BASIC MECHANICAL REQUIREMENTS

GENERAL

1. GENERAL NOTES, SYMBOL LISTS AND DETAILS ARE APPLICABLE TO ALL MECHANICAL DRAWINGS LABELED "M".

2. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK, MATERIALS AND LABOR TO PROVIDE COMPLETE AND WORKING MECHANICAL SYSTEMS WHETHER SPECIFIED OR IMPLIED.

3. ALL NECESSARY PERMITS AND INSPECTIONS SHALL BE PROCURED BY THE CONTRACTOR AND ALL FEES PAID BY THE COUNTY. ALL LICENSES REQUIRED BY CONTRACTOR SHALL BE PROCURED AND PAID BY THE CONTRACTOR. SUBMIT TO THE OWNER DUPLICATE CERTIFICATES OF INSPECTION FROM THE APPROVED INSPECTION AGENCIES.

4. THE ENTIRE MECHANICAL INSTALLATION SHALL CONFORM TO THE LOCAL CODE, STATE LAWS, 2015 IMC, 2015 IBC, AGA, NFPA, NSPC, ASME, IFGC AND ALL OTHER GOVERNING AUTHORITIES.

5. DO NOT SCALE THE DRAWINGS FOR EXACT DIMENSIONS. VERIFY ALL FIGURES, CONDITIONS, DIMENSIONS, ETC., AT THE JOB SITE.

6. CONTRACTOR SHALL GUARANTEE THE COMPLETE INSTALLATION AGAINST DEFECTS IN THE WORKMANSHIP AND MATERIALS. SEE DIVISION 1 SPECIFICATION SECTIONS FOR ADDITIONAL WARRANTY AND GUARANTEE INFORMATION.

7. THE CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES TO PREVENT INTERFERENCE BETWEEN BEAMS, STRUCTURES, PIPING, CONDUITS, LIGHTING FIXTURES, FIRE ALARM DEVICES, FIRE SPRINKLERS, ETC.

8. ALL MECHANICAL EQUIPMENT SHALL BE LOCATED AT A MINIMUM FLOOR ELEVATION ABOVE THE AREA'S FEMA BASE FLOOR ELEVATION. PROVIDE ALL NECESSARY STRUCTURES. SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION.

9. ALL MATERIALS USED IN CONSTRUCTION SHALL HAVE A FLAME SPREAD RATING OF 25 OR LESS, A SMOKE DEVELOPMENT RATING OF 50 OR LESS, AND A FUEL CONTRIBUTED RATING OF 25 OR LESS. ALL MATERIALS SHALL BE "SELF-EXTINGUISHING".

10. ALL PIPING, CONDUIT AND DUCT PENETRATIONS OF "FIRE RATED BUILDING CONSTRUCTION" SHALL BE SLEEVED AND SEALED WITH A FIRE BARRIER MATERIAL EQUAL TO 3M "PENETRATION SEALING SYSTEMS". REFER TO ARCHITECTURAL DRAWINGS FOR FIRE RATING OF BUILDING CONSTRUCTION.

11. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S WRITTEN RECOMMENDATIONS.

12. CONTRACTOR SHALL PROVIDE COMPLETE SETS OF BOUND OPERATING AND MAINTENANCE INSTRUCTIONS. CONTRACTOR SHALL INSTRUCT THE OWNER OR HIS AGENT WITH REGARD TO THE PROPER USE OF THE SYSTEM UNTIL SUCH INSTRUCTION IS COMPLETE TO THE OWNER'S SATISFACTION. OPERATION AND MAINTENANCE MANUAL SHALL INCLUDE A VALVE SCHEDULE IF VALVES ARE INSTALLED AS PART OF THE NEW WORK. SEE DIVISION 1 SPECIFICATIONS FOR ADDITIONAL INFORMATION.

13. MECHANICAL CONTRACTOR SHALL LABEL ALL NEW MECHANICAL EQUIPMENT, PIPING AND VALVES (INDOORS AND OUTDOORS) IN A PERMANENT MANNER. MECHANICAL PIPING SHALL BE LABELED IN ACCORDANCE WITH ASME A13.1 FOR LETTERING SIZE, LENGTH OF COLOR FIELD, COLORS, AND VIEWING ANGLES OF IDENTIFICATION. DIRECTION OF FLOW SHALL BE IDENTIFIED WITH DIRECTIONAL ARROW TAPE. VALVES SHALL BE IDENTIFIED WITH BRASS VALVE TAGS, ATTACHED WITH SOLID BRASS CHAINS AND "S" HOOKS. VALVE TAGS SHALL BE COORDINATED WITH VALVE SCHEDULE PROVIDED IN OPERATION AND MAINTENANCE MANUAL. MECHANICAL EQUIPMENT SHALL BE LABELED WITH ENGRAVED PLASTIC TAGS WITH MOUNTING HOLES AND STAINLESS STEEL SCREWS. ALL LABELING SHALL HAVE HIGH CONTRAST BETWEEN LETTER AND BACKGROUND COLORS AND SHALL BE LOCATED FOR EASY VISIBILITY.

14. ALL MECHANICAL EQUIPMENT AND APPLIANCES INSTALLED SHALL BEAR THE LABEL OF AN APPROVED AGENCY.

15. THE ENTIRE MECHANICAL INSTALLATION SHALL BE MADE IN ACCORDANCE WITH THE 2015 INTERNATIONAL MECHANICAL CODE (IMC) AND ANY ADOPTED SUPPLEMENTS, AS ADOPTED BY THE STATE OF NEW YORK.

16. PROVIDE VIBRATION ISOLATION MOUNTINGS FOR ALL MOTOR OPERATED EQUIPMENT AND AS RECOMMENDED BY THE MANUFACTURER.

17. MECHANICAL CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR ALL POWER REQUIREMENTS OF MECHANICAL EQUIPMENT. ELECTRICAL CONTRACTOR SHALL PROVIDE POWER WIRING TO ALL MECHANICAL EQUIPMENT. MECHANICAL CONTRACTOR SHALL FURNISH LOOSE MOTOR STARTERS AND DISCONNECT SWITCHES FOR INSTALLATION AND WIRING BY THE ELECTRICAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL PROVIDE ALL CONTROL AND INTERLOCK WIRING AND ALL THERMOSTATS AND ACCESSORIES.

18. PROVIDE BALANCING OF ALL WATER SYSTEMS PER AABC, NEBB OR TABB STANDARDS. SUBMIT TEST DATA AND DEMONSTRATE IN THE FIELD.

19. EQUIPMENT ACCESS: CONTRACTOR SHALL PROVIDE ACCESS FOR CONTROL DEVICES, HEAT EXCHANGERS AND HVAC SYSTEMS THAT UTILIZE ENERGY AND ARE LOCATED IN CONCEALED PLACES. ACCESS SHALL BE PROVIDED FOR INSPECTION, REPAIR, SERVICE AND REPLACEMENT WITHOUT THE NEED FOR DISMANTLING ANY PERMANENT CONSTRUCTION INCLUDING WALLS, DUCTS, PIPING, ETC. CONSTRUCTION SHALL BE AS DESCRIBED PER THE 2015 INTERNATIONAL MECHANICAL CODE (IMC), SECTION 306.1, AS ADOPTED BY THE STATE OF NEW JERSEY.

20. PRIOR TO CONSTRUCTION, MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO PREPARE ELECTRONIC COORDINATION DRAWINGS FOR ALL TRADES, WHICH SHALL BE SUBMITTED TO ARCHITECT FOR REVIEW. MECHANICAL CONTRACTOR SHALL COORDINATE THIS EFFORT WITH ALL OTHER TRADES PERFORMING WORK ON THE PROJECT. ANY CONFLICTS BETWEEN TRADES MUST BE RESOLVED PRIOR TO CONSTRUCTION. SEE DIVISION 1 AND DIVISION 23 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

21. SUBMIT 3/8" SCALE SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION. COORDINATE WITH ALL TRADES. SUBMIT TO THE ARCHITECT FOR APPROVAL, DUPLICATE SPECIFICATION SHEETS OF ALL EQUIPMENT SUPPLIED OR INSTALLED, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

    A. FAN COIL UNITS
    B. PIPING AND PIPING SPECIALTIES & APPURTENANCES
    C. PIPING & DUCTWORK LAYOUTS
    D. "AS-BUILT" DRAWINGS.

CONTINUITY OF EXISTING SYSTEMS AND SERVICES

1. ALL WORK SHALL BE PERFORMED AT SUCH TIME AND IN SUCH MANNER AS WILL LEAST INTERFERE WITH MAINTENANCE AND OPERATION OF OWNER'S ACTIVITIES. PROVISIONS SHALL BE MADE TO PERMIT OWNER'S USE OF ALL THE BUILDING AND OF EXISTING SYSTEMS AT ALL TIMES. PROVIDE TEMPORARY FACILITIES TO SECURE THESE CONDITIONS. REMOVE TEMPORARY FACILITIES WHEN PERMANENT WORK HAS BEEN PLACED INTO SERVICE.

2. FULLY COORDINATE WITH ARCHITECT, OWNER AND ALL OTHER TRADES, ALL WORK INVOLVING SHUT-DOWN AND INTERRUPTION OF EXISTING SYSTEMS AND SERVICE.

3. SHUT-DOWN OF EXISTING SERVICES WHERE REQUIRED TO INSTALL NEW SYSTEMS OR ALTER EXISTING, SHALL BE PERFORMED DURING HOURS THAT THE BUILDING IS NOT BEING USED BY OWNER. ALL COSTS FOR PERFORMING THIS WORK SHALL BE BORNE BY THE CONTRACTOR AND WITHOUT "EXTRA" COST TO THE OWNER.

4. EXISTING SYSTEMS AND SERVICES THAT ARE TEMPORARILY DISCONNECTED, BUT ARE TO REMAIN IN USE, SHALL BE PERMANENTLY RECONNECTED AND RETURNED TO PROPER OPERATION.

5. FULLY COORDINATE WITH ARCHITECT, OWNER AND OTHER TRADES TO INSURE COMPLETE CONTINUITY OF ALL SYSTEMS AND SERVICES.

DUCTWORK

1. UNLESS OTHERWISE NOTED, ALL DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL G90 GRADE PER SMACNA. ALL DUCTS CONSTRUCTED OF GALVANIZED STEEL SHEET METAL SHALL HAVE MINIMUM GAGE THICKNESS AS FOLLOWS:

| MAXIMUM SIDE (IN.) | GAGE |
|---|---|
| THROUGH 12 | 26 |
| 13 - 30 | 24 |
| 31 - 54 | 22 |
| 55 - 84 | 20 |
| OVER 84 | 16 |

| DIAMETER (IN.) | GAGE |
|---|---|
| THROUGH 12 | 26 |
| 13 - 18 | 24 |
| 19 - 28 | 22 |
| 29 - 36 | 20 |
| 37 - 52 | 18 |

PROVIDE ALL NECESSARY CROSS-BREAKING AND DUCT REINFORCING AS REQUIRED PER SMACNA RECOMMENDATIONS.

2. ALL DUCTWORK SHALL BE DESIGNED, CONSTRUCTED AND INSTALLED PER SMACNA STANDARDS.

3. DUCT SIZES SHOWN ON DRAWINGS ARE CLEAR DIMENSIONS.

4. COORDINATE LOCATION OF DUCTWORK, PIPING, AND DIFFUSERS WITH ALL OTHER TRADES.

5. ALL DUCTWORK AND PIPING ABOVE CEILING AND IN AREAS WITHOUT CEILINGS SHALL BE INSTALLED AS HIGH AS POSSIBLE.

6. PROVIDE VOLUME DAMPERS AT ALL DUCT BRANCHES AND RUNOUTS. PROVIDE OPPOSED BLADE VOLUME DAMPERS AT ALL REGISTERS, GRILLES AND DIFFUSER NECKS IN SUPPLY, RETURN AND EXHAUST DUCTWORK WHETHER SHOWN ON DRAWINGS OR NOT.

7. PROVIDE AT MINIMUM 10 GAUGE STEEL SLEEVES FOR ALL DUCT PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS AND PARTITIONS. PROVIDE PIPE SLEEVES FOR ALL MECHANICAL PIPING PENETRATING THROUGH FIRE RATED WALLS, FLOORS AND PARTITIONS. SEAL ALL ANNULAR SPACE BETWEEN SLEEVES AND DUCTWORK OR PIPING WITH A FIRE BARRIER MATERIAL EQUAL TO 3M "PENETRATION SEALING SYSTEM".

8. THE INSIDE OF ALL DUCTWORK VISIBLE THROUGH A GRILLE OR DIFFUSER SHALL BE PAINTED FLAT BLACK.

9. THE MECHANICAL CONTRACTOR SHALL COORDINATE EXACT LOCATIONS OF MASONRY RETURN AIR OPENINGS AND RECESSED EQUIPMENT WITH THE GENERAL CONTRACTOR.

10. ALL RETURN AIR OPENINGS SHALL BE ABOVE CEILING UNLESS NOTED OTHERWISE. PROVIDE AND INSTALL WIRE MESH SCREENS ON ALL OPENINGS.

11. ALL PIPING AND DUCTS IN FINISHED ROOMS OR SPACES SHALL BE CONCEALED IN FURRED CHASES OR SUSPENDED CEILING.

12. PROVIDE RETURN AIR OPENINGS AS REQUIRED. OPENING SHALL BE SIZED FOR REQUIRED CFM AT A VELOCITY NOT TO EXCEED 400 FEET PER MINUTE. PROVIDE LINTELS AS REQUIRED.

13. SUPPORTS FOR DUCTS SHALL BE INSTALLED AT INTERVALS OF NOT MORE THAN 10 FEET.

14. FLEXIBLE DUCTWORK CONCEALED ABOVE CEILING SHALL BE EQUAL TO THERMAFLEX PRO SERIES G-KM INSULATED FLEXIBLE DUCT (R-VALUE=4.2) WITH POLYETHYLENE VAPOR BARRIER JACKETING. FLEXIBLE DUCT EXPOSED TO VIEW SHALL BE EQUAL TO THERMAFLEX PRO SERIES M-KE INSULATED FLEXIBLE DUCTWORK WITH REINFORECED METALLIZED VAPOR BARRIER JACKETING. FLEX DUCT SHALL BE U.L. LISTED AND LABELED AS A CLASS 1 AIR DUCT, STANDARD 181. FLEX DUCT SHALL BE CONNECTED TO BRANCHES AND MAINS USING CONICAL FITTINGS AND SHALL NOT EXCEED 10'-0" IN LENGTH INCLUDING ONE ELBOW. FLEXIBLE DUCTWORK SHALL NOT BE USE AS RETURN AIR OR EXHAUST DUCTWORK.

15. PROVIDE TYPE "B", DYNAMIC FIRE DAMPERS IN DUCTS WHERE DUCT PENETRATES FIRE-RATED WALLS, FLOORS CEILINGS, ETC. WHERE SHOWN ON DRAWINGS AND AS REQUIRED BY THE INTERNATIONAL MECHANICAL CODE 2006. FIRE DAMPERS SHALL COMPLY WITH REQUIREMENTS OF UL 555. DAMPERS SHALL HAVE A MINIMUM RATING OF 1-1/2 HOURS FOR PENETRATIONS OF LESS THAN 3-HOUR FIRE-RESISTANCE-RATED ASSEMBLIES AND A MINIMUM RATING OF 3 HOURS FOR PENETRATIONS OF 3-HOUR OR GREATER FIRE-RESISTANCE-RATED ASSEMBLIES. PROVIDE ACCESS DOORS FOR ALL DAMPERS OR OTHER APPROVED MEANS OF ACCESS.

16. DUCT SMOKE DETECTORS AND ASSOCIATED AUDIO/VISUAL DEVICES SHALL BE FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL ALL DUCT SMOKE DETECTORS AND INSTALL ALL REQUIRED CONTROL WIRING TO AUTOMATICALLY SHUT DOWN FANS AS OUTLINED IN SPECIFICATION.

PIPING INSULATION

1. PRIOR TO INSULATING, PIPING SHALL BE HYDROSTATICALLY TESTED AT 150 PSIG WITH NO LOSS OF PRESSURE FOR THREE HOURS.

2. INSULATION SHALL CARRY THROUGH ALL WALL AND FLOOR PENETRATIONS AND PIPE HANGERS.

3. PROVIDE GALVANIZED METAL SHIELDS FORMED TO FIT THE INSULATION BETWEEN HANGERS AND FINISHED INSULATIONS.

4. EXCEPT AS OTHERWISE NOTED, INSULATE THE FOLLOWING WITH JOHNS-MANVILLE "MICRO-LOK" AP INSULATION (PROVIDE ZESTON PVC FITTING COVERS) THICKNESS AS SPECIFIED:

    A. CHILLED WATER PIPING: ARMAFLEX FLEXIBLE TYPE, CLOSED-CELL, ELASTOMERIC PIPE INSULATION 1/2" THICK UP TO 2" PIPE AND 3/4" THICK FOR PIPE 2-1/2" AND LARGER.
    B. CONDENSATE DRAINAGE: 1/2" THICK ARMAFLEX FLEXIBLE TYPE, CLOSED-CELL, ELASTOMERIC PIPE INSULATION.

5. INSULATION SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

6. INSULATION MUST BE FIRE RATED FOR FLAME SPREAD OF 25 OR LESS AND SMOKE DEVELOPED OF 50 OR LESS.

HYDRONIC PIPING

1. PIPING SHALL BE RIGIDLY SUPPORTED AT INTERVALS OF NOT MORE THAN 10 FEET.

2. PIPE PASSING THROUGH EXTERIOR WALLS SHALL BE SLEEVED AND PROPERLY SEALED AIR AND WATER TIGHT.

3. CONTRACTOR TO PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS IN ALL PIPING SYSTEMS.

4. INSULATION SHALL CARRY THROUGH ALL WALL PENETRATIONS AND PIPE HANGERS.

5. ALL PIPING CONDUCTING LIQUIDS SHALL BE INSTALLED ON THE "WARM" SIDE OF BUILDING INSULATION. PROVIDE FOR COMPLETE DRAINAGE AT ACCESSIBLE LOW POINTS WITH HOSE END DRAIN VALVES.

6. PROVIDE DIELECTRIC UNIONS IN PIPING WHERE DISSIMILAR METALS ARE JOINED TOGETHER.

7. THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND DUE TO THE SMALL SCALE OF THE DRAWINGS IT IS NOT POSSIBLE TO INDICATE ALL FITTINGS, VALVES, VENT PIPING AND SPECIALTIES REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING COMPLETE OPERATING SYSTEMS AND SHALL FURNISH ALL NECESSARY FITTINGS AND SPECIALTIES WHETHER INDICATED OR NOT.

8. THE SIZE OF ALL PIPING SHALL BE AS SHOWN ON THE DRAWINGS, OR WHERE NOT SHOWN, AS REQUIRED.

9. CHANGE OF PIPE SIZES ON HORIZONTAL RUNS SHALL BE MADE WITH ECCENTRIC REDUCERS WITH TOP OF PIPE LEVEL.

10. PROVIDE A MINIMUM THREE (3) ELBOW SWING FOR ALL PIPE TAKE-OFFS.

11. PROVIDE COMBINATION BALANCING & SHUTOFF VALVES AT SYSTEM LOOP RETURNS AND AT RETURN RISERS. PROVIDE SHUT-OFF VALVES AT SYSTEM LOOP SUPPLIES AND SUPPLY RISERS.

12. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO DETERMINE AND PROVIDE EXPANSION COMPENSATION FOR ALL MECHANICAL PIPING SYSTEMS AS NECESSARY TO PREVENT STRESSING ON ALL MECHANICAL PIPING. PROVIDE EXPANSION JOINTS ONLY WHERE EXPANSION LOOPS ARE DIMENSIONALLY IMPRACTICAL. PROVIDE AT MINIMUM TWO (2) PIPE GUIDES ON EACH END OF EXPANSION LOOPS OR JOINTS. PROVIDE ACCESS TO ALL EXPANSION JOINTS.

13. PRESSURE DROP THROUGH ALL COIL CONTROL VALVES SHALL NOT EXCEED 5 PSIG.

14. PROVIDE VALVE WITH HOSE END ON ALL LOW POINTS OF PIPING SYSTEM.

15. PRIOR TO INSULATING, PIPING SHALL BE HYDROSTATICALLY TESTED AT 150 PSIG WITH NO LOSS OF PRESSURE FOR 3 HOURS.

16. PROVIDE GALVANIZED METAL SHIELDS FORMED TO FIT THE INSULATION BETWEEN HANGERS AND FINISHED INSULATION.

17. VALVE AND ACCESSORIES:

    A. GATE (COPPER TUBING): NIBCO SCOTT S-111.
    B. BALL (COPPER TUBING): NIBCO SCOTT T-590-Y.
    C. GLOBE AND ANGLE: NIBCO SCOTT - 211.
    D. COMBINATION SHUT-OFF AND BALANCING: ARMSTRONG "CIRCUIT BALANCING" CRV-1. FURNISH A PORTABLE DIFFERENTIAL PRESSURE METER WITH HOSES TO BE USED DURING BALANCING OF SYSTEMS.

18. ALL COPPER PIPING SHALL BE JOINED USING 95-5 TIN/ANTIMONY SOLDER.

19. ALL VALVES SHALL BE OF THE APPROVED TYPE, AND COMPATIBLE WITH THE TYPE OF PIPING MATERIAL INSTALLED IN THE SYSTEM.

20. FLEXIBLE CONNECTORS, EXPANSION AND VIBRATION CONTROL DEVICES AND FITTINGS SHALL BE OF AN APPROVED TYPE.

21. SCREWED FITTINGS SHALL BE 125 POUNDS, BLACK MALLEABLE IRON, STANDARD WEIGHT. STOCKHAM, GRINNEL, OR CRANE IN ACCORDANCE WITH ASTM-197.

22. ALL SUPPLY AND RETURN RUNOUTS SHALL BE A MINIMUM OF 3/4", UNLESS NOTED OTHERWISE.

23. HEATING WATER PIPING: TYPE "L" HARD DRAWN COPPER UP TO 2-1/2" DIAMETER AND SCHEDULE 40 BLACK STEEL FOR 3" DIAMETER AND LARGER.

24. ALL DOWNFEED BRANCHES, CONVECTORS, UNIT HEATERS AND HEAT TRANSFER COILS SHALL HAVE DRAIN COCKS INSTALLED AT LOWEST POINT.

25. ALL UPFEED RISERS SHALL BE MADE WITH TOP CONNECTIONS AT MAINS. ALL DOWNFEED RISERS SHALL BE MADE WITH BOTTOM CONNECTIONS AT MAIN.

26. ALL HORIZONTAL LINES SHALL BE RUN LEVEL WITHOUT POCKETS. WHERE VERTICAL DROP IN DIRECTION OF FLOW.

27. INSTALL IDENTIFICATION ARROWS ON SUPPLY AND RETURN LINES INDICATING DIRECTION OF FLOW.

28. WATER PIPE CONNECTIONS TO AIR HEATING AND COOLING COILS SHALL BE MADE SO THERE WILL BE COUNTER FLOW BETWEEN WATER AND AIR SIDES.

29. ALL CONDENSATE DRAIN LINES SHALL BE PIPED TO FULL SIZE OF THE UNITS DRAIN OUTLET AND PROVIDED WITH A "P" TRAP SIZED AT MINIMUM TO EXCEED FAN STATIC PRESSURE. CONNECT CONDENSATE DRAINS TO PLUMBING LINES AS INDICATED ON DRAWINGS.

30. CONDENSATE DRAINAGE: DWV COPPER TUBING, PITCHED DOWN A MINIMUM OF 1/8" PER FOOT AWAY FROM UNIT.

31. INSTALL THE FOLLOWING PIPE HANGERS AND SUPPORTS:

    A. ADJUSTABLE STEEL CLEVIS HANGERS FOR INDIVIDUAL HORIZONTAL RUNS LESS THAN 20 FEET IN LENGTH.

    B. ADJUSTABLE ROLLER HANGERS AND SPRING HANGERS FOR INDIVIDUAL HORIZONTAL RUNS 20 FEET OR LONGER.

    C. PIPE ROLLER: MSS SP-58, TYPE 44 FOR MULTIPLE HORIZONTAL RUNS 20 FEET OR LONGER SUPPORT ON A TRAPEZE.

    D. SPRING HANGERS TO SUPPORT VERTICAL RUNS.

    E. STEEL PIPING, GROOVED OR WELDED, SHALL BE SUPPORTED AT A MAXIMUM HORIZONTAL SPACING OF 12 FEET AND A MAXIMUM VERTICAL SPACING OF 15 FEET.

    F. COPPER PIPING, 1-1/4" AND SMALLER, SHALL BE SUPPORTED AT A MAXIMUM HORIZONTAL SPACING OF 6 FEET AND A MAXIMUM VERTICAL SPACING OF 10 FEET.

    G. COPPER PIPING, 1-1/2" AND LARGER, SHALL BE SUPPORTED AT A MAXIMUM HORIZONTAL SPACING OF 10 FEET AND A MAXIMUM VERTICAL SPACING OF 10 FEET.

ALTERATIONS TO EXISTING SYSTEMS AND DEMOLITION

1. IT IS THE INTENT THAT ALL EXISTING PIPING, DUCTWORK, FIXTURES AND OTHER EQUIPMENT AND MATERIALS THAT INTERFERE WITH THE ALTERED EXISTING BUILDING ARRANGEMENTS AND NEW SYSTEMS BE REMOVED, RELOCATED, REROUTED OR ABANDONED. THE DRAWINGS GENERALLY INDICATE MAJOR ITEMS OF EXISTING MATERIALS AND EQUIPMENT THAT ARE TO BE REMOVED, RELOCATED, REROUTED OR ABANDONED BY EACH TRADE. IT IS NOT POSSIBLE TO INDICATE ALL RELATED ACCESSORIES, SPECIALTIES AND OTHER MINOR ITEMS. HOWEVER, THEIR REMOVAL, RELOCATIONS, REROUTING OR ABANDONMENT SHALL ALSO BE INCLUDED IN THIS CONTRACT AND SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.

2. EXISTING CONCEALED AND EXPOSED EQUIPMENT AND MATERIALS THAT WILL BECOME ABANDONED DUE TO NEW WORK SHALL BE REMOVED BACK TO ACTIVE RISER AND MAIN AND PROPERLY PLUGGED OR CAPPED BEHIND FINISHED SURFACES.

3. ALL EXISTING PIPING TO BE DEMOLISHED MAY NOT BE SHOWN. CONTRACTOR SHALL DURING PRE-BID SITE VISIT DETERMINE EXTENT OF DEMOLITION AND INCLUDE COST OF THIS WORK IN BID. SHOULD A CONTRACTOR REQUIRE REMOVAL, RELOCATION OR REROUTING OF ANOTHER TRADE'S WORK THAT IS NOT INDICATED ON DRAWINGS, THE CONTRACTOR REQUIRING SUCH WORK SHALL BE RESPONSIBLE FOR THAT WORK, AND PAY ALL REQUIRED COSTS. ALL UNKNOWN BELOW SLAB PIPING ENCOUNTERED DURING INSTALLATION OF NEW WORK SHALL BE REMOVED AND CAPPED OFF AT ACTIVE MAIN OR BRANCH. ALLOWANCE SHALL BE MADE FOR THESE ITEMS IN BID PRICE.

4. EXISTING EQUIPMENT AND MATERIALS THAT ARE TO REMAIN, BUT BECOME EXPOSED DUE TO NEW WORK, SHALL BE RELOCATED AND RECONNECTED AS DIRECTED BY ARCHITECT.

5. ALL WORK INVOLVING ALTERATIONS TO EXISTING SYSTEMS, EQUIPMENT AND MATERIALS SHALL BE REVIEWED WITH ARCHITECT AND OWNER BEFORE BEGINNING WORK.

6. REMOVED EQUIPMENT AND MATERIALS NOT DESIRED BY OWNER SHALL BECOME PROPERTY OF CONTRACTOR AND SHALL BE PROMPTLY REMOVED FROM SITE. EQUIPMENT AND MATERIALS DESIRED BY OWNER SHALL BE DELIVERED BY CONTRACTOR TO AN ON-SITE STORAGE LOCATION DESIGNATED BY OWNER.

7. THE CONTRACTOR MUST SURVEY AND VERIFY LOCATIONS AND PHYSICAL SIZES OF ALL EXISTING ITEMS AND DETERMINE WHETHER RELOCATION OR REROUTING WILL BE REQUIRED. IF RELOCATION OR REROUTING IS REQUIRED, INCLUDING THAT OF ALL RELATED ACCESSORIES, SPECIALTIES AND OTHER MINOR ITEMS, THE CONTRACTOR SHALL INCLUDE ALL NECESSARY WORK AS PART OF HIS CONTRACT AND IT SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.

8. CONTRACTOR SHALL PATCH AND REPAIR ALL ROOF, FLOOR AND WALL OPENINGS RESULTING FROM THE DEMOLITION OF EXISTING MECHANICAL EQUIPMENT, DUCTWORK, PIPING, DEVICES, ETC. COORDINATE THIS WORK WITH OWNER'S REPRESENTITIVES PRIOR TO DEMOLITION.

## ABBREVIATIONS

| | |
|---|---|
| ABV | ABOVE |
| BI | BLACK IRON |
| CD | CEILING DIFFUSER |
| CFM | CUBIC FEET PER MINUTE |
| CLG | CEILING |
| DEMO | DEMOLISH AND REMOVE |
| (D) | DEMOLISH AND REMOVE |
| DN | DOWN |
| EA | EXHAUST AIR |
| EG | EXHAUST GRILLE |
| EXIST. | EXISTING |
| (E) | EXISTING TO REMAIN |
| LD | LINEAR DIFFUSER |
| MIN. | MINIMUM |
| (N) | NEW |
| NK | NECK |
| OBD | OPPOSED BLADE DAMPER |
| OED | OPEN ENDED DUCT |
| RA | RETURN AIR |
| (R) | EXISTING SHOWN RELOCATED |
| (RE) | RELOCATE EXISTING |
| RG | RETURN GRILLE |
| SA | SUPPLY AIR |
| SG | SUPPLY GRILLE |
| S.P. | STATIC PRESSURE |
| TD | TRANSFER DUCT |
| T'STAT | THERMOSTAT OR TEMPERATURE SENSOR |
| TYP | TYPICAL |
| VAV | VARIABLE AIR VOLUME |
| VFD | VARIABLE FREQUENCY DRIVE |
| WMS | WIRE MESH SCREEN |

NOTE:
ALL SYMBOLS OR ABBREVIATIONS ARE NOT NECESSARILY USED ON THE CONTRACT DRAWINGS.

## MECHANICAL SYMBOLS

| | |
|---|---|
| 1 | REVISION NUMBER |
| T | THERMOSTAT |
| | CEILING DIFFUSER |
| | RETURN REGISTER OR EXHAUST GRILLE |
| | CONNECTION POINT |
| | DISCONNECT POINT |
| D | DUCT SMOKE DETECTOR |

## DUCTWORK SYMBOLS

| SINGLE LINE | | DOUBLE LINE |
|---|---|---|
| 24X12 | DUCT SIZE (WIDTH X DEPTH) | 24X24 |
| 24"ø | ROUND DUCT SIZE (DIAMETER) | 24"ø |
| 24"ø | FLEXIBLE DUCT (DIAMETER SIZE) | 24"ø |
| | SUPPLY DUCT CROSS SECTION UP | |
| | SUPPLY DUCT DN | |
| | RETURN OR EXHAUST CROSS SECTION UP | |
| | RETURN OR EXHAUST DUCT DN | |
| | SQUARE ELBOW WITH TURNING VANES | |
| | RADIUS TURN ELBOW | |
| | CEILING DIFFUSER W/FLEXIBLE DUCT & VOLUME DAMPER ON TAKE-OFF | |
| WMS | TRANSFER DUCT ABV CLG WITH WIRE MESH SCREEN ON END | WMS |
| | DUCT END CAP | |
| | VOLUME DAMPER | |
| | 1" UNDERCUT DOOR | |
| | SUPPLY OR OUTDOOR AIR FLOW DIRECTION | |
| | RETURN OR EXHAUST AIRFLOW DIRECTION | |
| BDD | BACKDRAFT DAMPER | |
| FD | FIRE DAMPER | |
| M | MOTOR OPERATED DAMPER | |

NOTE:
THE SYMBOLS FOR WORK TO BE DEMOLISHED AND REMOVED ARE THE SAME AS THOSE ABOVE EXCEPT THEY ARE DRAWN WITH A DASHED LINETYPE.

## MECHANICAL PIPING LEGEND

| | |
|---|---|
| LPS | LOW PRESSURE STEAM |
| CR | CONDENSATE RETURN |
| CWS | CONDESER WATER SUPPLY |
| CWR | CONDENSER WATER RETURN |
| CHWS | CHILLED WATER SUPPLY |
| CHWR | CHILLED WATER RETURN |
| G | GAS LINE |
| | SHUT-OFF VALVE |
| | COMBINATION SHUT-OFF/BALANCING VALVE |
| | 3-WAY AUTOMATIC CONTROL VALVE |
| | LOCKSHIELD GATE VALVE |
| | OS & Y VALVE |
| | BUTTERFLY VALVE |
| | BALL VALVE |
| | REDUCER |
| | FLOW DETECTOR |
| | PLUG VALVE |
| | PRESSURE GAUGE |
| | TEMPERATURE GAUGE |
| | PRESSURE RELIEF VALVE |

NOTE:
PIPING TO BE DEMOLISHED ARE SHOWN IN A DASHED LINETYPE.


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# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE NTS
PROJECT NO. BC17294

DWG. NAME

MECHANICAL SPECIFICATIONS, LEGEND, SYMBOLS & ABBREVIATIONS

DATE 06/13/17
DRAWN BY WFH
CHECKED BY AHC

M-000

## AUTOMATIC TEMPERATURE CONTROLS (ATC)

1. SCOPE OF WORK

   A. AUTOMATIC CONTROLS FOR NEW BLOWER COILS, FAN COILS AND FANS SHALL BE AN EXTENSION OF THE EXISTING BUILDING MANAGEMENT SYSTEM. FURNISH AND INSTALL ALL CONTROLLERS, SENSORS, VALVE AND DAMPER MOTORS, WIRING, ETC. AS REQUIRED FOR A COMPLETE INSTALLTION.

   B. THE SYSTEM SHALL BE COMPLETE IN ALL RESPECTS INCLUDING ALL LABOR, MATERIALS, EQUIPMENT AND SERVICE AS REQUIRED. THE SYSTEM SHALL BE DESIGNED AND INSTALLED BY AN APPROVED CONTRACTOR HAVING AT LEAST TEN (10) YEARS EXPERIENCE IN THE DESIGN AND INSTALLATION OF HVAC AUTOMATIC CONTROLS AND RELATED WORK WHO SHALL ALSO PROVIDE START-UP, OPERATING INSTRUCTION AND NECESSARY MAINTENANCE AND REPAIRS TO THE SYSTEM THROUGH THE GUARANTEE PERIOD.

   C. THE ATC SYSTEM SHALL CONSIST OF ALL THERMOSTATS, TEMPERATURE SENSORS, TRANSMITTERS, CONTROLLERS, AUTOMATIC DAMPERS AND DAMPER OPERATORS AND CONTROL EQUIPMENT NECESSARY TO FULFILL THE INTENT OF THIS SPECIFICATION AND PROVIDE FOR A COMPLETE AND OPERABLE SYSTEM.

   D. COORDINATE THE INSTALLATION OF THE ATC SYSTEM WITH ALL OTHER TRADES AS REQUIRED.

   E. THE CONTROL SYSTEM SHALL ALLOW THE OCCUPANTS OF THE SPACE TO MANUALLY ADJUST THEIR SETPOINTS AND PROGRAMS AS DESIRED. SETPOINTS AND SPACE CONDITIONS SHALL BE MONITORED AT THE BUILDING MANAGEMENT CONTROL STATION AND SHALL ALSO BE ADJUSTABLE FROM THE BMS CONTROL STATION.

2. ELECTRICAL

   A. ALL ELECTRICAL WORK REQUIRED FOR THE OPERATION OF THE CONTROL SYSTEMS SHALL BE PROVIDED UNDER THIS SECTION OF THE SPECIFICATION BY THE CONTROL SYSTEMS CONTRACTOR, EXCEPT AS SPECIFICALLY NOTED, AND SHALL BE IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL AUTHORITIES HAVING JURISDICTION.

   B. ALL ELECTRICAL CONTROL AND SWITCHES SHALL BE SUITABLE FOR 120 VOLTS, 60 HERTZ. UPON COMPLETION OF THE WORK, AN ELECTRICAL CERTIFICATE FROM THE LOCAL JURISDICTION INSPECTION AGENCY SHALL BE PROVIDED.

   C. ALL ELECTRICAL WIRING SHALL BE INSTALLED IN THIN-WALL EMT

   D. THE FOLLOWING WORK WILL BE PROVIDED BY THE ELECTRICAL CONTRACTOR:

      1. POWER WIRING TO ALL MOTORS
      2. WIRING TO THE PRIMARY AUTOMATIC TEMPERATURE
      3. FIRE ALARM WIRING FROM SMOKE DETECTORS (IF REQUIRED)
      4. FAN SHUT-DOWN WIRING FROM THE FIRE ALARM SYSTEM (IF REQUIRED)

3. SERVICE AND GUARANTEE

   A. THE ATC CONTRACTOR SHALL GUARANTEE THE CONTROL SYSTEM IS FREE FROM DEFECTS IN WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE (1) YEAR FROM DATE OF FINAL ACCEPTANCE. ANY ITEMS PROVEN TO BE DEFECTIVE WITHIN THE GUARANTEE PERIOD SHALL BE REPAIRED OR REPLACED FREE OF CHARGE.

