects covered with poly.

2.5 SECONDARY BARRIERS:

A. A loose layer of 6 mil fire retardant poly shall be used as a drop cloth to protect the floor/horizontal surfaces from debris generated during the Class II work, except for floor tile abatement. This layer shall be replaced as needed during the work.

2.6 EXTENSION OF THE REGULATED AREA

A. If the enclosure of the regulated area is breached in any way that could allow contamination to occur, the affected area shall be included in the regulated area and constructed as per this section. If the affected area cannot be added to the regulated area, decontamination measures must be started immediately and continue until air monitoring indicates background levels are met.

2.7 FIRESTOPPING:

A. Through penetrations caused by cables, cable trays, pipes, sleeves must be firestopped with a fire-rated firestop system providing an air tight seal.

B. Firestop materials that are not equal to the wall or ceiling penetrated shall be brought to the attention of the Exchange Representative. The Contractor shall list all areas of penetration, the type of sealant used, and whether or not the location is fire rated. Any discovery of penetrations during abatement shall be brought to the attention of the Exchange Representative immediately. All walls, floors and ceilings are considered fire rated unless otherwise determined by the Exchange Representative or Fire Marshall.

C. Any visible openings whether or not caused by a penetration shall be reported by the Contractor to the Exhange Representative for a sealant system determination. Firestops shall meet ASTM E814 and UL 1479 requirements for the opening size, penetrant, and fire rating needed.

2.8 MONITORING, INSPECTION AND TESTING

A. Contractor shall perform throughout abatement work monitoring, inspection and testing inside and around the regulated area in accordance with the OSHA requirements and these specifications. The CPIH shall continuously inspect and monitor conditions inside the regulated area to ensure compliance with these specifications. In addition, the CPIH shall personally manage air sample collection, analysis, and evaluation for personnel, regulated area, and adjacent area samples to satisfy OSHA requirements. Additional inspection and testing requirements are also indicated in other parts of this specification.

B. The Exchange will employ an independent industrial hygienist (EPIH/CIH) consultant and/or use IH from base or post to perform various services on behalf of the Exchange. The EPIH/CIH will perform the necessary monitoring, inspection, testing, and other support services to ensure that Exchange patrons, associates, and visitors will not be adversely affected by the abatement work, and that the abatement work proceeds in accordance with these specifications, that the abated areas or abated buildings have been successfully decontaminated. The work of the EPIH/CIH consultant in no way relieves the Contractor from their responsibility to perform the work in accordance with contract/specification requirements, to perform continuous inspection, monitoring and testing for the safety of their employees, and to perform other such services as specified. The cost of the EPIH/CIH and their services will be borne by the Exchange except for any repeat of final inspection and testing that may be required due to unsatisfactory initial results by Contractor. Any repeated final inspections and/or testing, if required, will be paid for by the Contractor. This professional shall have the Virginia DPOR Asbestos Project Monitor's license.

C. If fibers counted by the EPIH/CIH during abatement work inside the regulated area, utilizing the NIOSH 7400 air monitoring method, exceed 0.05 f/cc, the Contractor shall stop work. If fiber levels exceed 0.01 f/cc outside the regulated area, the Contractor shall stop work. The Contractor may request confirmation of the results by analysis of the samples by TEM. Request must be in writing and submitted to the Exchange representative. Cost for the confirmation of results will be borne by the Contractor for both the collection and analysis of samples and for the time delay that may/does result for this confirmation. Confirmation sampling and analysis will be the responsibility of the CPIH with review and approval of the EPIH/CIH. An agreement between the CPIH and the EPIH/CIH shall be reached on the exact details of the confirmation effort, in writing, including such things as the number of samples, location, collection, quality control on-site, analytical laboratory, interpretation of results and any follow-up actions. This written agreement shall be co-signed by the IH's and delivered to the Exchange representative.

2.9 SCOPE OF SERVICES OF THE EPIH/CIH CONSULTANT

A. The purpose of the work of the EPIH/CIH is to: assure quality; resolve problems; and prevent the spread of contamination beyond the regulated area. In addition, their work includes performing the final inspection and testing to determine whether the regulated area or building has been

adequately decontaminated. All air monitoring is to be done utilizing PCM/TEM. The EPIH/CIH will perform the following tasks:

1. Task 1: Establish background levels before abatement begins by collecting background samples. Retain samples for possible TEM analysis.

2. Task 2: Perform continuous air monitoring, inspection, and testing outside the regulated area during actual abatement work to detect any faults in the regulated area isolation and any adverse impact on the surroundings from regulated area activities.
3. Task 3: Perform unannounced visits to spot check overall compliance of work with contract/specifications. These visits may include any inspection, monitoring, and testing inside and outside the regulated area and all aspects of the operation except personnel monitoring.
4. Task 4: Provide support to the Exchange representative such as evaluation of submittals from the Contractor, resolution of unforeseen developments, etc.
5. Task 5: Perform, in the presence of the Exchange representative, final inspection and testing of a decontaminated regulated area or building at the conclusion of the abatement and clean-up work to certify compliance with all regulations and the Exchange requirements/specifications.
6. Task 6: Issue certificate of decontamination for each regulated area or building and project report.

B. All documentation, inspection results and testing results generated by the EPIH/CIH will be available to the Contractor for information and consideration. The Contractor shall cooperate with and support the EPIH/CIH for efficient and smooth performance of their work.

C. The monitoring and inspection results of the EPIH/CIH will be used by the Exchange to issue any Stop Removal orders to the Contractor during abatement work and to accept or reject a regulated area or building as decontaminated.

D. All air sampling and analysis data will be recorded in an easily readable format showing time, date and location of collection.

2.10 MONITORING, INSPECTION AND TESTING BY CONTRACTOR CPIH

A. The CPIH is responsible for managing all monitoring, inspections, and testing required by these specifications, as well as any and all regulatory requirements adopted by these specifications. The CPIH is responsible for the continuous monitoring of all subsystems and procedures which could affect the health and safety of the Contractor's personnel. Safety and health conditions and the provision of those conditions inside the regulated area for all persons entering the regulated area is the exclusive responsibility of the Contractor/Competent Person. The person performing the personnel and area air monitoring inside the regulated area shall be a CPIH, who shall be trained and shall have specialized field experience in air sampling and analysis. The CPIH shall have a NIOSH 582 Course or equivalent and show proof. The CPIH shall participate in the AIHA Asbestos Analysis Registry or participate in the Proficiency Analytic Testing program of AIHA for fiber counting quality control assurance. The CPIH shall also be an accredited EPA/State Contractor/Supervisor and Building Inspector. The CPIH shall have participated in five abatement projects collecting personal and area samples as well as responsibility for documentation. The analytic laboratory used by the Abatement Contractor to analyze the samples shall be AIHA accredited for asbestos PAT. A daily log documenting all OSHA requirements for air monitoring for asbestos in 29 CFR 1926.1101(f), (g) and Appendix A. This log shall be made available to the Exchange representative and the EPIH/CIH. The log will contain, at a minimum, information on personnel or area sampled, other persons represented by the sample, the date of sample collection, start and stop times for sampling, sample volume, flow rate, and fibers/cc. The CPIH shall collect and analyze samples for each representative job being done in the regulated area, i.e., removal, wetting, clean-up, and load-out. No fewer than two personal samples per shift shall be collected and one area sample per 1,000 square feet

of regulated area where abatement is taking place and one sample per shift in the clean room area shall be collected. In addition to the continuous monitoring required, the CPIH will perform inspection and testing at the final stages of abatement for each regulated area as specified in the CPIH responsibilities.

2.11 STANDARD OPERATING PROCEDURES

A. The Contractor shall have established Standard Operating Procedures (SOP's) in printed form and loose leaf folder consisting of simplified text, diagrams, sketches, and pictures that establish and explain clearly the ways and procedures to be followed during all phases of the work by the contractor's personnel. The SOP's must be modified as needed to address specific requirements of the project. The SOP's shall be submitted for review and approval prior to the start of any abatement work. The minimum topics and areas to be covered by the SOP's are:

1. Minimum Personnel Qualifications
2. Contingency Plans and Arrangements
3. Security and Safety Procedures
4. Respiratory Protection/Personal Protective Equipment Program and Training
5. Medical Surveillance Program and Recordkeeping
6. Regulated Area Requirements for Class II work
7. Decontamination Facilities and Entry/Exit Procedures (PDF and W/EDF)
8. Monitoring, Inspections, and Testing
9. Removal Procedures for Class II Materials
10. Disposal of ACM Waste
11. Regulated Area Decontamination/Clean-up
12. Regulated Area Visual and Air Clearance
13. Project Completion/Closeout

2.12 PRE-START MEETING SUBMITTALS

A. Submit to the Exchange contracting officer or contracting officer representative a minimum of 14 days prior to the pre-start meeting the following for review and approval. Meeting this requirement is a prerequisite for the pre-start meeting for this project.

1. Submit a detailed work schedule for the entire project reflecting contract documents and the phasing/schedule requirements from the CPM chart.
2. Submit a staff organization chart showing all personnel who will be working on the project and their capacity/function. Provide their qualifications, training, accreditations, and licenses, as appropriate.
3. Provide a copy of the "Certificate of Worker's Acknowledgment" and the "Affidavit of Medical Surveillance and Respiratory Protection" for each person.
4. Submit Standard Operating Procedures developed specifically for this project, incorporating the requirements of the specifications, prepared, signed and dated by the CPIH.
5. Submit the specifics of the materials and equipment to be used for this project with brand names, model numbers, performance characteristics, pictures/diagrams, and number available for the following:
    a. HEPA vacuums, air monitoring pumps, calibration devices, infrared heating machines, and emergency power generating system.
    b. Encapsulants, surfactants, hand held sprayers, airless sprayers, fire extinguishers.
    c. Personal protective equipment.

d. Fire safety equipment to be used in the regulated area.

6. Submit the name, location, and phone number of the approved landfill; proof/verification the landfill is approved for ACM disposal; the landfill's requirements for ACM waste; the type of vehicle to be used for transportation; and name, address, and phone number of subcontractor, if used. Proof of asbestos training for transportation personnel shall be provided.

7. Submit required notifications and arrangements made with regulatory agencies having regulatory jurisdiction and the specific contingency/emergency arrangements made with local health, fire, ambulance, hospital authorities and any other notifications/arrangements.

8. Submit the name, location and verification of the laboratory and/or personnel to be used for analysis of air and/or bulk samples. Air monitoring must be done in accordance with OSHA 29 CFR 1926.1101(f) and Appendix A.

9. Submit qualifications verification: Submit the following evidence of qualifications. Make sure that all references are current and verifiable by providing current phone numbers and documentation.

   a. Asbestos Abatement Company: Project experience within the past 3 years; listing projects first most similar to this project: Project Name; Type of Abatement; Duration; Cost; Reference Name/Phone Number; Final Clearance; Completion Date
   b. List of project(s) halted by owner, A/E, IH, regulatory agency in the last 3 years: Project Name; Reason; Date; Reference Name/Number; Resolution
   c. List asbestos regulatory citations, penalties, damages paid and legal actions taken against the company in the last 3 years. Provide copies and all information needed for verification.

10. Submit information on personnel: Provide a resume; address each item completely; provide references; phone numbers; copies of certificates, accreditations, and licenses. Submit an affidavit signed by the CPIH stating that all personnel submitted below have medical records in accordance with OSHA 29 CFR 1926.1101(m) and 29 CFR 1910.20 and that the company has implemented a medical surveillance program and maintains recordkeeping in accordance with the above regulations. Submit the phone number and doctor/clinic/hospital used for medical evaluations.

    a. CPIH: Name; years of abatement experience; list of projects similar to this one; certificates, licenses, accreditations for proof of AHERA/OSHA specialized asbestos training; professional affiliations; number of workers trained; samples of training materials; samples of SOP's developed; medical opinion; current respirator fit test.
    b. Competent Person(s)/Supervisor(s): Number; names; social security numbers; years of abatement experience as Competent Person/Supervisor; list of similar projects as Competent

Person/Supervisor; as a worker; certificates, licenses, accreditations; proof of AHERA/OSHA specialized asbestos training; maximum number of personnel supervised on a project; medical opinion; current respirator fit test.

c. Workers: Numbers; names; social security numbers; years of abatement experience; certificates, licenses, accreditations; training courses in asbestos abatement and respiratory protection; medical opinion; current respirator fit test.

11. Submit copies of State license for asbestos abatement; copy of insurance policy, including exclusions with a letter from agent stating in plain English the coverage provided and the fact that asbestos abatement activities are covered by the policy; copy of SOP's incorporating the requirements of this specification; information on who provides your training, how often; who provides medical surveillance, how often; who does and how is air monitoring conducted; a list of references of independent laboratories/IH's familiar with your air monitoring and standard operating procedures; copies of monitoring results of the five referenced projects listed and analytical method(s) used.

2.13 SUBMITTALS DURING ABATEMENT

A. The Competent Person shall maintain and submit a daily log at the regulated area documenting the dates and times of the following: purpose, attendees and summary of meetings; all personnel entering/exiting the regulated area; document and discuss the resolution of unusual events such as critical barrier breeching, equipment failures, emergencies, and any cause for stopping work; representative air monitoring and results/TWA's/EL's. Submit this daily log to the Exchange representative.

B. The CPIH shall document and maintain the following during abatement and submit as appropriate to the Exchange representative.

1. Inspection and approval of the regulated area preparation prior to start of work and daily during work.
2. Removal of any poly critical/floor barriers.
3. Visual inspection/testing by the CPIH.
4. Packaging and removal of ACM waste from regulated area.
5. Disposal of ACM waste materials; copies of Waste Shipment Records/landfill receipts to the Exchange representative on a weekly basis.

2.14 SUBMITTALS AT COMPLETION OF ABATEMENT

A. The CPIH shall submit a project report consisting of the daily log book requirements and documentation of events during the abatement project including Waste Shipment Records signed by the landfill's agent. The report shall include a certificate of completion, signed and dated by the CPIH, in accordance with Attachment #1.

PART 3 - EXECUTION

3.1 PRE-ABATEMENT MEETING

A. The Exchange representative, upon receipt, review, and substantial approval of all pre-abatement submittals and verification by the CPIH that all materials and equipment required for the project are on the site, will arrange for a pre-abatement meeting between the Contractor, the CPIH, Competent Person(s), the Exchange representative(s), and the EPIH/CIH. The purpose of the meeting is to discuss any aspect of the submittals needing

clarification or amplification and to discuss any aspect of the project execution and the sequence of the operation. The Contractor shall be prepared to provide any supplemental information/ documentation to the Exchange representative regarding any submittals, documentation, materials or equipment. Upon satisfactory resolution of any outstanding issues, the Exchange contracting officer or contracting officer representative will issue a written order to proceed to the Contractor. No abatement work of any kind described in the following provisions shall be initiated prior to the Exchange written order to proceed.

3.2 PRE-ABATEMENT INSPECTIONS AND PREPARATIONS

A. Before any work begins on the construction of the regulated area, the Contractor will:

1. Conduct a space-by-space inspection with an authorized Exchange representative and prepare a written inventory of all existing damage in those spaces where asbestos abatement will occur. Still or video photography may be used to supplement the written damage inventory. Document will be signed and certified as accurate by both parties.
2. The Exchange Representative, the Contractor, and the EPIH/CIH must be aware of 10/95 A/E Quality Alert indicating the failure to identify asbestos as applicable to glovebag abatement in the areas listed. Make sure these areas are looked at/reviewed on the project:
   Lay-in ceilings concealing ACM; ACM behind walls/windows from previous renovations; inside chases/walls; transite piping/ductwork/sheets; behind radiators; below window sills; water/sewer lines; electrical conduit coverings; steam line trench coverings.
3. Ensure that all furniture, machinery, equipment, curtains, drapes, blinds, and other movable objects which the Exchange Representative is required to remove from the regulated area have been cleaned and removed or properly protected from contamination.
4. Shut down and seal with a minimum of 2 layers of 6 mil fire retardant poly all HVAC systems and critical openings in the regulated area. The regulated area critical barriers shall completely isolate the regulated area from any other air in the building. The Exchange representative will monitor the isolation provision.
5. Shut down and lock out in accordance with 29 CFR 1910.147 all electrical circuits which pose a potential hazard. Electrical arrangements will be tailored to the particular regulated area and the systems involved. All electrical circuits affected will be turned off at the circuit box outside the regulated area, not just the wall switch. The goal is to eliminate the potential for electrical shock which is a major threat to life in the regulated area due to water use and possible energized circuits. Electrical lines used to power equipment in the regulated area shall conform to all electrical safety standards and shall be isolated by the use of a ground fault circuit interrupter (GFCI). All GFCI shall be tested prior to use. The Exchange representative will monitor the electrical shutdown.
6. If required, remove and dispose of carpeting from floors in the regulated area.
7. Inspect existing firestopping in the regulated area. Correct as needed.

3.3 PRE-ABATEMENT CONSTRUCTION AND OPERATIONS

A. Perform all preparatory work for the first regulated area in accordance with the approved work schedule and with this specification.

B. Upon completion of all preparatory work, the CPIH will inspect the work and systems and will notify the Exchange representative when the work is completed in accordance with

this specification. The Exchange representative may inspect the regulated area and the systems with the EPIH/CIH and may require that upon satisfactory inspection, Contractor's employees perform all major aspects of the approved SOP's, specially worker protection, respiratory systems, contingency plans, decontamination procedures, and monitoring to demonstrate satisfactory operation.

C. The CPIH shall document the pre-abatement activities described above and deliver a copy to the Exchange representative.

D. Upon satisfactory inspection of the installation of and operation of systems the Exchange representative will notify the Contractor in writing to proceed with the Class II asbestos abatement work in accordance with this specification.

3.4 OSHA DANGER SIGNS

A. Post OSHA DANGER signs meeting the specifications of OSHA 29 CFR 1926.1101 at any location and approaches to the regulated area where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance sufficiently far enough away from the regulated area to permit any personnel to read the sign and take the necessary measures to avoid exposure. Additional signs will be posted following construction of the regulated area enclosure.

3.5 SHUT DOWN - LOCK OUT ELECTRICAL

A. Shut down and lock out electric power to the regulated area. Provide temporary power and lighting. Insure safe installation including GFCI of temporary power sources and equipment by compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems. Electricity shall be provided by the Exchange.

3.6 SHUT DOWN - LOCK OUT HVAC

A. Shut down and lock out heating, cooling, and air conditioning system **(HVAC)** components that are in, supply or pass through the regulated area. Investigate the regulated area and agree on pre-abatement condition with the Exchange representative. Seal all intake and exhaust vents in the regulated area with duct tape and 2 layers of 6-mil poly. Also, seal any seams in system components that pass through the regulated area. Remove all contaminated HVAC system filters and place in labeled 6 mil poly disposal bags for disposal as asbestos waste.

3.7 SANITARY FACILITIES

A. The Contractor shall provide sanitary facilities for abatement personnel and maintain them in a clean and sanitary condition throughout the abatement project.

3.8 WATER FOR ABATEMENT

A. The Exchange will provide water for abatement purposes. The Contractor shall connect to the existing Exchange system. The service to the shower, if required shall be supplied with backflow prevention.

3.9 PRE-CLEANING MOVABLE OBJECTS

A. Pre-clean all movable objects within the regulated area using a HEPA filtered vacuum and/or wet cleaning methods as appropriate. After cleaning, these objects shall be removed from the regulated area and carefully stored in an uncontaminated location.

3.10 PRE-CLEANING FIXED OBJECTS

A. Pre-clean all fixed objects in the regulated area using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery behind grills or gratings where access may be difficult but contamination may be significant. Also, pay particular attention to wall, floor and ceiling penetration behind fixed items. After precleaning, enclose fixed objects with 2 layers of 6-mil poly and seal securely in place with duct tape. Objects (e.g., permanent fixtures, shelves, electronic equipment, laboratory tables, sprinklers, alarm systems, closed circuit TV equipment and computer cables) which must remain in the regulated area and that require special ventilation or enclosure requirements should be designated here along with specified means of protection. Contact the manufacturer for special protection requirements.

3.11 PRE-CLEANING SURFACES IN THE REGULATED AREA

A. Pre-clean all surfaces in the regulated area using HEPA filtered vacuums and/or wet cleaning methods as appropriate. Do not use any methods that would raise dust such as dry sweeping or vacuuming with equipment not equipped with HEPA filters. Do not disturb asbestos-containing materials during this pre-cleaning phase.

3.12 CONTAINMENT BARRIERS AND COVERINGS FOR THE REGULATED AREA

A. Seal off any openings at the perimeter of the regulated area with critical barriers to completely isolate the regulated area and to contain all airborne asbestos contamination created by the abatement activities. Should the adjacent area past the regulated area become contaminated due to improper work activities, the Contractor shall suspend work inside the regulated area, continue wetting, and clean the adjacent areas in accordance with procedures described in these specifications. Any and all costs associated with the adjacent area cleanup shall not be borne by the Exchange.

3.13 PREPARATION PRIOR TO SEALING OFF

A. Place all infrared machines, materials, equipment and supplies necessary to isolate the inside the regulated area. Remove all movable material/equipment as described above and secure all unmovable material/equipment as described above. Properly secured material/equipment shall be considered to be outside the regulated area.

3.14 CONTROLLING ACCESS TO THE REGULATED AREA

A. Access to the regulated area shall be permitted only by the competent person. All other means of access shall be closed off by proper sealing and OSHA DANGER demarcation signs posted on the clean side of the regulated area where it is adjacent to or within view of any occupiable area. An opaque visual barrier of 6 mil poly shall be provided so that the abatement work is not visible to any building occupants. If the area adjacent to the regulated area is accessible to the public, construct a solid barrier on the public side of the sheeting for protection and isolation of the project. The barrier shall be constructed with normal 2” x 4” (50mm x 100mm) wood or metal studs 16” (400mm) on centers, securely anchored to prevent movement and covered with a minimum of ½” (12.5mm) plywood. Provide an appropriate number of OSHA DANGER signs for each visual and

physical barrier. Any alternative method must be given a written approval by the Exchange representative.

3.15 CRITICAL BARRIERS

A. The regulated area must be completely separated from the adjacent areas, and the outside by at least 2 layers of 6 mil fire retardant poly and duct tape/spray adhesive. Individually seal all supply and exhaust ventilation openings, lighting fixtures, clocks, doorways, windows, convectors, speakers, and other openings into the regulated area with 2 layers of 6 mil fire retardant poly, and taped securely in place with duct tape/spray adhesive. Critical barriers must remain in place until all work and clearances have been completed.

3.16 EXTENSION OF THE REGULATED AREA

A. If the regulated area barrier is breached in any manner that could allow the passage of asbestos fibers or debris, the Competent Person shall immediately stop work, continue wetting, and proceed to extend the regulated area to enclose the affected area as per procedures described in this specification. If the affected area cannot be enclosed, decontamination measures and cleanup shall start immediately. All personnel shall be isolated from the affected area until decontamination/cleanup is completed as verified by visual inspection and air monitoring. Air monitoring at completion must indicate background levels or less than 0.01 f/cc.

3.17 FLOOR BARRIERS

A. Not applicable for floor tile removal (Class II work)

3.18 REMOVAL OF CLASS II FLOORING; ROOFING; AND TRANSITE MATERIALS:

A. All applicable requirements of OSHA, EPA and DOT shall be followed during Class II work. Keep materials intact; do not disturb; wet while working with it; wrap as soon as possible with 2 layers of 6 mil plastic for disposal.

3.19 REMOVAL OF FLOORING MATERIALS:

A. All requirements of OSHA Flooring agreement provisions shall be followed:

1. Negative air machine shall be used to effect some negative pressure in the regulated area. A spare machine shall be available.
2. Follow Resilient Floor Covering Institute (RFCI) recommended work practices for removal of resilient Floor coverings.
3. Mechanical chipping or sanding is not allowed. 4. Wet clean and HEPA vacuum the floor before and after removal of flooring.
5. Place a 6 mil poly layer 4’ by 10’ adjacent to the regulated area for use as a decontaminated area. All waste must be contained in the regulated area.
6. Package all waste in 6 mil poly lined fiberboard drums.

3.20 REMOVAL OF MASTIC

A. The mastic removal material must be a "low odor" or "no odor" material.

B. Follow RFCI recommended work practices for removal of mastic.

C. Package all waste in 6 mil poly lined fiberboard drums.

D. Prior to application of any liquid material, check the floor for penetrations and seal before removing mastic.

E. The use of any solvents is prohibited in the removal of mastic.

3.21 DISPOSAL OF CLASS II WASTE MATERIAL:

A. Package and dispose of waste materials as per this specification. All OSHA, EPA, and DOT requirements must be met. Landfill requirements for packaging must also be met. Disposal of non-friable waste must be done in accordance with applicable regulations.

3.22 PROJECT DECONTAMINATION

A. The entire work related to project decontamination shall be performed under the close supervision and monitoring of the CPIH.

B. If the asbestos abatement work is in an area which was contaminated prior to the start of abatement, the decontamination will be done by cleaning the primary barrier poly prior to its removal and cleaning of the regulated area surfaces after the primary barrier removal.

C. If the asbestos abatement work is in an area which was uncontaminated prior to the start of abatement, the decontamination will be done by cleaning the primary barrier poly prior to its removal, thus preventing contamination of the building when the regulated area critical barriers are removed.

3.23 REGULATED AREA CLEARANCE

A. Air testing and other requirements which must be met before release of the Contractor and re-occupancy of the regulated area space are specified in Final Testing Procedures.

3.24 WORK DESCRIPTION

A. Decontamination includes the cleaning and clearance of the air in the regulated area and the decontamination and removal of the enclosures/facilities installed prior to the abatement work including primary/critical barriers, PDF and W/EDF facilities.

3.25 PRE-DECONTAMINATION CONDITIONS

A. Before decontamination starts, all ACM waste from the regulated area shall be removed, all waste collected and removed, and the secondary barrier of poly removal and disposed of along with any gross debris generated by the work.

B. At the start of decontamination, the following shall be in place:
1. Critical barriers over all openings consisting of two layers of 6 mil poly which is the sole barrier between the regulated area and the rest of the building or outside.
2. Decontamination facilities, if required for personnel and equipment in operating condition.

3.26 CLEANING:

A. Clean all surfaces of the regulated area by wet methods and/or HEPA vacuuming. Do not use dry dusting/sweeping methods. If determined by the CPIH/EPIH/CIH additional cleaning(s) may be needed.

3.27 VISUAL INSPECTION AND AIR CLEARANCE TESTING

A. Notify the Exchange representative 24 hours in advance for the performance of the final visual inspection and testing. The final visual inspection and testing will be performed by the EPIH/CIH after the cleaning.

3.28 VISUAL INSPECTION

A. Final visual inspection will include the entire regulated area, all poly sheeting, seals over HVAC openings, doorways, windows, and any other openings. If any debris, residue, dust or any other suspect material is detected, the cleaning shall be repeated at no cost to the Exchange. Dust/material samples may be collected and analyzed at no cost to the Exchange at the discretion of the EPIH/CIH to confirm visual findings. When the regulated area is visually clean the final testing can be done.

3.29 AIR CLEARANCE TESTING

A. After an acceptable final visual inspection by the EPIH/CIH and Exchange Representative, the EPIH/CIH will perform the final testing. Air samples will be collected and analyzed in accordance with procedures for PCM in this specification. If the release criteria are not met, the Contractor shall repeat the final cleaning and continue decontamination procedures. Additional inspection and testing will be done at the expense of the Contractor**.**

B. If the results of the PCM are acceptable, remove the critical barriers. Any small quantities of residue material found upon removal of the poly shall be removed with a HEPA vacuum and localized isolation. If significant quantities are found as determined by the EPIH/CIH, then the entire area affected shall be cleaned as specified in the final cleaning.

C. If release criteria are met, proceed to perform the abatement closeout and to issue the certificate of completion in accordance with these specifications.

3.30 FINAL AIR CLEARANCE PROCEDURES

A. Contractor's Release Criteria: Work in a regulated area is complete when the regulated area is visually clean and airborne fiber levels have been reduced to or below 0.01 f/cc as measured with PCM methods.

B. Air Monitoring and Final Clearance Sampling: To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to the specified level, the EPIH/CIH will secure samples and analyze them according to the following procedures:

1. Fibers Counted: "Fibers" referred to in this section shall be either all fibers regardless of composition as counted in the NIOSH 7400 PCM method.

2. All clearance air testing samples shall be collected on 0.8 MCE filters for PCM analysis. Air samples will be collected in areas subject to normal air circulation. A

minimum of 5 PCM samples will be collected with at least 1200 Liters of air sampled. All results must be less than 0.01 f/cc for clearance.

3.31 COMPLETION OF ABATEMENT WORK

A. After thorough decontamination, complete asbestos abatement work upon meeting the regulated area clearance criteria and fulfilling the following:

1. Remove all equipment, materials, and debris from the project area.
2. Package and dispose of all asbestos waste as required.
3. Repair or replace all interior finishes damaged during the abatement work.
4. Fulfill other project closeout requirements as specified elsewhere in this specification.

3.32 CERTIFICATE OF COMPLETION BY CONTRACTOR

A. The CPIH shall complete and sign the "Certificate of Completion" in accordance with Attachment 1 at the completion of the abatement and decontamination of the regulated area.

3.33 WORK SHIFTS

A. All work shall be done during administrative hours (8:00 AM to 4:30 PM) Monday - Friday excluding Federal Holidays. Any change in the work schedule must be approved in writing by the Exchange Representative.

ATTACHMENT #1
CERTIFICATE OF COMPLETION
DATE:
PROJECT NAME:
Exchange Contracting Officer/ADDRESS:

1. I certify that I have personally inspected, monitored and supervised the abatement work of (specify regulated area or Building): which took place from / / to / /

2. That throughout the work all applicable requirements/regulations and the Exchange specifications were met.

3. That any person who entered the regulated area was protected with the appropriate personal protective equipment and respirator and that they followed the proper entry and exit procedures and the proper operating procedures for the duration of the work.

4. That all employees of the Abatement Contractor engaged in this work were trained in respiratory protection, were experienced with abatement work, had proper medical surveillance documentation, were fit-tested for their respirator, and were not exposed at any time during the work to asbestos without the benefit of appropriate respiratory protection.

5. That I performed and supervised all inspection and testing specified and required by applicable regulations and Exchange specifications.

6. That the conditions inside the regulated area were always maintained in a safe and healthy condition and the maximum fiber count never exceeded 0.5 f/cc, except as described below.

CPIH Name:

Signature/Date:

Asbestos Abatement Contractor's Name:

Signature/Date:

ATTACHMENT #2

CERTIFICATE OF WORKER'S ACKNOWLEDGMENT
PROJECT NAME:
DATE:
PROJECT ADDRESS:

ABATEMENT CONTRACTOR'S NAME:

WORKING WITH ASBESTOS CAN BE HAZARDOUS TO YOUR HEALTH. INHALING ASBESTOS HAS BEEN LINKED WITH VARIOUS TYPES OF CANCERS. IF YOU SMOKE AND INHALE ASBESTOS FIBERS YOUR CHANCES OF DEVELOPING LUNG CANCER IS GREATER THAN THAT OF THE NONSMOKING PUBLIC.

Your employer's contract with the Exchange for the above project requires that:

You must be supplied with the proper personal protective equipment including an adequate respirator and be trained in its use. You must be trained in safe and healthy work practices and in the use of the equipment found at an asbestos abatement project. You must receive/have a current medical examination for working with asbestos. These things shall be provided at no cost to you. By signing this certificate you are indicating to the owner that your employer has met these obligations.

RESPIRATORY PROTECTION: I have been trained in the proper use of respirators and have been informed of the type of respirator to be used on the above indicated project. I have a copy of the written Respiratory Protection Program issued by my employer. I have been provided for my exclusive use, at no cost, with a respirator to be used on the above indicated project.

TRAINING COURSE: I have been trained by a third party, State/EPA accredited trainer in the requirements for an AHERA/OSHA Asbestos Abatement Worker training course, 32 hours minimum duration. I currently have a valid State accreditation certificate. The topics covered in the course include, as a minimum, the following:
Physical Characteristics and Background Information on Asbestos
Potential Health Effects Related to Exposure to Asbestos
Employee Personal Protective Equipment
Establishment of a Respiratory Protection Program
State of the Art Work Practices
Personal Hygiene
Additional Safety Hazards
Medical Monitoring
Air Monitoring
Relevant Federal, State and Local Regulatory Requirements, Procedures, and Standards
Asbestos Waste Disposal

MEDICAL EXAMINATION: I have had a medical examination within the past 12 months which was paid for by my employer. This examination included: health history, occupational history, pulmonary function test, and may have included a chest xray evaluation. The physician issued a positive written opinion after the examination.
Signature:
Printed Name:
Social Security Number:
Witness:

ATTACHMENT #3

AFFIDAVIT OF MEDICAL SURVEILLANCE, RESPIRATORY PROTECTION AND TRAINING/ ACCREDITATION

EXCHANGE PROJECT NAME AND NUMBER:
EXCHANGE FACILITY:
ABATEMENT CONTRACTOR'S NAME AND ADDRESS:

1. I verify that the following individual

Name:
Social Security Number:
who is proposed to be employed in asbestos abatement work associated with the above project by the named Abatement Contractor, is included in a medical surveillance program in accordance with 29 CFR 1926.1101(m), and that complete records of the medical surveillance program as required by 29 CFR 1926.1101(m)(n) and 29 CFR 1910.20 are kept at the offices of the Abatement Contractor at the following address.

Address:

2. I verify that this individual has been trained, fit-tested and instructed in the use of all appropriate respiratory protection systems and that the person is capable of working in safe and healthy manner as expected and required in the expected work environment of this project.

3. I verify that this individual has been trained as required by 29 CFR 1926.1101(k). This individual has also obtained a valid State accreditation certificate. Documentation will be kept on-site.

4. I verify that I meet the minimum qualifications criteria of the Exchange specifications for a CPIH.

Signature of CPIH: Date:

Printed Name of CPIH:

Signature of Contractor: Date:

Printed Name of Contractor:

ATTACHMENT #4
ABATEMENT CONTRACTOR/COMPETENT PERSON(S) REVIEW AND ACCEPTANCE OF THE EXCHANGE ASBESTOS SPECIFICATIONS

Project Location:

Exchange Project #:

Exchange Project Description:

This form shall be signed by the Asbestos Abatement Contractor Owner and the Asbestos Abatement Contractor's Competent Person(s) prior to any start of work at the Exchange related to this Specification. If the Asbestos Abatement Contractor's/Competent Person(s) has not signed this form, they shall not be allowed to work on-site.

I, the undersigned, have read Exchange Asbestos Specification regarding the asbestos abatement requirements. I understand the requirements of the Exchange Asbestos Specification and agree to follow these requirements as well as all required rules and regulations of OSHA/EPA/DOT and State/Local requirements. I have been given ample opportunity to read the Exchange Asbestos Specification and have been given an opportunity to ask any questions regarding the content and have received a response related to those questions. I do not have any further questions regarding the content, intent and requirements of the Exchange Asbestos Specification.

At the conclusion of the asbestos abatement, I will certify that all asbestos abatement work was done in accordance with the Exchange Asbestos Specification and all ACM covered by the specification was removed properly and no fibrous residue remains on any abated surfaces.

Abatement Contractor Owner's Signature Date

Abatement Contractor Competent Person(s) Date

END OF SECTION 01 99 99

SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Demolition and removal of selected portions of building or structure.

B. Demolition and removal of selected site elements.

C. Salvage of existing items to be reused or recycled.

1.2 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area.

B. Hazardous Materials: Unknown.

1. Remediation: By Contractor as part of this Project.
2. Landfill records for hazardous wastes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

2.2 WARRANTY

A. Existing Warranties: Existing Roof Warranty may be in effect.

PART 3 - EXECUTION

A. Utility Services and Mechanical/Electrical Systems:

1. Shut Off: By Contractor.
2. Shall be maintained to occupied facilities.

3.2 PREPARATION

A. Site Access and Temporary Controls: Minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities

B. Temporary Facilities:

1. Temporary barricades to prevent injury to people.
2. Temporary weather protection.
3. Protection of existing finish work to remain.
4. Protection of furnishings and equipment.

C. Temporary shoring.

3.3 SELECTIVE DEMOLITION

A. Removed and Salvaged Items: Cleaned, crated, stored, and transported to Owner's storage area as directed by Owner.

B. Removed and Reinstalled Items: Cleaned, repaired, crated, stored, and reinstalled.

C. Existing Items to Remain: Existing construction protected against damage.

D. Disposal of Demolished Items:

1. Disposal: Off Owner's property.

E. Refer to Drawings for selective demolition work.

END OF SECTION 02 41 19

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Foundation walls.
3. Slabs-on-grade.
4. Suspended slabs.
5. Concrete toppings.
6. Building frame members.
7. Building walls.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect.

F. Samples: For vapor retarder.

G. Qualification Data: For manufacturer.

H. Welding certificates.

I. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Semirigid joint filler.
13. Joint-filler strips.
14. Repair materials.

J. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

K. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

L. Field quality-control reports.

M. Minutes of preinstallation conference.

1.3 QUALITY ASSURANCE

A. Quality Standard: ACI 301.

B. Mockups to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Form facing materials.

B. Steel Reinforcement:

1. Reinforcing Bars: Deformed.
2. Welded Wire Reinforcement: Plain.

C. Concrete Materials:

1. Portland Cement: ASTM C 150, Type I/II, gray, supplement with fly ash or ground granulated blast furnace slag.

2. Silica fume.
3. Aggregate: Normal weight.
4. Water.

D. Mixing: Ready mixed.

E. Color Pigment: ASTM C979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading and resistant to lime and other alkalis.

2.2 CONCRETE MIXTURES

A. Portland Cement Replacement: Use fly ash, ground granulated blast-furnace slag, and silica fume to reduce portland cement by 40 percent.

B. Compressive Strength (28 Days):

1. Footings: 4000 psi (27.6 MPa).
2. Foundation Walls: 4000 psi (27.6 MPa).
3. Slabs-on-Grade: 4000 psi (27.6 MPa).
4. Concrete Toppings: 4000 psi (27.6 MPa).
5. Building Frame Members: 4000 psi (27.6 MPa).
6. Building Walls: 4000 psi (27.6 MPa).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Formed Finishes: Smooth.

B. Floor and Slab Finishes:

1. Scratch: Surfaces to receive concrete floor toppings or mortar setting beds for bonded cementitious floor finishes.
2. Float: Surfaces to receive trowel finish and surfaces to be covered with sand-bed terrazzo.
3. Trowel: Surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or thin-film-finish coating system.
4. Trowel and Fine-Broom: Surfaces to be covered with ceramic or quarry tile to be installed by either thickset or thin-set method.
5. Broom: Exterior concrete platforms, steps, ramps.
6. Slip-Resistive Finish: Concrete stair treads, platforms, ramps.

3.2 WEATHER PLACEMENT CONDITIONS

Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

1. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C), and not more than 80 deg F (27 deg C) at point of

placement.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt and other materials containing antifreeze agents.

B. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength on concrete, place concrete in compliance with ACI 305 and as herein specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F (32 deg C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated in total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.

2. Cover reinforcing steel with water soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

3. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.

4. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.3 FIELD QUALITY CONTROL

A. Testing: By Owner engaged agency.

B. Special Inspections: By Owner-engaged special inspector.

END OF SECTION 03 30 00

SECTION 03 35 36

POLISHED CONCRETE FLOOR FINISH
(Option 1)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Installation of polished concrete floor system for new and/or existing interior concrete floors by dry grinding, application of concrete densifier, and polishing with various size grit metal-bonded and resin-bonded diamonds to the scheduled specified minimum local and overall gloss values.

B. Removal of existing epoxy, ceramic, carpet, and/or vinyl composite tile floor finish, and all underlayment products where shown on drawings.

C. Application of chemical dye and complementary edge band treatment.

1.2 RELATED SECTIONS

A. Section 01 23 00 – Options.

B. Section 01 33 00 – Submittal Procedures.

C. Section 03 30 00 – Cast-in-Place Concrete.

D. Section 03 35 40 – Interior Concrete Slab Repairs and Joint Filler Replacement.

E. Division 09 – Finishes

1.3 REFERENCES

A. ASTM C 1028 – Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.

B. ASTM D 523 – Standard Test Method for Specular Gloss.

F. NFSA - National Floor Safety Institute; Test Method 101A; current edition.

1.4 SUBMITTALS

A. Comply with Section 01 33 00 – Submittal Procedures.

B. Product Data:
   1. Provide manufacturer's equipment product data sheets for:
      a. Planetary grinder polishing equipment
      b. Planetary grinder HEPA dust collection equipment
      c. Hand tools
      d. Hand tool dust collection equipment
      e. Diamond tooling
      f. High speed propane burnisher
      g. Polyurea pump
      h. Joint cutting saw

2. Manufacturer's chemical and product data sheets for:
   a. Specified dye
   b. Liquid reactive surface densifier
   c. Liquid stain guard treatment
   d. Joint filler
   e. Crack and spall repair product
   f. Self leveling, dye-able, overlay product
   g. Grout coat, pin hole and small defect surface treatment

C. Installer's Certification:
   1. Provide list of 5 projects performed with last three years of similar type, size and complexity. Submit project names, addresses, contacts and phone numbers for each project. General Contractor is to validate references and polisher's capabilities prior to submitting bid to EXCHANGE.
   2. Applicator Qualifications: Submit letter of certification from each of the following manufacturers of products and equipment specified herein, stating that the applicator is a certified applicator of the system and is familiar with proper procedures and installation methods as required by the manufacturer.
      a. Planetary grinder system
      b. Liquid reactive surface densifier and stain guard treatment
      c. Joint filler, crack and spall repair products

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Accessibility Requirements: Comply with applicable requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAGs) for Buildings and Facilities; Final Guidelines, revisions, and updates for static coefficient of friction for walkway surfaces.
   2. Environmental Requirements: Comply with current Federal and local toxicity and air quality regulations and with Federal requirements on content of lead, mercury, and other heavy metals. Do not use solvents in floor polish products that contribute to air pollution or impact food quality.

B. Pre-installation Meeting:
   1. General contractor shall schedule and convene a pre-installation meeting at the project site before start of installation of polished concrete floor system.

      Meeting to occur only after review and approval of required Sub-contractor submittals and completion of test panel mock-up, including specified grinding, polishing and dye, joint filling, spall and crack repairs, and specified overall gloss values.

   2. Require attendance of parties directly affecting work of this section, including:
      a. EXCHANGE Project Manager
      b. EXCHANGE Store Manager of Assistant Manager
      c. Project Architect
      d. Owner's Polishing Consultant
      e. General Contractor
      f. Polishing Subcontractor including Project Manager and Foreman

   3. Meeting agenda to include (but not limited to): Review of existing conditions, surface preparation, system installations, field quality control, protection, environmental requirements, coordination with other work, controls to limit damage from dust and field quality control methods and reporting.

1.6 MOCK-UP

A. Provide polished concrete floor finish mock-up, a minimum of 250 square feet, illustrating completed finish including dye, all specified liquid surface treatments and specified gloss levels.

Mock-up will include properly repaired surface spalls, slab joints and slab edge treatments including complementary edge banding.

B. Locate mock-up where directed by EXCHANGE Project Manager.

C. Accepted mock-up will serve as standard to judge quality and workmanship of completed polished concrete floor finish.

D. Accepted mock-up shall remain as part of finished product.

1.7 PROJECT CONDITIONS

A. Sequence application of concrete polishing after completion of other construction activities that would be damaging to completed polished finish.

B. Close areas to traffic during and after floor application for time period recommended in writing by manufacturer.

PART 2 PRODUCTS

2.1 PRE-CERTIFIED INSTALLERS

A. <u>All bidding contractors must have completed our in house certification for this project</u>. Below is a list of pre-approved applicators.

1. American Concrete Concepts Inc. 877-775-0030
2. Avalon Corporation 425-643-5667
3. Bomanite of North Texas 800-492-2524
4. Budget Maintenance Concrete Services 610-323-7702
5. Diama-Shield 888-730-4075
6. Final Touch 614-751-0606
7. Jeffco Concrete Contractors 800-226-2668
8. K & J Concrete Polishing 865-567-5950
9. Kote It Inc 260-637-7051
10. Pacific Decorative Concrete 916-725-9269
11. Perfect Polish Inc. 877-917-4463
12. Stone Care of Texas 210-656-8019
13. Total Polish Solutions 865-633-5051
14. Wholesale Floors 602-248-7878

B. Refer to specifications Division 01 for substitution qualifications. Any substitutions must be submitted in writing a minimum of 10 days prior to bid date to the EXCHANGE contracting officer for approval.

2.2 EQUIPMENT TO BE USED FOR INSTALLATION

A. Floor Grinder:
1. Machinery manufacturer will be HTC, SASE, Concrete Polishing Solutions, Husqvarna, Diamatic or PrepMaster
2. Type: Multi-orbital, planetary-action, opposing-rotational, 3 or 4 diamond-headed floor grinders.
3. Weight: 850 pounds or more.
4. Grinding Pressure: 600 pounds minimum.

B. Dust Extraction System and pre-separator for grinding/polishing:

Heavy-duty industrial HEPA filtration vacuum system, suitable for extracting and containing large quantities of fine concrete dust (minimum 350 CFM air flow) in conjunction with manufacturer recommended pre-separator:

1. HTC 86D
2. Pullman-Ermator T8600
3. SASE Bull 1250
4. Approved equal

C. Diamond Tooling for Coating Removal, Initial Grinding, and Preparing Floor for Polishing:
   1. Metal Bonded Diamonds
      a. Grit Size: 40, 80, and 150.

D. Diamond Tooling for Polishing Concrete:
   1. Resin Bonded, Phenolic Diamonds
      a. Grit Size: Transitional diamond equal to Raptor L3 by VMC, 100, 200, 400, 800 and 1500 or equivalent.

E. Grinding / Polishing Pads for Edges
   1. Grit Size: 80, 100, 120, 200, 400, 800, 1500 and 3000.

G. Hand Grinder with dust extraction attachment and pads.

H. Joint cutting saw with dust extraction attachment
   1. Hump Back, by Joe Due
   2. Dust Buggy, by US Saws
   3. The Mongoose, by Engrave-a-Crete

H. Self-propelled shaver/leveler for slab surface demolition and leveling.
   1. ShaveMaster, by VIC International Corporation
   2. SuperShaver, by CPS
   3. BMC 335 Shaver, by Diamatic

I. High speed propane burnisher
   1. Minimum 27 inch head generating pad speeds of 1,500 RPM or higher.

J. Diamond Impregnated Burnisher Pads
   1. Twister Diamond Cleaning System Pads, by HTC
   2. Diamond Polishing Pads, by Norton
   3. SpinFlex Diamond Polishing Pads, by CPS

K. Applicator Pads and Equipment
   1. Professional Mighty Mop 077, by Quickie
   2. 24” Microfiber Wet Room Mop, by Rubbermaid
   3. Fas-Trak Chemical Application System, by Fas-Trak Industries
   4. Humm’V II, by Tuffy Systems, Inc.

2.3 MATERIALS

A. Penetrating Hardener/Densifier: Clear liquid reactive lithium-silicate based.
   1. RetroPlate 99 by Advanced Floor Products.
   2. FGS Permashine by L&M Construction Chemicals.
   3. Consolideck LS, by Prosoco.
   4. SureLock Densifier by Ameripolish
   5. No Substitutions

B. Protective Surface Treatment (Stain Guard):
   1. SureLock Stain Protector by Ameripolish.
   2. Consolideck LS Guard, by Prosoco.
   3. No Substitutions

C. Solvent-base dye color:
   1. AmeriPolish Solvent-based Dye.
   2. Colors:
      a. Color-1: Natural Color Concrete, no dye.
      b. Color-2: Midnight Black.
      c. Color-3: 60% Midnight Black – Place 3 one gallon kits of Midnight Black dye into a five gallon can of acetone. Dissolve per manufacturer's instructions and apply.
      d. Color-4: 20% Standard Black – place a one gallon kit of Standard Black dye into a 5 gallon can of acetone. Dissolve per manufacturer's instructions and apply.

   2. For color locations at the "X" in the mall, refer to www.aafesprototype.com and the diagram of the mall "X".

D. Joint Filler
   1. RS 88 Polyurea in complementary darker color to match Dyed Polished Concrete, by Metzger McGuire
   2. HT-PE85 Polyurea in complementary darker color to match Dyed Polished Concrete, by Hi-Tech Systems
   3. SL/85 Polyurea in complementary darker color to match Dyed Polished Concrete, by VersaFlex Incorporated
   4. Colors to be matched as closely as possible using a Sherwin Williams color chart. Manufacturer to produce product to match this color selection.

F. Crack and Spall Repair
   1. Rapid Refloor in complementary matching color, by Metzger McGuire
   2. HT Spall-FX2 in complementary matching color, by Hi-Tech Systems
   3. Quick-Mender in complementary matching color, by VersaFlex Incorporated
   4. 10 Minute Mender or Matchcrete in complementary color, by Roadware
   5. Colors to be reviewed and approved by EXCHANGE Project Manager in mock-up.

G. Wide Area Surface Repairs
   1. TRU Self Leveling, by CTS Cement Manufacturing Corporation
   2. Diama-Top by Ardex Engineered Cements

I. Grout Coat
   a. GM 3000 by Husqvarna Construction Products
   b. Diama-Fill, by Ardex Engineered Cements

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine floor to receive polished concrete floor system.

B. Notify the Contracting Officer of conditions that would adversely affect installation or subsequent use prior to commencement of polishing.

C. Do not begin surface preparation or installation until conditions are corrected and approved.

D. Verify the Following for New Integral Color Overlays in Mud Beds
   1. Floor Finish: Wide channel floated, smooth, pan, combination blade and plastic blade finished floor from edge to edge, with no rough areas.
   2. Floor and Joints:
      a. Free of debris and excessive dirt, dust, clay, and mud.
      b. Dry.
   3. Concrete Curing: Minimum 7 days disposable wet curing blankets or removable curing compound applied. Concrete shall be cured for 14-days minimum before start of grinding process.
   4. Concrete Adjacent to Floor Penetrations: Troweled flat and level with surrounding concrete.

3.2 SURFACE PREPARATION

A. Protection: Protect surrounding areas and adjacent surfaces from the following:
   1. Minimal accumulation of dust from grinding and polishing.
   2. Contact with overspray of penetrating hardener / densifier.
   3. Contact with overspray of protective surface treatment (stain guard)
   4. Contact with overspray of water or solvent based dye treatment.
   5. Contact with joint filler, crack or spall repair materials

B. On existing concrete floors, completely remove existing flooring, mastics, adhesives, self-leveling underlayment fillers and other foreign matter.

C. On existing concrete floors, remove the top ½ of an inch of existing joint material and replace with approved joint filler and crack repair products.

D. Clean Surfaces: Remove dirt, dust, debris, oil, grease, curing agents, bond breakers, paint, coatings, and other surface contaminants which could adversely affect installation of polished concrete floor system.

A. Refill new concrete joints (including decorative joints) in accordance with Section 07 92 00.

G. Repair all slab defects and joints in accordance with Section 03 35 40

3.3 INSTALLATION

A. Install polished concrete floor system in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Aggregate Exposure:

   1. Fine Aggregate: Mottled salt-and-pepper aggregate exposure.

C. Polished Concrete Floor System
   1. Open Slab Surface:
      a. As required to provide a uniform final polish or removal of existing floor coatings, begin grinding with 40 or 80-grit metal bond. Bids shall be based on starting initial cut with 40-grit metal diamonds. Expose coarse concrete aggregate when required to reach lows spots within floor surface.
      b. Review condition of floor with EXCHANGE Project Manager. Obtain approval from EXCHANGE Project Manager if large coarse aggregate is required to be exposed to remove existing coatings, floor underlayment or slab deficiencies. Variations to the precise grinding, densifying, polishing, dying and stain guard application are anticipated, but must be discussed and approved in writing by the EXCHANGE Project Manager prior to executing the work.
      c. For new concrete floors, open-up concrete by grinding with 80-grit metal-bonded.

e. Progressive edge grinding will be necessary with ½" of all vertical abutments, including walls, cases, columns, posts and racking systems.
f. Joint filler and spall repairs shall be flush with surface after grinding and polishing steps. Additional passes along curled joints may be necessary to remove joint filler chatter.

2. Remove metal-bonded diamond scratches by grinding with progressively finer metal-bonded diamonds, up to metal bond 150-grit.

3. Apply densifier
   a. per manufacturer's recommendations and the concrete's acceptance of the product.

4. Floor Polishing:
   a. Remove 150-grit metal-bonded diamond scratches by grinding with a transitional diamond per manufacturers recommendation
   b. Remove transitional resin-bonded diamond scratches by grinding with 100-grit resin-bonded diamonds.
   c. Remove 100-grit resin-bonded diamond scratches by grinding with 200-grit resin-bonded diamonds.
   d. Remove 200-grit resin-bonded diamond scratches by grinding with 400-grit resin-bonded diamonds.
   e. Remove 400-grit resin-bonded diamond scratches by grinding with 800-grit resin-bonded diamonds.
   f. Remove 800-grit resin-bonded diamond scratches by grinding with 1500-grit resin-bonded diamonds.

5. Apply stain guard
   a. Apply in accordance with manufacturer's published instructions.
   b. Apply first coat per manufacturer's recommendation (DO NOT OVER APPLY).
   c. Use applicator pad, pre-wetted with stain guard, to pull material out to create a thin film prior to drying.
   d. Remove product completely from areas of over application, as evidenced by surface streaking, and replace with unused stain guard.
   e. Apply second coat of stain guard at all high traffic areas identified on the drawings per manufacturers instructions.

6. High speed burnish:
   a. After each application of stain guard is dry, burnish surface.
   b. Burnish at a slow movement pace using high speed machine with 400 or 800 grit diamond impregnated pads as required to achieve specified gloss requirements. (For approved pads see section 2.3 J)
   c. Burnish with several passes. Make each progressive pass at 90 degrees from previous pass.
   d. Burnishing, pad type, and pace of forward movement shall combine to develop a minimum floor surface temperature of 91-degrees F directly below the burnishing pad as continuously measured by the operator during installation.

D. Penetrating Dye
1. Mix dye in accordance with installer's instructions.
2. Where shown on Architectural drawings, saw-cut reveal line around room periphery. Use Mongoose concrete saw or similar to cut precise intercepts. Use tape and protection along saw cut to prevent main floor dye from penetrating concrete surface to receive edge band.
3. Apply penetrating dye after 200 or 400-grit resin-bonded diamond-grinding step in accordance with manufacturer's recommendations and approved mock-up.
4. Thoroughly auto-scrub surface clean of excess dye residue in accordance with manufacturer's instructions.
5. Repeat application of penetrating dye if due to porosity of floor or darker color is desired. Bids shall be based on providing 2 applications of Dye.

6. Apply 2-coats of Ameripolish “Midnight Black” color within the edge band boundary.

3.4 FIELD QUALITY CONTROL

A. Inspect completed polished concrete floor system with the Contracting Officer, Contractor, and Installer.

B. Review procedures with Contracting Officer to correct unacceptable areas of completed polished concrete floor system.

C. Specular Gloss/Reflectance, ASTM D 523:
   1. Perform polishing and burnishing work necessary to produce a Specified Overall Gloss Value (SOGV) ≥ 50 prior to applying protective surface treatment, SOGV ≥ 60 after applying protective surface treatment, Minimum Local Gloss Value (MLGV) ≥ 40 after applying protective surface treatment as measured using a Horiba IG-320 60 Degree Gloss Checker.
   2. Gloss shall be considered as a quantitative value that expresses the degree of reflection when light hits the concrete floor surface. Gloss measurements will be taken independent of ambient lighting and will be taken within a sealed measurement window located beneath the test unit.
   3. Collects 12 readings minimum, throw out low and high measurements and average remaining measurements. Average shall exceed SOGV. No single measurement shall be less than MLGV.

3.5 PROTECTION

A. Protect completed polished concrete floor system from damage until Substantial Completion.
   1. Do not allow vehicle and pedestrian traffic on unprotected floor.
   2. Do not allow construction materials, equipment, and tools on unprotected floor.
   3. Prohibit parking of vehicles on concrete slab.
   4. If construction equipment must be used for application, diaper components that might drip oil, hydraulic fluid, or other liquids.
   5. No tire embedments (rocks, nails, screws, etc.) that will scratch or pit slab surface.
   6. Prohibit pipe cutting using pipe cutting machinery on concrete slab.
   7. Prohibit temporary placement and storage of steel members on concrete slab.
   8. Prohibit acids and acidic detergents from contacting concrete surfaces.
   9. Cover concrete floors with drop cloths or use breathable drop cloths during painting. If paint is spilled on concrete floor, remove paint immediately.
   10. Protect slab surface from standing moisture for 72 hours to prevent re-emulsification of surface treatment prior to cure

B. Immediately remove mortar splatter, spilled liquids, oil, grease, paint, coatings, and other surface contaminants which could adversely affect completed polished concrete floor system.

