SECTION 01 00 00
GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SAFETY REQUIREMENTS

A. Refer to section 01 35 26, SAFETY REQUIREMENTS for safety and infection control requirements.

1.2 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 VA Cheyenne Emergency Department Expansion Project as required by drawings and specifications.

B. Visits to the site by Bidders may be made in accordance with what is listed in the solicitation and at the discretion of the Contracting Officer.

C. Offices of Apogee Consulting Group, 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.

D. 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 workdays unless otherwise designated by the COR.

E. Normal working hours for the contract will be from 7:00 AM to 4:30 PM Mountain time Monday through Friday except for weekends and established Federal Holidays.

F. Performing on-site work outside normal working hours will require approval from the Contracting Officer and the COR. Requests shall be submitted via email at least 72 hours prior to the requested date and at no additional cost to the Government. Approvals are subject to the availability of on-site staff.

G. The design intent is to “Buy American” and use “American made products” where ever and as much as possible.

H. 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.

1.3 STATEMENT OF BID ITEM(S)

A. ITEM I, BASE BID – GENERAL CONSTRUCTION: Work includes selective demolition, general construction, and alterations (including necessary removal of existing structures and construction and certain other items). Work includes all labor, material, equipment and supervision to perform the required demolition and construction work on this project including Architectural and Site Modifications, Fire Protection Systems, Plumbing Systems, Mechanical Systems, Electrical Systems, and Telecommunication Systems as described in the Specifications and indicated on the Construction Documents.

B. DEDUCT ALTERNATES:

1. Reference plan sheets labels that end in A or B for deduct drawings (Example: AD113A or MD103B).
2. Deduct 1: All electrical scope associated with new panel EHP-4 in the penthouse. Including work related to panels EH11, NBM-2, DPEHB3 and ATS DPEHB3
3. Deduct 2: Men's & Women's staff lockers, weapon storage lockers, and police suite locker room lockers furnished by contractor.
4. Deduct 3: Eliminate front entrance canopy. Including the wrap-around sunscreen pergola feature and columns.
5. Deduct 4: Eliminate the renovation to the security control center (SCC). The police functions would remain as they currently exist in the SCC.
6. Deduct 5: Eliminate the renovation to the police suite. The police functions would remain as they currently exist. All work for architectural, electrical, plumbing, low voltage, and fire protection for this area to be removed. Minor duct modifications will need to be performed to demolish and reconnect the existing supply/return ductwork to the new mains installed during phase 3.
7. Deduct 6: Eliminate the renovation in the existing emergency department (ED). The temporary AHU will still be required to serve the existing ED while AHU-6 is being demolished and the new AHU is being installed. To the maximum extent practical, all existing VAV’s

shall remain and be reconnected to the new duct mains. The canteen store and storage areas shall be disconnected from AHU-4 and reconnected to the new AHU.

1.4 BID BREAKDOWN

A. The contractor shall provide a bid breakdown by division separated into labor and material by division at time of bid.

1.5 PERIOD OF PERFORMANCE AND WORKING HOURS

A. Period of performance of the contract shall be 730 calendar days from notice to proceed

B. Work shall be planned and scheduled to minimize the construction activity impact on the operation of the 24 hour 7 days a week medical center. Work requiring system shutdowns, utility interruptions/ outages, critical infection control work, or noise producing work will require extensive coordination and planning with the COR/ PM and will require three weeks notice. This work is to occur outside of normal agency operation hours and on weekends/ holidays as coordinated with the COR.

C. All other work is expected to occur within agency normal operation hours of Monday through Friday from 7:00am – 4:30pm (MST). This facility is closed for all federal legal holidays.

1.6 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

A. Drawings and contract documents may be obtained from the website where the solicitation is posted. Additional copies will be at Contractor's expense.

1.7 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. Before starting work the General Contractor shall give one week's notice to the Contracting Officer so that security arrangements 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. Patients and staff are not to be photographed at any time.
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. Key Control:
1. The General Contractor shall provide duplicate keys and lock combinations to the Contracting officers representative (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 install all permanent cores at completion of the work. See Section 08 71 00, DOOR HARDWARE, and coordinate.

D. 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.
3. 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.

4. These security documents shall not be removed or transmitted from the project site without the written approval of Contracting Officer.
5. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed in a manner acceptable to the VA.
6. Notify Contracting Officer and Site Security Officer immediately when there is a loss or compromise of "sensitive information".
7. All electronic information shall be stored in specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).
   a) Security, access, and maintenance of all project drawings, both scanned and electronic shall be performed and tracked through the EDMS system.
   b) "Sensitive information" including drawings and other documents may be attached to e-mail provided all VA encryption procedures are followed.

E. Motor Vehicle Restrictions:
1. General Contractor and its employees shall park in designated areas only. Contractor to coordinate with VA Medical Center Facility Manager. See site plan for logistics and details.

F. Physical Security and Badging Requirements
1. The contractor shall comply with agency personal identity verification procedures identified in the contract that implement homeland security presidential directive-12 (HSPD-12), Office of Management and Budget (OMB) guidance M-05-24, and federal information processing standards publication (FIPS PUB) number 201.
2. Every worker must wear a valid VA ID badge at all times to work on this site. As determined by the COR contractors will be required to complete fingerprinting and background checks to obtain a VA badge or VA Police will issue day badges daily to workers who produce valid IDs. Right-to-work documentation will be required for workers who are not US citizens.

1.8 OPERATIONS AND STORAGE AREAS (FAR 52.236-10)

A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the 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. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

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.

D. Working space and space available for storing materials is very limited and shall be as determined by the COR. Contractor shall plan to provide on-site or approved and secure off-site storage as needed.

E. Workers are subject to rules of Medical Center applicable to their conduct.

F. Execute work so as to interfere as little as possible with normal functioning of Medical Center 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 Medical Center areas required to remain in operation.

3. Where access by Medical Center 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 COR or Utility Company involved:

1. 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.

H. Phasing:

1. The Medical Center must maintain its operation 24 hours a day 7 days a week. Therefore, any interruption in service must be scheduled and coordinated with the COR to ensure that no lapses in operation occur. It is the CONTRACTOR'S responsibility to develop a work plan and schedule detailing, at a minimum, the procedures to be employed, the equipment and materials to be used, the interim life safety measure to be used during the work, and a schedule defining the duration of the work with milestone subtasks. The work to be outlined shall include, but not be limited to:

2. To ensure 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 three weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such phasing dates to ensure accomplishment of this work in successive phases mutually agreeable to the COR and Contractor. Reference the drawings for phasing guidance.

3. The VA and their contractors will be permitted to execute the activation phase of the new Emergency Department addition and renovation areas for VA provided VA installed FF&E (furniture, fixtures & equipment) prior to beneficial occupancy/ the start of the warranty phase. The Emergency Department addition must be complete, commissioned, and activated before operations can be moved and the renovation phase can begin on the existing emergency department area.

I. 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. These routes whether access or egress shall be isolated from the construction area by temporary partitions and have walking surfaces, lighting etc. to facilitate patient and staff access. Coordinate alteration work in areas occupied by Department of Veterans Affairs so that Medical Center operations will continue during the construction period.

J. 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.

K. When a building and/or construction site is turned over to Contractor, Contractor shall accept entire responsibility including upkeep and maintenance therefore:

1. Contractor shall maintain a minimum temperature of 4 degrees C (40 degrees F) at all times, except as otherwise specified. Protect areas with plumbing/fire protection systems from freezing.
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 or Company (Department of Veterans Affairs or municipal) whichever will be required to respond to an alarm from Contractor's employee or watchman.

L. 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 a detailed work plan, 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 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY for additional requirements.
2. Contractor shall submit a request to interrupt any such services to COR, in writing, minimum three weeks 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 three weeks 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.

M. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, shall be removed back to their source. Those which are indicated to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged at the main, branch or panel they originate from. 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.

N. 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 with approval.
2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the COR.

O. 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.

1.9 ALTERATIONS

A. Survey: Before any work is started, the Contractor shall make a thorough survey with the COR, of buildings in which alterations occur and areas which are anticipated routes of access, and furnish a report, signed by allh, 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 of buildings.
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).

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 workers 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.
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.

1.10 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.

1.11 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (FAR 52.236-9)

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 workers, 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.

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:

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

1.12 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 workers to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) 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 "DIFFERING SITE CONDITIONS" (FAR 52.236-2).

1.13 PHYSICAL DATA – SOIL CONDITIONS

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 Terragon

B. Subsurface conditions have been developed by core borings and test pits. Logs of subsurface exploration are shown diagrammatically on drawings.

C. A copy of the soil report will be made available for inspection by bidders upon request to the Engineering Officer at the VA Medical Center, Cheyenne 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.

1.14 PROFESSIONAL SURVEYING SERVICES

A. A registered professional land surveyor or registered civil engineer whose services are retained and paid for by the Contractor shall perform services specified herein and in other specification sections. The Contractor shall certify that the land surveyor or civil engineer is not one who is a regular employee of the Contractor, and that the land surveyor or civil engineer has no financial interest in this contract.

1.15 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 center lines for each building and corner of column lines 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:
   1. Such additional survey control points or system of points thus established shall be checked and certified by a registered land surveyor or registered civil engineer. Furnish such certification to the COR before any work (such as footings, floor slabs, columns, walls, utilities and other major controlling features) is placed.

D. During progress of work, and particularly as work progresses from floor to floor, Contractor shall have line grades and plumbness of all major form work checked and certified by a registered land surveyor or registered civil engineer as meeting requirements of contract drawings. Furnish such certification to the COR before any major items of concrete work are placed. In addition, Contractor shall also 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.
   4. Lines of elevations of all swales and interment areas.
   5. Lines and elevations of roads, streets and parking lots.

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. stationing along new road centerlines. These drawings shall bear the seal of the registered land surveyor or registered civil engineer.

G. The Contractor shall perform the surveying and layout work of this and other articles and specifications in accordance with the provisions of Article "Professional Surveying Services".

1.16 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 ensure compliance, as-built drawings shall be made available for the COR review, as often as requested.

C. Contractor shall deliver two approved completed sets of as-built drawings in the electronic version (scanned PDF) 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.

1.17 WARRANTY MANAGEMENT

A. Warranty Management Plan: Develop a warranty management plan which contains information relevant to FAR 52.246-21 Warranty of Construction in at least 30 days before the planned pre-warranty conference, submit two sets of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. Warranty will be phased in accordance with phases accepted and put in use by the VA. The VA and their contractors will be permitted to execute the activation phase of the new Emergency Department addition and renovation areas for VA provided VA installed FF&E (furniture, fixtures & equipment) prior to beneficial occupancy/ the start of the warranty phase. The plan must be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesman, or of engineering background, not necessarily familiar with this contract. The term “status” as indicated below must include due date and whether item has been submitted or was approved. Warranty information made available during the construction phase must be submitted to the Contracting Officer for approval prior to each monthly invoice for payment. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period will begin on the date of the project

acceptance and continue for the product warranty period. A joint 4 month and 9 month warranty inspection will be conducted, measured from time of acceptance, by the Contactor and the Contracting Officer. Include in the warranty management plan, but not limited to, the following:

1. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the company of the Contractor, subcontractors, manufacturers or suppliers involved.
2. Furnish with each warranty the name, address and telephone number of each of the guarantor's representatives nearest project location.
3. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers and for all commissioned systems such as fire protection and alarm systems, sprinkler systems and lightning protection systems, etc.
4. A list for each warranted equipment item, feature of construction or system indicating:
   a. Name of item.
   b. Model and serial numbers.
   c. Location where installed.
   d. Name and phone numbers of manufacturers and suppliers.
   e. Name and phone numbers of manufacturers or suppliers.
   f. Names, addresses and phone numbers of sources of spare parts.
   g. Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have extended warranties must be indicated with separate warranty expiration dates.
   h. Starting point and duration of warranty period.
   i. Summary of maintenance procedures required to continue the warranty in force.
   j. Cross-reference to specific pertinent Operation and Maintenance manuals.
   k. Organizations, names and phone numbers of persons to call for warranty service.
   l. Typical response time and repair time expected for various warranted equipment.

5. The plans for attendance at the 4 and 9-month post construction warranty inspections conducted by the government.
6. Procedure and status of tagging of all equipment covered by extended warranties.
7. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

B. Performance & Payment Bonds: The Performance & Payment Bonds must remain effective throughout the construction period.
1. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.
2. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the contractor's expenses, the Contracting Officer will have the right to recoup expenses from the bonding company.
3. Following oral or written notification of required construction warranty repair work, the Contractor shall respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.

C. Pre-Warranty Conference: Prior to contract completion, and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty will be established/ reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor.

This point of contract will be located within the local service area of the warranted construction, be continuously available and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in conjunction with other portions of this provision.

D. Contractor's Response to Construction Warranty Service Requirements:

E. Following oral or written notification by the Contracting Officer, the Contractor shall respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. Submit a report on any warranty item that has been repaired during the warranty period. Include within the report the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframe specified, the Government will perform the work and back charge the construction warranty payment item established.

1. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.
2. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.
3. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.
4. The "Construction Warranty Service Priority List" is as follows:
   a) Code 1-Life Safety Systems
      1) Fire suppression systems.
      2) Fire alarm system(s).
   b) Code 1-Air Conditioning Systems
      1) Air conditioning leak in part of the building, if causing damage.
      2) Air conditioning system not cooling properly.
   c) Code 1 Doors
      1) Overhead doors not operational, causing a security, fire or safety problem.

1) Interior, exterior personnel doors or hardware, not functioning properly, causing security, fire or safety problem.

d) Code 3-Doors
   1) Overhead doors not operational.
   2) Interior/exterior personnel doors or hardware not functioning properly.

e) Code 1-Electrical
   1) Power failure (entire area or any building operational after 1600 hours).
   2) Security lights.
   3) Smoke detectors.

f) Code 2-Electrical
   1) Power failure (no power to a room or part of building). Receptacle and lights not operational (in a room or part of building).

g) Code 3-Electrical
   1) Exterior lights not operational.

h) Code 1-Gas
   1) Leaks and pipeline breaks.

i) Code 1-Heat
   1) Power failure affecting heat.

j) Code 1-Plumbing
   1) Hot water heater failure.
   2) Leaking water supply pipes

k) Code 2-Plumbing
   1) Flush valves not operating properly
   2) Fixture drain, supply line or any water pipe leaking.
   3) Toilet leaking at base.

l) Code 3- Plumbing
   1) Leaky faucets.

m) Code 3-Interior
   1) Floors damaged.
   2) Paint chipping or peeling.
   3) Casework damaged.

n) Code 1-Roof Leaks
   1) Damage to property is occurring.

o) Code 2-Water (Exterior)

1) No water to facility.

p) Code 2-Water (Hot)

1) No hot water in portion of building listed.

q) Code 3

1) All work not listed above.

F. Warranty Tags: At the time of installation, tag each warranted item with a durable, oil and water-resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also submit two record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Warranty Tags	
Type of product/material	
Model number	
Serial number	
Contract number	
Warranty period from/to	
Inspector's signature	
Construction Contractor	
Address	
Telephone number	
Warranty Contact	
Address	
Telephone number	
Warranty response time priority code	

1.18 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, and restoration performed 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.

1.19 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 written approval and compliance with the following provisions:

1. Permission to use each unit or system must be given by COR in writing. If the equipment is not installed and maintained in accordance with the written agreement and 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. Installation of temporary electrical equipment or devices shall be in accordance with NFPA 70, National Electrical Code, (2014 Edition), Article 590, *Temporary Installations.* 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.

D. Any damage to the equipment or excessive wear due to prolonged use will be repaired replaced by the contractor at the contractor’s expense.

1.20 TEMPORARY USE OF EXISTING ELEVATORS

A. Contractor will not be allowed the use of existing elevators. Outside type hoist shall be used by Contractor for transporting materials and equipment.

B. Use of existing elevator 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 elevators Nos. _____ in Buffalo Building for exclusive use for daily use between the hours of 8-4 . and for special nonrecurring time intervals when permission is granted. Personnel for operating elevators will not be provided by the Department of Veterans Affairs.
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 at the contractor's expense.
4. If brake lining of elevators are excessively worn or damaged during temporary use, they shall be removed and replaced by new brake lining at the contractors expense.
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 at the contractor's expense, 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.

1.21 TEMPORARY TOILETS

A. Provide where directed, (for use of all Contractor's workers) ample temporary sanitary toilet accommodations with suitable sewer and water connections; or, when approved by COR, provide suitable dry closets where directed. Keep such places clean and free from flies and all connections and appliances connected therewith are to be removed prior to completion of contract, and premises left perfectly clean.

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, in compliance with code and as satisfactory to the Contracting Officer, shall install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of electricity used for the purpose of determining charges. Before final acceptance of the work by the Government, the Contractor shall remove

all the temporary connections, distribution lines, meters, and associated paraphernalia and repair restore the infrastructure as required.

C. 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.

D. Electricity (for Construction and Testing): Furnish all temporary electric services.
   1. Obtain electricity by connecting to the Medical Center electrical distribution system. Electricity is available at no cost to the Contractor.

E. 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 as per code. 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 discretion) of use of water from Medical Center's system.

1.23 TESTS

A. As per specification section 23 05 93 the contractor shall provide a written testing and commissioning plan complete with component level, equipment level, sub-system level and system level breakdowns. The plan will provide a schedule and a written sequence of what will be tested, how and what the expected outcome will be. This document will be submitted for approval prior to commencing work. The contractor shall document the results of the approved plan and submit for approval with the as built documentation.

B. 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.

C. 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.

D. Mechanical and electrical systems shall be balanced, controlled and coordinated. A system is defined as the entire system 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 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 fuel, combustion air, controls, steam, feedwater, condensate and other related components.

E. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonably period of time during which operating and environmental conditions remain reasonably constant and are typical of the design conditions.

F. 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.

1.24 INSTRUCTIONS

A. Contractor shall furnish Maintenance and Operating manuals (hard copies and electronic) and verbal instructions when required by the various sections of the specifications and as hereinafter specified. The electronic files shall be digital and searchable with digital bookmarks, scanned documents are not permitted.

B. Manuals: Maintenance and operating manuals and one compact disc (four hard copies and one electronic copy 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, as well as include the final approved submittal indicating all options selected for 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 training 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 contractor shall submit a course outline with associated material to the COR for review and approval prior to scheduling training to ensure the subject matter covers the expectations of the VA and the contractual requirements. 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. The contractor shall record all trainings and provide the training videos to the COR.

1.25 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.

1. *Storage space for equipment will be provided by the Government and the Contractor shall be prepared to unload and store such equipment therein upon its receipt at the Medical Center.

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.

1.26 RELOCATED EQUIPMENT ITEMS

A. Contractor shall disconnect, dismantle as necessary, remove and reinstall in new location, all existing equipment and items indicated 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, at the main 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. 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.

1.27 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.

E. Contractor to provide signage for various phases of construction to provide exiting and detour as well as any other critical phasing information.

1.28 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. Drawing details in VA Signage Design Manual, Section 11 Specialty Signs (found on VA TIL) show required legend and other characteristics of sign and are shown on the drawings.

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

1.29 PHOTOGRAPHIC DOCUMENTATION

A. During the construction period through completion, provide photographic documentation of construction progress and at selected milestones including electronic indexing, navigation, storage and remote access to the documentation, as per these specifications.

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 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.

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 ensure 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-foundation utilities and site utilities shall be documented prior to pouring footers, 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 ensure 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 ensure 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 ensure 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 ensure 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 (29 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 (21 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).

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-Builts viewable on-line and anticipated future shoot dates.

E. Contractor shall provide technical support related to using the system or service.

F. 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. Permanent Record shall have Building Information Modeling (BIM) interface capabilities. On-line access terminates upon delivery of the Permanent Record.

1.30 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 RE 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 RE 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 SRE will select one style to frame all six prints. Photographs with frames shall be delivered to the COR in boxes suitable for shipping.

1. Hospital Building No. Buffalo

1.31 HISTORIC PRESERVATION

A. 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.

- - - E N D - - -

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Project: Cheyenne VAMC - Expand Emergency Department
Location: Cheyenne, WY
Project #: 442-303
Date: 12/19/2023

STATEMENT OF SPECIAL INSPECTIONS

Project Seismic Design Category:	D
Project Risk Category:	IV
Project Design Wind Speed (mph):	120
Number of Stories:	2
Structure Height Above Grade (ft):	25
Hazardous Occupancy or attached to such?	No

Group H Occupancies

Special Inspector of Record (SIOR)

A Special Inspector of Record (SIOR) **IS** required (per UFGS 01 45 35, Section 1.3.8)

SIOR Name (Registered Professional):	Contractor to provide prior to construction start.
Professional Registration Number:	
Consulting Firm Name (if any):	
SIOR Office AND Mobile Phone Number:	

Lateral Force Resisting System (LFRS)

2015 IBC 1704.3.2 and 1704.3.3

Following is a listing of critical main wind/seismic force resisting systems for this structure. Carefully inspect these elements as part of the roles and responsiblities of the Special Inspector (reference the Schedule of Special Inspections for inspection checklists).

Vertical LFRS Elements	Notes
Braced Frames - Steel System Not Specifically Detailed for Seismic Resistance	Both orthogonal directions, see plans for callout

Horizontal LFRS Elements	Notes
Concrete slab on metal deck	Roof plan at second floor

Project: Cheyenne VAMC - Expand Emergency Department
Location: Cheyenne, WY
Project #: 442-303
Date: 12/19/2023

Designated Seismic Systems (DSS)

(2015 IBC 1705.13.3.4) (ASCE 7-10, 13.2.2, C13.2.2) (UFC 3-310-04, 2-11.2 & 2-13.2.2)

Non-structural 'Designated Seismic Systems' (DSS) must remain operable and contain hazardous substances following a design

ELECTRICAL Designated Seismic Systems (DSS) Requiring a Certificate of Compliance	
1.	DSS Emergency or Standby Power System
2.	DSS Component XX
3.	DSS Component XX
4.	DSS Component XX
5.	DSS Component XX

If additional space is required, append an additional sheet listing the remaining DSS

MECHANICAL/PLUMBING Designated Seismic Systems (DSS) Requiring a Certificate of Compliance	
1.	DSS Gas lines and associated fittings, anchorage, & flexible Connections
2.	DSS Component XX
3.	DSS Component XX
4.	DSS Component XX
5.	DSS Component XX
6.	DSS Component XX

If additional space is required, append an additional sheet listing the remaining DSS

OTHER Designated Seismic Systems (DSS) Requiring a Certificate of Compliance	
1.	DSS Building egress stair systems
2.	DSS Building fire sprinkler systems
3.	DSS Component XX
4.	DSS Component XX
5.	DSS Component XX
6.	DSS Component XX

Final Walk Down Inspection and Report

(UFC 3 301 01 SECTION 2-2.4.3)

Designated Seismic Systems shall receive a final walk-down inspection by the Registered Design Professional in Responsible Charge

Final Walk Down Report, Prepared by the Registered Design Professional in Responsible Charge, Must Include:

1. Record observations of Final Walk Down Inspection
2. Document that Inspections were performed in accordance with the Schedule of Special Inspections
3. Document that all Designated Seismic Systems are installed according to construction/manufacturer document requirements, and that Compliance Certificates have been collected (UFC 03 301 01, 2-13.2.2.1).

SECTION 02 82 13.13
GLOVEBAG ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. Section includes regulatory requirements and safety protocols for working in environments where asbestos-containing materials (ACM) are present but will not be disturbed or abated.

B. This section specifically excludes asbestos abatement procedures and focuses only on safety requirements for working in the vicinity of existing ACM.

