



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Administration
DIVISION OF PURCHASES
One Capitol Hill
Providence, RI 02908-5855

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February 19, 2015

ADDENDUM NUMBER TWO

RFQ # 7549284

TITLE: Electrical Upgrades to the DOT Building, DOA

Closing Date and Time: 2/25/15 at 2:00 PM

Per the issuance of this ADDENDUM #2 (34) pages, including this cover sheet)

Specification Change /Addition / Clarifications

See attached Addendum Number Two with clarifications to the bid specifications.

There is a Revised Bid Form included in the attached for your company to complete and return with your Bid Response.



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Administration DIVISION OF FACILITIES MANAGEMENT

One Capitol Hill
Providence, R.I. 02908-5850
(401) 222-6200 FAX 222-2599
TDD 222-1228

Bid No. 7549284

Addendum #2 Information and clarifications from pre-bid meeting on 02/03/15 and responses to bidder questions

Notes on items of significance discussed during pre-bid on 02/03/15

1. Hazardous materials abatement allowance will be carried in the bid.
2. The contractor shall be responsible for coordination with the elevator renovation and installation project which will be occurring concurrently with this project. The contractor shall coordinate with the elevator project for the location of devices, for example service disconnects.
3. The automatic transfer switch shall include (2) two sets of dry contacts which will be used by a separate elevator project to monitor the status of normal/standby power and generator run status. This Contractor shall provide the ATS with the contacts. The wiring from the contacts to elevator equipment will be by Others.
4. Allowance Specification Section included.
5. Working hours are Monday through Friday 7:00 AM - 4:30 PM and as stipulated in Section 01100. Extended working hours can be coordinate with the Owner with a minimum of (48) hours notice.
6. Plumbing and mechanical work to support relocations and new panels is included in the Contractor's scope of work.
7. Feeders to the panels appear to be original to the building's construction and are required to be replaced in accordance with the documents. Unless otherwise shown on the documents, branch circuits will be tied into new, modified or reused panelboards. Branch circuits must be identified and properly labeled in panels. Contractor must verify and identify branch circuits.
8. Plumbing series missing from drawings and specs. Construction drawings and specifications have been provided via addendum 01 to address missing documents.
9. Storage closets where mop sinks are tied in. Loose items will be removed by the State. All shelving and fixed equipment will be the responsibility of the contractor to remove and dispose of.
10. Question on sequencing of SDP feeders. DOA and F&O have provided clarification in this Addendum.
11. Building elevations showing overall building height have been issued via Addendum 01.

Requests for Information

1. Provide raceway and feeder sizes for panels SDP, G and DPBN.

Response:

For raceway and feeder sizes refer to revised Drawing EA-601

2. Provide panel schedules for Panels A and Panel P3NB as they are not shown on the drawings.

Response:

- a. **Panel A will be removed and not replaced. The circuits will be relocated to new Panelboard P3SA and P3SB, as indicated on the revised P3SA and P3SB Schedules. The existing Panelboard A will be disconnected, removed and disposed of. The existing feeders shall be removed back to the Main Switchboard. The feeder breaker shall be designated as spare. The feeder conduits will be abandoned in place.**

- b. Relocated Panel A circuits shall be installed in the Attic space above the 3rd Floor, wired with Type MC Cable, sized as required. Assume 100 linear feet per relocated circuit. Provide splice boxes as required.
 - c. Refer to attached Panelboard Schedules P3NB and P3NC. Panelboard P3NE shall be designated "P3NC".
3. There are discrepancies between the drawings for what new breakers are to be provided in the existing Main Distribution Switch Board. Please provide the types and quantities for the breakers to be provided.

Response:

Refer to revised Drawing EA-601 for clarification of breakers.

4. ATS will not fit through the existing electric room door

Response:

The left door to the Main Electric Room was installed in a metal stud / gypboard wall.



Remove the door and wall install the transfer switch into the room. Rebuild the wall and reinstall the door, frame and hardware back to the existing configuration. It should be noted that the height from the floor to the existing lintel is approximately 86 inches. Dimensions of the some of the transfer switches may exceed this height, requiring the transfer switch to be move in lying flat.

5. Exhaust pipe spec and support detail

Response: The two (6") generator exhaust will be combined via a Wye fitting and through a muffler. The wye fitting and muffler shall be supplied by the generator manufacturer. The combined exhaust shall be a 12" I.D. prefabricated piping system model IPIC-1 by Metal-Fab or equivalent. The piping system (also referred to as the exhaust stack) shall have 0.035" thick 304 stainless steel inner flue, and 0.024" thick 304 stainless steel outer jacket, with 1" of 6 lb density ceramic wool between the inner flue and outer jacket. The bottom of the exhaust stack shall be an elbow and a drain for water drainage. The prefabricated piping system shall be NFPA-211 and LU-103 listed. The contractor shall submit product literature, field verified drawings and sizing calculation to the Engineer for approval.

At the base of the wall, the exhaust stack shall be supported vertically with a system of stainless steel angle brackets that are braced back to the wall at a 45° angle. A stainless steel plate should be welded to the top of the brackets and support the pipes near the end of their horizontal run adjacent to the building wall. A stainless steel hold down clamp should secure the pipe to the bracket system to prevent horizontal

movement. The bracket should extend approximately 1'-6" from the face of the building wall. The pipes should be secured to the wall with stainless steel offset pipe clamps every 8 feet min. A pipe clamp shall be located between 6" and 1'-0" from the top of wall. The pipe clamps should be connected to the masonry wall with masonry screws or anchors. The exhaust stack shall extend a minimum of 10 feet above the top of roof elevation. The exhaust stack shall be braced back to the roof as required to prevent excessive sway and/or deflection. The bracing system should be designed to resist all Building Code required wind loads on the 10 feet section of pipe. All steel shall be stainless, type 316. All fasteners shall be compatible with stainless steel and approved for use in brick masonry.

