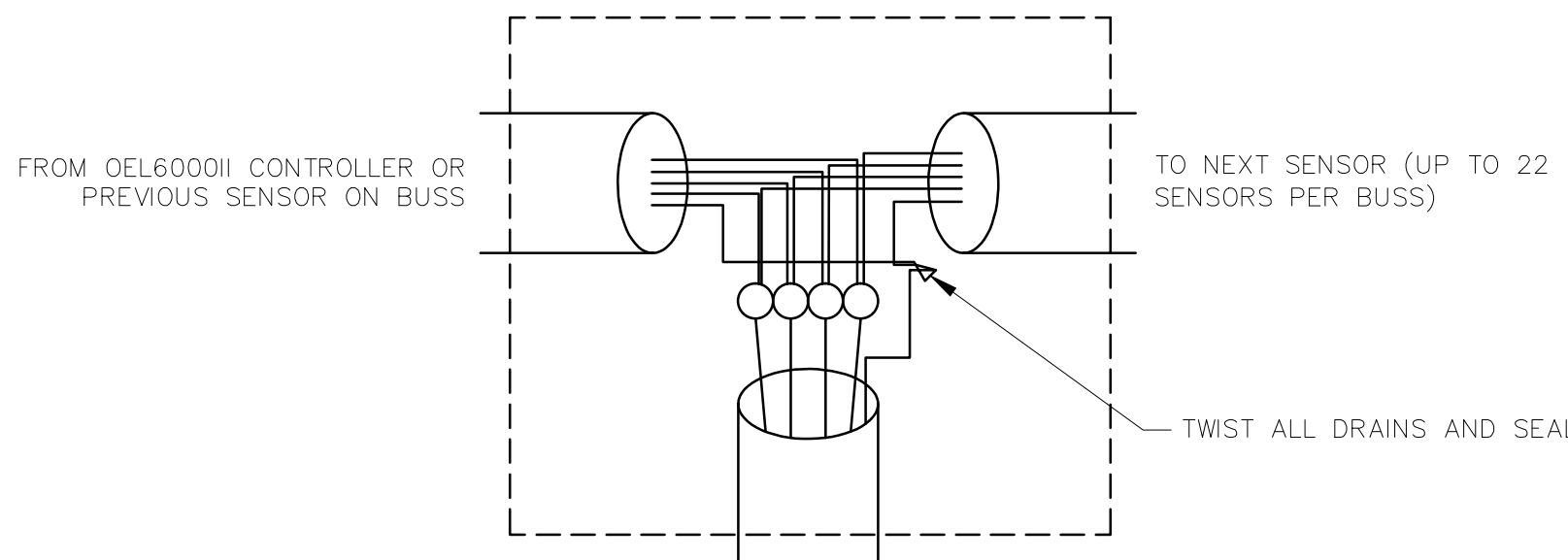


0 6" three inches = one foot
0 6" one and one half inches = one foot
0 2' one inch = one foot
0 6" three quarters inch = one foot
0 6" one half inch = one foot
0 4' one half inch = one foot
0 6" three eighths inch = one foot
0 8' one quarter inch = one foot
0 4' one eighth inch = one foot
0 16' one eighth inch = one foot



1 SUMP SENSOR WIRING DETAIL
Ei601 SCALE: NTS

13.8 kV EPSS SWITCHGEAR P&M:

P&M METERING & RELAYING PROVIDES OVERCURRENT/FAULT PROTECTION AS WELL AS VOLTAGE & LOAD MONITORING. PERFORMS PROTECTIVE RELAYING FUNCTIONS AS INDICATED ON E-601 AND E-602. PROVIDES SELECTIVE FAULT ISOLATION & CIRCUIT LOCKOUT. PROVIDES NODE VOLTAGE SIGNALS FOR G1, G2, EB1, EB2, FT1, AND FT2. PROVIDES CURRENT/LOAD INDICATION AT EACH MONITORED CIRCUIT: G1, G2, ET, FT1, FT2, S2-EP-A, S2-EP-C, S2-EP-E, S2-EP-G, S2-EP-H.

