

SCOPE OF WORK
VA LAS VEGAS MEDICAL CENTER
PROJECT NO. 593-13-002 CONSTRUCT CANOPY FOR EMERGENCY MANGEMENT
6900 North Pecos Road, N. Las Vegas, NV 89086
SECTION 01 00 00

4 JUN 2013

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GENERAL REQUIREMENTS:

General Intention

1.1 General Intention: Contractor shall construct 3000 square foot of canopy structure. The Contractor shall prepare the work site at the VA Medical Center, located at 6900 North Pecos Road, North Las Vegas, NV 89086. Project site location is on the south side of the existing water tower. Work shall include; providing a stamped structural drawing by a Structural Engineer, bid and build canopy, earthwork excavation for I-Beam footings, canopy's minimum lowest beam elevation shall be a minimum 15 feet above finish floor, assembly of I-Beams, assembly of metal roof panels, electrical work to include but not limited to trenching and installation of required electrical conduits, installing duplex electrical outlets, installing 3-ea 50A 125/250V with grounding, install 1-ea, 125/250V 1Ph/60Hz/50A, 2 hot wires, 1 neutral and 1 ground wire, NEMA 14-50R receptacle for Decon Trailer, installation of T-8 light fixtures rated for outdoor, for canopy lighting system and lightning protection system, installation of 1" PVC water line with two hose bibs, Provide concrete ramp access into the pad's East and West Gate, approximately 20' by 10' wide with rebar, type II fill, compacted to a minimum of 95%.

Provide detectable 5.0 mil marking tape for all utilities installed. The I-Beam and the roofing system shall be factory pre-painted in **BEIGE** color. Contractor is responsible for furnishing structural and electrical engineering stamped drawings, shop drawings, bolt patterns layout, labor, materials, equipment, transportation, tools, and obtaining local permits, management and supervision necessary to perform the work. The work hours are from Monday-Friday 7:30 am – 4:00 pm. Work during Federal Holiday shall be coordinated to the Contracting Officer. Coordinate entry of contractors through

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Contracting Officer Representative. Submit construction schedule prior to start of construction. The construction schedule must be approved by the Contracting Officer in writing.

- 1.2 Statement of Bid Item
- A. General Construction: Work includes general construction, soil excavation for concrete footings, and construction of a steel frame with 26GA PBR Roof Panel Canopy. The basis of Structural Stamped Drawing should be Clark County, Nevada.
 - B. Submit cost proposal, provide a cost breakdown of each of the line item below, to include material cost, equipment cost, labor cost, overhead and profit, in pdf format and in excel spread sheet.
 - C. Provide Stamped Engineering Drawing before issuance of Notice To Proceed. The building structure shall be AISC Certified.
 - D. Excavate footings for the I-Beam.
 - E. Trenching for the installation of electrical conduit for exterior lighting, electrical outlets and lighting protection system.
 - F. Trenching for the installation of water line.
 - G. Provide and Install 1" PVC water line with two hose bibs
 - H. Provide and Install 3-ea 50A 125/250V with grounding receptacle.
 - I. Provide and Install 1-ea, 125/250V 1Ph/60Hz/50A, 2 hot wires, 1 neutral and 1 ground wire, NEMA 14-50R receptacle for Decon Trailer.
 - J. Provide and Install weatherproof energy-efficient 4-foot T-8 fluorescent fixtures rated for outdoor, see layout. Lighting fixtures should be RoHS Compliant.
 - K. Provide and Install lightning protection system.
 - L. Provide and install 2-ea hose bibs for outdoor applications.
 - M. Provide and Install a light switch to control the canopy lighting systems.
 - N. Provide concrete ramp into the pad's East and West Gate, approximately 20' by 10' wide with rebar, type II fill, compacted to a minimum of 95%.
 - O. Backfill with select fill and compaction of the electrical trench.
 - P. Backfill with select fill and compaction of the water line trench.

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- Q. Submit structural stamped drawings, and shop drawings before assembly.
- R. Assembly of I-Beams.
- S. Assembly of roofing system.
- T. Assembly and installation of the canopy lighting system.
- U. Assembly of the lightning protection system.
- V. Refer to the attached layout for approximate location.
- W. Certification/inspection of the installed systems.
- X. Contractor shall field verify existing site condition before submitting bid.
- Y. Contractor shall field verify location of existing electrical system and water line.
- Z. The government shall retain 10% of the construction cost until all deliverables, punch list items and as-built drawings are submitted.
- AA. Contractor shall coordinate the marking of all existing utilities in the construction area. Before calling, mark the outline work area with white paint or chalk and shall be water base. Call USA North before you dig; 1-800-227-2600; <http://www.usanorth.org/USANHow2Call.html>.
- BB. Contractor is responsible in maintaining the marked layout from USA North during construction.
- CC. Submit shop drawings; i.e. Product data, and samples.
- DD. All work shall be accomplished in accordance with applicable industry standards, local building codes, and Federal Regulations.
- EE. Refer to the attached; Site Layout, Sketch 1, 2, and 3.
- FF. QUALIFICATIONS (PRODUCTS AND SERVICES)
 - A. Manufacturer's Qualifications: The manufacturer shall regularly and currently produce, as one of the manufacturer's principal products, the materials and equipment specified for this project, and shall have manufactured the materials and equipment for at least three years.
 - B. Product Qualification:

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1. Manufacturer's materials and equipment shall have been in satisfactory operation, on three installations of similar size and type as this project, for at least three years.
2. The Government reserves the right to require the Contractor to submit a list of installations where the materials and equipment have been in operation before approval.

GG. For Emergency Purposes, Contractor shall dial 911 for emergency and the physical address location is 6900 North Pecos Road, North Las Vegas, NV, south side of the Water Tower.