1.2 VARIATIONS IN QUANTITY

A. The quantities and locations of ACM as indicated on the drawings and the extent of work included in this section are estimated which are limited by the physical constraints imposed by occupancy of the buildings and accessibility to ACM. Accordingly, minor variations (+/- 10 percent) in quantities of ACM within the regulated area are considered as having no impact on contract price and time requirements of this contract. Where additional work is required beyond the above variation, the contractor shall provide unit prices for newly discovered ACM and those prices shall be used for additional work required under the contractor.

1.3 STOP WORK

A. If the Contracting Officer; their field representative; the facility Safety Officer/Manager or their designee presents a verbal Stop Work Order, the Contractor shall immediately stop work if encountering previously unknown ACM. Work shall not resume until authorized in writing by the VA Contracting Officer.

1.4 DEFINITIONS

A. General: Definitions and explanations here are neither complete nor exclusive of all terms used in the contract documents, but are general for the work to the extent they are not stated more explicitly in another element of the contract documents. Drawings must be recognized as diagrammatic in nature and not completely descriptive of the requirements indicated therein.

B. Glossary:

Abatement - Procedures to control fiber release from asbestos-containing materials. Includes removal, encapsulation, enclosure,

demolition, and renovation activities related to asbestos containing materials (ACM).

Aerosol - Solid or liquid particulate suspended in air.

Adequately wet - Sufficiently mixed or penetrated with liquid to prevent the release of particulates. If visible emissions are observed coming from the ACM, then that material has not been adequately wetted.

Aggressive method - Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact ACM.

Aggressive air sampling - EPA AHERA defined clearance sampling method using air moving equipment such as fans and leaf blowers to aggressively disturb and maintain in the air residual fibers after abatement.

AHERA - Asbestos Hazard Emergency Response Act. Asbestos regulations for schools issued in 1987.

Aircell - Pipe or duct insulation made of corrugated cardboard which contains asbestos.

Air monitoring - The process of measuring the fiber content of a known volume of air collected over a specified period of time. The NIOSH 7400 Method, Issue 3, Fifth Edition is used to determine the fiber levels in air. For personal samples, area air samples and clearance air testing using Phase Contrast Microscopy (PCM) analysis, the NIOSH Method 7402 Issue 2, Fourth Edition) can be used when it is necessary to confirm fibers counted by PCM as being asbestos. The AHERA TEM analysis may be used for background, area samples and clearance samples when required by this specification, or at the discretion of the VPIH/CIH as appropriate.

Air sample filter - The filter used to collect fibers which are then counted. The filter is made of mixed cellulose ester membrane (MCE) for PCM (Phase Contrast Microscopy, 25 mm, 3-piece with 2 inches Static Extension Cowl, 0.8 micron pore size) and MCE for TEM (Transmission Electron Microscopy, 25 mm, 3-piece with 2 inches Static Extension Cowl, 0.45 micron pore size).

Amended water - Water to which a surfactant (wetting agent) has been added to increase the penetrating ability of the liquid.

Asbestos - Includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these

minerals that have been chemically treated or altered. Asbestos also includes PACM, as defined below.

Asbestos Hazard Abatement Plan (AHAP) - Asbestos work procedures required to be submitted by the contractor before work begins.

Asbestos-containing material (ACM) - Any material containing more than one percent of asbestos.

Asbestos contaminated elements (ACE) - Building elements such as ceilings, walls, lights, or ductwork that are contaminated with asbestos.

Asbestos-contaminated soil (ACS) – Soil found in the work area or in adjacent areas such as crawlspaces or pipe tunnels which is contaminated with asbestos-containing material debris and cannot be easily separated from the material.

Asbestos-containing waste (ACW) material - Asbestos-containing material or asbestos contaminated objects requiring disposal.

Asbestos Project Monitor – Some States require that any person conducting asbestos abatement air sampling, clearance inspections and clearance air sampling be licensed as an asbestos project monitor.

Asbestos waste decontamination facility - A system consisting of drum/bag washing facilities and a temporary storage area for cleaned containers of asbestos waste. Used as the exit for waste and equipment leaving the regulated area. In an emergency, it may be used to evacuate personnel.

Authorized person - Any person authorized by the VA, the Contractor, or government agency and required by work duties to be present in regulated areas.

Authorized visitor - Any person approved by the VA; the contractor; or any government agency representative having jurisdiction over the regulated area (e.g., OSHA, Federal and State EPA).

Barrier - Any surface that isolates the regulated area and inhibits fiber migration from the regulated area.

Containment Barrier - An airtight barrier consisting of walls, floors, and/or ceilings of sealed plastic sheeting which surrounds and seals the outer perimeter of the regulated area.

Critical Barrier - The barrier responsible for isolating the regulated area from adjacent spaces, typically constructed of 2-layers of 6-mil independently installed plastic sheeting (Polyethylene) secured in

place at openings such as doors, windows, penetrations or any other opening into the regulated area.

Primary Barrier – Plastic barriers placed over critical barriers and exposed directly to abatement work or to secondary barrier.

Secondary Barrier - Any additional plastic barriers used to isolate and provide protection from debris during abatement work.

Breathing zone - The hemisphere forward of the shoulders with a radius of about 150 - 225 mm (6 - 9 inches) from the worker's nose.

Bridging encapsulant - An encapsulant that forms a layer on the surface of the ACM.

Building/facility owner - The legal entity, including a lessee, which exercises control over management and recordkeeping functions relating to a building and/or facility in which asbestos activities take place.

Bulk testing - The collection and analysis of suspect asbestos containing materials.

Certified Industrial Hygienist (CIH) - A person certified in the comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene.

Class I asbestos work - Activities involving the removal of Thermal System Insulation (TSI) and surfacing ACM and Presumed Asbestos Containing Material (PACM).

Class II asbestos work - Activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic.

Clean room/Changing room - An uncontaminated room having facilities for the storage of employee's street clothing and uncontaminated materials and equipment.

Clearance sample - The final air sample taken after all asbestos work has been done and visually inspected. Performed by the VA's Professional Industrial Hygiene Consultant/Certified Industrial Hygienist (VPIH/CIH).

Closely resemble - The major workplace conditions which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

Competent person - In addition to the definition in 29 CFR 1926.32(f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f); in addition, for Class I and II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

Contractor's Professional Industrial Hygienist (CPIH/CIH) - The asbestos abatement contractor's industrial hygienist. The industrial hygienist must meet the qualification requirements of a PIH and may report to a certified industrial hygienist (CIH).

Count - Refers to the fiber count or the average number of fibers greater than five microns in length with a length-to-width (aspect) ratio of at least 3 to 1, per cubic centimeter of air.

Crawlspace – An area which can be found either in or adjacent to the work area. This area has limited access and egress and may contain asbestos materials and/or asbestos contaminated soil.

Decontamination area/unit - An enclosed area adjacent to and connected to the regulated area and consisting of an equipment room, shower room, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Demolition - The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Disposal bag - Typically 6-mil thick sift-proof, dustproof, leak-tight container used to package and transport asbestos waste from regulated areas to the approved landfill. Each bag/container must be labeled/marked in accordance with EPA, OSHA and DOT requirements.

Disturbance - Asbestos Operations and Maintenance Activities (OSHA Class III) that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. Disturbance includes cutting away small amounts of ACM or PACM, no greater than the amount that can be contained in one standard sized glove bag or waste bag, in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained

in one glove bag or disposal bag, which shall not exceed 60 inches in length or width.

Drum - A rigid, impermeable container made of cardboard fiber, plastic, or metal which can be sealed in order to be sift-proof, dustproof, and leak-tight.

Employee exposure - The exposure to airborne asbestos that would occur if the employee were not wearing respiratory protection equipment.

Encapsulant - A material that surrounds or embeds asbestos fibers in an adhesive matrix and prevents the release of fibers.

Encapsulation - Treating ACM with an encapsulant.

Enclosure - The construction of an air tight, impermeable, permanent barrier around ACM to control the release of asbestos fibers from the material and also eliminate access to the material.

Equipment room - A contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

Fiber - A particulate form of asbestos, 5 microns or longer, with a length to width (aspect) ratio of at least 3 to 1.

Fibers per cubic centimeter (f/cc) - Abbreviation for fibers per cubic centimeter, used to describe the level of asbestos fibers in air.

Filter - Media used in respirators, vacuums, or other machines to remove particulate from air.

Firestopping - Material used to close the open parts of a structure in order to prevent a fire from spreading.

Friable asbestos containing material - Any material containing more than one (1) percent asbestos as determined using the method specified 40 CFR 763, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Glovebag - Not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which materials and tools may be handled.

High efficiency particulate air (HEPA) filter – An ASHRAE MERV 17 filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

HEPA vacuum - Vacuum collection equipment equipped with a HEPA filter system capable of collecting and retaining asbestos fibers.

Homogeneous area - An area of surfacing, thermal system insulation or miscellaneous ACM that is uniform in color, texture and date of application.

HVAC - Heating, Ventilation and Air Conditioning

Industrial hygienist (IH) - A professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards. Meets definition requirements of the American Industrial Hygiene Association (AIHA).

Industrial hygienist technician (IH Technician) - A person working under the direction of an IH or CIH who has special training, experience, certifications and licenses required for the industrial hygiene work assigned. Some States require that an industrial hygienist technician conducting asbestos abatement air sampling, clearance inspection and clearance air sampling be licensed as an asbestos project monitor.

Intact - The ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

Lockdown - Applying encapsulant, after a final visual inspection, on all abated surfaces at the conclusion of ACM removal prior to removal of critical barriers.

National Emission Standards for Hazardous Air Pollutants (NESHAP) - EPA's rule to control emissions of asbestos to the environment (40 CFR Part 61, Subpart M).

Negative initial exposure assessment - A demonstration by the employer which complies with the criteria in 29 CFR 1926.1101 (f)(2)(iii), that employee exposure during an operation is expected to be consistently below the PEL or Excursion Limit (EL).

Negative pressure - Air pressure which is lower than the surrounding area, created by exhausting air from a sealed regulated area through HEPA equipped filtration units. OSHA requires maintaining -0.02 inch water column gauge inside the negative pressure enclosure.

Negative pressure respirator - A respirator in which the air pressure inside the facepiece is negative during inhalation relative to the air pressure outside the respirator facepiece.

Non-friable ACM - Material that contains more than 1 percent asbestos but cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Organic vapor cartridge - The type of cartridge used on air purifying respirators to remove organic vapor hazardous air contaminants.

Outside air - The air outside buildings and structures, including, but not limited to, the air under a bridge or in an open ferry dock.

Owner/operator - Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

Penetrating encapsulant - Encapsulant that is absorbed into the ACM matrix without leaving a surface layer.

Permissible exposure limit (PEL) - The level of exposure OSHA allows for an 8-hour time weighted average. For asbestos fibers, the eight (8) hour time-weighted average PEL is 0.1 fibers per cubic centimeter (0.1 f/cc) of air and the 30-minute Excursion Limit (EL) is 1.0 fibers per cubic centimeter (1 f/cc).

Personal protective equipment (PPE) – equipment designed to protect user from injury and/or specific job hazard. Such equipment may include protective clothing, hard hats, safety glasses, fall protection, and respirators.

Personal sampling/monitoring - Representative air samples obtained in the breathing zone for one or more workers within the regulated area using a filter cassette and a calibrated air sampling pump to determine asbestos exposure.

Pipe tunnel – An area, typically located adjacent to mechanical spaces or boiler rooms in which the pipes servicing the heating system in the building are routed to allow the pipes to access heating elements. These areas may contain asbestos pipe insulation, asbestos fittings, debris or asbestos-contaminated soil.

Polarized light microscopy (PLM) - Light microscopy using dispersion staining techniques and refractive indices to identify and quantify the type of asbestos present in a bulk sample.

Polyethylene sheeting - Strong plastic barrier material 4 to 6-mils thick, semi-transparent, flame retardant per NFPA 241.

Positive/negative fit check - A method of verifying the seal of a facepiece respirator by temporarily occluding the filters and breathing in (inhaling) and then temporarily occluding the exhalation valve and breathing out (exhaling) while checking for inward or outward leakage of the respirator respectively.

Presumed ACM (PACM) - Thermal system insulation, surfacing, and flooring material installed in buildings prior to 1981. If the building owner has actual knowledge, or should have known through the exercise of due diligence that other materials are ACM, they too must be treated as PACM. The designation of PACM may be rebutted pursuant to 29 CFR 1926.1101 (k)(5).

Professional IH - An IH who meets the definition requirements of AIHA; meets the definition requirements of OSHA as a "Competent Person" at 29 CFR 1926.1101 (b); has completed two specialized EPA approved courses on management and supervision of asbestos abatement projects; has formal training in respiratory protection and waste disposal; and has a minimum of four projects of similar complexity with this project of which at least three projects serving as the supervisory IH. The PIH may be either the VA's PIH (VPIH/CIH) or Contractor's PIH (CPIH/CIH).

Project designer - A person who has successfully completed the training requirements for an asbestos abatement project designer as required by 40 CFR 763 Subpart E, Appendix C, Part I; (B)(5).

Assigned Protection factor - A value assigned by OSHA/NIOSH to indicate the expected protection provided by each respirator class, when the respirator is properly selected and worn correctly. The number indicates the reduction of exposure level from outside to inside the respirator facepiece.

Qualitative fit test (QLFT) - A fit test using a challenge material that can be sensed by the wearer if leakage in the respirator occurs.

Quantitative fit test (QNFT) - A fit test using a challenge material which is quantified outside and inside the respirator thus allowing the determination of the actual fit factor.

Regulated area - An area established by the employer to demarcate where Class I, II, III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work may accumulate; and a work area within which airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed the PEL.

Regulated ACM (RACM) - Friable ACM; Category I non-friable ACM that has become friable; Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or; Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of the demolition or renovation operation.

Removal - All operations where ACM, PACM and/or RACM is taken out or stripped from structures or substrates, including demolition operations.

Renovation - Altering a facility or one or more facility components in any way, including the stripping or removal of asbestos from a facility component which does not involve demolition activity.

Repair - Overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

Shower room - The portion of the PDF where personnel shower before leaving the regulated area.

Supplied air respirator (SAR) - A respiratory protection system that supplies minimum Grade D respirable air per ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-2018.

Surfacing ACM - A material containing more than 1 percent asbestos that is sprayed, troweled on or otherwise applied to surfaces for acoustical, decorative, fireproofing and other purposes.

Surfactant - A chemical added to water to decrease water's surface tension thus making it more penetrating into ACM.

Thermal system ACM - A material containing more than 1 percent asbestos applied to pipes, fittings, boilers, breeching, tanks, ducts, or other structural components to prevent heat loss or gain.

Transmission electron microscopy (TEM) - A microscopy method that can identify and count asbestos fibers.

VA Professional Industrial Hygienist (VPIH/CIH) - The Department of Veterans Affairs Professional Industrial Hygienist must meet the qualifications of a PIH, and may report to a Certified Industrial Hygienist (CIH).

VA Representative - The VA official responsible for on-going project work.

VA Total – means a building or substantial part of the building is completely removed, torn or knocked down, bulldozed, flattened, or razed, including removal of building debris.

Visible emissions - Any emissions, which are visually detectable without the aid of instruments, coming from ACM/PACM/RACM/ACS or ACM waste material.

Waste/Equipment decontamination facility (W/EDF) – The area in which equipment is decontaminated before removal from the regulated area.

Waste generator - Any owner or operator whose act or process produces asbestos-containing waste material.

Waste shipment record - The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

Wet cleaning - The process of thoroughly eliminating, by wet methods, any asbestos contamination from surfaces or objects.

C. Referenced Standards Organizations: See Section 01 42 19 REFERENCED STANDARDS.

1.5 APPLICABLE CODES AND REGULATIONS

General Applicability of Codes, Regulations, and Standards:

All work under this contract shall be done in strict accordance with all applicable Federal, State, and Local regulations, standards and codes governing asbestos abatement, and any other trade work done in conjunction with the abatement. All applicable codes, regulations and standards are adopted into this specification and will have the same force and effect as this specification.

The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with these specification, exists, the most stringent requirement(s) shall be utilized.

Copies of all standards, regulations, codes and other applicable documents, including this specification and those listed in Section 1.5 shall be available at the worksite in the clean change area of the worker decontamination system and/or the Contractor’s on-site Field Office. These standards, regulations, codes and other applicable documents, including this specification and those listed in Section 1.5 may be made available electronically.

A. Asbestos Abatement Contractor Responsibility: The Asbestos Abatement Contractor (Contractor) shall assume full responsibility and liability for compliance with all applicable Federal, State and Local regulations related to any and all aspects of the asbestos abatement project. The Contractor is responsible for providing and maintaining training, accreditations, medical exams, medical records, personal protective equipment (PPE), respiratory protection, and respirator fit testing, as required by applicable Federal, State and Local regulations. The Contractor shall hold the VA and VPIH/CIH consultants harmless for any Contractor's failure to comply with any applicable work, packaging, transporting, disposal, safety, health, or environmental requirement on the part of himself, his employees, or his subcontractors. The Contractor will incur all costs of the CPIH/CIH, including all sampling/analytical costs to assure compliance with OSHA/EPA/State/Local requirements related to failure to comply with the regulations applicable to the work.

B. Federal Requirements: Federal requirements which govern some aspect of asbestos abatement include, but are not limited to, the following regulations.

1. Occupational Safety and Health Administration **(OSHA)**
   a. Title 29 CFR 1926.1101 - Construction Standard for Asbestos
   b. Title 29 CFR 1926 Subpart E - Personal Protective Equipment and Life Saving Equipment
   c. Title 29 CFR 1910.134 - Respiratory Protection
   d. Title 29 CFR 1926 - Construction Industry Standards
   e. Title 29 CFR 1926.33 - Access to Employee Exposure and Medical Records
   f. Title 29 CFR 1926.59 same as 1910.1200 - Hazard Communication
   g. Title 29 CFR 1926 Subpart C – General Safety and Health Provisions and Subpart D – Occupational Health and Environmental Controls

B. Environmental Protection Agency **(EPA)**
   a. 1.40 CFR 61 Subpart M - National Emission Standard for Hazardous Air Pollutants - Asbestos
   b. 2.40 CFR 763.80 - Asbestos Hazard Emergency Response Act (AHERA) and Asbestos Hazard Abatement Reauthorization Act (ASHARA)

C. Department of Transportation **(DOT)**

a. Title 49 CFR 171 - 180 – Transportation

C. State Requirements:

D. Local Requirements:

E. Standards:

A. Standards which govern asbestos abatement activities include, but are not limited to, the following:

a. American National Standards Institute (ANSI/ASSP) Z9.2-2018 - Fundamentals Governing the Design and Operation of Local Exhaust Systems and ANSI/ASSE Z88.2-2015 - Practices for Respiratory Protection.

b. Underwriters Laboratories (UL) 586-2009 - UL Standard for Safety of HEPA filter Units, 9th Edition; ANSI Approval 2017-12-19.

B. Standards which govern encapsulation work include, but are not limited to, the following:

a. American Society for Testing and Materials International (ASTM).

C. Standards which govern the fire and safety concerns in abatement work include, but are not limited to, the following:

a. National Fire Protection Association (NFPA) 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

b. NFPA 701 - Standard Methods for Fire Tests for Flame Resistant Textiles and Film.

c. NFPA 101 - Life Safety Code.

F. EPA Guidance Documents:

A. EPA guidance documents which discuss asbestos abatement work activities are listed below. These documents are made part of this section by reference. Guidance for Controlling ACM in Buildings (Purple Book) EPA 560/5-85-024.

B. Asbestos Waste Management Guidance EPA 530-SW-85-007.

C. A Guide to Respiratory Protection for the Asbestos Abatement Industry EPA-560-OPTS-86-001.

D. Guide to Managing Asbestos in Place (Green Book) TS 799 20T July 1990.

G. Notices:

A. State and Local agencies: Send written notification as required by state and local regulations including the local fire department prior to beginning any work on ACM as follows:

B. Copies of notifications shall be submitted to the VA for the facility's records in the same time frame notification are given to EPA, State, and Local authorities.

H. Permits/Licenses: The contractor shall apply for and have all required permits and licenses to perform asbestos abatement work as required by Federal, State, and Local regulations prior to beginning any work on ACM as follows.

I. Posting and Filing of Regulations: Maintain two (2) copies of applicable Federal, State, and Local regulations. Post one copy of each at the regulated area where workers will have daily access to the regulations and keep another copy in the Contractor's office.

J. VA Responsibilities Prior to Commencement of Work:

A. Notify occupants adjacent to regulated areas of project dates and requirements for relocation, if needed. Arrangements must be made prior to starting work for relocation of desks, files, equipment, and personal possessions to avoid unauthorized access into the regulated area. Note: **Notification of adjacent personnel is required by OSHA in 29 CFR 1926.1101 (k) to prevent unnecessary or unauthorized access to the regulated area.**

B. Submit to the Contractor results of background air sampling; including location of samples, person who collected the samples, equipment utilized, calibration data and method of analysis. During abatement, submit to the Contractor, results of bulk material analysis and air sampling data collected during the course of the abatement. This information shall not release the Contractor from any responsibility for OSHA compliance.

K. 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 1926, Subpart C, Standard 1926.35 Employee Emergency Action Plans.

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.

E. Employees shall be trained in regulated area/site evacuation procedures in the event of workplace emergencies.

   a. For non-life-threatening situations - employees injured or otherwise incapacitated shall be decontaminated following normal procedures with assistance from fellow workers, if necessary, before exiting the regulated area to obtain proper medical treatment.

   b. For life-threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, medical personnel shall remove them from the regulated area if back or neck injury is present, and secure proper medical treatment.

F. Telephone numbers of any/all emergency response personnel shall be prominently posted in the clean room, along with the location of the nearest telephone.

G. The Contractor shall provide verification of first aid/CPR training for personnel responsible for providing first aid/CPR. OSHA requires medical assistance within 3-4 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.

L. Pre-Construction Meeting:

A. Prior to commencing the work, the Contractor shall meet with the VPIH/CIH to present and review, as appropriate, the items following this paragraph. The Contractor's Competent Person(s) who will be on-site shall participate in the pre-start meeting. The pre-start meeting is to discuss and determine procedures to be used during the project. At this meeting, the Contractor shall provide:

a. Proof of Contractor licensing.

b. Proof the Competent Person is trained and accredited and approved for working in this State. Verification of the experience of the Competent Person shall also be presented.

c. A list of all workers who will participate in the project, including experience and verification of training and accreditation.

d. A list of and verification of training for all personnel who have current first-aid/CPR training. A minimum of one person per shift must have adequate training.

e. Current medical written opinions for all personnel working on-site meeting the requirements of 29 CFR 1926.1101 (m).

f. Current fit-tests for all personnel wearing respirators on-site meeting the requirements of 29 CFR 1926.1101 (h) and Appendix C.

g. A copy of the Contractor's Asbestos Hazard Abatement Plan. In these procedures, the following information must be detailed, specific for this project. A copy of the Contractor's Asbestos Hazard Abatement Plan (AHAP) for Class I Glovebag Asbestos Abatement. In these procedures, the following information must be detailed, specific for this project.

1) Regulated area preparation procedures;

2) Notification requirements procedure of Contractor as required in 29 CFR 1926.1101 (d) Multi-Employer Worksites;

3) If required, decontamination area set-up/layout and decontamination procedures for employees;

4) Glovebag abatement methods/procedures and equipment to be used; and

5) Personal protective equipment to be used

B. At this meeting the Contractor shall provide all submittals as required.

C. Procedures for handling, packaging and disposal of asbestos waste.

D. Emergency Action Plan and Contingency Plan Procedures.

1.6 PERSONAL PROTECTIVE EQUIPMENT

A. Respiratory Protection

1. All personnel shall wear appropriate NIOSH-approved respiratory protection when working in environments containing ACM, based on exposure assessment.
2. Respiratory protection program must comply with 29 CFR 1910.134.