13.8 kV NORMAL SWITCHGEAR P&M:

METERING & RELAYING IS EXISTING WITH FUNCTIONS AS INDICATED ON SINGLE-LINE DIAGRAM. TO BE EXTENDED AS SHOWN ON DRAWINGS AND IN SPECIFICATIONS. PERFORMS PROTECTIVE RELAYING FUNCTIONS AS INDICATED ON E-601 AND E-602. PROVIDES SELECTIVE FAULT ISOLATION & CIRCUIT LOCKOUT. PROVIDES NODE VOLTAGE SIGNALS FOR U1, U2, NB1, AND NB2. PROVIDES CURRENT/LOAD INDICATION AT EACH MONITORED CIRCUIT: U1, U2, S2-A, S2-B, S2-C, S2-E, S2-F, S2-G, S2-I.

13.8 kV PROTECTIVE INTERLOCKS:

INTERLOCKS EMPLOY PLC AND/OR DISCRETE LOGIC TO PREVENT INADVERTENT PARALLELING OF SOURCES. INTERLOCKS FUNCTION AT ALL TIMES IN ALL MODES OF OPERATION, WHERE A BREAKER HAS A MANUAL OPERATOR, THAT OPERATION SHALL BE SUBJECT TO INTERLOCK REQUIREMENTS, WHERE A BREAKER HAS AN AUTOMATIC OPERATION, THAT OPERATION SHALL BE SUBJECT TO INTERLOCK REQUIREMENTS. INTERLOCKS SHALL BE ENGINEERED SUCH THAT THEY ARE NEVER OVERRIDDEN OR DEFEATED. INTERLOCKS APPLY WHENEVER THE ASSOCIATED BREAKERS ARE RACKED IN TO THEIR NORMAL OPERATING POSITION. FOR A BREAKER RACKED OUT FULLY OR IN TEST (MV BUS DISCONNECTED) POSITION, INTERLOCKS DO NOT GOVERN & RACKED OUT BREAKER POSITION IS "OPEN" AS PERTAINS TO OTHER BREAKERS WITH WHICH IT IS INTERLOCKED. A BREAKER IN "TRIPPED" POSITION IS LOCKED OUT OF FURTHER AUTOMATIC OR MANUAL OPERATION UNTIL RESET. POSITION IS "OPEN" WITH RESPECT TO INTERLOCKS. WHEN AN INTERLOCK IS IN EFFECT ON A BREAKER IT SHALL BE DISPLAYED ON THE MIMIC BUS HMI. E.G., WHEN 'U1' AND 'U2' ARE BOTH SHUT, THE HMI SHALL INDICATE THAT AN INTERLOCK IS PREVENTING THE OPEN 'NT' FROM BEING CLOSED UNDER THOSE CIRCUMSTANCES.

13.8 kV DUAL MASTER CONTROLLERS:

PLC-BASED CONTROLLERS MANAGE REAL-TIME FUNCTIONS OF SWITCHGEAR CONTROL, INCLUDING CHANGE OF OPERATING MODE, AUTOMATIC AND OPERATOR-INITIATED TRANSFER SWITCHING OPERATIONS, AND STATUS REPORTING TO PMCS.

RECEIVES INPUT FROM SWITCHGEAR P&M TO PERFORM NECESSARY SYSTEM CHANGES AS NEEDED, SUCH AS RESTORING POWER TO FIRST THE EPSS AND THEN THE NORMAL DISTRIBUTION IN RESPONSE TO A COMPLETE LOSS OF UTILITY VOLTAGE, AS WELL AS RETURN OF THE SYSTEM TO NORMAL WHEN COMMANDED AND AFTER UTILITY POWER IS RESTORED.

THE FOLLOWING FUNCTIONALITY IS PROVIDED:

- PROVIDE REAL-TIME SYSTEM STATUS TO THE PMCS
- EXECUTE THE AUTOMATIC TRANSFER OPERATIONS IN RESPONSE TO LOSS OF POWER
- EXERCISE THE GENERATORS UNDER LOAD WHEN COMMANDED
- MANAGE LOAD SHED AND LOAD PICKUP
- MANAGE GENERATORS AS NEEDED TO MAINTAIN GENERATOR(S) LOADED GREATER THAN 30% WHEN OPERATING UNDER LOAD
- PROTECT AVAILABILITY OF POWER TO THE EPSS

GENERATOR PARALLELING CONTROLLER:

STARTS, STOPS, AND PARALLELS GENERATORS ONTO THE EMERGENCY BUS. MAINTAINS BUS VOLTAGE AND FREQUENCY IN RESPONSE TO LOAD CHANGES, MANAGES LOAD SHARING BETWEEN GENERATORS, INCLUDING DROPPING OR ADDING GENERATORS TO THE RUN POOL. IN CONJUNCTION WITH MASTER CONTROLLER, CALLS FOR LOAD SHED SHOULD LOAD BECOME EXCESSIVE ON SOLE RUNNING GENERATOR. WHEN BRINGING GENERATORS ONTO DEAD BUS, SIGNALS GENERATOR READINESS AND CLOSES GENERATOR BREAKER ONTO BUS WHEN PROTECTIVE INTERLOCKS ARE SATISFIED.

