

DRY TYPE DISTRIBUTION TRANSFORMER CIRCUIT SIZING SCHEDULE						
TRANSFORMER KVA	PRIMARY (480V)		SECONDARY (208Y/120 VOLT)			GROUNDING ELECTRODE CONDUCTOR
	CIRCUIT BREAKER (NOTE 4)	CIRCUIT BREAKER	BRANCH CIRCUIT SIZE (AWG OR KCMIL)		CONDUIT (4W + G)	
			PHASE & NEUTRAL	SUPPLY SIDE BONDING JUNCTION		
9	20A	30A	10	#8	3/4"	#8
15	25A	60A	6	#8	3/4"	#8
25	45A	100A	3	#8	1 1/4"	#8
70	45A	175A	2	#2	2"	#4
75	125A	300A/225A**	350 / 4/0**	#1	2"	#2
112 1/2	175A	400A	600	#1/0	3 1/2"	#1 1/2
150	225A	600A	2-350	#2/0	2-3"	#2/0
225	350A	2-600A	2-600	#3/0	2-3 1/2"	#3/0
300	500A	1200A	4-600	#3/0	3-3"	#3/0
500	800A	1600A	4-600	#3/0	4-3 1/2"	#3/0

* = SEE NOTE 3 ** = SEE NOTE 4

NOTES:

1. TRANSFORMERS AND FEEDERS ARE BASED ON 480 VOLT, 3 PHASE, 3 WIRE PRIMARY AND 208Y/120 VOLT, 3 PHASE, 4 WIRE, SECONDARY.
2. FEEDERS ARE BASED ON COPPER CONDUCTORS. IF ALUMINUM CONDUCTORS ARE PERMITTED AND SELECTED, FEEDER SIZES SHALL BE FOR THE NEC.
3. CONDUCTORS ARE BASED ON 90°C, 600, INSULATED COPPER WIRE APPLIED AT 75°C FOR TERMINATION RATED 60/75°C OR 75/90°C.
4. THE SMALLER SIZE IS TO BE USED TO FEED 225A PANELBOARDS.
5. PRIMARY OVERCURRENT PROTECTION IS SET AT 125% OF TRANSFORMER FULL LOAD CURRENT. PROVIDE PRIMARY OVERCURRENT DEVICE SELECTION TO ALLOW TRANSFORMER IN-RUSH CURRENT AND PROTECT BASED ON THE ANSI DEGAUSS CURVE. IF MANUFACTURER'S DATA IS NOT AVAILABLE, PROVIDE OVERCURRENT GREATER THAN 125%NOM TO EXCEED 3500% WHEN PRIMARY FEEDER SHALL BE INCREASED ACCORDINGLY.

BRANCH CIRCUIT VOLTAGE DROP WIRING SCHEDULE FOR SINGLE PHASE CIRCUITS						
BRANCH CKT RATING (A)	WIRE SIZE (AWG)	MAXIMUM BRANCH CIRCUIT LENGTH (IN FEET)				
		120V	208V	240V	277V	480V
20A	12	83	143	165	191	331
	10	128	222	256	295	511
	8	201	348	402	464	804
	6	313	542	625	721	1250
	4	85	148	170	197	341
30A	8	134	232	268	309	536
	6	208	361	417	481	833
	4	313	542	625	721	1250

NOTES:

1. ABOVE THE TABLE VALUES ARE BASED ON COPPER CONDUCTORS, IN STEEL CONDUIT, WITH A LOAD POWER FACTOR OF 0.85 PER NEC CHAPTER 9, TABLE 9.
2. THE PERCENTAGE DROPS INDICATED IN THE TABLE ABOVE FOR ALL LIGHTING AND RECEPTACLE BRANCH CIRCUITS, WHERE BRANCH CIRCUITS SERVE DEDICATED EQUIPMENT, THE CONTRACTOR MAY PERFORM VOLTAGE DROP CALCULATIONS BASED ON ACTUAL EQUIPMENT CONNECTED LOAD AND PROVIDE CONDUCTORS APPROPRIATELY.
3. CONDUCTOR SIZES ARE BASED ON MAXIMUM OF 9 CURRENT CARRYING CONDUCTORS IN A SINGLE CONDUIT.
4. LIMITS FOR CONDUCTOR LENGTHS SHOWN ARE BASED ON A MAXIMUM BRANCH CIRCUIT LOAD OF 64% OF THE BRANCH BREAKER RATING AND A MAXIMUM OF 3 PERCENT VOLTAGE DROP TO COMPLY WITH ASHRAE/IES 90.1 - 2010, SECTION 9.4.2. FOR FEEDER AND SERVICE CALCULATIONS, THE CONTRACTOR SHALL PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO 3%.

LIGHTING FIXTURE SCHEDULE			
TYPE	DESCRIPTION	MANUFACTURER	LAMPS
L1	LED WALL PACK LIGHT FIXTURE WITH DIE CAST ALUMINUM HOUSING, IMPACT-RESISTANT TEMPERED GLASS LENS THAT IS FULLY GASKETED, AND INTEGRAL PHOTOCELL. FIXTURE SHALL BE DARK BRONZE FINISH, 120V OPERATION, TYPE 3 DISTRIBUTION AND FUSED.	1. LITHONIA TWIN LED SERIES 2. PHILIPS MPW LED SERIES 3. COOPER WP SERIES	10 LEDs

VIBRATION ISOLATOR APPLICATION SCHEDULE										
EQUIPMENT TYPE	EQUIPMENT CATEGORY	HORSEPOWER AND OTHER	RPM	EQUIPMENT LOCATION						KEYED NOTES
				SLAB ON GRADE			UP TO 40 FT (12 M) FLOOR SPAN			
				BASE TYPE	ISOLATOR TYPE	MIN. DEFL., IN. (MM)	BASE TYPE	ISOLATOR TYPE	MIN. DEFL., IN. (MM)	
SUSPENDED AXIAL FANS, PLENUM FANS, CABINET FANS, FAN SECTIONS, CENTRIFUGAL INLINE FANS	UP TO 22 IN. DIAMETER	ALL	ALL				A OR B	8a OR 8b	0.75 (19)	NOTES 1, 3, 4
	24 IN. DIAMETER AND UP	≤ 2 IN. SP	UP TO 300 301 TO 500 500 AND UP				A OR B	8a OR 8b	1.50 (38)	
							A OR B	8a OR 8b	1.50 (38)	
							A OR B	8a OR 8b	1.50 (38)	
		> 2 IN. SP	UP TO 300 301 TO 500 500 AND UP				A OR B	8a OR 8b	3.50 (89)	
							A OR B	8a OR 8b	2.50 (64)	
						A OR B	8a OR 8b	2.50 (64)		

NOTES:

1. THRUST RESTRAINTS: PROVIDE THRUST RESTRAINTS BETWEEN FAN DISCHARGE AND DUCT (IN PLACES, LOCATED ON THE CENTERLINE OF THE DISCHARGE OUTLET OF THE FAN, BRINGING THE FLEXIBLE DUCT CONNECTOR) FOR ALL FAN HEADS, FOR AXIAL AND CENTRIFUGAL FANS UNITS OPERATING AT 1500 RPM OR GREATER. PROVIDE THRUST RESTRAINTS BETWEEN FAN DISCHARGE AND DUCT (IN PLACES, LOCATED ON THE CENTERLINE OF THE DISCHARGE OUTLET OF THE FAN, BRINGING THE FLEXIBLE DUCT CONNECTOR) FOR ALL FAN HEADS, FOR AXIAL AND CENTRIFUGAL FANS UNITS OPERATING AT 1500 RPM OR GREATER.
2. PIPING RIGIDITY ISOLATION: PROVIDE PIPE RESILIENT ANCHORS, SPRING MOTORS AND RESILIENT PIPE GUIDES CAPABLE OF DISTRIBUTING THE LOADS WITHIN THE BUILDING DESIGN LIMITS AT THE SUPPORT POINTS.
3. SPRING HANGERS: PROVIDE SPRING HANGERS FOR PIPING CONNECTED TO VIBRATION ISOLATED EQUIPMENT FOR ALL PIPING IN MECHANICAL ROOMS OR THE FOLLOWING MINIMUM HORIZONTAL DISTANCES FROM THE ISOLATED EQUIPMENT: UP TO 6" - 50 FEET (1 1/2" MINIMUM DEFLECTION), 6" AND LARGER - 100 FEET (2 1/2" MINIMUM DEFLECTION), WHICHEVER IS GREATER, AND AS SHOWN ON DRAWINGS (3/4" MINIMUM DEFLECTION).
4. DUCTWORK VIBRATION ISOLATION: RETURNE TYPE 6a OR BR 8 SPRING HANGERS FOR DUCTWORK WITH A CROSS SECTION OF TWO SQUARE FEET OR GREATER CONNECTED TO AIR HANDLING UNITS, FLEXIBLE ELBOWS AND VIBRATION ISOLATED EQUIPMENT, WHICHEVER IS GREATER, AND AS SHOWN ON DRAWINGS (3/4" MINIMUM DEFLECTION).
5. SPRING HANGERS: PROVIDE SPRING HANGERS FOR PIPING CONNECTED TO VIBRATION ISOLATED EQUIPMENT, WHICHEVER IS GREATER, AND AS SHOWN ON DRAWINGS (3/4" MINIMUM DEFLECTION).
6. SPRING DEFLECTION INDICATED AND TYPE E BASE MAY BE 1.0 IN AND TYPE D BASE MAY BE USED FOR SPANS GREATER THAN 20 FT, USE SPRING DEFLECTION INDICATED AND TYPE E BASE.

BASE TYPES:

BASE TYPE A - NO BASE ISOLATORS ATTACHED DIRECTLY TO EQUIPMENT.
BASE TYPE B - STRUCTURAL, STEEL RAILS OR BASE.
BASE TYPE C - CONCRETE INERTIA BASE.
BASE TYPE D - CURB - MOUNTED ALUMINUM BASE WITH 1" DEFL. SPRING ISOLATORS
BASE TYPE E - CURB - MOUNTED STEEL BASE WITH ADJUSTABLE 1", 2" OR 3" DEFL. SPRING ISOLATORS

ISOLATOR TYPES:

ISOLATOR TYPE 1a - ELASTOMERIC ISOLATION PAD.
ISOLATOR TYPE 1b - ELASTOMERIC ISOLATION PAD WITH STEEL LOAD BEARING PLATE.
ISOLATOR TYPE 2 - ELASTOMERIC FLOOR ISOLATOR.
ISOLATOR TYPE 3 - FREE STANDING SPRING FLOOR ISOLATOR.
ISOLATOR TYPE 4 - RESTRAINED SPRING ISOLATOR.
ISOLATOR TYPE 5 - THRUST RESTRAINT.
ISOLATOR TYPE 6 - AIR SPRING.
ISOLATOR TYPE 7 - ELASTOMERIC HANGERS.
ISOLATOR TYPE 8a - SPRING HANGERS.
ISOLATOR TYPE 8b - SPRING HANGERS WITH VERTICAL-LIMIT STOP.

FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE - GENERAL PURPOSE				
COPPER CONDUCTORS				
OVERCURRENT DEVICE RATING (AMPERES)	WIRE SIZE (AWG OR KCMIL)		CONDUIT SIZE	
	PHASE & NEUTRAL	GROUND	SINGLE PHASE 2 WIRE+G (1PH, 1N, 1G)	SINGLE PHASE 3 WIRE+G (2PH, 1N, 1G)
15-20	12	12	3/4"	3/4"
25-30	10	10	3/4"	3/4"
35-40	8	10	3/4"	3/4"
45-50	8 (6)	10	3/4"	3/4"
60	6 (4)	10	3/4" (1")	3/4" (1")
70	4	8	1"	1 1/4"
80	4 (3)	8	1 1/4"	1 1/4"
90-100	2 (2)	8	1 1/4"	1 1/4"
110	2 (1)	8	1 1/4"	1 1/4" (1 1/2")
125	1 (1/0)	6	—	1 1/4" (1 1/2")
150	1/0	6	—	1 1/2"
175	2/0	6	2"	2"
200	3/0	6	2"	2 1/2"
225	4/0	4	2"	2 1/2"
250	250	4	2 1/2"	2 1/2"
300	350	4	2 1/2"	2 1/2"
350	500	3	3"	3"
400	500	3	3"	3"
450	2-1/0	2-2	2-2"	2-2 1/2"
500	2-250	2-2	2-2 1/2"	2-2 1/2"
600	2-350	2-1	2-2 1/2"	2-3"
700	2-500	2-1/0	2-3"	2-3"
800	2-500	2-1/0	2-3"	2-3 1/2"
1000	3-400	3-2/0	3-3"	3-3"
1200	3-600	3-3/0	3-3 1/2"	3-3 1/2"
1600	4-600	4-4/0	4-3 1/2"	4-3 1/2"
2000	5-600	5-250	5-3 1/2"	5-3 1/2"

* = SEE NOTE 4

NOTES:

1. CONTRACTOR TO SIZE FEEDERS AND BRANCH CIRCUITS BASED ON THIS SCHEDULE AND OVER CURRENT DEVICE SIZE, UNLESS NOTED OTHERWISE.
2. CONTRACTOR MAY COMBINE 20A CIRCUITS AS NOTED IN SPECIFICATION.
3. CONDUCTORS ARE BASED ON THHN/THWN UP TO AND INCLUDING #4/0. LARGER THAN #4/0 ARE BASED ON TYPE XHHW.
4. CONDUCTORS ARE BASED ON 80% DBO, INSULATED CONDUCTOR #4/0 AT 75°C FOR TERMINATION RATED 60/75°C OR 75°C. FOR TERMINATION RATED AT 60°C, USE #4/0 AWG.
5. CONDUIT SIZES ARE BASED ON CONDUIT SIZES INDICATED IN PATENTED DRAWINGS.
6. CONDUIT SIZES ARE VALID FOR EMT OR RGS. CONDUIT SIZES SHALL BE ADJUSTED AS REQUIRED FOR OTHER TYPES OF CONDUIT.
7. ELECTRICAL CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR AND PROVIDE REQUIRED WIRE SIZES TO ACCOMMODATE MECHANICAL EQUIPMENT LUG SIZES.
8. SIZE OF DISCONNECT SWITCH LOCATED AT OCCUPANT SHALL BE SIZED BASED ON OVERCURRENT PROTECTION OF THAT DEVICE.
9. PRIOR APPROVAL FROM ENGINEER SHALL OCCUR IF A DIFFERENT SIZE/NUMBER OF CONDUCTORS IS TO BE USED. AMPACITY SHALL BE EQUAL OR GREATER.

TELECOM OUTLET SCHEDULE			
TAG	DESCRIPTION	TYPE	REMARKS
A1	1 DATA	1 CAT6e	
A2	1 VOICE	1 CAT6e	
A3	1 DATA + 1 VOICE	2 CAT6e	
A4	2 DATA	2 CAT6e	
A5	2 DATA + 1 VOICE	3 CAT6e	
A6	2 DATA, 2 VOICE, 2 SMF, 2MMF	4 CAT6e, 2 SMF, 2 MMF	
A7	3 DATA	3 CAT6e	
A8	3 DATA + 1 VOICE	4 CAT6e	
A9	4 DATA	4 CAT6e	
A10	6 DATA	6 CAT6e	
BX	EXISTING OUTLET TO BE RECALCD. SIMILAR TO "A" OUTLETS ABOVE.		PROVIDE NEW CONNECTORS AND FACEPLATE.
C1	1 COAX	1 RG6	
C2	1 COAX + 1 DATA	1 RG6, 1 CAT6e	
C2	1 COAX, 1 DATA, 1 SVHS	1 RG6, 1 CAT6e, 1 SVHS	

▽ EMPTY BOX W/ CONDUIT FOR FUTURE TELECOM OUTLET

TELECOM OUTLET. PROVIDE CABLE PER SCHEDULE ABOVE.

DUCT SYSTEM APPLICATION SCHEDULE																			
		DUCT MATERIAL																	
AIR SYSTEMS		G90 GALV. SHEET METAL	DOUBLE-WALL UNID G90 GALV. SHEET METAL (3/8"X16"X1/2") (3/8"X16"X1/2")	G90 GALV. SHEET METAL (FEBE. INNER WALL)	G90 GALV. SHEET METAL WITH 1-INCH LINING	GALVANNEALED SHEET METAL	ALUMINUM	TYPE 304 STAINLESS STEEL	TYPE 316 STAINLESS STEEL	PVC COATED GALV. SHEET METAL (#x1)	PVC COATED GALV. SHEET METAL (1x4)	PVC COATED GALV. SHEET METAL (#x4)	16 GA. CARBON STEEL	ZERO-CLEARANCE PREFABRICATED RANGE HOOD EXHAUST DUCT	FABRIC	DESIGN PRESSURE CLASS (INCHES WG)			
	SUPPLY AIR WITHOUT TERMINAL UNITS	X														+2	A	C	
																			KEYED NOTES

GENERAL NOTES

1. "X" INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A DUCT SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. 4 X 1 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON EXTERIOR SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON INTERIOR SURFACES.
3. 1 X 4 (4 X 1 REVERSE COAT) PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON INTERIOR SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON EXTERIOR SURFACES.
4. 4 X 4 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND 4 MILS (0.10 MM) THICK ON OPPOSITE SURFACES.

GRILLE, REGISTER, AND DIFFUSER SCHEDULE									
UNIT IDENTIFICATION	TYPE	FACE SIZE	NECK SIZE	FRAME TYPE	ACCESSORY	CONSTRUCTION	FINISH	MODEL NUMBER	REMARKS
R-1	REGISTER	FACE + 1 3/4	32x30	SURFACE MOUNTED	-	STEEL	WHITE	530	

FAN SCHEDULE

FAN SCHEDULE																											
UNIT IDENTIFICATION	SYSTEM SERVED	TYPE	AIRFLOW CFM	T.S.P. IN. W.G.	MINIMUM WHEEL DIAMETER INCHES	RPM	CLASS	ARRANGEMENT	OUTLET VELOCITY FPM	MOTOR				MODULATION/ CONTROL TYPE	ELECTRICAL			UNIT INLET Lw BY OCTAVE BAND							MODEL NUMBER	REMARKS	
										BHP	HP	RPM	DRIVE TYPE		VOLTS	PHASE	OPTIONS/ ACCESSORIES										
																		63 HZ (DB)	125 HZ (DB)	250 HZ (DB)		500 HZ (DB)	1000 HZ (DB)	2000 HZ (DB)			4000 HZ (DB)
VF-1	ELEC 0012	BACKWARD INCLINED CENTRIFUGAL	3,500	1	16	1,597	I	4	2,303	1.4	2	1,725	DIRECT	ECM	208	1	B	86	85	82	82	75	70	66	64	SWD-16-VG	

NOTE:

1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE GREENHECK UNLESS OTHERWISE NOTED.