6. Conductor size and breaker rating for DPBS and DPBN

Response:

Refer to revised Drawing EA-601

Attachments:

1. Revised Bid Form
2. Specifications
 - a. Section 01210 ALLOWANCES (insert new section into Project Manual)
 - b. Section 16415 BY-PASS ISOLATION TRANSFER SWITCH (Replace in its entirety in Project Manual)
3. Drawings
 - a. Drawing EA-200, Main Distribution Switchboard Modification Diagram,
 - i. Section 2, 350 Amp breaker change to a 175Amp trip. (New Elevator Feeder)
 - ii. Section 3, on the top of Section 3 Change Key Note 5 to 4.
 - iii. At the bottom of the Section 3 delete Key Note 5 for the existing 500 Amp Feeder breaker and replace with Key Note 3. (feed for SDP)
 - b. Drawing EA -601 which replaces existing Drawing
1. The following Panelboard Schedules have been revised and are attached:
 - a. Panelboard A
 - b. Panelboard P3NB
 - c. Panelboard P3NC
 - d. Panelboard P3SA
 - e. Panelboard P3SB

Solicitation #:7549284
Solicitation Title: Electrical Upgrades to the DOT Building

BID FORM

To: The State of Rhode Island Department of Administration
Division of Purchases, 2nd Floor
One Capitol Hill, Providence, RI 02908-5855

Bidder:

Legal name of entity

Address (street/city/state/zip)

Contact name

Contact email

Contact telephone

Contact fax

1. **BASE BID PRICE**

The Bidder submits this bid proposal to perform all of the work (including labor and materials) described in the solicitation for this Base Bid Price (*including the costs for all Allowances, Bonds, and Addenda*):

\$ _____

(base bid price *in figures* printed electronically, typed, or handwritten legibly in ink)

(base bid price *in words* printed electronically, typed, or handwritten legibly in ink)

- **Allowances**

The Base Bid Price ***includes*** the costs for the following Allowances:

No. 1: Premium time labor \$30,000.00

No. 2: Firestopping/firesafing \$10,000.00

No. 3: Painting of corridors \$10,000.00

No. 4: Plumbing \$15,000.00

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No. 5: <u>Electrical/Light fixtures</u>	<u>\$15,000.00</u>
No. 6: <u>Hazardous Material Abatement</u>	<u>\$40,000.00</u>
Total Allowances:	<u>\$120,000.00</u>

- **Bonds**

The Base Bid Price ***includes*** the costs for all Bid and Payment and Performance Bonds required by the solicitation.

- **Addenda**

The Bidder has examined the entire solicitation (including the following Addenda), and the Base Bid Price ***includes*** the costs of any modifications required by the Addenda.

All Addenda must be acknowledged.

Addendum No. 1 dated: _____

Addendum No. 2 dated: _____

Addendum No. 3 dated: _____

2. ALTERNATES (Additions/Subtractions to Base Bid Price)

The Bidder offers to: (i) perform the work described in these Alternates as selected by the State in the order of priority specified below, based on the availability of funds and the best interest of the State; and (ii) increase or reduce the Base Bid Price by the amount set forth below for each Alternate selected.

Check "Add" or "Subtract."

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____ Add ____ Subtract Alternate No. 1:

\$ _____
(amount *in figures* printed electronically, typed, or handwritten legibly in ink)

(amount *in words* printed electronically, typed, or handwritten legibly in ink)

____ Add ____ Subtract Alternate No. 2:

\$ _____
(amount *in figures* printed electronically, typed, or handwritten legibly in ink)

(amount *in words* printed electronically, typed, or handwritten legibly in ink)

3. UNIT PRICES

The Bidder submits these predetermined Unit Prices as the basis for any change orders approved in advance by the State. These Unit Prices include **all** costs, including labor, materials, services, regulatory compliance, overhead, and profit.

Unit Price No. 1: _____ \$ _____

Unit Price No. 2: _____ \$ _____

Unit Price No. 3: _____ \$ _____

4. CONTRACT TIME

The Bidder offers to perform the work in accordance with the timeline specified below:

- Start of construction: Within (2) weeks of award
- Substantial completion: (150) calendar days after start

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- Final completion including closeout: (1) month after substantial completion

5. LIQUIDATED DAMAGES

The successful bidder awarded a contract pursuant to this solicitation shall be liable for and pay the State, as liquidated damages and not as a penalty, the following amount for each calendar day of delay beyond the date for substantial completion, as determined in the sole discretion of the State: \$_____.

This bid proposal is irrevocable for 60 days from the bid proposal submission deadline.

If the Bidder is determined to be the successful bidder pursuant to this solicitation, the Bidder will promptly: (i) comply with each of the requirements of the Tentative Letter of Award; and (ii) commence and diligently pursue the work upon issuance and receipt of the purchase order from the State and authorization from the user agency.

The person signing below certifies that he or she has been duly authorized to execute and submit this bid proposal on behalf of the Bidder.

BIDDER

Date: _____

Name of Bidder

Signature in ink

Printed name and title of person signing on behalf of Bidder
#

Bidder's Contractor Registration Number

SECTION 01210 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
 - 1. Certain materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - a. Note that the Contractor's overhead, profit and related costs are included in the base bid and shall not be applied to the allowances.
 - 2. Unit-cost allowances.
 - 3. Contingency allowances.
 - 4. Testing and inspecting allowances.
 - 5. Quantity allowances.
- C. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 1 Section "Unit Prices" for procedures for using unit prices.
 - 3. Division 1 Section "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Engineer of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Engineer's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

- C. Purchase products and systems selected by Engineer from the designated supplier.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.5 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Engineer for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's **overhead, profit, and** related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.6 TESTING AND INSPECTING ALLOWANCES

- A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure.
- C. Costs of services not required by the Contract Documents are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.7 UNUSED MATERIALS

- A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Engineer, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed by Engineer, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. **01**: Include the stipulated sum of \$30,000 for overtime labor as approved in advance by Owner's Representative to compensate for schedule delays beyond the control or responsibility of the Contractor or his forces. This allowance shall not be used to cover the cost for shutdowns stipulated in the Contract Documents to be performed after normal working hours.
- B. Allowance No. **02**: Include the stipulated sum of \$10,000 for firestopping/firesafing of penetrations which are existing and are not affected as part of the Work. Note that the Contractor is responsible for penetrations made or opened as part of the work as part of the base bid.
- C. Allowance No. **03**: Include the stipulated sum of \$10,000 for painting in public areas. Contractor is responsible for painting and patching affected by his work as part of the base bid.
- D. Allowance No. **04**: Include the stipulated sum of \$15,000 for plumbing work and fixtures as requested by the Owner.
- E. Allowance No. **05**: Include the stipulated sum of \$15,000 for light fixtures and convenience circuits as requested by the Owner.
- F. Allowance No. **06**: Include the stipulated sum of \$40,000 for hazardous materials abatement as directed by the Owner. The Owner will provide a hazardous materials survey and abatement plan to the Contractor.

