NOTICE INVITING INFORMAL BIDS – March 9, 2015

1. **NOTICE.** The Sierra Joint Community College District, hereby gives notice that in accordance with Public Contract Code 22000-22045 it will accept bids for the following public work:

**Sierra College Rocklin Campus**
**V Building Lighting Retrofit**

**DESCRIPTION AND LOCATION OF THE WORK**

The scope of work includes: interior lighting LED retrofit. The location of the work is: 5000 Rocklin Road, Rocklin CA 95677: Building V.

Detailed technical specifications for project provided at the end of this document, item #12.

2. **CONTRACTOR REQUIREMENTS:** Please note that in order to participate in any Sierra College Informal Bid, a contractor must, at the time of the bid:

- Be listed on the District’s Qualified Contractor list (see Contractor Application form on the District’s Purchasing webpage [http://www.sierracollege.edu/about-us/admin-services/fiscal-services/purchasing/contractor.php](http://www.sierracollege.edu/about-us/admin-services/fiscal-services/purchasing/contractor.php))
- Have a current, valid California C-10 contractor license, under the name shown on the District’s Qualified Contractor list.
- Submit a list of all planned subcontractors, with name of company, project contact, business address/phone number, California contractor license number and total dollar amount of subcontract.
- For contracts to be awarded on or after April 1, 2015, the contractors and subcontractors must be registered with the Department of Industrial Relations. See the [Department of Industrial Relations Public Works Funding Fact Sheet on SB854](https://www.dir.ca.gov/dirlab/pdf/SB854FactSheet.pdf) for more information.
- Provide a bid bond (payable to the District) or other form of bidder’s security, including a cashier’s check or certified check (also payable to the District), in the amount of 10% of the bid.
- Provide proof of payment and performance bonds before work can begin, for a sum not less than 100% of the total contract amount.
Sierra College Rocklin Campus  
V Building Lighting Retrofit

- Provide a certificate of insurance showing current commercial general liability coverage of at least $1,000,000 per occurrence/$2,000,000 aggregate.
- Provide a certificate of insurance showing current workers compensation insurance and employers liability insurance for the contractor and every subcontractor. If exempt from this requirement because there are no employees, show evidence of exemption issued by the Contractors State License Board.
- Shall maintain automobile liability insurance covering bodily injury and property damage for all project-related activities, including coverage for owned, hired, and non-owned vehicles, in an amount of not less than three hundred thousand dollars ($300,000) combined single limit for each occurrence.
- Have attended the mandatory bidder’s meeting (see Section 5).

3. CONTACT INFORMATION:

Owner: Sierra Joint Community College District
Project contact: Colin Irwin
Phone: 916-660-7655
Email: cirwin@sierracollege.edu

4. PROCUREMENT OF BIDDING DOCUMENTS. Bidders may examine and obtain bid documents from the District’s Purchasing webpage: http://www.sierracollege.edu/about-us/admin-services/fiscal-services/purchasing/contractor.php

5. MANDATORY BIDDERS MEETING. Owner will conduct a mandatory bidders meeting on:

Friday, March 13, 2015 at 1pm
Sierra College Rocklin Campus, Facilities & Operations Office, Building YT-1

The meeting will be followed by a site walk to familiarize bidders with work location and existing conditions. There will be no other available appointments to meet with Owner prior to bid due date.

Bidders are encouraged to submit written questions to Project contact who will transmit all questions and responses to all parties recorded as having attended the Mandatory Bidders Meeting. Bidders shall not rely on oral statements. Oral statements will not be binding or legally effective.

6. BID SUBMISSION. Sealed bids will be received at the Sierra College Rocklin Campus Facilities Department, Building YT-1 prior to 1pm. on Tuesday, March 24, 2015. Bids will be opened and publicly read immediately after 1pm.

8. BID PREPARATION COST. Bidders are solely responsible for the cost of preparing their bids.

9. CONTRACT TERM. Work shall start after contracts are signed on or about April 14, 2015 and be completed no later than June, 15, 2015.
10. **SUBSTITUTION OF SECURITIES.** The successful Bidder shall have the rights and options under Public Contract Code Section 22300 regarding disposition and handling of retention funds.

