CITY OF LOWELL, MASSACHUSETTS

LOWELL CITY HALL
BACKUP POWER DESIGN
March 24 , 2014
100% Bid Documents

Lowell City Hall
375 Merrimack Street
Lowell, Massachusetts 01854

DRAWING INDEX:

T001 - TITLE SHEET

E001 - ELECTRICAL LEGEND & NOTES
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ENGINEER

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CH'KD. BY	MIKE G. GAGNE	03.24.14
APPR'D. BY	JOHN C. PIERGA	03.24.14

CLIENT
CITY OF LOWELL
LOWELL, MA

PROJECT
LOWELL CITY HALL
BACKUP POWER DESIGN
LOWELL, MA

TITLE
TITLE SHEET

DRAWING NO.
T001

SHT. REF.

JOB NO. 13253

SIZE D

GENERAL SPECIFICATIONS

1. CONDITIONS OF THE CONTRACT AND DIVISION 1, GENERAL REQUIREMENTS APPLY TO WORK SHOWN ON THESE DRAWINGS. EXAMINE DRAWINGS AND OTHER SPECIFICATIONS FOR REQUIREMENTS THAT AFFECT WORK SHOWN ON THESE DRAWINGS.
2. PROVIDE ITEMS REFERRED TO IN SINGULAR NUMBER IN CONTRACT DOCUMENTS IN QUANTITIES NECESSARY TO COMPLETE WORK.
3. VISIT SITE AND EXAMINE CONDITIONS UNDER WHICH WORK MUST BE PERFORMED. REPORT ADVERSE CONDITIONS IN WRITING TO ARCHITECT. COMMENCEMENT OF WORK SHALL BE CONSTRUED AS COMPLETE ACCEPTANCE OF EXISTING CONDITIONS INCLUDING PREPARATORY WORK DONE BY OTHERS.
4. PERFORM WORK AND PROVIDE MATERIALS AND EQUIPMENT AS SHOWN ON DRAWINGS. COORDINATE ELECTRICAL WORK WITH WORK SHOWN ON THESE DRAWINGS.
5. GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY FEES AND OBTAIN NECESSARY APPROVALS FROM AUTHORITIES THAT HAVE JURISDICTION.
6. PERFORM WORK AS REQUIRED BY CODES, REGULATIONS AND LAWS OF LOCAL, STATE AND FEDERAL GOVERNMENTS AND OTHER AUTHORITIES WITH LAWFUL JURISDICTION.
7. MATERIAL AND EQUIPMENT SHALL BE UL, NEMA, ANSI, IEEE, ADA & CBM APPROVED FOR INTENDED SERVICE. MATERIAL AND INSTALLATION SHALL MEET REQUIREMENTS OF NATIONAL AND STATE ELECTRICAL CODE.
8. MAINTAIN RECORD DRAWINGS ON SITE. RECORD SET MUST BE COMPLETE, CURRENT AND AVAILABLE FOR INSPECTION WHEN REQUISITIONS FOR PAYMENT ARE SUBMITTED.
9. GUARANTEE WORK IN WRITING FOR ONE (1) YEAR FROM DATE OF FINAL ACCEPTANCE. REPAIR OR REPLACE DEFECTIVE MATERIALS OR INSTALLATION AT NO COST TO OWNER. CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE AT NO COST TO OWNER.
10. SUBMIT GUARANTEE TO ENGINEER BEFORE FINAL PAYMENT. STATEMENT OF GUARANTEE REQUIREMENTS SHALL NOT BE INTERPRETED TO LIMIT OWNER'S RIGHTS UNDER LAW AND THIS CONTRACT.
11. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. PROVIDE INFORMATION AND COMPONENTS SHOWN ON RISER DIAGRAMS BUT NOT SHOWN ON PLANS, AND VICE VERSA, AS IF EXPRESSLY REQUIRED ON BOTH.
12. UTILIZE MOLDED CASE CIRCUIT BREAKERS. MINIMUM INTERRUPTING CAPACITY SHALL BE 10,000 AMPS SYMMETRICAL AT 240 VOLTS, AND 14,000 AMPS SYMMETRICAL AT 480 VOLTS. ALL NEW BREAKERS INSTALLED WITHIN EXISTING EQUIPMENT SHALL HAVE AIC RATING TO MATCH EXISTING, BUT SHALL NOT BE LESS THAN INDICATED. CIRCUIT BREAKERS SHALL BE UL LISTED COMPATIBLE.
13. TEMPORARY LIGHT AND POWER SHALL BE PROVIDED ON SITE BY THE ELECTRICAL CONTRACTOR. COST OF ELECTRICITY SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
14. ADDRESS QUESTIONS REGARDING DRAWINGS TO ENGINEER IN WRITING BEFORE AWARD OF CONTRACT. OTHERWISE, ENGINEER INTERPRETATION OF MEANING AND INTENT OF DRAWINGS SHALL BE FINAL.
15. SUBMIT SHOP DRAWINGS AND PRODUCT DATA WITHIN THIRTY (30) DAYS AFTER AWARD OF CONTRACT. CHECK, STAMP AND MARK WITH PROJECT NAME'S SUBMITTALS BEFORE TRANSMITTING TO ARCHITECT. INDICATE DEVIATIONS FROM CONTRACT DOCUMENTS. SHOP DRAWINGS SHALL BE PROVIDED FOR ALL EQUIPMENT SHOWN ON THE DRAWINGS. PROVIDE SHOP DRAWINGS ON PANELBOARDS, AUTOMATIC TRANSFER SWITCHES, TRANSFORMERS; CIRCUIT BREAKERS, CONDUIT, WIRING DEVICES, CABLE AND CONDUCTORS, RACEWAY, WIREWAY, EQUIPMENT CUTS AND DISCONNECTS.
16. DEVIATION FROM CONTRACT DOCUMENTS, OR PROPOSED SUBSTITUTION OF MATERIALS OR EQUIPMENT FOR THOSE SPECIFIED, SHALL BE REQUESTED IN SEPARATE LETTER, WHETHER DEVIATIONS ARE DUE TO FIELD CONDITIONS, STANDARD SHOP PRACTICE, OR OTHER CAUSE.
17. SCHEDULE AT LEAST TEN (10) WORKING DAYS, EXCLUSIVE ON TRANSMITTAL TIME FOR SUBMITTAL REVIEW.
18. ALL WIRING SHALL BE RUN CONCEALED UNLESS SPECIFIED OTHERWISE. EXCEPT IN UTILITY ROOMS.
19. ALL EQUIPMENT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, RECTILINEAR TO BUILDING STRUCTURE.
20. ALL RACEWAY RUNNING THROUGH BUILDING EXPANSION JOINTS SHALL BE EQUIPPED WITH EXPANSION FITTINGS.
21. CONDUIT HOMERUNS SHOWN ON THE DRAWING WITH MORE THAN THREE (3) CURRENT CARRYING CONDUCTORS ARE SHOWN DIAGRAMMATICALLY. THE CONTRACTOR SHALL NOT INSTALL MORE THAN THREE (3) CURRENT CARRYING CONDUCTORS IN A RACEWAY UNLESS DONE SO STRICTLY BY THE NATIONAL ELECTRICAL CODE AS AMENDED BY THE STATE.
22. THE ELECTRICAL CONTRACTOR SHALL CONSULT AND COOPERATE WITH CONTRACTORS OF OTHER TRADES TO AVOID ANY INTERFERENCE IN THE INSTALLATION OF THEIR RESPECTIVE EQUIPMENT. CONTRACTOR SHALL REVIEW ALL TRADES' CONTRACT DOCUMENTS TO DETERMINE SPECIFIC MOUNTING LOCATIONS FOR ELECTRICAL EQUIPMENT. COORDINATE EXACT MOUNTING LOCATIONS WITH THE ENGINEER.
23. PROVIDE COMPLETE WIRING SYSTEM WHETHER OR NOT INDICATED GRAPHICALLY. PHASE BALANCE ALL PANELBOARDS IN FIELD. CIRCUIT NUMBERS ARE DIAGRAMMATIC, UTILIZE AVAILABLE SPACE OR PROVIDE ADDITIONAL BREAKERS AND PANELBOARDS AS NECESSARY.
24. ALL NEW WIRING SHALL BE TYPE THHN/THWN RATED 75-90°C, 600V. WET-DRY LOCATIONS. MINIMUM BRANCH CIRCUIT WIRING SHALL BE NO. 12 AWG SOLID COPPER. BRANCH CIRCUITS LONGER THAN 75 FEET FOR 120 VOLTS OR 175 FEET FOR 277 VOLTS SHALL BE AT LEAST NO. 10 AWG FROM PANEL TO LAST OUTLET.
25. ALL NEW EXPOSED INTERIOR WIRING ABOVE 8'-0" NOT EXPOSED TO DAMAGE SHALL BE INSTALLED IN ELECTRIC METALLIC TUBING. ALL WIRING IN CONCRETE SLABS OR EXPOSED IN ROOM BELOW 8'-0" OR EXPOSED TO DAMAGE SHALL BE INSTALLED IN RIGID STEEL CONDUIT. EXTERIOR WIRING SHALL BE IN GALVANIZED RIGID METALLIC CONDUIT.
26. INTERRUPTIONS TO EXISTING ELECTRIC SERVICES AND SYSTEMS SHALL BE AS SHORT AS POSSIBLE AND AT A TIME AND DURATION APPROVED BY THE ENGINEER OR OWNER. INCLUDE ALL PREMIUM TIME ASSOCIATED WITH INTERRUPTIONS, TWENTY-FOUR (24) HOUR NOTICE IS REQUIRED.
27. ALL GROUNDING SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AS AMENDED BY THE STATE OF MASSACHUSETTS.
28. ALL FIREPROOFING FOR ELECTRICAL PENETRATIONS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.
29. PROVIDE NEW TYPED IDENTIFICATION DIRECTORY IN PANELBOARDS INDICATING CIRCUIT FUNCTION OR EQUIPMENT SERVED. LABEL ALL ELECTRICAL PANELS, DISCONNECT SWITCHES AND OTHER EQUIPMENT WITH ENGRAVED VINYL PLATES. NAMEPLATE LETTERING SHALL BE 1/4" MINIMUM.
30. PANELBOARDS SHALL BE DOOR-IN-DOOR CONSTRUCTION WITH COPPER BUS. CIRCUIT BREAKERS SHALL BE THERMAL-MAGNETIC, BOLT-ON. PANELBOARDS AND BREAKERS SHALL BE CUTLER HAMMER, SQUARE 'D', G.E. OR SIEMENS. PROVIDE TYPE IDENTIFICATION DIRECTORY CARDS IN PANELBOARD INDICATING CIRCUIT FUNCTION OR EQUIPMENT SERVED.
31. DISCONNECT SWITCHES SHALL BE HEAVY DUTY (HD). SIDE OPERATED WITH INTERLOCKING COVER, G.E., SQUARE 'D', CUTLER HAMMER OR SIEMENS OR EQUAL.
32. AUTOMATIC TRANSFER SWITCH SHALL BE .....
33. TRANSFORMERS SHALL BE .....