   B. AFTER COMPLETION OF THE INSTALLATION, ALL EQUIPMENT PROVIDED UNDER THIS SPECIFICATION SHALL BE ADJUSTED AND CALIBRATED FOR PROPER OPERATION.

   C. THE ATC CONTRACTOR SHALL, UPON COMPLETION OF THE INSTALLATION AND PRIOR TO FINAL ACCEPTANCE, MAKE AVAILABLE TO THE OWNER AN ANNUAL SERVICE AGREEMENT

4. SEQUENCE OF OPERATION

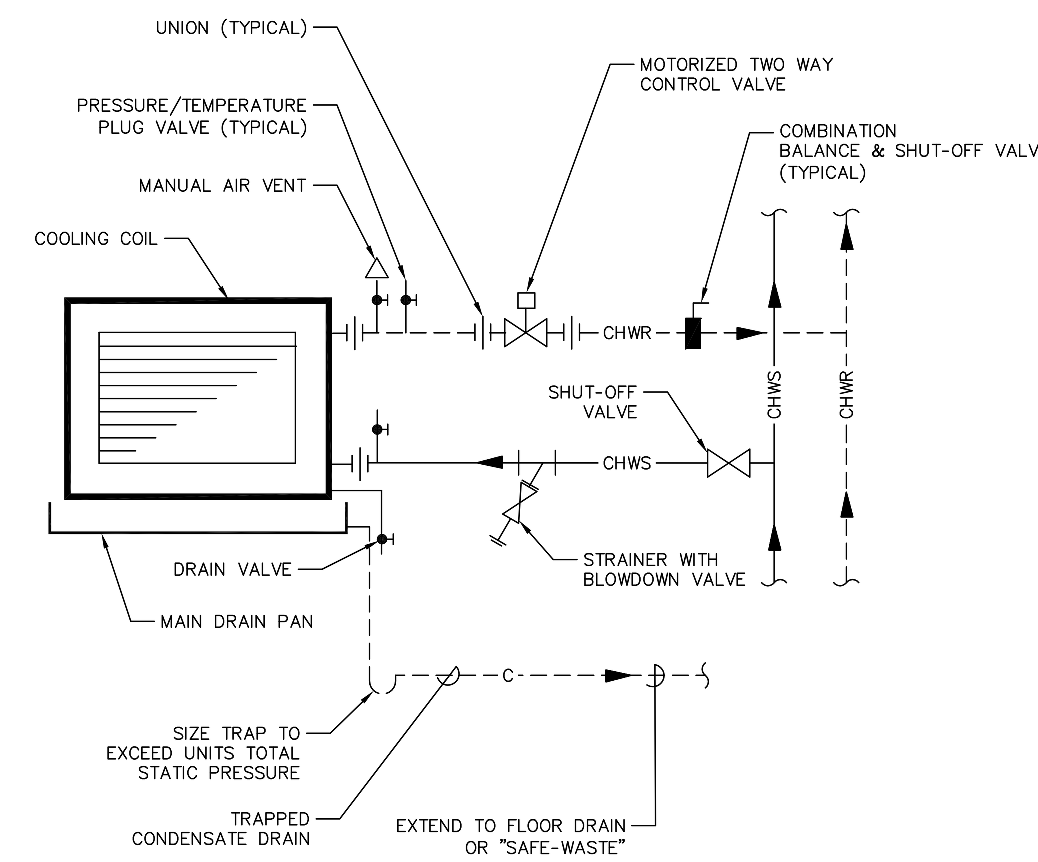
<u>FAN COIL UNITS:</u>

   A. FOR ALL NEW BLOWER COIL AND FAN COIL UNITS, PROVIDE A REMOTE WALL MOUNTED TEMPERATURE SENSOR AND A DUCT MOUNTED DISCHARGE AIR TEMPERATURE SENSOR. ALL UNIT SETPOINTS SHALL BE INPUT AND MONITORED BY THE FACILITY'S EXISTING BUILDING MANAGEMENT SYSTEM (BMS).

   B. UNIT'S FAN SHALL RUN CONTINUOUSLY DURING ALL OCCUPIED PERIODS OF THE DAY (AS DETERMINED BY BMS) WHEN UNIT IS ENERGIZED, THE OUTDOOR AIR DAMPER SHALL OPEN TO ITS PRESET MAXIMUM POSITION.

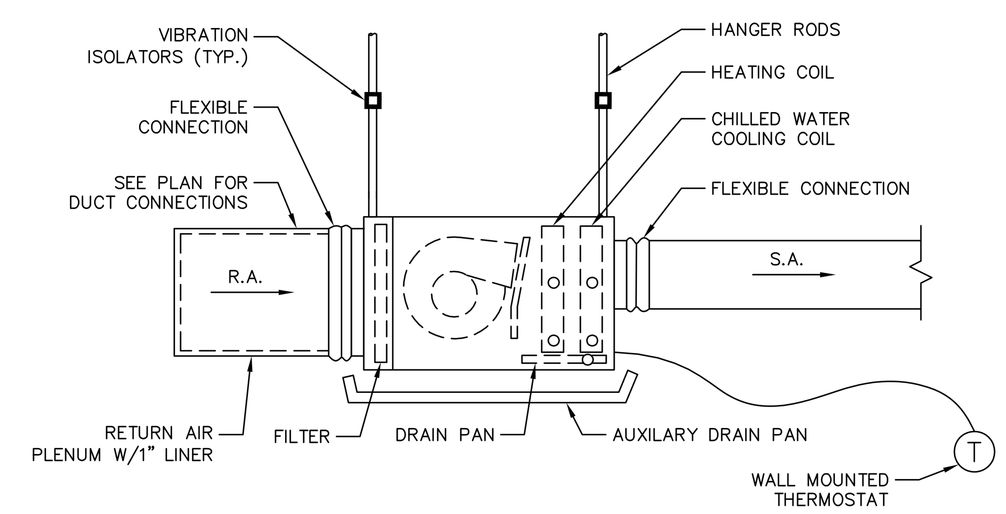
   C. <u>HEATING COIL CONTROL:</u>
      UPON A CALL FOR HEATING FROM THE WALL MOUNTED SPACE TEMPERATURE SENSOR, THE HOT WATER COIL'S 2-WAY CONTROL VALVE SHALL MODULATE OPEN ALLOWING FLOW TO COIL. WHEN SPACE TEMPERATURE HAS BEEN SATISFIED THE REVERSE SHALL OCCUR.

   D. <u>COOLING COIL CONTROL:</u>
      UPON A CALL FOR COOLING FROM THE WALL MOUNTED SPACE TEMPERATURE SENSOR, THE CHILLED WATER COIL'S 2-WAY CONTROL VALVE SHALL MODULATE OPEN ALLOWING FLOW TO COIL. WHEN SPACE TEMPERATURE HAS BEEN SATISFIED THE REVERSE SHALL OCCUR.




TYPICAL CHILLED WATER COIL PIPING DETAIL

NTS




HORIZONTAL FAN COIL UNIT DETAIL

N.T.S.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Boardwalk Hall
Arena Lighting Replacement
2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

| SCALE | PROJECT NO. |
|---|---|
| NTS | BC17294 |

DWG. NAME

MECHANICAL DETAILS & AUTOMATIC TEMPERATURE CONTROL

DATE 06/13/17
DRAWN BY WFH
CHECKED BY AHC

M-100

## SCHEDULE OF AIR DEVICES

| | |
|---|---|
| CD-1 | CEILING DIFFUSER EQUAL TO KRUEGER MODEL SSH, ALUMINUM, FIXED DISCHARGE WITH ADJUSTABLE 1, 2, 3 OR 4-WAY THROW. BORDER TYPE SHALL BE LAY-IN OR SURFACE MOUNT AS REQUIRED. ACTIVE DIFFUSER FACE AREA SHALL BE MAXIMUM AVAILABLE. PROVIDE MANUFACTURER'S OPPOSED BLADE LEVER OPERATED DAMPER AND ROUND NECK ADAPTOR PER SIZES SHOWN ON PLAN. FINISH SHALL BE BAKED ACRYLIC PAINT, COLOR AS SELECTED BY ARCH. DIFFUSER FACE SIZE SHALL BE 24X24 UNLESS OTHERWISE NOTED. NECK SIZE TO BE DETERMINED BY MANUFACTURER FOR AN NC LEVEL LESS THAN 30. |
| RG-1 | CEILING RETURN GRILLE EQUAL TO KRUEGER MODEL 56490 FOR SQUARE NECK AND 56690 FOR ROUND NECK, STEEL CONSTRUCTION WITH ALUMINUM FACE SCREEN, PERFORATED FACE. PROVIDE LAY-IN OR SURFACE MOUNT BORDER AS REQUIRED. FINISH SHALL BE BAKED ON ENAMEL PAINT, COLOR AS SELECTED BY ARCH. SEE DRAWING FOR GRILLE FACE SIZE. PROVIDE 18X18 NECK IF PLENUM RETURN, OTHERWISE NECK SIZE AS SHOWN ON DRAWINGS. |

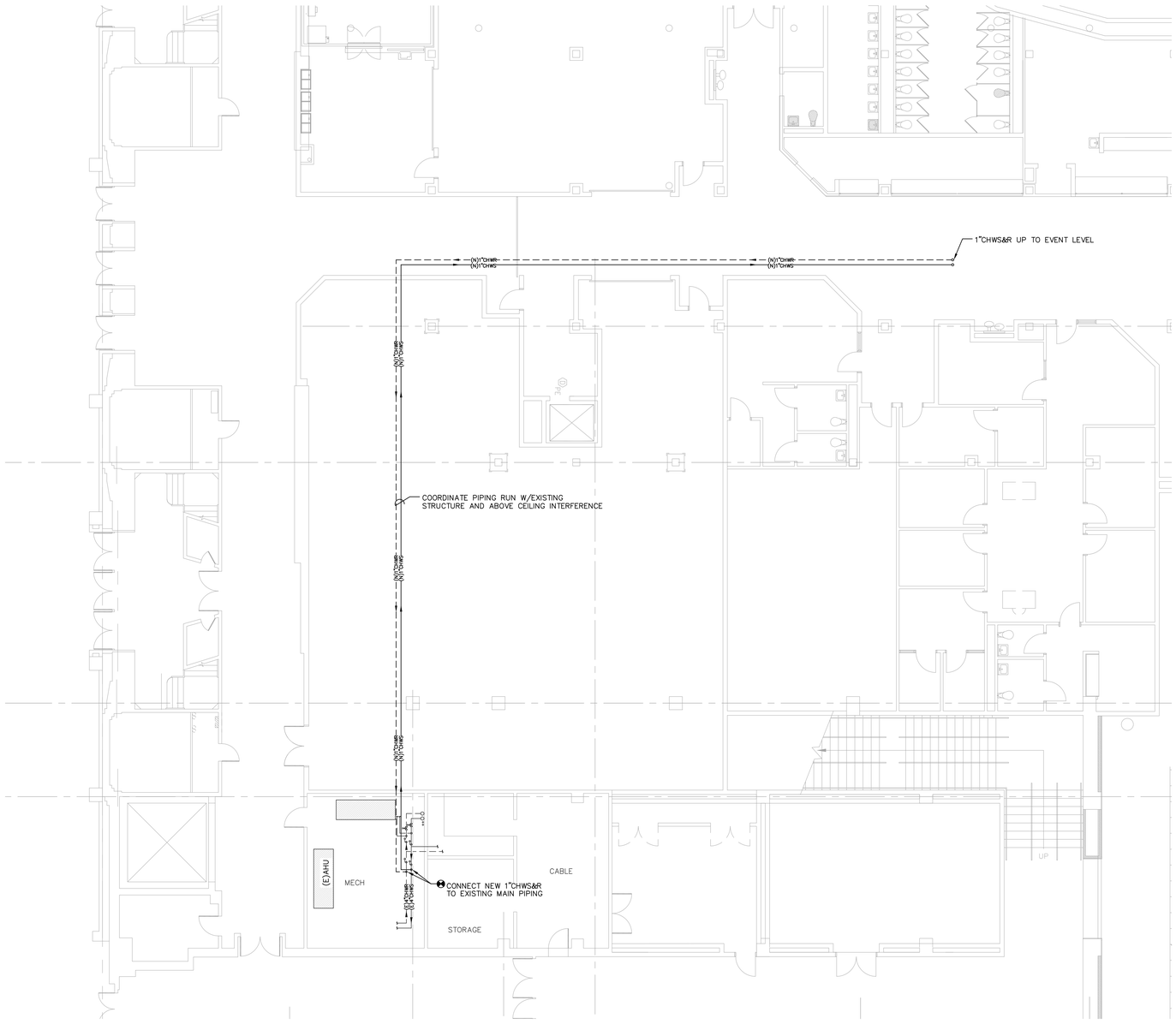
## FAN COIL UNIT SCHEDULE

FCU #

| UNIT SIZE. | TAG NO. | MFR. | MODEL NO. | TYPE | OUTSIDE AIR (CFM) | FAN DATA | | | CHILLED WATER COIL | | | | | | | | | ELECTRICAL | | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CFM | E.S.P. (IN $H_2O$) | HP | TOTAL CAPACITY (MBH) | SENSIBLE CAPACITY (MBH) | ROWS | GPM | E.A.T. (°F) DB | E.A.T. (°F) WB | L.A.T. (°F) DB | L.A.T. (°F) WB | E.W.T. (°F) | L.W.T. (°F) | VOLTAGE (V/φ/Hz) | FULL LOAD AMPS | |
| 10 | FCU-1 | ENVIRO-TEC | HPP 10 | ABOVE CEILING, HORIZONTAL | 0 | 300 | 0.05 | (1) 1/4 | 19.1 | 14.1 | 3 | 3.8 | 78 | 65 | 55.0 | 53.4 | 45 | 55 | 115/60/1 | 4.9 | ALL |

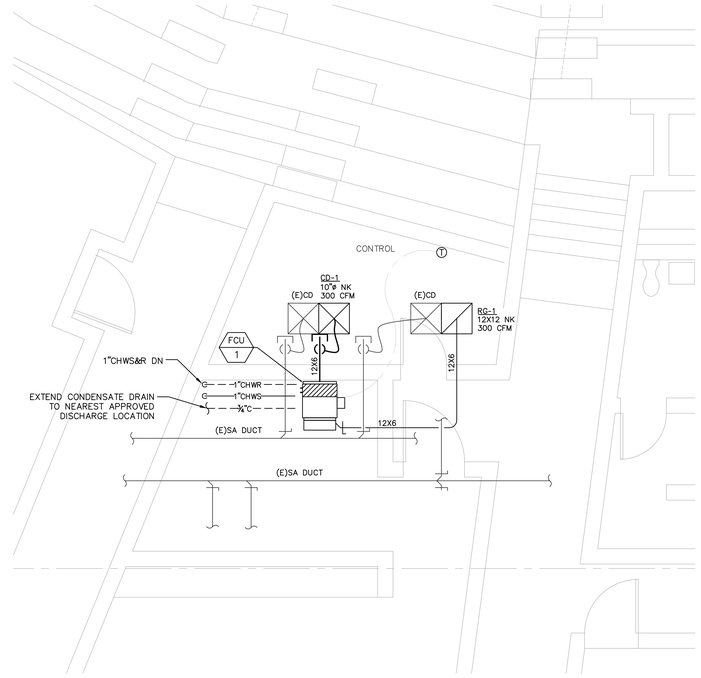
NOTES:

1. PROVIDE ELECTRICAL DISCONNECT SWITCH.
2. PROVIDE VIBRATION ISOLATION HANGERS ON HORIZONTAL UNITS.
3. PROVIDE UNIT CONTROLLER WITH A WALL MOUNTED TEMPERATURE SENSOR COMPATIBLE WITH EXISTING FACILITY'S BMS.
4. PROVIDE EMERGENCY OVERFLOW DRAIN PAN UNDER UNITS.
5. PROVIDE DRAIN PAN OVERFLOW SWITCH/CONTROLS TO AUTOMATICALLY SHUT DOWN UNIT ON HIGH DRAIN PAN LEVEL.
6. PROVIDE HIGH EFF FILTER RACK W/2" FILTERS. PROVIDE SPARE SET OF FILTERS.
7. PROVIDE PIPING PACKAGE WITH ISOLATION BALL VALVE W/MEMORY STOP, 2-WAY MODULATING CONTROL VALVE, Y STARINER & AUTOMATIC CATRIDGE FLOW CONTROL W/TWO PRESSURE/TEMPERATURE PORTS .
8. PROVIDE AUTOMATIC AIR VENTS.



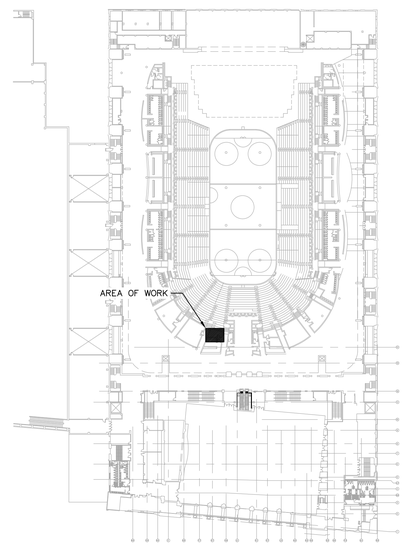

PARTIAL BOARDWALK LEVEL MECHANICAL PLAN

1/8" = 1'-0"




PARTIAL EVENT LEVEL MECHANICAL PLAN

1/8" = 1'-0"




EVENT LEVEL KEY PLAN

NOT TO SCALE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# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE: AS SHOWN

PROJECT NO. 8C17294

DWG. NAME: MECHANICAL PLANS & SCHEDULES

DATE: 06/13/17

DRAWN BY: WFH

CHECKED BY: AHC

M-200

# ELECTRICAL SHEET SPECIFICATIONS

GENERAL NOTES

A. CONTRACT PERFORMANCE

1. EXECUTE THE WORK IN THE BEST AND MOST THOROUGH MANNER & TO THE SATISFACTION OF THE CONSULTING ENGINEERS, WHO WILL JOINTLY INTERPRET THE MEANING OF THE DRAWINGS AND SPECIFICATIONS AND SHALL HAVE THE POWER TO REJECT ANY WORK AND MATERIALS WHICH, IN THEIR JUDGMENT, ARE NOT IN FULL ACCORDANCE THEREWITH.

2. EXCEPT FOR CHANGES AS MAYBE SPECIFICALLY APPROVED BY THE CONSULTING ENGINEERS, IN ACCORDANCE WITH ALTERNATES OF OPTIONS STATED HEREINAFTER, ALL WORK MUST BE IN FULL ACCORDANCE WITH THE INTENT OF THE PLANS AND SPECIFICATIONS, COMPLETE IN EVERY WAY AND READY FOR SATISFACTORY AND EFFICIENT OPERATION WHEN DELIVERED TO THE OWNER.

3. WHERE DISAGREEMENTS OCCUR BETWEEN THE PLANS AND THE SPECIFICATIONS, OR WITHIN EITHER DOCUMENT ITSELF, THE ITEM OR ARRANGEMENT OF BETTER QUALITY, GREATER QUANTITY OR HIGHER COST SHALL BE INCLUDED IN THE BASE BID.

4. THE DRAWINGS SHOW VARIOUS CONDUIT AND PIPING SYSTEMS SCHEMATICALLY. CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY JUNCTION BOXES, PULL BOXES, SUPPORT AND ACCESSORIES TO MEET APPLICABLE CODES, BUILDING STANDARDS AND FULFILL CONTRACT DOCUMENTS. NO ADDED COMPENSATION WILL BE PERMITTED FOR VARIATIONS DUE TO FIELD CONDITIONS.

5. THE CONTRACTOR COVENANTS AND AGREES THAT HE AND HIS SUBCONTRACTORS AND HIS AND THEIR AGENTS, SERVANTS AND EMPLOYEES WILL PROVIDE AND MAINTAIN A SAFE PLACE TO WORK AND THAT HE AND THEY WILL COMPLY WITH ALL LAWS AND REGULATIONS OF ANY GOVERNMENTAL AUTHORITY HAVING JURISDICTION THEREOF AND THE CONTRACTOR AGREES TO INDEMNITY, DEFEND AND HOLD HARMLESS THE CONSULTING ENGINEER, ARCHITECT AND OWNER FROM AND AGAINST ANY LIABILITY, LOSS, DAMAGE OR EXPENSE, INCLUDING ATTORNEY'S FEES ARISING FROM FAILURE OR ALLEGED FAILURE ON THE PART OF THE CONTRACTOR, HIS SUBCONTRACTORS AND HIS AND THEIR AGENTS, SERVANTS AND EMPLOYEES TO PROVIDE AND MAINTAIN A SAFE PLACE TO WORK OR TO COMPLY WITH ALL LAWS AND REGULATIONS OF ANY GOVERNMENTAL AUTHORITY HAVING JURISDICTION THEREOF.

6. THE CONTRACTOR AND EACH SUBCONTRACTOR COVENANTS AND AGREES TO INDEMNITY, DEFEND AND HOLD HARMLESS THE CONSULTING ENGINEER, ARCHITECT AND OWNER FROM AND AGAINST ANY LIABILITY, LOSS, DAMAGE OR EXPENSE, INCLUDING ATTORNEY'S FREES ARISING FROM A FAILURE OR ALLEGED FAILURE ON THE PART OF THE CONTRACTOR, HIS SUBCONTRACTORS AND HIS AND THEIR AGENTS, SERVANTS AND EMPLOYEES PROPERLY TO DISCHARGE THE OBLIGATIONS ASSUMED BY HIM OR THEM IN THE PERFORMANCE OF THE WORK, INCLUDING ANY ACT OR OMISSION ALLEGEDLY RESULTING IN DEATH OR PERSONAL INJURY OR PROPERTY DAMAGE OR IMPROPER CONSTRUCTION, CONSTRUCTION TECHNIQUES OR THE USE OF IMPROPER OR INAPPROPRIATE MATERIAL OR TOOLS.

7. THE CONTRACTOR AGREES THAT ANY CONTROVERSY OR DISPUTE TO WHICH THE CONTRACTOR, THE ARCHITECT, AND THE CONSULTING ENGINEERS ARE PARTIES SHALL BE SUBMITTED TO ARBITRATION FOR DECISION IN ACCORDANCE WITH THE RULES OF SUCH ASSOCIATION FOR CONSTRUCTION INDUSTRY DISPUTES. ALL SUBCONTRACTORS LIKEWISE AGREE TO SUBMIT TO SUCH ARBITRATION ANY DISPUTE BETWEEN OR AMONG THEM, THE CONTRACTOR, THE ARCHITECT AND THE CONSULTING ENGINEERS, AND THE CONTRACTOR AGREES TO MAKE AVAILABLE TO THE CONSULTING ENGINEERS ON DEMAND SIGNED COPIES OF THE CONTRACT BETWEEN THE OWNER AND THE CONTRACTOR AND BETWEEN THE CONTRACTOR AND HIS SUBCONTRACTORS. THE CONTRACTOR AND EACH SUBCONTRACTOR AGREE THAT BY SUBMITTING A BID WHICH IS ACCEPTED, THIS PARAGRAPH SHALL BE DEEMED A WRITTEN AGREEMENT TO SUBMIT ANY CONTROVERSY THEREAFTER ARISING ARBITRATION.

8. ALL WORK SHALL BE DONE IN CONFORMANCE WITH ALL GOVERNING CODES, INCLUDING AMENDMENTS, BULLETINS, ETC., AS WELL AS STANDARDS OF INSTALLATION AND EQUIPMENT ESTABLISHED FOR THE BUILDINGS, AND REQUIREMENTS OF THE OWNER.

9. OBTAIN ALL NECESSARY PERMITS AND APPROVAL FROM GOVERNING AUTHORITIES AND FILE ALL NECESSARY FORMS. PAY ALL INSPECTION FEES.

10. COORDINATE SCHEDULING OF ALL WORK TO BE PERFORMED WITH OWNER AND/OR HIS AGENT AND INCLUDE ALL NECESSARY PREMIUM TIME REQUIRED FOR SHUTDOWNS, WORK IN OCCUPIED AREAS, ETC.

11. ALL AREAS ASSOCIATED WITH WORK TO BE PERFORMED SHALL BE EXAMINED PRIOR TO BID SUBMISSION. NO ADDITIONAL COMPENSATION SHALL BE MADE FOR CONDITIONS FOUND DURING INSTALLATION.

12. BEFORE COMMENCING WORK, EXAMINE ALL ADJOINING WORK ON WHICH THIS WORK IS IN ANY WAY DEPENDENT FOR PERFECT WORKMANSHIP ACCORDING TO THE INTENT OF THIS SPECIFICATION, AND REPORT TO THE CONSTRUCTION MANAGER ANY CONDITION WHICH PREVENTS PERFORMANCE OF FIRST-CLASS WORK, NO "WAIVER OF RESPONSIBILITY" FOR INCOMPLETE, INADEQUATE OR DEFECTIVE ADJOINING WORK WILL BE CONSIDERED UNLESS NOTICE HAS BEEN FILED BEFORE SUBMITTAL OF A PROPOSAL.

13. COORDINATE ALL WORK WITH OTHER TRADES TO ENSURE INSTALLATION IS MADE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

14. FURNISH ADEQUATE LIABILITY INSURANCE AND BONDING AS REQUIRED BY OWNER.

15. INCLUDE ALL LABOR, MATERIALS, AND APPURTENANCES REQUIRED FOR THE FURNISHING, INSTALLING AND TESTING OF ALL WORK, COMPLETE AND MAKE READY FOR OPERATION IN A MANNER SATISFACTORY TO THE ARCHITECT AND CONSULTING ENGINEER, ALL WORK SHOWN ON DRAWINGS AND SPECIFIED HEREIN.

16. ALL WORK SHALL BE GUARANTEED FOR TWO (1) FULL YEAR FROM THE DATE WHEN THE OWNER HAS ISSUED A "CERTIFICATE OF SUBSTANTIAL COMPLETION".

B. INSTALLATION PROCEDURE

1. THIS CONTRACTOR'S WORK SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING: FURNISHING AND INSTALLATION OF ALL ELECTRICAL WORK, INCLUDING ELECTRICAL AND COMMUNICATIONS OUTLETS IN WALLS AND FLOOR, LIGHTING FIXTURES WITH LAMPS, SWITCHES, DIMMERS, EMERGENCY BATTERY UNITS, ETC., AND ASSOCIATED BRANCH CIRCUIT WIRING, DISCONNECT SWITCH SPECIAL RECEPTACLES, ETC. ALL SPECIAL EQUIPMENT, SUCH AS FANS, AIR CONDITION UNITS, COPIERS, ETC, WILL BE FURNISHED BY OTHERS (U.O.N). WHERE EQUIPMENT REQUIRES PERMANENT CONNECTIONS SHALL BE PROVIDED WITH APPROPRIATE DISCONNECTING MEANS.

2. ELECTRICAL CONTRACTOR SHALL COORDINATE ALL WORK SHOWN N DRAWINGS WITH OTHER TRADES TO ASSURE THAT ALL SYSTEMS ARE COMPLETE AND OPERATIONAL. THIS CONTRACTOR SHALL COORDINATE ALL EQUIPMENT LOCATIONS AND CONDUIT RUNS SUPPLIED AND/OR INSTALLED UNDER THIS SECTION TO AVOID CONFLICTS OR OBSTRUCTIONS TO OTHER TRADES. THIS CONTRACTOR SHALL PROVIDE ALL NECESSARY PULL BOXES, VERTICAL SUPPORT BOXES, AND CONDUIT OFFSETS REQUIRED TO ACCOMPLISH THE ABOVE NOTED COORDINATION AT NO ADDITIONAL COST TO THE OWNER, WHETHER OR NOT INDICATED ON PLANS. ALL VERTICAL SUPPORT BOXES, PULL BOXES, ETC, SHALL BE INSTALLED WHERE REQUIRED TO FACILITATE PULLS AND AT CODE REQUIRED INTERVALS, AT A MINIMUM

3. CONDUIT RUNS INDICATED ON PLAN ARE FOR REFERENCE ONLY. EXACT LOCATIONS AND ELEVATION SHALL BE DETERMINED AFTER COORDINATION WITH OTHER TRADES. THIS CONTRACTOR SHALL SUPPLY, AS PART OF THEIR SHOP DRAWING SUBMISSION, THE EXACT LOCATION OF ALL CEILING MOUNTED EQUIPMENT AND CONDUIT RUNS INCLUDING PROPOSED LOCATIONS AND MEANS OF SUPPORT AS WELL AS THE EXPECTED LOAD CONCENTRATION AT THE POINTS OF ATTACHMENT. THE ABOVE NOTED INFORMATION SHALL BE REVIEWED B THE STRUCTURAL ENGINEER BEFORE ANY WORK IS TO COMMENCE.

4. FURNISH AND INSTALL ALL NECESSARY CABLE SUPPORT BOXES, PULL BOXES AND CONDUIT SUPPORTS, WHERE NOTED AND AS REQUIRED BY APPLICABLE CODES. ALL LOW TENSION (COMMUNICATIONS, SECURITY, A/V, ETC,) CONDUIT, FIRE ALARM CONDUIT, ETC., WHICH HAVE RUNS IN EXCESS OF 100 FEET IN LENGTH AND/OR CONTAINING BENDS IN EXCESS OF 180 DEGREES SHALL BE PROVIDED WITH A PULLBOX. ALL PULLBOXES SHALL BE LABELED FOR THEIR INTENDED USE. DECALS SHALL BE PROVIDED TO INDICATE VOLTAGE LEVEL. FOR ALARM SYSTEM BOXES SHALL BE PAINTED RED, AND ALL WIRE AND CABLE PROVIDED UNDER THIS SECTION SHALL BE TAGGED (WITH FEEDER OR BRANCH CIRCUIT DESIGNATION) AT ALL BOXES. WHERE CONDUIT BENDS ARE REQUIRED IN COMMUNICATIONS RACEWAYS. PULL BOXES FOR COMMUNICATION RACEWAYS WILL BE PROVIDED IN STRAIGHT PULLS ONLY. LABEL EACH RACEWAY (PER TECHNOLOGY DEPT. REQUIREMENTS) EVERY 50 FEET HORIZONTALLY AND ON EACH FLOOR VERTICALLY. SUBMIT LABELING SYSTEM FOR REVIEW.

5. UNLESS SPECIFICALLY APPROVED. NO WIRES SHALL BE PULLED IN UNTIL THE CONDUIT SYSTEM IS COMPLETED. NO GREASE OR OIL SHALL BE USED TO FACILITATE THE PULLING OF WIRES; ONLY APPROVED PULLING COMPOUND SHALL BE USED, ALL WIRES SHALL BE CONTINUOUS BETWEEN OUTLET AND OUTLET, OR FROM PANELBOARD TO THE FIRST OUTLET. JOINTS THAT BECOME NECESSARY IN CIRCUIT WORK AT THE OUTLETS SHALL BE MADE WITH APPROVED PRESSURE CONNECTORS. ALL JOINTS SHALL BE COVERED WITH AN INSULATION EQUAL TO THAT ON THE CONDUCTORS. APPROVED PRESSURE CONNECTORS, IDEAL WINGNUTS, SCOTCH-LOCK, BUCHANAN, OR AS APPROVED, SHALL BE USED,

6. EXACT LOCATIONS AND MOUNTING HEIGHTS OF ALL LIGHTING FIXTURES, SWITCHES, WALL OUTLETS, ETC., SHALL BE IN ACCORDANCE WITH ARCHITECTURAL DRAWINGS.

7. NO ELECTRICAL CONNECTIONS SHALL BE MADE TO, OR WORK PERFORMED ON, ENERGIZED EQUIPMENT.

8. FINAL CONNECTIONS TO EQUIPMENT SHALL BE MADE ACCORDING TO VENDOR APPROVED SHOP DRAWINGS.

9. VERIFY ELECTRICAL REQUIREMENTS OF ALL NEW EQUIPMENT TO BE USED. ALL SPECIAL PURPOSE OUTLETS INDICATED ON PLAN SHALL BE VERIFIED WITH EQUIPMENT MANUFACTURER PRIOR TO INSTALLATION, TO ENSURE PROPER WIRING AND COMPATIBILITY WITH ATTACHMENT PLUGS OR JUNCTION BOXES THAT MAY BE FURNISHED AS AN INTEGRAL PART OF THE EQUIPMENT.

10. COORDINATE ALL LOCATIONS AND HEIGHTS OF STUB-UPS AND OUTLETS IN FIELD WITH VENDORS AND/OR FURNITURE MANUFACTURERS'S APPROVED SHOP DRAWINGS. ALL RECEPTACLES ARE TO BE ACCESSIBLE.

11. ALL ELECTRICAL SHALL BE ACCESSIBLE BELOW COUNTERS OR BEHIND EQUIPMENT. CONTRACTOR SHALL COORDINATE EXACT LOCATION OF EQUIPMENT RECEPTACLES WITH EQUIPMENT MANUFACTURER'S REQUIREMENTS AND THE LOCAL INSPECTOR.

12. ELECTRICAL CONTRACTOR SHALL PROVIDE DISCONNECTS FOR ALL EQUIPMENT PER CODE AND SHALL COORDINATE ALL DISCONNECT SWITCH REQUIREMENTS AND LOCATION WITH THE ELECTRICAL INSPECTOR, VENDORS APPROVED SHOP DRAWING AND FINAL EQUIPMENT LOCATIONS.

13. ELECTRICAL CONTRACTOR SHALL VERIFY PHASE LOAD BALANCING ON POWER PANELS UPON COMPLETION OF THE ELECTRICAL INSTALLATION. INCLUDE RE-DISTRIBUTION OF CIRCUITS WITHIN PANELS TO BALANCE WITHIN A 10% WINDOW (+/-5%).

14. ALL CONDUIT AND CABLE "HOMERUNS" SHALL CONSIST OF A SINGLE CIRCUIT PER CONDUIT FOR FEEDERS SERVED BY AN OVERCURRENT PROTECTIVE (OCP) DEVICE IN EXCESS OF 20 AMPERES, SINGLE POLE. WHERE WIRE AND CONDUIT BRANCH CIRCUITS SHARE A CONDUIT HOMERUN, OCP LESS THAN OR EQUAL TO 20 AMPERES SINGLE POLE). THERE SHALL BE A MAXIMUM OF THREE CIRCUITS COMBINED IN A RACEWAY TO THE PANELBOARD, UNLESS OTHERWISE NOTED. ALL CONDUCTORS SHALL BE DERATED PER NATIONAL ELECTRICAL CODE (LATEST VERSION). COMBINING OF MULTIPLE HOMERUNS (MORE THAN THREE) IN A SING CONDUIT SHALL NOT BE PERMITTED.

15. ALL CONDUIT SHOWN FOR INDOOR WORK SHALL BE EMT (¾" MINIMUM) WITH SET-SCREW TYPE COUPLINGS UNLESS OTHERWISE NOTED.

16. PROVIDED IMC CONDUIT WITH THREADED COUPLINGS WHERE REQUIRED BY CODE.

17. TYPE MC CABLE MAY BE UTILIZED FOR BRANCH LIGHTING AND RECEPTACLE CIRCUITRY, WHERE PERMITTED BY CODE AND PROVIDED THAT:

a. IT IS NOT LOCATED WITHIN VIEW, ALL EXPOSED RACEWAYS MUST BE IN CONDUIT.

b. CONTAINS AN INSULATED GROUND WIRE.

c. CONDUIT IS RUN TO THE FIRST DEVICE DOWN-LINE OF THE PANEL (I,E. RECEPTACLE, LIGHT FIXTURE, ETC.).

SPLICE BOXES MOUNTED ADJACENT TO THE ELECTRICAL CLOSET SHALL NOT BE PERMITTED TO CONVERT FROM A CONDUIT HOMERUN TO TYPE MC CABLE.

18. INCLUDE ALL LABOR, MATERIALS, AND APPLICATIONS REQUIRED FOR THE FURNISHING, INSTALLING AND TESTING OF ALL WORK SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN, IN A MANNER SATISFACTORY TO THE ARCHITECT.

19. WHERE CONDUITS, CABLE TRAY OR OTHER ELECTRICAL EQUIPMENT PENETRATE FIRE OR SMOKE RATED WALLS, PARTITIONS, FLOOR SLABS, ETC., THE SPACE BETWEEN THE SLEEVE OR CUTOUT AND THE ELECTRICAL EQUIPMENT SHALL BE CAULKED WITH A UL LISTED, INTUMESCENT TYPE, APPROVED FIRESTOP SYSTEM. SPACE BETWEEN THE SLEEVE OR CUTOUT AND THE ELECTRICAL EQUIPMENT SHALL BE SIZED IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS FOR CONDUIT SIZE AND DAMMING MATERIAL THICKNESS FOR THE TYPE OF RATED CONSTRUCTION FOR WHICH THE SYSTEM IS TO BE USED. THE FIRESTOP SYSTEM SHALL BE AS MANUFACTURED BY 3M FIR PROTECTION PRODUCTS OR AS APPROVED. SEE ARCHITECTURAL DRAWINGS FOR FIRE RATING OF WALLS AND FLOORS.

20. WHERE WORK IS ONGOING IN ELECTRICAL PANELS THE COVERS ARE NOT TO BE LEFT OFF UNLESS WORK IS CURRENTLY BEING PERFORMED ON THE PANEL. COVERS SHALL BE REPLACED EACH NIGHT AT THE END OF SHIFT.

21. TEMPORARY POWER FROM EXISTING PANELS FOR LIGHTS, DRILLS, WELDING EQUIPMENT, ETC,. SHALL BE LABELED ON THE PANEL AND PRE-APPROVED BY BUILDING OWNER/MANAGER 48 HOURS PRIOR TO INSTALLATION.

