

JOB NO.
13027

DATE:
NOVEMBER 15, 2013
REVISED:
FEBRUARY 20, 2014
AUGUST 22, 2014



A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
McKINLEY + ANTHONY AVE.
MUNDELEIN, ILLINOIS

SHEET
E1.0
OF

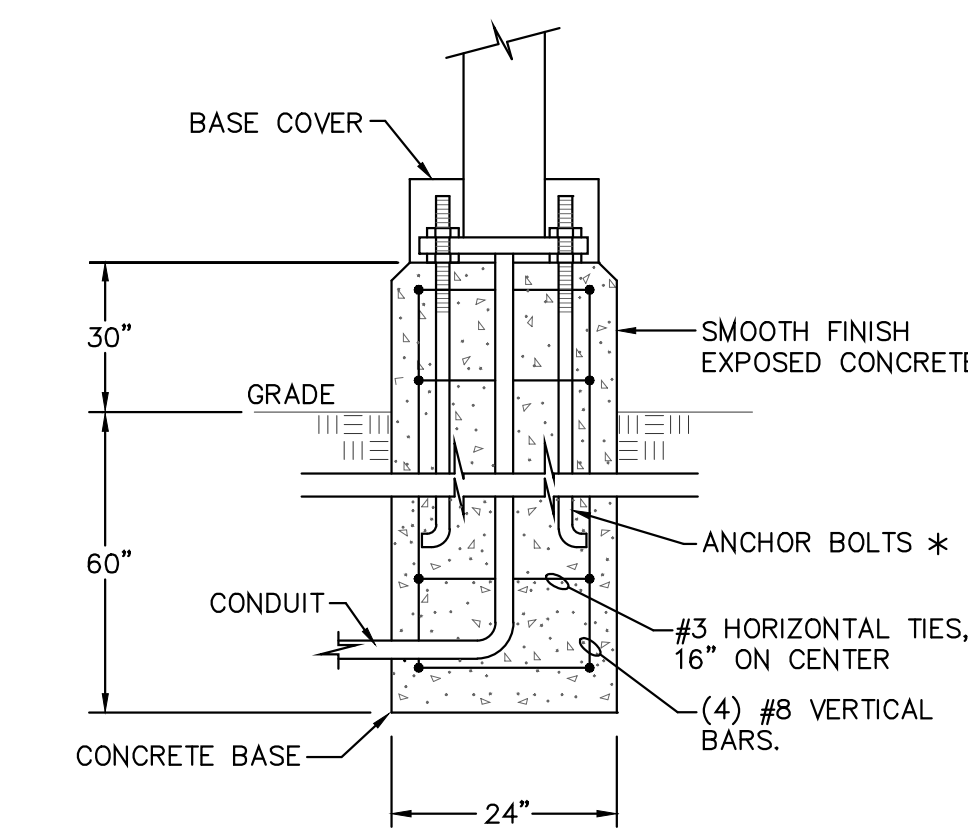
DRAWING KEY NOTE

1 ELECTRICAL CONTRACTOR TO WIRE THESE LIGHTING FIXTURES TO A PUBLIC STREET LIGHTING CONTROLLER, COORDINATE WITH VILLAGE OF MUNDELEIN.

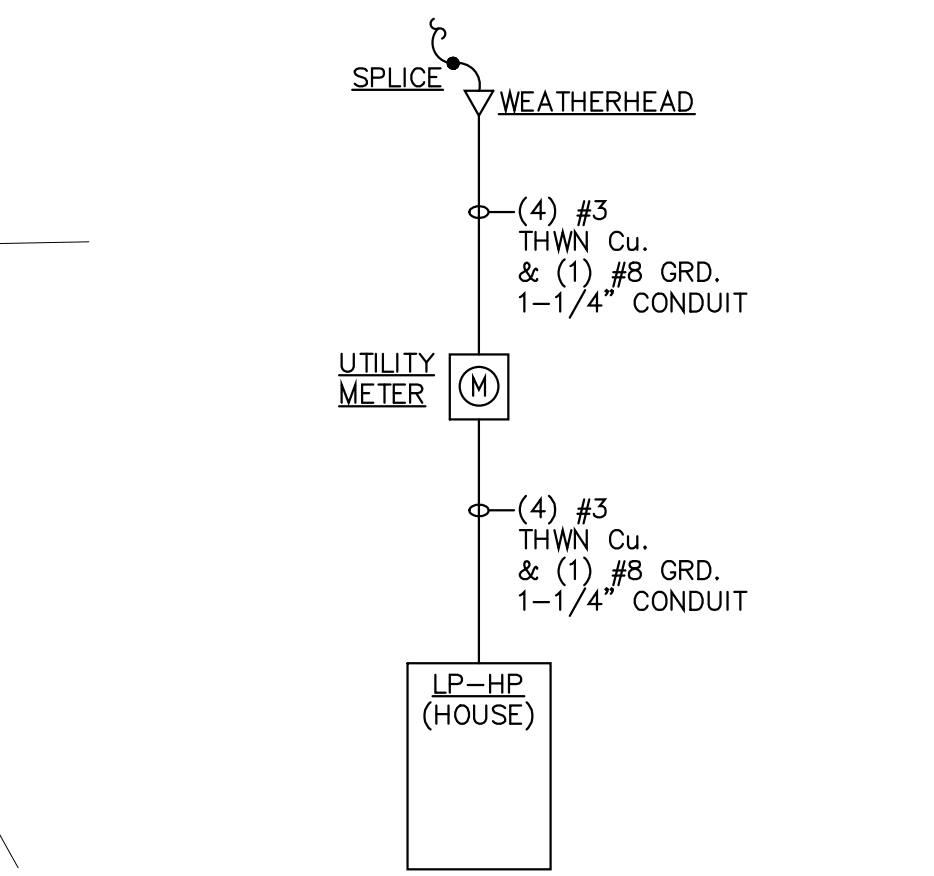
LUMINAIRE SCHEDULE

- A SURFACE MOUNTED LED TYPE GARAGE LUMINAIRE UL LISTED FOR WET LOCATIONS COMPLETE WITH 24 LED'S EQUAL TO HUBBELL "SEDONA" CAT. #SCP-24LU-4K-5M-*. (*-COORDINATE COLOR WITH THE OWNER)
- B 2FT X 4FT RECESSED DIRECT/INDIRECT FLUORESCENT LUMINAIRE, COMPLETE WITH (3) 32WT8 LAMPS AND ELECTRONIC BALLAST, EQUAL TO COLUMBIA CAT. #STE24-332G-MPO-EU.
- C 4FT STRIP TYPE FLUORESCENT LUMINAIRE, COMPLETE WITH (2) 32WT8 LAMPS AND ELECTRONIC BALLAST, EQUAL TO COLUMBIA CAT. #K4-232-EU.
- D 4FT WALL MOUNTED FLUORESCENT LUMINAIRE, COMPLETE WITH (2) 32WT8, (1) 17WT8 LAMPS, ELECTRONIC BALLAST AND EMERGENCY BATTERY, EQUAL TO COLUMBIA CAT. #BL4-232-EPU-EL.
- E RECESSED INCANDESCENT CAN TYPE LUMINAIRE, COMPLETE WITH (1) 16W LED LAMP EQUAL TO PRESOLITE CAT. #DBX-TBW60 (LUMINAIRE) AND WITH SOLAIS CAT. #LRP38/40/27K (LAMP).
- F SURFACE MOUNTED SCONCE TYPE FLUORESCENT LUMINAIRE, COMPLETE WITH (2) 13W PL LAMPS AND ELECTRONIC BALLAST, EQUAL TO ADVENT LIGHTING CAT. #AWB302-2F13-WHITE-120V. (MOUNT AT 7'-6" A.F.F.)
- G WALL MOUNTED FLUORESCENT, COMPLETE WITH (2) 13W PL LAMPS AND ELECTRONIC BALLAST, EQUAL TO INDESSA LIGHTING CAT. #5012CFQ13*. (*-COORDINATE COLOR WITH OWNER)
- H 30" WALL MOUNTED INCANDESCENT RESTROOM LUMINAIRE, COMPLETE WITH LAMPS, EQUAL TO PROGRESS LIGHTING CAT. #P3335-15.
- J COMBINATION EXHAUST FAN AND LIGHTING COMBINATION, COMPLETE WITH LAMPS AND 80CFM FAN, EQUAL TO NUTONE CAT. #XN80L.
- K WALL MOUNTED ELEVATOR PIT LIGHT UL LISTED FOR WET LOCATIONS, COMPLETE WITH (1) 100W. INCANDESCENT LAMP, EQUAL TO HUBBELL CAT. #VFB-15/VW-1/VG-15.
- L WALL MOUNTED LED TYPE LUMINAIRE UL LISTED FOR WET LOCATIONS, COMPLETE WITH 7W LED'S, EQUAL TO LUMINAIRE CAT. #SPC4122CR-7WHP-3500-120V.-OP-*. (*-COORDINATE COLOR WITH THE OWNER)
- M WALL MOUNTED LED TYPE LUMINAIRE UL LISTED FOR WET LOCATIONS, COMPLETE WITH (7) 16.4W LED'S, EQUAL TO HUBBELL "LAREDO" CAT. #LNC-7LU-5K-3-*. (*-COORDINATE COLOR WITH THE OWNER)
- N 2FT WALL MOUNTED FLUORESCENT LUMINAIRE, COMPLETE WITH (1) 17WT8 LAMP AND ELECTRONIC BALLAST EQUAL TO COLUMBIA CAT. #W2-117-EU.
- P1 POLE MOUNTED H.I.D. TYPE LUMINAIRE, COMPLETE WITH (1) 100W HIGH PRESSURE SODIUM LAMP, 14FT POLE AND ALL REQUIRED MOUNTING HARDWARE, HOLOPHNAE GRANDVILLE SERIES CAT. #GVJNT100HPMTB7RSB-P AND WADSWORTH SERIES STYLE POLE CAT. #W14F5/17-CA-BKH.
- P2 POLE MOUNTED H.I.D. TYPE LUMINAIRE, COMPLETE WITH (1) 320W METAL HALIDE LAMP, 25FT SQUARE STRAIGHT STEEL POLE AND ALL REQUIRED MOUNTING HARDWARE, EQUAL TO SPAULDING LIGHTING "CIMERRON" CAT. #CR1-A-P32-H4P-F-Q-*-*HS (LUMINAIRE) AND CAT. #SSS-25-50-7-AX-* (POLE), COORDINATE THE COLOR WITH THE OWNER.
- P3 POLE MOUNTED H.I.D. TYPE LUMINAIRE, COMPLETE WITH (1) 320W METAL HALIDE LAMP, 25FT SQUARE STRAIGHT STEEL POLE AND ALL REQUIRED MOUNTING HARDWARE, EQUAL TO SPAULDING LIGHTING "CIMERRON" CAT. #CR1-A-P32-H5-F-Q-*-*HS (LUMINAIRE) AND CAT. #SSS-25-50-7-AX-* (POLE), COORDINATE THE COLOR WITH THE OWNER.
- EX LED EXIT SIGN COMPLETE WITH BATTERY AND RED LETTERS EQUAL TO DUAL LITE CAT. #LXURW.
- EX1 LED EXIT SIGN COMPLETE WITH BATTERY, (2) HEADS, EXTRA CAPACITY AND RED LETTERS EQUAL TO DUAL LITE CAT. #LURW3.
- EM EMERGENCY BATTERY UNIT COMPLETE WITH BATTERY AND (2) HEADS EQUAL TO DUAL LITE CAT. #LZ2.
- RH REMOTE WEATHERPROOF EMERGENCY HEAD COMPLETE WITH 8W HALOGEN LAMP EQUAL TO DUAL LITE CAT. #OMSSW-0608.

ELECTRICAL LEGEND	
	FLUORESCENT FIXTURE
	CAN TYPE FIXTURE
	WALL MOUNTED FIXTURE
	EXIT LIGHT FIXTURE
	EMERGENCY BATTERY UNIT
	EXTERIOR REMOTE EMERGENCY HEAD
	EXIT LIGHT WITH HEADS
	JUNCTION BOX
	DISCONNECT SWITCH (HEAVY DUTY ONLY)
	COMBINATION STARTER DISCONNECT SWITCH
	SINGLE POLE SWITCH
	3 POLE SWITCH
	MOTOR RATED SWITCH
	DUPLEX RECEPTACLE
	GFCI TYPE DUPLEX RECEPTACLE
	SINGLE SPECIAL PURPOSE RECEPTACLE
	PHONE JACK WITH 1" CONDUIT STUBBED TO ABOVE CEILING
	HOME RUN TO PANEL WITH CIRCUIT NO.
	FIXTURE TYPE
	KEY NOTE
	WEATHER PROOF
	N.F. NON-FUSED

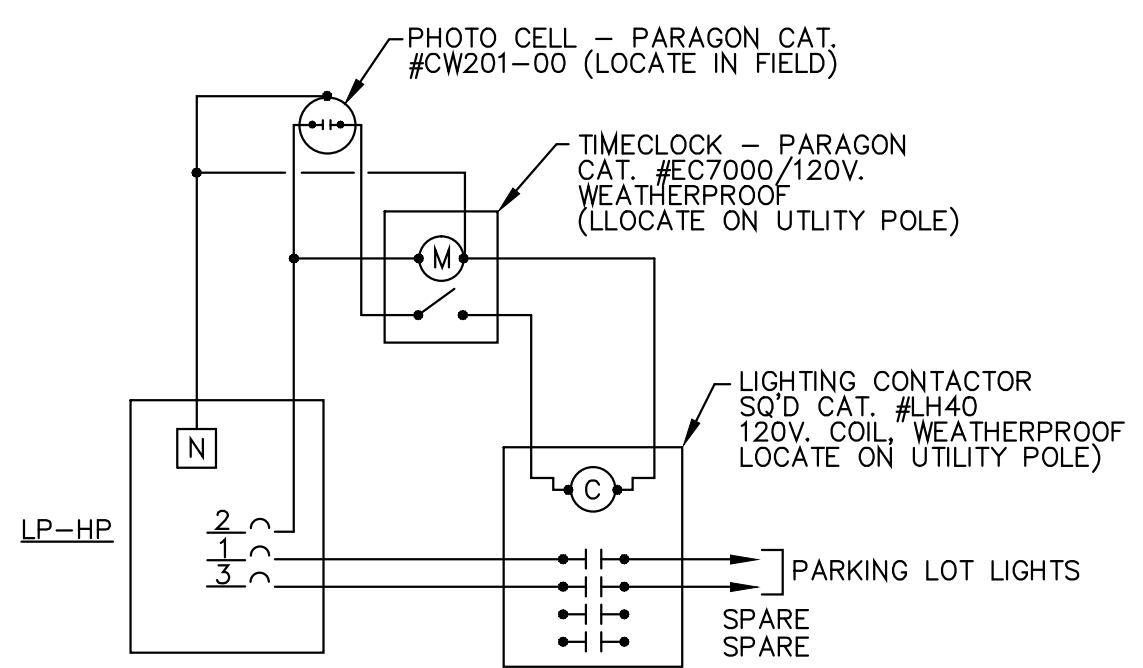


POLE BASE DETAIL
NOT TO SCALE
* = VERIFY EXACT REQUIREMENTS WITH POLE MANUFACTURER.