SCHEDULES GENERAL NOTES:

TYPICAL FOR ALL SCHEDULE SHEETS:

1. REFER TO ELECTRICAL STANDARD SCHEDULES, ONE LINE DIAGRAM AND PANEL SCHEDULES FOR ADDITIONAL ELECTRICAL INFORMATION
2. PROVIDE THE FOLLOWING FACTORY-WIRED ELECTRICAL OPTIONS/ACCESSORIES WHERE INDICATED IN SCHEDULE:
 - A - NON-FUSED DISCONNECT SWITCH
 - B - UNIT SHALL BE SINGLE POINT ELECTRICAL CONNECTION WITH FACTORY INSTALLED DISCONNECT MEANS AND ALL REQUIRED STARTERS AND CONTROLS
 - C - SERVICE RECEPTACLE
 - D - FUSED DISCONNECT SWITCH
 - E - COMBINATION STARTER
 - F - UNIT SHALL HAVE (2) SINGLE POINT CONNECTIONS WITH FACTORY INSTALLED DISCONNECT MEANS AND ALL REQUIRED STARTERS AND CONTROLS. (1) CONNECTION SHALL BE FOR CONDENSING SECTION AND (1) CONNECTION SHALL BE FOR THE REMAINDER OF THE UNIT.
3. FOR MODULATION/CONTROL TYPE COLUMN, "VFC" INDICATES VARIABLE FREQUENCY CONTROLLERS, "AUTO" INDICATES AUTOMATIC OPERATION (CONTROLLED BY TEMPERATURE CONTROLS OR SCHEDULED CONTROLS), "MANUAL" INDICATES HAND OPERATION
4. IF VARIABLE FREQUENCY CONTROLLERS ARE VARIABLE TO BE PROVIDED AND ARE NOT INSTALLED INTEGRAL TO THE UNIT, VARIABLE FREQUENCY CONTROLLERS SHALL BE SUPPLIED BY THE MECHANICAL CONTRACTOR (UNLESS OTHERWISE NOTED) AND INSTALLED BY THE ELECTRICAL CONTRACTOR INCLUDING THE LINE SIDE AND LOAD SIDE CONNECTIONS TO THE MOTOR AND INCLUDING MISCELLANEOUS STEEL REQUIRED FOR THE SUPPORT AND MOUNTING OF THE VFC. REFER TO FLOOR PLANS FOR LOCATION.
5. WHERE EQUIPMENT IS INDICATED TO HAVE A SINGLE POINT ELECTRICAL CONNECTION, THAT EQUIPMENT SHALL COME COMPLETE WITH FACTORY INSTALLED STARTERS, MOTOR PROTECTION, PROTECTORS, CONTACTORS, FUSING AND ALL NECESSARY INTERNAL WIRING AND CONTROLS. PROVIDE A FACTORY MOUNTED UNIT DISCONNECTING MEANS WHERE THE ELECTRICAL CONTRACTOR SHALL MAKE SINGLE POINT CONNECTION. INSTALLED PACKAGED EQUIPMENT SHALL HAVE CLEARANCES MEETING THE NATIONAL ELECTRICAL CODE.
6. WHERE PACKAGED EQUIPMENT IS PROVIDED, NAMEPLATE MUST INDICATE MAXIMUM OVERCURRENT PROTECTION BY HACR RATED CIRCUIT BREAKERS OR FUSES. IF FUSES PROVIDED ONLY IS INDICATED, PROVIDE A FUSED DISCONNECT AND FUSES WITH THE UNIT.
7. WHERE EQUIPMENT IS DESIGNATED BY MANUFACTURER AND MODEL NUMBER, THIS IS THE BASIS OF DESIGN. IF THE CONTRACTOR elects TO PROVIDE EQUIPMENT BY OTHER SPECIFIED MANUFACTURERS OR PROPOSED ALTERNATE EQUIPMENT BY THE BASIS OF DESIGN MANUFACTURER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REVISIONS TO ELECTRICAL REQUIREMENTS, STRUCTURAL LOADING, OR ARCHITECTURAL APPEARANCES AND SHALL INCLUDE THE COST OF SUCH REVISIONS IN HIS BID.
8. WHERE EQUIPMENT IS SCHEDULED TO INCLUDE A SERVICE RECEPTACLE, PROVIDE A FACTORY MOUNTED SERVICE RECEPTACLE WITH APPROPRIATE FUSES AND SERVICE CONNECTIONS ON THE LINE SIDE OF THE DISCONNECT. PROVIDE A NAMEPLATE ON THE DISCONNECT SWITCH INDICATING THE PRESENCE OF LINE POWER TO THE SERVICE RECEPTACLE WHEN THE UNIT DISCONNECT IS IN THE OFF POSITION.
9. SIZE ALL EQUIPMENT FEEDERS BASED ON THE LISTED MPD (MAXIMUM OVERCURRENT PROTECTION) AGREE TO THE FEEDER AND BRANCH CIRCUIT SIZES SCHEDULED ON THE ELECTRICAL STANDARD SCHEDULES SHEET.

RAILWAY APPLICATION SCHEDULE							
RAILWAY		ELECTRICAL METALLIC TUBING (EMT)	SURFACE RAILWAY	ELECTRICAL NONMETALLIC TUBING (ENT)	FLEXIBLE METAL CONDUIT (FMC)	GENERAL-USE OPTICAL FIBER/COMMUNICATION CABLE PLASTIC OR POLYMER OPTICAL FIBER (POF) LIQUIDIGHT FLEXIBLE METAL CONDUIT (LFMC) LIQUIDIGHT FLEXIBLE NONMETAL CONDUIT (LFWO) ROD STEEL CONDUIT (RSC) HIGH DENSITY POLYETHYLENE (HDPE) SCHEDULE 80	KEYED NOTES
OUTDOOR	EXPOSED					X	
	CONEALED (ABOVE GROUND)					X	
	UNDERGROUND					X X	
	CONNECTED TO VIBRATING EQUIPMENT				X		EQUIPMENT INCLUDING: TRANSFORMERS, HYDRAULIC PNEUMATIC, ELECTRIC SOLENOID, MOTOR DRIVEN EQUIPMENT
INDOOR	EXPOSED NOT SUBJECT TO PHYSICAL DAMAGE - UNFINISHED SPACES	X					
	EXPOSED NOT SUBJECT TO PHYSICAL DAMAGE - FINISHED SPACES	X					
	EXPOSED SUBJECT TO SEVERE PHYSICAL DAMAGE					X	[ROD STEEL CONDUIT UP TO 10"-Ø AFF.] LOCATIONS INCLUDE: LOADING DOCKS, CORRIDORS USED FOR TRAFFIC OF MECHANIZED CARTS AND PALLET HANDLING UNITS, MECHANICAL ROOMS
	CONEALED IN CEILINGS, INTERIOR WALL AND PARTITIONS	X					NOT TO EXCEED 6"-Ø IN CEILING SPACE
	CONNECTED TO VIBRATING EQUIPMENT		X	X			EQUIPMENT INCLUDING: TRANSFORMERS, HYDRAULIC PNEUMATIC, ELECTRIC SOLENOID, MOTOR DRIVEN EQUIPMENT USE LFMC IN DAMP/WET LOCATIONS
	DAMP AND WET LOCATIONS					X	
	EMBEDDED IN CONCRETE ABOVE GRADE					X	

2. REFER TO "CONDUCTORS AND CABLES" SPECIFICATION FOR APPLICATION LIMITATIONS OF AC/MC CABLE.

REVISION
9/24/2014REVISION
ADDENDUM 3

5145 Livernois, Suite 100
Troy, Michigan 48068-3276
48-879-5666 Fax 248-879-0001
www.PeterBassoAssociates.com
PBA Protect No. 2014.0175



Basso Associates Inc.
CONSULTING ENGINEERS

PROJECT TITLE
WSU 005 - SCIENCE HALL
ELECTRICAL RELIABILITY
UPGRADE
WSU Project No.: 005-219056

**WAYNE STATE
UNIVERSITY**

SHEET TITLE
MECHANICAL AND
ELECTRICAL STANDARD
SCHEDULES

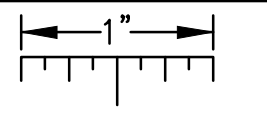
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NOTE: SOME SYMBOLS AND ABBREVIATIONS
SHOWN MAY NOT APPLY TO THIS PROJECT.

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THE FOLLOWING DIMENSION EQUALS
ONE INCH WHEN PRINTED TO SCALE.



GENERAL NOTES:

- THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
- INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
- TRANSFORMER SECONDARY CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH TRANSFORMER CIRCUIT SIZING SCHEDULE SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
- MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.

- REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPLACITY.

- CONTRACTOR TO PROVIDE CONDUIT AND WIRE FOR CONTROLS SYSTEMS. SIEMENS TO PROVIDE CONTROL EQUIPMENT AND CONTRACTOR TO INSTALL CONTROL EQUIPMENT. REFER TO SIEMENS REFERENCE DRAWINGS FOR SCOPE OF WORK. COORDINATE SCOPE OF WORK WITH SIEMENS DURING BIDDING AND INCLUDE ASSOCIATED COST WITH CONTROL SYSTEMS IN BID PRICE.

CONSTRUCTION NOTES:

- BUILDING MOUNTED LIGHTING FIXTURES 7.1" ON EXTERIOR WALL AT 10' ABOVE FINISHED GRADE. FIXTURE TO BE CONTROLLED VIA INTERNAL PHOTOCELL CIRCUIT TYPE "L1" LIGHTING FIXTURES AND RECEPTACLE TO CIRCUIT INDICATED ON GENERATOR WIRING CONNECTION DETAIL ON SHEET E7.1.
- CAMERA JUNCTION BOX ON ROOF OF CONNECTING BRIDGE. OWNER TO PROVIDE SECURITY CAMERA. PROVIDE 3/4" C AND CAT6a WIRING FROM CAMERA TO IT ROOM 1216 LOCATED IN BASEMENT FLOOR. REFER TO SHEET E3.1 FOR IT ROOM 1216 LOCATION. FIELD ADJUST CAMERA AS REQUIRED.
- PROPOSED CONDUIT ROUTING FOR GENERATOR FEEDER TO ATS-1, CONTROLS, CIRCUITS, ETC. COORDINATE IN FIELD. REFER TO GENERATOR WIRING CONNECTION DETAIL ON SHEET E7.1.
- CONNECT FEEDER CABLES TO MAIN LUGS IN (E)MDP-A.
- CORE FLOORING FOR CONDUIT ON FIRST, SECOND, AND THIRD FLOORS AS REQUIRED.
- PROVIDE NEW 4'-6" DUAL LEAF DOOR FRAME. RESTORE EXISTING BRICK WALL TO FIT NEW FRAME. PROVIDE (1) 3' DOOR AND (1) 1'-6" DOOR WITH SEALS BETWEEN DOOR FRAME AND FLOOR.
- SAW CUT AND TRENCH EXISTING CONCRETE FLOORING FOR INSTALLATION OF CONDUIT. CONCRETE ENCASE CONDUITS WITH MINIMUM 2" CONCRETE PER NEC 230.6. STUB UP CONDUIT TO 12" BELOW CABLE TRAY IN ELEC 0016.1 AND UP TO ATS-1.
- SIEMENS GENERATOR DIESEL FUEL METER AND PYPAN PANEL. COORDINATE WITH SIEMENS FOR EXACT REQUIREMENTS. COORDINATE WITH OWNER ON EXACT LOCATION.
- REMOVE DOOR AND FRAME FOR NEW ELECTRICAL EQUIPMENT MOVE IN. REINSTALL DOOR AND FRAME BACK TO ORIGINAL CONDITION AFTER EQUIPMENT HAS BEEN MOVED IN.

- INSTALL NEW WIRING FROM EXISTING DTE TRANSFORMERS ACROSS EXISTING CABLE TRAY.
- INSTALL NEW WIRING FROM EXISTING CABLE TRAY TO STUBBED CONDUIT IN ELEC 0016.1. PROVIDE METAL CHANNEL SUPPORT FOR CONDUITS.
- REMOVE AND CLEAN EXISTING FILTER. PLACE CLEANED FILTER BACK IN HOUSING.
- SUSPEND FAN 5' A.F.F. BLOWER OUTLET SHALL HAVE BIRDSREEN AND FACE THE TOWARDS THE TRANSFER DUCT.

- PROVIDE CORING OF EXISTING TUNNEL WALL. PROVIDE SEAL TIGHT AND SEAL SPRAY. REFER TO CONNECTING TUNNEL ELEVATION ON SHEET E7.1.

- PROPOSED FEEDER ROUTING. EXISTING SPACES HAVE NO CEILING AND UTILITIES ARE EXPOSED. CONDUIT TO BE INSTALLED AT HEIGHT OF EXISTING UTILITIES. PROVIDE SUPPORT FOR CONDUIT AS REQUIRED. SUPPORT FOR CONDUIT SHALL BE INDEPENDENT OF EXISTING UTILITY SUPPORT. COORDINATE WORK WITH EXISTING UTILITIES. CHANGE IN PROPOSED ROUTING OF FEEDER FROM CONTRACTOR TO BE SUBMITTED TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.

- REMOTE ATS-1 ANNUNCIATOR PANEL. COORDINATE WITH OWNER ON EXACT LOCATION.
- REMOTE GEN-1 ANNUNCIATOR PANEL. COORDINATE WITH OWNER ON EXACT LOCATION.

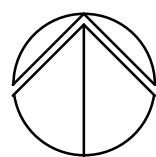
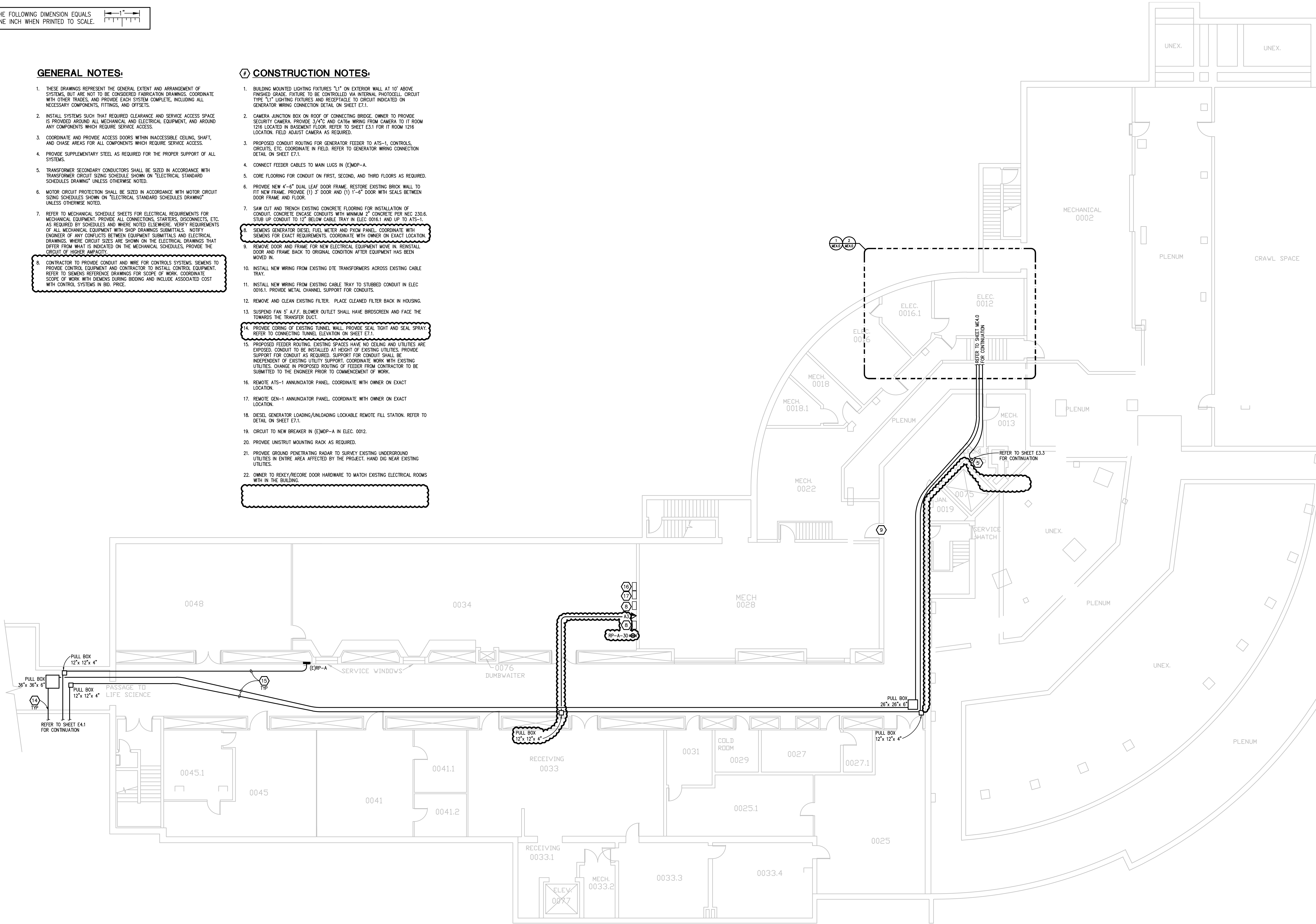
- DIESEL GENERATOR LOADING/UNLOADING LOCKABLE REMOTE FILL STATION. REFER TO DETAIL ON SHEET E7.1.

- CIRCUIT TO NEW BREAKER IN (E)MDP-A IN ELEC. 0012.

- PROVIDE UNISTRUT MOUNTING RACK AS REQUIRED.

- PROVIDE GROUND PENETRATING RADAR TO SURVEY EXISTING UNDERGROUND UTILITIES IN ENTIRE AREA AFFECTED BY THE PROJECT. HAND DIG NEAR EXISTING UTILITIES.

- OWNER TO REKEY/RECORE DOOR HARDWARE TO MATCH EXISTING ELECTRICAL ROOMS WITH IN THE BUILDING.



BASEMENT ELECTRICAL COMPOSITE PLAN
SCALE: 1/8" = 1' - 0"

REVISION
9/24/2014

REVISION
ADDENDUM 3

5045 Livonia, Suite 100
Livonia, MI 48150
Tel: 248-279-5960 Fax: 248-279-1007
www.PeterBassoAssociates.com
PBA Project No. 2014075

Peter Basso Associates Inc.
CONSULTING ENGINEERS

PROJECT TITLE
WSU 005 - SCIENCE HALL
ELECTRICAL RELIABILITY
UPGRADE
WSU Project No.: 005-219056
Detroit, MI 48202

**WAYNE STATE
UNIVERSITY**

SHEET TITLE
BASEMENT ELECTRICAL
COMPOSITE PLAN

DATE

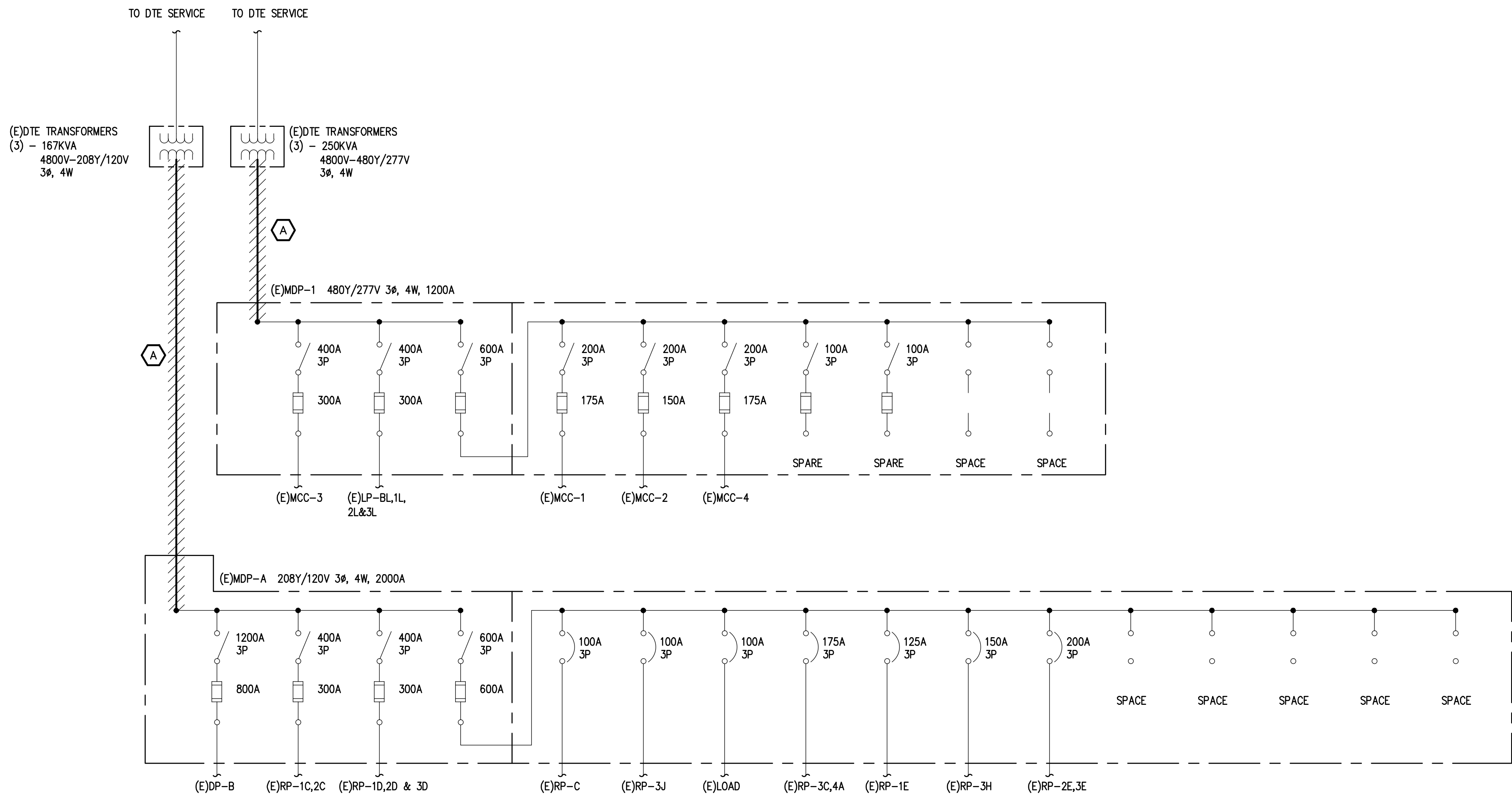
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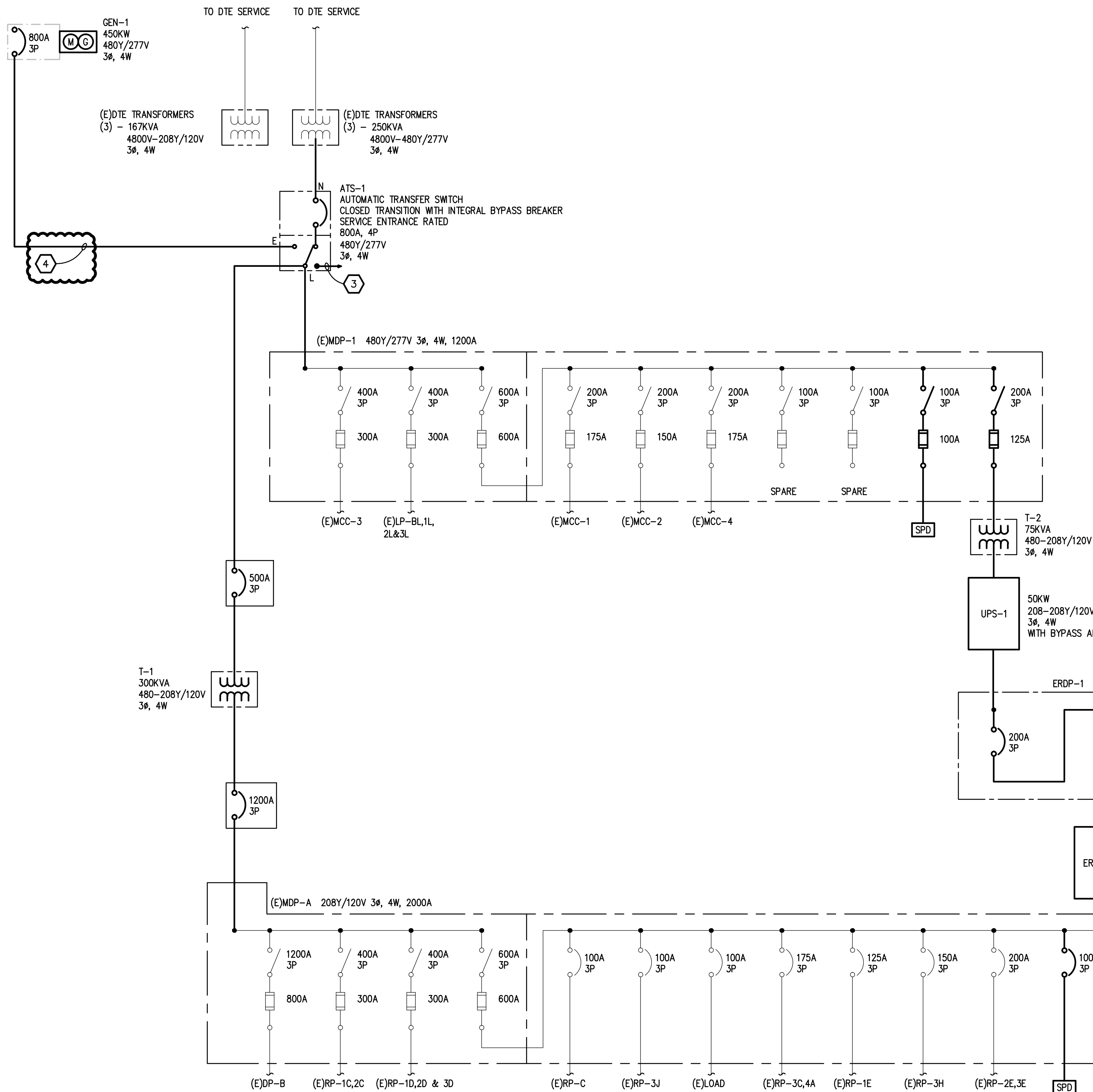
BIDS