POWER NOTES

1. ALL CONDUIT, WIRING AND ELECTRICAL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE LATEST STANDARDS OF THE NATIONAL & STATE ELECTRICAL CODES AND ANY APPLICABLE LOCAL REGULATIONS.
2. ALL CONDUITS ARE SHOWN DIAGRAMMATICALLY. EXACT LOCATION AND METHOD OF SUPPORT SHALL BE DETERMINED IN THE FIELD, EXCEPT WHERE SPECIFIC DIMENSIONS AND DETAILS ARE SHOWN. ALL CONDUIT RUNS SHALL BE RIGIDLY SUPPORTED.
3. NO CONDUIT SMALLER THAN 3/4 INCH ELECTRICAL TRADE SIZE SHALL BE USED, UNLESS SPECIFICALLY CALLED FOR ON THE DRAWINGS.
4. PERFORM WORK AND PROVIDE MATERIALS AND EQUIPMENT TO MAKE INSTALLATION COMPLETE IN EVERY DETAIL UNDER THIS CONTRACT WHETHER OR NOT SPECIFICALLY SHOWN ON DRAWINGS.
5. WIRING DEVICES SHALL BE SPECIFICATION GRADE, 20 AMP, WITH SMOOTH NYLON DEVICE PLATES AS MANUFACTURED BY HUBBELL, OR EQUAL. COLOR TO MATCH EXISTING OR AS APPROVED BY EMGOMEER.
6. CONDUCTORS AND CABLE SHALL BE MINIMUM #12 AWG, 600 VOLT, COPPER WITH TYPE THHN/THWN INSULATION. PROVIDE SEPARATE GREEN GROUND IN ALL FEEDERS. WIRE SIZE #8 AWG AND LARGER SHALL BE STRANDED, #10 AWG AND SMALLER SHALL BE SOLID. COLOR CODE CONDUCTORS BLACK, RED, BLUE, WITH WHITE NEUTRAL AND GREEN GROUND EXCEPT AS NOTED FOR 120 VOLT

GENERAL NOTES

1. REFER TO ELECTRICAL PLANS AND ELEVATIONS FOR MOUNTING HEIGHTS AND LOCATIONS OF ALL DEVICES, EXACT LOCATIONS SHALL BE COORDINATED IN THE FIELD AT NO ADDITIONAL COST TO THE OWNER.
2. ALL FLOOR, MASONRY WALLS AND STRUCTURAL CEILING PENETRATIONS SHALL BE SLEEVED.
3. PROVIDE FIRE/MOISTURE SEAL FOR WALL, FLOOR OR CEILING PENETRATIONS.
4. DO NOT LAY CABLES OR RACEWAY ON, OR SUPPORT FROM SUSPENDED CEILING OR PIPING AND DUCTWORK.
5. OUTLET BOXES SHALL BE MOUNTED FLUSH. CONDUIT SHALL BE RUN CONCEALED. WHERE WALLS ARE BLOCK, DEVICES AND WIRING SHALL BE SURFACE MOUNTED. PROVIDE WIREMOLD OR EQUAL TO SURFACE MOUNTED RACEWAY WITH FINISHED BOXES.
6. EXCEPT IN UTILITY AREAS, CONDUIT MAY BE EXPOSED. EMT MAY BE UTILIZED.
7. FLEXIBLE CONDUIT CONNECTIONS SHALL BE A MAXIMUM OF 6'-0".

DEMOLITION NOTES

1. REFER TO THE ELECTRICAL DRAWINGS FOR THE FULL EXTENT OF THE SCOPE OF DEMOLITION. THE ELECTRICAL SCOPE MAY EXTEND BEYOND THE AREA DEFINED BY THE DEMOLITION LIMITS. EC SHALL FULLY COMPLY WITH REQUIREMENTS DEFINED BY THESE DRAWINGS AND NOTES.
2. THE ELECTRICAL DEMOLITION PLANS AND DETAILS INDICATE THE GENERAL INTENT AND ARE NOT INTENDED TO SHOW ALL ITEMS TO BE REMOVED OR RETAINED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO THE SUBMISSION OF BIDS TO BECOME FAMILIAR WITH THE ACTUAL CONDITIONS AND EXTENT OF WORK. THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY UNANTICIPATED HIDDEN CONDITIONS ENCOUNTERED DURING DEMOLITION.
3. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ALL SYSTEMS OR BUILDING COMPONENTS DAMAGED DURING THE EXECUTION OF THE WORK. DAMAGE SHALL INCLUDE BUT NOT BE LIMITED TO DESTRUCTION OR DISPOSAL OF ITEMS INTENDED TO REMAIN OR TO BE SALVAGED.
4. THE ELECTRICAL CONTRACTOR SHALL IDENTIFY ALL BRANCH CIRCUITS, FEEDERS AND SYSTEM COMPONENTS, WHICH ARE TO REMAIN WITHIN THE AREA OF DEMOLITION SCOPE. THERE SHALL BE NO INTERRUPTION OF SERVICE TO ANY AREA OUTSIDE THE SCOPE LIMITS WITHOUT APPROVAL FROM THE OWNER'S REPRESENTATIVE. EXISTING EQUIPMENT TO REMAIN SHALL BE LEFT IN A CODE COMPLIANT MANNER.
5. THE ELECTRICAL CONTRACTOR SHALL DE-ENERGIZE AND REMOVE ALL CONDUCTORS AND RACEWAYS TO THEIR POINTS OF ORIGIN WITHIN THE AREA OF DEMOLITION SCOPE. ITEMS IDENTIFIED FOR DEMOLITION SHALL NOT BE ABANDONED IN PLACE. RACEWAYS THAT ENTER MASONRY WALLS AND FLOORS SHALL BE CUT FLUSH AT THE SURFACE FOR PATCHING BY OTHERS. ALL CIRCUIT BREAKERS ASSOCIATED WITH THE DEMOLITION SCOPE SHALL BE DE-ENERGIZED AND LABELED SPARE.
6. ALL REMOVED ITEMS SHALL BE LEGALLY DISPOSED OF UNLESS IDENTIFIED FOR REUSE. THE OWNER'S REPRESENTATIVE SHALL INSPECT ALL RETAINED ITEMS PRIOR TO PLACEMENT IN THE IDENTIFIED STORAGE LOCATION BY THE ELECTRICAL CONTRACTOR.

