USA MASTER: 24x36(WIDE BORDER)

ELECTRICAL SYMBOL LIST

- 24" x 48" FLUORESCENT LUMINAIRE
- 24" x 24" FLUORESCENT LUMINAIRE
- WALL MOUNTED LUMINAIRE, HEIGHT AS NOTED
- SINGLE FACE EXIT SIGN, ARROWS AS INDICATED
- DOUBLE FACE EXIT SIGN, ARROWS AS INDICATED
- BATTERY OPERATED EMERGENCY LIGHT
- EXIT/EMERGENCY COMBINATION UNIT
- EMERGENCY LIGHT
- NL NIGHT LIGHT
- SURFACE MOUNTED LIGHT FIXTURE
- PENDANT MOUNTED LIGHT FIXTURE
- RECESSED DOWNLIGHT
- FLUORESCENT STRIP LIGHT
- WALL BRACKET FIXTURE
- WALL SCONCE LUMINAIRE, HEIGHT AS NOTED
- SITE LIGHTING BOLLARD
- OUTDOOR LIGHTING POLE & LUMINAIRE
- S SINGLE POLE TOGGLE SWITCH, +48" A.F.F.
- S_3 THREE-WAY TOGGLE SWITCH, +48" A.F.F.
- S_4 FOUR-WAY TOGGLE SWITCH, +48" A.F.F.
- S_K KEY OPERATED SWITCH, +48" A.F.F.
- S_D WALL DIMMER, INCANDESCENT OR FLUORESCENT, AS REQUIRED, WATTAGE REQUIRED EQUAL TO CONNECTED LOAD PLUS 25 PERCENT, +48" A.F.F.
- S_P SWITCH WITH PILOT LIGHT, +48" A.F.F.
- S_F MULTI-SPEED FAN CONTROL SWITCH, +48" A.F.F.
- DUPLEX RECEPTACLE, 120V, 20A, GROUNDING TYPE, +18" A.F.F. OR AS NOTED
- SW SHOW WINDOW DUPLEX RECEPTACLE, 120V, 20A, GROUNDING TYPE MOUNT ON CEILING WITHIN 18" OF WINDOW.
- T TAMPER-RESISTANT DUPLEX RECEPTACLE, 120V, 20A, GROUNDING TYPE, +18" A.F.F. OR AS NOTED
- SINGLE RECEPTACLE, 120V, 20A, GROUNDING TYPE, +18" A.F.F. OR AS NOTED
- G DUPLEX RECEPTACLE, GFCI TYPE, 120V, 20A., GROUNDING TYPE, +48" A.F.F. OR 9" ABOVE COUNTER
- DOUBLE DUPLEX RECEPTACLE, 120V, 20A, GROUNDING TYPE +18" A.F.F. OR AS NOTED
- DOUBLE DUPLEX RECEPTACLE 120V, 20A, GROUNDING TYPE +48" A.F.F. OR 9" ABOVE COUNTER
- DUPLEX RECEPTACLE, 120V, 20A, GROUNDING TYPE +48" A.F.F. OR 9" ABOVE COUNTER
- DOUBLE DUPLEX RECEPTACLE 120V, 20A, GROUNDING TYPE +48" A.F.F. OR 9" ABOVE COUNTER
- SINGLE RECEPTACLE, 120V, 20A, GROUNDING TYPE +48" A.F.F. OR 9" ABOVE COUNTER
- WP WEATHERPROOF RECEPTACLE, +24" A.F.G.
- 1-GANG FLUSH FLOOR MOUNTED TELE/DATA OUTLET WITH 1-1/4" CONDUIT TO CEILING SPACE. HUBBELL #PFBRG1 WITH #PFBRFBL1 FLANGE AND #PFBR826BLA COVER AND DECORATOR INSERT, OR EQUAL.
- 1-GANG FLUSH FLOOR MOUNTED 120V, 20A CONVENIENCE RECEPTACLE IN HUBBELL #PFBRG1 WITH #PFBRFBL1 FLANGE AND #PFBR826BLA COVER AND DUPLEX INSERT, OR EQUAL.
- 2-GANG FLUSH FLOOR MOUNTED 120V, 20A CONVENIENCE RECEPTACLE WITH ADJACENT DATA OUTLET IN HUBBELL #PFBRG2 WITH #PFBRFBL2 FLANGE AND #PFBR826BLA COVERS AND DUPLEX AND DECORATIVE INSERTS, OR EQUAL.
- C CEILING MOUNTED RECEPTACLE.
- SPECIAL RECEPTACLE, TYPE & MOUNTING HEIGHT AS NOTED
- DATA OUTLET, MOUNTING HEIGHT TO MATCH ADJACENT OUTLETS. OUTLET TO INCLUDE EMPTY 3/4" C. TO CEILING SPACE
- TELEPHONE OUTLET, MOUNTING HEIGHT TO MATCH ADJACENT OUTLETS. OUTLET TO INCLUDE EMPTY 3/4" C. TO CEILING SPACE
- TELE/DATA OUTLET COMBINATION, MOUNTING HEIGHT TO MATCH ADJACENT OUTLETS. OUTLET TO INCLUDE EMPTY 3/4" C. TO CEILING SPACE
- W TELEPHONE OUTLET, +48" A.F.F. OUTLET TO INCLUDE EMPTY 3/4" C. TO CEILING SPACE
- INTERCOM OUTLET +48" A.F.F. WITH 3/4"C. EMPTY CONDUIT (WITH PULLSTRING) TO CEILING SPACE
- TELEVISION OUTLET, MOUNTING HEIGHT TO MATCH ADJACENT OUTLETS. OUTLET TO INCLUDE 3/4" C. TO CEILING SPACE.
- J JUNCTION BOX - CEILING MOUNTED
- H JUNCTION BOX - WALL MOUNTED, HEIGHT AS NOTED

- 30/10 FUSIBLE DISCONNECT SWITCH - UPPER NUMERAL DENOTES SWITCH SIZE, LOWER NUMERAL DENOTES FUSE SIZE
- NON-FUSED DISCONNECT SWITCH - NUMERAL DENOTES SWITCH SIZE, SIZE AT 30A 3P, UNLESS OTHERWISE NOTED.
- SMP MOTOR CONTROL SWITCH WITH PILOT LIGHT, +48" A.F.F.
- MAGNETIC MOTOR STARTER
- SM MANUAL MOTOR STARTER, +48" A.F.F., OR ON MOTORIZED EQUIP.
- COMBINATION MOTOR STARTER
- MOTOR CONNECTION
- LIGHTING PANELBOARD
- POWER PANELBOARD
- DISTRIBUTION PANELBOARD
- MAIN SWITCHBOARD
- T TRANSFORMER
- CONTROL PANEL
- TC 120V, SINGLE CIRCUIT ASTROMIC TIME CLOCK, +48" A.F.F.
- S CEILING MOUNTED SPEAKER ASSEMBLY
- C CEILING MOUNTED SECURITY CAMERA
- C WALL MOUNTED SECURITY CAMERA
- CIRCUIT BREAKER
- S CEILING SPEAKER ASSEMBLY FOR HOSPITAL PAGING SYSTEM
- F FIRE ALARM MANUAL PULL STATION +48" A.F.F.
- F FIRE ALARM AUDIBLE/VISUAL COMBINATION DEVICE +80" A.F.F.
- V FIRE ALARM VISUAL DEVICE +80" A.F.F.
- H MINI-HORN DEVICE +80" A.F.F
- D DOOR HOLD OPEN DEVICE
- SD DUCT SMOKE DETECTOR
- S SYSTEM SMOKE DETECTOR
- SR SINGLE- OR MULTIPLE-STATION SMOKE DETECTOR
- TS SPRINKLER SYSTEM TAMPER SWITCH
- WS SPRINKLER SYSTEM WATER FLOW
- FAAP FIRE ALARM ANNUNCIATOR PANEL
- FACP FIRE ALARM CONTROL PANEL
- CR CARD READER OUTLET + 44" A.F.F.
- H HEAT DETECTOR
- DS ½"C. STUBBED INTO DOOR FRAME FROM ABOVE FOR DOOR CONTACT

- CONDUIT RUN IN WALL OR ABOVE CEILING
- CONDUIT RUN BELOW GRADE OR CONCRETE SLAB
- BRANCH CIRCUIT HOMERUN
- LV LOW VOLTAGE WIRING FOR LIGHTING CONTROL
- BRANCH CIRCUIT HOMERUN WITH (3) LINE CONDUCTORS, (1) NEUTRAL CONDUCTOR, (1) SAFETY GROUND CONDUCTOR & (1) ISOLATED GROUND CONDUCTOR

NOTE: ANY CIRCUIT WITHOUT FURTHER IDENTIFICATION IS 2-WIRE PLUS GROUND WIRE. A GREATER NUMBER OF WIRES IS INDICATED BY HASH MARKS.

- E NIGHT LIGHT CIRCUIT ON EMERGENCY ELECTRIC SYSTEM
- T TELEPHONE RACEWAY
- D DATA SYSTEM RACEWAY
- P PRIMARY UNDERGROUND DUCT

ELECTRICAL ABBREVIATIONS

A.C.	ALTERNATING CURRENT
AC	ABOVE COUNTERTOP
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AFF	ABOVE FINISHED FLOOR TO CENTERLINE
AFG	ABOVE FINISHED GRADE TO CENTERLINE
C	CONDUIT
CKT/CIRC	CIRCUIT
CTC	CURRENT TRANSFORMER CABINET
DP	DISTRIBUTION PANEL
(E)	EXISTING
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EWC	ELECTRIC WATER COOLER
FURN	FURNICE
GRD	GROUNDED
HWH	HOT WATER HEATER
MDP	MAIN DISTRIBUTION PANEL
PP	POWER PANEL
RTU	ROOFTOP UNIT
UC	UNDER COUNTER
UON	UNLESS OTHERWISE NOTED
WP	WEATHERPROOF

AUTOMATIC LIGHTING CONTROL LEGEND

(CATALOG NUMBERS BASED ON "SENSORSWITCH" EQUIPMENT)

1	WSD PDT	DUAL TECHNOLOGY, P.I.R./MICROPHONICS AUTOMATIC WALL SWITCH
2	WSD PDT SA	DUAL TECHNOLOGY, P.I.R./MICROPHONICS WALL SWITCH MANUAL ON (SEMI-AUTO)
3	WSD PDT 2P FAN	DUAL TECHNOLOGY, P.I.R./MICROPHONICS 2-POLE AUTOMATIC WALL SWITCH WITH MINIMUM FAN RUN-TIME (AUTOMATIC ON)
4	MP-20	120/277 VAC RELAY/POWER PACK. (MOUNT IN ACCESSIBLE CEILING SPACE)
5	WSD PDT 2P	DUAL TECHNOLOGY, 2-POLE AUTOMATIC WALL SWITCH, P.I.R./MICROPHONICS
6	CM PDT 9	DUAL TECHNOLOGY, P.I.R./ MICROPHONICS OCCUPANCY SENSOR 450 SQ. FT. 360 DEG. COVERAGE. LOW VOLTAGE. (MOUNT ON CEILING)
7	CM PDT 10	DUAL TECHNOLOGY, P.I.R./ ULTRASONIC OCCUPANCY SENSOR 2450 SQ.FT. 360 DEG. COVERAGE. LOW VOLTAGE. (MOUNT ON CEILING)
8	HW13/WVBR	P.I.R. DETECTION HALLWAY OCCUPANCY SENSOR. 130 FT. MAXIMUM DETECTION. LOW VOLTAGE. (MOUNT ON CEILING)
9	WV PDT 16	DUAL TECHNOLOGY, P.I.R./MICROPHONICS WIDE VIEW OCCUPANCY SENSOR. 40 FOOT MOTION COVERAGE. LOW VOLTAGE. (MOUNT IN CORNER OF ROOM AT CEILING)
10	CMR PDT 9	DUAL TECHNOLOGY, P.I.R./ MICROPHONICS OCCUPANCY SENSOR 450 SQ. FT. 360 DEG. COVERAGE. LINE VOLTAGE. (MOUNT ON CEILING)
11	CMR PDT 10	DUAL TECHNOLOGY, P.I.R./ ULTRASONIC OCCUPANCY SENSOR 2450 SQ.FT. 360 DEG. COVERAGE. LINE VOLTAGE. (MOUNT ON CEILING)
12	WVR PDT 16	DUAL TECHNOLOGY, P.I.R./MICROPHONICS WIDE VIEW OCCUPANCY SENSOR. 40 FOOT MOTION COVERAGE. LINE VOLTAGE. (MOUNT IN CORNER OF ROOM AT CEILING)
13	CM ADC	DAYLIGHTING CONTROL SENSOR WITH AUTOMATIC DIMMING.
S	SPOD	LOW VOLTAGE WALL SWITCH. INTERFACES WITH OCCUPANCY SENSORS AND POWER PACKS.
S_D	SPOD D	LOW VOLTAGE DIMMING WALL SWITCH. INTERFACES WITH OCCUPANCY SENSORS AND POWER PACKS.
$S_{\#}$	GR 2400	LOW VOLTAGE DIGITAL SWITCH. NUMERAL INDICATES SWITCH DESIGNATION. SEE DIGITAL SWITCH DOCUMENTATION FOR BUTTON & RELAY INFORMATION. LC&D LIGHTING CONTROLS - CHELSEA SWITCH
S_M	TORK LCS115M	MOMENTARY OVERRIDE SWITCH. INTERFACES WITH TORK TIME CLOCKS.
		LOW VOLTAGE WIRING

NOTES:

1. ALL OCCUPANCY SENSORS SHALL BE MOUNTED TO A VIBRATION- FREE SURFACE, WITH SENSORS FACING THE AREA OF COVERAGE. PLACE AT LEAST 48 FROM SUPPLY AIR GRILLES, 72" FROM HORIZONTAL DISCHARGE DUCTS AND 6" FROM POWER PACKS.
2. ALL CONTROL TYPES INDICATED MAY NOT NECESSARILY BE USED ON THIS PROJECT.
3. SET TIME DELAY OF EACH SENSOR TO 15 MINUTES.
4. PRODUCTS BY ALTERNATE MANUFACTURERS OF EQUAL QUALITY AND PERFORMANCE ARE ACCEPTABLE.

GENERAL NOTES

1. THE CONTRACTOR SHALL ABIDE BY ALL FEDERAL, STATE, AND/OR LOCAL CODES. IF A DISCREPANCY BETWEEN CODES OCCURS, THE MOST STRINGENT SHALL PREVAIL.
2. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO THE COMMENCEMENT OF ANY WORK. SHOULD DISCREPANCIES BE DISCOVERED, THE CONTRACTOR SHALL VERIFY INTENT WITH THE ENGINEER/OWNER BEFORE PROCEEDING.
3. COORDINATE LOCATIONS OF ALL CEILING MOUNTED DEVICES WITH OTHER TRADES PRIOR TO INSTALLATION.
4. COORDINATE ALL ROUGH-IN REQUIREMENTS FOR OWNER FURNISHED EQUIPMENT WITH THE OWNER PRIOR TO BEGINNING WORK. THESE DRAWINGS ARE BASED ON THE BEST INFORMATION AVAILABLE DURING THE DESIGN PHASE OF THE PROJECT.
5. COORDINATE WITH MILLWORK CONTRACTOR TO DETERMINE THE EXACT LOCATION OF OUTLETS BEING PLACED IN MILLWORK.
6. ALL DEVICES ARE TO BE FLUSH MOUNTED UNLESS NOTED OTHERWISE.
7. DEVICES NOTED "GFI" SHALL INCLUDE GROUND FAULT INTERRUPTING DEVICES.
8. DEVICES NOTED "WP" SHALL BE WEATHERPROOF, "WHILE-IN-USE" TYPE WHERE APPLICABLE.
9. DEVICES NOTED "NL" SHALL BE NIGHT LIGHTS. PROVIDE UN-SWITCHED BRANCH CIRCUIT CONDUCTORS TO EACH FIXTURE.
10. CONNECT ALL EXIT AND EMERGENCY LIGHTING FIXTURES TO LOCAL LIGHTING CIRCUIT, AHEAD OF ALL SWITCHES, PER NEC.
11. ELECTRICAL CONTRACTOR SHALL PROVIDE SAFETY DISCONNECT SWITCHES FOR ALL MECHANICAL AND PLUMBING EQUIPMENT.
12. MULTI-WIRE BRANCH CIRCUITS SHALL BE PROVIDED WITH THE MEANS TO SIMULTANEOUSLY DISCONNECT ALL UNDERGROUND CONDUCTORS AT THE POINT WHERE THE BRANCH CIRCUIT ORIGINATES. REFER TO 2011 NEC 210.4 (B). THIS APPLIES TO ALL MULTI-WIRE BRANCH CIRCUITS SUPPLYING ANY LOAD.
13. DEDICATED NEUTRAL CONDUCTORS SHALL BE CONSIDERED CURRENT-CARRYING CONDUCTORS, HOMERUNS CONTAINING MORE THAN THREE CURRENT-CARRYING CONDUCTORS SHALL BE DERATED IN ACCORDANCE WITH THE 2011 NEC.
14. BRANCH CIRCUIT HOMERUN CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE 2011 NEC. THE MAXIMUM ALLOWABLE VOLTAGE DROP ON A FEEDER IS 2% AND THE MAXIMUM ALLOWABLE VOLTAGE DROP ON A BRANCH CIRCUIT IS 3%. PROVIDE BRANCH CIRCUIT CONDUCTORS SIZED TO ENSURE THE TOTAL VOLTAGE DROP FROM THE SOURCE TO THE POINT OF UTILIZATION IS LESS THAN OR EQUAL TO 5%.