END OF SECTION

SECTION 16415 AUTOMATIC TRANSFER SWITCHES WITH BYPASS ISOLATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes transfer switches rated 600 V and less, including the following:
 - 1. Automatic transfer switches
 - 2. Bypass/isolation switches
 - 3. Remote annunciation systems
- B. Related Sections include the following:
 - 1. Applicable requirements of other Sections of Division 16 shall apply to this Section.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.
 - 1. Technical data on all major components of all transfer switches and other products described in this section. Data is required for the transfer switch mechanism, control system, cabinet, and protective devices specifically listed for use with each transfer switch. Include steady state and fault current ratings, weights, operating characteristics, and furnished specialties and accessories.
 - 2. Single-Line Diagram: Show connections between transfer switch, bypass/isolation switch, power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.
- B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.
 - 1. Dimensioned outline drawings of assembly, including elevations, sections, and details including minimal clearances, conductor entry provisions, gutter space, installed features and devices and material lists for each switch specified.
 - 2. Internal electrical wiring and control drawings.

3. Interconnection wiring diagrams, showing recommended conduit runs and point-to-point terminal connections to generator set.
 4. Installation and mounting instructions, including information for proper installation of equipment to meet seismic requirements.
- C. Manufacturer Seismic Qualification Certification: Submit certification that transfer switches accessories, and components will withstand seismic forces include the following:
1. Seismic certification, as required for site conditions. Seismic certifications shall be third-party certified, and based on testing. Certification based on calculations does not meet this requirement.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational both during and after the seismic event."
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Manufacturer and Supplier Qualification Data
1. The transfer switch manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.
 2. The manufacturer of this equipment shall have produced similar equipment for a minimum period of 10 years. When requested, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
- E. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals, include the following:
1. Features and operating sequences, both automatic and manual.
 2. List of all factory settings of relays, timers and protective devices; provide setting and calibration instructions where applicable.
- F. Warranty documents demonstrating compliance with the project's contract requirements.

1.4 QUALITY ASSURANCE

- A. Only approved bidders shall supply equipment provided under this contract.
- B. Manufacturer Qualifications: The equipment supplier shall maintain a service center capable of providing training, parts, maintenance and emergency repairs to equipment, including transfer switch generator sets and remote monitoring equipment (if applicable) at the site within a response period of less than (eight hours or appropriate time period designated for Project) from time of notification.
 - 1. The transfer switch shall be serviced by technicians employed by, and specially trained and certified by, the generator set supplier and the supplier shall have a service organization that is factory-certified in both generator set and transfer switch service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.
 - 2. Submit names, experience level, training certifications, and locations for technicians that will be responsible for servicing equipment at this site.
 - 3. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.
- C. Source Limitations: All transfer switches are to be obtained through one source from a single manufacturer. The generator set manufacturer shall warrant transfer switches to provide a single source of responsibility for products provided.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked as suitable for use in emergency, legally required or optional standby use as appropriate for the connected load.
- E. The automatic transfer switch installation and application shall conform to the requirements of the following codes and standards:
 - 1. Transfer switches and enclosures shall be UL 1008 listed and labeled as suitable for use in emergency, legally required, and optional standby applications.
 - 2. CSA 282, Emergency Electrical Power Supply for Buildings, and CSA C22.2, No. 14-M91 Industrial Control Equipment
 - 3. NFPA 70, National Electrical Code. Equipment shall be suitable for use in systems in compliance with Articles 700, 701 and 702.
 - 4. Comply with NEMA ICS 10-1993 AC Automatic Transfer Switches

5. IBC 2012 – The transfer switch(es) shall be prototype-tested and third-party certified to comply with the requirements of IBC group III or IV, Category D/F. The equipment shall be shipped with the installation instructions necessary to attain installation compliance.
 6. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
 7. EN55011, Class B Radiated Emissions and Class B Conducted Emissions
 8. IEC 1000-4-5 (EN 61000-4-5); AC Surge Immunity
 9. IEC 1000-4-4 (EN 61000-4-4) Fast Transients Immunity
 10. IEC 1000-4-2 (EN 61000-4-2) Electrostatic Discharge Immunity
 11. IEC 1000-4-3 (EN 61000-4-3) Radiated Field Immunity
 12. IEC 1000-4-6 Conducted Field Immunity
 13. IEC 1000-4-11 Voltage Dip Immunity
 14. IEEE 62.41, AC Voltage Surge Immunity
 15. IEEE 62.45, AC Voltage Surge Testing
- F. Comply with NFPA 110 – Emergency and Standby Power Systems. The transfer switch shall meet all requirements for Level 1 systems, regardless of the actual circuit level.
- G. The manufacturer shall warrant the material and workmanship of the transfer switch equipment for a minimum of five (5) year from the warranty start date. The warranty start date is the date of registered commissioning and start up or eighteen (18) months from date of shipment, whichever is sooner.
- H. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, and repair parts cost, etc. during the minimum noted warranty period described above.

1.5 PROJECT CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:
1. Notify the Owner no fewer than 30 days in advance of proposed interruption of electrical service.

2. Do not proceed with interruption of electrical service without the Owner's written permission.
 3. Do not energize any new service or distribution equipment without notification and permission of the Owner.
- B. The existing Electric Room has limited head room at door entrance (86") transfer switch may require addition shipping bracing to move the transfer switch into the Electric Room laid down on its back.

1.6 COORDINATION

- A. Size and location of concrete bases and anchor bolt inserts shall be coordinated. Concrete, reinforcement and formwork must meet the requirements specified in Division 03. See section "INSTALLATION" for additional information on installation
- B. The base must be designed to accommodate the requirements of the draw-out mechanism (extension rails and/or wheeled carriage) of the bypass switch.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Cummins Power Generation
- B. Equipment specifications for this Project are based on automatic transfer switches manufactured by Cummins Power Generation. Switches manufactured by ASCO or Russelectric that meet the requirement of this specification are acceptable, if approved not less than two weeks before scheduled bid date. Proposals must include a line-by-line compliance statement based on this specification.
- C. Transfer switches utilizing molded case circuit breakers do not meet the requirements of this specification and will not be accepted.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

- A. Provide transfer switches in the number and ratings that are shown on the drawings.
- B. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer.
- C. Fault-Current Closing and Withstand Ratings: UL 1008 WCR ratings must be specifically listed as meeting the requirements for use with protective devices at installation loca-