ABBREVIATIONS

A/AMP	AMPERE
AC	ALTERNATING CURRENT
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	APRERE INTERRUPTING CAPACITY
AL	ALUMINUM
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CKT	CIRCUIT
CB	CIRCUIT BREAKER
CU	COPPER
CL	CENTERLINE
DC	DIRECT CURRENT
DE	DUAL ELEMENT
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
EMH	ELECTRICAL MANHOLE
EWC	ELECTRIC WATER COOLER
EMT	ELECTRIC METALLIC CONDUIT
FLMT	FLEXIBLE LIQUID TIGHT METALLIC TUBING
GC	GENERAL CONTRACTOR
GND	GROUND
GFI	GROUND FAULT INTERRUPTING
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
HP	HORSEPOWER
IMC	INTERMEDIATE METALLIC CONDUIT
JB	JUNCTION BOX
KVA	KILOVOLT-AMPERE
KW	KILOWATT
LTG	LIGHTING
PWR	POWER
MCB	MAIN CIRCUIT BREAKER
MEC	MASSACHUSETTS ELECTRICAL CODE
MLO	MAIN LUGS ONLY
MTG	MOUNTING
MTD	MOUNTED
MCC	MOTOR CONTROL CENTER
NEC	NATIONAL ELECTRICAL CODE
NS	NON-SYSTEM
NTS	NOT TO SCALE
No., #	NUMBER
PC	PLUMBING CONTRACTOR
RPM	REVOLUTIONS PER MINUTE
RMS	ROOT MEAN SQUARE VALUE
RGS	RIGID STEEL CONDUIT
SF	SQUARE FOOT
SN	SOLID NEUTRAL
SWBD	SWITCHBOARD
TYP	TYPICAL
V	VOLTS
VA	VOLT-AMPERE
VFD	VARIABLE FREQUENCY DRIVE
WP	WEATHERPROOF

BRANCH CIRCUIT AND FEEDER SYMBOLS

BRANCH CIRCUIT OR FEEDER CONCEALED UNLESS OTHERWISE NOTED. BRANCH CIRCUIT DIAGONAL LINES INDICATE NUMBER OR CONDUCTORS, NO DIAGONAL LINES INDICATES TWO (2) CONDUCTORS (1 PHASE AND 1 NEUTRAL). GROUND WIRE(S) NOT INDICATED. MINIMUM SIZE CONDUCTOR #12 AWG AND 3/4" CONDUIT, UNLESS OTHERWISE NOTED

4#1,1#6G-1½"C — INDICATES (3) #1 AWG(PHASE), (1)#1 AWG(NEUTRAL), (1) #6 GROUND IN A 1-1/2" CONDUIT

FLEXIBLE CONNECTION TO MOTOR OR EQUIPMENT

PP1-1 20A/1P — HOMERUN TO PANELBOARD 'P1' CIRCUIT NUMBER 1. DIAGONAL LINES INDICATE (1) PHASE AND (1) NEUTRAL CONDUCTOR. (1) GROUNDING CONDUCTOR UNDERSTOOD.

CONDUIT AND CONDUCTORS TO BE REMOVED

RECEPTACLES AND OUTLETS

5 — DUPLEX CONVENIENCE RECEPTACLE OUTLET, GROUNDING TYPE, RATED 20A, 125V TYPE. "5" DENOTES CIRCUIT NUMBER, MOUNTING HEIGHT 18" TO CENTERLINE AFF

DOUBLE DUPLEX CONVENIENCE OUTLET, MOUNTING HEIGHT 18" TO CENTERLINE AFF

GROUND FAULT INTERRUPTING OUTLET, RATED 20A, 125V RECEPTACLE, MOUNTING HEIGHT 18" TO CENTERLINE AFF

F — JUNCTION BOX, COORDINATE MOUNTING HEIGHT WITH ARCHITECT, 'F' INDICATES FAN RATED JUNCTION BOX

EXISTING EQUIPMENT DESIGNATIONS

X	EXISTING TO BE REMOVED. REMOVE ALL ASSOCIATED CONDUIT AND CONDUCTORS.
XM	EXISTING TO REMAIN.
XN	EXISTING EQUIPMENT TO BE REPLACED WITH NEW. CONNECT NEW EQUIPMENT TO EXISTING CIRCUIT.
XR	EXISTING EQUIPMENT TO BE RELOCATED. JUNCTION AND EXTEND EXISTING CONDUIT AND CONDUCTORS.
XL	NEW LOCATION FOR EXISTING EQUIPMENT. JUNCTION AND EXTEND CONDUIT AND CONDUCTORS AS REQUIRED.

MOTOR AND CONTROLS

3R — DISCONNECT SWITCH, NON-FUSIBLE TYPE, RATED 30A/3P, IN NEMA TYPE "1" ENCLOSURE, UNLESS OTHERWISE NOTED. "3R" DENOTES NEMA TYPE ENCLOSURE

CP — EQUIPMENT CONTROL PANEL

PANELBOARD AND TERMINAL CABINET

LIGHTING OR POWER PANEL, SURFACE

DISTRIBUTION PANEL

T — TRANSFORMER, DRY TYPE

SITE SYMBOLS

UNDERGROUND CONDUIT OR DUCTBANK, REFER TO DRAWING E__

A A — SECTION "A-A"

T — PAD MOUNTED TRANSFORMER

RISER DIAGRAM SYMBOLS

T — TRANSFORMER

GROUND

PB — PULL BOX

STARTER

40 — MOTOR '40' INDICATES HORSE POWER

DISCONNECT

CIRCUIT BREAKER

FUSEABLE SWITCH

ENCLOSED CIRCUIT BREAKER

AUTOMATIC TRANSFER SWITCH

G — GENERATOR

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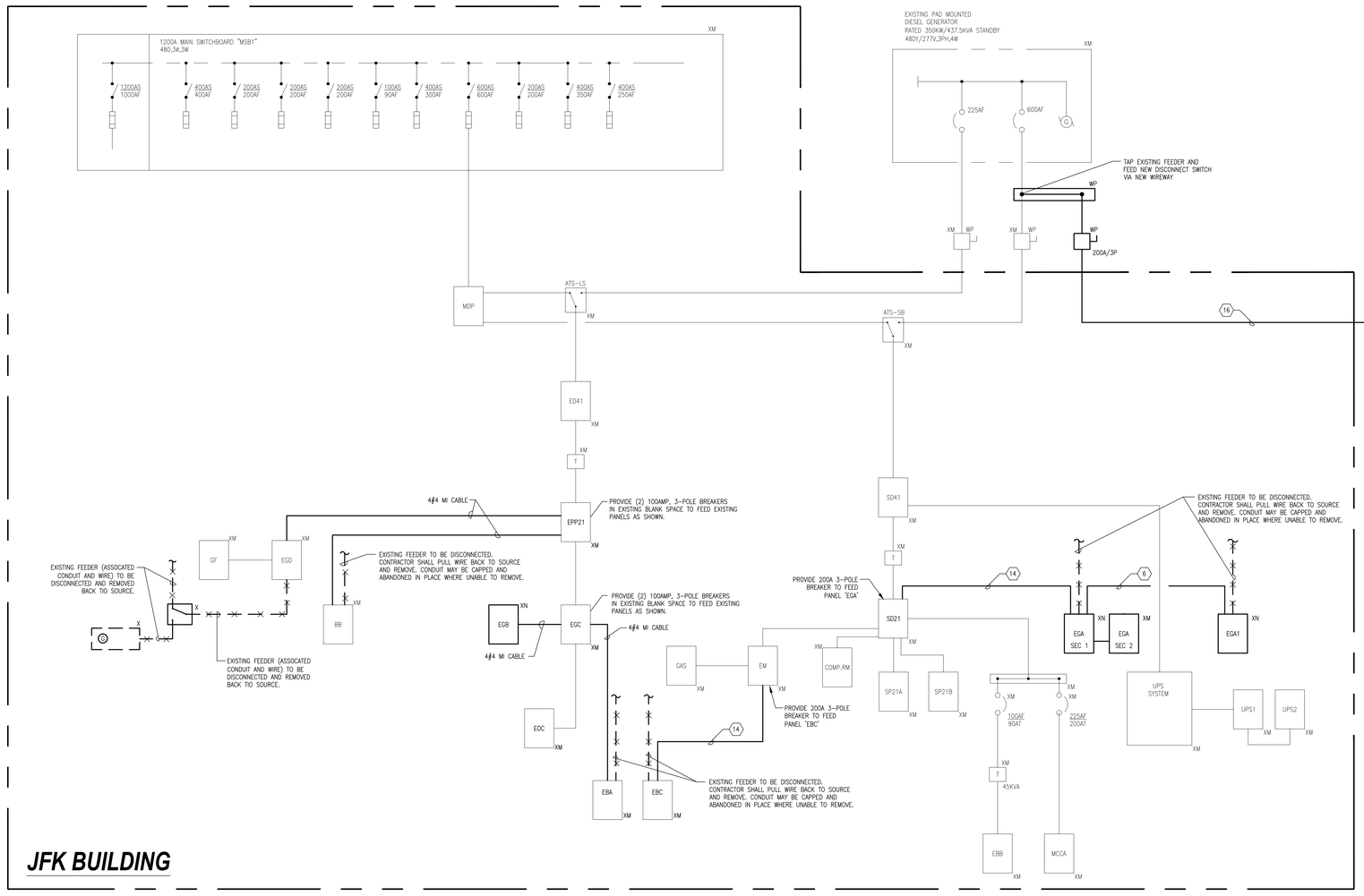
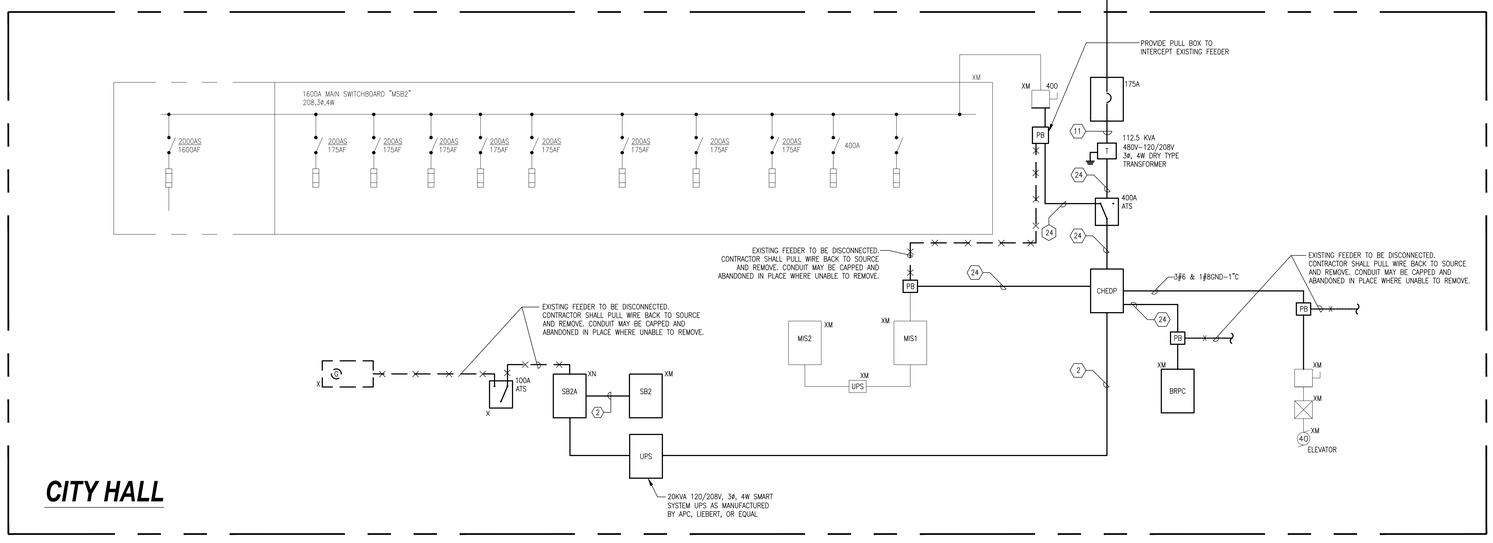