B. Protective Clothing

1. Provide personnel exposed to asbestos with disposable protective whole body clothing, head coverings, gloves, and foot coverings.
2. Provide disposable plastic or rubber gloves to protect hands.
3. Use tape to secure sleeves at the wrists and to secure foot coverings at the ankle.

1.7 TRAINING REQUIREMENTS

A. All personnel working in environments containing ACM shall receive:

1. Asbestos awareness training in accordance with OSHA 29 CFR 1926.1101
2. Respiratory protection training
3. Hazard communication training
4. Site-specific safety training

1.8 MEDICAL SURVEILLANCE

A. Provide medical monitoring for all personnel working in ACM environments in accordance with OSHA 29 CFR 1926.1101(m).

1.9 EMERGENCY PROCEDURES

A. Establish emergency and fire evacuation routes.

B. In case of suspected ACM disturbance:

1. Stop work immediately
2. Keep material wet/contained
3. Evacuate area
4. Notify supervisor and safety personnel
5. Follow site-specific emergency procedures

PART 2 - PRODUCTS

2.1 PROTECTIVE EQUIPMENT

A. Respirators: NIOSH-approved respirators appropriate for asbestos exposure levels

B. Protective Clothing: Disposable full-body coveralls and head covers

C. Additional PPE as required by site conditions and hazard assessment

PART 3 – EXECUTION

3.1 GENERAL REQUIREMENTS

A. Follow all applicable regulations regarding working near ACM.

B. Do not disturb existing ACM.

C. Stop work and notify supervisor if suspected ACM is encountered.

D. Maintain proper PPE use throughout operations.

E. Follow proper decontamination procedures when exiting work areas.

- - - END - - -

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies cast-in-place structural concrete and materials and mixes for other concrete.

1.2 RELATED WORK:

A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Concrete roads, walks, and similar exterior site work: Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS.

1.3 TESTING AGENCY FOR CONCRETE MIX DESIGN:

A. Testing agency for the trial concrete mix design retained and reimbursed by the Contractor and approved by Contracting Officer's Representative. For all other testing, refer to Section 01 45 29 Testing Laboratory Services.

B. Testing agency maintaining active participation in Program of Cement and Concrete Reference Laboratory (CCRL) of National Institute of Standards and Technology. Accompany request for approval of testing agency with a copy of Report of Latest Inspection of Laboratory Facilities by CCRL.

C. Testing agency shall furnish equipment and qualified technicians to establish proportions of ingredients for concrete mixes.

1.4 TOLERANCES:

A. Formwork: ACI 117, except the elevation tolerance of formed surfaces before removal of shores is +0 mm (+0 inch) and -20 mm (-3/4 inch).

B. Reinforcement Fabricating and Placing: ACI 117, except that fabrication tolerance for bar sizes Nos. 10, 13, and 16 (Nos. 3, 4, and 5) (Tolerance Symbol 1 in Fig. 2.1(a), ACI, 117) used as column ties or stirrups is +0 mm (+0 inch) and -13 mm (-1/2 inch) where gross bar length is less than 3600 mm (12 feet), or +0 mm (+0 inch) and -20 mm (-3/4 inch) where gross bar length is 3600 mm (12 feet) or more.

C. Cross-Sectional Dimension: ACI 117, except tolerance for thickness of slabs 12 inches or less is +20 mm (+3/4 inch) and - 6 mm (-1/4 inch). Tolerance of thickness of beams more than 300 mm (12 inch) but less than 900 mm (3 feet) is +20 mm (+3/4 inch) and -10 mm (-3/8 inch).

D. Slab Finishes: ACI 117, Section 4.5.6, F-number method in accordance with ASTM E1155, except as follows:
   1. Test entire slab surface, including those areas within 600 mm (2 feet) of construction joints and vertical elements that project through slab surface.
   2. Maximum elevation change which may occur within 600 mm (2 feet) of any column or wall element is 6 mm (0.25 inches).
   3. Allow sample measurement lines that are perpendicular to construction joints to extend past joint into previous placement no further than 1500 mm (5 feet).

1.5 REGULATORY REQUIREMENTS:

A. ACI SP-66 – ACI Detailing Manual.
B. ACI 318 - Building Code Requirements for Reinforced Concrete.
C. ACI 301 – Standard Specifications for Structural Concrete.

1.6 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
B. Shop Drawings: Required submittal items are listed here; see below for detailed requirements. Do not submit items not requested. Reproduction of structural drawings for shop drawings is not permitted.
   1. Submittal Schedule
   2. Mix Designs
   3. Concrete Travel Times to the Project Site
   4. Hot and Cold Weather Procedures
   5. Product Data
   6. Concrete Joint Locations
   7. Comprehensive Layout Drawings
   8. Preconstruction Survey: Submit for record. Where interface with existing construction occurs, before related shop drawings are prepared survey the existing construction and submit the survey prepared by a professional surveyor employed by the Contractor to the Design Professionals.
   9. FF/FL Testing
   10. Structural Repairs
   11. Patching Defective Concrete Finishes
   12. Conduit and Pipes Embedded in Concrete
   13. Hazardous Materials Notification

14. Reinforcing steel: Complete shop drawings

C. Mill Test Reports:
   1. Reinforcing Steel.
   2. Cement.

D. Manufacturer's Certificates:
   1. Abrasive aggregate.
   2. Air-entraining admixture.
   3. Chemical admixtures, including chloride ion content.
   4. Waterproof paper for curing concrete.
   5. Liquid membrane-forming compounds for curing concrete.
   6. Non-shrinking grout.
   7. Liquid hardener.
   8. Waterstops.
   9. Expansion joint filler.
   10. 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 water-cement-fly ash ratio curves, concrete mix ingredients, and admixtures.

1.7 DELIVERY, STORAGE, AND HANDLING:

A. Conform to ACI 304. Store aggregate separately for each kind or grade, to prevent segregation of sizes and avoid inclusion of dirt and other materials.

B. Deliver cement in original sealed containers bearing name of brand and manufacturer, and marked with net weight of contents. Store in suitable watertight building in which floor is raised at least 300 mm (1 foot) above ground. Store bulk cement and fly ash in separate suitable bins.

C. Deliver other packaged materials for use in concrete in original sealed containers, plainly marked with manufacturer's name and brand, and protect from damage until used.

1.8 PRE-CONCRETE CONFERENCE:

A. General: At least 15 days prior to submittal of design mixes, conduct a meeting to review proposed methods of concrete construction to achieve the required results.

B. Agenda: Includes but is not limited to:

1. Submittals.
2. Coordination of work.
3. Availability of material.
4. Concrete mix design including admixtures.
5. Methods of placing, finishing, and curing.
6. Finish criteria required to obtain required flatness and levelness.
7. Timing of floor finish measurements.
8. Material inspection and testing.

C. Attendees: Include but not limited to representatives of Contractor; subcontractors involved in supplying, conveying, placing, finishing, and curing concrete; lightweight aggregate manufacturer; admixture manufacturers; Contracting Officer's Representative; Consulting Engineer; Department of Veterans Affairs retained testing laboratories for concrete testing and finish (F-number) verification.

D. Minutes of the meeting: Contractor shall take minutes and type and distribute the minutes to attendees within five days of the meeting.

1.9 APPLICABLE PUBLICATIONS:

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

B. American Concrete Institute (ACI):

117-10.....Specifications for Tolerances for Concrete Construction and Materials and Commentary

211.1-91(R2009).....Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

214R-11.....Guide to Evaluation of Strength Test Results of Concrete

301-10.....Standard Practice for Structural Concrete

304R-00(R2009).....Guide for Measuring, Mixing, Transporting, and Placing Concrete

305.1-06.....Specification for Hot Weather Concreting

306.1-90(R2002).....Standard Specification for Cold Weather Concreting

308.1-11.....Specification for Curing Concrete

309R-05.....Guide for Consolidation of Concrete

318-11.....Building Code Requirements for Structural Concrete and Commentary

347-04.....Guide to Formwork for Concrete

SP-66-04.....ACI Detailing Manual

C. American National Standards Institute and American Hardboard Association (ANSI/AHA):

A135.4-2004.....Basic Hardboard

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

A185/185M-07.....Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete

A615/A615M-09.....Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement

A653/A653M-11.....Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process

A706/A706M-09.....Standard Specification for Low Alloy Steel Deformed and Plain Bars for Concrete Reinforcement

A767/A767M-09.....Standard Specification for Zinc Coated (Galvanized) Steel Bars for Concrete Reinforcement

A775/A775M-07.....Standard Specification for Epoxy Coated Reinforcing Steel Bars

A820-11.....Standard Specification for Steel Fibers for Fiber Reinforced Concrete

C31/C31M-10.....Standard Practice for Making and Curing Concrete Test Specimens in the field

C33/C33M-11A.....Standard Specification for Concrete Aggregates

C39/C39M-12.....Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

C94/C94M-12.....Standard Specification for Ready Mixed Concrete

C143/C143M-10.....Standard Test Method for Slump of Hydraulic Cement Concrete

C150-11.....Standard Specification for Portland Cement

C171-07.....Standard Specification for Sheet Materials for Curing Concrete

C172-10.....Standard Practice for Sampling Freshly Mixed Concrete

C173-10.....Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

C192/C192M-07.....Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory

C231-10.....Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

C260-10.....Standard Specification for Air Entraining Admixtures for Concrete

C309-11.....Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete

C494/C494M-11.....Standard Specification for Chemical Admixtures for Concrete

C618-12.....Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

C666/C666M-03(R2008)....Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing

C881/C881M-10.....Standard Specification for Epoxy Resin Base Bonding Systems for Concrete

C1107/1107M-11.....Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)

C1315-11.....Standard Specification for Liquid Membrane Forming Compounds Having Special Properties for Curing and Sealing Concrete

D6-95(R2011).....Standard Test Method for Loss on Heating of Oil and Asphaltic Compounds

D297-93(R2006).....Standard Methods for Rubber Products Chemical Analysis

D412—06AE2.....Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension

D1751-04(R2008).....Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural

Construction (Non-extruding and Resilient Bituminous Types)

D4263-83(2012).....Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

E1155-96(R2008).....Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers

F1249-13.....Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor

F1869-11.....Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

E. American Welding Society (AWS):

D1.4/D1.4M-11.....Structural Welding Code - Reinforcing Steel

F. Concrete Reinforcing Steel Institute (CRSI):

Handbook 2008

G. U. S. Department of Commerce Product Standard (PS):

PS 1.....Construction and Industrial Plywood

PS 20.....American Softwood Lumber

H. U. S. Army Corps of Engineers Handbook for Concrete and Cement:

CRD C513.....Rubber Waterstops

CRD C572.....Polyvinyl Chloride Waterstops

PART 2 – PRODUCTS:

2.1 FORMS:

A. Wood: PS 20 free from loose knots and suitable to facilitate finishing concrete surface specified; tongue and grooved.

B. Plywood: PS-1 Exterior Grade B-B (concrete-form) 16 mm (5/8 inch), or 20 mm (3/4 inch) thick for unlined contact form. B-B High Density Concrete Form Overlay optional.

C. Metal for Concrete Rib-Type Construction: Steel (removal type) of suitable weight and form to provide required rigidity.

D. Permanent Steel Form for Concrete Slabs: Corrugated, ASTM A653, Grade E, and Galvanized, ASTM A653, G90. Provide venting where insulating concrete fill is used.

E. Form Lining:

1. Hardboard: ANSI/AHA A135.4, Class 2 with one (S1S) smooth side)

2. Plywood: Grade B-B Exterior (concrete-form) not less than 6 mm (1/4 inch) thick.
3. Plastic, fiberglass, or elastomeric capable of reproducing the desired pattern or texture.

F. Concrete products shall comply with following standards for biobased materials:

Material Type	Percent by Weight
Concrete Penetrating Liquid	79 percent biobased material
Concrete form Release Agent	87 percent biobased material
Concrete Sealer	11 percent biobased material

The minimum-content standards are based on the weight (not the volume) of the material.

G. Form Ties: Develop a minimum working strength of 13.35 kN (3000 pounds) when fully assembled. Ties shall be adjustable in length to permit tightening of forms and not have any lugs, cones, washers to act as spreader within form, nor leave a hole larger than 20 mm (3/4 inch) diameter, or a depression in exposed concrete surface, or leave metal closer than 40 mm (1 1/2 inches) to concrete surface. Wire ties not permitted. Cutting ties back from concrete face not permitted.

2.2 MATERIALS:

A. Portland Cement: ASTM C150 Type I or II.

B. Fly Ash: ASTM C618, Class C or F including supplementary optional requirements relating to reactive aggregates and alkalies, and loss on ignition (LOI) not to exceed 5 percent.

C. Coarse Aggregate: ASTM C33.

1. Size 67 or Size 467 may be used for footings and walls over 300 mm (12 inches) thick.
2. Coarse aggregate for interior slabs on grade shall conform to the following:
   a. Dense or well graded aggregate.
      1) Percent retained on each sieve below the top size and above the No. 100 sieve:
         a) 8 to 18 percent for 1-1/2 inches (38 mm)top size.
         b) 8 to 22 percent for 3/4 or 1 inch (19 or 25 mm) top size.
      2) The above requirements may be deviated from based on locally available material.

a) One or two non-adjacent sieves sizes may fall outside of the limits set above.
b) Percent retained on two adjacent sieves sizes shall not be less than 5 percent of the above required.
c) Percent retained on three adjacent sieve sizes shall not be less than 8 percent of the above required.
d) When the percent retained on each of two adjacent sieve sizes is less than 8 percent the total percent retained on either of these sieves and the adjacent outside sieve should be at least 13 percent (for example, if both the No. 4 and No. 8 (4.75 and 2.36 mm)sieves have 6 percent retained on each item then: 1. the total retained on the 3/8 inch and No. 4 (9.5 and 4.75 mm) sieves should be at least 13 percent, and 2. the total retained on the No. 8 and No. 16 (2.36 and 1.18 mm) sieves should be at least 13 percent.

3. Coarse aggregate for applied topping and encasement of steel columns shall be Size 7.
4. Maximum size of coarse aggregates not more than one-fifth of narrowest dimension between sides of forms, one-third of depth of slabs, nor three-fourth of minimum clear spacing between reinforcing bars.

D. Fine Aggregate: ASTM C33. Fine aggregate for applied concrete floor topping shall pass a 4.75 mm (No. 4) sieve, 10 percent maximum shall pass a 150 µm (No. 100) sieve.
E. Mixing Water: ASTM C1602. Fresh, clean, and potable.
F. Admixtures:
1. Water Reducing Admixture: ASTM C494, Type A and not contain more chloride ions than are present in municipal drinking water.
2. Water Reducing, Retarding Admixture: ASTM C494, Type D and not contain more chloride ions than are present in municipal drinking water.
3. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C494, Type F or G, and not contain more chloride ions than are present in municipal drinking water.
4. Non-Corrosive, Non-Chloride Accelerator: ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal

drinking water. Admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory of at least one year duration using an acceptable accelerated corrosion test method such as that using electrical potential measures.

5. Air Entraining Admixture: ASTM C260.
6. Microsilica: Use only with prior review and acceptance of the Contracting Officer's Representative. Use only in conjunction with high range water reducer.
7. Calcium Nitrite corrosion inhibitor: ASTM C494 Type C.
8. Prohibited Admixtures: Calcium chloride, thiocyanate or admixtures containing more than 0.05 percent chloride ions are not permitted.
9. Certification: Written conformance to the requirements above and the chloride ion content of the admixture prior to mix design review.

G. Vapor Barrier: ASTM F1249,0.25 mm **(15 mil)** WVT 0.012 ft./hr. or 0.38 mm (15 mil) WVT 0.007 ft./hr.

H. Reinforcing Steel: ASTM A615, or ASTM A996, deformed, grade as shown.

I. Welded Wire Fabric: ASTM A1064.

J. Reinforcing Bars to be Welded: ASTM A706.

K. Epoxy Coated Reinforcing Bars: ASTM A775.

L. Reinforcement for Metal Pan Stair Fill: 50 mm (2 inch) wire mesh, either hexagonal mesh at .8Kg/m^2 (1.5 pounds per square yard), or square mesh at .6Kg/m^2 (1.17 pounds per square yard).

M. Supports, Spacers, and Chairs: Types which will hold reinforcement in position shown in accordance with requirements of ACI 318 except as specified.

N. Expansion Joint Filler: ASTM D1751.

O. Sheet Materials for Curing Concrete: ASTM C171.

P. Liquid Membrane-forming Compounds for Curing Concrete: ASTM C309, Type I, with fugitive dye, and shall meet the requirements of ASTM C1315.Compound shall be compatible with scheduled surface treatment, such as paint and resilient tile, and shall not discolor concrete surface.

Q. Abrasive Aggregate: Aluminum oxide grains or emery grits.

R. Liquid Hardener and Dustproofer: Fluosilicate solution of magnesium fluosilicate or zinc fluosilicate. Magnesium and zinc may be used separately or in combination as recommended by manufacturer. Use only

on exposed slab. Do not use where floor is covered with resilient flooring, paint or other finish coating.

S. Moisture Vapor Emissions & Alkalinity Control Sealer: 100% active colorless aqueous siliconate solution concrete surface.

1. ASTM C1315 Type 1 Class A, and ASTM C309 Type 1 Class A, penetrating product to have no less than 34% solid content, leaving no sheen, volatile organic compound (VOC) content rating as required to suite regulatory requirements. The product shall have at least a five (5) year documented history in controlling moisture vapor emission from damaging floor covering, compatible with all finish materials.
2. MVE 15-Year Warranty:
   a. When a floor covering is installed on a below grade, on grade, or above grade concrete slab treated with Moisture Vapor Emissions & Alkalinity Control Sealer according to manufacturer's instruction, sealer manufacturer shall warrant the floor covering system against failure due to moisture vapor migration or moisture-born contaminates for a period of fifteen (15) years from the date of original installation. The warranty shall cover all labor and materials needed to replace all floor covering that fails due to moisture vapor emission & moisture born contaminates.

T. Non-Shrink Grout:

1. ASTM C1107, pre-mixed, produce a compressive strength of at least 18 MPa at three days and the design f'c indicated in the drawings at 28 days. Furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95 percent bearing under a 1200 mm x 1200 mm (4 foot by 4 foot) base plate.
2. Where high fluidity or increased placing time is required, furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95 percent under an 450 mm x 900 mm (18 inch by 36 inch) base plate.

U. Adhesive Binder: ASTM C881.

V. Waterstops:

1. Polyvinyl Chloride Waterstop: CRD C572.
2. Rubber Waterstops: CRD C513.

3. Bentonite Waterstop: Flexible strip of bentonite 25 mm x 20 mm (1 inch by 3/4 inch), weighing 8.7 kg/m (5.85 lbs. per foot) composed of Butyl Rubber Hydrocarbon (ASTM D297), Bentonite (SS-S-210-A) and Volatile Matter (ASTM D6).
4. Non-Metallic Hydrophilic: Swellable strip type compound of polymer modified chloroprene rubber that swells upon contact with water shall conform to ASTM D412 as follows: Tensile strength 420 psi minimum; ultimate elongation 600 percent minimum. Hardness shall be 50 minimum on the type A durameter and the volumetric expansion ratio in in 70 deg water shall be 3 to 1 minimum.

W. Porous Backfill: Crushed stone or gravel graded from 25 mm to 20 mm (1 inch to 3/4 inch).

X. Fibers:
1. Synthetic Fibers: ASTM C1116, Type III. Monofilament or fibrillated polypropylene fibers for secondary reinforcing of concrete members. Use appropriate length and 0.9 kg/m^3 (1.5 lb. per cubic yard). Product shall have a UL rating.
2. Steel Fibers: ASTM A820, Type I cold drawn, high tensile steel wire for use as primary reinforcing in slab-on-grade. Minimum dosage rate 18 kg/m^3 (30 lb. per cubic yard).

Y. Epoxy Joint Filler: Two component, 100 percent solids compound, with a minimum shore D hardness of 50.

Z. Bonding Admixture: Non-rewettable, polymer modified, bonding compound.

2.3 CONCRETE MIXES:

A. Mix Designs: Proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318.
1. If trial mixes are used, make a set of at least 6 cylinders in accordance with ASTM C192 for test purposes from each trial mix; test three for compressive strength at 7 days and three at 28 days.
2. Submit a report of results of each test series, include a detailed listing of the proportions of trial mix or mixes, including cement, fly ash, admixtures, weight of fine and coarse aggregate per m^3 (cubic yard) measured dry rodded and damp loose, specific gravity, fineness modulus, percentage of moisture, air content, water-cement-fly ash ratio, and consistency of each cylinder in terms of slump.

3. Prepare a curve showing relationship between water-cement-fly ash ratio at 7-day and 28-day compressive strengths. Plot each curve using at least three specimens.
4. If the field experience method is used, submit complete standard deviation analysis.

B. Fly Ash Testing: Submit certificate verifying conformance with ASTM 618 initially with mix design and for each truck load of fly ash delivered from source. Submit test results performed within 6 months of submittal date. Notify Contracting Officer's Representative immediately when change in source is anticipated.
1. Testing Laboratory used for fly ash certification/testing shall participate in the Cement and Concrete Reference Laboratory (CCRL) program. Submit most recent CCRL inspection report.

C. After approval of mixes no substitution in material or change in proportions of approval mixes may be made without additional tests and approval of Contracting Officer's Representative or as specified. Making and testing of preliminary test cylinders may be carried on pending approval of cement and fly ash, providing Contractor and manufacturer certify that ingredients used in making test cylinders are the same. Contracting Officer's Representative may allow Contractor to proceed with depositing concrete for certain portions of work, pending final approval of cement and fly ash and approval of design mix.

D. Cement Factor: Maintain minimum cement factors in Table I regardless of compressive strength developed above minimums. Use Fly Ash as an admixture with 20% replacement by weight in all structural work. Fly ash shall not be used in high-early mix design.

TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE

Concrete Strength		Non-Air-Entrained	Air-Entrained	
Min. 28 Day Comp. Str. MPa (psi)	Min. Cement kg/m^3 (lbs/c. yd)	Max. Water Cement Ratio	Min. Cement kg/m^3 (lbs/c. yd)	Max. Water Cement Ratio
35 (5000)[1,3]	375 (630)	0.45	385 (650)	0.40
30 (4000)[1,3]	325 (550)	0.55	340 (570)	0.50
25 (3000)[1,3]	280 (470)	0.65	290 (490)	0.55
25 (3000)[1,2]	300 (500)	*	310 (520)	*

1. If trial mixes are used, the proposed mix design shall achieve a compressive strength 8.3 MPa (1200 psi) in excess of f'c. For concrete strengths above 35 Mpa (5000 psi), the proposed mix design shall achieve a compressive strength 9.7 MPa (1400 psi) in excess of f'c.
2. For concrete exposed to high sulfate content soils maximum water cement ratio is 0.44.
3. Determined by Laboratory in accordance with ACI 211.1 for normal concrete.

E. Maximum Slump: Maximum slump, as determined by ASTM C143 with tolerances as established by ASTM C94, for concrete to be vibrated shall be as shown in Table II.

TABLE II - MAXIMUM SLUMP, MM (INCHES)*

Type of Construction	Normal Weight Concrete
Reinforced Footings and Substructure Walls	75mm (3 inches)
Slabs, Beams, Reinforced Walls, and Building Columns	100 mm (4 inches)

F. Slump may be increased by the use of the approved high-range water-reducing admixture (superplasticizer). Tolerances as established by ASTM C94. Concrete containing the high-range-water-reducing admixture may have a maximum slump of 225 mm (9 inches). The concrete shall arrive at the job site at a slump of 50 mm to 75 mm (2 inches to 3 inches. This should be verified, and then the high-range-water-reducing admixture added to increase the slump to the approved level.

