

16 February 2016

ATA/Jefferson Middle School Rebuild  
Lane County School District No. 4J  
C.I.P. #410.436.003



## ADDENDUM #5

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### 1 GENERAL ITEMS

1. The Deadline for Bid Submission is revised to February 23, 2016 at 2:00pm.

### 2 CHANGES AND CLARIFICATIONS TO THE PROJECT MANUAL

1. 00 0110 TABLE OF CONTENTS
  - A. DIVISION 26 – ELECTRICAL, **ADD**:  
“26 2200 – Low-Voltage Transformers  
26 2413 – Switchboards  
26 2713 – Electrical Metering”
2. 00 1113 INVITATION TO BID
  - A. **REVISE** date of Deadline for Bid Submission to February 23, 2016.
3. 00 4100 BID FORM (Re-issued)
  - A. Page 1, **REVISE** date of Bid Deadline to February 23, 2016.
  - B. Pages 2 and 3, ALLOWANCES, **REVISE** per attached re-issued Bid Form.
    - i) **REVISE** order of ALLOWANCES section to appear before ALTERNATES section.
    - ii) **ADD** line for Total Base Bid including Allowance, along with statement about substantial completion.
    - iii) **REVISE** paragraphs describing Allowances.
    - iv) **REVISE** quantities for Allowances 2, 3, 4 and 5 to match those in Section 01 2100 – Allowances.
4. 00 4522 FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM (Re-issued)
  - A. BID SUBMISSION DEADLINE, **ADD** Date and Time per attached re-issued form.
5. 26 2200 LOW-VOLTAGE TRANSFORMERS (Issued)
  - A. **ADD** entire section.

6. 26 2413 SWITCHBOARDS (Issued)
  - A. **ADD** entire section.
  
7. 26 2713 ELECTRICAL METERING (Issued)
  - A. **ADD** entire section.

### **3 CHANGES AND CLARIFICATIONS TO THE DRAWINGS**

NONE

### **4 SUBSTITUTION REQUESTS**

NONE

### **5 DRAWINGS AND ATTACHMENTS**

00 4100 - Bid Form  
00 4522 - First-Tier Subcontractor Disclosure Form  
26 2200 - Low-Voltage Transformers  
26 2413 - Switchboards  
26 2713 - Electrical Metering

**End of Addendum #5**

**DOCUMENT 00 4100  
BID FORM**

**BID FOR:** 4j ATA Middle School Rebuild CIP Number 410.436.003

Submitted to: Facilities Management Bid Deadline: 2:00 PM  
Eugene School District 4J February 23, 2016  
715 West Fourth Avenue  
Eugene, Oregon 97402

Submitted by: \_\_\_\_\_  
(Company Name)

**BASE BID**

The undersigned proposes to furnish all material, equipment, and labor required for the complete project, and to perform all work in strict accordance with the Contract Documents for the lump sum prices indicated below with completion occurring on or prior to the dates indicated:

**ALLOWANCES**

The Undersigned proposes to include in the Base Bid indicated above the items of work relating to the following Allowances as described in the Project Manual, Section 01 2100 - Allowances. The Allowances may be authorized by the Owner for additional excavation and structural fills and shall be computed by multiplying the Contractor's price per cubic yard as entered below by the quantity noted below.

Additional Work including the scope of Allowances will be subject to Owner approval. Unused portions of each Allowance will be deducted from the contract by Change Order at the completion of the project based on Unit Costs listed below. In the event that additional work is required in excess of the Allowances, the contract may be modified using the Unit Costs listed below:

**BASE BID:**

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (BID AMOUNT))

ALLOWANCE No. 1: Over Excavation for Site and Building Pads.

\$ \_\_\_\_\_ per Cubic Yard times the quantity of (7,500) Cubic Yards equals \$ \_\_\_\_\_  
(UNIT COST) (BID AMOUNT)

ALLOWANCE No. 2: Over Excavation of Footings.

\$ \_\_\_\_\_ per Cubic Yard times the quantity of (200) Cubic Yards equals \$ \_\_\_\_\_  
(UNIT COST) (BID AMOUNT)

ALLOWANCE No. 3: Base Course for Sitework.

\$ \_\_\_\_\_ per Cubic Yard times the quantity of (5,500) Cubic Yards equals \$ \_\_\_\_\_  
(UNIT COST) (BID AMOUNT)

ALLOWANCE No. 4: Engineered Fill for Building Pads.

\$ \_\_\_\_\_ per Cubic Yard times the quantity of (2,000) Cubic Yards equals \$ \_\_\_\_\_  
(UNIT COST) (BID AMOUNT)

ALLOWANCE No. 5: Select Fill for Footings.

\$ \_\_\_\_\_ per Cubic Yard times the quantity of (200) Cubic Yards equals \$ \_\_\_\_\_  
(UNIT COST) (BID AMOUNT)

ALLOWANCE No. 6: Allowance for Skysite fees for change documents.

Amount in addition to Contractor costs for setup, monthly fees, and closeout documentation equals:

\$ 10,000  
(BID AMOUNT)

**TOTAL BASE BID INCLUDING ALLOWANCES:**

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (TOTAL BID AMOUNT)

The undersigned agrees, if awarded the Contract, to substantially complete all Work on or before the dates specified in Section 01 1000 - Summary.

**ALTERNATE BIDS**

The Undersigned proposes to ADD TO the Base Bid indicated above the items of work relating to the following Alternates as described in the Project Manual, Section 01 23 00.

ALTERNATE NO. 1: Add Classroom 144 & 213.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

ALTERNATE NO. 2: Gym #2 Addition.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

ALTERNATE NO. 3: Resurface North Parking.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

ALTERNATE NO. 4: Install Pump/Filtration Equipment for Rainwater Harvest.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

ALTERNATE NO. 5: Add Acoustical Ceiling Panels in Gyms.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

ALTERNATE NO. 6: Install AV Equipment in Gym #1.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

ALTERNATE NO. 7: Change to Metal Roofing at Sloped Roofs.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

ALTERNATE NO. 8: Change to Automatic Shades at 2<sup>nd</sup> Floor Exterior Windows.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

ALTERNATE NO. 9: Add Vertical Sunscreen at South Elevation.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

ALTERNATE NO. 10: Gym #1 Bleachers and Stage Partition.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
 (Words) (Figures)

ALTERNATE NO. 11: Increase Generator Capacity.

Bid: \_\_\_\_\_ \$ \_\_\_\_\_  
 (Words) (Figures)

The undersigned agrees, if awarded the Contract, to substantially complete all Alternates on or before dates specified in Section 01 1000 - Summary.

It is understood that the Base Bid may be adjusted for any alternates in determining the amount of the Contract. Any or all of such Alternates may be accepted or reinstated by the Owner at any time within 60 days from the date of the Contract Award by the Owner, at the respective amounts named herein.

**BID SECURITY**

Accompanying herewith is Bid Security, which is not less than ten percent (10%) of the total amount of the Base Bid plus additive alternates, plus total Allowances.

**STIPULATIONS**

The undersigned acknowledges the liquidated damages provision included in the Supplementary Conditions.

The undersigned agrees, if awarded the contract, to comply with the provisions of Oregon Revised Statutes 279C.800 through 279C.870 pertaining to the payment of prevailing rates of wage.

The undersigned agrees, if awarded the Contract, to execute and deliver to the Owner within ten (10) working days after receiving contract forms, a signed Agreement and a satisfactory Performance Bond and Payment Bond each in an amount equal to 100 percent (100%) of the Contract Sum.

For every Agreement of \$100,000 or greater in value, all Contractors and Subcontractors shall have a public works bond in the amount of \$30,000, filed with the Construction Contractors’ Board (CCB), in compliance with ORS 279C.836, before starting work on the project unless exempt. Contractor agrees to provide a copy of the Contractor’s BOLI Public Works bond with the signed Agreement as Specified in the Supplementary Conditions.

The undersigned agrees that the Bid Security accompanying this proposal is the measure of liquidated damages which the Owner will sustain by the failure of the undersigned to execute and deliver the above named agreement and bonds; and that if the undersigned defaults in executing that agreement within ten (10) days after forms are provided or providing the bonds, then the Bid Security shall become the property of the Owner; but if this proposal is not accepted within sixty (60) days of the time set for the opening of bids, or if the undersigned executes and delivers said agreement and bonds, the Bid Security shall be returned.

By submitting this Bid, the Bidder certifies that the Bidder:

- a) has available the appropriate financial, material, equipment, facility and personnel resources and expertise, or the ability to obtain the resources and expertise, necessary to meet all contractual responsibilities;
- b) has a satisfactory record of past performance;
- c) has a satisfactory record of integrity, and is not disqualified under ORS 279C.440;
- d) is qualified legally to contract with the Owner; and
- e) will promptly supply all necessary information in connection with any inquiry the Owner may make concerning the responsibility of the Bidder.

Prior to award of a Contract, the Bidder shall submit appropriate documentation to allow the Owner to determine whether or not the Bidder is “responsible” according to the above criteria.

**The Contractor agrees to comply with District’s requirements pertaining to unsupervised contact with students, background checks and photo ID. See Section 01 1000 – Summary, 1.09K, L and M.**

The contractor agrees with the provisions of Oregon Revised Statutes 279C.505, which requires that the contractor shall demonstrate it has established a drug-testing program for employees and will require each subcontractor providing labor for the Project to do the same.

The undersigned has received addenda numbers \_\_\_\_\_ to \_\_\_\_\_ inclusive and has included their provisions in the above Bid amounts.

The undersigned has visited the site to become familiar with conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

The undersigned certifies that the Bidder is a \_\_\_\_\_ Bidder under ORS.  
("Resident" or "Non-resident", to be filled in by Bidder)

Names of Firm: \_\_\_\_\_

Street Address: \_\_\_\_\_  
(City) (State) (Zip)

Telephone Number: \_\_\_\_\_ FAX Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

Signed By: \_\_\_\_\_ Printed Name: \_\_\_\_\_  
(Signature of Authorized Official. If bid is from a partnership, one of the partners must sign bid).

Date Signed: \_\_\_\_\_

Official Capacity: \_\_\_\_\_

If corporation, attest: \_\_\_\_\_ Date: \_\_\_\_\_  
(Secretary of Corporation)

SEAL (If Corporate)

\_\_\_\_\_ Corporation  
\_\_\_\_\_ Partnership  
\_\_\_\_\_ Individual

Enclosed: Bid Security

**NON-DISCRIMINATION REQUIREMENT**

Contractor certifies that the Contractor has not discriminated against minorities, women or emerging small business enterprises in obtaining any required subcontracts.

The Contractor agrees not to discriminate against any client, employee, or applicant for employment or for services, because of race, color, religion, sex, national origin, physical or mental handicap, sexual orientation or age, unless based upon bona fide occupational qualifications, and that they are otherwise in compliance with all federal, state and local laws prohibiting discrimination, with regard to, but not limited to, the following: Employment upgrading, demotion or transfer; Recruitment or recruitment advertising; Layoffs or termination; Rates of pay or other forms of compensation; Selection for training; Rendition of services. It is further understood that any vendor who is in violation of this clause shall be barred forthwith from receiving awards of any purchase order from the School District, unless a satisfactory showing is made that discriminatory practices have terminated and that a recurrence of such acts is unlikely.

FIRM NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

BY: \_\_\_\_\_  
(Company or Firm Officer)

BY: \_\_\_\_\_  
(Type or Print Name)

**NON-COLLUSION AFFIDAVIT**

STATE OF \_\_\_\_\_)

County of \_\_\_\_\_)

I state that I am \_\_\_\_\_ of \_\_\_\_\_  
(Title) (Name of Firm)

and that I am authorized to make this affidavit on behalf of my firm, and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

(1) The price(s) and amount of this bid have been arrived at independently and without consultation, communication or agreement with any other contractor, bidder or potential bidder, except as disclosed on the attached appendix.

(2) That neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid, have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.

(3) No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.

(4) The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or noncompetitive bid.

(5) \_\_\_\_\_, its affiliates, subsidiaries, officers, directors and  
(Name of my Firm)

employees are not currently under investigation by any governmental agency and have not in the last four years been convicted of or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as described on the attached appendix.

I state that \_\_\_\_\_ understands and acknowledges that the above representations  
(Name of my Firm)

are material and important, and will be relied on by School District 4J in awarding the contract(s) for which this bid is submitted. I understand and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from School District 4J of the true facts relating to the submission of bids for this contract.

\_\_\_\_\_  
(Authorized Signature)

Sworn to and subscribed before me this \_\_\_\_ day of \_\_\_\_\_, 20

\_\_\_\_\_  
(Notary Public for Oregon)

My Commission Expires: \_\_\_\_\_

END OF BID FORM



**DOCUMENT 00 4522  
FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM**

**PROJECT:** 4j ATA Middle School Rebuild    **CIP NUMBER:** 410.436.003

**TO:** Kathi Hernandez, Facilities Management Assistant  
Eugene School District 4J  
715 West Fourth Avenue  
Eugene, Oregon 97402

**BID SUBMISSION DEADLINE:**    **Date:** February 23, 2016    **Time:** 2:00 pm

**SUBMITTAL REQUIREMENTS**

Subcontractor disclosure is required on all public improvement contracts greater than \$100,000.

This form must be submitted at the location specified in the Invitation to Bid on the advertised bid closing date and within two working hours after the advertised bid closing time.

List below the name of each subcontractor that will be furnishing labor or labor and materials, and that is required to be disclosed, the category of work that the subcontractor will be performing, and the dollar value of the subcontract. Enter "NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED.)

SUBCONTRACTOR	DOLLAR VALUE	CATEGORY OF WORK
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

The above listed first- tier subcontractor(s) are providing labor, or labor and material, with a Dollar Value equal to or greater than:

- a) 5% of the total Contract Price, but at least \$15,000. [If the Dollar Value is less than \$15,000 do not list the subcontractor above.]
- b) \$350,000 regardless of the percentage of the total Contract Price

Failure to submit this form by the disclosure deadline will result in a non-responsive bid. A non-responsive bid will not be considered for award.

**Form submitted by (Bidder Name):** \_\_\_\_\_

**Contact Name:** \_\_\_\_\_    **Phone:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

END OF DOCUMENT 00 45 22

**SECTION 26 2200**  
**LOW-VOLTAGE TRANSFORMERS**

**PART 1 - GENERAL****1.01 SUMMARY**

- A. Work Included:
  1. Two-Winding Transformers
  2. Two-Winding Transformers Rated for Nonlinear Loads

**1.02 RELATED SECTIONS**

- A. Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

**1.03 REFERENCES AND STANDARDS**

- A. References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
  1. UL 1561: Dry-Type General Purpose and Power Transformers.

**1.04 SUBMITTALS**

- A. Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

**1.05 QUALITY ASSURANCE**

- A. Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

**1.06 WARRANTY**

- A. Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Eaton Electrical
- B. Federal Pacific
- C. General Electric
- D. Jefferson Electric
- E. Square D
- F. Or approved equivalent.
- G. Basis of Design: Square D. Manufacturers listed are allowed on condition of meeting specified conditions including available space for equipment and Code required working clearances. Remove and replace equipment installed that does not meet these conditions at no cost to Owner.

**2.02 TWO-WINDING TRANSFORMERS**

- A. Description: NEMA ST 20 and NEMA TP1, factory-assembled, air cooled dry type transformers. High Efficiency: Meets NEMA Premium and US Department of Energy proposed Candidate Standard Level CSL-3 efficiency.
- B. Primary Voltage: 480 volts, 3 phase.
- C. Secondary Voltage: 208Y/120 volts, 3 phase.
- D. Windings: Copper or Aluminum.
- E. Insulation system and average winding temperature rise for rated kVA as follows:
  1. 1-15 kVA: Class 220 with 80 degrees C rise.
  2. 16-500 kVA: Class 220 with 80 degrees C rise.

- F. Maximum Winding Temperature: Do not exceed 35 degrees C rise above 40 Degrees C ambient at warmest point at full load.
- G. Winding Taps:
  - 1. Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.
  - 2. Transformers 15 kVA and Larger: NEMA ST 20.
- H. Conductor Termination Lugs: Compression.
- I. Sound Levels: NEMA ST 20.
- J. Basic Impulse Level: 10 kV.
- K. Impedence: 3 to 5 percent, unless otherwise noted on drawings. Minimum reactance 2 percent.
- L. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.
- M. Mounting:
  - 1. 1-15 kVA: Suitable for wall mounting.
  - 2. 16-75 kVA: Suitable for wall mounting.
  - 3. Larger than 75 kVA: Suitable for floor mounting.
- N. Coil Conductors: Continuous windings with terminations brazed or welded.
- O. Transformer Enclosure: NEMA ST 20.
  - 1. Interior: Type 1.
  - 2. Exterior: Type 3R.
  - 3. Ventilated.
  - 4. Provide lifting eyes or brackets.
- P. Isolate core and coil from enclosure using vibration-absorbing mounting pads.
- Q. Nameplate: Reference Section 26 05 53, Identification for Electrical Systems.

### **2.03 TWO-WINDING TRANSFORMERS RATED FOR NONLINEAR LOADS**

- A. Description: NEMA ST 20 and NEMA TP 1, factory-assembled, air cooled dry type transformers, K-4 rated, per UL 1561. High Efficiency: Meets NEMA Premium and US Department of Energy proposed Candidate Standard Level CSL-3 efficiency.
- B. Primary Voltage: 480 volts, 3 phase.
- C. Secondary Voltage: 208Y/120 volts, 3 phase.
- D. Windings: Copper or Aluminum.
- E. Core Flux Density: Below saturation at 10 percent primary overvoltage.
- F. Insulation and Temperature rise: Class 220 insulation system with 80 degrees C average winding temperature rise. 150 degrees C rise is not acceptable.
- G. Case Temperature: Do not exceed 35 degrees C rise above ambient at warmest point at full load.
- H. Winding Taps:
  - 1. Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.
  - 2. Transformers 15 kVA and Larger: NEMA ST 20.
- I. Sound Levels: NEMA ST 20.
- J. Basic Impulse Level: 10 kV.
- K. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.
- L. Mounting:
  - 1. 1-15 kVA: Suitable for wall mounting.
  - 2. 16-75 kVA: Suitable for wall mounting.

- 3. Larger than 75 kVA: Suitable for floor mounting.
- M. Coil Conductors: Continuous windings with terminations brazed or welded. Individually insulate secondary conductors and arrange to minimize hysteresis and eddy current losses at harmonic frequencies. Size secondary neutral conductor at twice secondary phase conductor ampacity.
- N. Electrostatic Shield: Copper, between primary and secondary windings.
- O. Impedance Range: 3 to 5 percent. Minimum reactance 2 percent.
- P. Transformer Enclosure: NEMA ST 20.
  - 1. Interior: Type 1.
  - 2. Exterior: Type 3R.
  - 3. Ventilated.
  - 4. Provide lifting eyes or brackets.
- Q. Isolate core and coil from enclosure using vibration-absorbing mounting pads.
- R. Nameplate: Include transformer connection data. .

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION**

- A. Set transformers plumb and level.
- B. Use flexible conduit, 2-foot minimum length with slack, for connections to transformer case. Make conduit connections to side panel of enclosure.
- C. Mount wall-mounted transformers using integral flanges or accessory brackets furnished by manufacturer. Mount to allow a minimum of 6-feet, 6-inches headroom below unit.
- D. Mount trapeze-mounted transformers as indicated.
- E. Provide seismic restraints.
- F. Provide grounding and bonding in accordance with Section 26 05 26, Grounding and Bonding of Electrical Systems.
- G. Clearance: Minimum 6-inches clear on sides and back. Front clearance per NEC 110.26. Maintain minimum clearance from combustible materials per NEC. Comply with manufacturers recommendations.
- H. Exterior Installations: Weather resistant enclosure.
  - 1. Provide 8-inches diameter by 24-inches (above and below grade) concrete filled steel bollards where subject to vehicular traffic.
  - 2. Where grouped with switchgear refinish as required so that transformers and switchgear match in color.
- I. Unacceptable Humming and Noise Levels: Revise installation as required to achieve a noise level less than or equal to those defined in NEMA ST-20 for associated transformer size or replace with a new unit with an acceptable sound level.
- J. Stacked Transformer Support: Unistrut structure to support transformers shown on Drawings to be stacked above another transformer. Also provide sheet metal heat diversion shield between stacked transformers. Install shield at an angle as not to trap heat.
- K. Provide Concrete Housekeeping Pad:
  - 1. Interior Pads: Extend pad 4-inches beyond transformer width and depth dimensions. Top of pad minimum 3-inches above finish floor. Install pad plumb and level.
  - 2. Exterior Pads: Provide concrete pads of 2,500 to 3,000 PSI concrete reinforced with 8 gauge wire fabric or No. 6 reinforcing bars on 12-inch centers. Provide 10-inch thick base of gravel below pad for support. Pad extends 6-inches on all sides from exterior most prominent dimension. Provide 3/4-inch by 10-foot ground rod at each corner bonded to No. 2 AWG bare copper grounding conductor, bonded to transformer and concrete reinforcement.
  - 3. Housekeeping pads provided under provisions of Division 03, Concrete.
- L. Provide equipment nameplates per Section 26 05 53, Identification for electrical systems.

M. Arc flash labels in accordance with Section 26 05 73, Electrical Distribution System Studies.

### **3.02 FIELD QUALITY CONTROL**

- A. Perform field inspection, testing, and adjusting.
- B. Perform inspections and tests listed in accordance with manufacturers requirements. In addition including following:
  - 1. Perform turns ratio tests at tap positions.
  - 2. Verification that as-left tap connections are as specified.
  - 3. Perform excitation-current tests on each phase.
  - 4. Measure resistance of each winding at each tap connection.
  - 5. Overpotential test on high- and low-voltage windings-to-ground.
- C. Check for damage and tight connections prior to energizing transformers.

### **3.03 ADJUSTING**

- A. Measure primary and secondary voltages and make appropriate tap adjustments.

### **3.04 TESTING**

- A. Reference Division 26, Electrical Acceptance Testing.

### **3.05 COMMISSIONING**

- A. Reference Section 26 08 00, Commissioning of Electrical.

**END OF SECTION**

**SECTION 26 2413  
SWITCHBOARDS**

**PART 1 - GENERAL****1.01 SUMMARY**

- A. Work Included:
  - 1. Switchboards
  - 2. Ammeters and Volt Meters

**1.02 RELATED SECTIONS**

- A. Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.
- B. In addition, reference the following:
  - 1. Section 26 05 73, Electrical Distribution System Studies.

**1.03 REFERENCES AND STANDARDS**

- A. References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
  - 1. UL 891, Standards for Switchboards.

**1.04 SUBMITTALS**

- A. Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.
- B. In addition, provide:
  - 1. Operation and Maintenance Manuals:
    - a. After completion of work and start-up of the equipment at the project site, deliver to the Owner's Representative operation instructions, maintenance manuals and drawings presenting full details for care and maintenance of each time of equipment provided under this Contract. Number of copies in accordance with Division 01.
    - b. Each copy to contain the operating and maintenance information and parts lists for equipment provided under this Contract. When necessary, provide supplemental drawings to show system operation and servicing maintenance points. For electrical components, provide wiring and connection diagrams. Include instructions required to accomplish specified operation and functions. Data to be neat, clean and legible.
    - c. Switchboard drawings and wiring diagrams to be included and up to date at the completion of start-up and system acceptance by the Owner. Drawings and wiring diagrams to include any field modifications or changes to reflect actual as-installed conditions.
    - d. In general, the manual to include, but not necessarily be limited to, the following:
      - 1) Switchboard Elevation and One line.
      - 2) AC and DC Schematic and Physical Component Layout Drawings.
      - 3) Remote Interface Drawing.
      - 4) Bill of Material.
      - 5) Description of Operation.
    - e. Provide manuals in accordance with Division 01 adequately labeled with the project name and location and the contents indexed.

**1.05 QUALITY ASSURANCE**

- A. Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

**1.06 WARRANTY**

- A. Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Eaton Electric
- B. GE Industries
- C. Square D
- D. Or approved equivalent.
- E. Manufacturers listed above are allowed on condition of meeting specified conditions including available space for equipment, Code required working clearances and selective coordination per Section 26 05 73 can be met. Prior to submitting bid, manufacturer to provide documentation to Engineer verifying specific conditions, including those mentioned above, can be met. Remove and replace electrical equipment installed, at no cost to the Owner, that does not meet these conditions.
- F. Basis of Design: Eaton. Manufacturers listed are allowed on condition of meeting specified conditions including available space for the equipment and Code required working clearances and selective coordination per Section 26 0573, Electrical Distribution System Studies. Remove and replace electrical equipment installed that does not meet these conditions at no cost to Owner.

**2.02 SWITCHBOARDS**

- A. Description: NEMA PB 2 freestanding switchboard with electrical ratings and configurations as indicated and specified.
- B. Integrated Equipment Rating: Provide fully rated integrated equipment rating greater than the available fault current. Series rated switchboards are not acceptable. Reference drawings for available fault current. If drawings do not have available fault current shown, then coordinate with serving electrical utility. Final rating based on the protective device study completed under the provisions of Division 26, Electrical Distribution System Studies.
- C. Bus Material: Aluminum, standard size.
- D. Ground Bus: Extend length of switchboard, 50 percent of phase bus capacity.
- E. Neutral Bus: 100 percent rated, full length of switchboard.
- F. Lugs: Mechanical type for both aluminum and copper conductors.
- G. Main Section Devices: Individually mounted.
- H. Distribution Section Devices: Panel mounted.
- I. Molded Case Circuit Breakers: Integral thermal and instantaneous magnetic trip in each pole.
  - 1. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
  - 2. Include shunt trip where indicated.
- J. Current Limiting Molded Case Circuit Breakers: UL listed.
  - 1. Integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole.
  - 2. Interrupting rating 100,000 rms amperes symmetrical let-through current and energy level less than permitted for same size Class RK-5 fuse.
  - 3. Include shunt trip where indicated.
- K. Solid-State Molded Case Circuit Breakers: With electronic sensing, timing and tripping circuits for adjustable current settings; UL listed.
  - 1. Ground fault trip, ground fault sensing integral with circuit breaker.
  - 2. Instantaneous trip.
  - 3. Adjustable short time trip.
  - 4. Adjustable long time delay.
  - 5. Adjustable short time delay.
  - 6. Adjustable short time pickup.

- 7. Stationary mounting.
- 8. Include shunt trip where indicated.
- L. Ground Fault Sensor: Zero sequence type.
- M. Ground Fault Relay: Adjustable ground fault sensitivity from 200 to 1200 amperes, time delay. Provide monitor panel with lamp to indicate relay operation, TEST and RESET control switches.
- N. Metering Transformer Compartment: For utility company's use; compartment size, bus spacing and drilling, door, and locking and sealing requirements in accordance with utility company's requirements.
- O. Utility Pull Section:
  - 1. Width as shown on drawings. Depth and height to match switchboard.
  - 2. Arrange as shown on drawings.
- P. Future Provisions: Fully equip spaces for future devices with bussing and bus connections, suitably insulated and braced for short circuit currents. Provide continuous current rating as indicated.
- Q. Pull Box: Removable top and sides, same construction as switchboard.
  - 1. Provide insulating, fire-resistive bottom with separate openings for each circuit to pass into switchboard.
- R. Enclosure: NEMA Type 1 - Indoor.
  - 1. Align Sections as shown on drawings.
  - 2. Finish: Manufacturer's standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.
  - 3. Removable front covers: Screw attached.
  - 4. Provide removable hinge pins on hinged doors.
  - 5. Provide full height barriers between Sections.
  - 6. Mimic Bus: Showing bussing, connections and devices in single line form on the front panels of the switchboard.
    - a. Use blue factory painting.
    - b. Use plastic strips
    - c. Fasten strips flat against the panel face with screws or rivets

### **2.03 AMMETERS AND VOLTMETERS**

- A. Manufacturers:
  - 1. Same as switchboard manufacturer.
- B. Analog Ammeters: IEC 60051-1 and IEC 60051-2, direct reading, full range, indicating ammeter with 4-1/2-inch square recessed case and 250 degree scale, white dial with black figures and pointer, 5 ampere, 60 Hertz movement, 1 percent accuracy.
- C. Analog Voltmeters: IEC 60051-1 and IEC 60051-2, direct reading, full range, indicating voltmeter with 4-1/2-inch square recessed case and 250 degree scale, white dial with black figures and pointer, 120 volt, 60 Hertz movement, 1 percent accuracy.

### **2.04 SOURCE QUALITY CONTROL**

- A. Shop inspect and test switchboard according to NEMA PB 2.
- B. Make completed switchboard available for inspection at manufacturer's factory prior to packaging for shipment. Notify Owner at least 7 days before inspection is allowed.
- C. Allow witnessing of factory inspections and tests at manufacturer's test facility. Notify Owner at least 7 days before inspections and tests are scheduled.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Provide concrete housekeeping pad. Extend 6-inches beyond switchboard width and depth dimensions. Minimum 3-inches above finished floor. Install plumb and level.
- B. Verify that field measurements are as indicated on Shop Drawings.



**3.02 INSTALLATION**

- A. Install in a neat and workmanlike manner and in location shown on Drawings, according to NEMA PB 2.1.
- B. Install switchboard in accordance with manufacturer's installation instructions.
- C. Tighten accessible bus connections and mechanical fasteners after placing switchboard.
- D. Provide arc flash labels per Section 26 05 73, Electrical Distribution System Studies.
- E. Provide engraved nameplates per Section 26 05 53, Identification of Electrical Systems.
- F. Provide fuses in each switch.

**3.03 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing.
- B. Perform inspections and tests listed in NETA STD ATS, Section 7.1.
- C. Measure, using a Megger, insulation resistance of each bus Section phase-to-phase and phase-to-ground for one minute each, at minimum test voltage of 1000 Vdc; minimum acceptable value for insulation resistance is 1 megohms.
- D. Check tightness of accessible bolted bus joints using calibrated torque wrench per manufacturers recommended torque values.
- E. Physically test key interlock systems to check for proper functionality.
- F. Test ground fault systems by operating push-to-test button.
- G. Shunt Trip Circuit Breakers: Provide wiring to remote trip switch/contacts as indicated on Drawings.

**3.04 ADJUSTING**

- A. Adjust all operating mechanisms for free mechanical movement.
- B. Tighten bolted bus connections in accordance with manufacturer's instructions.
- C. Adjust circuit breaker trip and time delay settings to values indicated.
- D. Adjust circuit breaker trip and time delay settings to values as instructed by Engineer.

**3.05 CLEANING**

- A. Clean exterior and interior of switchboard in accordance with manufacturers installation instructions.
- B. Vacuum construction dust, dirt, and debris out of switchboard interior.
- C. Where enclosure finish is damaged, touch up finish with matching paint in accordance with manufacturer's specifications and installation instructions.

**3.06 TRAINING**

- A. Provide a minimum of 4 hours of video recorded training for Owner on use of non-utility meters.

**END OF SECTION**

**SECTION 26 2713  
ELECTRICAL METERING**

**PART 1 - GENERAL****1.01 SUMMARY**

- A. Work Included:
  - 1. Utility Metering Equipment

**1.02 RELATED SECTIONS**

- A. Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

**1.03 REFERENCES AND STANDARDS**

- A. References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

**1.04 SUBMITTALS**

- A. Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

**1.05 QUALITY ASSURANCE**

- A. Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

**1.06 WARRANTY**

- A. Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements Division 01, General Requirements.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Manufacturers:
  - 1. Meter Base:
    - a. Circle AW.
    - b. Or approved equivalent.
  - 2. Metering Equipment Enclosure:
    - a. General Electric
    - b. Square D
    - c. Eaton Electrical
    - d. Or approved equivalent.

**2.02 UTILITY METERING EQUIPMENT**

- A. Meter Base: Surface or Flush mounted meter socket enclosure. Provide meter base(s) for energy/demand and reactive energy/demand bases as required by serving electric utility.
- B. Terminal Cabinet: Provide terminal cabinet that meets serving utility company's requirements. Construct as an integral part of main distribution switchboard. Construct as an integral part of main distribution switchboard or Provide separate C.T. cabinet as detailed.
- C. Provide fault withstand rating greater than utility determined available fault current.
- D. C.T. Enclosure: Provide enclosure that meets serving utility company's requirements. Construct as an integral part of main distribution switchboard or Provide separate C.T. cabinet as detailed.

**PART 3 - EXECUTION****3.01 INSTALLATION - UTILITY METERING**

- A. Installation:
  - 1. Meter Bases: Locate to provide acceptable access for meter reading and maintenance. Locate to minimize risk of physical damage.
  - 2. Metering Equipment: Install current transformers supplied by serving electric utility.

3. Verify utility requirements prior to bidding and provide associated work required by local utility including but not limited to:
  - a. Service underground primary including conduit, pull cord, excavation and backfill.
  - b. Underground pull vaults.
  - c. Pole risers.
  - d. Transformer pads, and vaults.
  - e. Secondary service lateral raceways.
  - f. Grounding of transformers.
  - g. Service metering equipment.

**END OF SECTION**