LEGEND OF FEEDER SIZES-COPPER CONDUCTORS

FEEDER SYMBOL	CONDUCTORS (3ø, 3W) WITH GROUND	RACEWAY SIZE	CONDUCTORS (3ø, 4W) WITH GROUND	RACEWAY SIZE	NOMINAL AMPERE RATING
1	3#6 & 1#10 GND	3/4"C			60
2			4#6 & 1#10 GND	1"C	
3	3#4 & 1#8 GND	1"C			70
4			4#4 & 1#8 GND	1¼"C	
5	3#1 & 1#8 GND	1¼"C			100
6			4#1 & 1#8 GND	1½"C	
7	3#1 & 1#6 GND	1¼"C			125
8			4#1 & 1#6 GND	1½"C	
9	3#1/0 & 1#6 GND	1½"C			150
10			4#1/0 & 1#6 GND	2"C	
11	3#2/0 & 1#6 GND	2"C			175
12			4#2/0 & 1#6 GND	2"C	
13	3#3/0 & 1#6 GND	2"C			200
14			4#3/0 & 1#6 GND	2"C	
15	3#4/0 & 1#4 GND	2"C			225
16			4#4/0 & 1#4 GND	2½"C	
17	3-250KCMIL & 1#4 GND	2½"C			250
18			4-250KCMIL & 1#4 GND	3"C	
19	3-350KCMIL & 1#4 GND	3"C			300
20			4-350KCMIL & 1#4 GND	3"C	
21	3-500KCMIL & 1#3 GND	3"C			350
22			4-500KCMIL & 1#3 GND	4"C	
23	3-500KCMIL & 1#3 GND	3"C			400
24			4-500KCMIL & 1#3 GND	3½"C	
25	6-250KCMIL & 2#2 GND	(2) 2½"C			500
26			8-250KCMIL & 2#2 GND	(2) 3"C	
27	6-350KCMIL & 2#1 GND	(2) 3"C			600
28			8-350KCMIL & 2#1 GND	(2) 3"C	
29	6-500KCMIL & 2#1/0 GND	(2) 3½"C			800
30			8-500KCMIL & 2#1/0 GND	(2) 4"C	
31	9-400KCMIL & 3#2/0 GND	(3) 3"C			1000
32			12-400KCMIL & 3#2/0 GND	(3) 3"C	
33	9-600KCMIL & 3#3/0 GND	(3) 3½"C			1200
34			12-600KCMIL & 3#3/0 GND	(3) 4"C	
35	12-600KCMIL & 4#4/0 GND	(4) 3½"C			1600
36			16-600KCMIL & 4#4/0 GND	(4) 4"C	
37	15-600KCMIL & 5-250KCMIL GND	(5) 3½"C			2000
38			20-600KCMIL & 5-250KCMIL GND	(5) 4"C	
39	18-600KCMIL & 6-350KCMIL GND	(6) 3½"C			2500
40			24-600KCMIL & 6-350KCMIL GND	(6) 4"C	
41	24-600KCMIL & 8-400KCMIL GND	(8) 3½"C			3000
42			32-600KCMIL & 8-400KCMIL GND	(8)4"C	
43	24-600KCMIL & 8-500KCMIL GND	(8) 3½"C			3200
44			32-600KCMIL & 8-500KCMIL GND	(8) 4"C	
45	27-600KCMIL & 9-500KCMIL GND	(9) 3½"C			3500
46			36-600KCMIL & 9-500KCMIL GND	(9) 4"C	
47	30-600KCMIL & 10-500KCMIL GND	(10) 3½"C			4000
48			40-600KCMIL & 10-500KCMIL GND	(10) 4"C	



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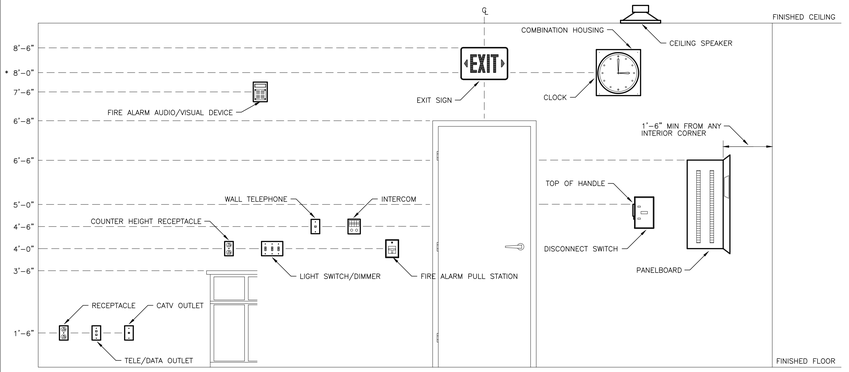
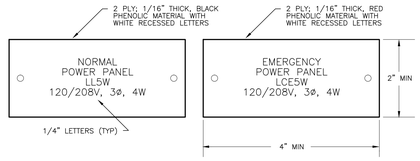
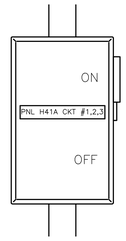


1 DEVICE MOUNTING HEIGHT DETAIL N.T.S.



2 PANELBOARD ENGRAVED NAMEPLATE DETAIL N.T.S.



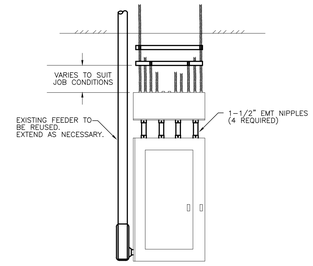
FUSED DISCONNECT SWITCH

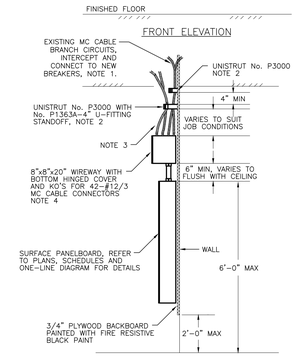
NON-FUSED DISCONNECT SWITCH

NOTES:

1. AT A MINIMUM, ELECTRICAL CONTRACTOR SHALL PROVIDE TYPED LABELS WITH PTOUCH MACHINE TO INDICATE PANEL NAME AND CIRCUIT NUMBER. PROVIDE "EMERGENCY" TYPED LABEL FOR CIRCUITS CONNECTED TO EMERGENCY PANELS. COORDINATE EXACT NAMING WITH PERSONNEL. IF FACILITY STANDARD IS ENGRAVED COVERPLATES, THE ELECTRICAL CONTRACTOR SHALL PROVIDE ENGRAVED COVERPLATES TO MATCH FACILITY REQUIREMENTS.

