DIVISION 16 — ELECTRICAL
SECTION 16010
GENERAL PROVISIONS

PART 1 — GENERAL

1.01 RELATED DOCUMENTS
A. The General Conditions, Supplementary Conditions, and General Requirements apply to the Work specified in this Section.

1.02 DESCRIPTION
A. This Section defines the General Provisions which are common to all Sections of Division 16.
B. The information in the Specifications and the Plan Drawings are basic facts to follow in determining a reasonable and competitive price for the disciplines intended. The Drawings and Specifications do not necessarily indicate or describe each item necessary for the full performance and completion of the particular work the contractor may be bidding. These documents provide the general intent necessary to inform the contractor of the Owner's desire for the systems required for Electrical. Contractor shall visit the site prior to bidding to become familiar with the existing conditions under which the work shall be performed. Failure to inspect the site will not be considered justification for an adjustment in contract price or failure to perform the work under this contract.
C. Work Included:
1. All electrical work herein specified and/or shown on Drawings unless noted otherwise.
2. Installation shall be complete from location designated by the Electric Utility Company as point of service connection, to the final connection of motors, fixtures, devices, apparatus or pieces of equipment, unless modified by Drawings or these Specifications.
3. The Electrical Drawings and Specifications shall be understood to cover complete operating system. The Drawings and Specifications are to be taken together. Work specified and not shown, or Work shown and not specified shall be performed or furnished as though mentioned in both Drawings and Specifications.
4. Minor items and accessories reasonably inferred as necessary to the complete and proper operation of any system, shall be provided by this Contractor or Subcontractor for such systems.
D. Description of Systems:
1. Complete power wiring from new panelboards to motorized equipment, motors, equipment cabinets, and miscellaneous outlets.
2. General wiring for power, lighting, and miscellaneous systems.
3. Materials and equipment for electrical work.
4. Motor and equipment wiring.
5. General and emergency lighting and power systems.
6. Wiring of equipment furnished by others.
7. Motor and equipment, including Starters if required.
8. Empty conduit stubs and backboxes for telephone system.
9. Reconnection of all relocated electrical equipment (where applicable).
10. Power and empty conduit system and backboxes for Owners security system.
11. Power and empty conduit system and backboxes for Owners computer system.
12. All other equipment, material, devices, accessories required and/or shown on the Drawings.
13. Arrange for sources of temporary construction services. Such services shall be nominally 120/208 volt, 1 phase, 3 wire from which a complete system of temporary power and lighting shall be installed for all construction needs and as required by the occupational safety and health departments. (OSHA) Temporary services shall be removed upon completion of work.
14. Cutting, patching, excavation and backfill and concrete work required to complete the work of this section. Backfill shall be compacted to 95% of standard compaction. All existing surfaces shall be patched or replaced to "Like New" conditions.
E. Related work to be completed by others:
1. Telephone system wiring.
2. Computer system wiring.
3. Temperature controls and thermostat wiring.
4. Fire alarm system by owner vendor.
F. Definitions — As used within the Contract Documents:
1. The term "Contractor" shall be understood to mean the Electrical Contractor or Electrical Subcontractor.
2. "Circuitry" shall mean any electric work (not limited to light and power distribution) which consists of wires, cables, raceways, and/or specialty wiring method assemblies taken all together complete with associated junction boxes, pull boxes, outlet boxes, joints, couplings, splices and connections, except where limited to a lesser meaning by specific description.
3. "Wiring" shall mean the same as Circuitry.
4. "Package Unit" shall mean an item of equipment having one or more motors or other electric energy consuming elements integrally factory mounted on a single base, complete with all associated control devices and interconnecting wiring.
5. "Normal Electric Work Conditions" means locations within building confines which are neither damp, wet, nor hazardous, and which are not used for air handling.
6. "Raceway" shall mean any pipe, duct, extended enclosed, or conduit (as specified for a particular system) which is used to contain wires, and which is of such nature as to require that the wires be installed by a "pulling in" procedure.
7. "Concealed" (as applied to circuitry) means covered completely by building materials, except for penetrations(by boxes or fittings) to a level flush with the surface as necessitated by functional or specified accessibility requirements. Unless directed otherwise, all outlet boxes in walls are to be concealed.
G. Fees and Permits:
1. Obtain all permits and pay all inspection fees required for the complete electrical system.

1.03 QUALITY ASSURANCE
A. Qualifications:
1. Only new products will be acceptable unless otherwise noted.
2. The Electrical Contractor and his Subcontractors shall only employ workmen who are skilled in their respective trades.
3. All equipment, material, fixtures, devices, articles, accessories or products included in the Contract shall be of the exact make, model or catalog number, size, form and of the characteristics specified.
B. Requirements of Regulatory Agencies:
1. All electrical work shall be in accordance with the National Electrical Code (N.E.C.), (check with local inspector for edition), and other governing bodies which have jurisdiction over this project.
2. Where applicable, all fixtures, equipment and materials shall be as approved or listed by the following agencies:
a. Factory Mutual Laboratories.
b. National Fire Protection Association.
c. Underwriters Laboratories, Inc. (UL)
d. National Electrical Manufacturers Association (NEMA)
e. Americans with Disabilities Act (ADA)
C. Allowable Tolerances:
1. Review Architectural, Structural and Mechanical Drawings for all dimensions, locations, partitions and walls, structural details, and location of mechanical pipes and ducts so that the electrical installation shall be in harmony with that of the other trades.
2. Exact size, location, and electrical requirements of equipment furnished by other trades and wired by this Contractor shall be obtained from the Drawings of the other trades.

1.04 SUBMITTALS
A. Shop drawings for all fixtures, equipment, materials, etc., shall be submitted as specified in Division 1.
B. Installation, maintenance and operating manuals and instructions for all equipment shall be provided as specified in Division 1.