HH. For final inspection, provide written request to Contracting Officer 3 working days prior to scheduling a Final Inspection.

CAST-IN-PLACE CONCRETE

1.3 DESCRIPTION:

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

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.

1.4 TOLERANCES:

A. ACI 117.

B. Slab Finishes: ACI 117, F-number method in accordance with ASTM E1155.

1.5 REGULATORY REQUIREMENTS:

A. ACI SP-66 ACI Detailing Manual

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

1.6 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.

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B. Concrete Mix Design.

C. Shop Drawings: Reinforcing steel: Complete shop drawings.

D. Manufacturer's Certificates: Air-entraining admixture, chemical admixtures, curing compounds.

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 Concrete Institute (ACI):

- 117-10..... Specification for Tolerances for Concrete Construction,
Materials and Commentary
- 211.1-91(R2009)..... Standard Practice for Proportions for Normal,
Heavyweight, and Mass Concrete
- 211.2-98(R2004)..... Standard Practice for Selecting Proportions for
Structural Lightweight Concrete
- 301-10..... Specifications for Structural Concrete
- 305.1-06..... Specification for Hot Weather Concreting
- 306.1-90(R2002)..... Standard Specification for Cold Weather Concreting
- SP-66-04 ACI Detailing Manual
- 318-11..... Building Code Requirements for Structural Concrete and
Commentary
- 347-04..... Guide to Formwork for Concrete

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

- A185/A185M-07 Standard Specification for Steel Welded Wire
Reinforcement, Plain, for Concrete Reinforcement
- A615/A615M-09 Standard Specification for Deformed and Plain Carbon
Steel Bars for Concrete Reinforcement
- A996/A996M-09 Standard Specification for Rail Steel and Axle Steel
Deformed Bars for Concrete Reinforcement
- C31/C31M-10 Standard Practice for Making and Curing Concrete Test
Specimens in the Field

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C33/C33M-11a	Standard Specification for Concrete Aggregates
C39/C39M-12	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
C94/C94M-12	Standard Specification for Ready Mixed Concrete
C143/C143M-10	Standard Test Method for Slump of Hydraulic Cement Concrete
C150-11	Standard Specification for Portland Cement
C171-07	Standard Specification for Sheet Material for Curing Concrete
C172-10	Standard Practice for Sampling Freshly Mixed Concrete
C173-10	Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
C192/C192M-07	Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
C231-10	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
C260-10	Standard Specification for Air-Entraining Admixtures for Concrete
C330-09	Standard Specification for Lightweight Aggregates for Structural Concrete
C494/C494M-11	Standard Specification for Chemical Admixtures for Concrete
C618-12	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
D1751-04 (R2008)	Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
D4397-10	Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications

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E1155-96(2008) Standard Test Method for Determining F_F Floor Flatness
and F_L Floor Levelness Numbers

1.8 FIRE SAFETY

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

1. American Society for Testing and Materials (ASTM):
E84-2009 Surface Burning Characteristics of Building Materials
2. National Fire Protection Association (NFPA):
10-2010 Standard for Portable Fire Extinguishers
51B-2009 Standard for Fire Prevention During Welding, Cutting
and Other Hot Work
241-2009 Standard for Safeguarding Construction, Alteration, and
Demolition Operations
3. Occupational Safety and Health Administration (OSHA):
29 CFR 1926 Safety and Health Regulations for Construction

B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submits to Contracting Officer and Facility Safety Officer for review for compliance with contract requirements. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the general contractor's competent person per OSHA requirements. This briefing shall include information on the construction limits, safety guidelines, means of egress, break areas, work hours, locations of restrooms, etc. Documentation shall be provided to the COR that individuals have undergone contractor's safety briefing.

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

D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).

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E. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with COR.

F. Fire Extinguishers: Provide and maintain extinguishers in construction areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.

G. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.

H. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to COR and Facility Safety Officer.

1.9 USE OF ROADWAYS/ /PROJECT SIGNAGE

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

1.10 AVAILABILITY AND USE OF UTILITY SERVICES

B. The Government shall make available utilities available to the Contractor from existing outlets and supplies. The Contractor shall carefully conserve any utilities furnished without charge.

C. Electricity for Construction and Testing: Furnish all temporary electric services.

1. Obtain electricity by connecting to the Medical Center electrical distribution system. Electricity for all other uses is available at no cost to the Contractor.

D. Water (for Construction and Testing): Furnish temporary water service.

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

1.11 PROJECT SIGNAGE

A. Provide a Safety Sign.

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B. Paint all surfaces of Safety Sign and posts with one prime coat and two coats of white gloss paint. Letters and design shall be painted with gloss paint of colors noted.

C. Maintain sign and remove it when directed by Contracting Officer.

1.12 LAYOUT OF WORK

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

1.13 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS

A. The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, and shrubs) on or adjacent to the work sites, which are not to be removed and which do not unreasonably interfere with the work required under this contract

B. The Contractor shall protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

1.14 RESTORATION

A. Upon completion of contract, deliver work complete and undamaged. Existing roads, sidewalks, disturbed or removed as a result of performing required new work, shall be patched,

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repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.

C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are indicated on drawings and which are not scheduled for discontinuance or abandonment.

D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled.

2.1 FORMS:

Wood, plywood, metal, or other materials, approved by Resident Engineer, of grade or type suitable to obtain type of finish specified.

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, Size 67. Size 467 may be used for footings and walls over 300 mm (12 inches) thick. Coarse aggregate for applied topping and metal pan stair fill shall be Size 7.