G. Air-Entrainment: Air-entrainment of normal weight concrete shall conform with Table III. Determine air content by either ASTM C173 or ASTM C231.

**TABLE III - TOTAL AIR CONTENT
FOR VARIOUS SIZES OF COARSE AGGREGATES (NORMAL CONCRETE)**

Nominal Maximum Size of Total Air Content	Coarse Aggregate, mm (Inches) Percentage by Volume
10 mm (3/8 in).6 to 10	13 mm (1/2 in).5 to 9
20 mm (3/4 in).4 to 8	25 mm (1 in).3-1/2 to 6-1/2
40 mm (1 1/2 in).3 to 6	

H. High early strength concrete, made with Type III cement or Type I cement plus non-corrosive accelerator, shall have a 7-day compressive strength equal to specified minimum 28-day compressive strength for concrete type specified made with standard Portland cement.

I. Concrete slabs placed at air temperatures below 10 degrees C (50 degrees Fahrenheit) use non-corrosive, non-chloride accelerator. Concrete required to be air entrained use approved air entraining admixture. Pumped concrete, synthetic fiber concrete, architectural concrete, concrete required to be watertight, and concrete with a water/cement ratio below 0.50 use high-range water-reducing admixture (superplasticizer).

J. Durability: Use air entrainment for exterior exposed concrete subjected to freezing and thawing and other concrete shown or specified. For air content requirements see Table III.

K. Enforcing Strength Requirements: Test as specified in Section 01 45 29, TESTING LABORATORY SERVICES, during the progress of the work. Seven-day tests may be used as indicators of 28-day strength. Average of any three 28-day consecutive strength tests of laboratory-cured specimens representing each type of concrete shall be equal to or greater than specified strength. No single test shall be more than 3.5 MPa (500 psi) below specified strength. Interpret field test results in accordance with ACI 214. Should strengths shown by test specimens fall below required values, Contracting Officer’s Representative may require any one or any combination of the following corrective actions, at no additional cost to the Government:

1. Require changes in mix proportions by selecting one of the other appropriate trial mixes or changing proportions, including cement content, of approved trial mix.
2. Require additional curing and protection.
3. If five consecutive tests fall below 95 percent of minimum values given in Table I or if test results are so low as to raise a question as to the safety of the structure, Contracting Officer’s Representative may direct Contractor to take cores from portions of the structure. Use results from cores tested by the Contractor retained testing agency to analyze structure.
4. If strength of core drilled specimens falls below 85 percent of minimum value given in Table I, Contracting Officer’s Representative

may order load tests, made by Contractor retained testing agency, on portions of building so affected. Load tests in accordance with ACI 318 and criteria of acceptability of concrete under test as given therein.

5. Concrete work, judged inadequate by structural analysis, by results of load test, or for any reason, shall be reinforced with additional construction or replaced, if directed by the Contracting Officer's Representative.

2.4 BATCHING AND MIXING:

A. General: Concrete shall be "Ready-Mixed" and comply with ACI 318 and ASTM C94, except as specified. Batch mixing at the site is permitted. Mixing process and equipment must be approved by the Contracting Officer's Representative. With each batch of concrete, furnish certified delivery tickets listing information in Paragraph 16.1 and 16.2 of ASTM C94. Maximum delivery temperature of concrete is 38^0C (100 degrees Fahrenheit). Minimum delivery temperature as follows:

Atmospheric Temperature	Minimum Concrete Temperature
-1. degrees to 4.4 degrees C (30 degrees to 40 degrees F)	15.6 degrees C (60 degrees F.)
-17 degrees C to -1.1 degrees C (0 degrees to 30 degrees F.)	21 degrees C (70 degrees F.)

1. Services of aggregate manufacturer's representative shall be furnished during the design of trial mixes and as requested by the Contracting Officer's Representative for consultation during batching, mixing, and placing operations of lightweight structural concrete. Services will be required until field controls indicate that concrete of required quality is being furnished. Representative shall be thoroughly familiar with the structural lightweight aggregate, adjustment and control of mixes to produce concrete of required quality. Representative shall assist and advise Contracting Officer's Representative.

PART 3 – EXECUTION

3.1 FORMWORK:

A. General: Design in accordance with ACI 347 is the responsibility of the Contractor. The Contractor shall retain a registered Professional Engineer to design the formwork, shores, and reshores.

1. Form boards and plywood forms may be reused for contact surfaces of exposed concrete only if thoroughly cleaned, patched, and repaired and Contracting Officer's Representative approves their reuse.
2. Provide forms for concrete footings unless Contracting Officer's Representative determines forms are not necessary.

B. Treating and Wetting: Treat or wet contact forms as follows:
1. Coat plywood and board forms with non-staining form sealer. In hot weather, cool forms by wetting with cool water just before concrete is placed.
2. Clean and coat removable metal forms with light form oil before reinforcement is placed. In hot weather, cool metal forms by thoroughly wetting with water just before placing concrete.
3. Use sealer on reused plywood forms as specified for new material.

C. Size and Spacing of Studs: Size and space studs, wales and other framing members for wall forms so as not to exceed safe working stress of kind of lumber used nor to develop deflection greater than 1/270 of free span of member.

D. Unlined Forms: Use plywood forms to obtain a smooth finish for concrete surfaces. Tightly butt edges of sheets to prevent leakage. Back up all vertical joints solidly and nail edges of adjacent sheets to same stud with 6d box nails spaced not over 150 mm (6 inches) apart.

E. Lined Forms: May be used in lieu of unlined plywood forms. Back up form lining solidly with square edge board lumber securely nailed to studs with all edges in close contact to prevent bulging of lining. No joints in lining and backing may coincide. Nail abutted edges of sheets to same backing board. Nail lining at not over 200 mm (8 inches) on center along edges and with at least one nail to each square foot of surface area; nails to be 3d blued shingle or similar nails with thin flatheads.

F. Architectural Liner: Attach liner as recommended by the manufacturer with tight joints to prevent leakage.

G. Wall Form Ties: Locate wall form ties in symmetrically level horizontal rows at each line of wales and in plumb vertical tiers. Space ties to maintain true, plumb surfaces. Provide one row of ties within 150 mm (6 inches) above each construction joint. Space through-ties adjacent to horizontal and vertical construction joints not over 450 mm (18 inches) on center.

1. Tighten row of ties at bottom of form just before placing concrete and, if necessary, during placing of concrete to prevent seepage of concrete and to obtain a clean line. Ties to be entirely removed shall be loosened 24 hours after concrete is placed and shall be pulled from least important face when removed.
2. Coat surfaces of all metal that is to be removed with paraffin, cup grease or a suitable compound to facilitate removal.

H. Inserts, Sleeves, and Similar Items: Flashing reglets, steel strips, masonry ties, anchors, wood blocks, nailing strips, grounds, inserts, wire hangers, sleeves, drains, guard angles, forms for floor hinge boxes, inserts or bond blocks for elevator guide rails and supports, and other items specified as furnished under this and other sections of specifications and required to be in their final position at time concrete is placed shall be properly located, accurately positioned, and built into construction, and maintained securely in place.
1. Install sleeves, inserts and similar items for mechanical services in accordance with drawings prepared specially for mechanical services. Contractor is responsible for accuracy and completeness of drawings and shall coordinate requirements for mechanical services and equipment.
2. Minimum clear distance of embedded items such as conduit and pipe is at least three times diameter of conduit or pipe, except at stub-ups and other similar locations.
3. Provide recesses and blockouts in floor slabs for door closers and other hardware as necessary in accordance with manufacturer's instructions.

I. Construction Tolerances:
1. Set and maintain concrete formwork to assure erection of completed work within tolerances specified and to accommodate installation of other rough and finish materials. Accomplish remedial work necessary for correcting excessive tolerances. Erected work that exceeds specified tolerance limits shall be remedied or removed and replaced, at no additional cost to the Government.
2. Permissible surface irregularities for various classes of materials are defined as "finishes" in specification sections covering individual materials. They are to be distinguished from tolerances

specified which are applicable to surface irregularities of structural elements.

3.2 PLACING REINFORCEMENT:

A. General: Details of concrete reinforcement in accordance with ACI 318 unless otherwise shown.

B. Placing: Place reinforcement conforming to CRSI DA4, unless otherwise shown.

1. Place reinforcing bars accurately and tie securely at intersections and splices with 1.6 mm (16 gauge) black annealed wire. Use epoxy-coated tie wire with epoxy-coated reinforcing. Secure reinforcing bars against displacement during the placing of concrete by spacers, chairs, or other similar supports. Portions of supports, spacers, and chairs in contact with formwork shall be made of plastic in areas that will be exposed when building is occupied. Type, number, and spacing of supports conform to ACI 318. Where concrete slabs are placed on ground, use concrete blocks or other non-corrodible material of proper height, for support of reinforcement. Use of brick or stone supports will not be permitted.
2. Lap welded wire fabric at least 1 1/2 mesh panels plus end extension of wires not less than 300 mm (12 inches) in structural slabs. Lap welded wire fabric at least 1 mesh panel plus end extension of wires not less than 150 mm (6 inches) in slabs on grade.

C. Spacing: Minimum clear distances between parallel bars, except in columns and multiple layers of bars in beams shall be equal to nominal diameter of bars. Minimum clear spacing is 25 mm (1 inch) or 1-1/3 times maximum size of coarse aggregate.

D. Splicing: Splices of reinforcement made only as required or shown or specified. Accomplish splicing as follows:

1. Lap splices: Do not use lap splices for bars larger than Number 36 (Number 11). Minimum lengths of lap as shown.
2. Welded splices: Splicing by butt-welding of reinforcement permitted providing the weld develops in tension at least 125 percent of the yield strength (fy) for the bars. Welding conform to the requirements of AWS D1.4. Welded reinforcing steel conform to the chemical analysis requirements of AWS D1.4.
   a. Submit test reports indicating the chemical analysis to establish weldability of reinforcing steel.

b. Submit a field quality control procedure to insure proper inspection, materials and welding procedure for welded splices.
c. Department of Veterans Affairs retained testing agency shall test a minimum of three splices, for compliance, locations selected by Contracting Officer's Representative.

3. Mechanical Splices: Develop in tension and compression at least 125 percent of the yield strength (fy) of the bars. Stresses of transition splices between two reinforcing bar sizes based on area of smaller bar. Provide mechanical splices at locations indicated. Use approved exothermic, tapered threaded coupling, or swaged and threaded sleeve. Exposed threads and swaging in the field not permitted.
   a. Initial qualification: In the presence of Contracting Officer's Representative, make three test mechanical splices of each bar size proposed to be spliced. Department of Veterans Affairs retained testing laboratory will perform load test.
   b. During installation: Furnish, at no additional cost to the Government, one companion (sister) splice for every 50 splices for load testing. Department of Veterans Affairs retained testing laboratory will perform the load test.

E. Bending: Bend bars cold, unless otherwise approved. Do not field bend bars partially embedded in concrete, except when approved by Contracting Officer's Representative.

F. Cleaning: Metal reinforcement, at time concrete is placed, shall be free from loose flaky rust, mud, oil, or similar coatings that will reduce bond.

G. Future Bonding: Protect exposed reinforcement bars intended for bonding with future work by wrapping with felt and coating felt with a bituminous compound unless otherwise shown.

3.3 VAPOR BARRIER:

A. Except where membrane waterproofing is required, interior concrete slab on grade shall be placed on a continuous vapor barrier.
   1. Place 100 mm (4 inches) of fine granular fill over the vapor barrier to act as a blotter for concrete slab.
   2. Vapor barrier joints lapped 150 mm (6 inches) and sealed with compatible waterproof pressure-sensitive tape.
   3. Patch punctures and tears.

3.4 SLABS RECEIVING RESILIENT COVERING

A. Slab shall be allowed to cure for 6 weeks minimum prior to placing resilient covering. After curing, slab shall be tested by the Contractor for moisture in accordance with ASTM D4263 or ASTM F1869. Moisture content shall be less than 3 pounds per 1000 sf prior to placing covering.

B. In lieu of curing for 6 weeks, Contractor has the option, at his own cost, to utilize the Moisture Vapor Emissions & Alkalinity Control Sealer as follows:

1. Sealer is applied on the day of the concrete pour or as soon as harsh weather permits, prior to any other chemical treatments for concrete slabs either on grade, below grade or above grade receiving resilient flooring, such as, sheet vinyl, vinyl composition tile, rubber, wood flooring, epoxy coatings and overlays.
2. Manufacturer’s representative will be on the site the day of concrete pour to install or train its application and document. He shall return on every application thereafter to verify that proper procedures are followed.
   a. Apply Sealer to concrete slabs as soon as final finishing operations are complete and the concrete has hardened sufficiently to sustain floor traffic without damage.
   b. Spray apply Sealer at the rate of 20 m^2 (200 square feet) per gallon. Lightly broom product evenly over the substrate and product has completely penetrated the surface.
   c. If within two (2) hours after initial application areas are subjected to heavy rainfall and puddling occurs, reapply Sealer product to these areas as soon as weather condition permits.

3.5 CONSTRUCTION JOINTS:

A. Unless otherwise shown, location of construction joints to limit individual placement shall not exceed 24,000 mm (80 feet) in any horizontal direction, except slabs on grade which shall have construction joints shown. Allow 48 hours to elapse between pouring adjacent sections unless this requirement is waived by Contracting Officer’s Representative.

B. Locate construction joints in suspended floors near the quarter-point of spans for slabs, beams or girders, unless a beam intersects a girder at center, in which case joint in girder shall be offset a distance

equal to twice width of beam. Provide keys and inclined dowels as shown. Provide longitudinal keys as shown.

3.6 EXPANSION JOINTS AND CONTRACTION JOINTS:

A. Clean expansion joint surfaces before installing premolded filler and placing adjacent concrete.

B. Install polyvinyl chloride or rubber water seals, as shown in accordance with manufacturer's instructions, to form continuous watertight seal.

C. Provide contraction (control) joints in floor slabs as indicated on the contract drawings. Joints shall be either formed or saw cut, to the indicated depth after the surface has been finished. Complete saw joints within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

3.7 PLACING CONCRETE:

A. Preparation:

1. Remove hardened concrete, wood chips, shavings and other debris from forms.
2. Remove hardened concrete and foreign materials from interior surfaces of mixing and conveying equipment.
3. Have forms and reinforcement inspected and approved by Contracting Officer’s Representative before depositing concrete.
4. Provide runways for wheeling equipment to convey concrete to point of deposit. Keep equipment on runways which are not supported by or bear on reinforcement. Provide similar runways for protection of vapor barrier on coarse fill.

B. Bonding: Before depositing new concrete on or against concrete which has been set, thoroughly roughen and clean existing surfaces of laitance, foreign matter, and loose particles.

1. Preparing surface for applied topping:
   a. Remove laitance, mortar, oil, grease, paint, or other foreign material by sand blasting. Clean with vacuum type equipment to remove sand and other loose material.
   b. Broom clean and keep base slab wet for at least four hours before topping is applied.
   c. Use a thin coat of one part Portland cement, 1.5 parts fine sand, bonding admixture; and water at a 50: 50 ratio and mix to achieve the consistency of thick paint. Apply to a damp base slab by

scrubbing with a stiff fiber brush. New concrete shall be placed while the bonding grout is still tacky.

C. Conveying Concrete: Convey concrete from mixer to final place of deposit by a method which will prevent segregation. Method of conveying concrete is subject to approval of Contracting Officer's Representative.

D. Placing: For special requirements see Paragraphs, HOT WEATHER and COLD WEATHER.

1. Do not place concrete when weather conditions prevent proper placement and consolidation, or when concrete has attained its initial set, or has contained its water or cement content more than 1 1/2 hours.
2. Deposit concrete in forms as near as practicable in its final position. Prevent splashing of forms or reinforcement with concrete in advance of placing concrete.
3. Do not drop concrete freely more than 3000 mm (10 feet) for concrete containing the high-range water-reducing admixture (superplasticizer) or 1500 mm (5 feet) for conventional concrete. Where greater drops are required, use a tremie or flexible spout (canvas elephant trunk), attached to a suitable hopper.
4. Discharge contents of tremies or flexible spouts in horizontal layers not exceeding 500 mm (20 inches) in thickness, and space tremies such as to provide a minimum of lateral movement of concrete.
5. Continuously place concrete until an entire unit between construction joints is placed. Rate and method of placing concrete shall be such that no concrete between construction joints will be deposited upon or against partly set concrete, after its initial set has taken place, or after 45 minutes of elapsed time during concrete placement.
6. On bottom of members with severe congestion of reinforcement, deposit 25 mm (1 inch) layer of flowing concrete containing the specified high-range water-reducing admixture (superplasticizer). Successive concrete lifts may be a continuation of this concrete or concrete with a conventional slump.
7. Concrete on metal deck:

a. Concrete on metal deck shall be minimum thickness shown. Allow for deflection of steel beams and metal deck under the weight of wet concrete in calculating concrete quantities for slab.
   1) The Contractor shall become familiar with deflection characteristics of structural frame to include proper amount of additional concrete due to beam/deck deflection.

E. Consolidation: Conform to ACI 309. Immediately after depositing, spade concrete next to forms, work around reinforcement and into angles of forms, tamp lightly by hand, and compact with mechanical vibrator applied directly into concrete at approximately 450 mm (18 inch) intervals. Mechanical vibrator shall be power driven, hand operated type with minimum frequency of 5000 cycles per minute having an intensity sufficient to cause flow or settlement of concrete into place. Vibrate concrete to produce thorough compaction, complete embedment of reinforcement and concrete of uniform and maximum density without segregation of mix. Do not transport concrete in forms by vibration.
   1. Use of form vibration shall be approved only when concrete sections are too thin or too inaccessible for use of internal vibration.
   2. Carry on vibration continuously with placing of concrete. Do not insert vibrator into concrete that has begun to set.

3.8 HOT WEATHER:

A. Follow the recommendations of ACI 305 or as specified to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete. Methods proposed for cooling materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by Contracting Officer’s Representative.

3.9 COLD WEATHER:

A. Follow the recommendations of ACI 306 or as specified to prevent freezing of concrete and to permit concrete to gain strength properly. Use only the specified non-corrosive, non-chloride accelerator. Do not use calcium chloride, thiocyantes or admixtures containing more than 0.05 percent chloride ions. Methods proposed for heating materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by Contracting Officer’s Representative.

3.10 PROTECTION AND CURING:

A. Conform to ACI 308: Initial curing shall immediately follow the finishing operation. Protect exposed surfaces of concrete from premature drying, wash by rain and running water, wind, mechanical injury, and excessively hot or cold temperatures. Keep concrete not covered with membrane or other curing material continuously wet for at least 7 days after placing, except wet curing period for high-early-strength concrete shall be not less than 3 days. Keep wood forms continuously wet to prevent moisture loss until forms are removed. Cure exposed concrete surfaces as described below. Other curing methods may be used if approved by Contracting Officer's Representative.

1. Liquid curing and sealing compounds: Apply by power-driven spray or roller in accordance with the manufacturer's instructions. Apply immediately after finishing. Maximum coverage 10m^2/L (400 square feet per gallon) on steel troweled surfaces and 7.5m^2/L (300 square feet per gallon) on floated or broomed surfaces for the curing/sealing compound. Use curing and sealing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete. Floors to receive covering shall be cleaned thoroughly using a power scrubber and industrial strength detergent. Hand-brooming and sweeping is not sufficient.
2. Plastic sheets: Apply as soon as concrete has hardened sufficiently to prevent surface damage. Utilize widest practical width sheet and overlap adjacent sheets 75 mm (3 inches). Tightly seal joints with tape.
3. Paper: Utilize widest practical width paper and overlap adjacent sheets 75 mm (3 inches). Tightly seal joints with sand, wood planks, pressure-sensitive tape, mastic or glue.

3.11 REMOVAL OF FORMS:

A. Remove in a manner to assure complete safety of structure after the following conditions have been met.

1. Where structure as a whole is supported on shores, forms for beams and girder sides, columns, and similar vertical structural members may be removed after 24 hours, provided concrete has hardened sufficiently to prevent surface damage and curing is continued without any lapse in time as specified for exposed surfaces.

2. Take particular care in removing forms of architectural exposed concrete to insure surfaces are not marred or gouged, and that corners and arises are true, sharp and unbroken.

B. Control Test: Use to determine if the concrete has attained sufficient strength and curing to permit removal of supporting forms. Cylinders required for control tests taken in accordance with ASTM C172, molded in accordance with ASTM C31, and tested in accordance with ASTM C39. Control cylinders cured and protected in the same manner as the structure they represent. Supporting forms or shoring not removed until strength of control test cylinders have attained at least 70 percent of minimum 28-day compressive strength specified. Exercise care to assure that newly unsupported portions of structure are not subjected to heavy construction or material loading.

3.12 CONCRETE SURFACE PREPARATION:

A. Metal Removal: Unnecessary metal items cut back flush with face of concrete members.

B. Patching: Maintain curing and start patching as soon as forms are removed. Do not apply curing compounds to concrete surfaces requiring patching until patching is completed. Use cement mortar for patching of same composition as that used in concrete. Use white or gray Portland cement as necessary to obtain finish color matching surrounding concrete. Thoroughly clean areas to be patched. Cut out honeycombed or otherwise defective areas to solid concrete to a depth of not less than 25 mm (1 inch). Cut edge perpendicular to surface of concrete. Saturate with water area to be patched, and at least 150 mm (6 inches) surrounding before placing patching mortar. Give area to be patched a brush coat of cement grout followed immediately by patching mortar. Cement grout composed of one part Portland cement, 1.5 parts fine sand, bonding admixture, and water at a 50:50 ratio, mix to achieve consistency of thick paint. Mix patching mortar approximately 1 hour before placing and remix occasionally during this period without addition of water. Compact mortar into place and screed slightly higher than surrounding surface. After initial shrinkage has occurred, finish to match color and texture of adjoining surfaces. Cure patches as specified for other concrete. Fill form tie holes which extend entirely through walls from unexposed face by means of a pressure gun or other

suitable device to force mortar through wall. Wipe excess mortar off exposed face with a cloth.

C. Upon removal of forms, clean vertical concrete surface that is to receive bonded applied cementitious application with wire brushes or by sand blasting to remove unset material, laitance, and loose particles to expose aggregates to provide a clean, firm, granular surface for bond of applied finish.

3.13 CONCRETE FINISHES:

A. Vertical and Overhead Surface Finishes:

1. Unfinished areas: Vertical and overhead concrete surfaces exposed in pipe basements, elevator and dumbwaiter shafts, pipe spaces, pipe trenches, above suspended ceilings, manholes, and other unfinished areas will not require additional finishing.
2. Interior and exterior exposed areas to be painted: Remove fins, burrs and similar projections on surfaces flush, and smooth by mechanical means approved by Contracting Officer's Representative, and by rubbing lightly with a fine abrasive stone or hone. Use ample water during rubbing without working up a lather of mortar or changing texture of concrete.
3. Interior and exterior exposed areas finished: Give a grout finish of uniform color and smooth finish treated as follows:
   a. After concrete has hardened and laitance, fins and burrs removed, scrub concrete with wire brushes. Clean stained concrete surfaces by use of a hone stone.
   b. Apply grout composed of one part of Portland cement, one part fine sand, smaller than a 600 µm (No. 30) sieve. Work grout into surface of concrete with cork floats or fiber brushes until all pits, and honeycombs are filled.
   c. After grout has hardened slightly, but while still plastic, scrape grout off with a sponge rubber float and, about 1 hour later, rub concrete vigorously with burlap to remove any excess grout remaining on surfaces.
   d. In hot, dry weather use a fog spray to keep grout wet during setting period. Complete finish of area in same day. Make limits of finished areas at natural breaks in wall surface. Leave no grout on concrete surface overnight.

