



Technical Report 2: 100% Submission

Pennsylvania State Employees Credit Union Corporate Headquarters
Harrisburg, PA

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Executive Summary

The following report presents detailed documentation and analysis of the electrical systems within the Pennsylvania State Employees Credit Union Corporate Headquarters located in Harrisburg, PA. The 234,000 square foot complex consists of offices, a daycare, a conference center, a fitness center, a data center, and a food court area. The electrical systems of the PSECU Corporate Headquarters were designed based on the ideas of flexibility and control. As a LEED Gold building, the electrical, lighting, communication, and mechanical systems were all designed with sustainability and energy efficiency in mind.

The following details the electrical systems, which include analysis of the service entrances, voltage systems, major equipment loads, emergency power systems, special equipment, and communication systems. A single-line diagram is also provided in order to understand the electrical path through the building systems.

General Building Information

Location | Harrisburg, PA

Building occupant | Pennsylvania State Employee Credit Union

Type of building | mixed use

Size | 238,000 square feet + 1,000 square foot maintenance storage building

Number of stories above grade | three

Dates of construction | August 2011 – August 2013

Project delivery method | design-bid-build

Primary Project Team

Owner | Pennsylvania State Employee Credit Union

Architect | Crabtree, Rohrbaugh & Associates Architects

Construction manager | Quandel Construction Services

Mechanical, Electrical, Plumbing Engineers | BALA Consulting Engineers

Fire Protection | Protection Engineering Group

Lighting | Grenald Waldron Associates

Structural engineer | Centerpoint Engineering Inc

Summary Description of Distributed System

The Pennsylvania State Employees Credit Union, PSECU, Corporate Headquarters is a primary selective system with a 12.47/7.2kV service entrance in the main electrical room of the building. The high-voltage cable feed splits into three feeders and services the double-ended main substation and fire pump substation switchboard, which are all owned by PSECU. The double-ended main substation services an additional switchboard under emergency conditions. It is normally serviced through a high-pressure natural-gas microturbine generator with heat recovery. Two primary transformers, rated at 2,500kV each, step down the voltage to a 480Y/277V, 3Ph, 4W voltage system, which feeds most of the building loads. The primary transformer in the fire substation switchboard steps the voltage down to a 480Y/277V, 3Ph, 3W voltage system which feeds the fire pump loads.

Utility Company Information

Pennsylvania Power and Light, also called PPL, is the utility company that provides power to the Pennsylvania State Employees Credit Union Corporate Headquarters.

Address:

827 Hausman Road

Allentown, PA 18104-9392

<http://www.pplelectric.com/>

The Distribution Rate for Primary service is as follows:

Customer Charge = \$160.19 / month

All kW = \$2.136 / kW

Act 129 Rider = \$0.465 / kW

*Based on peak Load Contribution

Smart Meter Rider = \$0.11 / month

Generation and Transmission:

9.7 cents / kWh

Transmission Supply Charge: \$1.819 / kW and \$0.0312 / kW

Pennsylvania Tax Adjustment Surcharge: (GSC + TSC)*(-0.00286)

Service Entrance

The Pennsylvania State Employees Credit Union Corporate Headquarters has two service entrances. The majority of the loads receive power from PPL, while the data center receives power from the high-pressure natural-gas microturbine generator with heat recovery. PPL services PSECU Corporate Headquarters on the North West side of the site. Conduits owned by PPL service the building through underground conduit, which is also encased in concrete. PPL provides high voltage service to a double-ended main substation and one switchboard through four high voltage cable feeders within electrical room B116 and B117. One of the high voltage feeders is for future expansion. Two primary transformers within the double-ended main substation are rated at 2,500kVA each and reduce 12.47/7.2kV to the 480Y/277V, 3Ph, 4W that services PSECU. The third

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high voltage cable feeder feeds the fire pump substation switchboard. The primary transformer within the fire pump substation is rated at 225kVA and reduces 12.47kV to the 480Y/277V, 3Ph, 3W that services the fire pump controller. All of the primary transformers are located on concrete pads that are six inches high and four inches beyond the base on all sides. Additionally, the high-pressure natural-gas microturbine generator services the data center double-ended main substation at a 480Y/277V, 3Ph, 4W voltage system. The microturbine generator is rated at 800kW with room for an additional 200kW module. As surplus energy is generated, the generator is capable of supplying the surplus electricity to PPL. If the microturbine generator could not service the entire data center double-ended main substation, a tie circuit breaker will open in order for half of the switchboard to be serviced from the utility.

The majority of the electrical equipment within PSECU Corporate Headquarters is both owned by PSECU Corporate Headquarters and is located in electrical room B116 and B117. The electrical room is located on the northern side of the first floor of the building. Metering occurs both on the interior and exterior of the building. PPL metering occurs at the exterior and interior of the building in electrical room B116 and B117 and PSECU metering occurs at the interior of the building in the main electrical room B116 and B117.

Voltage System

Power is fed from the utility to PSECU Corporate Headquarters on both a 480Y/277V, 3Ph, 4W voltage system and a 480Y/277V, 3Ph, 3W voltage system. The 480Y/277V, 3Ph, 3W voltage system services the fire pump substation only. Mechanical equipment and lighting panels are fed by 480Y/277V, 3Ph, 4W feeders. Receptacle and appliance loads, fire alarm loads, fitness equipment, kitchen equipment, and HVAC equipment operate on panels that are stepped down to a 208Y/120V, 3Ph, 4W voltage system.

Emergency Power System

Under emergency power conditions, the Pennsylvania State Employees Credit Union Corporate Headquarters is powered through two emergency generators; a diesel generator and a capstone high-pressure natural-gas microturbine generator with heat recovery, both of which are located adjacent to the maintenance building. The diesel generator is closed-loop, liquid cooled, and has a 300 gallon day tank, which is fed by a 15,000 gallon underground diesel tank with fuel pumps. The diesel generator has nominal ratings of 2,500kW/ 3.125kVA at 480Y/277V, 3Ph, 4W. This is the primary generator for the building loads. It services the double-ended main substation and the fire pump substation. The microturbine generator services the data center under normal conditions, but if the microturbine generator was not capable of servicing the entire data center, the double-ended main substation has a tie circuit breaker, which will open. Half of the data center loads will be serviced by the diesel generator under these conditions.

Location of Switchgear

The double-ended main substation and fire pump substation switchboard are located in the main electrical room, which is on the first floor of the building. From the double-ended main substation, power is stepped down through two main utility transformers in the main electrical room B116 to a main switchboard. Eighteen transformers are mainly located within electrical rooms on all three floors, which step the power down to 208Y/120V, 3Ph, 4W. The data center double-ended main substation is also located in the main electrical room. Additionally, the data center double-ended main substation services four UPS systems and 22 transformers to step the power down to 208Y/120V, 3Ph, 4W in order to service the data center loads. The UPS systems are located within the UPS and Battery Rooms. A third primary transformer steps the power down to a 480Y/277V, 3Ph, 3W voltage system, which services the fire pump substation switchboard, which is located within the main electrical room. The switchboard services the fire pump controller. An automatic transfer switch operates in emergency conditions to provide power to an emergency distribution panel, which is located within the main electrical room. A diesel generator is located outside of the building and services the double-ended substation and fire pump substation switchboard under emergency conditions. A microturbine generator is located on the exterior of the building and services the data center loads under normal conditions.

Main Equipment Schedule						
Tag	Type of Equipment	Floor Level	Room Number	Room Name	Drawing Number	Enlarged Drawing Number
XFMR#1	XFMR	1	B116	MAIN ELECTRICAL RM	E2.12	E6.01
MDP1	SBD	1	B116	MAIN ELECTRICAL RM	E2.12	E6.01
T-RPK	XFMR	1	B106	KITCHEN STORAGE RM	E2.12	E6.03
T-RP1E	XFMR	1	B160	1ST FLR ELEC CLOSET EAST	E2.12	E6.05
T-RP1MR	XFMR	1	B140	MAIL RM	E2.12	-
T-RP1WM	XFMR	1	B113	MAINTENANCE RM	E2.12	E6.01
T-RPM1E	XFMR	1	B160	1ST FLR ELEC CLOSET EAST	E2.12	E6.05
T-RP2E	XFMR	2	B208	2ND FLR ELEC CLOSET EAST	E2.22	E6.05
T-RPM2E	XFMR	2	B208	2ND FLR ELEC CLOSET EAST	E2.22	E6.05
T-RP3E	XFMR	3	B311	3RD FLR ELEC CLOSET EAST	E2.32	E6.05
T-RPM3E	XFMR	3	B311	3RD FLR ELEC CLOSET EAST	E2.32	E6.05
ATS-2	ATS	1	B117	MAIN ELECTRICAL RM	E2.12	E6.01
UPS-WS	UPS	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02

Main Equipment Schedule						
Tag	Type of Equipment	Floor Level	Room Number	Room Name	Drawing Number	Enlarged Drawing Number
T-DPUPSWS	XFMR	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
MBP1	MAINTENANCE BIPASS PANEL	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
MDP2	SBD	1	B116	MAIN ELECTRICAL RM	E2.12	E6.01
XFMR#2	XFMR	1	B116	MAIN ELECTRICAL RM	E2.12	E6.01
T-RP1FC	XFMR	1	A149	1ST FLR ELEC CLOSET WEST	E2.11	E6.05
T-RP1W	XFMR	1	A149	1ST FLR ELEC CLOSET WEST	E2.11	E6.05
T-RPM1W	XFMR	1	A149	1ST FLR ELEC CLOSET WEST	E2.11	E6.05
T-RP2W	XFMR	2	A215	2ND FLR ELEC CLOSET WEST	E2.21	E6.05
T-RPM2W	XFMR	2	A215	2ND FLR ELEC CLOSET WEST	E2.21	E6.05
T-RP3W	XFMR	3	A327	3RD FLR ELEC CLOSET WEST	E2.31	E6.05
T-RPM3W	XFMR	3	A327	3RD FLR ELEC CLOSET WEST	E2.31	E6.05
ATS-1	ATS	1	B117	MAIN ELECTRICAL RM	E2.12	E6.01
XFMR#3	XFMR	1	B117	MAIN ELECTRICAL RM	E2.12	E6.01
FPSB	SBD	1	B117	MAIN ELECTRICAL RM	E2.12	E6.01
EMDP	EMERGENCY SBD	1	B116	MAIN ELECTRICAL RM	E2.12	E6.01
T-ERP	XFMR	1	B117	MAIN ELECTRICAL RM	E2.12	E6.01
ATS-3	ATS	1	B117	MAIN ELECTRICAL RM	E2.12	E6.01
G1	GEN	OS	OUTSIDE	OUTSIDE	E0.51	E0.52
EGEN	GEN PANEL	OS	OUTSIDE	OUTSIDE	E0.51	E0.52
ESWBD	SBD	1	B116	MAIN ELECTRICAL RM	E2.12	E6.01
G2	GEN	OS	OUTSIDE	OUTSIDE	E0.51	E0.52
EGEN2	GEN PANEL	OS	OUTSIDE	OUTSIDE	E0.51	E0.52

Main Equipment Schedule						
Tag	Type of Equipment	Floor Level	Room Number	Room Name	Drawing Number	Enlarged Drawing Number
T-DC-1-1A	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-1-2A	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-1-3A	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-1-4A	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-2-1A	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-2-2A	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-2-3A	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-2-4A	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-1-1B	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-1-2A	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-1-3B	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-1-4B	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-2-1B	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-2-2B	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-2-3B	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-DC-2-4B	XFMR	3	B333	DATA CONTROL ELEC RM	E2.32	E.604
T-EMDF	XFMR	1	B118/B124	DEMARC RM	E2.12	E.6.05
T-EIDF1	XFMR	3	B335	IDF RM	E2.32	E.604
T-EIDF2	XFMR	3	B335	IDF RM	E2.32	E.604
T-EIDF3	XFMR	3	B335	IDF RM	E2.32	E.604
T-RPMB	XFMR	MB	C130	MAINTENANCE BLDG	A7.1	M6.02
T-EMRDC	XFMR	3	B333	DATA CONTROL ELECTRICAL RM	E2.32	E.604
UPS-A1	UPS	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
UPS-A2	UPS	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02

Main Equipment Schedule						
Tag	Type of Equipment	Floor Level	Room Number	Room Name	Drawing Number	Enlarged Drawing Number
UPS-B1	UPS	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
UPS-B2	UPS	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
EMWSDP1	EMERGENCY SBD	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
MBOPA1	MAINTENANCE BIPASS PANEL	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
MBOPA2	MAINTENANCE BIPASS PANEL	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
MBOPB1	MAINTENANCE BIPASS PANEL	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
MBOPB2	MAINTENANCE BIPASS PANEL	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
STS#1	STATIC TRANSFER SWITCH	1	B134/B135	1ST FLR UPS RM	E2.12	E6.02
DP-MECH	DISTRIBUTION PANEL	3	A327	3RD FLR DC ELECTRIC RM	E2.31	E6.05
Note:	XFMR: Transformer					
	GEN: Generator					
	SBD: Switchboard					
	ATS: Automatic Transfer Switch					

Panelboard Schedule									
Tag	Voltage System	Main Type	Main Size	Bus Size	Floor Level	Room Number	Room Name	DWG #	Enlarged DWG #
RP-K	480Y/277V, 3Ph, 4W	MLO	600A	600A	1	A167	KITCHEN ELEC CLOSET	E2.11	E6.03
RP-K1	208Y/120V, 3Ph, 4W	MCB	800A	800A	1	A167	KITCHEN ELEC CLOSET	E2.11	E6.03
RP-K2	208Y/120V, 3Ph, 4W	MLO	800A	800A	1	A167	KITCHEN ELEC CLOSET	E2.11	E6.03
RP-K3	208Y/120V, 3Ph, 4W	MLO	800A	800A	1	A167	KITCHEN ELEC CLOSET	E2.11	E6.03
PP-MB	480Y/277V, 3Ph, 4W	MCB	400A	400A	MB	C100	MAINT. BLDG	A7.1	E0.52

Panelboard Schedule									
Tag	Voltage System	Main Type	Main Size	Bus Size	Floor Level	Room Number	Room Name	DWG #	Enlarged DWG #
RP-MB	208Y/120V, 3Ph, 4W	MCB	125A	125A	MB	C100	MAINT. BLDG	A7.1	E0.52
ERPMB	208Y/120V, 3Ph, 4W	MCB	60A	100A	MB	C100	MAINT. BLDG	A7.1	E0.52
RPDC1-1A	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B332	DATA CNTR-1	E2.32	E6.04
RPDC1-1B	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B332	DATA CNTR-1	E2.32	E6.04
RPDC1-2A	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B332	DATA CNTR-1	E2.32	E6.04
RPDC1-2B	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B332	DATA CNTR-1	E2.32	E6.04
RPDC1-3A	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B332	DATA CNTR-1	E2.32	E6.04
RPDC1-3B	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B332	DATA CNTR-1	E2.32	E6.04
RPDC1-4A	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B332	DATA CNTR-1	E2.32	E6.04
RPDC1-4B	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B332	DATA CNTR-1	E2.32	E6.04
RPDC2-1A	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B340	DATA CNTR-2	E2.32	E6.04
RPDC2-1B	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B340	DATA CNTR-2	E2.32	E6.04
RPDC2-2A	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B340	DATA CNTR-2	E2.32	E6.04
RPDC2-2B	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B340	DATA CNTR-2	E2.32	E6.04
RPDC2-3A	208Y/120V, 3Ph, 4W	MCB	150A	150A	3	B340	DATA CNTR-2	E2.32	E6.04
RPDC2-3B	208Y/120V, 3Ph, 4W	MCB	150A	150A	3	B340	DATA CNTR-2	E2.32	E6.04
RPDC2-4A	208Y/120V, 3Ph, 4W	MCB	150A	150A	3	B340	DATA CNTR-2	E2.32	E6.04
RPDC2-4B	208Y/120V, 3Ph, 4W	MCB	150A	150A	3	B340	DATA CNTR-2	E2.32	E6.04
DWP	480Y/277V, 3Ph, 4W	MLO	100A	100A	1	B116	MAIN ELECTRICAL RM	E2.12	E6.01

Panelboard Schedule									
Tag	Voltage System	Main Type	Main Size	Bus Size	Floor Level	Room Number	Room Name	DWG #	Enlarged DWG #
EMIDF	480Y/277V, 3Ph, 4W	MLO	125A	125A	1	B136/ B137	FUTURE UPS RM	E2.12	E6.02
ERP1	208Y/120V, 3Ph, 4W	MCB	250A	175A	1	B117	MAIN ELECTRICAL RM	E2.12	E6.01
SLP	480Y/277V, 3Ph, 4W	MLO	100A	100A	1	B116	MAIN ELECTRICAL RM	E2.12	E6.01
EMDF	208Y/120V, 3Ph, 4W	MCB	125A	125A	1	B116	MAIN ELECTRICAL RM	E2.12	E6.01
ERP2	208Y/120V, 3Ph, 4W	MLO	225A	225A	1	B117	MAIN ELECTRICAL RM	E2.12	E6.01
RP1FC	208Y/120V, 3Ph, 4W	MCB	150A	125A	1	A145	CORRIDOR	E2.11	-
EIDF1	208Y/120V, 3Ph, 4W	MCB	100A	60A	1	A148	IDF RM	E2.11	E6.05
DPUPSWS	208Y/120V, 3Ph, 4W	MCB	500A	500A	1	B136/ B137	FUTURE UPS RM	E2.12	E6.02
RP1MR	208Y/120V, 3Ph, 4W	MCB	175A	250A	1	B140	MAIL RM	E2.12	-
RP1WM	208Y/120V, 3Ph, 4W	MCB	100A	60A	MB	C100	WORKRM MAINT BLDG	A7.1	E0.52
LP1W	480Y/277V, 3Ph, 4W	MLO	400A	400A	1	A149	ELECTRICAL RM	E2.11	E6.05
ELP1W	480Y/277V, 3Ph, 4W	MLO	250A	250A	1	A149	ELECTRICAL RM	E2.11	E6.05
PPM1W	480Y/277V, 3Ph, 4W	MLO	100A	100A	1	A149	ELECTRICAL RM	E2.11	E6.05
RP1W1	208Y/120V, 3Ph, 4W	MCB	250A	250A	1	A149	ELECTRICAL RM	E2.11	E6.05
RPM1W	208Y/120V, 3Ph, 4W	MCB	100A	100A	1	A149	ELECTRICAL RM	E2.11	E6.05
RP1W2	208Y/120V, 3Ph, 4W	MLO	250A	250A	1	A149	ELECTRICAL RM	E2.11	E6.05
RP1W3	208Y/120V, 3Ph, 4W	MLO	250A	250A	1	A149	ELECTRICAL RM	E2.11	E6.05
LP1E	480Y/277V, 3Ph, 4W	MLO	400A	400A	1	B160	ELECTRICAL RM	E2.12	E6.05

Panelboard Schedule									
Tag	Voltage System	Main Type	Main Size	Bus Size	Floor Level	Room Number	Room Name	DWG #	Enlarged DWG #
ELP1E	480Y/277V, 3Ph, 4W	MLO	250A	250A	1	B160	ELECTRICAL RM	E2.12	E6.05
PPM1E	480Y/277V, 3Ph, 4W	MLO	100A	100A	1	B160	ELECTRICAL RM	E2.12	E6.05
RP1E1	208Y/120V, 3Ph, 4W	MCB	250A	250A	1	B160	ELECTRICAL RM	E2.12	E6.05
RPUPS1	208Y/120V, 3Ph, 4W	MLO	250A	250A	1	B160	ELECTRICAL RM	E2.12	E6.05
RPM1E1	208Y/120V, 3Ph, 4W	MCB	100A	100A	1	B160	ELECTRICAL RM	E2.12	E6.05
RP1E2	208Y/120V, 3Ph, 4W	MLO	250A	250A	1	B160	ELECTRICAL RM	E2.12	E6.05
RPM1E2	208Y/120V, 3Ph, 4W	MLO	100A	100A	1	B160	ELECTRICAL RM	E2.12	E6.05
RP1E3	208Y/120V, 3Ph, 4W	MLO	250A	250A	1	B160	ELECTRICAL RM	E2.12	E6.05
LP2W	480Y/277V, 3Ph, 4W	MLO	400A	400A	2	A215	ELECTRICAL RM	E2.21	E6.05
ELP2W	480Y/277V, 3Ph, 4W	MLO	250A	250A	2	A215	ELECTRICAL RM	E2.21	E6.05
PPM2W	480Y/277V, 3Ph, 4W	MLO	100A	100A	2	A215	ELECTRICAL RM	E2.21	E6.05
RP2W1	208Y/120V, 3Ph, 4W	MCB	250A	250A	2	A215	ELECTRICAL RM	E2.21	E6.05
EIDF2	208Y/120V, 3Ph, 4W	MCB	100A	60A	2	A216	IDF RM	E2.21	E6.05
RPM2W	208Y/120V, 3Ph, 4W	MCB	100A	100A	2	A215	ELECTRICAL RM	E2.21	E6.05
RP2W2	208Y/120V, 3Ph, 4W	MLO	250A	250A	2	A215	ELECTRICAL RM	E2.21	E6.05
LP2E	480Y/277V, 3Ph, 4W	MLO	400A	400A	2	B208	ELECTRICAL RM	E2.22	E6.05
ELP2E	480Y/277V, 3Ph, 4W	MLO	250A	250A	2	B208	ELECTRICAL RM	E2.22	E6.05
RPUPS21	208Y/120V, 3Ph, 4W	MLO	400A	400A	2	B208	ELECTRICAL RM	E2.22	E6.05
RP2E1	208Y/120V, 3Ph, 4W	MCB	250A	250A	2	B208	ELECTRICAL RM	E2.22	E6.05
RPUPS22	208Y/120V, 3Ph, 4W	MLO	400A	400A	2	B208	ELECTRICAL RM	E2.22	E6.05

