

**Site Resurface Parking Lots 4-15  
DEPARTMENT OF VETERANS AFFAIRS**

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The "M" after the date denotes that the document is now in dual Metric/English.


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The "M" after the date denotes that the document is now in dual Metric/English.

### Milwaukee VAMC Specification Modifications Checklist

| Div | Section  | Comment   | VA Updated Checklist |
|-----|--|---|----------------------|
|     |  | <i>Reference the "Drawings" tab of this file for notes and design requirements on the drawings.</i>   | 27-Aug-11            |
| 1   | 01 00 00   | Add the following note:<br>In the case of conflicts or discrepancies within or among the Contract Drawings, the better quality, more stringent requirements or greater quantity of work, as determined by the Government, shall be provided.  | 6-Oct-10             |
| 1   | 01 00 00   | Phasing to be included in every project. Phase 1 will be submittals review and duration to be based on AE determination of submittals required prior to work beginning and time to review these and Phase 2 will be construction.<br><br>AE to combine submittal review and construction duration time to determine overall contract completion.  | 11-Jan-11            |
| 1   | 01 00 00<br>Item 1.6.K.5                                       | Contractor to provide a list of emergency contacts at the entrance to construction site.  | 30-Jan-11            |
| 1   | 01 32 16.13 /<br>01 32 16.15 /<br>01 32 16.16 /<br>01 32 16.17 | Inspection list needs to be included. Inspections need to be shown on CPM.  | 11-Jan-11            |
| 1   | 01 45 29   | Contractor is responsible for insuring all work meets the specification requirements. Testing services retained by the VA shall not relieve the contractor of providing his own testing services guaranteeing his work meeting these requirements. Testing services retained by the VA shall also not provide conclusive results to substantiate the contractors work.  | 6-Oct-10             |
| 1   | 01 74 19   | ADD:<br>1.1.B. Contractor is required to restore all finishes, surfaces, items, & materials as required accommodating new finishes. For example, if wall paper, vinyl wall covering, ceramic wall tile, etc. is existing on wall, and new wall finish calls for wall to be painted, contractor is required to remove existing wall paper, vinyl wall covering, ceramic wall tile, etc. to accommodate new painted finish. These surfaces are required to be verified prior to bid, as no change to contract will be provided after award if existing finishes are clearly present.<br>1.2.C. Lead Paint: Section 02 83 22.13, Lead Based Paint Removal and Disposal<br>1.7. B Separate out materials and recycle them. Submit report from construction and demolition "recycle" facility. One such facility that can/has been used is the Waste Management C&D Recycling facility (formerly City Wide Recycling), 10700 West Brown Deer Road, Milwaukee, WI, 53224. Phone number is (414) 355 – 6500. Plant manager is Mike Miller. This Waste Management facility will give contractor estimated weight of recycled materials including LEED report identifying drywall, inert materials (bricks, concrete, etc.), metals, old cardboard, wood recycled and the approximate amount of materials that cannot be recycled --- which is then landfilled. Other facilities offering similar reporting and methods can be proposed by Contractor. | 6-Oct-10             |

## Milwaukee VAMC Specification Modifications Checklist

| Div | Section  | Comment  | VA Updated Checklist |
|-----|----------|--|----------------------|
| 1   | 01 74 19 | <p>Add the following tables to the specification. Contractor is required to complete and keep current this document. Confirm with the VA the most current version of the tables.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 60px; margin: 5px;"></div> <div style="border: 1px solid black; width: 40px; height: 60px; margin: 5px;"></div> </div> | 27-Aug-11            |
| 1   | 01 74 19 | <p>Include in the specification the attached Attachment A, Sample Construction Waste Management Plan.</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 5px;"> <p>N:\Project Management\06 - C</p> </div> </div>  | 30-Dec-11            |

**SECTION 01 00 00  
GENERAL REQUIREMENTS**

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**SECTION 01 00 00  
GENERAL REQUIREMENTS**

**1.1 GENERAL INTENTION**

- A. See Scope of Work document posted to [www.fbo.gov](http://www.fbo.gov) during Presolicitation. Requirements therein apply. Table 1 attached to this section indicates quantities of work for Base Bid and Alternates.
- B. Visits to site by Bidders may be made only by appointment with Medical Center Engineering Officer.
- C. VA prepared contract documents and will serve as Engineer on this project.
- E. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission badges and authorized access of VA police, be identified by project and employer, and restricted from unauthorized access.
- F. Prior to commencing work, general contractor shall provide proof that OSHA certified “competent person” (CP) (29 CFR 1926.20(b)(2)) will maintain presence at work site whenever general or subcontractors are present.
- G. Training:
  - 1. Employees of general contractor or subcontractors shall have 10-hour OSHA certified Construction Safety course and /or other relevant competency training, as determined by VA CP with input from ICRA team.
  - 2. Submit training records of such employees for approval before start of work.

**1.2 STATEMENT OF BID ITEM(S)**

Allowances for work provided by Contractor: - NOT USED

- A. See Bid Schedule included with Scope of Work document.
- B. SCHEDULE OF VALUES is Attachment A to this Section. Submit after award as specified. Bid Selection does not depend on SCHEDULE OF VALUES.

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

- A. AFTER AWARD OF CONTRACT, three sets of specifications and Drawings will be furnished, including any Amendments.
- B. Additional sets of Drawings may be made by Contractor, at Contractor's expense, from electronic files.

### **1.4 CONSTRUCTION SECURITY REQUIREMENTS**

- A. Security Plan:
  - 1. The security plan defines both physical and administrative security procedures that will remain effective for entire duration of project.
  - 2. The General Contractor is responsible for assuring that sub-contractors working on project and their employees also comply with these regulations.
- B. Security Procedures:
  - 1. General Contractor's employees shall not enter project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving project site.
  - 2. For working outside "regular hours" as defined in contract, The General Contractor shall give 3 days' notice to Contracting Officer so that security arrangements be provided for employees. This notice is separate from any notices required for utility shutdown described later in this section. For this contract, regular work hours shall be: 5 p.m. to 10 p.m., weekdays; weekends 8 a.m. to 10 p.m.
  - 3. No photography of VA premises is allowed without written permission of Contracting Officer.
  - 4. VA reserves right to close down or shut down project site and order General Contractor's employees off premises in event of national emergency. The General Contractor may return to site only with written approval of Contracting Officer.
- C. Guards: NOT USED.
- D. Key Control:
  - 1. Use badges for access to construction site, entryways, and other required access ways.

## E. Document Control:

1. Before starting any work, General Contractor/Sub Contractors shall submit electronic security memorandum describing approach to following goals and maintaining confidentiality of “sensitive information”.
2. The General Contractor is responsible for safekeeping of Drawings, project manual and other project information. This information shall be shared only with those with specific need to accomplish project.
4. Certain documents, sketches, videos or photographs and Drawings may be marked “Law Enforcement Sensitive” or “Sensitive Unclassified”. Secure such information in separate containers and limit access to only those who will need it for project. Return information to Contracting Officer upon request.
5. These security documents shall not be removed or transmitted from project site without written approval of Contracting Officer.
6. All paper waste or electronic media such as CD’s and diskettes shall be shredded and destroyed in manner acceptable to VA.
7. Notify Contracting Officer and Site Security Officer immediately when there is loss or compromise of “sensitive information”.
8. All electronic information shall be stored in specified location following VA standards and procedures using Engineering Document Management Software (EDMS).
  - a. Security, access and maintenance of project Drawings, both scanned and electronic shall be performed and tracked through EDMS system.
  - b. “Sensitive information” including Drawings and other documents may be attached to e-mail provided VA encryption procedures are followed.

## F. Motor Vehicle Restrictions

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



## 1.5 FIRE SAFETY

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

1. American Society for Testing and Materials (ASTM):
  - E84-2007 .....Surface Burning Characteristics of Building Materials
2. National Fire Protection Association (NFPA):
  - 10-2006 .....Standard for Portable Fire Extinguishers
  - 30-2003 .....Flammable and Combustible Liquids Code
  - 51B-2003.....Standard for Fire Prevention During Welding, Cutting and  
Other Hot Work
  - 70-2005 .....National Electrical Code
  - 241-2004 .....Standard for Safeguarding Construction, Alteration, and  
Demolition Operations
3. Occupational Safety and Health Administration (OSHA):
  - 29 CFR 1926 .....Safety and Health Regulations for Construction

1. Fire Safety Plan: Establish and maintain fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare plan detailing project-specific fire safety measures, including periodic status reports, and submit to Resident Engineer for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Prior to any worker for contractor or subcontractors beginning work, they shall undergo safety briefing provided by general contractor's competent person per OSHA requirements. This briefing shall include information on construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, etc. Documentation shall be provided to Resident Engineer that individuals have undergone contractor's safety briefing.

C. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.

- D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6m (20 feet) exposing overall length, separate by 3m (10 feet).
- E. Temporary Construction Partitions:
  - 1. NOT USED.
- F. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- G. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Resident Engineer and facility Safety Manager.
- H. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to Contracting Officer's Representative (Resident Engineer).
- I. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- J. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.
- K. Standpipes: Install and extend standpipes up with each floor in accordance with 29 CFR 1926 and NFPA 241.
- M. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in 24-hour period. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with Resident Engineer. All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with medical center. Parameters for testing and results of any tests performed shall be recorded by medical center and copies provided to Resident Engineer.
- N. Smoke Detectors: Prevent accidental operation. Remove temporary paper covers at end of work operations each day. Coordinate with Resident Engineer. Maintain operability and full functioning in construction areas during project.

- O. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Resident Engineer. Obtain permits from facility Safety Manager at least 48 hours in advance.
- P. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Resident Engineer and facility Safety Manager.
- Q. Smoking: Refer to Appendix A of this Section. In addition to smoking policies in Appendix A, no smoking within 25 feet of work areas; cleanup cigarette butts within 25 feet of work areas regardless of origin.
- R. Dispose of waste and debris in accordance with NFPA 241. Remove from site daily.
- S. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.
- T. If required, submit documentation to Resident Engineer that personnel have been trained in fire safety aspects of working in areas with impaired structural or compartmentalization features.

## **1.6 OPERATIONS AND STORAGE AREAS**

- A. The Contractor shall confine operations (including storage of materials) on Government premises to areas authorized or approved by Contracting Officer. The Contractor shall hold and save Government, its officers and agents, free and harmless from liability of any nature occasioned by Contractor's performance.
- B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by Contractor only with approval of Contracting Officer and shall be built with labor and materials furnished by Contractor without expense to Government. The temporary buildings and utilities shall remain property of Contractor and shall be removed by Contractor at its expense upon completion of work. With written consent of Contracting Officer, buildings and utilities may be abandoned and need not be removed.
- C. The Contractor shall, under regulations prescribed by Contracting Officer, use only established roadways, or use temporary roadways constructed by Contractor when and as authorized by Contracting Officer. When materials are transported in prosecuting work, vehicles shall not be loaded beyond loading capacity recommended by manufacturer of

vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, Contractor shall protect them from damage. The Contractor shall repair or pay for repair of any damaged curbs, sidewalks, or roads.

- D. Working space and space available for storing materials shall be as determined by Resident Engineer.
- E. Workmen 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 whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others.
  - 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. Phasing: To insure such executions, Contractor shall furnish Resident Engineer with schedule of approximate phasing dates on which Contractor intends to accomplish work in each specific area of site, building or portion thereof. In addition, Contractor shall notify Resident Engineer two weeks in advance of proposed date of starting on-site construction work in each specific area of site, building or portion thereof. Arrange such phasing dates to insure accomplishment of this work in successive phases mutually agreeable to Resident Engineer and Contractor. Coordinate and verify phasing with VA for renovation of parking lots, traffic control & routing. Only one parking lot (refer to parking lot numbers per plan) at any one time may be under construction. Each parking lot shall be 100% complete including striping before work can commence on next parking lot. Work on weekends only. No work between 6 a.m. Monday through Friday at 5 p.m.. Work hours shall be Friday 5:00 p.m. through Monday 6:00a.m.. No work after 10:00p.m.. If work on any Parking Lot will take longer than one weekend to

accomplish, parking lot will be left in useable/drivable condition on Monday morning. This would include compacted traffic bond; or base course; or finish course. Tripping hazards, open excavations, unprotected manholes, etc., not allowed. Construction sequence shall be:

1. Place barricades, Contractor's security measures if any (e.g., construction fence, etc.), erosion control measures, temporary facilities, temporary fire protection measures, and construction signage in-place. Relocate existing concrete barriers as needed to modify traffic flow for access to adjacent lots. Coordinate temporary traffic rerouting plans with Resident Engineer.
2. Maintain services (roads and parking lots) open for vehicular traffic. Compacted (rolled) traffic bond or binder course surface is acceptable for up to two weeks. Flagman shall be present and directing traffic. Flagman shall not be site Superintendent.
3. Provide repairs per Drawings.
4. Remove barricades, Contractor's security measures if any (e.g., construction fence, etc.), erosion control measures, temporary facilities, temporary fire protection measures, and construction signage in-place.
5. Move work crew to next parking lot.
6. Repeat until complete with all lots.

H. NOT USED

I. NOT USED.

J. NOT USED.

K. Utilities Services: Maintain existing utility services for Medical Center at 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 Resident Engineer.

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 Resident Engineer. Electrical work shall be accomplished with affected circuits or equipment de-energized. When electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without Medical Center Director's prior knowledge and written approval.
  2. Contractor shall submit request to interrupt any such services to Resident Engineer, in writing, 48 hours in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
  3. Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of Medical Center. Interruption time approved by Medical Center may occur at other than Contractor's normal working hours.
  4. Major interruptions of any system must be requested, in writing, at least 15 calendar days prior to desired time and shall be performed as directed by Resident Engineer.
  5. In case of contract construction emergency, service will be interrupted on approval of Resident Engineer. Such approval will be confirmed in writing as soon as practical.
  6. Whenever it is required that connection fee be paid to public utility provider for new permanent service to construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be responsibility of Government and not Contractor.
- L. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind finished surfaces.
- M. To minimize interference of construction activities with flow of Medical Center traffic, comply with 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.
  2. Method and scheduling of required cutting, altering and removal of existing roads, walks, and entrances must be approved by Resident Engineer.
- N. Coordinate work for this contract with other construction operations as directed by Resident Engineer. This includes scheduling of traffic and use of roadways, as specified in Article, USE OF ROADWAYS.

### **1.7 ALTERATIONS**

- A. Walking Survey: Before any work is started, Contractor shall make thorough walking survey with Resident Engineer of areas of work and furnish annotated photolog of preconstruction conditions, including:
1. Existing condition and types of pavements.
  2. Existence and conditions of items such as manholes, water hydrants, and other above-ground structures.
  3. Note any discrepancies between Drawings and existing conditions at site.
  4. Show areas for working space, materials storage and routes of access to areas of work.
- 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 Resident Engineer, 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 contract work is changed by reason of this subparagraph B, contract will be modified accordingly.
- C. Re-Survey: Three days before expected partial or final inspection date, Contractor and Resident Engineer together shall make thorough re-survey of Areas shown on Drawings 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 outside structures and will form basis for determining extent of repair work required of Contractor to restore damage caused by Contractor's workmen in executing work of this contract.

D. Protection: Provide following protective measures:

1. NOT USED.
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. NOT USED.

## **1.8 INFECTION PREVENTION MEASURES**

A. ICRA TEAM REQUIREMENTS - NOT USED

B. Establish and maintain dust control program.

C. In general, following preventive measures shall be adopted during construction to keep down dust and prevent mold.

1. Dampen dusty road and graveled areas to keep down dust and provide temporary construction partitions in existing structures where directed by Resident Engineer.
2. Do not perform dust producing tasks within 50 feet of occupied areas without approval of Resident Engineer. For construction within 50 feet of any areas that will remain occupied by Medical Center workers, Contractor shall:
  - a. Prevent tracking by use of dust suppression and road sweeping daily.
  - b. The contractor shall not haul debris within 50 feet of patient-care areas without prior approval of Resident Engineer and Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. No sharp objects should be allowed to cut through plastic.
  - c. At completion, remove environmental controls. Run roadway sweeper and remove removable dust.

## **1.9 DISPOSAL AND RETENTION**

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

1. Reserved items which are to remain property of Government are noted on Drawings or in specifications as items to be stored. Items that remain property of Government shall be removed or dislodged from present locations in such manner as to prevent



- damage which would be detrimental to re-installation and reuse. Store such items, where directed by Resident Engineer.
2. Items not reserved shall become property of 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 property of Government. When rooms and spaces are vacated by Department of Veterans Affairs during alteration period, such items which are NOT required by Drawings and specifications to be either relocated or reused will be removed by Government in advance of work to avoid interfering with Contractor's operation.

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

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

**(FAR 52.236-9)**

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

### **1.11 RESTORATION**

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of Resident Engineer. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to Resident Engineer 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 result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.
- C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are indicated on Drawings and which are not scheduled for discontinuance or abandonment.
- D. Expense of repairs to such utilities and systems not shown on Drawings or locations of which are unknown will be covered by adjustment to contract time and price.

### **1.12 PHYSICAL DATA**

- A. Existing site map is included in Drawings. Verify quantities shown prior to work. If CONTRACTOR'S verification shows greater quantities than included in budget for project, VA may de-scope work at rate of unit prices in SCHEDULE OF VALUES to accomplish as much work as possible under available budget of contract.

**1.13 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. Submit for VA approval proposals of civil/surveying firms considered.

**1.14 LAYOUT OF WORK**

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

**(FAR 52.236-17)**

- B. NOT USED.
- C. NOT USED.
- D. During progress of work, and particularly as work progresses from Area to Area, Contractor shall have line grades checked and certified by a registered land surveyor or registered civil engineer.
- F. Survey and layout work of this and other articles and specifications in accordance with the provisions of Article "Professional Surveying Services".

**1.15 As-Built Drawings**

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

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

- A. For hauling, use only established public roads and roads on Medical Center property and, when authorized by Resident Engineer, such temporary roads which are necessary in performance of contract work. Temporary roads shall be constructed by 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 part of this contract, Contractor may construct them immediately for use to facilitate building operations. These roads may be used by 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, roads leading thereto must be completed and available for use at time set for completion of such buildings or parts thereof.

#### **1.17 RESIDENT ENGINEER'S FIELD OFFICE – NOT USED**

#### **1.18 TEMPORARY USE OF MECHANICAL AND ELECTRICAL EQUIPMENT - NOT USED.**

#### **1.21 TEMPORARY TOILETS**

- A. Provide where directed, (for use of Contractor's workmen) ample temporary sanitary toilet accommodations with suitable sewer and water connections; or, when approved by Resident Engineer, provide suitable dry closets where directed. Keep such places clean

and free from flies, and 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 reasonably required amounts of utilities available to Contractor from existing outlets and supplies, as specified in contract. The amount to be paid by Contractor for chargeable electrical services shall be prevailing rates charged to Government. The Contractor shall carefully conserve any utilities furnished without charge.
- B. The Contractor, at Contractor's expense and in workmanlike manner satisfactory to Contracting Officer, shall install and maintain necessary temporary connections and distribution lines, and meters required to measure amount of electricity used for purpose of determining charges. Before final acceptance of work by Government, Contractor shall remove temporary connections, distribution lines, meters, and associated paraphernalia.
- C. Contractor shall install meters at Contractor's expense and furnish Medical Center monthly record of Contractor's usage of electricity as hereinafter specified.
- D. Heat: Furnish temporary heat necessary to prevent injury to work and materials through dampness and cold. Use of open salamanders or any temporary heating devices which may be fire hazards or may smoke and damage finished work, will not be permitted. Maintain minimum temperatures as specified for various materials:
- E. Electricity (for Construction and Testing): Furnish temporary electric services.
  - 1. Obtain electricity by connecting to Medical Center electrical distribution system. The Contractor shall meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Electricity for other uses is available at no cost to Contractor.
- F. Water (for Construction and Testing): Furnish temporary water service.
  - 1. Obtain water by connecting to Medical Center water distribution system. Provide reduced pressure backflow preventer at each connection. Water is available at no cost to 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 Resident Engineer's discretion) of use of water from Medical Center's system.

G. Steam: NOT USED.

1. Obtain steam for testing by connecting to Medical Center steam distribution system. Steam is available at no cost to Contractor.
2. Maintain connections, pipe, fittings and fixtures and conserve steam-use so none is wasted. Failure to stop leakage or other waste will be cause for revocation (at Resident Engineer's discretion), of use of steam from Medical Center's system.

H. Fuel: Natural and LP gas and burner fuel oil – NOT USED.

#### **1.24 TESTS**

A. NOT USED.

#### **1.25 INSTRUCTIONS**

- A. Contractor shall furnish Maintenance and Operating manuals and verbal instructions when required by various sections of specifications and as hereinafter specified.
- B. Manuals: NOT USED.
- C. Instructions: NOT USED.

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

- A. The Government shall deliver to Contractor, Government-furnished property shown on Drawings. NOT USED.
- B. Equipment furnished by Government to be installed by Contractor – NOT USED.
- C. Storage space for materials above and beyond one day's anticipated usage shall be off site. Coordinate on-site storage with Resident Engineer.
- D. NOT USED.

#### **1.27 RELOCATED ITEMS**

A. NOT USED.

#### **1.29 CONSTRUCTION SIGN**

- A. Provide Construction Sign where directed by Resident Engineer. 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 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 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 Resident Engineer.
- D. Detail Drawing of construction sign showing required legend and other characteristics of sign to be provided by Resident Engineer.

### **1.31 CONSTRUCTION DIGITAL IMAGES**

- A. During construction period through completion, furnish Department of Veterans Affairs with 1200 views of digital images. Digital views shall be taken of exterior as selected and directed by Resident Engineer (RE). Each view shall be 300 to 500 KB in size.
  - 1. Take photos at following generic stages for each Work Area at locations every 50 feet starting 25 feet off one end, minimum 3 photos per distinct subarea:
    - 2. Beginning of demolition.
    - 3. End of demolition/scarification.
    - 4. At completion of each course.
    - 5. When ready to open area to traffic.
  - 2. In event greater or lesser number of images than specified above are required by Resident Engineer, adjustment in contract price will be made.
- B. Images shall show distinctly, at as large scale as possible, parts of work embraced in picture.
- C. Prints – NOT USED.
- E. Images on CD-ROM in JPEG format – NOT USED
- F. In case any set of IMAGES not submitted within five days of date established by Resident Engineer for taking thereof, Resident Engineer may have such images/photographs taken and cost of same will be deducted from any money due to Contractor.

G. Interior Final Photos: NOT USED.

**1.32 FINAL ELEVATION DIGITAL IMAGES**

A. NOT USED.

**1.33 HISTORIC PRESERVATION**

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



**APPENDIX A TO SECTION 01 00 00**

VA Medical Center  
Milwaukee, WI

Station Memorandum 00-250  
November 2005

**MEDICAL CENTER SMOKING POLICY**

1. **PURPOSE:** It is policy of this Medical Center to encourage and promote good health concepts to its patients, employees, and community at large. The use of smoking materials has been identified as preventable cause of premature death and disability. The Clement J. Zablocki VA Medical Center and Community Based Outpatient Clinics under charge and control of this Medical Center will be smoke-free environments, except in designated smoking areas. This practice will reduce fire hazards, provide safe and healthful environment and allow patients, visitors, volunteers and employees to enter and exit government buildings without being at risk of exposure to second hand smoke. Individuals have right to smoke, but cannot exercise that right to detriment of others. Where interests of smokers and nonsmokers are in conflict those of non smokers will take precedence.
2. **POLICY:**
  - A. Smoking of any kind by patients, employees, visitors, volunteers, or contractors is prohibited in Medical Center buildings and community based outpatient clinics.
    - 1) Smoking is prohibited within twenty-five (25) feet of buildings and Community Based Outpatient Clinics. Exceptions to this are only those designated smoking shelters.
    - 2) Smoking is prohibited under Building 111 south entrance canopy.
    - 3) Smoking is prohibited within loading dock area defined as area beginning at security barrier west to docks and compactors. The bulk oxygen storage tank within loading dock area is considered building.
    - 4) Smoking cessation and educational assistance is provided.
  - B. Smoking in government owned and government leased vehicles is prohibited at times. This applies to vehicles operated on and off Medical Center grounds.
  - C. Prior to initiation of oxygen therapy, patients will be educated in fire safety and oxygen use by nursing, admissions, and/or health care provider. This education will include prohibition of receiving oxygen therapy while actively smoking. All in-patients receiving oxygen therapy will be prohibited from possessing smoking materials. Family members and support persons shall

be educated in prohibiting patient's possession of smoking material by confused patients. This education is to be documented in patient record/care plan. The ability of patients to safely possess smoking materials while receiving oxygen therapy shall be evaluated by health care provider as patient condition changes.

- D. When inpatients are identified as smoking risk, notation will be placed in progress notes via wristband update template and Interdisciplinary Care Plan referenced in Professional Services Memorandum No. I-6, Management of Confused Patients.
- E. Patient non-adherence to Medical Center Smoking Policy is also referenced in Professional Services Memorandum No. I-2, Patient Control During Hospitalization.
- F. EXCEPTIONS:
  - 1) Smoking may be permitted in designated smoking area for inpatients of Mental Health Unit. This Smoking Policy provides for such exceptions when licensed independent practitioner (LIP) clinically assesses that sudden withdrawal may interfere with patient's treatment. The LIP must write "Patient may utilize smoking room if behavior is safe and appropriate" order in patient's record.
  - 2) A designated location on inpatient Mental Health Unit that is environmentally separate from patient care areas will be available to these patients with LIP order, at limited times when employees is available to monitor. Visitors, employees, and volunteers are prohibited from smoking in this designated area.

### **3. RESPONSIBILITY:**

- A. All patients, employees, visitors, volunteers, and contractors must adhere to this policy.
- B. Patients may be referred to Patient Education Center (PEC) as needed for smoking cessation programs. Appointments may be made via DHCP, under "Smoking Cessation Program" at PEC. Employees may register for smoking cessation program through Employee Health Clinic.
- C. Noncompliance with policy is required to be reported to VA Police at extension 42222. Police Service will initiate appropriate law enforcement action. Supervisors shall follow normal disciplinary procedures for noncompliance within their Division/Programs.

- D. In case of inpatient's noncompliance with this policy, incident is to be documented by clinical staff in patient's record at time of discovery. VA Police will be notified at extension 42222, to initiate appropriate law enforcement action. Inpatient violating this policy will be issued United States District Court Violation Notice and fined fifty dollars (\$50.00) by VA Police, enforcement authority 38 USC 1.218 (b) (6). Repeat (2 or more offenses) offenders will be documented and notification will be made by VA Police to Manager, Performance Improvement within two business days of second offense of individual.
- E. Medical Center employees, visitors, volunteers and contractors found to be in violation of this policy are subject to being issued United States District Court Violation Notice VAF10-9019 by VA Police and fine of fifty dollars (\$50.00) imposed. Enforcement authority 38 USC 1.218 (b) (6).
4. **REFERENCES:** Public Law 102-585, Section 526; JCAHO EC. 1.30
5. **COLLABORATION:** All Divisions; Patient Education Council; and Environment of Care Council
6. **RESCISSION:** Station Memorandum 00-250, Patient and Staff Smoking Policy, issued August 2003.
7. **REVIEW MONTH:** Every three years in November.

/s/

GLEN W. GRIPPEN  
Medical Center Director

Distribution: All Division Managers

- - - E N D - - -

**ATTACHMENT A TO SECTION 01 00 00**  
**SCHEDULE OF VALUES FOR ADDED OR SUBTRACTED WORK**

| <b>BID<br/>ITEM<br/>NO.</b> | <b>Work Item Description</b>  | <b>NO.<br/>UNITS</b> | <b>UNITS</b> | <b>UNIT PRICE</b> | <b>EXTENDED<br/>TOTAL</b> |
|-----------------------------|---|----------------------|--------------|-------------------|---------------------------|
| A                           | Road repairs, demolition and total road repair, w/filter fabric   | 500                  | SF           |                   |                           |
| B                           | Roadway striping  | 100                  | LF           |                   |                           |
| C                           | Asphalt pavement repairs in parking lots and non-roadway areas, demolition and total pavement repair                                | 500                  | SF           |                   |                           |
| D                           | Over-excavate poor soil, each additional 12" and provide an additional 12" base stone, plus filter fabric                           | 500                  | SF           |                   |                           |
| E                           | Flowable fill, as needed for large voids  | 12                   | CY           |                   |                           |
| F                           | Road repairs, demolition, scarify, and asphalt overlay road repair  | 500                  | SF           |                   |                           |
| G                           | Concrete sidewalk, demolition and replacement with new  | 100                  | SF           |                   |                           |
| H                           | Concrete sidewalk rest area, 6'x6' , w/landscape mods   | 1                    | EA           |                   |                           |
| I                           | Concrete ramp, demolition and h/c curb ramp from sidewalk to road or parking lot; embossed stipple pad for the blind (avg. 30"x48") | 1                    | EA           |                   |                           |
| J                           | Curb & gutter, demolition and replacement with new, slipformed  | 50                   | LF           |                   |                           |
| K                           | Curb & gutter, demolition and replacement with new, non-slipformed  | 10                   | LF           |                   |                           |
| L                           | Catch basin repair, demolition and new mh steel frame & steel cover and new concrete cover  | 1                    | EA           |                   |                           |

**ATTACHMENT A TO SECTION 01 00 00**  
**SCHEDULE OF VALUES FOR ADDED OR SUBTRACTED WORK**

| <b>BID<br/>ITEM<br/>NO.</b> | <b>Work Item Description</b>  | <b>NO.<br/>UNITS</b> | <b>UNITS</b> | <b>UNIT PRICE</b> | <b>EXTENDED<br/>TOTAL</b> |
|-----------------------------|---|----------------------|--------------|-------------------|---------------------------|
| M                           | Signs with post and footing,<br>excavation and new work   | 1                    | EA           |                   |                           |
| N                           | Route & fill cracks   | 500                  | LF           |                   |                           |
| O                           | Striping, non-van h/c parking space   | 10                   | EA           |                   |                           |
| P                           | Striping, van h/c parking space   | 10                   | EA           |                   |                           |
| Q                           | Striping, standard parking stall  | 10                   | EA           |                   |                           |
| R                           | Striping, double-stripe parking stall   | 1                    | EA           |                   |                           |
| S                           | Striping, stop bar  | 1                    | EA           |                   |                           |
| T                           | Striping, crosswalk   | 1                    | EA           |                   |                           |
| U                           | Striping, no parking zone hatching  | 10                   | SF           |                   |                           |
| V                           | New concrete vehicle barriers,<br>anchored to pavement  | 10                   | LF           |                   |                           |
| W                           | Concrete cross-gutter per 6/dtl-1   | 100                  | LF           |                   |                           |
| X                           | Concrete pavement per 3/dtl-3   | 1                    | SF           |                   |                           |
| NOTE<br>1                   | ROAD WORK REQUIRES ONE LANE OPEN UNLESS APPROVED TWO WEEKS IN ADVANCE. ROAD CLOSURE WORK SHALL BE BETWEEN 5 P.M. AND 10 P.M. WEEKDAYS; AND WEEKENDS.  |                      |              |                   |                           |
| NOTE<br>2                   | PARKING LOT WORK IS 5 PM TO 10 PM WEEKDAYS AND WEEKENDS ONLY  |                      |              |                   |                           |
| NOTE<br>3                   | UNIT PRICES SHALL INCLUDE CONTRACTOR'S SUPERVISION, BONDS & INSURANCE, OVERHEAD AND PROFIT, PROJECT MANAGEMENT, PROJECT ADMINISTRATION; AND INCIDENTAL COSTS SUCH AS SAFETY (FLAGMEN, CONES, BARRICADES), DUST AND EROSION CONTROL, WASTE MANAGEMENT, ENVIRONMENTAL PROTECTION, TEMPORARY SIGNAGE, PLOTTING, MATERIALS TESTING CONSULTANT SERVICES, SURVEYING AND MEASURING DONE FOR PAYMENT CERTIFICATION. UNIT PRICES SHALL BE VALID BASIS FOR PRICE ADJUSTMENT IN ACCORDANCE WITH CONTRACT REQUIREMENTS, AND FOR ADDED OR SUBTRACTED WORK. ADDITIONAL COSTS BEYOND UNIT PRICES WILL BE ALLOWED IF A SEPARATE MOBILIZATION IS REQUIRED. NUMBER OF UNITS REFLECTS MINIMUM QUANTITY CHANGE WHETHER ADD OR CREDIT. |                      |              |                   |                           |
| NOTE<br>4                   | COMPLETE AND SUBMIT SCHEDULE OF VALUES WITHIN 10 DAYS AFTER AWARD   |                      |              |                   |                           |

**Table 1**  
**Bid and Alternate Quantities**  
**Site Resurface Parking Lots 4-15**

| BID ITEM NO. | Work Item Description   | UNITS | Alt 4 Includes Lots: 11, 14, and 15 | Alt 3 Includes Lots: 11, 12, 13, 14, and 15 | Alt 2 Includes Lots: 10, 11, 12, 13, 14, and 15 | Alt 1 Includes Lots: 7, 8, 9, 10, 11, 12, 13, 14, and 15 | Base Bid Includes Lots: 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 15 |
|--------------|---|-------|-------------------------------------|---|---|--|--|
| A            | ROAD REPAIRS, DEMOLITION AND TOTAL ROAD REPAIR, W/FILTER FABRIC   | SF    | -                                   | -   | -   | -  | -  |
| B            | ROADWAY STRIPING  | LF    | -                                   | -   | -   | -  | -  |
| C            | ASPHALT PAVEMENT REPAIRS IN PARKING LOTS AND NON-ROADWAY AREAS, DEMOLITION AND TOTAL PAVEMENT REPAIR                                | SF    | <b>110,200</b>                      | <b>190,400</b>                              | <b>214,042</b>                                  | <b>363,072</b>   | <b>464,825</b>   |
| D            | OVER-EXCAVATE POOR SOIL, EACH ADDITIONAL 12" AND PROVIDE AN ADDITIONAL 12" BASE STONE, PLUS FILTER FABRIC                           | SF    | <b>36,733</b>                       | <b>63,467</b>                               | <b>71,347</b>                                   | <b>121,024</b>   | <b>154,942</b>   |
| E            | FLOWABLE FILL, AS NEEDED FOR LARGE VOIDS  | CY    | <b>12</b>                           | <b>24</b>                                   | <b>36</b>                                       | <b>48</b>  | <b>60</b>  |
| F            | ROAD REPAIRS, DEMOLITION, SCARIFY, AND ASPHALT OVERLAY ROAD REPAIR  | SF    | -                                   | -   | -   | -  | -  |
| G            | CONCRETE SIDEWALK, DEMOLITION AND REPLACEMENT WITH NEW  | SF    | <b>1,650</b>                        | <b>1,650</b>                                | <b>4,211</b>                                    | <b>9,138</b>   | <b>11,901</b>  |
| H            | CONCRETE SIDEWALK REST AREA, 6'X6' , W/LANDSCAPE MODS   | EA    | <b>1</b>                            | <b>1</b>                                    | <b>14</b>                                       | <b>38</b>  | <b>52</b>  |
| I            | CONCRETE RAMP, DEMOLITION AND H/C CURB RAMP FROM SIDEWALK TO ROAD OR PARKING LOT; EMBOSSED STIPPLE PAD FOR THE BLIND (AVG. 30"X48") | EA    | <b>9</b>                            | <b>9</b>                                    | <b>21</b>                                       | <b>33</b>  | <b>45</b>  |
| J            | CURB & GUTTER, DEMOLITION AND REPLACEMENT WITH NEW, SLIPFORMED  | LF    | <b>2,161</b>                        | <b>4,211</b>                                | <b>5,141</b>                                    | <b>7,446</b>   | <b>9,235</b>   |
| K            | CURB & GUTTER, DEMOLITION AND REPLACEMENT WITH NEW, NON-SLIPFORMED  | LF    | <b>43</b>                           | <b>84</b>                                   | <b>103</b>                                      | <b>149</b>   | <b>185</b>   |
| L            | CATCH BASIN REPAIR, DEMOLITION AND NEW MH STEEL FRAME & STEEL COVER AND NEW CONCRETE COVER  | EA    | <b>4</b>                            | <b>11</b>                                   | <b>13</b>                                       | <b>18</b>  | <b>24</b>  |
| M            | SIGNS WITH POST AND FOOTING, EXCAVATION AND NEW WORK  | EA    | <b>200</b>                          | <b>400</b>                                  | <b>412</b>                                      | <b>424</b>   | <b>436</b>   |
| N            | ROUTE & FILL CRACKS   | LF    | <b>10,018</b>                       | <b>17,309</b>                               | <b>19,458</b>                                   | <b>33,007</b>  | <b>42,257</b>  |

**Table 1**  
**Bid and Alternate Quantities**  
**Site Resurface Parking Lots 4-15**

| <b>BID ITEM NO.</b> | <b>Work Item Description</b>                        | <b>UNITS</b> | <b>Alt 4 Includes<br/>Lots: 11, 14, and<br/>15</b> | <b>Alt 3 Includes<br/>Lots: 11, 12, 13,<br/>14, and 15</b> | <b>Alt 2 Includes<br/>Lots: 10, 11,<br/>12, 13, 14, and<br/>15</b> | <b>Alt 1 Includes<br/>Lots: 7, 8, 9, 10,<br/>11, 12, 13, 14, and<br/>15</b> | <b>Base Bid Includes Lots: 4,<br/>5, 6, 7, 8, 9, 10, 11, 12, 13,<br/>14, and 15</b> |
|---------------------|---|--------------|--|--|--|---|---|
| O                   | STRIPING, NON-VAN H/C PARKING SPACE                 | EA           | <b>6</b>   | <b>16</b>  | <b>70</b>  | <b>70</b>   | <b>70</b>   |
| P                   | STRIPING, VAN H/C PARKING SPACE                     | EA           | <b>2</b>   | <b>4</b>   | <b>8</b>   | <b>8</b>  | <b>8</b>  |
| Q                   | STRIPING, STANDARD PARKING STALL                    | EA           | -  | -  | -  | -   | -   |
| R                   | STRIPING, DOUBLE-STRIPE PARKING STALL               | EA           | <b>265</b>   | <b>544</b>   | <b>544</b>   | <b>820</b>  | <b>1,038</b>  |
| S                   | STRIPING, STOP BAR                                  | EA           | <b>2</b>   | <b>3</b>   | <b>5</b>   | <b>11</b>   | <b>17</b>   |
| T                   | STRIPING, CROSSWALK                                 | EA           | <b>2</b>   | <b>3</b>   | <b>5</b>   | <b>11</b>   | <b>17</b>   |
| U                   | STRIPING, NO PARKING ZONE HATCHING                  | SF           | <b>5,510</b>                                       | <b>9,520</b>   | <b>10,702</b>  | <b>18,154</b>   | <b>23,241</b>   |
| V                   | NEW CONCRETE VEHICLE BARRIERS, ANCHORED TO PAVEMENT | EA           | <b>40</b>  | <b>50</b>  | <b>54</b>  | <b>64</b>   | <b>74</b>   |
| W                   | CONCRETE CROSS-GUTTER PER 6/DTL-1                   | LF           | -  | -  | -  | -   | -   |
| X                   | CONCRETE PAVEMENT PER 3/DTL-3                       | SF           | -  | -  | -  | -   | -   |
| Y                   | STAIRS, RAMP, RAILINGS, AND CONCRETE WALK           | LF           | <b>50</b>  | <b>50</b>  | <b>50</b>  | <b>50</b>   | <b>80</b>   |
|                     |   |              | -  |  |  | -   | -   |

**SECTION 01 01 10 - FSS**  
**FIRE SAFETY SECTION**

PART 1 - GENERAL

1.1 DESCRIPTION: This section covers safety precautions required by all contractor personnel to safeguard patients, visitors, and Department of Veterans Affairs employees. Fire extinguishers are required on all earth moving equipment, and shall be dated current year, and current month signed by OSHA competent person.

1.2 RELATED SECTION

A. Section 01 00 00 - GENERAL REQUIREMENTS

1.3 APPLICABLE PUBLICATIONS

A. NFPA standard No. 241 - Safeguarding Construction, Alteration, and Demolition Operations.

B. NFPA Standard No. 51B - Fire Protection in use of cutting and welding Processes.

C. NFPA Standard No. 101 - Life Safety Code (Current Edition)

D. OSHA Regulations 29CFR1926 - Construction Industry Standards.

1. Sub-part P- Fire Protection and Prevention

2. Sub-part J- welding and Cutting









PART 2 - PRODUCTS

2.1 PRODUCTS:



A. Table F-1 indicates which fire extinguishers are required for various combustible materials.

**Table F-1 FIRE EXTINGUISHERS DATA**

| TYPE OF AGENT   |                                 |            |                                        |    |  |
|---|--|---|---|---|---|
| Each class of fire calls for the right kind of extinguisher. Using the wrong extinguisher is dangerous and may do more harm than good. For your own protection, you should know the classes of fire, the different types of extinguishers, how to use them and why. | Multi-Purpose Dry Chemical<br>Mon ammonium Phosphate   | Regular<br>Dry Chemical Sodium Phosphate  | Halon 1211<br>Bromochlorodifluoromethane  | Carbon Dioxide<br>(CO <sub>2</sub> )  | Water   |
|    | Yes-excellent Adheres to burning materials and forms a coating which will smother the fire and minimize reflash. | No  | Yes-excellent Halon 1211 leaves no residue. May not normally affect equipment.  | No  | Yes<br>Water saturates materials and prevents rekindling.                           |
|    | Yes-excellent Dry chemical agent smothers fire. Screen of agent shields user from heat.                          | Yes-excellent Dry chemical agent smothers fire. Screen of agent shields user from heat.     | Yes-excellent Halon 1211 leaves no residue. May not normally affect equipment.  | Yes-excellent Carbon Dioxide leaves no residue, may not normally affect or damage equipment.                                | No<br>Water will spread flammable liquids and not put it out.                       |
|   | Yes-excellent Dry chemical agent is non-conductive. Screen of agent shields user from heat.                      | Yes-excellent Dry chemical agent is non-conductive. Screen of agent shields user from heat. | Yes-excellent Halon 1211 is a non-conductor, leaves no residue, may not normally affect or damage electrical equipment. | Yes-excellent Carbon Dioxide is a non-conductor, leaves no residue, may not normally affect or damage electrical equipment. | No<br>Water, a conductor, should never be used on live electrical fires.            |
| RANGE -----<br>Discharge Time -----   | 5 to 20 feet<br>10 to 25 seconds   | 5 to 20 feet<br>10 to 25 seconds  | 8 to 18 feet<br>8 to 18 seconds<br>Depending on size  | 3 to 8 feet<br>8 to 30 seconds  | Up to 40 feet<br>Up to 60 seconds   |

## B. Cover Plates

1. Receptacles - Manufactured by H. B. Enterprises or equal. Catalog No. 007
2. Switches - Manufactured by N. 13. Enterprises. Catalog No. 003

## PART III - EXECUTION

- 3.1 Construction offices and trailers used as storage are required to be located a minimum distance from permanent structures. Veterans Administration approval of location does not relieve the contractor of its ultimate responsibility of meeting OSHA and NFPA Regulation.
- 3.2 Contractor is required to obtain a permit from the office of the Chief Engineer prior to start of each welding/cutting operation. The Chief Engineer reserves the right to delegate the Project Manager as approving official. The following form is acceptable for obtaining approval and may be reproduced at contractor's expense. Other form must be submitted for approval by the Project Engineer prior to use.
- 3.3 The following checklist is provided to the contractor as a quick reference only. NFPA 513 should be consulted for official requirements for protection of the area.

**REQUEST FOR SPRINKLER SYSTEM SHUTDOWN**

Date Closed: \_\_\_\_\_ Time Closed: \_\_\_\_\_

Planned Date Restored: \_\_\_\_\_ Time Restored: \_\_\_\_\_

Location of System: Bldg: \_\_\_\_\_ Floor: \_\_\_\_\_ Wing: \_\_\_\_\_

Area this will affect: \_\_\_\_\_

Impact on adjacencies: \_\_\_\_\_

Reason for shutdown: \_\_\_\_\_

If Construction, Give Project#: \_\_\_\_\_ Generic Maintenance Contract \_\_\_\_\_

Sprinkler Contractor: \_\_\_\_\_ General Contractor: \_\_\_\_\_

Phone: \_\_\_\_\_ Phone: \_\_\_\_\_

Remarks: \_\_\_\_\_ Approval [ x ] Disapproval [ ]

Approving Authority Comments: \_\_\_\_\_

\_\_\_\_\_  
Signature/Approval Authority

**Copy one (1) VAMC, Form No 138-S1****Revised 2/05**

Location of System: Building: \_\_\_\_\_  
Wing: \_\_\_\_\_  
Floor: \_\_\_\_\_

Date Valve Reopened: \_\_\_\_\_

Time Valve Reopened: \_\_\_\_\_

Date Closed: \_\_\_\_\_

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

\_\_\_\_\_  
Signature of Requestor\_\_\_\_\_  
Signature of FM Divisional Manager

Print Name

REQUESTOR OF SHUTDOWN ID: O-001391  
Copy two (2) VAMC, Form No 138-S2

Copy three (3) VAMC, Form No 138-S3  
1,421

## PERMIT FOR CUTTING AND WELDING WITH PORTABLE GAS, ELECTRICAL, OR ARC EQUIPMENT

Date Disabled: \_\_\_\_\_ Time Disabled: \_\_\_\_\_  
 Planned Date Restored: \_\_\_\_\_ Time Restored: \_\_\_\_\_  
 Location of System: Bldg: \_\_\_\_\_ Floor: \_\_\_\_\_ Wing: \_\_\_\_\_  
 Area this Will Affect: \_\_\_\_\_ Impact on Adjacencies: \_\_\_\_\_

*The location where the work is to be done had been examined, necessary precautions taken, and permission is granted for this work.*

### Work to Be Accomplished:

Construction Project#: \_\_\_\_\_ Generic Maintenance Contract \_\_\_\_\_  
 Subcontractor: \_\_\_\_\_ General Contractor: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Phone: \_\_\_\_\_

Approval [ ] Disapproval [ ]  
 \_\_\_\_\_  
 Signature/Approval Authority Approving Authority Comments:

### ATTENTION

Before approving any cutting and welding permit, the Contractor's fire safety supervisor or his appointee and/or the PAI or his designee shall inspect the work area and confirm that precautions have been taken to prevent fire in accordance with NFPA 51B. Contractor is responsible to check off each item below that applies or indicate N/A.