4. Textured: Finish as specified. Maximum quantity of patched area 0.2 m^2 (2 square feet) in each 93 m^2 (1000 square feet) of textured surface.

B. Slab Finishes:

1. Monitoring and Adjustment: Provide continuous cycle of placement, measurement, evaluation and adjustment of procedures to produce slabs within specified tolerances. Monitor elevations of structural steel in key locations before and after concrete placement to establish typical deflection patterns for the structural steel. Determine elevations of cast-in-place slab soffits prior to removal of shores. Provide information to Contracting Officer's Representative and floor consultant for evaluation and recommendations for subsequent placements.
2. Set perimeter forms to serve as screed using either optical or laser instruments. For slabs on grade, wet screeds may be used to establish initial grade during strike-off, unless Contracting Officer's Representative determines that the method is proving insufficient to meet required finish tolerances and directs use of rigid screed guides. Where wet screeds are allowed, they shall be placed using grade stakes set by optical or laser instruments. Use rigid screed guides, as opposed to wet screeds, to control strike-off elevation for all types of elevated (non slab-on-grade) slabs. Divide bays into halves or thirds by hard screeds. Adjust as necessary where monitoring of previous placements indicates unshored structural steel deflections to other than a level profile.
3. Place slabs monolithically. Once slab placement commences, complete finishing operations within same day. Slope finished slab to floor drains where they occur, whether shown or not.
4. Use straightedges specifically made for screeding, such as hollow magnesium straightedges or power strike-offs. Do not use pieces of dimensioned lumber. Strike off and screed slab to a true surface at required elevations. Use optical or laser instruments to check concrete finished surface grade after strike-off. Repeat strike-off as necessary. Complete screeding before any excess moisture or bleeding water is present on surface. Do not sprinkle dry cement on the surface.

5. Immediately following screeding, and before any bleed water appears, use a 3000 mm (10 foot) wide highway straightedge in a cutting and filling operation to achieve surface flatness. Do not use bull floats or darbys, except that darbying may be allowed for narrow slabs and restricted spaces.
6. Wait until water sheen disappears and surface stiffens before proceeding further. Do not perform subsequent operations until concrete will sustain foot pressure with maximum of 6 mm (1/4 inch) indentation.
7. Scratch Finish: Finish base slab to receive a bonded applied cementitious application as indicated above, except that bull floats and darbys may be used. Thoroughly coarse wire broom within two hours after placing to roughen slab surface to insure a permanent bond between base slab and applied materials.
8. Float Finish: Slabs to receive unbonded toppings, steel trowel finish, fill, mortar setting beds, or a built-up roof, and ramps, stair treads, platforms (interior and exterior), and equipment pads shall be floated to a smooth, dense uniform, sandy textured finish. During floating, while surface is still soft, check surface for flatness using a 3000 mm (10 foot) highway straightedge. Correct high spots by cutting down and correct low spots by filling in with material of same composition as floor finish. Remove any surface projections and re-float to a uniform texture.
9. Steel Trowel Finish: Concrete surfaces to receive resilient floor covering or carpet, monolithic floor slabs to be exposed to view in finished work, future floor roof slabs, applied toppings, and other interior surfaces for which no other finish is indicated. Steel trowel immediately following floating. During final troweling, tilt steel trowel at a slight angle and exert heavy pressure to compact cement paste and form a dense, smooth surface. Finished surface shall be smooth, free of trowel marks, and uniform in texture and appearance.
10. Broom Finish: Finish exterior slabs, ramps, and stair treads with a bristle brush moistened with clear water after surfaces have been floated. Brush in a direction transverse to main traffic. Match texture approved by Contracting Officer’s Representative from sample panel.

11. Finished slab flatness (FF) and levelness (FL) values comply with the following minimum requirements:
    a. Areas covered with carpeting, or not specified otherwise in b. below:
        1) Slab on Grade:
            a) Specified overall value F_F 25/F_L 20
            b) Minimum local value F_F 17/F_L 15
        2) Unshored suspended slabs:
            a) Specified overall value FF 25
            b) Minimum local value FF 17
        3) Level tolerance such that 80 percent of all points fall within a 20 mm (3/4 inch) envelope +10 mm, -10 mm (+3/8 inch, -3/8 inch) from the design elevation.
    b. Areas that will be exposed, receive thin-set tile or resilient flooring, or roof areas designed as future floors:
        1) Slab on grade:
            a) Specified overall value FF 36/FL 20
            b) Minimum local value FF 24/FL 15
        2) Unshored suspended slabs:
            a) Specified overall value FF 30
            b) Minimum local value FF 24
        3) Level tolerance such that 80 percent of all points fall within a 20 mm (3/4 inch) envelope +10 mm, -10 mm (+3/8 inch, -3/8 inch) from the design elevation.
    c. "Specified overall value" is based on the composite of all measured values in a placement derived in accordance with ASTM E1155.
    d. "Minimum local value" (MLV) describes the flatness or levelness below which repair or replacement is required. MLV is based on the results of an individual placement and applies to a minimum local area. Minimum local area boundaries may not cross a construction joint or expansion joint. A minimum local area will be bounded by construction and/or control joints, or by column lines and/or half-column lines, whichever is smaller.
12. Measurements
    a. Department of Veterans Affairs retained testing laboratory will take measurements as directed by Contracting Officer’s

Representative, to verify compliance with FF, FL, and other finish requirements. Measurements will occur within 72 hours after completion of concrete placement (weekends and holidays excluded). Make measurements before shores or forms are removed to insure the "as-built" levelness is accurately assessed. Profile data for above characteristics may be collected using a laser level or any Type II apparatus (ASTM E1155, "profileograph" or "dipstick"). Contractor's surveyor shall establish reference elevations to be used by Department of Veterans Affairs retained testing laboratory.

b. Contractor not experienced in using FF and FL criteria is encouraged to retain the services of a floor consultant to assist with recommendations concerning adjustments to slab thicknesses, finishing techniques, and procedures on measurements of the finish as it progresses in order to achieve the specific flatness and levelness numbers.

13. Acceptance/ Rejection:
    a. If individual slab section measures less than either of specified minimum local F_F/F_L numbers, that section shall be rejected and remedial measures shall be required. Sectional boundaries may be set at construction and contraction (control) joints, and not smaller than one-half bay.
    b. If composite value of entire slab installation, combination of all local results, measures less than either of specified overall F_F/F_L numbers, then whole slab shall be rejected and remedial measures shall be required.
14. Remedial Measures for Rejected Slabs: Correct rejected slab areas by grinding, planing, surface repair with underlayment compound or repair topping, retopping, or removal and replacement of entire rejected slab areas, as directed by Contracting Officer’s Representative, until a slab finish constructed within specified tolerances is accepted.

3.14 SURFACE TREATMENTS:

A. Use on exposed concrete floors and concrete floors to receive carpeting except those specified to receive non-slip finish.

B. Liquid Densifier/Sealer: Apply in accordance with manufacturer's directions just prior to completion of construction.

C. Non-Slip Finish: Except where safety nosing and tread coverings are shown, apply non-slip abrasive aggregate to treads and platforms of concrete steps and stairs, and to surfaces of exterior concrete ramps and platforms. Broadcast aggregate uniformly over concrete surface at rate of application of 8% per 1/10th m^2 (7.5 percent per square foot) of area. Trowel concrete surface to smooth dense finish. After curing, rub treated surface with abrasive brick and water to slightly expose abrasive aggregate.

3.15 APPLIED TOPPING:

A. Separate concrete topping on floor base slab of thickness and strength shown. Topping mix shall have a maximum slump of 200 mm (8 inches) for concrete containing a high-range water-reducing admixture (superplasticizer) and 100 mm (4 inches) for conventional mix. Neatly bevel or slope at door openings and at slabs adjoining spaces not receiving an applied finish.

B. Placing: Place continuously until entire section is complete, struck off with straightedge, leveled with a highway straightedge or highway bull float, floated and troweled by machine to a hard dense finish. Slope to floor drains as required. Do not start floating until free water has disappeared and no water sheen is visible. Allow drying of surface moisture naturally. Do not hasten by "dusting" with cement or sand.

3.16 RESURFACING FLOORS:

A. Remove existing flooring areas to receive resurfacing to expose existing structural slab and extend not less than 25 mm (1 inch) below new finished floor level. Prepare exposed structural slab surface by roughening, broom cleaning, and dampening. Apply specified bonding grout. Place topping while the bonding grout is still tacky.

- - - E N D - - -

SECTION 07 54 23
THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Thermoplastic Polyolefin (TPO) sheet roofing mechanically fastened to roof deck.

1.2 RELATED WORK

A. Section 07 01 50.19, PREPARATION FOR REROOFING: Preparation of Existing Membrane Roofs and Repair Areas.

B. Section 07 22 00, ROOF AND DECK INSULATION: Roof Insulation.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American National Standards Institute/Single-Ply Roofing Institute (ANSI/SPRI):

FX-1-16.....Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners.

C. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI):

7-16.....Minimum Design Loads for Buildings and Other Structures.

D. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE):

90.1-13.....Energy Standard for Buildings Except Low-Rise Residential Buildings.

E. ASTM International (ASTM):

C67-20.....Sampling and Testing Brick and Structural Clay Tile.

C140/C140M-20a.....Sampling and Testing Concrete Masonry Units and Related Units.

C1371-15.....Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.

C1549-16.....Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.

D1876-08(2015)e1.....Peel Resistance of Adhesives (T-Peel Test).

D4263-83(2018).....Indicating Moisture in Concrete by the Plastic Sheet Method.

D4434/D4434M-15.....Poly(Vinyl Chloride) Sheet Roofing.
D6878/D6878M-13.....Thermoplastic Polyolefin Based Sheet Roofing.
E408-13.....Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
E1918-16.....Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
E1980-11(2019).....Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

F. Cool Roof Rating Council (CRRC):
1-20.....Product Rating Program.

G. National Roofing Contractors Association (NRCA):
Manual-19.....The NRCA Roofing Manual: Membrane Roofing Systems.

H. U.S. Department of Agriculture (USDA):
BioPreferred® Program Catalog.

I. UL LLC (UL):
580-06.....Tests for Uplift Resistance of Roof Assemblies.
1897-20.....Uplift Tests for Roof Covering Systems.

J. U.S. Department of Commerce National Institute of Standards and Technology (NIST):
DOC PS 1-19.....Structural Plywood.
DOC PS 2-18.....Performance Standard for Wood-Based Structural-Use Panels.

K. U.S. Environmental Protection Agency (EPA):
Energy Star.....ENERGY STAR Program Requirements for Roof Products Version 3.0.

1.4 PREINSTALLATION MEETINGS

A. Conduct pre-installation meeting at project site minimum 30 days before beginning Work of this section.
1. Required Participants:
a. Contracting Officer's Representative.
b. Inspection and Testing Agency.
c. Contractor.
d. Installer.
e. Manufacturer's field representative.

f. Other installers responsible for adjacent and intersecting work, including roof deck, flashings, roof penetrations, roof accessories, utility penetrations, rooftop curbs and equipment.

2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
   a. Installation schedule.
   b. Installation sequence.
   c. Preparatory work.
   d. Protection before, during, and after installation.
   e. Installation.
   f. Terminations.
   g. Transitions and connections to other work.
   h. Inspecting and testing.
   i. Other items affecting successful completion.
   j. Pullout test of fasteners.
   k. Material storage, including roof deck load limitations.
3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:
   1. Roof membrane layout.
   2. Roofing membrane fastener pattern and spacing.
   3. Roofing membrane seaming and joint details.
   4. Roof membrane penetration details.
   5. Base flashing and termination details.
   6. Paver layout.
   7. Paver anchoring locations and details.

C. Manufacturer's Literature and Data:
   1. Description of each product.
   2. Minimum fastener pullout resistance.
   3. Installation instructions.
   4. Warranty.

D. Samples:
   1. Roofing Membrane: 150 mm (6 inch) square.
   2. Base Flashing: 150 mm (6 inch) square.

3. Fasteners: Each type.
4. Roofing Membrane Seam: 300 mm (12 inches) square.

E. Sustainable Construction Submittals:
1. Solar Reflectance Index (SRI) for roofing membrane.
2. Biobased Content:
a. Show type and quantity for each product.
3. Low Pollutant-Emitting Materials:
a. Show volatile organic compound types and quantities.
4. Energy Star label for roofing membrane.

F. Certificates: Certify products comply with specifications.
1. Fire and windstorm classification.
2. Energy performance requirements.

G. Qualifications: Substantiate qualifications comply with specifications.
1. Installer, including supervisors with project experience list.
2. Manufacturer's field representative with project experience list.

H. Field quality control reports.

I. Temporary protection plan. Include list of proposed temporary materials.

J. Operation and Maintenance Data:
1. Maintenance instructions.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
1. Approved by roofing system manufacturer as installer for roofing system with specified warranty.
2. Regularly installs specified products.
3. Installed specified products with satisfactory service on five similar installations for minimum five years.
a. Project Experience List: Provide contact names and addresses for completed projects.
4. Employs full-time supervisors experienced installing specified system and able to communicate with Contracting Officer's Representative and installer's personnel.

B. Manufacturer's Field Representative:
1. Manufacturer's full-time technical employee or independent roofing inspector.
2. Individual certified by Roof Consultants Institute as Registered Roof Observer.

1.7 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.8 STORAGE AND HANDLING

A. Comply with NRCA Manual storage and handling requirements.

B. Store products indoors in dry, weathertight facility.

C. Store adhesives according to manufacturer's instructions.

D. Protect products from damage during handling and construction operations.

E. Products stored on the roof deck must not cause permanent deck deflection.

1.9 FIELD CONDITIONS

A. Environment:

1. Product Temperature: Minimum 4 degrees C (40 degrees F) for minimum 48 hours before installation.
2. Weather Limitations: Install roofing only during dry current and forecasted weather conditions.

1.10 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant roofing system against material and manufacturing defects and agree to repair any leak caused by a defect in the roofing system materials or workmanship of the installer.

1. Warranty Period: 20 years.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Roofing System: Thermoplastic Polyolefin (TPO) sheet roofing adhered **mechanically** fastened to roof deck.

2.2 SYSTEM PERFORMANCE

A. Design roofing system complying with specified performance:

1. Load Resistance: ASCE/SEI 7; Design criteria: as indicated on Drawings.

a. Uplift Pressures:

1) Corner Uplift Pressure: 100 kPa/square meter per square foot).
2) Perimeter Uplift Pressure: 100 kPa/square meter per square foot).
3) Field-of-Roof Uplift Pressure: 100 kPa/square meter per square foot).

2. Energy Performance:
   a. EPA Energy Star Listed for low-slope roof products.
   b. ASTM E1980; Minimum 78 Solar Reflectance Index (SRI).
   c. CRRC-1; Minimum 0.70 initial solar reflectance and minimum 0.75 emissivity.
   d. Three-Year Aged Performance: Minimum 0.55 solar reflectance tested in according to ASTM C1549 or ASTM E1918, and minimum 0.75 thermal emittance tested in according to ASTM C1371 or ASTM E408.
      1) Where tested aged values are not available:
         a) Calculate compliance adjusting initial solar reflectance according to ASHRAE 90.1.
         b) Provide roofing system with minimum 64 three-year aged Solar Reflectance Index calculated according to ASTM E1980 with 12 W/square meter/degree K (2.1 BTU/hour/square foot) convection coefficient.

2.3 PRODUCTS - GENERAL

A. Provide roof system components from one manufacturer.
B. Sustainable Construction Requirements:
   1. Solar Reflectance Index: 78 minimum.
   2. Biobased Content: Where applicable, provide products designated by USDA and meeting or exceeding USDA recommendations for bio-based content, and products meeting Rapidly Renewable Materials and certified sustainable wood content definitions; refer to www.biopreferred.gov.

2.4 TPO ROOFING MEMBRANE

1. TPO Sheet: ASTM D6878/D6878M, internally fabric or scrim reinforced, 1.5 mm **(60 mils)** thick, with **fabric backing**.

2.5 MEMBRANE ACCESSORY MATERIALS

A. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as TPO sheet membrane.

B. Factory Formed Flashings: Inside and outside corners, pipe boots, and other special flashing shapes to minimize field fabrication.

C. Bonding Adhesive: Manufacturer's standard, water based.

D. Metal Termination Bars: Manufacturer's standard, stainless-steel or aluminum, 25 mm wide by 3 mm thick (1-inch wide by 1/8 inch thick) factory drilled for fasteners.

E. Battens: Manufacturer's standard, galvannealed or galvanized steel sheet, 25 mm wide by 1.3 mm thick (1-inch wide by 0.05 inch thick), factory punched for fasteners.

F. Fasteners: Manufacturer's standard coated steel with metal or plastic plates, to suit application.

G. Primers, Sealers, T-Joint Covers, Lap Sealants, and Termination Reglets: As specified by roof membrane manufacturer.

H. Adhesive and sealant materials recommended by roofing system manufacturer for intended use, identical to materials utilized in approved listed roofing system, and compatible with roofing membrane.

2.6 ACCESSORIES

A. Temporary Protection Materials:

1. Expanded Polystyrene (EPS) Insulation: ASTM C578.
2. Plywood: NIST DOC PS 1, Grade CD Exposure 1.
3. Oriented Strand Board (OSB): NIST DOC PS 2, Exposure 1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine and verify substrate suitability with roofing Installer and roofing inspector present.

1. Verify roof penetrations are complete, secured against movement, and firestopped .
2. Verify roof deck is adequately secured to resist wind uplift.
3. Verify roof deck is clean, dry, and in-plane ready to receive roofing system.

B. Correct unsatisfactory conditions before beginning roofing work.

3.2 PREPARATION

A. Complete roof deck construction before beginning roofing work:

1. Curbs, blocking, edge strips, nailers, cants, and other components to which insulation, roofing, and base flashing is attached in place ready to receive insulation and roofing.

2. Coordinate roofing membrane installation with flashing work and roof insulation work so insulation and flashing are installed concurrently to permit continuous roofing operations.
3. Complete installation of flashing, insulation, and roofing in same day except for the area where temporary protection is required when work is stopped for inclement weather or end of work day.

B. Dry out surfaces including roof deck flutes, that become wet from any cause during progress of the work before roofing work is resumed. Apply materials to dry substrates, only.

C. Broom clean roof decks. Remove dust, dirt and debris.

D. Remove projections capable of damaging roofing materials.

E. Concrete Decks, except Insulating Concrete:
1. Test concrete decks for moisture according to ASTM D4263 before installing roofing materials.
2. Prime concrete decks. Keep primer back 100 mm (4 inches) from precast concrete deck joints.
3. Allow primer to dry before application of bitumen.

F. Insulating Concrete Decks:
1. Allow to dry out minimum five days after installation before installing roofing materials.
2. Allow additional drying time when precipitation occurs before installing roofing materials.

G. Poured Gypsum Decks: Dry out poured gypsum according to manufacturer's instructions before installing roofing materials.

H. Existing Membrane Roofs and Repair Areas:
1. Comply with requirements in Section 07 01 50.19 PREPARATION FOR REROOFING.

3.3 TEMPORARY PROTECTION

A. Install temporary protection consisting of a temporary seal and water cut-offs at the end of each day's work and when work is halted for an indefinite period or work is stopped when precipitation is imminent.

B. Install temporary cap flashing over top of base flashings where permanent flashings are not in place to protect against water intrusion into roofing system. Securely anchor in place to prevent blow off and damage by construction activities.

C. Temporarily seal exposed insulation surfaces within roofing membrane.

1. Apply temporary seal and water cut off by extending roofing membrane beyond insulation and securely embedding edge of the roofing membrane in 6 mm (1/4 inch) thick by 50 mm (2 inches) wide strip of temporary closure sealant. Weight roofing membrane edge with sandbags, to prevent displacement; space sandbags maximum 2400 mm (8 feet) on center.
2. Direct water away from work. Provide drainage, preventing water accumulation.
3. Check daily to ensure temporary seal remains watertight. Reseal open areas and weight down.

D. Before the work resumes, cut off and discard portions of roof membrane in contact with temporary seal.
   1. Cut minimum 150 mm (6 inches) back from sealed edges and surfaces.

E. Remove sandbags and store for reuse.

3.4 INSTALLATION - GENERAL

A. Install products according to manufacturer's instructions and approved submittal drawings.
   1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

B. Comply with NRCA Manual installation requirements.

C. Comply with UL 1897 for uplift resistance.

D. Do not allow membrane and flashing to contact surfaces contaminated with asphalt, coal tar, oil, grease, or other substances incompatible with TPO.

3.5 ROOFING INSTALLATION

A. Install the membrane so the sheets run perpendicular to the long dimension of the insulation boards.

B. Begin installation at the low point of the roof and work towards the high point. Lap membrane shingled in water flow direction.

C. Position the membrane free of buckles and wrinkles.

D. Roll membrane out; inspect for defects as membrane is unrolled. Remove defective areas:
   1. Lap edges and ends of sheets 50 mm (2 inches) or more as recommended by the manufacturer.
   2. Heat weld laps. Apply pressure as required. Seam strength of laps as required by ASTM D4434/D4434M.

3. Check seams to ensure continuous adhesion and correct defects.
4. Finish seam edges with beveled bead of lap sealant.
5. Finish seams same day as membrane is installed.
6. Anchor membrane perimeter to roof deck or parapet wall as indicated on drawings.
7. Repair areas of welded seams where samples have been taken or marginal welds, bond voids, or skips occurs.
8. Repair fishmouths and wrinkles by cutting to lay flat and installing patch over cut area extending 100 mm (4 inches) beyond cut.

E. Membrane Perimeter Anchorage:
1. Install batten at perimeter of each roof area, curb flashing, expansion joints and similar penetrations on top of roof membrane as indicated on drawings.
2. Mechanically Fastening:
   a. Space fasteners maximum 300 mm (12 inches) on center, starting 25 mm (1 inch) from ends.
   b. When battens are cut, round edges and corners before installing.
   c. After mechanically fastening strip cover and seal strip with a 150 mm (6 inch) wide roof membrane strip; heat weld to roof membrane and seal edges.
   d. At fascia-cants turn roofing membrane down over front edge of the blocking, cant, or nailer. Secure roofing membrane to vertical portion of nailer; or, if required by the membrane manufacturer, with fasteners spaced maximum 150 mm (6 inches) on centers.
   e. At parapet walls intersecting building walls and curbs, secure roofing membrane to structural deck with fasteners 150 mm (6 inches) on centers or as shown in NRCA manual.

F. Adhered System:
1. Apply bonding adhesive in quantities required by roof membrane manufacturer.
2. Fold sheet back on itself, clean and coat the bottom side of the membrane and the top of substrate with adhesive. Do not coat the lap joint area.
3. After adhesive has set according to adhesive manufacturer's instruction, roll roofing membrane into adhesive minimizing voids and wrinkles.

4. Repeat for other half of sheet.

G. Mechanically Fastened System Installation:

1. Secure roofing membrane to structural deck with fasteners through battens to achieve specified wind uplift performance.
   a. Drill pilot holes for fasteners installed into cast-in-place concrete. Drill hole minimum 10 mm (3/8 inch) deeper than fastener penetration.
2. When fasteners are installed within membrane laps, locate battens minimum 13 mm (1/2 inch) from the edge of sheets.
3. Apply lap sealant under battens and anchor to deck while lap sealant is still fluid. Cover fastener head with fastener sealer.
4. Where fasteners are installed over roofing membrane after seams are welded, cover fasteners with minimum 200 mm (8 inch) diameter TPO membrane cap centered over fasteners. Where battens are used cover battens with minimum 200 mm (8 inch) wide TPO strip cap centered over batten. Splice caps to roofing membrane and finish edges with lap sealant.