11. **RESERVATION OF RIGHTS.** Owner specifically reserves the right, in its sole discretion, to reject any or all bids, or re-bid, or to waive inconsequential deviations from bid requirements not involving time, price, or quality of the work.

12. **TECHNICAL SPECIFICATIONS:**

ELECTRICAL SPECIFICATIONS

PART 1-GENERAL

1.01 SCOPE OF WORK

A. Furnish all necessary labor, materials, equipment and incidentals required to install a complete and operational electronic system according to the intent of this specification whether itemized or not.

B. The general extent of the electrical work includes, among others, and installing controls as indicated on the drawings.
   1. Lighting installation, including fixtures, retrofit kits, replacement lamps and lighting controls as indicated on the drawings.
   2. All supports, bases, anchors, sleeves, hangers and the like, all electrical work shown and/or specified, not particularly mentioned above.
   3. Complete grounding and bonding systems

1.02 RELATED WORK INCLUDED IN OTHER DIVISIONS

A. Finish painting except factory applied finishes and repair of factory finishes shall be provided in accordance with approximate sections of this specification. Coordinate “painting” requirements of this division with other traders as required to assure timely and satisfactory completion of required work. In finished areas, all exposed raceway, boxes, galvanized steel box covers (where allowed), and other electrical “structure” shall be finished to match adjusted structures. Verify that all raceway openings are closed and box covers are in place prior to finishing work done by others.

1.03 DRAWINGS AND SPECIFICATIONS
A. The information presented in these specifications and on the drawings is intended to
describe the utilitarian and physical aspects of the system shown as well as the
quality of the entire installation. All information is as complete and thorough as
possible, but every condition or situation cannot be anticipated. Exact locations,
dimensions, elevations, etc. must be determined “on the job” with careful attention
to the intent of the drawings and specifications.

B. The above paragraph shall not be construed as to allow significance deviation from
either the drawings or specifications without prior approval of the engineer, but
minor changes in conduit routing or equipment locations may be required or desired
due to specific conditions encountered. This work shall be accomplished in
accordance with these specifications and no “extra charges” are to be created for
any unanticipated labor or material.

C. Any error or omissions of detail in either the drawings or the specifications shall not
relieve the contractor from correctly installing all materials necessary for complete
and operating electrical systems.

D. Contractor shall inspect the site and verify all measurements and conditions. No
extra compensation will be allowed because of differences between work shown on
the drawings and measurements.

E. The drawings are diagrammatic in nature, but the locations of devices, equipment,
outlets, and lighting fixtures are shown approximately where installations are
intended. Report conflicting conditions to the engineers for adjustment before
proceeding with the work. Should the contractor proceed with work without
reporting the matter, he does so on his own responsibility and shall alter the work if
directed by the engineer at his own expenses.

F. All equipment shall be located and installed so that it will be readily accessible for
operation and maintenance. The owner reserves the right to require minor changes
in location of outlets or equipment, prior to rough in without incurring any
additional cost or changes.

G. If significant departures from the drawings or specifications are considered
necessary by the contractor, details of the changes and the reasons therefore shall
be submitted to the engineer as within thirty days after award of contract. Prior
written acceptance of the engineer is required for these departures.

H. Clarifications of plans and specifications for the purpose of facilitating construction,
but not involving additional labor and materials, may be prepared during
construction by the engineer. Said revised plans and specifications shall become part
of the contract. The contractor shall confirm to the revised plans and specifications at no additional cost to the Owner/District.

1.04 CODES AND STANDARDS

A. All work shall conform the following codes:

2. Title 24- State of California Administrative Code
4. City or County Electrical Code as applicable
5. Applicable regulations of local unity companies
7. Occupational safety and Health Act (OSHA) Standards
8. Any additional codes effective at the job site

B. Furnish without extra charge any additional material and labor which may be required for compliance with these laws, rules, and regulations, even though the work is not mentioned in these particular specifications.

1.05 EXAMINATION OF THE SITE

A. The contractor is required to visit the site of construction prior to bid to determine existing conditions and their effect upon the work he will be required to perform. No additional compensation will be allowed for any extra expenses incurred by failure to detect and evaluate all existing conditions that will affect his work to be included in the bid to accomplish this contract document’s goal.