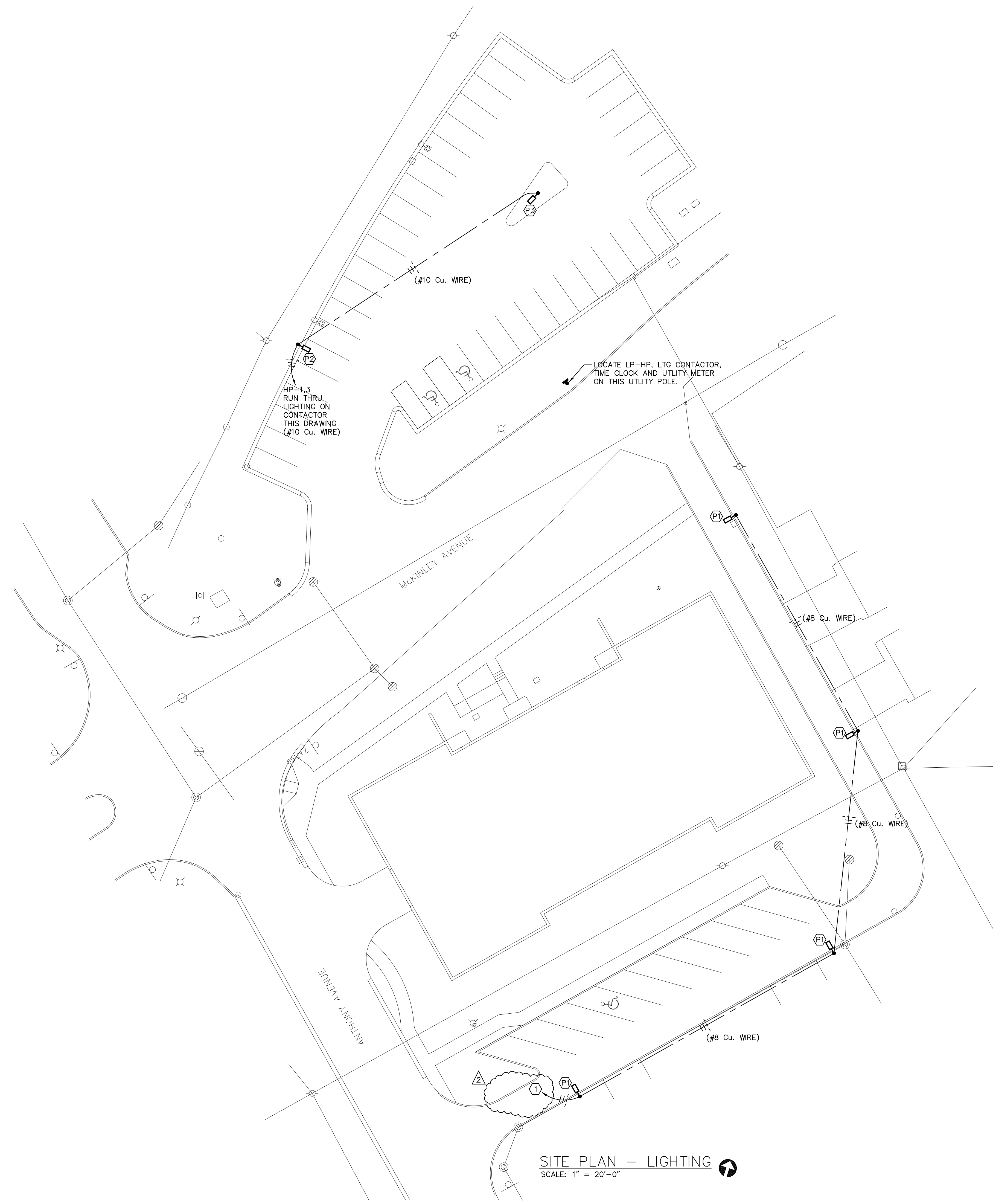
PARKING LOT LIGHTING SINGLE LINE RISER DIAGRAM

LP-HP (WEATHERPROOF)					
VOLTAGE: 120/208V. 3Ø 4W.			CONNECTED LOAD: 0.8KW.		
MOUNTING: SURFACE			MAIN: 100AMP MAIN BREAKER		
LOAD SERVED	KW	BRK	BRK	KW	LOAD SERVED
PARKING LOT LTG	.4	20	1	20	2
	.4	2P	3	20	2
SPACE			4		SPACE
			5		6
			7		8
			9		10
			11		12
			13		14
			15		16
			17		18
			19		20
			21		22
			23		24



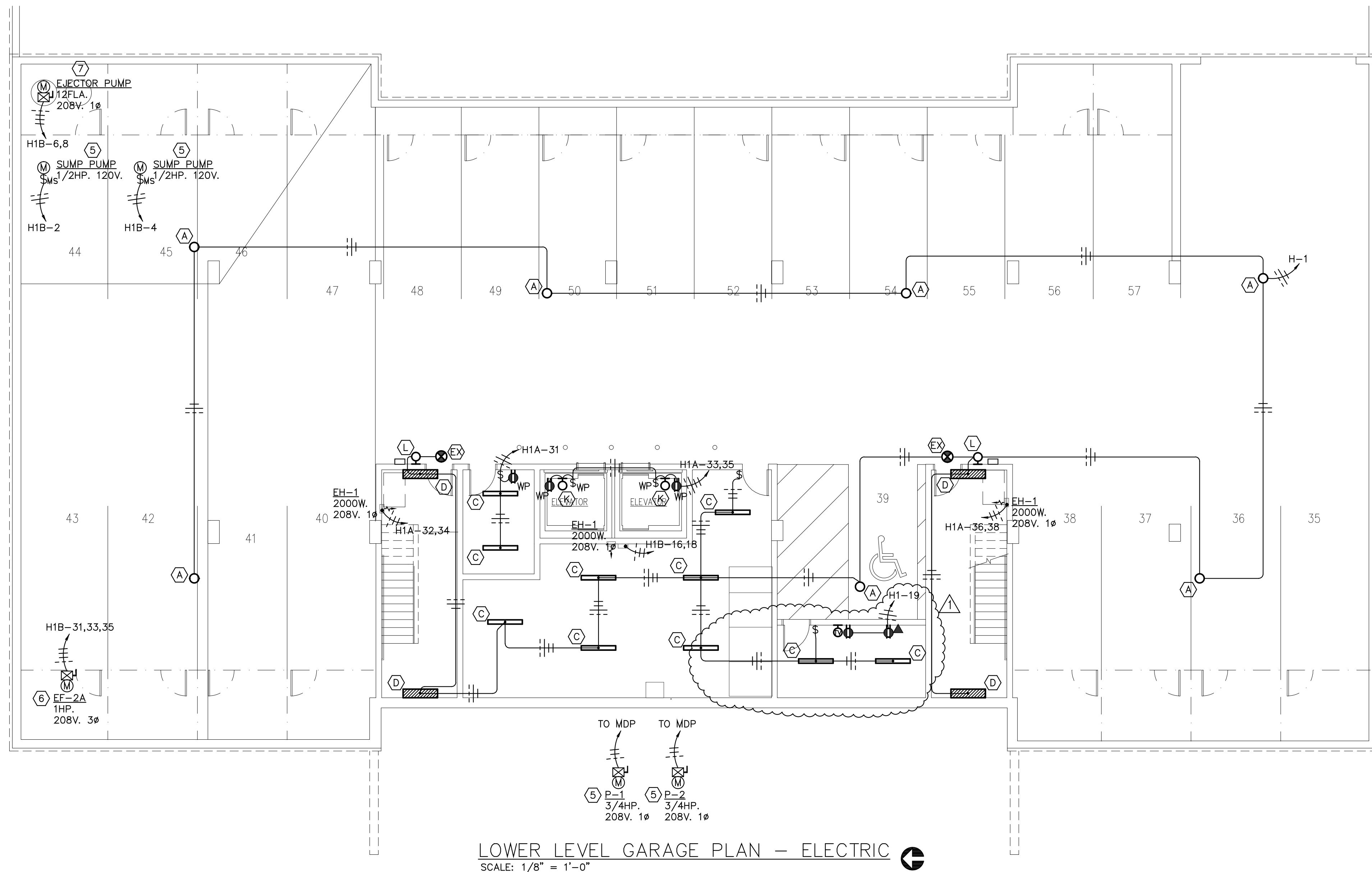
LIGHTING CONTROL WIRING DIAGRAM
NOT TO SCALE

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SITE PLAN - LIGHTING
SCALE: 1" = 20'-0"

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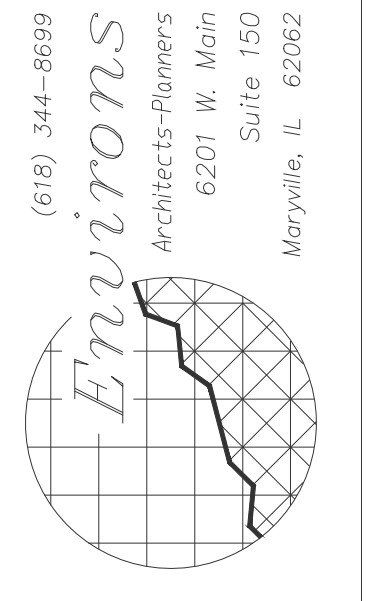


Ⓛ DRAWING KEY NOTES

- 1 ELECTRICAL CONTRACTOR SHALL VERIFY THE POWER REQUIREMENTS FOR THE ELEVATOR WITH THE SHOP DRAWINGS BEFORE ANY ROUGH-IN.
- 2 30AMP. 1-POLE NON-FUSED DISCONNECT SWITCH FOR THE ELEVATOR LIGHTING AND FAN. RUN A 3/4" CONDUIT WITH (2) #12 THWN CU. & (1) #12 GRD. FROM THIS SWITCH TO THE ELEVATOR CONTROLLER, COORDINATE THE CONNECTION WITH THE CONTROLLER INSTALLER AND COORDINATE THE DISCONNECT LOCATION IN THE FIELD.
- 3 COORDINATE THE LOCATION OF THIS FUSED SWITCH IN THE FIELD, SEE THE SINGLE LINE RISER DIAGRAM FOR SWITCH INFORMATION.
- 4 FURNISH AND INSTALL A WEATHER PROOF JUNCTION BOX MIDWAY IN THE ELEVATOR SHAFT FOR THE ELEVATOR TELEPHONE. STUB A 3/4" CONDUIT WITH PULL STRING OUT INTO AN ACCESSIBLE CEILING.
- 5 COORDINATE THE LOCATION AND POWER REQUIREMENTS OF THIS EQUIPMENT WITH THE INSTALLER AND SHOP DRAWINGS.
- 6 COORDINATE THE LOCATION AND POWER REQUIREMENTS OF THIS FAN WITH THE INSTALLER, THE STARTER AND DISCONNECT SWITCH ARE FURNISHED WITH THE FAN.
- 7 FURNISH AND INSTALL A COMBINATION STARTER FOR THIS MOTOR. UNIT TO HAVE A 30A. 2-POLE DISCONNECT SWITCH AND SIZE-1 STARTER WITH A 120V. CONTROL TRANSFORMER AND RUN LIGHT, SIZE THE OVERLOAD HEATERS PER THE MOTOR NAMEPLATE FULL LOAD AMPS. COORDINATE THE LOCATION AND POWER REQUIREMENTS WITH THE INSTALLER AND THE SHOP DRAWINGS.
- 8 COORDINATE THE DISCONNECT LOCATION WITH THE INSTALLER.



Richard D. Herndon, P.E.



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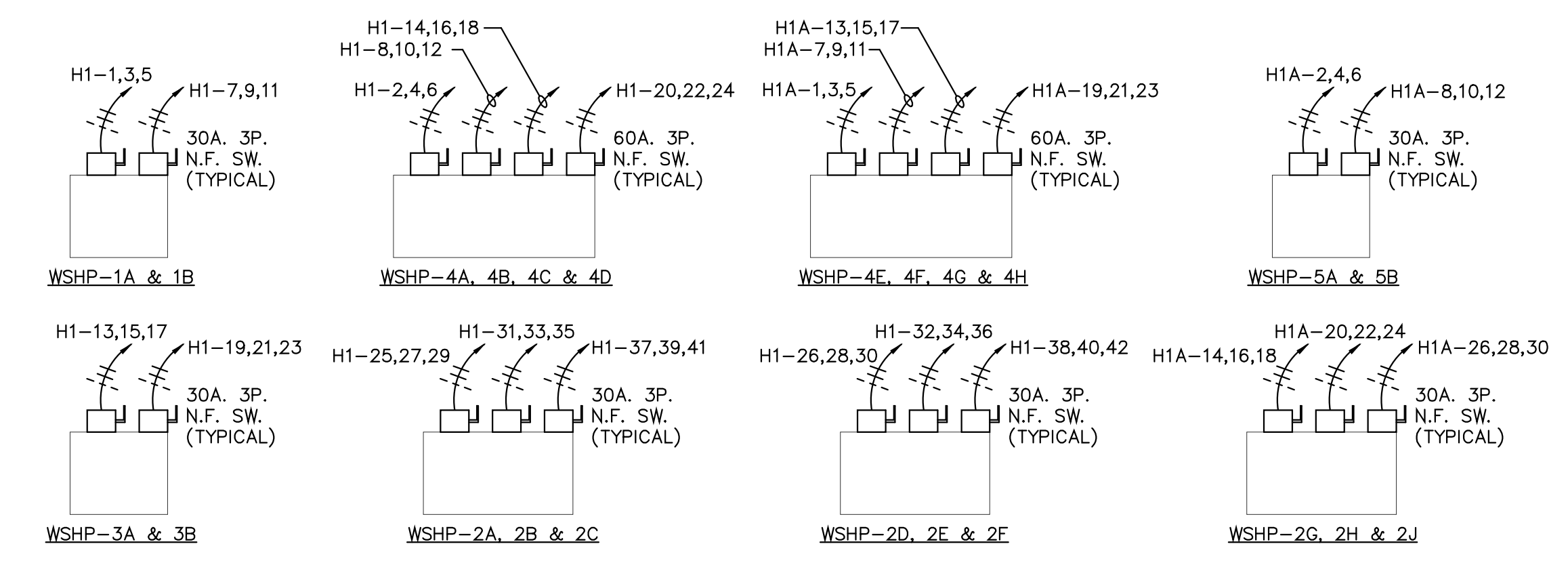
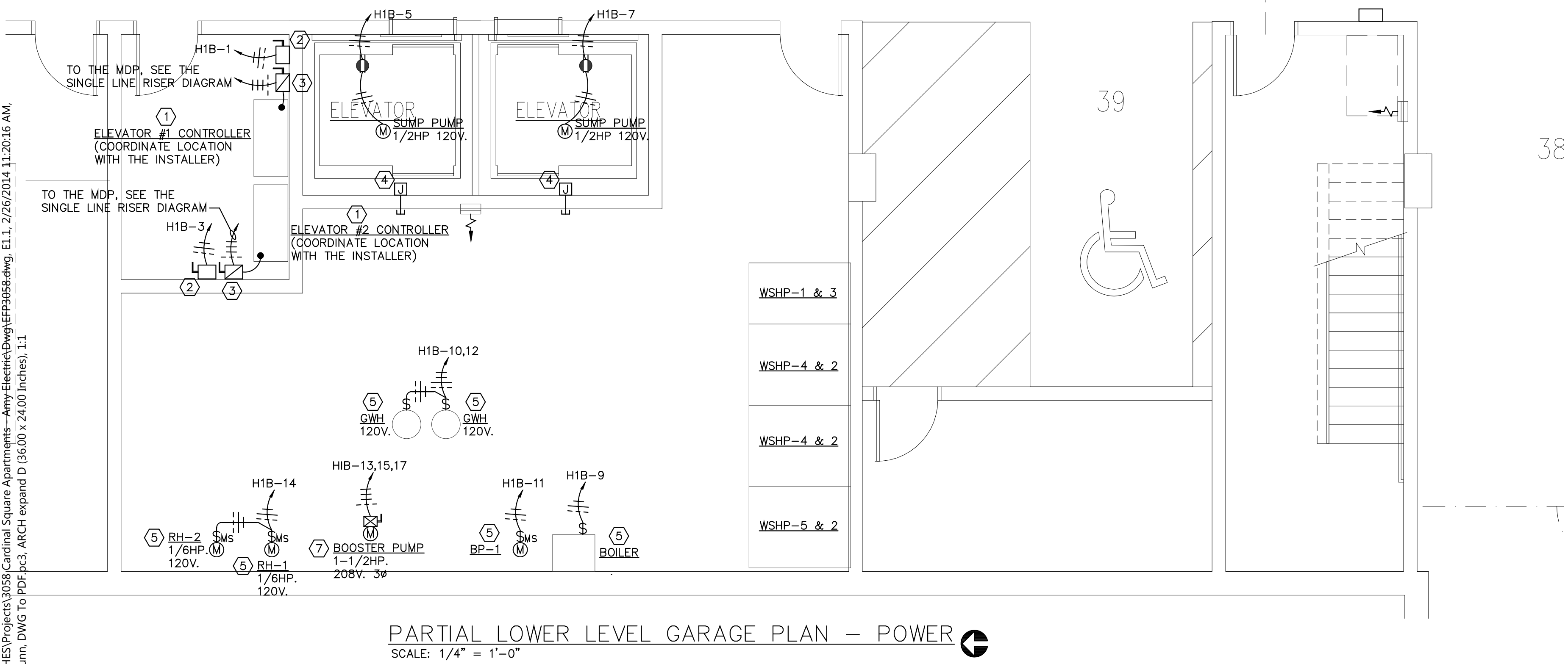
DATE:
NOVEMBER 15, 2013