D. Fine Aggregate: ASTM C33.

E. Lightweight Aggregate for Structural Concrete: ASTM C330, Table 1

F. Mixing Water: Fresh, clean, and potable.

G. Air-Entraining Admixture: ASTM C260.

H. Chemical Admixtures: ASTM C494.

I. Vapor Barrier: ASTM D4397, //0.25 mm (10 mil)//0.38 mm (15 mil)//.

J. Reinforcing Steel: ASTM A615 or ASTM A996, deformed. See structural drawings for grade.

K. Welded Wire Fabric: ASTM A185.

L. Expansion Joint Filler: ASTM D1751.

M. Sheet Materials for Curing Concrete: ASTM C171.

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N. Abrasive Aggregates: Aluminum oxide grains or emery grits.

O. Grout, Non-Shrinking: Premixed ferrous or non-ferrous, mixed and applied in accordance with manufacturer's recommendations. Grout shall show no settlement or vertical drying shrinkage at 3 days or thereafter based on initial measurement made at time of placement, and produce a compressive strength of at least 18mpa (2500 psi) at 3 days and 35mpa (5000 psi) at 28 days.

2.3 CONCRETE MIXES:

A. Design of concrete mixes using materials specified shall be the responsibility of the Contractor as set forth under Option C of ASTM C94.

B. Compressive strength at 28 days shall be not less than 25mpa or 30 MPa (3000 psi/4000 psi).

C. Establish strength of concrete by testing prior to beginning concreting operation. Test consists of average of three cylinders made and cured in accordance with ASTM C192 and tested in accordance with ASTM C39.

D. Maximum slump for vibrated concrete is 100 mm (4 inches) tested in accordance with ASTM C143.

E. Cement and water factor (See Table I):

TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE

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

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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.
4. Determined by Laboratory in accordance with ACI 211.1 for normal concrete or ACI 211.2 for lightweight structural concrete.

F. Air-entrainment is required for all exterior concrete. Air content shall conform to the following tables:

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

Nominal Maximum Size of Coarse Aggregate	Total Air Content Percentage by Volume
10 mm (3/8 in)	6 to 10
13 mm (1/2 in)	5 to 9
19 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

TABLE II TOTAL AIR CONTENT
AIR CONTENT OF LIGHTWEIGHT STRUCTURAL CONCRETE

Nominal Maximum size of Total Air Content	Coarse Aggregate, mm's (Inches) Percentage by Volume
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Greater than 10 mm (3/8 in) 4 to 8	10 mm (3/8 in) or less 5 to 9

2.4 BATCHING & MIXING:

A. Store, batch, and mix materials as specified in ASTM C94.

1. Job-Mixed: Concrete mixed at job site shall be mixed in a batch mixer in manner specified for stationary mixers in ASTM C94.
2. Ready-Mixed: Ready-mixed concrete comply with ASTM C94, except use of non-agitating equipment for transporting concrete to the site will not be permitted. With each load of concrete delivered to project, ready-mixed concrete producer shall furnish, in duplicate, certification as required by ASTM C94.
3. Mixing structural lightweight concrete: Charge mixer with 2/3 of total mixing water and all of the aggregate. Mix ingredients for not less than 30 seconds in a stationary mixer or not less than 10 revolutions at mixing speed in a truck mixer. Add remaining mixing water and other ingredients and continue mixing. Above procedure may be modified as recommended by aggregate producer.

3.1 FORMWORK:

A. Installation conforms to ACI 347. Sufficiently tight to hold concrete without leakage, sufficiently braced to withstand vibration of concrete, and to carry, without appreciable deflection, all dead and live loads to which they may be subjected.

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. Inserts, sleeves, and similar items: Flashing reglets, masonry ties, anchors, inserts, wires, hangers, sleeves, boxes for floor hinges and other items specified as furnished under this and

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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.

D. Construction Tolerances:

1. Contractor is responsible for setting and maintaining concrete formwork to assure erection of completed work within tolerances specified to accommodate installation or other rough and finish materials. Remedial work necessary for correcting excessive tolerances is the responsibility of the Contractor. 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 REINFORCEMENT:

Details of concrete reinforcement, unless otherwise shown, in accordance with ACI 318 and ACI SP-66. Support and securely tie reinforcing steel to prevent displacement during placing of concrete.

3.3 PLACING CONCRETE:

- A. Remove water from excavations before concrete is placed. Remove hardened concrete, debris and other foreign materials from interior of forms, and from inside of mixing and conveying equipment. Obtain approval of Resident Engineer before placing concrete. Provide screeds at required elevations for concrete slabs.
- B. Before placing new concrete on or against concrete which has set, existing surfaces shall be roughened and cleaned free from all laitance, foreign matter, and loose particles.
- C. Convey concrete from mixer to final place of deposit by method which will prevent segregation or loss of ingredients. Do not deposit in work concrete that has attained its initial set or has contained its water or cement more than 1 1/2 hours. Do not allow concrete to drop freely more than 1500 mm (5 feet) in unexposed work nor more than 900 mm (3 feet) in exposed work. Place and consolidate concrete in horizontal layers not exceeding 300 mm (12

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inches) in thickness. Consolidate concrete by spading, rodding, and mechanical vibrator. Do not secure vibrator to forms or reinforcement. Vibration shall be carried on continuously with placing of concrete.

D. Hot weather placing of concrete: Follow recommendations of ACI 305R to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete.

E. Cold weather placing of concrete: Follow recommendations of ACI 306R, to prevent freezing of thin sections less than 300 mm (12 inches) and to permit concrete to gain strength properly, except that use of calcium chloride shall not be permitted without written approval from Contracting Officer.

3.4 PROTECTION AND CURING:

Protect exposed surfaces of concrete 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 Contracting Officer.

3.5 FORM REMOVAL:

Forms remain in place until concrete has a sufficient strength to carry its own weight and loads supported. Removal of forms at any time is the Contractor's sole responsibility.