1.06 COORDINATION WITH OTHER TRADERS

A. Examine the Electrical drawings and refer to the drawings and specifications describing other work to be accomplished. Verify and coordinate prior to bid. Continue to coordinate work planning and all work in the field to avoid conflicts, errors, and/or delays. No compensation will be allowed for extra work necessitated by lack of coordination.

1.07 MANUFACTURERS INSTRUCTIONS

A. Follow the manufacturer’s instructions when specific installation or connection details are not indicated or specified on the contract documents.
B. Notify the engineer of conflicts between the manufacturer’s instructions and installation or connection details prior to the installation of materials.

1.08 DEMOLITION

A. Where remodel or demolition work is to be accomplished under this contract, all removed materials and equipment which in opinion of the owner is salvable shall remain the property of the owner. All materials considered scrap shall be removed from the premises and disposed of by the contractor.

B. Concealed conduits, which are not shown or specified to be reused and become exposed due to construction charges, shall be removed to nearest available accessible reuse outlets.

C. Make every effort to keep existing electrical circuits in operation. Where power outages are unavoidable, schedule such outages with owner to occur at such times to cause the least disruption of normal facility functions.

D. Reconnect all lighting which are to remain.

1.09 INSPECTION

A. Cooperate with the owner and provide assistance at all times for inspection of the electrical work. Remove covers, operate lighting, or perform any reasonable work, which in the opinion of the owner, will be necessary to determine the quality or adequacy of the work.

B. If any material does not conform to these specifications, remove the materials from the premises, within three days after being notified by the owner.

C. Work shall not be closed in or covered before inspection and approval by the Owner.

1.10 QUALITY OF MATERIAL

A. All electrical materials used on this project shall be new and free from defects.

B. All electrical materials used on this project shall conform where applicable, to the following statements, unless otherwise noted:

1. NEMA – National Electrical Manufacturers association.
2. ANSI – American National students institute
3. UL- Underwriters laboratories, Inc.
C. Each type of material shall be of the same manufacturer and quality throughout the work.

1.11 SUBMITTAL & SHOP DRAWINGS

A. Shop Drawings and supplemental data where called for, shall be prepared and submitted as per general Conditions. Final corrected copies of schedules and shop drawings or supplemental data of Electrical Engineer for review shall be such as to provide one (1) for electrical engineer’s files, Two (2) for the owner, One (1) to contractors job files, and such additional copies as contractor may desire for his office files and/or for distribution by him to subcontractors or vendors.

B. Shop drawings and supplemental data are required unless specifically not requested by the engineer. Shop drawings shall be submitted for all electrical equipment pertaining to job. (Not limited to electrical equipment, lights, light controls, boxes and enclosures, conduit, wire, etc.)

C. The shop drawings and supplemental data shown called for shall be submitted as the instruments of the contractor, even though they may have been prepared by a subcontractor, supplier, dealer, manufacturer, or by any other person, firm or organization. Prior to submission, the contractor, even shall undertake his own review and stamp with his acceptance, then submit to the engineer for his review. By accepting and submitting shop drawings and supplemental data, the contractor represents that he has determined and verified all field of measurements, the physical construction, the quality of materials, and the applicability of catalog numbers, and similar data, or will do so, and that he has checked and coordinated each shop drawings with the requirements of the trades shall be resolved by the contractor in the shop drawing, if possible but in any event prior to the actual construction.

D. All shop drawings shall be drawn accurately on paper suitable for duplicate copying by black, blue, line printing process or Xerox.

E. Supplemental data shall include information as noted in specification paragraphs requiring them, or as requested by the engineer.

F. The engineer will review shop drawings and supplemental data submitted by the contractor only for general design conformance with the concept of the project and compliance with the information given in the contract documents.

G. If more than one (1) submission of shop drawings or supplemental data is required for any given item to meet the project specifications, the cost of reviewing these additional submissions shall be charged directly against the contractor and the owner will withhold the funds necessary to cover these costs.

H. Shop drawings, if required, must be submitted to and favorably reviewed by the engineer before being used by the contractor on the job.

I. Shop drawings Deadline: The contractor shall, within 35 calendar days after the notice to proceed of the contract, submit to the engineer for approval the shop drawings for equipment and/or specialty items listed in each division of work. The
shop drawings shall be submitted in addition to the list of materials required by the “specified items substitutes” paragraph

J. Shop drawings Delineation: The shop drawings shall be drawn to scale and shall be completely dimensioned, giving the plan together with such sections as are necessary to clearly show construction detail.