REVISED:
FEBRUARY 26, 2014



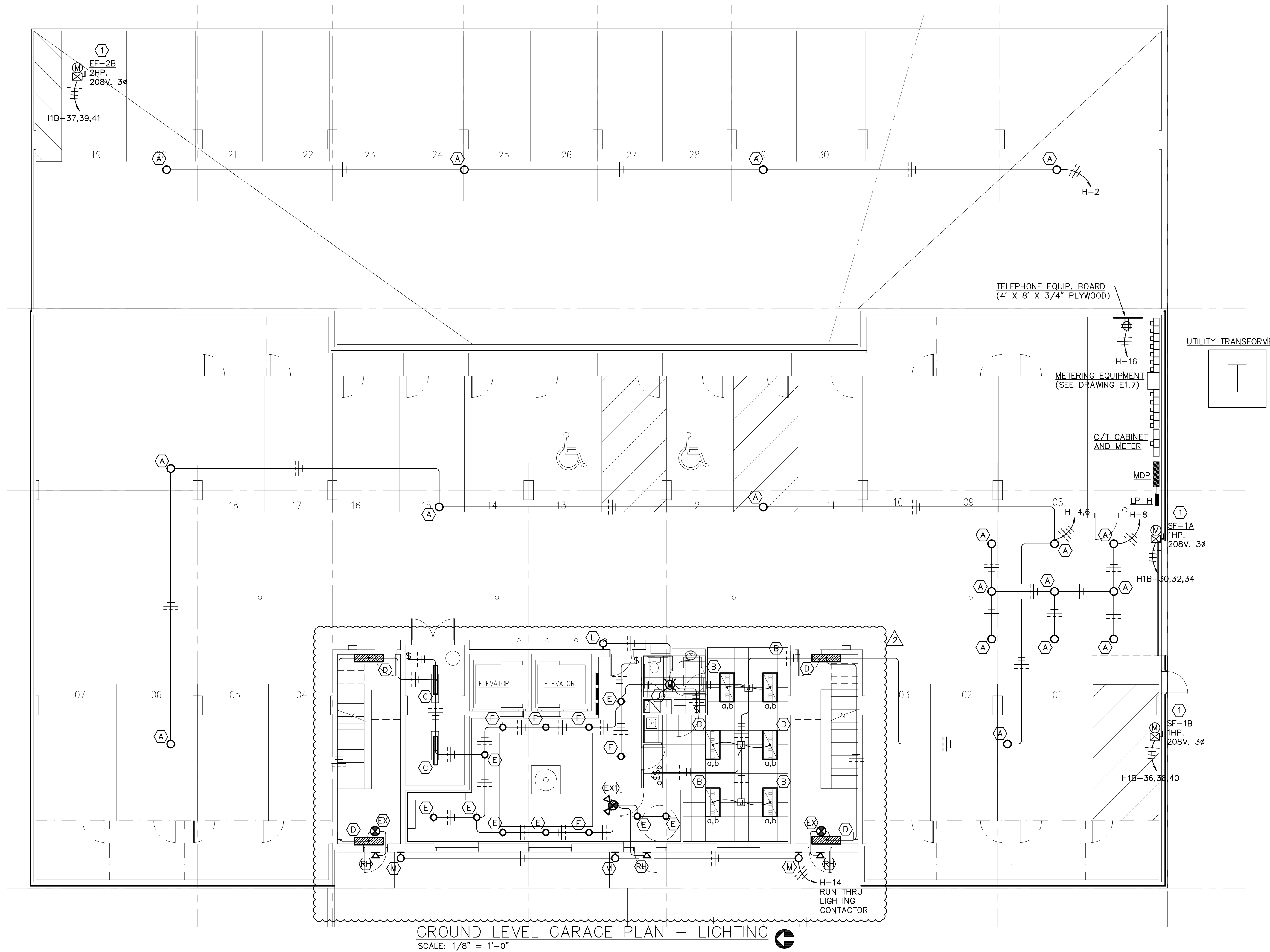
A NEW APARTMENT BUILDING 'C':
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MUNDELEIN, ILLINOIS

SHEET
E1.1
OF

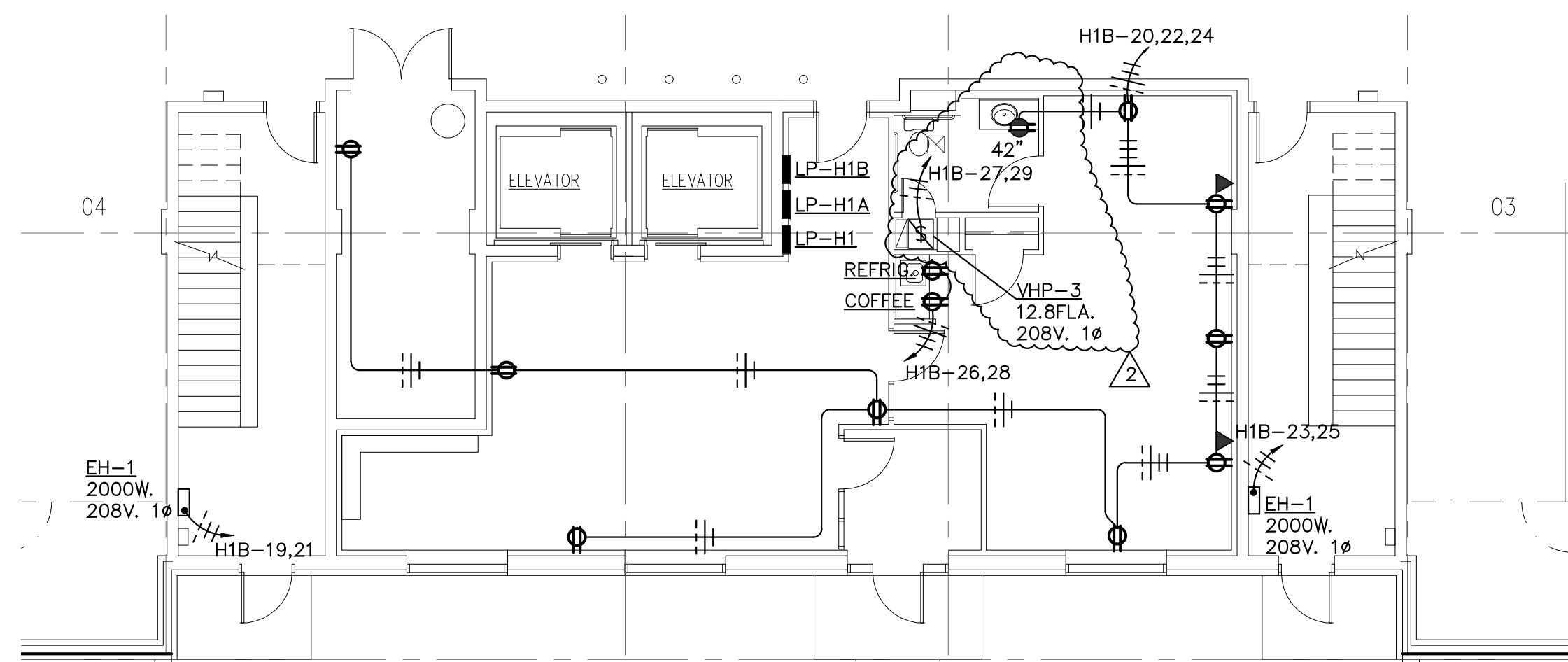


DRAWING KEY NOTES

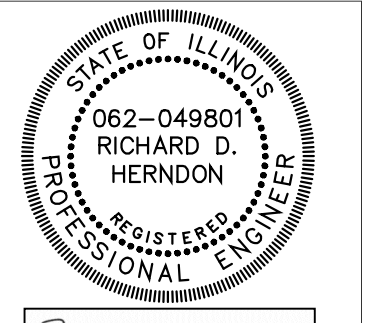
- COORDINATE THE LOCATION AND POWER REQUIREMENTS OF THIS FAN WITH THE INSTALLER, THE STARTER AND DISCONNECT SWITCH ARE FURNISHED WITH THE FAN.



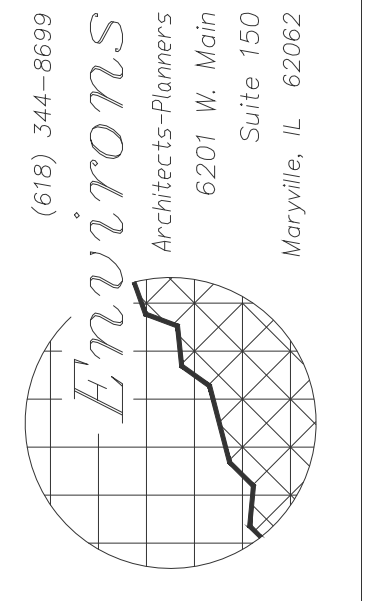
GROUND LEVEL GARAGE PLAN - LIGHTING
SCALE: 1/8" = 1'-0"



PARTIAL GROUND LEVEL GARAGE PLAN - POWER
SCALE: 1/8" = 1'-0"



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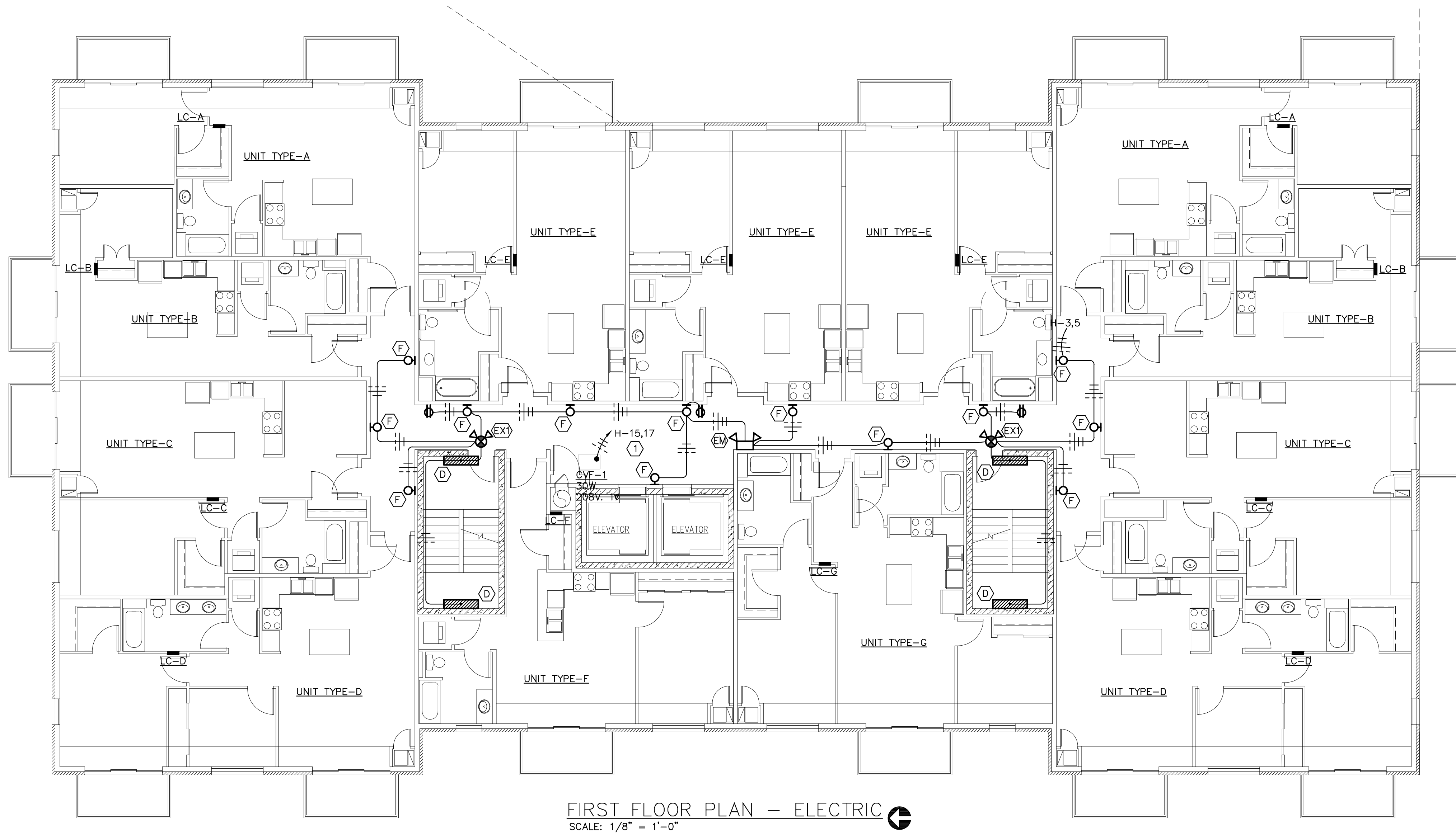
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2 SEPTEMBER 8, 2014



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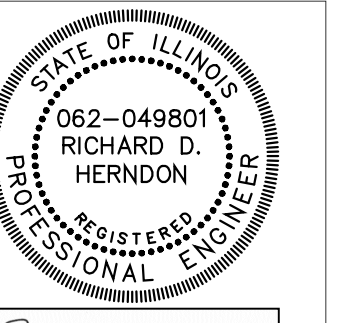


GENERAL NOTES

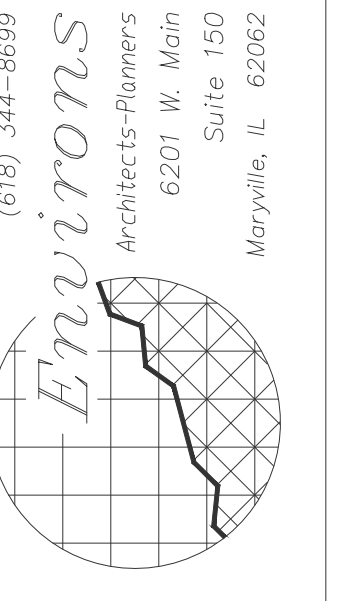
- A ALL UNIT TYPES ARE SHOWN FOR REFERENCE ONLY.
- B SEE DRAWINGS E1.5 AND E1.6 FOR THE WIRING OF THE APARTMENTS.

DRAWING KEY NOTE

- 1 COORDINATE THE LOCATION OF THIS HVAC UNIT WITH THE INSTALLER.