- tions, under specified fault conditions. Withstand and closing ratings shall be based on use of the same set of contacts for the withstand test and the closing test.
- D. Solid-State Controls: All settings should be accurate to +/- 2% or better over an operating temperature range of - 40 to + 60 degrees C (- 40 to + 140 degrees F).
- E. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- F. Electrical Operation: Accomplished by a non-fused, momentarily energized solenoid or electric motor operator mechanism, mechanically and electrically interlocked in both directions (except that mechanical interlock is not required for closed transition switches).
- G. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
1. Switches using molded-case switches or circuit breakers, or insulated case circuit breaker components are not acceptable.
 2. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the Source 1 and Source 2 positions.
 3. Main switch contacts shall be high pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.
 4. Contacts shall be operated by a high-speed electrical mechanism that causes contacts to open or close within three electrical cycles from signal.
 5. The power transfer mechanism shall include provisions for manual operation under load with the enclosure door closed. Manual operation may be electromechanical or mechanical, but must be coordinated with control function.
 6. Transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with components that could be operating at line voltage levels.
 7. The transfer switch shall include the mechanical and control provisions necessary to allow the device to be field-configured for operating speed. Transfer switch operation with motor loads shall be as is recommended in NEMA MG1.
 - a. Phase angle monitoring/timing equipment is not an acceptable substitute for this functionality

8. Transfer switches shall be 3-pole and shall have a full current-rated neutral bar with lugs.
 9. Transfer switches shall meet the requirements of section "BYPASS/ISOLATION SWITCHES" of this specification.
- H. Control: Transfer switch control shall be capable of communicating with the genset control, other switches and remote programming devices over a high-speed network interface.
- I. Factory wiring: Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism
- J. Terminals: Terminals shall be pressure type and appropriate for all field wiring. Control wiring shall be equipped with suitable lugs, for connection to terminal strips.
- K. Enclosures: All enclosures shall be third-party certified for compliance to NEMA ICS 6 and UL 508, unless otherwise indicated:
1. The enclosure shall provide wire bend space in compliance to the latest version of NFPA70, regardless of the direction from which the conduit enters the enclosure.
 2. Exterior cabinet doors shall provide complete protection for the system's internal components. Doors must have permanently mounted key-type latches. Bolted covers or doors are not acceptable.
 3. Transfer switches shall be provided in enclosures that are third party certified for their intended environment per NEMA requirements.

2.3 AUTOMATIC TRANSFER SWITCHES

- A. Comply with requirements for Level 1 equipment according to NFPA 110.
- B. Transfer Switch ratings:
1. The transfer switch shall be rated for **3000 Amps, 480 Volts, 3-pole, 100,000 Amperes** withstand and closing ratings, NEMA 1 enclosure type and accessories as specified. The system voltage is **208Y/120 Volts, three phase, 4- wire**.
 2. Main contacts shall be rated for 600 VAC minimum.
 3. Transfer switches shall be rated to carry 100% of rated current continuously in the enclosure supplied, in ambient temperatures of -40 to +60 degrees C (-40 to +140

degrees F), relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet (3000 meters).

- C. Manual Switch Operation: The power transfer mechanism shall include provisions for manual operation under load with the enclosure door closed. Manual operation may be electromechanical or mechanical, but must be coordinated with control function
- D. Relay Signal: Control shall include provisions for addition of a pre-transfer relay signal, adjustable from 0 to 60 seconds, to be provided if necessary for elevator operation, based on equipment provided for the project.
- E. Control: Transfer switch control shall be provided with necessary equipment and software to communicate with the gen-set control, other transfer switches, remote annunciation equipment, and other devices over a high speed control network.
- F. Transfer switches that are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating.
- G. Automatic Transfer Switch Control Features
 - 1. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600 VAC. Voltage sensing shall be monitored based on the normal voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions that are not field configurable are not acceptable.
 - 2. All transfer switch sensing shall be configurable from an operator panel or from a Windows XP or later PC-based service tool. Designs utilizing DIP switches or other electromechanical devices are not acceptable.
 - 3. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device for load shedding purposes. On receipt of this signal, the transfer switch shall switch to a neutral position when connected to Source 2. If Source 1 is available when the load-shed signal is received, the transfer switch shall connect to Source 1.
 - 4. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device to prevent transfer to the generator service.
 - 5. The transfer switch shall provide a relay contact signal prior to transfer or re-transfer. The time period before and after transfer shall be adjustable in a range of 0 to 60 seconds.
 - 6. The control system shall be designed and prototype tested for operation in ambient temperatures from - 40 degrees C to + 60 degrees C (- 40 to +140 degrees F). It

shall be designed and tested to comply with the requirements of the noted voltage and RFI/EMI standards.

7. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs and relays on all outputs, to provide optimum protection from line voltage surges, RFI and EMI.
 8. The transfer switch network monitoring equipment, when supplied, shall be provided with a battery-based auxiliary power supply to allow monitoring of the transfer switch when both AC power sources are non-operational.
- H. Transfer Switch Control Panel: The transfer switch shall have a microprocessor-based control with a sealed membrane panel incorporating pushbuttons for operator-controlled functions, and LED lamps for system status indicators. The panel shall also include an alphanumeric display for detailed system information. Panel display and indicating lamps shall include permanent labels.
1. The indicator panel LEDs shall display:
 - a. Which source the load is connected to (Source 1 or Source 2)
 - b. Which source or sources are available
 - c. When switch is not set for automatic operation, the control is disabled or the bypass switch is in use
 - d. When the switch is in test/exercise mode
 2. The indicator shall have pushbuttons that allow the operator to activate the following functions:
 - a. Activate pre-programmed test sequence
 - b. Override programmed delays, and immediately go to the next operation
 - c. Reset the control by clearing any faults
 - d. Test all of the LEDs by lighting them simultaneously
 3. The alphanumeric digital display shall be vacuum fluorescent-type, clearly visible in both bright sunlight and no-light conditions over an angle of 120 degrees, and shall display the following:
 - a. AC voltage for all phases, normal and emergency
 - b. Source status: connected or not connected.

- c. Load data, including voltage, AC current, frequency, KW, KVA, and power factor.
 4. The display panel shall be password-protected, and allow the operator to view and make adjustments:
 - a. Set nominal voltage and frequency for the transfer switch
 - b. Adjust voltage and frequency sensor operation set points
 - c. Set up time clock functions
 - d. Set up load sequence functions
 - e. Enable or disable control functions including program transition
 - f. View real-time clock data, operation log (hours connected, times transferred, failures) and service history
- I. Control Functions: Functions managed by the control shall include:
 1. Software adjustable time delays:
 - a. Engine start (prevents nuisance gen-set starts in the event of momentary power fluctuation): 0 to 120 seconds (default 3 sec)
 - b. Transfer normal to emergency (allows gen-set to stabilize before load is transferred): 0 to 120 seconds (default 3 sec)
 - c. Re-transfer emergency to normal (allows utility to stabilize before load is transferred from gen-set): 0 to 30 minutes (default 3 sec)
 - d. Engine cool down: 0 to 30 minutes (default 10 min)
 - e. Programmed transition: 0 to 60 seconds (default 3 sec)
 2. Under-voltage sensing: three-phase normal, three-phase emergency source.
 3. Over-voltage sensing: three-phase normal, three-phase emergency source.
 4. Over/under frequency sensing:
 - a. Pickup: +/- 5 to +/-20% of nominal frequency (default 10%)
 - b. Dropout: +/-1% beyond pickup (default 1%)
 - c. Dropout time delay: 0.1 to 15.0 seconds (default 5 sec)

