

**OPTIMUM CARE
SUGAR LAND, TEXAS
GENERAL NOTES AND ELECTRICAL SPECIFICATIONS**

26 05 00 BASIC ELECTRICAL REQUIREMENTS:

A. Code Compliance: The codes, ordinances and standards listed herein will be referred to in the design of electrical systems. The Engineer will select appropriate sections to be applied in accordance with established engineering principles and practices. All codes, ordinances and standards shall be subject to interpretation and enforcement as provided by City of Sugar Land, Fort Bend County, the State of Texas and Federal Agencies.

- The current City of Sugar Land Electrical Code, including the 2011 National Electrical Code (NFPA 70).
- 2009 International Building Code with City of Sugar Land Amendments. Occupancy for this facility is a business occupancy, as indicated in the Architectural Drawings.
- Texas Accessibility Standards (TAS).
- Accessibility Guidelines (ADAAG) of Title III, Americans with Disabilities Act (ADA) of 2010. Note that ADA is Federal civil rights law. Enforcement of ADA is by Federal Agencies specified in the Act. Owner(s) should obtain appropriate legal counsel to determine methods of compliance for the specific Work of this Project.
- Fire Alarm Rules of Texas Commission on Fire Protection.
- Texas Energy Code (IECC 2009; ASHRAE/IESNA 90.1 – 2007).
- Licensing Standards for Assisted Living Facilities as described in the Texas Administrative Code, Title 40, Chapter 92 and as administered by the Texas Department of Aging and Disability Services (DADS). Texas Administrative Code Rules and Statutes (rule 92.61 thru 92.64) as apply to a type "B-small" facility.

B. Permits and Codes: Obtain and pay for all necessary permits and required inspections. Comply with all national, state and municipal laws, codes and ordinances relating to building and public safety. Provide any required temporary power and utilities for all trades and all construction trailers. Provide temporary construction lighting and power. Electrical Contractor shall include Temporary Electric: All temporary electric shall be in accordance with OSHA Construction standards 29FCR, Part 1926 and Article 590 of the 2008 National Electrical Code. Temporary lighting and power shall be provided in accordance with OSHA standards. The OSHA minimum illumination is 5 footcandles in general construction areas, and 10 FC in mechanical/electrical rooms and workrooms. Included are connections to all construction trailers. The cost of this work is to be included in the base electrical bid for the project.

C. Visiting the Jobsite: Visit the site of the proposed construction in order to fully understand the facilities, difficulties and restrictions attending the execution of the work. No additional compensation will be allowed this Contractor for work or items omitted from his original proposal due to his failure to inform himself regarding such matters affecting the performance of the work in this contract or necessary for the installation and completion of the work included herein.

D. Terminology: "Provide," "Furnish" and "Install": Unless otherwise noted, the term "furnish" as used in these Drawings and Specifications is intended to mean procure and deliver to the jobsite in a condition that is ready to fit into the final location. Furnish shall include submittal of shop drawings and procuring any related warranties, ready to assign to the Owner. Unless otherwise noted, the term "install" as used in these Drawings and Specifications is intended to mean mounting the equipment and permanently affixing it into the designated location and making all necessary final connections so as to place the equipment into service. Install shall also include procuring and permanently fixing into place any mounting hardware, fittings and any other appurtenances as required for a complete and workman-like installation as well as performing all required tests on the completed installation. Install shall also mean documenting the installation, such as operation and maintenance manuals and/or as-installed drawings. Unless otherwise noted, the term "provide" as used in these Drawings and Specifications is intended to mean both "furnish" and "install".

E. Drawings: Drawings are diagrammatic in nature. Contractor shall confirm dimensions & locations in the field. If conflicting dimensions are shown, use larger dimensions and verify with the Architect. Refer to Architectural plans and elevations for exact locations of lighting fixtures and mounting heights of all wall mounted devices. In case of conflicts between drawings, or specs and drawings, Contractor shall request clarifications in writing from the Architect and/or the Engineer, otherwise the more stringent requirements shall be provided.

F. Material: All materials shall be new, made in USA and U.L. listed for the intended use. Material installation shall comply with NEC requirements and the installation of such materials shall be performed by craftsmen skilled in this particular work.

G. Equipment Protection: Protect equipment and work from damage during handling and installation until completion of construction.