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ELECTRICAL LEGEND AND NOTES

DO NOT SCALE DRAWINGS
USE FIGURED DIMENSIONS ONLY

seal & signature

STATE OF MICHIGAN
JAMES F. BUSHA
ENGINEER
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REGISTERED PROFESSIONAL ENGINEER

project number

13004

drawn	MAB
approved	JFB

issued	date
Bids & Permits	2/07/14

SHEET

E-001

INTERIOR LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	LAMP QUANTITY	LAMP TYPE	CCT	CRI	VOLTAGE	INPUT WATTS	BALLAST TYPE	BASIS OF DESIGN	NOTES
A	2'x2' RECESSED PARABOLIC TROFFER	3	17W T8	4100K	85	120V	47W	PROGRAM START ELECTRONIC BALLAST <10% THD	LSI INDUSTRIES 2PM G 9 3 17 FD SSOHLR FSS 120	9 CELL SPECULAR SILVER LOUVER.
AX	2'x2' RECESSED PARABOLIC TROFFER, WITH EMERGENCY BATTERY PACK.	3	17W T8	4100K	85	120V	47W	PROGRAM START ELECTRONIC BALLAST <10% THD	LSI INDUSTRIES 2PM G 9 3 17 FD SSOHLR FSS 120 BODINE #B50	9 CELL SPECULAR SILVER LOUVER. INCLUDE EMERGENCY BATTERY PACK WITH INTERNAL TEST SWITCH TO POWER 1-LAMP AT 1100 LUMENS FOR 90 MIN. DURING POWER FAILURE. PROVIDE AN UN-SWITCHED HOT LEAD TO BATTERY PACK FOR VOLTAGE SENSING OF NORMAL POWER.
B	2'x2' RECESSED PARABOLIC TROFFER	2	17W T8	4100K	85	120V	30W	PROGRAM START ELECTRONIC BALLAST <10% THD	LSI INDUSTRIES 2PM G 9 2 17 FD SSOHLR FSS 120	9 CELL SPECULAR SILVER LOUVER.
BX	2'x2' RECESSED PARABOLIC TROFFER, WITH EMERGENCY BATTERY PACK.	2	17W T8	4100K	85	120V	30W	PROGRAM START ELECTRONIC BALLAST <10% THD	LSI INDUSTRIES 2PM G 9 2 17 FD SSOHLR FSS 120 BODINE #B50	9 CELL SPECULAR SILVER LOUVER. INCLUDE EMERGENCY BATTERY PACK WITH INTERNAL TEST SWITCH TO POWER 1-LAMP AT 1100 LUMENS FOR 90 MIN. DURING POWER FAILURE. PROVIDE AN UN-SWITCHED HOT LEAD TO BATTERY PACK FOR VOLTAGE SENSING OF NORMAL POWER.
C	6" RECESSED OPEN DOWNLIGHT.	1	42W TRT CFL	3500K	82	120V-277V	45W	ELECTRONIC HPF, <10% THD	LSI INDUSTRIES 206H CFL 1 42T UNIV NB	NON-WALL WASH TYPE (NO INSERT)
D	18" DIA. SEALED IN-GRADE LUMINAIRE.	1	LED	4100K	85	120V	84W	ELECTRONIC BALLAST	HYDREL M9820 A LED MVOLT MFL FLC 34B LP DNA	DOUBLE LENS WITH MEDIUM FLOOD DISTRIBUTION. ALUMINUM FINISH.
F	2'x2' RECESSED TROFFER, ACRYLIC LENS.	2	17W T8	4100K	85	120V	30W	PROGRAM START ELECTRONIC BALLAST <10% THD	LSI INDUSTRIES 2T G A 2 RA SSOHLR 120	ACRYLIC LENS.
G	HIGH BAY LINEAR FLUORESCENT, WITH WIRE GUARD.	4	54W T5HO	4100 K	85	120V	234W	PROGRAM START ELECTRONIC BALLAST <10%THD	LSI INDUSTRIES IMX 6 54 SS5HO 120 - WG-IMX	V HOOK CHAIN SET. SUSPENDED TO 18'0" A.F.F. OR FLUSH WITH JOIST. DO NOT HANG ABOVE JOIST LEVEL. SUITABLE FOR DAMP LOCATION.
GX	HIGH BAY LINEAR FLUORESCENT, WITH WIRE GUARD AND EMERGENCY BATTERY PACK.	4	54W T5HO	4100 K	85	120V	234W	PROGRAM START ELECTRONIC BALLAST <10%THD	LSI INDUSTRIES IMX 6 54 SS5HO 120 - WG-IMX BODINE #B30	V HOOK CHAIN SET. SUSPENDED TO 18'0" A.F.F. OR FLUSH WITH JOIST. DO NOT HANG ABOVE JOIST LEVEL. SUITABLE FOR DAMP LOCATION. INCLUDE EMERGENCY BATTERY PACK WITH INTERNAL TEST SWITCH TO POWER 1-LAMP AT 3000 LUMENS FOR 90 MIN. DURING POWER FAILURE. PROVIDE AN UN-SWITCHED HOT LEAD TO BATTERY PACK FOR VOLTAGE SENSING OF NORMAL POWER.
H	INDUSTRIAL STRIP, WITH WIRE GUARD AND UPLIGHT REFLECTOR	2	32W T8	4100K	85	120V	59W	PROGRAM START ELECTRONIC BALLAST <10%THD	LSI INDUSTRIES F22 2 32 SSOHLR 120	PROVIDE CHAIN HANGING SET #CHS. PROVIDE WITH WIRE GUARD #IWGF22.
HX	INDUSTRIAL STRIP, WITH WIRE GUARD, UPLIGHT REFLECTOR, AND EMERGENCY BATTERY PACK.	2	32W T8	4100K	85	120V	59W	PROGRAM START ELECTRONIC BALLAST <10%THD	LSI INDUSTRIES F22 2 32 SSOHLR 120 BODINE #B30	PROVIDE CHAIN HANGING SET #CHS. PROVIDE WITH WIRE GUARD #IWGF22. INCLUDE EMERGENCY BATTERY PACK WITH INTERNAL TEST SWITCH TO POWER 1-LAMP AT 3000 LUMENS FOR 90 MIN. DURING POWER FAILURE. PROVIDE AN UN-SWITCHED HOT LEAD TO BATTERY PACK FOR VOLTAGE SENSING OF NORMAL POWER.
J1	PREMIUM INDUSTRIAL STRIP LIGHT	2	32W T8	4100K	85	120V	59W	PROGRAM START ELECTRONIC BALLAST <10%THD	LSI INDUSTRIES F20 2 32 SSOHLR 120	PROVIDE CHAIN HANGING SET #CHS. MOUNTED BELOW STEEL.
J2	PREMIUM INDUSTRIAL STRIP LIGHT, WITH WIRE GUARD AND UPLIGHT REFLECTOR.	2	32W T8	4100K	85	120V	59W	PROGRAM START ELECTRONIC BALLAST <10%THD	LSI INDUSTRIES F20 2 32 SSOHLR U 120	PROVIDE CHAIN HANGING SET OF SUFFICIENT LENGTH. PROVIDE WITH WIRE GUARD #IWG-F202. MOUNT AT 8' A.F.F. FOR TASK LIGHTING.
K	EXTERIOR LED WALL SCONCE. TYPE III DISTRIBUTION.	1	LED (30 LED)	4000K	>70	120V	104 W	CLASS II ELECTRONIC DRIVER, <20% THD, >0.9BF	LITHONIA #CSXW-LED-30C-1000-40K-T3M-MVOLT-DBLXD	BLACK FINISH. MOUNT BELOW METAL FAÇADE AT HEIGHTS AS NOTED.
L	RECESSED SOFFIT LIGHT	1	LED	5000K	>70	120V	62 W	ELECTRONIC DRIVER	LSI INDUSTRIES XSL2 S LED 50 CW 120 WHT DFL	DIFFUSED LENS.
X	SELF-POWERED EXIT SIGN	1	LED	-	-	120V	2 W	-	ROYAL PACIFIC RXL5	SINGLE OR DOUBLE FACE, UNIVERSAL MOUNT WITH 6" RED LETTERS ON STENCIL FACE. MAINTENANCE FREE NI-CAD BATTERY. CONNECT TO NEAREST GENERAL LIGHTING CIRCUIT, AHEAD OF ALL SWITCHES.
X2	SELF-POWERED EXIT SIGN, WITH REMOTE HEAD CAPABILITY (6V).	1	LED	-	-	120V	4 W	-	ROYAL PACIFIC RXL20	SINGLE OR DOUBLE FACE, UNIVERSAL MOUNT WITH 6" RED LETTERS ON STENCIL FACE. MAINTENANCE FREE NI-CAD BATTERY WITH CAPACITY TO POWER REMOTE HEAD. FIELD WIRE TO FIXTURE TYPE 'EX' WHERE INDICATED ON PLANS.CONNECT TO NEAREST GENERAL LIGHTING CIRCUIT, AHEAD OF ALL SWITCHES.
EX	DUAL HEAD REMOTE WEATHERPROOF EMERGENCY LIGHT, 6V.	2	8W PAR36, 6V	-	-	120V	16 W	-	LIGHTALARMS ELF647D H7551 M 6	CONNECT TO LOCAL EXIT SIGN BATTERY PACK. MOUNT AT 96" A.F.G. ABOVE DOORWAY FOR OUTDOOR LOCATIONS.

SITE LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	LAMP QUANTITY	LAMP TYPE	CCT	CRI	VOLTAGE	INPUT WATTS	BALLAST TYPE	BASIS OF DESIGN	NOTES
OA	25' POLE FIXTURE, LOW-PROFILE RECTANGULAR SINGLE HEAD LED, WITH HOUSING SIDE SHIELD. TYPE IV DISTRIBUTION.	1	LED (80 LED)	4000K	>70	120V-277V	275 W	CLASS I ELECTRONIC DRIVER, <20% THD, >0.9BF	LITHONIA #DSX2-LED-80C-1000-40K-T4M-MVOLT-SPA-HS-DBLXD	MOUNT ON POLE AT 25' A.F.G. TRIM POLE TO 22'-6" FOR 25' OVERALL POLE HEIGHT. PROVIDE BLACK SQUARE STEEL LIGHT POST BY LITHONIA #SSS-25-4C-DM19-BC-DBL. PROVIDE BLACK FINISH.
OB	25' POLE FIXTURE, LOW-PROFILE RECTANGULAR SINGLE HEAD LED. TYPE III DISTRIBUTION.	1	LED (80 LED)	4000K	>70	120V-277V	275 W	CLASS I ELECTRONIC DRIVER, <20% THD, >0.9BF	LITHONIA #DSX2-LED-80C-1000-40K-T3M-MVOLT-SPA-DBLXD	MOUNT ON POLE AT 25' A.F.G. TRIM POLE TO 22'-6" FOR 25' OVERALL POLE HEIGHT. PROVIDE BLACK SQUARE STEEL LIGHT POST BY LITHONIA #SSS-25-4C-DM19-BC-DBL. PROVIDE BLACK FINISH.
OC	25' POLE FIXTURE, LOW-PROFILE RECTANGULAR DUAL HEAD LED. 180-DEGREE MOUNTING. TYPE V DISTRIBUTION.	2	LED (80 LED)	4000K	>70	120V-277V	550 W	CLASS I ELECTRONIC DRIVER, <20% THD, >0.9BF	LITHONIA #DSX2-LED-80C-1000-40K-T5M-MVOLT-SPA-DBLXD	MOUNT ON POLE AT 25' A.F.G. TRIM POLE TO 22'-6" FOR 25' OVERALL POLE HEIGHT. PROVIDE BLACK SQUARE STEEL LIGHT POST BY LITHONIA #SSS-25-4C-DM28-BC-DBL. PROVIDE BLACK FINISH.
OD	15' POLE FIXTURE, LOW-PROFILE RECTANGULAR SINGLE HEAD LED, WITH HOUSING SIDE SHIELD. TYPE III DISTRIBUTION.	1	LED (80 LED)	4000K	>70	120V-277V	275 W	CLASS I ELECTRONIC DRIVER, <20% THD, >0.9BF	LITHONIA #DSX2-LED-80C-1000-40K-T3M-MVOLT-SPA-HS-DBLXD	MOUNT ON POLE AT 15' A.F.G. TRIM POLE TO 12'-6" FOR 15' OVERALL POLE HEIGHT. PROVIDE BLACK SQUARE STEEL LIGHT POST BY LITHONIA #SSS-15-4C-DM19-BC-DBL. PROVIDE BLACK FINISH.

LIGHTING FIXTURE NOTES

1. ALTERNATE LIGHTING MANUFACTURERS EQUIPMENT SHALL BE SIMILAR IN PERFORMANCE, PHYSICAL APPEARANCE AND CONSTRUCTION TO BE CONSIDERED AS EQUAL TO UNITS SPECIFIED.
2. ALTERNATE LIGHTING FIXTURE TYPES PROPOSED TO BE SUBSTITUTED BY BIDDING CONTRACTOR MUST BE PRE-APPROVED DURING BIDDING. CONTRACTOR, OR LIGHTING REPRESENTATIVE SHALL EMAIL ALL SUCH REQUESTS WITH FIXTURE CUTS TO ENGINEER AT LEAST ONE WEEK PRIOR TO SUBMITTING BIDS. ENGINEER SHALL REVIEW THE PROPOSED ALTERNATE LIGHTING FIXTURES AND ISSUE A WRITTEN ACCEPTANCE OR DENIAL BY RETURN EMAIL. VERBAL APPROVAL WILL NOT BE ACCEPTABLE.
3. ALL SHOP DRAWINGS SUBMITTED AFTER AWARD OF CONTRACT FOR LIGHTING FIXTURES WHICH WERE NOT PRE-APPROVED WILL BE REJECTED.
4. FIXTURES SIMILAR IN DESIGN, CONSTRUCTION AND PHOTOMETRIC CHARACTERISTICS MANUFACTURED BY LITHONIA, LSI INDUSTRIES, COOPER, LIGHTOLIER, HUBBELL, OR PHILIPS ARE ACCEPTABLE ALTERNATES TO THOSE FIXTURES SPECIFIED.
5. ALL FLUORESCENT FIXTURES TO INCLUDE A BALLAST DISCONNECT PLUG PER NEC REQUIREMENTS.
6. REMOTE TEST SWITCHES FOR EMERGENCY LIGHTS TO BE MOUNTED FLUSH IN WALL ADJACENT TO LIGHT FIXTURE. CONTRACTOR TO COORDINATE EXACT LOCATIONS FOR ALL SUCH REMOTE SWITCHES WITH ARCHITECT REPRESENTATIVE. ALL DIRECTIONS SHALL BE IN WRITING. VERBAL ORDERS ARE NOT ACCEPTABLE.

prepared for:

LINCOLN JACK DEMMER AUTOMOTIVE GROUP Ford

prepared by:

UNDER THE SUN ARCHITECTURAL LLC
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notice

project title

DEMMER QUICKLANE
37410 MICHIGAN AVE.
WAYNE, MI

sheet title

LIGHTING FIXTURE SCHEDULE

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STATE OF MICHIGAN JAMES E. BUSHA ENGINEER No. 44384 LICENSED PROFESSIONAL ENGINEER

project number

13004

drawn MAB
approved JFB

issued	date
Bids & Permits	2/07/14

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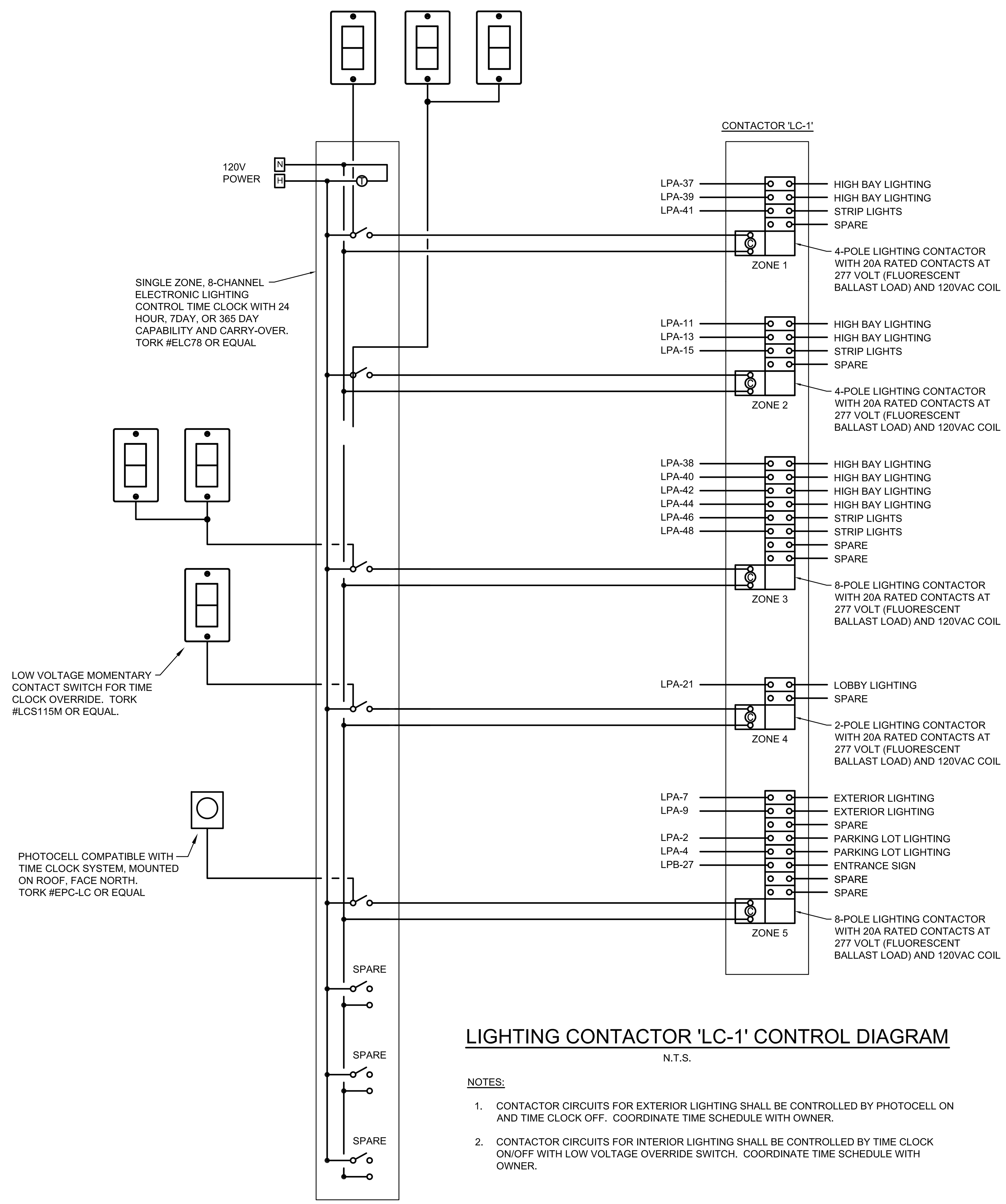
MEEC JOB # 204-13-238

SHEET
E-002

USA MASTER: 24X36.DWG 09/12

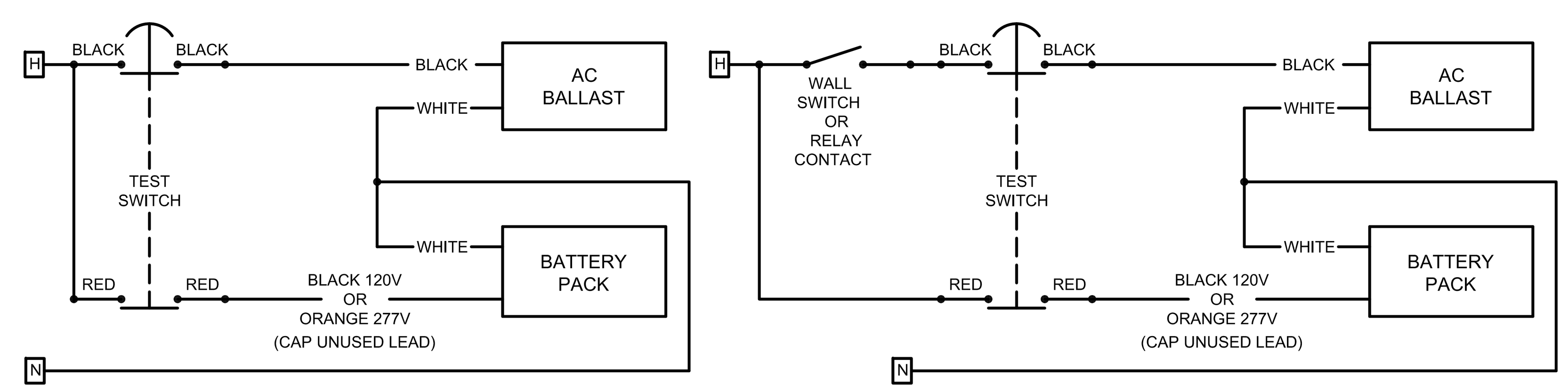


LIGHTING CONTACTOR 'LC-1' CONTROL DIAGRAM

N.T.S.

