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POWER DISTRIBUTION NEW PANELBOARD - SURFACE MOUNT NEW PANELBOARD - FLUSH MOUNT TRANSFORMER - SIZE AS INDICATED NON-FUSED DISCONNECT SMITCH (AMPERE RATING SHOWN) FUSED DISCONNECT SWITCH (FUSE AMPERE RATING SHOWN) CB ENCLOSED CIRCUIT BREAKER (AMPERE RATING SHOWN) \boxtimes MAGNETIC MOTOR STARTER, SIZE I UON \square COMBINATION MAGNETIC MOTOR STARTER AND DISCONNECT SWITCH, SIZE I UON VFD VARIABLE FREQUENCY DRIVE BY MC, EC TO WIRE **(5)** MOTOR - HORSEPOWER AS INDICATED JUNCTION BOX OR DIRECT CONNECTION POINT EMERGENCY POWER OFF STATION ΕK EMERGENCY POWER OFF KEY RESET STATION CONCEALED WIRING AS SPECIFIED OR AS NOTED -2#12 & 1#12G.-3/4"C UNO HOMERUN TO PANELBOARD, DESIGNATION = PANEL-CKT. INDICATES CONDUIT DOWN INDICATES CONDUIT UP —<u>E</u>M—— EMERGENCY ONLY CIRCUIT -NE----NORMAL EMERGENCY CIRCUIT WIRING CONNECTED TO SAME CIRCUIT, CONTROLLED SEPARATELY GROUND ROD - 34" X IO'-O" COPPERCLAD

	<u>OUTLETS</u>
Ф	DUPLEX RECEPTACLE OUTLET - 18"AFF UNO - COORDINATE COLOR WITH ARCHITECT
Φ_{xx}	DUPLEX RECEPTACLE SHOWN WITH SPECIAL DESIGNATIONS:
©F	GF - DENOTES GROUND FAULT INTERRUPTER
UTP	TP - TAMPERPROOF
	MP - WEATHERPROOF
	C - DENOTES MOUNTED ABOVE COUNTERTOP OR CASEWORK
"	(THESE DESIGNATIONS TYPICAL FOR ALL RECEPTACLES)
 	QUADRAPLEX RECEPTACLE OUTLET
Q 15 20B	SIMPLEX (SINGLE) RECEPTACLE
♥ ^{LJ-20K}	SPECIAL PURPOSE RECEPTACLE OUTLET - NEMA CONFIGURATION AS INDICATED ON DRAWINGS
lacksquare	TELEPHONE OUTLET (M DENOTES WALL PHONE)
lacksquare	DATA OUTLET - FLUSH MOUNTED SINGLE GANG BOX 18" AFF WITH I" CONDUIT TO ABOVE ACCESSIBLE CEILING PLENUM - NUMBER INDICATES QUANTITY OF DATA PORTS
\square^2	DATA OUTLET ABOVE CEILING - MOUNT IN WIREMOLD V700 SERIES SURFACE BOX - NUMBER INDICATES QUANTITY OF DATA PORTS
$lackbox{f V}$	COMBINATION TELEPHONE /DATA OUTLET
V ^{∧∨}	AUDIO VISUAL INPUT PLATE WITH COMPONENTS AS DETAILED IN INSTRUCTORS COMMUNICATION STATION DETAIL. WHERE INDICATED, INSTALL IN SURFACE RACEWAY. IN NEW CONSTRUCTION, FLUSH MOUNT IN 2-GANG BOX WITH SINGLE GANG TRIM RING AT 18"AFF
2 H	DATA OUTLET - FLUSH MOUNTED SINGLE GANG BOX 8'-6" PLUS/MINUS 3"AFF WITH I" CONDUIT TO ABOVE ACCESSIBLE CEILING - NUMBER INDICATES QUANTITY OF DATA PORTS
	CABLE TV OUTLET - FLUSH MOUNTED EXTRA DEEP SINGLE GANG BOX 18" AFF UNLESS NOTED OTHERWISE WITH I" CONDUIT AND TO ABOVE ACCESSIBLE CEILING PLENUM
abla	ABOVE CEILING MOUNTED BOX WITH DUPLEX RECEPTACLE AND DATA, FSR CATALOG NUMBER CB-22
	TYPICAL SURFACE MOUNTED RACEWAY - WIREMOLD V700 SERIES (IVORY) UNO
>	CORD AND PLUG - COORDINATE EXACT TYPE WITH EQUIPMENT

CORDREEL - HUBBELL HBL45123C2O PROVIDE RECEPTACLE IN CEILING TO CONNECT CORD REEL. MOUNT TO STRUCTURAL STEEL

	<u>SWITCHES</u>
\$	SINGLE POLE SWITCH
\$ _K	KEY OPERATED WALL SWITCH
\$ _{RL}	RAISE/LOWER SMITCH
\$з	THREE-WAY SWITCH
\$4	4-WAY SMITCH
\$ _D	LINE VOLTAGE DIMMER SWITCH
\$ _{LD}	LOW VOLTAGE DIMMER SWITCH
\$ <i>o</i> s	LINE VOLTAGE PASSIVE INFRARED OCCUPANCY SENSOR WALL SWITCH - SENSOR SWITCH. COLOR TO MATCH OTHER WIRING DEVICES
\$ <i>o</i> s	LINE VOLTAGE PASSIVE INFRARED OCCUPANCY SENSOR WALL SWITCH WITH O-IOV DIMMING CONTROL. COLOR TO MATCH OTHER WIRING DEVICES
PC	PHOTO CONTROL SMITCH (WEATHERPROOF FOR OUTDOOR INSTALLATION)
\$ _{PL}	SWITCH WITH PILOT LIGHT
\$LCS	LIGHTING CONTROL SMITCH (LOW VOLTAGE OVERRIDE SMITCH)
os os	CEILING MOUNTED OCCUPANCY SENSOR P - PASSIVE INFRARED U - ULTRASONIC D - DUAL TECHNOLOGY - ALL UON LOW VOLTAGE
LS	DAYLIGHT SENSOR UNIT - SEE SPECIFICATIONS
\$ _M	MANUAL MOTOR STARTER
\$ _T	THERMAL SWITCH (MANUAL STARTER WITH THERMAL PROTECTION) SQUARE D CLASS 2510 SERIES WITH HANDLE GUARD/LOCK OFF ATTACHMENT. MOUNT ON OR ADJACENT TO EQUIPMENT
\$ _{T2}	THERMAL SWITCH (MANUAL STARTER) LEVITON CAT NO. NI302 DOUBLE POLE SINGLE THROW 30A, 208VOLT, SINGLE PHASE WITH LOCK OFF ATTACHMENT IN NEMA I ENCLOSURE (SIMILAR SQUARE D).

MOUNT ON OR ADJACENT TO EQUIPMENT.

RECEPTACLE

	LIGHTING FIXTURES
X X X	2' X 4' FLUORESCENT LIGHT FIXTURE I' X 4' FLUORESCENT LIGHT FIXTURE 2' X 2' FLUORESCENT LIGHT FIXTURE INDUSTRIAL FLUORESCENT LIGHT FIXTURE WITH CHAIN KITS AND WIRE GUARD
×O + ×O +	FIXTURE CONNECTED TO NORMAL/EMERGENCY POWER (TYPICAL) CEILING OR PENDANT MOUNTED LIGHT FIXTURE WALL WASHER LIGHT FIXTURE WALL MOUNTED LIGHT FIXTURE
X X X X X X X X X X X X X X X X X X X	CEILING MOUNTED EXIT SIGN - ARROW AS INDICATED EMERGENCY BATTERY LIGHT FIXTURE WITH (2) LIGHTING HEADS (2) REMOTE LIGHTING HEADS CONNECTED TO LOCAL BATTERY UNIT - WP INDICATES WEATHERPROOF
× Ø	POLE MOUNTED SITE LIGHTING FIXTURE - ARM MOUNT POLE MOUNTED SITE LIGHTING FIXTURE - POST TOP MOUNT
	NOTE: 'X' INDICATES FIXTURE TYPE (TYPICAL) - REFER TO LIGHTING FIXTURE SCHEDULE FOR MORE INFORMATION

FIRE ALARM AND SAFETY

SMOKE DETECTOR HEAT DETECTOR HEAT DETECTOR DUCT SMOKE DETECTOR - SUPPLIED & WIRED BY EC, INSTALLED BY MC COMBINATION FIRE/SMOKE DAMPER BY MC. EC TO PROVIDE 120V POWER AND ALL FIRE ALARM WIRING FIRE ALARM AUDIBLE DEVICE - FLUSH MT IN CEILING FIRE ALARM PULL STATION - PROVIDE PROTECTIVE COVER FIRE ALARM AUDIBLE APPLIANCE - WALL FIRE ALARM VISUAL APPLIANCE - WALL MT - 15 CANDELA - XX INDICATES CANDELA RATING IF OTHER THAN 15 FIRE ALARM COMBINATION AUDIBLE AND VISUAL APPLIANCE - WALL MT 15 CANDELA - XX INDICATES CANDELA RATING IF OTHER THAN 15 FIRE ALARM COMBINATION AUDIBLE AND VISUAL APPLIANCE - FLUSH MOUNT IN CEILING - 15 CANDELA - XX INDICATES CANDELA RATING IF OTHER THAN 15 SPRINKLER SYSTEM FLOW SWITCH SPRINKLER SYSTEM FLOW SWITCH SPRINKLER SYSTEM TAMPER SWITCH SPRINKLER SYSTEM FRESSURE SWITCH DUCT SMOKE DETECTOR REMOTE ALARM/TEST/RESET STATION FIRE ALARM CONTROL PANEL HH MAGNETIC DOOR HOLD OPEN - FURNISHED AND INSTALLED BY GC, WIRED BY EC ELECTRIC GONG FOR SPRINKLER SYSTEM - PROVIDE 120V POWER		
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FIRE ALARM ANNUNCIATOR PANEL MH MAGNETIC DOOR HOLD OPEN - FURNISHED AND INSTALLED BY GC, WIRED BY EC		FIRE ALARM CONTROL PANEL
MAGNETIC DOOR HOLD OPEN - FURNISHED AND INSTALLED BY GC, WIRED BY EC		FIRE ALARM ANNUNCIATOR PANEL
ELECTRIC GONG FOR SPRINKLER SYSTEM - PROVIDE 120V POWER	MH	
	EG	ELECTRIC GONG FOR SPRINKLER SYSTEM - PROVIDE 120V POWER

SECURITY/PAGING

DS	ELECTRIC DOOR STRIKE
CR	CARD READER
DВ	DURESS BUTTON
DC	DOOR CONTACT FLUSH IN DOOR FRAME - ROUGH-IN 3/4"CONDUIT AND PULL STRING FROM DOOR FRAME TO TO POINT ABOVE CEILING SPACE - COORDINATE ROUGH-IN LOCATION WITH GC
DM	DOOR MAGNETIC LOCK
DR	DOOR RELEASE BUTTON (REMOTE)
EB	EXIT BUTTON
DL	ELECTRIC LOCKSET
ODC	OVERHEAD DOOR CONTACT
PIR	MOTION DETECTOR
KP	KEY PAD
REX	REQUEST TO EXIT
SD	SOUNDER (DOOR ALARM)
SM	SINGLE MAGNETIC LOCK
	SECURITY CAMERA
□\ PTZ	SECURITY CAMERA - PAN,TILT,ZOOM
(S) F12	SPEAKER - CEILING
(S) _L	SPEAKER - CEILING - CONNECTED TO LOCAL SOUND SYSTEM
S	SPEAKER - SURFACE MOUNTED
VC	SPEAKER VOLUME CONTROL - WALL
M_2	MICROPHONE OUTLET - WALL - NUMBER INDICATES QUANTITY OF OUTLETS
IC	STAGE INTERCOM STATION
	14/2 TO F.A.C.P. FOR INDICATION OF EXHAUST FAN ON HIGH SPEED