H. Cooperation With Other Trades: Cooperation with trades of adjacent, related or affected materials or operations, and with trades performing continuations of this work under subsequent contracts, is considered a part of this work in order to effect timely and accurate placing of work and to bring together, in proper and correct sequence, the work of such trades. Provide other trades, as required, all necessary templates, patterns, setting plans and shop details for the proper installation of the work and for the purpose of coordinating adjacent work. Electrical power connections for mechanical and plumbing equipment are specified under this Division unless noted otherwise. Verify electrical characteristics of all equipment with Division 22, Division 23 and any other special Divisions (elevators etc) before roughing in the electrical connections and energizing the equipment.

I. Mechanical/Plumbing/Special Equipment access and clearance areas: Remove any improperly installed electrical equipment and conduit that are limiting proper service and maintenance access for the equipment.

J. Access Panels: Provide access panels or doors for all devices requiring adjustment. Similarly for all junction boxes, pull boxes, etc. that are required to be accessible per Code and/or the local authority having jurisdiction. Appearance of access panels/doors shall be acceptable to the Architect. Panels/doors shall be designed for the fire rating of wall or ceiling in which they are installed. All access panels shall be lockable and shall be keyed alike (same keying as panels from other divisions).

K. Plenums: Plenums may be crowded and not all obstacles are indicated. Allow for conduit offsets and pull boxes not indicated on drawings.

L. Plaster, gypsum board or other non-accessible ceilings: Contractor shall minimize cutting and patching by installing conduit prior to ceiling/wall/partition cover-up.

M. Loss or Damage to New Facilities: The Contractor shall be responsible for loss or damage to the facilities caused by him and his workmen, and shall be responsible for repairing or replacing such loss or damage. The Contractor shall send proper notices, make necessary arrangements, and perform other services required for the care, protection and in-service maintenance of all electrical services for the new facilities. The Contractor shall erect temporary barricades, with necessary safety devices, as required to protect personnel and the general public from injury, removing all such temporary protection upon completion of the work.

O. Clean up: A) Provide for isolation of work areas and daily removal of debris. B) Clean all equipment and fixture lenses. C) Replace all burned out lamps. D) Touch up with paint where required.

R. Submittal Data: Submittal are required but not limited to the following equipment:

- Lighting Fixtures
- Distribution Equipment, including Distribution Panelboards, Branch Circuit Panelboards and Safety Disconnect Switches.
- Devices, including Lighting Switches, Receptacles, Occupancy Sensors and Wall Mounted Dimmers.

4. Lighting Control Relay Panelboards.

5. Grounding Systems, including Grounding Bus Bars, Ground Lugs, Ground Rods, Exothermic Bonding System, Proposed Footings or Beams for UFER Ground, etc.

6. Standby Generator System

7. Fire Alarm System (submit for information purposes only).

8. Conduit/fittings.

9. 600V Building Wire and Cable, including Metal Clad (MC) cable.

S. Shop Drawings: Shop drawings as required shall be provided by the Electrical Contractor at no additional cost to the Architect. These shop drawings shall be prepared to indicate installation at major equipment where special coordination problems may exist.

T. Certification of Overcurrent & Safety Disconnect Devices for HVAC Equipment: Overcurrent (OC) & disconnect devices shown on plans are based on a specific manufacturer of Division 22 and Division 23 equipment. The Contractor may submit other manufacturers and different models or different ratings. It is the responsibility of the Contractor to coordinate OC/Disconnect devices with the submitted Division 23 equipment prior to submitting such devices for the Engineer's review. Any deviations from sizes shown on drawings must be noted in the submittals. The Contractor must certify that he has reviewed and coordinated with Division 22 and Division 23 equipment and that all OC/Disconnect devices submitted match the Division 22 and Division 23 equipment requirements. Shop drawings without such certification will be returned to the Contractor. Only submittals with such certification will be reviewed.

U. Complete Systems: All systems shall be complete and working at completion of construction.

V. Final Inspection and Operating Tests:

1. General: All electrical systems must be checked for proper polarity and sequence, all motors must be checked for proper rotation and all equipment (including HVAC, elevator and special equipment) checked for proper voltage and phasing requirements. Prior to the application of any power, the Contractor must certify that all connected equipment match the characteristics of the supply circuit voltage, phasing and feeder requirements.