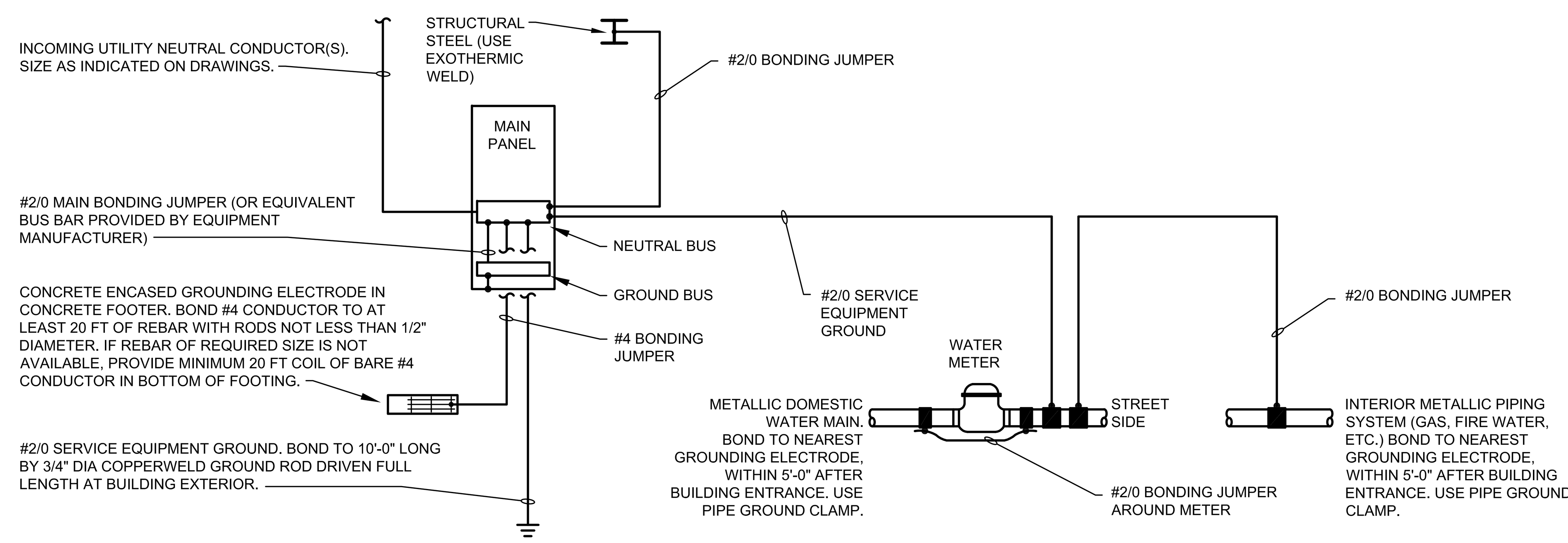
NOTES:

1. CONTACTOR CIRCUITS FOR EXTERIOR LIGHTING SHALL BE CONTROLLED BY PHOTOCELL ON AND TIME CLOCK OFF. COORDINATE TIME SCHEDULE WITH OWNER.
2. CONTACTOR CIRCUITS FOR INTERIOR LIGHTING SHALL BE CONTROLLED BY TIME CLOCK ON/OFF WITH LOW VOLTAGE OVERRIDE SWITCH. COORDINATE TIME SCHEDULE WITH OWNER.



TYPICAL WIRING DIAGRAM FOR EMERGENCY LIGHTING BATTERY POWER OPERATION

N.T.S.

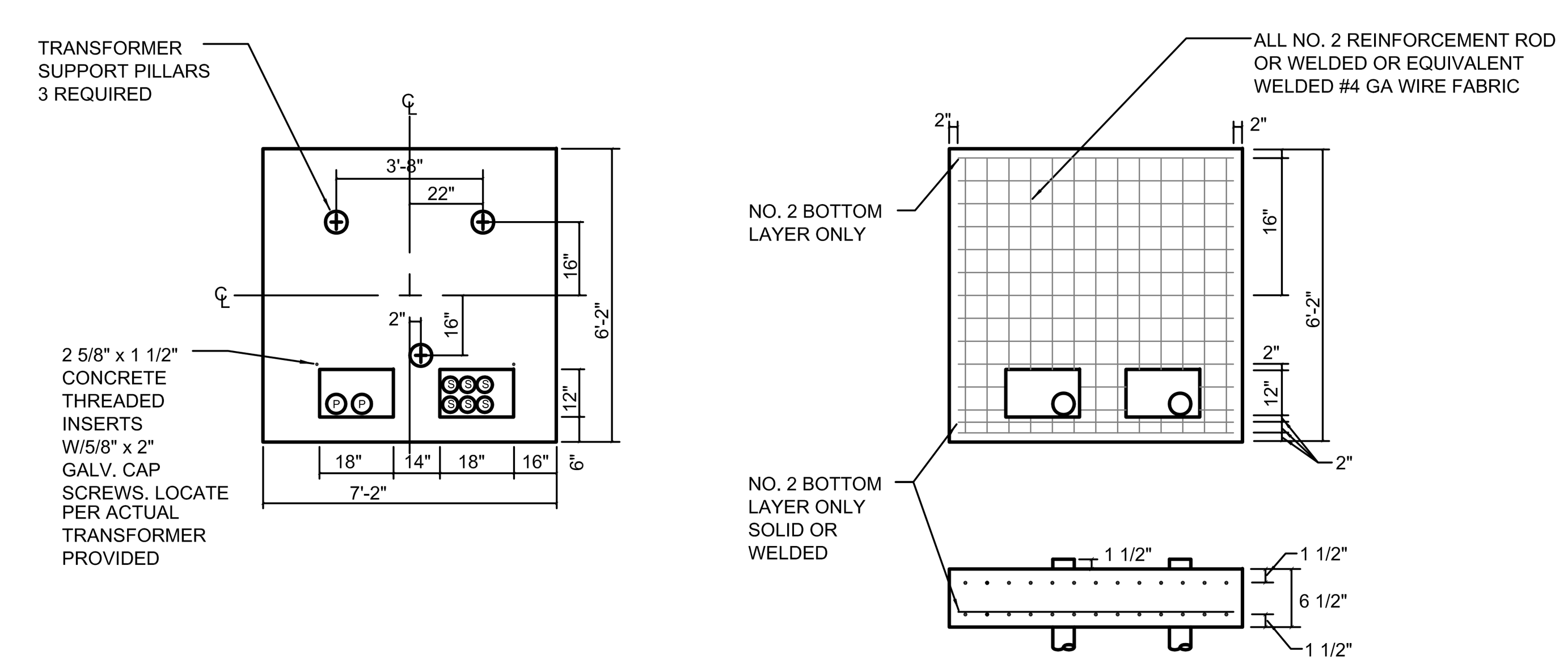


ELECTRICAL GROUNDING & BONDING DETAIL

N.T.S.

NOTES:

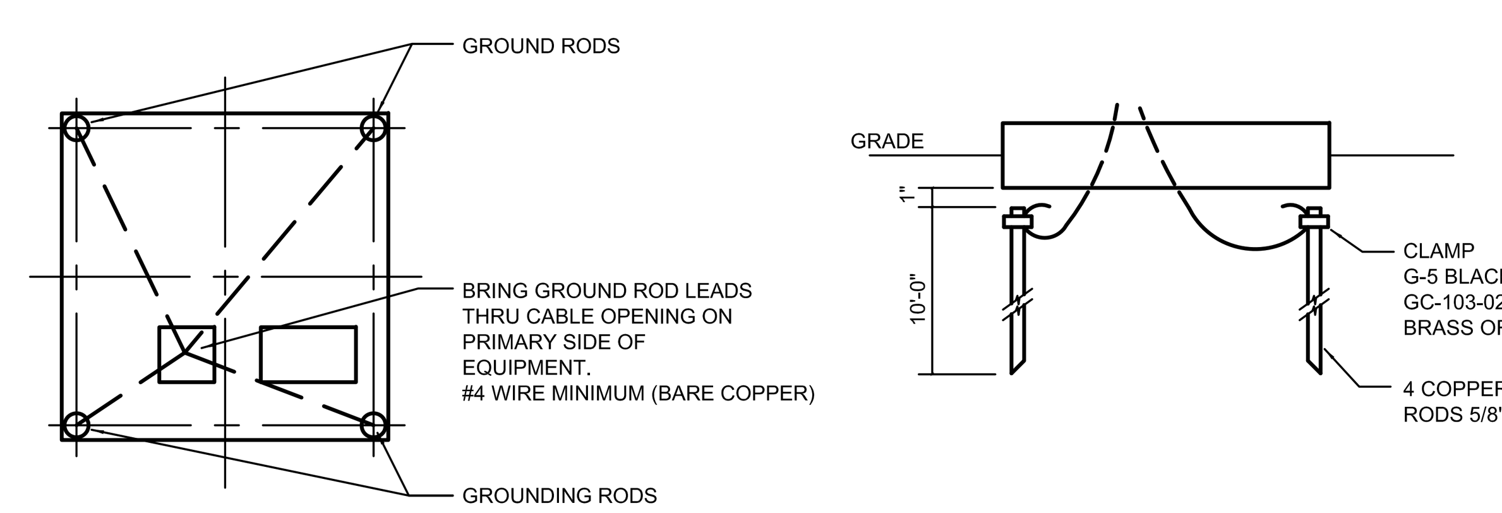
1. COMPLETE GROUNDING INSTALLATION SHALL COMPLY WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.
2. ALL CONDUCTORS ARE BARE STRANDED COPPER, UNLESS NOTED OTHERWISE.
3. ALL UNDERGROUND CONNECTIONS AND CONNECTIONS IN INACCESSIBLE LOCATIONS SHALL BE EXOTHERMIC WELD TYPE. UL LISTED MECHANICAL CONNECTORS CAN BE USED ABOVE GRADE IN ACCESSIBLE LOCATIONS, WHERE ALLOWABLE BY NEC.



GENERAL NOTES:

1. CABLE OPENING IN SLAB SHALL BE AS REQUIRED BY THE ACTUAL TRANSFORMERS PROVIDED FOR THE PROJECT.
2. PRIMARY CONDUIT MUST BE POSITIONED AT THE FRONT OF THE PRIMARY WINDOW AS SHOWN.
3. NUMBER OF CONDUIT IS TO BE AS INDICATED ON ONE LINE DIAGRAM.
4. IF CONDUCTORS ARE NOT PULLED IN ALL SECONDARY SERVICE CONDUITS, THE UNUSED CONDUIT SHOULD BE AT THE FRONT POSITION.
5. SWEEPS MUST BE 4" CONDUIT WITH A MINIMUM 36" RADIUS BEND.
6. CONCRETE MIX, 6 BAGS OF CEMENT PER YARD.
7. MAINTAIN CONCRETE COVER CLEARANCES BETWEEN REINFORCEMENT RODS AND SURFACES AS SHOWN.
8. TRANSFORMER AND PAD DIMENSIONS TO BE COORDINATED WITH THE LOCAL UTILITY COMPANY.

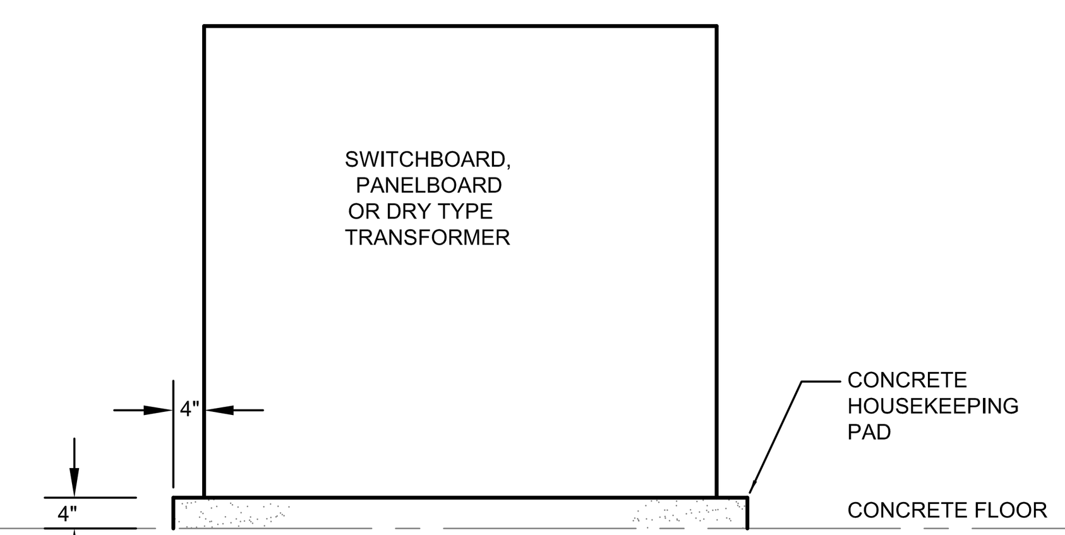
CONCRETE TRANSFORMER PADS



GROUNDING DETAIL

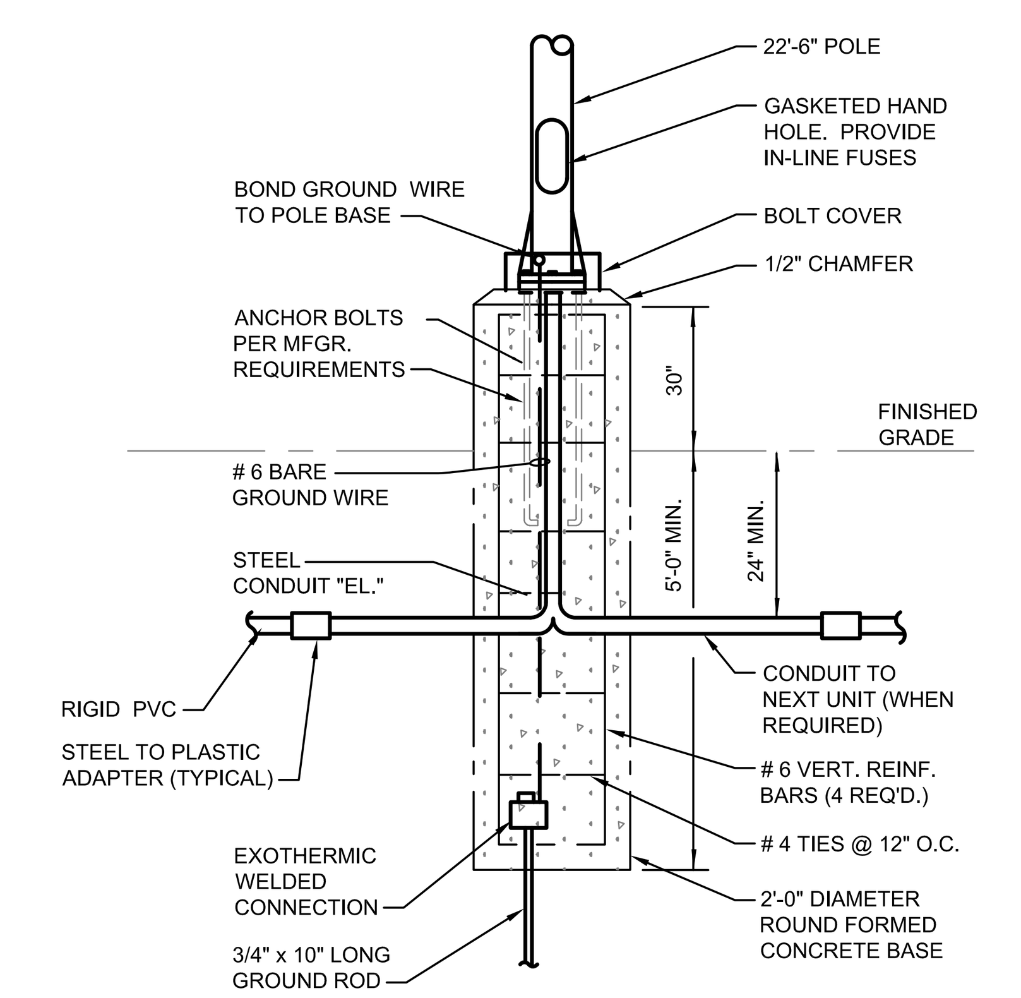
TRANSFORMER PAD DETAIL

N.T.S.



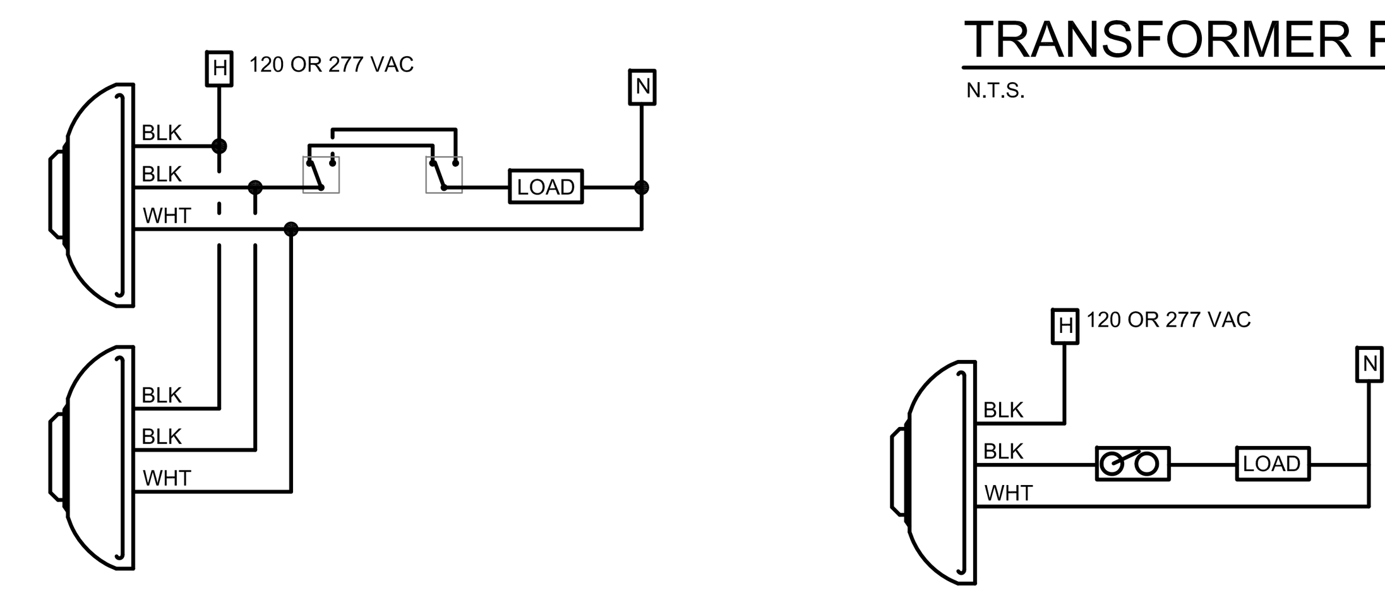
DETAIL - EQUIPMENT PAD

N.T.S.



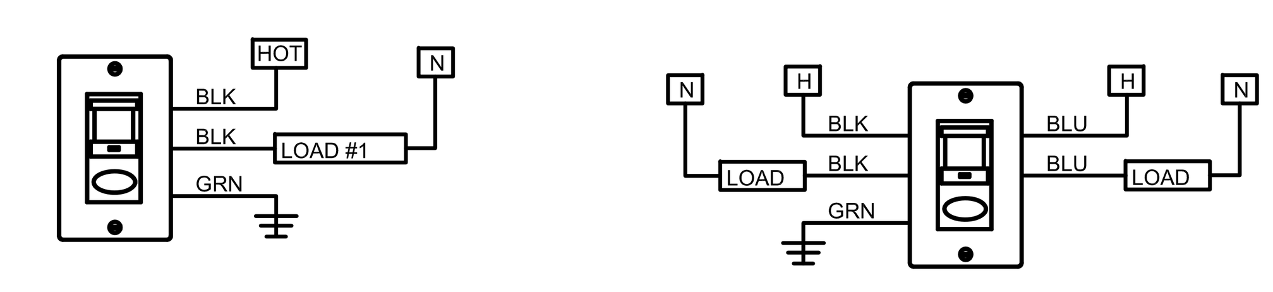
LIGHTING POLE - CONCRETE BASE DETAIL

N.T.S.