C. Repair damaged areas of completed polished concrete floor system to satisfaction of Contracting Officer.

END OF SECTION

SECTION 03 35 40

INTERIOR CONCRETE SLAB REPAIRS AND JOINT FILLER REPLACEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Joint filler removal and replacement, with or without metal keyway.
   a. Contractor is to provide unit price per linear foot in Section 01 22 00 for joint filler removal and replacement based on the following formula:
      1) Total Area to be Polished X 0.14 = Total Projected Linear Feet of Joint Filler Removal and Replacement to be Included and Broken Out in the Bid.
2. Spalled joint repair or joint with metal keyway (less than 3/4")
   a. Contractor is to provide unit price per linear foot in Section 01 22 00 for keyway segment removal and filler installation based on the following formula:
      1) Total Area to be Polished X 0.08 = Total Projected Linear Feet of keyway segment removal to be Included and Broken Out in the Bid.
3. Spalled joint repair, joint with metal keyway or self-leveling compound removal (great than 3/4")
   a. Contractor is to provide unit price per linear foot in Section 01 22 00 for keyway segment removal and repair material installation based on the following formula:
      1) Total Area to be Polished X 0.08 = Total Projected Square Feet of keyway segment and self-leveling compound removal and repair material installation to be Included and Broken Out in the Bid.
4. Crack repair.
   a. Contractor is to provide unit price per linear foot in Section 01 22 00 for crack cleaning and filling based on the following formula:
      1) Total Polished Area X 0.03 = Total Projected Linear Feet of Crack Repair to be Included and Broken Out in the Bid.
5. Surface defect repair, including pop-outs, spalls, and gouges.
   a. Contractor is to provide unit price per occurrence in Section 01 22 00 for pop-out and spall repair based on the following formula.
      1) Total Polished Area X 0.025 = Total Projected Occurrences of 3/4" to 1-1/2" DIA X 1/2" Deep Pop-Outs or Spalls to be Included and Broken Out in the Bid.
      2) Total Polished Area X 0.025 = Total Projected Occurrences of 1-1/2" to 3" DIA X 1/2" Deep Pop-Outs or Spalls to be Included and Broken Out in the Bid.
6. Surface embed repair, including cleanouts, in-floor electrical outlets and Walker Duct access holes.
   a. Contractor is to provide unit price per occurrence in Section 01 22 00 for over-coring cleanouts, in-floor electrical outlets and Walker Duct access holes based on the following formula.
      1) Total Polished Area X 0.001 = Total Projected Occurrences of 4" average DIA X 1/2" Deep Pop-Outs or Spalls to be Included and Broken Out in the Bid.
7. Large area surface repair, existing underlayment removal and replacement
   a. Contractor is to provide unit price per square foot in Section 01 22 00 for large area surface repair of rough surface, or removal and replacement of existing underlayment's > 1/4" in thickness.
      1) 1/4" Minimum Thick Self-leveling Topping to be Included as a Unit Cost
8. Grout coat surface enhancement, including micro-pin holes, pitting and other shallow surface deficiencies.
   a. Contractor is to provide unit price per square foot in Section 01 22 00 for grout coat surface enhancement based on the following formula:

1) Total Polished Area X 0.10 = Total Projected Square Feet of Grout Coat to Include and Breakout in Bid.

9. Full Grind, Densify, Dye and Polish portions of the project not currently indicated on the drawings.
   a. Contractor is to provide unit price per square foot in Section 01 22 00 to provide a Full Grind, Densify, Dye and Polish for portions of the project not currently indicated on the drawings.
      1) Full Grind, Densify, Dye and Polish to be Included as a Unit Cost

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Procedures for Submittals.

B. Joint Filler Installer Qualification Certification:
   1. Company branch or regional office shall provide a list of five projects minimum performed within the last three years of similar type, size and complexity as this contract. Provide project names, addresses, contact names and phone numbers for each project. General Contractor to validate the abilities of the subcontractor prior to submitting bid.
   2. Submit letter of certification, identifying specific individuals that are currently certified installers of the specified materials and are familiar with proper procedures and installation methods as required by the specified product manufacturers.

C. Product data for:
   1. All products and primary equipment used for repair of existing concrete slab defects.

1.3 QUALITY ASSURANCE

A. EXCHANGE reserves the right to engage the services of a Concrete Consultant to review, observe and inspect the work in progress.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Limit and control damage from excessive dust caused by demolition, preparation, and installation of all Work.

B. Limit and control damage from moisture.

C. All replaced concrete shall be cured a minimum of 8 calendar days prior to joint filler installation.

D. Concrete repair area shall be closed to traffic during preparation and repair for a time as recommended by manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Subject to compliance with project requirements, provide products as manufactured by the following to the extent as specified hereinafter:
   1. Metzger/McGuire
   2. Roadware
   3. Hi-Tech Systems
   4. VersaFlex Incoproated
   5. CTS Cement Manufacturing Corporation
   6. Ardex Engineered Cements
   7. Husqvarna Construction Products

B. Polyurea Joint Filler: Rapid setting, two-component polyurea polymer liquid of 100% solids content, Shore hardness 85-90, compatible with construction materials in contact.
   1. RS 88 Polyurea in complementary darker color to match Dyed Polished Concrete, by Metzger/McGuire.
   2. HT-PE85 Polyurea in complementary darker color to match Dyed Polished Concrete, by Hi-Tech Systems
   3. SL/85 Polyurea in complementary darker color to match Dyed Polished Concrete, by VersaFlex Incorporated
   4. Colors to be reviewed and approved by EXCHANGE Project Manager in mock-up.

C. Joint Filler Stain Preventing Film:
   1. SPF by Metzger/McGuire.

D. Low Viscosity Crack and Spall Repair:
   1. Rapid ReFloor in complementary matching color, by Metzger/McGuire.
   2. HT Spall-FX2 in complementary matching color, by Hi-Tech Systems
   3. Quick-Mender in complementary matching color, by VersaFlex Incorporated
   4. 10 Minute Mender or Matchcrete by Roadware
   5. Colors to be reviewed and approved by EXCHANGE Project Manager in mock-up.

E. Wide Area Surface Repairs
   1. TRU Self Leveling, by CTS Cement Manufacturing Corporation
   2. Diama-Top by Ardex Engineered Cements
   3. Color after application of Specified Dye to be reviewed and approved by EXCHANGE Project Manager in mock-up.

F. Pin Hole and Surface Pitting Grout Coat
   1. GM 3000, by Husqvarna Construction Products
   2. StarSeal Fusion, by Vexcon Chemicals, Inc
   3. Diama-Fill, by Ardex Engineered Cements
   4. Color after application of Specified Dye to be reviewed and approved by EXCHANGE Project Manager in mock-up.

G. Silica Sand
   1. Dry 00 Sandblasting sand.

2.2 EQUIPMENT

A. Subject to compliance with project requirements, provide equipment manufactured by the following:
   1. HTC
   2. Concrete Polishing Technologies
   3. Joe Due Blades and Equipment
   4. Pulman-Ermator
   5. SASE Company, Inc.
   6. U.S. Saws
   7. Diamatic
   8. VIC International Corporation
   9. Engrave-a-Crete

B. Dust extraction system for grinding/sawing:
   1. HEPA filtration vacuum, designed for use with all hand tools when grinding or sawing concrete (minimum 125CFM air flow).
   2. Provide one of the following:
      a. 26D, by HTC.
      b. S2400, by Pullman-Ermator.

c. Bull 50, by SASE Company, Inc.
d. Approved equal.

C. Joint Filler Removal and Preparation
1. Humpback Cutter Complete, by Joe Due.
2. Dust Buggy, by U.S. Saws.
3. The Mongoose, by Engrave-a-Crete
4. Approved equal.

D. Crack Repair:
1. 5” Dustmizer 007, by Joe Due.
2. 5” Crack Attacker, by Joe Due.
3. 7” Handheld Crack Chaser, by Joe Due.
4. SawTec 5” Tile Vac, by U.S. Saws.
5. SawTec 7” Crac-Vac, by U.S.Saws.
6. Approved equal.

E. Surface Grinder: Handheld 5”-7” electric surface grinder with dustless shroud/housing.
1. Dust Avenger 5, by Joe Due.
2. Dust Avenger 7, by Joe Due.
3. SawTec 5” Grinder Vac, by U.S. Saws.
4. SawTec 7” Grinder Vac, by U.S. Saws.
5. Approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. An evaluation of the existing floor slab shall be conducted, identifying all defects. Scope of repairs shall be confirmed by the EXCHANGE Project Manager, Architect of Record, or EXCHANGE Concrete Consultant prior to commencement of work. Identify scope of work on Floor Polishing Plan specified in other section(s) of Division 3 – Concrete.

B. Prior to Contract Award, the Unit Prices included in the attached worksheet (items 1-9) will be reviewed and approved by the Exchange Contracting Officer. The unit prices for these items shall include profit and overhead.

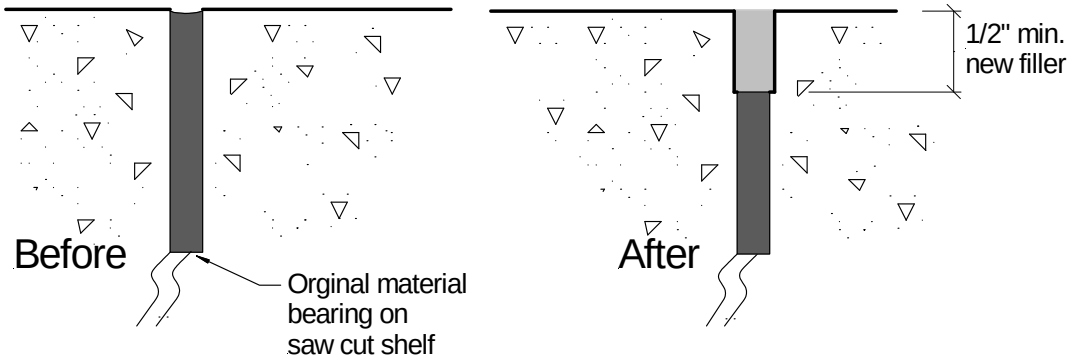
C. Repairs exceeding the Estimated Scope of Repairs developed in the attached Worksheet and included in the Base Bid must be approved by the EXCHANGE Contracting Officer prior to executing the work in any new Phase.

D. Repairs for Worksheet Items 3, 7, and 9 shall follow the Contract Change Order procedures for review and approval by the Exchange Contracting Officer prior to executing the work in any phase.

3.2 PREPARATION

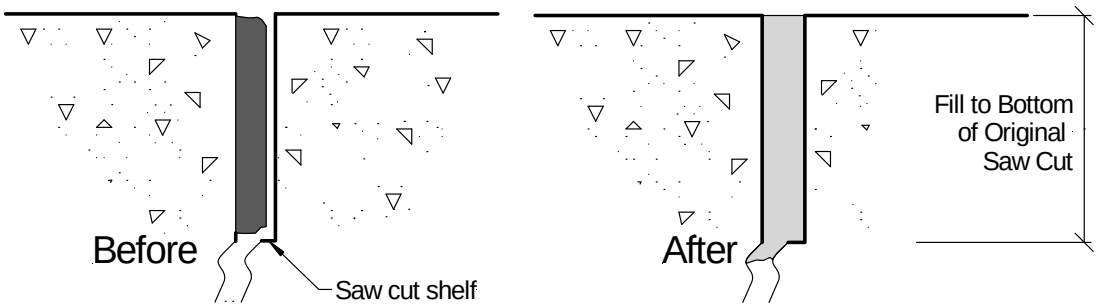
A. Protect surface of slab immediately adjacent to defect under repair.

3.3 JOINT MILLING AND CAP FILLER REPLACEMENT



A. If existing joint filler is sound and resting on top of saw cut shelf, mill top 1/2" of material and refill with specified Polyurea joint filler.
   1. Re-saw the joint to a minimum depth of 1/2” with a dry-cut, vacuum-equipped saw using a slightly oversized blade. The blade width should be sufficient to encapsulate the widest spall along a given contraction joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through the joint.
   2. Refill with polyurea joint filler material from the bottom up, taking care not to entrap large air bubbles per manufacturer’s recommendation. Slightly overfill and shave flush to the surface, prior to grinding process.
   3. Ensure that after grinding, the joint is cut smooth and flush with the finish floor surface, without concave or intermittent, darkened profile.

3.4 FULL DEPTH JOINT FILLER REPLACEMENT

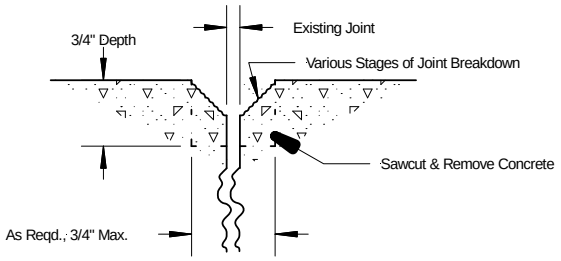


Note: if shelf width at base of saw cut is less than 1/4" on either side of joint, minimum required filler depth is 2" placed over compressibel backer rod or bagged silica sand.

A. If existing joint filler is loose, easily removed, or able to be forced downward with a hand tool, remove all filler material from joint and refill.
   1. Re-saw joint full depth with a dry-cut, vacuum-equipped saw using a slightly oversized blade. The blade width should be sufficient to encapsulate the widest spall along a given contraction joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through the joint. Remove all filler material, debris, and laitance.
   2. Refill with polyurea joint filler material from the bottom up, taking care not to entrap large air bubbles per manufacturer’s recommendation. Slightly overfill and shave flush to the surface prior to grinding process.

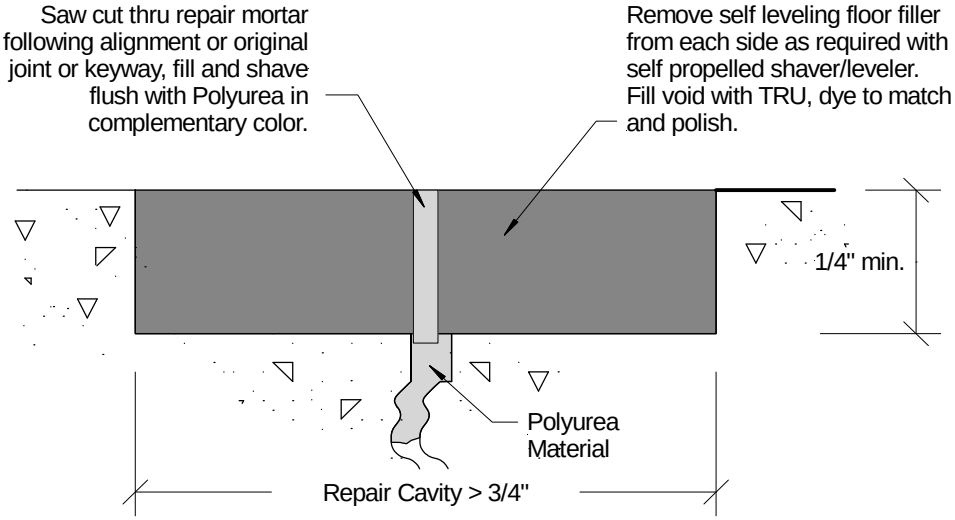
3. Ensure that after grinding, the joint is cut smooth and flush with the finish floor surface, without concave or intermittent, darkened profile.

3.5 NARROW SPALLED JOINT REPAIR OR JOINT WITH METAL KEYWAY (LESS THAN 3/4")



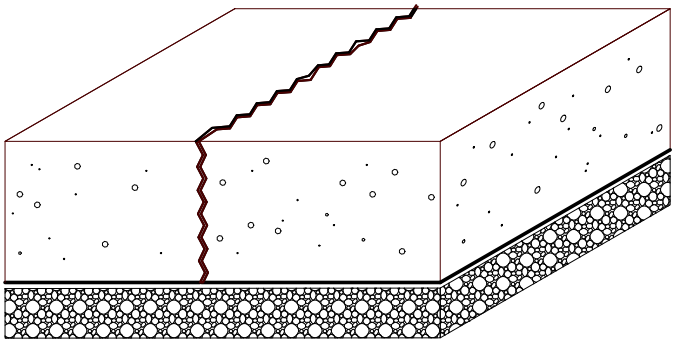
A. For joints that are spalled, are constructed with metal keys or have radius tooled edges not exceeding 3/4" in width at slab surface.
   1. Re-saw the joint edge to a minimum depth of 3/4" with a dry-cut, vacuum-equipped saw allowing removal of the widest spall (or top of radius) along a given joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through joint.
   2. Clean joint of loose concrete, metal key fragments, joint filler, laitance, dirt, debris, backer rod, etc.
   3. Joints must be free of all visible moisture.
   4. Ensure filler penetrates the irregular aggregate interlock portion of the sawn contraction joint as shown below, re-establishing the aggregate interlock that may have been lost due to shrinkage, curling, and lack of reinforcement.
   5. Fill joint cavity with specified Polyurea joint filler per manufacturer's instructions, taking care not to entrap large air bubbles. Overfill joint slightly and shave flush to slab surface prior to grinding process.

3.6 WIDE SPALLED JOINT REPAIR (GREATER THAN 3/4")



A. For joints that are spalled, contain metal key or self leveling floor material that exceeds 3/4” in width at slab surface.
   1. Re-saw the joint edge to a minimum depth of 1/4” with a dry-cut, vacuum-equipped shaver/leveler allowing removal of the widest spall or non-linear keyway along a given joint segment to produce a sharp corner on each side of the joint with a minimum of two passes through joint. Maintain consistent width of repair to within 1/2 inch in 10 feet.
   2. Overfill repair cavity with overlay material per manufacturer’s instructions, dye and grind flush to slab surface.
   3. After repair has cured, and prior to any traffic on patched surface, re-saw original slab joint(s) ¾” in depth to honor joint and fill full depth with Polyurea joint filler per manufacturer’s instructions.

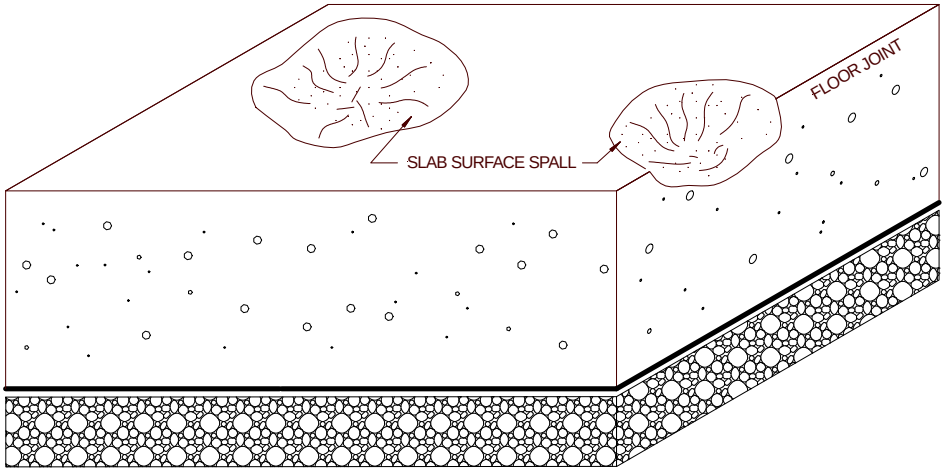
3.7 CRACK REPAIR



A. Crack width less than 1/32” without surface spalling.
   1. Do not repair.
   2. Grout coat may be used to fill thin hairline deficiencies.

B. Cracks from 1/32” to 1/4” in width.
   1. Clean crack cavity.
   2. Remove loose concrete, dirt and debris from crack with a wire brush or hand grinder with twisted wire wheel attachment, 1/2’” minimum depth, insuring crack sidewall is clean.
   3. Remove any loose segments, including islands formed by crack, with sharp tool.
   4. Use methods that will not widen existing crack.
   5. Vacuum crack to remove all dirt, debris and other laitance.
   6. Mask slab surface along crack as necessary to minimize overfill.
   7. Choose material color that closely matches the adjacent floor.
   8. Install low viscosity crack and spall repair material in accordance with manufacturer’s instructions.
   9. Repeat until all voids are filled and material crowns slab surface.
      a. Do not flood area around crack.
      b. Watch for bubble formation and out gassing.
      c. Do not allow material to gel before adding additional material.
   10. Shave or grind material flush to surface as stipulated by manufacturer.

3.8 SURFACE SPALLING REPAIR



A. For slab surface that is chipped and spalled, where the deficiency is 1/2" in length or width up to 3" in length or width, by 1/2" in depth.
   1. Route edge of spall to provide 1/8" deep square edge or 30° edge (consult manufacturer's data sheet for specific surface preparation instructions).
   2. Use small hand grinder with maximum 5" diameter dry diamond blade and vacuum system attachment.
   3. Do not overcut slots into existing slab surface.
   4. Clean and prep spalled cavity.
   5. Wire brush spalled surface to remove all dirt and laitance.
   6. Mask slab at perimeter of spall with tape.
   7. Install Low Viscosity Crack and Spall Repair material.
   8. Polish over repair area with diamond disks to blend surface.
   9. Feather filler material into the adjacent concrete floor surface.
   10. With 2000 grit disk and firm pressure, add a few burn marks to mottle surface to blend with adjacent floor surface.
      a. NOTE: For inconsistent, varying spalled joints that comply with the measurements in this section, a form material may be needed to temporarily form and support the vertical face of spalled joint edge. Ensure that the repair material will not adhere to the form and the rigid repair material does not fuse the joint together.
   11. For cleanouts, in-floor electric outlets and Walker Duct access plates, over-core around perimeter of existing embed by 1/2" in width and depth, then install Low Viscosity Crack and Spall Repair Material.

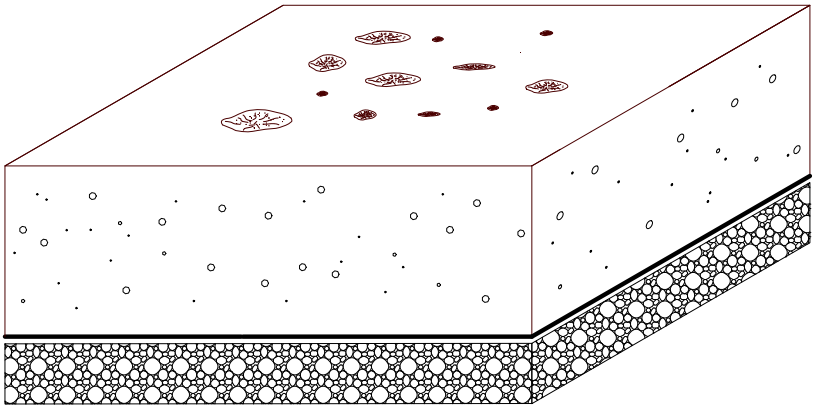
3.9 BOLT HOLE, CONDUIT REPAIR

A. For slab surfaces containing surface or sub-surface bolts, bolt-hole voids, conduit or subsurface conduit.
   1. Recess steel bolt or conduit a minimum of 1/2" below finish floor by either punching or cutting.
      a. Check with General Contractor prior to cutting into active electrical or communication conduit.
   2. For spall fractured edges less than 30 degrees, square edge to a minimum 1/8" depth with either a drill bit, chisel or edge grinder.
   3. Clean cavity of all debris and laitance with drill activated, brass wire wheel. Vacuum hole to remove all dirt, debris and other laitance.
   4. Dispense Low Viscosity Crack and Spall Repair at moderate pace using steady pressure. Dispense material into void, refilling as necessary to produce slight crown.
   5. Grind material flush to slab surface per manufacturer's instructions.

3.10 LARGE SURFACE REPAIR, UNDERLAYMENT REMOVAL AND REPLACEMENT

A. For slab surfaces containing wide-area irregular rough surfaces greater than 3” in width and length such as irregular coarse aggregate surfaces or surfaces with existing tile or carpet underlayment’s > 1/4" in thickness.
   1. Define edge perimeter with diamond masonry wheel or shaver/leveler to produce sharp edge, at least 1/8” deep.
   2. Roughen base surface using shaver/leveler to ICRI CSP 3 – 5 and vacuum clean.
   3. Wire brush to remove any small loose material and vacuum again.
   4. Mix and install overlay material in accordance with manufacturer’s instructions.
   5. Place repair material in floor surface defect, float level or leave slightly proud of existing floor.
   6. Grind, densify, dye and polish to match adjacent concrete.
   7. Re-establish original concrete slab joints by sawing completely through patch and re-filling with Polyurea joint filler prior to exposure to traffic.

3.11 SMALL SURFACE PITTING, PINHOLE REPAIR, GROUT COAT



A. For surfaces consisting of micro-deficiencies, pin holes, hairline cracks and other surface clutter that impedes the achievement of the specified overall gloss values
   1. Clean pitted sections with 90-degree angle grinder equipped with wire wheel to remove all dirt/laitance. Wheel should be run over defect in multiple directions to ensure proper cleaning.
   2. Vacuum prepared pitted sections.
   3. Install and disperse grout coat using GM 3000, StarSeal Fusion, or Diama-Fill in accordance with manufacturer’s directions.
   4. Ensure a thin, uniform layer of repair material covers the pitted areas. Refill any low spots as needed.
   5. Grind or polish flush with metal or resin-bond diamonds, ensuring repair material is flush with slab surface.
   6. Repeat repairs in areas as required if repair material pulls out of defects.
   7. Apply required applications of specified dye and polish smooth to meet specified overall gloss values.

3.12 PROTECTION

A. Protect surfaces of finished floor.

B. Prohibit traffic until floor repairs have received final approval by Owner.

WORKSHEET

INTERIOR CONCRETE SLAB ENHANCEMENT, REPAIR AND JOINT FILLER REPLACEMENT
(To Be Turned in with Sub-Contractor's Bid Behind Form 4450-024, Page 2)

ENTER TOTAL AREA TO BE POLISHED: _____ SQUARE FEET					
ITEM	**AREA FROM ABOVE**	**MULTIPLIER**	**TOTAL FROM MULTIPLIER**	**UNIT RATE INCLUDED IN BID**	**TOTAL COST INCLUDED IN BID**
….. SAMPLE CALCULATION ….. NOT PART OF BID …..					
Joint Filler Removal and Replacement	36,000	0.14	5014 LF	$2.75 / LF	$13,788.50
….. DO NOT INCLUDE SAMPLE CALCULATION COST IN BID …..					
1. Joint Filler Removal and Replacement	_____	0.14	_____ LF	$_____ / LF	$_____
2. Spalled joint repair or joint with metal keyway (less than 3/4")	_____	0.08	_____ LF	$_____ / LF	$_____
3. Spalled joint repair, joint with metal keyway or self-leveling compound removal (great than 3/4")				$_____ / LF	
4. Crack repair	_____	0.03	_____ LF	$_____ / LF	$_____
5a. Surface defect repair, including pop-outs, spalls, and gouges 3/4 – 1-1/2" DIA	_____	0.025	____ UNITS	$_____ / EA	$_____
5b. Surface defect repair, including pop-outs, spalls, and gouges 1.1/2 - 3" DIA	_____	0.025	____ UNITS	$_____ / EA	$_____
6. Surface embed repair, including cleanouts, in-floor electrical outlets and Walker Duct access holes.	_____	0.001	____ UNITS	$_____ / EA	$_____
7. Large surface repair, existing underlayment removal and replacement wit 1/4" Polished Overlay.				$_____ / SF	
8. Grout coat surface enhancement, including micro-pin holes, pitting and other shallow surface deficiencies	_____	0.10	_____ SF	$_____ / SF	$_____
9. Full Grind, Densify, Dye and Polish portions of the project not currently indicated on the drawings.				$_____ / SF	

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Grout.

B. Related Sections:

1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 05 Section "Steel Decking" for field installation of shear connectors through deck.

1.2 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.3 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering analysis by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC 360.
2. Use ASD; data are given at service-load level.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

5. Identify members and connections of the seismic-load-resisting system.
6. Indicate locations and dimensions of protected zones.
7. Identify demand critical welds.
8. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

D. Qualification Data: For qualified Installer, fabricator, testing agency.

E. Welding certificates.

F. Mill test reports for structural steel, including chemical and physical properties.

G. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Shop primers.
6. Nonshrink grout.

H. Source quality-control reports.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

E. Preinstallation Conference: Conduct conference at Project site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. STRUCTURAL-STEEL MATERIALS

1. W-Shapes: ASTM A 992/A 992M.
2. Channels, Angles, M , S-Shapes: ASTM A 36/A 36M.
3. Plate and Bar: ASTM A 36/A 36M.
4. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A 588/A 588M, Grade 50 (345).
5. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
6. Corrosion-Resisting Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M, structural tubing.
7. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
   a. Finish: Black except where indicated to be galvanized.
8. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.
9. Steel Forgings: ASTM A 668/A 668M.
10. Welding Electrodes: Comply with AWS requirements.

B. BOLTS, CONNECTORS, AND ANCHORS

1. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.

   a. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.

2. High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy-hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563, Grade DH, (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers with plain finish.

   a. Direct-Tension Indicators: ASTM F 959, Type 490 (ASTM F 959M, Type 10.9), compressible-washer type with plain finish.

3. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers.

   a. Finish: Hot-dip or mechanically deposited zinc coating.
   b. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with mechanically deposited zinc coating finish.

4. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

   a. Finish: Plain, Mechanically deposited zinc coating.

5. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
6. Unheaded Anchor Rods: ASTM F 1554, Grade 36.

   a. Configuration: Hooked.
   b. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
   c. Plate Washers: ASTM A 36/A 36M carbon steel.
   d. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
   e. Finish: Plain.

7. Headed Anchor Rods: ASTM F 1554, Grade 36 straight.

   a. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
   b. Plate Washers: ASTM A 36/A 36M carbon steel.
   c. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
   d. Finish: Plain.

8. Threaded Rods: ASTM A 36/A 36M.

   a. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.

b. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened] [ASTM A 36/A 36M] carbon steel.
c. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.

9. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

C. PRIMER

1. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer and compatible with topcoat.
2. Galvanizing Repair Paint: ASTM A 780.

D. GROUT

1. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.2 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning, SSPC-SP 2, "Hand Tool Cleaning, or SSPC-SP 3, "Power Tool Cleaning."

F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.

H. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure

removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches (250 mm) o.c. unless otherwise indicated.

I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

J. SHOP CONNECTIONS

1. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

   a. Joint Type: Snug tightened or Slip critical, as indicated on Drawings..
2. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
   a. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

K. SHOP PRIMING

1. Shop prime steel surfaces except the following:

   a. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
   b. Surfaces to be field welded.
   c. Surfaces to be high-strength bolted with slip-critical connections.
   d. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
   e. Galvanized surfaces.

2. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

   a. SSPC-SP 2, "Hand Tool Cleaning."

3. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

   a. Stripe paint corners, crevices, bolts, welds, and sharp edges.
   b. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

4. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

L. GALVANIZING

1. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

    a. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
    b. Galvanize all steel in exterior walls or permanently exposed to weather.

2.3 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

PART 3 - EXECUTION

3.1 ERECTION PREPARATION

A. EXAMINATION

1. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

    a. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. PREPARATION

1. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

   a. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.2 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Architect. .

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.3 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened or slip critical, as indicated on Drawings.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

   a. Liquid Penetrant Inspection: ASTM E 165.
   b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
   c. Ultrasonic Inspection: ASTM E 164.
   d. Radiographic Inspection: ASTM E 94.

D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.5 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION 05 12 00

SECTION 05 21 00

STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. K-series steel joists.
2. Joist accessories.

B. Related Requirements:

1. Division 03 Section "Cast-in-Place Concrete" for installing bearing plates in concrete.
2. Division 05 Section "Structural Steel Framing" for field-welded shear connectors.

1.2 DEFINITIONS

A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.

1. Use ASD; data are given at service-load level.
2. Design joists to withstand design loads with live-load deflections no greater than the following:

a. Roof Joists: Vertical deflection of 1/360 of the span.

1.4 SUBMITTALS

A. Product Data: For each type of joist, accessory, and product.

B. Shop Drawings:

1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details, bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
3. Indicate locations and details of bearing plates to be embedded in other construction.

C. Qualification Data: For manufacturer.

D. Welding certificates.

E. Manufacturer certificates.

F. Mill Certificates: For each type of bolt.

G. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications.

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications.

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.7 SEQUENCING

A. Deliver steel bearing plates to be built into cast-in-place concrete and masonry construction.

PART 2 - PRODUCTS

2.1 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

1. Joist Type: K-series steel joists.

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

C. Provide holes in chord members for connecting and securing other construction to joists.

D. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."

E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."

F. Do not camber joists.

G. Camber joists according to SJI's "Specifications."

H. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches (1:48).

2.2 PRIMERS

A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.3 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Fabricate steel bearing plates from ASTM A 36/A 36M steel with integral anchorages of sizes and thicknesses indicated. Shop prime paint.

C. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface unless otherwise indicated.

D. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.

   1. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.

E. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

   1. Finish: Plain.

F. Welding Electrodes: Comply with AWS standards.

G. Galvanizing Repair Paint: ASTM A 780.

H. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.4 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.

B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.

C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil (0.025 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications, joist manufacturer's written recommendations, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads are applied.

C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using carbon-steel bolts.

E. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.

B. Visually inspect field welds according to AWS D1.1/D1.1M.

1. In addition to visual inspection, test field welds according to AWS D1.1/D1.1M and the following procedures, as applicable:

a. Liquid Penetrant Inspection: ASTM E 165.
b. Magnetic Particle Inspection: ASTM E 709.
c. Ultrasonic Testing: ASTM E 164.
d. Radiographic Testing: ASTM E 94.

C. Visually inspect bolted connections.

D. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.

E. Perform additional testing to determine compliance of corrected Work with specified requirements.

3.4 PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists**,** bearing plates, abutting structural steel**,** and accessories.

1. Clean and prepare surfaces by hand-tool cleaning according to SSPC-SP 2, or power-tool cleaning according to SSPC-SP 3.
2. Apply a compatible primer of same type as primer used on adjacent surfaces.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 21 00

SECTION 05 31 00

STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.

B. Related Requirements:

1. Division 03 Section "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
2. Division 05 Section "Structural Steel Framing" for shop- and field-welded shear connectors.

1.2 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Welding certificates.

D. Product Certificates: For each type of steel deck.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:

1. Power-actuated mechanical fasteners.
2. Acoustical roof deck.

F. Evaluation Reports: For steel deck.

G. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

B. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. ROOF DECK

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. ASC Profiles, Inc.; a Blue Scope Steel company.
   b. Canam United States; Canam Group Inc.
   c. CMC Joist & Deck.
   d. Consolidated Systems, Inc.; Metal Dek Group.
   e. Cordeck.
   f. DACS, Inc.
   g. Epic Metals Corporation.
   h. Marlyn Steel Decks, Inc.
   i. New Millennium Building Systems, LLC.
   j. Nucor Corp.; Vulcraft Group.
   k. Roof Deck, Inc.
   l. Valley Joist; Subsidiary of EBSCO Industries, Inc.
   m. Verco Manufacturing Co.
   n. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

a. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230) G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

1) Color: Manufacturer's standard Gray.

b. Deck Profile: As indicated.
c. Profile Depth: As indicated.
d. Design Uncoated-Steel Thickness: As indicated.
e. Span Condition: Triple span or more.
f. Side Laps: Overlapped.

B. ACCESSORIES

1. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
2. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
3. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.
4. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
5. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
6. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
7. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
8. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
9. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.
10. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.
11. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. EXAMINATION

1. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. INSTALLATION, GENERAL

1. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
2. Install temporary shoring before placing deck panels if required to meet deflection limitations.

3. Locate deck bundles to prevent overloading of supporting members.
4. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
5. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
6. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
7. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
8. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
9. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

C. ROOF-DECK INSTALLATION

1. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches (38 mm) long, and as follows:

   a. Weld Diameter: 5/8 inch (16 mm), nominal.
   b. Weld Spacing: Space welds as indicated.

2. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals indicated on plans:

   a. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.

3. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:

   a. End Joints: Lapped 2 inches (51 mm) minimum.

4. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.

   a. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

5. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Field welds will be subject to inspection.

C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.3 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 31 00

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Load-bearing wall framing.
2. Floor joist framing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cold-formed steel framing product and accessory.

B. Shop Drawings: Provide shop drawings prepared by cold-formed metal framing manufacturer.

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
3. For cold-formed metal framing indicated to comply with design loads include structural analysis and detailed shop drawings signed and sealed by a qualified professional engineer, who shall be licensed in the state in which the project is located and responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product test reports.

D. Research reports.

1.4 QUALITY ASSURANCE

A. Product Tests: Mill certificates or data from a qualified independent testing agency.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AllSteel & Gypsum Products, Inc.
2. California Expanded Metal Products Company.
3. ClarkWestern Building Systems, Inc.
4. Consolidated Fabricators Corp.; Building Products Division.
5. Craco Mfg., Inc.
6. Custom Stud Inc.
7. Design Shapes in Steel.
8. Dietrich Metal Framing; a Worthington Industries company.
9. Formetal Co. Inc. (The).
10. MarinoWARE.
11. MBA Building Supplies, Inc.
12. Nuconsteel; a Nucor Company.
13. Olmar Supply, Inc.
14. Quail Run Building Materials, Inc.
15. SCAFCO Corporation.
16. Southeastern Stud & Components, Inc.
17. State Building Products, Inc.
18. Steel Construction Systems.
19. Steel Network, Inc. (The).
20. Steel Structural Systems.
21. Steeler, Inc.
22. Super Stud Building Products, Inc.
23. Telling Industries, LLC.
24. United Metal Products, Inc.

2.2 PERFORMANCE REQUIREMENTS

A. AISI Specifications and Standards: Unless more stringent requirements are indicated, comply with AISI S100 and AISI S200.

B. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

1. Interior Load-Bearing Wall Framing: Horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft. (239 Pa).
2. Floor Joist Framing: Vertical deflection of 1/480 for live loads and 1/360 for total loads of the span.

2.3 COLD-FORMED STEEL FRAMING, GENERAL

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: ST33H (ST230H) or ST50H (ST340H), as required by structural performance.
2. Coating: G90 (Z275) or equivalent.

2.4 LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
2. Minimum Flange Width: 1-5/8 inches (41mm).
3. Minimum Return Lips: 0.50 inch (12.7mm).

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and matching minimum base-metal thickness of steel studs or joists.

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
2. Flange Width: 1-5/8 inches (41 mm).

2.5 FLOOR JOIST FRAMING

A. Steel Floor Joists: Manufacturer’s proprietary cold-formed galvanized steel joists, of web depths indicated, featuring large extruded holes and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).

B. Steel Joists: Manufacturer’s standard C-shaped steel joists, of web depths indicated, unpunched, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
2. Minimum Flange Width: 1-5/8 inches (41 mm).
3. Minimum Return Lip: 0.50 inches.

C. Steel Joist Track: Manufacturer’s standard U-shaped steel joist track, of web depths indicated, unpunched, with unstiffened flanges, and as follows

1. Minimum Base-Metal Thickness: Matching steel joists.
2. Flange Width: 1-1/4 inches (32 mm).

2.6 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration.

2.7 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.

C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.8 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A 780.

B. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200 and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

D. Install framing members in one-piece lengths.

E. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

F. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

G. Install insulation, specified in Section 072100 "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.3 LOAD-BEARING WALL INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:

1. Anchor Spacing: To match stud spacing.

B. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:

1. Stud Spacing: 16 inches (406 mm).

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

D. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

E. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

G. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

H. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

I. Install horizontal bridging in stud system, spaced vertically 48 inches (1220 mm). Fasten at each stud intersection.

1. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 6 inches (150 mm) deep.
2. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
3. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

J. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

K. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 054400 - COLD-FORMED METAL TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-formed steel trusses for roofs.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel trusses; fabrication; and fastening and anchorage details, including mechanical fasteners.
2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

C. Delegated-Design Submittal: For cold-formed steel trusses.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Welding certificates.

C. Product test reports.

D. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Product Tests: Mill certificates or data from a qualified testing agency, indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Aegis Metal Framing.
2. Genesis Worldwide Inc.
3. Marino/WARE.
4. Nuconsteel, A Nucor Company.
5. Steel Construction Systems.
6. TrusSteel; an ITW company.
7. USA Frametek.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design cold-formed steel framing.

B. Structural Performance: Provide cold-formed steel trusses capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As indicated on structural drawings and required by code.
2. Deflection Limits: Design trusses to withstand design loads without deflections greater than the following:

a. Roof Trusses: Vertical deflection of 1/360 of the span.

3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).

C. Cold-Formed Steel Framing Design Standards:

1. Roof Trusses: Design according to AISI S214.

2.3 COLD-FORMED STEEL TRUSS MATERIALS

A. Steel Sheet: ASTM A 1003/A 1003M, structural grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: As required by structural performance.
2. Coating: G90 (Z275) or equivalent.

2.4 ROOF TRUSSES

A. Roof Truss Members: Manufacturer's standard C-shaped steel sections.

1. Connecting Flange Width: 1-5/8 inches (41 mm), minimum at top and bottom chords connecting to sheathing or other directly fastened construction.
2. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).

2.5 ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, structural grade, Type H, metallic coated, of same grade and coating weight used for truss members.

B. Provide accessories of manufacturer's standard thickness and configuration unless otherwise indicated.

2.6 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Power-Actuated Fasteners: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

C. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

D. Welding Electrodes: Comply with AWS standards.

2.7 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A 780.

B. Shims: Load bearing, of high-density multimonomer plastic, nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.

2.8 FABRICATION

A. Fabricate cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate trusses using jigs or templates.

2. Cut truss members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel truss members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

4. Fasten other materials to cold-formed steel trusses by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace trusses to withstand handling, delivery, and erection stresses. Lift fabricated trusses to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install, bridge, and brace cold-formed steel trusses according to AISI S200, AISI S214, AISI's "Code of Standard Practice for Cold-Formed Steel Structural Framing," and manufacturer's written instructions unless more stringent requirements are indicated.

B. Install cold-formed steel trusses and accessories plumb, square, and true to line, and with connections securely fastened.

1. Fasten cold-formed steel trusses by welding or mechanical fasteners.

    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings; comply with requirements for spacing, edge distances, and screw penetration.

C. Install temporary bracing and supports. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

D. Do not alter, cut, or remove framing members or connections of trusses.

E. Erect trusses with plane of truss webs plumb and parallel to each other, align, and accurately position at spacings indicated.

F. Erect trusses without damaging framing members or connections.

G. Coordinate with wall framing to align webs of bottom chords and load-bearing studs or continuously reinforce track to transfer loads to structure. Anchor trusses securely at all bearing points.

H. Install continuous bridging and permanently brace trusses as indicated on Shop Drawings and designed according to CFSEI's TechNote 551e, "Design Guide: Permanent Bracing of Cold-Formed Steel Trusses.".

I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual trusses no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.2 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform inspections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Field and shop welds will be subject to testing and inspecting.

D. Prepare test and inspection reports.

3.3 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal trusses are without damage or deterioration at time of Substantial Completion.

END OF SECTION 054400

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following metal fabrications:

1. Miscellaneous framing and supports for the following:

   a. Masonry lintels.
   b. Overhead grilles.

2. Miscellaneous steel trim, including stainless steel base.
3. Pipe bollards.
4. Rough hardware.
5. Structural steel door frames.
6. Remodeling of existing fabrications.
7. Shopping cart corral (AF/CI see Section 01 10 18).
8. Guardrails with welded steel mesh panels.
9. Wheelguards.

B. Related Sections: The following sections contain requirements that relate to this section:

1. Division 05 Section "Structural Steel" for structural steel framing system components.
2. Division 10 Section "Wall and Door Protection" for stainless steel corner guards and cart bumper rails.

1.2 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product data for products used in miscellaneous metal fabrications, including paint products and grout.

C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other sections.

1. Where installed metal fabrications are indicated to comply with certain design loadings, include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the qualified professional engineer who was responsible for their preparation.

D. Samples representative of materials and finished products as may be requested by Contracting Officer.

E. Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.

F. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project name, addresses, names of Contracting Officer and EXCHANGE, and other information specified.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design ladders, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Firms experienced in successfully producing metal fabrications similar to that indicated for this Project, with sufficient production capacity to produce required units without causing delay in the Work.

B. Installer Qualifications: Arrange for installation of metal fabrications specified in this section by same firm that fabricated them.

C. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel," D1.3 "Structural Welding Code - Sheet Steel", and D1.2 "Structural Welding Code - Aluminum."

1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

D. Engineer Qualifications: Professional engineer licensed to practice in jurisdiction where project is located and experienced in providing engineering services of the kind indicated that have resulted in the successful installation of metal fabrications similar in material, design, and extent to that indicated for this Project.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Ferrous Metals:

1. Metal Surfaces, General: For metal fabrications exposed to view upon completion of the Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by reference standards for stretcher-leveled sheet.
2. Steel Plates, Shapes, and Bars: ASTM A 36.

3. Steel Bars for Gratings: ASTM A 569 or ASTM A 36.
4. Wire Rod for Grating Cross Bars: ASTM A 510.
5. Steel Tubing: Product type (manufacturing method) and as follows:

    a. Cold-Formed Steel Tubing: ASTM A 500, grade as indicated below:

        1) Grade B, unless otherwise indicated or required for design loading.
        2) For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.

6. Uncoated Steel Sheet: Commercial quality, product type (method of manufacture) as follows:

    a. Cold-Rolled Steel Sheet: ASTM A 366.

7. Steel Pipe: ASTM A 53; finish, type, and weight class as follows:

    a. Black finish, unless otherwise indicated.
    b. Hot dipped galvanized finish for exterior installations and where indicated. Black finish elsewhere.
    c. Type S, Grade A, standard weight (schedule 40), unless otherwise indicated, or another grade or weight or both required by structural loads.

8. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
9. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.
10. Stainless Steel: Type 304, No. 4 Finish.

    a. Stainless Steel Base; Size and profile indicated on Drawings.

B. Grout and Anchoring Cement

1. Nonshrink Metallic Grout: Premixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C 621, specifically recommended by manufacturer for heavy duty loading applications of type specified in this section.
2. Nonshrink Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C 621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

C. Fasteners:

1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.

D. Paint

1. Shop Primer for Ferrous Metal: Manufacturer's or fabricator's standard, fast-curing, lead-free, universal modified alkyd primer selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated, and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure complying with performance requirements of FS TT-P-645.
2. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint-20.

3. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.

E. Pipe Bollards

1. Fabricate pipe bollards from Schedule 40 galvanized steel pipe.
2. Fill bollards with concrete and form convex top to shed water. Set in concrete foundation as indicated.
3. Paint bollards Base standard color.

F. Loose Steel Lintels

1. Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
2. Weld adjoining members together to form a single unit where indicated.
3. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than 8 inches (200 mm), unless otherwise indicated.
4. Galvanize and paint loose steel lintels located in exterior walls.

G. Shopping Cart Corral

1. Description:

   a. Manufacturer: McCue Corp. Ph. 800-800-8503.
   b. Exchange Fixture ID: BP3 and BP3-S.

2. AF/CI. See Section 01 10 18.

2.2 FABRICATION

A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 100 deg F (55.5 deg C).

D. Shear and punch metals cleanly and accurately. Remove burrs.

E. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

F. Remove sharp or rough areas on exposed traffic surfaces.

G. Weld corners and seams continuously to comply with AWS recommendations and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

K. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.

L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matches those adjacent.

F. Installation of Bollards

1. Anchor bollards in concrete as indicated.

G. Installation of Shopping Cart Corral

1. Install per manufacturer's written instructions.

H. Installation of Steel Guard Rails

1. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts as indicated. Plumb posts in each direction. Secure posts to building construction as follows:

   a. Anchor posts in concrete by means of pipe sleeves preset and anchored into concrete. Insert posts into sleeves, fill annular space between post and sleeve with nonshrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's directions.

   b. Anchor posts to steel with direct welding to support.

END OF SECTION 05 50 00

SECTION 05 52 13

PIPE RAILINGS

PART 1 - GENERAL

2.2 SUMMARY

A. Section Includes:

1. Steel pipe railings, posts and fittings.

B. Related Sections:

1. Division 06 Section "Rough Carpentry" for wood blocking for anchoring railings.
2. Division 09 Section "Non-Structural Metal Framing" for metal backing for anchoring railings.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Steel: 72 percent of minimum yield strength.

C. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
b. Infill load and other loads need not be assumed to act concurrently.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

2.2 SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

2.2 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

C. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations and where indicated.

D. Plates, Shapes, and Bars: ASTM A 36/A 36M.

E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

F. Shop Primer for Galvanized Steel: Shall be compatible with finish paint.

2.2 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Form changes in direction as follows:

1. As detailed.

J. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

K. Close exposed ends of railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.

M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

O. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

P. Galvanized Railing Finish:

1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
2. Hot-dip galvanize indicated steel and iron railings, including hardware, after fabrication.
3. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
4. Comply with ASTM A 153/A 153M for hot-dip galvanized hardware.
5. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
6. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

Q. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

END OF SECTION 05 52 13

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood blocking, cants, and nailers.
2. Wood furring and grounds.
3. Utility shelving.
4. Plywood backing panels.

B. Related Requirements:

1. Division 06 Section “Sheathing”.
2. Division 31 Section "Termite Control" for site application of borate treatment to wood framing.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

D. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.

3. Power-driven fasteners.
4. Powder-actuated fasteners.
5. Expansion anchors.
6. Metal framing anchors.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Wood Products, General:

1. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise directed.

B. Wood-Preservative-Treated Lumber:

1. Preservative Treatment: AWPA U1; Use Category UC2.

   a. Preservative Chemicals: Containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

2. Application: Items indicated and as follows:

   a. Items in contact with roofing or waterproofing.
   b. Items in contact with concrete or masonry.
   c. Framing less than 18 inches (460 mm) above ground in crawlspaces.
   d. Floor plates installed over concrete slabs-on-grade.

C. Fire-Retardant-Treated Materials:

1. Exterior type for exterior locations and where indicated.
2. Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
3. Interior Type A, unless otherwise indicated.
4. Application: Items indicated and as follows:

   a. Concealed blocking.
   b. Plywood backing panels.

D. Miscellaneous Lumber:

1. Utility Shelving: 19 percent maximum moisture content.

   a. Spruce-pine-fir, Construction or No. 2 Common.

E. Plywood Backing Panels: Exterior, AC, fire-retardant treated.

F. Fasteners: Hot-dip galvanized steel where exposed to weather, in ground contact, in contact with treated wood, or in area of high relative humidity.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Furring to Receive Plywood: 1-by-3-inch nominal-size (19-by-63-mm actual-size) furring at 24 inches o.c.

END OF SECTION 06 10 00

SECTION 06 16 00

SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof sheathing substrate board.

B. Related Sections:

1. Division 06 Section "Rough Carpentry" for plywood backing panels.

1.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: Comply with ASTM E84..

1.3 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 – MATERIALS

2.1 MATERIALS

A. Roof Sheathing Substrate Board

1. Substrate Board: ASTM C 1278/C 1278M, cellulosic-fiber-reinforced, water-resistant gypsum substrate, 5/8 inch (16 mm) thick.

2. Products: Subject to compliance with requirements, provide the following:

a. USG Corporation; Securock.

B. FASTENERS

1. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

    a. For roof sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

2. Nails, Brads, and Staples: ASTM F 1667.
3. Power-Driven Fasteners: NES NER-272.
4. Wood Screws: ASME B18.6.1.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

    1. NES NER-272 for power-driven fasteners.
    2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

    1. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturer's written instructions.

3.3 STRUCTURAL PANEL INSTALLATION

    1. Roof Sheathing:

a. Nail or staple to wood framing.
b. Space panels 1/8 inch (3 mm) apart at edges and ends.

END OF SECTION 06 16 00

SECTION 06 40 23

INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Plastic-laminate cabinets.

B. Plastic-laminate countertops.

C. Closet and utility shelving.

D. Solid-surfacing material countertops.

E. Cabinet hardware and accessories.

1.2 SUBMITTALS

A. Product Data: For high-pressure decorative laminate, solid-surfacing material, cabinet hardware and accessories, and finishing materials and processes.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of AWI's standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Products: Comply with the following:

1. Medium-Density Fiberboard: ANSI A208.2, Grade MD**,** made with binder containing no urea formaldehyde.
2. Particleboard: ANSI A208.1, Grade M-2.
3. Softwood Plywood: DOC PS 1**,** Medium Density Overlay.

C. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components with exposed or semiexposed edges.

D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

E. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.

F. Cabinet Hardware and Accessories: Provide materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware".

G. Concealed European Style Hinges: BHMA A156.9, B01602, 135 degree self-closing as manufactured by Grass.

H. Back-Mounted Pulls: BHMA A156.9, B02011.

I. Wire Pulls: Aluminum, satin finish, 4-inch x 5/16-inch diameter as manufactured by Stanley.

J. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with rests, B04081 as manufactured by K & V.

K. Drawer Slides: BHMA A156.9, B05091. As manufactured by Accuride.

1. Standard Duty (Grade 1, Grade 2, and Grade 3): Side mounted; full-extension; zinc-plated steel with polymer rollers.
2. Heavy Duty (Grade 1 HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
3. Box Drawer Slides: Grade 1 HD-100; for drawers not more than 6 inches (150 mm) high and 24 inches (600 mm) wide.
4. File Drawer Slides: Grade 1 HD-200; for drawers more than 6 inches (150 mm) high or 24 inches (600 mm) wide.
5. Pencil Drawer Slides: Grade 1; for drawers not more than 3 inches (75 mm) high and 24 inches (600 mm) wide.

L. Door Locks: BHMA A156.11, E07121, as manufactured by National Cabinet Lock.

M. Drawer Locks: BHMA A156.11, E07041, as manufactured by National Cabinet Lock.

N. Grommets for Cable Passage through Countertops: Selected by Architect, molded plastic; “OG” or “SG” series as manufactured by Doug Mockett.

O. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

P. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

Q. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with material and performance requirements in ANSI Z124.3, for Type 5 or Type 6, without a precoated finish.

1. Products: As scheduled on Drawings.

R. Plastic Laminate Countertops

1. Quality Standard: Comply with AWI Section 400 requirements for countertops.

a. Grade: Custom.

2. Type of Top: High-pressure decorative laminate complying with the following:

a. Grade: GP-50, 0.050-inch (1.270-mm) nominal thickness.
b. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1) See colors noted in Laminated-Clad Cabinets (plastic-covered casework).

c. Edge Treatment: Same as laminate cladding on horizontal surfaces.
d. Core Material: Medium-density particleboard.

S. Laminate-Clad Cabinets (Plastic-Covered Casework)

1. Quality Standard: Comply with AWS Section 11 requirements for laminate-clad cabinets.

a. Grade: Custom.

2. AWI Type of Cabinet Construction: Flush overlay.
3. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:

a. Horizontal Surfaces Other than Tops: GP-50, 0.050-inch (1.270-mm) nominal thickness.
b. Vertical Surfaces: GP-28, 0.028-inch (0.711-mm) nominal thickness.

c. Edges: GP-28, 0.028-inch (0.711-mm) nominal thickness where noted. 3 mm PVC matching laminate color unless otherwise noted.

4. Materials for Semiexposed Surfaces: Provide surface materials indicated below:

a. Surfaces Other than Drawer Bodies: Thermoset decorative overlay.
b. Drawer Sides and Backs: Thermoset decorative overlay.
c. Drawer Bottoms: Thermoset decorative overlay.

5. Colors, Patterns and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

a. See Finishes Legend and Food Vendor Drawings.

T. Solid-Surfacing Material Countertops with Integral Bowl Sinks

1. Quality Standard: Comply with AWS Section 11 requirements for countertops.

2. Grade: Custom.
3. Solid-Surfacing-Material Thickness: ¾ inch (19 mm).
4. Colors, Patterns and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:

a. See Finishes Legend and Food Vendor Drawings.

5. Fabricate tops in one piece with shop-applied backsplashes and edges, unless otherwise indicated. Provide integral bowl sinks. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

2.2 FABRICATION

A. Interior Woodwork Grade: Provide interior woodwork complying with the referenced quality standard and of the following grade:

1. Grade: Custom.

B. Fabricate woodwork to dimensions, profiles, and details indicated.

C. Complete fabrication, including assembly, finishing, and hardware application, before shipment to Project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Shop-cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges with a water-resistant coating.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.

C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for complete installation.

E. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c.

F. Tops: Anchor securely to base units and other support systems as indicated. Caulk space between backsplash and wall with specified sealant.

1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Secure backsplashes to tops with concealed metal brackets at 16 inches (400 mm) o.c.

END OF SECTION 06 40 23

SECTION 07 21 00

THERMAL INSULATION AND VAPOR RETARDER

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Foam-plastic board insulation.
2. Glass-fiber blanket insulation.
3. Vapor retarders.

1.2 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for each type of insulation product specified.

C. Product test reports from and based on tests performed by qualified independent testing laboratory evidencing compliance of insulation products with requirements including r-values (aged values for plastic foam insulations), fire performance characteristics, perm ratings, water absorption ratings, and other properties, based on comprehensive testing of current products.

1.3 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

B. Extruded Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation with closed-cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578 for type indicated; with 5-year aged r-values of 5.4 and 5 at 40 and 75 deg F (4.4 and 23.9 deg C), respectively; and as follows:

1. Type IV, 1.6 pcf min. density, unless otherwise indicated.
2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 75 and 450, respectively.

C. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

D. Polyethylene Vapor Retarders: ASTM D 4397, **6 mils (0.15 mm)** thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).

E. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

F. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

G. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.

H. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

E. Installation of Below Grade Insulation:

1. On vertical surfaces, set insulation units according to manufacturer's written instructions.

   a. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) below exterior grade line.

2. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

   a. If not otherwise indicated, extend insulation a minimum of 24 inches (610 mm) in from exterior walls.

F. Installation of Insulation in Ceilings for Sound Attenuation:

1. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 48 inches (1219 mm) up either side of partitions.

G. Installation of Vapor Retarders:

1. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
2. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.

   a. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window

openings. Seal overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

b. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.

3. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
4. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.2 INSTALLATION OF PERIMETER AND UNDERSLAB INSULATIONJ

A. On vertical footing and foundation wall surfaces, set insulation units according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

B. On horizontal surfaces under slabs, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of 24 inches in from exterior walls.

END OF SECTION 07 21 00

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manufactured Products:

a. Manufactured through-wall flashing and counterflashing.
b. Manufactured reglets and counterflashing.