- d. Accurate to within +/- 0.05 Hz
- 5. Voltage imbalance sensing:
 - a. Dropout: 2 to 10% (default 4%)
 - b. Pickup: 90% of dropout
 - c. Time delay: 2.0 to 20 seconds (default 5 sec)
- 6. Phase rotation sensing:
 - a. Time delay: 100 msec.
- 7. Loss of single-phase detection:
 - a. Time delay: 100 msec.
- J. Control features shall include:
 - 1. Programmable gen-set exerciser: A field-programmable control shall periodically start and run the generator with or without transferring the load for a preset time period, then re-transfer and shut down the generator after a preset cool-down period.
 - 2. In event of a loss of power to the control, all control settings, real-time clock setting and the engine start-time delay setting will be retained.
 - 3. The system continuously logs information including the number of hours each source has been connected to the load, the number of times transferred, and the total number of times each source has failed. An event recorder stores information, including time and date-stamp, for up to 50 events.
- K. Control Interface
 - 1. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.
 - 2. The transfer switch shall be provided with a network communication card, and configured to allow network-based communication with the transfer switch and other network system components, including the generator set(s) provided for the Project.
 - 3. Unassigned Auxiliary Contacts: Two normally open, 1-pole, double-throw contacts for each switch position, rated 10A at 240 VAC.
- L. Engine Starting Contacts
 - 1. One isolated and normally closed pair of contacts rated 10A at 32 VDC minimum.

2.4 BYPASS/ISOLATION SWITCHES

- A. Comply with requirements for Level 1 equipment according to NFPA 110.
- B. Description: Transfer switches that are designated on the drawings as “bypass isolation” transfer switches shall be provided with a manually-operated bypass switch arranged to select and connect either source of power directly to load, isolating transfer switch from load and from both power sources. Include the following features for each combined automatic transfer switch and bypass/isolation switch:
 1. The bypass switch shall be enclosed in the same cabinet as the automatic transfer switch, and UL-listed as an assembled product.
 2. The bypass isolation switch shall provide a means for manually bypassing the transfer switch from either source (Normal or Emergency) to the load, while under load if necessary, and to isolate the transfer switch from both sources for maintenance or repair without a power interruption or disturbance.
 - a. Designs that bypass to only one source are not acceptable under this specification.
 3. The bypass switch shall be operable without the use of tools, and shall include the ability to isolate the automatic switch mechanism without the use of tools and without opening the exterior cabinet door(s).
 4. Operability: Switch shall be constructed so load bypass and transfer-switch isolation can be performed by one person in no more than two operations, in 15 seconds or less.
 5. Bypass isolation switch equipment shall be UL listed per Standard 1008 and CSA approved, with continuous current rating, voltage and frequency ratings, and withstand and closing ratings equal to the transfer switch ratings at the specified conditions of ambient temperature, humidity, and altitude.
 6. The bypass isolation and transfer switches shall be mechanically held in each position. Switching mechanisms shall be break-before-make on all poles, including the neutral pole on 4-pole switches. The switch mechanism shall be an over-center toggle device which provides stored energy contact operation during both opening and closing. The speed of contact operation shall be independent of the force applied to the operating handles, which permit manual operation under load.
 7. Provide means to lock bypass/isolation switch in the position that isolates transfer switch with an arrangement that permits complete electrical testing of transfer switch

while isolated. While isolated, interlocks shall prevent transfer-switch operation, except for testing or maintenance.

8. Bypass switch shall be a fully-rated, manually-operated switch, rated for the same loads as the automatic transfer switch. Bypass switch shall provide bypass to either normal or emergency source by use of a door mounted, keyed source selector switch and a permanently mounted external operating handle. Equipment shall provide manual bypass without disturbance of the power supply to the load.
 - a. Equipment requiring load isolation before bypass is not acceptable for use on this Project.
9. Maintainability: Fabricate to allow convenient removal of major components from front without removing other parts or main power conductors.
10. Contact temperatures of bypass/isolation switches shall not exceed those of automatic transfer-switch contacts when they are carrying rated load.
11. Positive mechanical interlocks shall prevent all possible source-to-source interconnections via the bypass switch. The interlock system shall assure a properly sequenced, mechanically guided bypass and isolation action.
 - a. Designs which depend on electrical interlocks to prevent source to source interconnections, or which intentionally interconnect the sources via the bypass switch, are not acceptable.
12. The equipment shall utilize automatic, mechanical stops to prevent manually bypassing to a dead source.
 - a. Equipment that does not prevent dead source bypass is not acceptable.
13. A draw-out isolation mechanism shall provide closed-door isolation of the transfer switch. The isolation mechanism shall be interlocked so that either the transfer switch must be bypassed or the transfer switch must be open before the mechanism will permit isolation of the transfer switch. Draw-out arrangement must provide physical separation from live parts and accessibility for testing and maintenance operations.
14. The isolation mechanism shall provide for three-position operation: Connected, Test, and Isolated. In the Connected position, isolation contacts shall be fully engaged and closed, with the transfer switch control cable connected. In the Test position, isolation contacts shall be open and the transfer switch control cable connected. The Test position shall allow operational testing of transfer switches and controls without power disruption to the load. In the Isolated position, the transfer switch

and control shall be completely isolated from all power sources. In the Isolated position, the transfer switch shall be capable of being withdrawn from the cabinet.

15. The bypass and isolation process for the automatic transfer switch shall be capable of being fully accomplished without opening the cabinet door.
 16. Interconnection of bypass/isolation switch with automatic transfer switch shall consist of factory-installed copper bus bars, plated at connection points and braced for the indicated available short-circuit current.
 17. Note the size and access requirements for the transfer switch with bypass isolation and provide equipment that will fit into the space allowed as well as complying with code-specified access requirements.
 18. Manufacturer's standard legend for control labels and instruction signs shall describe operating instructions.
- C. Interconnection of Bypass/Isolation Switches with Automatic Transfer Switches: Factory-installed copper bus bars, plated at connection points and braced for the indicated available short-circuit current.