SINGLE LINE DIAGRAM GENERATOR TRANSFORMER CIRCUIT BREAKER -م 225AF AF= INDICATES AMPERE FRAME o 225AT AT = INDICATES AMPERE TRIP ST 920A IP = SINGLE POLE 2P = TWO POLE 3P = THREE POLE CIRCUIT BREAKER ST = SHUNT TRIP NON-FUSED SWITCH FUSE FUSED SWITCH OR FUSED DISCONNECT LIGHTNING ARRESTOR CURRENT TRANSFORMER DELTA CONNECTION GROUNDED MYE CONNECTION $-\infty$ OVERLOAD RELAY CONTACTOR RELAY TV95 TRANSIENT VOLTAGE SURGE SUPPRESSION \bigcirc DIGITAL MULTI PURPOSE METER GROUND CONNECTION म|----BATTERY TRANSFER SWITCH

9" BELOW FINISHED CEILING	WALL MOUNTED AUDIBLE APPLIANCE AND FIRE ALARM SOUNDING DEVICE (OR AS SHOWN ON ARCHITECTURAL DETAILS
8'-0" A.F.F.	TV MONITOR OUTLETS AND SERVICE RECEPTACLES FOR SHELF MOUNTED TV
CENTERED ABOVE DOOR OR WINDOW OPENING	WARNING AND SIGNALING FIXTURES/SIGNS
6'-8"	FIRE ALARM VISUAL APPLIANCE MOUNTED AT 6'-8" MEASURED FROM THE FINISHED FLOOR TO THE BOTTOM OF THE DEVICE OR 6" BELOW THE FINISHED CEILING MEASURED FROM THE FINISHED CEILING TO THE TOP OF THE DEVICE, WHICHEVER IS LOWER
6'-6"	TOP OF FLUSH AND SURFACE MOUNTED ELECTRICAL LIGHTING OR POWER PANELBOARDS AND TELEPHONE CABINETS
4'-6"	TOP OF HIGHEST ELECTRICAL SAFETY DISCONNECT SWITCHES, SECURITY SYSTEM KEYPAD
4'-0"	WALL MOUNTED ELECTRICAL DEVICES SUCH AS: LIGHTING SWITCHES, MANUAL MOTOR STARTERS, THERMOSTATS, AND FIRE ALARM PULL STATIONS - TO TOP OF BOX, WALL MOUNTED TELEPHONE AND WALL MOUNTED INTERCOM
l'-3"	ELECTRICAL RECEPTACLES INCLUDING THOSE USED WITHIN MECHANICAL SPACES AND ELEVATOR ROOMS TELEPHONE, DATA AND COMMUNICATION OUTLETS CATY AND A/V JUNCTION BOXES TO BOTTOM OF BOX

MOUNTING HEIGHTS - ELECTRICAL EQUIP.

MOUNTING HEIGHT NOTES

DETECTION SYSTEM RISER

DIAGRAM

- MOUNTING HEIGHTS TO CENTER OF OUTLETS UNLESS OTHERWISE NOTED. IN MASONRY CONSTRUCTION, THE ABOVE HEIGHTS SHALL BE USED FOR REFERENCE TO NEAREST BLOCK
- 2. THE ABOVE MOUNTING HEIGHTS SHALL BE ADHERED TO UNLESS SPECIFICALLY NOTED. OR 24. ALL WIRING METHODS SHALL BE NEC COMPLIANT AND MEET THE REQUIREMENTS OF
- DETAILED OTHERWISE ON THE ARCHITECTURAL DRAWINGS OR SPECIFICATIONS. 3. A 'C' BESIDE A DEVICE INDICATES THAT THE DEVICE IS MOUNTED ABOVE COUNTER OR

ALL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES, AND REGULATIONS ADOPTED BY MUNICIPAL, COUNTY, STATE, AND FEDERAL AUTHORITIES, INCLUDING THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND WITH THE REQUIREMENTS/AMENDMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ). 2. CONTRACT DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE INTENDED TO CONVEY SCOPE, DESIGN INTENT, AND GENERAL ARRANGEMENT ONLY. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL WORK OF ALL TRADES INCLUDING RESOLUTION OF FIELD CONFLICTS THAT MAY ARISE. 3. ALL OF THE ELECTRICAL INSTALLATION SHALL BE PERFORMED IN A NEAT,

WORKMANLIKE MANNER AND IN ACCORDANCE WITH INDUSTRY STANDARDS. 4. EACH FEEDER AND BRANCH CIRCUIT SHALL INCLUDE AN INSULATED EQUIPMENT GROUND CONDUCTOR PER NEC ARTCLE 250. BOND ALL ELECTRICAL EQUIPMENT. OUTLET BOXES, GROUNDING TYPE RECEPTACLES, ETC. IN ACCORDANCE WITH NEC ARTICLE 250.

GENERAL ELECTRICAL NOTES:

- 5. MULTI-WIRE BRANCH CIRCUITS SHALL NOT BE PERMITTED. EACH 120V BRANCH CIRCUIT SHALL INCLUDE DEDICATED NEUTRAL AND INSULATED GROUND CONDUCTORS.
- 6. GROUPING OF BRANCH CIRCUITS AND FEEDERS SHALL BE PERMITTED, PROVIDING THAT THE NEC RULES PERTAINING TO MAXIMUM ALLOWABLE PERCENT FILL OF RACEWAYS AND AMPACITY AD IISTMENT FACTORS FOR MORE THAN THREE (3) CURRENT CARRYING CONDUCTORS IN A RACEWAY ARE STRICTLY COMPLIED WITH. THE CONTRACTOR SHALL EXERCISE CAUTION IN PROVIDING AN EQUAL NUMBER OF A, B, AND C PHASE CONDUCTORS WHEN GROUPING CIRCUITS.
- 7. TROUGHS, JUNCTION BOXES, AND PULL BOXES ARE NOT NECESSARILY INDICATED, BUT SHALL BE PROVIDED WHERE REQUIRED BY THE NEC AND AS REQUIRED FOR EASE OF INSTALLATION. BOXES SHALL BE SIZED (MINIMUM) IN ACCORDANCE WITH NEC ARTICLE 314. TROUGHS SHALL BE SIZED PER NEC ARTICLE 366.
- 8. INTERIOR WIRING SHALL BE INSTALLED IN EMT OR RIGID GALVANIZED STEEL CONDUIT. 3/4" MINIMUM SIZE. FLEXIBLE METAL CONDUIT, LIQUIDTIGHT FLEXIBLE CONDUIT, OR MC CABLE SHALL BE UTILIZED IN LIMITED LENGTHS AS NECESSARY, OR AS REQUIRED/ALLOWED BY CODE AND SPECIFICATIONS.
- 9. ALL 600V OVER-CURRENT PROTECTIVE DEVICES SHALL HAVE INTERRUPTING CAPABILITIES OR RATINGS (AIC OR AIR) IN RMS AMPERES SYMMETRICAL. ALL DEVICES SHALL BE FULLY RATED FOR AVAILABLE FAULT CURRENT. ALL PANELBOARDS, DISTRIBUTION BOARDS, DEVICES ETC. SHALL BE FULLY RATED.
- O. ALL BUILDING WIRE SHALL BE TYPE THHN/TWHN (DUAL LISTED) COPPER CONDUCTORS. WITH 90° CELSIUS RATED INSULATION, #12 MINIMUM SIZE. UTILIZE #10 WIRE FOR ANY 120V, 15 OR 20A CIRCUIT THAT EXCEEDS 100 FEET TO LAST DEVICE OR OUTLET.
- . DO NOT UTILIZE FEED THRU GFG! RECEPTAGLES FOR DOWNSTREAM DEVICE PROTECTION. ALL DEVICES LISTED AS GF SHALL BE STAND ALONE.
- 12. CONTRACTOR SHALL PROVIDE AND INSTALL AN APPROVED, UL LISTED, FIRE STOP SEALANT TOTALLY ENCLOSING ALL PENETRATIONS THROUGH RATED WALLS, CEILINGS, FLOORS, ROOFS, ETC. ALL FLOOR PENETRATIONS SHALL BE CORE DRILLED, SLEEVED, AND SEALED WITH AN APPROVED, FIRE RATED SEALANT. ALL EXISTING PENETRATIONS IN WALLS AND FLOORS MUST BE SEALED TO MAINTAIN FIRE RATING.
- 13. BRANCH CIRCUIT FOR FACP SHALL MEET THE REQUIREMENT OF SECTION 4.4.1 OF NFPA 72. CONTRACTOR INSTALLING FIRE ALARM SYSTEM SHALL BE NICET II CERTIFIED.
- 14. EGRESS AND EMERGENCY LIGHTING SHALL BE CONNECTED AND INSTALLED TO MEET THE REQUIREMENTS OF NEC 700.12(F) AND 700.16. FINAL LOCATIONS SHALL BE APPROVED BY THE LOCAL AHJ.
- 15. THE CONTRACTOR SHALL PERFORM THE WORK AS INDICATED ON THE DRAWINGS. ANY DEVIATION FROM THE DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL IN WRITING. IF CHANGES ARE MADE WITHOUT WRITTEN CONSENT, THE CONTRACTOR SHALL BE LIABLE FOR ANY ISSUES THAT ARISE DUE TO
- 16. UNLESS NOTED OTHERWISE, ALL WIRE SIZES SHALL BE BASED ON THE FOLLOWING: TABLE 310.15(B)(16) 60° COLUMN FOR #14 THROUGH #1, TABLE 310.15(B)(16) 75° COLUMN FOR #I/O AND GREATER, AND OTHER ALLOWANCES OF IIO.14(C).
- 17. UNLESS OTHERWISE NOTED, FEEDER TAPS AND TRANSFORMER SECONDARY CONDUCTOR TAPS ARE DESIGNED BASED ON THE IO' RULE OF 240.2I(B)(I) AND 240.2l(c)(2).
- 18. UNLESS OTHERWISE NOTED, ALL CONDUIT SIZES ARE BASED ON EMT, RMC, OR RNC
- II. ALL ELECTRICAL MATERIALS, DEVICES, APPLIANCES, AND EQUIPMENT SHALL BE NEW, LABELED AND LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY OR AGENCY (E.G. UL) UNLESS OTHERWISE NOTED.
- 20. ELECTRICAL CONTRACTOR SHALL FOLLOW ALL MANUFACTURERS INSTRUCTIONS FOR INSTALLATION OF ALL EQUIPMENT IF NOT INDICATED ON DRAWINGS. IF THERE IS A DISCREPANCY, MANUFACTURERS INSTRUCTIONS TAKE PRECEDENCE.
- 21. THE EC SHALL FURNISH ALL EQUIPMENT, LABOR, SERVICES, AND MATERIALS REQUIRED FOR COMPLETE INSTALLATION OF THE WORK INDICATED. UNLESS OTHERWISE NOTED. ALL MATERIALS SHALL BE NEW.
- 22. PROVIDED ACCESS PANELS AS REQUIRED FOR ACCESS TO EQUIPMENT.
- 23. ALL WIRING, EQUIPMENT, STARTERS, AND CONTROLS SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE AND TO THE REQUIREMENTS OF THE LOCAL UTILITY
- THE SPACE, OCCUPANCY, AND CONDITION OF USE.
- 25. <u>DO NOT SCALE DRAWINGS</u>. CONTRACTOR SHALL VERIFY AND CONFIRM ALL CASEMORK. COORDINATE WITH ARCHITECTURAL DETAILS AND CASEMORK CONTRACTOR. DIMENSIONS IN THE FIELD AND NOTIFY THE ENGINEER OF ANY AND ALL

DISCREPANCIES ON THE DRAWINGS.