Panelboard Schedule									
Tag	Voltage System	Main Type	Main Size	Bus Size	Floor Level	Room Number	Room Name	DWG #	Enlarged DWG #
RP2E2	208Y/120V, 3Ph, 4W	MLO	250A	250A	2	B208	ELECTRICAL RM	E2.22	E6.05
PPM2E	480Y/277V, 3Ph, 4W	MLO	100A	100A	2	B208	ELECTRICAL RM	E2.22	E6.05
RPUPS23	208Y/120V, 3Ph, 4W	MLO	400A	400A	2	B208	ELECTRICAL RM	E2.22	E6.05
RP2E3	208Y/120V, 3Ph, 4W	MLO	250A	250A	2	B208	ELECTRICAL RM	E2.22	E6.05
RPM2E	208Y/120V, 3Ph, 4W	MCB	100A	100A	2	B208	ELECTRICAL RM	E2.22	E6.05
RPUPS24	208Y/120V, 3Ph, 4W	MLO	400A	400A	2	B208	ELECTRICAL RM	E2.22	E6.05
LP3W	480Y/277V, 3Ph, 4W	MLO	400A	400A	3	A327	ELECTRICAL RM	E2.31	E6.05
ELP3W	480Y/277V, 3Ph, 4W	MLO	250A	250A	3	A327	ELECTRICAL RM	E2.31	E6.05
PPM3W	480Y/277V, 3Ph, 4W	MLO	100A	100A	3	A327	ELECTRICAL RM	E2.31	E6.05
RP3W1	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	A327	ELECTRICAL RM	E2.31	E6.05
EMDC1	480Y/277V, 3Ph, 4W	MLO	400A	400A	3	B333	MECHANICAL RM	E2.32	E6.04
RPM3W	208Y/120V, 3Ph, 4W	MCB	110A	110A	3	A327	ELECTRICAL RM	E2.31	E6.05
RP3W2	208Y/120V, 3Ph, 4W	MLO	250A	250A	3	A327	ELECTRICAL RM	E2.31	E6.05
EMDC2	480Y/277V, 3Ph, 4W	MLO	400A	400A	3	B333	MECHANICAL RM	E2.32	E6.04
RP3W3	208Y/120V, 3Ph, 4W	MLO	250A	250A	3	A327	ELECTRICAL RM	E2.31	E6.05
EMRDC	208Y/120V, 3Ph, 4W	MCB	175A	175A	3	B333	MECHANICAL RM	E2.32	E6.04
LP3E	480Y/277V, 3Ph, 4W	MLO	400A	400A	3	B311	ELECTRICAL RM	E2.32	E6.05
ELP3E	480Y/277V, 3Ph, 4W	MLO	250A	250A	3	B311	ELECTRICAL RM	E2.32	E6.05
PPM3E	480Y/277V, 3Ph, 4W	MLO	100A	100A	3	B311	ELECTRICAL RM	E2.32	E6.05
RP3E1	208Y/120V, 3Ph, 4W	MCB	250A	250A	3	B311	ELECTRICAL RM	E2.32	E6.05

Panelboard Schedule									
Tag	Voltage System	Main Type	Main Size	Bus Size	Floor Level	Room Number	Room Name	DWG #	Enlarged DWG #
EIDF3	208Y/120V, 3Ph, 4W	MCB	225A	125A	3	B335	IDF RM	E2.32	E6.05
RPM3E1	208Y/120V, 3Ph, 4W	MCB	250A	175A	3	B311	ELECTRICAL RM	E2.32	E6.05
RP3E2	208Y/120V, 3Ph, 4W	MLO	250A	250A	3	B311	ELECTRICAL RM	E2.32	E6.05
RPUPS31	208Y/120V, 3Ph, 4W	MLO	250A	250A	3	B311	ELECTRICAL RM	E2.32	E6.05
RPM3E2	208Y/120V, 3Ph, 4W	MLO	250A	250A	3	B311	ELECTRICAL RM	E2.32	E6.05
RP3E3	208Y/120V, 3Ph, 4W	MLO	250A	250A	3	B311	ELECTRICAL RM	E2.32	E6.05
RPUPS32	208Y/120V, 3Ph, 4W	MLO	250A	250A	3	B311	ELECTRICAL RM	E2.32	E6.05

Over-current Devices

Over-current devices within the Pennsylvania State Employees Credit Union Corporate Headquarters include fixed circuit breakers, draw-out breakers, tie circuit breakers, and fused safety switches. Feeder circuit breakers in the switchboards are throughout the electrical distribution system and are all metered. Draw-out breakers are located after the primary transformers in the double-ended substation in order to switch the power from normal to emergency power. Tie circuit breakers are located within the double-ended substation switchboard and the data center double-ended main switchboard. Fused safety switches are within the variable frequency drives to regulate the current that services the elevators and air handling units. The elevators also have a shunt trip feature. High voltage fused interrupter switches are located at the utility service entrance.

Transformers

Pennsylvania State Employees Credit Union Corporate Headquarters has a total of 43 transformers throughout the building. The three primary transformers are located on the interior of the building in electrical room B116 and B117. Most of the transformers are located throughout the first floor, but some are located on both the second and third floors. Some of the other transformers are located in the secondary electrical rooms throughout the building. All of the transformers are either pad-mounted or ceiling-mounted.

Transformer Schedule								
Tag	Primary Voltage	Secondary Voltage	Size	Type	Temp Rise	Taps	Mounting	Rmks
XFMR #1	12.47KVA/ 7.2KV	480Y/277V, 3Ph, 4W	2500	dry	150° C	(2) 2.5%	pad-mounted	
T-RPK	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	225	dry	150° C	(2) 2.5%	pad-mounted	
T-RP1E	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	
T-RP1MR	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	45	dry	150° C	(2) 2.5%	clg-mounted	
T-RP1WM	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	clg-mounted	
T-RPM1E	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	pad-mounted	
T-RP2E	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	
T-RPM2E	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	pad-mounted	
T-RP3E	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	
T-RPM3E	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	45	dry	150° C	(2) 2.5%	pad-mounted	
T-DPUPSWS	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	150	dry	150° C	(2) 2.5%	pad-mounted	K-13
XFMR #2	12.47KVA/ 7.2KV	480Y/277V, 3Ph, 4W	2500	dry	150° C	(2) 2.5%	pad-mounted	
T-RP1FC	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	pad-mounted	
T-RP1W	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	
T-RPM1W	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	pad-mounted	
T-RP2W	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	
T-RPM2W	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	pad-mounted	
T-RP3W	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	

Transformer Schedule								
Tag	Primary Voltage	Secondary Voltage	Size	Type	Temp Rise	Taps	Mounting	Rmks
T-RPM3W	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	pad-mounted	
T-ERP	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	45	dry	150° C	(2) 2.5%	pad-mounted	
XFMR	12.47KVA	480Y/277V, 3Ph, 4W	225	dry	150° C	(2) 2.5%	pad-mounted	
T-DC-1-1A	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-1-2A	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-1-3A	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-1-4A	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-2-1A	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-2-2A	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-2-3A	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	45	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-2-4A	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	45	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-1-1B	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-1-2A	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-1-3B	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-1-4B	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13

Transformer Schedule								
Tag	Primary Voltage	Secondary Voltage	Size	Type	Temp Rise	Taps	Mounting	Rmks
T-DC-2-1B	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-2-2B	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	75	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-2-3B	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	45	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-DC-2-4B	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	45	dry	150° C	(2) 2.5%	pad-mounted	K-13
T-EMDF	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	clg-mounted	
T-EIDF1	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	15	dry	150° C	(2) 2.5%	clg-mounted	
T-EIDF2	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	15	dry	150° C	(2) 2.5%	clg-mounted	
T-EIDF3	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	clg-mounted	
T-RPMB	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	30	dry	150° C	(2) 2.5%	pad-mounted	
T-EMRDC	480Y/277V, 3Ph, 4W	208Y/120V, 3Ph, 4W	45	dry	150° C	(2) 2.5%	pad-mounted	

Grounding

The UPS rooms, Electrical rooms, Data Center, IDF room, Lighting Protection Grounding System, Generators, and all transformers are grounded through copper grounding electrode conductors and ground buses to the main ground bus in the main electrical room. From the main ground bus, the system connects to the grounding electrode conductors, which connects to the grounding rods and a metal water pipe. The grounding rods are welded to the building steel below grade and are ¾ inch by 10 feet diameter copper-clad steel rods. Grounding rods are also connected to the ground buses through copper grounding electrode conductors at the secondary electrical rooms, IDF Room, Data Center rooms, and UPS rooms. Grounding rods are also located at the base of each corner column and at the intermediate exterior columns.

Special Equipment

The electrical system within the Pennsylvania State Employees Credit Union Corporate Headquarters includes a variety of special equipment. PSECU has an extensive data center, a high-pressure natural-gas microturbine generator, a diesel generator, transient voltage surge suppressors (TVSS), draw-out breakers, tie circuit breakers, static bypass transfer switch, UPS Systems, and a future solar array system.

Five UPS systems provide fifteen minute battery backup for the data center and the workstation computers. The four UPS systems that provide power to the data center are each rated at 275kVA/247kW, 480V, 3Ph, 3W. The last UPS system provides power to the workstation computers and is rated at 120KVA/108kW, 480V, 3Ph. If a fault occurs and current flows in excess of the overload rating of the UPS, a static bypass transfer switch will operate in order to regulate the current.

Two generators provide power for PSECU Corporate Headquarters, which include a diesel generator and a capstone high-pressure natural-gas microturbine generator with heat recovery provide power to the entire building under emergency conditions. The microturbine generator also operates under normal conditions.

Draw-out breakers operate under emergency conditions to convert the double-ended main substation to emergency power. Tie circuit breakers operate for redundancy within the system.

Transient voltage surge suppressors, or TVSS, are located throughout the electrical distribution system. TVSS are located at the utility service entrance at the load side with ground lead bonded to the service ground and in every data center panelboard. It is rated for continuous operation under no less than 115% of the nominal system operating voltage.

In future development of PSECU Corporate Headquarters, solar panel arrays will be installed as a sustainability feature.

Lighting Loads

The lighting design for the Pennsylvania State Employees Credit Union Corporate Headquarters is both energy efficient and aesthetically pleasing through the overall design scheme of bringing the outside into the spaces and highlighting the building's architecture. Light sources throughout PSECU Corporate Headquarters include fluorescent, halogen, compact fluorescent, LED, and metal halide. Most lighting loads are serviced by a 480Y/277V system, but roadway fixtures are serviced by a 208Y/120V system. Due to the complexity of the lighting controls, spaces have appropriate lighting schemes which enhance the aesthetics of the spaces.

The following luminaire schedule provides in depth information on each luminaire throughout the building and grounds.

Lighting Control

Several control systems within the Pennsylvania State Employees Credit Union Corporate Headquarters allow for flexibility and scene control within each space. Open offices, the lobby, private offices, and the conference center utilize a daylight harvesting system with dimming, along with vacancy and occupancy systems. ASHRAE/IESNA Standards are met through three Lutron Light Management HUBs, which control every space throughout the building and provide power savings. The parking areas utilize motion detectors with dimming for roadway and walkway fixture power savings.

Luminaire Schedule										
Tag	Lamp				Ballast	Luminaire				
	Light Source	Lamp Type	Indiv. Lamp W	# of Lamps		Input V	Input W	B.F.	Current (A)	P.F.
AV1	QUAR	35 W MR16	35 W	1	INTEGRAL XFMR	277	35	-	0.13	0.56
BCE2	FLUOR	32 W T8	32 W	2	ELECTRONIC	277	73	1.20	0.26	0.59
BCE3	FLUOR	28 W T5	28 W	2	ELECTRONIC	277	63	1.00	0.23	0.57
BCE4	FLUOR	28 W T5	28 W	2	ELECTRONIC	277	63	1.00	0.23	0.57
CL1	LED	LED	13.5 W	-	INTEGRAL XFMR	277	13.5	-	0.03	1.00
DC1	TRT CFL	F26TBX	26 W	1	ELECTRONIC	277	28	1.00	0.22	0.27
DL1	LED	LED	27 W	-	INTEGRAL XFMR	277	27	-	0.03	1.00
DL2	LED	LED	27 W	-	INTEGRAL XFMR	277	27	-	0.03	1.00
DL3	LED	LED	20 W	-	INTEGRAL XFMR	277	20	-	0.03	1.00
DL4	LED	LED	1 W	-	INTEGRAL XFMR	277	1	-	0.03	1.00
DL5	LED	LED	39 W	-	INTEGRAL XFMR	277	39	-	0.03	1.00
DL6	LED	LED	27 W	-	INTEGRAL XFMR	277	27	-	0.03	1.00
DL7	LED	LED	20 W	-	INTEGRAL XFMR	277	20	-	0.03	1.00
GF1	FLUOR	32 W T8	32 W	2	ELECTRONIC	277	73	1.20	0.26	0.59
GF2	FLUOR	32 W T8	32 W	2	ELECTRONIC	277	73	1.20	0.26	0.59
GF3	FLUOR	32 W T8	32 W	2	ELECTRONIC	277	73	1.20	0.26	0.59
GF4	FLUOR	32 W T8	32 W	1	ELECTRONIC	277	39	1.20	0.14	0.58
GF5	FLUOR	32 W T8	32 W	2	ELECTRONIC	277	73	1.20	0.26	0.59
GF6	FLUOR	32 W T8	32 W	2	ELECTRONIC	277	73	1.20	0.26	0.59
GF7	FLUOR	32 W T8	32 W	1	ELECTRONIC	277	39	1.20	0.14	0.58
GF8	FLUOR	28 W T5	28 W	1	ELECTRONIC	277	32	1.00	0.12	0.56
GF9	FLUOR	14 W T5	14 W	1	ELECTRONIC	277	19	1.00	0.07	0.57

Luminaire Schedule										
Tag	Lamp				Ballast	Luminaire				
	Light Source	Lamp Type	Indiv. Lamp W	# of Lamps		Input V	Input W	B.F.	Current (A)	P.F.
LL1	LED	LED	8 W	-	INTEGRAL XFMR	277	8	-	0.03	1.00
LL2	LED	LED	29 W	-	INTEGRAL XFMR	277	29	-	0.03	1.00
MS1	MH	39 W PAR20	39 W	1	INTEGRAL XFMR	277	44	1.00	0.17	0.54
PF1	FLUOR	32 W T8	32 W	2	ELECTRONIC	277	73	1.20	0.26	0.59
PF2	FLUOR	32 W T8	32 W	1	ELECTRONIC	277	39	1.20	0.14	0.58
PF3	QUAD CFL	F18QBX	18 W	1	ELECTRONIC	277	20	1.00	0.14	0.30
PF4	FLUOR	32 W T8	32 W	4	ELECTRONIC	277	99	1.15	0.49	0.42
PF5	FLUOR	32 W T8	32 W	2	ELECTRONIC	277	73	1.20	0.26	0.59
PF6	FLUOR	32 W T8	32 W	4	ELECTRONIC	277	99	1.15	0.49	0.42
PF7	FLUOR	28 W T5	28 W	2	ELECTRONIC	277	63	1.00	0.23	0.57
PL1	LED	LED	20 W	1	INTEGRAL XFMR	277	20	-	0.03	1.00
PM1	MH	70 W CMH	70 W	1	ELECTRONIC	277	79	1.00	0.27	0.61
RL1	LED	LED	103 W	-	INTEGRAL XFMR	277	103	-	0.03	1.00
RL2	LED	LED	103 W	-	INTEGRAL XFMR	277	103	-	0.03	1.00
RL3	LED	LED	103 W	-	INTEGRAL XFMR	277	103	-	0.03	1.00
RL4	LED	LED	80 W	-	INTEGRAL XFMR	277	80	-	0.03	1.00
RL5	LED	LED	80 W	-	INTEGRAL XFMR	277	80	-	0.03	1.00
RM1	MH	70 W CMH	70 W	1	ELECTRONIC	277	79	1.00	0.27	0.61
RM2	LED	LED	20 W	-	INTEGRAL XFMR	120	20	-	0.03	1.00
SC1	TRT CFL	F32TBX	32 W	2	ELECTRONIC	277	67	0.96	0.22	0.63
SC2	TRT CFL	F32TBX	32 W	1	ELECTRONIC	277	35	0.98	0.22	0.33
SC3	TRT CFL	F32TBX	32 W	1	ELECTRONIC	277	35	0.98	0.22	0.33
SF1	QUAD CFL	F13QBX	13 W	1	ELECTRONIC	277	16	1.00	0.11	0.30
SF2	QUAD CFL	F13QBX	13 W	1	ELECTRONIC	277	16	1.00	0.11	0.30
SF3	FLUOR	14 W T5	14 W	1	ELECTRONIC	277	19	1.00	0.07	0.57
SF4	FLUOR	28 W T5	28 W	1	ELECTRONIC	277	32	1.00	0.12	0.56
SF5	FLUOR	32 W T8	32 W	2	ELECTRONIC	277	73	1.20	0.26	0.59
SF6	FLUOR/ QUAR	28 W T5/ 50 W MR16	28 W/ 50 W	1/2	ELECTRONIC	277	133	1.00	0.12	2.31
SL1	LED	LED	6 W	-	INTEGRAL XFMR	277	6	-	0.03	1.00

Luminaire Schedule										
Tag	Lamp				Ballast	Luminaire				
	Light Source	Lamp Type	Indiv. Lamp W	# of Lamps		Input V	Input W	B.F.	Current (A)	P.F.
SL2	LED	LED	60 W	-	INTEGRAL XFMR	277	60	-	0.03	1.00
SL3	LED	LED	6 W	-	INTEGRAL XFMR	277	6	-	0.03	1.00
SL4	MH	39 W CMH	39 W	1	ELECTRONIC	277	44	1.00	0.17	0.54
SL5	LED	LED	10.5 W / 30 MODULES	-	INTEGRAL XFMR	277	10.5	-	0.03	1.00
WF1	FLUOR	32 W T8	32 W	1	ELECTRONIC	277	39	1.20	0.14	0.58
WL1	LED	LED	27 W	-	INTEGRAL XFMR	277	27	-	0.03	1.00

Mechanical and Other Loads

Both variable air volume and constant air volume systems are utilized in order to circulate air throughout the building. Eighteen air handling units and thirty-six water pumps are implemented throughout the building. A heat recovery unit with an economizer allows for variable air volume throughout the year. An Air cooled chiller and an absorption chiller cooling tower, along with a hot water boiler provide both heating and cooling for the building.

The following Mechanical Equipment Schedule, Plumbing Equipment Schedule, Architectural Equipment Schedule, Data Center Equipment Schedule, and Kitchen Equipment Schedule provide in depth information on each piece of equipment throughout the building.