### PRECAUTIONS

- \_\_\_\_\_ Sprinklers in service. Fully charged and operable fire extinguishers that are appropriate for the type of possible fire shall be available immediately at the work area.
- \_\_\_\_\_ The hot work equipment to be used shall be in satisfactory operating condition and in good repair.
- \_\_\_\_\_ The following shall apply to hot work done in close proximity to a sprinkler head:
  - (a) A wet rag shall be laid over the sprinkler head and then removed at the conclusion of the welding or cutting operation.
  - (b) During hot work, special precautions shall be taken to avoid accidental operation of automatic fire detection or suppression systems (e.g., special extinguishing systems or sprinklers).
- \_\_\_\_\_ Nearby personnel shall be suitably protected against dangers such as heat, sparks, and slag.

### WITHIN 35 FT. OF WORK

- \_\_\_\_\_ Floors swept clean of combustibles
- \_\_\_\_\_ If relocation is impractical, combustibles shall be protected with fire-retardant covers or otherwise shielded with metal or fire-retardant guards or curtains.
- \_\_\_\_\_ Combustible floors (except wood on concrete) shall be kept wet, covered with damp sand, or protected by noncombustible or fire-retardant shields.
- \_\_\_\_\_ Where floors have been wet down, personnel operating arc welding equipment or cutting equipment shall be protected from possible shock.
- \_\_\_\_\_ Openings or cracks in walls, floors, or ducts within 11 m (35 ft) of the site shall be tightly covered with fire-retardant or noncombustible material to prevent the passage of sparks to adjacent areas.
- \_\_\_\_\_ Covers suspended beneath work to collect sparks

### WORK ON WALLS OR CEILINGS

- \_\_\_\_\_ Construction noncombustible and without combustible covering
- \_\_\_\_\_ Combustibles moved away from opposite side of wall
- \_\_\_\_\_ If hot work is done near walls, partitions, ceilings, or roofs of combustible construction, fire-retardant shields or guards shall be provided to prevent ignition.
- \_\_\_\_\_ If hot work is done on one side of a wall, partition, ceiling, or roof, one of the following criteria shall be met:
  - (a) Precautions shall be taken to prevent ignition of combustibles on the other side by relocating the combustibles.
  - (b) If it is impractical to relocate combustibles, a fire watch shall be provided on the side opposite from where the work is being performed.

### WORK ON ENCLOSED EQUIPMENT

(Tanks, containers, ducts, dust collectors, etc.)

- \_\_\_\_\_ Containers purged of flammable vapors
- \_\_\_\_\_ Ducts and conveyor systems that might carry sparks to distant combustibles shall be shielded, or shut down, or both.

### FIRE WATCH

- \_\_\_\_\_ To be provided during and 30 minutes after operation
- \_\_\_\_\_ Supplied with extinguisher
- \_\_\_\_\_ Trained in use of equipment and in sounding fire alarm

### FINAL CHECK-UP

- \_\_\_\_\_ Work area and all adjacent areas to which sparks and heat might have spread (including floors above and below and on opposite sides of walls) were inspected 30 minutes after the work was completed and were found fire safe.

Signed: \_\_\_\_\_  
 (Supervisor of Fire Watcher)

**SECTION 01 01 10 - IC**  
**INFECTION CONTROL**

**DESCRIPTION**

- A. Work on this Contract shall be considered Class II, Type C, Low Risk work. Street sweeper cleaning of tracking from work areas shall be required daily.
- B. This section specifies the control of environmental infection control and risk assessment that the Contractor must consider for construction & renovation projects in the medical facility. It includes Precautionary management of, Inspections and Non invasive activities, small scale, short duration activities, that create minimal dust. Major demolition and construction projects that generate a moderate to high levels of dust. Movement of materials and equipment, and resources that are encountered or generated by the Contractor. The Contractor is obligated to consider the

**Step 1. Identify Construction Activity**

specified control measures with the costs included within the various contract items of work. An ***Infection Control Risk Assessment Matrix of Precautions*** for construction and renovation for activities follows.

|  |   |
|--|---|
| <p><b>TYPE A</b></p> <p><b>Step 2. Identify Patient Risk Group</b></p> | <p><b>Inspection and Non-Invasive Activities.</b></p> <p>Includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>removal of ceiling tiles for visual inspection limited to 1 tile per 50 square feet</li> <li>painting (but not sanding)</li> <li>wall covering, electrical trim work, minor plumbing, and activities which do not require cutting of walls or access to ceilings other than for visual inspection.</li> </ul>  |
| <p><b>TYPE B</b></p>   | <p><b>Small scale, short duration activities which create minimal dust</b></p> <p>Includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>installation of telephone and computer cabling</li> <li>access to chase spaces</li> <li>cutting of walls or ceiling where dust migration can be controlled.</li> </ul>  |
| <p><b>TYPE C</b></p>   | <p><b>Work that generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies</b></p> <p>Includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>sanding of walls for painting or wall covering</li> <li>removal of floor coverings, ceiling tiles and casework</li> <li>new wall construction</li> <li>minor duct work or electrical work above ceilings</li> <li>major cabling activities</li> <li>any activity that cannot be completed within a single work shift.</li> </ul> |
| <p><b>TYPE D</b></p>   | <p><b>Major demolition and construction projects</b></p> <p>Includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>activities which require consecutive work shifts</li> <li>requires heavy demolition or removal of a complete cabling system</li> <li>new construction.</li> </ul>   |

B. Infection Control Risk and damage is defined as the presence of chemical, physical, or biological elements or agents which:

1. Adversely effect human health or welfare,
2. Unfavorably alter ecological balances of importance to human life.

Using the following table, **identify the Patient Risk Groups** that will be affected.

If more than one risk group will be affected, select the higher risk group:

| Low Risk | Medium Risk | High Risk | Highest Risk |
|----------|-------------|-----------|--------------|
|----------|-------------|-----------|--------------|

|  |   |  |   |
|--|---|--|---|
| <ul style="list-style-type: none"> <li>▪ Office areas</li> </ul> | <ul style="list-style-type: none"> <li>▪ Cardiology</li> <li>▪ Echocardiography</li> <li>▪ Endoscopy</li> <li>▪ Nuclear Medicine</li> <li>▪ Physical Therapy</li> <li>▪ Radiology/MRI</li> <li>▪ Respiratory Therapy</li> </ul> | <ul style="list-style-type: none"> <li>▪ CCU</li> <li>▪ Emergency Room</li> <li>▪ Labor &amp; Delivery</li> <li>▪ Laboratories (specimen)</li> <li>▪ Newborn Nursery</li> <li>▪ Outpatient Surgery</li> <li>▪ Pediatrics</li> <li>▪ Pharmacy</li> <li>▪ Post Anesthesia Care Unit</li> <li>▪ Surgical Units</li> </ul> | <ul style="list-style-type: none"> <li>▪ Any area caring for immunocompromised patients</li> <li>▪ Burn Unit</li> <li>▪ Cardiac Cath Lab</li> <li>▪ Central Sterile Supply</li> <li>▪ Intensive Care Units</li> <li>▪ Medical Unit</li> <li>▪ Negative pressure isolation rooms</li> <li>▪ Oncology</li> <li>▪ Operating rooms including C-section rooms</li> </ul> |
|--|---|--|---|

C. Match the *Patient Risk Group* with *Construction Project Type* on the following matrix to find the level of **infection control activities required**.

**Patient Risk Group** (*Low, Medium, High, Highest*) with the planned ...

**Construction Project Type** (*A, B, C, D*) on the following matrix, to find the ...

**Class of Precautions** (*I, II, III or IV*) or level of infection control activities required.

- 1) Infection Control approval will be required when the Construction Activity and Risk Level indicate that **Class III** or **Class IV** control procedures are necessary. Contact the VA Project engineer and the infection control officer before proceeding.

### Step 3. Identify Level of Infection Control Activities Required

## IC Matrix - Class of Precautions: Construction Project by Patient Risk

| Patient Risk Group        | Construction Project Type |               |               |               |
|---------------------------|---------------------------|---------------|---------------|---------------|
|                           | TYPE A                    | TYPE B        | TYPE C        | TYPE D        |
| <b>LOW</b> Risk Group     | <b>I</b>                  | <b>II</b>     | <b>II</b>     | <b>III/IV</b> |
| <b>MEDIUM</b> Risk Group  | <b>I</b>                  | <b>II</b>     | <b>III</b>    | <b>IV</b>     |
| <b>HIGH</b> Risk Group    | <b>I</b>                  | <b>II</b>     | <b>III/IV</b> | <b>IV</b>     |
| <b>HIGHEST</b> Risk Group | <b>II</b>                 | <b>III/IV</b> | <b>III/IV</b> | <b>IV</b>     |

### D. Description of Required Infection Control Precautions by Class

| During Construction Project |  | Upon Completion of Project  |
|-----------------------------|--|---|
| <b>CLASS I</b>              | <ol style="list-style-type: none"> <li>1. Execute work by methods to minimize raising dust from construction operations.</li> <li>2. Immediately replace a ceiling tile displaced for visual inspection</li> </ol>   |   |
| <b>CLASS II</b>             | <ol style="list-style-type: none"> <li>1. Provide active means to prevent airborne dust from dispersing into atmosphere.</li> <li>2. Water mist work surfaces to control dust while cutting.</li> <li>3. Seal unused doors with duct tape.</li> <li>4. Block off and seal air vents.</li> <li>5. Place dust mat at entrance and exit of work area</li> <li>6. *Remove or isolate HVAC system in areas where work is being performed.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Wipe work surfaces with disinfectant.</li> <li>2. Contain construction waste before transport in tightly covered containers.</li> <li>3. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.</li> <li>4. Remove isolation of HVAC system in areas where work is being performed.</li> </ol>   |
| <b>CLASS III</b>            | <ol style="list-style-type: none"> <li>1. *Remove or Isolate HVAC system in area where work is being done to prevent contamination of duct system.</li> <li>2. Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non-work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins.</li> <li>3. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.</li> <li>4. Contain construction waste before transport in tightly covered containers.</li> <li>5. Cover transport receptacles or carts. Tape covering unless solid lid.</li> </ol> <p>* Use window for negative HEPA air exhaust when accessible. Obtain V.A, resident engineer approval for exhausting in existing exhaust ductwork.</p> | <ol style="list-style-type: none"> <li>1. Do not remove barriers from work area until completed project is inspected by the owner's Safety Department and Infection Control Department and thoroughly cleaned by the owner's Environmental Services Department.</li> <li>2. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.</li> <li>3. Vacuum work area with HEPA filtered vacuums.</li> <li>4. Wet mop area with disinfectant.</li> <li>5. Remove isolation of HVAC system in areas where work is being performed.</li> </ol> |



|          |   |  |
|----------|---|--|
| CLASS IV | <ol style="list-style-type: none"> <li>1. Isolate HVAC system in area where work is being done to prevent contamination of duct system.</li> <li>2. Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non-work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins.</li> <li>3. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.</li> <li>4. Seal holes, pipes, conduits, and punctures appropriately.</li> <li>5. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site or they can wear cloth or paper coveralls that are removed each time they leave the work site.</li> <li>6. All personnel entering work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.</li> <li>7. Do not remove barriers from work area until completed project is inspected by the owner's Safety Department and Infection Control Department and thoroughly cleaned by the owner's Environmental Services Department.</li> </ol> | <ol style="list-style-type: none"> <li>1. Remove barrier material carefully to minimize spreading of dirt and debris associated with construction.</li> <li>2. Contain construction waste before transport in tightly covered containers.</li> <li>3. Cover transport receptacles or carts. Tape covering unless solid lid</li> <li>4. Vacuum work area with HEPA filtered vacuums.</li> <li>5. Wet mop area with disinfectant.</li> <li>6. Remove isolation of HVAC system in areas where work is being performed.</li> </ol> |
|----------|---|--|

E. Identify the area surrounding the project area, assessing potential impact.

**Step 4. Identify the areas surrounding the project area, assessing potential impact**

| Unit Below | Unit Above | Lateral    | Lateral    | Behind     | Front      |
|------------|------------|------------|------------|------------|------------|
|            |            |            |            |            |            |
| Risk Group | Risk Group | Risk Group | Risk Group | Risk Group | Risk Group |

**Step 5. Identify specific site of activity eg, patient rooms, medication room, etc.****Step 6. Identify issues related to: ventilation, plumbing, electrical in terms of the occurrence of probable outages.****Step 7. Identify containment measures, using prior assessment. What types of barriers? (Eg, solids wall barriers); Will HEPA filtration be required?**

(Note: Renovation/construction area shall be isolated from the occupied areas during construction and shall be negative with respect to surrounding areas)

**Step 8. Consider potential risk of water damage. Is there a risk due to compromising structural integrity? (eg, wall, ceiling, roof)****Step 9. Work hours: Can or will the work be done during non-patient care hours?****Step 10. Do plans allow for adequate number of isolation/negative airflow rooms?****Step 11. Do the plans allow for the required number & type of handwashing sinks?****Step 12. Does the infection control staff agree with the minimum number of sinks for this project? (Verify against AIA Guidelines for types and area)****Step 13. Does the infection control staff agree with the plans relative to clean and soiled utility rooms?****Step 14. Plan to discuss the following containment issues with the project team. Eg, traffic flow, housekeeping, debris removal (how and when)**

*Appendix: Identify and communicate the responsibility for project monitoring that includes infection control concerns and risks. The ICRA may be modified throughout the project. Revisions must be communicated to the Project Manager.*

Steps 1-3 Adapted with permission V Kennedy, B Barnard, St Luke Episcopal Hospital, Houston TX ; C Fine, CA

Steps 4-14 Adapted with permission Fairview University Medical Center, Minneapolis MN by ECSI Inc 2001  
Forms modified and provided courtesy of 3 Bartley, ECSI Inc 2002

| <b>Infection Control Construction Permit</b> |    |  |                         |                               |
|--|----|--|-------------------------|-------------------------------|
|  |    |  |                         | Permit No:                    |
| Location of Construction:                    |    |  | Project Start Date:     |                               |
| Project Coordinator:                         |    |  | Estimated Duration:     |                               |
| Contractor <u>Performing</u> Work            |    |  | Permit Expiration Date: |                               |
| Supervisor:                                  |    |  | Telephone:              |                               |
| YES  | NO | <u>CONSTRUCTION ACTIVITY</u>   | YES                     | NO                            |
|  |    | TYPE A: <u>Inspection, non-invasive activity</u>   |                         | INFECTION CONTROL, RISK GROUP |
|  |    | TYPE B: Small scale, short duration, moderate to <u>high</u> levels  |                         | GROUP 1: Low Risk             |
|  |    | TYPE C: Activity generates moderate to high levels of dust, re Lures cater 1 work shift for <u>completion</u>  |                         | GROUP 2: Medium Risk          |
|  |    | TYPE D: Major duration arid construction activities<br><u>Requiring consecutive work shifts</u>  |                         | GROUP 3: Medium/high Risk     |
|  |    |  |                         | GROUP 4: Highest Risk         |
| CLASS I                                      |    | 1. Execute work by methods to minimize raising dust from construction operations.<br>2. Immediately replace any ceiling tile displaced for visual <u>inspection</u> .<br>3. Minor Demolition for Remodeling  |                         |                               |
| CLASS 11                                     |    | 1. Provides active means to prevent air-borne dust from dispersing into atmosphere<br>2. Water mist work surfaces to control dust while cutting.<br>3. Seal unused doors with duct tape.<br>4. Block off and seal air vents.<br>5. Wipe surfaces with disinfectant.<br>6. Contain construction waste before transport in tightly covered containers.<br>7. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.<br>8. Place dust mat at entrance and exit of work area.<br>9. Remove or isolate HVAC system in areas where work is being <u>performed</u> .   |                         |                               |
| CLASS 111                                    |    | 1. Obtain infection control pennit before co nstruction begins.<br>2. Isolate HVAC system in area where work is being done to prevent contamination of the duct system.<br>3. Complete all critical barriers or implement control cube method before co nstruction begins.<br>4. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.<br>5. Do not remove barriers from work area until complete project is thoroughly cleaned by Env. Services Dept.<br>6. Vacuum work with HEPA filtered vacuums.<br>7. Wet mop with disinfectant<br>8. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.<br>9. Contain construction waste before transport in tightly covered containers.<br>10. Cover transport receptacles or carts. Tape covering.<br>11. Remove or isolate HVAC system in areas where work is being performed/   |                         |                               |
| Class IV                                     |    | 1. Obtain infection control permit before cons truction begins.<br>2. Isolate HVAC= system in area where work is being done to prevent contamination of duct system.<br>3. Complete all critical barriers or implement control cube method before co nstruction begins.<br>4. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.<br>5. Seal holes, pipes, conduits, and punctures appropriately.<br>6. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site or they can wear cloth or paper coveralls that are removed each time they leave the work site.<br>7. All personnel entering work site are required to wear shoe covers<br>8. Do not remove barriers from work area until completed project is thoroughly cleaned by the Environmental Service Dept.<br>9. Vacuum work area with HEPA filtered vacuums.<br>10. Wet mop with disinfectant<br>11. Remove barrier materials carefully to minimize spreading of dirt and debris associated with construction.<br>12. Contain construction waste before transport in tightly covered containers.<br>13. Cover transport receptacles or carts. Tape covering.<br>14. Remove or isolate HVAC system in areas where is bein done. |                         |                               |
| Additional Requirements:                     |    |  |                         |                               |
|  |    |  |                         |                               |
| Exceptions/Additions to this permit Date     |    |  |                         |                               |
| Date Initials                                |    | Initials are noted b attached memoranda  |                         |                               |
| Permit Request By:                           |    |  | Permit Authorized By:   |                               |
| Date:  |    |  | Date:                   |                               |

Steps 1-3 Adapted with permission V Kennedy, B Barnard, St Luke Episcopal Hospital, Houston TX; C Fine, CA Steps 4-14 Adapted with permission Fairview University Medical Center, Minneapolis MN, Forms modified and provided courtesy of I Bartley, ECSI Inc 2002

F. Apply Life Safety and standards (APIC) and the following criteria would need to be assured in order to maintain the supply air side open during Class 4 construction activity:

- The air supply is 100% fresh air and the site and adjacent areas can be kept under negative pressure at all times.
- There is no re circulated air in this section
- There is no duct work involved in this section of the demolition
- The site can never be positive to the adjacent areas (i.e. keep the negative air machines on at all times or for 1-2 hours post site work until the negative action can be maintained.
- A log is maintained to document that the negative pressure is checked and has been maintained during those hours when the negative air machines are turned off. (An alarmed device is recommended for this purpose and should be maintained and monitored by the construction personnel).

## **PART 2 - PRODUCTS, MATERIALS AND EQUIPMENT**

### **2.1 MATERIALS AND EQUIPMENT**

#### **GENERAL REQUIREMENTS**

- A. All materials shall be delivered in their original package, container or bundle bearing the name of the manufacturer and the brand name (where applicable). When transporting new materials & equipment through the hospital use 4 mil Poly sheeting encasing materials, tools and equipment or use a totally enclosed cart.
- B. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Flammable materials cannot be stored inside buildings. Replacement materials shall be stored outside of the regulated/work area until construction is completed.
- C. The Contractor shall not block or hinder use of buildings by patients, staff, and visitors to the VA in partially occupied buildings by placing materials/equipment in any unauthorized place.

- D. The Competent Person shall inspect for damaged, deteriorating or previously used materials. Such materials shall not be used and shall be removed from the worksite and disposed of properly.
- E. Demolition materials must be transported in totally enclosed containers.
  - 1) Demolition on above ground floors may use a window debris chute to convey materials to an enclosed dumpster that provides dust and noise control. The contractor is responsible to maintain the original appearance of the building fascia.

#### **2.1.2 NEGATIVE PRESSURE FILTRATION SYSTEM**

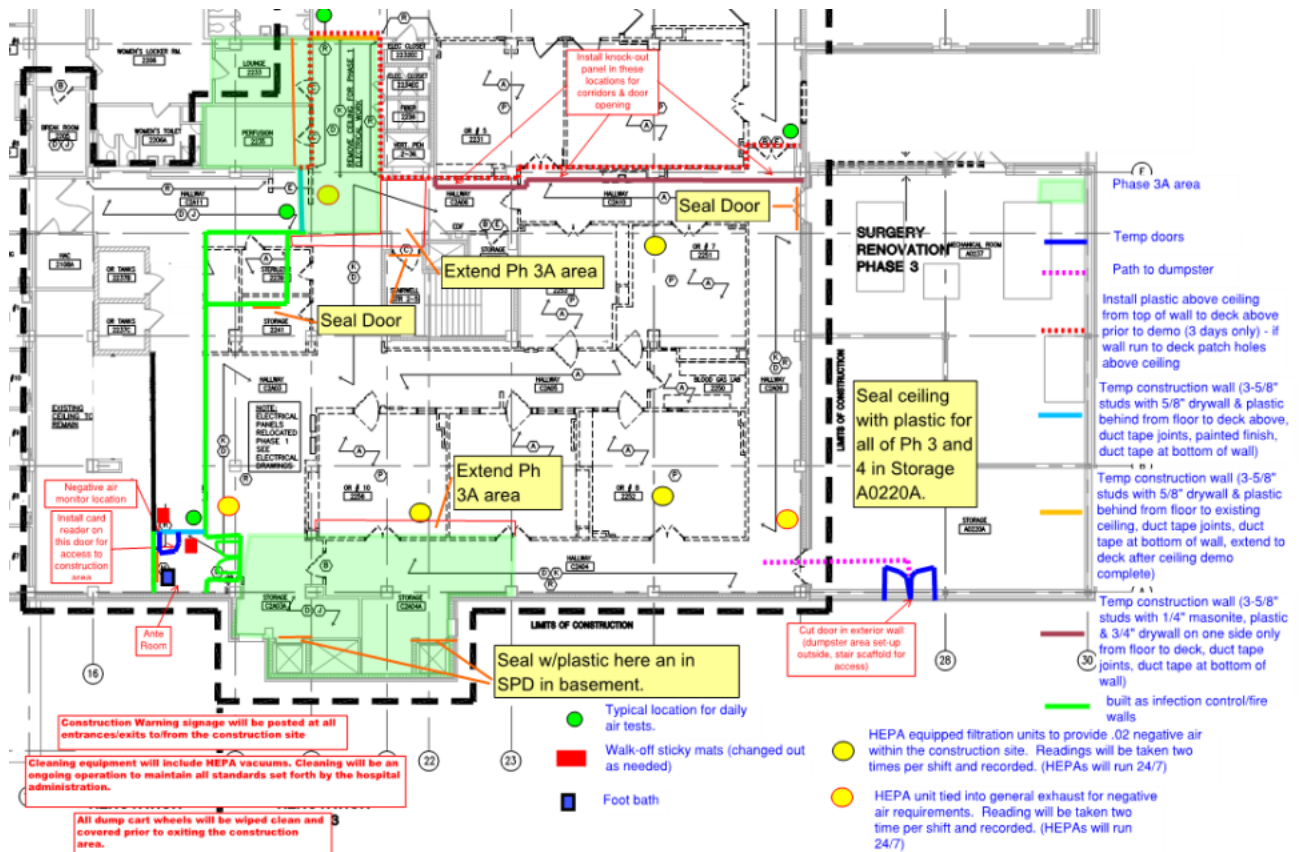
The Contractor shall provide enough negative air machines to completely exchange the regulated area air volume 4 actual times per hour. The Competent Person shall determine the number of units needed for each regulated area by dividing the cubic feet in the regulated area by 15 and then dividing that result by the actual cubic feet per minute (cfm) for each unit to determine the number of units needed to effect 4 air changes per hour. Provide a standby unit in the event of machine failure and/or emergency in an adjacent area.

#### **2.1.3 DESIGN AND LAYOUT**

**Before start of work for each phase of the project,** the contractor is to submit for approval, an infection control plan which will include the design and layout of the regulated area to include the type and location of infection control construction barriers to be used, access points, ante room location, etc. The submittal shall indicate the number of, location of and size of negative air machines and exhaust route & location of the windows to be used. The point(s) of exhaust, air flow within the regulated area, anticipated negative pressure differential, and supporting calculations for sizing shall be provided. In addition, submit the following:

1. Manufacturer's information on the negative air machine(s).
2. Method of supplying power to the units and designation/location of the panels.

3. Description of testing method(s) for correct air volume and pressure differential. Provide manufacturer's product data on the pressure differential measuring device used.
4. If auxiliary power supply is to be provided for the negative air machines, provide a schematic diagram of the power supply and manufacturer's data on the generator and switch.
5. Location of isolation negative air pressure monitor.
6. The following is a SAMPLE plan:



SAMPLE INFECTION CONTROL PLAN

#### 2.1.4 NEGATIVE AIR MACHINES

A. Negative Air Machine Cabinet: The cabinet shall be constructed of steel or other durable material capable of withstanding potential damage from rough handling and transportation. The width of the cabinet shall be less than 30" in order to fit in standard doorways. The cabinet must be factory sealed to prevent dust from being released during use, transport, or maintenance. Any

- access to and replacement of filters shall be from the inlet end. The unit must be on casters or wheels.
- B. Negative Air Machine Fan: The rating capacity of the fan must be the air moving capacity under actual operating conditions. Manufacturer's typically use "free-air" (no resistance) conditions when rating fans. The fan must be a centrifugal type fan.
- A. Negative Air Machine Final Filter:
- 1) When exhausting directly to the outside from a window or penetration the filter shall be a minimum **MERV 8** pleated filter media completely sealed on all edges within a structurally rigid frame.
  - 2) When exhausting to a exhaust duct: the final filter shall be a **HEPA** filter. The filter media must be completely sealed on all edges within a structurally rigid frame. The filter shall align with a continuous flexible gasket material in the negative air machine housing to form an air tight seal. Each **HEPA** filter shall be individually tested and certified by the manufacturer to have an efficiency of not less than 99.97% when challenged with 0.3  $\mu\text{m}$  dioctylphthalate (DOP) particles. Testing shall have been done in accordance with Military Standard MIL- STD-282 and Army Instruction Manual 136-300-175A. Each filter must bear a UL586 label to indicate ability to perform under specified conditions. Each filter shall be marked with the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
- D. Negative Air Machine Pre-filters: The pre-filters, which protect the final HEPA filter by removing larger particles, are required to prolong the operating life of the HEPA filter. Two stages of pre-filtration are required. A first stage pre-filter shall be a low efficiency type for particles 10  $\mu\text{m}$  or larger. A second stage pre-filter shall have a medium efficiency effective for particles down to 5  $\mu\text{m}$  or larger. Pre-filters shall be installed either on or in the intake grid of the unit and held in place with a special housing or clamps.
- F. Negative Air Machine Safety and Warning Devices: An electrical/mechanical lockout must be provide to prevent the fan from being

operated without a HEPA filter. Units must be equipped with an automatic shutdown device to stop the fan in the event of a rupture in the HEPA filter or blockage in the discharge of the fan. Warning lights are required to indicate normal operation; too high a pressure drop across filters; or too low of a pressure drop across filters.

- G. Negative Air Machine Electrical: All electrical components shall be approved by the National Electrical Manufacturer's Association (NEMA) and Underwriter's Laboratories (UL). Each unit must be provided with overload protection and the motor, fan, fan housing, and cabinet must be grounded.

#### **2.1.5 PRESSURE DIFFERENTIAL**

The fully operational negative air system within the regulated area shall continuously maintain a pressure differential of - 0.02" water column. Before any disturbance of any material or building system, this shall be demonstrated to the VA by use of a pressure differential meter/manometer as required by OSHA 29 CFR 1926.1101(e)(5)(i). The Competent Person shall be responsible for providing and maintaining the negative pressure and air changes as required by OSHA and this specification.

#### **2.1.9 TESTING THE SYSTEM**

The negative pressure system must be tested before any disturbedance. After the regulated area has been completely prepared, the decontamination units set up, and the negative air machines installed, start the units up one at a time. Demonstrate and document the operation and testing of the negative pressure system to the VA using smoke tubes and a negative pressure gauge. Testing must also be done at the start of each work shift.

#### **2.1.10 DEMONSTRATION OF THE NEGATIVE AIR PRESSURE SYSTEM**

The demonstration of the operation of the negative pressure system to the VA shall include, but not be limited to, the following:

- A. Contractor to install **Triatek** (Web site [www.Ttk.com](http://www.Ttk.com)) negative air isolation monitoring stations at the sites access doors or at opposite sides of the construction area check with COTR for number of units and location.
- B. Curtains of the decontamination units move in toward regulated area.



- D. Use smoke tubes to demonstrate air is moving air across all areas in which work is to be done.
- E. Plastic barriers and sheeting move lightly in toward the regulated area.

#### **2.1.11 USE OF SYSTEM DURING CONSTRUCTION OPERATIONS**

- A. Start units before beginning any disturbance occurs. After work begins, the units shall run continuously, maintaining 4 actual air changes per hour at a negative pressure differential of 5.0 Pa (-0.02") water column, for the duration of the work until a final visual clearance and final air clearance has been completed.
- B. The negative air machines shall not be shut down for the duration of the project unless authorized by the VA, in writing.
- C. Construction work shall begin at a location closest from the units and proceed away from them. If an electric failure occurs, the Competent Person shall stop all work and not resume until power is restored and all units necessary are operating properly again.
- D. The negative air machines shall continue to run after all work is completed and until a final visual clearance and a final air, clearance has been completed for that regulated area.

### **2.2 CONTAINMENT BARRIERS AND COVERINGS IN THE REGULATED AREA**

#### **2.2.1 GENERAL**

- A. Seal off the perimeter to the regulated area to completely isolate the regulated area from adjacent spaces. All surfaces in the regulated area must be covered to prevent contamination and to facilitate clean-up. Should adjacent areas become contaminated, immediately stop work and clean up the contamination at no additional cost to the Government.

#### **2.2.3 CONTROLLING ACCESS TO THE REGULATED AREA**

- A. Access to the regulated area is allowed only through the personnel decontamination facility (PDF). All other means of access shall be eliminated and OSHA warning signs posted as required by OSHA. If the regulated area is adjacent to or within view of an occupied area, provide a visual barrier of opaque fire retardant poly sheeting at least 4 mils thick to prevent building occupant observation. If the adjacent area is accessible to the

public, the barrier must be solid and capable of withstanding the negative pressure.

#### **2.2.4 CRITICAL BARRIERS**

- A. Completely separate the regulated area from adjacent areas using fire retardant poly at least 6 mils thick and duct tape. Individually seal with two layers of 6 mil poly and duct tape all HVAC openings, cap off exhaust into the regulated area. Individually seal all lighting fixtures, clocks, doors, windows, convectors, speakers, or any other objects in the regulated area. Use care with hot/warm surfaces see fig 1.

#### **2.2.5 PRIMARY BARRIERS**

- A. Temporary Construction Partitions:
  - 1. Install and maintain temporary construction partitions to provide separations between construction areas and adjoining areas. Construct partitions of gypsum board or treated plywood (flame spread rating of 25 or less in accordance with ASTM E84) on one side of wood or metal steel studs. Seal with one layers of 6 mil poly for a vapor barrier under gypsum or plywood. Extend the Poly through suspended ceilings to floor slab or roof. Seal penetrations at door openings, install tight-fitting yellow construction doors with self-closing devices see fig. 2 for barrier construction. Contractor to provide the construction(s) door for the project.

#### **2.2.6 CONTRACTOR SPILL RESPONSE KIT**

- A. The kit should include the following:
  - 1. Shop Vacuum.
  - 2. Multi-Purpose Spill Control Sorbents to absorb nonaggesive liquids up to 30 gallons.
  - 3. Sorbents pillows.
  - 4. Pipe leak clamps for copper & steel pipe in sufficient size range and quantity base on project piping scope.
  - 5. Bucket & mop and water resistant duct tape.

FIG. 1

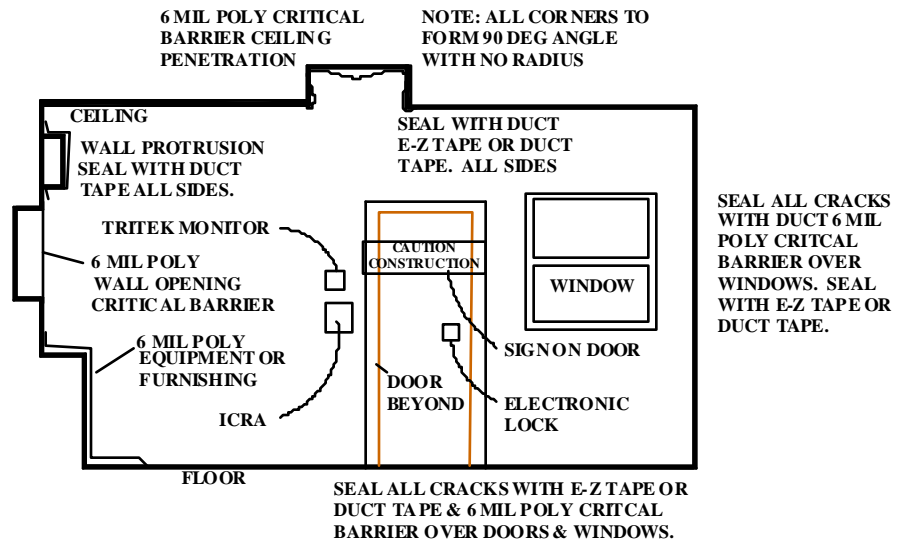


Figure 1

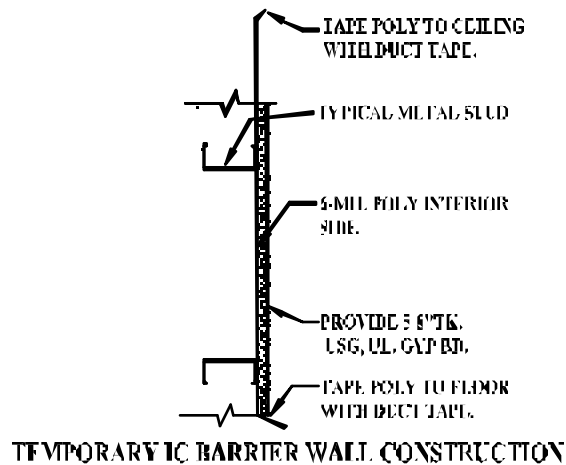
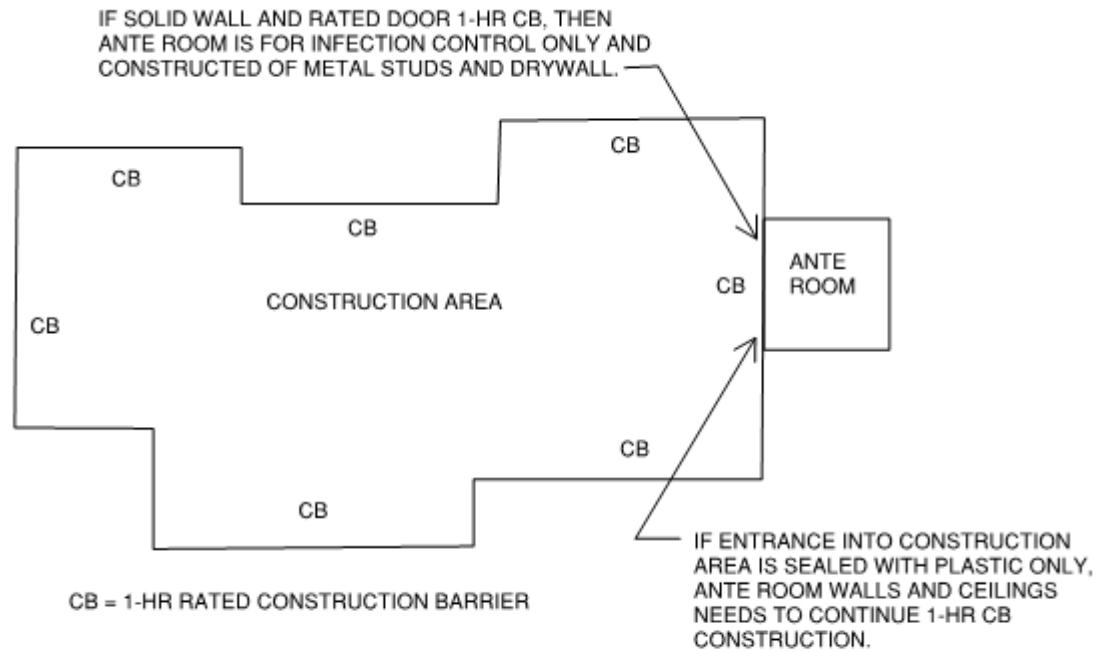


Figure 2



### CONSTRUCTION AREA TYPICAL PLAN

Figure 3

**SECTION 01 01 10 - SN****SPECIAL NOTES****PART 1: GENERAL**

1.1 All work is outdoors, and therefore only such requirements as may reasonably be applied to outdoors activities shall pertain to this Contract.

**1.2 FIRE ALARM SYSTEM:**

**FIRE/SECURITY ALARM SYSTEMS:** Contractor shall advise the Graphic Control Center and/or the Police Desk at extension 41010/42222 respectively, prior to any work which might result in the Fire Alarm System or Security System (this includes but is not limited to: Smoke Detectors, Water Flow Switches, Pull Stations, Sprinkler Heads, Motion Detectors, Door Contacts, Security Door Controls, etc.) being activated, in addition to having an approved outage form from the Facility Management Department. Notification to Graphics and/or the Police Desk and having an outage form, does not absolve the contractor from following the proper procedures to prevent the system from activating, i.e. covering the smoke heads with paper bags, closing valves, containing dust, monitoring and controlling security devices, etc.). If any system activates due to the contractor's failure to notify the Graphic Control Center, the Contractor's failure to follow proper procedures, or the Contractor's failure to obtain an outage form, a Modification/Settlement by Determination deduction of \$2500.00 per alarm/event or notice from the Police that a construction area was left unsecured will be issued to the contractor.

**1.3 SCHEDULING OF WORK:**

- A. Contractor shall verbally schedule work areas with Resident Engineer not less than fifteen (15) calendar days in advance of commencement of work. Verbal notification shall be backed up and verified in writing.
- B. Contractor shall verbally schedule outages or service interruptions with Resident Engineer not less than fifteen (15) calendar days in advance of intended commencement of work. Notification does not guarantee the date of scheduled outage or service interruption however Resident Engineer will schedule such dates and inform the contractor. Date will be scheduled with medical center personnel when service interruption will minimize affect to hospital patients and operations. Contractor to submit VA System Outage Request form to Resident Engineer not less than fifteen (15) calendar days in advance of intended commencement of outage work. Contractor to attend (2) weekly pre-outage meetings with Engineering and staff to coordinate actual date of outage, duration, time of outage, phasing, and affected services. In addition, contractor to attend the pre-outage meeting one hour prior to outage to coordinate communications, readiness, pre-outage checklist, document requirements, temporary measures, lock out tag out and other outage requirements and procedures.
- C. Contractor to attend weekly construction meetings.

**1.4 PROTECTION OF WORK AREAS:**

Contractor to provide drop cloths when working in occupied areas to avoid staining or damaging existing carpets or vinyl tile floors.

**1.5 HOURS OF WORK:**

- A. The hours of contract work shall be from 7:00 a.m. until 4:30 p.m. the normal work shift for hospital employees, the contractor shall verify shift or shifts required for construction areas. Other than normal, after (off) hours, including federal holidays shall be scheduled two days prior to starting with the Project Manager. These off hours will be required to complete the project in the time allotted for the contract at no additional cost to the Department of Veterans Affairs. Upon approval of the Department of Veterans Affairs, the contractor will propose the scope or extent of off hour work due to individual contractor resources available to accomplish this project in the time allotted. In addition, these off hours will be required for utility/service interruptions, and any/other work that may interrupt the operation of the occupied space, i.e., some road construction, demolition, work in occupied areas, work affecting occupied areas, etc. Some noise producing demolition operations will be required to be scheduled for off work hours as directed by Resident Engineer and described on drawings.

- B. Certain work items, which require off-hour work, have been identified. These items are indicated on the drawings. Refer, in particular, to Phasing Notes on Drawings. All drawings shall be reviewed for off-hour work requirements and items creating disturbance to the hospital staff or patient care must be performed during off-hour working periods as established and approved by the VA Engineer.
- C. Building will be occupied during performance of work, but areas of alterations will be vacated. Contractor shall take all measures and provide all material necessary for protecting existing equipment and property in affected areas of construction against dust and debris, so that equipment and affected areas to be used in the Medical Centers operations will not be hindered. Contractor shall permit access to Department of Veterans Affairs personnel and patients through other construction areas, which serve as routes of access to such affected areas and equipment. Coordinate alteration work in areas occupied by the VA so that Medical Center operations will continue during the construction period. Contractor to construct 7 feet tall by 5 feet wide metal stud and drywall tunnels through occupied space as deemed necessary by the VA for access by Medical Center personnel and maintaining construction operations.

#### 1.6 SUBMITTAL APPROVAL AND START OF CONSTRUCTION PROJECT:

No work may commence prior to the contractor receiving written approval of all submittals related to work on this contract. Delivery of submittals to the COTR or verbal acknowledgement of receipt by the Project Manager **does not** constitute approval.

#### 1.7 EMERGENCY SERVICE:

All offerors, if successful, must be able to respond to all contract and contractor created emergency services resulting from contractor actions and installations, as determined by the Department of Veterans Affairs Resident Engineer, with qualified staff personnel within one (1) hour of verbal notification during construction stages and warranty period. Bidders must be prepared to show proof, in writing, that they can satisfy this requirement prior to award.

#### 1.8 KEYS:

Keys for access to construction/work areas may be issued to the contractor at the discretion of the Project Manager. Up to three sets of keys will be provided at no cost. Additional keys will be provided for a charge of \$5.00 per key, payable by check to the Department of Veterans Affairs. All keys issued will be signed for and issued to the General Contractor. Upon completion of the work, failure to return all issued keys to the Project Manager will result in the issuance of a Settlement by Determination in the amount of \$100.00 for each outstanding key. In addition, a \$5.00 fee will be paid to VA for each outstanding key. Keys will be provided through the FMSAM Box. Keys are to be picked up and returned daily. If keys are not returned by the end of the day, a modification of \$5.00/key per day will be assessed against the contractor.

#### 1.9 SAFETY ITEMS:

- A. Training: All employees of contractor and subcontractor shall be aware of the egress routes from the construction areas. It is the contractor's responsibility to ensure all employees are aware of the fire alarm codes for the building they are working in and participate in fire alarm drills and actual fire alarms.
- B. Barricades: The contractor is responsible to erect barricades, construction and safety signs, and new egress routes. The barricades will be erected to restrict areas where hazardous operations are performed. The construction and safety signs shall consist of caution signs as determined and approved by VA; egress signs, where egress has been altered for construction; and any applicable hazardous warning signs. If the egress is changed due to construction, the contractor shall provide temporary directional signs for changes as determined by VA and for construction of any walkways, steps, or overhead protection scaffolding or the like as required providing a new means of egress.  
**Emergency egress plan shall be developed by the contractor and submitted for approval by the designated VA safety manager before egress routes are altered.**
- C. Fire Extinguisher: The contractor and subcontractor's shall provide fully charged and fully operational fire extinguishers as required and in accordance with section FSS on the job site(s) at all times. Reference section 01 01 10 FSS.

- D. Debris: Combustible storage and debris shall be kept to the lowest level necessary for required daily operations. The construction area shall be kept clean as indicated in general requirements and conditions
- E. Gasoline Powered Equipment: Gasoline powered equipment shall not be used within the confines of any building on the Medical Center without specific written permission from the Chief, Engineering Service.
- F. Fire/Smoke Doors: Fire and/or smoke doors shall not be propped open or prevented from closing and latching. This includes mechanical equipment rooms and utility closet doors.
- G. Construction Site Phone: Contractor to run wiring from telephone closet to the construction space for the installation of a VA phone in the construction space. Installation of the phone is required prior to construction can begin. The VA will provide the phone.
- H. Construction Hard Hats: General Contractor to provide (4) sets of hard hats and safety glasses for each worksite for VA staff use.
- I. Exit Signs:
  - a. Inside Construction Space: Contractor to provide luminescent Exit Signs throughout the construction space such that while standing in any place within the construction space, an Exit sign is visible and the path of egress can be followed.
  - b. Outside Construction Space: Contractor will cover, relocate, etc. Exit signs impacted due to their construction operations as directed by the ILSM and the VA Safety Officer.

#### 1.10 SECURITY OF CONSTRUCTION SITES – Contractor Regulations

- A. All construction sites must be secured to prevent inappropriate access by patients, visitors, and employees. While such security fences, doors, and barricades are temporary, they must be substantially installed to control access to the site. The existing security (Pegasys by Johnson Controls and Ingersoll Rand) system must be extended to each construction access door. Each construction door must be provided with an Ingersoll Rand Integrated Reader Lock programmed to the existing VA security system. Construction sites and all security measures must be monitored daily to ensure that security is maintained. Local VA Police must be alerted about the construction project. At the close of activity daily, before securing the site or portions of the site, the contractor must ensure that there are no patients, visitors, or staff in the area. If construction site problems arise, the Contracting Officer and COTR will take appropriate action to correct any and all safety and security conditions.
- B. VA engineering, safety/fire department, and police staff must have the right to access the construction site as needed to perform their assigned responsibilities.
- C. Lock up the worksite at all times to prevent patients and other unauthorized people from entering the site.
- D. The need for job site security is much greater when work is being conducted in psychiatric areas to protect the safety of the patients. All job boxes, tools, etc., must be locked up even when workers are on site unless there's enough activity to assure that patients cannot access tools or site. Verify that no one is in the construction area upon locking up the site for the evening.
- E. Two evacuation routes from the worksite must be maintained at all times.
- F. Contractors may lock up their tools etc., with personal locks.

## 1.11 PENETRATIONS:

## A. WALL:

- a. All wall and/or floor penetrations created by work on this contract, whether by demolition or new construction, shall be patched by the general contractor or as assigned by the general contractor. All patching materials shall be of like kind or a suitable substitute approved by NFPA or UL.
- b. If the permit is for other than inspection, a Follow-Up Inspection page will need to be filled out by the person performing the installation/removal work, which then needs to be signed and returned to whoever originally issued the permit. The permit initiator is then responsible for checking the areas listed on the permit to ensure firestopping was completed according to Facility standards and penetrations sealed with an approved fire/smoke sealant compound so as to maintain fire and smoke separation integrity. Documentation of the sealant or system used in the penetration must be made available at the affected penetration by the permit requestor at the time of permit completion inspection. The program or person completing the follow up inspection must validate that the sealant compound or system is properly rated and installed for maintaining the rating of the affected smoke or firewall. Photo-documentation in lieu of interim inspections can be performed to validate work.
- c. ONLY (1) one type of fire sealant is permissible per hole.
- d. The permit will be in this person's possession while all inspections and/or work are being performed.