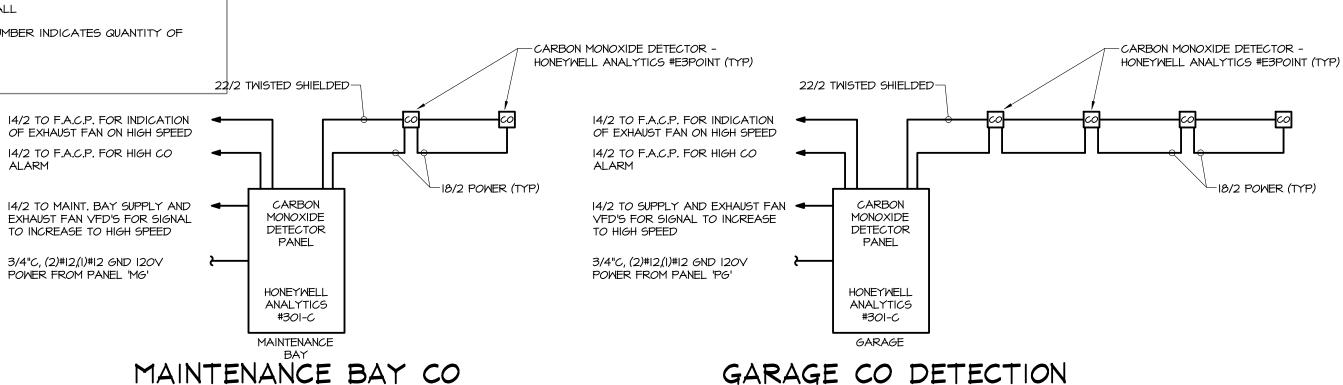
SYSTEM RISER DIAGRAM

- 26. ALL WORK SHALL COMPLY WITH THE LATEST REVISION OF THE LOCAL UTILITY'S ELECTRICAL SERVICE REQUIREMENTS - COORDINATE ALL SERVICE WORK WITH UTILITY PRIOR TO INSTALLATION. OBTAIN UTILITY APPROVAL BEFORE ENERGIZING NEW WORK. OBTAIN MET-ED REQUIREMENTS AND DELINEATION OF RESPONSIBILITIES IN WRITING, ESPECIALLY FOR MEDIUM VOLTAGE WORK AND METERING REQUIREMENTS.
- 27. CALL BEFORE YOU DIG (PA ONE CALL SYSTEM I-800-242-I776 OR DIAL 8II). EC TO HIRE AN INDEPENDENT UTILITY LOCATING COMPANY TO MARK OUT CUSTOMER OWNED/PRIVATE PROPERTY FACILITIES BEFORE DIGGING, AT EC'S EXPENSE.
- 28. CONTRACTOR TO PLACE NEW EQUIPMENT AS REQUIRED TO COMPLY WITH WORKING CLEARANCE ISSUES, DEDICATED SPACE ISSUES, AND WITH APPLICABLE CODES.
- 29. EXACT DIMENSIONS OF BUILDING AND ALL SPACES MUST BE VERIFIED IN THE FIELD. IF DIFFERENCES ARE DISCOVERED, THE EC IS RESPONSIBLE TO NOTIFY THE ENGINEER AND COORDINATE THE NECESSARY CORRECTIONS AS REQUIRED.
- 30. FURNISH ALL NECESSARY MATERIALS, TOOLS, AND LABOR AND INSTALL A COMPLETE AND FULLY OPERATIONAL WIRING SYSTEM AS INDICATED OR REASONABLY IMPLIED. ALL OUTLETS SHALL BE SHALL BE FULLY CONNECTED TO SOURCES OF CURRENT SUPPLY AND LEFT READY FOR USE. UNLESS NOTED OTHERWISE ALL MATERIALS SHALL BE NEW, FREE OF DEFECTS, AND BE UL LISTED

- 31. CONTRACTOR SHALL MEET INSTALLATION CRITERIA FOR SEISMIC REQUIREMENTS IN THE PROJECT LOCATION.
- 32. ALL SMALL MOTORS UNDER I HORSEPOWER SHALL HAVE INTEGRAL OVERLOAD PROTECTION PER NEC 430.32 AND 430.53(A) IF MULTIPLE MOTORS ARE PLANNED TO BE INSTALLED ON THE SAME BRANCH CIRCUIT.
- 33. THE EC IS RESPONSIBLE FOR THE CONTRACTIBILITY OF THE DRAWINGS FROM A

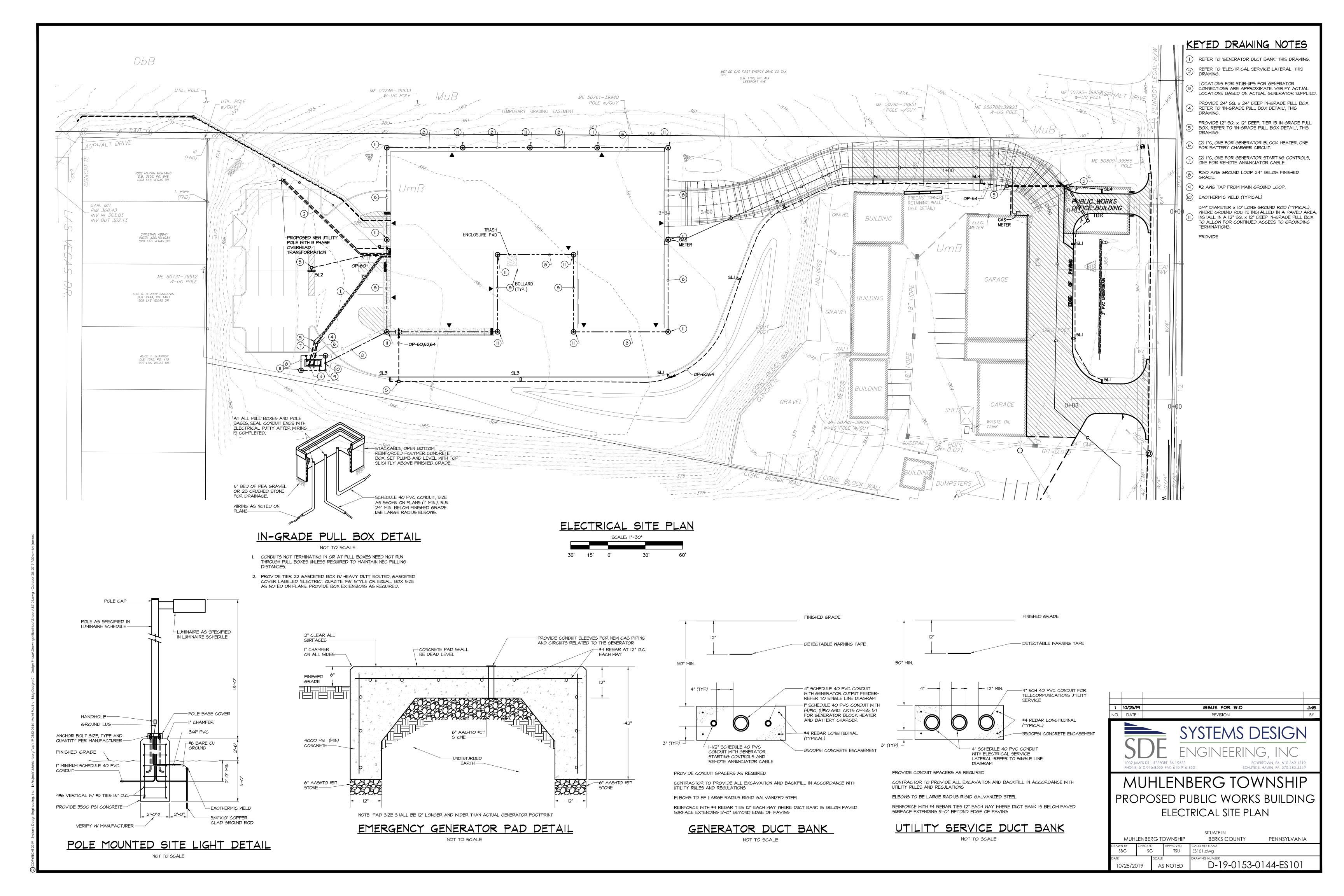
PRACTICAL AND EXISTING FIELD CONDITIONS PERSPECTIVE.

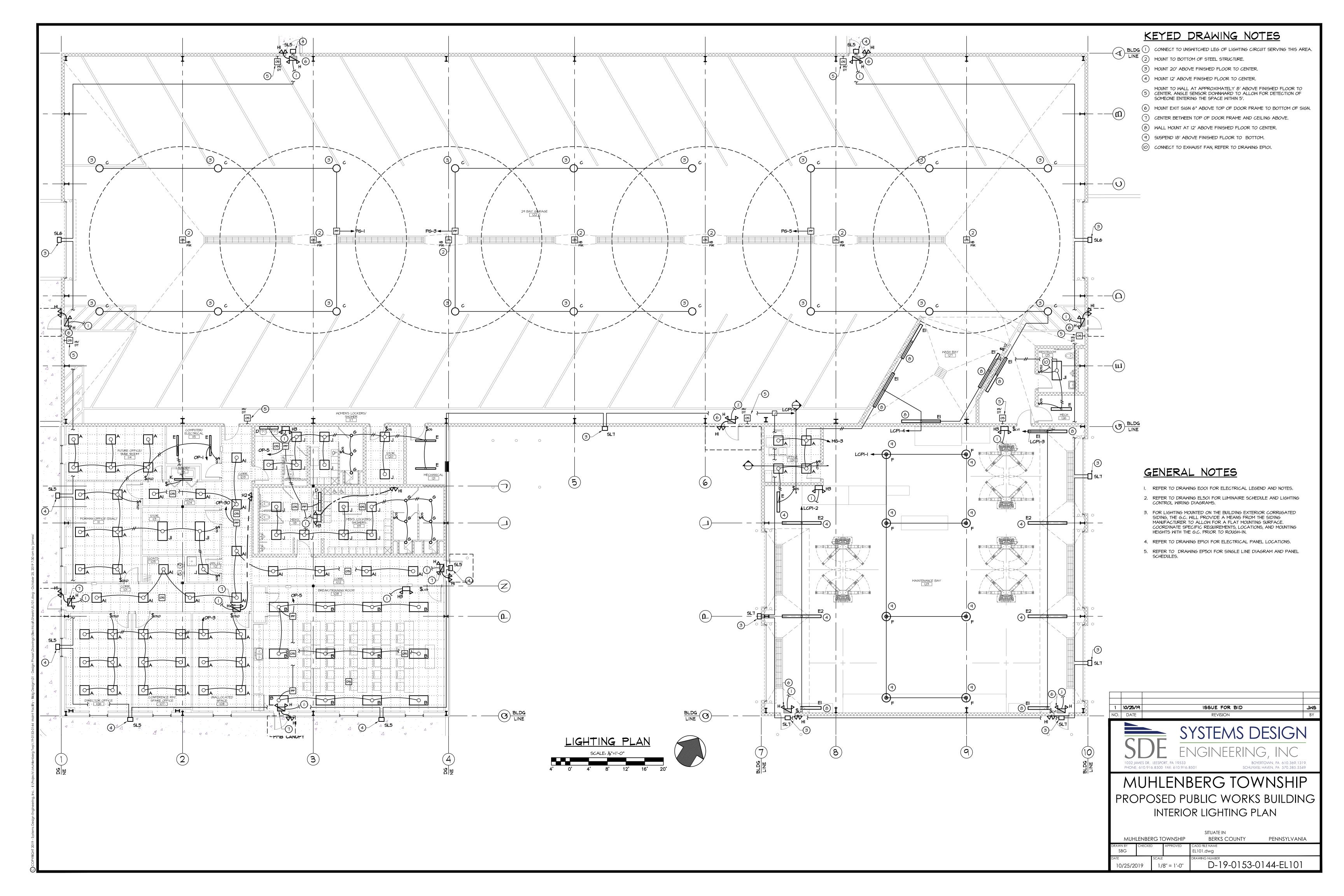
- 34. WITH RESPECT TO THE CONSTRUCTION BASED ON THESE DRAWINGS, THE EC IS ULTIMATELY RESPONSIBLE FOR ALL INSTALLED MEANS AND METHODS MEETING ALL APPLICABLE CODES AND STANDARDS.
- 35. EACH CONTRACTOR SHALL REVIEW ALL PROJECT DOCUMENTS OF ALL TRADES AND REVIEW ALL PROJECT REQUIREMENTS PRIOR TO BIDDING. DISCREPANCIES BETWEEN DOCUMENTS SHALL BE REPORTED BEFORE BIDS ARE DUE TO ALLOW FOR RESOLUTION
- 36. THE EC SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT HIS WORK. THE EC SHALL NOT BE ENTITLED TO CHANGE ORDERS DUE TO FAILURE TO COMPLY.
- 37 REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT FINAL LOCATION OF ALL CEILING MOUNTED APPURTENANCES INCLUDING BUT NOT LIMITED TO LIGHT FIXTURES, EXIT SIGNAGE, ETC. VERIFY IN FIELD.
- 38. COORDINATE WITH OTHER TRADES FOR ROUGH IN SUPPORT AS REQUIRED.
- 39. PRIOR TO ACCEPTANCE OF THE SPACE, ALL SYSTEMS SHALL TESTED, BALANCED AND OPERATED TO DEMONSTRATE TO THE OWNER THAT THE INSTALLATION AND PERFORMANCE OF THE INSTALLED SYSTEMS AND/OR PARTS THEREOF CONFORM TO THE DESIGN INTENT.
- 40. THE CONTRACTOR SHALL GUARANTEE THE ENTIRE INSTALLATION FOR A MINIMUM PERIOD OF ONE YEAR (EXCEPT WHERE EXTENSIONS OF THIS PERIOD ARE NOTED) FROM THE DATE OF ACCEPTANCE OF THE SYSTEM AS A WHOLE. ANY DEFECTS IN MORKMANSHIP, MATERIALS, MALFUNCTION OF EQUIPMENT, OR UNSATISFACTORY PERFORMANCE AND ALL OTHER PARTS OF THE BUILDING DAMAGED THEREBY, SHALL BE REPAIRED, REPLACED, OR OTHERWISE REMEDIED WITHOUT EXPENSE TO THE OWNER. SUCH REPAIRS OR REPLACEMENTS SHALL BE MADE IN A TIMELY MANNER AND AT THE CONVENIENCE OF THE OWNER.
- 41. WIRING DEVICES AND OUTLET BOXES SHALL BE RECESSED IN NEW CONSTRUCTION WITH CONCEALED CONDUIT/WIRING.
- 42. CONTRACTOR SHALL UPON COMPLETION OF THE WORK SUBMIT A SET OF RECORD DRAWINGS SHOWING ALL BURIED OR CONCEALED EQUIPMENT OF PARTS OF THE WORK.
- 43. EACH TRADE CONTRACTOR SHALL COORDINATE THE ELECTRICAL REQUIREMENTS OF HIS/HER WORK WITH THE PROJECT ELECTRICAL CONTRACTOR PRIOR TO SHOP DRAWING SUBMISSION.
- 44. COORDINATE INSTALLATION OF PIPING, DUCTWORK, EQUIPMENT, ETC. TO AVOID PASSING OVER ELECTRICAL PANELS, THROUGH ELECTRICAL CLOSETS, ETC. IN COMPLIANCE WITH CODE.
- 45. ALL COMMUNICATIONS WORK SHALL MEET THE REQUIREMENTS OF CHAPTER 8 OF THE NEC, AND ALL INDUSTRY STANDARDS (BICSI, EIA/TIA, ETC.).
- 46. THE EXACT LOCATIONS OF DEDICATED OUTLETS FOR COPIER, PHONE AND COMPUTER ARE TO BE CONFIRMED WITH THE OWNER PRIOR TO INSTALLATION.
- 47. COORDINATE/UPGRADE ELECTRICAL REQUIREMENTS FOR NEW MECHANICAL SYSTEMS.
- 48. UPON COMPLETION OF WORK, THOROUGHLY CLEAN ALL SYSTEMS OF OBSTRUCTIONS, DEBRIS, SCALE, DUST, DIRT, ETC. AND PLACE SYSTEMS IN OPERATION.
- 49. UNLESS OTHERWISE NOTED, ALL ELECTRICALLY DRIVEN EQUIPMENT PROVIDED OR FURNISHED BY THE MECHANICAL CONTRACTOR SHALL INCLUDE MOTORS, PUSHBUTTONS, RELAYS. CONTACTORS. DISCONNECTS AND ALL OTHER CONTROLLING DEVICES REQUIRED FOR PROPER AND SATISFACTORY OPERATION OF THE EQUIPMENT. EC SHALL INSTALL EQUIPMENT AS REQUIRED FROM THE LINE SIDE OF THE LAST DISCONNECTING MEANS (INCLUDING SUPPLIED DISCONNECT) BACK TO POWER SOURCE. ALL DDC AND OTHER CONTROL WIRING (INCLUDING VFD'S) SHALL BE SUPPLIED AND INSTALLED BY THE MC.
- 50. THE CONTRACTOR SHALL APPLY FOR AND PAY FOR ALL REQUIRED PERMITS, INSPECTIONS, ETC.
- 51. RECEPTACLE HEIGHT SHALL BE 18" AFF UNLESS NOTED OTHERWISE.



ISSUE FOR BID 1032 JAMES DR. LEESPORT, PA 19533 BOYERTOWN, PA 610.369.1319 PHONE: 610.916.8500 FAX: 610.916.850 SCHUYLKILL HAVEN, PA 570,385,5549 MUHLENBERG TOWNSHIP PROPOSED PUBLIC WORKS BUILDING **ELECTRICAL LEGEND AND NOTES**

SITUATE IN MUHLENBERG TOWNSHIP BERKS COUNTY PENNSYLVANIA D-19-0153-0144-E001

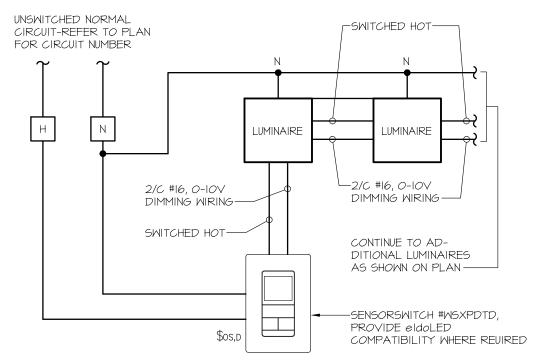




			LUMINAIR	RE SCHEDULE					
TYPE	DESCRIPTION	MANUFACTURER (DESIGN BASE)	CATALOG NO.	LAMPS	BALLAST / DRIVER	VOLTS	MTG	RMK	ACCEPTABLE EQUIVALENT MFRS
Α	2'x2' RECESSED BACK LIT L.E.D. LUMINAIRE, MEDIUM LAMBERTIAN DISTRIBUTION, POST PAINTED HOUSING, ACRYLIC LENS ALLOWING NO VISIBLE LAMP IMAGE	CURRENT BY G.E.	LBT 22 A 0 40MM 835 VQ LT WHTE	80+ CRI, 3500K, 4000 LUMEN, 32 WATT L.E.D. LIGHT ENGINE	MFR'S. STANDARD 10%, 0-10V DIMMING DRIVER	120-277	CR		LITHONIA 2TL SERIES, WILLIAMS LPT SERIES, METALUX 22EN SERIES
A1	SIMILAR TO TYPE 'A', EXCEPT WITH 16 WATT, 2000 LUMEN LIGHT ENGINE	CURRENT BY G.E.	LBT 22 A 0 20MM 835 VQ LT WHTE	80+ CRI, 3500K, 2000 LUMEN, 16 WATT L.E.D. LIGHT ENGINE	MFR'S. STANDARD 10%, 0-10V DIMMING DRIVER	120-277	CR		LITHONIA 2TL SERIES, WILLIAMS LPT SERIES, METALUX 22EN SERIES
В	2'x4' RECESSED ARCHITECTURAL L.E.D. LUMINAIRE, MEDIUM LAMBERTIAN DISTRIBUTION, CURVED OPTICAL ASSEMBLY	CURRENT BY G.E.	LBV 24 A 0 60 MM T35 VQ LT WHTE	80+ CRI, 3500K, 6000 LUMEN, 52 WATT L.E.D. LIGHT ENGINE	MFR'S. STANDARD 10%, 0-10V DIMMING DRIVER	120-277	CR		MARK WHSPR SERIES, COLUMBIA VERSIFY SERIES, METALUX 24EN SERIES
С	HIGH BAY L.E.D. AREA LUMINAIRE, DAMP/WET LOCATION LISTED, CAST ALUMINUM HOUSING CONSTRUCTION, GLASS LENS	DECO LIGHTING	DUFO 240 40 UNV C W D	80+ CRI, 4000K, 31100 LUMEN, 240 WATT L.E.D. LIGHT ENGINE	MFR'S. STANDARD 10%, 0-10V DIMMING DRIVER	120-277	Р		HUBBELL CRN SERIES
D	4' LONG, WALL MOUNT L.E.D. LUMINAIRE, .125" FROSTED ACRYLIC LENS WITH UP/DOWN DISTRIBU- TION	WILLIAMS	WMA 4 L32 835 AF DMV UNV	80+CRI, 3500K, 3200 LUMEN, 41 WATT L.E.D. LIGHT ENGINE	MFR'S. STANDARD 10%, 0-10V DIMMING DRIVER	120-277	ws	1	AXIS AIR WALL MOUNT
E	4' LONG, VAPOR TIGHT, L.E.D. LUMINAIRE, DIFFUSE ACRYLIC LENS WITH 120 DEG OPTIC, WET LOCATION LISTED, CABLE SUSPENDED	ALBEO	ALR2 0 4N 03 T C8 1D S VQ 51 K Q W	80+CRI, 3500K, 3000 LUMEN, 20 WATT L.E.D. LIGHT ENGINE	MFR'S. STANDARD 10%, 0-10V DIMMING DRIVER	120-277	Р		WILLIAMS 96 SERIES, LITHONIA VAP SERIES
E1	8' LONG, VAPOR TIGHT, L.E.D. LUMINAIRE, DIFFUSE ACRYLIC LENS WITH 120 DEG OPTIC, WET LOCATION LISTED, 45 DEG ANGLE WALL MOUNT	ALBEO	ALR2 0 8T 10 T C8 1D S VQ 45 K Q W	80+ CRI, 3500K, 10000 LUMEN, 67 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	ws		WILLIAMS 96 SERIES, LITHONIA VAP SERIES
E2	8' LONG, VAPOR TIGHT, L.E.D. LUMINAIRE, DIFFUSE ACRYLIC LENS WITH 120 DEG OPTIC, WET LOCATION LISTED, THREADED ROD MOUNTING	ALBEO	ALR2 0 8T 10 T C8 1D S VQ 21 K Q W	80+ CRI, 3500K, 10000 LUMEN, 67 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	Р		WILLAIMS 96 SERIES, LITHONIA VAP SERIES
F	PHUZION SERIES HIGH BAY, LOW COPPER CAST ALUMINUM HOUSING, POWDER COOAT WHITE FINISH, FROSTED GLASS LENS, WIDE OPTICAL DISTRIBUTION	HOLOPHANE	PHZ-12L-35K-80CRI-AS-P-W- WFR-D-C6-SSS	80+ CRI, 3500K, 12000 LUMEN, 81 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	Р		ALBEO ABR1 SERIES
G	6" DIA. NON-CONDUCTIVE L.E.D. SHOWER LIGHT	GOTHAM	EVO 35/15 6 DFR MVOLT GZ10	80+ CRI, 3500K, 1500 LUMEN, 19 WATT L.E.D. LIGHT ENGINE	MFR'S. STANDARD 10%, 0-10V DIMMING DRIVER	120-277	CR		WILLIAMS 6DR SERIES
Н	COMBINATION EXIT SIGN/EMERGENCY LIGHTING BATTERY UNIT, WHITE THERMOPLASTIC HOUSING, RED LETTERS, TWO L.E.D. LIGHTING HEADS, BATTERY CAPACITY FOR TWO ADDITIONAL HEADS	DUAL LITE	EVC U R W D4 I	RED L.E.D.'S AND (2) 1 WATT WHITE L.E.D.'S	N/A	120-277	S		
H1	TWIN OUTDOOR RATED EMERGENCY LIGHTING REMOTE HEADS, BLACK FINISH	DUAL LITE	EVO 2 B	(2) 1 WATT WHITE L.E.D.'S	N/A	4.6 VDC	ws		
H2	TWIN INDOOR EMERGENCY LIGHTING REMOTE HEADS, WHITE FINISH	DUAL LITE	EVR2	(2) 1 WATT WHITE L.E.D.'S	N/A	4.6 VDC	ws		
НЗ	EMERGENCY LIGHTING BATTERY UNIT, WHITE THERMOPLASTIC HOUSING, TWO L.E.D. LIGHTING HEADS, BATTERY CAPACITY FOR TWO ADDITIONAL HEADS	DUAL LITE	EV4 D I	(2) 1 WATT WHITE L.E.D.'S	N/A	120-277	ws		
J	2'x2' RECESSED EDGE LIT FLAT PANEL LUMINAIRE, MEDIUM LAMBERTIAN DISTRIBUTION, EXTRUDED ALUMINUM FRAME, POST PAINTED POWDER COAT FINISH	CURRENT BY G.E.	LPL 22 A 0 20MM 835 VQ LT WHTE	80+ CRI, 3500K, 2000 LUMEN, 20 WATT L.E.D. LIGHT ENGINE	MFR'S. STANDARD 10%, 0-10V DIMMING DRIVER	120-277	CR		ENVOY ELEDPNL2X2-PRM CP, LITHONIA EPANL2X2
J1	2'x4' RECESSED EDGE LIT FLAT PANEL LUMINAIRE, MEDIUM LAMBERTIAN DISTRIBUTION, EXTRUDED ALUMINUM FRAME, POST PAINTED POWDER COAT FINISH	CURRENT BY G.E.	LPL 24 A 0 30MM 835 VQ LT WHTE	80+ CRI, 3500K, 3000 LUMEN, 30 WATT L.E.D. LIGHT ENGINE	MFR'S. STANDARD 10%, 0-10V DIMMING DRIVER	120-277	CR		ENVOY ELEDPNL2X4-35W-PRM LITHONIA EPANL2X4
к	LINEAR INDUSTRIAL L.E.D. LUMINAIRE WITH 120 DEGREE DIFFUSE LENS	CURRENT BY G.E.	ALC6 0 4T 03TC8 1D Q V Q ST K Q W	80+ CRI, 3500K, 3000 LUMEN, 20 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	ws		WILLIAMS 75R SERIES, LITHONIA ZL1D SERIES
SL1	ARCHITECTURAL AREA LUMINAIRE, TYPE 2 MEDIUM, FULL CUT-OFF OPTICS, INTEGRAL NETWORKED WIRELESS OCCUPANCY / AMBIENT SENSOR, 18' SQUARE, STRAIGHT	LITHONIA	DSX1 LED P2 30K T2M	70+ CRI, 3000K, 8285 LUMEN, 70 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	POLE		BEACON SMALL VIPER WITH STRIKE OPTIC, McGRAW EDISON GLEON SERIES, GARDCO ASA SERIES
SL2	TWO AREA LUMINAIRES MOUNTED AT 180 DEGREES, TYPE V MEDIUM FULL CUT-OFF OPTICS, NETWORKED WIRELESS OCCUPANCY / AMBIENT SENSOR, 18' SQUARE	LITHONIA	DSX1 LED P2 30K T5M MVOLT SPA NLTAIR2 PIRHN HS DBLXD LUMINAIRE, SSA 18 4G-DM28AS-VD-FBC-TC	70+ CRI, 3000K, 8575 LUMEN, 70 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	POLE		BEACON SMALL VIPER WITH STRIKE OPTIC, McGRAW EDISON GLEON SERIES, GARDCO ASA SERIES
SL3	SIMILAR TO TYPE 'SL1' EXCEPT WITH HOUSE- SIDE SHIELD	LITHONIA	DSX1 LED P2 30K T2M MVOLT SPA NLTAIR2 PIRHN HS DBLXD LUMINAIRE, SSA 18 4G-DM19AS-VD-FBC-TC DBLXD POLE	70+ CRI, 3000K, 8285 LUMEN, 70 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	POLE		BEACON SMALL VIPER WITH STRIKE OPTIC, McGRAW EDISON GLEON SERIES, GARDCO ASA SERIES
SL4	SIMILAR TO TYPE 'SL1' EXCEPT WITH TYPE 1 SHORT FULL CUT-OFF OPTICS	LITHONIA	DSX1 LED P2 30K T1S MVOLT SPA NLTAIR2 PIRHN DBLXD LUMINAIRE, SSA 18 4G-DM19AS-VD-FBC-TC DBLXD POLE	70+ CRI, 3000K, 8250 LUMEN, 70 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	POLE		BEACON SMALL VIPER WITH STRIKE OPTIC, McGRAW EDISON GLEON SERIES, GARDCO ASA SERIES
SL5	D-SERIES WALL MOUNT L.E.D. LUMINAIRE, TYPE 2 SHORT FULL CUT-OFF OPTICS	LITHONIA	DSXW1 LED 530 30K T2S MVOLT DMG DBLXD	70+ CRI, 3000K, 2050 LUMEN, 19 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	WS		BEACON TRAVERSE, GARDCO PWS SERIES
SL6	SIMILAR TO TYPE 'SL5', EXCEPT (2) LIGHT ENGINES, 700mA DRIVE CURRENT, AND FORWARD THROW MEDIUM FULL CUT-OFF OPTICS	LITHONIA	DSXW1 LED 700 30K TFTM MVOLT DMG DBLXD	70+ CRI, 3000K, 5175 LUMEN, 46 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	ws		BEACON TRAVERSE, GARDOC PWS SERIES
SL7	SIMILAR TO TYPE 'SL5', EXCEPT (2) LIGHT ENGINES, 700mA DRIVE CURRENT, AND TYPE 3 MEDIUM FULL CUT-OFF OPTICS	LITHONIA	DSXW1 LED 700 30K T3M MVOLT DMG DBLXD	70+ CRI, 3000K, 5100 LUMEN, 46 WATT L.E.D. LIGHT ENGINE	MFR'S STANDARD 10%, 0-10V DIMMING DRIVER	120-277	ws		BEACON TRAVERSE, GARDOC PWS SERIES
	ING LEGEND	NOTES							

MOUNTING LEGEND C= CEILING W= WALL S= SURFACE

1. MOUNT BOTTOM OF LUMINAIRE 1" ABOVE TOP OF MIRROR.



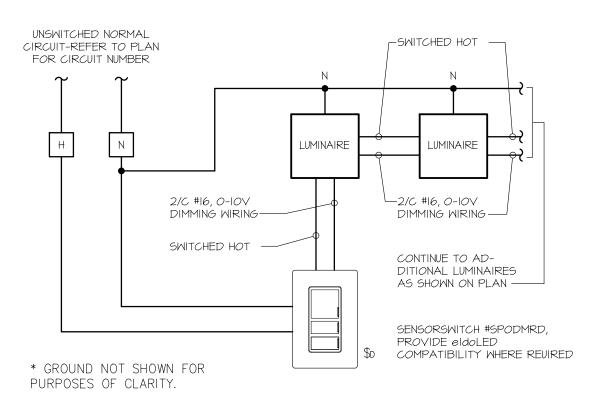
* GROUND NOT SHOWN FOR PURPOSES OF CLARITY.

LIGHTING CONTROL DIAGRAM #?

SINGLE ZONE DIMMING WITH OCCUPANCY OVER RIDE

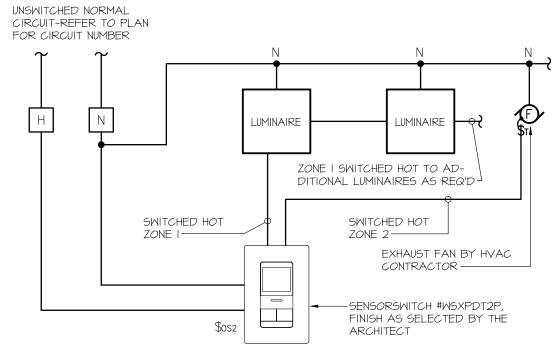
SEQUENCE OF OPERATION

- WHEN SOMEONE ENTERS THE SPACE AND OCCUPANCY IS DETECTED, LUMINAIRES ENERGIZE TO 50% BRIGHTNESS. LUMINAIRES MAY BE DIMMED OR BRIGHTENED AT THE WALL SWITCH.
- LUMINAIRES MAY BE EXTINGUISHED MANUALLY AT THE SWITCH OR AUTOMATICALLY AFTER A 15 MINUTE TIME OUT PERIOD BY THE OCCUPANCY SENSOR.



LIGHTING CONTROL DIAGRAM

SINGLE ZONE DIMMING WITHOUT OCCUPANCY OVER RIDE



* GROUND NOT SHOWN FOR PURPOSES OF CLARITY.

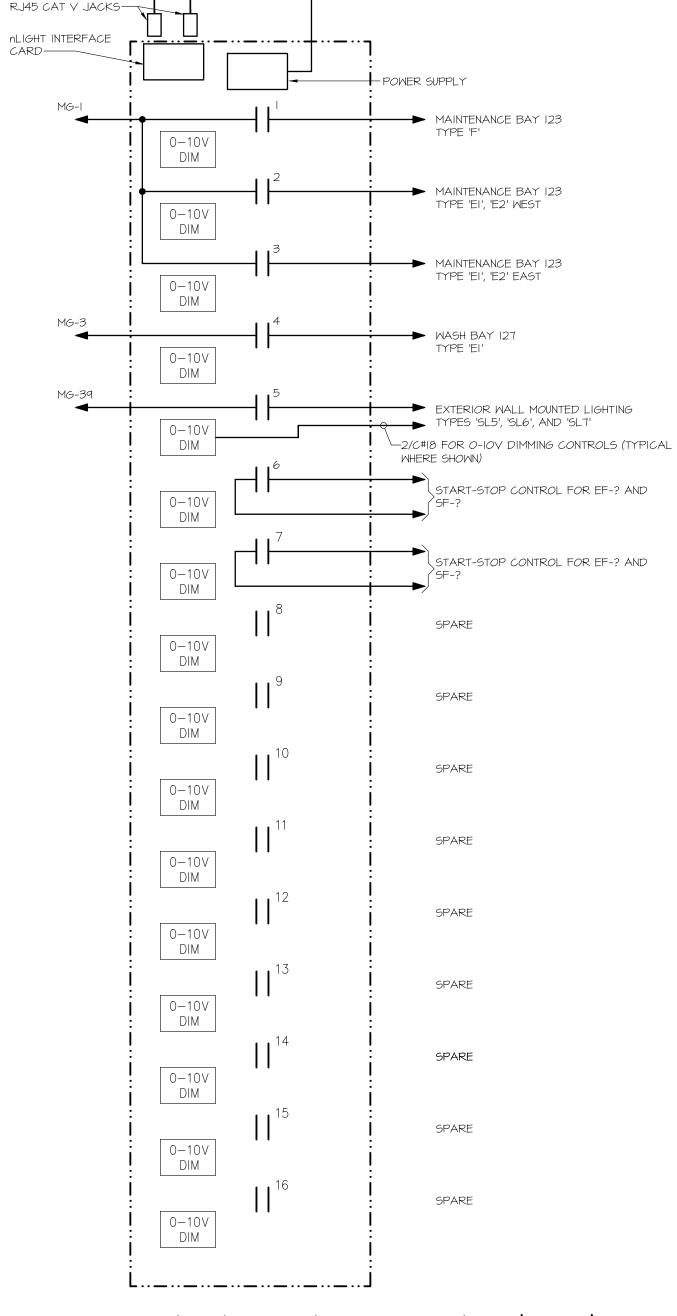
LIGHTING CONTROL DIAGRAM

TWO ZONE SWITCHING WITH OCCUPANCY OVER RIDE

SEQUENCE OF OPERATION

WHEN SOMEONE ENTERS THE SPACE AND OCCUPANCY IS DETECTED, ZONE I AND ZONE 2 ENERGIZE.

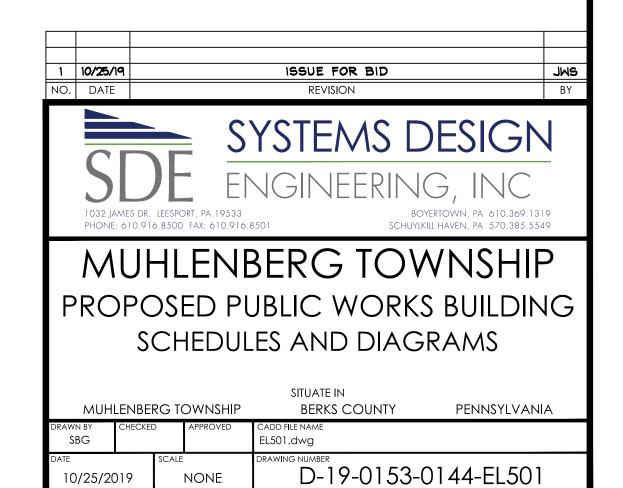
ZONE I MAY BE EXTINGUISHED MANUALLY AT THE SWITCH OR AUTOMATICALLY AFTER A 15 MIINUTE TIME OUT PERIOD BY THE OCCUPANCY SENSOR. ZONE 2 (EXHAUST FAN) WILL REMAIN ENERGIZED FOR FULL 15 MINUTE TIME-OUT PERIOD REGARDLESS OF SWITCH INPUT.



CAT V CABLE TO ADJACENT DEVICES—

LIGHTING CONTROL PANEL 'LCPI'

PROVIDE nLIGHT #ARP INTENCI6CLT ENCLOSURE, #16FCR RELAYS-MVOLT-IVB-HLK-SM, 16 RELAY ENCLOSURE WITH 16 FIELD CONFIGURABLE RELAYS, SURFACE MOUNT, WITH LOCKING HINGED COVER.



NETWORKED LIGHTING CONTROL SPECIFICATION

- A. SECTION INCLUDES A NETWORKED LIGHTING CONTROL SYSTEM COMPRISED OF THE FOLLOWING COMPONENTS
- I. SYSTEM SOFTWARE INTERFACES
- a. PERSONAL CONTROL APPLICATION
- b. SMARTPHONE PROGRAMMING INTERFACE FOR WIRED DEVICES
- 2. SYSTEM BACKBONE AND INTEGRATION EQUIPMENT
- a. SYSTEM CONTROLLER
- 3. WIRED NETWORKED DEVICES
- a. WALL SWITCHES, DIMMERS AND SCENE CONTROLLERS
- 4. AUXILIARY INPUT/OUTPUT DEVICES
- a. OCCUPANCY AND PHOTOCELL SENSORS
- b. POWER PACKS AND SECONDARY PACK c. RELAY AND DIMMING PANEL
- 5. WIRELESS NETWORKED DEVICES
- a. SENSOR INTERFACE b. LIGHT CONTROLLERS
- c. DIGITAL SENSOR ATTACHMENTS d. COMMUNICATION BRIDGE
- THE NETWORKED LIGHTING CONTROL SYSTEM SHALL MEET ALL OF THE CHARACTERISTICS AND PERFORMANCE REQUIREMENTS SPECIFIED HEREIN. THE CONTRACTOR SHALL PROVIDE, INSTALL AND VERIFY PROPER OPERATION OF ALL EQUIPMENT NECESSARY FOR PROPER OPERATION OF THE SYSTEM AS SPECIFIED HEREIN AND AS SHOWN ON APPLICABLE DRAWINGS

<u>SUBMITTALS</u>

A. SUBMITTAL SHALL BE PROVIDED INCLUDING THE FOLLOWING ITEMS.

7. HARDWARE AND SOFTWARE OPERATION MANUALS.

- I. BILL OF MATERIALS NECESSARY TO INSTALL THE NETWORKED LIGHTING CONTROL SYSTEM. 2. PRODUCT SPECIFICATION SHEETS INDICATING GENERAL DEVICE DESCRIPTIONS, DIMENSIONS, ELECTRICAL
- SPECIFICATIONS, WIRING DETAILS, AND NOMENCLATURE 3. RISER DIAGRAMS SHOWING DEVICE WIRING CONNECTIONS OF SYSTEM BACKBONE AND ALSO TYPICAL PER
- ROOM/AREA TYPE. 4. INFORMATION TECHNOLOGY (IT) CONNECTION INFORMATION PERTAINING TO INTERCONNECTION WITH FACILITY IT
- NETWORKING EQUIPMENT 5. CONTRACTOR STARTUP/COMMISSIONING WORKSHEET (MUST BE COMPLETED PRIOR TO FACTORY START-UP). 6. SERVICE SPECIFICATION SHEETS INDICATING GENERAL SERVICE DESCRIPTIONS, INCLUDING STARTUP, TRAINING, POST-STARTUP SUPPORT. AND SERVICE CONTRACT TERMS.

<u>APPROVALS</u>

- A. PRIOR APPROVAL FROM THE ENGINEER IS REQUIRED FOR PRODUCTS NOT THE DESIGN-BASE MANUFACTURER OR AN ALREADY LISTED 'EQUIVALENT' MANUFACTURER.
- ANY ALTERNATE PRODUCT OR SYSTEM THAT HAS NOT RECEIVED PRIOR APPROVAL FROM THE ENGINEER AT LEAST IO DAYS PRIOR TO SUBMISSION OF A PROPOSAL PACKAGE WILL NOT BE CONSIDERED.
- ALTERNATE PRODUCTS OR SYSTEMS REQUIRE SUBMISSION OF CATALOG DATA SHEETS, SYSTEM OVERVIEW DOCUMENTS AND INSTALLATION MANUALS TO THE ENGINEER.
-). FOR ANY ALTERNATE SYSTEM THAT DOES NOT SUPPORT ANY FORM OF WIRELESS COMMUNICATION TO NETWORKED CONTROL DEVICES, NETWORKED SENSORS, OR NETWORKED INPUT DEVICES, BIDDERS SHALL PROVIDE A TOTAL INSTALLED COST INCLUDING ITEMIZED LABOR COSTS FOR INSTALLING NETWORK WIRING TO LUMINAIRES, CONTROL

<u>QUALITY ASSURANCE</u>

A. PRODUCT QUALIFICATIONS

- I. SYSTEM ELECTRICAL COMPONENTS SHALL BE LISTED OR RECOGNIZED BY A NATIONALLY RECOGNIZED TESTING LABORATORY AND SHALL BE LABELED WITH REQUIRED MARKINGS AS APPLICABLE
- 2. SYSTEM LUMINAIRES AND CONTROLS ARE CERTIFIED BY MANUFACTURER TO HAVE BEEN DESIGNED, MANUFACTURED AND TESTED FOR INTEROPERABILITY
- 3. ALL COMPONENTS SHALL BE SUBJECTED TO 100% END OF LINE TESTING PRIOR TO SHIPMENT TO THE PROJECT SITE PROPER DEVICE OPERATION 4. ALL COMPONENTS AND THE MANUFACTURING FACILITY WHERE PRODUCT WAS MANUFACTURED MUST BE ROHS
- B. SYSTEM STARTUP SHALL BE PERFORMED BY QUALIFIED PERSONNEL APPROVED OR CERTIFIED BY THE MANUFACTURER.

PHONE SUPPORT: TOLL FREE TECHNICAL SUPPORT SHALL BE AVAILABLE. . REMOTE SUPPORT: THE BIDDER SHALL OFFER A REMOTE SUPPORT CAPABILITY.

DEVICES, SENSORS, INPUT DEVICES AND OTHER REQUIRED SYSTEM PERIPHERALS.

ONSITE SUPPORT: THE BIDDER SHALL OFFER ONSITE SUPPORT THAT IS BILLABLE AT WHOLE DAY RATES. . SERVICE CONTRACT: THE BIDDER SHALL OFFER A SERVICE CONTRACT THAT PACKAGES PHONE, REMOTE, AND ONSITE SUPPORT CALLS FOR THE PROJECT. RESPONSE TIMES FOR EACH TYPE OF SUPPORT CALL SHALL BE INDICATED IN THE TERMS OF THE SERVICE CONTRACT INCLUDED IN THE BID PACKAGE.

- A. THE MANUFACTURER SHALL PROVIDE A MINIMUM FIVE-YEAR WARRANTY ON ALL HARDWARE DEVICES SUPPLIED AND INSTALLED. WARRANTY COVERAGE SHALL BEGIN ON THE DATE OF SHIPMENT.
- THE HARDWARE WARRANTY SHALL COVER REPAIR OR REPLACEMENT ANY DEFECTIVE PRODUCTS WITHIN THE WARRANTY PERIOD.

MAINTENANCE & SUSTAINABILITY

nl IGHT #FCS PSIC

POWER SUPPLY-

A. THE MANUFACTURER SHALL MAKE AVAILABLE TO THE OWNER NEW PARTS, UPGRADES, AND/OR REPLACEMENTS AVAILABLE FOR A MINIMUM OF 5 YEARS FOLLOWING INSTALLATION.

> 4#24 UTP, CAT 5E CABLE SUITABLE FOR OUTDOOR AND HARSH ENVIRONMENT USE—

> > - nLIGHT #nBRG 8 EIGHT PORT

nLIGHT BRIDGE WITH #PS 150

POWER SUPPLY

nLIGHT #PSIO POWER

PART 2 - EQUIPMENT

SYSTEM PERFORMANCE REQUIREMENTS

A. SYSTEM ARCHITECTURE

- I. SYSTEM SHALL HAVE AN ARCHITECTURE THAT IS BASED UPON THREE MAIN CONCEPTS: (A) NETWORKABLE INTELLIGENT LIGHTING CONTROL DEVICES, (B) STANDALONE LIGHTING CONTROL ZONES USING DISTRIBUTED INTELLIGENCE, (C) OPTIONAL SYSTEM BACKBONE FOR REMOTE, TIME BASED AND GLOBAL OPERATION BETWEEN
- a. INTELLIGENT LIGHTING CONTROL DEVICES SHALL HAVE INDIVIDUALLY ADDRESSABLE NETWORK COMMUNICATION CAPABILITY AND CONSIST OF ONE OR MORE BASIC LIGHTING CONTROL COMPONENTS: OCCUPANCY SENSOR, PHOTOCELL SENSOR RELAY DIMMING OUTPUT CONTACT CLOSURE INPUT ANALOG O-IOV INPUT AND MANUAL WALL STATION CAPABLE OF INDICATING SWITCHING, DIMMING, AND/OR SCENE CONTROL. COMBINING ONE OR MORE OF THESE COMPONENTS INTO A SINGLE DEVICE ENCLOSURE SHALL BE PERMISSIBLE SO AS TO MINIMIZE OVERALL DEVICE COUNT OF SYSTEM
- b. LIGHTING CONTROL ZONES CONSISTING OF ONE OR MORE NETWORKED LUMINAIRES AND INTELLIGENT LIGHTING CONTROL DEVICES AND SHALL BE CAPABLE OF PROVIDING AUTOMATIC CONTROL FROM SENSORS (OCCUPANCY AND/OR PHOTOCELL) AND MANUAL CONTROL FROM LOCAL WALLSTATIONS WITHOUT REQUIRING CONNECTION TO A HIGHER LEVEL SYSTEM BACKBONE; THIS CAPABILITY IS REFERRED TO AS "DISTRIBUTED INTELLIGENCE." c. SYSTEM MUST BE CAPABLE OF INTERFACING DIRECTLY WITH NETWORKED LUMINAIRES SUCH THAT EITHER LOW VOLTAGE NETWORK CABLING OR WIRELESS RF COMMUNICATION IS USED TO INTERCONNECT NETWORKED LUMINAIRES WITH CONTROL COMPONENTS SUCH AS SENSORS, SWITCHES AND SYSTEM BACKBONE (SEE CONTROL
- ZONE CHARACTERISTICS SECTIONS FOR EACH TYPE OF NETWORK CONNECTION, WIRED OR WIRELESS). 2. THE SYSTEM SHALL BE CAPABLE OF PROVIDING INDIVIDUALLY ADDRESSABLE SWITCHING AND DIMMING CONTROL OF THE FOLLOWING: NETWORKED LUMINAIRES, CONTROL ZONES TO INCLUDE MULTIPLE SWITCH LEGS OR CIRCUITS, AND RELAY AND DIMMING OUTPUTS FROM CENTRALIZED PANELS TO PROVIDE DESIGN FLEXIBILITY APPROPRIATE
- WITH SEQUENCE OF OPERATIONS REQUIRED IN EACH PROJECT AREA OR TYPICAL SPACE TYPE. A SINGLE PLATFORM SHALL BE USED FOR BOTH INDOOR AND OUTDOOR LIGHTING CONTROLS.
- 3. LIGHTING CONTROL ZONES SHALL BE CAPABLE OF BEING NETWORKED WITH A HIGHER LEVEL SYSTEM BACKBONE TO PROVIDE TIME BASED CONTROL, REMOTE CONTROL FROM INPUTS AND/OR SYSTEMS EXTERNAL TO THE CONTROL ZONE, AND REMOTE CONFIGURATION AND MONITORING THROUGH A SOFTWARE.
- 4. ALL SYSTEM DEVICES SHALL SUPPORT REMOTE FIRMWARE UPDATE, SUCH THAT PHYSICAL ACCESS TO EACH DEVICE IS NOT NECESSARY, FOR PURPOSES OF UPGRADING FUNCTIONALITY AT A LATER DATE. 5. SYSTEM SHALL BE CAPABLE OF "OUT OF BOX" SEQUENCE OF OPERATION FOR EACH CONTROL ZONE. STANDARD SEQUENCE IS:
- a. ALL SWITCHES CONTROL ALL FIXTURES IN A ZONE b. ALL OCCUPANCY SENSORS AUTOMATICALLY CONTROL ALL FIXTURES IN THE CONTROL ZONE WITH A DEFAULT

B. WIRED NETWORKED CONTROL ZONE CHARACTERISTICS

- I. FOLLOWING PROPER INSTALLATION AND PROVISION OF POWER, ALL NETWORKED DEVICES CONNECTED TOGETHER WITH LOW VOLTAGE NETWORK CABLE SHALL AUTOMATICALLY FORM A FUNCTIONAL LIGHTING CONTROL ZONE WITHOUT REQUIRING ANY TYPE OF PROGRAMMING, REGARDLESS OF THE PROGRAMMING MECHANISM (E.G., SOFTWARE APPLICATION, HANDHELD REMOTE, PUSHBUTTON), THE "OUT OF BOX" DEFAULT SEQUENCE OF OPERATION IS INTENDED TO PROVIDE TYPICAL SEQUENCE OF OPERATION SO AS TO MINIMIZE THE SYSTEM STARTUP AND
- STARTUP AND PROGRAMMING. 2. SYSTEM SHALL BE ABLE TO AUTOMATICALLY DISCOVER ALL CONNECTED DEVICES WITHOUT REQUIRING ANY

PROGRAMMING REQUIREMENTS AND TO ALSO HAVE FUNCTIONAL LIGHTING CONTROL OPERATION PRIOR TO SYSTEM

- PROVISIONING OF SYSTEM OR ZONE ADDRESSES.
- 3. THE FOLLOWING TYPES OF WIRED NETWORKED CONTROL DEVICES SHALL BE PROVIDED FOR EGRESS AND/OR
- EMERGENCY LIGHT FIXTURES: a. LOW-VOLTAGE POWER SENSING: THESE DEVICES SHALL AUTOMATICALLY PROVIDE 100% LIGHT LEVEL UPON
- DETECTION OF LOSS OF POWER SENSED VIA THE LOW VOLTAGE NETWORK CABLE CONNECTION. b. UL924 LISTED LINE-VOLTAGE POWER SENSING: THESE DEVICES SHALL BE LISTED AS EMERGENCY RELAYS UNDER THE UL924 STANDARD, AND SHALL AUTOMATICALLY CLOSE THE LOAD CONTROL RELAY(S) AND PROVIDE

100% LIGHT OUTPUT UPON DETECTION OF LOSS OF POWER SENSED VIA LINE VOLTAGE CONNECTIONS. c. EMERGENCY EGRESS DEVICES SHALL BE PROVIDED AND UL LABELED BY THE LIGHTING CONTROL MANUFACTURER.

. WIRELESS NETWORKED CONTROL ZONE CHARACTERISTICS

- I. FOLLOWING PROPER INSTALLATION AND PROVISION OF POWER, ALL WIRELESS NETWORKED DEVICES PAIRED, MESHED OR GROUPED TOGETHER SHALL AUTOMATICALLY FOLLOW THE "OUT OF BOX" DEFAULT SEQUENCE OF
- OPERATIONS 2. WIRELESS NETWORK COMMUNICATION SHALL SUPPORT UNIFORM AND INSTANT RESPONSE SUCH THAT ALL LUMINAIRES IN A LIGHTING CONTROL ZONE RESPOND IMMEDIATELY AND SYNCHRONOUSLY IN RESPONSE TO A SENSOR OR WALL
- STATION SIGNA 3. TO SUPPORT THE SYSTEM ARCHITECTURE REQUIREMENT FOR DISTRIBUTED INTELLIGENCE, WIRELESS NETWORK COMMUNICATION SHALL SUPPORT COMMUNICATION OF CONTROL SIGNALS FROM SENSORS AND WALL STATIONS TO NETWORKED LUMINAIRES AND WIRELESS LOAD CONTROL DEVICES, WITHOUT REQUIRING ANY COMMUNICATION,
- INTERPRETATION, OR TRANSLATION OF INFORMATION THROUGH A BACKBONE DEVICE SUCH AS A WIRELESS ACCESS POINT COMMUNICATION BRIDGE OR GATEWAY 4. ALL WIRELESS COMMUNICATION SHALL BE ENCRYPTED USING AT LEAST 128-BIT ADVANCED ENCRYPTION STANDARD
- 5. THE FOLLOWING TYPES OF WIRED NETWORKED CONTROL DEVICES SHALL BE PROVIDED FOR EGRESS AND/OR
- EMERGENCY LIGHT FIXTURES: a. UL924 LISTED LINE-VOLTAGE POWER SENSING: THESE DEVICES SHALL BE LISTED AS EMERGENCY RELAYS UNDER THE UL924 STANDARD, AND SHALL AUTOMATICALLY CLOSE THE LOAD CONTROL RELAY(S) AND PROVIDE

100% LIGHT OUTPUT UPON DETECTION OF LOSS OR INTERRUPTION OF POWER SENSED VIA LINE VOLTAGE

CONNECTIONS D. SYSTEM INTEGRATION CAPABILITIES

nLIGHT #nCM PDT-10 LT RJB

NLIGHT LOW VOLTAGE WALL

OFF, RAISE-LOWER #nPODM /

CONTROL, TWO ZONE, ON-

-2P-DX-AL----

DUAL TECHNOLOGY

OCCUPANCY SENSOR-

I. THE SYSTEM SHALL CAPABLE OF INTERFACE WITH THIRD PARTY BUILDING MANAGEMENT SYSTEMS (BMS) TO SUPPORT TWO-WAY COMMUNICATION USING THE INDUSTRY STANDARD BACNET/IP OR BACNET/MSTP PROTOCOLS.

