SECTION 26 01 00
ELECTRICAL GENERAL

PART 1: GENERAL

1.1 Electrical/Telecommunications Design

A. This guideline is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 Electrical Space Planning Guide

1.2.1 The following requirements are to be used by architects for electrical space planning considerations at the conceptual design level. Refinements and modifications will be considered upon evaluation of the specific requirements in the building, but as a minimum, allow space according the following guidelines:

1.2.1.1 Main Service Entrance room shall be 10% larger than the NEC code minimum and shall provide for adequate equipment and maintenance clearance (e.g.: 4' between panels; 4' of working space clearance, etc.). Provide outside equipment access to this room.

1.2.1.2 Electrical rooms shall be centrally located and "stacked" so that feeder conduits and bus duct are run as straight and short as possible.

1.2.1.3 Doors shall be 48" width minimum single door or double door width and shall swing out where possible and as required by the National Electrical Code (NEC).

1.2.1.4 Electrical rooms shall not share space with storage, telecommunications, janitor's sink, water, and piping.

1.2.1.5 If possible locate electric rooms away from outside walls, elevator shafts, stairwells, HVAC duct chases, trunk runs, and other Utility Avenues so that branch circuits can fan out in all directions.

1.2.1.6 Locate electrical room where it is not susceptible to flood from heavy rains, broken pipes, stopped drains, or fire hose deluge.

1.2.1.7 Provide a separate space (80 sq. ft. minimum) in the building for storage of spare lamps and other electric equipment as needed.

1.3 Polychlorinated Biphenyl (PCB) Remediation

1.3.1 This section provides general guidance concerning the specific preferences of the University for **abatement** or removal of polychlorinated biphenyl (PCB) within buildings.

1.3.2 Reference Standards: Texas Hazard Communication Act chapter 502 of the Texas Health and Safety Code. Volume 40, Code of Federal Regulations, Chapter 761.

1.3.3 General Requirements:

Bulbs: Fluorescent light bulbs that do not have green end caps may contain mercury. These bulbs must be handled carefully so that they don't break, packaged in approved boxes furnished by EH&S, and given to EH&S for disposal.

Ballasts: Fluorescent lamp ballasts shall be treated as PCB waste unless labeled "no PCBs." PCB waste is regulated and must be packaged in drums furnished by EH&S, and given to EH&S for disposal.

Fixtures: Fixtures as well as green-tipped lamps and ballasts labeled "no-PCBs" will be disposed of by contractor in accordance with any applicable regulations.

PART 2: PRODUCTS

1.1 This product section is intended to inform the PSP on the minimum standard of quality that should be incorporated in new designs. The PSP should evaluate these standards and incorporate or make additional requirements per project specific requirements. Where the PSP considers any requirement listed not to be applicable or incompatible with the project design intent should be discussed with UTA Office of Facilities Management.

2.1 Electrical/Telecommunications Design

2.1.1 All products used and specified in Division 26 and 27 must be UL approved and must meet all applicable ANSI, NFPA, IEEE, EIA/TIA standards as indicated in the appropriate sections of this design standard.

PART 3: EXECUTION

3.1 Electrical/Telecommunications Design

3.1.1 In addition to the specific requirements of the sections of the standard that follow, use the following as baseline programming guidelines.

3.1.2 A typical Division 26 design project for the University shall include, but not be limited to the design and specifications for the following items:

3.1.2.1 Electrical and Telecommunications Duct bank Design. Duct bank will be installed from the University specified manholes to the building electrical and telecommunications service entrance.

3.1.2.2 Main Electrical Service Equipment: Double ended unit substations, and main tie main breakers shall be manufactured by Square D, Siemens, or Cutler Hammer.

3.1.2.3 Building Electrical Distribution Design: Normal and Emergency.

3.1.2.4 Special Systems Design: Including Fire Alarm and Security.

3.1.2.5 Telecommunications Systems Design: Performed by a registered telecommunications designer.

3.1.3 Main Electrical Service Entrance Equipment:

3.1.3.2 The main service entrance equipment shall be a double ended unit substation configured with main tie main breakers according to the attached one line diagram.

3.1.4 Building Electrical Distribution Design:

3.1.4.1 The low voltage distribution system shall be separately derived 3 phase, 4 wire 277/480 volt system supplying power to all fluorescent and HID lighting, all 480 volt utilization equipment and all motors over 7½ hp. From the 480 volt distribution system, a separately derived 3 phase, 4 wire 120/208 volt systems will be used to supply power to all lighting and miscellaneous building power and receptacle circuits.

3.1.4.2 Provide at least two (2) circuits for each classroom; do not connect more than one classroom on a circuit and no more than 6 computer workstations per circuit. Provide 25% not less than 1 spare electrical conduits, and 50% not less than 2 spare telecommunication conduits. Minimum size duct bank shall be 6 conduits.

3.1.4.3 All large electrical equipment, e.g. transformers, main switchgear, ATS shall be located on ground level or basement of the building near the power service entrance such that it may be removed is necessary without dismantling. If located in basement, the area must be equipped with an access door that is large enough to lower/raise the equipment in and out of in an accessible area.

3.1.5 Coordination Issues

3.1.5.1 It is the responsibility of the engineering team to prepare Reflected Ceiling Plans that accurately locate and coordinate ceiling panels, lighting fixtures, A/C supply and return grilles, sound system speakers, automatic sprinkler heads, fire and smoke detectors, access doors, and any other ceiling located items.