PERSONAL COMPUTER WORKSTATION (PCW) SERVER UNIT:

RUNS 13.8 kV POWER MONITORING CONTROL SYSTEM (PMCS) AND RELATED SOFTWARE. MAINTAINS AND LOGS SYSTEM STATUS, ALARMS, AND REPORTING REQUIREMENTS. KEEPS AND PRESENTS REAL-TIME AND HISTORY OF NODE VOLTAGES, CIRCUIT CURRENTS, POWER (REAL, REACTIVE, AND APPARENT) ON EACH SOURCE, TIE, AND DISTRIBUTION FEEDER. HOSTS PMCS SERVER SOFTWARE, PROVIDES LOGIN AUTHENTICATION AND SERVES STATUS DISPLAY TO REMOTE CLIENTS. PROVIDES INTERFACE TO VAMC CAMPUS NETWORK FOR REMOTE MONITORING. HOSTS 13.8 kV POWER SYSTEM PRIVATE NETWORK AS NEEDED, AND MAINTAINS GATEWAY IN BETWEEN PRIVATE & CAMPUS NETWORKS.

INTRUSION DETECTION:

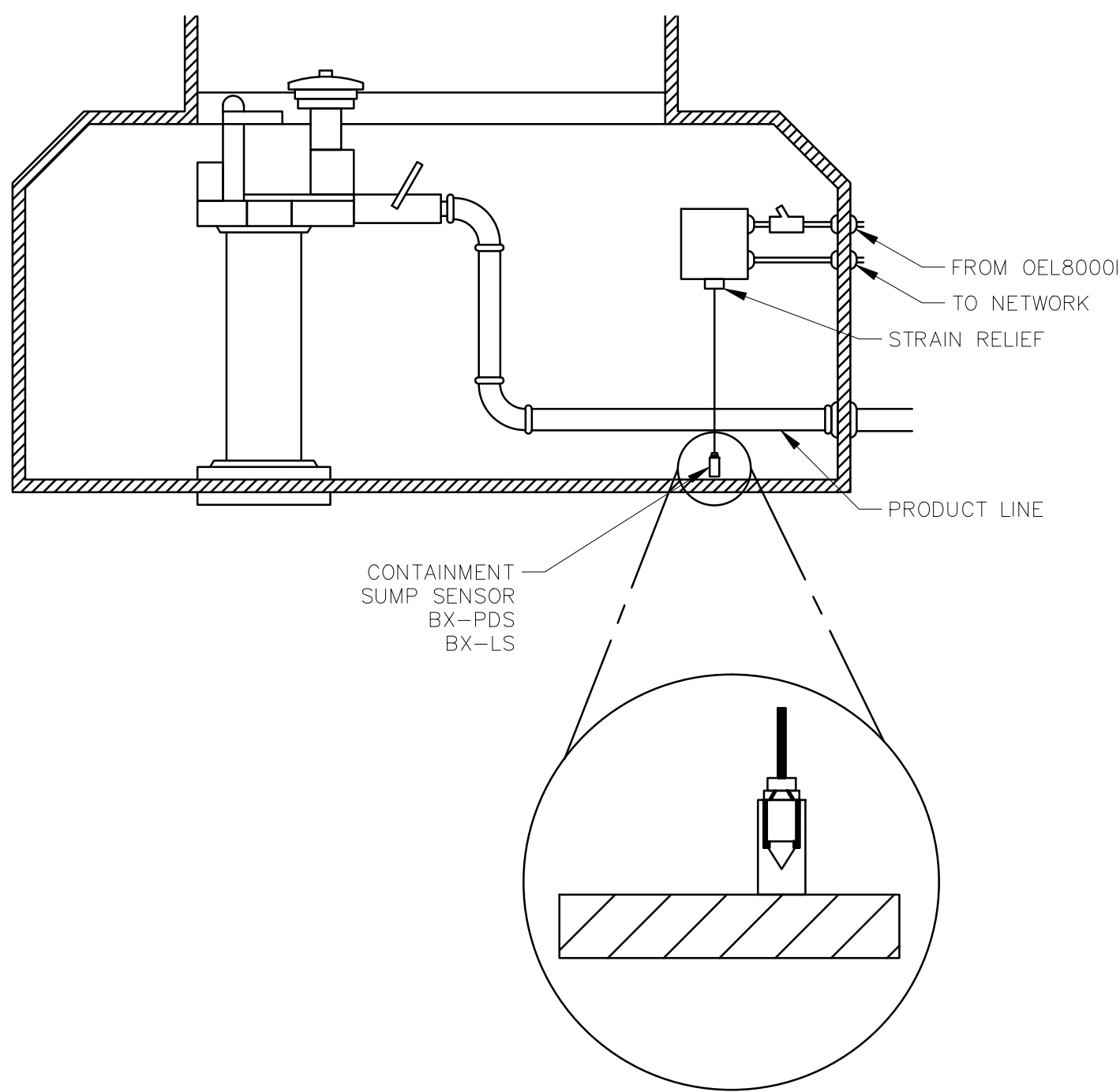
MONITORS PHYSICAL ACCESS TO BUILDINGS 74, 74A, & THE REMOTE FILL STATION, PROVIDING LOCAL AND REMOTE ALARM UPON BREACH.