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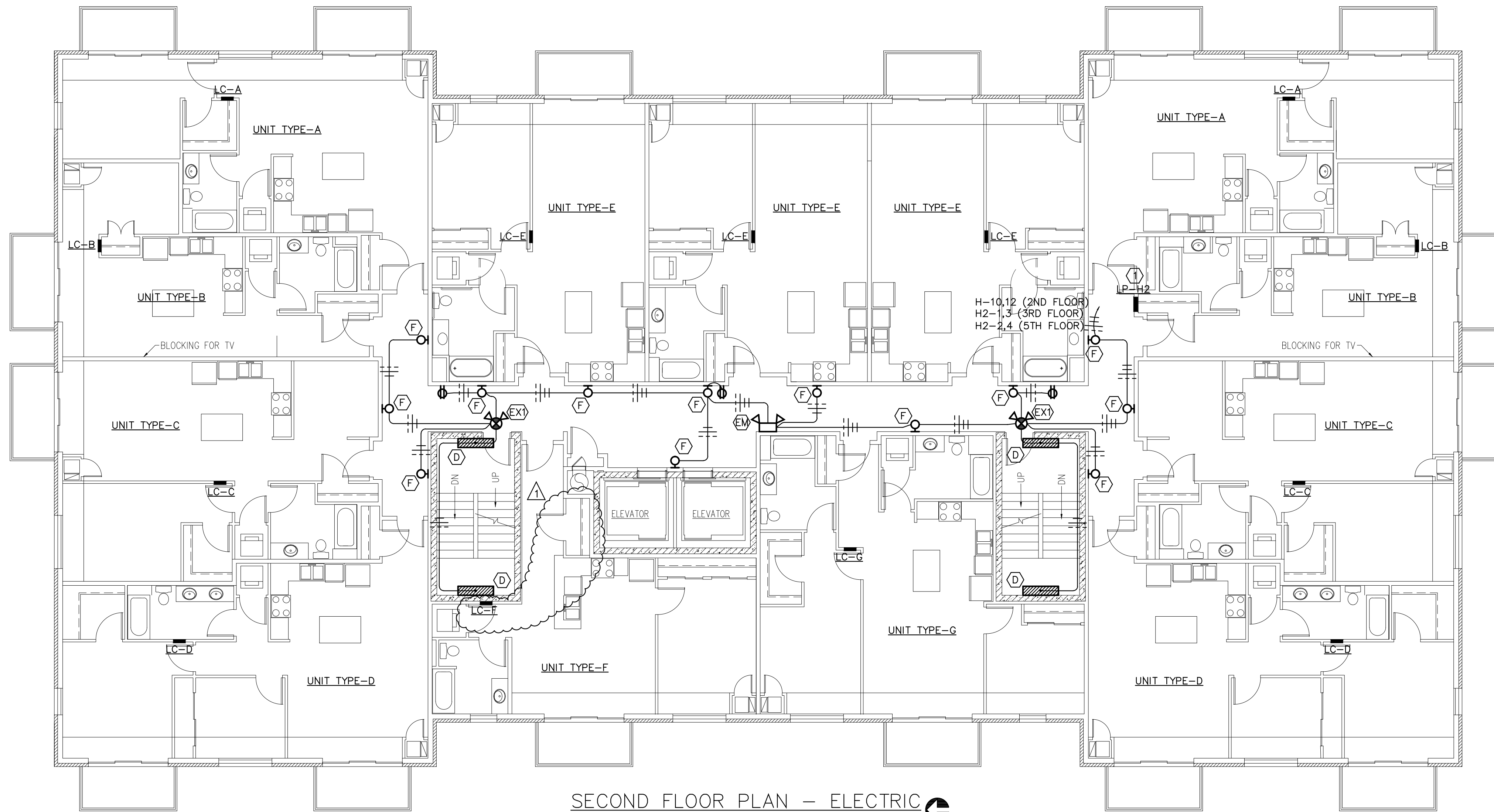
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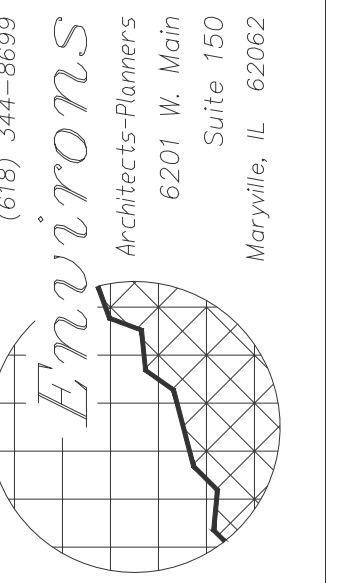
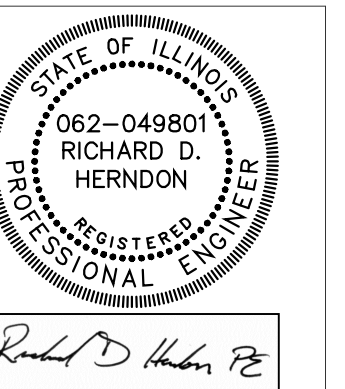
SECOND FLOOR PLAN - ELECTRIC
 SCALE: 1/8" = 1'-0"
 NOTE: THIS PLAN IS TYPICAL FOR THE 2ND, 3RD AND 5TH FLOOR.

GENERAL NOTES

- A ALL UNIT TYPES ARE SHOWN FOR REFERENCE ONLY.
- B SEE DRAWINGS E1.5 AND E1.6 FOR THE WIRING OF THE APARTMENTS.

DRAWING KEY NOTES

- 1 COORDINATE THE LOCATION OF THIS HOUSE PANEL IN THE FIELD.
- 2 COORDINATE THE LOCATION OF THIS HVAC UNIT WITH THE INSTALLER.



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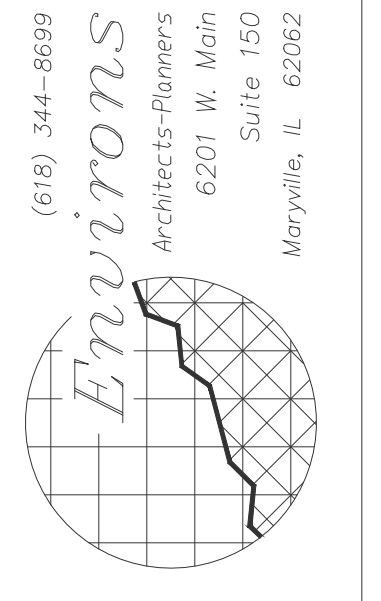
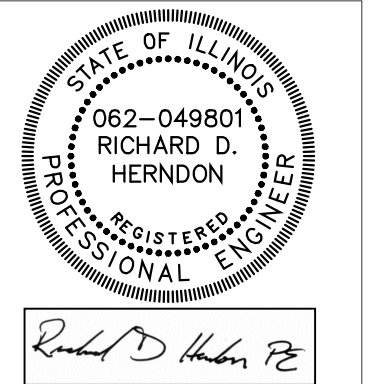
SHEET
E1.4
 OF



FOURTH FLOOR PLAN - ELECTRIC
SCALE: 1/8" = 1'-0"

GENERAL NOTES

- A ALL UNIT TYPES ARE SHOWN FOR REFERENCE ONLY.
- B SEE DRAWINGS E1.5 AND E1.6 FOR THE WIRING OF THE APARTMENTS.



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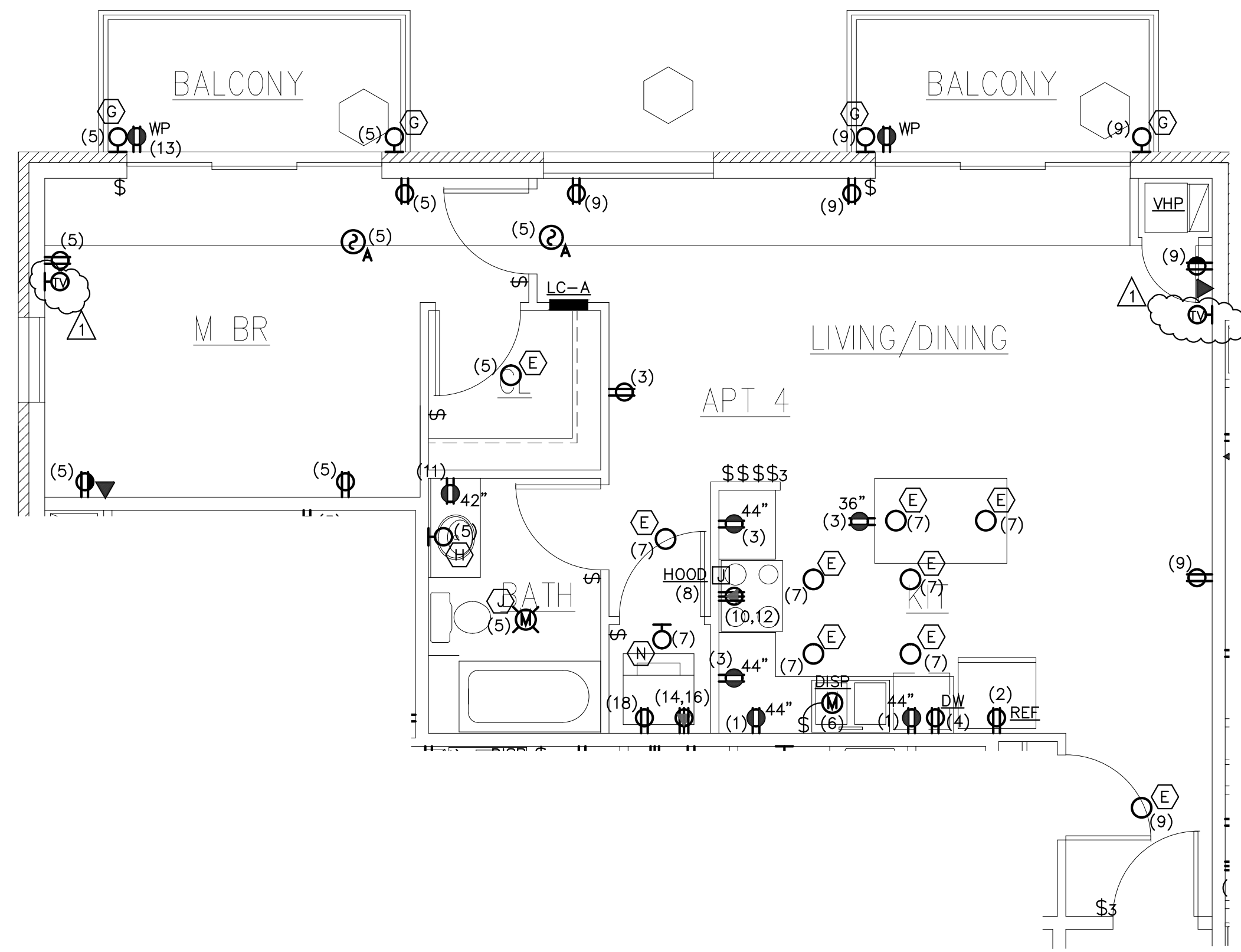
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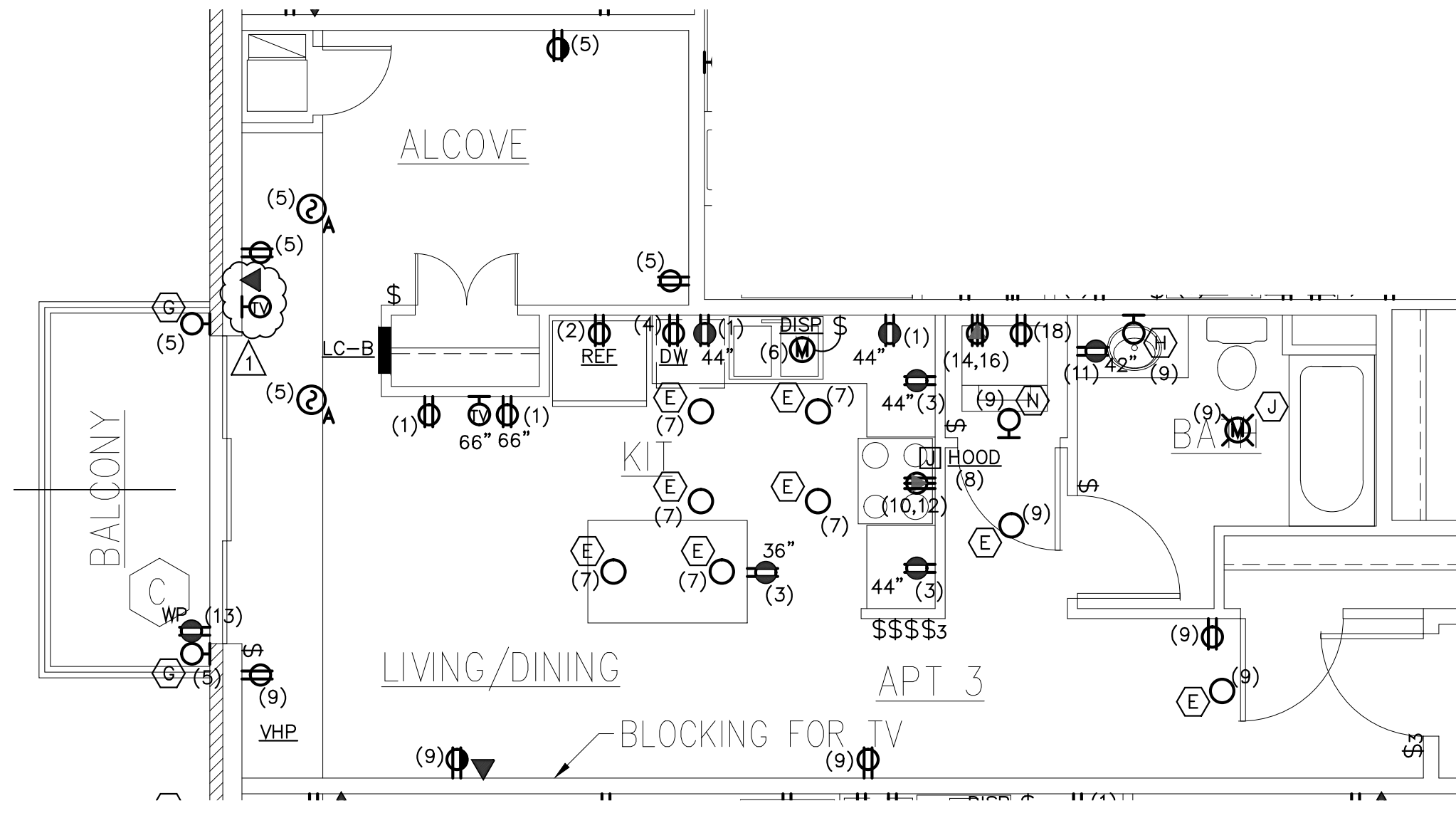