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
AHU-1	AIR HANDLING UNIT	20.00	HP	27	460 V	3	0.95	18.650	30.688
AHU-2	AIR HANDLING UNIT	20.00	HP	27	460 V	3	0.95	18.650	30.688
AHU-3	AIR HANDLING UNIT	20.00	HP	27	460 V	3	0.95	18.650	30.688
AHU-4	AIR HANDLING UNIT	25.00	HP	34	460 V	3	0.95	23.313	38.360

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
AHU-5	AIR HANDLING UNIT	10.00	HP	14	460 V	3	0.95	9.325	15.344
AHU-6	AIR HANDLING UNIT	30.00	HP	40	460 V	3	0.95	27.975	46.031
AHU-7	AIR HANDLING UNIT	20.00	HP	27	460 V	3	0.95	18.650	30.688
AHU-8	AIR HANDLING UNIT	30.00	HP	40	460 V	3	0.95	27.975	46.031
AHU-9	AIR HANDLING UNIT	10.00	HP	14	460 V	3	0.95	9.325	15.344
AHU-10	AIR HANDLING UNIT	7.50	HP	11	460 V	3	0.95	6.994	11.508
AHU-11	AIR HANDLING UNIT	7.50	HP	11	460 V	3	0.95	6.994	11.508
AHU-12	AIR HANDLING UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
AHU-13	AIR HANDLING UNIT	15.00	HP	21	460 V	3	0.95	13.988	23.016
AHU-14	AIR HANDLING UNIT	25.00	HP	34	460 V	3	0.95	23.313	38.360
AHU-15	AIR HANDLING UNIT	40.00	HP	52	460 V	3	0.95	37.300	61.375
AHU-16	AIR HANDLING UNIT	40.00	HP	52	460 V	3	0.95	37.300	61.375
AHU-17	AIR HANDLING UNIT	40.00	HP	52	460 V	3	0.95	37.300	61.375
MAU-1	AIR HANDLING UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
CRAC-1	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396
CRAC-2	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396
CRAC-5	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396
CRAC-6	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396
CRAC-7	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396
CRAC-8	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396
CRAC-3	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
CRAC-4	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396
CRAC-14	COMPUTER RM A/C UNIT	3.00	HP	4.8	460 V	3	0.85	2.798	4.119
CRAC-15	COMPUTER RM A/C UNIT	3.00	HP	4.8	460 V	3	0.85	2.798	4.119
CRAC-16	COMPUTER RM A/C UNIT	3.00	HP	4.8	460 V	3	0.85	2.798	4.119
CRAC-17	COMPUTER RM A/C UNIT	3.00	HP	4.8	460 V	3	0.85	2.798	4.119
CRAC-9	COMPUTER RM A/C UNIT	1.50	HP	3	460 V	3	0.85	1.399	2.059
CRAC-10	COMPUTER RM A/C UNIT	1.50	HP	3	460 V	3	0.85	1.399	2.059
CRAC-11	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396
CRAC-12	COMPUTER RM A/C UNIT	0.50	HP	4.9	277 V	1	0.85	0.466	0.396
CRAC-13	COMPUTER RM A/C UNIT	1.50	HP	3	460 V	3	0.85	1.399	2.059
EF R-1	FAN COIL UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
EF R-2	FAN COIL UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
EF R-3	FAN COIL UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
EF R-4	FAN COIL UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
EF R-5	FAN COIL UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
EF R-6	FAN COIL UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
EF R-7	FAN COIL UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
EF R-8	FAN COIL UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
EF R-9	FAN COIL UNIT	3.00	HP	4.8	460 V	3	0.85	2.798	4.119
EF R-10	FAN COIL UNIT	0.75	HP	1.6	460 V	3	0.75	0.699	0.909
EF R-11	FAN COIL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
EF R-12	FAN COIL UNIT	1.00	HP	2.1	460 V	3	0.85	0.933	1.373
EF R-13	FAN COIL UNIT	0.75	HP	1.6	460 V	3	0.85	0.699	1.030
EF R-14	FAN COIL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
EF R-15	FAN COIL UNIT	1.00	HP	2.1	460 V	3	0.85	0.933	1.373
EF R-16	FAN COIL UNIT	5.00	HP	7.6	460 V	3	0.85	4.663	6.864
EF R-17	FAN COIL UNIT	0.17	HP	4.4	120 V	1	0.75	0.156	0.117
EF R-18	FAN COIL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
EF R-19	FAN COIL UNIT	0.17	HP	4.4	120 V	1	0.75	0.156	0.117
EF R-20	FAN COIL UNIT	20.00	HP	27	460 V	3	0.95	18.650	30.688
EF R-21	FAN COIL UNIT	20.00	HP	27	460 V	3	0.95	18.650	30.688
EF R-22	FAN COIL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
EF R-23	FAN COIL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
EF R-24	FAN COIL UNIT	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
EF R-25	FAN COIL UNIT	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
EF1-2	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
EF1-3	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
EF1-4	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
EF1-5	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
EF1-6	FAN COIL UNIT	0.711	kW	-	120 V	1	0.95	0.748	0.711
EF2-1	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
EF2-2	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
EF3-1	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
EF3-2	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
EF3-3	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
EF3-4	FAN COIL UNIT	0.822	kW	-	120 V	1	0.95	0.865	0.822
SF 1-1	FAN COIL UNIT	1.000	HP	2.1	460 V	3	0.85	0.933	1.373
SF 1-2	FAN COIL UNIT	7.500	HP	11	460 V	3	0.95	6.994	11.508
SF 1-3	FAN COIL UNIT	0.333	HP	7.2	120 V	1	0.75	0.311	0.233
SF 1-4	FAN COIL UNIT	2.000	HP	3.4	460 V	3	0.85	1.865	2.746
SF 1-5	FAN COIL UNIT	0.250	HP	5.8	120 V	1	0.75	0.233	0.175
TF 1-1	FAN COIL UNIT	0.455	kW	-	120 V	1	0.95	0.479	0.455
TF 1-2	FAN COIL UNIT	0.455	kW	-	120 V	1	0.95	0.479	0.455
TF 1-3	FAN COIL UNIT	0.455	kW	-	120 V	1	0.95	0.479	0.455
TF 1-4	FAN COIL UNIT	0.455	kW	-	120 V	1	0.95	0.479	0.455
TF 2-1	FAN COIL UNIT	0.455	kW	-	120 V	1	0.95	0.479	0.455
TF 2-2	FAN COIL UNIT	0.455	kW	-	120 V	1	0.95	0.479	0.455
TF 3-1	FAN COIL UNIT	0.455	kW	-	120 V	1	0.95	0.479	0.455
TF 3-2	FAN COIL UNIT	0.455	kW	-	120 V	1	0.95	0.479	0.455
TF 3-3	FAN COIL UNIT	0.455	kW	-	120 V	1	0.95	0.479	0.455
GUH 1	GAS HEATER	0.10	HP	4.4	120 V	1	0.75	0.093	0.070
GUH 2	GAS HEATER	0.10	HP	4.4	120 V	1	0.75	0.093	0.070
FOP-1	FUEL OIL PUMP	0.33	HP	7.2	208 V	1	0.75	0.311	0.233
FOP-2	FUEL OIL PUMP	0.33	HP	7.2	208 V	1	0.75	0.311	0.233
FOP-3	FUEL OIL PUMP	1.0833	HP	16	208 V	1	0.85	1.010	0.859
AC 1-1	AIR CURTAIN	2.00	HP	7.8	208V	3	0.85	1.865	2.746
AC 1-2	AIR CURTAIN	2.00	HP	7.8	208V	3	0.85	1.865	2.746
FCU-1.1	FAN COIL UNIT	0.50	HP	9.8	277 V	1	0.75	0.466	0.350
FCU-1.2	FAN COIL UNIT	0.33	HP	7.2	278 V	1	0.75	0.311	0.233
FCU-3.1	FAN COIL UNIT	0.33	HP	7.2	279 V	1	0.75	0.311	0.233
FCU-3.2	FAN COIL UNIT	0.33	HP	7.2	280 V	1	0.75	0.311	0.233
FCU-3.3	FAN COIL UNIT	0.33	HP	7.2	281 V	1	0.75	0.311	0.233
FCU-3.4	FAN COIL UNIT	0.33	HP	7.2	282 V	1	0.75	0.311	0.233
UFTU 1.1	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
UFTU 1.2	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 1.3	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 1.4	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 1.5	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 1.6	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 1.7	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 1.8	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 1.9	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 1.10	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 1.11	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.1	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.2	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.3	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.4	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
UFTU 2.5	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.6	UNDERFLOOR FAN TERMINAL UNIT	1.00	HP	16	120 V	1	0.85	0.933	0.793
UFTU 2.7	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.8	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.9	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 2.10	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.11	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.12	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.13	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 2.14	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 2.15	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 2.16	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.17	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 2.18	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396

Mechanical Equipment Schedule

Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
UFTU 2.19	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 2.20	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 2.21	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 2.22	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.23	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.24	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 2.25	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.1	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.2	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.3	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.4	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.5	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.6	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.7	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
UFTU 3.8	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.9	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.10	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 3.11	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 3.12	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 3.13	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 3.14	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 3.15	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 3.16	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 3.17	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.18	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.19	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.308	0.231
UFTU 3.20	UNDERFLOOR FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
UFTU 3.21	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
UFTU 3.22	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.23	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.24	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.25	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.26	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.27	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.28	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.29	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.31	UNDERFLOOR FAN TERMINAL UNIT	1.00	HP	16	120 V	1	0.85	0.933	0.793
UFTU 3.32	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.33	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.34	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
UFTU 3.35	UNDERFLOOR FAN TERMINAL UNIT	0.33	HP	7.2	120 V	1	0.75	0.311	0.233
FTU-1.8.1	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-1.8.2	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
FTU-1.8.3	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.8.4	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.8.5	FAN TERMINAL UNIT	0.10	HP	4.4	120 V	1	0.75	0.093	0.070
FTU-1.10.1	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.10.2	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.10.3	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-1.10.4	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.11.1	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.13.1	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-1.13.2	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.13.3	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.13.4	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.13.5	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.13.6	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.13.7	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.13.8	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.13.9	FAN TERMINAL UNIT	0.10	HP	4.4	120 V	1	0.75	0.093	0.070
FTU-1.13.10	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-1.14.1	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-2.14.1	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-2.14.2	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
FTU-2.14.3	FAN TERMINAL UNIT	0.10	HP	4.4	120 V	1	0.75	0.093	0.070
FTU-2.14.4	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-2.14.5	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-2.14.6	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-2.14.7	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-2.2.1	FAN TERMINAL UNIT	0.10	HP	4.4	120 V	1	0.75	0.093	0.070
FTU-2.2.2	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-2.6.1	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-2.5.1	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-2.7.1	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-2.7.2	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-2.8.1	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-3.1.1	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.1.2	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.1.3	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.1.4	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.2.1	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.2.2	FAN TERMINAL UNIT	0.25	HP	5.8	120 V	1	0.75	0.233	0.175
FTU-3.3.1	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.3.2	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.4.1	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.4.2	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396

Mechanical Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
FTU-3.4.3	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.4.4	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.6.5	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.6.4	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.6.1	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.6.	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.7.1	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.7.2	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.7.3	FAN TERMINAL UNIT	0.50	HP	9.8	120 V	1	0.85	0.466	0.396
FTU-3.15.1	FAN TERMINAL UNIT	0.50	HP	9.8	121 V	1	0.85	0.466	0.396
							TOTALS	528.260	799.18

Plumbing Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
CP-1	CONDENSATE PUMP	0.372	kVA	-	120 V	1	0.95	0.372	0.353
CP-2	CONDENSATE PUMP	0.372	kVA	-	120 V	1	0.95	0.372	0.353
CP-3	CONDENSATE PUMP	0.372	kVA	-	120 V	1	0.95	0.372	0.353
CP-4	CONDENSATE PUMP	0.372	kVA	-	120 V	1	0.95	0.372	0.353
CP-5	CONDENSATE PUMP	0.372	kVA	-	120 V	1	0.95	0.372	0.353
CT-1	COOLING TOWER	25.0	HP	34	460 V	3	0.95	23.313	38.360

Plumbing Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
CH-1	AIR COOLED CHILLER	3.0	HP	4.8	460 V	3	0.85	2.798	4.119
CH-2	AIR COOLED CHILLER	3.0	HP	4.8	460 V	3	0.85	2.798	4.119
CH-3	ABSORPTION CHILLER	13.4	kVA	-	460 V	3	0.95	13.400	22.049
B-1	HOT WATER BOILER	0.25	kVA	-	208	3	0.95	0.250	0.411
B-2	HOT WATER BOILER	0.2	kVA	-	208	3	0.95	0.200	0.329
B-3	STEAM BOILER	15	HP	21	460	3	0.95	13.988	23.016
P-1	WATER PUMP	75.0	HP	96	460 V	3	0.95	69.938	115.079
P-2	WATER PUMP	75.0	HP	96	460 V	3	0.95	69.938	115.079
P-3	WATER PUMP	15.0	HP	21	460 V	3	0.95	13.988	23.016
P-4	WATER PUMP	15.0	HP	21	460 V	3	0.95	13.988	23.016
P-5	WATER PUMP	30.0	HP	40	460 V	3	0.95	27.975	46.031
P-6	WATER PUMP	30.0	HP	40	460 V	3	0.95	27.975	46.031
P-7	WATER PUMP	1.5	HP	20	120 V	1	0.85	1.399	1.189
P-8	WATER PUMP	1.5	HP	20	120 V	1	0.85	1.399	1.189
P-9	WATER PUMP	7.5	HP	11	460 V	3	0.95	6.994	11.508
P-10	WATER PUMP	5.0	HP	56	120 V	1	0.85	4.663	3.963
P-11	WATER PUMP	5.0	HP	56	120 V	1	0.85	4.663	3.963
P-12	WATER PUMP	1.5	HP	3	460 V	3	0.85	1.399	2.059
P-13	WATER PUMP	1.5	HP	3	460 V	3	0.85	1.399	2.059
P-14	WATER PUMP	40.0	HP	52	460 V	3	0.95	37.300	61.375
P-15	WATER PUMP	40.0	HP	52	460 V	3	0.95	37.300	61.375
P-16	WATER PUMP	20.0	HP	27	460 V	3	0.95	18.650	30.688
P-17	WATER PUMP	20.0	HP	27	460 V	3	0.95	18.650	30.688
P-18	WATER PUMP	1.5	HP	3	460 V	3	0.85	1.399	2.059
P-19	WATER PUMP	1.5	HP	3	460 V	3	0.85	1.399	2.059
P-20	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-1	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-2	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-3	WATER PUMP	0.167	HP	1.1	460 V	3	0.75	0.156	0.202
CCP-4	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-5	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-6	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-7	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-8	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-10	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-11	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-12	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117

Plumbing Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
P-14	WATER PUMP	40.0	HP	52	460 V	3	0.95	37.300	61.375
P-15	WATER PUMP	40.0	HP	52	460 V	3	0.95	37.300	61.375
P-16	WATER PUMP	20.0	HP	27	460 V	3	0.95	18.650	30.688
P-17	WATER PUMP	20.0	HP	27	460 V	3	0.95	18.650	30.688
P-18	WATER PUMP	1.5	HP	3	460 V	3	0.85	1.399	2.059
P-19	WATER PUMP	1.5	HP	3	460 V	3	0.85	1.399	2.059
P-20	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-1	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-2	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-3	WATER PUMP	0.167	HP	1.1	460 V	3	0.75	0.156	0.202
CCP-4	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-5	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-6	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-7	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-8	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-10	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-11	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-12	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-13	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-14	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-M1	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CCP-FC1	WATER PUMP	0.167	HP	4.4	120 V	1	0.75	0.156	0.117
CUH 1.1	HOT WATER HEATER	0.03	HP	7.2	120 V	1	0.75	0.028	0.021
CUH 1.2	HOT WATER HEATER	0.03	HP	7.2	120 V	1	0.75	0.028	0.021
CUH 1.3	HOT WATER HEATER	0.03	HP	7.2	120 V	1	0.75	0.028	0.021
CUH 1.4	HOT WATER HEATER	0.03	HP	7.2	120 V	1	0.75	0.028	0.021
CUH 1.5	HOT WATER HEATER	0.22	HP	7.2	120 V	1	0.75	0.205	0.154
CUH 1.6	HOT WATER HEATER	0.03	HP	7.2	120 V	1	0.75	0.028	0.021
CUH 1.7	HOT WATER HEATER	0.03	HP	7.2	120 V	1	0.75	0.028	0.021
CUH 1.8	HOT WATER HEATER	0.03	HP	7.2	120 V	1	0.75	0.028	0.021
UH 1-1	HOT WATER HEATER	0.083	HP	4.4	120 V	1	0.85	0.078	0.066
UH 1-2	HOT WATER HEATER	0.083	HP	4.4	120 V	1	0.85	0.078	0.066
UH 1-3	HOT WATER HEATER	0.025	kW	-	120 V	1	0.95	0.026	0.025
							TOTALS	422.091	679.01

Architectural Equipment Schedule										
Load				Characteristics						
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW	
ELEV #1	ELEVATOR	50.0	HP	130	277 V	3	0.95	46.625	76.719	
ELEV #2	ELEVATOR	50.0	HP	130	277 V	3	0.95	46.625	76.719	
ELEV #3	ELEVATOR	50.0	HP	130	277 V	3	0.95	46.625	76.719	
ELEV #4	ELEVATOR	50.0	HP	130	277 V	3	0.95	46.625	76.719	
ELEV #5	ELEVATOR	50.0	HP	130	277 V	3	0.95	46.625	76.719	
SI-1	SOLAR ARRAY	75.00	kW	-	480	3	0.95	45.58	75.00	
SI-2	SOLAR ARRAY	75.00	kW	-	480	3	0.95	45.58	75.00	
								TOTALS	324.29	533.60

Data Center Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
DC-1-1-1	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-1-2	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-1-3	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-1-4	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-1-5	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-1-6	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-1-7	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-1-8	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-1-9	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-2-1	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-2-2	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-2-3	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-2-4	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-2-5	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-2-6	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-2-7	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-2-8	IT CABINET	24.00	kVA	-	208	3	0.95	24.00	39.49
DC-1-2-9	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-3-1	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-3-2	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-3-3	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-3-4	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-3-5	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-3-6	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-3-7	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-3-8	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64

Data Center Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
DC-1-4-1	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-4-2	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-4-3	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-4-4	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-4-5	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-4-6	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-4-7	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-1-4-8	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-1-1	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-1-2	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-1-3	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-1-4	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-1-5	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-1-6	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-2-1	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-2-2	IT CABINET	24.00	kVA	-	208	3	0.95	24.00	39.49
DC-2-2-3	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-2-4	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-2-5	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-2-6	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-2-7	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-2-8	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-2-9	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-3-1	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-3-2	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-3-3	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-3-4	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-3-5	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-3-6	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-3-7	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-4-1	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-4-2	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-4-3	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-4-4	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-4-5	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-4-6	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-4-7	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
DC-2-4-8	IT CABINET	16.80	kVA	-	208	3	0.95	16.80	27.64
UPS A1	UPS	275.00	kVA	-	480	3	0.95	275.00	452.50

Data Center Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor amps	Voltage	Phase	P.F.	kVA	kW
UPS A2	UPS	275.00	kVA	-	480	3	0.95	275.00	452.50
UPS B1	UPS	275.00	kVA	-	480	3	0.95	275.00	452.50
UPS B2	UPS	275.00	kVA	-	480	3	0.95	275.00	452.50
UPS WS	UPS	120.00	kVA	-	480	3	0.95	120.00	197.45
TOTALS								2309.60	3800.33

Kitchen Equipment Schedule									
Load				Characteristics					
Tag	Description	Magnitude	Units	NEC Motor	Voltage	Phase	P.F.	kVA	kW
C3	COFFEE MAKER	6.90	kW	-	208	3	0.95	4.19	6.900
C4	COFFEE GRINDER	0.75	HP	13.8	120	1	0.85	0.70	0.594
C5	ESPRESSO MACHINE	2.00	kW	-	208	1	0.95	2.11	2.000
C9	REFRIGERATOR	0.20	HP	5.8	120	1	0.75	0.19	0.140
C11	BLENDER	3.00	HP	34	120	1	0.85	2.80	2.378
C12	MICROWAVE OVEN	6.20	kW	-	208	1	0.95	6.53	6.200
D1	SOILED TRAY CONVEYOR	0.50	HP	9.8	120	1	0.85	0.47	0.396
E1	REFRIGERATOR	0.25	HP	5.8	120	1	0.75	0.23	0.175
E4	MICROWAVE OVEN	2.10	kW	-	208	1	0.95	2.21	2.100
E8	GARBAGE DISPOSAL	3.00	HP	11	208	3	0.85	2.80	4.119
E13	COFFEE MAKER	1.7	kW	-	120	1	0.95	1.789	1.700
K2	REFRIGERATOR	4.0	HP	17.5	208	3	0.85	3.730	5.491
K5	REFRIGERATOR	2.00	HP	7.8	208	3	0.85	1.865	2.746
K7	GARBAGE DISPOSAL	3.00	HP	11	208	3	0.85	2.798	4.119
K12	REFRIGERATOR	0.25	HP	5.8	120	1	0.75	0.233	0.175
K17	FLOOR MIXER	0.50	HP	9.8	120	1	0.85	0.466	0.396
K21	GARBAGE DISPOSAL	3.00	HP	11	208	3	0.85	2.798	4.119
K26	REFRIGERATOR	0.25	HP	5.8	120	1	0.75	0.233	0.175
K30	REFRIGERATOR	0.25	HP	5.8	120	1	0.75	0.233	0.175
K32	FOOD SLICER	0.50	HP	9.8	120	1	0.85	0.466	0.396
K33	REFRIGERATOR	0.25	HP	5.8	120	1	0.75	0.233	0.175
K45	STEAM KETTLE	28.00	kW	-	480	3	0.95	17.02	28.000

Kitchen Equipment Schedule										
Load				Characteristics						
Tag	Description	Magnitude	Units	NEC Motor	Voltage	Phase	P.F.	kVA	kW	
K47	TILT SKILLET	12.00	kW	-	480	3	0.95	7.29	12.000	
K52	GAS RANGE	0.25	HP	5.8	120	1	0.75	0.23	0.175	
P12	REFRIGERATOR	0.33	HP	7.2	120	1	0.75	0.31	0.231	
S1	REFRIGERATOR	0.33	HP	7.2	120	1	0.75	0.31	0.231	
S3	MICROWAVE OVEN	5.90	kW	-	208	1	0.95	6.21	5.900	
S4	ELECTRIC GRIDDLE	1.60	kW	-	120	1	0.95	1.68	1.600	
S9	REFRIGERATOR	0.50	HP	9.8	120	1	0.85	0.47	0.396	
S11	CONVEYOR TOASTER	3.30	kW	-	208	1	0.95	3.47	3.300	
S15	COLD PAN	0.25	HP	5.8	120	1	0.75	0.23	0.175	
S16	INDUCTION COOKER	3.50	kW	-	208	1	0.95	3.68	3.500	
S22	REFRIGERATOR	0.25	HP	5.8	120	1	0.75	0.23	0.175	
S24	FREEZER	0.33	HP	7.2	120	1	0.75	0.31	0.231	
S26	PIZZA OVEN	7.20	kW	-	208	1	0.95	7.58	7.200	
S27	REFRIGERATOR	0.25	HP	5.8	120	1	0.75	0.23	0.175	
S38	WARM CABINET	1.10	kW	-	120	1	0.95	1.16	1.100	
S40	FOOD PROTECTION	1.10	kW	-	120	1	0.95	1.16	1.100	
S43	SOUP WELL	0.80	kW	-	208	1	0.95	0.84	0.800	
S54	COLD PAN UNDERMOUNT	0.50	HP	9.8	120	1	0.85	0.47	0.396	
S58	REFRIGERATOR	0.50	HP	9.8	120	1	0.85	0.47	0.396	
								TOTALS	90.41	111.75

Service Entrance Size

In order to estimate the service entrance size throughout the different stages of the project, three different methods are used. The Square Foot Method is typically used in the conceptual and schematic design phase in order to estimate the service entrance size based on the building type and building square footage. The Estimated Loads Method is typically used in the design development phase of design. It estimates the demand loads based on the load categories and the building square footage. Final Design Loads Method is typically used in the working drawings phase. The actual building loads from the working drawings are computed and NEC demand factors are incorporated. This method is the most accurate. The following tables detail the three methods along with the actual service entrance size.

