

912019Harrell Saltrick & Hopper PC

**AMENDMENT A0004**

**July 15, 2013**

**BUILDING 2 RENOVATIONS AND BUILDING 2 SITE  
ENTRANCE IMPROVEMENTS**

**VA-Butler  
Butler, PA**

VA Project Numbers 529-12-104, 529-12-107

HSH Project Number 12018, 12019

**NOTICE TO ALL BIDDERS**

The following shall take precedence over the plans and specifications for the above referenced project and shall become part of the contract documents. Information provided in the plans and specifications and not modified or amended herein shall remain in effect.

Amendment A0004 consists of the following:

1. Amendment Narrative, 5 pages.
2. Specifications, 14 sections.
3. Re-issued Drawings, 45 sheets.
4. Bidder Comments and Responses, 5 pages.

Attachments: Unless otherwise noted, the following attachments shall replace those provided in the Project Documents.

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Specification Sections:

1. 000110 Table of Contents  
Added new sections 08 14 10, 23 82 16, and 28 26 00.
2. 010000 General Requirements  
Modified alternate language for clarity.
3. 013323 Shop Drawings, Product Data, and Samples  
Added submittal requirements for newly added specification sections.
4. 019100 General Commissioning Requirements  
Deleted duplicate plumbing commissioning requirements.
5. 081410 Interior Wood Doors – Alternate No. 4  
Added section in its entirety.
6. 081710 Integrated Door Assemblies  
Added section in its entirety.

7. 087100 Door Hardware  
Deleted hardware set SH-9 for door 002 and replaced with 12-C.
8. 220800 Commissioning of Plumbing Systems  
Added section in its entirety.
9. 224000 Plumbing Fixtures  
Modified Fixture P-102.
10. 230711 HVAC and Boiler Plant Insulation  
Added section in its entirety to body of specification. It was previously indicated in TOC.
11. 230800 Commissioning of HVAC Systems  
Added section in its entirety.
12. 238216 Air Coils  
Added section in its entirety.
13. 280513 Conductors and Cables for Electronic Safety and Security  
Modified requirements for Optical Fiber Cable.
14. 282600 Electronic Personal Protection System  
Added section in its entirety.

Drawings:

Sheet Number	Description
GI002	MODIFIED HANDRAIL HEIGHT TO CONFORM TO ABA
GI100	ADDRESSED FIRE REVIEW COMMENTS DATED 4/26/13.
GI101	ADDED SMOKE COMPARTMENT 1-HOUR FIRE-SMOKE WALL.
GI103	CORRECTED LAYERING ISSUE ON DRAWING F1/GI103.
GI201	MODIFIED NOTES E AND 5 FOR BIDDING PURPOSES.
GI202	MODIFIED NOTES E AND 5 FOR BIDDING PURPOSES.
GI203	MODIFIED NOTES E AND 5 FOR BIDDING PURPOSES.
GD101	MODIFIED NOTE 17 FOR EVACUATION OF UTILITY LINE. NOTED EXISTING SMOKE NOT TO BE DEMOLISHED IN BASE BID ONLY.
AS101	SHOWS WALL AND CEILING MOUNTED LIGHTS. COORDINATION WITH CIVIL.
AD102	CORRECTED DRAWING F1 FOR LAYERING ISSUE. ADDED NOTES REGARDING TERRAZZO BASE.
AD103	CORRECTED DRAWING F1 FOR LAYERING ISSUE. ADDED NOTES REGARDING TERRAZZO BASE.
AE101	CORRECTED LAYERING ISSUE. ADDED CONTACT IFNOR FOR LIN'S ELEVATOR.
AE102	SHOWS SMOKE COMPARTMENT WALL. CORRECTS LAYERING ISSUE. DEPICTS TERRAZZO BASE INFO.
AE103	CORRECTS LAYERING ISSUE. DEPICTS TERRAZZO BASE INFO.
AE113	ADDS WINDOW FILM NOTE TO DRAWING.
AE401	CHANGES TO TOILET ACCESSORY PROVISIONS, PER OWNER REQUEST.
AE601	DELINEATES IMPACT PROTECTED DOORS IN BASE BID. DOOR 002 HARDWARE SET CHANGE.
AE602	IMPROVES LEGIBILITY--CONTENT UNCHANGED.
AE603	IMPROVES LEGIBILITY--CONTENT UNCHANGED.
AE604	IMPROVES LEGIBILITY--CONTENT UNCHANGED.
AE605	IMPROVES LEGIBILITY--CONTENT UNCHANGED.
AE606	IMPROVES LEGIBILITY--CONTENT UNCHANGED.
AE607	IMPROVES LEGIBILITY--CONTENT UNCHANGED.
AF101	CORRECTED LAYERING, DEFINED SHADING DEVICE LOCATIONS, ADDED TERRAZZO BASE DETAIL.
AF102	DEFINED SHADING DEVICE LOCATIONS.

Sheet Number	Description
AF103	DEFINED SHADING DEVICE LOCATIONS.
FA001	ADDED FIBER, SPLICE BOX INFORMATION TO RISER DIAGRAM.
FA101	ADDED FIRE/SMOKE DAMPERS.
FA102	ADDED FIRE/SMOKE DAMPERS AND HORN/STROBES.
FX101	ADDED NOTE FOR SMOKE COMPARTMENTS.
FX102	ADDED NOTE FOR SMOKE COMPARTMENTS.
PD101	REVISED NOTE 15
PD102	REVISED NOTES 1,2 &9. REVISES NOTE AT ROOM 124. ADDED NOTE 9 AT EXISTING WATER COOLER.
PD103	REVISED NOTE 8. DELETED NOTE 7 FROM ROOM ADJACENT TO EXISTING MECHANICAL CHASE 229.
PL102	ADDED SHUT-OFF VALVE AND RISER REFERENCE TO RETURN LINE.
PL103	ADDED SHUT-OFF VALVE AND RISER REFERENCE TO RETURN LINE.
PL104	CHANGED CIRCULATING PUMP DESIGNATION FROM 'CP' TO 'RCP'.
PL105	ADDED RISER TO B2 AND ALTERNATE 3 PIPING SCHEMATIC.
MH100	ADDED FIRE & SMOKE DAMPER.
MH101	ADDED FIRE & SMOKE DAMPERS.
M602	CORRECTED GLYCOL EWT AND LWT TO 135 AND 155.
EP101	CHANGED 'CP1 & 2' TO 'RCP1 & 2'; ADDED CONTROL PANEL; ALTERNATE #3 NOTATION.
EP102	ADDED FIRE/SMOKE DAMPERS; IT AND NURSE CALL AT SMOKE SHELTER.
EP103	ADDED EXISTING POWER AND DATE TO RM 207; ADDED 120 V FOR SECURITY PANEL.
ES101	ADDED INFO FOR POWER AND FIBER ROUTING
E801	CHANGED 'CP1 & 2' TO 'RCP1 & 2'.

## CLARIFICATIONS

Item 1: See attached document titled, "Bidder Comments and Responses."

**END OF AMENDMENT A0004**

Harrell, Saltrick, & Hopper, PC

A handwritten signature in black ink, reading "Jonathan M. Carr". The signature is written in a cursive, flowing style.

Jonathan Carr

**DEPARTMENT OF VETERANS AFFAIRS  
VHA MASTER SPECIFICATIONS**

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**SECTION 01 00 00  
GENERAL REQUIREMENTS**

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**SECTION 01 00 00**  
**GENERAL REQUIREMENTS**

**1.1 GENERAL INTENTION**

A. Contractor shall completely prepare site for building operations, including demolition and removal of existing structures, and furnish labor and materials and perform work for Construction and Modifications required to support building 2, post HCC. The work will include all necessary labor, tools, material, equipment, transportation, permits, license and supervision for the work described in the project Numbers 529-12-104 and 529-12-107 drawings and specifications.

1. Work includes but is not limited to site work, utilities, structure, demolition, landscaping, soil erosion and sedimentation controls, and storm water management. Primary objective of this portion (project 529-12-104) of the work will be modifying the existing building 1 loading dock vehicular entrance for the new access to the proposed building 2 basement level loading dock, replacement of existing patient smoke shelter, modifications required to site to meet VA accessibility requirements to enter and exit building 2. General construction, temporary site construction barriers, earth moving, concrete paving, planting, site improvements, plumbing, fire protection, communications, electronic safety and security, storm drainage, sanitary sewer, water service, natural gas service, exterior electrical work, and removal of certain existing site improvements. All work shall be coordination with project 529-12-107 Building 2 Renovation, which will be executed concurrently as required by drawings and specifications.

2. Provide all necessary labor, tools, materials, equipment, transportation, permits, licenses and supervision for project 529-12-107 in accordance with the drawings and specifications. The work includes but is not limited to the construction of a new loading dock, Kitchen and kitchen support area addition to building 2, renovate the interior of building 2, all levels, with selective demolition and modifications to existing infrastructure. General Construction includes, but is not limited to, general construction, earth moving, concrete paving, planting, site improvements, HVAC, plumbing, fire protection, communications, electronic safety and security, storm drainage,

sanitary sewer, water service, natural gas service, exterior and interior electrical work, and removal of certain existing site improvements.

- B. Offices of Harrell Saltrick & Hopper, as Architect-Engineers, will render certain technical services during construction. Such services shall be considered as advisory to the Government and shall not be construed as expressing or implying a contractual act of the Government without affirmations by Contracting Officer or his duly authorized representative.
- C. Before placement and installation of work subject to tests by testing laboratory retained by Department of Veterans Affairs, the Contractor shall notify the COR in sufficient time to enable testing laboratory personnel to be present at the site in time for proper taking and testing of specimens and field inspection. Such prior notice shall be not less than three work days unless otherwise designated by the COR.
- D. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission of the VA police, be identified by project and employer, and restricted from unauthorized access.
- E. Prior to commencing work, general contractor shall provide proof that a OSHA designated "competent person" (CP) (29 CFR 1926.20(b)(2)) will maintain a presence at the work site whenever the general or subcontractors are present. The CP shall have 30-hour OSHA Construction certificate.
- F. Training:
  - 1. All employees of general contractor or subcontractors shall have the 10-hour or 30-hour OSHA Construction Safety course and other relevant competency training, as determined by COR acting as the Construction Safety Officer with input from the facility Construction Safety Committee.
  - 2. Submit training records of all such employees for approval before the start of work.
- G. VHA Directive 2011-36, Safety and Health during Construction, dated 9/22/2011 in its entirety is made a part of this section

## 1.2 STATEMENT OF BID ITEM(S)

A. BASE BID ITEM I, GENERAL CONSTRUCTION: 529-12-104 Building 2 Site Entrance Improvements: Work includes but is not limited to site work, utilities, structure, demolition, landscaping, soil erosion and sedimentation controls, and storm water management. Primary objective of this portion of the work will be modifying the existing building 1 loading dock vehicular entrance for the new access to the proposed building 2 basement level loading dock, replacement of existing patient smoke shelter, modifications required to site to meet VA accessibility requirements to enter and exit building 2. General construction, temporary site construction barriers, earth moving, concrete paving, planting, site improvements, plumbing, fire protection, communications, electronic safety and security, storm drainage, sanitary sewer, water service, natural gas service, exterior electrical work, and removal of certain existing site improvements. All work shall be coordination with project 529-12-107 Building 2 Renovation which will be executed concurrently.

B. BASE BID ITEM II, GENERAL CONSTRUCTION: 529-12-107 Building 2 Renovation: The work includes but is not limited to the construction of a new loading dock, Kitchen and kitchen support area addition to building 2, renovate the interior of building 2, all levels, with selective demolition and modifications to existing infrastructure. General Construction includes, but is not limited to, general construction, earth moving, concrete paving, planting, site improvements, HVAC, plumbing, fire protection, communications, electronic safety and security, storm drainage, sanitary sewer, water service, natural gas service, exterior and interior electrical work, and removal of certain existing site improvements.

Complete all construction work within 365 calendar days of Notice to Proceed.



C. ALTERNATE NO. 1: Item I and II less Window Treatments. Delete all window treatments indicated in the contract documents. Delete specification section 12 24 00 Window Shades. Complete all construction work within 365 calendar days of Notice to Proceed.

- D. ALTERNATE NO. 2: Item I and II less ALTERNATE No. 1 and less Demolition of the existing Patient Smoke Shelter. Retain existing smoke shelter and delete all work in base bid associated with construction of new smoke shelter. Delete specification sections 13 34 19 Metal Building Systems, and 13 34 23 Pre-Fabricated Walkway Covers. Complete all construction work within 365 calendar days of Notice to Proceed.
- E. ALTERNATE NO. 3: Item I and II less ALTERNATE NO. 2 and less Copper Ionization System. Delete specification section 22 11 01 Copper Silver Ionization and base bid work indicated in contract documents. Complete all construction work within 365 calendar days of Notice to Proceed.
- F. ALTERNATE NO. 4: Item I and II less ALTERNATE NO.3 and wood doors to be used in lieu of Acrovyn Doors. Delete specification section 08 14 00 Interior Wood Doors, and use specification section 08 14 10 Interior Wood Doors - Alternate No. 4. Replace all instances of keynote number 1 on sheet AE601 Door Schedule And Details with keynote number 7. Complete all construction work within 365 calendar days of Notice to Proceed.

G. Unit Cost

1

1. Asbestos remediation
  - a. Cost per LF piping found \$ \_\_\_\_\_  
Quantity in base bid 1600\_LF
  - b. Cost per SF of Flooring \$ \_\_\_\_\_  
Quantity in base bid 2000\_SF
  - c. Cost per SF of Adhesive \$ \_\_\_\_\_  
Quantity in base bid 2000 SF
2. Plastic Sprinkler line replacement -
  - a. Cost per LF of plastic sprinkler line \$ \_\_\_\_\_  
Quantity in base bid **1000** LF
  - b. Cost per sprinkler head \$ \_\_\_\_\_  
Quantity of sprinkler heads in base bid **120**



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

- A. AFTER AWARD OF CONTRACT, specifications and drawings will be furnished provided to the contractor on a CD. The Drawings and Specification will be made available in electronic PDF format for reproduction, at Contractor's expense.

### **1.4 CONSTRUCTION SECURITY REQUIREMENTS**

#### **A. Security Plan:**

- 1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.
- 2. The General Contractor is responsible for assuring that all sub-contractors working on the project and their employees also comply with these regulations.

#### **B. Security Procedures:**

- 1. General Contractor's employees shall not enter the project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
- 2. For working outside the "regular hours" as defined in the contract, The General Contractor shall give 3 days notice to the COR or Contracting Officer so that arrangements and notifications can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this section.
- 3. No photography of VA premises is allowed without written permission of the Contracting Officer.
- 4. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the Contracting Officer.

#### **C. Guards:**

- 1. The General Contractor shall provide unarmed guards at the project site during any power outage related to the electronic security of

building 20. A minimum of 2 guards shall be required during any outage.

2. Guards shall supplement VA staff and take direction from VA Police, Fire, Safety or COR as to the specific locations and duties during such an outage.

D. Key Control:

1. The General Contractor shall provide duplicate keys and lock combinations to the COR for the purpose of security inspections of every area of project including tool boxes and parked machines and take any emergency action.
2. The General Contractor shall turn over all permanent lock cylinders to the VA locksmith for permanent installation. See Section 08 71 00, DOOR HARDWARE and coordinate.

E. Document Control:

1. Before starting any work, the General Contractor/Sub Contractors shall submit an electronic security memorandum describing the approach to following goals and maintaining confidentiality of "sensitive information".
2. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information. This information shall be shared only with those with a specific need to accomplish the project.
4. Certain documents, sketches, videos or photographs and drawings may be marked "Law Enforcement Sensitive" or "Sensitive Unclassified". Secure such information in separate containers and limit the access to only those who will need it for the project. Return the information to the Contracting Officer upon request.
5. These security documents shall not be removed or transmitted from the project site without the written approval of Contracting Officer.
6. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed in a manner acceptable to the VA.

7. Notify Contracting Officer and Site Security Officer immediately when there is a loss or compromise of "sensitive information".
8. All electronic information shall be stored in specified location following VA standards and procedures

F. Motor Vehicle Restrictions

1. Vehicle authorization request shall be required for any vehicle entering the site and such request shall be submitted 24 hours before the date and time of access. Access shall be restricted to picking up and dropping off materials and supplies.
2. Separate permits shall be issued for General Contractor and its employees for parking in designated areas only. Lot 20 located SE of building 4.

**1.5 FIRE SAFETY**

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

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

E84-2009.....Surface Burning Characteristics of Building  
Materials

2. National Fire Protection Association (NFPA):

10-2010.....Standard for Portable Fire Extinguishers

30-2008.....Flammable and Combustible Liquids Code

51B-2009.....Standard for Fire Prevention During Welding,  
Cutting and Other Hot Work

70-2011.....National Electrical Code

241-2009.....Standard for Safeguarding Construction,  
Alteration, and Demolition Operations

3. Occupational Safety and Health Administration (OSHA):

29 CFR 1926.....Safety and Health Regulations for Construction

- B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to COR for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the general contractor's competent person per OSHA requirements. This briefing shall include information on the construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, etc. Documentation shall be provided to the COR that individuals have undergone contractor's safety briefing.
- C. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.
- D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).
- E. Temporary Construction Partitions:
1. Install and maintain temporary construction partitions to provide fire rated smoke-tight separations between construction areas, the areas that are described in phasing requirements, and adjoining areas. Construct partitions of gypsum board or treated plywood (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of fire retardant treated wood or metal steel studs. Extend the partitions through suspended ceilings to floor slab deck or roof. Seal joints and penetrations. At door openings, install Class C, ¾ hour fire rated doors with self-closing devices.
  2. Install one-hour fire-rated temporary construction partitions as shown on drawings to maintain integrity of existing exit stair enclosures, exit passageways, fire-rated enclosures of hazardous areas, horizontal exits, smoke barriers, vertical shafts and openings enclosures.

3. Close openings in smoke barriers and fire-rated construction to maintain fire ratings. Seal penetrations with listed through-penetration firestop materials in accordance with Section 07 84 00, FIRESTOPPING.

- F. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- G. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with COR.
- H. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to COR.
- I. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- J. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- K. Standpipes: Install and extend standpipes up with each floor in accordance with 29 CFR 1926 and NFPA 241. Do not charge wet standpipes subject to freezing until weather protected. Coordinate all stand pipe modifications with COR and VA Fire Department. Provide 24 hour written notice prior to any work on any Fire System located on Butler campus.
- L. Sprinklers: Install, test and activate new automatic sprinklers prior to removing existing sprinklers. Coordinate all sprinkler modifications with COR and VA Fire Department
- M. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in a 24-hour period. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with COR. All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with the VA Fire Department. Parameters for the testing and results of any tests performed shall be recorded by the medical center and copies provided to the COR.

- N. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with COR.
- O. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with VA Fire Department and COR. Obtain permits from VA Fire Department, Permits are available beginning at 7:00 am and are for one day only. New permits are required daily and must be turned in daily, as the final check must be completed prior to contractor leaving the area of work. Designate contractor's responsible project-site fire prevention program manager to permit hot work.
- P. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to COR.
- Q. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.
- R. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.
- S. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.

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

- A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the COR or Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the Contracting Officer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work.

C. The Contractor shall, under regulations prescribed by the Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the Contracting Officer. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.

**(FAR 52.236-10)**

D. Working space and space available for storing materials shall be as shown on the drawings or as determined by the COR.

E. Workmen are subject to rules of Medical Center applicable to their conduct. Execute work in such a manner as to interfere as little as possible with work being done by others. Keep roads clear of construction materials, debris, standing construction equipment and vehicles at all times.

F. Execute work so as to interfere as little as possible with normal functioning of VA Butler Healthcare staff and Patients as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by COR where required by limited working space.

1. Do not store materials and equipment in other than assigned areas.

2. Schedule delivery of materials and equipment to immediate construction working areas within buildings in use by Department of Veterans Affairs in quantities sufficient for not more than two work days. Provide unobstructed access to Building 20 CLC, Building 1 loading dock areas, and the connection between building 1 to building 20 CLC required to remain in operation.

3. Where access by personnel to vacated portions of buildings is not required, storage of Contractor's materials and equipment will be permitted subject to fire and safety requirements.

G.. Utilities Services: Where necessary to cut existing pipes, electrical wires, conduits, cables, etc., of utility services, or of fire protection systems or communications systems (except telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by COR. All such actions shall be coordinated with the VA Maintenance and Repair, IT, and/or Fire Staff involved:

H. Phasing: To insure such executions, Contractor shall furnish the COR with a schedule of approximate phasing dates on which the Contractor intends to accomplish work in each specific area of site, building or portion thereof. In addition, Contractor shall notify the COR two weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such phasing to insure accomplishment of this work in successive phases mutually agreeable to Medical Center Director, COR and Contractor, as follows:



Phase I: Demolition and Site preparation North side (limited 90 calendar days from NTP) This Phase concludes with asphalt base reinstalled, and includes all retaining walls and sidewalks reinstalled. During this phase, the contractor must maintain accessible entrance to CLC Building 20 from existing Parking area. To include temporary signage - rerouting of accessible parking, stripping if necessary, signage, barriers and pathways defined.

Phase II: All interior work (Patient and Staff link to be maintained between building 20 (CLC) and Building 1 on the first floor level. After hours work when required in link. Contractor to be responsible for signage and barriers. This work can begin ASAP and run concurrently with all other Phases.

Phase III: South side work - Limited duration. Contractor responsible for signage and barriers. This work may occur any time during sequencing the GC deems appropriate; however, the time limit for all work in this area shall be limited to 60 calendar days.

H. Building No. 2 will be vacated by Government in accordance with above phasing beginning immediately after date of receipt of Notice to Proceed and turned over to Contractor.

1. Certain areas of Building(s) No. 2 will be occupied by Medical Center personnel for various periods as listed below:

a. Connection and travel between Buildings 1 and Building 20 thru out the construction period.

b. Patient Activity area is located on the South Side of the connection. This area will be used by Patients and Staff except during the 60 days of Phase III.

Contractor shall take all measures and provide all material necessary for protecting existing equipment and property in affected areas of construction against dust and debris, so that equipment and affected areas to be used in the Medical Centers operations will not be hindered. Contractor shall permit access to Department of Veterans Affairs personnel and patients through other construction areas which serve as routes of access to such affected areas and equipment. Coordinate alteration work in areas occupied by

Department of Veterans Affairs so that Medical Center operations will continue during the construction period.

2. Immediate areas of alterations not mentioned in preceding Subparagraph 1 will be temporarily vacated while alterations are performed.

I. Construction Fence: Before construction operations begin, Contractor shall provide a chain link construction fence, 2.1m (seven feet) minimum height, around the construction area indicated on the drawings. Provide gates as required for access with necessary hardware, including hasps and padlocks. Fasten fence fabric to terminal posts with tension bands and to line posts and top and bottom rails with tie wires spaced at maximum 375mm (15 inches). Bottom of fences shall extend to 25mm (one inch) above grade. Remove the fence when directed by COR.

J. When a building is turned over to Contractor, Contractor shall accept entire responsibility therefore.

1. Contractor shall maintain a minimum temperature of 4 degrees C (40 degrees F) at all times, except as otherwise specified.
2. Contractor shall maintain in operating condition existing fire protection and alarm equipment. In connection with fire alarm equipment, Contractor shall make arrangements for pre-inspection of site with Fire Department Department of Veterans Affairs whichever will be required to respond to an alarm from Contractor's employee or watchman.

K. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by COR.

1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of COR. Electrical work shall be accomplished with all affected circuits or equipment de-energized.

- When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without the Medical Center Director's prior knowledge and written approval. Refer to specification Sections 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, 27 05 11 REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS and 28 05 11, REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY INSTALLATIONS for additional requirements.
2. Contractor shall submit a request to interrupt any such services to COR, in writing, 48 hours in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
  3. Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of Medical Center . Interruption time approved by Medical Center may occur at other than Contractor's normal working hours.
  4. Major interruptions of any system must be requested, in writing, at least 15 calendar days prior to the desired time and shall be performed as directed by the COR.
  5. In case of a contract construction emergency, service will be interrupted on approval of COR. Such approval will be confirmed in writing as soon as practical.
  6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.
- L. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.

- M. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:
1. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles. Wherever excavation for new utility lines cross existing roads, at least one lane must be open to traffic at all times.
  2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the COR.
  3. Provide all traffic barriers, signage, detour routing, safety cones, and flagmen required during a road closure or traffic disruption.
  4. Roads will be kept clean during construction. Provide wet street sweeping whenever necessary to maintain dust and dirt from accumulating on the sidewalks and roadways.
  5. Inspect repair and maintain all soil erosion measures in place weekly or immediately following a rain event.
- N. Coordinate the work for this contract with other construction operations as directed by COR. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.

#### **1.7 ALTERATIONS**

- A. Survey: Before any work is started, the Contractor shall make a thorough survey with the COR of limited work areas of buildings in which alterations occur and areas which are anticipated routes of access, and furnish a report, signed by both to the Contracting Officer. This report shall list by rooms and spaces:
1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout affected areas to perform work.
  2. Existence and conditions of items such as plumbing fixtures and accessories, electrical fixtures, equipment, venetian blinds, shades, etc., required by drawings to be either reused or relocated, or both.

3. Shall note any discrepancies between drawings and existing conditions at site.
  4. Shall designate areas for working space, materials storage and routes of access to areas within buildings where alterations occur and which have been agreed upon by Contractor and COR.
- B. Any items required by drawings to be either reused or relocated or both, found during this survey to be nonexistent, or in opinion of COR to be in such condition that their use is impossible or impractical, shall be furnished and/or replaced by Contractor with new items in accordance with specifications which will be furnished by Government. Provided the contract work is changed by reason of this subparagraph B, the contract will be modified accordingly, under provisions of clause entitled "DIFFERING SITE CONDITIONS" (FAR 52.236-2) and "CHANGES" (FAR 52.243-4 and VAAR 852.236-88).
- C. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and COR together shall make a thorough re-survey of the areas of buildings involved. They shall furnish a report on conditions then existing, of resilient flooring, doors, windows, walls and other surfaces as compared with conditions of same as noted in first condition survey report:
1. Re-survey report shall also list any damage caused by Contractor to such flooring and other surfaces, despite protection measures; and, will form basis for determining extent of repair work required of Contractor to restore damage caused by Contractor's workmen in executing work of this contract.
- D. Protection: Provide the following protective measures:
1. Wherever existing roof surfaces are disturbed they shall be protected against water infiltration. In case of leaks, they shall be repaired immediately upon discovery. Roof repairs or modifications shall be performed by the original roof installer so not to void warranties.
  2. Temporary protection against damage for portions of existing structures and grounds where work is to be done, materials handled and equipment moved and/or relocated.

3. Protection of interior of existing structures at all times, from damage, dust and weather inclemency. Wherever work is performed, floor surfaces that are to remain in place shall be adequately protected prior to starting work, and this protection shall be maintained intact until all work in the area is completed.

#### **1.8 INFECTION PREVENTION MEASURES**

- A. Implement the requirements of VAMC's Infection Control Risk Assessment (ICRA) team. ICRA Group may monitor dust in the vicinity of the construction work and require the Contractor to take corrective action immediately if the safe levels are exceeded.
- B. Establish and maintain a dust control program as part of the contractor's infection preventive measures in accordance with the guidelines provided by ICRA Group and as specified here. Prior to start of work, prepare a plan detailing project-specific dust protection measures, including periodic status reports, and submit to COR and Facility ICRA team for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
  1. All personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.
- C. Medical center Infection Control personnel shall monitor for airborne disease (e.g. aspergillosis) as appropriate during construction. A baseline of conditions may be established by the medical center prior to the start of work and periodically during the construction stage to determine impact of construction activities on indoor air quality. In addition:
  1. The COR and VAMC Infection Control personnel shall review pressure differential monitoring documentation to verify that pressure differentials in the construction zone and in the patient-care rooms are appropriate for their settings. The requirement for negative air pressure in the construction zone shall depend on the location and type of activity. Upon notification, the contractor shall implement corrective measures to restore proper pressure differentials as needed.

2. In case of any problem, the medical center, along with assistance from the contractor, shall conduct an environmental assessment to find and eliminate the source.
- D. In general, following preventive measures shall be adopted during construction to keep down dust and prevent mold.
1. Dampen debris to keep down dust and provide temporary construction partitions in existing structures where directed by COR. Blank off ducts and diffusers to prevent circulation of dust into occupied areas during construction.
  2. Do not perform dust producing tasks within occupied areas without the approval of the COR. For construction in any areas that will remain jointly occupied by the medical Center and Contractor's workers, the Contractor shall:
    - a. Provide dust proof, one-hour fire-rated temporary drywall construction barriers to completely separate construction from the operational areas of the hospital in order to contain dirt debris and dust. Barriers shall be sealed and made presentable on hospital occupied side. Install a self-closing rated door in a metal frame, commensurate with the partition, to allow worker access. Maintain negative air at all times. A fire retardant polystyrene, 6-mil thick or greater plastic barrier meeting local fire codes may be used where dust control is the only hazard, and an agreement is reached with the COR and Medical Center.
    - b. HEPA filtration is required where the exhaust dust may reenter the breathing zone. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. Install HEPA (High Efficiency Particulate Accumulator) filter vacuum system rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. Insure continuous negative air pressures occurring within the work area. HEPA filters should have ASHRAE 85 or other prefilter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Exhaust hoses shall be heavy duty, flexible steel reinforced and exhausted so that dust is not reintroduced to the medical center.

- c. Adhesive Walk-off/Carpet Walk-off Mats, minimum 600mm x 900mm (24" x 36"), shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often as required to maintain clean work areas directly outside construction area at all times.
- d. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as they are created. Transport these outside the construction area in containers with tightly fitting lids.
- e. The contractor shall not haul debris through patient-care areas without prior approval of the COR and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools, material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.
- f. Using a HEPA vacuum, clean inside the barrier and vacuum ceiling tile prior to replacement. Any ceiling access panels opened for investigation beyond sealed areas shall be sealed immediately when unattended.
- g. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.
- h. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.

E. Final Cleanup:

- 1. Upon completion of project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.



2. Perform HEPA vacuum cleaning of all surfaces in the construction area. This includes walls, ceilings, cabinets, furniture (built-in or free standing), partitions, flooring, etc.
3. All new air ducts shall be cleaned prior to final inspection.

#### **1.18A INFECTIOUS CONTROL MEASURES**

During construction, renovation and minor improvement projects, hidden infectious disease hazards may be released into the air, carried on dust particles or on clothing - for example, fungal organisms such as, *Aspergillus*. *Aspergillus* species may be found in decaying leaves and compost, plaster and drywall, and settled dust. These organisms, and other fungal organisms, usually do not cause problems in healthy people but can cause illness and even death in patients with lung problems or poor immunity. Therefore, it is critical that you do your part to keep our patients, employees, and visitors as safe and healthy as possible. We, in turn, will make conditions as safe as possible for you.

##### **1. Medical Waste:**

a. We will remove any medical waste, including sharps containers (for used needles and syringes), from construction areas prior to the start of the projects.

b. If you (contract workers) find any needles, syringes, sharp medical objects, please notify your COR immediately

##### **2. Barrier Walls:**

a. The construction areas MUST be kept separated from patient care areas by barriers that keep the dust and dirt inside the worksite.

b. The walls must provide a complete seal of the construction area from adjacent areas.

3. Environmental Control:

a. As indicated, negative air pressure must be maintained within the construction area.

b. Demolition debris is removed in tightly fitted covered carts - use specified traffic patterns.

c. Sticky or walk-off mats are placed immediately outside the construction zone and changed whenever necessary to control the spread of dust and dirt.

d. Exterior window seals are to be used to reduce the amount of outside excavation debris coming into the building.

e. If demolition chutes are used, they must be sealed when not in use; the chute and damper should be sprayed with water, as necessary to maintain dust control.

f. Control, collection and disposal must be provided for any drain liquid or sludge found when demolishing plumbing.

4. Traffic Control:

a. Use designated entry and exit procedures.

b. Keep all egress pathways free of debris.

c. No unauthorized personnel should be allowed to enter construction areas.

d. Use designated elevators only.

5. Cleaning:

- a. Keep the construction area clean on a daily basis.
- b. Dust and dirt must be kept to a minimum.

6. Workers:

- a. Clothing must be free of loose soil and debris when exiting the construction area.
- b. Use personal protective equipment (masks, face shields, etc.) as required for the task at hand.
- c. Hand washing is the best method of reducing the transmission of infection: always wash your hands with soap and water after visiting the restroom, before eating, when leaving the construction site.

**1.9 DISPOSAL AND RETENTION**

A. Materials and equipment accruing from work removed and from demolition of buildings or structures, or parts thereof, shall be disposed of as follows:

- 1. Reserved items which are to remain property of the Government are identified by attached tags or noted on drawings or in specifications as items to be stored. Items that remain property of the Government shall be removed or dislodged from present locations in such a manner as to prevent damage which would be detrimental to re-installation and reuse. Store such items where directed by COR.
- 2. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.
- 3. Items of portable equipment and furnishings located in rooms and spaces in which work is to be done under this contract shall remain the property of the Government. When rooms and spaces are vacated by the Department of Veterans Affairs during the alteration period,

such items which are NOT required by drawings and specifications to be either relocated or reused will be removed by the Government in advance of work to avoid interfering with Contractor's operation.

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

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

**(FAR 52.236-9)**

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

D. Refer to FAR clause 52.236-7, "Permits and Responsibilities," which is included in General Conditions. A National Pollutant Discharge Elimination System (NPDES) permit is required for this project. The Contractor is considered an "operator" under the permit and has extensive responsibility for compliance with permit requirements. VA will make the permit application available at the (appropriate medical center) office. The apparent low bidder, contractor and affected subcontractors shall furnish all information and certifications that are required to comply with the permit process and permit requirements. Many of the permit requirements will be satisfied by completing construction as shown and specified. Some requirements involve the Contractor's method of operations and operations planning and the Contractor is responsible for employing best management practices. The affected activities often include, but are not limited to the following:

- Designating areas for equipment maintenance and repair;
- Providing waste receptacles at convenient locations and provide regular collection of wastes;
- Locating equipment wash down areas on site, and provide appropriate control of wash-waters;
- Providing protected storage areas for chemicals, paints, solvents, fertilizers, and other potentially toxic materials; and
- Providing adequately maintained sanitary facilities.

#### **1.11 RESTORATION**

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of the COR. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the COR before it is disturbed. Materials and workmanship used in restoring work, shall conform in type and quality to that of original existing construction, except as otherwise shown or specified.
- B. Upon completion of contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and

electrical work, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.

- C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are indicated on drawings and which are not scheduled for discontinuance or abandonment.
- D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled "CHANGES" (FAR 52.243-4 and VAAR 852.236-88) and "DIFFERING SITE CONDITIONS" (FAR 52.236-2).

#### **1.12 PHYSICAL DATA**

- A. Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.
  - 1. The indications of physical conditions on the drawings and in the specifications are the result of site investigations by GAI Consultants dated August 16, 2010.

#### **(FAR 52.236-4)**

- B. Subsurface conditions have been developed by core borings and test pits. Logs of subsurface exploration are shown diagrammatically in soils report.
- C. A copy of the soil report will be made available for inspection by bidders as part of the solicitation package and shall be considered part of the contract documents.
- D. Government does not guarantee that other materials will not be encountered nor that proportions, conditions or character of several materials will not vary from those indicated by explorations. Bidders are expected to examine site of work and logs of borings; and, after

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

#### **1.13 PROFESSIONAL SURVEYING SERVICES**

Not Used

#### **1.14 LAYOUT OF WORK**

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

#### **(FAR 52.236-17)**

- B. Establish and plainly mark lines for each building and/or addition to each existing building, and such other lines and grades that are reasonably necessary to properly assure that location, orientation, and elevations established for each such structure and/or addition, roads, parking lots, are in accordance with lines and elevations shown on contract drawings.
- C. Following completion of general mass excavation and before any other permanent work is performed, establish and plainly mark (through use of appropriate batter boards or other means) sufficient additional survey control points or system of points as may be necessary to assure proper alignment, orientation, and grade of all major features of work. Survey shall include, but not be limited to, location of lines and grades of footings, exterior walls, center lines of columns in both directions, major utilities and elevations of floor slabs:

- D. Contractor shall furnish to the COR certificates from a registered land surveyor or registered civil engineer that the following work is complete in every respect as required by contract drawings.
1. Lines of each building and/or addition.
  2. Elevations of bottoms of footings and tops of floors of each building and/or addition.
  3. Lines and elevations of sewers and of all outside distribution systems.
- E. Whenever changes from contract drawings are made in line or grading requiring certificates, record such changes on a reproducible drawing bearing the registered land surveyor or registered civil engineer seal, and forward these drawings upon completion of work to COR.
- F. Upon completion of the work, the Contractor shall furnish the COR, reproducible drawings at the scale of the contract drawings, showing the finished grade on the grid developed for constructing the work, including burial monuments and fifty foot stationing along new road centerlines. These drawings shall bear the seal of the registered land surveyor or registered civil engineer.

#### **1.15 AS-BUILT DRAWINGS**

- A. The contractor shall maintain two full size sets of as-built drawings which will be kept current during construction of the project, to include all contract changes, modifications and clarifications.
- B. All variations shall be shown in the same general detail as used in the contract drawings. To insure compliance, as-built drawings shall be made available for the COR's review, as often as requested.
- C. Contractor shall deliver one approved completed sets of as-built drawings to the COR within 15 calendar days after each completed phase and after the acceptance of the project by the COR.
- D. Paragraphs A, B, & C shall also apply to all shop drawings.

#### **1.16 USE OF ROADWAYS**

- A. For hauling, use only established public roads and roads on Medical Center property and, when authorized by the COR, such temporary roads which are necessary in the performance of contract work. Temporary



roads shall be constructed by the Contractor at Contractor's expense. When necessary to cross curbing, sidewalks, or similar construction, they must be protected by well-constructed bridges.

- B. When new permanent roads are to be a part of this contract, Contractor may construct them immediately for use to facilitate building operations. These roads may be used by all who have business thereon within zone of building operations.
- C. When certain buildings (or parts of certain buildings) are required to be completed in advance of general date of completion, all roads leading thereto must be completed and available for use at time set for completion of such buildings or parts thereof.

#### **1.17 COR'S FIELD OFFICE**

- A. Not Used

#### **1.18 TEMPORARY USE OF MECHANICAL AND ELECTRICAL EQUIPMENT**

- A. Use of new installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to compliance with the following provisions:
  - 1. Permission to use each unit or system must be given by COR. If the equipment is not installed and maintained in accordance with the following provisions, the COR will withdraw permission for use of the equipment.
  - 2. Electrical installations used by the equipment shall be completed in accordance with the drawings and specifications to prevent damage to the equipment and the electrical systems, i.e. transformers, relays, circuit breakers, fuses, conductors, motor controllers and their overload elements shall be properly sized, coordinated and adjusted. Voltage supplied to each item of equipment shall be verified to be correct and it shall be determined that motors are not overloaded. The electrical equipment shall be thoroughly cleaned before using it and again immediately before final inspection including vacuum cleaning and wiping clean interior and exterior surfaces.

3. Units shall be properly lubricated, balanced, and aligned.  
Vibrations must be eliminated.
  4. Automatic temperature control systems for preheat coils shall function properly and all safety controls shall function to prevent coil freeze-up damage.
  5. The air filtering system utilized shall be that which is designed for the system when complete, and all filter elements shall be replaced at completion of construction and prior to testing and balancing of system.
  6. All components of heat production and distribution system, metering equipment, condensate returns, and other auxiliary facilities used in temporary service shall be cleaned prior to use; maintained to prevent corrosion internally and externally during use; and cleaned, maintained and inspected prior to acceptance by the Government. Boilers, pumps, feedwater heaters and auxiliary equipment must be operated as a complete system and be fully maintained by operating personnel. Boiler water must be given complete and continuous chemical treatment.
- B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Government.
- C. This paragraph shall not reduce the requirements of the mechanical and electrical specifications sections.

#### **1.19 TEMPORARY USE OF EXISTING ELEVATORS**

- A. Contractor will be allowed the use of existing elevators for handling building materials and Contractor's personnel will be permitted subject to following provisions:
1. Contractor makes all arrangements with the COR for use of elevators. The COR will ascertain that elevators are in proper condition. Contractor may use elevator in Building No. 2 for for daily use
  2. Contractor covers and provides maximum protection of following elevator components:
    - a. Entrance jambs, heads soffits and threshold plates.

- b. Entrance columns, canopy, return panels and inside surfaces of car enclosure walls.
  - c. Finish flooring.
- 3. Government will accept hoisting ropes of elevator and rope of each speed governor if they are worn under normal operation. However, if these ropes are damaged by action of foreign matter such as sand, lime, grit, stones, etc., during temporary use, they shall be removed and replaced by new hoisting ropes.
- 4. If brake lining of elevators are excessively worn or damaged during temporary use, they shall be removed and replaced by new brake lining.
- 5. All parts of main controller, starter, relay panel, selector, etc., worn or damaged during temporary use shall be removed and replaced with new parts, if recommended by elevator inspector after elevator is released by Contractor.
- 6. Place elevator in condition equal, less normal wear, to that existing at time it was placed in service of Contractor as approved by Contracting Officer.
- 7. Contractor to contract with Lins elevator service in order to electronically lock out the use of the elevator for public use. Code must be coordinated and provided to COR for select VA staff.

#### **1.20 TEMPORARY USE OF NEW ELEVATORS**

- A. Not Used

#### **1.21 TEMPORARY TOILETS**

- A. Provide where directed, (for use of all Contractor's workmen) ample temporary suitable dry closets where directed at or near job trailer and staging area. Keep such places clean and free from flies to completion of contract, and premises left perfectly clean.
- B. Contractor may have for use of Contractor's workmen, such toilet accommodations as may be assigned to Contractor by Medical Center.

Contractor shall keep such places clean and be responsible for any damage done thereto by Contractor's workmen. Failure to maintain satisfactory condition in toilets will deprive Contractor of the privilege to use such toilets.

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

- A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The Contractor shall carefully conserve any utilities furnished without charge.
- B. The Contractor, at Contractor's expense and in a workmanlike manner satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines. Before final acceptance of the work by the Government, the Contractor shall remove all the temporary connections, distribution lines, meters, and associated paraphernalia.
- D. Heat: Furnish temporary heat necessary to prevent injury to work and materials through dampness and cold. Use of open salamanders or any temporary heating devices which may be fire hazards or may smoke and damage finished work, will not be permitted. Maintain minimum temperatures as specified for various materials:
  - 1. Obtain heat by connecting to Medical Center heating distribution system.
    - a. Steam is not available.
- E. Electricity (for Construction and Testing): Furnish all temporary electric services.
  - 1. Obtain electricity by connecting to the Medical Center electrical distribution system. The Contractor shall meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Electricity for all other uses is available at no cost to the Contractor.
- F. Water (for Construction and Testing): Furnish temporary water service.

1. Obtain water by connecting to the Medical Center water distribution system. Provide reduced pressure backflow preventer at each connection. Water is available at no cost to the Contractor.
2. Maintain connections, pipe, fittings and fixtures and conserve water-use so none is wasted. Failure to stop leakage or other wastes will be cause for revocation (at COR's discretion) of use of water from Medical Center's system.

G. Steam: Not Used

H. Fuel: Natural gas is available.

#### **1.23 NEW TELEPHONE EQUIPMENT**

The contractor shall coordinate with the work of installation of telephone equipment by others. This work shall be completed before the building is turned over to VA.

#### **1.24 TESTS**

- A. Pre-test mechanical and electrical equipment and systems and make corrections required for proper operation of such systems before requesting final tests. Final test will not be conducted unless pre-tested.
- B. Conduct final tests required in various sections of specifications in presence of an authorized representative of the Contracting Officer. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.
- C. Mechanical and electrical systems shall be balanced, controlled and coordinated. A system is defined as the entire complex which must be coordinated to work together during normal operation to produce results for which the system is designed. For example, air conditioning supply air is only one part of entire system which provides comfort conditions for a building. Other related components are return air, exhaust air, steam, chilled water, refrigerant, hot water, controls and electricity, etc. Another example of a complex which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of fuel, combustion air, controls, steam, feedwater, condensate and other related components.

- D. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonably short period of time during which operating and environmental conditions remain reasonably constant.
- E. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components and of the entire system.

#### **1.25 INSTRUCTIONS**

- A. Contractor shall furnish Maintenance and Operating manuals and verbal instructions when required by the various sections of the specifications and as hereinafter specified.
- B. Manuals: Maintenance and operating manuals (four copies each) for each separate piece of equipment shall be delivered to the COR coincidental with the delivery of the equipment to the job site. Manuals shall be complete, detailed guides for the maintenance and operation of equipment. They shall include complete information necessary for starting, adjusting, maintaining in continuous operation for long periods of time and dismantling and reassembling of the complete units and sub-assembly components. Manuals shall include an index covering all component parts clearly cross-referenced to diagrams and illustrations. Illustrations shall include "exploded" views showing and identifying each separate item. Emphasis shall be placed on the use of special tools and instruments. The function of each piece of equipment, component, accessory and control shall be clearly and thoroughly explained. All necessary precautions for the operation of the equipment and the reason for each precaution shall be clearly set forth. Manuals must reference the exact model, style and size of the piece of equipment and system being furnished. Manuals referencing equipment similar to but of a different model, style, and size than that furnished will not be accepted.
- C. Instructions: Contractor shall provide qualified, factory-trained manufacturers' representatives to give detailed instructions to assigned Department of Veterans Affairs personnel in the operation and complete maintenance for each piece of equipment. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. Instructions for different items of equipment that are component parts of a complete system, shall

be given in an integrated, progressive manner. All instructors for every piece of component equipment in a system shall be available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems. All instruction periods shall be at such times as scheduled by the COR and shall be considered concluded only when the COR is satisfied in regard to complete and thorough coverage. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the COR, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

#### **1.26 GOVERNMENT-FURNISHED PROPERTY**

- A. The Government shall deliver to the Contractor, the Government-furnished property shown on the drawings.
- B. Equipment furnished by Government to be installed by Contractor will be furnished to Contractor at the Medical Center.
- C. Contractor shall be prepared to receive this equipment from Government and store or place such equipment not less than 90 days before Completion Date of project.
- D. Notify Contracting Officer in writing, 60 days in advance, of date on which Contractor will be prepared to receive equipment furnished by Government. Arrangements will then be made by the Government for delivery of equipment.
  - 1. Immediately upon delivery of equipment, Contractor shall arrange for a joint inspection thereof with a representative of the Government. At such time the Contractor shall acknowledge receipt of equipment described, make notations, and immediately furnish the Government representative with a written statement as to its condition or shortages.
  - 2. Contractor thereafter is responsible for such equipment until such time as acceptance of contract work is made by the Government.
- E. Equipment furnished by the Government will be delivered in a partially assembled (knock down) condition in accordance with existing standard commercial practices, complete with all fittings, fastenings, and appliances necessary for connections to respective services installed

under contract. All fittings and appliances (i.e., couplings, ells, tees, nipples, piping, conduits, cables, and the like) necessary to make the connection between the Government furnished equipment item and the utility stub-up shall be furnished and installed by the contractor at no additional cost to the Government.

- F. Completely assemble and install the Government furnished equipment in place ready for proper operation in accordance with specifications and drawings.
- G. Furnish supervision of installation of equipment at construction site by qualified factory trained technicians regularly employed by the equipment manufacturer.

#### **1.27 RELOCATED EQUIPMENT ITEMS**

- A. Contractor shall disconnect, dismantle as necessary, remove and reinstall in new location, all existing equipment // and items // indicated by symbol "R" or otherwise shown to be relocated by the Contractor.
- B. Perform relocation of such equipment or items at such times and in such a manner as directed by the COR.
- C. Suitably cap existing service lines, such as steam, condensate return, water, drain, gas, air, vacuum and/or electrical, whenever such lines are disconnected from equipment to be relocated. Remove abandoned lines in finished areas and cap as specified herein before under paragraph "Abandoned Lines".
- D. Provide all mechanical and electrical service connections, fittings, fastenings and any other materials necessary for assembly and installation of relocated equipment; and leave such equipment in proper operating condition.
- E. Contractor shall employ services of an installation engineer, who is an authorized representative of the manufacturer of this equipment to supervise assembly and installation of existing kitchen and laundry equipment, required to be relocated.
- F. All service lines such as noted above for relocated equipment shall be in place at point of relocation ready for use before any existing



equipment is disconnected. Make relocated existing equipment ready for operation or use immediately after reinstallation.

#### **1.28 STORAGE SPACE FOR DEPARTMENT OF VETERANS AFFAIRS EQUIPMENT**

- A. Not Used

#### **1.29 CONSTRUCTION SIGN**

- A. Provide a Construction Sign where directed by the COR. All wood members shall be of framing lumber. Cover sign frame with 0.7 mm (24 gage) galvanized sheet steel nailed securely around edges and on all bearings. Provide three 100 by 100 mm (4 inch by 4 inch) posts (or equivalent round posts) set 1200 mm (four feet) into ground. Set bottom of sign level at 900 mm (three feet) above ground and secure to posts with through bolts. Make posts full height of sign. Brace posts with 50 x 100 mm (two by four inch) material as directed.
- B. Paint all surfaces of sign and posts two coats of white gloss paint. Border and letters shall be of black gloss paint, except project title which shall be blue gloss paint.
- C. Maintain sign and remove it when directed by the COR.
- D. Detail Drawing of construction sign showing required legend and other characteristics of sign is shown on the drawings.

#### **1.30 SAFETY SIGN**

- A. Provide a Safety Sign where directed by COR. Face of sign shall be 19 mm (3/4 inch) thick exterior grade plywood. Provide two 100 mm by 100 mm (four by four inch) posts extending full height of sign and 900 mm (three feet) into ground. Set bottom of sign level at 1200 mm (four feet) above ground.
- B. Paint all surfaces of Safety Sign and posts with one prime coat and two coats of white gloss paint. Letters and design shall be painted with gloss paint of colors noted.
- C. Maintain sign and remove it when directed by COR.
- D. Standard Detail Drawing Number SD10000-02(Found on VA TIL) of safety sign showing required legend and other characteristics of shown on the drawings.

E. Post the number of accident free days on a daily basis.

### **1.31 PHOTOGRAPHIC DOCUMENTATION**

A. During the construction period through completion, provide 250-300 photographic documentation of construction progress and at selected milestones including electronic indexing, navigation, storage and remote access to the documentation, as per these specifications. The commercial photographer or the subcontractor used for this work shall meet the following qualifications:

1. Demonstrable minimum experience of three (3) years in operation providing documentation and advanced indexing/navigation systems including a representative portfolio of construction projects of similar type, size, duration and complexity as the Project.
2. Demonstrable ability to service projects throughout North America, which shall be demonstrated by a representative portfolio of active projects of similar type, size, duration and complexity as the Project.

B. Photographic documentation elements:

1. Each digital image shall be taken with a professional grade camera with minimum size of 6 megapixels (MP) capable of producing 200x250mm (8 x 10 inch) prints with a minimum of 2272 x 1704 pixels and 400x500mm (16 x 20 inch) prints with a minimum 2592 x 1944 pixels.
2. Indexing and navigation system shall utilize actual AUTOCAD construction drawings, making such drawings interactive on an on-line interface. For all documentation referenced herein, indexing and navigation must be organized by both time (date-stamped) and location throughout the project.
3. Documentation shall combine indexing and navigation system with inspection-grade digital photography designed to capture actual conditions throughout construction and at critical milestones. Documentation shall be accessible on-line through use of an internet connection. Documentation shall allow for secure multiple-user access, simultaneously, on-line.

4. Before construction, the building pad, adjacent streets, roadways, parkways, driveways, curbs, sidewalks, landscaping, adjacent utilities and adjacent structures surrounding the building pad and site shall be documented. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation accomplished through interactive architectural drawings. If site work or pad preparation is extensive, this documentation may be required immediately before construction and at several pre-determined intervals before building work commences.
5. Construction progress for all trades shall be tracked at pre-determined intervals, but not less than once every thirty (30) calendar days ("Progressions"). Progression documentation shall track both the exterior and interior construction of the building. Exterior Progressions shall track 360 degrees around the site and each building. Interior Progressions shall track interior improvements beginning when stud work commences and continuing until Project completion.
6. As-built condition of pre-slab utilities and site utilities shall be documented prior to pouring slabs, placing concrete and/or backfilling. This process shall include all underground and in-slab utilities within the building(s) envelope(s) and utility runs in the immediate vicinity of the building(s) envelope(s). This may also include utilities enclosed in slab-on-deck in multi-story buildings. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation accomplished through interactive site utility plans.
7. As-built conditions of mechanical, electrical, plumbing and all other systems shall be documented post-inspection and pre-insulation, sheet rock or dry wall installation. This process shall include all finished systems located in the walls and ceilings of all buildings at the Project. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation accomplished through interactive architectural drawings.
8. As-built conditions of exterior skin and elevations shall be documented with an increased concentration of digital photographs as directed by the COR in order to capture pre-determined focal points, such as waterproofing, window flashing, radiused steel work,

architectural or Exterior Insulation and Finish Systems (EIFS) detailing. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation accomplished through interactive elevations or elevation details.

9. As-built finished conditions of the interior of each building including floors, ceilings and walls shall be documented at certificate of occupancy or equivalent, or just prior to occupancy, or both, as directed by the COR. Overlapping photographic techniques shall be used to insure maximum coverage. Indexing and navigation accomplished through interactive architectural drawings.
10. Miscellaneous events that occur during any Contractor site visit, or events captured by the Department of Veterans Affairs independently, shall be dated, labeled and inserted into a Section in the navigation structure entitled "Slideshows," allowing this information to be stored in the same "place" as the formal scope.
11. Customizable project-specific digital photographic documentation of other details or milestones. Indexing and navigation accomplished through interactive architectural plans.
12. Monthly (16 max) exterior progressions (360 degrees around the project) and slideshows (all elevations and building envelope). The slideshows allow for the inclusion of Department of Veterans Affairs pictures, aerial photographs, and timely images which do not fit into any regular monthly photopath.
13. Weekly (60 Max) Site Progressions - Photographic documentation capturing the project at different stages of construction. These progressions shall capture underground utilities, excavation, grading, backfill, landscaping and road construction throughout the duration of the project.
14. Regular (8 max) interior progressions of all walls of the entire project to begin at time of substantial framed or as directed by the COR through to completion.
15. Detailed Exact-Built of all Slabs for all project slab pours just prior to placing concrete or as directed by the COR.
16. Detailed Interior exact built overlapping photos of the entire building to include documentation of all mechanical, electrical and

plumbing systems in every wall and ceiling, to be conducted after rough-ins are complete, just prior to insulation and or drywall, or as directed by COR.

17. Finished detailed Interior exact built overlapping photos of all walls, ceilings, and floors to be scheduled by COR prior to occupancy.

18. In event a greater or lesser number of images than specified above are required by the COR, adjustment in contract price will be made in accordance with clause entitled "CHANGES" (FAR 52.243-4 and VAAR 852.236-88).

- C. Images shall be taken by a commercial photographer and must show distinctly, at as large a scale as possible, all parts of work embraced in the picture.
- D. Coordination of photo shoots is accomplished through COR. Contractor shall also attend construction team meetings as necessary. Contractor's operations team shall provide regular updates regarding the status of the documentation, including photo shoots concluded, the availability of new Progressions or Exact-Built viewable on-line and anticipated future shoot dates.
- E. Contractor shall provide all on-line domain/web hosting, security measures, and redundant server back-up of the documentation.
- F. Contractor shall provide technical support related to using the system or service.
- G. Upon completion of the project, final copies of the documentation (the "Permanent Record") with the indexing and navigation system embedded (and active) shall be provided in an electronic media format, typically a DVD or external hard-drive. Permanent Record shall have Building Information Modeling (BIM) interface capabilities. On-line access terminates upon delivery of the Permanent Record.

#### **1.32 FINAL ELEVATION DIGITAL IMAGES**

- A. A minimum of four (4) images of each elevation shall be taken with a minimum 6 MP camera, by a professional photographer with different settings to allow the COR to select the image to be printed. All images are provided to the COR on a CD.

B. Photographs shall be taken upon completion, including landscaping. They shall be taken on a clear sunny day to obtain sufficient detail to show depth and to provide clear, sharp pictures. Pictures shall be 400 mm x 500 mm (16 by 20 inches), printed on regular weight paper, matte finish archival grade photographic paper and produced by a RA4 process from the digital image with a minimum 300 PPI. Identifying data shall be carried on label affixed to back of photograph without damage to photograph and shall be similar to that provided for final construction photographs.

C. Furnish six (6) 400 mm x 500 mm (16 by 20 inch) color prints of the following buildings constructed under this project (elevations as selected by the COR from the images taken above). Photographs shall be artistically composed showing full front elevations. All images shall become property of the Government. Each of the selected six prints shall be place in a frame with a minimum of 2 inches of appropriate matting as a border. Provide a selection of a minimum of 3 different frames from which the COR will select one style to frame all six prints. Photographs with frames shall be delivered to the COR in boxes suitable for shipping.

1. Building No. 2

#### **1.33 HISTORIC PRESERVATION**

Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised of or discover any possible archeological, historical and/or cultural resources, the Contractor shall immediately notify the COR verbally, and then with a written follow up.

#### **1.34 PROCEDURES REGARDING PROCESSING INVOICES**

All payments are now processed through the On Line Certification System in Austin, Texas. You are required to reference the purchase order number as well as the contract number on the first page of the invoice. You are required to submit a draft copy to the COTR for approval. Once a draft is approved by the COTR at the VA Butler, you are required to fax a copy of your invoice to 512-460-5545 for payment. Be absolutely sure the purchase order number is on the invoice.

- 1) A draft (pencil) copy of the invoice shall be e-mailed to the COTR for approval and cc Contracting Officer.
- 2) If the invoice **is** approved by the COTR "as is", the contractor will be notified via email to submit the invoice to the Dept of Vet Affairs, Financial Svc Ctr, PO Box 149971, Austin TX 78714-8971, or by fax to 512-460-5545. **The purchase order number and project name MUST be on the invoice.** If the invoice is **not** approved as submitted to the COTR, the contractor will be notified via e-mail of required changes and will re-submit pencil copy to reflect said changes for approval. Upon approval by the COTR of the corrected invoice, the contractor shall either fax to 512-460-5545 or mail the invoice to the Financial Svc Center at the address provided above.

#### **1.35 CONFINED SPACE ENTRY**

Contractor to comply with all confined space entry requirements per 29 CFR 1910.146. and local confined space permitting requirements.

#### **1.36 CONSTRUCTION WASTE MANAGEMENT**

Contractor to comply with all construction waste management requirements as listed below:

- I. **PURPOSE:** To outline the policy and procedures to ensure effective management/disposal of any waste generated through approved construction projects at this Medical Center.
- II. **POLICY:** It is the policy of this Medical Center that construction projects shall generate the least amount of waste possible.

#### **III. PROCEDURES:**

A. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged or recycled.

B. Waste disposal in landfills shall be minimized to the greatest extent possible.

##### **1. Waste Diversion Goals.**

- a. New Construction: Minimum 5 of total project waste shall be diverted from landfill.
- b. Demolition, Major Remodeling: Minimum 5 of total project waste shall be diverted from landfill.

- c. Interior Remodeling: Minimum 5 of total project waste shall be diverted from landfill.
- 2. The following waste categories, at a minimum, shall be diverted from landfill if economically feasible:
  - a. Green waste (biodegradable landscaping materials).
  - b. Soil.
  - c. Inerts (concrete, asphalt, masonry).
  - d. Clean dimensional wood, palette wood.
  - e. Engineered wood products: plywood, particle board, I-joists, etc.
  - f. Cardboard, paper, packaging.
  - g. Asphalt roofing materials.
  - h. Insulation.
  - i. Gypsum board.
  - j. Carpet and pad.
  - k. Paint.
  - l. Plastics: ABS, PVC.
  - m. Beverage containers
- C. Submittals:
  - 1. Waste Management Plan. Prior to any waste removal, the Contractor shall submit their Waste Management Plan to the Medical Center. The Plan shall contain the following:
    - a. Analysis of the estimated job site waste to be generated, including types and quantities.
    - b. Proposed alternatives to land filling. Contractor shall prepare a list of each material proposed to be salvaged, re-used, or recycled during the course of the project.
    - c. Methods handling of materials to be recycled.
  - 2. On site:
    - a. Materials separation
    - b. Materials storage
    - c. Materials protection, where applicable



3. Off site: Provide name of mixed debris recycling facility; include list of materials to be recycled.
  - a. Procedures. A description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
  - b. Landfill Options. The name of the landfill(s) where trash will be disposed of.
  - c. Meetings. Contractor shall conduct Construction Waste Management meetings. Meetings shall include the Subcontractor, the Project Manager and representatives as designated by the Chief Engineer. At a minimum, waste management goals and issues shall be discussed at pre-bid meetings, pre-construction meetings and regular job-site meetings.
  - d. Transportation. A description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site) and destination of materials.
  - e. Waste Management Plan Implementation.
  - f. Manager. The Subcontractor shall designate an on-site party (or parties) responsible for instructing workers and subcontractors and overseeing and documenting results of the Waste Management Plan for the project.
  - g. Distribution. The Subcontractor shall distribute copies of the Waste Management Plan to the Medical Center Chief Engineer.
  - h. Instruction. The Subcontractor shall provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse and return methods to be used by all parties at appropriate stages of the project.
  - i. Separation Facilities. The Subcontractor shall lay out and label a specific area to facilitate separation of materials for reuse, salvage, recycling, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.
  - j. Hazardous Wastes. Hazardous wastes shall be separated, stored, and disposed of according to local, state and federal regulations.
4. Reports:
  - a. The Contractor shall submit at end of job a Waste Management Progress Report. The report shall contain the amount (in tons or cubic yards) of material land filled from the project, the identity of the landfill, the total amount of tipping fees paid at the landfill and the total disposal cost. Include legible copies of manifests, weight tickets, receipts and invoices.

Manifests shall be from recycle and/or disposal site operators that can legally accept the materials for the purpose of reuse, recycling or disposal.

b. For each material recycled, reused or salvaged from the project, provide the following:

(1) Amount (in tons or cubic yards).

(2) removed from the job site.

(3) Receiving party.

(4) Transportation cost.

(5) Amount of any money paid or received for the recycled or salvaged material. Net total cost or savings of salvage or recycling each material. Attach manifests, weight tickets, receipts, and/or invoices. Indicate the project information, including project title, name of company completing form, and beginning and ending dates of period covered by summary form.

**IV. RESPONSIBILITIES:** The Subcontractor shall employ processes that ensure the generation of as little waste as possible and shall avoid the generation of waste due to the following:

a. Over-packaging.

b. Error.

c. Poor planning, layout.

d. Over ordering.

e. Breakage

f. Mishandling.

g. Contamination.

h. Damage from weather.

A. Description of Work.

1. Includes:

a. Waste Management Plan development and implementation.

b. Meetings to discuss goals, issues and training for the Waste Management Plan.

c. Techniques to minimize waste generation.

- d. Sorting and separation of waste materials.
  - e. Reuse of salvaged materials on site.
  - f. Salvage of existing materials and items for reuse or resale.
  - g. Recycling of materials that cannot be reused or sold.
  - h. Record keeping of receipts and records of salvaged, recycled or land filled materials.
2. Related Elements:
- a. Alternates.
  - b. Construction Waste Management.
  - c. Site Demolition.
  - d. Site Clearing.
  - e. Slope Protection/Erosion Control.
  - f. Asphalt Concrete.
  - g. Crushed Stone Paving.
  - h. Portland Cement Concrete Paving.
  - i. Valve Boxes.
  - j. Storm Sewers.
  - k. Chain Link Fences and Gates.
  - l. Walk, Road and Parking Appurtenances.
  - m. Miscellaneous Landscaping Materials.
  - n. Concrete, Concrete Formwork, and Concrete Reinforcement.
  - o. Cast-in-Place Concrete.
  - p. Unit Masonry.
  - q. Structural Steel.
  - r. Steel Roof Deck/Steel Floor Deck.
  - s. Cold Formed Metal Framing.
  - t. Metal Fabrications.
  - u. Rough and Finish Carpentry.
  - v. Engineered Structural Wood.

- w. Plastic Lumber.
- x. Building Insulation.
- y. Modified Bitumen Roofing.
- z. Metal Doors.
- aa. Wood and Plastic Doors and Frames.
- bb. Metal Support Systems.
- cc. Gypsum Wallboard.
- dd. Acoustical Treatment.
- ee. Resilient Flooring.
- ff. Tile and Carpet.
- gg. Painting.
- hh. Toilet Compartments.
- ii. Louvers and Vents.
- jj. Signage and Graphics.
- kk. Ductwork and Ductwork Accessories

## **V. DEFINITIONS:**

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
- C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
- D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
- E. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
- F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.

- H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.
- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.
- L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
- M. On-site Recycling. Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
- N. Off-site Recycling. Materials hauled to a location and used in an altered form in the manufacture of new products.
- O. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.
- P. Re-Use: Materials that are recovered for use in the same form, on-site or off-site.
- Q. Return: To give back reusable items or unused products to vendors for credit.
- R. Salvage: To remove waste materials from the site for resale or re-use by a third party.
- S. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.
- T. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.
- U. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

## VI. REFERENCES:

Guides. No preference is given to the recycles listed below; they are listed for the convenience of the contractor.

Dirt/clean fill.

Green/landscaping waste.

Concrete, asphaltic concrete.

Cardboard, paper, packaging.

Clean dimensional wood, palette wood.

Usable palettes.

Metals from banding, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized Carpet and pad.

Gypsum board.

Paint.

Insulation.

Asphalt shingles.

Beverage containers

Medical Center Memorandum EC-32

March 5, 2013

## OSHA REQUIREMENTS AND SAFETY AND HEALTH REGULATIONS

### I. OSHA REQUIREMENTS:

#### A. General.

1. Contractors are required to comply with the Occupational Safety and Health Act of 1970. This will include the safety and health standard found in Code of Federal Regulations (CFR) 1910 and 1926. Copies of those standards can be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20420.

2. In addition, contractors will be required to comply with other applicable facility policies and safety regulations. These policies and regulations will be presented to the contractor at the preconstruction meeting. Each of the contractor's employees will be required to read the statement of policies and regulations and sign an acknowledgment that such policies and regulations are understood. Signed acknowledgment will be returned to the Facilities Engineer.

3. Contractors involved with the removal, alteration or disturbance of asbestos-type insulation or materials or lead paint will be required to

comply strictly with the regulations found in CFR 1910.1001 and the appropriate Environmental Protection Agency (EPA) lead regulations regarding disposal of asbestos or lead paint. Assistance in identifying asbestos or lead can be requested from the facility's Industrial Hygienist and the Project Engineer.

4. Contractors entering locations of asbestos contamination or lead paint residue (i.e., pipe, basements, walls, windows) shall be responsible for providing respiratory protection to their employees and ensuring respirators are worn in accordance with the Occupational Safety and Health Administration (OSHA) [CFR 1910.1001(g)]. Asbestos or lead paint contaminated areas shall be defined on project drawings. The minimum equipment requirements will be a half-mask air-purifying respirator equipped with high efficiency filters and disposable coveralls, or as determined by air monitoring results.

5. Contractors must submit a complete list of chemicals that will be used and Material Safety Data Sheets (MSDS) for all hazardous materials at least 2 weeks prior to bringing any materials on-site as defined in OSHA 1910.1200(d), Hazard Determination. The Contracting Officer shall have final approval of all materials brought on site.

6. Contractors will be held solely responsible for the safety and health of their employees. The contractor will also be held responsible for protecting the health and safety of the VA Community (Veterans, staff, and visitors) from the unwanted effects of construction. VA staff will monitor the contractor's performance in complying with all safety and health aspects of the project. Severe or constant violations may result in an immediate work stoppage or request for an evaluation by a Compliance Officer from OSHA.

7. During all phases of demolition, construction, and alteration, contractors are required to understand and strictly follow National Fire Protection Association (NFPA) 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations. The facility's Safety Officer or Industrial Hygienist will closely monitor the work area for compliance. Appropriate action will be taken for non-compliance.

## II. SPECIFIC FIRE AND SAFETY POLICIES, PROCEDURES, AND REGULATIONS:

### A. Introduction.

1. The safety and fire protection of Veterans, employees, members of the public, and government is one of continuous concern to this facility.

2. Contractors, their supervisors, and employees are required to comply with facility's policies to ensure the occupational safety and health of all. Failure to comply may result in work stoppage.

3. While working at this facility, contractors are responsible for the occupational safety and health of their employees. Contractors are required to comply with the applicable OSHA Standards found in 29 CFR 1910 for general industry and 29 CFR 1926 for construction. Failure to comply with these standards may result in work stoppage and a request to the Area Director of OSHA for a Compliance Officer to inspect your work site.

4. Contractors are to comply with the requirements found in NFPA 241, Building Construction, and Demolition Operation, and NFPA 51B, Fire Prevention in Use of Cutting and Welding Processes.

5. Questions regarding occupational safety and health issues can be addressed to the facility's Safety Officer or Industrial Hygienist.

6. Smoking is not permitted in any interior areas of this facility, including all interior stairwells, tunnels, construction and/or service/maintenance sites. Note: This includes interior posted patient smoking areas, if applicable. Compliance with this policy is required.

7. Also see Section 01 00 00, General Requirements, Article No. 1.5, Fire Safety Precautions, available online at: <http://www.cfm.va.gov/TIL/spec.asp#01>

#### B. Hazard Communications.

1. Contractors shall comply with OSHA Standard 29 CFR 1926.59, Hazard Communication.

2. Contractors shall submit copies of MSDS covering all hazardous materials to which the Contractor and VA employees are exposed to the facility Safety Officer.

3. Contractors shall inform the Safety Officer of the hazards to which VA personnel and Veterans may be exposed.

4. Contractors shall have a written Hazard Communication Program that details how the Contractor will comply with 29 CFR 1926.59 available at the construction site.

#### C. Fires

1. All fires must be reported. In the event of a fire in your work area, use the nearest pull box station and notify facility staff in the immediate area. Emergency notification can also be accomplished by dialing ext. 255.

2. The exact location of where the call originates must be provided, and the exact nature of the emergency must be explained thoroughly. If a contractor experiences a fire that was rapidly extinguished by staff, the Safety Manager must still be notified within an hour of the event so that an investigation of the fire can be accomplished.

#### D. Fire Alarms, Smoke Detection, and Sprinkler System.

1. If the nature of your work requires the deactivation of the fire alarm, smoke detection or sprinkler system, you must notify the Safety Manager. Notification must be made well in advance so that ample time can be allowed to deactivate the system and provide alternative measures for fire protection. Under no circumstance is a contractor allowed to deactivate any of the fire protection systems in this facility.

#### E. Smoke Detectors.

1. False alarms will not be tolerated. Contractor familiarity with the location of the smoke detectors in the work area is required. When performing cutting, burning, welding, or any other operations that may cause smoke or dust, steps to temporarily cover smoke detectors in order to prevent false alarms must be taken. Failure to take the appropriate action will result in the Contracting Officer assessing actual costs for government response for each false alarm that is preventable. Prior to covering the



smoke detectors, the contractor will notify the Safety Manager, who will also be notified when the covers are removed.

F. Hot Work Permit.

1. Hot work is defined as operations including, but not limited to, cutting, welding, thermal welding, brazing, soldering, grinding, thermal spraying, thawing pipes, or any similar situation. If such work is required, whenever possible, the contractor must notify the project manager no less than one day in advance of such work. The project manager will inspect the work area and issue a Hot Work Permit, authorizing the performance of such work.

2. All hot work will be performed in compliance with the facility's policy regarding Hot Work Permits and NFPA 241, Safeguarding Construction, Alteration, and Demolition Operations; and NFPA 51B, Fire Prevention in Use of Cutting and Welding Processes; and applicable OSHA Standards. A Hot Work Permit will only be issued to individuals familiar with

with these regulations.

3. A Hot Work Permit will be issued only for the period necessary to perform such work, not to exceed one normal work shift. A Hot Work Permit will apply only to the location identified on the permit. If additional areas involve hot work, then additional permits must be requested.

4. Contractors will not be allowed to perform hot work processes without the appropriate permit.

5. Any work involving the facility's fire protection system will require the fire department to be notified. Under no circumstance will the contractor or employee attempt to alter or tamper with the existing fire protection system.

6. The contractor's site supervisor will be notified within 30 minutes of the completion of all hot work to perform an inspection of the area to confirm that sparks or drops of hot metal are not present.

#### G. Temporary Enclosures.

1. Only non-combustible materials will be used to construct temporary enclosures or barriers at this medical center. Plastic materials and fabrics used to construct dust barriers must conform to NFPA 701, Standard Methods of Fire Tests for Flame-Resistant Textiles and Films.

#### H. Flammable Liquids.

1. All flammable liquids will be kept in approved safety containers. Only the amount necessary for your immediate work will be allowed in the building. Flammable liquids must be removed from the building at the end of each day.

#### I. Compressed Gas Cylinders.

1. Compressed gas shall be secured in an upright position at all times. A suitable cylinder cart will be used to transport compressed gas cylinders. Only compressed gas cylinders necessary for immediate work will be allowed in occupied buildings. All other compressed gas cylinders will be stored outside of buildings in a designated area. Contractors will comply with applicable compressed gas cylinders standards found in 29 CFR 1910 and 1926 (OSHA).

#### J. Internal Combustion Engine-Powered Equipment.

1. Equipment powered by an internal combustion engine (such as saws, compressors, generators, etc.) will not be used in an occupied building. Special consideration may be given for unoccupied buildings only if the OSHA and NFPA requirements have been met.

#### K. Power-Activated Tool.

1. The operator of powder-activated tools must be trained and certified to use them. Powder-activated tools will be kept secured at all times. When not in use, the tools will be locked up. When in use, the operator will have the tool under his immediate control.

#### L. Tools.

1. Under no circumstances will equipment, tools, and other items of work to be left unattended for any reason. All tools, equipment, and items of work must be under the immediate control of your employee.

2. If for some reason a work area must be left unattended, then tools and other equipment must be placed in an appropriate box or container and locked. All tool boxes, containers, or any other device used for the storage of tools and equipment will be provided with a latch and padlock, and will be kept locked at all times.

3. All doors to work areas will be closed and locked when rooms are left unattended and signs of a directive and restrictive nature posted for safety purposes. Failure to comply with this policy will be considered a violation of VA Regulations 1.218(b) and subject to a \$50.00 fine. Subsequent similar violations may result in both imposition of such a fine as well as the Contracting Officer taking action under the contract's Accident Prevention Clause, according to Federal Acquisition Regulation (FAR) 52.236-13, to suspend all contract work until violations are satisfactorily resolved. Alternatively, under FAR 52.236-5, Material and Workmanship Clause, the Contracting Officer may remove any personnel deemed to be careless to the point of jeopardizing the welfare of facility Veterans or staff from the worksite.

4. Missing tools or equipment must be reported to the VA Police Department.

5. Tools and equipment found unattended will be confiscated and removed from the work area.

#### M. Ladders.

1. Ladders must not be left unattended in an upright position. Ladders must be attended at all times or taken down and chained securely to a stationary object.

#### N. Scaffolds.

1. All scaffolds will be attended at all times. When not in use, an effective barricade (fence) will be erected around the scaffold to prevent use by unauthorized personnel (reference OSHA 1926, Subpart L).

#### O. Excavations.

1. The contractor shall comply with OSHA 1926, Subpart P. An OSHA Competent Person must be on site during excavation. The contractor shall coordinate with the project engineer and utility companies prior to excavation to identify underground utilities, tanks, etc.

Excavations will be provided with a barricade suitable to prevent entry by unauthorized persons.

P. Storage.

1. Arrangements for the storage of building materials must be made prior to construction projects with the project engineer. Storage will not be allowed to accumulate in the facility's buildings.

Q. Trash and Debris.

1. Trash and debris must be removed from the work area on a daily basis. Trash and debris will not be allowed to accumulate inside or outside of the buildings. Contractors are responsible for making arrangements for removal of trash from the facility.

R. Protection of Floors.

1. It may be necessary at times to take steps to protect floors from dirt, debris, paint, etc. A tarp or other protective covering may be used. However, a certain amount of floor space must be maintained for the safe passage of pedestrian traffic. Common sense must be used in this matter.

S. Signs.

1. Signs must be placed at the entrance to work areas warning people of construction work. Signs must be suitable for the condition of the work. Small pieces of paper with printing or writing are not acceptable. The facility Safety Manager or Project Manager can be consulted in this matter.

T. Accidents and Injuries.

1. Contractors must report all accidents and injuries involving their employees.

U. Infection Control

1. Contractors must control the generation of dust and the contamination of patient care surfaces, supplies, and equipment. During demolition phases of the construction:

a. The construction area shall be under negative pressure, ensuring there is an appreciable flow of clean air from the VA-occupied portion of the facility into the construction area. The airflow shall be sufficiently strong enough to draw in the plastic door flaps commonly located at the construction entrance or at the specific site within the construction area.

b. Construction debris being transported through the VA-occupied portion of the facility shall be covered and/or wetted.

c. Construction employees shall remove dust-laden clothing before entering the VA-occupied portion of the facility.

d. Carpet/sticky mats shall be placed at all construction entrances and be satisfactorily maintained so as to minimize the tracking of dust into the VA-occupied portion of the facility.

e. Dry sweeping of dust and debris is not to be performed.

2. Control measures B - E above must be practiced during the construction phase.

V. Confined Space Entry.

1. Contractors will be informed that the workplace contains permit-required confined space, and that permit-space entry is allowed only through compliance with a permit-space program meeting the requirements of 29 CFR 1910.146 and 1926.21(b)(6).

2. Contractor will be apprised of the elements including the hazards identified and the facility's (last employer) experience with the space that makes the space in question a permit space.

3. Contractors will be apprised of any precautions or procedures that the facility has implemented for the protection of employees in or near permit space where contractor personnel will be working.

4. The facility and contractor will coordinate entry operations when both facility personnel and contractor personnel will be working in or near permit spaces as required by 29 CFR 1910.146(d)(ii) and 1926.21(b)(6).

5. Contractors will obtain any available information regarding permit space hazards and entry operation from the facility.