2.5 REMOTE ANNUNCIATOR SYSTEM

- A. Functional Description: Remote annunciator panel shall annunciate conditions for indicated transfer switches. Annunciation shall include the following:
1. Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.
 2. Switch position.
 3. Failure of communication link.
- B. Annunciator Panel: LED-lamp type with audible signal and silencing switch.
1. Indicating Lights: Grouped for each transfer switch monitored.
 2. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.
 3. Lamp Test: Push-to-test or lamp-test switch on front panel.
- C. Malfunction of annunciator or communication link shall not affect functions of automatic transfer switch. In the event of failure of communication link, automatic transfer switch automatically reverts to stand-alone, self-contained operation.

- D. Automatic transfer-switch sensing, controlling, or operating function shall not depend on remote panel for proper operation. The remote annunciation system shall not prevent transfer to the alternate source when the primary power source fails, nor prevent return to the primary source if the alternate source fails

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Special attention should be considered to move the transfer switch into the Electric Room because of entrance height restrictions.
- B. Design each fastener and support to carry load indicated by seismic requirements and according to seismic-restraint details.
- C. Floor-Mounting Switch: Anchor to floor by bolting.
 - 1. Floor-mounted transfer switches (except draw-out switches supported by wheeled carriages, which must be rolled out at floor level) shall be mounted on concrete bases complying with the following requirements:
 - a. Concrete Bases: 6 inches high, reinforced, with chamfered edges. Extend base no more than 4 inches in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support.
- D. Annunciator Panel Mounting: Flush in wall, unless otherwise indicated.
- E. Set field-adjustable intervals and delays, relays, and engine exerciser clock.
- F. Provide certification of IBC Seismic compliance

3.2 CONNECTIONS

- A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.
- B. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.
- C. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the switch. Lugs shall be suitable for the number and size of conductors shown on the drawings.
- D. Ground equipment according to the National Electrical Code.

3.3 SOURCE QUALITY CONTROL

- A. Prior to shipping, factory shall test and inspect components, assembled switches, and associated equipment to ensure proper operation.
- B. Factory shall check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements.
- C. Factory shall perform dielectric strength test complying with NEMA ICS 1.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: The supplier of the transfer switch(es) and associated equipment shall inspect, test, and adjust components, assemblies, and equipment installations, including connections, and report results in writing.
- B. Manufacturer's representative shall perform tests and inspections and prepare test reports.
- C. After installing equipment and after electrical circuitry has been energized, installer shall test for compliance with requirements.
 - 1. Perform recommended installation tests as recommended in manufacturer's installation and service manuals.
 - 2. After energizing circuits, demonstrate interlocking sequence and operational function for each switch.
 - a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
 - b. Verify time-delay settings.
 - c. Verify that the transfer switch is accurately metering AC voltage and current.
 - d. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
 - e. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
- D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

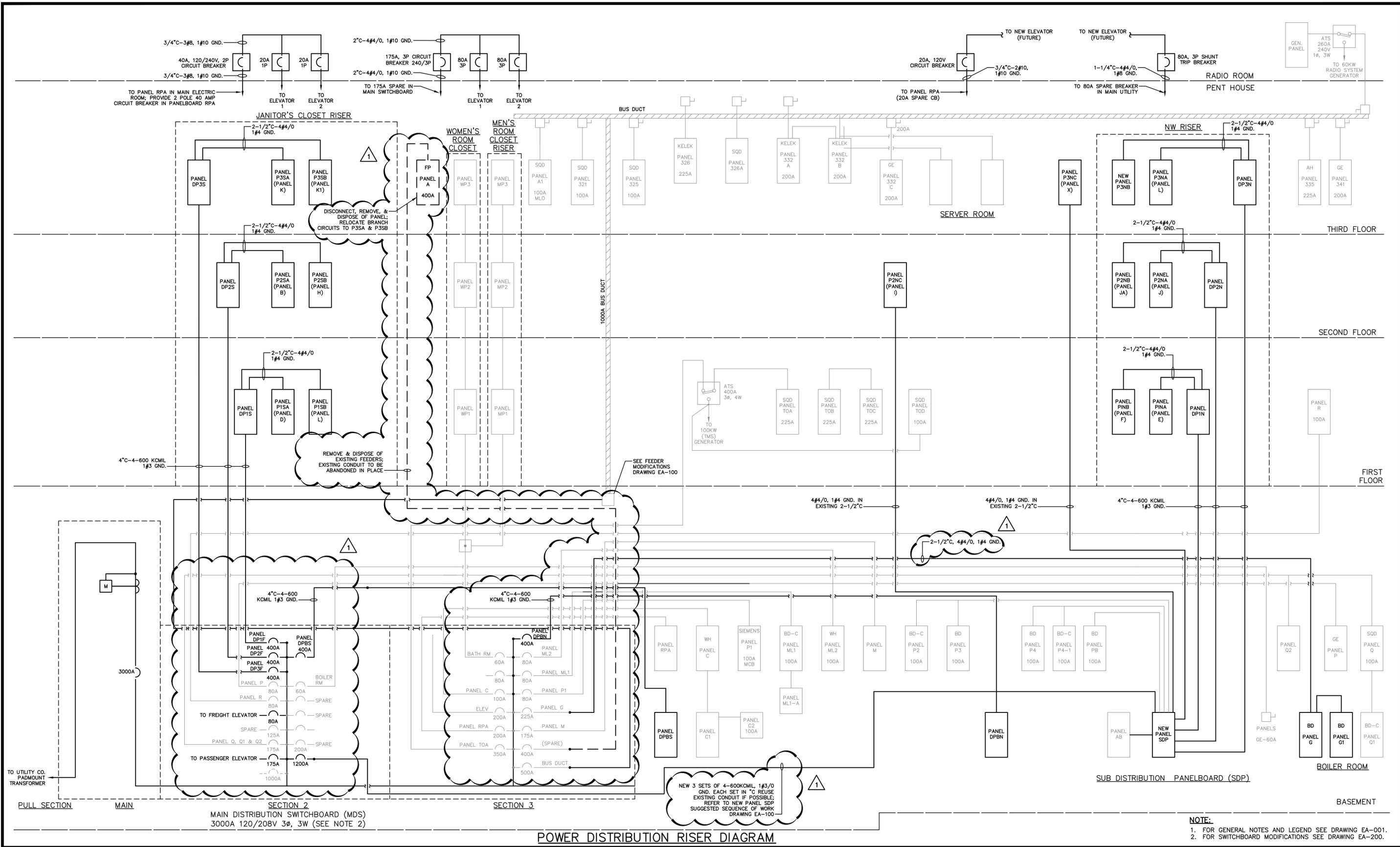
1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 DEMONSTRATION

- A. After generator set installation, the generator and transfer switch supplier shall conduct a complete operation, basic maintenance, and emergency service seminar covering generator set and transfer switch equipment, for up to 10 people employed by the Owner.
 1. The seminar shall include instruction on operation of the transfer equipment, normal testing and exercise, adjustments to the control system, use of the PC based service and maintenance tools provided under this contract, and emergency operation procedures.
 2. The class duration shall be at least 8 hours in length, and include practical operation with the installed equipment.

END OF SECTION

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No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1.	2/19/2015	ADDENDUM NO. 2	DL	KMS

SEAL	SEAL	
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SCALE:	HORIZ.: NOT TO SCALE
	VERT.:
DATUM:	HORIZ.:
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GRAPHIC SCALE	

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RHODE ISLAND DEPARTMENT OF ADMINISTRATION
 ELECTRICAL UPGRADES TO THE DOT BUILDING
**MODIFIED POWER DISTRIBUTION
 RISER DIAGRAM**
 TWO CAPITOL HILL
 PROVIDENCE RHODE ISLAND

PROJ. No.: 20130098.A10
 DATE: AUGUST 2014
EA-601

PANELBOARD SCHEDULE A

EXISTING PANEL:	A	M.L.O.:	-
LOCATION:	3rd Floor Corridor	MAIN BREAKER:	400
VOLTS:	120/208Y	MAIN BUS:	400
PHASE:	3	A.I.C.:	22 KA
WIRE:	4	MOUNTING:	Surface
SOLID NEUTRAL		DIMENSIONS:	20" X 57" X7"
NO. OF POLES:	42	MANUFACTURER:	Federal Pacific

		CIRCUIT BREAKER			CIRCUIT BREAKER					
CIRCUIT DESCRIPTION	No.	TRIP	POLE	AMPS	Ø	AMPS	POLE	TRIP	No.	CIRCUIT DESCRIPTION
Active Unknown	1	20	1		A		2	30	2	Active Unknown
Active Unknown	3	30	1		B		-	-	4	-
Active Unknown	5	20	1		C		2	20	6	Active Unknown
Active Unknown	7	30	2		A		-	-	8	-
Spare (Not Wired)	9	-	-		B		2	30	10	Active Unknown
Active Unknown	11	20	1		C		-	-	12	Spare (Not Wired)
Active Unknown	13	20	1		A		1	20	14	Space
Active Unknown	15	20	1		B		1	20	16	Active Unknown
Active Unknown	17	20	2		C		3	15	18	Active Unknown
-	19	-	-		A		-	-	20	Active Unknown
Active Unknown	21	20	2		B		-	-	22	Active Unknown
-	23	-	-		C		1	20	24	Active Unknown
Active Unknown	25	20	1		A		1	20	26	Emergency Lights
Active Unknown	27	20	1		B		1	-	28	Space
Active Unknown	29	20	1		C		1	-	30	Space
Space	31	-	1		A		1	-	32	Space
Space	33	-	1		B		1	-	34	Space
Space	35	-	1		C		1	-	36	Space
Space	37	-	1		A		1	-	38	Space
Space	39	-	1		B		1	-	40	Space
Space	41	-	1		C		1	-	42	Space
TOTAL AMPS	A	0.00	B	0.00	C	0.00				

NEW PANELBOARD SCHEDULE - P3NB

NEW PANEL:	P3NB	M.L.O.:	225
LOCATION:	3rd Floor NW	MAIN BREAKER:	-
VOLTS:	120/208Y	MAIN BUS:	225
PHASE:	3	A.I.C.:	22 kA
WIRE:	4	MOUNTING:	Surface
SOLID NEUTRAL			
NO. OF POLES:	42		

CIRCUIT DESCRIPTION	No.	CIRCUIT BREAKER			Ø	CIRCUIT BREAKER			No.	CIRCUIT DESCRIPTION
		TRIP	POLE	AMPS		AMPS	POLE	TRIP		
Spare	1	20	1		A		1	20	2	Spare
Spare	3	20	1		B		1	20	4	Spare
Spare	5	20	1		C		1	20	6	Spare
Spare	7	20	1		A		1	20	8	Spare
Spare	9	20	1		B		1	20	10	Spare
Spare	11	20	1		C		1	20	12	Spare
Spare	13	20	1		A		1	20	14	Spare
Spare	15	20	1		B		1	20	16	Spare
Spare	17	20	1		C		1	20	18	Spare
Spare	19	20	1		A		1	20	20	Spare
Spare	21	20	1		B		1	20	22	Spare
Spare	23	20	1		C		1	20	24	Spare
Spare	25	20	1		A		1	20	26	Spare
Spare	27	20	1		B		1	20	28	Spare
Spare	29	20	1		C		1	20	30	Spare
Spare	31	20	1		A		1	20	32	Spare
Spare	33	20	1		B		1	20	34	Spare
Spare	35	20	1		C		1	20	36	Spare
Spare	37	20	1		A		1	20	38	Spare
Spare	39	20	1		B		1	20	40	Spare
Spare	41	20	1		C		1	20	42	Spare
TOTAL AMPS	A	0.00	B	0.00	C	0.00				

PANELBOARD SCHEDULE P3NC

EXISTING PANEL:	X	M.L.O.:	225
LOCATION:	3rd Floor Room 334	MAIN BREAKER:	-
VOLTS:	120/208Y	MAIN BUS:	225
PHASE:	3	A.I.C.:	22 KA
WIRE:	4	MOUNTING:	Surface
SOLID NEUTRAL		DIMENSIONS:	21" X 50" X 5¼"
NO. OF POLES:	30	MANUFACTURER:	Kelek

CIRCUIT DESCRIPTION	No.	CIRCUIT BREAKER			Ø	CIRCUIT BREAKER			No.	CIRCUIT DESCRIPTION
		TRIP	POLE	AMPS		AMPS	POLE	TRIP		
Active Unknown	1	20	3		A		3	20	2	Active Unknown
-	3	-	-		B		-	-	4	-
-	5	-	-		C		-	-	6	-
Active Unknown	7	20	1		A		1	20	8	Active Unknown
Active Unknown	9	20	1		B		1	20	10	Room 338
Spare	11	20	1		C		1	20	12	AC 347
Spare	13	20	1		A		1	20	14	Spare
Spare	15	20	1		B		1	20	16	Spare
Active Unknown	17	20	1		C		1	20	18	Active Unknown
Spare	19	20	1		A		1	20	20	Active Unknown
Active Unknown	21	20	1		B		1	20	22	Spare
Active Unknown	23	20	1		C		1	20	24	Spare
Oven	25	20	1		A		1	20	26	Spare
-	27	20	1		B		1	20	28	Spare
-	29	20	1		C		1	20	30	Spare
Active Unknown	31	20	1		A		1	20	32	Spare
Active Unknown	33	20	1		B		2	20	34	Active Unknown (1)
Active Unknown	35	20	1		C		-	-	36	-
Active Unknown	37	20	1		A		3	20	38	Active Unknown
Active Unknown	39	20	1		B		-	-	40	-
Active Unknown	41	20	1		C		-	-	42	-
TOTAL AMPS	A	0.00	B	0.00	C	0.00				