## B. CEILINGS:

- a. To ensure that proper ceiling penetrations are sealed, all internal departments and contractors doing any cabling, wiring, plumbing, etc., must obtain a ceiling access permit from Facilities Services prior to installation.
- b. All wall penetrations must be located, marked, and sealed by contractor responsible for penetration. As penetrations are sealed, Facilities Service must be contacted to inspect penetrations for proper sealing.
- c. If the permit is for other than inspection, a Follow-Up Inspection page will need to be filled out by the person performing the installation/removal work, which then needs to be signed and returned to whoever originally issued the permit. The permit initiator is then responsible for checking the areas listed on the permit to ensure firestopping was completed according to Facility standards and penetrations sealed with an approved fire/smoke sealant compound so as to maintain fire and smoke separation integrity. Documentation of the sealant or system used in the penetration must be made available at the affected penetration by the permit requestor at the time of permit completion inspection. The program or person completing the follow up inspection must validate that the sealant compound or system is properly rated and installed for maintaining the rating of the affected smoke or firewall. Photo-documentation in lieu of interim inspections can be performed to validate work.
- d. The permit will be in this person's possession while all inspections and/or work are being performed.
- e. At the end of each work day and prior to leaving work site, the contractor shall replace all ceiling tiles temporarily removed to do work above finished ceilings in corridors.
- f. If it is not practical to replace all ceiling tiles on a daily basis the contractor is to construct 7 feet tall by 5 feet wide metal stud and drywall tunnels through occupied spaces as deemed necessary by the VA for access by Medical Center personnel and maintaining construction operations. Upon the first incident of the contractor not replacing the ceiling tiles, this tunnel construction will have to commence immediately prior to any further construction on the project.

## C. Reference section 01 01 10 – 1HR for additional information.



**1.12 PHASING:**

Phasing on this contract is critical as portions of the area to be remodeled shall remain occupied throughout the construction work. Contractor will be working in an operational hospital and not be provided designated elevators or entrances. The contractor will share the corridors, the B-Bank elevators, loading dock, etc. with staff, patients and other contractors. Each phase shall be as described on the drawings and/or specifications shall be completed in the sequence described. Also refer to Section 01 00 00, Article 1.6.G. Phasing.

**1.13 SCAFFOLDING:**

Prior to setup of all scaffolding, the contractor is to provide a submittal of the scaffolding design through the submittal review process. The scaffolding design is to be stamped by a professional engineer. Contractor is to provide copies of daily scaffolding inspections with daily logs.

**1.14 ENERGY EFFICIENCY REQUIREMENTS:**

- A. Federal Executive Order #13423/#13514 requires all energy efficiency materials, equipment, and systems to be evaluated and if feasible incorporated into VA Projects. The A/E, prime contractor, and all subcontractors shall cooperate with the Federal Government in specifying, evaluating, documenting, purchasing, and installing energy efficient equipment that meet basic energy efficiency criteria established by the VA. The criteria can be defined as comparing total energy savings to life cycle cost of the equipment. To accomplish this objective, the A/E shall produce an Energy Equipment Schedule comparing a description of each standard piece of equipment (system) versus a description of recommended efficient equipment (or system); including the estimated purchase price, estimated cost to install, maintain, and operate the equipment as well as the estimated annual energy usage and estimated useful life for each piece of equipment (or system).
- B. All design and installation will be in accordance with current VAMC, HVAC design guides, NEC, NFPA, ASHRAE 90.1, state, local and all VA and federal codes.
- C. The VA intends to provide energy savings equipment and design modifications for current energy usage to the most efficient and economical level possible.

**1.15 INSPECTIONS:**

All mechanical and electrical work shall be inspected by Engineering Service (Shop & Resident Engineer) personnel prior to being put into operation or closing up if work will be hidden by walls, ceilings, drop ceilings, cover plates, access panels, etc. Contractor shall notify the VA RE a minimum of two days prior to the inspection date, times and dates shall be scheduled and agreed upon by VA. Installations will be inspected by these VA personnel for work in compliance with State, Federal, Local, Dept. of Veterans Affairs Codes, regulations and contract specifications. If corrections, alterations, adjustments, new construction etc. is required, the VA will be notified within 48 hours of completion of such items. These inspections and corrections, alterations, etc. will be made at no additional time or cost to VA.

**1.16 CONTRACTOR'S AGREEMENT - RULES AND REGULATIONS FOR ALL CONTRACTORS**

The following is the contractor's agreement required to be signed at the pre-construction meeting and updated monthly when new subcontractors start working on the job site. The agreement will be preceded by a training video provided by the VA. The agreement is the general contractor's responsibility to ensure all subcontractor personnel are trained and acknowledge (sign) the agreement.

**A. STANDARD POLICY**

All outside General contractors and Sub-contractors will coordinate all work within the hospital with Facilities Management before beginning work.

**B. PURPOSE**

General Contractor will ensure that each individual General Contractor and Sub-Contractor employee is responsible for complying with established hospital standards, applicable OSHA Safety Requirements, federal, state and local environmental regulations, wearing prescribed safety equipment, and preventing avoidable accidents.

**C. PROCEDURE**

**General Contractor will ensure that each individual general contractor and sub-contractor employee review, understand and acknowledge (sign) the following information prior to the commencement of work scheduled at this facility. General Contractor will forward copies of signed acknowledgements to Project Engineer of all new employees on a monthly basis.**

**The following building rules and regulations affect all contractor personnel, suppliers, and vendors:**

**D. Access to Construction Areas**

- Access is limited to areas such as critical care and surgical units, as well as mechanical/electrical rooms, etc. Access can be obtained through Facilities Service.
- Access to any floors of the facility after normally scheduled work hours (Monday-Friday, 7:00 a.m.-5:00 p.m.) must be scheduled in advance with the Project section of Facilities Service. Police and Security reserves the right to refuse access to anyone without prior authorization and identification.
- Ready access for the Engineering, Safety, Police and (the Fire Department) shall be maintained to all areas under construction at all times.
- Areas under construction shall be locked during off-hours. Keys and cylinders for this purpose are obtained through Facilities Service. Contractors will not put their locks on any doors without VA approval.

**E. Accidents and Injuries**

- First Aid/Medical Aid/Emergency Treatment for workers: The contractor must post emergency phone numbers and treatment facilities if any contractor employees are injured on the job, or need medical treatment
- Work site injuries must be reported to the VA. The VA has an accident reporting form (form number 2162). The COTS/ Safety/ or Security and Police Service will initiate the 2 162. Once the VA has completed the supervisor's portion the injured individual will be required to complete the narrative portion of the report. The service chief responsible for the contract is also required to sign the report and forward the original report to the Safety Section.

**F. Asbestos**

- There are both friable and non-friable asbestos-containing materials located within the hospital complex. Inspection reports are located in the Facilities Service Department. Contractors are required to be aware of the asbestos materials located in the vicinity of their work. Further, all contractors are expressly forbidden to disturb any asbestos-containing materials unless specifically authorized in writing by VA. Under no circumstances are any materials supplied or installed by the contractor to contain asbestos in any form or quantity.
- Asbestos removal contractors will be trained and licensed, and will follow all OSHA rules, VA specifications, state and local regulations from notification to disposal.
- A VA representative will verify the adequacy of the barriers and ventilation before any asbestos removal work is conducted.
- The contractor is responsible for monitoring his own employees' exposure to asbestos.
- Additional specific asbestos removal specifications will apply.
- Contractor to provide a Fiscal Year breakdown of Asbestos Costs on the project.

**G. ACM TRACE WORK OPERATIONS – NOT USED****H. Clean-Up**

- All work activity within occupied portions of the facility shall be immediately cleaned and restored to its original finished condition upon completion of the activity. If the activity continues into the next workday, the area shall be left safe, clean, and presentable.
- Public restrooms are not to be used for the cleaning of tools or equipment, i.e., paintbrushes, rollers, finishing tools, etc. Janitor's slop sinks are available for this purpose. If janitor's closets are used, they must be cleaned.
- Trash, combustible waste, and excess construction materials must be removed daily to prevent accumulation. Contractors must arrange for the removal of their debris and waste.
- All work for an area must be confined within that space. Public corridors, stairwells, equipment rooms, and vacant floors are not to be used for the storage of materials or as a workshop. Tracking of construction dirt into the public corridors or stairwells must be prevented. The contractor will provide dampened walk-off mats at all entrances and exits from the construction area.
- If smoke detectors are covered during dust-producing activities, they must be uncovered daily.

**I. Compressed Gas Cylinders**

- Compressed gas cylinders are very dangerous if not treated properly.
- Employees who work with compressed gas cylinders must have specific training.
- Make sure that they are secured properly when in use or in storage.
- Always keep the caps on the cylinders when they are not in use.
- See also Hot Work section.

**J. Confined Space**

- Confined Space Entries. All Confined Spaces are clearly marked on campus. NO ENTRY is allowed in the areas without prior approval by the Project Engineer. NO ONE will be allowed to enter these areas without the proper qualifications, equipment and training as required by the OSHA Standards (29 CFR 1910.147)
- Identify storm sewers, underground electrical vaults, and all other areas that require confined space permits. (e.g., a map showing the locations of all the confined spaces located in the Facilities Service Department).
- All hospital personnel that would require entry into these spaces must abide by the Confined Space Program Procedure.
- It is the sole responsibility of any outside contractor doing work on a VA Medical Center campus to coordinate entry into any of these spaces or any other marked permit required confined spaces with the medical center.
- Anyone entering a permit-required confined space must follow Occupational Safety and Health Administration (OSHA) Regulations, 29 CFR 1910.120.
- **Contractor to submit as a formal submittal the Confined Space Entry program (and CSE Permit if needed).**

**K. Contractor Room/Space Guidelines:**

- Materials will be kept on the job site, in the contractor's room or in storage space provided by the Contractor via trailer located in the VA corporation yard on the North East section of the VA grounds.
- Any shared space within storage room(s) must be accessible to Facilities Service. Do not block access to electric panels or fire protection equipment.
- Hallways are not to be used for storage.
- Contractors will manage the area and assure the site is kept clean and safe. (OSHA standards apply.)
- Any disputes or concerns will be directed to the Facilities Service Manager.

**L. Damage by Contractors**

- Any damage caused by the contractor's employees is to be reported to the COTR or Facilities Service Project Section immediately.

**M. Deliveries**

- All material deliveries at the loading dock must be coordinated with the Receiving Department in advance.

**N. Dress Code**

- All personnel must be appropriately dressed for their work. T-shirts or garments with obscene or suggestive messages are not permitted. Personnel found improperly dressed will be asked to leave the facility. No construction staff is allowed to remove shirts or other clothing. No articles may include offensive statements/graphics.

**O. Dust Barriers and Ventilation Requirements**

- Reference section 01 01 10 IC.
- Dust barriers are needed to protect occupied areas on any portion of the job that has potential to create dust.

**P. Elevator Usage**

- Contractors shall not hold or block from use any public elevators in any building unless authorized by the COTR.
- Contractors shall use "B" bank freight elevators only for the delivery and transportation of materials and demolition materials. Contractors shall not hold or block public elevators from use in any building. .

**Q. EMERGENCIES**

**Fire Plan - There is no difference between a fire drill and an actual fire.**

**General Contractor will ensure that each employee on the worksite knows where the pull stations are in the areas you are working.**

**If you are in the area of the fire:**

- R     Rescue anyone from the area if necessary**
- A     Pull the nearest Pull Station**
- C.     Contain the fire by closing all doors in the area**
- E     Extinguish if possible or Evacuate the area immediately**

**If you are NOT in the area of the fire:**

***Construction Workers* are to cease activities, stay in place, and wait for further instructions or cancellation of the fire drill.**

**DO NOT move through the hospital. DO NOT use the elevators or stairwells.**

- Medical Emergencies - Any contractor who witnesses a medical emergency is to pick up a nearest phone and dial "911" or the operator and describe the condition of the emergency.
- Accidents/Injuries - The contractor must post emergency phone numbers and treatment facilities for any injured employee.
- Worksite injuries must be reported to the VA immediately using the VA accident reporting form (Number 2162). The COTR/Safety/or Security and Police Service will initiate the 2162.
- Patients and visitors may be anxious or irritated because of their situation. If you are faced with any patient or visitor that gets aggressive with you, simply call Ext. 42222 and say "Code Green" and describe the situation. Security will respond immediately.

**R. Equipment Safety**

- Ladders are not to be left unattended in public areas during breaks and lunch hours. Ladders shall be laid down and placed out of traffic areas during these periods.
- No tools, carts, ladders or other equipment are to be left unattended outside a secure area.
- Yellow safety barricades must be used when working in public areas.
- Use of hospital equipment is permitted only if the contractor receives permission from Facilities Service and is properly trained on the USC of the equipment.

**S. Equipment and Supplies**

- Caution must be used with all flammable materials, i.e., adhesives, thinners, varnishes, etc.
- All paints shall be low odor latex paint. The contractor will use odor reducing agents in all paints and solvents. Ventilation will be required if toxic or foul-smelling materials have to be applied.
- Only a one-day supply of paints, oils, and gas cylinders is permitted within the facility, unless it's properly stored in a flammable liquid storage cabinet.

**T. Fire Alarm System**

- Care must be exercised to prevent the accidental tripping of smoke detectors or fire alarms.
- Notify Facilities Service of your activities and location.
- Cover and protect the smoke alarms with paper bags when raising dust or creating smoke in short duration (less than 3 days) ancillary work areas. All other construction areas to follow section 01 01 10 – 1HR. (You must inform Facilities Service Fire Department when bagging smoke alarms.)
- Remove the paper bag upon completion of your work and at the end of each workday.
- If you accidentally trip an alarm, notify Facilities Service (Fire Department) immediately.

**U. Hazardous Materials and Waste**

- A listing of all hazardous materials that will be used on the job and their material safety data sheets (MSDS) will be provided to the VA before the chemicals are used.
- Any excess or used chemicals will be removed from the hospital promptly and properly disposed of by the contractor in accordance with federal, state and local regulations.
- Any hazardous waste generated at the facility must be properly contained and labeled and stored in accordance with local, state, federal and hospital regulations.
- Do not store flammable materials in the facility unless stored in an approved non-combustible storage cabinet or prior approval by the Project Engineer and Safety Office.

**V. Heavy Lifting**

- Hoisting heavy materials/items require prior review by the Project Engineer.

**W. Housekeeping**

- Housekeeping in public areas of the hospital will be maintained at the highest level, even while work is on going.
- In secured areas, housekeeping will be performed as needed, but at a minimum at the end of each job task, and at the end of the workday.
- Debris and waste will not be allowed to accumulate on the work site and disposal must be arranged to keep the amounts low.

**X. Hot Work Permits**

- Hot work permits are required before cutting, soldering, welding operations begin. Before any cutting, soldering or welding is conducted, the contractor or sub-contractor shall obtain permission through a hot work permit. The contractor shall be responsible for obtaining the hot work permits from the Project Engineer.
- Gas and oxygen canisters shall be properly chained and protected and two 10-pound fire extinguishers shall be present.
- A fire watch shall be maintained on the worksite during the hot work operations, and for 30 minutes after the hot work is completed.
- **All burn permits will be completed, signed and scanned within 48 hrs and posted to Buzzsaw.**

**Y. Identification Badges**

- ID Badges are required for all contractor employees working at the V.A.
- Before beginning work on any project, all outside contractors shall check obtain a VA contractor badge from the Police / Security Desk and obtain a contractors I.D. badge. The Contractor will complete the badge application and email it to the COTR, who will forward to the Police. The contractor will stop at the Police Desk 1-2 days later to complete the badge process. VA contractor badges are required for all contractors and consultants who will be onsite for more than (3) total days of the project. Temporary badges will be provided to the GC for contractors onsite for less than (3) days. The outside contractor will supply the following information: location of work site, authorization, duration, and any pertinent information that is required.

**Z. Infection Control**

- Reference section 01 01 10 IC.
- Sensitive/High Risk areas of the hospital require extra precautions to assure patient safety. These areas include but are not limited to the operating rooms, intensive care units, chemotherapy and transplant units. Contact infection control for other areas that may require special precautions.
- When working in patient care areas, please be sure to read and follow the directions listed on any Infection Control Precaution sheets posted outside of a patient's room. Generally this means permission must be obtained from Nursing staff before entry.
- Temporary walls or dust barriers are required to enclose areas under construction.
- Under some circumstances it may be necessary to block return and supply ducts, and install special HEPA exhaust ventilation from the worksite. There should be no re-circulation of air from construction area to rest of hospital.
- Dampened walk-off mats must be located outside of construction area.
- Dust mops/wet mops must be available to remove any dust tracked outside barriers.
- *Standard Precautions* assumes that any person may carry a contagious disease. In order to protect you from these diseases always assume blood, non-intact skin, mucous membranes and all other body fluids and excretions are infectious. Do not touch any such materials but contact a VA employee immediately. Needle container boxes are provided for the disposal of syringes and other sharps used in the medical center. These must be properly disposed of and should be moved only by VA personnel. The VA Medical Center provides written guidelines, education, and personal protective equipment (PPE) for anyone working at VA Medical Center campus to prevent their exposure to bloodborne pathogens.

**AA. Interim Life Safety**

- The hospital will document whether and to what extent Interim Life Safety Measures will be implemented for each project.
- VA Safety will ensure what interim life safety measures (ILSM) are required by the General Contractor to temporarily compensate for the hazards posted by existing Life Safety Code (LSC) deficiencies or construction activities in areas of the Medical Center.
- Implementation of ILSM will be required in or adjacent to all construction areas and throughout buildings with existing LSC deficiencies, ILSM applies to both construction workers and affected hospital employees, and will be implemented upon construction development and continuously enforced through construction completion.
- Almost always, Interim Life Safety Measures will require walkthrough inspections by the job foreman, the project manager, and safety staff at varying intervals.
- Training of workers and any affected staff will always be a significant part of the
- Interim Life Safety Measures procedures.

**BB. Life Safety**

- Any life safety code violations incurred during construction or renovation must be resolved and will result in close coordination with Project Engineer and Safety Section to implement the hospital's Interim Life Safety Measures. These measures are required by JCAHO and NFPA.

**CC. Lock Out/Tag Out**

- Lock Out/Tag Out - No contract worker is allowed to change the status/position of ANY switch, valve or any other energy source without prior approval from the Project Engineer. All Lock out/Tag Out activities need approval prior to being implemented. Any activity requiring a Lockout/Tagout process must comply with the hospital policy.
- Per OSHA Regulation 29 CFR 1910.147, all contractors must comply with OSHA's Safety Lockout/Tagout procedures.
- Coordinate all shut downs with Hospital Personnel.
- Only VA staff is authorized to shut down utilities unless permission is specifically granted.
- **Contractor to submit as a formal submittal the Lock Out / Tag Out Program policies and procedures.**

**DD. Material Safety Data Sheets (MSDS)**

- MSDS must be provided for any hazardous materials that you will be shipping or delivering to the VA Medical Center.
- MSDS are available for all materials used in the medical center. Contact the COTR if you need an MSDS for a VA owned material.
- See also Hazardous Materials and Wastes.

**EE. Noise**

- All core drilling, chipping, and hole drilling shall be done at a time and day determined by occupants on that floor and the floors above and below. The COTR shall coordinate and approve it.
- The patients, visitors, and staff deserve consideration and the quiet enjoyment of their premises. Anyone found being loud, rude, or otherwise annoying to the patients, their guests, or staff will be asked to leave the facility. Use of vulgar language will not be tolerated.
- All work activity within occupied portions of the facility shall be accomplished with minimal disruption to the patients, physicians, visitors, and staff.
- The playing of radios, tapes, and CD players is not permitted in any occupied area. "Walk-man" radios/tapes/CD players are not permitted anywhere.
- The playing of radios, tapes, and CD players is permitted in vacant areas but shall not be heard outside the vacant area.
- In inpatient areas, coordinate construction activities and debris removal with the Nurse Manager or Charge Nurse to minimize disruption.

**FF. OSHA Compliance**

- All contractors are subject to Occupational Safety and Health Administration (OSHA) regulations, these standards and are expected to enforce these standards in the performance of their work, OSHA regulations can be found in chapter 29 of the Code of Federal Regulations (CFR). Failure on the part of any contractor employee to comply with these standards and/or conduct their work in a safe fashion will result in an interruption in the work schedule for which the contractor will be solely responsible, Any contractor found deviating from regulatory standards and/or policy and SOPS will immediately be issued a stop work order and will be responsible for contractual conflicts related to the work stoppage.

**GG. Parking**

- Facilities Service Project Section will designate parking. Contractors may not block fire lanes or other roadways. Violators will be ticketed. During large construction projects, a staging site may be available for parking to contractors.
- All Contractors who need parking must contact Facilities Service for a parking permit.
- If special parking is required, permission shall be granted and coordinated through Facilities Management. Contractors should park in the designated Visitor parking areas. Limited loading and unloading will be permitted at the loading dock area, afterwards contractor employees will be required to park in designated areas.

**II. Patient/Visitor Privacy**

- Patient/Visitor Privacy. No construction staff is allowed to review, acknowledge or move any patient information or records.
- No construction staff may acknowledge any patient or visitor unless spoken to - even if the individual is known on a personal basis.

- Radios are NOT allowed on campus.
- Cell phones are to be used only in designated areas.

#### **JJ. Personal Protective Equipment**

- There are many situations that require specific personal protective equipment for worker safety according to OSHA. It is the responsibility of the individual contractor to know when it is to be used and is responsible to wear them.

#### **KK. Restroom Usage**

- Contractors are to use public restroom unless otherwise instructed to specific restrooms or portable facilities.

#### **LL. Requests for Information**

- All contractor requests for assistance and information shall be addressed to the Facilities Service Project Section or Facilities Service Department.

#### **MM. Safety Regulations**

- Contractors are expected to comply with all Occupational Safety and Health Administration (OSHA) regulations, 29 CFR 1926 and 1910.
- Work that is performed within a corridor or occupied space must be confined by dust barriers or non-combustible partitions.
- Appropriate job signs and barricades are to be placed in the area of construction to prevent occupants from straying into the job site.
- Stairwell doors shall not be propped open or blocked at any time. Equipment cannot be stored in the stairwells.
- All contractors are encouraged to frequently review these guidelines with their employees and/or subcontractors on site (e.g., during weekly Tool Box Safety Meetings).
- All contractors and their subcontractors are responsible for complying with these guidelines and all other conditions, OSHA requirements, and safety regulations.

#### **NN. Scaffolding**

- Prior to setup of all scaffolding, the contractor is to provide a submittal of the scaffolding design through the submittal review process. The scaffolding design is to be stamped by a professional engineer.
- Contractor to provide copies of daily scaffolding inspections with daily logs.

#### **OO. Smoking**

- The Smoking policy of the hospital is no smoking in any building nor within 50 feet of any the building entrance and only in areas designated for smoking. All construction employees must comply with this policy. A copy of the hospital smoking policy will be supplied at the pre-construction conference.
- Violation of the smoking policy will result in the worker being removed from the worksite for the duration of the project.
- The designated smoking areas are: Smoking Shelter located outside the East entrance
- Job site supervisors will enforce this smoking policy.

#### **PP. Stop Work**

- The hospital safety officer and COTR have the Director's permission and authority to stop work whenever conditions pose an imminent threat to life and health or threaten damage to equipment or buildings.

#### **QQ. Subcontractors**

- The general contractor has the responsibility to assure that all the subcontractors and their workers are properly trained and follow these safety guidelines. Assistance from VA staff will be providing on a case by case basis on technical issues.
- The VA reserves the right to approve of any subcontractor being used to complete a project.
- A worker on-site must be designated "in charge" at all times during the project.



**RR. Traffic Control**

- Contractors shall provide trained personnel and/or equipment, signage, barricades etc., to regulate traffic whenever construction operations affect traffic patterns.

**SS. Trenching**

- OSHA regulations must be followed during trenching operations.

**TT. Waste Management**

- Reference section 01 74 19.
- Trash, combustible waste, and excess construction materials must be removed daily to prevent accumulation. Contractors must arrange for the removal of their debris and waste. The building's dumpster shall not be used unless appropriate arrangements are made with Facilities Service.
- The contractor is encouraged to contact utilize our recycling program for the disposal of recyclables.
- The contractor is expected to comply with all environmental regulations.
- Contractor to provide a Fiscal Year breakdown of Waste Management/Recycling Costs on the project.

**UU. Work Site Requirements**

- All contractors are to maintain their work area as clean as possible while working and cleanup thoroughly every day.
- Prior to any utilities or critical systems being interrupted, a two weeks written notification to Facilities Management Project Engineer is mandatory. Only Facilities Management personnel will shut off a utility.
- All contractors are expected to use courtesy. Loud, vulgar, abusive language, sexual harassment and aggressive behavior will not be tolerated.
- All contractors working above the ceiling are required to replace all disturbed ceiling tile by the end of each day.
- Prior to making any penetrations in walls, floors or ceilings, it is the contractor's responsibility to identify rated systems and be verified through review of as built, line diagrams, etc.
- All repaired penetrations on rated systems must be completed using a fire rated material matching the rating of the system and must be inspected by the Project Engineer before ceiling tiles are replaced or area is concealed.
- Temporary construction partitions of non-combustible materials shall be installed as required to provide a smoke tight separation between the areas undergoing renovation and/or construction and adjoining areas that are occupied by the facility.
- Exits for occupied areas of the building including rooms, suites, corridors and floors shall not be blocked by the construction or by construction materials. Exit may be blocked temporarily if it is unavoidable and adequate alternative measures are provided, such as signage, instructions to occupants and approved in advance by the Project Engineer.
- Existing fire protection systems including fire alarm systems, smoke detection systems, and sprinkler systems shall not be altered except as required for the alteration and/or renovation project. Any alteration to the system shall be coordinated with Project Engineer. When sprinkler or fire and smoke detector systems are out of service for more than eight hours general contractor shall be responsible to institute a Fire Watch till systems are operational.
- At the end of each workday, combustible packaging and crating materials for building products and equipment to be installed shall be removed from the occupied building.
- It is the responsibility of each contractor to know exactly where the fire extinguishers and pull stations are in the areas they are working.
- Fire hazard inspections shall be conducted daily by the contractor once construction starts and until the work is turned back over to the facility.
- All temporary electrical wiring and equipment used for construction shall be installed and used in accordance with pertinent provisions of NFPA 70 and National Electrical Code.
- Contractor shall maintain construction site to permit access by the fire department as necessary. Clear building construction areas of obstructions so that all portions are accessible for fire department apparatus and permit emergency egress of patients and other personnel.
- All necessary precautions shall be taken by the contractor to prevent accidental operation of any existing smoke detectors by minimizing the amount of dust generated in the vicinity of any smoke detectors. Any activity that may generate dust or smoke shall be reviewed with the Project Engineer and the infectious control nurse.

#### 1.17 STANDARD REQUIRED FORMS

A. The following forms are required as noted below:

- a. Contractor's Checklist – Completed and signed by General Contractor
- b. Contractor's Impact Statement – Completed and signed by every contractor / subcontractor working on the project.
- c. Daily Log of Construction – Completed daily by General Contractor.
- d. Daily Intermediate Life Safety Measures (ILSM) Inspection Form – Completed daily by General Contractor.

### CONTRACTOR CHECKLIST

This agreement is between \_\_\_\_\_ and \_\_\_\_\_  
 Project Name (ref. #) \_\_\_\_\_  
 Project Start Date \_\_\_\_\_ Ending Date \_\_\_\_\_  
 Work Allowed Between Hours \_\_\_\_\_ AM/PM and \_\_\_\_\_ AM/PM

**Before performing any work on facility premises, outside contractors must read this checklist and comply with all local, state, federal and facility safety policies.**

**1.0 Life Safety** Will the contractor compromise any part during the Life Safety System of this facility (ceiling tiles, penetrations in smoke or fire walls, blocking exits, shutting down fire/smoke detection or fire suppression, etc.) **Y N**  
 Describe. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**1.1** Is Interim Life Safe necessary? **Y N**, if yes, attach and follow interim plan.

**2.0 Services** Will there be any compromises to patient services during the work performed? **Y N**

**2.1** What adjustments need to be implemented to minimize impact to residents, visitors and staff? **Y N** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**3.0 Chemical** Will hazardous chemicals (liquids or gases) be used on-site? **Y N**  
 If yes, what risks do they create for facility staff? Is there any chance of exposure? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**3.1** Are there any facility chemicals being used, stored or handled where the contractor will be working? **Y N**

If yes, has the contractor been informed by issuing MSDS's? **Y N**

**4.0 "Hot Work":** Will the contractor use equipment which will generate open flames, sparks or other ignition sources **Y N**

**4.1** Will flammable chemicals be in the area? **Y N**

**4.2** Will a **Fire Watch** be necessary to be posted during all Hot Work activities? **Y N**

**5.0 Confined Spaces:** Does the work involve entry into a confined space? **Y N**  
 If yes, retain a copy of contractor's Confined Space Entry program (and CSE Permit if needed).

**6.0 Lockout/Tagout:** Does the work involve maintenance on energized equipment or systems? **Y N** (If yes, retain a copy of the contractor's LOCKOUT/TAGOUT program)

**6.1** Is there any impact to residents, visitors, or staff during this procedure? **Y N**  
 If so, describe the impact, ways to minimize the impact and who has been notified. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**7.0 Unsafe Conditions/ Impact to Residents, Visitors and Staff** Are there any unusual or unsafe conditions which need to be addressed and/or communicated to facility staff, visitors or residents? ? **Y N**

Describe. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**8.0 Description of Work Area** The departments/areas you will be working are

List: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**8.1 The potential hazards** to you/your workers in the areas you are working in

List \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**8.2 The specific problems that can be caused** by the wrong actions in the areas you are working

List \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**9.0 Contractor's Employees**

**Safety Officer Contact** \_\_\_\_\_

**Facility Project Manager** \_\_\_\_\_

**First Aid Plan** \_\_\_\_\_

**Fire Plan** \_\_\_\_\_

**Disaster Plan** \_\_\_\_\_

**Restricted Areas** \_\_\_\_\_

**10.0 Restricted Areas**

The following are the areas of the hospital where construction workers are allowed to go in the hospital.

List \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_  
 (Contractor Representative)

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

\_\_\_\_\_  
 (Facility Project Manager)

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

## Contractor's Impact

| System   | Possible Interruption   | Possible Effect to Patients  |
|--|---|--|
| Electrical   | <ul style="list-style-type: none"> <li>- Changing position of switches and breakers</li> <li>- Cutting or splicing into wires</li> <li>- Disconnecting wires or terminals</li> <li>- Disturbing Junction Boxes/Electrical Panels</li> <li>- Core Drilling</li> <li>- Demolition of walls</li> <li>- Excavation</li> </ul> | Electrical Systems provides LIFE SUPPORT (Directly and Indirectly)<br>- Can cause DEATH to critical patients   |
| Water Lines  | <ul style="list-style-type: none"> <li>- Turning valves</li> <li>- Cutting into lines</li> <li>- Demolition &amp; Excavation</li> </ul>   | Dialysis, OR, HVAC, ICU, X Ray, etc<br>Can cause DEATH to critical patients<br>Infection Control issues<br>Major Cleanup issues  |
| Medical Gases:<br>Oxygen<br>Air<br>Vacuum<br>Nitrous Oxide<br>Nitrogen | <ul style="list-style-type: none"> <li>- Cutting or disturbing into lines (labeled, unlabeled)</li> <li>- Changing valve positions</li> <li>- Deactivating alarms</li> <li>- Demolition &amp; Excavation</li> </ul>   | Oxygen, vacuum, air, etc.<br>ICU, OR, Med/Surg.<br>Can cause DEATH to critical patients  |
| HVAC   | <ul style="list-style-type: none"> <li>- Shutting down</li> <li>- Modifying</li> <li>- Changing controls</li> <li>- Cutting into the roof</li> <li>- Producing foul odors near intakes</li> <li>- Cutting into chilled water lines</li> <li>- Obstruct fresh air intake</li> </ul>  | Temperature is critical in OR, ICU, etc.<br>Infection Control issues<br>Major Air Quality Issues   |
| Fire Alarm and Sprinklers  | <ul style="list-style-type: none"> <li>- ANY modifications</li> <li>- covering or removing smoke heads</li> <li>- Demolition &amp; Excavation</li> <li>- Damage or set off sprinkler heads</li> <li>- Duct work modifications</li> </ul>  | <ul style="list-style-type: none"> <li>- Compromising Fire Safety</li> <li>- False Alarms</li> <li>- Floods</li> <li>- Major disruptions and distractions</li> </ul> ALL THE ABOVE CAN RESULT IN DEATH |
| Code Alarms<br>Nurse Call<br>Wander Guards                             | <ul style="list-style-type: none"> <li>- Demolition &amp; Excavation</li> <li>- Unplugging</li> <li>- Changing position of switches/breakers</li> </ul>   | Lack of communicating system can result in patient death or injury   |

IF THERE IS ANY QUESTION REGARDING ANY OF THE INFORMATION ON THIS DOCUMENT, IMMEDIATELY CONTACT FACILITY MANAGEMENT OR SAFETY OFFICE TO RESOLVE ISSUES PRIOR TO WORK COMMENCEMENT.

Contract Company: \_\_\_\_\_

Receipt Acknowledged: \_\_\_\_\_

Signature: \_\_\_\_\_

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

**DAILY LOG OF CONSTRUCTION**

M T W Th F Pkg. No.:

PROJECT:

BUILDING

CONTRACT NO.  
V69DC-

DATE

CONTRACTOR

CONTRACTOR REPRESENTATIVE ON JOB

WEATHER (*Rain, Snow, Cloudy, Windy, etc., OR NA if all indoors*)

TEMP.

High

Low

SITE CONDITIONS (*CLEAN, DEBRIS, DUST, ETC.*)

NO. CONTRACTOR'S MEN BY JOB CATEGORIES

NO. SUBCONTRACTOR'S MEN BY JOB CATEGORIES

EQUIPMENT ON JOB

Brief description of size

No.  
UnitsWorking  
Yes No

MATERIALS DELIVERED

OFFICIAL VISITORS TO JOB SITE

**STATUS OF WORK**

ITEM NO. Brief description of work in progress, questionable performance, unforeseen developments on job etc. Include tests made and samples taken.

STATUS OF INFECTIOUS CONTROL MEASURES (NEGATIVE AIR FLOW, CLEAN WALK OFF MAT, ANTE-ROOM SECURE,...)

NEGATIVE AIR FLOW PRESSURE READING: \_\_\_\_\_

SAFETY COMMENTS

DIFFICULTIES WITH CONTRACTOR OR REPRESENTATIVE

UNFORESEEN DEVELOPMENTS ON JOB CONTINUED (*Describe conditions, action taken; person contacted, recommended actions*)

SIGNATURE

TITLE

PROJECT SUPERINTENDENT

FORM QCA-01A

### Daily Intermediate Life Safety Measures (ILSM) Inspection Form

**INSTRUCTIONS:** This form is to be utilized when significant hazards posed by existing NFPA 101 deficiencies or construction activities are in progress. ILSM must be implemented upon project start and continuously enforced through project completion to provide a level of life safety comparable to that described in Chapter 1-7, 31 and applicable occupancy chapters of the Life Safety Code. WHERE APPLICABLE NOTE EXCEPTIONS ONLY OF AREA IDENTIFIED AS BEING DEFICIENT DURING INSPECTION AND EXPLAIN IN SUFFICIENT DETAIL IN THE COMMENTS SECTION OF THIS FORM. TURN COMPLETED FORMS INTO THE LHS SAFETY OFFICER.

| PROJECT:  | DATE | MON | TUE | WED | THR | FRI | SAT | SUN |
|---|------|-----|-----|-----|-----|-----|-----|-----|
| 1. Are exits readily accessible and provide unobstructed egress?  |      |     |     |     |     |     |     |     |
| 2. If required, due to inaccessibility of existing, have alternate exits been established?  |      |     |     |     |     |     |     |     |
| 3. If alternate exits have been established, are personnel in the area informed and aware of their relocation and existence?  |      |     |     |     |     |     |     |     |
| 4. Are the existing and relocation exits clearly identified and able to be seen in the event of an emergency or fire?   |      |     |     |     |     |     |     |     |
| 5. Are fire evacuation routes posted and do they reflect up-to-date changes and alternate escape routes due to construction deficiencies?   |      |     |     |     |     |     |     |     |
| 6. Are written procedures and guidelines posted in the immediate and adjacent areas for what to do and who to call in the event of fire or emergency?   |      |     |     |     |     |     |     |     |
| 7. Are personnel in the immediate and adjacent areas aware and informed as to the procedures and guidelines to follow in the event of fire or emergency?  |      |     |     |     |     |     |     |     |
| 8. Do fire alarms, detection, and suppression equipment and systems appear to be operational?   |      |     |     |     |     |     |     |     |
| 9. If the fire alarm or suppression systems are impaired or temporarily made nonfunctional has a fire watch, as required or necessary, of the area been established?  |      |     |     |     |     |     |     |     |
| 10. If the existing fire alarm or suppression systems/equipment are impaired, have measures been taken to provide equivalent equipment/systems for adequate protection? Note date of installation for equivalent measures to the right. |      |     |     |     |     |     |     |     |
| 11. If the fire alarm or suppression systems are impaired, are the temporary equipment/systems being inspected and tested at least monthly?   |      |     |     |     |     |     |     |     |
| 12. If temporary fire alarm or suppression systems are installed, are personnel in the area aware and informed on how to operate or utilize in the event of fire or emergency?  |      |     |     |     |     |     |     |     |
| 13. Has the LHS "No Smoking" policy been posted, implemented and enforced in the construction area?   |      |     |     |     |     |     |     |     |
| 14. Are construction/remodel area storage, waste and debris being maintained to minimize potential for fire or safety hazards during daily operations?  |      |     |     |     |     |     |     |     |

## Daily Intermediate Life Safety Measures (ILSM) Inspection Form (Continued)

| PROJECT:   | DATE | MON | TUE | WED | THR | FRI | SAT | SUN |
|--|------|-----|-----|-----|-----|-----|-----|-----|
| 15. Are temporary partitions built to be smoke tight and of noncombustible/fire retardant materials to minimize spread of smoke or fire within the building?   |      |     |     |     |     |     |     |     |
| 16. Do electrical panels, temporary wiring, extension cords, tools and equipment appear to be installed, utilized, and functioning in a safe manner?   |      |     |     |     |     |     |     |     |
| 17. In general, are the exterior construction site, buildings, and ground free of hazard and potential safety violations?  |      |     |     |     |     |     |     |     |
| 18. If there is any gas/arc welding or cutting being performed within the building or on site, have additional fire safety precautions been taken and the necessary equipment provided and utilized? |      |     |     |     |     |     |     |     |
| 19. If there is any gas/arc welding or cutting being performed within the building or on site, has the Plant Operations department been notified?  |      |     |     |     |     |     |     |     |
| 20. If there are hand and safety rails required, are they in place and maintained in good condition?   |      |     |     |     |     |     |     |     |
| 21. Are extension cords that are being used a 3 wire grounded type?  |      |     |     |     |     |     |     |     |
| 22. If there are temporary electrical outlets provided, do they have ground fault protection at the receptacle or at the panel?  |      |     |     |     |     |     |     |     |
| 23. If hazardous chemicals are present and/or being used, are they being limited to the amount needed and used daily?  |      |     |     |     |     |     |     |     |
| 24. Are MSD S sheets readily available for any hazardous chemicals that are present or being used?   |      |     |     |     |     |     |     |     |
| 25. Do ladders and scaffolds appear to be in satisfactory condition and being utilized in a safe manner?   |      |     |     |     |     |     |     |     |
| 26. Is personnel protective equipment, such as safety glasses, hard hats and etc. needed or required and being used?   |      |     |     |     |     |     |     |     |
| 27. If infection control is required, are the appropriate policies and procedures known and being followed?  |      |     |     |     |     |     |     |     |
| 28. If electrical equipment needs to be de-energized, are applicable "Lockout/Tagout" procedures being followed?   |      |     |     |     |     |     |     |     |
| PLACE INITIALS OF PERSON PERFORMING DAILY INSPECTION TO THE RIGHT.   |      |     |     |     |     |     |     |     |

INSPECTION COMMENTS/FINDINGS: \_\_\_\_\_

DATE PROJECT STARTED \_\_\_\_\_ DATE PROJECT COMPLETED \_\_\_\_\_

PROJECT CE #: \_\_\_\_\_ GENERAL CONTRACTOR \_\_\_\_\_

AREAS(S) OF PROJECT/JOB INSPECTED \_\_\_\_\_



**SECTION 01 32 16.15**  
**PROJECT SCHEDULES**

**PART 1- GENERAL**

**1.1 DESCRIPTION:**

- A. The Contractor shall develop a Critical Path Method (CPM) plan and schedule demonstrating fulfillment of the contract requirements (Project Schedule), and shall keep the Project Schedule up-to-date in accordance with the requirements of this section and shall utilize the plan for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers). Conventional Critical Path Method (CPM) technique shall be utilized to satisfy both time and cost applications.

**1.2 CONTRACTOR'S REPRESENTATIVE:**

- A. The Contractor shall designate an authorized representative responsible for the Project Schedule including preparation, review and progress reporting with and to the Contracting Officer's Representative (COTR).
- B. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section.
- C. The Contractor's representative shall have the option of developing the project schedule within their organization or to engage the services of an outside consultant. If an outside scheduling consultant is utilized, Section 1.3 of this specification will apply.

**1.3 CONTRACTOR'S CONSULTANT:**

- A. NOT USED.

**1.4 COMPUTER PRODUCED SCHEDULES**

- A. The contractor shall provide monthly, to the Department of Veterans Affairs (VA), all computer-produced time/cost schedules and reports generated from monthly project updates. This monthly computer service will include an earned value report, current progress to date, and any changes to contract.
- B. The contractor shall be responsible for the correctness and timeliness of the computer-produced reports. The Contractor shall also be responsible for the accurate and timely submittal of the updated project schedule

and all CPM data necessary to produce the computer reports and payment request that is specified.

- C. The VA will report errors in computer-produced reports to the Contractor's representative within ten calendar days from receipt of reports. The Contractor shall reprocess the computer-produced reports and associated diskette(s), when requested by the Contracting Officer's representative, to correct errors which affect the payment and schedule for the project.

#### **1.5 THE COMPLETE PROJECT SCHEDULE SUBMITTAL**

- A. Within 45 calendar days after receipt of Notice to Proceed, the Contractor shall submit for the Contracting Officer's review; three blue line copies of the interim schedule on sheets of paper 765 x 1070 mm (30 x 42 inches) and an electronic file in the previously approved CPM schedule program. The submittal shall also include three copies of a computer-produced activity/event ID schedule showing project duration; phase completion dates; and other data, including event cost. Each activity/event on the computer-produced schedule shall contain as a minimum, but not limited to, activity/event ID, activity/event description, duration, budget amount, early start date, early finish date, late start date, late finish date and total float. Work activity/event relationships shall be restricted to finish-to-start or start-to-start without lead or lag constraints. Activity/event date constraints, not required by the contract, will not be accepted unless submitted to and approved by the Contracting Officer. The contractor shall make a separate written detailed request to the Contracting Officer identifying these date constraints and secure the Contracting Officer's written approval before incorporating them into the network diagram. The Contracting Officer's separate approval of the Project Schedule shall not excuse the contractor of this requirement. Logic events (non-work) will be permitted where necessary to reflect proper logic among work events, but must have zero duration. The complete working schedule shall reflect the Contractor's approach to scheduling the complete project. **The final Project Schedule in its original form shall contain no contract changes or delays which may have been incurred during the final network diagram development period and shall reflect**

the entire contract duration as defined in the bid documents. These changes/delays shall be entered at the first update after the final Project Schedule has been approved. The Contractor should provide their requests for time and supporting time extension analysis for contract time as a result of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION.

- D. Within 30 calendar days after receipt of the complete project interim Project Schedule and the complete final Project Schedule, the Contracting Officer or his representative, will do one or both of the following:
  - 1. Notify the Contractor concerning his actions, opinions, and objections.
  - 2. A meeting with the Contractor at or near the job site for joint review, correction or adjustment of the proposed plan will be scheduled if required. Within 14 calendar days after the joint review, the Contractor shall revise and shall submit three blue line copies of the revised Project Schedule, three copies of the revised computer-produced activity/event ID schedule and a revised electronic file as specified by the Contracting Officer. The revised submission will be reviewed by the Contracting Officer and, if found to be as previously agreed upon, will be approved.
- E. The approved baseline schedule and the computer-produced schedule(s) generated there from shall constitute the approved baseline schedule until subsequently revised in accordance with the requirements of this section.
- F. The Complete Project Schedule shall contain approximately 200 work activities/events, including:
  - a. Barricade setup and relocations
  - b. Switching from one traffic lane to another
  - c. Completion of material courses
  - d. Proof rolling
  - e. Excavation of unsuitable material

#### **1.6 WORK ACTIVITY/EVENT COST DATA**

- A. The Contractor shall cost load all work activities/events except procurement activities. The cumulative amount of all cost loaded work

activities/events (including alternates) shall equal the total contract price. Prorate overhead, profit and general conditions on all work activities/events for the entire project length. The contractor shall generate from this information cash flow curves indicating graphically the total percentage of work activity/event dollar value scheduled to be in place on early finish, late finish. These cash flow curves will be used by the Contracting Officer to assist him in determining approval or disapproval of the cost loading. Negative work activity/event cost data will not be acceptable, except on VA issued contract changes.

#### **1.7 PROJECT SCHEDULE REQUIREMENTS**

- A. Show on the project schedule the sequence of work activities/events required for complete performance of all items of work. The Contractor Shall:
  1. Show activities/events as:
    - a. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
    - b. Contracting Officer's and Architect-Engineer's review and approval of shop drawings, samples, or similar items.
    - c. Interruption of VA Facilities utilities, project phasing and any other specification requirements.
    - d. VA inspection and acceptance activity/event with a minimum duration of five work days at the end of each phase and immediately preceding any VA move activity/event required by the contract phasing for that phase.
  2. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area, floor, or building, to another area, floor, or building, for at least five trades who are performing major work under this contract.
  3. Break up the work into activities/events of a duration no longer than 5 work days each or one reporting period, except as to non-construction activities/events (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities/events for which the COTR may approve the showing of a longer duration. The duration for VA approval of any required

- submittal, shop drawing, or other submittals will not be less than 20 work days.
4. Describe work activities/events clearly, so the work is readily identifiable for assessment of completion. Activities/events labeled "start," "continue," or "completion," are not specific and will not be allowed. Lead and lag time activities will not be acceptable.
  5. The schedule shall be generally numbered in such a way to reflect either discipline, phase or location of the work.
- B. The Contractor shall submit the following supporting data in addition to the project schedule:
1. The appropriate project calendar including working days and holidays.
  2. The planned number of shifts per day.
  3. The number of hours per shift.
- Failure of the Contractor to include this data shall delay the review of the submittal until the Contracting Officer is in receipt of the missing data.
- C. To the extent that the Project Schedule or any revised Project Schedule shows anything not jointly agreed upon, it shall not be deemed to have been approved by the COTR. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase regardless of the COTR's approval of the Project Schedule.

