

**April 17, 2014**  
**BOARD OF COUNTY COMMISSIONERS**  
**ORANGE COUNTY, FLORIDA**  
**Y14-764 MM / ADDENDUM #3**  
**ORANGE COUNTY CONVENTION CENTER WEST BUILDING PHASE 1 HALL D**  
**CATWALK POWER**

**Bid Opening Date: April 24, 2014**

This addendum is hereby incorporated into the bid documents of the project referenced above. The following items are clarifications, corrections, additions, deletions and/or revisions to and shall take precedence over the original documents. Underlining indicates additions, deletions are indicated by ~~strikethrough~~.

**A. The Bid Opening Date remains April 24, 2014 at 2:00 P.M.**

**B. QUESTIONS/RESPONSES:**

- 1 Does section 01800 apply to this project?  
**Response:** No.
- 2 16061 TEST EXISTING? Will we be required to test any of the listed existing systems?  
**Response:** Only verify existing switchboard is functional live before connecting.
- 3 16484 Motor control Does this section apply?  
**Response:** No.
- 4 There is no detail on how to mount the disconnect or receptacle could one be provided?  
**Response:** Yes. Please refer to mounting detail on attached sheet E5.2.01.
- 5 161114 conduit 3.1 d 1. c allows emt to be run under the canopy will any exterior emt be allowed?  
**Response:** Provide RMC under exterior overpass.
- 6 16123 wire and cable: 3.11 e will splices in the power cable be allowed  
**Response:** Splices will only be allowed in wire transition boxes to reduce cable size. Other applications will have to be approved by engineer.
- 7 16195 2.3 color does exposed conduit above the hall floor need to be black?  
**Response:** All exposed conduit in hall shall be black. .

- 8 There is no section panel boards or power distribution is this correct?  
**Response:** Please refer to attached specification sections 16472 and 16471.
- 9 The plans call for 2 disconnects at each location. At the walk thru it was noted that the owner may want a receptacle on the 208/120 feed. Please confirm what is correct and what type of receptacle if required.  
**Response:** Please refer to new detail on sheet E5.2.01.
- 10 Provide specifications for the following:  
a. Switchboards.  
**Response:** Switchboard is existing so it is not required.  
b. Disconnect Switches.  
**Response:** Please refer to attached Specification Section 16441.  
c. Dry Type Transformers.  
**Response:** Please refer to attached Specification Section 16461.  
d. Pin and Sleeve Devices.  
**Response:** Catalog and manufacturer listed on new detail on revised sheet E5.2.01.
- 11 Indicate manufacturer of existing switchboard MSB-30.  
**Response:** Existing switchboard is by Square D.
- 12 Please confirm that all distribution panelboards and transformers indicated on E5.2.01 (with the exception of existing MSB-30) are to be furnished by the contractor.  
**Response:** Panelboards and transformers shall be provided by contractor.
- 13 We are calculating the load under the exterior canopy at a little over 200 pounds per lineal foot with hangers included. Will the steel structure support this load as a hanging point?  
**Response:** Calculations have indicated that based on total area and width that the distributed weight is approximately .5lbs per square inch. Structural Engineer is under contract to verify mounting methods.
- 14 The roof structure above the new panel at the catwalk We have the load there at over 240 pounds per lineal foot. Will the roof framing support this load?  
**Response:** Calculations have indicated that based on total area and width that the distributed weight is approximately .5lbs per square inch. Structural Engineer is under contract to verify mounting methods.

- 15 Upon further inspection the room that the hall divider doors pockets into which was shown to us on the walk thru to turn up in is under the breeze way and not a possible path. I was not able to gain access to the adjacent rooms on either level 2 or 3. There is a 4-5' cavity on the hall side of the divider storage room that has huge steel infrastructure the conduit needs to pass horizontal thru that cavity then turn up. Can someone with access to the rooms meet with us to help us determine what options are possible?  
**Response:** Probable conduit path shall be shown on the attached new sheet E1.2.00.
- 16 There isn't a spec for the panelboards, is aluminum buss acceptable?  
**Response:** Refer to attached specification section 16471.
- 17 Do the transformers have to have copper windings or can we use an alternate conductor metal?  
**Response:** Refer to attached specification section 16461.
- 18 Plans call for Hubbell pin and sleeve disconnects on sheet E5.2.01 but there is no spec for this or part # on plans. Please send spec info and part # for this.  
**Response:** Refer to new detail on sheet E5.2.01 for part numbers.
- 19 Please confirm the path in which the feeders are to be installed, from MSB 30 to the new gear location in the mezzanine.  
**Response:** Probable conduit path is shown on attached new drawing E1.200.
- 20 Please issue structural and architectural drawings for the walls and floors the 13 conduits (question # 19) are to be run through.  
**Response:** .Probable conduit path is shown on attached new drawing E1.200.
- 21 Please confirm fused/nonfused disconnects.  
**Response:** Fused disconnects. Refer to new detail on sheet E5.2.01
- 22 Please give spec for disconnects, transformers and panels.  
**Response:** See answers to item no. 10.
- 23 Feeders from MSB 30 are to be attached to the underside of the overpass, will it bear the weight?  
**Response:** Calculations have indicated that based on total area and width that the distributed weight is approximately .5lbs per square inch. Structural Engineer is under contract to verify mounting methods.
- 24 Specs call for surge protection but plans do not show any. Please clarify if surge is required and where.  
**Response:** Surge protection will be required at each distribution panel.

- 25 Existing switchboard MSB-30 is indicated with a 4,000 amp main circuit breaker. The actual switchboard installed has a 3,000 amp main circuit breaker. Will the 3,000 amp switchboard carry the load of the three new distribution panels?  
**Response:** MSB-30 will carry the load of the three new distribution panels.
- 26 Please provide a viable pathway for the (13) conduits from MSB-30 to the catwalk.  
**Response:** Probable conduit path is shown on new attached drawing sheet E1.2.00.
- 27 The Main switchgear is not as listed on the drawing. Could not confirm if the service to this gear is sufficient.  
**Response:** The main switch gear is sufficient.
- 28 Is the framing of the north wall of the catwalk which has a stucco façade sufficient to carry the 13 3.5' RMC if that route is chosen.  
**Response:** Refer to new conduit routing plan on attached sheet E1.2.00.
- 29 Is the framing of the new metal panels on the west elevation above the Level 2 roof sufficient to carry the 13 3.5 rmc.  
**Response:** Conduits will need to be supported in accordance to specifications 16111 and 16190 which require all conduit supported by structural members. Parallel members shall be grouped and supported by racking systems.
- 30 Could we get wall section drawings of both sections?  
**Response:** Conduit paths will be shown on revised sheet E1.2.00. Sections of wall will be provided where available.
- 31 Are the conduits leading from MSB 30 to be painted? If so, what is the color, or the surface that they should match?  
**Response:** Conduits are only required to be painted in catwalk area. Conduits in Catwalk area shall be painted matte black to match catwalk surface colors.
- 32 According to the specifications for conduit, it appears that rigid non-metallic PVC conduit would be acceptable to be run underneath the bridge across the loading dock parking lot and over the loading dock. Please confirm if this is acceptable.  
**Response:** Per OCCC request conduits underneath bridge shall be RMC.

- 33 Pursuant to conversations during the 2<sup>nd</sup> walkthrough, there are some challenges to bringing in the conduit with the suggested route on the plans. During the site visit, it was mentioned that a possible acceptable route would be on the underside of the loading dock ceiling to a point somewhere between trailer dock 45 and ramp #5 on the loading dock, then vertically penetrating the existing ceiling and roof above, then turning toward the exhibit hall and up the new aluca-bond wall system on the exterior and then penetrating into the exhibit hall at the catwalk height. The specifications (16111-6.D.3.a) says conduit is not to be installed on roofs without written authorization by A/E for specific conditions. Would this be an acceptable route?  
**Response:** Conduit routing shall be in accordance with new sheet E1.2.00. Conduit on new roof and penetrating new curtain wall system shall not be allowed.
- 34 Are the conduits and all fittings, etc. within the exhibit hall at the catwalk level to be painted black?  
**Response:** All conduits with the exhibit hall at the catwalk level shall be painted matte black to match existing catwalk level finishes.
- 35 There appears to be a large expansion joint along the conduit route. Confirm we must provide expansion fittings at this location for all conduits.  
**Response:** Conduits shall be installed in accordance with specifications. Per specifications conduits spanning over expansion joints shall be provided with expansion type fittings.
- 36 Is a Structural Engineer involved in this project to look at the loads this conduit will impose on the beams on the bridge, the structure above the loading dock and the structure of the exterior wall where the conduits go vertical? Is the route supposed to be Design-Build, structurally speaking?  
**Response:** A structural engineer has been retained by OCCC and Engineering staff to review contractors' proposed racking and mounting systems.
- 37 Referring to the exhibit G , it was mentioned that the construction will not start before July 1<sup>st</sup> and the substantial completion has to be by September 5<sup>th</sup> , however the work availability is limited to two weeks in July and three weeks in August , (5 weeks total period ) that includes all the weekends and the mobilization and the demobilization period , please advise if the substantial completion date can be pushed to be September 30<sup>th</sup>.  
**Response:** Substantial Completion Date remains as listed in Exhibit G.
- 38 The Drawings doesn't call for any black painting for the new conduit in the catwalk please advise if it will be applied or no?  
**Response:** All conduits with the exhibit hall at the catwalk level shall be painted matte black to match existing catwalk level finishes.