2. Formed Products:

a. Formed roof drainage sheet metal fabrications.
b. Formed low-slope roof sheet metal fabrications.

1.2 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:

1. Wind Zone 1: For velocity pressures of 10 to 20 lbf/sq. ft. (0.48 to 0.96 kPa): 40-lbf/sq. ft. (1.92-kPa) perimeter uplift force, 60-lbf/sq. ft. (2.87-kPa) corner uplift force, and 20-lbf/sq. ft. (0.96-kPa) outward force.
2. Wind Zone 1: For velocity pressures of 21 to 30 lbf/sq. ft. (1.00 to 1.44 kPa): 60-lbf/sq. ft. (2.87-kPa) perimeter uplift force, 90-lbf/sq. ft. (4.31-kPa) corner uplift force, and 30-lbf/sq. ft. (1.44-kPa) outward force.
3. Wind Zone 2: For velocity pressures of 31 to 45 lbf/sq. ft. (1.48 to 2.15 kPa): 90-lbf/sq. ft. (4.31-kPa) perimeter uplift force, 120-lbf/sq. ft. (5.74-kPa) corner uplift force, and 45-lbf/sq. ft. (2.15-kPa) outward force.
4. Wind Zone 3: For velocity pressures of 46 to 104 lbf/sq. ft. (2.20 to 4.98 kPa): 208-lbf/sq. ft. (9.96-kPa) perimeter uplift force, 312-lbf/sq. ft. (14.94-kPa) corner uplift force, and 104-lbf/sq. ft. (4.98-kPa) outward force.

C. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

C. Copper Sheet Metal Standard: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sheet Metals:

1. Copper Sheet: Non-patinated mill finish.
2. Aluminum Sheet with Smooth, Flat Surface:

a. As-Milled Finish: Mill finish.

B. Underlayment: As indicated on Drawings.

C. Manufactured Flashing and Trim:

1. Reglets and Counterflashing: Copper and Aluminum where indicated.

a. Type: Surface-mounted.
b. Accessories: Counterflashing wind-restraint clips.
c. Thickness: As indicated on Drawings.

D. Formed Roof Drainage Fabrications: Including copper, built-in gutters and downspouts.

1. Thickness as indicated on Drawings.

E. Formed Low-Slope Roof Fabrications: Including copper flashing.

1. Thickness as indicated on Drawings.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

B. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less

than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of [**uncoated-aluminum**] [**and**] [**stainless-steel**] sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance..

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel and aluminum sheet.
2. Do not use torches for soldering.
3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
4. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Built-in Gutters: Join sections with riveted and soldered joints. Provide for thermal expansion. Slope to downspouts. Provide end closures and seal watertight with sealant.

1. Install underlayment layer in built-in gutter trough and extend to drip edge at eaves and under underlayment on roof sheathing. Lap sides minimum of 2 inches (50 mm) over underlying course. Lap ends minimum of 4 inches (100 mm). Stagger end laps between succeeding courses at least 72 inches (1830 mm). Fasten with roofing nails. Install slip sheet over underlayment.

2. Install gutter with expansion joints at locations indicated, but not exceeding, 30 feet apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements[**, sheet metal manufacturer's written installation instructions,**] and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm).

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION 07 62 00

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes joint sealants for the following locations:

1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces as indicated below:

   a. Control joints in masonry walls.
   b. Control and expansion joints in cast-in-place concrete.
   c. Perimeter joints between adjacent materials and frames of doors and windows.
   d. Other joints as indicated.

2. Exterior joints in horizontal traffic surfaces as indicated below:

   a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
   b. Other joints as indicated.

3. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated below:

   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Tile control and expansion joints.
   d. Perimeter joints between interior wall surfaces and frames of interior doors.
   e. Perimeter joints of plumbing fixtures.
   f. Other joints as indicated.

4. Interior joints in horizontal traffic surfaces as indicated below:

   a. Control and expansion joints in cast-in-place concrete slabs.
   b. Other joints as indicated.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction compatibility and adhesion testing.

B. Preconstruction field-adhesion testing.

1.3 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

1.4 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

B. Provide joint sealants for interior applications that have been produced and installed to establish and maintain airtight continuous seals that are water resistant and cause no staining or deterioration of joint substrates.

1.5 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

1.6 QUALITY ASSURANCE

A. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. VOC Content of Interior Sealants:

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

B. Stain Test: ASTM C 1248.

C. Suitability for Contact with Food: Comply with 21 CFR 177.2600, where applicable.

2.2 SILICON JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/500, for Use NT.

1. Application: Exterior locations.

B. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

1. Application: Exterior locations.

C. Mildew-Resistant, Single-Component, Nonsag, Neutral-Curing Silicon Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT:

1. Application: Interior Locations.

D. Mildew-Resistant, Single-Component, Acid-Curing, Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Application: Interior Locations.

2.3 URETHANE JOINT SEALANTS

A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Application: Exterior locations.

B. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Application: Exterior locations.

C. Multi-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use NT.

1. Application: Interior and exterior locations.

2.4 LATEX JOINT SEALANT

A. Acrylic Latex or siliconized acrylic latex, ASTM C834.

2.5 ACOUSTICAL JOINT SEALANT: Non-sag, paintable, non-staining latex.

2.6 JOINT-SEALANT BACKING: Cylindrical.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

a. Do not leave gaps between ends of joint fillers.
b. Do not stretch, twist, puncture, or tear joint fillers.
c. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

2. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.

E. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

F. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

3.2 FIELD QUALITY CONTROL

A. Field-adhesion testing.

END OF SECTION 07 92 00

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following products manufactured in accordance with SDI Recommended Standards:

1. Doors: Seamless, hollow or composite construction standard steel doors for interior and exterior locations.
2. Frames: Pressed steel frames for doors, pocket doors, transoms, sidelights, mullions, interior glazed panels, and other interior and exterior openings of following type:

   a. Welded unit type.

3. Provide factory primed doors and frames to be field painted.

B. Painting primed doors and frames is specified in Division 09 Section "Painting."

C. Door hardware is specified in another Division 08 Section.

D. Glass and Glazing are specified in another Division 08 Section.

1.2 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.

B. Product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

C. Shop drawings showing fabrication and installation of standard steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.
2. Indicate coordinate of glazing frames and stops with glass and glazing requirements.

D. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors available for factory-finished doors and frames.

1.3 QUALITY ASSURANCE

A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Contracting Officer; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4-inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inches spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

B. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, or drawing quality, ASTM A 642, hot dipped galvanized in accordance with ASTM A 525, with A60 or G60 coating designation, mill phosphatized.

C. Supports and Anchors: Fabricate of not less than 18-gage sheet steel; galvanized where used with galvanized frames.

D. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize in compliance with ASTM A 153, Class C or D as applicable.

E. Shop Applied Paint: Apply after fabrication.

1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints complying with ANSI A224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."

F. Doors: Provide doors of sizes, thicknesses, and designs indicated.

G. Interior Doors: Provide 1-3/4 inch (44.4 mm) thick doors complying with requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).

H. Exterior Doors: Provide 1-3/4 inch (44.4 mm) thick doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).
2. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu (1.057 K x sq. m/W) when tested according to ASTM C 1363.

I. Frames: Provide steel frames for doors, transoms, sidelights, relights and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.

J. Frames of 0.053-inch- (1.3-mm-) (16 gauge) thick steel sheet for:

1. Door openings wider than 48 inches (1220 mm).
2. Level 2 steel doors.

K. Frames of 0.075-inch- (14 gauge) thick steel sheet for:

3. Level 3 steel doors.

L. Door Silencers: Except on weather-stripped frames, fabricate stops to receive three silencers on strike jambs of single-door frames and two silencers on heads of double-door frames.

M. Plaster Guards: Provide 0.016-inch- (0.4-mm-) thick, steel sheet plaster guards or mortar boxes to close off interior of openings; place at back of hardware cutouts where mortar or other materials might obstruct hardware operation.

N. Supports and Anchors: Fabricated from not less than 0.042-inch- (1.0-mm-) thick, electrolytic zinc-coated or metallic-coated steel sheet.

1. Wall Anchors in Masonry Construction: 0.177-inch- (4.5-mm-) diameter, steel wire complying with ASTM A 510 (ASTM A 510M) may be used in place of steel sheet.

O. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where zinc-coated items are to be built into exterior walls, comply with ASTM A 153/A 153M, Class C or D as applicable.

2.2 FABRICATION

A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site. Comply with ANSI/SDI-100 requirements.

1. Internal Construction: Manufacturer's standard honeycomb, polyurethane, polystyrene, unitized steel grid, vertical steel stiffeners, or rigid mineral fiber core with internal sound deadener on inside of face sheets where appropriate in accordance with SDI standards.

2. Clearances: Not more than 1/8 inch at jambs and heads except between non-fire-rated pairs of doors not more than 1/4 inch. Not more than 3/4 inch at bottom.

B. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C236 or ASTM C 976 on fully operable door assemblies.

1. Unless otherwise indicated, provide thermal-rated assemblies with U-value rating of 0.41 Btu/sq. ft. x h x deg F (2.33 W/sq. m x K) or better.

C. Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel.

D. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."

E. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel.

F. Fabricate exterior doors, panels, and frames from galvanized sheet steel in accordance with SDI-112. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gage inverted steel channels.

G. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

H. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware in accordance with final Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.

1. For concealed overhead door closers, provide space, cutouts, reinforcing and provisions for fastening in top rail of doors or head of frames, as applicable.

I. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at project site.

J. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames," published by Door and Hardware Institute.

K. Shop Painting: Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

1. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.
2. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.

L. Glazing Stops: Minimum 20 gage steel.

1. Provide screw applied removable glazing beads on inside of glass, louvers, and other panels in doors.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames," unless otherwise indicated.

1. Except for frames located at existing concrete, masonry or drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
2. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with screws.

C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100.

3.2 ADJUST AND CLEAN

A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.

C. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION 08 11 13

SECTION 08 14 16

FLUSH WOOD DOORS

1.1 SUMMARY

A. This Section includes the following:

1. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.
3. Factory machining for hardware.

B. Related Sections include the following:

1. Division 08 Section "Hollow Metal Doors and Frames" for metal door frames.
2. Division 08 Section "Door Hardware".

1.2 SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.

C. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches (200 by 250 mm), for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
2. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edgings representing typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

B. Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated." Provide AWI Quality Certification Labels or an AWI letter of licensing for Project indicating that doors comply with requirements of grades specified.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect doors during transit, storage and handling to prevent damage, soiling, warping and deterioration. Protect doors from direct sunlight. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting. Separate packing materials in accordance with Waste Management Plan and place in designated areas for recycling.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.6 WARRANTY

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 75-mm) span.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
2. Warranty shall be in effect from date of Substantial Completion for the life of the installation.

1.7 MATERIALS

A. Doors for Transparent Finish:

1. Grade: Premium, with Grade AA faces.
2. Species and Cut: Shall match existing wood doors.
3. Match between Veneer Leaves: Shall match existing wood doors.
4. Assembly of Veneer Leaves on Door Faces: Shall match existing wood doors.
5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
6. Stiles: Applied wood edges of same species as faces and covering edges of crossbands.

B. Solid Core Doors with Particleboard Cores: Comply with the following requirements:

1. Particleboard: ANSI A208.1, Grade LD-2.
2. Blocking: Provide wood blocking in particleboard-core doors as follows:

   a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers.
   b. 5-inch (125-mm) bottom-rail blocking, in doors indicated to have kick, mop, or armor plates.
   c. 5-inch (125-mm) midrail blocking, in doors indicated to have exit devices.

C. Interior Veneer-Faced Doors:

1. Core: Particleboard.

2. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

1.8 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

1.9 FACTORY FINISHING

A. General: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated" for factory finishing.

B. Finish doors at factory.

C. Transparent Finish:

1. Grade: Premium.
2. Finish: AWI System TR-6 catalyzed polyurethane.
3. Staining: Shall match existing and as approved by Architect.

a. Open grain woods may require a filled finish to match existing doors.

1.10 INSTALLATION

A. Hardware: For installation, see Division 08 Section "Door Hardware."

B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.

C. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

E. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

1.11 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 08 14 16

SECTION 08 33 26

OVERHEAD COILING GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Open-curtain overhead coiling grilles.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design overhead coiling grilles, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Operation Cycles: Provide overhead coiling grille components and operators capable of operating for not less than number of cycles indicated for each grille. One operation cycle is complete when a grille is opened from the closed position to the fully open position and returned to the closed position.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain overhead coiling grilles from single source from single manufacturer.

C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

PART 2 - PRODUCTS

2.1 OPEN-CURTAIN GRILLE ASSEMBLY

A. Open-Curtain Grille: Overhead coiling grille with a curtain having a network of horizontal rods that interconnect with vertical links.

1. Basis-of-Design Product: Subject to compliance with requirements, provide “Model FPG” as manufactured by Cookson Company or comparable product by one of the following:

a. Cornell Iron Works, Inc.
b. McKeon Rolling Steel Door Company, Inc.

B. Operation Cycles: Grille components and operators capable of operating for not less than 50,000.

C. Grille Curtain Material: Aluminum.

1. Rod Spacing: Approximately 2 inches (51 mm).
2. Link Spacing: Approximately 9 inches (228 mm) apart in Pattern 5014-M92.
3. Spacers: Metal tubes matching curtain material.

D. Bottom Bar: Continuous tubular shape fabricated from aluminum extrusion to match grille.

E. Curtain Jamb Guides: Aluminum with expose finish matching curtain. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.

F. Hood: Match curtain material and finish.

1. Mounting: Face of wall.

G. Locking Devices: Equip grille with cylinder in bottom bar.

H. Manual Grille Operator: Push-up operation.

I. Curtain Accessories: Equip grille with push/pull handles.

J. Grille Finish:

1. Aluminum Finish: Bronze anodized to match existing adjacent entrance framing and as acceptable to Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install overhead coiling grilles and operating equipment complete with necessary hardware, anchors, inserts, hangars, and equipment supports, according to manufacturer's written instructions and as specified.

B. Adjust hardware and moving parts to function smoothly, so that grilles operate easily, free of warp, twist, or distortion. Lubricate bearings and sliding parts as recommended by manufacturer.

END OF SECTION 08 33 26

SECTION 08 41 26

ALL-GLASS ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior, manual-swinging, all-glass entrance doors.
2. Interior, all-glass storefronts.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details, including the following:

1. Plans, elevations, and sections.
2. Details of fittings and glazing, including isometric drawings of patch fittings.
3. Door hardware locations, mounting heights, and installation requirements.

C. Samples: For each type of exposed finish indicated.

D. Other Action Submittals:

1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Warranty: Warranty specified herein.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain all-glass systems from single source from single manufacturer.

C. Accessible All-Glass Entrance Doors: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

D. Preinstallation Conference: Conduct conference at Project site.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of all-glass systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion, except as follows:

a. Concealed Floor Closers: 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers/Products: Subject to compliance with requirements, provide “Type F All Glass Entrance” as manufactured by Oldcastle Glass, Inc. or comparable product by one of the following:

1. Arch aluminum & glass.
2. Vistawall Architectural products.
3. Other acceptable to Owner.

2.2 MATERIALS

A. Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), tested for surface and edge compression per ASTM C 1048 and for impact strength per 16 CFR 1201 for Category II materials.

1. Class 1: Clear monolithic.

a. Thickness: 1/2 inch (13 mm).
b. Locations: As indicated.

2. Exposed Edges: Machine ground and flat polished.
3. Butt Edges: Flat ground.
4. Corner Edges: Lap-joint corners with exposed edges polished.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), with strength and durability characteristics of not less than Alloy 6063-T5.

2.3 METAL COMPONENTS

A. Fitting Configuration:

1. Manual-Swinging, All-Glass Entrance Doors: Patch fittings as shown on Drawings.

B. Patch Fittings: Bronze anodized aluminum.

C. Channel Fittings: Match patch-fitting metal and finish.

1. Height Top Channel: 2-inches
2. Height Bottom Channel: 1-inch

D. Accessory Fittings: Match patch-fitting metal and finish for the following:

1. Overhead doorstop.

E. Anchors and Fastenings: Concealed.

2.4 ENTRANCE DOOR HARDWARE

A. General: Heavy-duty entrance door hardware units in sizes, quantities, and types recommended by manufacturer for all-glass entrance systems indicated. For exposed parts, match metal and finish of patch fittings.

B. Concealed Floor Closers and Top Pivots: Center hung; BHMA A156.4, Grade 1; including cases, bottom arms, top walking beam pivots, plates, and accessories required for complete installation.

1. Swing: Double acting.
2. Opening-Force Requirements:

a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N)to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
b. Accessible Interior Swinging Doors: Not more than 5 lbf (22.2 N) to fully open door.

C. Push-Pull Set: As selected from manufacturer's full range and acceptable to Owner. Color shall match patch-fittings.

D. Single-Door and Active-Leaf Locksets: Bottom-fitting deadbolt.

1. Deadbolt operated by key outside.

E. Cylinders: As specified in Section 087100 "Door Hardware."

2.5 FABRICATION

A. Provide holes and cutouts in glass to receive hardware, fittings, and accessory fittings before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.

1. Fully temper glass using horizontal (roller-hearth) process, and fabricate so that when glass is installed, roll-wave distortion is parallel with bottom edge of door or lite.

B. Factory assemble components and factory install hardware and fittings to greatest extent possible.

2.6 Aluminum Finishes

A. Color Anodic Finish: AAMA611, AA-MIZC22 A32/A34, Class II, 0.010 mm or thicker.

1. Color: Shall match existing adjacent entrance doors and as approved by Owner.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install all-glass systems and associated components according to manufacturer's written instructions.

B. Set units level, plumb, and true to line, with uniform joints.

C. Maintain uniform clearances between adjacent components.

D. Lubricate hardware and other moving parts according to manufacturer's written instructions.

E. Set, seal, and grout floor closer cases as required to suit hardware and substrate indicated.

F. Install joint sealants as specified in Section 079200 "Joint Sealants."

END OF SECTION 08 41 26

SLIDING AUTOMATIC ENTRANCES

SECTION 08 42 29.23

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes exterior sliding, power-operated automatic entrances.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For automatic entrances.

1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
2. Include diagrams for power, signal, and control wiring.
3. Indicate locations of activation and safety devices.
4. Include hardware schedule and indicate hardware types, functions, quantities, and locations.

C. Sample: For each exposed product and for each color and texture specified.

D. Delegated-Design Submittal: For automatic entrances.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Product test reports.

C. Field quality-control reports.

D. Warranties specified herein.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project.

B. Certified Inspector Qualifications: Certified by AAADM.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of automatic entrances that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 AUTOMATIC ENTRANCE ASSEMBLIES

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Power-Operated Door Standard: BHMA A156.10.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design automatic entrances.

B. Wind Loads: As indicated on Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

D. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 1.25 cfm/sq. ft. (6.4 L/s x sq. m) of fixed entrance-system area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa).

2.3 SLIDING AUTOMATIC ENTRANCES

A. General: Provide manufacturer's standard automatic entrances including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, controls, and accessories required for a complete installation.

B. Sliding Automatic Entrance:

1. Basis-of-Design Product: Subject to compliance with requirements, provide "DuraGlide 3000 Series" as manufactured by Stanley Access Technologies, LLC; Division of Stanley Security Solutions, or comparable product by one of the following:

   a. Single-Sliding Units:

      1) Besam Entrance Solutions; Subsidiary of ASSA ABLOY Entrance Systems.
      2) Horton Automatics; a division of Overhead Door Corporation.

2. Configuration: Single sliding door(s) with transom.

   a. Traffic Pattern: Two way.
   b. Emergency Breakaway Capability: As indicated on Drawings.
   c. Mounting: As indicated on Drawings.

3. Operator Features: Manufacturer's standard.

   a. On-Off/Hold-Open Switch to control electric power to operator, key-operated.

4. Sliding-Door Carrier Assemblies and Overhead Roller Tracks: Carrier assembly that allows vertical adjustment; consisting of nylon- or delrin-covered, ball-bearing-center steel wheels operating on a continuous roller track, or ball-bearing-center steel wheels operating on a nylon- or delrin-covered, continuous roller track. Support doors from carrier assembly by cantilever and pivot assembly.

   a. Rollers: Minimum of two ball-bearing roller wheels and two antirise rollers for each active leaf.

5. Sliding-Door Threshold: Threshold members and bottom-guide-track system with stainless-steel, ball-bearing-center roller wheels.

   a. Configuration: Surface-mounted guide-track system at sidelites.

6. Controls: Activation and safety devices according to BHMA standards.

   a. Activation Device: Motion sensor mounted on each side of door header to detect pedestrians in activating zone to activate door operator.
   b. Safety Device: Manufacturer's Standard, comply with ANSI 156.10.

7. Finish: Finish framing, door(s), and header with Class II, color anodic finish.

   a. Color: Bronze to match existing adjacent entrances and as approved by Architect.

2.4 ENTRANCE COMPONENTS

A. Framing Members: Extruded aluminum, minimum 0.125 inch (3.2 mm) thick and reinforced as required to support imposed loads.

   1. Nominal Size: As indicated on Drawings.
   2. Extruded Glazing Stops and Applied Trim: Minimum 0.062-inch (1.6-mm) wall thickness.

B. Stile and Rail Doors: 1-3/4-inch- (45-mm-) thick, glazed doors with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular stile and rail members. Mechanically fasten corners with

reinforcing brackets that are welded, or incorporate concealed tie-rods that span full length of top and bottom rails.

1. Glazing Stops and Gaskets: Snap-on, extruded-aluminum stops and preformed gaskets.
2. Stile Design: As indicated on Drawings.
3. Rail Design: As indicated on Drawings..
4. Muntin Bars: Horizontal tubular rail member for each door; match stile design and finish.

C. Transom: 1-3/4-inch- (45-mm-) deep transom with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular stile and rail members matching door design.

1. Glazing Stops and Gaskets: Same materials and design as for stile and rail door.
2. Muntin Bars: Horizontal tubular rail members for each sidelite; match stile design.

D. Headers: Fabricated from minimum 0.125-inch- (3.2-mm-) thick extruded aluminum and extending full width of automatic entrance units to conceal door operators and controls. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.

1. Mounting: Surface mounted.

E. Signage: As required by cited BHMA standard.

1. Application Process: Decals.

2.5 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Extrusions: ASTM B 221 (ASTM B 221M).
2. Sheet: ASTM B 209 (ASTM B 209M).

B. Steel Reinforcement: Reinforcement with corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Use surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

C. Glazing: As specified in Section 088000 "Glazing."

D. Sealants and Joint Fillers: As recommended by sealant manufacturer for application indicated.

E. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout; complying with ASTM C 1107/C 1107M; of consistency suitable for application.

F. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

G. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.6 DOOR OPERATORS AND CONTROLS

A. General: Provide operators and controls, which include activation and safety devices, according to BHMA standards, for condition of exposure, and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.

B. Door Operators: Provide door operators of size recommended by manufacturer for door size, weight, and movement.

1. Door Operator Performance: Door operators shall open and close doors and maintain them in fully closed position when subjected to Project's design wind loads.
2. Electromechanical Operators: Concealed, self-contained, overhead unit powered by fractional-horsepower, permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor; with solid-state microprocessor controller; UL 325; and with manual operation with power off.

C. Motion Sensors: Self-contained, K-band-frequency, microwave-scanner units; fully enclosed by its plastic housing; adjustable to provide detection-field sizes and functions required by BHMA A156.10.

1. Provide capability for switching between bidirectional and unidirectional detection.

D. Presence Sensors: Self-contained, active-infrared scanner units; adjustable to provide detection-field sizes and functions required by BHMA A156.10. Sensors shall remain active at all times.

E. Photoelectric Beams: Pulsed infrared, sender-receiver assembly for recessed mounting. Beams shall not be active when doors are fully closed.

F. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.7 HARDWARE

A. General: Provide units in sizes and types recommended by automatic entrance and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish.

B. Breakaway Device for Power-Operated Doors: Device that allows door to swing out in direction of egress to full 90 degrees from any operating position. Interrupt powered operation of door operator while in breakaway mode.

C. Deadlocks: Deadbolt operated by exterior cylinder and interior thumb turn, with minimum 1-inch- (25-mm-) long throw bolt; BHMA A156.5, Grade 1.

1. Cylinders: As specified in Section 087100 “Door Hardware”.

a. Keying: Integrate into building master key system.

2. Deadbolts: Laminated-Steel Hook, mortise type, BHMA A156.5, Grade 1.

3. Two-Point Locking for Stile and Rail Sliding Doors: Mechanism in stile of active door leaf that automatically extends second lockbolt into overhead carrier assembly.

D. Weather Stripping: Replaceable components.

1. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

2.8 FABRICATION

A. General: Factory fabricate automatic entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.

B. Framing: Provide automatic entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.

1. Provide components with concealed fasteners and anchor and connection devices.
2. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
3. Fabricate exterior components to drain condensation and water passing joints within system to the exterior.
4. Provide anchorage and alignment brackets for concealed support of assembly from building structure.
5. Allow for thermal expansion of exterior units.

C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.

D. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.

E. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, according to GANA's "Glazing Manual."

F. Hardware: Factory install hardware to greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.

1. Provide sliding-type weather stripping, mortised into door, at perimeter of doorsand breakaway sidelights.

G. Controls:

1. General: Factory install activation and safety devices in doors and headers as required by BHMA A156.10 for type of door and direction of travel.

2.9 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install automatic entrances according to manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel, including signage, controls, wiring, and connection to the building's power supply.

1. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
2. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
3. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous coating.

B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.

1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior.
4. Level recesses for recessed thresholds using nonshrink grout.

C. Door Operators: Connect door operators to electrical power distribution system.

D. Controls: Install and adjust activation and safety devices according to manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel. Connect control wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

E. Glazing: Install glazing as specified in Section 088000 "Glazing."

F. Sealants: Comply with requirements specified in Section 079200 "Joint Sealants" to provide weathertight installation.

1. Set thresholds, framing members and flashings in full sealant bed.
2. Seal perimeter of framing members with sealant.

G. Signage: Apply signage on both sides of each door and breakaway sidelite as required by cited BHMA standard for direction of pedestrian travel.

H. Wiring within Automatic Entrance Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's written limitations on bending radii. Provide and use lacing bars and distribution spools.

3.2 FIELD QUALITY CONTROL

A. Certified Inspector: Engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Test and inspect each automatic entrance, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.

C. Automatic entrances will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.3 ADJUSTING

A. Adjust hardware, moving parts, door operators, and controls to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.

B. Readjust door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic entrances.

END OF SECTION 08 42 29.23

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

1.2 RELATED SECTIONS

A. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 08 Section "Hollow Metal Steel Doors and Frames" for hardware used with hollow metal frames.
2. Division 08 Section "Flush Wood Doors" for factory prefitting and factory premachining of doors for door hardware.
3. Division 08 Section "Sliding Automatic Entrances".
4. Division 08 Section "All Glass Entrances and Storefronts".

1.3 REFERENCES

A. AWI (Architectural Woodwork Institute) – Architectural Woodwork Quality Standards
B. BHMA (Builders Hardware Manufacturers Association)
C. DHI (Door and Hardware Institute)
D. NFPA 101 – Life Safety Code

1.4 SUBMITTALS FOR REVIEW

A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification sections.

1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:

a. Type, style, function, size, and finish of each hardware item.
b. Name and manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
e. Explanation of all abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for hardware.
g. Door and frame sizes and materials.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

A. Maintenance Data: Include data on operating hardware, lubrication requirements and inspection procedures related to preventative maintenance.

B. Keys: Deliver with identifying tags to local facility EXCHANGE General Manager by security shipment direct from hardware supplier.

C. Warranty: Submit manufacturer warranty and ensure forms have been completed in EXCHANGE's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.

B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.

C. Hardware: Coordinate products used during fire tests meeting UBC 7-2 and ICBO AC84, including component gasket system for "S" labeled openings. All hardware must provide an acceptable means of egress to the Building Official.

1.7 PRODUCT HANDLING

A. Tag each item, or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Deliver all hardware to the General Contractor in a timely manner to ensure orderly progress of the total work.

C. The General Contractor shall receive, take charge of, and distribute hardware at the building. General Contractor shall provide and arrange temporary shelving for the storage of all hardware.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following. Submittals for approved substitutions must be received no later than 10 days before bid date. Only requests for substitutions submitted by a distributor firm will be considered. No substitutions will be allowed after bid opening.

1. Hinges: Unless otherwise noted provide 5-knuckle, button tip, full mortise template type butts with non-rising pins, plain or ball-bearing as indicated. Provide non-removable pins for all out-swinging doors with locksets.

   a. Bommer Industries, Inc.
   b. Hager Hinge Co.
   c. Ives, Div. Ingersoll-Rand
   d. McKinney Products Co.
   e. Stanley Hardware, Div. Stanley Works.

2. Key Control System:

   a. Key Control Systems, Inc.
   b. Telkee Inc.

3. Locks: Locks and latches shall be full mortise type 1000, grade 1, in accordance with BHMA/ANSI A156.13 All locks shall be have interchangeable cores. All cylinders shall be provided with temporary construction cores.

    a. Best Access Systems
    b. Falcon Lock, Div. Ingersoll-Rand Door Hardware Group
    c. Arrow Lock, Div. Assa Abloy Group

4. Cylinders:

    a. Best Access Systems
    b. Falcon Lock, Div. Ingersoll-Rand Door Hardware Group
    c. Arrow Lock, Div. Assa Abloy Group

5. Bolts:

    a. Triangle Brass Manufacturing Company (Trimco)
    b. Ives, Div. Ingersoll-Rand Door Hardware Group
    c. Rockwood Mfg. Company

6. Overhead Closers / Auto. Operators:

    a. LCN Closers, Div. Ingersoll-Rand Door Hardware Group
    b. Norton Door Closers, Div. Yale Security Group

7. Door Control Devices:

    a. Rockwood Mfg. Company
    b. Ives, Div. Ingersoll-Rand Door Hardware Group
    c. Triangle Brass Manufacturing Company (Trimco).

8. Door Trim Units:

    a. Rockwood Mfg. Company
    b. Ives, Div. Ingersoll-Rand Door Hardware Group
    c. Triangle Brass Manufacturing Company (Trimco).

9. Kick, Mop, and Armor Plates:

    a. Rockwood Mfg. Company
    b. Ives, Div. Ingersoll-Rand Door Hardware Group
    c. Triangle Brass Manufacturing Company (Trimco).

10. Door Stripping and Seals:

    a. National Guard Products, Inc.
    b. Pemko Manufacturing Co., Inc.
    c. Reese Enterprises, Inc.

11. Thresholds:

    a. National Guard Products, Inc.
    b. Pemko Manufacturing Co., Inc.
    c. Reese Enterprises, Inc.

12. Automatic Drop Seals:

    a. National Guard Products, Inc.
    b. Pemko Manufacturing Co., Inc.
    c. Reese Enterprises, Inc.

13. Astragals:

    a. National Guard Products, Inc.
    b. Pemko Manufacturing Co., Inc.
    c. Reese Enterprises, Inc.

14. Exit Devices: Exit devices shall be modern style ANSI A156.3 grade 1.

    a. Von Duprin, Div. Ingersoll-Rand Hardware Group
    b. Sargent, Div. Assa Abloy
    c. Precision Hardware, Inc.

2.2 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of this Section. Products are identified by using hardware designation numbers of the following:

1.	Butts and Hinges:	Stanley Hardware
2.	Locks:	Best Access Systems
3.	Exit/Panic Devices:	Von Duprin, Div Ingersoll-Rand Hardware Group
4.	Push/Pull Units:	Rockwood Mfg. Co.
5.	Overhead Closers:	LCN Closers, Div Ingersoll-Rand Hardware Group
6.	Door Controls:	Glynn-Johnson, Div Ingersoll-Rand Hardware Group
7.	Door Controls:	Ives, Div Ingersoll-Rand Hardware Group
8.	Door Stripping and Seals:	Pemko Manufacturing Co., Inc.
9.	Continuous Hinges:	Pemko Manufacturing Co., Inc.
10.	Bolts:	Ives, Div Ingersoll-Rand Hardware Group
11.	Exit Alarms:	Detex Corporation
12.	Door Viewers:	Du Seung Trading Corporation

2.3 LOCK CYLINDERS AND KEYING

A. All cylinders shall be keyed as directed by Owner, integrated into Grandmaster key system.

B. All cylinders shall be factory keyed and masterkeyed as directed.

2.4 ELECTRONIC HARDWARE

A. Provide a complete description of how each electronic hardware system should function.

B. Provide complete wiring diagrams, riser drawings and installation instructions for each system.

2.5 HARDWARE SETS

A. Hardware sets indicate quantity, item, manufacturer and product designation, size, and finish or color, as applicable.

Automatic doors:

Hardware - 1

1	Each	Cylinder	1E72/1E74 US26D As Required

All Other Hardware by Door Manufacturer

Pairs of Aluminum Storefront Entry Doors:

Hardware – 2 – NOT USED

Interior Pairs of Aluminum Storefront Doors:

Hardware – 3 – NOT USED

Public Access Doors:

Hardware - 4

3	Each	Hinges	FBB179 4.5 x 4.5 US26D NRP
1	Each	Lock	45H7R15H US26D
1	Each	Wall Stop	WS402CCV US26D
1	Each	Kickplate	10” x 2” LDW US32D
3	Each	Silencer	SR64

Storage Doors, Security Office Doors:

Hardware – 5

3	Each	Hinges	FBB179 4.5 x 4.5 US26D NRP
1	Each	Lock	45H7D15H US26D
1	Each	Wall Stop	WS402CCV US26D
1	Each	Kickplate	10” x 2” LDW US32D
3	Each	Silencer	SR64

Exterior Service Doors:

Hardware - 6

3	Each	Hinges	FBB191 4.5 x 4.5 US32D
1	Each	Lock	45H7D15H US26D
1	Each	Closer	4011 Alum Lacq
1	Each	Wall Stop	WS402CCV US26D
1	Each	Kickplate	10” x 2” LDW US32D
1	Each	Gasket	S88D
1	Each	Door Bottom	420APKL
1	Each	Threshold	253X4AFG x Pemkote
1	Each	Security Switch	1076W

Double-acting Service Doors:

Hardware – 7

All Hardware by Door Manufacturer.

Fire Rated Storage Doors; Elevator Machine Room Doors:

Hardware – 8 – NOT USED

Fire Rated Telephone Closet Room Doors; Fire Rated Electrical Room Doors:

Hardware – 9 – NOT USED

Office Doors:

Hardware - 10

3	Each	Hinges	FBB179 4.5 x 4.5 US26D
1	Each	Lock	45H7A15H US26D
1	Each	Wall Stop	WS402CCV US26D
1	Each	Kickplate	10” x 2” LDW US32D
3	Each	Silencer	SR64

Public Toilet Room Doors:

Hardware - 11

3	Each	Hinges	FBB168 4.5 x 4.5 US26D
1	Each	Push	70-F 8 x 16 US32D
1	Each	Pull	110-10” US32D
1	Each	Closer	4111 Alum Lacq
1	Each	Wall Stop	WS402CCV US26D
1	Each	Kickplate	10” x 2” LDW US32D
3	Each	Silencer	SR64

Private Toilet Room Doors:

Hardware – 12

3	Each	Hinges	FBB179 4.5 x 4.5 US26D
1	Each	Privacy Lock	45H0L15H US26D
1	Each	Wall Stop	WS402CCV US26D
1	Each	Kickplate	10” x 2” LDW US32D
1	Each	Gasket	S88D

Pairs of Storage Room Doors:

Hardware - 13

6	Each	Hinges	FBB179 4.5 x 4.5 NRP US26D
2	Each	Flushbolts	FB458 US26D
1	Each	DP Strike	DP-1 US26D
1	Each	Lock	45H7D15H US26D
2	Each	Wall Stop	WS402CCV US26D
2	Each	Kickplate	10” x 2” LDW US32D
1	Each	Astragal	357SP
2	Each	Silencer	SR64

Pairs of Exterior Service Doors:

Hardware – 14 – NOT USED

MCSS – MPA Pairs of Doors:

Hardware – 15

6	Each	Hinges	FBB168 4.5 x 4.5 US26D NRP
1	Each	Exit Device	9947EO US26D
1	Each	Exit Device	9975NL US26D
1	Each	Cylinder	1E74 US26D
2	Each	Closer	4111 Alum Lacq
2	Each	Wall Stop	WS402CCV US26D
2	Each	Kickplate	10” x 2” LDW US32D
2	Each	Silencer	SR64

MCSS – MPA Exterior Pairs of Doors:

Hardware – 16 – NOT USED

Interior Aluminum Storefront Pairs of Doors:

Hardware – 17 – NOT USED

Non-Secured Interior Doors:

Hardware - 18

3	Each	Hinges	FBB179 4.5 x 4.5 US26D
1	Each	Passage Latch	45H0N15H US26D
1	Each	Wall Stop	WS402CCV US26D
1	Each	Kickplate	10” x 2” LDW US32D
1	Each	Gasket	S88D

Exterior Service Doors; Exterior Electrical Room Doors:

Hardware – 19 – NOT USED

Emergency Exit Doors:

Hardware – 20 – NOT USED

Fire Rated Pairs of Doors at MPA

Hardware – 21 – NOT USED

Emergency Exit Outdoor Living Area Doors:

Hardware – 22

6	Each	Hinges	FBB191 4.5 x 4.5 US26D NRP
1	Each	Mullion	F90KR USP
2	Each	Exit Alarm	8010W
1	Each	Cylinder	1E74 US26D

2	Each	Cylinder	1E72 US26D
2	Each	Wall Stop	WS402CCV US26D
2	Each	Kickplate	10” x 2” LDW US32D
1	Each	Threshold	171A
2	Each	Security Switch	1076W

Exterior Gates:

Hardware – 23 – NOT USED

Cashier Office Doors:

Hardware - 24

3	Each	Hinges	FBB179 4.5 x 4.5 US26D
1	Each	Lock	45H7R15H US26D
1	Each	Closer	4111 Alum Lacq
1	Each	Wall Stop	WS402CCV US26D
1	Each	Kickplate	10” x 2” LDW US32D
3	Each	Silencer	SR64

Cashier Office Doors:

Hardware – 25 – NOT USED

Customer Service Doors:

Hardware - 26

3	Each	Hinges	FBB179 4.5 x 4.5 US26D
1	Each	Lock	45H7D15H US26D
1	Each	Wall Stop	WS402CCV US26D
1	Each	Kickplate	10” x 2” LDW US32D
1	Each	Viewer	DoorScope US28
3	Each	Silencer	SR64

Fire Rated Corridor Doors:

Hardware – 27 – NOT USED

Public Toilet Room Doors:

Hardware – 28 – NOT USED

Secured Office Area Entry Vestibule Doors:

Hardware – 29 – NOT USED

Secured Exterior Office Area Entry Doors:

Hardware – 30 – NOT USED

MPA Area Service Doors:

Hardware – 31 – NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION:

Mount hardware units at heights indicated in Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.

Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.
Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

Drill and counter sink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

3.2 ADJUST AND CLEAN:

Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustments of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilation equipment.

Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finish during the final adjustment of hardware.

Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials, or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

END SECTION 08 71 00

SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Glazing required for the following:

1. Doors.

1.2 PERFORMANCE REQUIREMENTS

A. Glass Design: Glass thicknesses indicated on the drawings and in the schedule at the end of this Section are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:

a. Specified Design Wind Loads: Determine design wind loads applicable to Project from basic wind speed indicated in miles per hour (meters per second) at 33 feet (10 m) above grade, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 6.4.2, "Analytic Procedure," based on mean roof heights above grade indicated on Drawings or if not indicated, wind speed of 70 mph, exposure by design pressure 15 psf.

b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action for load duration of 60 seconds or less.

c. Maximum Lateral Deflection: For the following types of glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch (25 mm), whichever is less.

1.3 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

1.4 QUALITY ASSURANCE

A. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.

1. Provide safety glazing at locations required in the 2006 IBC Section 2406.

B. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:

1. Insulating Glass Certification Council (IGCC).

C. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful in-service performance.

D. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:

1. Primary glass of each (ASTM C 1036) type and class indicated.
2. Insulating glass of each construction indicated.

E. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

F. Design Standard: All glazing shall be designed to criteria as set forth in Chapter 24 of the 2006 edition of the International Building Code.

1.5 WARRANTY

A. General: Warranties specified in this Article shall not deprive EXCHANGE of other rights EXCHANGE may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

B. Insulating Glass: Not less than 10 year

PART 2 - PRODUCTS

2.1 MATERIALS

A. Glazing Gaskets: Dense compression, soft compression, or lock strip.

B. Glazing Tapes: Back-bedding-mastic or Expanded-cellular type.

C. Glass Types:

1. Monolithic-glass: 1/4-inch clear tempered and 1/2-inch clear tempered.
2. Insulating-glass: 1-inch clear tempered; 1/4-inch inboard and 1/4-inch outboard lites with 1/2-inch air space.

PART 3 - EXECUTION

3.1 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.2 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 088000

SECTION 09 22 16

NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

B. Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645.
2. Double-Runner System: ASTM C 645.
3. Deflection Track.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Install studs so flanges within framing system point in same direction.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

D. Z-Furring Members:

1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

END OF SECTION 09 22 16

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

1.2 SUBMITTALS

A. Product Data: For each type of product.

1.3 QUALITY ASSURANCE

A. Mockups for the following:

1. Levels of gypsum board finish for use in exposed locations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Interior Gypsum Board: ASTM C 1396C; 5/8-inch, Type X.

B. Tile-Backing Panels: Cementitious Type, ANSI A118.9 and ASTM C 1288 with manufacturer's standard edge; thickness as shown on drawings. Mold resistance ASTM D3273.

C. Trim Accessories:

1. Interior Trim: ASTM C 1047
2. Aluminum Trim: ASTM B 221 (ASTM B 221M), Alloy 6063-T5.

D. Auxiliary materials:

1. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
2. Sound Attenuation Blankets: ASTM C 665, Type 1 (blankets without membrane facing).
3. Acoustical Joint Sealant: ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing according to ASTM E 90.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect.

3.2 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: At panel surfaces that will be exposed to view unless otherwise indicated.

   a. Primer and its application to surfaces are specified in other Division 09 Sections.

END OF SECTION 09 29 00

SECTION 09 30 00

TILING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes porcelain and ceramic tile products on walls and floors in toilet and locker rooms. Substrates include cementitious backer board and concrete masonry at walls and at floors, concrete slabs-on-grade and suspended concrete slabs. Materials include the following:

1. Porcelain tile.
2. Glazed wall tile.
3. Elastomeric Joint Sealant in tile fields.
4. Tile cleaner and sealer.
5. Mortar & Grout.

B. Related Sections include the following:

1. Division 03 Section "Cast-In-Place Concrete" for slab finishes specified for tile over concrete substrates.

2. Division 09 Section “Gypsum Board” for Cementitious Backer Panels.

1.2 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.

1.3 SUBMITTALS

A. Product Data: For each type of tile, mortar, grout, and other products specified.

B. Grout Samples for Initial Selection: Manufacturer's color charts consisting of actual sections of grout showing the full range of colors available for each type of grout indicated.

C. Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.

1. Each type and composition of tile and for each color and texture required, at least 12 inches (300 mm) square, mounted on braced cementitious backer units, and with grouted joints using product complying with specified requirements and approved for completed work in color or colors selected by Architect.
2. Full-size units of each type of trim and accessory for each color required.
3. Stone thresholds in 6-inch (150-mm) lengths.
4. Metal edge strips in 6-inch (150-mm) lengths.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.

C. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

D. Source Limitations for Other Products: Obtain each of the following products specified in this Section from one source and by a single manufacturer for each product:

1. Cementitious backer units.
2. Joint sealants.
3. Waterproofing.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

1.7 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.
2. Obtain a written receipt from the Owner’s Representative, to include in Closeout Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Basis of Specification is Dal Tile Company, American Olean and Crossville Ceramics products indicated in the ceramic tile installation schedules on Drawings.

B. Manufacturers: Subject to compliance with requirements, and properties of the specified products, including color selection, products by the following will be considered if submitted before Bids are received in accordance with the Instructions to Bidders:

1. Tile Products:

   a. American Marrazzi Tile, Inc.
   b. American Olean Tile Co.
   c. Dal-Tile Corporation.
   d. Florida Tile Industries, Inc.
   e. Mannington Ceramic Tile.
   f. Monarch Tile, Inc.
   g. Quarry Tile Company.
   h. United States Ceramic Tile Company.

2. Tile-Setting and -Grouting Materials:

   a. American Olean Tile Company.
   b. Custom Building Products.
   c. Dal-Tile Corporation.
   d. DAP, Inc.
   e. Laticrete International, Inc.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard Grade requirements, unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. Match colors, textures, and patterns indicated by referencing manufacturer's standard designations for these characteristics.
2. Provide tile trim and accessories as indicated in the Schedule.

D. Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

E. Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless another mounting method is indicated.

2.3 TILE PRODUCTS

A. Porcelain Floor Tile: Provide flat tile complying with the following requirements:

1. See Finishes Legend and Schedule for description and location.

B. Glazed Wall Tile: Provide flat tile complying with the following requirements:

1. See Finishes Legend and Schedule for description and location.

C. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:

1. Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
2. Shapes: As indicated on the Drawings or if not indicated, as follows, selected from manufacturer's standard shapes:

a. Provide coved base at unglazed floor tile.
b. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose.
c. External Corners for Thin-Set Mortar Installations: Surface bullnose.
d. Internal Corners: Field-butted square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.
e. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide a reduction in thickness from 1/2 to 1/4 inch (12.7 to 6.35 mm) across nominal 4-inch (100-mm) dimension.

2.4 SETTING MATERIALS

A. Portland Cement Mortar Installation Materials: Provide materials complying with ANSI A108.1A and as specified below:

1. Latex additive (water emulsion) described below, serving as replacement for part or all of gaging water, of type specifically recommended by latex additive manufacturer for use with job-mixed Portland Cement and aggregate mortar bed.

a. Latex Additive: Manufacturer's standard.

B. Latex-Portland Cement Mortar: ANSI A118.4, composed as follows:

1. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of Portland Cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.

a. For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.

2.5 GROUTING MATERIALS

A. Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows:

1. Factory-Prepared, Dry-Grout Mixture: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to produce the following:

a. Unsanded grout mixture for joints 1/8 inch (3.2 mm) and narrower.
b. Color: See Finish Schedule.

B. Floor Grout: Two-component, chemical resistant, non-saging epoxy grout which is water cleanable; grout shall comply with ANSI A118.3. Colors as indicated on Finishes Legend and Food Vendor Drawings. The following manufacturers and products are approved:

1. Laticrete International “Latapoxy SP-100 Stainless Epoxy Grout (Series 700)”.
2. Mapei, Inc. “Kerapoxy 400 100% Solids Epoxy Grout”.
3. Bostik Construction Products “Hydroment Colo-Poxy”.

2.6 ELASTOMERIC SEALANTS

A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."

B. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.

1. Provide at joints of ceramic wall tile and ceiling surface, around pipe penetrations, plumbing fixtures and trim.
2. Provide at perimeter of toilet room accessories such as grab bars, towel bars, paper and soap dispensers provided on or within walls in accordance with UBC, 1997 Edition, Section 807.1.2

C. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.

1. Provide at control joints in floors where indicated, or if not indicated, over control joints in substrates and at 30-feet maximum spacing.

D. Products: Subject to compliance with requirements, provide one of the following:

1. One-Part, Mildew-Resistant Silicone Sealants:

a. Dow Corning 786; Dow Corning Corporation.
b. Sanitary 1700; GE Silicones.
c. Pecora 898 Sanitary Silicone Sealant; Pecora Corp.
d. Rhodorsil 6B White; Rhone-Poulenc, Inc.
e. Tremsil 600 White; Tremco, Inc.

2. Multipart, Pourable Urethane Sealants:

a. Chem-Calk 550; Bostik.
b. Vulkem 245; Mameco International, Inc.
c. NR-200 Urexpan; Pecora Corp.
d. THC-900; Tremco, Inc.

2.7 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: White-zinc-alloy terrazzo strips, 1/8 inch (3.2 mm) wide at top edge with integral provision for anchorage to mortar bed or substrate, unless otherwise indicated.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

D. Tile Sealer: Aqua Mix “Sealer’s Choice 15 Gold.”

1. Description: No-sheen, water-based penetrations sealer.
2. Application: Two coats in accordance with manufacturer’s recommendations.

2.8 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

B. Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.

1. Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
2. Remove protrusions, bumps, and ridges by sanding or grinding.

C. Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.

C. Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Lay out tile wainscots (if indicated) to next full tile beyond dimensions indicated.

G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.
2. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."

H. Grout tile to comply with the requirements of the following tile installation standards:

1. For ceramic tile grouts (sand-portland cement, dry-set, commercial Portland Cement, and latex-Portland Cement grouts), comply with ANSI A108.10.

3.4 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Ceramic Tile Floor Installation Schedule, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.

B. Joint Widths: Install tile on floors with the following joint widths:

1. Unglazed Ceramic Tile: 1/4 inch.

C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.5 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with requirements in the Ceramic Tile Wall Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

B. Joint Widths: Install tile on walls with the following joint widths:

1. Wall Tile: 1/4 inch.

C. For exterior corners at food concessions, see Det B2/Sht. A-501.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove latex-portland cement grout residue from tile as soon as possible.
2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure tile is without damage or deterioration at the time of Substantial Completion.

1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
2. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.7 CERAMIC TILE INSTALLATION SCHEDULE

A. Ceramic Tile Floor Installation. Comply with the following:

1. Tile Type: Unglazed ceramic tile over concrete slabs. Provide products according to the Finishes Legend at the end of the Finish Schedule.
2. Provide according to TCA Installation Method F113, Thinset.

    a. Latex Portland Cement mortar, ANSI A118.4.
    b. Latex Portland Cement grout, ANSI A118.6.

B. Ceramic Wall Tile over Cementitious Backer Units: Comply with the following:

1. Tile Type: Ceramic wall tile. Provide products according to the Finishes Legend at the end of the Finish Schedule.
2. Provide according to TCA Installation Method W244.

    a. Latex Portland cement mortar, ANSI A118.4.
    b. Latex Portland cement grout, ANSI A118.6.

END OF SECTION 09 30 00

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes acoustical panels and exposed suspension systems for ceilings.

B. Related Sections include the following:

1. Division 07 Section "Joint Sealants" for acoustical sealants.

1.2 DEFINITIONS

A. AC: Articulation Class.

B. CAC: Ceiling Attenuation Class.

C. LR: Light Reflectance coefficient.

D. NRC: Noise Reduction Coefficient.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Panel: Set of 6-inch- (150-mm-) square Samples of each type, color, pattern, and texture.

C. Maintenance Data: For finishes to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
2. Suspension System: Obtain each type through one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they

will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.

2.3 WATER-FELTED, MINERAL-BASE ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

A. Products: USG Interiors 562 Fissured.

B. Classification: Class A.

C. Color: White.

D. LR: .81.

E. NRC: .55.

F. CAC: 35

G. Edge Detail: Square.

H. Thickness: 5/8”.

I. Size: 2’ x 4’.

J. Location: See Finishes Legend and Finish Schedule for location.

2.4 WATER-FELTED, MINERAL-BASE ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

A. Products: USG Interiors Clean Room Climaplus

B. Color: White.

C. LR: .79.

D. NRC: 0.

E. CAC: 35.

F. Edge Detail: Square.

G. Thickness: 5/8”.

H. Size: 2’ x 4’.

I. Location: See Finishes Legend and Finish Schedule for location.

2.5 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.

E. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

F. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.

G. Impact Clips: Where indicated, provide manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

2.6 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

A. Manufacturers:

1. Armstrong World Industries, Inc.
2. Celotex Corporation
3. Chicago Metallic Corp.
4. USG Interiors, Inc.

B. Steel Suspension Systems:

1. USG DONN-DX Grid 15/16”.

C. Aluminum Suspension Systems:

1. USG DONN-DXLA 15/16”.

2.7 METAL EDGE MOLDINGS AND TRIM

A. Manufacturers:

1. Armstrong World Industries, Inc.
2. Celotex Corporation; Architectural Ceilings Marketing Dept.
3. Chicago Metallic Corporation.
4. USG Interiors, Inc.

B. Roll-Formed Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

2.8 ACOUSTICAL SEALANT

A. Products: See Section 07 92 00.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements

for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION, GENERAL

A. General: Install acoustical panel ceilings to comply with UBC Standard 25-2 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not attach hangers to steel deck tabs.
6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
7. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.66 m). Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

    a. Pop rivets acceptable at 9/16” grid only. Painted to match grid.

D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 65 13

RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Resilient wall base.

B. Related Sections include the following:

1. Division 09 Section "Resilient Tile Flooring."

1.2 SUBMITTALS

A. Product Data: For each type of product specified.

B. Samples for Verification: In manufacturer's standard sizes, but not less than 12 inches (300 mm) long, of each product color and pattern specified.

C. Product Certificates: Signed by manufacturers of resilient wall base and accessories certifying that each product furnished complies with requirements.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.

B. Source Limitations: Obtain each type and color of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.
2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F (10 and 32 deg C).

C. Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.5 PROJECT CONDITIONS

A. Maintain a temperature of not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C) in spaces to receive resilient products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After postinstallation period, maintain a temperature of not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

B. Do not install products until they are at the same temperature as the space where they are to be installed.

C. For resilient products installed on traffic surfaces, close spaces to traffic during installation and for time period after installation recommended in writing by manufacturer.

D. Coordinate resilient product installation with other construction to minimize possibility of damage and soiling during remainder of construction period. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design product is Johnsonite wall base. Color as scheduled on Drawings. Subject to compliance with Division 01 Requirements, and this specification section, products from other manufacturer's may be considered.

2.2 RESILIENT WALL BASE

A. Rubber Wall Base: Products complying with FS SS-W-40, Type I and with requirements specified by reference to manufacturers product as listed.

1. Color and Pattern: See Finishes Legend.
2. Style: Cove with top-set toe.
3. Minimum Thickness: 1/8 inch (3.2 mm).
4. Height: 4 inches (101.6 mm).
5. Lengths: Cut lengths 48 inches (1219.2 mm) long or coils in lengths standard with manufacturer, but not less than 96 feet (29.26 m).
6. Outside Corners: Job formed.
7. Inside Corners: Job formed.
8. Surface: Smooth.

2.3 RESILIENT ACCESSORIES

A. Rubber Accessories: Products complying with requirements specified below.

B Color and Pattern: As selected by Architect from manufacturer's full range of colors and patterns produced for resilient accessories complying with requirements indicated.

C. Product Types: Provide resilient accessories for the project including but not limited to the following types:

1. Reducer strip for resilient flooring.

2.4 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by resilient product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements, including those for maximum moisture content. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Broom and vacuum clean substrates to be covered immediately before installing resilient products. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General: Install resilient products according to manufacturer's written installation instructions.

B. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
3. Do not stretch base during installation.

4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
5. Form outside corners on job, from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
6. Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

C. Place resilient products so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.

D. Apply resilient products to stairs as indicated and according to manufacturer's written installation instructions.

3.4 EXCESS MATERIALS AND WASTE

A. Recycling: Separate and recycle all waste materials in accordance with the Contractor's waste management plan and to the extent economically feasible. This includes metal banding, pallets, and other shipping materials in addition to waste resulting from installation operations.

3.5 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing resilient products:

1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
2. Sweep or vacuum horizontal surfaces thoroughly.
3. Do not wash resilient products until after time period recommended by resilient product manufacturer.
4. Damp-mop or sponge resilient products to remove marks and soil.

B. Protect resilient products against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by resilient product manufacturer.

1. Cover resilient products installed on floors with undyed, untreated building paper until inspection for Substantial Completion.

END OF SECTION 09 65 13

SECTION 09 65 19

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Vinyl composition tile (VCT).

2. Solid vinyl tile (VT).

B. Related Sections include the following:

1. Division 01 Section “Options”.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: Full-size units of each color and pattern of resilient floor tile required.

1. All types and styles of vinyl composite tile.

2. All types and styles of solid vinyl tile.

D. Maintenance Data: For resilient products to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide products identical to those tested for fire-exposure behavior per test method indicated by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store tiles on flat surfaces.

1.5 PROJECT CONDITIONS

A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

C. Close spaces to traffic during floor covering installation.

D. Close spaces to traffic for 48 hours after floor covering installation.

E. Install resilient products after other finishing operations, including painting, have been completed.

1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.
2. Resilient Wall Base and Accessories: Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS (VCT)

A. Manufacturers: Basis of this Specification is Armstrong Excelon Tile and Johnsonite Wall Base. Color as scheduled on Drawings. Subject to compliance with the requirements and properties of the product listed, including acceptable color and texture, products of other manufacturers will be considered if submitted prior to Bid in accordance with the stipulations in the Instructions to Bidders.

2.2 VINYL COMPOSITION TILE

A. Vinyl Composition Tile (VCT):

B. Tile Standard: ASTM F 1066.

C. Wearing Surface: Smooth.

D. Thickness: 0.125 inch (3.2 mm).

E. Size: 12 by 12 inches (305 by 305 mm).

F. Fire-Test-Response Characteristics:

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.3 SOLID VINYL TILE

A. Solid vinyl tile (VT): As manufactured by AMTICO and as scheduled on Drawings.

B. Tile Standard: ASTM F1700

C. Wearing Surface: Smooth, unless otherwise indicated.

D. Thickness: 0.100 inch.

E. Size: 4-inches by 36-inches.

F. Fire-Test response characteristics:

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

G. Adhesive: As recommended by tile manufacturer for substrate indicated.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
3. Moisture Testing:

a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are same temperature as space where they are to be installed.

F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 TILE INSTALLATION

A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis in pattern indicated.

B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).