SHEET No.

E3.0



PARTIAL ONE LINE DRAWING - DEMOLITION
NO SCALE

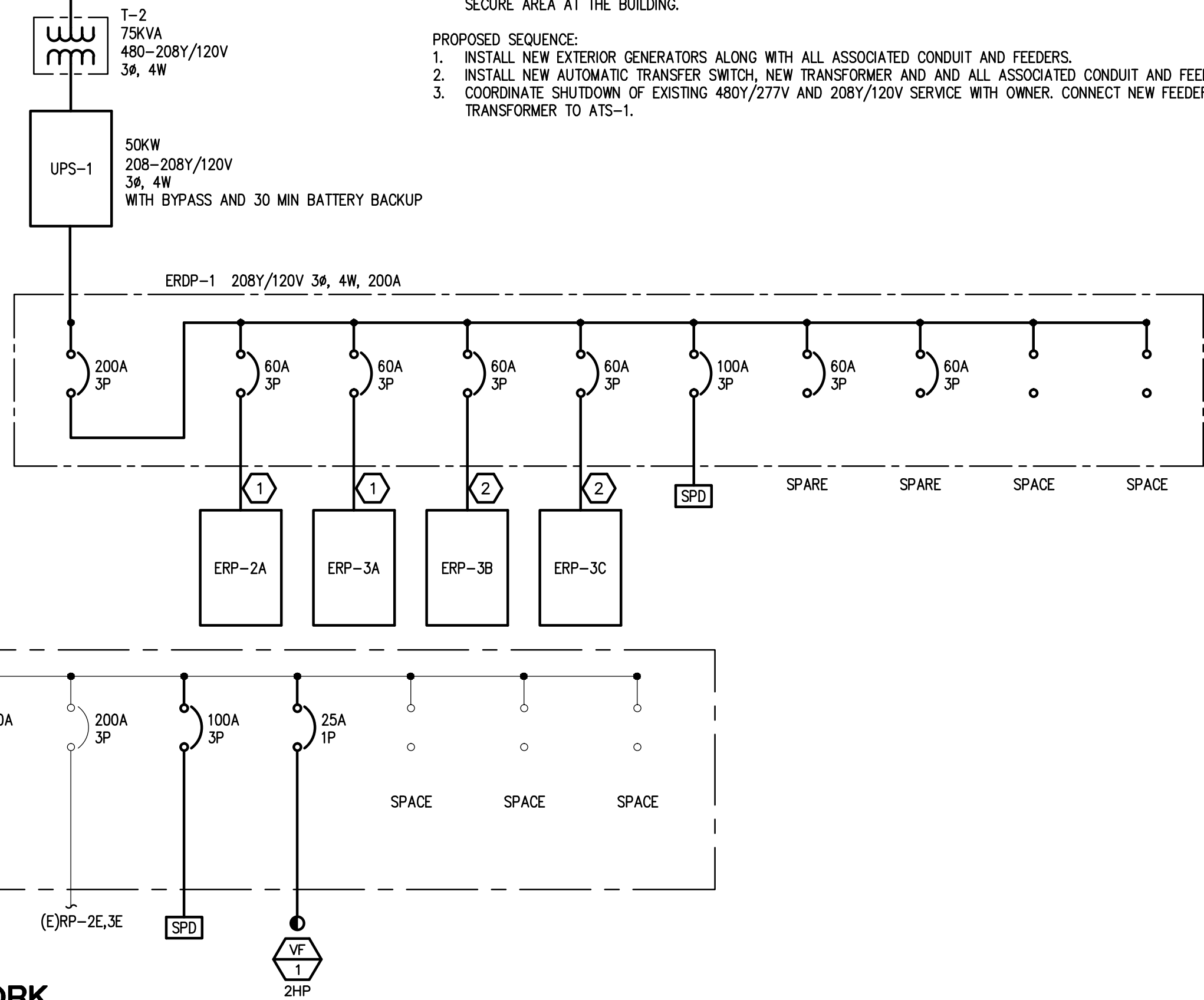


PARTIAL ONE LINE DRAWING - NEW WORK
NO SCALE

PROPOSED CONSTRUCTION SEQUENCE

- GENERAL:
1. PROPOSED CONSTRUCTION SEQUENCE IS PROVIDED FOR BIDDING PURPOSES ONLY. PROVIDE DETAILED CONSTRUCTION SEQUENCE INCLUDING DATES AND DURATION OF WORK TO ENGINEER AND OWNER PRIOR TO COMMENCING WORK.
 2. ALL SHUT DOWN WORK IS TO BE COORDINATED SO THAT WORK IS SCHEDULED FOR SUNDAYS OR HOLIDAYS. THE PREMIUM PORTION ONLY OF WORKS ASSOCIATED WITH A SHUTDOWN IS TO BE COVERED IN THE ALLOWANCE THAT IS TO BE INCLUDED IN THE BASE BID. (FOR SCIENCE HALL THIS ALLOWANCE IS \$25,000.) IT WILL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE HOW TO SEQUENCE THE WORK, AS WELL AS THE MEANS AND METHODS NECESSARY TO PROVIDE POWER TO THE BUILDING FOR ANY SHUT DOWN EXCEEDING 2 HOURS IN DURATION, INCLUDING PROVIDING ANY NECESSARY EQUIPMENT, (RENTING / OPERATING GENERATORS, PROVIDING FUEL, ETC.) TO SUPPORT A BUILDING LOAD OF 150KW. PROPOSED SEQUENCING AND MEANS AND METHODS MUST BE REVIEWED AND APPROVED BY WSU AND ALL COSTS TO SUPPORT THE PROPOSED SEQUENCING AND PROVIDE POWER FOR ANY SHUT DOWN EXCEEDING 2 HOURS IS TO BE INCLUDED WITHIN THE BASE BID. NOTE: CONTRACTORS MUST PROVIDE AT A MINIMUM A SEVEN (7) DAY ADVANCED SHUT DOWN NOTICE FOR DISRUPTION OF ANY UTILITIES, AND TEMPORARY ENCLOSURES SHALL BE INSTALLED AS SECURITY MEASURES AROUND CABLES BETWEEN ANY TEMPORARY GENERATOR AND A SECURE AREA AT THE BUILDING.

- PROPOSED SEQUENCE:
1. INSTALL NEW EXTERIOR GENERATORS ALONG WITH ALL ASSOCIATED CONDUIT AND FEEDERS.
 2. INSTALL NEW AUTOMATIC TRANSFER SWITCH, NEW TRANSFORMER AND AND ALL ASSOCIATED CONDUIT AND FEEDERS.
 3. COORDINATE SHUTDOWN OF EXISTING 480Y/277V AND 208Y/120V SERVICE WITH OWNER. CONNECT NEW FEEDER FROM 480Y/277V TRANSFORMER TO ATS-1.



GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
2. FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE "FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE-GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
3. TRANSFORMER SECONDARY CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE "TRANSFORMER CIRCUIT SIZING SCHEDULE-GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
4. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH THE MOTOR CIRCUIT SIZING SCHEDULES ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
5. BASIS OF DESIGN IS EATON DISTRIBUTION EQUIPMENT AND ASCO TRANSFER SWITCHES. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT FROM OTHER APPROVED MANUFACTURERS, THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE THE LAYOUT AND CLEARANCE REQUIREMENTS IN ALL SPACES CONTAINING ELECTRICAL EQUIPMENT AND PROVIDE EQUIPMENT MEETING THE SPECIFICATIONS AND ACHIEVING CODE REQUIRED CLEARANCES WITHIN THE SPACE PROVIDED.
6. SELECTIVE COORDINATION (PER NEC ARTICLE 700.27) IS BASED ON EATON DISTRIBUTION EQUIPMENT AND ASCO TRANSFER SWITCHES. ELECTRICAL CONTRACTOR SHALL SUBMIT SELECTIVE COORDINATION STUDY WITH TIME CURRENT CHARACTERISTIC CURVES (AND TABLES FOR TESTED PAIR INSTANTANEOUS COORDINATION) FOR THE EMERGENCY SYSTEMS. ELECTRICAL CONTRACTORS SHALL RECEIVE APPROVED SHOP DRAWINGS BACK FROM ENGINEER OF RECORD PRIOR TO PURCHASING OR INSTALLING ANY ELECTRICAL DISTRIBUTION EQUIPMENT. BREAKERS MUST BE COORDINATED WITH AUTOMATIC TRANSFER SWITCHES 3-CYCLE WITHSTAND RATING. ALTERNATE MANUFACTURERS SHALL MEET SELECTIVE COORDINATION CRITERIA AT NO ADDITIONAL COST TO THE PROJECT.
7. BRANCH CIRCUIT CONDUCTORS, FEEDERS, AND BRANCH CIRCUIT OVERCURRENT PROTECTION ARE SIZED AT 125% OF THE TOTAL CONTINUOUS AND NON CONTINUOUS LOAD FOR LIGHTING AND MOTOR LOADS THAT RUN CONTINUOUSLY FOR THREE HOURS OR MORE (NEC 210.19 A, 210.20 A, AND 215.2 A). DEMAND AND CONNECTED LOADS ARE CALCULATED PER NEC 220.

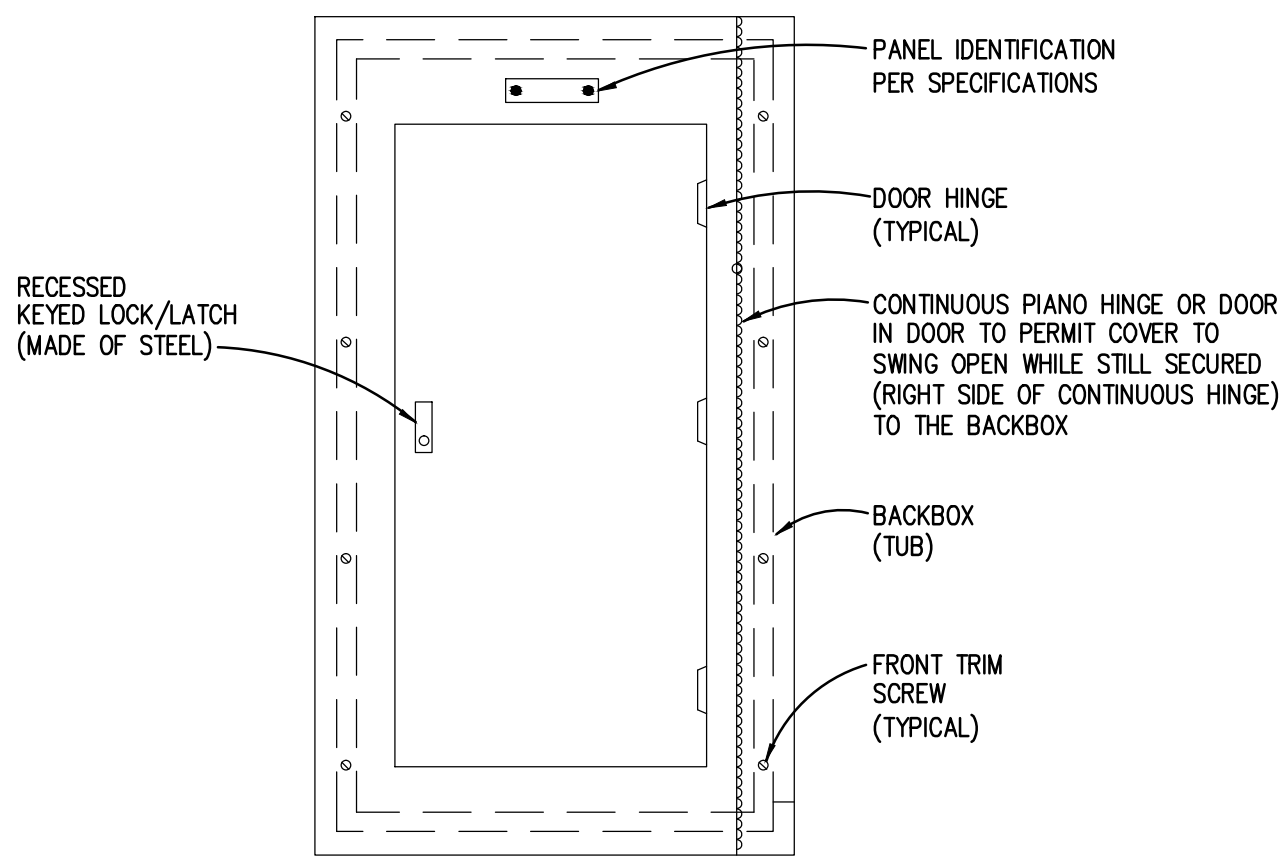
DEMOLITION NOTES:

1. REMOVE MDP-1 AND MDP-A FEEDERS. ABANDON DTE 208Y/120V SERVICE.

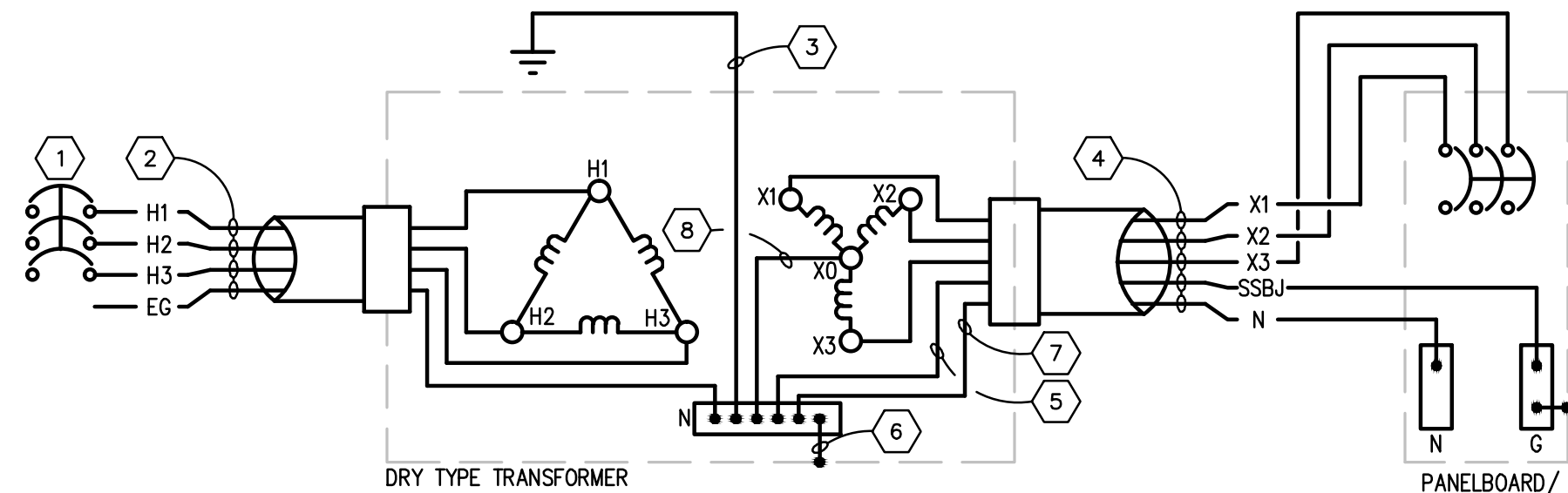
CONSTRUCTION NOTES:

1. PROVIDE 3/ø2, 1/ø2 N, & 1/ø6 G IN 1-1/4" C.
2. PROVIDE 3/ø4, 1/ø4 N, & 1/ø8 G IN 1-1/4" C.
3. PROVIDE GENERATOR START CONTROL WIRE AND CONDUIT FROM ATS-1 TO GEN-1. GENERATOR START CONTROL WIRE IS BASED ON GENERAC. COORDINATE START CONTROL WIRE REQUIREMENTS WITH APPROVED GENERATOR SHOP DRAWINGS. REFER TO DETAIL ON SHEET E7.1.
4. REFER TO FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE FOR WIRE AND CONDUIT SIZE. PROVIDE AN ADDITIONAL (2) SPARE 4" C FROM GEN-1 TO FULL BOX IN CONNECTING TUNNEL.

