

SECTION 26 05 01

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

- A. This section supplements all sections of this Division and shall apply to all phases of work hereinafter specified and/or required to provide a complete installation of electrical systems for the Project. The Work required under this Division, is not limited to the Electrical work. Coordinate with all trades as required to complete the work. The intent of the Specifications is to provide a complete electrical system that includes all scoping documents that are a part of the Contract.
  - 1. Work Included: Furnish all labor, material, services and skilled supervision necessary for the construction, erection, installation, connections, testing, and adjustment of all circuits and electrical equipment specified herein, or as otherwise required per Program, and its delivery to the County complete in all respects ready for use.
- B. Contract Scoping Documents: These documents are shown in part diagrammatic, intended to convey the Scope of Work indicating the intended general arrangement of equipment, conduit and outlets. The Developer Design/Builder is responsible for preparing Contract Documents for review and approval by the County's Representative.
- C. Equipment or Fixtures: Equipment and fixtures shall be connected to provide circuit continuity in accordance with the Specifications whether or not each piece of conductor, conduit, or protective device is shown between such items of equipment or fixtures, and the point of circuit origin.
- D. Work Installed but Furnished under Other Sections: The Electrical Work includes the installation or connection of certain materials and equipment furnished under other sections. Verify installation details. Foundations for apparatus and equipment will be furnished under other sections unless otherwise noted or detailed.

1.02 GENERAL REQUIREMENTS

- A. Guarantee: Furnish a written guarantee for a period of one year from date of filing notice of completion.
- B. Equipment Safety: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety.
- C. Codes and Regulations:
  - 1. Design, manufacture, testing and method of installation of all apparatus and materials furnished under the requirements of these specifications shall conform to the latest publications or standard rules of the following:
    - Institute of Electrical and Electronic Engineers – IEEE
    - National Electrical Manufacturers' Association – NEMA
    - California Fire Code – CFC
    - California Building Code – CBC
    - Underwriters' Laboratories, Inc. – UL
    - National Fire Protection Association – NFPA
    - Federal Specifications - Fed. Spec.
    - American Society for Testing and Materials – ASTM
    - American National Standards Institute – ANSI

American Standard Association – ASA  
 California Electrical Code – CEC  
 National Electrical Safety Code – NESC  
 Insulated Power Cable Engineers Association – IPCEA  
 Public Utilities Commission – PUC  
 California Code of Regulations, Title 8, Subchapter 5  
 California Code of Regulations, Title 24  
 State & Municipal Codes in Force in the Specific Project Area  
 Occupational Safety and Health Administration –OSHA

The term "Code", when used within the specifications, shall refer to the Publications, Standards, ordinances and codes, listed above. In the case where the codes have different levels of requirements the most stringent rules shall apply.

D. Seismic Design of Electrical Equipment:

1. All electrical prefabricated equipment is to be designed and constructed in such a manner that all portions, elements, sub-assemblies and/or parts of said equipment and the equipment as a whole, including their attachments, will resist a horizontal load equal to the operating weights of those parts multiplied times the following factors:

Type of Equipment	Horizontal CP	Vertical CP
Rigid and rigidly supported piping or equipment such as boilers, chillers, pumps, motors, transformers, unit substations and control panels.	0.50	0.33
Flexible and flexibly supported equipment such as air-handling units, piping and other equipment so supported that the fundamental period of vibration of the equipment and its supporting system is greater than 0.05 seconds. Communication equipment and emergency stand-by equipment	1.00	0.67

2. Load is to be applied at the center of gravity of the part and to be in any direction horizontally. Design stresses shall be in accordance with the specifications for design of the American Institute of Steel Construction. Anchorage, support and/or attachment of said prefabricated equipment to the structure is to be as required by the Authority Having Jurisdiction and per Code requirements.
3. It is the entire responsibility of the Developer Design/Builder to verify the design of equipment so that the strength and anchorage of the internal components of the equipment exceeds the force level used to restrain and anchor the unit itself to the supporting structure.