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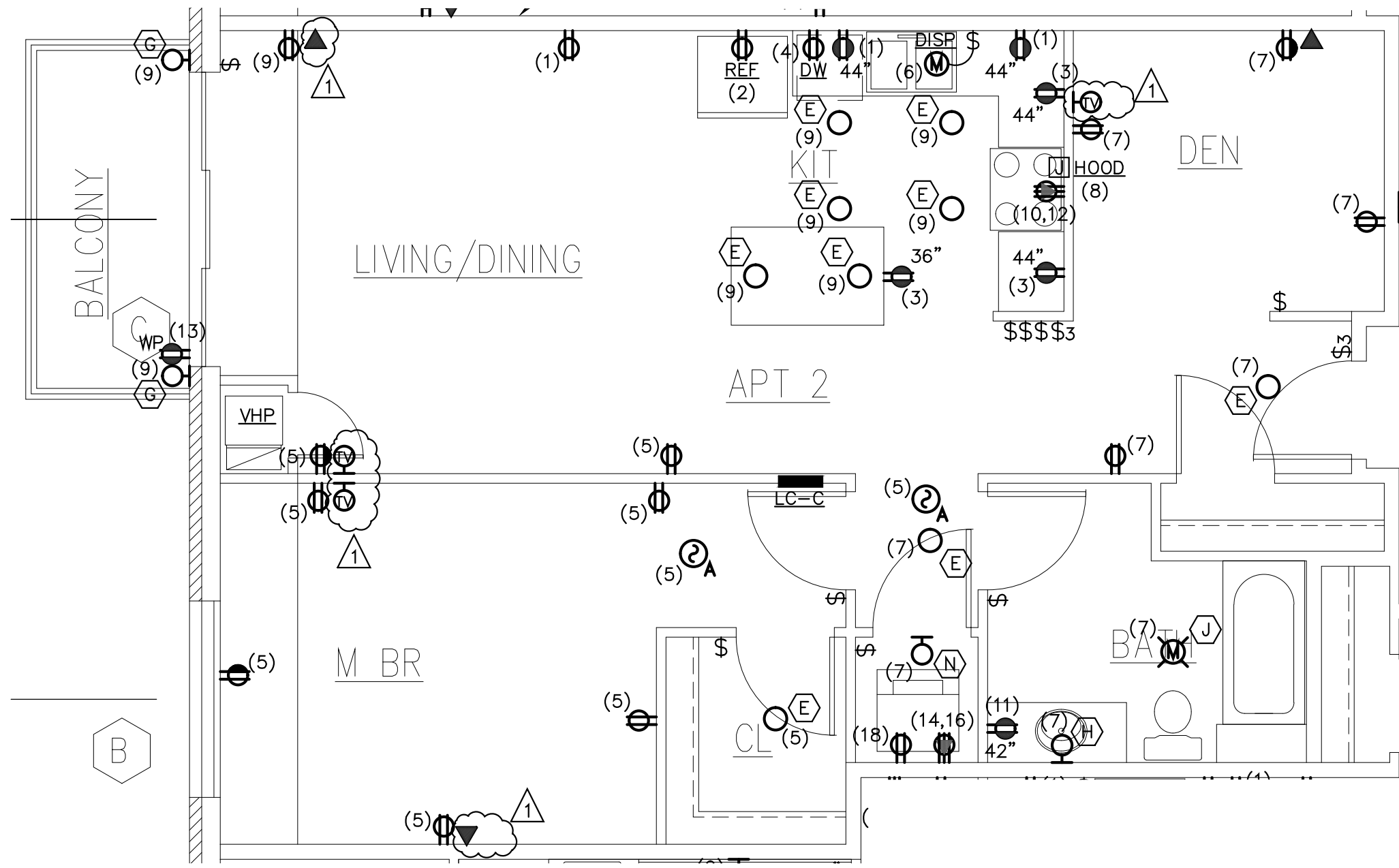
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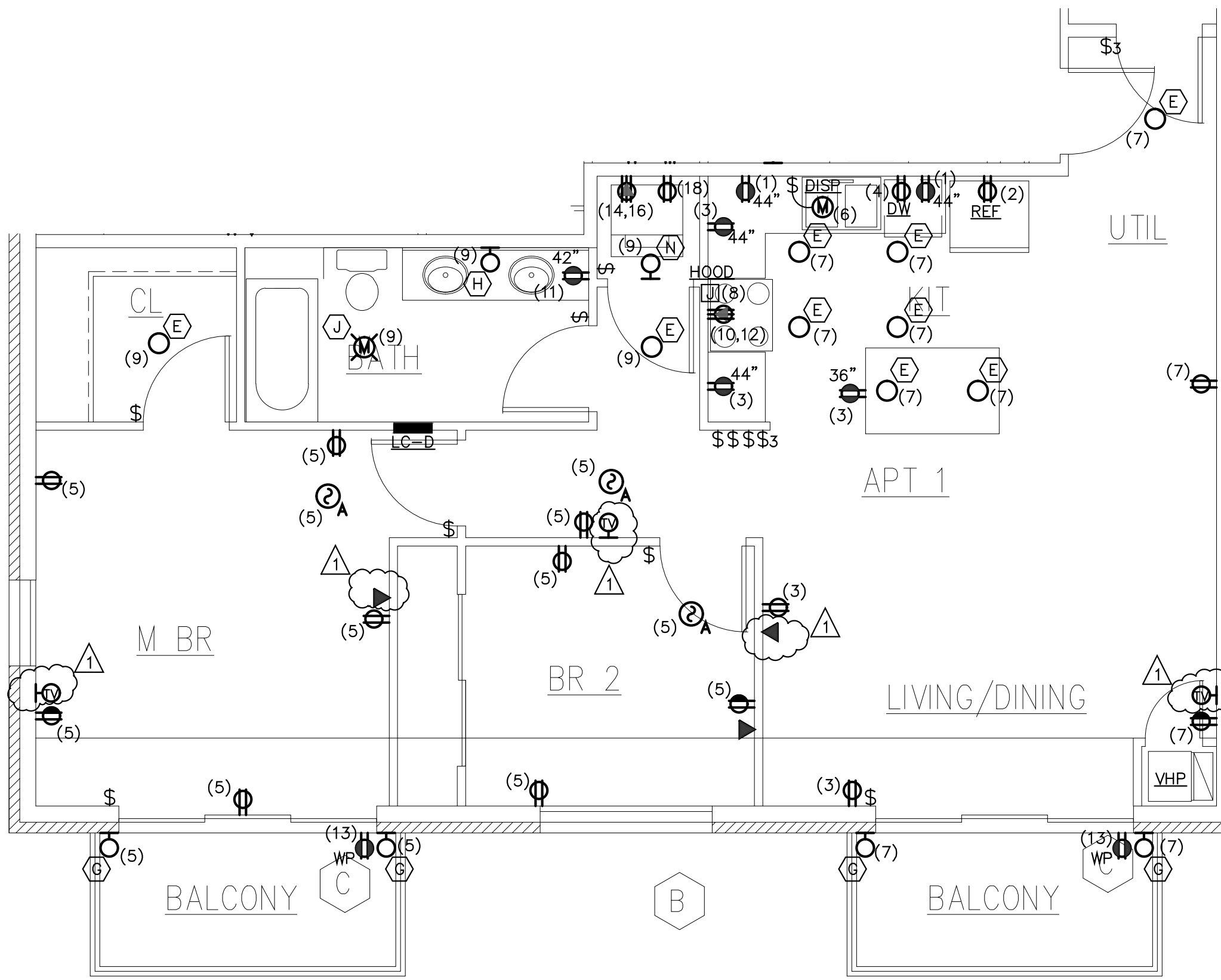
UNIT TYPE-A FLOOR PLAN - ELECTRIC
SCALE: 1/4" = 1'-0"



UNIT TYPE-B FLOOR PLAN - ELECTRIC
SCALE: 1/4" = 1'-0"



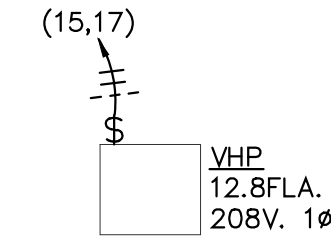
UNIT TYPE-C FLOOR PLAN - ELECTRIC
SCALE: 1/4" = 1'-0"



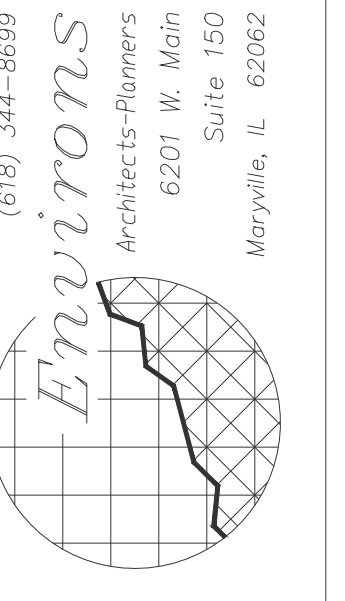
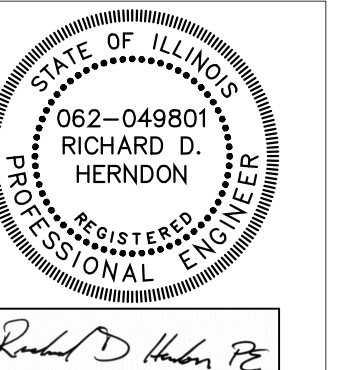
UNIT TYPE-D FLOOR PLAN - ELECTRIC
SCALE: 1/4" = 1'-0"

GENERAL NOTE

A WIRE THE SMOKE ALARMS WITHIN EACH APARTMENT TOGETHER, WHEN ONE DETECTOR GOES INTO ALARM ALL THE DETECTORS WITHIN THAT APARTMENT GO INTO ALARM.



TYPICAL APARTMENT "VHP" WIRING
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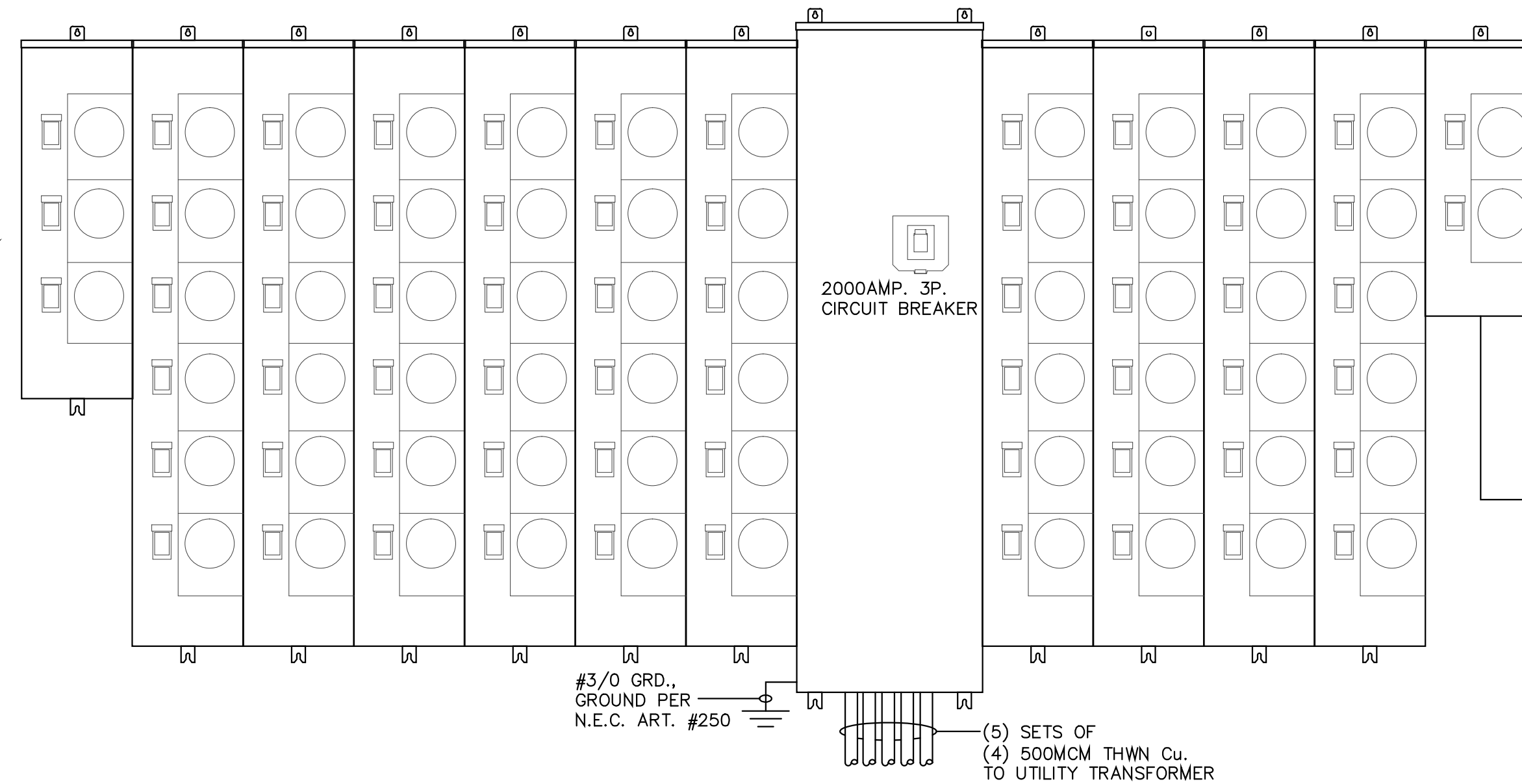
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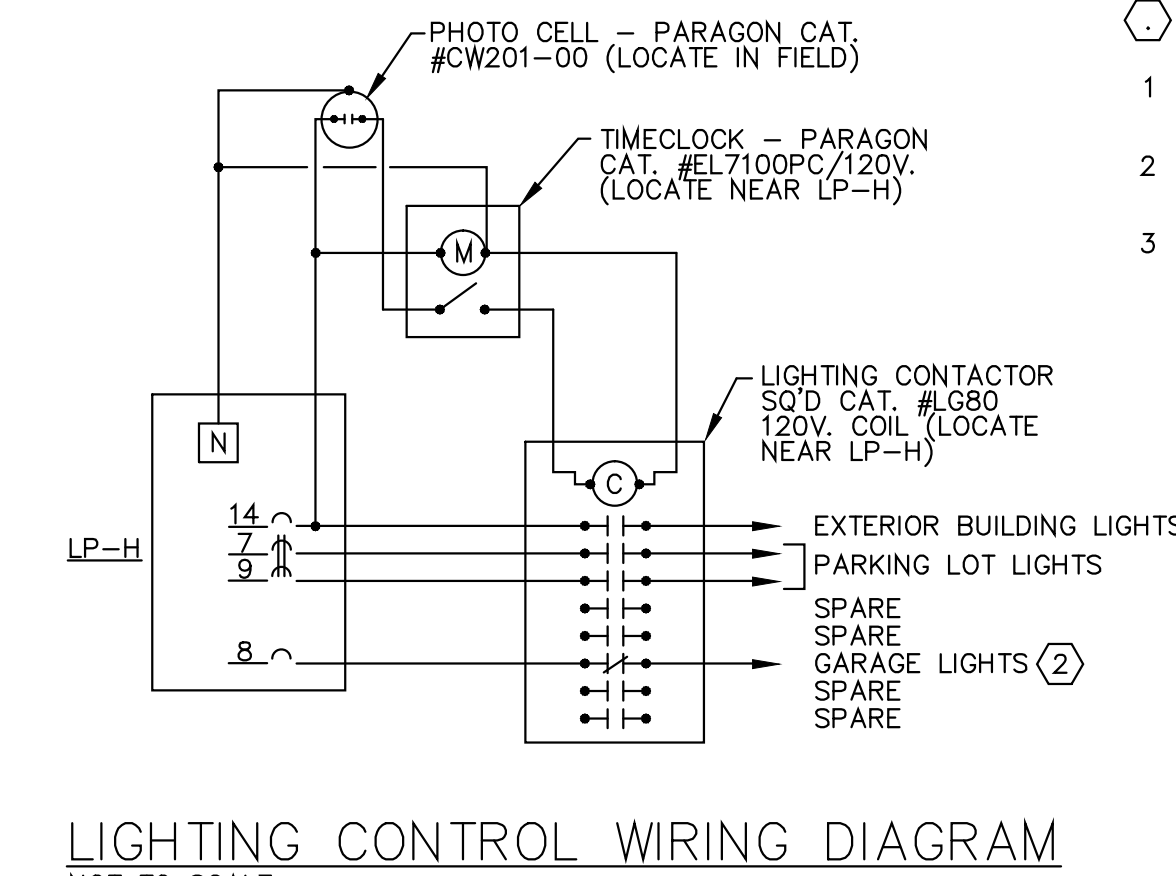
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1ST FLOOR THRU 3RD FLOOR
 UNIT TYPE-A = 20.5KW. X 6-UNITS = 123KW.
 UNIT TYPE-B = 20.4KW. X 6-UNITS = 122KW.
 UNIT TYPE-C = 20.8KW. X 6-UNITS = 125KW.
 UNIT TYPE-D = 20.8KW. X 6-UNITS = 125KW.
 UNIT TYPE-E = 20.5KW. X 9-UNITS = 185KW.
 UNIT TYPE-F = 20.8KW. X 3-UNITS = 63KW.
 UNIT TYPE-G = 20.8KW. X 3-UNITS = 63KW.
 TOTAL = 807KW.
 PER N.E.C. ARTICLE #220.84 39 DWELLING UNITS
 = 28% DEMAND FACTOR THEREFORE 807KW. @ 28%
 = 226KW.
 226KW. @ 208V. 3Ø = 628AMP.



4TH AND 5TH FLOORS PLUS HOSE LOADS
 UNIT TYPE-A = 20.5KW. X 2-UNITS = 41KW.
 UNIT TYPE-B = 20.4KW. X 2-UNITS = 41KW.
 UNIT TYPE-C = 20.8KW. X 2-UNITS = 42KW.
 UNIT TYPE-D = 20.8KW. X 2-UNITS = 42KW.
 UNIT TYPE-E = 20.5KW. X 6-UNITS = 123KW.
 UNIT TYPE-F = 20.8KW. X 2-UNITS = 42KW.
 UNIT TYPE-G = 20.8KW. X 2-UNITS = 42KW.
 TOTAL = 373KW.
 PER N.E.C. ARTICLE #220.84 26 DWELLING UNITS
 = 34% DEMAND FACTOR THEREFORE 373KW. @ 34%
 = 127KW.
 HOUSE LOAD = 296KW.
 APARTMENT LOAD = 127KW.
 TOTAL = 423KW.
 423KW. @ 208V. 3Ø = 1175AMP.



DRAWING KEY NOTES

- 1 WIRE THIS CIRCUIT BREAKER SHUNT TRIP INTO THE FIRE ALARM SYSTEM, COORDINATE WITH THE SYSTEM INSTALLER.
- 2 THE LIGHTING ON THIS CIRCUIT ARE TO BE ON DURING THE DAY ON/OFF AT NIGHT.
- 3 FURNISH AND INSTALL ARC FAULT CIRCUIT BREAKER FOR BRANCH CIRCUITS AS REQUIRED BY THE NATIONAL ELECTRIC CODE.

LOAD SERVED		KW BRK		LOAD SERVED	
SMALL APPL.	- 20	1	20	2	20
SMALL APPL.	- 20	3	4	20	20
GEN LTG & PWR	- 20	5	8	15	15
GEN LTG & PWR	- 20	7	8	15	15
GEN LTG & PWR	- 20	9	10	50	50
RESTRM GFCCI REC	- 20	11	12	2P	2P
BALCONY GFCCI REC	- 20	13	14	20	20
VHP	- 20	15	16	2P	2P
SPACE	- 2P	17	18	20	20
		19	20		
		21	22		
		23	24		

NOTE: FILL IN "*" WITH APARTMENT NUMBER FOR THE FINISHED LOAD CENTER NUMBER.
 DEMAND LOADS:
 UNIT TYPE-A AND E = 14.9KW. = 72AMP.
 UNIT TYPE-B = 14.8KW. = 71AMP.
 UNIT TYPE-C, D AND G = 15.2KW. = 73AMP.
 UNIT TYPE-F = 14.8KW. = 71AMP.