K. Responsibility: These shop drawings and all supporting data, catalogs, etc., shall be prepared by the contractor or his suppliers, but shall be submitted as the instruments of the contractor. Therefore, the contractor shall check the drawings or his suppliers as well as his own drawings before submitting them to the engineer. In particular, the contractor shall ascertain that the drawings meet all requirements of the drawings and specifications and also conform to the structural and space conditions. Each shop drawing submitted for approval shall bear a stamp certifying it has been checked by the contractor in accordance with the specifications. If such shop drawings show various from contract documents, whether because of standard shop practice or other reasons, the contractor shall make special mention thereof in his letter transmittal. The contractor shall be fully responsible for observing the need for making any changes in the agreement of piping, connections, wiring, manner of installation etc., which may be required by the equipment he proposes to supply both as pertains to his own work and any work affected under other parts, heading of drawings and specifications.

L. Identification: Shop Drawings shall be entitled with the name of the project on each sheet and shall otherwise be identified by listing the particular division, section, article, or reference or the work pertaining. Submit different items on separate sheets. All submittals shall be numbered serially.

M. Manner: Furnish for architect’s approval several sheets of submittal of each specialty item in the following manner.

1. Catalog cuts shall be photocopied or reproduced in some other acceptable manner and submitted seven (7) copies on one side only of an 8½” x 11” sheet noting only the items in question, together with descriptive (Specification) data complete. Drawings shall be submitted in ozalid transparency form

2. Each sheet shall be identified with the division, section, article or reference in the contact documents which covers the item submitted for approval.

3. Each sheet shall be identified by the project name and the engineer.

4. Each sheet shall bear the contractor’s stamp and signature for approval.

1.12 SPECIFIED ITEMS-SUBSTITUTES
A. Whether catalog numbers and specific brands or trade names followed by the
designation “or equal’ are used in conjunction with designated material, product,
thickness or service mentioned in this specification, they are used to establish the
standards of quality utility and appearance required. Substitutions which are equal
in quality utility and appearance to those specified will be approved, subject to the
following provision: all substitutions must eb approved by the engineer in writing.
For this purpose, the contractor shall submit to the engineer, within 30-callernder
days after date of commencement specified in the notice to proceed, a typewritten
list containing a description of each proposed substitute item or material. The
engineer may increase the submittal period beyond 30 calendar days if the schedule
allows. Sufficient data, drawings, samples, literature or other detailed information
that will demonstrate to the engineer that the proposed substitute is equal in
quality, utility, and appearance to the material specified shall be appended to this
list. The engineer will approve, in writing, such as proposed substitution which affect
other parts of the contractors own work or the work of others.

B. Failure of the contractor to submit proposed submissions for approval in manner
described above and within the time period prescribed shall be sufficient cause for
disapproval by the engineer of any substitutions otherwise proposed.

C. Wherever catalog numbers and specific brands or trade names not followed by the
designation “or equal’ Material, product, thing or service mentioned in these
specifications, no substitutions will be accepted for approval.

D. Wherever more than one manufacturer s product is specified, the first name
product is the basis of the project design and the use of alternative name
manufacturer’s products or substitutes may require modifications in the project
design and construction. If such alternatives are proposed by the contractor and are
favorably used by the engineer the contractor shall assume costs required to make
necessary revisions and modifications including additional costs to the owner for
evaluation of modifications of the project by the project design submitted by the
contractor to the engineer.

E. When materials are specified by the manufacturer’s name, and product number,
second manufacturers’ name, or equal, the second manufacturer’s project shall be
submitter in accordance with the paragraph above.

F. If the engineer in the review list of materials and equipment require revisions or
corrections to be made or shop drawings and/ or supplemental data to be
submitted, the contractor shall promptly do so. If any proposed material is judged by
the engineer to be unacceptable the specified item shall be provided; further
submissions will not be allowed unless directed by the engineer.

G. Physical samples may be required. If tests for the determination of equality and
utility are required by the engineer they shall be made by testing laboratory, with
acceptance of the test procedure first given by the engineer and at the expense or
the contractor.

H. In the review of the data submitted in support of the submissions, the engineer will
use for purpose of comparison all the characteristics of the specified item as they
appear in the manufacturers published data even though all characteristics of the
specified item may not have been particularly mentioned in the if more than two submissions of data are required the cost of reviewing against the contractor and the owner will withhold the funds necessary to cover these costs. Only one (1) such request may resubmit. The engineer’s rejection of any substitute shall automatically require the contractor to furnish the specified item without further discussion or delay.

1.13 Warranty

A. Guarantee all work for one year from date of acceptance against all defects in material equipment and workmanship.

1.14 Record As-Build Drawings

A. The contractor shall keep a separate set of Electrical drawing at the job site to be used as RECORD Drawings. These drawings are to be kept current and in neat and clean condition at all times. They are to be available for inspection by the engineer at any time during site visitations. These drawings shall be “red lined” to indicate all changes in equipment, device, and outlet locations; and to indicate the true locations of all concealed or underground work were different from that shown on the drawings. Each sheet of this set shall be clearly and permanently marked “RECORD AS- BUILD DRAWINGS”.

B. Upon completion of project and prior to final payment, transfer all RECORD DRAWINGS information to the provided original drawings. All information shall be clearly drawn with “RED” ink. The drawings shall be scanned, 100% edited, and converted into an AutoCAD”.dwg” version 2000( or higher) electronic file. Deliver the original, final sets and electronic files (CD) to the architect for review and delivery to the District/Owner.

Part 2-Products

2.01 Materials

A. Unless Specifically indicated otherwise, all material shall be new and free from defects; it shall be listed by Underwriters’ Laboratories where applicable. Like items shall be of the same manufacturer (except lighting fixtures- which shall be as specified). B. Except as noted otherwise, where materials of a particular manufacturer is specified, the intent to describe the quality and function of the item. The term”...or Approved equal” is implied. A substitution of any of these items will require that the item be presented in a submittal whether specifically listed in the “submittal’s” paragraph above.

2.02 Enclosures

A. Provide enclosures suitable for the specific type of location in which they are installed.
1. Provide NEMA 1 or NEMA 12 boxes and enclosures for the dry locations. Dry locations are all indoor areas that do not fall within the definitions below for wet or damp locations.

2.03 RACEWAY AND FITTINGS

A. Rigid steel conduit:
   1. Comply with underwriter’s laboratories UL-6 specification, ANSI C80.1 and federal specification WW-C-581E or latest revisions. Hot dip galvanized on the exterior, zinc or enamel on the interior.
   2. Couplings, locknuts, and all other fittings shall be galvanized or sherardized, waterproof and threaded type only. Appleton, Crouse-Hinds or equal.

B. Intermediate Metallic Conduit (IMC)
   1. Comply with proposed underwriters Laboratories UL 1242 and federal specification WW-C-581E or latest version. Hot dipped galvanized on the exterior, corrosion inhabiting coating on the interior.
   2. Couplings, locknuts, and all other fittings shall be galvanized or sherardized, waterproof and threaded type only. Some material as conduit. Appleton, Crouse-Hinds or equal.

C. Electrical metallic tubing (EMT):
   1. Comply with underwriters Laboratories UL 797, ANSI C80.3 and federal specification WW-C-563 or latest revisions. EMT shall be galvanized or sherardized.
   2. Couplings and connectors for EMT shall be galvanized or cadmium plated and shall be of the compression type requiring the tightening of a nut on a gland ring or an approved steel set screw type. Appleton, Crouse-Hinds or equal. No die cast type allowed.

D. Flexible Metallic Conduit.
   2. Neoprene jacked flexible metallic conduit shall be used in all moist or weatherproof locations where flexible conduit is required.
   3. Fittings shall be hot dipped, galvanized compression or clamp type. Fittings which use a screw to bind against tubing or which screw into the end of the conduit will not be accepted. Fillings for neoprene jacked flexible conduit shall be of the screw in type. Appleton STB series. Appleton, Crouse-Hinds or equal may be used.

E. Electrical Non –Metallic tubing (ENT): Electrical Non-metallic tubing (ENT) is not permissible to use on this project.

F. Conduit Supports:
   1. Pipe hangers for individual conduits shall be threaded suspension rod. The pipe ring shall be malleable iron, split and hinged, or shall be springable wrought steel. Rings shall eb bolted to or interlocked with suspension rod socket.
   2. pipe racks for groups of parallel conduits shall be constructed of galvanized structural steel preformed channels of length as required, suspended on threaded rods and secure thereto with nuts above and below the cross bar.
3. Factory made pipe straps shall be one-hole malleable iron or two-hole galvanized clamps.
4. Kindorf, Unistrut, T&B or equal.

H. Outlet boxed: galvanized steel. Boxed installed in any exterior location, where exposed to rain or where exposed to moisture laden atmosphere shall be cast screw hub type with gasketed weatherproof covers. Boxes for vapor proof or explosion proof applications shall be designed specifically for such use.
1. Each box shall be large enough to accommodate the required number and sizes of conduits, wires, splices and devices but not smaller than size shown or specified.

2.04 WIRE AND CABLE

A. Labeling:
Marked on 24 inch centers as follows:
1. Underwriters’ label
2. Gauge
3. Voltage
4. Kind of insulation
5. Name of manufacturer
6. Trade name

B. Insulation:
1. All conductors’ #10 and smaller shall be 600 volt, type THWN, THW, TW or THHN unless noted otherwise.
2. All conductors for underground and conductors #8 and larger shall be 600 volt, type XHHW or THWN unless noted otherwise.
3. Insulation type XHHW shall be used for wire sizes #2 and larger.
4. All circuit conductors installed within Florissant fixture raceways shall be 600 volt, 105 degree type RHH, or THHN, except in fixtures that have wiring raceways specifically approved for 75 degree centigrade wire.

C. Grounding wire:
1. Grounding wire #1/0 or larger tinned standard copper cable. All smaller ground wires shall be insulated with green color insulation.

D. Color coding of conductors:
1. The guidelines of the NCE shall be followed when selecting wire colors. Generally, all phase’s wires for power conductors of the same system may be the same color except as follows.

<table>
<thead>
<tr>
<th>Phase</th>
<th>120/208 volts</th>
<th>277/480 volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase A</td>
<td>Black</td>
<td>Brown</td>
</tr>
<tr>
<td>Phase B</td>
<td>Red</td>
<td>Orange</td>
</tr>
<tr>
<td>Phase C</td>
<td>Blue</td>
<td>Yellow</td>
</tr>
<tr>
<td>Neutral</td>
<td>White</td>
<td>Gray</td>
</tr>
<tr>
<td>Ground</td>
<td>Green</td>
<td>Green</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Isolated Ground</td>
<td>Light green or light green with white stripes</td>
<td></td>
</tr>
</tbody>
</table>

2. These colors may be the conductor insulation colors or the colors may be applied using indicating tape manufactured for the purpose. In addition, where color tape is used to identify 480 volt wires, the 480 Volt I.D. Tape shall be applied above and below the phases I.D. tape.

3. In addition to color coding, all power, control, and alarm wiring shall be numbered and identified by means of wire markers at all switchboards, panel boards, auxiliary gutters, junction boxes, receptacle outlets, light outlets, disconnect switches, and circuit breakers. These markers shall correspond to numbers on shop drawings.

4. Conductors in size up through #10AGW shall have solid color as listed above. No. eight (#8) AGW shall be coded by application of phase tape for a minimum of 6 inch length on conductor. Coding shall occur on all splices and termination and pull boxes.

E. Conductors:

1. Unless specifically noted otherwise herein, all conductors for general wiring shall be a minimum of 98% conductivity, stranded, soft drawn copper.

2. Conductors for lighting and receptacle branch circuits No. 8 and smaller shall be similar to the above except solid copper may be used.

3. Except when noted on the plans or in this specification, the minimum conductor size for branch circuits shall be No. 12. Minimum size mechanical equipment control circuits where covered under this specification shall be No. 14.

4. Aluminum conductors are not allowed unless specifically called out for on drawings.

F. Pulling lubricant: UL approved.

G. Connections:

1. Number (#8) and smaller, pre-insulated spring type connectors. Threded or crimp types will not be accepted. Use Scotchlock, Hydent, T&B or equal.