E. Requirements of Regulatory Agencies:

1. Codes, Permits and Fees: Where the Scoping Documents exceed minimum requirements, the Scoping Documents take precedence. Where code conflicts occur, the most stringent shall apply unless variance is approved. Where provisions in the Scoping Documents differ in regard to code application, size, quality, quantity or type of equipment, Developer Design/Builder shall include in the bid, costs for the most costly provision. This provision shall apply as an amendment to the California Public Contracts Code.
  - a. Comply with all requirements for permits, licenses, fees and Code. Permits, licenses, fees, inspections and arrangements required for the Work shall be obtained by the Developer Design/Builder.
  - b. Comply with the requirements of the applicable utility companies serving the Project. Make all arrangements with the utility companies for proper coordination of the Work.
2. Substitutions: The materials, products, and equipment described in the Contract Documents establish a standard of required function, dimension, appearance, and quality. County's Representative may consider requests for substitutions of specified equipment, materials, or products.

- F. Record Drawings: Comply with Division 1. Keep up to date, monthly payments withheld if not updated.
- G. Shop Drawings and Submittals: Submittals on all material prior to installation.
1. Drawings shall be submitted, as required under Division 1.
  2. Shop drawings shall be submitted on, but not limited to, the following:
    - a. Electrical Power Conductors and Cables
    - b. Grounding and Bonding for Electrical Systems
    - c. Hangers and Supports for Electrical Systems
    - d. Raceway and Boxes for Electrical Systems
    - e. Floor Boxes for Electrical Systems
    - f. Lighting Control Panels and Devices
    - g. Transformers
    - h. Switchboards
    - i. Panelboards
    - j. Electrical Cabinets and Enclosures
    - k. Wiring Devices
    - l. Fuses
    - m. Enclosed Switches
    - n. Enclosed Circuit Breakers
    - o. Automatic Transfer Switches
    - p. Engine Generators
    - q. Interior Lighting
    - r. Electrical Underground Ducts and Manholes
    - s. Short Circuit and Coordination Study
    - t. Medium Voltage Switchboards
    - u. Unit Substations
    - v. Exterior Lighting
- H. Trenching and Backfilling: All trenching and backfilling for electrical work shall be the responsibility of the Developer Design/Builder and shall be done in accordance with Divisions 2, 31 and 33 of this specification. The Developer Design/Builder shall examine the existing conditions and survey to determine locations of all existing underground lines. The Developer Design/Builder shall use extreme caution when working in the vicinity of these lines and shall be responsible for the proper and approved repair of any damage caused by his work.
- I. Cutting and Patching:
1. Obtain written permission from the County's Representative before core drilling or cutting any structural members. Exact method and location of conduit penetrations and/or openings in concrete walls, floors, or ceilings shall be as approved by the Design Builder's Structural Engineer.
  2. All core drilling, cutting and patching for this work shall be performed under this Section of the specifications. Use craftsmen skilled in their respective sections for cutting, fitting, repairing, patching of plaster and finishing of materials including carpentry work, metal work or concrete work required for this Work. Do not weaken walls, partitions or floor with cutting. Holes required to be cut in floors must be drilled without excessive breaking out around the holes. Patch and repair as required.
  3. Use care in piercing waterproofing. After the part piercing the waterproofing has been set in place, seal openings and make absolutely watertight.
  4. Seal all openings to meet the fire rating of the particular wall floor or ceiling. Conform to Division 7.
  5. Conform to Division 1.

### 1.03 JOB CONDITIONS

#### A. Existing Conditions:

1. The Developer Design/Builder shall visit the site and verify existing conditions. Where existing conditions differ from the Scoping Documents, adjustment shall be made and allowances included for all necessary equipment to complete all parts of the drawings and specifications.
2. Electrical high voltage equipment to be removed shall be de-energized while working on or near them.
3. Arrange the work so that high voltage electrical power is de-energized to all electrical equipment within existing facility prior to removal. Provide temporary power during all periods of construction and demolition.