3 FUSED DISCONNECT LABELING DETAIL N.T.S.



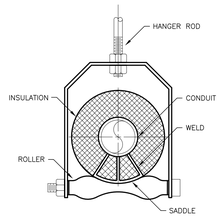


NOTES:

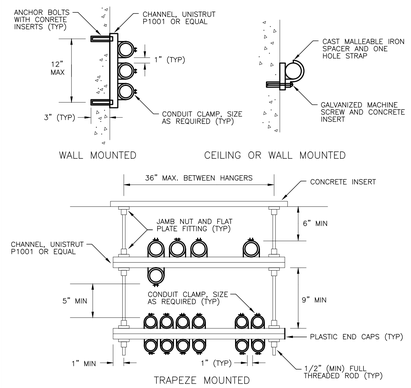
1. SUPPORT ALL CABLE RUNS FROM BUILDING STRUCTURE TO HIGH ABOVE CEILING. DO NOT ALLOW CABLES TO LAY-ON HUNG CEILINGS AT ANY POINT IN RUN.
2. PROVIDE UNISTRUT No. M5026 OR No. M5028 CABLE/CONDUIT CLAMPS FOR EACH BRANCH CIRCUIT. INSTALL ALL INSIDE CABLE RUNS ON INSIDE STRUT AND INSIDE WIREWAY KO'S BEFORE INSTALLING ANY RUNS ON OUTSIDE STRUT. SUPPLY AND INSTALL ONE SPARE CLAMP FOR EACH SPARE OR SPACE IN PANELBOARD.
3. INSTALL MARKER TAPE INDICATING CIRCUIT NUMBERS FOR EACH CABLE RUN.
4. CUT BACK CABLE ARMOR JACKET SUFFICIENT TO RUN CONDUCTORS THRU WIREWAY AND NIPPLES TO EACH CIRCUIT BREAKER. WITHOUT SPLICES.
5. CONDUCTORS RUN IN PANELBOARDS, NIPPLES AND WIREWAY SHALL BE GROUPED WITH 3 PHASES AND NEUTRALS IN EACH BUNDLED CONDITION TO AVOID INDUCTIVE HEATING IN METALLIC ENCLOSURES.

13850_E003

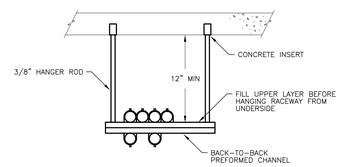
8 TYPICAL PANELBOARD/BRANCH CIRCUIT WIRING DETAIL N.T.S.



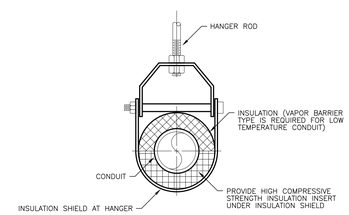
4 TYPICAL HANGER FOR CONDUIT (4" OR LARGER) DETAIL N.T.S.



5 CONDUIT MOUNTING DETAIL N.T.S.



6 CONDUIT TRAPEZE DETAIL N.T.S.



7 TYPICAL HANGER FOR CONDUIT (3" OR SMALLER) DETAIL N.T.S.

NEW DISTRIBUTION PANELBOARD 'CHEDP'

480/277 VOLTS 3 PHASE 4 WIRE & GROUND — 400 MAIN BUS AMPS — 65,000 AIC

MAIN DEVICE: 400A — NEUTRAL: 400A — MOUNTING: SURFACE — GROUND BUS: YES

CIRCUIT No.	DESCRIPTION	LOAD KVA	OVERCURRENT DEVICE FRAME	TRIP	POLE	REMARKS
1	MIS SERVICE (PANEL MS1)	–	400	400	3	–
2	PANEL "SB2A" (VIA UPS SYSTEM)	–	100	70	3	–
3	ELEVATOR	–	100	90	3	–
4	PANEL "BRPC"	–	400	400	3	–
5	SPACE AND HARDWARE	–	–	–	–	–
6	SPACE AND HARDWARE	–	–	–	–	–
7	SPACE AND HARDWARE	–	–	–	–	–
8	SPACE AND HARDWARE	–	–	–	–	–
9	SPACE AND HARDWARE	–	–	–	–	–
10	SPACE AND HARDWARE	–	–	–	–	–

SCHEDULE OF PANELBOARDS 120/208 VOLTS 3ø, 4W

PANEL TAG	MAINS MCB	MAINS MLO	MTG	AIC	TOTAL POLES	BRANCH CIRCUIT BREAKERS 20A 1P	20A 2P	20A 3P	30A 1P	30A 2P	30A 3P	40A 3P	50A 3P	60A 3P	70A 3P	80A 3P	100A 3P	125A 3P	150A 3P	200A 3P	1P SPACE
BB	100	–	SUR	10K	–	42	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EGA	200	–	SUR	10K	–	39	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–
EGA1	100	–	SUR	10K	–	81	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EGB	100	–	SUR	10K	–	42	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SB2A	70	–	SUR	10K	–	39	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–
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NOTE:

1. ALL PANELS LISTED ABOVE ARE EXISTING TO BE REPLACED WITH NEW. CONTRACTOR SHALL VERIFY EXACT QUANTITY AND AMPERE RATING OF EXISTING BREAKERS TO BE PROVIDED IN NEW PANELS.

REV. No.	DATE	DESCRIPTION	CHK. BY	APPR. BY

BLW Engineers, Inc.
311 Great Road, PO Box 1551
Littleton, Massachusetts 01460
t: 978.486.4301 f: 978.428.0067
e: info@blwengineers.com
HVAC • Electrical • Plumbing • Fire Protection

	NAME	DATE
DRAWN BY	THOMAS B. CHOPELAS	03.24.14
CH'KD. BY	MIKE G. GAGNE	03.24.14
APPR'D. BY	JOHN C. PIERGA	03.24.14

CLIENT
CITY OF LOWELL
LOWELL, MA

PROJECT
LOWELL CITY HALL
BACKUP POWER DESIGN
LOWELL, MA

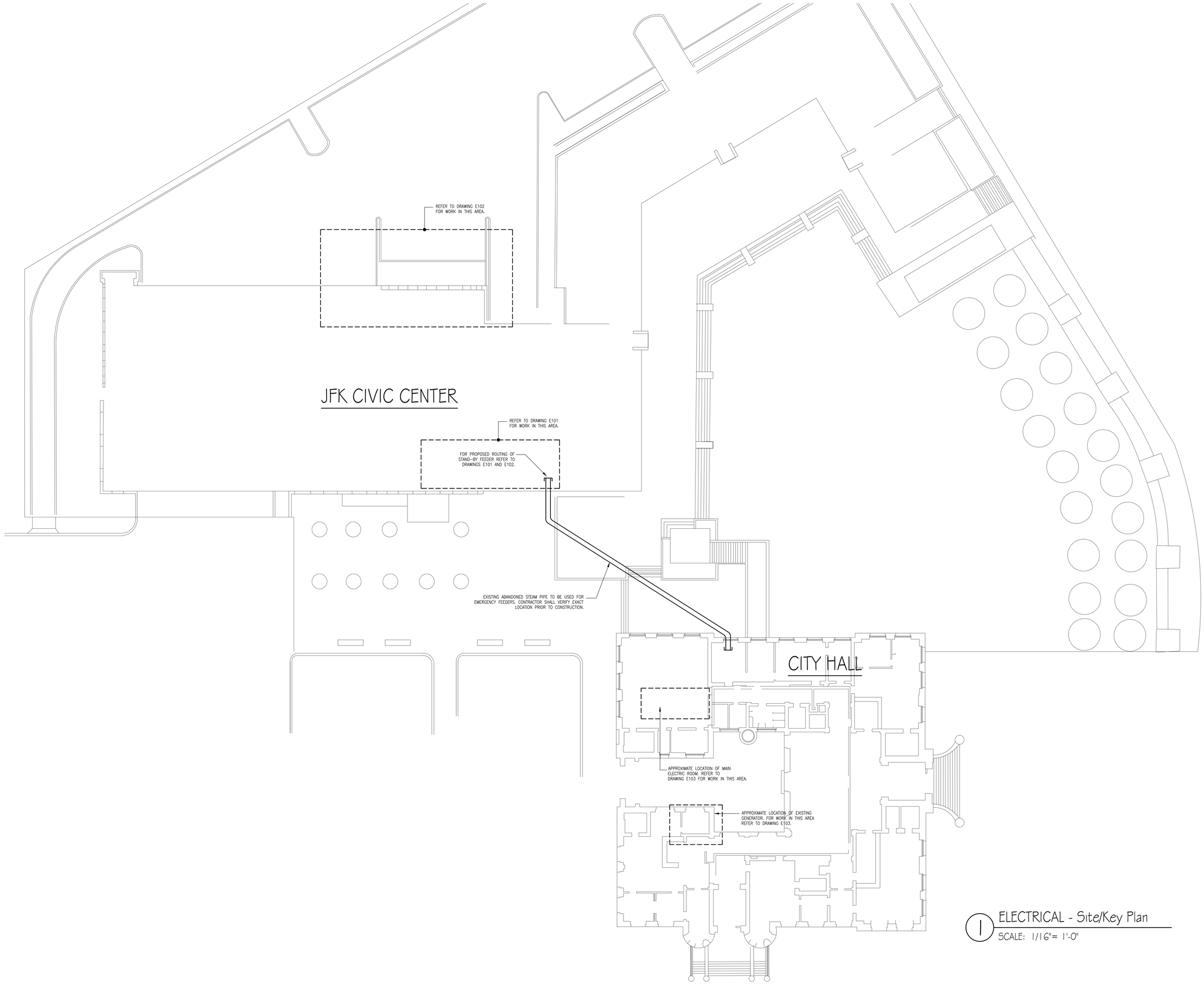
SHT. REF.