3.1.5.2 The final drawings shall as a minimum be checked for the following:

3.1.5.2.1 Physical space above ceiling for duct work, lighting fixtures, piping, etc.

3.1.5.2.2 That no piping of any type encroaches on electrical switchgear.

3.1.5.2.3 That electric closets are “stacked” so that feeder conduits and bus duct are in as straight a line and as short a route as possible.

3.1.5.2.4 That electric closets are not next to elevator shafts or stair wells, vertical HVAC duct chases and horizontal trunk runs or other Utility Avenues, etc., so that branch circuit conduits can “fan out” in all directions. Do not locate on exterior walls.

3.1.5.2.5 That electric panels or terminal boards are not in Janitor’s closets or public areas.

3.1.6 Basic Drawing Requirements

3.1.6.1 Electrical, Special Systems and Telecommunications Drawings should be drawn on ⅛” = 1’0” scale or larger floor plans. In conjunction with the requirements listed in sections of Division 26 that follow, the Electrical Drawings should include the following information:

3.1.6.1.1 The location of all electric utilization, power distribution and special systems equipment.

3.1.6.1.2 All branch circuit and feeder wiring including circuit numbers and circuit schedule.

3.1.6.1.3 An overall electrical one-line diagram. Complete riser diagrams for power and special systems.

3.1.6.1.4 Detailed lighting fixture schedule including the type designation, manufacturer product number, type and size of lamps per fixture, and the accessories and methods for mounting the type of fixture.

3.1.6.1.5 Detailed panel schedule for each panelboard, switchboard, motor control center, etc. Include breaker, fusible switch size or fuse size, frame size, usage of circuit, spares, spaces and connected load for each circuit.

3.1.6.1.6 Site plan where necessary showing electrical and telephone service entry, duct bank and manhole locations and details, exterior lighting, circuiting, and details.

3.1.6.2 ¼" = 1'0" scale drawings should be provided for the following:

3.1.6.2.1 Typical Rooms.
3.1.6.2.2 Electrical vaults and main power distribution areas.
3.1.6.2.3 Kitchens and other areas with high density of utilization equipment.

3.1.6.3 Separate drawings should be provided for lighting, power, special systems, and telecommunications of each floor and roof.

3.1.6.4 Room names and numbers shall appear on all Electrical Floor Plans. Special systems floor plans will require door numbers as well.

3.1.6.5 Column lines and designations, plan North, and graphic scale shall appear on all sheets as they shall appear on all Architectural Sheets. All drawings shall be dated and signed for each Review Submittal.

3.1.7 Specification Requirements

3.1.7.1 Electrical and Telecommunications Specifications shall be complete and in the CSI Master Spec format. Specifications shall be tailored to the project and not contain items that are not a part of the project.

3.1.7.2 Electrical Specifications should not instruct the contractor or installer to size a piece of electrical equipment according to the National Electrical Code. All electrical designs should be complete and appear as such on the Drawings and Specifications.

3.1.7.3 A clear statement shall be made concerning construction power; where available, and at what voltage and phase, who makes and removes the installation, and who pays for the energy.

3.1.7.4 Specify non-proprietary equipment, where applicable. Specify products with proven reliability.

3.1.8 Design Review

3.1.8.1 Schematic design review (35% overall) shall include:

3.1.8.1.1 Narrative description of services: electrical, communications, central clock control, FCMS, CCTV, etc.

3.1.8.1.2 Narrative description of electrical distribution, utilization voltages, lighting types, illumination levels.

3.1.8.1.3 Rudimentary site plan with scale

3.1.8.1.4 Basic floor layouts

3.1.8.3 Design Development Review (75% overall) shall include:

3.1.8.3.1 Switchgear and panels located and drawn to approximate scales

3.1.8.3.2 Lighting layouts including panels

3.1.8.3.3 Several representative lights and receptacles circuited

3.1.8.3.4 Fixture schedule

3.1.8.3.5 Electrical symbols

3.1.8.3.6 Site plan, all services detailed

3.1.8.3.7 Panel schedules near completion

3.1.8.3.8 Conduits larger than 2" size

3.1.8.3.9 Bus duct and cable trays

3.1.8.3.10 Controls

3.1.8.3.11 Details

3.1.8.3.12 One-line-diagram complete, except sizing of protective devices, transformers and feeders, for final horsepower selections

3.1.8.3.13 Reflected ceiling plans

3.1.8.3.14 Specifications of all major equipment

3.1.8.4 Final Design Review (100% overall) shall include:

3.1.8.4.1 Design complete except for corrections required from Final Review Comments

3.1.8.4.2 Engineer's seal on all of the drawings, labeled **"100% review issued, not for construction"**

3.1.8.5 Documents issued for construction

3.1.8.5.1 Documents will incorporate all comments from the 100% submittal

3.1.8.5.2 Documents will be labeled "issued for construction"

3.2.1 Welds, splices, and joints shall not be permitted in new construction unless approved by UTA electrical supervisor.

3.2.3 Homeruns shall be clearly indicated on the floor plans. All homerun conduits shall be clearly marked with tape label all circuits within the conduit.

3.3.1.1 Installed conduits shall be Rigid Galvanized Conduit (RGC), Intermediate Conduit (IMC), or Electric Metallic Tubing (EMT). Permissible conduit sizes are ¾" to 4".

3.3.1.2 In exposed interior and exterior areas, use only Rigid Galvanized Conduit.

3.3.1.5 Flexible metal conduit is permissible in sizes ¾" and larger with one exception. Applications with fixture tails may be ½". Used only in dry locations.

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