C. ARCHITECT'S AND/OR ENGINEER'S REVIEW

1. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO THE START OF ANY WORK. ANY WORK OR EQUIPMENT INSTALLED PRIOR TO REVIEW OF SHOP DRAWINGS AND FOUND TO BE UNACCEPTABLE SHALL BE REMOVED AND MODIFIED AT THE CONTRACTOR'S SOLE EXPENSE INCLUDING ANY RESULTANT SCHEDULING DELAYS EXPERIENCED BY ANY TRADE.

2. THE ARCHITECT AND/OR ENGINEER WILL REVIEW SHOP DRAWINGS AND SAMPLES FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND THE INFORMATION CONTAINED IN THE CONTRACT DOCUMENTS. THE ARCHITECT'S AND/OR ENGINEER'S REVIEW OF SHOP DRAWINGS AND SAMPLES IS ONLY FOR THE CONVENIENCE OF THE OWNER IN FOLLOWING THE WORK AND DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR DEVIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. THE ARCHITECT'S AND/OR ENGINEER'S REVIEW SHALL NOT BE CONSTRUED AS A COMPLETE OR DETAILED CHECK OF THE WORK SUBMITTED, NOR SHALL IT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS OF ANY SORT IN THE SHOP DRAWINGS AND SAMPLES, OR FROM THE NECESSITY OF FURNISHING ANY WORK REQUIRED BY THE CONTRACT DOCUMENTS WHICH MAY HAVE BEEN OMITTED FROM SHOP DRAWING SUBMITTALS.

3. THE REVIEW OF A SEPARATE ITEM SHALL NOT INDICATE REVIEW OF THE COMPLETE ASSEMBLY IN WHICH IT FUNCTIONS. NOTHING IN THE ARCHITECT'S ANS/OR ENGINEER'S REVIEW OF SHOP DRAWINGS AND SAMPLES SHALL BE CONSIDERED AS AUTHORIZING:

a. A DEPARTURE FROM CONTRACT DOCUMENTS OR SPECIFICATIONS, OR,

b. ADDITIONAL COST TO THE OWNER, OR,

c. INCREASED TIME FOR COMPLETION OF THE WORK.

4. NO PART OF THE WORK SHALL BE IN THE FABRICATION SHOP OR IN THE FIELD UNTIL THE ARCHITECT AND/OR ENGINEER HAS REVIEWED THE SHOP DRAWINGS AND SAMPLES FOR THAT POTION OF THE WORK. THEREAFTER, THE WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND THE INDICATED STATUS OF THE REVIEWED SHOP DRAWING.

5. SAMPLES SHALL BE SUBMITTED FOR REVIEW WHEN REQUESTED BY THE ARCHITECT AND/OR ENGINEER.

6. TWO WEEKS AFTER AWARD OF CONTRACT SUBMIT A SHOP DRAWING LOG FOR REVIEW WITH SUBMITTAL DATES AND SUBMITTAL TYPE.

7. PROVIDE OPERATIONS AND MAINTENANCE MANUALS FOR ALL EQUIPMENT AND MATERIALS.

D. RECORD DRAWINGS

1. PREPARE AND FURNISH TO OWNER "AS BUILT" PLANS FOR ALL WORK INSTALLED. PROVIDE CAD DRAWINGS AND CAD FILES ON A COMPACT DISC COMPLETED IN THE LATEST VERSION OF AUTOCAD. ALL DRAWINGS SHALL BE IN A STYLE COMMENSURATE WITH THE ENGINEERING DESIGN. THE ENGINEERING DESIGN CAD DRAWINGS OR BACKGROUNDS WILL BE FURNISHED FOR USE TO THIS CONTRACTOR FOR THE PURPOSE OF THIS SUBMISSION (SUBMIT A CAD INDEMNIFICATION AGREEMENT).

2. UPON CONSTRUCTION, KEEP AN ACCURATE RECORD OF ALL DEVIATIONS BETWEEN THE WORK AS SHOWN ON DRAWINGS AND THAT WHICH IS ACTUALLY INSTALLED. THIS RECORD SET OF PRINTS SHALL BE KEPT AT THE JOB SITE FOR INSPECTION.

3. UPON COMPLETION OF INSTALLATION, SUBMIT ONE SET OF BLACK AND WHITE PRINTS OF THESE "AS-BUILT" RECORD DRAWINGS TO THE CONSULTING ENGINEER FOR REVIEW. AFTER REVIEW BY THE CONSULTING ENGINEER, MAKE NECESSARY CHANGES TO THESE PRINTS AND THEN DELIVER THEM TO THE OWNER FOR RECORD. FINAL PAYMENT WILL BE WITHHELD UNTIL COMPLETION OF "AS-BUILT" DRAWINGS.

4. AS-BUILT DRAWINGS SHALL CONTAIN EXACT ROUTING AND ELEVATIONS OF ALL CONDUIT BANKS, ACTUAL PANELBOARD CIRCUIT BREAKER POLE POSITIONS USED FOR EACH CIRCUIT, AND EXACT LOCATION OF ALL EQUIPMENT, ALL DIMENSIONS SHALL BE REFERENCED TO BUILDING STRUCTURE CENTERLINES.

E. EQUIPMENT SPECIFICATIONS

1. ALL EQUIPMENT AND MATERIALS SHALL BE NEW, UL LISTED AND SHALL CONFORM TO ANY ADDITIONAL LABELING, TESTING AND CONSTRUCTION REQUIREMENTS ESTABLISHED BY THE GOVERNING AUTHORITIES. SAME SHALL BE GUARANTEED FOR 1 YEAR SUBSEQUENT TO FINAL ACCEPTANCE.

2. ALL EQUIPMENT (ELECTRICAL AND MECHANICAL) SHALL BE SPECIFIED TO HAVE VOLTAGE RATINGS COMPATIBLE WITH THE PROVISIONS OF ANSI C84.

3. ALL CONDUITS FOR LIGHTING AND POWER SYSTEMS SHALL BE ¾" (MINIMUM).

4. INTERMEDIATE METAL CONDUIT SHALL BE USED WHERE SUBJECTED TO ANY WATER OR MOISTURE CONDITIONS, OR WHERE BURIED IN SLAB.

5. PROVIDE CONDUIT EXPANSION FITTINGS TOGETHER WITH BONDING JUMPER AND SUITABLE SLEEVES WHERE REQUIRED. CONDUIT EXPANSION FITTING SHALL BE INSTALLED IN EACH CONDUIT RUN WHEREVER IT CROSSES AN EXPANSION JOINT IN THE STRUCTURE. THE EXPANSION FITTING SHALL BE INSTALLED ON ONE SIDE OF THE JOINT WITH ITS SLIDING SLEEVE END FLUSH WITH THE AND WITH A LENGTH OF BONDING JUMPER IN THE EXPANSION JOINT EQUAL TO AT LEAST THREE TIMES THE NORMAL WIDTH OF THE JOINT.

6. ALL 15A OR 20A, SINGLE POLE, 120 VOLT OR 208 VOLT BRANCH CIRCUIT RUNS IN EXCESS OF 100 FEET FROM THE PANEL TO THE DEVICE SHALL BE PROVIDED WITH #10 MINIMUM AWG WIRE FOR ITS ENTIRE LENGTH.

7. JUNCTION OR PULL BOXES SHALL BE FURNISHED AND INSTALLED WHERE INDICATED ON PLANS AND WHEREVER ELSE SUCH A BOX MAY BE NECESSARY TO FACILITATE INSTALLATION OR CONFORM TO CODE REQUIREMENTS. COORDINATE LOCATIONS OF SAME WITH ARCHITECT FOR ACCESSIBILITY AND AESTHETIC CONSIDERATIONS. GENERALLY, JUNCTION BOXES AND PULL BOXES SHALL BE INSTALLED EVERY 100 FEET IN CONDUIT HORIZONTAL RUNS AND SHALL NOT BE EXPOSED IN FINISHED SPACES. ALL CABLES WITHIN PULL BOXES SHALL BE PROPERLY TAGGED FOR IDENTIFICATION. LABEL ALL CONDUITS WITH FEEDER DESIGNATION AT ENTRY AND EXIT TO THE BOX.

8. INSULATING BUSHING OR INSULATING THROATS SHALL BE INSTALLED ON ALL FITTINGS.

9. FOR AREAS OF PUBLIC ASSEMBLY (SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS), BRANCH CIRCUITS FOR LIGHTING AND POWER SHALL BE RIGID GALVANIZED STEEL, AND SHALL BE SEPARATED FROM THE NORMAL LIGHTING AND POWER CIRCUITS, ADDITIONALLY, BRANCH CIRCUITS FOR EMERGENCY EGRESS AND EXIT LIGHTING SHALL BE DEDICATED.

F. PANELBOARDS

1. ALL PANELBOARDS SHALL BE OF THE ENCLOSED TYPE, FLUSH OR SURFACE MOUNTED, AS REWIRED, IN CODE GAUGE STEEL CABINETS, WITH STEEL TRIM, CONCEALED HINGES, DOORS AND FLUSH TYPE LOCKS, ALL KEYED ALIKE. PROVIDE DUAL CONCEALED HINGED DOORS (DOOR-IN-DOOR CONSTRUCTION) WITH TWO KEYED LATCHES, AND WITHOUT BOLTS OR SCREWS ON THE NON-HINGED SIDE OF THE DOORS WHERE INDICATED ON DOCUMENTS (SEE ARCHITECTURAL DRAWINGS.)

2. ALL BUSES, INCLUDING NEUTRAL, SHALL BE ELECTRICAL GRADE HARD-DRAWN COPPER AND SIZED IN CONFORMANCE WITH NEMA STANDARDS. BUSES SHALL BE ARRANGED FOR SEQUENCE PHASING AND LOADS SHALL BE BALANCED AS EQUALLY AS POSSIBLE AMONGST THE THREE PHASES.

3. PANELBOARDS SHALL BE EQUIPPED WITH QUICK-MAKE, QUICK-BREAK FUSED SWITCHES OR BOLT-ON MOLDED CASE CIRCUIT BREAKERS, OF VOLTAGE REQUIRED, AND OF SIZE AND NUMBER OF POLES INDICATED ON THE SCHEDULES.

4. A TYPE WRITTEN DIRECTORY OF 5 INCHES X 8 INCHES WITH METAL FRAME AND LEXAN FACE SHALL BE PROVIDED ON THE INSIDE OF THE DOOR OF EACH CABINET, INDICATING THE LOAD SERVED BY EACH CIRCUIT. UTILIZE ARCHITECTURAL DRAWINGS TO INDICATE ROOM NAMES AND NUMBERS OF ALL EQUIPMENTS SERVED. (E.G 1. RECEPT: ROOMS27-202, 203, 205, 207). UPDATE PANEL DIRECTORIES OF ALL EXISTING PANELS.

5. POWER, LIGHTING AND UTILITY PANELS FOR 120/208 VOLTS SHALL BE BOLT-ON CIRCUIT BREAKER TYPE UNLESS OTHERWISE NOTED. SINGLE POLE BRANCHES SHALL BE BOLT-ON TYPE OF AT LEAST 10,000 AMPERES RMS SYMMETRICAL INTERPRETING CAPACITY (OR AS INDICATED ON THE DRAWINGS). MULTIPLE POLE BREAKERS SHALL BE COMMON TRIP, OF THE CAPACITY AND NUMBER OF POLES AS INDICATED IN SCHEDULES. PANELBOARDS SHALL BE EQUIPPED WITH 200% SOLID NEUTRAL BAR AND CONTAIN THE NUMBER OF POLES, OVERCURRENT DEVICES AND BUSED SPACES AS SPECIFIED IN SCHEDULE. PANELBOARDS SHALL INCLUDE A SEPARATE GROUND BUS ISOLATED FROM THE CASING. FUSIBLE TYPE PANELS SHALL CONFORM TO REQUIREMENTS OF ABOVE PARAGRAPH.

6. PROVIDE ISOLATED GROUND BUSES ON STAND-OFF ISOLATORS WHERE INDICATED ON SCHEDULES.

7. PROVIDE NEW CIRCUIT BREAKERS IN PANELS AS REQUIRED TO MEET THE SCHEDULES OR CIRCUIT DESIGN INTENT.

8. GUTTER SPACE SHALL BE INCREASED WHEN CONTAINING FEEDER TAPS.

9. PROVIDE WIRE TROUGHS WHERE ACCESS TO THE FLOOR SYSTEM IS REQUIRED.

10. WHERE SPACE LIMITATIONS REQUIRED REDUCED PANEL WIDTH, PROVIDE VERTICAL (SINGLE ROW) BREAKER TYPE PANELS AS PART OF THE INITIAL SCOPE PRICE.

11. ALL PANEL BUS BARS SHALL CONSIST OF A MINIMUM 1/8 INCH DEPTH COOPER BUS.

12. PROVIDE SHUNT TRIP MAIN CIRCUIT BREAKERS FOR ALL PANELS TO BE CONTROLLED BY BREAKGLASS STATIONS, ANSUL SYSTEMS(IN KITCHENS OR SERVERIES) ETC.

13. PROVIDE GFI TYPE BRANCH CIRCUIT BREAKERS FOR ALL CIRCUITS SERVING KITCHENS, HEAT TRACING CIRCUITS, H-WATT CIRCUITS, FREEZE PROTECTION CIRCUITS, WINDOW WASHING CIRCUITS, OUTDOOR CIRCUITS, ETC. AND AS REQUIRED BY CODE.

G. FUSES

1. ALL FUSES SHALL BE OF THE SAME MANUFACTURER, BUSSMAN, OR AS APPROVED, AND SHALL BE INSTALLED, AS REQUIRED. IN ALL CUTOUTS, PANE.S AND SAFETY SWITCHES.

2. UNLESS OTHERWISE NOTED, FUSES SHALL BE BUSSMAN TYPE LPN, LPS OR KRP-C

H. SECONDARY TRANSFORMERS

1. PROVIDE DRY TYPE 100% NON-LINER, NON-SINUSOIDAL TRANSFORMERS OF QUANTITY AND KVA RATING AS SHOWN ON DOCUMENTS, 3ø, 480 VOLT-DELTA-208Y/120 VOLT, 3ø, 4 W, FURNISHED W/TWO 2-1/2% TAPS ABOVE AND FOUR 2-1/2% BELOW NORMAL 480V PRIMARY FOR TRANSFORMERS. THE NEUTRAL OF THE TRANSFORMERS SHALL BE BROUGHT UP TO A LUG AND BOLT INSIDE OF CASE SO THAT THE NEUTRAL CAN BE GROUNDED EXTERNALLY. ALL REQUIREMENTS SHALL BE IN ACCORDANCE WITH UL 1561 AND UL 506.

2. TRANSFORMERS SHALL BE SPECIFICALLY DESIGNED TO SUPPLY RATED CURRENT WHEN LOADED WITH NONLINEAR LOADS AND MEET THE MINIMUM REQUIREMENTS OF EPACT2005 DEPARTMENT OF ENERGY'S STANDARD LEVEL 3 (CSL-3).

3. A COPPER ELECTRONIC SHIELD SHALL BE INSERTED BETWEEN THE PRIMARY AND SECONDARY WINDINGS TO ATTENUATE HIGH FREQUENCY HARMONICS.

4. THE SECONDARY NEUTRAL SHALL BE TWICE THE AMPACITY OF THE SECONDARY PHASE CONDUCTORS, AND THE PRIMARY WINDING CONDUCTOR SHALL BE OF SUFFICIENT SIZE TO LIMIT THE TEMPERATURE RISE TO ITS RATED VALUE, EVEN WITH THE CIRCULATING 3RD HARMONIC CURRENT.

5. THE TRANSFORMER SHALL UTILIZE AN INSULATION SYSTEM THAT HAS BEEN PROPERLY TEMPERATURE CLASSIFIED AND LISTED BY UL. TRANSFORMERS SHALL HAVE A 220 CLASSIFICATION AND A 150 DEGREE CELSIUS WINDING TEMPERATURE RISE AT FULL LOAD.

6. ALL TRANSFORMERS SHALL HAVE VIBRATION ISOLATORS THAT ISOLATE THE CASE FROM THE CORE AND COIL ASSEMBLY. TRANSFORMERS SHALL BE CAPABLE OF FLOOR, WALL OR CEILING (TRAPEZE) MOUNTING, AS INDICATED ON THE DRAWINGS. TRANSFORMERS SHALL BE TRAPEZE MOUNTED U.O.N.

7. VIBRATION ISOLATORS EQUAL TO MASON INDUSTRIES TYPE HD AND TYPE CD FOR TRAPEZE AND FLOOR MOUNTING RESPECTIVELY, SHALL BE INSTALLED BETWEEN CASE AND TRAPEZE OR FLOOR.

8. PROVIDE COPPER GROUND CONDUCTOR, WITH EXOTHERMIC (CADWELD OR AS APPROVED) TO BUILDING STEEL WHERE STEEL IS PROVIDED. SIZE OF GROUND SHALL BE CODE MINIMUM OR AS INDICATED ON THE DRAWINGS. ALL FINAL CONNECTIONS TO TRANSFORMER CASING SHALL BE MADE USING A MINIMUM 24 INCH LENGTH OF FLEXIBLE METAL CONDUIT WITH GROUND BUSHING. ALL CONDUCTORS SHALL BE IN CONDUIT.

9. ALL CONNECTIONS TO THE TRANSFORMER SHALL BE MADE WITH TWO BOLT, LONG BARREL COMPRESSION FITTINGS.

I. GENERAL

1. OUTLET BOXES SHALL BE CODE GAUGE GALVANIZED STAMPED STEEL, 4 INCH SQUARE BY 1-1/2 INCHES DEEP FOR POWER AND 4 INCHES SQUARE BY 2-1/2 INCHES DEEP FOR COMMUNICATION, FIRMLY ANCHORED IN PLACE. BOX VOLUME SHALL BE AS REQUIRED BY GOVERNING CODES WITH BLANK COVERS PROVIDED FOR ALL BOXES USED FOR JUNCTION PURPOSES. GEM BOXES SHALL ONLY BE USED WHERE DIMENSIONAL RESTRAINTS EXIST AND WHERE THE CONTRACTOR HAS OBTAINED PERMISSION FROM THE ENGINEER. MULTI-GANG BOXES SHALL BE PROVIDED WITH EXTENSION COLLARS MOUNTED WITHIN 1/8 INCH OF OUTER SURFACE. WHERE OUTLET BOXES ARE SHOWN FOR FLUSH MOUNTED DEVICES, A SINGLE GANG PLASTER RING SHALL BE PROVIDED, AND MOUNTED WITH 1/8 INCH OF OUTER SURFACE.

2. DISCONNECT SWITCHES SHALL BE QMQB FUSIBLE OR NONFUSIBLE WITH CURRENT AND VOLTAGE RATING AS INDICATED ON PLANS. SWITCHES SHALL BE HORSEPOWER RATED, ENCLOSED TYPE, SUITABLE FOR PADLOCKING IN OPEN POSITION.

3. HORSEPOWER RATED THERMAL SWITCHES (BRYANT OR AS APPROVED) SHALL BE USED FOR ALL MOTOR CIRCUITS. ELECTRICAL CONTRACTOR SHALL INSTALL WHERE APPLICABLE TOGGLE SWITCHES FOR USE AS DISCONNECTED. THESE SWITCHES SHALL BE "T" RATED FOR RESISTANCE LOADS AND "M" RATED FOR MOTOR LOADS.

4. STANDARD DUPLEX CONVENIENCE RECEPTACLES SHALL BE SPECIFICATION GRADE NEMA 5-15R, 5-20R, 2 POLE, 3 WIRE, GROUNDED, 15 OR 20 AMPERE RATED FOR DEVICES SHOWN ON A 15 OR 20 AMPERE CIRCUIT (RESPECTIVELY). PROVIDE DEVICES RATED TO THE EQUIPMENT CIRCUIT BREAKER SIZE UNLESS OTHERWISE NOTED. GROUND FAULT TYPE SHALL BE USED WHERE REQUIRED BY GOVERNING CODES INCLUDING ALL DEVICES SHOWN TO BE WITHIN SIX FEET OF A SINK/WATER.

5. SWITCHES SHALL BE FLUSH, SPECIFICATION GRADE, QUIET TUMBLER TYPE, GROUNDED, BEHIND COMMON PLATE WITH BARRIERED BACK BOX WHERE REQUIRED BY CODE FOR MULTIPLE CIRCUITS GREATER THAN 250 VOLTS. SINGLE POLE SWITCHES SHALL BE 20 AMPERES, 277 VOLT.

6. DEVICE TYPES, MANUFACTURES AND COLORS SHALL BE SPECIFIED BY THE ARCHITECT. IF NO SPECIFICATION HAS BEEN PROVIDED, THIS CONTRACTOR SHALL OBTAIN ALL INFORMATION REGARDING THE ABOVE FROM THE ARCHITECT PRIOR TO THE SUBMISSION OF BID, OR SHALL INCLUDE THE ABILITY TO FURNISH ANY MANUFACTURER SELECTED BY THE ARCHITECT DURING THE SHOP DRAWING SUBMISSION PHASE.

7. DEVICE PLATES SHALL BE AS INDICATED ON THE ARCHITECTURAL DRAWINGS. COORDINATE EXACT COLOR WITH ARCHITECT.

8. ALL CABLES SHALL BE COPPER WITH THWN OR THHN INSULATION FOR HORIZONTAL APPLICATIONS AND XHHW FOR VERTICAL APPLICATIONS (I.E. WHEN PASSING THROUGH A CABLE SUPPORT BOX), EMPLOYED AT THE 75°C CODE RATED AMPACITY. NO SMALLER THAN No.12 AWG SHALL BE USED UNLESS SPECIFICALLY NOTED ON PLANS. COLOR CODING SHALL CONFORM TO CODE REQUIREMENTS. DERATE ALL CABLES PER LATEST VERSION OF THE NATIONAL ELECTRICAL CODE.

9. ALL CONDUCTORS #10 AND SMALLER SHALL BE SOLID COPPER CONDUCTORS. ALL CONDUCTORS #8 AND LARGER SHALL BE STRANDED COPPER.

10. ALL CABLING FURNISHED FOR INSTALLATION EXPOSED (NOT IN AN ENCLOSED RACEWAY) IN AN AIR PLENUM CEILING OR FLOOR SHALL BE APPROVED FOR USE BY GOVERNING AUTHORITIES, AND SHALL CONFORM TO UL 910 WITH A MINIMUM OF 125 DEGREES CELSIUS RATED JACKED.

11. ALL SUPPLIED LUGS FOR EQUIPMENT REQUIRING HARD-WIRED CONNECTIONS, ETC. SHALL BE DOUBLE INDENT, 2 BOLT HOLE, LONG BARREL AND COMPRESSION TYPE. PROVIDE DOUBLE INDENT "HEXAGONAL" COMPRESSION DIES AND TOOL (T & B OR BURNDY OR AS REVIEWED). MECHANICAL LUGS, SINGLE INDENT COMPRESSION TOOLS AND UNIVERSAL DIES SHALL NOT BE PERMITTED. ALL COMPRESSION TOOLS AND DIES SHALL BE MANUFACTURED BY THE LUG VENDOR.

12. ALL SUPPLIED IN-LINE SPLICE CONNECTORS, "T: CONNECTORS, ETC., SHALL BE DOUBLE INDENT (PER CONDUCTOR), LONG BARREL AND COMPRESSION TYPE. PROVIDE DOUBLE INDENT "HEXAGONAL" COMPRESSION DIES AND TOOL (T & B, BURNDY OR AS REVIEWED). MECHANICAL CONNECTORS, SINGLE INDENT COMPRESSION TOOLS AND UNIVERSAL DIES SHALL NOT BE PERMITTED. ALL COMPRESSION TOOLS AND DIES SHALL BE MANUFACTURED BY THE CONNECTOR VENDOR.

13. PROVIDE LOCAL DISCONNECTS FOR ALL MOTORS, HARD-WIRED PANTRY/KITCHEN EQUIPMENT AND HOT WATER HEATERS, WHETHER OR NOT SHOWN ON PLAN. DISCONNECTS SHALL BE SIZED PER THE OVERCURRENT PROTECTION AND LOCATED PER THE ENGINEER AND ARCHITECT.

14. PROVIDE A 120 VOLT DEDICATED CIRCUIT FOR EACH CONDENSATE PUMP FOR ALL AC UNITS. COORDINATE WITH THE ENGINEER, THE PANEL AND BREAKER POSITION, PRIOR TO INSTALLATION.

15. ALL EQUIPMENT MATERIALS SHALL BE NEW, UL LISTED AND SHALL CONFORM TO ANY ADDITIONAL LABELING, TESTING AND CONSTRUCTION REQUIREMENTS ESTABLISHED BY THE GOVERNING AUTHORITIES. SAME SHALL BE GUARANTEED FOR 1 YEAR SUBSEQUENT TO FINAL ACCEPTANCE.

16. ALL EQUIPMENT (ELECTRICAL AND MECHANICAL) SHALL BE SPECIFIED TO HAVE VOLTAGE RATINGS COMPATIBLE WITH THE PROVISIONS OF ANSI C84.

17. ALL WORK SHALL BE IN CONDUIT.

18. DISCONNECTS FOR INCOMING SERVICE SHALL BE SERVICE RATED.

J. KITCHEN NOTES

1. ELECTRICAL CONTRACTOR SHALL COORDINATE ALL STUB-UP LOCATIONS AND HEIGHTS, MOUNTING HEIGHTS AND DIMENSIONS, OUTLET LOCATIONS IN FIELD WITH VENDOR'S APPROVED SHOP DRAWINGS.

2. ELECTRICAL CONTRACTOR SHALL MAKE FINAL CONNECTIONS TO EQUIPMENT PER VENDOR'S APPROVED SHOP DRAWINGS.

3. COVER PLATES FOR ALL OUTLETS, JUNCTION BOXES, ETC. MOUNTED ABOVE COUNTERTOPS SHALL BE GASKETED AND STAINLESS STEEL.

4. APPROVED TYPE HIGH TEMPERATURE WIRE SHALL BE USED FOR CONNECTION TO HOOD LIGHTING, RANGES, HOT PLATES, ETC.

5. ELECTRICAL CONTRACTOR SHALL COORDINATE RECEPTACLE TYPES REQUIRED WITH PLUGS SUPPLIED WITH EQUIPMENT.

6. ALL DISCONNECT SWITCHES ARE TO BE PER SCHEDULES (UNLESS OTHERWISE NOTED) AND SHALL BE NEMA 3R. HORSEPOWER RATED SWITCHES SHALL BE USED FOR ALL MOTOR CIRCUITS, AND SHALL BE NEMA 3R. ELECTRICAL CONTRACTOR SHALL INSTALL WHERE APPLICABLE TOGGLE SWITCHES FOR USE AS DISCONNECTS. THESE SWITCHES SHALL BE "T" RATED FOR RESISTANCE LOADS AND "M" RATED FOR MOTOR.

7. ELECTRICAL CONTRACTOR SHALL VERIFY PHASE, LOAD, BALANCING ON POWER PANELS WITH APPROVED VENDOR'S EQUIPMENT, LOAD REQUIREMENTS, AND BALANCE TO WITH 10%.

8. ALL PANELS WHICH ARE NOT LOCATED WITHIN A CLOSET AND ARE OPEN TO THE KITCHEN/SERVERY AREA SHALL BE PROVIDED WITH BRUSHED STAINLESS STEEL, NEMA 3R COVERS.

9. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ALL DISCONNECT SWITCH REQUIREMENTS WITH ELECTRICAL INSPECTOR, VENDOR APPROVED SHOP DRAWINGS AND FINAL EQUIPMENT LOCATIONS.

10. KITCHEN DISTRIBUTION AND/OR POWER PANELS SHALL BE PROVIDED WITH GROUND AND NEUTRAL BUSSES.

11. PROVIDE SEPARATED GROUND WIRE (PER CODE) FOR EACH PIECE OF KITCHEN EQUIPMENT, UPSIZE CONDUIT AS REQUIRED TO ACCOMMODATE GROUND WIRE.

12. ELECTRICAL CONTRACTOR SHALL VERIFY ELECTRICAL REQUIREMENTS OF ALL NEW EQUIPMENT TO BE USED. ALL SPECIAL PURPOSE OUTLETS INDICATED ON PLAN SHALL BE VERIFIED WITH EQUIPMENT MANUFACTURER TO ENSURE PROPER WIRING AND COMPATIBILITY WITH ATTACHMENT PLUGS OR JUNCTION BOXES THAT MAYBE FURNISHED AS AN INTEGRAL PART OF THE EQUIPMENT.

13. PROVIDE LOCAL DISCONNECTS FOR ALL HARD-WIRED MOTORS, AND PANTRY/KITCHEN EQUIPMENT AND HOT WATER HEATERS, WHETHER OR NOT SHOWN ON PLAN. DISCONNECTS SHALL BE SIZED PER THE OVERCURRENT PROTECTION AND LOCATED PER THE ENGINEER AND ARCHITECT.

14. PROVIDE NEW CIRCUIT BREAKERS IN NEW PANELS AS REQUIRED TO MEET THE SCHEDULES OR CIRCUIT DESIGN INTENT.

15. ELECTRICAL CONTRACTOR TO PROVIDE ALL INTER WIRING FROM REMOTE COMPRESSOR TO TEMPERATURE CONTROLS FOR ALL REMOTE REFRIGERATION SYSTEMS AND ALSO PROVIDE INTER WIRING FROM TIME CLOCK FOR DEFROST CYCLE FOR ALL REMOTE FREEZER UNITS.

16. PROVIDE RELAYS, ENCLOSURES, ANSUL SYSTEM AND SHUT TRIP CIRCUIT BREAKER CONNECTIONS TO COMPLETE HOOD PROTECTION SYSTEMS AS DETAILED. LABEL ALL RELAYS WITH PHENOLIC NAMEPLATES.

17. ALL OUTLETS IN KITCHEN AREA SHALL BE GFI TYPE.

K. UNIT PRICES

1. AT THE SUBMISSION OF BID, PROVIDE A COMPREHENSIVE UNIT PRICE LIST TO FURNISH AND INSTALL CABLES, CONDUITS, PANELS, TRANSFORMERS, DISCONNECTS, CIRCUIT BREAKERS, RECEPTACLES, FIXTURES, SWITCHES. ETC. THE LIST SHALL CONSIST, AS A MINIMUM, OF ALL TYPES AND SIZES OF EQUIPMENT AS INCLUDED IN THE BASE PROJECT. ONLY THOSE BIDS CONTAINING A UNIT PRICE LIST SHALL BE CONSIDERED UNLESS WRITTEN PERMISSION HAS BEEN GRANTED ON BEHALF OF THE OWNER, ARCHITECT, ENGINEER AND/OR CONSTRUCTION MANAGER (OR GENERAL CONTRACTOR).

L. ELECTRONIC MEDIA REQUIREMENT

1. ALL INFORMATION INCLUDING, NOT LIMITED TO, SHOP DRAWING SUBMITTALS, "AS-BUILT" DRAWINGS, TEST RESULTS, AND OPERATION AND MAINTENANCE MANUALS SHALL BE SUBMITTED ON CD-ROM(S) PRIOR TO THE COMPLETION OF THE PROJECT.

a. ALL "AS-BUILT" DRAWINGS SHALL BE IN ELECTRONIC .PDF FORMAT.

b. ALL CUT SHEETS, SUBMITTALS, MANUALS, AND ASSOCIATED INFORMATION SHALL BE IN .PDF FORMAT.

2. EACH CD-ROM SHALL BE INDEXED TO ALLOW READY ACCESS TO ALL INFORMATION.

3. PROVIDE THREE (3) COPIES OF EACH CD-ROM.


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Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|
| SCALE N.T.S. | | PROJECT NO. 8C17294 |