6. At the conclusion of the entry operations, the facility and contractor will discuss any hazards confronted or created in permit spaces.

7. Contractors are responsible for complying with 29 CFR 1910.246(d) through (g) and 1926.21(b)(6). The facility, upon request, will provide rescue and emergency services required by 29 CFR 1910.246(k) and 1926.21(b)(6).

W. Contractor Parking and Material Delivery.

1. Contractor parking and the delivery of building materials tools, etc., must be pre-arranged with the Project Manager.

Medical Center Memorandum SC-20

February 25, 2013

## EXCAVATION SAFETY INSPECTION CHECKLIST

To be completed by the Competent Person

Competent Person: \_\_\_\_\_

Time: \_\_\_\_\_

Excavation Width: \_\_\_\_\_

General Worksite Inspection:

A. Surface encumbrances removed or supported Yes\_\_\_ No\_\_\_

B. Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation. Shoring or other protective systems are installed, as required. Yes\_\_\_ No\_\_\_

C. Hard hats worn by all employees. Yes\_\_\_ No\_\_\_

D. Spoils, materials, and equipment set back at least 25 feet from the edge of the excavation. Yes\_\_\_ No\_\_\_

E. Barriers provided at all excavations, wells, pits, shafts, etc. Yes\_\_\_ No\_\_\_

F. Warning vests or other highly visible clothing provided and worn by employees *directly* exposed to vehicular traffic. Yes\_\_\_ No\_\_\_

G. Employees required to stand away from vehicles while loading/unloading. Yes\_\_\_ No\_\_\_

H. Warning system established and used when mobile equipment is operating near the edge of the excavation. Yes\_\_\_ No\_\_\_

I. Employees prohibited from passing beneath suspended loads. Yes\_\_\_ No\_\_\_

J. Employees prohibited from working on the faces of sloped or benched excavations above other employees. Yes\_\_\_ No\_\_\_

K. Equipment inspections: A pre-use equipment inspection has been completed and documented on each piece of operating equipment and each piece of equipment being used is operating properly and has all manufactured safety devices installed. Yes\_\_\_ No\_\_\_

L. Exact location of utilities marked. Yes\_\_\_ No\_\_\_

M. Underground installations protected, supported, or removed when excavation is open. Yes\_\_\_ No\_\_\_

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February 25, 2013

**EXCAVATION (DIGGING/DRILLING) PERMIT**

NOTE: Lockout/tagout must be used with this permit when utility isolation is required.

Void Date:\_\_\_\_\_

Contractors competent person (Printed name):

COTR / SUPERVISOR:

Are soil samples required?    \_\_\_Yes                      \_\_\_No                      \_\_\_\_\_ I.H.  
Initials\_\_\_\_\_

01 00 00 -4

Initials: _____ Status: <input type="checkbox"/> All Clear <input type="checkbox"/> POTENTIAL CONFLICT DO NOT DIG!				
The following site drawings have been reviewed for proximity to digging (circle)				
Steam DATA	Electrical FIRE ALARM	Gas	Water	Sewer
DRAWING _____ review _____ completed _____ by: _____ DATE _____				
The following sources apply and have been locked/tagged prior to starting work (circle)				
Steam Water	Electrical Sewer	Gas		
COTR / SUPERVISOR: _____				
PERMIT VOID WITHOUT ATTACHED UTILITIES SKETCH				
Maint. Sup. Initials Safety Officer Initials		Fac. Manager Initials		
_____ Approved _____ Denied _____ Approved _____ Denied _____ Approved _____ Denied				
Digging/Drilling Completed on: _____ Date: _____ Time: _____				
EXCAVATION PERMIT CANCELLED				



01 00 00 -6

etc. within 35 feet?			
8. Comb./flam. material removed or protected with covers, guards, etc. within 35 feet?			
9. Are wall and floor openings covered within 35 feet?			
10. Tarp suspended beneath work to collect sparks?			
11. Construction non-combustible and without combustible covering			
12. Combustibles moved away from opposite side of wall?			
13. Fire watch provided for work period plus <b>AT LEAST</b> 30 minutes?			
14. Fire watch trained in fire extinguisher use and sounding alarm?			
15. <b>EXTRA</b> charged fire extinguisher present?			
<p>Nearest facility fire extinguisher:_____ Nearest pull station:_____</p> <p>We have inspected the identified work location, taken adequate precautions, and authorize hot work:</p> <p>Fire Department: _____ Technician: _____</p>			

VAMC BUTLER, PA 16001

4/1/2010

## ENVIRONMENTAL REQUIREMENTS CHECKLIST

**Instructions:** The Contracting Officer/Facilities Management Officer will provide this list to applicable A/E Firms and on- site contractors.

The A/E firm and the contractor must complete this checklist for any work applicable to the project scope of work.

Any checks below will require remediation and appropriate work plans prior to start of construction work and activities.

**A/E Firm and Contractor will ensure all PA DEP( Requests for Determination Form) and permits and fees are properly filed prior to start of work operations.**

The contracting officer will review the applicable subsections checked and ensure contractors' scope of work includes the checked items.

Contracting and Facilities Management Staff will ensure program requirement are met prior release of contract.

The contracting officer/Facilities Management Staff will consult the Environmental Protection Specialist with any specific program requirements.

Project Name: \_\_\_\_\_

Project Number: \_\_\_\_\_

Work Activity	
	<b>Constructing or Modifying Facilities, Equipment or Processes</b>
<input checked="" type="checkbox"/>	3.2 Const. or Mod. Facilities, Structures, Equipment, or Processes - General
<input type="checkbox"/>	3.3 Const. or Mod. Stationary Air Emission Sources
<input checked="" type="checkbox"/>	3.4 Relocating Portable Air Emission Sources, or Bringing Portable or Stationary Air Emission Sources onto the Site
<input checked="" type="checkbox"/>	3.5 Const. or Mod. Drinking Water Systems & Controlling Cross Connections at the Site
<input checked="" type="checkbox"/>	3.6 Const. or Mod. Drinking Water Sys. & Controlling Cross Connections
<input checked="" type="checkbox"/>	3.7 Const. or Mod. Facilities that Store Oil in Containers or Tanks
<input type="checkbox"/>	3.8 Const. or Mod. AST & UST not Regulated under 40 CFR 280
<input type="checkbox"/>	3.9 Const. or Mod. UST Systems Regulated under 40 CFR 280
<input type="checkbox"/>	3.10 Changing Use or Reactivating ASTs & USTs not Regulated under 40 CFR 280
<input type="checkbox"/>	3.11 Changing Use or Reactivating USTs Regulated under 40 CFR 280
<input type="checkbox"/>	3.12 Const. or Mod. Septic Tanks or Systems
<input checked="" type="checkbox"/>	3.13 Const. or Mod. Sewage & Other Wastewater Systems
<input checked="" type="checkbox"/>	3.14 Disch. New Wastewaters or Changing Disch. to the City of Butler Sewer System
<input type="checkbox"/>	3.15 Discharging New Wastewaters at the Site
<input type="checkbox"/>	3.16 Const. or Mod. Potable Water, Production, Monitoring, & Obs. Wells
<input type="checkbox"/>	3.17 Const. or Mod. Injection Wells
<input type="checkbox"/>	3.18 Reactivating Buildings or Facilities from Standby (Inactive) Status
	<b>Operating Facilities, Equipment, or Processes</b>
<input type="checkbox"/>	3.19 Oper. Facilities, Equipment or Processes - General
<input type="checkbox"/>	3.20 Oper. & Sampling Drink. Water Sys. & Controlling Cross Connections at the Site
<input type="checkbox"/>	3.21 Oper. Stationary Air Emission Sources
<input type="checkbox"/>	3.22 Oper. Stat., Portable or Mobile Oil Tanks & Oil Container Storage Facilities
<input type="checkbox"/>	3.23 Oper. ASTs & USTs not Regulated under 40 CFR 280
<input type="checkbox"/>	3.24 Operating Volatile Organic Liquid Storage Tanks
<input type="checkbox"/>	3.25 Oper., Discharging to & Monitoring Permitted Injection Wells
<input type="checkbox"/>	3.26 Oper. & Discharging to Shallow Injection Wells not Requiring a Permit
<input type="checkbox"/>	3.27 Discharging to Septic Tanks or Systems
<input checked="" type="checkbox"/>	3.28 Discharging Wastewaters to the City of Butler Sewer System
<input type="checkbox"/>	3.29
<input type="checkbox"/>	3.30 Oper. Potable Water, Production, Monitoring, & Observation Wells
<input type="checkbox"/>	3.31 Using, Storing & Dispositioning Chemical Products/Chemicals/Hazardous Agents
<input checked="" type="checkbox"/>	3.32 Using Drinking Water Sys. & Controlling Cross Connections at the Site

<input checked="" type="checkbox"/>	3.34	Managing Storm Water Discharges at the Site
<input type="checkbox"/>	3.35	Perf. Activities with the Potential for Fugitive Dust or Fugitive Emissions
<input type="checkbox"/>	3.36	Conducting Open Burning
<input type="checkbox"/>	3.37	Responding to Regulatory Inspections
		Maintaining or Repairing Facilities, Equipment, or Processes
<input type="checkbox"/>	3.38	Maint. & Repairing Facilities, Structures, Equipment or Processes - General
<input type="checkbox"/>	3.39	Starting Up, Shutting Down, or Performing Scheduled Maint. on Stationary
		Air Emissions Sources
<input type="checkbox"/>	3.40	Maint., Repairing or Altering Drinking Water Sys. at the Site
<input type="checkbox"/>	3.41	Repairing Drinking Water Sys. & Controlling Cross Connections
<input type="checkbox"/>	3.42	Repairing ASTs & USTs not Regulated under 40 CFR 280
<input type="checkbox"/>	3.43	Repairing USTs Regulated under 40 CFR 280
		WORK ACTIVITY
<input checked="" type="checkbox"/>	3.44	Planning Activities that may Break Up, Dislodge, Disturb or Block Access to
<input type="checkbox"/>		Asbestos-Containing Material
<input checked="" type="checkbox"/>	3.45	Removing Asbestos-Containing Material
<input type="checkbox"/>	3.46	Maint. Equipment Containing or Contaminated with PCBs
<input type="checkbox"/>	3.47	Decontaminating Equipment Containing or Contaminated with PCBs
<input type="checkbox"/>	3.48	Maint., Testing & Disposing of Halon-Containing Equipment & Halon
<input checked="" type="checkbox"/>	3.49	Maint., Serv., or Repairing Stationary HVAC & Refrigeration Equipment
<input type="checkbox"/>	3.50	Maintaining, Servicing or Repairing Motor Vehicle Air Conditioners (MVACs)
<input checked="" type="checkbox"/>	3.51	Removing Lead from Service or from a Structure, or Classifying Newly
		Discovered Lead
<input type="checkbox"/>	3.52	Applying & Storing Pesticides
<input type="checkbox"/>	3.53	Applying Fertilizers
<input type="checkbox"/>	3.54	Maint. & Repairing Septic Tanks or Systems
<input type="checkbox"/>	3.55	Pumping Septic Tanks & Septic Systems
		Discontinuing Use Of, or Closing Facilities, Equipment or Processes

<input type="checkbox"/>	3.56	Deactivating, Decontaminating, Dismantling, or Closing Facilities (including trailers), Structures, Equipment, or Processes - General
<input type="checkbox"/>	3.57	Permanently Discont. Use of, or Closing, USTs Reg. under 40 CFR 280
<input type="checkbox"/>	3.58	Abandoning or Closing Septic Tanks
<input type="checkbox"/>	3.59	Abandoning Potable Water, Production, Monitoring, and Observation Wells
<input type="checkbox"/>	3.60	Abandoning Injection Wells
		Disturbing Soils
<input checked="" type="checkbox"/>	3.61	Disturbing Soils
		Purchasing of Goods and Services
<input checked="" type="checkbox"/>	3.62	Procuring Goods or Services
<input type="checkbox"/>	3.63	Purchasing Diesel Fuel
<input checked="" type="checkbox"/>	364	Purch. Refrigerants, Appliances Containing Refrigerants, Sys. Components that Operate Using Refrigerants, or Refrigerant Recovery or Recycling Equip.
<input type="checkbox"/>	3.65	Procuring Pesticides
		Spills/Releases, Fires, and Explosions; and Permit or Reg. Exceedances
<input type="checkbox"/>	3.66	Reporting and Cleaning Up Spills & Releases
<input type="checkbox"/>	3.67	Cleaning Up Spills and Releases of PCBs
<input type="checkbox"/>	3.68	Exceeding Permitted or Reg. Limits from Stationary Air Emission Sources
<input type="checkbox"/>	3.69	Exceeding WW Discharge Limits to the City of Butler Sewer System
		Generating Waste
<input checked="" type="checkbox"/>	3.70	Generating Waste
		(Content Weights for recovery, recycling Required)
		Receiving Off-site Waste, Disposing of Waste & Recycling or Reusing Materials

<input type="checkbox"/>	3.71	Distributing, Excessing or disposing of Appliances Containing Refrigerants
<input type="checkbox"/>	3.72	Dispositioning Excess Materials
<input checked="" type="checkbox"/>	3.73	Disposing of Asbestos-Containing Material
<input type="checkbox"/>		
<input type="checkbox"/>		Sample Collection and Monitoring
<input type="checkbox"/>	3.74	Monitor Wastewater Discharge to the City of Butler Sewer System
<input type="checkbox"/>	3.75	Preparing to collect and collecting samples (CERCLA or D&D&D)
<input type="checkbox"/>	3.76	Preparing to collect and collecting samples (NON-CERCLA or NON-D&D&D)
<input type="checkbox"/>	3.77	Packaging and Temporarily Storing Samples
<input type="checkbox"/>	3.78	Transferring Samples to a Laboratory
<input type="checkbox"/>	3.79	Storing and Maintaining Samples
<input type="checkbox"/>	3.80	Disposing of samples
<input type="checkbox"/>	3.81	Report. Env. Characterization Data collected to support FFA/CO Activities
<input type="checkbox"/>	3.82	Report Disturbances to CERCLA or Inactive Waste Sites and Identifying of
		Suspected Inactive Waste Sites
<input type="checkbox"/>	3.83	Developing and Maintaining an EMS
<input type="checkbox"/>	3.84	Performing CERCLA Remedial Activities

- - - E N D - - -

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

- 1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.23621) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.
- 1-2. For the purposes of this contract, samples (including laboratory samples to be tested), test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.
- 1-3. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:
  - A. Satisfactory written evidence is presented to, and approved by Contracting Officer, that manufacturer cannot make scheduled delivery of approved item or;
  - B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;
  - C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.
- 1-4. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract required items. Delays attributable to untimely and rejected submittals, (including any laboratory samples to be tested), will not serve as a basis for extending contract time for completion.
- 1-5. Submittals will be reviewed for compliance with contract requirements by ArchitectEngineer, and action thereon will be taken by the COR on behalf of the Contracting Officer.
- 1-6. Upon receipt of submittals, ArchitectEngineer will assign a file number thereto. Contractor, in any subsequent correspondence, shall refer to this file and identification number to expedite replies relative to previously approved or disapproved submittals.

- 1-7. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are furnished pursuant to request therefor by Contracting Officer, adjustment in contract price and time will be made in accordance with Articles titled CHANGES (FAR 52.2434) and CHANGES SUPPLEMENT (VAAR 852.23688) of the GENERAL CONDITIONS.
- 1-8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and ArchitectEngineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and Architect Engineer assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.
- 1-9. Submittals must be submitted by Contractor only and shipped prepaid. Contracting Officer assumes no responsibility for checking quantities or exact numbers included in such submittals.
- A. Submit samples required by Section 09 06 00, SCHEDULE FOR FINISHES, in quadruplicate. Submit other samples in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.
- B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail and shall contain the list of items, name of Medical Center, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.
1. A copy of letter must be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.
2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Medical Center, name of Contractor, manufacturer, brand, contract number and ASTM or



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

- E. Approved samples will be kept on file by the COR at the site until completion of contract, at which time such samples will be delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request should be made prior to completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.
- F. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.
1. For each drawing required, submit one legible photographic paper or vellum reproducible.
  2. Reproducible shall be full size.
  3. Each drawing shall have marked thereon, proper descriptive title, including Medical Center location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
  4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
  5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.
  6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
  7. When work is directly related and involves more than one trade, shop drawings shall be submitted to ArchitectEngineer under one cover.
- 1-10. Samples (except laboratory samples), shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to
- Harrell, Saltrick & Hopper, PC  
 8016 Tower Point Drive  
 Charlotte, NC 28227

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

1-12. Not used.

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

**1-13. MASTER SUBMITTAL LIST**

**\*\*ALL SUBMITTALS SHALL BE IN ACCORDANCE WITH SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES, IN ITS ENTIRETY.\*\***

The following list includes required submittals as specified in Part 1 - General of each Specification Section, and the materials as specified in Part 2 - Products of each Specification Section.

SECTION 01 00 00  
GENERAL REQUIREMENTS

\*COMPLETE SECTION\*

SECTION 01 32 16.15  
PROJECT SCHEDULES

\*COMPLETE SECTION\*

SECTION 01 57 19  
TEMPORARY ENVIRONMENTAL CONTROLS

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
  1. Environmental Protection Plan: After the contract is awarded and prior to the commencement of the work, the Contractor shall meet with the COR to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to details of environmental protection. Not more than 20 days after the meeting, the Contractor shall prepare and submit to the COR and the Contracting Officer for approval, a written and/or graphic Environmental Protection Plan including, but not limited to, the following:
    - a. Name(s) of person(s) within the Contractor's organization who is (are) responsible for ensuring adherence to the Environmental Protection Plan.
    - b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site.
    - c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
    - d. Description of the Contractor's environmental protection personnel training program.
    - e. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.
    - f. Methods for protection of features to be preserved within authorized work areas including trees, shrubs, vines, grasses, ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, and archeological and cultural resources.

- g. Procedures to provide the environmental protection that comply with the applicable laws and regulations. Describe the procedures to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.
  - h. Permits, licenses, and the location of the solid waste disposal area.
  - i. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials. Include as part of an Erosion Control Plan approved by the District Office of the U.S. Soil Conservation Service and the Department of Veterans Affairs.
  - j. Environmental Monitoring Plans for the job site including land, water, air, and noise.
  - k. Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas. This plan may be incorporated within the Erosion Control Plan.
- B. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

**SECTION 01 58 16**  
**TEMPORARY INTERIOR SIGNAGE**

**PART 2 - PRODUCTS**  
**2.1 TEMPORARY SIGNS**

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

**PART 2 - PRODUCTS:**  
**2.1 MATERIALS**

**SECTION 01 81 11**  
**SUSTAINABLE DESIGN REQUIREMENTS**

**PART 1 - GENERAL**  
**1.5 SUBMITTALS**

- A. Sustainable Design Submittals:
  - 2. Heat Island Effect:
    - a. Site Paving: Provide manufacturer's cut sheets for all impervious paving materials, highlighting the Solar Reflectance Index (SRI) of the material.
    - b. Roofing Materials: Submittals for roofing materials must include manufacturer's cut sheets or product data highlighting the Solar Reflectance Index (SRI) of the material.
  - 3. Exterior Lighting Fixtures: Submittals must include cut sheets with manufacturer's data on initial fixture lumens above 90° from nadir for all exterior lighting fixtures, and, for parking lot lighting, verification that the fixtures are classified by the IESNA as "full cutoff" (FCO); OR provide documentation that exterior luminaires are IDA-Approved as Dark-Sky Friendly by the International Dark Sky Association (IDA) Fixture Seal of Approval Program.
  - 5. Water Conserving Fixtures: Submittals must include manufacturer's cut sheets for all water-consuming plumbing fixtures and fittings (toilets, urinals, faucets, showerheads, etc.) highlighting maximum

- flow rates and/or flush rates. Include cut sheets for any automatic faucet-control devices.
6. Process Water Use: Provide manufacturer's cut sheets for all water-consuming commercial equipment (clothes washers, dishwashers, ice machines, etc.), highlighting water consumption performance.
  7. Elimination of CFCs AND HCFCs: Provide manufacturer's cut sheets for all cooling equipment with manufacturer's product data, highlighting refrigerants; provide manufacturer's cut sheets for all fire-suppression equipment, highlighting fire-suppression agents; provide manufacturer's cut-sheets for all polystyrene insulation (XPS) and closed-cell spray foam polyurethane insulation, highlighting the blowing agent(s).
  8. Appliances and Equipment: Provide copies of manufacturer's product data for all Energy Star eligible equipment and appliances, including office equipment, computers and printers, electronics, and commercial food service equipment (excluding HVAC and lighting components), verifying compliance with EPA's Energy Star program.
  10. Measurement and Verification Systems: Provide cut sheets and manufacturer's product data for all controls systems, highlighting electrical metering and trending capability components.
  11. Salvaged or Reused Materials: Provide documentation that lists each salvaged or reused material, the source or vendor of the material, the purchase price, and the replacement cost if greater than the purchase price.
  12. Recycled Content: Submittals for all materials with recycled content (excluding MEP systems equipment and components) must include the following documentation: Manufacturer's product data, product literature, or a letter from the manufacturer verifying the percentage of post-consumer and pre-consumer recycled content (by weight) of each material or product
    - a. An electronic spreadsheet that tabulates the Project's total materials cost and combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value) expressed as a percentage of total materials cost. This spreadsheet shall be submitted every third month with the Contractor's Certificate and Application for Payment. It should indicate, on an ongoing basis, line items for each material, including cost, pre-consumer recycled content, post-consumer recycled content, and combined recycled content value.
  13. Regional Materials: Submittals for all products or materials expected to contribute to the regional calculation (excluding MEP systems equipment and components) must include the following documentation:
    - a. Cost of each material or product, excluding cost of labor and equipment for installation
    - b. Location of product manufacture and distance from point of manufacture to the Project Site
    - c. Location of point of extraction, harvest, or recovery for each raw material in each product and distance from the point of extraction, harvest, or recovery to the Project Site
    - d. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of manufacture for each regional material
    - e. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the

- Project Site to the point of extraction, harvest, or recovery for each regional material or product, including, at a minimum, gravel and fill, planting materials, concrete, masonry, and GWB
- f. An electronic spreadsheet that tabulates the Project's total materials cost and regional materials value, expressed as a percentage of total materials cost. This spreadsheet shall be submitted every third month with the Contractor's Certificate and Application for Payment. It should indicate on an ongoing basis, line items for each material, including cost, location of manufacture, distance from manufacturing plant to the Project Site, location of raw material extraction, and distance from extraction point to the Project Site.
  14. Outdoor Air Delivery Monitoring: Provide manufacturer's cut sheets highlighting the installed carbon dioxide monitoring system components and sequence of controls shop drawing documentation, including CO<sub>2</sub> differential set-points and alarm capabilities.
  15. 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.
  16. Interior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data highlighting VOC content
  17. Exterior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on ambient air quality, must include manufacturer's MSDSs or other manufacturer's Product Data highlighting VOC content.
  18. Floorcoverings:
    - a. Carpet Systems: Submittals for all carpet must include the following:
      - 1) A copy of an assessment from the Building for Environmental and Economic Sustainability (BEES) software model, either Version 3.0 or 4.0, with parameters of the model set as described by this specification section.
      - 2) Manufacturer's product data verifying that all carpet systems meet or exceed the testing and product requirements of the Carpet and Rug Institute Green Label Plus program.
  19. Composite Wood and Agrifiber Binders: Submittals for all composite wood and agrifiber products (including but not limited to particleboard, wheatboard, strawboard, agriboard products, engineered wood components, solid-core wood doors, OSB, MDF, and plywood products) must include manufacturer's product data verifying that these products contain no urea-formaldehyde resins.
  20. Systems Furniture and Seating: Provide manufacturer's product data verifying that all systems furniture and seating products meet the requirements of one of the following:
    - a. Greenguard certification
    - b. SCS Indoor Advantage certification
    - c. SCS Indoor Advantage Gold certification
    - d. BIFMA Standard X7.1-2005, as tested to BIFMA method M7.1-2005 and as verified by an independent laboratory
    - d. Calculated indoor air concentration limits for furniture systems and seating determined by the U.S. EPA's Environmental Technology

- Verification Large Chamber Test Protocol for Measuring Emissions of VOCs and Aldehydes (September 1999) testing protocol as conducted in an independent air quality testing laboratory
21. Entryway Systems: Provide manufacturer's cut sheets for all walk-off systems installed to capture particulates, including permanently installed grates, grilles, slotted systems, direct glue-down walk-off mats, and non-permanent roll-out mats.
  22. Air Filtration: Provide manufacturer's cut sheets and product data highlighting the following:
    - a. Minimum Efficiency Reporting Value (MERV) for filtration media in all air handling units (AHUs) per ASHRAE HVAC Design Manual for Hospitals and Clinics.
    - b. Minimum Efficiency Reporting Value (MERV) for filtration media installed at return air grilles during construction if permanently installed AHUs are used during construction. See above for requirements
  23. Mercury in Lighting: Provide manufacturer's cut sheets or product data for all fluorescent or HID lamps highlighting mercury content.
  24. Lighting Controls: Provide manufacturer's cut sheets and shop drawing documentation highlighting all lighting controls systems components.
  25. Thermal Comfort Controls: Provide manufacturer's cut sheets and shop drawing documentation highlighting all thermal comfort-control systems components.
  26. Blended Cement: It is the intent of this specification to reduce CO<sub>2</sub> emissions and other environmentally detrimental effects resulting from the production of portland cement by requiring that all concrete mixes, in aggregate, utilize blended cement mixes to displace portland cement as specified in Section 03 30 00, CONCRETE typically included in conventional construction. Provide the following submittals:
    - a. Copies of concrete design mixes for all installed concrete
    - b. Copies of typical regional baseline concrete design mixes for all compressive strengths used on the Project
    - c. Quantities in cubic yards of each installed concrete mix
  27. Gypsum Wall Board: Provide manufacturer's cut sheets or product data verifying that all gypsum wallboard products are moisture and mold-resistant.
  28. Fiberglass Insulation: Provide manufacturer's cut sheets or product data verifying that fiberglass batt insulation contains no urea-formaldehyde.
  29. Duct Acoustical Insulation: Provide manufacturer's cut sheets or product data verifying that mechanical sound insulation materials in air distribution ducts consists of an impervious, non-porous coatings that prevent dust from accumulating in the insulating materials.
  30. Green Housekeeping: Provide documentation that all cleaning products and janitorial paper products meet the VOC limits and content requirements of this specification section.
- B. Project Materials Cost Data: Provide a spreadsheet in an electronic file indicating the total cost for the Project and the total cost of building materials used for the Project, as follows:
1. Not more than 60 days after the Preconstruction Meeting, the General Contractor shall provide to the Owner and Architect a preliminary schedule of materials costs for all materials used for the Project organized by specification section. Exclude labor costs and all



- mechanical, electrical, and plumbing (MEP) systems materials and labor costs. Include the following:
- a. Identify each reused or salvaged material, its cost, and its replacement value.
  - b. Identify each recycled-content material, its post-consumer and pre-consumer recycled content as a percentage the product's weight, its cost, its combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value), and the total combined recycled content value for all materials as a percentage of total materials costs.
  - c. Identify each regional material, its cost, its manufacturing location, the distance of this location from the Project site, the source location for each raw material component of the material, the distance of these extraction locations from the Project site, and the total value of regional materials as a percentage of total materials costs.
  - d. Identify each biobased material, its source, its cost, and the total value of biobased materials as a percentage of total materials costs. Also provide the total value of rapidly renewable materials (materials made from plants that are harvested in less than a 10-year cycle) as a percentage of total materials costs.
  - e. Identify each wood-based material, its cost, the total wood-based materials cost, each FSC Certified wood material, its cost, and the total value of Certified wood as a percentage of total wood-based materials costs.
2. Provide final versions of the above spreadsheets to the Owner and Architect not more than 14 days after Substantial Completion.
- C. Construction Waste Management: See Section 01 74 19 "Construction Waste Management" for submittal requirements.
- D. Construction Indoor Air Quality (IAQ) Management: Submittals must include the following:
1. Not more than 30 days after the Preconstruction Meeting, prepare and submit for the Architect and Owner's approval, an electronic copy of the draft Construction IAQ Management Plan in an electronic file including, but not limited to, descriptions of the following:
  2. Instruction procedures for meeting or exceeding the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction, 1995, Chapter 3, including procedures for HVAC Protection, Source Control, Pathway Interruption, Housekeeping, and Scheduling
    - a. Instruction procedures for protecting absorptive materials stored on-site or installed from moisture damage
    - b. Schedule of submission to Architect of photographs of on-site construction IAQ management measures such as protection of ducts and on-site stored oil installed absorptive materials
    - c. Instruction procedures if air handlers must be used during construction, including a description of filtration media to be used at each return air grille
    - d. Instruction procedure for replacing all air-filtration media immediately prior to occupancy after completion of construction, including a description of filtration media to be used at each air handling or air supply unit

3. Not more than 30 days following receipt of the approved draft CIAQMP, submit an electronic copy of the approved CIAQMP in an electronic file, along with the following:
  - a. Manufacturer's cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for all filtration media to be installed at return air grilles during construction if permanently installed AHUs are used during construction.
  - b. Manufacturer's cut sheets and product data highlighting the Minimum Efficiency Reporting Value (MERV) for filtration media in all air handling units (AHUs).
4. Not more than 14 days after Substantial Completion provide the following:
  - a. Documentation verifying required replacement of air filtration media in all air handling units (AHUs) after the completion of construction and prior to occupancy and, if applicable, required installation of filtration during construction.
  - b. Minimum of 18 Construction photographs: Six photographs taken on three different occasions during construction of the SMACNA approaches employed, along with a brief description of each approach, documenting implementation of the IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.
  - c. A copy of the report from testing and inspecting agency documenting the results of IAQ testing, demonstrating conformance with IAQ testing procedures and requirements defined in Section 01 81 09 "Testing for Indoor Air Quality."
- F. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports for the following:
  1. Construction Waste Management: Waste reduction progress reports and logs complying with the requirements of Section 01 74 19 "Construction Waste Management."
  2. Construction IAQ Management: See details below under Section 3.2 Construction Indoor Air Quality Management for Construction IAQ management progress report requirements.

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT ENVIRONMENTAL REQUIREMENTS**

## **SECTION 02 65 00 UNDERGROUND STORAGE TANK REMOVAL**

## **PART 1 - GENERAL**

### **1.1 DESCRIPTION:**

#### **D. Report:**

1. Written report describing in detail the procedures used to remove the liquid from the underground storage tank, cleaning and removing of the underground storage tank, and disposal of the liquid residues.
2. Photographic documentation of the work, including lab and field results, and receipts from the proper authority for the tank and residue disposal.

### **1.4 SUBMITTAL:**

- A. Furnished detailed CADD generated submittals including:
  1. Detailed plan view
  2. Piping removal diagrams
  3. Control removal diagrams
  4. Component diagrams including tank removal procedure
  5. Detailed sequence of procedure

- 6. Local Fire Marshal requirement
- 7. Hazardous material plan for local VA management.

**SECTION 02 82 13.13**  
**GLOVEBAG ASBESTOS ABATEMENT**

**1.5.12 EMERGENCY ACTION PLAN AND ARRANGEMENTS**

- A. An Emergency Action Plan shall be developed by prior to commencing abatement activities and shall be agreed to by the Contractor and the VA. The Plan shall meet the requirements of 29 CFR 1910.38 (a); (b).
- B. Emergency procedures shall be in written form and prominently posted in the clean room and equipment room of the decontamination unit. 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; layout of regulated area; and access to the 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.
- G. The Contractor shall provide verification of first aid/CPR training for personnel responsible for providing first aid/CPR. OSHA requires medical assistance within 3-4 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 Asbestos Hazard Abatement Plans during abatement. Such incidents include, but are not limited to, fire; accident; power failure; negative pressure failure; and supplied air system failure. The Contractor shall detail procedures to be followed in the event of an incident assuring that asbestos abatement work is stopped and wetting is continued until correction of the problem.

**1.7 RESPIRATORY PROTECTION**

**1.7.1 GENERAL - RESPIRATORY PROTECTION PROGRAM**

The Contractor shall develop and implement a written 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 Subpart I;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 RPP shall, at a minimum, contain the basic requirements found at 29 CFR 1910.134 (c)(1)(i - ix) - Respiratory Protection Program.

**1.7.2 RESPIRATORY PROTECTION PROGRAM COORDINATOR**

The Respiratory Protection Program Coordinator (RPPC) must be identified and shall have two (2) years experience coordinating RPP of similar size and complexity. The RPPC must submit a signed statement attesting to the fact that the program meets the above requirements.

**1.7.3 SELECTION AND USE OF RESPIRATORS**

The procedure for the selection and use of respirators must be submitted to the VA as part of the Contractor's qualifications. The procedure must be 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.

#### **1.7.8 MAINTENANCE AND CARE OF RESPIRATORS**

The Respiratory Protection Program Coordinator shall submit evidence and documentation showing compliance with 29 CFR 1910.134 (h) maintenance and care of respirators.

### **1.8 WORKER PROTECTION**

#### **1.8.1 TRAINING OF ABATEMENT PERSONNEL**

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.

#### **1.8.2 MEDICAL EXAMINATIONS**

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. A current physician's written opinion as required by 29 CFR 1926.1101 (m)(4) shall be provided for each person and shall include in the medical opinion the person has been evaluated for working in a heat and cold stress environment while wearing personal protective equipment (PPE) and is able to perform the work without risk of material health impairment.

### **2.3 MONITORING, INSPECTION AND TESTING**

#### **2.4 ASBESTOS HAZARD ABATEMENT PLAN**

#### **2.5 SUBMITTALS**

##### **2.5.1 PRE-START MEETING SUBMITTALS**

Submit to the VA 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:

- A. Submit a detailed work schedule for the entire project reflecting contract documents and the phasing/schedule requirements from the CPM chart.
- B. 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. Provide a copy of the "Certificate of Worker's Acknowledgment" and the "Affidavit of Medical Surveillance and Respiratory Protection" for each person.
- C. Submit Asbestos Hazard Abatement Plan developed specifically for this project, incorporating the requirements of the specifications, prepared, signed and dated by the CPIH/CIH.
- D. Submit the specifics of the materials and equipment to be used for this project with manufacturer names, model numbers, performance characteristics, pictures/diagrams, and number available for the following:
  1. Supplied air system, negative air machines, HEPA vacuums, air monitoring pumps, calibration devices, pressure differential monitoring device and emergency power generating system.
  2. Waste water filtration system, shower system, containment barriers.
  3. Encapsulants, surfactants, hand held sprayers, airless sprayers, glovebags, and fire extinguishers.
  4. Respirators, protective clothing, personal protective equipment.
  5. Fire safety equipment to be used in the regulated area.

- E. 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.
- F. 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.
- G. Submit the name, location and verification of the laboratory and/or personnel to be used for analysis of air and/or bulk samples. Personal air monitoring must be done in accordance with OSHA 29 CFR 1926.1101(f) and Appendix A. And area or clearance air monitoring in accordance with EPA AHERA protocols.
- H. 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.
  - 1. 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; and Completion Date
  - 2. List of project(s) halted by owner, A/E, IH, regulatory agency in the last 3 years: Project Name; Reason; Date; Reference Name/Number; and Resolution.
  - 3. List asbestos regulatory citations (e.g., OSHA), notices of violations (e.g., Federal and state EPA), penalties, and legal actions taken against the company including and of the company's officers (including damages paid) in the last 3 years. Provide copies and all information needed for verification.
- I. Submit information on personnel: Provide a resume; address each item completely; copies of certificates, accreditations, and licenses. Submit an affidavit signed by the CPIH/CIH 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 written respiratory protection program, and maintains recordkeeping in accordance with the above regulations. Submit the phone number and doctor/clinic/hospital used for medical evaluations.
  - 1. CPIH/CIH and IH Technician: 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 AHAP(s) developed; medical opinion; and current respirator fit test.
  - 2. Competent Person(s)/Supervisor(s): Number; names; social security numbers; years of abatement experience as Competent Person/Supervisor; list of similar projects in size/complexity 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 (asbestos surveillance and respirator use); and current respirator fit test.
  - 3. Workers: Numbers; names; social security numbers; years of abatement experience; certificates, licenses, accreditations; training courses in asbestos abatement and respiratory protection; medical opinion

(asbestos surveillance and respirator use); and current respirator fit test.

- J. Submit copies of State license for asbestos abatement; copy of insurance policy, including exclusions with a letter from agent stating in plain language the coverage provided and the fact that asbestos abatement activities are covered by the policy; copy of AHAP(s) incorporating the requirements of this specification; information on who provides your training, how often; who provides medical surveillance, how often; who performs and how is personal air monitoring of abatement workers conducted; a list of references of independent laboratories/IH's familiar with your air monitoring and Asbestos Hazard Abatement Plans; copies of monitoring results of the five referenced projects listed and analytical method(s) used.
- K. Rented equipment must be decontaminated prior to returning to the rental agency.
- L. Submit, before the start of work, the manufacturer's technical data for all types of encapsulants, all MSDS, and application instructions.

#### **2.5.2 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 barrier breeching, equipment failures, emergencies, and any cause for stopping work; representative air monitoring and results/TWAs/ELs. Submit this information daily to the VPIH/CIH.
- B. The CPIH/CIH shall document and maintain the inspection and approval of the regulated area preparation prior to start of work and daily during work.
  - 1. Removal of any poly barriers.
  - 2. Visual inspection/testing by the CPIH/CIH or IH Technician prior to application of lockdown encapsulant.
  - 3. Packaging and removal of ACM waste from regulated area.
  - 4. Disposal of ACM waste materials; copies of Waste Shipment Records/landfill receipts to the VA's representative on a weekly basis.

#### **2.5.3 SUBMITTALS AT COMPLETION OF ABATEMENT**

The CPIH/CIH 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. It will also include information on the containment and transportation of waste from the containment with applicable Chain of Custody forms. The report shall include a certificate of completion, signed and dated by the CPIH/CIH, in accordance with Attachment #1. All clearance and perimeter area samples must be submitted. The VA Representative will retain the abatement report after completion of the project and provide copies of the abatement report to VAMC Office of Engineer and the Safety Office.

#### **2.6 ENCAPSULANTS**

#### **2.7 CERTIFICATES OF COMPLIANCE**

#### **2.8 RECYCLABLE PROTECTIVE CLOTHING**

### **SECTION 03 30 00 CAST-IN-PLACE CONCRETE**

#### **PART 1 - GENERAL**

##### **1.6 SUBMITTALS:**

- B. Shop Drawings: Reinforcing steel: Complete shop drawings.
- C. Mill Test Reports:
  - 1. Reinforcing Steel.
  - 2. Cement.
- D. Manufacturer's Certificates:
  - 2. Lightweight aggregate for structural concrete.
  - 3. Air-entraining admixture.
  - 4. Chemical admixtures, including chloride ion content.
  - 5. Waterproof paper for curing concrete.
  - 6. Liquid membrane-forming compounds for curing concrete.
  - 7. Non-shrinking grout.
  - 8. Liquid hardener.
  - 9. Waterstops.
  - 10. Expansion joint filler.
  - 11. Adhesive binder.
- E. Testing Agency for Concrete Mix Design: Approval request including qualifications of principals and technicians and evidence of active participation in program of Cement and Concrete Reference Laboratory (CCRL) of National Institute of Standards and Technology and copy of report of latest CCRL, Inspection of Laboratory.
- F. Test Report for Concrete Mix Designs: Trial mixes including watercement fly ash ratio curves, concrete mix ingredients, and admixtures.

**PART 2 - PRODUCTS:**

**2.1 FORMS**

**2.2 MATERIALS**

**2.3 CONCRETE MIXES**

**2.4 BATCHING AND MIXING**

**SECTION 03 54 16  
HYDRAULIC CEMENT UNDERLAYMENT**

**PART 2 - PRODUCTS**

**2.1 HYDRAULIC-CEMENT-BASED UNDERLAYMENTS**

- A. Underlayment
- B. Aggregate
- C. Water
- D. Primer

**SECTION 04 05 13  
MASONRY MORTARING**

**PART 1 - GENERAL**

**1.5 SUBMITTALS**

- B. Certificates:
  - 1. Testing laboratory's facilities and qualifications of its technical personnel.
  - 2. Indicating that following items meet specifications:
    - a. Portland cement.
    - b. Masonry cement.
    - c. Mortar cement.
    - d. Hydrated lime.
    - e. Fine aggregate (sand).
    - g. Color admixture.
- C. Laboratory Test Reports:
  - 1. Mortar, each type.
  - 2. Admixtures.
- D. Manufacturer's Literature and Data:
  - 1. Cement, each kind.

- 2. Hydrated lime.
- 3. Admixtures.
- 4. Liquid acrylic resin.

**PART 2 - PRODUCTS**

- 2.1 HYDRATED LIME
- 2.2 AGGREGATE FOR MASONRY MORTAR
- 2.3 BLENDED HYDRAULIC CEMENT
- 2.4 MASONRY CEMENT
- 2.5 MORTAR CEMENT
- 2.6 PORTLAND CEMENT
- 2.7 LIQUID ACRYLIC RESIN
- 2.8 WATER
- 2.9 POINTING MORTAR
- 2.10 MASONRY MORTAR
- 2.12 COLOR ADMIXTURE

**SECTION 04 05 16  
MASONRY GROUTING**

**PART 1 - GENERAL**

**1.4 SUBMITTALS:**

- B. Certificates:
  - 1. Indicating that following items meet specifications:
    - a. Portland cement.
    - b. Masonry cement.
    - c. Grout.
    - d. Hydrated lime.
    - e. Fine aggregate (sand).
    - f. Coarse aggregate for grout.
- C. Laboratory Test Reports:
  - 1. Grout, each type.
  - 2. Admixtures.
- D. Manufacturer's Literature and Data:
  - 1. Cement, each kind.
  - 2. Hydrated lime.
  - 3. Admixtures.
  - 4. Liquid acrylic resin.

**PART 2 - PRODUCTS**

- 2.1 HYDRATED LIME
- 2.2 AGGREGATE FOR MASONRY GROUT
- 2.3 BLENDED HYDRAULIC CEMENT
- 2.4 MASONRY CEMENT
- 2.5 PORTLAND CEMENT
- 2.6 LIQUID ACRYLIC RESIN
- 2.7 WATER
- 2.8 GROUT

**SECTION 04 20 00  
UNIT MASONRY**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Samples:
  - 1. Face brick, sample panel, 200 mm by 400 mm (8 inches by 16 inches,) showing full color range and texture of bricks, bond, and proposed mortar joints.
  - 3. Anchors, and ties, one each and joint reinforcing 1200 mm (48 inches) long.



## C. Shop Drawings:

1. Special masonry shapes.
2. Drawings, showing reinforcement, applicable dimensions and methods of hanging soffit or lintel masonry and reinforcing masonry for embedment of anchors for hung fixtures.
3. Concrete masonry units for typical window and door openings, and, for special conditions as affected by structural conditions.
5. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of reinforcing bars. Comply with ACI 315. Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work.

## D. Certificates:

1. Certificates signed by manufacturer, including name and address of contractor, project location, and the quantity, and date or dates of shipment of delivery to which certificate applies.
2. Indicating that the following items meet specification requirements:
  - a. Face brick.
  - b. Solid and load-bearing concrete masonry units, including fire-resistant rated units.
3. Testing laboratories facilities and qualifications of its principals and key personnel to perform tests specified.

## F. Manufacturer's Literature and Data:

1. Anchors, ties, and reinforcement.
2. Shear keys.
3. Reinforcing bars.

**PART 2 - PRODUCTS****2.1 BRICK****2.2 CONCRETE MASONRY UNITS****2.4 SHEAR KEYS****2.5 ANCHORS, TIES, AND REINFORCEMENT****2.7 ACCESSORIES**

**SECTION 04 72 00**  
**CAST STONE MASONRY**

**PART 1 - GENERAL****1.3 SUBMITTALS**

## B. Samples:

1. Cast stone, sample panel, size 100 by 300 by 300 mm (4 by 12 by 12 inches) each color and finish.
2. Show finish on two 100 mm (4-inch) edges and 300 by 300 mm (12 by 12 inch) surface.

## C. Shop Drawings:

1. Cast stone showing exposed faces, profiles, cross sections, anchorage, reinforcing, jointing and sizes.
2. Setting drawings with setting mark.

## D. Certificates: Test results indicating that the cast stone meets specification requirements and proof of plant certification.

## E. Submit manufacturers test results of cast stone previously made by manufacturer.

## F. Laboratory Data: Description of testing laboratories facilities and qualifications of its principals and key personnel.

## G. List of jobs furnished by the manufacturer, which were similar in scope and at least three (3) years of age.

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

2.2 RAW MATERIALS  
 2.3 COLOR AND FINISH  
 2.4 REINFORCING  
 2.5 CURING

SECTION 05 12 00  
 STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.7 SUBMITTALS:

- B. Shop and Erection Drawings: Complete.
- C. Certificates:
  - 1. Structural steel.
  - 2. Steel for all connections.
  - 3. Welding materials.
  - 4. Shop coat primer paint.
- D. Test Reports:
  - 1. Welders' qualifying tests.
- E. Design Calculations and Drawings:
  - 1. Connection calculations, if required.
- F. Record Surveys.

PART 2 - PRODUCTS

2.1 MATERIALS

SECTION 05 36 00  
 COMPOSITE METAL DECKING

PART 1 - GENERAL

1.4 SUBMITTALS:

- B. Shop Drawings: Shop and erection drawings showing decking unit layout, connections to supporting members, and information necessary to complete the installation as shown and specified, including supplementary framing, cant strips, cut openings, special jointing or other accessories. Show welding, side lap, closure, deck reinforcing and closure reinforcing details. Show openings required for work of other trades, including openings not shown on structural drawings. Indicate where temporary shoring is required to satisfy design criteria.
- C. Manufacturer's Literature and Data: Showing steel decking section properties and specifying structural characteristics as specified herein.
- D. Manufacturer's written recommendations for:
  - 1. Shape of decking section to be used.
  - 2. Cleaning of steel decking prior to concrete placement.
- E. Test Report: Establishing structural characteristics of composite concrete and steel decking system.
- F. Test Report: Stud base qualification.
- G. Welding power setting recommendation by shear stud manufacturer.
- H. Shear Stud Layouts: Submit drawings showing the number, pattern, spacing and configuration of the shear studs for each beam and girder.
- I. Certification: For each type and gauge of metal deck supporting concrete slab or fill, furnish certification of the specified fire ratings. Certify that the units supplied are U.L. listed as a "Steel Floor and Form Unit".

PART 2 - PRODUCTS

2.1 MATERIALS

2.2 REQUIREMENTS

**SECTION 05 40 00  
COLD-FORMED METAL FRAMING**

**PART 1 - GENERAL**

**1.4 SUBMITTALS:**

- B. Shop Drawings: Shop and erection drawings showing steel unit layout, connections to supporting members, and information necessary to complete installation as shown and specified.
- C. Manufacturer's Literature and Data: Showing steel component sections and specifying structural characteristics.
- D. For cold-formed metal framing indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for its preparation.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**2.2 WALL FRAMING**

**2.4 FRAMING ACCESSORIES**

**2.5 ANCHORS, CLIPS, AND FASTENERS**

**2.6 REQUIREMENTS**

**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- C. Shop Drawings:
  - 1. Each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors.
  - 2. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
  - 3. Provide templates and rough-in measurements as required.
- D. Manufacturer's Certificates:
  - 1. Anodized finish as specified.
  - 2. Live load designs as specified.
- E. Design Calculations for specified live loads including dead loads.
- F. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction.

**PART 2 - PRODUCTS**

**2.1 DESIGN CRITERIA**

**2.2 MATERIALS**

**2.3 HARDWARE**

**2.4 FABRICATION GENERAL**

**2.5 SUPPORTS**

**2.6 FRAMES**

**2.7 GUARDS**

**2.10 LOOSE LINTELS**

**2.13 SAFETY NOSINGS**

**2.15 RAILINGS**

**SECTION 05 51 33.16  
INCLINED METAL LADDERS**

**PART 1 - GENERAL**

**1.2 SUBMITTALS**

- B. Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings for Ladders:
  - 1. Plan, section and details of ladder installation.

**PART 2 - PRODUCTS**

- 2.1 ALUMINUM SHIPS LADDER**
- 2.2 FABRICATION**
- 2.3 FINISHES**

**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 2 - PRODUCTS**

- 06 10 00 - 2.1 LUMBER**
- 06 10 00 - 2.4 ROUGH HARDWARE AND ADHESIVES**

**SECTION 06 20 00  
FINISH CARPENTRY**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Shop Drawings:
  - 1. Millwork items - Half full size scale for sections and details 1:50 (1/4-inch) for elevations and plans.
  - 2. Show construction and installation.
- C. Samples:
  - 1. Plastic laminate finished plywood, 150 mm by 300 mm (six by twelve inches).
- D. Certificates:
  - 1. Indicating preservative treatment and/or fire retardant treatment of materials meet the requirements specified.
  - 2. Indicating moisture content of materials meet the requirements specified.
- E. List of acceptable sealers for fire retardant and preservative treated materials.
- F. Manufacturer's literature and data:
  - 1. Finish hardware.

**SECTION 07 11 13  
BITUMINOUS DAMPPROOFING**

**PART 1 - GENERAL**

**1.2 SUBMITTALS:**

- B. Manufacturer's Literature and Data:
  - 1. Product description.
  - 2. Application instructions.

**PART 2 - PRODUCTS**

- 2.1 ASPHALT (HOT APPLIED)**
- 2.2 ASPHALT SATURATED FELT**
- 2.3 ASPHALT EMULSION (COLD APPLIED)**

**SECTION 07 21 13  
THERMAL INSULATION**

**PART 1 - GENERAL**

**1.3 SUBMITTALS:**

- B. Manufacturer's Literature and Data:
  - 1. Insulation, each type used
  - 2. Adhesive, each type used.
  - 3. Tape
- C. Certificates: Stating the type, thickness and "R" value (thermal resistance) of the insulation to be installed.

**PART 2 - PRODUCTS**

- 2.1 INSULATION - GENERAL
- 2.2 MASONRY CAVITY WALL INSULATION:
- 2.3 PERIMETER INSULATION IN CONTACT WITH SOIL
- 2.4 EXTERIOR FRAMING OR FURRING INSULATION
- 2.5 ACOUSTICAL INSULATION
- 2.6 SOUND DEADENING BOARD
- 2.7 RIGID INSULATION
- 2.9 FASTENERS
- 2.10 ADHESIVE
- 2.11 TAPE

**SECTION 07 22 00  
ROOF AND DECK INSULATION**

**PART 1 - GENERAL**

**1.6 SUBMITTALS**

- B. Product Data:
  - 1. Asphalt and adhesive materials, each type.
  - 2. Roofing cement, each type.
  - 3. Roof insulation, each type.
  - 4. Substrate board, each type.
  - 5. Cover board, each type.
  - 6. Fastening requirements.

**PART 2 - PRODUCTS**

- 2.1 ADHESIVE MATERIALS
- 2.2 ROOF AND DECK INSULATION
- 2.3 INSULATION ACCESSORIES
- 2.4 FASTENERS

**SECTION 07 41 13  
METAL ROOF PANELS**

**PART 1 - GENERAL**

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of roof panel and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of metal roof panels; details of edge conditions, side-seam and endlap joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.
  - 1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):
    - a. Flashing and trim.
    - b. Gutters.
    - c. Downspouts.
    - d. Snow guards.
- C. Samples for Initial Selection: For each type of metal roof panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
  1. Metal Roof Panels: 12 inches (300 mm) long by actual panel width. Include fasteners, clips, battens, closures, and other metal roof panel accessories.
  2. Trim and Closures: 12 inches (300 mm) long. Include fasteners and other exposed accessories.
  3. Accessories: 12-inch- (300-mm-) long Samples for each type of accessory.
- E. Delegated-Design Submittal: For metal roof panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer registered in the state of Pennsylvania responsible for their preparation.
  1. Snow Retention System Calculations: Include calculation of number and location of snow guards based on snow load, roof slope, panel length and finish, and seam type and spacing.

#### **1.5 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Roof plans, drawn to scale, on which the following are shown and coordinated with each other, based on input from installers of the items involved:
  1. Roof panels and attachments.
  2. Purlins and rafters.
  3. Roof-mounted items including snow guards.
- B. Manufacturer Certificates: Signed by manufacturer certifying that roof panels comply with energy performance requirements specified in "Performance Requirements" Article.
  1. Submit evidence of meeting performance requirements.
- C. Qualification Data: For qualified Installer.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.
- E. Warranties: Samples of special warranties.

### **PART 2 - PRODUCTS**

- 2.1 PANEL MATERIALS
- 2.2 FIELD-INSTALLED THERMAL INSULATION
- 2.3 SUBSTRATE BOARDS
- 2.4 MISCELLANEOUS METAL FRAMING
- 2.5 MISCELLANEOUS MATERIALS
- 2.6 STANDING-SEAM METAL ROOF PANELS
- 2.7 ACCESSORIES
- 2.8 SNOW GUARDS
- 2.9 FABRICATION
- 2.10 FINISHES

## **SECTION 07 53 23**

### **ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING**

#### **PART 1 - GENERAL**

##### **1.4 SUBMITTALS**

- B. Applicators approval certification by manufacturer.
- C. Shop Drawings:
  1. Sheet membrane layout.
  2. Fastener pattern, layout, and spacing requirements.
  3. Termination details.
- D. Manufacturers installation instructions revised for project.

**E. Samples:**

1. Sheet membrane: One 150 mm (6 inch) square piece.
2. Sheet flashing: One 150 mm (6 inch) square piece.
3. Fasteners: Two, each type.
4. Welded seam: Two 300 mm (12 inch) square samples of welded seams to represent quality of field welded seams.
5. Vapor Retarder: One 150 mm (6 inch) square piece.
6. Flexible Tubing: One 150 mm (6 inch) long piece.
7. Walkway Pad: One 150 mm (6 inch) square piece.

**PART 2 - PRODUCTS****2.1 EPDM SHEET ROOFING****2.2 EPDM FLASHING SHEET****2.3 MISCELLANEOUS ROOFING MEMBRANE MATERIALS****2.4 FASTENERS****2.5 VAPOR RETARDER OR SEPARATION SHEETS****2.6 FLEXIBLE TUBING****2.7 WALKWAY PADS**

**SECTION 07 60 00**  
**FLASHING AND SHEET METAL**

**PART 1 - GENERAL****1.5 SUBMITTALS**

- B. Shop Drawings: For all specified items, including:
  1. Flashings
  5. Expansion joints
- C. Manufacturer's Literature and Data: For all specified items, including:
  1. Two-piece counter-flashing
  2. Thru wall flashing
  3. Expansion joint cover, each type
  4. Non-reinforced, elastomeric sheeting
- D. Certificates: Indicating compliance with specified finishing requirements, from applicator and contractor.

**PART 2 - PRODUCTS****2.1 FLASHING AND SHEET METAL MATERIALS****2.2 FLASHING ACCESSORIES****2.3 SHEET METAL THICKNESS****2.4 FABRICATION, GENERAL****2.5 FINISHES****2.6 THROUGH-WALL FLASHINGS****2.7 BASE FLASHING****2.8 COUNTERFLASHING (CAP FLASHING OR HOODS)****2.14 REGLETS****2.15 INSULATED EXPANSION JOINT COVERS**

**SECTION 07 72 00**  
**ROOF ACCESSORIES**

**PART 1 - GENERAL****1.4 SUBMITTALS**

- B. Samples: Representative samples of manufacturer's available range of fluorocarbon finishes on metal squares not less than 100 mm X 100 mm (four by four inches), except extrusions shall be a width not less than section to be used. Sample shall show coating with integral color and texture and shall include manufacturer's identifying label.
- C. Shop Drawings: Each item specified showing design, details of construction, installation and fastenings.
- D. Manufacturer's Literature and Data: Each item specified.

- E. Certificates: Stating that aluminum has been given specified thickness of anodizing.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**2.2 COPINGS**

**2.6 FINISH**

**SECTION 07 84 00**

**FIRESTOPPING**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Manufacturers literature, data, and installation instructions for types of firestopping and smoke stopping used.
- C. List of FM, UL, or WH classification number of systems installed.
- D. Certified laboratory test reports for ASTM E814 tests for systems not listed by FM, UL, or WH proposed for use.

**PART 2 - PRODUCTS**

**2.1 FIRESTOP SYSTEMS**

**2.2 SMOKE STOPPING IN SMOKE PARTITIONS**

**SECTION 07 92 00**

**JOINT SEALANTS**

**PART 1 - GENERAL**

**1.4 SUBMITTALS:**

- B. Manufacturer's installation instructions for each product used.
- C. Cured samples of exposed sealants for each color where required to match adjacent material.
- D. Manufacturer's Literature and Data:
  - 1. Caulking compound
  - 2. Primers
  - 3. Sealing compound, each type, including compatibility when different sealants are in contact with each other.

**PART 2 - PRODUCTS**

**2.1 SEALANTS**

**2.2 CAULKING COMPOUND**

**2.3 COLOR**

**2.4 JOINT SEALANT BACKING**

**2.5 FILLER**

**2.6 PRIMER**

**2.7 CLEANERS-NON POUROUS SURFACES**

**SECTION 07 95 13**

**EXPANSION JOINT COVER ASSEMBLIES**

**PART 1 - GENERAL**

**1.5 SUBMITTALS**

- B. Manufacturer's Literature and Data:
  - 1. Submit copies of manufacturer's current literature and data for each item specified.
  - 2. Clearly indicate movement capability of cover assemblies and suitability of material used in exterior seals for ultraviolet exposure.
- D. Shop Drawings:
  - 1. Showing full extent of expansion joint cover assemblies; include large-scale details indicating profiles of each type of expansion joint cover assembly, splice joints between sections, joiners with other type assemblies, special end conditions, anchorages,



- fasteners, and relationship to adjoining work and finishes.
- 2. Include description of materials and finishes and installation instructions.

E. Samples:

- 1. Samples of each type and color of metal finish on metal of same thickness and alloy used in work.
- 2. Samples of each type and color of flexible seal used in work.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**2.2 FABRICATION**

**2.3 METAL FINISHES**

**SECTION 08 11 13  
HOLLOW METAL DOORS AND FRAMES**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

B. Manufacturers Literature and Data:

- 1. Fire rated doors and frames, showing conformance with NFPA 80 and Underwriters Laboratory, Inc., or Intertek Testing Services or Factory Mutual fire rating requirements and temperature rise rating for stairwell doors. Submit proof of temperature rating.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**2.2 FABRICATION GENERAL**

**2.3 METAL FRAMES**

**2.6 SHOP PAINTING**

**SECTION 08 14 00  
INTERIOR WOOD DOORS**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

B. Samples:

- 1. Corner section of flush door 300 mm (12 inches) square, showing details of construction, labeled to show grade and type number and conformance to specified standard.

C. Shop Drawings:

- 1. Show every door in project and schedule location in building.
- 2. Indicate type, grade, finish and size; include detail of glazing and pertinent details.
- 3. Provide information concerning specific requirements not included in the manufacturer's literature and data submittal.

D. Manufacturer's Literature and Data:

- 2. Labeled fire rated doors showing conformance with NFPA 80.

E. Laboratory Test Reports:

- 1. Screw holding capacity test report in accordance with WDMA T.M.10.
- 2. Split resistance test report in accordance with WDMA T.M.5.
- 3. Cycle/Slam test report in accordance with WDMA T.M.7.
- 4. Hinge-Loading test report in accordance with WDMA T.M.8.

**PART 2 - PRODUCTS**

**2.1 FLUSH DOORS**

**2.3 PREFINISH, PREFIT OPTION**

**2.4 IDENTIFICATION MARK**

**2.5 SEALING**

**SECTION 08 31 00**

## ACCESS DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.3 SUBMITTALS:

- B. Shop Drawings: Access doors, each type, showing construction, location and installation details.
- C. Manufacturer's Literature and Data: Access doors, each type.

### PART 2 - PRODUCTS

- 2.1 FABRICATION, GENERAL
- 2.3 INTERIOR ACCESS DOORS, FLUSH PANEL
- 2.4 INTERIOR FLOOR ACCESS DOORS, FLUSH PANEL
- 2.5 EXTERIOR FLUSH ACCESS DOORS

## SECTION 08 33 00 COILING DOORS AND GRILLES

### PART 1 - GENERAL

#### 1.5 SUBMITTALS

- B. Shop Drawings:
  - 1. Each type of door showing details of construction, accessories and hardware, electrical and mechanical items supporting brackets for motors, location, and ratings of motors, and safety devices.
  - 2. Wiring diagrams for motors and controls, including wiring diagram for door, showing electrical interlock of motor with manually operated dead lock, electrical rough-in.
- C. Manufacturer's Literature and Data:
  - 1. Brochures or catalog cuts, each type door.
  - 2. Manufacturer's installation procedures and instructions.
  - 3. Maintenance instructions, parts lists.
- D. Certificates:
  - 1. Attesting doors, anchors and hardware will withstand the horizontal loads specified.

### PART 2 - PRODUCTS

- 2.1 MATERIAL
- 2.2 DESIGN REQUIREMENTS
- 2.3 FABRICATION
- 2.4 ELECTRIC MOTOR OPERATORS
- 2.7 FINISHES

## SECTION 08 41 13 ALUMINUM ENTRANCES AND STOREFRONTS

### PART 1 - GENERAL

#### 1.3 SUBMITTALS:

- B. Shop Drawings: (1/2 full scale) showing construction, anchorage, reinforcement, and installation details.
- C. Manufacturer's Literature and Data:
  - 1. Doors, each type.
  - 2. Entrance and Storefront construction.
- D. Samples:
  - 1. Door corner section, 450 mm x 450 mm (18 x 18 inches), of each door type specified, showing vertical and top hinge edges, door closer reinforcement, internal reinforcement and insulation, of flush panel door.
  - 2. Two samples of anodized aluminum of each color showing finish and maximum shade range.

## E. Manufacturer's Certificates:

1. Stating that aluminum has been given specified thickness of anodizing.
2. Indicating manufacturer's qualifications specified.

**PART 2 - PRODUCTS****2.2 FABRICATION****2.1 MATERIALS****2.3 PROTECTION OF ALUMINUM****2.4 FRAMES****2.5 STILE AND RAIL DOORS****2.7 REINFORCEMENT FOR BUILDERS HARDWARE****2.8 TRIM****2.9 FINISH****SECTION 08 71 00****DOOR HARDWARE****PART 1 - GENERAL****1.6 SUBMITTALS**

- A. Submit 6 copies of the schedule per Section 01 33 23. Submit 2 final copies of the final approved schedules to VAMC Locksmith as record copies (VISN Locksmith if the VAMC does not have a locksmith).
- B. Hardware Schedule: Prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHMA Finish Designation

## C. Samples and Manufacturers' Literature:

1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.
2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.

- D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

**PART 2 - PRODUCTS****2.1 BUTT HINGES****2.2 CONTINUOUS HINGES****2.3 DOOR CLOSING DEVICES****2.4 OVERHEAD CLOSERS****2.5 FLOOR CLOSERS AND FLOOR PIVOT SETS**

- 2.6 DOOR STOPS
- 2.9 LOCKS AND LATCHES
- 2.10 PUSH-BUTTON COMBINATION LOCKS
- 2.13 KEYS
- 2.15 ARMOR PLATES, KICK PLATES, MOP PLATES AND DOOR EDGING
- 2.16 EXIT DEVICES
- 2.18 FLUSH BOLTS (AUTOMATIC)
- 2.19 DOOR PULLS WITH PLATES
- 2.21 COMBINATION PUSH AND PULL PLATES
- 2.22 COORDINATORS
- 2.23 THRESHOLDS
- 2.25 WEATHERSTRIPS (FOR EXTERIOR DOORS)
- 2.26 MISCELLANEOUS HARDWARE
- 2.27 PADLOCKS FOR VARIOUS DOORS, GATES AND HATCHES
- 2.30 FINISHES
- 2.31 BASE METALS

# SECTION 08 71 13 AUTOMATIC DOOR OPERATORS

## PART 1 - GENERAL

### 1.6 SUBMITTALS

- B. Manufacturer's literature and data describing operators, power units, controls, door hardware and safety devices.
- C. Shop Drawings:
  - 1. Showing location of controls and safety devices in relationship to each automatically operated door.
  - 2. Showing layout, profiles, product components, including anchorage, accessories, as applicable.
  - 3. Submit templates, wiring diagrams, fabrication details and other information to coordinate the proper installation of the automatic door operators.
- D. Submit in writing to the COR that items listed in Article 1.3 are in compliance.

## PART 2 - PRODUCTS

- 2.1 MICROPROCESSOR CONTROLS
- 2.2 SLIDING DOOR OPERATORS
- 2.4 POWER UNITS
- 2.5 DOOR CONTROLS
- 2.6 SAFETY DEVICES

# SECTION 08 80 00 GLAZING

## PART 1 - GENERAL

### 1.5 SUBMITTALS

- B. Manufacturer's Certificates:
  - 2. Certificate on shading coefficient.
  - 3. Certificate on "R" value.
- C. Warranty: Submit written guaranty, conforming to General Condition requirements, and to "Warranty of Construction" Article in this Section.
- D. Manufacturer's Literature and Data:
  - 1. Glass, each kind required.
  - 2. Insulating glass units.
  - 4. Elastic compound for metal sash glazing.
  - 5. Putty, for wood sash glazing.
  - 6. Glazing cushion.

- 7. Sealing compound.
- E. Samples:
  - 1. Size: 150 mm by 150 mm (6 inches by 6 inches).
- F. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer's test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

**PART 2 - PRODUCTS**

**2.1 GLASS**

**2.5 LAMINATED GLASS**

**2.6 LAMINATED GLAZING ASSEMBLIES**

**2.9 INSULATING GLASS UNITS**

**2.13 GLAZING ACCESSORIES**

**SECTION 08 81 13  
DECORATIVE GLASS GLAZING**

**PART 1 - GENERAL**

**1.3 ACTION SUBMITTALS**

- A. Product Data: For decorative film overlay product indicated.
- B. Shop Drawings: For decorative film overlay. Show fabrication and installation details. Include the following:
  - 1. Size and location of penetrations.
  - 2. Mounting method.
  - 3. Attachments to other work.
  - 4. Full-size details of edge-finished profiles.
- C. Samples: For the following products, 12 inches (300 mm) square:
  - 1. Decorative film overlay.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For decorative film overlay, from manufacturer.
- C. Warranty: Sample of special warranty.

**PART 2 - PRODUCTS**

**2.1 DECORATIVE GLASS TYPE GL-1**

**2.2 DECORATIVE FILM OVERLAY FABRICATION**

**SECTION 08 90 00  
LOUVERS AND VENTS**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Shop Drawings: Each type, showing material, finish, size of members, method of assembly, and installation and anchorage details.
- C. Manufacturer's Literature and Data: Each type of louver.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**2.2 EXTERIOR WALL LOUVERS**

**2.3 CLOSURE ANGLES AND CLOSURE PLATES**

**2.4 WIRE GUARDS**

**2.8 AIR INTAKE VENTS**

**2.10 FINISH**

**2.11 PROTECTION**

**SECTION 09 06 00  
SCHEDULE FOR FINISHES**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- A. Submit quadruplicate samples for color approval of materials and finishes specified in this section.

**PART 2 - PRODUCTS**

**2.4 DIVISION 04 - MASONRY**

**2.9 DIVISION 09 - FINISHES**

**2.10 DIVISION 10 - SPECIALTIES**

**2.13 DIVISION 12 - FURNISHINGS**

**SECTION 09 22 16  
NON-STRUCTURAL METAL FRAMING**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- B. Manufacturer's Literature and Data:
  - 1. Studs, runners and accessories.
  - 2. Hanger inserts.
  - 3. Channels (Rolled steel).
  - 4. Furring channels.
  - 5. Screws, clips and other fasteners.
- C. Shop Drawings:
  - 1. Typical ceiling suspension system.
  - 2. Typical metal stud and furring construction system including details around openings and corner details.
  - 3. Typical shaft wall assembly
  - 4. Typical fire rated assembly and column fireproofing showing details of construction same as that used in fire rating test.
- D. Test Results: Fire rating test designation, each fire rating required for each assembly.

**PART 2 - PRODUCTS**

**2.1 PROTECTIVE COATING**

**2.2 STEEL STUDS AND RUNNERS (TRACK)**

**2.3 FURRING CHANNELS**

**2.4 FASTENERS, CLIPS, AND OTHER METAL ACCESSORIES**

**2.5 SUSPENDED CEILING SYSTEM FOR GYPSUM BOARD**

**SECTION 09 23 00  
GYPSUM PLASTERING**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- B. Shop Drawings:
  - 1. Details of floating interior angle unrestrained construction.
  - 2. Details of assembly and anchorage of lath and accessories.
- C. Manufacturers' Literature and Data:
  - 1. Accessories for plaster, each type.
  - 2. Metal plaster bases, each type.
  - 3. Fasteners.
  - 4. Bonding compounds, including application instructions.
  - 5. Admixtures, including mixing and application instructions.
- D. Manufacturers certificates:
  - 1. Gypsum plaster.
  - 2. Keene's cement.
- E. Samples: Accessories for plaster, each type, not less than 150 mm (six inches) long.
  - 1. Panel showing finish coat, 12 by 12 inches.

**PART 2 - PRODUCTS**

**2.1 PLASTERING BASES (LATH)**

**2.2 GYPSUM PLASTERS**

- 2.3 LIME
- 2.4 AGGREGATES
- 2.5 BONDING COMPOUND (FOR INTERIOR WORK)
- 2.6 ACCESSORIES FOR GYPSUM PLASTER
- 2.7 FASTENERS

**SECTION 09 29 00  
GYPSUM BOARD**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- B. Manufacturer's Literature and Data:
  - 1. Cornerbead and edge trim.
  - 2. Finishing materials.
  - 3. Laminating adhesive.
  - 4. Gypsum board, each type.
- C. Shop Drawings:
  - 1. Typical gypsum board installation, showing corner details, edge trim details and the like.
  - 3. Typical shaft wall assembly.
  - 4. Typical fire rated assembly and column fireproofing, indicating details of construction same as that used in fire rating test.
- D. Samples:
  - 1. Cornerbead.
  - 2. Edge trim.
  - 3. Control joints.
- E. Test Results:
  - 1. Fire rating test, each fire rating required for each assembly.

**PART 2 - PRODUCTS**

- 2.1 GYPSUM BOARD
- 2.2 GYPSUM SHEATHING BOARD
- 2.3 ACCESSORIES
- 2.4 FASTENERS
- 2.5 FINISHING MATERIALS AND LAMINATING ADHESIVE

**SECTION 09 30 13  
CERAMIC/PORCELAIN TILING**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Samples:
  - 1. Base tile, each type, each color, each size.
  - 2. Mosaic floor tile panels, 225 mm by 225 mm (9 inches by 9 inches), each type, color, size and pattern.
  - 5. Porcelain tile, each type, color, patterns and size.
  - 6. Wall (or wainscot) tile, each color, size and pattern.
  - 7. Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.
- C. Product Data:
  - 1. Ceramic and porcelain tile, marked to show each type, size, and shape required.
  - 4. Dry-set Portland cement mortar and grout.
  - 6. Elastomeric membrane and bond coat.
  - 7. Reinforcing tape.
  - 8. Leveling compound.
  - 9. Latex Portland cement mortar and grout.
  - 10. Commercial Portland cement grout.

- 11. Organic adhesive.
- 12. Slip resistant tile.
- 13. Waterproofing isolation membrane.
- 14. Fasteners.
- D. Certification:
  - 1. Master grade, ANSI A137.1.
  - 2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
    - b. Modified epoxy emulsion.
    - c. Commercial Portland cement grout.
    - e. Dry-set Portland cement mortar and grout.
    - f. Elastomeric membrane and bond coat.
    - g. Reinforcing tape.
    - h. Latex Portland cement mortar and grout.
    - i. Leveling compound.
    - j. Organic adhesive.
    - k. Waterproof isolation membrane.
    - l. Factory mounted tile suitability for application in wet area specified under 2.1, A, 3 with list of successful in-service performance locations.

## **PART 2 - PRODUCTS**

- 2.1 TILE
- 2.4 FASTENERS
- 2.5 GLASS MAT WATER RESISTANT GYPSUM BACKER BOARD
- 2.6 SETTING MATERIALS OR BOND COATS
- 2.7 GROUTING MATERIALS
- 2.8 PATCHING AND LEVELING COMPOUND
- 2.9 MARBLE
- 2.11 WATER
- 2.12 CLEANING COMPOUNDS
- 2.13 FLOOR MORTAR BED REINFORCING
- 2.14 POLYETHYLENE SHEET

## **SECTION 09 51 00 ACOUSTICAL CEILINGS**

### **PART 1 - GENERAL**

#### **1.3 SUBMITTAL**

- B. Samples:
  - 1. Acoustical units, each type, with label indicating conformance to specification requirements, including units specified to match existing.
  - 2. Colored markers for units providing access.
- C. Manufacturer's Literature and Data:
  - 1. Ceiling suspension system, each type, showing complete details of installation.
  - 2. Acoustical units, each type.
- D. Manufacturer's Certificates: Acoustical units, each type, in accordance with specification requirements.

## **PART 2 - PRODUCTS**

- 2.1 METAL SUSPENSION SYSTEM
- 2.3 WIRE
- 2.4 ANCHORS AND INSERTS
- 2.5 CARRYING CHANNELS FOR SECONDARY FRAMING
- 2.7 ACOUSTICAL UNITS
- 2.9 ACCESS IDENTIFICATION



**SECTION 09 65 13  
RESILIENT BASE AND ACCESSORIES**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Manufacturer's Literature and Data:
  - 1. Description of each product.
  - 2. Base and stair material manufacturer's recommendations for adhesives.
  - 3. Application and installation instructions.
- C. Samples:
  - 1. Base: 150 mm (6 inches) long, each type and color.
  - 2. Resilient Stair Treads: 150 mm (6 inches) long.
  - 4. Adhesive: Literature indicating each type.

**PART 2 - PRODUCTS**

- 2.1 GENERAL**
- 2.2 RESILIENT BASE**
- 2.3 RESILIENT TREADS**
- 2.5 PRIMER (FOR CONCRETE FLOORS)**
- 2.6 LEVELING COMPOUND (FOR CONCRETE FLOORS)**
- 2.7 ADHESIVES**

**SECTION 09 65 16.13  
LINOLEUM FLOORING**

**PART 1 - GENERAL**

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each type of floor covering. Include floor covering layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
  - 1. Show details of special patterns.
- C. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9-inch (152-by-230-mm) sections of each color and pattern of floor covering required.
  - 1. Heat-Welding Bead: Include manufacturer's standard-size Samples, but not less than 9 inches (230 mm) long, of each color required.
- D. Heat-Welded Seam Samples: For each floor covering product and welding bead color and pattern combination required; with seam running lengthwise and in center of 6-by-9-inch (152-by-230-mm). Sample applied to rigid backing and prepared by Installer for this Project.
- E. Product Schedule: See Room Finish Schedule in Drawings.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.

**PART 2 - PRODUCTS**

- 2.1 MANUFACTURERS**
- 2.2 PERFORMANCE REQUIREMENTS**
- 2.3 LINOLEUM FLOOR COVERING - WSF**
- 2.4 LINOLEUM FLOOR COVERING - SVT**
- 2.5 LINOLEUM FLOOR COVERING - LVT**
- 2.6 INSTALLATION MATERIALS**

**SECTION 09 67 23  
RESINOUS FLOORING**

**PART 1 - GENERAL**

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.
- B. Samples for Verification: For each resinous system required, 6 inches (150 mm) square, applied to a rigid backing by Installer for this Project.
- C. Product Schedule: For resinous flooring system, RES-1, RES-2. For resinous wall system, RES-W.

### **1.3 INFORMATIONAL SUBMITTALS**

- A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- B. Material Certificates: For each resinous system component, from manufacturer.
- C. Material Test Reports: For each resinous system component.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

### **2.2 MATERIALS**

### **2.3 TROVELED-MORTAR FLAKE RESINOUS FLOORING - RES-2**

### **2.4 LIQUID-APPLIED RESINOUS WALL COATING - RES-W**

### **2.5 HEAVY-DUTY TROVELED-MORTAR RESINOUS FLOORING SYSTEM - RES-1**

### **2.6 ACCESSORIES**

## **SECTION 09 68 00**

### **CARPETING**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- B. Product Data:
  - 1. Manufacturer's catalog data and printed documentation stating physical characteristics, durability, resistance to fading and flame resistance characteristics for each type of carpet material and installation accessory.
  - 2. Manufacturer's printed installation instructions for the carpet, including preparation of installation substrate, seaming techniques and recommended adhesives and tapes.
  - 3. Manufacturer's certificate verifying carpet containing recycled materials include percentage of recycled materials as specified.
- C. Samples:
  - 1. Carpet: "Production Quality" samples of carpet tile, of actual product size, showing quality, pattern and color specified in Section 09 06 00, SCHEDULE FOR FINISHES.
  - 2. Floor Edge Strip (Molding): 150 mm (6 inches) long of each color and type specified.
  - 3. Base Edge Strip (Molding): 150 mm (6 inches) long of each color specified.
- D. Shop Drawings: Installers layout plan showing patterns and cuts for carpet modules.
- E. Maintenance Data: Carpet manufacturer's maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods and cleaning cycles.

## **PART 2 - PRODUCTS**

### **2.1 CARPET**

### **2.2 ADHESIVE AND CONCRETE PRIMER**

### **2.4 EDGE STRIPS (MOLDING)**

### **2.5 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

## **SECTION 09 91 00**

**PAINTING****PART 1 - GENERAL****1.3 SUBMITTALS****B. Manufacturer's Literature and Data:**

Before work is started, or sample panels are prepared, submit manufacturer's literature, the current Master Painters Institute (MPI) "Approved Product List" indicating brand label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI "Approved Product List" where applicable is acceptable.