FACILITY FUEL SYSTEM MANAGEMENT:

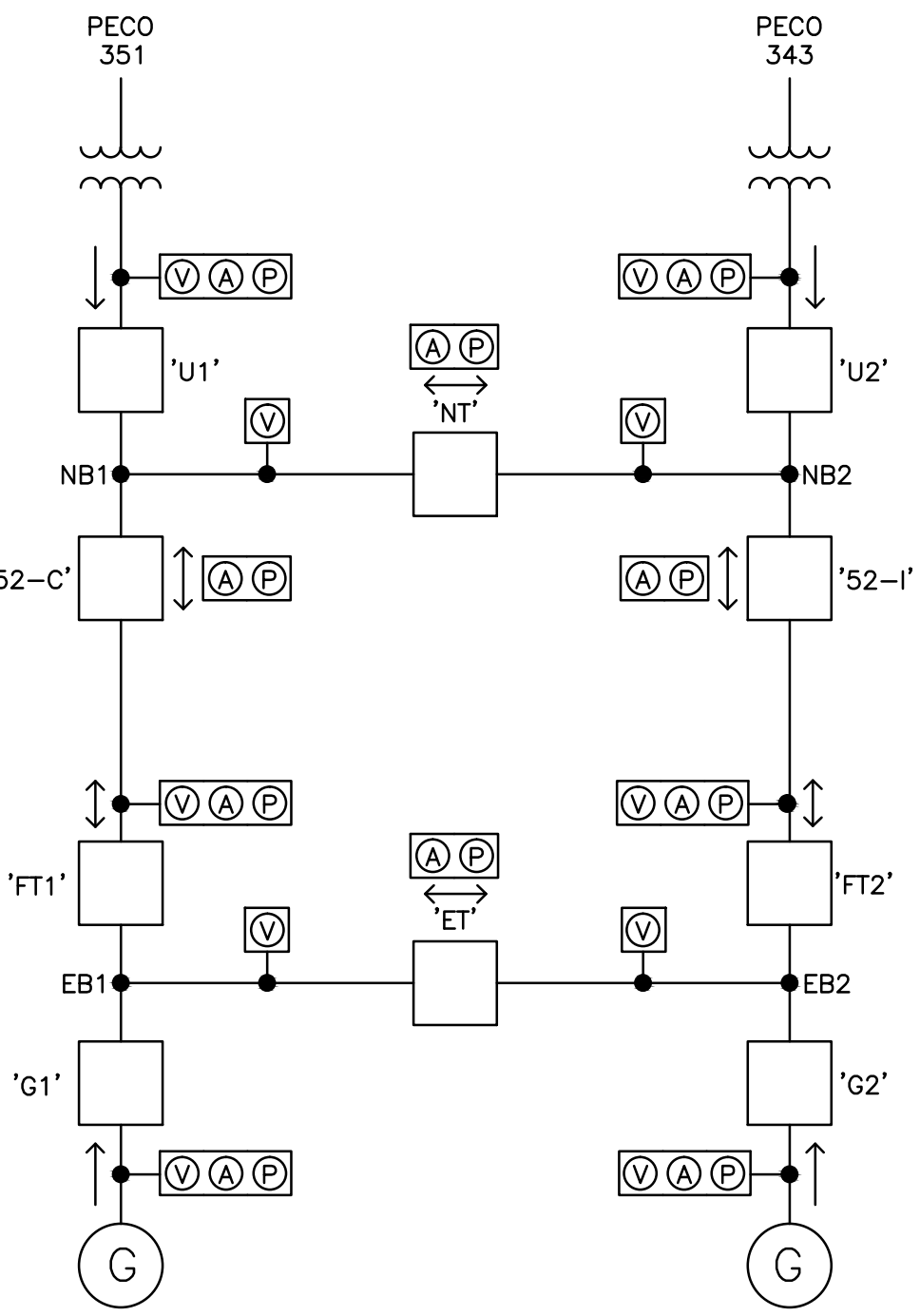
MONITORS AND DISPLAYS FUEL SYSTEM STATUS, LOCALLY AND REMOTELY, INCLUDING TANK LEVEL AND LEAK DETECTION.