1.05 APPROVAL DRAWINGS
A. Prepare and submit for approval to local code authorities such additional electrical drawings, diagrams, and specifications as are required by:
1. Local Fire Prevention Bureau
2. Local Building Department — Electrical Inspection Section
3. Local Utility Company Metering Department

1.06 EXAMINATION OF THE SITE
A. All Contractors submitting proposals for this work are requested to visit the existing site. Failure to visit the existing site will in no way relieve the successful bidder from the necessity of furnishing any materials or performing any work that may be required to complete work in accordance with Drawings and Specifications without additional cost to the Owner.

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING
A. Exercise care in transporting and handling to avoid damage to fixtures, equipment and materials.
B. Store materials on the site so as to prevent damage.
C. Keep fixtures, equipment and materials clean, dry and free from deleterious conditions.
D. Where items of electrical equipment and/or materials are furnished by others for installation by Electrical Contractor, Electrical Contractor will be held responsible for the unloading of such equipment and/or materials from the delivery truck. He shall check equipment and/or materials upon receipt and notify party furnishing item of any damaged or missing equipment. He shall coordinate installation with Contractor providing equipment.

1.08 GUARANTEE
A. Provide one year guarantee for all fixtures, equipment, materials and workmanship, upon final acceptance by Owner.

PART 2 — PRODUCTS
2.01 MATERIALS
A. Refer to individual Sections of Division 16.

PART 3 — EXECUTION
3.01 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION
A. Excavating and Backfilling:
1. The Electrical Contractor shall do all excavating and backfilling required for the installation of any and all parts of his work requiring excavation. He shall also do all sheathing and bracing required for the installation of his work. He shall provide and operate pumping equipment, if required, to keep the trenches free of standing water. All work shall comply with requirements given in Section 02200.
2. The above shall include all excavation of every character, including rock, if encountered. Contractor shall visit the premises and determine for himself, by actual observations, boring, or other means, the nature of the soil conditions. The cost of all such inspections, boring, etc., shall be borne by the Contractor.
3. All excavations are to be so conducted that no walls or footings shall be disturbed or injured in any way.
4. Remove all surplus earth not needed for filling and dispose of same as specified under Section 02200 of the Specifications.
5. All backfilling shall be thoroughly tamped and settled in a manner as is proper for the particular type of work.
6. Where it is necessary to install work in or across roads, pavements, curbs, sidewalks, etc., this Contractor shall restore the present construction to its original or better condition if disturbed by his operation at no additional cost to the Owner.
B. Application, Installation:
1. In the event that conflicts, if any, cannot be settled rapidly and amicably between the affected trades, with work proceeding in a workmanlike manner, then the Architect/Engineer shall decide which work is to be relocated and his judgement shall be final and binding on this Contractor.
2. No measurements of a Drawing by scale shall be used as a dimension to work by. The Drawings are not intended to show complete or accurate details of the building in every respect. Exact locations and relations are to be defined in the field and shall be satisfactory to the Architect/Engineer. This Contractor shall take all field measurements and shall be responsible therefore.
3. Compare Drawings and Specifications, checking all measurements and determine intent of Contract Documents. Discrepancies shall be brought to the Architect/Engineer's attention for interpretation prior to any installation.
4. The right is reserved to make any reasonable change in location of outlets and equipment prior to roughing-in without involving additional expense. Any change from the Electrical Drawings as is necessary to make the work of this Contractor conform to the building as constructed and to fit the work of other trades shall be included in Contractor's Contract and installed without extra cost.

3.02 FIELD QUALITY CONTROL
A. Testing:
1. After wires are in place and connected to devices and equipment, the system shall be tested for shorts and grounds.
2. All hot wires, if shorted or grounded, shall be removed and replaced.
3. A voltage test shall be made at the last outlet on each circuit. If drop in potential is excessive, Contractor will be required to correct the condition by locating partly grounded conductor or high resistance splice.
4. All grounds, shorts and high resistance splices shall be rectified.
5. Any wiring device, electrical apparatus or lighting fixture furnished under this Contract, if grounded or shorted on any integral "live" part, shall be removed and the trouble rectified by replacing all defective parts or materials as directed.
6. Service ground to be tested per National Electrical Code requirement. Grounding pole of all receptacles to be tested.
7. All motors shall be tested under load with ammeter readings taken in each phase, and the RPM of motors recorded at the time. All motors shall be tested for correct direction or rotation. Electrical Contractor shall be responsible for testing running of all motors and shall verify that proper overload devices have been installed.
8. All meters, instruments, cable connections, equipment or apparatus necessary for making all tests, shall be furnished by this Contractor at his own expense.
9. Contractor shall submit proof of all tests to the Architect before final acceptance of the work.

3.03 ADJUST AND CLEAN
A. Cleaning Equipment, Completed Work and Premises: After the completion of all installations, each system shall be thoroughly cleaned to remove all paint, oil and other foreign material. Contractor shall also clean all foreign paint, grease, oil, dirt, labels and stickers, etc., from all fixtures, equipment, etc. The Contractor shall remove all rubbish, debris, etc., accumulated from his operations from the premises.
B. Demonstration: At the conclusion of the work and before final contract payment is made demonstrate and explain to the Using Agency's personnel, the function, operation and maintenance of all equipment and systems installed by this Division of the work and provide a copy of all tests performed.
C. Protect all equipment and systems against harmful exposures to, or accumulations of dust and moisture, flooding, corrosion or other forms of damage and clean and restore damaged finishes as may be required to place installations in a "like-new" condition before acceptance by the Architect.

3.04 SCHEDULES
A. Equipment Schedules: See Drawings for schedules of lighting fixtures, switchboard, panelboards, distribution equipment, and related items.