#### B. Protection:

1. Protection of historical materials and equipment. Take such precautions as necessary to properly protect all historical fixtures, appliances, material, equipment and installations from damage of any kind. The County's Representative may reject any particular material, apparatus or equipment scratched, dented or otherwise damaged. (See section of work relating to historical issues.)
2. Seal equipment or components exposed to the weather and make watertight and insect proof. Protect equipment outlets and conduit openings with temporary plugs or caps at all times that work is not in progress.

#### C. Sequencing and Scheduling:

1. Verify all dimensions and conditions at the job site and establish all elevations and detailed dimensions.
2. Lay out and coordinate all work well enough in advance to avoid conflicts or interferences with other work in progress so that in case of interference the electrical layout may be altered to suit the conditions, prior to the installation of any work and without additional cost to the County. Conflicts arising from lack of coordination shall be this Developer Design/Builder's responsibility. Maintain all code-required clearances about electrical equipment. Unless specifically noted otherwise, establish the exact location of electrical equipment based on the actual dimensions of equipment furnished.

### 1.04 WORK IN COOPERATION WITH OTHER SECTIONS

A. Examine the Scoping Documents and determine the work to be performed by the electrical, mechanical and other sections. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, motor starters, disconnects, relays, time clocks and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment.

B. Plan all work so that it proceeds with a minimum of interference with other sections. Inform all parties concerned of openings required for equipment or conduit required in the building construction for Electrical Work and provide all special frames, sleeves and anchor bolts as required. Coordinate the electrical work with the mechanical installation. Promptly report to the County's Representative any delay or difficulties encountered in the installation of this work which might prevent prompt and proper installation, or make it unsuitable to connect with or receive the work of other sections. Failure to so report shall constitute an acceptance of the work of other sections as being fit and proper for the execution of this work.

1.05 TESTING AND ADJUSTMENT

A. Upon completion of all Electrical Work, the Developer Design/Builder shall provide all testing as follows:

1. Operational Test: Test all circuit breakers, receptacles, motor voltage test and all other electrical and communication equipment. Replace all faulty devices and equipment discovered during testing with new devices and equipment at no additional cost, and that part of the system (or devices or equipment) shall then be retested.
2. Secondary Grounding Resistance: Perform ground continuity test between main ground system and equipment frame, system neutral and/or derived neutral point.
3. All test procedure shall be performed by an independent testing firm except megger and voltage test on motor and receptacles.

1.06 MAINTENANCE, SERVICING AND INSTRUCTION MANUALS AND WIRING DIAGRAMS

A. Prior to substantial completion, the Developer Design/Builder shall submit 5 copies of operating and maintenance and servicing instructions, as well as an equal number of copies of complete wiring diagrams all neatly bound in hard cover 3-ring binders with table of contents and tabs for the following items or equipment: (See Division 1):

1. Lighting Control Devices
2. Network Lighting Controls
3. Transformers
4. Switchboards
5. Panelboards
6. Motor-Control Centers
7. Enclosed Transfer Switches
8. Enclosed Controllers
9. Enclosed Contactors
10. Engine Generators
11. Interior Lighting
12. Fire Detection and Alarm

B. All wiring diagrams shall specifically cover the installed system indicating zones, wiring, and components added to the system. Typical drawings will not be accepted.

1.07 FINAL INSPECTION AND ACCEPTANCE

A. After all requirements of the approved Developer Design/Builder Construction Documents have been fully completed, representatives of the County will inspect the Work. The Developer Design/Builder shall provide competent personnel to demonstrate the operation of any item of system, to the full satisfaction of each representative.

B. Final acceptance of the work will be made by the County after receipt of approval and recommendation of acceptance from each representative.

C. The Developer Design/Builder shall furnish Record Drawings before final payment of retention.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION