

P383-15629

ADDENDUM NUMBER 2

MITCHELL PARK DOMES
ELECTRICAL SERVICE UPGRADE
Site #782, Bldg. #4160
524 South Layton Boulevard
Milwaukee, WI 53204

Project Number: P383-15629

Notice Number: 7103

Date of Addendum: April 28, 2016

This Addendum to the Contract Documents is issued to modify, explain or correct the original documents, dated March 16, 2016, and is hereby made part of the Contract Documents. Acknowledge receipt of this Addendum in the space provided on the Bid Form, or bid may be rejected.

SPECIFICATIONS

1. Section 26 24 13 Main Switchboard. ADD entire specification issued with this Addendum 2.

DRAWINGS

1. Drawing EL Symbols, Abbreviations and General Notes. Refer to entire drawing for changes. Drawing is available on the Milwaukee County Website at the following link:

<http://county.milwaukee.gov/ConstructionBidsandR23075/Mitchell-Park-Show-Domes-Electrical-Service-Upgrade.htm>

2. Drawing E1.0 Basement Power Plan. ADD Plan Note #9: Add the following verbiage to note #9 "Remove and dispose of concrete slab below gear being removed and resurface so that its even to the surrounding concrete floor. Patching must meet Owner's satisfaction".

End of Addendum No. 2

00900-1

Section 26 24 13 - Main Switchboard

PART 1 - GENERAL

1.01 DESCRIPTION

- A. General:
 - 1. Furnish all labor, materials, tools, equipment and services for all main switchboards as indicated in accord with provisions of Contract Documents.
 - 2. Completely coordinate with work of all other trades.
 - 3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
 - 4. See Section 26 00 01 for General Electrical Requirements.
 - 5. See Division 1 for General Requirements.
 - 6. Contractor shall be responsible to provide a completely coordinated system for emergency branches.

- B. Related Work Specified Elsewhere:
 - 1. Electrical System Short Circuit Coordination Arc Flash Studies (SCCAF): Section 26 01 60.

1.02 SUBMITTALS (See Section 011 10 00)

- A. Shop Drawings:
 - 1. Outline drawings of assembly.
 - 2. One line diagrams and wiring for assembly and components.
 - 3. Interconnection wiring diagrams.
 - 4. Electrical System Short-Circuit, Coordination and Arc Flash Studies (See Section 26 01 60).

- B. Product Data:
 - 1. Certified test reports on interrupt switches, in enclosures, with and without power fuses, showing fault closing rating.
 - 2. Time-current characteristic curves and other characteristic and current ratings, for coordination with source and load protective devices.

- C. Project Data:
 - 1. Operating and maintenance data: See Division 1.
 - 2. Owner instruction reports: See Division 1.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Square D
- B. Cutler Hammer
- C. Engineer Approved Equal

2.02 MAIN SWITCHBOARD

- A. Provide a free-standing, metal enclosed, dead-front assembly of matching unit sections arranged to accommodate electrical components as further described herein ready for line and load circuit connections in the field.
- B. Main Switchboard shall be complete with main power bus, main disconnect, terminal compartment, and branch circuit distribution devices connected to the main power bus in sequence in accordance with single line diagram on the drawings and approved shop drawings.
- C. The entire assembly shall be designed, manufactured, and tested in accordance with IEEE, ANSI, and NEMA Standards and National Electrical Code, Art 384.
- D. Main Switchboard shall be all copper conductors and shall be suitable for service indicated.
- E. Main switchboard shall be monitored by the DDC system via the power trip history monitor.

2.03 ELECTRICAL COMPONENTS

- A. Main power bus shall be sized to conform to the ampere rating of the main service protector frame size and shall be plated copper and sized on the basis of 30 degrees C. temperature rise above 40 degrees C. ambient. Switchboard shall be braced for minimum 100,000 AIC RMS unless otherwise indicated in Short-Circuit Coordination Arc Flash Study. Plating shall be applied continuously to all bus work. The switchboard bussing shall be of sufficient cross-sectional area to meet UL Standard 891 temperature rise requirements. The phase and neutral through-bus shall have an ampacity as shown in the plans. For 4-wire systems, the neutral shall be of equivalent ampacity as the phase bus bar. Tapered bus is not acceptable. Full provisions for the addition of future sections shall be provided. Bussing shall include all necessary hardware to accommodate splicing for future additions.
- B. Ground bus shall be solid copper extending the full length of the Switchboard; supported and bonded to the structural steel framework in each compartment. See ground bus per NFPA 70 and UL 891 Tables 25.1 and 25.2.
- C. Complement:
 - 1. General:
 - a. The Main Switchboard shall be suitable for service, as indicated on drawings, and shall be 90" in height and with sections and total length as necessary to accommodate equipment components described herein.
 - b. Main Switchboard shall be NEMA Class I, front connectable, front accessible, with drip hood (when electrical equipment room is sprinkled).
 - 2. Specifics:
 - a. Main Interrupter:
 - 1) Electronic trip molded case full function 100% rated circuit breaker(s) through 2000A.
 - 2) All electronic circuit breakers shall have the following time/current response adjustments: Long Time Pickup, Long Time Delay, Short Time Pickup, Short Time Delay, [Ground Fault Pickup,] [Ground Fault Delay,] and Instantaneous settings. Each adjustment shall have discrete settings (fully adjustable) and shall be independent of all other adjustments.