PANELBOARD ERP-2												
TYPE	DESCRIPTION	CB	VA	#	BA	BB	BC	#	VA	CB	DESCRIPTION	TYPE
C	SPARE	20		1				2		20	SPARE	C
C	SPARE	20		3				4		20	SPARE	C
C	SPARE	20		5				6		20	SPARE	C
C	SPARE	20		7				8		20	SPARE	C
C	SPARE	20		9				10		20	SPARE	C
C	SPARE	20		11				12		20	SPARE	C
C	SPARE	20		13				14		20	SPARE	C
C	SPARE	20		15				16		20	SPARE	C
C	SPARE	20		17				18		20	SPARE	C
C	SPARE	20		19				20		20	SPARE	C
C	SPARE	20		21				22		20	SPARE	C
C	SPARE	20		23				24		20	SPARE	C
C	SPARE	20		25				26		20	SPARE	C
C	SPARE	20		27				28		20	SPARE	C
C	SPARE	20		29				30		20	SPARE	C
C	SPARE	20		31				32		20	SPARE	C
C	SPARE	20		33				34		20	SPARE	C
C	SPARE	20		35				36		20	SPARE	C
C	SPARE	20		37				38		20	SPARE	C
C	SPARE	20		39				40		20	SPARE	C
C	SPARE	20		41				42		20	SPARE	C
				BA	BB	BC						
				PANEL LOCATION								
				REMARKS								

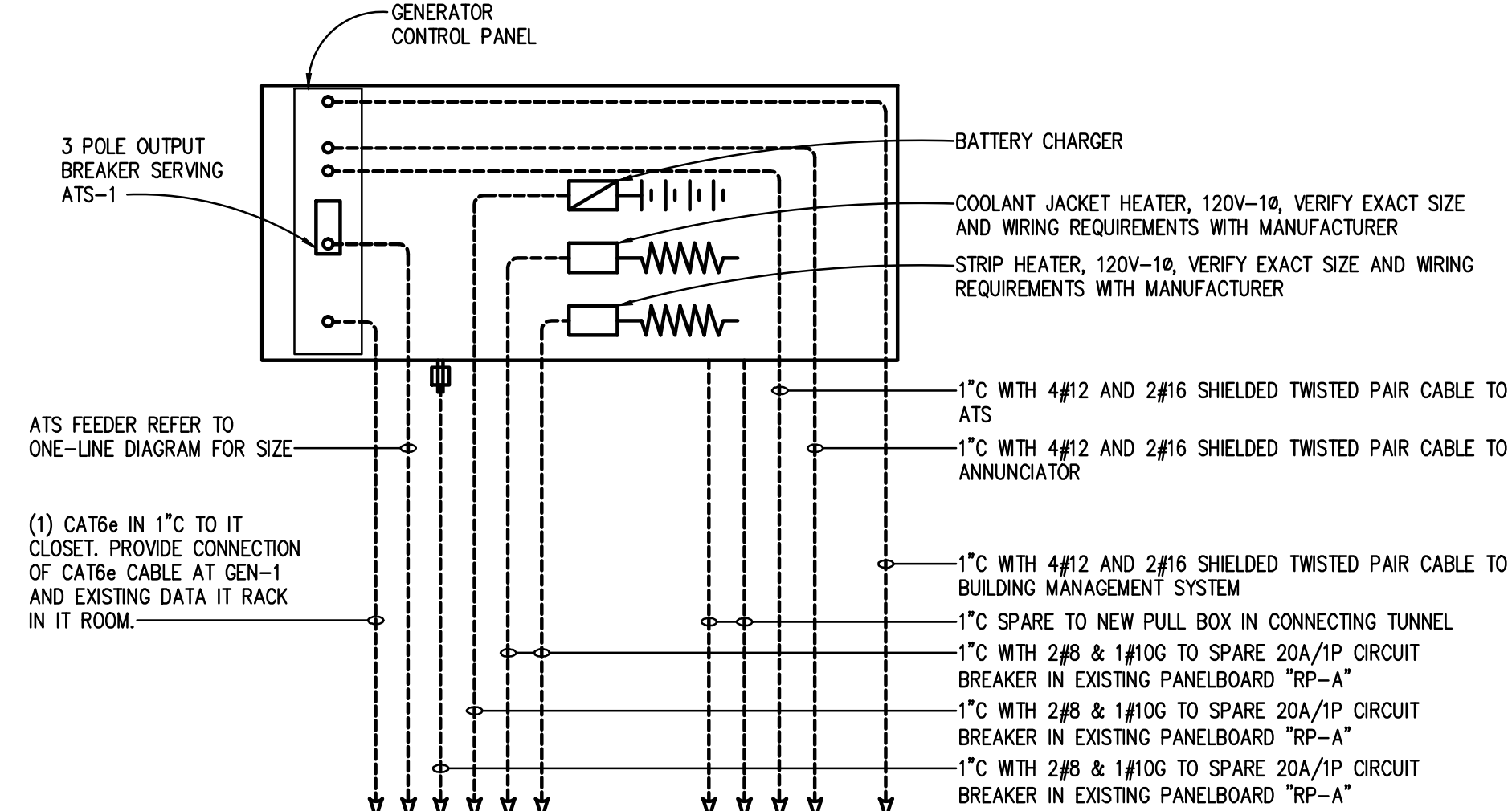


PANELBOARD FRONT COVER DETAIL
NO SCALE



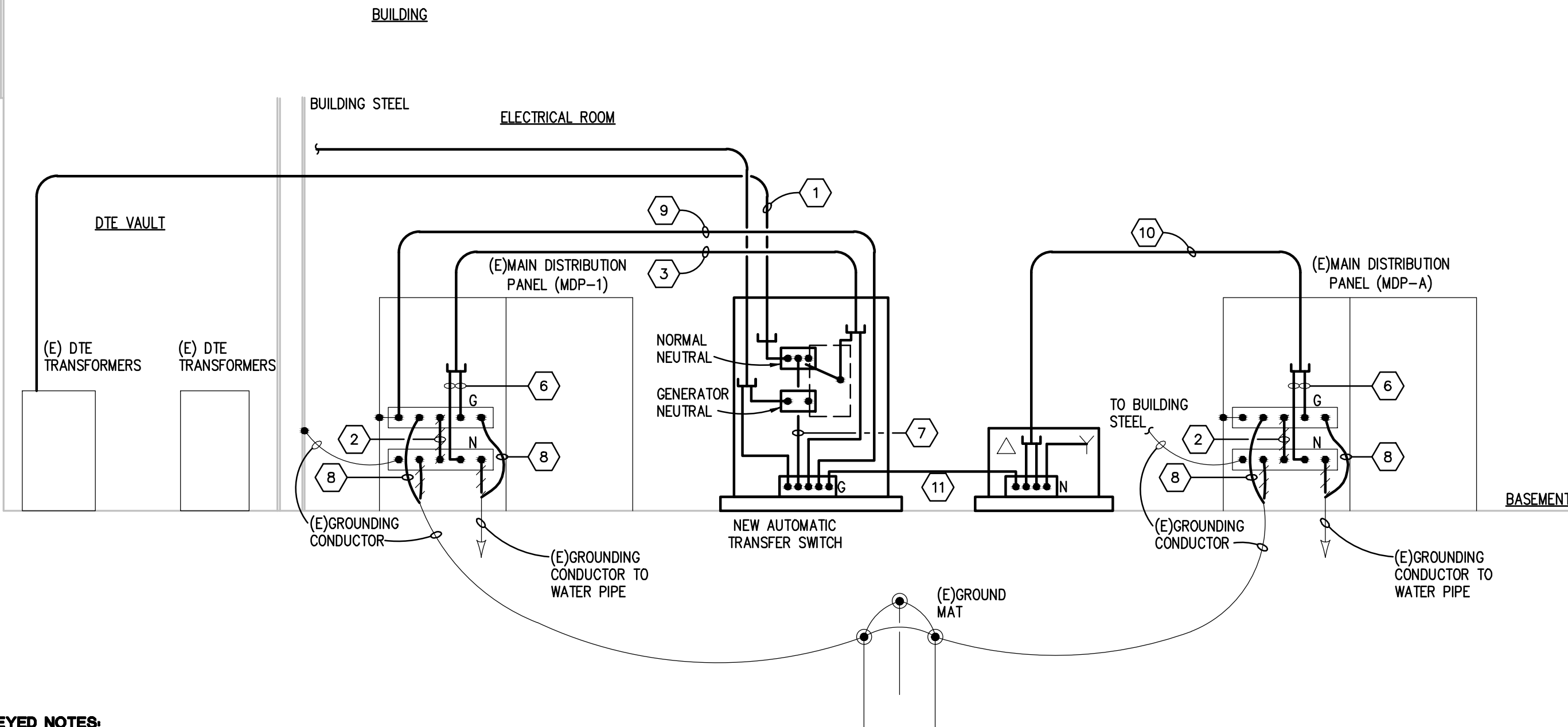
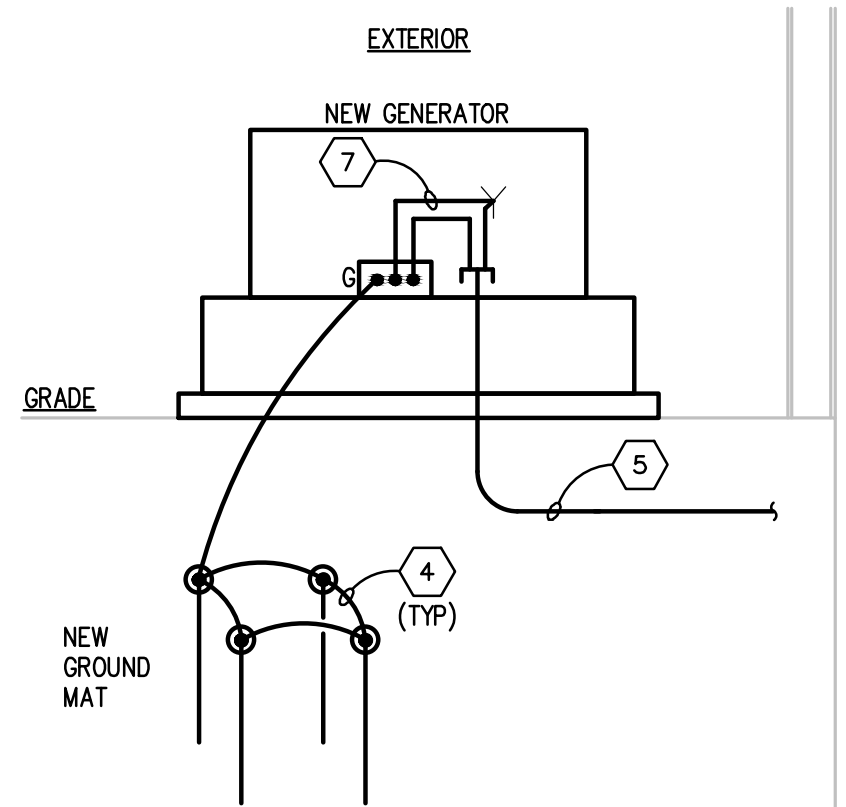
- # KEYED NOTES:
- 480V, 3# PRIMARY CIRCUIT BREAKER BASED ON DRY TYPE DISTRIBUTION TRANSFORMER CIRCUIT SIZING SCHEDULE ON ELECTRICAL STANDARD SCHEDULE DRAWING UNLESS OTHERWISE NOTED.
 - PRIMARY FEEDER BASED ON FEEDER AND BRANCH CIRCUIT SIZING TABLE ON ELECTRICAL STANDARD SCHEDULE DRAWING UNLESS OTHERWISE NOTED.
 - GROUNDING ELECTRODE CONDUCTOR TO NEAREST GROUNDING ELECTRODE (i.e. BUILDING STEEL, METAL WATER PIPE, GROUND RING, OR GROUND BUS). SEE DRY TYPE DISTRIBUTION TRANSFORMER CIRCUIT SIZING SCHEDULE ON ELECTRICAL STANDARD SCHEDULE DRAWING FOR SIZE UNLESS OTHERWISE NOTED.
 - 208Y/120V, 3#, 4W SECONDARY FEEDER BASED ON DRY TYPE DISTRIBUTION TRANSFORMER CIRCUIT SIZING SCHEDULE ON ELECTRICAL STANDARD SCHEDULE DRAWING UNLESS OTHERWISE NOTED.
 - SUPPLY SDC BONDING JUMPER.
 - SYSTEM BONDING JUMPER.
 - GROUNDING CONDUCTOR (NEUTRAL).
 - NEUTRAL CONDUCTOR PROVIDED WITH EQUIPMENT.

DRY TYPE DISTRIBUTION TRANSFORMER GROUNDING ARRANGEMENT
NO SCALE



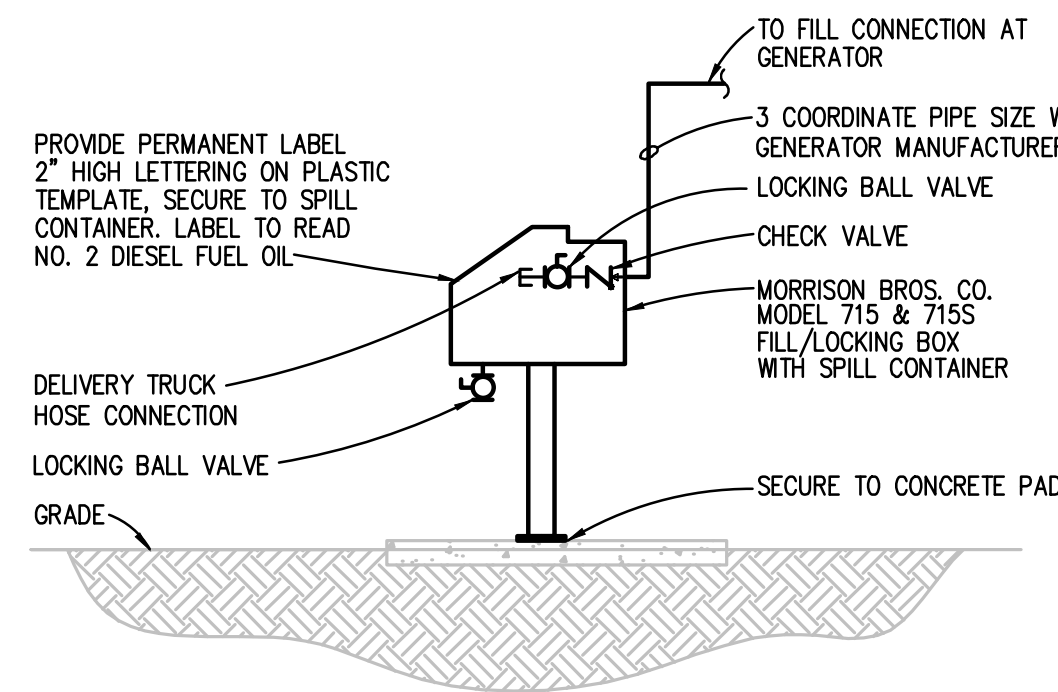
NOTE: VERIFY ALL WIRING WITH SELECTED GENERATOR MANUFACTURERS DRAWINGS AND WIRING DIAGRAMS

GENERATOR WIRING CONNECTION DETAIL
NO SCALE

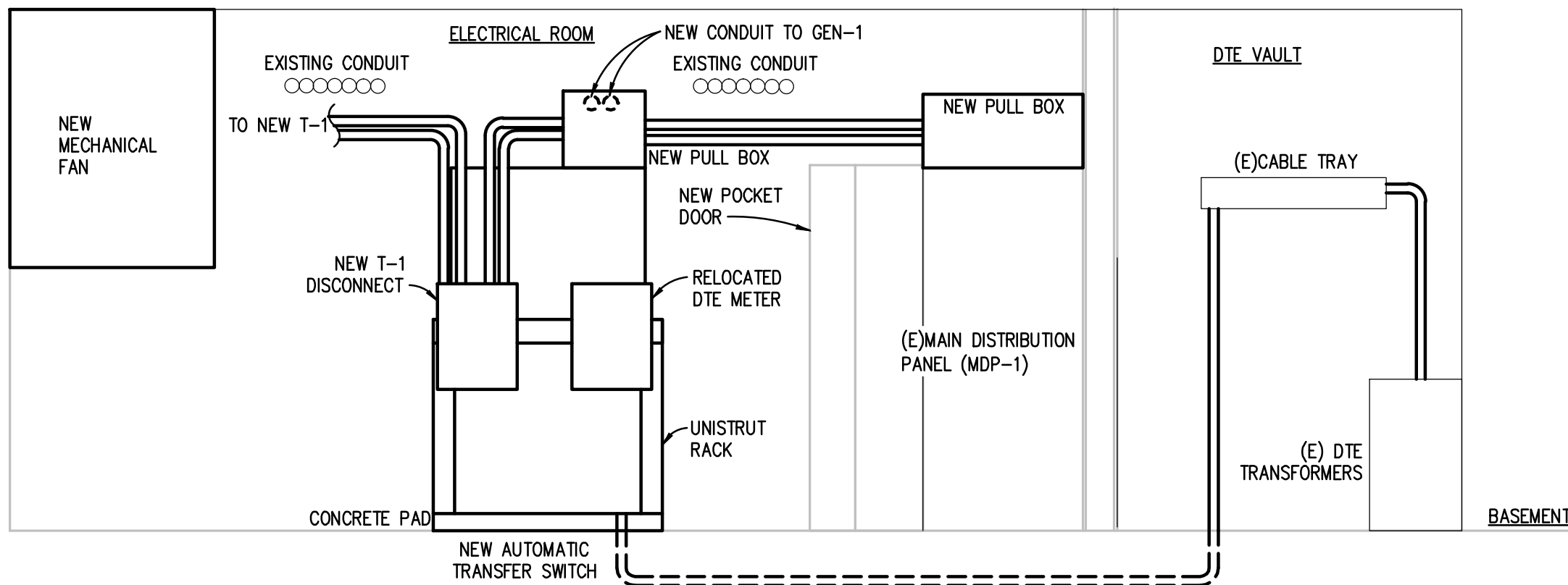


- # KEYED NOTES:
- SERVICE ENTRANCE PHASE CONDUCTORS AND GROUNDING CONDUCTOR IN CONDUIT. SEE ONE LINE DIAGRAM.
 - REMOVE EXISTING MAIN BONDING JUMPER.
 - NEW PHASE CONDUCTORS, NEUTRAL, AND EQUIPMENT GROUND IN CONDUIT.
 - NEW GROUNDING ELECTRODE CONDUCTOR, #4/0 COPPER.
 - GENERATOR SERVICE FEEDERS IN CONDUIT (3P+N,G). SEE ONE LINE DIAGRAM. NEUTRAL (N) CONNECTED TO GENERATOR NEUTRAL BUS IN TRANSFER SWITCH.
 - CONNECT NEW NEUTRAL AND EQUIPMENT GROUND TO EXISTING NEUTRAL AND GROUNDING BUSBAR IN EXISTING MAIN DISTRIBUTION PANEL.
 - BONDING JUMPER, PROVIDED BY MANUFACTURER AS PART OF LISTED EQUIPMENT SIZED PER 2011 NEC 250.28 AND 250.102.
 - GROUNDING ELECTRODE CONDUCTOR CONNECTED TO NEUTRAL BUS. DISCONNECT FROM NEUTRAL BUS AND CONNECT TO GROUND BUS.
 - 4/0 INSULATED COPPER IN CONDUIT BETWEEN MDP GROUND BUS AND NEW SERVICE ENTRANCE POINT.
 - TRANSFER SECONDARY FEEDER. SPN,G REFER TO DRY TYPE DISTRIBUTION TRANSFORMER GROUNDING ARRANGEMENT DETAIL.
 - GROUNDING ELECTRODE CONDUCTOR CONNECTED FROM NEW AUTOMATIC TRANSFER SWITCH GROUNDING BUSBAR TO NEW TRANSFORMER GROUNDING BUSBAR.