DWG. NAME

ELECTRICAL SHEET SPECIFICATIONS

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

EC-000

# ELECTRICAL GENERAL NOTES

1. ALL ELECTRICAL WORK TO BE INSTALLED IN ACCORDANCE WITH THE 2014 EDITION OF THE NATIONAL ELECTRICAL CODE ADOPTED BY THE UNIFORM CONSTRUCTION CODE - STATE OF NEW JERSEY AND ANY OTHER PARTY HAVING JURISDICTION.
2. ALL ELECTRICAL MATERIALS AND EQUIPMENT FOR THE PROJECT SHALL BE NEW AND APPROVED BY UNDERWRITERS LABORATORY (U.L.) OR ANY OTHER NATIONALLY RECOGNIZED TESTING AGENCY UNLESS NOTED OTHERWISE ON DRAWINGS.
3. ALL NECESSARY PERMITS, INSPECTIONS, AND LICENSES SHALL BE PROCURED AND ALL FEES PAID BY THE CONTRACTOR. SUBMIT TO THE OWNER DUPLICATE CERTIFICATES OF INSPECTION FROM THE APPROVED INSPECTION AGENCY.
4. UPON COMPLETION OF THE WORK, THE ENTIRE WIRING SYSTEM SHALL BE FREE FROM GROUNDS, SHORT CIRCUITS, OPENS, OVERLOADS AND IMPROPER VOLTAGES.
5. PRIOR TO FINAL ACCEPTANCE OF THE WORK, A WRITTEN STATEMENT SHALL BE SUBMITTED TO THE OWNER GUARANTEEING ALL EQUIPMENT AND SYSTEMS AGAINST DEFECTIVE MATERIAL AND WORKMANSHIP FOR ONE (1) YEAR FROM THE DATE OF ACCEPTANCE. UPON NOTICE ALL DEFECTIVE EQUIPMENT, MATERIALS AND SYSTEMS SHALL BE PROMPTLY REPAIRED AT NO EXPENSE TO THE OWNER.
6. THIS SET OF DRAWINGS IS DIAGRAMMATIC IN NATURE AND INDICATES THE GENERAL ARRANGEMENT OF THE VARIOUS SYSTEMS AND APPROXIMATE LOCATIONS OF THE EQUIPMENT. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THAT THERE IS ADEQUATE SPACE AT THE LOCATIONS INDICATED FOR ALL EQUIPMENT PRIOR TO INSTALLATION OF SAME. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ALL DIMENSIONS IN THE FIELD, PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
7. ELECTRICAL CONTRACTOR SHALL SECURE SHOP DRAWINGS FROM OTHER CONTRACTORS AND VERIFY EXACT ELECTRICAL CHARACTERISTICS OF EQUIPMENT TO BE WIRED PRIOR TO ROUGH-IN. IF DISCREPANCIES ARE NOTED BETWEEN THE ELECTRICAL CONTRACT DRAWINGS AND OTHER CONTRACTOR SHOP DRAWINGS, ELECTRICAL CONTRACTOR IS TO NOTIFY ENGINEER AT ONCE. FAILURE TO PERFORM THIS DUTY WILL NOT RELIEVE THE ELECTRICAL CONTRACTOR OF THE RESPONSIBILITY TO CORRECT WIRING DEFICIENCIES AT NO EXPENSE TO THE OWNER.
8. ALL DEVICES OR EQUIPMENT SHOWN IN SYMBOL FORM SHALL BE WIRED TO ITS RESPECTIVE PANEL.
9. FEEDER AND BRANCH CIRCUIT WIRING SHALL BE COPPER, 600 VOLT CONDUCTOR INSULATION TYPE THHN. THE MINIMUM SIZE 600 VOLT CONDUCTOR SHALL BE #12 AWG FOR POWER AND LIGHTING BRANCH CIRCUIT WIRING. THE MINIMUM SIZE CONDUIT SHALL BE 3/4". ALL CIRCUIT WIRING SIZES LARGER THAN #10 AWG SHALL BE STRANDED AND SMALLER CONDUCTORS SHALL BE SOLID. BRANCH CIRCUITS 100 TO 200 FEET IN LENGTH UTILIZING #12 AWG WIRE SHALL BE INCREASED TO #10 AWG TO THE CENTER OF THE CIRCUIT LOAD AND #12 WIRE TO THE REMAINING DEVICES BEYOND THE LOAD CENTER.
10. ALL INTERIOR WIRING SHALL BE INSTALLED IN ELECTRICAL METALLIC TUBING OR METAL CLAD CABLE AND CONCEALED IN WALLS OR IN HUNG CEILING SPACE. WHERE WIRING CANNOT BE CONCEALED IN FINISHED AREAS, IT SHALL BE RUN EXPOSED IN A NEAT MANNER VIA SURFACE RACEWAY. MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS NOTED OTHERWISE.
11. ALL WIRING, CONNECTIONS AND DEVICES SHALL BE PROVIDED TO COMPLY WITH THE GROUNDING REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE AND THE DRAWINGS UNLESS NOTED OTHERWISE. ALL EXPOSED NON-CURRENT CARRYING ELECTRICAL EQUIPMENT METALLIC PARTS, RACEWAY SYSTEMS AND WIRING SYSTEM GROUNDING CONDUCTORS SYSTEM SHALL BE GROUNDED.
12. PROVIDE A SEPARATE, GREEN-COLORED, INSULATED EQUIPMENT GROUNDING CONDUCTOR WITHIN EACH FEEDER AND BRANCH CIRCUIT RACEWAY. THIS CONDUCTOR SHALL BE SEPARATE FROM THE ELECTRICAL SYSTEM NEUTRAL CONDUCTOR. TERMINATE EACH END OF THIS GROUNDING CONDUCTOR ON A U.L. LISTED LUG, BUS OR BUSHING. THE GROUNDING CONDUCTOR SIZE SHALL BE IN ACCORDANCE WITH NEC, TABLE 250.122.
13. THE ELECTRICAL CONTRACTOR SHALL LABEL WITH PERMANENT MARKER ALL JUNCTION BOXES AND RECEPTACLE OUTLET BOXES WITH CIRCUIT NUMBER AND PANEL IDENTIFICATION.
14. ALL CUTTING AND PATCHING REQUIRED FOR THE ELECTRICAL WORK SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
15. PANEL BOARD DIRECTORIES SHALL BE TYPED, AND UPDATED INDICATING NEW CIRCUITING AND DEVICE DESCRIPTION AS SHOWN ON DRAWINGS.
16. ALL HOLES OR VOIDS CREATED TO ROUTE CONDUIT OR METAL CLAD CABLE THROUGH FIRE-RATED FLOORS, CEILINGS, AND WALLS SHALL BE PROTECTED WITH A 3-HOUR RATED, APPROVED FIRESTOP SYSTEM EQUAL TO 3M FIRE BARRIER CAULK, PUTTY, STRIP AND SHEET FORM, CAPABLE OF EXPANDING UP TO 8 TO 10 TIMES WHEN EXPOSED TO A TEMPERATURE OF 250 DEGREES FAHRENHEIT AND ABOVE. FIRESTOP SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH ASME E814 (U.L. 1479) AND 2014 NEC ARTICLE 300.21.
17. A COMPLETE SET OF "AS-BUILT" DRAWINGS, (1) SET IN HARD COPY REPRODUCIBLE AND (1) SET OF ELECTRONIC FILES PRODUCED IN AUTOCAD FORMAT 2004 (MIN.) SHALL BE FURNISHED TO THE OWNER AND ENGINEER UPON PROJECT COMPLETION.
18. ALL EQUIPMENT, DEVICES AND CIRCUITS SHALL BE LABELED ACCORDING TO OWNER REQUIREMENTS.
19. TWO OR THREE POLE CIRCUIT BREAKERS SHALL BE COMMON TRIP TYPE. SINGLE POLE BREAKERS WITH YOKED HANDLE WILL NOT BE PERMITTED.
20. THE ELECTRICAL CONTRACTOR SHALL NOT UTILIZE A "COMMON NEUTRAL" ON MULTIPLE BRANCH CIRCUITS. EACH SUCH CIRCUIT SHALL BE RUN WITH ITS OWN DEDICATED NEUTRAL WIRE.
21. ALL SYSTEM CABLE SHALL BE PLENUM RATED OR RUN IN CONDUIT. SYSTEM CABLE EXPOSED TO PHYSICAL DAMAGE SHALL BE RUN IN CONDUIT. SYSTEM CABLE LOCATED ABOVE ACCESSIBLE CEILINGS SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE. CABLES SHALL NOT BE LAID ON CEILING TILES.
22. ALL WIRING AND EQUIPMENT INSTALLED IN DUCTS, PLENUMS AND OTHER AIR HANDLING SPACES TO CONFORM TO NEC, ARTICLE 300.22.
23. THE ELECTRICAL CONTRACTOR SHALL ASSURE THAT ANY ELECTRICAL DEVICE OR PRODUCT WHICH IS TO BE RELOCATED OR REUSED IS IN PROPER WORKING CONDITION IN ACCORDANCE WITH INSTRUCTIONS INCLUDED IN ITS LISTING OR LABELING. ANY DEVICE OR PRODUCT FOUND TO BE DEFECTIVE OR DAMAGED SHALL BE REPLACED WITH NEW.
24. SITE VISIT PRIOR TO BID SUBMISSION:
    A. PRIOR TO BID SUBMISSION, THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS. BIDS AS SUBMITTED WILL BE INTERPRETED TO INCLUDE ALL COSTS AND CHARGES MADE NECESSARY BY EXISTING CONDITIONS.
    B. ELECTRICAL CONTRACTOR SHALL VERIFY THE SIZE, LOCATION AND ELEVATION OF ALL SERVICES IN THE FIELD AFFECTED BY THIS WORK BEFORE PROCEEDING WITH CONSTRUCTION. NOTIFY THE CONSTRUCTION MANAGER IMMEDIATELY IN THE EVENT OF EXISTING UTILITIES VARY APPRECIABLY FROM THOSE SHOWN ON DRAWINGS.
25. THERMAL OVERLOAD PROTECTION SHALL BE IN COMPLIANCE WITH MOTOR MANUFACTURER'S SPECIFICATIONS.
26. WHERE CIRCUIT BREAKERS OR FUSES ARE APPLIED IN COMPLIANCE WITH THE SERIES COMBINATION RATINGS MARKED ON THE EQUIPMENT BY THE MANUFACTURER, THE EQUIPMENT ENCLOSURE(S) SHALL BE LEGIBLY MARKED IN THE FIELD TO INDICATE THE EQUIPMENT HAS BEEN APPLIED WITH A SERIES COMBINATION DEVICE RATING. THE MARKING SHALL BE READILY VISIBLE AND CONFORM TO ARTICLE 110.22 OF THE 2014 EDITION OF THE NATIONAL ELECTRICAL CODE.
27. GROUNDING CONTINUITY SHALL BE VERIFIED ON ALL ISOLATED GROUND RECEPTACLES.
28. THE PLACEMENT OF LIGHTING FIXTURES, RECEPTACLES, ETC. IN MECHANICAL EQUIPMENT ROOMS SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT.
29. PROVIDE NECESSARY COMMON GROUNDS BETWEEN THE ELECTRICAL SERVICE, TELEPHONE SERVICE, UNDERGROUND METALLIC PIPING, CONDUIT, AND FOUNDATION/FOOTING REBAR PER NEC ARTICLES 250.50 & 250.52
30. ALL DUCT MOUNTED SMOKE OR HEAT DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR THE WIRING OF ALL DUCT MOUNTED DETECTORS TO INSURE A COMPLETE OPERATING SYSTEM. THE ELECTRICAL CONTRACTOR SHALL REFER TO THE MECHANICAL DRAWINGS FOR THE LOCATIONS OF ALL DUCT MOUNTED DETECTORS. ALL DUCT MOUNTED DETECTORS AND THEIR ASSOCIATED WIRING SHALL CONFORM TO ARTICLE 300.22 OF THE 2014 EDITION OF THE NATIONAL ELECTRICAL CODE.
31. CONTRACTOR TO PROVIDE RECEPTACLES TO MATCH PLUGS FURNISHED WITH EQUIPMENT.
32. LIGHTING AND POWER BRANCH CIRCUIT PANEL BOARDS FOR 120/240 VOLTS SERVICE SHALL BE BOLT-ON CIRCUIT BREAKER TYPE EQUIPPED WITH QUICK-MAKE, QUICK-BREAK, TRIP INDICATING, MOLDED CASE, THERMAL- MAGNETIC CIRCUIT BREAKERS.
33. ALL LIGHTING AND POWER PANELS SHALL HAVE THEIR TOPS AT 6'-6" ABOVE FINISHED FLOOR.
34. PANEL BOARDS SHALL BE DEAD-FRONT, SAFETY-TYPE AND SHALL CONTAIN MAIN LUG RATINGS, BRANCH CIRCUIT BREAKERS, SPACES AND COPPER BUSSES AS INDICATED ON THE DRAWINGS.
35. PANEL BOARDS SHALL BE SUITABLE FOR FLUSH MOUNTING OR SURFACE MOUNTED INSTALLATION AS REQUIRED.
36. ELECTRICAL CONTRACTOR SHALL LOCATE LIGHTING FIXTURES TO SUIT STRUCTURAL AND ARCHITECTURAL CONDITIONS IN THOSE ROOMS WHERE BEAMS, DROPPED SOFFITS, ACCESS PANELS OR SIMILAR OBSTRUCTIONS REQUIRE A CHANGE IN LIGHTING FIXTURE LAYOUT.
37. ELECTRICAL CONTRACTOR SHALL COORDINATE PLACEMENT OF ALL ELECTRICAL DEVICES WITH MILLWORK CONSTRUCTOR AND ARCHITECT PRIOR TO ROUGH-IN.
38. FOR EMERGENCY LIGHTING AND EXIT SIGN BATTERY PACK UNITS, THE CIRCUIT FEEDING THE UNIT SHALL BE THE SAME BRANCH CIRCUIT AS THAT SERVING THE NORMAL LIGHTING IN THE AREA AND SHALL BE CONNECTED AHEAD OF ANY LOCAL SWITCHES.
39. THE ELECTRICAL CONTRACTOR SHALL CONFORM TO ARTICLE 400 OF THE 2014 EDITION OF THE NATIONAL ELECTRICAL CODE REGARDING FLEXIBLE CORDS AND CABLES FOR THE SELECTION AND INSTALLATION OF FLEXIBLE FEEDER CABLE FOR TEMPORARY POWER. THE TYPE OF CABLE SHALL BE "EXTRA-HARD USAGE" TYPE "W", COPPER CONDUCTOR, THERMOSET INSULATION WITHOUT EXCEPTION.
40. THE ELECTRICAL CONTRACTOR SHALL CONFORM TO ARTICLE 590 OF THE 2014 EDITION OF THE NATIONAL ELECTRICAL CODE REGARDING THE PROTECTION AND INSTALLATION OF TEMPORARY WIRING.
41. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SERVICE APPLICATIONS FOR ELECTRICAL, CABLE AND TELEPHONE SERVICE CONNECTIONS. THE OWNER SHALL BE RESPONSIBLE TO PROVIDE ALL REQUIRED FEES.
42. FOR ALL INSTALLATIONS IN WHICH OUTLET BOXES ARE INSTALLED IN A FIRE- RATED WALL, THE OUTLET BOXES SHALL BE THOMAS & BETTS UNION PHENOLIC THERMOSET BOXES OR EQUAL, INSTALLED PER MANUFACTURERS INSTRUCTIONS.

# ELECTRICAL DEMOLITION NOTES

1. IT IS THE INTENT THAT ALL EXISTING CONDUIT, CONDUCTORS, FIXTURES AND OTHER EQUIPMENT AND MATERIALS THAT INTERFERE WITH THE ALTERED EXISTING BUILDING ARRANGEMENTS AND NEW SYSTEMS BE REMOVED, RELOCATED, REROUTED OR ABANDONED. THE DRAWINGS GENERALLY INDICATE MAJOR ITEMS OR EXISTING MATERIALS AND EQUIPMENT THAT ARE TO BE REMOVED, RELOCATED, REROUTED OR ABANDONED. IT IS NOT POSSIBLE TO INDICATE ALL RELATED ACCESSORIES, SPECIALTIES AND OTHER MINOR ITEMS. HOWEVER, THEIR REMOVAL, RELOCATIONS, REROUTING OR ABANDONMENT SHALL ALSO BE INCLUDED IN THIS CONTRACT AND SHALL BE DONE AT NOT COST TO THE OWNER.
2. EXISTING CONCEALED AND EXPOSED EQUIPMENT AND MATERIALS THAT WILL BECOME ABANDONED DUE TO NEW WORK SHALL BE REMOVED BACK TO THE PANEL.
3. ALL EXISTING ELECTRICAL DEVICES TO BE DEMOLISHED MAY NOT BE SHOWN. CONTRACTOR SHALL PRIOR TO BID PERFORM A SITE VISIT AND DETERMINE FULL EXTENT OF DEMOLITION AND INCLUDE COST OF THIS WORK IN BID. SHOULD A CONTRACTOR REQUIRE REMOVAL, RELOCATION OR REROUTING OF ANOTHER TRADE'S WORK THAT IS NOT INDICATED ON DRAWINGS, THE CONTRACTOR REQUIRING SUCH WORK SHALL BE RESPONSIBLE FOR THAT WORK, AND PAY ALL REQUIRED COSTS. ALL UNKNOWN BELOW SLAB CONDUIT ENCOUNTERED DURING INSTALLATION OF NEW WORK SHALL BE SAFFED OFF. ALLOWANCE SHALL BE MADE FOR THESE ITEMS IN BID PRICE.
4. EXISTING EQUIPMENT AND MATERIALS THAT ARE TO REMAIN, BUT BECOME EXPOSED DUE TO NEW WORK, SHALL BE RELOCATED AND RECONNECTED AS DIRECTED BY ARCHITECT.
5. ALL WORK INVOLVING ALTERATIONS TO EXISTING SYSTEMS, EQUIPMENT AND MATERIALS SHALL BE REVIEWED WITH ARCHITECT AND OWNER BEFORE BEGINNING WORK.
6. REMOVED EQUIPMENT AND MATERIALS NOT DESIRED BY OWNER SHALL BECOME PROPERTY OF CONTRACTOR AND SHALL BE PROMPTLY REMOVED FROM SITE. EQUIPMENT AND MATERIALS DESIRED BY OWNER SHALL BE DELIVERED BY CONTRACTOR TO AN ON-SITE STORAGE LOCATION DESIGNATED BY OWNER.
7. THE CONTRACTOR MUST SURVEY AND VERIFY LOCATIONS AND PHYSICAL SIZES OF ALL EXISTING ITEMS AND DETERMINE WHETHER RELOCATION OR REROUTING WILL BE REQUIRED. IF RELOCATION OR REROUTING IS REQUIRED, INCLUDING THAT WORK IN BID WITH ALL RELATED ACCESSORIES, SPECIALTIES AND OTHER MINOR ITEMS, THE CONTRACTOR SHALL INCLUDE ALL NECESSARY WORK AS PART OF HIS CONTRACT AND IT SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.
8. WORK SHALL BE PERFORMED BY MECHANICS SKILLED IN PARTICULAR TRADE INVOLVED, THAT IS, ALL ELECTRICAL WORK SHALL BE PERFORMED BY ELECTRICIANS.
9. ALL WORK SHALL BE INSPECTED, TESTED AND APPROVED BY THE PROPER AUTHORITIES HAVING JURISDICTION. CERTIFIED COPIES OF THESE APPROVALS AND CERTIFICATES OF OCCUPANCIES (CO'S) SHALL BE DELIVERED TO THE OWNER BEFORE FINAL PAYMENT.
10. REMOVE DEMOLITION MATERIS FROM PREMISES BY THE MOST DIRECT PATH. ANY DAMAGE INCURRED BY THE REMOVAL PROCESS SHALL BE REPAIRED TO MATCH THE SURROUNDING WORK AND LEFT IN SATISFACTORY CONDITION. ALL AREAS SHALL BE CLEANED OF ALL DIRT AND DEBRIS RESULTING FROM DEMOLITION.
11. ELECTRICAL CONTRACTOR SHALL DISPOSE OF ALL ELECTRICAL COMPONENTS SUCH AS TRANSFORMERS, FLUORESCENT LAMPS, SMOKE DETECTORS, HEAT DETECTORS, BATTERIES, LIGHTING BALLAST, ETC. IN STRICT ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL LAWS. COORDINATE DISPOSAL REQUIREMENTS WITH THE GENERAL CONTRACTOR AND THE OWNER.

ADDITIONAL SCOPE OF WORK:

A. ELECTRICAL CONTRACTOR SHALL INCLUDE IN BASE BID, THE FURNISHING AND INSTALLATION OF THE FOLLOWING ADDITIONAL ITEMS, NOT IDENTIFIED ON DRAWINGS, BUT TO BE IDENTIFIED DURING CONSTRUCTION BY ENGINEER OR OWNER:
   1. THE ELECTRICAL CONTRACTOR SHALL PROVIDE IN THEIR BID, AN ADDITIONAL TWENTY (20) 20A, 120V POWER DUPLEX RECEPTACLES (MAXIMUM OF 4 PER CIRCUIT ON (5) 20A, 120V DEDICATED BRANCH CIRCUITS, UTILIZING #10 WIRE AT A MAXIMUM DISTANCE OF 250 FT. HOME RUN TO FIELD DESIGNATED POWER PANEL).
   2. THE ELECTRICAL CONTRACTOR SHALL PROVIDE IN THEIR BID, AN ADDITIONAL TEN (10) DUPLEX DATA DROPS (300 FT. CAT 5E CABLE HOME RUNS TO OWNER DESIGNATED I.T. CLOSET). EACH DUPLEX DATA DROP INCLUDES TWO (2) CAT5E CABLES.
   3. THE ELECTRICAL CONTRACTOR SHALL PROVIDE IN THEIR BID, AN ADDITIONAL EIGHT (8) 208V, 30 AMP POWER FEEDERS TO MEP EQUIPMENT/DEVICES WITH 450 FT. OF 10/2 WIRING, DISCONNECT SWITCH & HACR RATED 30A/2P CIRCUIT BREAKER.
   4. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ADDITIONAL CONDUIT, CONDUCTORS, JUNCTION BOXES, PULL-CORDS, BACK-BOXES, COVER PLATES, WIRE/CONDUIT SUPPORTS, CIRCUIT BREAKERS, DISCONNECT SWITCHES, LABOR, ETC., REQUIRED FOR ALL SPECIFIED ADDITIONAL RECEPTACLES, DATA DROPS, POWER FEEDERS, ETC.

# ELECTRICAL LEGEND

| | |
|---|---|
| P 14 | INDICATES HOME RUN OF WIRING TO PANEL AND CIRCUIT INDICATED |
| GFI | GROUND FAULT INTERRUPTER |
| (E) | EXISTING TO REMAIN. ALL EXISTING TO REMAIN DEVICES TO BE REPLACED WITH NEW DEVICES TO MATCH FLOOR/WALL FINISHES. REFER TO ARCHITECTURAL DRAWINGS. |
| (R) | EXISTING TO BE RELOCATED |
| (RE) | RELOCATED EXISTING, SHOWN IN NEW LOCATION |
| (ER) | EXISTING TO BE REMOVED |
| (RP) | EXISTING TO BE RELAMPED and RECIRCUITED AS SHOWN |
| (ERI) | EXISTING TO BE REMOVED AND RE-INSTALLED |
| J | JUNCTION BOX TYPICAL |
| | DISCONNECT SWITCH - SIZED AS REQUIRED. |
| | NEW ARENA LIGHTING FIXTURE |
| | EXISTING WEST HALL DUAL LIGHTING FIXTURE |
| | NEW WEST HALL HIGH BAY LIGHTING FIXTURE |
| | ARENA LIGHTING FIXTURE |


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# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.
PROJECT NO. 8C17294

DWG. NAME
GENERAL NOTES

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

EC-001

| BOARDWALK HALL<br>ATLANTIC CITY, NJ | TLP PROJECT NUMBER:<br>17066.00 | TLP ISSUE DATE:<br>09/01/2017 |
|---|---|---|

## LIGHTING FIXTURE SCHEDULE

| TYPE | MTG. | DESCRIPTION | LAMPING QTY. | LAMPING LAMP DESIGNATION | WATTAGE PER FIXTURE | VOLTS | MANUFACTURER | CATALOG NUMBER |
|---|---|---|---|---|---|---|---|---|
| DL1 | TRUSS | LED SPORTS-LIGHTING FLOODLIGHT WITH (2) LED MODULE HOUSINGS, EACH HOUSING NOMINAL 10-1/2 INCH TALL X 25 INCH WIDE X 4-7/8 INCH DEEP CAST ALUMINUM HOUSING, CLEAR GLASS PROTECTIVE LENS, WITH NEMA 5 BEAM SPREAD OPTICS. (2) HOUSINGS TO MOUNT TO (1) YOKE, FOR NOMINAL 23 INCH TALL X 25 INCH WIDE X 9-1/2 INCH DEEP OVERALL FIXTURE DIMENSIONS. FIXTURE YOKE TO BE ABLE TO SECURELY MOUNT TO EXISTING SUSPENDED BOX-TRUSS. PROVIDE AIRCRAFT SAFETY CABLE.<br><br>INTEGRAL DRIVER SHALL PROVIDE SMOOTH, FLICKER-FREE DIMMING FROM 100% TO 1% LIGHT OUTPUT VIA DMX512 PROTOCOL.<br><br>LED REQUIREMENTS:<br>NOMINAL 85,000 INITIAL DELIVERED LUMENS, 128,000 CENTERBEAM CANDLEPOWER, NOMINAL 75 CRI, 5700K CCT, L70 AT 120,000 HOURS, 10-YEAR PARTS AND LABOR WARRANTY. | - | LEDs BY MANUFACUTURER | 650 | 277 | EPHASUS LIGHTING<br><br>MUSCO LIGHTING | ARENA SERIES<br><br>TLC SERIES |
| DL1A | TRUSS | SIMILAR TO TYPE DL1 EXCEPT FOR LIGHTING OF OVERALL ARENA FLOOR.<br><br>LED REQUIREMENTS:<br>NOMINAL 85,000 INITIAL DELIVERED LUMENS, 128,000 CENTERBEAM CANDLEPOWER, NOMINAL 75 CRI, 5700K CCT, L70 AT 120,000 HOURS, 10-YEAR PARTS AND LABOR WARRANTY. | - | LEDs BY MANUFACUTURER | 650 | 277 | EPHASUS LIGHTING<br><br>MUSCO LIGHTING | ARENA SERIES<br><br>TLC SERIES |
| DL2 | TRUSS | LED SPORTS-LIGHTING FLOODLIGHT WITH (2) LED MODULE HOUSINGS, EACH HOUSING NOMINAL 10-1/2 INCH TALL X 25 INCH WIDE X 4-7/8 INCH DEEP CAST ALUMINUM HOUSING, CLEAR GLASS PROTECTIVE LENS, WITH NEMA 4 BEAM SPREAD OPTICS. (2) HOUSINGS TO MOUNT TO (1) YOKE, FOR NOMINAL 23 INCH TALL X 25 INCH WIDE X 9-1/2 INCH DEEP OVERALL FIXTURE DIMENSIONS. FIXTURE YOKE TO BE ABLE TO SECURELY MOUNT TO EXISTING SUSPENDED BOX-TRUSS. PROVIDE AIRCRAFT SAFETY CABLE.<br><br>INTEGRAL DRIVER SHALL PROVIDE SMOOTH, FLICKER-FREE DIMMING FROM 100% TO 1% LIGHT OUTPUT VIA DMX512 PROTOCOL.<br><br>LED REQUIREMENTS:<br>NOMINAL 88,000 INITIAL DELIVERED LUMENS, 210,000 CENTERBEAM CANDLEPOWER, NOMINAL 75 CRI, 5700K CCT, L70 AT 120,000 HOURS, 10-YEAR PARTS AND LABOR WARRANTY. | - | LEDs BY MANUFACUTURER | 650 | 277 | EPHASUS LIGHTING<br><br>MUSCO LIGHTING | ARENA SERIES<br><br>TLC SERIES |
| DL2A | TRUSS | SIMILAR TO TYPE DL2 EXCEPT FOR LIGHTING OF OVERALL ARENA FLOOR.<br><br>LED REQUIREMENTS:<br>NOMINAL 88,000 INITIAL DELIVERED LUMENS, 210,000 CENTERBEAM CANDLEPOWER, NOMINAL 75 CRI, 5700K CCT, L70 AT 120,000 HOURS, 10-YEAR PARTS AND LABOR WARRANTY. | - | LEDs BY MANUFACUTURER | 650 | 277 | EPHASUS LIGHTING<br><br>MUSCO LIGHTING | ARENA SERIES<br><br>TLC SERIES |
| DL3 | TRUSS | LED SPORTS-LIGHTING FLOODLIGHT WITH (1) LED MODULE HOUSINGS, NOMINAL 10-1/2 INCH TALL X 25 INCH WIDE X 4-7/8 INCH DEEP CAST ALUMINUM HOUSING, CLEAR GLASS PROTECTIVE LENS, WITH NEMA 5 BEAM SPREAD OPTICS. HOUSING TO MOUNT TO YOKE, FOR NOMINAL 23 INCH TALL X 25 INCH WIDE X 9-1/2 INCH DEEP OVERALL FIXTURE DIMENSIONS. FIXTURE YOKE TO BE ABLE TO SECURELY MOUNT TO EXISTING SUSPENDED BOX-TRUSS. PROVIDE AIRCRAFT SAFETY CABLE.<br><br>INTEGRAL DRIVER SHALL PROVIDE SMOOTH, FLICKER-FREE DIMMING FROM 100% TO 1% LIGHT OUTPUT VIA DMX512 PROTOCOL.<br><br>LED REQUIREMENTS:<br>NOMINAL 18,000 INITIAL DELIVERED LUMENS, 100,000 CENTERBEAM CANDLEPOWER, NOMINAL 75 CRI, 5700K CCT, L70 AT 120,000 HOURS, 10-YEAR PARTS AND LABOR WARRANTY. | - | LEDs BY MANUFACUTURER | 190 | 277 | EPHASUS LIGHTING<br><br>MUSCO LIGHTING | ARENA SERIES<br><br>TLC SERIES |
| TL1 | TRUSS | THEATRICAL-STYLE LED ELLIPSOIDAL SPOTLIGHT LUMINAIRE NOMINAL 20 INCHES LONG BY 14 INCHES WIDE (SHUTTER HANDLE TO SHUTTER HANDLE), MOUNTING YOKE NOMINAL 15 INCHES TALL, DIE-CAST ALUMINUM HOUSING, ELECTRICAL WHIP WITH TWIST-LOCK CONNECTOR, INTEGRAL DMX LED DRIVER WITH DMX IN AND THRU CONNECTORS, FULL 360° PAN AND 85° TILT ADJUSTABILITY, TOOLESS ADJUSTABLE OPTIC FOCUS, INTERNAL SHUTTER GATE WITH FOUR INDEPENDENTLY ADJUSTABLE ALUMINUM BEAM-SHAPING SHUTTERS, INTERNAL ACCESSORY SLOT. PROVIDE 14" BEAM LENS TUBE, LENS TO TO ACCOMMODATE TWO EXTERNAL MEDIA/ACCESSORIES, PROVIDE C-CLAMP MOUNTING ACCESSORY, GEL MEDIA HOLDER, AND SAFETY CABLE.<br><br>LED REQUIREMENTS:<br>7,500 INITIAL DELIVERED LUMENS, 222,000 CENTERBEAM CANDLEPOWER, 80+ CRI, 3000K CCT, L70 AT 120,000 HOURS, 5-YEAR LIMITED WARRANTY. | - | LEDs BY MANUFACUTURER | 156 | 120 | ELECTRONIC THEATRE CONTROLS<br><br>ALTMAN LIGHTING<br><br>CHAUVET PROFESSIONAL | S4WRDFB-C-14 DEG BARREL +400CC+400SC+407CF<br><br>PHX LED 250 SERIES<br><br>OVATION E-260 SERIES |

## GENERAL NOTES:

1. ALL LIGHTING FIXTURES, LAMPS AND RELATED DEVICES FURNISHED UNDER THIS CONTRACT SHALL CARRY THE APPROVAL LABEL OF UL OR ETL FOR THE SPECIFIC APPLICATION IN WHICH THEY ARE USED.

2. THE STATEMENT "FINISH TO BE SELECTED BY DESIGN PROFESSIONAL" SHALL BE INTERPRETED TO MEAN THAT THE FINISH OF THE LUMINAIRE SHALL MATCH THE APPEARANCE OF A PAINT CHIP, COLOR NUMBER, OR METAL SWATCH FURNISHED BY THE DESIGN PROFESSIONAL DURING THE SUBMITTAL REVIEW PROCESS.

3. CONTRACTOR SHALL PROVIDE ALL MOUNTING HARDWARE AS REQUIRED FOR FIXTURE INSTALLATION.

4. WHITE L.E.D.'S SHALL MEET, AT A MINIMUM, CHROMATICITY STANDARDS SET BY ANSI/NEMA/ANSLG C78.377-2015. L.E.D. LUMEN MAINTENANCE SHALL BE MEASURED IN ACCORDANCE WITH IESNA LM-80 STANDARDS. PHOTOMETRIC TESTING FOR SOLID STATE LUMINAIRES SHALL BE IN ACCORDANCE WITH IESNA LM-79 STANDARDS.

5. CONTRACTOR SHALL CONFIRM FIXTURE VOLTAGES, CEILING TRIMS, AND MOUNTING HARDWARE ARE COMPATIBLE WITH THEIR APPLICATION AS DETERMINED BY THE DESIGN PROFESSIONAL PRIOR TO ORDERING FIXTURES.

6. CONTRACTOR SHALL SELECT, FURNISH AND INSTALL THE CORRECT SIZE OF SECONDARY WIRING FROM REMOTE TRANSFORMERS AND/OR REMOTE BALLASTS AS REQUIRED TO KEEP VOLTAGE DROP IN THE SECONDARY WIRING BELOW 3% OF RATED VOLTAGE.

7. ALL DIMMABLE L.E.D. LAMPS SHALL BE BURNED CONTINUOUSLY FOR 100 HOURS AT FULL OUTPUT PRIOR TO FOCUSING OF FIXTURES AND COMMISSIONING OF CONTROL SYSTEMS.

8. CONTRACTOR SHALL PROVIDE LABOR AND EQUIPMENT FOR FOCUSING OF ADJUSTABLE FIXTURES AND PRESETTING OF LIGHTING CONTROL SYSTEMS. FOCUSING AND PRESETTING SHALL BE DONE IN THE PRESENCE OF THE DESIGN PROFESSIONAL. CONTRACTOR SHALL FOCUS LIGHTING AFTER DARK IF DIRECTED BY THE OWNER'S REPRESENTATIVE. UNLESS OTHERWISE NOTED, CONTRACTOR SHALL PROVIDE AT LEAST ONE DAY OF A FACTORY-TRAINED AND CERTIFIED TECHNICIAN TO PROVIDE WARRANTY START UP AND PROGRAMMING FOR ALL LIGHTING CONTROL SYSTEMS AND PROGRAMMABLE LIGHTING FIXTURES.

9. CONTRACTOR SHALL PROVIDE THE FOLLOWING WITH THEIR BID:

   A. THE UNIT PRICE, WITHOUT LAMP, FOR EACH LIGHTING FIXTURE TYPE LISTED WITHIN THE LIGHTING FIXTURE SCHEDULE. THE UNIT PRICE SHALL BE FOR ONE OF THE LISTED MANUFACTURER'S FOR THAT PARTICULAR FIXTURE. THE MANUFACTURER SHALL BE IDENTIFIED. SUBSTITUTIONS FOR FIXTURES PROVIDED BY MANUFACTURERS NOT LISTED IN THE SCHEDULE ARE NOT ACCEPTABLE. SEE BELOW FOR REQUIREMENTS ASSOCIATED WITH SUBMITTING LIGHTING FIXTURE SUBSTITUTIONS.
   B. THE TOTAL QUANTITY OF EACH FIXTURE TYPE WITH THE EXTENDED COST FOR THAT QUANTITY.
   C. THE UNIT PRICE, TYPE, AND QUANTITY OF LAMPS.

10. WITHIN 21 DAYS OF CONTRACT AWARD, THE CONTRACTOR SHALL FURNISH SUBMITTALS FOR ALL SPECIFIED LIGHTING FIXTURES FOR REVIEW BY THE DESIGN PROFESSIONAL. THE SUBMITTALS SHALL INCLUDE LUMINAIRE CATALOG CUTS, SUBMITTAL SHEETS, OR MANUFACTURERS SHOP DRAWINGS INDICATING THE FOLLOWING:

    A. MANUFACTURER'S NAME AND COMPLETE CATALOG NUMBER
    B. FIXTURE TYPE, DIMENSIONS AND FINISHES
    C. FIXTURE PHOTOMETRIC TEST DATA FROM AN INDEPENDENT TEST LABORATORY
    D. FIXTURE ACCESSORIES, COMPONENTS, AND HARDWARE WHEN SPECIFIED
    E. LAMP TYPE, QUANTITY, WATTAGE, LUMEN OUTPUT, RATED LIFE, COLOR TEMPERATURE, COLOR RENDERING INDEX AND BEAM SPREAD AS APPLICABLE
    F. BALLAST TYPE AND FIXTURE VOLTAGE

    SUBMITTALS FOR LIGHTING FIXTURES MOUNTED WITHIN ARCHITECTURAL COVES OR CASEWORK, VARIABLE LENGTH FIXTURES, AND FOR NON-STANDARD, OR CUSTOM FIXTURES, SHALL ALSO INCLUDE SCALED DRAWINGS SHOWING THE LAYOUT AND DIMENSIONS OF ALL FIXTURE COMPONENTS AND ACCESSORIES, THE METHOD OF INSTALLATION, AND A COMPLETE BILL OF MATERIALS.

11. LIGHTING FIXTURE SUBSTITUTION REQUESTS MUST BE SENT TO AND RECEIVED BY THE LIGHTING DESIGNER FOR REVIEW 14 DAYS PRIOR TO BID DATE. FAILURE TO SUBMIT WITHIN THIS DEADLINE SHALL CONSTITUTE A GUARANTEE THAT THE SPECIFIED FIXTURES WILL BE SUPPLIED. THE SUBMITTAL SHALL INCLUDE THE FOLLOWING:

    A. SIX HARD COPIES OF THE SUBMITTALS REQUIRED ABOVE FOR BOTH THE SPECIFIED FIXTURE AND THE PROPOSED SUBSTITUTION.
    B. ONE NON-RETURNABLE WORKING SAMPLE OF THE PROPOSED SUBSTITUTE FIXTURE WITH CORD & PLUG CONNECTION FOR 120 VOLT OPERATION, AND SPECIFIED LAMP(S).
    C. CONTRACTOR'S STATEMENT INDICATING THE EFFECT OF THE SUBSTITUTION ON THE CONSTRUCTION SCHEDULE COMPARED TO THE SCHEDULE WITHOUT THE APPROVAL OF THE PROPOSED SUBSTITUTION.
    D. CONTRACTOR'S CERTIFICATION STATING THAT THE PROPOSED SUBSTITUTION CONFORMS TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS IN EVERY RESPECT AND IS APPROPRIATE FOR THE APPLICATIONS INDICATED IN THE DOCUMENTS.
    E. CONTRACTOR'S CERTIFICATION STATING THAT ANY MODIFICATIONS TO ANY BUILDING SYSTEM OR EQUIPMENT THAT MAY RESULT FROM THE PROPOSED LIGHTING FIXTURE SUBSTITUTION WILL BE DESIGNED AND CONSTRUCTED AT THE CONTRACTOR'S EXPENSE.
    F. CONTRACTOR'S WAIVER OF RIGHTS TO ADDITIONAL PAYMENT OR TIME THAT MAY BECOME NECESSARY SHOULD THE PROPOSED SUBSTITUTION FAIL TO PERFORM IN A MANNER THAT MATCHES THE SPECIFIED FIXTURE.
    G. CONTRACTOR-NET UNIT PRICE FOR THE SPECIFIED FIXTURE AND FOR THE PROPOSED SUBSTITUTE FIXTURE.

    THE LIGHTING DESIGNER SHALL BE REIMBURSED BY THE CONTRACTOR FOR ALL OF THE DESIGNER'S TIME ASSOCIATED WITH THE REVIEW OF THE PROPOSED FIXTURE SUBSTITUTION(S). PAYMENT SHALL BE MADE IN ADVANCE OF THE REVIEW, BASED ON THE DESIGNER'S ESTIMATE OF THE REQUIRED TIME. THE PAYMENT SHALL BE BASED ON THE DESIGNER'S STANDARD HOURLY RATES FOR THE PERSONNEL INVOLVED IN THE REVIEW.

## DEFINITIONS:

1. CORRELATED COLOR TEMPERATURE (CCT): THE ABSOLUTE TEMPERATURE, MEASURED IN DEGREES KELVIN, OF A BLACKBODY RADIATOR HAVING CHROMATICITY RESEMBLING THAT OF AN ELECTRIC LIGHT SOURCE. FOR LED SOURCES CCT SHALL NOT DEVIATE FROM THE REFERENCE COLOR TEMPERATURE BY NO MORE THAN THREE MACADAM ELLIPSES, AS DEFINED BY NEMA/ANSI/ANSLG C78.377-2015.

2. COLOR RENDERING INDEX (CRI): MEASURE OF COLOR SHIFT OBJECTS UNDERGO WHEN ILLUMINATED BY AN ELECTRIC LIGHT SOURCE AS COMPARED WITH THE COLOR OF THE SAME OBJECTS ILLUMINATED BY A REFERENCE SOURCE AT THE SAME COLOR TEMPERATURE. CRI VALUES FOR ELECTRIC LIGHT SOURCES RANGE FROM APPROXIMATELY 20 (LOW PRESSURE SODIUM) TO 99 (HALOGEN). CRI VALUES FOR LED SOURCES SHALL BE MEASURED AFTER 6000 HOURS AND SHALL NOT DEVIATE MORE THAN 3 POINTS FROM THE RATED VALUE.

3. LED LIGHT ENGINE: THE COMBINED LED LIGHT SOURCE AND ITS ASSOCIATED ELECTRONIC DRIVER. THE LED LIGHT ENGINE MAY HAVE AN INTEGRAL DRIVER OR THE DRIVER MAY BE HOUSED IN A SEPARATE ENCLOSURE.

4. LED DRIVER: CONTROL DEVICE THAT MAINTAINS CONSTANT AMOUNT OF CURRENT TO THE LED LIGHT SOURCE. LED DRIVERS GENERALLY OPERATE AT 12VDC OR 24VDC. SOME DRIVERS ARE DESIGNED TO ACCEPT BRANCH CIRCUIT VOLTAGE RANGING FROM 120VAC THROUGH 277VAC OR MAY REQUIRE A SEPARATE TRANSFORMER.

5. TRANSFORMER: ELECTROMAGNETIC OR ELECTRONIC DEVICE THAT STEPS DOWN PRIMARY VOLTAGE TO A LOWER SECONDARY VOLTAGE. GENERALLY SECONDARY VOLTAGE WILL BE 12V OR 24V.

6. DIMMING: THE REDUCTION OF LIGHT INTENSITY OF A LIGHT SOURCE. ALL SOURCES SHALL HAVE A SMOOTH, FLICKER-FREE AND CONTINUOUS DIMMING CURVE FROM FULL-OFF TO 100% OUTPUT. LED SOURCES MAY BE DIMMED BY EITHER CONSTANT CURRENT REDUCTION (CCR) OR BY PULSE WIDTH MODULATION (PWM) DIMMING FOR CONSTANT CURRENT DRIVERS.

7. RATED LUMEN MAINTENANCE LIFE: THE ELAPSED OPERATING TIME OVER WHICH AN LED LIGHT SOURCE WILL MAINTAIN THE PERCENTAGE OF ITS INITIAL LUMEN OUTPUT.
   L70: TIME, IN HOURS, TO 70% LUMEN MAINTENANCE
   L50: TIME, IN HOURS, TO 50% LUMEN MAINTENANCE

## PROJECT REQUIREMENTS

1 STRUCTURAL ENGINEER TO REVIEW AND COMMENT ON PROPOSED LIGHTING DESIGN AND FIXTURE WEIGHTS FOR USE WITH EXISTING BOX TRUSS SYSTEM. ENGINEER SHALL ALERT THE DESIGN TEAM AND OWNER OF ANY DEFICIENCIES FOUND DURING REVIEW. STRUCTURAL ENGINEER TO PROVIDE RECOMMENDATIONS TO REMEDY ANY DEFICIENCIES IN THE SUPPORT SYSTEM.

2 SUBMITTALS

A. THE ELECTRICAL CONTRACTOR SHALL SUBMIT WITH THEIR BID POINT-BY-POINT LIGHTING CALCULATIONS FROM THE PROPOSED FIXTURE MANUFACTURER FOR REVIEW BY THE OWNER AND THE DESIGN TEAM. LIGHTING DESIGN LAYOUTS AND FIXTURE SPECIFICATIONS SHALL CONFORM TO NCAA NATIONAL BROADCAST LIGHTING STANDARDS, NCAA BEST LIGHTING PRACTICES 2016, UNLESS NOTED OTHERWISE BELOW.

   CALCULATIONS ARE TO INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING INFORMATION:
   1. HORIZONTAL ILLUMINANCE VALUES MEASURED IN FOOTCANDLES FOR THE ICE HOCKEY AND BASKETBALL PLAYING AREAS. MINIMUM AVERAGE OF 150 FOOTCANDLES (FC) PER OWNER
   2. VERTICAL ILLUMINANCE VALUES MEASURED IN FOOTCANDLES FOR THE ICE HOCKEY PLAYING AND BASKETBALL PLAYING AREAS.
   3. AVERAGE TO MINIMUM UNIFORMITY RATIOS
   4. HORIZONTAL ILLUMINANCE VALUES MEASURED IN FOOTCANDLES OVER THE ENTIRE EVENT FLOOR AREA AT GRADE. MINIMUM AVERAGE OF 100FC, MINIMUM 50FC ALONG PERIMETER.

B. THE ELECTRICAL CONTRACTOR SHALL SUBMIT MANUFACTURER'S CATALOG CUTS INCLUDING NAME OF THE MANUFACTURER AND TECHNICAL DATA ON FEATURES, ACCESSORIES, FINISHES, AND THE FOLLOWING:
   1. PHYSICAL DESCRIPTION OF LIGHTING FIXTURE AND DRIVER INCLUDING DIMENSIONS.
   2. LIFE, OUTPUT (DELIVERED LUMENS, CCT, TLCI, AND CRI), AND ENERGY-EFFICIENCY DATA.
   3. DRIVER OPERATING PROTOCOL AND ELECTRICAL PARAMETERS
   4. PHOTOMETRIC DATA BASED ON LABORATORY TESTS, COMPLYING WITH IESNA LIGHTING MEASUREMENTS TESTING & CALCULATION GUIDES, OF EACH LIGHTING FIXTURE TYPE. TESTS SHALL BE FOR SOURCES, DRIVERS AND ACCESSORIES IDENTICAL TO THE LIGHTING FIXTURES IN THIS SPECIFICATION.
   5. LIGHTING LAYOUT INDICATING FIXTURE TYPE AND LOCATION. PROVIDE SEPARATE FIXTURES FOR HOUSE/EMERGENCY LIGHTING. INCLUDE PROPOSED DMX CHANNEL NOTED FOR EACH LUMINAIRE. ALL FIXTURES SHALL BE INDIVIDUALLY CONTROLLED THROUGH UNIQUE DMX ADDRESS. PROVIDE MOUNTING & INSTALLATION DETAILS FOR EACH UNIQUE FIXTURE TYPE.

3 WARRANTY

FIXTURE MANUFACTURERS' WARRANTY SHALL INCLUDE THE FOLLOWING:

A. MINIMUM TEN (10) YEAR PRODUCT WARRANTY (PARTS AND LABOR) AND PREVENTIVE MAINTENANCE SERVICE FOLLOWING THE DATE OF FINAL ACCEPTANCE OF THE SYSTEM.

B. DETAILED ANNUALIZED SCHEDULE LISTING ATTIC STOCK, AND MAINTENANCE SERVICES INCLUDING MATERIALS AND LABOR THAT THE MANUFACTURER CONSIDERS NECESSARY TO KEEP THE LED LUMINAIRES AND RELATED POWER AND SIGNAL SYSTEMS IN FULL OPERATION FOR THE LED LIFE.
   1. AT A MINIMUM, ATTIC STOCK SHOULD INCLUDE 10 ADDITIONAL LED MODULES FOR EACH LIGHT DISTRIBUTION / OPTIC TYPE AND 10 ADDITIONAL LED DRIVERS.

C. FIXTURE MANUFACTURER AGREES TO PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTS THAT OCCUR IN THE SYSTEM DUE TO MANUFACTURING DEFECT OR DEFICIENCY WITHIN THE WARRANTY PERIOD. IF REPAIR IS AFFECTED USING THE OWNERS SPARE PARTS ALLOTMENT, MANUFACTURER SHALL REPLENISH ALL PARTS USED TO KEEP OWNER'S INVENTORY AT THE AMOUNT REQUIRED BY THE CONTRACT.

D. FAILED PARTS SHALL BE RETURNED TO THE FIXTURE MANUFACTURER FOR REPAIR AT A SERVICE FACILITY. FIXTURE MANUFACTURER SHALL IDENTIFY THE LOCATION OF ITS SERVICE FACILITY IN THE DOCUMENTATION PROVIDED WHEN SUBMITTING A BID FOR THIS WORK.

E. FIXTURE MANUFACTURER TO REPLACE FAILED PARTS THAT CANNOT BE REPAIRED.

F. UPON RECEIPT OF A FAILED PART, THE FIXTURE MANUFACTURER SHALL RETURN A REPAIRED OR REPLACEMENT PART TO THE OWNER WITHIN FIFTEEN (15) BUSINESS DAYS FROM RECEIPT OF FAILED PART.

G. FIXTURE MANUFACTURER AGREES TO REPLACE FAILED PARTS THAT CANNOT BE REPAIRED.

H. WARRANTY SHALL COVER ALL EQUIPMENT, INCLUDING POWER/DATA MODULES

I. WARRANTY SHALL INCLUDE ONE (1) ANNUAL ON-SITE SYSTEM CHECK-UP BY A QUALIFIED TECHNICIAN WHO IS A FULL-TIME EMPLOYEE OF THE FIXTURE MANUFACTURER.

J. CHECK-UP SHALL INCLUDE ALL REGULAR MAINTENANCE; A COMPLETE INSPECTION OF ALL SYSTEMS, PARTS REPLACEMENT WHERE REQUIRED, MEASUREMENT OF ILLUMINANCE LEVELS, AND A COMPLETE WRITTEN REPORT OF ALL FINDINGS.

K. TELEPHONE SERVICE ASSISTANCE AND TECHNICAL SUPPORT FROM 8 AM TO 8 PM LOCAL TIME AT OWNER'S FACILITY, 7- DAYS PER WEEK.

L. ANSWER ALL SERVICE CALLS AND REQUESTS FOR INFORMATION WITHIN ONE (1) HOUR DURING THE WARRANTY PERIOD.

## ACCEPTANCE TESTING & PROGRAMMING:

1. THE ELECTRICAL CONTRACTOR AND FIXTURE MANUFACTURER SHALL PROVIDE ALL REQUIRED MATERIALS AND PERSONNEL FOR AIMING OF ALL LIGHTING FIXTURES. ARENA LIGHTING EQUIPMENT, TYPES DL1, DL1A, DL2, DL2A, AND DL3 TO BE AIMED UNDER DIRECTION OF THE FIXTURE MANUFACTURER'S TECHNICIAN. AIMING OF TYPE TL1 FIXTURES TO BE COORDINATED WITH LIGHTING DESIGN PROFESSIONAL.

2. UPON COMPLETION OF INSTALLATION, AIMING, AND INITIAL TESTS, ACCEPTANCE TESTING SHALL BE WITNESSED BY THE DESIGN PROFESSIONAL OR OWNER'S REPRESENTATIVE.

3. ACCEPTANCE TESTING WILL INCLUDE OPERATION OF EACH MAJOR SYSTEM AND ANY OTHER COMPONENTS DEEMED NECESSARY. INSTALLER WILL ASSIST IN THIS TESTING AND PROVIDE ANY TEST EQUIPMENT REQUIRED. INSTALLER SHALL PROVIDE AT LEAST ONE (1) TECHNICIAN AVAILABLE FOR THE ENTIRE TESTING PERIOD (DAY AND NIGHT), TO ASSIST IN TESTS, ADJUSTMENTS, AND FINAL MODIFICATIONS. TOOLS AND MATERIAL REQUIRED TO MAKE ANY NECESSARY REPAIRS, CORRECTIONS, OR ADJUSTMENTS SHALL BE FURNISHED BY THE INSTALLER. TESTING PROCESS IS ESTIMATED TO TAKE A MINIMUM OF THREE (3) DAYS.

4. THE FOLLOWING PROCEDURES WILL BE PERFORMED ON EACH SYSTEM:

   A. CONTROL FUNCTIONS SHALL BE CHECKED FOR PROPER OPERATION, FROM CONTROLLING DEVICES TO CONTROLLED DEVICES.

   B. ADJUST, BALANCE, AND ALIGN EQUIPMENT FOR OPTIMUM QUALITY AND TO MEET THE MANUFACTURER'S PUBLISHED SPECIFICATIONS AND RECORD THESE SETTINGS, IN THE SYSTEM OPERATION AND MAINTENANCE MANUAL.

   C. IN THE EVENT THE NEED FOR FURTHER ADJUSTMENT OR WORK BECOMES EVIDENT DURING ACCEPTANCE TESTING, THE INSTALLER WILL CONTINUE TO WORK UNTIL THE SYSTEM IS ACCEPTABLE AT NO ADDITION TO THE CONTRACT PRICE. IF APPROVAL IS DELAYED BECAUSE OF DEFECTIVE EQUIPMENT, OR FAILURE OF EQUIPMENT OR INSTALLATION TO MEET THE REQUIREMENTS OF THESE SPECIFICATIONS, THE INSTALLER WILL PAY FOR ADDITIONAL TIME AND EXPENSES OF THE ARCHITECT OR OWNER'S REPRESENTATIVE.

5. PROVIDE ON-SITE VISITS BY VENDOR'S APPLICATION ENGINEER AND SYSTEMS PROGRAMMER TO INSPECT, START-UP, COMMISSION, AND PROGRAM THE LIGHTING SYSTEM IN ORDER TO PROVIDE A COMPLETE, FULLY-FUNCTIONING LIGHTING SYSTEM. COMMISSIONING ACTIVITIES WILL INCLUDE, BUT NOT LIMITED TO THE FOLLOWING:

   A. INSTRUCT THE OWNER'S PERSONNEL ON THE USE, OPERATION, PROGRAMMING, AND MAINTENANCE OF THE SYSTEM. REFER TO DEMONSTRATION NOTES FOR DETAILS.

   B. PROGRAM THE INSTALLED SYSTEM WITH A MINIMUM OF TWELVE (12) LED SEQUENCES THAT ARE DESIGNED TO THE OWNER'S REQUIREMENTS. EACH SEQUENCE MUST BE DEMONSTRATED LIVE IN THE BUILDING FOR OWNER'S APPROVAL.

   C. 100-HOUR BURN IN PERIOD, COMMENCING UPON THE START-UP OF THE SYSTEM DURING WHICH THE INSTALLED SYSTEM WILL CONTINUOUSLY LOOP A TEST PROGRAM, THE TEST PROGRAM WILL BE COMPOSED BY THE VENDOR AND REVIEWED BY THE LIGHTING DESIGNER, THE PROGRAM SHALL USE THE FULL RANGE OF SYSTEM EFFECTS, AND CONTROL FUNCTIONS, THE OWNER AND LIGHTING DESIGNER SHALL WITNESS THE TEST, SYSTEM FAILURES REVEALED BY THE TEST SHALL BE CORRECTED BY THE SYSTEM VENDOR.

   D. A 100-HOUR BURN-IN PERIOD, COMMENCING 30 DAYS AFTER SYSTEM START-UP. THE INITIAL TEST PROGRAM WILL BE RE-RUN DURING THIS BURN-IN, THE OWNER AND LIGHTING DESIGNER SHALL WITNESS THE TEST, SYSTEM FAILURES REVEALED BY THE TEST SHALL BE CORRECTED BY THE SYSTEM VENDOR.

   E. UPON SUCCESSFUL COMPLETION OF STEPS "C" AND "D" ABOVE, PROVIDE OWNER A WRITTEN CERTIFICATION THAT THE SYSTEM HAS BEEN COMMISSIONED PER THE METHOD DESCRIBED ABOVE AND THAT IT IS FULLY OPERATION.

## DEMONSTRATION & TRAINING:

1. PROVIDE FOUR (4) HOURS OF INSTRUCTION TO THE OWNER'S REPRESENTATIVE DESIGNATED PERSONNEL/FACILITY STAFF ON THE USE, OPERATION AND MAINTENANCE OF THE SYSTEM, BY AN INSTRUCTOR FULLY KNOWLEDGEABLE AND QUALIFIED IN SYSTEM OPERATION. THE SYSTEM REFERENCE MANUALS SHOULD BE COMPLETE AND AVAILABLE DURING THESE DEMONSTRATIONS/INSTRUCTION.

2. TRAINING SCHEDULES:

   A. TRAINING SHOULD BE ASSUMED TO TAKE PLACE ON THE PROJECT SITE;

   B. TRAINING SCHEDULE SHALL BE BY AGREEMENT WITH OWNER.

   C. IN THE EVENT THAT A PORTION OF THE TRAINING TIME IS OCCUPIED IN TROUBLESHOOTING THE EQUIPMENT INSTALLATION, THEN THE TRAINING TIME SHALL BE EXTENDED AN EQUAL AMOUNT OF TIME AT A TIME MUTUALLY AGREED TO WITH OWNER;

   D. THE FOLLOWING IS A GENERAL IDEA OF THE TRAINING "CURRICULUM":
      - A GENERAL FAMILIARIZATION OF EACH MAJOR DEVICE.
      - AN EXPLANATION OF HOW THE DEVICE INTERFACES TO THE REST OF THE SYSTEM (INCLUDING REMOTE CONTROLS, DATA CONNECTIONS; TIMING REQUIREMENTS AND THE LIKE).
      - GENERAL TRAINING ON OPERATING THE SYSTEM:
      - SPECIFIC TRAINING ON DEVICE OPERATION (E.G. ENTERING STATISTICS; HOW TO ACCESS DATA RETRIEVAL SOURCES; HOW TO CREATE REPEATABLE FORMATS AND LAYOUTS, CHANGING FONTS, LOADING NEW FONTS).
      - SAVING INFORMATION; BACKING INFORMATION UP (INCLUDING A REVIEW OF THE PROPER PROCEDURES FOR BACKING UP.
      - BASIC TROUBLESHOOTING
      - HOW TO UPGRADE SOFTWARE; PRECAUTIONS TAKEN WHILE DOING (E.G. BACKING-UP EXISTING SOFTWARE, DON'T BE THE FIRST ONE TO TRY THE NEW SOFTWARE ON GAME DAY).

   F. ADDITIONALLY, BE PRESENT AT ONE (1) SEPARATE EVENT OR DAY UTILIZING THE DISPLAY SYSTEMS AS DESIGNATED BY THE OWNER, TO ASSIST WITH OPERATION OF SYSTEM.

      - ADDITIONALLY PROVIDE ONE (1) FOLLOW-UP VISIT AT THE OWNER'S REQUEST PRIOR TO THE END OF EACH WARRANTY YEAR OF OPERATION. SITE TRIP TO INCLUDE AT LEAST FOUR (4) HOURS OF TECHNICIAN TIME ON SITE, AT OWNER'S DIRECTION.
      - ANY TIME SPENT TROUBLESHOOTING THE INSTALLATION DURING THIS TIME, SHALL NOT COUNT TOWARDS FULFILLING THIS REQUIREMENT.


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Anthony H. Cauci
Professional Engineer
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# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

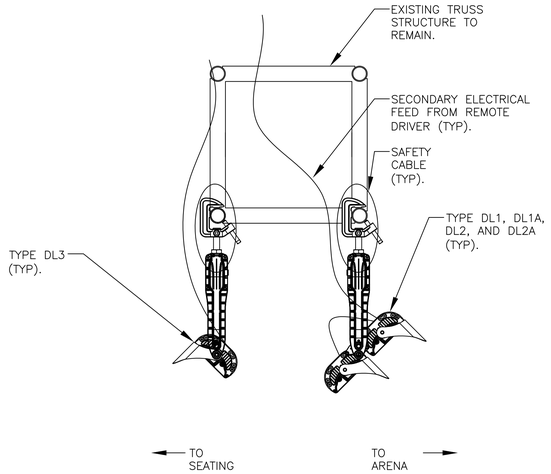
SCALE N.T.S. | PROJECT NO. BC17294

DWG. NAME

GENERAL LIGHTING NOTES

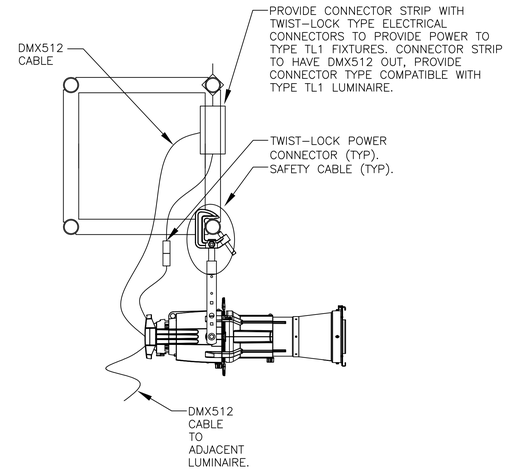
DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

EC-002




1 EC-002 DL1, DL1A, DL2, AND DL2A TYPICAL MOUNTING

NOT TO SCALE




2 EC-002 TL1 TYPICAL MOUNTING

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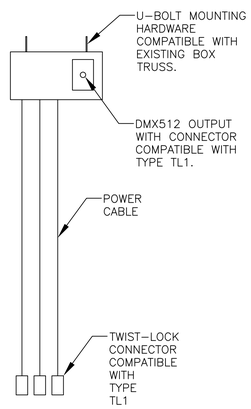


3 EC-002 POWER/DATA CONNECTOR STRIP TYPE TL1

NOT TO SCALE

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# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.

PROJECT NO. BC17294

DWG. NAME

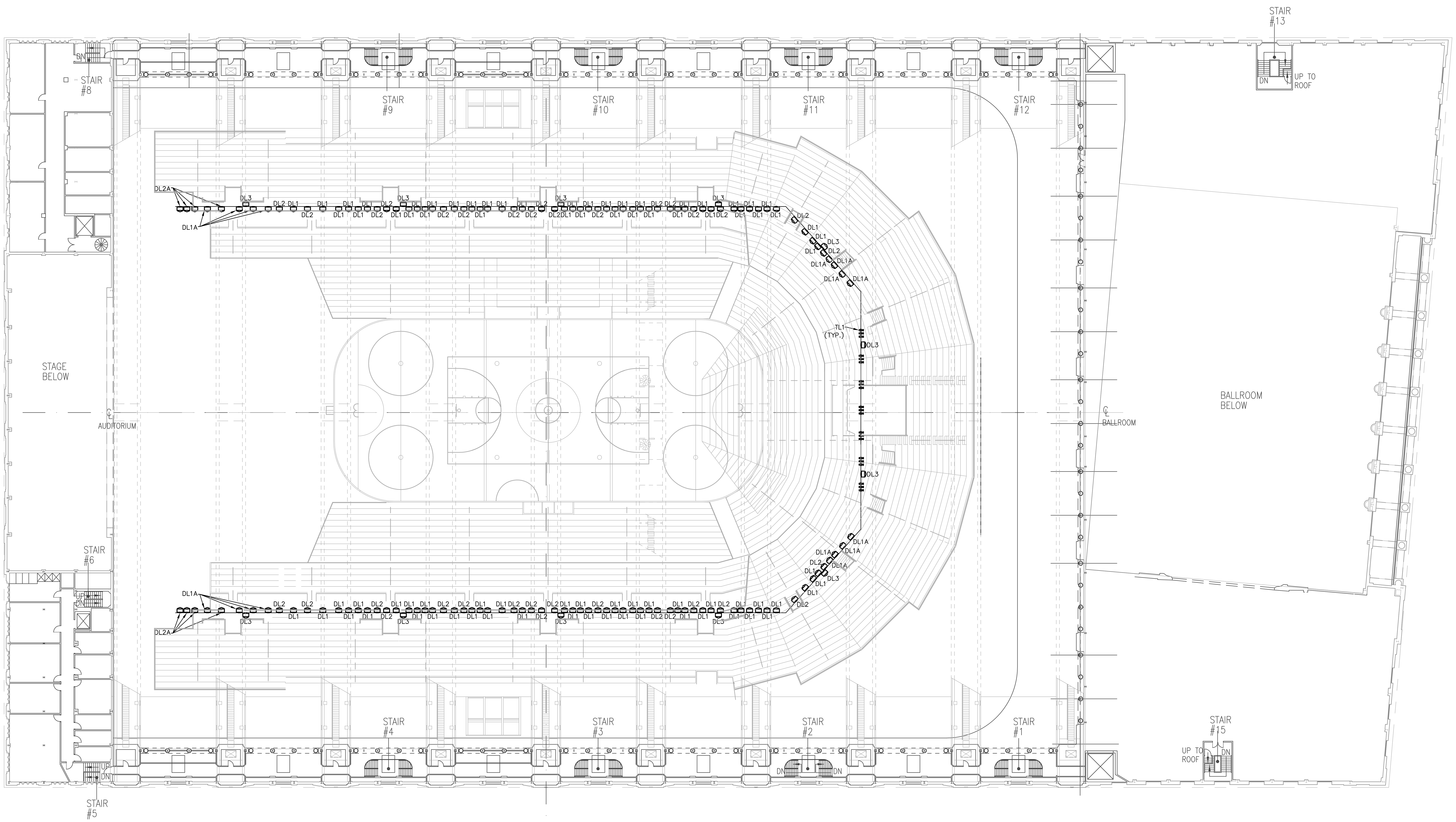
GENERAL LIGHTING NOTES

DATE 06/13/17

DRAWN BY ZRT

CHECKED BY ET

EC-003




## ARENA LIGHTING PROPOSED LAYOUT

NOT TO SCALE

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Professional Engineer
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**Boardwalk Hall Arena Lighting Replacement**

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|
| | | |

| SCALE | PROJECT NO. |
|---|---|
| N.T.S. | BC17294 |

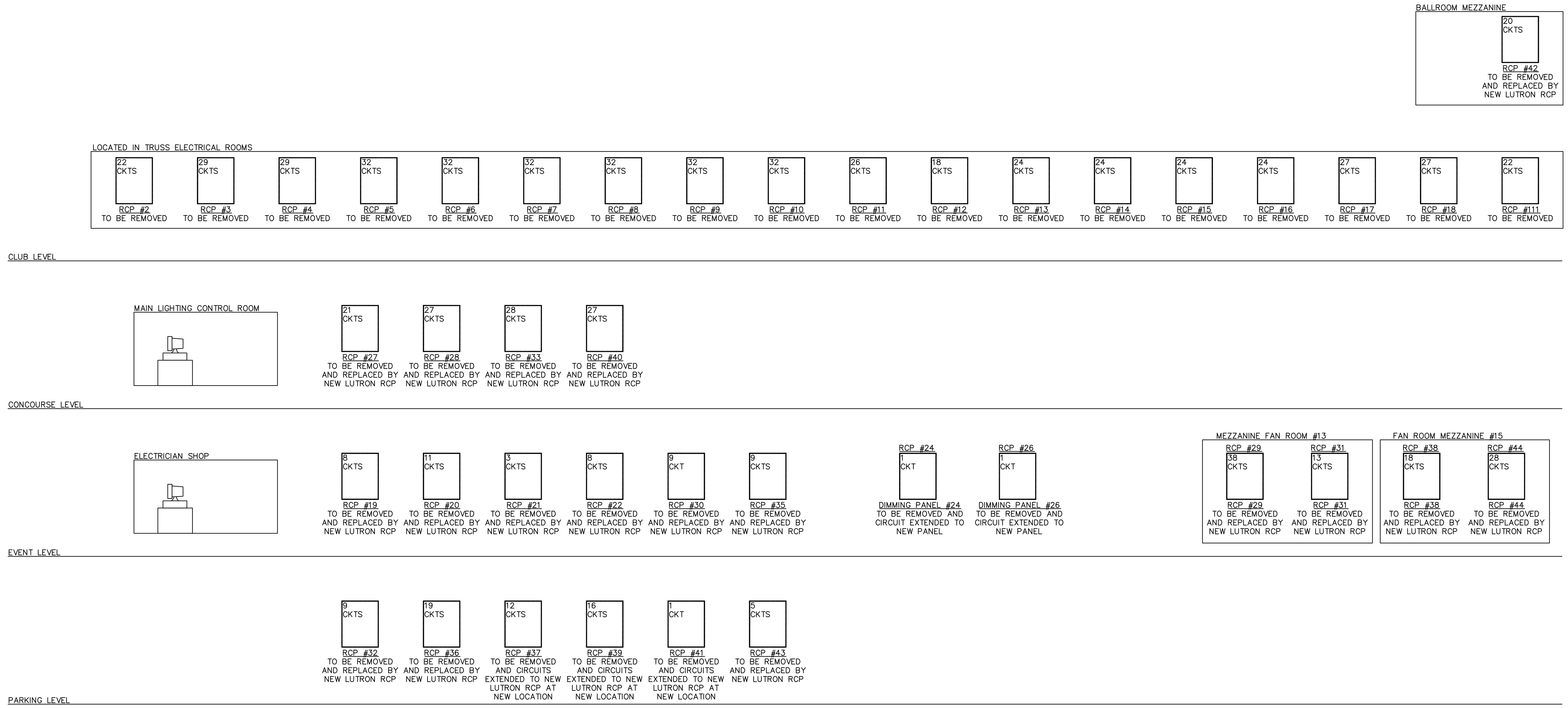
DWG. NAME

ELECTRICAL ARENA LIGHTING PROPOSED LAYOUT

| | |
|---|---|
| DATE | 06/13/17 |
| DRAWN BY | ZRT |
| CHECKED BY | ET |

EC-004

| RCP DESIGNATION | NUMBER OF CIRCUITS CONTROLLED BY RCP |
|---|---|
| RCP #2 | 22 CKTS |
| RCP #3 | 29 CKTS |
| RCP #4 | 29 CKTS |
| RCP #5 | 32 CKTS |
| RCP #6 | 32 CKTS |
| RCP #7 | 32 CKTS |
| RCP #8 | 32 CKTS |
| RCP #9 | 32 CKTS |
| RCP #10 | 32 CKTS |
| RCP #11 | 26 CKTS |
| RCP #12 | 18 CKTS |
| RCP #13 | 24 CKTS |
| RCP #14 | 24 CKTS |
| RCP #15 | 24 CKTS |
| RCP #16 | 24 CKTS |
| RCP #17 | 27 CKTS |
| RCP #18 | 27 CKTS |
| RCP #19 | 8 CKTS |
| RCP #20 | 11 CKTS |
| RCP #21 | 3 CKTS |
| RCP #22 | 8 CKTS |
| RCP #24 | 1 CKT |
| RCP #26 | 1 CKT |
| RCP #27 | 21 CKTS |
| RCP #28 | 27 CKTS |
| RCP #29 | 38 CKTS |
| RCP #30 | 9 CKTS |
| RCP #31 | 13 CKTS |
| RCP #32 | 9 CKTS |
| RCP #33 | 28 CKTS |
| RCP #35 | 9 CKTS |
| RCP #36 | 19 CKTS |
| RCP #37 | 12 CKTS |
| RCP #38 | 18 CKTS |
| RCP #39 | 16 CKTS |
| RCP #40 | 27 CKTS |
| RCP #41 | 1 CKT |
| RCP #42 | 20 CKTS |
| RCP #43 | 5 CKTS |
| RCP #44 | 28 CKTS |
| RCP #111 | 22 CKTS |




EXISTING RCP RISER DIAGRAM

NOT TO SCALE

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Boardwalk Hall Arena Lighting Replacement
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Atlantic City, NJ

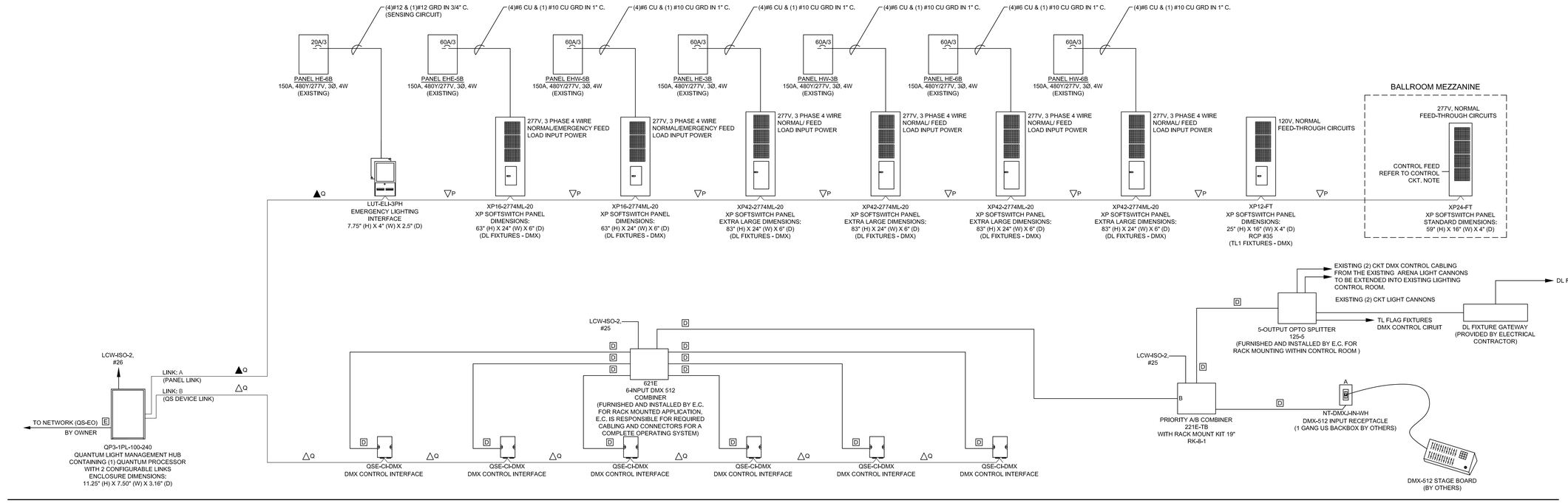
| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S. | PROJECT NO. BC17294

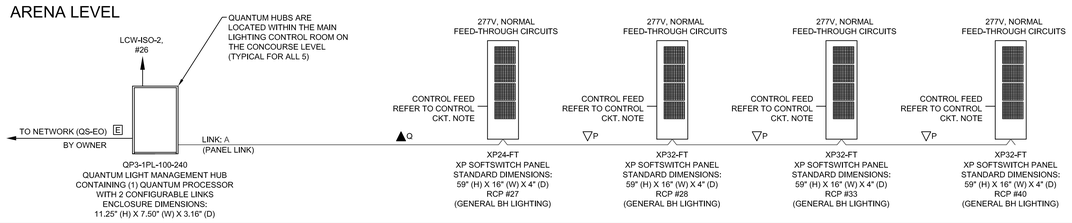
DWG. NAME: EXISTING RCP RISER DIAGRAM

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

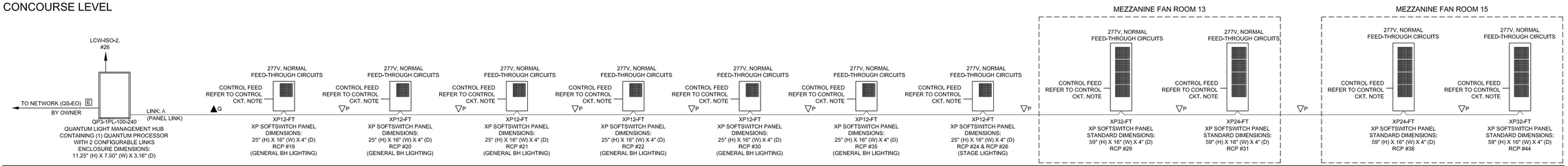
EC-005



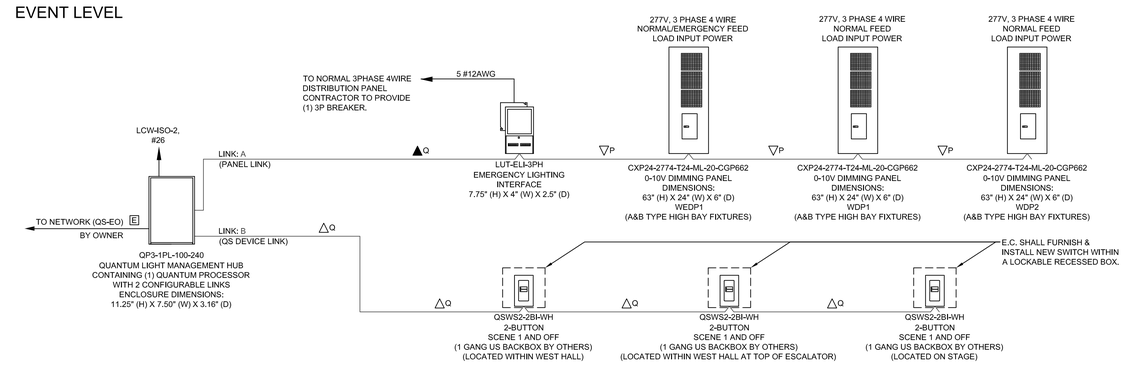

## ARENA LEVEL




## CONCOURSE LEVEL




## EVENT LEVEL




## WIRING LEGEND:

△Q QS CONTROL LINK (SEE WIRE DESCRIPTION BELOW)
▲Q QS CONTROL LINK (SEE WIRE DESCRIPTION BELOW) (CONNECT WIRES 1, 3 AND 4, DO NOT CONNECT WIRE # 2)

QS WIRING AS REQUIRED BY CONTROL LINK LENGTH (REFER TO QS SMART PANEL POWER SUPPLY WIRING GUIDE FOR SHADE WIRING NOTES):

| TOTAL CONTROL LINK LENGTH | WIRE GUAGE | AVAILABLE FROM LIBERTY AV SOLUTIONS IN ONE CABLE: |
|---|---|---|
| LESS THAN 500ft (153 m) | POWER (TERMINALS 1&2): 1 PAIR 18 AWG (1.0 mm²) | LUTRON-YEL OR LUTRON-P-YEL |
| | DATA (TERMINALS 3&4): 1 PAIR 22 AWG (0.5 mm²), TWISTED AND SHIELDED* | |
| 500ft (153 m) TO 2,000ft (600 m)** | POWER (TERMINALS 1&2): 1 PAIR 12 AWG (4 mm²) | LUTRON-RBL OR LUTRON-P-RBL |
| | DATA (TERMINALS 3&4): 1 PAIR 22 AWG (0.5 mm²), TWISTED AND SHIELDED* | |

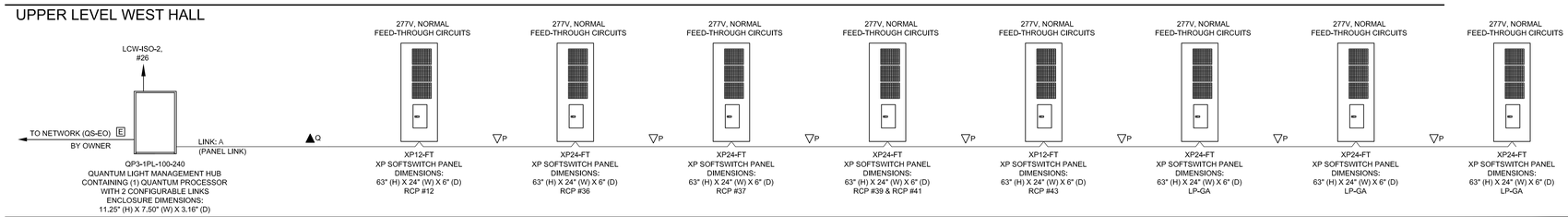
*ALTERNATE DATA-ONLY CABLE: USE APPROVED DATA LINK CABLE (22 AWG [0.5 mm²] TWISTED/SHIELDED) FROM BELDEN (MODEL # 9461).

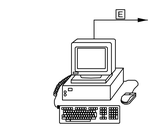
**TOTAL LENGTH OF THE QS LINK MUST NOT EXCEED 2,000 ft (600 m).

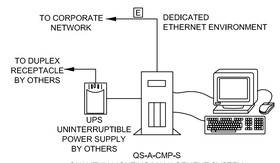
◪ INPUT POWER (NORMAL-EMERGENCY)
□ INPUT POWER (NORMAL)
● 2 #12AWG (4 mm²)
○ 3 #12AWG (4 mm²)
E CAT5E OR BETTER CABLE FOR LUTRON NETWORK TERMINATED WITH RJ45 CONNECTORS (TO BE PROVIDED BY OTHERS). 328 ft (100 m) MAXIMUM RUN.
▽P PANEL LINK (SEE WIRE DESCRIPTION BELOW)
▼P PANEL LINK (SEE WIRE DESCRIPTION BELOW) (CONNECT WIRES 1, 2, 3 AND 4, DO NOT CONNECT WIRE # 5)
LUTRON CABLE LUTRON-RBL (5 CONDUCTOR NON-PLENUM) OR LUTRON-P-RBL (5 CONDUCTOR PLENUM RATED). OTHERWISE USE 2 #12 AWG (4 mm²), 1 BELDEN #9461 AND BETWEEN PANELS ADD 1 #18 AWG (1.0 mm²) FOR EMERGENCY SENSING CABLE BY OTHERS.
D DMX CONTROL

CONTROL CIRCUIT NOTE:
- SUPPLIES POWER FOR INTERNAL OPERATION.
- LUTRON RECOMMENDS A DEDICATED 120V OR 277V, 20A 1 PHASE 2 WIRE FEED TO POWER THE CONTROL CIRCUIT IN THE PANEL.
- IF THE CONTROL CIRCUIT IS TAPPED FROM A CIRCUIT THAT POWERS A RELAY IN THE PANEL, IT DRAWS A MAXIMUM OF 1.5A TOWARD THE TOTAL LOAD FOR THAT CIRCUIT.

## UPPER LEVEL WEST HALL




## LOWER LEVEL PARKING, EAST & WEST HALLS


CONCORD ENGINEERING
3020 Market Street, Suite 103 Philadelphia, Pennsylvania 19104 (215) 387-1011
2311 Atlantic Avenue Atlantic City, New Jersey 08401 (609) 572-0000
520 South Burnt Mill Road Voorhees, New Jersey 08043 (856) 767-8000
www.concord-engineering.com

Anthony H. Caucci
Professional Engineer
New Jersey Lic. # 44036


# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

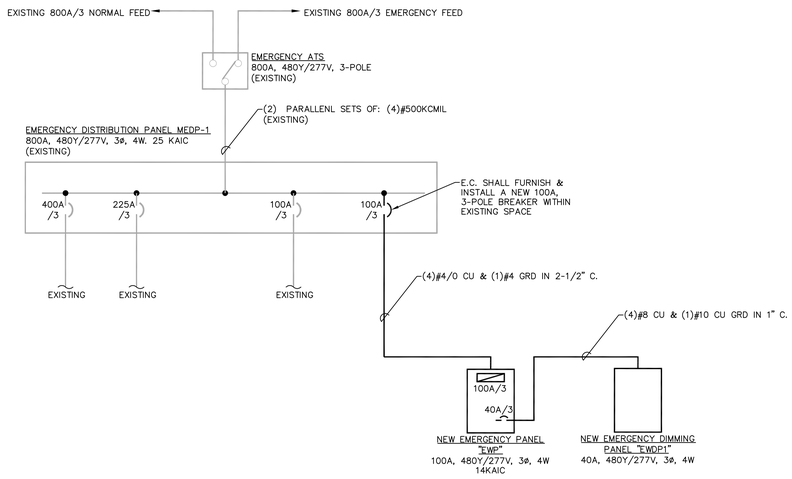
| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.
PROJECT NO. 8C17294

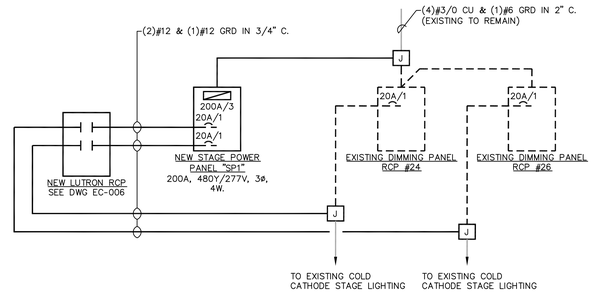
DWG. NAME
LUTRON LIGHTING RISER DIAGRAM

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

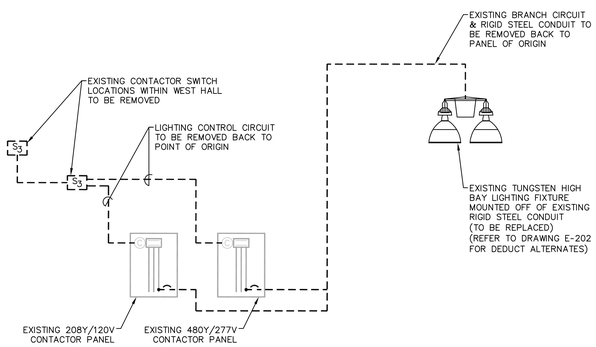
EC-006



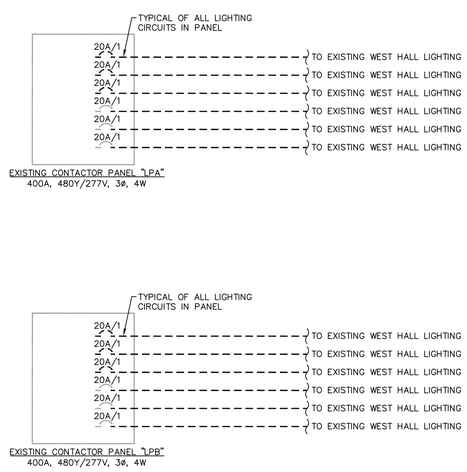

## EXISTING WEST HALL EMERGENCY LIGHTING SINGLE LINE DIAGRAM



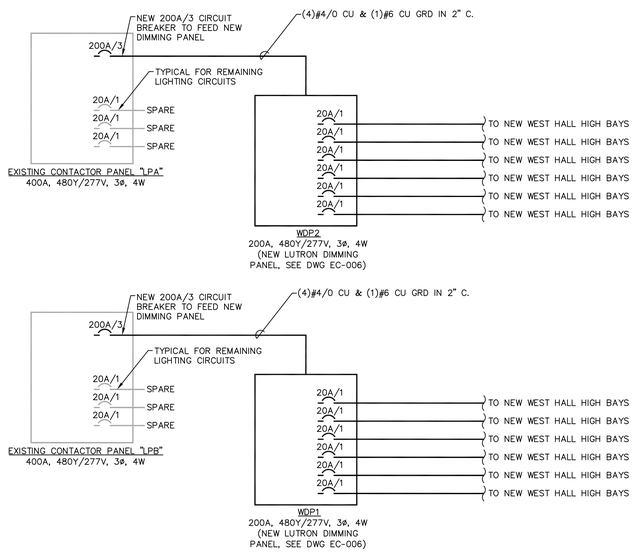

## EXISTING STAGE DIMMING PANEL SINGLE LINE DIAGRAM




## EXISTING TYPICAL WEST HALL LIGHTING RISER DIAGRAM




## EXISTING WEST HALL LIGHTING SINGLE LINE DIAGRAM




## NEW WEST HALL LIGHTING SINGLE LINE DIAGRAM


CONCORD ENGINEERING
520 South Burrs Mill Road
Voorhees, New Jersey 08043
(856) 767-9000
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
www.concord-engineering.com
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1011

Anthony H. Caucci
Professional Engineer
New Jersey Lic. # 44806


# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.
PROJECT NO. 8C17294

DWG. NAME
WEST HALL LIGHTING RISER DIAGRAMS

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

EC-007

## DIMMING PANEL "DP1"

MAINS: 60A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED BY: REFER TO SINGLE LINE DIAGRAM
FEEDER: REFER TO SINGLE LINE DIAGRAM

| CIRCUIT NUMBER | CIRCUIT BREAKER | WIRE SIZE | CONDUIT SIZE | ZONE NUMBER | ZONE NAME AND DESCRIPTION | LOAD/LAMP TYPE | FIXTURE WATTAGE (W) | FIXTURES/ ZONE | TOTAL LOAD (KW) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 2#12 & 1#12 GRD | 3/4" | 1 | ARENA LIGHTING | DL2A | 650 | 1 | 0.65 | |
| 2 | 20 | 2#12 & 1#12 GRD | 3/4" | 2 | ARENA LIGHTING | DL2A | 650 | 1 | 0.65 | |
| 3 | 20 | 2#12 & 1#12 GRD | 3/4" | 3 | ARENA LIGHTING | DL2A | 650 | 1 | 0.65 | |
| 4 | 20 | 2#12 & 1#12 GRD | 3/4" | 4 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 5 | 20 | 2#12 & 1#12 GRD | 3/4" | 5 | ARENA LIGHTING | DL2A | 650 | 1 | 0.65 | |
| 6 | 20 | 2#12 & 1#12 GRD | 3/4" | 6 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 7 | 20 | 2#12 & 1#12 GRD | 3/4" | 7 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 8 | 20 | 2#12 & 1#12 GRD | 3/4" | 8 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 9 | 20 | 2#12 & 1#12 GRD | 3/4" | 9 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 10 | 20 | 2#12 & 1#12 GRD | 3/4" | 10 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 11 | 20 | 2#12 & 1#12 GRD | 3/4" | 11 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 12 | 20 | 2#12 & 1#12 GRD | 3/4" | 12 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 13 | 20 | 2#12 & 1#12 GRD | 3/4" | 13 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 14 | 20 | 2#12 & 1#12 GRD | 3/4" | 14 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 15 | 20 | 2#12 & 1#12 GRD | 3/4" | 15 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 16 | 20 | 2#12 & 1#12 GRD | 3/4" | 16 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 17 | 20 | 2#12 & 1#12 GRD | 3/4" | 17 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 18 | 20 | 2#12 & 1#12 GRD | 3/4" | 18 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 19 | 20 | 2#12 & 1#12 GRD | 3/4" | 19 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 20 | 20 | 2#12 & 1#12 GRD | 3/4" | 20 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 21 | 20 | 2#12 & 1#12 GRD | 3/4" | 21 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 22 | 20 | 2#12 & 1#12 GRD | 3/4" | 22 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 23 | 20 | 2#12 & 1#12 GRD | 3/4" | 23 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 24 | 20 | 2#12 & 1#12 GRD | 3/4" | 24 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 25 | 20 | 2#12 & 1#12 GRD | 3/4" | 25 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 26 | 20 | 2#12 & 1#12 GRD | 3/4" | 26 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 27 | 20 | 2#12 & 1#12 GRD | 3/4" | 27 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 28 | 20 | 2#12 & 1#12 GRD | 3/4" | 28 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 29 | 20 | 2#12 & 1#12 GRD | 3/4" | 29 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 30 | 20 | 2#12 & 1#12 GRD | 3/4" | 30 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 31 | 20 | 2#12 & 1#12 GRD | 3/4" | 31 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 32 | 20 | 2#12 & 1#12 GRD | 3/4" | 32 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 33 | | | | | | | | | 0.00 | |
| 34 | | | | | | | | | 0.00 | |
| 35 | | | | | | | | | 0.00 | |
| 36 | | | | | | | | | 0.00 | |
| 37 | | | | | | | | | 0.00 | |
| 38 | | | | | | | | | 0.00 | |
| 39 | | | | | | | | | 0.00 | |
| 40 | | | | | | | | | 0.00 | |
| 41 | | | | | | | | | 0.00 | |
| 42 | | | | | | | | | 0.00 | |

TOTAL: 20.8 / 0.831 = 25.0 AMPS
25.0 A X 125 % = **31.3 AMPS**

## DIMMING PANEL "DP2"

MAINS: 60A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED BY: REFER TO SINGLE LINE DIAGRAM
FEEDER: REFER TO SINGLE LINE DIAGRAM

| CIRCUIT NUMBER | CIRCUIT BREAKER | WIRE SIZE | CONDUIT SIZE | ZONE NUMBER | ZONE NAME AND DESCRIPTION | LOAD/LAMP TYPE | FIXTURE WATTAGE (W) | FIXTURES/ ZONE | TOTAL LOAD (KW) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 2#12 & 1#12 GRD | 3/4" | 1 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 2 | 20 | 2#12 & 1#12 GRD | 3/4" | 2 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 3 | 20 | 2#12 & 1#12 GRD | 3/4" | 3 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 4 | 20 | 2#12 & 1#12 GRD | 3/4" | 4 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 5 | 20 | 2#12 & 1#12 GRD | 3/4" | 5 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 6 | 20 | 2#12 & 1#12 GRD | 3/4" | 6 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 7 | 20 | 2#12 & 1#12 GRD | 3/4" | 7 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 8 | 20 | 2#12 & 1#12 GRD | 3/4" | 8 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 9 | 20 | 2#12 & 1#12 GRD | 3/4" | 9 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 10 | 20 | 2#12 & 1#12 GRD | 3/4" | 10 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 11 | 20 | 2#12 & 1#12 GRD | 3/4" | 11 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 12 | 20 | 2#12 & 1#12 GRD | 3/4" | 12 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 13 | 20 | 2#12 & 1#12 GRD | 3/4" | 13 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 14 | 20 | 2#12 & 1#12 GRD | 3/4" | 14 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 15 | 20 | 2#12 & 1#12 GRD | 3/4" | 15 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 16 | 20 | 2#12 & 1#12 GRD | 3/4" | 16 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 17 | 20 | 2#12 & 1#12 GRD | 3/4" | 17 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 18 | 20 | 2#12 & 1#12 GRD | 3/4" | 18 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 19 | 20 | 2#12 & 1#12 GRD | 3/4" | 19 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 20 | 20 | 2#12 & 1#12 GRD | 3/4" | 20 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 21 | 20 | 2#12 & 1#12 GRD | 3/4" | 21 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 22 | 20 | 2#12 & 1#12 GRD | 3/4" | 22 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 23 | 20 | 2#12 & 1#12 GRD | 3/4" | 23 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 24 | 20 | 2#12 & 1#12 GRD | 3/4" | 24 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 25 | 20 | 2#12 & 1#12 GRD | 3/4" | 25 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 26 | 20 | 2#12 & 1#12 GRD | 3/4" | 26 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 27 | 20 | 2#12 & 1#12 GRD | 3/4" | 27 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 28 | 20 | 2#12 & 1#12 GRD | 3/4" | 28 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 29 | 20 | 2#12 & 1#12 GRD | 3/4" | 29 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 30 | 20 | 2#12 & 1#12 GRD | 3/4" | 30 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 31 | 20 | 2#12 & 1#12 GRD | 3/4" | 31 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 32 | | | | | | | | | 0.00 | |
| 33 | | | | | | | | | 0.00 | |
| 34 | | | | | | | | | 0.00 | |
| 35 | | | | | | | | | 0.00 | |
| 36 | | | | | | | | | 0.00 | |
| 37 | | | | | | | | | 0.00 | |
| 38 | | | | | | | | | 0.00 | |
| 39 | | | | | | | | | 0.00 | |
| 40 | | | | | | | | | 0.00 | |
| 41 | | | | | | | | | 0.00 | |
| 42 | | | | | | | | | 0.00 | |

TOTAL: 20.2 / 0.831 = 24.2 AMPS
24.2 A X 125 % = **30.3 AMPS**

## DIMMING PANEL "DP3"

MAINS: 60A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED BY: REFER TO SINGLE LINE DIAGRAM
FEEDER: REFER TO SINGLE LINE DIAGRAM

| CIRCUIT NUMBER | CIRCUIT BREAKER | WIRE SIZE | CONDUIT SIZE | ZONE NUMBER | ZONE NAME AND DESCRIPTION | LOAD/LAMP TYPE | FIXTURE WATTAGE (W) | FIXTURES/ ZONE | TOTAL LOAD (KW) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 2#12 & 1#12 GRD | 3/4" | 1 | ARENA LIGHTING | DL2A | 650 | 1 | 0.65 | |
| 2 | 20 | 2#12 & 1#12 GRD | 3/4" | 2 | ARENA LIGHTING | DL2A | 650 | 1 | 0.65 | |
| 3 | 20 | 2#12 & 1#12 GRD | 3/4" | 3 | ARENA LIGHTING | DL2A | 650 | 1 | 0.65 | |
| 4 | 20 | 2#12 & 1#12 GRD | 3/4" | 4 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 5 | 20 | 2#12 & 1#12 GRD | 3/4" | 5 | ARENA LIGHTING | DL2A | 650 | 1 | 0.65 | |
| 6 | 20 | 2#12 & 1#12 GRD | 3/4" | 6 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 7 | 20 | 2#12 & 1#12 GRD | 3/4" | 7 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 8 | 20 | 2#12 & 1#12 GRD | 3/4" | 8 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 9 | 20 | 2#12 & 1#12 GRD | 3/4" | 9 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 10 | 20 | 2#12 & 1#12 GRD | 3/4" | 10 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 11 | 20 | 2#12 & 1#12 GRD | 3/4" | 11 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 12 | 20 | 2#12 & 1#12 GRD | 3/4" | 12 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 13 | 20 | 2#12 & 1#12 GRD | 3/4" | 13 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 14 | 20 | 2#12 & 1#12 GRD | 3/4" | 14 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 15 | 20 | 2#12 & 1#12 GRD | 3/4" | 15 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 16 | 20 | 2#12 & 1#12 GRD | 3/4" | 16 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 17 | 20 | 2#12 & 1#12 GRD | 3/4" | 17 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 18 | 20 | 2#12 & 1#12 GRD | 3/4" | 18 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 19 | 20 | 2#12 & 1#12 GRD | 3/4" | 19 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 20 | 20 | 2#12 & 1#12 GRD | 3/4" | 20 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 21 | 20 | 2#12 & 1#12 GRD | 3/4" | 21 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 22 | 20 | 2#12 & 1#12 GRD | 3/4" | 22 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 23 | 20 | 2#12 & 1#12 GRD | 3/4" | 23 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 24 | 20 | 2#12 & 1#12 GRD | 3/4" | 24 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 25 | 20 | 2#12 & 1#12 GRD | 3/4" | 25 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 26 | 20 | 2#12 & 1#12 GRD | 3/4" | 26 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 27 | 20 | 2#12 & 1#12 GRD | 3/4" | 27 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 28 | 20 | 2#12 & 1#12 GRD | 3/4" | 28 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 29 | 20 | 2#12 & 1#12 GRD | 3/4" | 29 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 30 | 20 | 2#12 & 1#12 GRD | 3/4" | 30 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 31 | 20 | 2#12 & 1#12 GRD | 3/4" | 31 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 32 | 20 | 2#12 & 1#12 GRD | 3/4" | 32 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 33 | | | | | | | | | 0.00 | |
| 34 | | | | | | | | | 0.00 | |
| 35 | | | | | | | | | 0.00 | |
| 36 | | | | | | | | | 0.00 | |
| 37 | | | | | | | | | 0.00 | |
| 38 | | | | | | | | | 0.00 | |
| 39 | | | | | | | | | 0.00 | |
| 40 | | | | | | | | | 0.00 | |
| 41 | | | | | | | | | 0.00 | |
| 42 | | | | | | | | | 0.00 | |

TOTAL: 20.8 / 0.831 = 25.0 AMPS
25.0 A X 125 % = **31.3 AMPS**

## DIMMING PANEL "DP4"

MAINS: 60A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED BY: REFER TO SINGLE LINE DIAGRAM
FEEDER: REFER TO SINGLE LINE DIAGRAM

| CIRCUIT NUMBER | CIRCUIT BREAKER | WIRE SIZE | CONDUIT SIZE | ZONE NUMBER | ZONE NAME AND DESCRIPTION | LOAD/LAMP TYPE | FIXTURE WATTAGE (W) | FIXTURES/ ZONE | TOTAL LOAD (KW) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 2#12 & 1#12 GRD | 3/4" | 1 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 2 | 20 | 2#12 & 1#12 GRD | 3/4" | 2 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 3 | 20 | 2#12 & 1#12 GRD | 3/4" | 3 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 4 | 20 | 2#12 & 1#12 GRD | 3/4" | 4 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 5 | 20 | 2#12 & 1#12 GRD | 3/4" | 5 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 6 | 20 | 2#12 & 1#12 GRD | 3/4" | 6 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 7 | 20 | 2#12 & 1#12 GRD | 3/4" | 7 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 8 | 20 | 2#12 & 1#12 GRD | 3/4" | 8 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 9 | 20 | 2#12 & 1#12 GRD | 3/4" | 9 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 10 | 20 | 2#12 & 1#12 GRD | 3/4" | 10 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 11 | 20 | 2#12 & 1#12 GRD | 3/4" | 11 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 12 | 20 | 2#12 & 1#12 GRD | 3/4" | 12 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 13 | 20 | 2#12 & 1#12 GRD | 3/4" | 13 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 14 | 20 | 2#12 & 1#12 GRD | 3/4" | 14 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 15 | 20 | 2#12 & 1#12 GRD | 3/4" | 15 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 16 | 20 | 2#12 & 1#12 GRD | 3/4" | 16 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 17 | 20 | 2#12 & 1#12 GRD | 3/4" | 17 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 18 | 20 | 2#12 & 1#12 GRD | 3/4" | 18 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 19 | 20 | 2#12 & 1#12 GRD | 3/4" | 19 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 20 | 20 | 2#12 & 1#12 GRD | 3/4" | 20 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 21 | 20 | 2#12 & 1#12 GRD | 3/4" | 21 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 22 | 20 | 2#12 & 1#12 GRD | 3/4" | 22 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 23 | 20 | 2#12 & 1#12 GRD | 3/4" | 23 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 24 | 20 | 2#12 & 1#12 GRD | 3/4" | 24 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 25 | 20 | 2#12 & 1#12 GRD | 3/4" | 25 | ARENA LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 26 | 20 | 2#12 & 1#12 GRD | 3/4" | 26 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 27 | 20 | 2#12 & 1#12 GRD | 3/4" | 27 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 28 | 20 | 2#12 & 1#12 GRD | 3/4" | 28 | ARENA LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 29 | 20 | 2#12 & 1#12 GRD | 3/4" | 29 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 30 | 20 | 2#12 & 1#12 GRD | 3/4" | 30 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 31 | 20 | 2#12 & 1#12 GRD | 3/4" | 31 | ARENA LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 32 | | | | | | | | | 0.00 | |
| 33 | | | | | | | | | 0.00 | |
| 34 | | | | | | | | | 0.00 | |
| 35 | | | | | | | | | 0.00 | |
| 36 | | | | | | | | | 0.00 | |
| 37 | | | | | | | | | 0.00 | |
| 38 | | | | | | | | | 0.00 | |
| 39 | | | | | | | | | 0.00 | |
| 40 | | | | | | | | | 0.00 | |
| 41 | | | | | | | | | 0.00 | |
| 42 | | | | | | | | | 0.00 | |

TOTAL: 20.2 / 0.831 = 24.2 AMPS
24.2 A X 125 % = **30.3 AMPS**

## DIMMING PANEL "EDP1"

MAINS: 60A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED BY: REFER TO SINGLE LINE DIAGRAM
FEEDER: REFER TO SINGLE LINE DIAGRAM

| CIRCUIT NUMBER | CIRCUIT BREAKER | WIRE SIZE | CONDUIT SIZE | ZONE NUMBER | ZONE NAME AND DESCRIPTION | LOAD/LAMP TYPE | FIXTURE WATTAGE (W) | FIXTURES/ ZONE | TOTAL LOAD (KW) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 2#12 & 1#12 GRD | 3/4" | 1 | ARENA EMERGENCY LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 2 | 20 | 2#12 & 1#12 GRD | 3/4" | 2 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 3 | 20 | 2#12 & 1#12 GRD | 3/4" | 3 | ARENA EMERGENCY LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 4 | 20 | 2#12 & 1#12 GRD | 3/4" | 4 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 5 | 20 | 2#12 & 1#12 GRD | 3/4" | 5 | ARENA EMERGENCY LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 6 | 20 | 2#12 & 1#12 GRD | 3/4" | 6 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 7 | 20 | 2#12 & 1#12 GRD | 3/4" | 7 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 8 | 20 | 2#12 & 1#12 GRD | 3/4" | 8 | ARENA EMERGENCY LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 9 | 20 | 2#12 & 1#12 GRD | 3/4" | 9 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 10 | 20 | 2#12 & 1#12 GRD | 3/4" | 10 | ARENA EMERGENCY LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 11 | 20 | 2#12 & 1#12 GRD | 3/4" | 11 | ARENA EMERGENCY LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 12 | 20 | 2#12 & 1#12 GRD | 3/4" | 12 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 13 | 20 | 2#12 & 1#12 GRD | 3/4" | | | | | | 0.00 | |
| 14 | 20 | 2#12 & 1#12 GRD | 3/4" | | | | | | 0.00 | |
| 15 | 20 | 2#12 & 1#12 GRD | 3/4" | | | | | | 0.00 | |
| 16 | 20 | 2#12 & 1#12 GRD | 3/4" | | | | | | 0.00 | |

TOTAL: 5.0 / 0.831 = 6.1 AMPS
6.1 A X 125 % = **7.6 AMPS**

## EMERGENCY DIMMING PANEL "EDP2"

MAINS: 60A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED BY: REFER TO SINGLE LINE DIAGRAM
FEEDER: REFER TO SINGLE LINE DIAGRAM

| CIRCUIT NUMBER | CIRCUIT BREAKER | WIRE SIZE | CONDUIT SIZE | ZONE NUMBER | ZONE NAME AND DESCRIPTION | LOAD/LAMP TYPE | FIXTURE WATTAGE (W) | FIXTURES/ ZONE | TOTAL LOAD (KW) | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 2#12 & 1#12 GRD | 3/4" | 1 | ARENA EMERGENCY LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 2 | 20 | 2#12 & 1#12 GRD | 3/4" | 2 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 3 | 20 | 2#12 & 1#12 GRD | 3/4" | 3 | ARENA EMERGENCY LIGHTING | DL1 | 650 | 1 | 0.65 | |
| 4 | 20 | 2#12 & 1#12 GRD | 3/4" | 4 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 5 | 20 | 2#12 & 1#12 GRD | 3/4" | 5 | ARENA EMERGENCY LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 6 | 20 | 2#12 & 1#12 GRD | 3/4" | 6 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 7 | 20 | 2#12 & 1#12 GRD | 3/4" | 7 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 8 | 20 | 2#12 & 1#12 GRD | 3/4" | 8 | ARENA EMERGENCY LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 9 | 20 | 2#12 & 1#12 GRD | 3/4" | 9 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 10 | 20 | 2#12 & 1#12 GRD | 3/4" | 10 | ARENA EMERGENCY LIGHTING | DL2 | 650 | 1 | 0.65 | |
| 11 | 20 | 2#12 & 1#12 GRD | 3/4" | 11 | ARENA EMERGENCY LIGHTING | DL1A | 650 | 1 | 0.65 | |
| 12 | 20 | 2#12 & 1#12 GRD | 3/4" | 12 | SEATING EMERGENCY LIGHTING | DL3 | 190 | 1 | 0.19 | |
| 13 | 20 | 2#12 & 1#12 GRD | 3/4" | | | | | | 0.00 | |
| 14 | 20 | 2#12 & 1#12 GRD | 3/4" | | | | | | 0.00 | |
| 15 | 20 | 2#12 & 1#12 GRD | 3/4" | | | | | | 0.00 | |
| 16 | 20 | 2#12 & 1#12 GRD | 3/4" | | | | | | 0.00 | |

TOTAL: 5.0 / 0.831 = 6.1 AMPS
6.1 A X 125 % = **7.6 AMPS**

## LIGHTING PANEL 'WDP1'

MAINS: 200A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED BY: REFER TO SINGLE LINE DIAGRAM
FEEDER: REFER TO SINGLE LINE DIAGRAM

| CIRCUIT NUMBER | CIRCUIT BREAKER | POLE | WIRE SIZE | CONDUIT | SERVICE TO: | TOTAL LOAD (KW) |
|---|---|---|---|---|---|---|
| 1 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.02 |
| 2 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.41 |
| 3 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.41 |
| 4 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.02 |
| 5 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.02 |
| 6 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.41 |
| 7 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.41 |
| 8 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.02 |
| 9 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.02 |
| 10 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.41 |
| 11 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.41 |
| 12 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.02 |
| 13 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.02 |
| 14 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 3.52 |
| 15 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.56 |
| 16 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 3.68 |
| 17 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 3.20 |
| 18 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.32 |
| 19 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 3.20 |
| 20 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.87 |
| 21 | | | | | | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |

TOTAL: 65.0 / 0.831 = 78.2 AMPS
78.2 A X 125 % = **97.7 AMPS**

## LIGHTING PANEL 'WDP2'

MAINS: 200A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED BY: REFER TO SINGLE LINE DIAGRAM
FEEDER: REFER TO SINGLE LINE DIAGRAM

| CIRCUIT NUMBER | CIRCUIT BREAKER | POLE | WIRE SIZE | CONDUIT | SERVICE TO: | TOTAL LOAD (KW) |
|---|---|---|---|---|---|---|
| 1 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.29 |
| 2 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.68 |
| 3 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.68 |
| 4 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.29 |
| 5 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.29 |
| 6 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.68 |
| 7 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.68 |
| 8 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.29 |
| 9 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.29 |
| 10 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.68 |
| 11 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.68 |
| 12 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.29 |
| 13 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 4.29 |
| 14 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.72 |
| 15 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.40 |
| 16 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.76 |
| 17 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.88 |
| 18 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.88 |
| 19 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 2.88 |
| 20 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 21 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | LOWER RAMP LTG | 0.16 |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |

TOTAL: 62.9 / 0.831 = 75.7 AMPS
75.7 A X 125 % = **94.6 AMPS**

## LIGHTING PANEL 'EWDP1'

MAINS: 40A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED BY: REFER TO SINGLE LINE DIAGRAM
FEEDER: REFER TO SINGLE LINE DIAGRAM

| CIRCUIT NUMBER | CIRCUIT BREAKER | POLE | WIRE SIZE | CONDUIT | SERVICE TO: | TOTAL LOAD (KW) |
|---|---|---|---|---|---|---|
| 1 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.28 |
| 2 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 3 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 4 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 5 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 6 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 7 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 8 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 9 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 10 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.12 |
| 11 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 0.96 |
| 12 | 20 | 1 | 2#12 & 1#12 GRD | 3/4" | WEST HALL HIGH BAYS | 1.28 |
| 13 | | | | | | |
| 14 | | | | | | |
| 15 | | | | | | |
| 16 | | | | | | |
| 17 | | | | | | |
| 18 | | | | | | |
| 19 | | | | | | |
| 20 | | | | | | |
| 21 | | | | | | |
| 22 | | | | | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 25 | | | | | | |
| 26 | | | | | | |
| 27 | | | | | | |
| 28 | | | | | | |
| 29 | | | | | | |
| 30 | | | | | | |

TOTAL: 13.6 / 0.831 = 16.4 AMPS
16.4 A X 125 % = **20.5 AMPS**

## NEW PANEL "SP1"

MAINS: 200A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED FROM: SEE SINGLE LINE DIAGRAM
FEEDER: SEE SINGLE LINE DIAGRAM

| CONDUIT | WIRE SIZE | SERVICE TO: | KW/PHASE A | KW/PHASE B | KW/PHASE C | CIRCUIT BREAKER AMP | P | NO. | Φ | NO. | P | CIRCUIT BREAKER AMP | KW/PHASE A | KW/PHASE B | KW/PHASE C | SERVICE TO: | WIRE SIZE | CONDUIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/4" | 2#12 & 1#12 GRD | STAGE COLD CATHODE LTG | 2.00 | | | 20 | 1 | 1 | A | 2 | 1 | 20 | 2.00 | | | STAGE COLD CATHODE LTG | 2#12 & 1#12 GRD | 3/4" |
| | | SPARE | | | | 20 | 1 | 3 | B | 4 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 5 | C | 6 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 7 | A | 8 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 9 | B | 10 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 11 | C | 12 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 13 | A | 14 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 15 | B | 16 | 1 | 20 | | | | SPARE | | |
| | | SPACE | | | | | | 17 | C | 18 | | | | | | SPACE | | |
| | | SPACE | | | | | | 19 | A | 20 | | | | | | SPACE | | |
| | | SPACE | | | | | | 21 | B | 22 | | | | | | SPACE | | |
| | | SPACE | | | | | | 23 | C | 24 | | | | | | SPACE | | |
| | | SPACE | | | | | | 25 | A | 26 | | | | | | SPACE | | |
| | | SPACE | | | | | | 27 | B | 28 | | | | | | SPACE | | |
| | | SPACE | | | | | | 29 | C | 30 | | | | | | SPACE | | |
| | | SPACE | | | | | | 31 | A | 32 | | | | | | SPACE | | |
| | | SPACE | | | | | | 33 | B | 34 | | | | | | SPACE | | |
| | | SPACE | | | | | | 35 | C | 36 | | | | | | SPACE | | |
| | | SPACE | | | | | | 37 | A | 38 | | | | | | SPACE | | |
| | | SPACE | | | | | | 39 | B | 40 | | | | | | SPACE | | |
| | | SPACE | | | | | | 41 | C | 42 | | | | | | SPACE | | |
| | | | 2.00 | 0.00 | 0.00 | A | | | B | | | C | 2.00 | 0.00 | 0.00 | | | |
| | | | | | | 4.00 | | | 0.00 | | | 0.00 | | | | | | |
| | | | | | | | | | 4.00 | | | | | | | | | |

**LOAD SUMMARY**
4,000 W/ 831 V= 4.8 AMPS
5 A X 125% = **6.0 AMPS**

## NEW PANEL "EWP"

MAINS: 100A
VOLTAGE: 480Y/277V, 3Φ, 4W

FED FROM: SEE SINGLE LINE DIAGRAM
FEEDER: SEE SINGLE LINE DIAGRAM

| CONDUIT | WIRE SIZE | SERVICE TO: | KW/PHASE A | KW/PHASE B | KW/PHASE C | CIRCUIT BREAKER AMP | P | NO. | Φ | NO. | P | CIRCUIT BREAKER AMP | KW/PHASE A | KW/PHASE B | KW/PHASE C | SERVICE TO: | WIRE SIZE | CONDUIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | SPARE | | | | 20 | 1 | 1 | A | 2 | 3 | 40 | 4.64 | | | EMERGENCY DIMMING PANEL | 4#8 & 1#10 GRD | 3/4" |
| | | SPARE | | | | 20 | 1 | 3 | B | 4 | ▼ | ▼ | | 4.48 | | ▼ | ▼ | ▼ |
| | | SPARE | | | | 20 | 1 | 5 | C | 6 | ▼ | ▼ | | | 4.48 | ▼ | ▼ | ▼ |
| | | SPARE | | | | 20 | 1 | 7 | A | 8 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 9 | B | 10 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 11 | C | 12 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 13 | A | 14 | 1 | 20 | | | | SPARE | | |
| | | SPARE | | | | 20 | 1 | 15 | B | 16 | 1 | 20 | | | | SPARE | | |
| | | SPACE | | | | | | 17 | C | 18 | | | | | | SPACE | | |
| | | SPACE | | | | | | 19 | A | 20 | | | | | | SPACE | | |
| | | SPACE | | | | | | 21 | B | 22 | | | | | | SPACE | | |
| | | SPACE | | | | | | 23 | C | 24 | | | | | | SPACE | | |
| | | SPACE | | | | | | 25 | A | 26 | | | | | | SPACE | | |
| | | SPACE | | | | | | 27 | B | 28 | | | | | | SPACE | | |
| | | SPACE | | | | | | 29 | C | 30 | | | | | | SPACE | | |
| | | SPACE | | | | | | 31 | A | 32 | | | | | | SPACE | | |
| | | SPACE | | | | | | 33 | B | 34 | | | | | | SPACE | | |
| | | SPACE | | | | | | 35 | C | 36 | | | | | | SPACE | | |
| | | SPACE | | | | | | 37 | A | 38 | | | | | | SPACE | | |
| | | SPACE | | | | | | 39 | B | 40 | | | | | | SPACE | | |
| | | SPACE | | | | | | 41 | C | 42 | | | | | | SPACE | | |
| | | | 0.00 | 0.00 | 0.00 | A | | | B | | | C | 4.64 | 4.48 | 4.48 | | | |
| | | | | | | 4.64 | | | 4.48 | | | 4.48 | | | | | | |
| | | | | | | | | | 13.60 | | | | | | | | | |

**LOAD SUMMARY**
13,600 W/ 831 V= 16.4 AMPS
16 A X 125% = **20.5 AMPS**

## EXISTING PANEL "LCW-ISO-2"

MAINS: 100A
VOLTAGE: 208Y/120V, 3Φ, 4W

FED FROM: EXISTING
FEEDER: EXISTING

| CONDUIT | WIRE SIZE | SERVICE TO: | KW/PHASE A | KW/PHASE B | KW/PHASE C | CIRCUIT BREAKER AMP | P | NO. | Φ | NO. | P | CIRCUIT BREAKER AMP | KW/PHASE A | KW/PHASE B | KW/PHASE C | SERVICE TO: | WIRE SIZE | CONDUIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EXISTING LOAD | | | | 20 | 1 | 1 | A | 2 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 3 | B | 4 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 5 | C | 6 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 7 | A | 8 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 9 | B | 10 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 11 | C | 12 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 13 | A | 14 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 15 | B | 16 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 17 | C | 18 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 19 | A | 20 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 21 | B | 22 | 1 | 20 | | | | EXISTING LOAD | | |
| | | EXISTING LOAD | | | | 20 | 1 | 23 | C | 24 | 1 | 20 | | | | EXISTING LOAD | | |
| 3/4" | 2#12 & 1#12 GRD | QUANTUM HUBS | 0.60 | | | L | 1 | 25 | A | 26 | 1 | 20 | 0.60 | | | DMX COMBINER | 2#12 & 1#12 GRD | 3/4" |
| 3/4" | 2#12 & 1#12 GRD | FCU-1 | | 0.59 | | 20 | 1 | 27 | B | 28 | | | | | | SPACE | | |
| | | SPACE | | | | | | 29 | C | 30 | | | | | | SPACE | | |

**LOAD SUMMARY:**
ON 08/31/2010 THE LOAD ON THIS EXISTING PANEL WAS MEASURED BY PHASE AS FOLLOWS: AΦ = 5.2 AMPS, BΦ = 5.4 AMPS, CΦ = 6.1 AMPS AND THE NEUTRAL CARRIED 1.2 AMPS.
WITH THE ADDED NEW LOAD TO THE EXISTING MEASURED LOADS, THE TOTAL ESTIMATED LOADS ON THIS PANEL BY PHASE ARE AΦ = 5.8 AMPS, BΦ = 6 AMPS, CΦ = 6.7 AMPS.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Anthony H. Caucci
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New Jersey Lic. # 44806


# Boardwalk Hall Arena Lighting Replacement

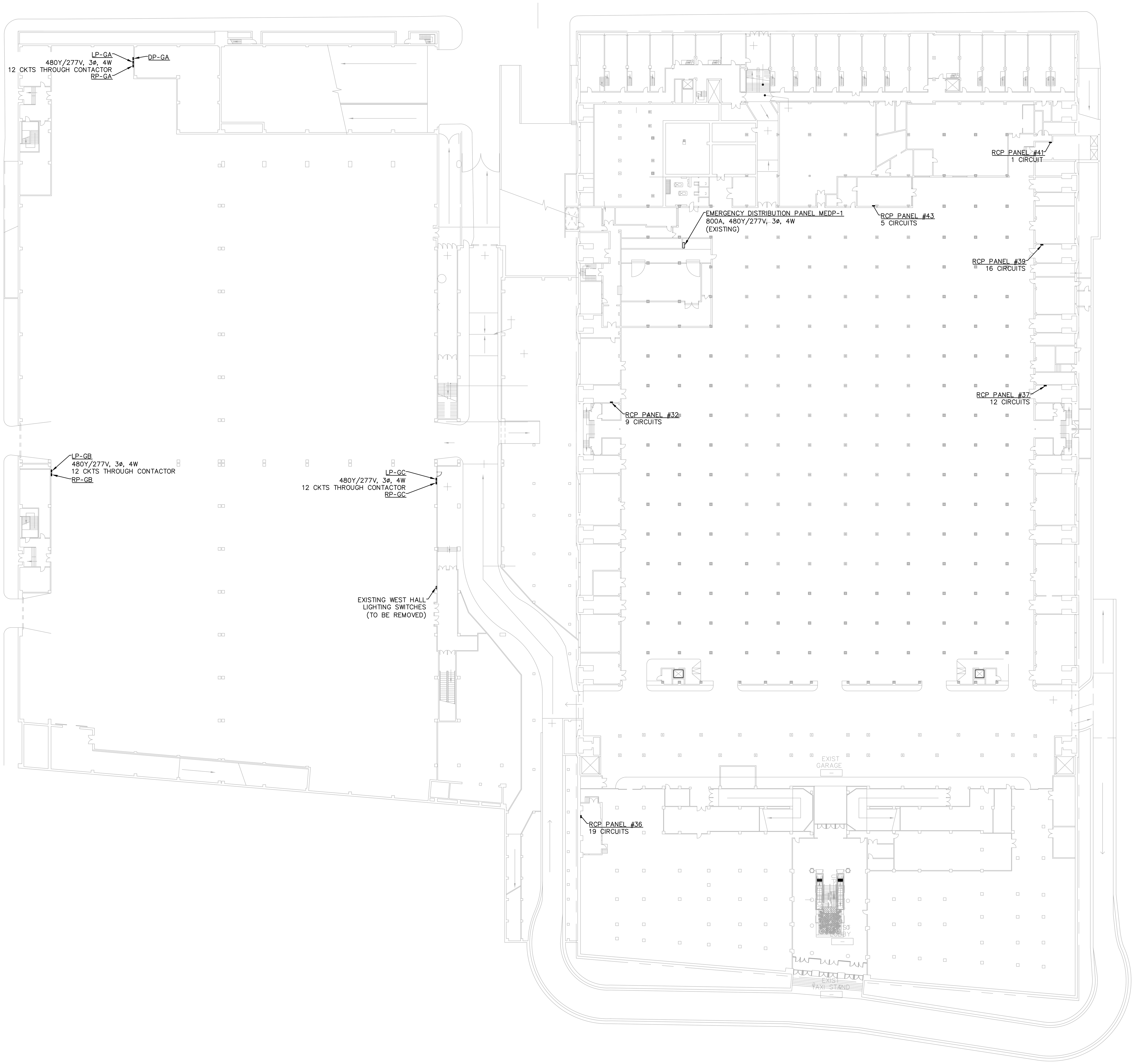
2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|
| SCALE N.T.S. | | PROJECT NO. 8C17294 |

DWG. NAME
PANEL SCHEDULES

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

EC-008




PARKING LEVEL EXISTING PANEL LOCATIONS

NOT TO SCALE

CONCORD ENGINEERING

520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 427-0200

2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 272-9620
www.concord-engineering.com

3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1911

Anthony H. Caucci
Professional Engineer
New Jersey Lic #44806

# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

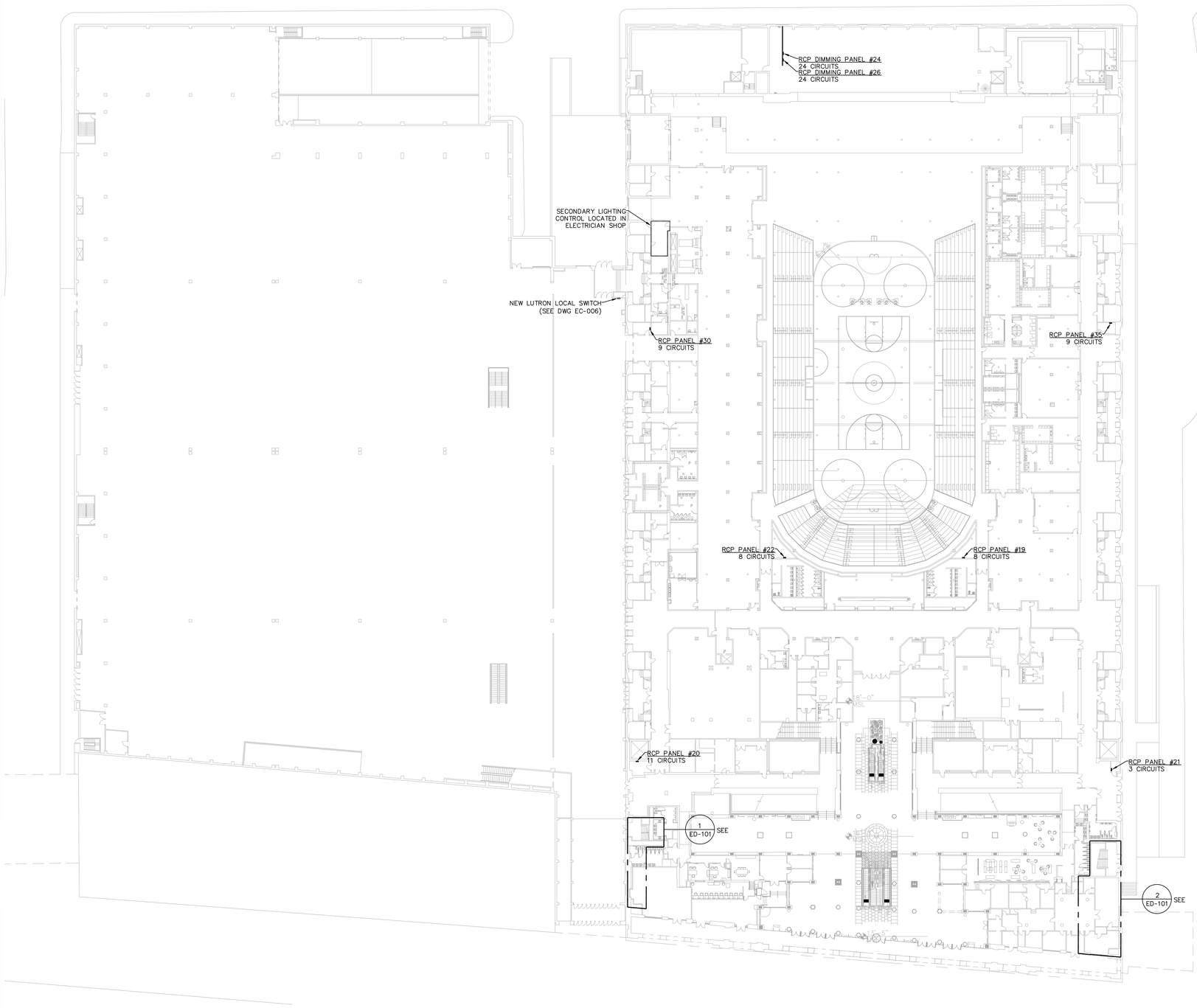
| REV. | DATE | DESCRIPTION |
|---|---|---|
| SCALE N.T.S. | | PROJECT NO. BC17294 |

DWG. NAME

ELECTRICAL PARKING LEVEL RELAY PANEL LOCATIONS

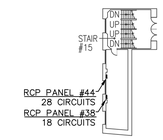
DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

ED-100



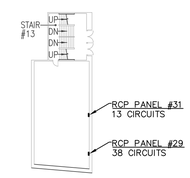

EVENT LEVEL EXISTING PANEL LOCATIONS

NOT TO SCALE




1 ED-101 MEZZANINE FAN ROOM #15

NOT TO SCALE




2 ED-101 MEZZANINE FAN ROOM #13

NOT TO SCALE

CONCORD ENGINEERING
520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 767-2000
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
www.concord-engineering.com
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1011

Anthony H. Caucci
Professional Engineer
New Jersey Lic. # 44006

# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.

PROJECT NO. 8C17294

DWG. NAME

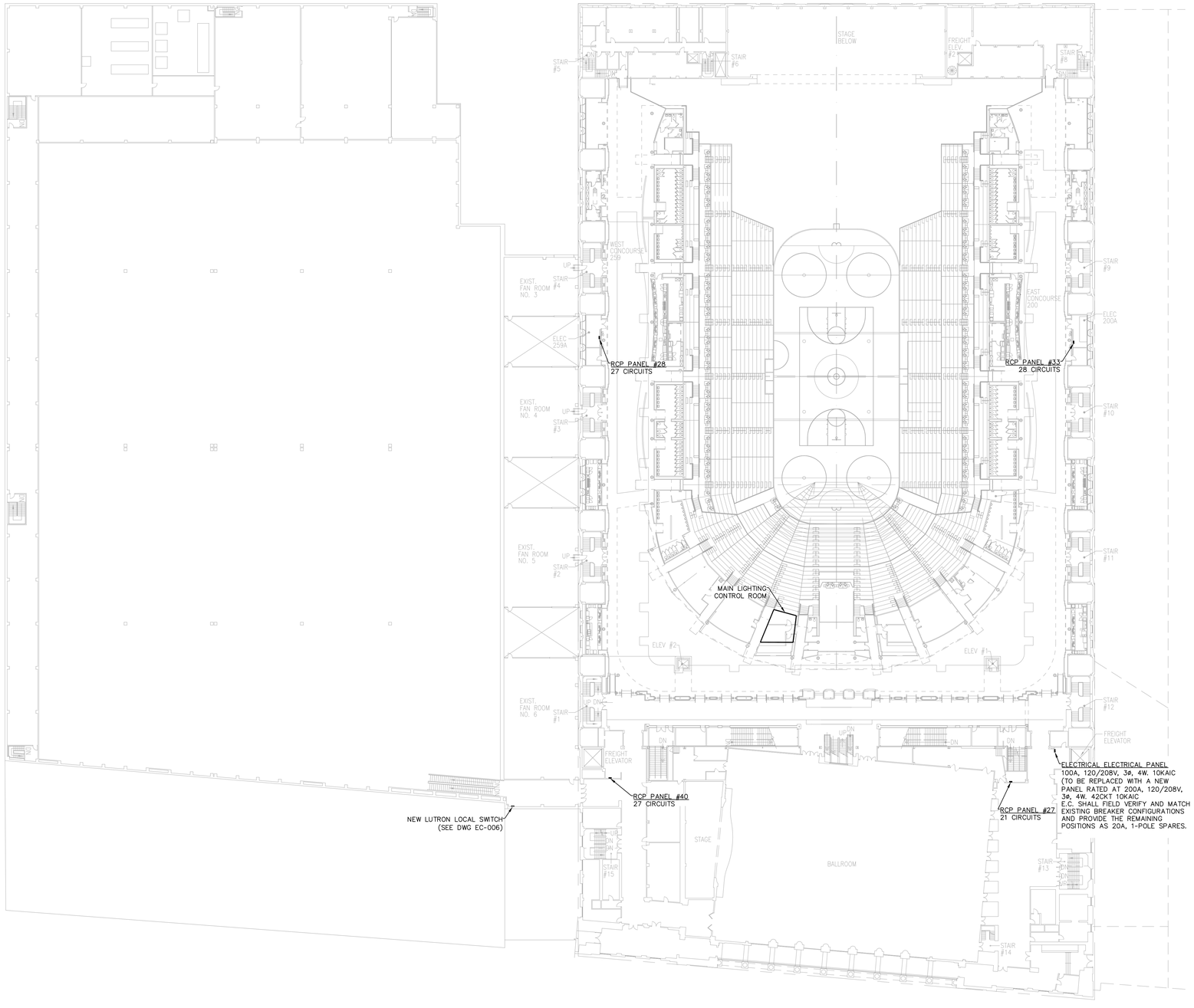
ELECTRICAL EVENT LEVEL RELAY PANEL LOCATIONS

DATE 06/13/17

DRAWN BY ZRT

CHECKED BY ET

ED-101




## CONCOURSE LEVEL EXISTING PANEL LOCATIONS

NOT TO SCALE

CONCORD ENGINEERING
520 South Burrs Mill Road
Voorhees, New Jersey 08043
(856) 427-0600
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 347-0500
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1011
www.concord-engineering.com

Anthony H. Caucci
Professional Engineer
New Jersey Lic. # 44006

# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

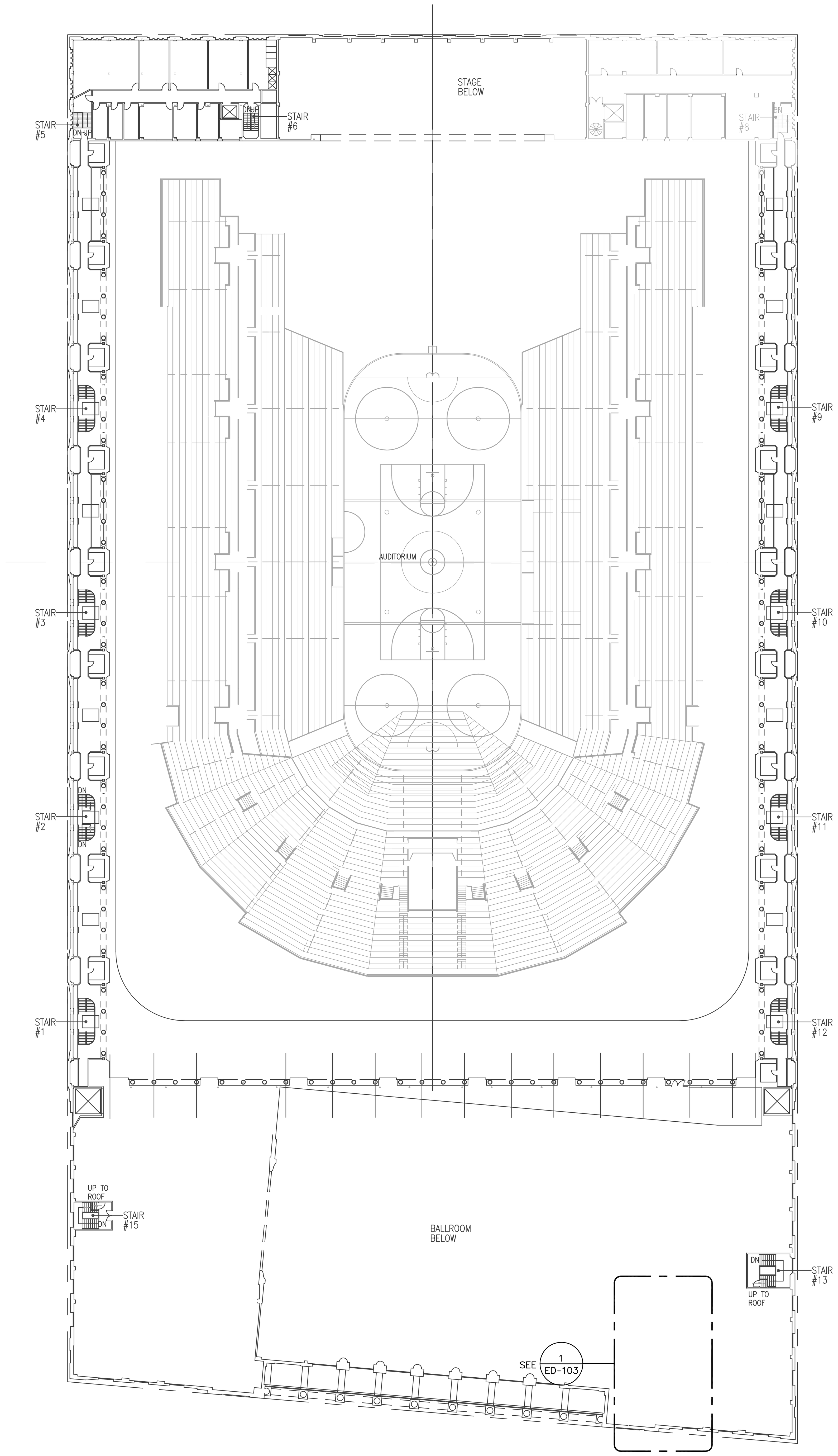
| REV. | DATE | DESCRIPTION |
|---|---|---|
| | | |

SCALE N.T.S.
PROJECT NO. 8C17294

DWG. NAME
ELECTRICAL CONCOURSE LEVEL RELAY PANEL LOCATIONS

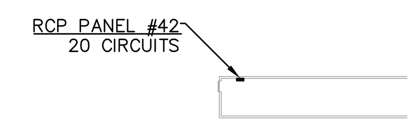
DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

ED-102




## CLUB LEVEL RELAY EXISTING PANEL LOCATIONS

NOT TO SCALE




1 ED-103 **BALLROOM MEZZANINE**

NOT TO SCALE

CONCORD ENGINEERING
520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 427-0200
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 272-9620
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1011
www.concord-engineering.com

Anthony H. Caucci
Professional Engineer
New Jersey Lic. # 44806

**Boardwalk Hall Arena Lighting Replacement**

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

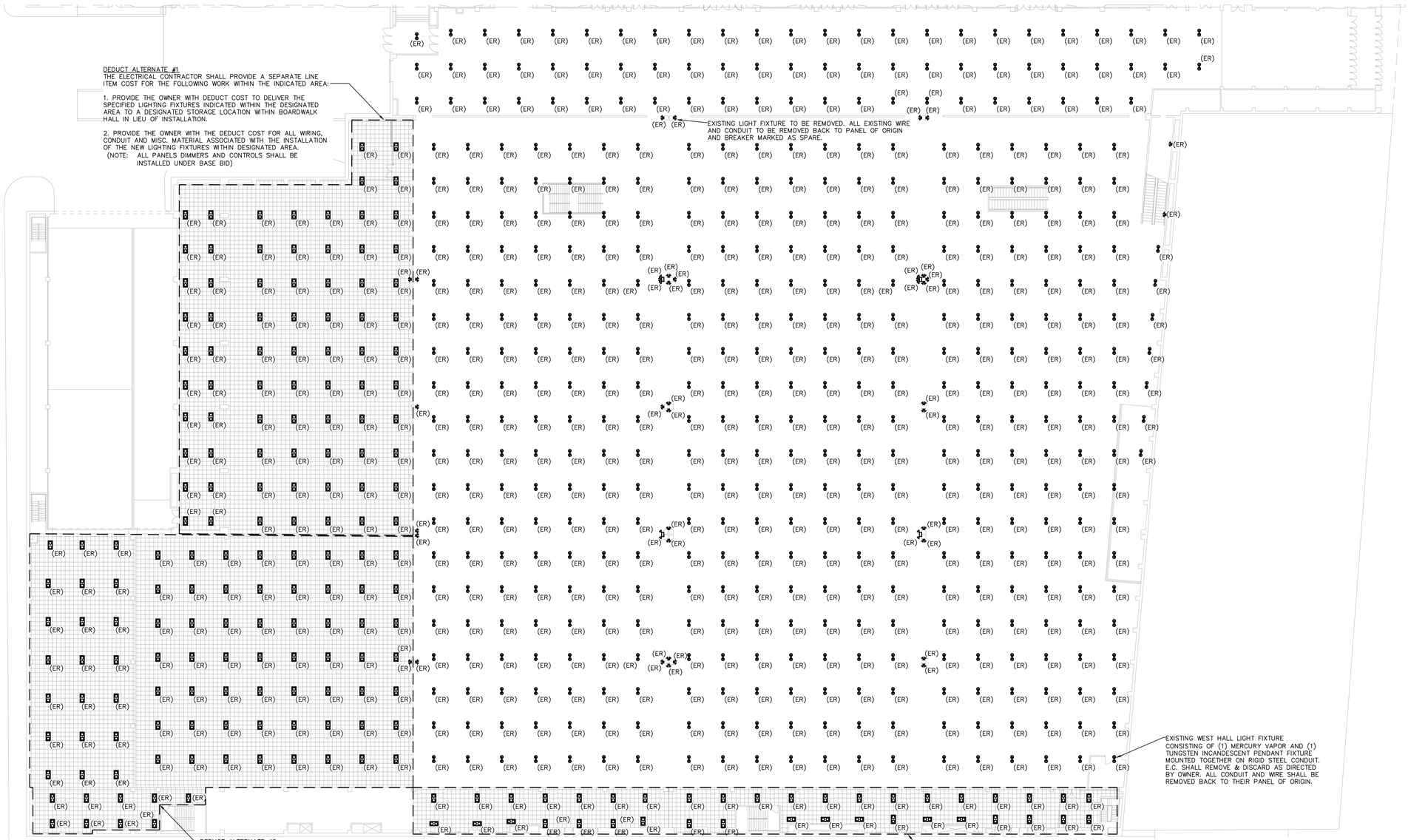
| SCALE | PROJECT NO. |
|---|---|
| N.T.S. | BC17294 |

DWG. NAME

ELECTRICAL CLUB LEVEL RELAY PANEL LOCATIONS

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

ED-103




## WEST HALL LIGHTING DEMOLITION PLAN

NOT TO SCALE

CONCORD ENGINEERING
520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 767-9000
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 572-0900
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1311
www.concord-engineering.com

Anthony H. Cauci
Professional Engineer
New Jersey Lic. # 44036

# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

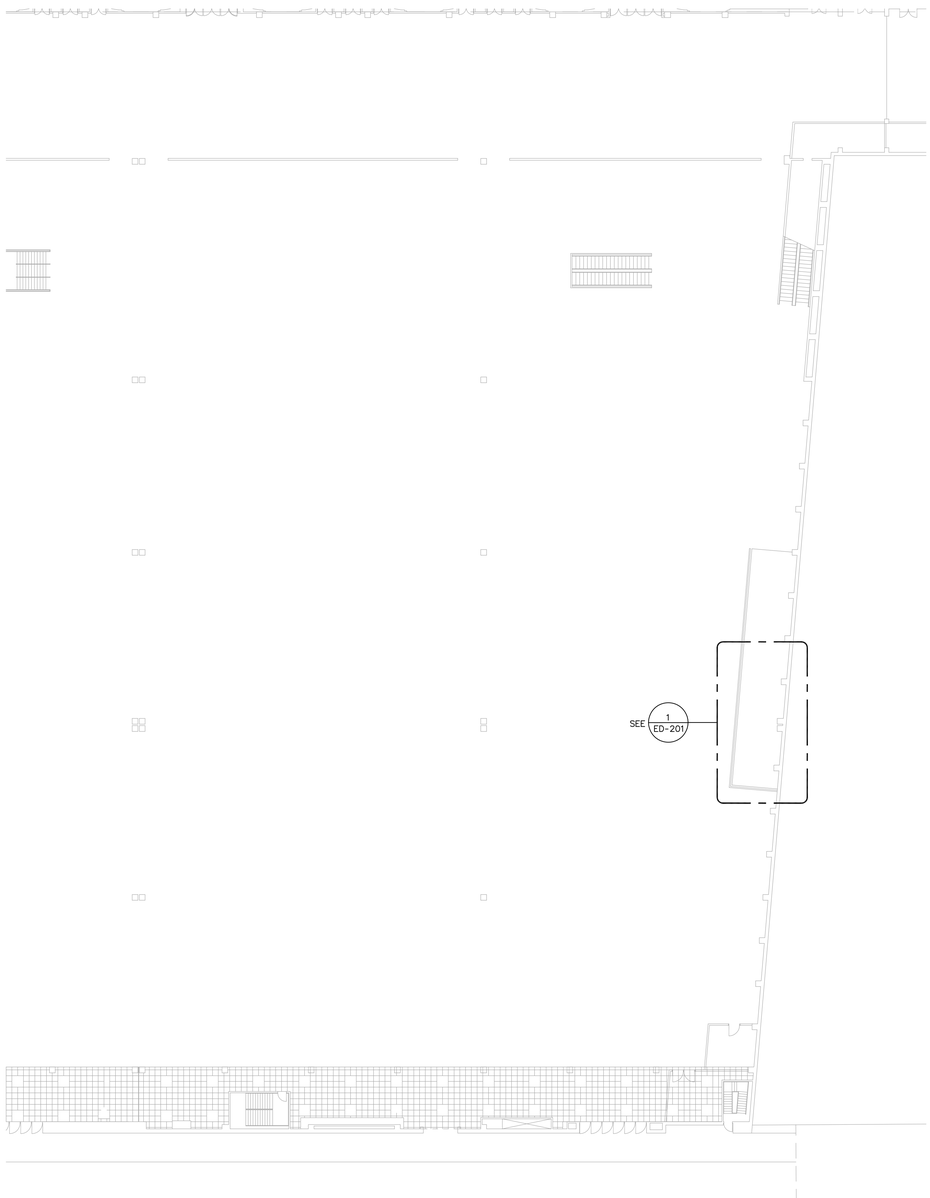
| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.
PROJECT NO. 8C17294

DWG. NAME
ELECTRICAL WEST HALL LIGHTING DEMOLITION PLAN

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

ED-200




WEST HALL LOWER RAMP LIGHTING LOCATION

NOT TO SCALE

1
ED-201
WEST HALL LOWER RAMP

NOT TO SCALE

CONCORD ENGINEERING

520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 427-0600

2311 Atlantic Avenue
Atlantic City, New Jersey 08401
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3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
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Anthony H. Caucci
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# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.

PROJECT NO. 8C17294

DWG. NAME

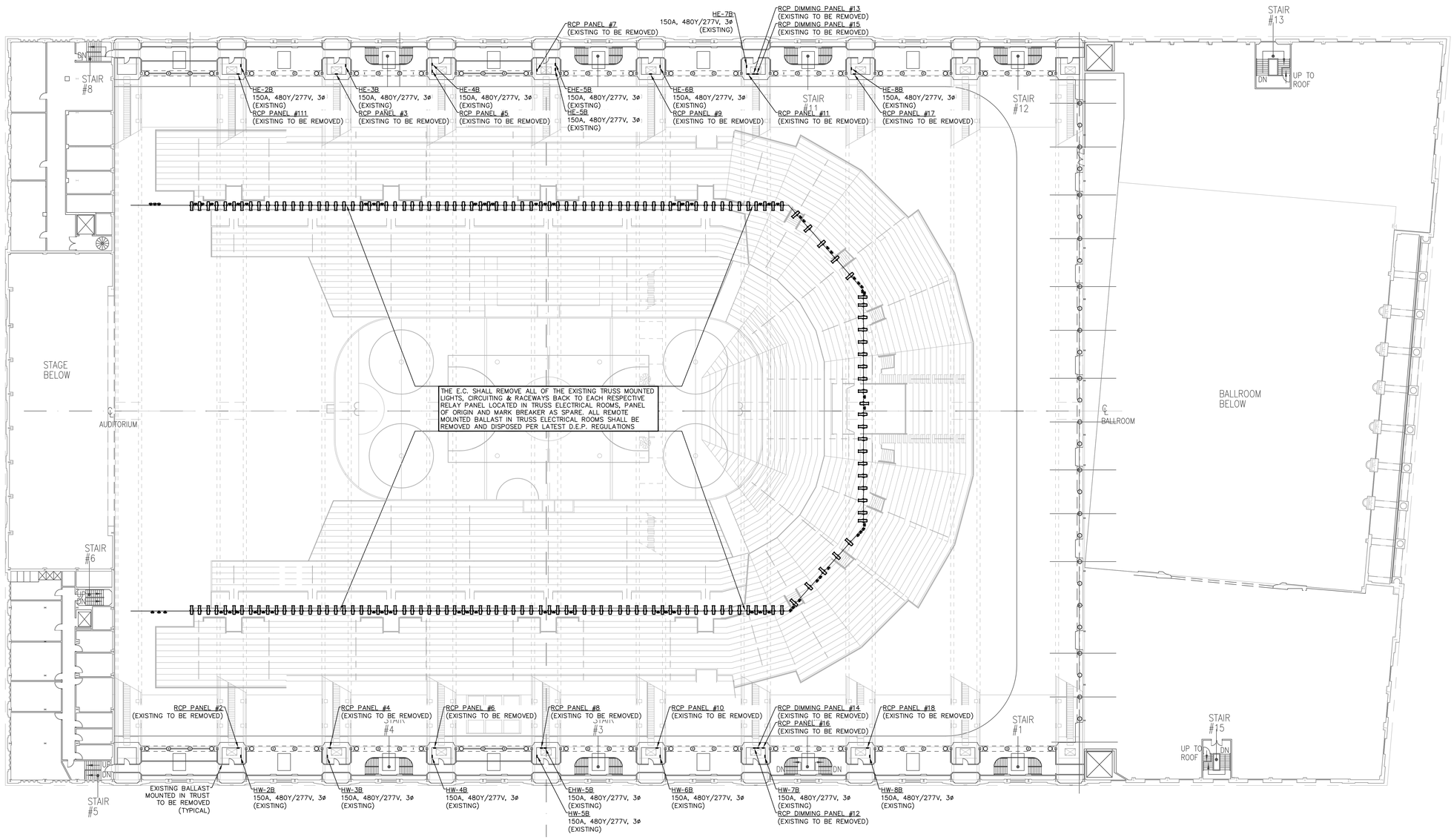
ELECTRICAL
WEST HALL
LOWER RAMP
DEMOLITION PLAN

DATE 06/13/17

DRAWN BY ZRT

CHECKED BY ET

ED-201




## ARENA LIGHTING DEMOLITION PLAN

NOT TO SCALE

CONCORD ENGINEERING
520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 767-8000
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 572-0500
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1011
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Anthony H. Cauci
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New Jersey Lic. # 44036

# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

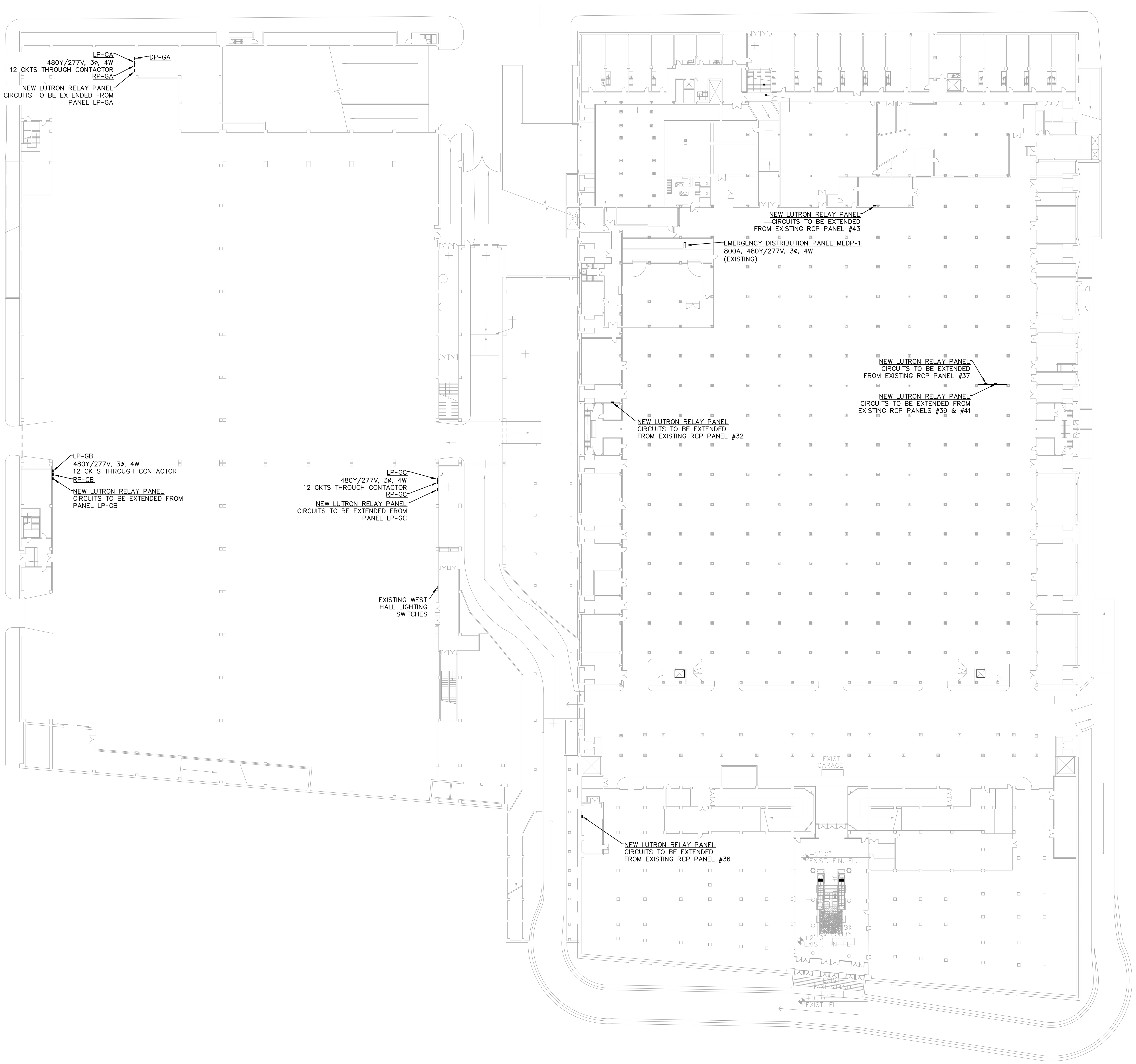
| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.
PROJECT NO. 8C17294

DWG. NAME
ELECTRICAL ARENA LIGHTING DEMOLITION PLAN

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

ED-300




PARKING LEVEL PANEL LOCATIONS

NOT TO SCALE


CONCORD ENGINEERING

520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 427-0200

2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 272-9620
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3020 Market Street, Suite 103
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(215) 387-1011

Anthony H. Caucci
Professional Engineer
New Jersey Lic. # 44806


# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

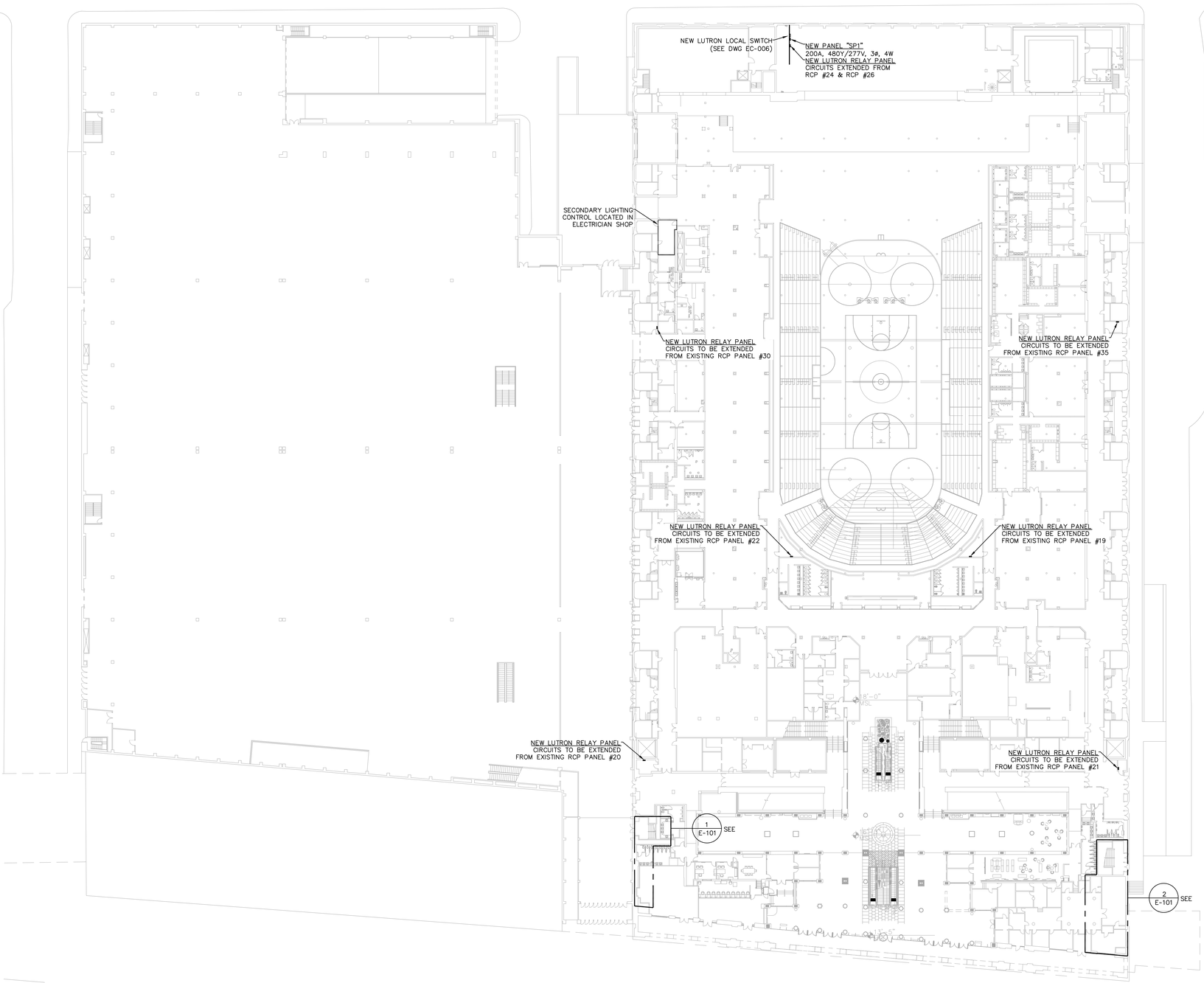
| REV. | DATE | DESCRIPTION |
|---|---|---|
| SCALE N.T.S. | | PROJECT NO. BC17294 |

DWG. NAME

ELECTRICAL PARKING LEVEL RELAY PANEL LOCATIONS

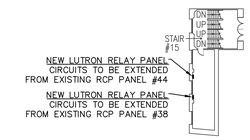
DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

E-100




EVENT LEVEL PANEL LOCATIONS

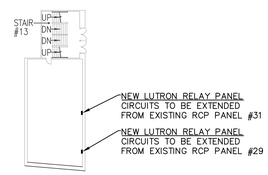
NOT TO SCALE




1
E-101

MEZZANINE FAN ROOM #15

NOT TO SCALE




2
E-101

MEZZANINE FAN ROOM #13

NOT TO SCALE

CONCORD ENGINEERING
520 South Burrs Mill Road
Voorhees, New Jersey 08043
(856) 427-0050
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 572-0300
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1011
www.concord-engineering.com

Anthony H. Caucci
Professional Engineer
New Jersey Lic. # 44006

# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.