3.6 FLASHING INSTALLATION

A. Install flashings same day as roofing membrane is installed. When flashing cannot be completely installed in one day, complete installation until flashing is watertight and provide temporary covers or seals.

B. Flashing Roof Drains:

1. Install roof drain flashing as recommended by roofing membrane manufacturer.
   a. Coordinate to set the metal drain flashing in asphalt roof cement, holding cement back from the edge of the metal flange.
   b. Do not allow the roof cement to come in contact with TPO roofing membrane.
   c. Adhere roofing membrane to metal flashing with bonding adhesive.
2. Turn down the metal drain flashing and roofing membrane into drain body. Install clamping ring and strainer.

C. Installing Base Flashing and Pipe Flashing:

1. Install flashing sheet to pipes, wall or curbs to minimum200 mm (8 inches) above roof surfaces and extending roofing manufacturer's standard lap dimension onto roofing membranes.
   a. Adhere flashing with bonding adhesive.

b. Form inside and outside corners of flashing sheet according to NRCA manual. Form pipe flashing according to NRCA manual.
c. Lap ends roofing manufacturer's standard dimension.
d. Heat weld flashing membranes together and flashing membranes to roofing membranes. Finish exposed edges with lap sealant.
e. Install flashing membranes according to NRCA manual.

2. Anchor top of flashing to walls and curbs with fasteners spaced maximum150 mm (6 inches) on center. Use surface mounted fastening strip with sealant on ducts. Use pipe clamps on pipes or other round penetrations.
3. Apply sealant to top edge of flashing.

D. Installing Building Expansion Joints:
1. Install base flashing on curbs as specified.
2. Coordinate installation with metal expansion joint cover roof expansion joint system .
Install flexible tubing 1-1/2 times the width of joint centered over joint. Cover tubing with flashing sheet adhered to base flashing and lapping base flashing roofing manufacturer's standard dimension. Finish edges of laps with sealant.

E. Repairs to Membrane and Flashings:
1. Remove sections of roofing membrane or flashing that are creased, wrinkled, or fishmouthed.
2. Cover removed areas, cuts and damaged areas with a patch extending 100 mm (4 inches) beyond damaged, cut, or removed area. Heat weld to roofing membrane or flashing sheet. Finish edge of lap with lap sealant.

3.7 FIELD QUALITY CONTROL

A. Field Tests: Performed by testing laboratory specified in Section 01 45 29, TESTING LABORATORY SERVICES.
1. Fastener Pull Out Tests: ANSI/SPRI FX-1; one test for every 230 square meter (2,500 square feet) of deck. Perform tests for each combination of fastener type and roof deck type before installing roof insulation.
a. Test at locations selected by Contracting Officer's Representative.
b. Do not proceed with roofing work when pull out resistance is less than manufacturer's required resistance.

c. Test Results:

1) Repeat tests using different fastener type or use additional fasteners achieve pull out resistance required to meet specified wind uplift performance.

2) Patch cementitious deck to repair areas of fastener tests holes.

2. Examine and probe roofing membrane and flashing seams in presence of Contracting Officer's Representative and Manufacturer's field representative.
3. Probe seams to detect marginal bonds, voids, skips, and fishmouths.
4. Cut 100 mm (4 inch) wide by 300 mm (12 inch) long samples through seams where directed by Contracting Officer's Representative.
5. Cut one sample for every 450 m (1500 feet) of seams.
6. Cut samples perpendicular to seams.
7. Failure of samples to pass ASTM D1876 test will be cause for rejection of work.
8. Repair areas where samples are taken and where marginal bond, voids, and skips occur.
9. Repair fishmouths and wrinkles by cutting to lay flat. Install patch over cut area extending 100 mm (4 inches) beyond cut.

B. Manufacturer Services:

1. Inspect initial installation, installation in progress, and completed work.
2. Issue supplemental installation instructions necessitated by field conditions.
3. Prepare and submit inspection reports.
4. Certify completed installation complies with manufacturer's instructions and warranty requirements.

3.8 CLEANING

A. Remove excess adhesive before adhesive sets.

B. Clean exposed roofing surfaces. Remove contaminants and stains to comply with specified solar reflectance performance .

3.9 PROTECTION

A. Protect roofing system from traffic and construction operations.

1. Protect roofing system when used for subsequent work platform, materials storage, or staging.

2. Distribute scaffolding loads to exert maximum 50 percent roofing system materials compressive strength.

B. Loose lay temporary insulation board overlaid with plywood or OSB.

1. Weight boards to secure against wind uplift.

C. Remove protective materials immediately before acceptance.

D. Repair damage.

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SECTION 08 56 53
BLAST RESISTANT WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Prefabricated fixed aluminum , blast resistant forced entry resistant blast and forced entry resistances exterior window units.

1.2 RELATED REQUIREMENTS

A. Forced entry and ballistic rated glazing: Section 08 80 00, GLAZING.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this Section.

B. American Architectural Manufacturers Association (AAMA):
AAMA/WDMA/CSA 101/I.S.2/A440-11 Windows, Doors, and Skylights

C. American Welding Society (AWS):
D1.1/D1.1M-15.....Structural Welding Code - Steel
D1.3/D1.3M-08.....Structural Welding Code - Sheet Steel
D1.6/D1.6M-07.....Structural Welding Code - Stainless Steel

D. ASTM International (ASTM):
A36/A36M-19.....Carbon Structural Steel
A123/A123M-17.....Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
A320/A320M-18.....Alloy-Steel and Stainless Steel Bolting Materials for Low-Temperature Service
A666-15.....Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
B221-14.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
B221M-13.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
E283/A283M-18.....Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
E331-00(2016).....Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
F1233-08(2019).....Standard Test Method for Security Glazing Materials and Systems

F1642/F1642M-17.....Standard Test Method for Glazing and Glazing Systems Subject to Air blast Loadings

E. National Association of Architectural Metal Manufactures (NAAMM):

AMP 500-06.....Metal Finishes Manual

F. UL LLC (UL):

752-10(R2013).....Bullet Resisting Equipment

G. Department of Veterans Affairs:

VA Physical Security and Resiliency Design Manual October 1, 2020

1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this Section.

1. Required Participants:
   a. Contracting Officer's Representative.
   b. Inspection and Testing Agency.
   c. Contractor.
   d. Installer.
   e. Manufacturer's field representative.
2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
   a. Installation schedule.
   b. Installation sequence.
   c. Preparatory work.
   d. Protection before, during, and after installation.
   e. Installation.
   f. Transitions and connections to other work.
   g. Inspecting and testing.
   h. Other items affecting successful completion.
3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Submittal Drawings:

1. Show dimensioned details of window units, including intended metal and glazing materials. 1: 20 (Three quarter inch equals 1 foot) scaled elevations showing interior and exterior. Indicated how window units can be replaced or removed, including replacement of

glazing. Shop drawings shall be submitted for review and approval prior to fabrication. The contractor is responsible for all field verification of existing conditions and dimensions for new construction that is being conducted adjacent to or integral with existing construction. The field verification shall be conducted and incorporated in the submitted shop drawings and calculations prior to submission. Blast calculations and or testing data shall be submitted with the shop drawings.

2. Show detailed sections at 1: 5 (3 inch equal 1 foot) scale for members; indicating construction, size, and thickness of components, together with connections, fasteners, and means of separating dissimilar metals.
3. Provide final submittal drawings as DWG AutoCAD files.

C. Manufacturer's Literature and Data:
1. Description of each product, metal, and alloy when applicable.
2. Indicate manufacturer's recommendations for fasteners, welding, applied finishes, hardware and accessories.
3. Installation instructions.
4. Standard color chart.

D. Sustainable Construction Submittals:
1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.

E. Certificates: Indicate each product complies with specifications.
1. Window forced entry resistance.
2. Window blast resistance.

F. Calculations: Submit calculations for review and approval prepared by qualified blast consultant, with a minimum of 5 years of experience in design of blast resistant window systems, verifying window and glazing assembly including anchors comply with specified blast resistance performance given in Section 2.1.a of this specification. The magnitudes of the design threats W1, W2 and GP1, GP2 are defined in the Physical Security and Resiliency Design Standards Data Definitions which is a document separate from the referenced VA Security and Resiliency Design Manual. The Physical Security and Resiliency Design Standards Data Definitions are provided on a need to know basis by the structural blast specialist performing the blast design on VA projects. It is the responsibility of the delegated engineer responsible for the

design of blast resistant windows to request and obtain the Physical Security and Resiliency Design Data Standard Data Definitions from the VA Office of Construction and Facilities Management (CFM). Any associated delays or increased costs due to failure to obtain this information will be borne by the contractor.

G. Qualifications: Substantiate qualifications comply with specifications.
   1. Manufacturer with project experience list demonstrating a minimum of 5 years of experience manufacturing blast resistant windows.
   2. Installer with project experience list demonstrating a minimum of 5 years of experience installing blast resistant windows.
   3. Welders and welding procedures.

1.6 QUALITY ASSURANCE

A. Manufacturer and Installer Qualifications:
   1. Regularly manufactures and installs specified products.
   2. Manufactured and installed specified products with satisfactory service on five similar installations for minimum five years.
      a. Provide contact names and addresses for completed projects when requested by Contracting Officer's Representative.

B. Welders and Welding Procedures Qualifications:
   1. Stainless Steel: AWS D1.6/D1.6M.
   2. Steel: AWS D1.1/D1.1M.
   3. Sheet Steel: AWS D1.3/D1.3M.

1.7 DELIVERY

A. Deliver prefabricated unit in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, unit type, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, wet, or opened packaging.

1.8 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight facility.

B. Protect products from damage during handling and construction operations.

1.9 FIELD CONDITIONS

A. Field Measurements: Verify field conditions affecting window fabrication and installation. The field verification shall be conducted and incorporated in the submitted shop drawings and calculations prior to submission. Show field measurements on Submittal Drawings.

1. Coordinate field measurement and fabrication schedule to avoid delay.

1.10 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. **Design windows complying with specified performance:**

1. **Comply with VA Physical Security and Resiliency Design Manual**
   a. **Standoff Distance: 50 feet (Mission Critical Protected).**
   b. **Design Threat W1 at the standoff distance not to exceed pressure and impulse associated with GP1 threat for Life Safety Protected BuildingsW1 at the standoff not to exceed pressure and impulse associated with GP2 threat for Mission Critical Protected Buildings.**
   c. **Mullion deformation not to exceed deformation limits shown in Table 6-4 of the referenced Physical Security and Resiliency Design Manual.**
   d. **Glazing performance condition shall not exceed those shown in Table 6-3 of the referenced Physical Security and Resiliency Design Manual.**
   e. **Glass shall be restrained within the mullions with ½″ bite and 3/8″ wide continuous bead of structural silicone adhesive attaching the inner lite of the glass to the frame.**
   f. **ASTM F1642, ASTM F1233 and AAMA/WDMA/CSA 101/I.S.2/A440.**
2. **Provide indicated levels of resistance for forced entry and blast resistances window assemblies. Resistance level applies to anchorages, interfaces with adjoining substrates, glass retention, and hardware.**
3. **Would be attackers cannot penetrate through secure closed window assembly.**
4. **Provide combined performances within rating limitations knowing certain attacks can result in severe damage to unit and require replacement.**

B. **Forced-Entry (FE) Resistant Assemblies: Manufacturer's window unit assembled with panels, inserts, hardware, glazing and framing.**

1. **Provide FE rated units where shown or scheduled:**
   a. **Resistance of 15 minutes for forced entry, using basic hand tools.**

C. **Blast Resistant (BR) Assemblies: Manufacturer's window unit assembled with panels, inserts, glazing and framing.**
   1. **Provide BR rated units where shown or scheduled:**
      a. **As required to meet the blast performance requirements listed in this specification**

D. **Thermal Movement: Assembly capable of withstanding thermal movements resulting from ambient range of 67 degrees C (150 degrees F) to 82 degrees C (180 degrees F).**

E. **Design Performance: Comply with structural performance, air infiltration, and water penetration requirements indicated in AAMA/WDMA/CSA 101/I.S.2/A440 for AW Class.**
   1. **Wind Load Resistance: ASCE/SEI 7; Design criteria as indicated on Drawings.**
   2. **Water Infiltration: ASTM E331; no uncontrolled penetration at 300 Pa (6.2 psf), minimum, pressure differential.**
   3. **Air Infiltration: ASTM E283; Maximum 6 liter/second/square meter (0.1 cubic feet/minute/square foot.) at static pressure difference of 300 Pa (6.2 pound square foot).**

2.2 MATERIALS

A. Stainless Steel: ASTM A666, Type 304; formed stainless steel members.

B. Aluminum Extrusions: ASTM B221.
   1. Framing Members: Alloy 6063-T5, -T6, or -T52, or alloy 6061-T6; 5 mm (3/16 inch) minimum thickness.
   2. Trim and Stops not exposed to forced entry attack: Alloy 6063-T5, -T6, or -T52; 1.5 mm (1/16 inch) minimum thickness.

C. Steel Shapes/Plates/Bars: ASTM A36/A36M, except where another designation is indicated.

D. Bolts and Fasteners: ASTM A320/A320M; Type 300-series stainless steel screws, bolts, nuts, and washers. Non-removable type where accessible from attack side.

E. Window Cleaner's Bolts: Nonmagnetic stainless steel, complying with safety regulations for window cleaning equipment.

F. Glazing Materials: Rated laminated assembly as specified in Section 08 80 00, GLAZING.

2.3 PRODUCTS - GENERAL

A. Provide blast resistant windows from one manufacturer.

B. Sustainable Construction Requirements:

1. Steel Recycled Content: 30 percent total recycled content, minimum.
2. Stainless Steel Recycled Content: 70 percent total recycled content, minimum.
3. Aluminum Recycled Content: 80 total recycled content, minimum.

2.4 FABRICATION

A. Assemblies: Shop fabricate matching profiles indicated on Drawings. Make welds that comply with AWS standards; exposed welds ground smooth. Provide welded-in-place reinforcements and anchorage devices.

1. Removable Glazing Stops: Applied to room side of window.
   a. Miter and weld removable stops at corners.
   b. Secure removable stops to frames with countersunk screws, spaced as required for specified performance requirements.
2. New Building: Frame system with inner frame, outer frame, and fasteners to connect frames together.
   a. Fabricate continuous outer frame for masonry concrete embedment as exterior wall is constructed.
   b. Preassemble inner frame with glazing for bolting to outer frame.
   c. Provide both frames shall be supplied by one manufacturer.
   d. Anchorage: Provide anchors as required to meet the project loading requirements.
3. Existing Buildings: Fabricate continuous frame for anchoring to supporting structural elements shown on the drawings.
   a. Provide both inner and outer frames by one manufacturer.
   b. Anchorage: Provide anchors as required to meet the project loading requirements

B. Unit Anchorages: Fabricate metal anchorage system complying with performance requirements.

C. Unit Glazing: Laminated glass assembly meeting VA Physical Security and Resiliency Design Manual. Testing shall be in accordance with ASTM F1642, as specified in Section 08 80 00, GLAZING. Where tested glazed systems do not match the project dimensional requirements, submit calculations prepared by a qualified blast consultant using accepted dynamic methods that demonstrate the submitted system meets the project requirements.

2.5 FINISHES

A. General: Finish fabricated units including framing, sub-framing, hardware, and accessories.

B. Steel Surfaces: ASTM A123/A123M galvanized.

C. Stainless Steel: NAAMM AMP 500; No. 4 polished finish, except retain manufacturer's standard mill finish on exposed fasteners and similar devices.

D. Blend welds to match adjacent finish.

E. Aluminum Anodized Finish: NAAMM AMP 500.

1. Clear Anodized Finish: AA-C22A41; Class I Architectural, 0.018 mm (0.7 mil) thick.
2. Color Anodized Finish: AA-C22A42 or AA-C22A44; Class I Architectural, 0.018 mm (0.7 mil) thick.

2.6 ACCESSORIES

A. Welding Materials: Type to suit application for color match, strength and compatibility in fabricated item.

1. Stainless Steel: AWS D1.6/D1.6M, TIG using rods made from alloyed Type 308 stainless steel.
2. Steel: D1.1/D1.1M.
3. Steel Sheet: D1.3/D1.3M-08.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.

1. Verify opening is correctly sized and located.
2. Verify substrate is prepared to receive frame anchors.

B. Protect existing construction and completed work from damage.

C. Apply bituminous coating approximately 30 mils dry film thickness, or other suitable permanent separator, on surfaces of dissimilar metals, and metal surfaces in contact with concrete.

1. Where the metals are exposed to view, provide a plastic or neoprene separator between dissimilar metals.

3.2 INSTALLATION

A. Install products according to manufacturer's instructions and approved submittal drawings .

B. Install window units according to manufacturer's installation instructions.

C. Set units accurately, plumb, and level.

D. Securely anchor to masonry concrete partition framing as shown on approved submittal drawings to withstand specified performance.

E. Anchorage to Existing Building:

1. Spacing: Maximum 300 mm (12 inch) on center through pre drilled bolt holes in structural frame. Install anchorage per reviewed and approved shop drawings.
2. Anchor Diameter: 10 mm (3/8 inch) minimum.
3. Minimum Embedment and Edge Distances:
   a. Embedment in Concrete: 88 mm (3-1/2 inches).
   b. Embedment in Solid Masonry: 150 mm (6 inches).
   c. Edge Distance: 75 mm (3 inches).
4. Do not cut rebar during concrete anchor installation without approval of the Contracting Officer's Representative (COR).

F. Touch up damaged factory finishes.

1. Repair galvanized surfaces with galvanized repair paint.

3.3 CLEANING

A. Clean exposed window surfaces. Remove temporary labels, contaminants, and stains.

B. Clean glazing according to Section 08 80 00, GLAZING.

3.4 PROTECTION

A. Protect window units from construction operations.

B. Remove protective materials immediately before acceptance.

C. Repair damage.

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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 42 23, INTENSIVE CARE UNIT/CRITICAL CARE UNIT (ICU/CCU) ENTRANCES Section 08 42 29, AUTOMATIC ENTRANCES Section 08 71 13, AUTOMATIC DOOR OPERATORS Section 08 71 13.11, LOW ENERGY DOOR OPERATORS

C. Finishes: Section 09 06 00, SCHEDULE FOR FINISHES.

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 GENERAL

A. All hardware shall comply with ABAAS, (Architectural Barriers Act Accessibility Standard) 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, latchsets, and panic hardware: 5 years.
2. Door closers and continuous hinges: 10 years.
3. Exit Devices: 3 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: AHC certified hardware consultant to 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 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 preinstallation 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, Project Engineer 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 __Kaba Peaks_____ Grand Master Key System . Provide removable core cylinders that are removable only with a special key or tool without disassembly of lever or lockset . Cylinders shall be 7 pin type. Keying information shall be furnished at a later date by the COR.

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. ASTM International(ASTM):

F883-13.....Padlocks

E2180-18.....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):

A156.1-06.....Butts and Hinges

A156.2-03.....Bored and Pre-assembled Locks and Latches

A156.3-08.....Exit Devices, Coordinators, and Auto Flush Bolts

A156.4-08.....Door Controls (Closers)

A156.5-14.....Cylinders and Input Devices for Locks.

A156.6-05.....Architectural Door Trim

A156.8-05.....Door Controls-Overhead Stops and Holders

A156.11-14.....Cabinet Locks

A156.12-05 .....Interconnected Locks and Latches

A156.13-05.....Mortise Locks and Latches Series 1000

A156.14-07 .....Sliding and Folding Door Hardware

A156.15-06.....Release Devices-Closer Holder, Electromagnetic and Electromechanical

A156.16-08.....Auxiliary Hardware

A156.17-04 .....Self-Closing Hinges and Pivots

A156.18-06.....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

A156.36-10.....Auxiliary Locks

A250.8-03.....Standard Steel Doors and Frames

D. National Fire Protection Association (NFPA):

80-10.....Fire Doors and Other Opening Protectives

101-09.....Life Safety Code

E. Underwriters Laboratories, Inc. (UL):

Building Materials Directory (2008)

PART 2 - PRODUCTS

2.1 BUTT HINGES

A. ANSI A156.1. 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 outswing 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, unless otherwise specified in hardware sets.
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 pounds) 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: Stainless steel .
4. Provide with non-removable pin (hospital tip option) at lockable outswing 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 plastic covers.
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 backcheck valve shall not be used to stop the door from overswing, 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 ½" (38mm) minimum piston diameter.

2.5 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 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 (Unless specified otherwise in the hardware sets), Type L02141 or L02161 in office areas, Type L02121 elsewhere.

F. Provide stop Type L02011, as applicable for exterior doors. At outswing 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).

2.6 OVERHEAD DOOR STOPS AND HOLDERS

A. Conform to ANSI Standard A156.8. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door. Set overhead holders for 110 degree opening, unless limited by building construction or equipment. Provide Grade 1 overhead concealed slide type: stop-only at rated doors and security doors, hold-open type with exposed hold-open on/off control at all other doors requiring overhead door stops.

2.7 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 seven 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 to 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 latchsets, except on designated doors in Psychiatric (Mental Health) areas, shall have lever handles fabricated from cast stainless steel. Provide sectional (lever x rose) lever design matching Schlage 06A_____. No substitute lever material shall be accepted. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping

astragals, provide flat lip strip with 21mm (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. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.36.

2.8 PUSH-BUTTON COMBINATION LOCKS

A. ANSI/BHMA A156.5, Grade 1.

B. Construction: Heavy duty mortise lock housing conforming to ANSI/BHMA A156.13, Grade 1. Lever handles and operating components in compliance with the ABAAS and the ADA Accessibility Guidelines. Match lever handles of locks and latchsets 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.

2.9 ELECTROMAGNETIC LOCKS

A. ANSI/BHMA A156.23; electrically powered, of strength and configuration indicated; with electromagnet attached to frame and armature plate attached to door. Listed under Category E in BHMA's "Certified Product Directory."

1. Type: Full exterior or full interior, as required by application indicated.
2. Strength Ranking: 1200 pound force.
3. Residual Magnetism: Not more than 4 pound force to separate door from magnet.

B. Delayed-Egress Locks: BHMA A156.24. Listed under Category G in BHMA's "Certified Product Directory".

1. Means of Egress Doors: Lock releases within 15 seconds after applying a force not more than 15 pound force (67 N) for not more than 3 seconds, as required by NFPA 101.
2. Security Grade: Activated from secure side of door by initiating device.
3. Movement Grade: Activated by door movement as initiating device.

4. The lock housing shall not project more than 4-inches (101mm) from the underside of the frame head stop.

2.10 ELECTRIC STRIKES

A. ANSI/ BHMA A156.31 Grade 1.

B. General: Use fail-secure electric strikes at fire-rated doors.

2.11 KEYS

A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

Locks/Keys	**Quantity**
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. Psychiatric keys shall be cut so that first two bittings closest to the key shoulder are shallow to provide greater strength at point of greatest torque.

2.12 KEY CABINET

A. ANSI Standard A156.11. Provide key cabinet made of cold rolled, 1.2 mm (0.0478 inch) thick furniture steel electro-welded. Doors shall have "no sag" continuous brass-pin piano type hinge and be equipped with chrome plated locking door handles, hook cam and mechanical pushbutton door lock. Key Cabinet and Key Control System shall accommodate all keys for this project plus 25 percent. Provide minimum number of multiple cabinets where a single cabinet of largest size will not accommodate the required number of keys.