**C. CHANGES TO SPECIFICATIONS:**

1. Add Section 16441 Enclosed Disconnect Switches
2. Add Section 16461 Drytype Transformers.
3. Add Section 16471 Panelboards
4. Add Section 16472 Distribution Panelboards
5. Delete Section 01800 in its entirety
6. Delete Section 16484 in its entirety

**D. CHANGES TO DRAWINGS:**

**ELECTRICAL:** E1.2.00, E2.5.02, and E5.2.01(Rev 1 dated 4/8/14)

Sheet E1.2.00 – New Sheet Added – Conduit Routing Plan

Sheet E2.5.02 – Revised Switchboard MSB 30 Feeder Schedule Detail

Sheet E5.2.01 – Added Disconnect mounting and receptacle detail

E. All other terms and conditions of the IFB remain the same.

F. The Proposer shall acknowledge receipt of this addendum by completing the applicable section in the solicitation or by completion of the acknowledgement information on the addendum. Either form of acknowledgement must be completed and returned not later than the date and time for receipt of the proposal.

**Receipt acknowledged by:**

\_\_\_\_\_  
**Authorized Signature**

\_\_\_\_\_  
**Date Signed**

\_\_\_\_\_  
**Title**

\_\_\_\_\_  
**Name of Firm**

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SECTION 16441  
ENCLOSED DISCONNECT SWITCHES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide all labor, materials, and equipment necessary to properly install switches as shown on the Drawings and as required by codes.
- B. Coordinate with Division 15 Contractor and Specifications as to who is to provide disconnect switches for mechanical equipment. Provide all disconnect switches not being provided by Division 15 Contractor.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver switches in factory wrapped packaging to the site. Handle switches carefully to prevent damage. Store in a clean, dry space protected from dirt, water, and physical damage. Do not install damaged switches.

1.4 QUALITY ASSURANCE

- A. The manufacturer of switches shall be the same as that of the panelboards.

1.5 SUBMITTALS

- A. Submit catalog cut sheet on each type of disconnect switch to be used on this project. Submit catalog cut sheet on enclosure locks to be used on this project.

PART 2 - PRODUCTS

2.1 CONSTRUCTION

- A. Switches shall be heavy duty types with visible, quick-make, quick-break blades.
- B. Units for 2-speed motors shall be 6-pole in a single enclosure. Use of two 3-pole units will not be acceptable.
- C. Provide ground bus, and where required a solid neutral bus.
- D. Switches shall be fusible or nonfusible as denoted on the Drawings or as required by the equipment served from the switch. Fusible switches shall have rejection type fuse holders.
- E. Terminal lugs shall be rated for 75 degrees Centigrade.
- F. Enclosures, unless otherwise noted, shall be NEMA 1 for indoor locations and NEMA 4X stainless steel for outdoor locations as a minimum. All switches mounted outdoors including those noted to be NEMA 3R on drawings shall be heavy duty type 4X, watertight, corrosion resistant.
- G. The enclosure shall be interlocked with the switch handle such that the enclosure door or cover cannot be opened with the switch in the "ON" position. The switch handle shall be capable of being padlocked in the "OFF" position but not in the "ON" position.
- H. Finish for NEMA 1 units shall be standard baked gray enamel finish over a rust inhibiting phosphate primer.
- I. Each disconnect switch shall be provided with a Homac #ELB-2 or similar enclosure lock. Homac #ELB-2 is available from Graybar Electric.

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- J. Disconnect switches installed between any variable speed drive type of unit (VFD, AFD, USD, etc.) and its respective motor(s), shall have auxiliary break before break (open) interlock control contact.
- K. Disconnect switches installed to disconnect HVAC equipment are to be fusible type with fuses as recommended by HVAC manufacturer.

2.2 RATING

- A. The size, number of poles, and fusing for each switch shall be as denoted on the Drawings. As a minimum, no less than one pole for each ungrounded conductor shall be provided. Switches shall be rated 250 VAC or 600 VAC as required by the circuit to which it is connected.
- B. Switches serving motors with more than one set of windings shall have the number of poles necessary to disconnect all conductors to all windings in a single switch. Switches serving motor loads shall be horsepower rated of sufficient size to handle the load.

2.3 SERVICE ENTRANCE EQUIPMENT

- A. Switches used as service entrance equipment shall be listed and labeled by UL for use as service equipment.

2.4 ENCLOSED CIRCUIT BREAKERS

- A. Molded Case Circuit Breakers: NEMA AB1, plug-on type for 250V or less, bolt-on type for over 250V, thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Breakers shall be HID rated. Provide UL Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers.
- B. Thermal-magnetic, molded case, with inverse time-current overload and instantaneous magnetic tripping, unless otherwise shown. Breakers shall be calibrated for 40 degrees C or shall be ambient compensating.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all switches in accordance with the manufacturer's written instructions, NECA National Electrical Installation Standards, the applicable requirements of the NEC, and recognized industry practice.
- B. All switches shall be firmly anchored to walls and supporting structures (where used) using appropriate installation. Switches shall be installed with the turning axis of their handles approximately 5'-0" above finished floor unless otherwise indicated. Provide rigid steel (galvanized for exterior use) mounting stands, brackets, plates, hardware, and accessories for a complete installation.
- C. Switches shall be mounted in accessible locations chosen where the passageway to the switch is not likely to become obstructed. Where a switch serves as the disconnecting means for a load, the switch shall be located as close as practical to the load with the switch handle within sight of the load.
- D. Provide and install lugs on disconnect switch as required to accept conductors called for on Drawings.
- E. Disconnect switches shall not be mounted on equipment, unless specifically noted or required and meet all applicable codes, etc. If switches are noted or required to be mounted on equipment they shall have vibrator clips on fuses and be connected to conduit system with liquid tight flexible conduit.
- F. Provide and install enclosure lock on each disconnect switch. Enclosure lock bolt shall be



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tightened firmly but not tight enough to break bolt.

- G. Coordinate all requirements for controls between variable speed drive units and its respective motor with drive specification, manufacturer, provider and installer. Provide auxiliary contacts, relays, etc. as required.
- H. Install all labels and identification as required by the NEC and applicable sections of these specifications.

END OF SECTION

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SECTION 16461  
DRY TYPE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide and install all equipment, labor, material, accessories, and mounting hardware for a complete and operating system for [energy efficient](#) dry type transformers [per TP-1 and CSA 802.2-00](#).

1.3 REFERENCES

- A. [CSA C22.2](#)
- B. [CSA 802.2-00](#)
- C. NECA National Electrical Contractors Association
- D. NEMA ST 1 Specialty Transformers
- E. NEMA ST 20 Dry Type Transformers for General Applications
- F. NFPA 70 National Electrical Code
- G. [NEMA TP-1](#)
- H. [NEMA TP-2](#)
- I. [UL 1561](#)

1.4 SUBMITTALS

- A. Submit Product Data: Provide outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with NECA National Electrical Installation Standards.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years experience.

1.7 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed and classified by UL as suitable for purpose specified and shown.
- C. [Transformers 750 kVA and smaller shall be listed by third party testing agency.](#)
- D. [Transformers are to be manufactured and be tested in accordance with NEMA ST20 and CSA C22.2 No. 47.](#)

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store, protect, and handle products to site.
- B. Deliver transformers individually wrapped for protection and mounted on shipping skids.

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- C. Accept transformers on site. Inspect for damage.
- D. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- E. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to transformer internal components, enclosure and finish.