Service Entrance Size - Conceptual/Schematic Design

Building Type	Building Area	VA/SF	VA	kVA	Total Current at 480V	Recommended Switchboard Size
Office Building	234,000	16	3,744,000	3,744	4,503 A	5,000 A

Service Entrance Size - Design Development

Load Type	Area (sq.ft.)	VA/sq.ft.	VA
LIGHTING (DF=1)	224,642	3.5	786,247
RECEPTACLES (DF=0.5 FOR >10kVA)	224,642	1.0	224,642
FANS AND PUMPS	224,642	2.0	449,284
HVAC EQUIPMENT: COOLING	224,642	8.0	1,797,136
HVAC EQUIPMENT: EXHAUST FANS	224,642	2.0	449,284
DATA CENTER: MAIN FRAME	4,909	60.0	294,540
KITCHEN EQUIPMENT: FULL SERVICE	2,628	20.0	52,560
KITCHEN EQUIPMENT: WARMING	1,821	10	18,210
ARCHITECTURAL EQUIPMENT: ELEVATORS (5)	50 kW/elev	-	192
TOTAL kVA:			4,072
TOTAL CURRENT AT 480V:			4,898A
RECOMMENDED SWITCHBOARD SIZE:			5,000A

Service Entrance Size - Working Drawings			
Load Type	Connected Load (VA)	Demand Factor	Demand Load (VA)
LIGHTING	221,621	1	221,621
RECEPTACLES	656,502	1.0(<10,000), 0.5(REST)	656,502
MECHANICAL EQUIPMENT	1,570,454	0.8	1,256,363.2
DATA CENTER: MAIN FRAME	3,800,330	1	1,900,165
ELEVATORS	233,125	1	233,125
FITNESS EQUIPMENT	5,700	1	5,700
SECURITY	9,640	1	7,712
AV EQUIPMENT	63,840	1	51,072
SOLAR ARRAY	91,160	1	91,160
KITCHEN EQUIPMENT	111,750	1	100,575
TOTAL kVA:			4,524
TOTAL kVA W/ 25% SPARE CAPACITY:			5,655
TOTAL CURRENT AT 480V:			6,801.90
RECOMMENDED SWITCHBOARD SIZE:			7,000A
RECOMMENDED UTILITY SWITCHBOARD SIZE			6,000A
RECOMMENDED SECOND SWITCHBOARD SIZE			2,000A
*NOTE: SWITCHBOARD SIZES ARE FOR REDUNDANCY			

Service Entrance Size - Table 1			
Service Entrance	Size- Amps	Voltage System	Capacity - kVA
CONCEPTUAL/SCHEMATIC PHASE	4,503 A	480Y/277V, 3P, 4W	5,655
DESIGN DEVELOPMENT PHASE	4,898	480Y/277V, 3P, 4W	4,072
WORKING DRAWINGS PHASE	6,801.90	480Y/277V, 3P, 4W	3,744

Service Entrance Size - Table 2			
Service Entrance	Size- Amps	Voltage System	Capacity - kVA
ACTUAL CONDITIONS - SERVICE ENTRANCE 1	6,400A	480Y/277V, 3P, 4W/ 480Y/277V, 3P, 3W	5,225kVA
ACTUAL CONDITIONS - SERVICE ENTRANCE 2	2,000A	480Y/277V, 3P, 4W	1330.2kVA
TOTAL ACTUAL CONDITION - ALL SERVICES	8,400A	480Y/277V, 3P, 4W	6,555.2kVA
SUMMARY - VA/SQ.FT.	28.01		

In comparing the three methods, the schematic/conceptual design method was underestimated. This is due to the Square Foot Method generalizing all office buildings in order to calculate the service entrance. Most typical office buildings do not usually include extensive data centers, a fitness center, a daycare, and a kitchen as PSECU Corporate Headquarters does. The design development method was more accurate, but it also underestimated the service entrance. This is also due to the generalization of the building type. The working drawings method was very accurate to the actual service entrance size, but it somewhat underestimates the sizing of the switchboards due to the actual switchboards including spare circuits for additional loads.

Environmental Stewardship Design

PSECU Corporate Headquarters is a LEED Gold project that has a variety of sustainable features. One of its most prominent sustainable features is the extensive daylighting system, which reaches over 75% of the spaces within the structure. A microturbine generator specifically serves to power the data center under normal conditions and is capable of selling surplus energy back to the utility. An efficient HVAC system allows for outdoor air delivery monitoring and increased ventilation. The exterior lighting abides by LEED light pollution requirements and has an extensive controls system.

Design Issues

Design issues include the complexity of the data center, along with providing consistent power to the data center.

The lighting designer mentioned that the lighting budget for PSECU Corporate Headquarters is very limited, which resulted in the lighting design to be value engineered.

Sound disturbances were also a design issue due to both the surrounding environment and the office environment within the PSECU Corporate Headquarters. Therefore, the generators are specified to have silencers that are hospital grade for sound issues.

Single-Line Diagram Drawing List

E0.11 Electrical Single Line Diagram

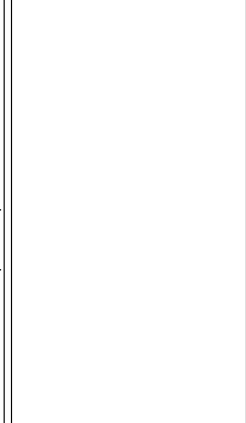
E0.12 Electrical Single Line Diagram

E0.13 Electrical Single Line Diagram

Single-Line Diagram Drawing

See Appendix A for full size drawings of the single-line diagrams of the Pennsylvania State Employees Credit Union Corporate Headquarters. The single-line drawings explain the electrical distribution path through the building

KEY PLAN



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 401 EAST WINDING HILL ROAD
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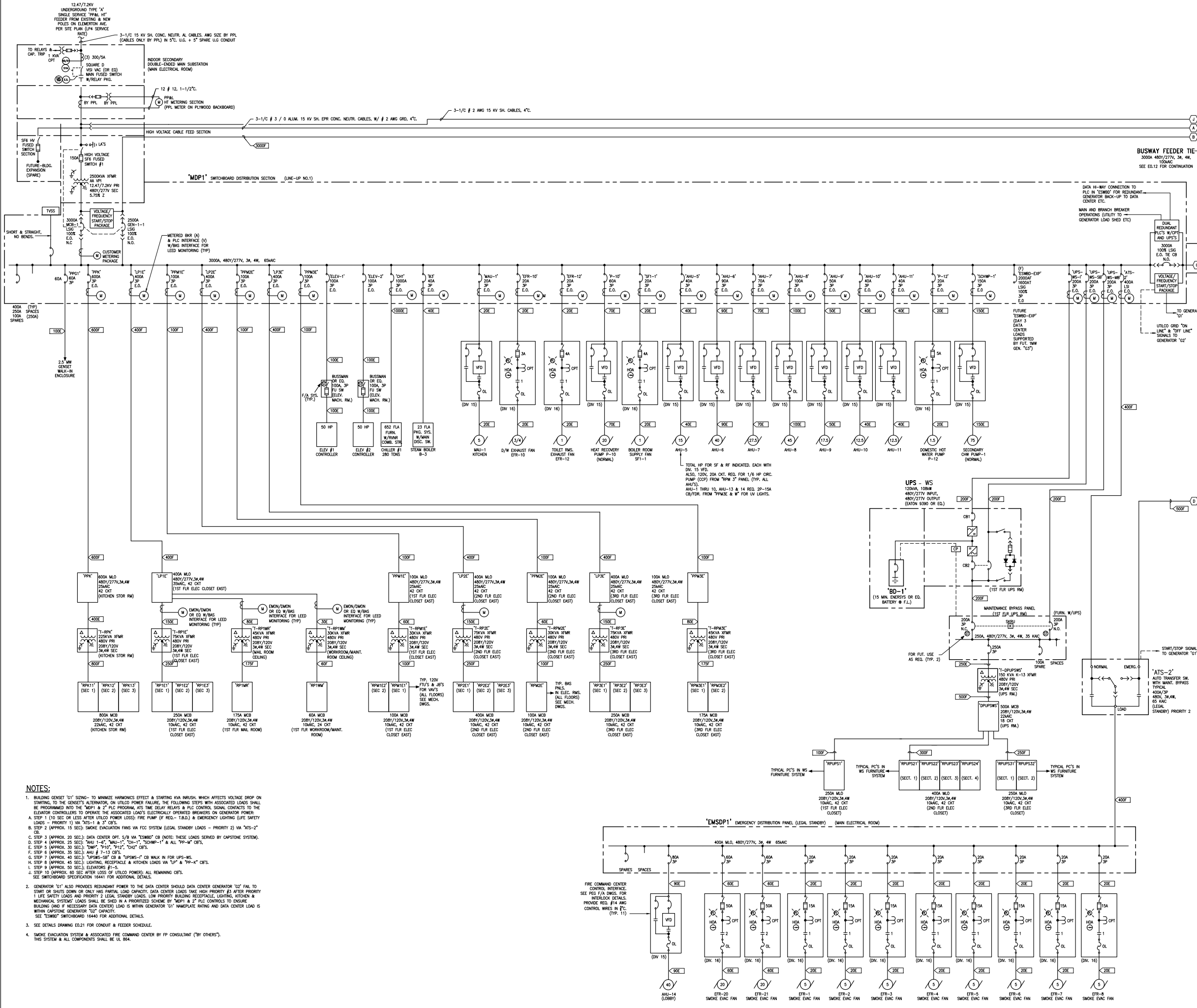
Project Description
**PENNSYLVANIA STATE EMPLOYEES CREDIT UNION
 CORPORATE HEADQUARTERS**
 250 WEST MAIN STREET, SUITE 200
 CHARLOTTESVILLE, VA 22902
 434-975-7262 FAX 434-975-7263
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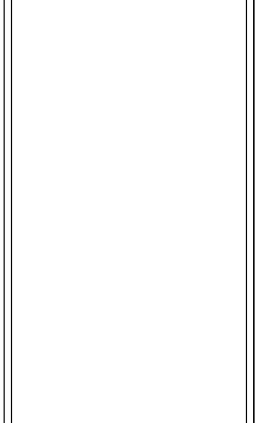
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 SINGLE LINE DIAGRAM

PROJECT
E0.11

DATE:
 10-11-2011



KEY PLAN



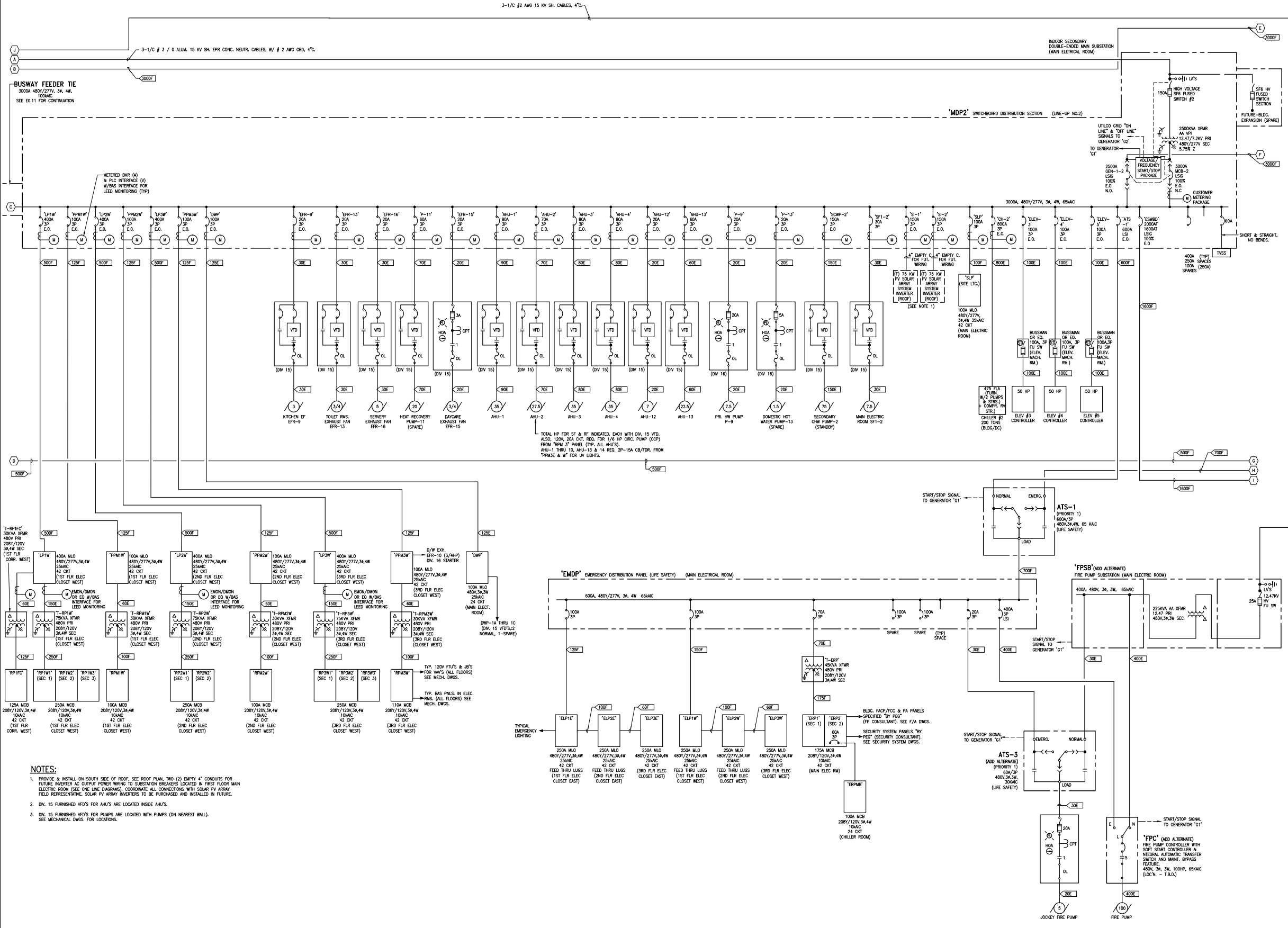
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 717-458-0272 FAX 717-458-0047



- NOTES:**
- PROVIDE & INSTALL ON SOUTH SIDE OF ROOF, SEE ROOF PLAN, TWO (2) EMPTY 4" CONDUITS FOR FUTURE INVERTER AC OUTPUT POWER WIRING TO SUBSTATION BREAKERS LOCATED IN FIRST FLOOR MAIN ELECTRICAL ROOM (SEE ONE LINE DIAGRAMS). COORDINATE ALL CONNECTIONS WITH SOLAR PV ARRAY FIELD REPRESENTATIVE. SOLAR PV ARRAY INVERTERS TO BE PURCHASED AND INSTALLED IN FUTURE.
 - DIV. 15 FURNISHED VFD'S FOR AHU'S ARE LOCATED INSIDE AHU'S.
 - DIV. 15 FURNISHED VFD'S FOR PUMPS ARE LOCATED WITH PUMPS (ON NEAREST WALL). SEE MECHANICAL DWGS. FOR LOCATIONS.

KEY PLAN



REVISIONS

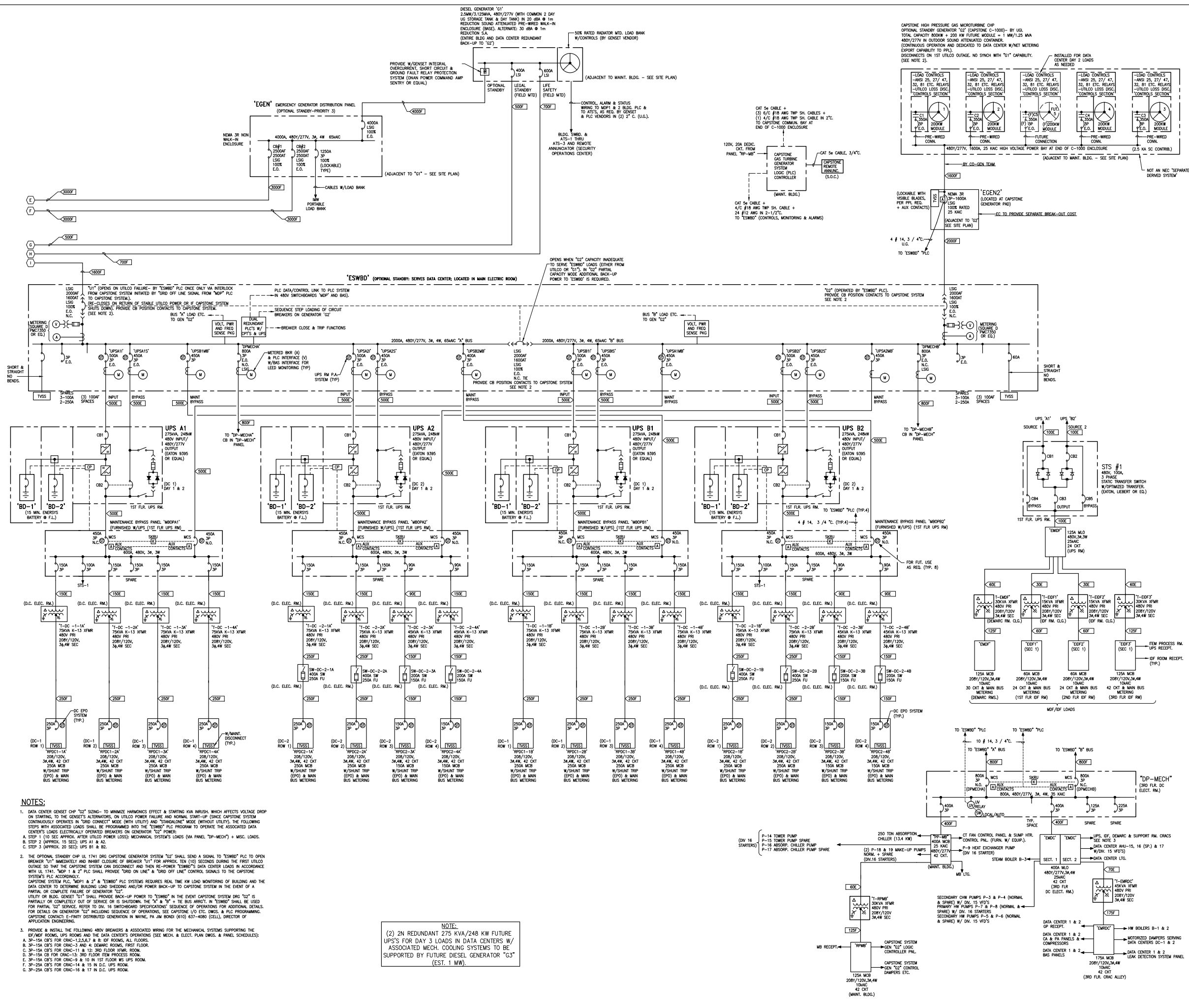
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CRABTREE ROHRBAUGH & ASSOCIATES - ARCHITECTS
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Project Description
PENNSYLVANIA STATE EMPLOYEES CREDIT UNION
 CORPORATE HEADQUARTERS
 Limerion Avenue
 Harrisburg, PA

250 WEST MAIN STREET, SUITE 200
 CHARLOTTESVILLE, VA 22902
 434-975-7262 FAX 434-975-7263



- NOTES:**
- DATA CENTER GENSET CHP "G2" SIZING-- TO MINIMIZE HARMONICS EFFECT & STARTING KVA INRUSH, WHICH AFFECTS VOLTAGE DROP ON STARTING, THE GENSET'S ALTERNATOR, ON UTILCO POWER FAILURE AND NORMAL START-UP (ONCE CAPSTONE SYSTEM CONTINUOUSLY OPERATES IN "BOND CONNECT" MODE WITH UTILTY) AND "STANDBY" MODE (WITHOUT UTILTY), THE FOLLOWING STEPS WITH ASSOCIATED LOADS SHALL BE PROGRAMMED INTO THE "ESWB" PLC PROGRAM TO OPERATE THE ASSOCIATED DATA CENTER'S LOADS ELECTRICALLY OPERATED BREAKERS ON GENERATOR "G2" POWER:
 - A. STEP 1 (10 SEC APPROX. AFTER UTILCO POWER LOSS): MECHANICAL SYSTEMS' LOADS (VA PANEL "DP-MECH") + MISC. LOADS.
 - B. STEP 2 (APPROX. 15 SEC): UPS A1 & A2.
 - C. STEP 3 (APPROX. 20 SEC): UPS B1 & B2.
 - THE OPTIONAL STANDBY CHP 11741 DCR CAPSTONE GENERATOR SYSTEM "G2" SHALL SEND A SIGNAL TO "ESWB" PLC TO OPEN BREAKER "G1" IMMEDIATELY AND INHIBIT CLOSURE OF BREAKER "G1" FOR APPROX. TEN (10) SECONDS DURING THE FIRST UTILITY OUTAGE SO THAT THE CAPSTONE SYSTEM CAN DISCONNECT AND THEN RE-POWER "ESWB" DATA CENTER LOADS IN ACCORDANCE WITH UL 1741, "MODE 1" & "2" PLC SHALL PROVIDE "TWO" ON LINE "G2" & "TWO" OFF LINE" CONTROL SIGNALS TO THE CAPSTONE SYSTEM'S PLC ACCORDINGLY. CAPSTONE SYSTEM PLC, "MCP1" & "2" & "ESWB" PLC SYSTEMS REQUIRE REAL TIME KW LOAD MONITORING OF BUILDING AND THE DATA CENTER TO DETERMINE BUILDING LOAD SHEDDING AND/OR POWER BACK-UP TO CAPSTONE SYSTEM IN THE EVENT OF A PARTIAL OR COMPLETE FAILURE OF GENERATOR "G2".
 - A. UTILTY OR BLDG. GENSET "G1" SHALL PROVIDE BACK-UP POWER TO "ESWB" IN THE EVENT CAPSTONE SYSTEM DRG "G2" IS PARTIALLY OR COMPLETELY OUT OF SERVICE OR IS SHUTDOWN, THE "A" & "B" + "E" BUS ARRGT. IN "ESWB" SHALL BE USED FOR PARTIAL "G2" SERVICE. REFER TO DIV. 16 SWITCHBOARD SPECIFICATIONS SEQUENCE OF OPERATIONS FOR ADDITIONAL DETAILS. FOR DETAILS ON GENERATOR "G2" INCLUDING SEQUENCE OF OPERATIONS, SEE CAPSTONE I/O ETC. DRGS. & PLC PROGRAMMING. CAPSTONE CONTACT: E-FINITY DISTRIBUTED GENERATION IN WAYNE, PA. JIM BONDI (610) 837-4080 (CELL), DIRECTOR OF APPLICATION ENGINEERING.
 - PROVIDE & INSTALL THE FOLLOWING 480V BREAKERS & ASSOCIATED WIRING FOR THE MECHANICAL SYSTEMS SUPPORTING THE EDP/DF ROOMS, UPS ROOMS AND THE DATA CENTER OPERATIONS (SEE MECH. & ELEC. PLAN DRGS. & PANEL SCHEDULES):
 - A. 3P-15A CB'S FOR CRAC-1,2,3,4,5,6,7 & 8: DF ROOMS, ALL FLOORS.
 - B. 3P-15A CB'S FOR CRAC-3 AND 4: DEMARC ROOMS, FIRST FLOOR.
 - C. 3P-15A CB'S FOR CRAC-11 & 12: 3RD FLOOR XFRM. ROOM.
 - D. 3P-15A CB'S FOR CRAC-13: 3RD FLOOR TRM PROCESS ROOM.
 - E. 3P-15A CB'S FOR CRAC-9 & 10 IN 1ST FLOOR WS UPS ROOM.
 - F. 3P-25A CB'S FOR CRAC-14 & 15 IN D.C. UPS ROOM.
 - G. 3P-25A CB'S FOR CRAC-16 & 17 IN D.C. UPS ROOM.