C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

D. Extend tiles into toe spaces, door reveals, closets, and similar openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

F. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 SOLID VINYL TILE (VT) INSTALLATION

A. Refer to Drawings for location and floor pattern.

B. Comply with tile manufacturer's current installation instructions.

3.5 RESILIENT ACCESSORY INSTALLATION

A. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.6 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

a. Do not wash surfaces until after time period recommended by manufacturer.

B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

1. Apply protective floor polish to horizontal surfaces that are free from soil, visible adhesive, and surface blemishes if recommended in writing by manufacturer.

a. Use commercially available product acceptable to manufacturer and as approved by the Owner's maintenance service.

2. Cover products installed on horizontal surfaces with undyed, untreated building paper until Substantial Completion.
3. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

C. Waxing.

1. Apply three (3) coats of manufacturer recommended wax to installed VCT. Verify type used with maintenance manager.
2. Apply coatings prior to installing display, cashier, railing units.
3. Apply coatings per manufacturer's recommendations.

END OF SECTION 09 65 19

SECTION 09 68 13

TILE CARPETING

PART 1 - GENERAL

1.2 SUMMARY

A. This Section includes:

1. Modular Carpet installation: EXCHANGE Furnished/Contractor Installed.
2. Accessories: Contractor Furnished/Contractor Installed.

B. See Section 01 10 18 for coordination.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soilage, extreme temperatures, and humidity. Lay flat, blocked off ground. Maintain minimum temperature of 68 deg F (20 deg C) at least three days prior to and during installation in area where materials are stored.

1.4 PROJECT CONDITIONS

A. Substrate Conditions: No condensation within 48 hours on underside of 4-foot by 4-foot polyethylene sheet, fully taped at perimeter to substrate.

B. Substrate Conditions: pH of 9 or less when substrate wetted with potable water and pHydrion paper applied.

PART 2 - PRODUCTS

2.1 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clear away debris and scrape up cementitious deposits from concrete surfaces to receive carpet tile; apply sealer to prevent dusting.

3.2 INSTALLATION

A. Preparation: Comply with CRI 104, Section 6.2, “Site Conditions; Floor Preparation,” and with carpet tile manufacturer’s written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Installation: Comply with CRI 104, Section 14, “Carpet Modules,” and with carpet tile manufacturer’s written installation instructions.

C. Installation Method: As recommended in writing by carpet tile manufacturer.

D. Maintain dye lot integrity. Do not mix dye lots in same area.

3.3 CLEANING

A. Remove adhesive from carpet surface with manufacturer's recommended cleaning agent.

B. Remove and dispose of debris and unusable scraps. Vacuum with commercial machine with face-beater element. Remove soil. Replace carpet where soil cannot be removed. Remove protruding face yarn.

C. Vacuum carpet.

3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, to ensure carpet tile is not damaged or deteriorated at time of Substantial Completion.

END OF SECTION 09 68 13

SECTION 09 72 00

WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Vinyl wall covering.

B. Related Sections include the following:

1. Division 09, Section “Gypsum Board” for gypsum board assemblies.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include data on physical characteristics, durability, fade resistance, and flame-resistance characteristics.

B. Shop Drawings: Show location and extent of each wall-covering type. Indicate seams and termination points.

C. Samples for Verification: Full width by 36-inch- (1000-mm-) long section of wall covering from dye lot to be used for each type of wall covering indicated for each color, texture, and pattern required.

D. Schedule: For wall coverings. Use same designations indicated on Drawings.

E. Maintenance Data: For wall coverings to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide wall coverings and adhesives with the following fire-test-response characteristics as determined by testing identical products applied with identical adhesives to substrates per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Surface-Burning Characteristics: As follows, per ASTM E 84:

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 450 or less.
c. Fire Rating: Class A.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not install wall coverings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and

ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Lighting: Do not install wall covering until a lighting level of not less than 15 fc (160 lux) is provided on the surfaces to receive wall covering.

C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

1.5 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Rolls of Wall-Covering Material: Full-size units equal to 5 percent of amount of each type installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Basis of this Specification, including color, is scheduled on Drawings. Subject to compliance with the requirements and properties of the product listed, including acceptable color and texture, products of other manufacturers will be considered if submitted prior to Bid in accordance with the stipulations in the Instructions to Bidders.

2.2 WALL-COVERING PRODUCTS

A. General: Provide rolls of each type of wall covering from the same run number or dye lot.

B. Location: See Finishes Legend and Finish Schedule for location of vinyl wall covering.

2.3 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific wall covering and substrate application, as recommended in writing by wall-covering manufacturer.

B. Metal Primer: Interior ferrous metal primer complying with Division 9 Section "Painting (Professional Line Products)."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair wall covering's bond, including mold, mildew, oil, grease, incompatible primers, dirt, and dust.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Moisture Content: Maximum of 5 percent on new plaster, concrete and concrete masonry units when tested with an electronic moisture meter.
2. Metals: If not factory primed, clean and apply metal primer.
3. Gypsum Board: Prime with primer recommended by wall-covering manufacturer.

D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.

E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION

A. General: Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Cut wall-covering strips in roll number sequence. Change roll numbers at partition breaks and corners.

C. Install strips in same order as cut from roll.

D. Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.

E. Match pattern 72 inches (1830 mm) above the finish floor.

F. Install seams vertical and plumb at least 6 inches (150 mm) from outside corners and 6 inches (150 mm) from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.

G. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

H. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

3.4 CLEANING

A. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.

B. Use cleaning methods recommended in writing by wall-covering manufacturer.

C. Replace strips that cannot be cleaned.

D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 09 72 00

SECTION 09 91 13

EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Galvanized metal.

1.2 SUBMITTALS

A. Product Data: For each type of product, include preparation requirements and application instructions

B. Samples: Each color and finish.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Products as scheduled on Drawings and listed below.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations.

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. Exterior Substrate

1. Galvanized Doors, door frames, bollards

a. Primer: 1 coat ProCryl Universal Acrylic Primer B66-310 Series @2.0-4.0 mils dft.

b. Finish: 2 coats ProIndustrial Zero VOC Acrylic Semi-Gloss B66-600 Series @ 2.5-4.0 mils dft./coat.

END OF SECTION 09 91 13

SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Gypsum board walls.
2. Gypsum board ceilings.
3. Canvas pipe covering, all service jacket.
4. Ferrous metal doors and door frames.

1.2 SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples: Each color and finish.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Products as scheduled on Drawings and listed below.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Gypsum Board: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations.

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

A. Interior Substrate

1. Gypsum Board Walls:

a. Primer: 1 coat Harmony Primer B11W500 Series @ 1.3 mils dft.
b. Finish: 2 coats Harmony Eg-Shel B9-500 Series @ 1.6 mils dft/coat.
c. Paint Manufacturer: Sherwin-Williams.

2. Gypsum Board Walls and Ceilings:

a. Primer: 1 coat Harmony Primer B11W500 Series @ 1.3 mils dft.
b. Finish: 2 coats Harmony Semi-Gloss B10-500 Series @ 1.6 mils dft/coat.
c. Paint Manufacturer: Sherwin Williams.

3. Ferrous Metal Doors and Door Frames:

   a. Primer: 1 coat ProCryl Universal Primer, B66-310 Series @ 2.0-4.0 mils dft.
   b. Finish: 2 coats Harmony Eg-Shel, B09-500 Series @ 1.6 mils dft/coat.
   c. Paint Manufacturer: Sherwin Williams.

4. Ferrous Metals Doors and Frames

   a. Primer: 1 coat ProCryl Universal Primer, B66-310 series @ 2.0 – 4.0 mils dft.
   b. Finish: 2 coats Harmony semi-gloss, B10-500 series@ 1.6 mils dft/coat.
   c. Paint Manufacturer: Sherwin Williams.

5. Canvas Piping Covering All Service Jacket

   a. Primer: 1 coat PrepRite 200 Latex Primer B28W200 series @ 1.2 mils dft.
   b. Finish: 2 coats Pro-Industrial Zero VOC Semi-Gloss Acrylic B66-650 Series @ 2.5-4.0 mils dft/coat.
   c. Paint Manufacturer: Sherwin-Williams.

6. Gypsum Board Walls

   a. Primer: 1 coat High Hide Interior Primer Sealer 1000-1200@1.2-1.3 mils dft.
   b. Finish: 2 coats Ultra Hide 150 Interior Semi-Gloss 1416 Series @ 1.3-1.5 mils dft/coat.
   c. Paint Manufacturer: Glidden.

END OF SECTION 09 91 23

SECTION 10 14 00

SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. ADA Room Identification Signage (Panel signs).

1.2 SUBMITTALS

A. General: Submit the following in accordance with Conditions of the Contract and Division 01 Specification Sections.

B. Product data from each manufacturer for each type of product specified, including construction details relative to materials, dimensions of individual components, profiles, finishes and accessories for each type of sign and dimensional letter and number required.

C. Shop Drawings: Provide shop drawings for fabrication and erection of signs. Include elevations and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details. Provide text for each sign required, including large scale details of wording and layout of lettering.

D. Panel sign samples: Provide one full size sample of each type of sign specified for initial selection of color, pattern and surface texture required. On each panel include a representative example of the graphic image process required, showing graphic style, colors and finishes of letters, numbers and other graphic devices as required and for verification of compliance with requirements indicated.

E. Dimensional letters and number samples: Provide full-size representative sample of each dimensional letter type required, showing letter style, color, and material finish and method of attachment, as required and for verification of compliance with requirements indicated.

1.3 QUALITY ASSURANCE

A. Single-Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.

B. Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

1. Produce smooth, even level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally.
2. Text shall be centered at top of signs, with symbol centered.
3. Braille shall be produced by extracting the background of the plaque using a photo etching process, leaving the copy and braille raised. The plaque shall then be laminated to an opaque acrylic base, cut to size and finished with a professional surface painted acrylic polyurethane enamel in a specified color. The photo etched plaque shall have raised Grade 2 Braille, meeting both ADA and ANSI guidelines.

2.2 FABRICATION

A. Signs: Plaque face; 1/32" raised copy, integral copy/Braille, 1/8" thick opaque acrylic base. Comply with ADA.

1. Raised Copy: Produced by photo mechanical etching process.
2. Plaque background color to be Interface #5 Slate.
3. Plaque face shall be laminated to 1/8" thick opaque acrylic base.
4. Text, logos, and border design, precision cut, 1/32" minimum thickness, black or white, polyurethane enamel finish, upper case. Helvetica medium style, shall be chemically welded to the face of the plaque.
5. Edge Condition: Beveled.
6. Corner Condition: Radiused.

2.3 SIGN TYPES

A. ADA, text, Braille text and symbol as indicated, 8-3/4" x 8-3/4", plaque.

1. Men/Women with universal symbols and universal accessibility symbol.
2. “Keep This Door Unlocked During Business Hours”.
3. “Maximum Occupancy:

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Locate signs and dimensional letter units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.

1. Install signs and dimensional letters level, plumb, and at the height indicated and free from distortion or other defects in appearance, with sign surfaces free from distortion or other defects in appearance.

B. Wall Mounted Panel Signs: Attach panel signs to wall surfaces using double-sided foam tape to mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces. Use silastic adhesive for irregular of porous surfaces or where sign occurs on a vinyl covered surface.

Provide signs on wall adjacent to latch side of door, centered 60" above finish floor unless otherwise noted.

1. Mount sign so that a person may approach within 3" of sign without encountering protruding objects or standing within the swing of a door.
2. Signs at exterior entrances shall be installed adjacent to the entrance as directed by EXCHANGE.

C. Dimensional letters: Installed with manufacturer's recommended spacing, align all letters with each other, level and plumb.

3.2 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by EXCHANGE.

END OF SECTION 10 14 00

SECTION 10 21 13

TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Stainless-steel toilet compartments configured as follows:

1. Toilet-Enclosure Style: Overhead braced Floor anchored.
2. Entrance-Screen Style: Overhead braced Floor anchored.
3. Urinal-Screen Style: Wall hung with integral flanges.

1.2 QUALITY ASSURANCE

A. Flame-Spread Index: 25 or less.

PART 2 - PRODUCTS

2.1 COMPONENTS

A. Door, Panel, and Pilaster Construction: No-sightline system as scheduled on Drawings.

B. Finish: No. 4 stainless steel.

C. Brackets (Fittings):

1. Stirrup Type: Stainless steel.
2. Full-Height (Continuous) Type: Stainless steel.

D. Hardware and Accessories: Stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

B. Clearances: Maximum 1/2 inch (13 mm) between pilasters and panels; 1 inch (25 mm) between panels and walls.

C. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

3.2 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10 21 13

SECTION 10 26 00

WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following types of wall surface protection systems:

1. Wall protection systems, include, Contractor Furnished Contractor installed.

a. Crash rails.
b. Cart bumper rails.
c. Corner guards.

1.2 SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

B. Shop Drawings: For each impact-resistant wall protection unit showing locations and extent. Include sections, details, and attachments to other work.

1.3 WARRANTY

A. Materials and Workmanship: Five years.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain each type impact-resistant wall protection units from single source from single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Division 01 Section "Quality Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.5 SPECIAL WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CRASH RAIL

A. Heavy duty stainless steel crash rail with V-groove in face as scheduled on drawings.

1. Surface mounted.
2. Include factory installed stainless steel and plates.
3. Type 304 Alloy, 16-gage, #4 Satin finish.

2.2 CART BUMPER RAILS

A. Galvanized box rail with cast aluminum components as scheduled on drawings.

1. Impact resistant; 2500 lbs.

2.3 CORNER GUARDS/END WALL GUARDS

A. Stainless steel corner guards formed from one piece as scheduled on drawings.

1. Surface mounted.
2. Type 304 stainless steel, #4 satin finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb and true to line without distortions. Do not use materials with chips, cracks, voids, stains or other defects that might be visible in the finished Work.

1. Install impact-resistant wall protection units in locations and at mounting heights indicated on drawings.
2. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.

a. Provide anchoring devices to withstand imposed loads.

END OF SECTION 10 26 00

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes toilet and dressing room accessory items as follows:

1. Automatic paper towel dispenser.
2. Baby changing station.
3. Child safety seat.
4. Electric hand dryers.
5. Grab bars.
6. Heavy duty coat hooks.
7. Liquid soap dispenser.
8. Mirrors.
9. Mop and broom holder.
10. Sanitary disposal unit.
11. Seat cover dispensers.
12. Shelf.
13. Toilet tissue dispenser.
14. Waste receptacle.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify products using designations indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Warranty: Special warranty specified herein.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer, unless otherwise scheduled.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

1.7 WARRANTY

A. Silver Spoilage for Mirrors: 15 years.

PART 2 - PRODUCTS

2.1 ACCESSORIES

APTD-1	Automatic paper towel dispenser	B-72974
BCS-1	Baby changing station, Koala Kare, horizontal wall mount. Provide 4 cases of liners and 2 extra safety straps. Color: White Granite	KB200-05
CSS-1	Child safety seat, vertical wall mount, Gray	KB102-01
EHD-1	Electric hand dryer, brushed stainless steel, manufactured by Excell Dryer, Inc.	"Model Xelerator XL-SB"
FM-1	Angle frame mirror, stainless steel, 18 inches wide by 36 inches high	B-290 1836
GB-1	Grab Bar horizontal mount, satin stainless steel, 36-inches*	B6806 x 36
GB-2	Grab Bar horizontal mount, satin stainless steel, 42-inches*	B6806 x 42
GB-3	Grab Bar vertical mount, satin stainless steel, 18-inches*	B6806 x 18
H-1	Heavy duty clothes hook, concealed mount	B-2116
LSD-1	Liquid soap dispenser, stainless steel / 40 oz capacity	B-2111
MBH-1	Mop and broom holder, 36-inches long, stainless steel	B-224 x 36
SCD-1	Seat cover dispenser, surface mount, stainless steel	B-221
SH-1	Shelf, 16-inches long, stainless steel	B-295
SND-1	Sanitary napkin disposal, surface mount, stainless steel	B254
TTD-1	Surface mounted multi-roll toilet tissue dispenser, stainless steel	B-2888
WR-1	Wall mounted waste receptacle, stainless steel / 12 gallon capacity	B-277

** Provide manufacturer's standard mounting kits and anchoring devices.*

PART 3 – EXECUTION (NOT APPLICABLE)

3.1 INSTALLATION

A. Install accessories according to manufacturer's written instructions, using fasteners appropriate to substrate indicated and recommended by manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

END OF SECTION 10 28 00

SECTION 10 44 16

FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Portable fire extinguishers.

1.2 QUALITY ASSURANCE

A. Fire Extinguishers: NFPA 10

1.3 WARRANTY

A. Materials and Workmanship: Six years.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS

A. Portable, Hand-Carried Fire Extinguishers:

1. Existing shall be relocated as shown on Drawings.
2. Additional extinguishers may be required by Base Fire Marshal and/or authorities having jurisdiction.

B. Mounting Brackets: Match existing.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 10 44 16

SECTION 10 53 80

SUNSCREEN CANOPY SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Design, engineering, fabrication and erection of extruded aluminum space frame having a pre-determined area, geometry type and features indicated on the Drawings.
2. Fabric cover as indicated on the Drawings.

1.2 SUBMITTALS

A. Shop Drawings. Submit shop drawings in accordance with Section 013300 for the Architect's approval prior to starting fabrication. These Drawings will show dimensions, sizes, thicknesses, materials, finishes, joint connections, and anchor brackets. Furnish separate shop drawings for fabric cover and related hardware.

B. Submit Structural calculations by a licensed engineer for approval. Calculations shall include loads, member stresses, support reactions and deflections. The computer analysis and design shall be accompanied by comprehensive explanation of input and output.

C. Samples:

1. Samples of the finish shall be submitted to the Architect for approval.
2. Submit samples of fabric for Architect's color selection.

1.3 QUALITY ASSURANCE

A. Erector Qualifications: Fabricator/erector shall be a contractor regularly engaged in the supply and erection of metal space frames and having experience in projects of similar size and complexity.

B. Design Criteria: Space frame manufacturer shall be responsible for proper design of the structural system to comply with snow load and wind load indicated on the structural drawings.

1.4 DELIVERY, STORAGE AND HANDLING

A. Framing members which are stored at the project site shall be above ground on platforms, skids or other supports and stored upright to prevent twisting. Protect from corrosion. Store other materials in a weathertight and dry place, until ready for use. Store packaged materials in their original unbroken package or container.

1.5 GUARANTEE

A. Prior to final payment, furnish the Owner with a written guarantee certifying that all work was finished and installed in complete accordance with the contract documents.

B. This guarantee shall certify that the installation will be completely free of defects for one (1) year from the date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Space frame and fabric cover shall be designed, engineered, fabricated and erected by one of the following:

1. Hendee Enterprises, Inc., P.O. Box 4289, Houston, TX 77210. Tel: 713/796-2322.
2. Other Acceptable Manufacturers:

a. Ohio Awning & Manufacturing; Cleveland, OH Tel: 1-800-756-4471
b. Accepted substitute in accordance with Section 01600.

2.2 SPACE FRAME MATERIALS

A. Space Frame: Hendee Triangular Truss Shade System or equal of other acceptable manufacturer.

1. Bottom Chord: 6063-T5 Schedule 40 aluminum tube.
2. Top Chord: 6063-T6 Schedule 40 aluminum tube.
3. Web Members: Schedule 40 aluminum tube.

B. Columns: Schedule 40 galvanized steel posts.

C. Baseplates: 8 inch by 8 inch by 3/8 inch steel.

D. Finish:

1. Aluminum Components: Manufacturer's standard mill finish.
2. Steel Components: Hot dipped galvanized.

2.3 FABRICATION

A. The space frame shall be constructed using the extruded aluminum components and alloys as specified.

B. All cutting and fabrication shall be performed in the shop.

C. All field construction of space frame shall be made with bolts or pins.

D. All components shall be color coded for easy field assembly.

2.4 FABRIC

A. Fabric: Enduro Fabric as manufactured by Hendee Enterprises of vinyl impregnated polyester yarn, or accepted substitute by other acceptable manufacturer.

1. Fire retardant treated.
2. Shade Factor: 63 percent.
3. Colors: As selected by Architect from Manufacturer's standards.

B. Edge Reinforcement: 2 inch webbing.

C. Grommets: #2 3/8 inch brass spur grommets at 12 inches o.c.

D. Attachment Hardware: Stainless steel springs fabricated in accordance with SST-302 ASTMA-A-313.

E. Fabric supplier shall furnish all cables and fastening hardware to make a taunt installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: The space frame constructor shall determine whether the support system to receive the anchor mounts is properly prepared and ready to receive the work included herein. Responsibility for the accuracy of benchmarks shall be that of the general contractor.

B. In the event of error in the support locations, the space frame contractor shall notify the general contractor in sufficient time for the correction without undue delay to the project. No further erection work shall be done until the faulty work has been corrected.

3.2 INSTALLATION

A. The space frame shall be completely erected and cover installed by the space frame manufacturer.

B. The installation shall be under the supervision of the space frame manufacturer's crew site engineers.

C. The method and sequence of the assembly procedure shall be done to standards set forth by the space frame manufacturer.

D. The anchor mounts shall be field welded as per AISC requirements. All welded areas shall be field painted to prevent corrosion.

E. The space frame shall be delivered to the site and erected in a clean condition, without any damage or deterioration at the time of completion of installation. Protection shall be provided for space frame components. As the space frame is installed, any areas which may be damaged during assembly shall be touched-up; the tough-up paint shall be air dried to match factory painted finish.

F. Fabric Cover: Install over space frame according to manufacturer's instructions and approved shop drawings.

END OF SECTION 10 53 80

SECTION 11 02 00

BANK & SECURITY EQUIPMENT

PART I – GENERAL

1.1 SUMMARY

A. Contractor provides:

1. Bank equipment indicated.
2. Security equipment indicated.
3. Installation of bank and security equipment.
4. Installation of electrical or security connections to such equipment where indicated for complete operation of equipment and systems.
5. All equipment, fasteners, miscellaneous items and other means necessary for complete installation.
6. Coordination of installations and final connections made by others to furnished equipment for complete operation of equipment and systems.

1.2 RELATED WORK

A. Specified Elsewhere:

1. Division 01 – General Requirements.
2. Division 06 – Architectural Woodwork.
3. Division 09 – Finishes.
4. Division 26 – Electrical.

1.3 QUALITY ASSURANCE

A. All Bank/Security Equipment shall be supplied and installed by a nationally recognized company.

B. All equipment shall be new, with similar equipment or systems manufactured by one manufacturer or company.

C. Acceptable manufacturers are:

1. Diebold Incorporated, 818 Mulberry Road S.E., Canton, Ohio 44711; (216) 489-4000 or St. Louis, Missouri; (314) 995-6500.
2. Hamilton Safe, 3143 Production Drive, Fairfield, Ohio 45014; (513) 874-3733 or Pacific, Missouri; (800) 299-5400.

D. Mechanics employed on the project shall have a minimum of three (3) years experience installing equipment and systems as required for this project.

1.4 SUBMITTALS

A. Shop drawings shall detail layout of work, fabrication, erection, anchorage and reinforcing for review and approval.

B. Submit wiring diagrams, wiring and security system device location plans and elevations for coordination of rough-in and finish installations for all bank and security equipment.

C. Manufacturer's catalog sheets, data, complete parts list, and installation instructions.

D. Manufacturer's current color charts for color selection where color choices are available.

E. Contractor shall furnish number of submittals needed for own use plus:

1. Four (4) copies for retention by the Architect.
2. Each drawing submittal shall be accompanied by a reproducible sepia or translucent bond copy if larger than 11" x 17" size.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Arrange and provide for delivery, storage and handling of equipment in coordination with Contractor and the established construction schedule.

B. Deliver all items in manufacturer's original unopened and undamaged containers with labels intact and legible.

C. Handle products in such a manner as to prevent damage to materials or finishes.

D. Inspect contents of delivered containers and replace any damaged items at no additional cost to AAFES.

1.6 COORDINATION

A. Installation of new equipment shall be closely coordinated by Contractor and related subcontractors.

B. Coordinate connections of security terminal, local telephone company and security monitoring.

C. Review shop drawings for fire detection equipment furnished by others for compatibility with existing monitoring system.

1.7 WARRANTY

A. All materials and equipment produced shall be guaranteed free of defects in material or workmanship for a period of one (1) year from date of Substantial Completion of the Project.

B. Any defective material or workmanship discovered within guarantee period shall be repaired, replaced or corrected promptly and without charge upon notification by AAFES.

PART 2 - PRODUCTS

2.1 GENERAL

A. Products specified in detail under this part of the specifications are based on those manufactured by Hamilton.

B. Equal products of the other manufacturers listed in Paragraph 1.3 are acceptable subject to strict compliance with detailed specifications.

1. Products that do not specifically meet features of operation or construction as specified in detail may be rejected.
2. If other manufacturer's products are furnished it will be construed to mean that dimension, function, operation or construction for products are in strict compliance with detailed drawings and specifications and will be furnished accordingly.

2.2 SAFE CHEST

A. Provide – Number unencased Teller Chest Safe designed for installation of specified interior components at building floor elevation on 1" of grout as indicated.

1. External dimensions of unencased safes shall be nominally 60" high x 37" wide x 32" deep with ½" perimeter clearance around vault door.
2. Safe construction shall be ½" high strength 100,000 p.s.i. steel plate body, all welded construction, with 1" steel door or laminated high carbon, high tensile steel meeting all Bank Protection Act requirements, hinged on right when facing door (right hand swing).
3. Boltwork shall consist of 1" live locking bolts on strike side and three 1" dead bolts on hinge side, hardened for strength.
4. Lock shall be a U.L. Group 1 electronic combination lock for dual control equipped with optional silent signal feature activating silent alarm in a duress situation.
5. Chest shall have a U.L. TL-15 rating.
6. Color shall be chosen by Architect from manufacturers full range to match under counter equipment.

B. Teller Chest interior shall be equipped as follows:

1. Provide eight (8) teller cash tray locker unit with dual nose keylocks.

a. Nominal mulitple unit clear dimensions shall be 41 3/8" high x 15 ½" wide x 24" deep.
b. Construction of lockers:

1.) Nominal Locker Dimensions: 5" high x 15 ½" wide.
2.) Locker Body: ¼" steel with welded construction in painted grey interior and exterior finish .
3.) Doors: ½" mild steel with stainless steel finish plate, satin chrome handle and continuous stainless steel hinges mounted to doors and center divider.

c. Locker doors shall be hinged on right when facing doors (right hand swing).
d. Unit shall be installed above a fixed shelf as indicated and specified above, with ¼" painted steel filler panels at sides and top.

2. Provide two (2) inner currency/coinage locker unit with U.L. Group 1 electronic combination lock for dual control equipped with silent signal feature activating silent alarm in a duress situation.

   a. Nominal multiple unit clear dimensions shall be 41 3/8” high x 15 ¼” wide x 24” deep.

   b. Construction of lockers:

      1.) Nominal Locker Dimensions: 20” high x 15 ¼” wide
      2.) Locker Body: 1/4” steel with welded construction in painted grey interior and exterior finish .
      3.) Doors: ½” mild steel with stainless steel finish plate, satin chrome handle and continuous stainless steel hinges mounted to doors and center divider.

   c. Locker doors shall be hinged on right when facing doors (right hand swing).
   d. Unit shall be installed above a fixed shelf as indicated and specified above, with ¼” painted steel filler panels at sides and top.

3. Provide fixed storage shelf as indicated in lower portion of Chest supported with center divider.
4. Provide matching continuous stainless steel trim pieces with concealed fasteners as follows:

   a. Fillers at sides of installation scribed neatly to interior surface of safe wall.
   b. Vertical top extension dust plate to extend above sections and scribed neatly to interior top surface of safe and recessed from front face sufficiently to provide clearance for alarm maintenance.

C. Security features for the safe deposit box safe installation shall be as follows:

1. Provide U.L. “Complete” money safe alarm protection on chest consisting of the following:
   a. Door Contact
   b. Heat thermo
   c. Seismic detector on back of door.

2. All security monitoring features shall be capable of being connected to a 24-hour circuit in the alarm system for status surveillance.

D. All conduit, junction boxes and wiring for power and monitoring shall be installed by the Contractor.

E. Provide necessary coordination, wiring diagrams, wire sizes, drawings and instructions for rough-in installations by others.

F. Provide final connections and confirm operational features for specified equipment.

PART 3 - EXECUTION

3.1 PREPARATION

A. Contractor shall inspect the building construction and areas scheduled to receive equipment, to verify that work already in place, which affects the installation of work under this Contract, is correct and in acceptable condition.

B. Pre-Installation Meeting: Meet at project site prior to delivery of bank equipment and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work.

1. Include in meeting the Contractor; AAFES Project Manager or designated representative; Installers of architectural woodwork, wet work such as gypsum board taping, other finishes, painting, mechanical work and electrical work.
2. Proceed with bank equipment installation only when everyone concerned agrees that required ambient conditions can be maintained.

C. Prior to installation of bank equipment, examine shop-fabricated work by Division 06 for completion and confirm work is correct and acceptable.

3.2 COORDINATION AND DELIVERY

A. Closely coordinate fabrication and delivery of materials with Contractor to assure compliance with the procedure required by Paragraph 1.5 and 1.6 of this Section.

3.3 INSTALLATION

A. Install safe chest as indicated, plumb, level and aligned with other construction.

1. Set chest on grout leveling bed verifying that door will open to clear new floor finishes and freely swing 180 degrees.
2. Install all specified security monitoring equipment to security device rough-ins.
3. Verify power and security wiring and make final connections for powering door and monitoring security at security terminal.

B. Install modular sections of currency/coinage and cash drawer inserts as indicated on making sure all units are vertically plumb and in alignment with interior of chests.

1. Stack and interlock modular sections vertically.
2. Screw attach adjacent sections using concealed fasteners to form a continuous installation anchored securely to interior of chests.
3. Scribe matching stainless steel filler strips at sides of installation in continuous pieces from floor to ceiling of chest using concealed fasteners anchored through frames of end sections.
4. Install continuous matching stainless steel extension trim from top of installation to top of chest using concealed fasteners.

3.4 ADJUST AND CLEAN

A. After installation is complete, adjust all equipment items as required for smooth, trouble- free operation.

B. Test all equipment and systems, individual intrusion detection devices and adjust or replace as required for proper operation.

C. Clean all equipment items including interiors of equipment and accessories.

D. Touch-up any minor scratches or defects on equipment to the satisfaction of the Contracting Officer or designated representative.

1. Remove and replace with new acceptable equipment, any items which cannot be satisfactorily repaired or touched-up.

2. Clean, lubricate and adjust all hardware.

E. Remove all excess materials, debris and tools and leave the area in a clean, safe condition.

1. Dispose of excess materials and debris in a legal manner, off site.
2. Protect all installed work and maintain conditions that ensure equipment will remain undamaged until substantial completion.

3.5 INSTRUCTIONS

A. Instruct and demonstrate to AAFES personnel the proper operation and programming of all installed equipment.

B. Submit four (4) bound, printed instruction manuals with complete operation instructions, shop drawings and routine maintenance procedures to AAFES, as part of Final Closeout requirements, for all equipment and accessories.

END OF SECTION 11 02 00

SECTION 11 40 00

FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Built in food equipment, walk-in refrigeration, hoods.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Section 01 10 00 - Summary.
B. Sections 01 10 17 and 01 10 18: Owner Furnished Equipment.

1.3 RELATED SECTIONS

A. Division 22 Section - Plumbing Piping.

B. Division 22 Section - Plumbing Specialties: Grease interceptor.

C. Division 23 Section - Food Service Ventilation Systems

1.4 REFERENCES

A. ASTM A167 - Stainless and Heat-resisting Chromium-nickel Steel Plate, Sheet and Strip.

B. ANSI/AWS D1.1 - Structural Welding Code.

C. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

D. ASTM C1036 - Flat Glass.

E. ASTM C1048 - Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.

F. NEMA LD3 - High Pressure Decorative Laminates.

G. NFPA - National Fire Protection Association: appliances.

H. NFPA 96 - Removal of Smoke and Grease Laden Vapors from Commercial Cooking Equipment.

I. NGA - National Gas Association: appliances.

J. NSF - National Sanitation Foundation: appliances.

1.5 PERFORMANCE REQUIREMENTS

A. Load Supporting Components: Reinforced frame support system and surfaces [where indicated] so that surfaces may safely support a load of 200 lbs concentrated on one square foot (one sq m) in any area on the component surface, with no indentation showing on surface, and with permanent set not exceeding 0.005 inches (0.127 mm).

1.6 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings: Indicate in large scale detail, fabricated equipment showing construction methods, type and gage of metal, hardware and fittings, plan front elevation, a minimum of one cross-section, and utility requirements as to types and sizes and locations. Illustrate complicated parts of typical items in cut-away perspective. For control systems, indicate service connections, characteristics, and wiring diagrams.

C. Product Data: Provide data on appliances; indicate configuration, sizes, materials, finishes, locations, and utility connections and locations.

D. Samples: Submit two (2) samples, 6" x 6" inch in size illustrating equipment and finish.

E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

F. Manufacturer's Certificate: Certify that Products meet or exceed UL and specified requirements.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01 77 00.

B. Operation Data: Provide operating data for the specified equipment.

C. Maintenance Data: Provide lubrication and periodic maintenance requirement schedules.

1.8 QUALITY ASSURANCE

A. Perform Work as follows:
1. Cooler and Freezer Units: Listed by Underwriters Laboratories, Inc. (UL) standards.
2. Electrical Wiring and Components and Self-contained Refrigeration Systems: Conform to Underwriters' Laboratories, Inc (UL) standards.
3. Exhaust Hoods: NFPA 96.
4. Fabricated Equipment: Shall be installed in accordance with the following codes: NFPA - National Fire Protection Association requirements, NGA - National Gas Association requirements, NSF - National Sanitation Foundation requirements.

1.9 QUALIFICATIONS

A. Fabricator: Company specializing in performing the work of this section with minimum five (5) years experience.

1.10 REGULATORY REQUIREMENTS

A. Conform to applicable code for utility requirements.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc., as suitable for the purpose specified and indicated.

1.11 PRE-INSTALLATION CONFERENCE

A. Convene one week prior to commencing work of this section, under provisions of Section 01 31 00.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

B. Store products clear of floor in a manner to prevent damage.

C. Coordinate size of access and route to place of installation.

1.13 SCHEDULING

A. Schedule work under the provisions of Section 01 31 00.

B. Schedule Work to immediately follow installation of utilities and precede installation of room finishes.

1.14 COORDINATION

A. Coordinate the work with location and placement of utilities. Coordinate characteristics of utilities with requirements of food service equipment.

1.15 WARRANTY

A. Provide five (5) year warranty under provisions of Section 01 77 00.

B. Warranty: Include replacement or repair of scheduled equipment, refrigerant and compressors, including disconnection of defective unit, and connection of replacement unit.

PART 2 - PRODUCTS

2.1 EQUIPMENT SCHEDULE

A. Equipment Schedule: Refer to drawing.

B. Provide rough-in hardware, supports and connections, attachment devices, closure trim, and accessories.

2.2 MATERIALS

A. Sheet Steel: ASTM A446, 1.25 oz/sq ft (380 g/sq m) galvanized coating.

B. Stainless Steel: ASTM A167, Type 304 commercial grade, No. 4 finish.

C. Sealants: Silicone, bacteria resistant type.

2.3 FABRICATION - GENERAL

A. Fabricate sheet material for work surfaces, facings, shelves, and drain boards of straight lengths in one continuous sheet when less than 12 ft (3.5 m) in length. Fit and attach integral sinks. Weld metal joints for lengths over 12 ft (3.5 m).

B. Weld and form edges, ends, and joints smooth. Grind welds of stainless steel smooth and flush ; polish to match adjacent surfaces.

C. Cut and drill components for service outlets and fixtures.

D. Fix leg mounted units by dowelling to floor with 1/4 inch (6 mm) stainless steel pins, where vibration or oscillation is anticipated.

E. Provide stainless steel legs with adjustable feet. Fasten legs to equipment securely and rigidly.

F. Install nylon button feet on bearing surface of any item positioned on a finished surface.

G. Isolate rotating or reciprocating machinery to prevent noise and vibration.

H. Provide indirect drain piping from equipment to terminate over nearest waste receptor.

I. Accommodate site installation of other services or equipment.

J. Shop assemble work where possible.

K. Stainless Steel Fastenings and Fittings: Bolt and screw with countersunk flat heads at visible or accessible surfaces. Use concealed fastenings where possible.

2.4 METAL WALL PANELS

A. Tri-Mark, custom stainless steel mill finish. Contact: Lisa Wood 816-746-5077.

2.5 FINISHES

A. All Components: Shop pre-finish.

B. Metal (Except Stainless Steel): Degrease and phosphate etch, prime and apply minimum two coats factory baked epoxy enamel, color as selected.

C. Stainless Steel: No. 4 finish.

D. Bituminous Paint: Sound deaden internal surfaces of metal work and underside of metal counters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify ventilation outlets, service connections, and supports are correct and in required location.

B. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install items in accordance with manufacturers' instructions.

B. Insulate to prevent electrolysis between dissimilar metals.

C. Weld and grind joints in steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.

D. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.

E. Cut, fit, and patch where necessary. Provide cutting and patching of items of this section required for installation or services of equipment.

F. Cut and drill components for service outlets, fixtures, and fittings.

G. Use anchoring devices appropriate for equipment and expected usage.

H. Provide sealant to achieve clean joint with adjacent building finishes and between abutting components.

3.3 ADJUSTING

A. Adjust work under provisions of Section 01 65 00.

B. Adjust equipment and apparatus to ensure proper working order and conditions.

C. Remove and replace equipment creating excessive noise or vibration.

3.4 CLEANING

A. Clean work under provisions of 01 71 00.

B. Remove masking or protective covering from stainless steel and other finished surfaces.

C. Wash and clean equipment.

D. Polish glass, plastic, hardware and accessories, fixtures and fittings.

3.5 DEMONSTRATION

A. Provide systems demonstration under provisions of Section 01 65 00.

B. Test equipment prior to demonstration.

C. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct Owner in operating procedures and maintenance.

D. Individual Performing Demonstration: Fully knowledgeable of all operating and service aspects of equipment.

3.6 PROTECTION OF FINISHED WORK

A. Protect finished Work.

B. Remove protective coverings from pre-finished work.

END OF SECTION 11 40 00

SECTION 21 00 00

FIRE PROTECTION

1.1 SUMMARY

A. Work Included: Provide all material, labor, equipment, design and services necessary to perform the installation of the fire sprinkler system as shown on the drawings and as described herein.

B. Summary of Work: This installation will consist of hydraulically calculated wet pipe sprinkler systems protecting the entire building.

C. Design densities shall be in accordance with NFPA 13 and the following:

1. Mechanical rooms, storage rooms, and similar areas shall be designed for an ordinary hazard group 1 density.
2. All other areas shall be designed in accordance with NFPA 13.

D. The water supply for this installation is supplied from a 2000 gpm, 80 psi fire pump at the high school taking suction from on-site storage tanks. A margin of 10% between all demand points and the water supply is required.

1.2 QUALITY ASSURANCE

A. Codes and Standards: This installation shall conform to each of the following:

1. NFPA 13, 2007 Edition, Installation of Sprinkler Systems,
2. International Building Code, 2006 Edition
3. International Fire Code, 2006 Edition
4. International Mechanical Code, 2006 Edition
5. Underwriters Laboratories Fire Protection Equipment Directory, 2010 Edition

B. All work shall comply fully with all applicable codes and standards. Nothing in the contract documents shall be construed to permit non-compliance with any code or standard.

C. Warrantee: The contractor shall guarantee all materials, equipment and workmanship in this installation for a period of one year from the date of completion. Any system failure during that time shall be repaired at the contractor's expense. Contractor shall respond on site to system problems within 24 hours.

D. Qualifications of Contractor: All work shall be performed by a Contractor with a valid State Contractor's license for the installation of fire sprinkler systems.

E. The field installation shall be supervised at all times by a journeyman sprinkler fitter or person with equivalent experience.

F. Approval by the Authority Having Jurisdiction: For purposes of code compliance the Authority Having Jurisdiction (AHJ) for this installation will be the Washington State Fire Marshal, Spokane County Division of Building, and Fire District 11. Where there are conflicts between the AHJ and the referenced codes and standards, the more stringent shall apply.

1.3 SUBMITTALS

A. Material Submittals: At least 10 working days prior to submitting shop drawings, furnish to the A/E a complete list of equipment and products, and a manufacturer's catalog sheet for each item to be included in the project. The Contractor may submit as many copies as it practically needs. Three copies will be retained, the remainder will be returned to the contractor. Each copy shall be bound separately in a soft cover three-hole folder, and shall include an index of all items in the submittal.

B. All material submittals shall include all items listed in the product section of this specification and all additional items necessary to provide a complete installation. Where more than one item appears on a manufacture's catalog sheet, the item or items to be used shall be indicated.

C. Shop Drawings: At least 15 working days prior to any installation or fabrication of the system components, the Contractor shall submit two sets of shop drawings and hydraulic calculations to the A/E for review by the A/E. The A/E will review the submittals and make any pertinent comments, returning one set to the contractor. The contractor will then make any necessary corrections and submit six sets for approval. Two sets of each will be retained by the A/E. Submit additional sets as desired for return to the contractor.

D. Shop drawings shall conform to, and include all items as set forth in NFPA 13.

E. After approval is received from the A/E, submit shop drawings to the AHJ for approval. Submit evidence of final drawing approval by the AHJ to the A/E prior to the start of fabrication or installation.

1.4 DRAWINGS OF RECORD

A. Updating Drawings: Provide and keep up to date, a complete record set of approved shop drawings, corrected daily to show every change from the approved shop drawings. Keep this set of prints on the job site and use only as a record set.

1.5 MATERIALS

A. Materials and Equipment: All materials and equipment in the system shall be new and current products of a manufacturer regularly engaged in the production of such materials and equipment. Where two or more pieces of equipment are required to perform interrelated functions, they shall be products of one manufacturer.

B. Approval Guides: Unless otherwise indicated, all products shall be listed in the latest publication of the Underwriters Laboratory Fire Protection Directory or the Factory Mutual Approval Guide.

C. Schedule of Pipe: All pipe shall be ferrous, and shall meet the requirements of NFPA 13, section 2-3. All threaded pipe shall be schedule 40.

D. Threaded Fittings: Threaded fittings shall be cast iron class 125, rated for 175 psi. cold water working pressure and shall conform to ANSI B16.4, ASTM 126 and ANSI B2.1 NPT.

E. Grooved Fittings: 90's, 45's, Tees, and reducers shall be malleable iron or ductile. The fittings shall be by Gustin Bacon, Gruvlok, Victaulic, or approved equal.

F. Adapter Flanges: Adapter flanges (fittings) shall be cast iron/class 125 conforming to ANSI B 16.1, with a rust inhibiting coating. The adapter flanges shall be by Gustin Bacon, Gruvlok, Victaulic, or approved equal.

G. Grooved Couplings: Grooved couplings and reducers shall be malleable or ductile iron conforming to ASTM A 47.

H. Plain End Couplings: Plain-end couplings are permitted when installed in complete conformance with their listings.

I. Hangers: Provide hangers to support all piping in perfect alignment without sagging or interference, to permit free expansion and contraction, and meet the requirements of NFPA 13.

J. Pipe Rings: Pipe rings to be zinc coated Grinnell figure 69 or equal.

K. Earthquake bracing shall be with a pipe clamp and pipe with a swivel type anchor or similar to those illustrated in NFPA 13. Other types of bracing may be used when UL-listed or FM approved.

L. Butterfly Valves: Butterfly valves shall be Gruvlok Model 7700 FP with integral tamper switch, or approved equal. Externally mounted tamper switches are also permissible.

M. Drain Valves: Drain valves shall be screw in bonnet bronze globe valves, rated to 175 psi non shock cold water working pressure by Nibco, United or approved equal. Low point drain valves shall have, in addition, a ¾ inch brass nipple with ¾ inch male hose threads and cap.

N. Check valves shall be grooved, iron body, bronze seat, stainless steel clapper with a replaceable rubber seal and 175 psi non shock cold water working pressure. Viking model D, Central model 90 or approved equal.

O. Provide quick response sprinklers throughout.

P. Sprinklers in ceilings shall be glass bulb, white finish, with white recessed escutcheon.

Q. Sidewall sprinklers in finished areas shall be white finish in white recessed escutcheon.

R. Spare Sprinklers: Provide spare sprinklers and escutcheons for each type and style of sprinkler used in accordance with NFPA 13 and proportioned based upon the number of each type and style of sprinkler used on the project.

S. Provide a spare sprinkler cabinet to accommodate the required number of spare sprinklers and escutcheons. Include a wrench for each type of sprinkler in the cabinet.

T. Provide chrome- or nickel-plated, UL Listed sprinkler headguards for sprinkler heads subject to mechanical damage or for any sprinkler lower than 7 feet above the floor. All sprinklers in the gyms shall be provided with plated head guards.

U. Provide a 3½ inch diameter, bourdon type pressure gauge, 0 200 lbs, ¼ inch soft metal seat globe valve with arrangements for draining pipe between gage and valve.

V. Provide plastic split ring type escutcheons. Escutcheons are only required where wall penetrations are exposed.

W. Equipment in this section shall be provided, installed, and adjusted by the sprinkler Contractor. Conduit, wiring, and terminations, shall be by others.

X. Waterflow Switch: Potter VSR F or approved equal.

Y. Supervisory Switches: SPST, normally closed contacts, designed to signal valve in other than full open position

Z. Provide all control, drain and test valves with signs identifying the type of valve and the area affected by the valve. Signs shall be three layer etched plastic with red letters on a white background to identify valves above ceilings or behind access doors. Lithographed metal plates may be used in unfinished spaces or above ceilings. Provide hydraulic design information plates as required by NFPA 13.

AA. Firestopping material is to be UL classified Bio Fireshield BFS100, 200 caulk or approved equal.

1.6 INSTALLATION

A. Requirements Prior to Installation: Do not order, fabricate, or install any material prior to receipt of all approvals as stipulated in Part 1 of this Section.

B. The most current architectural backgrounds shall be used to produce shop drawings. Obtain these from the architect prior to starting design.

C. Standards and Requirements: All installation work shall be performed in accordance with the reference standards without exception, and as required by the AHJ. All piping shall be installed straight, true and plumb.

D. Changes to the Work: Install all piping as shown on the approved shop drawings. Minor deviations shall be carefully noted on the record drawings as outlined in Part 1 of this Section. Before making significant deviations from the approved drawings, written approval must be obtained from the Owner and the AHJ.

E. Coordination of Work: Carefully coordinate work with other trades so that unnecessary offsets and revisions to the approved drawings are avoided. Failure to coordinate does not relieve Contractor from meeting the performance standards herein. The contractor is responsible for completely coordinating with all other trades and building conditions, providing all offsets as necessary for a completely coordinated installation. No extras will be allowed for resolving conflicts with other trades.

F. Sprinklers shall be spaced in accordance with NFPA 13 and as noted in Part 2 of this specification.

G. In addition to the sprinklers indicated on the drawings, provide all design, materials, and labor for installation of 6 additional sprinklers as directed by the AHJ or the engineer.

H. Provide plated head guards for all sprinklers in the gymnasiums.

I. Required Clearance Around Pipe: Piping passing through fire rated assemblies, including fire rated GWB assemblies shall be provided with clearance around the entire circumference of the pipe. Penetrations shall be made in a neat manner using properly sized hole saw or masonry/concrete coring as necessary.

J. Fire Rated Assemblies: The annular spaces around sprinkler pipes which penetrate fire rated assemblies shall be filled with UL classified firestopping material in accordance with the manufacturer's recommendations. Penetrations of all fire-rated assemblies shall be protected. The shop drawings or material submittals shall clearly depict the firestopping assembly proposed by the contractor.

K. Escutcheons: Split wall plates or escutcheons shall be installed where exposed piping or hangers pass through a finished floor, wall or ceiling and shall fit snugly, securely and cover the opening.

L. Install all control valves and test valves in locations indicated on the plans. Auxiliary drain valves shall be installed in easily accessible locations.

M. Main Drains: Provide main drains for all systems as shown on the drawings. Main drains shall discharge to a safe location outside of the building.

N. Auxiliary Drains: Provide auxiliary drains at all low points of the system, where the trapped section of pipe exceeds five gallons. The drain shall consist of, as a minimum: a valve, a ¾ inch brass nipple with ¾ inch male hose threads, and cap.

O. Provide remote inspectors test drains as required by the AHJ.

P. Sprinklers in 2 x 2 ceiling tiles shall be located in the center of tile, plus or minus 1 inch. Sprinklers in 2 x 4 ceiling tiles shall be located at the quarter points

Q. .Where surface mounted lights present an obstruction to sprinkler spray pattern, 401 canopies shall be used.

1.7 FIELD QUALITY CONTROL

A. Hydrostatic tests shall be performed in the presence of the AHJ. Any leaks or drips shall be promptly repaired. Evidence of the completed tests shall be conveyed to the A/E by submitting a completed contractor's Material and Test Certificate.

B. Punch List: Deficiencies found in the installation will be recorded on a punch list and delivered to Contractor. All items on the punch list shall be promptly corrected. Notify the A/E in writing once all punch list items have been corrected.

END OF SECTION 21 00 00

SECTION 22 00 00

PLUMBING-GENERAL PROVISIONS

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

A. Refer to BIDDING REQUIREMENTS, CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS and DIVISION 01 of these specifications, which govern work under DIVISION 23. Refer to other sections of these specifications for additional related requirements.

1.2 SCOPE OF REQUIREMENTS

A. The work covered by Division 22 of the specifications shall include but not be limited to:

1. Furnishing all materials and supplying all labor, equipment and services to install the complete mechanical system as shown on the accompanied drawings and specified herein.

1.3 DESCRIPTION OF WORK

A. The contract documents including specifications and construction drawings are intended to provide all material and labor to install complete plumbing, heating ventilating and air conditioning systems for the building.

B. Every effort has been made on the design to meet or exceed the minimum requirements of the Codes; therefore, unless Contractor before signing his Contract, shall have notified the Architect, in writing, of any items in conflict with said Codes, he shall thereafter make any minor adjustments necessary to meet said Codes at no cost to the Owner.

C. The Contractor shall refer to the architectural interior detail, floor plans, elevations, and the structural and other Contract Drawings and he shall coordinate his work with that of the other trades to avoid interference. The plans are diagrammatic and show generally the locations of the equipment and are not to be scaled; all dimensions shall be checked at the building.

D. The Contractor shall comply with the project close-out requirements as detailed in General Requirements of Division 01.

1.4 DESCRIPTION OF BID DOCUMENTS

A. Specifications:

1. Specifications, in general, describe quality and character of materials and equipment.

2. Specifications are of simplified form and include incomplete sentences.

B. Drawings:

1. Drawings in general are diagrammatic and indicate sizes, locations, connections to equipment and methods of installation.

2. Scaled and figured dimensions are approximate and are for estimating purposes only.

3. Before proceeding with work check and verify all dimensions.

4. Assume all responsibility for fitting of materials and equipment to other parts of equipment and structure.

5. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades.

6. If any part of Specifications or Drawings appears unclear or contradictory, apply to Architect or Engineer for his interpretation and decision as early as possible.

1.5 CODES PERMITS AND FEES

A. Mechanical work shall be in accordance with the following:

1. The latest edition of the International Building Code, International Mechanical Code, Uniform Plumbing Code, International Fire Code, National Electric Code, American Disability Act and all applicable State and Local Codes and Ordinances.

2. The Contractor at his expense shall obtain permits and inspections required for the mechanical work on this project. Deliver all inspection certificates to the Owner's Representative prior to final acceptance of the work.

3. Contractor shall pay all costs levied by utility companies and/or governing agencies associated with gas connections and include these costs within his bid. This shall include but not be limited to tap fees, service mains, meter, and vault charges.

1.6 DEFINITIONS

A. The terms "The Contractor", when used in Division 22 shall mean the Contractor for mechanical work.

B. The term "Owners Representative" as used in Division 22 generally refers to the Architect or his designated representative in accordance with the General Conditions.

C. The term "Provide" shall mean furnish and install.

1.7 TEMPORARY HEATING

A. See Section 015000 Temporary Facilities and Controls.

1.8 SAFETY AND PROTECTION

A. Safety Measures: The Engineer has not been retained to provide design and construction services relating to the Contractor's safety precautions, or means, methods, techniques, sequences or procedures required for the Contractor to perform his work. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement applies continuously and is not limited to normal working hours. Provide all required safety measures and consult with the State or Federal safety inspector for interpretation whenever in doubt as to whether safe conditions do or do not exist or whether compliance with State or Federal regulations exist.

B. Head protection: Where pipe hangers, equipment support angles, etc., are exposed in access ways for any maintenance, cover all such potentially injurious protrusions less than 7'-0" above the floor with padding; secure and permanently fasten, and finish to match adjacent finishes.

1.9 MECHANICAL COST BREAKDOWN

A. Cost breakdown not required.

1.10 GUARANTEE

A. The Mechanical equipment and installation shall be guaranteed for a period of one (1) year from the date of acceptance unless and individual item or specification is otherwise noted as longer. The Contractor shall make-good at his own expense all defects in his work, and/or equipment furnished by him, which shall develop at any time during the one year guarantee period and shall stand any expense of cutting and patching and repairing made necessary by his corrections of unsatisfactory work or equipment operation.

PART 2 - PRODUCTS

2.1 DUCTWORK AND PIPING COORDINATION

A. Prior to installation of the new Division 22 systems, the Contractor shall coordinate the proposed installation with the Architectural and Structural requirements, and all other trades (including HVAC, Plumbing, Fire Protection, Electrical, Ceiling Suspension and Tile systems), and provide reasonable maintenance access requirements.

B. Provide means of access to all valves, dampers, controllers, operable devices and other apparatus which may require adjustment or servicing.

C. Verify in field exact size, location, invert, and clearances regarding all existing material, equipment and apparatus, and advise the Owners Representative of any discrepancies between that indicated on the Drawings and that existing in the field prior to any installation. Contractor shall be responsible for all costs associated with the removal or relocation of installed systems that have been installed without prior notification of the Owners Representative.

2.2 SHOP DRAWINGS AND SUBMITTALS

A. Submit Shop Drawings and Product Data per the requirements of Section 013300 Submittals Procedures.

B. See individual Division 22 specification sections for additional submittal requirements.

C. Submittals of Product Data shall be bound in a black 3-ring binder with the project name on the cover. Data within this binder shall be arranged as follows:

1. Provide index tabs for each specification section in the same order and using the same name as appears in the Specifications.

2. Data shall be black and white, on 8 ½" x 11" or 11" x 17", single, one-sided sheets suitable for copying. Diagrams and drawings larger than 11" x 17" shall be submitted in reproducible form (translucent bond paper).

3. Drawings and catalog data must be clean, neat copies. Fax material or other poor quality copies will not be acceptable.

D. If material or equipment is not as specified or submittal is not complete, it will be rejected. Only completed submittal including all applicable specification sections will be reviewed.

E. Indicate manufacturer, trade name and model number. Include copies of applicable brochure or catalogue material. Indicate sizes, types, model numbers, ratings, capacities and options actually being proposed.

F. Include dimensional data for roughing in and installation, and technical data sufficient to confirm that equipment meets requirements of drawings and specifications.

G. Include wiring, piping and service connection data, motor sizes complete with voltage ratings and schedules.

H. Submit five (5) copies of each shop drawing. The Engineer will retain one stamped copy, one will be provided to the Architect, one will be provided to the owner and a two stamped copies will be returned to the Contractor. The Contractor shall be responsible for distribution of required number of reviewed copies to parties other than the Owner's Representative(s).

I. LEED Submittals

1. Provide LEED submittals for water conserving plumbing fixtures.

2.3 RECORD DRAWINGS

A. Refer to Division 01.

B. Keep on site, an extra set of drawings and specifications recording changes and deviations daily. Return these drawings to the Owner's Representative at the completion of the Project. These drawings shall not be used for any other purposes.

2.4 OPERATING AND MAINTENANCE MANUALS

A. Refer to Section 017800 Closeout Submittals.

B. See individual Division 23 specification sections for additional Operating and Maintenance Manual requirements.

2.5 OPERATION AND MAINTENANCE TRAINING/STARTUP

A. Instruct the Owners representative(s) in operation and maintenance of mechanical systems utilizing the Operation and Maintenance Manual.

B. Individuals present shall include Contractors, subcontractors and equipment factory representatives. These individuals shall assist in instruction and start-up.

C. Instruction period shall occur after final inspection when systems are properly working.

D. Prepare statement and check list to be included in the Operation and Maintenance Manual. This Statement shall read as follows:

"The Contractor, associated factory representatives and subcontractors, have started each system and the total system and have proved their normal operation to the Owner's representative and have instructed him in the operation and maintenance thereof."

_____ _____

Owner's Representative Contractor

2.6 EQUIPMENT AND MATERIALS – STANDARDS/CODES

A. Materials used under this Contract, unless specifically noted otherwise, shall be new and of the latest and most current model line produced by the manufacturer. Each item of equipment shall conform to the latest Standard Specifications of the American Society for Testing Materials and shall conform to any applicable standards of the United States Department of Commerce.

B. Instruct the Owners representative(s) in operation and maintenance of mechanical systems utilizing the Operation and Maintenance Manual. Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when the Project is turned over to the Owner.

C. All electrically driven or connected equipment shall be provided with UL or equivalent label and/or listing in accordance with the requirements of the NEC.

D. All control panels shall be provided with UL or equivalent Label and/or listing in accordance with the requirements of the NEC an applicable local codes.