**C. Sample Panels:**

1. After painters' materials have been approved and before work is started submit sample panels showing each type of finish and color specified.
2. Panels to show color: Composition board, 100 by 250 by 3 mm (4 inch by 10 inch by 1/8 inch).
3. Panel to show transparent finishes: Wood of same species and grain pattern as wood approved for use, 100 by 250 by 3 mm (4 inch by 10 inch face by 1/4 inch) thick minimum, and where both flat and edge grain will be exposed, 250 mm (10 inches) long by sufficient size, 50 by 50 mm (2 by 2 inch) minimum or actual wood member to show complete finish.
4. Attach labels to panel stating the following:
  - a. Federal Specification Number or manufacturers name and product number of paints used.
  - b. Specification code number specified in Section 09 06 00, SCHEDULE FOR FINISHES.
  - c. Product type and color.
  - d. Name of project.
5. Strips showing not less than 50 mm (2 inch) wide strips of undercoats and 100 mm (4 inch) wide strip of finish coat.

**D. Sample of identity markers if used.****E. Manufacturers' Certificates indicating compliance with specified requirements:**

1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
3. Epoxy coating.
4. Intumescent clear coating or fire retardant paint.

**PART 2 - PRODUCTS****2.1 MATERIALS****2.2 PAINT PROPERTIES****2.3 REGULATORY REQUIREMENTS/QUALITY ASSURANCE**

**SECTION 09 96 59**  
**HIGH-BUILD GLAZED COATINGS**

**PART 1 - GENERAL****1.3 SUBMITTALS****B. Samples:**

1. Material samples, six inches square, showing the number of coats of each coating material on each substrate to which the material is to be applied. Apply coating to the samples in a setback procedure,

- leaving exposed a portion of the substrate and subsequent portions of each coat.
- 2. Color samples, minimum three inches by five inches of each color and texture (Class) specified.
- C. Certificates:
  - 1. Certifying that the coating complies with requirements of this specification, including resistance to abrasion and resistance to perspiration.
  - 2. Certifying that the coating supplied is the same, with manufacturing tolerances, as the coating tested.
- D. Manufacturer's Literature and Data:
  - Literature and data describing the coating material to be furnished.
  - Printed application for instructions for each substrate.
- E. Test Reports: Reports of tests certifying compliance with requirement specified.

## **PART 2 - PRODUCTS**

### **2.1 GLAZED COATING**

## **SECTION 10 14 00 SIGNAGE**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- B. Samples: Sign panels and frames, with letters and symbols, each type. Submit 2 sets. One set of samples will be retained by the COR, other returned to Contractor.
  - 1. Sign Panel, 200 mm x 250 mm (8 inches x 10 inches), with letters.
  - 2. Color samples of each color, 150 mm x 150 mm (6 inches x 6 inches. Show anticipated range of color and texture.
  - 3. Sample of typeface, arrow and symbols in a typical full size layout.
- C. Manufacturer's Literature:
  - 1. Showing the methods and procedures proposed for the concealed anchorage of the signage system to each surface type.
  - 2. Manufacturer's printed specifications, anchorage details, installation and maintenance instructions.
- D. Samples: Sign location plan, showing location, type and total number of signs required.
- E. Shop Drawings: Scaled for manufacture and fabrication of sign types. Identify materials, show joints, welds, anchorage, accessory items, mounting and finishes.
- F. Full size layout patterns for dimensional letters.

## **PART 2 - PRODUCTS**

### **2.2 PRODUCTS**

### **2.3 SIGN STANDARDS**

### **2.4 SIGN TYPES**

## **SECTION 10 21 13 TOILET COMPARTMENTS**

## **PART 1 - GENERAL**

### **1.3 SUBMITTALS**

- B. Samples: 75 mm (three-inch) square color samples of manufacturer's color range for solid polyethylene partition material.
- C. Manufacturer's Literature and Data: Specified items indicating all hardware and fittings, material, finish, and latching.
- D. Shop Drawings: Construction details at 1/2 scale, showing installation details, anchoring and leveling devices.

- E. Manufacturer's certificate, attesting that zinc-coatings conform to specified requirements.

**PART 2 - PRODUCTS**

**2.1 TOILET PARTITIONS:**

**2.2 FASTENERS**

**SECTION 10 26 00  
WALL AND DOOR PROTECTION**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Shop Drawings: Show design and installation details.
- C. Manufacturer's Literature and Data:
  - 1. Handrail/Wall Guard Combinations.
  - 3. Corner Guards.
  - 5. High Impact Wall covering.
- D. Test Report: Showing that resilient material complies with specified fire and safety code requirements.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**2.2 CORNER GUARDS**

**2.3 WALL GUARDS AND HANDRAILS**

**2.5 HIGH IMPACT WALL COVERING**

**2.6 FASTENERS AND ANCHORS**

**2.7 FINISH**

**SECTION 10 28 00  
TOILET, BATH, AND LAUNDRY ACCESSORIES**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Shop Drawings:
  - 1. Each product specified.
  - 2. Paper towel dispenser.
  - 3. Metal framed mirrors, showing shelf where required, fillers, and design and installation of units when installed on ceramic tile wainscots and offset surfaces.
  - 4. Shower Curtain rods, showing required length for each location.
  - 5. Grab bars, showing design and each different type of anchorage.
  - 8. Show material and finish, size of members, and details of construction, installation and anchorage of mop racks.
- C. Samples:
  - 1. One of each type of accessory specified.
  - 2. After approval, samples may be used in the work.
- D. Manufacturer's Literature and Data:
  - 1. All accessories specified.
  - 2. Show type of material, gages or metal thickness in inches, finishes, and when required, capacity of accessories.
  - 3. Show working operations of spindle for toilet tissue dispensers.
  - 4. Mop racks.
- E. Manufacturer's Certificates:
  - 1. Attesting that soap dispensers are fabricated of material that will not be affected by liquid soap or aseptic detergents, PhisoHex and solutions containing hexachlorophene.
  - 2. Anodized finish as specified.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**2.2 FASTENERS**

- 2.3 FINISH
- 2.4 FABRICATION - GENERAL
- 2.5 PAPER TOWEL DISPENSERS
- 2.8 TOILET TISSUE DISPENSERS
- 2.9 GRAB BARS
- 2.11 CLOTHES HOOKS-ROBE OR COAT
- 2.13 METAL FRAMED MIRRORS
- 2.18 MOP RACKS

**SECTION 10 44 13  
FIRE EXTINGUISHER CABINETS**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Manufacturer's Literature and Data: Fire extinguisher cabinet including installation instruction and rough opening required.

**PART 2 - PRODUCTS**

- 2.1 FIRE EXTINGUISHER CABINET
- 2.2 FABRICATION
- 2.3 FINISH

**SECTION 10 51 13  
METAL LOCKERS**

**PART 1 - GENERAL**

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.
- B. Shop Drawings: For metal lockers. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show locker trim and accessories.
  - 2. Include locker identification system and numbering sequence.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For metal lockers, in manufacturer's standard sizes.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Warranty: Sample of special warranty.

**1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.
  - 1. Full-size units of the following metal locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:
    - b. Identification plates.
    - c. Hooks.

**PART 2 - PRODUCTS**

- 2.1 MATERIALS
- 2.2 STANDARD METAL LOCKERS
- 2.9 FABRICATION
- 2.10 STEEL SHEET FINISHES
- 2.11 STAINLESS-STEEL FINISHES

**SECTION 10 73 13  
AWNINGS**

**PART 1 - GENERAL****1.2 SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include styles, material descriptions, construction details, fabrication details, dimensions of individual components and profiles, hardware, fittings, mounting accessories, features, and finishes for awnings.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, mounting heights, and attachment details.
  - 2. Detail fabrication and assembly of awnings.
  - 3. Show locations for blocking, reinforcement, and supplementary structural support.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Samples for Verification: For the following:
  - 1. Frame Finish: Not less than 6-inch (150-mm) lengths.
- E. Product Schedule: For awnings. Use same designations indicated on Drawings.
- F. Delegated-Design Submittal: For awnings.
- G. Operation and Maintenance Data: For awnings to include in operation and maintenance manuals.

**PART 2 - PRODUCTS****2.2 PERFORMANCE REQUIREMENTS****2.3 AWNING FRAMES****SECTION 11 13 10****DOCK LEVELERS****PART 1 - GENERAL****1.3 SUBMITTALS**

- A. Submit the following in accordance with Section 01 33 23 SUBMITTAL PROCEDURES:
  - 1. Shop Drawings: Detail Drawings
  - 2. Product Data
    - a. Loading Dock Levelers
    - b. Dock Bumpers
  - 3. Samples: Fastening Materials
    - c. Fastening Hardware
    - d. Dock Bumpers
    - e. Rubber
    - f. Rubberized Fabric
  - 4. Certificates
    - a. Fastening Materials
    - b. Rubberized Fabric
    - d. Hardware Items
  - 5. Operation and Maintenance Data
    - a. Loading Dock Levelers
  - 6. Closeout Submittals: Record Drawings

**PART 2 - PRODUCTS****2.1 MATERIALS****2.2 LOADING DOCK LEVELERS****2.3 OPERATION****2.4 CONSTRUCTION AND MATERIALS****2.5 ELECTRO-HYDRAULIC SYSTEM**

**2.6 ELECTRICAL REQUIREMENTS**  
**2.7 ACCESSORIES**

**SECTION 11 13 16.13**  
**LOADING DOCK SEALS**

**PART 1 - GENERAL**

**1.3 SUBMITTALS:**

- B. Shop and Erection Drawings: Complete including dimensions, projection, range of trucks to be serviced and any other information necessary for the proper installation and operation of the unit.
- C. Submit Operation and Maintenance manuals for dock seals as part of project closeout documentation required.

**PART 2 - PRODUCTS**

- 2.1 SIDE PADS**
- 2.2 HEAD CURTAIN**
- 2.3 FOAM**

**SECTION 11 41 21**  
**WALK-IN COOLERS AND FREEZERS**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- B. Manufacturer's Literature and Data:
  - 1. Walk-in units, including assembly instructions.
  - 2. Condensing units, with mounting rack where required.
  - 3. Unit coolers.
  - 4. Temperature controls and alarms.
  - 5. Diagrams and details of piping, wiring and controls.
- C. Operating Test Data.
- D. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

**PART 2 - PRODUCTS**

- 2.1 WALK-IN REFRIGERATOR/FREEZER CONSTRUCTION**
- 2.2 CONDENSING UNITS**
- 2.3 UNIT COOLERS**
- 2.4 ROOM TEMPERATURE CONTROL**
- 2.5 ROOM TEMPERATURE ALARMS**
- 2.6 PIPING, PIPE INSULATION, AND REFRIGERANT AND OIL CHARGES**
- 2.7 EQUIPMENT IDENTIFICATION REQUIREMENTS**

**SECTION 11 44 00**  
**FOOD COOKING EQUIPMENT**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- B. Manufacturer's Literature and Data:
  - 1. Include manufacturer's address and telephone number.
  - 2. Include catalog or model numbers and illustrations and descriptions of cooking equipment.
  - 3. Proof of appliances being Energy Star qualified where applicable.
- C. Installation Drawings: Show dimensions, details of installation, coordination with plumbing and electrical work, and other work required for a complete installation.
- D. Operating Instructions: In accordance with requirements in Section 01 00 00, GENERAL REQUIREMENTS.

**PART 2 - PRODUCTS**

- 2.8 KETTLES, STEAM, STATIONARY, GAS**



- 2.11 TABLE-TOP KETTLES, TILTING, SELF-CONTAINED
- 2.12 STEAMERS, PRESSURELESS CONVECTION, COUNTERTOP, ELECTRIC
- 2.15 OVENS, CONVEYOR

**SECTION 11 48 00  
CLEANING AND DISPOSAL EQUIPMENT**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- B. Manufacturer's Literature and Data:
  - 1. Include manufacturer's address and telephone number.
  - 2. Include catalog or model numbers, and illustrations and descriptions of ware-washing equipment and accessories.
  - 3. Proof of appliance being Energy Star qualified.
- C. Installation Drawings: Show dimensions; method of assembly; and details of installation, adjoining construction, coordination with plumbing and electrical work, and other work required for a complete installation.
- D. Operating Instructions: Comply with requirements in Section 00 72 00, GENERAL CONDITIONS.

**PART 2 - PRODUCTS**

**2.5 FLIGHT-TYPE DISH MACHINES, RACKLESS CONVEYOR, ELECTRIC**

**SECTION 12 36 00  
COUNTERTOPS**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

- B. Shop Drawings
  - 1. Show dimensions of section and method of assembly.
  - 2. Show details of construction at 1/2 scale.
- C. Samples:
  - 1. 150 mm (6 inch) square samples each top.
  - 2. Front edge, back splash, end splash and core with surface material and booking.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**2.10 COUNTERTOPS**

**SECTION 13 05 41  
SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS**

**PART 1 - GENERAL**

**1.4 SUBMITTALS:**

- A. Submit a coordinated set of equipment anchorage drawings prior to installation including:
  - 1. Description, layout, and location of items to be anchored or braced with anchorage or brace points noted and dimensioned.
  - 2. Details of anchorage or bracing at large scale with all members, parts brackets shown, together with all connections, bolts, welds etc. clearly identified and specified.
  - 3. Numerical value of design seismic brace loads.
  - 4. For expansion bolts, include design load and capacity if different from those specified.
- B. Submit prior to installation, a coordinated set of bracing drawings for seismic protection of piping, with data identifying the various support-to-structure connections and seismic bracing structural connections, include:

1. Single-line piping diagrams on a floor-by-floor basis. Show all suspended piping for a given floor on the same plain.
  2. Type of pipe (Copper, steel, cast iron, insulated, non-insulated, etc.).
  3. Pipe contents.
  4. Structural framing.
  5. Location of all gravity load pipe supports and spacing requirements.
  6. Numerical value of gravity load reactions.
  7. Location of all seismic bracing.
  8. Numerical value of applied seismic brace loads.
  9. Type of connection (Vertical support, vertical support with seismic brace etc.).
  10. Seismic brace reaction type (tension or compression): Details illustrating all support and bracing components, methods of connections, and specific anchors to be used.
- C. Submit prior to installation, bracing drawings for seismic protection of suspended ductwork and suspended electrical and communication cables, include:
1. Details illustrating all support and bracing components, methods of connection, and specific anchors to be used.
  2. Numerical value of applied gravity and seismic loads and seismic loads acting on support and bracing components.
  3. Maximum spacing of hangers and bracing.
  4. Seal of registered structural engineer responsible for design.
- D. Submit design calculations prepared and sealed by the registered structural engineer specified above in paragraph 1.3A.
- E. Submit for concrete anchors, the appropriate ICBC evaluation reports, OSHPD pre-approvals, or lab test reports verifying compliance with OSHPD Interpretation of Regulations 28-6.

## **PART 2 - PRODUCTS**

### **2.1 STEEL**

### **2.2 CAST-IN-PLACE CONCRETE**

## **SECTION 13 34 19 METAL BUILDING SYSTEMS**

## **PART 1 - GENERAL**

### **1.5 SUBMITTALS**

- B. Samples: Samples for all available colors on 4 inch square pieces of metal panel sheet for selection. Wall and roof panels, 600 mm (24-inch) wide by 300 mm (12 inch) high sections, with factory finish in chosen color(s). Fasteners for panels.
- C. Certificates:
1. Stating that the zinc coating on steel panels is the specified thickness.
  2. Stating that the thermal values of the roof and wall panels with insulation meet the specified requirements.
  3. Indicating manufacturers and installers meet qualifications specified.
  4. Certificate test reports confirming compliance's with specified bullet resistive rating.
- D. Manufacturer's Literature and Data:
1. Metal Panels
  2. Insulation
  3. Sealing materials
  4. Steel doors, door frames and hardware interlocking thresholds
  5. Windows

- E. Shop Drawings: Shop drawings, erection drawings and erection manuals showing complete erection layouts, installation instructions, and details of connections. Details and layouts shall show the steel framing location, lengths, and markings of panels and other component parts to correspond with sequence and procedure for erection. Shop drawings shall show connections with adjoining work.
- F. Structural Design Analysis:
  - 1. Furnish complete structural design analysis for all structural components of the prefabricated metal buildings.
  - 2. Provide manufacturer load tables indicating the selected panel material, configuration and thickness meets the design requirements for the spans shown.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

### **2.2 FABRICATION**

### **2.3 FACTORY FINISH AND PAINTING**

### **2.3 BUILDING ACCESSORIES**

### **2.4 ELECTRICAL UTILITIES**

## **SECTION 13 34 23 PRE-FABRICATED WALKWAY COVERS**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer registered in Pennsylvania responsible for their preparation.
- C. Samples for Initial Selection: For extruded aluminum covered walkway with factory-applied clear anodized finish.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for covered walkway performance.
- E. Maintenance Data: For covered walkway to include in maintenance manuals.
- F. Warranties: Special warranties specified in this Section.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

### **2.2 PREFABRICATED COVERED WALKWAY SYSTEMS, GENERAL**

### **2.3 FABRICATION**

### **2.4 FINISHES**

## **SECTION 13 49 00 RADIATION PROTECTION**

## **PART 1 - GENERAL**

### **1.5 SUBMITTALS**

- B. Shop Drawings: Each lead radiation shielding item specified showing thickness of lead, details of construction and installation.
- C. Samples:
  - 1. Lead lined gypsum wallboard.
  - 2. Bottom corner section of lead lined door, 300 mm (12 inches) square showing bottom and side edge strips.

- D. Manufacturers' Literature and Data: Each lead radiation shielding item specified.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

**2.2 FABRICATION**

**SECTION 14 24 00  
HYDRAULIC ELEVATORS**

**PART 1 - GENERAL**

**1.5 SUBMITTALS**

- B. Before execution of work, furnish information to evidence full compliance with contract requirements for proposed items. Such information shall include, as required: Manufacturer's Name, Trade Names, Model or Catalog Number, and corresponding specification reference (Federal or project specification number and paragraph). All submitted drawings and related elevator material shall be forwarded to the COR.
- C. Shop Drawings:
  - 1. Product data from manufacturer for access controls and interface with existing elevator controls.

**PART 2 - PRODUCTS**

**2.11 THREE-STOP CONTROLLED ACCESS AUTOMATIC OPERATION**

**SECTION 21 05 11  
COMMON WORK RESULTS FOR FIRE SUPPRESSION**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data: Submit under the pertinent section rather than under this section.
  - 1. Equipment and materials identification.
  - 2. Fire-stopping materials.
  - 3. Hangers, inserts, supports and bracing. Provide load calculations for variable spring and constant support hangers.
  - 4. Wall, floor, and ceiling plates.
- C. Coordination Drawings: Provide detailed layout drawings of all piping systems. Provide details of the following.
  - 1. Mechanical equipment rooms.
  - 2. Interstitial space.
  - 3. Hangers, inserts, supports, and bracing.
  - 4. Pipe sleeves.
  - 5. Equipment penetrations of floors, walls, ceilings, or roofs.
- D. Maintenance Data and Operating Instructions:

1. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS, Article, INSTRUCTIONS, for systems and equipment.
2. Provide a listing of recommended replacement parts for keeping in stock supply, including sources of supply, for equipment. Include in the listing belts for equipment.

## **PART 2 - PRODUCTS**

### **2.1 LIFTING ATTACHMENTS**

### **2.2 EQUIPMENT AND MATERIALS IDENTIFICATION**

21 05 11 - 2.5 FIRESTOPPING

### **2.8 TOOLS AND LUBRICANTS**

### **2.9 WALL, FLOOR AND CEILING PLATES**

## **SECTION 21 13 13**

### **WET-PIPE SPRINKLER SYSTEMS**

## **PART 1 - GENERAL**

### **1.3 QUALITY ASSURANCE**

- A. Installer Reliability: The installer shall possess a valid fire sprinkler contractor's license. The installer shall have been actively and successfully engaged in the installation of commercial automatic sprinkler systems for the past ten years.
- B. Materials and Equipment: All equipment and devices shall be of a make and type listed by UL and approved by FM, or other nationally recognized testing laboratory for the specific purpose for which it is used. All materials, devices, and equipment shall be approved by the VA.
- C. Submittals: Submit as one package in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Prepare detailed working drawings that are signed by a NICET Level III or Level IV Sprinkler Technician or stamped by a Registered Professional Engineer practicing in the field of Fire Protection Engineering. As Government review is for technical adequacy only, the installer remains responsible for correcting any conflicts with other trades and building construction that arise during installation. Partial submittals will not be accepted. Material submittals shall be approved prior to the purchase or delivery to the job site. Suitably bind submittals in notebooks or binders and provide index referencing the appropriate specification

section. Submittals shall include, but not be limited to, the following:

1. Qualifications:

- a. Provide a copy of the installing contractors fire sprinkler contractors license.
- b. Provide a copy of the NICET certification for the NICET Level III or Level IV Sprinkler Technician who prepared and signed the detailed working drawings unless the drawings are stamped by a Registered Professional Engineer practicing in the field of Fire Protection Engineering.

2. Drawings: Submit detailed 1:100 (1/8 inch) scale (minimum) working drawings conforming to NFPA 13. Include a site plan showing the piping to the water supply test location.

3. Manufacturers Data Sheets:

- a. For backflow preventers, provide flow test curves from UL, FM, or the Foundation for Hydraulic Research and Cross-Connection Control to verify pressure loss calculations.
- b. Provide for materials and equipment proposed for use on the system. Include listing information and installation instructions in data sheets. Where data sheet describes items in addition to that item being submitted, clearly identify proposed item on the sheet.

4. Calculation Sheets: Submit hydraulic calculation sheets in tabular form conforming to the requirements and recommendations of NFPA 13.

5. Final Document Submittals: Provide as-built drawings, testing and maintenance instructions in accordance with the requirements in Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

Submittals shall include, but not be limited to, the following:

- a. One complete set of reproducible as-built drawings showing the installed system with the specific interconnections between the waterflow switch or pressure switch and the fire alarm equipment.
- b. Complete, simple, understandable, step-by-step, testing instructions giving recommended and required testing frequency of all equipment, methods for testing all equipment, and a complete trouble shooting manual. Provide maintenance instructions on replacing any components of the system including internal parts, periodic cleaning and adjustment of the equipment and components

with information as to the address and telephone number of both the manufacturer and the local supplier of each item.

- c. Material and Testing Certificate: Upon completion of the sprinkler system installation or any partial section of the system, including testing and flushing, provide a copy of a completed Material and Testing Certificate as indicated in NFPA 13.
  - d. Certificates shall document all parts of the installation.
  - e. Instruction Manual: Provide one copy of the instruction manual covering the system in a flexible protective cover and mount in an accessible location adjacent to the riser.
- D. Design Basis Information: Provide design, materials, equipment, installation, inspection, and testing of the automatic sprinkler system in accordance with the requirements of NFPA 13. Recommendations in appendices shall be treated as requirements.
- 1. Perform hydraulic calculations in accordance with NFPA 13 utilizing the Area/Density method. Do not restrict design area reductions permitted for using quick response sprinklers throughout by the required use of standard response sprinklers in the areas identified in this section.
  - 2. Sprinkler Protection: To determining spacing and sizing, apply the following coverage classifications:
    - a. Light Hazard Occupancies: Patient care, treatment, and customary access areas.
    - b. Ordinary Hazard Group 1 Occupancies: Laboratories, Mechanical Equipment Rooms, Transformer Rooms, Electrical Switchgear Rooms, Electric Closets, Elevator Shafts, Elevator Machine Rooms, and Storage Rooms.
    - c. Request clarification from the Government for any hazard classification not identified.
  - 3. Hydraulic Calculations: Calculated demand including hose stream requirements shall fall no less than 10 percent below the available water supply curve.
  - 5. Zoning:
    - a. For each sprinkler zone provide a control valve, flow switch and a test and drain assembly with pressure gauge.
    - b. Sprinkler zones shall conform to the smoke barrier zones shown on the drawings.

- c. Provide seismic protection in accordance with NFPA 13.

## **PART 2 - PRODUCTS**

- 2.1 PIPING & FITTINGS**
- 2.2 VALVES**
- 2.3 FIRE DEPARTMENT SIAMESE CONNECTION**
- 2.4 SPRINKLERS**
- 2.5 SPRINKLER CABINET**
- 2.6 IDENTIFICATION SIGNS/HYDRAULIC PLACARDS**
- 2.7 SWITCHES:**
- 2.9 GAUGES**
- 2.10 PIPE HANGERS AND SUPPORTS**
- 2.11 WALL, FLOOR AND CEILING PLATES**

## **SECTION 22 05 11 COMMON WORK RESULTS FOR PLUMBING**

### **PART 1 - GENERAL**

#### **1.4 SUBMITTALS**

- A. Submittals shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 22 05 11, COMMON WORK RESULTS FOR PLUMBING", with applicable paragraph identification.
- C. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.
- D. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.
- E. Prior to submitting shop drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.
- F. Upon request by Government, lists of previous installations for selected items of equipment shall be provided. Contact persons who



will serve as references, with telephone numbers and e-mail addresses shall be submitted with the references.

- G. Manufacturer's Literature and Data: Manufacturer's literature shall be submitted under the pertinent section rather than under this section.
  - 1. Electric motor data and variable speed drive data shall be submitted with the driven equipment.
  - 2. Equipment and materials identification.
  - 3. Fire stopping materials.
  - 4. Hangers, inserts, supports and bracing. Provide load calculations for variable spring and constant support hangers.
  - 5. Wall, floor, and ceiling plates.
- H. Coordination Drawings: Complete consolidated and coordinated layout drawings shall be submitted for all new systems, and for existing systems that are in the same areas. The drawings shall include plan views, elevations and sections of all systems and shall be on a scale of not less than 1:32 (3/8-inch equal to one foot). Clearly identify and dimension the proposed locations of the principal items of equipment. The drawings shall clearly show the proposed location and adequate clearance for all equipment, piping, pumps, valves and other items. All valves, trap primer valves, water hammer arrestors, strainers, and equipment requiring service shall be provided with an access door sized for the complete removal of plumbing device, component, or equipment. Equipment foundations shall not be installed until equipment or piping until layout drawings have been approved. Detailed layout drawings shall be provided for all piping systems. In addition, details of the following shall be provided.
  - 1. Mechanical equipment rooms.
  - 2. Interstitial space.
  - 3. Hangers, inserts, supports, and bracing.
  - 4. Pipe sleeves.
  - 5. Equipment penetrations of floors, walls, ceilings, or roofs.
- I. Maintenance Data and Operating Instructions:
  - 1. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS, Article, INSTRUCTIONS, for systems and equipment.
  - 2. Listing of recommended replacement parts for keeping in stock supply, including sources of supply, for equipment shall be provided.

3. The listing shall include belts for equipment: Belt manufacturer, model number, size and style, and distinguished whether of multiple belt sets.

**PART 2 - PRODUCTS**

**2.1 FACTORY-ASSEMBLED PRODUCTS**

**2.2 COMPATIBILITY OF RELATED EQUIPMENT**

**2.3 SAFETY GUARDS**

**2.4 LIFTING ATTACHMENTS**

**2.5 ELECTRIC MOTORS, MOTOR CONTROL, CONTROL WIRING**

**2.6 VARIABLE SPEED MOTOR CONTROLLERS**

**2.7 EQUIPMENT AND MATERIALS IDENTIFICATION**

22 05 11 - 2.8 FIRE STOPPING

**2.9 GALVANIZED REPAIR COMPOUND**

**2.10 PIPE AND EQUIPMENT SUPPORTS AND RESTRAINTS**

22 05 11 - 2.11 PIPE PENETRATIONS

**2.12 TOOLS AND LUBRICANTS**

22 05 11 - 2.13 WALL, FLOOR AND CEILING PLATES

**2.14 ASBESTOS**

**SECTION 22 05 19**

**METERS AND GAGES FOR PLUMBING PIPING**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. Not Used.
2. Pressure Gages.
3. Product certificates for each type of meter and gauge

C. Operations and Maintenance manual shall include:

1. Troubleshooting and preventive maintenance guidelines
2. Spare parts information.

**PART 2 - PRODUCTS**

**2.7 PRESSURE GAGES FOR WATER AND SEWAGE USAGE**

**SECTION 22 05 23**

**GENERAL-DUTY VALVES FOR PLUMBING PIPING**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. Valves.
2. Backflow Preventers.
4. Backwater Valves
5. Thermostatic Mixing Valves
6. All items listed in Part 2 - Products.

**PART 2 - PRODUCTS**

22 05 23 - 2.1 VALVES

**2.4 BACKFLOW PREVENTERS**

**2.5 THERMOSTATIC MASTER MIXING VALVECS**

**2.6 THERMOSTATIC POINT OF USE MIXING VALVES**

**SECTION 22 07 11  
PLUMBING INSULATION**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

B. Shop Drawings:

1. All information, clearly presented, shall be included to determine compliance with drawings and specifications and ASTM, federal and military specifications.
  - a. Insulation materials: Specify each type used and state surface burning characteristics.
  - b. Insulation facings and jackets: Each type used.
  - c. Insulation accessory materials: Each type used.
  - d. Manufacturer's installation and fitting fabrication instructions for flexible unicellular insulation.
  - e. Make reference to applicable specification paragraph numbers for coordination.

**PART 2 - PRODUCTS**

22 07 11 - 2.1 MINERAL FIBER OR FIBER GLASS

**2.2 FLEXIBLE ELASTOMERIC CELLULAR THERMAL**

**2.3 INSULATION FACINGS AND JACKETS**

**2.4 FIRESTOPPING MATERIAL**

**2.5 FLAME AND SMOKE**

**SECTION 22 11 00  
FACILITY WATER DISTRIBUTION**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. All items listed in Part 2 - Products.

**PART 2 - PRODUCTS**

**2.1 UNDERGROUND WATER SERVICE CONNECTIONS TO BUILDINGS**

**2.2 ABOVE GROUND (INTERIOR) WATER PIPING**

**2.3 EXPOSED WATER PIPING**

**2.5 TRAP PRIMER WATER PIPING**

**2.6 STRAINERS**

**2.7 DIELECTRIC FITTINGS**

**2.8 STERILIZATION CHEMICALS**

**2.9 WATER HAMMER ARRESTER**

SECTION 22 11 23  
DOMESTIC WATER PUMPS

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. Pump:
  - a. Manufacturer and model.
  - b. Operating speed.
  - c. Capacity.
  - d. Characteristic performance curves.
2. Motor:
  - a. Manufacturer and type.
  - b. Speed.
  - c. Current Characteristics.
  - d. Efficiency.

C. Certificate of shop test for domestic water booster system. Provide certified performance curves.

D. Certified copies of all the factory and construction site test data sheets and reports.

E. Complete operating and maintenance manuals including wiring diagrams, technical data sheets and information for ordering replaceable parts:

1. Include complete list indicating all components of the systems.
2. Include complete diagrams of the internal wiring for each item of equipment.

3. Diagrams shall have their terminals identified to facilitate installation, operation and maintenance.

**PART 2 - PRODUCTS**

**2.2 INLINE HOT WATER RECIRCULATING PUMP**

**SECTION 22 13 00  
FACILITY SANITARY AND VENT PIPING**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. Piping.
2. Floor Drains.
3. Grease Removal Unit.
4. Cleanouts.
5. All items listed in Part 2 - Products.

- C. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane or the floor drain.

**PART 2 - PRODUCTS**

**22 13 00 - 2.1 SANITARY WASTE, DRAIN, AND VENT PIPING**

**2.2 EXPOSED WASTE PIPING**

**2.3 SPECIALTY PIPE FITTINGS**

**2.4 CLEANOUTS**

**2.5 FLOOR DRAINS**

**22 13 00 - 2.6 TRAPS**

**2.7 TRAP SEAL PRIMER VALVES AND TRAP SEAL PRIMER SYSTEMS**

**2.9 WATERPROOFING**

**SECTION 22 13 23  
SANITARY WASTE INTERCEPTORS**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. For each type of interceptor indicated, the submittal shall include materials of fabrication, dimensions, rated capacities, retention capacities, operating characteristics, size and location of each pipe connection, furnished specialties, and accessories.

- C. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane or the floor drain shall be submitted.

**PART 2 - PRODUCTS**

**2.1 LINT INTERCEPTOR (LT-1)**

**2.2 GREASE INTERCEPTOR (GT-1)**

SECTION 22 13 33  
PACKAGED, SUBMERSIBLE SEWERAGE PUMP UNITS

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

B. Manufacturer's Literature and Data:

- 1. Pump:
  - a. Manufacturer and model.
  - b. Operating speed.
  - c. Capacity.
  - d. Characteristic performance curves.
- 2. Motor:
  - a. Manufacturer, frame and type.
  - b. Speed.
  - c. Current Characteristics and W (HP).
  - d. Efficiency.

- C. Certified copies of all the factory and construction site test data sheets and reports.
- D. Complete operating and maintenance manuals including wiring diagrams, technical data sheets and information for ordering replaceable parts:
  - 1. Include complete list indicating all components of the system.
  - 2. Include complete diagrams of the internal wiring for each item of equipment.
  - 3. Diagrams shall have their terminals identified to facilitate installation, operation and maintenance.

**PART 2 - PRODUCTS**

**2.1 SUBMERSIBLE SEWERAGE PUMP UNITS**

SECTION 22 14 00  
FACILITY STORM DRAINAGE

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. Piping.
2. Roof Drains.
3. Cleanouts.
4. All items listed in Part 2 - Products.

C. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane.

## **PART 2 - PRODUCTS**

### **2.1 STORM WATER DRAIN PIPING**

### **2.3 SPECIALTY PIPE FITTINGS**

### **2.4 CLEANOUTS**

### **2.5 ROOF DRAINS AND CONNECTIONS**

### **2.6 WATERPROOFING**

## **SECTION 22 34 00 FUEL-FIRED DOMESTIC WATER HEATERS**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS:**

- A. Submit manufacturer's literature and data pertaining to the water heater in properly bound package, in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Include the following as a minimum:
  1. Water Heaters.
  2. Pressure and Temperature Relief Valves.
  4. Thermometers.
  5. Pressure Gages.
  6. Vacuum Breakers.
- B. For each natural gas fired domestic hot water heater type and size, the following characteristics shall be submitted:
  1. Rated Capacities
  2. Operating characteristics
  3. Electrical characteristics
  4. Furnished specialties and accessories
  5. A form U-1 or other documentation stating compliance with the ASME Boiler and Pressure Vessel code.
- C. Shop drawings shall include wiring diagrams for power, signal and control functions.
- D. Seismic qualification certificates shall be submitted that details equipment anchorage components identifies equipment center of gravity

with mounting and anchorage provisions, and whether the seismic qualification certificate is based on an actual test or calculations.

E. The domestic water heater shall be certified and labeled by a testing agency.

## **PART 2 - PRODUCTS**

### **2.1 INSTANTANEOUS, TANKLESS, GAS WATER HEATERS:**

### **2.5 COMBINATION TEMPERATURE AND PRESSURE RELIEF VALVES**

### **2.6 GAS SHUTOFF VALVES**

### **2.7 GAS PRESSURE REGULATORS**

### **2.8 AUTOMATIC GAS VALVES**

### **2.9 THERMOMETERS**

## **SECTION 22 40 00 PLUMBING FIXTURES**

## **PART 1 - GENERAL**

### **1.3 SUBMITTALS**

B. Submit plumbing fixture information in an assembled brochure, showing cuts and full detailed description of each fixture.

22 40 00 - 2.1 STAINLESS STEEL SINKS AND EMERGENCY EYEWASH

22 40 00 - 2.2 STOPS

22 40 00 - 2.3 ESCUTHEONS

22 40 00 - 2.4 LAMINAR FLOW CONTROL DEVICE

### **2.5 CARRIERS**

### **2.6 WATER CLOSETS**

### **2.7 URINALS**

### **2.9 LAVATORIES**

### **2.10 SINKS AND LAUNDRY TUBS**

### **2.11 DISPENSER, DRINKING WATER**

### **2.12 SHOWER BATH FIXTURE**

### **2.14 HYDRANT, HOSE BIBB AND MISCELLANEOUS DEVICES**

## **SECTION 22 11 01 COPPER SILVER IONIZATION**

## **PART 1 - GENERAL**

### **1.3 SUBMITTALS**

- A. Equipment Data: Attached "Equipment Data Sheet" to be completed.
- B. Shop Drawings: Include plans, elevations, sections, details, and connections to piping systems as appropriate.
- C. Operation and Maintenance Data: Include operation and maintenance manuals.
- D. Warranty: Include any warranties.
- E. Maintenance: Include maintenance service agreement if available.

## **PART 2 - PRODUCTS**



- 2.1 COPPER SILVER IONIZATION SYSTEM
- 2.3 TESTING SETS
- 2.4 QUALITY CONTROL

**SECTION 23 05 11  
COMMON WORK RESULTS FOR HVAC**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- B. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.
- C. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.
- D. Prior to submitting shop drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.
- E. Submittals and shop drawings for interdependent items, containing applicable descriptive information, shall be furnished together and complete in a group. Coordinate and properly integrate materials and equipment in each group to provide a completely compatible and efficient.
- H. Layout Drawings:
  - 1. Submit complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same areas. Refer to Section 00 72 00, GENERAL CONDITIONS, Article, SUBCONTRACTS AND WORK COORDINATION.
  - 2. The drawings shall include plan views, elevations and sections of all systems and shall be on a scale of not less than 1:32 (3/8-inch equal to one foot). Clearly identify and dimension the proposed locations of the principal items of equipment. The drawings shall clearly show locations and adequate clearance for all equipment, piping, valves, control panels and other items. Show the access means for all items requiring access for operations and maintenance. Provide detailed layout drawings of all piping and duct systems.

3. Do not install equipment foundations, equipment or piping until layout drawings have been approved.
4. In addition, for HVAC systems, provide details of the following:
  - a. Mechanical equipment rooms.
  - b. Not Used
  - c. Hangers, inserts, supports, and bracing.
  - d. Pipe sleeves.
  - e. Duct or equipment penetrations of floors, walls, ceilings, or roofs.
- I. Manufacturer's Literature and Data: Submit under the pertinent section rather than under this section.
  1. Submit belt drive with the driven equipment. Submit selection data for specific drives when requested by the COR.
  2. Submit electric motor data and variable speed drive data with the driven equipment.
  3. Equipment and materials identification.
  4. Fire-stopping materials.
  5. Hangers, inserts, supports and bracing. Provide load calculations for variable spring and constant support hangers.
  6. Wall, floor, and ceiling plates.
- J. HVAC Maintenance Data and Operating Instructions:
  1. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS, Article, INSTRUCTIONS, for systems and equipment.
  2. Provide a listing of recommended replacement parts for keeping in stock supply, including sources of supply, for equipment. Include in the listing belts for equipment: Belt manufacturer, model number, size and style, and distinguished whether of multiple belt sets.
- K. Provide copies of approved HVAC equipment submittals to the Testing, Adjusting and Balancing Subcontractor.

## **PART 2 - PRODUCTS**

- 23 05 11 - 2.1 FACTORY-ASSEMBLED PRODUCTS
- 23 05 11 - 2.2 COMPATIBILITY OF RELATED EQUIPMENT
- 23 05 11 - 2.3 BELT DRIVES
- 23 05 11 - 2.4 DRIVE GUARDS
- 23 05 11 - 2.5 LIFTING ATTACHMENTS
- 23 05 11 - 2.6 ELECTRIC MOTORS
- 23 05 11 - 2.7 VARIABLE SPEED MOTOR CONTROLLERS

- 23 05 11 - 2.8 EQUIPMENT AND MATERIALS IDENTIFICATION
- 23 05 11 - 2.9 FIRESTOPPING
- 23 05 11 - 2.10 GALVANIZED REPAIR COMPOUND
- 23 05 11 - 2.11 HVAC PIPE AND EQUIPMENT SUPPORTS AND RESTRAINTS
- 23 05 11 - 2.12 PIPE PENETRATIONS
- 23 05 11 - 2.13 DUCT PENETRATIONS
- 23 05 11 - 2.14 SPECIAL TOOLS AND LUBRICANTS
- 2.15 WALL, FLOOR AND CEILING PLATES**
- 2.16 ASBESTOS**

**SECTION 23 05 12  
GENERAL MOTOR REQUIREMENTS FOR HVAC**

**PART 1 - GENERAL**

**1.3 SUBMITTALS:**

- A. In accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, submit the following:
- B. Shop Drawings:
  - 1. Provide documentation to demonstrate compliance with drawings and specifications.
  - 2. Include electrical ratings, efficiency, bearing data, power factor, frame size, dimensions, mounting details, materials, horsepower, voltage, phase, speed (RPM), enclosure, starting characteristics, torque characteristics, code letter, full load and locked rotor current, service factor, and lubrication method.
- C. Manuals:
  - 1. Submit simultaneously with the shop drawings, companion copies of complete installation, maintenance and operating manuals, including technical data sheets and application data.
- D. Certification: Two weeks prior to final inspection, unless otherwise noted, submit four copies of the following certification to the COR
  - 1. Certification that the motors have been applied, installed, adjusted, lubricated, and tested according to manufacturer published recommendations.

**PART 2 - PRODUCTS**

- 23 05 12 - 2.1 MOTORS

**SECTION 23 05 41  
NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT**

**PART 1 - GENERAL****1.4 SUBMITTALS****B. Manufacturer's Literature and Data:****1. Vibration isolators:**

- a. Floor mountings
- b. Hangers
- c. Snubbers
- d. Thrust restraints

**2. Bases.****3. Seismic restraint provisions and bolting.****4. Acoustical enclosures.**

C. Isolator manufacturer shall furnish with submittal load calculations for selection of isolators, including supplemental bases, based on lowest operating speed of equipment supported.

D. Seismic Requirements: Submittals are required for all equipment anchors, supports and seismic restraints. Submittals shall include weights, dimensions, standard connections, and manufacturer's certification that all specified equipment will withstand seismic Lateral Force requirements as shown on drawings.

**PART 2 - PRODUCTS****2.1 GENERAL REQUIREMENTS**

23 05 41 - 2.2 SEISMIC RESTRAINT REQUIREMENTS FOR EQUIPMENTS

23 05 41 - 2.3 VIBRATION ISOLATORS

23 05 41 - 2.4 BASES

**SECTION 23 05 93****TESTING, ADJUSTING, AND BALANCING FOR HVAC****PART 1 - GENERAL****1.4 SUBMITTALS**

B. Submit names and qualifications of TAB agency and TAB specialists within 60 days after the notice to proceed. Submit information on three recently completed projects and a list of proposed test equipment.

C. For use by the COR staff, submit one complete set of applicable AABC or NEBB publications that will be the basis of TAB work.

D. Submit Following for Review and Approval:

- 1. Design Review Report within 90 days for conventional design projects after the system layout on air and water side is completed by the Contractor.

2. Systems inspection report on equipment and installation for conformance with design.
3. Duct Air Leakage Test Report.
4. Systems Readiness Report.
5. Intermediate and Final TAB reports covering flow balance and adjustments, performance tests, vibration tests and sound tests.
6. Include in final reports uncorrected installation deficiencies noted during TAB and applicable explanatory comments on test results that differ from design requirements.

E. Prior to request for Final or Partial Final inspection, submit completed Test and Balance report for the area.

## **PART 2 - PRODUCTS**

### **2.1 PLUGS**

### **2.2 INSULATION REPAIR MATERIAL**

## **SECTION 23 07 11 HVAC AND BOILER PLANT INSULATION**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

#### **B. Shop Drawings:**

1. All information, clearly presented, shall be included to determine compliance with drawings and specifications and ASTM, federal and military specifications.
  - a. Insulation materials: Specify each type used and state surface burning characteristics.
  - b. Insulation facings and jackets: Each type used. Make it clear that white finish will be furnished for exposed ductwork, casings and equipment.
  - c. Insulation accessory materials: Each type used.
  - d. Manufacturer's installation and fitting fabrication instructions for flexible unicellular insulation.
  - e. Make reference to applicable specification paragraph numbers for coordination.

#### **C. Samples:**

1. Each type of insulation: Minimum size 100 mm (4 inches) square for board/block/ blanket; 150 mm (6 inches) long, full diameter for round types.
2. Each type of facing and jacket: Minimum size 100 mm (4 inches square).

3. Each accessory material: Minimum 120 ML (4 ounce) liquid container or 120 gram (4 ounce) dry weight for adhesives cement mastic.

## **PART 2 - PRODUCTS**

- 2.1 MINERAL FIBER OR FIBER GLASS
- 2.2 MINERAL WOOL OR REFRACTORY FIBER
- 2.3 RIGID CELLULAR PHENOLIC FOAM
- 2.4 CELLULAR GLASS CLOSED-CELL
- 2.6 FLEXIBLE ELASTOMERIC CELLULAR THERMAL
- 2.7 DUCT WRAP FOR KITCHEN HOOD GREASE DUCTS
- 2.8 CALCIUM SILICATE
- 2.9 INSULATION FACINGS AND JACKETS
- 2.10 REMOVABLE INSULATION JACKETS
- 2.11 PIPE COVERING PROTECTION SADDLES
- 2.12 ADHESIVE, MASTIC, CEMENT
- 2.13 MECHANICAL FASTENERS
- 2.14 REINFORCEMENT AND FINISHES
- 2.15 FIRESTOPPING MATERIAL
- 2.16 FLAME AND SMOKE

## **SECTION 23 09 23 DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC**

## **PART 1 - GENERAL**

### **1.7 SUBMITTALS**

- A. Submit shop drawings in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's literature and data for all components including the following:
  1. A wiring diagram for each type of input device and output device including DDC controllers, modems, repeaters, etc. Diagram shall show how the device is wired and powered, showing typical connections at the digital controllers and each power supply, as well as the device itself. Show for all field connected devices, including but not limited to, control relays, motor starters, electric or electronic actuators, and temperature pressure, flow and humidity sensors and transmitters.
  2. A diagram of each terminal strip, including digital controller terminal strips, terminal strip location, termination numbers and the associated point names.

3. Control dampers and control valves schedule, including the size and pressure drop.
4. Not Used
5. Catalog cut sheets of all equipment used. This includes, but is not limited to software (by manufacturer and by third parties), DDC controllers, panels, peripherals, airflow measuring stations and associated components, and auxiliary control devices such as sensors, actuators, and control dampers. When manufacturer's cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted. Each submitted piece of literature and drawings should clearly reference the specification and/or drawings that it supposed to represent.
6. Sequence of operations for each HVAC system and the associated control diagrams. Equipment and control labels shall correspond to those shown on the drawings.
7. Color prints of proposed graphics with a list of points for display.
8. Furnish a BACnet Protocol Implementation Conformance Statement (PICS) for each BACnet-compliant device.
9. Schematic wiring diagrams for all control, communication and power wiring. Provide a schematic drawing of the central system installation. Label all cables and ports with computer manufacturers' model numbers and functions. Show all interface wiring to the control system.
10. An instrumentation list for each controlled system. Each element of the controlled system shall be listed in table format. The table shall show element name, type of device, manufacturer, model number, and product data sheet number.
11. Riser diagrams of wiring between central control unit and all control panels.
12. Scaled plan drawings showing routing of LAN and locations of control panels, controllers, routers, gateways, ECC, and larger controlled devices.
13. Construction details for all installed conduit, cabling, raceway, cabinets, and similar. Construction details of all penetrations and their protection.

14. Quantities of submitted items may be reviewed but are the responsibility of the contractor administered by this Section of the technical specifications.
- C. Product Certificates: Compliance with Article, QUALITY ASSURANCE.
- D. Licenses: Provide licenses for all software residing on and used by the Controls Systems and transfer these licenses to the Owner prior to completion.
- E. As Built Control Drawings:
1. Furnish three (3) copies of as-built drawings for each control system. The documents shall be submitted for approval prior to final completion.
  2. Furnish one (1) stick set of applicable control system prints for each mechanical system for wall mounting. The documents shall be submitted for approval prior to final completion.
  3. Furnish one (1) CD-ROM in CAD DWG and/or .DXF format for the drawings noted in subparagraphs above.
- F. Operation and Maintenance (O/M) Manuals):
1. Submit in accordance with Article, INSTRUCTIONS, in Specification Section 01 00 00, GENERAL REQUIREMENTS.
  2. Include the following documentation:
    - a. General description and specifications for all components, including logging on/off, alarm handling, producing trend reports, overriding computer control, and changing set points and other variables.
    - b. Detailed illustrations of all the control systems specified for ease of maintenance and repair/replacement procedures, and complete calibration procedures.
    - c. One copy of the final version of all software provided including operating systems, programming language, operator workstation software, and graphics software.
    - d. Complete troubleshooting procedures and guidelines for all systems.
    - e. Complete operating instructions for all systems.
    - f. Recommended preventive maintenance procedures for all system components including a schedule of tasks for inspection, cleaning and calibration. Provide a list of recommended spare parts needed to minimize downtime.



- g. Training Manuals: Submit the course outline and training material to the Owner for approval three (3) weeks prior to the training to VA facility personnel. These persons will be responsible for maintaining and the operation of the control systems, including programming. The Owner reserves the right to modify any or all of the course outline and training material.
- h. Licenses, guaranty, and other pertaining documents for all equipment and systems.

G. Submit Performance Report to COR prior to final inspection.

## **PART 2 - PRODUCTS**

### **23 09 23 - 2.1 MATERIALS**

### **23 09 23 - 2.2 CONTROLS SYSTEMS ARCHITECTURE**

### **23 09 23 - 2.3 COMMUNICATION**

### **23 09 23 - 2.5 PORTABLE OPERATOR'S TERMINAL (POT)**

### **23 09 23 - 2.6 BACNET PROTOCOL ANALYZER**

### **23 09 23 - 2.7 NETWORK AND DEVICE NAMING CONVENTION**

### **23 09 23 - 2.8 BACNET DEVICES**

### **23 09 23 - 2.9 CONTROLLERS**

### **23 09 23 - 2.11 SENSORS (AIR, WATER AND STEAM)**

### **23 09 23 - 2.12 CONTROL CABLES**

### **23 09 23 - 2.13 THERMOSTATS AND HUMIDISTATS**

### **23 09 23 - 2.14 FINAL CONTROL ELEMENTS AND OPERATORS**

### **23 09 23 - 2.15 AIR FLOW**

## **SECTION 23 21 13 HYDRONIC PIPING**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Pipe and equipment supports. Submit calculations for variable spring and constant support hangers.
  - 2. Pipe and tubing, with specification, class or type, and schedule.
  - 3. Pipe fittings, including miscellaneous adapters and special fittings.
  - 4. Flanges, gaskets and bolting.
  - 5. Grooved joint couplings and fittings.
  - 6. Valves of all types.

7. Strainers.
  8. Flexible connectors for water service.
  9. Pipe alignment guides.
  10. Expansion joints.
  11. Expansion compensators.
  12. All specified hydronic system components.
  13. Water flow measuring devices.
  14. Gages.
  15. Thermometers and test wells.
  16. Electric heat tracing systems.
  17. Seismic bracing details for piping.
- C. Manufacturer's certified data report, Form No. U-1, for ASME pressure vessels:
1. Heat Exchangers (Water to Water)
  2. Air separators.
  3. Expansion tanks.
- D. Submit the welder's qualifications in the form of a current (less than one year old) and formal certificate.
- E. Coordination Drawings: Refer to Article, SUBMITTALS of Section 23 05 11, COMMON WORK RESULTS FOR HVAC and STEAM GENERATION.
- F. As-Built Piping Diagrams: Provide drawing as follows for chilled water, condenser water, and heating hot water system and other piping systems and equipment.
1. One wall-mounted stick file with complete set of prints. Mount stick file in the chiller plant or control room along with control diagram stick file.
  2. One complete set of reproducible drawings.
  3. One complete set of drawings in electronic Autocad and pdf format.

**PART 2 - PRODUCTS**

23 21 13 - 2.1 PIPE AND EQUIPMENT SUPPORTS, PIPE SLEEVES, AND WALL AND CEILING PLATES

23 21 13 - 2.2 PIPE AND TUBING

23 21 13 - 2.3 FITTINGS FOR STEEL PIPE

23 21 13 - 2.4 FITTINGS FOR COPPER TUBING

23 21 13 - 2.5 FITTINGS FOR PLASTIC PIPING

23 21 13 - 2.6 DIALECTRIC FITTINGS

23 21 13 - 2.7 SCREWED JOINTS

23 21 13 - 2.8 VALVES

23 21 13 - 2.9 WATER FLOW MEASURING DEVICES

23 21 13 - 2.10 STRAINERS

2.11 FLEXIBLE CONNECTORS FOR WATER SERVICE

2.12 EXPANSION JOINTS

23 21 13 - 2.13 HYDRONIC SYSTEM COMPONENTS

23 21 13 - 2.15 GAUGES PRESSURE AND COMPOUND

23 21 13 - 2.16 PRESSURE/TEMPERATURE TEST PROVISIONS

23 21 13 - 2.17 THERMOMETERS

**SECTION 23 21 23  
HYDRONIC PUMPS**

**PART 1 - GENERAL****1.4 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. Pumps and accessories.
2. Motors and drives.
3. Variable speed motor controllers.

C. Manufacturer's installation, maintenance and operating instructions, in accordance with Section 23 05 11, COMMON WORK RESULTS FOR HVAC.

D. Characteristic Curves: Head-capacity, efficiency-capacity, brake horsepower-capacity, and NPSHR-capacity for each pump and for combined pumps in parallel or series service. Identify pump and show fluid pumped, specific gravity, pump speed and curves plotted from zero flow to maximum for the impeller being furnished and at least the maximum diameter impeller that can be used with the casing.

**PART 2 - PRODUCTS**

2.1 CENTRIFUGAL PUMPS, BRONZE FITTED

**SECTION 23 25 00  
HVAC WATER TREATMENT**

**PART 1 - GENERAL****1.4 SUBMITTALS****B. Manufacturer's Literature and Data including:**

1. Cleaning compounds and recommended procedures for their use.
2. Chemical treatment for closed systems, including installation and operating instructions.
3. Not Used
4. Glycol-water system materials, equipment, and installation.

**C. Water analysis verification.****D. Materials Safety Data Sheet for all proposed chemical compounds, based on U.S. Department of Labor Form No. L5B-005-4.****E. Maintenance and operating instructions in accordance with Section 01 00 00, GENERAL REQUIREMENTS.****PART 2 - PRODUCTS****2.1 CLEANING COMPOUNDS****2.2 CHEMICAL TREATMENT FOR CLOSED LOOP SYSTEMS****2.3 CHEMICAL TREATMENT FOR OPEN LOOP SYSTEM(S)****2.4 GLYCOL-WATER SYSTEM****2.5 EQUIPMENT AND MATERIALS IDENTIFICATION**

**SECTION 23 31 00**  
**HVAC DUCTS AND CASINGS**

**PART 1 - GENERAL****1.4 SUBMITTALS****B. Manufacturer's Literature and Data:****1. Rectangular ducts:**

- a. Schedules of duct systems, materials and selected SMACNA construction alternatives for joints, sealing, gage and reinforcement.
- b. Duct liner.
- c. Sealants and gaskets.
- d. Access doors.

**2. Round duct construction details:**

- a. Manufacturer's details for duct fittings.
- b. Duct liner.
- c. Sealants and gaskets.
- d. Access sections.
- e. Installation instructions.

3. Volume dampers, back draft dampers.
  4. Upper hanger attachments.
  5. Fire dampers, fire doors, and smoke dampers with installation instructions.
  6. Sound attenuators, including pressure drop and acoustic performance.
  7. Flexible ducts and clamps, with manufacturer's installation instructions.
  8. Flexible connections.
  9. Instrument test fittings.
  - 10 Details and design analysis of alternate or optional duct systems.
  - 11 COMMON WORK RESULTS FOR HVAC and STEAM GENERATION.
- C. Coordination Drawings: Refer to article, SUBMITTALS, in Section 23 05
- 11 - Common Work Results for HVAC and Steam Generation.

## **PART 2 - PRODUCTS**

- 23 31 00 - 2.1 DUCT MATERIALS AND SEALANTS
- 23 31 00 - 2.2 DUCT CONSTRUCTION AND INSTALLATION
- 23 31 00 - 2.4 DUCT ACCESS DOORS, PANELS AND SECTIONS
- 23 31 00 - 2.5 FIRE DAMPERS
- 23 31 00 - 2.7 COMBINATION FIRE AND SMOKE DAMPERS
- 23 31 00 - 2.8 FIRE DOORS
- 23 31 00 - 2.9 FLEXIBLE AIR DUCT
- 23 31 00 - 2.10 FLEXIBLE DUCT CONNECTIONS
- 23 31 00 - 2.12 PREFABRICATED ROOF CURBS
- 23 31 00 - 2.15 DUCT MOUNTED THERMOMETER (AIR)
- 23 31 00 - 2.17 INSTRUMENT TEST FITTINGS
- 2.20 ELECTROSTATIC SHIELDING

### **SECTION 23 34 00 HVAC FANS**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- B. Manufacturers Literature and Data:
1. Fan sections, motors and drives.
  2. Centrifugal fans, motors, drives, accessories and coatings.
    - a. In-line centrifugal fans.
    - c. Up-blast kitchen hood exhaust fans.
    - e. Utility fans and vent sets.
  3. Prefabricated roof curbs.
  4. Power roof and wall ventilators.

- 10. Air curtain units.
- C. Certified Sound power levels for each fan.
- D. Motor ratings types, electrical characteristics and accessories.
- E. Roof curbs.
- F. Belt guards.
- G. Maintenance and Operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS.
- H. Certified fan performance curves for each fan showing cubic feet per minute (CFM) versus static pressure, efficiency, and horsepower for design point of operation.

**PART 2 - PRODUCTS**

**23 34 00 - 2.2 CENTRIFUGAL FANS**

**2.3 POWER ROOF VENTILATOR**

**2.9 AIR CURTAIN UNITS**

**SECTION 23 36 00  
AIR TERMINAL UNITS**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- B. Manufacturer's Literature and Data:
  - 1. Air Terminal Units: Submit test data.
- C. Not Used
- D. Certificates:
  - 1. Compliance with paragraph, QUALITY ASSURANCE.
  - 2. Compliance with specified standards.
- E. Operation and Maintenance Manuals: Submit in accordance with paragraph, INSTRUCTIONS, in Section 01 00 00, GENERAL REQUIREMENTS.

**PART 2 - PRODUCTS**

**23 36 00 - 2.1 GENERAL**

**2.2 AIR TERMINAL UNITS (BOXES)**

**SECTION 23 37 00  
AIR OUTLETS AND INLETS**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- B. Manufacturer's Literature and Data:
  - 1. Air intake/exhaust hoods.
  - 2. Diffusers, registers, grilles and accessories.
- C. Coordination Drawings: Refer to article, SUBMITTALS, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

**PART 2 - PRODUCTS**

**2.1 GRAVITY INTAKE/EXHAUST VENTILATORS (ROOF MOUNTED)**

**2.2 EQUIPMENT SUPPORTS**

**2.3 AIR OUTLETS AND INLETS**

**2.4 WIRE MESH GRILLE**

**2.5 FILTER RETURN/EXHAUST GRILLE**

**SECTION 23 38 13  
COMMERCIAL-KITCHEN HOODS**

**PART 1 - GENERAL**

**1.5 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. Include manufacturer's address and telephone number.
2. Include catalog or model numbers, and illustrations and descriptions of ventilators and accessories.

C. Installation Drawings: Show dimensions; method of assembly; and details of installation, adjoining construction, coordination with service utilities, and other work required for a complete installation.

D. Field Test Reports: Indicate dates and times of tests and certify test results.

E. Operating Instructions: Include operating instructions covering operation of all components and maintenance procedures covering proper cleaning and necessary lubrication or adjustments to controls.

**PART 2 - PRODUCTS**

**2.1 EXHAUST HOODS**

**SECTION 23 40 00  
HVAC AIR CLEANING DEVICES**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

B. Manufacturer's Literature and Data:

1. Extended surface filters.
2. Holding frames. Identify locations.
3. Side access housings. Identify locations, verify insulated doors.
4. Not Used
5. Magnehelic gages.

C. Air Filter performance reports.

D. Suppliers warranty.

**PART 2 - PRODUCTS**

2.1 REPLACEMENT FILTER ELEMENTS TO BE FURNISHED

2.2 EXTENDED SURFACE AIR FILTERS

2.3 MEDIUM EFFICIENCY PLEATED PANEL PRE-FILTERS (2"; MERV 8; UL 900 CLASS 2):

2.4 HIGH EFFICIENCY EXTENDED SURFACE (INTERMEDIATE/AFTER (FINAL)) CARTRIDGE FILTERS (12"; MERV 14/13/11; UL 900 CLASS 2):

2.7 FILTER HOUSINGS/SUPPORT FRAMES

2.11 INSTRUMENTATION

2.12 HVAC EQUIPMENT FACTORY FILTERS

2.13 FILTER RETURN GRILLES

**SECTION 23 74 13****PACKAGED, OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS****PART 1 - GENERAL****1.4 SUBMITTALS:**

A. The contractor shall, in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish a complete submission for all roof top units covered in the project. The submission shall include all information listed below. Partial and incomplete submissions shall be rejected without reviews.

B. Manufacturer's Literature and Data:

1. Submittals for RTUs shall include fans, drives, motors, coils, mixing box with outside/return air dampers, filter housings, blender sections and all other related accessories. The contractor shall provide custom drawings showing total air handling unit assembly including dimensions, operating weight, access sections, diffusion plates, flexible connections, door swings, controls penetrations, electrical disconnect, lights, duplex receptacles, switches, wiring, utility connection points, unit support system, vibration isolators, drain pan, pressure drops through each component (filter, coil etc) and rigging points.
2. Submittal drawings of section or component only, will not be acceptable. Contractor shall also submit performance data including performance test results, charts, curves or certified computer selection data; data sheets; fabrication and insulation details; if the unit cannot be shipped in one piece, the contractor shall indicate the number of pieces that each unit will have to be broken into to meet shipping and job site rigging requirements. This data shall be submitted in hard copies and in electronic version



- compatible to AutoCAD version used by the VA at the time of submission.
3. Submit sound power levels in each octave band for fan and at entrance and discharge of RTUs at scheduled conditions. Include sound attenuator capacities and itemized internal component attenuation. Internal lining of supply air ductwork with sound absorbing material is not permitted. In absence of sound power ratings refer to Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT.
  4. Provide fan curves showing Liters/Second (cubic feet per minute), static pressure, efficiency, and horsepower for design point of operation and at maximum design Liters/Second (cubic feet per minute) and 110 percent of design static pressure.
  5. Submit total fan static pressure, external static pressure, for RTU including total, inlet and discharge pressures, and itemized specified internal losses and unspecified internal losses. Refer to air handling unit schedule on drawings.
- C. Maintenance and operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS. Include instructions for lubrication, filter replacement, motor and drive replacement, spare part lists, and wiring diagrams.
- D. Submit written test procedures two weeks prior to factory testing. Submit written results of factory tests for approval prior to shipping.
- E. Completed System Readiness Checklists provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 23 08 00 COMMISSIONING OF HVAC SYSTEMS.
- F. Submit shipping information that clearly indicates how the units will be shipped in compliance with the descriptions below.
1. Units shall be shipped in one (1) piece where possible and in shrink wrapping to protect the unit from dirt, moisture and/or road salt.
  2. If not shipped in one (1) piece, provide manufacturer approved shipping splits where required for installation or to meet shipping and/or job site rigging requirements in modular sections. Indicate clearly that the shipping splits shown in the submittals have been verified to accommodate the construction constraints for rigging as required to complete installation and removal of any section for

replacement through available access without adversely affecting other sections.

3. If shipping splits are provided, each component shall be individually shrink wrapped to protect the unit and all necessary hardware (e.g. bolts, gaskets etc.) will be included to assemble unit on site (see section 2.1.A4).
4. Lifting lugs will be provided to facilitate rigging on shipping splits and joining of segments. If the unit cannot be shipped in one piece, the contractor shall indicate the number of pieces that each unit will have to be broken into to meet shipping and job site rigging requirements.

## **PART 2 - PRODUCTS**

### **2.1 ROOF TOP AIR HANDLING UNITS**

1

#### **SECTION 23 82 16 AIR COILS**

### **PART 1 - GENERAL**

#### **1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Manufacturer's Literature and Data for Heating and Cooling Coils: Submit type, size, arrangements and performance details. Present application ratings in the form of tables, charts or curves.
- C. Provide installation, operating and maintenance instructions.
- D. Certification Compliance: Evidence of listing in current ARI Directory of Certified Applied Air Conditioning Products.
- E. Coils may be submitted with Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS, Section 23 74 13.
- F. Completed System Readiness Checklists provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 23 08 00 COMMISSIONING OF HVAC SYSTEMS.

**SECTION 23 84 13****HUMIDIFIERS****PART 1 - GENERAL****A. ACTION SUBMITTALS**

1. Product Data: Include rated humidification capacity, operating characteristics, mounting information, and flow requirements, furnished specialties, and accessories.
2. Shop Drawings: Detail fabrication and installation of humidifiers. Include piping details, plans, elevations, section cuts, details of components, and attachments to other work.
  - a. Wiring Diagrams: Power, signal, and control wiring.

**B. CLOSEOUT SUBMITTALS**

1. Operation and Maintenance Data: For humidifiers to include in operation and maintenance manuals.

**PART 2 - PRODUCTS****2.1 HUMIDIFIER****SECTION 26 05 11****REQUIREMENTS FOR ELECTRICAL INSTALLATIONS****PART 1 - GENERAL****1.12 SUBMITTALS**

- B. The Government's approval shall be obtained for all materials and equipment before delivery to the job site. Delivery, storage or installation of materials and equipment which has not had prior approval will not be permitted.
- C. All submittals shall include six copies of adequate descriptive literature, catalog cuts, shop drawings, test reports, certifications, samples, and other data necessary for the Government to ascertain that the proposed materials and equipment comply with drawing and specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify specific materials and equipment being submitted.
- D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
  1. Mark the submittals, "SUBMITTED UNDER SECTION\_\_\_\_\_".
  2. Submittals shall be marked to show specification reference including the section and paragraph numbers.

3. Submit each section separately.

E. The submittals shall include the following:

1. Information that confirms compliance with contract requirements.

Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, manuals, pictures, nameplate data, and test reports as required.

3. Elementary and interconnection wiring diagrams for communication and signal systems, control systems, and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.

4. Parts list which shall include information for replacement parts and ordering instructions, as recommended by the equipment manufacturer.

F. Maintenance and Operation Manuals:

1. Submit as required for systems and equipment specified in the technical sections. Furnish in hardcover binders or an approved equivalent.

2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, material, equipment, building, name of Contractor, and contract name and number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the material or equipment.

3. Provide a table of contents and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.

4. The manuals shall include:

a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.

b. A control sequence describing start-up, operation, and shutdown.

c. Description of the function of each principal item of equipment.

d. Installation instructions.

e. Safety precautions for operation and maintenance.

f. Diagrams and illustrations.

g. Periodic maintenance and testing procedures and frequencies, including replacement parts numbers.

h. Performance data.

- i. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare and replacement parts, and name of servicing organization.
  - j. List of factory approved or qualified permanent servicing organizations for equipment repair and periodic testing and maintenance, including addresses and factory certification qualifications.
- G. Approvals will be based on complete submission of shop drawings, manuals, test reports, certifications, and samples as applicable.
- H. After approval and prior to installation, furnish the COTR with one sample of each of the following:
- 1. A minimum 300 mm (12 inches) length of each type and size of wire and cable along with the tag from the coils or reels from which the sample was taken. The length of the sample shall be sufficient to show all markings provided by the manufacturer.
  - 2. Each type of conduit coupling, bushing, and termination fitting.
  - 3. Conduit hangers, clamps, and supports.
  - 4. Duct sealing compound.
  - 5. Each type of receptacle, toggle switch, lighting control sensor, outlet box, manual motor starter, device wall plate, engraved nameplate, wire and cable splicing and terminating material, and branch circuit single pole molded case circuit breaker.

**SECTION 26 05 19**  
**LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

**PART 1 - GENERAL**

**1.5 SUBMITTALS**

- A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
- 1. Shop Drawings:
    - a. Submit sufficient information to demonstrate compliance with drawings and specifications.
    - b. Submit the following data for approval:
      - 1) Electrical ratings and insulation type for each conductor and cable.
      - 2) Splicing materials and pulling lubricant.
  - 2. Certifications: Two weeks prior to final inspection, submit the following.

- a. Certification by the manufacturer that the conductors and cables conform to the requirements of the drawings and specifications.
- b. Certification by the Contractor that the conductors and cables have been properly installed, adjusted, and tested.

## **PART 2 - PRODUCTS**

### **2.1 CONDUCTORS AND CABLES**

### **2.2 SPLICES**

### **2.3 CONNECTORS AND TERMINATIONS**

### **2.4 CONTROL WIRING**

### **2.5 WIRE LUBRICATING COMPOUND**

## **SECTION 26 05 33 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- A. Manufacturer's Literature and Data: Showing each cable type and rating. The specific item proposed and its area of application shall be identified on the catalog cuts.
- B. Shop Drawings:
  - 1. Size and location of main feeders.
  - 2. Size and location of panels and pull-boxes.
  - 3. Layout of required conduit penetrations through structural elements.
- C. Certifications:
  - 1. Two weeks prior to the final inspection, submit four copies of the following certifications to the COR:
    - a. Certification by the manufacturer that the material conforms to the requirements of the drawings and specifications.
    - b. Certification by the contractor that the material has been properly installed.

## **PART 2 - PRODUCTS**

### **2.1 MATERIAL**

## **SECTION 26 09 23 LIGHTING CONTROLS**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- B. Product Data: For each type of lighting control, submit the following information.
  - 1. Manufacturer's catalog data.
  - 2. Wiring schematic and connection diagram.

3. Installation details.

C. Manuals:

1. Submit, simultaneously with the shop drawings companion copies of complete maintenance and operating manuals including technical data sheets, and information for ordering replacement parts.
2. Two weeks prior to the final inspection, submit four copies of the final updated maintenance and operating manuals, including any changes, to the COR.

D. Certifications:

1. Two weeks prior to final inspection, submit four copies of the following certifications to the Resident Engineer:
  - a. Certification by the Contractor that the equipment has been properly installed, adjusted, and tested.

**PART 2 - PRODUCTS**

**2.7 INDOOR OCCUPANCY SENSORS**

**SECTION 26 24 16  
PANELBOARDS**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1. Shop Drawings:
  - a. Submit sufficient information to demonstrate compliance with drawings and specifications.
  - b. Include electrical ratings, dimensions, mounting details, materials, required clearances, terminations, weight, circuit breakers, wiring and connection diagrams, accessories, and nameplate data.
2. Manuals:
  - a. Submit, simultaneously with the shop drawings, complete maintenance and operating manuals including technical data sheets, wiring diagrams, and information for ordering circuit breakers and replacement parts.
    - 1) Include schematic diagrams, with all terminals identified, matching terminal identification in the panelboards.
    - 2) Include information for testing, repair, troubleshooting, assembly, and disassembly.

- b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.
- 3. Certifications: Two weeks prior to final inspection, submit the following.
  - a. Certification by the manufacturer that the panelboards conform to the requirements of the drawings and specifications.
  - b. Certification by the Contractor that the panelboards have been properly installed, adjusted, and tested.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL REQUIREMENTS**

### **2.2 ENCLOSURES AND TRIMS**

### **2.3 MOLDED CASE CIRCUIT BREAKERS FOR PANELBOARDS**

#### **SECTION 26 27 26 WIRING DEVICES**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
  - 1. Shop Drawings:
    - a. Submit sufficient information to demonstrate compliance with drawings and specifications.
    - b. Include electrical ratings, dimensions, mounting details, construction materials, grade, and termination information.
  - 2. Manuals:
    - a. Submit, simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals, including technical data sheets and information for ordering replacement parts.
    - b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.
  - 3. Certifications: Two weeks prior to final inspection, submit the following.
    - a. Certification by the manufacturer that the wiring devices conform to the requirements of the drawings and specifications.
    - b. Certification by the Contractor that the wiring devices have been properly installed and adjusted.



**PART 2 - PRODUCTS**

**2.1 RECEPTACLES**

**2.2 TOGGLE SWITCHES**

**2.3 MANUAL DIMMING CONTROL**

**2.4 WALL PLATES**

**SECTION 26 29 21  
ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1. Shop Drawings:

- a. Submit sufficient information to demonstrate compliance with drawings and specifications.
- b. Submit the following data for approval:
  - 1) Electrical ratings, dimensions, mounting details, materials, required clearances, terminations, weight, fuses, circuit breakers, wiring and connection diagrams, accessories, and device nameplate data.

2. Manuals:

- a. Submit complete maintenance and operating manuals including technical data sheets, wiring diagrams, and information for ordering fuses, circuit breakers, and replacement parts.
  - 1) Include schematic diagrams, with all terminals identified, matching terminal identification in the enclosed switches and circuit breakers.
  - 2) Include information for testing, repair, troubleshooting, assembly, and disassembly.
- b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.

3. Certifications: Two weeks prior to final inspection, submit the following.

- a. Certification by the manufacturer that the enclosed switches and circuit breakers conform to the requirements of the drawings and specifications.

- b. Certification by the Contractor that the enclosed switches and circuit breakers have been properly installed, adjusted, and tested.

## **PART 2 - PRODUCTS**

### **2.1 FUSED SWITCHES RATED 600 AMPERES AND LESS**

### **2.2 UNFUSED SWITCHES RATED 600 AMPERES AND LESS**

### **2.4 MOTOR RATED TOGGLE SWITCHES**

### **2.5 CARTRIDGE FUSES**

### **2.6 SEPARATELY-ENCLOSED CIRCUIT BREAKERS**

## **SECTION 26 36 23 AUTOMATIC TRANSFER SWITCHES**

## **PART 1 - GENERAL**

### **1.5 SUBMITTALS**

- A. Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

- B. Shop Drawings:

1. Clearly present sufficient information to determine compliance with drawings and specifications.
2. Include electrical ratings (including withstand), dimensions, weights, mounting details, conduit entry provisions front view, side view, equipment and device arrangement, elementary and interconnection wiring diagrams, factory relay settings, and accessories.
3. For automatic transfer switches that are networked together to a common means of annunciation and/or control, submit interconnection diagrams and site and building plans, showing connections for normal and emergency sources of power, load, control and annunciation components, and interconnecting communications paths. Equipment locations on the diagrams and plans shall match the site, building, and room designations on the construction drawings.
4. Complete nameplate data, including manufacturer's name and catalog number.
5. A copy of the markings that are to appear on the transfer switches when installed.

- C. Manuals:

1. When submitting the shop drawings, submit companion copies of complete maintenance and operating and maintenance manuals, including technical data sheets, wiring diagrams and information,

such as telephone number, fax number and web sites, for ordering replacement parts.

2. Two weeks prior to final inspection, submit four copies of a final updated maintenance and operating manual to the COTR.
  - a. Include complete "As Installed" diagrams that indicate all pieces of equipment and their interconnecting wiring.
  - b. Include complete diagrams of the internal wiring for each piece of equipment, including "As Installed" revisions of the diagrams.
  - c. The wiring diagrams shall identify the terminals to facilitate installation, maintenance, operation, and testing.

D. Certifications:

1. When submitting the shop drawings, submit a certified test report from a recognized independent testing laboratory that a representative sample has passed UL 1008 prototype testing.
2. Two weeks prior to final inspection, submit four copies of the following to the COTR:
  - a. Certification that no design changes have been made to the switch or its components since last certified by UL or tested by an independent laboratory.
  - b. Certification by the manufacturer that the equipment conforms to the requirements of the drawings and specifications.
  - c. Certification that the withstand current rating has been coordinated with upstream protective devices.
  - d. Certification by the contractor that the equipment has been properly installed, adjusted, and tested.
  - e. A certified test report from an independent laboratory that a representative sample has passed the ANSI surges withstand test for transfer switches which incorporate solid-state components.

**PART 2 - PRODUCTS**

**2.1 OPEN-TRANSITION AUTOMATIC TRANSFER SWITCH**

**2.2 SEQUENCE OF OPERATION**

**2.3 BYPASS/ISOLATION SWITCH**

**2.4 REMOTE ANNUNCIATOR SYSTEM**

**2.5 SPARE PARTS**

**SECTION 26 41 00  
FACILITY LIGHTNING PROTECTION**

**PART 1 - GENERAL****1.4 SUBMITTALS**

A. Submit the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1. Shop Drawings:

- a. Submit sufficient information to demonstrate compliance with drawings and specifications.
- b. Show locations of air terminals, connections to required metal surfaces, down conductors, and grounding means.
- c. Show the mounting hardware and materials used to attach air terminals and conductors to the structure.

2. Certifications: Two weeks prior to final inspection, submit the following.

- a. Certification by the manufacturer that the lightning protection system conforms to the requirements of the drawings and specifications.
- b. Certification by the Contractor that the lightning protection system has been properly installed and inspected.
- c. Certification that the lightning protection system has been inspected by a UL representative and has been approved by UL without variation.

**PART 2 - PRODUCTS****2.1 GENERAL REQUIREMENTS**

**SECTION 26 51 00  
INTERIOR LIGHTING**

**PART 1 - GENERAL****1.4 SUBMITTALS**

A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1. Shop Drawings:

- a. Submit the following information for each type of lighting fixture designated on the LIGHTING FIXTURE SCHEDULE, arranged in order of lighting fixture designation.
- b. Material and construction details, include information on housing and optics system.
- c. Physical dimensions and description.
- d. Wiring schematic and connection diagram.

- e. Installation details.
  - f. Energy efficiency data.
  - g. Photometric data based on laboratory tests complying with IES Lighting Measurements testing and calculation guides.
  - h. Lamp data including lumen output (initial and mean), color rendition index (CRI), rated life (hours), and color temperature (degrees Kelvin).
  - i. Ballast data including ballast type, starting method, ambient temperature, ballast factor, sound rating, system watts, and total harmonic distortion (THD).
  - j. For LED lighting fixtures, submit US DOE LED Lighting Facts label, and IES L70 rated life.
2. Manuals:
- a. Submit, simultaneously with the shop drawings, complete maintenance and operating manuals, including technical data sheets, wiring diagrams, and information for ordering replacement parts.
  - b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.
3. Certifications: Two weeks prior to final inspection, submit the following.
- a. Certification by the Contractor that the interior lighting systems have been properly installed and tested.

## **PART 2 - PRODUCTS**

### **26 51 00 - 2.1 LIGHTING FIXTURES (LUMINAIRES)**

### **26 51 00 - 2.2 BALLASTS**

### **26 51 00 - 2.5 LAMPS**

### **2.9 LED EXIT LIGHT FIXTURES**

## **SECTION 26 56 00 EXTERIOR LIGHTING**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- A. Submit in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
- B. Shop Drawings:
  - 1. Clearly present sufficient information to determine compliance with drawings and specifications.