PART 2 - PRODUCTS

2.1 TWO-WINDING TRANSFORMERS (standard, not for non-linear transformers)

- A. Manufacturers:
  - 1. Same manufacturer as panelboards.
- B. Description: NEMA ST 20, factory-assembled, air cooled dry type transformers, ratings as indicated.
- C. Insulation system and average winding temperature rise for rated kVA as follows:
  - 1. 1-15 kVA: Class 185 with 115°C rise.
  - 2. 16-500 kVA: Class 220 with 150°C rise.
- D. Case temperature: Do not exceed 35°C rise above ambient at warmest point.
- E. 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.
- F. Sound Levels: NEMA ST 20.
- G. Basic Impulse Level: 10 kV.
- H. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.
- I. Mounting: Suitable for wall, floor, or trapeze mounting, except transformers larger than 75 kVA, suitable for floor or trapeze mounting.
- J. Coil Conductors: Continuous windings with terminations brazed or welded.
- K. Enclosure: NEMA ST 20; Type 1 or Type 3R ventilated as indicated. Provide lifting eyes or brackets.
- L. Isolate core and coil from enclosure using vibration-absorbing mounts.
- M. Nameplate: Include transformer connection data.

2.2 SOURCE QUALITY CONTROL

- A. Provide testing of transformers under provisions of Section 16090 Tests and Performance Verification of Electrical Systems.
- B. Provide production testing of each unit in accordance with NEMA ST 20.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site condition.
- B. Verify that surfaces are suitable for installing transformer supports.

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3.2 PREPARATION

- A. Provide concrete pad sized minimum of 3" larger on all sides of the transformer.

3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Set transformer plumb and level.
- C. Use flexible conduit, under the provisions of Section 16111 Conduit, 1' minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.
- D. Mount transformers on vibration isolating pads suitable for isolating the transformer noise from the building structure.
- E. Provide grounding and bonding in accordance with Section 16170 Grounding and Bonding.
- F. Ground per NEC 250.26 and all applicable codes per Authority Having Jurisdiction.

3.4 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed.
- B. Check for damage and tight connections prior to energizing transformer.
- C. Measure primary and secondary voltages and make appropriate tap adjustments.

END OF SECTION

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SECTION 16471  
PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide all labor, materials and equipment necessary to properly and completely install panelboards as scheduled on the drawings and as required by this section.

1.3 REFERENCES

- A. NECA National Electrical Installation Standards
- B. NEMA PB 1 Panelboards
- C. NEMA PB 1.1 General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less
- D. NFPA 70 National Electrical Code
- E. UL 50 Enclosures for Electrical Equipment
- F. UL 67 Panelboards
- G. UL 489 Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed and classified by UL as suitable for purpose specified and indicated.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with NECA National Electrical Installation Standards.
- B. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum ten years experience.

1.6 SUBMITTALS

- A. Product data shall be submitted on:
  - 1. Panel
  - 2. Cabinet
  - 3. Bus
  - 4. Dimensions
  - 5. Construction
- B. Shop drawings shall be submitted for every panel on this project. Clearly indicate the following information:
  - 1. UL Label.
  - 2. Each circuit breaker amperage rating, circuit number and position/location in panel.
  - 3. Electrical characteristics of panel.
  - 4. Mains rating.
  - 5. Main device rating.
  - 6. Mounting.
  - 7. Dimension, width, depth, height.
  - 8. Bus material.
  - 9. Interrupting capacity of minimum rated breaker.

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- 10. Panel type.
- 11. Series AIC rating with upstream breakers.

1.7 PROJECT RECORD DOCUMENTS

- A. Submit record documents to record actual locations of products; indicate actual branch circuit arrangement.

1.8 OPERATION AND MAINTENANCE DATA

- A. Submit Maintenance Data: Include spare parts data listing, source and current prices of replacement parts and supplies, and recommended maintenance procedures and intervals.

1.9 FIELD MEASUREMENTS

- A. Verify that field measurements are as instructed by manufacturer.

1.10 MAINTENANCE MATERIALS

- A. Provide two of each panelboard key.

1.11 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handle panelboards and enclosures carefully to prevent damage.
- B. Store equipment indoors and protect from weather.
- C. Deliver tubs and internal assemblies sufficiently in advance of installation period as necessary to prevent delay of work. This time shall be established by a CPM provided by the Contractor and accepted by the supervising authorities.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Square D
- B. Manufacturers (including accepted substitutions) must provide equipment equal to or superior than the basis of design used on this project.
  - 1. Panels or circuit breakers with an AIC rating less than that shown on the Drawings will not be approved.
  - 2. Where basis of design panelboard can accept a certain type, frame, and/or AIC rated breaker, the accepted substitution manufacturer must also be able to accept all equal breaker type, frame, and/or AIC rating.

2.2 GENERAL

- A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB 1, circuit breaker type, dead front UL 67.
- B. Panelboard Bus: Copper ratings as indicated. Provide copper ground bus in each panelboard. Provide isolated full size neutral bus where neutral is applicable. Provide non-linear load panelboards as specified on drawings. Non-linear panelboards shall have 200 percent rated neutral busbar.
- C. Short Circuit Rating:
  - 1. Minimum Integrated Short Circuit Rating: 10,000 amperes rms symmetrical for 240 volt panelboards; 14,000 amperes rms symmetrical for 480 volt panelboards. Bus shall be braced for minimum capacity equal to or greater than the lowest breaker symmetrical interrupting capacity. Minimum short circuit rating shall be increased to meet the following requirements:
    - a) Individual CB AIC rating shown on panel schedules indicate lowest AIC rating

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allowed for individual circuit breaker in panel.

- b) Panel Series AIC rating shown is the required rating of panel and its circuit breakers based on series rating of individual panel circuit breakers with panel main circuit breaker or upstream feeder breaker.
- c) Circuit breaker types are not shown or called for. The Contractor must provide breakers in panel or feeder breakers in upstream breakers to comply with the required AIC ratings given, including providing current limiting breakers where required to achieve all ratings given.

2. Short Circuit Rating Label:

- a) Panelboards shall be labeled with a UL short-circuit rating.
- b) When series ratings are applied with integral or remote upstream devices, a label or manual shall be provided. It shall state the conditions of the UL series ratings including:
  - 1. Size and type of upstream device.
  - 2. Branch devices that can be used.
  - 3. UL series short-circuit rating.

D. Enclosure:

- 1. Enclosures shall be at least 20" wide made from galvanized steel. Provide minimum gutter space in accordance with the National Electrical Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.
- 2. Enclosures shall be provided with blank ends.
- 3. Where indicated on the drawings, branch circuit panelboards shall be column width type.
- 4. Regulatory requirements:
  - a) NEMA PB 1, Type 1, Type 3R, or Type 4X as indicated on Drawings. Use only Type 3R or Type 4X for units to be installed outdoors. Use only Type 4X in interior wet locations and designated wash-down areas. For the purposes of this specification, a wash-down area is defined as any area that is directly washed or rinsed with any form of water hose.
- 5. Cabinet Box: 6" deep, 20" wide minimum, constructed of code gauge steel, galvanized or bonderized to prevent rust.

E. Cabinet Front: Flush or surface (as indicated on Drawings) cabinet front with concealed trim clamps, concealed hinge, and flush lock all keyed alike. Finish in manufacturer's standard baked enamel finish for interior panels. Exterior panels to be painted with rust inhibit primer painted over on all surfaces with epoxy paint.

F. Panels and breakers shall be rated for voltage and class of service to which applied.

G. Spaces:

- 1. Space provisions or spaces for future breakers shall be located at the bottom of the panel and be fully bussed complete with all necessary mounting hardware less the breaker.

H. Provide lugs as required for conductors being connected to panelboard lugs, circuit breakers, etc.

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2.3 MAINS

- A. Provide main lug only (MLO) or main circuit breaker (MCB) as noted on drawings either by riser diagram or by schedule. Where conflict exists, provide MCB.
- B. Regardless of what is shown on drawings, provide the following minimum requirements.
  - 1. Main circuit breaker on each panel serving building main, if required by applicable codes.
  - 2. Main circuit breaker on each panel fed directly from a transformer (unless disconnect with overcurrent devices is installed in feeder between transformer and panel).
- C. Provide lugs as required for conductors being connected to panelboard lugs, circuit breakers, etc.
- D. Main circuit breaker is not to be mounted as branch breaker or subfeed breaker.