NOTE:
 (2) 2N REDUNDANT 275 KVA/248 KW FUTURE UPS'S FOR DAY 3 LOADS IN DATA CENTERS W/ ASSOCIATED MECH., COOLING SYSTEMS TO BE SUPPORTED BY FUTURE DIESEL GENERATOR "G3" (EST. 1 MW).

Sheet Name
 SINGLE LINE DIAGRAM

PROJECT
E0.13

DATE:
 10/11/2011

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STATE EMPLOYEES
CREDIT UNION
CORPORATE
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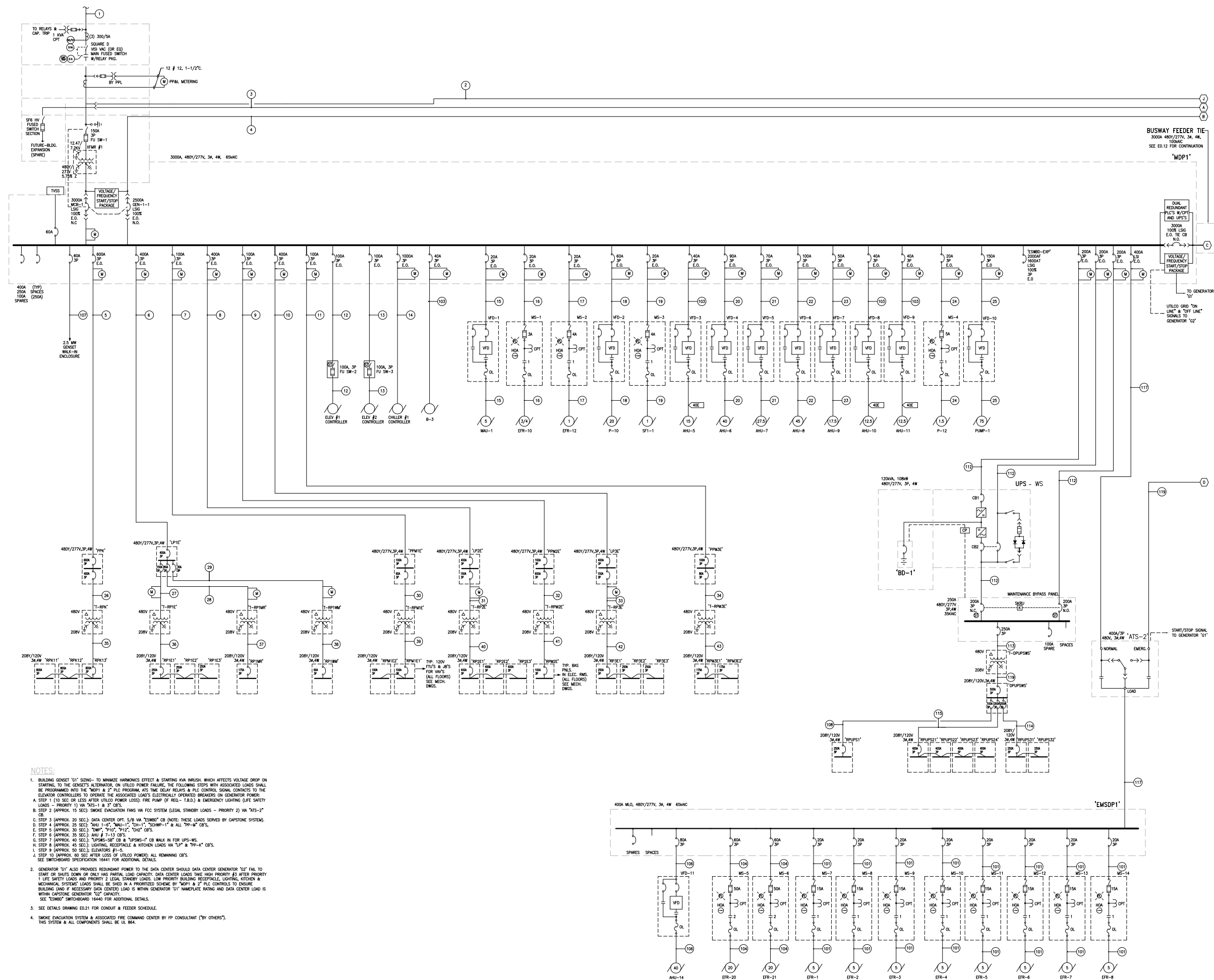
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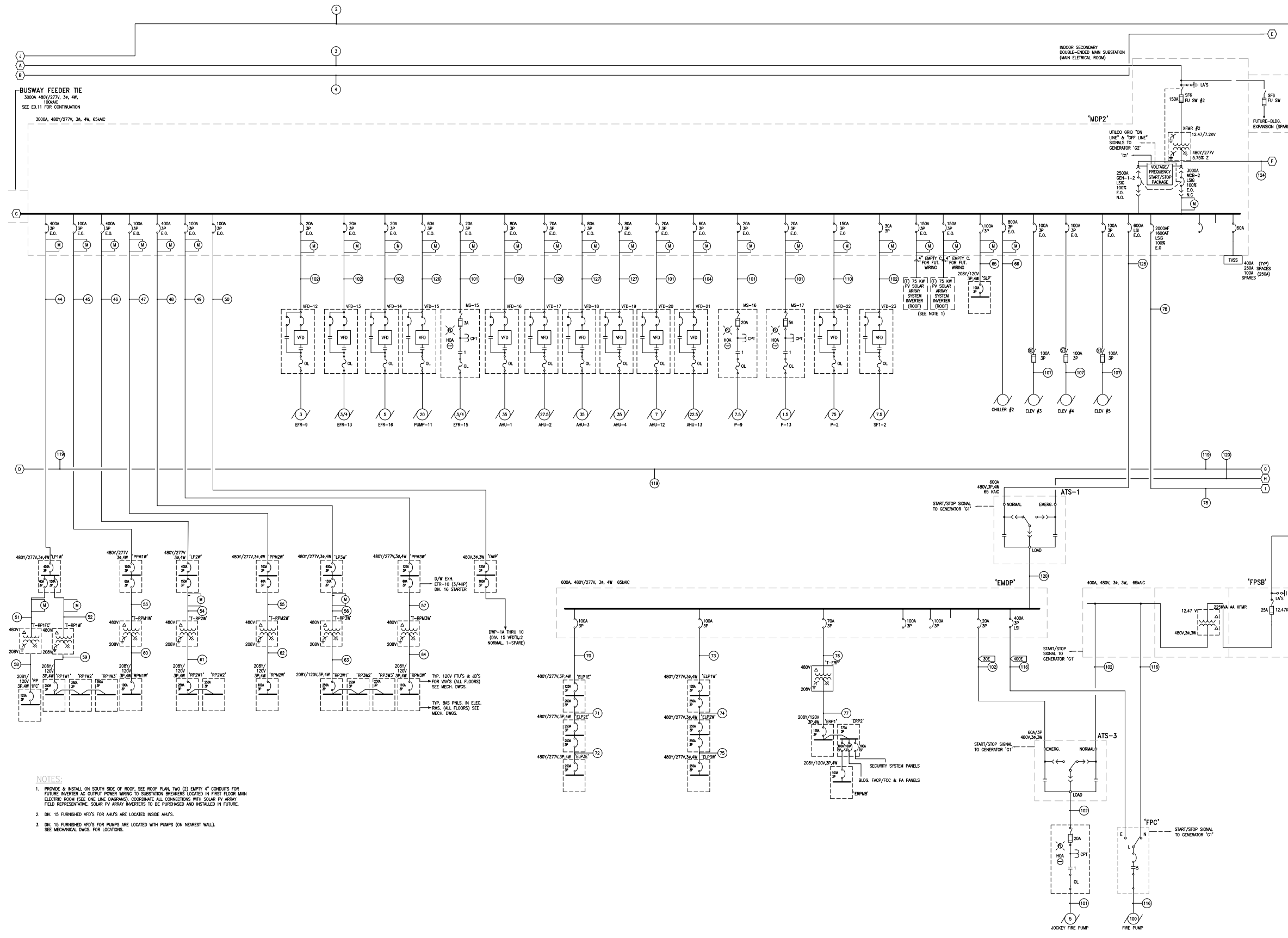
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E.01



- NOTES:**
- 1. BUILDING GENSET 'G1' SIZING-- TO MINIMIZE HARMONICS EFFECT & STARTING KVA INRUSH, WHICH AFFECTS VOLTAGE DROP ON STARTING, TO THE GENSET'S ALTERNATOR, ON UTILCO POWER FAILURE, THE FOLLOWING STEPS WITH ASSOCIATED LOADS SHALL BE PROGRAMMED INTO THE 'MOP' & 'P' PLC PROGRAM, AND THE RELAY RELAYS & PLC CONTROL SINK CONTACTS TO THE ELEVATOR CONTROLLERS TO OPERATE THE ASSOCIATED LOAD'S ELECTRICALLY OPERATED BREAKERS ON GENERATOR POWER:
 - A. STEP 1 (10 SEC. OR LESS AFTER UTILCO POWER LOSS): FIRE PUMP (IF REC-11.0.0.) & EMERGENCY LIGHTING (LIFE SAFETY LOADS - PRIORITY 1) VIA 'ATS-1' & '3' CB'S.
 - B. STEP 2 (APPROX. 15 SEC.): SMOKE EVACUATION FANS VIA FCC SYSTEM (LEGAL STANDBY LOADS - PRIORITY 2) VIA 'ATS-2' CB.
 - C. STEP 3 (APPROX. 20 SEC.): DATA CENTER OPT. 5/B VIA 'ESM80' CB (NOTE: THESE LOADS SERVED BY CAPSTONE SYSTEM).
 - D. STEP 4 (APPROX. 25 SEC.): MAU-1 & 'MAU-1', 'SCHW-1' & ALL 'SP-4' CB'S.
 - E. STEP 5 (APPROX. 30 SEC.): 'MOP', 'P10', 'P12', 'CH2' CB'S.
 - F. STEP 6 (APPROX. 35 SEC.): AHU # 7-13 CB'S.
 - G. STEP 7 (APPROX. 40 SEC.): 'UPSAS-5B' CB & 'UPSWS-1' CB WALK IN FOR UPS-WS.
 - H. STEP 8 (APPROX. 45 SEC.): LIGHTING, RECEPTACLE & KITCHEN LOADS VIA 'LP' & 'K' CB'S.
 - I. STEP 9 (APPROX. 50 SEC.): ELEVATORS #1-5.
 - J. STEP 10 (APPROX. 60 SEC. AFTER LOSS OF UTILCO POWER): ALL REMAINING CB'S.SEE SWITCHBOARD SPECIFICATIONS 18441 FOR ADDITIONAL DETAILS.
 - 2. GENERATOR 'G1' ALSO PROVIDES REDUNDANT POWER TO THE DATA CENTER SHOULD DATA CENTER GENERATOR 'G2' FAIL TO START OR SHUTS DOWN OR ONLY HAS PARTIAL LOAD CAPACITY. DATA CENTER LOADS TAKE HIGH PRIORITY #3 AFTER PRIORITY 1 LIFE SAFETY LOADS AND PRIORITY 2 LEGAL STANDBY LOADS. LOW PRIORITY BUILDING RECEPTACLE, LIGHTING, KITCHEN & MECHANICAL SYSTEMS LOADS SHALL BE SHED IN A PRIORITIZED SCHEME BY 'MOP' & 'P' PLC CONTROLS TO ENSURE BUILDING (AND IF NECESSARY DATA CENTER) LOAD IS WITHIN GENERATOR 'G1' NAMEPLATE RATING AND DATA CENTER LOAD IS WITHIN CAPSTONE GENERATOR 'G2' CAPACITY. SEE 'ESM80' SWITCHBOARD 18440 FOR ADDITIONAL DETAILS.
 - 3. SEE DETAILS DRAWING ED.21 FOR CONDUIT & FEEDER SCHEDULE.
 - 4. SMOKE EVACUATION SYSTEM & ASSOCIATED FIRE COMMAND CENTER BY FP CONSULTANT ('BY OTHERS'). THIS SYSTEM & ALL COMPONENTS SHALL BE UL 864.

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HARRISBURG, PA



- NOTES:**
1. PROVIDE & INSTALL ON SOUTH SIDE OF ROOF, SEE ROOF PLAN, TWO (2) EMPTY 4" CONDUITS FOR FUTURE INVERTER AC OUTPUT POWER WIRING TO SUBSTATION BREAKERS LOCATED IN FIRST FLOOR MAIN ELECTRICAL ROOM (SEE ONE LINE DIAGRAMS). COORDINATE ALL CONNECTIONS WITH SOLAR PV ARRAY FIELD REPRESENTATIVE. SOLAR PV ARRAY INVERTERS TO BE PURCHASED AND INSTALLED IN FUTURE.
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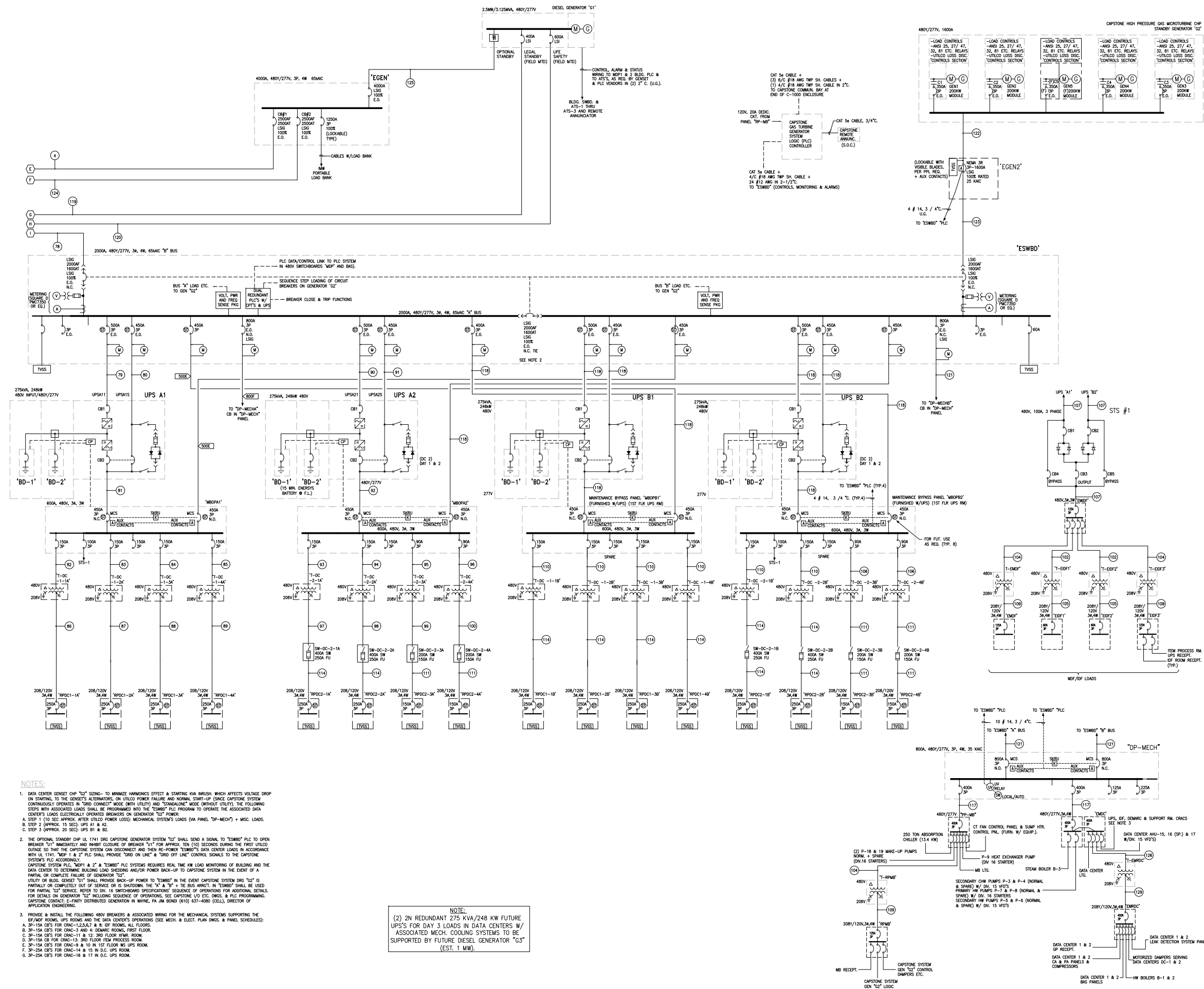
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AE SENIOR THESIS
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E.02

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AE SENIOR THESIS
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E.03

Communication Systems

Security System

PSECU Corporate Headquarters has an extensive security system, which includes video surveillance and intrusion detection. Card readers along with turnstiles with barriers provide intrusion detection into the building. Video surveillance and card readers for intrusion detection are used throughout the building, which is controlled through a Security Operations Center.

Fire Alarm System

Fire alarm emergency communication speakers with strobe notification are common throughout the building spaces. Manual fire alarm pull boxes are located at every building entrance. Magnetic door holders are installed within the lobby and the elevators operate on an elevator recall system. Duct smoke detectors, digital alarm communicator transmitters, and addressable interface panel are also common throughout the building.

Telecommunications System

A main telecommunications room, IDF room B224, is located on the first floor of the building. Voice and data outlets are located in all of the main spaces within the building. Most are floor-mounted, but wall-mounted outlets are also located throughout the building.

Audio Visual System

The audio visual system provides duplex voice communication in order to provide instant intercommunication for employees, visitors, emergency paging and signaling, alarm distribution, and an audio program. Small wall-mounted intercom systems are controlled by a master intercom system, which is networked into the Security Operations Center. The intercom systems are located in the daycare center and kitchen, along with some of the small offices.

Appendix A

Appendix A includes the Feeder Schedule and Single-Line Diagram Drawings as 30 inch x 42 inch sheets. The Feeder Schedule labels the first 100 feeders with individual labels and the rest of the feeders with generic labels by load size on the single-line diagram.