#### **1.8 PAYMENT TO THE CONTRACTOR:**

- A. Monthly, the contractor shall submit the AIA application and certificate for payment documents G702 & G703 reflecting updated schedule activities and cost data in accordance with the provisions of the following Article, PAYMENT AND PROGRESS REPORTING, as the basis upon which progress payments will be made pursuant to Article, FAR 52.232 - 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.236 - 83 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS). The Contractor shall be entitled to a monthly progress payment upon approval of estimates as determined from the currently approved updated project schedule. Monthly payment requests shall include: a listing of all agreed upon project schedule changes and associated data; and an electronic file (s) of the resulting monthly updated schedule.

- B. Approval of the Contractor's monthly Application for Payment shall be contingent, among other factors, on the submittal of a satisfactory monthly update of the project schedule.

#### **1.9 PAYMENT AND PROGRESS REPORTING**

- A. NOT USED.

#### **1.10 RESPONSIBILITY FOR COMPLETION**

- A. If it becomes apparent from the current revised monthly progress schedule that phasing or contract completion dates will not be met, the Contractor shall execute some or all of the following remedial actions:
  - 1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.
  - 2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
  - 3. Reschedule the work in conformance with the specification requirements.
- B. Prior to proceeding with any of the above actions, the Contractor shall notify and obtain approval from the COTR for the proposed schedule changes. If such actions are approved, the representative schedule revisions shall be incorporated by the Contractor into the Project Schedule before the next update, at no additional cost to the Government.

#### **1.11 CHANGES TO THE SCHEDULE**

- A. Within 30 calendar days after VA acceptance and approval of any updated project schedule, the Contractor shall submit a revised electronic file (s) and a list of any activity/event changes including predecessors and successors for any of the following reasons:
  - 1. Delay in completion of any activity/event or group of activities/events, which may be involved with contract changes, strikes, unusual weather, and other delays will not relieve the Contractor from the requirements specified unless the conditions are shown on the CPM as the direct cause for delaying the project beyond the acceptable limits.
  - 2. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary.

3. The schedule does not represent the actual prosecution and progress of the project.
  4. When there is, or has been, a substantial revision to the activity/event costs regardless of the cause for these revisions.
- B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished equipment, vacating of areas by the VA Facility, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, shall be furnished in writing to the Contracting Officer for approval.
- C. Contracting Officer's approval for the revised project schedule and all relevant data is contingent upon compliance with all other paragraphs of this section and any other previous agreements by the Contracting Officer or the VA representative.
- D. The cost of revisions to the project schedule resulting from contract changes will be included in the proposal for changes in work as specified in FAR 52.243 - 4 (Changes) and VAAR 852.236 - 88 (Changes - Supplemental), and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.
- E. The cost of revisions to the Project Schedule not resulting from contract changes is the responsibility of the Contractor.

#### **1.12 ADJUSTMENT OF CONTRACT COMPLETION**

- A. The contract completion time will be adjusted only for causes specified in this contract. Request for an extension of the contract completion date by the Contractor shall be supported with a justification, CPM data and supporting evidence as the COTR may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof based on revised activity/event logic, durations (in work days) and costs is obligatory to any approvals. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in this request. The Contracting Officer's determination as to the total number of days of contract extension will be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information.

- B. Actual delays in activities/events which, according to the computer-produced calendar-dated schedule, do not affect the extended and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Contracting Officer will within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Contracting Officer's decision.
- C. The Contractor shall submit each request for a change in the contract completion date to the Contracting Officer in accordance with the provisions specified under FAR 52.243 - 4 (Changes) and VAAR 852.236 - 88 (Changes - Supplemental). The Contractor shall include, as a part of each change order proposal, a sketch showing all CPM logic revisions, duration (in work days) changes, and cost changes, for work in question and its relationship to other activities on the approved network diagram.
- D. All delays due to non-work activities/events such as RFI's, WEATHER, STRIKES, and similar non-work activities/events shall be analyzed on a month by month basis.

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

- 1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91).
- 1-2. For the purposes of this contract, samples, including laboratory samples to be tested, test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.
- 1-3. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:
  - A. Satisfactory written evidence is presented to, and approved by Contracting Officer, that manufacturer cannot make scheduled delivery of approved item or;
  - B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;
  - C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.
- 1-4. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract - required items. Delays attributable to untimely and rejected submittals, including any laboratory samples to be tested, will not serve as a basis for extending contract time for completion.
- 1-5. Submittals will be reviewed for compliance with contract requirements by Architect-Engineer, and action thereon will be taken by Resident Engineer on behalf of the Contracting Officer.
- 1-6. Upon receipt of submittals, Architect-Engineer will assign a file number thereto. Contractor, in any subsequent correspondence, shall refer to

this file and identification number to expedite replies relative to previously approved or disapproved submittals.

- 1-7. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are furnished pursuant to request therefor by Contracting Officer, adjustment in contract price and time will be made in accordance with Articles titled CHANGES (FAR 52.243-4) and CHANGES - SUPPLEMENT (VAAR 852.236-88) of the GENERAL CONDITIONS.
- 1-8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and Architect-Engineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and Architect- Engineer assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.
- 1-9. Submittals must be electronic (except samples), submitted by Contractor, and uploaded to VAMKE Projects Buzzsaw website. Samples to be shipped prepaid. Contracting Officer assumes no responsibility for checking quantities or exact numbers included in such submittals.
  - A. Submit samples in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.
  - B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail and shall contain the list of items, name of the Medical Center, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.

1. A copy of letter must be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.
  2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Medical Center, name of Contractor, manufacturer, brand, contract number and ASTM or Federal Specification Number as applicable and location(s) on project.
  3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.
- C. In addition to complying with the applicable requirements specified in preceding Article 1.9, samples which are required to have Laboratory Tests (those preceded by symbol "LT" under the separate sections of the specification shall be tested, at the expense of Contractor, in a commercial laboratory approved by Contracting Officer.
1. Laboratory shall furnish Contracting Officer with a certificate stating that it is fully equipped and qualified to perform intended work, is fully acquainted with specification requirements and intended use of materials and is an independent establishment in no way connected with organization of Contractor or with manufacturer or supplier of materials to be tested.
  2. Certificates shall also set forth a list of comparable projects upon which laboratory has performed similar functions during past five years.
  3. Samples and laboratory tests shall be sent directly to approved commercial testing laboratory.
  4. Contractor shall send a copy of transmittal letter to both Resident Engineer and to Architect-Engineer simultaneously with submission of material to a commercial testing laboratory.
  5. Contractor shall forward a copy of transmittal letter to Resident Engineer simultaneously with submission to a commercial testing laboratory.
  6. Laboratory test reports shall be sent directly to Resident Engineer for appropriate action.
  7. Laboratory reports shall list contract specification test requirements and a comparative list of the laboratory test results.

When tests show that the material meets specification requirements, the laboratory shall so certify on test report.

8. Laboratory test reports shall also include a recommendation for approval or disapproval of tested item.
- D. If submittal samples have been disapproved, resubmit new samples as soon as possible after notification of disapproval. Such new samples shall be marked "Resubmitted Sample" in addition to containing other previously specified information required on label and in transmittal letter.
- E. Approved samples will be kept on file by the Resident Engineer at the site until completion of contract, at which time such samples will be delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request should be made prior to completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.
- F. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.
  1. For each drawing required, submit one legible photographic paper or vellum reproducible.
  2. Reproducible shall be full size.
  3. Each drawing shall have marked thereon, proper descriptive title, including Medical Center location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
  4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
  5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.

6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
7. When work is directly related and involves more than one trade, shop drawings shall be submitted to Architect-Engineer under one cover.
- 1-10. Samples, shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to Architect-Engineer:

VAMC Facilities Management

Mail Stop FM-138 c/o Mark Mobley

5000 W National Avenue

Milwaukee, WI 53295

- 1-11. At the time of transmittal to the Architect-Engineer, the Contractor shall also send a copy of the complete submittal directly to the Resident Engineer. Architect-Engineer will forward reviewed submittal to VA for final approval/disapproval. Only submittals approved by VA are considered valid.

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**SECTION 01 42 19**  
**REFERENCE STANDARDS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies the availability and source of references and standards specified in the project manual under paragraphs APPLICABLE PUBLICATIONS and/or shown on the drawings.

**1.2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS FPMR PART 101-29 (FAR 52.211-1) (AUG 1998)**

- A. The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29 and copies of specifications, standards, and commercial item descriptions cited in the solicitation may be obtained for a fee by submitting a request to – GSA Federal Supply Service, Specifications Section, Suite 8100, 470 East L'Enfant Plaza, SW, Washington, DC 20407, Telephone (202) 619-8925, Facsimile (202) 619-8978.
- B. If the General Services Administration, Department of Agriculture, or Department of Veterans Affairs issued this solicitation, a single copy of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained free of charge by submitting a request to the addressee in paragraph (a) of this provision. Additional copies will be issued for a fee.

**1.3 AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-4) (JUN 1988)**

The specifications and standards cited in this solicitation can be examined at the following location:

DEPARTMENT OF VETERANS AFFAIRS

Office of Construction & Facilities Management

Facilities Quality Service (00CFM1A)

811 Vermont Avenue, NW - Room 462

Washington, DC 20420

Telephone Number: (202) 565-5214

Between 9:00 AM - 3:00 PM

**1.4 AVAILABILITY OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF  
FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM  
DESCRIPTIONS (FAR 52.211-3) (JUN 1988)**

The specifications cited in this solicitation may be obtained from the associations or organizations listed below.

AA Aluminum Association Inc.

<http://www.aluminum.org>

AABC Associated Air Balance Council

<http://www.aabchq.com>

AAMA American Architectural Manufacturer's Association

<http://www.aamanet.org>

AAN American Nursery and Landscape Association

<http://www.anla.org>

AASHTO American Association of State Highway and Transportation Officials

<http://www.aashto.org>

AATCC American Association of Textile Chemists and Colorists

<http://www.aatcc.org>

ACGIH American Conference of Governmental Industrial Hygienists

<http://www.acgih.org>

ACI American Concrete Institute

<http://www.aci-int.net>

ACPA American Concrete Pipe Association

<http://www.concrete-pipe.org>

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| ACPPA | American Concrete Pressure Pipe Association<br><a href="http://www.acppa.org">http://www.acppa.org</a>           |
| ADC   | Air Diffusion Council<br><a href="http://flexibleduct.org">http://flexibleduct.org</a>                           |
| AGA   | American Gas Association<br><a href="http://www.aga.org">http://www.aga.org</a>                                  |
| AGC   | Associated General Contractors of America<br><a href="http://www.agc.org">http://www.agc.org</a>                 |
| AGMA  | American Gear Manufacturers Association, Inc.<br><a href="http://www.agma.org">http://www.agma.org</a>           |
| AHAM  | Association of Home Appliance Manufacturers<br><a href="http://www.aham.org">http://www.aham.org</a>             |
| AISC  | American Institute of Steel Construction<br><a href="http://www.aisc.org">http://www.aisc.org</a>                |
| AISI  | American Iron and Steel Institute<br><a href="http://www.steel.org">http://www.steel.org</a>                     |
| AITC  | American Institute of Timber Construction<br><a href="http://www.aitc-glulam.org">http://www.aitc-glulam.org</a> |
| AMCA  | Air Movement and Control Association, Inc.<br><a href="http://www.amca.org">http://www.amca.org</a>              |
| ANLA  | American Nursery & Landscape Association<br><a href="http://www.anla.org">http://www.anla.org</a>                |
| ANSI  | American National Standards Institute, Inc.<br><a href="http://www.ansi.org">http://www.ansi.org</a>             |
| APA   | The Engineered Wood Association<br><a href="http://www.apawood.org">http://www.apawood.org</a>                   |



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| ARI    | Air-Conditioning and Refrigeration Institute<br><a href="http://www.ari.org">http://www.ari.org</a>  |
| ASAE   | American Society of Agricultural Engineers<br><a href="http://www.asae.org">http://www.asae.org</a>  |
| ASCE   | American Society of Civil Engineers<br><a href="http://www.asce.org">http://www.asce.org</a>   |
| ASHRAE | American Society of Heating, Refrigerating, and<br>Air-Conditioning Engineers<br><a href="http://www.ashrae.org">http://www.ashrae.org</a> |
| ASME   | American Society of Mechanical Engineers<br><a href="http://www.asme.org">http://www.asme.org</a>  |
| ASSE   | American Society of Sanitary Engineering<br><a href="http://www.asse-plumbing.org">http://www.asse-plumbing.org</a>                        |
| ASTM   | American Society for Testing and Materials<br><a href="http://www.astm.org">http://www.astm.org</a>  |
| AWI    | Architectural Woodwork Institute<br><a href="http://www.awinet.org">http://www.awinet.org</a>  |
| AWS    | American Welding Society<br><a href="http://www.aws.org">http://www.aws.org</a>  |
| AWWA   | American Water Works Association<br><a href="http://www.awwa.org">http://www.awwa.org</a>  |
| BHMA   | Builders Hardware Manufacturers Association<br><a href="http://www.buildershardware.com">http://www.buildershardware.com</a>               |
| BIA    | Brick Institute of America<br><a href="http://www.bia.org">http://www.bia.org</a>  |
| CAGI   | Compressed Air and Gas Institute<br><a href="http://www.cagi.org">http://www.cagi.org</a>  |

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| CGA   | Compressed Gas Association, Inc.<br><a href="http://www.cganet.com">http://www.cganet.com</a>                       |
| CI    | The Chlorine Institute, Inc.<br><a href="http://www.chlorineinstitute.org">http://www.chlorineinstitute.org</a>     |
| CISCA | Ceilings and Interior Systems Construction Association<br><a href="http://www.cisca.org">http://www.cisca.org</a>   |
| CISPI | Cast Iron Soil Pipe Institute<br><a href="http://www.cispi.org">http://www.cispi.org</a>                            |
| CLFMI | Chain Link Fence Manufacturers Institute<br><a href="http://www.chainlinkinfo.org">http://www.chainlinkinfo.org</a> |
| CPMB  | Concrete Plant Manufacturers Bureau<br><a href="http://www.cpmc.org">http://www.cpmc.org</a>                        |
| CRA   | California Redwood Association<br><a href="http://www.calredwood.org">http://www.calredwood.org</a>                 |
| CRSI  | Concrete Reinforcing Steel Institute<br><a href="http://www.crsi.org">http://www.crsi.org</a>                       |
| CTI   | Cooling Technology Institute<br><a href="http://www.cti.org">http://www.cti.org</a>                                 |
| DHI   | Door and Hardware Institute<br><a href="http://www.dhi.org">http://www.dhi.org</a>                                  |
| EGSA  | Electrical Generating Systems Association<br><a href="http://www.egsa.org">http://www.egsa.org</a>                  |
| EEI   | Edison Electric Institute<br><a href="http://www.eei.org">http://www.eei.org</a>                                    |
| EPA   | Environmental Protection Agency<br><a href="http://www.epa.gov">http://www.epa.gov</a>                              |

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| ETL  | ETL Testing Laboratories, Inc.<br><a href="http://www.etl.com">http://www.etl.com</a>   |
| FAA  | Federal Aviation Administration<br><a href="http://www.faa.gov">http://www.faa.gov</a>  |
| FCC  | Federal Communications Commission<br><a href="http://www.fcc.gov">http://www.fcc.gov</a>  |
| FPS  | The Forest Products Society<br><a href="http://www.forestprod.org">http://www.forestprod.org</a>                                  |
| GANA | Glass Association of North America<br><a href="http://www.cssinfo.com/info/gana.html/">http://www.cssinfo.com/info/gana.html/</a> |
| FM   | Factory Mutual Insurance<br><a href="http://www.fmglobal.com">http://www.fmglobal.com</a>   |
| GA   | Gypsum Association<br><a href="http://www.gypsum.org">http://www.gypsum.org</a>   |
| GSA  | General Services Administration<br><a href="http://www.gsa.gov">http://www.gsa.gov</a>  |
| HI   | Hydraulic Institute<br><a href="http://www.pumps.org">http://www.pumps.org</a>  |
| HPVA | Hardwood Plywood & Veneer Association<br><a href="http://www.hpva.org">http://www.hpva.org</a>                                    |
| ICBO | International Conference of Building Officials<br><a href="http://www.icbo.org">http://www.icbo.org</a>                           |
| ICEA | Insulated Cable Engineers Association Inc.<br><a href="http://www.icea.net">http://www.icea.net</a>                               |
| ICAC | Institute of Clean Air Companies<br><a href="http://www.icac.com">http://www.icac.com</a>   |

|        |  |
|--------|--|
| IEEE   | Institute of Electrical and Electronics Engineers<br><a href="http://www.ieee.org">http://www.ieee.org</a>                                 |
| IMSA   | International Municipal Signal Association<br><a href="http://www.imsasafety.org">http://www.imsasafety.org</a>                            |
| IPCEA  | Insulated Power Cable Engineers Association  |
| NBMA   | Metal Buildings Manufacturers Association<br><a href="http://www.mbma.com">http://www.mbma.com</a>   |
| MSS    | Manufacturers Standardization Society of the Valve and Fittings Industry Inc.<br><a href="http://www.mss-hq.com">http://www.mss-hq.com</a> |
| NAAMM  | National Association of Architectural Metal Manufacturers<br><a href="http://www.naamm.org">http://www.naamm.org</a>                       |
| NAPHCC | Plumbing-Heating-Cooling Contractors Association<br><a href="http://www.phccweb.org.org">http://www.phccweb.org.org</a>                    |
| NBS    | National Bureau of Standards<br>See - NIST   |
| NBBPVI | National Board of Boiler and Pressure Vessel Inspectors<br><a href="http://www.nationboard.org">http://www.nationboard.org</a>             |
| NEC    | National Electric Code<br>See - NFPA National Fire Protection Association  |
| NEMA   | National Electrical Manufacturers Association<br><a href="http://www.nema.org">http://www.nema.org</a>                                     |
| NFPA   | National Fire Protection Association<br><a href="http://www.nfpa.org">http://www.nfpa.org</a>  |
| NHLA   | National Hardwood Lumber Association<br><a href="http://www.natlhardwood.org">http://www.natlhardwood.org</a>                              |
| NIH    | National Institute of Health<br><a href="http://www.nih.gov">http://www.nih.gov</a>  |

NIST National Institute of Standards and Technology  
<http://www.nist.gov>

NLMA Northeastern Lumber Manufacturers Association, Inc.  
<http://www.nelma.org>

NPA National Particleboard Association  
18928 Premiere Court  
Gaithersburg, MD 20879  
(301) 670-0604

NSF National Sanitation Foundation  
<http://www.nsf.org>

NWWDA Window and Door Manufacturers Association  
<http://www.nwwda.org>

OSHA Occupational Safety and Health Administration  
Department of Labor  
<http://www.osha.gov>

PCA Portland Cement Association  
<http://www.portcement.org>

PCI Precast Prestressed Concrete Institute  
<http://www.pci.org>

PPI The Plastic Pipe Institute  
<http://www.plasticpipe.org>

PEI Porcelain Enamel Institute, Inc.  
<http://www.porcelainenamel.com>

PTI Post-Tensioning Institute  
<http://www.post-tensioning.org>

RFCI The Resilient Floor Covering Institute  
<http://www.rfci.com>

|                           |   |
|---------------------------|---|
| RIS                       | Redwood Inspection Service<br>See - CRA   |
| RMA                       | Rubber Manufacturers Association, Inc.<br><a href="http://www.rma.org">http://www.rma.org</a>   |
| SCMA                      | Southern Cypress Manufacturers Association<br><a href="http://www.cypressinfo.org">http://www.cypressinfo.org</a>                       |
| SDI                       | Steel Door Institute<br><a href="http://www.steeldoor.org">http://www.steeldoor.org</a>   |
| IGMA                      | Insulating Glass Manufacturers Alliance<br><a href="http://www.igmaonline.org">http://www.igmaonline.org</a>                            |
| SJI Steel Joist Institute | <a href="http://www.steeljoist.org">http://www.steeljoist.org</a>   |
| SMACNA                    | Sheet Metal and Air-Conditioning Contractors<br>National Association, Inc.<br><a href="http://www.smacna.org">http://www.smacna.org</a> |
| SSPC                      | The Society for Protective Coatings<br><a href="http://www.sspc.org">http://www.sspc.org</a>  |
| STI                       | Steel Tank Institute<br><a href="http://www.steeltank.com">http://www.steeltank.com</a>   |
| SWI                       | Steel Window Institute<br><a href="http://www.steelwindows.com">http://www.steelwindows.com</a>   |
| TCA                       | Tile Council of America, Inc.<br><a href="http://www.tileusa.com">http://www.tileusa.com</a>  |
| TEMA                      | Tubular Exchange Manufacturers Association<br><a href="http://www.tema.org">http://www.tema.org</a>                                     |
| TPI                       | Truss Plate Institute, Inc.<br>583 D'Onofrio Drive; Suite 200   |

Madison, WI 53719

(608) 833-5900

UBC The Uniform Building Code

See ICBO

UL Underwriters' Laboratories Incorporated

<http://www.ul.com>

ULC Underwriters' Laboratories of Canada

<http://www.ulc.ca>

WCLIB West Coast Lumber Inspection Bureau

6980 SW Varns Road, P.O. Box 23145

Portland, OR 97223

(503) 639-0651

WRCLA Western Red Cedar Lumber Association

P.O. Box 120786

New Brighton, MN 55112

(612) 633-4334

WWPA Western Wood Products Association

<http://www.wwpa.org>

- - - E N D - - -

**SECTION 01 45 29**  
**TESTING LABORATORY SERVICES**

**PART 1 - GENERAL****1.1 DESCRIPTION:**

This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained and paid for by Contractor.

B. This work shall be considered incidental to the other defined work and therefore paid intrinsically based on completion thereof.

**1.2 APPLICABLE PUBLICATIONS:**

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

B. American Association of State Highway and Transportation Officials (AASHTO):

T27-06.....Sieve Analysis of Fine and Coarse Aggregates

T96-02 (R2006).....Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

T99-01 (R2004).....The Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop

T104-99 (R2003).....Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate

T180-01 (R2004).....Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop

T191-02(R2006).....Density of Soil In-Place by the Sand-Cone Method

C. American Concrete Institute (ACI):

506.4R-94 (R2004).....Guide for the Evaluation of Shotcrete

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

A325-06.....Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

A370-07.....Definitions for Mechanical Testing of Steel Products



A416/A416M-06.....Steel Strand, Uncoated Seven-Wire for  
Prestressed Concrete

A490-06.....Heat Treated Steel Structural Bolts, 150 ksi  
Minimum Tensile Strength

C31/C31M-06.....Making and Curing Concrete Test Specimens in the  
Field

C33-03.....Concrete Aggregates

C39/C39M-05.....Compressive Strength of Cylindrical Concrete  
Specimens

C109/C109M-05.....Compressive Strength of Hydraulic Cement Mortars

C138 (REV. A)-01.....Unit Weight, Yield, and Air Content  
(Gravimetric) of Concrete

C140-07.....Sampling and Testing Concrete Masonry Units and  
Related Units

C143/C143M-05.....Slump of Hydraulic Cement Concrete

C172-04.....Sampling Freshly Mixed Concrete

C173-07.....Air Content of freshly Mixed Concrete by the  
Volumetric Method

C330-05.....Lightweight Aggregates for Structural Concrete

C567-05.....Density Structural Lightweight Concrete

C780-07.....Pre-construction and Construction Evaluation of  
Mortars for Plain and Reinforced Unit Masonry

C1019-97.....Sampling and Testing Grout

C1064/C1064M-05.....Freshly Mixed Portland Cement Concrete

C1077-06.....Laboratories Testing Concrete and Concrete  
Aggregates for Use in Construction and Criteria  
for Laboratory Evaluation

C1314-07.....Compressive Strength of Masonry Prisms

D698-07.....Laboratory Compaction Characteristics of Soil  
Using Standard Effort

D1143-07.....Piles Under Static Axial Compressive Load

D1188-96(R2002).....Bulk Specific Gravity and Density of Compacted  
Bituminous Mixtures Using Paraffin-Coated  
Specimens

D1556-00.....Density and Unit Weight of Soil in Place by the  
Sand-Cone Method

D1557-02.....Laboratory Compaction Characteristics of Soil  
Using Modified Effort

D2166-2000.....Unconfined Compressive Strength of Cohesive Soil

D2167-94(R2001).....Density and Unit Weight of Soil in Place by the  
Rubber Balloon Method

D2216-05.....Laboratory Determination of Water (Moisture)  
Content of Soil and Rock by Mass

D2922-05.....Density of soil and Soil-Aggregate in Place by  
Nuclear Methods (Shallow Depth)

D2974-07.....Moisture, Ash, and Organic Matter of Peat and  
Other Organic Soils

D3666-(2002).....Minimum Requirements for Agencies Testing and  
Inspection Bituminous Paving Materials

D3740-07.....Minimum Requirements for Agencies Engaged in the  
Testing and Inspecting Road and Paving Material

E94-04.....Radiographic Testing

E164-03.....Ultrasonic Contact Examination of Weldments

E329-07.....Agencies Engaged in Construction Inspection  
and/or Testing

E543-06.....Agencies Performing Non-Destructive Testing

E605-93(R2006).....Thickness and Density of Sprayed Fire-Resistive  
Material (SFRM) Applied to Structural Members

E709-(2001).....Guide for Magnetic Particle Examination

E1155-96(R2001).....Determining FF Floor Flatness and FL Floor  
Levelness Numbers

E. American Welding Society (AWS):

D1.1-04.....Structural Welding Code-Steel

**1.3 REQUIREMENTS:**

- A. Accreditation Requirements: Testing Laboratory must be accredited by one or more of the National Voluntary Laboratory Accreditation Program (NVLAP) programs acceptable in the geographic region for the project. Furnish to the Resident Engineer a copy of the Certificate of Accreditation and Scope of Accreditation. For testing laboratories that have not yet obtained accreditation by a NVLAP program, submit an acknowledgement letter from one of the laboratory accreditation authorities indicating that the application for accreditation has been

received and the accreditation process has started, and submit to the Resident Engineer for approval, certified statements, signed by an official of the testing laboratory attesting that the proposed laboratory, meets or conforms to the ASTM standards listed below as appropriate to the testing field.

1. Laboratories engaged in testing of construction materials shall meet the requirements of ASTM E329.
  2. Laboratories engaged in testing of concrete and concrete aggregates shall meet the requirements of ASTM C1077.
  3. Laboratories engaged in testing of bituminous paving materials shall meet the requirements of ASTM D3666.
  4. Laboratories engaged in testing of soil and rock, as used in engineering design and construction, shall meet the requirements of ASTM D3740.
  5. Laboratories engaged in inspection and testing of steel, stainless steel, and related alloys will be evaluated according to ASTM A880.
  6. Laboratories engaged in non-destructive testing (NDT) shall meet the requirements of ASTM E543.
  7. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA.
- B. Inspection and Testing: Testing laboratory shall inspect materials and workmanship and perform tests described herein and additional tests requested by Resident Engineer. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall direct attention of Resident Engineer to such failure.
- C. Written Reports: Testing laboratory shall submit test reports to Resident Engineer, Contractor, and Local Building Authority within 24 hours after each test is completed unless other arrangements are agreed to in writing by the Resident Engineer. Submit reports of tests that fail to meet construction contract requirements on colored paper.
- D. Verbal Reports: Give verbal notification to Resident Engineer immediately of any irregularity.
- E. Test Standards: The Contractor shall include a lump sum allowance of \$5000 for furnishing published standards (ASTM, AASHTO, ACI, ANSI, AWS, ASHRAE, UL, etc.) referred to or specifically referenced which are

pertinent to any Sections of these specifications. Furnish one set of standards in single copies or bound volumes to the Resident Engineer within 60 days. Photocopies are not acceptable. Billings for the standards furnished shall be at the net cost to Testing Laboratory. A preliminary list of test standards, with the estimated costs, shall be submitted to the Resident Engineer for review before any publications of reference standards are ordered.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION**

**3.1 EARTHWORK:**

A. General: The Testing Laboratory shall provide qualified personnel, materials, equipment, and transportation as required to perform the services identified/required herein, within the agreed to schedule and/or time frame. The work to be performed shall be as identified herein and shall include but not be limited to the following:

1. Observe fill and subgrades during proof-rolling to evaluate suitability of surface material to receive fill or base course. Provide recommendations to the Resident Engineer regarding suitability or unsuitability of areas where proof-rolling was observed. Where unsuitable results are observed, witness excavation of unsuitable material and recommend to Resident Engineer extent of removal and replacement of unsuitable materials and observe proof-rolling of replaced areas until satisfactory results are obtained.2.

Provide full time observation of fill placement and compaction and field density testing in building areas and provide full time observation of fill placement and compaction and field density testing in pavement areas to verify that earthwork compaction obtained is in accordance with contract documents.

3. Provide supervised geotechnical technician to inspect excavation, subsurface preparation, and backfill for structural fill.

B. Testing Compaction:

1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with ASTM D1557.
2. Make field density tests in accordance with the primary testing method following ASTM D2922 wherever possible. Field density tests

utilizing ASTM D1556 shall be utilized on a case by case basis only if there are problems with the validity of the results from the primary method due to specific site field conditions. Should the testing laboratory propose these alternative methods, they should provide satisfactory explanation to the Resident Engineer before the tests are conducted.

- a. Building Slab Subgrade: At least one test of subgrade for every 185 m<sup>2</sup> (2000 square feet) of building slab, but in no case fewer than three tests. In each compacted fill layer, perform one test for every 185 m<sup>2</sup> (2000 square feet) of overlaying building slab, but in no case fewer than three tests.
  - b. Foundation Wall Backfill: One test per 30 m (100 feet) of each layer of compacted fill but in no case fewer than two tests.
  - c. Pavement Subgrade: One test for each 335 m<sup>2</sup> (400 square yards), but in no case fewer than two tests.
  - d. Curb, Gutter, and Sidewalk: One test for each 90 m (300 feet), but in no case fewer than two tests.
  - e. Trenches: One test at maximum 30 m (100 foot) intervals per 1200 mm (4 foot) of vertical lift and at changes in required density, but in no case fewer than two tests.
  - f. Footing Subgrade: At least one test for each layer of soil on which footings will be placed. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested subgrade when acceptable to Resident Engineer. In each compacted fill layer below wall footings, perform one field density test for every 30 m (100 feet) of wall. Verify subgrade is level, all loose or disturbed soils have been removed, and correlate actual soil conditions observed with those indicated by test borings.
- C. Testing for Footing Bearing Capacity: Evaluate if suitable bearing capacity material is encountered in footing subgrade.

**D. TESTING MATERIALS: TEST SUITABILITY OF ON-SITE AND OFF-SITE BORROW AS DIRECTED BY RESIDENT ENGINEER.**

**3.2 FOUNDATION PILES: NOT USED.**

**3.3 FOUNDATION CAISSONS: NOT USED.**

**3.4 LANDSCAPING:**

A. Test topsoil for organic materials, pH, phosphate, potash content, and gradation of particles.

1. Test for organic material by using ASTM D2974.

2. Determine percent of silt, sand, clay, and foreign materials such as rock, roots, and vegetation.

B. Submit laboratory test report of topsoil to Resident Engineer.

**3.5 ASPHALT CONCRETE PAVING:**

A. Aggregate Base Course:

1. Determine maximum density and optimum moisture content for aggregate base material in accordance with ASTM D1557, Method D.

2. Make a minimum of three field density tests on each day's final compaction on each aggregate course in accordance with ASTM D1556.

3. Sample and test aggregate as necessary to insure compliance with specification requirements for gradation, wear, and soundness as specified in the applicable state highway standards and specifications.

B. Asphalt Concrete:

1. Aggregate: Sample and test aggregates in stock pile and hot-bins as necessary to insure compliance with specification requirements for gradation (AASHTO T27), wear (AASHTO T96), and soundness (AASHTO T104).

2. Temperature: Check temperature of each load of asphalt concrete at mixing plant and at site of paving operation.

3. **Density: make a minimum of two field density tests in accordance with ASTM D1188 of asphalt base and surface course for each day's paving operation.**

**3.6 SITE WORK CONCRETE:**

Test site work concrete including materials for concrete as required in Article CONCRETE of this section.

**3.8 CONCRETE:****A. Batch Plant Inspection and Materials Testing:**

1. Perform continuous batch plant inspection until concrete quality is established to satisfaction of Resident Engineer with concurrence of Contracting Officer and perform periodic inspections thereafter as determined by Resident Engineer.
2. Periodically inspect and test batch proportioning equipment for accuracy and report deficiencies to Resident Engineer.
3. Sample and test mix ingredients as necessary to insure compliance with specifications.
4. Sample and test aggregates daily and as necessary for moisture content. Test the dry rodded weight of the coarse aggregate whenever a sieve analysis is made, and when it appears there has been a change in the aggregate.
5. Certify, in duplicate, ingredients and proportions and amounts of ingredients in concrete conform to approved trial mixes. When concrete is batched or mixed off immediate building site, certify (by signing, initialing or stamping thereon) on delivery slips (duplicate) that ingredients in truck-load mixes conform to proportions of aggregate weight, cement factor, and water-cement ratio of approved trial mixes.

**B. Field Inspection and Materials Testing:**

1. Provide a technician at site of placement at all times to perform concrete sampling and testing.
2. Review the delivery tickets of the ready-mix concrete trucks arriving on-site. Notify the Contractor if the concrete cannot be placed within the specified time limits or if the type of concrete delivered is incorrect. Reject any loads that do not comply with the Specification requirements. Rejected loads are to be removed from the site at the Contractor's expense. Any rejected concrete that is placed will be subject to removal.
3. Take concrete samples at point of placement in accordance with ASTM C172. Mold and cure compression test cylinders in accordance with

- ASTM C31. Make at least three cylinders for each 40 m<sup>3</sup> (50 cubic yards) or less of each concrete type, and at least three cylinders for any one day's pour for each concrete type. After good concrete quality control has been established and maintained as determined by Resident Engineer make three cylinders for each 80 m<sup>3</sup> (100 cubic yards) or less of each concrete type, and at least three cylinders from any one day's pour for each concrete type. Label each cylinder with an identification number. Resident Engineer may require additional cylinders to be molded and cured under job conditions.
4. Perform slump tests in accordance with ASTM C143. Test the first truck each day, and every time test cylinders are made. Test pumped concrete at the hopper and at the discharge end of the hose at the beginning of each day's pumping operations to determine change in slump.
  5. Determine the air content of concrete per ASTM C173. For concrete required to be air-entrained, test the first truck and every 20 m<sup>3</sup> (25 cubic yards) thereafter each day. For concrete not required to be air-entrained, test every 80 m<sup>3</sup> (100 cubic yards) at random. For pumped concrete, initially test concrete at both the hopper and the discharge end of the hose to determine change in air content.
  6. If slump or air content fall outside specified limits, make another test immediately from another portion of same batch.
  7. Perform unit weight tests in compliance with ASTM C138 for normal weight concrete and ASTM C567 for lightweight concrete. Test the first truck and each time cylinders are made.
  8. Notify laboratory technician at batch plant of mix irregularities and request materials and proportioning check.
  9. Verify that specified mixing has been accomplished.
  10. Environmental Conditions: Determine the temperature per ASTM C1064 for each truckload of concrete during hot weather and cold weather concreting operations.
    - a. When ambient air temperature falls below 4.4 degrees C (40 degrees F), record maximum and minimum air temperatures in each 24 hour period; record air temperature inside protective enclosure; record minimum temperature of surface of hardened concrete.



- b. When ambient air temperature rises above 29.4 degrees C (85 degrees F), record maximum and minimum air temperature in each 24 hour period; record minimum relative humidity; record maximum wind velocity; record maximum temperature of surface of hardened concrete.
- 11. Inspect the reinforcing steel placement, including bar size, bar spacing, top and bottom concrete cover, proper tie into the chairs, and grade of steel prior to concrete placement. Submit detailed report of observations.
- 12. Observe conveying, placement, and consolidation of concrete for conformance to specifications.
- 13. Observe condition of formed surfaces upon removal of formwork prior to repair of surface defects and observe repair of surface defects.
- 14. Observe curing procedures for conformance with specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.
- 15. Observe preparations for placement of concrete:
  - a. Inspect handling, conveying, and placing equipment, inspect vibrating and compaction equipment.
  - b. Inspect preparation of construction, expansion, and isolation joints.
- 16. Observe preparations for protection from hot weather, cold weather, sun, and rain, and preparations for curing.
- 17. Observe concrete mixing:
  - a. Monitor and record amount of water added at project site.
  - b. Observe minimum and maximum mixing times.
- 18. Measure concrete flatwork for levelness and flatness as follows:
  - a. Perform Floor Tolerance Measurements  $F_F$  and  $F_L$  in accordance with ASTM E1155. Calculate the actual overall F- numbers using the inferior/superior area method.
  - b. Perform all floor tolerance measurements within 48 hours after slab installation and prior to removal of shoring and formwork.
  - c. Provide the Contractor and the Resident Engineer with the results of all profile tests, including a running tabulation of the overall  $F_F$  and  $F_L$  values for all slabs installed to date, within 72 hours after each slab installation.

19. Other inspections:

- a. Grouting under base plates.
- b. Grouting anchor bolts and reinforcing steel in hardened concrete.

C. Laboratory Tests of Field Samples:

1. Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test one cylinder at 7 days and one cylinder at 28 days. Use remaining cylinder as a spare tested as directed by Resident Engineer. Compile laboratory test reports as follows: Compressive strength test shall be result of one cylinder, except when one cylinder shows evidence of improper sampling, molding or testing, in which case it shall be discarded and strength of spare cylinder shall be used.
2. Make weight tests of hardened lightweight structural concrete in accordance with ASTM C567.
3. Furnish certified compression test reports (duplicate) to Resident Engineer. In test report, indicate the following information:
  - a. Cylinder identification number and date cast.
  - b. Specific location at which test samples were taken.
  - c. Type of concrete, slump, and percent air.
  - d. Compressive strength of concrete in MPa (psi).
  - e. Weight of lightweight structural concrete in  $\text{kg/m}^3$  (pounds per cubic foot).
  - f. Weather conditions during placing.
  - g. Temperature of concrete in each test cylinder when test cylinder was molded.
  - h. Maximum and minimum ambient temperature during placing.
  - i. Ambient temperature when concrete sample in test cylinder was taken.
  - j. Date delivered to laboratory and date tested.

**3.9 REINFORCEMENT:**

A. NOT USED.

**3.10 SHOTCRETE: NOT USED.**

3.11 PRESTRESSED CONCRETE: NOT USED.

3.12 ARCHITECTURAL PRECAST CONCRETE: NOT USED.

3.13 MASONRY: NOT USED.

3.15 STEEL DECKING: NOT USED.

3.16 SHEAR CONNECTOR STUDS: NOT USED.

3.17 SPRAYED-ON FIREPROOFING: NOT USED.

3.18 TYPE OF TEST:

Approximate  
Number of  
Tests  
Required

A. Earthwork:

Laboratory Compaction Test, Soils:

(ASTM D1557) 7

B. Landscaping:

Topsoil Test 2

C. Aggregate Base:

Laboratory Compaction, (ASTM D1557) 15

Field Density, (ASTM D1556) 60

D. Asphalt Concrete:

Field Density, (ASTM D1188) 60

Aggregate, Asphalt Concrete

Gradation (AASHTO T27) 5

Wear (AASHTO T96) 5

Soundness (AASHTO T104) 5

## E. Concrete:

|   |         |
|---|---------|
| Making and Curing Concrete Test Cylinders (ASTM C31)          | ___3___ |
| Compressive Strength, Test Cylinders (ASTM C39)               | ___3___ |
| Concrete Slump Test (ASTM C143)                               | ___3___ |
| Concrete Air Content Test (ASTM C173)                         | ___3___ |
| Unit Weight, Lightweight Concrete (ASTM C567)                 | ___0___ |
| Aggregate, Normal Weight:                                     |         |
| Gradation (ASTM C33)  | ___3___ |
| Deleterious Substances (ASTM C33)                             | ___2___ |
| Soundness (ASTM C33)  | ___2___ |
| Abrasion (ASTM C33)   | ___2___ |
| Flatness and Levelness Readings (ASTM E1155) (number of days) | ___7___ |

F. Reinforcing Steel:NOT USED

I. Masonry:NOT USED

J. Structural Steel:NOT USED

K. Sprayed-On Fireproofing:NOT USED

- - - E N D - - -

**SECTION 01 57 19**  
**TEMPORARY ENVIRONMENTAL CONTROLS**

**EP-1. DESCRIPTION**

- A. This section specifies the control of environmental pollution and damage that the Contractor must consider for air, water, and land resources. It includes management of visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.
- B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:
1. Adversely effect human health or welfare,
  2. Unfavorably alter ecological balances of importance to human life,
  3. Effect other species of importance to humankind, or;
  4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.
- C. Definitions of Pollutants:
1. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
  2. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
  3. Sediment: Soil and other debris that has been eroded and transported by runoff water.
  4. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
  5. Surface Discharge: The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "water of the United States" and would require a permit to discharge water from the governing agency.

6. Rubbish: Combustible and noncombustible wastes such as paper, boxes, glass and crockery, metal and lumber scrap, tin cans, and bones.
7. Sanitary Wastes:
  - a. Sewage: Domestic sanitary sewage and human and animal waste.
  - b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

**EP-2. QUALITY CONTROL**

- A. Establish and maintain quality control for the environmental protection of all items set forth herein.
- B. Record on daily reports any problems in complying with laws, regulations, and ordinances. Note any corrective action taken.

**EP-3. REFERENCES**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. U.S. National Archives and Records Administration (NARA):  
33 CFR 328.....Definitions

**EP-4. SUBMITTALS**

- A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
  1. Environmental Protection Plan: After the contract is awarded and prior to the commencement of the work, the Contractor shall meet with the Resident Engineer to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to details of environmental protection. Not more than 20 days after the meeting, the Contractor shall prepare and submit to the Resident Engineer for approval, a written and/or graphic Environmental Protection Plan including, but not limited to, the following:
    - a. Name(s) of person(s) within the Contractor's organization who is (are) responsible for ensuring adherence to the Environmental Protection Plan.
    - b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site.
    - c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.

- d. Description of the Contractor's environmental protection personnel training program.
  - e. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.
  - f. Methods for protection of features to be preserved within authorized work areas including trees, shrubs, vines, grasses, ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, and archeological and cultural resources.
  - g. Procedures to provide the environmental protection that comply with the applicable laws and regulations. Describe the procedures to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.
  - h. Permits, licenses, and the location of the solid waste disposal area.
  - i. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials. Include as part of an Erosion Control Plan approved by the District Office of the U.S. Soil Conservation Service and the Department of Veterans Affairs.
  - j. Environmental Monitoring Plans for the job site including land, water, air, and noise.
  - k. Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas. This plan may be incorporated within the Erosion Control Plan.
- B. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

**EP-5. PROTECTION OF ENVIRONMENTAL RESOURCES**

- A. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract. Confine activities to areas defined by the specifications and drawings.
- B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from the Resident Engineer. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.
  - 1. Work Area Limits: Prior to any construction, mark the areas that require work to be performed under this contract. Mark or fence isolated areas within the general work area that are to be saved and protected. Protect monuments, works of art, and markers before construction operations begin. Convey to all personnel the purpose of marking and protecting all necessary objects.
  - 2. Protection of Landscape: Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using any other approved techniques.
    - a. Box and protect from damage existing trees and shrubs to remain on the construction site.
    - b. Immediately repair all damage to existing trees and shrubs by trimming, cleaning, and painting with antiseptic tree paint.
    - c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
  - 3. Reduction of Exposure of Unprotected Erodible Soils: Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas in reasonably sized increments only as needed to use. Form earthwork to final grade as shown. Immediately protect side slopes and back slopes upon completion of rough grading.
  - 5. Erosion and Sedimentation Control Devices: The erosion and sediment controls selected and maintained by the Contractor shall be such that



- water quality standards are not violated as a result of the Contractor's activities. Construct or install all temporary and permanent erosion and sedimentation control features shown. Maintain temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing, and mulching, until permanent drainage and erosion control facilities are completed and operative.
6. Manage borrow areas on Government property to minimize erosion and to prevent sediment from entering nearby water courses or lakes.
  7. Manage and control spoil areas on Government property to limit spoil to areas shown as within the limits of site work and prevent erosion of soil or sediment from entering nearby water courses or lakes.
  3. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in containers that are emptied on a regular schedule. Transport all solid waste off Government property and dispose of waste in compliance with Federal, State, and local requirements.
  4. Store chemical waste away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.
  5. Handle discarded materials other than those included in the solid waste category as directed by the Resident Engineer.
- C. Protection of Water Resources: Keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and sewer systems. Implement management techniques to control water pollution by the listed construction activities that are included in this contract.
1. Washing and Curing Water: Do not allow wastewater directly derived from construction activities to enter water areas. Collect and place wastewater in retention ponds allowing the suspended material to settle, the pollutants to separate, or the water to evaporate.
  2. Monitor water areas affected by construction.
- D. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict

accordance with the State of Wisconsin, Wisconsin Statutes, Chapter 285 Air Pollution Control and including but not limited to the Wisconsin Administrative Code Environmental Protection Air Pollution Control rules listed below as applicable;

1. NR 400 Air Pollution Control Definitions
2. NR 401 Nonattainment Areas
3. NR 403 Local Air Pollution Control Programs
4. NR 404 Ambient Air Quality
5. NR 405 Prevention of Significant Deterioration
6. NR 406 Construction Permits
7. NR 407 Operation Permits
8. NR 408 Operation Permits for Direct Major Sources in Nonattainment Areas
9. NR 409 Acid Rain Portion of Operation Permits
10. NR 410 Air Permit, Emission and Inspection Fees
11. NR 411 Construction and Operation Permits for Indirect Sources
12. NR 415 Control of Particulate Emissions
13. NR 417 Control of Sulfur Emissions
14. NR 418 Sulfur Emission Control in Specific Geographic Areas
15. NR 419 Control of Organic Compound Emissions
16. NR 420 Control of Organic Compound Emissions from Petroleum and Gasoline Sources
17. NR 421 Control of Organic Compound Emissions from Chemical, Coatings and Rubber Products Manufacturing
18. NR 422 Control of Organic Compound Emissions from Solvent Cleaning Operations
19. NR 423 Control of Organic Compound Emissions from Process Lines
20. NR 426 Control of Carbon Monoxide Emissions
21. NR 427 Control of Lead Emissions
22. NR 428 Control of Nitrogen Compound Emissions
23. NR 429 Malodorous Emissions and Open Burning
24. NR 431 Control of Visible Emissions
25. NR 445 Control of Hazardous Air Pollutants
26. NR 446 Control of Mercury Emissions
27. NR 447 Control of Asbestos Emissions
28. NR 448 Control of Beryllium Emissions

29. NR 449 Control of Vinyl Chloride Emissions

30. NR 488 Refrigerant Recovery from Salvaged or Dismantled  
Refrigeration Equipment

31. NR 489 Conformity of General Federal actions to State  
Implementation Plans

32. NR 494 Enforcement and Penalties for Violation of Air Pollution  
Control Provisions

and Federal emission and performance laws and standards. Maintain ambient air quality standards set by the Environmental Protection Agency, for those construction operations and activities specified.

33. Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials (such as from asphaltic batch plants) at all times, including weekends, holidays, and hours when work is not in progress.

34. Particulates Control: Maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause a hazard or a nuisance. Sprinklering, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators, or other methods are permitted to control particulates in the work area.

35. Hydrocarbons and Carbon Monoxide: Control monoxide emissions from equipment to Federal and State allowable limits.

36. Odors: Control odors of construction activities and prevent obnoxious odors from occurring.

E. Reduction of Noise: Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the Resident Engineer. Maintain noise-produced work at or below the decibel levels and within the time periods specified.

1. Perform construction activities involving repetitive, high-level impact noise only between 8:00 a.m. and 6:00 p.m unless otherwise permitted by local ordinance or the Resident Engineer. Repetitive impact noise on the property shall not exceed the following dB limitations:

| Time Duration of Impact Noise       | Sound Level in dB |
|-------------------------------------|-------------------|
| More than 12 minutes in any hour    | 70                |
| Less than 30 seconds of any hour    | 85                |
| Less than three minutes of any hour | 80                |
| Less than 12 minutes of any hour    | 75                |

2. Provide sound-deadening devices on equipment and take noise abatement measures that are necessary to comply with the requirements of this contract, consisting of, but not limited to, the following:

- a. Maintain maximum permissible construction equipment noise levels at 15 m (50 feet) (dBA):

| EARTHMOVING           |    | MATERIALS HANDLING |    |
|-----------------------|----|--------------------|----|
| FRONT LOADERS         | 75 | CONCRETE MIXERS    | 75 |
| BACKHOES              | 75 | CONCRETE PUMPS     | 75 |
| DOZERS                | 75 | CRANES             | 75 |
| TRACTORS              | 75 | DERRICKS IMPACT    | 75 |
| SCAPERS               | 80 | PILE DRIVERS       | 95 |
| GRADERS               | 75 | JACK HAMMERS       | 75 |
| TRUCKS                | 75 | ROCK DRILLS        | 80 |
| PAVERS,<br>STATIONARY | 80 | PNEUMATIC TOOLS    | 80 |
| PUMPS                 | 75 | BLASTING           | -- |
| GENERATORS            | 75 | SAWS               | 75 |
| COMPRESSORS           | 75 | VIBRATORS          | 75 |

- b. Use shields or other physical barriers to restrict noise transmission.
- c. Provide soundproof housings or enclosures for noise-producing machinery.
- d. Use efficient silencers on equipment air intakes.
- e. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.
- f. Line hoppers and storage bins with sound deadening material.
- g. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.

3. Measure sound level for noise exposure due to the construction at least once every five successive working days while work is being performed above 55 dB(A) noise level. Measure noise exposure at the property line or 15 m (50 feet) from the noise source, whichever is greater. Measure the sound levels on the A weighing network of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face. Submit the recorded information to the Resident Engineer noting any problems and the alternatives for mitigating actions.
- F. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
- G. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor shall leave the construction area in a clean condition satisfactory to the Resident Engineer. Cleaning shall include off the station disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition and new work operations.

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

**1.1 DESCRIPTION**

This specification covers the requirements for management of non-hazardous building construction and demolition waste.

**1.2 RELATED WORK**

- A. Section 02 41 00, DEMOLITION.
- B. Demolition and removal of roads, walks, curbs, and on-grade slabs outside buildings to be demolished: Section 31 20 00, EARTH MOVING.  
Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Reserved items which are to remain the property of the Government: Section 01 00 00, GENERAL REQUIREMENTS.
- E. Asbestos Removal: Section 02 82 13.13, GLOVEBAG ASBESTOS - NOT USED
- F. This work shall be considered incidental to the other defined work and therefore paid intrinsically based on completion thereof.

**1.3 GOVERNMENT POLICY**

- A. Contractor shall practice efficient waste management when sizing, cutting and installing building construction products.
- B. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators and facilitate their recycling.
- C. Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to recycling and any revenues or savings obtained from salvage or recycling shall accrue to the Contractor.
- D. Contractor shall ensure that facilities used for recycling, reuse and disposal shall be permitted for the intended use to the extent required by federal, state and local regulations.

**1.4 SUBMITTALS - PLAN**

- A. Conduct a site assessment to estimate the types of materials that will be generated by demolition at the site. The Whole Building Design Guide website (<http://www.wbdg.org>) has a Construction Waste Management Database that contains information on companies

that haul, collect, and process recyclable debris from construction projects

- B. Develop and implement procedures to reuse and recycle materials to the greatest extent feasible based upon the contract, the construction and demolition debris management plan, the estimated quantities of materials, and the availability of recycling facilities.
- C. Prepare and submit to the Resident Engineer a written demolition debris management plan per Section 01 33 23. The plan shall include, but not be limited to, the following information:
  - 1. Contractor and project identification information;
  - 2. Procedures to be used for debris management;
  - 3. A listing of the materials to be reused, recycled, or taken to the landfill.
  - 4. The names and locations of reuse and recycling facilities or sites.

**1.5 COLLECTION**

- A. Provide necessary containers, bins and storage areas to facilitate effective waste management.
- B. Clearly identify so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.

**1.6 DISPOSAL**

- A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state law.
- B. Building or demolition materials with no practical use or that cannot be recycled shall be disposed of at a landfill or incinerator.

**1.7 REPORT**

With each application for progress payment, the contractor shall submit a summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

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**SECTION 02 41 00**  
**DEMOLITION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

This section specifies demolition and removal of buildings, portions of buildings, utilities, other structures and debris from trash dumps shown.

**1.2 RELATED WORK:**

- A. Demolition and removal of roads, walks, curbs, and on-grade slabs outside buildings to be demolished: Section 31 20 00, EARTH MOVING.
- B. Safety Requirements: GENERAL CONDITIONS, Article, ACCIDENT PREVENTION.
- C. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Reserved items that are to remain the property of the Government: Section 01 00 00, GENERAL REQUIREMENTS.
- E. Asbestos Removal:  
02 82 13.13      Glovebag Asbestos Abatement - NOT USED
- G. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- H. Infectious Control: Section 01 00 00, GENERAL REQUIREMENTS, Article 1.7, INFECTION PREVENTION MEASURES, and 01 01 10 IC Infection Control
- I. This work shall be considered incidental to the other defined work and therefore paid intrinsically based on completion thereof.

**1.3 PROTECTION:**

- A. Perform demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures. Comply with requirements of GENERAL CONDITIONS, Article, ACCIDENT PREVENTION.
- B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations. Comply with requirements of Section 01 00 00, GENERAL REQUIREMENTS,



Article 1.9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS.

- C. Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled.
- D. Provide enclosed dust chutes with control gates from each floor to carry debris to truck beds and govern flow of material into truck. Provide overhead bridges of tight board or prefabricated metal construction at dust chutes to protect persons and property from falling debris.
- E. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.
- F. In addition to previously listed fire and safety rules to be observed in performance of work, include following:
  - 1. No wall or part of wall shall be permitted to fall outwardly from structures.
  - 2. Maintain at least one stairway in each structure in usable condition to highest remaining floor. Keep stairway free of obstructions and debris until that level of structure has been removed.
  - 3. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. Instruct all possible users in use of fire extinguishers.
  - 4. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 4500 mm (15 feet) of fire hydrants.
- G. Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The contractor shall take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Medical Center; any damaged items shall be repaired or replaced as approved by the Resident Engineer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new

supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have Resident Engineer's approval.

- H. The work shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.
- I. The work shall comply with the requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article 1.7 INFECTION PREVENTION MEASURES.

#### **1.4 UTILITY SERVICES:**

- A. Demolish and remove outside utility service lines shown to be removed.
- B. Remove abandoned outside utility lines that would interfere with installation of new utility lines and new construction.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION**

##### **3.1 DEMOLITION:**

- A. Completely demolish and remove ROAD, PAVEMENT, SIDEWALK, CURB & GUTTER, and MANHOLE structures per plans, including all appurtenances related or connected thereto, as noted below:
  - 1. As required for installation of new ROADS, PAVEMENTS, SIDEWALKS, CURB & GUTTER and MANHOLE structures.
  - 2. To full depth within an area defined by hypothetical lines located 1500 mm (5 feet) outside building lines of new structures.
- B. Debris, including brick, concrete, stone, metals and similar materials shall become property of Contractor and shall be disposed of by him daily, off the Medical Center to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in areas specified by the Resident Engineer. Break up concrete slabs below grade that do not require removal from present location into pieces not exceeding 600 mm (24 inches) square to permit drainage. Contractor shall dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations.
- C. NOT USED.
- D. Remove and legally dispose of all materials, other than earth to remain as part of project work, from any trash dumps shown. Materials removed

shall /become property of contractor and shall be disposed of in compliance with applicable federal, state or local permits, rules and regulations. All materials in the indicated trash dump areas, including above surrounding grade and extending to a depth of 1500mm (5feet) below surrounding grade, shall be included as part of the lump sum compensation for the work of this section. Materials that are located beneath the surface of the surrounding ground more than 1500 mm (5 feet), or materials that are discovered to be hazardous, shall be handled as unforeseen. The removal of hazardous material shall be referred to Hazardous Materials specifications.

- E. Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Resident Engineer. When Utility lines are encountered that are not indicated on the drawings, the Resident Engineer shall be notified prior to further work in that area.

### **3.2 CLEAN-UP:**

On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to Resident Engineer. Clean-up shall include off the Medical Center disposal of all items and materials not required to remain property of the Government as well as all debris and rubbish resulting from demolition operations.

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**SECTION 02 42 00**  
**CUTTING, REMOVAL, DEMOLITION, RESTORATION AND PATCHING**

**PART 1 GENERAL**

**1.1 SCOPE:**

- A. Refer to SECTION 01 00 00 for special requirements, protection, constraints, timing of work, scheduling of work, enclosures and similar requirements relating to this section.
- B. This section covers cutting, demolition, removal work, patching, leveling and restoration work as necessary to accomplish and complete all work under this contract, including any relocation or reuse of existing materials, equipment, systems, or other work, as well as the disposition of salvaged materials or debris. This Section applies to all work under this contract, including general construction, mechanical and electrical work.
- C. Contractor and his subcontractors shall examine the spaces/work site themselves to determine the actual conditions and requirements. All removals, demolition, cutting, restoration, new installations and other work shall be accomplished to transform the existing spaces and conditions to the new conditions required under the Contract, as well as to accomplish all tie-in work of new to existing.
- D. It is the intent that, unless specifically shown on the schedules, or is inherent in the work to be accomplished under the general construction work of the area, that each contractor shall perform the demolition, cutting, removals, relocations, patching and leveling, and restoration as will

be required to accomplish the work under their contracts.  
All work indicated on the schedules shall be accomplished by the General Contractor.

- E. Except for general demolition of entire areas, it is the intent that at each area or space the contractor and each subcontractor shall make removals, perform cutting or demolition and accomplish relocations of work normal to his trade (i.e., Mechanical Contractor removes or relocates piping, ductwork and similar. At areas of general demolition of entire area spaces, the Mechanical Contractor shall make removals normal to their trade or may be called for, for reuse or relocation, make any relocations and cutoffs, terminate, or otherwise discontinue services that will be abandoned, shall be removed to the nearest active main. The general contractor shall then demolish or remove all unwanted electrical or mechanical materials, items or elements in the area.
- F. Contractor is required to restore all finishes, surfaces, items, & materials as required to accommodate new finishes. These surfaces are required to be verified prior to bid, as no change to contract will be provided after award if existing finishes are clearly present.

## PART 2: MATERIALS

### 2.1 SALVAGEABLE MATERIALS TO BE STORED BY OWNER (VA):

- A. Not used.

## PART 3 EXECUTION:

3.1 TEMPORARY PROTECTION:

A. Not used.

3.2 MECHANICAL AND ELECTRICAL WORK EXPOSED

A. Not used.

3.3 WORK OF EACH CONTRACT

A. The contractor and each subcontractor shall carefully review the contract documents, including those primarily for other trades, with respect to the coordination of demolition, removal and remodeling work and perform such removals normal to their respective trade as may be shown, noted, or otherwise required. Cutting and patching incidental to demolition, removal and/or remodeling of general construction work shall be construed as the work of the general contractor when shown or indicated on the general construction drawings or schedules or specifically noted or called for on documents primarily for other trades as being accomplished by the general contractor. Other contractors shall perform such other cutting, demolition, patching, replacement and restoration as may be required to accomplish their part of the work.

3.4 PAINTING

A. Not used.

3.5 LEVELING OF FLOORS

A. Not used.

3.6 PATCHING

A. Contractor shall be responsible for all patching required as a result of installation of new work.

B. Contractor shall furnish all related components, trims, etc. required to complete the work.

- - -END- - -

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

**PART 1 - GENERAL****1.1 DESCRIPTION:**

- A. This section specifies cast-in-place structural concrete and materials and mixes for other concrete.
- B. This work shall be defined by Changes to the Contract and is not in the base bid quantities, except where required in order to perform other work such as curb & gutter, stairs, and sidewalk. Concrete work shall be considered incidental to the other defined work and therefore paid intrinsically based on completion thereof.

**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 retained and reimbursed by the Contractor and approved by Resident Engineer.
- B. Testing agency maintaining active participation in Program of Cement and Concrete Reference Laboratory (CCRL) of National Institute of Standards and Technology.
- 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 315 - Details and Detailing of Concrete Reinforcement.
- 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. Samples: NOT USED
- C. Shop Drawings: NOT USED
- D. Mill Test Reports: NOT USED.
- E. Manufacturer's Certificates: NOT USED.
- F. 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
- G. Test Report for Concrete Mix Designs: Trial mixes including water-cementitious 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; Resident Engineer; 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):
  - 117-06.....Tolerances for Concrete Construction and  
Materials
  - 117R-90.....Tolerances for Concrete Construction and  
Materials
  - 211.1-02.....Selecting Proportions for Normal, Heavyweight,  
and Mass Concrete
  - 211.2-04.....Selecting Proportions for Structural Lightweight  
Concrete
  - 214R-02.....Evaluation of Strength Test Results of Concrete
  - 301-05.....Structural Concrete
  - 304R-2000.....Guide for Measuring, Mixing, Transporting, and  
Placing Concrete
  - 305R-06.....Hot Weather Concreting
  - 306R-(R2002).....Cold Weather Concreting

- 308 -(R1997).....Standard Practice for Curing Concrete
- 309R-05.....Guide for Consolidation of Concrete
- 315-99.....Details and Detailing of Concrete Reinforcement
- 318/318R-05.....Building Code Requirements for Reinforced  
Concrete and Commentary
- 347R- 04.....Guide to Formwork for Concrete
- C. American National Standards Institute and American Hardboard Association  
(ANSI/AHA):
- A135.4-95.....Basic Hardboard
- D. American Society for Testing and Materials (ASTM):
- A82-05.....Steel Wire, Plain, for Concrete Reinforcement
- A185-06.....Steel Welded Wire Fabric, Plain, for Concrete  
Reinforcement
- A615/A615M-07.....Deformed and Plain Billet-Steel Bars for  
Concrete Reinforcement
- A653/A653M-07.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-  
Iron Alloy-Coated (Galvannealed) by the Hot-Dip  
Process
- A706/A706M-06.....Low-Alloy Steel Deformed and Plain Bars for  
Concrete Reinforcement
- A767/A767M-05.....Zinc-Coated (Galvanized) Steel Bars for Concrete  
Reinforcement
- A775/A775M-07.....Epoxy-Coated Reinforcing Steel Bars
- A820-06.....Steel Fibers for Fiber-Reinforced Concrete
- A996/A996M-06.....Rail-Steel and Axle-Steel Deformed Bars for  
Concrete Reinforcement
- C31/C31M-06.....Making and Curing Concrete Test Specimens in the  
field
- C33-03.....Concrete Aggregates
- C39/C39M-05.....Compressive Strength of Cylindrical Concrete  
Specimens
- C94/C94M-07.....Ready-Mixed Concrete
- C143/C143M-05.....Slump of Hydraulic Cement Concrete
- C150-07.....Portland Cement
- C171-03.....Sheet Materials for Curing Concrete
- C172-04.....Sampling Freshly Mixed Concrete
- C173-07.....Air Content of Freshly Mixed Concrete by the  
Volumetric Method
- C192/C192M-06.....Making and Curing Concrete Test Specimens in the  
Laboratory
- C231-04.....Air Content of Freshly Mixed Concrete by the  
Pressure Method

- C260-06.....Air-Entraining Admixtures for Concrete
- C309-07.....Liquid Membrane-Forming Compounds for Curing  
Concrete
- C330-05.....Lightweight Aggregates for Structural Concrete
- C494/C494M-05.....Chemical Admixtures for Concrete
- C496-06.....Splitting Tensile Strength of Cylindrical  
Concrete Specimens
- C567-05.....Density of Structural Lightweight Concrete
- C618-05.....Coal Fly Ash and Raw or Calcined Natural  
Pozzolan for Use as a Mineral Admixture in  
Concrete
- C666-03.....Resistance of Concrete to Rapid Freezing and  
Thawing
- C881-02.....Epoxy-Resin-Base Bonding Systems for Concrete
- C1107-07.....Packaged Dry, Hydraulic-Cement Grout (Non-  
shrink)
- D6-95(R2006).....Loss on Heating of Oil and Asphaltic Compounds
- D297-93(R2006).....Rubber Products-Chemical Analysis
- D1751-04.....Preformed Expansion Joint Filler for Concrete  
Paving and Structural Construction (Non-  
extruding and Resilient Bituminous Types)
- D4397-02.....Polyethylene Sheeting for Construction,  
Industrial and Agricultural Applications
- E1155-96(R2001).....Determining FF Floor Flatness and FL Floor  
Levelness Numbers
- E. American Welding Society (AWS):
- D1.4-05.....Structural Welding Code - Reinforcing Steel
- F. Concrete Reinforcing Steel Institute (CRSI):
- Manual of Standard Practice 27<sup>th</sup> Edition
- G. National Cooperative Highway Research Program (NCHRP):
- Report On.....Concrete Sealers for the Protection of Bridge  
Structures
- H. U. S. Department of Commerce Product Standard (PS):
- PS 1.....Construction and Industrial Plywood
- PS 20.....American Softwood Lumber
- I. 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. Corrugated Fiberboard Void Boxes: Double faced, completely impregnated with paraffin and laminated with moisture resistant adhesive, size as shown. Design forms to support not less than 48 kPa (1000 psf) and not lose more than 15 percent of their original strength after being completely submerged in water for 24 hours and then air dried.
- F. Form Lining:
  - 1. Hardboard: ANSI/AHA A135.4, Type 2, Grade 2-M-2, exterior bond not less than 5 mm (3/16 inch) thick.
  - 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.
- 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 alkalis, 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 applied topping, encasement of steel columns, and metal pan stair fill shall be Size 7.

3. 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  $\mu$ m (No. 100) sieve.
- E. Mixing Water: 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. Prohibited Admixtures: Calcium chloride, thiocyanate or admixtures containing more than 0.05 percent chloride ions are not permitted.
  7. Certification: Written conformance to the requirements above and the chloride ion content of the admixture prior to mix design review.
- G. Vapor Barrier: Not Used
- H. Reinforcing Steel: ASTM A615, or ASTM A996, deformed, grade as shown.
- I. Welded Wire Fabric: ASTM A185.
- J. Supports, Spacers, and Chairs: Types which will hold reinforcement in position shown in accordance with requirements of ACI 318 except as specified.
- K. Expansion Joint Filler: ASTM D1751.
- L. Sheet Materials for Curing Concrete: ASTM C171.
- M. Liquid Membrane-forming Compounds for Curing Concrete: ASTM C309, Type I, with fugitive dye. Compound shall be compatible with scheduled surface treatment, such as paint and resilient tile, and shall not discolor concrete surface.
- N. Abrasive Aggregate: Not Used

## O. Non-Shrink Grout:

1. ASTM C1107, pre-mixed, produce a compressive strength of at least 18 MPa at three days and 35 MPa (5000 psi) 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.

## P. Adhesive Binder: ASTM C881.

Volatile Matter (ASTM D6).

1. Porous Backfill: Crushed stone or gravel graded from 25 mm to 20 mm (1 inch to 3/4 inch).
2. Synthetic Fibers: Monofilament or fibrillated polypropylene fibers for secondary reinforcing of concrete members. Use appropriate length and 0.9 kg/m<sup>3</sup> (1.5 lb. per cubic yard). Product shall have a UL rating.
3. 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<sup>3</sup> (30 lb. per cubic yard).
4. Epoxy Joint Filler: Two component, 100 percent solids compound, with a minimum shore D hardness of 50.
5. 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<sup>3</sup> (cubic yard) measured dry rodded and damp loose, specific gravity, fineness modulus, percentage of moisture, air content, water-cementitious ratio, and consistency of each cylinder in terms of slump.
3. Prepare a curve showing relationship between water-cementitious 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. After approval of mixes no substitution in material or change in proportions of approval mixes may be made without additional tests and approval of Resident Engineer 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. Resident Engineer 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.
- C. Cement Factor: Maintain minimum cement factors in Table I regardless of compressive strength developed above minimums. Fly ash may be substituted for up to 20 percent of the minimum cement factor at option of Contractor, except fly ash may not be used in concrete designated as architectural concrete.

**TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE**

| Concrete Strength                   |  | Non-Air-Entrained          | Air-Entrained                                   |                               |
|-------------------------------------|--|----------------------------|---|-------------------------------|
| Min. 28 Day Comp. Str.<br>MPa (psi) | Min. Cement<br>kg/m <sup>3</sup> (lbs/c. yd) | Max. Water<br>Cement Ratio | Min. Cement<br>kg/m <sup>3</sup><br>(lbs/c. yd) | Max. Water<br>Cement<br>Ratio |
| 35 (5000) <sup>1,3</sup>            | 375 (630)                                    | 0.45                       | 385 (650)                                       | 0.40                          |
| 30 (4000) <sup>1,3</sup>            | 325 (550)                                    | 0.55                       | 340 (570)                                       | 0.50                          |
| 25 (3000) <sup>1,3</sup>            | 280 (470)                                    | 0.65                       | 290 (490)                                       | 0.55                          |
| 25 (3000) <sup>1,2</sup>            | 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. Lightweight Structural Concrete. Pump mixes may require higher cement values.
  3. For concrete exposed to high sulfate content soils maximum water cement ratio is 0.44.
- \* Determined by Laboratory in accordance with ACI 211.1 for normal concrete or ACI 211.2 for lightweight structural concrete.



- D. 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 | Lightweight Structural Concrete |
|--|------------------------|---------------------------------|
| Reinforced Footings and Substructure Walls           | 75mm (3 inches)        | 75 mm (3 inches)                |
| Slabs, Beams, Reinforced Walls, and Building Columns | 100 mm (4 inches)      | 100 mm (4 inches)               |

- \* 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.

- E. 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)<br>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                   |   |

- F. 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).
- G. Durability: Use air entrainment for exterior exposed concrete subjected to freezing and thawing and other concrete shown or specified. Air content as shown in Table III or Table IV.
- H. 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, Resident Engineer 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, Resident Engineer 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, Resident Engineer 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 Resident Engineer.

#### **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 Resident Engineer. 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°C (100 degrees Fahrenheit). Minimum delivery temperature as follows:

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

|                              |  |
|------------------------------|--|
| (0 degrees to 30 degrees F.) |  |
|------------------------------|--|

1. Services of aggregate manufacturer's representative shall be furnished during the design of trial mixes and as requested by the Resident Engineer 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 Resident Engineer.

### **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 Resident Engineer approves their reuse.
  2. Provide forms for concrete footings unless Resident Engineer determines forms are not necessary.
  3. Corrugated fiberboard forms: Place forms on a smooth firm bed, set tight, with no buckled cartons to prevent horizontal displacement, and in a dry condition when concrete is placed.
- 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. Locate inserts or hanger wires for furred and suspended ceilings only in bottom of concrete joists, or similar concrete member of overhead concrete joist construction.
  2. 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.
  3. Do not install sleeves in beams, joists or columns except where shown or permitted by Resident Engineer. Install sleeves in beams, joists, or columns that are not shown, but are permitted by the Resident

Engineer, and require no structural changes, at no additional cost to the Government.

4. 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.
5. 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 and ACI 315, 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. 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 315. 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 1/2 mesh panels plus end extension of wires not less than 150 mm (6 inches) in slabs on grade.
  3. Splice column steel at no points other than at footings and floor levels unless otherwise shown.

- 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.
- E. Bending: Bend bars cold, unless otherwise approved. Do not field bend bars partially embedded in concrete, except when approved by Resident Engineer.
- 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:NOT USED**

### **3.4 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 Resident Engineer.
- 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.
- C. Place concrete for columns slowly and in one operation between joints. Install joints in concrete columns at underside of deepest beam or girder framing into column.
- D. Allow 2 hours to elapse after column is cast before concrete of supported beam, girder or slab is placed. Place girders, beams, grade beams, column capitals, brackets, and haunches at the same time as slab unless otherwise shown.
- E. Install polyvinyl chloride or rubber water seals, as shown in accordance with manufacturer's instructions, to form continuous watertight seal.

### **3.5 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 Resident Engineer 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 subject to approval of Resident Engineer.
- 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 it's 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.

### **3.6 HOT WEATHER:**

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 Resident Engineer.



**3.7 COLD WEATHER:**

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, thiocyanates 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 Resident Engineer.

**3.8 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 Resident Engineer.

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<sup>2</sup>/L (400 square feet per gallon) on steel troweled surfaces and 7.5m<sup>2</sup>/L (300 square feet per gallon) on floated or broomed surfaces for the curing/sealing compound.
2. Plastic sheets: Apply as soon as concrete has hardened sufficiently to prevent surface damage. Utilize widest practical width sheet and overlap adjacent sheets 50 mm (2 inches). Tightly seal joints with tape.
3. Paper: Utilize widest practical width paper and overlap adjacent sheets 50 mm (2 inches). Tightly seal joints with sand, wood planks, pressure-sensitive tape, mastic or glue.

**3.9 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.

### **3.10 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.

### **3.11 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 Resident Engineer, 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  $\mu$ m (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.

#### **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 Resident Engineer 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 Resident Engineer 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 Resident Engineer 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:
 

|   |                                     |
|---|-------------------------------------|
| Slab on Grade:  |                                     |
| Specified overall value   | F <sub>F</sub> 25/F <sub>L</sub> 20 |
| Minimum local value   | F <sub>F</sub> 17/F <sub>L</sub> 15 |
| Level suspended slabs (shored until after testing) and topping slabs:   |                                     |
| Specified overall value   | FF 25/FL 20                         |
| Minimum local value   | FF 17/FL 15                         |
| Unshored suspended slabs:   |                                     |
| Specified overall value   | FF 25                               |
| Minimum local value   | FF 17                               |
| 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:
 

|                         |             |
|-------------------------|-------------|
| Slab on grade:          |             |
| Specified overall value | FF 36/FL 20 |

Minimum local value FF 24/FL 15  
 Level suspended slabs (shored until after testing) and topping  
 slabs  
 Specified overall value FF 30/FL 20  
 Minimum local value FF 24/FL 15  
 Unshored suspended slabs:  
 Specified overall value FF 30  
 Minimum local value FF 24  
 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 Resident Engineer, to verify  
 compliance with  $F_F$ ,  $F_L$ , 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  $F_F$  and  $F_L$  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 Resident Engineer, until a slab finish constructed within specified tolerances is accepted.

- - - E N D - - -

**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This section specifies items and assemblies fabricated from structural steel shapes and other materials as shown and specified.
- B. Items specified.
  - 1. Support for Wall and Ceiling Mounted Items - NOT USED
  - 2. Frames
  - 3. Guards - NOT USED
  - 4. Covers and Frames for Pits and Trenches. - NOT USED
  - 5. Gratings
  - 6. Loose Lintels - NOT USED
  - 7. Plate Door Sill - NOT USED
  - 8. Ladders
  - 9. Railings
  - 10. Trap Doors with Ceiling Hatch - NOT USED
- C. This work shall be defined by Changes to the Contract and is not in the base bid quantities.

**1.2 RELATED WORK**

- A. Railings for concrete stairs, per plans and Section 03 30 00 CAST-IN-PLACE CONCRETE.
- B. Colors, finishes, and textures: Section 09 06 00, SCHEDULE FOR FINISHES. - NOT USED
- C. Prime and finish painting: Section 09 91 00, PAINTING. - NOT USED
- D. Stainless steel corner guards: Section 10 26 00, WALL AND DOOR PROTECTION. - NOT USED

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:

|                    |  |
|--------------------|--|
| Grating, each type |  |
| Manhole Covers     |  |
| Railings           |  |
|                    |  |

- C. Shop Drawings:



1. Each item specified, showing complete detail, location in the project, material and size of components, method of joining various components and assemblies, finish, and location, size and type of anchors.
  2. Mark items requiring field assembly for erection identification and furnish erection drawings and instructions.
  3. Provide templates and rough-in measurements as required.
- D. Manufacturer's Certificates:
1. Anodized finish as specified.
  2. Live load designs as specified.
- E. Design Calculations for specified live loads including dead loads. NOT USED.
- F. Furnish setting drawings and instructions for installation of anchors to be preset into concrete and masonry work, and for the positioning of items having anchors to be built into concrete or masonry construction. NOT USED.

#### **1.4 QUALITY ASSURANCE**

- A. Each manufactured product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
- B. Each product type shall be the same and be made by the same manufacturer.
- C. Assembled product to the greatest extent possible before delivery to the site.
- D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Mechanical Engineers (ASME):
  - B18.6.1-97.....Wood Screws
  - B18.2.2-87(R2005).....Square and Hex Nuts
- C. American Society for Testing and Materials (ASTM):
  - A36/A36M-08.....Structural Steel
  - A47-99(R2009).....Malleable Iron Castings
  - A48-03(R2008).....Gray Iron Castings
  - A53-10.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

- A123-09.....Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
- A269-10.....Seamless and Welded Austenitic Stainless Steel Tubing for General Service
- A307-10.....Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
- A312/A312M-09.....Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
- A391/A391M-07.....Grade 80 Alloy Steel Chain
- A653/A653M-10.....Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
- A786/A786M-09.....Rolled Steel Floor Plate
- B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
- B456-03(R2009).....Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
- B632-08.....Aluminum-Alloy Rolled Tread Plate
- C1107-08.....Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- D3656-07.....Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns
- F436-10.....Hardened Steel Washers
- F468-10.....Nonferrous Bolts, Hex Cap Screws, and Studs for General Use
- F593-02(R2008).....Stainless Steel Bolts, Hex Cap Screws, and Studs
- F1667-11.....Driven Fasteners: Nails, Spikes and Staples
- D. American Welding Society (AWS):
- D1.1-10.....Structural Welding Code Steel
- D1.2-08.....Structural Welding Code Aluminum
- D1.3-08.....Structural Welding Code Sheet Steel
- E. National Association of Architectural Metal Manufacturers (NAAMM)
- AMP 521-01.....Pipe Railing Manual
- AMP 500-06.....Metal Finishes Manual
- MBG 531-09.....Metal Bar Grating Manual
- MBG 532-09.....Heavy Duty Metal Bar Grating Manual
- F. Structural Steel Painting Council (SSPC)/Society of Protective Coatings:
- SP 1-04.....No. 1, Solvent Cleaning
- SP 2-04.....No. 2, Hand Tool Cleaning
- SP 3-04.....No. 3, Power Tool Cleaning

## G. Federal Specifications (Fed. Spec):

RR-T-650E.....Treads, Metallic and Nonmetallic, Nonskid

**PART 2 - PRODUCTS****2.1 DESIGN CRITERIA**

- A. In addition to the dead loads, design fabrications to support the following live loads unless otherwise specified.
- B. Ladders and Rungs: 120 kg (250 pounds) at any point.
- C. Railings and Handrails: 900 N (200 pounds) in any direction at any point.
- D. Floor Plates, Gratings, Covers, Trap Doors, Catwalks, and Platforms: 500 kg/m<sup>2</sup> (100 pounds per square foot).
- E. Manhole Covers: 1200 kg/m<sup>2</sup> (250 pounds per square foot).

**2.2 MATERIALS**

- A. Structural Steel: ASTM A36.
- B. Stainless Steel: ASTM A167, Type 302 or 304.
- C. Aluminum, Extruded: ASTM B221, Alloy 6063-T5 unless otherwise specified. For structural shapes use alloy 6061-T6 and alloy 6061-T4511.
- D. Floor Plate:
  - 1. Steel ASTM A786.
  - 2. Aluminum: ASTM B632.
- E. Steel Pipe: ASTM A53.
  - 1. Galvanized for exterior locations.
  - 2. Type S, Grade A unless specified otherwise.
  - 3. NPS (inside diameter) as shown.
- F. Cast-Iron: ASTM A48, Class 30, commercial pattern.
- G. Malleable Iron Castings: A47.
- H. Primer Paint: As specified in Section 09 91 00, PAINTING.
- I. Stainless Steel Tubing: ASTM A269, type 302 or 304.
- J. Modular Channel Units:
  - 1. Factory fabricated, channel shaped, cold formed sheet steel shapes, complete with fittings bolts and nuts required for assembly.
  - 2. Form channel with in turned pyramid shaped clamping ridges on each side.
  - 3. Provide case hardened steel nuts with serrated grooves in the top edges designed to be inserted in the channel at any point and be given a quarter turn so as to engage the channel clamping ridges. Provide each nut with a spring designed to hold the nut in place.
  - 4. Factory finish channels and parts with oven baked primer when exposed to view. Channels fabricated of ASTM A525, G90 galvanized steel may

- have primer omitted in concealed locations. Finish screws and nuts with zinc coating.
- 5. Fabricate snap-in closure plates to fit and close exposed channel openings of not more than 0.3 mm (0.0125 inch) thick stainless steel.
- K. Grout: ASTM C1107, pourable type.
- L. Insect Screening: ASTM D3656.

### **2.3 HARDWARE**

- A. Rough Hardware:
  - 1. Furnish rough hardware with a standard plating, applied after punching, forming and assembly of parts; galvanized, cadmium plated, or zinc-coated by electro-galvanizing process. Galvanized G-90 where specified.
  - 2. Use G90 galvanized coating on ferrous metal for exterior work unless non-ferrous metal or stainless is used.
- B. Fasteners:
  - 1. Bolts with Nuts:
    - a. ASME B18.2.2.
    - b. ASTM A307 for 415 MPa (60,000 psi) tensile strength bolts.
    - c. ASTM F468 for nonferrous bolts.
    - d. ASTM F593 for stainless steel.
  - 2. Screws: ASME B18.6.1.
  - 3. Washers: ASTM F436, type to suit material and anchorage.
  - 4. Nails: ASTM F1667, Type I, style 6 or 14 for finish work.

### **2.4 FABRICATION GENERAL**

- A. Material
  - 1. Use material as specified. Use material of commercial quality and suitable for intended purpose for material that is not named or its standard of quality not specified.
  - 2. Use material free of defects which could affect the appearance or service ability of the finished product.
- B. Size:
  - 1. Size and thickness of members as shown.
  - 2. When size and thickness is not specified or shown for an individual part, use size and thickness not less than that used for the same component on similar standard commercial items or in accordance with established shop methods, or match existing when replacing with new.
- C. Connections
  - 1. Except as otherwise specified, connections may be made by welding, riveting or bolting.
  - 2. Field riveting will not be approved.

3. Design size, number and placement of fasteners, to develop a joint strength of not less than the design value.
4. Holes, for rivets and bolts: Accurately punched or drilled and burrs removed.
5. Size and shape welds to develop the full design strength of the parts connected by welds and to transmit imposed stresses without permanent deformation or failure when subject to service loadings.
6. Use Rivets and bolts of material selected to prevent corrosion (electrolysis) at bimetallic contacts. Plated or coated material will not be approved.
7. Use stainless steel connectors for removable members machine screws or bolts.

D. Fasteners and Anchors

1. Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.
2. Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.
3. Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.
4. Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.
5. Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self drilling and tapping screws or bolts.

E. Workmanship

1. General:
  - a. Fabricate items to design shown.
  - b. Furnish members in longest lengths commercially available within the limits shown and specified.
  - c. Fabricate straight, true, free from warp and twist, and where applicable square and in same plane.
  - d. Provide holes, sinkages and reinforcement shown and required for fasteners and anchorage items.
  - e. Provide openings, cut-outs, and tapped holes for attachment and clearances required for work of other trades.
  - f. Prepare members for the installation and fitting of hardware.

- g. Cut openings in gratings and floor plates for the passage of ducts, sumps, pipes, conduits and similar items. Provide reinforcement to support cut edges.
  - h. Fabricate surfaces and edges free from sharp edges, burrs and projections which may cause injury.
2. Welding:
- a. Weld in accordance with AWS.
  - b. Welds shall show good fusion, be free from cracks and porosity and accomplish secure and rigid joints in proper alignment.
  - c. Where exposed in the finished work, continuous weld for the full length of the members joined and have depressed areas filled and protruding welds finished smooth and flush with adjacent surfaces.
  - d. Finish welded joints to match finish of adjacent surface.
3. Joining:
- a. Miter or butt members at corners.
  - b. Where frames members are butted at corners, cut leg of frame member perpendicular to surface, as required for clearance.
4. Anchors:
- a. Where metal fabrications are shown to be preset in concrete, weld 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 150 mm (6 inches) long with 25 mm (one inch) hooked end, to back of member at 600 mm (2 feet) on center, unless otherwise shown.
  - b. Where metal fabrications are shown to be built into masonry use 32 x 3 mm (1-1/4 by 1/8 inch) steel strap anchors, 250 mm (10 inches) long with 50 mm (2 inch) hooked end, welded to back of member at 600 mm (2 feet) on center, unless otherwise shown.
5. Cutting and Fitting:
- a. Accurately cut, machine and fit joints, corners, copes, and miters.
  - b. Fit removable members to be easily removed.
  - c. Design and construct field connections in the most practical place for appearance and ease of installation.
  - d. Fit pieces together as required.
  - e. Fabricate connections for ease of assembly and disassembly without use of special tools.
  - f. Joints firm when assembled.
  - g. Conceal joining, fitting and welding on exposed work as far as practical.
  - h. Do not show rivets and screws prominently on the exposed face.
  - i. The fit of components and the alignment of holes shall eliminate the need to modify component or to use exceptional force in the

assembly of item and eliminate the need to use other than common tools.

F. Finish:

1. Finish exposed surfaces in accordance with NAAMM Metal Finishes Manual.
2. Aluminum: NAAMM AMP 501.
  - a. Mill finish, AA-M10, as fabricated, use unless specified otherwise.
  - b. Clear anodic coating, AA-C22A41, chemically etched medium matte, with Architectural Class 1, 0.7 mils or thicker.
  - c. Colored anodic coating, AA-C22A42, chemically etched medium matte with Architectural Class 1, 0.7 mils or thicker.
  - d. Painted: AA-C22R10.
3. Steel and Iron: NAAMM AMP 504.
  - a. Zinc coated (Galvanized): ASTM A123, G90 unless noted otherwise.
  - b. Surfaces exposed in the finished work:
    - 1) Finish smooth rough surfaces and remove projections.
    - 2) Fill holes, dents and similar voids and depressions with epoxy type patching compound.
  - c. Shop Prime Painting:
    - 1) Surfaces of Ferrous metal:
      - a) Items not specified to have other coatings.
      - b) Galvanized surfaces specified to have prime paint.
      - c) Remove all loose mill scale, rust, and paint, by hand or power tool cleaning as defined in SSPC-SP2 and SP3.
      - d) Clean of oil, grease, soil and other detrimental matter by use of solvents or cleaning compounds as defined in SSPC-SP1.
      - e) After cleaning and finishing apply one coat of primer as specified in Section 09 91 00, PAINTING.
    - 2) Non ferrous metals: Comply with MAAMM-500 series.
4. Stainless Steel: NAAMM AMP-504 Finish No. 4.
5. Chromium Plating: ASTM B456, satin or bright as specified, Service Condition No. SC2.

G. Protection:

1. Insulate aluminum surfaces that will come in contact with concrete, masonry, plaster, or metals other than stainless steel, zinc or white bronze by giving a coat of heavy-bodied alkali resisting bituminous paint or other approved paint in shop.

2. Spot prime all abraded and damaged areas of zinc coating which expose the bare metal, using zinc rich paint on hot-dip zinc coat items and zinc dust primer on all other zinc coated items.

## 2.5 SUPPORTS

### A. General:

1. Fabricate ASTM A36 structural steel shapes as shown.
2. Use clip angles or make provisions for welding hangers and braces to overhead construction.
3. Field connections may be welded or bolted.

### B. For Ceiling Hung Toilet Stall: - NOT USED

1. Use a continuous steel channel above pilasters with hangers centered over pilasters.
2. Make provision for installation of stud bolts in lower flange of channel.
3. Provide a continuous steel angle at wall and channel braces spaced as shown.
4. Use threaded rod hangers.
5. Provide diagonal angle brace where the suspended ceiling over toilet stalls does not extend to side wall of room.

### C. For Wall Mounted Items: - NOT USED

1. For items supported by metal stud partitions.
2. Steel strip or hat channel minimum of 1.5 mm (0.0598 inch) thick.
3. Steel strip minimum of 150 mm (6 inches) wide, length extending one stud space beyond end of item supported.
4. Steel hat channels where shown. Flange cut and flattened for anchorage to stud.
5. Structural steel tube or channel for grab bar at water closets floor to structure above with clip angles or end plates formed for anchors.
6. Use steel angles for thru wall counters. Drill angle for fasteners at ends and not over 100 mm (4 inches) on center between ends.

### D. For Trapeze Bars: - NOT USED

1. Construct assembly above ceilings as shown and design to support not less than a 340 kg (750 pound) working load at any point.
2. Fabricate trapeze supports as shown, with all exposed members, including screws, nuts, bolts and washers, fabricated of stainless steel.
3. Fabricate concealed components of structural steel shapes unless shown otherwise.
4. Stainless steel ceiling plate drilled for eye bolt.
5. Continuously weld connections where welds shown.



6. Use modular channel where shown with manufacturers bolts and fittings.
  - a. Weld ends of steel angle braces to steel plates and secure to modular channel units as shown. Drill plates for anchor bolts.
  - b. Fabricate eye bolt, special clamp bolt, and plate closure full length of modular channel at ceiling line and secure to modular channel unit with manufacturers standard fittings.
- E. For Intravenous Track and Cubical Curtain Track: - NOT USED
  1. Fabricate assembly of steel angle as shown.
  2. Drill angle bent ends for anchor screws to acoustical suspension system and angle for hanger wires.
  3. Provide pipe sleeve welded to angle.
- F. Supports at Ceiling for Radiographic (x-ray) Equipment: - NOT USED
  1. Fabricate hangers braces, and track of modular channel units assembly as shown.
  2. Fabricate steel plates for anchor to structure above.
  3. Drill bent plates for bolting at mid height at concrete beams.
- G. For Operating Room Light: - NOT USED
  1. Fabricate as shown to suit equipment furnished.
  2. Drill leveling plate for light fixture bolts.
- H. Supports in Orthopedic Brace Shop: - NOT USED
  1. Fabricate from 25 mm (one inch) steel pipe, fasten to steel angles above and extend to a point 150 mm (6 inches) below finished ceiling.
  2. Lower end of the pipe shall have a standard pipe thread.
  3. Provide an escutcheon plate at ceiling.
- I. Supports for Accordion Partition Tracks, Exercise Equipment, and Items at Various Conditions at Suspended Ceilings: - NOT USED
  1. Fabricate of structural steel shapes as shown.
  2. Drill for anchor bolts of suspended item.
- J. Supports for Communion Rail Posts in Chapel: - NOT USED
  1. Fabricate one steel plate support for each post as shown.
  2. Drill for fasteners.

## 2.6 FRAMES

- A. Elevator Entrance Wall Opening. - NOT USED
  1. Fabricate of channel shapes, plates, and angles as shown.
  2. Weld or bolt head to jamb as shown.
  3. Weld clip angles to bottom of frame and top of jamb members extended to structure above for framed construction.
    - a. Provide holes for anchors.
    - b. Weld head to jamb members.
- B. Channel Door Frames: - NOT USED

1. Fabricate of structural steel channels of size shown.
  2. Miter and weld frames at corners.
  3. Where anchored to masonry or embedded in concrete, weld to back of frame at each jamb, 5 mm (3/16 inch) thick by 44 mm (1-3/4 inch) wide steel strap anchors with ends turned 50 mm (2 inches), and of sufficient length to extend at least 300 mm (12 inches) into wall. Space anchors 600 mm (24 inches) above bottom of frame and 600 mm (24 inches) o.c. to top of jamb. Weld clip angles to bottom of jambs and provide holes for expansion bolts.
  4. Where anchored to concrete or masonry in prepared openings, drill holes at jambs for anchoring with expansion bolts. Weld clip angles to bottom of frame and provide holes for expansion bolt anchors as shown. Drill holes starting 600 mm (24 inches) above bottom of frame and 600 mm (24 inches) o.c. to top of jamb and at top of jamb. Provide pipe spacers at holes welded to channel.
  5. Where closure plates are shown, continuously weld them to the channel flanges.
  6. Weld continuous 19 x 19 x 3 mm (3/4 x 3/4 x 1/8 inch) thick steel angles to the interior side of each channel leg at the head and jambs to form a caulking groove.
  7. Prepare frame for installation of hardware specified in Section 08 71 00, DOOR HARDWARE.
    - a. Cut a slot in the lock jamb to receive the lock bolt.
    - b. Where shown use continuous solid steel bar stops at perimeter of frame, weld or secure with countersunk machine screws at not more than 450 mm (18 inches) on center.
- C. Frames for Breech Opening: - NOT USED
1. Fabricate from steel channels, or combination of steel plates and angles to size and contour shown.
  2. Weld strap anchors on back of frame at not over 600 mm (2 feet) on centers for concrete or masonry openings.
- D. Frames for Lead Lined Doors: - NOT USED
1. Obtain accurate dimensions and templates from suppliers of lead lined doors, finish hardware, and hollow steel door frames.
  2. Fabricate as shown for use in connection with lead lined doors.
  3. Deliver assembled frames with removable shipping spreaders at top and bottom.
  4. Extend angles at jambs from floor to structural slab above. At floors of interstitial spaces, terminate jamb sections and provide anchors as shown.