TYPICAL OCCUPANCY SENSOR WIRING DETAILS

N.T.S.



TYPICAL OCCUPANCY WALL SWITCH WIRING DETAILS

N.T.S.

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prepared by:

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ELECTRICAL DETAILS

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STATE OF MICHIGAN · JAMES F. BUSHA · ENGINEER · No. 44384 · LICENSED PROFESSIONAL ENGINEER

project number

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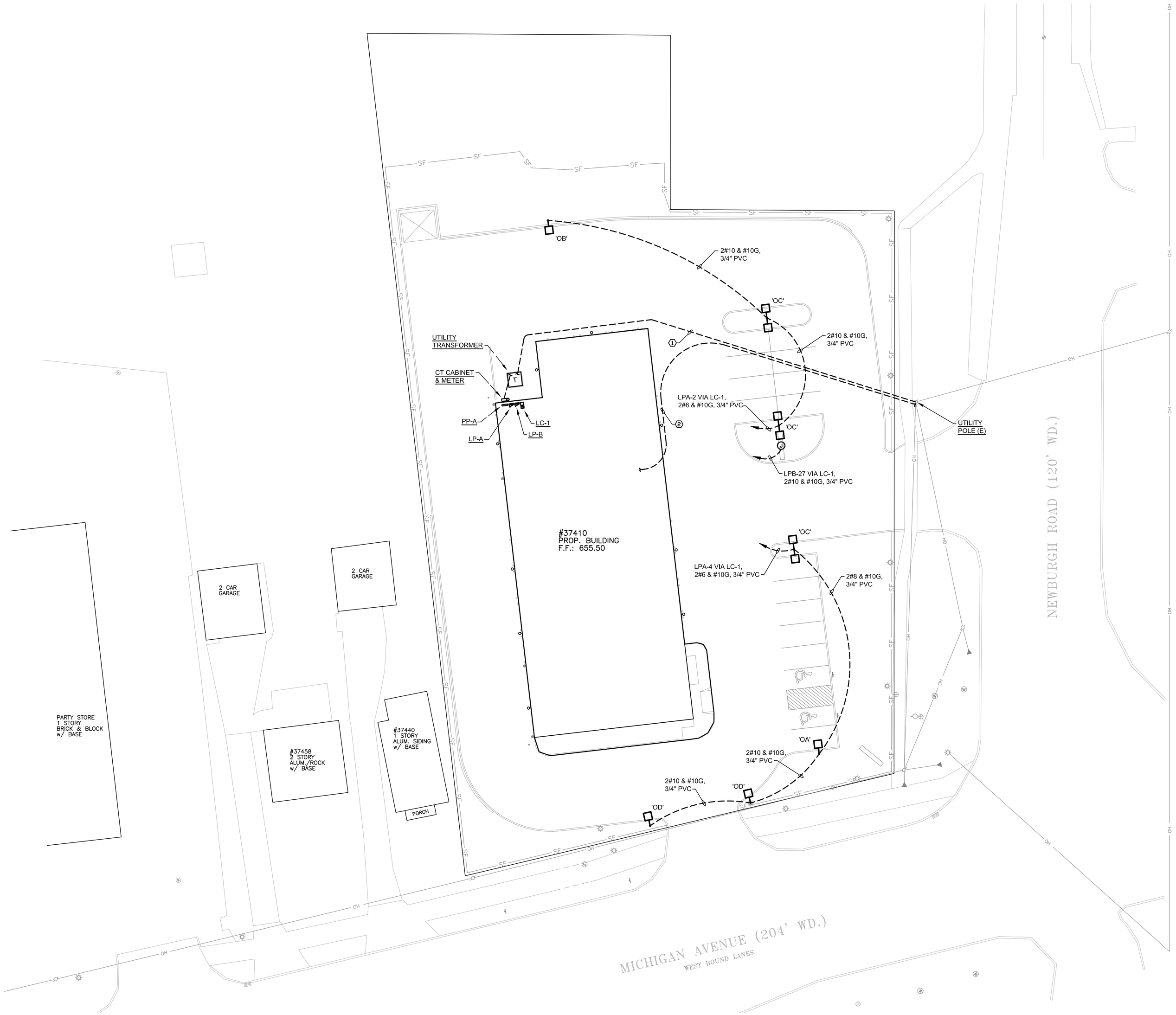
SHEET

E-003

USA MASTER - BACKGROUND BASED



SITE PLAN - ELECTRICAL
SCALE:1"=20'

SHEET KEYNOTES:

1. PROVIDE (2)-4" PVC CONDUITS WITH PULL STRING FROM ELECTRICAL SERVICE CONNECTION LOCATION AT PROPERTY LINE TO SECONDARY SERVICE TRANSFORMER. CONDUCTORS TO BE PROVIDED BY THE UTILITY COMPANY. COORDINATE ALL REQUIREMENTS WITH THE UTILITY COMPANY.
2. PROVIDE (2)-4" PVC CONDUITS WITH PULL STRING FROM TELECOMMUNICATIONS POINT OF SERVICE AT PROPERTY LINE TO TELECOMMUNICATIONS BACKBOARD ON MEZZANINE LEVEL.

GENERAL NOTES:

1. SEE LIGHTING CONTACTOR WIRING DIAGRAM FOR SITE LIGHTING AND ENTRANCE SIGN CONTROL DETAILS.

prepared for:

LINCOLN JACK DEMMER AUTOMOTIVE GROUP Ford

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SITE PLAN - ELECTRICAL

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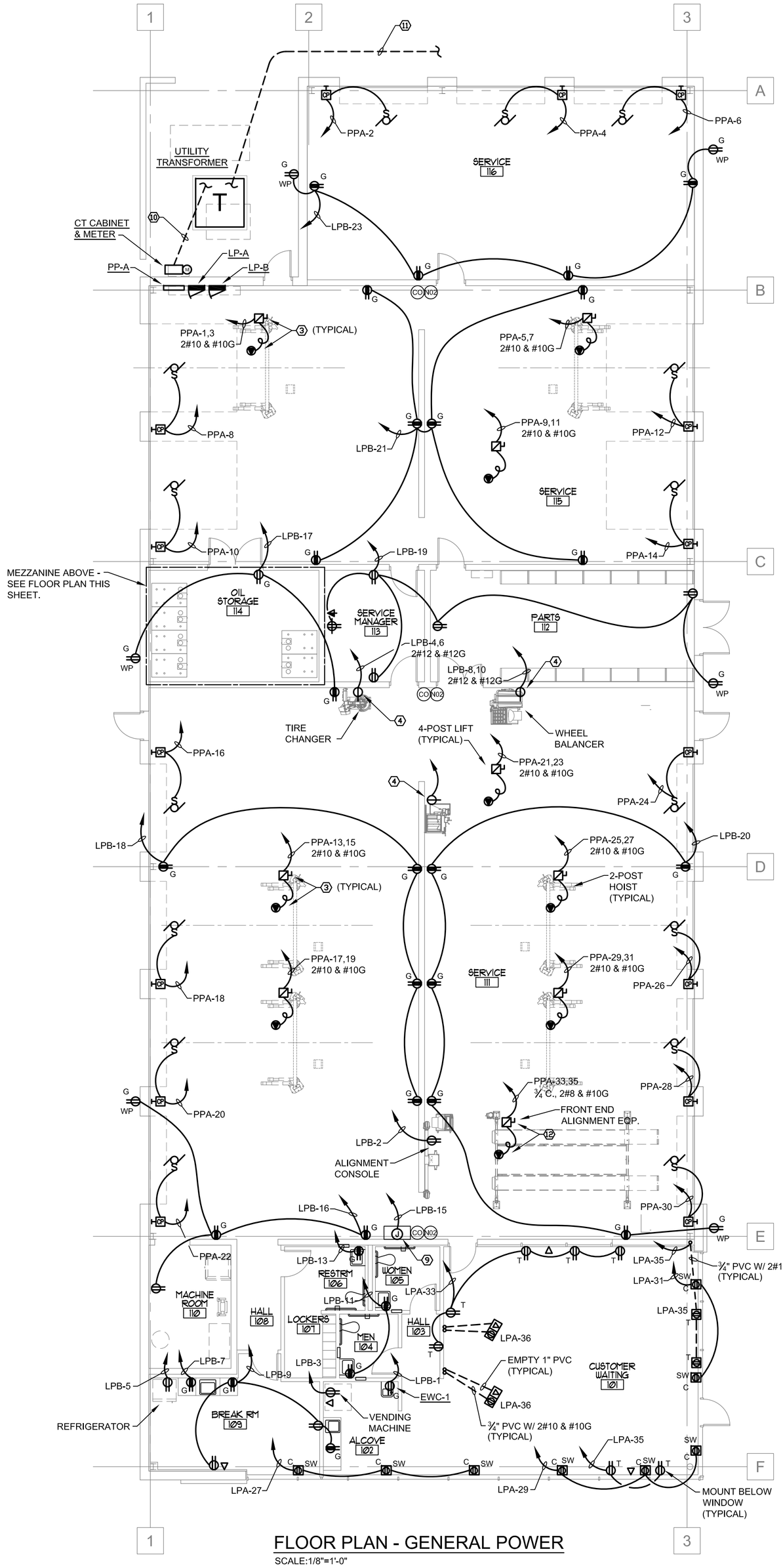
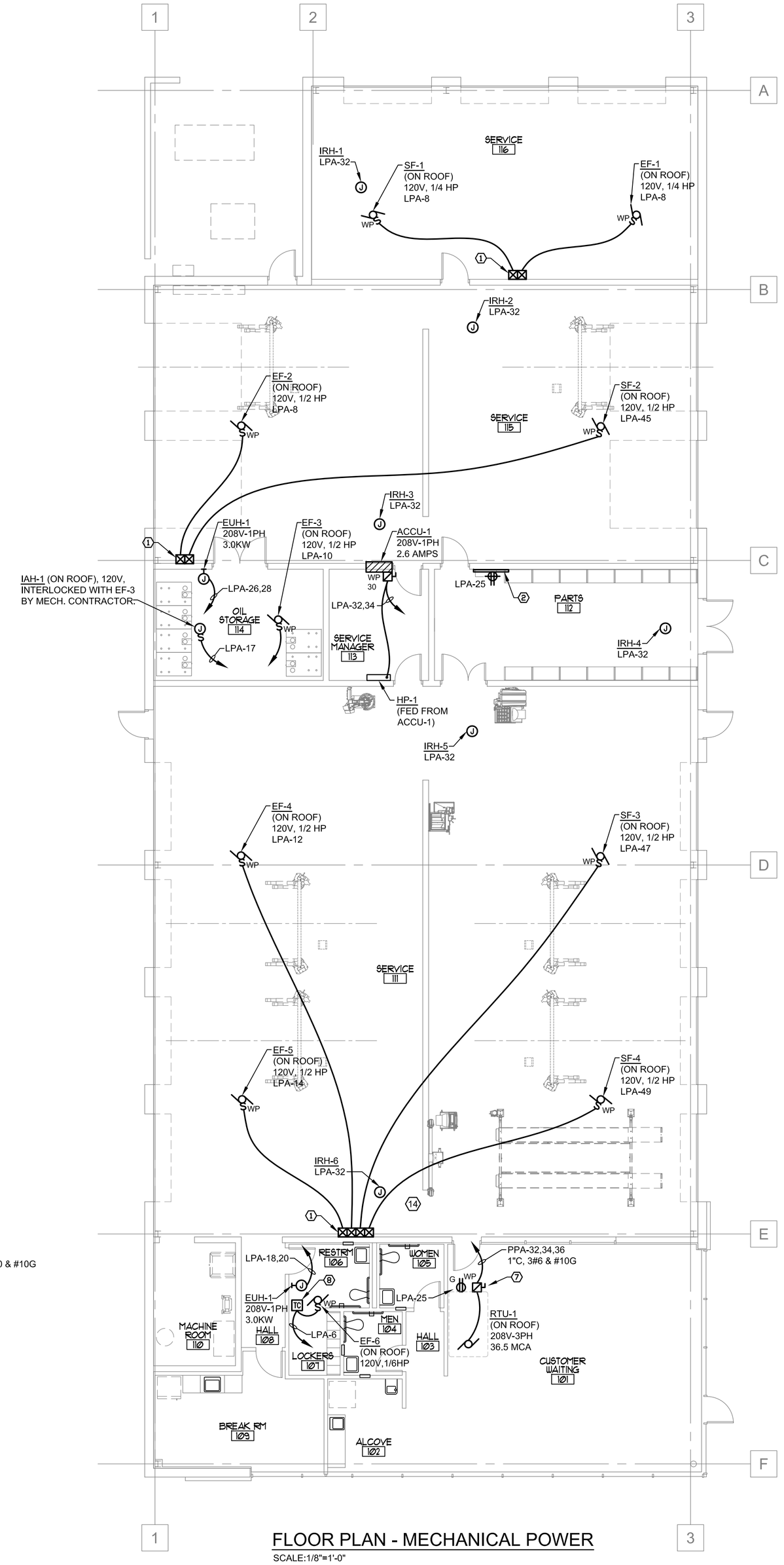
SHEET
E-100

USA MASTER - BACKGROUND 30x42



FLOOR PLAN - GENERAL POWER

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



FLOOR PLAN - MECHANICAL POWER

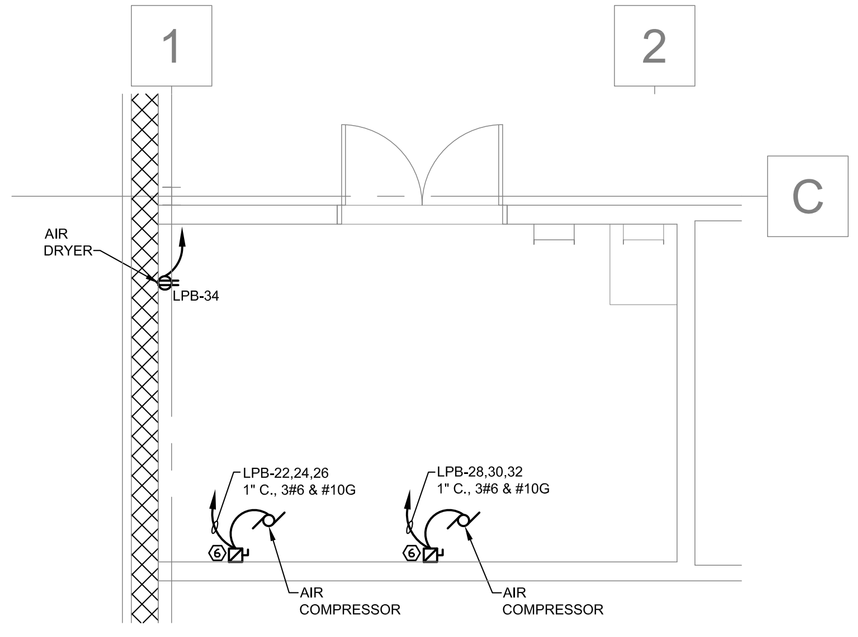
SCALE:1/8"=1'-0"

SHEET KEYNOTES:

1. HAND/OFF/AUTO FAN STARTERS TO BE INTERLOCKED IN AUTO MODE WITH CO2 SYSTEM. INTERLOCK WIRING BY MECHANICAL CONTRACTOR.
2. PROVIDE 48" WIDE FIRE-RETARDANT PLYWOOD TELECOMMUNICATIONS BACKBOARD. PROVIDE DEDICATED QUAD RECEPTACLE FOR EQUIPMENT. VERIFY EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.
3. FOR SERVICE LIFTS, PROVIDE L6-30R RECEPTACLE CONNECTED TO LOCAL 30A, 2-POLE NON-FUSED DISCONNECT SWITCH IN TRUSS. RECEPTACLE SHALL BE INSTALLED ON HARDWIRED CORD REEL WITH 30' FLEXIBLE 'SO' CORD, APPLETON #RL203L-30 OR EQUAL. VERIFY EQUIPMENT CONNECTION AND RECEPTACLE TYPE PRIOR TO INSTALLATION.
4. PROVIDE NEMA L6-20R RECEPTACLE ON WALL FOR SHOP EQUIPMENT.
5. PROVIDE 2-GANG, SLAB-IN GRADE FLOOR BOX AND ROUTE CONDUITS TO NEAREST WALL SPACE. SEE SYMBOLS LEGEND.
6. PROVIDE 240V RATED, 60A, 3-POLE NON-FUSED DISCONNECT SWITCH FOR AIR COMPRESSOR.
7. PROVIDE WEATHERPROOF 240V RATED, 60A, 3-POLE, NON-FUSED DISCONNECT SWITCH FOR ROOF TOP UNIT. MOUNT TO STRUT SUPPORT IF REQUIRED.
8. PROVIDE 120V, IN-LINE, SINGLE-CIRCUIT ASTRONOMIC TIME CLOCK FOR ON/OFF CONTROL OF RESTROOM EXHAUST FANS.
9. PROVIDE 120V POWER TO CO2 CONTROL PANEL (PANEL BY OTHERS). INTERLOCK WIRING BY MECHANICAL CONTRACTOR. SEE SHEET M-201 FOR MORE DETAILS.
10. UNDERGROUND SECONDARY SERVICE CONDUCTORS. SEE ONE-LINE DIAGRAM.
11. UNDERGROUND EMPTY PRIMARY SERVICE CONDUITS. SEE SITE PLAN.
12. FOR FRONT END ALIGNMENT EQUIPMENT, PROVIDE 50A TWIST-LOCK RECEPTACLE CONNECTED TO LOCAL 60A, 2-POLE NON-FUSED DISCONNECT SWITCH IN TRUSS. RECEPTACLE SHALL BE INSTALLED ON HARDWIRED CORD REEL WITH 30' FLEXIBLE 'SO' CORD, APPLETON #RW309-30 OR EQUAL. VERIFY EQUIPMENT CONNECTION AND RECEPTACLE TYPE PRIOR TO INSTALLATION.
13. PROVIDE SIZE 1 NON-FUSED MOTOR STARTER WITH 24V RELAY CONTACT FOR ON/OFF CONTROL AND 120V AUXILIARY RELAY CONTACT FOR LOUVER MOTOR CONTROL. INTERLOCK 120V POWER TO LOUVER MOTORS WITH 2#12 & #12 GND. LOUVERS WILL SHARE ONE CIRCUIT.

GENERAL NOTES:

1. WHERE SWITCHES ARE INDICATED FOR MECHANICAL UNIT DISCONNECTS, THEY SHALL BE MOTOR RATED AND SHALL BE SINGLE OR DOUBLE POLE, MATCHING THE NUMBER OF POLES SERVING THE EQUIPMENT.
2. MOUNT ALL GFCI CONVENIENCE RECEPTACLES LOCATED IN WORK BAY AREAS AT +46" A.F.F., UNLESS OTHERWISE NOTED.