TITLE
ELECTRICAL
DETAILS & SCHEDULES

DRAWING NO.
E003

JOB NO. 13253

SIZE D



1 ELECTRICAL - Site/Key Plan
SCALE: 1/16"= 1'-0"

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CITY OF LOWELL
LOWELL, MA

PROJECT
LOWELL CITY HALL
BACKUP POWER DESIGN
LOWELL, MA

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TITLE
ELECTRICAL
SITE/KEY PLAN

DRAWING NO.
E100

JOB NO. 13253

SIZE D

NOTES:

1. SEE ELECTRICAL ONE LINE DIAGRAM ON DRAWING E002 FOR FEEDER SIZES.

1 ELECTRICAL - Basement Plan

SCALE: 1/8"= 1'-0"

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PROJECT
LOWELL CITY HALL
BACKUP POWER DESIGN
LOWELL, MA

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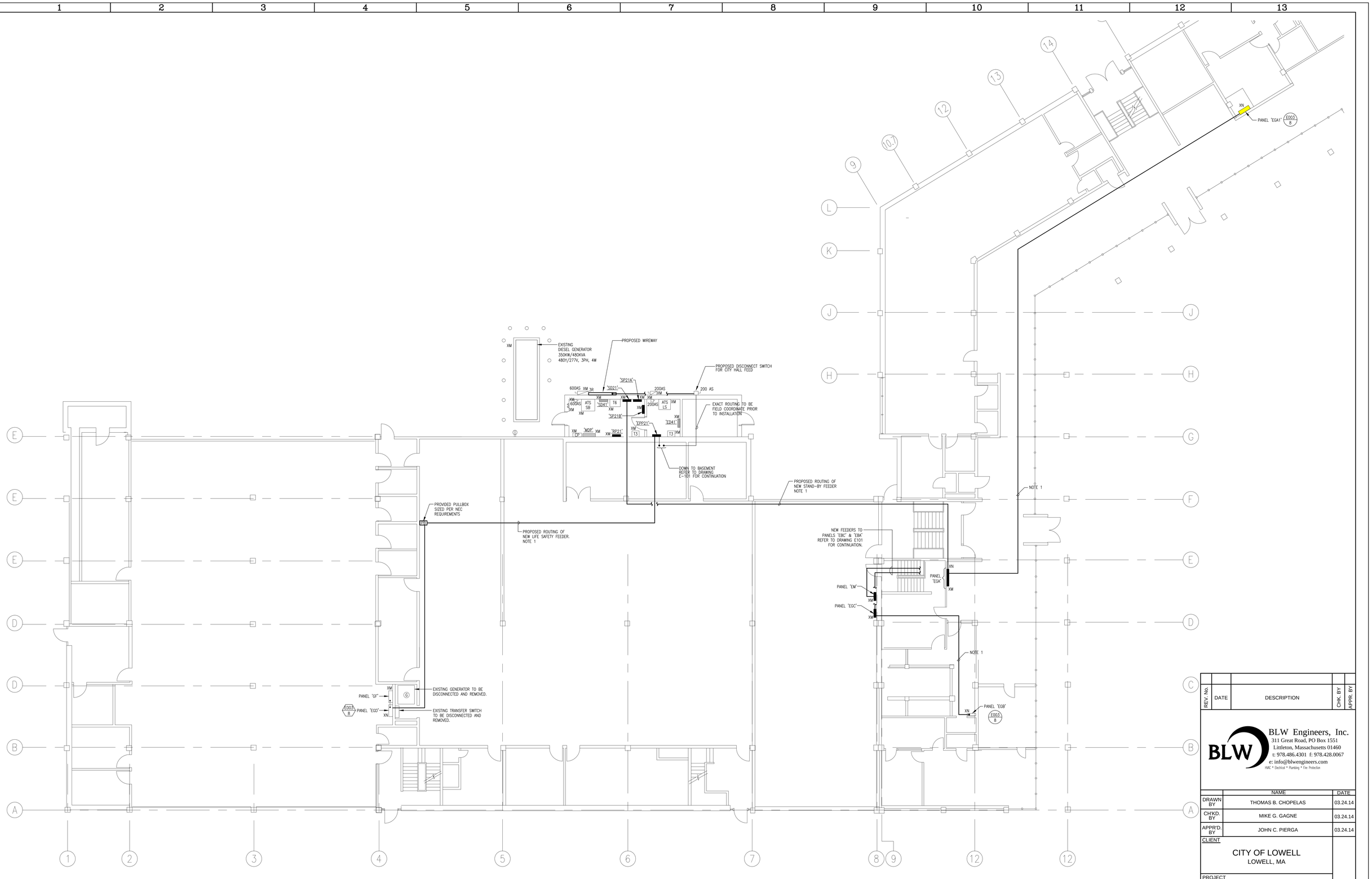
TITLE
ELECTRICAL
JFK BASEMENT PLAN

DRAWING NO.
E101

JOB NO. 13253

SIZE D



1 ELECTRICAL - Ground Floor Plan

SCALE: 1/8"= 1'-0"

NOTES:

1. SEE ELECTRICAL ONE LINE DIAGRAM ON DRAWING E002 FOR FEEDER SIZES.

REV. No.	DATE	DESCRIPTION	CHK. BY	APPR. BY

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APPR'D. BY	JOHN C. PIERGA	03.24.14

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CITY OF LOWELL
LOWELL, MA

PROJECT
LOWELL CITY HALL
BACKUP POWER DESIGN
LOWELL, MA

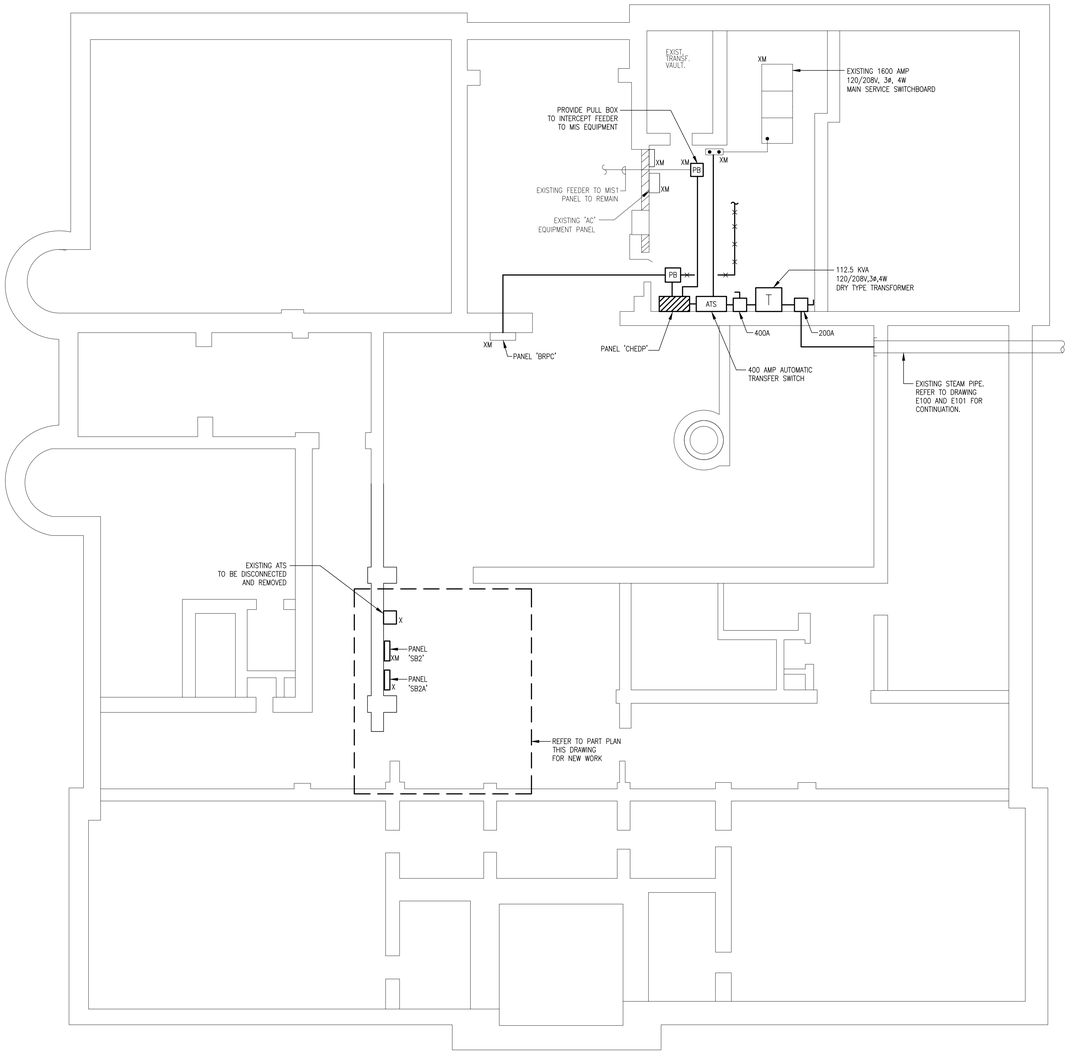
SHT. REF.