- 3) Circuit breaker trip system shall be microprocessor-based true rms sensing designed with sensing accuracy through the thirteenth (13th) harmonic. Sensor ampere ratings shall be as indicated on drawing.
 - 4) Local visual trip indication for overload, short circuit and ground fault trip occurrences.
 - 5) Long Time Pickup indication to signal when loading approaches or exceeds the adjustable ampere rating of the circuit breaker shall be provided.
- b. Distribution Compartment:
- 1) Front connected, molded case breakers, in ampere rating and interrupting rating as scheduled.
 - 2) All future switch positions shall be bussed to receive future units.
 - 3) Branch circuit breakers shall be equipped with solderless pressure type lugs compatible with conductor type and size.
- c. Emergency branch circuit breakers shall be properly coordinated with down stream circuit breakers.
- d. Coordination of Overcurrent Protective Devices:
- 1) Provide a coordination study of the electrical system and recommend set points for all of the overcurrent and ground fault trip adjustments on the equipment provided. The coordination study and set point recommendations shall be submitted to the consulting engineer for approval. Submittal shall be on or before date of switchboard and panelboard equipment submittal. The study shall meet the requirements of specification section 26 01 60.

2.04 POWER AND TRIP HISTORY MONITORING

- A. System Description:
1. The customer monitoring shall consist of an electronic Circuit Monitor and System Display installed as designated on the project drawings.
 2. Provide a Square D PowerLogic Class 3020 PM820, or equal, Circuit Monitor with waveform capture provisions to monitor the main disconnect in the switchboard.
- B. Circuit Monitor:
1. The electronic Circuit Monitors shall accept inputs from industry standard instrument transformers (5A secondary CT's).
 2. The current and voltage signals shall be digitally sampled at a rate high enough to provide accurate RMS sensing.
 3. All setup parameters required by the Circuit Monitors shall be stored in nonvolatile memory (no battery backup) and retained in the event of a control power interruption.
 4. The Circuit Monitor shall also maintain in nonvolatile memory a maximum and minimum value for each of the instantaneous values reported as well as the time and date of the highest peak for all of the peak demand readings.
 5. The following instantaneous readings shall be reported by the Circuit Monitor:
 - a. Current, per phase RMS $\pm 1.0\%$.
 - b. Current, 3-phase average RMS $\pm 1.0\%$.
 - c. Current, apparent RMS $\pm 1.0\%$.
 - d. Voltage, phase-to-phase & phase-to-neutral $\pm 1.0\%$
 - e. Power factor, per phase $\pm 2.0\%$.
 - f. Power factor, 3-phase total $\pm 2.0\%$.
 - g. Real power, 3-phase total $\pm 2.0\%$.
 - h. Reactive power, 3-phase total $\pm 2.0\%$.

- i. Apparent power, 3-phase total $\pm 2.0\%$.
 - j. Frequency $\pm 0.5\%$.
 - k. Temperature $\pm 2^{\circ}\text{C}$.
6. The following demand readings shall be reported by the Circuit Monitor.
 - a. Average demand current, per phase.
 - b. Peak demand current, per phase.
 - c. Average demand, real power.
 - d. Predicted demand, real power.
 - e. Peak demand, real power.
 7. The following energy readings shall be reported by the Circuit Monitor:
 - a. Accumulated energy.
 - b. Accumulated reactive energy.
 8. Interconnect to DDC system. Coordinate with Mechanical Contractor for exact requirements.
The Electrical Contractor shall be responsible for providing all metering communication wiring between the meters and shall provide a single termination point for BACnet communication bus to be interfaced to the building automation system.
 9. For meters that are specified to be interfaced to the building automation system, this contractor shall provide all communication trunk wiring to provide for a single connection point to the building automation network.
 10. Verify the proper operation of all meters. Compare the meter display readings to measurements taken with a clamp on amp-meter and hand held volt meter.

2.05 CIRCUIT MONITOR INSTALLATION

- A. Electronic Circuit Monitors shall be installed by the switchboard manufacturer for all circuits as indicated by the project drawings.
- B. All control power, CT, PT, and communications wire shall be factory wired and harnessed within the switchboard lineup.
- C. Where external circuit connections are required, terminal blocks shall be provided and the manufacturer's drawings must clearly identify the interconnection requirements including wire type to be used.

2.06 CERTIFICATION DESCRIPTION

- A. All equipment included as part of the power and trip history metering shall be UL Listed.

2.07 MISCELLANEOUS

- A. The EC shall provide a 4" raised concrete housekeeping pad for Main Switchboard extending 2" beyond the perimeter of the Switchboard. The EC shall anchor switchboard to same.
- B. Each circuit breaker shall be equipped with an engraved, laminated core, bakelite nameplate with nomenclature in accordance with the shop drawings and as necessary to identify item in question.
- C. The vendor shall submit shop drawings drawn to scale depicting the specific switchboard intended to be supplied. Drawings shall show each item of equipment including bussing, bus supports, circuit breakers, etc.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install switchboard in locations shown on Drawings, in accordance with manufacturer's written instructions and NEMA PB 2.1.
- B. Provide main service and metering as indicated on drawings and per local utility requirements.

3.02 ADJUSTING

- A. Adjust all operating mechanisms for free mechanical movement.
- B. Adjust trip and time delay settings to values as recommended in coordination study or as instructed by the A/E. Include a copy of the coordination study and recommend circuit breaker set points in the O&M manual.

END OF SECTION