(1) FROM 2 POLE BREAKER BESIDE PANEL

PANELBOARD SCHEDULE - P3SA

EXISTING PANEL:	K	M.L.O.:	225
LOCATION:	3rd Floor Janitors	MAIN BREAKER:	-
VOLTS:	120/208Y	MAIN BUS:	225
PHASE:	3	A.I.C.:	22 kA
WIRE:	4	MOUNTING:	Surface
SOLID NEUTRAL		DIMENSIONS:	20" X 32" X 5½" (1)
NO. OF POLES:	54	MANUFACTURER:	Bulldog Pushmatic

CIRCUIT DESCRIPTION	No.	CIRCUIT BREAKER			Ø	CIRCUIT BREAKER			No.	CIRCUIT DESCRIPTION
		TRIP	POLE	AMPS		AMPS	POLE	TRIP		
Active Unknown	1	20	1		A	1	20	2	Active Unknown	
Active Unknown	3	20	1		B	1	20	4	Active Unknown	
Active Unknown	5	20	1		C	1	20	6	Active Unknown	
Active Unknown	7	20	1		A	1	20	8	Active Unknown	
Active Unknown	9	20	1		B	1	20	10	Active Unknown	
Active Unknown	11	20	1		C	1	20	12	Active Unknown	
Active Unknown	13	20	1		A	1	20	14	Active Unknown	
Active Unknown	15	20	1		B	1	20	16	Active Unknown	
Active Unknown	17	20	1		C	1	20	18	Active Unknown	
Active Unknown	19	20	1		A	1	20	20	Active Unknown	
Active Unknown	21	20	1		B	1	20	22	Active Unknown	
Active Unknown	23	20	1		C	1	20	24	Active Unknown	
Active Unknown	25	20	1		A	1	20	26	Active Unknown	
Active Unknown	27	20	1		B	1	20	28	Active Unknown	
Active Unknown	29	20	1		C	1	20	30	Active Unknown	
Active Unknown	31	20	1		A	1	20	32	Active Unknown	
Panel A Circ. 1	33	20	1		B	2	20	34	Panel A Circ. 2	
Panel A Circ. 3	35	30	1		C	-	20	36	Panel A Circ. 6	
Panel A Circ. 5	37	20	1		A	1	20	38	Panel A Circ. 10	
Panel A Circ. 7	39	30	1		B	1	20	40	Panel A Circ. 16	
Panel A Circ. 11	41	20	1		C	3	15	42	Panel A Circ. 18	
Panel A Circ. 13	43	20	1		A	-	-	44	-	
Spare	45	20	1		B	-	-	46	-	
Spare	47	20	1		C	1	20	48	Spare	
Spare	49	20	1		A	1	20	50	Spare	
Spare	51	20	1		B	1	20	52	Spare	
Spare	53	20	1		C	1	20	54	Spare	
TOTAL AMPS	A	0.00	B	0.00	C	0.00				

(1) PROVIDE A PANEL TUB EXTENSION TO PROVIDE ADDITIONAL BREAKERS

PANELBOARD SCHEDULE - P3SB

EXISTING PANEL:	K1	M.L.O.:	225
LOCATION:	3rd Floor Janitors	MAIN BREAKER:	-
VOLTS:	120/208Y	MAIN BUS:	225
PHASE:	3	A.I.C.:	22 kA
WIRE:	4	MOUNTING:	Surface
SOLID NEUTRAL		DIMENSIONS:	20" X 32" X 5½" (1)
NO. OF POLES:	54	MANUFACTURER:	Bulldog Pushmatic

CIRCUIT DESCRIPTION	No.	CIRCUIT BREAKER			Ø	CIRCUIT BREAKER			No.	CIRCUIT DESCRIPTION
		TRIP	POLE	AMPS		AMPS	POLE	TRIP		
Active Unknown	1	20	1		A	1	20	2	Active Unknown	
Active Unknown	3	20	1		B	1	20	4	Active Unknown	
Active Unknown	5	20	1		C	1	20	6	Active Unknown	
Active Unknown	7	20	1		A	1	20	8	Active Unknown	
Active Unknown	9	20	1		B	1	20	10	Active Unknown	
Active Unknown	11	20	1		C	1	20	12	Active Unknown	
Active Unknown	13	20	1		A	1	20	14	Active Unknown	
Active Unknown	15	20	1		B	1	20	16	Active Unknown	
Active Unknown	17	20	1		C	1	20	18	Active Unknown	
Active Unknown	19	20	1		A	1	20	20	Active Unknown	
Active Unknown	21	20	1		B	1	20	22	Active Unknown	
Active Unknown	23	20	1		C	1	20	24	Active Unknown	
Active Unknown	25	20	1		A	1	20	26	Active Unknown	
Active Unknown	27	20	1		B	1	20	28	Active Unknown	
Active Unknown	29	20	1		C	1	20	30	Active Unknown	
Panel A Circ. 15	31	20	1		A	1	20	32	Active Unknown	
Panel A Circ. 17	33	20	2		B	1	20	34	Panel A Circ. 24	
-	35	-	-		C	1	20	36	Pnl A Circ. 26 - Em.Ltg	
Panel A Circ. 20	37	20	2		A	1	20	38	Spare	
-	39	-	-		B	1	20	40	Spare	
Panel A Circ. 25	41	20	1		C	1	20	42	Spare	
Panel A Circ. 27	43	20	1		A	1	20	44	Spare	
Panel A Circ. 29	45	20	1		B	1	20	46	Spare	
Spare	47	20	1		C	1	20	48	Spare	
Spare	49	20	1		A	1	20	50	Spare	
Spare	51	20	1		B	1	20	52	Spare	
Spare	53	20	1		C	1	20	54	Spare	
TOTAL AMPS	A	0.00	B	0.00	C	0.00				

(1) PROVIDE A PANEL TUB EXTENSION TO PROVIDE ADDITIONAL BREAKERS