TITLE
ELECTRICAL
JFK GROUND FLOOR PLAN

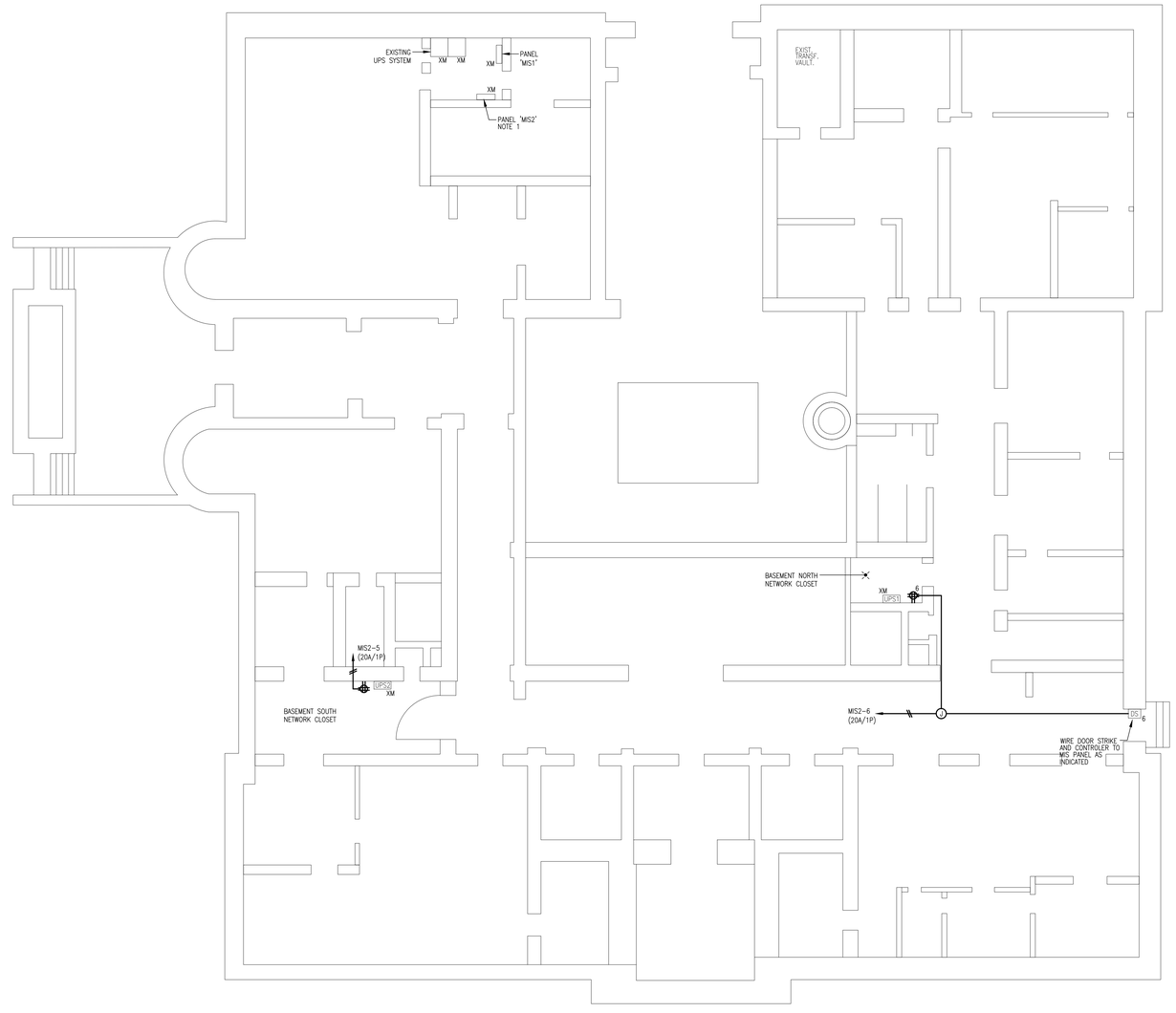
DRAWING NO.
E102

JOB NO. 13253

SIZE D



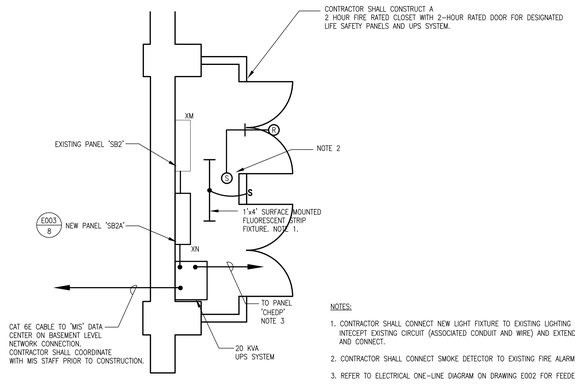
1 ELECTRICAL - City Hall Sub-Basement Plan
SCALE: 1/8"= 1'-0"



2 ELECTRICAL - City Hall Basement Plan
SCALE: 1/8"= 1'-0"

NOTES:

1. EC SHALL PROVIDE (5) 20AMP/1P CIRCUIT BREAKERS, IN EXISTING BLANK SPACE, TO FEED RECEPTACLES INDICATED ON FLOORS: BASEMENT, THIRD AND FOURTH (ATTIC).



NOTES:

1. CONTRACTOR SHALL CONNECT NEW LIGHT FIXTURE TO EXISTING LIGHTING CIRCUIT IN THIS AREA. INTECCPT EXISTING CIRCUIT (ASSOCIATED CONDUIT AND WIRE) AND EXTEND TO TO LIGHT FIXTURE AND CONNECT.
2. CONTRACTOR SHALL CONNECT SMOKE DETECTOR TO EXISTING FIRE ALARM SYSTEM LOOP IN THIS AREA.
3. REFER TO ELECTRICAL ONE-LINE DIAGRAM ON DRAWING E002 FOR FEEDER SIZES.

3 ELECTRICAL - City Hall Sub-Basement Part Plan
SCALE: 1/4"= 1'-0"

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CLIENT
CITY OF LOWELL
LOWELL, MA

PROJECT
LOWELL CITY HALL
BACKUP POWER DESIGN
LOWELL, MA

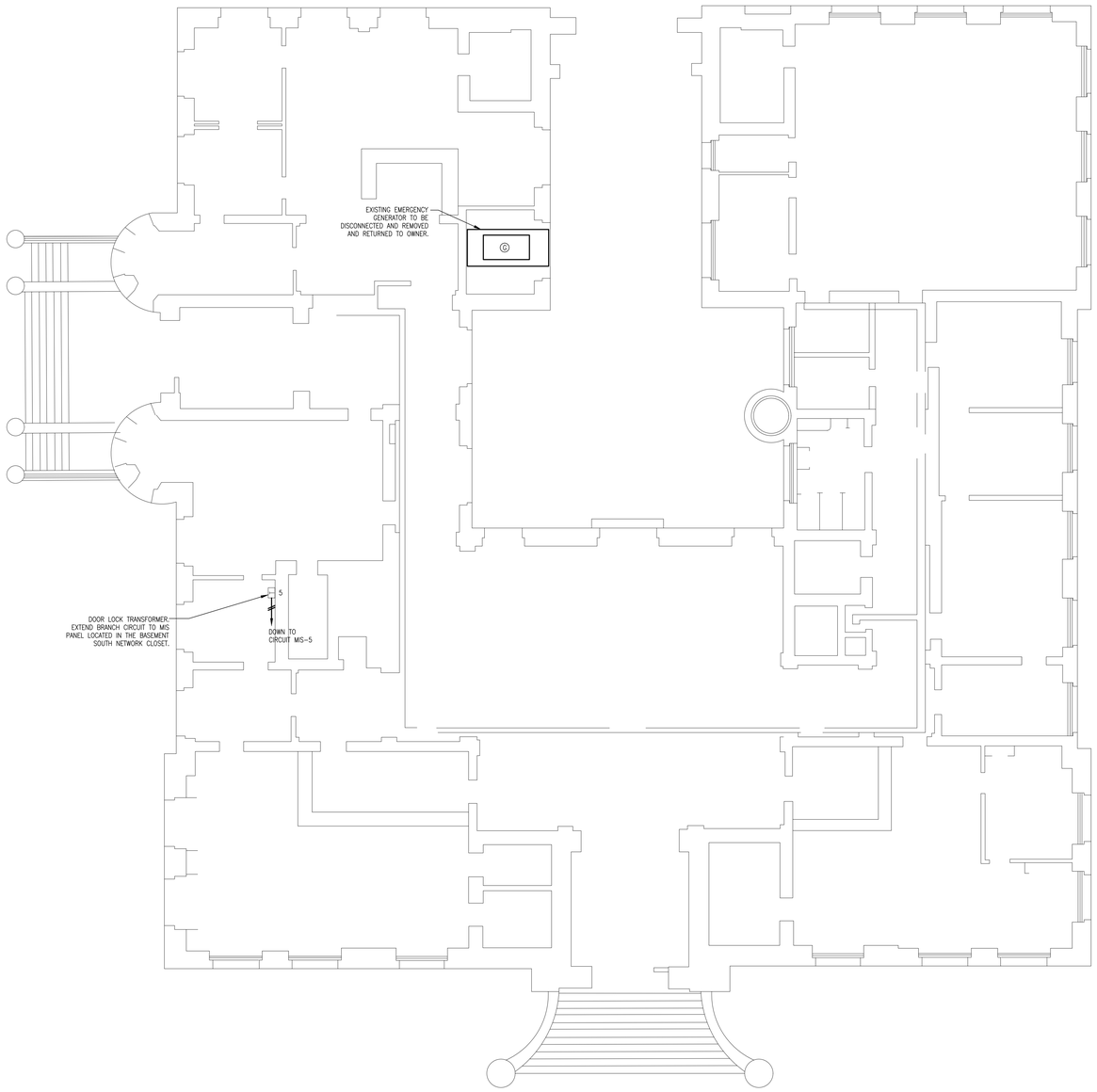
TITLE
ELECTRICAL CITY HALL
SUB-BASEMENT & BASEMENT PLANS

DRAWING NO.
E103

SHT. REF.