B. Key tags shall consist of two sets: Permanent self-locking and loan key snaphook type with tag colors as follows: Red fiber marker of the permanent self-locking type approximately 32 mm (1-1/4 inch) in diameter engraved with the legend "FILE KEY MUST NOT BE LOANED." Also furnish for each hook a white cloverleaf key marker with snap-hooks engraved with the legend "LOAN KEY."

C. The manufacturer of the lock cylinders and locks shall attach a key tag to keys of each lock cylinder and shall mark thereon the respective item number and key change number. Provide each group of keys in a key gathering envelope (supplied by Key Cabinet Manufacturer) in which the lock manufacturer shall include the following information: Item number, key change number and

door number. The contractor shall furnish the Key Cabinet Manufacturer the hardware and keying schedules and change keys.

D. The Key Cabinet Manufacturer shall set up a three-way cross index system, including master keys, listing the keys alphabetically, the hooks numerically and the key changes numerically on different colored index cards. Index cards shall be typewritten and inserted in a durable binder. Attach the keys to the two sets of numbered tags supplied with the cabinet. (The permanent tag and the loan key tag). Instruct the owner in proper use of the system. Install cabinet as directed by the COR.

2.13 KICK PLATES

A. Conform to ANSI Standard A156.6.

B. Provide protective plates as specified below:

1. Kick plates of metal, Type J100 series.
2. Provide kick plates where specified. Kick plates shall be 254 mm (10 inches) high. Kick plates shall be minimum 1.27 mm (0.050 inches) thick. Provide kick plates beveled on all 4 edges (B4E). On push side of doors where jamb stop extends to floor, make kick plates 50 mm (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.

2.14 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.

2.15 FLUSH BOLTS (LEVER EXTENSION)

A. Conform to ANSI A156.16. Flush bolts shall be Type L24081 unless otherwise specified. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors.

B. Lever extension manual flush bolts shall only be used at non-fire-rated pairs for rooms only accessed by maintenance personnel.

C. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2-1/2 inches).

D. Friction-fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.

E. Provide extension rods for top bolt where door height exceeds 2184 mm (7 feet 2 inches).

2.16 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 flushbolt. 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.

2.17 DOOR PULLS WITH PLATES

A. Conform to ANSI A156.6. Pull Type J401, 152 mm CTC (6 inches CTC) length by 19 mm (3/4 inches) diameter minimum with plate Type J302, 90 mm by 381 mm (3-1/2 inches by 15 inches), unless otherwise specified. Provide pull with projection of 57.2 mm (2 1/4 inches) minimum and a clearance of 38.1 mm (1 1/2 inches) minimum. Cut plates of door pull plate for cylinders, or turn pieces where required.

2.18 PUSH PLATES

A. Conform to ANSI A156.6. Metal, Type J302, 203 mm (8 inches) wide by 406.4 mm (16 inches) high. Provide metal Type J302 plates 102 mm (4 inches) wide by 406.4 mm (16 inches) high where push plates are specified for doors

with stiles less than 203 mm (8 inches) wide. Cut plates for cylinders, and turn pieces where required.

2.19 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, except where gravity coordinators are required at acoustic pairs. 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.

2.20 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 ¼-20 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. For thresholds at elevators entrances see other sections of specifications.

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) beyond face of frame.

2.21 AUTOMATIC DOOR BOTTOM SEAL AND RUBBER GASKET FOR LIGHT PROOF OR SOUND CONTROL DOORS

A. Conform to ANSI A156.22. Provide mortise or under-door type, except where not practical. For mortise automatic door bottoms, provide type specific for door construction (wood or metal).

2.22 WEATHERSTRIPS (FOR EXTERIOR DOORS)

A. Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length (0.000774m^3/s/m).

2.23 MISCELLANEOUS HARDWARE

A. 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, lead-lined frames and frames for sound-resistant, lightproof and electromagnetically shielded doors. 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.

2.24 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. Constant Temperature and Cold Rooms in Research Departments: Research Laboratory Set.
2. Cold Room in Morgue Department: Autopsy Set.
3. Refrigerators in Canteen Department: Canteen Storage Set.
4. All Refrigerator Rooms in Main Kitchen Department: Kitchen Storage Set.
5. Chain Link Fence Gates for Electrical Substation and other Fenced Buildings or Areas: Engineer's set, except as otherwise specified.
6. Chain Link Fence Gates for Oxygen Storage Buildings: Maintenance supply set.
7. Roof Access and Scuttles: Engineer's set.
8. Hinged Wicket in Post Office Partitions: Post Office set.

C. Omit padlocks on communicating refrigerator doors.

2.25 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.

2.26 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.

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 except security bedroom, bathroom and anteroom doors which shall have closer installed parallel arm on exterior side of doors. At exterior doors, closers shall be mounted on interior side. Where closers are mounted on doors they shall be mounted with hex 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 COR. Existing hinges shall not be reused on door openings having new doors and new frames. Coordinate preparation for hinge cut-outs and screw-hole locations on doors and frames.

E. Hinges Required Per Door:

Door Description	**Number butts**
Doors 1500 mm (5 ft) or less in height	2 butts
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, ceramic or quarry 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 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 Resident/Project Engineer 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 Resident/Project Engineer and VA Locksmith.

3.5 HARDWARE SETS

A. 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 facility manufacturer standards.

ELECTRIC HARDWARE ABBREVIATIONS LEGEND:

ADO = Automatic Door Operator

CR = Card Reader

RR = Remote Release

B. Manufacturer Abbreviations

1. IV - Ives
2. MR - Markar
3. PE - Pemko
4. RF - Rixson
5. RO - Rockwood
6. SC - Schlage
7. SU - Securitron
8. SI - dormakaba Simplex
9. AT - Accurate Lock and Hardware
10. VD - Von Duprin
11. KA - Kaba Ilco
12. HS - HES
13. AH - Architectural Builders Hardware
14. LC - LCN Closers
15. BM - Besam
16. ZE - Zero International
17. MK - McKinney
18. OT - Other

C. HARDWARE SETS

Set: 1.0

Doors: B1-200A, B1-220B

Description: Exterior Auto Slider AL

Notes: All hardware by door manufacturer.

Set: 2.0

Doors: B1-220A

Description: Vestibule Auto Slider AL (CR)

Notes: All hardware by door manufacturer. Access control required. General contractor to coordinate electrical and ACS requirements.

Set: 3.0

Doors: B1-200B

Description: Vestibule Auto Slider AL

Notes: All hardware by door manufacturer.

Set: 4.0

Doors: B1-13C

Description: Pair Exterior Entry AL (CR)

2 Continuous Hinge	FM300 HT CTP WEP	630	MR
1 Nightlatch	QEL RX 9947NL-OP CON 110MD-NL	626	VD
1 Exit Only	QEL RX 9947EO CON	626	VD
1 Rim Cylinder Housing	80-129	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Construction Core	80-035		SC
2 Door Pull	BF168 Mtg-Type 12XHD	US32D	RO
2 Conc Overhead Stop	102XSA	US32D	AH
2 Surface Closer	4040XP EDA	689	LC
2 Drop Plate	4040XP-18PA	689	LC
2 Shoe	4040XP-30	689	LC
2 Spacer	4040XP-61	689	LC
1 Threshold	2705AT Pemkote		PE
2 Sweep	315CN		PE
2 Wire Harness	CON-192P (Jamb)		VD

2 Wire Harness	CON-XXX (Door)		VD
2 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT
2 Electric Power Transfer	EPT10 CON	689	VD

Notes: Perimeter gasket to be provided by door supplier.

Operation:
1. Doors electrically unlocked or locked during established time zones as programmed by the access control system. When devices are locked then the card reader grants access upon presentation of a valid credential. Exit devices mechanically lock during power failure with a mechanical key override entry.
2. Egress always free from inside by depressing inside push pad.
3. Request to exit switch in the push pad to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.

Set: 5.0

Doors: B1-115B
Description: Single Exterior Exit AL (CR)

1 Continuous Hinge	FM300 HT WEP	630	MR
1 Nightlatch	99L-NL 996L-NL 06	626	VD
1 Rim Cylinder Housing	80-129	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Construction Core	80-035		SC
1 Electric Strike	9600	630	HS
1 SMART Pac Bridge Rectifier	2005M3		HS
1 Conc Overhead Stop	102XSA	US32D	AH
1 Surface Closer	4040XP EDA	689	LC
1 Drop Plate	4040XP-18PA	689	LC
1 Shoe	4040XP-30	689	LC
1 Spacer	4040XP-61	689	LC
1 Threshold	2705AT Pemkote		PE
1 Sweep	315CN		PE
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT

1 Card Reader	Provided by ACS	OT
1 Motion Sensor	Provided by ACS	OT
1 Power Supply	Provided by ACS	OT

Notes: Perimeter gasket to be provided by door supplier.

Operation:

1. Card reader grants access upon presentation of a valid credential. Electric strike to fail secure during power failure with mechanical key override entry.
2. Egress always free from inside by depressing inside push pad.
3. Request to exit motion sensor to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.

Set: 6.0

Doors: B1-218B

Description: Single Exterior Decon (CR)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 5" x 4-1/2" NRP	630	IV
1 Storeroom Lock	L9080 H 06A	630	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Electric Strike	1006CS	630	HS
1 Surf Overhead Stop	N 902XA Non-ferrous screws	US32D	AH
1 Surface Closer	4040XP EDAW62G SRI	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Threshold	2705AT Pemkote		PE
1 Gasketing	2891APK (Head)		PE
2 Gasketing	290APK (Jambs)		PE
1 Sweep	315CN		PE
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes: Mount weatherstripping prior to installing closer bracket. Special templating required.

Operation:

1. Card reader grants access upon presentation of a valid credential. Electric strike to fail secure during power failure with mechanical key override entry.
2. Egress always free from inside by depressing inside lever.
3. Request to exit motion sensor to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.

Set: 7.0

Doors: B1-225

Description: Single Exterior Fire Riser

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2" NRP	630	IV
1 Storeroom Lock	L9080 H 06A	630	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Surface Closer	4040XP CUSH	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Threshold	2705AT Pemkote		PE
1 Gasketing	2891APK (Head)		PE
2 Gasketing	290APK (Jambs)		PE
1 Rain Guard	346C		PE
1 Sweep	315CN		PE

Notes: Mount weatherstripping prior to installing closer bracket. Special templating required.

Set: 8.0

Doors: B1-43

Description: Single Roof

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2" NRP	630	IV
1 Passage Latch	L9010 06A	626	SC
1 Surface Closer	4040XP CUSH	689	LC
1 Threshold	2705AT Pemkote		PE
1 Gasketing	2891APK (Head)		PE
2 Gasketing	290APK (Jambs)		PE
1 Sweep	315CN		PE

Set: 9.0

Doors: P1-ACC1

Description: Single Access Door

2	Hinge, Full Mortise	5BB1 4-1/2" x 4-1/2" NRP	630	IV
1	Storeroom Lock	L9080 H 06A	630	SC
1	Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1	Construction Core	80-035		SC
1	Gasketing	290APK (Head, Jambs, and Sill)		PE

Set: 10.0

Doors: B1-201

Description: Pair Corridor Rated (CR, RR, ADO)

2	Continuous Hinge	FM300 HT CTP WEP	630	MR
1	Nightlatch	QEL RX 9927L-NL-F CON 996L-NL 06	LBR626	VD
1	Exit Only	QEL RX 9927EO-F CON LBR-AFL	626	VD
1	Rim Cylinder Housing	80-129	626	SC
1	Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1	Construction Core	80-035		SC
2	Door Operator	SW200i	AL	BM
2	Off/On/Hold Switch	Provided by Operator Mfr.		BM
2	Kick Plate	8400 10" H x 1" LDW B-CS	US32D	IV
2	Floor Stop	FS441	626	IV
1	Gasketing	S88D		PE
1	Astragal	S772D		PE
2	Wire Harness	CON-192P (Jamb)		VD
2	Wire Harness	CON-XXX (Door)		VD
2	Actuator Touchless (Wall)	MS31 70.5844	Gray	BEA
2	Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1	Card Reader	Provided by ACS		OT
1	Power Supply	Provided by ACS		OT
2	Electric Power Transfer	EPT10 CON	689	VD

Notes: Mount operators in continuous header.

Operation:

1. Doors electrically unlocked or locked during established time zones as programmed by the access control system. When devices are locked access is granted by card reader upon presentation of a valid credential or by remote release at nurse station. Exit devices mechanically lock during power failure with a mechanical key override entry.
2. Egress always free from inside by depressing inside push pad.
3. Request to exit switch in the push pad to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.
5. Outside card reader retracts the latches and powers the door operators.
6. Outside actuator is only active when doors are unlocked by the access control system or by remote release.
7. Inside actuator switch retracts the latches and powers the door operators.
8. Upon fire alarm electric latch retraction becomes disabled and exit devices will latch.
9. Upon fire alarm or power failure automatic operators to become electrically inactive and will function as manual closers.

Set: 11.0

Doors: B1-194B

Description: Pair Corridor Rated (CR, ADO)

2 Continuous Hinge	FM300 HT CTP WEP	630	MR
1 Nightlatch	QEL RX 9927L-NL-F CON 996L-NL 06	LBR626	VD
1 Exit Only	QEL RX 9927EO-F CON LBR-AFL	626	VD
1 Rim Cylinder Housing	80-129	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Construction Core	80-035		SC
2 Door Operator	SW200i	AL	BM
2 Off/On/Hold Switch	Provided by Operator Mfr.		BM
2 Kick Plate	8400 10" H x 1" LDW B-CS	US32D	IV
1 Floor Stop	FS441	626	IV
1 Gasketing	S88D		PE
1 Astragal	S772D		PE
2 Wire Harness	CON-192P (Jamb)		VD
2 Wire Harness	CON-XXX (Door)		VD
2 Actuator Touchless (Wall)	MS31 70.5844	Gray	BEA

2 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT
2 Electric Power Transfer	EPT10 CON	689	VD

Notes: Mount operators in continuous header.

Operation:
1. Doors electrically unlocked or locked during established time zones as programmed by the access control system. When devices are locked then the card reader grants access upon presentation of a valid credential. Exit devices mechanically lock during power failure with a mechanical key override entry.
2. Egress always free from inside by depressing inside push pad.
3. Request to exit switch in the push pad to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.
5. Outside card reader retracts the latches and powers the door operators.
6. Outside actuator is only active when doors are unlocked by the access control system or by remote release.
7. Inside actuator switch retracts the latches and powers the door operators.
8. Upon fire alarm electric latch retraction becomes disabled and exit devices will latch.
9. Upon fire alarm or power failure automatic operators to become electrically inactive and will function as manual closers.

Set: 12.0

Doors: B1-194A, B1-226
Description: Pair Corridor (CR, RR, ADO)

2 Continuous Hinge	FM300 HT CTP WEP	630	MR
1 Nightlatch	QEL RX 9927L-NL CON 996L-NL 06 LBR	626	VD
1 Exit Only	QEL RX 9927EO CON LBR	626	VD
1 Rim Cylinder Housing	80-129	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Construction Core	80-035		SC
2 Door Operator	SW200i	AL	BM
2 Off/On/Hold Switch	Provided by Operator Mfr.		BM

2	Kick Plate	8400 10" H x 1" LDW B-CS	US32D	IV
2	Floor Stop	FS441	626	IV
2	Silencer	SR64-GRY		IV
2	Wire Harness	CON-192P (Jamb)		VD
2	Wire Harness	CON-XXX (Door)		VD
2	Actuator Touchless (Wall)	MS31 70.5844	Gray	BEA
2	Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1	Card Reader	Provided by ACS		OT
1	Power Supply	Provided by ACS		OT
2	Electric Power Transfer	EPT10 CON	689	VD

Notes: Mount operators in continuous header.

Operation:
1. Doors electrically unlocked or locked during established time zones as programmed by the access control system. When devices are locked access is granted by card reader upon presentation of a valid credential or by remote release at nurse station. Exit devices mechanically lock during power failure with a mechanical key override entry.
2. Egress always free from inside by depressing inside push pad.
3. Request to exit switch in the push pad to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.
5. Outside card reader retracts the latches and powers the door operators.
6. Outside actuator is only active when doors are unlocked by the access control system or by remote release.
7. Inside actuator switch retracts the latches and powers the door operators.

Set: 13.0

Doors: B1-230
Description: Single Corridor Rated (CR)

3	Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2" NRP	652	IV
1	Storeroom Lock	L9080 H 06A	626	SC
1	Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1	Electric Strike	1006CS	630	HS
1	Surface Closer	4040XP EDA	689	LC

1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
1 Gasketing	S88D		PE
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:

Operation:

1. Card reader grants access upon presentation of a valid credential. Electric strike to fail secure during power failure with mechanical key override entry.
2. Egress always free from inside by depressing inside lever.
3. Request to exit motion sensor to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.

Set: 14.0

Doors: B1-240A, B1-240B, B1-252A, B1-84, B1-84A

Description: Single Trap (CR, Interlock)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	652	IV
1 Storeroom Lock	L9080 H 06A	626	SC
1 Magnetic Lock	M62		SU
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Electric Strike	1006CS	630	HS
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Emergency Pull Station	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:

Operation:

1. Doors electrically unlocked or locked during established time zones as programmed by the access control system. When locked card reader grants access upon presentation of a valid credential. Electric Strike to fail secure during power failure with mechanical key override entry.
2. Egress free from inside by depressing inside lever.
3. Request to exit motion sensor to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.
5. Magnetic lock normally unsecured.
6. Outer corridor door and inner door are interlocked. If one is open the other will remain secured.
7. Emergency pull station will override interlock in case of emergency.
8. Magnetic locks to release upon fire alarm or power failure.

Set: 15.0

Doors: B1-252B

Description: Single Trap (CR, Interlock)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	652	IV
1 Storeroom Lock	L9080 H 06A	626	SC
1 Magnetic Lock	M62		SU
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Electric Strike	1006CS	630	HS
1 Surface Closer	4040XP CUSH	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
3 Silencer	SR64-GRY		IV
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Emergency Pull Station	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:

Operation:

1. Doors electrically unlocked or locked during established time zones as programmed by the access control system. When locked card reader grants access upon presentation of a valid credential. Electric Strike to fail secure during

power failure with mechanical key override entry.

2. Egress free from inside by depressing inside lever.

3. Request to exit motion sensor to signal authorized egress to the access control system.

4. Door position switch to signal door open/closed to the access control system.

5. Magnetic lock normally unsecured.

6. Outer corridor door and inner door are interlocked. If one is open the other will remain secured.

7. Emergency pull station will override interlock in case of emergency.

8. Magnetic locks to release upon fire alarm or power failure.

Set: 16.0

Doors: B1-219

Description: Single Meds (CR)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 5" x 4-1/2"	652	IV
1 Storeroom Lock	L9080 H 06A	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Electric Strike	1006CS	630	HS
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:

Operation:

1. Card reader grants access upon presentation of a valid credential. Electric strike to fail secure during power failure with mechanical key override entry.

2. Egress always free from inside by depressing inside lever.

3. Request to exit motion sensor to signal authorized egress to the access control system.

4. Door position switch to signal door open/closed to the access control system.

Set: 17.0

Doors: B1-114, S2F1T

Description: Single Stair Rated (CR)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 5" x 4-1/2" NRP	652	IV
1 Rim Exit Device	RX 99L-F CON E 996L 06	626	VD
1 Rim Cylinder Housing	80-129	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Construction Core	80-035		SC
1 Surface Closer	4040XP SCUSH	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Gasketing	S88D		PE
1 Wire Harness	CON-192P (Jamb)		VD
1 Wire Harness	CON-XXX (Door)		VD
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT
1 Electric Power Transfer	EPT10 CON	689	VD

Notes: Operation:
1. Doors electrically unlocked or locked during established time zones as programmed by the access control system. When devices are locked then the card reader grants access upon presentation of a valid credential. Exit devices mechanically lock during power failure with a mechanical key override entry.
2. Egress always free from inside by depressing inside push pad.
3. Request to exit switch in the push pad to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.

Set: 18.0

Doors: B1-221A, B1-222A

Description: Single Ante

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	652	IV
1 Passage Latch	L9010 06A	626	SC
1 Surface Closer	4040XP REGARM	689	LC

1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
1 Gasketing	315CR		PE
1 Door Bottom	369AA Z49-PL		ZE

Set: 19.0

Doors: B1-221C, B1-222C

Description: Single Bariatric & Isolation

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	652	IV
1 Passage Latch	L9010 06A	626	SC
1 Surface Closer	4040XP EDA	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
1 Gasketing	315CR		PE
1 Door Bottom	369AA Z49-PL		ZE

Set: 20.0

Doors: B1-209

Description: Single Breakroom Rated (CR)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	652	IV
1 Storeroom Lock	L9080 H 06A	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Electric Strike	1006CS	630	HS
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
1 Gasketing	S88D		PE
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:

Operation:

1. Card reader grants access upon presentation of a valid credential. Electric strike to fail secure during power failure with mechanical key override entry.

2. Egress always free from inside by depressing inside lever.

3. Request to exit motion sensor to signal authorized egress to the access control system.

4. Door position switch to signal door open/closed to the access control system.

Set: 21.0

Doors: B1-46

Description: Single Consult (CR)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 5" x 4-1/2"	652	IV
1 Storeroom Lock	L9080 H 06A	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Electric Strike	1006CS	630	HS
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:

Operation:

1. Card reader grants access upon presentation of a valid credential. Electric strike to fail secure during power failure with mechanical key override entry.

2. Egress always free from inside by depressing inside lever.

3. Request to exit motion sensor to signal authorized egress to the access control system.

4. Door position switch to signal door open/closed to the access control system.

Set: 22.0

Doors: B1-46A

Description: Single On-Call (CR)

3 Hinge, Full Mortise	5BB1 4-1/2" x 4-1/2"	652	IV

1 Storeroom Lock	L9080 H 06A	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Electric Strike	1006CS	630	HS
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
1 Gasketing	S88D		PE
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:

Operation:

1. Card reader grants access upon presentation of a valid credential. Electric strike to fail secure during power failure with mechanical key override entry.
2. Egress always free from inside by depressing inside lever.
3. Request to exit motion sensor to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.

Set: 23.0

Doors: B1-238

Description: Single On-Call (Keypad)

3 Hinge, Full Mortise	5BB1 4-1/2" x 4-1/2"	652	IV
1 Pushbutton Mortise Lock	5066 B WL	26D	SI
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Construction Core	80-035		SC
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV

Set: 24.0

Doors: B1-201A

Description: Single Check-In (CR)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	652	IV
1 Storeroom Lock	L9080 H 06A	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Electric Strike	1006CS	630	HS
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:
Operation:
1. Card reader grants access upon presentation of a valid credential. Electric strike to fail secure during power failure with mechanical key override entry.
2. Egress always free from inside by depressing inside lever.
3. Request to exit motion sensor to signal authorized egress to the access control system.
4. Door position switch to signal door open/closed to the access control system.