METER PAK - FRONT ELEVATION

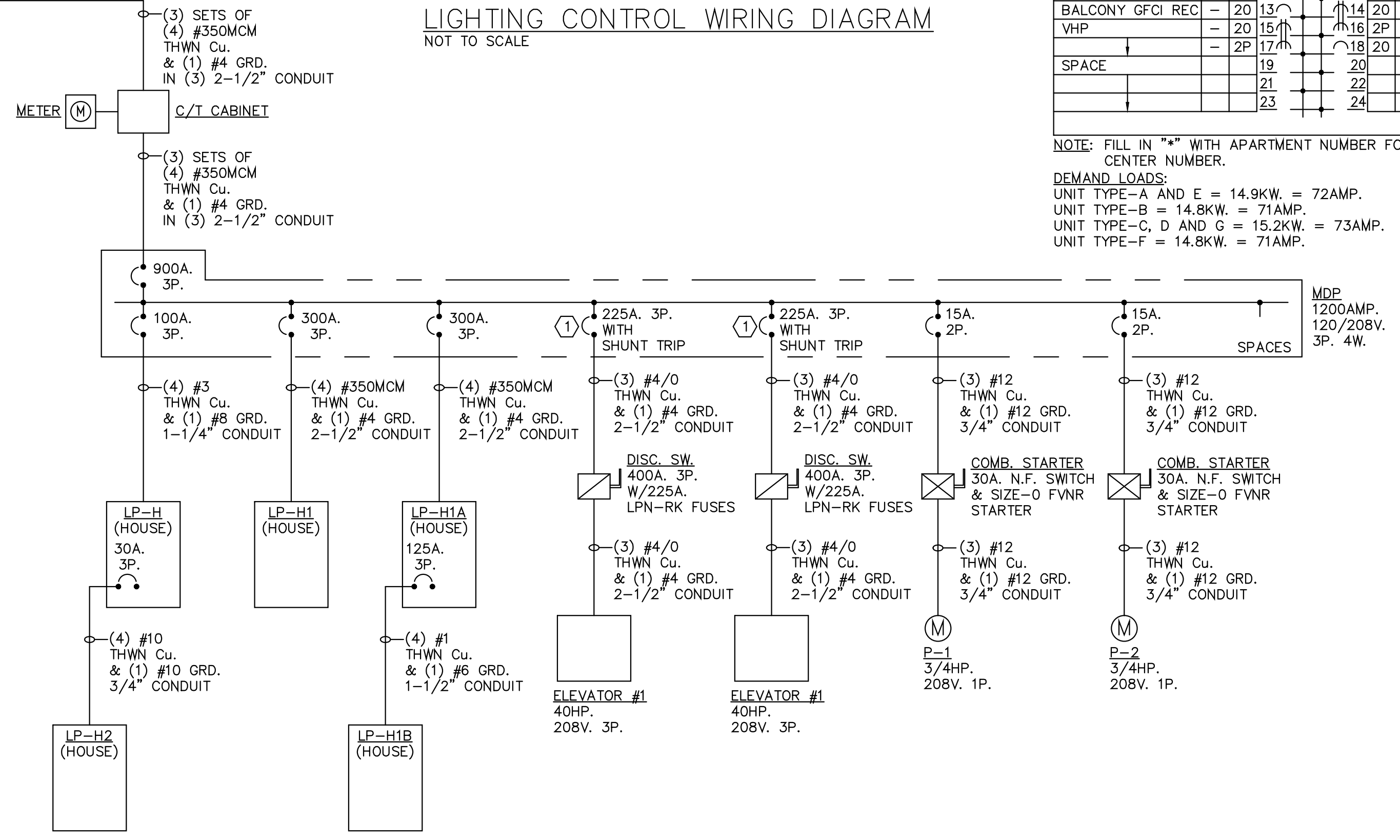
- NOT TO SCALE
 NOTES:
 1. ALL UTILITY METERS SHOWN ARE 125AMP, 208V. 1-PHASE WITH 100AMP. 2-POLE CIRCUIT BREAKERS
 2. RUN #1/3 CONDUCTOR W/GRD., SER. AL CABLE TO EACH APPARTMENT LOAD CENTER.
 3. THE MAIN CIRCUIT BREAKER IS TO BE CAPABLE OF WITHSTANDING THE AVAILABLE SHORT CIRCUIT CURRENT, COORDINATE WITH THE UTILITY CO.
 4. LABEL EACH METER/CIRCUIT BREAKER WITH THE APARTMENT NUMBER.

LOAD CALCULATIONS

HOUSE LOADS
 LIGHTING = 10.9KW. @ 125% = 13.6KW.
 RECEPTACLES = 5.4KW. @ 100% = 5.4KW.
 COOLING = 158.2KW.
 MOTORS = 261.5KW.
 LARGEST = 43.2KW. @ 125% = 54.0KW.
 REMAINDER = 218.3KW. @ 100% = 218.3KW.
 MISC = 4.4KW. @ 125% = 5.5KW.
 TOTAL HOUSE LOAD = 296.2KW. @ 208V. 3Ø = 823AMP.

APARTMENTS
 UNIT TYPE-A = 20.5KW. X 10-UNITS = 205KW.
 UNIT TYPE-B = 20.4KW. X 10-UNITS = 204KW.
 UNIT TYPE-C = 20.8KW. X 10-UNITS = 208KW.
 UNIT TYPE-D = 20.8KW. X 10-UNITS = 208KW.
 UNIT TYPE-E = 20.5KW. X 15-UNITS = 308KW.
 UNIT TYPE-F = 20.8KW. X 5-UNITS = 104KW.
 UNIT TYPE-G = 20.8KW. X 5-UNITS = 104KW.
 TOTAL = 1341KW.
 PER N.E.C. ARTICLE #220.84 65 DWELLING UNITS
 = 23% DEMAND FACTOR THEREFORE 1341KW. @ 23%
 = 309KW.

TOTAL BUILDING LOAD
 HOUSE LOAD = 297KW.
 APARTMENT LOAD = 309KW.
 TOTAL = 606KW.
 606KW. @ 208V. 3Ø = 1683AMP.



LP-H (HOUSE)

VOLTAGE: 120/208V. 3Ø 4W. CONNECTED LOAD: 13.9KW. MOUNTING: SURFACE. MAIN: 100AMP. MAIN BREAKER

LOAD SERVED	KW	BRK	LOAD SERVED	KW	BRK
LTG-LOWER LEVEL	1.4	20	1	2	20
LTG-1ST FLOOR	.8	20	3	4	20
REC-1ST FLOOR	.5	20	5	6	20
PARKING LOT LTG	.4	20	7	8	20
SPARE	.4	2P	9	10	20
CVF1-1ST FLOOR	.1	20	15	16	20
REC-MAINTENANCE	.4	20	19	20	20
LP-H2	4.1	3P	27	28	30

LP-H1 (HOUSE)

VOLTAGE: 120/208V. 3Ø 4W. CONNECTED LOAD: 87.3KW. MOUNTING: SURFACE. MAIN: 300AMP. MAIN BREAKER

LOAD SERVED	KW	BRK	LOAD SERVED	KW	BRK
WSHP-1A	6.3	3P	3	4	3P
WSHP-1B	6.3	3P	7	8	40
WSHP-3A	6.3	3P	13	14	40
WSHP-3B	6.3	3P	19	20	40
WSHP-2A	6.3	3P	25	26	30
WSHP-2B	6.3	3P	31	32	30
WSHP-2C	6.3	3P	37	38	30

LP-H1A (HOUSE)

VOLTAGE: 120/208V. 3Ø 4W. CONNECTED LOAD: 102.3KW. MOUNTING: SURFACE. MAIN: 300AMP. MAIN BREAKER

LOAD SERVED	KW	BRK	LOAD SERVED	KW	BRK
WSHP-4E	8.4	3P	3	4	3P
WSHP-4F	7.5	3P	9	10	3P
WSHP-4G	8.4	3P	15	16	3P
WSHP-4H	7.5	3P	21	22	3P
CP-1 & CP-2	1.2	20	25	26	30
CP-3 & CP-4	1.2	20	27	28	30
CP-5	.6	20	29	30	30
LTG & REC-LG05	.6	20	31	32	20
LTG & REC-ELEV PIT	.4	20	33	34	2P
LP-H1B	34.6	3P	39	40	20

LP-H1B (HOUSE)

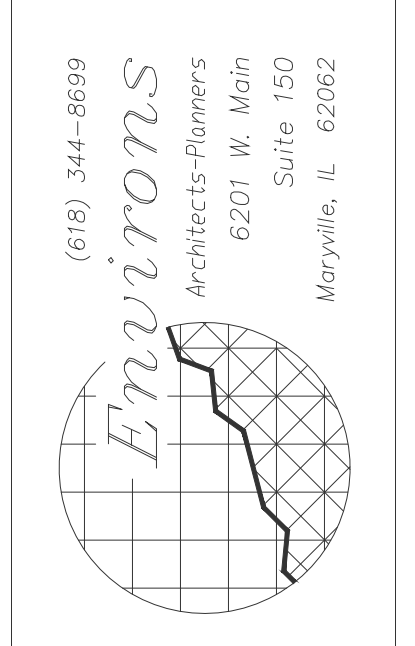
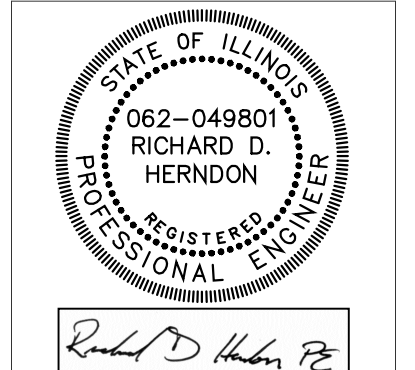
VOLTAGE: 120/208V. 3Ø 4W. CONNECTED LOAD: 34.6KW. MOUNTING: SURFACE. MAIN: 125AMP. MAIN BREAKER

LOAD SERVED	KW	BRK	LOAD SERVED	KW	BRK
ELEV LTG & CNTLS	.5	20	1	2	1.2
ELEV SUMP PUMP	1.2	20	5	6	1.4
BP-1	1.2	20	7	8	.9
BOOSTER PUMP	1.2	20	9	10	.9
EH-1-G03	1.0	20	19	20	.6
EH-1-G04	1.0	20	21	22	.7
VHP-3	1.3	20	27	28	1.5
EF-2A	1.7	3P	33	34	1.5
EF-2B	2.8	3P	39	40	1.7

LP-H2 (HOUSE)

VOLTAGE: 120/208V. 3Ø 4W. CONNECTED LOAD: 4.3KW. MOUNTING: RECESSED. MAIN: 30AMP. MAIN BREAKER

LOAD SERVED	KW	BRK	LOAD SERVED	KW	BRK
LTG-3RD FLOOR	.8	20	1	2	.8
REC-3RD FLOOR	.5	20	3	4	.5
LTG-4TH FLOOR	.8	20	5	6	.8
REC-4TH FLOOR	.5	20	7	8	.5
SPACE			9	10	
			11	12	
			13	14	
			15	16	
			17	18	



JOB NO. 13027
 DATE: NOVEMBER 15, 2013
 REVISED: FEBRUARY 26, 2014
 AUGUST 22, 2014
 OCTOBER 1, 2014



A NEW APARTMENT BUILDING 'C':
 CARDINAL SQUARE APARTMENTS
 MCKINLEY + ANTHONY AVE. MUNDELEIN, ILLINOIS

SHEET E1.8
 OF



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ELECTRICAL SPECIFICATIONS

1. GENERAL

A. ALL ELECTRICAL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL REGULATIONS, LAWS, AND ORDINANCES WHICH MAY BE APPLICABLE.

B. A CERTIFICATE OF FINAL INSPECTION AND APPROVAL SHALL BE SUBMITTED WITH THE CONTRACTOR'S REQUEST FOR FINAL PAYMENT. NO FINAL PAYMENT WILL BE APPROVED WITHOUT THIS CERTIFICATE.

C. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL WORK WITH THE OWNER TO MINIMIZE INTERRUPTION OF BUILDING OPERATION. SCHEDULE OF ALL POWER OUTAGES MUST BE APPROVED BY THE OWNER PRIOR TO THE BEGINNING OF ANY WORK.

2. WORK INCLUDED

A. THE WORK COVERED BY THESE SPECIFICATIONS SHALL CONSIST OF PROVIDING ALL THE MATERIAL, LABOR, EQUIPMENT, AND SERVICES NECESSARY FOR A COMPLETE ELECTRICAL INSTALLATION AS SPECIFIED HEREIN. WORK IN THIS SECTION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING ITEMS:

1. INSTALLATION OF LIGHTING FIXTURES
2. TELEPHONE CONDUIT SYSTEM
3. WIRING DEVICES
4. BRANCH CIRCUITING
5. GROUNDING
6. CONNECTION OF HVAC EQUIPMENT
7. TEMPORARY ELECTRICAL WIRING
8. INSTALLATION OF NEW SERVICE

3. SUBMITTALS

A. THE ELECTRICAL CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ON THE FOLLOWING ITEMS FOR REVIEW BEFORE FABRICATION OR SHIPMENT:

1. PANEL BOARDS, LOAD CENTERS AND CIRCUIT BREAKERS
2. DISCONNECT SWITCHES
3. WIRING DEVICES
4. LIGHT FIXTURES
5. METER PACKS AND SERVICE ENTRANCE EQUIPMENT
6. MOTOR STARTERS AND CONTROL DEVICES

B. MAINTENANCE MANUALS: FURNISH THREE FINAL COPIES, INCLUDING WIRING DIAGRAMS, MAINTENANCE AND OPERATING INSTRUCTIONS, PARTS LISTINGS, AND COPIES OF OTHER SUBMITTALS INDICATED FOR INCLUSION.

C. ANY CHANGES TO ITEMS SPECIFIED MUST BE SUBMITTED AS A SUBSTITUTION, WITH COMPLETE DOCUMENTATION OF PRICE DIFFERENTIAL AND EQUIPMENT DETAILS.

4. PROJECT RECORD DRAWINGS

A. DURING PROGRESS OF THE WORK, MAINTAIN ON DRAWINGS AT THE SITE, AN ACCURATE RECORD OF THE INSTALLATION OF THE ELECTRICAL SYSTEM, INDICATING ALL ITEMS WHICH HAVE BEEN CHANGED OR ADDED.

5. PERMITS

A. THE ELECTRICAL CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND ELECTRICAL INSPECTIONS REQUIRED BY LOCAL AUTHORITY, FOR THE APPROVAL OF HIS WORK.

6. INSPECTION OF CONDITIONS

A. PRIOR TO ALL WORK, CAREFULLY INSPECT THE INSTALLED WORK OF ALL OTHER TRADES AND VERIFY THAT ALL SUCH WORK IS COMPLETE TO THE POINT WHERE THIS INSTALLATION MAY PROPERLY COMMENCE.

B. VERIFY THAT ELECTRICAL INSTALLATION MAY BE MADE IN COMPLETE ACCORDANCE WITH ALL PERTINENT CODES AND REGULATIONS AND THE ORIGINAL DESIGN.

C. IN THE EVENT OF DISCREPANCY, IMMEDIATELY NOTIFY THE ELECTRICAL ENGINEER. DO NOT PROCEED WITH THE INSTALLATION IN AREAS OF DISCREPANCY UNTIL ALL SUCH DISCREPANCIES HAVE BEEN FULLY RESOLVED.

D. PRIOR TO SUBMISSION OF BID THIS CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS WHICH MAY AFFECT HIS WORK.

7. PREPARATION

A. COORDINATE THE INSTALLATION OF ELECTRICAL ITEMS WITH THE SCHEDULES FOR WORK OF ALL OTHER TRADES TO PREVENT UNNECESSARY DELAYS IN THE TOTAL WORK.

B. WHERE LIGHT FIXTURE AND OTHER ELECTRICAL ITEMS ARE SHOWN IN CONFLICT WITH LOCATIONS OF STRUCTURAL MEMBERS AND MECHANICAL OR OTHER EQUIPMENT, FURNISH AND INSTALL ALL REQUIRED SUPPORTS AND WIRING TO CLEAR THE ENCROACHMENT.