JOB NO. 13253

SIZE D

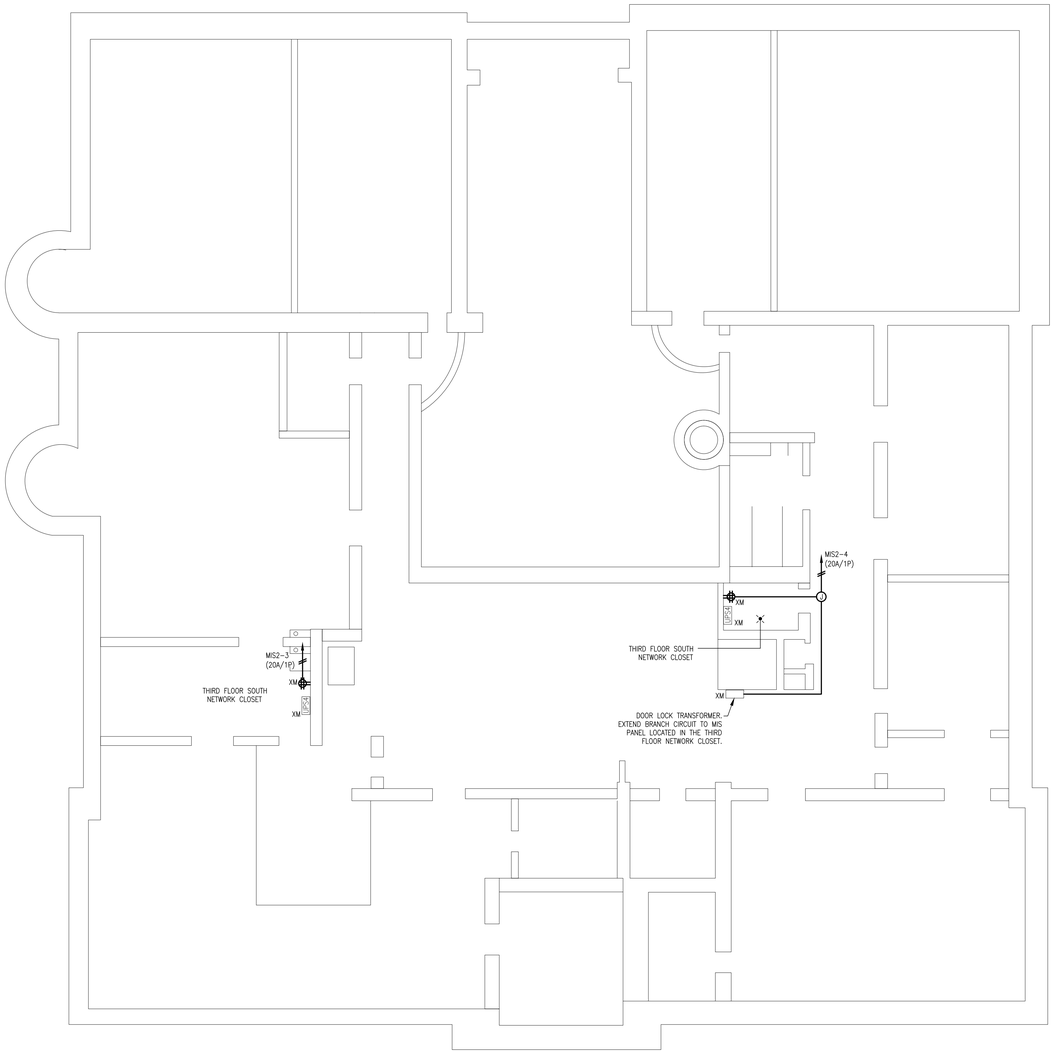


1 ELECTRICAL - City Hall First Floor Plan

SCALE: 1/8"= 1'-0"

NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF GENERATOR AND OFFSITE STORAGE AS REQUIRED BY OWNER. CONTRACTOR SHALL COORDINATE LOCATION OF GENERATOR STORAGE WITH THE OWNER.



2 ELECTRICAL - City Hall Third Floor Plan

SCALE: 1/8"= 1'-0"

LIGHTING NOTES:

1. EC SHALL PROVIDE (5) 20AMP/1P CIRCUIT BREAKERS, IN EXISTING BLANK SPACE, TO FEED RECEPTACLES INDICATED ON FLOORS: BASEMENT, THIRD AND FOURTH (ATTIC).

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CH'KD. BY	MIKE G. GAGNE	03.24.14
APPR'D. BY	JOHN C. PIERGA	03.24.14

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CITY OF LOWELL
LOWELL, MA

PROJECT

LOWELL CITY HALL
BACKUP POWER DESIGN
LOWELL, MA

SHT. REF.

TITLE

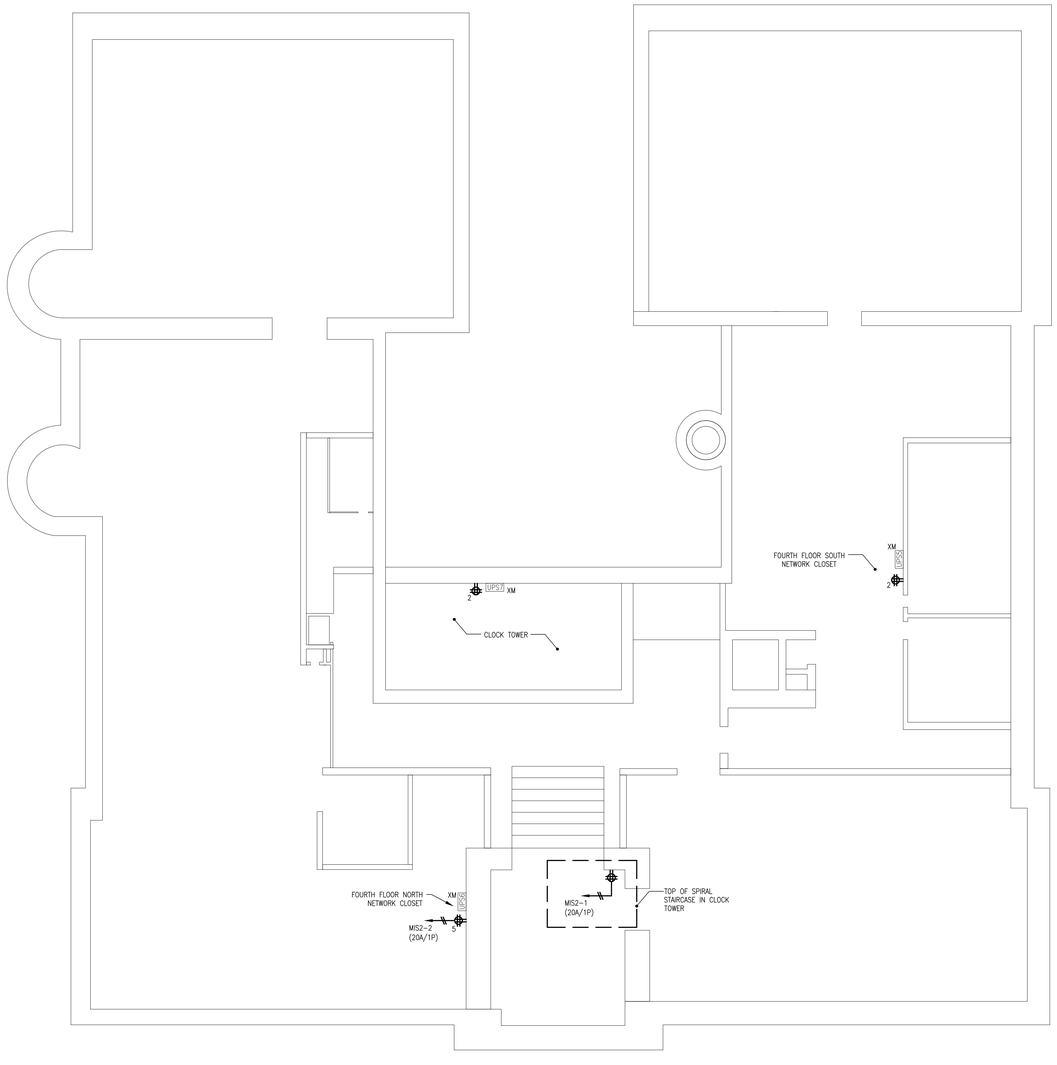
ELECTRICAL CITY HALL
FIRST & THIRD FLOOR PLANS

DRAWING NO.

E104

JOB NO. 13253

SIZE D



1 ELECTRICAL - City Hall Fourth Floor (Attic) Plan

SCALE: 1/8"= 1'-0"

NOTES:

1. FOR LOCATION OF PANEL 'MIS2' REFER TO BASEMENT PLAN ON DRAWING E103.

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CH'KD. BY	MIKE G. GAGNE	03.24.14
APPR'D. BY	JOHN C. PIERGA	03.24.14

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CITY OF LOWELL
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PROJECT
LOWELL CITY HALL
BACKUP POWER DESIGN
LOWELL, MA

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TITLE
ELECTRICAL CITY HALL
FOURTH FLOOR (ATTIC) PLAN

DRAWING NO.
E105

JOB NO. 13253

SIZE D