2. Include electrical ratings, dimensions, mounting, details, materials, required clearances, terminations, wiring and connection diagrams, photometric data, ballasts, poles, luminaires, lamps, and accessories. Include electronic photometric files in IES format, or provide link (URL) to manufacturer's website that contains photometric data for each specific fixture used, excluding wallpack fixtures.
- C. Manuals: Two weeks prior to final inspection, submit four copies of operating and maintenance manuals to the COTR. Include technical data sheets, wiring and connection diagrams, and information for ordering replacement lamps, ballasts, and parts.
- D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the COTR:
1. Certification by the manufacturer that the materials are in accordance with the drawings and specifications.
  2. Certification by the contractor that the complete installation has been properly installed and tested.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS AND EQUIPMENT**

### **2.4 LUMINAIRES**

### **2.5 LAMPS**

### **2.6 HIGH INTENSITY DISCHARGE BALLASTS**

### **2.7 METAL HALIDE CORE AND COIL BALLASTS**

### **2.8 METAL HALIDE ELECTRONIC BALLASTS**

### **2.9 LED DRIVERS**

### **2.10 EXISTING LIGHTING SYSTEMS**

## **SECTION 27 05 11 REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS**

## **PART 1 - GENERAL**

### **1.10 SUBMITTALS**

- B. The Government's approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage, or installation of equipment or material which has not had prior approval will not be permitted at the job site.
- C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings, and other data necessary for the Government to ascertain that the proposed equipment and materials comply with

specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.

- D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.

1. Mark the submittals, "SUBMITTED UNDER SECTION\_\_\_\_\_".
2. Submittals shall be marked to show specification reference including the section and paragraph numbers.
3. Submit each section separately.

- E. The submittals shall include the following:

1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
3. Elementary and interconnection wiring diagrams for communication and signal systems, control system and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.
4. Parts list which shall include those replacement parts recommended by the equipment manufacturer, quantity of parts, current price and availability of each part.

- F. Manuals: Submit in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

1. Maintenance and Operation Manuals: Submit as required for systems and equipment specified in the technical sections. Furnish four copies, bound in hardback binders, (manufacturer's standard binders) or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.
2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
3. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions

covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.

4. The manuals shall include:

- a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
- b. A control sequence describing start-up, operation, and shutdown.
- c. Description of the function of each principal item of equipment.
- d. Installation and maintenance instructions.
- e. Safety precautions.
- f. Diagrams and illustrations.
- g. Testing methods.
- h. Performance data.
- i. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
- j. Appendix; list qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.

G. Approvals will be based on complete submission of manuals together with shop drawings.

H. After approval and prior to installation, furnish the Resident Engineer with one sample of each of the following:

- 1. A 300 mm (12 inch) length of each type and size of wire and cable along with the tag from the coils of reels from which the samples were taken.
- 2. Each type of conduit and pathway coupling, bushing and termination fitting.
- 3. Raceway and pathway hangers, clamps and supports.
- 4. Duct sealing compound.

**SECTION 27 05 26**  
**RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

B. Shop Drawings:

- 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.



2. Include the location of system grounding electrode connections and the routing of aboveground and underground grounding electrode conductors.

C. Test Reports: Provide certified test reports of ground resistance.

D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the Resident Engineer:

1. Certification that the materials and installation is in accordance with the drawings and specifications.
2. Certification, by the Contractor, that the complete installation has been properly installed and tested.

**PART 2 - PRODUCTS**

27 05 26 - 2.1 GROUNDING AND BONDING CONDUCTORS

27 05 26 - 2.3 SPLICES AND TERMINATION COMPONENTS

27 05 26 - 2.5 GROUND CONNECTIONS

**2.6 EQUIPMENT RACK AND CABINET GROUND BARS**

27 05 26 - 2.7 GROUND TERMINATION BLOCKS

27 05 26 - 2.8 SPLICE CASE GROUND ACCESSORIES

**SECTION 27 05 33  
GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS**

**PART 1 - GENERAL**

**1.3 SUBMITTALS**

A. Shop Drawings:

1. Size and location of panels and pull boxes
2. Layout of required conduit penetrations through structural elements.
3. The specific item proposed and its area of application shall be identified on the catalog cuts.

B. Certification: Prior to final inspection, deliver to the COR four copies of the certification that the material is in accordance with the drawings and specifications and has been properly installed.

**PART 2 - PRODUCTS**

**2.1 MATERIAL**

**SECTION 27 15 00  
COMMUNICATIONS HORIZONTAL CABLING**

**PART 1 - GENERAL****1.5 SUBMITTALS**

- A. Provide submittals in accordance with Specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. The RE shall retain one copy for review and approval.
  - 1. If the submittal is approved the COR shall retain one copy for Official Records and return three (3) copies to the Contractor.
  - 2. If the submittal is disapproved, three (3) copies will be returned to the Contractor with a written explanation attached that indicates the areas the submittal deviated from the System specifications. The COR shall retain one copy for Official Records.
- B. Environmental Requirements: Technical submittals shall confirm the environmental specifications for physical TC areas occupied by the System. These environmental specifications shall identify the requirements for initial and expanded system configurations for:
  - 1. Floor loading for batteries and cabinets.
  - 2. Minimum floor space and ceiling heights.
  - 3. Minimum size of doors for equipment passage.
  - 4. Power requirements: The Contractor shall provide the specific voltage, amperage, phases, and quantities of circuits required.
  - 5. Air conditioning, heating, and humidity requirements. The Contractor shall identify the ambient temperature and relative humidity operating ranges required preventing equipment damage.
  - 6. Air conditioning requirements (expressed in BTU per hour, based on adequate dissipation of generated heat to maintain required room and equipment standards).
  - 7. Proposed floor plan, based on the expanded system configuration of the bidder's proposed EPBX for this FACILITY.
  - 8. Conduit size requirement (between main TC, computer, and console rooms).
  - 9. Main backbone, trunk line, riser, and horizontal cable pathways, cable duct, and conduit requirements between each MTC, TC, and TCO.
- C. Documents: The submittal shall be separated into sections for each subsystem and shall contain the following:
  - 1. Title page to include:
    - a. VA Medical Center.
    - b. Contractor's name, address, and telephone (including FAX) numbers.

- c. Date of Submittal.
  - d. VA Project No.
2. List containing a minimum of three locations of installations of similar size and complexity as identified herein. These locations shall contain the following:
    - a. Installation Location and Name.
    - b. Owner's or User's name, address, and telephone (including FAX) numbers.
    - c. Date of Project Start and Date of Final Acceptance by Owner.
    - d. System Project Number.
    - e. Brief (three paragraphs minimum) description of each system's function, operation, and installation.
  3. Narrative Description of the system.
  4. A List of the equipment to be furnished. The quantity, make, and model number of each item is required.

QUANTITY	UNIT
As required	Telecommunications Outlets (TCO)
As Required	Distribution Cables
As required	TCO Connection Cables
As required	System Connectors
As required	Terminators
As required	Distribution Frames
1 ea.	Installation Kit
As-required	Separate List Containing Each Equipment Spare(s)

5. Pictorial layouts of each MTC, IMTC, and RTCs; MCCS, IMCCS, VCCS, and HCCS termination cabinet(s), each distribution cabinet layout drawing, and TCO as each is expected to be installed and configured.
6. Equipment technical literature detailing the electrical and technical characteristics of each item of equipment to be furnished.
7. Engineering drawings of the System, showing calculated signal levels at the EPBX output, each input and output distribution point, proposed TCO values, and signal level at each TCO multipin, fiberoptic, and coaxial cable jack.
8. List of test equipment as per paragraph 1.5.D. below.

9. Letter certifying that the Contractor understands the requirements of the SAMPLES Paragraph 1.5.E.
10. Letter certifying that the Contractor understands the requirements of Section 3.2 concerning acceptance tests.

D. Test Equipment List:

1. The Contractor is responsible for furnishing all test equipment required to test the system in accordance with the parameters specified. Unless otherwise stated, the test equipment shall not be considered part of the system. The Contractor shall furnish test equipment of accuracy better than the parameters to be tested.
2. The test equipment furnished by the Contractor shall have a calibration tag of an acceptable calibration service dated not more than 12 months prior to the test. As part of the submittal, a test equipment list shall be furnished that includes the make and model number of the following type of equipment as a minimum:
  - a. Spectrum Analyzer.
  - b. Signal Level Meter.
  - c. Volt-Ohm Meter.
  - d. Time Domain Reflectometer (TDR) with strip chart recorder (Data and Optical Measuring).
  - e. Bit Error Test Set (BERT).
  - f. Camera with a minimum of 60 pictures to that will develop immediately to include appropriate test equipment adapters. A video camera in VHS format is an acceptable alternate.

F. Certifications:

1. Submit written certification from the OEM indicating that the proposed supervisor of the installation and the proposed provider of the contract maintenance are authorized representatives of the OEM. Include the individual's exact name and address and OEM credentials in the certification.
2. Submit written certification from the OEM that the wiring and connection diagrams meet National and/or Government Life Safety Guidelines, NFPA, NEC, UL, this specification, and JCAHCO requirements and instructions, requirements, recommendations, and guidance set forth by the OEM for the proper performance of the System as described herein. The VA will not approve any submittal without this certification.

3. Preacceptance Certification: This certification shall be made in accordance with the test procedure outlined in paragraph 3.2.B.
- G. Equipment Manuals: Fifteen (15) working days prior to the scheduled acceptance test, the Contractor shall deliver four complete sets of commercial operation and maintenance manuals for each item of equipment furnished as part of the System to the RE. The manuals shall detail the theory of operation and shall include narrative descriptions, pictorial illustrations, block and schematic diagrams, and parts list.
- H. Record Wiring Diagrams:
1. Fifteen (15) working days prior to the acceptance test, the Contractor shall deliver four complete sets of the Record Wiring Diagrams of the System to the RE. The diagrams shall show all inputs and outputs of electronic and passive equipment correctly identified according to the markers installed on the interconnecting cables, Equipment and room/area locations.
  2. The Record Wiring Diagrams shall be in hard copy and two compact disk (CD) copies properly formatted to match the Facility's current operating version of Computer Aided Drafting (AutoCAD) system. The RE shall verify and inform the Contractor of the version of AutoCAD being used by the Facility.
- I. Surveys Required As A Part Of The Technical Submittal: The Contractor shall provide the following surveys that depict various system features and capacities are required in addition to the on site survey requirements described herein. Each survey shall be in writing and contain the following information (the formats are suggestions and may be used for the initial Technical Submittal survey requirements), as a minimum:
1. The required EPBX connections (each CSU shall be compatible with) shall be compatible with the following:
    - a. Initially connect:

<u>EQUIPPED ITEM</u>	<u>CAPACITY</u>	<u>WIREDCAPACITY</u>
Main Station Lines		
Single Line		
Multi Line (Equipped for direct input dial [DID])		
Central Office (CO) Trunks		

TWO WAY		
DID		
Two-way DRTL		
Foreign Exchange (FX)		
Conference		
Radio Paging Access		
Audio Paging Access		
Off-Premise Extensions		
CO Trunk By-pass		
CRT w/keyboard		
Printers		
Attendant Consoles		
T-1 Access/Equipment		
Maintenance console		

- b. Projected Maximum Growth: The Contractor shall clearly and fully indicate this category for each item identified in Paragraph 1.4.H.1.a. as a part of the technical submittal. For this purpose, the following definitions and sample connections are provided to detail the system's capability:

EQUIPPED ITEM	CAPACITY	WIRED CAPACITY
Servers		
PC's		
Projected Maximum Growth		

The Contractor shall clearly and fully indicate this category for each item identified in Paragraph 1.4.H.2.a. as a part of the technical submittal.

2. Cable Distribution System Design Plan: A design plan for the entire cable distribution systems requirements shall be provided with this document. A specific cable count shall coincide with the total growth items as described herein. It is the Contractor's responsibility to provide the Systems entire cable requirements and engineer a distribution system requirement plan using the format of the following paragraph(s), at a minimum:

## a. UTP (and/or STP) Requirements/Column Explanation:

Column	Explanation
FROM BUILDING	Identifies the building by number, title, or location, and main signal closet or intermediate signal closet cabling is provided from
BUILDING	Identifies the building by number, title, or location cabling is to be provided in
TO BUILDING IMC	Identifies building main terminal signal closet, by room number or location, to which cabling is provided too, in, and from
FLOOR	Identifies the floor by number (i.e. 1st, 2nd, etc.) cabling and TCOs are to be provided
TC ROOM NUMBER	Identifies the floor signal closet room, by room number, which cabling shall be provided
ROOM NUMBER	Identifies the room, by number, from which cabling and TCOs shall be provided
NUMBER OF CABLE PAIR	Identifies the number of cable pair required to be provided on each floor designated OR the number of cable pair (VA Owned) to be retained
NUMBER OF STRANDS USED/SPARE	Identifies the number of strands provided in each run

## b. Fiber Optic Cabling Requirements/Column Explanation:

Column	Explanation
FROM BUILDING	Identifies the building by number, title, or location, and main signal closet or intermediate signal closet cabling is provided from
TO BUILDING IMC	Identifies building, by number, title, or location, to which cabling is provided
FLOOR	Identifies the floor by number (i.e. 1st, 2nd, etc.)
TC ROOM NUMBER	Identifies the room, by number, from which cabling shall be installed
NUMBER OF STRANDS	Identifies the number of strands in each run of fiber optic cable
INSTALLED METHOD	Identifies the method of installation in accordance with as designated herein

NOTES	Identifies a note number for a special feature or equipment
BUILDING MTC	Identifies the building by number or title

c. Analog RF Cabling Requirements/Column Explanation:

Column	Explanation
FLOOR	Identifies the floor by number (i.e. 1st, 2nd, etc.)
TC ROOM NUMBER	Identifies the room, by number, from which cabling shall be installed
TO FLOOR TC	Identifies building, by number or location, to which cabling is installed
NUMBER OF STRANDS	Identifies the number of strands in each run of RF cable
INSTALLED METHOD	Identifies the method of installation in accordance with as designated herein
NOTES	Identifies a note number for a special feature or equipment
BUILDING MTC	Identifies the building by number or title

d. Analog Video Cabling Requirements/Column Explanation:

Column	Explanation
FROM BUILDING	Identifies building, by number or location, from which cabling is installed
TC ROOM NUMBER	Identifies the room, by number, from which cabling shall be installed
TO BUILDING IMC	Identifies building, by number or location, to which cabling is installed
TC ROOM NUMBER	Identifies the room, by number, to which cabling shall be installed
NUMBER OF STRANDS	Identifies the number of strands in each run of fiber optic cable
INSTALLED METHOD	Identifies the method of installation in accordance with as designated herein
NOTES	Identifies a note number for a special feature or equipment
BUILDING MTC	Identifies the building by number or title

3. Telecommunication Outlets: The Contractor shall clearly and fully indicate this category for each outlet location and compare the total count to the locations identified above as a part of the



technical submittal. Additionally, the Contractor shall indicate the total number of spares.

**PART 2 - PRODUCTS**

**2.1 EQUIPMENT AND MATERIALS**

- 27 10 00 - 2.2 DISTRIBUTION EQUIPMENT AND SYSTEMS
- 27 10 00 - 2.3 TELECOMMUNICATIONS CLOSET REQUIREMENTS
- 27 10 00 - 2.4 ENVIRONMENTAL REQUIREMENTS
- 27 10 00 - 2.5 INSTALLATION KIT

**SECTION 27 52 23  
NURSE CALL AND CODE BLUE SYSTEMS**

**PART 1 - GENERAL**

**PART 2 - PRODUCTS / FUNCTIONAL REQUIREMENTS**

- 2.0 GENERAL REQUIREMENTS FOR EQUIPMENT AND MATERIALS**
- 2.1 SYSTEM DESCRIPTION**
- 2.3 MANUFACTURERS**
- 2.4 PRODUCTS**

**SECTION 28 05 00  
COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY**

**PART 1 - GENERAL**

**1.6 SUBMITTALS**

- B. The Government's approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.
- C. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
  - 1. Mark the submittals, "SUBMITTED UNDER SECTION\_\_\_\_\_".
  - 2. Submittals shall be marked to show specification reference including the section and paragraph numbers.
  - 3. Submit each section separately.
- D. The submittals shall include the following:
  - 1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.

3. Parts list which shall include those replacement parts recommended by the equipment manufacturer, quantity of parts, current price and availability of each part.

E. Submittals shall be in full compliance of the Contract Documents. All submittals shall be provided in accordance with this section.

Submittals lacking the breadth or depth these requirements will be considered incomplete and rejected. Submissions are considered multidisciplinary and shall require coordination with applicable divisions to provide a complete and comprehensive submission package. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Government to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted. Additional general provisions are as follows:

1. The Contractor shall schedule submittals in order to maintain the project schedule. For coordination drawings refer to Specification Section 01 33 10 - Design Submittal Procedures, which outline basic submittal requirements and coordination. Section 01 33 10 shall be used in conjunction with this section.
2. The Contractor shall identify variations from requirements of Contract Documents and state product and system limitations, which may be detrimental to successful performance of the completed work or system.
3. Each package shall be submitted at one (1) time for each review and include components from applicable disciplines (e.g., electrical work, architectural finishes, door hardware, etc.) which are required to produce an accurate and detailed depiction of the project.
4. Manufacturer's information used for submittal shall have pages with items for approval tagged, items on pages shall be identified, and capacities and performance parameters for review shall be clearly marked through use of an arrow or highlighting. Provide space for Resident Engineer and Contractor review stamps.
5. Technical Data Drawings shall be in the latest version of AutoCAD®, drawn accurately, and in accordance with VA CAD Standards CAD Standard Application Guide, and VA BIM Guide. FREEHAND SKETCHES OR COPIED VERSIONS OF THE CONSTRUCTION DOCUMENTS WILL NOT BE ACCEPTED.

The Contractor shall not reproduce Contract Documents or copy standard information as the basis of the Technical Data Drawings. If departures from the technical data drawings are subsequently deemed necessary by the Contractor, details of such departures and the reasons thereof shall be submitted in writing to the Resident Engineer for approval before the initiation of work.

6. Packaging: The Contractor shall organize the submissions according to the following packaging requirements.
  - a. Binders: For each manual, provide heavy duty, commercial quality, durable three (3) ring vinyl covered loose leaf binders, sized to receive 8.5 x 11 in paper, and appropriate capacity to accommodate the contents. Provide a clear plastic sleeve on the spine to hold labels describing the contents. Provide pockets in the covers to receive folded sheets.
    - 1) Where two (2) or more binders are necessary to accommodate data; correlate data in each binder into related groupings according to the Project Manual table of contents. Cross-referencing other binders where necessary to provide essential information for communication of proper operation and/or maintenance of the component or system.
    - 2) Identify each binder on the front and spine with printed binder title, Project title or name, and subject matter covered. Indicate the volume number if applicable.
  - b. Dividers: Provide heavy paper dividers with celluloid tabs for each Section. Mark each tab to indicate contents.
  - c. Protective Plastic Jackets: Provide protective transparent plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
  - d. Text Material: Where written material is required as part of the manual use the manufacturer's standard printed material, or if not available, specially prepared data, neatly typewritten on 8.5 inches by 11 inches 20 pound white bond paper.
  - e. Drawings: Where drawings and/or diagrams are required as part of the manual, provide reinforced punched binder tabs on the drawings and bind them with the text.
    - 1) Where oversized drawings are necessary, fold the drawings to the same size as the text pages and use as a foldout.

- 2) If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in the front or rear pocket of the binder. Insert a type written page indicating the drawing title, description of contents and drawing location at the appropriate location of the manual.
  - 3) Drawings shall be sized to ensure details and text is of legible size. Text shall be no less than 1/16" tall.
- f. Manual Content: Submit in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

- 1) Maintenance and Operation Manuals: Submit as required for systems and equipment specified in the technical sections. Furnish four copies, bound in hardback binders, (manufacturer's standard binders) or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.
- 2) Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
- 3) The manuals shall include:
  - a) Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
  - b) A control sequence describing start-up, operation, and shutdown.
  - c) Description of the function of each principal item of equipment.
  - d) Installation and maintenance instructions.
  - e) Safety precautions.
  - f) Diagrams and illustrations.
  - g) Testing methods.
  - h) Performance data.

- i) Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
  - j) Appendix; list qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.
- g. Binder Organization: Organize each manual into separate sections for each piece of related equipment. At a minimum, each manual shall contain a title page, table of contents, copies of Product Data supplemented by drawings and written text, and copies of each warranty, bond, certifications, and service Contract issued. Refer to Group I through V Technical Data Package Submittal requirements for required section content.
- h. Title Page: Provide a title page as the first sheet of each manual to include the following information; project name and address, subject matter covered by the manual, name and address of the Project, date of the submittal, name, address, and telephone number of the Contractor, and cross references to related systems in other operating and/or maintenance manuals.
- i. Table of Contents: After the title page, include a type written table of contents for each volume, arranged systematically according to the Project Manual format. Provide a list of each product included, identified by product name or other appropriate identifying symbols and indexed to the content of the volume. Where more than one (1) volume is required to hold data for a particular system, provide a comprehensive table of contents for all volumes in each volume of the set.
- j. General Information Section: Provide a general information section immediately following the table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the installer and maintenance Contractor. In addition, list a local source for replacement parts and equipment.
- k. Drawings: Provide specially prepared drawings where necessary to supplement the manufacturers printed data to illustrate the relationship between components of equipment or systems, or

provide control or flow diagrams. Coordinate these drawings with information contained in Project Record Drawings to assure correct illustration of the completed installation.

- l. Manufacturer's Data: Where manufacturer's standard printed data is included in the manuals, include only those sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where more than one (1) item in tabular format is included, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation and delete references to information which is not applicable.
  - m. Where manufacturer's standard printed data is not available and the information is necessary for proper operation and maintenance of equipment or systems, or it is necessary to provide additional information to supplement the data included in the manual, prepare written text to provide the necessary information. Organize the text in a consistent format under a separate heading for different procedures. Where necessary, provide a logical sequence of instruction for each operating or maintenance procedure. Where similar or more than one product is listed on the submittal the Contractor shall differentiate by highlighting the specific product to be utilized.
  - n. Calculations: Provide a section for circuit and panel calculations.
  - o. Loading Sheets: Provide a section for DGP Loading Sheets.
  - p. Certifications: Provide section for Contractor's manufacturer certifications.
7. Contractor Review: Review submittals prior to transmittal. Determine and verify field measurements and field construction criteria. Verify manufacturer's catalog numbers and conformance of submittal with requirements of contract documents. Return non-conforming or incomplete submittals with requirements of the work and contract documents. Apply Contractor's stamp with signature certifying the review and verification of products occurred, and the field dimensions, adjacent construction, and coordination of information is in accordance with the requirements of the contract documents.

8. Resubmission: Revise and resubmit submittals as required within 15 calendar days of return of submittal. Make resubmissions under procedures specified for initial submittals. Identify all changes made since previous submittal.
  9. Product Data: Within 15 calendar days after execution of the contract, the Contractor shall submit for approval a complete list of all of major products proposed for use. The data shall include name of manufacturer, trade name, model number, the associated contract document section number, paragraph number, and the referenced standards for each listed product.
- F. Group 1 Technical Data Package: Group I Technical Data Package shall be one submittal consisting of the following content and organization. Refer to VA Special Conditions Document for drawing format and content requirements. The data package shall include the following:
1. Section I - Drawings:
    - a. General - Drawings shall conform to VA CAD Standards Guide. All text associated with security details shall be 1/8" tall and meet VA text standard for AutoCAD™ drawings.
    - b. Cover Sheet - Cover sheet shall consist of Project Title and Address, Project Number, Area and Vicinity Maps.
    - c. General Information Sheets - General Information Sheets shall consist of General Notes, Abbreviations, Symbols, Wire and Cable Schedule, Project Phasing, and Sheet Index.
    - d. Floor Plans - Floor plans shall be produced from the Architectural backgrounds issued in the Construction Documents. The contractor shall receive floor plans from the prime A/E to develop these drawing sets. Security devices shall be placed on drawings in scale. All text associated with security details shall be 1/8" tall and meet VA text standard for AutoCAD™ drawings. Floor plans shall identify the following:
      - 1) Security devices by symbol,
      - 2) The associated device point number (derived from the loading sheets),
      - 3) Wire & cable types and counts
      - 4) Conduit sizing and routing
      - 5) Conduit riser systems
      - 6) Device and area detail call outs

- e. Architectural details - Architectural details shall be produced for each device mounting type (door details for EECS and IDS, Intrusion Detection system (motion sensor, vibration, microwave Motion Sensor and Camera mounting,
- f. Riser Diagrams - Contractor shall provide a riser diagram indicating riser architecture and distribution of the SMS throughout the facility (or area in scope).
- g. Block Diagrams - Contractor shall provide a block diagram for the entire system architecture and interconnections with SMS subsystems. Block diagram shall identify SMS subsystem (e.g., electronic entry control, intrusion detection, closed circuit television, intercom, and other associated subsystems) integration; and data transmission and media conversion methodologies.
- h. Interconnection Diagrams - Contractor shall provide interconnection diagram for each sensor, and device component. Interconnection diagram shall identify termination locations, standard wire detail to include termination schedule. Diagram shall also identify interfaces to other systems such as elevator control, fire alarm systems, and security management systems.
- i. Security Details:
  - 1) Panel Assembly Detail - For each panel assembly, a panel assembly details shall be provided identifying individual panel component size and content.
  - 2) Panel Details - Provide security panel details identify general arrangement of the security system components, backboard size, wire through size and location, and power circuit requirements.
  - 3) Device Mounting Details - Provide mounting detailed drawing for each security device (physical access control system, intrusion detection, video surveillance and assessment, and intercom systems) for each type of wall and ceiling configuration in project. Device details shall include device, mounting detail, wiring and conduit routing.
  - 4) Details of connections to power supplies and grounding
  - 5) Details of surge protection device installation
  - 6) Sensor detection patterns - Each system sensor shall have associated detection patterns.



- 7) Equipment Rack Detail - For each equipment rack, provide a scaled detail of the equipment rack location and rack space utilization. Use of BISCII wire management standards shall be employed to identify wire management methodology. Transitions between equipment racks shall be shown to include use vertical and horizontal latter rack system.
- 8) Security Control Room - The contractor shall provide a layout plan for the Security Control Room. The layout plan shall identify all equipment and details associated with the installation.
- 9) Operator Console - The contractor shall provide a layout plan for the Operator Console. The layout plan shall identify all equipment and details associated with the installation.  
Equipment room - the contractor shall provide a layout plan for the equipment room. The layout plan shall identify all equipment and details associated with the installation.
- 10) Equipment Room - Equipment room details shall provide architectural, electrical, mechanical, plumbing, IT/Data and associated equipment and device placements both vertical and horizontally.
- j. Electrical Panel Schedule - Electrical Panel Details shall be provided for all SMS systems electrical power circuits. Panel details shall be provided identifying panel type (Standard, Emergency Power, Emergency/Uninterrupted Power Source, and Uninterrupted Power Source Only), panel location, circuit number, and circuit amperage rating.
- k. Door Schedule - A door schedule shall be developed for each door equipped with electronic security components. At a minimum, the door schedule shall be coordinated with Division 08 work and include the following information:
  - 1) Item Number
  - 2) Door Number (Derived from A/E Drawings)
  - 3) Floor Plan Sheet Number
  - 4) Standard Detail Number
  - 5) Door Description (Derived from Loading Sheets)
  - 6) Data Gathering Panel Input Number
  - 7) Door Position or Monitoring Device Type & Model Number
  - 8) Lock Type, Model Number & Power Input/Draw (standby/active)

- 9) Card Reader Type & Model Number
  - 10) Shunting Device Type & Model Number
  - 11) Sounder Type & Model Number
  - 12) Manufacturer
  - 13) Misc. devices as required
    - a) Delayed Egress Type & Model Number
    - b) Intercom
    - c) Camera
    - d) Electric Transfer Hinge
    - e) Electric Pass-through device
  - 14) Remarks column indicating special notes or door configurations
2. Camera Schedule - A camera schedule shall be developed for each camera. Contractors shall coordinate with the Resident Engineer to determine camera starting numbers and naming conventions. All drawings shall identify wire and cable standardization methodology. Color coding of all wiring conductors and jackets is required and shall be communicated consistently throughout the drawings package submittal. At a minimum, the camera schedule shall include the following information:
- a. Item Number
  - b. Camera Number
  - c. Naming Conventions
  - d. Description of Camera Coverage
  - e. Camera Location
  - f. Floor Plan Sheet Number
  - g. Camera Type
  - h. Mounting Type
  - i. Standard Detail Reference
  - j. Power Input & Draw
  - k. Power Panel Location
  - l. Remarks Column for Camera
3. Section II - Data Gathering Panel Documentation Package
- a. Contractor shall provide Data Gathering Panel (DGP) input and output documentation packages for review at the Shop Drawing submittal stage and also with the as-built documentation package. The documentation packages shall be provided in both printed and magnetic form at both review stages.

- b. The Contractor shall provide loading sheet documentation package for the associated DGP, including input and output boards for all field panels associated with the project. Documentation shall be provided in current version Microsoft Excel spreadsheets following the format currently utilized by VA. A separate spreadsheet file shall be generated for each DGP and associated field panels.
- c. The spreadsheet names shall follow a sequence that shall display the spreadsheets in numerical order according to the DGP system number. The spreadsheet shall include the prefix in the file name that uniquely identifies the project site. The spreadsheet shall detail all connected items such as card readers, alarm inputs, and relay output connections. The spreadsheet shall include an individual section (row) for each panel input, output and card reader. The spreadsheet shall automatically calculate the system numbers for card readers, inputs, and outputs based upon data entered in initialization fields.
- d. All entries must be verified against the field devices. Copies of the floor plans shall be forwarded under separate cover.
- e. The DGP spreadsheet shall include an entry section for the following information:
  - 1) DGP number
  - 2) First Reader Number
  - 3) First Monitor Point Number
  - 4) First Relay Number
  - 5) DGP, input or output Location
  - 6) DGP Chain Number
  - 7) DGP Cabinet Tamper Input Number
  - 8) DGP Power Fail Input Number
  - 9) Number of Monitor Points Reserved For Expansion Boards
  - 10) Number of Control Points (Relays) Reserved For Expansion Boards
- f. The DGP, input module and output module spreadsheets shall automatically calculate the following information based upon the associated entries in the above fields:
  - 1) System Numbers for Card Readers
  - 2) System Numbers for Monitor Point Inputs
  - 3) System Numbers for Control Points (Relays)

- 4) Next DGP or input module First Monitor Point Number
- 5) Next DGP or output module First Control Point Number
- g. The DGP spreadsheet shall provide the following information for each card reader:
  - 1) DGP Reader Number
  - 2) System Reader Number
  - 3) Cable ID Number
  - 4) Description Field (Room Number)
  - 5) Description Field (Device Type i.e.: In Reader, Out Reader, etc.)
  - 6) Description Field
  - 7) DGP Input Location
  - 8) Date Test
  - 9) Date Passed
  - 10) Cable Type
  - 11) Camera Numbers (of cameras viewing the reader location)
- h. The DGP and input module spreadsheet shall provide the following information for each monitor point (alarm input).
  - 1) DGP Monitor Point Input Number
  - 2) System Monitor Point Number
  - 3) Cable ID Number
  - 4) Description Field (Room Number)
  - 5) Description Field (Device Type i.e.: Door Contact, Motion Detector, etc.)
  - 7) DGP or input module Input Location
  - 8) Date Test
  - 9) Date Passed
  - 10) Cable Type
  - 11) Camera Numbers (of associated alarm event preset call-ups)
- i. The DGP and output module spreadsheet shall provide the following information for each control point (output relay).
  - 1) DGP Control Point (Relay) Number
  - 2) System (Control Point) Number
  - 3) Cable ID Number
  - 4) Description Field (Room Number)
  - 5) Description Field (Device: Lock Control, Local Sounder, etc.)
  - 6) Description Field
  - 7) DGP or OUTPUT MODULE Output Location

- 8) Date Test
- 9) Date Passed Cable Type
- 10) Camera Number (of associated alarm event preset call-ups)
- j. The DGP, input module and output module spreadsheet shall include the following information or directions in the header and footer:
  - 1) Header
    - a) DGP Input and Output Worksheet
    - b) Enter Beginning Reader, Input, and Output Starting Numbers and Sheet Will Automatically Calculate the Remaining System Numbers.
  - 2) Footer
    - a) File Name
    - b) Date Printed
    - c) Page Number
- 4. Section III - Construction Mock-up: In areas with exposed EMT/Conduit Raceways, contractor shall conceal raceway as much as practical and unobtrusively. In addition, historic significance must be considered to determine installation means and methods for approval by the owner.
- 5. Section IV - Manufacturers' Data: The data package shall include manufacturers' data for all materials and equipment, including sensors, local processors and console equipment provided under this specification.
- 6. Section V - System Description and Analysis: The data package shall include system descriptions, analysis, and calculations used in sizing equipment required by these specifications. Descriptions and calculations shall show how the equipment will operate as a system to meet the performance requirements of this specification. The data package shall include the following:
  - a. Central processor memory size; communication speed and protocol description; rigid disk system size and configuration; flexible disk system size and configuration; back-up media size and configuration; alarm response time calculations; command response time calculations; start-up operations; expansion capability and method of implementation; sample copy of each report specified; and color photographs representative of typical graphics.

- b. Software Data: The data package shall consist of descriptions of the operation and capability of the system, and application software as specified.
  - c. Overall System Reliability Calculations: The data package shall include all manufacturers' reliability data and calculations required to show compliance with the specified reliability.
- 7. Section VI - Certifications & References: All specified manufacturer's certifications shall be included with the data package. Contractor shall provide Project references as outlined in Paragraph 1.4 "Quality Assurance".
- G. Group II Technical Data Package
  - 1. The Contractor shall prepare a report of "Current Site Conditions" and submit a report to the Resident Engineer documenting changes to the site, particularly those conditions that affect performance of the system to be installed. The Contractor shall provide specification sheets, or written functional requirements to support the findings, and a cost estimate to correct those site changes or conditions which affect the installation of the system or its performance. The Contractor shall not correct any deficiency without written permission from the COTR.
  - 2. System Configuration and Functionality: The contractor shall provide the results of the meeting with VA to develop system requirements and functionality including but not limited to:
    - a. Baseline configuration
    - b. Access levels
    - c. Schedules (intrusion detection, physical access control, holidays, etc.)
    - d. Badge database
    - e. System monitoring and reporting (unit level and central control)
    - f. Naming conventions and descriptors
- H. Group III Technical Data Package
  - 1. Development of Test Procedures: The Contractor will prepare performance test procedures for the system testing. The test procedures shall follow the format of the VA Testing procedures and be customized to the contract requirements. The Contractor will deliver the test procedures to the Resident Engineer for approval at least 60 calendar days prior to the requested test date.
- I. Group IV Technical Data Package

1. Performance Verification Test

- a. Based on the successful completion of the pre-delivery test, the Contractor shall finalize the test procedures and report forms for the performance verification test (PVT) and the endurance test. The PVT shall follow the format, layout and content of the pre-delivery test. The Contractor shall deliver the PVT and endurance test procedures to the Resident Engineer for approval. The Contractor may schedule the PVT after receiving written approval of the test procedures. The Contractor shall deliver the final PVT and endurance test reports within 14 calendar days from completion of the tests. Refer to Part 3 of this section for System Testing and Acceptance requirements.

2. Training Documentation

- a. New Facilities and Major Renovations: Familiarization training shall be provided for new equipment or systems. Training can include site familiarization training for VA technicians and administrative personnel. Training shall include general information on new system layout including closet locations, turnover of the completed system including all documentation, including manuals, software, key systems, and full system administration rights. Lesson plans and training manuals training shall be oriented to type of training to be provided.
- b. New Unit Control Room:
  - 1) Provide the security personnel with training in the use, operation, and maintenance of the entire control room system (Unit Control and Equipment Rooms). The training documentation must include the operation and maintenance. The first of the training sessions shall take place prior to system turnover and the second immediately after turnover. Coordinate the training sessions with the Owner. Completed classroom sessions will be witnessed and documented by the Architect/Engineer, and approved by the Resident Engineer. Instruction is not to begin until the system is operational as designed.
  - 2) The training documents will cover the operation and the maintenance manuals and the control console operators' manuals and service manuals in detail, stressing all important operational and service diagnostic information necessary for

the maintenance and operations personnel to efficiently use and maintain all systems.

- 3) Provide an illustrated control console operator's manual and service manual. The operator's manual shall be written in laymen's language and printed so as to become a permanent reference document for the operators, describing all control panel switch operations, graphic symbol definitions and all indicating functions and a complete explanation of all software.
- 4) The service manual shall be written in laymen's language and printed so as to become a permanent reference document for maintenance personnel, describing how to run internal self diagnostic software programs, troubleshoot head end hardware and field devices with a complete scenario simulation of all possible system malfunctions and the appropriate corrective measures.
- 5) Provide a professional color DVD instructional recording of all the operational procedures described in the operator's manual. All charts used in the training session shall be clearly presented on the video. Any DVD found to be inferior in recording or material content shall be reproduced at no cost until an acceptable DVD is submitted. Provide four copies of the training DVD, one to the architect/engineer and three to the owner.

### 3. System Configuration and Data Entry:

- a. The contractor is responsible for providing all system configuration and data entry for the SMS and subsystems (e.g., video matrix switch, intercom, digital video recorders, network video recorders). All data entry shall be performed per VA standards & guidelines. The Contractor is responsible for participating in all meetings with the client to compile the information needed for data entry. These meetings shall be established at the beginning of the project and incorporated in to the project schedule as a milestone task. The contractor shall be responsible for all data collection, data entry, and system configuration. The contractor shall collect, enter, & program and/or configure the following components:

- 1) Physical Access control system components,



- 2) All intrusion detection system components,
  - 3) Video surveillance, control and recording systems,
  - 4) Intercom systems components,
  - 5) All other security subsystems shown in the contract documents.
- b. The Contractor is responsible for compiling the card access database for the VA employees, including programming reader configurations, access shifts, schedules, exceptions, card classes and card enrollment databases.
- c. Refer to Part 3 for system programming requirements and planning guidelines.
4. Graphics: Based on CAD as-built drawings developed for the construction project, create all map sets showing locations of all alarms and field devices. Graphical maps of all alarm points installed under this contract including perimeter and exterior alarm points shall be delivered with the system. The Contractor shall create and install all graphics needed to make the system operational. The Contractor shall utilize data from the contract documents, Contractor's field surveys, and all other pertinent information in the Contractor's possession to complete the graphics. The Contractor shall identify and request from the COTR, any additional data needed to provide a complete graphics package. Graphics shall have sufficient level of detail for the system operator to assess the alarm. The Contractor shall supply hard copy, color examples at least 203.2 x 254 mm (8 x 10 in) of each type of graphic to be used for the completed Security system. The graphics examples shall be delivered to the Resident Engineer for review and approval at least 90 calendar days prior to the scheduled date the Contractor requires them.
- J. Group V Technical Data Package: Final copies of the manuals shall be delivered to the Resident Engineer as part of the acceptance test. The draft copy used during site testing shall be updated with any changes required prior to final delivery of the manuals. Each manual's contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of each sub-contractor installing equipment or systems, as well as the nearest service representatives for each item of equipment for each system. The manuals shall include a table of contents and tab sheets. Tab sheets shall be placed at the beginning of each chapter or section and at the

beginning of each appendix. The final copies delivered after completion of the endurance test shall include all modifications made during installation, checkout, and acceptance. Six (6) hard-copies and one (1) soft copy on CD of each item listed below shall be delivered as a part of final systems acceptance.

1. Functional Design Manual: The functional design manual shall identify the operational requirements for the entire system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included for all system operating modes. Manufacturer developed literature may be used; however, shall be produced to match the project requirements.
2. Equipment Manual: A manual describing all equipment furnished including:
  - a. General description and specifications; installation and checkout procedures; equipment electrical schematics and layout drawings; system schematics and layout drawings; alignment and calibration procedures; manufacturer's repair list indicating sources of supply; and interface definition.
3. Software Manual: The software manual shall describe the functions of all software and include all other information necessary to enable proper loading, testing, and operation. The manual shall include:
  - a. Definition of terms and functions; use of system and applications software; procedures for system initialization, start-up, and shutdown; alarm reports; reports generation, database format and data entry requirements; directory of all disk files; and description of all communications protocols including data formats, command characters, and a sample of each type of data transfer.
4. Operator's Manual: The operator's manual shall fully explain all procedures and instructions for the operation of the system, including:
  - a. Computers and peripherals; system start-up and shutdown procedures; use of system, command, and applications software; recovery and restart procedures; graphic alarm presentation; use of report generator and generation of reports; data entry;

operator commands' alarm messages, and printing formats; and system access requirements.

5. Maintenance Manual: The maintenance manual shall include descriptions of maintenance for all equipment including inspection, recommend schedules, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective components.
6. Spare Parts & Components Data: At the conclusion of the Contractor's work, the Contractor shall submit to the Resident Engineer a complete list of the manufacturer's recommended spare parts and components required to satisfactorily maintain and service the systems, as well as unit pricing for those parts and components.
7. Operation, Maintenance & Service Manuals: The Contractor shall provide two (2) complete sets of operating and maintenance manuals in the form of an instructional manual for use by the VA Security Guard Force personnel. The manuals shall be organized into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder. If multiple volumes are required, each volume shall be fully indexed and coordinated.
8. Equipment and Systems Maintenance Manual: The Contractor shall provide the following descriptive information for each piece of equipment, operating system, and electronic system:
  - a. Equipment and/or system function.
  - b. Operating characteristics.
  - c. Limiting conditions.
  - d. Performance curves.
  - e. Engineering data and test.
  - f. Complete nomenclature and number of replacement parts.
  - g. Provide operating and maintenance instructions including assembly drawings and diagrams required for maintenance and a list of items recommended to stock as spare parts.
  - h. Provide information detailing essential maintenance procedures including the following: routine operations, trouble shooting guide, disassembly, repair and re-assembly, alignment, adjusting, and checking.
  - i. Provide information on equipment and system operating procedures, including the following; start-up procedures, routine and normal operating instructions, regulation and control procedures, instructions on stopping, shut-down and emergency instructions,

required sequences for electric and electronic systems, and special operating instructions.

j. Manufacturer equipment and systems maintenance manuals are permissible.

9. Project Redlines: During construction, the Contractor shall maintain an up-to-date set of construction redlines detailing current location and configuration of the project components. The redline documents shall be marked with the words 'Master Redlines' on the cover sheet and be maintained by the Contractor in the project office. The Contractor will provide access to redline documents anytime during the project for review and inspection by the Resident Engineer or authorized Office of Protection Services representative. Master redlines shall be neatly maintained throughout the project and secured under lock and key in the contractor's onsite project office. Any project component or assembly that is not installed in strict accordance with the drawings shall be so noted on the drawings. Prior to producing Record Construction Documents, the contractor will submit the Master Redline document to the Resident Engineer for review and approval of all changes or modifications to the documents. Each sheet shall have Resident Engineer initials indicating authorization to produce "As Built" documents. Field drawings shall be used for data gathering & field changes. These changes shall be made to the master redline documents daily. Field drawings shall not be considered "master redlines".
10. Record Specifications: The Contractor shall maintain one (1) copy of the Project Specifications, including addenda and modifications issued, for Project Record Documents. The Contractor shall mark the Specifications to indicate the actual installation where the installation varies substantially from that indicated in the Contract Specifications and modifications issued. (Note related Project Record Drawing information where applicable). The Contractor shall pay particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later. Upon completion of the mark ups, the Contractor shall submit record Specifications to the COTR. As with master relines,

Contractor shall maintain record specifications for Resident Engineer review and inspection at anytime.

11. Record Product Data: The Contractor shall maintain one (1) copy of each Product Data submittal for Project Record Document purposes. The Data shall be marked to indicate the actual product installed where the installation varies substantially from that indicated in the Product Data submitted. Significant changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation shall be included. Particular attention will be given to information on concealed products and installations that cannot be readily identified or recorded later. Note related Change Orders and mark up of Record Construction Documents, where applicable. Upon completion of mark up, submit a complete set of Record Product Data to the COTR.
12. Miscellaneous Records: The Contractor shall maintain one (1) copy of miscellaneous records for Project Record Document purposes. Refer to other Specifications for miscellaneous record-keeping requirements and submittals concerning various construction activities. Before substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Categories of requirements resulting in miscellaneous records include a minimum of the following:
  - a. Certificates received instead of labels on bulk products.
  - b. Testing and qualification of tradesmen. ("Contractor's Qualifications")
  - c. Documented qualification of installation firms.
  - d. Load and performance testing.
  - e. Inspections and certifications.
  - f. Final inspection and correction procedures.
  - g. Project schedule
13. Record Construction Documents (Record As-Built)
  - a. Upon project completion, the contractor shall submit the project master redlines to the Resident Engineer prior to development of Record construction documents. The Resident Engineer shall be given a minimum of a thirty (30) day review period to determine the adequacy of the master redlines. If the master redlines are found suitable by the Resident Engineer, the Resident Engineer

will initial and date each sheet and turn redlines over to the contractor for as built development.

- b. The Contractor shall provide the Resident Engineer a complete set of "as-built" drawings and original master redlined marked "as-built" blue-line in the latest version of AutoCAD drawings unlocked on CD or DVD. The as-built drawing shall include security device number, security closet connection location, data gathering panel number, and input or output number as applicable. All corrective notations made by the Contractor shall be legible when submitted to the COTR. If, in the opinion of the COTR, any redlined notation is not legible, it shall be returned to the Contractor for re-submission at no extra cost to the Owner. The Contractor shall organize the Record Drawing sheets into manageable sets bound with durable paper cover sheets with suitable titles, dates, and other identifications printed on the cover. The submitted as built shall be in editable formats and the ownership of the drawings shall be fully relinquished to the owner.
- c. Where feasible, the individual or entity that obtained record data, whether the individual or entity is the installer, sub-contractor, or similar entity, is required to prepare the mark up on Record Drawings. Accurately record the information in a comprehensive drawing technique. Record the data when possible after it has been obtained. For concealed installations, record and check the mark up before concealment. At the time of substantial completion, submit the Record Construction Documents to the COTR. The Contractor shall organize into bound and labeled sets for the COTR's continued usage. Provide device, conduit, and cable lengths on the conduit drawings. Exact in-field conduit placement/routings shall be shown. All conduits shall be illustrated in their entire length from termination in security closets; no arrowed conduit runs shall be shown. Pull box and junction box sizes are to be shown if larger than 100mm (4 inch).

#### K. FIPS 201 Compliance Certificates

1. Provide Certificates for all software components and device types utilizing credential verification. Provide certificates for:
  - b. Card Readers

- L. Approvals will be based on complete submission of manuals together with shop drawings.
- M. After approval and prior to installation, furnish the Resident Engineer with one sample of each of the following:
  - 1. A 300 mm (12 inch) length of each type and size of wire and cable along with the tag from the coils of reels from which the samples were taken.
  - 2. Each type of conduit and pathway coupling, bushing and termination fitting.
  - 3. Conduit hangers, clamps and supports.
  - 4. Duct sealing compound.
- O. In addition to the requirement of SUBMITTALS, the VA reserves the right to request the manufacturer to arrange for a VA representative to see typical active systems in operation, when there has been no prior experience with the manufacturer or the type of equipment being submitted.

## **PART 2 - PRODUCTS**

### **2.1 EQUIPMENT AND MATERIALS**

### **2.2 EQUIPMENT ITEMS**

### **2.5 INSTALLATION KIT**

## **SECTION 28 05 13**

### **CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY**

## **PART 1 - GENERAL**

### **1.5 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
  - 1. Manufacturer's Literature and Data: Showing each cable type and rating.
  - 2. Certificates: Two weeks prior to final inspection, deliver to the COR four copies of the certification that the material is in accordance with the drawings and specifications and diagrams for cable management system.
  - 3. Shop Drawings: Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:
    - a. Vertical and horizontal offsets and transitions.
    - b. Clearances for access above and to side of cable trays.
    - c. Vertical elevation of cable trays above the floor or bottom of ceiling structure.
    - d. Load calculations to show dead and live loads as not exceeding manufacturer's rating for tray and its support elements.
    - e. System labeling schedules, including electronic copy of labeling schedules that are part of the cable and asset identification system of the software specified in Parts 2 and 3.
  - 4. Wiring Diagrams. Show typical wiring schematics including the following:
    - a. Workstation outlets, jacks, and jack assemblies.
    - b. Patch cords.
    - c. Patch panels.
  - 5. Cable Administration Drawings: As specified in Part 3 "Identification" Article.
  - 6. Project planning documents as specified in Part 3.
  - 7. Maintenance Data: For wire and cable to include in maintenance manuals.

## **PART 2 - PRODUCTS**

- 2.1 GENERAL
- 2.2 BACKBOARDS
- 2.3 UTP CABLE
- 2.4 UTP CABLE HARDWARE
- 2.5 OPTICAL FIBER CABLE
- 2.6 OPTICAL FIBER CABLE HARDWARE
- 2.7 COAXIAL CABLE
- 2.8 COAXIAL CABLE HARDWARE
- 2.9 RS-232 CABLE
- 2.10 RS-485 CABLE
- 2.11 LOW-VOLTAGE CONTROL CABLE
- 2.12 CONTROL-CIRCUIT CONDUCTORS
- 2.13 FIRE ALARM WIRE AND CABLE
- 2.14 IDENTIFICATION PRODUCTS
- 2.15 SOURCE QUALITY CONTROL
- 2.16 WIRE LUBRICATING COMPOUND
- 2.17 FIREPROOFING TAPE

#### SECTION 28 05 26

##### GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY

#### PART 1 - GENERAL

##### 1.3 SUBMITTALS

- A. Submit in accordance with Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY.
- B. Shop Drawings:
  - 1. Clearly present enough information to determine compliance with drawings and specifications.
  - 2. Include the location of system grounding electrode connections and the routing of aboveground and underground grounding electrode conductors.
- C. Test Reports: Provide certified test reports of ground resistance.
- D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the COTR:
  - 1. Certification that the materials and installation are in accordance with the drawings and specifications.
  - 2. Certification by the contractor that the complete installation has been properly installed and tested.

#### PART 2 - PRODUCTS

- 2.1 GROUNDING AND BONDING CONDUCTORS
- 2.2 GROUND RODS
- 2.3 SPLICES AND TERMINATION COMPONENTS
- 2.4 EQUIPMENT RACK AND CABINET GROUND BARS
- 2.5 GROUND TERMINAL BLOCKS
- 2.6 SPLICE CASE GROUND ACCESSORIES
- 2.7 COMPUTER ROOM GROUND
- 2.8 SECURITY CONTROL ROOM GROUND

#### SECTION 28 05 28.33

##### CONDUITS AND BACKBOXES FOR ELECTRONIC SAFETY AND SECURITY

#### PART 1 - GENERAL

##### 1.5 SUBMITTALS

- A. Submit in accordance with Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY and Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. Furnish the following:
- B. Shop Drawings:
  - 1. Size and location of main feeders;
  - 2. Size and location of panels and pull boxes
  - 3. Layout of required conduit penetrations through structural elements.
  - 4. The specific item proposed and its area of application shall be



identified on the catalog cuts.

- C. Certification: Prior to final inspection, deliver to the COTR four copies of the certification that the material is in accordance with the drawings and specifications and has been properly installed.
- E. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- F. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Custom enclosures and cabinets.
  - 2. Not used.
- G. 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.
- I. Source quality-control test reports.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

### **2.2.CONDUIT**

### **2.3.WIREWAYS AND RACEWAYS**

### **2.4.CONDUIT FITTINGS**

### **2.5 CONDUIT SUPPORTS**

### **2.6 OUTLET, JUNCTION, AND PULL BOXES**

### **2.7 CABINETS**

### **2.8 WIREWAYS**

### **2.9 WARNING TAPE**

### **2.10 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING**

### **2.11 SLEEVES FOR RACEWAYS**

### **2.12 SLEEVE SEALS**

### **2.13 GROUT**

## **SECTION 28 13 00 PHYSICAL ACCESS CONTROL SYSTEM**

## **PART 1 - GENERAL**

### **1.4 SUBMITTALS**

- A. Refer to 28 05 00 COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY, Part 1
- B. Provide certificates of compliance with Section 1.3, Quality Assurance.
- C. Provide a complete and thorough pre-installation and as-built design package in both electronic format and on paper, minimum size 48 x 48 inches (1220 x 1220 millimeters); drawing submittals shall be per the established project schedule.
- D. Shop drawing and as-built packages shall include, but not be limited to:
  - 1. Index Sheet that shall:
    - a. Define each page of the design package to include facility name, building name, floor, and sheet number.
    - b. Provide a complete list of all security abbreviations and symbols.
    - c. Reference all general notes that are utilized within the design package.
    - d. Specification and scope of work pages for all individual security systems that are applicable to the design package that will:
      - 1) Outline all general and job specific work required within the design package.
      - 2) Provide a detailed device identification table outlining

- device Identification (ID) and use for all security systems equipment utilized in the design package.
2. Drawing sheets that will be plotted on the individual floor plans or site plans shall:
    - a. Include a title block as defined above.
    - b. Clearly define the drawings scale in both standard and metric measurements.
    - c. Provide device identification and location.
    - d. Address all signal and power conduit runs and sizes that are associated with the design of the electronic security system and other security elements (e.g., barriers, etc.).
    - e. Identify all pull box and conduit locations, sizes, and fill capacities.
    - f. Address all general and drawing specific notes for a particular drawing sheet.
  3. A detailed riser drawing for each applicable security subsystem shall:
    - a. Indicate the sequence of operation.
    - b. Relationship of integrated components on one diagram.
    - c. Include the number, size, identification, and maximum lengths of interconnecting wires.
    - d. Wire/cable types shall be defined by a wire and cable schedule. The schedule shall utilize a lettering system that will correspond to the wire/cable it represents (example: A = 18 AWG/1 Pair Twisted, Unshielded). This schedule shall also provide the manufacturer's name and part number for the wire/cable being installed.
  4. A detailed system drawing for each applicable security system shall:
    - a. Clearly identify how all equipment within the system, from main panel to device, shall be laid out and connected.
    - b. Provide full detail of all system components wiring from point-to-point.
    - c. Identify wire types utilized for connection, interconnection with associate security subsystems.
    - d. Show device locations that correspond to the floor plans.
    - e. All general and drawing specific notes shall be included with the system drawings.
  5. A detailed schedule for all of the applicable security subsystems shall be included. All schedules shall provide the following information:
    - a. Device ID.
    - b. Device Location (e.g. site, building, floor, room number, location, and description).
    - c. Mounting type (e.g. flush, wall, surface, etc.).
    - d. Power supply or circuit breaker and power panel number.
    - e. In addition, for the PACS, provide the door ID, door type (e.g. wood or metal), locking mechanism (e.g. strike or electromagnetic lock) and control device (e.g. card reader or biometrics).
  6. Detail and elevation drawings for all devices that define how they were installed and mounted.
- E. Pre-installation design packages shall go through a full review process conducted by the Contractor along with a VA representative to ensure all work has been clearly defined and completed. All reviews shall be conducted in accordance with the project schedule. There shall be four (4) stages to the review process:
1. 35 percent

2. 65 percent
  3. 90 percent
  4. 100 percent
- F. Provide manufacturer security system product cut-sheets. Submit for approval at least 30 days prior to commencement of formal testing, a Security System Operational Test Plan. Include procedures for operational testing of each component and security subsystem, to include performance of an integrated system test.
- G. Submit manufacture's certification of Underwriters Laboratories, Inc. (UL) listing as specified. Provide all maintenance and operating manuals per Section 01 00 00, GENERAL REQUIREMENTS, and Section 28 05 00 COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY.
- H. Completed System Readiness Checklists provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 28 08 00 COMMISSIONING OF ELECTRONIC SAFETY AND SECURITY SYSTEMS.
- I. General: Submittals shall be in full compliance of the Contract Documents. All submittals shall be provided in accordance with this section. Submittals lacking the breadth or depth these requirements will be considered incomplete and rejected. Submissions are considered multidisciplinary and shall require coordination with applicable divisions to provide a complete and comprehensive submission package. Additional general provisions are as follows:
1. The Contractor shall schedule submittals in order to maintain the project schedule. For coordination drawings refer to Specification Section 01 33 10 - DESIGN SUBMITTAL PROCEDURES, which outline basic submittal requirements and coordination. Section 01 33 10 shall be used in conjunction with this section.
  2. The Contractor shall identify variations from requirements of Contract Documents and state product and system limitations, which may be detrimental to successful performance of the completed work or system.
  3. Each package shall be submitted at one (1) time for each review and include components from applicable disciplines (e.g., electrical work, architectural finishes, door hardware, etc.) which are required to produce an accurate and detailed depiction of the project.
  4. Manufacturer's information used for submittal shall have pages with items for approval tagged, items on pages shall be identified, and capacities and performance parameters for review shall be clearly marked through use of an arrow or highlighting. Provide space for Resident Engineer and Contractor review stamps.
  5. Technical Data Drawings shall be in the latest version of AutoCAD®, drawn accurately, and in accordance with VA CAD Standards. FREEHAND SKETCHES OR COPIED VERSIONS OF THE CONSTRUCTION DOCUMENTS WILL NOT BE ACCEPTED. The Contractor shall not reproduce Contract Documents or copy standard information as the basis of the Technical Data Drawings. If departures from the technical data drawings are subsequently deemed necessary by the Contractor, details of such departures and the reasons thereof shall be submitted in writing to the Resident Engineer for approval before the initiation of work.
  6. Packaging: The Contractor shall organize the submissions according to the following packaging requirements.
    - a. Binders: For each manual, provide heavy duty, commercial quality, durable three (3) ring vinyl covered loose leaf binders, sized to receive 8.5 x 11 in paper, and appropriate capacity to

accommodate the contents. Provide a clear plastic sleeve on the spine to hold labels describing the contents. Provide pockets in the covers to receive folded sheets.

- 1) Where two (2) or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross-referencing other binders where necessary to provide essential information for communication of proper operation and or maintenance of the component or system.
- 2) Identify each binder on the front and spine with printed binder title, Project title or name, and subject matter covered. Indicate the volume number if applicable.
- b. Dividers: Provide heavy paper dividers with celluloid tabs for each Section. Mark each tab to indicate contents.
- c. Protective Plastic Jackets: Provide protective transparent plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
- d. Text Material: Where written material is required as part of the manual use the manufacturer's standard printed material, or if not available, specially prepared data, neatly typewritten on 8.5 inches by 11 inches 20 pound white bond paper.
- e. Drawings: Where drawings and/or diagrams are required as part of the manual, provide reinforced punched binder tabs on the drawings and bind them with the text.
  - 1) Where oversized drawings are necessary, fold the drawings to the same size as the text pages and use as a foldout.
  - 2) If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in the front or rear pocket of the binder. Insert a type written page indicating the drawing title, description of contents and drawing location at the appropriate location of the manual.
  - 3) Drawings shall be sized to ensure details and text is of legible size. Text shall be no less than 1/16" tall.
- f. Manual Content: In each manual include information specified in the individual Specification section, and the following information for each major component of building equipment and controls:
  - 1) General system or equipment description.
  - 2) Design factors and assumptions.
  - 3) Copies of applicable Shop Drawings and Product Data.
  - 4) System or equipment identification including: manufacturer, model and serial numbers of each component, operating instructions, emergency instructions, wiring diagrams, inspection and test procedures, maintenance procedures and schedules, precautions against improper use and maintenance, repair instructions, sources of required maintenance materials and related services, and a manual index.
- g. Binder Organization: Organize each manual into separate sections for each piece of related equipment. At a minimum, each manual shall contain a title page, table of contents, copies of Product Data supplemented by drawings and written text, and copies of each warranty, bond, certifications, and service Contract issued. Refer to Group I through V Technical Data Package Submittal requirements for required section content.
- h. Title Page: Provide a title page as the first sheet of each manual to include the following information; project name and address, subject matter covered by the manual, name and address

- of the Project, date of the submittal, name, address, and telephone number of the Contractor, and cross references to related systems in other operating and/or maintenance manuals.
- i. Table of Contents: After the title page, include a type written table of contents for each volume, arranged systematically according to the Project Manual format. Provide a list of each product included, identified by product name or other appropriate identifying symbols and indexed to the content of the volume. Where more than one (1) volume is required to hold data for a particular system, provide a comprehensive table of contents for all volumes in each volume of the set.
  - j. General Information Section: Provide a general information section immediately following the table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the installer and maintenance Contractor. In addition, list a local source for replacement parts and equipment.
  - k. Drawings: Provide specially prepared drawings where necessary to supplement the manufacturers printed data to illustrate the relationship between components of equipment or systems, or provide control or flow diagrams. Coordinate these drawings with information contained in Project Record Drawings to assure correct illustration of the completed installation.
  - l. Manufacturer's Data: Where manufacturer's standard printed data is included in the manuals, include only those sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where more than one (1) item in tabular format is included, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation and delete references to information which is not applicable.
  - m. Where manufacturer's standard printed data is not available and the information is necessary for proper operation and maintenance of equipment or systems, or it is necessary to provide additional information to supplement the data included in the manual, prepare written text to provide the necessary information. Organize the text in a consistent format under a separate heading for different procedures. Where necessary, provide a logical sequence of instruction for each operating or maintenance procedure. Where similar or more than one product is listed on the submittal the Contractor shall differentiate by highlighting the specific product to be utilized.
  - n. Calculations: Provide a section for circuit and panel calculations.
  - o. Loading Sheets: Provide a section for DGP Loading Sheets.
  - p. Certifications: Provide section for Contractor's manufacturer certifications.
7. Contractor Review: Review submittals prior to transmittal. Determine and verify field measurements and field construction criteria. Verify manufacturer's catalog numbers and conformance of submittal with requirements of contract documents. Return non-conforming or incomplete submittals with requirements of the work and contract documents. Apply Contractor's stamp with signature certifying the review and verification of products occurred, and the field dimensions, adjacent construction, and coordination of information is in accordance with the requirements of the contract

- documents.
8. Resubmission: Revise and resubmit submittals as required within 15 calendar days of return of submittal. Make resubmissions under procedures specified for initial submittals. Identify all changes made since previous submittal.
  9. Product Data: Within 15 calendar days after execution of the contract, the Contractor shall submit for approval a complete list of all of major products proposed for use. The data shall include name of manufacturer, trade name, model number, the associated contract document section number, paragraph number, and the referenced standards for each listed product.
- J. Group 1 Technical Data Package: Group I Technical Data Package shall be one submittal consisting of the following content and organization. Refer to VA Special Conditions Document for drawing format and content requirements. The data package shall include the following:
1. Section I - Drawings:
    - a. General - Drawings shall conform to VA Special Conditions and CAD Standards Documents. All text associated with security details shall be 1/8" tall and meet VA text standard for AutoCAD™ drawings.
    - b. Cover Sheet - Cover sheet shall consist of Project Title and Address, Project Number, Area and Vicinity Maps.
    - c. General Information Sheets - General Information Sheets shall consist of General Notes, Abbreviations, Symbols, Wire and Cable Schedule, Project Phasing, and Sheet Index.
    - d. Floor Plans - Floor plans shall be produced from the Architectural backgrounds issued in the Construction Documents. The contractor shall receive floor plans from the prime A/E to develop these drawing sets. Security devices shall be placed on drawings in scale. All text associated with security details shall be 1/8" tall and meet VA text standard for AutoCAD™ drawings. Floor plans shall identify the following:
      - 1) security devices by symbol,
      - 2) the associated device point number (derived from the loading sheets),
      - 3) wire & cable types and counts
      - 4) conduit sizing and routing
      - 5) conduit riser systems
      - 6) device and area detail call outs
    - e. Architectural details - Architectural details shall be produced for each device mounting type (door details for doors with physical access control, reader pedestals and mounts, security panel and power supply details).
    - f. Riser Diagrams - Contractor shall provide a riser diagram indicating riser architecture and distribution of the physical access control system throughout the facility (or area in scope).
    - g. Block Diagrams - Contractor shall provide a block diagram for the entire system architecture and interconnections with SMS subsystems. Block diagram shall identify SMS subsystem (e.g., physical access control, intrusion detection, closed circuit television, intercom, and other associated subsystems) integration; and data transmission and media conversion methodologies.
    - h. Interconnection Diagrams - Contractor shall provide interconnection diagram for each sensor, and device component. Interconnection diagram shall identify termination locations, standard wire detail to include termination schedule. Diagram

shall also identify interfaces to other systems such as elevator control, fire alarm systems, and security management systems.

i. Security Details:

- 1) Panel Assembly Detail - For each panel assembly, a panel assembly details shall be provided identifying individual panel component size and content.
- 2) Panel Details - Provide security panel details identify general arrangement of the security system components, backboard size, wire through size and location, and power circuit requirements.
- 3) Device Mounting Details - Provide mounting detailed drawing for each security device (physical access control system, intrusion detection, video surveillance and assessment, and intercom systems) for each type of wall and ceiling configuration in project. Device details shall include device, mounting detail, wiring and conduit routing.
- 4) Details of connections to power supplies and grounding
- 5) Details of surge protection device installation
- 6) Sensor detection patterns - Each system sensor shall have associated detection patterns.
- 7) Equipment Rack Detail - For each equipment rack, provide a scaled detail of the equipment rack location and rack space utilization. Use of BISC wire management standards shall be employed to identify wire management methodology. Transitions between equipment racks shall be shown to include use vertical and horizontal latter rack system.
- 8) Security Control Room - The contractor shall provide a layout plan for the Security Control Room. The layout plan shall identify all equipment and details associated with the installation.
- 9) Operator Console - The contractor shall provide a layout plan for the Operator Console. The layout plan shall identify all equipment and details associated with the installation.  
Equipment room - the contractor shall provide a layout plan for the equipment room. The layout plan shall identify all equipment and details associated with the installation.
- 10) Equipment Room - Equipment room details shall provide architectural, electrical, mechanical, plumbing, IT/Data and associated equipment and device placements both vertical and horizontally.

j. Electrical Panel Schedule - Electrical Panel Details shall be provided for all SMS systems electrical power circuits. Panel details shall be provided identifying panel type (Standard, Emergency Power, Emergency/Uninterrupted Power Source, and Uninterrupted Power Source Only), panel location, circuit number, and circuit amperage rating.

k. Door Schedule - A door schedule shall be developed for each door equipped with electronic security components. At a minimum, the door schedule shall be coordinated with Division 08 work and include the following information:

- 1) Item Number
- 2) Door Number (Derived from A/E Drawings)
- 3) Floor Plan Sheet Number
- 4) Standard Detail Number
- 5) Door Description (Derived from Loading Sheets)
- 6) Data Gathering Panel Input Number
- 7) Door Position or Monitoring Device Type & Model Number

- 8) Lock Type, Model Number & Power Input/Draw (standby/active)
  - 9) Card Reader Type & Model Number
  - 10) Shunting Device Type & Model Number
  - 11) Sounder Type & Model Number
  - 12) Manufacturer
  - 13) Misc. devices as required
    - a) Delayed Egress Type & Model Number
    - b) Intercom
    - c) Camera
    - d) Electric Transfer Hinge
    - e) Electric Pass-through device
  - 14) Remarks column indicating special notes or door configurations
2. Camera Schedule - A camera schedule shall be developed for each camera. Contractors shall coordinate with the Resident Engineer to determine camera starting numbers and naming conventions. All drawings shall identify wire and cable standardization methodology. Color coding of all wiring conductors and jackets is required and shall be communicated consistently throughout the drawings package submittal. At a minimum, the camera schedule shall include the following information:
- a. Item Number
  - b. Camera Number
  - c. Naming Conventions
  - d. Description of Camera Coverage
  - e. Camera Location
  - f. Floor Plan Sheet Number
  - g. Camera Type
  - h. Mounting Type
  - i. Standard Detail Reference
  - j. Power Input & Draw
  - k. Power Panel Location
  - l. Remarks Column for Camera
3. Section II - Data Gathering Panel Documentation Package
- a. Contractor shall provide Data Gathering Panel (DGP) input and output documentation packages for review at the Shop Drawing submittal stage and also with the as-built documentation package. The documentation packages shall be provided in both printed and magnetic form at both review stages.
  - b. The Contractor shall provide loading sheet documentation package for the associated DGP, including input and output boards for all field panels associated with the project. Documentation shall be provided in current version Microsoft Excel spreadsheets following the format currently utilized by VA. A separate spreadsheet file shall be generated for each DGP and associated field panels.
  - c. The spreadsheet names shall follow a sequence that shall display the spreadsheets in numerical order according to the DGP system number. The spreadsheet shall include the prefix in the file name that uniquely identifies the project site. The spreadsheet shall detail all connected items such as card readers, alarm inputs, and relay output connections. The spreadsheet shall include an individual section (row) for each panel input, output and card reader. The spreadsheet shall automatically calculate the system numbers for card readers, inputs, and outputs based upon data entered in initialization fields.
  - d. All entries must be verified against the field devices. Copies



- of the floor plans shall be forwarded under separate cover.
- e. The DGP spreadsheet shall include an entry section for the following information:
    - 1) DGP number
    - 2) First Reader Number
    - 3) First Monitor Point Number
    - 4) First Relay Number
    - 5) DGP, input or output Location
    - 6) DGP Chain Number
    - 7) DGP Cabinet Tamper Input Number
    - 8) DGP Power Fail Input Number
    - 9) Number of Monitor Points Reserved For Expansion Boards
    - 10) Number of Control Points (Relays) Reserved For Expansion Boards
  - f. The DGP, input module and output module spreadsheets shall automatically calculate the following information based upon the associated entries in the above fields:
    - 1) System Numbers for Card Readers
    - 2) System Numbers for Monitor Point Inputs
    - 3) System Numbers for Control Points (Relays)
    - 4) Next DGP or input module First Monitor Point Number
    - 5) Next DGP or output module First Control Point Number
  - g. The DGP spreadsheet shall provide the following information for each card reader:
    - 1) DGP Reader Number
    - 2) System Reader Number
    - 3) Cable ID Number
    - 4) Description Field (Room Number)
    - 5) Description Field (Device Type i.e.: In Reader, Out Reader, etc.)
    - 6) Description Field
    - 7) DGP Input Location
    - 8) Date Test
    - 9) Date Passed
    - 10) Cable Type
    - 11) Camera Numbers (of cameras viewing the reader location)
  - h. The DGP and input module spreadsheet shall provide the following information for each monitor point (alarm input).
    - 1) DGP Monitor Point Input Number
    - 2) System Monitor Point Number
    - 3) Cable ID Number
    - 4) Description Field (Room Number)
    - 5) Description Field (Device Type i.e.: Door Contact, Motion Detector, etc.)
    - 6) DGP or input module Input Location
    - 7) Date Test
    - 8) Date Passed
    - 9) Cable Type
    - 10) Camera Numbers (of associated alarm event preset call-ups)
  - i. The DGP and output module spreadsheet shall provide the following information for each control point (output relay).
    - 1) DGP Control Point (Relay) Number
    - 2) System (Control Point) Number
    - 3) Cable ID Number
    - 4) Description Field (Room Number)
    - 5) Description Field (Device: Lock Control, Local Sounder, etc.)
    - 6) Description Field

- 7) DGP or OUTPUT MODULE Output Location
- 8) Date Test
- 9) Date Passed Cable Type
- 10) Camera Number (of associated alarm event preset call-ups)
- j. The DGP, input module and output module spreadsheet shall include the following information or directions in the header and footer:
  - 1) Header
    - a) DGP Input and Output Worksheet
    - b) Enter Beginning Reader, Input, and Output Starting Numbers and Sheet Will Automatically Calculate the Remaining System Numbers.
  - 2) Footer
    - a) File Name
    - b) Date Printed
    - c) Page Number
- 5. Section IV - Manufacturers' Data: The data package shall include manufacturers' data for all materials and equipment, including sensors, local processors and console equipment provided under this specification.
- 6. Section V - System Description and Analysis: The data package shall include system descriptions, analysis, and calculations used in sizing equipment required by these specifications. Descriptions and calculations shall show how the equipment will operate as a system to meet the performance requirements of this specification. The data package shall include the following:
  - a. Central processor memory size; communication speed and protocol description; rigid disk system size and configuration; flexible disk system size and configuration; back-up media size and configuration; alarm response time calculations; command response time calculations; start-up operations; expansion capability and method of implementation; sample copy of each report specified; and color photographs representative of typical graphics.
  - b. Software Data: The data package shall consist of descriptions of the operation and capability of the system, and application software as specified.
  - c. Overall System Reliability Calculations: The data package shall include all manufacturers' reliability data and calculations required to show compliance with the specified reliability.
- 7. Section VI - Certifications & References: All specified manufacturer's certifications shall be included with the data package. Contractor shall provide Project references as outlined in Paragraph 1.4 "Quality Assurance".
- K. Group II Technical Data Package
  - 1. The Contractor shall prepare a report of "Current Site Conditions" and submit a report to the Resident Engineer documenting changes to the site, particularly those conditions that affect performance of the system to be installed. The Contractor shall provide specification sheets, or written functional requirements to support the findings, and a cost estimate to correct those site changes or conditions which affect the installation of the system or its performance. The Contractor shall not correct any deficiency without written permission from the COTR.
  - 2. System Configuration and Functionality: The contractor shall provide the results of the meeting with VA to develop system requirements and functionality including but not limited to:
    - a. Baseline configuration
    - b. Access levels

- c. Schedules (intrusion detection, physical access control, holidays, etc.)
  - d. Badge database
  - e. System monitoring and reporting (unit level and central control)
  - f. Naming conventions and descriptors
- L. Group III Technical Data Package
  - 1. Development of Test Procedures: The Contractor will prepare performance test procedures for the system testing. The test procedures shall follow the format of the VA Testing procedures and be customized to the contract requirements. The Contractor will deliver the test procedures to the Resident Engineer for approval at least 60 calendar days prior to the requested test date.
- M. Group IV Technical Data Package
  - 1. Performance Verification Test
    - a. Based on the successful completion of the pre-delivery test, the Contractor shall finalize the test procedures and report forms for the performance verification test (PVT) and the endurance test. The PVT shall follow the format, layout and content of the pre-delivery test. The Contractor shall deliver the PVT and endurance test procedures to the Resident Engineer for approval. The Contractor may schedule the PVT after receiving written approval of the test procedures. The Contractor shall deliver the final PVT and endurance test reports within 14 calendar days from completion of the tests. Refer to Part 3 of this section for System Testing and Acceptance requirements.
  - 2. Training Documentation
    - a. New Facilities and Major Renovations: Familiarization training shall be provided for new equipment or systems. Training can include site familiarization training for VA technicians and administrative personnel. Training shall include general information on new system layout including closet locations, turnover of the completed system including all documentation, including manuals, software, key systems, and full system administration rights. Lesson plans and training manuals training shall be oriented to type of training to be provided.
    - b. New Unit Control Room:
      - 1) Provide the security personnel with training in the use, operation, and maintenance of the entire control room system (Unit Control and Equipment Rooms). The training documentation must include the operation and maintenance. The first of the training sessions shall take place prior to system turnover and the second immediately after turnover. Coordinate the training sessions with the Owner. Completed classroom sessions will be witnessed and documented by the Architect/Engineer, and approved by the Resident Engineer. Instruction is not to begin until the system is operational as designed.
      - 2) The training documents will cover the operation and the maintenance manuals and the control console operators' manuals and service manuals in detail, stressing all important operational and service diagnostic information necessary for the maintenance and operations personnel to efficiently use and maintain all systems.
      - 3) Provide an illustrated control console operator's manual and service manual. The operator's manual shall be written in laymen's language and printed so as to become a permanent reference document for the operators, describing all control

panel switch operations, graphic symbol definitions and all indicating functions and a complete explanation of all software.

- 4) The service manual shall be written in laymen's language and printed so as to become a permanent reference document for maintenance personnel, describing how to run internal self diagnostic software programs, troubleshoot head end hardware and field devices with a complete scenario simulation of all possible system malfunctions and the appropriate corrective measures.
  - 5) Provide a professional color DVD instructional recording of all the operational procedures described in the operator's manual. All charts used in the training session shall be clearly presented on the video. Any DVD found to be inferior in recording or material content shall be reproduced at no cost until an acceptable DVD is submitted. Provide four copies of the training DVD, one to the architect/engineer and three to the owner.
3. System Configuration and Data Entry:
- a. The contractor is responsible for providing all system configuration and data entry for the SMS and subsystems (e.g., video matrix switch, intercom, digital video recorders, network video recorders). All data entry shall be performed per VA standards & guidelines. The Contractor is responsible for participating in all meetings with the client to compile the information needed for data entry. These meetings shall be established at the beginning of the project and incorporated in to the project schedule as a milestone task. The contractor shall be responsible for all data collection, data entry, and system configuration. The contractor shall collect, enter, & program and/or configure the following components:
    - 1) Physical Access control system components,
    - 2) All intrusion detection system components,
    - 3) Video surveillance, control and recording systems,
    - 4) Intercom systems components,
    - 5) All other security subsystems shown in the contract documents.
  - b. The Contractor is responsible for compiling the card access database for the VA employees, including programming reader configurations, access shifts, schedules, exceptions, card classes and card enrollment databases.
  - c. Refer to Part 3 for system programming requirements and planning guidelines.
4. Graphics: Based on CAD as-built drawings developed for the construction project, create all map sets showing locations of all alarms and field devices. Graphical maps of all alarm points installed under this contract including perimeter and exterior alarm points shall be delivered with the system. The Contractor shall create and install all graphics needed to make the system operational. The Contractor shall utilize data from the contract documents, Contractor's field surveys, and all other pertinent information in the Contractor's possession to complete the graphics. The Contractor shall identify and request from the COTR, any additional data needed to provide a complete graphics package. Graphics shall have sufficient level of detail for the system operator to assess the alarm. The Contractor shall supply hard copy, color examples at least 203.2 x 254 mm (8 x 10 in) of each type of graphic to be used for the completed Security system. The

graphics examples shall be delivered to the Resident Engineer for review and approval at least 90 calendar days prior to the scheduled date the Contractor requires them.