3.05 APPROVALS
A. Obtain all permits and approvals from the governing bodies which have jurisdiction over this project.

3.06 IDENTIFICATION AND TAGGING
A. Provide all distribution switches and circuit breakers, starters, etc. whether individually mounted in panelboards, switchboards, etc., with suitable identification. The designation, using proper nomenclature, shall indicate the load served. Provide all feeders with suitable identification as to their designation in all junction boxes, pullboxes, gutter spaces through which they pass, and at their terminal points of connection. Identification of distribution switches or circuit breakers in panelboards shall be by means of panelboard directories. Identification of distribution switches or circuit breakers and starters individually mounted or in switchboards shall be by means of engraved lamacoid nameplates permanently fastened on the front face of the housing, showing 1/4" high white lettering on a black background. Identification of feed cables shall be by means of engraved fiber tags suitably fastened to the cables.

3.07 SLEEVES
A. Provide coring in walls and floor slabs for the passage of all conduits, pipes and ducts installed.
B. Cored holes in floor shall be provided with sleeves extended one inch above finished floor level and made watertight.

3.08 PAINTING
A. All equipment, panelboards, switchboards, etc., shall be factory finished in baked enamel or lacquer, or as specified. Standard factory finishes shall be approved. Any scratches shall be neatly touched up by the installing Contractor.
B. All metal work installed by this Contractor exposed to the weather and not factory finished shall be painted with two coats of oil paint of color selected by Architect.
C. All finish painting shall comply with the Painting Section of the Specifications.

3.09 CUTTING AND PATCHING
A. Perform all cutting and patching required to complete the Work, except where specifically shown on the Architectural or Structural Drawings.
B. Refer to Section 01070 for additional requirements.
END OF SECTION

SECTION 16100
BASIC MATERIALS AND METHODS

PART 1 — GENERAL
1.01 DESCRIPTION
A. This section defines the Basic Material and Methods which are common to all Sections of Division 16.

PART 2 — PRODUCTS
2.01 MATERIALS
A. Conduit:
1. Electrical Metallic Tubing: EMT, "Thinwall" conduit shall in general be utilized where permitted by Code except where described herein. Minimum size conduit shall be 3/4", unless otherwise specifically noted otherwise.
2. Heavy-wall steel conduit and I.M.C shall be either hot dipped galvanized or sherardized.
3. Flexible conduit shall be heavy duty steel Greenfield type except, where exposed to oil, grease, or water — then conduit shall be Sealtite.
4. Plastic conduit shall be PVC Schedule 40.
5. Conduit Fittings:
a. Rigid & IMC: Threaded.
b. Thin-Wall: Compression Type.
c. Flexible: Connectors shall be compatible with flexible conduit used.
6. Conduit shall be as manufactured by Allied, National Electric, Republic or Triangle.
7. Flexible liquid tight conduit as manufactured by Anaconda, Simplex, or International Metal Hose.
8. Provide an insulating bushing for all conduits containing #4 and larger wire as well as all conduits 1" and larger regardless of the size wire they contain.
B. Wires and Cables:
1. All wire shall be type THW or THWN copper.
2. Wire smaller than #8 shall be solid; #8 and larger, stranded.
3. Where light fixtures are wired in continuous rows, wire pulled through fixtures shall be type SF2.
4. Final connections to heating equipment where shown, type SF2.
5. Cable and wire shall be as manufactured by Alcoa, Anaconda, General Cable, Triangle, Simplex, Hatfield, Bell, Alpha, and Coleman Cable and Wire.
6. Unless specifically noted otherwise, all wiring shall be installed in conduit.
7. Layout branch circuit wiring and arrangement of home runs for maximum economy efficiency. Increase wire size if voltage drop exceeds 2% or 100 ft in length.
C. Color Coding: Color coding shall be used throughout the entire electrical system:
1. "A" Phase — Black — all gauges.
2. "B" Phase — Red — through #8. Larger black with phase markers.
3. "C" Phase — Blue — through #8. Larger black with phase markers.
4. Neutral — White — through #8. Larger black with phase markers.
5. Grounding Wire — Green, insulated.
6. Control Wire — Colors other than above.
D. Wire Pulling Lubricant: Use of wire pulling lubricant is optional; but, if needed to prevent damage to the conductors, it must be listed by Underwriters Laboratories and be of such consistency that it will leave no obstruction or tackiness that will prevent pulling out old wires or pulling in new wires or additional wires.
E. Electrical Connections, Terminals and Splicing shall be in accordance with Section 110-14 of the NEC. Connection materials and equipment must be given special attention when using dissimilar metal conductors, etc.
F. Outlet, Pull and Junction Boxes:
1. Boxes shall be 12 gauge or heavier steel, sherardized or galvanized to prevent rusting and shall have readily removable knockouts.
2. Pullboxes and pull fittings shall be accessible with removable covers secured with brass machine screws.
3. Junction boxes shall be minimum 4" square or octagon, not less than 2" deep, deeper if required by the number of wires or construction, with appropriate covers. Provide with 3/8" stud where lighting fixture is suspended from box.
4. All switch and receptacle outlets shall be equipped with minimum 4" box. Gang boxes shall be provided where groups of switches occur. All boxes shall be equipped with proper raised covers, mounted at heights shown on Drawings, or as directed. The approximate location of outlet boxes is shown on the Drawings, but care shall be taken to install all outlets with proper relation to equipment or material to be installed by other trades. Special outlets shall have proper boxes to accommodate special equipment. Outlet boxes in masonry shall be or proper depth to allow conduit to be installed without cutting of shell of blocks, etc.
5. Outlet boxes shall be as manufactured by Appleton, Steel City, Raco or Crouse-Hinds.
6. Boxes for all exterior conduit, or conduit mounted on exterior walls, shall be cast iron boxes, type "FS" or "FD", as manufactured by Crouse-Hinds, Appleton, or National, Or Killark and provided with gasketed watertight covers. Fittings shall be [illegible] type with gasketed covers.
G. Disconnect Switches:
1. Switches shall meet NEMA enclosed switch standards KS1, current edition. Switches shall be quick-make, quick-break so that operation of the contacts shall not be capable, during normal operation of the switch, of being restrained by the operating handle after the opening or closing of the contacts has started.
2. All safety switches shall be heavy duty of voltage matching equipment served, NEMA 1 for indoor use and NEMA 3R for outdoor use. Switches shall be as manufactured by Westinghouse, Square D, or Siemens.
H. Fuses: Furnish and install all fuses. Fuses shall be Bussman "Fusetron" dual element, current limiting type, unless specifically noted otherwise.
I. Switches:
1. Except where otherwise specified, wall switches shall be mounted in suitable outlet boxes in the walls, partitions, or as shown on Drawings.
2. Wall switches shall be located as indicated on the Drawings, arranged singly or in gangs and at the height specified or indicated and shall have proper covers with finishes specified herein. Switches shall be as follows unless otherwise called for on Drawings or hereinafter specified. (Contractor shall check architectural drawings for additional information.)
a. Light switches shall be toggle 20amp, 120/277 Volt Specification grade.
b. SPST Hubbell #1221; P & S #20AC1; Leviton #1221
c. 3-way Hubbell #1223; P & S #20AC3; Leviton #1223
d. 30A-SPST (Motor Disconnect): Hubbell #3031; P & S #30AC1; Leviton #3031. Coordinate location with mechanical trades.
e. Key switch Hubbel #1221L.
3. Verify door swings before installing switchboxes and install the boxes on the latch side of the door unless otherwise directed by the Architect.
4. Color of devices to be bid as white; however, final selection shall be by the Architect.
J. Receptacles:
1. Receptacle shall be located as shown on the Drawings and at the heights specified or indicated. Receptacle and power outlets shall be of the grounding type and as manufactured by Hubbell, Pass & Seymour, or Leviton.
2. Duplex Convenience Receptacles: 20A.,2 Pole, 3 Wire, 125 Volt, (NEMA designation 5-20R) Specification Grade.
a. Pass & Seymour #5362
b. Leviton # 5362
c. Hubbell # 5362
3. Special Receptacles and Floor Boxes: As indicated on Drawings.
4. Color of receptacles to match switches (white), unless noted otherwise. Color of Isolated Ground receptacles shall be orange.
5. Ground fault circuit interrupter to be provided for receptacles outdoors, in toilet rooms, and within 6' of sinks.
K. Switch and Receptacle Plates:
1. Plates in finished areas for switches and receptacles shall be white finish and thermoplastic nylon, unless noted otherwise.
2. Provide multigang or combination plates for devices grouped in gang or combination.
3. Provide cadmium plated steel plates in unfinished areas.
4. Identify all dedicated circuits with a laser printed adhesive label indicating panel and circuit number.
L. Circuit Breakers:
1. Circuit breakers shall be as manufactured by Westinghouse, Square D, General Electric or Siemens or of type and manufacturer to match existing for exiting panels.
M. Motors, Control Panels, Etc., Furnished by Others:
1. Check the Drawings and Specifications covering all branches of the work to ascertain what equipment is furnished by others. It will be this Contractor's responsibility to furnish the necessary labor and materials to receive and wire said equipment. Check the Plumbing and Mechanical Drawings and Division 15 of the Specifications carefully for wiring by the Electrical Contractor.