2.4 CIRCUIT BREAKERS

- A. General
  - 1. Molded Case Circuit Breakers: Plug-in type for 250V or less, bolt-on type for over 250V, thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers.
  - 2. Current Limiting Molded Case Circuit Breakers: Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size Class RK-5 fuse.
- B. Main Breakers:
  - 1. Main breakers shall be individually mounted separate from branch breakers.
  - 2. Covered by a metal plate, except for operating handle.
  - 3. Connection from the load's side to the panel bus shall be bus bar. Insulated wire not permitted.
- C. Branch Breakers:
  - 1. Thermal-magnetic, molded case, with inverse time-current overload and instantaneous magnetic tripping, unless otherwise shown. Breakers shall be calibrated for 40 degrees C or shall be ambient compensating.
  - 2. Quick-make, quick-break, with tripped indication clearly shown by breaker handle taking a position between ON and OFF.
  - 3. Multi-pole breakers shall have common internal trip. No handle ties between single pole breakers are acceptable for this project.
  - 4. Multi-wire branch circuit breakers shall have multi-pole breakers as required by the NEC. Handle ties between breaker handles are not acceptable.
  - 5. Single pole 15 and 20 ampere circuit breakers shall be rated for switching duty and shall be labeled as "SWD."
  - 6. AIC rating shall be as called for under "2.2 General."
  - 7. Ground Fault Circuit Interrupters (GFCI):
    - a) Provide UL Class (5 milliamp sensitivity) ground fault circuit protection on 120 VAC branch circuits for exterior location receptacles and for interior locations where



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WEST BUILDING PHASE I – ELECTRICAL POWER UPGRADES

required by NEC. (These may not be indicated on Panel Schedule.) This protection shall be an integral part of the branch circuit breaker, which also provides overload, and short circuit protection for branch circuit wiring. Tripping of a branch circuit breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. Provide separate neutral for circuits on GFCI breakers whether indicated on drawings or otherwise.

- 8. Breakers feeding heating and air-conditioning equipment shall be rated HACR type breaker.
- 9. Breakers feeding high intensity discharge lamps systems shall be HID rated.
- D. All breakers are to have lugs sized to match conductors called for on drawings.

2.5 SERVICE ENTRANCE EQUIPMENT

- A. Panelboards used as service entrance equipment shall be listed and labeled by UL for use as service equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1. Install all panelboards and panelboard enclosures in accordance with the manufacturer's written instructions, NECA Standard of Installation, the applicable requirements of the National Electrical Code, and recognized industry practices.
- B. Install panelboards plumb. Install recessed panelboards flush with wall finishes. Provide supports in accordance with Section 16190 Hangers and Supports.
- C. Height: 6' to top of panelboard; install panelboards taller than 6' with bottom no more than 4" above housekeeping curb.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed circuit directory for each branch circuit panelboard. Mount a typewritten directory showing the actual circuit numbers, type of load and room names on inside of door. Room names shall be actual names or numbers used, not necessarily shown on the drawings. Progress drawings shall show same arrangements as the directory. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide engraved plastic nameplates under the provisions of Section 16195 Identification for Electrical Systems.
- G. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Minimum spare conduits: 4 empty 1". Identify each as "SPARE."
- H. Proper working clearances shall be maintained at every panelboard location. The working space in front of a panelboard shall be as a minimum, 30" wide extending 3', 3.5', or 4' (per NEC 110.26) out perpendicular to the panelboard.
- I. All enclosures shall be firmly anchored to walls and supporting structures (where used) using appropriate hardware. Provide supporting (unistrut type) channels on walls constructed of gypsum board or where otherwise necessary to provide a mechanically secure and permanent installation. Enclosures shall be installed so that the top is 6'-6" above finished floor. Where the size of the enclosure is such that the top cannot be installed at 6'-6", the top of the enclosure shall be kept as low as possible.
- J. Clean the interior of each panelboard before installing conductors. At all times, keep the interior trim and exterior surfaces of the panelboard free of rust and debris. Repaint finishes if necessary.

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- K. Coordinate all raceways and conductors with their respective panelboards so that all connections and conductors routing present an orderly appearance. Conductors in the panelboards shall be laced and arranged in orderly manner.
- L. Collect all keys upon delivery of panelboard. Store keys on one ring to be kept by project superintendent. Forward key ring with keys to Owner upon substantial completion.
- M. Provide a separate neutral conductor for each GFI breaker. These shall not be combined to serve more than one circuit, even when on different phases. Increase plan indications of conductors for neutral wires required as necessary.

3.2 IDENTIFICATION

- A. Refer to Section 16195 Identification for Electrical Systems for products and content.
- B. Provide engraved plastic nameplates under the provisions of Section Electrical Identification.
- C. Nameplate shall state panel name and voltage of this panel, name of panel that feeds this respective panel, and UL short-circuit rating of this panel.
- D. Provide labels and identification as required by the NEC.
- E. All circuit identifications and directories shall be checked to verify accuracy of the description of the load and/or equipment being fed

3.3 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed.
- B. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.
- C. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.
- D. Feeder conductors shall be checked by accepted means to establish the absence of shorts to ground, insulation value, etc., and the result recorded and submitted to the Engineer.
- E. All circuits shall be operated to establish a good working order and checked for shorts.
- F. All panel directory circuit numbers shall be checked to verify accuracy of the number.
- G. Where and when requested by Engineer provide:
  - 1. Inspection of equipment by authorized equipment manufacturer technician complete with submittal of statement of findings by technician, and providing any adjustments deemed necessary for a complete and operating system.
  - 2. Ground, voltage, and/or load readings complete with submittal on legible form with applicable data.

END OF SECTION

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SECTION 16472  
DISTRIBUTION PANELBOARDS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Factory-assembled, metal-enclosed panelboard for distribution and control of power from incoming line terminals to outgoing feeder terminals, installed and tested in place.
- B. Distribution panelboard shall include all protective devices and equipment as listed on drawings or as included in these specifications, with necessary interconnections, instrumentation.

1.3 REFERENCES AND REGULATORY REQUIREMENTS

- A. ANSI/NFPA 70 National Electrical Code
- B. NEMA KS 1 Enclosed and Miscellaneous Distribution Equipment Switches (60 Volts Maximum)
- C. NEMA PB 2 Deadfront Distribution Switchboards
- D. NEMA PB 2.1 Proper Handling, Installation, Operation and Maintenance of Deadfront Switchboards Rated 600 Volts or Less
- E. UL 67 Panelboards
- F. UL 50 Enclosures for Electrical Equipment
- G. UL 489 Molded Case Circuit Breakers, Molded Case Switches, and Circuit Breaker Enclosures

1.4 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.5 SUBMITTALS

- A. Submit under provisions of Section 16012 Submittals.
- B. Shop Drawings
  - 1. Shop drawings shall clearly indicate:
    - a) Front and side views of enclosures with overall dimensions shown.
    - b) Conduit entrance locations and requirements.
    - c) Nameplate legends.
    - d) Size and number of bus bars per phase, neutral, and ground.
    - e) Frame sizes and interrupting capacity of each breaker, and total assembly.
    - f) Horsepower ratings at rated voltage of fused switches and/or breakers.
    - g) Type of labels and labeling for every device and what it feeds.
    - h) Nameplate on main panelboard only giving name of project, Architect, Engineer

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and Contractor.

i) Bus bar size, arrangement and spacing.

- C. Product Data: Provide electrical characteristics including voltage, frame size and trip ratings, fault current withstand ratings, and time-current curves of all equipment and components.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under "Regulatory Requirements." Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit Maintenance Data: Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 10 years experience.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and protect products at the site.
- B. Deliver in sections as required to fit equipment through doors, individually wrapped for protection and mounted on shipping skids.
- C. Accept switchboards on site. Inspect for damage.
- D. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- E. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Conform to NEMA PB 2 service conditions during and after installation of switchboards.

1.10 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated and comply with instructions by manufacturer.

1.11 MAINTENANCE MATERIALS

- A. Provide two of each key (where applicable).
- B. Provide two fuse pullers (where applicable).