2.7 EQUIPMENT/MATERIAL SUBSTITUTIONS

A. Refer to Section 012500 Substitution Procedures for product prior approval and substitution requirements.

B. Throughout these specifications and drawings, various materials, equipment, apparatus, etc., are specified or scheduled by manufacturer, brand name, type or catalog number. Such designation is to establish standards of desired quality and construction and shall be the basis of design and the bid.

C. Submit proposals to supply alternative materials or equipment in writing, in accordance with Section 012500 Substitution Procedures.

D. Equipment manufacturers listed in individual sections are approved alternatives for this project and are subject to requirements of drawings and specifications. Revisions required to adapt alternatives shall be the responsibility of the Contractor.

E. Products furnished other than the (basis of design) shall have similar electrical characteristics as the scheduled or specified equipment. Contractor shall be responsible for any electrical changes caused by products not in accordance with this requirement.

2.8 EQUIPMENT PROTECTION AND CLEAN-UP

A. Protect equipment and materials in storage on site, during and after installation until final acceptance. Leave factory covers in place and take special precautions to prevent entry of foreign material into working parts and duct systems.

B. Protect equipment with polyethylene covers and crates.

C. Operate, drain and flush bearings and refill with change of lubricant before final acceptance.

D. Protect bearings and shafts during installation. Grease shafts and sheaves to prevent corrosion. Provide extended nipples for lubrication.

E. Ensure that existing equipment is carefully dismantled and not damaged or lost. Do not re-use existing materials and equipment unless specifically indicated.

PART 3 - EXECUTION

3.1 LOCATIONS

A. Coordination of Division 22 equipment and systems to the available space, with other trades. The access routes through the construction shall be the Contractor's responsibility.

B. Drawings are diagrammatic. Make offsets, transitions, and changes in direction of pipes and ducts, as required to maintain proper headroom and pitch of sloping lines and avoid structural, electrical, pipe and duct interference's whether or not indicated on Drawings. Furnish fittings, etc., as required to make these offsets, transitions and changes in direction at no additional cost to the Owner.

C. Determine exact route and location of ducts and coordinate and obtain approval for changes from the layout indicated on the drawings with the Owner's Representative prior to fabrication.

D. Locations of equipment and devices, as shown on the drawings, are approximate unless dimensioned. Verify the physical dimensions of each item of mechanical equipment to fit the available space and promptly notify the Owner's Representative prior to roughing-in if conflicts appear.

E. All wiring, equipment, ductwork, tubing, etc., shall be concealed within building construction unless otherwise noted, or in mechanical rooms.

F. Arrange ducts, and equipment to permit ready access to starters, motors, control components, and to clear openings of doors and access panels.

3.2 CUTTING AND PATCHING

A. All cutting and patching of new and existing construction required for the installation of systems and equipment specified in Division 22 shall be the responsibility of the Division 23 Contractor. All cutting shall be accomplished with masonry saws, drills or similar equipment to provide neat uniform openings.

B. Patch and repair walls, floors, ceilings and roof with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials. All patching shall meet the approval of the Owner's Representative.

C. All cutting and patching made necessary to repair defective equipment, defective workmanship or be neglect of this Contractor to properly anticipate his requirements shall be included in Division 23.

D. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses or other structural members without the Owner Representative's written approval.

E. Cutting, patching, repairing, and replacing pavement, sidewalks, roads, and curbs to permit installation of work specified or indicated under this Division is responsibility of Division 23.

3.3 SCHEDULING

A. It is understood that while drawings are to be followed as closely as circumstances permit, the Contractor shall be responsible for installation of systems according to the true intent and meaning of Contract Documents. Anything not clear or in conflict will be explained by making application to Owner's Representative. Should conditions arise where certain changes would be advisable, secure approval from Owner's Representative for those changes before proceeding with work.

B. Coordinate with the work of various trades when installing interrelated work. Before installation of mechanical items, make proper provision to avoid interference's. Changes required in work specified in Division 22 caused by neglect to do so shall be made at no cost to Owner.

C. Furnish and install inserts and supports required by Division 23 unless otherwise noted. Furnish sleeves, inserts, supports, and equipment that are an integral part of other Divisions of the Work to those involved in sufficient time to be built into construction as the Work proceeds. Locate these items and see that they are properly installed. Expense resulting from improper location or installation of items above shall be borne under Division 23.

3.4 EXISTING UTILITIES

A. The locations of existing concealed lines and connection points have been indicated as closely as possible from available information. The Contractor shall assume that such connection points are within a Ten foot (10') radius of the indicated location. Where connection points are not within this radius, the Contractor shall contact the Owner's Representative for a decision before proceeding or may proceed at his own expense.

B. Connection points to existing work shall be located and verified prior to starting new work.

C. Prior to commencing any excavation or ditching activity, the Contractor shall verify the exact location and inverts of all existing utilities and connection points in the area of his proposed excavation. Notify Owner's representative for further direction if actual inverts will not allow the proper installation of new work.

D. The Contractor shall be responsible for damages, which might be caused by his failure to exactly locate and preserve underground utilities.

3.5 PHASING AND SEQUENCE OF WORK

A. Contractor shall be aware that this is a remodel project. There will be occupied areas in the construction areas that must remain operable.

B. Work shall be bid to allow for the remodel nature of this project and the concurrent occupied areas.

C. All systems shall be fully operational to the extent that they are installed at the termination of each phase of the work.

D. System passing through existing, future, or other phase areas shall be installed, if required, to make work installed under the current phase operational.

E. All connections to and disconnection's from existing utilities shall be coordinated with and approved by the Owner prior to proceeding with the work. Work shall be planned so as to minimize impact to areas not involved in ongoing construction. Where areas not involved in ongoing construction are to be impacted, the contractor shall identify such areas, the extent to which they will be affected and the period of time for which they will be affected. The contractor is advised that the above notification and scheduling requirement may necessitate rescheduling, partial completion and reconnection, overtime work at night or on weekends or delay of the work. Contractor costs incurred due to the above shall be included in the original bid price and shall not be the cause for additional claims or charges to the Owner.

3.6 ASBESTOS CONTROL

A. Specific attention is directed to the potential of asbestos bearing compounds and materials on the project. Careful coordination with other Contractors and reasonable care shall be exercised.

1. Extent of Asbestos: See Section 003126 Existing Hazardous Materials information and Section 028200 Asbestos abatement.

2. If other asbestos bearing or other hazardous compounds are encountered during the course of construction, the Contractor shall immediately notify the Owner who will take appropriate action to have the asbestos removed.

3.7 PROJECT FINALIZATION & STARTUP

A. Upon completion of the equipment and systems installation and connections, the Contractor shall assemble all major equipment factory representatives (Exhaust fans) and subcontractors together for system start-up and Owner instructional period.

B. These individuals shall assist in start-up and check out of their systems and shall remain at the site until the system operation is acceptable and understood to the Owner's maintenance and/or operation personnel.

C. To provide acceptance of operation and instruction by the Owner's representative, the Contractor shall prepare a written statement of acceptance explaining same for the Owner's signature.

The statement should read as follows:

"I, the Contractor, associated factory representative and subcontractor, have started each system and the total system and have proved their normal operation to the Owner's representative and have instructed him in the operation and maintenance thereof."

_____	_____
Owner's Representative	Contractor

D. Copies of this acceptance shall be sent to the Engineer and the Architect and one copy shall be put in each maintenance manual.

3.8 PUNCH LIST PROCEDURES

A. The Contractor shall notify the Owner’s Representative in wiring when the project is ready for punch lists. After punch lists are complete, written notice must be forwarded to the Owner’s Representative requesting final checkout.

B. At the time of final observation, the project foreman shall accompany the observation party and shall remove access panels as required, to allow complete observation of the entire mechanical system.

END OF SECTION 22 00 00

SECTION 22 05 00

COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Dielectric fittings.
3. Sleeves.
4. Escutcheons.
5. Plumbing demolition.
6. Equipment installation requirements common to equipment sections.
7. Supports and anchorages.
8. Access doors.

1.2 DEFINITIONS

A. Finished Spaces: Spaces other than plumbing and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and plumbing equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 SUBMITTALS

A. Welding certificates.

1.4 QUALITY ASSURANCE

A. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.5 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

1.6 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

D. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.

E. Welding Filler Metals: Comply with AWS D10.12.

1.7 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

1.8 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

1.9 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

1. Finish: Polished chrome-plated.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.

1.10 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors.

M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

N. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Section 07 72 00 "Firestopping" for materials.

O. Verify final equipment locations for roughing-in.

P. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

1.11 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

1.12 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

1.13 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

1.14 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

C. Field Welding: Comply with AWS D1.1.

1.15 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

1.16 ACCESS DOORS

A. Access doors to match surrounding surface, provided with recess to accept matching finish. Provide UL rated doors in fire rated construction.

B. Provide 12”x12” access doors for maintenance or adjustments purposes for all mechanical system components including valves, volume dampers, fire dampers, fire/smoke dampers, clean outs, traps and controls.

C. Refer to Section 08 31 00 "Access Doors and Panels”.

END OF SECTION 230500

SECTION 22 05 19

METERS AND GAGES FOR PLUMBING PIPING

1.1 SUMMARY

A. This section includes the following:
1. Thermometers
2. Pressure gauges.
3. Test Plugs

1.2 PERFORMANCE REQUIREMENTS

A. Provide thermometers, pressure gauges and test plugs in plumbing system piping and equipment as required to adjust and monitor system performance.

1.3 SUBMITTALS

A. Product data: For each type of thermometer and pressure gauge.

1.4 PRODUCTS

A. Thermometers:

1. Metal-Case, Liquid-in-Glass Type: Aluminum or Brass case, mercury or organic-liquid filled.
2. Plastic-Case, Liquid-in-Glass Type: Mercury or organic-liquid filled.
3. Direct-Mounting, Vapor-Actuated Dial Type: Dry or Liquid-filled type, steel or aluminum metal case.
4. Remote-Reading, Vapor-Actuated Dial Type: Dry type, steel or aluminum case.
5. Bimetallic-Actuated Dial Type: Dry or Liquid-filled type, stainless-steel case.

B. Thermowells to hold thermometers.

C. Pressure Gages:

1. Direct-Mounting Dial Type: Dry or Liquid-filled type, drawn-steel or cast-aluminum, metal case; Grade A accuracy.
2. Remote-Mounting Dial Type: Dry type, drawn-steel or cast-aluminum case; Grade A accuracy.
3. Fittings: Needle valves and Snubbers.

D. Test Plugs: Corrosion-resistant brass or stainless-steel body with core inserts.

1. Test kit containing pressure gage, low- and high-range thermometers, and carrying case.

1.5 INSTALLATION

1. Install thermometers, pressure gauges and test plugs where required per the plumbing design and in accordance with the manufacturer's recommendations.

END OF SECTION 220519

SECTION 22 05 23

GENERAL-DUTY VALVES FOR PLUMBING PIPING

1.1 SUMMARY

A. This section includes the following:

1. Valves for plumbing piping systems.

1.2 PERFORMANCE REQUIREMENTS

A. Provide plumbing system valves as required for complete and fully serviceable plumbing system, including isolation valves and check valves. Valves shall be provided to isolate every individual piece of plumbing equipment and to isolate major branches of plumbing distribution piping, including each plumbing room battery and other groups of fixtures.

1.3 SUBMITTALS

A. Product data: For each type of valve.

1.4 DOMESTIC, HOT- AND COLD-WATER VALVES

A. Pipe NPS 2 (DN 50) and Smaller:

1. Ball Valves.
2. Bronze Swing Check Valves.

B. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Iron Ball Valves:
2. Iron, Single-Flange Butterfly Valves
3. Iron, Grooved-End Butterfly Valves:
4. Iron Swing Check Valves:
5. Iron, Grooved-End Swing Check Valves: 300 CWP.
6. Iron, Center-Guided Check Valves
7. Iron Gate Valves.
8. Iron Globe Valves:

1.5 SANITARY-WASTE AND STORM-DRAINAGE VALVES

A. Pipe NPS 2-1/2 (DN 65) and Larger:

1. Iron Swing Check Valves with Closure Control:
2. Iron, Grooved-End Swing Check Valves:
3. Iron Gate Valves,

END OF SECTION 22 05 23

SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

1.1 SUMMARY

A. Hangers and supports for plumbing system piping and equipment.

1.2 STANDARDS

A. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.3 PERFORMANCE REQUIREMENTS

A. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Design supports for multiple pipes and equipment.

1.4 SUBMITTALS

A. Product Data: For each type of hanger and accessories.

1.5 COMPONENTS

A. Steel pipe hangers and supports.

B. Trapeze pipe hangers.

C. Fiberglass pipe hangers.

D. Metal framing systems.

E. Fiberglass strut systems.

F. Thermal-hanger shield inserts.

G. Pipe Stands

H. Pipe positioning systems.

I. Equipment supports.

1.6 INSTALLATION

A. Install hanger and supports in accordance with manufacturer's standards and building code requirements.

END OF SECTION 22 05 29

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

1.1 SUMMARY

A. This section includes the following:
1. Equipment labels.
2. Piping identification.
3. Valve tags.

1.2 PERFORMANCE REQUIREMENTS

A. Provide piping and equipment identification to assist in system start-up, commissioning and Owner operation.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. Product data: Equipment and pipe labels and valve tags.

1.4 QUALITY ASSURANCE

A. Quality Standard for Piping Identification: ASME A13.1.

1.5 PRODUCTS

A. Equipment Labels: Plastic.

B. Warning Signs and Labels: 1/16 inch (1.6 mm) thick with adhesive.

C. Pipe Labels: Pretensioned or Self-adhesive.

D. Stencils: Fiberboard or metal.

E. Valve Tags: Brass, 0.032-inch (0.8-mm)Stainless steel, 0.025-inch (0.64-mm)Aluminum, 0.032-inch (0.8-mm)] or anodized aluminum, 0.032-inch (0.8-mm) minimum thickness.

F. Warning Tags: 3 by 5-1/4 inches (75 by 133 mm) minimum, reinforced grommet and wire fasteners.

1.6 INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.

3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

END OF SECTION 22 05 53

SECTION 22 07 00

PLUMBING INSULATION

1.1 SUMMARY

A. This section includes the following:
   1. Pipe and plumbing equipment insulation and accessories.

1.2 PERFORMANCE REQUIREMENTS

A. Provide thermal insulation on HVAC systems to meet energy codes and to minimize system energy losses and/or prevent condensation on cold surfaces.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. LEED Submittals

   1. Interior Adhesives and Sealants: Submittals for all field-applied adhesives and sealants, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data highlighting VOC content.

      a. Provide manufacturers' documentation verifying all adhesives used to apply laminates, whether shop-applied or field-applied, contain no urea-formaldehyde.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Flame-spread index of 25, and smoke-developed index of 50 for insulation installed indoors; according to ASTM E 84.

1.5 MATERIALS

A. General
   1. Products shall not contain asbestos, lead, mercury, or mercury compounds.
   2. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
   3. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
   4. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

B. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

C. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I or II with factory-applied jacket

D. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied factory

E. Mineral-Fiber, Preformed Pipe Insulation: Type I, 850 deg F (454 deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied jacket.

F. Adhesive materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

G. Factory Applied Jackets: Coordinate types of factory-applied jacket insulation materials selected and types of factory-applied jackets indicated in insulation system schedules. For insulation materials with factory-applied jackets for use on applications above 140 deg F (60 deg C), provide sufficient insulation thickness to maintain outer surface temperature of insulation below 140 deg F (60 deg C). 140 deg F (60 deg C) surface temperature is set by OSHA for personnel protection. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.

1.6 EQUIPMENT INSULATION SCHEDULE

A. Domestic Hot-Water Storage Tank Insulation: Factory Insulated or Mineral-fiber board or mineral-fiber pipe and tank.

1.7 PIPING INSULATION SCHEDULE, GENERAL

A. Plumbing Piping requiring insulation:

1. Domestic hot, cold and recirculation hot water – aboveground.
2. Storm Drainage Piping (roof drains) and roof drain bodies - aboveground.
3. Handicapped plumbing fixtures with exposed piping.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Sanitary drainage and vent piping – aboveground.
3. Below-grade piping.
4. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

1.8 INSTALLATION

A. Install pipe insulation in accordance with manufacturer's recommendations, and in thickness according to the applicable energy code standards.

1. Provide protective metal jacketing on all piping located outdoors.

END OF SECTION 22 07 00

SECTION 22 11 16

DOMESTIC WATER PIPING

1.1 SUMMARY

A. This section includes the following:
1. Domestic water piping.
2. Flow balance valves.

1.2 PERFORMANCE REQUIREMENTS

A. Provide domestic water distribution piping system to serve all building plumbing facilities and equipment.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. Product data: For each type of pipe material, fittings and joint methods.

1.4 QUALITY ASSURANCE

A. Comply with the IPC and other applicable local and state codes.

1.5 UNDER-BUILDING-SLAB, DOMESTIC WATER, BUILDING SERVICE PIPING,

A. Pipe NPS 3 (DN 80) and Smaller:

1. Soft copper tube, ASTM B 88, Type K (ASTM B 88M, Type A); wrought-copper solder-joint fittings; and brazed joints.
2. PVC, Schedule 80 pipe; PVC, Schedule 80 socket fittings; and solvent-cemented joints.

B. Pipe NPS 4 to NPS 8 (DN 100 to DN 200) and Larger:

1. Soft copper tube, ASTM B 88, Type K (ASTM B 88M, Type A) wrought-copper solder-joint fittings; and brazed joints.
2. Mechanical-joint, ductile-iron pipe; [standard-] [or] [compact-] pattern mechanical-joint fittings; and mechanical joints.
3. Push-on-joint, ductile-iron pipe; [standard-] [or] [compact-] pattern push-on-joint fittings; and gasketed joints.
4. Plain-end, ductile-iron pipe; grooved-joint, ductile-iron-pipe appurtenances; and grooved joints.
5. Plain-end, ductile-iron pipe; ductile-iron-pipe appurtenances; and grooved joints.
6. PVC, Schedule 80 pipe; PVC, Schedule 80 socket fittings; and solvent-cemented joints.

1.6 UNDER-BUILDING SLAB, COMBINED DOMESTIC WATER, BUILDING-SERVICE, AND FIRE-SERVICE-MAIN PIPING

A. Pipe NPS 6 to NPS 12 (DN 150 to DN 300):

1. Mechanical-joint, ductile-iron pipe; [standard-] [or] [compact-] pattern mechanical-joint fittings; and mechanical joints.
2. Push-on-joint, ductile-iron pipe; [standard-] [or] [compact-] pattern push-on-joint fittings; and gasketed joints.
3. Plain-end, ductile-iron pipe; grooved-joint, ductile-iron-pipe appurtenances; and grooved joints.

1.7 UNDER-BUILDING-SLAB, DOMESTIC WATER PIPING

A. Pipe NPS 2 (DN 50) and Smaller:

1. Hard or soft copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); wrought-copper solder-joint fittings; and brazed joints.

1.8 ABOVEGROUND DOMESTIC WATER PIPING

A. Pipe NPS 2 (DN 50) and Smaller:

1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B) cast- or wrought-copper solder-joint fittings; and soldered joints.
2. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B); copper pressure-seal-joint fittings; and pressure-sealed joints.
3. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B); copper push-on-joint fittings; and push-on joints.

B. Pipe NPS 2-1/2 to NPS 4 (DN 65 to DN 100):

1. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B) cast- or wrought-copper solder-joint fittings; and soldered joints.
2. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B]; copper pressure-seal-joint fittings; and pressure-sealed joints.
3. Hard copper tube, [ASTM B 88, Type L (ASTM B 88M, Type B)]; grooved-joint copper-tube appurtenances; and grooved joints.

C. Pipe NPS 5 to NPS 8 (DN 65 to DN 125):

1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B; cast- or wrought-copper solder-joint fittings; and brazed joints.
2. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); grooved-joint copper-tube appurtenances; and grooved joints.
3. Galvanized-steel pipe, galvanized fittings, and threaded joints.
4. Galvanized-steel pipe; grooved-joint, galvanized-steel-pipe appurtenances; and grooved joints.

1.9 ABOVEGROUND, COMBINED DOMESTIC-WATER-SERVICE AND FIRE-SERVICE-MAIN PIPING

A. Pipe NPS 6 to NPS 12 (DN 150 to (DN300):

1. Plain-end, ductile-iron pipe; grooved-joint, ductile-iron-pipe appurtenances; and grooved joints.
2. Galvanized-steel pipe, galvanized fittings, and threaded joints.
3. Galvanized-steel pipe; grooved-joint, galvanized-steel-pipe appurtenances; and grooved joints.

1.10 MANUFACTURED UNITS

A. Hot-Water Circulation Piping, Balancing Duty: Calibrated balancing valves.

B. Flexible Connectors: Stainless-steel hose.

1.11 PRODUCTS

A. Wall Penetrations below Grade: Sleeve and sleeve seal.

END OF SECTION 22 11 16

SECTION 22 11 19

DOMESTIC WATER PIPING SPECIALTIES

1.1 SUMMARY

A. This section includes the following:
1. Vacuum breakers.
2. Backflow preventers.
3. Pressure reducing valves.
4. Balancing valves.
5. Mixing valves.
6. Strainers.
7. Outlet boxes.
8. Hose stations.
9. Hose bibs and freeze-proof wall hydrants.
10. Water hammer arrestors.
11. Trap primers.

1.2 PERFORMANCE REQUIREMENTS

A. Provide domestic water piping system specialties in order to create a fully functional and serviceable system.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. Product data: For each plumbing system specialty item.

1.4 QUALITY ASSURANCE

A. Local and State Plumbing Codes and standards.

B. Plastic Piping Components: NSF 14.

C. Drinking Water System Components: NSF 61.

1.5 PRODUCTS

A. Vacuum Breakers:

1. Pipe-Applied, Atmospheric-Type Vacuum Breakers:
2. Hose-Connection Vacuum Breakers:
3. Pressure vacuum breakers.
4. Laboratory-faucet vacuum breakers.
5. Spill-resistant vacuum breakers.

B. Backflow Preventers:

1. Intermediate Atmospheric-Vent Backflow Preventers:

2. Reduced-Pressure-Principle Backflow Preventers:
3. Double-Check Backflow-Prevention Assemblies:
4. Beverage-dispensing-equipment backflow preventers.
5. Dual-check-valve backflow preventers.
6. Carbonated-beverage-dispenser, dual-check-valve backflow preventers.
7. Reduced-Pressure-Detector, Fire-Protection Backflow-Preventer Assemblies:
8. Double-Check, Detector-Assembly Backflow Preventers:
9. Hose-connection backflow preventers.
10. Backflow-preventer test kits.

C. Water Pressure-Reducing Valves:

1. Water Regulators:
2. Water Control Valves:

D. Balancing Valves:

1. Copper-Alloy Calibrated Balancing Valves:
2. Cast-iron calibrated balancing valves.
3. Accessories: Meter kit.
4. Memory-stop balancing valves.

E. Temperature-Actuated Water Mixing Valves:

1. Water-Temperature Limiting Devices:
2. Primary, Thermostatic, Water Mixing Valves:
3. Manifold, Thermostatic, Water-Mixing-Valve Assemblies:
4. Photographic-process, thermostatic, water-mixing-valve assemblies.
5. Individual-fixture, water tempering valves.
6. Primary water tempering valves.

F. Strainers for Domestic Water Piping:

G. Outlet Boxes:

1. Clothes Washer Outlet Boxes:
2. Icemaker Outlet Boxes.

H. Hose Stations:

1. Single-Temperature-Water Hose Stations:
2. Hot- and Cold-Water Hose Stations:
3. Cold-Water and Steam Hose Stations:

I. Hose Bibbs with vacuum breaker:

J. Wall Hydrants:

1. Nonfreeze Wall Hydrants:
2. Nonfreeze, Hot- and Cold-Water Wall Hydrants:
3. Moderate-Climate Wall Hydrants:
4. Vacuum Breaker Wall Hydrants:

K. Ground Hydrants:

L. Post Hydrants:

1. Nonfreeze, draining-type post hydrants.

2. Nonfreeze, nondraining-type post hydrants.
3. Freeze-Resistant Sanitary Yard Hydrants.

M. Drain Valves.

N. Water Hammer Arresters.

O. Air Vents.

P. Trap-Seal Primer Valves.

1.6 INSTALLATION

A. Install domestic water system specialties according to manufacturer's recommendations and where required to meet established design standards and applicable codes.

END OF SECTION 22 11 19

SECTION 22 13 16

SANITARY WASTE AND VENT PIPING

1.1 SUMMARY

A. Soil, waste, vent piping inside the building.

1.2 PERFORMANCE REQUIREMENTS

A. Provide sanitary waste and vent piping system to connect to building plumbing fixtures and equipment.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. Product data: For each type of pipe material, fittings and joint methods.

1.4 QUALITY ASSURANCE

A. Design and installation shall comply with local and state plumbing codes.

1.5 MATERIALS

A. Cast-Iron Pipe and Fittings:

1. Hub-and-spigot class.
2. Hubless.

B. Steel Pipe and Fittings: Standard Weight and Schedule 40, galvanized.

C. Stainless-steel pipe and fittings with socket and spigot ends.

D. Ductile-iron pipe and fittings.

E. Copper Tubing and Fittings:

1. DWV tube with solder-joint fittings.
2. Hard copper tube.
3. Soft copper tube with copper pressure fittings.

F. ABS Pipe and Fittings.

G. PVC Pipe and Fittings

H. Special pipe fittings:

1. Flexible, nonpressure pipe couplings.
2. Shielded, nonpressure pipe couplings.
3. Rigid, unshielded, nonpressure pipe couplings.
4. Pressure pipe couplings.

5. Flexible ball joints.
6. Expansion joints.
7. Wall-penetration fittings.

I. Encasement for Underground Metal Piping: PE film.

END OF SECTION 22 13 16

SECTION 22 13 19

SANITARY WASTE PIPING SPECIALTIES

1.1 SUMMARY

A. This Section includes the following:
1. Backwater valves.
2. Cleanouts.
3. Floor drains.
4. Floor sinks.
5. Trench drains.
6. Grease interceptors.

1.2 PERFORMANCE REQUIREMENTS

A. Provide sanitary waste piping specialties as required to create a complete and fully functional and serviceable system.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. Product data: For each waste piping specialty item.

1.4 QUALITY ASSURANCE

A. Local and State Plumbing Codes.

B. Quality Standard for Plastic Piping: NSF 14.

1.5 PRODUCTS

A. Backwater Valves.

B. Cleanouts.

C. Floor Drains:

1. Cast-Iron Floor Drains:

2. Stainless-Steel Floor Drains:

3. Plastic Floor Drains:

D. Trench Drains:

E. Channel Drainage Systems:

1. Stainless-Steel Channel Drainage Systems: Modular system of channel sections, grates, and appurtenances.

2. Polymer-Concrete Channel Drainage Systems: Modular system of channel sections, grates, and appurtenances.

3. Polymer-Concrete Sediment Interceptor: 27 inches square. Include 24-inch- square, gray-iron slotted grate.

   a. Frame: Gray iron or galvanized steel for grate.

4. FRP Channel Drainage Systems: Modular system of channel sections, grates, and appurtenances.

F. Air-Admittance Valves .

G. Roof Flashing Assemblies:

H. Through-Penetration Firestop Assemblies: Listed and labeled assembly of sleeve and stack fitting with firestopping plug.

I. Miscellaneous Sanitary Drainage Piping Specialties:

1. Open drains, shop or field fabricate from Service class, hub-and-spigot, cast-iron, soil-pipe fittings.
2. Cast-iron or bronze deep-seal traps.
3. Floor-drain, trap-seal primer fittings.
4. Air-gap fittings.
5. Counterflashing-type, cast-iron stack flashing fittings.
6. Cast-iron body vent caps.
7. Frost-resistant vent terminals.
8. Expansion joints.

J. Flashing Materials:

1.6 MANUFACTURED UNITS

A. Grease Interceptors – Design, sizing and configuration as required by local jurisdiction:

B. Grease Removal Devices: Design, sizing and configuration as required by local jurisdiction:

C. Oil Interceptors: Design, sizing and configuration as required by local jurisdiction:

END OF SECTION 22 13 19

SECTION 22 14 13

FACILITY STORM DRAINAGE PIPING

1.1 SUMMARY

A. Storm drainage piping inside the building.

1.2 PERFORMANCE REQUIREMENTS

A. Provide interior, above and below ground, storm drainage piping from roof drains and overflow drains to exterior underground storm drainage piping or to perimeter overflow discharge nozzles.

B. Minimum Working-Pressure Ratings:

1. Storm Drainage Piping: 10-foot head of water (30 kPa).
2. Storm Drainage, Force-Main Piping: 50 psig (345 kPa) or as required.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. Product data: For each type of pipe material, fittings and joint methods.

1.4 QUALITY ASSURANCE

A. Quality Standard for Plastic Piping: NSF 14.

B. Seismic Performance: ASCE 7.

1.5 MATERIALS

A. Cast-Iron Pipe and Fittings:

1. Hub-and-spigot, Service class.
2. Hubless with standard, shielded, stainless-steel couplings.

B. Steel Pipe and Fittings: Standard Weight and Schedule 40, galvanized grooved-end fittings.

C. Ductile-iron pipe and fittings with mechanical or grooved-end fittings.

D. Copper Tubing and Fittings:

1. DWV tube with solder-joint fittings.

E. ABS Pipe and Fittings: Solid-wall pipe with socket fittings.

F. PVC Pipe and Fittings: Solid-wall pipe with socket fittings.

G. Special Pipe Fittings:

1. Flexible, nonpressure pipe couplings.
2. Shielded, nonpressure pipe couplings.
3. Rigid, nonpressure pipe couplings.
4. Pressure pipe couplings.
5. Flexible ball joints.
6. Expansion joints.
7. Wall-penetration fittings.

H. Encasement for Underground Metal Piping: PE film.

END OF SECTION 22 14 13

SECTION 22 14 23

STORM DRAINAGE PIPING SPECIALTIES

1.1 SUMMARY

A. This section includes the following:
   1. Roof drains.

1.2 PERFORMANCE REQUIREMENTS

A. Provide a storm drainage piping system as necessary to accommodate the building roof drainage system.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. Product data: For each type of pipe material, fittings and joint methods.

1.4 QUALITY ASSURANCE

A. Design and installation shall comply with local and state plumbing codes.

1.5 PRODUCTS

A. Cleanouts.

B. Through-Penetration Firestop Assemblies: Listed and labeled assembly of sleeve and stack fitting with firestopping plug.

C. Roof Drains:

   1. Metal Roof Drains:

   2. Plastic Roof Drains:

D. Miscellaneous Drainage Piping Specialties:

   1. Expansion joints.
   2. Downspout boots.
   3. Bronze body conductor nozzles.

END OF SECTION 22 14 23

SECTION 22 33 00

ELECTRIC DOMESTIC WATER HEATERS

1.1 SUMMARY

A. Commercial electric water heaters.

1.2 PERFORMANCE REQUIREMENTS

A. Provide commercial electric domestic water heaters to furnish the required supply of hot water to the building. Where natural gas is available, the use of electric water heaters shall be justified by and economic analysis.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. Product data: For each type of water heater.

1.4 QUALITY ASSURANCE

A. Quality Standard for Performance Efficiency: ASHRAE/IESNA 90.1 and ASHRAE 90.2.

B. Water Heater Storage Tanks, Specified to Be ASME-Code Construction: Tested and inspected according to ASME Boiler and Pressure Vessel Code.

1.5 WARRANTY

A. Materials and Workmanship:

1. Instantaneous Electric Water Heaters: Five years.
2. Commercial Electric Water Heaters: Five years.
3. Compression Tanks: One years.

1.6 PRODUCTS

A. Instantaneous Electric Water Heaters: Comply with UL 499 for tankless electric (water heater) heating appliance.

B. Light-Commercial Electric Water Heaters: Comply with UL 174 for household, storage electric water heaters.

C. Commercial Electric Booster Heaters: Comply with UL 1453 requirements for booster-type water heaters.

D. Commercial, Storage Electric Water Heaters: Comply with UL 1453 requirements for storage-tank-type water heaters.

E. Compression Tanks:

F. Water Heater Accessories:

1. Combination temperature and pressure relief valves.
2. Pressure relief valves.
3. Water heater stand and drain pan units.
4. Water heater stands.
5. Water heater mounting brackets.
6. Drain pans.
7. Piping Manifold Kits: Manufacturer's factory-fabricated piping arrangement.
8. Piping-Type Heat Traps: Field-fabricated piping.

END OF SECTION 22 33 00

SECTION 22 40 00

PLUMBING FIXTURES

1.1 SUMMARY

A. Includes furnishing and installation of plumbing fixtures and related accessories.

1.2 PERFORMANCE REQUIREMENTS

A. Provide plumbing fixtures and all associated faucets, flush valves, traps, supplies, etc. as required to serve the building facilities.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.

B. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

C. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

D. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

E. Comply with the following applicable standards and other requirements specified for plumbing fixtures:

1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
2. Plastic Laundry Trays: ANSI Z124.6.
3. Plastic Shower Enclosures: ANSI Z124.2.
4. Plastic Sinks: ANSI Z124.6.
5. Porcelain-Enameled, Formed-Steel Fixtures: ASME A112.19.4M.
6. Slip-Resistant Bathing Surfaces: ASTM F 462.
7. Solid-Surface-Material Lavatories and Sinks: ANSI/ICPA SS-1.
8. Stainless-Steel Residential Sinks: ASME A112.19.3.
9. Vitreous-China Fixtures: ASME A112.19.2M.
10. Water-Closet, Flush Valve, Tank Trim: ASME A112.19.5.
11. Water-Closet, Flushometer Tank Trim: ASSE 1037.

F. Comply with the following applicable standards and other requirements specified for lavatory and/or sink faucets:

1. Backflow Protection Devices for Faucets with Side Spray: ASME A112.18.3M.
2. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
3. Diverter Valves for Faucets with Hose Spray: ASSE 1025.
4. Faucets: ASME A112.18.1.
5. Hose-Connection Vacuum Breakers: ASSE 1011.

6. Hose-Coupling Threads: ASME B1.20.7.
7. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
8. NSF Potable-Water Materials: NSF 61.
9. Pipe Threads: ASME B1.20.1.
10. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
11. Supply Fittings: ASME A112.18.1.
12. Brass Waste Fittings: ASME A112.18.2.

G. Comply with the following applicable standards and other requirements specified for shower faucets:

1. Backflow Protection Devices for Hand-Held Showers: ASME A112.18.3M.
2. Combination, Pressure-Equalizing and Thermostatic-Control Antiscald Faucets: ASSE 1016.
3. Faucets: ASME A112.18.1.
4. Hand-Held Showers: ASSE 1014.
5. High-Temperature-Limit Controls for Thermal-Shock-Preventing Devices: ASTM F 445.
6. Hose-Coupling Threads: ASME B1.20.7.
7. Manual-Control Antiscald Faucets: ASTM F 444.
8. Pipe Threads: ASME B1.20.1.
9. Pressure-Equalizing-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.
10. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
11. Thermostatic-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.

H. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:

1. Atmospheric Vacuum Breakers: ASSE 1001.
2. Brass and Copper Supplies: ASME A112.18.1.
3. Dishwasher Air-Gap Fittings: ASSE 1021.
4. Manual-Operation Flushometers: ASSE 1037.
5. Plastic Tubular Fittings: ASTM F 409.
6. Brass Waste Fittings: ASME A112.18.2.
7. Sensor-Operation Flushometers: ASSE 1037 and UL 1951.

I. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Disposers: ASSE 1008 and UL 430.
2. Dishwasher Air-Gap Fittings: ASSE 1021.
3. Flexible Water Connectors: ASME A112.18.6.
4. Grab Bars: ASTM F 446.
5. Hose-Coupling Threads: ASME B1.20.7.
6. Hot-Water Dispensers: ASSE 1023 and UL 499.
7. Off-Floor Fixture Supports: ASME A112.6.1M.
8. Pipe Threads: ASME B1.20.1.
9. Plastic Toilet Seats: ANSI Z124.5.
10. Supply and Drain Protective Shielding Guards: ICC A117.1.

J. Quality Standard for Electrical Components, Devices, and Accessories: NFPA 70, Article 100.

1.5 WARRANTY

A. Materials and Workmanship for Plumbing Fixtures and Accessories:

1. Commercial Applications: One year.

1.6 FAUCETS

A. Lavatory Faucets;

1. Single-control mixing valve.

B. Shower Faucets:

1. Single-handle pressure-balance valve.

C. Sink Faucets;

1. Kitchen faucet with spray, three-hole fixture, Kitchen faucet with spray, four-hole fixture, Kitchen faucet without spray, Laundry tray faucet, Service sink faucet with stops in shanks, vacuum breaker, hose-thread outlet, and pail hook, or Bar sink faucet as appropriate for application.

1.7 FLUSHOMETERS

A. Flushometers:

1. Flushometer for urinal and/or water-closet-type fixture. Include brass body with corrosion-resistant internal components, non-hold-open feature, control stop with check valve, vacuum breaker, copper or brass tubing, and polished chrome-plated finish on exposed parts.

a. Trip Mechanism: Manual or automatic as determined by Facility Standards.
b. Consumption: Per energy code or high performance design standards.

1.8 TOILET SEATS

A. Toilet Seats:

1. Commercial toilet seat for water-closet-type fixture.

1.9 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers for Handicap Fixtures

1. Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping.

1.10 FIXTURE SUPPORTS

A. Water-Closet Supports;

1. Combination carrier designed for accessible and/or standard mounting height of wall-mounting, water-closet-type fixture.

B. Urinal Supports;:

1. Urinal carrier for wall-mounting, urinal-type fixture.

C. Lavatory Support:

1. Lavatory carrier for wall-mounting, lavatory-type fixture.

1.11 INTERCEPTORS

A. Hair Interceptors;

1. Manufactured unit with removable screen or strainer and removable cover; designed to trap and retain hair.

B. Sediment Interceptors:

1. Manufactured unit with removable screens or strainer and removable cover; designed to trap and retain waste material.

1.12 SHOWER RECEPTORS

A. Shower Receptors:

1. Precast-terrazzo base for built-up-type shower fixture.

1.13 DISHWASHER AIR-GAP FITTINGS

A. Dishwasher Air-Gap Fittings:

1. Fitting suitable for use with domestic dishwashers and for deck mounting; with plastic body, & chrome-plated brass cover.

1.14 DISPOSERS

A. Disposers - Residential:

1. Batch-feed household, food-waste disposer.

1.15 HOT-WATER DISPENSERS

A. Hot-Water Dispensers:

1. Gooseneck spout with lever-handle or spout with twist-knob or push-button, flow control, household-type dispenser.

1.16 WATER CLOSETS

A. Water Closets, Wall Mounted:

1. Wall-mounting, back-outlet, vitreous-china fixture designed for flushometer valve] operation.

B. Water Closets, Floor Mounted, Floor Outlet:

1. Floor-mounting, floor-outlet, vitreous-china fixture designed for flushometer valve operation.

C. Water Closets, Floor Mounted, Back Outlet:

1. Floor-mounting, back-outlet, vitreous-china fixture designed for flushometer-valve operation.

1.17 URINALS

A. Urinals, Back Outlet:

1. Wall-mounting, back-outlet, vitreous-china fixture designed for flushometer valve operation.

B. Urinals, Bottom Outlet:

1. Wall-mounting, bottom-outlet, vitreous-china fixture designed for flushometer valve operation.

1.18 LAVATORIES

A. Lavatories, Wall and Pedestal:

1. Wall-and-pedestal-mounting, vitreous-china fixture.

B. Lavatories, Counter-Mounting:

1. Counter-mounting vitreous-china fixture.

C. Lavatories, Accessible:

1. Accessible, wall-mounting, vitreous-china fixture designed for people in wheelchairs.

1.19 COMMERCIAL SINKS

A. Commercial Sinks, Counter-Mounting, Stainless Steel:

1. One, two or three-compartment, counter-mounting, stainless-steel commercial sink with backsplash.

B. Commercial Sinks, Freestanding, Stainless Steel:

1. One, two or three-compartment, freestanding, stainless-steel commercial sink with backsplash.

C. Commercial Sinks, Wall-mounting, handwash sink:

1. Wall-mounting, stainless-steel, commercial, handwash-sink fixture.

1.20 SHAMPOO BOWLS

A. Shampoo Bowls:

1. PMMA fixture shaped for head rest. Include vacuum breaker, faucet, hose and spray, drain, and mounting brackets.

1.21 WASH FOUNTAINS

A. Wash Fountains:

1. [Circular, freestanding-design, Semi-circular or corner design, and linear design, wash-up fixture.

1.22 INDIVIDUAL SHOWERS

A. Individual Showers, Enclosure Type:

1. FRP or PMMA shower enclosure with slip-resistant bathing surface and shower rod with curtain.

B. Individual Showers, Built-up Type:

1.23 KITCHEN SINKS

A. Kitchen Sinks:

1. One or two-bowl, residential, counter-mounting, stainless-steel kitchen sink.

B. Bar Sinks:

1. Single-bowl, residential, counter-mounting, stainless-steel bar sink.

1.24 SERVICE SINKS

A. Service Sinks, Wall-Mounting:

1. Trap-standard- and wall-mounting, enameled, cast-iron fixture with roll-rim with rim guard.

B. Service Sinks, Floor-Mounting:

1. Floor-mounting, enameled, cast-iron fixture with front apron, raised back, and coated, wire rim guard.

1.25 SERVICE BASINS (MOP SINKS)

A. Service Basins:

1. Flush-to-wall, floor-mounting, precast terrazzo fixture with rim guard.

1.26 FOOD SERVICE FIXTURES

A. Food service fixtures shall be defined by individual food service suite design.

END OF SECTION 22 40 00

SECTION 22 47 00

DRINKING FOUNTAINS AND WATER COOLERS

1.1 SUMMARY

A. Electric water coolers.

B. Fixture supports.

1.2 PERFORMANCE REQUIREMENTS

A. Provide commercial grade drinking fountains and/or water coolers to accommodate the building layout.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

B. Product data: For each type of pipe material, fittings and joint methods.

1.4 QUALITY ASSURANCE

A. Regulatory Requirement: ICC A117.1, Public Law 90-480 and/or Public Law 101-336.

B. Quality Standard: NSF 61 for fixture materials in contact with potable water.

C. Quality Standard for Water Coolers: ARI 1010, and ARI's "Directory of Certified Drinking Water Coolers" for style classifications.

D. Quality Standard for Refrigerant: ASHRAE 34. HFC 134a (tetrafluoroethane), unless otherwise indicated.

E. Quality Standard for Electrical Components, Devices, and Accessories: NFPA 70, Article 100.

1.5 DRINKING FOUNTAINS

A. Drinking Fountain – Wall Mounted.

1.6 ELECTRIC WATER COOLERS

A. Water Coolers, Wall mounted, or semi-recessed, single or dual height bowls, electric cooler, ARI 1010, Type PB, pressure with bubbler.

END OF SECTION 22 47 00

SECTION 23 00 00

HVAC-GENERAL PROVISIONS

PART 1 - GENERAL

1.1 CONDITIONS AND REQUIREMENTS

A. Refer to BIDDING REQUIREMENTS, CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS and DIVISION 01 of these specifications, which govern work under DIVISION 23. Refer to other sections of these specifications for additional related requirements.

1.2 SCOPE OF REQUIREMENTS

A. The work covered by Division 23 of the specifications shall include but not be limited to:

1. Furnishing all materials and supplying all labor, equipment and services to install the complete mechanical system as shown on the accompanied drawings and specified herein.

1.3 DESCRIPTION OF WORK

A. The contract documents including specifications and construction drawings are intended to provide all material and labor to install complete plumbing, heating ventilating and air conditioning systems for the building.

B. Every effort has been made on the design to meet or exceed the minimum requirements of the Codes; therefore, unless Contractor before signing his Contract, shall have notified the Architect, in writing, of any items in conflict with said Codes, he shall thereafter make any minor adjustments necessary to meet said Codes at no cost to the Owner.

C. The Contractor shall refer to the architectural interior detail, floor plans, elevations, and the structural and other Contract Drawings and he shall coordinate his work with that of the other trades to avoid interference. The plans are diagrammatic and show generally the locations of the equipment and are not to be scaled; all dimensions shall be checked at the building.

D. The Contractor shall comply with the project close-out requirements as detailed in General Requirements of Division 01.

1.4 DESCRIPTION OF BID DOCUMENTS

A. Specifications:

1. Specifications, in general, describe quality and character of materials and equipment.
2. Specifications are of simplified form and include incomplete sentences.

B. Drawings:

1. Drawings in general are diagrammatic and indicate sizes, locations, connections to equipment and methods of installation.
2. Scaled and figured dimensions are approximate and are for estimating purposes only.
3. Before proceeding with work check and verify all dimensions.
4. Assume all responsibility for fitting of materials and equipment to other parts of equipment and structure.
5. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades.

6. If any part of Specifications or Drawings appears unclear or contradictory, apply to Architect or Engineer for his interpretation and decision as early as possible.

1.5 CODES PERMITS AND FEES

A. Mechanical work shall be in accordance with the following:

1. The latest edition of the International Building Code, International Mechanical Code, Uniform Plumbing Code, International Fire Code, National Electric Code, American Disability Act and all applicable State and Local Codes and Ordinances.

2. The Contractor at his expense shall obtain permits and inspections required for the mechanical work on this project. Deliver all inspection certificates to the Owner's Representative prior to final acceptance of the work.

3. Contractor shall pay all costs levied by utility companies and/or governing agencies associated with gas connections and include these costs within his bid. This shall include but not be limited to tap fees, service mains, meter, and vault charges.

1.6 DEFINITIONS

A. The terms "The Contractor", when used in Division 23 shall mean the Contractor for mechanical work.

B. The term "Owners Representative" as used in Division 23 generally refers to the Architect or his designated representative in accordance with the General Conditions.

C. The term "Provide" shall mean furnish and install.

1.7 SAFETY AND PROTECTION

A. Safety Measures: The Engineer has not been retained to provide design and construction services relating to the Contractor's safety precautions, or means, methods, techniques, sequences or procedures required for the Contractor to perform his work. The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement applies continuously and is not limited to normal working hours. Provide all required safety measures and consult with the State or Federal safety inspector for interpretation whenever in doubt as to whether safe conditions do or do not exist or whether compliance with State or Federal regulations exist.

B. Head protection: Where pipe hangers, equipment support angles, etc., are exposed in access ways for any maintenance, cover all such potentially injurious protrusions less than 7'-0" above the floor with padding; secure and permanently fasten, and finish to match adjacent finishes.

1.8 GUARANTEE

A. The Mechanical equipment and installation shall be guaranteed for a period of one (1) year from the date of acceptance unless and individual item or specification is otherwise noted as longer. The Contractor shall make-good at his own expense all defects in his work, and/or equipment furnished by him, which shall develop at any time during the one year guarantee period and shall stand any expense of cutting and patching and repairing made necessary by his corrections of unsatisfactory work or equipment operation.

1.9 DUCTWORK AND PIPING COORDINATION

A. Prior to installation of the new Division 23 systems, the Contractor shall coordinate the proposed installation with the Architectural and Structural requirements, and all other trades (including HVAC, Plumbing, Fire Protection, Electrical, Ceiling Suspension and Tile systems), and provide reasonable maintenance access requirements.

B. Provide means of access to all valves, dampers, controllers, operable devices and other apparatus which may require adjustment or servicing.

C. Verify in field exact size, location, invert, and clearances regarding all existing material, equipment and apparatus, and advise the Owners Representative of any discrepancies between that indicated on the Drawings and that existing in the field prior to any installation. Contractor shall be responsible for all costs associated with the removal or relocation of installed systems that have been installed without prior notification of the Owners Representative.

1.10 SHOP DRAWINGS AND SUBMITTALS

A. Submit Shop Drawings and Product Data per the requirements of Section 013300 Submittals Procedures.

B. See individual Division 23 specification sections for additional submittal requirements.

C. Submittals of Product Data shall be bound in a black 3-ring binder with the project name on the cover. Data within this binder shall be arranged as follows:

1. Provide index tabs for each specification section in the same order and using the same name as appears in the Specifications.

2. Data shall be black and white, on 8 ½" x 11" or 11" x 17", single, one-sided sheets suitable for copying. Diagrams and drawings larger than 11" x 17" shall be submitted in reproducible form (translucent bond paper).

3. Drawings and catalog data must be clean, neat copies. Fax material or other poor quality copies will not be acceptable.

D. If material or equipment is not as specified or submittal is not complete, it will be rejected. Only completed submittal including all applicable specification sections will be reviewed.

E. Indicate manufacturer, trade name and model number. Include copies of applicable brochure or catalogue material. Indicate sizes, types, model numbers, ratings, capacities and options actually being proposed.

F. Include dimensional data for roughing in and installation, and technical data sufficient to confirm that equipment meets requirements of drawings and specifications.

G. Include wiring, piping and service connection data, motor sizes complete with voltage ratings and schedules.

H. Submit five (5) copies of each shop drawing. The Engineer will retain one stamped copy, one will be provided to the Architect, one will be provided to the owner and a two stamped copies will be returned to the Contractor. The Contractor shall be responsible for distribution of required number of reviewed copies to parties other than the Owner's Representative(s).

1.11 RECORD DRAWINGS

A. Refer to Division 01.

B. Keep on site, an extra set of drawings and specifications recording changes and deviations daily. Return these drawings to the Owner's Representative at the completion of the Project. These drawings shall not be used for any other purposes.

1.12 OPERATING AND MAINTENANCE MANUALS

A. Refer to Section 017800 Closeout Submittals.

B. See individual Division 23 specification sections for additional Operating and Maintenance Manual requirements.

1.13 OPERATION AND MAINTENANCE TRAINING/STARTUP

A. Instruct the Owners representative(s) in operation and maintenance of mechanical systems utilizing the Operation and Maintenance Manual.

B. Individuals present shall include Contractors, subcontractors and equipment factory representatives. These individuals shall assist in instruction and start-up.

C. Instruction period shall occur after final inspection when systems are properly working.

D. Prepare statement and check list to be included in the Operation and Maintenance Manual. This Statement shall read as follows:

"The Contractor, associated factory representatives and subcontractors, have started each system and the total system and have proved their normal operation to the Owner's representative and have instructed him in the operation and maintenance thereof."

_____ _____

Owner's Representative Contractor

1.14 EQUIPMENT AND MATERIALS – STANDARDS/CODES

A. Materials used under this Contract, unless specifically noted otherwise, shall be new and of the latest and most current model line produced by the manufacturer. Each item of equipment shall conform to the latest Standard Specifications of the American Society for Testing Materials and shall conform to any applicable standards of the United States Department of Commerce.

B. Instruct the Owners representative(s) in operation and maintenance of mechanical systems utilizing the Operation and Maintenance Manual. Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when the Project is turned over to the Owner.

C. All electrically driven or connected equipment shall be provided with UL or equivalent label and/or listing in accordance with the requirements of the NEC.

D. All control panels shall be provided with UL or equivalent Label and/or listing in accordance with the requirements of the NEC an applicable local codes.

1.15 EQUIPMENT/MATERIAL SUBSTITUTIONS

A. Refer to Section 012500 Substitution Procedures for product prior approval and substitution requirements.

B. Throughout these specifications and drawings, various materials, equipment, apparatus, etc., are specified or scheduled by manufacturer, brand name, type or catalog number. Such designation is to establish standards of desired quality and construction and shall be the basis of design and the bid.

C. Submit proposals to supply alternative materials or equipment in writing, in accordance with Section 012500 Substitution Procedures.

D. Equipment manufacturers listed in individual sections are approved alternatives for this project and are subject to requirements of drawings and specifications. Revisions required to adapt alternatives shall be the responsibility of the Contractor.

E. Products furnished other than the (basis of design) shall have similar electrical characteristics as the scheduled or specified equipment. Contractor shall be responsible for any electrical changes caused by products not in accordance with this requirement.

1.16 EQUIPMENT PROTECTION AND CLEAN-UP

A. Protect equipment and materials in storage on site, during and after installation until final acceptance. Leave factory covers in place and take special precautions to prevent entry of foreign material into working parts and duct systems.

B. Protect equipment with polyethylene covers and crates.

C. Operate, drain and flush bearings and refill with change of lubricant before final acceptance.

D. Protect bearings and shafts during installation. Grease shafts and sheaves to prevent corrosion. Provide extended nipples for lubrication.

E. Ensure that existing equipment is carefully dismantled and not damaged or lost. Do not re-use existing materials and equipment unless specifically indicated.

1.17 LOCATIONS

A. Coordination of Division 23 equipment and systems to the available space, with other trades. The access routes through the construction shall be the Contractor's responsibility.

B. Drawings are diagrammatic. Make offsets, transitions, and changes in direction of pipes and ducts, as required to maintain proper headroom and pitch of sloping lines and avoid structural, electrical, pipe and duct interference's whether or not indicated on Drawings. Furnish fittings, etc., as required to make these offsets, transitions and changes in direction at no additional cost to the Owner.

C. Determine exact route and location of ducts and coordinate and obtain approval for changes from the layout indicated on the drawings with the Owner's Representative prior to fabrication.

D. Locations of equipment and devices, as shown on the drawings, are approximate unless dimensioned. Verify the physical dimensions of each item of mechanical equipment to fit the available space and promptly notify the Owner's Representative prior to roughing-in if conflicts appear.

E. All wiring, equipment, ductwork, tubing, etc., shall be concealed within building construction unless otherwise noted, or in mechanical rooms.

F. Arrange ducts, and equipment to permit ready access to starters, motors, control components, and to clear openings of doors and access panels.

1.18 CUTTING AND PATCHING

A. All cutting and patching of new and existing construction required for the installation of systems and equipment specified in Division 23 shall be the responsibility of the Division 23 Contractor. All cutting shall be accomplished with masonry saws, drills or similar equipment to provide neat uniform openings.

B. Patch and repair walls, floors, ceilings and roof with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials. All patching shall meet the approval of the Owner's Representative.

C. All cutting and patching made necessary to repair defective equipment, defective workmanship or be neglect of this Contractor to properly anticipate his requirements shall be included in Division 23.

D. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses or other structural members without the Owner Representative's written approval.

E. Cutting, patching, repairing, and replacing pavement, sidewalks, roads, and curbs to permit installation of work specified or indicated under this Division is responsibility of Division 23.

1.19 SCHEDULING

A. It is understood that while drawings are to be followed as closely as circumstances permit, the Contractor shall be responsible for installation of systems according to the true intent and meaning of Contract Documents. Anything not clear or in conflict will be explained by making application to

Owner's Representative. Should conditions arise where certain changes would be advisable, secure approval from Owner's Representative for those changes before proceeding with work.

B. Coordinate with the work of various trades when installing interrelated work. Before installation of mechanical items, make proper provision to avoid interference's. Changes required in work specified in Division 23 caused by neglect to do so shall be made at no cost to Owner.

C. Furnish and install inserts and supports required by Division 23 unless otherwise noted. Furnish sleeves, inserts, supports, and equipment that are an integral part of other Divisions of the Work to those involved in sufficient time to be built into construction as the Work proceeds. Locate these items and see that they are properly installed. Expense resulting from improper location or installation of items above shall be borne under Division 23.

1.20 EXISTING UTILITIES

A. The locations of existing concealed lines and connection points have been indicated as closely as possible from available information. The Contractor shall assume that such connection points are within a Ten foot (10') radius of the indicated location. Where connection points are not within this radius, the Contractor shall contact the Owner's Representative for a decision before proceeding or may proceed at his own expense.

B. Connection points to existing work shall be located and verified prior to starting new work.

C. Prior to commencing any excavation or ditching activity, the Contractor shall verify the exact location and inverts of all existing utilities and connection points in the area of his proposed excavation. Notify Owner's representative for further direction if actual inverts will not allow the proper installation of new work.

D. The Contractor shall be responsible for damages, which might be caused by his failure to exactly locate and preserve underground utilities.

1.21 PHASING AND SEQUENCE OF WORK

A. Contractor shall be aware that this is a remodel project. There will be occupied areas in the construction areas that must remain operable.

B. Work shall be bid to allow for the remodel nature of this project and the concurrent occupied areas.

C. All systems shall be fully operational to the extent that they are installed at the termination of each phase of the work.

D. System passing through existing, future, or other phase areas shall be installed, if required, to make work installed under the current phase operational.

E. All connections to and disconnection's from existing utilities shall be coordinated with and approved by the Owner prior to proceeding with the work. Work shall be planned so as to minimize impact to areas not involved in ongoing construction. Where areas not involved in ongoing construction are to be impacted, the contractor shall identify such areas, the extent to which they will be affected and the period of time for which they will be affected. The contractor is advised that the above notification and scheduling requirement may necessitate rescheduling, partial completion and reconnection, overtime work at night or on weekends or delay of the work. Contractor costs incurred due to the above shall be included in the original bid price and shall not be the cause for additional claims or charges to the Owner.

1.22 ASBESTOS CONTROL

A. Specific attention is directed to the potential of asbestos bearing compounds and materials on the project. Careful coordination with other Contractors and reasonable care shall be exercised.

1. Extent of Asbestos: See Section 003126 Existing Hazardous Materials information and Section 028200 Asbestos abatement.

2. If other asbestos bearing or other hazardous compounds are encountered during the course of construction, the Contractor shall immediately notify the Owner who will take appropriate action to have the asbestos removed.

1.23 PROJECT FINALIZATION & STARTUP

A. Upon completion of the equipment and systems installation and connections, the Contractor shall assemble all major equipment factory representatives (Exhaust fans) and subcontractors together for system start-up and Owner instructional period.

B. These individuals shall assist in start-up and check out of their systems and shall remain at the site until the system operation is acceptable and understood to the Owner's maintenance and/or operation personnel.

C. To provide acceptance of operation and instruction by the Owner's representative, the Contractor shall prepare a written statement of acceptance explaining same for the Owner's signature.