PART 3 — EXECUTION
3.01 PREPARATION/INSTALLATION/APPLICATION
A. Conduit:
1. Installation — All conduit shall be sized in accordance per local codes:
a. Conduit to be run exposed in unfinished areas such as mechanical, electrical room, and janitors' closets used as electrical closets. All other conduit shall be concealed.
b. All conduit and wiring shall be concealed wherever possible. Where conduit and wire cannot be concealed, obtain direction from the Architect. No surface mounted conduit, wiremold or power poles will be acceptable, unless specifically indicated on the drawings.
c. Run parallel or perpendicular to exterior walls of building.
d. Locate to avoid equipment, fixtures, ductwork, piping, etc.
e. Layout and install work in advance of the laying of floors, walls, etc., and furnish and install all sleeves that may be required for openings through floors, walls, etc.
f. Where conduit is to be run exposed, furnish and install all inserts and clamps for the supporting of conduit.
g. If contractor does not properly install all sleeves and inserts he will be required to do the necessary cutting and patching later at his own expense, and to the satisfaction of the Architect.
h. Do not obstruct openings or passageways.
i. Where conduit passes through floors or through smoke and fire walls, space between conduit and floor or wall shall be filled with cement grout.
j. Radius of bends shall be not less than six(6) times internal diameter. Any run of conduit shall not include more than the equivalent of four(4) quarter bends.
k. Provide expansion fittings for all conduits at expansion joints.
2. Cutting Conduit:
a. Measure and cut conduit from job site conditions, not from Drawings.
b. Conduit shall be cut square and butted solidly into fittings.
c. On rigid conduit, cut conduit full and clean with sharp dies. Ream ends of pipe after cutting and before assembly to remove burrs.
d. Ream thin-wall conduit (EMT) after it is cut.
3. Liquid Tight and Flexible Conduit:
a. Liquid tight flexible conduit shall be installed in such a manner that liquids tend to run off the surfaces and not drain toward the fittings.
b. All runs of flexible conduit shall be as short as practicle (maximum of 6'), of the same size as the conduit it extends and with enough slack to reduce the effects of vibration. A minimum of 24 inches of flexible conduit shall be installed.
c. Where the fittings are brought into an enclosure with a knockout, an insulated throat type fitting with liquid sealing "O" ring shall be used.
d. Flexible metal conduit shall be installed for all final equipment connections to transformers, light fixtures (lay-in type) and all other devices where so required. (Maximum of 6')
4. Type of Conduit:
a. The following areas shall be galvanized steel heavy wall conduit:
1) In earth fill.
2) Exposed in wet areas.
3) Exposed outdoors (include watertight fittings & boxes).
4) Outside masonry walls.
5) Within building confines run in concrete slab.
6) Exposed in mechanical rooms.
7) Feeder conduit for panelboards.
8) Sleevings for conduit run in poured concrete shall be concrete tight.
b. Conduit run in dry areas within building confines shall be EMT. Dry areas are inside partitions, ceiling cavities and areas not subject to damage. Outside walls are not considered dry areas.
c. IMC may be used in above grade floor slabs of size 3/4" only.
d. Where permitted by local codes run conduits under floor slabs and in contact with earth may be schedule 40 PVC.
5. Supporting of Conduit:
a. All conduits must be independently supported from structure. No conduits shall be supported from the ventilating ducts, ceiling hangers, mechanical piping or their hangers.
b. All surface run conduit one inch(1") and smaller shall be supported every five feet with one hole straps with clamp backs. Perforated strap hangers will not be permitted.
c. Hangers shall be proportioned for the weight of the conduit(s) supported. All rods, clamps and/or hangers shall be galvanized, bonderized, plated or painted. Where factory supplied, with one of the above rust resistant finishes, all field cuts and threads are to be painted and covered with a grey finishing paint.
d. Trapeze type hangers may be used where several conduits occur at the same elevation. The spacing of such trapeze hangers shall be determined by the electrical code spacing requirements for the smallest conduit in the run.
e. Approved type inserts for support of work in cast or concrete construction.
f. Approved type steel beam clamps in the case of steel construction.
6. Where holes or recesses must be cut in walls, floors, ceilings, or any part of the building to admit apparatus, conduit or other work of this Contractor, he must have it done by a competent mechanic in a neat and workmanlike manner. The portions cut must be restored to their original condition at the expense of this Contractor. This Contractor shall provide for all of his own cutting and patching.
7. All conduits run in or below any grade slab shall be heavy wall conduit and entirely encased in 2" of concrete. In no case shall conduit be laid in fill below slab. Conduit shown as plastic shall be schedule 40.
8. 3/4"D. minimum conduit shall be provided in all non-accessible construction such as floor slabs, earth, masonry, walls, partitions, etc.
9. Provide:
a. Supplementary angles, channels, plates, etc., where supports are required between building's structural members, spanning the space and attached to building structural members, by welding, bolting or with concrete anchors.
b. All rods, angles, rails, struts, brace plates, platforms, etc. required for suspension or support of conduit and equipment.
c. Straps, clamps, threaded rods, turnbuckles, anchors, etc., and all miscellaneous specialties for the attachment of hangers and supports to the structure.
10. Unless otherwise noted on the Drawings, the following shall apply:
a. Convenience outlets shall be placed on separate circuits from motor and lighting outlets.
b. Motors shall be placed on separate circuits from lighting outlets.
c. Convenience outlets shall not be installed back to back.
11. Provide full size ground wire in all conduits, PVC or Metallic. Where the drawings do not identify the size of the equipment ground wire, it shall be the same size as the phase conductors.
B. Motor and Equipment Wiring:
1. Unless indicated or specified elsewhere perform the following:
a. Connect and wire to each motor and piece of electrically operated equipment shown on the Drawings or as specified in these Specifications.
b. Furnish, install and connect all starters, controller selector switches, pilot lights, pushbuttons' stations for each motor and piece of electrically operated equipment shown on Drawings, or as specified in the Specifications, unless otherwise indicated.
c. Furnish and install all wiring from the current source to all starters and from starters to motors, except in the case of factory installed wiring packaged equipment. Wire to the line side of all prewired equipment.
d. Furnish and install a disconnect switch ahead of all prewired package equipment. Coordinate with Mechanical Trades Contractor.
e. Install all roughing-in pertaining to each item of equipment furnished under other Sections of the Specifications or by the Owner. Locations of electrical outlets for this equipment are indicated on the Drawings in their approximate locations. The supplier furnishing the equipment will furnish dimensional drawings accurately locating all roughing-in required for his equipment.
f. Receive, set and align motors which are shipped loose if local union or trade jurisdiction practice requires doing so.
g. Provide all control circuit and interlock wiring and connections for all mechanical equipment as indicated and scheduled on the Drawings.
2. If a disconnect switch is required by the enforcing code and not indicated on the Drawings or in the Specifications, it shall be furnished and installed.
3. Where specific locations of switches and starters are not shown on the Drawings, these shall be placed near the motor.
C. Conductors, Cables:
1. Except where otherwise shown on the drawings all wiring shall be installed in conduit.
2. Conductors and cables shall not be installed in conduit or raceways until same are free from moisture and debris.
3. Leave a minimum of six inch(6") length of cable and conductor slack at each outlet.
4. All wire shall be type THW or THWN copper.
D. Expansion Fittings:
1. Expansion fittings shall be installed in all conduits crossing expansion joints. Refer to Architectural drawings for locations.
E. Fire and Smoke Partition Penetrations:
1. The Contractor shall familiarize himself with all fire rated construction and install his work so as to maintain the integrity of the fire code rating. Maintain rating of fire rated and smoke rated construction. Sleeves shall be steel or pre-manufactured sleeves similar to Pipe Shields, Inc., for bare pipe through fire walls and floors, model WFB, DFB or QDFB. For plastic pipe, use type [illegible] with one inch thick calcium silicate insulation encased in metal sleeve extension two feet either side of fire rated walls or floor. Seal annular space around conduits. For fire and smoke rated floors, walls and partitions, use UL listed material that maintains fire rated wall and floor integrity, similar to 3M foam, Dow Corning "Fire Stop" or Pipe Shields, Inc., model WFB, DFB, or QDFB. For non-rated walls and partitions, use mineral fiber glass fiber insulation.
END OF SECTION