2. Inspection Schedule: At the time designated by the Architect, the entire system shall be inspected by the Architect and the Engineer. The Contractor or his representative shall be present at this inspection.

3. Operational Test: After all systems have been completed and put into operation, subject each system to an operating test under design conditions to ensure proper sequence and operation throughout the range of operation. Make adjustments as required to ensure proper functioning of all systems. Special tests on individual systems are specified under individual sections.

4. Final Inspection Working Drawings. The Contractor shall provide a set of working drawings for the final inspection / walk-through to be performed by the Architect and/or the Engineer. After the inspection, any items which are noted as needing to be changed or corrected in order to comply with these specifications and the drawings shall be accomplished without delay.

W. Guarantee: Contractor shall provide a guarantee all work and materials furnished under this contract for a period of one year from the date of acceptance by the Owner and the Architect. Guarantee shall include: All labor, parts, travel/subsistence, software changes / re-programming, etc.

X. Record Drawings: Contractor shall maintain a continuous daily record during the course of construction of all changes and deviations in the work from the accompanying drawings. Record drawings shall show exact dimensions and location for all under-slab conduits including dimensions from key building points and depth of cover. Project record documents shall also include switchgear, panelboards, transformers, connection locations of equipment specified under other Divisions and revised homerun circuit locations. Upon completion of the work, Contractor shall submit Record Drawings for approval. Record Drawings shall be submitted in Autodesk AutoCAD 2010 format or higher. Electronic CAD backgrounds may be available for purchase from the Architect or Redding Linden Burr Engineers.

26 05 05 FIRE STOPPING FOR ELECTRICAL PENETRATIONS:

All penetrations through fire rated floors and walls shall be sealed with intumescent or ablative type fire barrier sealant (foam), to prevent the spread of smoke, flame, toxic gas or water through the penetration either before, during or after a fire. The fire rating of the penetration seal shall be at least that of the floor or wall into which it is installed, so that the original fire rating of the floor or wall is maintained as required by Article 300.21 of the National Electrical Code. Acceptable manufacturers are 3M (3M Fire Barrier Silicone RTV Foam) or Hilti (CP 660 Firestop Foam, CP 657 Firestop Brick, CP 658 Firestop Plug).

26 05 19 BUILDING WIRE AND CABLE (600V):

A. General: All wiring shall be in conduit except plenum rated low voltage cables and metal clad cables. Insulation for all power wiring must be 75°C rated or better, 60°C rated wire shall not be used. Wiring with insulation rated at 90°C may be used but only at the 75°C ampacity. Insulation

B. Conductor: Soft drawn, annealed, bare (uncoated) copper, 98% conductivity. Aluminum wiring is not acceptable.

C. Type: All wire sized #8 AWG and larger shall be stranded. Line voltage #12 AWG and #10 AWG shall be solid. Low voltage fire alarm and security system wiring shall be solid.

D. Minimum Wire Size, Absolute: Minimum wire size for power wiring located inside of building shall be #12 AWG. Minimum wire size for power wiring located outside of building shall be #8 AWG. Minimum size for control wiring shall be #14 AWG. Minimum size for signal wiring (60V class) shall be #18 AWG or larger as recommended by fire alarm and/or security contractor.

E. Power Wiring Minimum Size, Voltage Drop Considerations: Special wire sizes shall be provided for single pole (single phase) circuits based on one-way distance measured along the actual circuit routing including rise and drop from the circuit breaker in the panelboard to the final device along the run. Sizing is based on a 1P-20A breaker loaded to 16 amps.

1. Minimum wire size for 120V, single phase circuits routed inside of building shall be as follows:

- Runs longer than 60' and less than 90', #10 AWG
- Runs longer than 90' and less than 150', #8 AWG.
- Specific 120V runs located inside of building that are longer than 150' shall be as noted on the Drawings.

2. Minimum wire size for 120V wiring inside of building or outside of building shall be as follows:

- Runs longer than 150' and less than 240', #6 AWG.
- Runs longer than 240' and less than 380', #4 AWG.
- Specific 120V runs located outside of building that are longer than 380' shall be as noted on the Drawings (on the Panel Schedules).

F. Insulation: Provide THHN/THWN type insulation for all dry indoor locations. Provide XHHW insulation for all feeders routed underground. Provide THWN insulation for other wet locations such as outdoors, rooftop, final kitchen connections, branch circuits routed underground, etc.