- N. Group V Technical Data Package: Final copies of the manuals shall be delivered to the Resident Engineer as part of the acceptance test. The draft copy used during site testing shall be updated with any changes required prior to final delivery of the manuals. Each manual's contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of each sub-contractor installing equipment or systems, as well as the nearest service representatives for each item of equipment for each system. The manuals shall include a table of contents and tab sheets. Tab sheets shall be placed at the beginning of each chapter or section and at the beginning of each appendix. The final copies delivered after completion of the endurance test shall include all modifications made during installation, checkout, and acceptance. Six (6) hard-copies and one (1) soft copy on CD of each item listed below shall be delivered as a part of final systems acceptance.
1. Functional Design Manual: The functional design manual shall identify the operational requirements for the entire system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included for all system operating modes. Manufacturer developed literature may be used; however, shall be produced to match the project requirements.
  2. Equipment Manual: A manual describing all equipment furnished including:
    - a. General description and specifications; installation and checkout procedures; equipment electrical schematics and layout drawings; system schematics and layout drawings; alignment and calibration procedures; manufacturer's repair list indicating sources of supply; and interface definition.
  3. Software Manual: The software manual shall describe the functions of all software and include all other information necessary to enable proper loading, testing, and operation. The manual shall include:
    - a. Definition of terms and functions; use of system and applications software; procedures for system initialization, start-up, and shutdown; alarm reports; reports generation, database format and data entry requirements; directory of all disk files; and description of all communications protocols including data formats, command characters, and a sample of each type of data transfer.
  4. Operator's Manual: The operator's manual shall fully explain all procedures and instructions for the operation of the system, including:
    - a. Computers and peripherals; system start-up and shutdown procedures; use of system, command, and applications software; recovery and restart procedures; graphic alarm presentation; use of report generator and generation of reports; data entry; operator commands' alarm messages, and printing formats; and system access requirements.
  5. Maintenance Manual: The maintenance manual shall include descriptions of maintenance for all equipment including inspection, recommend schedules, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective components.
  6. Spare Parts & Components Data: At the conclusion of the

- Contractor's work, the Contractor shall submit to the Resident Engineer a complete list of the manufacturer's recommended spare parts and components required to satisfactorily maintain and service the systems, as well as unit pricing for those parts and components.
7. Operation, Maintenance & Service Manuals: The Contractor shall provide two (2) complete sets of operating and maintenance manuals in the form of an instructional manual for use by the VA Security Guard Force personnel. The manuals shall be organized into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder. If multiple volumes are required, each volume shall be fully indexed and coordinated.
  8. Equipment and Systems Maintenance Manual: The Contractor shall provide the following descriptive information for each piece of equipment, operating system, and electronic system:
    - a. Equipment and/or system function.
    - b. Operating characteristics.
    - c. Limiting conditions.
    - d. Performance curves.
    - e. Engineering data and test.
    - f. Complete nomenclature and number of replacement parts.
    - g. Provide operating and maintenance instructions including assembly drawings and diagrams required for maintenance and a list of items recommended to stock as spare parts.
    - h. Provide information detailing essential maintenance procedures including the following: routine operations, trouble shooting guide, disassembly, repair and re-assembly, alignment, adjusting, and checking.
    - i. Provide information on equipment and system operating procedures, including the following; start-up procedures, routine and normal operating instructions, regulation and control procedures, instructions on stopping, shut-down and emergency instructions, required sequences for electric and electronic systems, and special operating instructions.
    - j. Manufacturer equipment and systems maintenance manuals are permissible.
  9. Project Redlines: During construction, the Contractor shall maintain an up-to-date set of construction redlines detailing current location and configuration of the project components. The redline documents shall be marked with the words 'Master Redlines' on the cover sheet and be maintained by the Contractor in the project office. The Contractor will provide access to redline documents anytime during the project for review and inspection by the Resident Engineer or authorized Office of Protection Services representative. Master redlines shall be neatly maintained throughout the project and secured under lock and key in the contractor's onsite project office. Any project component or assembly that is not installed in strict accordance with the drawings shall be so noted on the drawings. Prior to producing Record Construction Documents, the contractor will submit the Master Redline document to the Resident Engineer for review and approval of all changes or modifications to the documents. Each sheet shall have Resident Engineer initials indicating authorization to produce "As Built" documents. Field drawings shall be used for data gathering & field changes. These changes shall be made to the master redline documents daily. Field drawings shall not be considered "master redlines".
  10. Record Specifications: The Contractor shall maintain one (1)

- copy of the Project Specifications, including addenda and modifications issued, for Project Record Documents. The Contractor shall mark the Specifications to indicate the actual installation where the installation varies substantially from that indicated in the Contract Specifications and modifications issued. (Note related Project Record Drawing information where applicable). The Contractor shall pay particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later. Upon completion of the mark ups, the Contractor shall submit record Specifications to the COTR. As with master relines, Contractor shall maintain record specifications for Resident Engineer review and inspection at anytime.
11. Record Product Data: The Contractor shall maintain one (1) copy of each Product Data submittal for Project Record Document purposes. The Data shall be marked to indicate the actual product installed where the installation varies substantially from that indicated in the Product Data submitted. Significant changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation shall be included. Particular attention will be given to information on concealed products and installations that cannot be readily identified or recorded later. Note related Change Orders and mark up of Record Construction Documents, where applicable. Upon completion of mark up, submit a complete set of Record Product Data to the COTR.
  12. Miscellaneous Records: The Contractor shall maintain one (1) copy of miscellaneous records for Project Record Document purposes. Refer to other Specifications for miscellaneous record-keeping requirements and submittals concerning various construction activities. Before substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Categories of requirements resulting in miscellaneous records include, a minimum of the following:
    - a. Certificates received instead of labels on bulk products.
    - b. Testing and qualification of tradesmen. ("Contractor's Qualifications")
    - c. Documented qualification of installation firms.
    - d. Load and performance testing.
    - e. Inspections and certifications.
    - f. Final inspection and correction procedures.
    - g. Project schedule
  13. Record Construction Documents (Record As-Built)
    - a. Upon project completion, the contractor shall submit the project master redlines to the Resident Engineer prior to development of Record construction documents. The Resident Engineer shall be given a minimum of a thirty (30) day review period to determine the adequacy of the master redlines. If the master redlines are found suitable by the Resident Engineer, the Resident Engineer will initial and date each sheet and turn redlines over to the contractor for as built development.
    - b. The Contractor shall provide the Resident Engineer a complete set of "as-built" drawings and original master redlined marked "as-built" blue-line in the latest version of AutoCAD drawings unlocked on CD or DVD. The as-built drawing shall include security device number, security closet connection location, data gathering panel number, and input or output number as applicable.

All corrective notations made by the Contractor shall be legible when submitted to the COTR. If, in the opinion of the COTR, any redlined notation is not legible, it shall be returned to the Contractor for re-submission at no extra cost to the Owner. The Contractor shall organize the Record Drawing sheets into manageable sets bound with durable paper cover sheets with suitable titles, dates, and other identifications printed on the cover. The submitted as built shall be in editable formats and the ownership of the drawings shall be fully relinquished to the owner.

- c. Where feasible, the individual or entity that obtained record data, whether the individual or entity is the installer, sub-contractor, or similar entity, is required to prepare the mark up on Record Drawings. Accurately record the information in a comprehensive drawing technique. Record the data when possible after it has been obtained. For concealed installations, record and check the mark up before concealment. At the time of substantial completion, submit the Record Construction Documents to the COTR. The Contractor shall organize into bound and labeled sets for the COTR's continued usage. Provide device, conduit, and cable lengths on the conduit drawings. Exact in-field conduit placement/routings shall be shown. All conduits shall be illustrated in their entire length from termination in security closets; no arrowed conduit runs shall be shown. Pull box and junction box sizes are to be shown if larger than 100mm (4 inch).

O. FIPS 201 Compliance Certificates

- 1. Provide Certificates for all software components and device types utilizing credential verification. Provide certificates for:
  - b. Card Readers
  - d. PIV Middleware

- P. Approvals will be based on complete submission of manuals together with shop drawings.

**PART 2 - PRODUCTS**

- 2.1 GENERAL
- 2.2 SECURITY MANAGEMENT SYSTEM (SMS)
- 2.3 APPLICATION SOFTWARE
- 2.4 SURGE AND TAMPER PROTECTION
- 2.5 PACS SERVER HARDWARE
- 2.6 STANDARD WORKSTATION HARDWARE
- 2.8 CONTROLLERS
- 2.10 CARD READERS
- 2.11 KEYPADS
- 2.12 CREDENTIAL CARDS
- 2.13 SYSTEM SENSORS AND RELATED EQUIPMENT
- 2.17 INTERFACES
- 2.18 FLOOR SELECT ELEVATOR CONTROL
- 2.20 REAL TIME GUARD TOUR
- 2.21 VIDEO AND CAMERA CONTROL
- 2.22 WIRES AND CABLES

**SECTION 28 13 53  
SECURITY ACCESS DETECTION**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- A. Submit below items in conjunction with Master Specification Sections 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, Section 02 41 00, DEMOLITION, and Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC



## SAFETY AND SECURITY.

- B. Provide certificates of compliance with Section 1.3, Quality Assurance.
- C. Provide a complete and thorough pre-installation and as-built design package in both electronic format and on paper, minimum size 48 x 48 inches (in.) (1220 x 1220 millimeters) (mm); drawing submittals shall be per the established project schedule.
- D. Pre-installation design and as-built packages shall include, but not be limited to:
  - 1. Index Sheet that shall:
    - a. Clearly define each page of the design package to include facility name, building name, floor, and sheet number.
    - b. Provide a complete list of all security abbreviations and symbols.
    - c. Reference all general notes that are utilized within the design package.
    - d. Specification and scope of work pages for all individual security systems that are applicable to the design package that will:
      - 1) Outline all general and job specific work required within the design package.
      - 2) Provide a detailed device identification table outlining device Identification (ID) and use for all security systems equipment utilized in the design package.
  - 2. Drawing sheets that will be plotted on the individual floor plans or site plans shall:
    - a. Include a title block as defined above.
    - b. Clearly define the drawings scale in both standard and metric measurements.
    - c. Provide device identification and location.
    - d. Address all signal and power conduit runs and sizes that are associated with the design of the electronic security system and other security elements.
    - e. Identify all pull box and conduit locations, sizes, and fill capacities.
    - f. Address all general and drawing specific notes for a particular drawing sheet.
  - 3. A detailed riser drawing for each applicable security subsystem shall:
    - a. Indicate the sequence of operation.
    - b. Relationship of integrated components on one (1) diagram.
    - c. Include the number, size, identification, and maximum lengths of interconnecting wires.
    - d. Wire/cable types shall be defined by a wire and cable schedule. The schedule shall utilize a lettering system that will correspond to the wire/cable it represents (example: A = 18 AWG/1 Pair Twisted, Unshielded). This schedule shall also provide the manufacturer's name and part number for the wire/cable being installed.
  - 4. A detailed system drawing for each applicable security system shall:
    - a. Clearly identify how all equipment within the system, from main panel to device, shall be laid out and connected.
    - b. Provide full detail of all system components wiring from point-to-point.
    - c. Identify wire types utilized for connection, interconnection with associate security subsystems.
    - d. Show device locations that correspond to the floor plans.
    - e. All general and drawing specific notes shall be included with the system drawings.

5. A detailed schedule for all of the applicable security subsystems shall be included. All schedules shall provide the following information:
  - a. Device ID.
  - b. Device Location (e.g. site, building, floor, room number, location, and description).
  - c. Mounting type (e.g. flush, wall, surface, etc.).
  - d. Power supply or circuit breaker and power panel number.
  - e. In addition, provide the Security Access Detection detector or screening device ID, type (e.g. walk-through screener, X-ray, explosive detector, etc.), type of technology used by system for detection and model number.
6. Provide detail and elevation drawings for all devices that define how they were installed and mounted.
- E. The pre-installation design packages shall go through a full review process conducted by the Contractor along with a VA representative to ensure all work has been clearly defined and completed. All reviews shall be conducted in accordance with the project schedule. There shall be four (4) stages to the review process:
  1. 35 percent
  2. 65 percent
  3. 90 percent
  4. 100 percent
- F. The Contractor shall provide manufacturer security system product cut-sheets that clearly and completely indicate the description and function of each component of the security systems they are associated with. Also, indicate all termination points of devices and interconnections required for operation of the system, and between modules and devices.
- G. The Contractor shall submit for approval at least 30 days prior to commencement of formal testing, a Security System Operational Test Plan. Include detailed procedures for operational testing of each component and security subsystem, to include performance of an integrated system test.
- H. The Contractor shall submit manufacture's certification of Underwriters Laboratories, Inc. (UL) listing for all security system devices, power sources, control panels, and monitoring equipment.
- I. The Contractor shall provide complete maintenance and operating manuals from the manufacturer that support as-builts and system design, to include all technical product sheets and overall system schematics. Two (2) weeks prior to the final inspection, four (4) copies of the maintenance and operating manuals also need to be submitted to the RE.
- J. Certifications: Two (2) weeks prior to final inspection, submit four (4) copies of the following to the RE:
  1. Complete maintenance and operating manuals from the manufacturer that support as-built and systems design, to include all technical data sheets and overall system schematics.
  2. Certification by the Contractor that the materials submitted is in accordance with the drawings and specifications.
  3. Certification by the Contractor that a complete security system installation has been installed, tested and adjusted.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

### **2.2 EQUIPMENT ITEMS**

## **SECTION 28 23 00 VIDEO SURVEILLANCE**

**PART 1 - GENERAL****1.5 SUBMITTALS**

- A. Submit below items in conjunction with Master Specification Sections 01 33 23, Shop Drawings, Product Data, and Samples, and Section 02 41 00, Demolition Drawings.
- B. Provide certificates of compliance with Section 1.4, Quality Assurance.
- C. Provide a pre-installation and as-built design package in both electronic format and on paper, minimum size 1220 x 1220 millimeters (48 x 48 inches); drawing submittals shall be per the established project schedule.
- D. Pre-installation design and as-built packages shall include, but not be limited to:
  - 1. Index Sheet that shall:
    - a. Define each page of the design package to include facility name, building name, floor, and sheet number.
    - b. Provide a list of all security abbreviations and symbols.
    - c. Reference all general notes that are utilized within the design package.
    - d. Specification and scope of work pages for all security systems that are applicable to the design package that will:
      - 1) Outline all general and job specific work required within the design package.
      - 2) Provide a device identification table outlining device Identification (ID) and use for all security systems equipment utilized in the design package.
  - 2. Floor plans, site plans, and enlarged plans shall:
    - a. Include a title block as defined above.
    - b. Define the drawings scale in both standard and metric measurements.
    - c. Provide device identification and location.
    - d. Address all signal and power conduit runs and sizes that are associated with the design of the electronic security system and other security elements (e.g., barriers, etc.).
    - e. Identify all pull box and conduit locations, sizes, and fill capacities.
    - f. Address all general and drawing specific notes for a particular drawing sheet.
  - 3. A riser drawing for each applicable security subsystem shall:
    - a. Indicate the sequence of operation.
    - b. Relationship of integrated components on one diagram.
    - c. Include the number, size, identification, and maximum lengths of interconnecting wires.
    - d. Wire/cable types shall be defined by a wire and cable schedule. The schedule shall utilize a lettering system that will correspond to the wire/cable it represents (example: A = 18 AWG/1 Pair Twisted, Unshielded). This schedule shall also provide the manufacturer's name and part number for the wire/cable being installed.
  - 4. A system drawing for each applicable security system shall:
    - a. Identify how all equipment within the system, from main panel to device, shall be laid out and connected.
    - b. Provide full detail of all system components wiring from point-to-point.
    - c. Identify wire types utilized for connection, interconnection with associate security subsystems.
    - d. Show device locations that correspond to the floor plans.
    - e. All general and drawing specific notes shall be included with the

- system drawings.
5. A schedule for all of the applicable security subsystems shall be included. All schedules shall provide the following information:
    - a. Device ID.
    - b. Device Location (e.g. site, building, floor, room number, location, and description).
    - c. Mounting type (e.g. flush, wall, surface, etc.).
    - d. Power supply or circuit breaker and power panel number.
    - e. In addition, for the VASS Systems, provide the camera ID, camera type (e.g. fixed or pan/tilt/zoom (P/T/Z), lens type (e.g. for fixed cameras only) and housing model number.
  6. Detail and elevation drawings for all devices that define how they were installed and mounted.
- E. Pre-installation design packages shall be reviewed by the Contractor along with a VA representative to ensure all work has been clearly defined and completed. All reviews shall be conducted in accordance with the project schedule. There shall be four (4) stages to the review process:
1. 35 percent
  2. 65 percent
  3. 90 percent
  4. 100 percent
- F. Provide manufacturer security system product cut-sheets. Submit for approval at least 30 days prior to commencement of formal testing, a Security System Operational Test Plan. Include procedures for operational testing of each component and security subsystem, to include performance of an integrated system test.
- G. Submit manufacture's certification of Underwriters Laboratories, Inc. (UL) listing as specified. Provide all maintenance and operating manuals per the VA General Requirements, Section 01 00 00, GENERAL REQUIREMENTS.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

### **2.2 CAMERAS**

### **2.3 VIDEO MANAGEMENT SYSTEM (ANALOG)**

### **2.4 VIDEO DISPLAY EQUIPMENT**

### **2.5 CONTROLLING EQUIPMENT**

### **2.6 VIDEO CAMERAS**

### **2.7 AUTOMATIC COLOR DOME CAMERA - ANALOG**

### **2.8 POWER SUPPLIES**

### **2.10 NETWORK SERVER**

### **2.11 RECORDING DEVICES**

### **2.12 WIRES AND CABLES**

1

## **SECTION 28 26 00 ELECTRONIC PERSONAL PROTECTION SYSTEM**

## **PART 1 - GENERAL**

### **1.4 SUBMITALS**

- A. Submit below items in accordance with Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY and Master Specification

Sections 01 33 23, SHOP DRAWING, PRODUCT DATA, AND SAMPLES, and Section 02 41 00, DEMOLITION.

B. Provide certificates of compliance with Section 1.3, Quality Assurance.

C. Provide a pre-installation and as-built design package in both electronic format and on paper, minimum size 48 x 48 inches (1220 x 1220 millimeters); drawing submittals shall be per the established project schedule.

D. Shop drawings and as-built packages shall include, but not be limited to:

1. Index Sheet that shall:

- a. Define each page of the design package to include facility name, building name, floor, and sheet number.
- b. Provide a list of all security abbreviations and symbols.
- c. Reference all general notes that are utilized within the design package.
- d. Specification and scope of work pages for all security systems that are applicable to the design package that will:
  - 1) Outline all general and job specific work required within the design package.
  - 2) Provide a device identification table outlining device Identification (ID) and use for all security systems equipment utilized in the design package.

2. Drawing sheets that will be plotted on the individual floor plans or site plans shall:

- a. Include a title block as defined above.
- b. Define the drawings scale in both standard and metric measurements.
- c. Provide device identification and location.
- d. Address all signal and power conduit runs and sizes that are associated with the design of the electronic security system and other security elements (e.g., barriers, etc.).
- e. Identify all pull box and conduit locations, sizes, and fill capacities.
- f. Address all general and drawing specific notes for a particular drawing sheet.

3. A riser drawing for each applicable security subsystem shall:

- a. Indicate the sequence of operation.
- b. Relationship of integrated components on one diagram.

- c. Include the number, size, identification, and maximum lengths of interconnecting wires.
- d. Wire/cable types shall be defined by a wire and cable schedule. The schedule shall utilize a lettering system that will correspond to the wire/cable it represents (example: A = 18 AWG/1 Pair Twisted, Unshielded). This schedule shall also provide the manufacturer's name and part number for the wire/cable being installed.
- 4. A system drawing for each applicable security system shall:
  - a. Identify how all equipment within the system, from main panel to device, shall be laid out and connected.
  - b. Provide full detail of all system components wiring from point-to-point.
  - c. Identify wire types utilized for connection, interconnection with associate security subsystems.
  - d. Show device locations that correspond to the floor plans.
  - e. All general and drawing specific notes shall be included with the system drawings.
- 5. A schedule for all of the applicable security subsystems shall be included. All schedules shall provide the following information:
  - a. Device ID.
  - b. Device Location (e.g. site, building, floor, room number, location, and description).
  - c. Mounting type (e.g. flush, wall, surface, etc.).
  - d. Power supply or circuit breaker and power panel number.
- 6. Detail and elevation drawings for all devices that define how they were installed and mounted.
- E. Pre-installation design packages shall be reviewed by the Contractor along with a VA representative to ensure all work has been clearly defined and completed. All reviews shall be conducted in accordance with the project schedule. There shall be four (4) stages to the review process:
  - 1. 35 percent
  - 2. 65 percent
  - 3. 90 percent
  - 4. 100 percent
- F. Provide manufacturer security system product cut-sheets. Submit for approval at least 30 days prior to commencement of formal testing, a

Security System Operational Test Plan. Include procedures for operational testing of each component and security subsystem, to include performance of an integrated system test.

- G. Submit manufacture's certification of Underwriters Laboratories, Inc. (UL) listing as specified. Provide all maintenance and operating manuals per the VA General Requirements, Section 01 00 00, GENERAL REQUIREMENTS.

1

**SECTION 28 31 00  
FIRE DETECTION AND ALARM**

**PART 1 - GENERAL**

**1.4 SUBMITTALS**

- A. General: Submit 5 copies in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, and Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.
- B. Drawings:
1. Prepare drawings using AutoCAD and include all contractors information. Layering shall be by VA criteria as provided by the Contracting Officer's Technical Representative (COTR). Bid drawing files on AutoCAD will be provided to the Contractor at the pre-construction meeting. The contractor shall be responsible for verifying all critical dimensions shown on the drawings provided by VA.
  2. Floor plans: Provide locations of all devices (with device number at each addressable device corresponding to control unit programming), appliances, panels, equipment, junction/terminal cabinets/boxes, risers, electrical power connections, individual circuits and raceway routing, system zoning; number, size, and type of raceways and conductors in each raceway; conduit fill calculations with cross section area percent fill for each type and size of conductor and raceway. Only those devices connected and incorporated into the final system shall be on these floor plans. Do not show any removed devices on the floor plans. Show all interfaces for all fire safety functions.
  3. Riser diagrams: Provide, for the entire system, the number, size and type of riser raceways and conductors in each riser raceway and number of each type device per floor and zone. Show door holder interface, elevator control interface, HVAC shutdown interface, fire extinguishing system interface, and all other fire safety interfaces. Show wiring Schedules on the riser diagram for all circuits. Provide diagrams both on a per building and campus wide basis.
  4. Detailed wiring diagrams: Provide for control panels, modules, power supplies, electrical power connections, auxiliary relays and annunciators showing termination identifications, size and type conductors, circuit boards, LED lamps, indicators, adjustable controls, switches, ribbon connectors, wiring harnesses, terminal strips and connectors, spare zones/circuits. Diagrams shall be drawn to a scale sufficient to show spatial relationships between

components, enclosures and equipment configuration.

5. Two weeks prior to final inspection, the Contractor shall deliver to the COTR 3 sets of as-built drawings and one set of the as-built drawing computer files using AutoCAD. As-built drawings (floor plans) shall show all new and/or existing conduit used for the fire alarm system.

C. Manuals:

1. Submit simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals including technical data sheets for all items used in the system, power requirements, device wiring diagrams, dimensions, and information for ordering replacement parts.
  - a. Wiring diagrams shall have their terminals identified to facilitate installation, operation, expansion and maintenance.
  - b. Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnections between the items of equipment.
  - c. Include complete listing of all software used and installation and operation instructions including the input/output matrix chart.
  - d. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate, inspect, test and maintain the equipment and system. Provide all manufacturer's installation limitations including but not limited to circuit length limitations.
  - e. Complete listing of all digitized voice messages.
  - f. Provide standby battery calculations under normal operating and alarm modes. Battery calculations shall include the magnets for holding the doors open for one minute.
  - g. Include information indicating who will provide emergency service and perform post contract maintenance.
  - h. Provide a replacement parts list with current prices. Include a list of recommended spare parts, tools, and instruments for testing and maintenance purposes.
  - i. A computerized preventive maintenance schedule for all equipment. The schedule shall be provided on disk in a computer format acceptable to the VAMC and shall describe the protocol for preventive maintenance of all equipment. The schedule shall include the required times for systematic examination, adjustment and cleaning of all equipment. A print out of the schedule shall also be provided in the manual. Provide the disk in a pocket within the manual.
  - j. Furnish manuals in 3 ring loose-leaf binder or manufacturer's standard binder.
  - k. A print out for all devices proposed on each signaling line circuit with spare capacity indicated.
2. Two weeks prior to final inspection, deliver 4 copies of the final updated maintenance and operating manual to the COTR.
  - a. The manual shall be updated to include any information necessitated by the maintenance and operating manual approval.
  - b. Complete "As installed" wiring and schematic diagrams shall be included that shows all items of equipment and their interconnecting wiring. Show all final terminal identifications.
  - c. Complete listing of all programming information, including all control events per device including an updated input/output matrix.
  - d. Certificate of Installation as required by NFPA 72 for each



building. The certificate shall identify any variations from the National Fire Alarm Code.

- e. Certificate from equipment manufacturer assuring compliance with all manufacturers installation requirements and satisfactory system operation.

**D. Certifications:**

1. Together with the shop drawing submittal, submit the technician's NICET level III fire alarm certification as well as certification from the control unit manufacturer that the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include in the certification the names and addresses of the proposed supervisor of installation and the proposed performer of contract maintenance. Also include the name and title of the manufacturer's representative who makes the certification.
2. Together with the shop drawing submittal, submit a certification from either the control unit manufacturer or the manufacturer of each component (e.g., smoke detector) that the components being furnished are compatible with the control unit.
3. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer that the wiring and connection diagrams meet this specification, UL and NFPA 72 requirements.

**PART 2 - PRODUCTS**

- 2.1 EQUIPMENT AND MATERIALS, GENERAL**
- 2.2 CONDUIT, BOXES, AND WIRE**
- 2.3 FIRE ALARM CONTROL UNIT**
- 2.7 ALARM NOTIFICATION APPLIANCES**
- 2.8 ALARM INITIATING DEVICES**
- 2.9 SUPERVISORY DEVICES**
- 2.10 ADDRESS REPORTING INTERFACE DEVICE**
- 2.11 SMOKE BARRIER DOOR CONTROL**
- 2.12 UTILITY LOCKS AND KEYS:**
- 2.14 INSTRUCTION CHART:**

**SECTION 31 20 11  
EARTH MOVING (SHORT FORM)**

**PART 1 - GENERAL**

**1.6 SUBMITTALS:**

- B. Rock Excavation Report:
  1. Certification of rock quantities excavated.
  2. Excavation method.
  3. Labor.
  4. Equipment.
  5. Land Surveyor's or Civil Engineer's name and official registration stamp.
  6. Plot plan showing elevations.
- C. Furnish to COR soil samples, suitable for laboratory tests, of proposed off site or on site fill material.

**PART 2 - PRODUCTS**

**2.1 MATERIALS:**

**SECTION 31 23 19  
DEWATERING**

**PART 1 - GENERAL**

**1.5 SUBMITTALS:**

- B. Drawings and Design Data:
  1. Submit drawings and data showing the method to be employed in dewatering excavated areas 30 days before commencement of excavation.

2. Material shall include: location, depth and size of wellpoints, headers, sumps, ditches, size and location of discharge lines, capacities of pumps and standby units, and detailed description of dewatering methods to be employed to convey the water from site to adequate disposal.
  3. Include a written report outlining control procedures to be adopted if dewatering problem arises.
  4. Materials submitted shall be in a format acceptable for inclusion in required permit applications to any and all regulatory agencies for which permits for discharge water from the dewatering system are required due to the discharge reaching regulated bodies of water.
- C. Inspection Reports.
- D. All required permits.

#### **SECTION 32 05 23**

#### **CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS**

#### **PART 1 - GENERAL**

##### **1.6 SUBMITTALS**

- B. Manufacturers' Certificates and Data certifying that the following materials conform to the requirements specified.
1. Expansion joint filler
  2. Hot poured sealing compound
  3. Reinforcement
  4. Curing materials
- C. Data and Test Reports: Select subbase material.
1. Job-mix formula.
  2. Source, gradation, liquid limit, plasticity index, percentage of wear, and other tests as specified and in referenced publications.

#### **PART 2 - PRODUCTS**

##### **2.1 GENERAL**

##### **2.2 REINFORCEMENT**

##### **2.3 SELECT SUBBASE**

##### **2.4 FORMS**

##### **2.5 CONCRETE CURING MATERIALS**

##### **2.6 EXPANSION JOINT FILLERS**

#### **SECTION 32 12 16**

#### **ASPHALT PAVING**

#### **PART 1 - GENERAL**

##### **1.5 SUBMITTALS**

- B. Data and Test Reports:
1. Aggregate Base Course: Sources, gradation, liquid limit, plasticity index, percentage of wear, and other tests required by State Highway Department.
  2. Asphalt Base/Surface Course: Aggregate source, gradation, soundness loss, percentage of wear, and other tests required by State Highway Department.
  3. Job-mix formula.
- C. Certifications:
1. Asphalt prime and tack coat material certificate of conformance to State Highway Department requirements.
  2. Asphalt cement certificate of conformance to State Highway Department requirements.
  3. Job-mix certification - Submit plant mix certification that mix equals or exceeds the State Highway Specification.
- D. One copy of State Highway Department Specifications.
- E. Provide MSDS (Material Safety Data Sheets) for all chemicals used on ground.

**PART 2 - PRODUCTS****2.1 GENERAL****2.2 AGGREGATES****2.3 ASPHALTS****2.4 SEALER**

**SECTION 31 14 00  
ADJUSTABLE ROOF PAVER SYSTEM**

**PART 1 - GENERAL****1.2 SUBMITTALS**

- A. Submit under provisions of Section 01 33 23.  
Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- B. Shop Drawings:
  - 1. Layout drawings of each paved area showing the pattern of pavers, indicate pavers requiring cutting, indicate setting bed methods in each area, drainage patterns and drains. Include details of setting beds, noting all materials and their thickness, show details at curbs and vertical surfaces.
  - 2. Details of custom (nonstandard) curbs and stair tread/risers, include methods of installation.

**PART 2 - PRODUCTS****2.1 PAVERS****2.2 INSTALLATION MATERIALS**

**SECTION 32 17 23  
PAVEMENT MARKINGS**

**PART 1 - GENERAL****1.2 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish Manufacturer's Certificates and Data certifying that the following materials conform to the requirements specified.
- B. Paint.

**PART 2 - PRODUCTS****2.1 PAINT****2.2 PAINT APPLICATOR****2.3 SANDBLASTING EQUIPMENT**

**SECTION 32 90 00  
PLANTING**

**PART 1 - GENERAL****1.8 SUBMITTALS**

- A. Submit product data for each type of product indicated, including soils:
  - 1. Include quantities, sizes, quality, and sources for plant materials.
  - 2. Include EPA approved product label, MSDS (Material Safety Data Sheet) and manufacturer's application instructions specific to the Project.
  - 3. Include color photographs in digital 3 by 5 inch (76 by 127 mm) print format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of 3 photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant,

- plant size, and name of the growing nursery.
- B. Submit samples and manufacturer's literature for each of the following for approval before work is started.
    - 1. Trees and Shrubs: delivered to the site for review. Maintain approved samples on-site as a standard for comparison.
    - 2. Organic and Compost Mulch: 1 quart (1-liter) volume of each organic and compost mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
    - 3. Mineral Mulch: 5 lb (2.5 kg) Insert quantity of each mineral mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the lot of material to be delivered and installed on the site; provide an accurate indication of color, texture, and makeup of the material.
      - a. Weed Control Barrier: 12 by 12 inches (300 by 300 mm).
    - 4. Submit edging materials and accessories in manufacturer's standard size, to verify color selected.
    - 5. Erosion Control Materials: 12 by 12 inches (300 by 300 mm).
    - 6. Root Barrier: Width of panel by 12 inches (300 mm).
    - 7. Landscape Membranes: 12 by 12 inches (300 by 300 mm).
    - 8. Tree Wrap: Width of panel by 12 inches (300 mm).
  - C. Qualification data for qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
  - D. Prior to delivery, provide notarized certificates attesting that each type of manufactured product, from the manufacturer, meet the requirements specified and shall be submitted to the Contracting Officer's Representative for approval:
    - 1. Plant Materials (Department of Agriculture certification by State Nursery Inspector declaring material to be free from insects and disease).
    - 2. Seed and Turf Materials notarized certificate of product analysis.
    - 3. Manufacturer's certified analysis of standard products.
    - 4. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
  - E. Material Test Reports: For existing in-place surface soil and imported or manufactured topsoil.
  - F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

## **PART 2 - PRODUCTS**

### **2.1 PLANT MATERIAL**

### **2.2 INORGANIC SOIL AMENDMENTS**

### **2.3 ORGANIC SOIL AMENDMENTS**

### **2.4 PLANT AND TURF FERTILIZERS**

### **2.5 PLANTING SOILS**

### **2.6 BIOSTIMULANTS**

### **2.7 LANDSCAPE MEMBRANES**

### **2.8 MULCH**

### **2.9 TACKIFIERS AND ADHESIVES**

### **2.10 EROSION CONTROL**

### **2.11 TREE WRAP**

### **2.12 WATER**

- 2.13 ANTIDESICCANT
- 2.14 TURF SELECTIONS
- 2.15 SEED
- 2.16 PESTICIDES

SECTION 33 40 00  
STORM SEWER UTILITIES

PART 1 - GENERAL

1.8 SUBMITTALS

- A. Manufacturers' Literature and Data shall be submitted, as one package, for pipes, fittings and appurtenances, including jointing materials, hydrants, valves and other miscellaneous items.

PART 2 - PRODUCTS

- 2.1 FACTORY-ASSEMBLED PRODUCTS
- 2.2 STEEL PIPE AND FITTINGS
- 2.3 ALUMINUM PIPE AND FITTINGS
- 2.4 ABS PIPE AND FITTINGS
- 2.5 PE PIPE AND FITTINGS
- 2.6 CONCRETE PIPE AND FITTINGS
- 2.7 NONPRESSURE TRANSITION COUPLINGS
- 2.8 PRESSURE PIPE COUPLINGS
- 2.9 EXPANSION JOINTS AND DEFLECTION FITTINGS
- 2.10 BACKWATER VALVES
- 2.11 CLEANOUTS
- 2.12 DRAINS
- 2.13 ENCASEMENT FOR PIPING
- 2.14 MANHOLES AND CATCH BASINS
- 2.15 CONCRETE FOR MANHOLES AND CATCH BASINS
- 2.16 POLYMER-CONCRETE, CHANNEL DRAINAGE SYSTEMS
- 2.17 PLASTIC, CHANNEL DRAINAGE SYSTEMS
- 2.18 PIPE OUTLETS
- 2.19 STORMWATER DISPOSAL SYSTEMS
- 2.20 HEADWALLS
- 2.21 FLARED END SECTIONS
- 2.22 PRECAST REINFORCED CONCRETE BOX CULVERT
- 2.23 RESILIENT CONNECTORS AND DOWNSPOUT BOOTS FOR BUILDING ROOF DRAINS
- 2.24 WARNING TAPE

SECTION 33 46 13  
FOUNDATION DRAINAGE

PART 2 - PRODUCTS

- 2.1 FACTORY-ASSEMBLED PRODUCTS
- 2.2 COMPATIBILITY OF RELATED EQUIPMENT
- 2.3 PERFORATED-WALL PIPES AND FITTINGS FOR VAULTS OR MANHOLES
- 2.4 SOLID-WALL PIPES AND FITTINGS
- 2.5 SPECIAL PIPE COUPLINGS
- 2.6 DRAINAGE CONDUITS
- 2.7 DRAINAGE MAT
- 2.8 SOIL MATERIALS
- 2.9 GEOTEXTILE FILTER FABRICS

SECTION 34 71 13  
VEHICLE BARRIERS

PART 1 - GENERAL

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Indicate dimensions, required clearances, method of field assembly, and location and size of each field connection.

C. Certificate test reports confirming compliance's with specified resistive rating.

E N D

**SECTION 01 91 00****GENERAL COMMISSIONING REQUIREMENTS****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS shall form the basis of the construction phase commissioning process and procedures. The Commissioning Agent shall add, modify, and refine the commissioning procedures, as approved by the Department of Veterans Affairs (VA), to suit field conditions and actual manufacturer's equipment, incorporate test data and procedure results, and provide detailed scheduling for all commissioning tasks.
- B. Various sections of the project specifications require equipment startup, testing, and adjusting services. Requirements for startup, testing, and adjusting services specified in the Division 7, Division 21, Division 22, Division 23, Division 26, Division 27, Division 28, and Division 31 series sections of these specifications are intended to be provided in coordination with the commissioning services and are not intended to duplicate services. The Contractor shall coordinate the work required by individual specification sections with the commissioning services requirements specified herein.
- C. Where individual testing, adjusting, or related services are required in the project specifications and not specifically required by this commissioning requirements specification, the specified services shall be provided and copies of documentation, as required by those specifications shall be submitted to the VA and the Commissioning Agent to be indexed for future reference.
- D. Where training or educational services for VA are required and specified in other sections of the specifications, including but not limited to Division 7, Division 8, Division 21, Division 22, Division 23, Division 26, Division 27, Division 28, and Division 31 series sections of the specification, these services are intended to be provided in addition to the training and educational services specified herein.
- E. Commissioning is a systematic process of verifying that the building systems perform interactively according to the construction documents and the VA's operational needs. The commissioning process shall encompass and coordinate the system documentation, equipment startup,

control system calibration, testing and balancing, performance testing and training. Commissioning during the construction, and post-occupancy phases is intended to achieve the following specific objectives according to the contract documents:

1. Verify that the applicable equipment and systems are installed in accordance with the contract documents and according to the manufacturer's recommendations.
  2. Verify and document proper integrated performance of equipment and systems.
  3. Verify that Operations & Maintenance documentation is complete.
  4. Verify that all components requiring servicing can be accessed, serviced and removed without disturbing nearby components including ducts, piping, cabling or wiring.
  5. Verify that the VA's operating personnel are adequately trained to enable them to operate, monitor, adjust, maintain, and repair building systems in an effective and energy-efficient manner.
  6. Document the successful achievement of the commissioning objectives listed above.
- F. The commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functioning product.
- G. The Commissioning Agent, both the firm and individual designated as the Commissioning Agent, shall be certified by at least one of the following entities: the National Environmental Balancing Bureau (NEBB), the Associated Air Balance Council Commissioning Group (AABC), and the Building Commissioning Association (BCA). Certification(s) shall be valid and active. Proof of certification(s) shall be submitted to the Contracting Officer and the COR three (3) calendar days after the Notice to Proceed.

## **1.2 CONTRACTUAL RELATIONSHIPS**

- A. For this construction project, the Department of Veterans Affairs contracts with a Contractor to provide construction services. The contracts are administered by the VA Contracting Officer and the COR as the designated representative of the Contracting Officer. On this project, the authority to modify the contract in any way is strictly limited to the authority of the Contracting Officer and the COR.
- B. In this structure, only two contract parties are recognized and communications on contractual issues are strictly limited to the VA COR



and the Contractor. It is the practice of the VA to require that communications between other parties to the contracts (Subcontractors and Vendors) be conducted through the COR and Contractor. It is also the practice of the VA that communications between other parties of the project (Commissioning Agent and Architect/Engineer) be conducted through the COR.

- C. Whole Building Commissioning is a process that relies upon frequent and direct communications, as well as collaboration between all parties to the construction process. By its nature, a high level of communication and cooperation between the Commissioning Agent and all other parties (Architects, Engineers, Subcontractors, Vendors, third party testing agencies, etc) is essential to the success of the Commissioning effort.
- D. With these fundamental practices in mind, the commissioning process described herein has been developed to recognize that, in the execution of the Commissioning Process, the Commissioning Agent must develop effective methods to communicate with every member of the construction team involved in delivering commissioned systems while simultaneously respecting the exclusive contract authority of the Contracting Officer and the COR. Thus, the procedures outlined in this specification must be executed within the following limitations:
  - 1. No communications (verbal or written) from the Commissioning Agent shall be deemed to constitute direction that modifies the terms of any contract between the Department of Veterans Affairs and the Contractor.
  - 2. Commissioning Issues identified by the Commissioning Agent will be delivered to the COR and copied to the designated Commissioning Representatives for the Contractor and subcontractors on the Commissioning Team for information only in order to expedite the communication process. These issues must be understood as the professional opinion of the Commissioning Agent and as suggestions for resolution.
  - 3. In the event that any Commissioning Issues and suggested resolutions are deemed by the COR to require either an official interpretation of the construction documents or require a modification of the contract documents, the Contracting Officer or the COR will issue an official directive to this effect.

4. All parties to the Commissioning Process shall be individually responsible for alerting the COR of any issues that they deem to constitute a potential contract change prior to acting on these issues.
5. Authority for resolution or modification of design and construction issues rests solely with the Contracting Officer or the COR, with appropriate technical guidance from the Architect/Engineer and/or Commissioning Agent.

### **1.3 RELATED WORK**

- A. Section 01 00 00 GENERAL REQUIREMENTS.
- B. Not used.
- C. Not used.
- D. Not used.
- E. Not used.
- F. Not used.
- G. Not used.
- H. Not used.
- I. Not used.

### **1.4 SUMMARY**

- A. This Section includes general requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.
- B. The commissioning activities have been developed to support the VA requirements to meet guidelines for Federal Leadership in Environmental, Energy, and Economic Performance.
- C. Not used.
- D. Not used.

### **1.5 DEFINITIONS**

- A. Architect: Includes Architect identified in the Contract for Construction between the Department of Veterans Affairs and Contractor, plus consultant/design professionals responsible for design of fire suppression, plumbing, HVAC, controls for HVAC systems, electrical, communications, electronic safety and security, as well as other related systems.
- B. CxA: Commissioning Agent.
- C. Commissioning Plan: a document that is an overall plan that outlines the commissioning process, commissioning team responsibilities, schedule for commissioning activities, and commissioning documents.

- D. Commissioning Issue: a condition in the installation or function of a component, piece of equipment or system that affects the system operations, maintenance, and/or repair.
- E. Commissioning Observation: a condition in the installation or function of a component, piece of equipment or system that may not be in compliance with the Contract Documents, or may not be in compliance with the manufacturer's installation instruction, or may not be in compliance with generally accepted industry standards.
- F. Systems Functional Performance Test: a test, or tests, of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Systems Functional Performance Testing is the dynamic testing of systems (rather than just components) under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint). Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) is not Systems Functional Performance Testing, in the commissioning sense of the word. TAB's primary work is setting up the system flows and pressures as specified, while System Functional Performance Testing is verifying that the system has already been set up properly and is functioning in accordance with the Construction Documents. The Commissioning Agent develops the Systems Functional Performance Test Procedures in a sequential written form, coordinates, witnesses, and documents the actual testing. Systems Functional Performance Testing is performed by the Contractor. Systems Functional Performance Tests are performed after startups, control systems are complete and operational, TAB functions and Pre-Functional Checklists are complete.
- G. System: A system is defined as the entire set of components, equipment, and subsystems which must be coordinated to work together during normal operation to produce results for which the system is designed. For example, air conditioning supply air is only one component of an entire system which provides comfort conditions for a building. Other related components are return air, exhaust air, steam

supply, chilled water supply, refrigerant supply, hot water supply, controls and electrical service, etc. Another example of a system which involves several components of different disciplines is a boiler installation. Efficient and acceptable boiler operation depends upon the coordination and proper operation of the fuel supply, combustion air, controls, steam, feedwater supply, condensate return and other related components.

- H. Pre-Functional Checklist: a list of items provided by the Commissioning Agent to the Contractor that require inspection and elementary component tests conducted to verify proper installation of equipment. Pre-Functional Checklists are primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). However, some Pre-Functional Checklist items entail simple testing of the function of a component, a piece of equipment or system (such as measuring the voltage imbalance on a three-phase pump motor of a chiller system). The term "Pre-Functional" refers to before Systems Functional Performance Testing. Pre-Functional Checklists augment and are combined with the manufacturer's startup checklist and the Contractor's Quality Control checklists.
- I. Seasonal Functional Performance Testing: a test or tests that are deferred until the system will experience conditions closer to their design conditions.
- J. VA: Includes the Contracting Officer, COR, or other authorized representative of the Department of Veterans Affairs.
- K. TAB: Testing, Adjusting, and Balancing.

#### **1.6 SYSTEMS TO BE COMMISSIONED**

- A. Commissioning of a system or systems specified for this project is part of the construction process. Documentation and testing of these systems, as well as training of the VA's Operation and Maintenance personnel, is required in cooperation with the VA and the Commissioning Agent.
- B. The following systems will be commissioned as part of this project:
  - 1. Facility exterior closure (Division 7 and Division 8)
    - a. Roofs (EPDM, flashing & sheet metal, metal roofing, roof specialties, and roof accessories)
    - b. Not used.
    - c. Not used.


- d. Exterior Doors (emergency exit, and service)
- e. Not used.
- f. Louvers and Vents
- g. Sealants (Caulking, mechanical seals, and wind and vapor barriers)

## 2. Fire Suppression (Division 21)


- a. Fire Protection System (Fire pump, jockey pump, fire pump automatic transfer switch/controller, Wet-pipe fire suppression, Dry-pipe fire suppression, Pre-action fire suppression, dry system air compressors and motors, and clean agent fire suppression).

## 3. Plumbing (Division 22)


- a. Domestic Hot Water systems (Domestic water heaters, steam-to-hot water converters, hot water circulating pumps and motors, controls, combustion burners/fans/motors).
- b. Medical Gas systems (Medical compressed air and air compressor, laboratory vacuum and vacuum pumps, nitrous oxide and oxygen, Medical Gas Alarm System).

 c. Not used.

- d. Sewage Ejection Pumps (Sump level controls, pump alternator, alarms and alarm panel, pumps and motors).

 e. Not used.

- f. Domestic Water Filtration and Softener Systems (Tanks and casings, gages and instruments, controls, pumps and motors - if applicable, packaged piping, alarms).

 g. Not used.  
h. Not used.  
i. Not used.

## 4. HVAC (Division 23)

- a. Air Handling Systems (Fans, motors, Variable Speed Drives, cooling coils and control valves, heating coils and control valves, filters, dampers, safeties such as smoke detectors or freezestats and damper end switches, controls, gages, and vibration isolation).
- b. Dehumidification Systems (Energy recovery devices - such as enthalpy wheels, fans, motors, Variable Speed Drives, cooling coils and control valves, heating coils and control valves,

- filters, dampers, safeties, controls, gages, and vibration isolation).
- c. Heating Hot Water Systems (Boilers, controls, instrumentation and gages, flues, heating water pumps and motors, Variable Speed Drives, mixing valves).
  - d. Condensate Return Systems (Condensate receivers and transfer pumps, motors, controls, pump alternator, alarms and instrumentation, deaerators, boiler feed pumps and motors, safeties).
  - e. Chilled Water Systems (Chilled water pumps and motors, Variable Speed Drives, chiller motor/compressor, controls, instrumentation and safeties, isolation valves, blending valves, side stream water cleaners/scrubbers/filters).
  - f. Condenser Water Systems for Chillers (Condenser water pumps and motors, Variable Speed Drives, cooling tower fans, cooling tower sump level controls, open-circuit water treatment system, water treatment injection pumps and motors, water treatment controls, cooling tower basin heaters and controls, side stream water cleaners/scrubbers/filters, tower bypass valves).
  - g. Exhaust Fans (Fan, motor, Variable Speed Drives, controls and safeties).
  - h. Steam System (Boilers, controls, gages and instrumentation, safety relief valves, combustion burners/fans/motors, fuel delivery pumps and motors, flues).
  - i. Direct Digital Control System (BACnet or similar Local Area Network (LAN), Operator Work Station hardware and software, building controller hardware and software, terminal unit controller hardware and software, all sequences of operation, system accuracy and response time).
  - j. Laboratory Exhaust Systems (Fume hoods, pressure controls, system alarms, fans, motors, and Variable Speed Drives).
  - k. Laboratory Ventilation Systems (Supply air terminal units and controls, pressure controls and alarms, fans, motors, and Variable Speed Drives).
  - l. OR Air Handling Systems (Fans, motors, Variable Speed Drives, Energy recovery devices - such as heat pipes, cooling coils and control valves, heating coils and control valves, filters, HEPA filter performance, dampers, safeties such as smoke detectors or

freezestats and damper end switches, controls, gages, and vibration isolation).

- m. Radiology/Imaging Cooling Systems (Fans, motors, Variable Speed Drives, cooling coils and control valves, filters, dampers, safeties, controls, gages, and vibration isolation).
  - n. Computer Room Air Conditioning Systems (CRAC units - including fans, motors, Variable Speed Drives, cooling coils and control valves, heating coils and control valves, humidifiers, compressors and liquid-cooled condensers, filters, safeties, controls, gages, vibration isolation, condensate pumps, water/leak detection system and alarms, and shunt trip shut down).
  - o. Room Pressurization Equipment (Pressure sensors, terminal units/dampers, and controls and alarms).
  - p. HVAC Water Treatment Systems (Closed circuits - including shot feeders and final water analysis, open circuits - including water analysis, chemical/biocide tanks, injection piping, chemical/biocide pumps and motors, controls, water meter, and automatic blowdown).
  - q. Commercial Kitchen Hoods & Associated Fire Suppression Systems (Fans, motors, Variable Speed Drives, automatic shut down on fire suppression discharge, and gas valve operation).
  - r. Fuel Delivery and Storage Systems for Boilers and Standby Generators (Fuel level monitoring/controls/alarms, transfer pumps and motors, leak detection monitoring/alarms, and fill systems)
5. Electrical (Division 26)
- a. Utility Service Entrance Switchgear (Fuses and circuit breaker settings, metering, mimic diagram, gages, and controls).
  - b. Standby Generator Systems (Automatic transfer switches, fuel delivery pumps and motors, battery charging and instrumentation, muffler and exhaust system, and vibration isolation).
  - c. Generator Paralleling Switchboards (Automatic transfer switches, instrumentation, metering and gages, and controls).
  - d. Generator Power Distribution Systems (Fuses and circuit breaker settings, metering, gages, and controls).
  - e. Utility Power Unit Substations (Transformers and tap settings, fuses and circuit breaker settings, metering, gages, and controls).

- f. Generator Power Unit Substations (Transformers and tap settings, fuses and circuit breaker settings, metering, gages, and controls).
  - g. Automatic Transfer Switches (Test with associated generator).
  - h. Normal Power Distribution Systems (Grounding tests, coordination study review, major circuit breaker settings, meters and gages, and controls).
  - i. Life Safety Power Distribution Systems (Automatic transfer on loss of normal power, grounding tests, coordination study review, major circuit breaker settings, meters and gages, and controls).
  - j. Critical Power Distribution Systems (Automatic transfer on loss of normal power, grounding tests, coordination study review, major circuit breaker settings, meters and gages, and controls).
  - k. Essential Equipment Power Distribution Systems (Automatic transfer on loss of normal power, grounding tests, coordination study review, major circuit breaker settings, meters and gages, and controls).
  - l. Lighting Controls (Control system hardware and software, scene settings, zone settings, occupancy sensor interface, and unoccupied cycle control).
  - m. Uninterruptible Power Supply Systems and UPS Power Distribution Systems (Battery chargers, static and dynamic power generators - i.e. inverters, MG sets, metering and controls, system power displays, and distribution panel circuit breakers).
6. Communications (Division 27)
- a. Facility Telecommunications and Data Distribution Systems.
  - b. Nurse Call / Code Blue Systems (Local stations, system hardware and software, reset functions, response time per activation, and notification signals).
  - c. Public Address and Mass Notification Systems (Amplifiers and head-end hardware, speaker volume, and background noise - i.e. hiss or similar interference).
  - d. Healthcare Intercommunications and Program Systems (Local stations, system hardware and software, and notification signals).
7. Electronic Safety and Security (Division 28)
- a. Fire Detection and Alarm (Master panel and software, addressable units - i.e. pull stations, flow detectors, heat detectors, etc.,



controls and alarm functions, horns/bells/door releases and other output devices, and fire command center functions - stairwell communications, stairwell pressurization fan start, mechanical systems shutdowns).

8. Site Utility Systems (Division 31)

- a. Sanitary Sewage Lift Stations (Lift station sump or tank level controls, pump alternator, alarms and alarm panel, pumps and motors).
- b. Steam Condensate Pump Stations (Condensate receivers and transfer pumps, motors, controls, pump alternator, alarms and instrumentation, and safeties).
- c. Storm Drainage Pump Systems (Sump level controls, pump alternator, alarms and alarm panel, pumps and motors).

**1.7 COMMISSIONING TEAM**

A. Members Appointed by Contractor:

- 1. Contractor: The designated person, company, or entity that plans, schedules and coordinates the commissioning activities for the construction team.
- 2. Contractor's Commissioning Representative(s): Individual(s), each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project Superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the Department of Veterans Affairs (VA) and Commissioning Agent.

B. Members Appointed by VA:

- 1. Commissioning Agent: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. The VA will engage the CxA under a separate contract.
- 2. Representatives of the facility user and operation and maintenance personnel.
- 3. Architect and engineering design professionals.

**1.8 VA'S COMMISSIONING RESPONSIBILITIES**

- A. Appoint an individual, company or firm to act as the Commissioning Agent.

- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
  - 1. Coordination meetings.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
  - 3. Testing meetings.
  - 4. Witness and assist in Systems Functional Performance Testing.
  - 5. Demonstration of operation of systems, subsystems, and equipment.
- C. Provide the Construction Documents, prepared by Architect and approved by VA, to the Commissioning Agent and for use in managing the commissioning process, developing the commissioning plan, systems manuals, and reviewing the operation and maintenance training plan.

#### **1.9 CONTRACTOR'S COMMISSIONING RESPONSIBILITIES**

- A. The Contractor shall assign a Commissioning Manager to manage commissioning activities of the Contractor, and subcontractors.
- B. The Contractor shall ensure that the commissioning responsibilities outlined in these specifications are included in all subcontracts and that subcontractors comply with the requirements of these specifications.
- C. The Contractor shall ensure that each installing subcontractor shall assign representatives with expertise and authority to act on behalf of the subcontractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
  - 1. Participate in commissioning coordination meetings.
  - 2. Conduct operation and maintenance training sessions in accordance with approved training plans.
  - 3. Verify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
  - 4. Evaluate commissioning issues and commissioning observations identified in the Commissioning Issues Log, field reports, test reports or other commissioning documents. In collaboration with entity responsible for system and equipment installation, recommend corrective action.
  - 5. Review and comment on commissioning documentation.

6. Participate in meetings to coordinate Systems Functional Performance Testing.
7. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to Commissioning Agent for incorporation into the commissioning plan.
8. Provide information to the Commissioning Agent for developing commissioning plan.
9. Participate in training sessions for VA's operation and maintenance personnel.
10. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures to conduct Systems Functional Performance Testing of installed systems.

#### **1.10 COMMISSIONING AGENT'S RESPONSIBILITIES**

- A. Organize and lead the commissioning team.
- B. Prepare the commissioning plan. See Paragraph 1.11-A of this specification Section for further information.
- C. Review and comment on selected submittals from the Contractor for general conformance with the Construction Documents. Review and comment on the ability to test and operate the system and/or equipment, including providing gages, controls and other components required to operate, maintain, and test the system. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the Construction Documents.
- D. At the beginning of the construction phase, conduct an initial construction phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; Pre-Functional Checklists, Systems Functional Performance Testing; and project completion.
- E. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss status of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The Commissioning Agent shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.

- F. Observe construction and report progress, observations and issues.  
Observe systems and equipment installation for adequate accessibility for maintenance and component replacement or repair, and for general conformance with the Construction Documents.
- G. Prepare Project specific Pre-Functional Checklists and Systems Functional Performance Test procedures.
- H. Coordinate Systems Functional Performance Testing schedule with the Contractor.
- I. Witness selected systems startups.
- J. Verify selected Pre-Functional Checklists completed and submitted by the Contractor.
- K. Witness and document Systems Functional Performance Testing.
- L. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.
- M. Review and comment on operation and maintenance (O&M) documentation and systems manual outline for compliance with the Contract Documents.  
Operation and maintenance documentation requirements are specified in Paragraph 1.25, Section 01 00 00 GENERAL REQUIREMENTS.
- N. Review operation and maintenance training program developed by the Contractor. Verify training plans provide qualified instructors to conduct operation and maintenance training.
- O. Prepare commissioning Field Observation Reports.
- P. Prepare the Final Commissioning Report.
- Q. Return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal Systems Functional Performance Testing. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.
- R. Assemble the final commissioning documentation, including the Final Commissioning Report and Addendum to the Final Commissioning Report.

### 1.11 COMMISSIONING DOCUMENTATION

- A. Commissioning Agent's Certification(s): Commissioning Agent shall submit evidence of valid and current certification(s), as required in Section 1.1(G), to the Contracting Officer.
- B. Commissioning Plan: A document, prepared by Commissioning Agent, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited, to the following:
  - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.
  - 2. Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.
  - 3. Identification of systems and equipment to be commissioned.
  - 4. Schedule of Commissioning Coordination meetings.
  - 5. Identification of items that must be completed before the next operation can proceed.
  - 6. Description of responsibilities of commissioning team members.
  - 7. Description of observations to be made.
  - 8. Description of requirements for operation and maintenance training.
  - 9. Schedule for commissioning activities with dates coordinated with overall construction schedule.
  - 10. Process and schedule for documenting changes on a continuous basis to appear in Project Record Documents.
  - 11. Process and schedule for completing prestart and startup checklists for systems, subsystems, and equipment to be verified and tested.
  - 12. Preliminary Systems Functional Performance Test procedures.
- C. Systems Functional Performance Test Procedures: The Commissioning Agent will develop Systems Functional Performance Test Procedures for each system to be commissioned, including subsystems, or equipment and interfaces or interlocks with other systems. Systems Functional Performance Test Procedures will include a separate entry, with space for comments, for each item to be tested. Preliminary Systems

Functional Performance Test Procedures will be provided to the VA, Architect/Engineer, and Contractor for review and comment. The Systems Performance Test Procedure will include test procedures for each mode of operation and provide space to indicate whether the mode under test responded as required. Each System Functional Performance Test procedure, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:

1. Name and identification code of tested system.
2. Test number.
3. Time and date of test.
4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
5. Dated signatures of the person performing test and of the witness, if applicable.
6. Individuals present for test.
7. Observations and Issues.
8. Issue number, if any, generated as the result of test.

- D. Pre-Functional Checklists: The Commissioning Agent will prepare *Pre-Functional Checklists*. *Pre-Functional Checklists shall be completed* and signed by the Contractor, verifying that systems, subsystems, equipment, and associated controls are ready for testing. The Commissioning Agent will spot check *Pre-Functional Checklists* to verify accuracy and readiness for testing. Inaccurate or incomplete *Pre-Functional Checklists* shall be returned to the Contractor for correction and resubmission.
- E. Test and Inspection Reports: The Commissioning Agent will record test data, observations, and measurements on Systems Functional Performance Test Procedure. The report will also include recommendation for system acceptance or non-acceptance. Photographs, forms, and other means appropriate for the application shall be included with data. Commissioning Agent Will compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.
- F. Corrective Action Documents: The Commissioning Agent will document corrective action taken for systems and equipment that fail tests. The documentation will include any required modifications to systems and equipment and/or revisions to test procedures, if any. The Commissioning Agent will witness and document any retesting of systems

and/or equipment requiring corrective action and document retest results. Contractor is liable for any costs incurred by the VA for retesting. These costs may include additional fees to the Commissioning Agent and/or A/E.

- G. Commissioning Issues Log: The Commissioning Agent will prepare and maintain Commissioning Issues Log that describes Commissioning Issues and Commissioning Observations that are identified during the Commissioning process. These observations and issues include, but are not limited to, those that are at variance with the Contract Documents. The Commissioning Issues Log will identify and track issues as they are encountered, the party responsible for resolution, progress toward resolution, and document how the issue was resolved. The Master Commissioning Issues Log will also track the status of unresolved issues.

1. Creating an Commissioning Issues Log Entry:

- a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
- b. Assign a descriptive title for the issue.
- c. Identify date and time of the issue.
- d. Identify test number of test being performed at the time of the observation, if applicable, for cross reference.
- e. Identify system, subsystem, and equipment to which the issue applies.
- f. Identify location of system, subsystem, and equipment.
- g. Include information that may be helpful in diagnosing or evaluating the issue.
- h. Note recommended corrective action.
- i. Identify commissioning team member responsible for corrective action.
- j. Identify expected date of correction.
- k. Identify person that identified the issue.

2. Documenting Issue Resolution:

- a. Log date correction is completed or the issue is resolved.
- b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
- c. Identify changes to the Contract Documents that may require action.

- d. State that correction was completed and system, subsystem, and equipment are ready for retest, if applicable.
  - e. Identify person(s) who corrected or resolved the issue.
  - f. Identify person(s) verifying the issue resolution.
- H. Final Commissioning Report: The Commissioning Agent will document results of the commissioning process, including unresolved issues, and performance of systems, subsystems, and equipment. The Commissioning Report will indicate whether systems, subsystems, and equipment have been properly installed and are performing according to the Contract Documents. This report will be used by the Department of Veterans Affairs when determining that systems will be accepted. This report will be used to evaluate systems, subsystems, and equipment and will serve as a future reference document during VA occupancy and operation. It shall describe components and performance that exceed requirements of the Contract Documents and those that do not meet requirements of the Contract Documents. The commissioning report will include, but is not limited to, the following:
- 1. Lists and explanations of substitutions; compromises; variances with the Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. Design Narrative documentation maintained by the Commissioning Agent.
  - 2. Commissioning plan.
  - 3. Pre-Functional Checklists completed by the Contractor, with annotation of the Commissioning Agent review and spot check.
  - 4. Systems Functional Performance Test Procedures, with annotation of test results and test completion.
  - 5. Commissioning Issues Log.
  - 6. Listing of deferred and off season test(s) not performed, including the schedule for their completion.
- I. Addendum to Final Commissioning Report: The Commissioning Agent will prepare an Addendum to the Final Commissioning Report near the end of the Warranty Period. The Addendum will indicate whether systems, subsystems, and equipment are complete and continue to perform according to the Contract Documents. The Addendum to the Final Commissioning Report shall include, but is not limited to, the following:
- 1. Documentation of deferred and off season test(s) results.



2. Completed Systems Functional Performance Test Procedures for off season test(s).
3. Documentation that unresolved system performance issues have been resolved.
4. Updated Commissioning Issues Log, including status of unresolved issues.
5. Identification of potential Warranty Claims to be corrected by the Contractor.

- J. Systems Manual: The Commissioning Agent will gather required information and compile the Systems Manual. The Systems Manual will include, but is not limited to, the following:
1. Design Narrative, including system narratives, schematics, single-line diagrams, flow diagrams, equipment schedules, and changes made throughout the Project.
  2. Reference to Final Commissioning Plan.
  3. Reference to Final Commissioning Report.
  4. Approved Operation and Maintenance Data as submitted by the Contractor.

#### **1.12 SUBMITTALS**

- A. Preliminary Commissioning Plan Submittal: The Commissioning Agent has prepared a Preliminary Commissioning Plan based on the final Construction Documents. The Preliminary Commissioning Plan is included as an Appendix to this specification section. The Preliminary Commissioning Plan is provided for information only. It contains preliminary information about the following commissioning activities:
1. The Commissioning Team: A list of commissioning team members by organization.
  2. Systems to be commissioned. A detailed list of systems to be commissioned for the project. This list also provides preliminary information on systems/equipment submittals to be reviewed by the Commissioning Agent; preliminary information on Pre-Functional Checklists that are to be completed; preliminary information on Systems Performance Testing, including information on testing sample size (where authorized by the VA).
  3. Commissioning Team Roles and Responsibilities: Preliminary roles and responsibilities for each Commissioning Team member.

4. Commissioning Documents: A preliminary list of commissioning-related documents, include identification of the parties responsible for preparation, review, approval, and action on each document.
  5. Commissioning Activities Schedule: Identification of Commissioning Activities, including Systems Functional Testing, the expected duration and predecessors for the activity.
  6. Pre-Functional Checklists: Preliminary Pre-Functional Checklists for equipment, components, subsystems, and systems to be commissioned. These Preliminary Pre-Functional Checklists provide guidance on the level of detailed information the Contractor shall include on the final submission.
  7. Systems Functional Performance Test Procedures: Preliminary step-by-step System Functional Performance Test Procedures to be used during Systems Functional Performance Testing. These Preliminary Systems Functional Performance procedures provide information on the level of testing rigor, and the level of Contractor support required during performance of system's testing.
- B. Final Commissioning Plan Submittal: Based on the Final Construction Documents and the Contractor's project team, the Commissioning Agent will prepare the Final Commissioning Plan as described in this section. The Commissioning Agent will submit three hard copies and three sets of electronic files of Final Commissioning Plan. The Contractor shall review the Commissioning Plan and provide any comments to the VA. The Commissioning Agent will incorporate review comments into the Final Commissioning Plan as directed by the VA.
- C. Systems Functional Performance Test Procedure: The Commissioning Agent will submit preliminary Systems Functional Performance Test Procedures to the Contractor, and the VA for review and comment. The Contractor shall return review comments to the VA and the Commissioning Agent. The VA will also return review comments to the Commissioning Agent. The Commissioning Agent will incorporate review comments into the Final Systems Functional Test Procedures to be used in Systems Functional Performance Testing.
- D. Pre-Functional Checklists: The Commissioning Agent will submit Pre-Functional Checklists to be completed by the Contractor.
- E. Test and Inspection Reports: The Commissioning Agent will submit test and inspection reports to the VA with copies to the Contractor and the Architect/Engineer.

- F. Corrective Action Documents: The Commissioning Agent will submit corrective action documents to the VA COR with copies to the Contractor and Architect.
- G. Preliminary Commissioning Report Submittal: The Commissioning Agent will submit three electronic copies of the preliminary commissioning report. One electronic copy, with review comments, will be returned to the Commissioning Agent for preparation of the final submittal.
- H. Final Commissioning Report Submittal: The Commissioning Agent will submit four sets of electronically formatted information of the final commissioning report to the VA. The final submittal will incorporate comments as directed by the VA.
- I. Data for Commissioning:
  - 1. The Commissioning Agent will request in writing from the Contractor specific information needed about each piece of commissioned equipment or system to fulfill requirements of the Commissioning Plan.
  - 2. The Commissioning Agent may request further documentation as is necessary for the commissioning process or to support other VA data collection requirements, including Construction Operations Building Information Exchange (COBIE), Building Information Modeling (BIM), etc.

### **1.13 COMMISSIONING PROCESS**

- A. The Commissioning Agent will be responsible for the overall management of the commissioning process as well as coordinating scheduling of commissioning tasks with the VA and the Contractor. As directed by the VA, the Contractor shall incorporate Commissioning tasks, including, but not limited to, Systems Functional Performance Testing (including predecessors) with the Master Construction Schedule.
- B. Within **//XX//** days of contract award, the Contractor shall designate a specific individual as the Commissioning Manager (CM) to manage and lead the commissioning effort on behalf of the Contractor. The Commissioning Manager shall be the single point of contact and communications for all commissioning related services by the Contractor.
- C. Within **//XX//** days of contract award, the Contractor shall ensure that each subcontractor designates specific individuals as Commissioning Representatives (CR) to be responsible for commissioning related tasks. The Contractor shall ensure the designated Commissioning

Representatives participate in the commissioning process as team members providing commissioning testing services, equipment operation, adjustments, and corrections if necessary. The Contractor shall ensure that all Commissioning Representatives shall have sufficient authority to direct their respective staff to provide the services required, and to speak on behalf of their organizations in all commissioning related contractual matters.

#### **1.14 QUALITY ASSURANCE**

- A. Instructor Qualifications: Factory authorized service representatives shall be experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.
- B. Test Equipment Calibration: The Contractor shall comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within six months prior to use.

#### **1.15 COORDINATION**

- A. Management: The Commissioning Agent will coordinate the commissioning activities with the VA and Contractor. The Commissioning Agent will submit commissioning documents and information to the VA. All commissioning team members shall work together to fulfill their contracted responsibilities and meet the objectives of the contract documents.
- B. Scheduling: The Contractor will work with the Commissioning Agent and the VA to incorporate the commissioning activities into the construction schedule. The Commissioning Agent will provide sufficient information on commissioning activities to allow the Contractor and the VA to schedule commissioning activities. All parties shall address scheduling issues and make necessary notifications in a timely manner in order to expedite the project and the commissioning process. The Contractor shall update the Master Construction as directed by the VA.
- C. Initial Schedule of Commissioning Events: The Commissioning Agent will provide the initial schedule of primary commissioning events in the Commissioning Plan and at the commissioning coordination meetings. The Commissioning Plan will provide a format for this schedule. As construction progresses, more detailed schedules will be developed by the Contractor with information from the Commissioning Agent.

- D. Commissioning Coordinating Meetings: The Commissioning Agent will conduct periodic Commissioning Coordination Meetings of the commissioning team to review status of commissioning activities, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.
- E. Pretesting Meetings: The Commissioning Agent will conduct pretest meetings of the commissioning team to review startup reports, Pre-Functional Checklist results, Systems Functional Performance Testing procedures, testing personnel and instrumentation requirements.
- F. Systems Functional Performance Testing Coordination: The Contractor shall coordinate testing activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting. The Contractor shall coordinate the schedule times for tests, inspections, obtaining samples, and similar activities.

## **PART 2 - PRODUCTS**

### **2.1 TEST EQUIPMENT**

- A. The Contractor shall provide all standard and specialized testing equipment required to perform Systems Functional Performance Testing. Test equipment required for Systems Functional Performance Testing will be identified in the detailed System Functional Performance Test Procedure prepared by the Commissioning Agent.
- B. Data logging equipment and software required to test equipment shall be provided by the Contractor.
- C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration within the past year to an accuracy of 0.5 °C (1.0 °F) and a resolution of + or - 0.1 °C (0.2 °F). Pressure sensors shall have an accuracy of + or - 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

**PART 3 - EXECUTION****3.1 STARTUP, INITIAL CHECKOUT, AND PRE-FUNCTIONAL CHECKLISTS**

A. The following procedures shall apply to all equipment and systems to be commissioned, according to Part 1, Systems to Be Commissioned.

1. Pre-Functional Checklists are important to ensure that the equipment and systems are hooked up and operational. These ensure that Systems Functional Performance Testing may proceed without unnecessary delays. Each system to be commissioned shall have a full Pre-Functional Checklist completed by the Contractor prior to Systems Functional Performance Testing. No sampling strategies are used.
  - a. The Pre-Functional Checklist will identify the trades responsible for completing the checklist. The Contractor shall ensure the appropriate trades complete the checklists.
  - b. The Commissioning Agent will review completed Pre-Functional Checklists and field-verify the accuracy of the completed checklist using sampling techniques.
2. Startup and Initial Checkout Plan: The Contractor shall develop detailed startup plans for all equipment. The primary role of the Contractor in this process is to ensure that there is written documentation that each of the manufacturer recommended procedures have been completed. Parties responsible for startup shall be identified in the Startup Plan and in the checklist forms.
  - a. The Contractor shall develop the full startup plan by combining (or adding to) the checklists with the manufacturer's detailed startup and checkout procedures from the O&M manual data and the field checkout sheets normally used by the Contractor. The plan shall include checklists and procedures with specific boxes or lines for recording and documenting the checking and inspections of each procedure and a summary statement with a signature block at the end of the plan.
  - b. The full startup plan shall at a minimum consist of the following items:
    - 1) The Pre-Functional Checklists.
    - 2) The manufacturer's standard written startup procedures copied from the installation manuals with check boxes by each procedure and a signature block added by hand at the end.
    - 3) The manufacturer's normally used field checkout sheets.

a) The Commissioning Agent will submit the full startup plan to the VA and Contractor for review. Final approval will be by the VA.

b) The Contractor shall review and evaluate the procedures and the format for documenting them, noting any procedures that need to be revised or added.

### 3. Sensor and Actuator Calibration

a. All field installed temperature, relative humidity, CO<sub>2</sub> and pressure sensors and gages, and all actuators (dampers and valves) on all equipment shall be calibrated using the methods described in Division 21, Division 22, Division 23, Division 26, Division 27, and Division 28 specifications.

b. All procedures used shall be fully documented on the Pre-Functional Checklists or other suitable forms, clearly referencing the procedures followed and written documentation of initial, intermediate and final results.

### 4. Execution of Equipment Startup

a. Four weeks prior to equipment startup, the Contractor shall schedule startup and checkout with the VA and Commissioning Agent. The performance of the startup and checkout shall be directed and executed by the Contractor.

b. The Commissioning Agent will observe the startup procedures for selected pieces of primary equipment.

c. The Contractor shall execute startup and provide the VA and Commissioning Agent with a signed and dated copy of the completed startup checklists, and contractor tests.

d. Only individuals that have direct knowledge and witnessed that a line item task on the Startup Checklist was actually performed shall initial or check that item off. It is not acceptable for witnessing supervisors to fill out these forms.

### **3.2 DEFICIENCIES, NONCONFORMANCE, AND APPROVAL IN CHECKLISTS AND STARTUP**

A. The Contractor shall clearly list any outstanding items of the initial startup and Pre-Functional Checklist procedures that were not completed successfully, at the bottom of the procedures form or on an attached sheet. The procedures form and any outstanding deficiencies shall be provided to the VA and the Commissioning Agent within two days of completion.

- B. The Commissioning Agent will review the report and submit comments to the VA. The Commissioning Agent will work with the Contractor to correct and verify deficiencies or uncompleted items. The Commissioning Agent will involve the VA and others as necessary. The Contractor shall correct all areas that are noncompliant or incomplete in the checklists in a timely manner, and shall notify the VA and Commissioning Agent as soon as outstanding items have been corrected. The Contractor shall submit an updated startup report and a Statement of Correction on the original noncompliance report. When satisfactorily completed, the Commissioning Agent will recommend approval of the checklists and startup of each system to the VA.
- C. The Contractor shall be responsible for resolution of deficiencies as directed the VA.

### **3.3 PHASED COMMISSIONING**

- A. The project may require startup and initial checkout to be executed in phases. This phasing shall be planned and scheduled in a coordination meeting of the VA, Commissioning Agent, and the Contractor. Results will be added to the master construction schedule and the commissioning schedule.

### **3.4 TRENDING AND ALARMS**

- A. Trending is a method of testing as a standalone method or to augment manual testing. The Contractor shall trend any and all points of the system or systems at intervals specified below.
- B. Alarms are a means to notify the system operator that abnormal conditions are present in the system. Alarms shall be structured into three tiers - Critical, Priority, and Maintenance.
  - 1. Critical alarms are intended to be alarms that require the immediate attention of and action by the Operator. These alarms shall be displayed on the Operator Workstation in a popup style window that is graphically linked to the associated unit's graphical display. The popup style window shall be displayed on top of any active window within the screen, including non DDC system software.
  - 2. Priority level alarms are to be printed to a printer which is connected to the Operator's Work Station located within the engineer's office. Additionally Priority level alarms shall be able to be monitored and viewed through an active alarm application. Priority level alarms are alarms which shall require reaction from



the operator or maintenance personnel within a normal work shift, and not immediate action.

3. Maintenance alarms are intended to be minor issues which would require examination by maintenance personnel within the following shift. These alarms shall be generated in a scheduled report automatically by the DDC system at the start of each shift. The generated maintenance report will be printed to a printer located within the engineer's office.

- C. The Contractor shall provide a wireless internet network in the building for use during controls programming, checkout, and commissioning. This network will allow project team members to more effectively program, view, manipulate and test control devices while being in the same room as the controlled device.
- D. The Contractor shall provide graphical trending through the DDC control system of systems being commissioned. Trending requirements are indicated below and included with the Systems Functional Performance Test Procedures. Trending shall occur before, during and after Systems Functional Performance Testing. The Contractor shall be responsible for producing graphical representations of the trended DDC points that show each system operating properly during steady state conditions as well as during the System Functional Testing. These graphical reports shall be submitted to the COR and Commissioning Agent for review and analysis before, during dynamic operation, and after Systems Functional Performance Testing. The Contractor shall provide, but not limited to, the following trend requirements and trend submissions:

1. Pre-testing, Testing, and Post-testing - Trend reports of trend logs and graphical trend plots are required as defined by the Commissioning Agent. The trend log points, sampling rate, graphical plot configuration, and duration will be dictated by the Commissioning Agent. At any time during the Commissioning Process the Commissioning Agent may recommend changes to aspects of trending as deemed necessary for proper system analysis. The Contractor shall implement any changes as directed by the COR. Any pre-test trend analysis comments generated by the Commissioning Team should be addressed and resolved by the Contractor, as directed by the COR, prior to the execution of Systems Functional Performance Testing.
2. Dynamic plotting - The Contractor shall also provide dynamic plotting during Systems Functional Performance testing at frequent

intervals for points determined by the Systems Functional Performance Test Procedure. The graphical plots will be formatted and plotted at durations listed in the Systems Functional Performance Test Procedure.

3. Graphical plotting - The graphical plots shall be provided with a dual y-axis allowing 15 or more trend points (series) plotted simultaneously on the graph with each series in distinct color. The plots will further require title, axis naming, legend etc. all described by the Systems Functional Performance Test Procedure. If this cannot be sufficiently accomplished directly in the Direct Digital Control System then it is the responsibility of the Contractor to plot these trend logs in Microsoft Excel.
4. The following tables indicate the points to be trended and alarmed by system. The Operational Trend Duration column indicates the trend duration for normal operations. The Testing Trend Duration column indicates the trend duration prior to Systems Functional Performance Testing and again after Systems Functional Performance Testing. The Type column indicates point type: AI = Analog Input, AO = Analog Output, DI = Digital Input, DO = Digital Output, Calc = Calculated Point. In the Trend Interval Column, COV = Change of Value. The Alarm Type indicates the alarm priority; C = Critical, P = Priority, and M = Maintenance. The Alarm Range column indicates when the point is considered in the alarm state. The Alarm Delay column indicates the length of time the point must remain in an alarm state before the alarm is recorded in the DDC. The intent is to allow minor, short-duration events to be corrected by the DDC system prior to recording an alarm.