SECTION 16[illegible]
LIGHTING SYSTEMS AND CONTROLS

PART 1 — GENERAL
1.01 DESCRIPTION
A. Work Included:
1. Installing and wiring lighting fixtures as shown on Drawings, Lighting Fixture Schedule, and as furnished by the Owner.
2. Refer to the Architectural Room Finish Schedules and Architectural and Structural details to determine conditions and finishes affecting the installation of the work and include, to the full intent and meaning of these Specifications, all items of labor and materials necessary for design, detailing or adjustment of fixtures due to surrounding finishes and construction.

PART 2 — PRODUCTS
2.01 MATERIALS
A. All lighting fixtures shall be furnished by Owner.
B. All lamps shall be furnished by Owner.

PART 3 — EXECUTION
3.01 INSTALLATION
A. Fixtures: An outlet is to be provided for each fixture. All fixtures shall be located to suit the Architectural details of the areas involved. Unpack, assemble, wire and install all fixtures at the proper locations indicated on the Drawings.
B. Recessed Fixture Installation: Recessed fixtures shall be of type suitable for mounting in the type of ceiling as scheduled on the Drawings. Variations to catalog numbers indicated shall be made to assure proper mounting and fitting arrangements, prior to fabrication. Changes to be made by this Division Contractor must have prior written approval from the Architect.
C. Supports:
1. Each lighting fixture shall be rigidly supported from the building construction. Provide suspension hangers, stems and extra steel work for fixture support where required.
2. Confer with Ceiling Contractor to determine modifications required to make fixtures suitable for ceiling as installed.
3. Where recessed fixtures are called for, each shall be provided with the proper plaster frame or suitable adapter to receive the finished ceiling construction.
4. Where suspended acoustic tile ceilings on steel channels occur, outlets and fixtures shall be supported on members resting on the channel framework. In no case shall fixtures be supported from plaster or acoustic material.
5. Suspended fixtures shall be hung on suspension hangers furnished by the fixture manufacturer and shall be adjusted as necessary during installation to insure that all fixtures in the same room or area are at a uniform height from the floor. Mounting height shall be as specified, detailed or noted on the Drawings.
6. Any electrical lighting fixture which weighs more than 50 pounds shall be supported independently of the outlet box.
D. Fixture Wiring:
1. Fixtures shall be wired with white wire for the neutral and colored wire for phase wires, see Section 16100.
2. Housing of all fixtures must be grounded to conduit system.
3. Each fixture to be complete with holders, screws, sockets, wires, lamps, etc., as is necessary for a complete installation.
E. Operation and Controls:
1. Local switches as shown and wired.
2. Exit and directional signs shall be constantly on, and wired as shown.
END OF SECTION

SECTION 16620
EMERGENCY LIGHT AND POWER

PART 1 — GENERAL
1.01 DESCRIPTION
A. Install all exit signs and battery emergency lights as shown on the Drawings and required by all governing authorities having jurisdiction.

1.02 SUBMITTALS
A. Requirements of Regulatory Agency: Obtain any and all plan approvals as required by the authorities which have jurisdiction over this Project, prior to start of work.

PART 2 — PRODUCTS
2.01 MATERIALS AND FIXTURES
A. Conduits, fittings, wire, etc., shall be in accordance with applicable Section of this Specification.
B. Exit and Direction Signs:
1. Shall be U.L. approved.
2. Colored letters on white background. (Color per the local Code Authority).
3. Directional arrows as required by local Fire Protection Bureau.
4. Color of trim as selected by Architect.

PART 3 — EXECUTION
3.01 INSTALLATION
A. Furnish and install all panels, conduits, feeders, branch circuit wiring, etc., with green ground wire required by Code and as shown on the Drawings.
B. All emergency system branches shall be installed in separate conduits.
END OF SECTION

SECTION 16720
ALARM AND DETECTION SYSTEMS

PART 1 — GENERAL
1.01 DESCRIPTION
A. Work Included:
1. Provide necessary conduit and power for alarm and detection systems. This shall only include the following:
a. Dedicated 20 Amp., 120 Volt circuit (s).
b. 3/4" conduit (empty) to each door contact, silent duress alarm, camera and keypad.

PART 2 — PRODUCTS (REFER TO OTHER SECTIONS OF THE SPECIFICATION)

PART 3 — EXECUTION
3.01 RELATED DOCUMENTS
A. All conduit and wiring requirements shall conform with Section 16100, "Basic Materials and Methods" of this Specification.
END OF SECTION

SECTION 16700
COMUNICATIONS

PART 1 — GENERAL
1.01 DESCRIPTION
A. Work Includes:
1. Empty conduit and boxes for wiring installed by owner's vendor.
B. Work by Telephone Utility:
1. All wiring for telephone instruments.
2. All telephone instruments.

PART 2 — PRODUCTS
2.01 MATERIALS
A. Conduits, fittings, wire, outlet boxes shall be as hereinbefore specified in Section 16100.
B. Wall boxes to be flush 4" square, with extension ring.
C. Telephone System Grounding Conductors: Furnish a #6 AWG, copper grounding conductor from each telephone service equipment to respective electrical service grounding electrode system.
D. Telephone/Computer Conduit System: Furnish as indicated on the Drawings, including the following:
1. Telephone service conduits for underground service.
2. Other conduits as indicated on the Drawings. Furnish #14 AWG soft iron pull wire or heavy nylon cord in each conduit for pulling the telephone cable to each termination point.
3. Outlet boxes with a 3/4" conduit stubbed into accessible ceiling space with pullwire for cabling by others. Provide separate dedicated conduits for P. O. S. lines. (Do not share with other telephone or data lines.)
4. No electrical conduits or power wiring shall pass over the telecommunications closet and panels, except for telecommunications room light fixtures.
5. Contact CrossCom National Green team/Ulta Project Coordinator at (800) 933-9203 to fully coordinate entire Tele/Data low voltage installation.