G. MC Cable:

1. General: Type MC Cable (Metal Clad) is acceptable only if approved by the Owner in writing and the Local Authority Having Jurisdiction.

2. Approved uses: MC Cable, if approved, however, may be used only in the following locations:

- Drops from ceiling plenum junction boxes to receptacles in the walls.
- Drops from ceiling plenum junction boxes to light switches in walls.
- Final connection ceiling lighting fixtures from ceiling plenum junction boxes. When used as final connection to lighting fixtures, ceiling plenum junction boxes shall be located such that the whips do not exceed 6-ft in length.

3. Not approved: MC Cable is not approved for home run to panels (final connection to panels). MC Cable is not approved where it would be routed in locations that are not concealed inside of walls or ceilings (exposed structural elements), such as mechanical rooms, electrical rooms, telecomm rooms and other unfinished spaces.

H. AC cable: Type AC cable (trade name "BX") is not allowed for use on this project.

I. Acceptable Manufacturers: Triangle, American Insulated Cable Company or Southwire.

J. Installation, Communication Wire (60V), Fire Alarm, Telephone, HVAC Thermostat, Data, Etc.: Plenum rated low-smoke cable may be used in lieu of wire/conduit type installation. All plenum rated cable shall be properly supported by bridal rings, cable ties, clips etc made by Erico (caddy communication fasteners) or equal. Do not use scrap wire to wrap and support communication wires. Homemade support devices are not acceptable. Do not lay communication cable directly on top of ceiling tiles, install cables a minimum of 12" above ceiling tiles and 12" from HVAC ductwork. Provide minimum 6" separation between power conduit and communication wirings.

26 05 33 CONDUIT RACEWAYS AND BOXES:

A. Conduit, General: Shall be Rigid Galvanized Steel (RGS – National Electrical Code Article 344), PVC coated Rigid Galvanized Steel, Intermediate Metallic Conduit (IMC – N.E.C. Article 342), Polyethylene Vinyl Chloride (PVC – N.E.C. Article 352), Flexible Metal Conduit (FMC – N.E.C. Article 348), or Electrical Metallic Tubing (EMT – N.E.C. Article 358) as manufactured by Allied, Carlon, Rob Roy or Wheatland.

B. Conduit Type:

- Indoors Above Grade: EMT or RGS conduit
- Outdoors Above Grade or stub-ups: PVC coated RGS conduit or IMC.
- Outdoors Below Grade: RGS, Schedule 40 PVC or Schedule 80 PVC conduit.
- Under Slab: RGS or Schedule 40 PVC conduit
- Below Drive Lanes or Parking Lots: RGS conduit or Schedule 40 PVC conduit.
- Poured In Slab: LFNC or EMT

C. Fittings, Coatings and Encasement: Provide transition fittings from PVC (Schedule 40 or Schedule 80) to RGS for all above grade conduit. Compression or set-screw type fittings shall be used for EMT. All underground RGS conduit shall have 40-mil thick external PVC coating for corrosion protection. Provide concrete encasement for the entire length of the underground portion of the incoming service conduit run unless specifically noted otherwise. Provide red detectable warning tape over entire run of service, over the generator feeder run and over other major conduit runs.

D. Minimums: Minimum conduit size for any above ground run is 1/2" C, except that minimum conduit size for home run to panelboard is 3/4" C. Minimum conduit size for any underground conduit run is 1" C. Minimum burial depth for conduit without concrete cover is 24" from finished grade to top of conduit, provide deeper burial depth if required by local codes. Minimum burial depth with at least 4" of concrete cover is 4" below grade.

E. Use Restrictions: Electrical nonmetallic tubing (ENT – N.E.C. Article 362) shall not be used unless specifically approved by the Engineer. EMT may be used for conduits poured in slab, but must be used with concrete-tight compression fittings. Flexible Metallic Conduit or Liquid-tight Flexible Metallic Conduit shall be utilized as final connections (3'-5' only) at the following equipment: motors, lighting fixtures, heater, power supplies, and any other vibration producing equipment. For flexible final connection, utilize minimum size 1/2" Flexible Metallic Conduit and include a green ground wire. Use Liquid-tight Flexible Metallic Conduit (trade name Sealtite) as final connection to equipment in wet locations such as outdoor condensing units, walk-in cooler/freezer, kitchen equipment, rooftop HVAC equipment, etc. Liquid-tight Flexible Metallic Conduit shall not be used in plenum spaces.