3.6 SURFACE PREPARATION:

Immediately after forms have been removed and work has been examined and approved by Project Engineer, remove loose materials, and patch all stone pockets, surface honeycomb, or similar deficiencies with cement mortar made with 1 part Portland cement and 2 to 3 parts sand.

3.7 FINISHES:

A. Vertical and Overhead Surface Finishes:

1. Unfinished Areas: Vertical and overhead concrete surfaces exposed in unfinished areas, above suspended ceilings in manholes, and other unfinished areas exposed or concealed will not require additional finishing.

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STRUCTURAL STEEL FRAMING

4.1 DESCRIPTION:

This section specifies structural steel shown and classified by Section 2, Code of Standard Practice for Steel Buildings and Bridges.

4.2 RELATED WORK:

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. PAINTING.
- C. STEEL JOIST FRAMING.
- D. STEEL DECKING.
- E. Composite Steel Deck: COMPOSITE METAL DECKING.
- F. Fireproofing: APPLIED FIREPROOFING.

4.3 QUALITY ASSURANCE:

- A. Fabricator and erector shall maintain a program of quality assurance in conformance with Section 8, Code of Standard Practice for Steel Buildings and Bridges. Work shall be fabricated in an AISC certified Category Std fabrication plant.
- B. Before authorizing the commencement of steel erection, the controlling contractor shall ensure that the steel erector is provided with the written notification required by 29 CFR 1926.752. Provide copy of this notification to the Project Engineer.

4.4 TOLERANCES:

Fabrication tolerances for structural steel shall be held within limits established by ASTM A6, by AISC 303, Sections 6 and 7, Code of Standard Practice for Buildings and Bridges, except as follows:

- A. Elevation tolerance for closure plates at the building perimeter and at slab openings prior to concrete placement is 6 mm (1/4 inch).

4.5 STAMP DRAWING:

- A. Connections: Provide complete stamp structural and shop drawings, and detail all connections for each member size, steel grade and connection type to resist the loads and

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reactions indicated on the drawings or specified herein. Use details consistent with the details shown on the Drawings, supplementing where necessary. The details shown on the Drawings are conceptual and do not indicate the required weld sizes or number of bolts unless specifically noted. Use rational engineering design and standard practice in detailing, accounting for all loads and eccentricities in both the connection and the members. Promptly notify the Project Engineer of any location where the connection design criteria is not clearly indicated. The design of all connections is subject to the review and acceptance of the Project Engineer. Submit structural calculations prepared and sealed by a qualified engineer registered in the state of Nevada. Submit calculations for review before preparation of detail drawings.

4.6 REGULATORY REQUIREMENTS:

- A. AISC 360: Specification for Structural Steel Buildings
- B. AISC 303: Code of Standard Practice for Steel Buildings and Bridges.

4.7 SUBMITTALS:

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

4.8 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 Institute of Steel Construction (AISC):

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1. AISC 360-10 Specification for Structural Steel Buildings
3. AISC 303-10 Code of Standard Practice for Steel Buildings and Bridges

C. American National Standards Institute (ANSI):

B18.22.1-65(R2008)..... Plain Washers

B18.22M-81(R2000) Metric Plain Washers

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

A6/A6M-11 Standard Specification for General Requirements for
Rolled Structural Steel Bars, Plates, Shapes, and Sheet
Piling

A36/A36M-08 Standard Specification for Carbon Structural Steel

A53/A53M-10 Standard Specification for Pipe, Steel, Black and Hot-
Dipped, Zinc-Coated Welded and Seamless

A123/A123M-09 Standard Specification for Zinc (Hot-Dip Galvanized)
Coatings on Iron and Steel Products

A242/A242M-04(R2009) Standard Specification for High-Strength Low-Alloy
Structural Steel

A283/A283M-03(R2007) Standard Specification for Low and Intermediate Tensile
Strength Carbon Steel Plates

A307-10 Standard Specification for Carbon Steel Bolts and Studs,
60,000 psi Tensile Strength

A325-10 Standard Specification for Structural Bolts, Steel, Heat
Treated, 120/105 ksi Minimum Tensile Strength

A490-12 Standard Specification for Heat-Treated Steel Structural
Bolts 150 ksi Minimum Tensile Strength

A500/A500M-10a Standard Specification for Cold Formed Welded and
Seamless Carbon Steel Structural Tubing in Rounds and
Shapes

A501-07 Standard Specification for Hot-Formed Welded and
Seamless Carbon Steel Structural Tubing

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- A572/A572M-07 Standard Specification for High-Strength Low-Alloy
Columbium-Vanadium Structural Steel
- A992/A992M-11 Standard Specification for Structural Steel Shapes
- E. American Welding Society (AWS):
- D1.1/D1.1M-10..... Structural Welding Code-Steel
- F. Research Council on Structural Connections (RCSC) of The Engineering Foundation:
- Specification for Structural Joints Using ASTM A325 or A490 Bolts
- G. Military Specifications (Mil. Spec.):
- MIL-P-21035 Paint, High Zinc Dust Content, Galvanizing, Repair
- H. Occupational Safety and Health Administration (OSHA):
- 29 CFR Part 1926-2001 Safety Standards for Steel Erection

5.1 MATERIALS:

- A. Structural Steel: ASTM A36, A242, A283, A572, Grade A992.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Structural Tubing: ASTM A501.
- D. Steel Pipe: ASTM A53, Grade B.
- E. Bolts, Nuts and Washers:
1. High-strength bolts, including nuts and washers: ASTM A325.
 2. Bolts and nuts, other than high-strength: ASTM A307, Grade A.
 3. Plain washers, other than those in contact with high-strength bolt heads and nuts: ANSI Standard B18.22.1.
- F. Zinc Coating: ASTM A123.
- G. Galvanizing Repair Paint: Mil. Spec. MIL-P-21035.