PART 2 - PRODUCTS

2.1 GENERAL

- A. Panelboards with circuit breaker, or fusible switch, branch protective devices shall comply with NEMA PB2 as a minimum requirement. Panelboards shall be NEMA I and shall meet Underwriter's Laboratories enclosure requirements for service conditions.
- B. Each cubicle shall have UL label affixed, unless special construction prohibits and no labeling or listing is available.
- C. See Drawings for acceptable manufacturers. Basis of design is Square D.
- D. Short-Circuit Rating Label:
  - 1. Minimum integrated short circuit rating, 10,000 amperes rms symmetrical for 240 volt,

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14,000 amperes rms symmetrical for 480 volt. Bus shall be braced for minimum capacity equal to or greater than the lowest breaker symmetrical interrupting capacity. Minimum short circuit rating shall be increased to meet the following requirements:

- a) Individual circuit breaker AIC rating shown on panel schedules indicate lowest AIC rating allowed for individual circuit breaker in panel.
  - b) Panel series AIC rating shown is the required rating of panel and its circuit breakers based on series rating of individual panel circuit breakers with panel main circuit breaker or upstream feeder breaker.
  - c) Circuit breaker types are not shown or called for. The Contractor must provide breakers in panel or feeder breakers in upstream breakers to comply with the required AIC ratings given, including providing current limiting breakers where required to achieve all ratings given.
- E. When series ratings are applied with integral or remote upstream devices, a label or manual shall be provided. It shall state the conditions of the UL series ratings including:
1. Size and type of upstream device
  2. Branch devices that can be used
  3. UL series short-circuit rating
- F. Provide lugs on bus, distribution panelboard and circuit breakers as required to match conductors being connected/terminated.

## 2.2 MANUFACTURERS

- A. Basis of Design: Square D
- B. Manufacturers (including accepted substitutions) must provide equipment equal to or superior than the basis of design used on this project.

## 2.3 DISTRIBUTION PANELBOARDS

- A. Description: NEMA PB 2 with electrical ratings and configurations as indicated.
- B. Main Section Devices: Panel mounted.
- C. Distribution Section Devices: Panel mounted.
- D. Bus Material: copper standard size.
- E. Bus Connections: Bolted, accessible from front for maintenance.
- F. Ground Bus: Extend length of board.
- G. Molded Case Circuit Breakers: Integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
- H. Molded Case Circuit Breakers with Current Limiters: Molded case circuit breakers with replaceable current limiting elements, in addition to integral thermal and instantaneous magnetic trip in each pole.
- I. Current Limiting Molded Case Circuit Breakers: Molded case circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 rms amperes symmetrical let-through current and energy level less than permitted for same size Class RK-5 fuse.
- J. Solid-State Molded Case Circuit Breakers: Provide with electronic sensing, timing and tripping circuits for adjustable current settings; instantaneous trip; and adjustable short time trip. Provide ground fault sensing integral with circuit breaker. Provide zero sequence type

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ground fault sensor.

- K. Line and Load Terminations: Accessible from the front only of the switchboard, suitable for the conductor materials and sizes indicated.
- L. Ground Fault Sensor: (Where called for on Drawings) Zero sequence or ground return type.
- M. Ground Fault Relay: (Where called for on Drawings) Adjustable ground fault sensitivity from 200 to 1200 amperes, time delay adjustable from 0 to 15 seconds. Provide monitor panel with lamp to indicate relay operation, TEST and RESET control switches.
- N. 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.
- O. Enclosures:
  - 1. Type 1 General Purpose for interior locations.
  - 2. Type 2 Raintight for exterior locations.
  - 3. Align sections at front and rear.
  - 4. Finish:
    - a) Interior: 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.
    - b) Exterior: Coat interior and exterior of enclosure with rust inhibiting primer and paint over with epoxy paint
  - 5. Enclosures shall be at least 20" wide made from galvanized steel. Provide minimum gutter space in accordance with the National Electrical Code. Where feeder cables supplying the mains of a panel are carried through its box to supply other electrical equipment, the box shall be sized to include the additional required wiring space. At least four interior mounting studs with adjustable nuts shall be provided.
  - 6. Enclosures shall be provided with blank ends.
  - 7. Where indicated on the Drawings, branch circuit panelboards shall be column width type.
- P. Breakers
  - 1. All breakers are to have lugs sized to match conductors called for on Drawings.
  - 2. Main circuit breaker is not to be mounted as branch breaker or subfeed breaker.
  - 3. Breakers feeding heating and air conditioning equipment shall be rated HACR type breaker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surface is suitable for distribution panelboard installation.

3.2 PREPARATION

- A. Provide concrete housekeeping pad.

3.3 INSTALLATION

- A. Install distribution panelboard in locations shown on Drawings, in accordance with manufacturer's written instructions and NEMA PB 2.1.
- B. Tighten accessible bus connections and mechanical fasteners after placing switchboard.

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- C. Install fuses in each switch (where applicable).

3.4 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed under provisions of Section 16090 Tests and Performance Verification of Electrical System.
- B. Inspect completed installation for physical damage, proper alignment, anchorage, and grounding.
- C. Measure insulation resistance of each bus section phase to phase and phase to ground for one minute each, at test voltage of 1000 volts; minimum acceptable value for insulation resistance is 2 megohms.
- D. Check tightness of accessible bolted bus joints using calibrated torque wrench.
- E. Physically test key interlock systems to ensure proper function.

3.5 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 as instructed by the Architect/Engineer or (if so directed by A/E) as manufacturer's recommendation.

3.6 CLEANING

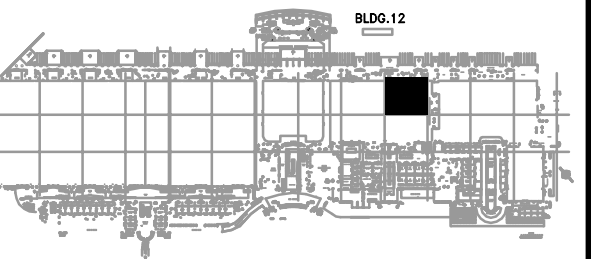
- A. Touch up scratched or marred surfaces to match original finish.

3.7 LABELING

- A. Refer to Section 16195 Identification for Electrical Systems for products and content.
- B. Provide engraved plastic nameplates under the provisions of 16195 Identification for Electrical Systems.
- C. Nameplate shall state panel name and voltage of this panel, name of panel that feeds this respective panel, and UL short-circuit rating of this panel.
- D. Provide labels and identification as required by the NEC.
- E. Each circuit breaker shall have engraved nameplate describing load/equipment being fed by breaker.
- F. All circuit identifications/nameplates shall be checked to verify accuracy of the description of the load and/or equipment being fed.

END OF SECTION

**OCCC PHASE 1  
HALL D  
CATWALK POWER**



Key Plan - West

**Revisions**

No.	Date	Description
1	4/9/14	ADDENDUM #3

MPE PROJ#: 2012-188C

Designed By: RB

Drawn By: AG/RB

Checked By: CT

Issue Date: FEBRUARY 28, 2014

Drawing Scale: 1"=20'-0"

Drawing Title:

**CONDUIT ROUTING PLAN**

BID DOCUMENTS

Drawing No.