The statement should read as follows:

"I, the Contractor, associated factory representative and subcontractor, have started each system and the total system and have proved their normal operation to the Owner's representative and have instructed him in the operation and maintenance thereof."

_____	_____
Owner's Representative	Contractor

D. Copies of this acceptance shall be sent to the Engineer and the Architect and one copy shall be put in each maintenance manual.

1.24 PUNCH LIST PROCEDURES

A. The Contractor shall notify the Owner’s Representative in wiring when the project is ready for punch lists. After punch lists are complete, written notice must be forwarded to the Owner’s Representative requesting final checkout.

B. At the time of final observation, the project foreman shall accompany the observation party and shall remove access panels as required, to allow complete observation of the entire mechanical system.

END OF SECTION 23 00 00

SECTION 23 05 00

COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Dielectric fittings.
3. Sleeves.
4. Escutcheons.
5. Plumbing demolition.
6. Equipment installation requirements common to equipment sections.
7. Supports and anchorages.
8. Access doors.

1.2 DEFINITIONS

A. Finished Spaces: Spaces other than plumbing and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and plumbing equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 SUBMITTALS

A. Welding certificates.

1.4 QUALITY ASSURANCE

A. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.5 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

1.6 JOINING MATERIALS

A. Refer to individual Division 23 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

D. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.

E. Welding Filler Metals: Comply with AWS D10.12.

1.7 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.

E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.

F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

1.8 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

1.9 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

1. Finish: Polished chrome-plated.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.

1. Finish: Polished chrome-plated.

1.10 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors.

M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

N. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Section 07 72 00 "Firestopping" for materials.

O. Verify final equipment locations for roughing-in.

P. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

1.11 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

1.12 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

1.13 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

1.14 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

C. Field Welding: Comply with AWS D1.1.

1.15 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

1.16 ACCESS DOORS

A. Access doors to match surrounding surface, provided with recess to accept matching finish. Provide UL rated doors in fire rated construction.

B. Provide 12”x12” access doors for maintenance or adjustments purposes for all mechanical system components including valves, volume dampers, fire dampers, fire/smoke dampers, clean outs, traps and controls.

C. Refer to Section 08 31 00 "Access Doors and Panels”.

END OF SECTION 23 05 00

SECTION 23 05 29

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

1.1 SUMMARY

A. Hangers and supports for HVAC system piping and equipment.

1.2 STANDARDS

A. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.3 PERFORMANCE REQUIREMENTS

A. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Design supports for multiple pipes and equipment.

1.4 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.5 COMPONENTS

A. Steel pipe hangers and supports.

B. Trapeze pipe hangers.

C. Metal framing systems.

D. Thermal-hanger shield inserts.

E. Fastener Systems

F. Pipe Stands.

G. Equipment supports.

H. Miscellaneous Metals.

1.6 INSTALLATION

A. Install hanger and supports in accordance with manufacturer's standards and building code requirements.

END OF SECTION 23 05 29

SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

1.1 SUMMARY

A. Furnish and install pipe, ductwork and equipment labels.

1.2 PERFORMANCE REQUIREMENTS

A. Provide piping, ductwork and equipment identification to assist in system start-up, commissioning and Owner operation.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.4 QUALITY ASSURANCE

A. Quality Standard for Piping Identification: ASME A13.1.

1.5 PRODUCTS

A. Equipment Labels: Plastic.

B. Warning Signs and Labels: 1/16 inch (1.6 mm) thick with adhesive.

C. Pipe Labels: Pretensioned or Self-adhesive.

D. Duct Labels: 1/16 inch (1.6 mm) thick with adhesive.

E. Stencils: Fiberboard or metal.

F. Valve Tags: Brass, 0.032-inch (0.8-mm)Stainless steel, 0.025-inch (0.64-mm)Aluminum, 0.032-inch (0.8-mm)] or anodized aluminum, 0.032-inch (0.8-mm) minimum thickness.

G. Warning Tags: 3 by 5-1/4 inches (75 by 133 mm) minimum, reinforced grommet and wire fasteners.

1.6 INSTALLATION

A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.

6. Spaced at maximum intervals of 50 feet (15 m)along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

B. Install duct labels with permanent adhesive on air ducts with separate color codes for each system.

C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet (15 m) in each space where ducts are exposed or concealed by removable ceiling system.

END OF SECTION 23 05 53

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 SUMMARY

A. Testing, adjusting, and balancing for the following:

1. Air Systems: Constant-volume systems.
2. Exhaust Systems.
3. Air Distribution systems, outlets and inlets.
4. Motors.
5. Split-System AC units.
6. Water Systems:
   a. Hot water reheat coils.
   b. Cabinet unit heaters.
   c. Convectors.
7. Temperature measurements.
8. Commercial kitchen exhaust hoods.
9. Space pressurization measurements and adjustments.
10. Vibration measurements.
11. Sound-level measurements.
12. Indoor-air quality measurements.
13. Temperature-control verification.

1.2 PERFORMANCE REQUIREMENTS

A. Perform HVAC system testing, adjusting and balancing in order to verify a properly operating and correctly adjusted system in order to assure that the intended design conditions are being met.

1.3 SUBMITTALS

A. Provide Test and Balance Report in accordance with Section 230000 and 013300.

1.4 QUALITY ASSURANCE

A. Testing, Adjusting, and Balancing Agent Qualifications: AABC or NEBB certified.

1.5 WARRANTY

A. Guarantee: AABC national project performance or NEBB guarantee that a certified agent has performed TAB and optimum performance capabilities have been achieved.

1.6 EXECUTION

A. Examination: Contract Documents, approved submittal data, Project Record Documents, design data, equipment performance data, system and equipment installations, systems and equipment test reports, and automatic controls for deficiencies that may preclude proper TAB of systems and equipment.

1. Deficiencies report.

B. Testing, adjusting, and balancing plan.

C. Systems readiness checks.

D. Testing, Adjusting, and Balancing Procedures: AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems." or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems." In conjunction with SMACNA's "HVAC Systems HVAC Systems - Testing, Adjusting, and Balancing."

E. Equipment settings marked to show final settings.

F. HVAC Systems Airflow Rate Tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 5 percent to plus 10 percent.
2. Air Outlets and Inlets: 0 to minus 10 percent.

G. Reporting:

1. Initial Construction-Phase Report: Based on examination of the Contract Documents, on adequacy of design for systems' balancing devices.
2. Status Reports: As Work progresses.
3. Final Report: Certification sheet with content and format according to AABC or NEBB standard forms.

H. Inspections:

1. Initial Inspections: Random checks by TAB firm to verify final TAB report.
2. Final Inspections: Random checks by Owner to verify final TAB report.

I. Additional Tests:

1. Performed within 90 days to verify that balance conditions are being maintained.
2. Seasonal tests.

END OF SECTION 23 05 93

SECTION 23 07 00

HVAC INSULATION

1.1 SUMMARY

A. Furnish and install thermal insulation for HVAC systems.

1.2 PERFORMANCE REQUIREMENTS

A. Provide thermal insulation on HVAC systems to meet all local, state and ASHRAE 90.1 energy codes, and to minimize system energy losses and/or prevent condensation on cold surfaces.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Flame-spread index of 25, and smoke-developed index of 50 for insulation installed indoors according to ASTM E 84.

1.5 MATERIALS

A. General
1. Products shall not contain asbestos, lead, mercury, or mercury compounds.
2. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
3. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
4. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

B. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.

C. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type I or II with factory-applied jacket

D. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied factory

E. Mineral-Fiber, Preformed Pipe Insulation: Type I, 850 deg F (454 deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied jacket.

F. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is tested and certified to provide a **2**-hour fire rating by a NRTL acceptable to authority having jurisdiction.

G. Adhesive materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

H. Factory Applied Jackets: Coordinate types of factory-applied jacket insulation materials selected and types of factory-applied jackets indicated in insulation system schedules. For insulation materials with factory-applied jackets for use on applications above 140 deg F (60 deg C), provide sufficient insulation thickness to maintain outer surface temperature of insulation below 140 deg F (60 deg C). 140 deg F (60 deg C) surface temperature is set by OSHA for personnel protection. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.
4. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C 1136, Type II.

1.6 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in nonconditioned space.
4. Indoor, exposed return located in nonconditioned space.
5. Indoor, concealed, Type I, commercial, kitchen hood exhaust.
6. Indoor, exposed, Type I, commercial, kitchen hood exhaust.
7. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
8. Indoor, exposed exhaust between isolation damper and penetration of building exterior.

B. Items Not Insulated:

1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
2. Factory-insulated flexible ducts.
3. Factory-insulated plenums and casings.
4. Flexible connectors.
5. Vibration-control devices.
6. Factory-insulated access panels and doors.

1.7 PIPING INSULATION SCHEDULE, GENERAL

A. HVAC piping requiring insulation:
1. Refrigerant Piping
2. Heating hot water piping.
3. Chilled water piping.
   a. Provide vapor barrier on all chilled water piping insulation.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Underground piping.

1.8 INSTALLATION

A. Install duct and pipe insulation in accordance with manufacturer's recommendations, and in thickness according to the applicable energy code standards.

1. Provide protective metal jacketing on all ductwork and piping located outdoors.

END OF SECTION 23 07 00

SECTION 23 09 00

INSTRUMENTATION AND CONTROL FOR HVAC

1.1 SUMMARY

A. Control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls.

B. This project entails the remodeling of an existing building with an existing, newly installed (2011) Honeywell direct digital control (DDC) automation system overlaid on pre-existing pneumatic controls. The pneumatic operators are still operational. Supervisory control signals from the DDC BAS are communicated via P/E and E/P switches.

1.2 PERFORMANCE REQUIREMENTS

A. Any new electronic (DDC) control components shall be compatible with the existing Honeywell BAS either directly, in the case of Honeywell controllers, or via BACnet interface in the case of third-party controllers.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.4 QUALITY ASSURANCE

A. Quality Standard: Comply with ASHRAE 135 for DDC system components.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 CONTROL SYSTEM

A. Distributed system to control mechanical systems including the following:

1. New constant volume air terminal units (AHU-6 system).

1.6 COMPONENTS

A. Programmable BACnet Controllers:
1. Manufacturers:
   a. Trane ‘Tracer UC-400’
   b. Honeywell
2. Description:
   a. The direct digital controller Unit Control Module (DDC-UCM) is a microprocessor-based terminal unit with non-volatile memory which provides accurate airflow and room temperature control of constant volume air terminal units. The controller provides a simple open protocol to allow integration of constant volume terminal units and controls into the existing Honeywell control system. The UCM can operate in pressure-independent or pressure-dependent mode and uses a proportional plus integral control algorithm.

b. The controller monitors zone temperature setpoints, zone temperature and its rate of change and valve airflow (via flow ring differential pressure). Proportional hot water heat control shall be provided. The control board operates using 24-VAC power.

3. Requirements:
   a. Provide a programmable general purpose BACnet, microprocessor-based, Direct Digital Controller (DDC). When factory installed on air terminal units, it shall be factory-downloaded with appropriate programs and configuration settings. The controller shall be configured from the factory for Space Temperature Control.
   b. When programmed for Constant Volume Space Temperature Control, the controller maintains supply airflow at the setpoint capacity independent of system pressure fluctuations, and modulates the box's hot water reheat coil control valve as required to maintain space temperature.
   c. Inputs include a twisted/shielded communication link, zone sensor, and 24 VAC power.
   d. DDC controllers shall be factory-commissioned. The DDC boards shall be powered and run-tested with project-specific sequence parameters, and connected to a communication link to make sure that information and diagnostic data function properly.
   e. The BACnet Controller shall provide state-of-the-art, consistent open communication protocol for integration with the existing Honeywell building automation control system.

B. Analog Controllers:

1. 6- or 10-stage-type step controllers.
2. Remote-bulb or bimetal rod-and-tube-type, electric outdoor-reset controllers.
3. Wheatstone-bridge-amplifier-type electronic controllers.
4. Solid-state fan-speed controllers.
5. Single- or multiple-input receiver controllers.

C. Electronic Sensors: Wall, immersion, or duct mounting.

1. Thermistor temperature sensors and transmitters.
2. RTDs and transmitters.
3. Humidity sensors.
4. Pressure transmitters/transducers.

D. Thermostats:

1. Combination thermostat and fan switches.
2. Electric, solid-state, microcomputer-based room thermostats.
3. Low-voltage, on-off thermostats.
4. Line-voltage, on-off thermostats.
5. Remote-bulb thermostats.
6. Fire-protection thermostats.
7. Pneumatic room thermostats.
8. Immersion thermostats.
9. Airstream thermostats.
10. Electric, low-limit duct thermostats.
11. Electric, high-limit duct thermostats.
12. Heating/cooling valve-top thermostats.

E. Actuators:

1. Electric motors.
2. Electronic actuators.

F. Terminal Unit Control Valves:
   1. Proportional Water Valve: Field-adaptable, 2-way or 3-way configuration, with an equal percentage plug. The actuator is a synchronous motor drive. The valve is driven to a predetermined position by the UCM controller using a proportional plus integral control algorithm. If power is removed, the valve stays in its last position. The actuator is rated for plenum applications under UL 94-5V and UL 873 standards.

2. *Pressure and Temperature Ratings:*
   a. The valve is designed and tested in full compliance with ANSI B16.15 Class 250 pressure/temperature ratings, ANSI B16.104 Class IV control shutoff leakage, and ISA S75.11 flow characteristic standards.
   b. Maximum Allowable Pressure – 300 psi;
   c. Maximum Operating Fluid Temperature – 200ºF;
   d. Maximum Close-off Pressure – 55 psi;
   e. Electrical Rating – 6VA at 24VAC.

G. Self-Contained Control Valves:
   1. Manufacturer: Danfoss RA2000 or equivalent.
   2. Construction: Valve shall be of nickel plated brass construction with a fully replaceable packing gland. The gland shall be replaceable while the system is in full operation. The valve disc shall be constructed of EPDM capable of withstanding 250 deg. F temperatures.
   3. Description: The thermostatic radiator valve shall be selected to maintain room temperature with +/- 1 deg. F. The operator shall be of the bellows design with either a liquid or vapor charge, and capable of temperature adjustment between 45 and 86 deg. F. Locking or limiting of the temperature shall be accomplished by the use of limiting pins or rings.

H. Dampers: AMCA-rated, opposed-blade design, for standard-pressure and low-leak applications.

1.7 INSTALLATION

A. The control components specified herein shall be designed and installed to perform the required sequences of operation for the HVAC systems as necessary, and shall interface (as required) with the existing Building Automation System.

END OF SECTION 23 09 00

SECTION 23 09 93

SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

1.1 SUMMARY

A. Control sequences for HVAC systems, subsystems, and equipment.

1.2 PERFORMANCE REQUIREMENTS

A. Provide a Building Automation System to provide control of HVAC systems and optimize performance in order to maximize occupant comfort and minimize energy usage in accordance with applicable energy codes and standards.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.4 CONTROL SEQUENCES

A. Constant volume air terminal units:
   1. The DDC controllers modulate the air damper as required to maintain setpoint airflow independent of system pressure fluctuations.
   2. The DDC zone sensor senses space temperature and communicates to the DDC controller.
   3. When the space temperature is below the zone setpoint temperature minus deadband, the controller modulates the hot water reheat coil's control valve toward open.
   4. Water valve position is dependent on the degree that the space temperature is below the active heating setpoint and the time that the space temperature has been below the active heating setpoint.
   5. If not already closed, the water valve fully closes when the zone temperature rises above the active heating setpoint by 0.5 °F (0.28 °C).

B. HVAC System Sequences of Operation are as required to provide control of systems in order to achieve occupant comfort and required energy efficiency levels.

END OF SECTION 23 09 93

SECTION 23 31 13

METAL DUCTS

1.1 SUMMARY

A. This section includes furnishing and installation of metal ductwork and related accessories.

1.2 PERFORMANCE REQUIREMENTS

A. Provide air distribution system for HVAC systems that is correctly sized for optimized system performance relative to energy, leakage and noise.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 220000 and 013300.

1.4 QUALITY ASSURANCE

A. Comply with SMACNA Standards, NFPA 90A, ASHRAE and the IMC, for ductwork design, construction and optimization.

1.5 MATERIALS

A. Single-wall rectangular ducts and fittings.

B. Double-wall rectangular ducts and fittings.

1. Fibrous-glass or Flexible elastomeric duct liner for interstitial insulation.

C. Single-wall round ducts and fittings.

D. Sheet Metal Materials:

1. Galvanized sheet steel.
2. Carbon-steel sheets.
3. Stainless-steel sheets.
4. Aluminum sheets.
5. Factory-applied antimicrobial coating.

E. Duct Liner:

1. Fibrous glass, Type I, flexible.

a. With antimicrobial erosion-resistant coating.

2. Flexible elastomeric.

F. Sealant Materials:

1. Two-part tape sealing system.

2. Water-based joint and seam sealant.
3. Solvent-based joint and seam sealant.
4. Flanged joint sealant.
5. Flange gaskets.
6. Round duct joint O-ring seals.

1.6 SEISMIC-RESTRAINT DEVICES

A. Channel support system.

B. Stainless-steel restraint cables.

C. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or reinforcing steel angle clamped to hanger rod.

1.7 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Clean the following items:

1. Air outlets and inlets.
2. Supply, return, and exhaust fans.
3. Air-handling units.
4. Coils and related components.
5. Return-air ducts, dampers, actuators, and turning vanes.
6. Supply-air ducts, dampers, actuators, and turning vanes.
7. Dedicated exhaust and ventilation components and makeup air systems.

1.8 DUCT SCHEDULE

A. All ducts shall be galvanized steel except as follows:

1. Commercial Kitchen Hood Exhaust Ducts:

a. Exposed to View: Type 304, stainless-steel sheet, No. 4 finish.
b. Concealed: Carbon-steel sheet.
c. Welded seams and joints.

2. Dishwasher Hood Exhaust Ducts:

a. Type 304, stainless-steel sheet.
b. Exposed to View: No. 4 finish.
c. Concealed: No. 2D finish.
d. Welded seams and flanged joints with watertight EPDM gaskets.

3. Moist Environment Duct Material: Aluminum.

1.9 INSTALLATION

A. All ducts shall be fabricated and installed in accordance with the appropriate standards of ASHRAE, IMC, NFPA 90A and SMACNA.

END OF SECTION 23 31 13

SECTION 23 33 00

AIR DUCT ACCESSORIES

1.1 SUMMARY

A. Furnish and install HVAC air distribution system duct accessories.

1.2 PERFROMANCE REQUIREMENTS

A. Provide air duct accessories as required to optimize air distribution and delivery of the various HVAC systems, and to provide for means to properly proportion the air flow quantity and direction.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.4 QUALITY ASSURANCE

A. Installation Standards: SMACNA, IMC, ASHRAE and NFPA 90A and NFPA 90B.

1.5 PRODUCTS

A. Backdraft and Pressure Relief Dampers: Multiple blade, parallel action, gravity balanced.

B. Barometric Relief Dampers: Horizontal or vertical mounting.

C. Manual Volume Dampers: Standard steel, multiple or single blade, parallel- or opposed-blade design.

D. Control Dampers: Parallel or Opposed blade design.

E. Flange connectors.

F. Duct Silencers: Factory fabricated and tested, round or rectangular.

G. Turning Vanes: Single-blade, galvanized sheet steel.

H. Remote damper operators.

I. Duct-Mounted Access Doors: Double wall, rectangular, galvanized sheet steel with insulation.

J. Flexible Connectors: Indoor and outdoor, high temperature.

K. Flexible Ducts: Insulated.

L. Duct accessory hardware.

1.6 INSTALLATION

A. Install duct accessories in accordance with manufacturer's recommendations and per SMACNA, IMC and ASHRAE Standards.

END OF SECTION 23 33 00

SECTION 23 34 23

HVAC POWER VENTILATORS

1.1 SUMMARY

A. Power Ventilators:

1. Centrifugal roof ventilators.
2. Centifugal wall ventilators.
3. Ceiling-mounting ventilators.
4. In-line centrifugal fans.

1.2 PERFORMANCE REQUIREMENTS

A. Provide HVAC system power ventilators and exhaust fans to meet the ventilation requirements of the facility, indoor air quality levels and contamination control requirements.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.4 QUALITY ASSURANCE

A. Performance Requirements: AMCA-Certified Ratings Seal.

1.5 CENTRIFUGAL ROOF VENTILATORS

A. Belt-driven centrifugal type, with upblast housing, wheel, motor, drive assembly, and curb base.

1. Housing: Removable, spun-aluminum, hinged subbase.
2. Fan Wheels: Aluminum with backward-inclined blades.
3. Belt-Driven Drive Assembly: Steel shaft, permanently lubricated and sealed bearings, and cast-iron adjustable-pitch pulley.
4. Accessories:

a. Disconnect switch inside or outside fan housing.
b. Bird screens.
c. Backdraft dampers.

5. Roof Curbs: Galvanized steel; self-flashing without cant strip and with mounting flange.

a. Overall Height: 12 inches].
b. Options: Vented for range hood exhaust applications.

B. Direct-driven centrifugal type, with downblast housing, wheel, motor, drive assembly, and curb base.

1. Housing: Removable, spun-aluminum, hinged subbase.
2. Fan Wheels: Aluminum with backward-inclined blades.
3. Direct drive.
4. Accessories:

a. Disconnect switch inside or outside fan housing.
b. Bird screens.
c. Backdraft dampers.

5. Roof Curbs: Galvanized steel; self-flashing without cant strip and with mounting flange.

a. Overall Height: 12 inches].

1.6 CEILING-MOUNTING VENTILATORS

A. Housing: Steel with acoustical insulation.

B. Fan Wheels: Centrifugal.

C. Grilles: Aluminum, louvered.

D. Accessories:

1. Variable-speed controller.
2. Manual starter switch.
3. Time-delay switch.
4. Motion sensor.
5. Washable filter.
6. Vibration isolators.
7. Roof jack or wall cap and transition fittings.

END OF SECTION 23 34 23

SECTION 23 36 16

AIR TERMINAL UNITS

1.1 SUMMARY

A. This Section includes the following:

1. Single-duct air terminal units.

1.2 PERFROMANCE REQUIREMENTS

A. Provide air duct accessories as required to optimize air distribution and delivery of the various HVAC systems, and to provide for means to properly proportion the air flow quantity and direction.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.4 QUALITY ASSURANCE

A. Installation Standards: SMACNA, IMC, ASHRAE and NFPA 90A and NFPA 90B.

1.5 PRODUCTS

A. AIR TERMINAL UNITS

1. Manufacturers: Acceptable manufacturers:
   a. The Trane Company
   b. Price Industries
   c. Titus
   d. Krueger

B. Configuration: The primary air inlet connection is an 18-gage galvanized steel cylinder sized to fit standard round duct. A multiple-point, averaging flow sensing ring is provided with balancing taps for measuring +/- 5% of unit cataloged airflow. An airflow-versus-pressure differential calibration chart is provided. The damper blade is constructed of a closed-cell foam seal that is mechanically locked between two 22-gage galvanized steel disks. The damper blade assembly is connected to a cast zinc shaft supported by self-lubricating bearings. The shaft is cast with a damper position indicator. The valve assembly includes a mechanical stop to prevent overstroking. At 4.0 in. wg, air valve leakage does not exceed 1% of cataloged airflow.

C. Casing Lining: The interior surface of the unit casing is acoustically and thermally lined with 1-inch, 1.5 lb/ft3 density glass fiber with foil facing. The insulation R-Value is 4.1. The insulation is UL listed and meets NFPA-90A and UL 181 standards as well as bacteriological standard ASTM C 665. There are no exposed edges of insulation (complete metal encapsulation).

D. Air Outlet: S-slip and drive connections for a singular rectangular outlet.

E. Access: Removable panels for access to dampers and other parts requiring service, adjustment, or maintenance; with airtight gasket and quarter-turn latches.

F. Boxes shall be pressure independent with constant volume controls. The controller shall maintain setpoint CFM with 5% regardless of system pressure change.

G. Hot-Water Heating Coil: 1-row hot water reheat coil is factory-installed on the discharge outlet. The coil has aluminum fins with 3/8" OD seamless copper tubes mechanically expanded into the fin collars. Coils are proof tested at 450 psig and leak tested at 300 psig air pressure under water.

H. DDC Actuator: 3-wire, 24-VAC, floating-point control actuator with linkage release button. Torque is 35 in-lb minimum, non-spring return with 90-second drive time. Travel is terminated by end stops at fully-opened and -closed positions. An integral magnetic clutch eliminates motor stall.

I. Direct Digital Controller—The microprocessor based terminal unit controller provides accurate, pressure-independent control through the use of a proportional integral control algorithm and direct digital control technology. The controller monitors zone temperature setpoints, zone temperature and its rate of change, and valve airflow using a differential pressure signal from the pressure transducer. The controller is provided in an enclosure with 7/8" knockouts for remote control wiring. A DDC zone sensor is required. Refer to Section 230900 for additional information.

J. DDC Zone Sensor—The controller senses zone temperature through a sensing element located in the zone sensor. Wired zone sensors utilize a thermistor to vary the voltage output in response to changes in the zone temperature. Wiring to the controller must be 18- to 22-AWG twisted pair wiring .The setpoint adjustment range is 50–88ºF.

K. Factory-Mounted and -Wired Controls: Electrical components shall be mounted in control box with removable cover. Incorporate single-point electrical connection to power source.
   1. Control Transformer: Factory-mounted for control voltage on electric and electronic control units with terminal strip in control box for field wiring of temperature sensor and power source.
   2. Wiring Terminations: Fan and controls to terminal strip, and terminal lugs shall match quantities, sizes, and materials of branch-circuit conductors. Enclose terminal lugs in terminal box that is sized according to NFPA 70.
   3. Disconnect Switch: Factory-mounted, toggle-switch type.

L. Controls shall comply with Section 230900 Temperature Control System.

M. Control Panel Enclosure: NEMA 250, Type 1, with access panel sealed from airflow and mounted on side of unit.

1.6 INSTALLATION

A. Install air terminal units level and plumb. Maintain sufficient clearance for recommended service and maintenance.

B. HVAC contractor shall coordinate exact side of coil connection and control box to give the maximum space for service clearances required.

1.7 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to air terminal units to allow service and maintenance.

C. Hot-Water Piping: In addition to requirements in Division 23 Section "Hydronic Piping," connect heating coils to supply with shutoff valve, control valve, and union or flange; and to return with balancing valve and union or flange.

D. Connect ducts to air terminal units according to Division 23 Section "Metal Ducts."

E. Connect wiring according to Division 26 specifications.

F. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

1.8 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.
2. Leak Test: After installation, fill water coils and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Remove and replace malfunctioning units and retest as specified above.

1.9 STARTUP SERVICE

A. Complete installation and startup checks according to manufacturer's written instructions and do the following:
1. Verify that inlet duct connections are as recommended by air terminal unit manufacturer to achieve proper performance.
2. Verify that controls and control enclosure are accessible.
3. Verify that control connections are complete.
4. Verify that nameplate and identification tag are visible.
5. Verify that controls respond to inputs as specified.

1.10 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air terminal units. Refer to Division 1 for Closeout Procedures.

END OF SECTION 23 36 16

SECTION 23 37 13

DIFFUSERS, REGISTERS, AND GRILLES

1.1 SUMMARY

A. Ceiling- and wall-mounted diffusers, registers, and grilles.

1.2 PERFORMANCE REQUIREMENTS

A. Provide air distribution devices to optimize air distribution and thermal comfort and to minimize drafts and noise.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.4 QUALITY ASSURANCE

A. Tested for performance according to ASHRAE 70.

1.5 PRODUCTS

A. General

1. Commercial grade, manufactured air distribution inlets and outlets suitable for the installation application location (ceiling, wall, floor, etc.).
2. Balancing volume dampers shall be provided at the main branch duct take-off to each air outlet, rather than be integral with each device, in order to minimize airborne noise levels.

B. Adjustable Bar Grille

C. Fixed Face Grille

D. Linear Slot Diffuser

E. Round Ceiling Diffuser

F. Perforated Return Grille

G. Louver Face Diffuser

END OF SECTION 23 37 13

SECTION 23 81 26

DUCTLESS SPLIT-SYSTEM AIR-CONDITIONERS

1.1 SUMMARY

A. Split-system air-conditioning and heat pump units with separate evaporator-fan and compressor-condenser components.

1.2 PERFORMANCE REQUIREMENTS

A. HVAC systems shall be designed and sized to provide adequate heating, cooling and ventilation to the facility, in accordance with the Design Criteria and appropriate building codes and energy standards.

1.3 SUBMITTALS

A. Provide product data and shop drawings in accordance with Section 230000 and 013300.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

C. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

D. Units shall be designed to operate with HCFC-free refrigerants.

1.5 WARRANTY

A. Materials and Workmanship: Five years.

1.6 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mitsubishi Electronics America, Inc.; HVAC Division.
2. EMI / EnviroMaster International LLC
3. Carrier Air Conditioning; Div. of Carrier Corporation.

1.7 WALL-MOUNTING, EVAPORATOR-FAN COMPONENTS

A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.

1. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.
2. Drain Pan and Drain Connection: Comply with ASHRAE 62.1-2004.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Fan: Direct drive, centrifugal fan, and integral condensate pump.

D. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."

1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.

E. Filters: Disposable, with ASHRAE 52.2 MERV rating of 6 or higher.

1.8 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

1. Compressor Type: Scroll.
2. DC inverter twin rotary compressor.
3. Refrigerant R-410A.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.

D. Fan: Aluminum-propeller type, directly connected to motor.

E. Motor: Permanently lubricated, with integral thermal-overload protection.

F. Low Ambient Kit: Permits operation down to 45 deg F.

G. Mounting Base: Polyethylene.

H. Minimum Energy Efficiency: Comply with ASHRAE/IESNA 90.1-2007, "Energy Standard for Buildings except Low-Rise Residential Buildings."

1.9 ACCESSORIES

A. Hardwired wall-mounted unit controller.
1. Room Temperature: Displays room temperature sensed at either the indoor unit (default) or at the remote controller.
2. Set Temperature Range Limit: Allowable set point range can be limited.
3. Diagnostics: Displays 4-digit error code and error unit address.
4. Clean filter display.
5. No addressing required.
6. Connects using two-wire, stranded, non-polar control wire to connection terminal on the indoor unit.
7. User functions allow user to set:
   a. On/Off

b. Operation modes: Cool/Dry/Fan
c. Set temperature
d. Fan speed setting
e. Airflow direction

B. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

1. Minimum Insulation Thickness: 1 inch thick.

C. Condensate pump.

1.10 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

END OF SECTION 23 81 26

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the contract, including General and Supplementary Conditions, Division 01 Specification sections, apply to this section.

B. Division 07, Penetration Firestopping.

1.2 SUMMARY

A. This performance specification section provides the minimum requirements for a complete and operational electrical system for an Exchange Shoppette BX or PX (Base Exchange, Post Exchange OR Fort Exchange) Retail Store and Mall. The electrical and low-voltage systems shall include but are not limited to all design, equipment, materials, labor, installation, documentation, testing and services necessary to furnish and install a complete, operational Exchange Shoppette Retail Store and Mall to include but are not limited to the following functions:

1. Store Sales Area
2. Administration Area
3. Freezers and Coolers
4. Exchange food and other vendors, equipment and all connections to same
5. Lighting and Control System to meet current Exchange, UFC, Energy Codes and LEED Requirements and state and local codes
6. Fire Alarm System extension

B. Section Includes:

1. Electrical equipment coordination and installation
2. Grout, concrete
3. Access doors and frames
4. Common electrical installation requirements
5. Fire stopping
6. Cleanup/Touchup paint
7. Safety conditions
8. AF/AI material and equipment
9. EXCHANGE furnished, Contractor installed equipment

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For sleeve seals.

1.5 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

2. To provide for ease of disconnecting the equipment with minimum interference to other installations.

3. To allow right of way for piping and conduit installed at required slope.

4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

5. To maintain access and keep passageways clear.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section 'Access Doors and Frames'.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section 'penetration Firestoppping'.

1.6 CODES AND CRITERIA

A. Systems will be designed to comply with the following:

1. International Building Code as modified by UFC 1-200-01
2. International Energy Conservation Code
3. International Fire Alarm Code
4. National Electric Code
5. ASHRAE Standard 90.1, 2004 Energy Standards for Buildings
6. Americans with Disability Act (ADA)
7. ANSI/TIA 942 – Telecom Infrastructure Standard for Data Centers
8. UFC 3-400-01 Energy Conservation
9. UFC 3-501-03N Electrical Engineering Preliminary Considerations
10. UFC 3-520-01 Interior Electrical Systems
11. UFC 3-530-01 Interior and Exterior Lighting and Controls
12. UFC 3-55-03 FA Electrical Power Supply and Distribution
13. UFC 3-550-03N Power Distribution Systems
14. UFC 3-560-01 Electrical Safety, O&M; with Change 2
15. UFC 3-580-01 Telecommunications Building Cabling Systems Planning and Design
16. UFC 3-600-01 Fire Protection Engineering for Facilities
17. UFC 3-600-02 O&M: Inspection, Testing, and Maintenance of Fire Protection System
18. UFC 4-010-01 DoD Minimum Antiterrorism Standard for Buildings
19. DoD 5200.1-R DoD Information Security Program
20. DCID 6/9 Physical Security for Sensitive Compartmented Information Facilities
21. JAFAN 6/9 Physical Security Standards for Special Access Program Facilities (DOS)
22. Real Estate Standards

1.7 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, non-metallic aggregate grout, non-corrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

1.9 CONCRETE

A. Cast-in-Place concrete for Lighting pole bases, housekeeping pads, transformer pads, etc. shall be the responsibility of each section of Division 26.

B. Cast-in-Place concrete shall comply with Division 03 requirements.

1.10 ACCESS DOORS AND FRAMES

A. Access panels shall be the responsibility of each related section of Division 26. All access doors on the project are to be the product of one manufacturer and are to meet the requirements of Division 08 Section 'Access Doors and Frames'. Closely coordinate the type of access doors and locations with all other Divisions.

B. Where required for access to hidden junction boxes or other Division 26 equipment, the doors shall be sized as necessary to provide proper working clearance. Provide access door at all roll-up gate motors above gypboard ceilings.

C. Provide identification tags for all Division 26 access doors.

1.11 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

F. All material and equipment shall be installed symmetrical, level, plumb, parallel and perpendicular to other building systems and components, except where otherwise indicated.

G. Use 'waterguard' compound for all watertight seals to outside or freezer/coolers.

1.12 UTILITIES

A. Power: Coordinate requirements with Base or Fort requirements and local servicing utility.
B. Telephone: Coordinate requirements with Base or Fort requirements and local servicing utility.

1.13 NOT USED

1.14 CLEANUP

A. Removal of refuse, debris, cuttings, packaging, cartons, etc. for work provided under Division 26 shall be the responsibility of each related section of Division 26.

B. Cleanup shall be done continually during construction, at sufficient frequency to eliminate hazard to the public, occupants, workmen, the premise and adjacent property.

C. Before acceptance of the installation, carefully clean cabinets, panels, boxes, wiring devices, cover plates, etc., to remove dirt, cuttings, paint, plaster, mortar, concrete, etc. Blemishes to finished surfaces of apparatus shall be removed and new finish equal to the original applied.

1.16 TOUCHUP PAINTING

A. Touch up or repair of factory finishes that are scratched or marred in shipment or installation shall be the responsibility shall be the responsibility of each related section of Division 26.

B. Thoroughly clean damaged areas and provide primer, intermediate, and finish coats to suit the degree of damage at each location.

C. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.

D. Repairs shall be made to the satisfaction of the Government and Contracting Officer.

1.17 SAFETY CONDITIONS

A. The Contractor will be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours. The duty of the Contracting Officer to conduct construction observations of the Contractor's performance is not intended to include review of the adequacy of the Contractor's performance measures, in, on, or near the construction site.

B. Furnish, erect and maintain all barricades, guard structures, warning signs, detour signs, lights and flares as may be required to protect and safeguard from injury or damage.

C. Provide bracing, scaffolding, guard rails and protective devices necessary to protect workmen and personnel from personal injury due to electrical installations while on the jobsite.

D. Contractor shall be liable for all damage and injury occurring to the Government's property on or in the adjacent areas of the work, or which shall occur to any person or property whatsoever by reason of the negligence of the Contractor or any of his employees, or sub- Contractors, or of any breach or violation of the provisions of this agreement, or of any of his duties or obligations under the contract.

E. Temporary power used for construction shall be ground fault protected.

1.18 EXCHANGE FURNISHED AND INSTALLED EQUIPMENT

A. Certain items of equipment will be furnished and installed by EXCHANGE. See drawings references to (AF/AI).

1. See Division 10.

B. The Contractor shall provide coordinate and cooperation with personnel installing Exchange furnished materials and equipment, should overlap of work occur.

1.19 TYPICAL MATERIALS AND EQUIPMENT (AF/AI)

A. Equipment or material to be furnished and installed by Exchange but not limited to, is as follows and as indicated on the drawings:

1. All store shelving and fixtures.

2. Check-out fixtures in.
3. Close circuit (CCTV) video security system equipment and wiring
4. Graphic signage.
5. Microwaves, refrigerators, washer and dryer
6. Safes, printers, meat slicer, cash registers, etc.
7. ATM Machines
8. Dry storage shelving
9. ELCC Communications and Center Equipment (as indicated)
10. Slotwall
11. EAS Merchandise Detectors
12. Signage

1.20 FINAL CONNECTIONS

A. All final electrical connections to Exchange furnished and installed equipment shall be made by the Electrical Contractor as part of the construction contract. The electrical contractor shall provide all conduit, wire, J-boxes, and miscellaneous equipment necessary and make the equipment operational.

B. The Contractor shall adjust all wire sizes and breakers, and disconnect sizes, at no extra cost to the Owner. This cost shall be included in the Bid for connection to all EXCHANGE provided equipment.

1.21 EXCHANGE FURNISHED, CONTRACTOR INSTALLED EQUIPMENT

A. The material noted below will be furnished by the Exchange and shall be installed and made operational by the Contractor. See drawing references to (AF/CI). The Contractor shall provide for and cooperate with personnel furnishing the designated material.

B. Provide all conduit and wire to equipment. Electrical Contractor shall field verify nameplate rating prior to pulling in wire and purchasing and installation of disconnects, breakers, etc. after all equipment is on site and ready for installation.

C. Provide cost in bid to adjust all breakers, conduits, wire size, disconnect sizes either direction larger or smaller to equipment after equipment is on site.

1.22 DELIVERY

A. Contractor shall unload, handle, store, protect, uncrate, assemble, set in final position, align, join, and level all Exchange-furnished material, and shall make all utility connections thereto. Exchange will provide supervision for installation of the material. Electrical Contractor shall field verify nameplate ratings of the equipment prior to pulling in wire and making final connections. Contractor shall adjust wire sizes and breaker disconnect sizes (either direction larger or smaller) at no extra cost to the Owner. This cost shall be included in Bid.

1.23 MATERIALS AND EQUIPMENT (AF/CI)

A. Contractor shall install and make connections but not limited to the following Exchange furnished items at locations indicated on drawings:

1. Walk-in coolers and freezers
2. ELCC Communications Center Equipment (as indicated)
3. Sales Area cornice (gondolas) fixtures with Contractor provided lamps

B. Execution

1. Provide matching receptacles, three phase and single phase for all cord plug equipment. Provide and include different receptacle combinations from Exchange documents for equipment being furnished with different plug and amp ratings than cut sheet furnished during design. Include cost in bid.

2. Equipment Branch Circuits: Provide different breakers to make connections to Exchange equipment with different amp rating. Install in finished walls and ceilings. Include cost in bid.

3. Provide labor and material to pull out new wiring to Food Court equipment that doesn't match equipment and replace with new wire to match amp rating or to meet NEC. Allow the cost of conduit wire to be replaced due to mis-matched equipment and difference in Exchange equipment. Include cost in bid.

C. Walk-In Coolers and Freezers:

1. Contractor shall provide all conduit and wire to and make all freezer and cooler condenser connections plus provide and install phase protection on condensers. Normal electrical requirements for cooler and freezer condensing units, 208-230/16 0/3; freezer evaporator coils 208-230/60/1 and cooler evaporator coils 115/60/1.

2. Contractor shall provide conduit and wire between condensers and freezers, condensers and coolers or reach-in units.

3. Contractor shall provide a separate ¾" conduit between each condenser and the evaporator units with 6#12 for control wiring or per Shop Drawing.

4. Contractor shall provide separate 120 volt circuits to each evaporator unit per shop drawing 3#10-3/4"C or per Shop Drawing.

5. The Contractor shall provide conduit and wire 3#10-3/4"C or per final Shop Drawing and make all connections to all light switches with pilot lights, temperature control, light fixtures, door heaters, drain pipe and provide heat tape on drain with thermostat for a complete and working system.

6. Contractor shall provide an electrician and allow 40 hours for field connections per Exchange freezer/cooler supplier requirements for each unit.

END OF SECTION 26 05 00

SECTION 26 05 19

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the contract, including General and Supplementary Conditions, Division 01 Specification sections, apply to this section.

1.2 SUMMARY

A. This section includes the following:

1. Building wires and cables rated 600V and less.
2. Connectors, splices, and terminations rated 600V and less.
3. Sleeves and sleeve seals for cables

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70 and UL.

C. Wires and cables manufactured more than 12 months prior to date of delivery to site shall not be used.

1.6 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

1.7 CONDUCTORS AND CABLES

A. Unified Facilities Criteria UFC 3-520-01, June 10, 2002 Edition, paragraph 6-2.4 allows aluminum conductors #4 and larger.

B. Aluminum and Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN, or XHHW.

D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC with ground wire. Allowed by UFC 6.2.1, June 10, 2002 Edition. **Do not install Type MC Cable without getting approval of local state electrical inspector or Fort of Base approval. Unified Facilities Criteria UPF 3-520-01, June 10, 2002 Edition, paragraph 6-2.1 allows MC Cable for branch circuit wiring. All bid prices shall be based on conduit and wire. MC Cable shall be submitted as a deduct cost to EXCHANGE and the Government.**

1.8 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type and class for application and service indicated.

1.9 SLEEVES FOR CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated 'wall pipe', equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inche (1.3- or 3.5-mm) thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section 'Penetration Firestopping'.

1.10 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

C. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

D. Pressure Plates: Carbon steel or stainless steel. Include two for each sealing element.

E. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating or stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

1.11 ALUMINUM SUBSTITUTION

A. All calculations, distribution feeders and circuits shall be based on the use of copper conductors. All mechanical equipment feeders are to be copper only. **All bid pricing shall be copper only. Provide credit back for aluminum substitution.** Aluminum may be substituted for copper, for feeders #4 and larger under the following conditions:

1. Aluminum conductors shall be compact stranded, AA-8000 series aluminum-alloy conductors equal to Alcan STABILOY or reviewed equal.

2. The conductor ampacity of the substituted aluminum conductor shall be equal to or exceed the copper conductor ampacity.

3. Aluminum conductor ampacity shall be as shown in the 75 degree C column of NEC Table 310.16.

4. All aluminum conductors shall be terminated with UL approved compression connectors. Prior to termination all exposed ends that contact compression lugs shall be cleaned and coated with an oxide-inhibiting compound.

5. Aluminum Conductor Terminations in mechanical compression lugs shall utilize a compression connector with a stranded copper pigtail equal to T&B Bi-Pin.

6. Terminations on bus or lugs shall utilize one or two hole compression lugs.

7. Aluminum substitution is at the risk of the Contractor. All equipment requiring copper connections and feeders to meet UL Listing requirements or manufacturer's recommendations shall be fed from the overcurrent device to the unit with copper conductors. It shall be the contractor's responsibility to verify that aluminum feeders are acceptable for the equipment being served with the manufacturer.

8. Splicing on copper pigtails on an aluminum wire is prohibited unless rated for splicing to aluminum.

9. As allowed under Unified Facilities Criteria, UFC 3-520-01

1.12 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger. Conductors for remote control, alarm and signal circuits, Class 1, 2, and 3 shall be stranded unless specifically indicated otherwise.

C. Aluminum Conductors: From UFC 2.9.1.2.

D. Color Coding: UFC 2.g.2, 262000 page 24 or from master specifications.

E. Minimum conductor sizes to be as follows:

Lighting and power branch circuits	#12 AWG Min
Control circuits for motors and generators	#14 AWG Min
Grounding Conductor	#12 AWG Min

F. Provide conductors with conductivity of not less than 98% at 20 degrees C (68 degrees F).

.1.13 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS.

A. Service Entrance: Type THHN-THWN or XHHW, single conductors in raceway.

B. Feeders Exposed or Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN or XHHW, single conductors in raceway. Metal-clad cable, Type MC as allowed by NFPA 70.

C. Feeders Concealed in Concrete, Below Slabs-on-Grade, and Underground: Type THHN-THWN or XHHW, single conductors in raceway.

D. Feeders in Cable Tray: Type THHN-THWN or XHHW, single conductors in raceway, Metal-clad cable, Type MC and listed for cable tray use.

E. Branch Circuits Concealed Below Slab on Grade, in Concrete, in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway, Metal-clad cable, Type MC as allowed by NFPA 70..

F. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

G. Class 1 Control Circuits: Type THHN-THWN, in raceway.

H. Class 2 Control Circuits: Type THHN-THWN, in raceway, power-limited cable, concealed in building finishes, Power-limited tray cable, in cable tray.

1.14 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to walls, ceilings and surfaces of exposed structural members. Conceal all exposed cable from view and follow structural contours where possible.

E. Support cables according to Division 26 Section 'Hangers and Supports for Electrical Systems'.

1.15 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150mm).

1.16 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

B. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

C. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).

2. For sleeve rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and one or more sides equal to, or great than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

D. Cut sleeves to length for mounting flush with both wall surfaces.

E. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

F. Size pipe sleeves to provide ¼-inch (6.4 mm) annular clear space between sleeve and cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.

G. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section 'Joint Sealants'.

I. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

J. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch (25 mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

K. Underground Exterior-Wall Penetrations: Install cast-iron 'wall pipes' for sleeves. Size sleeves to allow for 1-inch (25 mm) annular clear space between cable and sleeve for installing mechanical sleeve seals.

1.17 SLEEVE-SEAL INSTALLATION

A. Install to seal underground exterior-wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assembly mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

1.19 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

C. Remove and replace any defective wire or cable..

END OF SECTION 26 05 19

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:

1. Grounding arrangements and connections for separately derived systems.
2. Grounding for sensitive electronic equipment.

C. Qualification Data: For testing agency and testing agency's field supervisor.

1.4 QUALITY ASSURANCE

A. Comply with UL 467 for grounding and bonding materials and equipment.

1.5 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3

2. Stranded Conductors: ASTM B 8

3. Tinned Conductors: ASTM B 33.

4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.

5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Bare Grounding Conductor and Conductor Protector for Wood Poles:

1. No. 4 AWG minimum, soft-drawn copper.

2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.

D. Grounding Bus: Rectangular bars of annealed copper, ¼ by 2 inches (6 by 50 mm) in cross section, unless otherwise indicated; with insulators.

1.6 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions. CADWELD® or approved equal.

D. Compression connectors of types recommended by manufacturer for materials being joined and installation conditions.

1.7 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated. Equipment ground conductors shall be green insulated, unless otherwise noted.

B. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch (25 mm), minimum, from wall 6 inches (150 mm) above finished floor, unless otherwise indicated.

2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

2. Connections to Structural Steel: Welded connectors.

1.8 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.

2. Lighting circuits.

3. Receptacle circuits.

4. Single-phase motor and appliance branch circuits.

5. Three-phase motor and appliance branch circuits.

6. Flexible raceway runs.

7. Armored and metal-clad cable runs.

8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-era power panels and power-distribution units.

10. All raceways.

C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

F. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AQWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a l/4-by-2-by-12 inch (6-by-50-by300 mm) grounding bus.

2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

G. Metal and Wood Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

1.9 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors wher they may be subjected to strain, impact, or damage.

B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.

3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp. Make exothermal welds strictly in accordance with the weld manufacturer's written recommendations. Wels which are 'puffed up' or show convex surfaces indicating improper cleaning are not acceptable, nor are welds that break when hit with a hammer.

E. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

END OF SECTION 26 05 26

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force, or as required by Authorities Having Jurisdiction.

1.5 SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.

2. Nonmetallic slotted support systems.

B. Shop Drawings: Signed and sealed by a qualified structural professional engineer. Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

C. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.7 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

1.8 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

2. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.

3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

4. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

5. Toggle Bolts: All-steel springhead type.

6. Hanger Rods: Threaded steel.

1.9 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

1.10 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps, single-bolt conduit clamps or single-bolt conduit clamps using spring friction action for retention in support channel.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

1.11 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.

3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

4. To Existing Concrete: Expansion anchor fasteners.

5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts, Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 or Spring-tension clamps.

6. To Light Steel: Sheet metal screws.

7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

1.12 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

1.13 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete."

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor bolts to elevations required for proper attachment to supported equipment.

3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

1.14 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Comply with requirements in Division 09 painting sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 26 05 29

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Structural members in the paths of conduit groups with common supports.

2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.

C. Source quality-control test reports.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.6 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1; UL 6
   1. Rigid threaded zinc-coated steel conduit.

B. IMC: ANSI C80.6; UL 1242

   1. Intermediate Metal Conduit (IMC)

C. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit or IMC.

   1. Comply with NEMA RN 1.
   2. Coating Thickness: 0.040 inch (1 mm), minimum.

D. EMT: ANSI C80.3.

E. LFMC: Flexible steel conduit with PVC jacket.

F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

   1. Fittings for EMT: Steel or die-cast, compression type.

   2. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

G. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

1.7 NONMETALLIC CONDUIT AND TUBING

A. RNC: NEMA TC 2, Type EPC-40-PVC**,** unless otherwise indicated.

B. LFNC: UL 1660

C. Fittings for RNC: NEMA TC3, match to conduit type and material.

D. Fittings for LFNC: UL 514B.

1.8 OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY AND FITTINGS

A. Description: Comply with UL 2024; flexible type, approved for plenum, riser, or general-use installations.

1.9 METAL WIREWAYS

A. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1 or 3R, unless otherwise indicated.

B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

C. Wireway Covers: Hinged type, screw-cover type, or flanged-and-gasketed type, rated for location installed.

D. Finish: Manufacturer's standard enamel finish.

1.10 SURFACE RACEWAYS

A. Surface Metal Raceways: UL5 two-piece, painted, totally enclosed galvanized steel with snap-on covers. Manufacturer’s standard enamel finish in color or as selected by EXCHANGE.

1. A full compliment of fittings shall be provided as required for a complete raceway system, including but not limited to, flat, internal and external elbows, tees, entrance fittings, cover clips, wire clips, support clips and end caps. The fittings shall match the base and cover. All fittings shall be supplied with a base where applicable. Transition fittings shall be available to adapt to an existing flush wall box.

2. Device fittings with faceplate and ID labels shall be available to mount stand and devices and device faceplates in single gang configurations.

1.11 BOXES, ENCLOSURES, AND CABINETS

A. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy or aluminum, Type FD, with gasketed cover.

C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

D. Metal Floor Boxes: Cast or sheet metal, fully adjustable, rectangular.

E. Nonmetallic Floor Boxes: Nonadjustable, round.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum or galvanized, cast iron with gasketed cover.

H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

I. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

2. Hinged door in front cover with flush latch and concealed hinge.

3. Key latch to match panelboards.

4. Metal barriers to separate wiring of different systems and voltage.

5. Accessory feet where required for freestanding equipment.

1.13 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated 'wall pipe', equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.

1.14 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

2. Pressure Plates: Stainless steel. Include two for each sealing element.

3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

B. Manufacturers: Subject to compliance with requirements, provide comparable products by one of the following manufacturers:

1. Advance Products & Systems, Inc.
2. Cal Pico, Inc.
3. Metraflex Co.
4. Pipeline Seals and Insulator, Inc.

1.15 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit, IMC, RNC, Type EPC-40-PVC or RNC, Type EPC-80-PVC as allowed by local Authority Having Jurisdiction.

2. Concealed Conduit, Aboveground: Rigid steel conduit, IMC, EMT or as allowed by local Authority Having Jurisdiction.

3. Underground Conduit: RNC, Type EPC-40 or 80-PVC, direct buried.

4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R or 4.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.

2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit or IMC. Includes raceways in the following locations or as otherwise indicated:

a. Loading dock.
b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.

3. Concealed in Ceilings and Interior Walls and Partitions: EMT.

4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.

5. Damp or Wet Locations: Rigid steel conduit, IMC or EMT, with weathertight fittings.

6. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, optical fiber/communications cable raceway in EMT .

7. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: Riser-type, optical fiber/communications cable raceway in EMT

8. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: General-use, optical fiber/communications cable raceway, plenum-type, optical fiber/communications cable raceway in EMT

9. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.

C. Minimum Raceway Size: 1/2-inch (16-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

1.16 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of four 90-degree bends in any conduit run except for communications conduits, for which only two bends are allowed..

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Raceways Embedded under Slabs:

1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.

2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

3. Change from Type EPC-40-PVC to rigid steel conduit, or IMC before rising above the floor.

4. All raceway shall be 12” to 18” minimum below slab, seal around barrier.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull cords in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Identify each end to indicate destination.

L. Raceways for Optical Fiber and Communications Cable: Unless otherwise noted, install raceways, metallic and nonmetallic, rigid and flexible, as follows:

1. ¾-inch (19 mm) Trade Size and Smaller: Install raceways in maximum lengths of 50 feet (15 m).

2. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).

3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

2. Where otherwise required by NFPA 70.

N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m).

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:

   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C)] temperature change.

   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.

   c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.

   d. Attics: 135 deg F (75 deg C) temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change.

3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

O. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

P. Recessed Boxes on Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

Q. Set metal floor boxes level and flush with finished floor surface.

R. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

1.17 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit.

2. Install backfill and compact in 6” lifts.

3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.

4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.

5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

   a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.

   b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

   c. Tape wrap all rigid steel conduits and elbows below grade.

1.18 NOT USED

1.19 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Rectangular Sleeve Minimum Metal Thickness:

   1. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).

   2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm)

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

G. Size pipe sleeves to provide ¼ inch (6.4 mm) annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

   1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section 'Joint Sealants' for materials and installation.

J. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25 mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

L. Underground, Exterior-Wall Penetrations: Install cast-iron 'wall pipes' for sleeves. Size sleeves to allow for 1-inch (25 mm) annular clear space between rceway and sleeve for installing mechanical sleeve seals.

1.20 SLEEVE-SEAL INSTALLATION

A. Install to seal underground, exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

1.21 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 26 05 33

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.
9. Device plate identification

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.4 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. All material and equipment supplied under this contract shall be identified with an Underwriters Laboratories, Inc. (UL) label.

F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

G. Comply with State adopted electrical codes.

1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

1.6 POWER RACEWAY IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on a white field
2. Legend: Indicate voltage and system or service type

C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers diagonally over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stop stripes at legends.

1.7 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Colors for Raceways Carrying Circuits at 600 V and Less:

1. Black letters on a white field, or per NEC.
2. Legend: Indicate voltage and system or service type

C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.

1.8 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

1.9 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

1.10 FLOOR MARKING TAPE

A. 2-inch- (50-mm-) wide, 5-mil (0.125-mm) pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

1.11 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.

2. Printing on tape shall be permanent and shall not be damaged by burial operations.

3. Detectable tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.

2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.

3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE,

1.12 IDENTIFICATION TAGS AND LABELS FOR ELECTRICAL EQUIPMENT

A. Equipment Identification Tags: Two-ply phenolic plastic, 1/16 inch (1.6 mm) thick, beveled edges, double stick tape. Black field with ½" high white letters.

1.13 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

3. Flash protection markings as required by NEC.

1.14 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.
3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).

C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

1.15 DEVICE PLATE LABELS AND IDENTIFICATION

A. Engraved plate with ¼ inch (6.4mm) high lettering filled with enamel paint. Black for normal systems, red for emergency systems.

B. Accessible Junction and Pull Boxes Within Buildings: Identify the covers of each junction and pull box with self-adhesive vinyl labels with the wiring system, system voltage and circuit number within. Boxes located in accessible ceilings shall have permanent marker pen on outside cover plate, approximately ½ inch (12.5m) high letters, black for normal systems, red for emergency.

1.16 CABLE TIES

A. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
5. Color: Black.

1.17 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

1.18 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. Provide identification as required by NEC and State adopted codes to indicate series ratings, flash protection, disconnecting means, or other information required by Code.

G. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.

H. Wraparound Marker Labels: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.

I. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

J. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

K. Provide identification plates for all disconnect switches which identify the circuit source (panelboard and circuit number) that supplies the disconnect, per NEC and all adopted State code requirements.

L. Equipment Identification, Emergency Systems: All boxes and enclosures, for Article 700 NEC systems larger than six inches by six inches, including transfer switches, generators, and power panels for emergency systems and circuits must be permanently identified with an identification plate that is substantially orange in color. All other device and junction boxes for emergency systems and circuits must be substantially orange in color, both inside and outside.

M. Provide warning signs for rooms, which contain wiring over 600 volts per NEC requirements. Screw signs to the outside of the room door.

N. Where a building or structure is supplied by more than one service, identify the location of all services with permanent plaques per NEC Article 230.

1.19 IDENTIFICATION SCHEDULE

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase and pre-printed labels identifying circuit numbers and panel designations.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.

b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.
4) Neutral: White

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.
4) Neutral: Gray

d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

B. Power-Circuit Conductor Identification, More than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic plastic tag holder with adhesive-backed phase and voltage tags, and a separate tag with the circuit designation.

C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 30-foot (10-m) maximum intervals.