5.2 CONNECTIONS (SHOP AND FIELD):

- A. Welding: Welding in accordance with AWS D1.1. Welds shall be made only by welders and welding operators who have been previously qualified by tests as prescribed in AWS D1.1 to perform type of work required.
- B. High-Strength Bolts: High-strength bolts tightened to a bolt tension not less than 70% of their minimum tensile strength. Tightening done with properly calibrated wrenches, by turn-of-nut method or by use of direct tension indicators (bolts or washers). Tighten bolts in connections

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identified as slip-critical using Direct Tension Indicators. Twist-off torque bolts are not an acceptable alternate fastener for slip critical connections.

5.3 FABRICATION:

Fabrication in accordance with Chapter M, AISC 360. .

5.4 SHOP PAINTING:

A. General: Shop paint steel with primer in accordance with AISC 303, Section 6.

B. Shop paint for steel surfaces is specified in Section 09 91 00, PAINTING.

C. Do not apply paint to following:

1. Surfaces within 50 mm (2 inches) of joints to be welded in field.
2. Surfaces which will be encased in concrete.
3. Surfaces which will receive sprayed on fireproofing.
4. Top flange of members which will have shear connector studs applied.

D. Zinc Coated (Hot Dip Galvanized) per ASTM A123 (after fabrication): Touch-up after erection:

Clean and wire brush any abraded and other spots worn through zinc coating, including threaded portions of bolts and welds and touch-up with galvanizing repair paint.

5.5 ERECTION:

A. General: Erection in accordance with AISC 303, Section 7B. Temporary Supports: Temporary support of structural steel frames during erection in accordance with AISC 303, Section 7

5.6 FIELD PAINTING:

A. After erection, touch-up steel surfaces specified to be shop painted. After welding is completed, clean and prime areas not painted due to field welding.

B. Finish painting of canopy and steel surfaces is specified as BEIGE.

6.1 HOSE BIBB

A. Provide Hose Bib Vacuum Breakers, mounted and secured on support bracket (24 inches) above ground surface. Provide faucet with 19 mm (3/4 inch) hose coupling thread on spout and vacuum breaker.

6.2 INSTALLATION

D. Toggle Bolts: For hollow masonry units, finished or unfinished.

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E. Expansion Bolts: For brick or concrete or other solid masonry. Shall be 6 mm (1/4 inch) diameter bolts, and to extend at least 76 mm (3 inches) into masonry and be fitted with loose tubing or sleeves extending into masonry. Wood plugs, fiber plugs, lead or other soft metal shields are prohibited.

6.3 CLEANING

At completion of all work, fixtures, exposed materials and equipment shall be thoroughly cleaned.

LIGHTNING PROTECTION

PART 1 - GENERAL

7.1 DESCRIPTION

This section specifies the furnishing and installation of a complete master labeled lightning protection system, complying with NFPA 780, UL 96 and UL 96A.

7.2 RELATED WORK

- A. FLASHING AND SHEET METAL: penetrations through the roof.
- B. REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that is in compliance with applicable Local, State, Federal Codes.
- C. GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground faults.
- D. CATHODIC PROTECTION: Requirements for protection of buried ferrous equipment from galvanic corrosion.

7.3 QUALITY ASSURANCE

Refer to section 1.2 Qualifications.

7.4 SUBMITTALS

- A. Submit Shop Drawings, Product Data, and Samples.
- B. Shop Drawings:
 - 1. Isometric and plan views showing layout and connections to the required metal surfaces.
 - 2. Show the methods of mounting the system to the adjacent construction.

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C. Qualifications: Submit proof that the installer of the lightning protection system is a certified Lightning Protection Institute (LPI) installer, and has had suitable and adequate experience installing other lightning protection systems, and is capable of installing the system as recommended by the manufacturer of the equipment.

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

1. Certification that the lightning protection system has been properly installed and tested.
2. Certification that the lightning protection system has been inspected by a UL representative and has been approved by UL without variation.

7.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. National Fire Protection Association (NFPA):

- 70..... National Electrical Code (NEC)
- 780..... Standard for the Installation of Lightning Protection
Systems

C. Underwriters Laboratories, Inc. (UL):

- 96..... Lightning Protection Components
- 96A..... Installation Requirements for Lightning Protection
Systems
- UL 467 Standard for Grounding and Bonding Equipment

7.6 MATERIALS

A. Attach master labels to each item by its manufacturer as evidence that the materials have been manufactured in conformance with the UL Standards for master label lightning protection materials.

B. In addition to conformance to UL 96, the component material requirements are as follows:

1. Conductors: Electrical grade copper. Conductors shall be in accordance with NFPA 780 and UL 96 for Class I, Class II, or Class II modified materials as applicable.

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2. Air terminals: Solid copper, 18 inches long, not less than 3/8 inch [9mm] diameter, with sharp nickel-plated points.
3. Ground rods: Solid copper, not less than 1/2 inch [13mm] diameter by 8 feet [2400mm] long. Rods made of copper-clad steel shall conform to UL 467 and galvanized ferrous rods shall conform to IEEE C135.30. Ground rods of copper-clad steel, steel, stainless steel, galvanized ferrous and solid copper shall not be mixed on the project.
4. Ground plates: Solid copper, not less than 1/16 inch [2mm] thick.
5. Tubing: Stiff copper or brass.

C. Anchors and fasteners: Bolt types which are most suitable for the specific anchor and fastener installations. Clamp-type connectors for splicing conductors shall conform to UL 96, class as applicable, and, Class 2, style and size as required for the installation. Clamp-type connectors shall only be used for the connection of the roof conductor to the air terminal and to the guttering. All other connections, bonds, and splices shall be done by exothermic welds or by high compression fittings. The exothermic welds and high compression fittings shall be listed for the purpose. The high compression fittings shall be the type which requires a hydraulically operated mechanism to apply a minimum of 10,000 psi.

7.7 INSTALLATION

- A. Installation shall be coordinated with the roofing manufacturer and installer.
- B. Install the conductors as inconspicuously as practical and with the proper bends.
- C. Install the vertical conductors within the concealed cavity of exterior walls. Run the conductors to the exterior at elevations below the finished grade and make the ground connections to the earth outside of the building or stack perimeter.
- D. Make connections of dissimilar metal with bimetallic type fittings to prevent electrolytic action.
- E. Use the exothermic welding type connections that form solid metal joints in the main vertical and horizontal conductors, and for connections that are not exposed in the finish work.
- F. Protect copper conductors with stiff copper or brass tubing, which enclose the conductors from the top to the bottom of the tubing, between one foot [300mm] below and seven feet

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[2100mm] above the finished grade. The conductor shall be bonded to the top and bottom of the tubing.

G. Sheath copper conductors, which pass over cast stone, cut stone, architectural concrete and masonry surfaces, with not less than a 1/16 inch [2mm] thickness of lead to prevent staining of the exterior finish surfaces.

H. For the earth connections, install ground rods and ground plates, and the conductor connections to them and the main water pipes in the presence of the Project Engineer. For the conductors located outside of the building or stack, install the conductors not less than two feet [600mm] below the finished grade.

J. Connect lightning protection cables to all metallic projections, equipment, and components above the roof as indicated on the drawings.

K. Connect exterior metal surfaces, located within three feet [900mm] of the lightning protection system conductors, to the lightning protection system conductors to prevent flashovers.

L. Maintain horizontal or downward coursing of main conductor and insure that all bends have at least an 8-inch radius and do not exceed 90 degrees.

M. Conductors shall be rigidly fastened every three feet [900mm] along the roof and down to the building to ground.

N. Air terminals shall be secured against overturning either by attachment to the object to be protected or by means of a substantial tripod or other braces permanently and rigidly attached to the building or structure. Install air terminal bases, cable holders and other roof-system supporting means without piercing roof metal.

O. Use clamp supports to secure supporting means to roof structure.

P. Use through-roof connectors for down-conductor attachment to roof system. Provide flashing in accordance with acceptable trade standard.

Q. Down-conductors coursed on or in reinforced concrete columns or on structural steel columns shall be connected to the reinforcing steel or the structural steel member at its upper and lower extremities. In the case of long vertical members an additional connection shall be made at intervals not exceeding 100 feet [30m].

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R. A counterpoise, where shown, shall be of No. 1/0 copper cable or equivalent material having suitable resistance to corrosion and shall be laid around the perimeter of the structure in a trench not less than 2 feet [600mm] deep at a distance not less than 3 feet [900mm] nor more than 8 feet [2.5m] from the nearest point of the structure.

S. Grounding: Test the ground resistance to earth by standard methods and conform to the ground resistance requirements.

T. Where shown, use the structural steel framework or reinforcing steel as the main conductor:

1. Weld or bond the non-electrically-continuous sections together and make them electrically continuous.
2. Verify the electrical continuity by measuring the ground resistances to earth at the ground level, at the top of the building or stack, and at intermediate points with a sensitive ohmmeter. Compare the resistance readings.
3. Connect the air terminals together with an exterior conductor connected to the structural steel framework at not more than 60 foot [18m] intervals.
4. Install ground connections to earth at not more than 60 foot [18m] intervals around the perimeter of the canopy.
5. Weld or braze bonding plates, not less than 8 inches [200mm] square, to cleaned sections of the steel and connect the conductors to the plates.
6. Do not pierce the structural steel in any manner. Connections to the structural steel shall conform to UL Publication No. 96A.

U. For obstruction lights, the following additional requirements shall apply:

1. Extend air terminals one foot [300mm] above the top of the light fixtures and securely clamp to the light fixture supports.
2. Install 600 volt class lightning arresters. Connect the arresters to the lightning circuit conductors at suitable locations, and ground and bond them to the lightning protection system.

CANOPY LIGHTING SYSTEM

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8.1 DESCRIPTION:

A. This section specifies the furnishing, installation and connection of the weatherproof energy efficient interior lighting systems.

8.2 RELATED WORK

- A. Requirement for seismic restraint for nonstructural Components.
- B. General requirements that is common to electrical work.
- C. Low Voltage electrical power conductors and cables (600 volts and below): Cables and wiring.
- D. Grounding and bonding for electrical systems: Requirements for personnel safety and to provide a low impedance path to ground for possible ground fault currents.
- E. Wiring devices: Wiring devices used for control of the lighting systems.

8.3 QUALITY ASSURANCE

Refer to Section 1.2, Qualifications.

8.4 SUBMITTALS

A. In accordance with Section 1.1 REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, submit the following:

B. Product Data: For each type of lighting fixture (luminaire), submit the following information.

1. Material and construction details include information on housing, optics system and lens/diffuser.
2. Physical dimensions and description.
3. Wiring schematic and connection diagram.
4. Installation details.
5. Energy efficiency data.
6. Photometric data based on laboratory tests complying with IESNA Lighting Measurements, testing and calculation guides.
7. Lamp data including lumen output (initial and mean), color rendition index (CRI), rated life (hours) and color temperature (degrees Kelvin).
8. Ballast data including ballast type, starting method, ambient temperature, ballast factor, sound rating, system watts and total harmonic distortion (THD).

C. Manuals:

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

D. Certifications:

1. One week prior to final inspection, submit four copies of the following certifications to the Project Engineer/COTR:
 - a. Certification by the Contractor that the equipment has been properly installed, adjusted, and tested.