FLOOR PLAN - MEZZANINE POWER

SCALE:1/4"=1'-0"

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FLOOR PLANS - POWER

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STATE OF MICHIGAN
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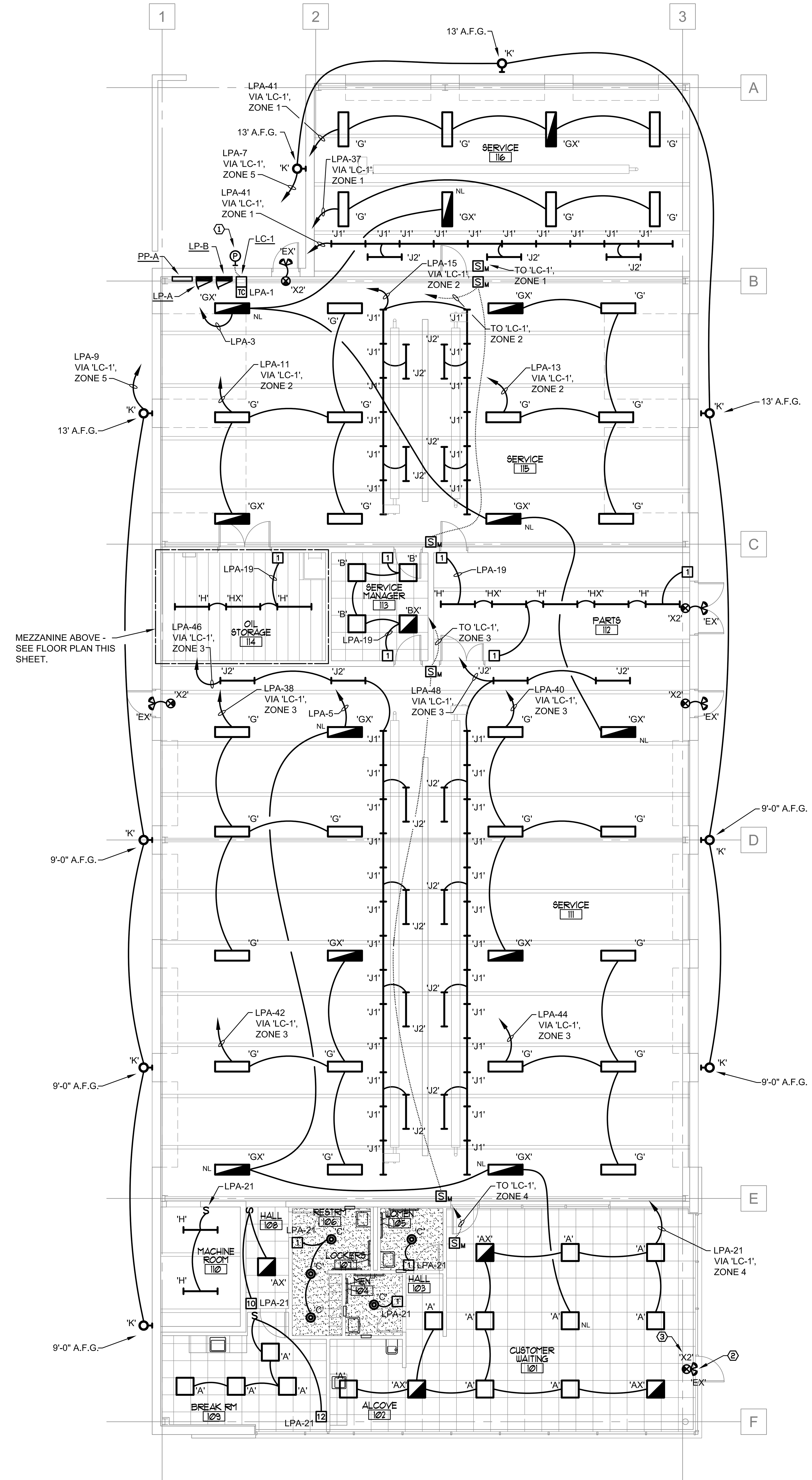
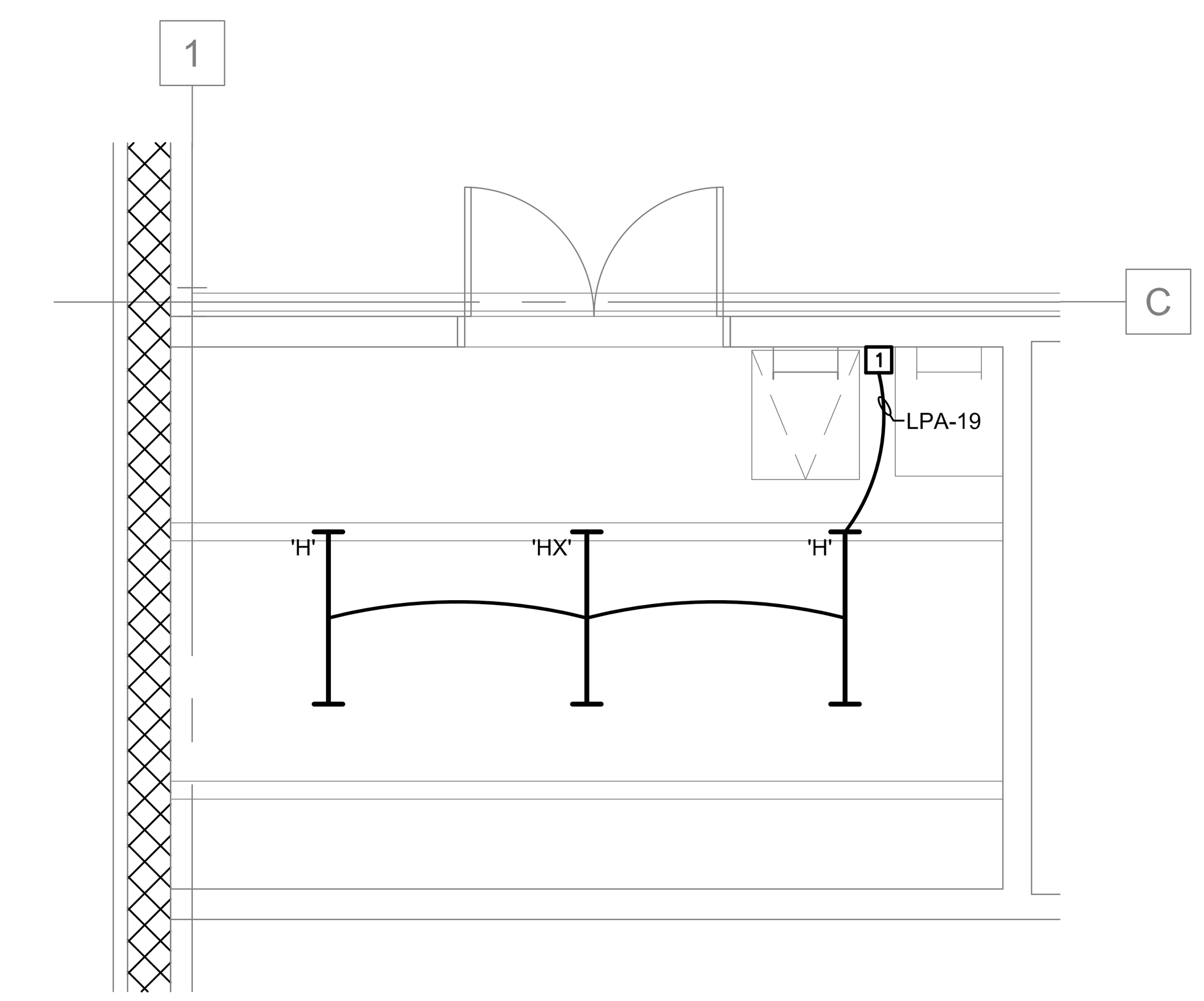
Bids & Permits	2/07/14

SHEET
E-101



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



FLOOR PLAN - MEZZANINE LIGHTING
SCALE:1/4"=1'-0"

SHEET KEYNOTES:

1. MOUNT PHOTOCELL AT ROOF LEVEL AND TIE TO TIME CLOCK, ZONE 5.
2. REMOTE HEADS SHALL BE AIMED THROUGH GLASS DOOR TO PROVIDE A MINIMUM OF 0.1 FOOTCANDLES ALONG THE PATH OF EGRESS (AREA DIRECTLY OUTSIDE OF DOORWAY).
3. EXIT SIGN TO BE MOUNTED TO GRID AND NOT TO WALL SURFACE.

GENERAL NOTES:

1. ALL EXIT SIGNS AND EMERGENCY BATTERY PACKS SHALL BE CONNECTED TO LOCAL CIRCUITS, AHEAD OF ALL SWITCHING.
2. TYPE 'K' WALL PACKS SHALL BE MOUNTED BELOW METAL FACADE AT ELEVATIONS AS NOTED. MOUNT TYPE 'EX' ABOVE DOORWAY (96" A.F.G.) FOR OUTDOOR LOCATIONS.

prepared for:

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FLOOR PLAN LIGHTING

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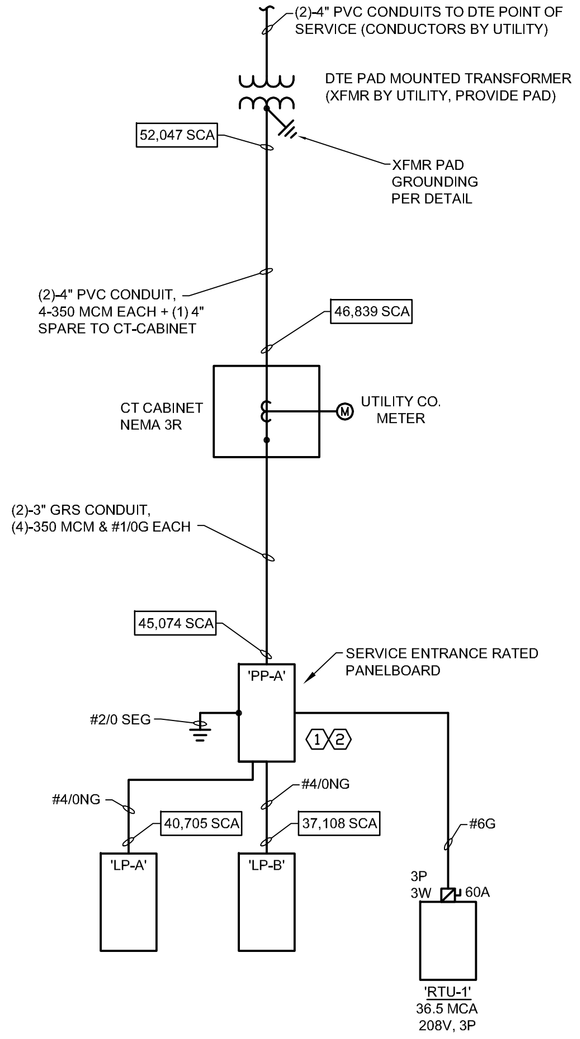
SHEET
E-201

USA WATER SHORING BMB

CONDUCTOR SIZE AND CONDUIT FILL SYMBOL LIST
FOR NEC TYPES THHN, THWN, XHHW INSULATION

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
#12	3#12 - 1/2" C.	#3/0	3#3/0 - 1-1/2" C.
#12N	4#12 - 1/2" C.	#3/0N	4#3/0 - 2" C.
#12G	3#12 & 1#12 GND - 1/2" C.	#3/0G	3#3/0 & 1#6 GND - 2" C.
#12NG	4#12 & 1#12 GND - 1/2" C.	#3/0NG	4#3/0 & 1#6 GND - 2" C.
#10	3#10 - 1/2" C.	#4/0	3#4/0 - 2" C.
#10N	4#10 - 1/2" C.	#4/0N	4#4/0 - 2" C.
#10G	3#10 & 1#10 GND - 1/2" C.	#4/0G	3#4/0 & 1#2 GND - 2" C.
#10NG	4#10 & 1#10 GND - 1/2" C.	#4/0NG	4#4/0 & 1#2 GND - 2-1/2" C.
#8	3#8 - 3/4" C.	250 MCM	3-250 MCM - 2" C.
#8N	4#8 - 3/4" C.	250 MCM/N	4-250 MCM - 2-1/2" C.
#8G	3#8 & 1#10 GND - 3/4" C.	250 MCM/G	3-250 MCM & 1#2 GND - 2-1/2" C.
#8NG	4#8 & 1#10 GND - 3/4" C.	250 MCM/NG	4-250 MCM & 1#2 GND - 2-1/2" C.
#6	3#6 - 3/4" C.	300 MCM	3-300 MCM - 2" C.
#6N	4#6 - 3/4" C.	300 MCM/N	4-300 MCM - 2-1/2" C.
#6G	3#6 & 1#8 GND - 3/4" C.	300 MCM/G	3-300 MCM & 1#2 GND - 2-1/2" C.
#6NG	4#6 & 1#8 GND - 1" C.	300 MCM/NG	4-300 MCM & 1#2 GND - 3" C.
#4	3#4 - 1" C.	350 MCM	3-350 MCM - 2-1/2" C.
#4N	4#4 - 1" C.	350 MCM/N	4-350 MCM - 3" C.
#4G	3#4 & 1#8 GND - 1" C.	350 MCM/G	3-350 MCM & 1#2 GND - 3" C.
#4NG	4#4 & 1#8 GND - 1-1/4" C.	350 MCM/NG	4-350 MCM & 1#2 GND - 3" C.
#3	3#3 - 1" C.	400 MCM	3-400 MCM - 2-1/2" C.
#3N	4#3 - 1-1/4" C.	400 MCM/N	4-400 MCM - 3" C.
#3G	3#3 & 1#8 GND - 1-1/4" C.	400 MCM/G	3-400 MCM & 1#2 GND - 3" C.
#3NG	4#3 & 1#8 GND - 1-1/2" C.	400 MCM/NG	4-400 MCM & 1#2 GND - 3" C.
#2	3#2 - 1-1/4" C.	500 MCM	3-500 MCM - 3" C.
#2N	4#2 - 1-1/4" C.	500 MCM/N	4-500 MCM - 3" C.
#2G	3#2 & 1#6 GND - 1-1/4" C.	500 MCM/G	3-500 MCM & 1#2 GND - 3" C.
#2NG	4#2 & 1#6 GND - 1-1/2" C.	500 MCM/NG	4-500 MCM & 1#2 GND - 3" C.
#1	3#1 - 1-1/4" C.	600 MCM	3-600 MCM - 3" C.
#1N	4#1 - 1-1/2" C.	600 MCM/N	4-600 MCM - 3-1/2" C.
#1G	3#1 & 1#6 GND - 1-1/4" C.	600 MCM/G	3-600 MCM & 1#1/0 GND - 3" C.
#1NG	4#1 & 1#6 GND - 1-1/2" C.	600 MCM/NG	4-600 MCM & 1#1/0 GND - 3-1/2" C.
#1/0	3#1/0 - 1-1/4" C.	700 MCM	3-700 MCM - 3" C.
#1/0N	4#1/0 - 1-1/2" C.	700 MCM/N	4-700 MCM - 3-1/2" C.
#1/0G	3#1/0 & 1#6 GND - 1-1/2" C.	700 MCM/G	3-700 MCM & 1#1/0 GND - 3-1/2" C.
#1/0NG	4#1/0 & 1#6 GND - 2" C.	700 MCM/NG	4-700 MCM & 1#1/0 GND - 4" C.
#2/0	3#2/0 - 1-1/2" C.	750 MCM	3-750 MCM - 3-1/2" C.
#2/0N	4#2/0 - 2"C.	750 MCM/N	4-750 MCM - 4" C.
#2/0G	3#2/0 & 1#6 GND - 2" C.	750 MCM/G	3-750 MCM & 1#1/0 GND - 3-1/2" C.
#2/0NG	4#2/0 & 1#6 GND - 2" C.	750 MCM/NG	4-750 MCM & 1#1/0 GND - 4" C.



KEY NOTES: (#)

1. SEE PANEL SCHEDULE FOR SERVICE LOAD SUMMARY.
2. BOND GROUNDING ELECTRODE CONDUCTOR TO PANELBOARD NEUTRAL BUS. PROVIDE JUMPER FROM PANELBOARD NEUTRAL BUS TO GROUND BUS. SEE DETAIL FOR MORE INFORMATION.

SERVICE LOAD SUMMARY

	CONNECTED LOAD (KVA)	DEMAND FACTOR	DEMAND LOAD (KVA)
LIGHTING	23.8	1.25	29.7
RECEPTACLES	11.7	NEC	10.9
LARGEST MOTOR	13.2	1.25	16.5
REMAINING MOTORS	64.8	1.00	64.8
MISCELLANEOUS	32.5	1.00	32.5
SHOW WINDOWS	----	NEC	16.0
SUBTOTAL	146.0 KVA		170.4 KVA
10% SPARE			17.1 KVA
TOTAL			187.5 KVA
			521.1 A @ 208V - 3PH.

PANEL SCHEDULE

Panel ID: **PP-A** Status: **NEW** Power Source: **NORMAL** Voltage: **120/208V, 3PH**
Location: **N.W. WORK BAYS** Enclosure: **NEMA 1** Service: **3 PHASE, 4 WIRE**
Mounting: **SURFACE** Mains: **600A BREAKER**
Neutral: **SOLID** AIC: **65 KAIC**

Load Description	VA	Wire Size	Cond. Size	Brk	P	Ckt. No.	A	B	C	Ckt. No.	P	Brk	Cond. Size	Wire Size	VA	Load Description
Hoist	1250	10	3/4"	30A	-	1	2426	-	-	2	1	20A	3/4"	12	1176	Overhead Door
-	1250	10	3/4"	-	2	3	-	2426	-	4	1	20A	3/4"	12	1176	Overhead Door
Hoist	1250	10	3/4"	30A	-	5	-	-	2426	6	1	20A	3/4"	12	1176	Overhead Door
-	1250	10	3/4"	-	2	7	2426	-	-	8	1	20A	3/4"	12	1176	Overhead Door
4-Post Lift	1250	10	3/4"	30A	-	9	-	2426	-	10	1	20A	3/4"	12	1176	Overhead Door
-	1250	10	3/4"	-	2	11	-	-	2426	12	1	20A	3/4"	12	1176	Overhead Door
Hoist	1250	10	3/4"	30A	-	13	2426	-	-	14	1	20A	3/4"	12	1176	Overhead Door
-	1250	10	3/4"	-	2	15	-	2426	-	16	1	20A	3/4"	12	1176	Overhead Door
Hoist	1250	10	3/4"	30A	-	17	-	-	2426	18	1	20A	3/4"	12	1176	Overhead Door
-	1250	10	3/4"	-	2	19	2426	-	-	20	1	20A	3/4"	12	1176	Overhead Door
4-Post Lift	1250	10	3/4"	30A	-	21	-	2426	-	22	1	20A	3/4"	12	1176	Overhead Door
-	1250	10	3/4"	-	2	23	-	-	2426	24	1	20A	3/4"	12	1176	Overhead Door
Hoist	1250	10	3/4"	30A	-	25	2426	-	-	26	1	20A	3/4"	12	1176	Overhead Door
-	1250	10	3/4"	-	2	27	-	2426	-	28	1	20A	3/4"	10	1176	Overhead Door
Hoist	1250	10	3/4"	30A	-	29	-	-	2426	30	1	20A	3/4"	10	1176	Overhead Door
-	1250	10	3/4"	-	2	31	5628	-	-	32	-	50A	1"	6	4378	RTU-1
Front End Alignment Equip.	2500	8	3/4"	50A	-	33	-	6878	-	34	-	-	1"	6	4378	-
-	2500	8	3/4"	-	2	35	-	-	6878	36	3	-	1"	6	4378	-
SPARE	-	-	-	20A	1	37	0	-	-	38	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	39	-	0	-	40	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	41	-	-	0	42	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	43	0	-	-	44	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	45	-	0	-	46	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	47	-	-	0	48	1	20A	-	-		SPARE
Panel 'LP-B'	16630	1	1-1/2"	225A	-	49	33357	-	-	50	-	225A	2"	3/0	16727	Panel 'LP-A'
-	16630	1	1-1/2"	-	-	51	-	33357	-	52	-	-	2"	3/0	16727	-
-	16630	1	1-1/2"	-	3	53	-	-	33357	54	3	-	2"	3/0	16727	-

Notes:
1) PANELBOARD SHALL HAVE MAIN BREAKER AND BE SERVICE ENTRANCE RATED.
2) PANEL SHALL HAVE DISTRIBUTION PANEL TYPE CONSTRUCTION (EATON POW-R-LINE 3A OR EQUAL).
3) PANEL SHALL HAVE (54) CIRCUIT CAPACITY.