Set: 25.0

Doors: B1-231, B1-233, B1-243, B1-244, B1-47A
Description: Single Office

3 Hinge, Full Mortise	5BB1 4-1/2" x 4-1/2"	652	IV
1 Entrance/Office	L9050 H 06A 09-509xL583-363	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV

Set: 26.0

Doors: B1-41, B1-41A, B1-48
Description: Single Corridor Office

3 Hinge, Full Mortise	5BB1 4-1/2" x 4-1/2"	652	IV
1 Entrance/Office	L9050 H 06A 09-509xL583-363	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV

Set: 27.0

Doors: B1-47

Description: Single Office

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 5" x 4-1/2"	652	IV
1 Entrance/Office	L9050 H 06A 09-509xL583-363	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV

Set: 28.0

Doors: B1-234, B1-236, B1-250, B1-251

Description: Single Locker

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	630	IV
1 Push Plate	70C-RKW	US32D	RO
1 Pull Plate	BF 111x70C	US32D	RO
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV

Set: 29.0

Doors: B1-237, B1-248, B1-84B

Description: Single Toilet

3 Hinge, Full Mortise	5BB1 4-1/2" x 4-1/2"	652	IV

1 Privacy Lock	L9040 06A L283-722 09-509xL583-363	626	SC
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV

Set: 30.0

Doors: B1-201B, B1-201C, B1-202, B1-203

Description: Single Toilet (Rescue)

1 Cont Hinge, Double Swing	DSHP01C		PE
1 Privacy Lock	L9040 06A L283-722 09-509xL583-363	626	SC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
1 Emergency Stop	ERS84C-NOTCHxHT		PE

Set: 31.0

Doors: B1-211

Description: Single Toilet (Anti-Ligature)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW HT 5" x 4-1/2" SEC NRP	630	IV
1 Privacy Set (Anti-Ligature)	CH 9144i-BL	US26D	AT
1 Concealed Closer	2031 BUMP TORX	689	LC
3 Silencer	SR64-GRY		IV

Set: 31.1

Doors: B1-212A

Description: Single Exam (Anti-Ligature, STC)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW HT 5" x 4-1/2" SEC NRP	630	IV
1 Privacy Set (Anti-Ligature)	CH 9144i-BL	US26D	AT
1 Concealed Closer	2031 BUMP TORX	689	LC

Note: Perimeter seals, door bottom, and threshold (if required) by acoustic door manufacturer.

Set: 32.0

Doors: B1-235

Description: Single Toilet/Shower

3	Hinge, Full Mortise	5BB1 4-1/2" x 4-1/2"	652	IV
1	Privacy Lock	L9040 06A L283-722 09-509xL583-363	626	SC
1	Surf Overhead Stop	902XA	US32D	AH
1	Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
3	Silencer	SR64-GRY		IV

Set: 33.0

Doors: B1-221B, B1-222B

Description: Pair Toilet/Shower (Unequal)

6	Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	652	IV
1	Flush Bolt	2805	US26D	RO
1	Passage Latch	L9010 06A 10-072 - 7/8"	626	SC
2	Surf Overhead Stop	902XA	US32D	AH
2	Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1	Astragal	357C		PE
2	Silencer	SR64-GRY		IV

Notes: Mount astragal on pull side of active leaf and size doors for 1/8" clearance between leaves.

Set: 34.0

Doors: B1-213

Description: Single Intervention (Anti-Ligature, ML)

3	Hinge, Full Mortise, Hvy Wt	5BB1HW HT 5" x 4-1/2" SEC NRP	630	IV
1	Storeroom (Anti-Ligature)	CH 9195BL	US26D	AT
1	Magnetic Lock	M62F		SU
1	Mortise Cylinder Housing	80-103 (cam as required)	626	SC
1	Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1	Construction Core	80-035		SC
1	Concealed Closer	2031 BUMP TORX	689	LC
1	Kick Plate	8400 10" H x 2" LDW B-CS Torx	US32D	IV
1	Push Button (For Lockdown)	Provided by ACS		OT
1	Power Supply	Provided by ACS		OT
1	Bracket	ZA-32/62CL		SU

Notes: Perimeter seals, door bottom, and threshold (if required) by acoustic door manufacturer.

Operation:

1. Mechanical key required for entry to room.
2. Outside push button to activate mag lock to secure room and bar exit. Push button must be continually depressed to keep mag lock energized.
3. Releasing push button deactivates mag lock to allow exit from room.

Set: 35.0

Doors: B1-241

Description: Single Holding (Anti-Ligature, ML)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW HT 4-1/2" x 4-1/2" NRP SEC 652		IV
1 Storeroom (Anti-Ligature)	CH 9195BL	US26D	AT
1 Magnetic Lock	M62F		SU
1 Mortise Cylinder Housing	80-103 (cam as required)	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Construction Core	80-035		SC
1 Concealed Closer	2031 BUMP TORX	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS Torx	US32D	IV
1 Gasketing	S88D		PE
1 Door Bottom	369AA Z49-PL		ZE
1 Push Button (For Lockdown)	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT
1 Bracket	ZA-32/62CL		SU

Notes:

Operation:

1. Mechanical key required for entry to room.
2. Outside push button to activate mag lock to secure room and bar exit. Push button must be continually depressed to keep mag lock energized.
3. Releasing push button deactivates mag lock to allow exit from room.

Set: 36.0

Doors: B1-246A

Description: Single Interview (CR2)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2" NRP	652	IV
1 Passage Latch	L9010 06A	626	SC
1 Magnetic Lock	M62BD		SU
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV
2 Card Reader	Provided by ACS		OT
1 Emergency Pull Station	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:
Operation:
1. Doors electrically unlocked or locked from both directions during established time zones as programmed by the access control system. When magnetic locks are secure then the card reader grants access upon presentation of a valid credential.
2 Magnetic locks unlock during power failure or fire alarm allowing egress.
3. Door position switch in magnetic lock to signal door open/closed to the access control system.
4. Emergency pull station will cut power to magnetic lock to allow for emergency egress.

Set: 37.0

Doors: B1-246
Description: Single Interview (CRx2)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2" NRP	652	IV
1 Passage Latch	L9010 06A	626	SC
1 Magnetic Lock	M62BD		SU
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV
2 Card Reader	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:

Operation:

1. Doors electrically unlocked or locked from both directions during established time zones as programmed by the access control system. When magnetic locks are secure then the card reader grants access upon presentation of a valid credential.

2 Magnetic locks unlock during power failure or fire alarm allowing egress.

3. Door position switch in magnetic lock to signal door open/closed to the access control system.

Set: 38.0

Doors: B1-247, B1-249, B1-D1

Description: Single Evidence, Armory (CR)

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	652	IV
1 Storeroom Lock	L9080 H 06A	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Electric Strike	1006CS	630	HS
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
1 Gasketing	S88D		PE
1 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Motion Sensor	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT

Notes:

Operation:

1. Card reader grants access upon presentation of a valid credential. Electric strike to fail secure during power failure with mechanical key override entry.

2. Egress always free from inside by depressing inside lever.

3. Request to exit motion sensor to signal authorized egress to the access control system.

4. Door position switch to signal door open/closed to the access control system.

Set: 39.0

Doors: B1-207

Description: Single Soiled Rated (Keypad)

3	Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	652	IV
1	Pushbutton Mortise Lock	5066 B WL	26D	SI
1	Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1	Construction Core	80-035		SC
1	Surface Closer	4040XP REGARM	689	LC
1	Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1	Wall Stop	WS406CCV	630	IV
1	Gasketing	S88D		PE

Set: 40.0

Doors: B1-216, B1-217

Description: Single Clean, Storage Rated (Keypad)

3	Hinge, Full Mortise, Hvy Wt	5BB1HW 5" x 4-1/2"	652	IV
1	Pushbutton Mortise Lock	5066 B WL	26D	SI
1	Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1	Construction Core	80-035		SC
1	Surface Closer	4040XP REGARM	689	LC
1	Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1	Wall Stop	WS406CCV	630	IV
1	Gasketing	S88D		PE

Set: 41.0

Doors: B1-208

Description: Pair Clean Rated (Keypad)

6	Hinge, Full Mortise, Hvy Wt	5BB1HW 5" x 4-1/2" NRP	652	IV
1	Flush Bolt	2842	US26D	RO
1	Dust Proof Strike	570	US26D	RO
1	Pushbutton Mortise Lock	5066 B WL	26D	SI
1	Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1	Construction Core	80-035		SC
1	Coordinator	2672	Black	RO
2	Mounting Bracket	2601AB or C	Black	RO
2	Surface Closer	4040XP SCUSH	689	LC

2 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Gasketing	S88D		PE
1 Astragal	18041CNB (2)		PE

Set: 42.0

Doors: B1-210

Description: Single HAC Rated

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2" NRP	652	IV
1 Storeroom Lock	L9080 H 06A	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Surface Closer	4040XP CUSH	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Gasketing	S88D		PE

Set: 43.0

Doors: B1-45

Description: Single Elec

3 Hinge, Full Mortise	5BB1 4-1/2" x 4-1/2"	652	IV
1 Storeroom Lock	L9080 H 06A	630	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Surface Closer	4040XP REGARM	689	LC
1 Kick Plate	8400 10" H x 2" LDW B-CS	US32D	IV
1 Wall Stop	WS406CCV	630	IV
3 Silencer	SR64-GRY		IV

Set: 44.0

Doors: B1-42

Description: Single Mechanical Rated

3 Hinge, Full Mortise, Hvy Wt	5BB1HW 4-1/2" x 4-1/2"	630	IV
1 Storeroom Lock	L9080 H 06A	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Surf Overhead Stop	902XA	US32D	AH
1 Surface Closer	4040XP REGARM	689	LC
1 Gasketing	S88D		PE

Set: 45.0

Doors: B1-204, B1-205, B1-206, B1-214, B1-215, B1-221, B1-222, B1-223

Description: ICU Type Sliding Door

Notes: All hardware provided by door manufacturer.

Set: 46.0

Doors: B1-207A, B1-207B, B1-218A

Description: Surface Sliding Door Unit

1 Mortise Cylinder Housing	80-103 (cam as required)	626	SC
1 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
1 Construction Core	80-035		SC

Notes: Balance of hardware provided by door manufacturer. General contractor to coordinate cylinder requirements.

Operation:
1. Secure Side Access via Electronic Activation Hardware (Keypad/Card Key/Other) by Division 28.
2. Upon door closing the latch will automatically engage.
3. User activates electric strike with keypad or key card to unlock door.
4. User pulls ladder pull from corridor side to slide door open.
5. User rotates lever from room side to slide door closed.
6. Electric strike engages and door locks automatically.
7. User rotates lever from room side to release latch (single action egress at all times).
8. User slides door open.

Set: 47.0

Doors: B1-212B

Description: Overhead Coiling Door

Notes: All hardware by door manufacturer.

Set: 48.0

Doors: B1-229A

Description: Pair Corridor Rated (MHO)

2 Continuous Hinge	FM300 HT WEP	630	MR
2 Exit Only	9927EO-F LBR	626	VD
2 Surface Closer	4040XP EDA	689	LC
2 Kick Plate	8400 10" H x 1" LDW B-CS	US32D	IV
2 Electromagnetic Holder	998M	689	RF
1 Gasketing	S88D		PE
1 Astragal	S772D		PE

Operation:

1. Magnetic holder to release upon fire alarm or power failure.

Set: 49.0

Doors: B1-124

Description: Pair Double Egress Corridor Rated (CR, Delayed Egress, ADO)

2 Continuous Hinge	FM300 HT CTP WEP	630	MR
2 Exit Only	QEL RX 9927EO-F CON LBR	626	VD
1 Rim Cylinder Housing	80-129	626	SC
1 Mortise Cylinder Housing	80-103 (cam as required)	626	SC
2 Kaba Peaks Core	8850-25-1007PP5	US26D	KA
2 Construction Core	80-035		SC
1 Delayed Egress Mag Lock	DEM680E (With Key Switch)	630	SU
2 Door Operator	SW200i	AL	BM
2 Off/On/Hold Switch	Provided by Operator Mfr.		BM
2 Kick Plate	8400 10" H x 1" LDW B-CS	US32D	IV
1 Gasketing	S88D		PE
1 Astragal	S772D		PE
2 Wire Harness	CON-192P (Jamb)		VD
2 Wire Harness	CON-XXX (Door)		VD
2 Actuator Touchless (Wall)	MS31 70.5844	Gray	BEA
2 Position Switch	Provided by ACS-Prep by Dr/Fr mfr.		OT
1 Card Reader	Provided by ACS		OT
1 Power Supply	Provided by ACS		OT
2 Electric Power Transfer	EPT10 CON	689	VD

Notes: Mount operators in continuous header.

Operation:

1. Depressing push pad on East leaf activates a delayed egress cycle. When delayed egress cycle is activated door will unlock after a 15 second delay allowing egress.
2. Delayed egress alarm activated or deactivated by the wall mounted key switch or through the access control system.
3. When delayed egress alarm is activated, card reader shunts delayed egress system to allow exiting without alarm.
4. Activating the delayed egress devices sends a remote alarm to the access control system.
5. Loss of power or fire alarm releases the device for immediate egress.
6. Egress always free through West leaf by depressing inside push pad.
7. Request to exit switch in the West leaf push pad to signal authorized egress to the access control system.
8. Door position switch to signal door open/closed to the access control system.
9. Outside card reader releases the magnet, retracts the latches, and powers the door operators.
10. Outside actuator retracts the latches and powers the door operators. Outside actuator is only active when doors are unlocked by the access control system or by remote release.
11. Inside actuator switch releases the magnet, retracts the latches and powers the door operators.
12. Upon fire alarm electric latch retraction becomes disabled and exit devices will latch.
13. Upon fire alarm or power failure automatic operators to become electrically inactive and will function as manual closers.

- - - E N D - - -

SECTION 08 71 13
AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Automatic operators for swinging and sliding doors.

1.2 RELATED WORK

A. Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS: Aluminum Frames Entrance Work.

B. Section 08 71 00, DOOR HARDWARE: Door Hardware.

C. Division 26, ELECTRICAL Electric General Wiring, Connections and Equipment Requirements.

D. Division 28, ELECTRONIC SAFETY AND SECURITY: Access Control Devices:.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):

1. B209-14 - Aluminum and Aluminum-Alloy Sheet and Plate.
2. A1008/A1008M-20 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Baked Hardenable.

C. Builders Hardware Manufacturers Association (BHMA):

1. BHMA A156.10-11 - Power Operated Pedestrian Doors.

D. National Fire Protection Association (NFPA):

1. 101-15 - Life Safety Code.

E. Underwriters Laboratories (UL):

1. 325-13 - Standard for Doors, Drapery, Gate, Louver, and Window Operators and Systems.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

1. Show size, configuration, and fabrication and installation details.

C. Manufacturer's Literature and Data:

1. Description of each product.
2. Installation instructions.
3. Warranty.

D. Sustainable Construction Submittals:
   1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
E. Test reports: Certify each product complies with specifications.
F. Qualifications: Substantiate qualifications comply with specifications.
   1. Manufacturer.
   2. Installer with project experience list.
G. Operation and Maintenance Data:
   1. Care instructions for each exposed finish product.
   2. Start-up, maintenance, troubleshooting, emergency, and shut-down instructions for each operational product.

1.5 QUALITY ASSURANCE

A. Manufacturer’s Qualifications:
   1. Regularly manufactures specified products.
   2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
      a. Provide contact names and addresses for completed projects when requested by Contracting Officer's Representative.
B. Installer’s Qualifications: Experienced installer, approved by the manufacturer.

1.6 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
B. Manufacturer's Warranty: Warrant automatic door operators against material and manufacturing defects.
   1. Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Comply with requirements of BHMA A156.10. Unless otherwise indicated on Drawings, provide operators that move doors from fully closed to fully opened position in five seconds maximum time interval, when speed adjustment is at maximum setting.
B. Equipment: Conforming to UL 325. Provide key operated power disconnect wall switch for each door installation.
C. Electrical Wiring, Connections and Equipment: Motors, starters, controls, associated devices, and interconnecting wiring required for

installation. Equipment and wiring as specified in Division 26, ELECTRICAL.

2.2 PRODUCTS - GENERAL

A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.

B. Provide door operators from one manufacturer.

C. Provide one type of operator throughout project.

D. Sustainable Construction Requirements:

1. Steel Recycled Content: 30 percent total recycled content, minimum.
2. Aluminum Recycled Content: 80 percent total recycled content, minimum.

2.3 SWING DOOR OPERATORS

A. General:

1. Type: Institutional type.
2. Size: As recommended by manufacturer for door weight and sizes.

B. Function:

1. Provide operators, enclosed in housing, permitting opening of door by energizing motor and stopped by electrically reducing Voltage and stalling motor against mechanical stop.
2. Door to close by means of spring energy, and closing force controlled by gear system and motor being used as dynamic brake without power, or controlled by hydraulic closer in electro-hydraulic operators.
3. Opening and Closing Speeds: Field adjustable.
4. Operators with checking mechanism providing cushioning action at last part of door travel, in both opening and closing cycle.
5. Operators capable of recycling doors instantaneously to full open position from any point in closing cycle when control switch is activated.
6. When automatic power is interrupted or shut-off, permit doors to easily open manually without damage to automatic operator system.

C. Connect hardware with drive arm attached to door with pin linkage rotating in a self-lubricating bearing. Prevent doors from pivoting on shaft of operator.

D. Operator Housing:

1. ASTM B209, Type 6063-T5 aluminum alloy, 112 mm (4-1/2 inches) wide by 140 mm (5.5 inches) high by 3.2 mm (0.125 inch) thick, aluminum

extrusions with enclosed end caps for application to 100 mm (4 inches) and larger frame systems.

E. Power Operator:

1. Completely assembled and sealed unit including gear drive transmission, mechanical spring and bearings, located in aluminum case and filled with special lubricant for extreme temperature conditions. Rubber mounted units with provisions for easy maintenance and replacement, without removing door from pivots or frame.

F. Motors:

1. Provide with interlock to prevent operation when doors are electrically locked from opening.

G. Electrical Control:

1. Self-contained electrical control unit, including necessary transformers, relays, rectifiers, and other electronic components for proper operation and switching of power operator.
2. Connecting Harnesses: Interlocking plugs.

H. Accessories:

1. Metal mounting supports, brackets and other accessories necessary for installation of operators at head of door frames.

I. Microprocessor Controls:

1. Multi-function microprocessor control providing adjustable hold open time (1-30 seconds) with fully adjustable opening speed, LED indications for sensor input signals and operator status and power assist close options. Control capable of receiving activation signals from any device with normally open dry contact output.
2. Hold doors held open by low Voltage applied to the continuous duty motor.
3. Controls:
   a. Adjustable safety circuit that monitors door operation and stops opening direction of door if obstruction is sensed.
   b. Recycle feature that reopens door if obstruction is sensed at any point during closing cycle.
   c. Standard three position key switch with functions for ON, OFF, and HOLD OPEN, mounted on operator enclosure, door frame, or wall, as indicated on drawings.

2.4 SLIDING DOOR OPERATORS

A. Operator Function:

1. Electric motor pulling door from closed to open position, stopping door by electrically reducing Voltage and stalling door against mechanical stop.
2. Opening and Closing Speeds: Field adjustable.
3. System permitting manual control of door in event of power failure.

B. Power Operator:

1. Completely assembled and sealed electromechanical operating unit including 95 W (1/8 hp.) DC shunt-wound permanent magnet motor with sealed bearings, located in aluminum case and filled with special lubricant for extreme temperature conditions. Rubber mount units with provisions for easy maintenance and replacement, without removing door from pivots or frame.
2. Opening and Closing Cycle: Field adjustable.

C. Operator Housing:

1. ASTM B209, Type 6063-T5 aluminum alloy, 150 mm (6 inches) wide by 200 mm (8 inches) high by 3.2 mm (0.125 inch) thick, aluminum extrusions with enclosed end caps for application to 100 mm (4 inches) and larger frame systems.

2.5 SLIDING DOOR UNITS

A. Provide door panels in compliance with NFPA 101, allowing "breakout" to full open position to provide instant egress at any point in door's movement.

1. Door Panels: ASTM A1008/A1008M, steel sheet, Type B, cold-rolled, reinforce frame structure, minimum 1.1-mm (0.043 inch) thick steel shapes.

B. Sliding Door Hardware Guide Rollers, Door Carrier:

1. Rollers: Steel or plastic rollers with sealed bearings with each door having two support rollers and one anti-rise roller.
   a. Vertical Adjustment: Minimum 9 mm (0.35 inch) with positive mechanical locks.
   b. Include two urethane covered oil impregnated bearing bottom rollers attached with 5 mm (3/16 inch) thick formed steel guide brackets at each door.

c. Door Carriers: For each door carrier supporting door leaf, include vertical steel reinforcing member to prevent sagging when door is swung under breakaway conditions.

1) Carbon Steel Brackets And Fittings: Corrosion resistant.

C. Locking Hardware:

1. Locking hardware at interior doors not requiring physical security is not required.
2. Doors with flush concealed vertical rod panic hardware integrated into doors where physical security is required and free egress is required at all times.
3. Doors with manufacturers' standard hookbolt lock (keyed both sides) where physical security is required and free egress is not required at all times.

a. At doors with access control devices specified in Division 28 - ELECTRONIC SAFETY AND SECURITY, provide doors with electronic deadbolt locking to prevent doors from manually sliding open.

D. Door Closers: Breakout or swing-out panels with door closers concealed in top rail of door.

2.6 POWER UNITS

A. Self-contained, electric operated and independent of door operator.

1. Capacity and size of power circuits according to automatic door operator manufacturer's specifications and Division 26 - ELECTRICAL.

2.7 DOOR CONTROLS

A. Control Devices: BHMA A156.10; control opening and closing functions.

B. Open doors when control device is actuated; hold doors in open positions; then, close doors after a adjustable time period, unless safety device or reactivated control interrupts operation.

C. Manual Controls:

1. Push Plate Wall Switch: Recessed type, stainless steel push plate minimum 100 mm by 100 mm (4 inch by 4 inch), with 13 mm (1/2 inch) high letters "To Operate Door-Push" engraved on face of plate.

D. Motion Detector:

1. Mounting: Surface or concealed.
2. Detection Area: 1500 mm (60 inches) deep and 1500 mm (60 inches) across, plus or minus 150 mm (6 inches).
3. Response Time: 25 milliseconds, maximum.
4. Control Power: 24 Volt DC.

5. Design units to be unaffected by cleaning material, solvents, dust, dirt and outdoor weather conditions.

2.8 SAFETY DEVICES

A. Sliding Doors:
   1. Two photoelectric beams mounted at heights of 600 mm (24 inches) and 1200 mm (48 inches) in door frame.
   2. Overhead safety presence sensors at door head on both sides of opening.
   3. Recycle doors to full open position when beams are interrupted.
   4. Motion detector mounted on both sides of door for detection of traffic in both directions.

B. Swing Doors: Install presence sensor on pull side of door to detect any person standing in door swing path and prevent door from opening.
   1. Time delay Switches: Adjustable between 3 to 60 seconds and control closing cycle of doors.

C. Install decal signs with "In" or "Do Not Enter" on both faces of each door where shown.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.
   1. Verify door opening is correctly sized and within acceptable tolerances.

B. Protect existing construction and completed work from damage.

3.2 INSTALLATION

A. Install products according to manufacturer's instructions and approved submittal drawings.
   1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

B. Coordinate door installation with other related work.

C. Install manual controls and power disconnect switches recessed or semi-flush mounted in partitions.

D. Secure operator components to adjacent construction with suitable fastenings.

E. Conceal conduits, piping, and electric equipment, in finish work.

F. Install power units in locations shown.

1. Where units are mounted on walls, provide metal supports or shelves for units.
2. Ensure equipment, including time delay switches, are accessible for maintenance and adjustment.

G. Ensure operators are adjusted and function properly for type of expected traffic.

H. Synchronize each leaf of pair doors to open and close simultaneously. Permit each door leaf to be opened manually, independent of other door leaf.

I. Install controls at positions shown and ensuring convenience for expected traffic.

J. Push Plate Wall Switches Mounting Height: 1000 mm (40 inches) maximum, unless otherwise approved by Contracting Officer's Representative.

3.3 DEMONSTRATION AND TRAINING

A. Instruct VA personnel in proper automatic door operator operation and maintenance.
1. Trainer: Manufacturer approved instructor.
2. Training Time: 2 hours minimum.

B. Coordinate instruction to VA personnel with VA Contracting Officer's Representative.

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