2. Terminals for standard conductors No.8 or smaller shall be pre insulated crimp type.

3. Lugs and connectors for conductors No.6 and larger shall be compression types of one piece tubular construction with flat rectangle tongues. Two hole lugs shall be used for sizes 4/0 and larger. Filings for copper conductors shall be tin plated copper. Fittings for aluminum conductors shall be tin plated aluminum, Factory filled with corrosion inhibiting and oxide penetrating compound.

4. Cast resin kits shall be scotchlock sealing packs for wire size # 10 and scotchlock kits for larger splices as recommended by 3M Company.

### 2.05 WIRING DEVICES
A. Wall switches:
   1. Refer to drawings for schedules and/or specification notes. Color as selected by owner
B. Plates: plates shall be supplied for every local switch. Plates shall be stainless steel or nylon to match wall finish. Furnish with engraved or etched designations under any one of the following conditions:
   1. Three gang or larger gang switches
   2. Switches in locations from which the equipment or circuits controlled cannot be readily seen
   3. Where so indicated on the drawings.

2.06 LIGHTING FIXTURES AND ACCESSORIES
A. Lighting fixtures: supply light fixtures as indicated on Fixture Schedule.
   1. Manufacturer of fixtures: All fixtures of one type shall be of one manufacturer and of identical finish and appearance.
B. Accessories: All fixtures shall be complete with accessories, end required for the specific installation.
C. Lamps: Refer to drawings for schedules and/or specifications notes.
D. It shall be the responsibility of the contractor to coordinate retrofit fixtures with existing fixtures types and supply voltages.

2.07 LIGHTING CONTROL
1. Refer to drawings for schedule and/or specification notes.

2.08 OCCUPANCY SENSORS.
1. Refer to drawings for schedule and/or specification notes.

PART 3- EXECUTION

3.01 RACEWAY INSTALLATION
A. Conduit Application:
   1. Minimum size of conduit shall be ½ inch. In no case shall the conduit size be smaller than that shown on drawings.
   2. All conduit runs exposed above grade and below 8 feet shall be rigid steel or IMC. Except as noted in conduit applications items 2 and 4.
   3. Electrical metallic tubing (EMT) may be installed in protected attic spaces and hollow stud spaces. It may be exposed on the surface of electrical and mechanical rooms where designed on the plans.
   4. Flexible metallic conduit shall be used only where required for connection to light fixtures, etc., or with the approval of the owner where absolutely necessary due to structural conditions.
B. Conduit location:
   1. All conduits shall be run concealed in all finished areas.
   2. Exposed conduit shall be neatly installed parallel to or at right angle to the structural members.
   3. Maintain 12-inch separation between power and intercommunication cables.
   4. Conduit shall be kept at least 6” from the covering on hot water pipes, and 18” from the covering on flies and breechings.
C. Conduit Support.
   1. Conduit shall be supported with factory made pipe straps or suspended with pipe hangers or racks.
   2. Hanger straps, rods, or pipe supports under wood shall be attached to the wood structure using bolts, lag bolts, or lag screws. Attach to trusses using beam clamps.
   3. Conduits, which are suspended on rods more than 2 feet long shall be rigidly braced to prevent horizontal motion or swaying.
   4. Conduit shall be supported at intervals not exceeding 10 feet and in all cases with a support not more than 3 feet from outlet and at any point where it changes in direction.
   5. Perforated strap and plumbers tape shall not be used in the support of conduits.
   6. Conduit placed against concrete or masonry aboveground shall be fastened to the concrete with pipe straps or one- screw conduit clamps attached to the concrete by means of expansion anchors and screws. Expanders and shields shall be steel or malleable iron. Sizes of shields and bolts shall be such that the proof test load will not be less than four times the actual working load.

D. Conduit Bends:
   1. Field bends or off sets are permitted in 1 inch and smaller conduit only.
   2. Elbows in 1-1/4 inch conduit and larger sizes shall be factory made.
   3. Minimum radius bend for telephone service entrance conduit shall be 36’.
   4. Conduit bends, or other then factory ells, shall have a radius of not less than 10 times the internal diameter of the conduit.
   5. 90 Degree bends in PVC Larger than 2 inches shall be steel.
   6. Use of a blow torch to bend conduit is specifically prohibited.

E. Empty conduits: All conduits, which are installed at this time and left empty for future use or where conductors are to be installed by a representative of the telephone company shall have a 3/16 inch polypropylene rope left in place for the future use.