8.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. Institute of Electrical and Electronic Engineers (IEEE):

C62.41-02 Guide on the Surge Environment in Low Voltage (1000V and less) AC Power Circuits

C. National Fire Protection Association (NFPA):

70-08..... National Electrical Code (NEC)

101-09..... Life Safety Code

D. National Electrical Manufacturer's Association (NEMA):

C78.138-98 Electric Lamps - 250-Watt, 70 Watt, M85 Metal-Halide Lamps

C78.43-07 Standard for Electric Lamps - Single-Ended Metal-Halide Lamps

C78.81-05 Electric Lamps - Double-capped Fluorescent Lamps
Dimensional and Electrical Characteristics

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- C78.901-05 Electric Lamps - Single Base Fluorescent Lamps
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- C82.1-04 Ballasts for Fluorescent Lamps - Specifications
- C82.2-02 Method of Measurement of Fluorescent Lamp Ballasts
- C82.4-02 Ballasts for High-Intensity-Discharge and Low-Pressure
Sodium Lamps
- C82.11-02 High Frequency Fluorescent Lamp Ballasts

E. Underwriters Laboratories, Inc. (UL):

- 496-08..... Safety Lampholders
- 542-05..... Lampholders, Starters, and Starter Holders for
Fluorescent Lamps
- 844-06..... Electric Lighting Fixtures for Use in Hazardous
(Classified) Locations
- 924-06..... Emergency Lighting and Power Equipment
- 935-01..... Fluorescent-Lamp Ballasts
- 1598-08..... Luminaires
- 2108-04.....Standard for Low-Voltage Lighting Systems
- 8750-08.....Light Emitting Diode (LED) Light Sources for Use in Lighting Products

F. Federal Communications Commission (FCC):

Code of Federal Regulations (CFR), Title 47, Part 18

8.6 LIGHTING FIXTURES (LUMINAIRES)

A. Shall be in accordance with NFPA 70 and UL 1598, and as specified.

B. Sheet Metal:

1. Shall be formed to prevent warping and sagging. Housing, trim and lens frame shall be true, straight (unless intentionally curved) and parallel to each other as designed.
2. Wireways and fittings shall be free of burrs and sharp edges and shall accommodate internal and branch circuit wiring without damage to the wiring.

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3. When installed, any exposed fixture housing surface, trim frame, door frame and lens frame shall be free of light leaks; lens doors shall close in a light tight manner.

4. Hinged door closure frames shall operate smoothly without binding when the fixture is in the installed position, latches shall function easily by finger action without the use of tools.

C. Ballasts shall be serviceable while the fixture is in its normally installed position, and shall not be mounted to removable reflectors or wireway covers unless so specified.

D. Lamp Sockets:

1. Fluorescent: Lampholder contacts shall be the biting edge type or phosphorous-bronze with silver flash contact surface type and shall conform to the applicable requirements of UL 542. Lamp holders for bi-pin lamps shall be of the telescoping compression type, or of the single slot entry type requiring a one-quarter turn of the lamp after insertion.

E. Mechanical Safety: Lighting fixture closures (lens doors, trim frame, hinged housings, etc.) shall be retained in a secure manner by captive screws, chains, captive hinges or fasteners such that they cannot be accidentally dislodged during normal operation or routine maintenance.

F. Metal Finishes:

1. The manufacturer shall apply standard finish (unless otherwise specified) over a corrosion resistant primer, after cleaning to free the metal surfaces of rust, grease, dirt and other deposits. Edges of pre-finished sheet metal exposed during forming, stamping or shearing processes shall be finished in a similar corrosion resistant manner to match the adjacent surface(s). Fixture finish shall be free of stains or evidence of rusting, blistering, or flaking, and shall be applied after fabrication.

2. Interior light reflecting finishes shall be white with not less than 85 percent reflectances, except where otherwise shown on the drawing.

3. Exterior finishes shall be as shown on the drawings.

G. Lighting fixtures shall have a specific means for grounding metallic wireways and housings to an equipment grounding conductor.

H. Light Transmitting Components for Fluorescent Fixtures:

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1. Shall be 100 percent virgin acrylic.
2. Flat lens panels shall have not less than 3.2mm (1/8 inch) of average thickness. The average thickness shall be determined by adding the maximum thickness to the minimum unpenetrated thickness and dividing the sum by 2.
3. Unless otherwise specified, lenses, diffusers and louvers shall be retained firmly in a metal frame by clips or clamping ring in such a manner as to allow expansion and contraction of the lens without distortion or cracking.

J. Lighting fixtures in hazardous areas shall be suitable for installation in Class and Group areas as defined in NFPA 70, and shall comply with UL 844.

8.7 BALLASTS

A. Linear Fluorescent Lamp Ballasts: Multi-voltage (120 – 277V) electronic instant-start type, complying with UL 935 and with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated; including the following features:

1. Lamp end-of-life detection and shutdown circuit (T5 lamps only).
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: Class A.
4. Total Harmonic Distortion Rating: 10 percent or less.
5. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.
8. Ballast Factor: 0.87 or higher unless otherwise indicated.
9. Power Factor: 0.98 or higher.
10. Interference: Comply with 47 CFT 18, Ch.1, Subpart C, for limitations on electromagnetic and radio-frequency interference for non-consumer equipment.
11. To facilitate multi-level lamp switching, lamps within fixture shall be wired with the outermost lamp at both sides of the fixture on the same ballast, the next inward pair on ballast and so on to the innermost lamp (or pair of lamps). Within a given

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room, each switch shall uniformly control the same corresponding lamp (or lamp pairs) in all fixture units that are being controlled.