C. VERIFY ALL EQUIPMENT LOCATIONS, SWITCHES, RECEPTACLES, LIGHTING FIXTURES, ETC., IN FIELD. THE OWNER RESERVES THE RIGHT TO CHANGE LOCATION OF ANY OUTLET OR FIXTURE FOR A DISTANCE OF 10 FT. IN ANY DIRECTION FROM DRAWING LOCATION, BEFORE THE WORK IS ACTUALLY ROUGHED IN, AT NO EXTRA CHARGE.

8. GROUNDING

A. ALL WIRE FOR GROUNDING PURPOSE SHALL BE COPPER, OR COPPER CLAD STEEL AS REQUIRED FOR TYPE AND SIZES INDICATED ON DRAWINGS, AND SHALL BE STRANDED.

B. BUILDING ELECTRODE GROUND RODS SHALL BE 10'-0" LONG X 3/4" DIAMETER (MINIMUM DIMENSIONS). GROUND RODS SHALL BE STEEL WITH A MOLECULARLY BONDED OUTER LAYER OF ELECTROLYTICALLY APPLIED COPPER JACKET OF GALVANIZED STEEL AS REQUIRED. ALL GROUND RODS SHALL BE TESTED WITH PROPER TEST EQUIPMENT FOR ROD TO EARTH RESISTANCE BEFORE CONNECTING GROUND WIRE.

C. METAL RACEWAYS MAY NOT BE USED FOR EQUIPMENT GROUNDING CONDUCTOR.

D. PROPERLY GROUND ALL MOTORS, TRANSFORMERS, EQUIPMENT, CONDUITS, SWITCH GEAR, ETC., IN COMPLIANCE WITH THE LATEST EDITION OF THE NEC AND AS INDICATED ON DRAWINGS.

E. PROVIDE BURNDY TYPE GAR GROUND CONNECTOR FOR CONNECTION AT WATER MAINS. PROVIDE EXOTHERMIC TYPE WELD CONNECTIONS AT ALL CONNECTIONS TO BUILDING STEEL AND GROUND RODS.

F. GROUND ALL LIGHT FIXTURES BY INSTALLING A SEPARATE GREEN GROUND WIRE IN ANY FLEXIBLE CONDUIT BETWEEN OUTLET BOX AND FIXTURE.

9. WIRING METHOD

A. NON-METALIC SHEATHED CABLE MAY BE USED FOR BRANCH CIRCUIT WIRING IN APARTMENTS ABOVE CEILINGS OR CONCEALED IN WALLS WHERE IT IS NOT SUBJECT TO DAMAGE.

B. EXPOSED INTERIOR BRANCH CIRCUIT WIRING SUBJECT TO DAMAGE SHALL BE INSTALLED IN EMT.

C. ALL NON-METALIC SHEATHED CABLE SHALL BE INSTALLED PER ARTICLE #334 OF THE N.E.C.

10. ELECTRICAL RACEWAYS

A. INTERIOR CONDUIT SHALL BE OF SUFFICIENT SIZE AND INSTALLED SO THAT THE REQUIRED NUMBER OR CONDUCTORS CAN BE INSERTED OR REMOVED WITHOUT INJURY TO, OR EXCESSIVE STRAIN UPON, THE INSULATION. THE MINIMUM CONDUIT SIZE SHALL BE 3/4" UNLESS OTHERWISE NOTED.

B. CONDUITS SHALL BE RUN CONTINUOUS FROM OUTLET TO OUTLET AND SHALL BE FASTENED TO ALL BOXES AND CABINETS WITH DOUBLE LOCKOUTS, TO PROVIDE CONTINUITY OF GROUND, AND A BUSHING, THE FULL NUMBER OF THREADS MUST PROJECT BEYOND LOCKOUT IN BOXES AND CABINETS TO ALLOW THE BUSHING TO BUTT UP TIGHT AGAINST THE END OF THE CONDUIT.

C. CONDUIT RUN EXPOSED SHALL RUN PARALLEL, OR PERPENDICULAR TO WALLS, CEILINGS, OR PRINCIPAL FRAMING MEMBERS. IT IS REQUIRED THAT ALL CONDUIT BE INSTALLED TO REFLECT NEAT, CAREFUL WORKMANSHIP THROUGHOUT THE JOB. CONDUIT WHICH HAS BEEN CRUSHED, DAMAGED, OR DEFORMED IN ANY WAY SHALL NOT BE INSTALLED IN THE JOB. CONDUIT SHALL BE INSTALLED IN SUCH A MANNER AS TO INSURE AGAINST TROUBLE FROM COLLECTION OF TRAPPED CONDENSATE, AND ALL RUNS OF CONDUIT SHALL BE FREE OF SUCH TRAPS WHEREVER POSSIBLE.

D. CONDUITS SHALL BE INSTALLED A MINIMUM OF 12" FROM STEAM OR HOT WATER PIPING IN PARALLEL RUNS, AT LEAST 6" FROM CROSS RUNS AND AT LEAST 3" FROM COLD WATER PIPING. CONDUITS SHALL NOT BE SECURED TO OTHER PIPING OR OTHER PIPING SUPPORTS.

E. ALL CONDUIT HANGERS AND SUPPORTS SHALL BE RIGIDLY FASTENED TO THE BUILDING STRUCTURE. NO CONDUIT SHALL BE SUPPORTED FROM DUCTWORK, PIPING, OR CEILING GRID SYSTEMS.

F. PROVIDE FIRE SEALS WHEREVER CONDUIT PENETRATES FIRE WALLS, CEILING OR RATED FLOOR SLABS.

G. RIGID STEEL CONDUIT SHALL BE USED FOR ALL CONDUIT RUNS INSTALLED IN CONCRETE SLABS, IN ALL POURED CONCRETE CONSTRUCTION AND ALL APPLICATIONS INSIDE BUILDING REQUIRING 2" OR LARGER IN SIZE. CONDUIT SHALL BE SUPPORTED AT INTERVALS NOT TO EXCEED 7 FEET FOR 3/4" CONDUIT, 8 FEET INTERVALS FOR CONDUIT ON 1" TO AND INCLUDING 2", AND 10 FEET FOR CONDUITS 2-1/2" OR LARGER.

H. RIGID CONDUIT (ALUMINUM) SHALL NOT BE INSTALLED IN POURED CONCRETE. ALUMINUM CONDUIT MAY BE USED FOR SWITCH LEGS AND BRANCH CIRCUITS IN PARTITIONS, ABOVE CEILING, AND WHERE CONDUIT RUN IS EXPOSED. CONDUIT SHALL BE SUPPORTED AT INTERVALS NOT TO EXCEED 7 FEET FOR 3/4" CONDUIT, 8 FEET INTERVALS FOR CONDUIT 1" TO AND INCLUDING 2".

I. ELECTRICAL METALLIC TUBING (THIN WALL) MAY BE USED FOR SWITCH LEGS (EXCEPT IN POURED CONCRETE WALLS) AND BRANCH CIRCUITS IN PARTITIONS, ABOVE CEILINGS, AND WHERE CONDUIT RUN IS EXPOSED. CONDUIT SHALL BE SUPPORTED AT INTERVALS NOT TO EXCEED 7 FEET FOR 3/4" CONDUIT, 8 FEET INTERVALS FOR CONDUIT 1" TO AND INCLUDING 1-1/2". EMT LARGER THAN 1-1/2" WILL NOT BE PERMITTED. COMPRESSION FITTINGS SHALL BE USED OTHERWISE NOTED. SET-SCREW FITTINGS SHALL NOT BE ACCEPTABLE.

J. PLASTIC CONDUIT (PVC): PLASTIC CONDUIT MAY BE USED FOR UNDERGROUND CONDUIT RUNS OUTSIDE BUILDING AND BELOW OR IN CONCRETE FLOOR SLABS. UNDERGROUND CONDUIT RUNS OUTSIDE BUILDING SHALL BE A MINIMUM OF 2'-6" BELOW GRADE ENCASED IN CONCRETE. CONDUIT RUN BELOW FLOOR SLAB SHALL BE A MINIMUM OF 12" BELOW FLOOR SLAB.

K. FLEXIBLE CONDUIT SHALL BE USED BETWEEN OUTLET BOXES IN HUNG OR FURRED CEILINGS AND RECESSED LIGHTING FIXTURES. FLEXIBLE CONDUIT SHALL NOT EXCEED 6 FEET IN LENGTH.

L. LIQUID TIGHT FLEXIBLE CONDUIT SHALL BE USED FOR FINAL CONNECTIONS TO ALL MOTORS. LIQUID TIGHT FLEXIBLE CONDUIT SHALL BE USED FOR FINAL CONNECTIONS TO ALL MOTORS OR DEVICES WHICH DO OR MAY VIBRATE. LIQUID TIGHT FLEXIBLE CONDUIT SHALL NOT EXCEED 3 FEET IN LENGTH.

M. PROVIDE SEALING BUSHINGS IN ALL UNDERGROUND CONDUITS AS REQUIRED TO PREVENT THE ENTRY OF MOISTURE INTO ELECTRICAL EQUIPMENT.

N. MINIMUM SIZE CONDUIT SHALL BE 3/4" TRADE SIZE, UNLESS OTHERWISE NOTED.

O. PROVIDE CONDUIT EXPANSION FITTINGS WHERE CONDUIT CROSSES A BUILDING EXPANSION JOINT, AND IN ALL STRAIGHT CONDUIT RUNS 200 FEET OR LONGER.

11. CONDUCTORS, WIRE AND CONNECTORS

A. ALL CONDUCTORS SHALL BE NEW, NEC GRADE COPPER AND FREE FROM IMPERFECTIONS AND SHALL BE TYPE THWN/THHN EXCEPT AS OTHERWISE NOTED ON THE DRAWINGS.

B. FIXTURE WIRE CONFORMING TO NEC REQUIREMENTS SHALL BE USED IN ALL LIGHTING FIXTURES AND FROM LIGHTING FIXTURE TO FIRST JUNCTION OR OUTLET BOX.

C. NO CONDUCTOR SMALLER THAN NO. 12 AWG SHALL BE USED UNLESS OTHERWISE INDICATED. IN GENERAL, CONDUCTORS SMALLER THAN NO. 12 WILL BE PERMITTED ONLY FOR COMMUNICATION, SIGNAL, OR CONTROL CIRCUITS. WIRE NO. 10 AND SMALLER SHALL BE SOLID CONDUCTORS. WIRE NO. 8 AND LARGER SHALL BE STRANDED. STRANDED CONDUCTORS SMALLER THAN NO. 8 MAY BE USED ONLY IF "STA-KON" OR EQUAL COMPRESSION LUGS ARE USED FOR ALL TERMINATIONS.

D. ELECTRICAL ENERGY CONSUMING DEVICES SUCH AS LIGHTING FIXTURES INDICATED BY LOWER CASE LETTERS, OR OTHER READILY IDENTIFIED SYMBOLS ON THE DRAWINGS, ARE CONTROLLED BY CORRESPONDINGLY MARKED SWITCHES AND PANEL BOARDS.

E. CONDUCTORS SHALL BE CONTINUOUS FROM OUTLET TO OUTLET, NO SPLICES SHALL BE PERMITTED EXCEPT AT OUTLETS. ALL ELECTRICAL CONNECTIONS SHALL BE MADE IN ACCORDANCE WITH NEC.

F. COLOR CODING IS REQUIRED FOR ALL SERVICE, FEEDER, BRANCH, CONTROL, AND SIGNALING CIRCUIT CONDUCTORS. INSULATION COLOR FOR NEUTRALS SHALL BE WHITE FOR 120 VOLT CIRCUITS. EQUIPMENT GROUNDING CONDUCTORS SHALL BE GREEN. THE COLOR OF THE INSULATION OF THE UNGROUNDED CONDUCTORS IN DIFFERENT VOLTAGE SYSTEMS SHALL BE AS FOLLOWS:

1. 208/120 VOLT, 3 PHASE, 4 WIRE: BLACK PHASE (A1), RED PHASE (B2), AND BLUE PHASE (C3).
2. ALL UNGROUNDED CONDUCTORS OF THE SAME COLOR SHALL BE CONNECTED TO THE SAME UNGROUNDED FEEDER CONDUCTOR.

12. OUTLET BOXES AND FITTINGS

G. USE NO WIRE SMALLER THAN NO. 12 AWG, RATED AT 600 VOLTS, FOR POWER AND LIGHTING CIRCUITS AND NO SMALLER THAN NO. 14 FOR CONTROL WIRING. BRANCH CIRCUIT CONDUCTORS FOR 20 AMPERE, 120 VOLT CIRCUITS SHALL BE NO. 12 AWG, WITH CONDUCTOR FROM PANEL BOARD TO THE FIRST OUTLET AS FOLLOWS:

0 - 75 FEET-----#12 AWG
75 -150 FEET-----#10 AWG
150-250 FEET-----# 8 AWG
250-350 FEET-----# 6 AWG

H. ALL JOINTS AND SPLICES SHALL BE MADE MECHANICALLY AND ELECTRICALLY SECURE. ALL SPLICES AND JOINTS SHALL BE MADE WITH APPROVED SOLDERLESS CONNECTORS, PROPERLY INSTALLED.

12. OUTLET BOXES AND FITTINGS

A. OUTLET BOXES SHALL BE NEC GAUGE STEEL, GALVANIZED, OF AMPLE SIZE TO ACCOMMODATE WIRE, SWITCHES, RECEPTACLES, OR OTHER DEVICES MOUNTED IN THE BOX WITHOUT CROWDING. USE GANG BOXES WHERE MORE THAN ONE DEVICE IS TO BE INSTALLED AT THE SAME LOCATION.

B. OUTLET BOXES FOR LIGHTING FIXTURES SHALL HAVE 3/8" FIXTURE STUD WHERE REQUIRED. CEILING OUTLET BOXES SHALL BE 4" OCTAGONAL, 2-1/8" DEEP FOR FURRED PLASTER AND EXPOSED WORK, AND 3" DEEP FOR CONCRETE WORK. ALL BOXES FOR CONCRETE WORK SHALL BE OF TYPE ESPECIALLY DESIGNED FOR INSTALLATION IN CONCRETE.

C. OUTLET BOXES FOR SWITCHES, RECEPTACLES, TELEPHONE, OR OTHER DEVICES RECESSED IN WALLS SHALL BE 4" SQUARE BOXES WITH EXTENSION RINGS AND PLASTER COVERS WHERE REQUIRED TO BRING BOX FLUSH WITH WALL. USE OF COVER PLATE AS TENSION OR RIGIDITY DEVICE WILL NOT BE PERMITTED.

D. PROVIDE OUTLET BOX ACCESSORIES AS REQUIRED FOR EACH INSTALLATION, INCLUDING MOUNTING BRACKETS, WALLBOARD HANGERS, EXTENSION RINGS, FIXTURE STUDS, CABLE CLAMPS, AND METAL STRAPS FOR SUPPORTING OUTLET BOXES, COMPATIBLE WITH OUTLET BOXES BEING USED AND MEETING REQUIREMENTS OF INDIVIDUAL WIRING SITUATIONS.

E. JUNCTION AND PULL BOXES SHALL BE OF NEC GAUGE STEEL, GALVANIZED, AND OF SUFFICIENT SIZE TO ACCOMMODATE THE CONDUCTORS SERVED WITHOUT CROWDING. BOXES SHALL BE EQUIPPED WITH SCREWED OR HINGED COVERS AS CONDITIONS REQUIRE. PULL BOXES (NOT SHOWN ON THE CONTRACT DRAWINGS) SHALL BE INSTALLED AS REQUIRED TO FACILITATE PULLING OF CONDUCTORS ON LONG RUNS. PULL BOXES LOCATED IN FLOORS SHALL BE FLUSH WITH FINISHED FLOOR, AND OF CAST WROUGHT IRON, ALUMINUM, OR BRONZE WITH GASKETED, WATERPROOF COVER. CONDUIT ENTRANCES SHALL BE THREADED.

F. PROVIDE CORROSION RESISTANT CAST METAL WEATHERPROOF OUTLET WIRING BOXES, OF THE TYPE, SHAPE, AND SIZE REQUIRED FOR EACH APPLICATION, WITH THREADED CONDUIT ENDS, CAST METAL FACE PLATE WITH SPRING-HINGE, WATERPROOF CAP, SUITABLE CONFIGURED FOR EACH APPLICATION, INCLUDING FACE PLATE GASKET AND CORROSION PROOF FASTENERS.