D. Accessible Raceways, Armored and Metal-Clad Cables, More Than 600 V: Self-adhesive vinyl or Snap-around labels. Install labels at 30-foot (10-m) maximum intervals.

E. Conductors to Be Extended in the Future: Attach write-on tags or marker tape to conductors and list source.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Install underground-line warning tape for both direct-buried cables and cables in raceway.

H. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

I. Warning Labels for Indoor or Outdoor Cabinets, Boxes, and Enclosures for Power and Lighting: Phenolic engraved signs with ½" high letters.

1. Comply with 29 CFR 1910.145.
2. Identify system and voltage phase and where fed from.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of all electrical equipment.

J. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

K. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used.

L. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual.

1. Labeling Instructions:

a. Indoor Equipment: Engraved phenolic plastic tags self-adhesive. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.

b. Outdoor Equipment: Engraved phenolic plastic tags self-adhesive and mechanically attached with No. 4 chrome round head screws.

c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

e. Mount tags top and centered on outside of covers and doors.

2. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer.
b. Enclosures and electrical cabinets.
c. Access doors and panels for concealed electrical items.
d. Switchgear.
e. Switchboards.
f. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
g. Substations.
h. Motor-control centers.
i. Enclosed switches. 200A and above
j. Enclosed circuit breakers, 200A and above
k. Power transfer switches
l. UPS equipment

N. Equipment Function Labels: On each electrical component associated with the control or disconnecting means of a pieced of equipment, install unique designation labels consistent with wiring diagrams, schedules and operation and maintenance of the equipment serviced. Match other equipment labels.

1. Labeling Instructions:

a. Indoor Equipment: Adhesive film label
b. Outdoor Equipment: Adhesive film label with clear protective overlay

2. Equipment to be labeled:
a. Enclosed circuit breakers, 100A or less
b. Safety switches, 100A or less
c. Enclosed controllers.
d. Variable-speed controllers.
e. Push-button stations.
f. Contactors.
g. Remote-controlled switches, manual starters, timer switches, dimmer modules, and control devices.
h. Battery-inverter units.
i. Battery racks.
j. Monitoring and control equipment.

O. Provide engraved plates or phenolic plastic nameplates at all switches installed for control of fans, pumps, remotely located lighting, illuminated signs, switched receptacles, contactors or other applications noted on the drawings.

END OF SECTION 26 05 53

SECTION 26 09 23

LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following lighting control devices:

1. Outdoor and indoor photoelectric switches.
2. Indoor occupancy sensors.
3. Outdoor motion sensors.
4. Emergency shunt relays.
5. Wall box dimmers
6. Circuit control hardware

B. Related Sections include the following:

1. Division 26 Section "Network Lighting Controls" for low-voltage, manual and programmable lighting control systems.

2. Division 26 Section "Wiring Devices" for wall-box dimmers, wall-switch occupancy sensors, and manual light switches.

C. All areas and rooms shall have automatic and manual controls.

1.3 DEFINITIONS

A. LED: Light-emitting diode.

B. PIR: Passive infrared.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control test reports.

C. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

D. Manufacturer shall substantiate conformance to this specification by supplying the necessary documents, performance data and wiring diagrams. Any deviations to this specification must be clearly stated by letter and submitted.

E. Submit any interconnection diagrams per major subsystem showing proper wiring.

F. Submit standard catalog literature which includes performance specifications indicating compliance to the specification.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Products supplied shall be from a manufacturer that has been continuously involved in the manufacturing of occupancy sensors for a minimum of five years.

C. All components shall be UL Listed, offer a five year warranty and meet all state and local applicable code requirements.

1.6 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

1.7 OUTDOOR PHOTOELECTRIC SWITCHES

A. Description: Solid state, with SPST or DPST dry contacts (as required) rated for 1800 VA to operate connected load, relay, or contactor coils; complying with UL 773.

1. Light-Level Monitoring Range: 1.5 to 10 fc (16.14 to 108 lx), with an adjustment for turn-on and turn-off levels within that range.

2. Time Delay: 30-second minimum, to prevent false operation.

3. Lightning Arrester: Air-gap type.

4. Mounting: Conduit body

5. Adjustable exposure shield

6. Slide sensor adjustment, die cast weatherproof housing. ½" threaded stem and six-inch color coded #16 AWG wire leads.

1.8 INDOOR PHOTOELECTRIC SWITCHES

A. Ceiling-Mounted Photoelectric Switch: Solid-state, light-level sensor unit, with separate relay unit, to detect changes in lighting levels that are perceived by the eye. Cadmium sulfide photoresistors are not acceptable.

1. Sensor Output: Contacts rated to operate the associated relay, complying with UL 773A. Sensor shall be powered from the relay unit.

2. Light-Level Monitoring Range: 10 to 200 fc (108 to 2152 lx), with an adjustment for turn-on and turn-off levels within that range.

3. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling, with deadband adjustment.

4. Indicator: Two LEDs to indicate the beginning of on-off cycles.

B. Skylight Photoelectric Sensors: Solid-state, light-level sensor; housed in a threaded, plastic fitting for mounting under skylight, facing up at skylight; with separate relay unit, to detect changes in lighting levels that are perceived by the eye. Cadmium sulfide photoresistors are not acceptable.

1. Sensor Output: Contacts rated to operate the associated relay, complying with UL 773A. Sensor shall be powered from the relay unit.

2. Light-Level Monitoring Range: 1000 to 10,000 fc (10 800 to 108 000 lx), with an adjustment for turn-on and turn-off levels within that range.

3. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling, with deadband adjustment.

4. Indicator: Two LEDs to indicate the beginning of on-off cycles.

1.9 INDOOR OCCUPANCY SENSORS

A. System Description:

1. The objective of this section is to ensure the proper installation of the occupancy sensor based lighting control system so that lighting is turned off automatically after 30 minutes time delay when a room or area is vacated by the last person to occupy said room or area.

2. The occupancy sensor based lighting control shall accommodate all conditions of space utilization and all irregular work hours and habits.

3. Contractor shall warrant all equipment furnished in accordance to this specification to be undamaged, free of defects in materials and workmanship, and in conformance with the specifications. The suppliers obligation shall include repair or replacement, and testing without charge to the Government, all or any parts of equipment which are found to be damaged, defective or non-conforming and returned to the supplier. The warranty shall commence upon the Government's acceptance of the project. Warranty on labor shall be for a minimum period of one year.

4. The Contractor shall be responsible to locate and install the occupancy sensors per the selected manufacturer's recommendations, to accomplish the intended automatic control for the areas indicated.

B. Product Requirements

1. Unit will be a line voltage occupancy sensor in either 120 volt or 277 volt and be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.

2. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.

3. Have readily accessible user adjustable controls for up to 15 minute time delay and sensitivity. Controls shall be recessed to limit tampering.

4. Be equipped with a bypass manual override for use in the event of a sensor failure. When the bypass is utilized, lighting shall divert to the load side wall switch until sensor is replaced. This control shall be recessed to prevent tampering.

5. Have a method of indication to verify that motion is being detected during testing and that the unit is working.

6. Unit will be constructed of high impact plastics to assure vandal resistance.

7. For areas requiring multiple detectors, provide additional sensors, power packs, splitters, slave relays and harness cable as required.

8. If the device emits ultrasonic radiation as a signal for sensing occupants within an area, the device shall have had a Radiation Safety Abbreviated Report submitted to the Center for Devices and Radiological Health, Federal Food and Drug Administration, under 21 Code of Federal Regulations, Section 1002.12 (1996).

9. If the device emits microwave radiation as a signal for sensing occupants within the area, the device shall comply with all applicable provisions in 47 Code of Federal Regulations, Parts 2 and 15 (1996), and have an approved Federal Communications Commission Identifier that appears on all units of the device.

C. Dual technology occupancy sensors shall meet the following additional requirements:

1. Unit shall combine air transducer ultrasonic detection with passive infrared detectors to insure maximum detection ability.

2. Unit will be capable of detecting occupancy in an area of up to 2000 sq.ft. with no detectable blind spots.

3. Unit will require no special hardware to complete installation on either a suspended or inaccessible ceiling.

4. Unit will have an accessible adjustable time delay of 30 seconds to 15 minutes depending on application.

5. Unit will have an easily accessible sensitivity adjustment for all applications.

6. Unit will have a convenient shunt provision to by-pass the sensor in case of failure so lighting and HVAC may be operated manually.

7. Unit will employ a programmable dip switch to select sensing modes as dictated by environmental factors.

8. Unit will employ a programmable dip switch to allow either detection technology to be independently configured.

9. Where specified, sensors shall offer daylighting footcandle adjustment control and be able to accommodate dual level lighting.

10. Unit shall have an additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, data logging and other control options. Sensors utilizing separate components or specially modified units to achieve this function are not acceptable.

D. Wall sensors shall meet the following additional minimum requirements:

1. Unit shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.

2. Unit shall accommodate loads from 0 to 800 watts at 120 volts; 9 to 1200 watts at 277 volts and shall have 180° coverage capability.

3. Unit shall have no leakage current to load, in manual or in Auto/Off mode, for safety purposes and shall have voltage drop protection.

4. Unit shall be dual technology only.

5. Unit shall be installed for manual 'ON', auto 'OFF' operation.

E. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection or PIR and ultraphonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.

2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).

3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

F. Wall switch sensor with integral relay. Dual technology with two circuit capability for a/b switching sensors. Manual 'ON', auto 'OFF' operation unless specified otherwise.

1.10 OUTDOOR MOTION SENSORS (PIR)

A. Passive-infrared type, 120/277V, weatherproof, adjustable time delay up to 15 minutes, 180-degree field of view, and 110-foot (34m) detection range. Minimum switch rating: 1000W incandescent, 500 VA fluorescent.

B. Performance Requirements: Suitable for operation in ambient temperatures ranging from minus 40 to plus 130 deg F (minus 40 to plus 54 deg C), rated as raintight according to UL 773A.

1. Operation: Turn lights on when sensing infrared energy changes between background and moving body in area of coverage; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.

2. Mounting:

a. Sensor: Suitable for mounting in any position on a standard outdoor junction box.

b. Relay: Internally mounted in a standard weatherproof electrical enclosure.

c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

3. Bypass Switch: Override the on function in case of sensor failure.

4. Automatic Light-Level Sensor: Adjustable from 1 to 20 fc (11 to 215 lx); keep lighting off during daylight hours.

C. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm).

D. Detection Coverage: 110 foot (34 m) with a field of view of 180 degrees.

E. Lighting Fixture Mounted Sensor: Suitable for switching lamp/ballast within fixture at voltage rated.

F. Individually Mounted Sensor: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.

1. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.

2. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.

1.11 EMERGENCY SHUNT RELAY

A. Description: Normally closed, electrically held relay, arranged for wiring in parallel with manual or automatic switching contacts; complying with UL 924.

1. Coil Rating: 120 or 277 V as required.

1.12 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 22 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 16 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

1.13 WALL BOX DIMMERS

A. Wall box dimmers shall be the quality as defined below and compatible with the dimming ballasts provided in the various dimming fixtures:

1. Solid State Triac Dimming: Dimmers shall utilize solid-state triacs rated for a minimum of 150% of the control's rated capacity.

2. *Surge Protection: Dimmer shall be tested to withstand voltage surges of up to 6000V and current surges of 200A without damage. Controls shall meet ANSI/IEEE Standard C62.41-1980.*

3. *Filtering Network: Dimmer shall utilize large toroidal chokes to minimize radio frequency interference.*

4. *Air-Gap Switch: Dimmer shall totally disconnect power from the load in Off position by an accessible air-gap switch, such that there is no leakage current present at fixtures.*

5. *Heat Transfer: Dimmer shall incorporate full-sized heat sinks to transfer heat away from integral components, reducing operating temperatures.*

6. *Power Failure memory: Dimmer shall restore light to same level set prior to power failure.*

7. *Voltage Compensation: Dimmer shall include voltage compensation to stabilize light output from variations in the AC line-voltage. Dimmers in which the light output is not held constant with varying AC line-voltage shall not be acceptable.*

8. *Listing: Dimmer shall be solid state, UL listed specifically for each required load.*

9. *Electrostatic discharge Protection: Dimmer shall not be susceptible to damage or loss of memory due to 16K volt static discharges.*

10. *Smooth Continuous Dimming: Dimmer shall provide flicker-free and continuously variable control of light intensity.*

11. Three-Way Locations: Dimmer shall be capable of operating in either three-way switch location.

12. Device and coverplate finish to match wall switches on project.

13. Size dimmers for connected load.

14. Where dimmers are ganged together, provide a single multi-gang coverplate.

1.14 CIRCUIT CONTROL HARDWARE

A. Control units shall be complete with an isolated load switching control relay and low voltage transformer.

B. Relay contacts shall have ratings of:

13A – 120 VAC Tungsten
20A – 120 VAC Ballast
20A – 277 VAC Ballast

C. Control wiring between sensors and control units shall be Class II, 18-24 AWG, stranded UL Classified, PVC insulated or Teflon jacketed cable suitable for use in plenums, where applicable.

1.15 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions. In exterior applications, locate photocell in an area devoid of artificial light which may cause false

on/off. Select location not subject to tampering. Verify location with Contracting Officer prior to rough-in.

B. Contractor's work to include all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.

C. Contractor/Supplier shall examine all general specification provisions and drawings for related electrical work required as work under Division 26.

D. It shall be the Contractor's responsibility to locate and aim sensory in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations. Rooms shall have 90 to 100 percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the rooms. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The Contractor shall provide additional sensors if required to properly and completely cover the respective rooms.

E. It is the Contractor's responsibility to obtain installation diagrams from the manufacturer or an authorized factory representative, to verify placement of sensors and installation criteria.

F. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. The Contractor shall also provide, at the Government's facility, the training necessary to familiarize the Government's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems.

G. Adjust the time delay on all sensors for 15 minutes.

H. All switches associated with the occupancy sensor are to be wired in series, on the load side of the sensor. Switches are not to be wired so that the sensor can be bypassed. They can only operate the light fixtures while the sensor is detecting occupancy.

I. Where sensor wiring is exposed it shall be installed in conduit.

1.16 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

B. For multiple exterior lighting circuits, provide contactors mounted in a separate matching, lockable enclosure.

1.17 WIRING INSTALLATION

A. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be 1/2 inch (13 mm).

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

E. Provide all associated wiring required for control of exterior lighting circuits.

1.18 IDENTIFICATION

A. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.

2. Identify circuits or luminaries controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

1.19 FIELD QUALITY CONTROL

A. Perform the following field service and commissioning inspections:

1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.

2. Operational Test: Verify operation of each lighting control device, and adjust time delays. Set sensitivity to detect motion and/or sound immediately upon room entry and from anywhere within the space to be covered. Set timer to turn off lights 15 minutes after occupancy is not detected.

B. Lighting control devices that fail tests and inspections are defective work.

C. Provide commissioning reports to Government and Contracting Officer..

1.20 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide two visits to Project during other-than-normal occupancy hours for this purpose.

1.21 DEMONSTRATION

A. Coordinate demonstration of products specified in this Section with demonstration requirements for low-voltage, programmable lighting control system specified in Division 26 Section "Network Lighting Controls."

B. Engage a factory-authorized service representative to train Government's maintenance personnel to adjust, operate, and maintain lighting control devices. Refer to Division 01 Section "Demonstration and Training."

C. Factory Commissioning: It shall be the manufacturer's responsibility to verify all proper adjustments and train Government's personnel to ensure Government's satisfaction with the occupancy system. This service shall be provided at no additional cost to the Government. Include all cost in the Division 26 Bid.

1.22 CONTROL OF EXTERIOR LIGHTING FIXTURES

A. Control of exterior lighting fixtures shall be provided as follows:

1. Security Lighting Circuit(s): Dusk to dawn operation. Control device is to be the Division 26 provided network lighting controls.

2. General Lighting Circuit(s): Dusk to selected shut off time operation. Control device is to be the Division 26 provided network lighting controls.

1.23 FACTORY COMMISSIONING

A. Upon completion of the installation, the system shall be completely commissioned by the manufacturer's factory authorized technician who will verify all adjustments and sensor placement to ensure a trouble-free occupancy-based lighting control system. This service is to be included in the electrical bid.

B. Lighting Control Acceptance: Before a new lighting system serving a building, space, or site is operated for normal use, all indoor and outdoor lighting controls serving the building, space, or site shall be certified as meeting the Acceptance Requirements for Code Compliance. A Certificate of Acceptance shall be submitted.

END OF SECTION 26 09 23

SECTION 26 09 43

NETWORK LIGHTING CONTROLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes manually operated lighting controls with relays or electrically operated circuit breakers and control module.

B. Related Sections include the following:

1. Division 26 Section "Lighting Control Devices" for time switches, photoelectric switches, occupancy sensors, and multi-pole contactors.

E. This specification section provides the minimum lighting controls required for all large retail, sales, mall, MPA, Food Court or other areas in the store. All areas shall have automatic lighting controls with manual override switching. Provide local manual controls for each area.

1.3 DEFINITIONS

A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling and power-limited circuits.

1.4 SUBMITTALS

A. Product Data: For control modules, power distribution components, network materials**,** manual switches and plates, and conductors and cables.

B. Shop Drawings: Detail assemblies of standard components, custom assembled for specific application on this Project.

1. Outline Drawings: Indicate dimensions, weights, arrangement of components, and clearance and access requirements.

2. Block Diagram: Show interconnections between components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices to be used. Describe characteristics of network and other data communication lines.

3. Wiring Diagrams: Power, signal, and control wiring. Coordinate nomenclature and presentation with a block diagram.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For lighting controls to include in emergency, operation, and maintenance manuals.

E. Warranty: Warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain lighting control module and power distribution components through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with 47 CFR, Subparts A and B, for Class A digital devices.

D. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate lighting control components to form an integrated interconnection of compatible components.

1. Match components and interconnections for optimum performance of lighting control functions.

1.7 WARRANTY

A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of lighting controls that fail in materials or workmanship or from transient voltage surges within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of software input/output to execute switching or dimming commands.
b. Failure of modular relays to operate under manual or software commands.
c. Damage of electronic components due to transient voltage surges.

2. Warranty Period: One years from date of Substantial Completion.

1.8 SYSTEM REQUIREMENTS

A. Performance Requirements: Manual switch operation sends a signal to programmable-system control module that processes the signal according to its programming and routes an open or close command to one or more relays or electrically operated circuit breakers in the power-supply circuits to groups of lighting fixtures or other loads.

1.9 CONTROL MODULE

A. Control Module Description: Comply with UL 916 (CSA C22.2, No. 205); microprocessor-based, solid-state, 365-day timing and control unit. Unit shall be programmable for control of

indicated number of output circuits. Output circuits shall be switched on or off by internally programmed time signals or by program-controlled analog or digital signals from external sources. Output circuits shall be pilot-duty relays compatible with power switching devices, all located in other enclosures. An integral touchscreen shall provide local programming and control capability. A programmed security access code shall protect touchscreen use. An integral alphanumeric LCD shall display manual-control and programming steps. Modules and their associated control panels shall include the following features:

1. Multiple inputs and multichannel output .
2. Multiple inputs for occupancy sensors and hand-held programming device.

1.10 POWER DISTRIBUTION COMPONENTS

A. Modular Relay Panel: Comply with UL 508 (CSA C22.2, No. 14) and UL 916 (CSA C22.2, No. 205); factory assembled with modular single-pole relays, power supplies, and accessory components required for specified performance.

1. Cabinet: Steel with hinged, locking door.

a. Barriers separate low-voltage and line-voltage components.

b. Directory: Mounted on back of door. Identifies each relay as to load groups controlled and each programmed pilot device if any.

c. Control Power Supply: Transformer and full-wave rectifier with filtered dc output.

2. Single-Pole Relays: Mechanically held unless otherwise indicated; split-coil, momentary-pulsed type.

a. Low-Voltage Leads: Plug connector to the connector strip in cabinet and pilot light power where indicated.

b. Rated Capacity (Mounted in Relay Panel): 20 A, 125-V ac for tungsten filaments; 20 A, 277-V ac for ballasts.

c. Endurance: 50,000 cycles at rated capacity.

d. Mounting: Provision for easy removal and installation in relay cabinet.

B. Line-Voltage Surge Suppression: Factory installed as an integral part of 120- and 277-V ac, solid-state control panels.

1.11 MANUAL SWITCHES AND PLATES

A. Push-Button Switches: Modular, momentary-contact, low-voltage type.

1. Match color specified in Division 26 Section "Wiring Devices."
2. Integral green LED or neon pilot light to indicate when circuit is on.

B. Manual, Maintained Contact, Full- or Low-Voltage Switch: Comply with Division 26 Section "Wiring Devices."

C. Wall-Box Dimmers: Comply with Division 26 Section "Wiring Devices."

D. Wall Plates: Single and multi-gang plates as specified in Division 26 Section "Wiring Devices."

E. Legend: Engraved or permanently silk-screened on wall plate

1.12 CONDUCTORS AND CABLES

A. Classes 2 and 3 Control Cables: Multiconductor cable with copper conductors not smaller than No. 18 AWG, complying with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

B. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than No. 16 AWG, complying with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

C. Digital and Multiplexed Signal Cables: Unshielded, twisted-pair cable with copper conductors, complying with TIA/EIA-568-B.2, Category 5e for horizontal copper cable and with Division 27 Section "Communications Horizontal Cabling."

1.13 WIRING INSTALLATION

A. Comply with NECA 1.

B. Wiring Method: Install wiring in raceways. Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables" Minimum conduit size shall be 1/2 inch (13 mm).

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and non-power-limited conductors according to conductor manufacturer's written instructions.

D. Install field-mounting transient voltage suppressors for lighting control devices in Category A locations that do not have integral line-voltage surge protection.

E. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

F. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in terminal cabinets, equipment enclosures, and in junction, pull, and outlet boxes.

G. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

1.14 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections.

1.15 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors and to assist Owner's personnel in making program changes to suit actual occupied conditions. Provide up to two visits to Project during other than normal occupancy hours for this purpose.

1.16 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting controls and software training for control systems. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 26 09 43

SECTION 26 22 00

LOW-VOLTAGE TRANSFORMERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of energy efficient dry-type transformers rated 600 V or less, with capacities up to 1000 kVA:

1. Distribution transformers.
2. Buck-boost transformers.

1.3 SUBMITTALS

A. Product Data: Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated and vibration isolation.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each transformer type through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

D. NEMA: ST20, TP-1, TP-2, TR-28-1975, TR-16-1975, 250

E. UL: 1561, 506

F. ANSI: C57 Standards

G. CSA: C22.2 (No. 47), 802.2-00

H. Code of Federal Regulations, 10 CFR Part 431, Energy Conservation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

1.6 COORDINATION

A. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

B. Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.

1.7 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous windings without splices except for taps.

1. Internal Coil Connections: Brazed or pressure type.
2. Coil Material: Copper. .

1.8 DISTRIBUTION TRANSFORMERS

A. Comply with NEMA ST 20, and list and label as complying with UL 1561.

B. Cores: One leg per phase.

C. Enclosure: Ventilated, NEMA 250, Type 2 (indoor), Type 3R (outdoor).

1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.

2. The terminal compartment shall be sized to permit wiring in accordance with NEC on deflection of conductors.

3. A metal nameplate shall be affixed to the case of each transformer listing the following information as a minimum:

Manufacturer’s Name	Catalog Number
Primary and Secondary Voltage	Type
KVA	Impedance
Serial Number	Wiring Diagram

4. The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable UL and NEC standards.

D. Transformer Enclosure Finish: Comply with NEMA 250.

1. Finish Color: Gray.

E. Taps for Transformers Smaller Than 3 kVA: One 5 percent tap above normal full capacity.

F. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity.

G. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and four 2.5 percent taps below normal full capacity.

H. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 115 deg C rise above 40 deg C ambient temperature. The maximum temperature of the top of the enclosure shall not exceed 50°C rise above a 40°C ambient.

I. Energy Efficiency for Transformers Rated 15 kVA and Larger:

1. Complying with NEMA TP 1, Class 1 efficiency levels.
2. Tested according to NEMA TP 2.

J. Efficiency: Low-voltage dry-type distribution transformers shall have efficiencies not less than the applicable values in the following table when tested at 35% of the rated output power:

Single Phase		*Three Phase*	
Rated Power Output In KVA	*Minimum Efficiency %*	*Rated Power Output In KVA*	*Minimum Efficiency %*
≥15 <25	*97.7*	*≥15 <30*	*97.0*
≥25 <37.5	*98.0*	*≥30 <45*	*97.5*
≥37.5 <50	*98.2*	*≥45 <75*	*97.7*
≥ 50 <75	*98.3*	*≥75 <112.5*	*98.0*
≥75 <100	*98.5*	*≥112.5 <150*	*98.2*
≥100 <167	*98.6*	*≥150 <225*	*98.3*
≥ 167 <250	*98.7*	*≥225 <300*	*98.5*
≥ 250 <333	*98.8*	*≥300 <500*	*98.6*
333	*98.9*	*≥500 <750*	*98.7*
		≥750 <1000	*98.8*
		1000	*98.9*

K. Wall Brackets: Manufacturer's standard brackets.

1.9 BUCK-BOOST TRANSFORMERS

A. Description: Self-cooled, two-winding dry type, rated for continuous duty and with wiring terminals suitable for connection as autotransformer. Transformers shall comply with NEMA ST 1 and shall be listed and labeled as complying with UL 506 or UL 1561.

B. Enclosure: Ventilated, NEMA 250, Type 2.

1. Finish Color: Gray.

1.10 VIBRATION ISOLATION AND NOISE CONTROL

A. Manufacturers: Subject to compliance with requirements, provide comparable products by one of the following manufacturers:

1. Kinetics Noise Control
2. Mason Industries
3. Vibration Eliminator Co., Inc.

B. Submittals: Include rated load, spring diameters, deflections and upon request, calculations signed by a registered engineer showing that the seismic loads the mountings are to resist have been properly calculated.

C. Pads: Arrange in single or multiple layers of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.

1. Resilient Material: Oil- and water-resistant, neoprene or rubber**.**

D. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic or limit-stop restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to weight being removed; factory-drilled baseplate bonded to ¼-inch- (6 mm) thick, neoprene or rubber isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Restraint: Seismic or limit-stop as required for equipment and authorities having jurisdiction.
3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

1.11 IDENTIFICATION DEVICES

A. Nameplates: Engraved, laminated-plastic or metal nameplate for each distribution or buck-boost transformer, mounted with corrosion-resistant screws. Nameplates and label products are specified in Division 26 Section "Identification for Electrical Systems."

1.12 NOT USED.

1.13 NOT USED.

1.14 FIRE RATED SHEETING

A. Concrete board, ½ inch _13 mm) with fiberglass mesh, 4’ x 4’ or 4’ x 8’ sheets.

1.15 CUSTOM SUPPORT

A. Fabricated from welded steel angle or bolted channel.

B. Contractor shall be responsible for design, fabrication and installation. The support structure shall be submitted as a shop drawing and include information on weight, material load ratings and dimensions.

C. Provide shop drawings stamped approved by a registered structural engineer. The submittal shall be reviewed and approved by the project electrical and structural engineers prior to fabrication.

1.16 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

A. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.

B. Verify that ground connections are in place and requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

1.17 INSTALLATION

A. Install wall-mounting transformers level and plumb on the floor or with wall brackets fabricated by transformer manufacturer or custom fabricated.

B. Construct concrete bases and anchor floor-mounting transformers according to manufacturer's written instructions**,** and seismic codes applicable to Project.

C. Where indoor transformers are installed or adjacent to combustible surfaces, provide concrete board to provide the NEC required separation from combustible material, per Article 450.

D. Where outdoor transformers are installed, locate to provide the NEC required separation from combustible material, per Article 450.

E. Install units on vibration mounts as specified; comply with manufacturer’s indicated installation instructions.

F. Locate all transformers to provide required clearances per NEC and manfuacturer's requirements.

1.18 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

C. The final conduit connections to the transformer units shall utilize flexible conduit.

D. Tighten electrical and ground connections in accordance with equipment manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std 486A and B.

E. Provide secondary overcurrent protection for all dry type transformers in accordance with Section 240 of the NEC.

F. Ground each transformer as a separately derived service. Provide equipment bonding jumpers and secondary grounding electrode per NEC requirements.

1.19 NOT USED

1.20 ADJUSTING

A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.

B. Connect buck-boost transformers to provide nameplate voltage of equipment being served, plus or minus 5 percent, at secondary terminals.

C. Output Settings Report: Prepare a written report recording output voltages and tap settings.

1.21 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 26 22 00

SECTION 26 24 16

PANELBOARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.

B. Provide 35% spare ampacity in all panelboards above final loads and 30% extra breaker space with bussing and all hardware for future breakers. Provide 10% spare breakers in each panel in addition to the 30% extra breaker space. Don't provide panels smaller than 100 amps for vendors and EXCHANGE areas. Each vendor shall have their own electrical panel servicing only their stores or area. Provide main breakers in all panels per UFC.

1.3 DEFINITIONS

A. SVR: Suppressed voltage rating.

B. TVSS: Transient voltage surge suppressor.

1.4 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified.

1.5 SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.

2. Detail enclosure types and details for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.

4. Short-circuit current rating of panelboards and overcurrent protective devices.

5. Include evidence of NRTL listing for series rating of installed devices.

6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

7. Include wiring diagrams for power, signal, and control wiring.

8. It shall be the contractor's, supplier's and manufacturer's responsibility to ensure that the equipment purchased for installation will fit in the space available and to insure compliance with all applicable code required working clearances.

9. Should it be determined that the space available is not sufficient for the manufacturer's equipment, the contractor shall develop a plan which is acceptable to EXCHANGE and the Government for placing the equipment in a satisfactory layout which meets all required working clearances.

10. No equipment shall be purchased without verification that the space available is adequate for the intended manufacturer's equipment.

C. Qualification Data: For qualified testing agency.

D. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Contractor's Review: Prior to submitting the required material for review the contractor shall review all documentation received from the manufacturer and make notations to correct non-compliant items. Prior to forwarding the reviewed documentation for review; the contractor shall stamp the documents as 'Accepted' or 'Accepted as Noted'. Submittals which have not been pre-reviewed by the contractor or marked as previously stated shall be rejected.

F. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

G. Panelboard Directories: Installed on the inside of the doorframe under the plastic cover and slot provided. The directory shall be typewritten with spares and spaces written in pencil. The Contractor shall identify the type of load and area served by each circuit using the permanent

(end use) room numbers as determined by the Owner. Include all field changes and change order additions and deletions to the schedule. Attached copies of the panel schedules are not acceptable substitution. Provide new updated directories for all existing panelboards with load revisions.

H. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NEMA PB 1.

F. Comply with NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.8 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

   a. Ambient Temperature: Not exceeding minus 22 deg F (minus 30 deg C) to plus 104 deg F (plus 40 deg C).
   b. Altitude: Not exceeding 6600 feet (2000 m).

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

1.9 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: five years from date of Substantial Completion.

1.11 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Two spares for each type of panelboard cabinet lock.

2. Circuit Breakers Including GFCI and Ground Fault Equipment Protection (GFEP) Types: as scheduled.

3. Fuses for Fused Switches: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

4. Fuses for Fused Power-Circuit Devices: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.12 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Enclosures: Flush- and surface-mounted cabinets. Provide flush enclosures in all finished walls and vendor stores and janitor rooms. Surface enclosures shall only be allowed in mechanical/electrical areas and MPA area. Do not install panels in retail sales areas.

1. Rated for environmental conditions at installed location.

    a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
    b. Outdoor Locations: NEMA 250, Type 3R.
    c. Kitchen Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
    d. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
    e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

4. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.

5. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.

6. Finishes:

    a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.

    b. Flush Back Boxes: Galvanized steel.

    c. Surface Back Box in Utility Spaces, Electrical, Mechanical, Storage Rooms: Galvanized Steel.

    d. Surface Backboxes in Non-Utility Spaces: Finish to match panel and cover.

7. Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover.

B. Incoming Mains Location: As determined by the contractor.

C. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

2. Bus structure shall have minimum full current ratings as indicated for the through bus. Section bus shall be equal to or greater than the sum of the maximum ampacity ratings of all devices, including provisions for future devices, in that section.

3. Provisions for future devices shall be such that no additional connectors or bus will bed required to add devices.

4. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.

5. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box. Provide where indicated on the drawings.

D. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn **copper**, 98 percent conductivity.

2. Main and Neutral Lugs: Compression type.

3. Ground Lugs and Bus-Configured Terminators: Compression type.

4. Feed-Through Lugs: Compression type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

5. Subfeed (Double) Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

6. Gutter-Tap Lugs: Compression type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

7. Coordinate and provide lugs sized for the conductors specified.

E. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

F. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals per UL 67 testing.

1.13 DISTRIBUTION PANELBOARDS

A. Panelboards: NEMA PB 1, power and feeder distribution type.

B. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches (914 mm**)** high, provide two latches, keyed alike.

C. Mains: Circuit breaker or Lugs only as scheduled.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers. All breakers for EXCHANGE provided equipment and walk-in refrigeration freezer, coolers and vender food court equipment plus Division 25 equipment shall be returnable to supplier and new breakers shipped at no extra cost.

1.14 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

B. Mains: Circuit breaker or lugs only as scheduled.

C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units. All breakers for EXCHANGE provided equipment and walk-in refrigeration freezer, cooler and vender food court equipment plus Division 25 equipment shall be returnable to supplier and new breakers shipped at no extra cost.

D. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

E. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.

1.15 LOAD CENTERS

A. Not Allowed.

1.16 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

a. Instantaneous trip.
b. Long- and short-time pickup levels.
c. Long- and short-time time adjustments.
d. Ground-fault pickup level, time delay, and I^2t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

6. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).

7. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.

8. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

a. Standard frame sizes, trip ratings, and number of poles.

b. Lugs: Compression style, suitable for number, size, trip ratings, and conductor materials.

c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.

d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

e. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.

f. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage with field-adjustable 0.1- to 0.6-second time delay.

g. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.

h. Multi-pole units enclosed in a single housing or factory assembled to operate as a single unit.

i. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

j. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

1.17 PANELBOARD SUPPRESSORS

A. Surge Protection Device: IEEE C62.41-compliant, integrally mounted, bolt-on, solid-state, parallel-connected, modular (with field-replaceable modules) type, with sine-wave tracking suppression and filtering modules, UL 1449, 3rd edition, short-circuit current rating matching or exceeding the panelboard short-circuit rating, and with the following features and accessories:

1. Fabrication using bolted compression lugs for internal wiring.

2. Redundant suppression circuits.

3. Redundant replaceable modules.

4. Arrangement with wire connections to phase buses, neutral bus, and ground bus.

5. LED indicator lights for power and protection status. The indicator lights shall indicate which phase as well as which module is fully operable. The status of each TVSs module shall be monitored on the front cover of the enclosure as well as on the module. A push-to-test button shall be provided to test each phase indicator. Push-to-test button shall activate a state change of dry contacts for testing purposes.

6. Audible alarm, with silencing switch, to indicate when protection has failed.

7. Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of system operation. Contacts shall reverse position on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.

8. TVSS shall be designed to withstand a maximum continuous operating voltage (MCOV) of not less than 155% of nominal RMS voltage.

9. TVSS shall be constructued of one self-contained suppression module per phase.

10. The TVSS shall be equipped the following optional items:

    a. A transient voltage surge counter shall be located on the diagnostic panel on the front cover of the enclosure. The counter shall be equipped with a manual reset and battery backup to retain memory upon loss of AC power.

11. Peak Single-Impulse Surge Current Rating: 125 kA per mode/250 kA per phase for service entrance panelboards, 80 kA per mode/160 per phase for distribution panelboards and 60 kA per mode/120 per phase for branch panelboards.

12. Minimum single-impulse current ratings, using 8-by-20-mic.sec. waveform described in IEEE C62.41.2.

    a. Line to Neutral: 70,000 A.
    b. Line to Ground: 70,000 A.
    c. Neutral to Ground: 50,000 A.

13. Withstand Capabilities: 12,000 IEEE C62.41, Category C3 (10 kA), 8-by-20-mic.sec. surges with less than 5 percent change in clamping voltage.
14. Protection modes and UL 1449 SVR for grounded wye, three-phase, four-wire circuits shall be as follows:

    a. Line to Neutral: 800 V for 480Y/277, 400 V for 208Y/120]
    b. Line to Ground: 800 V for 480Y/277, 400 V for 208Y/120
    c. Neutral to Ground: 800 V for 480Y/277, 400 V for 208Y/120

15. Protection modes and UL 1449 SVR for 240/120-V, single-phase, three-wire circuits shall be as follows:

    a. Line to Neutral: 400 V.
    b. Line to Ground: 400 V.
    c. Neutral to Ground: 400 V.

16. Protection modes and UL 1449 SVR for 240/120-V, three-phase, four-wire circuits with high leg shall be as follows:

    a. Line to Neutral: 400 V, 800 V from high leg.
    b. Line to Ground: 400 V.
    c. Neutral to Ground: 400 V.
    d. Line to Ground: 1500 V for 480 V, 800 V for 240 V, or 2500 V for 600 V.

1.18 NOT USED

1.19 NOT USED

1.20 EXAMINATION

A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

A. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. The panelboards must fit in the allotted space shown on the drawings and meet all NEC required working clearances.

D. Acceptance of the manufacturers listed above is conditional upon compliance with the electrical and spatial requirements of the project.

1.21 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Equipment Mounting: Install ground-mounted power distribution panelboards on concrete bases, 4-inch (100-mm) nominal thickness. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-Place Concrete".

1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around full perimeter of base.

2. For panelboards, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.

3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

4. Install anchor bolts to elevations required for proper attachment to panelboards.

5. Attach panelboard to the vertical finished or structural surface behind the panelboard.

C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

D. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

E. Mount panelboard with uppermost handle no higher than +72” above finished floor unless otherwise indicated.

F. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

G. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

H. Install filler plates in unused spaces.

I. Stub four 1-inch empty conduits from each flush mounted panelboard section into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits [into raised floor space or] below slab not on grade. Stub one 1-1/2” inch empty conduit into accessible ceiling space or as indicated on the plans per each spare device greater than 60A.

J. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

K. Comply with NECA 1.

1.21 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

F. NEC, State and local code- required flash protection labels.

1.22 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Perform tests, inspections and make adjustments per the manufacturer's instructions and as specified.

2. Manufacturer's Field Service: Engage a factory-authorized service representative for technical support and to assist in testing.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.

b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.

c. Instruments and Equipment:

1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

2) The Contractor shall engage a qualified testing agency to test the ground fault protection system to verify compliance with NEC 230.95c requirements.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

F. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std 486A.

1.23 ADJUSTING

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Division 26 Section "Overcurrent Protective Device Coordination Study."

C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.

1. Measure as directed during period of normal system loading.

2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.

3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.

4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

1.24 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION 26 24 16

SECTION 26 27 26

WIRING DEVICES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Wall switches.
4. Isolated-ground receptacles.
5. Solid-state fan speed controls.
6. Pendant cord-connector devices.
7. Cord and plug sets.
8. Floor service outlets, service poles, and multioutlet assemblies.

B. Related Sections include the following:

1. Division 27 Section "Communications Horizontal Cabling" for workstation outlets.

2. Division 26 Section “Lighting Control Devices” for wall-box dimmers and wall switch occupancy sensors.

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for EXCHANGE-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements. Adjust voltage and amperage rating for EXCHANGE-furnished equipment.

1.7 STRAIGHT BLADE RECEPTACLES

A. Convenience Receptacles, hand use, heavy duty, grounding type, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498. Bodies shall be ivory as per NEMA WD1, face and body shall b thermoplastic supported on a metal mounting strap. Dimensional requirements shall be per NEMA WD6.

B. Provide screw-type, side wired wiring terminals. Connect grounding pole to mounting strap. The receptacle shall contain triple-wipe power contacts and double- or triple-wipe ground contacts.

C. Isolated-Ground, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

1. Description: Straight blade; equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts. UL 498, hard use, heavy duty, isolated grounding per NEMA WD1. Face and body shall be thermoplastic supported on a metal mounting strap. Dimensional requirements shall meet NEMA WD6. Provide screw-type side wired wiring terminals. The receptacle shall contain triple-wipe power contacts and double- or triple-wipe ground contacts.

1.8 GFCI RECEPTACLES

A. General Description: Straight blade, extra heavy duty, tamper-resistant, duplex type for mounting in a standard outlet box, feed or non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A. Device shall be capable of detecting current leak

of 6 milliamps or greater and tripping per requirements of UL 943 for Class A GFT devices. Provide screw type, side-wired wiring terminals or pre-wired pigtail leads. Provide with 'push-to-test' button and visible indication of tripped condition. All outdoor GFCI receptacles shall be marked weather-resistant. All receptacles shall have 10 KA short circuit current rating.

1.9 DUPLEX TVSS RECEPTACLES

A. General Description: Comply with NEMA WD1, NEMA WD6, UL 498 and UL 1449, with integral TVSS in line to ground, line to neutral, and neutral to ground.

1. TVSS Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 volts and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.

2. Active TVSS Indication: Visual and audible, with light visible in face of device to indicate device is 'active' or 'no longer in service'.

1.10 TWIST-LOCKING RECEPTACLES

A. Single Convenience Receptacles, 125 V, 20 A and 250 V, 60A: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, L22-30R, and UL 498.

1. High-impact nylon face, with one-piece all brass contact with long spring arm and oxide cutting nibs.

2. Provide twist-locking receptacles to match EXCHANGE furnished equipment voltage, phase and amperage.

1.11 PENDANT CORD-CONNECTOR DEVICES

A. Description: Matching, locking-type plug and receptacle body connector; NEMA WD 6 configurations L5-20P and L5-20R, heavy-duty grade or as required to match EXCHANGE furnished equipment. Coordinate voltage, phase and amperage with EXCHANGE.

1. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.

2. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

1.12 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.

2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

1.13 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches shall be rated quiet-type AC only, 120/277 V, 20 A with number of poles required. Totally enclosed single pole, three way, and four way switches with bodies of thermoplastic or thermoset plastic and mounting strap with grounding screw. Handles shall be ivory. Thermoplastic wiring terminals shall be screw type, side-wired. Contacts shall be silver-cadmium and contact arm shall be one-piece copper alloy.

C. Pilot Light Switches, 20 A, Wired Handle.:

1. Provide pilot light adapter for 277 volt operation.

2. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."

D. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors.

E. Breakers used as switches are not allowed.

F. Special Purpose Switches: Switches used for disconnection purposes (small water heaters, duct heaters, circ pumps, exhaust fans, etc.) shall be same as wall switches. Switches must have a horsepower rating adequate for the motor being switched.

1.14 WALL BOX DIMMERS

A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.

B. Control: Continuously adjustable with single-pole or three-way switching. Comply with UL 1472.

C. Incandescent Lamp Dimmers: 120V; control shall follow square-law dimming curve. On-off switch positions shall bypass dimmer module.

1. 600 W; dimmers shall require no derating when ganged with other devices. Illuminated when ‘OFF’.

D. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 10 percent of full brightness.

1.15 FAN SPEED CONTROLS

A. Modular, 120-V, full-wave, solid-state units with integral, quiet on-off switches and audible frequency and EMI/RFI filters. Comply with UL 1917.

1. Continuously adjustable slider, toggle switch or rotary knob, 5 A or 1.5 A.

2. Three-speed adjustable slider or rotary knob, 1.5 A.

1.16 OCCUPANCY SENSORS

A. Long-Range Wall-Switch Sensors:

1. Description: Dual technology, with both passive-infrared- and ultrasonic-type sensing, 120/277V, adjustable time delay up to 30 minutes, 110-degree field of view, and a minimum coverage area of 1200 sq. ft. (111 sq. m).

B. Wide-Range Wall-Switch Sensors:

1. Description: Passive-infrared type, 120/277V, weatherproof, adjustable time delay up to 15 minutes, 180-degree field of view, and 110 foot (34 m) detection range. Minimum switch rating: 1000W incandescent, 500 VA fluorescent.

1.18 COMMUNICATIONS OUTLETS

A. Data Outlet:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to, the following:

a. Siemon CT-C5-C5-02 blue in color Category 5e cable for primary and yellow in color Category 5e cable for secondary.

2. Description: Single 5E jacks for terminating 100 Ohm, balanced, four-pair UTP; TIA/EIA 568-B.1; eight pin, non-keyed; complying with Category 5e. Comply with UL 1863.

B. Telephone Outlet:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to, the following:

a. Siemon CT-C5-C5-02 white in color Category 5e cable.

2. Description: Single RJ-45 jack for 100 Ohm, balanced, four-pair UTP; TIA/EIA 568 B.1; eight pin, non-keyed; complying with Category 5e.

1.19 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: Smooth, high-impact nylon or lexan 0.03-inch- (1-mm-) thick, satin-finished stainless steel, 0.04-inch- (1-mm-). Plates to be same color as device. Verify plate material with EXCHANGE.

3. Sectional type device plates will not be permitted.

4. Material for Unfinished Spaces: Galvanized steel or smooth, high-impact nylon or lexan.

5. Material for Damp Locations: Cast aluminum with in-use cover, and listed and labeled for use in ‘damp or wet locations’.

6. Restrooms: Smooth specification grade satin stainless steel.

C. Wet-Location, Weatherproof 'In-Use' UL Listed, Gasketed Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable cover

1.20 FLOOR SERVICE FITTINGS

A. Type: Modular, flush-type, flap-type or above-floor, dual-service units suitable for wiring method used.

B. Compartments: Barrier separates power from voice and data communication cabling.

C. Service Plate: Rectangular or round, solid brass with satin finish.

D. Power Receptacle: NEMA WD 6 configuration 5-20R, gray finish, unless otherwise indicated.

E. Voice and Data Communication Outlet: One, two, or three modular, keyed, color-coded, RJ-45 Category 5e jacks for UTP cable.

1.21 MULTI-OUTLET ASSEMBLIES

A. The surface metal raceway shall consist of a base and cover with convenience power outlets, duplex receptacles with pre-wired branch wiring, for use in dry interiors

B. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.

C. Raceway Material: Metal, with Wilsonart frosty white #15-73-60 custom finish.

D. Wire: No. 12 AWG.

1.22 SERVICE POLES

A. Description: Factory-assembled and field-wired units to extend power and voice and data communication from distribution wiring concealed in ceiling to devices or outlets in pole near floor or in EXCHANGE provided casework and displays.

1. Poles: Nominal 2.5-inch- (65-mm-) square cross section, with height adequate to extend from floor to at least 6 inches (150 mm) above ceiling or to structure, and with separate channels for power wiring and voice and data communication cabling. Coordinate with EXCHANGE final casework layout for poles with power only and poles with power and data and security wiring.

2. Mounting: Ceiling trim flange with concealed bracing arranged for positive connection to supports or structure supports; with pole foot and carpet pad attachment where pole extends to finished floor.

3. Casework Mounting: Custom length power poles into checkout, jewelry and electronic casework require two power circuits (one clean power, one dirty power) from these power poles. Make connections to receptacles and J-boxes in casework. The checkout, jewelry and electronics casework also require a data channel for data cabling and security duress alarm wiring. Power only service poles into EXCHANGE provided freestanding casework require custom length pole in field to the 6 ft above floor connection point with two 20 amp duplex receptacles within 12" of top of casework.

4. Finishes: Custom painted finish to match EXCHANGE requirements. Wilsonart frosty white #15-73-60 or current standard.

5. Wiring: Sized for minimum of five No. 12 AWG power and ground conductors and a minimum of four, 4-pair, Category 5e voice and data communication cables.

6. Power Receptacles: Two duplex, 20-A, heavy-duty, NEMA WD 6 configuration 5-20R units.

7. Voice and Data Communication Outlets: Two RJ-45 Category 5e jacks or as required per final EXCHANGE store layout. Coordinate with EXCHANGE store layout and Contracting Officer.

1.23 FINISHES

A. Color:

1. Wiring Devices Connected to Normal Power System: Ivory or as selected by EXCHANGE, unless otherwise indicated or required by NFPA 70 or device listing.

2. Isolated-Ground Receptacles: Orange or with orange triangle on face. Orange devices required for clean power to all checkout counters.

1.24 BUILDING ENTRY ANNUNCIATION SYSTEM

A. Provide a buzzer entry system to alert personnel of visitors or deliveries. The system shall be 24 volt and have Edwards #15-0G5 buzzer or equal, with wall mounted weatherproof Edwards pushbuttons #644 or equal at entry door. Provide systems, at receiving.

1.25 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

1. Mounting Heights:

Switches:	+48” to top of J-box
Receptacles:	+18” to top of J-box.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.

2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

3. Install device boxes in brick or block walls on the wall so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall or half in and half out of a tiled surface.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.

2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

4. Existing Conductors:

   a. Cut back and pigtail, or replace all damaged conductors.
   b. Straighten conductors that remain and remove corrosion and foreign matter.
   c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.

2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.

3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.

4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.

5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.

6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

8. Tighten unused terminal screws on the device.

9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation: Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening. Plate edges shall be parallel to wall junctions, door, windows, etc., and flush against the wall surface. All switches and receptacles shall be installed vertical unless in toe space or indicated otherwise.

G. Dimmers:

1. Install dimmers within terms of their listing.

2. Verify that dimmers used for fan speed control are listed for that application.

3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on bottom. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of EXCHANGE furnished partitions and furnishings.

1.28 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use machine printing with black lettering on white field Use durable wire markers inside outlet boxes.

1.29 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

2. Test Instruments: Use instruments that comply with UL 1436.

3. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.

2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.

3. Ground Impedance: Values of up to 2 ohms are acceptable.

4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.

5. Using the test plug, verify that the device and its outlet box are securely mounted.

6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION 26 27 26

SECTION 26 28 13

FUSES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cartridge fuses rated 600-V ac and less for use in control circuits; enclosed switches; enclosed controllers and motor-control centers.

2. Plug fuses rated 125-V ac and less for use in plug-fuse-type enclosed switches.

3. Spare-fuse cabinets.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material, dimensions, descriptions of individual components, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:

1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.

a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.

b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.

2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.

3. Current-limitation curves for fuses with current-limiting characteristics.

4. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse.

5. Coordination charts and tables and related data.

B. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Ambient temperature adjustment information.

2. Current-limitation curves for fuses with current-limiting characteristics.

3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse.

4. Coordination charts and tables and related data.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA FU 1 for cartridge fuses.

D. Comply with NFPA 70.

E. Comply with UL 248-11 for plug fuses.

1.5 PROJECT CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.6 COORDINATION

A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

1.7 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

2. Fuse Pullers: Two for each size and type.

1.8 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

B. Fuses shall be as follows:

1. Circuits 601 to 6000 amperes shall be protected by current limiting Bussmann or equal Low-Peak Time-Delay fuses KRP-C. Fuses shall be time-delay and must hold 500% of

2. Circuits 0 to 600 ampere shall be protected by current limiting Bussmann or equal Low-Peak Dual-Element fuses LPN-RJK (250 volts) or LPS-RK (600 volts). All dual-element fuses shall have separate overload and short-circuit elements. The fuse must hold 500% of rated current for a minimum of 10 seconds and be listed by Underwriters Laboratories, Inc., with an interrupting rating of 200,000 amperes r.m.s. symmetrical. The fuses shall be UL Class RK1.

3. Motor Circuits: All individual motor circuits rated 480 amperes or less shall be protected by Low-Peak Dual-Element fuses LPN-RK (250 volts) or LPS-RK (600 volts). The fuses for 1.15 service factor motors shall be installed in ratings approximately 125% of motor full load current except where high ambient temperatures prevail, or where the motor drives a heavy revolving part which cannot be brought up to full speed quickly, such as large fans. Under such conditions the fuse should be 150% to 175% of the motor full load current. Larger HP motors shall be protected by Bussmann Type KRP-C Low-Peak Time-Delay fuses or equal. 1.0 service factor motors shall be protected by Low-Peak Dual-Element fuses LPN-RK (250 volts) or LPS-RK (600 volts) installed in ratings approximately 115% of the motor full load current except as noted above. The fuss shall be UL Class RK1 Dual Element Time Delay or Class L.

1.9 PLUG FUSES

A. Characteristics: UL 248-11, nonrenewable plug fuses; 125-V ac.

1.10 PLUG-FUSE ADAPTERS

A. Characteristics: Adapters for using Type S, rejection-base plug fuses in Edison-base fuseholders or sockets; ampere ratings matching fuse ratings; irremovable once installed.

1.11 PLUG FUSE BOX COVER UNITS

A. Box Cover Units: 4” square box cover with plug fuse holder, on/off switch, single receptacle equal to Bussmann SSY-RL.

1.12 SPARE-FUSE CABINET

A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.

1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
2. Finish: Gray, baked enamel.
3. Identification: "SPARE FUSES" in 1-1/2-inch- (38-mm-) high letters on exterior of door.
4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 2 - EXECUTION

2.1 EXAMINATION

A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.

C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

2.2 FUSE APPLICATIONS

A. Cartridge Fuses:

1. Service Entrance: Class L, fast acting.
2. Feeders: 601-6000A Class L, fast acting: 0-600A Class RK1, fast acting
3. Motor Branch Circuits: Class RK1, time delay.
4. Other Branch Circuits: Class RK1, time delay unless otherwise indicated.
5. Control Circuits: Class CC, fast acting

B. Plug Fuses with box cover units for motor branch circuits 120V less than ½ HP:

1. Plug Fuses: Edison-base type, dual-element time delay. Type T or TL for box cover units.

2.3 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

B. Install plug-fuse adapters in Edison-base fuseholders and sockets. Ensure that adapters are irremovable once installed.

C. Install spare-fuse cabinet(s).

2.4 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems" and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 26 28 13

SECTION 26 28 16

ENCLOSED SWITCHES, CIRCUIT BREAKERS AND STARTERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Elevator.
4. Receptacle switches.
5. Shunt trip switches.
6. Molded-case circuit breakers (MCCBs).
7. Molded-case switches.
8. Enclosures.

1.3 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.

2. Current and voltage ratings.

3. Short-circuit current ratings (interrupting and withstand, as appropriate).

4. Include evidence of NRTL listing for series rating of installed devices.

5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

B. Qualification Data: For qualified testing agency.

C. Seismic Qualification Certificates: For enclosed switches and circuit breakers, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Field quality-control reports.

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

E. Manufacturer's field service report.

F. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).

2. Altitude: Not exceeding 6600 feet (2010 m).

1.7 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than 3 of each size and type.

1.10 FUSIBLE SWITCHES

A. Type HD, Heavy Duty, Two or Three Pole, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Double Throw, 600-V AC, 1200A and Smaller: UL 98 and NEMA KX 1, horsepower rated, with clips or bolt pads to accommodate fuss, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

5. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.

6. Hookstick Handle: Allows use of a hookstick to operate the handle.

7. Lugs: Mechanical type, suitable for number, size, and conductor material.

8. Service-Rated Switches: Labeled for use as service equipment.

1.11 NONFUSIBLE SWITCHES

A. Type HD, Heavy Duty, Two or Three Pole, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

B. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

4. Lugs: Mechanical type, suitable for number, size, and conductor material.

1.12 RECEPTACLE SWITCHES

A. Type HD, Heavy-Duty, Single-Throw Fusible Switch: 600-V ac, 30, 60 or 100A; UL 98 and NEMA KS 1; horsepower rated, with clips or bolt pads to accommodate fuses; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.

B. Type HD, Heavy-Duty, Single-Throw Nonfusible Switch: 600-V ac, 30, 60 or 100 A; UL 98 and NEMA KS 1; horsepower rated, lockable handle with capability to accept three padlocks; interlocked with cover in closed position.

C. Interlocking Linkage: Provided between the receptacle and switch mechanism to prevent inserting or removing plug while switch is in the on position, inserting any plug other than specified, and turning switch on if an incorrect plug is inserted or correct plug has not been fully inserted into the receptacle.

D. Receptacle: Polarized, three-phase, four-wire receptacle (fourth wire connected to enclosure ground lug).

1.13 SHUNT TRIP SWITCHES

A. General Requirements: Comply with ASME A17.1**,** UL 50, and UL 98, with 200-kA interrupting and short-circuit current rating when fitted with Class J fuses.

B. Switches: Three-pole, horsepower rated, with integral shunt trip mechanism and Class J fuse block; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.

C. Control Circuit: 120-V ac; obtained from integral control power transformer, with primary and secondary fuses, with a control power transformer of enough capacity to operate shunt trip, connected pilot, and indicating and control devices.

D. Accessories:

1. Oiltight key switch for key-to-test function.

2. Oiltight green ON pilot light.

3. Isolated neutral lug; 100 percent rating.

4. Mechanically interlocked auxiliary contacts that change state when switch is opened and closed.

5. Form C alarm contacts that change state when switch is tripped.

6. Three-pole, double-throw, fire-safety and alarm relay; 120-V ac coil voltage.

7. Three-pole, double-throw, fire-alarm voltage monitoring relay complying with NFPA 72.

1.14 MOLDED-CASE CIRCUIT BREAKERS

A. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

B. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

C. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

D. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:

1. Instantaneous trip.
2. Long- and short-time pickup levels.
3. Long- and short-time time adjustments.
4. Ground-fault pickup level, time delay, and I^2t response.

E. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

F. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.

G. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

H. Ground-Fault, Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).

I. Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.

2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.

3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.

5. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.

6. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.

7. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.

8. Alarm Switch: One NO and one NC contact that operates only when circuit breaker has tripped.

9. Accessory Control Power Voltage: Integrally mounted, self-powered, 120-V ac**.**

1.15 MOLDED-CASE SWITCHES

A. General Requirements: MCCB with fixed, high-set instantaneous trip only, and short-circuit withstand rating equal to equivalent breaker frame size interrupting rating.

B. Features and Accessories:

1. Standard frame sizes and number of poles.

2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.