LOAD SUMMARY

	Connected VA	Demand Factor	Demand VA	
Lighting:	0	125%	0	
Receptacles (1st 10 KVA):	0	100%	0	
Receptacles (> 10 KVA):	0	50%	0	
Largest Motor Load:	13134	125%	16418	
Remaining Motor Load:	42640	100%	42640	
Miscellaneous:	0	100%	0	
Kitchen Equipment:	0	100%	0	
TOTAL CONNECTED VA =	55774		59058	= SUBTOTAL DEMAND VA
			50180	= PANEL 'LP-A'
			49890	= PANEL 'LP-B'
			16000	= SHOW WINDOW RECEPTACLES (NEC 220.14 (G))
			17513	= 10% SPARE CAPACITY
			192641	= TOTAL DEMAND VA
			535.11	= TOTAL DEMAND AMPS

PHASE SUMMARY		
Phase	VA	Ø Balance
A	51115	-0.53%
B	52364.667	0.27%
C	52364.667	0.27%

PANEL SCHEDULE

Panel ID: **LP-A** Status: **NEW** Power Source: **NORMAL** Voltage: **120/208V, 3PH**
Location: **N.W. WORK BAYS** Enclosure: **NEMA 1** Service: **3 PHASE, 4 WIRE**
Mounting: **SURFACE** Mains: **225A MLO**
Neutral: **SOLID** AIC: **50 KAIC**

Load Description	VA	Wire Size	Cond. Size	Brk	P	Ckt. No.	A	B	C	Ckt. No.	P	Brk	Cond. Size	Wire Size	VA	Load Description
Time Clock Control Pwr	100	12	3/4"	20A	1	1	1475	-	-	2	1	20A	3/4"	8	1375	Site Lighting
Night Lights	1296	12	3/4"	20A	1	3	-	2671	-	4	1	20A	3/4"	6	1375	Site Lighting
Night Lights	1068	10	3/4"	20A	1	5	-	-	1764	6	1	15A	3/4"	12	696	EF-1
Exterior Lights	520	10	3/4"	20A	1	7	1696	-	-	8	1	20A	3/4"	12	1176	EF-2
Exterior Lights	416	10	3/4"	20A	1	9	-	1112	-	10	1	20A	3/4"	12	696	EF-3
Work Bay Lights	1620	12	3/4"	20A	1	11	-	-	2796	12	1	20A	3/4"	12	1176	EF-4
Work Bay Lights	1620	12	3/4"	20A	1	13	2316	-	-	14	1	20A	3/4"	12	696	EF-5
Work Bay Strip Lights	1024	12	3/4"	20A	1	15	-	1024	-	16	1	20A				-
IAH-1	100	12	3/4"	20A	1	17	-	-	1600	18	-	20A	3/4"	12	1500	EUH-1
Part Service, Storage Lts.	648	12	3/4"	20A	1	19	2148	-	-	20	2	-	3/4"	12	1500	-
Customer Area Lights	1344	10	3/4"	20A	1	21	-	1344	-	22	1	20A				SPARE
Employee Area Lights	722	10	3/4"	20A	1	23	-	-	722	24	1	20A				SPARE
GFCI for RTU	180	12	3/4"	20A	1	25	1680	-	-	26	-	20A	3/4"	12	1500	EUH-1
Show Window Rcpt. (3)	540	10	3/4"	20A	1	27	-	2040	-	28	2	-	3/4"	12	1500	-
Show Window Rcpt. (3)	540	10	3/4"	20A	1	29	-	-	1740	30	1	20A	3/4"	12	1200	IRH-1 THRU IRH-6
Show Window Rcpt. (2)	360	10	3/4"	20A	1	31	631	-	-	32	-	15A	3/4"	12	271	ACCU-1
Lobby Receptacles (5)	900	10	3/4"	20A	1	33	-	1171	-	34	2	-	3/4"	12	271	-
Lobby Receptacles (4)	720	10	3/4"	20A	1	35	-	-	1060	36	1	20A	3/4"	10	360	Lobby Floor Boxes (2)
Work Bay Lights	972	12	3/4"	20A	1	37	2268	-	-	38	1	20A	3/4"	12	1296	Work Bay Lights
Work Bay Lights	1296	12	3/4"	20A	1	39	-	2592	-	40	1	20A	3/4"	12	1296	Work Bay Lights
Work Bay Strip Lights	832	12	3/4"	20A	1	41	-	-	2128	42	1	20A	3/4"	10	1296	Work Bay Lights
SF-1	696	12	3/4"	15A	1	43	1992	-	-	44	1	20A	3/4"	10	1296	Work Bay Lights
SF-2	1176	12	3/4"	20A	1	45	-	2392	-	46	1	20A	3/4"	12	1216	Work Bay Strip Lights
SF-3	1176	12	3/4"	20A	1	47	-	-	2392	48	1	20A	3/4"	12	1216	Work Bay Strip Lights
SF-4	1176	12	3/4"	20A	1	49	1176	-	-	50	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	51	-	0	-	52	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	53	-	-	0	54	1	20A	-	-		SPARE

Notes: 1) PANEL SHALL HAVE (54) CIRCUIT CAPACITY.

LOAD SUMMARY

	Connected VA	Demand Factor	Demand VA	
Lighting:	23744	125%	29680	
Receptacles (1st 10 KVA):	3600	100%	3600	
Receptacles (> 10 KVA):	0	50%	0	
Largest Motor Load:	1176	125%	1470	
Remaining Motor Load:	8030	100%	8030	
Miscellaneous:	7300	100%	7300	
Kitchen Equipment:	0	100%	0	
TOTAL CONNECTED VA =	43850		50080	= SUBTOTAL DEMAND VA
			16000	= SHOW WINDOW RECEPTACLES (NEC 220.14 (G))
			6608	= 10% SPARE CAPACITY
			72688	= TOTAL DEMAND VA
			201.91	= TOTAL DEMAND AMPS

PHASE SUMMARY		
Phase	VA	Ø Balance
A	15383	1.67%
B	14346	-0.69%
C	14222	-0.97%

PANEL SCHEDULE

Panel ID: **LP-B** Status: **NEW** Power Source: **NORMAL** Voltage: **120/208V, 3PH**
Location: **N.W. WORK BAYS** Enclosure: **NEMA 1** Service: **3 PHASE, 4 WIRE**
Mounting: **SURFACE** Mains: **225A MLO**
Neutral: **SOLID** AIC: **42 KAIC**

Load Description	VA	Wire Size	Cond. Size	Brk	P	Ckt. No.	A	B	C	Ckt. No.	P	Brk	Cond. Size	Wire Size	VA	Load Description
Electric Water Cooler	600	10	3/4"	20A	1	1	2400	-	-	2	1	20A	3/4"	10	1800	Alignment Console
Vending Machine	1000	10	3/4"	20A	1	3	-	2040	-	4	-	20A	3/4"	12	1040	Tire Changer
Refrigerator	1200	10	3/4"	20A	1	5	-	-	2240	6	2	-	3/4"	12	1040	-
Microwave	1000	10	3/4"	20A	1	7	2040	-	-	8	-	20A	3/4"	12	1040	Wheel Balancer
Break Rm Rcpt. (4)	720	10	3/4"	20A	1	9	-	1760	-	10	2	-	3/4"	12	1040	-
Customer Rest Rm Rcpt.	360	10	3/4"	20A	1	11	-	-	1400	12	-	20A	3/4"	12	1040	???
Employee Rest Rm Rcpt.	180	10	3/4"	20A	1	13	1220	-	-	14	2	-	3/4"	12	1040	-
CO2 Control Panel	400	10	3/4"	20A	1	15	-	1120	-	16	1	20A	3/4"	10	720	Bay Receptacles (4)
Receptacles (3)	540	12	3/4"	20A	1	17	-	-	1260	18	1	20A	3/4"	12	720	Bay Receptacles (4)
Receptacles (6)	1260	12	3/4"	20A	1	19	2340	-	-	20	1	20A	3/4"	10	1080	Bay Receptacles (6)
Bay Receptacles (6)	1260	12	3/4"	20A	1	21	-	4160	-	22	-	60A	1"	6	2900	HM10 Air Compressor
Bay Receptacles (6)	1260	12	3/4"	20A	1	23	-	-	4160	24	-	-	1"	6	2900	-
Telecom Backboard	1500	12	3/4"	20A	1	25	4400	-	-	26	3	-	1"	6	2900	-
Entrance Sign	1500	10	3/4"	20A	1	27	-	4400	-	28	-	60A	1"	6	2900	HM10 Air Compressor
Electric Water Heater	1500	12	3/4"	20A	-	29	-	-	4400	30	-	-	1"	6	2900	-
-	1500	12	3/4"	-	2	31	4400	-	-	32	3	-	1"	6	2900	-
SPARE	-	-	-	20A	1	33	-	1800	-	34	1	20A	3/4"	12	1800	Air Dryer
SPARE	-	-	-	20A	1	35	-	-	0	36	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	37	0	-	-	38	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	39	-	0	-	40	1	20A	-	-		SPARE
SPARE	-	-	-	20A	1	41	-	-	0	42	1	20A	-	-		SPARE

Notes:

LOAD SUMMARY

	Connected VA	Demand Factor	Demand VA	
Lighting:	0	125%	0	
Receptacles (1st 10 KVA):	8100	100%	8100	
Receptacles (> 10 KVA):	0	50%	0	
Largest Motor Load:	17400	125%	21750	
Remaining Motor Load:	0	100%	0	
Miscellaneous:	20040	100%	20040	
Kitchen Equipment:	0	100%	0	
TOTAL CONNECTED VA =	45540		49890	= SUBTOTAL DEMAND VA
			4989	= 10% SPARE CAPACITY
			54879	= TOTAL DEMAND VA
			152.44	= TOTAL DEMAND AMPS

PHASE SUMMARY		
Phase	VA	Ø Balance
A	16800	3.56%
B	15280	0.22%
C	13460	-3.78%

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notice

project title

DEMMER QUICKLANE

37410
MICHIGAN AVE.
WAYNE, MI

sheet title

ELECTRICAL ONE-LINE AND PANEL SCHEDULES

DO NOT SCALE DRAWINGS
USE FIGURED DIMENSIONS ONLY

seal & signature

STATE OF MICHIGAN
JAMES F. BUSHA
ENGINEER
No. 44384
LICENSED PROFESSIONAL ENGINEER

project number

13004

drawn MAB
approved JFB

issued date

Bids & Permits 2/07/14

SHEET
E-300

USA MASTER - BACKDRAWS 8X10

ELECTRICAL SPECIFICATIONS

1. GENERAL CONDITIONS:

   A. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS, APPLY TO WORK OF THIS SECTION. THE ELECTRICAL CONTRACTOR SHALL ASSUME ALL OBLIGATIONS CONTAINED THEREIN THAT AFFECT HIS WORK. THE ELECTRICAL ENGINEER SHALL BE CONSULTED IN CASE OF ANY DISPUTES AND HIS DECISION SHALL BE FINAL.

   B. THE ELECTRICAL CONTRACTOR SHALL EXAMINE THE ARCHITECTURAL, PLUMBING AND MECHANICAL DRAWINGS AND SPECIFICATIONS AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS OF WORK AFFECTING THE CONTRACT. SIZE AND CAPACITY OF ALL EQUIPMENT SHALL BE AS ON PLANS OR AS INDICATED HEREIN.

   C. FURNISH LABOR AND MATERIALS TO PROVIDE A COMPLETE ELECTRICAL SYSTEM AS REQUIRED BY THE PLANS AND SPECIFICATIONS.

   D. ANY ITEM APPEARING ON THE DRAWINGS AND NOT IN THE SPECIFICATION OR VICE VERSA, AND ANY ITEMS APPEARING IN NEITHER BUT NECESSARY TO ACCOMPLISH THE INTENT OF THESE SPECIFICATIONS, SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR.

   E. WHERE EQUIPMENT SPECIFICATIONS OR DESCRIPTIONS INCLUDE A SPECIFIC MANUFACTURER AND CATALOG NUMBER, ANY SUBSTITUTED EQUIPMENT OR EQUIPMENT PROPOSED TO BE PROVIDED BY AN ALTERNATIVE MANUFACTURER SHALL FUNCTIONALLY MEET, OR EXCEED, THE REQUIREMENTS OF THE SPECIFIED EQUIPMENT IN ALL RESPECTS. ALTERNATE MANUFACTURERS SHALL REFER TO PRODUCT LITERATURE PUBLISHED BY THE MANUFACTURER OF THE EQUIPMENT SPECIFIED TO DETERMINE EQUIVALENCY OF THEIR PROPOSED ALTERNATE PRODUCT.

2. SCOPE OF WORK:

   THIS SPECIFICATION CONTEMPLATES THE PROVISION BY THE ELECTRICAL CONTRACTOR OF ALL LABOR AND MATERIALS REQUIRED TO INSTALL A COMPLETE SYSTEM OF ELECTRICAL WORK AS HEREIN SPECIFIED AND AS SHOWN OF THE DRAWINGS. WITHOUT RESTRICTING THE GENERALITY OF THE FOREGOING, THE FOLLOWING SHALL BE INCLUDED:

   A. INSTALLATION OF NEW SECONDARY SERVICE, FEEDERS, AND PANELBOARDS, COMPLETE WITH ALL REQUIRED GROUNDING PER THE REQUIREMENTS OF LOCAL ELECTRICAL CO. AND NATIONAL ELECTRICAL CODE.

   B. POWER AND LIGHTING PANELBOARDS AND FEEDERS, SAFETY SWITCHES, BRANCH CIRCUIT WIRING, OUTLETS AND CONNECTIONS COMPLETE.

   C. TELEPHONE CONDUITS, ALL GROUNDING, AND ALL TELEPHONE/DATA OUTLETS AND CONDUIT SYSTEMS AS REQUIRED.

   D. GROUNDING OF COMPLETE ELECTRICAL SYSTEM PER ARTICLE 250 OF N.E.C. AND SPECIFICATIONS.

   E. EMERGENCY EGRESS AND EXIT LIGHTING SYSTEMS COMPLETE.

   F. SERVICES AND FINAL CONNECTIONS TO ALL ITEMS OF MECHANICAL EQUIPMENT AS REQUIRED.

   G. DISCONNECT SWITCHES WHICH ARE NOT AN INTEGRAL PART OF EQUIPMENT.

   H. INSTALLATION OF LIGHTING FIXTURES BY COMPLETE WITH LAMPS, HANGERS, SUPPORTS, AUXILIARIES AND FOUNDATIONS.

3. CHARACTER OF EQUIPMENT: ALL EQUIPMENT SHALL BE NEW AND SHALL CONFORM IN ALL RESPECTS TO THE LATEST APPROVED STANDARDS OF THE IEEE, ANSI AND THE "UL" LABEL OR LISTING.

4. CODES AND ORDINANCES: ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2011 EDITION OF THE NATIONAL ELECTRICAL CODE, LOCAL CODES AND THE LATEST EDITION OF THE MICHIGAN BUILDING CODE, ALL ORDINANCES AND REGULATIONS, AND THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA).

5. PERMITS AND FEES: THE ELECTRICAL CONTRACTOR SHALL OBTAIN ALL PERMITS, PAY ALL FEES, INCLUDING ALL COSTS ACCESSED BY THE UTILITY COMPANY, AND ARRANGE FOR ALL INSPECTIONS FOR HIS WORK. BEFORE SUBMITTING HIS BID, THE ELECTRICAL CONTRACTOR SHALL CHECK WITH EACH UTILITY COMPANY SUPPLYING SERVICE TO THE PROJECT AND DETERMINE FROM THEM ALL OF THEIR REQUIREMENTS AND CHARGES. ALL SUCH REQUIREMENTS AND CHARGES SHALL BE INCLUDED IN THE BASE BID PROPOSAL. AT THE COMPLETION OF ELECTRICAL WORK, THE ELECTRICAL CONTRACTOR SHALL FURNISH THE OWNER WITH ALL CERTIFICATES OF FINAL INSPECTION AND APPROVALS.

6. UTILITIES POINTS OF SERVICE: ELECTRICAL CONTRACTOR SHALL VERIFY THE EXISTING ELECTRICAL SERVICE AND ELECTRIC SERVICE POINT, AND COORDINATE ANY NEW REQUIREMENTS WITH THE UTILITY COMPANY SERVICE PLANNER. ELECTRICAL CONTRACTOR SHALL INSTALL COMMUNICATIONS CONDUITS FROM SERVICE CONNECTION POINT AS INDICATED ON THE DRAWINGS.

7. SITE VISIT BY CONTRACTOR: THE CONTRACTOR SHALL VISIT THE SITE AND VERIFY THE CONDITIONS UNDER WHICH HIS WORK MUST BE CONDUCTED BEFORE SUBMITTING HIS PROPOSAL. THE SUBMITTING OF A PROPOSAL IMPLIES THAT THE CONTRACTOR HAS VISITED THE SITE, IS CONVERSANT WITH ALL SITE CONDITIONS, INCLUDING EXISTING SERVICES AND EQUIPMENT, OBSTRUCTIONS AND ALL CONDITIONS, WHICH WILL BE ENCOUNTERED IN THE REMOVAL AND/OR RELOCATION OF PRESENT MATERIALS AND EQUIPMENT, INSTALLATION OF NEW MATERIALS AND CUTTING AND PATCHING, ETC., FOR A COMPLETE ELECTRICAL INSTALLATION. IF ANY INTERFERENCES OR VIOLATIONS APPEAR AND DEPARTURE FROM THE DESIGN INTENT OF THE BID DOCUMENTS IS REQUIRED, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT PRIOR TO ENTERING INTO CONTRACT WITH THE OWNER. FAILURE TO PROVIDE THE ARCHITECT WITH THE AFOREMENTIONED NOTIFICATION WILL RESULT IN THE CONTRACTOR BEING HELD RESPONSIBLE TO COMPLETE ALL WORK TO MEET THE DESIGN INTENT OF THE BID DOCUMENTS WITH NO ADDITIONAL EXPENSES ('EXTRAS') BEING INCURRED BY THE OWNER, ARCHITECT, OR ENGINEER.

8. SUBSTITUTIONS:

   A. ANY EQUIPMENT PROPOSED AS EQUAL TO THAT SPECIFIED SHALL BE SO PROVEN BY THE CONTRACTOR WHO SHALL, PRIOR TO BIDDING, SUBMIT THE MANUFACTURER'S NAME, MODEL NUMBERS, VERIFICATION DATA SHEETS AND APPLICABLE WORKING DRAWINGS. THE ENGINEER SHALL REVIEW AND APPROVE OR DISAPPROVE SUCH PROPOSED SUBSTITUTIONS PRIOR TO BIDDING TIME. IF THIS PROCEDURE IS NOT FOLLOWED BY THE CONTRACTOR PRIOR TO BIDDING, IT IS UNDERSTOOD THAT THE CONTRACTOR IS BIDDING EQUIPMENT AND MAKE AS SPECIFIED.