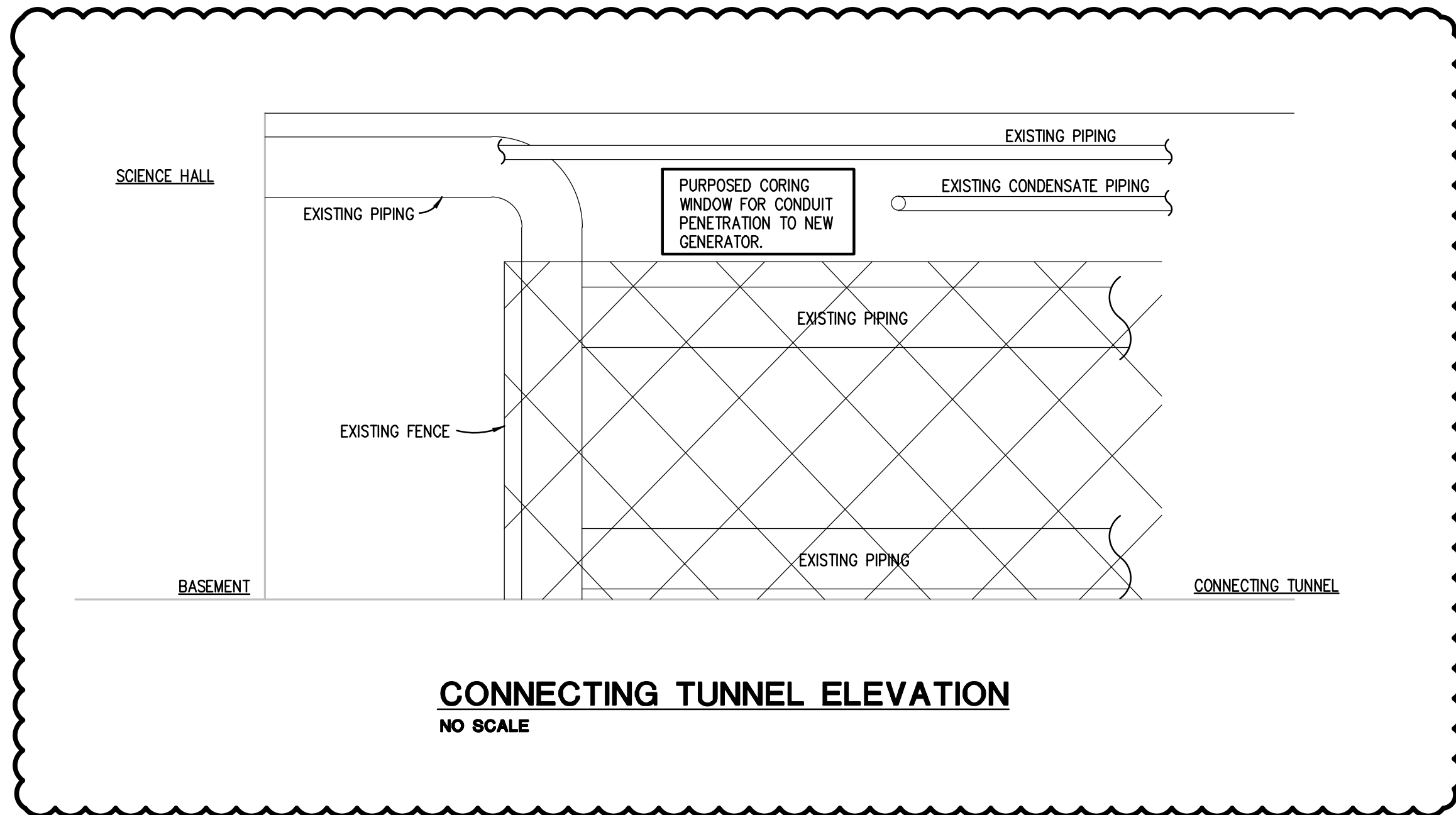
GROUNDING DIAGRAM
NO SCALE



REMOTE FILL STATION DIAGRAM
NO SCALE



ELEC 0012 SECTION
NO SCALE



CONNECTING TUNNEL ELEVATION
NO SCALE

REVISION
9/24/2014

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ADDENDUM 3

5145 Livonia, Suite 100
Livonia, MI 48150
Tel: 248-879-5966 Fax: 248-879-4007
www.PeterBassoAssociates.com
PEA Project No. 204075

Peter Basso Associates Inc
CONSULTING ENGINEERS

PROJECT TITLE
WSU 005 - SCIENCE HALL
ELECTRICAL RELIABILITY
UPGRADE
WSU Project No.: 005-219056
Detroit MI 48202

WAYNE STATE
UNIVERSITY

SHEET TITLE
ELECTRICAL DETAILS

DATE

8/26/2014

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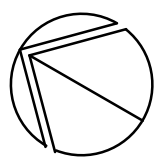
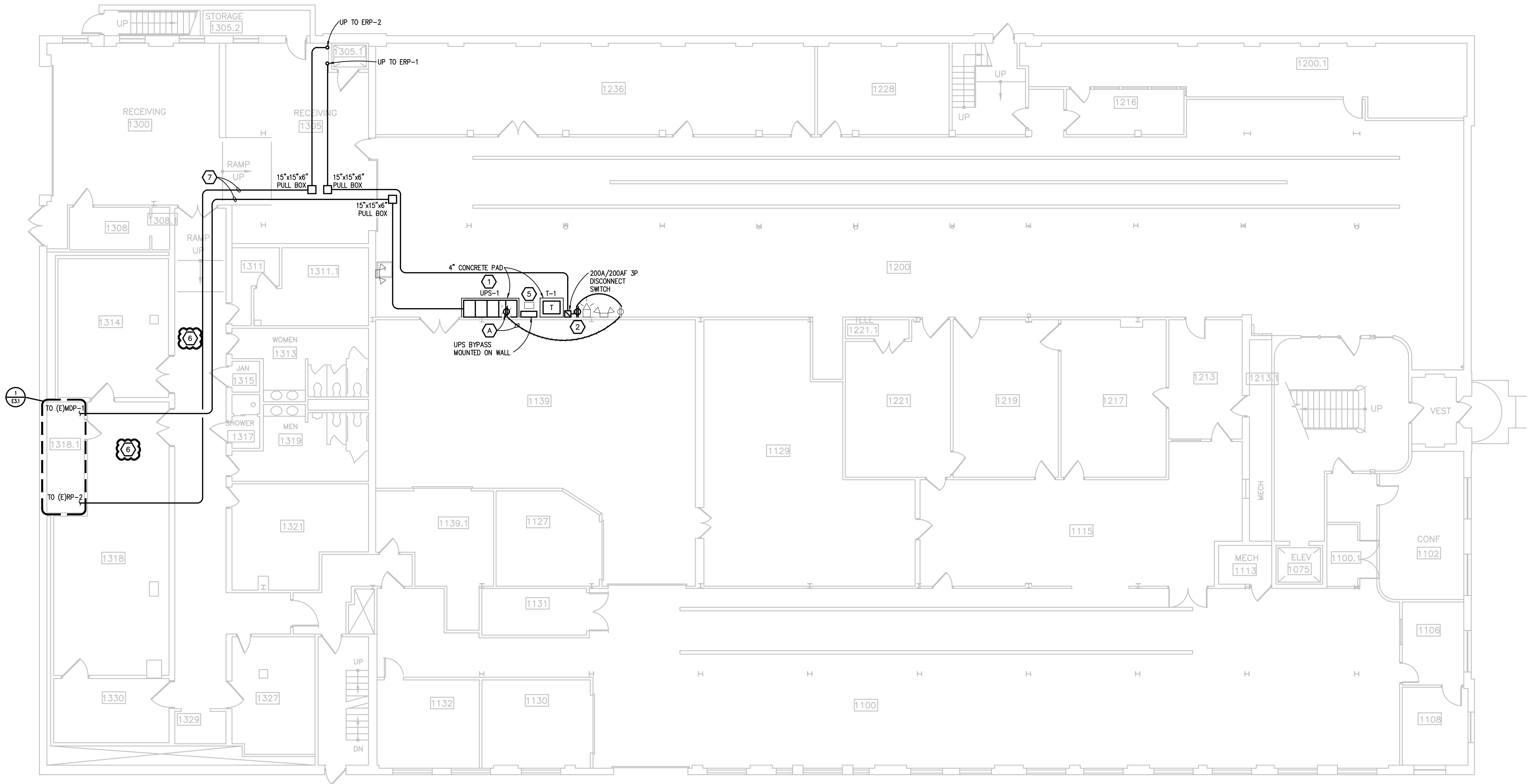
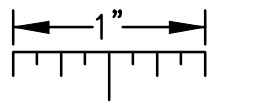
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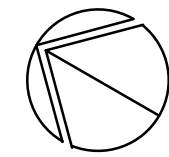
E7.1

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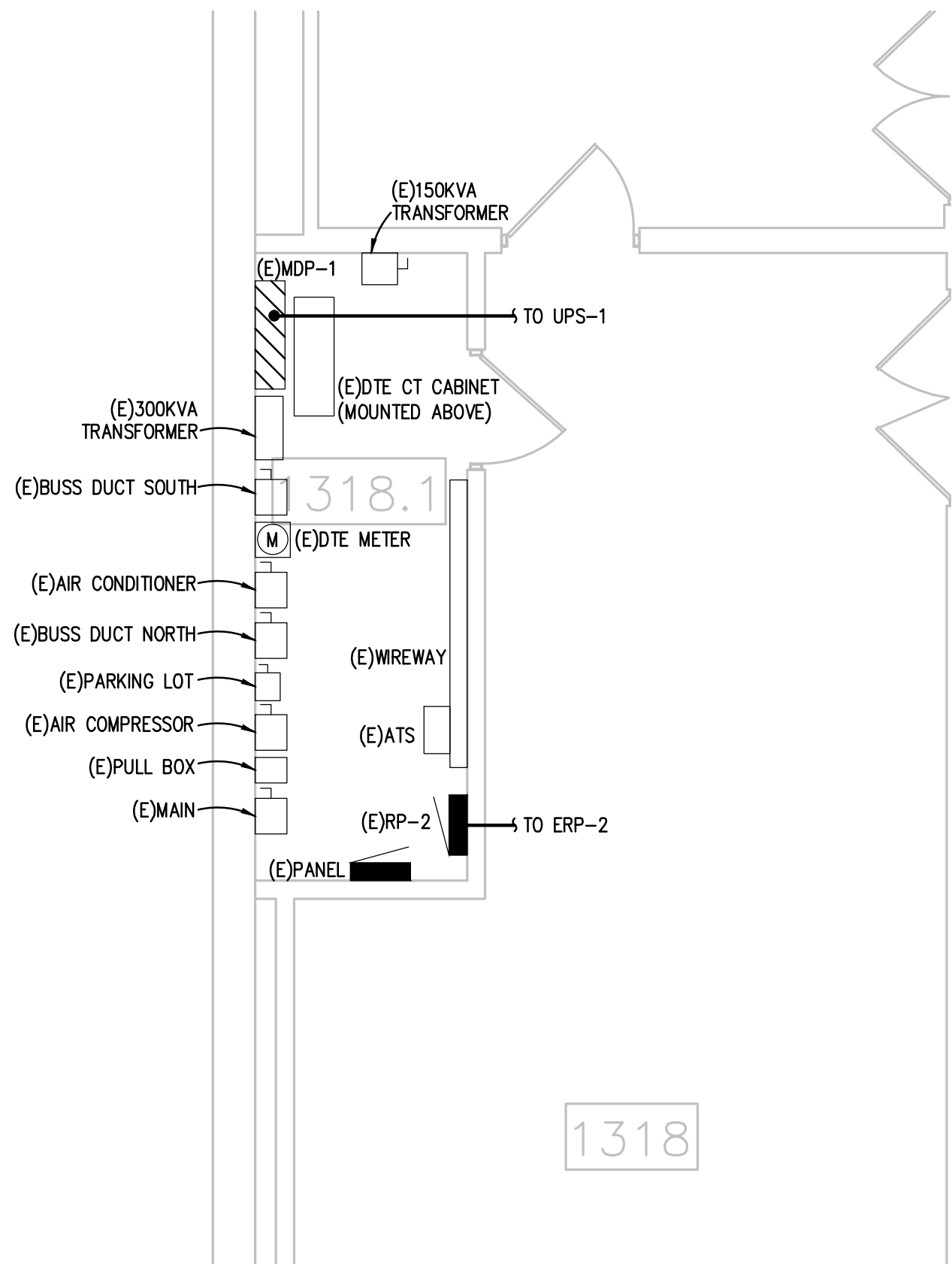
THE FOLLOWING DIMENSION EQUALS
ONE INCH WHEN PRINTED TO SCALE.



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



ENLARGED ELECTRICAL ROOM 1318.1
SCALE: 1/2" = 1' - 0"



GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS.
4. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.

DEMOLITION NOTES:

- A. RELOCATE EXISTING DUPLEX RECEPTACLE INCLUDING CONDUIT AND WIRE AS REQUIRED.

CONSTRUCTION NOTES:

1. PROVIDE 4" HIGH CONCRETE HOUSEKEEPING PAD. COORDINATE CONCRETE PAD SIZE WITH FINAL APPROVED UPS UNIT SHOP DRAWING.
2. RELOCATED RECEPTACLE. EXTEND EXISTING CONDUIT AND WIRE TO EXISTING DOWNSTREAM DUPLEX RECEPTACLE AS REQUIRED. COORDINATE EXACT LOCATION OF RELOCATED RECEPTACLE WITH WIDTH OF SELECTED UPS.
3. REMOVE EXISTING RACEWAY BRANCH CIRCUITS FROM SOURCE. PROVIDE NEW BRANCH CIRCUITS TO NEW ERP-1 PANEL AS REQUIRED.
4. REFER TO SHEET E3.1 FOR CONTINUATION OF PROPOSED CONDUIT ROUTING.
5. EXISTING WALL MOUNTED COMPUTER/SERVER. OWNER TO RELOCATE AS REQUIRED.
6. REMOVE AND REPLACE EXISTING LAY-IN CEILING AS REQUIRED TO INSTALL BRANCH CIRCUITS. REPLACE DAMAGED CEILING GRID AND TILES.
7. PROPOSED FEEDER ROUTING EXISTING SPACES HAVE NO CEILING AND STEEL STRUCTURE IS EXPOSED. CONDUIT TO BE INSTALLED AT HEIGHT OF EXISTING LOWEST UTILITIES. PROVIDE SUPPORT FOR CONDUIT AS REQUIRED. SUPPORT FOR CONDUIT SHALL BE INDEPENDENT OF EXISTING UTILITIES SUPPORT. CHANGE IN PROPOSED ROUTING OF FEEDER FROM CONTRACTOR TO BE SUBMITTED TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.

REVISION
9/24/2014

REVISION
ADDENDUM 3

5145 Livonia, Suite 100
Livonia, MI 48150
Tel: 248-879-5566 Fax: 248-879-4007
www.PeterBassoAssociates.com
PEA Project No. 20100288
Peter Basso Associates Inc.
CONSULTING ENGINEERS

PROJECT TITLE
WSU 169 - BIOENGINEERING BUILDING
ELECTRICAL RELIABILITY
UPGRADE
WSU Project No.: 169-235557
Detroit, MI 48202

**WAYNE STATE
UNIVERSITY**

SHEET TITLE
FIRST FLOOR POWER PLAN

DATE
8/26/2014
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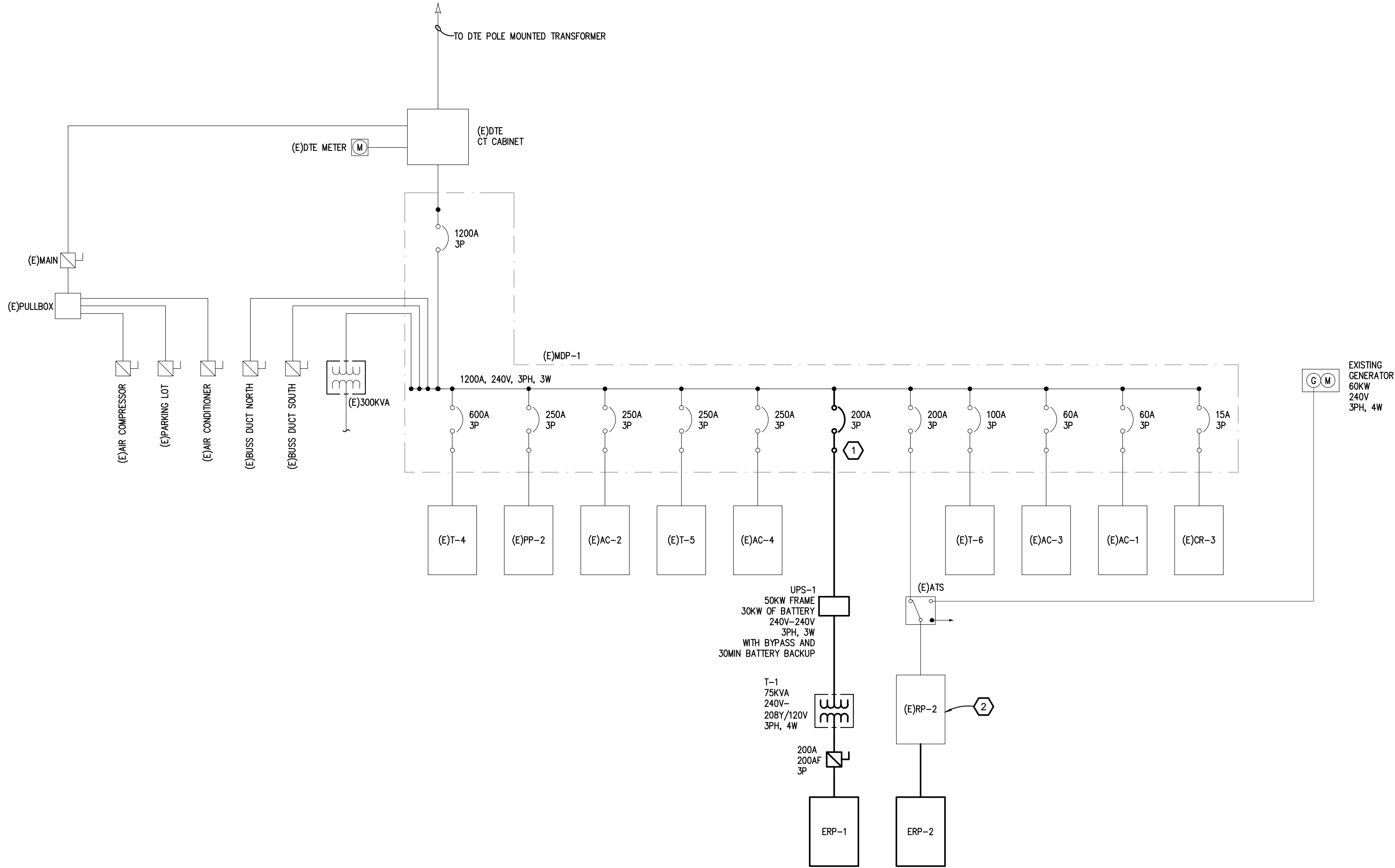
E3.1

GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
2. FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE-GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
3. BASIS OF DESIGN IS EATON UNINTERRUPTIBLE POWER SUPPLY UNIT. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT FROM OTHER APPROVED MANUFACTURERS, THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE THE LAYOUT AND CLEARANCE REQUIREMENTS IN ALL SPACES CONTAINING ELECTRICAL EQUIPMENT AND PROVIDE EQUIPMENT MEETING THE SPECIFICATIONS AND ACHIEVING CODE REQUIRED CLEARANCES WITHIN THE SPACE PROVIDED.
4. ALL SHUT DOWN WORK IS TO BE COORDINATED SO THAT WORK IS SCHEDULED FOR SUNDAYS OR HOLIDAYS. THE PREMIUM PORTION ONLY OF WAGES ASSOCIATED WITH A SHUTDOWN IS TO BE COVERED IN THE ALLOWANCE THAT IS TO BE INCLUDED IN THE BASE BID. (FOR BIOENGINEERING THIS ALLOWANCE IS \$5,000.) IT WILL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE HOW TO SEQUENCE THE WORK, AS WELL AS THE MEANS AND METHODS NECESSARY TO PROVIDE POWER TO THE BUILDING FOR ANY SHUT DOWN EXCEEDING 2 HOURS IN DURATION, INCLUDING PROVIDING ANY NECESSARY EQUIPMENT, (RENTING / OPERATING GENERATORS, PROVIDING FUEL, ETC.) TO SUPPORT A BUILDING LOAD OF 70KW. PROPOSED SEQUENCING AND MEANS AND METHODS MUST BE REVIEWED AND APPROVED BY WSU AND ALL COSTS TO SUPPORT THE PROPOSED SEQUENCING AND PROVIDE POWER FOR ANY SHUT DOWN EXCEEDING 2 HOURS IS TO BE INCLUDED WITHIN THE BASE BID. NOTE: CONTRACTORS MUST PROVIDE AT A MINIMUM A SEVEN (7) DAY ADVANCED SHUT DOWN NOTICE FOR DISRUPTION OF ANY UTILITIES, AND TEMPORARY ENCLOSURES SHALL BE INSTALLED AS SECURITY MEASURES AROUND CABLES BETWEEN ANY TEMPORARY GENERATOR AND A SECURE AREA AT THE BUILDING.

CONSTRUCTION NOTES:

1. PROVIDE NEW CIRCUIT BREAKER IN SPACE POSITION IN EXISTING DISTRIBUTION PANELBOARD. EXISTING DISTRIBUTION PANELBOARD MANUFACTURER IS GENERAL ELECTRIC. INCLUDE IN BID PRICE COST FOR ONE FOUR HOUR SHUTDOWN DURING PREMIUM TIME DURING A SATURDAY MORNING FROM 8AM TO 12PM. COORDINATE SHUTDOWN OF DISTRIBUTION PANELBOARD WITH OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF WORK.
2. PROVIDE 100A 3P CIRCUIT BREAKER IN SPACE IN EXISTING PANELBOARD.