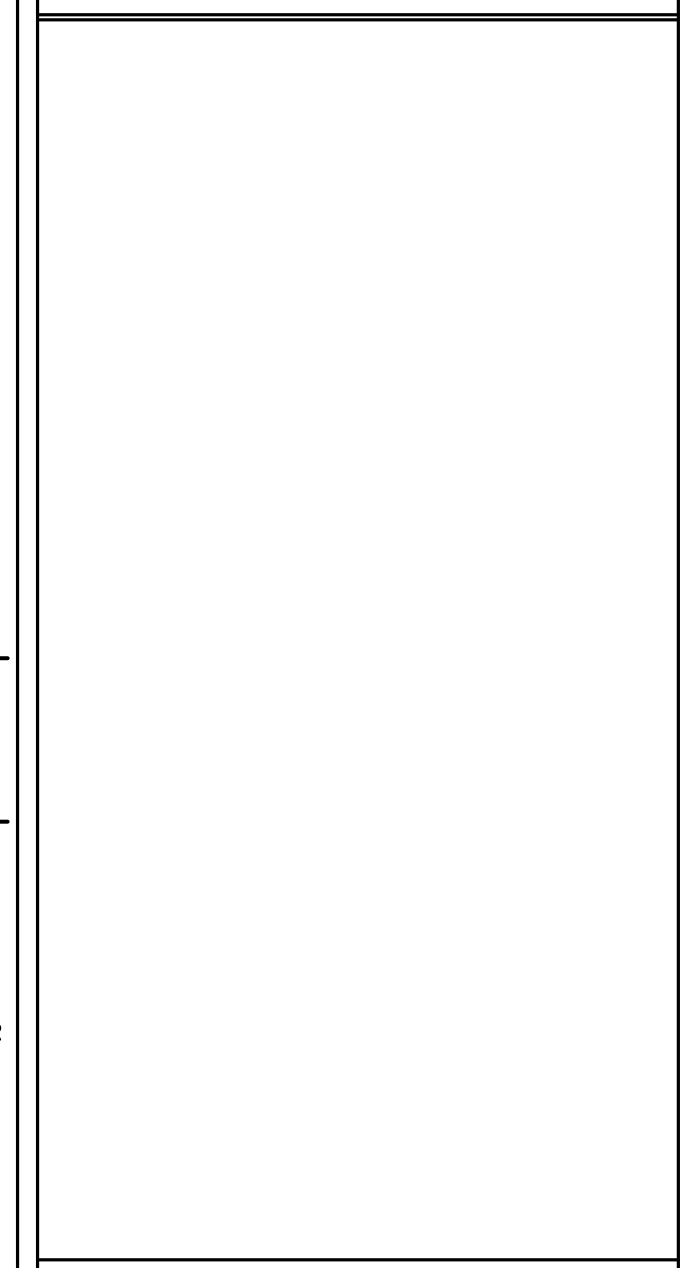
Feeder Schedule

See E.00

Single-Line Drawings

See E.01, E.02, and E.03

KEY PLAN



REVISIONS

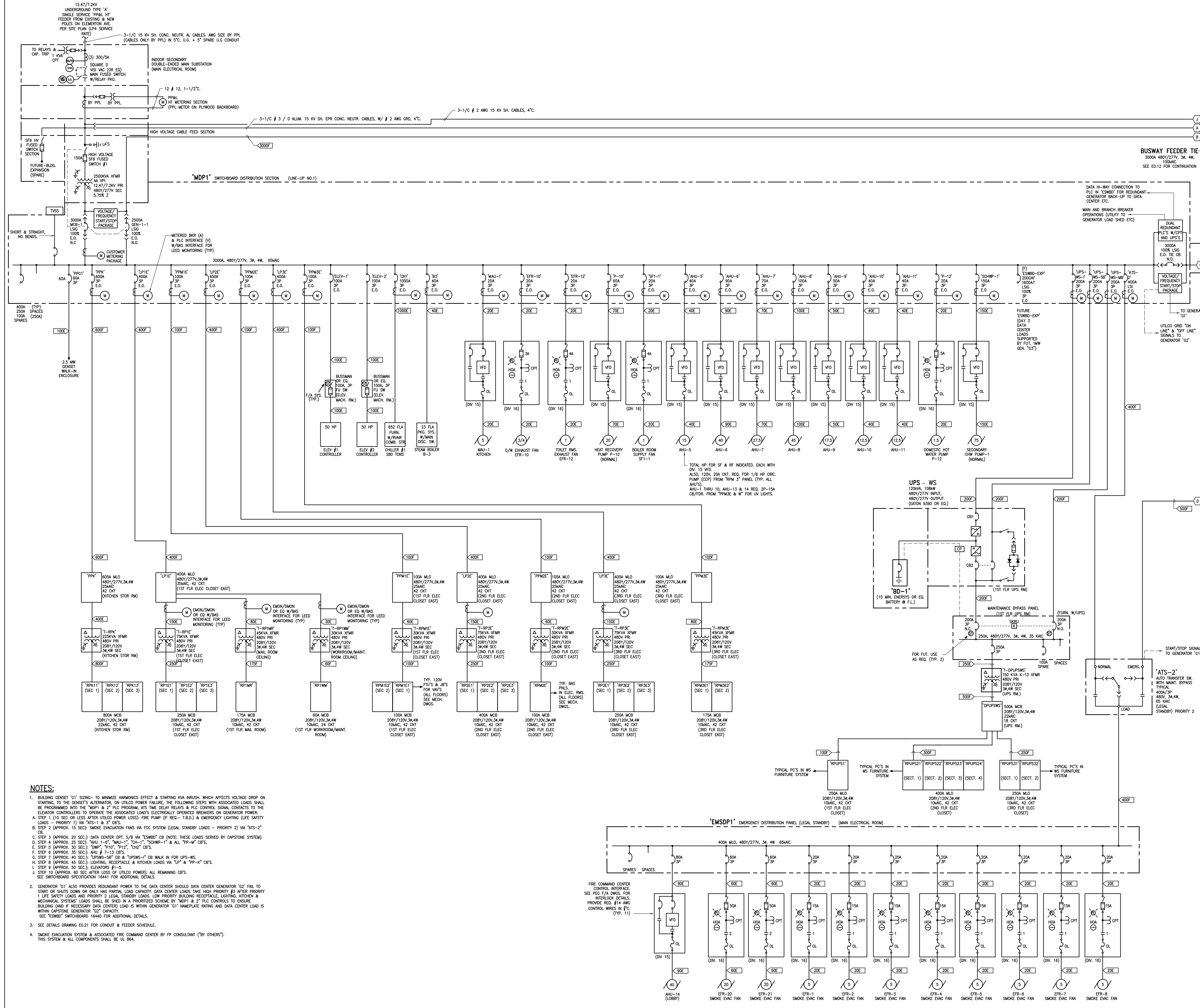
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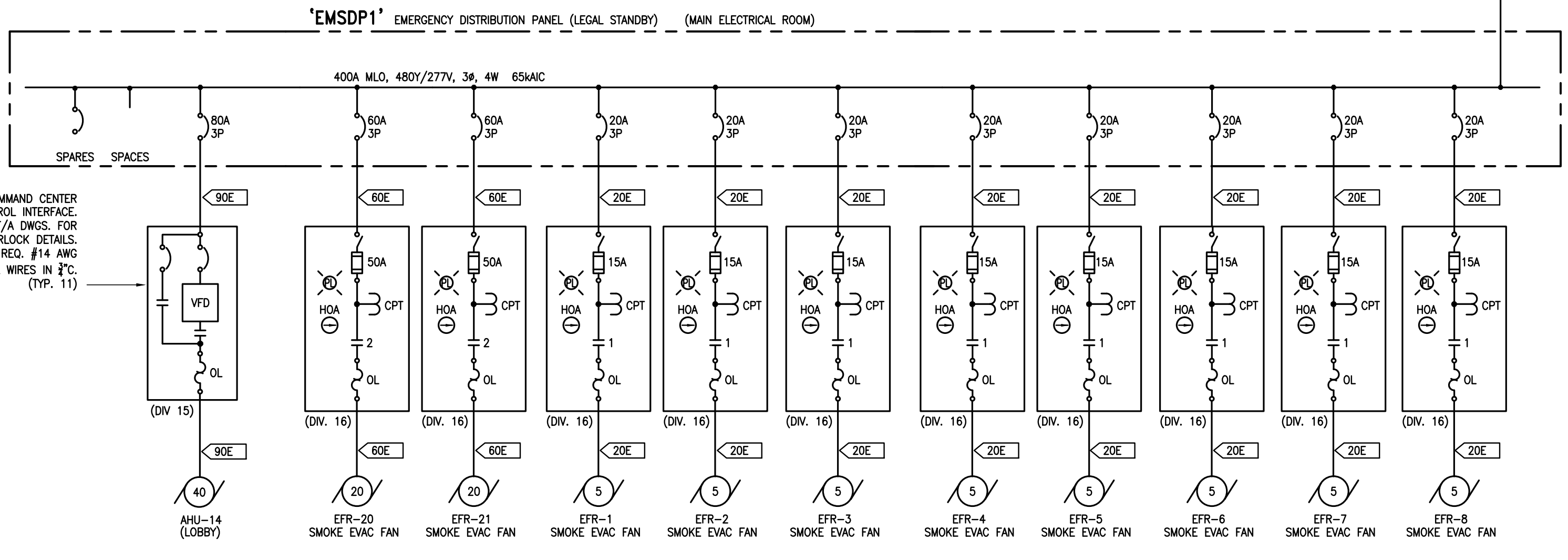
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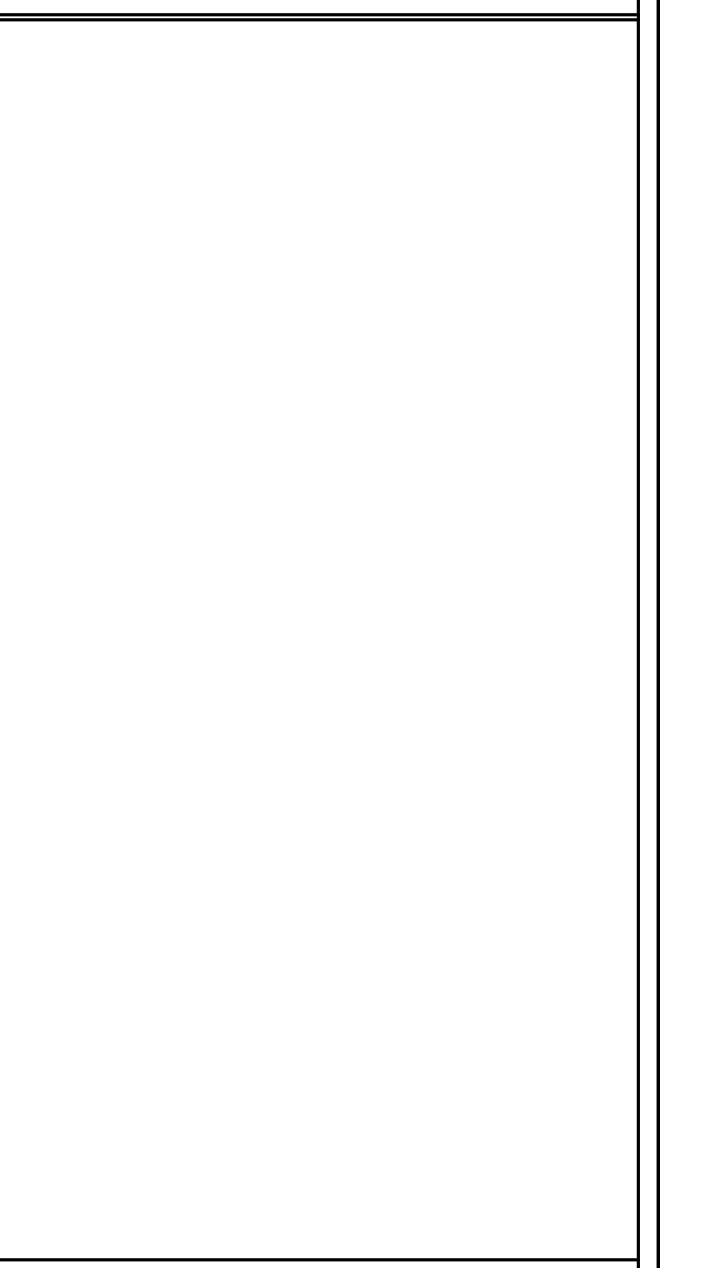
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 CORPORATE HEADQUARTERS
 EMERSON AVENUE
 HARRISBURG, PA



- NOTES:**
- BUILDING GENSET 'G1' SIZING - TO MINIMIZE HARMONICS EFFECT & STARTING KVA INRUSH, WHICH AFFECTS VOLTAGE DROP ON STARTING, TO THE GENSET'S ALTERNATOR, ON UTILCO POWER FAILURE, THE FOLLOWING STEPS WITH ASSOCIATED LOADS SHALL BE PROGRAMMED INTO THE 'MDP1' & '2' PLC PROGRAM, AT THE DELAY RELAYS & PLC CONTROL SIGNAL CONTACTS TO THE ELEVATOR CONTROLLERS TO OPERATE THE ASSOCIATED LOADS ELECTRICALLY OPERATED BREAKERS ON GENERATOR POWER:
 - STEP 1 (10 SEC OR LESS AFTER UTILCO POWER LOSS): FIRE PUMP (IF REQ.) & EMERGENCY LIGHTING (LIFE SAFETY LOADS - PRIORITY 1) VIA 'ATS-1' & '3' CB'S.
 - STEP 2 (APPROX. 15 SEC): SMOKE EVACUATION FANS VIA FCC SYSTEM (LEGAL STANDBY LOADS - PRIORITY 2) VIA 'ATS-2' CB.
 - STEP 3 (APPROX. 20 SEC): DATA CENTER OPT. S/B VIA 'ESWB' CB (NOTE: THESE LOADS SERVED BY CAPSTONE SYSTEM).
 - STEP 4 (APPROX. 25 SEC): 'AHU-1'-'4', 'MAU-1', 'CH-1', 'SCHMP-1' & ALL 'PP-W' CB'S.
 - STEP 5 (APPROX. 30 SEC): 'DWP', 'P10', 'P12', 'CH2' CB'S.
 - STEP 6 (APPROX. 35 SEC): 'AHU-5'-'13' CB'S.
 - STEP 7 (APPROX. 40 SEC): 'RUPS-1'-'4' & 'LUPS-1'-'4' CB W/ IN FOR LUPS-WS.
 - STEP 8 (APPROX. 45 SEC): LIGHTING, RECEPTACLE & KITCHEN LOADS VIA 'LP' & 'PP-K' CB'S.
 - STEP 9 (APPROX. 50 SEC): ELEVATORS #1-5.
 - STEP 10 (APPROX. 60 SEC AFTER LOSS OF UTILCO POWER): ALL REMAINING CB'S.
 - SEE SWITCHBOARD SPECIFICATION 16441 FOR ADDITIONAL DETAILS.
 - GENERATOR 'G1' ALSO PROVIDES REDUNDANT POWER TO THE DATA CENTER SHOULD DATA CENTER GENERATOR 'G2' FAIL TO START OR SHUTS DOWN OR ONLY HAS PARTIAL LOAD CAPACITY. DATA CENTER LOADS TAKE HIGH PRIORITY #3 AFTER PRIORITY 1 LIFE SAFETY LOADS AND PRIORITY 2 LEGAL STANDBY LOADS. LOW PRIORITY BUILDING RECEPTACLE, LIGHTING, KITCHEN & MECHANICAL SYSTEMS LOADS SHALL BE SHED IN A PRIORITIZED SCHEME BY 'MDP1' & '2' PLC CONTROLS TO ENSURE BUILDING (AND IF NECESSARY DATA CENTER) LOAD IS WITHIN GENERATOR 'G1' NAMEPLATE RATING AND DATA CENTER LOAD IS WITHIN CAPSTONE GENERATOR 'G2' CAPACITY. SEE 'ESWB' SWITCHBOARD 16440 FOR ADDITIONAL DETAILS.
 - SEE DETAILS DRAWING E0.21 FOR CONDUIT & FEEDER SCHEDULE.
 - SMOKE EVACUATION SYSTEM & ASSOCIATED FIRE COMMAND CENTER BY FP CONSULTANT ('BY OTHERS'). THIS SYSTEM & ALL COMPONENTS SHALL BE UL 864.

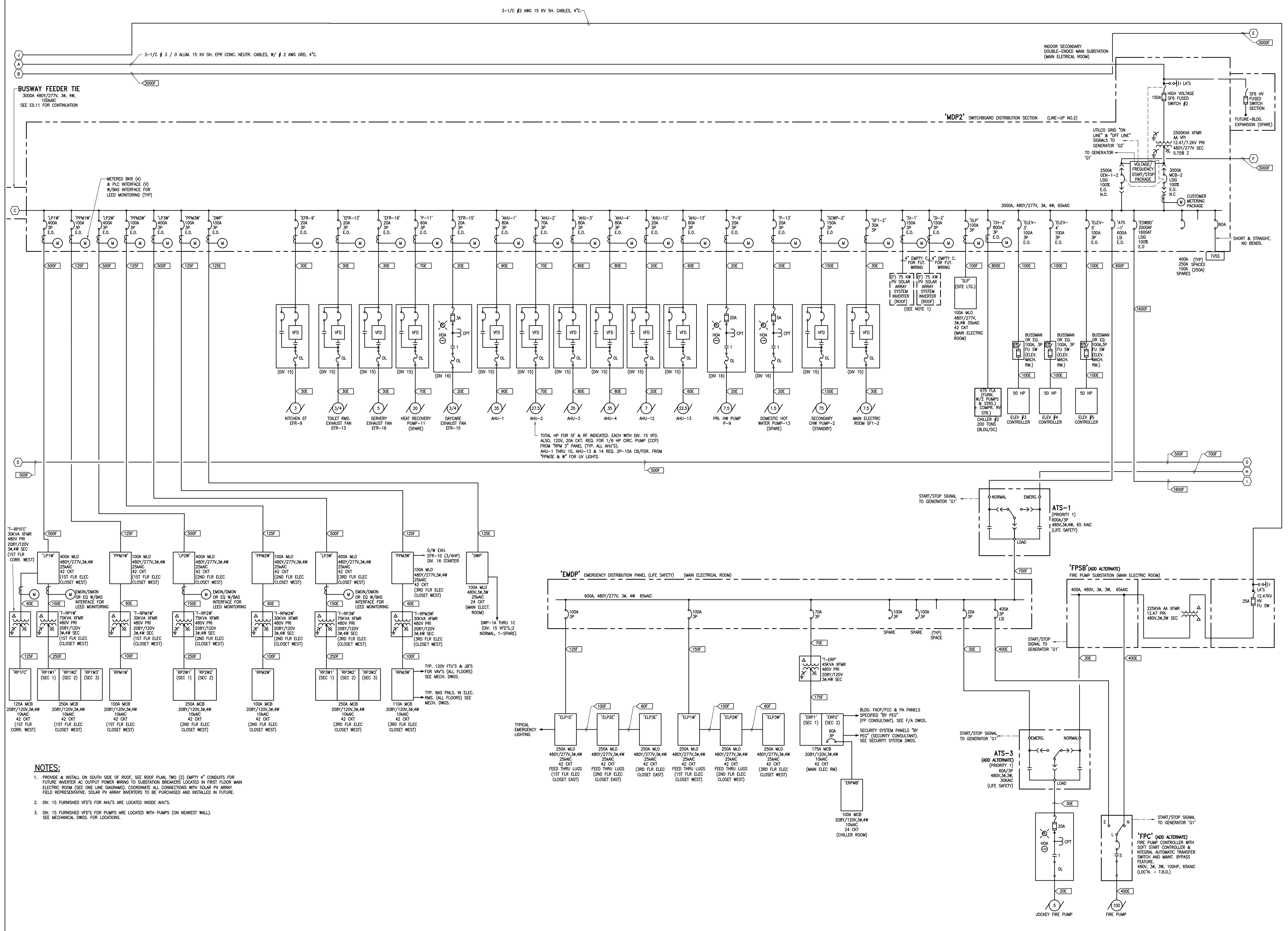


KEY PLAN



REVISIONS

NO.	DATE	DESCRIPTION
01	06/03/11	ISSUE FOR BID



CRABTREE ROHRBAUGH & ASSOCIATES - ARCHITECTS
 401 EAST WINDING HILL ROAD
 MECHANICSBURG PA 17055
 717-458-0272 FAX 717-458-0047

www.cra-architects.com

Project Description
PENNSYLVANIA STATE EMPLOYEES CREDIT UNION
 CORPORATE HEADQUARTERS
 Elmerton Avenue
 Harrisburg, PA

250 WEST MAIN STREET, SUITE 200
 CHARLOTTEVILLE VA 22902
 434-975-7262 FAX 434-975-7263

CR

Sheet Name
 ELECTRICAL
 SINGLE LINE DIAGRAM

PLOT SCALE:
 NONE

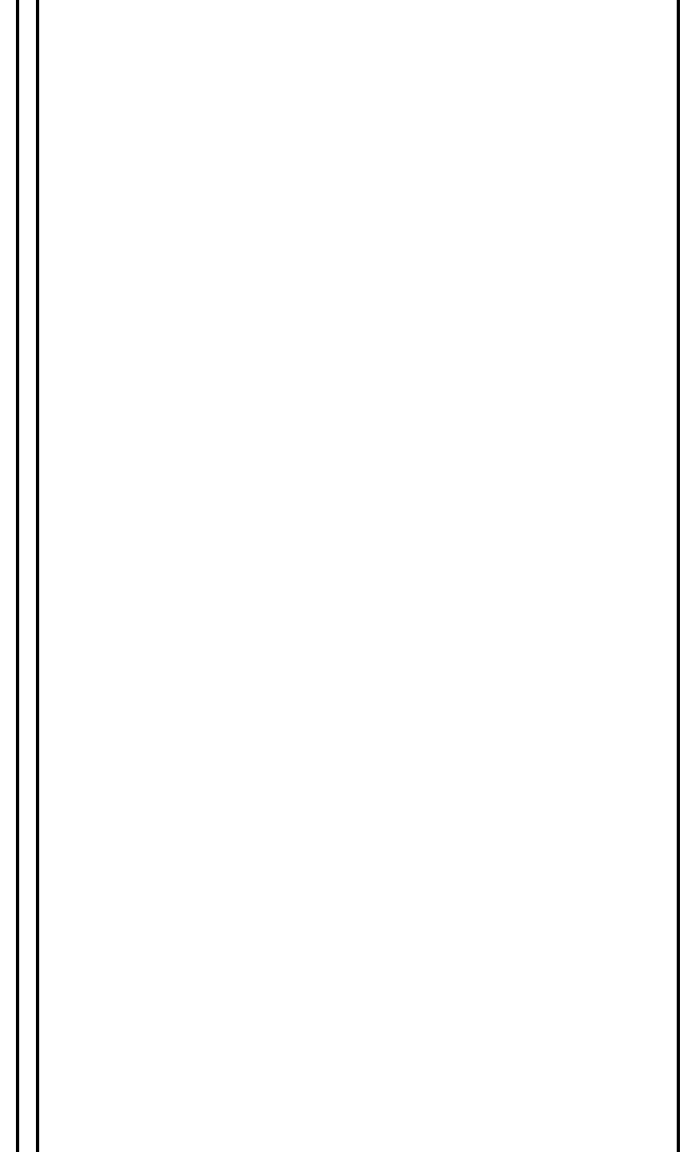
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 1009023/ED11.DWG