   B. IN THE EVENT SUBSTITUTIONS ARE PROPOSED TO THE ENGINEER AFTER THE CONTRACT HAS BEEN AWARDED, THE CONTRACTOR SHALL ISSUE A PURCHASE ORDER NUMBER TO THE ENGINEER ALONG WITH THE SHOP DRAWING SUBMITTAL FOR USE BY THE ENGINEER IN OBTAINING PAYMENT FROM THE CONTRACTOR FOR THE ENGINEERS TIME IN EVALUATING THE PROPOSED SUBSTITUTION.

   C. WHETHER OR NOT THE ENGINEER APPROVED THE PROPOSED SUBSTITUTION, THE CONTRACTOR SHALL PROMPTLY UPON RECEIPT OF THE ENGINEER'S BILLING, REIMBURSE THE ENGINEER AT THE RATE OF TWO AND THREE-QUARTER TIMES THE DIRECT COST TO THE ENGINEER FOR ALL TIME SPENT BY HIM IN EVALUATION OF THE PROPOSED SUBSTITUTION.

9. COOPERATION WITH OTHER CONTRACTORS:

   A. ELECTRICAL CONTRACTOR SHALL ARRANGE ALL PARTS OF HIS WORK IN PROPER RELATION TO THE WORK OF OTHERS AND TO THE ARCHITECTURAL FINISH. WHERE INTERFERENCES OCCUR, THE ELECTRICAL CONTRACTOR SHALL, BEFORE INSTALLING THE WORK INVOLVED, CONSULT WITH THE ARCHITECT AS TO THE EXACT LOCATION AND LEVEL OF HIS WORK. THE ARCHITECT'S DECISION SHALL BE FINAL.

   B. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE ARRANGEMENT OF HIS WORK AND EQUIPMENT, AND SHALL MAINTAIN PROPER HEADROOM UNDER HIS WORK. SHOULD WORK INSTALLED BY HIM REQUIRE MODIFICATION TO AVOID INTERFERENCE WITH OTHER WORK, AS DETERMINED BY THE ARCHITECT, SUCH CHANGES SHALL BE MADE WITHOUT ADDITIONAL COST.

10. STANDARDS OF MATERIAL AND WORKMANSHIP:

    A. ALL WORK SHALL BE DONE AT SUCH TIMES AND IN SUCH A MANNER AS WILL LEAST INTERFERE WITH THE MAINTENANCE AND OPERATION OF ALL RELATED OR AFFECTED SYSTEMS.

    B. ALL MATERIALS AND EQUIPMENT SHALL BEAR THE LABEL OF APPROVAL OF THE NATIONAL BOARD OF FIRE UNDERWRITER'S LABORATORIES.

    C. THE ELECTRICAL CONTRACTOR SHALL EFFECTIVELY PROTECT, AT HIS OWN EXPENSE, SUCH OF HIS WORK, MATERIALS OR EQUIPMENT AS IS LIABLE TO INJURY DURING THE CONSTRUCTION PERIOD.

    D. ALL OPENINGS INTO ANY PART OF THE CONDUIT SYSTEM AS WELL AS ASSOCIATED FIXTURES, EQUIPMENT, ETC., BOTH BEFORE AND AFTER BEING SET IN PLACE, MUST BE SECURELY COVERED OR OTHERWISE PROTECTED TO PREVENT OBSTRUCTION OF THE CONDUIT, OR INJURY DUE TO CARELESSNESS OR MALICIOUSLY DROPPED TOOLS OR MATERIALS, GRIT, DIRT OR ANY FOREIGN MATTER. THE ELECTRICAL CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ALL DAMAGE SO DONE UNTIL HIS WORK IS FULLY AND FINALLY ACCEPTED. CONDUIT ENDS SHALL BE COVERED WITH CAPPED BUSHINGS. ALL ELECTRICAL EQUIPMENT SHALL BE GROUNDED.

    E. IT IS NOT INTENDED THAT THE DRAWINGS OR THIS SPECIFICATION INDICATE OR SPECIFY EACH PIECE OF CONDUIT, FITTINGS, ETC., REQUIRED FOR THE INSTALLATION. WHERE ITEMS ARE REQUIRED FOR THE SATISFACTORY OPERATION OF THE INSTALLATION AND ARE NOT INDICATED ON THE DRAWINGS, THEY SHALL BE CONSIDERED TO BE BOTH SPECIFIED AND INDICATED.

    F. GENERAL REQUIREMENTS AND DETAILS OF EQUIPMENT ARE SHOWN. DIMENSIONS OR SCALES SHOWN ARE APPROXIMATE AND MUST BE CHECKED AT JOB PRIOR TO INSTALLATION OF EQUIPMENT OR ANY ORDER GIVEN FOR FABRICATION.

    G. ELECTRICAL CONTRACTORS SHALL HAVE COMPETENT FOREMAN ON THE PREMISES AT ALL TIMES TO SUPERINTEND AND CHECK AND LAY OUT ALL WORK, GIVE INFORMATION TO GENERAL CONTRACTOR REGARDING CHASES AND OPENINGS, AND BE RESPONSIBLE FOR SUCH LOCATIONS. THIS CONTRACTOR SHALL COOPERATE WITH OTHER CONTRACTORS WHERE CHASES, OPENINGS, PIPES, FOUNDATIONS, ETC., ARE IN PROXIMITY TO THE WORK OF OTHER TRADES AND ARRANGE THE WORK TO FIT. THIS CONTRACTOR SHALL STUDY WHERE OTHER TRADES LEAVE CONNECTIONS AND OUTLETS TO BE CONNECTED, SO THAT ALL WORK AND APPLIANCES SHALL BE PROPERLY ARRANGED FOR AND CONNECTED READY FOR USE.

11. CUTTING AND PATCHING:

    CUTTING AND PATCHING OF WALLS, FLOORS, CEILINGS, ROOFS, ETC., SHALL BE DONE BY ARCHITECTURAL TRADES CONTRACTOR BUT PAID FOR BY THE ELECTRICAL CONTRACTOR. STRUCTURAL MEMBERS SHALL NOT BE CUT WITHOUT OBTAINING WRITTEN PERMISSION FROM THE ARCHITECT. CONDUITS PASSING THROUGH ROOFS OR OUTSIDE WALLS EXPOSED TO WEATHER SHALL BE CAREFULLY FLASHED. FIRE PROOFING OF HOLES SHALL BE PROVIDED AND SHALL BE OF A UL LISTED MATERIAL, AND APPROVED BY AUTHORITY HAVING JURISDICTION.

12. OBSTRUCTIONS:

    SHOULD ANY STRUCTURAL DIFFICULTIES PREVENT SETTING OF CABINETS, RUNNING CONDUCTORS, ETC., AT POINTS SHOWN ON PLANS, THE NECESSARY MINOR DEVIATIONS THEREFROM, AS DETERMINED BY THE ARCHITECT, MAY BE PERMITTED AND MUST BE MADE WITHOUT ADDITIONAL COST.

13. DRAWINGS AND SPECIFICATIONS:

    ANY ITEM APPEARING ON THE DRAWINGS AND NOT IN THE SPECIFICATION OR VICE VERSA, AND ANY ITEMS APPEARING IN NEITHER BUT NECESSARY TO ACCOMPLISH THE INTENT OF THESE SPECIFICATIONS, SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR.

14. COORDINATION WITH LOCAL UTILITY COMPANIES:

    A. THE ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT ELECTRIC AND TELEPHONE UTILITY COMPANY SERVICE POINTS AND COORDINATE THE ELECTRIC UTILITIES PRIMARY AND SECONDARY CONDUIT ROUTINGS AND LENGTH OF RUN WITH THE UTILITY COMPANIES SERVICE PLANNERS PRIOR TO SUBMITTING HIS BID FOR THE ELECTRICAL WORK FOR THIS PROJECT.

    B. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE LOCAL UTILITY COMPANIES PROVIDING SERVICES TO THE PROJECT.

    C. BEFORE SUBMITTING HIS BID, THE ELECTRICAL CONTRACTOR SHALL CHECK WITH THE UTILITY COMPANIES AND DETERMINE FROM THEM ALL OF THEIR REQUIREMENTS AND CHARGES. ALL SUCH REQUIREMENTS AND CHARGES SHALL BE INCLUDED IN THE BASE BID PROPOSAL.

    D. THE AREA OF POWER COMPANY RESPONSIBILITIES AS INDICATED IN THESE SPECIFICATIONS AND DRAWINGS IS PRESENTED AS UNDERSTOOD BY THE ENGINEER. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE TO VERIFY THESE REQUIREMENTS WITH THE UTILITY COMPANIES PROVIDING SERVICE TO THE PROJECT AND TO INCLUDE IN HIS BID PRICE THE COST OF ANY UTILITY COMPANY'S REQUIREMENTS NOT SHOWN ON THE DRAWINGS OR INCLUDED IN THE SPECIFICATIONS. UNDER NO CIRCUMSTANCES WILL ADDITIONAL CHARGES TO THE OWNER BE ALLOWED DUE TO THE CONTRACTOR'S FAILURE TO PROPERLY COORDINATE THIS PROJECT WITH THE COMPANIES PROVIDING SERVICES TO THIS PROJECT.

    E. WITHIN 15 DAYS FOLLOWING AWARD OF CONTRACT TO THE ELECTRICAL CONTRACTOR, THE CONTRACTOR SHALL ARRANGE AN ON SITE MEETING WITH THE UTILITY COMPANY REPRESENTATIVES TO DISCUSS THE PROJECT IN DETAIL, AND OBTAIN THEIR SPECIFIC REQUIREMENTS RELATIVE TO NEW SERVICES. A MEETING REPORT OUTLINING THE ITEMS DISCUSSED, AND THE RESULTS OF THE MEETING SHALL BE SUBMITTED TO THE ENGINEER WITHIN 15 DAYS FOLLOWING THE MEETING.

15. TEMPORARY SERVICE:

    A. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL TEMPORARY CONSTRUCTION LIGHTING AND POWER IN ACCORDANCE WITH THE PROGRESS SCHEDULE OF THE GENERAL CONTRACTOR.

16. PENETRATIONS AND FIRE PROOFING:

    A. ALL PENETRATIONS OF RATED FIRE AND SMOKE WALLS SHALL BE BY CONDUIT.

    B. ALL PENETRATIONS OF FLOORS SHALL BE BY CONDUIT OR METAL SLEEVES.

    C. ALL PENETRATION SLEEVES INCLUDING OPEN ENDED CONDUITS NOT TERMINATED IN JUNCTION BOXES SHALL BE FILLED WITH FIRE SAFING MATERIAL AS MANUFACTURED BY U. S. GYPSUM CO., OR ARCHITECT APPROVED EQUAL FOR 2" IN LENGTH FROM CONDUIT END.

    D. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR COMPLETE FIRE STOPPING REQUIREMENTS AND LOCATIONS OF FIRE RATED WALLS, FLOORS AND PARTITIONS.

17. GROUNDING:

    A. FURNISH AND INSTALL A COMPLETE GROUNDING SYSTEM IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND LOCAL CODES AND ORDINANCES.

    B. ALL BRANCH CIRCUIT CONDUCTORS SHALL INCLUDE A SEPARATE COPPER, INSULATED (GREEN), EQUIPMENT GROUNDING CONDUCTOR SIZED PER ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.

    C. GROUNDING PATH FROM CIRCUITS, EQUIPMENT, AND CONDUCTOR ENCLOSURES SHALL BE PERMANENT AND CONTINUOUS, AND SHALL HAVE A RESISTANCE TO GROUND OF LESS THAN 5 OHMS.

    D. ALL CABINETS, MOTOR FRAMES, MOTOR STARTERS, CONTACTORS, CONDUIT SYSTEMS, PANELBOARDS, TRANSFORMERS, ETC., SHALL BE THOROUGHLY GROUNDED IN ACCORDANCE WITH THE NEC.

18. CONDUCTORS:

    A. ALL CONDUCTORS SHALL BE COPPER AND SHALL BE INSTALLED IN CONDUIT. EXCEPTION: MC CABLE SHALL BE ALLOWED IN CONCEALED SPACES WHERE PERMISSIBLE BY CODE.

    B. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE MINIMUM SIZE #12 AWG, TYPE "THHN" INSULATED. ALL FEEDERS AND SECONDARY SERVICE CONDUCTORS SHALL BE COPPER, WITH 600 VOLT INSULATION. FEEDER INSULATION SHALL BE TYPE "THHN" OR "XHHW".

    C. NO WIRING SMALLER THAN NO. 12 AWG SHALL BE USED UNLESS OTHERWISE NOTED, AND ALL WIRE NO. 10 AWG AND LARGER SHALL BE STRANDED, UNLESS OTHERWISE SPECIFIED.

    D. HOME RUNS TO PANELBOARDS 75 FEET IN LENGTH OR OVER SHALL BE NOT LESS THAN NO. 10 AWG, OR LARGER AS NECESSARY TO MAINTAIN A MAXIMUM VOLTAGE DROP OF 3 PERCENT, WHETHER OR NOT SHOWN ON THE DRAWINGS.

    E. CONDUCTORS SHALL BE COLOR CODED PER THE NATIONAL ELECTRICAL CODE.

19. CONDUITS:

    A. ALL CONDUITS SHALL BE RUN CONCEALED IN FINISHED AREAS UNLESS OTHERWISE NOTED. EXPOSING OF ANY CONDUIT IN UN-FINISHED AREAS SHALL BE ONLY DONE WITH THE WRITTEN APPROVAL OF THE ARCHITECT.

    B. CONDUIT INSTALLED IN CONCEALED AREAS NOT SUBJECT TO DAMAGE MAY BE ELECTRIC METALLIC TUBING "EMT". CONDUIT INSTALLED EXPOSED AND SUBJECT TO DAMAGE SHALL BE RIGID GALVANIZED STEEL CONDUIT.

    C. ALL CONDUIT SHALL BE 1/2" MINIMUM SIZE UNLESS OTHERWISE NOTED.

    D. ALL CONDUITS INSTALLED AT EXTERIOR LOCATIONS BELOW GRADE SHALL BE SCHEDULE 40 PVC. CONDUITS INSTALLED IN THE CONCRETE SLAB SHALL BE RIGID GALVANIZED STEEL CONDUIT.

    E. A GROUND WIRE SIZED PER ARTICLE 250 OF THE N.E.C. SHALL BE INCLUDED WITH ALL CIRCUIT CONDUCTORS.

20. CURRENT TRANSFORMER ENCLOSURE: (OUTDOOR):

    A. ENCLOSURE SHALL BE WEATHERPROOF CONSTRUCTION NEMA 3R.

    B. EACH CURRENT TRANSFORMER ENCLOSURE SHALL BE RATED AT 1000 AMP, 120/208 VOLTS, 3-PHASE, 4-WIRE.

    C. ENCLOSURE SHALL BE MIN. 14 GA. GALVANIZED SHEET STEEL. COORDINATE ENCLOSURE REQUIREMENTS AND DIMENSIONS WITH UTILITY CO.

    D. ENCLOSURE SHALL HAVE A LIFT OFF HINGED DOOR WITH STAINLESS STEEL HINGES AND HANDLE WITH PROVISIONS FOR LOCKING AND UTILITY SEAL.

    E. DIMENSION OF ENCLOSURE SHALL BE AS REQUIRED BY THE LOCAL UTILITY CO.

    F. THE ENCLOSURE SHALL BE LISTED UNDER CURRENT TRANSFORMER ENCLOSURES PER U.L. 414., AND SHALL MEET ALL LOCAL UTILITY CO. SPECIFICATIONS.

21. FUSES:

    A. ALL FUSES SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. ALL FUSES SHALL BE OF THE SAME MANUFACTURER.

    B. MAIN FEEDER AND BRANCH CIRCUITS:

       CIRCUITS 601 TO 6000 AMPERES SHALL BE PROTECTED BY U.L. CLASS "L" CURRENT LIMITING FUSES. FUSES SHALL BE TIME DELAY TYPE AND BE LISTED BY THE UNDERWRITERS' LABORATORIES, INC. WITH AN INTERRUPTING RATING OF 200,000 AMPERES RMS SYMMETRICAL.

       a. ACCEPTABLE PRODUCTS:

          1) BUSSMANN TYPE "KRP-C"

          2) LITTLEFUSE TYPE "KLP-C".

          3) RELIANCE TYPE "LCL".

       CIRCUITS 1 TO 600 AMPERES SHALL BE PROTECTED BY U.L. CLASS "RK-1" CURRENT LIMITING FUSES. FUSES SHALL BE DUAL ELEMENT, TIME-DELAY TYPE AND BE LISTED BY THE UNDERWRITERS' LABORATORIES WITH AN INTERRUPTING RATING OF 200,000 AMPERES RMS SYMMETRICAL.

       a. ACCEPTABLE PRODUCTS:

          1) BUSSMANN TYPE "LPN-RK" (250 VOLTS) OR "LPS-RK" (600 VOLTS).

          2) LITTLEFUSE TYPE "LLNRK" (250 VOLTS) OR "LLSRK" (600 VOLTS).

          3) RELIANCE TYPE "LENRK" (250 VOLTS) OR "LESRK" (600 VOLTS).

    C. MOTOR CIRCUITS:

       ALL INDIVIDUAL MOTOR CIRCUITS RATED 460 VOLTS OR LESS SHALL BE PROTECTED BY U.L. CLASS "RK-1" CURRENT LIMITING, DUAL ELEMENT, TIME-DELAY TYPE FUSES. THE FUSES FOR 1.15 SERVICE FACTOR MOTORS SHALL BE INSTALLED IN RATINGS APPROXIMATELY 125% OF MOTOR FULL LOAD CURRENT. UNDER SUCH CONDITIONS AS HIGH AMBIENT TEMPERATURES OR WHERE A MOTOR CANNOT BE BROUGHT TO SPEED QUICKLY, FUSES 150% OR 200% OF THE MOTOR FULL LOAD CURRENT SHALL BE USED. LARGER HORSEPOWER MOTORS SHALL BE PROTECTED BY U.L. CLASS "L" ON THE PLANS OR RECOMMENDED BY THE EQUIPMENT MANUFACTURER.

       a. ACCEPTABLE PRODUCTS:

          1) SEE ABOVE.

    D. A FUSE IDENTIFICATION LABEL SHALL BE PLACED INSIDE EACH SWITCH DOOR. THE LABEL SHALL INDICATE FUSE TYPE, AMPERE RATING AND INTERRUPTING RATING. A WARNING LABEL SHALL BE PLACED ON THE OUTSIDE AND INSIDE OF EACH SWITCH DOOR WARNING THAT THE INSTALLATION OF ANOTHER SIZE OR TYPE FUSE MAY CAUSE A HAZARDOUS CONDITION. THE LABEL REQUIREMENTS ARE IN ADDITION TO THE OTHER LABELING REQUIREMENTS IN THE SPECIFICATIONS.

    E. SPARE: UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE THE OWNER WITH SPARE SETS OF FUSES EQUAL TO 10% (MINIMUM OF THREE) OF EACH TYPE AND RATING OF INSTALLED FUSES. CONTRACTOR SHALL PROVIDE SPARE FUSE CABINET(S) LOCATED CONVENIENT TO THE MAIN SERVICE EQUIPMENT.