**E1.2.00**

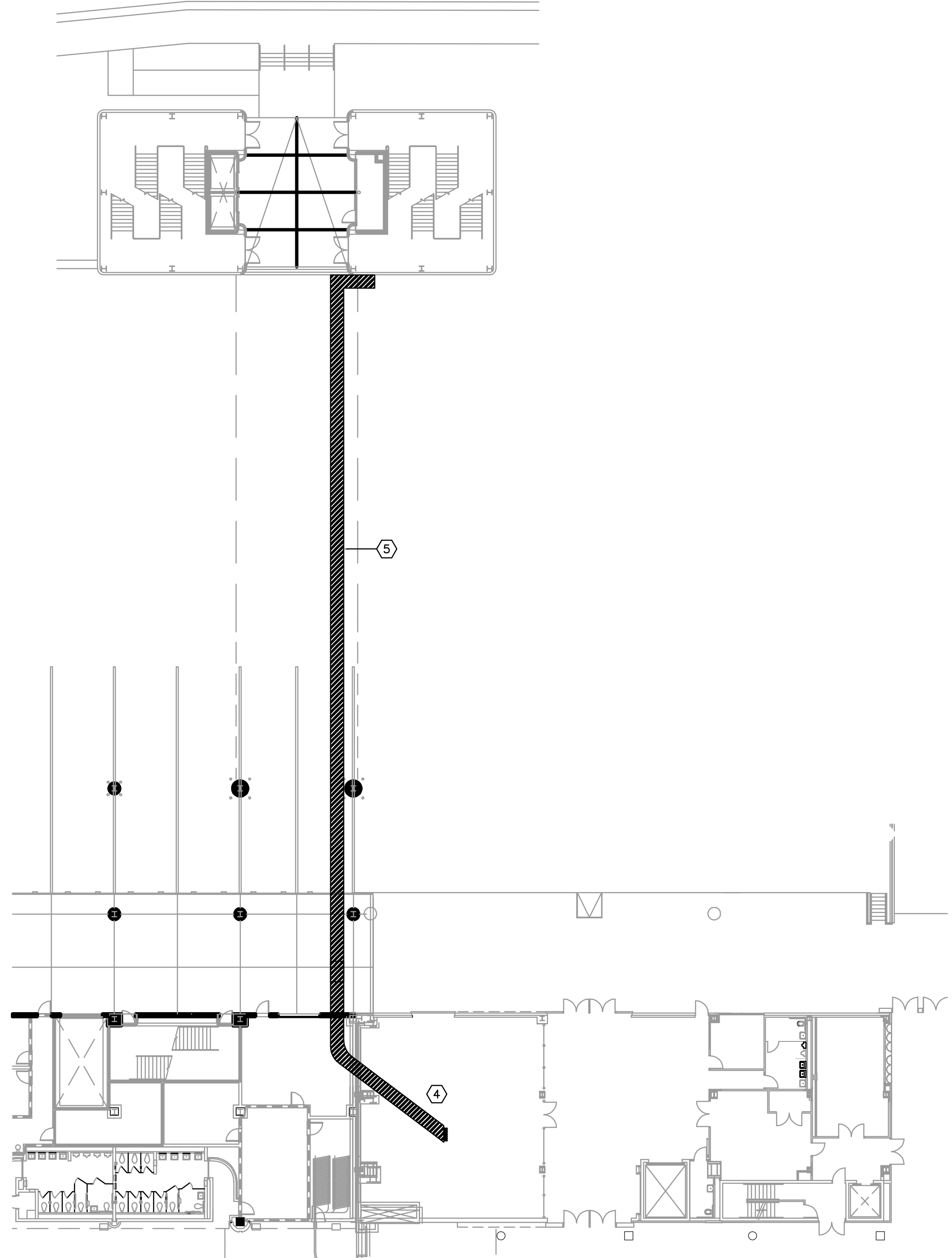
- GENERAL NOTES**
- REFER TO GENERAL NOTES FOR THIS DISCIPLINE.
  - REFER TO SPECIFICATIONS.
  - ALL HEX NOTES NOT NECESSARILY USED ON ALL SHEETS.
  - EXISTING CONDUIT ROUTING IS UNKNOWN.
  - WHERE CONDUIT ROUTING IS SHOWN, THE CONDUITS ARE SHOWN FOR DIAGRAMMATIC PURPOSES AND ARE NOT NECESSARILY REPRESENTATIVE OF EXACT PLACEMENT. CONTRACTOR SHALL SIZE AND PLACE PULL BOXES AS REQUIRED BY NEC AND TO MINIMIZE MAXIMUM PULL TENSION AND MAXIMUM NUMBER OF BENDS. IT SHALL BE UNDERSTOOD THAT UNFORESEEN CONDITIONS EXIST AND FIELD MODIFICATIONS WILL BE REQUIRED. PATH ALTERNATING FOR SUGGESTED ROUTING SHALL BE SKETCH AND SENT TO EOR AND OCCC STAFF.
  - ADDITIONAL PULL BOXES SHALL BE PROVIDED WHERE CONDUIT BENDS/TRANSITIONS ARE MADE RESTRICTIVE DUE TO FIELD CONDITIONS.
  - ALL CONDUIT ON CATWALK LEVEL SHALL BE PAINTED MATTE BLACK.

- HEX NOTES**
- ROUTING ASSUMES CONDUIT WILL BE STACKED 2 DEEP AND MOUNTED VERTICALLY AND SUPPORTED IN ACCORDANCE WITH SPECS TO STRUCTURAL STEEL.
  - OPEN AREA ON CATWALK LEVEL. CONTRACTOR TO COORDINATE WITH DUCT AND OTHER MECHANICAL EQUIPMENT LOCATED IN THE AREA.
  - PAPER STORAGE AREA. CONTRACTOR TO COORDINATE WITH OCCC STAFF ON RELOCATING/ MOVING RACKS AS REQUIRED TO FACILITATE RENOVATION.
  - EXISTING FACILITIES WORKSHOP, OFFICES, AND BREAK AREA. CONDUIT TO BE INSTALLED ABOVE ACCESSIBLE CEILING. CONTRACTOR TO COORDINATE WITH EXISTING MECHANICAL PIPING AND DUCT IN AREA.
  - CONDUIT RUN UNDERSIDE OF BRIDGE WALK WAY. MOUNTING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS AND MOUNTED TO STRUCTURAL STEEL.
  - AREA IS NOT EASILY ACCESSIBLE VIA CATWALK WALK WAYS. CONTRACTOR SHALL PROVIDE OSHA APPROVED SAFETY METHODS TO ACCESS AREA AND INSTALL CONDUIT.

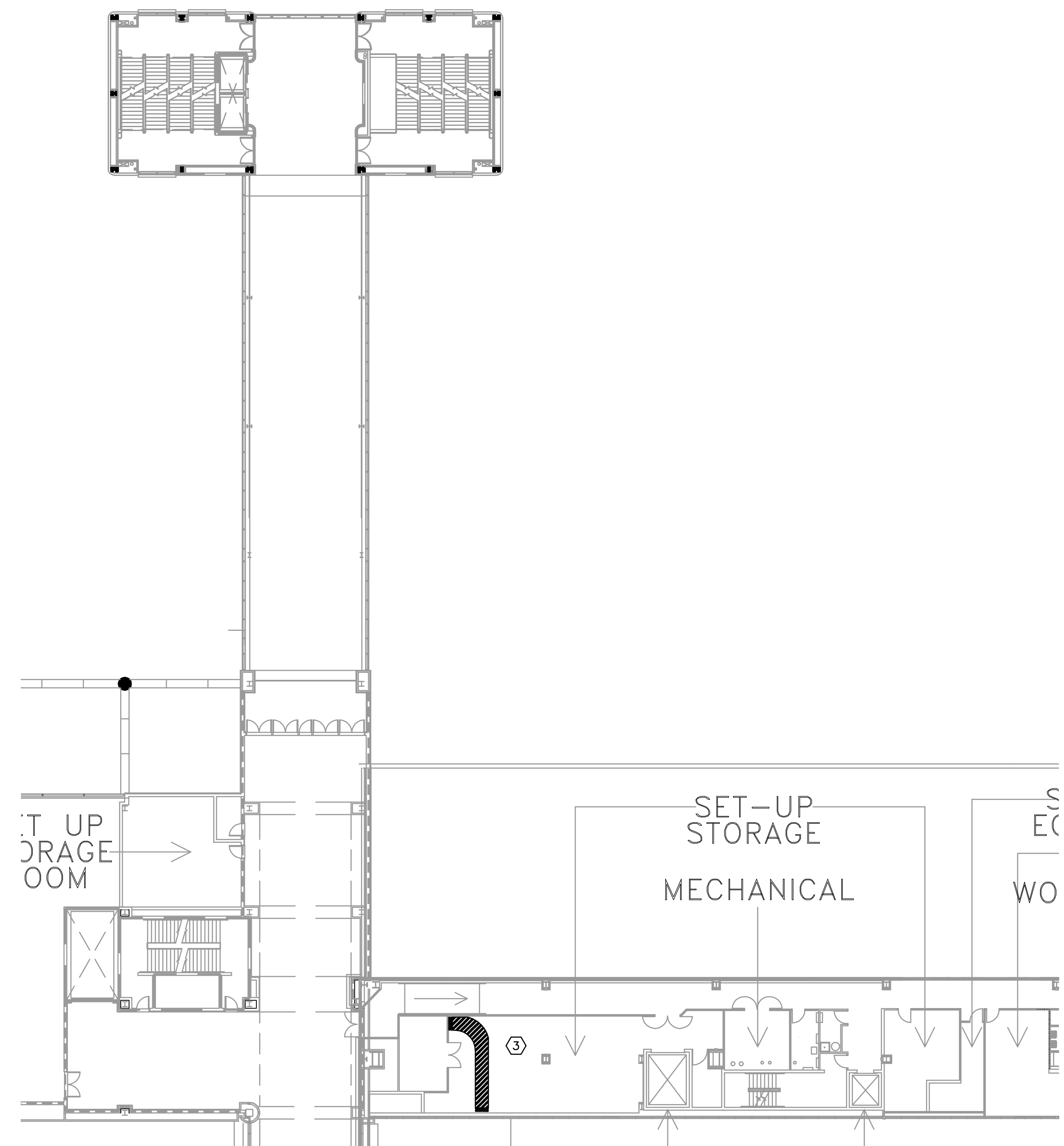
**LEGEND**

INDICATES DIAGRAMMATIC CONDUIT ROUTING.