PARTIAL ONE LINE DIAGRAM
NO SCALE

#	EQUIPMENT	MANUFACTURER	MODEL	ROOM	Voltage	Amps	Wattage
G1	REFRIGERATOR	FRIGIDAIRE	FRT2116JWO	2245	120v	5	600
G2	REFRIGERATOR	KENMORE	2539289110	2245	120v	5	600
G3	REFRIGERATOR	KENMORE	2539658420	2245	120v	5	600
G4	REFRIGERATOR	FRIGIDAIR	-	2225	120v	8.5	1020
G5	-80 FREEZER	FISHER SCIENTIFIC	-	2225	120v	16	1920
G6	REFRIGERATOR	KENMORE	253.60722000	2223	120v	5	600
G7	REFRIGERATOR	FISHER SCIENTIFIC	-	2223	120v	5	600

GENERATOR LOAD CALCULATION

Measured Load:	7.20 KVA
Added Load	5.94 KVA
Total Load:	13.14 KVA 10.51 kW

#	EQUIPMENT	MANUFACTURER	MODEL	ROOM	Voltage	Amps	Wattage
U1	AMAX CLUSTER	-	-	2241	120v	30	3600
U2	PC SERVER(3)	-	-	2241	120v	12	1440
U3	SUN CLUSTER & PSSC LAB CLUSTER	SUN INFOSYSTEMS	-	2241	120v	20	2400
U4	RACK EQUIPMENT	MULTIPLE	-	2241			9376
U5	RACK	-	-	2241	120v	20	2400
U6	INCUBATORS(2)	HERA CELL	150i	2225	120v	10	2400
U7	INCUBATOR	HERA CELL	150i	2223	120v	10	1200

UPS LOAD CALCULATION

Total Load:	22.816 KVA 18.2528 kW
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FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE - GENERAL PURPOSE						
OVERCURRENT DEVICE RATING (AMPERES)	WIRE SIZE (AWG OR KCMIL)		CONDUIT SIZE			
	PHASE & NEUTRAL	GROUND	COPPER CONDUCTORS			
			SINGLE PHASE 2 WIRE+G (FPM, IN, IN)	SINGLE PHASE 3 WIRE+G (FPM, IN, IN)	THREE PHASE 3 WIRE+G (FPM, IN, IN)	THREE PHASE & NEUTRAL 4 WIRE+G (FPM, IN, IN)
15-20	12	12	3/4"	3/4"	3/4"	3/4"
25-30	10	10	3/4"	3/4"	3/4"	3/4"
35-40	8	10	3/4"	3/4"	3/4"	3/4"
45-50	8 (6)	10	3/4"	3/4"	3/4"	3/4"
60	6 (4)	10	3/4" (1")	3/4" (1")	3/4" (1")	3/4" (1")
70	4	8	1"	1 1/4"	1 1/4"	1 1/4"
80	4 (3)	8	1"	1 1/4"	1 1/4"	1 1/4"
90-100	3 (2)	8	1 1/4"	1 1/4"	1 1/4"	1 1/4"
110	2 (1)	6	-	1 1/4"	1 1/4"	1 1/4" (1 1/2")
125	1 (1/0)	6	-	1 1/4" (1 1/2")	1 1/4" (1 1/2")	1 1/2"
150	1/0	6	-	1 1/2"	1 1/2"	1 1/2"
175	2/0	6	-	2"	2"	2"
200	3/0	6	-	2"	2"	2 1/2"
225	4/0	4	-	2"	2"	2 1/2"
250	250	4	-	2 1/2"	2 1/2"	2 1/2"
300	350	4	-	2 1/2"	2 1/2"	3"
350	500	3	-	3"	3"	3"
400	500	3	-	3"	3"	3"
450	2-4/0	2-2	-	2-2"	2-2"	2-2 1/2"
500	2-250	2-2	-	2-2 1/2"	2-2 1/2"	2-2 1/2"
600	2-350	2-1	-	2-2 1/2"	2-2 1/2"	2-3"
700	2-500	2-1/0	-	2-3"	2-3"	2-3"
800	2-500	2-1/0	-	2-3"	2-3"	2-3 1/2"
1000	3-400	3-2/0	-	3-3"	3-3"	3-3"
1200	3-600	3-3/0	-	3-3 1/2"	3-3 1/2"	3-3 1/2"
1600	4-600	4-4/0	-	4-3 1/2"	4-3 1/2"	4-3 1/2"
2000	5-600	5-250	-	5-3 1/2"	5-3 1/2"	5-3 1/2"

* = SEE NOTE 4

NOTES:

- CONTRACTOR TO SIZE FEEDERS AND BRANCH CIRCUITS BASED ON THIS SCHEDULE AND OVER CURRENT DEVICE SIZE, UNLESS NOTED OTHERWISE.
- CONTRACTOR MAY COMBINE 20A CIRCUITS AS NOTED IN SPECIFICATION.
- CONDUCTORS ARE BASED ON THHN/THWN UP TO AND INCLUDING #4/0. LARGER THAN #4/0 ARE BASED ON TYPE XHHW.
- CONDUCTORS ARE BASED ON 90°C, 600V, INSULATED COPPER WIRE APPLIED AT 75°C FOR TERMINATION RATED 60/75°C OR 75°C. FOR TERMINATION RATED AT 60°C, USE CONDUCTORS AND CONDUIT SIZES INDICATED IN PARENTHESES.
- CONDUIT SIZES ARE VALID FOR EMT OR RGS. CONDUIT SIZES SHALL BE ADJUSTED AS REQUIRED FOR OTHER TYPES OF CONDUIT.
- ELECTRICAL CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR AND PROVIDE REQUIRED WIRE SIZES TO ACCOMMODATE MECHANICAL EQUIPMENT LUG SIZES.
- SIZE OF DISCONNECT SWITCH LOCATED AT EQUIPMENT SHALL BE SIZED BASED UPON OVERCURRENT PROTECTION OF THAT DEVICE.
- PRIOR APPROVAL FROM ENGINEER SHALL OCCUR IF A DIFFERENT SIZE/NUMBER OF CONDUCTORS IS TO BE USED. AMPACITY SHALL BE EQUAL OR GREATER.

DRY TYPE DISTRIBUTION TRANSFORMER CIRCUIT SIZING SCHEDULE						
TRANSFORMER KVA	PRIMARY (480V)	CIRCUIT BREAKER (NOTE 4)	SECONDARY (208Y/120 VOLT)			GROUNDING ELECTRODE CONDUCTOR
			BRANCH CIRCUIT SIZE (AWG OR KCMIL)	SUPPLY SIDE BONDING JUMPER	CONDUIT (4W + G)	
9	20A	30A	10	#8	3/4"	#8
15	25A	60A	6	#8	3/4"	#8
30	45A	100A	3	#8	1 1/4"	#8
45	70A	175A	2/0	#4	2"	#4
75	125A	300A/225A**	350 / 4/0**	#2	3"	#2
112 1/2	175A	400A	600	#1/0	3 1/2"	#1/0
150	225A	600A	2-350	#2/0	2-3"	#2/0
225	350A	800A	2-600	#3/0	2-3 1/2"	#3/0
300	500A	1200A	3-600	#3/0	3-3 1/2"	#3/0
500	800A	1600A	4-600	#3/0	4-3 1/2"	#3/0

* = SEE NOTE 3

** = SEE NOTE 4

NOTES:

- TRANSFORMERS AND FEEDERS ARE BASED ON 480 VOLT, 3 PHASE, 3 WIRE PRIMARY AND 208Y/120 VOLT, 3 PHASE, 4 WIRE, SECONDARY.
- FEEDERS INDICATED ARE BASED ON COPPER CONDUCTORS. IF ALUMINUM CONDUCTORS ARE PERMITTED AND SELECTED, FEEDER SIZES SHALL BE PER THE NEC.
- CONDUCTORS ARE BASED ON 90°C, 600V, INSULATED COPPER WIRE APPLIED AT 75°C FOR TERMINATION RATED 60/75°C OR 75°C.
- THE SMALLER SIZE IS TO BE USED TO FEED 225A PANELBOARDS.
- PRIMARY OVERCURRENT PROTECTION IS SIZED AT 125% OF TRANSFORMER FULL LOAD CURRENT. PROVIDE PRIMARY OVERCURRENT DEVICE SELECTION TO ALLOW TRANSFORMER IN-RUSH CURRENT AND PROTECT BASED ON THE ANSI DAMAGE CURVE. IF MANUFACTURER REQUIRES PRIMARY OVERCURRENT GREATER THAN 125%(NOT TO EXCEED 250%) THEN PRIMARY FEEDER SHALL BE INCREASED ACCORDINGLY.

SPECIAL RECEPTACLES	
TYPE	DESCRIPTION
◇	125V, 30A, SINGLE PHASE, LOCKING RECEPTACLE, 2 POLE, 3 WIRE (NEMA L5-30R)
◇	250V, 20A, SINGLE PHASE, LOCKING RECEPTACLE, 2 POLE, 3 WIRE (NEMA L6-20R)
◇	250V, 30A, SINGLE PHASE, LOCKING RECEPTACLE, 2 POLE, 3 WIRE (NEMA L6-30R)
◇	250V, 20A, THREE PHASE, LOCKING RECEPTACLE, 3 POLE, 4 WIRE (NEMA L15-20R)
◇	250V, 30A, THREE PHASE, LOCKING RECEPTACLE, 3 POLE, 4 WIRE (NEMA L15-30R)
◇	208Y/120V, 30A, THREE PHASE, LOCKING RECEPTACLE, 4 POLE, 5 WIRE (NEMA L21-30R)
◇	125/ 250V SINGLE PHASE RECEPTACLE, 3 POLE, 4 WIRE (NEMA 14-30R)
◇	125/ 250V SINGLE PHASE RECEPTACLE, 3 POLE, 4 WIRE (NEMA 14-50R)

BRANCH CIRCUIT VOLTAGE DROP WIRING SCHEDULE FOR SINGLE PHASE CIRCUITS						
BRANCH CCT RATING (A)	WIRE SIZE (AWG)	MAXIMUM BRANCH CIRCUIT LENGTH (IN FEET)				
		120V	208V	240V	277V	480V
20A	12	63	143	165	191	331
	10	128	222	256	295	511
	8	201	348	402	464	804
	6	313	542	625	721	1250
30A	10	85	148	170	197	341
	8	134	232	268	309	536
	6	208	361	417	481	833
	4	313	542	625	721	1250

NOTES:

- THE ABOVE TABLE VALUES ARE BASED ON COPPER CONDUCTORS, IN STEEL CONDUIT, WITH A LOAD POWER FACTOR OF 0.85 PER NEC CHAPTER 9, TABLE 9.
- PROVIDE BRANCH CIRCUIT CONDUCTORS AS INDICATED IN THE TABLE ABOVE FOR ALL LIGHTING AND RECEPTACLE BRANCH CIRCUITS. WHERE BRANCH CIRCUITS SERVE DEDICATED EQUIPMENT, THE CONTRACTOR MAY PERFORM VOLTAGE DROP CALCULATIONS BASED ON ACTUAL EQUIPMENT CONNECTED LOAD AND PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO A MAXIMUM OF 3%.
- CONDUCTOR SIZES ARE BASED ON MAXIMUM OF 9 CURRENT CARRYING CONDUCTORS IN A SINGLE CONDUIT.
- LIMITS FOR CONDUCTOR LENGTHS SHOWN ARE BASED ON A MAXIMUM BRANCH CIRCUIT LOADING OF 64% OF THE BRANCH BREAKER RATING AND A MAXIMUM OF 3 PERCENT VOLTAGE DROP. TO COMPLY WITH ASHRAE/IES 90.1 - 1999 AND THE NEC, FOR CIRCUITS LOADED GREATER THAN 64% OF BRANCH BREAKER RATING, THE CONTRACTOR SHALL PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO 3%.

LIGHTING FIXTURE SCHEDULE			
TYPE	DESCRIPTION	MANUFACTURER	LAMPS
L1	LED WALL PACK LIGHT FIXTURE WITH DIE CAST ALUMINUM HOUSING, IMPACT-RESISTANT TEMPERED GLASS LENS THAT IS FULLY GASKETED, AND INTEGRAL PHOTOCCELL. FIXTURE SHALL BE DARK BRONZE FINISH, 120V OPERATION. TYPE 3 DISTRIBUTION AND FUSED.	1. LITHONIA TWIN LED SERIES 2. PHILIPS MPW LED SERIES 3. COOPER MP SERIES	10 LEDs
L2	LED FLOOD LIGHT FIXTURE AND 20" HIGH SQUARE STEEL POLE. FLOOD LIGHT FIXTURE TO HAVE DIE CAST ALUMINUM HOUSING, FULLY GASKETED LENS ON HINGED DOOR FRAME AND INTEGRAL PHOTOCCELL. FIXTURE TO BE MOUNTED MOUNTED ON TOP OF POLE. POLE AND FIXTURE SHALL HAVE DARK BRONZE FINISH. PROVIDE YOKE ON POLE TOP FOR MOUNTING THE TWO FIXTURES. 120V OPERATION	1. INVUE VFS SERIES 2. WIDELIGHT UF3 SERIES 3. CARDICO DLF SERIES	40 LEDs (70mA)

TELECOMMUNICATIONS OUTLET SCHEDULE			
TAG	DESCRIPTION	TYPE	REMARKS
A1	1 DATA	1 CAT6e	
A2	1 VOICE	1 CAT6e	
A3	1 DATA + 1 VOICE	2 CAT6e	
A4	2 DATA	2 CAT6e	
A5	2 DATA + 1 VOICE	3 CAT6e	
A6	2 DATA, 2 VOICE, 2 SMF, 2MMF	4 CAT6e, 2 SMF, 2 MMF	
A7	3 DATA	3 CAT6e	
A8	3 DATA + 1 VOICE	4 CAT6e	
A9	4 DATA	4 CAT6e	
A10	6 DATA	6 CAT6e	
BX	EXISTING OUTLET TO BE RE-CABLED. SIMILAR TO "A" OUTLETS ABOVE.		PROVIDE NEW CONNECTORS AND FACEPLATE
C1	1 COAX	1 RG6	
C2	1 COAX + 1 DATA	1 RG6, 1 CAT6e	
C3	1 COAX, 1 DATA, 1 SVHS	1 RG6, 1 CAT6e, 1 SVHS	

▽ EMPTY BOX W/ CONDUIT FOR FUTURE TELECOM OUTLET

XX[TE] TELECOM OUTLET. PROVIDE CABLE PER SCHEDULE ABOVE.

XX[FE] TELECOM OUTLET TO BE PROVIDED IN FLOOR SERVICE FITTING. PROVIDE CABLE PER SCHEDULE ABOVE.

XX[ET] TELECOM OUTLET TO BE PROVIDED IN POKE-THRU ASSEMBLY. PROVIDE CABLE PER SCHEDULE ABOVE.

RACEWAY APPLICATION SCHEDULE						
RACEWAY		ELECTRICAL METALLIC TUBING (EMT)	SURFACE RACEWAY	FLEXIBLE METAL CONDUIT (FMC)	LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)	RIGID STEEL CONDUIT
OUTDOOR	EXPOSED					X
	UNDERGROUND					X X
INDOOR	CONNECTED TO VIBRATING EQUIPMENT			X		
	EXPOSED NOT SUBJECT TO PHYSICAL DAMAGE - UNFINISHED SPACES	X				
	EXPOSED NOT SUBJECT TO PHYSICAL DAMAGE - FINISHED SPACES	X				
	CONCEALED IN CEILINGS, INTERIOR WALL AND PARTITIONS	X				
	CONNECTED TO VIBRATING EQUIPMENT			X X		
	DAMP AND WET LOCATIONS				X	

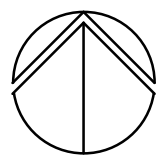
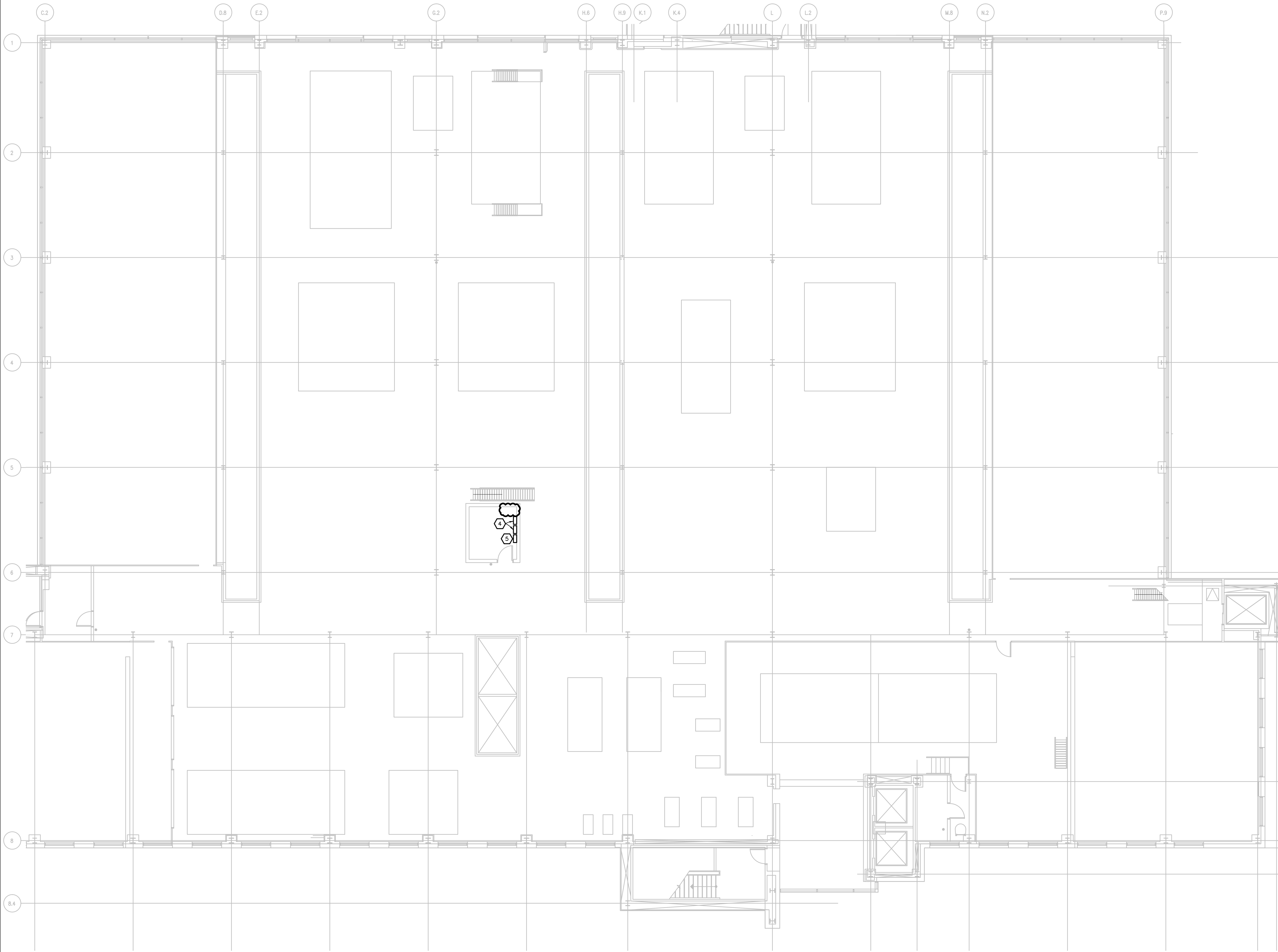
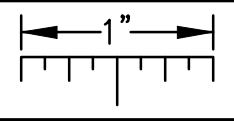
GENERAL NOTES:

- "X" INDICATES ACCEPTABLE SELECTION.
- REFER TO "CONDUCTORS AND CABLES" SPECIFICATION FOR APPLICATION LIMITATIONS OF AC/MC CABLE.

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

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THE FOLLOWING DIMENSION EQUALS
ONE INCH WHEN PRINTED TO SCALE.



PENTHOUSE ELECTRICAL PLAN
SCALE: 1/8" = 1' - 0"

GENERAL NOTES:

- THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
- INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
- TRANSFORMER SECONDARY CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH TRANSFORMER CIRCUIT SIZING SCHEDULE SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
- MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
- REMOVE AND REPLACE CEILING TILES AS REQUIRED TO INSTALL CONDUIT. REPLACE DAMAGED CEILING TILES.

CONSTRUCTION KEY NOTES:

- PROPOSED ROUTING OF PANELBOARD FEEDERS. COORDINATE ROUTING WITH EXISTING FIELD CONDITIONS. TYPICAL CORRIDOR CEILING ARE LAY-IN TYPE. REMOVE AND REPLACE CEILING TILES AS REQUIRED TO INSTALL CONDUIT. REPLACE DAMAGED CEILING TILES.
- PROVIDE CORING AS REQUIRED TO ACCOMMODATE NEW FEEDER PENETRATION THROUGH FLOOR.
- OWNER TO REKEY/RECORE DOOR HARDWARE TO MATCH EXISTING ELECTRICAL ROOMS WITH IN THE BUILDING.
- REMOTE ATS ANNUNCIATOR PANEL. COORDINATE EXACT LOCATION WITH OWNER.
- REMOTE GEN-1 ANNUNCIATOR PANEL. COORDINATE EXACT LOCATION WITH OWNER.

SHEET TITLE
PENTHOUSE ELECTRICAL
PLAN

DATE
8/26/2014

ISSUE
BIDS

SHEET No.