22. DISTRIBUTION AND POWER PANELBOARDS:

    A. PANELBOARDS SHALL BE DEAD FRONT AND SHALL COMPLY WITH NEMA PD-1; VOLTAGE AND BUS RATING AS INDICATED ON DRAWINGS; SHALL HAVE COPPER BUSSING; FULL HEIGHT PHASE BUSSING WITHOUT SIZE REDUCTION; GROUND BAR, NEUTRAL BUS AND LOAD SIDE CONNECTORS OF BRANCH CIRCUIT PROTECTIVE DEVICES SHALL BE EQUIPPED WITH SOLDERLESS CONNECTORS.

    B. MAIN DISTRIBUTION PANEL SHALL BE SERVICE ENTRANCE RATED.

    C. FUTURE SPACES SHALL BE EQUIPPED WITH BUS CONNECTION STRAPS FOR MAXIMUM DEVICE RATING WHICH CAN BE INSTALLED.

    D. INTERRUPTING RATING:

       PANELBOARDS SHALL HAVE FULLY RATED INTERRUPTING RATINGS, UNLESS INDICATED OTHERWISE. PANELBOARDS SHALL BE LABELED WITH THE UL SHORT-CIRCUIT RATING. WHEN SERIES RATINGS ARE APPLIED WITH INTEGRAL OR REMOTE UPSTREAM DEVICES, A LABEL OR MANUAL SHALL BE PROVIDED. IT SHALL STATE THE CONDITION OF THE UL SERIES RATINGS INCLUDING: SIZE AND TYPE OF UPSTREAM DEVICE, BRANCH DEVICE THAT CAN BE USED, AND UL SERIES SHORT-CIRCUIT RATING.

    E. CIRCUIT BREAKER TYPE PANELBOARDS:

       DISTRIBUTION AND POWER PANELBOARDS WITH BOLT-ON DEVICES CONTAINED THEREIN SHALL HAVE FULLY RATED INTERRUPTING RATINGS AS INDICATED ON THE DRAWINGS. PANELBOARDS SHALL BE CUTLER-HAMMER POW-R LINE C, PRL-3 OR PRL-4. PANELBOARDS SHALL HAVE CIRCUIT BREAKERS AS INDICATED BELOW.

       a. CIRCUIT BREAKERS 400 AMPERE FRAME AND BELOW SHALL BE CUTLER-HAMMER SERIES C, WITH THERMAL-MAGNETIC TRIP UNITS, AND INVERSE TIME-CURRENT CHARACTERISTICS.

       b. CIRCUIT BREAKERS 600 AMPERE THROUGH 1200 AMPERE FRAME SHALL BE CUTLER-HAMMER SERIES C, WITH MICROPROCESSOR-BASED RMS SENSING TRIP UNITS TYPE DIGITRIP RMS 310.

       c. CIRCUIT BREAKERS SHALL HAVE A MINIMUM SYMMETRICAL INTERRUPTION CAPACITY AS INDICATED ON THE DRAWINGS OR 10,000 RMS SYMMETRICAL AT 240 VOLTS, AND 14,000 RMS SYMMETRICAL AT 480 VOLTS, IF NOT INDICATED.

       d. ARRANGE BREAKERS RATED 400 AMPERES AND LESS IN DOUBLE ROW CONSTRUCTION.

    D. ACCEPTABLE ALTERNATE MANUFACTURERS:

       a. GENERAL ELECTRIC.

       b. SQUARE D COMPANY

       c. PARK METAL

       d. ELECTRICAL POWER PRODUCTS

       e. SIEMENS ENERGY AND AUTOMATION

       f. ALTERNATE MANUFACTURER'S EQUIPMENT SHALL FUNCTIONALLY MEET, OR EXCEED, THE REQUIREMENTS OF THE SPECIFIED EQUIPMENT IN ALL RESPECTS.

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ELECTRICAL SPECIFICATIONS

DO NOT SCALE DRAWINGS
USE FIGURED DIMENSIONS ONLY

seal & signature

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issued	date
Bids & Permits	2/07/14

SHEET
E-400

USA MASTER: 24X36.DWG (09/13)

23. LIGHTING AND RECEPTACLE PANELBOARDS:

A. PANELBOARDS FOR THE CONTROL OF GENERAL LIGHTING, AND RECEPTACLES SHALL BE DEAD FRONT TYPE WITH 4 WIRE MAINS AND BRANCHES OF THE CIRCUIT BREAKER TYPE PROVIDING THERMAL AND MAGNETIC TRIPPING. CIRCUIT BREAKERS SHALL BE THE MOLDED CASE QUICK-MAKE TYPE, AND SHALL BE PROVIDED WITH BRANCHES AS SCHEDULED ON THE DRAWINGS.

B. ALL BREAKERS SHALL BE "BOLT-ON" TYPE. HANDLE TIES SHALL NOT BE PERMITTED.

C. CIRCUIT BREAKERS SHALL BE CUTLER-HAMMER SERIES B FOR 240/120 VOLT AND SERIES G FOR 480/277 VOLT.

D. ALL BUS BARS SHALL BE COPPER.

E. INTERRUPTING RATING:

PANELBOARDS SHALL HAVE FULLY RATED OR SERIES RATED INTERRUPTING RATINGS. PANELBOARDS SHALL BE LABELED WITH THE UL SHORT-CIRCUIT RATING. WHEN SERIES RATINGS ARE APPLIED WITH INTEGRAL OR REMOTE UPSTREAM DEVICES, A LABEL OR MANUAL SHALL BE PROVIDED. IT SHALL STATE THE CONDITION OF THE UL SERIES RATINGS INCLUDING: SIZE AND TYPE OF UPSTREAM DEVICE, BRANCH DEVICE THAT CAN BE USED, AND UL SERIES SHORT-CIRCUIT RATING.

F. PANELBOARDS SHALL BE CUTLER-HAMMER PRL-1 OR PRL-2.

G. ACCEPTABLE ALTERNATE MANUFACTURERS:

a. GENERAL ELECTRIC.

b. SQUARE D COMPANY

c. PARK METAL

d. ELECTRICAL POWER PRODUCTS

e. SIEMENS ENERGY AND AUTOMATION

f. ALTERNATE MANUFACTURER

24. TRANSIENT VOLTAGE SURGE SUPPRESSION:

A. THE MAIN DISTRIBUTION PANEL SHALL INCLUDE A TRANSIENT VOLTAGE SURGE SUPPRESSOR (TVSS).

B. THE TVSS SHALL BE PARALLEL CONFIGURED AND SHALL PROVIDE ALL MODE PROTECTION.

C. PROTECTION MODES SHALL BE: DEDICATED L-N, L-L (NORMAL MODE), DEDICATED L-G, N-G (COMMON MODE).

D. RESPONSE TIME OF LESS THAN 1 NANOSECOND.

E. EMI/RFI ATTENUATION OF UP TO 42 DB NORMAL MODE, UP TO 41 DB COMMON MODE.

F. CAPACITANCE UP TO 15 NANOFARADS PER MODE.

G. LED INDICATORS , 1 PER PHASE, NORMALLY ON.

H. PEAK SURGE CURRENT PER MODE SHALL BE 125KA AND 250KA PHASE TO PHASE WITH REPETITIVE SURGE CURRENT CAPACITY /MODE OF 7000 IMPULSES.

I. COMPLY WITH U.L.. 1449 3RD EDITION, U.L. 1283, CUL LISTED, ANSI/IEEE C62.41-1980-INDUSTRY STANDARD FOR DESIGNING AND TESTING TVSS DEVICES RATED UP TO 600 V.

J. MANUFACTURER QUALIFICATIONS: IS 9001 QUALITY SYSTEM CERTIFICATION BSE FM 30833.

K. UNIT MAY BE MOUNTED IN SWITCHBOARD. TVSS SHALL BE FUSED IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.

L. TVSS SHALL BE CUTLER HAMMER CLIPPER SERIES, OR EQUAL.BY INNOVATIVE TECHNOLOGY, INC., SQUARE D OR SIEMENS ENERGY AND AUTOMATION.

25. DUPLEX RECEPTACLES:

DUPLEX RECEPTACLES SHALL BE SPECIFICATION GRADE, 120 VOLT, 20 AMPERE, GROUNDING TYPE, EQUAL TO HUBBELL #5362 SERIES, P&S, OR ARROW-HART. COLOR SHALL BE SELECTED BY ARCHITECT OR OWNER.

26. GROUND FAULT RECEPTACLES:

GROUND FAULT RECEPTACLES SHALL BE SPECIFICATION GRADE, 120 VOLT, 20 AMPERE, U.L. LISTED UNDER 498 RECEPTACLE REQUIREMENTS AND 943 CLASS A REQUIREMENTS, SHALL CONFORM TO NEC REQUIREMENTS, AND EQUAL TO HUBBELL SERIES #5260, P&S, OR ARROW-HART. COLOR TO BE SELECTED BY ARCHITECT OR OWNER.

27. TOGGLE SWITCHES:

TOGGLE WALL SWITCHES SHALL BE 20 AMPERE, 120/277 VOLT, SPECIFICATION GRADE, SINGLE, DOUBLE, ETC., AS INDICATED, EQUAL TO HUBBELL #1120 SERIES, P&S, OR ARROW HART. COLOR TO BE SELECTED BY ARCHITECT OR OWNER.

28. WEATHERPROOF BOXES AND COVERS:

WIRING DEVICES INSTALLED AT EXTERIOR LOCATIONS SHALL BE INSTALLED IN A SINGLE GANG, DEEP WEATHERPROOF BOX WITH WHILE-IN-USE COVER PER NEC SECTION 406.8(B)(1). BOXES AND COVERS SHALL BE CONSTRUCTED OF POLYCARBONATE AND SHALL BE FULLY GASKETED. THE TRANSLUCENT COVER SHALL INCLUDE A PAD-LOCKABLE, BREAK-RESISTANT BULLNOSE AND LATCH. PASS & SEYMOUR #WIUC10-DC OR EQUAL.

29. DEVICE PLATES:

DEVICE PLATES SHALL BE STAINLESS STEEL TYPE 302. HUBBELL "S" SERIES, OR AS SELECTED BY ARCHITECT OR OWNER.

30. LIGHTING FIXTURES:

A. FLUORESCENT FIXTURES, UNLESS OTHERWISE INDICATED, SHALL BE SUITABLE FOR 120 VOLT, SINGLE PHASE, A.C., 60 HERTZ SERVICE AND SHALL BE EQUIPPED WITH THE QUANTITY AND TYPE OF T8 ENERGY SAVING FLUORESCENT LAMPS AS SPECIFIED IN THE LIGHT FIXTURE SCHEDULE PROVIDED ON THE DRAWINGS. FLUORESCENT LAMP BALLASTS SHALL BE ENERGY EFFICIENT, >98% POWER FACTOR, PARALLEL LAMP CONNECTION, CLASS "P", ELECTRONIC TYPE, WITH A BALLAST FACTOR OF >0.92, THD OF <10%, AND CREST FACTOR OF 1.7.

B. LIGHTING FIXTURE LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. THE ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL LIGHTING FIXTURES WITH THE ARCHITECTURAL REFLECTED CEILING PLANS. LIGHT FIXTURES AND SPRINKLER HEAD LOCATIONS SHALL, UNLESS OTHERWISE NOTED, TAKE PRECEDENCE OVER AIR DISTRIBUTION DEVICE LOCATIONS.

C. EXIT LIGHTS SHALL BE AS SCHEDULED ON THE DRAWINGS. UNITS SHALL BE SINGLE OR DOUBLE-FACED AND ARROWS SHALL BE PROVIDED AS INDICATED ON PLANS. MOUNTING SHALL BE AS INDICATED ON PLANS.

D. ALL FLUORESCENT BALLASTS SHALL BE PROVIDED WITH DISCONNECTING MEANS PER NEC.

31. EMERGENCY LIGHTING:

A. THE ELECTRICAL CONTRACTOR SHALL INSTALL AN EMERGENCY LIGHTING SYSTEM AS SHOWN ON THE DRAWINGS, CONFORMING TO THE 2009 INTERNATIONAL FIRE CODE AND THE MICHIGAN BUILDING CODE.

B. BRANCH CIRCUIT CONDUCTORS FOR EMERGENCY LIGHTS SHALL NOT RUN IN RACEWAY WITH OTHER BRANCH CIRCUIT CONDUCTORS, NOR SHALL THEY ENTER AN OUTLET BOX WITH OTHER WIRE.

32. EMERGENCY LIGHTING UNITS:

A. FURNISH AND INSTALL BATTERY OPERATED EMERGENCY LIGHTING UNITS AT LOCATIONS INDICATED ON THE PLANS OF TYPES SCHEDULED ON PLANS.

B. EMERGENCY LIGHTING UNITS SHALL INCLUDE A SUITABLE SHELF OR WALL MOUNTING BRACKET AND SHALL CONTAIN ALL NECESSARY MODULES, READY AND HIGH CHARGE INDICATOR PILOT LIGHTS, TEST SWITCH, LAMPS, AND SUITABLE TERMINAL BOARDS FOR CONNECTION OF NORMAL ELECTRICAL SUPPLY CABLES.

C. BATTERIES SHALL BE LEAD CALCIUM TYPE, OR NI-CAD TYPE, AS SCHEDULED.

D. BATTERY CHARGER SHALL BE DESIGNED AS TO MAINTAIN THE BATTERIES FULLY CHARGED ON THE TRICKLE RATE.

E. EMERGENCY LIGHTING UNITS UTILIZING INCANDESCENT LAMPS OR HALOGEN LAMPS RATED LESS THAN SCHEDULED ON THE DRAWINGS WILL NOT BE ACCEPTABLE. CONSULT LIGHTING FIXTURE SCHEDULE FOR MINIMUM ACCEPTABLE EQUIPMENT RATINGS. ANY EQUIPMENT SUBMITTED NOT MEETING THE MINIMUM REQUIREMENTS WILL BE REJECTED.

33. DISCONNECT SWITCHES:

DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE, NEMA 1 FOR INDOOR USE, AND NEMA 3R OUTDOOR USE RATED 600 VOLT. DISCONNECT SWITCHES SERVING MOTOR LOADS SHALL BE HORSEPOWER RATED. SQUARE D, CUTLER-HAMMER OR SIEMENS ENERGY AND AUTOMATION.

34. TELEPHONE RACEWAY SYSTEM:

THE ELECTRICAL CONTRACTOR SHALL INSTALL A COMPLETE SYSTEM OF SLEEVES, CONDUITS, OUTLET BOXES, CABINETS, ETC, AS SHOWN ON THE DRAWINGS. ALL CONDUITS SHALL BE PROVIDED WITH FISH WIRE.

35. MOTOR STARTERS:

A. STARTERS FOR SINGLE PHASE MOTORS SHALL BE MANUAL TOGGLE SWITCH TYPE WITH THERMAL OVERLOADS, SURFACE OR FLUSH MOUNTED AS REQUIRED. SQUARE D CLASS 2510.

B. STARTERS FOR THREE PHASE MOTORS SHALL BE MAGNETICALLY OPERATED, MECHANICALLY-HELD TYPE WITH OVERLOADS, CONTROL TRANSFORMER AND 2 AUXILIARY CONTACTS, WITH HOA SELECTOR SWITCH AND RED & GREEN PILOT LIGHTS MOUNTED IN FRONT COVER. STARTERS SHALL BE MOUNTED IN NEMA 3R ENCLOSURES FOR USE IN KITCHEN AREAS, NEMA 1 IN INDOOR FINISHED AREAS, AND NEMA 4 FOR OUTDOOR INSTALLATION. SQUARE D CLASS 8536.

36. CONNECTION OF MECHANICAL EQUIPMENT:

A. THE ELECTRICAL CONTRACTOR IS CAUTIONED TO NOTE CAREFULLY OTHER SECTIONS OF THESE SPECIFICATIONS DESCRIBING ELECTRICAL EQUIPMENT TO BE FURNISHED UNDER THOSE SECTIONS IN ORDER THAT HE MAY FULLY UNDERSTAND THE WIRING REQUIREMENTS.

B. ALL POWER WIRING AND FEEDERS FOR MECHANICAL EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. MOTOR STARTERS WHICH ARE NOT AN INTEGRAL PART OF EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. SAFETY OR DISCONNECT SWITCHES WHERE INDICATED OR REQUIRED SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. MOTOR CONTROL WIRING AND EQUIPMENT WILL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED OR INDICATED ON THE DRAWINGS.

C. COORDINATE ALL REQUIRED CONTROL WIRING AND LOW VOLTAGE WIRING WITH MECHANICAL EQUIPMENT SUPPLIER.

37. SHOP DRAWINGS:

ELECTRICAL CONTRACTOR SHALL SUBMIT EQUIPMENT SHOP DRAWINGS TO THE ARCHITECT FOR REVIEW PRIOR TO INSTALLATION OF LIGHTING FIXTURES, ELECTRICAL DISTRIBUTION PANELS, MOTOR STARTERS, DISCONNECT SWITCHES, AND WIRING DEVICES. NOTE: REVIEW OF CONTRACTORS SHOP DRAWINGS DOES NOT RELIEVE THE ELECTRICAL CONTRACTOR OF HIS RESPONSIBILITY TO CONFORM TO THE CONTRACT DOCUMENTS AND APPLICABLE CODES.

38. GUARANTEE:

ELECTRICAL CONTRACTOR SHALL GUARANTEE ALL WORK INSTALLED BY HIS WORKMEN UNDER THIS CONTRACT TO BE FREE FROM ALL DEFECTIVE WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE YEAR AFTER THE ACCEPTANCE OF THE BUILDING BY THE OWNER, AND SHOULD DEFECTS OCCUR WITHIN THIS PERIOD, REPAIR AND/OR REPLACE DEFECTIVE ITEMS, AT NO EXPENSE TO THE OWNER.

39. NAMEPLATES:

MOTOR CONTROLS, PANELBOARDS, DISCONNECT SWITCHES, ETC., SHALL BE IDENTIFIED WITH MANUFACTURER'S NAMEPLATES, SHOP ORDERS, WHERE APPLICABLE ON COMPOSITE ASSEMBLIES, AND DESIGNATIONS USED ON THE DRAWINGS. NAMEPLATES FOR THIS PURPOSE SHALL BE LAMINATED PHENOLIC PLASTIC, BEVELED EDGE, BLACK WITH ENGRAVED WHITE LETTERS. EXCEPT WHERE IMPRACTICAL, LETTERS AND NUMERALS SHALL BE A MINIMUM OF 1/2" HIGH. DYMO LABELS SHALL NOT BE USED FOR THIS PURPOSE. PANEL DIRECTORIES SHALL BE NEATLY TYPED SHOWING EQUIPMENT SERVED AND LOCATION FOR EACH BREAKER OR SWITCH.

40. FINAL TESTING:

ALL CIRCUITS AND EQUIPMENT SHALL BE TESTED UPON COMPLETION OF WORK AND FINAL TESTS, WHEN REQUESTED, SHALL BE DONE IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE. ANY CIRCUITS OR EQUIPMENT FOUND TO BE DEFECTIVE SHALL BE REPLACED OR REPAIRED, AS NECESSARY, AND THEN RETESTED WITHOUT ADDITIONAL EXPENSE TO THE OWNER.

41. CLEANING:

UPON COMPLETION OF THE PROJECT, ALL ENCLOSURES SHALL BE LEFT FREE OF REFUSE AND THE EXTERIOR FREE OF DIRT AND PAINT SPLATTERS.

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ELECTRICAL SPECIFICATIONS

DO NOT SCALE DRAWINGS
USE FIGURED DIMENSIONS ONLY

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