DATE:
 10-11-2011

PROJECT

E0.12

KEY PLAN



REVISIONS

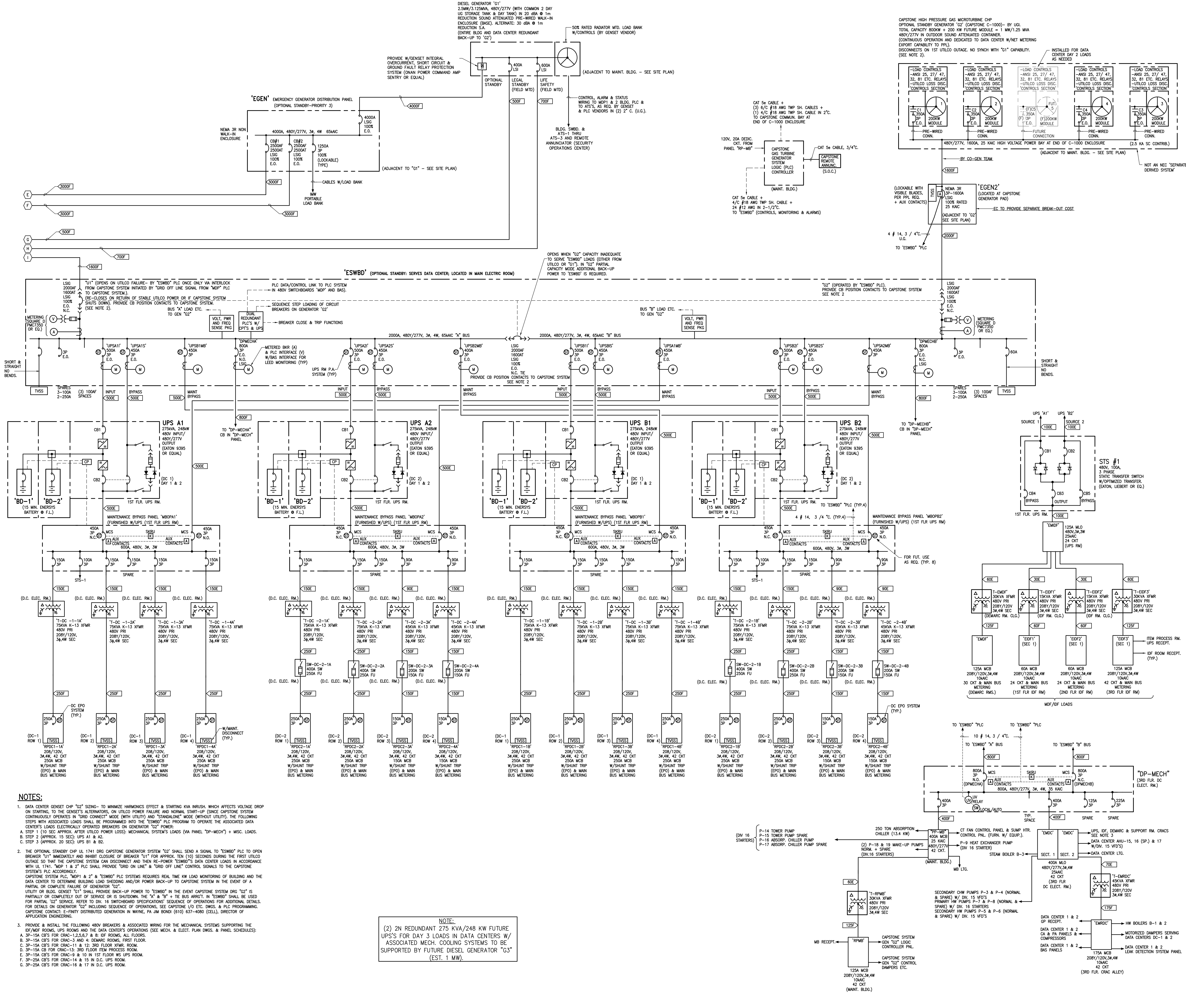
NO.	DATE	DESCRIPTION
1	06/03/11	ISSUE FOR BID

CRABTREE ROHRBAUGH & ASSOCIATES - ARCHITECTS
 250 WEST MAIN STREET, SUITE 200
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PENNSYLVANIA STATE EMPLOYEES CREDIT UNION
 CORPORATE HEADQUARTERS
 EMERSON AVENUE
 FRANKSBURG, PA

CRABTREE ROHRBAUGH & ASSOCIATES
 401 EAST WINDING HILL ROAD
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 717-458-0272 FAX 717-458-0047

PROJECT
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 SINGLE LINE DIAGRAM
 PLOT SCALE
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 FILENAME
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 DATE
 10-11-2011

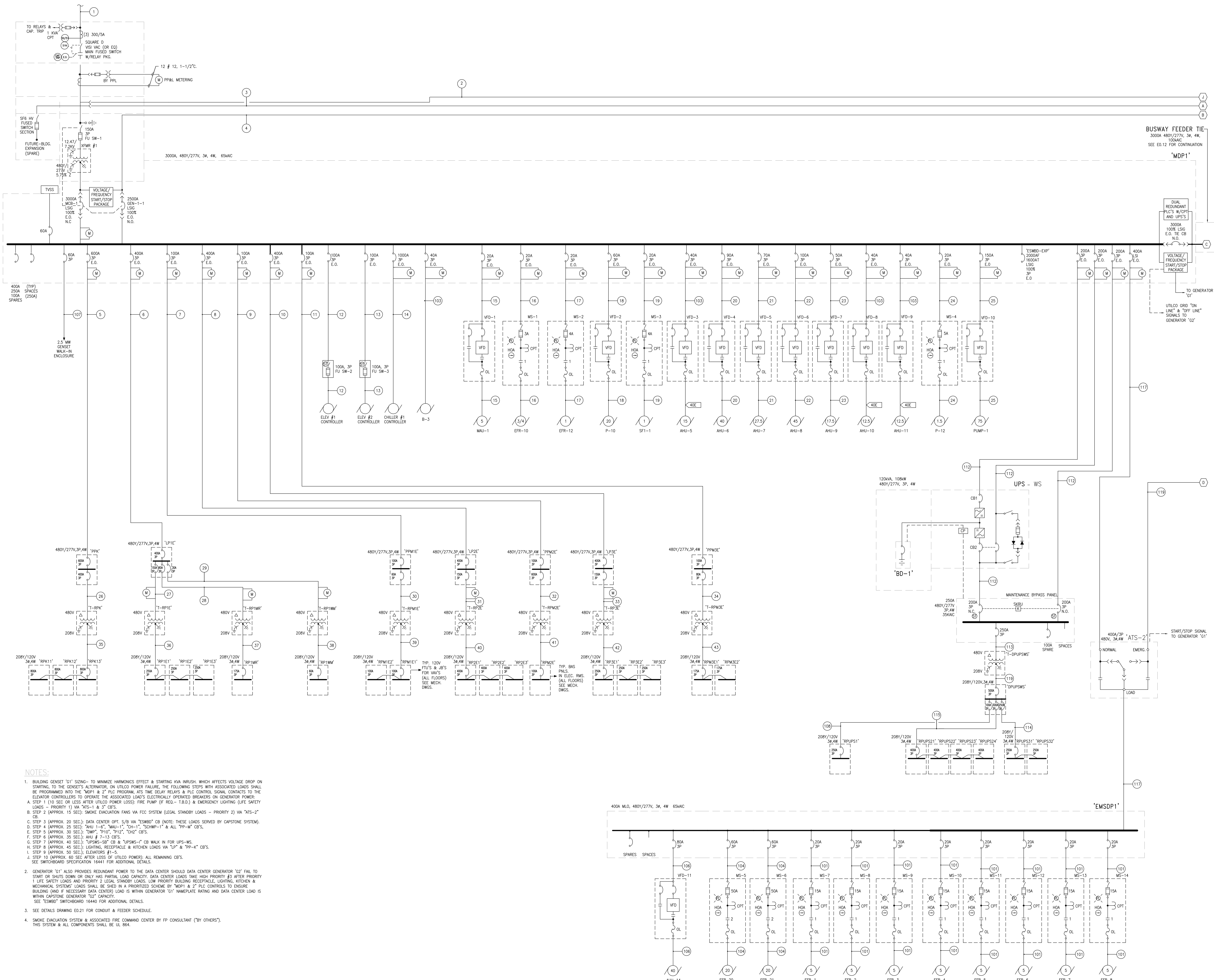


- NOTES:**
- DATA CENTER GENSET "G2" SIZING-- TO MINIMIZE HARMONICS EFFECT & STARTING KVA INRUSH, WHICH AFFECTS VOLTAGE DROP ON STARTING, TO THE GENSET'S ALTERNATOR, ON UTILIO POWER FAILURE AND NORMAL START-UP (ONCE CAPSTONE SYSTEM CONTINUOUSLY OPERATES IN "GRID CONNECT" MODE (WITH UTILIO) AND "STANDALONE" MODE (WITHOUT UTILIO)). THE FOLLOWING STEPS WITH ASSOCIATED LOADS SHALL BE PROGRAMMED INTO THE "ESWB" PLC PROGRAM TO OPERATE THE ASSOCIATED DATA CENTER'S LOADS ELECTRICALLY OPERATED BREAKERS ON GENERATOR "G2" POWER:
 - STEP 1 (10 SEC. APPROX. AFTER UTILIO POWER LOSS): MECHANICAL SYSTEM'S LOADS (VIA PANEL "DP-MECH") & MISC. LOADS.
 - STEP 2 (APPROX. 15 SEC.): UPS A1 & A2.
 - STEP 3 (APPROX. 20 SEC.): UPS B1 & B2.
 - THE OPTIONAL STANDBY CHP 16, 1741 DRG CAPSTONE GENERATOR SYSTEM "G2" SHALL SEND A SIGNAL TO "ESWB" PLC TO OPEN BREAKER "U1" IMMEDIATELY AND INHIBIT CLOSURE OF BREAKER "U1" FOR APPROX. TEN (10) SECONDS DURING THE FIRST UTILIO OUTAGE SO THAT THE CAPSTONE SYSTEM CAN DISCONNECT AND THEN RE-POWER "ESWB'S" DATA CENTER LOADS IN ACCORDANCE WITH UL 1741. "BD-1" & "2" SHALL PROVIDE "GRID ON LINE" & "GRID OFF LINE" CONTROL SIGNALS TO THE CAPSTONE SYSTEM'S PLC ACCORDINGLY. CAPSTONE SYSTEM PLC, "MDF1" & "2" & "ESWB" PLC SYSTEMS REQUIRES REAL TIME KW LOAD MONITORING OF BUILDING AND THE DATA CENTER TO DETERMINE BUILDING LOAD SHEDDING AND/OR POWER BACK-UP TO THE CAPSTONE SYSTEM IN THE EVENT OF A PARTIAL OR COMPLETE FAILURE OF GENERATOR "G2". UTILITY OR BLDG. GENSET "G1" SHALL PROVIDE BACK-UP POWER TO "ESWB" IN THE EVENT CAPSTONE SYSTEM DRG "G2" IS PARTIALLY OR COMPLETELY OUT OF SERVICE OR IS SHUTDOWN. THE "A" & "B" BUS AROCK IN "ESWB" SHALL BE USED FOR PARTIAL "G2" SERVICE. REFER TO DWG. 16 SWITCHBOARD OPERATIONS: SEQUENCE OF OPERATIONS FOR ADDITIONAL DETAILS. FOR DETAILS ON GENERATOR "G2" INCLUDING SEQUENCE OF OPERATIONS, SEE CAPSTONE (V) ETC. DWGS. & PLC PROGRAMMING. CAPSTONE CONTACT: E-EMT@DISTRIBUTEDGENERATION.COM, PA, 401 RIND (610) 437-4006 (CELL), DIRECTOR OF APPLICATION ENGINEERING.
 - PROVIDE & INSTALL THE FOLLOWING 480V BREAKERS & ASSOCIATED WIRING FOR THE MECHANICAL SYSTEMS SUPPORTING THE "DP-MECH" ROOMS, UPS ROOMS AND THE DATA CENTER'S OPERATIONS (SEE MECH. & ELEC. PLAN DWGS. & PANEL SCHEDULES):
 - 3P-15A CB'S FOR CRAC-1,2,3,6 & 8; DF ROOMS, ALL FLOORS.
 - 3P-15A CB'S FOR CRAC-3 AND 4; DEMARC ROOMS, FIRST FLOOR.
 - 3P-15A CB'S FOR CRAC-11 & 12; 3RD FLOOR ITEM PROCESS ROOM.
 - 3P-15A CB FOR CRAC-13; 3RD FLOOR ITEM PROCESS ROOM.
 - 3P-15A CB'S FOR CRAC-9 & 10 IN 1ST FLOOR WS UPS ROOM.
 - 3P-25A CB'S FOR CRAC-14 & 15 IN D.C. UPS ROOM.
 - 3P-25A CB'S FOR CRAC-16 & 17 IN D.C. UPS ROOM.

NOTE:
 (2) 2N REDUNDANT 275 KVA/248 KW FUTURE UPS'S FOR DAY 3 LOADS IN DATA CENTERS W/ ASSOCIATED MECH. COOLING SYSTEMS TO BE SUPPORTED BY FUTURE DIESEL GENERATOR "G3" (EST. 1 MW).

PENNSYLVANIA
STATE EMPLOYEES
CREDIT UNION
CORPORATE
HEADQUARTERS

ADDRESS:
HARRISBURG, PA



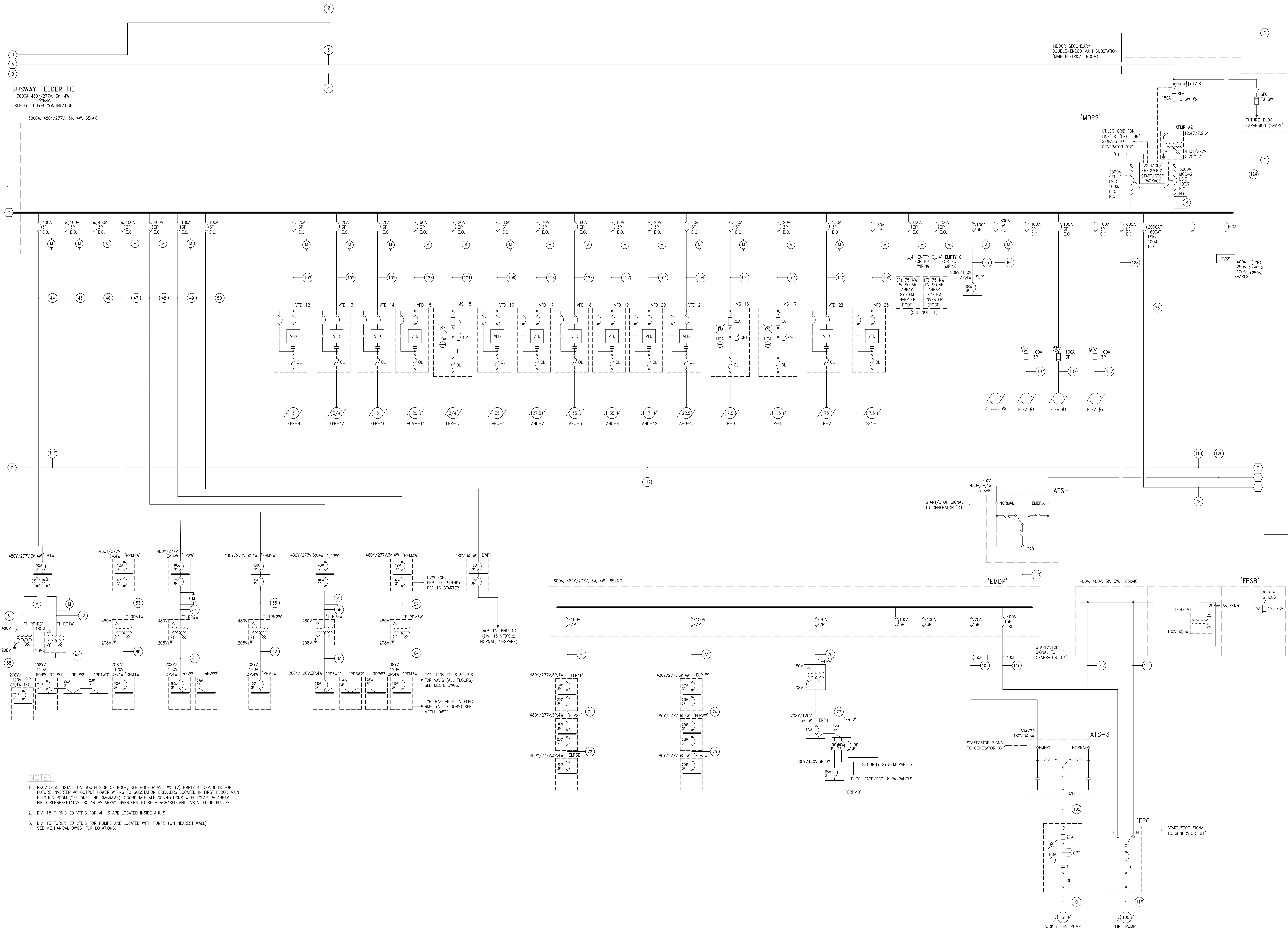
SCALE:
NOT TO SCALE

ISSUE:
10/26/2011

DRAWN BY:
SARAH WUJCIK

AE SENIOR THESIS
SINGLE-LINE
DIAGRAM

SHEET TITLE:
E.01



- NOTES:**
1. PROVIDE & INSTALL ON SOUTH SIDE OF ROOF. SEE ROOF PLAN. TWO (2) EMPTY 4" CONDUITS FOR FUTURE INVERTER AC OUTPUT POWER WIRING TO SUBSTATION BREAKERS LOCATED IN FIRST FLOOR MAIN ELECTRICAL ROOM (SEE ONE LINE DIAGRAMS). COORDINATE ALL CONNECTIONS WITH SOLAR PV ARRAY FIELD REPRESENTATIVE. SOLAR PV ARRAY INVERTERS TO BE PURCHASED AND INSTALLED IN FUTURE.
 2. DW. 15 FURNISHED VFD'S FOR AHU'S ARE LOCATED INSIDE AHU'S.
 3. DW. 15 FURNISHED VFD'S FOR PUMPS ARE LOCATED WITH PUMPS (ON NEAREST WALL). SEE MECHANICAL DWGS. FOR LOCATIONS.