Spec Writer Note: The following tables provide guidelines for system trends and alarms. Coordinate the types of systems and point names with the construction documents. Verify alarm priorities, ranges and delay. The Design Engineer may elect to include trending and alarm information on the DDC Control Schematics and Sequences of Operations in the Construction Drawing set or in the DDC Control Specifications. Verify the control drawings or DDC specification has included reference to this section of 01 91 00. If adequately included in the drawings or specifications, the following

tables should be deleted to prevent duplication and possible conflicts.

Dual-Path Air Handling Unit Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
OA Temperature	AI	15 Min	24 hours	3 days	N/A		
RA Temperature	AI	15 Min	24 hours	3 days	N/A		
RA Humidity	AI	15 Min	24 hours	3 days	P	>60% RH	10 min
Mixed Air Temp	AI	None	None	None	N/A		
SA Temp	AI	15 Min	24 hours	3 days	C	±5°F from SP	10 min
Supply Fan Speed	AI	15 Min	24 hours	3 days	N/A		
Return Fan Speed	AI	15 Min	24 hours	3 days	N/A		
RA Pre-Filter Status	AI	None	None	None	N/A		
OA Pre-Filter Status	AI	None	None	None	N/A		
After Filter Status	AI	None	None	None	N/A		
SA Flow	AI	15 Min	24 hours	3 days	C	±10% from SP	10 min
OA Supply Temp	AI	15 Min	24 hours	3 days	P	±5°F from SP	10 min
RA Supply Temp	AI	15 Min	24 hours	3 days	N/A		
RA CHW Valve Position	AI	15 Min	24 hours	3 days	N/A		
OA CHW Valve Position	AI	15 Min	24 hours	3 days	N/A		
OA HW Valve Position	AI	15 Min	24 hours	3 days	N/A		
OA Flow	AI	15 Min	24 hours	3 days	P	±10% from SP	5 min
RA Flow	AI	15 Min	24 hours	3 days	P	±10% from SP	5 min
Initial UVC Intensity (%)	AI	None	None	None	N/A		
Duct Pressure	AI	15 Min	24 hours	3 days	C	±25% from SP	6 min
CO2 Level	AI	15 Min	24 hours	3 days	P	±10% from SP	10 min

Dual-Path Air Handling Unit Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Supply Fan Status	DI	COV	24 hours	3 days	C	Status <> Command	10 min
Return Fan Status	DI	COV	24 hours	3 days	C	Status <> Command	10 Min
High Static Status	DI	COV	24 hours	3 days	P	True	1 min
Fire Alarm Status	DI	COV	24 hours	3 days	C	True	5 min
Freeze Stat Level 1	DI	COV	24 hours	3 days	C	True	10 min
Freeze Stat Level 2	DI	COV	24 hours	3 days	C	True	5 min
Freeze Stat Level 3	DI	COV	24 hours	3 days	P	True	1 min
Fire/Smoke Damper Status	DI	COV	24 hours	3 days	P	Closed	1 min
Emergency AHU Shutdown	DI	COV	24 hours	3 days	P	True	1 min
Exhaust Fan #1 Status	DI	COV	24 hours	3 days	C	Status <> Command	10 min
Exhaust Fan #2 Status	DI	COV	24 hours	3 days	C	Status <> Command	10 min
Exhaust Fan #3 Status	DI	COV	24 hours	3 days	C	Status <> Command	10 min
OA Alarm	DI	COV	24 hours	3 days	C	True	10 min
High Static Alarm	DI	COV	24 hours	3 days	C	True	10 min
UVC Emitter Alarm	DI	COV	24 hours	3 days	P	True	10 min
CO2 Alarm	DI	COV	24 hours	3 days	P	True	10 min
Power Failure	DI	COV	24 hours	3 days	P	True	1 min
Supply Fan Speed	AO	15 Min	24 hours	3 days	N/A		
Return Fan Speed	AO	15 Min	24 hours	3 days	N/A		
RA CHW Valve Position	AO	15 Min	24 hours	3 days	N/A		
OA CHW Valve Position	AO	15 Min	24 hours	3 days	N/A		

Dual-Path Air Handling Unit Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
OA HW Valve Position	AO	15 Min	24 hours	3 days	N/A		
Supply Fan S/S	DO	COV	24 hours	3 days	N/A		
Return Fan S/S	DO	COV	24 hours	3 days	N/A		
Fire/Smoke Dampers	DO	COV	24 hours	3 days	N/A		
Exhaust Fan S/S	DO	COV	24 hours	3 days	N/A		
Exhaust Fan S/S	DO	COV	24 hours	3 days	N/A		
Exhaust Fan S/S	DO	COV	24 hours	3 days	N/A		
AHU Energy	Calc	1 Hour	30 day	N/A	N/A		

Terminal Unit (VAV, CAV, etc.) Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Space Temperature	AI	15 Min	12 hours	3 days	P	±5°F from SP	10 min
Air Flow	AI	15 Min	12 hours	3 days	P	±5°F from SP	10 min
SA Temperature	AI	15 Min	12 hours	3 days	P	±5°F from SP	10 min
Local Set-point	AI	15 Min	12 hours	3 days	M	±10°F from SP	60 min
Space Humidity	AI	15 Min	12 hours	3 days	P	> 60% RH	5 min

<b>Terminal Unit (VAV, CAV, etc.) Trending and Alarms</b>							
<b>Point</b>	<b>Type</b>	<b>Trend Interval</b>	<b>Operational Trend Duration</b>	<b>Testing Trend Duration</b>	<b>Alarm Type</b>	<b>Alarm Range</b>	<b>Alarm Delay</b>
Unoccupied Override	DI	COV	12 hours	3 days	M	N/A	12 Hours
Refrigerator Alarm	DI	COV	12 hours	3 days	C	N/A	10 min
Damper Position	AO	15 Minutes	12 hours	3 days	N/A		
Heating coil Valve Position	AO	15 Minutes	12 hours	3 days	N/A		

<b>4-Pipe Fan Coil Trending and Alarms</b>							
<b>Point</b>	<b>Type</b>	<b>Trend Interval</b>	<b>Operational Trend Duration</b>	<b>Testing Trend Duration</b>	<b>Alarm Type</b>	<b>Alarm Range</b>	<b>Alarm Delay</b>
Space Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min
SA Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min
Pre-Filter Status	AI	None	None	None	M	> SP	1 hour
Water Sensor	DI	COV	12 hours	3 days	M	N/A	30 Min
Cooling Coil Valve Position	AO	15 Minutes	12 hours	3 days	N/A		
Heating coil Valve Position	AO	15 Minutes	12 hours	3 days	N/A		
Fan Coil ON/OFF	DO	COV	12 hours	3 days	M	Status <> Command	30 min

2-Pipe Fan Coil Unit Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Space Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min
SA Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min
Pre-Filter Status	AI	None	None	None	M	> SP	1 hour
Water Sensor	DI	COV	12 hours	3 days	M	N/A	30 Min
Cooling Coil Valve Position	AO	15 Minutes	12 hours	3 days	N/A		
Fan Coil ON/OFF	DO	COV	12 hours	3 days	M	Status <> Command	30 min

Unit Heater Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Space Temperature	AI	15 Minutes	12 hours	3 days	P	±5°F from SP	10 min
Heating Valve Position	AO	15 Minutes	12 hours	3 days	N/A		
Unit Heater ON/OFF	DO	COV	12 hours	3 days	M	Status <> Command	30 min

Steam and Condensate Pumps Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Steam Flow (LB/HR)	AI	15 Minutes	12 hours	3 days	N/A		
Condensate Pump Run Hours	AI	15 Minutes	12 hours	3 days	N/A		
Water Meter (GPM)	AI	15 Minutes	12 hours	3 days	N/A		
Electric Meter (KW/H)	AI	15 Minutes	12 hours	3 days	N/A		
Irrigation Meter (GPM)	AI	15 Minutes	12 hours	3 days	N/A		
Chilled Water Flow (TONS)	AI	15 Minutes	12 hours	3 days	N/A		
Condensate Flow (GPM)	AI	15 Minutes	12 hours	3 days	N/A		
High Water Level Alarm	DI	COV	12 hours	3 days	C	True	5 Min
Condensate Pump Start/Stop	DO	COV	12 hours	3 days	P	Status <> Command	10 min

Domestic Hot Water Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Domestic HW Setpoint WH-1	AI	15 Minute	12 Hours	3 days	N/A		
Domestic HW Setpoint WH-2	AI	15 Minute	12 Hours	3 days	N/A		
Domestic HW Temperature	AI	15 Minute	12 Hours	3 days	C	> 135 °F	10 Min
Domestic HW Temperature	AI	15 Minute	12 Hours	3 days	P	±5°F from SP	10 Min



Domestic Hot Water Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Dom. Circ. Pump #1 Status	DI	COV	12 Hours	3 days	M	Status <> Command	30 min
Dom. Circ. Pump #2 Status	DI	COV	12 Hours	3 days	M	Status <> Command	30 min
Dom. Circ. Pump #1 Start/Stop	DO	COV	12 Hours	3 days	N/A		
Dom. Circ. Pump #2 Start/Stop	DO	COV	12 Hours	3 days	N/A		
Domestic HW Start/Stop	DO	COV	12 Hours	3 days	N/A		

Hydronic Hot Water Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
System HWS Temperature	AI	15 min	12 hours	3 days	C	±5°F from SP	10 Min
System HWR Temperature	AI	15 min	12 hours	3 days	M	±15°F from SP	300 Min
HX-1 Entering Temperature	AI	15 min	12 hours	3 days	P	±5°F from SP	10 Min
HX-2 Entering Temperature	AI	15 min	12 hours	3 days	P	±5°F from SP	10 Min
HX-2 Leaving Temperature	AI	15 min	12 hours	3 days	P	±5°F from SP	10 Min
System Flow (GPM)	AI	15 min	12 hours	3 days	N/A		
System Differential Pressure	AI	15 min	12 hours	3 days	P	±10% from SP	8 Min
				3 days			
HW Pump 1 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min

Hydronic Hot Water Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
HW Pump 2 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
HW Pump 1 VFD Speed	AO	15 Min	12 Hours	3 days	N/A		
HW Pump 2 VFD Speed	AO	15 Min	12 Hours	3 days	N/A		
Steam Station #1 1/3 Control Valve Position	AO	15 Min	12 Hours	3 days	N/A		
Steam Station #1 2/3 Control Valve Position	AO	15 Min	12 Hours	3 days	N/A		
Steam Station #2 1/3 Control Valve Position	AO	15 Min	12 Hours	3 days	N/A		
Steam Station #2 2/3 Control Valve Position	AO	15 Min	12 Hours	3 days	N/A		
Steam Station Bypass Valve Position	AO	15 Min	12 Hours	3 days	N/A		
HW Pump 1 Start/Stop	DO	COV	12 Hours	3 days	N/A		
HW Pump 2 Start/Stop	DO	COV	12 Hours	3 days	N/A		
HWR #1 Valve	DO	COV	12 Hours	3 days	N/A		
HWR #2 Valve	DO	COV	12 Hours	3 days	N/A		

Chilled Water System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Chiller 1 Entering Temperature	AI	15 Minutes	12 Hours	3 days	N/A		

Chilled Water System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Chiller 1 Leaving Temperature	AI	15 Minutes	12 Hours	3 days	P	±5°F from SP	10 Min
Chiller 1 Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 1 Percent Load	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 1 KW Consumption	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 1 Tonnage	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Entering Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Leaving Temperature	AI	15 Minutes	12 Hours	3 days	P	±5°F from SP	10 Min
Chiller 2 Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Percent Load	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 KW Consumption	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Tonnage	AI	15 Minutes	12 Hours	3 days	N/A		
Primary Loop Decoupler Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Primary Loop Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Primary Loop Supply Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Differential Pressure	AI	15 Minutes	12 Hours	3 days	P	±5% from SP	10 Min
Secondary Loop Flow	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Supply Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Return Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Tonnage	AI	15 Minutes	12 Hours	3 days	N/A		

Chilled Water System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Primary Loop Pump 1 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Primary Loop Pump 2 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Secondary Loop Pump 1 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Secondary Loop Pump 2 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Chiller 1 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Chiller 1 Evaporator Iso-Valve	DI	COV	12 Hours	3 days	N/A		
Chiller 1 Evaporator Flow Switch	DI	COV	12 Hours	3 days	N/A		
Chiller 1 Unit Alarm	DI	COV	12 Hours	3 days	C	True	10 Min
Chiller 2 Status	DI	COV	12 Hours	3 days	C	Status <> Command	30 min
Chiller 2 Evaporator Iso-Valve	DI	COV	12 Hours	3 days	N/A		
Chiller 2 Evaporator Flow Switch	DI	COV	12 Hours	3 days	N/A		
Chiller 2 Unit Alarm	DI	COV	12 Hours	3 days	C	True	10 Min
Refrigerant Detector	DI	COV	12 Hours	3 days	C	True	10 Min
Refrigerant Exhaust Fan Status	DI	COV	12 Hours	3 days	M	Status <> Command	30 min
Emergency Shutdown	DI	COV	12 Hours	3 days	P	True	1 Min
Primary Loop Pump 1 VFD Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Primary Loop Pump 2 VFD Speed	AO	15 Minutes	12 Hours	3 days	N/A		

Chilled Water System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Secondary Loop Pump 1 VFD Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Pump 2 VFD Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Primary Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Primary Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Secondary Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Secondary Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Chiller 1 Enable	DO	COV	12 Hours	3 days	N/A		
Chiller 1 Iso-Valve Command	DO	COV	12 Hours	3 days	N/A		
Chiller 2 Enable	DO	COV	12 Hours	3 days	N/A		
Chiller 2 Iso-Valve Command	DO	COV	12 Hours	3 days	N/A		
Refrigerant Exhaust Fan Start / Stop	DO	COV	12 Hours	3 days	N/A		

Condenser Water System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Chiller 1 Condenser Entering Temp	AI	15 Minutes	12 Hours	3 days	N/A		

Condenser Water System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Chiller 1 Condenser Leaving Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Condenser Entering Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Condenser Leaving Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Supply Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Return Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Basin Temp	AI	15 Minutes	12 Hours	3 days	P	< 45 °F	10 Min
Cooling Tower 2 Supply Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 2 Return Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 2 Basin Temp	AI	15 Minutes	12 Hours	3 days	P	< 45 °F	10 Min
Condenser Water Supply Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Condenser Water Return Temp	AI	15 Minutes	12 Hours	3 days	N/A		
Outdoor Air Wet Bulb	AI	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Fan Status	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Cooling Tower 1 Basin Heat	DI	COV	12 Hours	3 days	N/A		
Cooling Tower 1 Heat Trace	DI	COV	12 Hours	3 days	N/A		
Cooling Tower 2 Fan Status	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Cooling Tower 2 Basin Heat	DI	COV	12 Hours	3 days	N/A		
Cooling Tower 2 Heat Trace	DI	COV	12 Hours	3 days	N/A		
Chiller 1 Isolation Valve	DI	COV	12 Hours	3 days	P	Status <> Command	1 min

<b>Condenser Water System Trending and Alarms</b>							
<b>Point</b>	<b>Type</b>	<b>Trend Interval</b>	<b>Operational Trend Duration</b>	<b>Testing Trend Duration</b>	<b>Alarm Type</b>	<b>Alarm Range</b>	<b>Alarm Delay</b>
Chiller 2 Isolation Valve	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Condenser Water Pump 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Condenser Water Pump 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	1 min
Chiller 1 Condenser Bypass Valve	AO	15 Minutes	12 Hours	3 days	N/A		
Chiller 2 Condenser Bypass Valve	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Bypass Valve	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Fan Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 2 Bypass Valve	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 2 Fan Speed	AO	15 Minutes	12 Hours	3 days	N/A		
Cooling Tower 1 Fan Start / Stop	DO	COV	12 Hours	3 days	N/A		
Cooling Tower 2 Fan Start / Stop	DO	COV	12 Hours	3 days	N/A		
Condenser Water Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Condenser Water Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		

<b>Steam Boiler System Trending and Alarms</b>
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Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Boiler 1 Steam Pressure	AI	15 Minutes	12 Hours	3 days	P	±5% from SP	10 Min
Boiler 1 Steam Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Fire Signal	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 2 Steam Pressure	AI	15 Minutes	12 Hours	3 days	P	±5% from SP	10 Min
Boiler 2 Steam Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 2 Fire Signal	AI	15 Minutes	12 Hours	3 days	N/A		
System Steam Pressure	AI	15 Minutes	12 Hours	3 days	P	±5% from SP	10 Min
Boiler 1 Enable	DI	COV	12 Hours	3 days	N/A		
Boiler 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Boiler 1 Alarm	DI	COV	12 Hours	3 days	C	True	1 Min
Boiler 1 on Fuel Oil	DI	COV	12 Hours	3 days	N/A		
Boiler 1 Low Water Alarm	DI	COV	12 Hours	3 days	C	True	5 Min
Boiler 1 High Water Alarm	DI	COV	12 Hours	3 days	C	True	5 Min
Boiler 1 Feed Pump	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Enable	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Boiler 2 Alarm	DI	COV	12 Hours	3 days	C	True	1 Min
Boiler 2 on Fuel Oil	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Low Water Alarm	DI	COV	12 Hours	3 days	C	True	5 Min
Boiler 2 High Water Alarm	DI	COV	12 Hours	3 days	C	True	5 Min
Boiler 2 Feed Pump	DI	COV	12 Hours	3 days	N/A		



Steam Boiler System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Combustion Damper Status	DI	COV	12 Hours	3 days	P	Status <> Command	5 min
Condensate Recovery Pump Status	DI	COV	12 Hours	3 days	P	Status <> Command	5 min
Boiler 1 Feed Pump Start / Stop	DO	COV	12 Hours	3 days	N/A		
Boiler 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Combustion Damper Command	DO	COV	12 Hours	3 days	N/A		
Condensate Recovery Pump Start / Stop	DO	COV	12 Hours	3 days	N/A		

Hot Water Boiler System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Outside Air Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Fire Signal	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Entering Water Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Leaving Water Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 2 Fire Signal	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 2 Entering Water Temperature	AI	15 Minutes	12 Hours	3 days	N/A		

Hot Water Boiler System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Boiler 2 Leaving Water Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Hot Water Supply Temperature	AI	15 Minutes	12 Hours	3 days	P	±5 °F from SP	10 Min
Hot Water Return Temperature	AI	15 Minutes	12 Hours	3 days	N/A		
Secondary Loop Differential Pressure	AI	15 Minutes	12 Hours	3 days	C	±5% from SP	10 Min
Lead Boiler	AI	15 Minutes	12 Hours	3 days	N/A		
Boiler 1 Enable	DI	COV	12 Hours	3 days	N/A		
Boiler 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Boiler 1 Isolation Valve	DI	COV	12 Hours	3 days	N/A		
Boiler 1 on Fuel Oil	DI	COV	12 Hours	3 days	N/A		
Boiler 1 Alarm	DI	COV	12 Hours	3 days	C	True	1 Min
Boiler 2 Enable	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Boiler 2 Isolation Valve	DI	COV	12 Hours	3 days	N/A		
Boiler 2 on Fuel Oil	DI	COV	12 Hours	3 days	N/A		
Boiler 2 Alarm	DI	COV	12 Hours	3 days	C	True	1 Min
Combustion Dampers Open	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Primary Pump 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Primary Pump 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min

Hot Water Boiler System Trending and Alarms							
Point	Type	Trend Interval	Operational Trend Duration	Testing Trend Duration	Alarm Type	Alarm Range	Alarm Delay
Secondary Pump 1 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Secondary Pump 2 Status	DI	COV	12 Hours	3 days	P	Status <> Command	10 min
Primary Pump 1 VFD Speed	AO	COV	12 Hours	3 days	N/A		
Primary Pump 2 VFD Speed	AO	COV	12 Hours	3 days	N/A		
Secondary Pump 1 VFD Speed	AO	COV	12 Hours	3 days	N/A		
Secondary Pump 2 VFD Speed	AO	COV	12 Hours	3 days	N/A		
Hot Water System Enable	DO	COV	12 Hours	3 days	N/A		
Combustion Dampers Command	DO	COV	12 Hours	3 days	N/A		
Primary Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Primary Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Secondary Pump 1 Start / Stop	DO	COV	12 Hours	3 days	N/A		
Secondary Pump 2 Start / Stop	DO	COV	12 Hours	3 days	N/A		

E. The Contractor shall provide the following information prior to Systems Functional Performance Testing. Any documentation that is modified after submission shall be recorded and resubmitted to the COR and Commissioning Agent.

1. Point-to-Point checkout documentation;

2. Sensor field calibration documentation including system name, sensor/point name, measured value, DDC value, and Correction Factor.
3. A sensor calibration table listing the referencing the location of procedures to following in the O&M manuals, and the frequency at which calibration should be performed for all sensors, separated by system, subsystem, and type. The calibration requirements shall be submitted both in the O&M manuals and separately in a standalone document containing all sensors for inclusion in the commissioning documentation. The following table is a sample that can be used as a template for submission.

<b>SYSTEM</b>		
<b>Sensor</b>	<b>Calibration Frequency</b>	<b>O&amp;M Calibration Procedure Reference</b>
Discharge air temperature	Once a year	Volume I Section D.3.aa
Discharge static pressure	Every 6 months	Volume II Section A.1.c

4. Loop tuning documentation and constants for each loop of the building systems. The documentation shall be submitted in outline or table separated by system, control type (e.g. heating valve temperature control); proportional, integral and derivative constants, interval (and bias if used) for each loop. The following table is a sample that can be used as a template for submission.

<b>AIR HANDLING UNIT AHU-1</b>				
<b>Control Reference</b>	<b>Proportional Constant</b>	<b>Integral Constant</b>	<b>Derivative Constant</b>	<b>Interval</b>
Heating Valve Output	1000	20	10	2 sec.

### 3.5 SYSTEMS FUNCTIONAL PERFORMANCE TESTING

- A. This paragraph applies to Systems Functional Performance Testing of systems for all referenced specification Divisions.
- B. Objectives and Scope: The objective of Systems Functional Performance Testing is to demonstrate that each system is operating according to the Contract Documents. Systems Functional Performance Testing facilitates bringing the systems from a state of substantial completion to full dynamic operation. Additionally, during the testing process, areas of noncompliant performance are identified and corrected, thereby

improving the operation and functioning of the systems. In general, each system shall be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load, fire alarm and emergency power) where there is a specified system response. The Contractor shall verify each sequence in the sequences of operation. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.

C. Development of Systems Functional Performance Test Procedures: Before Systems Functional Performance Test procedures are written, the Contractor shall submit all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. Using the testing parameters and requirements found in the Contract Documents and approved submittals and shop drawings, the Commissioning Agent will develop specific Systems Functional Test Procedures to verify and document proper operation of each piece of equipment and system to be commissioned. The Contractor shall assist the Commissioning Agent in developing the Systems Functional Performance Test procedures as requested by the Commissioning Agent i.e. by answering questions about equipment, operation, sequences, etc. Prior to execution, the Commissioning Agent will provide a copy of the Systems Functional Performance Test procedures to the VA, the Architect/Engineer, and the Contractor, who shall review the tests for feasibility, safety, equipment and warranty protection.

D. Purpose of Test Procedures: The purpose of each specific Systems Functional Performance Test is to verify and document compliance with the stated criteria of acceptance given on the test form. Representative test formats and examples are found in the Commissioning Plan for this project. (The Commissioning Plan is issued as a separate document and is available for review.) The test procedure forms developed by the Commissioning Agent will include, but not be limited to, the following information:

1. System and equipment or component name(s)
2. Equipment location and ID number
3. Unique test ID number, and reference to unique Pre-Functional Checklists and startup documentation, and ID numbers for the piece of equipment.

4. Date
  5. Project name
  6. Participating parties
  7. A copy of the specification section describing the test requirements
  8. A copy of the specific sequence of operations or other specified parameters being verified
  9. Formulas used in any calculations
  10. Required pretest field measurements
  11. Instructions for setting up the test.
  12. Special cautions, alarm limits, etc.
  13. Specific step-by-step procedures to execute the test, in a clear, sequential and repeatable format
  14. Acceptance criteria of proper performance with a Yes / No check box to allow for clearly marking whether or not proper performance of each part of the test was achieved.
  15. A section for comments.
  16. Signatures and date block for the Commissioning Agent. A place for the Contractor to initial to signify attendance at the test.
- E. Test Methods: Systems Functional Performance Testing shall be achieved by manual testing (i.e. persons manipulate the equipment and observe performance) and/or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by standalone data loggers. The Contractor and Commissioning Agent shall determine which method is most appropriate for tests that do not have a method specified.
1. Simulated Conditions: Simulating conditions (not by an overwritten value) shall be allowed, although timing the testing to experience actual conditions is encouraged wherever practical.
  2. Overwritten Values: Overwriting sensor values to simulate a condition, such as overwriting the outside air temperature reading in a control system to be something other than it really is, shall be allowed, but shall be used with caution and avoided when possible. Such testing methods often can only test a part of a system, as the interactions and responses of other systems will be erroneous or not applicable. Simulating a condition is preferable. e.g., for the above case, by heating the outside air sensor with a hair blower rather than overwriting the value or by altering the appropriate setpoint to see the desired response. Before simulating

conditions or overwriting values, sensors, transducers and devices shall have been calibrated.

3. Simulated Signals: Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overwritten values.
  4. Altering Setpoints: Rather than overwriting sensor values, and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable. For example, to see the Air Conditioning compressor lockout initiate at an outside air temperature below 12 C (54 F), when the outside air temperature is above 12 C (54 F), temporarily change the lockout setpoint to be 2 C (4 F) above the current outside air temperature.
  5. Indirect Indicators: Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the tested parameters, that the indirect readings through the control system represent actual conditions and responses. Much of this verification shall be completed during systems startup and initial checkout.
- F. Setup: Each function and test shall be performed under conditions that simulate actual conditions as closely as is practically possible. The Contractor shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Contractor shall return all affected building equipment and systems, due to these temporary modifications, to their pretest condition.
- G. Sampling: No sampling is allowed in completing Pre-Functional Checklists. Sampling is allowed for Systems Functional Performance Test Procedures execution. The Commissioning Agent will determine the sampling rate. If at any point, frequent failures are occurring and testing is becoming more troubleshooting than verification, the Commissioning Agent may stop the testing and require the Contractor to perform and document a checkout of the remaining units, prior to continuing with Systems Functional Performance Testing of the remaining units.
- H. Cost of Retesting: The cost associated with expanded sample System Functional Performance Tests shall be solely the responsibility of the

Contractor. Any required retesting by the Contractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.

- I. Coordination and Scheduling: The Contractor shall provide a minimum of 7 days notice to the Commissioning Agent and the VA regarding the completion schedule for the Pre-Functional Checklists and startup of all equipment and systems. The Commissioning Agent will schedule Systems Functional Performance Tests with the Contractor and VA. The Commissioning Agent will witness and document the Systems Functional Performance Testing of systems. The Contractor shall execute the tests in accordance with the Systems Functional Performance Test Procedure.
- J. Testing Prerequisites: In general, Systems Functional Performance Testing will be conducted only after Pre-Functional Checklists have been satisfactorily completed. The control system shall be sufficiently tested and approved by the Commissioning Agent and the VA before it is used to verify performance of other components or systems. The air balancing and water balancing shall be completed before Systems Functional Performance Testing of air-related or water-related equipment or systems are scheduled. Systems Functional Performance Testing will proceed from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems will be checked.
- K. Problem Solving: The Commissioning Agent will recommend solutions to problems found, however the burden of responsibility to solve, correct and retest problems is with the Contractor.

### **3.6 DOCUMENTATION, NONCONFORMANCE AND APPROVAL OF TESTS**

- A. Documentation: The Commissioning Agent will witness, and document the results of all Systems Functional Performance Tests using the specific procedural forms developed by the Commissioning Agent for that purpose. Prior to testing, the Commissioning Agent will provide these forms to the VA and the Contractor for review and approval. The Contractor shall include the filled out forms with the O&M manual data.
- B. Nonconformance: The Commissioning Agent will record the results of the Systems Functional Performance Tests on the procedure or test form. All items of nonconformance issues will be noted and reported to the VA on Commissioning Field Reports and/or the Commissioning Master Issues Log.



1. Corrections of minor items of noncompliance identified may be made during the tests. In such cases, the item of noncompliance and resolution shall be documented on the Systems Functional Test Procedure.
2. Every effort shall be made to expedite the systems functional Performance Testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the Commissioning Agent shall not be pressured into overlooking noncompliant work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so by direction from the VA.
3. As the Systems Functional Performance Tests progresses and an item of noncompliance is identified, the Commissioning Agent shall discuss the issue with the Contractor and the VA.
4. When there is no dispute on an item of noncompliance, and the Contractor accepts responsibility to correct it:
  - a. The Commissioning Agent will document the item of noncompliance and the Contractor's response and/or intentions. The Systems Functional Performance Test then continues or proceeds to another test or sequence. After the day's work is complete, the Commissioning Agent will submit a Commissioning Field Report to the VA. The Commissioning Agent will also note items of noncompliance and the Contractor's response in the Master Commissioning Issues Log. The Contractor shall correct the item of noncompliance and report completion to the VA and the Commissioning Agent.
  - b. The need for retesting will be determined by the Commissioning Agent. If retesting is required, the Commissioning Agent and the Contractor shall reschedule the test and the test shall be repeated.
5. If there is a dispute about item of noncompliance, regarding whether it is an item of noncompliance, or who is responsible:
  - a. The item of noncompliance shall be documented on the test form with the Contractor's response. The item of noncompliance with the Contractor's response shall also be reported on a Commissioning Field Report and on the Master Commissioning Issues Log.

- b. Resolutions shall be made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive and acceptance authority is with the Department of Veterans Affairs.
  - c. The Commissioning Agent will document the resolution process.
  - d. Once the interpretation and resolution have been decided, the Contractor shall correct the item of noncompliance, report it to the Commissioning Agent. The requirement for retesting will be determined by the Commissioning Agent. If retesting is required, the Commissioning Agent and the Contractor shall reschedule the test. Retesting shall be repeated until satisfactory performance is achieved.
- C. Cost of Retesting: The cost to retest a System Functional Performance Test shall be solely the responsibility of the Contractor. Any required retesting by the Contractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.
- D. Failure Due to Manufacturer Defect: If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform in compliance with the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance specifications, all identical units may be considered unacceptable by the VA. In such case, the Contractor shall provide the VA with the following:
- 1. Within one week of notification from the VA, the Contractor shall examine all other identical units making a record of the findings. The findings shall be provided to the VA within two weeks of the original notice.
  - 2. Within two weeks of the original notification, the Contractor shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly exceed the specification requirements of the original installation.
  - 3. The VA shall determine whether a replacement of all identical units or a repair is acceptable.

4. Two examples of the proposed solution shall be installed by the Contractor and the VA shall be allowed to test the installations for up to one week, upon which the VA will decide whether to accept the solution.
  5. Upon acceptance, the Contractor shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.
- E. Approval: The Commissioning Agent will note each satisfactorily demonstrated function on the test form. Formal approval of the Systems Functional Performance Test shall be made later after review by the Commissioning Agent and by the VA. The Commissioning Agent will evaluate each test and report to the VA using a standard form. The VA will give final approval on each test using the same form, and provide signed copies to the Commissioning Agent and the Contractor.

### **3.7 DEFERRED TESTING**

- A. Unforeseen Deferred Systems Functional Performance Tests: If any Systems Functional Performance Test cannot be completed due to the building structure, required occupancy condition or other conditions, execution of the Systems Functional Performance Testing may be delayed upon approval of the VA. These Systems Functional Performance Tests shall be conducted in the same manner as the seasonal tests as soon as possible. Services of the Contractor to conduct these unforeseen Deferred Systems Functional Performance Tests shall be negotiated between the VA and the Contractor.
- B. Deferred Seasonal Testing: Deferred Seasonal Systems Functional Performance Tests are those that must be deferred until weather conditions are closer to the systems design parameters. The Commissioning Agent will review systems parameters and recommend which Systems Functional Performance Tests should be deferred until weather conditions more closely match systems parameters. The Contractor shall review and comment on the proposed schedule for Deferred Seasonal Testing. The VA will review and approve the schedule for Deferred Seasonal Testing. Deferred Seasonal Systems Functional Performances Tests shall be witnessed and documented by the Commissioning Agent. Deferred Seasonal Systems Functional Performance Tests shall be executed by the Contractor in accordance with these specifications.

### 3.8 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

- A. Training Preparation Conference: Before operation and maintenance training, the Commissioning Agent will convene a training preparation conference to include VA's COR, VA's Operations and Maintenance personnel, and the Contractor. The purpose of this conference will be to discuss and plan for Training and Demonstration of VA Operations and Maintenance personnel.
- B. The Contractor shall provide training and demonstration as required by other Division 21, Division 22, Division 23, Division 26, Division 27, Division 28, and Division 31 sections. The Training and Demonstration shall include, but is not limited to, the following:
1. Review the Contract Documents.
  2. Review installed systems, subsystems, and equipment.
  3. Review instructor qualifications.
  4. Review instructional methods and procedures.
  5. Review training module outlines and contents.
  6. Review course materials (including operation and maintenance manuals).
  7. Review and discuss locations and other facilities required for instruction.
  8. Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.
  9. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.
- C. Training Module Submittals: The Contractor shall submit the following information to the VA and the Commissioning Agent:
1. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module. At completion of training, submit two complete training manuals for VA's use.
  2. Qualification Data: Submit qualifications for facilitator and/or instructor.
  3. Attendance Record: For each training module, submit list of participants and length of instruction time.

4. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.
5. Demonstration and Training Videotapes: Submit two copies within seven days of end of each training module.
  - a. Identification: On each copy, provide an applied label with the following information:
    - 1) Name of Project.
    - 2) Name and address of photographer
    - 3) Name of Contractor.
    - 4) Date videotape was recorded.
    - 5) Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
6. Transcript: Prepared on 8-1/2-by-11-inch paper, punched and bound in heavy-duty, 3-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding videotape. Include name of Project and date of videotape on each page.

#### D. QUALITY ASSURANCE

1. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
2. Instructor Qualifications: A factory authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
3. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

#### E. COORDINATION

1. Coordinate instruction schedule with VA's operations. Adjust schedule as required to minimize disrupting VA's operations.
2. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
3. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the VA.

## F. INSTRUCTION PROGRAM

1. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
  - a. Fire protection systems, including fire alarm, fire pumps, and fire suppression systems.
  - b. Intrusion detection systems.
  - c. Conveying systems, including elevators, wheelchair lifts, escalators, and automated materials handling systems.
  - d. Medical equipment, including medical gas equipment and piping.
  - e. Laboratory equipment, including laboratory air and vacuum equipment and piping.
  - f. Heat generation, including boilers, feedwater equipment, pumps, steam distribution piping, condensate return systems, heating hot water heat exchangers, and heating hot water distribution piping.
  - g. Refrigeration systems, including chillers, cooling towers, condensers, pumps, and distribution piping.
  - h. HVAC systems, including air handling equipment, air distribution systems, and terminal equipment and devices.
  - i. switchgear, transformers, switchboards, panelboards, uninterruptible power supplies, and motor controls.
  - j. Packaged engine generators, including synchronizing switchgear/switchboards, and transfer switches.
  - k. Lighting equipment and controls.
  - l. Communication systems, including intercommunication, surveillance, nurse call systems, public address, mass evacuation, voice and data, and entertainment television equipment.
  - m. Site utilities including lift stations, condensate pumping and return systems, and storm water pumping systems.

- G. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participants are expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria:
  - Include the following:
    - a. System, subsystem, and equipment descriptions.

- b. Performance and design criteria if Contractor is delegated design responsibility.
  - c. Operating standards.
  - d. Regulatory requirements.
  - e. Equipment function.
  - f. Operating characteristics.
  - g. Limiting conditions.
  - h. Performance curves.
2. Documentation: Review the following items in detail:
- a. Emergency manuals.
  - b. Operations manuals.
  - c. Maintenance manuals.
  - d. Project Record Documents.
  - e. Identification systems.
  - f. Warranties and bonds.
  - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
- a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
- a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.

- 1. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.
- H. Training Execution:
  - 1. Preparation: Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual. Set up instructional equipment at instruction location.
  - 2. Instruction:
    - a. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Department of Veterans Affairs for number of participants, instruction times, and location.



- b. Instructor: Engage qualified instructors to instruct VA's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
    - 1) The Commissioning Agent will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
    - 2) The VA will furnish an instructor to describe VA's operational philosophy.
    - 3) The VA will furnish the Contractor with names and positions of participants.
  - 3. Scheduling: Provide instruction at mutually agreed times. For equipment that requires seasonal operation, provide similar instruction at start of each season. Schedule training with the VA and the Commissioning Agent with at least seven days' advance notice.
  - 4. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of **an oral, or a written**, performance-based test.
  - 5. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.
- I. Demonstration and Training Recording:
- 1. General: Engage a qualified commercial photographer to record demonstration and training. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice. At beginning of each training module, record each chart containing learning objective and lesson outline.
  - 2. Video Format: Provide high quality color DVD color on standard size DVD disks.
  - 3. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.
  - 4. Narration: Describe scenes on videotape by audio narration by microphone while demonstration and training is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

- - - END - - -

<p style="text-align: center;"><b>SECTION 08 14 10</b></p> <p style="text-align: center;"><b>INTERIOR WOOD DOORS - <u>ALTERNATE NO. 4</u></b></p>
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**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This section specifies interior flush doors with prefinish, prefit option only for alternate 2.
- B. Section includes fire rated doors, and smoke doors.

**1.2 RELATED WORK**

- A. Metal door frames: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.
- B. Not used.
- C. Overhead doors including loading docks: Section 08 33 00, COILING DOORS AND GRILLES.
- D. Not used.
- E. Door hardware including hardware location (height): Section 08 71 00, DOOR HARDWARE.
- F. Installation of doors and hardware: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, Section 08 14 00, WOOD DOORS, or Section 08 71 00, DOOR HARDWARE.
- G. Glazing: Section 08 80 00, GLAZING.
- H. Finish: Section 09 06 00, SCHEDULE FOR FINISHES.
- I. Not used.
- J. Lead lined wood door: Section 13 49 00, RADIATION PROTECTION.
- K. Card readers and biometric devices: Section 28 13 00, ACCESS CONTROL.
- L. Not used.
- M. Not used.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. Corner section of flush veneered door 300 mm (12 inches) square, showing details of construction, labeled to show grade and type number and conformance to specified standard.
  - 2. Veneer sample 200 mm (8 inch) by 275 mm (11 inch) by 6 mm (1/4 inch) showing specified wood species sanded to receive a transparent finish. Factory finish veneer sample where the prefinished option is accepted.

## C. Shop Drawings:

1. Show every door in project and schedule location in building.
2. Indicate type, grade, finish and size; include detail of glazing and pertinent details.
3. Provide information concerning specific requirements not included in the manufacturer's literature and data submittal.

## D. Manufacturer's Literature and Data:

1. Not used.
2. Labeled fire rated doors showing conformance with NFPA 80.

## E. Laboratory Test Reports:

1. Screw holding capacity test report in accordance with WDMA T.M.10.
2. Split resistance test report in accordance with WDMA T.M.5.
3. Cycle/Slam test report in accordance with WDMA T.M.7.
4. Hinge-Loading test report in accordance with WDMA T.M.8.

**1.4 WARRANTY**

A. Doors are subject to terms of Article titled "Warranty of Construction", FAR clause 52.246-21, except that warranty shall be as follows:

1. For interior doors, manufacturer's warranty for lifetime of original installation.
2. Not used.

**1.5 DELIVERY AND STORAGE**

- A. Factory seal doors and accessories in minimum of 6 mil polyethylene bags or cardboard packages which shall remain unbroken during delivery and storage.
- B. Store in accordance with WDMA I.S.1-A, Job Site Information.
- C. Label package for door opening where used.

**1.6 APPLICABLE PUBLICATIONS**

Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

## B. Window and Door Manufacturers Association (WDMA):

- I.S.1A-11.....Architectural Wood Flush Doors
- I.S.4-09.....Water-Repellent Preservative Non-Pressure  
Treatment for Millwork
- T.M.6-08.....Adhesive (Glue Bond) Durability Test Method
- T.M.7-08.....Cycle-Slam Test Method
- T.M.8-08.....Hinge Loading Test Method

T.M.10-08.....Screwholding Test Method

C. National Fire Protection Association (NFPA):

80-10.....Protection of Buildings from Exterior Fire

252-08.....Fire Tests of Door Assemblies

D. Not used.

**PART 2 - PRODUCTS**

**2.1 FLUSH DOORS**

A. General:

1. Meet requirements of WDMA I.S.1-A, Extra Heavy Duty.
2. Adhesive: Type II
3. Thickness: 45 mm (1-3/4 inches) unless otherwise shown or specified.
4. Not used.

B. Face Veneer:

1. In accordance with WDMA I.S.1-A.
2. One species throughout the project unless scheduled or otherwise shown.
3. For transparent finishes: Premium Grade.
  - a. A grade face veneer standard optional.
  - b. AA grade face veneer
  - c. Match face veneers for doors for uniform effect of color and grain at joints.
  - d. Door edges shall be same species as door face veneer except maple may be used for stile face veneer on birch doors.
  - e. On doors required to have transparent finish on one side and paint finish on other side; use veneers as required for transparent finish on both sides.
  - f. Use wood species and grade of face veneers to match adjacent existing doors.
4. For painted finishes: Custom Grade, mill option close grained hardwood, premium or medium density overlay. Do not use Lauan.
5. Factory sand doors for finishing.

C. Wood for stops, louvers, muntins and moldings of flush doors required to have transparent finish:

1. Solid Wood of same species as face veneer, except maple may be used on birch doors.
2. Glazing:

- a. On non-labeled doors use applied wood stops nailed tight on room side and attached on opposite side with flathead, countersunk wood screws, spaced approximately 125 mm (5 inches) on centers.
  - b. Not used.
- 3. Not used.
- D. Not used.
- E. Fire rated wood doors:
  - 1. Fire Performance Rating:
    - a. "B" label, 1-1/2 hours.
    - b. "C" label, 3/4 hour.
  - 2. Labels:
    - a. Doors shall conform to the requirements of ASTM E2074, or NFPA 252, and, carry an identifying label from a qualified testing and inspection agency for class of door or opening shown designating fire performance rating.
    - b. Metal labels with raised or incised markings.
  - 3. Performance Criteria for Stiles of doors utilizing standard mortise leaf hinges:
    - a. Hinge Loading: WDMA T.M.8. Average of 10 test samples for Extra Heavy Duty doors.
    - b. Direct screw withdrawal: WDMA T.M.10 for Extra Heavy Duty doors. Average of 10 test samples using a steel, fully threaded #12 wood screw.
    - c. Cycle Slam: 1,000,000 cycles with no loose hinge screws or other visible signs of failure when tested in accordance with WDMA T.M.7.
  - 4. Additional Hardware Reinforcement:
    - a. Provide fire rated doors with hardware reinforcement blocking.
    - b. Size of lock blocks as required to secure hardware specified.
    - c. Top, bottom and intermediate rail blocks shall measure not less than 125 mm (five inches) minimum by full core width.
    - d. Reinforcement blocking in compliance with manufacturer's labeling requirements.
    - e. Mineral material similar to core is not acceptable.
  - 5. Other Core Components: Manufacturer's standard as allowed by the labeling requirements.
  - 6. Provide steel frame approved for use in labeled doors for vision panels.

7. Provide steel astragal on pair of doors.

**F. Smoke Barrier Doors:**

1. For glazed openings use steel frames approved for use in labeled doors.
2. Provide a steel astragal on one leaf of pairs of doors, including double egress doors.

G. Not used.

H. Not used.

**2.2 NOT USED.**

**2.3 PREFINISH, PREFIT OPTION**

- A. Flush doors may be factory machined to receive hardware, bevels, undercuts, cutouts, accessories and fitting for frame.
- B. Factory fitting to conform to specification for shop and field fitting, including factory application of sealer to edge and routings.
- C. Flush doors to receive transparent finish (in addition to being prefit) shall be factory finished as follows:
  1. WDMA I.S.1-A Section F-3 specification for System TR-4, Conversion Varnish or System TR-5, Catalyzed Vinyl.
  2. Use stain as required to match existing adjacent doors.

**2.4 IDENTIFICATION MARK:**

- A. On top edge of door.
- B. Either a stamp, brand or other indelible mark, giving manufacturer's name, door's trade name, construction of door, code date of manufacture and quality.
- C. Accompanied by either of the following additional requirements:
  1. An identification mark or a separate certification including name of inspection organization.
  2. Identification of standards for door, including glue type.
  3. Identification of veneer and quality certification.
  4. Not used.

**2.5 SEALING:**

- A. Give top and bottom edge of doors two coats of catalyzed polyurethane or water resistant sealer before sealing in shipping containers.

**PART 3 - EXECUTION**

**3.1 DOOR PREPARATION**

- A. Field, shop or factory preparation: Do not violate the qualified testing and inspection agency label requirements for fire rated doors.

B. Clearances between Doors and Frames and Floors:

1. Maximum 3 mm (1/8 inch) clearance at the jambs, heads, and meeting stiles, and a 19 mm (3/4 inch) clearance at bottom, except as otherwise specified.
2. Not used.

C. Provide cutouts for special details required and specified.

D. Rout doors for hardware using templates and location heights specified in Section, 08 71 00 DOOR HARDWARE.

E. Fit doors to frame, bevel lock edge of doors 3 mm (1/8 inch) for each 50 mm (two inches) of door thickness, undercut where shown.

F. Immediately after fitting and cutting of doors for hardware, seal cut edges of doors with two coats of water resistant sealer.

G. Finish surfaces, including both faces, top and bottom and edges of the doors smooth to touch.

H. Apply a steel astragal on the opposite side of active door on pairs of fire rated doors.

I. Apply a steel astragal to meeting style of active leaf of pair of doors or double egress smoke doors.

### **3.2 INSTALLATION OF DOORS APPLICATION OF HARDWARE**

A. Install doors and hardware as specified in this Section.

### **3.3 DOOR PROTECTION**

A. As door installation is completed, place polyethylene bag or cardboard shipping container over door and tape in place.

B. Provide protective covering over knobs and handles in addition to covering door.

C. Maintain covering in good condition until removal is approved by the COR.

- - - E N D - - -



<b>SECTION 08 17 10</b> <b>INTEGRATED DOOR ASSEMBLIES</b>
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**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Work in this section includes integrated door opening systems including metal frame, integrated doors, hanging device, latching mechanism and associated finish hardware, unless specified elsewhere.
- B. Smoke and draft control seals shall be included in this section, unless specifically listed elsewhere.
- C. All glass and glazing are not covered in this section.

**1.2 RELATED WORK**

- A. Blocking for Hardware: Section 06 10 00, ROUGH CARPENTRY.
- B. Key Cylinders: Section 08 71 00, DOOR HARDWARE
- C. Auto Door Operators: Section 08 71 13, AUTOMATIC DOOR OPERATORS.
- D. Painting: Section 09 91 00, PAINTING.
- E. Card Readers: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS.
- F. Electrical: Division 26, ELECTRICAL.
- G. Fire Detection: Section 28 31 00, FIRE DETECTION AND ALARM.

**1.3 QUALITY ASSURANCE**

- A. Hardware shall be installed by people knowledgeable and skilled in the application, installation and adjustment of commercial grade doors and door hardware. Doors and Frames must be installed plumb, square and level.
- B. Doors frames must be properly prepared and reinforced to install hardware per the manufacturer's template and installation instructions. Install door frames in accordance with ANSI/SDI A250.11 - "Recommended Erection Instructions for Steel Frames."
- C. Contractor shall provide and furnish screws, bolts, expansions shields or other fasteners to facilitate the proper installation of products, not furnished as part of the Integrated Door Assembly.

**1.4 WARRANTY**

- A. Provide manufacturer's standard five-year limited warranty against defects in material and workmanship unless noted otherwise.
  - 1. Door Closers: 10 years
  - 2. Steel Pinned Continuous Hinges: 10 years

**1.5 SUBMITTALS**

- A. Submit shop drawings with proposed Integrated Door Assembly system, product and hardware options, in a timely manner to obtain the approval

from architect in time to meet construction schedule of other trades.

- B. Provide for each door an frame location; frame type, profile, and installation details, items of finish hardware accessories, finishes, degree of opening and electrical rough-in requirements. Submit required templates to door and frame manufacturers to enable proper and accurate sizing and locations of hardware.
- C. Samples: Provide physical samples as required by Section 01 33 23.
- D. Provide Owner Manual, instruction sheets and installation.

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

- A. Integrated Door Assembly systems shall be delivered to the general contractor at the job site complete with necessary screws, miscellaneous parts, instructions, and installation templates. Each package shall be legibly and properly labeled to correspond to the approved door schedule.
- B. Deliver Integrated Door Assembly system to project site. Contractor will jointly check in hardware with representatives of the supplier to verify shipment is correct and / or note and rectify discrepancies promptly.
- C. Furnish door assemblies with flush operating hardware flush with door skin, using protective wrappings and protective spacers between projecting hardware. Maintain and protect door assemblies using cardboard spacers and protective edge guards along the door edges, to reduce exposure to marring or damage during storage.
- D. Store door assemblies in a dry and secure area. Storage area shall be void of any excess humidity that can cause damage to the product.

#### **1.7 APPLICABLE PUBLICATIONS**

- A. The following references established standards for architectural hardware as specified in this section.
- B. American National Standards Institute (ANSI)
  - ICC/ANSI A117.1-2003.....Accessible and Usable Buildings and Facilities
  - ANSI/BHMA A156.1-2006.....Butts and Hinges
  - ANSI/BHMA A156.3-2008.....Exit Devices
  - ANSI/BHMA A156.4-2008.....Door Controls - Closers
  - ANSI/BHMA A156.5-2001.....Auxiliary Locks and Associated Products
  - ANSI/BHMA A156.6-2005.....Architectural Door Trim
  - ANSI/BHMA A156.7-2009.....Template Hinge Dimensions
  - ANSI/BHMA A156.8-2005.....Door Controls - Overhead Holders

ANSI/BHMA A156.10-2005.....Power Operated Pedestrian Doors

ANSI/BHMA A156.13-2002.....Mortise Locks and Latches

ANSI/BHMA A156.15-2006.....Closer Holder Release Devices

ANSI/BHMA A156.16-2008.....Auxiliary Hardware

ANSI/BHMA A156.18-2006.....Materials and Finishes

ANSI/BHMA A156.19-2007.....Power Assist and Low Energy Power  
Operated Doors

ANSI/BHMA A156.21-2009.....Thresholds

ANSI/BHMA A156.22-2005.....Door Gasketing Systems

ANSI/BHMA A156.23-2004.....Electromagnetic Locks

ANSI/BHMA A156.24-2003.....Delayed Egress Locking Systems

ANSI/BHMA A156.25-2007.....Electrified Locking Devices

ANSI/BHMA A156.26-2006.....Continuous Hinges

ANSI/BHMA A156.28-2007.....Master Keying Systems

ANSI/BHMA A156.29-2007.....Exit Locks and Alarms

ANSI/BHMA A156.30-2003.....High Security Cylinders

ANSI/BHMA A156.31-2007.....Electric Strikes and Frame Mounted  
Actuators

ANSI/BHMA A156.32-2008.....Integrated Door Opening Assemblies

ANSI/SDI A250.4-2001.....Test Procedure and Acceptance Criteria  
for Physical Evidence for Steel Doors,  
Frames, Frame Anchors and Reinforcings

ANSI/SDI A250.8-2003.....Recommended Specifications for Standard  
Steel Doors and Frames

ANSI/SDI A250.11-2001.....Recommended Erection Instructions for  
Steel Frames

UL10C-2009.....Positive Pressure Fire Tests of Door  
Assemblies

C. American Society for Testing and Materials (ASTM)

1. ASTM E2074 (2000): Standard Test Method for Fire Tests of Door Assemblies
2. ASTM E2180 (2007): Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials
3. ASTM F476 (2002): Standard Test Method for Security of Swinging Door Assemblies

D. Door and Hardware Institute (DHI)

1. Recommended Locations for Builder's Hardware for Standard Doors and

- Frames (2004)
- 2. Recommended Locations for Builder's Hardware for Custom Steel Doors and Frames (1996)
- E. Metal Door and Frame Associations
  - 1. Hollow Metal Manufacturing Association (HMMA)
    - a. National Association of Architectural Metal Manufacturers (NAAMM)
  - 2. Steel Door Institute (SDI)
- F. Approved Testing Laboratories
  - 1. Underwriter's Laboratories, Inc. (UL)
    - a. UL305 (2007): Panic Hardware
    - b. UL1784 (2004): Air Leakage Tests of Door Assemblies
  - 2. ITS / Intertek Testing Services / Warnock Hersey Inc.
- G. National Fire Protection Association (NFPA)
  - 1. NFPA 70-2008: National Electrical Code
  - 2. NFPA 80-2010: Standard for Fire Doors and Other Opening Protectives
  - 3. NFPA 101-2009: Life Safety Code
  - 4. NFPA 105-2010: Standard for Installation of Smoke Door Assemblies and Other Opening Protectives
  - 5. NFPA 252-2008: Standard Methods of Fire Tests of Door Assemblies
- H. Building Codes [Applicable Building Code]
  - 1. 2009 International Building Code
  - 2. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards - 1998) unless specified otherwise

## **PART 2 - PRODUCTS**

### **2.1 MATERIAL REQUIREMENTS**

- A. Integrated Door Assembly requirements:
  - 1. Comply with ANSI/BHMA A156.32a: Grade 1:1,000,000
  - 2. Integrated Door Opening Assemblies shall provide a label for life safety or fire labels as required in door schedule.
  - 3. Integral vision lite provided with door assembly, or field installed lite kit, as required.
- B. Door Frame requirements:
  - 1. Door Frames shall be 14-gauge ASTM A366, cold roll steel and shall comply to ANSI/SDI A250.8 Level A - Grade III and / or HMMA/NAAMM - 850-99.
  - 2. Door frames shall be furnished with mitered corners, continuously welded, ground smooth on frame face.

3. Prepare frames with 14 gauge reinforcements for applied hardware.  
Provide 12 gauge reinforcements for continuous hinges.
  4. Provide suitable adjustable type anchors, minimum 4 per jamb.
- C. Integrated Hardware Requirements:
1. Provide a complete Integrated Door Assembly including the installation and adjustment of the latching mechanism within the door construction. The exit device shall be inset in door, clean and unobtrusive in design. The push bar shall comply with ANSI/BHMA Grade 1 Standard for exit devices. End caps shall be metal, plated satin nickel (BHMA 619). The Push and Pull devices shall be clean and unobtrusive in design. Lever handles shall be clean and unobtrusive in design with and shall match style of other hardware furnished on project. Continuous hinges shall comply with ANSI/BHMA A156.26.
    - a. At doors with plastic laminate faces, provide hinges with wrap-around hinge guards and provide stainless steel wrap-around edge guards at the leading edge of the door. Hinges shall comply with ANSI/BHMA A156.26

## 2.2 FINISHES

### A. Finish Symbols

US	BHMA	DESCRIPTION OF FINISH
USP	600	Primed for field painting
US26D	626/652	Satin Chrome
US28	628	Satin Aluminum
US32	629	Bright Stainless
US32D	630	Satin Stainless
N/A	689	Aluminum Painted

### B. Finish Requirements

1. Door Faces: Prime
2. Frames: Prime
3. Door Hardware:
  - a. Continuous Hinges: 630
  - b. Push Bar: 630 clad with 619 end caps
  - c. Lever Exit Device Trim: 630
  - d. Push/Pull Trim: 626
  - e. Door Closers: 689
  - f. Miscellaneous: To match other finishes
4. Anti-microbial Coating: All hand-operated hardware (levers, pulls,

push bars, push plates, paddles, and panic bars) shall be provided with an anti-microbial/anti-fungal coating that has passed ASTM E2180 tests. Coating to consist of ionic silver (Ag<sup>+</sup>). Silver ions surround bacterial cells, inhibiting growth of bacteria, mold, and mildew by blockading food and respiration supplies.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Contractor is responsible for notification of any wall conditions or building structure that would prevent proper execution of the installation of products produced in accordance with approved hardware schedule.
- B. Note short or damaged deliveries on the bill of lading at the time of delivery.
- C. The fire label is a manufacturer's certification only. Proper installation of products and proper wall construction are requirements to meet fire label.
- D. Unless otherwise required in other sections of the contract specs, provide power supply as required per the manufacturer's installation instructions.
- E. Do not fabricate any product until receipt of approved submittal drawings.
- F. Beginning of installation means acceptance of existing conditions.

#### **3.2 INSTALLATION**

- A. Mount furnished hardware accessories at heights indicated in "Recommended Locations or Builder's Hardware" for Standard Doors and Frames, Custom Steel Doors and Frames, established by the Door and Hardware Institute (DHI), except if otherwise indicated or to comply with requirements of governing regulations, or if otherwise directed by the architect.
- B. Install furnished hardware accessories in compliance with the manufacturer's instructions, templates and recommendations. Comply with specified degree of opening for doors with automatic operators, overhead door closers, etc. Securely fasten all furnished parts. Make sure all operating parts move freely and smoothly without binding, sticking and void of any excessive clearance.
- C. Coordinate installation and interface wiring with fire alarm and smoke detection systems. Provide all additional auxiliary contacts, relays, or interface for the fire alarm and security system

- D. Remove or protect furnished hardware accessories, prior to any painting or finishing that is to be completed after the installation of the hardware accessories.

### 3.3 ADJUSTMENT AND CLEANING

- A. Adjust and check door assembly and each operating item of hardware to ensure correct operation and function. Units which cannot be adjusted to operate as intended for the application made shall be replaced.
- B. Final Adjustment: Wherever hardware installation is made more than a month prior to building acceptance or occupancy of a space or area, the installer shall return to the work during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items. Hardware Accessories shall be cleaned as necessary to restore correct operation, function, and finish. Do not use cleaners that will harm finish.

### 3.4 PROTECTION

- A. Whenever furnished hardware accessories are located in areas where it may be subject to damage during construction by handling, cleaning, etc., (e.g. painting, cleaning of bricks) it shall be protected and/or removed from its location until the hazardous condition is terminated.

### 3.5 SCHEDULES:

- A. The following is a general listing of the Integrated Door Assembly requirements and is not intended for use as a final door submittal. Any items of hardware required by established standards or practices, or to meet federal building codes shall be furnished whether or not specifically called out in the following listed groups.

**HW-6D - NOT USED**

**HW-8 - NOT USED**

**HW-12A - NOT USED**

**HW-12B - NOT USED**

**HW-12C**

<b>Each [ADO] Pair Integrated Double Egress Doors to Have:</b>	<b>RATED</b>
1 Steel Frame	
1 Integrated Pair Doors w/Exit DEVICES	Q2331 x TYPE 8 EXIT DEVICES (F01)
2 Continuous Hinges	A51031B
1 Overlapping Astragal with Self-Adhesive Seal	R5Y634 x R0E154 x THRU-BOLTS

2 Closers	C02011/C02021 (PT4D, PT4H
2 Magnetic Holders	C00011 TRI-VOLTAGE
1 Set Self-Adhesive Seals	R0E154

POWER, WIRING, CONDUIT, AND FIRE ALARM CONNECTION BY DIVISION 26.

HW-12D - NOT USED

HW-SH-4 - NOT USED

HW-SH-4A - NOT USED

HW-SH-10 - NOT USED

HW-SH-10A - NOT USED

HW-SH-12 - NOT USED

- - - E N D - - -



**SECTION 08 71 00****DOOR HARDWARE****PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Door hardware and related items necessary for complete installation and operation of doors.

**1.2 RELATED WORK**

- A. Caulking: Section 07 92 00 JOINT SEALANTS.
- B. Application of Hardware: Section 08 14 00, WOOD DOORS Section 08 11 13, HOLLOW METAL DOORS AND FRAMES Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS Section 08 33 00, COILING DOORS AND GRILLES Section 08 71 13, AUTOMATIC DOOR OPERATORS and Section 13 49 00, RADIATION PROTECTION.
- C. Finishes: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Painting: Section 09 91 00, PAINTING.
- E. Card Readers: Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEMS.
- F. Electrical: Division 26, ELECTRICAL.
- G. Fire Detection: Section 28 31 00, FIRE DETECTION AND ALARM.

**1.3 GENERAL**

- A. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards) unless specified otherwise.
- B. Provide rated door hardware assemblies where required by most current version of the International Building Code (IBC).
- C. Hardware for Labeled Fire Doors and Exit Doors: Conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Provide hardware listed by UL, except where heavier materials, large size, or better grades are specified herein under paragraph HARDWARE SETS. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements.
- D. Hardware for application on metal and wood doors and frames shall be made to standard templates. Furnish templates to the fabricator of these items in sufficient time so as not to delay the construction.
- E. The following items shall be of the same manufacturer, except as otherwise specified:
  - 1. Mortise locksets.

2. Hinges for hollow metal and wood doors.
3. Surface applied overhead door closers.
4. Exit devices.
5. Floor closers.

#### 1.4 WARRANTY

- A. Automatic door operators shall be subject to the terms of FAR Clause 52.246-21, except that the Warranty period shall be two years in lieu of one year for all items except as noted below:
1. Locks, latch sets, and panic hardware: 5 years.
  2. Door closers and continuous hinges: 10 years.

#### 1.5 MAINTENANCE MANUALS

- A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on all door hardware. Provide installation instructions with the submittal documentation.

#### 1.6 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Submit 6 copies of the schedule per Section 01 33 23. Submit 2 final copies of the final approved schedules to VAMC Locksmith as record copies (VISN Locksmith if the VAMC does not have a locksmith).
- B. Hardware Schedule: Prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHMA Finish Designation

- C. Samples and Manufacturers' Literature:

1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.

2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.

D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

#### **1.7 DELIVERY AND MARKING**

A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to The COR for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in COR's office until all other similar items have been installed in project, at which time the COR will deliver items on file to Contractor for installation in predetermined locations on the project.

#### **1.8 PREINSTALLATION MEETING**

A. Convene a pre-installation meeting not less than 30 days before start of installation of door hardware. Require attendance of parties directly affecting work of this section, including Contractor and Installer, Architect, COR and VA Locksmith, Hardware Consultant, and Hardware Manufacturer's Representative. Review the following:

1. Inspection of door hardware.
2. Job and surface readiness.
3. Coordination with other work.
4. Protection of hardware surfaces.
5. Substrate surface protection.
6. Installation.
7. Adjusting.
8. Repair.
9. Field quality control.
10. Cleaning.

**1.9 INSTRUCTIONS**

- A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters (e.g., "HW") followed by a number. Each number designates a set of hardware items applicable to a door type.
- B. Keying: All cylinders shall be keyed into existing Great Grand Master Key System. Provide removable core cylinders that are removable only with a special key or tool without disassembly of knob or lockset. Cylinders shall be 6 pin type. Keying information shall be furnished at a later date by the COR.
- C. Not used.

**1.10 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.
- B. American Society for Testing and Materials (ASTM):
  - F883-04.....Padlocks
  - E2180-07.....Standard Test Method for Determining the  
Activity of Incorporated Antimicrobial Agent(s)  
In Polymeric or Hydrophobic Materials
- C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
  - A156.106.....Butts and Hinges
  - A156.203.....Bored and Pre-assembled Locks and Latches
  - A156.308.....Exit Devices, Coordinators, and Auto Flush  
Bolts
  - A156.408.....Door Controls (Closers)
  - A156.501.....Auxiliary Locks and Associated Products
  - A156.605.....Architectural Door Trim
  - A156.805.....Door Controls Overhead Stops and Holders
  - A156.12-05 .....Interconnected Locks and Latches
  - A156.13-05.....Mortise Locks and Latches Series 1000
  - A156.14-07 .....Sliding and Folding Door Hardware

- A156.1506.....Release Devices-Closer Holder, Electromagnetic  
and Electromechanical
- A156.1608.....Auxiliary Hardware
- A156.17-04 .....Self-Closing Hinges and Pivots
- A156.1806.....Materials and Finishes
- A156.20-06 .....Strap and Tee Hinges, and Hasps
- A156.21-09.....Thresholds
- A156.22-05.....Door Gasketing and Edge Seal Systems
- A156.23-04.....Electromagnetic Locks
- A156.24-03.....Delayed Egress Locking Systems
- A156.25-07 .....Electrified Locking Devices
- A156.26-06.....Continuous Hinges
- A156.28-07 .....Master Keying Systems
- A156.29-07 .....Exit Locks and Alarms
- A156.30-03 .....High Security Cylinders
- A156.31-07 .....Electric Strikes and Frame Mounted Actuators
- A250.8-03.....Standard Steel Doors and Frames
- D. National Fire Protection Association (NFPA):
  - 80-2013.....Fire Doors and Fire Windows
  - 101-2012.....Life Safety Code
- E. Underwriters Laboratories, Inc. (UL):
  - Building Materials Directory (2013)

## **PART 2 - PRODUCTS**

### **2.1 BUTT HINGES**

- A. ANSI A156.1. Provide only three-knuckle hinges, except five-knuckle where the required hinge type is not available in a three-knuckle version (e.g., some types of swing-clear hinges). The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:
  1. Exterior Doors: Type A2112/A5112 for doors 900 mm (3 feet) wide or less and Type A2111/A5111 for doors over 900 mm (3 feet) wide. Hinges for exterior out-swing doors shall have non-removable pins. Hinges for exterior fire-rated doors shall be of stainless steel material.
  2. Interior Doors: Type A8112/A5112 for doors 900 mm (3 feet) wide or less and Type A8111/A5111 for doors over 900 mm (3 feet) wide. Hinges for doors exposed to high humidity areas (shower rooms,

toilet rooms, kitchens, janitor rooms, etc. shall be of stainless steel material.

B. Provide quantity and size of hinges per door leaf as follows:

1. Doors up to 1210 mm (4 feet) high: 2 hinges.
2. Doors 1210 mm (4 feet) to 2260 mm (7 feet 5 inches) high: 3 hinges minimum.
3. Doors greater than 2260 mm (7 feet 5 inches) high: 4 hinges.
4. Doors up to 900 mm (3 feet) wide, standard weight: 114 mm x 114 mm (4-1/2 inches x 4-1/2 inches) hinges.
5. Doors over 900 mm (3 feet) to 1065 mm (3 feet 6 inches) wide, standard weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
6. Doors over 1065 mm (3 feet 6 inches) to 1210 mm (4 feet), heavy weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
7. Provide heavy-weight hinges where specified.
8. At doors weighing 330 kg (150 lbs.) or more, furnish 127 mm (5 inch) high hinges.

C. See Articles "MISCELLANEOUS HARDWARE" and "HARDWARE SETS" for pivots and hinges other than butts specified above and continuous hinges specified below.

## 2.2 CONTINUOUS HINGES

A. ANSI/BHMA A156.26, Grade 1-600.

1. Listed under Category N in BHMA's "Certified Product Directory."

B. General: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete

C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a Teflon-coated 6.35mm (0.25-inch) minimum diameter pin that extends entire length of hinge.

1. Base Metal for Exterior Hinges: Stainless steel.
2. Base Metal for Interior Hinges: Stainless steel.
3. Base Metal for Hinges for Fire-Rated Assemblies: Steel.
4. Provide with non-removable pin (hospital tip option) at lockable out-swing doors.
5. Where required to clear adjacent casing, trim, and wall conditions and allow full door swing, provide wide throw hinges of minimum width required.

6. Provide with manufacturer's cut-outs for separate mortised power transfers and/or mortised automatic door bottoms where they occur.
7. Where thru-wire power transfers are integral to the hinge, provide hinge with easily removable portion to allow easy access to wiring connections.
8. Where models are specified that provide an integral wrap-around edge guard for the hinge edge of the door, provide manufacturer's adjustable threaded stud and machine screw mechanism to allow the door to be adjusted within the wrap-around edge guard.

### **2.3 DOOR CLOSING DEVICES**

- A. Closing devices shall be products of one manufacturer for each type specified.

### **2.4 OVERHEAD CLOSERS**

- A. Conform to ANSI A156.4, Grade 1.
- B. Closers shall conform to the following:
  1. The closer shall have minimum 50 percent adjustable closing force over minimum value for that closer and have adjustable hydraulic back check effective between 60 degrees and 85 degrees of door opening.
  2. Where specified, closer shall have hold-open feature.
  3. Size Requirements: Provide multi-size closers, sizes 1 through 6, except where multi-size closer is not available for the required application.
  4. Material of closer body shall be forged or cast.
  5. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
  6. Where closers are exposed to the exterior or are mounted in rooms that experience high humidity, provide closer body and arm assembly of stainless steel material.
  7. Closers shall have full size metal cover; plastic covers will not be accepted.
  8. Closers shall have adjustable hydraulic back-check, separate valves for closing and latching speed, adjustable back-check positioning valve, and adjustable delayed action valve.
  9. Provide closers with any accessories required for the mounting application, including (but not limited to) drop plates, special soffit plates, spacers for heavy-duty parallel arm fifth screws, bull-nose or other regular arm brackets, longer or shorter arm

assemblies, and special factory templating. Provide special arms, drop plates, and templating as needed to allow mounting at doors with overhead stops and/or holders.

10. Closer arms or back-check valve shall not be used to stop the door from over-swing, except in applications where a separate wall, floor, or overhead stop cannot be used.

11. Provide parallel arm closers with heavy duty rigid arm.

12. Where closers are to be installed on the push side of the door, provide parallel arm type except where conditions require use of top jamb arm.

13. Provide all surface closers with the same body attachment screw pattern for ease of replacement and maintenance.

14. All closers shall have a 1-1/2 inch (38 mm) minimum piston diameter.

## **2.5 FLOOR CLOSERS AND FLOOR PIVOT SETS**

A. Comply with ANSI A156.4. Provide stainless steel floor plates for floor pivots, except where metal thresholds occur. Pivots for non-labeled doors shall be cast, forged or extruded brass or bronze.

B. Not used.

## **2.6 DOOR STOPS**

A. Conform to ANSI A156.16.

B. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of building construction. For concrete, masonry or quarry tile construction, use lead expansion shields for mounting door stops.

C. Where cylindrical locks with turn pieces or pushbuttons occur, equip wall bumpers Type L02251 (rubber pads having concave face) to receive turn piece or button.

D. Provide floor stops (Type L02141 or L02161 in office areas; Type L02121 x 3 screws into floor elsewhere. Wall bumpers, where used, must be installed to impact the trim or the door within the leading half of its width. Floor stops, where used, must be installed within 4-inches of the wall face and impact the door within the leading half of its width.

E. Where drywall partitions occur, use floor stops, Type L02141 or L02161 in office areas, Type L02121 elsewhere.

F. Provide stop Type L02011, as applicable for exterior doors. At out-swing doors where stop can be installed in concrete, provide stop mated to concrete anchor set in 76mm (3-inch) core-drilled hole and filled with quick-setting cement.



- G. Omit stops where floor mounted door holders are required and where automatic operated doors occur.
- H. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.
- I. Provide appropriate door mounted stop on doors in individual toilets where floor or wall mounted stops cannot be used.
- J. Provide overhead surface applied stop Type C02541, ANSI A156.8 on patient toilet doors in bedrooms where toilet door could come in contact with the bedroom door.
- K. Provide door stops on doors where combination closer magnetic holders are specified, except where wall stops cannot be used or where floor stops cannot be installed within 4-inches of the wall.
- L. Where the specified wall or floor stop cannot be used, provide concealed overhead stops (surface-mounted where concealed cannot be used).

## **2.7 NOT USED.**

## **2.8 NOT USED.**

## **2.9 LOCKS AND LATCHES**

- A. Conform to ANSI A156.2. Locks and latches for doors 45 mm (1-3/4 inch) thick or over shall have beveled fronts. Lock cylinders shall have not less than six pins. Cylinders for all locksets shall be removable core type. Cylinders shall be furnished with construction removable cores and construction master keys. Cylinder shall be removable by special key or tool. Construct all cores so that they will be interchangeable into the core housings of all mortise locks, rim locks, cylindrical locks, and any other type lock included in the Great Grand Master Key System. Disassembly of lever or lockset shall not be required to remove core from lockset. All locksets or latches on double doors with fire label shall have latch bolt with 19 mm (3/4 inch) throw, unless shorter throw allowed by the door manufacturer's fire label. Provide temporary keying device or construction core of allow opening and closing during construction and prior to the installation of final cores.
- B. In addition to above requirements, locks and latches shall comply with following requirements:
  - 1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13. Mortise locksets shall be series 1000, minimum Grade 2. All locksets and latch sets shall have lever handles fabricated from cast stainless

- steel. Provide sectional (lever x rose) lever design matching existing. No substitute lever material shall be accepted. All locks and latch sets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At out-swing pairs with overlapping astragals, provide flat lip strip with 21 mm (7/8-inch) lip-to-center dimension. Lock function F02 shall be furnished with emergency tools/keys for emergency entrance. All lock cases installed on lead lined doors shall be lead lined before applying final hardware finish. Furnish armored fronts for all mortise locks. Where mortise locks are installed in high-humidity locations or where exposed to the exterior on both sides of the opening, provide non-ferrous mortise lock case.
2. Cylindrical Lock and Latch Sets: levers shall meet ADA (Americans with Disabilities Act) requirements. Cylindrical locksets shall be series 4000 Grade I. All locks and latch sets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At out-swing pairs with overlapping astragals, provide flat lip strip with 21 mm (7/8-inch) lip-to-center dimension. Provide lever design to match existing lever design. Where two turn pieces are specified for lock F76, turn piece on inside knob shall lock and unlock inside knob, and turn piece on outside knob shall unlock outside knob when inside knob is in the locked position. (This function is intended to allow emergency entry into these rooms without an emergency key or any special tool.)
  3. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.5.
  4. Not used.
  5. Privacy locks in non-mental-health patient rooms shall have an inside thumb-turn for privacy and an outside thumb-turn for emergency entrance. Single occupancy patient privacy doors shall typically swing out; where such doors cannot swing out, provide center-pivoted doors with rescue hardware (see HW-2B).

#### **2.10 PUSH-BUTTON COMBINATION LOCKS**

- A. ANSI/BHMA A156.13, Grade 1. Battery operated pushbutton entry.
- B. Construction: Heavy duty mortise lock housing conforming to ANSI/BHMA A156.13, Grade 1. Lever handles and operating components in compliance with the UFAS and the ADA Accessibility Guidelines. Match lever handles of locks and latch-sets on adjacent doors.

- C. Special Features: Key override to permit a master keyed security system and a pushbutton security code activated passage feature to allow access without using the entry code.

**2.11 NOT USED.**

**2.12 NOT USED.**

**2.13 KEYS**

- A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

<b>Locks/Keys</b>	<b>Quantity</b>
Cylinder locks	2 keys each
Cylinder lock change key blanks	100 each different key way
Master keyed sets	6 keys each
Grand Master sets	6 keys each
Great Grand Master set	5 keys
Control key	2 keys

- B. Not used.

**2.14 NOT USED.**

**2.15 ARMOR PLATES, KICK PLATES, MOP PLATES AND DOOR EDGING**

- A. Conform to ANSI Standard A156.6.
- B. Provide protective plates and door edging as specified below:
1. Kick plates, mop plates and armor plates of metal, Type J100 series.
  2. Provide kick plates and mop plates where specified. Kick plates shall be 254 mm (10 inches) or 305 mm (12 inches) high. Mop plates shall be 152 mm (6 inches) high. Both kick and mop plates shall be minimum 1.27 mm (0.050 inches) thick. Provide kick and mop plates beveled on all 4 edges (B4E). On push side of doors where jamb stop extends to floor, make kick plates 38 mm (1-1/2 inches) less than width of door, except pairs of metal doors which shall have plates 25 mm (1 inch) less than width of each door. Extend all other kick and mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick and mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.
  3. Kick plates and/or mop plates are not required on following door sides:
    - a. Armor plate side of doors;
    - b. Exterior side of exterior doors;

- c. Closet side of closet doors;
  - d. Both sides of aluminum entrance doors.
  - e. Both sides of abuse-resistant faced interior wood doors.
4. Armor plates for doors are listed under Article "Hardware Sets".
- Armor plates shall be thickness as noted in the hardware set, 875 mm (35 inches) high and 38 mm (1 1/2 inches) less than width of doors, except on pairs of metal doors. Provide armor plates beveled on all 4 edges (B4E). Plates on pairs of metal doors shall be 25 mm (1 inch) less than width of each door. Where top of intermediate rail of door is less than 875 mm (35 inches) from door bottom, extend armor plates to within 13 mm (1/2 inch) of top of intermediate rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt push bar.
5. Not used.
6. Provide stainless steel edge guards where so specified at wood doors. Provide mortised type instead of surface type except where door construction and/or ratings will not allow. Provide edge guards of bevel and thickness to match wood door. Provide edge guards with factory cut-outs for door hardware that must be installed through or extend through the edge guard. Provide full-height edge guards except where door rating does not allow; in such cases, provide edge guards to height of bottom of typical lockset armor front. Forward edge guards to wood door manufacturer for factory installation on doors.

## **2.16 EXIT DEVICES**

- A. Conform to ANSI Standard A156.3. Exit devices shall be Grade 1; type and function are specified in hardware sets. Provide flush with finished floor strikes for vertical rod exit devices in interior of building. Trim shall have cast satin stainless steel lever handles of design similar to locksets, unless otherwise specified. Provide key cylinders for keyed operating trim and, where specified, cylinder dogging.
- B. Surface vertical rod panics shall only be provided less bottom rod; provide fire pins as required by exit device and door fire labels. Do not provide surface vertical rod panics at exterior doors.
- C. Concealed vertical rod panics shall be provided less bottom rod at interior doors, unless lockable or otherwise specified; provide fire pins as required by exit device and door fire labels. Where concealed

vertical rod panics are specified at exterior doors, provide with both top and bottom rods.

- D. Where removable mullions are specified at pairs with rim panic devices, provide mullion with key-removable feature.
- E. At non-rated openings with panic hardware, provide panic hardware with key cylinder dogging feature.
- F. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

**2.17 NOT USED.**

**2.18 FLUSH BOLTS (AUTOMATIC)**

- A. Conform to ANSI A156.3. Dimension of flush bolts shall conform to ANSI A115. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware. Flush bolts shall automatically latch and unlatch. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flush-bolt. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1-1/2 by 3-1/2 inches).
- B. At interior doors, provide auto flush bolts less bottom bolt, unless otherwise specified, except at wood pairs with fire-rating greater than 20 minutes; provide fire pins as required by auto flush bolt and door fire labels.

**2.19 DOOR PULLS WITH PLATES**

- A. Conform to ANSI A156.6. Pull Type J401, 152 mm (6 inches) high by 19 mm (3/4 inches) diameter with plate Type J302, 90 mm by 350 mm (3-1/2 inches by 14 inches), unless otherwise specified. Provide pull with projection of 70 mm (2-3/4 inches) and a clearance of 51 mm (2 inches). Cut plates of door pull plate for cylinders, or turn pieces where required.

**2.20 NOT USED.**

**2.21 COMBINATION PUSH AND PULL PLATES**

- A. Conform to ANSI 156.6. Type J303, stainless steel 3 mm (1/8 inch) thick, 80 mm (3-1/3 inches) wide by 800 mm (16 inches) high), top and bottom edges shall be rounded. Secure plates to wood doors with 38 mm (1-1/2 inch) long No. 12 wood screws. Cut plates for turn pieces, and cylinders where required. Pull shall be mounted down.

**2.22 COORDINATORS**

- A. Conform to ANSI A156.16. Coordinators, when specified for fire doors, shall comply with Underwriters Laboratories, Inc., requirements for

fire door hardware. Coordinator may be omitted on exterior pairs of doors where either door will close independently regardless of the position of the other door. Coordinator may be omitted on interior pairs of non-labeled open where open back strike is used. Open back strike shall not be used on labeled doors. Paint coordinators to match door frames, unless coordinators are plated. Provide bar type coordinators. For bar type coordinators, provide filler bars for full width and, as required, brackets for push-side surface mounted closers, overhead stops, and vertical rod panic strikes.

## **2.23 THRESHOLDS**

- A. Conform to ANSI A156.21, mill finish extruded aluminum, except as otherwise specified. In existing construction, thresholds shall be installed in a bed of sealant with 1/4-20 stainless steel machine screws and expansion shields. In new construction, embed aluminum anchors coated with epoxy in concrete to secure thresholds. Furnish thresholds for the full width of the openings.
- B. Not used.
- C. At exterior doors and any interior doors exposed to moisture, provide threshold with non-slip abrasive finish.
- D. Provide with miter returns where threshold extends more than 12 mm (0.5 inch) from frame face.

## **2.24 NOT USED.**

## **2.25 WEATHERSTRIPS (FOR EXTERIOR DOORS)**

- A. Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length ( $0.000774\text{m}^3/\text{s/m}$ ).

## **2.26 MISCELLANEOUS HARDWARE**

- A. Access Doors (including Sheet Metal, Screen and Woven Wire Mesh Types): Except for fire-rated doors and doors to Temperature Control Cabinets, equip each single or double metal access door with Lock Type E76213, conforming to ANSI A156.5. Key locks as directed. Ship lock prepaid to the door manufacturer. Hinges shall be provided by door manufacturer.
- B. Cylinders for Various Partitions and Doors: Key cylinders same as entrance doors of area in which partitions and door occur, except as otherwise specified. Provide cylinders to operate locking devices where specified for following partitions and doors:
  - 1. Not used.
  - 2. Not used.
  - 3. Overhead coiling doors.

4. Not used.

5. Not used.

6. Not used.

7. Not used.

C. Mutes: Conform to ANSI A156.16. Provide door mutes or door silencers Type L03011 or L03021, depending on frame material, of white or light gray color, on each steel or wood door frame, except at fire-rated frames, and lead-lined frames. Furnish 3 mutes for single doors and 2 mutes for each pair of doors, except double-acting doors. Provide 4 mutes or silencers for frames for each Dutch type door. Provide 2 mutes for each edge of sliding door which would contact door frame.

## **2.27 PADLOCKS FOR VARIOUS DOORS, GATES AND HATCHES**

A. ASTM E883, size 50 mm (2 inch) wide chain; furnish extended shackles as required by job conditions. Provide padlocks, with key cylinders, for each door in following areas as noted.

B. Key padlocks as follows:

1. Not used.

2. Not used.

3. Not used.

4. Not used.

5. Not used.

6. Not used.

7. Roof Access and Scuttles: Engineer's set.

8. Not used.

C. Not used.

## **2.28 NOT USED.**

## **2.29 NOT USED.**

## **2.30 FINISHES**

A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds, etc., shall be as specified below under "Miscellaneous Finishes." For field painting (final coat) of ferrous hardware, see Section 09 91 00, PAINTING.

B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.

C. Miscellaneous Finishes:

1. Hinges - exterior doors: 626 or 630.

2. Hinges - interior doors: 652 or 630.

- 3. Pivots: Match door trim.
- 4. Door Closers: Factory applied paint finish. Dull or Satin Aluminum color.
- 5. Thresholds: Mill finish aluminum.
- 6. Cover plates for floor hinges and pivots: 630.
- 7. Other primed steel hardware: 600.
- D. Hardware Finishes for Existing Buildings: U.S. Standard finishes shall match finishes of hardware in (similar) existing spaces except where otherwise specified.
- E. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze) finish on door closers shall closely match doors.
- F. Anti-microbial Coating: All hand-operated hardware (levers, pulls, push bars, push plates, paddles, and panic bars) shall be provided with an anti-microbial/anti-fungal coating that has passed ASTM E2180 tests. Coating to consist of ionic silver (Ag+). Silver ions surround bacterial cells, inhibiting growth of bacteria, mold, and mildew by blockading food and respiration supplies.

### 2.31 BASE METALS

- A. Apply specified U.S. Standard finishes on different base metals as following:

Finish	Base Metal
652	Steel
626	Brass or bronze
630	Stainless steel

## PART 3 - EXECUTION

### 3.1 HARDWARE HEIGHTS

- A'. For existing buildings locate hardware on doors at heights to match existing hardware. The Contractor shall visit the site, verify location of existing hardware and submit locations to VA COR for approval.
- A. For new buildings locate hardware on doors at heights specified below, with all hand-operated hardware centered within 864 mm (34 inches) to 1200 mm (48 inches), unless otherwise noted:
  - B. Hardware Heights from Finished Floor:
    - 1. Exit devices centerline of strike (where applicable) 1024 mm (40-5/16 inches).
    - 2. Locksets and latch sets centerline of strike 1024 mm (40-5/16 inches).



3. Deadlocks centerline of strike 1219 mm (48 inches).
4. Hospital arm pull 1168 mm (46 inches) to centerline of bottom supporting bracket.
5. Centerline of door pulls to be 1016 mm (40 inches).
6. Push plates and push/pull shall be 1270 mm (50 inches) to top of plate.
7. Push/pull latch to be 1024 mm (40-5/16 inches) to centerline of strike.
8. Locate other hardware at standard commercial heights. Locate push and pull plates to prevent conflict with other hardware.

### 3.2 INSTALLATION

- A. Closer devices, including those with hold-open features, shall be equipped and mounted to provide maximum door opening permitted by building construction or equipment. Closers shall be mounted on side of door inside rooms, inside stairs, and away from corridors. At exterior doors, closers shall be mounted on interior side. Where closers are mounted on doors they shall be mounted with sex nuts and bolts; foot shall be fastened to frame with machine screws.

- B. Hinge Size Requirements:

Door Thickness	Door Width	Hinge Height
45 mm (1-3/4 inch)	900 mm (3 feet) and less	113 mm (4-1/2 inches)
45 mm (1-3/4 inch)	Over 900 mm (3 feet) but not more than 1200 mm (4 feet)	125 mm (5 inches)
35 mm (1-3/8 inch) (hollow core wood doors)	Not over 1200 mm (4 feet)	113 mm (4-1/2 inches)

- C. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim and surrounding conditions.
- D. Where new hinges are specified for new doors in existing frames or existing doors in new frames, sizes of new hinges shall match sizes of existing hinges; or, contractor may reuse existing hinges provided hinges are restored to satisfactory operating condition as approved by the COR. Existing hinges shall not be reused on door openings having new doors and new frames. Coordinate preparation for hinge cutouts and screw-hole locations on doors and frames.

- E. Hinges Required Per Door:

Doors 1500 mm (5 ft) or less in height	2 butts
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Doors over 1500 mm (5 ft) high and not over 2280 mm (7 ft 6 in) high	3 butts
Doors over 2280 mm (7 feet 6 inches) high	4 butts
Dutch type doors	4 butts
Doors with spring hinges 1370 mm (4 feet 6 inches) high or less	2 butts
Doors with spring hinges over 1370 mm (4 feet 6 inches)	3 butts

- F. Fastenings: Suitable size and type and shall harmonize with hardware as to material and finish. Provide machine screws and lead expansion shields to secure hardware to concrete, or ceramic floor tile, or solid masonry. Fiber or rawl plugs and adhesives are not permitted. All fastenings exposed to weather shall be of nonferrous metal.
- G. After locks have been installed; show in presence of the COR that keys operate their respective locks in accordance with keying requirements. (All keys, Master Key level and above shall be sent Registered Mail to the Medical Center Director along with the bitting list. Also a copy of the invoice shall be sent to the COR for his records.) Installation of locks which do not meet specified keying requirements shall be considered sufficient justification for rejection and replacement of all locks installed on project.

### **3.3 FINAL INSPECTION**

- A. Installer to provide letter to VA COR that upon completion, installer has visited the Project and has accomplished the following:
1. Re-adjust hardware.
  2. Evaluate maintenance procedures and recommend changes or additions, and instruct VA personnel.
  3. Identify items that have deteriorated or failed.
  4. Submit written report identifying problems.

### **3.4 DEMONSTRATION**

- A. Demonstrate efficacy of mechanical hardware and electrical, and electronic hardware systems, including adjustment and maintenance procedures, to satisfaction of the COR and VA Locksmith.

### **3.5 HARDWARE SETS**

- A. Following sets of hardware correspond to hardware symbols shown on drawings. Only those hardware sets that are shown on drawings will be required. Disregard hardware sets listed in specifications but not shown on drawings.

B. Hardware Consultant working on a project will be responsible for providing additional information regarding these hardware sets. The numbers shown in the following sets come from BHMA standards.

ELECTRIC HARDWARE ABBREVIATIONS LEGEND:

ADO = Automatic Door Operator

**INTERIOR SINGLE DOORS**

HW-1 - NOT USED

HW-1A - NOT USED

HW-1B - NOT USED

HW-1C - NOT USED

HW-1D - NOT USED

HW-1E - NOT USED

HW-1F - NOT USED

HW-1G - NOT USED

HW-1H - NOT USED

HW-1J - NOT USED

HW-1K - NOT USED

HW-1L

Each Door to Have:

NON-RATED

1	Continuous Hinge	
1	Latch set	F01
1	Wall Stop	L02101 CONVEX
1	Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1	Auto Door Bottom	R0Y346 - HEAVY DUTY
2	Sets Self-Adhesive Seals	R0Y154

HW-1M - NOT USED

HW-1N - NOT USED

HW-1P - NOT USED

HW-1Q - NOT USED

HW-1R - NOT USED

HW-2Each Door to Have:RATED/NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Keyed Privacy Indicator Lock	F13 x OCCUPANCY INDICATOR
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

STONE THRESHOLD BY OTHER TRADES.

HW-2A - NOT USEDHW-2B - NOT USEDHW-2C - NOT USEDHW-2D - NOT USEDHW-2E - NOT USEDHW-2F - NOT USEDHW-2G - NOT USEDHW-2H - NOT USEDHW-2J - NOT USEDHW-2K - NOT USEDHW-3 - NOT USEDHW-3A - NOT USEDHW-3B - NOT USEDHW-3C - NOT USEDHW-3D - NOT USEDHW-3EEach Door to Have:NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Office Lock	F04
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154
1 Coat Hook	L03121

OMIT COAT HOOK WHERE GLASS LITE PREVENTS INSTALLATION.

HW-3F - NOT USEDHW-3G - NOT USEDHW-3H - NOT USEDHW-3J - NOT USED

HW-4 - NOT USED  
HW-4A - NOT USED  
HW-4B - NOT USED  
HW-4C - NOT USED  
HW-4D - NOT USED  
HW-4E - NOT USED  
HW-4F - NOT USED  
HW-4G - NOT USED  
HW-4H - NOT USED  
HW-4J - NOT USED  
HW-4K - NOT USED  
HW-4L - NOT USED  
HW-4M - NOT USED  
HW-4N - NOT USED  
HW-4P - NOT USED  
HW-4Q - NOT USED  
HW-4R - NOT USED  
HW-4S - NOT USED  
HW-4T - NOT USED

HW-4U

Each Door to Have:

NON-RATED/RATED

1	Continuous Hinge	
1	Public Restroom Lock	F09
1	Closer	C02011/C02021
1	Closer	C02051/C02061
1	Floor Stop (@ Outswing Doors)	L02121 x 3 FASTENERS
1	Wall Stop (@ Inswing Doors)	L02101 CONVEX
1	Set Self-Adhesive Seals	R0Y154

PROVIDE NON-HOLD-OPEN CLOSER AT TOILET ROOMS.

STONE THRESHOLD BY OTHER TRADES.

HW-4VEach Lead-Lined Door to Have:NON-RATED

1	Pivot Set	C07162 x 454KG (1000 LBS) WEIGHT CAPACITY
1	Intermediate Pivot	C07311
1	Utility Hospital Lock	F09 x LEAD-LINED x PADDLES POINTING DOWN
1	Closer	CO2011/CO2021 x METAL LEAD-LINED COVER
1	Overhead Holder-Stop	C01541-ADJUSTABLE
1	Set Self-Adhesive Seal	R0Y154

HW-4X - NOT USEDHW-4Y - NOT USEDHW-5 - NOT USEDHW-5A - NOT USEDHW-5BEach Door to Have:RATED

1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Storeroom Lock	F07
1	Closer	C02011/C02021
1	Floor Stop	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

HW-5C - NOT USEDHW-5DEach Door to Have:NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Storeroom Lock	F07
1	Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1	Wall Stop (@ Outswing Doors)	L02101 CONVEX
3	Silencers	L03011

HW-5E - NOT USED

HW-5FEach Door to Have:RATED/NON-RATED

1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Storeroom Lock	F07
1	Closer (@ Rated Doors)	C02011/C02021
1	Floor Stop	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

HW-5G - NOT USEDHW-5H - NOT USEDHW-5J - NOT USEDHW-5K - NOT USEDHW-5L - NOT USEDHW-6 - NOT USEDHW-6AEach Door to Have:RATED

1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X HOSPITAL TIP X ADJUSTA-SCREWS
1	Exit Device	TYPE 1 F08 LEVER
1	Key Cylinder	TYPE AS REQUIRED
1	Closer	C02011/C02021
1	Floor Stop	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154/R0Y155

HW-6B - NOT USEDHW-6C - NOT USEDHW-6D - NOT USEDHW-6E - NOT USEDHW-6F - NOT USEDHW-6G - NOT USEDHW-7 - NOT USEDHW-7A - NOT USEDHW-7B - NOT USED

## HW-7C

Each Access Door to Have:

NON-RATED

- 1 Key Cylinder Cam Lock with 2 keys, keyed alike

**INTERIOR PAIRS OF DOORS**HW-8 - NOT USEDHW-8A - NOT USEDHW-8B - NOT USEDHW-8C - NOT USEDHW-8DEach [ADO] Aluminum Storefront Pair to Have:NON-RATED

- 2 Pivot Sets C07162
- 2 Intermediate Transfer Pivots C07321 x 4-WIRES
- 2 Intermediate Pivots C07321
- 2 Push/Pull Bar Sets J505 - 305 MM (12 INCH) CENTER-TO-CENTER  
PULL
- 2 Overhead Stops C01541-ADJUSTABLE

POWER TRANSFERS FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.

HW-8E - NOT USEDHW-8F - NOT USEDHW-9 - NOT USEDHW-10 - NOT USEDHW-10A - NOT USEDHW-10B - NOT USEDHW-10C - NOT USEDHW-10D - NOT USEDHW-10E - NOT USEDHW-10F - NOT USEDHW-10G - NOT USEDHW-10H - NOT USEDHW-10J - NOT USEDHW-10K - NOT USEDHW-10L - NOT USED



HW-10MEach Pair to Have:NON-RATED

2	Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1	Utility Lock	F09
1	Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2	Floor Stops	L02121 x 3 FASTENERS
1	Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
2	Auto Door Bottom	R0Y346 - HEAVY DUTY
2	Sets Self-Adhesive Seals	R0Y154

HW-11 - NOT USEDHW-11A - NOT USEDHW-11B - NOT USEDHW-11C - NOT USEDHW-12 - NOT USEDHW-12A - NOT USEDHW-12B - NOT USEDHW-12C - NOT USEDHW-12D - NOT USEDHW-12EEach Pair to Have:RATED

2	Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X HOSPITAL TIP X ADJUSTA-SCREWS
1	Exit Device	TYPE 7 or 8 F01
1	Exit Device	TYPE 7 or 8 F08 LEVER
1	Key Cylinder	TYPE AS REQUIRED
1	Set Meeting Stile Astragals	R0Y834
2	Closers	C02011/C02021
2	Floor Stops	L02121 x 3 FASTENERS
2	Door Bottom	R0Y434 x NYLON BRUSH INSERT
2	Set Self-Adhesive Seals	R0Y154

HW-12F - NOT USEDHW-12GEach Pair to Have:NON-RATED

2	Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Exit Device	TYPE 7 or 8 F01
1	Exit Device	TYPE 7 or 8 F08 LEVER
1	Key Cylinder	TYPE AS REQUIRED
1	Set Meeting Stile Astragals	R0Y834
2	Closers	C02051/C02071
2	Floor Stops	L02121 x 3 FASTENERS
2	Auto Door Bottoms	R0Y346 - HEAVY DUTY
2	Sets Self-Adhesive Seals	R0Y154

HW-12H - NOT USEDHW-12J - NOT USEDHW-13 - NOT USED**EXTERIOR SINGLE DOORS**HW-E1 - NOT USEDHW-E2 - NOT USEDHW-E3 - NOT USED

HW-E4Each Door to Have:NON-RATED

1	Continuous Hinge	
1	Anti-Vandal Pull	
1	Exit Device	TYPE 1 F03 LESS TRIM
1	Latch Protector (outswing dr.)	
1	Key Cylinder	TYPE AS REQUIRED
1	Closer	C02011
1	Kick Plate	J102
1	Floor Stop	L02121 x 3 FASTENERS
1	Threshold	J32120 x SILICONE GASKET
1	Door Sweep	R0Y416
1	Set Frame Seals	R0Y164

HW-E5Each Roll-up Door to Have:NON-RATED

2 Cylinders                      TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 33 00, COILING DOORS AND GRILLES

**EXTERIOR PAIRS OF DOORS**

HW-E6 - NOT USED

HW-E7 - NOT USED

HW-E8Each Pair to Have:NON-RATED

2	Continuous Hinge	
1	Set Auto Flush Bolts	TYPE 25
1	Dust Proof Strike	L04021
1	Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
1	Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
1	Coordinator	TYPE 21A
2	Closer	C02011/C02021
2	Armor Plate	J101 x 3.125 MM (0.125 INCH) THICKNESS
2	Floor Stop	L02121 x 3 FASTNERS
1	Threshold (outswing door)	J32120 x SILICONE GASKET
1	Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
2	Door Sweep	R0Y416
1	Set Frame Seals	R0Y164
1	Drip	R0Y976

HW-E9 - NOT USEDHW-E10 - NOT USED**EXTERIOR SINGLE GATES**HW-G1 - NOT USEDHW-G2Each Gate to Have:NON-RATED

2	Weldable Gate Hinges	A8181 (3 KNUCKLE) X 5 INCHES X WELDED OR FASTENED X SHEAR HINGE LEAVES TO FIT GATE MEMBERS
1	Weldable Lock Box	
1	Utility Lock	F09 X NON-FERROUS LOCK CASE
1	Stainless Steel Closer	C52011/C22021

HW-G3 - NOT USED

HW-G4Each Gate to Have:NON-RATED

2	Weldable Gate Hinges	A8181 (3 KNUCKLE) X 5 INCHES X WELDED OR FASTENED X SHEAR HINGE LEAVES TO FIT GATE MEMBERS
1	Weldable Panic Box	
1	Anti-Vandal Pull	
1	Rim Panic Device	TYPE 1 F03 LESS TRIM
1	Cylinder	TYPE AS REQUIRED
1	Stainless Steel Closer	C52011/C22021

HW-G5 - NOT USED**EXTERIOR PAIRS OF GATES - NOT USED****RESIDENTIAL UNIT SINGLE DOORS - NOT USED**

## SECURITY HARDWARE ABBREVIATIONS LEGEND:

AC = Access Control Device (Card reader, biometric reader, keypad, etc.)

DPS = Door Position Switch (Door or Alarm Contact)

EL = Electric Lock or Electric Lever Exit Device

PB = Push-button Combination Lock (stand-alone)

REX = Request-to-Exit Switch in Latching Device Inside Trim

**INTERIOR SINGLE SECURITY DOORS**HW-SH-1 - NOT USEDHW-SH-2 - NOT USED

HW-SH-3

<u>Each [AC, EL, REX, DPS] Door to Have:</u>	<u>RATED/NON-RATED</u>
Hinges	QUANTITY & TYPE AS REQUIRED
1 Transfer Hinge	4-WIRE TYPE AS REQUIRED
1 Electrified Lock	F07 (E01-REX, E06) 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154
1 Alarm Contact	
120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.	
CARD READER BY DIVISION 28.	

HW-SH-3A - NOT USEDHW-SH-3B - NOT USEDHW-SH-3C

<u>Each [PB] Door to Have:</u>	<u>NON-RATED/RATED</u>
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Push-button Combination Lock	N3 - A156.13 F07 G1 E06
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-SH-3D - NOT USEDHW-SH-3E - NOT USEDHW-SH-3F - NOT USEDHW-SH-3G - NOT USEDHW-SH-3H - NOT USEDHW-SH-4 - NOT USEDHW-SH-4A - NOT USEDHW-SH-4B - NOT USEDHW-SH-5 - NOT USED

HW-SH-6 - NOT USED

**INTERIOR PAIRS OF SECURITY DOORS**

HW-SH-7 - NOT USED

HW-SH-8 - NOT USED

HW-SH-9 - NOT USED



HW-SH-9A - NOT USED

HW-SH-10 - NOT USED



HW-SH-10A

Each [AC, ADO, EL, REX, DPS] Pair Integrated Doors to Have:      RATED

1 Key Cylinder

TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES.

AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.

**EXTERIOR SINGLE SECURITY DOORS - NOT USED**

**MENTAL HEALTH AREAS - NOT USED**

E N D

**SECTION 22 08 00**  
**COMMISSIONING OF PLUMBING SYSTEMS**

1.

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. The requirements of this Section apply to all sections of Division 22.
- B. This project will have selected building systems commissioned. The complete list of equipment and systems to be commissioned are specified in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS. The commissioning process, which the Contractor is responsible to execute, is defined in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS. A Commissioning Agent (CxA) appointed by the Department of Veterans Affairs will manage the commissioning process.

**1.2 RELATED WORK**

- A. Section 01 00 00 GENERAL REQUIREMENTS.
- B. Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.
- C. Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

**1.3 SUMMARY**

- A. This Section includes requirements for commissioning plumbing systems, subsystems and equipment. This Section supplements the general requirements specified in Section 01 91 00 General Commissioning Requirements.
- B. Refer to Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS for more specifics regarding processes and procedures as well as roles and responsibilities for all Commissioning Team members.

**1.4 DEFINITIONS**

- A. Refer to Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS for definitions.

**1.5 COMMISSIONED SYSTEMS**

- A. Commissioning of a system or systems specified in Division 22 is part of the construction process. Documentation and testing of these systems, as well as training of the VA's Operation and Maintenance personnel in accordance with the requirements of Section 01 91 00 and of Division 22, is required in cooperation with the VA and the Commissioning Agent.
- B. The Plumbing systems commissioning will include the systems listed in Section 01 19 00 General Commissioning Requirements:



**1.6 SUBMITTALS**

- A. The commissioning process requires review of selected Submittals. The Commissioning Agent will provide a list of submittals that will be reviewed by the Commissioning Agent. This list will be reviewed and approved by the VA prior to forwarding to the Contractor. Refer to Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, and SAMPLES for further details.
- B. The commissioning process requires Submittal review simultaneously with engineering review. Specific submittal requirements related to the commissioning process are specified in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.

**PART 2 - PRODUCTS (NOT USED)****PART 3 - EXECUTION****3.1 CONSTRUCTION INSPECTIONS**

- A. Commissioning of the Building Plumbing Systems will require inspection of individual elements of the Plumbing construction throughout the construction period. The Contractor shall coordinate with the Commissioning Agent in accordance with Section 01 91 00 and the Commissioning Plan to schedule inspections as required to support the commissioning process.

**3.2 PRE-FUNCTIONAL CHECKLISTS**

- A. The Contractor shall complete Pre-Functional Checklists to verify systems, subsystems, and equipment installation is complete and systems are ready for Systems Functional Performance Testing. The Commissioning Agent will prepare Pre-Functional Checklists to be used to document equipment installation. The Contractor shall complete the checklists. Completed checklists shall be submitted to the VA and to the Commissioning Agent for review. The Commissioning Agent may spot check a sample of completed checklists. If the Commissioning Agent determines that the information provided on the checklist is not accurate, the Commissioning Agent will return the marked-up checklist to the Contractor for correction and resubmission. If the Commissioning Agent determines that a significant number of completed checklists for similar equipment are not accurate, the Commissioning Agent will select a broader sample of checklists for review. If the Commissioning Agent determines that a significant number of the broader sample of checklists is also inaccurate, all the checklists for the type of equipment will be returned to the Contractor for correction and

resubmission. Refer to SECTION 01 91 00 GENERAL COMMISSIONING REQUIREMENTS for submittal requirements for Pre-Functional Checklists, Equipment Startup Reports, and other commissioning documents.

### **3.3 CONTRACTORS TESTS**

- A. Contractor tests as required by other sections of Division 22 shall be scheduled and documented in accordance with Section 01 00 00 GENERAL REQUIREMENTS. All testing shall be incorporated into the project schedule. Contractor shall provide no less than 7 calendar days' notice of testing. The Commissioning Agent will witness selected Contractor tests at the sole discretion of the Commissioning Agent. Contractor tests shall be completed prior to scheduling Systems Functional Performance Testing.

### **3.4 SYSTEMS FUNCTIONAL PERFORMANCE TESTING:**

- A. The Commissioning Process includes Systems Functional Performance Testing that is intended to test systems functional performance under steady state conditions, to test system reaction to changes in operating conditions, and system performance under emergency conditions. The Commissioning Agent will prepare detailed Systems Functional Performance Test procedures for review and approval by the Resident Engineer. The Contractor shall review and comment on the tests prior to approval. The Contractor shall provide the required labor, materials, and test equipment identified in the test procedure to perform the tests. The Commissioning Agent will witness and document the testing. The Contractor shall sign the test reports to verify tests were performed. See Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS, for additional details.

### **3.5 TRAINING OF VA PERSONNEL**

- A. Training of the VA operation and maintenance personnel is required in cooperation with the Resident Engineer and Commissioning Agent. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems. Contractor shall submit training agendas and trainer resumes in accordance with the requirements of Section 01 19 00. The instruction shall be scheduled in coordination with the Resident Engineer after submission and approval of formal training plans. Refer to Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS and Division 22 Sections for additional Contractor training requirements.

----- END -----

**SECTION 22 40 00****PLUMBING FIXTURES****PART 1 - GENERAL****1.1 DESCRIPTION**

Plumbing fixtures, associated trim and fittings necessary to make a complete installation from wall or floor connections to rough piping, and certain accessories.

**1.2 RELATED WORK**

- A. Sealing between fixtures and other finish surfaces: Section 07 92 00, JOINT SEALANTS.
- B. Flush panel access doors: Section 08 31 13, ACCESS DOORS AND FRAMES.
- C. Through bolts: Section 10 21 13, TOILET COMPARTMENTS.
- D. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.
- E. SECTION 22 08 00, COMMISSIONING OF PLUMBING SYSTEMS.  
Requirements for commissioning, systems readiness checklist, and training.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submit plumbing fixture information in an assembled brochure, showing cuts and full detailed description of each fixture.

**1.4 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American National Standard Institute (ANSI):  
The American Society of Mechanical Engineers (ASME):  
A112.6.1M-02(R2008).....Floor Affixed Supports for Off-the-Floor  
Plumbing Fixtures for Public Use  
A112.19.1M-08 .....Enameled Cast Iron Plumbing Fixtures  
A112.19.2M-03.....Vitreous China Plumbing Fixtures  
A112.19.3-2001(R2008)...Stainless Steel Plumbing Fixtures (Designed for  
Residential Use)
- C. American Society for Testing and Materials (ASTM):  
A276-2010 .....Stainless and Heat-Resisting Steel Bars and  
Shapes  
WW-P-541-E/GEN .....Plumbing Fixtures with Amendment 1

- D. National Association of Architectural Metal Manufacturers (NAAMM): NAAMM  
AMP 500-505  
Metal Finishes Manual (1988)
- E. American Society of Sanitary Engineers (ASSE):  
1016-05.....Performance Requirements for Individual  
Thermostatic, Pressure Balancing and Combination  
Pressure Balancing and Thermostatic Control  
Valves for Individual Fixture Fittings
- F. National Sanitation Foundation (NSF)/American National Standards  
Institute (ANSI):  
61-2009 .....Drinking Water System Components-Health Effects
- G. American with Disabilities Act (A.D.A) Section 4-19.4 Exposed Pipes and  
Surfaces
- H. Environmental Protection Agency EPA PL 93-523 1974; A 1999) Safe  
Drinking Water Act.
- I. International Building Code, ICC IPBC 2009.

## **PART 2 - PRODUCTS**

### **2.1 STAINLESS STEEL**

- A. Corrosion-resistant Steel (CRS):
  - 1. Plate, Sheet and Strip: CRS flat products shall conform to chemical composition requirements of any 300 series steel specified in ASTM A276.
  - 2. Finish: Exposed surfaces shall have standard polish (ground and polished) equal to NAAMM finish Number 4.
- B. Die-cast zinc alloy products are prohibited.

### **2.2 STOPS**

- A. Provide lock-shield loose key or screw driver pattern angle stops, straight stops or stops integral with faucet, with each compression type faucet whether specifically called for or not, including sinks in wood and metal casework, laboratory furniture and pharmacy furniture. Locate stops centrally above or below fixture in accessible location.
- B. Furnish keys for lock shield stops to Resident Engineer.
- C. Supply from stops not integral with faucet shall be chrome plated copper flexible tubing or flexible stainless steel with inner core of non-toxic polymer.
- D. Supply pipe from wall to valve stop shall be rigid threaded IPS copper alloy pipe, i.e. red brass pipe nipple, chrome plated where exposed.
- E. Psychiatric Area: Provide stainless steel drain guard for all lavatories not installed in casework.

### 2.3 ESCUTCHEONS

Heavy type, chrome plated, with set screws. Provide for piping serving plumbing fixtures and at each wall, ceiling and floor penetrations in exposed finished locations and within cabinets and millwork.

### 2.4 LAMINAR FLOW CONTROL DEVICE

- A. Smooth, bright stainless steel or satin finish, chrome plated metal laminar flow device shall provide non-aeration, clear, coherent laminar flow that will not splash in basin. Device shall also have a flow control restrictor and have vandal resistant housing.
- B. Flow Control Restrictor:
  - 1. Capable of restricting flow from 95 ml/s to 110 ml/s (1.5 gpm to 1.7 gpm) for lavatories; 125 ml/s to 140 ml/s (2.0 gpm to 2.2 gpm) for sinks P-528; and 170 ml/s to 190 ml/s (2.75 gpm to 3.0 gpm) for dietary food preparation and rinse sinks or as specified.
  - 2. Compensates for pressure fluctuation maintaining flow rate specified above within 10 percent between 170 kPa and 550 kPa (25 psi and 80 psi).
  - 3. Operates by expansion and contraction, eliminates mineral/sediment build-up with self-cleaning action, and is capable of easy manual cleaning.

### 2.5 CARRIERS

- A. ASME/ANSI A112.6.1M, with adjustable gasket faceplate chair carriers for wall hung closets with auxiliary anchor foot assembly, hanger rod support feet, and rear anchor tie down.
- B. ASME/ANSI A112.6.1M, lavatory, chair carrier for thin wall construction. All lavatory chair carriers shall be capable of supporting the lavatory with a 250-pound vertical load applied at the front of the fixture.
- C. Where water closets, lavatories or sinks are installed back-to-back and carriers are specified, provide one carrier to serve both fixtures in lieu of individual carriers. The drainage fitting of the back to back carrier shall be so constructed that it prevents the discharge from one fixture from flowing into the opposite fixture.

### 2.6 WATER CLOSETS

- A. (P-101) Water Closet (Floor Mounted, ANSI 112.19.2M, Figure 6) - office and industrial, elongated bowl, siphon jet 6 L (1.6 gallons) per flush, floor outlet. Top of rim shall be 435 mm to 438 mm (17 1/8 inches to 17 1/4 inches) above finished floor.
  - 1. Seat: Institutional/Industrial, extra heavy duty, chemical resistant, solid plastic, open front less cover for elongated bowls, integrally

- molded bumpers, concealed check hinge with stainless steel post. Seat shall be posture contoured body design. Color shall be white.
2. Fittings and Accessories: Floor flange fittings-cast iron; Gasket-wax; bolts with chromium plated cap nuts and washers.
  3. Flush valve: Large chloramines resistant diaphragm, semi-red brass valve body, exposed chrome plated, , water saver design 6 L (1.6 gallons) per flush with maximum 10 percent variance, top spud connection, adjustable tailpiece, one-inch IPS screwdriver back check angle stop with vandal resistant cap, high back pressure vacuum breaker, and sweat solder adapter with cover tube and cast set screw wall flange. Set centerline of inlet 292 mm (11 1/2 inches) above rim. Seat bumpers shall be integral part of flush valve. Valve body, cover, tailpiece and control stop shall be in conformance with ASTM Alloy classification for semi-red brass.

B. NOT USED

C. (P-102) Water Closet (Floor Mounted, ADA Height, ANSI 112.19.2M, Figure 6) - office and industrial, elongated bowl, siphon jet 6 L (1.6 gallons) per flush, floor outlet. Top of rim shall be 435 mm to 438 mm (18 inches) above finished floor.

1

1. Seat: Institutional/Industrial, extra heavy duty, chemical resistant, solid plastic, open front less cover for elongated bowls, integrally molded bumpers, concealed check hinge with stainless steel post. Seat shall be posture contoured body design. Color shall be white.
2. Fittings and Accessories: Floor flange fittings-cast iron; Gasket-wax; bolts with chromium plated cap nuts and washers.
3. Flush valve: Large chloramines resistant diaphragm, semi-red brass valve body, exposed chrome plated, water saver design 6 L (1.6 gallons) per flush with maximum 10 percent variance, top spud connection, adjustable tailpiece, one-inch IPS screwdriver back check angle stop with vandal resistant cap, high back pressure vacuum breaker, and sweat solder adapter with cover tube and cast set screw wall flange. Set centerline of inlet 292 mm (11 1/2 inches) above rim. Seat bumpers shall be integral part of flush valve. Valve body, cover, tailpiece and control stop shall be in conformance with ASTM Alloy classification for semi-red brass

D. NOT USED

E. NOT USED

F. NOT USED

G. NOT USED

H. NOT USED

- I. NOT USED
- J. NOT USED
- K. NOT USED
- L. NOT USED
- M. NOT USED

## 2.7 URINALS

- A. NOT USED
- B. (P-202) Urinal, Wall Hung, ANSI A112.19.2M, Figure 30) bowl with integral flush distribution, wall to front of flare 356 mm (14 inches). Wall hung with integral trap, siphon jet flushing action 4 L (1.0 gallon per flush) with 51 mm (2 inches) back outlet and 19 mm (3/4 inch) top inlet spud.
  - 1. Support urinal with chair carrier and install with rim 381 mm (15 inches) above finished floor.
  - 2. Flushing Device: Large chloramines resistant diaphragm, semi-red brass body, exposed flush valve, water saver design, 19 mm (3/4 inch) capped screwdriver angle stop valve. Set centerline of inlet 292 mm (11 1/2 inches) above urinal. Valve body, cover, tailpiece and control stop shall be in conformance with ASTM alloy classification for semi-red brass.
- C. NOT USED
- D. NOT USED
- E. NOT USED
- F. NOT USED

## 2.8 NOT USED

## 2.9 LAVATORIES

- A. Dimensions for lavatories are specified, Length by width (distance from wall) and depth.
- B. Brass components in contact with water shall contain no more than 3 percent lead content by dry weight.
  - C. NOT USED gauge)
  - 3. D. NOT USED
  - E. NOT USED
- F. NOT USED
  - G. NOT USED
  - H. NOT USED
- I. (P-401) Lavatory (Wrist Control,) seamless welded construction, fabricated of 18 gauge type 304 stainless steel, with integral-formed apron and backsplash. Exposed surfaces polished with hand blended finish. Underside coated to insulate for sound and reduce condensation.



Drain punch for standard lavatory drain for drain with overflow. Unit shall be furnished with one stainless steel wall clip and integral flange for wall mounting. Dimensions shall be approximately 20 inches by 18 inches. Punching for faucet shall be on 2 inch centers. Set rim 36 inches above finished floor.

1. Faucet: Solid cast brass construction with washer-less ceramic mixing cartridge type and centrally exposed rigid gooseneck spout with outlet 102 mm to 127 mm (4 inches to 5 inches) above rim. Provide laminar flow control device. One hundred two millimeter (4-inch) wrist blade type, handles on faucets shall be cast, formed or drop forged copper alloy. Faucet, wall and floor escutcheons shall be either copper alloy or CRS. Exposed metal parts, including exposed part under valve handle when in open position, shall be chrome plated with a smooth bright finish.
2. Drain: Cast or wrought brass with flat grid strainer, offset tailpiece, chrome plated.
3. Stops: Angle type. See paragraph 2.2.Stops
4. Trap: Cast copper alloy, 38 mm by 32 mm (1 1/2 inches by 1 1/4 inches)P-trap. Adjustable with connected elbow and 1.4 mm thick (17 gauge) tubing extension to wall. Exposed metal trap surface, and connection hardware shall be chrome plated with a smooth bright finish. Set trap parallel to the wall.
5. Provide cover for drain, stops and trap per A.D.A 4-19.4.
- J. NOT USED
- K. NOT USED
- L. (P-418) Lavatory (Sensor Control, Gooseneck Spout, ASME/ANSI A112.19.2M, Figure 16) straight back, approximately 508 mm by 457 mm (20 inches by 18 inches) and a 102 mm (4 inches) minimum apron, first quality vitreous china with punching for gooseneck spout. Set rim 864 mm (34 inches) above finished floor.
  1. Faucet: Solid cast brass construction, chrome plated, gooseneck spout with outlet 102 mm to 127 mm (4 inches to 5 inches) above rim. Foot and Wrist control, 102 mm (4 inches) center set mounting. Refer to drawings for exact locations.
  2. Drain: Cast or wrought brass with flat grid strainer with offset tailpiece, brass, chrome plated.
  3. Stops: Angle type. See paragraph 2.2.Stops
  4. Trap: Cast copper alloy, 38 mm by 32 mm (1 1/2 inches by 1 1/4 inches)P-trap. Adjustable with connected elbow and 17 gage tubing extension to wall. Exposed metal trap surface and connection hardware

shall be chrome plated with a smooth bright finish. Set trap parallel to wall.

5. Provide cover for drain, stops and trap per A.D.A 4-19.4.

M. NOT USED

## 2.10 SINKS AND LAUNDRY TUBS

A. Dimensions for sinks and laundry tubs are specified, length by width (distance from wall) and depth.

B. (P-502) Service Sink (Corner, Floor Mounted) stain resistant terrazzo, 711 mm by 711 mm by 305 mm (28 inches by 28 inches by 12 inches) with 152 mm (6 inches) drop front. Terrazzo, composed of marble chips and white Portland cement, shall develop compressive strength of 20684 kPa (3000 psi) seven days after casting. Provide extruded aluminum cap on front side.

1. Faucet: Solid brass construction, combination faucet with replaceable monel seat, removable replacement unit containing all parts subject to wear, integral stops, mounted on wall above sink. Spout shall have a pail hook, 19 mm (3/4 inch) hose coupling threads, vacuum breaker, and top or bottom brace to wall. Four-arm handles on faucets shall be cast, formed, or drop forged copper alloy. Escutcheons shall be either forged copper alloy or CRS. Exposed metal parts, including exposed part under valve handle when in open position, shall have a smooth bright finish. Provide 914 mm (36 inches) hose with wall hook. Centerline of rough in is 1219 mm (48 inches) above finished floor.

2. Drain: Seventy six millimeter (3 inches) cast brass drain with nickel bronze strainer.

3. Trap: P-trap, drain through floor.

C. NOT USED

D. NOT USED

E. NOT USED

F. NOT USED

G. NOT USED

H. NOT USED

I. NOT USED

J. NOT USED

K. NOT USED

L. NOT USED

M. NOT USED

N. NOT USED

O. (P-524) Sink, (CRS, Double Compartment, Counter Top, ASME/ANSI A112.19.3M, Kitchen Sinks, Figure 6) self-rimming, approximately 838 mm

by 559 mm (33 inches by 22 inches) with two compartments inside dimensions approximately 343 mm by 406 mm by 191 mm (13 1/2 inches by 16 inches by 7 1/2 inches), minimum 20 gage CRS. Corners and edges shall be well rounded.

1. Faucet: Kitchen sink, solid brass construction, swing spout, chrome plated copper alloy.
2. Drain: Drain plug with cup strainer, stainless steel.
3. Trap: Cast copper alloy, 38 mm (1 1/2 inches) P-trap with cleanout plug, continuous drain with wall connection and escutcheon.
4. Provide cover for drain, stops and trap per A.D.A 4-19.4.

P. NOT USED

Q. NOT USED

R. NOT USED

#### **2.11 DISPENSER, DRINKING WATER**

- A. Standard rating conditions: 10 degrees C (50 degrees F) water with 27 degrees C (80 degrees F) inlet water temperature and 32 degrees C (90 degrees F) ambient air temperature.
- B. (P-604) Electric Water Cooler (Mechanically Cooled, Wall Hung, Self-contained, Wheelchair) bubbler style, 5 ml/s (5 gph) minimum capacity, lead free. Top shall be CRS anti-splash design. Cabinet, CRS, satin finish, approximately 457 mm by 457 mm by 635 mm (18 inches by 18 inches by 25 inches) high with mounting plate. Set bubbler 914 mm (36 inches) above finished floor. Unit shall be push bar operated with front and side bar and automatic stream regulator. All trim polished chrome plated.
- C. NOT USED
- D. NOT USED
- E. NOT USED

#### **2.12 SHOWER BATH FIXTURE**

- A. NOT USED
- B. NOT USED
- C. NOT USED
- D. (P-704) Shower Bath Fixture (Wall Mounted, Concealed Supplies, Hose Spray):
  1. Shower Installation: Wall mounted showerhead connected to shower arm.
  2. Shower Heads: Chrome plated metal head, adjustable ball joint, self-cleaning head with automatic flow control device to limit discharge to not more than three gpm. Body, internal parts of shower head and

flow control fittings shall be copper alloy or CRS. Install showerhead 1829 mm (72 inches) above finished floor.

3. Valves: Type T/P combination temperature and pressure balancing, with chrome plated metal lever type operating with adjustment for rough-in variations handle and chrome plated metal or CRS face plate. Install diverter selector valve and elevated vacuum breaker to provide tempered water to shower head and hose spray. Valve body shall be any suitable copper alloy. Internal parts shall be copper nickel alloy, CRS or thermoplastic material. Valve inlet and outlet shall be 13 mm (1/2 inch) IPS. Provide external screwdriver check stops, and temperature limit stops. Set stops for a maximum temperature of 105 degrees F. All exposed fasteners shall be vandal resistant. Valve shall provide a minimum of 160 ml/s at 310 kPa (2.5 gpm at 45 psi) pressure drop.
4. Spray Assembly: Shall consist of a 1524 mm (60 inches) length of rubber lined CRS, chrome plated metal flexible, or white vinyl reinforced hose with coupling for connection to 13 mm (1/2 inch) hose supply elbow protruding through wall. Spray shall consist of a self-closing, lever-handle, faucet with thumb control having open-shut positions and intermediate positions for regulating water flow and elevated pressure type vacuum breaker. Provide wall hook for faucet.

E. NOT USED

F. NOT USED

## **2.13 NOT USED**

## **2.14 HYDRANT, HOSE BIBB AND MISCELLANEOUS DEVICES**

- A. (P-801) Wall Hydrant: Cast bronze non-freeze hydrant with detachable T-handle. Brass operating rod within casing of bronze pipe of sufficient length to extend through wall and place valve inside building. Brass valve with coupling and union elbow having metal-to-metal seat. Valve rod and seat washer removable through face of hydrant; 19 mm (3/4 inch) hose thread on spout; 19 mm (3/4 inch) pipe thread on inlet. Finish may be rough; exposed surfaces shall be chrome plated. Set not less than 457 mm (18 inches) nor more than 914 mm (36 inches) above grade. On porches and platforms, set approximately 762 mm (30 inches) above finished floor. Provide integral vacuum breaker which automatically drains when shut off.
- B. NOT USED
- C. (P-804) Hose Bibb (Single Faucet, Concealed : Cast or wrought copper alloy, single faucet with replaceable monel seat, removable replacement unit containing all parts subject to wear, mounted on wall 914 mm (36

inches) above floor to concealed supply pipe. Provide faucet with 19 mm (3/4 inch) hose coupling thread on spout and vacuum breaker. Four-arm handle on faucet shall be cast, formed or drop forged copper alloy. Escutcheons shall be either forged copper alloy or CRS. Exposed metal parts, including exposed part under valve handle when in open position, shall have a bright finish.

D. NOT USED

E. NOT USED

F. (P-808) Washing Machine Supply and Drain Units: Fabricate of 16-gage steel with highly corrosion resistant epoxy finish. Unit to have 51 mm (2 inches) drain connection, 13 mm (1/2 inch) combination MPT brass sweat connection, ball type shut-off valve, 51 mm (2 inches) cast brass P-trap, duplex electric grounding receptacle and dryer outlet. Size 229 mm by 375 mm (9 inches by 14 3/4 inches) rough wall opening 203 mm by 330 mm by 92 mm (8 inches by 13 inches by 3 5/8 inches). Centerline of box shall be 1118 mm (44 inches) above finished floor.

G. NOT USED

H. NOT USED

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

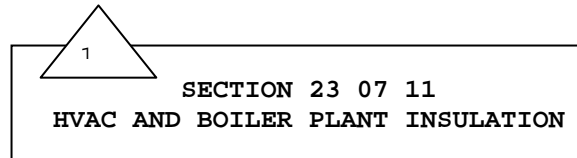
- A. Fixture Setting: Opening between fixture and floor and wall finish shall be sealed as specified under Section 07 92 00, JOINT SEALANTS.
- B. Supports and Fastening: Secure all fixtures, equipment and trimmings to partitions, walls and related finish surfaces. Exposed heads of bolts and nuts in finished rooms shall be hexagonal, polished chrome plated brass with rounded tops.
- C. Through Bolts: For free standing marble and metal stud partitions refer to Section 10 21 13, TOILET COMPARTMENTS.
- D. Toggle Bolts: For hollow masonry units, finished or unfinished.
- E. Expansion Bolts: For brick or concrete or other solid masonry. Shall be 6 mm (1/4 inch) diameter bolts, and to extend at least 76 mm (3 inches) into masonry and be fitted with loose tubing or sleeves extending into masonry. Wood plugs, fiber plugs, lead or other soft metal shields are prohibited.
- F. Power Set Fasteners: May be used for concrete walls, shall be 6 mm (1/4 inch) threaded studs, and shall extend at least 32 mm (1 1/4 inches) into wall.
- G. Tightly cover and protect fixtures and equipment against dirt, water and chemical or mechanical injury.

- H. Where water closet waste pipe has to be offset due to beam interference, provide correct and additional piping necessary to eliminate relocation of water closet.
- I. Do not use aerators on lavatories and sinks.

### **3.2 CLEANING**

At completion of all work, fixtures, exposed materials and equipment shall be thoroughly cleaned.

E N D



**PART 1 - GENERAL**

**1.1 DESCRIPTION**

A. Field applied insulation for thermal efficiency and condensation control for

1. HVAC piping, ductwork and equipment.
2. Not Used
3. Re-insulation of HVAC piping, ductwork and equipment, plumbing piping and equipment

B. Definitions

1. ASJ: All service jacket, white finish facing or jacket.
2. Air conditioned space: Space having air temperature and/or humidity controlled by mechanical equipment.
3. Cold: Equipment, ductwork or piping handling media at design temperature of 16 degrees C (60 degrees F) or below.
4. Concealed: Ductwork and piping above ceilings and in chases, and pipe spaces.
5. Exposed: Piping, ductwork, and equipment exposed to view in finished areas including mechanical and electrical equipment rooms or exposed to outdoor weather. Attics and crawl spaces where air handling units are located are considered to be mechanical rooms. Shafts, chases, unfinished attics, crawl spaces and pipe basements are not considered finished areas.
6. FSK: Foil-scrim-kraft facing.
7. Hot: HVAC Ductwork handling air at design temperature above 16 degrees C (60 degrees F); HVAC equipment or piping handling media above 41 degrees C (105 degrees F).
8. Density:  $\text{kg/m}^3$  - kilograms per cubic meter (Pcf - pounds per cubic foot).
9. Runouts: Branch pipe connections up to 25-mm (one-inch) nominal size to fan coil units or reheat coils for terminal units.
10. Thermal conductance: Heat flow rate through materials.
  - a. Flat surface: Watt per square meter (BTU per hour per square foot).
  - b. Pipe or Cylinder: Watt per square meter (BTU per hour per linear foot).

11. Thermal Conductivity (k): Watt per meter, per degree C (BTU per inch thickness, per hour, per square foot, per degree F temperature difference).
12. Vapor Retarder (Vapor Barrier): A material which retards the transmission (migration) of water vapor. Performance of the vapor retarder is rated in terms of permeance (perms). For the purpose of this specification, vapor retarders shall have a maximum published permeance of 0.1 perms and vapor barriers shall have a maximum published permeance of 0.001 perms.
13. Not Used
14. Not Used
15. Not Used
16. Not Used
17. Not Used
18. Not Used
19. Not Used
20. HWH: Hot water heating supply.
21. HWHR: Hot water heating return.
22. GH: Hot glycol-water heating supply.
23. GHR: Hot glycol-water heating return.
24. Not Used
25. Not Used
26. Not Used
27. Not Used
28. Not Used
29. Not Used
30. R: Pump recirculation.
31. Not Used
32. Not Used
33. CW: Cold water.
34. SW: Soft water.
35. HW: Hot water.
36. CH: Chilled water supply.
37. CHR: Chilled water return.
38. Not Used
39. Not Used
40. Not Used
41. PVDC: Polyvinylidene chloride vapor retarder jacketing, white.



**1.2 RELATED WORK**

- A. Not Used
- B. Section 02 82 13.13, GLOVEBAG ASBESTOS ABATEMENT: Insulation containing asbestos material.
- C. Section 07 84 00, FIRESTOPPING: Mineral fiber and bond breaker behind sealant.
- D. Not Used
- E. Section 23 05 11, COMMON WORK RESULTS FOR HVAC: General mechanical requirements and items, which are common to more than one section of Division 23.
- F. Not Used
- G. Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING and EQUIPMENT
- H. Not Used
- I. Section 23 21 23, HYDRONIC PUMPS
- J. Not Used
- K. Not Used
- L. Not Used
- M. Not Used
- N. Not Used
- O. Not Used
- P. Section 23 21 13, HYDRONIC PIPING and Section 23 22 13,
- Q. Section 23 21 13, HYDRONIC PIPING: Hot water, chilled water, and glycol piping.
- R. Section 23 31 00, HVAC DUCTS AND CASINGS: Ductwork, plenum and fittings.
- S. Not Used
- T. Not Used

**1.3 QUALITY ASSURANCE**

- A. Refer to article QUALITY ASSURANCE, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC
- B. Criteria:
  - 1. Comply with NFPA 90A, particularly paragraphs 4.3.3.1 through 4.3.3.6, 4.3.10.2.6, and 5.4.6.4, parts of which are quoted as follows:
    - 4.3.3.1** Pipe insulation and coverings, duct coverings, duct linings, vapor retarder facings, adhesives, fasteners, tapes, and supplementary materials added to air ducts, plenums, panels, and duct silencers used in duct systems, unless otherwise provided

for in 4.3.3.1.1 or 4.3.3.1.2., shall have, in the form in which they are used, a maximum flame spread index of 25 without evidence of continued progressive combustion and a maximum smoke developed index of 50 when tested in accordance with NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials.

**4.3.3.1.1** Where these products are to be applied with adhesives, they shall be tested with such adhesives applied, or the adhesives used shall have a maximum flame spread index of 25 and a maximum smoke developed index of 50 when in the final dry state. (See 4.2.4.2.)

**4.3.3.1.2** The flame spread and smoke developed index requirements of 4.3.3.1.1 shall not apply to air duct weatherproof coverings where they are located entirely outside of a building, do not penetrate a wall or roof, and do not create an exposure hazard.

**4.3.3.2** Closure systems for use with rigid and flexible air ducts tested in accordance with UL 181, Standard for Safety Factory-Made Air Ducts and Air Connectors, shall have been tested, listed, and used in accordance with the conditions of their listings, in accordance with one of the following:

(1) UL 181A, Standard for Safety Closure Systems for Use with Rigid Air Ducts and Air Connectors

(2) UL 181B, Standard for Safety Closure Systems for Use with Flexible Air Ducts and Air Connectors

**4.3.3.3** Air duct, panel, and plenum coverings and linings, and pipe insulation and coverings shall not flame, glow, smolder, or smoke when tested in accordance with a similar test for pipe covering, ASTM C 411, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation, at the temperature to which they are exposed in service.

**4.3.3.3.1** In no case shall the test temperature be below 121°C (250°F).

**4.3.3.4** Air duct coverings shall not extend through walls or floors that are required to be fire stopped or required to have a fire resistance rating, unless such coverings meet the requirements of 5.4.6.4.

**4.3.3.5\*** Air duct linings shall be interrupted at fire dampers to prevent interference with the operation of devices.

**4.3.3.6** Air duct coverings shall not be installed so as to conceal or prevent the use of any service opening.

**4.3.10.2.6** Materials exposed to the airflow shall be noncombustible or limited combustible and have a maximum smoke developed index of 50 or comply with the following.

**4.3.10.2.6.1** Electrical wires and cables and optical fiber cables shall be listed as noncombustible or limited combustible and have a maximum smoke developed index of 50 or shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.5 m (5 ft) or less when tested in accordance

with NFPA 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

#### 4.3.10.2.6.2 Not Used

4.3.10.2.6.4 Optical-fiber and communication raceways shall be listed as having a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.5 m (5 ft) or less when tested in accordance with UL 2024, Standard for Safety Optical-Fiber Cable Raceway.

4.3.10.2.6.6 Supplementary materials for air distribution systems shall be permitted when complying with the provisions of 4.3.3.

5.4.6.4 Where air ducts pass through walls, floors, or partitions that are required to have a fire resistance rating and where fire dampers are not required, the opening in the construction around the air duct shall be as follows:

(1) Not exceeding a 25.4 mm (1 in.) average clearance on all sides

(2) Filled solid with an approved material capable of preventing the passage of flame and hot gases sufficient to ignite cotton waste when subjected to the time-temperature fire conditions required for fire barrier penetration as specified in NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*

2. Test methods: ASTM E84, UL 723, or NFPA 255.

3. Specified k factors are at 24 degrees C (75 degrees F) mean temperature unless stated otherwise. Where optional thermal insulation material is used, select thickness to provide thermal conductance no greater than that for the specified material. For pipe, use insulation manufacturer's published heat flow tables. For domestic hot water supply and return, run out insulation and condensation control insulation, no thickness adjustment need be made.

4. All materials shall be compatible and suitable for service temperature, and shall not contribute to corrosion or otherwise attack surface to which applied in either the wet or dry state.

C. Every package or standard container of insulation or accessories delivered to the job site for use must have a manufacturer's stamp or label giving the name of the manufacturer and description of the material.

## 1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.

B. Shop Drawings:

1. All information, clearly presented, shall be included to determine compliance with drawings and specifications and ASTM, federal and military specifications.
  - a. Insulation materials: Specify each type used and state surface burning characteristics.
  - b. Insulation facings and jackets: Each type used. Make it clear that white finish will be furnished for exposed ductwork, casings and equipment.
  - c. Insulation accessory materials: Each type used.
  - d. Manufacturer's installation and fitting fabrication instructions for flexible unicellular insulation.
  - e. Make reference to applicable specification paragraph numbers for coordination.

C. Samples:

1. Each type of insulation: Minimum size 100 mm (4 inches) square for board/block/ blanket; 150 mm (6 inches) long, full diameter for round types.
2. Each type of facing and jacket: Minimum size 100 mm (4 inches square).
3. Each accessory material: Minimum 120 ML (4 ounce) liquid container or 120 gram (4 ounce) dry weight for adhesives cement mastic.

#### 1.5 STORAGE AND HANDLING OF MATERIAL

- A. Store materials in clean and dry environment, pipe covering jackets shall be clean and unmarred. Place adhesives in original containers. Maintain ambient temperatures and conditions as required by printed instructions of manufacturers of adhesives, mastics and finishing cements.

#### 1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. Federal Specifications (Fed. Spec.):
 

L-P-535E (2)- 99.....Plastic Sheet (Sheeting): Plastic Strip; Poly (Vinyl Chloride) and Poly (Vinyl Chloride - Vinyl Acetate), Rigid.
- C. Military Specifications (Mil. Spec.):
 

MIL-A-3316C (2)-90.....Adhesives, Fire-Resistant, Thermal Insulation

MIL-A-24179A (1)-87.....Adhesive, Flexible Unicellular-Plastic  
Thermal Insulation

MIL-C-19565C (1)-88.....Coating Compounds, Thermal Insulation, Fire-and  
Water-Resistant, Vapor-Barrier

MIL-C-20079H-87.....Cloth, Glass; Tape, Textile Glass; and Thread,  
Glass and Wire-Reinforced Glass

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

A167-99(2004).....Standard Specification for Stainless and  
Heat-Resisting Chromium-Nickel Steel Plate,  
Sheet, and Strip

B209-07.....Standard Specification for Aluminum and  
Aluminum-Alloy Sheet and Plate

C411-05.....Standard test method for Hot-Surface  
Performance of High-Temperature Thermal  
Insulation

C449-07.....Standard Specification for Mineral Fiber  
Hydraulic-Setting Thermal Insulating and  
Finishing Cement

C533-09.....Standard Specification for Calcium Silicate  
Block and Pipe Thermal Insulation

C534-08.....Standard Specification for Preformed Flexible  
Elastomeric Cellular Thermal Insulation in  
Sheet and Tubular Form

C547-07.....Standard Specification for Mineral Fiber pipe  
Insulation

C552-07.....Standard Specification for Cellular Glass  
Thermal Insulation

C553-08.....Standard Specification for Mineral Fiber  
Blanket Thermal Insulation for Commercial and  
Industrial Applications

C585-09.....Standard Practice for Inner and Outer Diameters  
of Rigid Thermal Insulation for Nominal Sizes  
of Pipe and Tubing (NPS System) R (1998)

C612-10.....Standard Specification for Mineral Fiber Block  
and Board Thermal Insulation

C1126-04.....Standard Specification for Faced or Unfaced  
Rigid Cellular Phenolic Thermal Insulation

- C1136-10.....Standard Specification for Flexible, Low  
Permeance Vapor Retarders for Thermal  
Insulation
- D1668-97a (2006).....Standard Specification for Glass Fabrics (Woven  
and Treated) for Roofing and Waterproofing
- E84-10.....Standard Test Method for Surface Burning  
Characteristics of Building  
Materials
- E119-09c.....Standard Test Method for Fire Tests of Building  
Construction and Materials
- E136-09b.....Standard Test Methods for Behavior of Materials  
in a Vertical Tube Furnace at 750 degrees C  
(1380 F)
- E. National Fire Protection Association (NFPA):
- 90A-09.....Standard for the Installation of Air  
Conditioning and Ventilating Systems
- 96-08.....Standards for Ventilation Control and Fire  
Protection of Commercial Cooking Operations
- 101-09.....Life Safety Code
- 251-06.....Standard methods of Tests of Fire Endurance of  
Building Construction Materials
- 255-06.....Standard Method of tests of Surface Burning  
Characteristics of Building Materials
- F. Underwriters Laboratories, Inc (UL):
- 723.....UL Standard for Safety Test for Surface Burning  
Characteristics of Building Materials with  
Revision of 09/08
- G. Manufacturer's Standardization Society of the Valve and Fitting  
Industry (MSS):
- SP58-2009.....Pipe Hangers and Supports Materials, Design,  
and Manufacture

## **PART 2 - PRODUCTS**

### **2.1 MINERAL FIBER OR FIBER GLASS**

- A. ASTM C612 (Board, Block), Class 1 or 2, density 48 kg/m<sup>3</sup> (3 pcf), k = 0.037 (0.26) at 24 degrees C (75 degrees F), external insulation for temperatures up to 204 degrees C (400 degrees F) with foil scrim (FSK) facing.

- B. ASTM C553 (Blanket, Flexible) Type I, // Class B-3, Density 16 kg/m<sup>3</sup> (1 pcf), k = 0.045 (0.31) at 24 degrees C (75 degrees F), for use at temperatures up to 204 degrees C (400 degrees F) with foil scrim (FSK) facing.
- C. ASTM C547 (Pipe Fitting Insulation and Preformed Pipe Insulation), Class 1, k = 0.037 (0.26) at 24 degrees C (75 degrees F), for use at temperatures up to 230 degrees C (450 degrees F) with an all service vapor retarder jacket with polyvinyl chloride premolded fitting covering.

## **2.2 MINERAL WOOL OR REFRACTORY FIBER**

- A. Comply with Standard ASTM C612, Class 3, 450 degrees C (850 degrees F).

## **2.3 RIGID CELLULAR PHENOLIC FOAM**

- A. Preformed (molded) pipe insulation, ASTM C1126, type III, grade 1, k = 0.021(0.15) at 10 degrees C (50 degrees F), for use at temperatures up to 121 degrees C (250 degrees F) with all service vapor retarder jacket with polyvinyl chloride premolded fitting covering.
- B. Equipment and Duct Insulation, ASTM C 1126, type II, grade 1, k = 0.021 (0.15) at 10 degrees C (50 degrees F), for use at temperatures up to 121 degrees C (250 degrees F) with rigid cellular phenolic insulation and covering, and all service vapor retarder jacket.

## **2.4 CELLULAR GLASS CLOSED-CELL**

- A. Comply with Standard ASTM C177, C518, density 120 kg/m<sup>3</sup> (7.5 pcf) nominal, k = 0.033 (0.29) at 24~~0~~ degrees C (75 degrees F).
- B. Pipe insulation for use at temperatures up to 200 degrees C (400 degrees F) with all service vapor retarder jacket.

## **2.5 NOT USED**

## **2.6 FLEXIBLE ELASTOMERIC CELLULAR THERMAL**

- A. ASTM C177, C518, k = 0.039 (0.27) at 24 degrees C (75 degrees F), flame spread not over 25, smoke developed not over 50, for temperatures from minus 4 degrees C (40 degrees F) to 93 degrees C (200 degrees F). No jacket required.

## **2.7 DUCT WRAP FOR KITCHEN HOOD GREASE DUCTS**

- A. Light weight, high temperature mineral fiber or ceramic fiber insulating material with low thermal conductivity K value of 0.060 W/m<sup>2</sup> degrees C (0.417 Btu in/hr ft<sup>2</sup> degrees F) at mean temperature of 260 degrees C (500 degrees F).
- B. Material shall be fully encapsulated by UL classified aluminum foil and tested to ASTM E84 standard.

- C. Material shall be UL tested for internal grease fire to 1093 degrees C (2,000 degrees F) with zero clearance and for through-penetration firestop.
- D. Material shall be UL classified for // 1 hour // 2 hour // fire rating for grease duct enclosure, and meet NFPA 96 requirements for direct applied insulating material to grease ducts with zero clearance.
- E. Material flame spread and smoke developed ratings shall not be higher than 5, as per ASTM E 84/UL 723 Flammability Test.

## 2.8 CALCIUM SILICATE

- A. Preformed pipe Insulation: ASTM C533, Type I and Type II with indicator denoting asbestos-free material.
- B. Premolded Pipe Fitting Insulation: ASTM C533, Type I and Type II with indicator denoting asbestos-free material.
- C. Equipment Insulation: ASTM C533, Type I and Type II
- D. Characteristics:

Insulation Characteristics		
ITEMS	TYPE I	TYPE II
Temperature, maximum degrees C (degrees F)	649 (1200)	927 (1700)
Density (dry), Kg/m <sup>3</sup> (lb/ ft <sup>3</sup> )	232 (14.5)	288 (18)
Thermal conductivity: Min W/ m K (Btu in/h ft <sup>2</sup> degrees F)@ mean temperature of 93 degrees C (200 degrees F)	0.059 (0.41)	0.078 (0.540)
Surface burning characteristics: Flame spread Index, Maximum	0	0
Smoke Density index, Maximum	0	0

## 2.9 INSULATION FACINGS AND JACKETS

- A. Vapor Retarder, higher strength with low water permeance  $\leq$  0.02 or less perm rating, Beach puncture 50 units for insulation facing on exposed ductwork, casings and equipment, and for pipe insulation jackets. Facings and jackets shall be all service type (ASJ) or PVDC Vapor Retarder jacketing.
- B. ASJ jacket shall be white kraft bonded to 0.025 mm (1 mil) thick aluminum foil, fiberglass reinforced, with pressure sensitive adhesive



closure. Comply with ASTM C1136. Beach puncture 50 units, Suitable for painting without sizing. Jackets shall have minimum 40 mm (1-1/2 inch) lap on longitudinal joints and minimum 75 mm (3 inch) butt strip on end joints. Butt strip material shall be same as the jacket. Lap and butt strips shall be self-sealing type with factory-applied pressure sensitive adhesive.

- C. Vapor Retarder medium strength with low water vapor permeance of 0.02 or less perm rating), Beach puncture 25 units: Foil-Scrim-Kraft (FSK) or PVDC vapor retarder jacketing type for concealed ductwork and equipment.
- D. Field applied vapor barrier jackets shall be provided, in addition to the specified facings and jackets, on all exterior piping and ductwork as well as on interior piping and ductwork exposed to outdoor air (i.e.; in ventilated attics, piping in ventilated (not air conditioned) spaces, etc.) in high humidity areas conveying fluids below ambient temperature. The vapor barrier jacket shall consist of a multi-layer laminated cladding with a maximum water vapor permeance of 0.001 perms. The minimum puncture resistance shall be 35 cm-kg (30 inch-pounds) for interior locations and 92 cm-kg (80 inch-pounds) for exterior or exposed locations or where the insulation is subject to damage.
- E. Glass Cloth Jackets: Presized, minimum 0.18 kg per square meter (7.8 ounces per square yard), 2000 kPa (300 psig) bursting strength with integral vapor retarder where required or specified. Weather proof if utilized for outside service.
- F. Factory composite materials may be used provided that they have been tested and certified by the manufacturer.
- G. Pipe fitting insulation covering (jackets): Fitting covering shall be premolded to match shape of fitting and shall be polyvinyl chloride (PVC) conforming to Fed Spec L-P-335, composition A, Type II Grade GU, and Type III, minimum thickness 0.7 mm (0.03 inches). Provide color matching vapor retarder pressure sensitive tape.
- H. Aluminum Jacket-Piping systems ASTM B209, 3003 alloy, H-14 temper, 0.6 mm (0.023 inch) minimum thickness with locking longitudinal joints. Jackets for elbows, tees and other fittings shall be factory-fabricated to match shape of fitting and of 0.6 mm (0.024) inch minimum thickness aluminum. Fittings shall be of same construction as straight run jackets but need not be of the same alloy. Factory-fabricated stainless steel bands shall be installed on all circumferential joints.

Bands shall be 13 mm (0.5 inch) wide on 450 mm (18 inch) centers.

System shall be weatherproof if utilized for outside service.

I. Not Used

## **2.10 REMOVABLE INSULATION JACKETS**

A. Insulation and Jacket:

1. Non-Asbestos Glass mat, type E needled fiber.
2. Temperature maximum of 450°F, Maximum water vapor transmission of 0.00 perm, and maximum moisture absorption of 0.2 percent by volume.
3. Jacket Material: Silicon/fiberglass and LFP 2109 pure PTFE.
4. Construction: One piece jacket body with three-ply braided pure Teflon or Kevlar thread and insulation sewn as part of jacket. Belt fastened.

## **2.11 PIPE COVERING PROTECTION SADDLES**

A. Cold pipe support: Premolded pipe insulation 180 degrees (half-shells) on bottom half of pipe at supports. Material shall be cellular glass insulation of the same thickness as adjacent insulation.

<b>Nominal Pipe Size and Accessories Material (Insert Blocks)</b>	
<b>Nominal Pipe Size mm (inches)</b>	<b>Insert Blocks mm (inches)</b>
Up through 125 (5)	150 (6) long
150 (6)	150 (6) long
200 (8), 250 (10), 300 (12)	225 (9) long
350 (14), 400 (16)	300 (12) long
450 through 600 (18 through 24)	350 (14) long

B. Warm or hot pipe supports: Premolded pipe insulation (180 degree half-shells) on bottom half of pipe at supports. cellular glass or calcium silicate. Insulation at supports shall have same thickness as adjacent insulation.

C. Not Used

## **2.12 ADHESIVE, MASTIC, CEMENT**

- A. Mil. Spec. MIL-A-3316, Class 1: Jacket and lap adhesive and protective finish coating for insulation.
- B. Mil. Spec. MIL-A-3316, Class 2: Adhesive for laps and for adhering insulation to metal surfaces.
- C. Mil. Spec. MIL-A-24179, Type II Class 1: Adhesive for installing flexible unicellular insulation and for laps and general use.
- D. Mil. Spec. MIL-C-19565, Type I: Protective finish for outdoor use.

- E. Mil. Spec. MIL-C-19565, Type I or Type II: Vapor barrier compound for indoor use.
- F. ASTM C449: Mineral fiber hydraulic-setting thermal insulating and finishing cement.
- G. Other: Insulation manufacturers' published recommendations.

### **2.13 MECHANICAL FASTENERS**

- A. Pins, anchors: Welded pins, or metal or nylon anchors with galvanized steel-coated or fiber washer, or clips. Pin diameter shall be as recommended by the insulation manufacturer.
- B. Staples: Outward clinching galvanized steel.
- C. Wire: 1.3 mm thick (18 gage) soft annealed galvanized or 1.9 mm (14 gage) copper clad steel or nickel copper alloy.
- D. Bands: 13 mm (0.5 inch) nominal width, brass, galvanized steel, aluminum or stainless steel.

### **2.14 REINFORCEMENT AND FINISHES**

- A. Glass fabric, open weave: ASTM D1668, Type III (resin treated) and Type I (asphalt treated).
- B. Glass fiber fitting tape: Mil. Spec MIL-C-20079, Type II, Class 1.
- C. Tape for Flexible Elastomeric Cellular Insulation: As recommended by the insulation manufacturer.
- D. Hexagonal wire netting: 25 mm (one inch) mesh, 0.85 mm thick (22 gage) galvanized steel.
- E. Corner beads: 50 mm (2 inch) by 50 mm (2 inch), 0.55 mm thick (26 gage) galvanized steel; or, 25 mm (1 inch) by 25 mm (1 inch), 0.47 mm thick (28 gage) aluminum angle adhered to 50 mm (2 inch) by 50 mm (2 inch) Kraft paper.
- F. PVC fitting cover: Fed. Spec L-P-535, Composition A, 11-86 Type II, Grade GU, with Form B Mineral Fiber insert, for media temperature 4 degrees C (40 degrees F) to 121 degrees C (250 degrees F). Below 4 degrees C (40 degrees F) and above 121 degrees C (250 degrees F). Provide double layer insert. Provide color matching vapor barrier pressure sensitive tape.

### **2.15 FIRESTOPPING MATERIAL**

- A. Other than pipe and duct insulation, refer to Section 07 84 00 FIRESTOPPING.

## 2.16 FLAME AND SMOKE

- A. Unless shown otherwise all assembled systems shall meet flame spread 25 and smoke developed 50 rating as developed under ASTM, NFPA and UL standards and specifications. See paragraph 1.3 "Quality Assurance".

## PART 3 - EXECUTION

### 3.1 GENERAL REQUIREMENTS

- A. Required pressure tests of duct and piping joints and connections shall be completed and the work approved by the COR for application of insulation. Surface shall be clean and dry with all foreign materials, such as dirt, oil, loose scale and rust removed.
- B. Except for specific exceptions, insulate entire specified equipment, piping (pipe, fittings, valves, accessories), and duct systems. Insulate each pipe and duct individually. Do not use scrap pieces of insulation where a full length section will fit.
- C. Where removal of insulation of piping, ductwork and equipment is required to comply with Section 02 82 11 GLOVEBAG ASBESTOS ABATEMENT, such areas shall be reinsulated to comply with this specification.
- D. Insulation materials shall be installed in a first class manner with smooth and even surfaces, with jackets and facings drawn tight and smoothly cemented down at all laps. Insulation shall be continuous through all sleeves and openings, except at fire dampers and duct heaters (NFPA 90A). Vapor retarders shall be continuous and uninterrupted throughout systems with operating temperature 16 degrees C (60 degrees F) and below. Lap and seal vapor retarder over ends and exposed edges of insulation. Anchors, supports and other metal projections through insulation on cold surfaces shall be insulated and vapor sealed for a minimum length of 150 mm (6 inches).
- E. Install vapor stops at all insulation terminations on either side of valves, pumps and equipment and particularly in straight lengths of pipe insulation.
- F. Construct insulation on parts of equipment such as chilled water pumps and heads of chillers, convertors and heat exchangers that must be opened periodically for maintenance or repair, so insulation can be removed and replaced without damage. Install insulation with bolted 1 mm thick (20 gage) galvanized steel or aluminum covers as complete units, or in sections, with all necessary supports, and split to coincide with flange/split of the equipment.

- G. Insulation on hot piping and equipment shall be terminated square at items not to be insulated, access openings and nameplates. Cover all exposed raw insulation with white sealer or jacket material.
- H. Protect all insulations outside of buildings with aluminum jacket using lock joint or other approved system for a continuous weather tight system. Access doors and other items requiring maintenance or access shall be removable and sealable.
- I. Not Used
- I. HVAC work not to be insulated:
  - 1. Internally insulated ductwork and air handling units.
  - 2. Relief air ducts (Economizer cycle exhaust air).
  - 3. Exhaust air ducts and plenums, and ventilation exhaust air shafts.
  - 4. Not Used
  - 5. In hot piping: Unions, flexible connectors, control valves, , safety valves and discharge vent piping, vacuum breakers, thermostatic vent valves, , exposed piping through floor for convectors and radiators. Insulate piping to within approximately 75 mm (3 inches) of uninsulated items.
- J. Not Used
  - 1. Not Used
    - a. Not Used
    - b. Not Used
    - c. Not Used
    - d. Not Used
    - e. Not Used
    - f. Not Used
    - g. Not Used
    - h. Not Used
    - i. Not Used
    - j. Not Used
    - k. Not Used
    - l. Not Used
    - m. Not Used
    - n. Not Used
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  - g. Not Used
  - h. Not Used
  - i. Not Used
- 3. Not Used
  - a. Not Used
  - b. Not Used
  - c. Not Used
  - d. Not Used
  - e. Not Used
  - f. Not Used
  - g. Not Used
  - h. Not Used
  - i. Refrigerated or desiccant air drier
  - j. Not Used
  - k. Not Used
  - l. Not Used
- 4. Not Used
  - a. Not Used
  - b. Not Used
  - c. Not Used
  - d. Not Used
  - e. Not Used
  - f. Not Used
  - g. Not Used
  - h. Not Used
- K. Apply insulation materials subject to the manufacturer's recommended temperature limits. Apply adhesives, mastic and coatings at the manufacturer's recommended minimum coverage.

- L. Elbows, flanges and other fittings shall be insulated with the same material as is used on the pipe straights. The elbow fitting insulation shall be field-fabricated, mitered or factory prefabricated to the necessary size and shape to fit on the elbow/ fitting. Use of polyurethane spray-foam to fill a PVC elbow jacket is prohibited
- M. Firestop Pipe and Duct insulation:
  - 1. Provide firestopping insulation at fire and smoke barriers through penetrations. Fire stopping insulation shall be UL listed as defines in Section 07 84 00, FIRESTOPPING.
  - 2. Pipe and duct penetrations requiring fire stop insulation including, but not limited to the following:
    - a. Pipe risers through floors
    - b. Pipe or duct chase walls and floors
    - c. Smoke partitions
    - d. Fire partitions
- N. Freeze protection of above grade outdoor piping (over heat tracing tape): 26 mm (10 inch) thick insulation, for all pipe sizes 75 mm(3 inches) and smaller and 25 mm(1inch) thick insulation for larger pipes. Provide metal jackets for all pipes.
- O. Provide vapor barrier jackets over insulation as follows:
  - 1. All piping and ductwork exposed to outdoor weather.
  - 2. Not Used
- P. Provide metal jackets over insulation as follows:
  - 1. All piping and ducts exposed to outdoor weather.
  - 2. Piping exposed in building, within 1800 mm (6 feet) of the floor, that connects to sterilizers, kitchen and laundry equipment. Jackets may be applied with pop rivets. Provide aluminum angle ring escutcheons at wall, ceiling or floor penetrations.
  - 3. A 50 mm (2 inch) overlap is required at longitudinal and circumferential joints.

### **3.2 INSULATION INSTALLATION**

- A. Mineral Fiber Board:
  - 1. Faced board: Apply board on pins spaced not more than 300 mm (12 inches) on center each way, and not less than 75 mm (3 inches) from each edge of board. In addition to pins, apply insulation bonding adhesive to entire underside of horizontal metal surfaces. Butt insulation edges tightly and seal all joints with laps and butt

strips. After applying speed clips cut pins off flush and apply vapor seal patches over clips.

2. Plain board:

- a. Insulation shall be scored, beveled or mitered to provide tight joints and be secured to equipment with bands spaced 225 mm (9 inches) on center for irregular surfaces or with pins and clips on flat surfaces. Use corner beads to protect edges of insulation.
- b. For hot equipment: Stretch 25 mm (1 inch) mesh wire, with edges wire laced together, over insulation and finish with insulating and finishing cement applied in one coat, 6 mm (1/4 inch) thick, trowel led to a smooth finish.
- c. For cold equipment: Apply meshed glass fabric in a tack coat 1.5 to 1.7 square meter per liter (60 to 70 square feet per gallon) of vapor mastic and finish with mastic at 0.3 to 0.4 square meter per liter (12 to 15 square feet per gallon) over the entire fabric surface.
- d. Chilled water pumps: Insulate with removable and replaceable 1 mm thick (20 gage) aluminum covers lined with insulation. Seal closure joints/flanges of covers with gasket material. Fill void space in enclosure with flexible mineral fiber insulation.

3. Exposed, unlined ductwork and equipment in unfinished areas, mechanical and electrical equipment rooms and attics, and duct work exposed to outdoor weather:

- a. 50 mm (2 inch) thick insulation faced with ASJ (white all service jacket): Supply air duct unlined air handling units and after-filter housing.
- b. 50 mm (2 inch) thick insulation faced with ASJ: Return air duct, mixed air plenums and prefilter housing.
- c. Outside air intake ducts: 25 mm (one inch) thick insulation faced with ASJ.
- d. Exposed, unlined supply and return ductwork exposed to outdoor weather: 50 mm (2 inch) thick insulation faced with a reinforcing membrane and two coats of vapor barrier mastic or multi-layer vapor barrier with a maximum water vapor permeability of 0.001 perms.

4. Supply air duct in the warehouse: 25 mm (one inch) thick insulation faced with ASJ.



5. Cold equipment: 40 mm (1-1/2inch) thick insulation faced with ASJ.
  - a. Chilled water pumps, water filter, chemical feeder pot or tank.
  - b. Pneumatic, cold storage water and surge tanks.
6. Hot equipment: 40 mm (1-1/2 inch) thick insulation faced with ASJ.
  - a. Convertors, air separators.
  - b. Reheat coil casing and separation chambers on steam humidifiers located above ceilings.
  - c. Domestic water heaters and hot water storage tanks (not factory insulated).
  - d. Booster water heaters for dietetics dish and pot washers and for washdown grease-extracting hoods.

7. Not Used

B. Flexible Mineral Fiber Blanket:

1. Adhere insulation to metal with 75 mm (3 inch) wide strips of insulation bonding adhesive at 200 mm (8 inches) on center all around duct. Additionally secure insulation to bottom of ducts exceeding 600 mm (24 inches) in width with pins welded or adhered on 450 mm (18 inch) centers. Secure washers on pins. Butt insulation edges and seal joints with laps and butt strips. Staples may be used to assist in securing insulation. Seal all vapor retarder penetrations with mastic. Sagging duct insulation will not be acceptable. Install firestop duct insulation where required.
2. Supply air ductwork to be insulated includes main and branch ducts from AHU discharge to room supply outlets, and the bodies of ceiling outlets to prevent condensation. Insulate sound attenuator units, coil casings and damper frames. To prevent condensation insulate trapeze type supports and angle iron hangers for flat oval ducts that are in direct contact with metal duct.
3. Concealed supply air ductwork.
  - a. Above ceilings at a roof level, in attics, and duct work exposed to outdoor weather: 50 mm (2 inch) thick insulation faced with FSK.
  - b. Above ceilings for other than roof level: 40 mm (1 ½ inch) thick insulation faced with FSK.
4. Concealed return air duct:
  - a. In attics (where not subject to damage) and where exposed to outdoor weather: 50mmmm (2 inch)thick insulation faced with FSK,

- b. Above ceilings at a roof level, unconditioned areas, and in chases with external wall 40 mm (1-1/2 inch) thick, insulation faced with FSK.
  - c. Not Used
  - d. Concealed return air ductwork in other locations need not be insulated.
- 5. Concealed outside air duct: 40 mm (1-1/2 inch) thick insulation faced with FSK.
- 6. Not Used
- C. Molded Mineral Fiber Pipe and Tubing Covering:
  - 1. Fit insulation to pipe or duct, aligning longitudinal joints. Seal longitudinal joint laps and circumferential butt strips by rubbing hard with a nylon sealing tool to assure a positive seal. Staples may be used to assist in securing insulation. Seal all vapor retarder penetrations on cold piping with a generous application of vapor barrier mastic. Provide inserts and install with metal insulation shields at outside pipe supports. Install freeze protection insulation over heating cable.
  - 2. Contractor's options for fitting, flange and valve insulation:
    - a. Insulating and finishing cement for sizes less than 100 mm (4 inches) operating at surface temperature of 16 degrees C (61 degrees F) or more.
    - b. Factory premolded, one piece PVC covers with mineral fiber, (Form B), inserts. Provide two insert layers for pipe temperatures below 4 degrees C (40 degrees F), or above 121 degrees C (250 degrees F). Secure first layer of insulation with twine. Seal seam edges with vapor barrier mastic and secure with fitting tape.
    - c. Factory molded, ASTM C547 or field mitered sections, joined with adhesive or wired in place. For hot piping finish with a smoothing coat of finishing cement. For cold fittings, 16 degrees C (60 degrees F) or less, vapor seal with a layer of glass fitting tape imbedded between two 2 mm (1/16 inch) coats of vapor barrier mastic.
    - d. Fitting tape shall extend over the adjacent pipe insulation and overlap on itself at least 50 mm (2 inches).
  - 3. Nominal thickness in millimeters and inches specified in the schedule at the end of this section.

D. Rigid Cellular Phenolic Foam:

1. Rigid closed cell phenolic insulation may be provided for piping, ductwork and equipment for temperatures up to 121 degrees C (250 degrees F).
2. Note the NFPA 90A burning characteristics requirements of 25/50 in paragraph 1.3.B
3. Provide secure attachment facilities such as welding pins.
4. Apply insulation with joints tightly drawn together
5. Apply adhesives, coverings, neatly finished at fittings, and valves.
6. Final installation shall be smooth, tight, neatly finished at all edges.
7. Minimum thickness in millimeters (inches) specified in the schedule at the end of this section.
8. Exposed, unlined supply and return ductwork exposed to outdoor weather: 50 mm (2 inch) thick insulation faced with a multi-layer vapor barrier with a maximum water vapor permeance of 0.00 perms.
9. Condensation control insulation: Minimum 25 mm (1.0 inch) thick for all pipe sizes.
  - a. HVAC: Cooling coil condensation piping to waste piping fixture or drain inlet. Omit insulation on plastic piping in mechanical rooms.

E. Cellular Glass Insulation:

1. Pipe and tubing, covering nominal thickness in millimeters and inches as specified in the schedule at the end of this section.
2. Underground Piping Other than or in lieu of that Specified in Section 23 21 13, HYDRONIC PIPING: Type II, factory jacketed with a 3 mm laminate jacketing consisting of 3000 mm x 3000 mm (10 ft x 10 ft) asphalt impregnated glass fabric, bituminous mastic and outside protective plastic film.
  - a. 75 mm (3 inches) thick for hot water piping.
  - b. As scheduled at the end of this section for chilled water piping.
  - c. Underground piping: Apply insulation with joints tightly butted. Seal longitudinal self-sealing lap. Use field fabricated or factory made fittings. Seal butt joints and fitting with jacketing as recommended by the insulation manufacturer. Use 100 mm (4 inch) wide strips to seal butt joints.
  - d. Provide expansion chambers for pipe loops, anchors and wall penetrations as recommended by the insulation manufacturer.

- e. Underground insulation shall be inspected and approved by the COR as follows:
    - 1) Insulation in place before coating.
    - 2) After coating.
  - f. Sand bed and backfill: Minimum 75 mm (3 inches) all around insulated pipe or tank, applied after coating has dried.
  - 3. Cold equipment: 50 mm (2 inch) thick insulation faced with ASJ for chilled water pumps, water filters, chemical feeder pots or tanks, expansion tanks, air separators and air purgers.
  - 4. Exposed, unlined supply and return ductwork exposed to outdoor weather: 50 mm (2 inch) thick insulation faced with a reinforcing membrane and two coats of vapor barrier mastic or multi-layer vapor barrier with a water vapor permeability of 0.00 perms.
- F. Not Used
- G. Flexible Elastomeric Cellular Thermal Insulation:
- 1. Apply insulation and fabricate fittings in accordance with the manufacturer's installation instructions and finish with two coats of weather resistant finish as recommended by the insulation manufacturer.
  - 2. Pipe and tubing insulation:
    - a. Use proper size material. Do not stretch or strain insulation.
    - b. To avoid undue compression of insulation, provide cork stoppers or wood inserts at supports as recommended by the insulation manufacturer. Insulation shields are specified under Section 23 05 11, COMMON WORK RESULTS FOR HVAC
    - c. Where possible, slip insulation over the pipe or tubing prior to connection, and seal the butt joints with adhesive. Where the slip-on technique is not possible, slit the insulation and apply it to the pipe sealing the seam and joints with contact adhesive. Optional tape sealing, as recommended by the manufacturer, may be employed. Make changes from mineral fiber insulation in a straight run of pipe, not at a fitting. Seal joint with tape.
  - 3. Apply sheet insulation to flat or large curved surfaces with 100 percent adhesive coverage. For fittings and large pipe, apply adhesive to seams only.
  - 4. Pipe insulation: nominal thickness in millimeters (inches as specified in the schedule at the end of this section.

5. Minimum 20 mm (0.75 inch) thick insulation for pneumatic control lines for a minimum distance of 6 m (20 feet) from discharge side of the refrigerated dryer.
  6. Use Class S (Sheet), 20 mm (3/4 inch) thick for the following:
    - a. Chilled water pumps
    - b. Not Used
    - c. Chillers, insulate any cold chiller surfaces subject to condensation which has not been factory insulated.
    - d. Piping inside refrigerators and freezers: Provide heat tape under insulation.
  7. Exposed, unlined supply and return ductwork exposed to outdoor weather: 50 mm (2 inch) thick insulation faced with a multi-layer vapor barrier with a water vapor permeance of 0.00 perms.
- H. Duct Wrap for Kitchen Hood Grease Ducts:
1. The insulation thickness, layers and installation method shall be as per recommendations of the manufacturer to maintain the fire integrity and performance rating.
  2. Provide stainless steel jacket for all exterior and exposed interior ductwork.
- I. Calcium Silicate:
1. Minimum thickness in millimeter (inches) specified in the schedule at the end of this section for piping other than in boiler plant..
  2. Engine Exhaust Insulation for Emergency Generator and Diesel Driven Fire Pump: Type II, Class D, 65 mm (2 1/2 inch) nominal thickness. Cover exhaust completely from engine through roof or wall construction, including muffler. Secure with 16 AWG galvanized annealed wire or 0.38 x 12 mm 0.015 x 1/2 IN wide galvanized bands on 300 mm 12 IN maximum centers. Anchor wire and bands to welded pins, clips or angles. Apply 25 mm 1 IN hex galvanized wire over insulation. Fill voids with 6 mm 1/4 IN insulating cement.
  3. ETO Exhaust (High Temperature): Type II, class D, 65 mm (2.5 inches) nominal thickness. Cover duct for entire length. Provide sheet aluminum jacket for all exterior ductwork.
  4. Kitchen Exhaust Duct work: Type II, class D, 65 mm (2.5 inches) nominal thickness. Wire insulation in place with 12 gauge galvanized wire.
  5. MRI Quench Vent Insulation: Type I, class D, 150 mm (6 inch) nominal thickness.

**3.3 NOT USED**

A. Not Used

B. Not Used

1. Not Used

2. Not Used

a. Not Used

b. Not Used

c. ASJ with PVC premolded fitting coverings.

d. Not Used

3. Not Used

4. Not Used

C. Not Used

D. Not Used

E. Not Used

**3.4 NOT USED**

A. Not Used

B. Protective Insulation to Prevent Personnel Injury:

C. Not Used

**3.5 NOT USED****3.6 NOT USED****3.7 NOT USED****3.8 PIPE INSULATION SCHEDULE**

Provide insulation for piping systems as scheduled below:

Insulation Thickness Millimeters (Inches)					
		Nominal Pipe Size Millimeters (Inches)			
Operating Temperature Range/Service	Insulation Material	Less than 25 (1)	25 - 32 (1 - 1¼)	38 - 75 (1½ - 3)	100 (4) and Above
122-177 degrees C (251-350 degrees F) (HPS, MPS)	Mineral Fiber (Above ground piping only)	75 (3)	100 (4)	113 (4.5)	113 (4.5)
93-260 degrees C (200-500 degrees F) (HPS, HPR)	Calcium Silicate	100 (4)	125 (5)	150 (6)	150 (6)

100-121 degrees C (212-250 degrees F) (HPR, MPR, LPS, vent piping from PRV Safety Valves, Condensate receivers and flash tanks)	Mineral Fiber (Above ground piping only)	62 (2.5)	62 (2.5)	75 (3.0)	75 (3.0)
100-121 degrees C (212-250 degrees F) (HPR, MPR, LPS, vent piping from PRV Safety Valves, Condensate receivers and flash tanks)	Rigid Cellular Phenolic Foam	50 (2.0)	50 (2.0)	75 (3.0)	75 (3.0)
38-94 degrees C (100-200 degrees F) (LPR, PC, HWH, HWHR, GH and GHR)	Mineral Fiber (Above ground piping only)	38 (1.5)	38 (1.5)	50 (2.0)	50 (2.0)
38-99 degrees C (100-211 degrees F) (LPR, PC, HWH, HWHR, GH and GHR)	Rigid Cellular Phenolic Foam	38 (1.5)	38 (1.5)	50 (2.0)	50 (2.0)
38-94 degrees C (100-200 degrees F) (LPR, PC, HWH, HWHR, GH and GHR)	Flexible Elastomeric Cellular Thermal (Above ground piping only)	38 (1.5)	38 (1.5)	----	----
4-16 degrees C (40-60 degrees F) (CH, CHR, GC, GCR and RS for DX refrigeration)	Rigid Cellular Phenolic Foam	38 (1.5)	38 (1.5)	38 (1.5)	38 (1.5)
4-16 degrees C (40-60 degrees F) (CH and CHR within chiller room and pipe chase and underground)	Cellular Glass Closed- Cell	50 (2.0)	50 (2.0)	75 (3.0)	75 (3.0)
4-16 degrees C	Cellular Glass Closed-	38 (1.5)	38 (1.5)	38 (1.5)	38 (1.5)

(40-60 degrees F) (CH, CHR, GC, GCR and RS for DX refrigeration)	Cell				
(40-60 degrees F) (CH, CHR, GC, GCR and RS for DX refrigeration)	Flexible Elastomeric Cellular Thermal (Above ground piping only)	38 (1.5)	38 (1.5)	38 (1.5)	38 (1.5)

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**SECTION 23 08 00**  
**COMMISSIONING OF HVAC SYSTEMS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. The requirements of this Section apply to all sections of Division 23.
- B. This project will have selected building systems commissioned. The complete list of equipment and systems to be commissioned are specified in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS. The commissioning process, which the Contractor is responsible to execute, is defined in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS. A Commissioning Agent (CxA) appointed by the Department of Veterans Affairs will manage the commissioning process.

**1.2 RELATED WORK**

- A. Section 01 00 00 GENERAL REQUIREMENTS.
- B. Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.
- C. Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

**1.3 SUMMARY**

- A. This Section includes requirements for commissioning the HVAC systems, subsystems and equipment. This Section supplements the general requirements specified in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.
- B. The commissioning activities have been developed to support the VA requirements to meet guidelines for Federal Leadership in Environmental, Energy, and Economic Performance.
- C. Not used.
- D. Refer to Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS for more specifics regarding processes and procedures as well as roles and responsibilities for all Commissioning Team members.

**1.4 DEFINITIONS**

- A. Refer to Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS for definitions.

**1.5 COMMISSIONED SYSTEMS**

- A. Commissioning of a system or systems specified in this Division is part of the construction process. Documentation and testing of these systems, as well as training of the VA's Operation and Maintenance personnel, is required in cooperation with the VA and the Commissioning Agent.

B. The following HVAC systems will be commissioned:

1. Air Handling Systems (including terminal units and energy recovery units)
2. Air Handling Systems (Fans, motors, Variable Speed Drives, cooling coils and control valves, heating coils and control valves, filters, dampers, safeties such as smoke detectors or freezestats and damper end switches, controls, gages, and vibration isolation).
3. Fans, motors, Variable Speed Drives, cooling coils and control valves, heating coils and control valves, filters, dampers, safeties, controls, gages, and vibration isolation).
4. Heating Hot Water Systems (controls, instrumentation and gages, flues and motors, Variable Speed Drives, mixing valves).
5. Condensate Return Systems alarms and instrumentation, safeties.
6. Chilled Water Systems (controls, instrumentation and safeties, isolation valves, blending valves,
7. Not used.
8. Exhaust Fans (Fan, motor, Variable Speed Drives, controls and safeties.
9. Steam System controls, gages and instrumentation, safety relief valves.
10. Direct Digital Control System (BACnet or similar Local Area Network (LAN), Operator Work Station hardware and software, building controller hardware and software, terminal unit controller hardware and software, all sequences of operation, system accuracy and response time).
11. Not used.
12. Not used.
13. Not used.
14. Not used.
15. Not used.
16. Not used.
17. Not used.
18. Not used.
19. Not used.
20. Not used.

#### **1.6 SUBMITTALS**

A. The commissioning process requires review of selected Submittals. The Commissioning Agent will provide a list of submittals that will be

reviewed by the Commissioning Agent. This list will be reviewed and approved by the VA prior to forwarding to the Contractor. Refer to Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, and SAMPLES for further details.

- B. The commissioning process requires Submittal review simultaneously with engineering review. Specific submittal requirements related to the commissioning process are specified in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.

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

## **PART 3 - EXECUTION**

### **3.1 PRE-FUNCTIONAL CHECKLISTS**

- A. The Contractor shall complete Pre-Functional Checklists to verify systems, subsystems, and equipment installation is complete and systems are ready for Systems Functional Performance Testing. The Commissioning Agent will prepare Pre-Functional Checklists to be used to document equipment installation. The Contractor shall complete the checklists. Completed checklists shall be submitted to the VA and to the Commissioning Agent for review. The Commissioning Agent may spot check a sample of completed checklists. If the Commissioning Agent determines that the information provided on the checklist is not accurate, the Commissioning Agent will return the marked-up checklist to the Contractor for correction and resubmission. If the Commissioning Agent determines that a significant number of completed checklists for similar equipment are not accurate, the Commissioning Agent will select a broader sample of checklists for review. If the Commissioning Agent determines that a significant number of the broader sample of checklists is also inaccurate, all the checklists for the type of equipment will be returned to the Contractor for correction and resubmission. Refer to SECTION 01 91 00 GENERAL COMMISSIONING REQUIREMENTS for submittal requirements for Pre-Functional Checklists, Equipment Startup Reports, and other commissioning documents.

### **3.2 CONTRACTORS TESTS**

- A. Contractor tests as required by other sections of Division 23 shall be scheduled and documented in accordance with Section 01 00 00 GENERAL REQUIREMENTS. The Commissioning Agent will witness selected Contractor tests. Contractor tests shall be completed prior to scheduling Systems Functional Performance Testing.

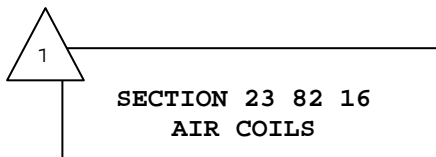
**3.3 SYSTEMS FUNCTIONAL PERFORMANCE TESTING:**

- A. The Commissioning Process includes Systems Functional Performance Testing that is intended to test systems functional performance under steady state conditions, to test system reaction to changes in operating conditions, and system performance under emergency conditions. The Commissioning Agent will prepare detailed Systems Functional Performance Test procedures for review and approval by the COR. The Contractor shall review and comment on the tests prior to approval. The Contractor shall provide the required labor, materials, and test equipment identified in the test procedure to perform the tests. The Commissioning Agent will witness and document the testing. The Contractor shall sign the test reports to verify tests were performed. See Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS, for additional details.

**3.4 TRAINING OF VA PERSONNEL**

- A. Training of the VA's operation and maintenance personnel is required in cooperation with the COR and Commissioning Agent. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems. The instruction shall be scheduled in coordination with the COR after submission and approval of formal training plans. Refer to Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS and Division 23 Sections for additional Contractor training requirements.

----- END -----

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Heating and cooling coils for air handling units.

**1.2 RELATED WORK**

- A. NOT USED
- B. Section 23 05 11, COMMON WORK RESULTS FOR HVAC.
- C. Section 23 31 00, HVAC DUCTS AND CASINGS
- D. NOT USED
- E. Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS.
- F. NOT USED
- G. NOT USED
- H. Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS: Requirements for commissioning, systems readiness checklists, and training.
- I. Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS

**1.3 QUALITY ASSURANCE**

- A. Refer to paragraph, QUALITY ASSURANCE, Section 23 05 11, COMMON WORK RESULTS FOR HVAC,
- B. Unless specifically exempted by these specifications, heating and cooling coils shall be tested, rated, and certified in accordance with AHRI Standard 410 and shall bear the AHRI certification label.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Manufacturer's Literature and Data for Heating and Cooling Coils: Submit type, size, arrangements and performance details. Present application ratings in the form of tables, charts or curves.
- C. Provide installation, operating and maintenance instructions.
- D. Certification Compliance: Evidence of listing in current ARI Directory of Certified Applied Air Conditioning Products.
- E. Coils may be submitted with Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS, Section 23 74 13.
- F. Completed System Readiness Checklists provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician and dated on the date of completion, in accordance with the requirements of Section 23 08 00 COMMISSIONING OF HVAC SYSTEMS.

## 1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Air Conditioning and Refrigeration Institute (AHRI):  
Directory of Certified Applied Air Conditioning Products  
AHRI 410-01.....Forced-Circulation Air-Cooling and Air-Heating Coils
- C. American Society for Testing and Materials (ASTM):  
B75/75M-02.....Standard Specifications for Seamless Copper Tube
- D. National Fire Protection Association (NFPA):  
70-11.....National Electric Code
- E. National Electric Manufacturers Association (NEMA):  
250-11.....Enclosures for Electrical Equipment (1,000 Volts Maximum)
- F. Underwriters Laboratories, Inc. (UL):  
1996-09.....Electric Duct Heaters

## PART 2 - PRODUCTS

### 2.1 HEATING AND COOLING COILS

- A. Conform to ASTM B75 and AHRI 410.
- B. NOT USED
- C. High Humidity Locations:
  - 1. NOT USED
  - 2. NOT USED
- D. Tubes: Minimum 16 mm (0.625 inch) tube diameter; Seamless copper tubing.
- E. Fins: 0.1397 mm (0.0055 inch) aluminum or 0.1143 mm (0.0045 inch) copper mechanically bonded or soldered or helically wound around tubing.
- F. Headers: Copper, welded steel or cast iron. Provide seamless copper tubing or resistance welded steel tube for volatile refrigerant coils.
- G. "U" Bends, Where Used: Machine die-formed, silver brazed to tube ends.
- H. Coil Casing: 1.6 mm (16 gage) galvanized steel with tube supports at 1200 mm (48 inch) maximum spacing. Construct casing to eliminate air bypass and moisture carry-over. Provide duct connection flanges.
- I. Pressures kPa (PSIG):

Pressure	Water Coil	Steam Coil	Refrigerant Coil
Test	2070 (300)	1725 (250)	2070 (300)
Working	1380 (200)	520 (75)	1725 (250)

- J. Protection: Unless protected by the coil casing, provide cardboard, plywood, or plastic material at the factory to protect tube and finned surfaces during shipping and construction activities.
- K. Vents and Drain: Coils that are not vented or drainable by the piping system shall have capped vent/drain connections extended through coil casing.
- L. Cooling Coil Condensate Drain Pan: Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS.
- M. Steam Distributing Coils: Conform to ASTM B75 and ARI 410. Minimum 9.5 mm (3/8-inch) steam distributing tubing installed concentrically in 25 mm (one-inch) OD condensing coil tubes.
- N. Integral Face and Bypass Type Steam Coil:
  - 1. Exempt from ARI Test and Certification.
  - 2. Conform to ASTM B75 and ARI 410.
  - 3. Minimum 16 mm (5/8-inch) steam tube installed in concentrically 25 mm (one-inch) OD diameter tube.
  - 4. Casing: 1.9 mm (14 gage) galvanized steel with corrosion resistant paint.
  - 5. Tubes and Bypasses: Vertical or horizontal.
- O. Dampers: Interlocking opposed blades to completely isolate coil from air flow when unit is in bypass position; 1.6 mm (16 gage) steel, coated with factory applied corrosion resistant baked enamel finish. Provide damper linkage and electric operators. Damper operators shall be of same manufacturer as controls furnished under Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.

## **2.2 REHEAT COILS, DUCT MOUNTED**

- A. The coils shall be continuous circuit booster type for steam or hot water as shown on drawings. Use the same coil material as listed in Paragraphs 2.1.

## **2.3 WATER COILS, INCLUDING GLYCOL-WATER**

- A. Use the same coil material as listed in Paragraphs 2.1.
- B. Drainable Type (Self Draining, Self Venting); Manufacturer standard:
  - 1. Cooling, all types.
  - 2. Heating or preheat.
  - 3. NOT USED
- C. NOT USED

**2.4 NOT USED****2.5 NOT USED****PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Follow coil manufacturer's instructions for handling, cleaning, installation and piping connections.
- B. Comb fins, if damaged. Eliminate air bypass or leakage at coil sections.

**3.2 STARTUP AND TESTING**

- A. The Commissioning Agent will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the COR and Commissioning Agent. Provide a minimum of 7 days prior notice.

**3.3 COMMISSIONING**

- A. Provide commissioning documentation in accordance with the requirements of Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.
- B. Components provided under this section of the specification will be tested as part of a larger system. Refer to Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS and related sections for contractor responsibilities for system commissioning.

**3.4 DEMONSTRATION AND TRAINING**

- A. Provide services of manufacturer's technical representative for four hours to instruct VA personnel in operation and maintenance of units.
- B. Submit training plans and instructor qualifications in accordance with the requirements of Section 23 08 00 - COMMISSIONING OF HVAC SYSTEMS.

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**SECTION 28 05 13**  
**CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the finishing, installation, connection, testing and certification the conductors and cables required for a fully functional for electronic safety and security (ESS) system.

**1.2 RELATED WORK**

- A. Section 01 00 00 - GENERAL REQUIREMENTS. For General Requirements.
- B. Section 07 84 00 - FIRESTOPPING. Requirements for firestopping application and use.
- C. Section 28 05 00 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY. Requirements for general requirements that are common to more than one section in Division 28.
- D. Section 28 05 26 - GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY. Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
- E. Section 28 05 28.33 - CONDUITS AND BOXES FOR ELECTRONIC SECURITY AND SAFETY. Requirements for infrastructure.
- F. Not used.
- G. Section 31 20 11 - EARTH MOVING. For excavation and backfill for cables that are installed in conduit.

**1.3 DEFINITIONS**

- A. BICSI: Building Industry Consulting Service International.
- B. EMI: Electromagnetic interference.
- C. IDC: Insulation displacement connector.
- D. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).
- E. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- F. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).
- G. RCDD: Registered Communications Distribution Designer.
- H. Solid-Bottom or Nonventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal side rails, and a bottom without ventilation openings.

I. Trough or Ventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal rails and a bottom having openings sufficient for the passage of air and using 75 percent or less of the plan area of the surface to support cables.

J. UTP: Unshielded twisted pair.

#### **1.4 QUALITY ASSURANCE**

A. See section 28 05 00, Paragraph 1.4.

#### **1.5 SUBMITTALS**

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

1. Manufacturer's Literature and Data: Showing each cable type and rating.
2. Certificates: Two weeks prior to final inspection, deliver to the COTR four copies of the certification that the material is in accordance with the drawings and specifications and diagrams for cable management system.
3. Shop Drawings: Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:
  - a. Vertical and horizontal offsets and transitions.
  - b. Clearances for access above and to side of cable trays.
  - c. Vertical elevation of cable trays above the floor or bottom of ceiling structure.
  - d. Load calculations to show dead and live loads as not exceeding manufacturer's rating for tray and its support elements.
  - e. System labeling schedules, including electronic copy of labeling schedules that are part of the cable and asset identification system of the software specified in Parts 2 and 3.
4. Wiring Diagrams. Show typical wiring schematics including the following:
  - a. Workstation outlets, jacks, and jack assemblies.
  - b. Patch cords.
  - c. Patch panels.
5. Cable Administration Drawings: As specified in Part 3 "Identification" Article.
6. Project planning documents as specified in Part 3.
7. Maintenance Data: For wire and cable to include in maintenance manuals.

## 1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are reference in the text by the basic designation only.
- B. American Society of Testing Material (ASTM):
  - D2301-04.....Standard Specification for Vinyl Chloride  
Plastic Pressure Sensitive Electrical Insulating  
Tape
- C. Federal Specifications (Fed. Spec.):
  - A-A-59544-08.....Cable and Wire, Electrical (Power, Fixed  
Installation)
- D. National Fire Protection Association (NFPA):
  - 70-11.....National Electrical Code (NEC)
- E. Underwriters Laboratories, Inc. (UL):
  - 44-05.....Thermoset-Insulated Wires and Cables
  - 83-08.....Thermoplastic-Insulated Wires and Cables
  - 467-07.....Electrical Grounding and Bonding Equipment
  - 486A-03.....Wire Connectors and Soldering Lugs for Use with  
Copper Conductors
  - 486C-04.....Splicing Wire Connectors
  - 486D-05.....Insulated Wire Connector Systems for Underground  
Use or in Damp or Wet Locations
  - 486E-00.....Equipment Wiring Terminals for Use with Aluminum  
and/or Copper Conductors
  - 493-07.....Thermoplastic-Insulated Underground Feeder and  
Branch Circuit Cable
  - 514B-04.....Fittings for Cable and Conduit
  - 1479-03.....Fire Tests of Through-Penetration Fire Stops//

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
  - 1. Test optical fiber cable to determine the continuity of the strand end to end. Use optical-fiber flashlight or optical loss test set.
  - 2. Test optical fiber cable on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector; include the loss value of each. Retain test data and include the record in maintenance data.
  - 3. Test each pair of UTP cable for open and short circuits.

## 1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install UTP, optical fiber, and coaxial cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. Support of Open Cabling: NRTL labeled for support of Category 5e cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
  - 1. Support brackets with cable tie slots for fastening cable ties to brackets.
  - 2. Lacing bars, spools, J-hooks, and D-rings.
  - 3. Straps and other devices.
- B. Cable Trays:
  - 1. Cable Tray Materials: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inch (0.012 mm) thick.
  - 2. Basket Cable Trays: 6 inches (150 mm) wide and 2 inches (50 mm) deep. Wire mesh spacing shall not exceed 2 by 4 inches (50 by 100 mm).
  - 3. Trough Cable Trays: Nominally 6 inches (150 mm).4. Ladder Cable Trays: Nominally 18 inches (455 mm) wide, and a rung spacing of 12 inches (305 mm).
  - 5. Channel Cable Trays: One-piece construction, nominally 4 inches (100 mm) wide. Slot spacing shall not exceed 4-1/2 inches (115 mm) o.c.
  - 6. Solid-Bottom Cable Trays: Not permitted.
- C. Conduit and Boxes: Comply with requirements in Division 28 Section "Conduits and Backboxes for Electrical Systems." Flexible metal conduit shall not be used.
  - 1. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.

### 2.2 BACKBOARDS

- A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels in Division 06 Section "Rough Carpentry".


### 2.3 UTP CABLE

- A. Description: 100-ohm, 4-pair UTP, formed into 25-pair binder groups covered with a blue thermoplastic jacket.
1. Comply with ICEA S-90-661 for mechanical properties.
  2. Comply with TIA/EIA-568-B.1 for performance specifications.
  3. Comply with TIA/EIA-568-B.2, [Category 5e] [Category 6].
  4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
    - a. Communications, General Purpose: Type CM or CMG.
    - b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
    - c. Communications, Riser Rated: Type CMR, complying with UL 1666.
    - d. Communications, Limited Purpose: Type CMX.
    - e. Multipurpose: Type MP or MPG.
    - f. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
    - g. Multipurpose, Riser Rated: Type MPR, complying with UL 1666.

### 2.4 UTP CABLE HARDWARE

- A. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.
- B. Connecting Blocks: 110-style for Category 5e. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

### 2.5 OPTICAL FIBER CABLE

- |   |   |
|---|---|
| <p>A. Description: Multimode, 62.5/125-micrometer, 12-fiber, tight buffer, optical fiber cable.</p> |  |
|---|---|

1. Comply with ICEA S-83-596 for mechanical properties.
2. Comply with TIA/EIA-568-B.3 for performance specifications.
3. Comply with TIA/EIA-492AAAA-B for detailed specifications.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
  - a. General Purpose, Nonconductive: Type OFN or OFNG.
  - b. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
  - c. Riser Rated, Nonconductive: Type OFNR, complying with UL 1666.
  - d. General Purpose, Conductive: Type OFC or OFCG.
  - e. Plenum Rated, Conductive: Type OFCP, complying with NFPA 262.
  - f. Riser Rated, Conductive: Type OFCR, complying with UL 1666.
5. Conductive cable shall be steel armored type.

- 6. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
- 7. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.

B. Jacket:

1. Jacket Color: Orange for 62.5/125-micrometer cable.

1

- 2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
- 3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

## 2.6 OPTICAL FIBER CABLE HARDWARE

- A. Cable Connecting Hardware: Meet the Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.

1. Quick-connect, simplex and duplex, Type ST connectors. Insertion loss shall be not more than 0.75 dB.

1

- 2. Type SFF connectors may be used in termination racks, panels, and equipment packages.

## 2.7 COAXIAL CABLE

- A. General Coaxial Cable Requirements: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 806 MHz.

B. RG-11/U: NFPA 70, Type CATV.

- 1. No. 14 AWG, solid, copper-covered steel conductor.
- 2. Gas-injected, foam-PE insulation.
- 3. Double shielded with 100 percent aluminum polyester tape and 60 percent aluminum braid.
- 4. Jacketed with sunlight-resistant, black PVC or PE.
- 5. Suitable for outdoor installations in ambient temperatures ranging from minus 40 to plus 85 deg C.

C. RG59/U: NFPA 70, Type CATVR.

- 1. No. 20 AWG, solid, silver-plated, copper-covered steel conductor.
- 2. Gas-injected, foam-PE insulation.
- 3. Triple shielded with 100 percent aluminum polyester tape and 95 percent aluminum braid; covered by aluminum foil with grounding strip.
- 4. Color-coded PVC jacket.

D. RG-6/U: NFPA 70, Type CATV or CM.

- 1. No. 16 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.

2. Double shielded with 100 percent aluminum-foil shield and 60 percent aluminum braid.
3. Jacketed with black PVC or PE.
4. Suitable for indoor installations.

E. RG59/U: NFPA 70, Type CATV.

1. No. 20 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
2. Double shielded with 100 percent aluminum polyester tape and 40 percent aluminum braid.
3. PVC jacket.

F. RG59/U (Plenum Rated): NFPA 70, Type CMP.

1. No. 20 AWG, solid, copper-covered steel conductor; foam fluorinated ethylene propylene insulation.
2. Double shielded with 100 percent aluminum-foil shield and 65 percent aluminum braid.
3. Copolymer jacket.

G. NFPA and UL compliance, listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1655, and with NFPA 70 "Radio and Television Equipment" and "Community Antenna Television and Radio Distribution" Articles. Types are as follows:

1. CATV Cable: Type CATV.
2. CATV Plenum Rated: Type CATVP, complying with NFPA 262.
3. CATV Riser Rated: Type CATVR, complying with UL 1666.
4. CATV Limited Rating: Type CATVX.

## **2.8 COAXIAL CABLE HARDWARE**

- A. Coaxial-Cable Connectors: Type BNC, 75 ohms.

## **2.9 RS-232 CABLE**

A. Standard Cable: NFPA 70, Type CM.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Polypropylene insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. PVC jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.

2. Plastic insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. Plastic jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with NFPA 262.

#### **2.10 RS-485 CABLE**

- A. Standard Cable: NFPA 70, Type CM[ or CMG].
  1. Paired, 2 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors.
  2. PVC insulation.
  3. Unshielded.
  4. PVC jacket.
  5. Flame Resistance: Comply with UL 1581.
- B. Plenum-Rated Cable: NFPA 70, Type CMP.
  1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
  2. Fluorinated ethylene propylene insulation.
  3. Unshielded.
  4. Fluorinated ethylene propylene jacket.
  5. Flame Resistance: NFPA 262, Flame Test.

#### **2.11 LOW-VOLTAGE CONTROL CABLE**

- A. Paired Lock Cable: NFPA 70, Type CMG.
  1. 1 pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors.
  2. PVC insulation.
  3. Unshielded.
  4. PVC jacket.
  5. Flame Resistance: Comply with UL 1581.
- B. Plenum-Rated, Paired Lock Cable: NFPA 70, Type CMP.
  1. 1 pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors.
  2. PVC insulation.
  3. Unshielded.
  4. PVC jacket.
  5. Flame Resistance: Comply with NFPA 262.
- C. Paired Lock Cable: NFPA 70, Type CMG.
  1. 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors.



- 2. PVC insulation.
- 3. Unshielded.
- 4. PVC jacket.
- 5. Flame Resistance: Comply with UL 1581.
- D. Plenum-Rated, Paired Lock Cable: NFPA 70, Type CMP.
  - 1. 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors.
  - 2. Fluorinated ethylene propylene insulation.
  - 3. Unshielded.
  - 4. Plastic jacket.
  - 5. Flame Resistance: NFPA 262, Flame Test.

#### **2.12 CONTROL-CIRCUIT CONDUCTORS**

- A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, in raceway complying with UL 83.
- B. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, in raceway complying with UL 83.
- C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or TF, complying with UL 83.

#### **2.13 FIRE ALARM WIRE AND CABLE**

- A. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- B. Signaling Line Circuits: Twisted, shielded pair, size as recommended by system manufacturer.
  - 1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a 2-hour rating.
- C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
  - 1. Low-Voltage Circuits: No. 16 AWG, minimum.
  - 2. Line-Voltage Circuits: No. 12 AWG, minimum.
  - 3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NRTL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

#### **2.14 IDENTIFICATION PRODUCTS**

- A. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

**2.15 SOURCE QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.
- C. Factory test UTP cables according to TIA/EIA-568-B.2.
- D. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.
- E. Factory sweep test coaxial cables at frequencies from 5 MHz to 1 GHz.  
Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.
- F. Cable will be considered defective if it does not pass tests and inspections.
- G. Prepare test and inspection reports.

**2.16 WIRE LUBRICATING COMPOUND**

- A. Suitable for the wire insulation and conduit it is used with, and shall not harden or become adhesive.
- B. Shall not be used on wire for isolated type electrical power systems.

**2.17 FIREPROOFING TAPE**

- A. The tape shall consist of a flexible, conformable fabric of organic composition coated one side with flame-retardant elastomer.
- B. The tape shall be self-extinguishing and shall not support combustion. It shall be arc-proof and fireproof.
- C. The tape shall not deteriorate when subjected to water, gases, salt water, sewage, or fungus and be resistant to sunlight and ultraviolet light.
- D. The finished application shall withstand a 200-ampere arc for not less than 30 seconds.
- E. Securing tape: Glass cloth electrical tape not less than 0.18 mm (7 mils) thick, and 19 mm (3/4 inch) wide.

**PART 3 - EXECUTION****3.1 INSTALLATION OF CONDUCTORS AND CABLES**

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
  - 1. Comply with TIA/EIA-568-B.1.
  - 2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
  - 3. Install 110-style IDC termination hardware unless otherwise indicated.

4. Terminate all conductors; no cable shall contain un-terminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
5. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
6. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
9. Pulling Cable:
  - a. Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
  - b. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.
  - c. Use ropes made of nonmetallic material for pulling feeders.
  - d. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors, as approved by the Resident Engineer/COTR.
  - e. Pull in multiple cables together in a single conduit.
- C. Splice cables and wires where necessary only in outlet boxes, junction boxes, or pull boxes.
  1. Splices and terminations shall be mechanically and electrically secure.
  2. Where the Government determines that unsatisfactory splices or terminations have been installed, remove the devices and install approved devices at no additional cost to the Government.
- D. Seal cable and wire entering a building from underground, between the wire and conduit where the cable exits the conduit, with a non-hardening approved compound.
- E. Unless otherwise specified in other sections install wiring and connect to equipment/devices to perform the required functions as shown and specified.

- F. Except where otherwise required, install a separate power supply circuit for each system so that malfunctions in any system will not affect other systems.
- G. Where separate power supply circuits are not shown, connect the systems to the nearest panel boards of suitable voltages, which are intended to supply such systems and have suitable spare circuit breakers or space for installation.
- H. Install a red warning indicator on the handle of the branch circuit breaker for the power supply circuit for each system to prevent accidental de-energizing of the systems.
- I. System voltages shall be 120 volts or lower where shown on the drawings or as required by the NEC.
- J. UTP Cable Installation:
  - 1. Comply with TIA/EIA-568-B.2.
  - 2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
- K. Optical Fiber Cable Installation:
  - 1. Comply with TIA/EIA-568-B.3.
  - 2. Cable shall be terminated on connecting hardware that is rack or cabinet mounted.
- L. Open-Cable Installation:
  - 1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
  - 2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1525 mm) apart.
  - 3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
- M. Not used.
- N. Outdoor Coaxial Cable Installation:
  - 1. Install outdoor connections in enclosures complying with NEMA 250, Type 4X. Install corrosion-resistant connectors with properly designed O-rings to keep out moisture.
  - 2. Attach antenna lead-in cable to support structure at intervals not exceeding 36 inches (915 mm).
- O. Separation from EMI Sources:
  - 1. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from

- potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
    - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
    - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
    - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (600 mm).
  3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
    - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
    - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
    - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
  4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
    - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (75 mm).
    - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
  5. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
  6. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

### **3.2 FIRE ALARM WIRING INSTALLATION**

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method: Install wiring in metal raceway according to Division 28 Section "CONDUITS AND BACKBOXES FOR ELECTRICAL SYSTEMS."
  1. Install plenum cable in environmental air spaces, including plenum ceilings.

2. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring Method:

1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
2. Fire-Rated Cables: Use of 2-hour, fire-rated fire alarm cables, NFPA 70, Types MI and CI, is permitted.
3. Signaling Line Circuits: Power-limited fire alarm cables may be installed in the same cable or raceway as signaling line circuits.

D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.

H. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

### 3.3 CONTROL CIRCUIT CONDUCTORS

A. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits, No. 14 AWG.

- 2. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.
- 3. Class 3 low-energy, remote-control, alarm and signal circuits, No. 12 AWG.

### **3.4 CONNECTIONS**

- A. Comply with requirements in Division 28 Section, "PHYSICAL ACCESS CONTROL" for connecting, terminating, and identifying wires and cables.
- B. Comply with requirements in Division 28 Section "INTRUSION DETECTION" for connecting, terminating, and identifying wires and cables.
- C. Comply with requirements in Division 28 Section "VIDEO SURVEILLANCE" for connecting, terminating, and identifying wires and cables.
- D. Not used.
- E. Comply with requirements in Division 28 Section "FIRE DETECTION AND ALARM" for connecting, terminating, and identifying wires and cables.

### **3.5 FIRESTOPPING**

- A. Comply with requirements in Division 07 Section "PENETRATION FIRESTOPPING."
- B. Comply with TIA/EIA-569-A, "Firestopping" Annex A.
- C. Comply with BICSI TDMM, "Firestopping Systems" Article.

### **3.6 GROUNDING**

- A. For communications wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. For low-voltage wiring and cabling, comply with requirements in Division 28 Section "GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY."

### **3.7 IDENTIFICATION**

- A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A.
- B. Install a permanent wire marker on each wire at each termination.
- C. Identifying numbers and letters on the wire markers shall correspond to those on the wiring diagrams used for installing the systems.
- D. Wire markers shall retain their markings after cleaning.
- E. In each handhole, install embossed brass tags to identify the system served and function.

### **3.8 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  - 1. Visually inspect UTP and optical fiber cable jacket materials for UL or third-party certification markings. Inspect cabling terminations

- to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
  3. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross connection.
    - a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
  4. Optical Fiber Cable Tests:
    - a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
    - b. Link End-to-End Attenuation Tests:
      - 1) Multimode Link Measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
      - 2) Attenuation test results for links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.
  5. Coaxial Cable Tests: Comply with requirements in Division 27 Section "Master Antenna Television System."
  - D. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
  - E. End-to-end cabling will be considered defective if it does not pass tests and inspections.
  - F. Prepare test and inspection reports.

### 3.9 EXISTING WIRING

- A. Unless specifically indicated on the plans, existing wiring shall not be reused for the new installation. Only wiring that conforms to the specifications and applicable codes may be reused. If existing wiring



does not meet these requirements, existing wiring may not be reused and new wires shall be installed.

- - - E N D - - -

<b>SECTION 28 26 00</b> <b>ELECTRONIC PERSONAL PROTECTION SYSTEM</b>
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**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. Provide and install complete Duress-Panic Alarms, and Intercom Systems, data transmission wiring and a control station with its associated equipment, hereafter referred to as EPPS System.
- B. Not used.

**1.2 RELATED WORK**

- A. Section 01 00 00 - GENERAL REQUIREMENTS. For General Requirements.
- B. Section 07 84 00 - FIRESTOPPING. Requirements for firestopping application and use.
- C. Section 10 14 00 - SIGNAGE. Requirements for labeling and signs.
- D. Not used.
- E. Not used.
- F. Section 26 05 11 - REQUIREMENTS FOR ELECTRICAL INSTALLATIONS. Requirements for connection of high voltage.
- G. Section 26 05 19 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW). Requirements for power cables.
- H. Section 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS. Requirements for infrastructure.
- I. Section 28 05 00 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY. Requirements for general requirements that are common to more than one section in Division 28.
- J. Section 28 05 13 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY. Requirements for conductors and cables.
- K. Section 28 05 26 - GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY. Requirements for grounding of equipment.
- L. Section 28 05 28.33 - CONDUITS AND BACK BOXES FOR ELECTRONIC SAFETY AND SECURITY. Requirements for infrastructure.
- M. Not used.
- N. Section 28 13 00 - PHYSICAL ACCESS CONTROL SYSTEMS (PACS). Requirements for physical access control integration.
- O. Not used.
- P. Not used.

Q. Section 28 13 53 - SECURITY ACCESS DETECTION. Requirements for security access detection.

R. Section 28 23 00 - VIDEO SURVEILLANCE. Requirements for security camera systems.

### **1.3 QUALITY ASSURANCE**

A. The Contractor shall be responsible for providing, installing, and the operation of the EPPS System as shown. The Contractor shall also provide certification as required.

B. The security system shall be installed and tested to ensure all components are fully compatible as a system and can be integrated with all associated security subsystems, whether the security system is stand-alone or a part of a complete Information Technology (IT) computer network.

C. The Contractor or security sub-contractor shall be a licensed security Contractor as required within the state or jurisdiction of where the installation work is being conducted.

D. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.

E. Product Qualification:

1. Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.
2. The Government reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval.

F. Contractor Qualification:

1. The Contractor or security sub-contractor shall be a licensed security Contractor with a minimum of five (5) years experience installing and servicing systems of similar scope and complexity. The Contractor shall be an authorized regional representative of the Security Management System's (PACS) manufacturer. The Contractor shall provide four (4) current references from clients with systems of similar scope and complexity which became operational in the past three (3) years. At least three (3) of the references shall be utilizing the same system components, in a similar configuration as the proposed system. The references must include a current point of

- contact, company or agency name, address, telephone number, complete system description, date of completion, and approximate cost of the project. The owner reserves the option to visit the reference sites, with the site owner's permission and representative, to verify the quality of installation and the references' level of satisfaction with the system. The Contractor shall provide copies of system manufacturer certification for all technicians. The Contractor shall only utilize factory-trained technicians to install, program, and service the PACS. The Contractor shall only utilize factory-trained technicians to install, terminate and service controller/field panels and reader modules. The technicians shall have a minimum of five (5) continuous years of technical experience in electronic security systems. The Contractor shall have a local service facility. The facility shall be located within 60 miles of the project site. The local facility shall include sufficient spare parts inventory to support the service requirements associated with this contract. The facility shall also include appropriate diagnostic equipment to perform diagnostic procedures. The COTR reserves the option of surveying the company's facility to verify the service inventory and presence of a local service organization.
2. The Contractor shall provide proof project superintendent with BICSI Certified Commercial Installer Level 1, Level 2, or Technician to provide oversight of the project.
  3. Cable installer must have on staff a Registered Communication Distribution Designer (RCDD) certified by Building Industry Consulting Service International. The staff member shall provide consistent oversight of the project cabling throughout design, layout, installation, termination and testing.
- G. Service Qualifications: There shall be a permanent service organization maintained or trained by the manufacturer which will render satisfactory service to this installation within four hours of receipt of notification that service is needed. Submit name and address of service organizations.

#### **1.4 SUBMITALS**

- A. Submit below items in accordance with Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY and Master Specification

Sections 01 33 23, SHOP DRAWING, PRODUCT DATA, AND SAMPLES, and Section 02 41 00, DEMOLITION.

- B. Provide certificates of compliance with Section 1.3, Quality Assurance.
- C. Provide a pre-installation and as-built design package in both electronic format and on paper, minimum size 48 x 48 inches (1220 x 1220 millimeters); drawing submittals shall be per the established project schedule.
- D. Shop drawings and as-built packages shall include, but not be limited to:
  - 1. Index Sheet that shall:
    - a. Define each page of the design package to include facility name, building name, floor, and sheet number.
    - b. Provide a list of all security abbreviations and symbols.
    - c. Reference all general notes that are utilized within the design package.
    - d. Specification and scope of work pages for all security systems that are applicable to the design package that will:
      - 1) Outline all general and job specific work required within the design package.
      - 2) Provide a device identification table outlining device Identification (ID) and use for all security systems equipment utilized in the design package.
  - 2. Drawing sheets that will be plotted on the individual floor plans or site plans shall:
    - a. Include a title block as defined above.
    - b. Define the drawings scale in both standard and metric measurements.
    - c. Provide device identification and location.
    - d. Address all signal and power conduit runs and sizes that are associated with the design of the electronic security system and other security elements (e.g., barriers, etc.).
    - e. Identify all pull box and conduit locations, sizes, and fill capacities.
    - f. Address all general and drawing specific notes for a particular drawing sheet.
  - 3. A riser drawing for each applicable security subsystem shall:
    - a. Indicate the sequence of operation.
    - b. Relationship of integrated components on one diagram.

- c. Include the number, size, identification, and maximum lengths of interconnecting wires.
  - d. Wire/cable types shall be defined by a wire and cable schedule. The schedule shall utilize a lettering system that will correspond to the wire/cable it represents (example: A = 18 AWG/1 Pair Twisted, Unshielded). This schedule shall also provide the manufacturer's name and part number for the wire/cable being installed.
4. A system drawing for each applicable security system shall:
- a. Identify how all equipment within the system, from main panel to device, shall be laid out and connected.
  - b. Provide full detail of all system components wiring from point-to-point.
  - c. Identify wire types utilized for connection, interconnection with associate security subsystems.
  - d. Show device locations that correspond to the floor plans.
  - e. All general and drawing specific notes shall be included with the system drawings.
5. A schedule for all of the applicable security subsystems shall be included. All schedules shall provide the following information:
- a. Device ID.
  - b. Device Location (e.g. site, building, floor, room number, location, and description).
  - c. Mounting type (e.g. flush, wall, surface, etc.).
  - d. Power supply or circuit breaker and power panel number.
6. Detail and elevation drawings for all devices that define how they were installed and mounted.
- E. Pre-installation design packages shall be reviewed by the Contractor along with a VA representative to ensure all work has been clearly defined and completed. All reviews shall be conducted in accordance with the project schedule. There shall be four (4) stages to the review process:
- 1. 35 percent
  - 2. 65 percent
  - 3. 90 percent
  - 4. 100 percent
- F. Provide manufacturer security system product cut-sheets. Submit for approval at least 30 days prior to commencement of formal testing, a

Security System Operational Test Plan. Include procedures for operational testing of each component and security subsystem, to include performance of an integrated system test.

- G. Submit manufacture's certification of Underwriters Laboratories, Inc. (UL) listing as specified. Provide all maintenance and operating manuals per the VA General Requirements, Section 01 00 00, GENERAL REQUIREMENTS.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below (including amendments, addenda, revisions, supplement, and errata) form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Not used.
- C. Department of Justice American Disability Act (ADA)  
28 CFR Part 36.....2010 ADA Standards for Accessible Design
- D. Not used.
- E. National Fire Protection Association (NFPA):  
70-11.....National Electrical Code
- F. National Electrical Manufacturers Association (NEMA)  
250-08.....Enclosures for Electrical Equipment (1000 Volts Maximum)
- G. Underwriters Laboratories, Inc. (UL):  
305-08.....Standard for Panic Hardware  
444-08.....Safety Communications Cables  
636-01.....Standard for Holdup Alarm Units and Systems
- H. Uniform Federal Accessibility Standards (UFAS), 1984

#### **1.6 COORDINATION**

- A. Coordinate arrangement, mounting, and support of electronic safety and security 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.

- 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 electronic safety and security items that are behind finished surfaces or otherwise concealed.

## **1.7 MAINTENANCE & SERVICE**

### **A. General Requirements**

- 1. The Contractor shall provide all services required and equipment necessary to maintain the entire integrated electronic security system in an operational state as specified for a period of one (1) year after formal written acceptance of the system. The Contractor shall provide all necessary material required for performing scheduled adjustments or other non-scheduled work. Impacts on facility operations shall be minimized when performing scheduled adjustments or other non-scheduled work. See also General Project Requirements.

### **B. Description of Work**

- 1. The adjustment and repair of the security system includes all software updates, panel firmware, and the following new items: computers, equipment, communications transmission equipment and data transmission media (DTM), local processors, security system sensors, facility interface, and signal transmission equipment.

### **C. Personnel**

- 1. Service personnel shall be certified in the maintenance and repair of the selected type of equipment and qualified to accomplish all work promptly and satisfactorily. The COTR shall be advised in writing of the name of the designated service representative, and of any change in personnel. The COTR shall be provided copies of system manufacturer certification for the designated service representative.

### **D. Schedule of Work**

- 1. The work shall be performed during regular working hours, Monday through Friday, excluding federal holidays. These inspections shall include:
  - a. The Contractor shall perform two (2) minor inspections at six (6) month intervals or more if required by the manufacturer, and two (2) major inspections offset equally between the minor



inspections to effect quarterly inspection of alternating magnitude.

- 1) Minor Inspections shall include visual checks and operational tests of all console equipment, peripheral equipment, local processors, sensors, electrical and mechanical controls, and adjustments on printers.
- 2) Major Inspections shall include all work described for Minor Inspections and the following: clean all system equipment and local processors including interior and exterior surfaces; perform diagnostics on all equipment; operational tests of the CPU, switcher, peripheral equipment, check and calibrate each sensor; run all system software diagnostics and correct all problems; and resolve any previous outstanding problems.

#### E. Emergency Service

1. The owner shall initiate service calls whenever the system is not functioning properly. The Contractor shall provide the Owner with an emergency service center telephone number. The emergency service center shall be staffed 24 hours a day 365 days a year. The Owner shall have sole authority for determining catastrophic and non-catastrophic system failures within parameters stated in General Project Requirements.
  - a. For catastrophic system failures, the Contractor shall provide same day four (4) hour service response with a defect correction time not to exceed eight (8) hours from arrival on site. Catastrophic system failures are defined as any system failure that the Owner determines will place the facility(s) at increased risk.
  - b. For non-catastrophic failures, the Contractor within eight (8) hours with a defect correction time not to exceed 24 hours from notification.

#### F. Operation

1. Performance of scheduled adjustments and repair shall verify operation of the system as demonstrated by the applicable portions of the performance verification test.

#### G. Records & Logs

1. The Contractor shall maintain records and logs of each task and organize cumulative records for each component and for the complete system chronologically. A continuous log shall be submitted for all

devices. The log shall contain all initial settings, calibration, repair, and programming data. Complete logs shall be maintained and available for inspection on site, demonstrating planned and systematic adjustments and repairs have been accomplished for the system.

#### H. Work Request

1. The Contractor shall separately record each service call request, as received. The record shall include the serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, instructions describing the action taken, the amount and nature of the materials used, and the date and time of commencement and completion. The Contractor shall deliver a record of the work performed within five (5) working days after the work was completed.

#### I. System Modifications

1. The Contractor shall make any recommendations for system modification in writing to the COR. No system modifications, including operating parameters and control settings, shall be made without prior written approval from the COR. Any modifications made to the system shall be incorporated into the operation and maintenance manuals and other documentation affected.

#### J. Software

1. The Contractor shall provide all software updates when approved by the Owner from the manufacturer during the installation and 12-month warranty period and verify operation of the system. These updates shall be accomplished in a timely manner, fully coordinated with the system operators, and incorporated into the operations and maintenance manuals and software documentation. There shall be at least one (1) scheduled update near the end of the first year's warranty period, at which time the Contractor shall install and validate the latest released version of the Manufacturer's software. All software changes shall be recorded in a log maintained in the unit control room. An electronic copy of the software update shall be maintained within the log. At a minimum, the contractor shall provide a description of the modification, when the modification occurred, and name and contact information of the individual

performing the modification. The log shall be maintained in a white 3 ring binder and the cover marked "SOFTWARE CHANGE LOG".

#### **1.8 WARRANTY OF CONSTRUCTION.**

- A. Warrant EPPS System work subject to the Article "Warranty of Construction" of FAR clause 52.246-21.
- B. Demonstration and training shall be performed prior to system acceptance.

#### **1.9 GENERAL REQUIREMENTS**

- A. For general requirements that are common to more than one section in Division 28 refer to Section 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY.
- B. General requirements applicable to this section include:
  - 1. Performance Requirements,
  - 2. Delivery, Handling and Storage,
  - 3. Project Conditions,
  - 4. Equipment and Materials,
  - 5. Electrical Power,
  - 6. Lightning, Power Surge Suppression, and Grounding,
  - 7. Electronic Components,
  - 8. Substitute Materials and Equipment, and
  - 9. Like Items.

### **PART 2 - PRODUCTS**

#### **2.1 EQUIPMENT AND MATERIALS**

- A. General:
  - 1. All equipment shall be rated for continuous operation. Environmental conditions (i.e. temperature, humidity, wind, and seismic activity) shall be taken under consideration at each facility and site location prior to installation of the equipment.
  - 2. All equipment shall operate on a 120 or 240 volts alternating current (VAC); 50 hertz (Hz) or 60 Hz Alternating Current (AC) power system unless documented otherwise in subsequent sections listed within this spec. All equipment shall have a battery back-up source of power that will provide 12 hours (hrs.) of run time in the event of a loss of primary power to the security systems until a backup generator comes on-line.

3. The EPPS systems shall be designed, installed, and programmed in a manner that will allow for easy of operation, programming, servicing, maintenance, testing, and upgrading of the system.
4. Not used.
5. The Contractor shall provide the Contracting Officer with written verification, that the type of wire/cable being provided is recommended and approved by the OEM. Cabling shall meet the interconnecting wiring requirements of NFPA 70, National Electrical Code. The Contractor is responsible for providing the correct protection cable duct and/or conduit and wiring.
6. When interfacing with other communications or security subsystems the Contractor shall utilize interfacing methods that are approved by the Contracting Officer. At a minimum, an acceptable interfacing method requires not only a physical and mechanical connection; but also a matching of signal, voltage, and processing levels with regard to signal quality and impedance. The interface point must adhere to all standards described herein.
7. Systems shall be scaleable, not vendor specific, and allow expansion as required.
8. Not used.
9. All hardwired alarms, switches, and junction boxes shall be protected from tampering and include line supervision.
10. The installation and placement of intercom units and emergency-call boxes in strategic locations shall also require that signage be posted near these devices. The signage, in accordance with Section 10 14 00, SIGNAGE shall communicate the location of the device and its unique identification number, and brief instruction on how to access/use the device. The signage may appear on the device, on a pole or wall near the device location and shall be printed in a manner that is easily read during daylight and hours of darkness.

## **2.2 EQUIPMENT ITEMS**

- A. All systems shall be designed to provide continuous electrical supervision of the complete and entire system.
- B. Noise filters and surge protectors shall be provided for all intercommunications equipment to ensure protection from primary AC power surges and to ensure noise interference is not induced into low voltage data circuits.

- C. All alarm and initiating and signaling circuits shall be supervised for open circuits, short circuits, and system grounds. Main and Uninterrupted Power Supply (UPS) power circuits shall be supervised for any change in operating conditions (e.g. low battery, primary to back up battery, and UPS online). When an open, short or ground occurs in any system circuit, an audible and visual fault alarm signal shall be initiated at the master control station and all remote locations.
- D. Control Unit: Shall consist of the components to constantly monitor and verify alarm activation; identify zone of activation and location of activation.
- E. Audible Signal Device for Duress-Panic: Provides alarm activation and audible sound for alarms, as well as supervisory and trouble signals that shall be distinctive.
- F. Assessment: This capability shall consist of electronic devices required to visually and audibly verify the validity of alarms. Assessment also includes providing indication of tampering, fail-safe, low battery, and power losses.
- G. Alarm Monitoring and Reporting: Shall annunciate information to at least two (2) separate locations. The alarms shall maintain the capability to respond with local and remote visible and audible signals upon activation of an alarm. The alarms shall have the capability of operating in a silent mode, alerting personnel monitoring the system that the device has been activated.
- H. The intercom and emergency call-box systems shall be provided with normally acceptable speech intelligibility, defined as a score of at least 70% in accordance with ANSI S3.2
- I. Master Stations for Emergency Call Box and Security Intercoms:
  - 1. All master stations shall have a "call-in" switch to provide an audible and visual indication of incoming calls from remote stations. Individual visual indication shall identify the calling station and status, and remain actuated until a call is answered by a master station.
  - 2. Master stations shall be equipped with a handset with a switch for private conversations.
  - 3. Intercom master stations shall also have an all-call feature, and have the ability to receive video from a video intercom unit.

4. Master stations shall have the capability to selectively communicate with any remote station by actuating assigned station number on a keypad or select button for that station.

5. Not used.

J. Duress-Panic Alarms:

1. Housing shall be a rugged corrosion-resistant housing of stainless steel or Acrylonitrile Butadiene Styrene (ABS) molded plastic or similar material that is weather and dust proof.
2. Actuating device shall include a minimum of a plunger button whose head is recessed from the face/front edge of the housing and be designed to avoid accidental activation using switch guard or multiple buttons (i.e., requires pressing two (2) buttons simultaneously)
3. Not used. 4. Alarm switch/button shall lock-in upon activation until manually reset with key or manufacture provided device.
5. The switch shall be a positive-acting, double-pole, and double-throw switch.
6. Duress/Panic alarms shall meet UL 305 Standard for Panic Alarms. To reduce the possibility of false alarms and ensure installation functionality UL 636 Standard for Holdup Alarms standards shall be met.
7. Alarms used for concealed application requires silent alarm notification to a monitoring station. They shall annunciate at the Physical Access Control System and Database Management, monitored by a central station or direct connect to local police, depending on local ordinance requirements.
8. Shall be capable of being mounted for hand or foot use in a manner that is unable to be viewed by the public. Larger systems use a computer that intercepts and processes alarms and displays them on a monitor. The central computer can make an announcement over facility hand held radios, pagers or telephones, or at the Physical Access Control System and Database Management so that the other security personnel can be immediately notified. These systems shall be hardwired.
9. Components:
  - a. Transmitter
  - b. Locator subsystem
  - c. Receiver

- d. Software
10. Wiring will be four (4) conductor #18 American Wire Gauge (AWG).
11. Duress-Panic Alarm Technical Characteristics:

Temperature Range	0° to 110°F (-17.8°C to 43.3°C)
Nominal Voltage	12 V DC @ 6 mA
Current	Max 8 mA
Operational Voltage	7 V DC to 15 V DC
Operational life	Rated for 0,000 activations
Battery Activations	500
Actuator	Dual button plunger with activation lock
LED	Bi-color - on and activated

- K. Not used.
- L. Not used.
- M. Not used.
- N. Not used.
- O. Not used.

### 2.3 INSTALLATION KIT

- A. General: A kit shall be provided that, at a minimum, includes all connectors and terminals, labeling systems, barrier strips, wiring blocks or wire wrap terminals, heat shrink tubing, cable ties, solder, hangers, clamps, bolts, etc., required to accomplish a neat and secure installation. Unfinished or unlabeled wire connections will not be allowed. Contractor shall turn over to the Contracting Officer all unused and partially opened installation kit boxes, coaxial cable reels, conduit, cable tray, and/or cable duct bundles, wire rolls, and physical installation hardware. This is an acceptable alternate to the individual spare equipment requirement as long as the minimum spare items are provided in this count. The following installation sub-kits are required as a minimum:
- B. System Grounding:
1. The grounding kit shall include all cable in accordance with UL 444 Communications Cables, and installation hardware required. All grounding will be according to the NEC.
  2. This includes, but is not limited to:
    - a. Coaxial Cable Shields
    - b. Control Cable Shields

- c. Data Cable Shields
  - d. Conduits
  - e. Cable Duct
  - f. Cable Trays
  - g. Power Panels
  - h. Connector Panels
- C. Coaxial Cable: The coaxial cable kit shall include all coaxial connectors, cable tying straps, heat shrink tabbing, hangers, clamps, etc., required to accomplish a neat and secure installation.
- D. Wire And Cable: The wire and cable kit shall include all connectors and terminals, barrier straps, wiring blocks, wire wrap strips, heat shrink tubing, tie wraps, solder, hangers, clamps, labels etc., required to accomplish a neat and orderly installation.
- E. Equipment Interface: The equipment interface kit shall include any item or quantity of equipment, cable, mounting hardware and materials needed to interface Systems and Subsystems according to the OEM requirements and this specification.
- F. Labels: The labeling kit shall include any item or quantity of labels, tools, stencils, and materials needed to label each subsystem according to the OEM requirements, as-installed drawings, and this specification.
- G. Documentation: The documentation kit shall include any item or quantity of items, computer discs, as installed drawings, equipment, maintenance, and operation manuals, and OEM materials needed to correctly provide the system documentation as required by this document and explained herein.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. System installation shall be installed in accordance with NFPA 731 Standards for the Installation of Electric Premises Security Systems and appropriate installation manual for each type of subsystem designed, engineered, and installed.
- B. The location and type of duress, intercom, or call-box to be installed will be in accordance with physical security requirements unique to each VA facility.
- C. Not used.
- D. Concealed duress/panic devices shall be mounted in such a way that their location is only known by the person having knowledge of the



activating device location. No wiring shall be exposed to identify the location of the activation device.

- E. Floor mounted duress alarms shall be attached to millwork on floor. When mounted under millwork, wiring shall be routed in millwork to conduit system via flexible conduit.
- F. Hard-wired switches shall be wired to individual alarm points within the Advanced Processing Controller (apC).
- G. Not used.
- H. Cleaning: Subsequent to installation, clean each system component of dust, dirt, grease, or oil incurred during installation in accordance to manufacture instructions.
- I. Provisions shall be made for systems in high-noise areas or areas with electrical interference environments.
- J. Adjustment/Alignment/Synchronization: Contractor shall prepare for system activation by following manufacturer's recommended procedures for adjustment, alignment, or programming. Prepare each component in accordance with appropriate provisions of the component's installation, operations, and maintenance instructions.

### **3.2 WIRELINE DATA TRANSMISSION**

- A. Installation: The Contractor shall install all system components including Owner furnished equipment, and appurtenances in accordance with the manufacturer's instructions, ANSI C2 and as shown, and shall furnish all necessary connectors, terminators, interconnections, services, and adjustments required for a complete and operable data transmission system.
- B. Identification and Labeling: The Contractor shall supply permanent identification labels for each cable at each end that will appear on the as-built drawings. The labeling format shall be identified and a complete record shall be provided to the Owner with the final documentation. Each cable shall be identified by type or signal being carried and termination points. The labels shall be printed on letter size label sheets that are self laminated vinyl that can be printed from a computer data base or spread sheet. The labels shall be E-Z code WES12112 or equivalent.
- C. The Contractor shall provide all personnel, equipment, instrumentation, and supplies necessary to perform all testing.
- D. Transient Voltage Surge Suppressors (TVSS): The Contractor shall mount TVSS within 3 m (118 in) of equipment to be protected inside terminal

cabinets or suitable NEMA 1 enclosures. Terminate off-premise conductors on input side of device. Connect the output side of the device to the equipment to be protected. Connect ground lug to a low impedance earth ground (less than 10 ohms) via Number 12 AWG insulated, stranded copper conductor.

- E. Contractor's Field Test: The Contractor shall verify the complete operation of the data transmission system during the Contractor's Field Testing. Field test shall include a bit error rate test. The Contractor shall perform the test by sending a minimum of 1,000,000 bits of data on each DTM circuit and measuring the bit error rate. The bit error rate shall not be greater than one (1) bit out of each 100,000 bits sent for each dial-up DTM circuit, and one (1) bit out of 1,000,000 bits sent for each leased or private DTM circuit. The Contractor shall submit a report containing results of the field test.
- F. Acceptance Test and Endurance Test: The wire line data transmission system shall be tested as a part of the completed IDS and EECS during the Acceptance test and Endurance Test as specified.
- G. Identification and Labeling: The Contractor shall supply identification tags or labels for each cable. Cable shall be labeled at both end points and at intermediate hand holes, manholes, and junction boxes. The labeling format shall be identified and a complete record shall be provided to the Owner with the final documentation. Each cable shall be identified with type of signal being carried and termination points.

### 3.3 WIRING

- A. Not used. .
- B. Wiring Method: Install cables concealed in accessible ceilings, walls, and floors where possible.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- D. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. 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.

E. Not used.

### **3.4 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation and supervise pretesting, testing, and adjusting of video surveillance equipment.
- B. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
- C. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
- D. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.
- E. Remove and replace malfunctioning items and retest as specified above.
- F. Record test results for each piece of equipment.
- G. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

### **3.5 ADJUSTING**

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions and to optimize performance of the installed equipment. Tasks shall include, but are not limited to, the following:
  - 1. Check cable connections.
  - 2. Not used.
  - 3. Not used.
  - 4. Provide a written report of adjustments and recommendations.

### **3.6 CLEANING**

- A. Clean installed items using methods and materials recommended in writing by manufacturer.

### **3.7 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain electronic personal protection system (EPSS) equipment.

1. Train Owner's maintenance personnel on procedures and schedules for troubleshooting, servicing, and maintaining equipment.
2. Demonstrate methods of determining optimum alignment and adjustment of components and settings for system controls.
3. Review equipment list and data in maintenance manuals.
4. Conduct a minimum of two hours' training.

### **3.8 NOT USED**

### **3.9 TESTS AND TRAINING**

- A. All testing and training shall be compliant with the VA General Requirements, Section 01 00 00, GENERAL REQUIREMENTS and Section 28 05 00 COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY.

-----END-----

# Bidder Comments and Responses

**Phase:** **100% Construction Documents**



Project Name: Building 2 Site Entrance Improvements & Building 2 Renovations

Location: VA-Butler, Butler, PA

VA Project #: 529-12-104 & 529-12-107 HSH Project #: 12019

Bid Date: July 23, 2013

COR: Matt Wilson, RA

Item	Comment/Concern	Responsible Party	Response
<b>General</b>			
1	<p>The gas line shown on sheet PL104 shows multiple sizing designations for the same line. Please clarify gas line sizes.</p> <p><i>MLW: I see a discrepancy please clarify.</i></p>	BLH	<p>Gas line enters Building 2 as 2" nominal diameter, carrying 1741 CFH at 2 psi; 2" is routed through the main corridor. 2" Branch is extended from the main into "exist mechanical B010" and serves the water heaters at a demand of 1400 CFH. The main reduces to 1" nominal diameter after the branch to carry 341 CFH to the kitchen equipment. A gas pressure regulator is indicated to reduce pressure from 2 psi to 7" as indicated by note 8. Reducing natural gas pressure will cause an increase in pipe size. Therefore the pipe size increases to 1 1/4" after the regulator where it serves items 21 &amp; 23 and is downsized respectively.</p>

2	<p>Plumbing fixture schedule calls for P102 to be a floor mounted water closet. The specifications indicate P102 to be wall hung. Please clarify.</p> <p><i>MLW: Floor mounted is preferred choice – please clarify in documents.</i></p>	BLH	<p>Specification section 22 40 00 has been corrected to reflect floor mounted water closet as indicated on drawings.</p>
3	<p>The existing restroom 125 shows fixtures to be removed on sheet PD102, but sheet PL102 shows them to remain with new water supply. Please clarify.</p> <p><i>MLW: All piping is to be removed, replaced and recirculation piping for all fixtures is to be provided on the hot water. Fixtures listed in question is to remain – please clarify.</i></p>	BLH	<p>PD102 has been corrected to reflect that the plumbing fixtures are to remain and piping removed.</p>
4	<p>Are CP-1 and CP-2 the same pumps as RCP-1 and RCP-2?</p> <p><i>MLW: I believe these are the same pumps shown as CP on PL104 and RCP on sheet PL501 – please clarify.</i></p>	BLH	<p>CP-1 and CP-2 are the same pumps as RCP-1 and RCP-2. “CP-1” and “CP-2” have been changed on PL104 to “RCP-1” and “RCP-2” as indicated on the pump schedule.</p>
5	<p>Is Enrich Products an acceptable substitution for the copper silver ionization unit?</p> <p><i>MLW: No substitutions allowed for the sole source item – Liquidtech is the contracted entity for our campus wide copper ionization systems at this time.</i></p>	VA-Butler	<p>Liquidtech is the contracted entity.</p>

6	<p>Site demolition sheet GD101. Note 17 – clarify “existing utility” by location and show utility paths.</p>	MH	<p>Site Demolition Note #17 on Sheet GD101 has been updated to read, “Existing utility line to be removed, Contractor to determine location by exploratory excavation. Contractor shall coordinate limits with COR and cap utility line.”</p>
7	<p>We requested a fiber splice box (24 Connector with ST connectors) installed in building 131 and Building 2 for the fire alarm system – I do not see where any of the work in building 131 is described nor do I see a site plan which can be used by contractors to know the complete path from building 2 to building 131 and the amount of fiber which will be required.</p> <p>A. Specification 28 05 13, 2.5 Optic Fiber Cable calls for 50/125-micrometer, 24 fiber where it should be 62.5/125-micrometer, 12 fiber.</p> <p>B. 1 color orange for 62.5/125-micrometer</p> <p>C. Verify connector type ST is included for splice box.</p>	DJ	<p>Work related to fiber optic connections to fire alarm system has been clarified in Amendment #A0004. See drawing ES101 Note #3 and drawing FA001, Detail #D5. Specification Section 28 05 13 has been edited to reflect the requested fiber optic cable requirements.</p>
8	<p>Sheet EP103 does not show any power or communications whatever for Fire Alarm &amp; Security 207. Is there somewhere else this information is referenced?</p>	DJ	<p>Existing power and data have been shown on drawing EP103 in Amendment #A0004.</p>

9	Sheet FA001 does not show fiber splice box in riser diagram – please include.	DJ	Work related to fiber optic connections to fire alarm system has been clarified in Amendment #A0004. See drawing FA001, Detail #D5.
10	Sheet ES101 Notes #8 and #9 call for the existing smoke shelter feeder to be rerouted. The feeder should be new as the existing smoke shelter will need to remain in operation until full acceptance of the new smoke shelter. Revise notation to provide new feeder.	DJ	Notes #8 and #9 have been edited to reflect new feeder for smoke shelter.
11	Sheet AE401 – Toilet tissue dispenser TA-2, Paper Towel Dispenser TA-3, Liquid Soap Dispenser TA-5 shall be provided and installed by others. Contractor to provide blocking as required.	MW	Toilet Accessory Schedule on Sheet AE401 has been edited to indicate TA-2, TA-3 and TA-5 are supplied and installed by others, and blocking to be provided by the Contractor.
12	There is a spec for a vehicle barrier (34 71 13) but we cannot find any on the drawings.	MH	Spec 34 71 13 “Vehicle Barriers” is for high security vehicle barricades of walls and fixed bollards of crash resistance rating.  There are Concrete Post Barricades on drawing GS103 protecting Building 1 and the steps at the new loading dock for Building 2.
13	There is a spec for window shades (12 24 00) but we cannot find any on the drawings.	MW	General Sheet Note on drawing sheets AF101, AF102 and AF103 state “Shading devices shall be provided at all windows.”



14	Can you provide the name of the contractor that currently has the contract for the elevator maintenance?	JMC	VA-Butler currently contracts with Lin's Elevator Service, 207 Gist Street, Pittsburgh, PA 15219. 412/261-1656.
15	Dwg. E601 shows a new emergency feeder from Panel EDP-1 to a new 800A breaker. This equipment doesn't show on the plan drawings.  Also, the feeder routing is not shown on the drawings.	DJ	The 3P-800A circuit breaker is located in the small closet on the east end of Room #B008. See drawing EP101, Note #23. Feeder routing has been added to drawing ES101 for clarity. See Note #15.
16	Will premium time be required for any part of this project or can all work be completed during normal working hours?	JMC	Phasing plans have been updated to indicate that Premium Time will be required for Loading Dock Construction, First Floor Connector Renovations, and Access through Building 2 Lobby / Corridor Renovation from Building 20 to First Floor Connector.