G. PROVIDE WATERPROOF OUTLETS FOR INTERIOR AND EXTERIOR LOCATIONS EXPOSED TO WEATHER OR SUBJECT TO FREQUENT WASHING.

H. SECURE BOXES RIGIDLY TO THE SUBSTRATE UPON WHICH THEY ARE BEING MOUNTED, OR SOLIDLY EMBED BOXES IN CONCRETE OR MASONRY.

I. PROVIDE CORROSION RESISTANT PUNCHED-STEEL BOX KNOCKOUT CLOSURES, CONDUIT LOCK NUTS, AND MALLEABLE IRON CONDUIT BUSHINGS OF THE TYPE AND SIZE TO SUIT EACH RESPECTIVE USE AND INSULATION.

13. WIRING DEVICES

A. DUPLEX RECEPTACLES SHALL BE 20 AMP., 125 VOLT, 3 WIRE GROUNDING TYPE. PROVIDE SMOOTH IVORY THERMOPLASTIC COVER PLATE AND MATCHING SCREWS. APPROVED PRODUCTS: HUBBELL NO. 5362-I, LEVITON NO. 5362-I, COOPER WIRING DEVICES, BRYANT OR SLATER EQUAL, HUBBELL 18 OR EQUAL COVER PLATE.

B. WEATHERPROOF RECEPTACLES SHALL BE DUPLEX, 20 AMP., 125 VOLT, GROUND FAULT 3 WIRE GROUNDING TYPE WITH WEATHERPROOF COVER. APPROVED PRODUCTS: HUBBELL NO. GF5362-I, LEVITON NO. GF5362-I WITH COVER PLATE.

C. WALL SWITCHES SHALL BE 20 AMP., 120-277 VOLT, QUIET, HIGH CAPACITY, TOGGLE TYPE. SINGLE POLE SWITCHES APPROVED PRODUCTS ARE SLATER NO. 720-AG-IV, COOPER WIRING, BRYANT, HUBBELL, LEVITON. THREE-WAY SWITCHES APPROVED PRODUCTS ARE SLATER NO. 724-AG-IV, COOPER WIRING DEVICES, BRYANT, HUBBELL, LEVITON.

D. WALL PLATES FOR SWITCHES, TELEPHONE OUTLETS AND OTHER SPECIAL OUTLETS SHALL MATCH THE WALL PLATES PREVIOUSLY SPECIFIED WITH THE RECEPTACLES. ALL PLATES IN EACH ROOM SHALL MATCH UNLESS OTHERWISE APPROVED BY THE OWNER'S REPRESENTATIVE. APPROVED PRODUCTS: HUBBELL, BRYANT, SLATER, COOPER WIRING DEVICES, LEVITON.

E. WEATHER-PROOF WALL PLATES SHALL BE NEMA 3R RATED. COVERS SHALL BE GASKETED AND SHALL HAVE THE MEANS TO BE LATCHED AND HOLD SECURELY WHILE ELECTRIC CORDS ARE IN USE, THUS MAINTAINING THE NEMA 3R RATING AT ALL TIMES. APPROVED PRODUCTS: HUBBELL CAT. #WPM, BRYANT, SLATER, COOPER WIRING DEVICES, LEVITON.

F. DISCONNECT SWITCHES SHALL BE HEAVY DUTY, SINGLE THROW DISCONNECT SWITCHES. ENCLOSURE SHALL BE NEMA 1 INDOOR AND NEMA 3R (RAIN TIGHT) WHERE THEY ARE REQUIRED TO BE WEATHERPROOF. THE AMPERE RATING, FUSIBLE OR NOT FUSIBLE AND VOLTAGE CHARACTERISTICS SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS AND/OR AS REQUIRED BY THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE. APPROVED PRODUCTS: SQUARE D COMPANY, GENERAL ELECTRIC ITE AND CUTLER HAMMER.

G. INSTALLATION OF WIRING DEVICES: OUTLET HEIGHTS GIVEN BELOW, OR AS SHOWN ON DRAWINGS, ARE TO THE CENTER OF THE OUTLET BOX. IN UNPLASTERED MASONRY WALLS WHERE OUTLETS ARE NOT DIMENSIONED, ADJUST HEIGHT TO THE NEXT HIGHER COURSE, AND ADJUST LOCATION TO THE NEAREST CENTER OF THE MASONRY UNIT.

1. CONVENIENCE OUTLETS - OFFICE AREAS: 18" A.F.F., UNLESS OTHERWISE NOTED ON DRAWING.
2. WALL SWITCH OUTLETS SHALL BE 4'-0" A.F.F. AND INSTALLED ON THE LOCK SIDE OF THE DOOR.

H. TESTING: TEST WIRING DEVICES TO ENSURE ELECTRICAL CONTINUITY OF GROUNDING CONNECTIONS, AND AFTER ENERGIZING CIRCUITRY, TO DEMONSTRATE COMPLIANCE WITH REQUIREMENTS.

14. PANEL BOARDS AND LOAD CENTERS

A. FURNISH AND INSTALL PANELBOARDS AND LOAD CENTERS AS SHOWN ON THE DRAWINGS. PANEL BOARDS SHALL BE DEAD FRONT EQUIPPED WITH THERMAL MAGNETIC MOLDED CASE CIRCUIT BREAKERS, OF FRAME AND TRIP RATINGS AS SHOWN ON THE SCHEDULES. EQUIPMENT SHALL BE MANUFACTURED IN ACCORDANCE WITH THE LATEST NEMA STANDARDS AND SHALL BE LISTED BY UL AND BEAR UL LABEL. ALL EQUIPMENTS SHALL BE OF ONE MANUFACTURER.

B. PANELBOARDS AND LOAD CENTER, MAIN BUSS, MAIN LUGS, AND/OR MAIN BREAKER SHALL BE RATED AS NOTED ON SCHEDULES. CURRENT DENSITY SHALL BE IN ACCORDANCE WITH UL REQUIREMENTS. BUSS MOUNTING FOR CIRCUIT BREAKERS SHALL BE BOLTED CONNECTIONS AND ACCOMMODATE ANY COMBINATION OF CIRCUIT BREAKER UNITS WITHOUT FURTHER MODIFICATIONS. THE COMPLETE PANEL BOARD, INCLUDING MAIN CIRCUIT BREAKER, BUSS AND LUGS, BRANCH CIRCUIT BREAKERS, AND CONNECTION SHALL BE PROPERLY DESIGNED AND UL LISTED TO WITHSTAND THE EFFECT OF THE AVAILABLE REQUIRED SHORT CIRCUIT CURRENT. ELECTRICAL CONTRACTOR SHALL VERIFY AVAILABLE FAULT CURRENT WITH LOCAL UTILITY COMPANY AND SPECIFY AIC RATINGS ON SHOP DRAWINGS ACCORDINGLY.

C. MATERIALS: ALL PANELBOARDS AND LOAD CENTERS SHALL BE MOUNTED IN CODE GAUGE GALVANIZED STEEL CABINETS, HAVING HINGED DOOR. EACH DOOR SHALL BE EQUIPPED WITH A LATCH AND LOCK. ALL LOCKS ON ALL PANEL BOARD CABINET DOORS ON THIS PROJECT SHALL ACCEPT A COMMON KEY. FURNISH TWO KEYS WITH EACH LOCK.

D. FOR DETAILS CONCERNING THE NUMBER AND SIZE OF CIRCUIT BREAKERS, SIZE OF MAINS, SIZE AND LOCATION OF LUGS, AND WHETHER SURFACE OR FLUSH MOUNTED, SEE THE SCHEDULES ON THE CONTRACT DRAWINGS.

E. CABINET SHALL BE SIZED TO PROVIDE WIRING GUTTERS AT SIDES, TOP AND BOTTOM TO ACCOMMODATE THE NECESSARY CONDUCTORS WITHOUT CROWDING.

F. FLUSH MOUNTED ENCLOSURES SHALL HAVE FRONTS FINISHED WITH PRIME COAT ONLY, AND SURFACE MOUNTED ENCLOSURES SHALL HAVE FACTORY FINISHED FRONT.

G. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ON THE INSIDE OF THE DOOR FACE OF EACH PANELBOARD AND LOAD CENTER CABINET, AN ACCURATE TYPEWRITTEN CIRCUIT DIRECTORY PROTECTED BY GLASS OR CLEAR PLASTIC. HANDWRITTEN OR HAND PRINTED DIRECTORIES WILL NOT BE ACCEPTED. THE CONTRACTOR IS INSTRUCTED THAT THE FINAL TYPED DIRECTORY SHALL BE MADE AFTER THE PERMANENT ROOM NUMBERS ARE INSTALLED ON THE DOORS, AND THE DIRECTORIES SHALL LIST THESE NUMBERS RATHER THAN THE ROOM NUMBERS USED ON THE CONSTRUCTION DRAWINGS.

H. ALL PANEL BOARDSSHALL HAVE ENGRAVED NAME TAGS ATTACHED TO COVER INDICATING PANEL NUMBER AND VOLTAGE.

I. ANCHOR ENCLOSURES FIRMLY TO WALLS AND STRUCTURAL SURFACES, ENSURING THAT THEY ARE PERMANENTLY AND MECHANICALLY SECURED.

J. INSTALL ALL PANELBOARDS AND LOAD CENTERS WITH THE TOP 6'-6" ABOVE FINISHED FLOOR.

K. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL PROPER CIRCUIT BREAKER TYPES PER APPLICATION (GFI, HACR, AFCI, HID, SWITCH RATED, ETC.) VERIFY EXACT LOAD TYPE WITH DRAWINGS.

L. LIGHTING PANEL BOARDS (120/208 VOLT, 3 PHASE, 4 WIRE) - SHALL BE FACTORY ASSEMBLED, BOLTED CIRCUIT BREAKER TYPE, FOR 120/208 VOLT, 3 PHASE, 4 WIRE SERVICE, CONSTRUCTED IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF NEC AND NEMA STANDARDS. APPROVED PRODUCTS: SQUARE "D" Co. TYPE "N00D", GENERAL ELECTRIC, ITE OR CUTLER HAMMER

M. LOAD CENTERS (120/208 VOLT, 1 PHASE, 3 WIRE) - SHALL BE FACTORY ASSEMBLED, BOLTED CIRCUIT BREAKER TYPE, FOR 120/208 VOLT, 1 PHASE, 3 WIRE SERVICE, CONSTRUCTED IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF NEC AND NEMA STANDARDS. APPROVED PRODUCTS: SQUARE "D" Co. TYPE "N00", GENERAL ELECTRIC, ITE OR CUTLER HAMMER

N. DISTRIBUTION PANEL BOARDS (120/208 VOLT, 3 PHASE, 4 WIRE) - SHALL BE FACTORY ASSEMBLED, BOLTED CIRCUIT BREAKER TYPE, FOR 120/208 VOLT, 3 PHASE, 4 WIRE SERVICE, CONSTRUCTED IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF NEC AND NEMA STANDARDS. APPROVED PRODUCTS: SQUARE "D" Co. TYPE "HGM", GENERAL ELECTRIC, ITE OR CUTLER HAMMER

15. LIGHTING FIXTURES

A. PROVIDE LIGHTING FIXTURES OF THE SIZE, TYPE, AND RATING INDICATED ON THE DRAWINGS: COMPLETE WITH, BUT NOT NECESSARILY LIMITED TO, LAMPS, LAMP HOLDERS, REFLECTORS, BALLASTS, STARTERS, WIRING AND MOUNTING HARDWARE.

B. FLUORESCENT BALLASTS - PROVIDE ELECTRONIC INSTANT START TYPE BALLASTS, ETL-CBM APPROVED, AUTO RESET TYPE, VOLTAGE AS INDICATED. APPROVED PRODUCTS: ADVANCE, MAGNETEK, GENERAL ELECTRIC.

C. H.I.D. BALLASTS - PROVIDE BALLASTS FOR HIGH INTENSITY DISCHARGE FIXTURES OPERATING LAMP OF TYPE AND RATING INDICATED, ETL-CBM APPROVED, TYPE C.W.A. APPROVED PRODUCTS: ADVANCE, UNIVERSAL.

D. LAMPS SHALL BE GENERAL ELECTRIC OR SYLVANIA. INCANDESCENT LAMPS SHALL BE INSIDE FROSTED, 130 VOLT, LONG LIFE TYPE, UNLESS OTHERWISE NOTED ON LIGHT FIXTURE LEGEND. FLUORESCENT AND H.I.D. LAMPS SHALL BE AS INDICATED ON LIGHT FIXTURE LEGEND.

E. FURNISH AND INSTALL ALL NECESSARY MOUNTING HARDWARE AND SUPPORTING CHANNEL AS REQUIRED TO SUPPORT FIXTURES FROM BUILDING STRUCTURE.

F. FURNISH AND INSTALL CONCRETE POLE BASES AS INDICATED ON CONTRACT DRAWINGS.

16. TELEPHONE CONDUIT SYSTEM

A. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL A COMPLETE TELEPHONE CONDUIT SYSTEM, CONSISTING OF AN "EMPTY" CONDUIT SYSTEM AS SHOWN ON THE CONTRACT DRAWINGS.

B. THE OWNER SHALL MAKE ARRANGEMENTS WITH THE LOCAL TELEPHONE COMPANY FOR INSTALLATION OF THE TELEPHONE INSTRUMENTS, EQUIPMENT, AND WIRING. THIS IS NOT A PART OF THIS CONTRACT.

C. TELEPHONE OUTLETS SHALL BE EMPTY 4" SQUARE BOXES WITH EXTENSION RINGS AND COVER PLATE WITH 7/16" CORD HOLE IN CENTER.

D. INSTALL A FISH WIRE IN ALL EMPTY CONDUITS TO FACILITATE PULLING OF WIRE BY TELEPHONE COMPANY.

17. ELECTRIC SERVICE

A. PROVIDE NEW 120/208 VOLT, 3 PHASE, 4 WIRE ELECTRICAL SERVICE, AS SHOWN ON CONTRACT DOCUMENTS.

B. MAKE ALL NECESSARY ARRANGEMENTS WITH UTILITY COMPANY AS REQUIRED FOR INSTALLATION OF NEW SERVICE AND EQUIPMENT.

18. TEMPORARY ELECTRICAL SERVICE

A. ELECTRICAL CONTRACTOR SHALL FURNISH, INSTALL, AND MAINTAIN TEMPORARY LIGHTING AND POWER FOR GENERAL USE RECEPTACLES REQUIRED FOR ALL TRADES DURING CONSTRUCTION.

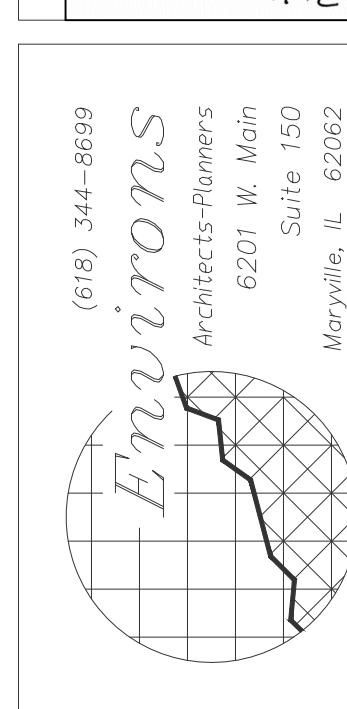
B. TEMPORARY SERVICE SHALL BE SUPPLIED FROM EXISTING BUILDING FACILITIES.

19. MISCELLANEOUS ELECTRICAL CONTROLS

A. THE EXTENT OF THE MISCELLANEOUS ELECTRICAL CONTROL WIRING IS INDICATED ON THE DRAWINGS. IT IS DEFINED, BUT NOT BY WAY OF LIMITATION, TO INCLUDE THE FOLLOWING: PLUMBING CONTROL WIRING; HEATING, VENTILATING, AND AIR CONDITIONING CONTROL WIRING.

B. RELATED WORK INCLUDED IS THE FURNISHING AND INSTALLING OF CONTROL DEVICES, INCLUDING REMOTE DEVICES WHERE THEY ARE INDICATED.

C. FURNISH AND INSTALL CONTROL WIRING TO HVAC UNITS, EXHAUST FANS, AND SUPPLY FANS IN ACCORDANCE WITH DRAWINGS. PROVIDE THE INTERLOCKING AND DAMPER WIRING AS INDICATED.



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

REVISED:



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