5. Continuously weld plates and reinforcements to frame members and head members of angle frames between jambs.
6. Weld strap anchors, not over 600 mm (24 inches) on centers, to the back of angles for embedment in masonry or concrete unless shown otherwise.
7. Type 15 Door Frames:
  - a. Structural steel angle frames with plate or bar full height to heads. Extend reinforcing at hinge cutouts two inches beyond cutout.
  - b. Fabricate top anchorage to beam side at mid height.
  - c. Weld clip angles to both legs of angle at top and bottom.
  - d. Drill clips and plates, at top and bottom for anchoring jamb angles with two 9 mm (3/8 inch) expansion bolts at each location.
  - e. Cut rabbet for pivot hinges and lock strike.

## 2.7 GUARDS- NOT USED

- A. Wall Corner Guards:
  1. Fabricate from steel angles and furnish with anchors as shown.
  2. Continuously weld anchor to angle.
- B. Edge Guard Angles for Openings in slabs.
  1. Fabricate from steel angles of sizes and with anchorage shown.
  2. Where size of angle is not shown, provide 50 x 50 x 6 mm (2 x 2 x 1/4 inch) steel angle with 32 x 5 mm (1-1/4 x 3/16 inch) strap anchors, welded to back.
  3. Miter or butt angles at corners and weld.
  4. Use one anchor near end and three feet on centers between end anchors.

## 2.8 COVERS AND FRAMES FOR PITS AND TRENCHES

- A. Fabricate covers to support live loads specified.
- B. Galvanized steel members after fabrication in accordance with ASTM A123, G-90 coating.
- C. Steel Covers:
  1. Use 6 mm (1/4 inch) thick floor plate for covers unless otherwise shown. Use gratings where shown as specified in paragraph GRATINGS. Use smooth floor plate unless noted otherwise.
  2. Provide clearance at all sides to permit easy removal of covers.
  3. Make cutouts within 6 mm (1/4 inch) of penetration for passage of pipes and ducts.
  4. Drill covers for flat head countersunk screws.
  5. Make cover sections not to exceed 2.3 m<sup>2</sup> (25 square feet) in area and 90 kg (200 pounds) in weight.

6. Fabricate trench cover sections not be over 900 mm (3 feet) long and if width of trench is more than 900 mm (3 feet) or over, equip one end of each section with an angle or "T" bar stiffener to support adjoining plate.
7. Use two, 13 mm (1/2 inch) diameter steel bar flush drop handles for each cover section.

D. Cast Iron Covers

1. Fabricate covers to support live loads specified.
2. Fabricate from ASTM A48, cast-iron, 13 mm (1/2 inch) minimum metal thickness, cast with stiffeners as required.
3. Fabricate as flush type with frame, reasonably watertight and be equipped with flush type lifting rings. Provide seals where watertight covers noted.
4. Make covers in sections not over 90 kg (200 pounds) except round covers.

E. Steel Frames:

1. Form frame from structural steel angles as shown. Where not shown use 63 x 63 x 6 mm (2-1/2 x 2-1/2 x 1/4 inch) angles for frame openings over 1200 mm (4 feet) long and 50 x 50 x 6 mm (2 ix 2 x 1/4 inch) for frame openings less than 1200 mm (4 feet).
2. Fabricate intermediate supporting members from steel "T's" or angles; located to support cover section edges.
3. Where covers are required use steel border bars at frames so that top of cover will be flush with frame and finish floor.
4. Weld steel strap anchors to frame. Space straps not over 600 mm (24 inches) o.c., not shown otherwise between end anchors. Use 6 x 25 x 200 mm (1/4 x 1 x 8 inches) with 50 mm (2 inch) bent ends strap anchors unless shown otherwise.
5. Drill and tap frames for screw anchors where plate covers occur.

F. Cast Iron Frames:

1. Fabricate from ASTM A48 cast iron to shape shown.
2. Provide anchors for embedding in concrete, spaced near ends and not over 600 mm (24 inches) apart.

## 2.9 GRATINGS

- A. Fabricate gratings to support live loads specified and a concentrated load as specified.
- B. Provide clearance at all sides to permit easy removal of grating.

- C. Make cutouts in gratings with 6 mm (1/4 inch) minimum to 25 mm (one inch) maximum clearance for penetrations or passage of pipes and ducts. Edge band cutouts.
- D. Fabricate in sections not to exceed 2.3 m<sup>2</sup> (25 square feet) in area and 90 kg (200 pounds) in weight.
- E. Fabricate sections of grating with end-banding bars.
- F. Fabricate angle frames and supports, including anchorage as shown.
  - 1. Fabricate intermediate supporting members from "T's" or angles.
  - 2. Locate intermediate supports to support grating section edges.
  - 3. Fabricate frame to finish flush with top of grating.
  - 4. Locate anchors at ends and not over 600 mm (24 inches) o.c.
  - 5. Butt or miter, and weld angle frame at corners.
- G. Steel Bar Gratings:
  - 1. Fabricate grating using steel bars, frames, supports and other members shown in accordance with Metal Bar Grating Manual.
  - 2. Galvanize steel members after fabrication in accordance with ASTM A123, G-90 for exterior gratings, gratings in concrete floors, and interior grating where specified.
  - 3. Interior gratings: Prime paint unless specified galvanized.
- H. Aluminum Bar Gratings: - NOT USED
  - 1. Fabricate grating and frame assembly from aluminum as shown in accordance with Metal Bar Grating Manual.
  - 2. Use 25 x 5 mm (1 x 3/16 inch) minimum size bearing bars.
  - 3. Mill finish unless specified otherwise.
- I. Plank Gratings:
  - 1. Conform to Fed. Spec. RR-G-1602.
  - 2. Manufacturers standard widths, lengths and side channels to meet live load requirements.
  - 3. Galvanize exterior steel gratings ASTM A123, G-90 after fabrication.
  - 4. Fabricate interior steel gratings from galvanized steel sheet, ASTM A525, where bearing on concrete or masonry.
  - 5. Fabricate other interior grating from steel sheet and finish with shop prime paint. Prime painted galvanized sheet may be used.
- J. Cast Iron Gratings:
  - 1. Fabricate gratings to support a live load of 23940 Pa (500 pounds per square foot).
  - 2. Fabricate gratings and frames for gutter type drains from cast-iron conforming to ASTM A48.
  - 3. Fabricate gratings in section not longer than 1200 mm (4 feet) or over 90 kg (200 pounds) and fit so as to be readily removable.

**2.10 LOOSE LINTELS- NOT USED**

- A. Furnish lintels of sizes shown. Where size of lintels is not shown, provide the sizes specified.
- B. Fabricate lintels with not less than 150 mm (6 inch) bearing at each end for nonbearing masonry walls, and 200 mm (8 inch) bearing at each end for bearing walls.
- C. Provide one angle lintel for each 100 mm (4 inches) of masonry thickness as follows except as otherwise specified or shown.
  - 1. Openings 750 mm to 1800 mm (2-1/2 feet to 6 feet) - 100 x 90 x 8 mm (4 x 3-1/2 x 5/16 inch).
  - 2. Openings 1800 mm to 3000 mm (6 feet to 10 feet) - 150 x 90 x 9 mm (6 x 3-1/2 x 3/8 inch).
- D. For 150 mm (6 inch) thick masonry openings 750 mm to 3000 mm (2-1/2 feet to 10 feet) use one angle 150 x 90 x 9 mm (6 x 3-1/2 x 3/8 inch).
- E. Provide bearing plates for lintels where shown.
- F. Weld or bolt upstanding legs of double angle lintels together with 19 mm (3/4 inch bolts) spaced at 300 mm (12 inches) on centers.
- G. Insert spreaders at bolt points to separate the angles for insertion of metal windows, louver, and other anchorage.
- H. Where shown or specified, punch upstanding legs of single lintels to suit size and spacing of anchor bolts.
- I. Elevator Entrance:
  - 1. Fabricate lintel from plate bent to channel shape, and provide a minimum of 100 mm (4 inch) bearing each end.
  - 2. Cut away the front leg of the channel at each end to allow for concealment behind elevator hoistway entrance frame.

**2.11 LADDERS**

- A. Steel Ladders:
  - 1. Fixed-rail type with steel rungs shouldered and headed into and welded to rails.
  - 2. Fabricate angle brackets of 50 mm (2 inch) wide by 13 mm (1/2 inch) thick steel; brackets spaced maximum of 1200 mm (4 feet) apart and of length to hold ladder 175 mm (7 inches) from wall to center of rungs. Provide turned ends or clips for anchoring.
  - 3. Provide holes for anchoring with expansion bolts through turned ends and brackets.
  - 4. Where shown, fabricate side rails curved, twisted and formed into a gooseneck.
  - 5. Galvanize exterior ladders after fabrication, ASTM A123, G-90.
- B. Ladder Rungs:
  - 1. Fabricate from 25 mm (one inch) diameter steel bars.

2. Fabricate so that rungs will extend at least 100 mm (4 inches) into wall with ends turned 50 mm (2 inches), project out from wall 175 mm (7 inches), be 400 mm (16 inches) wide and be designed so that foot cannot slide off end.
3. Galvanized after fabrication, ASTM A123, G-90 rungs for exterior use and for access to pits.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION, GENERAL**

- A. Set work accurately, in alignment and where shown, plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Items set into concrete or masonry.
  1. Provide temporary bracing for such items until concrete or masonry is set.
  2. Place in accordance with setting drawings and instructions.
  3. Build strap anchors, into masonry as work progresses.
- C. Set frames of gratings, covers, corner guards, trap doors and similar items flush with finish floor or wall surface and, where applicable, flush with side of opening.
- D. Field weld in accordance with AWS.
  1. Design and finish as specified for shop welding.
  2. Use continuous weld unless specified otherwise.
- E. Install anchoring devices and fasteners as shown and as necessary for securing metal fabrications to building construction as specified. Power actuated drive pins may be used except for removable items and where members would be deformed or substrate damaged by their use.
- F. Spot prime all abraded and damaged areas of zinc coating as specified and all abraded and damaged areas of shop prime coat with same kind of paint used for shop priming.
- G. Isolate aluminum from dissimilar metals and from contact with concrete and masonry materials as required to prevent electrolysis and corrosion.
- H. Secure escutcheon plate with set screw.

#### **3.2 INSTALLATION OF SUPPORTS**

- A. Anchorage to structure.
  1. Secure angles or channels and clips to overhead structural steel by continuous welding unless bolting is shown.
  2. Secure supports to concrete inserts by bolting or continuous welding as shown.

3. Secure supports to mid height of concrete beams when inserts do not exist with expansion bolts and to slabs, with expansion bolts. unless shown otherwise.
  4. Secure steel plate or hat channels to studs as detailed.
- B. Ceiling Hung Toilet Stalls: - NOT USED
1. Securely anchor hangers of continuous steel channel above pilasters to structure above.
  2. Bolt continuous steel angle at wall to masonry or weld to face of each metal stud.
  3. Secure brace for steel channels over toilet stall pilasters to wall angle supports with bolts at each end spaced as shown.
  4. Install diagonal angle brace where the suspended ceiling over toilet stalls does not extend to side wall of room.
  5. Install stud bolts in lower flange of channel before installing furred down ceiling over toilet stalls.
  6. Install support for ceiling hung pilasters at entrance screen to toilet room similar to toilet stall pilasters.
- C. Supports for Wall Mounted items: - NOT USED
1. Locate center of support at anchorage point of supported item.
  2. Locate support at top and bottom of wall hung cabinets.
  3. Locate support at top of floor cabinets and shelving installed against walls.
  4. Locate supports where required for items shown.
- D. Support at Ceiling for X-ray Tube Stand and Radiographic Equipment: - NOT USED
1. Bolt modular steel channel frames to hangers as shown, anchored to structure above.
  2. Fasten frames with modular channel manufacturers fittings, bolts, and nuts. Space modular channel supports and hangers as shown and as required to suit equipment furnished.
  3. Install closure plates in channels at ceiling where channel opening is visible. Coordinate and cut plates to fit tight against equipment anchors after equipment anchors are installed.
- E. Ceiling Support for Operating Light: - NOT USED
1. Anchor support to structure above as shown.
  2. Set leveling plate as shown level with ceiling.
  3. Secure operating light to leveling plate in accordance with light manufacturer's requirements.
- F. Supports for intravenous (IV) Track and Cubicle Curtain Track: - NOT USED



1. Install assembly where shown after ceiling suspension grid is installed.
  2. Drill angle for bolt and weld nut to angle prior to installation of tile.
- G. Support for cantilever grab bars: - NOT USED
1. Locate channels or tube in partition for support as shown, and extend full height from floor to underside of structural slab above.
  2. Anchor at top and bottom with angle clips bolted to channels or tube with two, 9 mm (3/8 inch) diameter bolts.
  3. Anchor to floors and overhead construction with two 9 mm (3/8 inch) diameter bolts.
  4. Fasten clips to concrete with expansion bolts, and to steel with machine bolts or welds.
- H. Supports for Trapeze Bars: - NOT USED
1. Secure plates to overhead construction with fasteners as shown.
  2. Secure angle brace assembly to overhead construction with fasteners as shown and bolt plate to braces.
  3. Fit modular channel unit flush with finish ceiling, and secure to plate with modular channel unit manufacturer's standard fittings through steel shims or spreaders as shown.
    - a. Install closure plates in channel between eye bolts.
    - b. Install eyebolts in channel.
- I. Support for Communion Rail Posts: - NOT USED
1. Anchor steel plate supports for posts as shown.
  2. Use four bolts per plate, locate two at top and two at bottom.
  3. Use lag bolts.

### **3.3 COVERS AND FRAMES FOR PITS AND TRENCHES**

- A. Set frame and cover flush with finish floor.
- B. Secure plates to frame with flat head countersunk screws.
- C. Set gratings loose in drainage trenches or over pits unless shown anchored.

### **3.4 FRAMES FOR LEAD LINED DOORS- NOT USED**

- A. Secure jamb angle clips and plates, at top and bottom with two, 9 mm (3/8 inch) expansion bolts to concrete.
- B. Secure 150 x 90 x 13 mm (6 x 3-1/2 x 1/2 inch) angle to steel framing for anchorage when expansion bolts to concrete is not possible.
- C. Secure clips by welding to steel.
- D. At interstitial spaces, anchor jamb angles as shown.

### **3.5 DOOR FRAMES- NOT USED**

- A. Secure clip angles at bottom of frames to concrete slab with expansion bolts as shown.

- B. Level and plumb frame; brace in position required.
- C. At masonry, set frames in walls so anchors are built-in as the work progresses unless shown otherwise.
- D. Set frames in formwork for frames cast into concrete.
- E. Where frames are set in prepared openings, bolt to wall with spacers and expansion bolts.

### **3.6 OTHER FRAMES**

- A. Set frame flush with surface unless shown otherwise.
- B. Anchor frames at ends and not over 450 mm (18 inches) on centers unless shown otherwise.
- C. Set in formwork before concrete is placed.

### **3.7 GUARDS- NOT USED**

- A. Steel Angle Corner Guards:
  - 1. Build into masonry as the work progress.
  - 2. Set into formwork before concrete is placed.
  - 3. Set angles flush with edge of opening and finish floor or wall or as shown.
  - 4. At existing construction fasten angle and filler piece to adjoining construction with 16 mm (5/8 inch) diameter by 75 mm (3 inch) long expansion bolts 450 mm (18 inches) on center.
  - 5. Install Guard Angles where shown.
- B. Channel Guard at Top Edge of Concrete Platforms:
  - 1. Install in formwork before concrete is placed.
  - 2. Set channel flush with top of the platform.
- C. Wheel Guards:
  - 1. Set flanges of wheel guard at least 50 mm (2 inches) into pavement.
  - 2. Anchor to walls as shown, expansion bolt if not shown.

### **3.8 GRATINGS**

- A. Set grating flush with finish floor; top of curb, or areaway wall. Set frame so that horizontal leg of angle frame is flush with face of wall except when frame is installed on face of wall.
- B. Set frame in formwork before concrete is placed.
- C. Where grating terminates at a wall bolt frame to concrete or masonry with expansion bolts unless shown otherwise.
- D. Secure removable supporting members in place with stainless steel bolts.
- E. Bolt gratings to supports.

### **3.9 STEEL LINTELS- NOT USED**

- A. Use lintel sizes and combinations shown or specified.
- B. Install lintels with longest leg upstanding, except for openings in 150 mm (6 inch) masonry walls install lintels with longest leg horizontal.

- C. Install lintels to have not less than 150 mm (6 inch) bearing at each end for nonbearing walls, and 200 mm (8 inch) bearing at each end for bearing walls.

### **3.10 LADDERS**

- A. Anchor ladders to walls and floors with expansion bolts through turned lugs or angle clips or brackets.
- B. In elevator pits, set ladders to clear all elevator equipment where shown on the drawings.
  - 1. Where ladders are interrupted by division beams, anchor ladders to beams by welding, and to floors with expansion bolts.
  - 2. Where ladders are adjacent to division beams, anchor ladders to beams with bent steel plates, and to floor with expansion bolts.
- C. Ladder Rungs:
  - 1. Set ladder rungs into formwork before concrete is placed.
  - 2. Set step portion of rung 150 mm (6 inches) from wall.
  - 3. Space rungs approximately 300 mm (12 inches) on centers.
  - 4. Where only one rung is required, locate it 400 mm (16 inches) above the floor.

### **3.11 STEEL COMPONENTS FOR MILLWORK ITEMS**

Coordinate and deliver to Millwork fabricator for assembly where millwork items are secured to metal fabrications.

### **3.12 CLEAN AND ADJUSTING**

- A. Adjust movable parts including hardware to operate as designed without binding or deformation of the members centered in the opening or frame and, where applicable, contact surfaces fit tight and even without forcing or warping the components.
- B. Clean after installation exposed prefinished and plated items and items fabricated from stainless steel, aluminum and copper alloys, as recommended by the metal manufacture and protected from damage until completion of the project.

- - - E N D - - -

**SECTION 26 05 11**  
**REQUIREMENTS FOR ELECTRICAL INSTALLATIONS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Work described in this section is for incidental and repair work only, not quantities prescribed in contract specifications and drawings. This section hereby establishes the standard of care for such work, if it becomes necessary. This section applies to all sections of Division 26.
- B. Furnish and install electrical wiring, systems, equipment and accessories in accordance with the specifications and drawings. Capacities and ratings of motors, transformers, cable, switchboards, switchgear, panelboards, motor control centers, generators, automatic transfer switches, and other items and arrangements for the specified items are shown on drawings.
- C. Electrical service entrance equipment and arrangements for temporary and permanent connections to the utility's system shall conform to the utility's requirements. Coordinate fuses, circuit breakers and relays with the utility's system, and obtain utility approval for sizes and settings of these devices.
- D. Wiring ampacities specified or shown on the drawings are based on copper conductors, with the conduit and raceways accordingly sized. Aluminum conductors are prohibited.

**1.2 MINIMUM REQUIREMENTS**

- A. References to the International Building Code (IBC), National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL) and National Fire Protection Association (NFPA) are minimum installation requirement standards.
- B. Drawings and other specification sections shall govern in those instances where requirements are greater than those specified in the above standards.

**1.3 TEST STANDARDS**

- A. All materials and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet Underwriters Laboratories, Inc., standards where test standards have been established. Equipment and materials which are not covered by UL Standards will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected

or tested in accordance with national industrial standards, such as NEMA, or ANSI. Evidence of compliance shall include certified test reports and definitive shop drawings.

B. Definitions:

1. Listed; Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production or listed equipment or materials or periodic evaluation of services, and whose listing states that the equipment, material, or services either meets appropriate designated standards or has been tested and found suitable for a specified purpose.
2. Labeled; Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.
3. Certified; equipment or product which:
  - a. Has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards or to be safe for use in a specified manner.
  - b. Production of equipment or product is periodically inspected by a nationally recognized testing laboratory.
  - c. Bears a label, tag, or other record of certification.
4. Nationally recognized testing laboratory; laboratory which is approved, in accordance with OSHA regulations, by the Secretary of Labor.

**1.4 QUALIFICATIONS (PRODUCTS AND SERVICES)**

- A. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.
- B. Product Qualification:
  1. Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.
  2. The Government reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval.

- C. Service Qualifications: There shall be a permanent service organization maintained or trained by the manufacturer which will render satisfactory service to this installation within eight hours of receipt of notification that service is needed. Submit name and address of service organizations.

#### **1.5 APPLICABLE PUBLICATIONS**

Applicable publications listed in all Sections of Division are the latest issue, unless otherwise noted.

#### **1.6 MANUFACTURED PRODUCTS**

- A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts shall be available.
- B. When more than one unit of the same class or type of equipment is required, such units shall be the product of a single manufacturer.
- C. Equipment Assemblies and Components:
1. Components of an assembled unit need not be products of the same manufacturer.
  2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
  3. Components shall be compatible with each other and with the total assembly for the intended service.
  4. Constituent parts which are similar shall be the product of a single manufacturer.
- D. Factory wiring shall be identified on the equipment being furnished and on all wiring diagrams.
- E. When Factory Testing Is Specified:
1. The Government shall have the option of witnessing factory tests. The contractor shall notify the VA through the Resident Engineer a minimum of 15 working days prior to the manufacturers making the factory tests.
  2. Four copies of certified test reports containing all test data shall be furnished to the Resident Engineer prior to final inspection and not more than 90 days after completion of the tests.
  3. When equipment fails to meet factory test and re-inspection is required, the contractor shall be liable for all additional expenses, including expenses of the Government.

#### **1.7 EQUIPMENT REQUIREMENTS**

Where variations from the contract requirements are requested in accordance with GENERAL CONDITIONS and Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, the connecting work and related components

shall include, but not be limited to additions or changes to branch circuits, circuit protective devices, conduits, wire, feeders, controls, panels and installation methods.

#### **1.8 EQUIPMENT PROTECTION**

- A. Equipment and materials shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.
  - 1. Store equipment indoors in clean dry space with uniform temperature to prevent condensation. Equipment shall include but not be limited to switchgear, switchboards, panelboards, transformers, motor control centers, motor controllers, uninterruptible power systems, enclosures, controllers, circuit protective devices, cables, wire, light fixtures, electronic equipment, and accessories.
  - 2. During installation, equipment shall be protected against entry of foreign matter; and be vacuum-cleaned both inside and outside before testing and operating. Compressed air shall not be used to clean equipment. Remove loose packing and flammable materials from inside equipment.
  - 3. Damaged equipment shall be, as determined by the Resident Engineer, placed in first class operating condition or be returned to the source of supply for repair or replacement.
  - 4. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.
  - 5. Damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

#### **1.9 WORK PERFORMANCE**

- A. All electrical work must comply with the requirements of NFPA 70 (NEC), NFPA 70B, NFPA 70E, OSHA Part 1910 subpart J, OSHA Part 1910 subpart S and OSHA Part 1910 subpart K in addition to other references required by contract.
- B. Job site safety and worker safety is the responsibility of the contractor.
- C. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished in this manner for the required work, the following requirements are mandatory:
  - 1. Electricians must use full protective equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E.

2. Electricians must wear personal protective equipment while working on energized systems in accordance with NFPA 70E.
3. Before initiating any work, a job specific work plan must be developed by the contractor with a peer review conducted and documented by the Resident Engineer and Medical Center staff. The work plan must include procedures to be used on and near the live electrical equipment, barriers to be installed, safety equipment to be used and exit pathways.
4. Work on energized circuits or equipment cannot begin until prior written approval is obtained from the Resident Engineer.
- D. For work on existing stations, arrange, phase and perform work to assure electrical service for other buildings at all times. Refer to Article OPERATIONS AND STORAGE AREAS under Section 01 00 00, GENERAL REQUIREMENTS.
- E. New work shall be installed and connected to existing work neatly, safely and professionally. Disturbed or damaged work shall be replaced or repaired to its prior conditions, as required by Section 01 00 00, GENERAL REQUIREMENTS.
- F. Coordinate location of equipment and conduit with other trades to minimize interferences.

#### **1.10 EQUIPMENT INSTALLATION AND REQUIREMENTS**

- A. Equipment location shall be as close as practical to locations shown on the drawings.
- B. Working spaces shall not be less than specified in the NEC for all voltages specified.
- C. Inaccessible Equipment:
  1. Where the Government determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the Government.
  2. "Conveniently accessible" is defined as being capable of being reached quickly for operation, maintenance, or inspections without the use of ladders, or without climbing or crawling under or over obstacles such as, but not limited to, motors, pumps, belt guards, transformers, piping, ductwork, conduit and raceways.

#### **1.11 EQUIPMENT IDENTIFICATION**

- A. In addition to the requirements of the NEC, install an identification sign which clearly indicates information required for use and maintenance of items such as switchboards and switchgear, panelboards, cabinets, motor controllers (starters), fused and unfused safety switches, automatic transfer switches, separately enclosed circuit



breakers, individual breakers and controllers in switchboards, switchgear and motor control assemblies, control devices and other significant equipment.

- B. Nameplates for Normal Power System equipment shall be laminated black phenolic resin with a white core with engraved lettering. Nameplates for Essential Electrical System (EES) equipment, as defined in the NEC, shall be laminated red phenolic resin with a white core with engraved lettering. Lettering shall be a minimum of 1/2 inch [12mm] high. Nameplates shall indicate equipment designation, rated bus amperage, voltage, number of phases, number of wires, and type of EES power branch as applicable. Secure nameplates with screws.
- C. Install adhesive arc flash warning labels on all equipment as required by NFPA 70E. Label shall indicate the arc hazard boundary (inches), working distance (inches), arc flash incident energy at the working distance (calories/cm<sup>2</sup>), required PPE category and description including the glove rating, voltage rating of the equipment, limited approach distance (inches), restricted approach distance (inches), prohibited approach distance (inches), equipment/bus name, date prepared, and manufacturer name and address.

#### **1.12 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. The Government's approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.
- C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Government to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.
- D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.
  - 1. Mark the submittals, "SUBMITTED UNDER SECTION\_\_\_\_\_".
  - 2. Submittals shall be marked to show specification reference including the section and paragraph numbers.
  - 3. Submit each section separately.

E. The submittals shall include the following:

1. Information that confirms compliance with contract requirements.  
Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.

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

1. Maintenance and Operation Manuals: Submit as required for systems and equipment specified in the technical sections. Furnish four copies, bound in hardback binders, (manufacturer's standard binders) or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.
2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
3. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.
4. The manuals shall include:
  - a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
  - b. A control sequence describing start-up, operation, and shutdown.
  - c. Description of the function of each principal item of equipment.
  - d. Installation instructions.
  - e. Safety precautions for operation and maintenance.
  - f. Diagrams and illustrations.
  - g. Periodic maintenance and testing procedures and frequencies, including replacement parts numbers and replacement frequencies.
  - h. Performance data.
  - i. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.

- j. List of factory approved or qualified permanent servicing organizations for equipment repair and periodic testing and maintenance, including addresses and factory certification qualifications.
- G. Approvals will be based on complete submission of manuals together with shop drawings.
- H. After approval and prior to installation, furnish the Resident Engineer with one sample of each of the following:
  - 1. A 300 mm (12 inch) length of each type and size of wire and cable along with the tag from the coils of reels from which the samples were taken.
  - 2. Each type of conduit coupling, bushing and termination fitting.
  - 3. Conduit hangers, clamps and supports.
  - 4. Duct sealing compound.
  - 5. Each type of receptacle, toggle switch, occupancy sensor, outlet box, manual motor starter, device wall plate, engraved nameplate, wire and cable splicing and terminating material, and branch circuit single pole molded case circuit breaker.

#### **1.13 SINGULAR NUMBER**

Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

#### **1.14 PCB EQUIPMENT - NOT USED**

- A. This project requires the removal, transport and disposal of electrical equipment containing Polychlorinated Biphenyl (PCB) in accordance with the Federal Toxic Substances Control Act (TSCA).
- B. The equipment for removal is shown on the drawings.
- C. The selective demolition shall be in accordance with Section 01 00 00, GENERAL REQUIREMENTS.

#### **1.15 ACCEPTANCE CHECKS AND TESTS**

The contractor shall furnish the instruments, materials and labor for field tests.

#### **1.16 TRAINING**

- A. Training shall be provided in accordance with Article 1.25, INSTRUCTIONS, of Section 01 00 00, GENERAL REQUIREMENTS.
- B. Training shall be provided for the particular equipment or system as required in each associated specification.

C. A training schedule shall be developed and submitted by the contractor and approved by the Resident Engineer at least 30 days prior to the planned training.

- - - E N D - - -

**SECTION 31 20 00**  
**EARTH MOVING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK:**

A. This section specifies the requirements for furnishing all equipment, materials, labor, tools, and techniques for earthwork including, but not limited to, the following:

1. Site preparation.
2. Excavation.
4. Filling and backfilling.
5. Grading.
6. Soil Disposal.
7. Clean Up.

B. This work shall be defined by Changes to the Contract and is not in the base bid quantities, except where required in order to perform other work such as paving, curb & gutter, and sidewalk. Earth Moving work shall be considered incidental to the other defined work and therefore paid intrinsically based on completion thereof.

C. Unsuitable Existing Soil beneath Roads: Include in Bid pricing cost of earthwork removal and off-site disposal of soft soil expected to be encountered under asphalt pavements in contract. Assume for Bid, per roadway, parking lot, and other asphalt paved area:

1. Thirty percent of the area is unsuitable existing soil beneath pavement
2. Remove to 6 to 18 inches below existing pavement. Average over total contract shall be 12 inches.
3. Place filter fabric geotextile against existing soil after excavation.

**1.2 DEFINITIONS:**

A. Unsuitable Materials:

1. Fills: Topsoil; frozen materials; construction materials and materials subject to decomposition; clods of clay and stones larger than 75 mm (3 inches); organic material, including silts, which are unstable; and inorganic materials, including silts, too wet to be stable and any material with a liquid limit and plasticity index

- exceeding 40 and 15 respectively. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction, as defined by ASTM D 1557.
2. Existing Subgrade (Except Footing Subgrade): Same materials as 1.2.A.1, that are not capable of direct support of slabs, pavement, and similar items with possible exception of improvement by compaction, proofrolling, or similar methods.
  3. Existing Subgrade (Footings Only): Same as paragraph 1, but no fill or backfill. If materials differ from reference borings and design requirements, excavate to acceptable strata subject to Resident Engineer's approval.
- B. Building Earthwork: Earthwork operations required in area enclosed by a line located 1500 mm (5 feet) outside of principal building perimeter. It also includes earthwork required for auxiliary structures and buildings.
- C. Trench Earthwork: Trenchwork required for utility lines.
- D. Site Earthwork: Earthwork operations required in area outside of a line located 1500 mm (5 feet) outside of principal building perimeter and within new construction area with exceptions noted above.
- E. Degree of compaction: Degree of compaction is expressed as a percentage of maximum density obtained by laboratory test procedure. This percentage of maximum density is obtained through use of data provided from results of field test procedures presented in ASTM D1556, ASTM D2167, and ASTM D2922.
- F. Fill: Satisfactory soil materials used to raise existing grades. In the Construction Documents, the term "fill" means fill or backfill as appropriate.
- G. Backfill: Soil materials or controlled low strength material used to fill an excavation.
- H. Unauthorized excavation: Removal of materials beyond indicated sub-grade elevations or indicated lines and dimensions without written authorization by the Resident Engineer. No payment will be made for unauthorized excavation or remedial work required to correct unauthorized excavation.
- I. Authorized additional excavation: Removal of additional material authorized by the Resident Engineer based on the determination by the

Government's soils testing agency that unsuitable bearing materials are encountered at required sub-grade elevations. Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.

- J. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular sub-base, drainage fill, or topsoil materials.
- K. Structure: Buildings, foundations, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- L. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- M. Drainage course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.
- N. Bedding course: Layer placed over the excavated sub-grade in a trench before laying pipe. Bedding course shall extend up to the springline of the pipe.
- O. Sub-base Course: Layer placed between the sub-grade and base course for asphalt paving or layer placed between the sub-grade and a concrete pavement or walk.
- P. Utilities include on-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.
- Q. Debris: Debris includes all materials located within the designated work area not covered in the other definitions and shall include but not be limited to items like vehicles, equipment, appliances, building materials or remains thereof, tires, any solid or liquid chemicals or products stored or found in containers or spilled on the ground.
- R. Contaminated soils: Soil that contains contaminants as defined and determined by the Resident Engineer or the Government's testing agency.

### **1.3 RELATED WORK:**

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Safety requirements: GENERAL CONDITIONS, Article, ACCIDENT PREVENTION.
- C. Protection of existing utilities, fire protection services, existing equipment, roads, and pavements: Section 01 00 00, GENERAL REQUIREMENTS.
- D. Subsurface Investigation: Section 01 00 00, GENERAL REQUIREMENTS, Article, PHYSICAL DATA.

- E. Erosion Control: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, and Section 32 90 00, PLANTING.
- F. Site preparation: Section 02 41 00, DEMOLITION.
- G. Foundation system requirements: Section 31 23 23.33, FLOWABLE FILL.

**1.4 CLASSIFICATION OF EXCAVATION:**

- A. Unclassified Excavation: Removal and disposal of pavements and other man-made obstructions visible on surface; utilities, and other items including underground structures indicated to be demolished and removed; together with any type of materials regardless of character of material and obstructions encountered.
- B. Classified Excavation: NOT USED
- C. Rock Excavation: NOT USED

**1.5 MEASUREMENT AND PAYMENT FOR ROCK EXCAVATION: NOT USED**

**1.6 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- C. Furnish to Resident Engineer:
  - 1. Contactor shall furnish resumes with all personnel involved in the project including Project Manager, Superintendent, and on-site Engineer. Project Manager and Superintendent should have at least 3 years of experience on projects of similar size.
  - 2. Soil samples.
    - a. Classification in accordance with ASTM D2487 for each on-site or borrow soil material proposed for fill, backfill, engineered fill, or structural fill.
    - b. Laboratory compaction curve in accordance with ASTM D 1557 for each on site or borrow soil material proposed for fill, backfill, engineered fill, or structural fill.
    - c. Test reports for compliance with ASTM D 2940 requirements for subbase material.



- d. Pre-excavation photographs and videotape in the vicinity of the existing structures to document existing site features, including surfaces finishes, cracks, or other structural blemishes that might be misconstrued as damage caused by earthwork operations.
- e. The Contractor shall submit a scale plan daily that defines the location, limits, and depths of the area excavated.

#### 1.7 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 Association of State Highway and Transportation Officials (AASHTO):
  - T99-01(2004).....Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 305 mm (12 inch) Drop
  - T180-01(2004).....Moisture-Density Relations of Soils using a 4.54 kg (10 lb) Rammer and a 457 mm (18 inch) Drop
- C. American Society for Testing and Materials (ASTM):
  - [javascript:onClick=AllVersionsPick\('/D448.htm'\);D448-03a](#) Standard Classification for Sizes of Aggregate for Road and Bridge Construction
  - D698-00ae1.....Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft<sup>3</sup> (600 kN m/m<sup>3</sup>))
  - D1556-00.....Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
  - D1557-02e1.....Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2700 kN m/m<sup>3</sup>))
  - D2167-94 (2001).....Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
  - D2487-06.....Standard Classification of Soil for Engineering Purposes (Unified Soil Classification System)
  - D2922-05.....Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D2940-03.....Standard Specifications for Graded Aggregate  
Material for Bases or Subbases for Highways or  
Airports

D. Society of Automotive Engineers (SAE):

J732-92.....Specification Definitions - Loaders

J1179-02.....Hydraulic Excavator and Backhoe Digging Forces

**PART 2 - PRODUCTS**

**2.1 MATERIALS:**

- A. General: Provide borrow soil material when sufficient satisfactory soil materials are not available from excavations.
- B. Fills: Material in compliance with ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, SM, SC, and ML, or any combination of these groups; free of rock or gravel larger than 75 mm (3 inches) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. Material approved from on site or off site sources having a minimum dry density of 1760 kg/m<sup>3</sup> (110 pcf), a maximum Plasticity Index of 15, and a maximum Liquid Limit of 40.
- C. Engineered Fill: Naturally or artificially graded mixture of compliance with ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, SM, SC, and ML, or any combination of these groups, or as approved by the Engineer or material with at least 90 percent passing a 37.5-mm (1 1/2-inch) sieve and not more than 12 percent passing a 75-µm (No. 200) sieve, per ASTM D2940;.
- D. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; except with 100 percent passing a 25 mm (1 inch) sieve and not more than 8 percent passing a 75-µm (No. 200) sieve.
- E. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 37.5 mm (1 1/2-inch) sieve and 0 to 5 percent passing a 2.36 mm (No. 8) sieve.
- F. Granular Fill:
  - 1. Under concrete slab, crushed stone or gravel graded from 25 mm (1 inch) to 4.75 mm (No. 4), per ASTM D 2940.

2. Bedding for sanitary and storm sewer pipe, crushed stone or gravel graded from 13 mm (1/2 inch) to 4.75 mm (No 4), per ASTM D 2940.

### **PART 3 - EXECUTION**

#### **3.1 SITE PREPARATION:**

- A. Clearing: Clear within limits of earthwork operations as shown. Work includes removal of trees, shrubs, fences, foundations, incidental structures, paving, debris, trash, and other obstructions. Remove materials from Medical Center.
- B. Grubbing: Remove stumps and roots 75 mm (3 inch) and larger diameter. Undisturbed sound stumps, roots up to 75 mm (3 inch) diameter, and nonperishable solid objects a minimum of 900 mm (3 feet) below subgrade or finished embankment may be left.
- C. Trees and Shrubs: Trees and shrubs, not shown for removal, may be removed from areas within 4500 mm (15 feet) of new construction and 2250 mm (7.5 feet) of utility lines when removal is approved in advance by Resident Engineer. Remove materials from Medical Center Property. Trees and shrubs, shown to be transplanted, shall be dug with a ball of earth and burlapped in accordance with latest issue of, "American Standard for Nursery Stock" of the American Association of Nurserymen, Inc. Transplant trees and shrubs to a permanent or temporary position within two hours after digging. Maintain trees and shrubs held in temporary locations by watering as necessary and feeding semiannually with liquid fertilizer with a minimum analysis of 5 percent nitrogen, 10 percent phosphorus, and 5 percent potash. Maintain plants moved to permanent positions as specified for plants in temporary locations until conclusion of contract. Box, and otherwise protect from damage, existing trees and shrubs which are not shown to be removed in construction area. Immediately repair damage to existing trees and shrubs by trimming, cleaning and painting damaged areas, including roots, in accordance with standard industry horticultural practice for the geographic area and plant species. Do not store building materials closer to trees and shrubs, that are to remain, than farthest extension of their limbs.
- D. Stripping Topsoil: Strip topsoil from within limits of earthwork operations as specified. Topsoil shall be a fertile, friable, natural topsoil of loamy character and characteristic of locality. Topsoil shall

be capable of growing healthy horticultural crops of grasses. Stockpile topsoil and protect as directed by Resident Engineer. Eliminate foreign materials, such as weeds, roots, stones, subsoil, frozen clods, and similar foreign materials larger than 0.014 m<sup>3</sup> (1/2 cubic foot) in volume, from soil as it is stockpiled. Retain topsoil on station. Remove foreign materials larger than 50 mm (2 inches) in any dimension from topsoil used in final grading. Topsoil work, such as stripping, stockpiling, and similar topsoil work shall not, under any circumstances, be carried out when soil is wet so that the composition of the soil will be destroyed.

- E. Concrete Slabs and Paving: Score deeply or saw cut to insure a neat, straight cut, sections of existing concrete slabs and paving to be removed where excavation or trenching occurs. Extend pavement section to be removed a minimum of 300 mm (12 inches) on each side of widest part of trench excavation and insure final score lines are approximately parallel unless otherwise indicated. Remove material from Medical Center.

F. Lines and Grades:

1. Grades shall conform to elevations indicated on plans within the tolerances herein specified. Generally grades shall be established to provide a smooth surface, free from irregular surface changes. Grading shall comply with compaction requirements and grade cross sections, lines, and elevations indicated. Where spot grades are indicated the grade shall be established based on interpolation of the elevations between the spot grades while maintaining appropriate transition at structures and paving and uninterrupted drainage flow into inlets.
2. Locations of existing and proposed elevations indicated on plans, except spot elevations, are from a site survey that measured spot elevations and subsequently generated existing contours and spot elevations. Proposed spot elevations and contour lines have been developed utilizing the existing conditions survey and developed contour lines and may be approximate. Contractor is responsible to notify Resident Engineer of any differences between existing elevations shown on plans and those encountered on site by Surveyor/Engineer described above. Notify Resident Engineer of any

differences between existing or constructed grades, as compared to those shown on the plans.

3. Subsequent to establishment of lines and grades, Contractor will be responsible for any additional cut and/or fill required to ensure that site is graded to conform to elevations indicated on plans.
  4. Finish grading is specified in Section 32 90 00, PLANTING.
- G. Disposal: All materials removed from the property shall be disposed of at a legally approved site, for the specific materials, and all removals shall be in accordance with all applicable Federal, State and local regulations.

### **3.2 EXCAVATION:**

- A. Shoring, Sheet piling and Bracing: Shore, brace, or slope, its angle of repose or to an angle considered acceptable by the Resident Engineer, banks of excavations to protect workmen, banks, adjacent paving, structures, and utilities.
1. Design of the temporary support of excavation system is the responsibility of the Contractor.
  2. Construction of the support of excavation system shall not interfere with the permanent structure and may begin only after a review by the Resident Engineer.
  3. Extend shoring and bracing to a minimum of 1500 mm (5 feet) below the bottom of excavation. Shore excavations that are carried below elevations of adjacent existing foundations.
  4. If bearing material of any foundation is disturbed by excavating, improper shoring or removal of existing or temporary shoring, placing of backfill, and similar operations, the Contractor shall provide flowable fill in compliance with specifications Section 31 23 23.33, FLOWABLE FILL, under disturbed foundations, as directed by Resident Engineer, at no additional cost to the Government. Do not remove shoring until permanent work in excavation has been inspected and approved by Resident Engineer.
- B. Excavation Drainage: Operate pumping equipment and/or provide other materials, means and equipment as required to keep excavation free of water and subgrade dry, firm, and undisturbed until approval of permanent work has been received from Resident Engineer. Approval by the

Resident Engineer is also required before placement of the permanent work on all subgrades.

- C. Subgrade Protection: Protect subgrades from softening, undermining, washout, or damage by rain or water accumulation. Reroute surface water runoff from excavated areas and not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches. When subgrade for foundations has been disturbed by water, remove disturbed material to firm undisturbed material after water is brought under control. Replace disturbed subgrade in trenches with concrete or material approved by the Resident Engineer.

D. Blasting: NOT ALLOWED

E. Proofrolling:

1. After rough grade has been established in cut areas and prior to placement of fill in fill areas under building and pavements, proofroll exposed subgrade with a fully loaded dump truck to check for pockets of soft material.
2. Proofrolling shall consist of at least two complete passes with one pass being in a direction perpendicular to preceding one. Remove, at no added cost to the government, such unsuitable soil from any areas that deflect, rut, or pump excessively during proofrolling, or that fail to consolidate after successive passes to suitable soils and replaced with compacted fill. Maintain subgrade until succeeding operation has been accomplished.

F. Building Earthwork: NOT USED

1. Excavation shall be accomplished as required by drawings and specifications.
2. Excavate foundation excavations to solid undisturbed subgrade.
3. Remove loose or soft materials to a solid bottom.
4. Fill excess cut under footings or foundations with 25 MPa (3000 psi) concrete poured separately from the footings.
5. Do not tamp earth for backfilling in footing bottoms, except as specified.
6. Slope grades to direct water away from excavations and to prevent ponding.

G. Trench Earthwork: NOT USED

## 1. Utility trenches (except sanitary and storm sewer):

- a. Excavate to a width as necessary for sheeting and bracing and proper performance of the work.
- b. Grade bottom of trenches with bell holes scooped out to provide a uniform bearing.
- c. Support piping on undisturbed earth unless a mechanical support is shown.
- d. Length of open trench in advance of piping laying shall not be greater than is authorized by Resident Engineer.

## 2. Sanitary and storm sewer trenches:

- a. Trench width below a point 150 mm (6 inches) above top of pipe shall be 600 mm (24 inches) maximum for pipe up to and including 300 mm (12 inches) diameter, and four-thirds diameter of pipe plus 200 mm (8 inches) for pipe larger than 300 mm (12 inches). Width of trench above that level shall be as necessary for sheeting and bracing and proper performance of the work.
- b. Bed bottom quadrant of pipe on undisturbed soil or granular fill.
  - 1) Undisturbed: Bell holes shall be no larger than necessary for jointing. Backfill up to a point 300 mm (12 inches) above top of pipe shall be clean earth placed and tamped by hand.
  - 2) Granular Fill: Depth of fill shall be a minimum of 75 mm (3 inches) plus one sixth of pipe diameter below pipe to 300 mm (12 inches) above top of pipe. Place and tamp fill material by hand.
- c. Place and compact as specified remainder of backfill using acceptable excavated materials. Do not use unsuitable materials.
- d. Use granular fill for bedding where rock or rocky materials are excavated.

H. Site Earthwork: Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation. Excavation shall be accomplished as required by drawings and specifications. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 25 mm (1 inch). Extend excavations a

sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, complying with OSHA requirements, and for inspections. Remove subgrade materials that are determined by Resident Engineer as unsuitable, and replace with acceptable material. If there is a question as to whether material is unsuitable or not, the contractor shall obtain samples of the material, under the direction of the Resident Engineer, and the materials shall be examined by an independent testing laboratory for soil classification to determine whether it is unsuitable or not. Testing of the soil shall be performed by the CONTRACTOR'S Testing Laboratory. When unsuitable material is encountered and removed above and beyond the quantities described under Article 1.1.B, contract price and time will be adjusted in accordance with Articles, DIFFERING SITE CONDITIONS, CHANGES and CHANGES-SUPPLEMENT of the GENERAL CONDITIONS as applicable. Adjustments to be based on volume in cut section only.

1. Site Grading:

- a. Provide a smooth transition between adjacent existing grades and new grades.
- b. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- c. Slope grades to direct water away from buildings and to prevent ponds from forming where not designed. Finish subgrades to required elevations within the following tolerances:
  - 1) Lawn or Unpaved Areas: Plus or minus 25 mm (1 inch).
  - 2) Walks: Plus or minus 25 mm (1 inch).
  - 3) Pavements: Plus or minus 13 mm (1 inch).
- d. Grading Inside Building Lines: Finish subgrade to a tolerance of 13 mm (1/2 inch) when tested with a 3000 mm (10 foot) straightedge.

**3.3 UNDERPINNING: NOT USED.**

**3.4 FILLING AND BACKFILLING:**

- A. General: Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation. For fill and backfill, use excavated materials



and borrow meeting the criteria specified herein, as applicable. Borrow will be supplied at no additional cost to the Government. Do not use unsuitable excavated materials. Do not backfill until foundation walls have been completed above grade and adequately braced, waterproofing or dampproofing applied, foundation drainage, and pipes coming in contact with backfill have been installed and work inspected and approved by Resident Engineer.

- B. Placing: Place materials in horizontal layers not exceeding 200 mm (8 inches) in loose depth for material compacted by heavy compaction equipment, and not more than 100 mm (4 inches) in loose depth for material compacted by hand-operated tampers and then compacted. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure. Place no material on surfaces that are muddy, frozen, or contain frost.
- C. Compaction: Compact with approved tamping rollers, sheepsfoot rollers, pneumatic tired rollers, steel wheeled rollers, vibrator compactors, or other approved equipment (hand or mechanized) well suited to soil being compacted. Do not operate mechanized vibratory compaction equipment within 3000 mm (10 feet) of new or existing building walls without prior approval of Resident Engineer. Moisten or aerate material as necessary to provide moisture content that will readily facilitate obtaining specified compaction with equipment used. Compact soil to not less than the following percentages of maximum dry density, according to ASTM D698 or ASTM D1557 as specified below:
  - 1. Fills, Embankments, and Backfill
    - a. Under proposed structures, building slabs, steps, and paved areas, scarify and recompact top 300 mm (12 inches) of existing subgrade and each layer of backfill or fill material in accordance with ASTM D1557 Method A 95 percent
    - b. Curbs, curbs and gutters, D1557 Method A 95 percent.
    - c. Under Sidewalks, scarify and recompact top 150 mm (6 inches) below subgrade and compact each layer of backfill or fill material in accordance with ASTM D1557 Method A 90 percent.

- d. Landscaped areas, top 400 mm (16 inches), ASTM D1557 Method A 85 percent.
- e. Landscaped areas, below 400 mm (16 inches) of finished grade, ASTM D1557 Method A 90 percent.
- 2. Natural Ground (Cut or Existing)
  - a. Under building slabs, steps and paved areas, top 150 mm (6 inches), ASTM D1557 Method A 95 percent.
  - b. Curbs, curbs and gutters, top 150 mm (6 inches), ASTM D1557 Method A 95 percent.
  - c. Under sidewalks, top 150 mm (6 inches), ASTM D1557 Method A 95 percent.

### 3.5 GRADING:

- A. General: Uniformly grade the areas within the limits of this section, including adjacent transition areas. Smooth the finished surface within specified tolerance. Provide uniform levels or slopes between points where elevations are indicated, or between such points and existing finished grades. Provide a smooth transition between abrupt changes in slope.
- B. Cut rough or sloping rock to level beds for foundations. In pipe spaces or other unfinished areas, fill low spots and level off with coarse sand or fine gravel.
- C. Slope backfill outside building away from building walls for a minimum distance of 1800 mm (6 feet).
- D. Finish grade earth floors in pipe basements as shown to a level, uniform slope and leave clean.
- E. Finished grade shall be at least 150 mm (6 inches) below bottom line of window or other building wall openings unless greater depth is shown.
- F. Place crushed stone or gravel fill under concrete slabs on grade, tamped, and leveled. Thickness of fill shall be 150 mm (6 inches) unless otherwise shown.
- G. Finish subgrade in a condition acceptable to Resident Engineer at least one day in advance of paving operations. Maintain finished subgrade in a smooth and compacted condition until succeeding operation has been accomplished. Scarify, compact, and grade subgrade prior to further construction when approved compacted subgrade is disturbed by Contractor's subsequent operations or adverse weather.

- H. Grading for Paved Areas: Provide final grades for both subgrade and base course to +/- 6 mm (0.25 inches) of indicated grades.

**3.6 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL:**

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Medical Center property.
- C. Place excess excavated materials suitable for fill and/or backfill on site where directed.
- D. Remove from site and dispose of any excess excavated materials after all fill and backfill operations have been completed.
- E. Segregate all excavated contaminated soil designated by the Resident Engineer from all other excavated soils, and stockpile on site on two 0.15 mm (6 mil) polyethylene sheets with a polyethylene cover. A designated area shall be selected for this purpose. Dispose of excavated contaminated material in accordance with State and Local requirements.

**3.7 CLEAN UP:**

Upon completion of earthwork operations, clean areas within contract limits, remove tools, and equipment. Provide site clear, clean, free of debris, and suitable for subsequent construction operations. Remove all debris, rubbish, and excess material from Medical Center.

----- E N D -----

**SECTION 31 23 23.33**  
**FLOWABLE FILL**

**PART 1 - GENERAL**

**1.1 INTRODUCTION:**

- A. Flowable fill refers to cementitious slurry consisting of a mixture of fine aggregate or filler, water, and cementitious material(s), which is used as a fill or backfill in lieu of compacted earth. This mixture is capable of filling all voids in irregular excavations and hard to reach places (such as under undercuts of existing slabs), is self-leveling, and hardens in a matter of a few hours without the need for compaction in layers. Flowable fill is sometimes referred to as controlled density fill (CDF), controlled low strength material (CLSM), lean concrete slurry, and unshrinkable fill.
- B. Flowable fill materials will be used as only as a structural fill replacement on VA projects. Unless otherwise noted, flowable fill installed as a substitution for structural earth fill, shall not be designed to be removed by the use of hand tools. The materials and mix design for the flowable fill should be designed to produce a comparable compressive strength to the surrounding soil after hardening, making excavation at a later time possible.

C.

**1.2 DESCRIPTION:**

Furnish and place flowable fill in a fluid condition that sets within the required time and, after curing, obtains the desired strength properties as evidenced by the laboratory testing of the specific mix design, at locations shown on the plans or as directed by the Resident Engineer, in writing. This section specifies flowable fill for use as structural fill to remain easily excavatable using a backhoe as would be utilized for adjoining earth.

**1.3 RELATED WORK:**

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Earthwork, excavation and backfill and compaction requirements: Section 31 20 00, EARTH MOVING.

**1.4 DEFINITIONS:**

- A. Flowable fill - Ready-mix Controlled Low Strength Material used as an alternative to compacted soil, and is also known as controlled density fill, and several other names, some of which are trademark names of material suppliers. Flowable fill (Controlled Low Strength Material) differs from Portland cement concrete as it contains a low cementitious content to reduce strength development for possible future removal. Unless specifically approved otherwise, by the Resident Engineer, flowable fill shall be designed as a permanent material, not designed for future removal. Design strength for this permanent type flowable fill shall be a compressive strength of 2.1 MPa (300 psi) minimum at 28 days. Chemical admixtures may also be used in flowable fill to modify performance properties of strength, flow, set and permeability.
- B. Excavatable Flowable fill - flowable fill designed with a compressive strength that will allow excavation as either machine tool excavatable at compressive strength of 1.5 MPa (200 psi) maximum at 1 year, or hand tool excavatable at compressive strength of 0.7 MPa (100 psi) maximum at 1 year.

**1.5 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Flowable fill Mix Design: Provide flowable fill mix design containing cement and water. At the contractor's option, it may also contain fly ash, aggregate, or chemical admixtures in any proportions such that the final product meets the strength and flow consistency, and shrinkage requirements included in this specifications.
  - 1. Test and Performance - Submit the following data:
    - a. Flowable fill shall have a minimum strength of 2.1 MPa (300 psi) according to ASTM C 39 at 28 days after placement.
    - b. Flowable fill shall have minimal subsidence and bleed water shrinkage. Evaporation of bleed water shall not result in shrinkage of more than 10.4 mm per m (1/8 inch per ft.) of flowable fill depth (for mixes containing high fly ash content). Measurement of a Final Bleeding shall be as measured in Section 10 of ASTM C 940 "Standard Test Method for Expansion and Bleeding of

Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory.

- c. Flowable fill shall have a unit weight of 1500 - 1900 kg/m<sup>3</sup> (90 - 115 lbs/feet<sup>3</sup>) measured at the point of placement after a 60 minute ready-mix truck ride.
- C. Provide documentation that the admixture supplier has experience of at least one year, with the products being provided and any equipment required to obtain desired performance of the product.
- D. Manufacturer's Certificates: Provide Resident Engineer with a certification that the materials incorporated in the flowable fill, following achievement of the required strength, do not represent a threat to groundwater quality.

#### 1.6 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 Society for Testing and Materials (ASTM):
  - D4832-02.....Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
  - C618-03.....Standard Specifications for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use as Mineral Admixture in Concrete. (Use Fly Ash conforming to the chemical and physical requirements for mineral admixture, Class F listed, including Table 2 (except for Footnote A). Waive the loss on ignition requirement.)
  - C403/C403M-05.....Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance.
  - C150-99 Rev.A-04.....Standard Specification for Portland Cement
  - C33-03.....Standard Specification for Concrete Aggregates
  - C494/C494M-04.....Standard Specification for Chemical Admixtures for Concrete

C940 RevA-98.....Standard Specification for Expansion and  
 Bleeding of Freshly Mixed Grouts for Preplaced -  
 Aggregate Concrete in the Laboratory

C. American Concrete Institute (ACI):

SP-150-94.....Controlled Low-Strength Materials

#### **1.7 QUALITY ASSURANCE:**

- A. Manufacturer: Flowable fill shall be manufactured by a ready-mix concrete producer with a minimum of 1 year experience in the production of similar products.
- B. Materials: For each type of material required for the work of this Section, provide primary materials that are the products of one manufacturer. If not otherwise specified here, materials shall comply with recommendations of ACI 229, "Controlled Low Strength Materials."
- C. Pre-Approval Procedures: The use of flowable fill during any part of the project shall be restricted to those incidences where, due to field conditions, the Contractor has made the Resident Engineer aware of the conditions for which he recommends the use of the flowable, and the Resident Engineer has confirmed those conditions and approved the use of the flowable fill, in advance. During the submittal process, the contractor shall prepare and submit various flowable fill mix designs corresponding to required conditions or if the contractor desires to use flowable fill due to economics. Approval for the strength of the flowable fill shall be obtained from the Resident Engineer when the contractor desires, or is required, to use flowable fills at specific location(s) within the project. Prior to commencement of field operations the contractor shall establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

#### **1.8 DELIVERY, STORAGE, AND HANDLING:**

Deliver and handle all products and equipment required, in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.

#### **1.9 PROJECT CONDITIONS:**

Perform installation of flowable fill only when approved by the Resident Engineer, and when existing and forecasted weather conditions are within

the limits established by the manufacturer of the materials and products used.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS:**

Provide flowable fill containing, at a minimum, cementitious materials and water. Cementitious materials shall be Portland cement, pozzolanic materials, or other self-cementing materials, or combinations thereof, at the contractor's option. The flowable fill mix design may also contain, fine aggregate or filler, and/or chemical admixtures in any proportions such that the final product meets the strength, flow consistency and shrinkage requirements included in this specification, as approved by the Resident Engineer.

- A. Portland Cement: ASTM C150, Type 1 or Type 2. Meeting Wisconsin State DOT standards.
- B. Mixing Water: Fresh, clean, and potable.
- C. Air-Entraining Admixture: ASTM C260.
- D. Chemical Admixtures: ASTM C494.
- E. Aggregate: ASTM C33.

### **2.2 FLOWABLE FILL MIXTURE:**

- A. Mix design shall produce a consistency that will result in a flowable product at the time of placement which does not require manual means to move it into place.
- B. Flowable fill shall have a minimum strength of 2.1 MPa (300 psi) according to ASTM C39 at 28 days after placement.
- C. Flowable fill shall have minimal subsidence and bleed water shrinkage. Evaporation of bleed water shall not result in shrinkage of more than 10.4 mm per m (1/8 inch per foot) of flowable fill depth (for mixes containing high fly ash content). Measurement of a Final Bleeding shall be as measured in Section 10 of ASTM C 940 "Standard Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced-Aggregate Concrete in the Laboratory.
- D. Flowable fill shall have a unit weight specified in Article 1.5 herein. In the absence of strength data the cementitious content shall be a maximum of 90 kg/m<sup>3</sup> (150 lbs/cy).



E. Flowable fill shall have an in-place yield of a maximum of 110% of design yield for removable types at 1 year.

F. Provide equipment as recommended by the Manufacturer.

**PART 3 - EXECUTION**

**3.1 EXAMINATION:**

Examine conditions of substrates and other conditions under which work is to be performed and notify Resident Engineer, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

**3.2 APPLICATION OF FLOWABLE FILL:**

Secure tanks, pipes and other members to be encased in flowable fill. Insure that there are no exposed metallic pipes, conduits, or other items that will be in contact with the flowable fill after placement. If so, replace with non-metallic materials or apply manufacturers recommended coating to protect metallic objects before placing the flowable fill. Replacement or protection of metallic objects is subject to the approval of the Resident Engineer.

**3.3 PROTECTION AND CURING:**

Protect exposed surfaces of flowable fill from premature drying, wash by rain or running water, wind, mechanical injury, and excessively hot or cold temperature. Curing method shall be subject to approval by Resident Engineer.

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**SECTION 32 05 23**  
**CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section shall cover site work concrete constructed upon the prepared subgrade and in conformance with the lines, grades, thickness, and cross sections shown. Construction shall include the following:
- B. Combination curb and gutter.
- C. Pedestrian Pavement: Walks, grade slabs and wheelchair curb ramps, steps.
- D. Vehicular Pavement: NOT USED.
- E. Equipment Pads: NOT USED.

**1.2 RELATED WORK**

- A. Laboratory and Field Testing Requirements: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Subgrade Preparation: Section 31 20 00, EARTH MOVING.
- C. Concrete Materials, Quality, Mixing, Design and Other Requirements: Section 03 30 00, CAST-IN-PLACE-CONCRETE.
- D. Metal Components of Steps (Nosing and Railing): Section 05 50 00, METAL FABRICATIONS.

**1.3 DESIGN REQUIREMENTS**

Design all elements with the latest published version of applicable codes.

**1.4 WEATHER LIMITATIONS**

Placement of concrete shall be as specified under Article 3.8, COLD WEATHER and Article 3.7, HOT WEATHER of Section 03 30 00, CAST-IN-PLACE CONCRETE.

**1.5 SELECT SUBBASE MATERIAL JOB-MIX**

The Contractor shall retain and reimburse a testing laboratory to design a select subbase material mixture and submit a job-mix formula to the Resident Engineer, in writing, for approval. The formula shall include the source of materials, gradation, plasticity index, liquid limit, and

laboratory compaction curves indicating maximum density at optimum moisture.

#### 1.6 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
- B. Manufacturers' Certificates and Data certifying that the following materials conform to the requirements specified.
  - 1. Expansion joint filler
  - 2. Hot poured sealing compound
  - 3. Reinforcement
  - 4. Curing materials
- C. Data and Test Reports: Select subbase material.
  - 1. Job-mix formula.
  - 2. Source, gradation, liquid limit, plasticity index, percentage of wear, and other tests as specified and in referenced publications.

#### 1.7 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. Refer to the latest edition of all referenced Standards and codes.
- B. American Association of State Highway and Transportation Officials (AASHTO):
  - M31.....Deformed and Plain Billet Steel Bars for  
Concrete Reinforcement (ASTM A615/A615M-96A)
  - M55M/55M.....Welded Steel Wire Fabric for Concrete  
Reinforcement (ASTM A185)
  - M147.....Materials for Aggregate and Soil-Aggregate  
Subbase, Base and Surface Courses (R 1996)
  - M148.....Liquid Membrane-Forming Compounds for Curing  
Concrete (ASTM C309A)
  - M171.....Sheet Materials for Curing Concrete (ASTM C171)
  - M182.....Burlap Cloth Made from Jute or Kenaf
  - M213.....Preformed Expansion Joint Fillers for Concrete  
Paving and Structural Construction

(Non-extruding and Resilient Bituminous Type)

(ASTM D1751)

T99.....Moisture-Density Relations of Soils Using a 2.5  
kg. (5.5 lb) Rammer and a 305 mm (12 in.) Drop

T180.....Moisture-Density Relations of Soils Using a 4.54  
kg (10 lb.) Rammer and a 457 mm (18 in.) Drop

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

C94/C94M.....Ready-Mixed Concrete

C143/C143M.....Slump of Hydraulic Cement Concrete

## PART 2 - PRODUCTS

### 2.1 GENERAL

Concrete shall be Type C, air-entrained as specified in Section 03 30 00, CAST-IN-PLACE CONCRETE, with the following exceptions:

| <u>TYPE</u>   | <u>MAXIMUM SLUMP*</u>  |
|---|--|
| Curb & Gutter   | 75 mm (3")   |
| Pedestrian Pavement   | 75 mm (3")   |
| Vehicular Pavement  | 50 mm (2") (Machine Finished)<br>100 mm (4") (Hand Finished) |
| Equipment Pad   | 75 to 100 mm (3" to 4")                                      |
| * For concrete to be vibrated: Slump as determined by ASTM C143. Tolerances as established by ASTM C94. |  |

### 2.2 REINFORCEMENT

- A. The type, amount, and locations of steel reinforcement shall be as shown on the drawings and in the specifications.
- B. Welded wire-fabric shall conform to AASHTO M55.
- C. Dowels shall be plain steel bars conforming to AASHTO M31 or M42. Tie bars shall be deformed steel bars conforming to AASHTO M31 or M42.

### 2.3 SELECT SUBBASE (WHERE REQUIRED)

- A. Subbase material shall consist of select granular material composed of sand, sand-gravel, crushed stone, crushed or granulated slag, with or without soil binder, or combinations of these materials conforming to AASHTO M147, Grading E or F.

- B. Materials meeting other gradations than that noted will be acceptable whenever the gradations are within a tolerance of three to five percent, plus or minus, of the single gradation established by the job-mix formula.
- C. Subbase material shall produce a compacted, dense-graded course, meeting the density requirement specified herein.

#### **2.4 FORMS**

- A. Use metal or wood forms that are straight and suitable in cross-section, depth, and strength to resist springing during depositing and consolidating the concrete, for the work involved.
- B. Do not use forms if they vary from a straight line more than 3 mm (1/8 inch) in any 3000 mm (ten foot) long section, in either a horizontal or vertical direction.
- C. Wood forms should be at least 50 mm (2 inches) thick (nominal). Wood forms shall also be free from warp, twist, loose knots, splits, or other defects. Use approved flexible or curved forms for forming radii.

#### **2.5 CONCRETE CURING MATERIALS**

- A. Concrete curing materials shall conform to one of the following:
  - 1. Burlap conforming to AASHTO M182 having a weight of 233 grams (seven ounces) or more per square meter (yard) when dry.
  - 2. Impervious Sheeting conforming to AASHTO M171.
  - 3. Liquid Membrane Curing Compound conforming to AASHTO M148 (ASTM C309), Type 1 and shall be free of paraffin or petroleum.

#### **2.6 EXPANSION JOINT FILLERS**

Material shall conform to AASHTO M213.

### **PART 3 - EXECUTION**

#### **3.1 SUBGRADE PENETRATION**

- A. Prepare, construct, and finish the subgrade as specified in Section 31 20 00, EARTH MOVING.
- B. Maintain the subgrade in a smooth, compacted condition, in conformance with the required section and established grade until the succeeding operation has been accomplished.

**3.2 SELECT SUBBASE (WHERE REQUIRED)**

A. Mixing: Proportion the select subbase by weight or by volume in quantities so that the final approved job-mixed formula gradation, liquid limit, and plasticity index requirements will be met after subbase course has been placed and compacted. Add water in approved quantities, measured by weight or volume, in such a manner to produce a uniform blend.

B. Placing:

1. Place the mixed material on the prepared subgrade in a uniform layer to the required contour and grades, and to a loose depth not to exceed 200 mm (8 inches), and that when compacted, will produce a layer of the designated thickness.
2. When the designated compacted thickness exceeds 150 mm (6 inches), place the material in layers of equal thickness. Remove unsatisfactory areas and replace with satisfactory mixture, or mix the material in the area.
3. In no case will the addition of thin layers of material be added to the top layer in order to meet grade.
4. If the elevation of the top layer is 13 mm (1/2 inch) or more below the grade, excavate the top layer and replace with new material to a depth of at least 75 mm (3 inches) in compacted thickness.

C. Compaction:

1. Perform compaction with approved equipment (hand or mechanical) well suited to the material being compacted.
2. Moisten or aerate the material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.
3. Compact each layer to at least 95 percent or 100 percent of maximum density as determined by AASHTO T180 or AASHTO T99 respectively.

D. Smoothness Test and Thickness Control:

Test the completed subbase for grade and cross section with a straight edge.

1. The surface of each layer shall not show any deviations in excess of 10 mm (3/8 inch).
2. The completed thickness shall be within 13 mm (1/2 inch) of the thickness as shown.

E. Protection:

1. Maintain the finished subbase in a smooth and compacted condition until the concrete has been placed.
2. When Contractor's subsequent operations or adverse weather disturbs the approved compacted subbase, excavate, and reconstruct it with new material meeting the requirements herein specified, at no additional cost to the VA.

### 3.3 SETTING FORMS

A. Base Support:

1. Compact the base material under the forms true to grade so that, when set, they will be uniformly supported for their entire length at the grade as shown.
2. Correct imperfections or variations in the base material grade by cutting or filling and compacting.

B. Form Setting:

1. Set forms sufficiently in advance of the placing of the concrete to permit the performance and approval of all operations required with and adjacent to the form lines.
2. Set forms to true line and grade and use stakes, clamps, spreaders, and braces to hold them rigidly in place so that the forms and joints are free from play or movement in any direction.
3. Forms shall conform to line and grade with an allowable tolerance of 3 mm (1/8 inch) when checked with a straightedge and shall not deviate from true line by more than 6 mm (1/4 inch) at any point.
4. Do not remove forms until removal will not result in damaged concrete or at such time to facilitate finishing.
5. Clean and oil forms each time they are used.

C. The Contractor's Registered Professional Land Surveyor, specified in GENERAL CONDITIONS, shall establish and control the alignment and the grade elevations of the forms or concrete slipforming machine operations.

1. Make necessary corrections to forms immediately before placing concrete.
2. When any form has been disturbed or any subgrade or subbase has become unstable, reset and recheck the form before placing concrete.

**3.4 EQUIPMENT**

- A. The Resident Engineer shall approve equipment and tools necessary for handling materials and performing all parts of the work prior to commencement of work.
- B. Maintain equipment and tools in satisfactory working condition at all times.

**3.5 PLACING REINFORCEMENT**

- A. Reinforcement shall be free from dirt, oil, rust, scale or other substances that prevent the bonding of the concrete to the reinforcement.
- B. Before the concrete is placed, the Resident Engineer shall approve the reinforcement, which shall be accurately and securely fastened in place with suitable supports and ties. The type, amount, and position of the reinforcement shall be as shown.

**3.6 PLACING CONCRETE - GENERAL**

- A. Obtain approval of the Resident Engineer before placing concrete.
- B. Remove debris and other foreign material from between the forms before placing concrete. Obtain approval of the Resident Engineer before placing concrete.
- C. Before the concrete is placed, uniformly moisten the subgrade, base, or subbase appropriately, avoiding puddles of water.
- D. Convey concrete from mixer to final place of deposit by a method which will prevent segregation or loss of ingredients. Deposit concrete so that it requires as little handling as possible.
- E. While being placed, spade or vibrate and compact the concrete with suitable tools to prevent the formation of voids or honeycomb pockets. Vibrate concrete well against forms and along joints. Over-vibration or manipulation causing segregation will not be permitted. Place concrete continuously between joints without bulkheads.
- F. Install a construction joint whenever the placing of concrete is suspended for more than 30 minutes and at the end of each day's work.
- G. Workmen or construction equipment coated with foreign material shall not be permitted to walk or operate in the concrete during placement and finishing operations.



**3.7 PLACING CONCRETE FOR CURB AND GUTTER, PEDESTRIAN PAVEMENT, AND EQUIPMENT PADS**

- A. Place concrete in the forms in one layer of such thickness that, when compacted and finished, it will conform to the cross section as shown.
- B. Deposit concrete as near to joints as possible without disturbing them but do not dump onto a joint assembly.
- C. After the concrete has been placed in the forms, use a strike-off guided by the side forms to bring the surface to the proper section to be compacted.
- D. Consolidate the concrete thoroughly by tamping and spading, or with approved mechanical finishing equipment.
- E. Finish the surface to grade with a wood or metal float.
- F. All Concrete pads and pavements shall be constructed with sufficient slope to drain properly.

**3.8 PLACING CONCRETE FOR VEHICULAR PAVEMENT NOT USED.**

**3.9 CONCRETE FINISHING - GENERAL**

- A. The sequence of operations, unless otherwise indicated, shall be as follows:
  - 1. Consolidating, floating, straight-edging, troweling, texturing, and edging of joints.
  - 2. Maintain finishing equipment and tools in a clean and approved condition.

**3.10 CONCRETE FINISHING CURB AND GUTTER**

- A. Round the edges of the gutter and top of the curb with an edging tool to a radius of 6mm (1/4 inch) or as otherwise detailed.
- B. Float the surfaces and finish with a smooth wood or metal float until true to grade and section and uniform in textures.
- C. Finish the surfaces, while still wet, with a bristle type brush with longitudinal strokes.
- D. Immediately after removing the front curb form, rub the face of the curb with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Brush the surface, while still wet, in the same manner as the gutter and curb top.

- E. Except at grade changes or curves, finished surfaces shall not vary more than 3 mm (1/8 inch) for gutter and 6 mm (1/4 inch) for top and face of curb, when tested with a 3000 mm (10 foot) straightedge.
- F. Remove and reconstruct irregularities exceeding the above for the full length between regularly scheduled joints.
- G. Correct any depressions which will not drain.
- H. Visible surfaces and edges of finished combination curb and gutter shall be free of blemishes, form marks, and tool marks, and shall be uniform in color, shape, and appearance.

### **3.11 CONCRETE FINISHING PEDESTRIAN PAVEMENT**

- A. Walks, Grade Slabs: Wheelchair Curb Ramps.
  - 1. Finish the surfaces to grade and cross section with a metal float, trowled smooth and finished with a broom moistened with clear water.
  - 2. Brooming shall be transverse to the line of traffic.
  - 3. Finish all slab edges, including those at formed joints, carefully with an edger having a radius as shown on the Drawings.
  - 4. Unless otherwise indicated, edge the transverse joints before brooming. The brooming shall eliminate the flat surface left by the surface face of the edger. Execute the brooming so that the corrugation, thus produced, will be uniform in appearance and not more than 2 mm (1/16 inch) in depth.
  - 5. The completed surface shall be uniform in color and free of surface blemishes, form marks, and tool marks. The finished surface of the pavement shall not vary more than 5 mm (3/16 inch) when tested with a 3000 mm (10 foot) straightedge.
  - 6. The thickness of the pavement shall not vary more than 6 mm (1/4 inch).
  - 7. Remove and reconstruct irregularities exceeding the above for the full length between regularly scheduled joints.
- B. Steps: The method of finishing the steps and the sidewalls is similar to above except as herein noted.
  - 1. Remove the riser forms one at a time, starting with the top riser.
  - 2. After removing the riser form, rub the face of the riser with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Use an outside edger to round the

corner of the tread; use an inside edger to finish the corner at the bottom of the riser.

3. Give the risers and sidewall a final brush finish. The treads shall have a final finish with a stiff brush to provide a non-slip surface.
4. The texture of the completed steps shall present a neat and uniform appearance and shall not deviate from a straightedge test more than 5 mm (3/16 inch).

### **3.12 CONCRETE FINISHING FOR VEHICULAR PAVEMENT - NOT USED**

### **3.13 CONCRETE FINISHING EQUIPMENT PADS - NOT USED.**

### **3.14 JOINTS - GENERAL**

- A. Place joints, where shown, conforming to the details as shown, and perpendicular to the finished grade of the concrete surface.
- B. Joints shall be straight and continuous from edge to edge of the pavement.

### **3.15 CONTRACTION JOINTS**

- A. Cut joints to depth as shown with a grooving tool or jointer of a radius as shown or by sawing with a blade producing the required width and depth.
- B. Construct joints in curbs and gutters by inserting 3 mm (1/8 inch) steel plates conforming to the cross sections of the curb and gutter.
- C. Plates shall remain in place until concrete has set sufficiently to hold its shape and shall then be removed.
- D. Finish edges of all joints with an edging tool having the radius as shown.
- E. Score pedestrian pavement with a standard grooving tool or jointer.

### **3.16 EXPANSION JOINTS**

- A. Use a preformed expansion joint filler material of the thickness as shown to form expansion joints.
- B. Material shall extend the full depth of concrete, cut and shaped to the cross section as shown, except that top edges of joint filler shall be below the finished concrete surface where shown to allow for sealing.
- C. Anchor with approved devices to prevent displacing during placing and finishing operations.
- D. Round the edges of joints with an edging tool.

E. Form expansion joints as follows:

1. Without dowels, about structures and features that project through, into, or against any site work concrete construction.
2. Using joint filler of the type, thickness, and width as shown.
3. Installed in such a manner as to form a complete, uniform separation between the structure and the site work concrete item.

**3.17 CONSTRUCTION JOINTS**

- A. Locate construction joints between slabs of vehicular pavement to match existing.
- B. Place transverse construction joints of the type shown, where indicated and whenever the placing of concrete is suspended for more than 30 minutes.
- C. Use a butt-type joint with dowels in curb and gutter if the joint occurs at the location of a planned joint.
- D. Use keyed joints with tiebars if the joint occurs in the middle third of the normal curb and gutter joint interval.

**3.18 FORM REMOVAL**

- A. Forms shall remain in place at least 12 hours after the concrete has been placed. Remove forms without injuring the concrete.
- B. Do not use bars or heavy tools against the concrete in removing the forms. Promptly repair any concrete found defective after form removal.

**3.20 CURING OF CONCRETE**

- A. Cure concrete by one of the following methods appropriate to the weather conditions and local construction practices, against loss of moisture, and rapid temperature changes for at least seven days from the beginning of the curing operation. Protect unhardened concrete from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready to install before actual concrete placement begins. Provide protection as necessary to prevent cracking of the pavement due to temperature changes during the curing period. If any selected method of curing does not afford the proper curing and protection against concrete cracking, remove and replace the damaged pavement and employ another method of curing as directed by the Resident Engineer.

- B. Burlap Mat: Provide a minimum of two layers kept saturated with water for the curing period. Mats shall overlap each other at least 150 mm (6 inches).
- C. Impervious Sheeting: Use waterproof paper, polyethylene-coated burlap, or polyethylene sheeting. Polyethylene shall be at least 0.1 mm (4 mils) in thickness. Wet the entire exposed concrete surface with a fine spray of water and then cover with the sheeting material. Sheets shall overlap each other at least 300 mm (12 inches). Securely anchor sheeting.
- D. Liquid Membrane Curing:
  - 1. Apply pigmented membrane-forming curing compound in two coats at right angles to each other at a rate of 5 m<sup>2</sup>/L (200 square feet per gallon) for both coats.
  - 2. Do not allow the concrete to dry before the application of the membrane.
  - 3. Cure joints designated to be sealed by inserting moistened paper or fiber rope or covering with waterproof paper prior to application of the curing compound, in a manner to prevent the curing compound entering the joint.
  - 4. Immediately re-spray any area covered with curing compound and damaged during the curing period.

### **3.21 CLEANING**

- A. After completion of the curing period:
  - 1. Remove the curing material (other than liquid membrane).
  - 2. Sweep the concrete clean.
  - 3. After removal of all foreign matter from the joints, seal joints as herein specified.
  - 4. Clean the entire concrete of all debris and construction equipment as soon as curing and sealing of joints has been completed.

### **3.22 PROTECTION**

The contractor shall protect the concrete against all damage prior to final acceptance by the Government. Remove concrete containing excessive cracking, fractures, spalling, or other defects and reconstruct the entire section between regularly scheduled joints, when directed by the Resident Engineer, and at no additional cost to the Government. Exclude traffic from vehicular pavement until the concrete is at least seven

days old, or for a longer period of time if so directed by the Resident Engineer.

**3.23 FINAL CLEAN-UP**

Remove all debris, rubbish and excess material from the Station.

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**SECTION 32 12 16**  
**ASPHALT PAVING**

**PART 1 - GENERAL****1.1 DESCRIPTION**

This work shall cover the composition, mixing, construction upon the prepared subgrade, and the protection of hot asphalt concrete pavement. The hot asphalt concrete pavement shall consist of an aggregate or asphalt base course and asphalt surface course constructed in conformity with the lines, grades, thickness, and cross sections as shown. Each course shall be constructed to the depth, section, or elevation required by the drawings and shall be rolled, finished, and approved before the placement of the next course.

**1.2 RELATED WORK**

- A. Laboratory and field testing requirements: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Subgrade Preparation: Paragraph 3.3 and Section 31 20 00, EARTH MOVING.
- C. Pavement Markings: Section 32 17 23, PAVEMENT MARKINGS.

**1.3 INSPECTION OF PLANT AND EQUIPMENT**

The Resident Engineer shall have access at all times to all parts of the material producing plants for checking the mixing operations and materials and the adequacy of the equipment in use.

**1.4 ALIGNMENT AND GRADE CONTROL**

The Contractor's Registered Professional Land Surveyor specified in GENERAL CONDITIONS shall establish and control the pavement (aggregate or asphalt base course and asphalt surface course) alignments, grades, elevations, and cross sections as shown on the Drawings.

**1.5 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
- B. Data and Test Reports:
  - 1. Aggregate Base Course: Sources, gradation, liquid limit, plasticity index, percentage of wear, and other tests required by State Highway Department.

2. Asphalt Base/Surface Course: Aggregate source, gradation, soundness loss, percentage of wear, and other tests required by State Highway Department.

3. Job-mix formula.

C. Certifications:

1. Asphalt prime and tack coat material certificate of conformance to State Highway Department requirements.

2. Asphalt cement certificate of conformance to State Highway Department requirements.

3. Job-mix certification - Submit plant mix certification that mix equals or exceeds the State Highway Specification.

D. One copy of State Highway Department Specifications.

E. Provide MSDS (Material Safety Data Sheets) for all chemicals used on ground.

**PART 2 - PRODUCTS**

**2.1 GENERAL**

A. Asphaltic base and asphalt concrete materials shall conform to the requirements of the following and other appropriate sections of the latest version of the State Highway Material Specifications, including amendments, addenda and errata. Where the term "Engineer" or "Commission" is referenced in the State Highway Specifications, it shall mean the VA Resident Engineer or VA Contracting Officer.

**2.2 AGGREGATES**

A. Provide aggregates consisting of crushed stone, gravel, sand, or other sound, durable mineral materials processed and blended, and naturally combined.

B. Subbase aggregate (where required) maximum size: 38mm(1-1/2").

C. Base aggregate maximum size:

1. Base course over 152mm(6") thick: 38mm(1-1/2");

2. Other base courses: 19mm(3/4").

D. Asphaltic base course:

1. Maximum particle size not to exceed 25.4mm(1").



2. Where conflicts arise between this specification and the requirements in the latest version of the State Highway Specifications, the State Specifications shall control.

- E. Aggregates for asphaltic concrete paving: Provide a mixture of sand, mineral aggregate, and liquid asphalt mixed in such proportions that the percentage by weight will be within:

| <u>Sieve Sizes</u> | <u>Percentage Passing</u> |
|--------------------|---------------------------|
| 19mm(3/4")         | 100                       |
| 9.5mm(3/8")        | 67 to 85                  |
| 6.4mm(1/4")        | 50 to 65                  |
| 2.4mm(No. 8 mesh)  | 37 to 50                  |
| 600µm(No. 30 mesh) | 15 to 25                  |
| 75µm(No. 200 mesh) | 3 to 8                    |

plus 50/60 penetration liquid asphalt at 5 percent to 6-1/2 percent of the combined dry aggregates.

### **2.3 ASPHALTS**

- A. Comply with provisions of Asphalt Institute Specification SS2:
1. Asphalt cement: Penetration grade 50/60
  2. Prime coat: Cut-back type, grade MC-250
  3. Tack coat: Uniformly emulsified, grade SS-1H

### **2.4 SEALER**

- A. Provide a sealer consisting of suitable fibrated chemical type asphalt base binders and fillers having a container consistency suitable for troweling after thorough stirring, and containing no clay or other deleterious substance.
- B. Where conflicts arise between this specification and the requirements in the latest version of the State Highway Specifications, the State Specifications shall control.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

The Asphalt Concrete Paving equipment, weather limitations, job-mix formula, mixing, construction methods, compaction, finishing, tolerance, and protection shall conform to the requirements of the appropriate

sections of the State Highway Specifications for the type of material specified.

### **3.2 MIXING ASPHALTIC CONCRETE MATERIALS**

- A. Provide hot plant-mixed asphaltic concrete paving materials.
  - 1. Temperature leaving the plant: 143 degrees C(290 degrees F) minimum, 160 degrees C(320 degrees F) maximum.
  - 2. Temperature at time of placing: 138 degrees C(280 degrees F) minimum.

### **3.3 SUBGRADE**

- A. Shape to line and grade and compact with self-propelled rollers.
- B. All depressions that develop under rolling shall be filled with acceptable material and the area re-rolled.
- C. Soft areas shall be removed and filled with acceptable materials and the area re-rolled.
- D. Should the subgrade become rutted or displaced prior to the placing of the subbase, it shall be reworked to bring to line and grade.
- E. Proof-roll the subgrade with maximum 45 tonne (50 ton) gross weight dump truck as directed by VA Resident Engineer or VA Contracting Officer. If pumping, pushing, or other movement is observed, rework the area to provide a stable and compacted subgrade.

### **3.4 BASE COURSES**

- A. Subbase (when required)
  - 1. Spread and compact to the thickness shown on the drawings.
  - 2. Rolling shall begin at the sides and continue toward the center and shall continue until there is no movement ahead of the roller.
  - 3. After completion of the subbase rolling there shall be no hauling over the subbase other than the delivery of material for the top course.
- B. Base
  - 1. Spread and compact to the thickness shown on the drawings.
  - 2. Rolling shall begin at the sides and continue toward the center and shall continue until there is no movement ahead of the roller.
  - 3. After completion of the base rolling there shall be no hauling over the base other than the delivery of material for the top course.
- C. Thickness tolerance: Provide the compacted thicknesses shown on the Drawings within a tolerance of minus 0.0mm (0.0") to plus 12.7mm (0.5").

- D. Smoothness tolerance: Provide the lines and grades shown on the Drawings within a tolerance of 5mm in 3m (3/16 inch in ten feet).
- E. Moisture content: Use only the amount of moisture needed to achieve the specified compaction.

### **3.5 PLACEMENT OF ASPHALTIC CONCRETE PAVING**

- A. Remove all loose materials from the compacted base.
- B. Apply the specified prime coat, and tack coat where required, and allow to dry in accordance with the manufacturer's recommendations as approved by the Architect or Engineer.
- C. Receipt of asphaltic concrete materials:
  - 1. Do not accept material unless it is covered with a tarpaulin until unloaded, and unless the material has a temperature of not less than 130 degrees C (280 degrees F).
  - 2. Do not commence placement of asphaltic concrete materials when the atmospheric temperature is below 10 degrees C (50 degrees F), not during fog, rain, or other unsuitable conditions.
- D. Spreading:
  - 1. Spread material in a manner that requires the least handling.
  - 2. Where thickness of finished paving will be 76mm (3") or less, spread in one layer.
- E. Rolling:
  - 1. After the material has been spread to the proper depth, roll until the surface is hard, smooth, unyielding, and true to the thickness and elevations shown on the drawings.
  - 2. Roll in at least two directions until no roller marks are visible.
  - 3. Finished paving smoothness tolerance:
    - a. No depressions which will retain standing water.
    - b. No deviation greater than 3mm in 1.8m (1/8" in six feet).

### **3.6 APPLICATION OF SEAL COAT**

- A. Prepare the surfaces, mix the seal coat material, and apply in accordance with the manufacturer's recommendations as approved by the Architect or Engineer.
- B. Apply one coat of the specified sealer.
- C. Achieve a finished surface seal which, when dry and thoroughly set, is smooth, tough, resilient, of uniform black color, and free from coarse textured areas, lap marks, ridges, and other surface irregularities.

**3.7 PROTECTION**

Protect the asphaltic concrete paved areas from traffic until the sealer is set and cured and does not pick up under foot or wheeled traffic.

**3.8 FINAL CLEAN-UP**

Remove all debris, rubbish, and excess material from the work area.

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**SECTION 32 17 23**  
**PAVEMENT MARKINGS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This work shall consist of furnishing and applying paint and reflective glass beads on pavement surfaces, in the form of traffic lanes, parking bays, areas restricted to handicapped persons, crosswalks, and other detail pavement markings. Conform to the Manual on Uniform Traffic Control Devices for Streets and Highways, published by the U.S. Department of Transportation, Federal Highway Administration, for details not shown.
- B. This work shall be defined by Changes to the Contract and is not in the base bid quantities, except where existing pavement markings are damaged or demolished by contractor's work, in which case provide new pavement markings to match existing in terms of color and layout. See Drawings for typical details.

**1.2 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish Manufacturer's Certificates and Data certifying that the following materials conform to the requirements specified.
- B. Paint
- C. Reflective Glass Beads

**1.3 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Federal Specifications (Fed. Spec.):
- TT-B-1325C.....Beads (Glass Spheres); Retro-Reflective
- TT-P-1952D.....Paint, Traffic Black, and Airfield Marking,  
Waterborne
- C. Master Painters Institute (MPI):
- No. 97-2002.....Latex Traffic Marking Paint

**PART 2 - PRODUCTS****2.1 PAINT**

Paint for marking pavement (parking lot and zone marking) shall conform to MPI No. 97, color as shown. Paint for obliterating existing markings shall conform to Fed. Spec. TT-P-1952D. Paint shall be in containers of at least 18 L (5 gallons). A certificate shall accompany each batch of paint stating compliance with the applicable publication.

**2.2 REFLECTIVE GLASS BEADS**

Beads shall conform to Fed. Spec. TT-B-1325C, Type I, Gradation A. When used in regions of high humidity, coat beads with silicone or other suitable waterproofing material to assure free flow. Furnish the glass beads in containers suitable for handling and strong enough to prevent loss during shipment. A certificate shall accompany each batch of beads stating compliance with this section.

**2.3 PAINT APPLICATOR**

Apply all marking by approved mechanical equipment. The equipment shall provide constant agitation of paint and travel at controlled speeds. Synchronize one or more paint "guns" to automatically begin and cut off paint flow in the case of skip lines. The equipment shall have manual control to apply continuous lines of varying length and marking widths as shown. Provide pneumatic spray guns for hand application of paint in areas where a mobile paint applicator cannot be used. An experienced technician that is thoroughly familiar with equipment, materials, and marking layouts shall control all painting equipment and operations.

**2.4 SANDBLASTING EQUIPMENT**

Sandblasting equipment shall include an air compressor, hoses, and nozzles of proper size and capacity as required for cleaning surfaces to be painted. The compressor shall furnish not less than 0.08 m<sup>3</sup>/s (150 cfm) of air at a pressure of not less than 625 kPa (90 psi) at each nozzle used.

**PART 3 - EXECUTION****3.1 SURFACE PREPARATION**

- A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.

- B. Thoroughly clean all surfaces to be marked before application of paint. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods. Completely remove rubber deposits, existing paint markings, and other coatings adhering to the pavement with scrapers, wire brushings, sandblasting, mechanical abrasion, or approved chemicals as directed by the Resident Engineer. The application of paint conforming to Fed. Spec. TT-P-1952 is an option to removal of existing paint markings on asphalt pavement. Apply the black paint in as many coats as necessary to completely obliterate the existing markings. Where oil or grease are present on old pavements to be marked, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application. After cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint. Pavement marking shall follow as closely as practicable after the surface has been cleaned and dried, but do not begin any marking until the Resident Engineer has inspected the surface and gives permission to proceed. The Contractor shall establish control points for marking and provide templates to control paint application by type and color at necessary intervals. The Contractor is responsible to preserve and apply marking in conformance with the established control points.

### **3.2 APPLICATION**

Apply uniformly painted and reflective pavement marking of required color(s), length, and width with true, sharp edges and ends on properly cured, prepared, and dried surfaces in conformance with the details as shown and established control points. The length and width of lines shall conform within a tolerance of plus or minus 75 mm (3 inches) and plus or minus 3 mm (1/8 inch), respectively, in the case of skip markings. The length of intervals shall not exceed the line length tolerance. Temperature of the surface to be painted and the atmosphere shall be above 10°C (50°F) and less than 35°C (95°F). Apply the paint at a wet film thickness of 0.4 mm (0.015 inch). Disperse reflective glass beads evenly on the wet paint at a rate of 720 g/L (6 pounds per gallon) of paint. Apply paint in one coat. At the direction of the Resident Engineer, markings showing light spots may receive additional coats. The

maximum drying time requirements of the paint specifications will be strictly enforced, to prevent undue softening of asphalt, and pick-up, displacement, or discoloration by tires of traffic. If there is a deficiency in drying of the marking, discontinue paint operations until cause of the slow drying is determined and corrected. Remove and replace marking that is applied at less than minimum material rates; deviates from true alignment; exceeds stipulated length and width tolerances; or shows light spots, faulty distribution of beads, smears, or other deficiencies or irregularities. Use carefully controlled sand blasting, approved grinding equipment, or other approved method to remove marking so that the surface to which the marking was applied will not be damaged.

### **3.3 PROTECTION**

Conduct operations in such a manner that necessary traffic can move without hindrance. Protect the newly painted markings so that, insofar as possible, the tires of passing vehicles will not pick up paint. Place warning signs at the beginning of the wet line, and at points well in advance of the marking equipment for alerting approaching traffic from both directions. Place small flags or other similarly effective small objects near freshly applied markings at frequent intervals to reduce crossing by traffic. Efface and replace damaged portions of markings at no additional cost to the Government.

### **3.4 DETAIL PAVEMENT MARKING**

Use Detail Pavement Markings, exclusive of actual traffic lane marking, at exit and entrance islands and turnouts, on curbs, at crosswalks, at parking bays, and at such other locations as shown. Show the International Handicapped Symbol at indicated parking spaces. Color shall be as shown. Apply paint for the symbol using a suitable template that will provide a pavement marking with true, sharp edges and ends. Place detail pavement markings of the color(s), width(s) and length(s), and design pattern at the locations shown.