PART 3 — EXECUTION
3.01 INSTALLATION
A. Furnish and install conduit system as shown. Cabling and final connection to be by the owners subcontractor. The system shall consist of telephone/data outlets in locations as indicated, branch conduits, and all accessories required by the telephone company for complete installation.
END OF SECTION

SECTION 16400
SERVICE AND DISTRIBUTION

PART 1 — GENERAL
1.01 RELATED DOCUMENTS
A. The General Conditions, Supplementary Conditions, and General Requirements apply to the Work specified in this Section.
B. Section 16010, "General Provisions — Electrical", applies to the work specified in this Section

1.02 DESCRIPTION
A. Work Included:
1. Complete electrical service and secondary distribution system.
2. All charges by the Local Utility Company for construction related work. Owner charges will be paid by the Owner.
3. System Grounding per the local Utility Company and N.E.C.
4. Main switchboard distribution panelboards and lighting panelboards as scheduled.
5. Utility approved current transformers and meter fittings.
6. Utility Company transformer support pad and primary conduit(s).
7. Complete secondary 120/208 volt, 3 phase, 4 wire, 60 hertz service from the secondary side of pad mounted transformer into the building main service overcurrent protective device.
8. Tenant metering where shown and required.

PART 2 — PRODUCTS
2.01 EQUIPMENT
A. Main Distribution Panelboards "MDP":
1. Shall be as scheduled on the drawings.
2. Panelboard shall be enclosed in steel cabinet of rigidity and gauge of steel per UL Standard #50 for cabinets.
3. Acceptable manufacturers are Westinghouse, Siemens and Square D.
4. Bus structure shall be copper not exceeding density of 1000 amps per square inch of cross section. Buss supports shall be adequate to withstand 50,000 amperes symmetrical short circuit stresses minimum. All contact surfaces shall be silver plated.
5. Panelboard shall be braced for short circuit capacities as scheduled by the local Utility Company; however, the minimum bracing shall be 50,000 A.I.C. symmetrical.
6. Each circuit breaker shall be equipped with an approved nameplate which indicates the name of the equipment (motor, panelboard, etc.) to which the feeder conductors are connected.
7. Main distribution panel shall have a ground bus. The ground bus shall be fastened and bonded to the framing member in an approved manner. The ground bus shall be grounded in a manner meeting all code requirements.
B. Building Metering: For metering furnish and install on the C/T compartment or on the exterior wall a mounting panel with all meter accessory equipment for mounting thereon the associated Utility Company's meter requirements.
C. Lighting and Appliance Panelboards:
1. Panels shall be type indicated on the Drawings, with main lugs, main breakers, bolt-on branch breakers, spares and spaces as scheduled. Ground fault interrupter (GFI) circuit breakers shall be provided where noted.
2. Panels shall comply with U.S. Federal Specification WP115a, Type I, Class I. Where applicable, provide with copper bus of density not exceeding 1000 amps per square inch.
3. The Electrical Contractor shall balance all circuits. All conductors shall be continuous without splicing from last outlet to their terminals in cabinet. All circuit conductors in cabinet shall be installed with sufficient amount of length to reach the most remote breaker connection from its point of entrance.
4. Panelboard fronts shall be fabricated from a flat piece of full finished code gauge sheet steel with door cut out leaving a trim of proper width around the door. Provide a latching mechanism controlled by a chrome plated vault-handle on doors twenty-four inches(24") or over in height. All Locks to be keyed alike to the panel manufactures's standard key. Two(2) Keys shall be furnished with each cabinet.
5. Contractor shall provide a directory of circuits for cabinet. Directory shall be typewritten designating room or equipment and circuit numbers. Directory frame, lock, hinges, etc., are to be secured to inside of door and trim in such a manner that screws, holes or welds, etc., are not visible on the door panel or trim.
6. The width and height of cabinets shall be sufficient to provide a wiring gutter at the two sides and at the top and bottom not less than 4". Additional width or height shall be provided, if required for entering conduits. Additional wiring gutter space shall be provided if required for main or sub-feeder cables passing through to feed other cabinets.
7. Where 2 or 3 pole breakers units are called for, they shall be one unit with common trip and not single pole units with handle ties. Capacity of main busses shall be as shown on the Drawings.
8. Acceptable manufacturers are Westinghouse, Siemens and Square D.
9. Panelboards shall be braced for short circuit capacities as scheduled by the local Utility Company.
10. All breakers utilized for switching lighting shall be rated switching duty type.

PART 3 — EXECUTION
3.01 INSTALLATION
A. Electrical service, metering and main distribution shall be as shown on the Drawings and as herein specified.
B. System Grounding: Shall be in strict accordance with the National Electrical Code, Local Governing Authorities and in accordance with the recommendations of the Utility Company.
C. Electrical Service:
1. Electrical service shall be from the Utility Company's transformer at 3 phase, 4 wire, 60 hertz with voltage as specified on the Drawings.
2. Furnish and install the secondary service from transformer to the current transformer cabinet and into the main service switches as shown on the Drawings. Leave sufficient slack cable, at the transformer locations for connection of the secondary conductors to the transformer by the Utility Company.
3. This Contractor shall contact the Utility Company to obtain all information necessary for the work, incorporate their instructions into the work, and obtain their approval of all work and material. Include all contractor related costs in base bid.
4. Provide transformer support pad in accordance with the Utility Company's standards. Work shall include pad, trench for ground wire, conduits, ells and miscellaneous hardware.
5. The Utility Company will furnish, install and connect all primary service conductors.
D. Grounding:
1. Provide an electrically continuous ground system from service to all points of utilization. In general, all pieces of electrical equipment shall be grounded as required by Federal, State and Local Codes and regulations, but special attention is called to the following items to be grounded as indicated:
a. All distribution equipment including switchboard, transformer and panelboards.
b. Conduit and other metallic raceways.
2. In general where grounding wire is shown use green color.
END OF SECTION