E2.6

PROJECT TITLE
WSU 603 - COLLEGE OF PHARMACY
ELECTRICAL RELIABILITY
UPGRADE
WSU Project No.: 603-243264
Detroit MI 48202

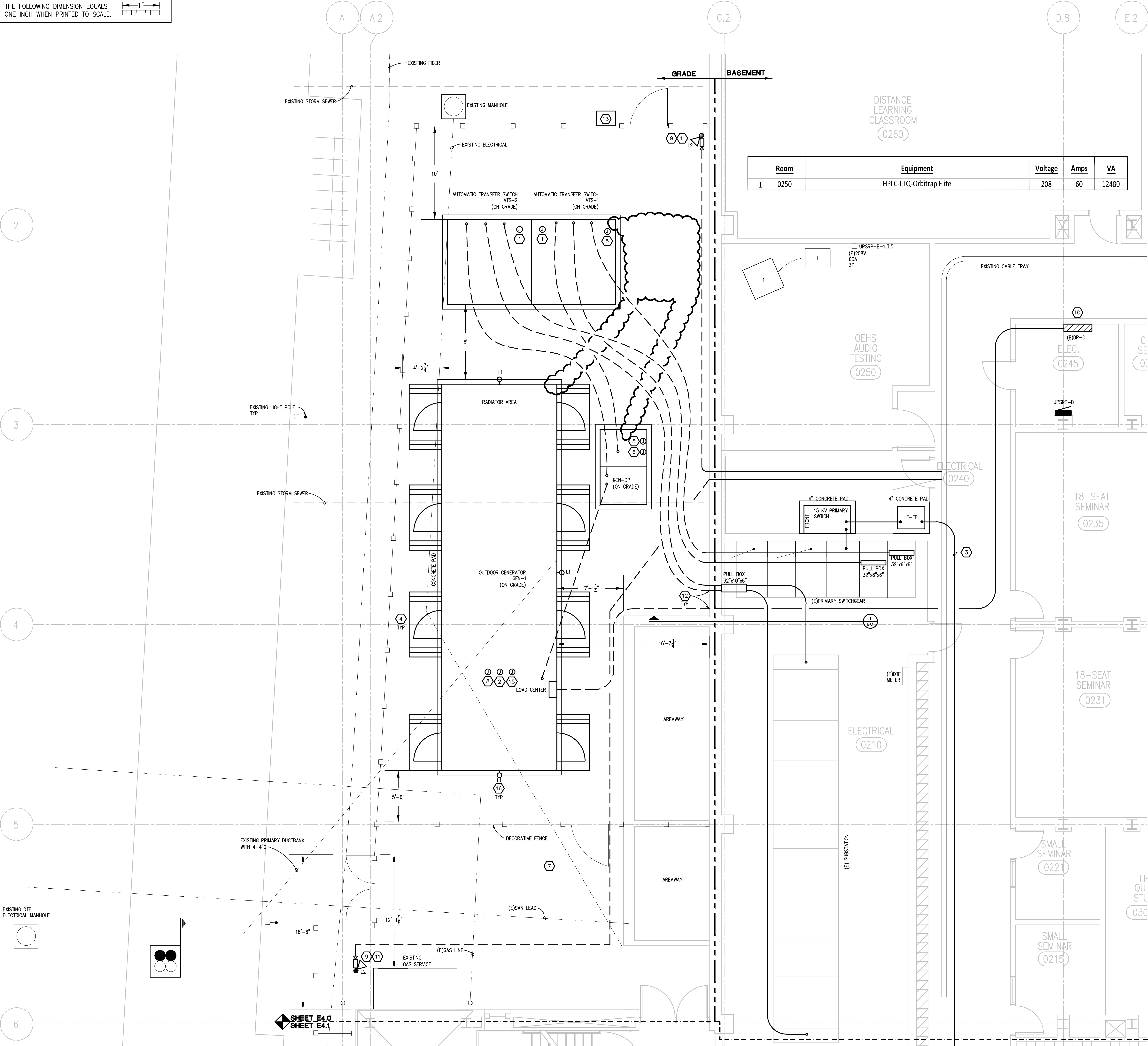
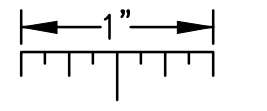


5145 Livorno, Suite 100
Detroit, MI 48202
Tel: 248-879-5966 Fax: 248-879-4007
www.PeterBassoAssociates.com
PBA Project No. 2010030700

REVISION
APPENDIX 3

REVISION
9/24/2014

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



GENERAL NOTES:

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- THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
- CONDUCT A SURVEY TO IDENTIFY ALL UNDERGROUND UTILITIES. CALL 811 PRIOR TO EXCAVATION.
- UTILITIES SHOWN ON THESE DRAWINGS ARE FOR REFERENCE ONLY. COORDINATE EXACT LOCATION OF ALL EXISTING UTILITIES, AND ROUTING OF ALL NEW UNDERGROUND UTILITIES PRIOR TO EXCAVATION.
- DEWATER TRENCHES PRIOR TO INSTALLATION OF CONDUITS. PROVIDE WATER TIGHT FITTINGS ON ALL UNDERGROUND CONDUITS.
- COORDINATE DEMOLITION WORK, AND ELECTRICAL AND TELEPHONE SERVICES TO THE SITE, WITH THE RESPECTIVE LOCAL UTILITY COMPANY REPRESENTATIVES PRIOR TO COMMENCEMENT OF WORK. INCLUDE ALL ASSOCIATED COSTS/FEES BY THE UTILITY COMPANIES IN THE BID PRICE.
- INSTALL UNDERGROUND CONDUITS 42" BELOW FINISHED GRADE, MINIMUM, UNLESS NOTED OTHERWISE.
- COORDINATE SERVICE SHUT-DOWNS WITH ALL TRADES INVOLVED ON SITE AND OBTAIN WRITTEN AUTHORIZATION FROM OWNER 72 HOURS PRIOR TO ANY ELECTRICAL AND/OR TELEPHONE SHUT-DOWN.
- REMOVE ALL DE-ENERGIZED CONDUCTORS FROM SITE AT COMPLETION OF THE PROJECT.
- OUTDOOR LIGHTING BRANCH CIRCUIT WIRING SHALL BE MINIMUM #8 AWG CONDUCTORS (XHHW), IN MINIMUM 1" DIA. CONDUIT, UNLESS NOTED OTHERWISE.
- SPARE CONDUITS SHALL INCLUDE PULL STRING AND SHALL BE TERMINATED WITH A CAP.
- EXCAVATE THE ENTIRE LENGTH OF TRENCH TO PROPERLY SET DUCT ELEVATIONS.

CONSTRUCTION KEY NOTES:

- PROVIDE 3/4" FROM ATS TO REMOTE ATS ANNUNCIATOR PANEL LOCATED IN THE PENTHOUSE. REFER TO SHEET E2.6 FOR REMOTE ATS ANNUNCIATOR PANEL LOCATION.
- PROVIDE 3/4" FROM GEN-1 TO REMOTE GEN-1 ANNUNCIATOR PANEL LOCATED IN THE PENTHOUSE. REFER TO SHEET E2.6 FOR REMOTE GEN-1 ANNUNCIATOR PANEL LOCATION.
- PROPOSED ROUTING OF EXISTING PUMP FEEDER. COORDINATE ROUTING WITH EXISTING FIELD CONDITIONS. TYPICAL CORRIDOR CEILING ARE LAY-IN TYPE. REMOVE AND REPLACE CEILING TILES AS REQUIRED TO INSTALL CONDUIT. REPLACE DAMAGED CEILING TILES.
- CUSTOM GALVANIZED STEEL STAIRS AND SERVICE PLATFORM. COORDINATE WITH GENERATOR MANUFACTURER.
- JUNCTION BOX FOR 120V CIRCUIT FOR STRIP HEATER. CIRCUIT TO SPARE BREAKER IN GEN-1 LOAD CENTER.
- JUNCTION BOX FOR 120V CIRCUIT FOR MEDIUM VOLTAGE CIRCUIT BREAKER CONTROL. CIRCUIT TO SPARE BREAKER IN GEN-1 LOAD CENTER.
- PROVIDE GROUND PENETRATING RADAR TO SURVEY EXISTING UNDERGROUND UTILITIES IN ENTIRE AREA AFFECTED BY THE PROJECT. HAND DIG NEAR EXISTING UTILITIES.
- PROVIDE 3/4" FROM GEN-1 TO SIEMENS DIESEL FUEL LEVEL METER LOCATED IN THE PENTHOUSE. REFER TO SHEET E2.6 FOR SIEMENS DIESEL FUEL LEVEL METER LOCATION.
- NEW LIGHT POLE AND POLE MOUNTED SITE LIGHTING FIXTURE. SEE DETAIL ON SHEET E7.1 FOR POLE BASE REQUIREMENTS. FIXTURE TO BE CONTROLLED VIA INTEGRAL PHOTOCELL. PROVIDE CIRCUIT FROM GEN-1 LOAD CENTER.
- PROVIDE A NEW 100A 3P 208V CIRCUIT BREAKER IN AVAILABLE SPACE OF EXISTING DP-C FOR NEW GEN-1 LOAD CENTER.
- CAMERA JUNCTION BOX AT TOP OF NEW LIGHT POLE. CAMERA PROVIDED BY OWNER. PROVIDE 3/4" CONDUIT AND CAT6a WIRING FROM JUNCTION BOX TO EXISTING CABLE TRAY LOCATED IN THE BASEMENT CORRIDOR ABOVE THE CEILING. CAT6a WIRING TO CONTINUE IN EXISTING CABLE TRAY TO COMM ROOM 0462. REFER TO SHEET E2.0 FOR COMM ROOM 0462 LOCATION. ADJUST CAMERA IN FIELD AS REQUIRED.
- PROVIDE CORING OF EXTERIOR PRECAST WALL AS REQUIRED. PROVIDE SEAL TIGHT AND SEAL SPRAY.
- DIESEL GENERATOR LOADING/UNLOADING LOCKABLE REMOTE FILL STATION. REFER TO DETAIL ON SHEET E7.1.
- SIEMENS GENERATOR DIESEL FUEL METER AND P10M PANEL. CONTRACTOR TO PROVIDE CONDUIT AND WIRE FOR SIEMENS CONTROL SYSTEMS. SIEMENS TO PROVIDE CONTROL EQUIPMENT AND CONTRACTOR TO INSTALL CONTROL EQUIPMENT. REFER TO SIEMENS REFERENCE DRAWINGS FOR SCOPE OF WORK. COORDINATE SCOPE OF WORK WITH SIEMENS DURING BIDDING AND INCLUDE ASSOCIATED CONST WITH CONTROL SYSTEMS TO BID PRICE.
- LOCATE IN 1" TO EXISTING CABLE TRAY IN BASEMENT CORRIDOR ABOVE THE CEILING. CAT6a WIRING TO CONTINUE IN EXISTING CABLE TRAY TO COMM ROOM 0462. REFER TO SHEET E2.0 FOR COMM ROOM 0462 LOCATION.
- INSTALL "L1" LIGHT FIXTURE ON GENERATOR ENCLOSURE. MOUNT LIGHT FIXTURE 10' ABOVE GRADE. CIRCUIT LIGHT FIXTURE TO SPARE CIRCUIT IN GENERATOR LOAD CENTER.
- CIRCUIT TO EXISTING SPARE BREAKER IN AN EXISTING 120V PANELBOARD IN ROOM ELEC 0245. REFER TO SHEET E2.0 FOR ELECTRICAL ROOM LOCATION.



ENLARGED ELECTRICAL PLAN
SCALE: 1/4" = 1' - 0"

SHEET E4.0
SHEET E4.1

REVISION
9/24/2014

REVISION
ADDENDUM 3

5045 Livonia, Suite 100
Livonia, MI 48150
Tel: 248-879-5966 Fax: 248-879-4007
www.PeterBassoAssociates.com
PBA Project No.: 201003070

Peter Basso Associates Inc.
CONSULTING ENGINEERS

PROJECT TITLE
WSU 603 - COLLEGE OF PHARMACY
ELECTRICAL RELIABILITY
UPGRADE
WSU Project No.: 603-243264
Detroit MI 48202

**WAYNE STATE
UNIVERSITY**

SHEET TITLE
ENLARGED ELECTRICAL PLAN

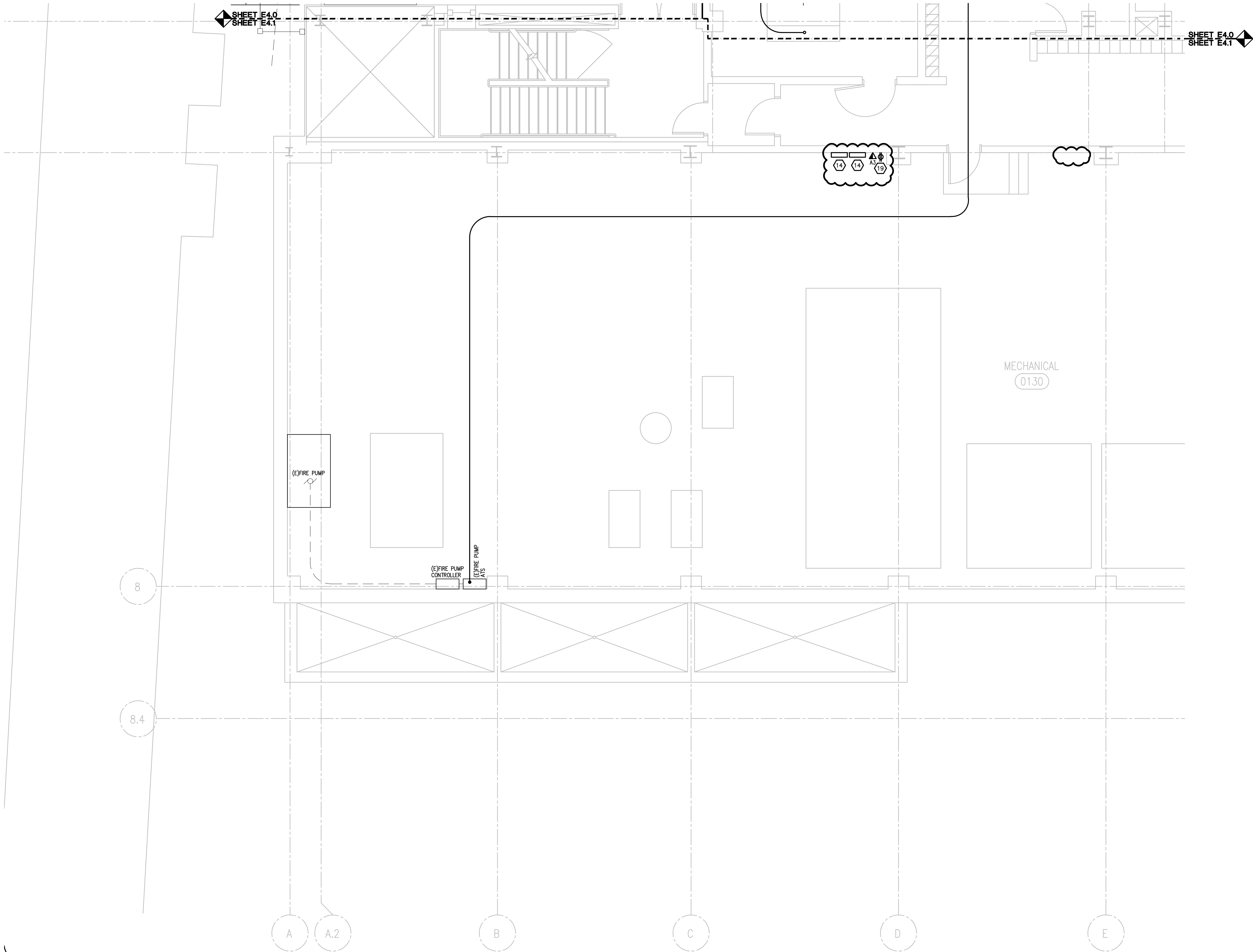
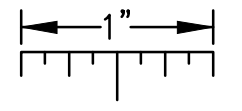
DATE
8/26/2014
ISSUE
BIDS

SHEET No.

E4.0

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THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.



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- CONDUCT A SURVEY TO IDENTIFY ALL UNDERGROUND UTILITIES. CALL 811 PRIOR TO EXCAVATION.
- UTILITIES SHOWN ON THESE DRAWINGS ARE FOR REFERENCE ONLY. COORDINATE EXACT LOCATION OF ALL EXISTING UTILITIES, AND ROUTING OF ALL NEW UNDERGROUND UTILITIES PRIOR TO EXCAVATION.
- DEWATER TRENCHES PRIOR TO INSTALLATION OF CONDUITS. PROVIDE WATER TIGHT FITTINGS ON ALL UNDERGROUND CONDUITS.
- COORDINATE DEMOLITION WORK, AND ELECTRICAL AND TELEPHONE SERVICES TO THE SITE, WITH THE RESPECTIVE LOCAL UTILITY COMPANY REPRESENTATIVES PRIOR TO COMMENCEMENT OF WORK. INCLUDE ALL ASSOCIATED COST/FEE'S BY THE UTILITY COMPANIES IN THE BID PRICE.
- INSTALL UNDERGROUND CONDUITS 42" BELOW FINISHED GRADE, MINIMUM, UNLESS NOTED OTHERWISE.
- COORDINATE SERVICE SHUT-DOWNS WITH ALL TRADES INVOLVED ON SITE AND OBTAIN WRITTEN AUTHORIZATION FROM OWNER 72 HOURS PRIOR TO ANY ELECTRICAL AND/OR TELEPHONE SHUT-DOWN.
- REMOVE ALL DE-ENERGIZED CONDUCTORS FROM SITE AT COMPLETION OF THE PROJECT.
- OUTDOOR LIGHTING BRANCH CIRCUIT WIRING SHALL BE MINIMUM #8 AWG CONDUCTORS (XHHW), IN MINIMUM 1" DIA. CONDUIT, UNLESS NOTED OTHERWISE.
- SPARE CONDUITS SHALL INCLUDE PULL STRING AND SHALL BE TERMINATED WITH A CAP.
- EXCAVATE THE ENTIRE LENGTH OF TRENCH TO PROPERLY SET DUCT ELEVATIONS.

CONSTRUCTION KEY NOTES:

- PROVIDE 3/4"Ø FROM ATS TO REMOTE ATS ANNUNCIATOR PANEL LOCATED IN THE PENTHOUSE. REFER TO SHEET E2.6 FOR REMOTE ATS ANNUNCIATOR PANEL LOCATION.
- PROVIDE 3/4"Ø FROM GEN-1 TO REMOTE GEN-1 ANNUNCIATOR PANEL LOCATED IN THE PENTHOUSE. REFER TO SHEET E2.6 FOR REMOTE GEN-1 ANNUNCIATOR PANEL LOCATION.
- PROPOSED ROUTING OF (E)FIRE PUMP FEEDER. COORDINATE ROUTING WITH EXISTING FIELD CONDITIONS. TYPICAL CORRIDOR CEILING ARE LAY-IN TYPE. REMOVE AND REPLACE CEILING TILES AS REQUIRED TO INSTALL CONDUIT. REPLACE DAMAGED CEILING TILES.
- CUSTOM GALVANIZED STEEL STAIRS AND SERVICE PLATFORM. COORDINATE WITH GENERATOR MANUFACTURE.
- JUNCTION BOX FOR 120V CIRCUIT FOR STRIP HEATER. CIRCUIT TO SPARE BREAKER IN GEN-1 LOAD CENTER.
- JUNCTION BOX FOR 120V CIRCUIT FOR MEDIUM VOLTAGE CIRCUIT BREAKER CONTROL. CIRCUIT TO SPARE BREAKER IN GEN-1 LOAD CENTER.
- PROVIDE GROUND PENETRATING RADAR TO SURVEY EXISTING UNDERGROUND UTILITIES IN ENTIRE AREA AFFECTED BY THE PROJECT. HAND DIG NEAR EXISTING UTILITIES.
- PROVIDE 3/4"Ø FROM GEN-1 TO SIEMENS DIESEL FUEL LEVEL METER LOCATED IN THE PENTHOUSE. REFER TO SHEET E2.6 FOR SIEMENS DIESEL FUEL LEVEL METER LOCATION.
- NEW LIGHT POLE AND POLE MOUNTED SITE LIGHTING FIXTURE. SEE DETAIL ON SHEET E7.1 FOR POLE BASE REQUIREMENTS. FIXTURE TO BE CONTROLLED VIA INTEGRAL PHOTOCELL. PROVIDE CIRCUIT FROM GEN-1 LOAD CENTER.
- PROVIDE A NEW 100A 3P 208V CIRCUIT BREAKER IN AVAILABLE SPACE OF EXISTING DP-C FOR NEW GEN-1 LOAD CENTER.
- CAMERA JUNCTION BOX AT TOP OF NEW LIGHT POLE. CAMERA PROVIDED BY OWNER. PROVIDE 3/4" CONDUIT AND CAT6a WIRING FROM JUNCTION BOX TO EXISTING CABLE TRAY LOCATED IN THE BASEMENT CORRIDOR ABOVE THE CEILING. CAT6a WIRING TO CONTINUE IN EXISTING CABLE TRAY TO COMM ROOM 0462. REFER TO SHEET E2.0 FOR COMM ROOM 0462 LOCATION. ADJUST CAMERA IN FIELD AS REQUIRED.
- PROVIDE CORING OF EXTERIOR PRECAST WALL AS REQUIRED. PROVIDE SEAL TIGHT AND SEAL SPRAY.
- DIESEL GENERATOR LOADING/UNLOADING LOCKABLE REMOTE FILL STATION. REFER TO DETAIL ON SHEET E7.1.
- SIEMENS GENERATOR DIESEL FUEL METER AND PXOM PANEL. CONTRACTOR TO PROVIDE CONDUIT AND WIRE FOR SIEMENS CONTROL SYSTEMS. SIEMENS TO PROVIDE CONTROL EQUIPMENT AND CONTRACTOR TO INSTALL CONTROL EQUIPMENT. REFER TO SIEMENS REFERENCE DRAWINGS FOR SCOPE OF WORK. COORDINATE SCOPE OF WORK WITH SIEMENS DURING BIDDING AND INCLUDE ASSOCIATED CONST WITH CONTROL SYSTEMS TO BID PRICE.
- (1)CAT6a IN 1"Ø TO EXISTING CABLE TRAY IN BASEMENT CORRIDOR ABOVE THE CEILING. CAT6a WIRING TO CONTINUE IN EXISTING CABLE TRAY TO COMM ROOM 0462. REFER TO SHEET E2.0 FOR COMM ROOM 0462 LOCATION.
- INSTALL "L1" LIGHT FIXTURE ON GENERATOR ENCLOSURE. MOUNT LIGHT FIXTURE 10' ABOVE GRADE. CIRCUIT LIGHT FIXTURE TO SPARE CIRCUIT IN GENERATOR LOAD CENTER.
- CIRCUIT TO EXISTING SPARE BREAKER IN AN EXISTING 120V PANELBOARD IN ROOM ELEC 0045. REFER TO SHEET 34.0 FOR ELECTRICAL ROOM LOCATION.