3. Ground-Fault Protection: Comply with UL 1053; remote-mounted and powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.

4. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.

5. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.

6. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic switch contacts, "b" contacts operate in reverse of switch contacts.

7. Alarm Switch: One NO and one NC contact that operates only when switch has tripped.

1.16 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.

2. Outdoor Locations: NEMA 250, Type 3R.

3. Kitchen Wash-Down Areas: NEMA 250, Type 4X, stainless steel.

4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.

5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

6. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7.

1.17 STARTERS

A. Non-Reversing Starters: Reference Divisions 01, 23, and 26 drawings and specifications and provide all motor starters that are indicated to be provided by Division 26. Some starters are furnished as integral parts of the equipment specified under other Divisions. Coordinate with these trades and make all required line voltage connections to starter equipment furnished by others. Starters shall be NEMA size and provided by Division 26 unless otherwise noted. Where less than three starters are required in a room, individual starters are acceptable. Three or more require a motor control center.

B. Combination starters are acceptable for locations where both the disconnecting means and starter are provided by Division 26.

C. Motor starters provided by Division 26 shall be across-the-line, no-reversing, NEMA Size 1 (minimum). Starters shall be furnished with the following:

1. Overloads: Three Overload Relays – overload shallb e block-type with a push-to-test feature. Provisions for an isolated, field-mountable alarm contact shall be available. Starter shall provide for field installation of up to 3 NO and 4 NC auxiliary contacts in addition to the hold-in interlock. Overloads provided shall be sized from the nameplate of the actual motor to be installed.

2. HOA Switch: Three position control switch for hand, off and automatic (HOA) operation.

3. NEMA enclosures rated for the environment where equipment is to be installed. Verify locations with equipment supplier and/or contractors.

4. In addition to the above items combination starters will be provided with the following features:

   a. Operating handle shall always remain connected to the breaker or switch. The operating handle shall not be mounted in the door of the enclosure, but to the side of the door for safe ‘stand-aside’ operation. Position of operting handle will indicate On, Off or Tripped condition of switch or circuit breaker.

   b. Interlock provisions shall prevent unauthorized opening or closing of the starter door with the disconnect in the On position.

5. Starter control voltage shall be 120 volt AC.

6. Provide 120 volt AC power for control at each 208 volt or 480 volt starter by one of the following methods:

   a. 208 Volt Source: Provide 120 volt control power derived from Phase A of the feeder circuit. Provide separate overcurrent protection per NEC for the control power source. NOTE: Include a neutral conductor in the equipment feeder circuit.

   b. 480 Volt Source: Provide a 120 volt control voltage transformer derived from phases A and C. Provide separate overcurrent protection per the NEC for the control power source.

c. Separate 120 volt power circuit from the nearest panel or other source approved by the Engineer. Provide a means of disconnect per NEC requirements.

1.16 MOTOR WIRING AND MECHANICAL EQUIPMENT CONNECTIONS

A. Provide line voltage power wiring to each unit, motor and/or equipment, furnished by other Divisions.

B. Verify motor characteristics prior to installing wiring. Exact location of motor and connections will be ascertained before installation of conduit. A flexible conduit connection with grounding wire, with sufficient slack to comply with vibration requirements, shall be provided at each motor.

C. Prior to energizing any motor or mechanical equipment circuit notify the mechanical contractor. Prior to motor start-up ensure that all motors are lubricated, rotate in the correct direction and are furnished with the proper overload protection. Energizing any mechanical circuit, prior to coordination with the mechanical contractor, is at your own risk.

1.17 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1.18 INSTALLATION

C. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

D. Comply with mounting and anchoring requirements specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

F. Install fuses in fusible devices.

G. Comply with NECA 1.

1.19 IDENTIFICATION

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

1.20 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to provide technical assistance.

D. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.

b. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values.

4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

1.21 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 26 28 16

SECTION 26 51 00

INTERIOR LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Interior lighting fixtures, lamps, and ballasts.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.
5. Retrofit kits for fluorescent lighting fixtures.

B. This performance specification section provides the minimum requirements for a complete and operating lighting system design, material and installation.

C. Related Sections include the following:

1. Division 26 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multi-pole lighting relays and contactors.

2. Division 26 Section "Network Lighting Controls" for manual or programmable control systems with low-voltage control wiring or data communication circuits.

3. Division 26 Section "Wiring Devices" for manual wall-box dimmers for incandescent lamps.

1.3 DEFINITIONS

A. BF: Ballast factor.

B. CRI: Color-rendering index.

C. CU: Coefficient of utilization.

D. HID: High-intensity discharge.

E. LER: Luminaire efficacy rating.

F. Luminaire: Complete lighting fixture, including ballast housing if provided.

G. RCR: Room cavity ratio.

H. CCT: Correlated color temperature.

1.4 SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions.

2. Emergency lighting units including battery and charger.

3. Ballast, including ballast factor and power factor.

4. Energy-efficiency data.

5. Life, output, CRI rating, CCT rating, color shift characteristics and energy-efficiency data for lamps.

6. Voltage rating.

7. Type of mounting.

8. Type of ceiling.

B. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, signed by product manufacturer.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.

E. Warranties: Special warranties specified in this Section.

F. Substitutions: Approval of substitution requests may be contingent upon EXCHANGE approval, furnishing sample fixtures for inspection, providing additional photometric data, such as point-by-point calculations or any or all of the above.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.7 WARRANTY

A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Emergency Lighting Unit Batteries: Three years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining two years.

2. Warranty Period for Emergency Fluorescent Ballast and Self-Powered Exit Sign. Batteries: Three years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining two years.

B. Special Warranty for Ballasts: Manufacturer's standard form in which ballast manufacturer agrees to repair or replace ballasts that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Fluorescent Electronic Ballasts: Five years from date of Substantial Completion.

3. Warranty Period for HID Electromagnetic Ballasts: Two years from date of substantial completion

C. Special Warranty for **T5, T5H0 and T8** Fluorescent Lamps: Manufacturer's standard form, made out to Owner and signed by lamp manufacturer agreeing to replace lamps that fail in materials or workmanship, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: One year from date of Substantial Completion.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps: 10 for every 100 of each type and rating installed. Furnish at least one of each type.

2. Plastic Diffusers and Lenses: 1 for every 100 of each type and rating installed. Furnish at least one of each type.

3. Battery and Charger Data: One for each type of emergency lighting unit inside fixture

4. Ballasts: 1 for every 100 of each type and rating installed. Furnish at least one of each type.

5. Globes and Guards: 1 for every 20 of each type and rating installed. Furnish at least one of each type.

1.9 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

B. In Interior Lighting Fixture Schedule where titles below a column or row headings that introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

1.10 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Compact Fluorescent Fixtures:

1. Compact fluorescent fixtures shall be provided with instant start with electronic high power factor ballasts (.90 nominal), with Class P protection and end of life protection.

2. Compact fluorescent fixtures shall be provided with lamps as recommended by the fixture manufacturer.

3. Lamp sockets shall comply with the applicable UL and ANSI provisions with end-of-life protection.

4. Downlight reflectors shall be spun aluminum with the color and finish specified.

5. Downlights shall be self-trimming.

6. Downlights installed in food preparation, over serving lines shall be provided with clear plastic lenses inside the reflector assembly.

7. Integral Emergency Battery Packs: Where specified, batteries shall be specification grade with highest available lumen output for lamp. Bodine or equal. Provide integral test switch internal to reflector where available. Remote test switch location shall be verified with EXCHANGE.

C. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable. Fluorescent lighting fixtures shall be internally wired, connected and provided with the quantity of ballasts required to accomplish the switching arrangement indicated.

D. Fluorescent fixtures which utilize double ended lamps and contain ballasts or ballasted luminaries that are supplied from multiwire branch circuits and contain ballasts which can be serviced in place, shall have an **internal disconnecting** means that shall simultaneously disconnect all supply source conductors per NEC Article 410.

E. Metal Parts: Free of burrs and sharp corners and edges. Metal Finishes: Provide manufacturer's standard finish applied over corrosion resistant primer, free of streaks, runs, holidays, stains, blisters or similar defects. Remove any fixtures showing evidence of rust at time of final inspection.

F. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

G. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

H. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.
4. Laminated Silver Metallized Film: Is not permitted.

I. Plastic Diffusers, Covers, Louvers and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

   a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum average unless different thickness is indicated.

   b. UV stabilized.

2. All fixtures installed in food preparation and over serving lines shall be provided with lenses.

3. Glass: Annealed crystal glass, unless otherwise indicated.

4. Stright blade louvers: Steel baffles perpendicular to the lamps providing shielding. Baffle to be 8” high and 1” on center spacing, painted with 90% reflective white paint.

J. Severe Environment Fixtures: Light fixtures required to be operating in severe environmental conditions such as insulated ceilings, wet, damp or hazardous locations shall be furnished with appropriate UL labels, gaskets, ballast, etc.

K. Lamp Sockets:

1. Fluorescents shall comply with applicable provisions of UL 542 and ANSI C81.

2. Lamp sockets shall comply with the applicable UL and ANSI provisions with end-of-life protection.

P. Mounting Accessories: Fixtures shall be complete with all necessary accessories for installation, such as suspension hangers, canopies, plaster frames, spacers, etc. Where recessed fixtures are specified, it shall be the Contractor’s responsibility to coordinate the proper fixture type (flange, grid type, plaster frame, etc.) with the final type of ceiling construction to be installed. For suspended type luminaires, the hanger lengths (unless specifically indicated) shall be coordinated before ordering and installation. Provide swivel hangers for suspended fixtures attached to slope ceilings.

1.11 BALLASTS FOR LINEAR FLUORESCENT LAMPS

A. Electronic Programmed-Start Ballasts for T5, T5HO and T8 Lamps: Comply with ANSI C82.11 and the following:

1. Lamp end-of-life detection and shutdown circuit for T5 diameter lamps.
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: A.
4. Total Harmonic Distortion Rating: Less than 20 percent.
5. Transient Voltage Protection: IEEE C62.41, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.

8. BF: 0.95 or higher, unless otherwise indicated for T5, T5HO. BF=0.85 or higher for T8.
9. Power Factor: 0.95 or higher.
10. Class 'P' protected.
11. Voltage: Ballast shall be multi-voltage 120/277V. The operating input voltage shall be 108 to 305 at an input frequency of 60 hZ. Light output shall remain constant for line voltage fluctuation of plus or minus 5%. Ballasts that automatically sense the connected input voltage are preferred. Ballasts with voltage taps are acceptable.

B. Single Ballasts for Multiple Lighting Fixtures: Factory-wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.

C. Ballasts for Low-Temperature Environments:

1. Temperatures 0 Deg F (Minus 17 Deg C) and Higher: Electronic type rated for 0 deg F (minus 17 deg C) starting and operating temperature with indicated lamp types.

2. Temperatures Minus 20 Deg F (Minus 29 Deg C) and Higher: Electromagnetic type designed for use with indicated lamp types.

D. Ballasts for Dimmer-Controlled Lighting Fixtures: Electronic type.

1. Dimming Range: 100 to 5 percent of rated lamp lumens.
2. Ballast Input Watts: Can be reduced to 20 percent of normal.
3. Compatibility: Certified by manufacturer for use with specific dimming control system and lamp type indicated.

E. Ballast shall be designed for integral mounting with fixtures unless specifically designated as 'remote mounted'.

F. Compliance: All ballasts shall have compliance with EMI and RFI limits set by the FCC (CFR 47, Part 18) or NEMA and not interfere with normal electrical equipment, and compliance with line transient requirements of ANSI C82.41.

G. Ballasts shall be fault tolerant; lamp failure mode will not adversely impact ballast reliability.

H. Accepted Manufactures: Advance, GE or approved equal.

1.12 BALLASTS FOR COMPACT FLUORESCENT LAMPS

A. Description: Electronic programmed rapid-start type, complying with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:

1. Lamp end-of-life detection and shutdown circuit.
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: A.
4. Total Harmonic Distortion Rating: Less than 20 percent.
5. Transient Voltage Protection: IEEE C62.41, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.
8. BF: 0.95 or higher, unless otherwise indicated.
9. Power Factor: 0.95 or higher.
10. Interference: Comply with 47 CFR, Chapter 1, Part 18, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
11. Ballast Case Temperature: 75 deg C, maximum.

1.13 EMERGENCY POWER UNIT

A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with fluorescent ballast. Comply with UL 924, NFPA 101 and NEC Article 700.

1. Emergency Connection: Operate one fluorescent lamp continuously at an output of a minimum 1100 lumens each. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.

2. Night-Light Connection: Operate one fluorescent lamp continuously.

3. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space.

a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

4. Battery: Sealed, maintenance-free, nickel-cadmium type.

5. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.

6. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

7. The emergency lighting system to be designed with battery units to provide a maintained one footcandle (minimum) level of lighting throughout the designated path of egress. The battery unit shall provide a minimum 1350 lumen output for one T8 Octron (4 ft) lamp for a minimum duration of 90 minutes. Other manufacturers shall provide photometric data along with their submittal data to verify that the maintained one footcandle minimum light level is provided with the substitute battery unit. Should additional battery units be required to meet the specification requirements the contractor shall include such units in their bid.

8. Damp area battery units shall be Bodine BDL-500 or equal.

B. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more fluorescent lamps, remote mounted from lighting fixture. Comply with UL 924. Locate remote emergency battery units s close as possible to light fixture in accessible location or provide access panels.

1. Emergency Connection: Operate one fluorescent lamp continuously. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.

2. Night-Light Connection: Operate one fluorescent lamp in a remote fixture continuously.

3. Battery: Sealed, maintenance-free, nickel-cadmium type.

4. Charger: Fully automatic, solid-state, constant-current type.

5. Housing: NEMA 250, Type 1 enclosure.

6. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

7. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

8. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

1.14 EXIT SIGNS

A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.
2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

   a. Battery: Sealed, maintenance-free, nickel-cadmium type.

   b. Charger: Fully automatic, solid-state type with sealed transfer relay.

   c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

   d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

   e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

   f. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

1.15 EMERGENCY LIGHTING UNITS

A. Description: Self-contained units complying with UL 924.

1. Battery: Sealed, maintenance-free, lead-acid type.

2. Charger: Fully automatic, solid-state type with sealed transfer relay.

3. Operation: Relay automatically turns lamp on when power supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

6. Integral Time-Delay Relay: Holds unit on for fixed interval of 15 minutes when power is restored after an outage.

7. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

1.16 FLUORESCENT LAMPS

A. Low-Mercury Lamps: Comply with EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.

B. T8 rapid-start low-mercury lamps, rated 28 W maximum, nominal length of 48 inches (1220 mm), 3,100 initial lumens (minimum), CRI 85 (minimum), color temperature 3500 K, and average rated life 36,000 hours, unless otherwise indicated.

C. Compact Fluorescent Lamps: 4-Pin, low mercury**,** CRI 80 (minimum), color temperature 3500 K, average rated life of 12,000 hours at 3 hours operation per start, and suitable for use with dimming ballasts, unless otherwise indicated.

1. 13 W: T4, double or triple tube, rated 900 initial lumens (minimum).
2. 18 W: T4, double or triple tube, rated 1200 initial lumens (minimum).
3. 26 W: T4, double or triple tube, rated 1800 initial lumens (minimum).
4. 32 W: T4, triple tube, rated 2400 initial lumens (minimum).
5. 42 W: T4, triple tube, rated 3200 initial lumens (minimum).
6. 55 W: T4, triple tube, rated 4300 initial lumens (minimum).

1.17 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.

C. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.

D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gauge.

E. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, 12 gauge.

F. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

G. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

1.18 RETROFIT KITS FOR FLUORESCENT LIGHTING FIXTURES

A. Comply with UL 1598 listing requirements.

1. Reflector Kit: UL 1598, Type I. Suitable for two- to four-lamp, surface-mounted or recessed lighting fixtures by improving reflectivity of fixture surfaces.
2. Ballast and Lamp Change Kit: UL 1598, Type II. Suitable for changing existing ballast, lamps, and sockets.

1.19 NOT USED

1.22 INSTALLATION

A. Lighting Fixtures: Install interior lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of NEC, NECA's 'Standard of Installation', NEMA standards, and with recognized industry practices to ensure that lighting fixtures fulfill requirements.

B. Coordinate with the ceiling grid, sprinkler system, mechanical ductwork, plumbing and electrical conduit, boxes, cabling, etc., in the ceiling space to properly interface the installation of interior lighting fixtures.

C. Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

D. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element.

1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches (150mm) from lighting fixture corners. Comply with NEC 410-16 and IBC support and seismic requirements.

2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application. Caddy IDS or equal, wrap-around clips are acceptable. Twist or scissor clips are not permitted.

3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two ¾-inch (20 mm) metal channels spanning and secured to ceiling tees.

4. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

5. Recessed lighting fixtures shall comply with the requirements of NEC Article 410.

E. Suspended Lighting Fixture Support:

1. Securely mount all fixtures, provide all additional hangers and supporting brackets, including canopies, stem suspensions or proper lengths, etc., as necessary to securely fasten and support fixtures. All hangers shall support a weight equivalent of three times the weight of fixture supported. Recessed fixtures are to be secured to ceiling framing to comply with NEC 410-16b.

2. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.

3. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.

4. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.

5. Aircraft Cable Suspension: Provide cord clips to attach the power cord to the cable securely and in an orderly manner.

F. Recessed Fixtures Suspended in Gypboard Ceilings:

1. Provide #12 wire hangers attached directly to two opposite corners of each fixture, to structure. At a minimum, comply with NEC 410-16 and UBC support and seismic requirements.

2. Openings cut in suspended gypboard ceilings for recessed fixtures shall be completely concealed when fixture trim is installed. Provide recessed fixtures with plaster frames and flanges appropriate for the ceiling type. All junction boxes are to be located in an accessible location. The Contractor shall provide ceiling access panels where accessibility to junction boxes is required.

3. Recessed *lighting fixtures shall comply with the requirements of NEC Article 410.*

G. Adjust aimable lighting fixtures to provide required light intensities.

H. Connect wiring according to Division 26 Section 'Low-Voltage Electrical Power Conductors and Cables'.

I. Junction Boxes:

1. Provide junction box within 6 feet of fixture above removable grid ceiling and wire to recessed fluorescent troffers with 6 ft or less of flexible conduit or MC cable with Type THW-MTW (90°C) conductors and ground wire.

2. Integral outlet boxes shall be acceptable for straight through wiring.

3. All junction boxes shall be accessible per NEC requirements. The Contractor shall coordinate the box locations with duct work, piping and the ceiling type. Boxes located above suspended gypboard ceilings are not considered accessible, unless access panels are provided.

J. Requirements for lighting fixtures located in or on intermediate or heavy-duty suspended ceiling systems shall meet the intent of NEC 410-16c and UBC Section 25.213.

1. Provide positive attachment to the ceiling system. The attachment device shall have a capacity of 100 percent of the lighting fixture weight acting in any direction.

2. Lighting fixtures weighing less than 56 pounds (25.4 kg) shall have in addition to the requirement for attachment, two No.1 2 gauge (2.7 mm) hangers connected from the fixture housing to the structure above. These wires may be slack. Attach the slack wires to the opposite corners of each fixture.

3. Lighting fixtures weighting 56 pounds (25.4 kg) or more shall be supported directly from the structure above by approved hangers.

4. Pendant-hung lighting fixtures shall be supported directly from the structure above with No. 9 gauge (3.8 mm) wire or approved alternate support without using the ceiling suspension system for direct support.

1.23 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

1.24 LAMP DISPOSAL

A. Any lamps that must be removed from existing fixtures shall be properly disposed of or recycled through an approved lamp recycler. Contractor shall contact the local jurisdiction for acceptable lamp disposal. All lamp disposal shall be considered inclusive in the contract.

B. Ballast Disposal: If present, polychlorinated biphenyls (transformer, lighting ballasts) must be surveyed, removed and disposed of following regulatory requirements. Submit abatement/waste management plans to local jurisdiction.

1.25 ADJUST AND CLEAN

A. Immediately before final inspection, thoroughly clean all fixtures inside and out including plastics and glassware, adjust all trim, replace broken or damaged parts, lamp and test all fixtures for electrical and mechanical operation. Replace all non-operative lamps and/or ballasts. Noisy ballasts are to be replaced. Replace scratched or marred diffusers.

B. Protect installed fixtures from damage during construction period.

1.26 GROUNDING

A. Provide tight equipment grounding connections for each interior lighting fixture installation.

B. Ground conductors in the following applications shall be listed for use as ‘fixture wire’ with a temperature rating equal to that used in the particular fixture and capacity equal to the branch circuit protection.

1. Channels in fluorescent fixtures used as a raceway.
2. In conduit to first junction outside fluorescent fixture channel.
3. In flexible conduit from fixture to associated junction box.

END OF SECTION 26 51 00

SECTION 26 56 00

EXTERIOR LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Exterior luminaires with lamps and ballasts.
2. Luminaire-mounted photoelectric relays.

B. Related Sections include the following:

1. Division 26 Section "Interior Lighting" for exterior luminaires normally mounted on exterior surfaces of buildings.

1.3 DEFINITIONS

A. CRI: Color-rendering index.

B. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.4 SUBMITTALS

A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:

1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.

2. Details of attaching luminaires and accessories.

3. Details of installation and construction.

4. Luminaire materials.

5. Photoelectric relays.

6. Ballasts, including energy-efficiency data.

7. Lamps, including life, output, and energy-efficiency data.

8. Materials, dimensions, and finishes of poles.

B. Operation and Maintenance Data: For luminaires and poles to include in emergency, operation, and maintenance manuals.

C. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with IEEE C2, "National Electrical Safety Code."

C. Comply with NFPA 70.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.

1. Warranty Period for Luminaires: Five years from date of Substantial Completion.

2. Warranty Period for Lamps: Replace lamps and fuses that fail within 12 months from date of Substantial Completion; furnish replacement lamps and fuses that fail within the second 12 months from date of Substantial Completion.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps: 1 for every 10 of each type and rating installed. Furnish at least one of each type.

2. Glass and Plastic Lenses, Covers, and Other Optical Parts: 1 for every 10 of each type and rating installed. Furnish at least one of each type.

3. Ballasts: 1 for every 10 of each type and rating installed. Furnish at least one of each type.

1.8 MANUFACTURERS

A. In Exterior Lighting Device Schedule where titles below are column or row headings that introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

1.9 LUMINAIRES, GENERAL REQUIREMENTS

A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.

B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses. Designed to disconnect ballast when door opens.

G. Exposed Hardware Material: Stainless steel.

H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

I. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.

J. Reflecting surfaces shall have minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

K. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

L. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

M. Factory-Applied Finish for Steel Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, and other contaminants that could impair paint bond. Grind welds and polish surfaces to a smooth, even finish. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."

2. Exterior Surfaces: Manufacturer's standard finish consisting of one or more coats of primer and two finish coats of high-gloss, high-build polyurethane enamel.

   a. Color: As selected by EXCHANGE from manufacturer's full range.

N. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.

3. Class I, Clear Anodic Finish: AA-M32C22A41 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

4. Class I, Color Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

   a. Color: Dark bronze or as selected by EXCHANGE.

1.10 FLUORESCENT BALLASTS AND LAMPS

A. Low-Temperature Ballast Capability: Rated by its manufacturer for reliable starting and operation of indicated lamp(s) at temperatures minus 20 deg F (minus 29 deg C) and higher.

B. Ballast Characteristics:

1. Power Factor: 90 percent, minimum.

2. Sound Rating: A.

3. Total Harmonic Distortion Rating: Less than 10 percent.

4. Electromagnetic Ballasts: Comply with ANSI C82.1, energy-saving, high power factor, Class P, automatic-reset thermal protection.

5. Case Temperature for Compact Lamp Ballasts: 65 deg C, maximum.

6. Transient-Voltage Protection: Comply with IEEE C62.41 Category A or better.

C. Fluorescent Lamps: Low-mercury type. Comply with the EPA's toxicity characteristic leaching procedure test; shall yield less than 0.2 mg of mercury per liter when tested according to NEMA LL 1.

1.11 LUMINAIRE INSTALLATION

A. Install lamps in each luminaire.

B. Fasten luminaire to indicated structural supports.

1. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Adjust luminaires that require field adjustment or aiming.

1.12 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Division 26 Section "Raceway and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

1.13 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

1. Verify operation of controls.

C. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 26 56 00

SECTION 27 41 23

TV MOUNTING BRACKETS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes ceiling mounted TV mounting brackets and all accessories required for installation.

1.2 SUBMITTALS

A. Product Data: For each type of TV mounting bracket specified. Include details of construction relative to materials, fabrication, installation, anchors, hardware and fastenings.

B. Shop Drawings: For installation of TV mounting brackets. Include plans, sections, details and attachment to other work.

1.3 PROJECT CONDITIONS

A. Field Conditions: Verify dimensions and existing conditions in area of installation. Coordinate installation with construction progress to avoid delaying the work.

PART 2 - PRODUCTS

2.1 TV MOUNTING BRACKET

A. Provide and install ceiling mounted TV mounting brackets, Bretford Yoke style, mount where indicated.

1. Model: TVCC 3027-BK
2. Color/Finish: Black powder paint finish.
3. Yoke: 14 and 12 gauge steel.
4. Tilt/Swivel: 0 – 30 degree forward tilt and 360° swivel.

B. Mounting Accessories: Provide mounting brackets and extension pipes as required:

1. Extension Pipes: Custom exact-length pipe, 1-1/2” NPS.
2. Coiling Mount Adapter: TVUCA-BK
3. Stabilizing Bracket: TVSTBL-BK (2 per mount).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install TV mounting brackets according to manufacturer’s instructions, using mounting accessories and anchors as required. Install brackets plumb and firmly anchored at locations indicated.

3.2 ADJUSTING AND CLEANING

A. Adjust TV mounting bracket as required for proper mounting and operation. Verify that brackets are adjustable for tilt and swivel.

B. Clean and polish all exposed surfaces according to manufacturer's recommendations after removing all temporary labels.

END OF SECTION 27 41 23

SECTION 28 31 00

FIRE ALARM SYSTEM / LIFE SAFETY SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. This section is a Division 28 Basic Electrical Materials and Methods section, and is part of each Division 28 section making reference to fire alarm systems.

B. Drawings and General Provisions of the contract, including General and Supplementary Conditions, Division 01 Specification sections and all Division 28 sections, apply to this section.

1.2 DESCRIPTION

A. Extend existing fire alarm system. Add addressable initiating device circuits and additional notification appliance circuits to existing fire alarm system. Provide additional power extender equipment as required. Existing addressable fire alarm control panel is a Fire-Lite MS9600 unit.

B. Provide all design, equipment, installation and testing for the system herein described and obtain the Authority Having Jurisdiction's acceptance.

C. Quantity or Placement of Devices: This specification makes no representation to the quantity or location of devices required to satisfy the authority having jurisdiction. It is the responsibility of the Contractor to coordinate with the Authority Having Jurisdiction to ensure that the completed installation satisfies all requirements of the governing codes.

1.3 SIGNAL SUBCONTRACTOR

A. The Signal Subcontractor shall submit written certification that the proposed fire alarm system complies with the following. These certifications shall accompany submittals:

1. Compliance with NFPA Standards 72, 101 and 110 as applicable. The design, engineering and construction will be in accordance with Unified Facilities Criteria (UFC) 4-740-06 and UFC 3-600-01.

2. All equipment installed in the system including the interconnecting wiring is UL listed for the purpose and appropriately

3. All equipment installed in the system including the interconnecting wiring is UL listed for the purpose and appropriately cross listed.

B. A proposed maintenance agreement contract for this project shall be included with submittals indicating:

1. The installation is covered by a maintenance agreement between the Government and a UL listed fire alarm company whereby the service company issuing the certificate bears responsibility for inspecting, testing, maintaining, and providing any necessary repairs.

2. Documentation is maintained on the alarm system including description of system operation, location of alarm equipment throughout the area protected, initial acceptance tests and the performance of periodic testing and maintenance.

3. An executed maintenance agreement for the system shall also be forwarded to the Contracting Officer, upon certification of this fire alarm system, for the Contracting Officer's consideration in selecting a system maintenance and confidence testing fire alarm company.

C. Authority Having Jurisdiction: The Authority Having Jurisdiction for this project is to be determined by the Contractor.

1.4 LISTING REQUIREMENTS

A. Listing Requirements: All fire detection and alarm components furnished under this section shall be UL listed in the fire equipment list or FM, approved for fire signaling or fire suppression use. All accessory equipment shall be manufactured with UL listed components.

B. Reference Standards (Edition currently adopted by Authority Having Jurisdiction):

NFPA 72	National Fire Alarm Code
NFPA 101	Life Safety Code
UFC	Uniform Fire Code
UFC 3-600-01	Fire Protection Engineering for Facilities Unified Facilities Criteria (UFC)
NFPA 70	National Electrical Code with local amendments
NFPA 110	Standard for Emergency and Standby Power Systems
ADA	American Disabilities Act

1.5 DRAWINGS AND DOCUMENTATION

A. Fire Alarm System Drawings:

1. Contractor shall prepare a design which includes all design equipment and installation necessary to obtain Authority Having Jurisdiction acceptance.

B. Submittal Data:

1. Design and Installation Drawings:

a) Drawings shall be reproduced electrionically in digital format in DXF format on 24"x36" velum plots or approved equal. Submitted drawings shall have Authority Having Jurisdiction approval marked thereon. Layout plan drawings, interconnect drawings, and wiring diagrams submitted without Authority Having Jurisdiction approval will not be reviewed.

b) Show a general layout of the complete system including equipment arrangement. It shall be the responsibility of the fire alarm contractor to verify dimensions and assure compatibility all other systems interfacing with the fire alarm system.

c) Identify on the drawings the Class A raceway system and conductor sizes and types with number of conductors in each conduit. Provide each raceway and device with a unique alphanumeric identification.

d) Indicate on the point to point wiring diagrams, interconnecting wiring within the panel between modules, and connecting wiring to the field device terminals.

e) Designs of attachments to building structure shall meet the requirements of UBC, Seismic Zone as directed by Authority Having Jurisdiction. Submit detailed mathematical analysis of the design.

f) Interconnect Drawings: Show only external connections between equipment and devices. All wires shall be identified with alphanumeric designators and all termination points shall show the correct terminal identification.

g) Wiring Diagrams: Show the general physical arrangement of the component parts of the equipment and the connection of all internal wiring. All components, wires, terminal strips and terminals shall be identified with alphanumeric designators. Wiring system shall be Class A.

h) Equipment mounting details: Show the mounting location for all floor and wall mounted equipment including distance from floor and column lines, and fabrication details for all special mounting brackets. Details shall also provide any special installation instructions. These details may be included on the plan drawings if space allows.

i) Layout Plan Drawings: Show every device provided under this section in its relative spatial location. Sections and elevations shall be utilized as necessary to accurately describe the installed location of all devices.

2. Provide voltage drop calculations indicating the system ability to furnish power at a minimum of 90 percent of nameplate listing in a standby power condition with all devices in alarm utilizing the proposed wire type and size. It shall be demonstrated that no single wire run between a circuit and its most remote device exceeds the manufacturers recommendations for wire length, circuit resistance or circuit wire to wire and wire to ground capacity.

3. Itemize all battery loads under standby and alarm conditions. Auxiliary power supplies and transponder battery calculations shall demonstrate the ability of the batteries to supply the required secondary power for a period of twenty four hours with no external power applied and furnish power for worst case alarm signaling for five minutes at the end of this period with all devices in alarm and all device LED's lighted. Battery sizing shall be at a factor of 1.5 times the results of this mathematical requirement to account for battery aging between replacements and for system modifications and expansions.

4. Catalog sheets: Show the color, configuration and dimensions of the equipment or device described. Provide technical specifications, such as operating voltage, operating temperature and humidity limitations, mounting and wiring information and a description of the function and operation of the device.

5. Recommended Spare Parts List: Submit a listing of all devices and components recommended for Contracting Officer purchase as spare parts to support the system herein. The list shall include recommended quantities for all items. Unit prices guaranteed for 90 days after submittal shall be listed for all items.

6. Scheduled Testing: Include step-by-step procedures for performance testing every fire alarm device and system output to demonstrate functionality in accordance with specification requirements.

7. Operation and Maintenance Manuals: Refer to Division 26, Section 'Common Work Results for Electrical Systems'. Manuals shall be typewritten or printed instructions which contain the following minimum information:

   a) Complete operating instructions

   b) Preventative maintenance instructions

   c) Catalog sheets on all devices and equipment

   d) Manufacturers operation and maintenance instructions

   e) Reduced 11"x17" copies of all system drawings

8. Record Drawings: All review drawings shall be revised to reflect the accurate As-Built condition. Working plans shall show actual, accurate locations of devices, and actual routing of conduit and location of end of line devices. The Contractor shall provide five sets of vellum plots and three electronic CD's of the Record Drawings.

1.6 DESIGN REQUIREMENTS

A. The system shall provide for multiple zones of alarm including the following:

1. Sprinkler water flow and tamper switch(es)
2. Smoke detection
3. Heat detection
4. Cooking hood fire suppression
5. Other fire suppression systems
6. Manual pull stations
7. Spares
8. Class A Wiring System in ¾" conduit
9. Provide other additional zones as required by Authority Having Jurisdiction

B. Thermal detectors:

1. Shall be provided to detect a high temperature condition in required areas.

2. Thermal detectors shall be located in accordance with guidelines in NFPA 72E or manufacturers UL (or FM, if applicable) listed spacing.

3. Thermal detectors shall not be installed immediately above heating appliances.

4. Thermal detectors, rated as required, shall be provided to detect a high temperature condition in ceiling and roof structure cavities as required by code authority.

C. A combination of ionization and photoelectric detectors shall be provided to detect fire conditions in the required areas. Detectors shall be installed where required by the Authority Having Jurisdiction. Detectors shall be located in accordance with the NFPA guidelines on the spacing not to exceed 30 lineal feet and 900 square feet.

D. A rechargeable battery supply shall be provided to automatically operate the entire fire detection and alarm system, including detectors, control panel, remote fire annunciator, alarm sounding devices and auxiliary control equipment (unless otherwise specified herein) in the event of a loss of

primary power for 72 hours. The batteries shall be sized at 150 percent of size prescribed by code.

E. Manual fire alarm stations, connected to alarm zones, shall be provided as required by the Authority Having Jurisdiction.

F. Audible and visual evacuation alarms shall be provided as required by the Authority Having Jurisdiction and comply with ADA requirements. All notification appliance circuits shall be Class A, Style Z. All notification appliance circuits shall have a minimum circuit output rating of 2 amps at 24 V dc; 50 watts at 25 V audio and 35 watts at 70 V audio. The notification circuits shall be power limited.

G. Remote fire annunciators shall be provided and installed to individually annunciate alarms for each of the fire zones, and a fire alarm control panel (FACP) trouble condition.

H. Provide a weatherproof audible and visual evacuation alarm (95 dB at 10 feet minimum) on building exterior at side of building directed by the Authority Having Jurisdiction.

I. Provide automatic releases for all doors as required by the Authority Having Jurisdiction. Connection to door hardware shall be made as directed by door hardware manufacturer. Coordinate device requirements with doors, hardware, and adjacent mounting surfaces to assure that doors are held in a position acceptable to the Contracting Officer and Authority Having Jurisdiction..

J. System shall be capable of remote monitoring at either a monitoring station or the fire department. Coordinate the interface requirements with the Contracting Officer. Provide remote radio transmitter per Government requirements.

K. Interfaces between air handling and fire suppression systems and the fire alarm system shall be accomplished utilizing interposing relays with a dry contact. See requirements in Divisions 23 and 26. Provide for each zone of alarm that actuates in an alarm condition. Coordinate with Divisions 23 and 26 to insure proper sequencing of air handling and fire suppression systems.

L. Provide interface to the mass notification panel to shut down the fire alarm signals both audible and visual, upon a mass notification alarm condition. During any mass notification alert message, the fire alarm horns/strobes shall be silenced so that the mass notification message can be heard throughout.

1.7 SYSTEM OPERATION

A. Activation of any alarm causing device (manual station, smoke detector, water flow switch, heat detector, etc.) shall cause the following actions and indications:

1. Initiate a pre-signal alarm at main control panel, and begin a time delay sequence. If the staff can confirm that the alarm is false, the general alarm shall be cancelled. If the alarm condition is valid, the general alarm shall be initiated after the time delay.

2. Indicate the fire device and/or fire zone on remote annunciators and/or graphic annunciators.

3. Initiate shut down and/or start of supply and exhaust fans through the interposing relays to evacuate or restrain smoke movement.

4. Energize extinguishing systems for containment of the fire where appropriate.

5. Close all fire doors, smoke doors, and fire dampers.

6. Activate the off site alarm (central reporting).

B. Activation of any supervisory condition causing device (tamper switch, valve supervision device, fire pump trouble, generator trouble, low temperature thermostat, low water level) shall initiate a supervisory alarm signal at main control panel, and remote annunciators.

C. Any system trouble caused by wiring failure including open circuits, grounded circuits and shorted circuits on circuitry required to be supervised in this manner; communications loss, device removal, battery low voltage, power loss, charger failure or failure in any device shall cause the following actions and indications:

1. Initiate a fire alarm system trouble signal at the fire alarm control panel.

2. Indicate a trouble condition at remote annunciators and/or graphic annunciators.

D. All signal circuits including evacuation circuits, trouble circuits and supervisory indicating circuits, but not including water flow indication circuits, shall be acknowledged by means of a switch on the control panel front. Subsequent alarm receptions shall cause the alarm signals to resound indicating the reception of a new alarm condition. The signals shall also be caused to resound by the re-operation of the signal silence switch allowing evacuation signaling from the silence switch without keyboard commands when an alarm condition exists.

E. Labels: Indicating lights and controls shall be permanently labeled as to their function.

1.8 ACCEPTANCE TEST PROCEDURE

A. Submit for approval, prior to testing, an acceptance testing procedure meetings the requirements of this section.

B. Submit, for system record, all required data as compiled during installation and testing upon completion of the acceptance testing procedure. This data shall be loose-leaf bound and labeled as system acceptance testing information.

C. Submit for system record, a completed ‘fire alarm system certification and description’ as included in NFPA 72, 2007 Edition.

1.9 EQUIPMENT

A. All equipment shall be new and the latest state of the art equipment as marketed by a single manufacturer. The equipment shall be installed in a fashion consistent with the listings to perform all functions and indications as described herein. All equipment shall be listed for fire alarm system use by the UL or listed by FM. The system shall be comprised of all equipment, software, firmware, raceways, wire and wiring as required to furnish a complete and operating system in full compliance with this specification and the contract documents.

B. Fire Alarm Control Panel: Existing addressable Fire-Lite MS9600 control unit.

C. NOT USED.

D. Remote Annunciators: Remote annunciator panels shall provide visual indication and be dead front construction with nomenclature for alphanumeric annunciation applied with a photo emulsion technology and finish trim in anodized aluminum. Locate adjacent to entry designated by Authority Having Jurisdiction for fire department use. Provide an indicator for each zone. Provide additional indicators as required by the Authority Having Jurisdiction.

E. System Power:

1. Primary power for the FACP and the secondary power battery chargers shall each be obtained from the power panelboard. Connect primary power circuit to emergency generator if available.

2. Secondary Power Supply:

a) Provide sealed gelled electrolyte batteries as the secondary power supply for the fire alarm control panel and each system transponder. The battery supply shall be calculated to operate its load in a supervisory mode for a period of 72 hours with no primary power applied and at the end of that period operate its alarm mode for a period of fifteen minutes. Batteries shall be sized to carry 1.5 times the calculated size to compensate for deterioration and aging during the battery life cycle. Batteries shall be housed in the control cabinet or a separate cabinet with adequate cell separation to prevent accidental discharge. Batteries shall be equipped with post and nut or one blade terminals. Slip on tap terminals are not acceptable. If housed in a separate cabinet, a fuse block shall be provided within the battery cabinet.

b) Provide battery charging circuitry for each standby battery bank in the system low voltage power supply or as a separate circuit. The charger shall be automatic in design, adjusting the charge rate to the condition of the batteries. Battery charge rate and terminal voltage shall be read using the fire alarm control panel LCD display in the service mode and indicated directly in volts and amps. Meters reading in percentage are not acceptable. Charger shall be housed in the main fire alarm control panel or the battery cabinet.

F. Manual Stations: Provide double action type with no break glass/plastic bar feature, keyed flush or surface mounted devices as required. Station shall be equipped with terminal strip and pressure style screw terminals for the connection of field wiring. Devices utilizing rotary switches, pins, jumpers or staples are not acceptable. Surface mounted stations shall be mounted using a baked red enamel outlet box. Manual pull boxes shall open with a screwdriver or an Allen wrench.

G. Heat detectors shall be rate compensated type, rated at 135 degrees (except where noted otherwise). Detectors shall be constructed to compensate for the thermal inertia inherent in detectors due to the thermal mass, and alarm at the set point. Detector bases shall be of the twist lock style and shall be provided with an indicating light to verify operation which shall latch on in an alarm condition and screw type pressure terminals for the connection of field wiring. Removal of the detector from its base shall cause a system trouble signal. Devices utilizing rotary switches, pins, jumpers or staples are not acceptable.

H. Photoelectric Smoke Detectors: Light refraction technology smoke detectors shall have a high rejection of false signals caused by electrical noise and electrical transients and shall be capable of being checked for sensitivity without being removed from its twist lock base. The reading of the detector sensitivity shall yield a discrete electrical value for logging and tracking of status to determine the maintenance and cleaning requirements. Detectors not yielding a calibrated value indicating sensitivity shall not be acceptable. The detector shall be readily dissembled to gain ac-

cess to the detection chamber for cleaning and maintenance. Detectors shall be used for open area protective coverage and shall be insensitive to air velocity.

I. Ionization Smoke Detectors: Dual chamber and self-compensating for ambient temperature and humidity and shall be capable of being checked for sensitivity without being removed from its twist lock base. The reading of the detector sensitivity shall yield a discrete electrical value for logging and tracking of status to determine the maintenance and cleaning requirements. The detector shall be readily dissembled to gain access to the detection chamber for cleaning and maintenance. Detectors shall be used for open area protective coverage and shall be insensitive to air velocity.

K Notification Appliances:

1. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections. All notification appliance circuits shall be Class A, Style Z. The notification circuits shall be power limited.
2. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.
3. Chimes, Low-Level Output: Vibrating type, 75-dBA minimum rated output.
4. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.
5. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.
6. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens. Rated Light Output: 15/30/75/110 cd, selectable in the field. Intensity per ADA requirements.
7. Mounting: Flush ceiling mounted unless otherwise indicated.
8. Flashing shall be in a temporal pattern, synchronized with other units.
9. Strobe Leads: Factory connected to screw terminals.
10. Mounting Faceplate: Factory finished white.
11. Sound pressure levels shall comply with applicable codes and shall satisfy the Authority Having Jurisdiction.
12. Provide a strobe type integral with assembly. Intensity per ADA requirements.
13. The device shall be fully enclosed, heavy duty, suitable for mounting on a standard four inch square outlet box.

L. Smoke Door Release Mechanisms: Where required by the Authority Having Jurisdiction, provide combination door closer/holder as a separately mounted device. Electrical characteristics of door holder mechanisms shall be coordinated for proper operation of magnetic release from fire alarm system. Manual override release shall be possible at any time.

M. Remote Indicators: Indicator (LED or lamp) mounted in escutcheon plate for flush mounting in ceiling or wall. Normal condition shall be compatible with area smoke detector indicators (i.e. illumination upon alarm, extinguish upon return to normal).

N. Spare Parts: Deliver the following:

1. One zone module of each type
2. Two of each type of detector
3. One manual pull station
4. One alarm horn/strobe unit

1.10 INSTALLATION

A. The installation of the system shall meet all requirements of NFPA 70.

B. Breakers in the panels feeding the control panel shall be fitted with suitable guard, such that the breaker cannot be turned off but fixed so the breaker can trip and requiring the removal of a screw to remove the guard. Separate breakers shall be provided for each control panel main power and trouble circuits. Breakers shall be lockable in ON position.

C. Conductors shall be copper and shall be of the type and AWG size to Authority Having Jurisdiction.

D. Provide adequate evacuation alarm devices for appropriate signal level throughout building.

E. Remote Indicators: Provide in an adjacent area where readily visible for all concealed detectors.

F. General smoke Detector spacing: Smoke detector spacing shall be in accordance with the listed spacing, the manufacturers recommendations and the requirements of NFPA 72E. Detectors shall not be located within five feet of a supply air register nor within twelve inches of a lighting fixture.

H. Visual Indicators: Locate to meet ADA requirements and be ceiling mounted.

I. Devices: Relays and other devices to be mounted in auxiliary panels are to be securely fastened to avoid false indications and failures due to shock or vibration.

J. Wiring:

1. Within sub-panels: Shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.

2. Terminals: Spade lugs with upset legs and insulation sleeves sized for the conductors.

3. Each conductor shall be identified as specified herein with wire markers at every splice and terminal point. Attach the wire markers within two inches of the wire termination. Mark both ends with alphanumeric wire markers.

4. Raceways carrying notification and Class A fire alarm signals shall have supply and return conductors installed in separate conduits and be identified by color coding. Paint coverplates of fire alarm J-boxes red. In ceiling spaces and other unfinished areas, apply red paint to the raceway at ten foot intervals to identify the raceway as fire alarm. All wiring shall be in conduit.

5. Voltages shall not be mixed in any junction box, housing, or device, except those containing power supplies and control relays. Electrical metallic tubing conduit is acceptable in dry locations not enclosed in concrete or where not subject to mechanical damage. Conceal conduit in finished areas of new construction and wherever practicable in existing construction. The use of flexible conduit not exceeding a 6 foot length shall be permitted in initiating device circuits. Run conduit or tubing concealed unless specifically shown otherwise on the drawings. Shielded wiring shall be utilized where recommended by the manufacturer. For shielded wiring, the shield shall be grounded at only one point, that shall be in or adjacent to the FACP. Pigtail or T-tap connections to signal line circuits. Initiating device circuits, supervisory alarm circuits, and notification appliance circuits are prohibited. Color coding is required for circuits

and shall be maintained throughout the circuit. Conductors used for the same functions shall be similarly color coded. Wiring shall conform to NFPA 70.

6. Conductor Terminations: Labeling of conductors at terminal blocks in terminal cabinets, and remote control units shall be provided at each conductor connection. Each conductor or cable shall have a shrink-wrap label to provide a unique and specific designation. Each terminal cabinet and fire alarm control unit shall contain a laminated drawing that indicates each conductor, its label, circuit, and terminal. The laminated drawing shall be neat, using 12 point lettering minimum size, and mounted within each cabinet, panel, or unit so that it does not interfere with the wiring or terminals. Maintain existing color code scheme where connecting to existing equipment.

1.11 TESTING

A. All test equipment, instruments, tools and labor required to conduct the system tests shall be furnished by the installing Contractor.

B. The Contractor shall use test instruments that bear valid calibration stamp showing date of calibration and the expiration date of the stamp. Calibration and accuracy of test instruments shall be certified by an independent testing laboratory having standards traceable to the National Institute of Standards and Technology.

C. In addition to the testing specified to be performed by the installing contractor, the installation shall be subject to test by the local Authority Having Jurisdiction.

1.12 AUXILIARY CONTROLS

A. Conductors and power supplies of sufficient size shall be installed to minimize voltage drop consistent with the proper operation of all devices. Destructive link smoke dampers shall not be connected to the fire alarm system. Fan shutdown control circuits, smoke removal control circuits supervised (subject to NFPA requirements) and may be incorporated into the fire alarm raceway system, except that limited energy circuits shall be routed separately from line voltage circuits as required by Code (NEC Article 760).

1.13 CERTIFICATION

A. Following the final acceptance testing, the manufacturer's representative shall submit a letter to the Contracting Officer with a copy to the Construction Manager stating he has inspected the system installation and found it in compliance with the manufacturer's installation standards and acceptable in all respects.

1.14 ACCEPTANCE TESTING

A. A written acceptance test procedure for testing the fire alarm system components and installation will be prepared by signal subcontractor in accordance with NFPA 72 and this specification. The signal subcontractor shall be responsible for the performance of the acceptance test procedure, demonstrating the functionality of the system and verifying the correct operation of all system components, circuits, and programming.

B. A program matrix shall be prepared by the signal subcontractor, referencing each alarm input to every output function affected as a result of an alarm condition on that input. In the case of outputs programmed using more complex logic functions involving 'any', 'or', 'not', 'count', 'time', and 'timer' statements; the complete output equation shall be referenced in the matrix.

C. A complete listing of all device labels for alphanumeric annunciator displays and logging printers shall be prepared prior to the acceptance test procedure.

D. The signal subcontractor's acceptance inspector shall use the system As-Built drawings in combination with the documents specified herein, during the test procedure to verify operation as programmed. In conducting the acceptance test procedure, the acceptance inspector shall request demonstration of any or all input and/or output functions.

E. Class A system wiring shall be tested to demonstrate correct system response and correct subsequent system operation in the event of:

1. Open loop
2. Shorted loop
3. Grounded loop
4. Open communication link
5. Shorted communication link
6. Grounded communication link
7. Open zone wiring
8. Grounded zone wiring
9. Open signal circuit wiring
10. Shorted signal circuit wiring
11. Grounded signal circuit wiring
12. Initiating device removal
13. Battery disconnected
14. Primary power disconnected
15. Connection to EMS system, where applicable

F. System evacuation alarm signaling shall be demonstrated as follows:

1. All signals actuate as programmed
2. Signal audibility

G. System indications shall be demonstrated as follows:

1. Correct message display for each alarm input
2. Correct annunciator light for each alarm input
3. System charging current shall be normal trickle charge for a full charged battery bank

1.15 DOCUMENTATION

A. System documentation shall be furnished to the Contracting Officer and Government and shall include but not be limited to the following:

1. The contractor shall maintain a set of drawings on site to record as-built construction. The drawings shall be updated on a daily basis and shall be available for review at all times. These drawings shall not be used for construction prints. As-built drawings shall show details of installation including conduit/cable locations, device locations, wire counts, equipment locations and such other details of construction required for a complete record of the construction. Upon completion of the construction the on-site as-built drawings shall be formally produced in a CAD format for turnover to the government as part of the required documentation package.

2. System operation, installation, maintenance and programming manuals.

3. System menu driven instructions for the alteration, addition or deletion of zones, modification, addition or deletion of zone messages and the modification, deletion or addition of logic modules as required for system operation.

1.16 MOUNTING HEIGHTS

A. Per ADA requirements, all mounting heights indicated are the distances from the finished floor level to the top of the device box:

Manual Stations	48"
Strobes	Ceiling
Control Panel	60" (depending on control panel)
Annunciator	60"

1.17 FIELD QUALITY CONTROL

A. Testing Procedures: Detailed test procedures, prepared and signed by a Registered Professional Engineer or a NICET Level 3 Fire Alarm Technician, and signed by representative of the installing company, for the fire detection and alarm system 60 days prior to performing system tests. Detailed test procedures shall list all components of the installed system such as initiating devices and circuits, notification appliances and circuits, signaling line devices and circuits, control devices/equipment, batteries, transmitting and receiving equipment, power sources/supply, annunciators, special hazard equipment, emergency communication equipment, interface equipment, Guard's Tour equipment, and transient (surge) suppressors. Test procedures shall include sequence of testing, time estimate for each test, and sample test data forms. The test data forms shall be in a check-off format (pass/fail with space to add applicable test data) and shall be used for the preliminary testing and the acceptance testing. The test data forms shall record the test results and shall:

1. Identify the NFPA Class of all Initiating Device Circuits (IDC), Notification Appliance Circuits (NAC), Voice Notification System, and Signaling Line Circuits (SLC).

2. Identify each test required by NFPA 72 Test Methods and required test herein to be performed on each component, and describe how this test shall be performed.

3. Identify each component and circuit as to type, location within the facility, and unique identity within the installed system. Provide necessary floor plan sheets showing each component location, test location, and alphanumeric identity.

4. Identify all test equipment and personnel required to perform each test (including equipment necessary for testing smoke detectors using real smoke).

5. Provide space to identify the date and time of each test. Provide space to identify the names and signatures of the individuals conducting and witnessing each test.

B. Test States:

1. Preliminary Testing: Conduct preliminary tests to ensure that devices and circuits area functioning properly. Tests shall meet the requirements of paragraph entitled 'Minimum System Tests;. After preliminary testing is complete, provide a letter certifying that the installation is complete and fully operable. The letter shall state that each initiating and indicating device was tested in place and functioned properly. The letter shall also state that panel functions were tested and operating properly. The letter shall include the names and titles of the witnesses to the preliminary tests. The Contractor and an authorized representative from each

supplier of equipment shall be in attendance at the preliminary testing to make necessary adjustments.

2. Request for Formal Inspection and Tests: When tests have been completed and corrections made, submit a signed, dated certificate with a request for formal inspection and tests to the Contracting Offices Designated Representative (COR).

3. Final Testing: Notify the Contracting Officer in writing when the system is ready for final acceptance testing. Submit request for test at least 15 calendar days prior to the test date. The tests shall be performed in accordance with the approved test procedures in the presence of the Contracting Officer. The Contractor shall furnish instruments and personnel required for the tests. A final acceptance test will not be scheduled until the operation and maintenance (O&M) Manuals are furnished to the Contracting Officer and the following are provided at the job site:

   a. The systems manufacturer's technical representative

   b. Marked-up red line drawings of the system as actually installed.

   c. Megger test results

   d. Loop resistance test results

   e. Complete program printout including input/output addresses

4. The final tests shall be witnessed by the Contracting Offices Designated Representative (COR). At this time, any and all required tests shall be repeated at their discretion. Following acceptance of the system, as-built drawings and O&M Manuals shall be delivered to the Contracting Officer for review and acceptance.

C. Minimum System Tests: Test the system in accordance with the procedures outlined in NFPA 72, IEC 60849, IEC 60268-16. The required tests are as follows:

1. Megger Tests: After wiring has been installed, and prior to making any connections to panels or devices, wiring shall be megger tested for insulation resistance, grounds, and/or shorts. Conductors with 300 volt rated insulation shall be tested at a minimum of 250 VDC. Conductors with 600 volt rated insulation shall be tested at a minimum of 500 VDC. The tests shall be witnessed by the Contracting Officer and test results recorded for use at the final acceptance test.

2. Loop Resistance Tests: Measure and record the resistance of each circuit with each pair of conductors in the circuit short-circuited at the farthest point from the circuit origin. The tests shall be witnessed by the Contracting Officer and test results recorded for use at the final acceptance test.

3. Verify the absence of unwanted voltages between circuit conductors and ground. The tests shall be accomplished at the preliminary test with results available at the final system test.

4. Verify that the control unit is in the normal condition as detailed in the manufacturer's O&M Manual.

5. Test each initiating and indicating device and circuit for proper operation and response at the control unit. Smoke sensors shall be tested in accordance with manufacturer's recommended calibrated test method. Use of magnets is prohibited.

6. Test the system for specified functions in accordance with the contract drawings and specifications and the manufacturer's O&M Manual.

7. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the time period and in the manner specified.

8. Determine that the system is operable under trouble conditions as specified.

9. Visually inspect wiring.

10. Test the battery charger and batteries.

11. Verify that software control and data files have been entered or programmed into the FACP. Hard copy records of the software shall be provided to the Contracting Officer.

12. Verify that red-line drawings are accurate.

13. Measure the current in circuits to ensure there is the calculated spare capacity for the circuits.

14. Measure voltage readings for circuits to ensure that voltage drop is not excessive.

15. Disconnect the verification feature for smoke sensors during tests to minimize the amount of smoke needed to activate the sensor. Testing of smoke sensors shall be conducted using real smoke. The use of canned smoke is prohibited.

16. Measure the voltage drop at the most remote appliance (based on wire length) on each notification appliance circuit.

17. Audibility intelligibility testing of the voice evacuation notification system shall be accomplished law NFPA 72 for voice evacuation systems, IEC 60268-16, and ANSI S3.2.

18. Opening the circuit at not less than 10% of alarm initiating devices and notification appliances to test the wiring supervisory feature.

19. The Contractor shall demonstrate modem communications with remote sites as specified by the COR. Dial in capability shall also be demonstrated, using specified security.

20. The Contractor shall demonstrate fiber optic communications with remote sites as specified by the COR. Dial in capability shall also be demonstrated, using specified security.

1.18 DRAWINGS, MANUALS, TOOLS AND SPARE PARTS

A. Upon completion of the installation and prior to final inspection, the contractor shall furnish 'as-built' drawings as indicated above. In addition, the contractor shall furnish five (5) copies of a manual, including wiring diagrams, giving complete instructions for the operation, inspection, testing and maintenance of the system. Any special tools necessary for the maintenance of the equipment shall be furnished, as well as one spare set of fuses of each type and size required. As son as practicable after approval of the list of equipment, the contractor shall furnish copies of spare parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies with current unit prices.

1.19 INSTRUCTION OF GOVERNMENT EMPLOYEES

A. Instructor: Include in the project the services of an instructor, who shall have received specific training from the manufacturer for the training of other persons regarding the inspection, testing, and maintenance of the system provided. The instructor shall train the Government employees designated by the Contracting Officer, in the care, adjustment, maintenance, and operation of the fire alarm and fire detection/mass notification system.

B. Qualifications: Each instructor shall be thoroughly familiar with all parts of this installation. The instructor shall be trained in operating theory as well as in practical O&M work.

C. Required Instruction Time: Provide eight hours of instruction after final acceptance of the system. The instruction shall be given during regular working hours on such dates and times as are selected by the Contracting Officer. The instruction may be divided into two or more periods at the discretion of the Contracting Officer. The training shall allow for rescheduling for unforeseen maintenance and/or fire department responses.

END OF SECTION 28 31 00