SECTION 16050
DEMOLITION WORK

PART 1 — GENERAL
1.01 DESCRIPTION
A. Description of Work:
1. The extent of demolition work and areas involved is shown on the Drawings and as specified herein.
2. Work shall include the complete wrecking, demolishing, removal and the legal disposal of demolished materials required for the installation of new work and as specified herein.
3. Carefully coordinate demolition work with work of other trades.

PART 2 — PRODUCTS (NOT APPLICABLE)

PART 3 — EXECUTION
3.01 DEMOLITION
A. Fixtures: All existing lighting fixtures to be removed shall be turned over to Owners Representative unless noted otherwise.
B. Motors and Motor Starters: All motors, motor starters and their associated controls to be removed under demolition shall be disconnected and feeder wires removed. Removal of equipment shall be by other Divisions.
C. Legally dispose of all light fixtures being removed. This Contractor shall verify the existence of ballasts, which contain PCB's and DEHP's. If these chemicals exist, verify with local Municipalities as to the requirements of proper disposal and follow all requirements. Provide a separate cost to the bid proposal for the additional cost to legally dispose of ballasts containing these chemicals.

3.02 STORING OF SALVAGEABLE EQUIPMENT
A. Contact Owner's Representative for designated location of storage area.
B. Properly place all salvageable equipment in assigned storage area as directed by Owner's Representative.

3.03 PANEL DIRECTORIES
A. Label all panel directories "spare" for the circuits being removed under demolition.

3.04 SHUTDOWN
A. Approval must be obtained from the Owner's Representative, in writing, should it become absolutely necessary to shut down service to any part of the building.
B. Such shutdown shall be at the Owner's convenience and only for the period of time agreed upon.

3.05 RELOCATION AND CONTINUITY OF SERVICE
A. Provide all extensions and/or modifications necessary to maintain continuity of service to remaining electrical equipment. Include all Contractor costs in base bid for pullboxes, conduit systems, feeders, etc. required to maintain continuity of service.
END OF SECTION

SEISMIC CONTROLS FOR MEPF SYSTEMS:

SEISMIC BRACING OF MECHANICAL, ELECTRICAL, AND PLUMBING SYSTEMS SHALL BE INSTALLED AS REQUIRED BY LOCAL ADOPTED CODES. SEISMIC BRACING MEASURES TO BE APPLIED TO MECHANICAL/ELECTRICAL/PLUMBING EQUIPMENT AND SYSTEMS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND/OR FEDERAL CODES AS WELL AS MANUFACTURER'S REQUIREMENTS. REFER TO ARCHITECTURAL AND/OR STRUCTURAL FOR ADDITIONAL BRACING DETAILS AND INFORMATION.

HENDERSON ENGINEERS
8345 LENEXA DRIVE, SUITE 300
LENEXA, KS 66214
TEL 913.742.5000 FAX 913.742.5001
WWW.HENDERSONENGINEERS.COM
1950001750
AL CORPORATE NUMBER: CA-2185-E
EXPIRES 01/31/20

LISA A. COYAN

RGLA
rgla solutions, inc.
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

REVISIONS:	DATE:
LL & ULTA REVIEW	06/03/2019
BID ISSUE	06/03/2019
PERMIT ISSUE	06/04/2019

robert g. lyon + associates, inc.
retail architecture
5100 River Road, Ste 125
Schiller Park, IL 60176
p: 847.671.7452
f: 847.671.4200
www.rgla.com

SEAL:

THE ABOVE DRAWINGS AND SPECIFICATIONS AND IDEAS, DESIGNS AND ARRANGEMENTS REPRESENTED THEREBY ARE AND SHALL REMAIN THE PROPERTY OF THIS OFFICE: AND NO PART THEREOF SHALL BE COPIED, DISCLOSED TO OTHERS OR USED IN THE CONNECTION WITH ANY WORK OR PROJECT OTHER THAN THE SPECIFIC PROJECT FOR WHICH THEY HAVE BEEN PREPARED AND DEVELOPED WITHOUT THE WRITTEN CONSENT OF THIS OFFICE. VISUAL CONTACT WITH THESE DRAWINGS OR SPECIFICATIONS SHALL CONSTITUTE CONCLUSIVE EVIDENCE OF ACCEPTANCE OF THESE RESTRICTIONS.

WRITTEN DIMENSIONS ON THESE DRAWINGS SHALL HAVE PRECEDENCE OVER SCALED DIMENSIONS: CONTRACTORS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND THIS OFFICE MUST BE NOTIFIED OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN BY THESE DRAWINGS. SHOP DETAILS MUST BE SUBMITTED TO THIS OFFICE FOR APPROVAL BEFORE PROCEEDING WITH FABRICATION.

© 2018 RGLA SOLUTIONS, INC.
© 2018 ROBERT G. LYON & ASSOCIATES, INC.

ULTA BEAUTY

ULTA #1613
SHOPPES OF MADISON
8201 HIGHWAY 72 WEST
SUITE C
MADISON, AL 35758

ELECTRICAL SPECIFICATIONS

DRAWN BY	
HEI	
CHECKED BY	
HEI	
JOB NUMBER	
19047	
SHEET NAME	
E4-1	

Order Plans @ www.DIIine.com