ENLARGED ELECTRICAL PLAN
SCALE: 1/4" = 1' - 0"

SHEET TITLE
ENLARGED ELECTRICAL PLAN

DATE
8/26/2014
ISSUE
BIDS

SHEET No.

E4.1

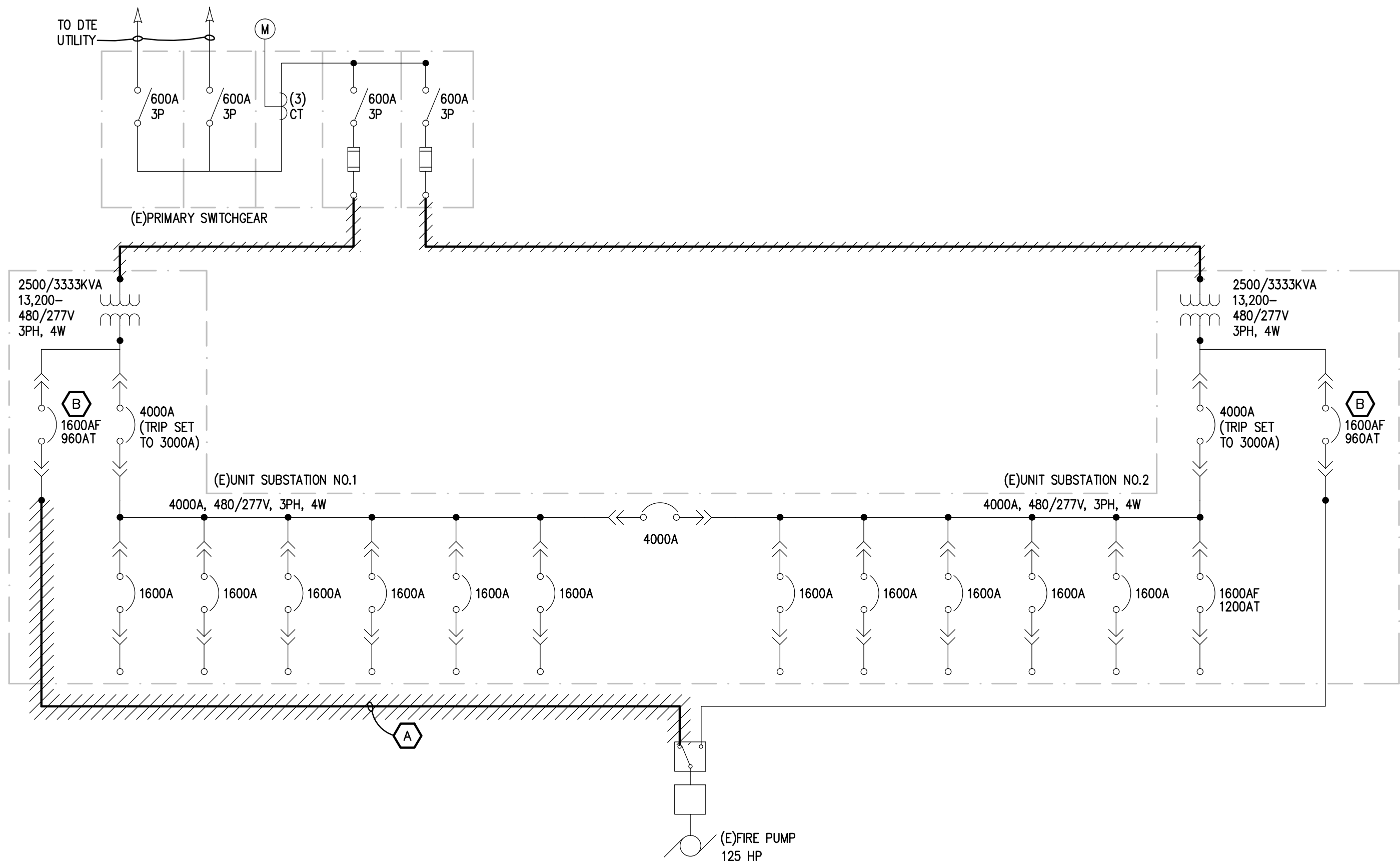
PROJECT TITLE
WSU 603 - COLLEGE OF PHARMACY
ELECTRICAL RELIABILITY
UPGRADE
WSU Project No.: 603-243264
Detroit MI 48202

Peter Basso Associates Inc.
CONSULTING ENGINEERS

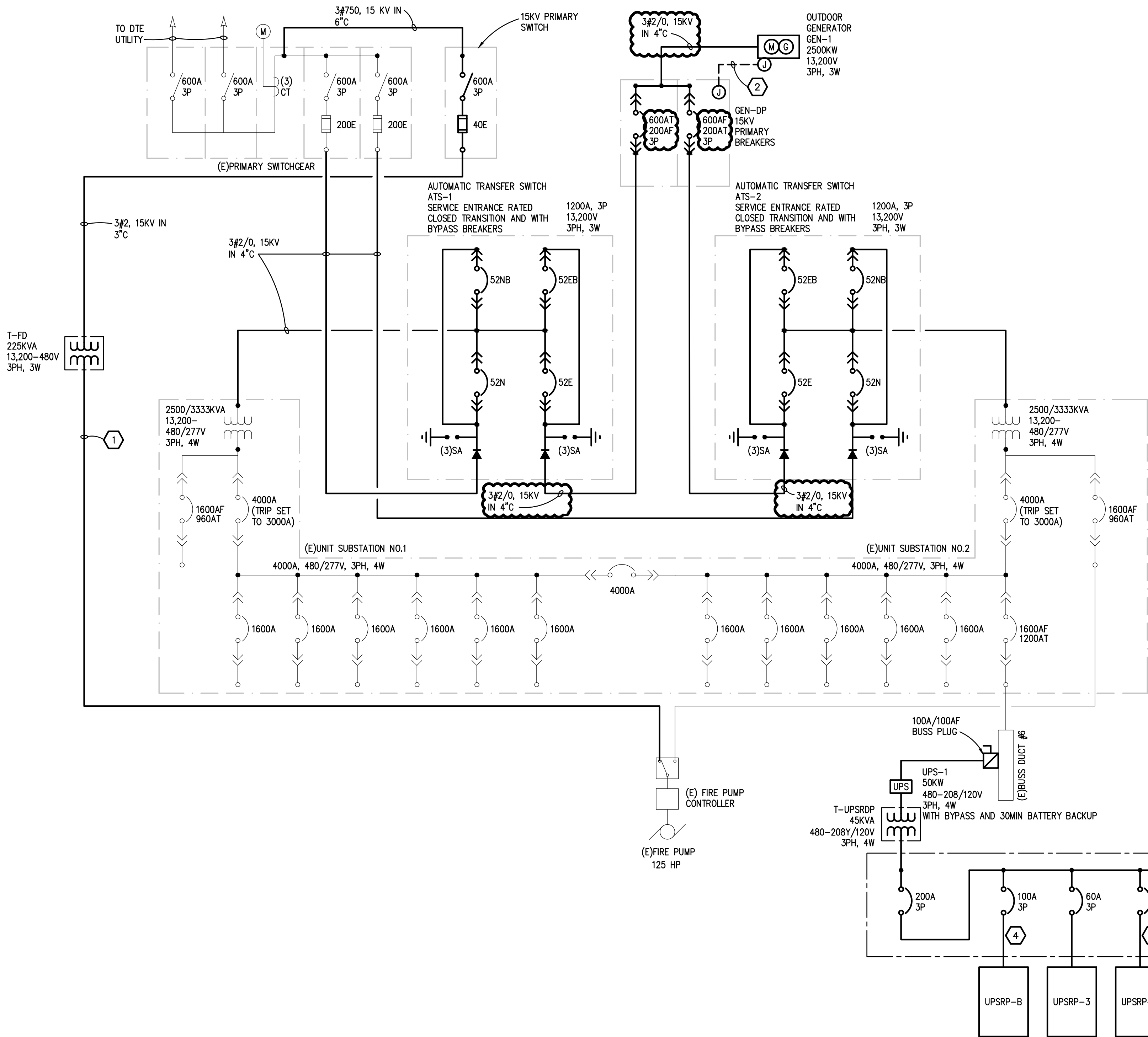
REVISION
ADDENDUM 3

REVISION
9/24/2014

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PARTIAL ONE LINE DRAWING - DEMOLITION
NO SCALE



PARTIAL ONE LINE DRAWING - NEW WORK
NO SCALE

GENERATOR SEQUENCE OF OPERATION

- EXISTING ELECTRICAL PRIMARY SWITCHGEAR AND UNIT SUBSTATIONS:
- THE EXISTING ELECTRICAL PRIMARY SWITCHGEAR CONSISTS OF TWO INCOMING DTE PRIMARY LINES INTO TWO SEPARATE PRIMARY SWITCHES, DTE CT CABINET AND TWO LOAD INTERRUPTER SWITCHES. ONE LOAD INTERRUPTER SWITCH PROVIDED POWER TO SIDE A OF THE UNIT SUBSTATION AND THE SECOND LOAD INTERRUPTER SWITCH PROVIDES POWER TO SIDE B.
 - THE UNIT SUBSTATION CONSISTS OF A DOUBLE ENDED UNIT SUBSTATION WITH A MAIN-TIE-MAIN. THE MAIN-TIE-MAIN BREAKERS ARE MANUAL.
- GENERATOR SEQUENCE:
- UPON LOSS OF POWER FROM BOTH DTE PRIMARY LINES THE TWO ATS UNITS WILL SIGNAL THE GENERATOR TO START AFTER A 60 SECOND DELAY.
 - UPON GENERATOR START THE TWO ATS UNITS WILL TRANSFER TO THE GENERATOR SOURCE AND PROVIDE POWER TO THE UNIT SUBSTATION.
 - ONCE DTE POWER IS RESTORED AND THE ATS UNITS SENSE STABLE POWER FOR 60 SECONDS THE ATS UNITS WILL TRANSFER THE UTILITY SOURCE AND THE GENERATOR WILL START THE LOCK DOWN SEQUENCE.

PROPOSED CONSTRUCTION SEQUENCE

- GENERAL:
- PROPOSED CONSTRUCTION SEQUENCE IS PROVIDED FOR BIDDING PURPOSES ONLY. PROVIDE DETAILED CONSTRUCTION SEQUENCE INCLUDING DATES AND DURATION OF WORK TO ENGINEER AND OWNER PRIOR TO COMMENCING WORK.
 - ALL SHUT DOWN WORK IS TO BE COORDINATED SO THAT WORK IS SCHEDULED FOR SUNDAYS OR HOLIDAYS. THE PREMIUM PORTION ONLY OF WAGES ASSOCIATED WITH A SHUTDOWN IS TO BE COVERED IN THE ALLOWANCE THAT IS TO BE INCLUDED IN THE BASE BID. (FOR PHARMACY THIS ALLOWANCE IS \$20,000.) IT WILL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE HOW TO SEQUENCE THE WORK, AS WELL AS THE MEANS AND METHODS NECESSARY TO PROVIDE POWER TO THE BUILDING FOR ANY SHUT DOWN, INCLUDING PROVIDING ANY NECESSARY EQUIPMENT, (RENTING / OPERATING GENERATORS, PROVIDING FUEL, ETC.) TO SUPPORT A BUILDING LOAD OF 1.0MW. PROPOSED SEQUENCING AND MEANS AND METHODS MUST BE REVIEWED AND APPROVED BY NSU AND ALL COSTS TO SUPPORT THE PROPOSED SEQUENCING AND PROVIDE POWER FOR ANY SHUT DOWN IS TO BE INCLUDED WITHIN THE BASE BID. NOTE: CONTRACTORS MUST PROVIDE AT A MINIMUM A SEVEN (7) DAY ADVANCED SHUT DOWN NOTICE FOR DISRUPTION OF ANY UTILITIES, AND TEMPORARY ENCLOSURES SHALL BE INSTALLED AS SECURITY MEASURES AROUND CABLES BETWEEN ANY TEMPORARY GENERATOR AND A SECURE AREA AT THE BUILDING.
- PROPOSED SEQUENCE:
- INSTALL NEW EXTERIOR GENERATOR, EXTERIOR GENERATOR DISTRIBUTION PANEL, EXTERIOR AUTOMATIC TRANSFER SWITCHES AND GROUND MAT ALONG WITH ALL ASSOCIATED CONDUIT AND FEEDERS.
 - INSTALL NEW 15KV PRIMARY SWITCH AND TRANSFORMER ALONG WITH ALL ASSOCIATED CONDUIT AND FEEDERS. RELATED TO THE FIRE PUMP SERVICE. COORDINATE SHUTDOWN OF BOTH PRIMARY SWITCHES WITH OWNER. CONNECT NEW FEEDER FROM NEW 15KV PRIMARY SWITCH TO THE EXISTING PRIMARY SWITCHGEAR BUS ON SECONDARY SIDE OF CTS.
 - TRANSFER LOAD FROM SUBSTATION SIDE A TO SIDE B BY OPENING THE MAIN BREAKER IN SUBSTATION SIDE A AND CLOSING THE BREAKER. REVERSE LOAD TRANSFER ONCE WORK RELATED TO LOAD INTERRUPTER NO.1 IS COMPLETED. COORDINATE SHUTDOWN OF EXISTING LOAD INTERRUPTER NO.1 OF EXISTING UNIT SUBSTATION NO.1 WITH OWNER. CONNECT NEW FEEDER FROM ATS-1 TO EXISTING LOAD INTERRUPTER NO.1. CONNECT NEW FEED FROM ATS-1 TO EXISTING UNIT SUBSTATION NO.1.
 - TRANSFER LOAD FROM SUBSTATION SIDE B TO SIDE A BY OPENING THE MAIN BREAKER IN SUBSTATION SIDE B AND CLOSING THE BREAKER. REVERSE LOAD TRANSFER ONCE WORK RELATED TO LOAD INTERRUPTER NO.2 IS COMPLETED. COORDINATE SHUTDOWN OF EXISTING LOAD INTERRUPTER NO.2 OF EXISTING UNIT SUBSTATION NO.2 WITH OWNER. CONNECT NEW FEEDER FROM ATS-2 TO EXISTING LOAD INTERRUPTER NO.2. CONNECT NEW FEED FROM ATS-2 TO EXISTING UNIT SUBSTATION NO.2.

MEASURED BUILDING LOAD: 1865.00 KVA
REMOVED LOAD: - 26.87 KVA
ADDED LOAD: + 26.87 KVA
TOTAL LOAD: 1865.00 KVA

LOAD CALCULATION

NOTE: ADDED UPS LOAD IS RELOCATED LOADS. THESE LOADS ARE ALREADY PRESENT IN MEASURED BUILDING LOAD.

	Room	Equipment	Voltage	Amps	VA
1	0250	HPLC-LTQ-Orbitrap Elite	208	60	12480
2	3210	AKTA FPLC Academic Edition	120	3	360
3	3210	AKTA FPLC	120	7.5	900
4	3210	AKTA FPLC Prime Plus	120	1	90
5	3250	ITC/DSC	120	12	1440
6	3250	CD AND COMPUTER	120	3	360
7	3250	UV/Vis Spectrometer	240	5	1200
8	3330	GCMS Instrument	120	3	360
9	3437	Micro pump - Ultimate 3000	120	5	600
10	3437	Auto-Sampler - Ultimate 3000 Analytical Split loop	220	5	1100
11	3437	Coulochem III Electrochemical Detector	120	3	360
12	3437	GPC Max	120	3	360
13	3437	DSC Q2000	120	3	360
14	3437	Freeze Dryer/lyophilizer	120	4	480
15	3520	Real Time PCR System	120	3	360
16	4320	LCMS-Liquid Chromatography Mass Spectroscopy	240	5	1200
17	4440	Real Time PCR System	120	3	360
18	5320	Freeze Dryer/lyophilizer	120	4	480
19	5320	HPLC - High Purity Liquid Chromatography	208	9.5	1976
20	5341	Vet Test 808	120	5	600
21	5341	IDEXX LaserCyte	120	3	360
22	5341	IDEXX Catalyst Dx	120	3	360
23	5341	Heska CBC Diff (Veterinary Hematology System)	120	3	360
24	5341	Heska DRi-Chem 4000	120	3	360

Grand Total: 26.866 KVA

UPS LOAD CALCULATION

GENERAL NOTES:

- THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
- FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE "FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE-GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
- TRANSFORMER SECONDARY CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH THE "TRANSFORMER CIRCUIT SIZING SCHEDULE-GENERAL PURPOSE" ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
- MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH THE MOTOR CIRCUIT SIZING SCHEDULES ON THE "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS SPECIFICALLY NOTED OTHERWISE.
- BASIS OF DESIGN IS CATERPILLAR POWER GENERATION EQUIPMENT SQUARE D DISTRIBUTION EQUIPMENT AND ASCO TRANSFER SWITCHES. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT FROM OTHER APPROVED MANUFACTURERS, THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE THE LAYOUT AND CLEARANCE REQUIREMENTS IN ALL SPACES CONTAINING ELECTRICAL EQUIPMENT AND PROVIDE EQUIPMENT MEETING THE SPECIFICATIONS AND ACHIEVING CODE REQUIRED CLEARANCES WITHIN THE SPACE PROVIDED.
- BRANCH CIRCUIT CONDUCTORS, FEEDERS, AND BRANCH CIRCUIT OVERCURRENT PROTECTION ARE SIZED AT 125% OF THE TOTAL CONTINUOUS AND NON CONTINUOUS LOAD FOR LIGHTING AND MOTOR LOADS THAT RUN CONTINUOUSLY FOR THREE HOURS OR MORE (NEC 210.19 A, 210.20 A, AND 215.2 A). DEMAND AND CONNECTED LOADS ARE CALCULATED PER NEC 220.

DEMOLITION NOTES:

- REMOVE EXISTING CABLES FROM SUBSTATION TO FIRE PUMP. EXISTING UNDERGROUND CONDUIT TO REMAIN IN PLACE. PERFORM WORK AFTER FIRE PUMP FEEDER IS SAFE IN PLACE. LABEL EXISTING DRAWOUT BREAKER AS SPARE.
- DRAWOUT BREAKER TO BE TRIPPED AFTER NEW FIRE PUMP FEEDER IS IN PLACE.

CONSTRUCTION KEY NOTES:

- PROVIDE 3#350KCMIL & 1#4/0(4)-3" TWO HOUR FIRE RESISTIVE CABLE DRAKA LIFELINE OR SIMILAR TO COMPLY WITH NEC ARTICLE 695.6 PART 2.
- PROVIDE 10-#12 & 1 #20 - 1-1/4" FOR CONTROL WIRING BETWEEN GENERATOR OVERCURRENT PROTECTION AND MEDIUM VOLTAGE PRIMARY BREAKERS. COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER.
- PROVIDE 3#2, #2 N, & 1#6 G IN 1-1/4".
- PROVIDE 3#3/0, 1#3/0 N, & 1#6 G IN 2".