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ISSUE:
10/26/2011

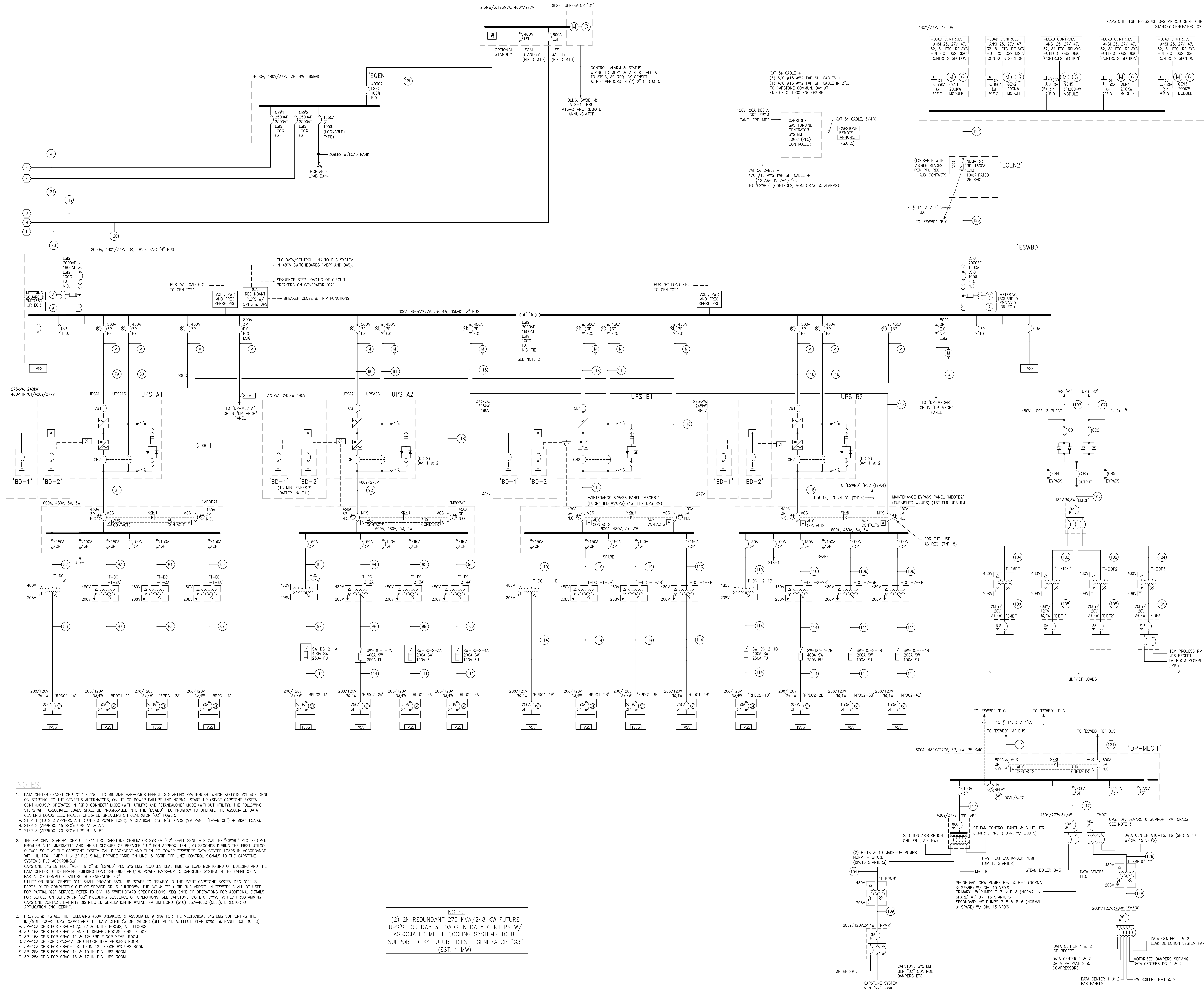
DRAWN BY:
SARAH WUJCIK

AE SENIOR THESIS
SINGLE-LINE
DIAGRAM

SHEET TITLE:
E.02

PENNSYLVANIA
STATE EMPLOYEES
CREDIT UNION
CORPORATE
HEADQUARTERS

ADDRESS:
HARRISBURG, PA



- NOTES:**
- DATA CENTER GENSET CHP 'G2' SIZING- TO MINIMIZE HARMONICS EFFECT & STARTING KVA INRUSH, WHICH AFFECTS VOLTAGE DROP ON STARTING, TO THE GENSET ALTERNATORS, ON UTILITY POWER FAILURE AND NORMAL START-UP (GENSET CAPSTONE SYSTEM CONTINUOUSLY OPERATES IN "GRID CONNECT" MODE (WITH UTILITY) AND "STANDALONE" MODE (WITHOUT UTILITY). THE FOLLOWING STEPS WITH ASSOCIATED LOADS SHALL BE PROGRAMMED INTO THE "ESWBD" PLC PROGRAM TO OPERATE THE ASSOCIATED DATA CENTER'S LOADS ELECTRICALLY OPERATED BREAKERS ON GENERATOR "G2" POWER.
 - A. STEP 1 (10 SEC APPROX. AFTER UTILITY POWER LOSS): MECHANICAL SYSTEM'S LOADS (VIA PANEL "DP-MECH") + MISC. LOADS.
 - B. STEP 2 (APPROX. 15 SEC): UPS A1 & A2.
 - C. STEP 3 (APPROX. 20 SEC): UPS B1 & B2.
 - THE OPTIONAL STANDBY CHP UL 1741 DRG CAPSTONE GENERATOR SYSTEM "G2" SHALL SEND A SIGNAL TO "ESWBD" PLC TO OPEN BREAKER "G1" IMMEDIATELY AND INHIBIT CLOSURE OF BREAKER "G1" FOR APPROX. TEN (10) SECONDS DURING THE FIRST UTILITY OUTAGE SO THAT THE CAPSTONE SYSTEM CAN DISCONNECT AND THEN RE-POWER "ESWBD'S" DATA CENTER LOADS IN ACCORDANCE WITH UL 1741. "MCP" 1 & 2' PLC SHALL PROVIDE "GRID ON LINE" & "GRID OFF LINE" CONTROL SIGNALS TO THE CAPSTONE SYSTEM'S PLC ACCORDINGLY.

CAPSTONE SYSTEM PLC, "MCP" 1 & 2' & "ESWBD" PLC SYSTEMS REQUIRES REAL TIME KW LOAD MONITORING OF BUILDING AND THE DATA CENTER TO DETERMINE BUILDING LOAD SHEDDING AND/OR POWER BACK-UP TO CAPSTONE SYSTEM IN THE EVENT OF A PARTIAL OR COMPLETE FAILURE OF GENERATOR "G2".

UTILITY OR BLDG. GENSET "G1" SHALL PROVIDE BACK-UP POWER TO "ESWBD" IN THE EVENT CAPSTONE SYSTEM DRG "G2" IS PARTIALLY OR COMPLETELY OUT OF SERVICE OR IS SHUTDOW. THE "A" & "B" + TE BUS ARRG. IN "ESWBD" SHALL BE USED FOR PARTIAL "G2" SERVICE. REFER TO DIV. 16 SWITCHBOARD SPECIFICATIONS, SEQUENCE OF OPERATIONS FOR ADDITIONAL DETAILS. FOR DETAILS ON GENERATOR "G2" INCLUDING SEQUENCE OF OPERATIONS, SEE CAPSTONE (V.O. ETC. (MISC. & PLC PROGRAMMING. CAPSTONE CONTACT: E-FINITY DISTRIBUTED GENERATION IN WAYNE, PA JIM BOND (610) 637-4080 (CELL), DIRECTOR OF APPLICATION ENGINEERING.
 - PROVIDE & INSTALL THE FOLLOWING 480V BREAKERS & ASSOCIATED WIRING FOR THE MECHANICAL SYSTEMS SUPPORTING THE DP/MOF ROOMS, UPS ROOMS AND THE DATA CENTER'S OPERATIONS (SEE MECH. & ELECT. PLAN DMS & PANEL SCHEDULES):
 - A. 3P-15A CB'S FOR CRAC-1, 2, 5, 6, 7 & 8. 10F ROOMS, ALL FLOORS.
 - B. 3P-15A CB'S FOR CRAC-3 AND 4. 05A/RM ROOMS, FIRST FLOOR.
 - C. 3P-15A CB'S FOR CRAC-11 & 12. 3RD FLOOR YFMR. ROOM.
 - D. 3P-15A CB FOR CRAC-13. 3RD FLOOR ITEM PROCESS ROOM.
 - E. 3P-15A CB'S FOR CRAC-9 & 10 IN 1ST FLOOR W/ UPS ROOM.
 - F. 3P-25A CB'S FOR CRAC-14 & 15 IN D.C. UPS ROOM.
 - G. 3P-25A CB'S FOR CRAC-16 & 17 IN D.C. UPS ROOM.

NOTE:
(2) 2N REDUNDANT 275 KVA/248 KW FUTURE UPS'S FOR DAY 3 LOADS IN DATA CENTERS W/ ASSOCIATED MECH. COOLING SYSTEMS TO BE SUPPORTED BY FUTURE DIESEL GENERATOR "G3" (EST. 1 MW).

SCALE:
NOT TO SCALE

ISSUE:
10/26/2011

DRAWN BY:
SARAH WUJCIK

AE SENIOR THESIS
SINGLE-LINE
DIAGRAM

SHEET TITLE:
E.03

Appendix B

Appendix B includes the high intensity discharge lamp and ballast catalog cut sheets for the Pennsylvania State Employees Credit Union Corporate Headquarters. This information is also included in the luminaire schedule starting on page 21



PAR30LN



PAR20



PAR38

METALARC® POWERBALL® Ceramic PAR ECOLOGIC® Lamps

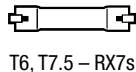
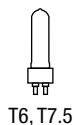
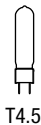
HIGH CRI, PULSE START, UV STOP METAL HALIDE LAMPS FOR OPEN OR ENCLOSED FIXTURES

See product information bulletin (HID052) for product details

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code/ Fixture Req.	Pkg Qty	Beam Type	Beam Angle	Operating Position	Avg Rated Life (hrs)	MBCP	Approx Lumens (Initial)	CRI (K)	CCT (K)	Lamp Efficacy (LPW)
20	PAR20	E26Med	64859	MCP20PAR20/U/830/SP/ECO PB	C156/0	12	SP	8°	Universal	12000	15000	900	82	3000	45
			64861	MCP20PAR20/U/830/SP10/ECO PB	C156/0	12	SP	10°	Universal	12000	10500	900	82	3000	45
			64860	MCP20PAR20/U/830/FL/ECO PB	C156/0	12	FL	30°	Universal	12000	2650	900	82	3000	45
	PAR30LN	E26Med	64879	MCP20PAR30LN/U/830/SP/ECOPB	C156/0	6	SP	10°	Universal	12000	21000	1200	82	3100	60
			64878	MCP20PAR30LN/U/830/FL/ECOPB	C156/0	6	FL	30°	Universal	12000	4000	1200	82	3100	60
	39	PAR20	E26Med	64895	MCP39PAR20/U/940/SP	C130/0	12	SP	10°	Universal	12000	16000	1850	90	4200
64896				MCP39PAR20/U/940/FL	C130/0	12	FL	30°	Universal	12000	4000	1850	90	4200	47
64824				MCP39PAR20/U/830/SPPB	C130/0	12	SP	10°	Universal	12000	20000	2000	87	3000	51
64826				MCP39PAR20/U/830/FLPB	C130/0	12	FL	30°	Universal	12000	5000	2000	87	3000	51
PAR30LN		E26Med	64897	MCP39PAR30LN/U/940/SP/ECO	C130/0	6	SP	10°	Universal	12000	36000	2200	90	4200	56
			64898	MCP39PAR30LN/U/940/FL/ECO	C130/0	6	FL	30°	Universal	12000	7500	2200	90	4200	56
			64880	MCP39PAR30LN/U/830/SP/ECOPB	C130/0	6	SP	10°	Universal	12000	39600	2300	85	3000	59
			64881	MCP39PAR30LN/U/830/FL/ECOPB	C130/0	6	FL	30°	Universal	12000	8000	2300	85	3000	59
			64885	MCP39PAR30LN/U/830/VWFL/ECOPB	C130/0	6	VWFL	46°	Universal	12000	3500	2300	85	3000	59
			70	PAR30LN	E26Med	64222	MCP70PAR30LN/U/940/SP/ECO	C139/0	6	SP	9°	Universal	12000	70000	4000
			64224	MCP70PAR30LN/U/940/FL/ECO	C139/0	6	FL	27°	Universal	12000	13000	4000	90	4200	57
			64201	MCP70PAR30LN/U/930/SP/ECOPB	C139/0	6	SP	12°	Universal	12000	42000	3600	95	3000	51
			64202	MCP70PAR30LN/U/930/FL/ECOPB	C139/0	6	FL	30°	Universal	12000	12000	3600	95	3000	51
			64230	MCP70PAR30LN/U/930/VWFL/ECO PB	C139/0	6	VWFL	46°	Universal	12000	5000	3400	95	3000	49
	PAR38	E26Med Skt ²	64749	MCP70PAR38/U/830/SP/ECOPB	C98/0	6	SP	15°	Universal	15000	40000	4300	88	3000	61
			64750	MCP70PAR38/U/830/FL/ECOPB	C98/0	6	FL	25°	Universal	15000	16000	4300	88	3000	61
			64751	MCP70PAR38/U/VWFL/830/ECOPB	C98/0	6	VWFL	65°	Universal	15000	3500	4300	88	3000	61
100	PAR38	E26Med Skt ²	64752	MCP100PAR38/U/830/SP/ECOPB	C90/0	6	SP	15°	Universal	15000	58000	6500	88	3000	65
			64753	MCP100PAR38/U/830/FL/ECOPB	C90/0	6	FL	25°	Universal	15000	25000	6500	88	3000	65
			64754	MCP100PAR38/U/830/VWFL/ECOPB	C90/0	6	VWFL	60°	Universal	15000	6000	6500	88	3000	65
150	PAR38	E26Med Skt ²	64841	MCP150/PAR38/U/830/SP/ECOPB	C102/0	6	SP	15°	Universal	15000	50000	9100	88	3000	61
			64842	MCP150/PAR38/U/830/FL/ECOPB	C102/0	6	FL	25°	Universal	15000	28000	9100	88	3000	61
			64843	MCP150/PAR38/U/830/VWFL/ECOPB	C102/0	6	VWFL	65°	Universal	15000	6500	9100	88	3000	61

¹ The first letter of the ANSI code represents the lamp type; "C" for ceramic metal halide and "M" for quartz metal halide. The numbers following the lamp type refer to the electrical characteristics required by the ballast to start and operate the lamp reliably. Ceramic, "C", or quartz, "M" lamps with the same electrical characteristic number will operate on the same ballast (per ANSI C78.380-2007). For example, a 150W ceramic lamp with a C102 designation will operate on a 150W metal halide ballast with an M102 designation and vice versa.

² Lamps with a E26 medium skirt base are not compatible with exclusionary medium sockets.



T4

T4.5

T6, T7.5

T6, T7.5 - RX7s

METALARC® POWERBALL® Ceramic TUBULAR SINGLE ENDED AND DOUBLE ENDED Lamps

HIGH CRI, PULSE START, UV STOP METAL HALIDE LAMPS FOR ENCLOSED FIXTURES ONLY

See product information bulletin (HID054) for product details

Watts	Bulb	Base	Product Number	Ordering Abbreviation	ANSI Code ¹ / Fixture Req.	Pkg Qty	Finish	Operating Position	Avg Rated Life (hrs)	Approx Lumens Initial (Mean)	CRI	CCT (K)	Lamp Efficacy (LPW)
TF													
15	T4	GU6.5	69043	MC15TF/U/GU6.5/830	C186/E	12	Clear	Universal	15000	1200 (900 ²)	82	3000	80
20	T4	GU6.5	68842	MC20TF/U/GU6.5/830	C156/E	12	Clear	Universal	15000	1700 (1275)	85	3000	85
39	T4	GU6.5	69044	MC39TF/U/GU6.5/830	C130/E	12	Clear	Universal	15000	3400 (2550 ²)	90	3000	87
TC													
20	T4.5	G8.5	64882	MC20TC/U/G8.5/830PB	C156/E	12	Clear	Universal	15000	1700 (1275)	83	3000	85
39	T4.5	G8.5	64791	MC39TC/U/G8.5/830PB	C130/E	12	Clear	Universal	15000	3400 (2720)	82	3000	87
70	T4.5	G8.5	64825	MC70TC/U/G8.5/930PB	C139/E	12	Clear	Universal	15000	6300 (5040)	95	3000	90
T6 and T7.5													
39	T6	G12	64162	MC39T6/U/G12/930	C130/E	12	Clear	Universal	15000	2800 (2240 ²)	93	3000	72
			64363	MC39T6/U/G12/830PB	C130/E	12	Clear	Universal	15000	3400 (2720)	82	3000	87
			64325	MC39T6/U/G12/940PB	C130/E	12	Clear	Universal	15000	3300 (2640)	90	4200	85
70	T6	G12	64338	MC70T6/U/G12/940PB	C139/E	12	Clear	Universal	15000	6700 (5360)	93	4200	96
			64200	MC70T6/U/G12/930PB	C139/E	12	Clear	Universal	15000	6400 (5120)	95	3000	91
			64361	MC70T6/U/G12/830PB	C139/E	12	Clear	Universal	15000	7000 (5600)	87	3000	100
100	T6	G12	64160	MC100T6/U/G12/830	C191/E	12	Clear	Universal	15000	9500 (7600 ²)	85	3000	95
150	T7.5	G12	64337	MC150T7.5/U/G12/940PB	C142/E	12	Clear	Universal	15000	14500 (11600)	95	4200	97
			64359	MC150T7.5/U/G12/830	C142/E	12	Clear	Universal	15000	15500 (12400)	89	3000	103
70	T6	RX7s	64793	MC70T6/DE/830PB	C139/E	12	Clear	HOR ±45°	12000	6900 (5520)	88	3000	99
150	T7.5	RX7s	64794	MC150T7.5/DE/830PB	C142/E	12	Clear	HOR ±45°	12000	14800 (11840)	91	3000	99

¹ The first letter of the ANSI code represents the lamp type; "C" for ceramic metal halide and "M" for quartz metal halide. The numbers following the lamp type refer to the electrical characteristics required by the ballast to start and operate the lamp reliably. Ceramic, "C", or quartz, "M" lamps with the same electrical characteristic number will operate on the same ballast (per ANSI C78.380-2007). For example, a 150W ceramic lamp with a C102 designation will operate on a 150W metal halide ballast with an M102 designation and vice versa.

² Preliminary data, visit www.sylvania.com for updates.

QUICKTRONIC® METAL HALIDE and High Pressure Sodium Electronic Systems

QUICKTRONIC® MH SUPER MINI SYSTEMS

Electronic Metal Halide Systems, Universal Voltage (120-277V)

Item Number	OSRAM SYLVANIA Description	Input Voltage (VAC)	Input Current (AMPS)	Lamp Type ¹	Rated Lumens (lm)	No. of Lamps	Internal IDTP ²	Ballast Factor (BF)	System Lumens	Input Power (W) 120V 277V	System Efficacy (lm/W)	Lamp ANSI Code ³
51991*	QTP1x15MH SM UNV J	120-277	0.15/0.07	15W T4	1200	1	Yes	1.00	1200	17.5 17.5	69	C186
51986	QTP1x15MH SM UNV F											
51987*	QTP1x20MH SM UNV J	120-277	0.19/0.09	20W T4	1700	1	Yes	1.00	1700	23 23	74	C156
51988	QTP1x20MH SM UNV F											
51989*	QTP1x39MH SM UNV J	120-277	0.38/0.17	39W T4.5	3400	1	Yes	1.00	3400	44 44	77	C130
51990	QTP1x39MH SM UNV F											

QUICKTRONIC® MH PROFESSIONAL SYSTEMS

Electronic Metal Halide Systems, Universal Voltage (120-277V)

Item Number	OSRAM SYLVANIA Description	Input Voltage (VAC)	Input Current (AMPS)	Lamp Type ¹	Rated Lumens (lm)	No. of Lamps	Internal IDTP ²	Ballast Factor (BF)	System Lumens	Input Power (W) 120V 277V	System Efficacy (lm/W)	Lamp ANSI Code ³
51968	QTP2X20MH UNV F ⁴	120-277	0.38/0.16	20W T4.5	1700	2	Yes	1.00	3400	46 46	74	C156
51969	QTP2X20MH UNV J ⁴											
51910	QTP1x39MH/UNV-F	120-277	0.39/0.17	39W T6	3400	1	Yes	1.00	3400	44 44	77	C130
51911	QTP1x39MH/UNV-J											
51970	QTP2X39MH UNV F ⁴	120-277	0.75/0.33	39W T6	3400	2	Yes	1.00	6800	89 89	76	C130
51971	QTP2X39MH UNV J ⁴											
51912	QTP1x70MH/UNV-F	120-277	0.67/0.29	70W T6	7000	1	Yes	1.00	7000	79 79	89	C98, C139
51913	QTP1x70MH/UNV-J											
51914	QTP1x100MH/UNV-F	120-277	0.96/0.41	100W E17	9700	1	Yes	1.00	9700	110 110	88	C90, C140, C191
51915	QTP1x100MH/UNV-J											

QUICKTRONIC® MH PROFESSIONAL (SLIM & SQUARE) SYSTEMS

Electronic Metal Halide Systems, Mini Sized

Item Number	OSRAM SYLVANIA Description	Input Voltage (VAC)	Input Current (AMPS)	Lamp Type ¹	Rated Lumens (lm)	No. of Lamps	Internal IDTP ²	Ballast Factor (BF)	System Lumens	Input Power (W) 120V 277V	System Efficacy (lm/W)	Lamp ANSI Code ³
51959	QTP1x20MH UNV SQ F <i>Formerly: QT1x20MH UNV SQ</i>	120-277	0.19/0.09	20W T4.5	1700	1	Yes	1.00	1700	23 23	74	C156
51956	QTP1x20MH UNV SQ J	120-277	0.19/0.09	20W T4.5	1700	1	Yes	1.00	1700	23 23	74	C156
51961	QTP1x39MH UNV SQ F <i>Formerly: QT1x39MH UNV SQ</i>	120-277	0.38/0.17	39W T6	3400	1	Yes	1.00	3400	44 44	77	C130
51957	QTP1x39MH UNV SQ J	120-277	0.38/0.17	39W T6	3400	1	Yes	1.00	3400	44 44	77	C130
51963	QTP1x70MH UNV SQ F <i>Formerly: QT1x70MH 120V SQ</i>	120-277	0.66/0.29	70W T6	7000	1	Yes	1.00	7000	79 79	89	C98, C139
51964	QTP1X70MH UNV SQ J	120-277	0.65/0.27	70W T6	7000	1	Yes	1.00	7000	79 79	89	C98, C139
51946	QTP1X70MH UNV SLIM F	120-277	0.63 / 0.27	70W T6	7000	1	Yes	1.00	7000	76 74	92/95	C98, C139
51947	QTP1X70MH UNV SLIM J											
51948	QTP1X100MH UNV SLIM F	120-277	0.91 / 0.39	100W E17	9700	1	Yes	1.00	9700	109 107	99/91	C90, C140, C191
51949	QTP1X100MH UNV SLIM J											

*New Product. Contact OSRAM SYLVANIA for product availability.

¹ For other compatible lamp types/systems info please refer to the Product Information Bulletins and/or Ballast Tech. Applications & Specification Guide and www.sylvania.com.

² Internal IDTP – Insulation Detection Thermal Protector.

³ or quartz equivalent "M"

⁴ Ballast can operate 1 or 2 lamps, cap off unused leads individually for 1 lamp operation.