### **3.5 TEMPORARY PAVEMENT MARKING**

When shown or directed by the Resident Engineer, apply Temporary Pavement Markings of the color(s), width(s) and length(s) shown or directed. After the temporary marking has served its purpose and when



so ordered by the Resident Engineer, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that the surface to which the marking was applied will not be damaged. As an option, an approved preformed pressure sensitive, reflective, adhesive tape type of temporary pavement marking of the required color(s), width(s) and length(s) may be furnished and used in lieu of temporary painted and reflective marking. The Contractor shall be fully responsible for the continued durability and effectiveness of such marking during the period for which its use is required. Remove any unsatisfactory tape type marking and replace with painted and reflective markings at no additional cost to the Government.

### **3.6 FINAL CLEAN-UP**

Remove all debris, rubbish and excess material from the Station.

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**SECTION 32 90 00  
PLANTING**

**PART 1 - GENERAL****1.1 DESCRIPTION**

A. This work consists of furnishing and installing all planting materials required for landscaping hereinafter specified in locations as shown. Included are bushes, tress, and lawn areas. Bushes and trees to be furnished by the VA. For lawn areas, provide New Lawn & Repair Kit (or VA-approved equal) all-in-one seed, fertilizer, mulch, and anti-desiccant and apply as recommended, or VA-approved equal alternatives as specified herein.

B. This work shall be defined by Changes to the Contract and is not in the base bid quantities, except where repairs to existing lawn areas are required due to contractor's damage.

**1.2 EQUIPMENT**

Maintain all equipment, tools and machinery while on the project in sufficient quantities and capacity for proper execution of the work.

**1.3 RELATED WORK**

- A. Section 31 20 00, EARTH MOVING, Stripping Topsoil and Stock Piling.
- B. Section 01 45 29, TESTING LABORATORY SERVICES, Topsoil Testing.
- C. Section 31 20 00, EARTH MOVING, Topsoil Materials.
- D. Section 32 84 00, PLANTING IRRIGATION. NOT USED.
- E. Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

**1.4 SUBMITTALS**

- A. Provide following if specified New Lawn & Repair Kit (or VA-approved equal) product is not used. Not required if New Lawn & Repair Kit (or VA-approved equal) is used. New Lawn & Repair Kit (or VA-approved equal) comes in 50# bags and is available from local retailers.
- B. Samples: Submit the following samples for approval before work is started:

|               |  |
|---------------|--|
| Inert Mulch   | 2.3 kg (5 pounds) of each type to be used. |
| Organic Mulch | 2.3 kg (5 pounds) of each type to be used. |

|                           |   |
|---------------------------|---|
| Pre-Emergent<br>Herbicide | 2.3 kg (5 pounds) of each<br>type to be used. |
|---------------------------|---|

B. Certificates of Conformance or Compliance: Before delivery, notarized certificates attesting that the following materials meet the requirements specified shall be submitted to the Resident Engineer for approval:

1. Plant Materials (Department of Agriculture certification by State Nursery Inspector declaring material to be free from insects and disease).
2. Fertilizers.
3. Lime
4. Peat
5. Seed
6. Sod
7. Membranes
8. Asphalt Adhesive

C. Manufacturer's Literature and Data:

1. Metal edging
2. Antidesiccant
3. Erosion control materials
4. Hydro mulch
5. Pre-emergent herbicide

### 1.5 DELIVERY AND STORAGE

A. Delivery:

1. Notify the Resident Engineer of the delivery schedule in advance so the plant material may be inspected upon arrival at the job site. Remove unacceptable plant material from the job site immediately.
4. Deliver fertilizer to the site in the original, unopened containers bearing the manufacturer's warranted chemical analysis, name, trade name or trademark, and in conformance to state and federal law. In lieu of containers, fertilizer may be furnished in bulk and a certificate indicating the above information shall accompany each delivery.
5. During delivery: Protect seed from contamination.

## B. Storage:

2. Keep seed and fertilizer in dry storage away from contaminants.

**1.6 PLANTING AND TURF INSTALLATION SEASONS AND CONDITIONS**

- A. Perform operations within the following dates: All seasons for turf. Bushes and trees from May 1 through September 30.
- B. No work shall be done when the ground is frozen, snow covered, too wet or in an otherwise unsuitable condition for planting. Special conditions may exist that warrants a variance in the specified planting dates or conditions. Submit a written request to the Resident Engineer stating the special conditions and proposal variance.

**1.7 PLANT AND TURF ESTABLISHMENT PERIOD**

- A. The Establishment Period for plants and turf shall begin immediately after installation, with the approval of the Resident Engineer, and continue until the date that the Government accepts the project or phase for beneficial use and occupancy. During the Plant and Turf Establishment Period the Contractor shall:
  1. Water all plants and turf to maintain an adequate supply of moisture within the root zone. An adequate supply of moisture is one of following: a) monitor Sparkle® (or VA-approved equal) gelatin granules on ground surface and water when appearance is dull; b) the equivalent of 25 mm (1 inch) of absorbed water per week either through natural rainfall or augmented by periodic watering. Apply water at a moderate rate so as not to displace the mulch or flood the plants and turf.
  2. Replace mulch as required.
  3. Replace and restore stakes, guy wires, and eroded plant saucers as required.
  4. In plant beds and saucers, remove grass, weeds, and other undesired vegetation, including the root growth, before they reach a height of 75 mm (3 inches).
  5. Spray with approved insecticides and fungicides to control pests and ensure plant survival in a healthy growing condition, as directed by the Resident Engineer.
  6. Provide the following turf establishment:
    - a. Eradicate all weeds. Water, fertilize, overseed, and perform any other operation necessary to promote the growth of grass.

- b. Replant areas void of turf 0.1 m<sup>2</sup> (one square foot) and larger in area.
- c. Mow the new lawn at least three times prior to the final inspection. Begin mowing when grass is 100 mm (4 inches) high. Mow to a 65 mm (2-1/2 inch) height.

#### **1.8 TURF WARRANTY**

- A. All work shall be in accordance with the terms of the Paragraph, "Warranty" of GENERAL CONDITIONS, including the following supplements:
  - 1. A One Year Turf Warranty will begin on the date that the Government accepts the project or phase for beneficial use and occupancy. The Contractor shall have completed, located, and installed all turf according to the plans and specifications. All turf is expected to be living and in a healthy condition at the time of final inspection.
  - 2. The Contractor will replace any areas devoid of turf immediately. A one year warranty for the turf that was replaced, will begin on the day the work is completed.
  - 3. Replacement of relocated plants, that the Contractor did not supply, is not required unless they die from improper handling and care during transplanting. Loss through Contractor negligence requires replacement in kind and size.
  - 4. The Government will reinspect all turf at the end of the One Year Warranty. The Contractor will replace any dead, missing, or defective turf immediately. The Warranty will end on the date of this inspection provided the Contractor has complied with the work required by this specification. The Contractor shall also comply with the following requirements:
    - d. Complete remedial measures directed by the Resident Engineer to ensure turf survival.
    - e. Repair damage caused while making turf replacements.

#### **1.9 APPLICABLE PUBLICATIONS**

- A. The publications listed below, form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. American National Standards Institute (ANSI) Publications:
  - ANSI Z60.1-04.....Nursery Stock

- ANSI Z133.1-06.....Tree Care Operations-Pruning, Trimming,  
Repairing, Maintaining, and Removing Trees and  
Cutting Brush- Safety Requirements
- C. Hortus Third, A Concise Dictionary of Plants Cultivated in the U.S. and  
Canada.
- D. American Society for Testing and Materials (ASTM) Publications:  
C136-06.....Sieve Analysis of Fine and Coarse Aggregates  
C516-02.....Vermiculite Loose Fill Thermal Insulation  
C549-06.....Perlite Loose Fill Insulation  
D977-05.....Emulsified Asphalt (AASHTO M140)  
D2028-97 (Rev. 2004)....Cutback Asphalt (Rapid-curing Type)  
D2103-05.....Polyethylene Film and Sheeting
- E. Turfgrass Producers International:  
Turfgrass Sodding.
- F. U. S. Department of Agriculture Federal Seed Act.  
1998.....Rules and Regulations
- G. American Wood Protection Association (AWPA):  
C2-02.....Lumber, Timbers, Bridge Ties and Mine Ties,  
Pressure Treatment

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

All turf material will conform to the varieties specified or shown in  
the plant list and be true to botanical name as listed in Hortus Third.

### **2.2 PLANTS - NOT USED.**

### **2.3 LABELS - NOT USED.**

### **2.4 TOPSOIL**

- A. Topsoil shall be a well-graded soil of good uniform quality. It shall be  
a natural, friable soil representative of productive soils in the  
vicinity. Topsoil shall be free of admixture of subsoil, foreign matter,  
objects larger than 25 mm (one inch) in any dimension, toxic substances,  
weeds and any material or substances that may be harmful to turf growth  
and shall have a pH value of not less than 5.0 nor more than 7.5.

- B. Obtain material from stockpiles established under Section 31 20 00, EARTH MOVING, subparagraph, Stripping Topsoil, that meet the general requirements as stated above.
- C. If sufficient topsoil is not available on the site to meet the depth as specified herein, the Contractor shall furnish additional topsoil. At least 10 days prior to topsoil delivery, notify the Resident Engineer of the source(s) from which topsoil is to be furnished. Obtain topsoil from well drained areas. Additional topsoil shall meet the general requirements as stated above and comply with the requirements specified in Section 01 45 29, TESTING LABORATORY SERVICES. Amend topsoil not meeting the pH range specified by the addition of pH adjusters.

**2.5 LIME - NOT USED.**

**2.6 SOIL CONDITIONERS - NOT USED.**

**2.7 PLANTING SOIL MIXTURE - NOT USED.**

**2.8 BIOSTIMULANTS - NOT USED.**

**2.9 PLANT FERTILIZER**

- A. Provide plant fertilizer that is commercial grade and uniform in composition and conforms to applicable state and federal regulations.
- B. For government-furnished new plant material, provide packet, table, or pellet forms of slow release fertilizers, bearing the manufacturer's warranted statement of analysis. Slow release fertilizers shall contain a minimum percentage by weight of 10% nitrogen (of which 50% percent will be organic), 10% available phosphoric acid, and 10% potash.

**2.10 TURF FERTILIZER**

Provide turf fertilizer that is commercial grade, free flowing, uniform in composition, and conforms to applicable state and federal regulations. Granular fertilizer shall bear the manufacturer's warranted statement of analysis. Granular fertilizer shall contain a minimum percentage by weight of 10% nitrogen (of which 50 percent shall be organic), 5% available phosphoric acid, and 5% potash. Liquid starter

fertilizer for use in the hydro seed slurry will be commercial type with 50 percent of the nitrogen in slow release form.

**2.11 MEMBRANES - NOT USED.**

**2.12 MULCH**

A. Mulch shall be free from deleterious materials and shall be stored as to prevent inclusion of foreign material.

C. Organic mulch materials shall be wood cellulose fiber:

2. Wood cellulose fiber for use with hydraulic application of grass seed and fertilizer shall consist of specially prepared wood cellulose fiber, processed to contain no growth or germination-inhibiting factors, and dyed an appropriate color to facilitate visual metering of the application of materials. On an air-dry weight basis, the wood cellulose fiber shall contain a maximum of 12 percent moisture, plus or minus three percent at the time of manufacture. The pH range shall be from 3.5 to 5.0. The wood cellulose fiber shall be manufactured so that:

a. After addition and agitation in slurry tanks with fertilizers, grass seeds, water, and other approved additives, the fibers in the material will become uniformly suspended to form a homogeneous slurry.

c. The cover will allow the absorption of moisture and allow rainfall or applied water to percolate to the underlaying soil.

**2.13 ASPHALT ADHESIVE - NOT USED.**

**2.14 EROSION CONTROL - NOT USED.**

**2.15 TREE WRAP - REFERENCE DRAWINGS**

**2.16 STAKES AND GUYING WIRES**

A. Provide stakes for tree support of rough sawn wood, free from knots, rot, cross grain, or other defects that would impair the strength. Stakes shall be a minimum of 50 mm by 50 mm (2 inches by 2 inches), or 65 mm (2-1/2 inches) in diameter, by 2400 mm (8 feet) long and pointed at one end .



- B. Guying wire shall be 2.7 mm (12 gage) annealed galvanized steel.
- C. Hose chafing guards shall be new or used 2-ply reinforced rubber or plastic hose of all the same color on the project.
- D. Flags to be fastened to guys shall be surveyor's plastic tape, white in color and 150 mm (6 inches) in length.
- E. Guying cable shall be a minimum of five strand twisted, 5 mm (3/16 inch) diameter steel cable.
- F. Turnbuckles shall be galvanized or cadmium plated and have a 75 mm (3 inch) minimum lengthwise opening fitted with screw eyes.
- G. Eye bolts shall be galvanized or cadmium plated having a 50 mm (one inch) diameter eye with a minimum screw length of 40 mm (1-1/2 inches).
- H. Deadmen shall be 100 mm by 200 mm (4 inch by 8 inch) rectangular, or 200 mm (8 inch) diameter by 900 mm (36 inch) long sound wood.
- I. Arrow shaped or auger iron anchors shall be noncorrosive, and sized according to the manufacturer's recommendation.

#### **2.17 EDGING NOT USED.**

#### **2.18 WATER**

Water shall not contain elements toxic to plant life. It shall be obtained from VA-spigot indicated by COTR at no cost to the Contractor.

#### **2.19 ANTIDESICCANT**

Antidesiccant shall be granules or an emulsion specifically manufactured for agricultural use.

#### **2.20 SEED**

Seed shall be state-certified seed of the latest season's crop and shall be delivered in original sealed packages bearing the producer's warranted analysis for percentages of mixtures, purity, germination, weed seed content, and inert material. Seed shall be labeled in conformance with U. S. Department of Agriculture rules and regulations under the Federal Seed Act and applicable state seed laws. Seed that has become wet, moldy, or otherwise damaged will not be acceptable. Onsite seed mixing IS NOT ALLOWED. Seed mixtures shall be proportioned by weight as follows: a) Seed mix provided with New Lawn & Repair Kit (or

VA-approved equal), or b) 40% Kentucky Bluegrass, 30% Perennial Ryegrass, and 30% Creeping Red Fescue.

**2.21 SOD - NOT USED.**

**2.22 SPRIGS - NOT USED.**

**2.23 PLUGS - NOT USED.**

**2.24 HERBICIDES - NOT USED.**

**PART 3 - EXECUTION**

**3.1 LAYOUT**

Stake plant material locations and bed outlines on project site for approval by the Resident Engineer before any plant pits or beds are dug. The Resident Engineer may approve adjustments to plant material locations to meet field conditions.

**3.2 EXCAVATION FOR PLANTING**

- A. Prior to excavating for plant pits and bed, verify the location of any underground utilities. Damage to utility lines will be repaired at the Contractor's expense. Where lawns have been established prior to planting operation, cover the surrounding turf before excavations are made in a manner that will protect turf areas. Barricade existing trees, shrubbery, and beds that are to be preserved in a manner that will effectively protect them during the project construction.
- B. Remove rocks and other underground obstructions to a depth necessary to permit proper planting according to plans and specifications. Where underground utilities, construction, or solid rock ledges are encountered, the Resident Engineer may select other locations for plant material.
- C. Dig plant pits by any approved method so that they have vertical sides and flat bottoms. When pits are dug with an auger and the sides of the pits become glazed, scarify the glazed surface. Size the plant pits as shown, otherwise, the minimum allowable dimensions of plant pits shall be regardless of width, 150 mm (6 inches) deeper for shrubs and 225 mm (9 inches) deeper for trees than the depth of ball or root spread; for ball or root spread up to 600 mm (2 feet), pit diameters shall be twice the ball or root spread; for ball or root spread from 600 to 1200 mm (2

to 4 feet), pit diameters shall be 600 mm (2 feet) greater; for ball or root spread over 1200 mm (4 feet), pit diameters shall be 1-1/2 times the ball or root spread.

- D. Where ground cover and planting beds occur in existing turf areas, remove turf to a depth that will ensure the removal of the entire root system, with additional bed preparation as specified in the next paragraph.
- E. Where existing soil is to be used in place, till new ground cover and plant beds to a depth of 100 mm (4 inches). Spread soil amendment uniformly over the bed to depth of 50 mm (2 inches) and thoroughly incorporate it into the existing soil to a depth of 100 mm (4 inches) using a roto-tiller or similar type of equipment to obtain a uniform and well pulverized soil mix. Where existing soil is compacted (former roadways, parking lots, etc.) till the soil down to a depth necessary to support the growth of new planting. During tillage operations, remove all sticks, stones, roots, and other objectionable materials. Bring plant beds to a smooth and even surface conforming to established grades.
- F. In areas of new grading where existing soil is being replaced for the construction of new ground cover and plant beds, remove 100 mm (4 inches) of existing soil and replace with topsoil. Plant beds shall be brought to a smooth and even surface conforming to established grades. Till 50 mm (2 inches) of soil amendment into the topsoil as specified.
- G. Using topsoil, form earth saucers or water basins for watering around plants. Basins to be 2" high for shrubs and 4" high for trees.
- H. Treat plant saucers, shrub, and ground cover bed areas, prior to mulching, with an approved pre-emergent herbicide. Plant ground cover in areas to receive erosion control material through the material after material is in place.

### **3.3 SETTING PLANTS**

- A. Handle balled and burlapped and container-grown plants only by the ball or container. Remove container-grown plants in such a way to prevent damage to plants or root system. Set plants plumb and hold in position until sufficient soil has been firmly placed around the roots or ball. Set plants so that the root crown is 1" higher than the surrounding

grade. Plant ground cover plants after the mulch is in place. Avoid contaminating the mulch with the planting soil. Add slow release packet, tablet or pellet fertilizer as each plant is installed as per manufacturer's recommendation for method of installation and quantity.

- B. Backfill balled and burlapped and container-grown plants with planting soil mixture as specified to approximately half the depth of the ball and then tamp and water. For balled and burlapped plants, carefully remove excess burlap and tying materials and fold back. Where plastic wrap or treated burlap is used in lieu of burlap, completely remove these materials before backfilling. Tamp and water remainder of backfill Planting Soil Mixture; then form earth saucers or water basins around isolated plants with topsoil.
- C. Plant bare-root stock arranging the roots in a natural position. Remove damaged roots with a clean cut. Carefully work Planting Soil Mixture in among the roots. Tamp and water the remainder of Planting Soil Mixture; then form earth saucers or water basins around isolated plants with topsoil.

### **3.7 MULCHING PLANTS**

- A. Mulch within 48 hours after planting and applying a pre-emergent herbicide. Do not mulch in ground cover areas that shall have organic material placed before planting.

### **TILLAGE FOR TURF AREAS**

Thoroughly till the soil to a depth of at least 100 mm (4 inches) by scarifying, disking, harrowing, or other approved methods. This is particularly important in areas where heavy equipment has been used, and especially under wet soil conditions. Remove all debris and stones larger than 25 mm (one inch) remaining on the surface after tillage in preparation for finish grading. To minimize erosion, do not till areas of 3:1 slope ratio or greater. Scarify these areas to a 50 mm (one inch) depth and remove debris and stones.

### **3.2 FINISH GRADING**

After tilling the soil for bonding of topsoil with the subsoil, spread the topsoil evenly to a minimum depth of 100 mm (4 inches). Incorporate topsoil at least 50 to 75 mm (2 to 3 inches) into the subsoil to avoid soil layering. Do not spread topsoil when frozen or excessively wet or dry. Correct irregularities in finished surfaces to eliminate

depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic. Complete lawn work only after areas are brought to finished grade.

### **3.3 APPLICATION OF FERTILIZER FOR TURF AREAS**

- A. Apply turf fertilizer per manufacturer's recommendations.
- B. NOT USED.
- C. Fertilizers provided as separate product: Incorporate fertilizers into the soil to a depth of at least 100 mm (4 inches) as part of the finish grading operation. Immediately restore the soil to an even condition before any turf work.

### **3.4 MECHANICAL SEEDING**

- A. Broadcast seed by approved sowing equipment. Sow one half of the seed in one direction, and the remainder sown at right angles to the first sowing. Cover seed to an average depth of 6 mm (1/4 inch) by means of spike-tooth harrow, cultipacker, or other approved device.
- B. Immediately after seeding, firm up the entire area with a roller not exceeding 225 kg/m (150 pounds per foot) of roller width. Where seeding is performed with a cultipacker-type seeder or where seed is applied in combination with hydro-mulching, no rolling is required.
- C. For Separate Mulch: Immediately after preparing the seeded area, evenly spread an organic mulch by hand or by approved mechanical blowers at the rate of 0.5 kg/m<sup>2</sup> (2 tons per acre). Application shall allow some sunlight to penetrate and air to circulate but also reduce soil and seed erosion and conserve soil moisture.

### **3.5 WATERING**

Apply water to the turf areas immediately following installation at a rate sufficient to ensure thorough wetting of the soil to a depth of at least 100 mm (4 inches). Supervise watering operation to prevent run-off. Supply all pumps, hoses, pipelines, and sprinkling equipment. Repair all areas damaged by water operations.

### **3.6 PROTECTION OF TURF AREAS**

Immediately after installation of the turf areas, protect against traffic or other use by erecting barricades, as required, and placing approved signs at appropriate intervals until final acceptance.

**3.7 RESTORATION AND CLEAN-UP**

Where existing or new turf areas have been damaged or scarred during planting and construction operations, restore disturbed area to their original condition. Keep at least one paved pedestrian access route and one paved vehicular access route to each building clean at all times. In areas where planting and turf work have been completed, clear the area of all debris, spoil piles, and containers. Clear all other paved areas when work in adjacent areas is completed. Remove all debris, rubbish and excess material from the station.

**3.8 ENVIRONMENTAL PROTECTION**

All work and Contractor operations shall comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

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**SECTION 33 40 00**  
**STORM DRAINAGE UTILITIES**

**PART 1 - GENERAL****1.1 DESCRIPTION:**

This section specifies construction of outside, underground storm sewer systems. The storm sewer systems shall be complete and ready for operation, including all drainage structures, frames, grate and covers, connections to new buildings, structure service lines, existing storm sewer lines and existing drainage structures and all required incidentals. This work shall be defined by Changes to the Contract and is not in the base bid quantities.

**1.2 RELATED WORK:**

- A. Maintenance of Existing Utilities: Section 01 00 00, GENERAL REQUIREMENTS.
- B. Excavation, Trench Widths, Pipe Bedding, Backfill, Shoring, Sheeting, Bracing: Section 31 20 00, EARTH MOVING.
- C. Concrete Work, Reinforcing, Placement and Finishing: Section 03 30 00, CAST-IN-PLACE CONCRETE.
- D. Fabrication of Steel Ladders: Section 05 50 00, METAL FABRICATIONS.
- E. Protection of Materials and Equipment: Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING - NOT USED.

**1.3 QUALITY ASSURANCE:**

- A. Products Criteria:
  - 1. Multiple Units: When two or more units of the same type or class of materials or equipment are required, these units shall be products of one manufacturer.
  - 2. Nameplates: Nameplate bearing manufacturer's name, or identifiable trademark, securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped, or otherwise permanently marked on each item of equipment.
- B. Comply with the rules and regulations of the Public Utility having jurisdiction over the connection to public storm sewer lines and the extension, and/or modifications to Public Utility systems.

**1.4 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturers' Literature and Data: Submit the following as one package:
  - 1. Piping.
  - 2. Jointing material.
  - 3. Manhole, inlet and catch basin material.
  - 4. Frames and covers.
  - 5. Steps.
  - 6. Resilient connectors and downspout boots.
- C. One copy of State Department of Transportation standard details of MANHOLES, INLETS and catch basins.
- D. One copy of State Department of Transportation specification.

#### **1.5 APPLICABLE PUBLICATIONS:**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A48-03/A48M-03.....Gray Iron Castings
  - A536-84(2004).....Ductile Iron Castings
  - A615-05/A615M-05.....Deformed and Plain-Billet Steel Bars for  
Concrete Reinforcement
  - A655-04e1/A655M-04e1... Reinforced Concrete D-Load Culvert, Storm Drain  
and Sewer Pipe
  - A742-03/A742M-03.....Steel Sheet, Metallic Coated and Polymer  
Precoated for Corrugated Steel Pipe
  - A760-01a/A760M-01a.....Corrugated Steel Pipe, Metallic-Coated for  
Sewers and Drains
  - A762-00/A762M-00.....Corrugated Steel Pipe, Polymer Precoated for  
Sewers and Drains
  - A798-01/M798M-01.....Installing Factory-Made Corrugated Steel Pipe  
for Sewers and Other Applications
  - A849-00.....Post-Applied Coatings, Pavings, and Linings for  
Corrugated Steel Sewer and Drainage Pipe
  - A929-01/A929M-01.....Steel Sheet, Metallic Coated by the Hot Dip  
Process for Corrugated Steel Pipe



C76-05a/C76M-05a.....Reinforced Concrete Culvert, Storm Drain and  
Sewer Pipe

C139-03.....Concrete Masonry Units for Construction of Catch  
Basins and Manholes

C150-04ae1.....Portland Cement

C443-05/C443M-05.....Joints for Concrete Pipe and Manholes, Using  
Rubber Gaskets

C478-03a/C478M-03a.....Precast Reinforced Concrete Manhole Sections

C506-05/C506M-05.....Reinforced Concrete Arch Culvert, Storm Drain  
and Sewer Pipe

C507-05a/C507M-05a.....Reinforced Concrete Elliptical Culvert, Storm  
Drain and Sewer Pipe

C655-04e1/C655M-04e1....Reinforced Concrete D-Load Culvert, Storm Drain  
and Sewer Pipe

C1433-04e1/C1433M-04e1..Precast Reinforced Concrete Box Sections for  
Culverts, Storm Drains and Sewers

C828-03.....Low-Pressure Air Test of Vitrified Clay Pipe  
Lines

C857-95(2001).....Minimum Structural Design Loading for  
Underground Precast Concrete Utility Structures

C923-02/C923M-02.....Resilient Connectors between Reinforced Concrete  
Manhole Structures, Pipes and Materials

C924-02/C924M-02.....Testing Concrete Pipe Sewer Lines by Low  
Pressure Air Test Method

C1103-03/C1103M-03.....Joint Acceptance Testing of Installed Precast  
Concrete Pipe Sewer Lines

D698-00ae1.....Laboratory Compaction Characteristics of Soil  
Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600  
kN-m/m<sup>3</sup>))

D1056-00.....Flexible Cellular Materials-Sponge or Expanded  
Rubber

D2412-02.....Determination of External Loading  
Characteristics of Plastic Pipe by Parallel  
Plate Loading

D2321-04e1.....Underground Installation of Thermoplastic Pipe  
for Sewers and Other Gravity Flow Applications .

D3034-04a.....Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe  
and Fittings

D3212-96a(2003)e1.....Joints for Drain and Sewer Plastic Pipes Using  
Flexible Elastomeric Seals

D3350-04.....Polyethylene Plastics Pipe and Fittings  
Materials

D4101-05a.....Polypropylene Injection and Extrusion Materials

F477-02e1.....Elastomeric Seals (Gaskets) for Joining Plastic  
Pipe

F679-03.....Poly (Vinyl Chloride) (PVC) Large-Diameter  
Plastic Gravity Sewer Pipe and Fittings

F714-05.....Polyethylene (PE) Plastic Pipe (SDR-PR) Based on  
Outside Diameter

F794-03.....Poly (Vinyl Chloride)(PVC) Profile Gravity Sewer  
Pipe and Fittings Based on Controlled Inside  
Diameter

F894-98a.....Polyethylene (PE) Large Diameter Profile Wall  
Sewer and Drain Pipe

F949-03.....Poly (Vinyl Chloride) (PVC) Corrugated Sewer  
Pipe with Smooth Interior

F1417-92(2005).....Installation Acceptance of Plastic Gravity Sewer  
Lines Using Low-Pressure Air

NOTE: ASTM test methods shall be the current version as of the date of  
advertisement of the project.

C. American Association of State Highway and Transportation Officials  
(AASHTO):

HB17.....Standard Specifications for Highway Bridges

M190-04.....Bituminous Coated Corrugated Metal Culvert Pipe  
and Pipe Arches

M198-05.....Joints for Circular Concrete Sewer and Culvert  
Pipe Using Flexible Watertight Gaskets

M294-04.....Corrugated Polyethylene Pipe, 300-1500 mm (12 to  
60 inches) Diameter

**PART 2 - PRODUCTS**

**2.1 PIPING:**

## A. Gravity Lines (Pipe and Appurtenances):

## 1. Concrete:

- a. Reinforced pipe, ASTM C76. Class III, or ASTM C655, 19.7kN/lm (1350 lbs/lf) per 300 mm (1 foot) inside dia. D-Load, 300 mm through 2740 mm (12 inches through 108 inches). Joints shall be watertight flexible joints made with rubber-type gaskets conforming to ASTM C443.

## 2. Polyvinyl Chloride (PVC):

- a. Pipe and Fittings, Type PSM PVC Pipe, shall conform to ASTM D3034, Type PSM, SDR 35. Pipe and fittings shall have elastomeric gasket joints providing a watertight seal when tested in accordance with ASTM D 3212. Gaskets shall conform to ASTM F 477. Solvent welded joints shall not be permitted.
- b. Pipe and fittings, smooth wall, corrugated or ribbed PVC, shall conform to the following:
  - 1) Pipe and fittings shall conform to ASTM F949 corrugated sewer pipe with a smooth interior. The corrugated outer wall shall be fused to the smooth interwall at the corrugation valley. Pipe and fitting shall have a smooth bell, elastomeric joints conforming to ASTM D 3212, and shall have a minimum pipe stiffness of 345 kPa (50 psi) at 5 percent deflection, when tested in accordance with ASTM D 2412. Corrugation shall be perpendicular to the axis of the pipe to allow gaskets to be installed on field cut sections of pipe without the requirement for special fittings.
  - 2) Ribbed wall PVC pipe and fittings shall conform to ASTM F794, Series 46. Ribbed sewer pipe with smooth interior pipe and fittings shall have a smooth bell, elastomeric joints conforming to ASTM D 3212, and shall have a minimum pipe stiffness of 320 kPa (46 psi) when tested in accordance with ASTM D 2412, at 5 percent vertical deflection. Joints shall not leak at 7.6 m (25 feet) of head under 5 percent deflection.
  - 3) Solid wall pipe and fittings shall conform to ASTM F 679, SDR 35 pipe and fittings shall gaskets conforming to ASTM F 477, and shall be able to withstand a hydrostatic pressure of 345 kPa (50 psi).

3. High Density Polyethylene (HDPE): NOT USED.
4. Corrugated Steel Pipe: NOT USED.

## **2.2 JOINTING MATERIAL:**

- A. Concrete Pipe: Rubber gasket ASTM C443.
- B. Polyvinyl Chloride (PVC) Pipe:
  1. PVC Plastic Pipe: Joints shall comply with ASTM D3212, Elastomeric Gaskets shall comply with ASTM F477 and as recommended by the manufacturer.

## **2.3 MANHOLES, INLETS AND CATCH BASINS:**

- A. Manholes, inlets and catch basins shall be constructed of precast concrete segmental blocks, precast reinforced concrete rings, precast reinforced sections, or cast-in-place concrete. Manholes, inlets and catch basins shall be in accordance with State Department of Transportation standard details, and the following VA requirements, in case of variance, VA requirements supersede:
  1. Precast Concrete Segmental Blocks: Blocks shall conform to ASTM C139 and shall not be less than 150 mm (6 inches) thick for manholes to a depth of 3.6 m (12 feet); not less than 200 mm (8 inches) thick for manholes deeper than 3.6 m (12 feet) deep. Blocks shall be not less than 200 mm (8 inches) in length. Blocks shall be shaped so that joints seal and bond effectively with cement mortar. Parge structure interior and exterior with 15 mm (1/2 inch) of cement mortar applied with a trowel and finished to an even glazed surface.
  2. Precast Reinforced Concrete Rings: Rings or sections shall have an inside diameter as indicated on the drawings, and shall be not less than 1200 mm (48 inches) in diameter. Wall thickness shall conform to requirements of ASTM C76, except that lengths of the sections may be shorter as conditions require. Tops shall conform to ASTM C478. Top section shall be eccentric cone type. Steps on inside wall shall be in the same plane from bottom of structure to manhole cover.
  3. Precast Reinforced Concrete Manhole Risers and Tops: Design, material and installation shall conform to requirements of ASTM C478. Top sections shall be eccentric. Steps on inside wall shall be in the same plane from bottom of structure to manhole cover.

4. Flat top manhole tops shall be reinforced concrete as detailed on the drawings.
5. Precast Catch Basins: Concrete for precast sections shall have a minimum compressive strength of 35 MPa (5,000 psi) at 28 days, ASTM A615, Grade 60 reinforcing steel, rated for AASHTO HS20-44 loading with 30 percent impact, and conform to ASTM C-857.
6. Mortar:
  - a. Precast Concrete Segmental Block Structures: By volume, 1 part of Portland cement, 1/4 part lime hydrate, and 3 parts sand.
  - b. Precast Reinforced Concrete Ring and Riser Structures: By volume, 1 part of Portland cement and 2 parts sand. Water in mixture shall produce a stiff, workable mortar, but shall not exceed 21L (5-1/2 gallons) per sack of cement.
7. Flexible sealing compound shall be packaged in extruded preformed shape, sized to completely fill the joint between precast sections, and form permanently flexible watertight seal. The sealing compound shall be non-shrink and meet AASHTO M-198B.
8. Frames and covers shall be gray cast iron conforming to ASTM A48. The frame and cover shall be rated for HS20-44 loading, have a studded pattern on the cover, and the words "storm sewer". The studs and the lettering shall be raised 8 mm (5/16 inch). The cover shall be a minimum of 600 mm (24 inches) in diameter and shall have four 19 mm (3/4 inch) vent holes and two lifting slots. The bearing surface of the frame and cover shall be machine finished. The cover shall fit firmly on the frame without movement when subject to traffic.
9. Manhole steps shall be polypropylene plastic coated on a No. 4 deformed rebar conforming to ASTM C478, Polypropylene shall conform to ASTM D4101. Steps shall be a minimum of 250 mm (10 inches) wide and project a minimum of 125 mm (5 inches) away from the wall. The top surface of the step shall have a studded non-slip surface. Steps shall be placed at 300 mm (12 inch) centers.
10. Ladders, brackets and hardware shall be constructed of welded aluminum, rails shall be 9 mm (3/8 inch) by 63 mm (2-1/2 inches) spaced a minimum of 400 mm (16 inches) apart. Rungs shall be 35 mm (1-3/8 inches) in diameter and have a non-slip surface. Standoffs

shall offset the ladder 180 mm (7 inches) from the wall. The ladder assembly shall be rated for a minimum of 2200 N (500 pounds).

- B. Prefabricated Corrugated Metal Manholes: Manholes shall be the type and design as indicated on the drawings and as recommended by the manufacturer.
- C. Prefabricated Plastic Manholes and Drain Basins: Plastic manholes and drain basins shall be as indicated on the drawings.
- D. Frame and Cover for Gratings: Frame and cover for gratings shall be in accordance with State Department of Transportation standard details. Weight, shape, size, and waterway openings for grates and curb inlets shall be as indicated on the drawings.

#### **2.4 HEADWALLS:**

- A. Headwalls shall be cast-in-place concrete and in accordance with State Department of Transportation standard details. Concrete shall have a minimum compressive strength of 20 MPa (3000 psi) at 28 days. The cement shall be Type III conforming to ASTM C150. Concrete shall conform with the provisions of Division 03 of these specifications.

#### **2.5 CONCRETE:**

For concrete not specified in above standards, concrete shall have a minimum compressive strength of 20 MPa (3000 psi) at 28 days. The cement shall be Type III conforming to ASTM C150. Concrete shall conform to the provisions of Division 03 of these specifications.

#### **2.6 REINFORCING STEEL:**

Reinforcing steel shall be deformed bars, ASTM A615, Grade 40 unless otherwise noted.

#### **2.7 FLARED END SECTIONS:**

Flared End Sections: Sections shall be of standard design fabricated from zinc-coated steel sheets conforming to requirements of ASTM A929.

#### **2.8 PRECAST REINFORCED CONCRETE BOX.**

Precast Reinforced Concrete Box: For highway loadings with 600 mm (2 feet) of cover or more subjected to dead load only, conform to ASTM C1433; For less than 600 mm (2 feet) of cover subjected to highway loading, conform to ASTM C1433.

#### **2.9 RESILIENT CONNECTORS AND DOWNSPOUT BOOTS:**

- A. Resilient Connectors: Flexible, watertight connectors used for connecting pipe to manholes and inlets shall conform to ASTM C923.

- B. Downspout Boots: Boots used to connect exterior downspouts to the storm drainage system shall be of gray cast iron conforming to ASTM A48, Class 30B or 35B.

#### **2.10 WARNING TAPE:**

Standard, 4-Mil polyethylene 76 mm (3 inch) wide tape detectable type, purple with black letters, and imprinted with "CAUTION BURIED STORM SEWER BELOW".

### **PART 3 - EXECUTION**

#### **3.1 EXCAVATION FOR STORM DRAINS AND DRAINAGE STRUCTURES:**

Excavation of trenches and for appurtenances and backfilling for storm drains, shall be in accordance with the applicable portions of Section 31 20 00, EARTH MOVING.

#### **3.2 PIPE BEDDING:**

The bedding surface of the pipe shall provide a firm foundation of uniform density throughout the entire length of pipe. Concrete pipe requirements are such that when no bedding class is specified, concrete pipe shall be bedded in a soil foundation accurately shaped and rounded to conform with the lowest one-fourth of the outside portion of circular pipe. When necessary, the bedding shall be tamped. Bell holes and depressions for joints shall not be more than the length, depth, and width required for properly making the particular type of joint. Plastic pipe bedding requirements shall meet the requirements of ASTM D2321. Bedding, haunching and initial backfill shall be either Class IB or Class II material. Corrugated metal pipe bedding requirements shall conform to ASTM A798.

#### **3.3 GENERAL PIPING INSTALLATION:**

- A. Lay pipes true to line and grade. Gravity flow sewer shall be laid with bells facing upgrade.
- B. Do not lay pipe on unstable material, in wet trench or when trench and weather conditions are unsuitable for the work.
- C. Support pipe on compacted bedding material. Excavate bell holes only large enough to properly make the joint.
- D. Inspect pipes and fittings, for defects before installation. Defective materials shall be plainly marked and removed from the site. Cut pipe shall have smooth regular ends at right angles to axis of pipe.

- E. Clean interior of all pipe thoroughly before installation. When work is not in progress, open ends of pipe shall be closed securely to prevent entrance of storm water, dirt or other substances.
- F. Lower pipe into trench carefully and bring to proper line, grade, and joint. After jointing, interior of each pipe shall be thoroughly wiped or swabbed to remove any dirt, trash or excess jointing materials.
- G. Do not lay sewer pipe in same trench with another pipe or other utility.
- H. Do not walk on pipe in trenches until covered by layers of shading to a depth of 300 mm (12 inches) over the crown of the pipe.
- I. Install gravity sewer line in accordance with the provisions of these specifications and the following standards:
  - 1. Reinforced Concrete Pipe: Comply with manufacturer's recommendations with gasketed joints.
  - 2. Polyvinyl Chloride (PVC) Piping: ASTM D2321.
  - 3. High Density Polyethylene (HDPE) Piping: Comply with manufacturer's recommendations with gasketed joints
- J. Warning tape shall be continuously placed 300 mm (12 inches) above storm sewer piping.

#### **3.4 REGRADING:**

- A. Raise or lower existing manholes and structures frames and covers in regraded areas to finish grade. Carefully remove, clean and salvage cast iron frames and covers. Adjust the elevation of the top of the manhole or structure as detailed on the drawings. Reset cast iron frame and cover, grouting below and around the frame. Install concrete collar around reset frame and cover as specified for new construction.
- B. During periods when work is progressing on adjusting manholes or structures cover elevations, the Contractor shall install a temporary cover above the bench of the structure or manhole. The temporary cover shall be installed above the high flow elevation within the structure, and shall prevent debris from entering the wastewater stream.
- C. The Contractor shall comply with all OSHA confined space requirements when working within existing structures.

#### **3.5 CONNECTIONS TO EXISTING VA-OWNED MANHOLES:**

Make pipe connections and alterations to existing manholes so that finished work will conform as nearly as practicable to the applicable



requirements specified for new manholes, including concrete and masonry work, cutting, and shaping.

### **3.7 MANHOLES, INLETS AND CATCH BASINS:**

#### **A. General:**

##### **1. Circular Structures:**

- a. Precast concrete segmental blocks shall lay true and plumb. All horizontal and vertical joints shall be completely filled with mortar. Parge interior and exterior of structure with 15 mm (1/2 inch) or cement mortar applied with a trowel and finished to an even glazed surface.
- b. Precast reinforced concrete rings shall be installed true and plumb. The joints between rings and between rings and the base and top shall be sealed with a preform flexible gasket material specifically manufactured for this type of application. Adjust the length of the rings so that the eccentric conical top section will be at the required elevation. Cutting the conical top section is not acceptable.
- c. Precast reinforced concrete manhole risers and tops. Install as specified for precast reinforced concrete rings.

##### **2. Rectangular Structures:**

- a. Reinforced concrete structures shall be installed in accordance with Division 03, CONCRETE of these specifications.
  - b. Precast concrete structures shall be placed on a 200 mm (8 inch) reinforced concrete pad, or be provided with a precast concrete base section. Structures provided with a base section shall be set on a 200 mm (8 inches) thick aggregate base course compacted to a minimum of 95 percent of the maximum density as determined by ASTM D 698. Set precast section true and plumb. Seal all joints with preform flexible gasket material.
3. Do not build structures when air temperature is 0 degrees C (32 degrees F), or below.
  4. Invert channels shall be smooth and semicircular in shape conforming to inside of adjacent sewer section. Make changes in direction of flow with a smooth curve of as large a radius as size of structure will permit. Make changes in size and grade of channels gradually and evenly. Construct invert channels by one of the listed methods:

- a. Forming directly in concrete base of structure.
  - b. Building up with brick and mortar.
5. Floor of structure outside the channels shall be smooth and slope toward channels not less than 1:12 (25mm per 300mm, 1-inch per foot) nor more than 1:6 (50mm per 300mm, 2 inches per foot). Bottom slab and benches shall be concrete.
  6. The wall that supports access rungs or ladder shall be 90 degrees vertical from the floor of structure to manhole cover.
  7. Install steps and ladders per the manufacturer's recommendations. Steps and ladders shall not move or flex when used. All loose steps and ladders shall be replaced by the Contractor.
  8. Install manhole frames and covers on a mortar bed, and flush with the finish pavement. Frames and covers shall not move when subject to vehicular traffic. Install a concrete collar around the frame to protect the frame from moving until the adjacent pavement is placed. In unpaved areas, the rim elevation shall be 50 mm (2 inches) above the adjacent finish grade. Install a 200 mm (8 inches) thick, by 300 mm (12 inches) concrete collar around the perimeter of the frame. Slope the top of the collar away from the frame.

### **3.8 CURB INLETS, CATCH BASINS, AND AREA DRAINS:**

Reinforced concrete as shown or precast concrete.

### **3.9 INSPECTION OF SEWERS:**

Inspect and obtain the Resident Engineer's approval. Thoroughly flush out before inspection. Lamp between structures and show full bore indicating sewer is true to line and grade. Lip at joints on inside of sewer is prohibited.

### **3.10 TESTING OF STORM SEWERS:**

#### **A. Gravity Sewers (Select one of the following):**

1. Air Test: Concrete Pipes conform to ASTM C924, Plastic Pipes conform to ASTM F1417, all other pipe material conform to ASTM C828 or C924, after consulting with pipe manufacturer. Testing of individual joints shall conform to ASTM C1103.
2. Exfiltration Test:
  - a. Subject pipe to hydrostatic pressure produced by head of water at depth of 900 mm (3 feet) above invert of sewer at upper manhole under test. In areas where ground water exists, head of water

shall be 900 mm (3 feet) above existing water table. Maintain head of water for one hour for full absorption by pipe body before testing. During 1 hour test period, measured maximum allowable rate of exfiltration for any section of sewer shall be 11L (3.0 gallons) per hour per 30 m (100 feet).

- b. If measurements indicate exfiltration is greater than maximum allowable leakage, take additional measurements until leaks are located. Repair and retest.

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**SECTION 34 71 13**  
**VEHICLE BARRIERS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section includes passive Vehicle Barricades.
- B. Use wherever work is performed within 50 feet of a building or permanent structure shown on plans.
- C. This work shall be defined by Changes to the Contract except as defined in the base bid quantities.
- D. After market barriers may be used if in good condition, with no through cracks, less than 10 percent surface defects, and no objectionable markings.
- E. Nominal dimensions 10' L x (2'W base and 0.5'W top) x 32" H.  
Variations subject to VA approval.

**1.2 RELATED WORK**

- A. Section 32 12 16, ASPHALT PAVING, for asphalt driveway and approach paving.
- B. Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS, for concrete driveway and approach paving.
- C. Section 03 30 00, CAST-IN-PLACE CONCRETE, for concrete islands and curbing.
- D. Section 05 50 00, METAL FABRICATIONS, for pipe bollards to protect parking control equipment.
- E. Section 28 16 00, INTRUSION DETECTION SYSTEM - NOT USED.

**1.3 SYSTEM DESCRIPTION**

- A. Barricade system mounted in the ground. Specific routes to be determined by COTR.
- B. Barricades shall be nominally 10 feet in length, and have lifting rings or bottom slots for lifting by hydraulic lift truck.

**1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated. Photos of each after market barricades. Photograph sides and ends.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Indicate dimensions, required clearances,

method of field assembly, and location and size of each field connection.

- C. Certificate test reports confirming compliance's with specified resistive rating.

#### **1.5 QUALITY ASSURANCE**

- A. Source Limitations: None.

#### **1.6 PERFORMANCE**

- A. Performance Evaluation. NOT USED.

#### **1.7 COORDINATION**

Do not anchor, but provide anchorage attachments with barriers.

Coordinate with VA Grounds staff to ensure barriers are accessible for future relocation by VA.

#### **1.8 APPLICABLE PUBLICATIONS:**

NOT USED.

### **PART 3-EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, for compliance with requirements for installation tolerances, critical dimensions, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 INSTALLATION**

Install per manufacturer's installation instructions.

#### **3.3 FIELD QUALITY CONTROL**

Rejected materials shall be replaced at no cost to government.

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