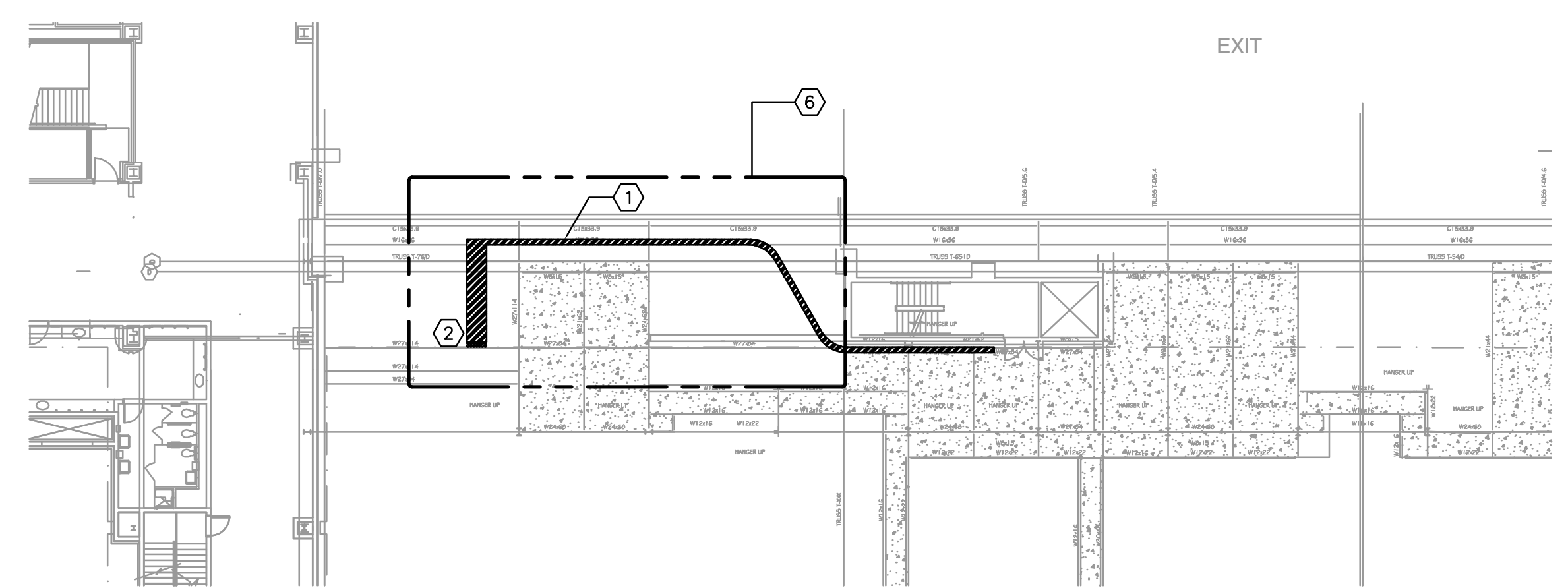
THE CONDUITS ARE SHOWN FOR DIAGRAMMATIC PURPOSES AND ARE NOT NECESSARILY REPRESENTATIVE OF EXACT PLACEMENT. CONTRACTOR SHALL SIZE AND PLACE PULL BOXES AS REQUIRED BY NEC AND TO MINIMIZE MAXIMUM PULL TENSION AND MAXIMUM NUMBER OF BENDS. IT SHALL BE UNDERSTOOD THAT UNFORESEEN CONDITIONS EXIST AND FIELD MODIFICATIONS WILL BE REQUIRED. CONTRACTOR SUGGESTED PATHS ALTERNATING FROM ROUTING SHOWN SHALL BE SKETCH AND SENT TO EOR AND OCCC STAFF.



**PARTIAL CONDUIT ROUTING PLANS - LEVEL 2**  
1"=20'-0"  
0 10' 20' 40'



**PARTIAL CONDUIT ROUTING PLANS - LEVEL 3**  
1"=20'-0"  
0 10' 20' 40'



**PARTIAL CONDUIT ROUTING PLANS - LEVEL 4**  
1"=20'-0"  
0 10' 20' 40'

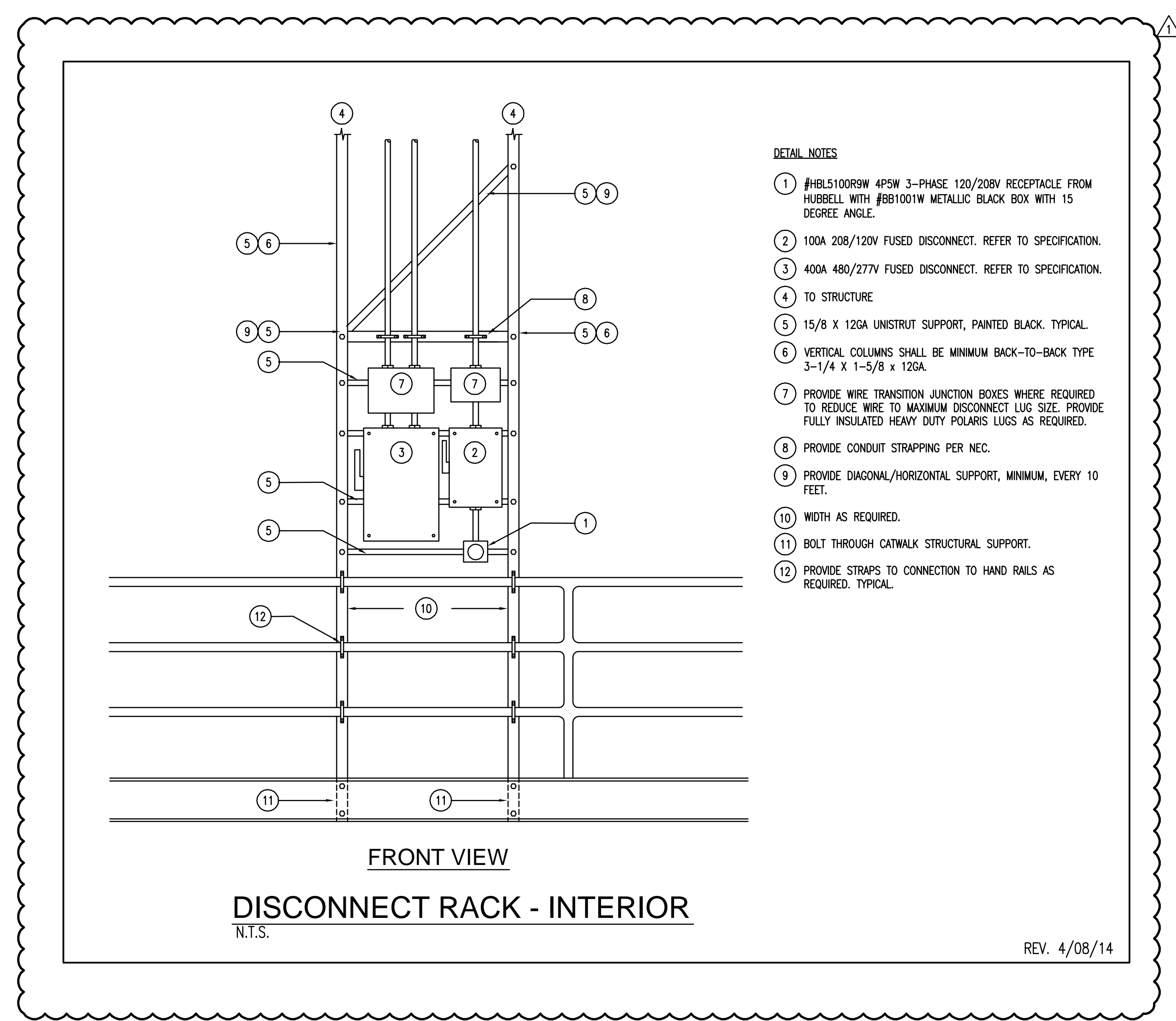
**PARTIAL CONDUIT ROUTING PLANS**  
1"=20'-0"  
0 10' 20' 40'

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 LAST SAVED: 4/15/2014 12:28:58 PM  
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 MATERN PROFESSIONAL ENGINEERING PLOT DATE: 4/17/2014 10:51:17 AM





LAST SAVED BY: CTURNER  
 LAST SAVED: 4/16/2014 10:45:59 AM  
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 MATEM PROFESSIONAL ENGINEERING  
 PLOT DATE: 4/17/2014 10:42:53 AM