FIRE ALARM REMOTE MONITOR:

SIGNALS TO PMCS AN ALARM RECEIVED FROM THE BUILDING 74/74A FIRE ALARM SYSTEM. THIS IS IN ADDITION TO BUILDING 74 FACP WHICH REPORTS DIRECTLY TO THE FIRE DEPARTMENT



2 CONTAINMENT SUMP SENSOR DETAIL
Ei601 SCALE: NTS



3 MIMIC BUS DISPLAY
Ei601 SCALE: NTS

CAMPUS 13.8 kV ELECTRICAL SYSTEM CONTROLS & MONITORING:

1. 13.8 kV NORMAL/EMERGENCY POWER SYSTEM SHALL BE PROVIDED WITH DUAL MASTER CONTROLLERS & CONTROL STATIONS, ONE IN BLDG 74 AND ONE IN BLDG 74A, FROM WHICH ALL CONTROL AND MONITORING MAY BE CARRIED OUT.
2. THE MASTER CONTROL STATION HMI SHALL CONTAIN A TOUCHSCREEN DISPLAY ON WHICH IS PROVIDED A MIMIC BUS AS SHOWN IN DETAIL 3/EI601 SHOWING SYSTEM TOPOLOGY, STATUS IN REAL-TIME, AND SOFT "BUTTONS" BY WHICH TO SELECT AND DISPLAY VARIOUS CONTROL AND MONITORING FUNCTIONS. SUB-SCREENS OR POP-UP WINDOWS, SELECTABLE FROM THE MAIN LOGIN SCREEN, MAY BE EMPLOYED TO PROVIDE DETAILED STATUS, SUCH AS FOR A GENERATOR.
3. EITHER STATION MAY BE DESIGNATED MASTER. ONLY ONE STATION MAY SERVE AS MASTER AT ANY TIME, THE OTHER FUNCTIONING AS SLAVE. ONLY THE MASTER STATION CAN BE USED TO CHANGE SYSTEM TOPOLOGY OR EXERCISE GENERATORS.
4. THE SLAVE STATION SHALL FUNCTION SOLELY AS A REMOTE MONITOR, EXCEPT THAT EITHER STATION CAN TRANSFER MASTER CONTROL TO ITSELF OR THE OTHER STATION AT ANY TIME. THIS ALLOWS AN OPERATOR AT THE SLAVE STATION TO TAKE CONTROL IN THE EVENT THE MASTER IS OUT OF COMMISSION OR NOT AVAILABLE.
5. EACH CONTROLLER SHALL MONITOR THE OTHER AND SHALL ASSUME SYSTEM MASTER CONTROL AND ISSUE AN ALARM EVENT SHOULD THE OTHER CONTROLLER FAIL. EACH PLC SHALL PERFORM SELF-MONITORING AND REVERT TO SLAVE MODE UPON FAILURE.
6. THE DISPLAY FUNCTION ONLY, WITHOUT CONTROL CAPABILITY, SHALL BE VIEWABLE REMOTELY VIA AN INTERNET BROWSER. REMOTE ACCESS SHALL BE CONTROLLED BY AUTHENTICATION WITH USERNAME AND PASSWORD.
7. REMOTE DISPLAY OF STATUS OF ALL STATION MONITORED PARAMETERS (E.G., SWITCHGEAR, GENERATORS, LOADS, FUEL SYSTEM, INTRUSION, & FIRE ALARM (IF AVAILABLE)) SHALL BE MADE AVAILABLE VIA THE CAMPUS DATA NETWORK FOR VIEW VIA AN INTERNET BROWSER. STATION REMOTE MONITORING SHALL REQUIRE USERNAME AND PASSWORD FOR ACCESS. CONTROL FUNCTIONS SHALL NOT BE AVAILABLE REMOTELY.
8. REMOTE MONITOR PC'S WILL BE SUPPLIED AND/OR SET UP WHERE DIRECTED BY COTR IN BUILDING 14 AND ONE OTHER LOCATION. PERSONNEL TRAINING SHALL INCLUDE REMOTE ACCESS AT THESE STATIONS AND OTHERS AS USERS MAY CHOOSE. NO SPECIAL SOFTWARE SHALL BE REQUIRED AT THE REMOTE MONITOR PC OTHER THAN AN INTERNET BROWSER AND STANDARD AVAILABLE BROWSER EXTENSIONS.

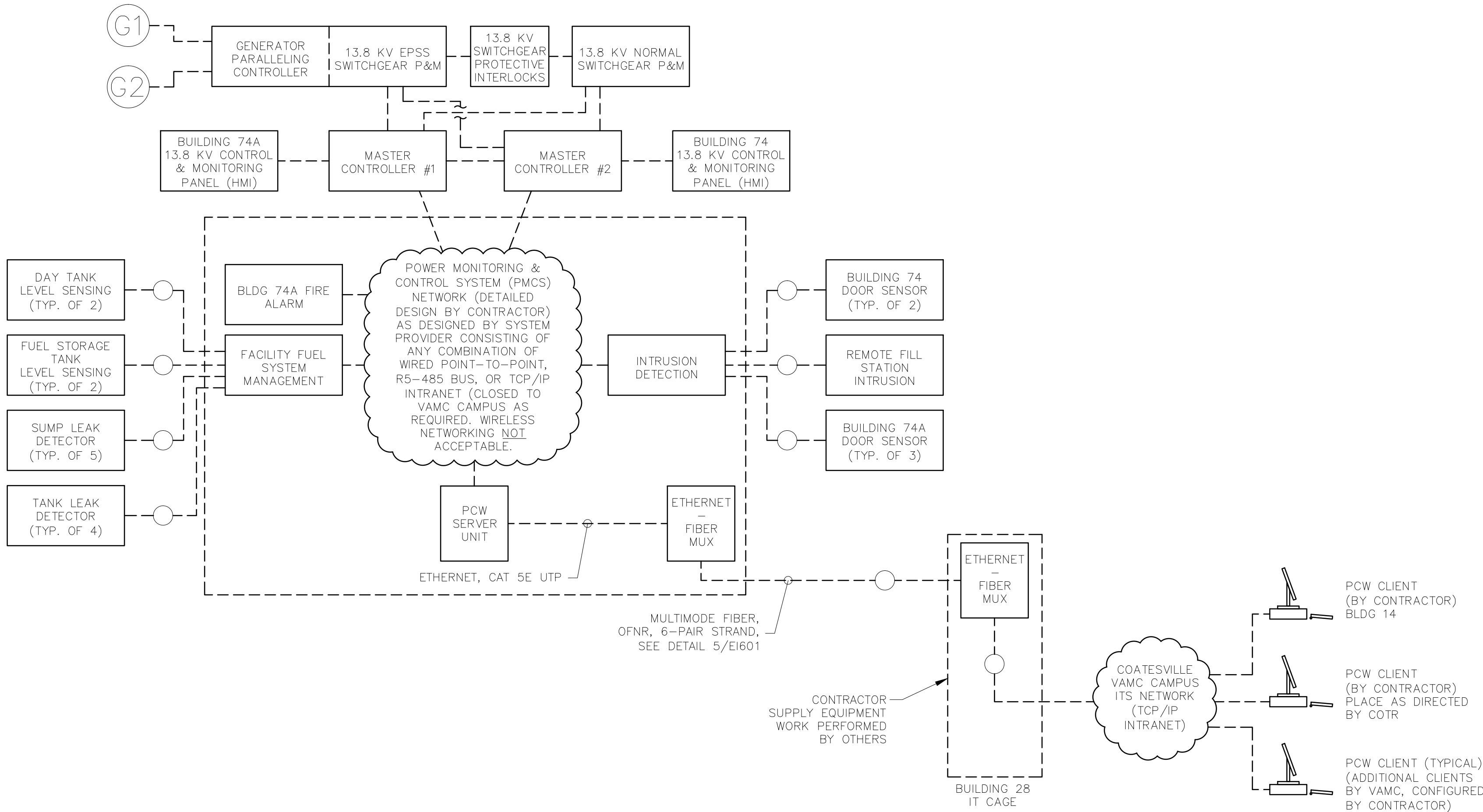
MIMIC BUS REAL-TIME STATUS INDICATIONS:

1. COLOR CODING:
BREAKER CLOSED GREEN
BREAKER OPEN AMBER
BREAKER TRIPPED AMBER FLASHING
BREAKER UNKNOWN OR FAULT RED
BUS HOT BLACK
BUS DEAD FLASHING
BUS VOLTAGE FAULT INDICATED
2. METERING INDICATIONS:
(V) VOLTAGE (L-L AND L-N)
(A) AMPERES (PH A, B, C)
(P) KW, KVA, KVAR, PF

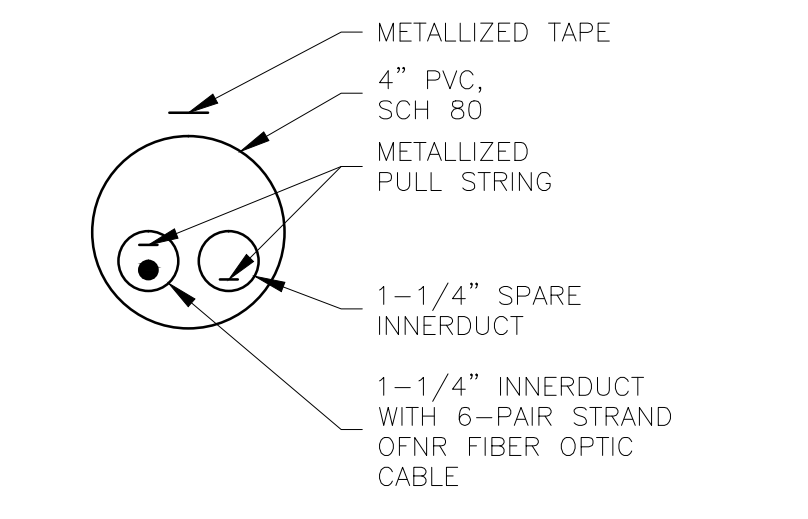
VOLTAGE SHALL BE VIEWABLE FOR EACH SOURCE, BUS, AND FOR BOTH SIDES OF EACH TIE. CURRENT AND DIRECTIONAL POWER (REAL, REACTIVE, APPARENT) SHALL BE VIEWABLE FROM EACH SOURCE AND THROUGH EACH TIE. LIMITED CURRENT AND POWER HISTORY SHALL BE AVAILABLE, INCLUDING PEAK SINCE LAST RESET AND DATE/TIME OF SAME.

CONTROLS & MONITORING FUNCTIONAL DIAGRAM:

1. DIAGRAM PROVIDES A FUNCTIONAL SPECIFICATION OF CAMPUS 13.8 kV SYSTEM I&C REQUIREMENTS ONLY AND IS NOT INTENDED TO PRESCRIBE A PARTICULAR IMPLEMENTATION, HARDWARE COMPONENTS, ITEMS OF EQUIPMENT OR PROTOCOLS PARTICULAR TO A CERTAIN VENDOR.
2. THE SYSTEM SHALL BE CAPABLE OF PROVIDING REMOTE MONITORING INFORMATION ACCESSIBLE VIA A STANDARD INTERNET BROWSER VIA PASSWORD CONTROL.
3. MONITORED INFORMATION SHALL INCLUDE THOSE PARAMETERS APPLICABLE TO THE FUNCTIONAL BLOCKS SHOWN. SEE SPECIFICATIONS FOR MINIMUM REQUIREMENTS.
4. CONNECTIVITY TO REMOTE MONITORS OUTSIDE BUILDINGS 74 AND 74A SHALL BE VIA THE COATESVILLE VAMC CAMPUS NETWORK. CONNECTION TO THE CAMPUS NETWORK SHALL BE MADE BY THE ITS GROUP IN THE BASEMENT TELCO CAGE OF BUILDING 28S. CONTRACTOR WILL PROVIDE ITS WITH ETHERNET-OVER-FIBER MUX/CONVERTER/EXTENDERS OF BRAND AND MODEL SPECIFIED BY ITS, AND SHALL PULL A 6-PAIR STRAND OF MULTIMODE FIBER IN ONE INNERDUCT OF THE 4" CONDUIT INSTALLED TO CONNECT BUILDING 74A AND BUILDING 28S.
5. IMMEDIATELY UPON APPROVAL OF CONTRACTOR SUBMITTALS, CONTRACTOR SHALL CONTACT THE ITS GROUP AND REQUEST IN WRITING THE NUMBER OF IP ADDRESSES NEEDED ON THE CAMPUS TCP/IP NETWORK.
6. CONNECTIVITY BETWEEN BUILDING 74, 74A, AND SEPARATE EQUIPMENT WITHIN THOSE BUILDINGS TO THE "POWER MONITORING CONTROL SYSTEM (PMCS) SERVER" FUNCTION SHALL COMPRISE A PRIVATE NETWORK. ONLY THOSE FUNCTIONS SERVING STATUS TO REMOTE CLIENTS SHOULD BE VISIBLE/ADDRESSABLE TO THE CAMPUS NETWORK.
7. THE FUNCTIONAL DIAGRAM COVERS ONLY STATION-LEVEL MONITORING AND CONTROL FUNCTIONALITY. ADDITIONAL CONDUCTORS AND ROUTING BETWEEN NORMAL AND EPSS SWITCHBOARDS FOR BREAKER INTERLOCKS AND BUS MONITORING IS SEPARATE. LINKAGE BETWEEN THE SWITCHGEAR SHALL CONSIST OF A COMBINATION OF DISCRETE CONTROLS (INTERLOCKING) AND REAL-TIME ANALOG/DIGITAL SIGNALING ON DEDICATED LINES, DESIGNED BY A SWITCHGEAR CONTROLS SUPPLIER QUALIFIED TO DESIGN, IMPLEMENT, TEST, AND CERTIFY CUSTOM SWITCHGEAR CONTROLS.



4 CONTROLS AND MONITORING FUNCTIONAL DIAGRAM
Ei601 SCALE: NTS



5 TELCO DUCT DETAIL
Ei601 SCALE: 3'-4'-0"

		PATIENT SAFETY MANAGER	INFECTION PREVENTIONIST	SUPERVISOR, PROJECT SECTION	PROJECT MANAGER (COTR)	<div>ENGINEERS/ARCHITECT:</div> <div><div><div><div><div></div><div>APOGEE</div><div>Consulting Group, PA</div><div>www.acg-pa.com</div></div><div>Raleigh, NC Indianapolis, IN Atlanta, GA Columbia, MD (919) 858-7420 Apogee Project # 2010 228</div></div><div><div><div><div></div><div>WSP - SELLS</div><div>Transportation & Infrastructure</div></div><div>LandDesign™</div></div><div><div>WALDON STUDIO</div><div>ARCHITECTS & PLANNERS, PC</div><div>6325 Woodside Court, Suite 310</div><div>Columbia, Maryland 21046</div><div>Tel: 410.290.9680 Fax: 410.290.5777</div><div>www.waldonstudio.com</div></div></div></div><div>Professional Stamp/Seal</div></div>	<div>Drawing Title</div> <div>SITE POWER PLAN, EXISTING GEAR BUILDING POWER PLAN AND GENERATOR ENCLOSURE POWER & LIGHTING PLAN</div> <div>Approved: Chief Engineering Service</div> <div>Drawn DJR/NAC</div> <div>Checked JMB/JDC</div> <div>Approved: Medical Center Director</div>	<div>Project Title</div> <div>COATESVILLE - VA MEDICAL CENTER A/E INSTALL EMERGENCY GENERATOR</div> <div>Building Number ---</div> <div>Location COATESVILLE, PENNSYLVANIA</div>	<div>Date</div> <div>9/23/11</div>
		SUPERVISION, BIOMED/ M&O	ENVIRON HEALTH FIRE/SAFETY SECTION	SAFETY/OCCUPATIONAL HEALTH MANAGER	CHIEF, ACQUISITION MGT SECT, CONTRACTING OFFICER				<div>Project No.</div> <div>542-11-104</div>
		VA POLICE CHIEF	PATIENT CARE SECTION	GENERAL PROPERTIES SECTION	GENERAL UTILITIES SECTION				<div>DRAWING No.</div> <div>EI601</div>
									<div>Dwg. 16 Of 16</div>
Revisions	Date								

100% CONSTRUCTION DOCUMENTS

VA