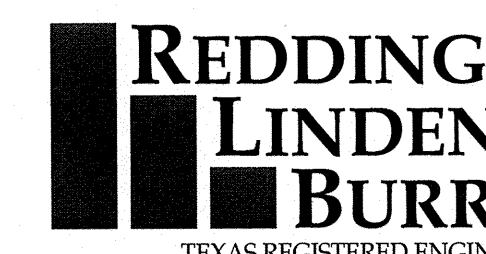
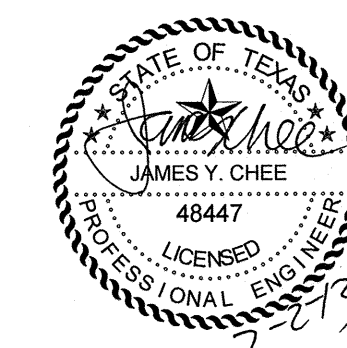
F. Conduit Installations: Conduit shall be supported from structure every 5 feet and within 3 feet of all boxes. Use locknuts inside and out at boxes. Maintain a minimum 12" separation from all high temperature pipes. All conduit runs shall be installed either parallel or perpendicular to major building lines. Route conduit as directly as possible with largest radius bends possible. Make bends with standard ells or bends per NEC. Provide expansion fittings if conduit crosses structural expansion joint. Support any exterior exposed conduit runs at interval not to exceed 10' on center, within 5' of any deflection of conduit and within 5' of junction or device boxes. Clean conduit interior after installation; coat scratches with zinc paint. Provide a pull string in all conduit systems with wiring specified under another division (power, fire alarm, security, telephone and other communication conduit). Provide a pull string in all spare conduits.

G. Project Record Documents: Accurately record actual routing of all underslab and underground conduits; include dimensions from key building points and depth of cover.

H. Outlet Boxes: Outlet boxes shall be galvanized steel suitable for the location. Ceiling outlet boxes shall be 4" octagon. Wall outlet boxes shall be proper design to accommodate the devices required - 4 inch square with raised cover. Outlet boxes installed surface mounted in outdoor locations or surface mounted indoors in wet locations shall be weatherproof type. Outlet boxes to be manufactured by Raco, Steel City or Appleton. All junction boxes, splice boxes and device boxes shall be accessible without damaging the building structure or finish and shall not be permanently closed in by the structure or finish of the building.

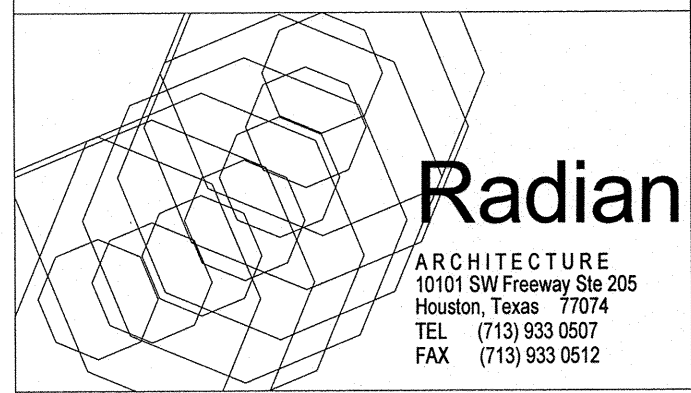
I. Junction and Pull Box Locations: For power conductor raceways, provide a junction or pull box for each segment of a conduit run where run contains equivalent of four "ninety degree bends (360)". For telecommunications conduits (Tele. Data, Security, Fire Alarm, Communications), provide a junction or pull box for each segment of a conduit run where run contains equivalent of three "ninety degree bends (270)". Provide a pull box, pull point or in-grade pull box for each segment of an underground conduit run where segment of conduit run would otherwise exceed 350 feet or for each underground conduit run that contains equivalent of more than one "ninety degree" bend in the horizontal plane.

REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL PHASING INFORMATION.



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**OPTIMUM CARE
SUGAR LAND, TEXAS**



Revision Schedule		
#	Date	Description

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