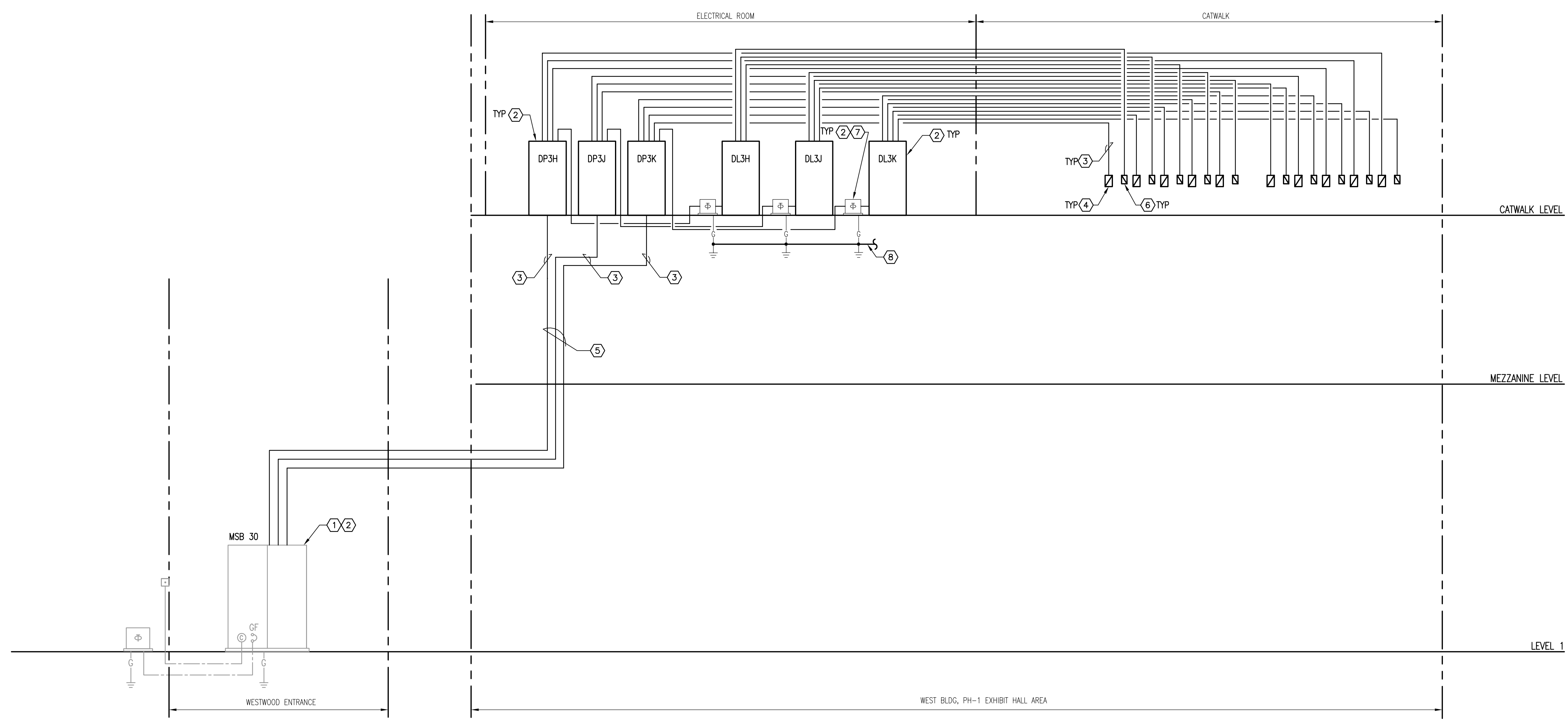
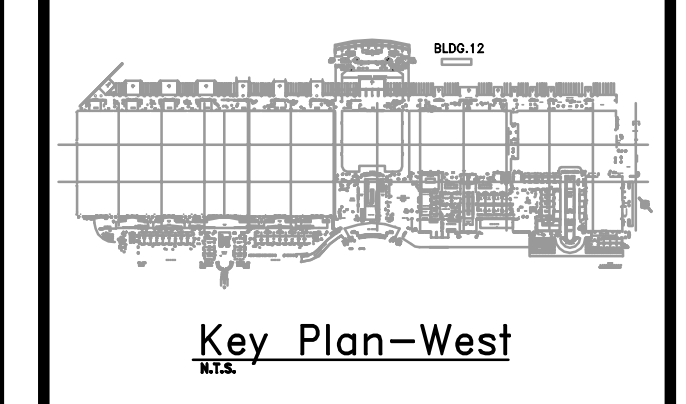


- DETAIL NOTES**
- 1 #HBL100R0W 4PSW 3-PHASE 120/208V RECEPTACLE FROM HURBELL WITH #8B1001W METALLIC BLACK BOX WITH 15 DEGREE ANGLE.
  - 2 100A 208/120V FUSED DISCONNECT. REFER TO SPECIFICATION.
  - 3 400A 480/277V FUSED DISCONNECT. REFER TO SPECIFICATION.
  - 4 TO STRUCTURE
  - 5 15/8 X 12GA UNISTRUT SUPPORT, PAINTED BLACK. TYPICAL.
  - 6 VERTICAL COLUMNS SHALL BE MINIMUM BACK-TO-BACK TYPE 3-1/4 X 1-5/8 X 12GA.
  - 7 PROVIDE WIRE TRANSITION JUNCTION BOXES WHERE REQUIRED TO REDUCE WIRE TO MAXIMUM DISCONNECT LUG SIZE. PROVIDE FULLY INSULATED HEAVY DUTY POLARIS LUGS AS REQUIRED.
  - 8 PROVIDE CONDUIT STRAPPING PER NEC.
  - 9 PROVIDE DIAGONAL/HORIZONTAL SUPPORT, MINIMUM, EVERY 10 FEET.
  - 10 WIDTH AS REQUIRED.
  - 11 BOLT THROUGH CATWALK STRUCTURAL SUPPORT.
  - 12 PROVIDE STRAPS TO CONNECTION TO HAND RAILS AS REQUIRED. TYPICAL.

- GENERAL NOTES**
- 1) REFER TO GENERAL NOTES FOR THIS DISCIPLINE.
  - 2) REFER TO SPECIFICATIONS.
  - 3) NO MULTI-WIRE BRANCH CIRCUITS ARE TO BE USED. EACH CIRCUIT IS TO HAVE SEPARATE INDIVIDUAL NEUTRAL.
  - 4) REWORK/RELOCATE EXISTING ELECTRICAL AS REQUIRED TO FACILITATE REMODELING.
  - 5) CONTRACTOR SHALL MAINTAIN CONTINUITY TO EXISTING DEVICES REMAINING.
  - 6) ALL DISCONNECTING MEANS (SWITCHES) FEEDING FAN TERMINAL BOXES SHALL BE MOTOR RATED SWITCHES.

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 ME/PE/FP Engineering Consultants - A Solutions Based Firm  
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 ENG. BUS. No. EB-000096 CERT. OF AUTH. No. 5096

**OCCC PHASE 1  
HALL D  
CATWALK POWER**



- HEX NOTES**
- 1 EXISTING 3000A SWITCHGEAR
  - 2 PROVIDE NEW PANEL/TRANSFORMER. REFER TO PANEL SCHEDULES
  - 3 REFER TO FEEDER SCHEDULES
  - 4 PROVIDE NEW 480V, 3P, 400A FUSED DISCONNECT. REFER TO DETAIL THIS SHEET
  - 5 ROUTE CONDUIT AS REQUIRED. PROVIDE PULL BOXES AS REQUIRED. CONTRACTOR TO FIELD LOCATE ROUTING TO FACILITATE INSTALLATION.
  - 6 PROVIDE NEW 208V, 3P, 100A DISCONNECT AND RECEPTACLE WITH PIN AND SLEEVE. REFER TO DETAIL THIS SHEET.
  - 7 STEP DOWN TRANSFORMER 480V, 3P PRIMARY, 208/120V 3Ø 4W SECONDARY. SEE RESPECTIVE PANEL SCHEDULE FOR SIZE. PROVIDE WITH 4" HOUSEKEEPING PAD.
  - 8 NEW GROUNDING ELECTRODE CONDUCTOR. SIZE PER NEC. CONNECT TO NEAREST GROUND.

**Revisions**

No.	Date	Description
1	4/9/14	ADDENDUM #3

MPE PROJ#: 2012-188C

Designed By: RB

Drawn By: AG/RB

Checked By: CT

Issue Date: FEBRUARY 28, 2014

Drawing Scale: NTS

Drawing Title: **POWER RISER DIAGRAM**

BID DOCUMENTS

Drawing No. **E5.2.01**