PROJECT NO. 8C17294

DWG. NAME

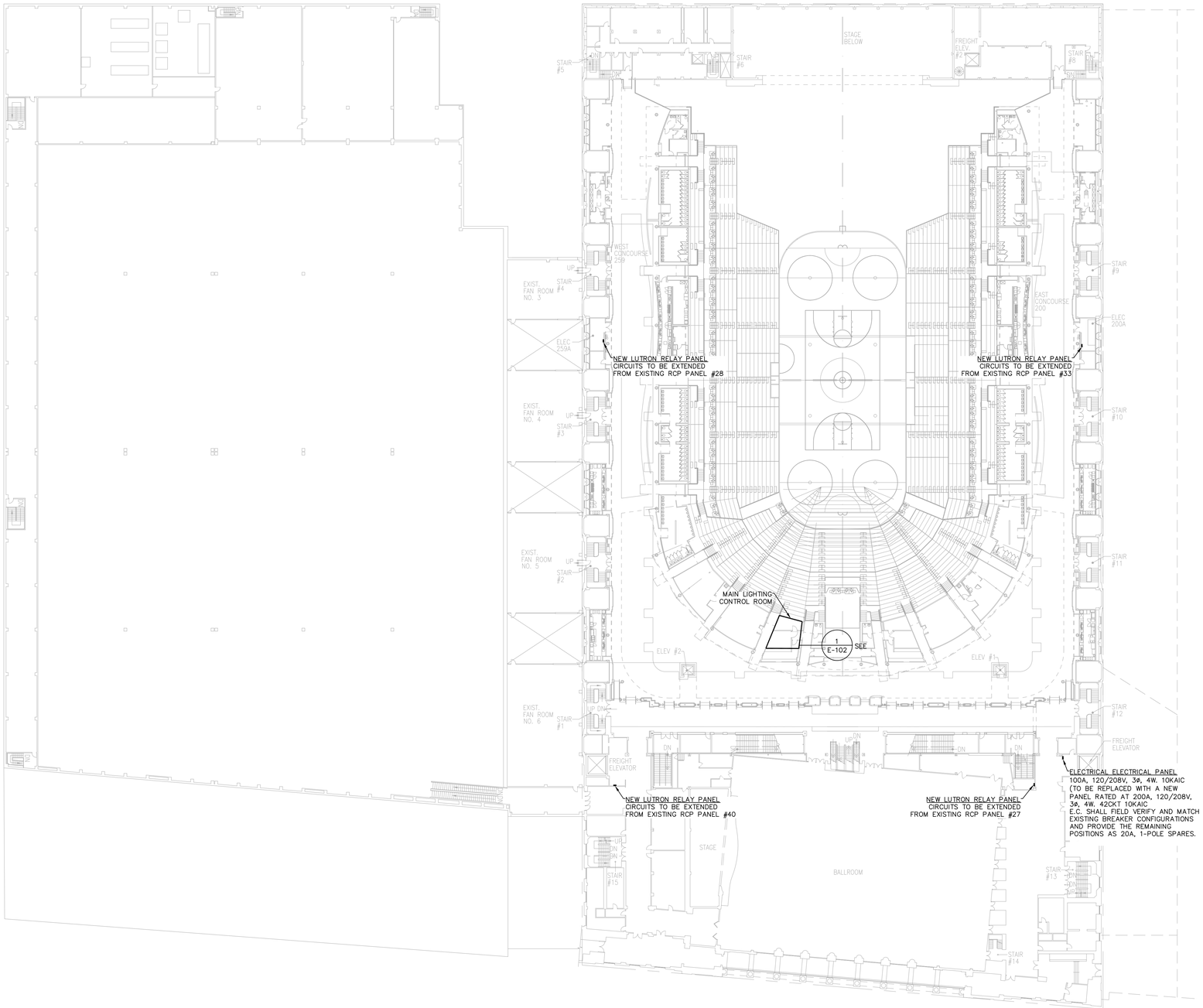
ELECTRICAL EVENT LEVEL RELAY PANEL LOCATIONS

DATE 06/13/17

DRAWN BY ZRT

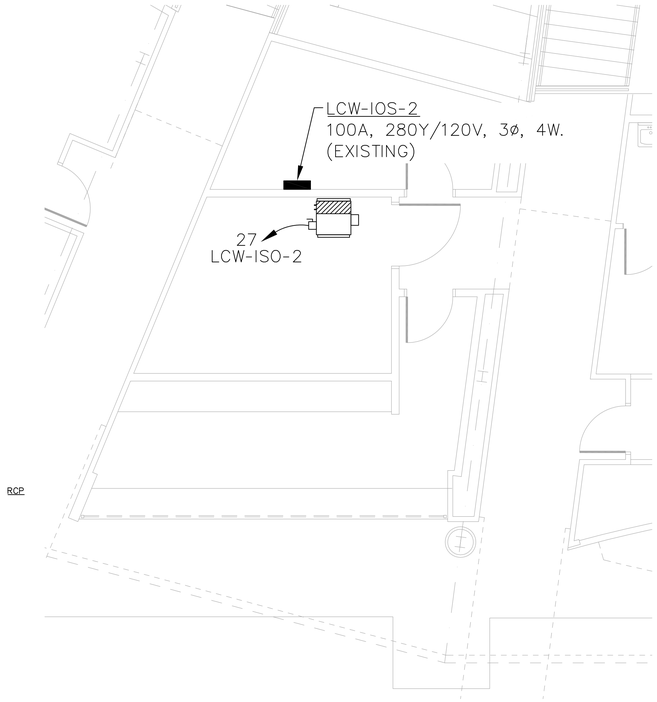
CHECKED BY ET

E-101




## CONCOURSE LEVEL PANEL LOCATIONS

NOT TO SCALE




## 1 / E-102 LIGHTING CONTROL ROOM ENLARGED PLAN

1/4" = 1'-0"


CONCORD ENGINEERING
520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 427-0600
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 572-0300
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1011
www.concord-engineering.com

Anthony H. Caucci
Professional Engineer
New Jersey Lic. #44806


# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|
| | | |

SCALE N.T.S.

PROJECT NO. 8C17294

DWG. NAME

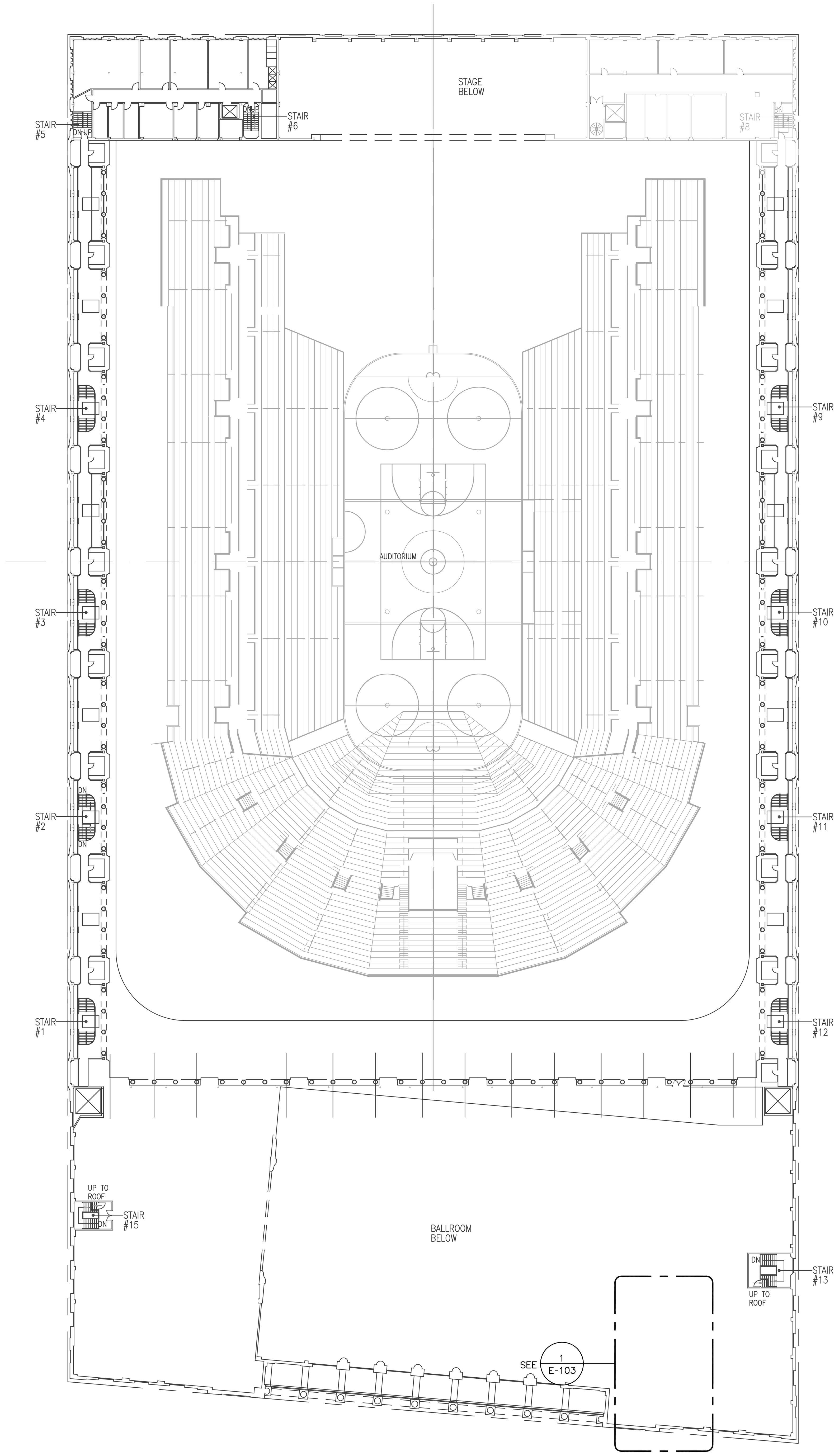
ELECTRICAL CONCOURSE LEVEL RELAY PANEL LOCATIONS

DATE 06/13/17

DRAWN BY ZRT

CHECKED BY ET

E-102




## CLUB LEVEL RELAY PANEL LOCATIONS

NOT TO SCALE

## 1 E-103 BALLROOM MEZZANINE

NOT TO SCALE

CONCORD ENGINEERING
520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 427-0200
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 272-9620
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
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Anthony H. Caucci
Professional Engineer
New Jersey Lic. # 44806

Boardwalk Hall
Arena Lighting
Replacement

2301 Boardwalk
Atlantic City, NJ

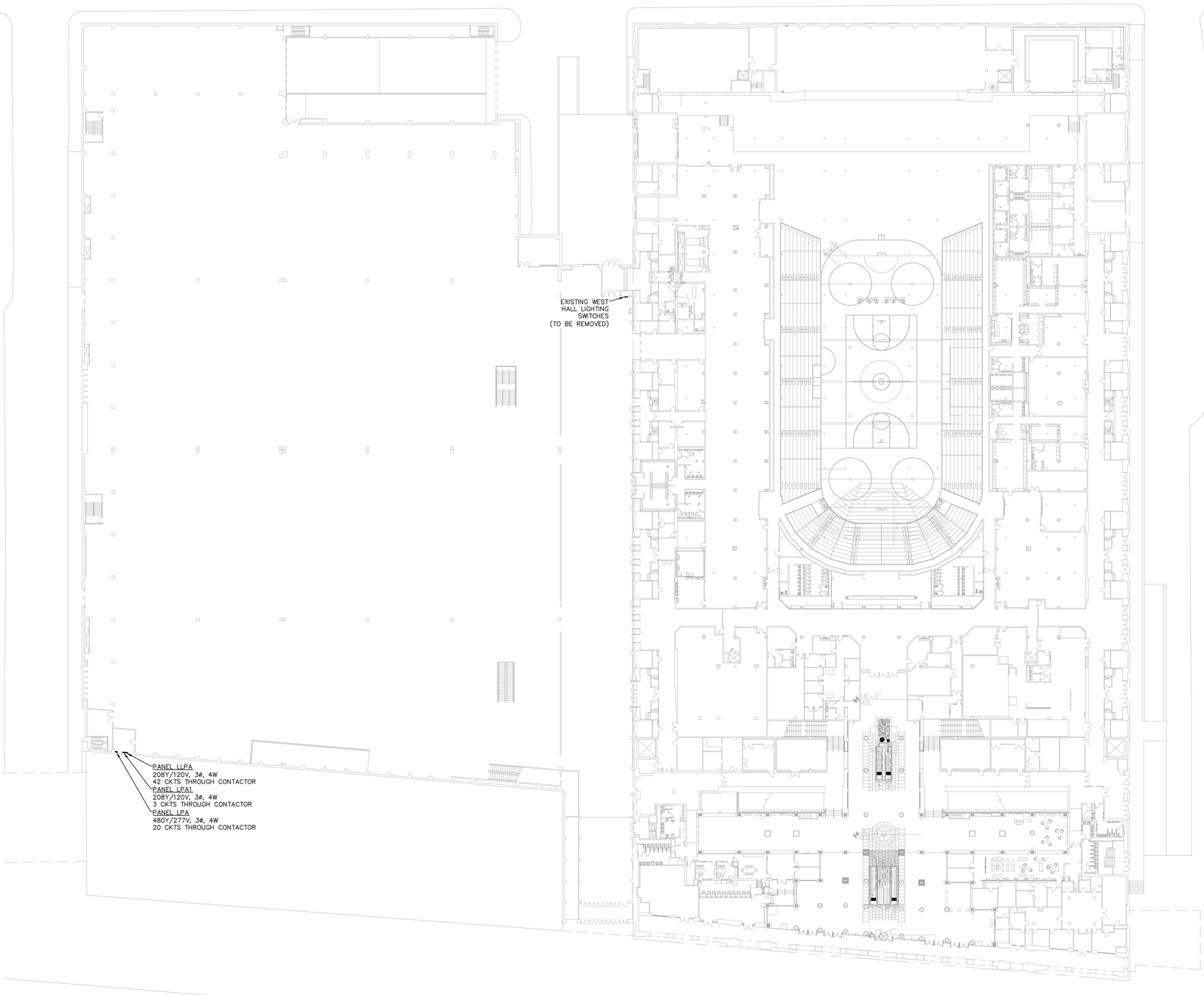
| REV. | DATE | DESCRIPTION |
|---|---|---|
| SCALE N.T.S. | | PROJECT NO. BC17294 |

DWG. NAME

ELECTRICAL
CLUB LEVEL
RELAY PANEL
LOCATIONS

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

E-103




EVENT LEVEL PANEL LOCATIONS

NOT TO SCALE

CONCORD ENGINEERING

520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 767-2600

2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 572-0300

3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1011

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Anthony H. Caucci
Professional Engineer
New Jersey Lic. # 44036

# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|
| | | |

SCALE N.T.S.

PROJECT NO. BC17294

DWG. NAME

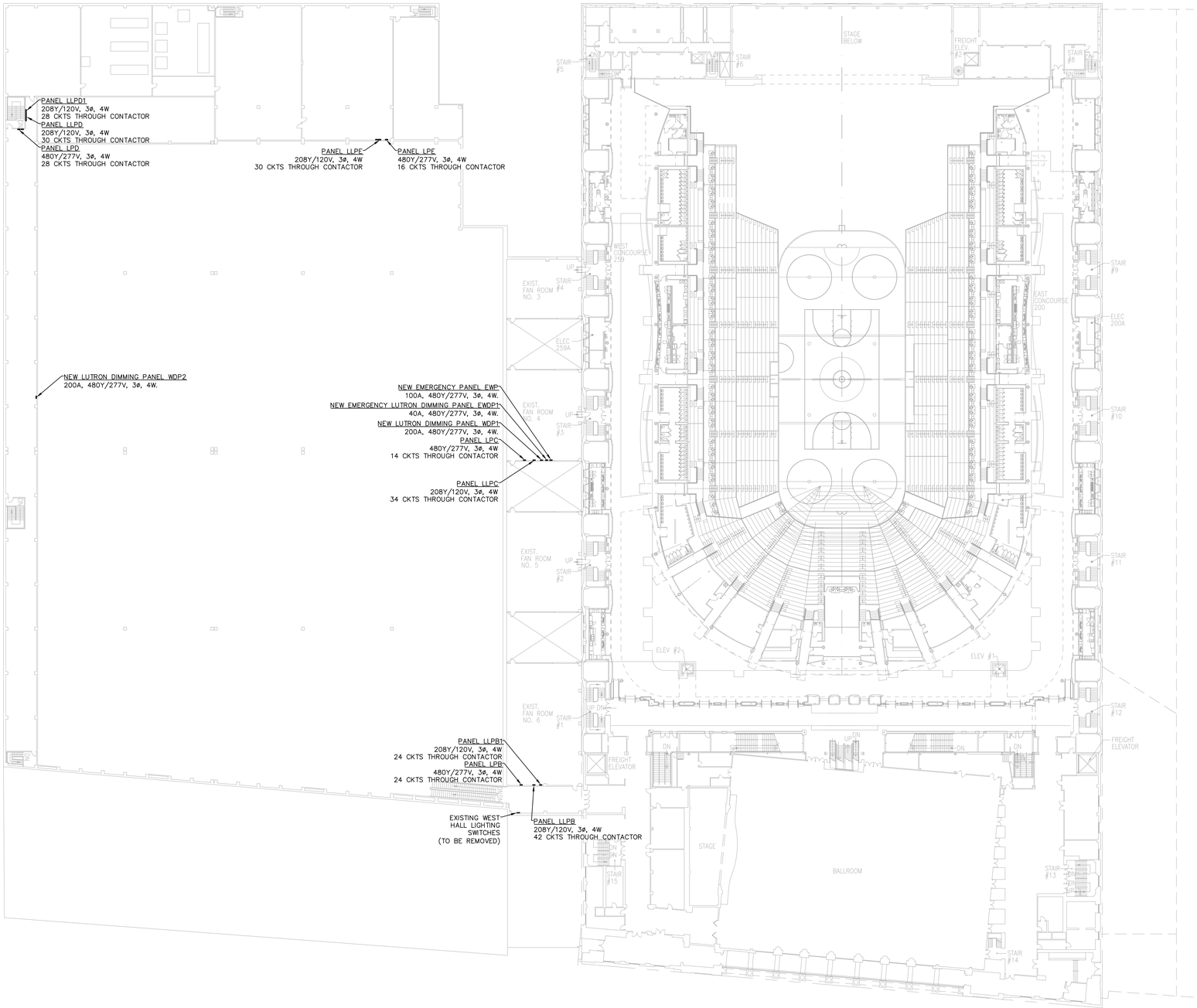
ELECTRICAL WEST HALL LIGHTING PANEL LOCATIONS

DATE 06/13/17

DRAWN BY ZRT

CHECKED BY ET

E-200




## CONCOURSE LEVEL WEST HALL PANEL LOCATIONS

NOT TO SCALE

CONCORD ENGINEERING
520 South Burrs Mill Road
Voorhees, New Jersey 08043
(856) 427-0600
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 347-0600
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1011
www.concord-engineering.com

Anthony H. Caucci
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New Jersey Lic. # 44006

# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.
PROJECT NO. BC17294

DWG. NAME
ELECTRICAL WEST HALL LIGHTING PANEL LOCATIONS

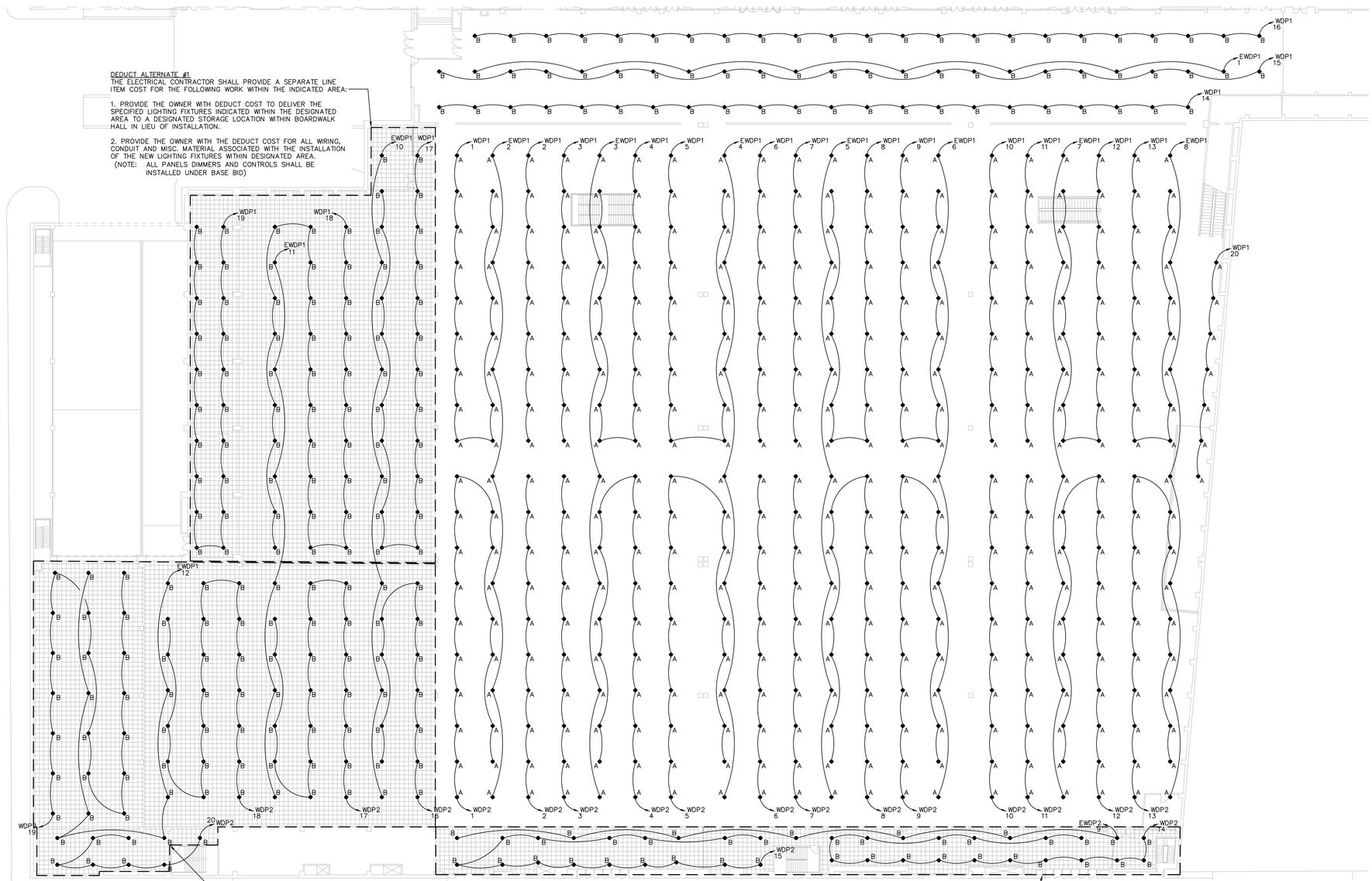
DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

E-201

## LIGHTING FIXTURE SCHEDULE

R= RECESSED P=PENDANT
S=SURFACE W=WALL MOUNT
U=UNIVERSAL T=TRACK

| TYPE | MANUFACTURER | CATALOG NO. | VOLTAGE | WATTS | MTG | REMARKS |
|---|---|---|---|---|---|---|
| A | CREE | HXB-A-UV-35L-M-40K-UL-SV | 277V | 268W | P | NEW WEST MAIN AREA HALL HIGH BAY |
| B | CREE | CXB-A-UV-M-40K-8-UL-ML | 277V | 160W | P | NEW WEST HALL LOW AREA HIGH BAY |
| C | CREE | LS4-40L-40K-10V | 277V | 40W | S | WEST HALL RAMP LIGHTING |




WEST HALL NEW WORK LIGHTING LAYOUT

NOT TO SCALE


CONCORD ENGINEERING
520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 767-9000
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
www.concord-engineering.com
3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1311

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New Jersey Lic. # 44036


# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

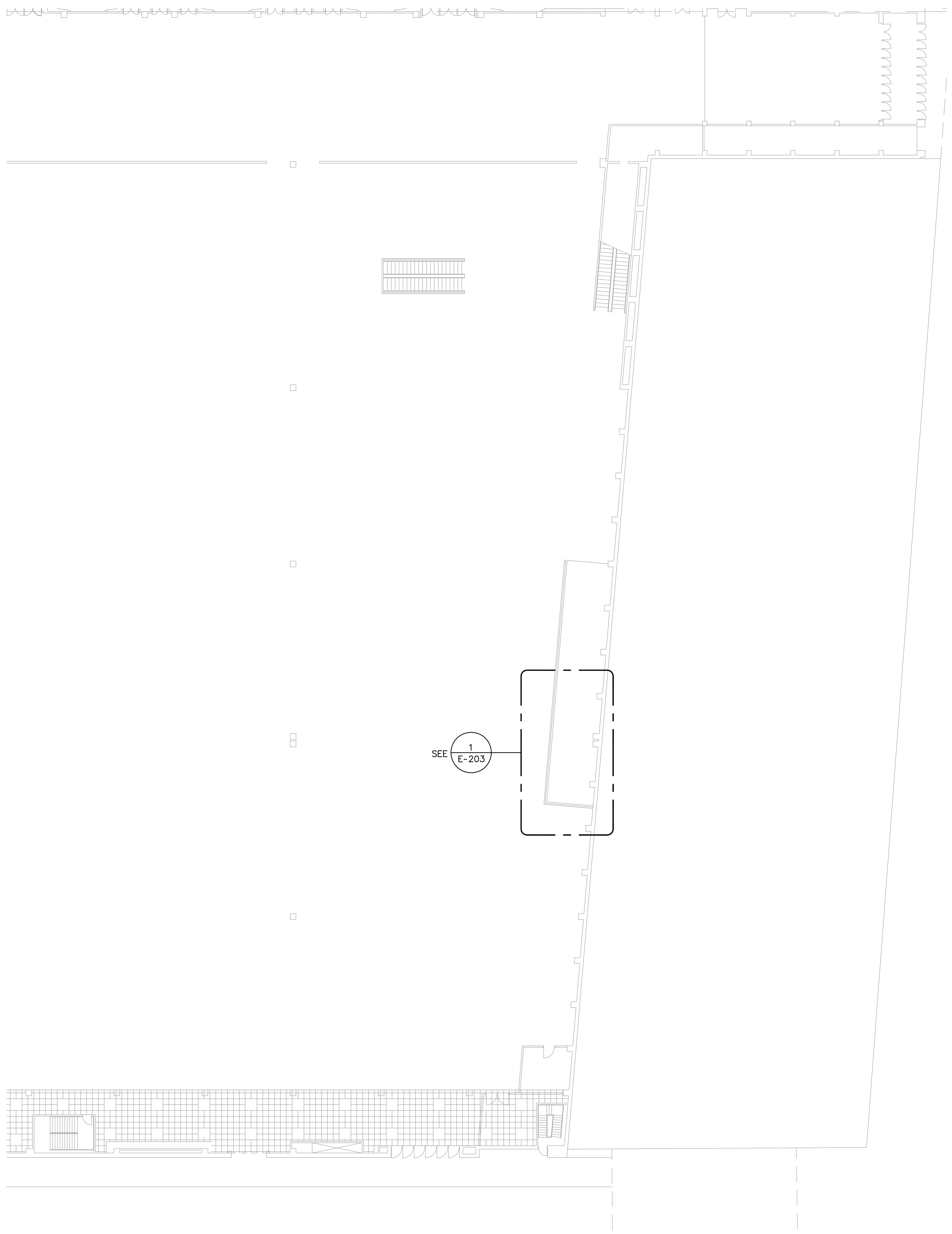
| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.
PROJECT NO. 8C17294

DWG. NAME
ELECTRICAL WEST HALL LIGHTING NEW WORK PLAN

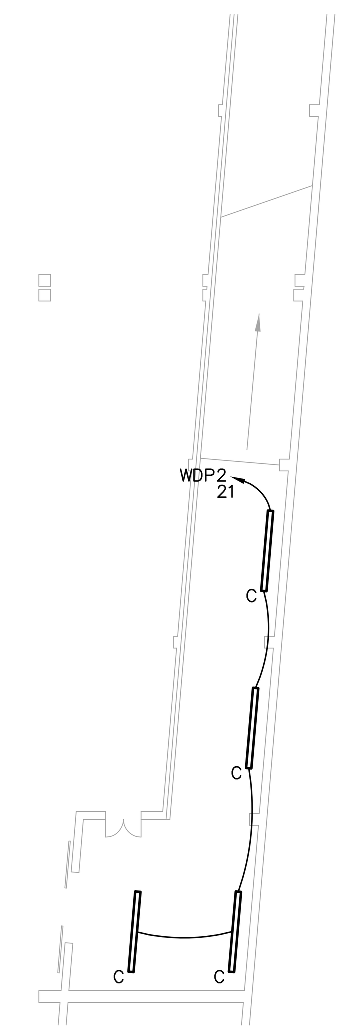
DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

E-202




WEST HALL LOWER RAMP LIGHTING LOCATION

NOT TO SCALE




1 / E-203 WEST HALL LOWER RAMP

NOT TO SCALE

CONCORD ENGINEERING

520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 427-0200

2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 272-9820

3020 Market Street, Suite 103
Philadelphia, Pennsylvania 19104
(215) 387-1911

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Professional Engineer
New Jersey Lic. #44806

Boardwalk Hall
Arena Lighting
Replacement

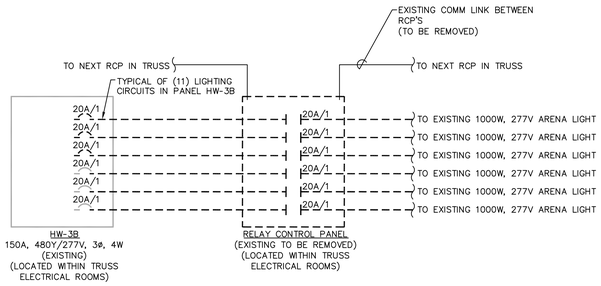
2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|
| SCALE N.T.S. | | PROJECT NO. BC17294 |

DWG. NAME

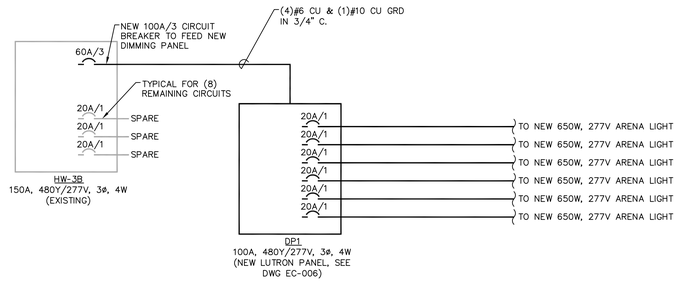
ELECTRICAL
WEST HALL
LOWER RAMP
NEW WORK PLAN

| | |
|---|---|
| DATE 06/13/17 | E-203 |
| DRAWN BY ZRT | |
| CHECKED BY ET | |



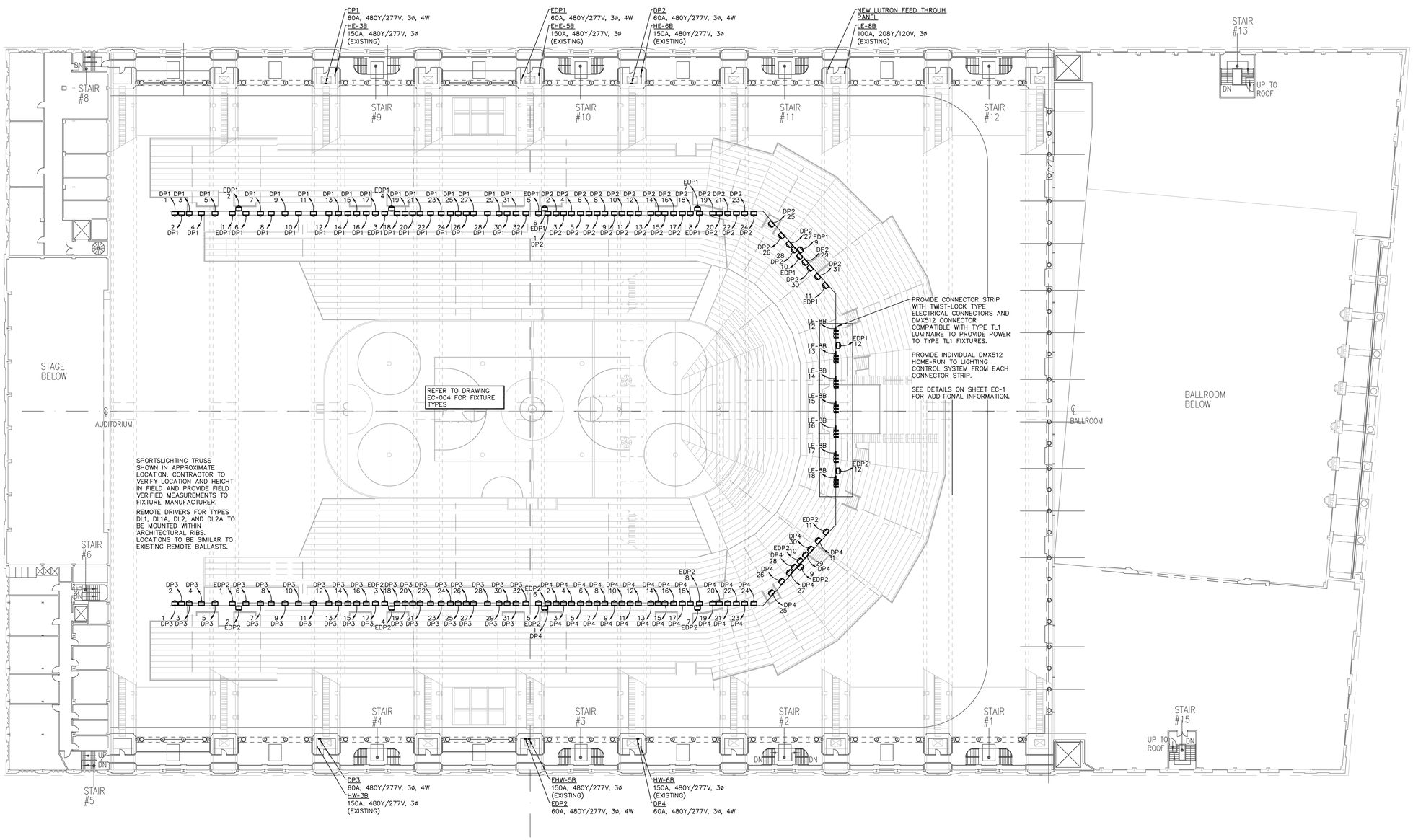

## EXISTING ARENA LIGHTING CONTROL SCHEMATIC

TYPICAL FOR ALL ARENA LIGHTS




## PROPOSED ARENA LIGHTING CONTROL SCHEMATIC

TYPICAL FOR ALL ARENA LIGHTS




## CLUB LEVEL PANEL LOCATIONS & NEW ARENA LIGHTING LAYOUT

NOT TO SCALE

CONCORD ENGINEERING
520 South Burnt Mill Road
Voorhees, New Jersey 08043
(856) 767-9000
2311 Atlantic Avenue
Atlantic City, New Jersey 08401
(609) 572-0900
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Philadelphia, Pennsylvania 19104
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Professional Engineer
New Jersey Lic. # 44006

# Boardwalk Hall Arena Lighting Replacement

2301 Boardwalk
Atlantic City, NJ

| REV. | DATE | DESCRIPTION |
|---|---|---|

SCALE N.T.S.
PROJECT NO. 8C17294

DWG. NAME
ELECTRICAL ARENA LIGHTING NEW WORK PLAN

DATE 06/13/17
DRAWN BY ZRT
CHECKED BY ET

E-300