F. Conduit Protection:
   1. Cap all conduits during construction by means of manufactured seals. Swap out all conduits before pulling in wire.
   2. All conduit systems must be installed complete before conductors are pulled in.

G. Outlet boxes
   1. Boxes must be accurately placed for finish, independently not secures supported by manufactured ox hangers. Fixtures outlets shall be located symmetrically.
   2. Local switches shall be located + 48 inches above the floor unless otherwise noted.
3. Changes in outlet locations of fixtures and wall switches found necessary due to interference with structure, pipes, ducts, etc. shall be reported to owner for approval.

4. All boxes shall be of proper code size for number of wires or conduits passing through terminating therein, but in no case shall any box be less than 4” square, unless specifically noted as smaller. Covers shall be of the types most suitable for the fixtures or devices used at the outlet, and shall finish flush with plaster or other finished surface. Approved factory made knockout seals shall be used in all boxes where knockouts are not intact. Boxes in concrete shall be a type, which will allow the placing of conduit without displacing the reinforcing bars.

5. Outlet boxes shall be used as pull boxes whether possible, and junction or pull boxes shall be installed only as required by specifications, or as directed.

6. For lighting outlet boxes use minimum of 4” square, 1-1/2” deep, equipped with plaster ring and fixture supporting device as required by unit.

7. For wall switch outlets use 4” boxes with single or two gang rings for one or two switches and solid gang boxes with gang plaster rings for more than two switches, unless noted otherwise on the drawings.

3.06 WIRE INSTALLATION

A. Cleaning: all debris and moisture shall be removed from raceways, boxes, and cabinets before installing wire or cable.

B. Pulling:
   1. No oil, grease or similar substances shall be used to facilitate the pulling in of conductors. Use UL approved wire pulling compound.
   2. No wire or cable shall be pulled in until all construction, which might damage insulation or fill conduit with foreign material is completed.
   3. Wire shall be pulled into conduits with care to prevent damage to insulation. Use basket pulling grips to avoid slipping of insulation on conductors. Nylon rope or other “soft” surface cable must be used for pulling in conduits other than steel.

C. Connections:
   1. Stranded conductors No.8 and smaller shall be terminated with terminals or appropriate size where connected to screw type lugs.
   2. Joints, splices and taps in dry locations for conductors No.8 and smaller shall be made with twist on connectors suitably sized for number and gauge of the conductors.

3.02 LIGHTING FIXTURE INSTALLATION

A. Mounting: Unless specifically indicated otherwise, all lighting fixtures shall be placed symmetrically with respect to ceiling tile pattern or another architectural ceiling and wall modems.
B. Support:
1. In suspended grid lay-in ceilings, in addition to supporting from ceiling tee, support all luminaire housings from structural members with a minimum of four No.12 galvanized wires for each luminaire.
2. All fixture mounting shall meet seismic requirements of the state of California.
3. Provide support for all fixtures from (or on) building structural wall members. Support from ceiling tiles only is specifically prohibited.

C. Fire Protection
1. All recessed fixtures shall be protected from contact with combustible building materials, such as wood framing members and insulation vapor barriers, as required by applicable codes.
2. Fixtures installed in rated 1-hour ceiling shall be encased by 1-hour enclosures to maintain fire integrity of the ceiling. All fixtures enclosed will comply with UL Fire Resistance Directory Design Requirements.

D. Cleaning Up: all fixtures shall be left in clean condition, free of dirt and defects, before acceptance by owner.

3.03 GROUNDING AND BOUNDING
A. The entire electrical raceway system shall form a continues metallic electrical conductor from service point to every outlet and shall be grounded by connection to the main service ground.
B. All raceway systems, supports and lighting fixtures shall be permanently and effectively grounded.
C. All grounding conductors are to be copper only. Aluminum will not be allowed.

3.04. TESTS
A. Upon completion of work and adjustments of all equipment, all systems shall be tested to demonstrate that all equipment furnished, installed, and/or connected under the previous of these specifications shall function in the required manner.
B. All systems shall test free from short circuits and grounds, and be free from mechanical and electrical defects. All circuit shall be tested for the proper neutral connection.
C. Where tests indicate faulty installation or other defects, they shall be located, repaired and retested at the contractors expenses.