12. Where three-lamp fixtures are indicated, unless switching arrangements dictate otherwise, utilize a common two-lamp ballast to operate the center lamp in pairs of adjacent units that are mounted in a continuous row. The ballast fixture and slave-lamp fixture shall be factory wired with leads or plug devices to facilitate this circuiting. Individually mounted fixtures and the odd fixture in a row shall utilize single-lamp ballast for operation of the center lamp.

B. Low-Frequency Linear T8 Fluorescent Lamp Ballasts: 120V hybrid electronic-electromagnetic rapid-start type, complying with UL 935 and with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output; including the following features:

1. Automatic lamp starting after lamp replacement.
2. Sound Rating: Class A.
3. Total Harmonic Distortion Rating: 20 percent or less.
4. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
5. Operating Frequency: 60 Hz.
6. Lamp Current Crest Factor: 1.7 or less.
7. Ballast Factor: 0.85 or higher unless otherwise indicated.
8. Power Factor: 0.90 or higher.
9. Interference: Comply with 47 CFT 18, Ch.1, Subpart C, for limitations on electromagnetic and radio-frequency interference for non-consumer equipment.
10. To facilitate multi-level lamp switching, lamps within fixture shall be wired with the outermost lamp at both sides of the fixture on the same ballast, the next inward pair on ballast and so on to the innermost lamp (or pair of lamps). Within a given room, each switch shall uniformly control the same corresponding lamp (or lamp pairs) in all fixture units that are being controlled.
11. Where three-lamp fixtures are indicated, unless switching arrangements dictate otherwise, utilize a common two-lamp ballast to operate the center lamp in pairs of

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adjacent units that are mounted in a continuous row. The ballast fixture and slave-lamp fixture shall be factory wired with leads or plug devices to facilitate this circuiting. Individually mounted fixtures and the odd fixture in a row shall utilize single-lamp ballast for operation of the center lamp.

8.8 LAMPS

A. Linear T8 Fluorescent Lamps:

1. Rapid start fluorescent lamps shall comply with ANSI C78.1; and instant-start lamps shall comply with ANSI C78.3.
2. Chromacity of fluorescent lamps shall comply with ANSI C78.376.
3. Except as indicated below, lamps shall be low-mercury energy saving type, have a color temperature between 3500° and 4100°K, a Color Rendering Index (CRI) of greater than 70, average rated life of 20,000 hours, and be suitable for use outdoors.

8.9 INSTALLATION

A. Installation shall be in accordance with the NEC, manufacturer's instructions and as shown on the drawings or specified.

B. Align, mount and level the lighting fixtures uniformly.

C. Lighting Fixture Supports:

1. Shall provide support for all of the fixtures. Supports may be anchored to structural members within the canopy structure.
2. Shall maintain the fixture positions after cleaning and relamping.

c. Burn-in all lamps that require specific aging period to operate properly, prior to occupancy by Government. Burn-in period to be 40 hours minimum, unless a lesser period is specifically recommended by lamp manufacturer. Burn-in fluorescent and compact fluorescent lamps intended to be dimmed, for at least 100 hours at full voltage. Replace any lamps and ballasts which fail during burn-in.

d. At completion of project, relamp/reballast fixtures which have failed lamps/ballasts. Clean fixtures, lenses, diffusers and louvers that have accumulated dust/dirt/fingerprints during construction. Replace damaged lenses, diffusers and louvers with new.

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9.1 MEDICAL CENTER ACCESS

- A. The Contractor shall obtain badges from the VA Police located in Room of 1C378 of the Medical Center. During construction Contractors shall maintain the badge and will be properly display badge while on Medical Center Campus.
- B. Contractors shall observed and obey traffic signs.

9.2 GUARRANTY/WARRANTY

- A. Submit written guaranty, in accordance with General Condition requirements except that guarantee period shall be extended to include two (2) years.

9.3 DEBRIS AND FINAL CLEAN-UP

- A. Contractor shall provide own dumpster during construction. It is the responsibility of the general contractor to keep its construction site clean and safe to all its employees and VA employee. The area shall be left free of debris; left over materials shall be neatly arranged at the end of the duty day. At the end of construction, general contractor shall clean the areas of construction and all materials will be hauled off site.

Waste disposal in landfills shall be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much of the waste material as economically feasible shall be salvaged, recycled or reused.

- C. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:

- 1. Waste Management Plan development and implementation.
- 2. Techniques to minimize waste generation.
- 3. Sorting and separating of waste materials.
- 4. Salvage of existing materials and items for reuse or resale.
- 5. Recycling of materials that cannot be reused or sold.

- D. At a minimum the following waste categories shall be diverted from landfills:

- 1. Soil.
- 2. Inerts (e.g., concrete, masonry and asphalt).
- 3. Clean dimensional wood and palette wood.

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4. Green waste (biodegradable landscaping materials).
5. Engineered wood products (plywood, particle board and I-joists, etc.).
6. Metal products (e.g., steel, wire, beverage containers, copper, etc.).
7. Cardboard, paper and packaging.
8. Bitumen roofing materials.
9. Plastics (e.g., ABS, PVC).
10. Paint.
11. Fluorescent lamps.

9.4 AS BUILT DRAWINGS/RED LINE DRAWINGS

A. The contractor shall maintain one full size sets of as-built drawings which will be kept current during construction of the project, to include all contract changes, modifications and clarifications.

B. All variations shall be shown in the same general detail as used in the contract drawings. To insure compliance, as-built drawings shall be made available for the COR's review, as often as requested.

C. Contractor shall deliver one approved completed sets of as-built drawings to the Contracting Officer Representative within 15 calendar days and after the acceptance of the project by Contracting Officer.

9.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in original sealed packages or containers; labeled for identification with manufacturer's name and brand.

B. Protect materials from damage due to handling, weather, and construction operations before, during and after installation.

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