E. MANAGEMENT INTERFACE

I. SYSTEM SHALL PROVIDE A WEB-BASED MANAGEMENT INTERFACE THAT PROVIDES REMOTE SYSTEM CONTROL, LIVE STATUS MONITORING, AND CONFIGURATION CAPABILITIES OF LIGHTING CONTROL SETTINGS AND SCHEDULES. MANAGEMENT INTERFACE MUST BE COMPATIBLE WITH INDUSTRY-STANDARD WEB BROWSER CLIENTS, INCLUDING, BUT NOT LIMITED TO, MICROSOFT INTERNET EXPLORER, APPLE SAFARI, GOOGLE CHROME, MOZILLA FIREFOX.

3. ALL SYSTEM SOFTWARE UPDATES MUST BE AVAILABLE FOR AUTOMATIC DOWNLOAD AND INSTALLATION VIA THE

- F. PORTABLE PROGRAMMING INTERFACE FOR STANDALONE CONTROL ZONES
- I. PORTABLE HANDHELD APPLICATION INTERFACE FOR STANDALONE CONTROL ZONES SHALL BE PROVIDED FOR SYSTEMS THAT ALLOWS CONFIGURATION OF LIGHTING CONTROL SETTINGS

2. PROGRAMMING CAPABILITIES THROUGH THE APPLICATION SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

- a. SWITCH/OCCUPANCY/PHOTOSENSOR GROUP CONFIGURATION
- b. MANUAL/AUTOMATIC ON MODES
- c. TURN-ON DIM LEVEL d. OCCUPANCY SENSOR TIME DELAYS
- e. DUAL TECHNOLOGY OCCUPANCY SENSORS SENSITIVITY F. PHOTOSENSOR CALIBRATION ADJUSTMENT AND AUTO-SETPOINT
- q. TRIM LEVEL SETTINGS

SYSTEM CONTROLLER SHALL BE A MULTI-TASKING, REAL-TIME DIGITAL CONTROL PROCESSOR CONSISTING OF MODULAR HARDWARE WITH PLUG-IN ENCLOSED PROCESSORS, COMMUNICATION CONTROLLERS, AND POWER

- 2. SYSTEM CONTROLLER SHALL PERFORM THE FOLLOWING FUNCTIONS:
- a. FACILITATION OF GLOBAL NETWORK COMMUNICATION BETWEEN DIFFERENT AREAS AND CONTROL ZONES.
- b. TIME-BASED CONTROL OF DOWNSTREAM WIRED AND WIRELESS NETWORK DEVICES. c. LINKING INTO AN ETHERNET NETWORK.
- d. INTEGRATION WITH HEATING, VENTILATION AND AIR CONDITIONING (HVAC) EQUIPMENT. e. CONNECTION TO VARIOUS SOFTWARE INTERFACES, INCLUDING MANAGEMENT INTERFACE, VISUALIZATION INTERFACE, AND PERSONAL CONTROL APPLICATIONS.
- 3. SYSTEM CONTROLLER SHALL NOT REQUIRE A DEDICATED PC OR A DEDICATED CLOUD CONNECTION.
- 5. DEVICE SHALL HAVE A STANDARD AND ASTRONOMICAL INTERNAL TIME CLOCK.

H. WIRED NETWORKED DEVICES

- a. WALL SWITCHES & DIMMERS SHALL SUPPORT THE FOLLOWING DEVICE OPTIONS:
- b. SCENE CONTROLLERS SHALL SUPPORT THE FOLLOWING DEVICE OPTIONS:

CONTROL TYPES SUPPORTED:

- c) REPROGRAMMING OF OTHER DEVICES WITHIN DAISY-CHAINED ZONE SO AS TO IMPLEMENT USER SELECTED
- d) SELECTING A LIGHTING PROFILE TO BE RUN BY THE SYSTEM'S UPSTREAM CONTROLLER SO AS TO IMPLEMENT A SELECTED LIGHTING PROFILE ACROSS MULTIPLE ZONES

a. AUXILIARY INPUT/OUTPUT DEVICES SHALL BE SPECIFIED AS AN INPUT OR OUTPUT DEVICE WITH THE FOLLOWING

I) CONTACT CLOSURE INPUT

a) INPUT SHALL BE PROGRAMMABLE TO SUPPORT MAINTAINED OR MOMENTARY INPUTS THAT CAN ACTIVATE

- 3) RS-232/RS-485 DIGITAL INPUT a) INPUT SUPPORTS ACTIVATION OF UP TO 4 LOCAL OR GLOBAL SCENES AND PROFILES, AND
- 4) O-IOV DIMMING CONTROL OUTPUT, CAPABLE OF SINKING A MINIMUM OF 20MA OF CURRENT
- a) OUTPUT SHALL BE PROGRAMMABLE TO SUPPORT ALL STANDARD SEQUENCE OF OPERATIONS SUPPORTED BY SYSTEM.

3. WIRED NETWORKED OCCUPANCY AND PHOTOSENSORS

SOFTWARE AND LOCALLY VIA THE DEVICE.

5. WIRED NETWORKED WALL SWITCH SENSORS

AND LOW TEMPERATURE/HIGH HUMIDITY OPERATION.

SYSTEM FROM EXHIBITING NUISANCE ON/OFF SWITCHING

ADJUST THE PHOTOCELL SET POINT AND DIMMING RATES.

a. WALL SWITCH SENSORS SHALL SUPPORT THE FOLLOWING DEVICE OPTIONS:

2) OCCUPANCY SENSING TECHNOLOGY: PIR ONLY OR DUAL TECH

CONTRIBUTE LOW VOLTAGE CLASS 2 POWER TO THE REST OF THE SYSTEM.

2. STANDARD RELAYS USED SHALL HAVE THE FOLLOWING REQUIRED PROPERTIES:

4. DEVICES SHALL BE UL LISTED FOR LOAD AND LOAD TYPE AS SPECIFIED ON THE PLANS.

3. O-IO DIMMING OUTPUTS SHALL SUPPORT A MINIMUM OF IOOMA SINK CURRENT PER OUTPUT.

4. PANEL SHALL BE UL924 LISTED FOR CONTROL OF EMERGENCY LIGHTING CIRCUITS.

b. AN EXTERNAL ANTENNA ATTACHED TO THE LUMINAIRE SHALL NOT BE ALLOWED.

I) INTEGRATED DIGITAL OCCUPANCY SENSING AND DIGITAL PHOTOCELL SENSOR.

3) DAYLIGHT SENSING OPTION: INHIBIT PHOTOSENSOR

I. DISTRIBUTED SYSTEM POWER, SWITCHING AND DIMMING CONTROLS

AND LOCALLY VIA THE DEVICE PUSH-BUTTON.

3. DEVICE SHALL BE PLENUM RATED.

J. WIRED NETWORKED RELAY AND DIMMING PANEL

c. BE INDIVIDUALLY PROGRAMMABLE

I. WIRELESS NETWORKED SENSOR INTERFACE

2. WIRELESS NETWORKED LIGHT CONTROLLERS (NO SENSOR)

WATTAGE, AND WATT-HOURS OF ITS CONTROLLED LIGHTING.

EMBEDDING INTO THE ENCLOSURE OF A LUMINAIRE.

3) SENSOR SHALL HAVE SOFTWARE-ADJUSTABLE SETTINGS

OFF, AND ADJUST DIM LEVEL.

3. WIRELESS NETWORKED DIGITAL SENSORS

K. WIRELESS NETWORKED DEVICES

I) USER INPUT CONTROL TYPES SUPPORTED: ON/OFF OR ON/OFF/DIMMING

- a. SENSORS SHALL UTILIZE PASSIVE INFRARED (PIR) OR PASSIVE DUAL TECHNOLOGY (PDT) TO DETECT BOTH
- MAJOR AND MINOR MOTION AS DEFINED BY NEMA WD-7 STANDARD b. SENSING TECHNOLOGIES THAT ARE ACOUSTICALLY PASSIVE, MEANING THEY DO NOT TRANSMIT SOUNDS WAVES OF ANY FREQUENCY DO NOT REQUIRE ADDITIONAL COMMISSIONING. ULTRASONIC OR MICROWAVE BASED

I) ON/OFF: THE CONTROL ZONE IS AUTOMATICALLY TURNED OFF IF THE PHOTOCELL READING EXCEEDS THE

DEFINED SET POINT AND AUTOMATICALLY TURNED ON IF THE PHOTOCELL READING IS BELOW THE DEFINED

2) CONTINUOUS DIMMING: THE CONTROL ZONE AUTOMATICALLY ADJUSTS ITS DIMMING OUTPUT IN RESPONSE TO

DAYLIGHT SOURCES IS MAINTAINED AT THE TASK. THE PHOTOCELL RESPONSE SHALL BE CONFIGURABLE TO

PHOTOCELL READINGS, SUCH THAT A MINIMUM LIGHT LEVEL CONSISTING OF BOTH ELECTRIC LIGHT AND

I. DEVICES SHALL INCORPORATE ONE OPTIONAL CLASS I RELAY, OPTIONAL O-10 VDC DIMMING OUTPUT, AND

2. DEVICE PROGRAMMING PARAMETERS SHALL BE AVAILABLE AND CONFIGURABLE REMOTELY FROM THE SOFTWARE

I. RELAY AND DIMMING PANEL(S) SHALL BE CAPABLE OF PROVIDING THE REQUIRED AMOUNT OF RELAY CAPACITY,

a. CONFIGURABLE IN THE FIELD TO OPERATE WITH NORMALLY CLOSED OR NORMALLY OPEN BEHAVIOR.

b. PROVIDES VISUAL STATUS OF CURRENT STATE AND MANUAL OVERRIDE CONTROL OF EACH RELAY.

5. PANEL SHALL PROVIDE A CONTACT CLOSURE INPUT THAT ACTS AS A PANEL OVERRIDE TO ACTIVATE THE

NORMALLY CONFIGURED STATE OF ALL RELAYS (I.E., NORMALLY OPEN OR NORMALLY CLOSED) IN THE PANEL.

a. THE DEVICE SHALL BE CAPABLE OF BROADCASTING THE FOLLOWING MANUAL WALL CONTROL COMMANDS: ON,

a. THE WIRELESS LIGHT CONTROLLER SHALL BE CAPABLE OF PROVIDING CONTINUOUS DIMMING AND ON/OFF

a. IN ADDITION TO PROVIDING WIRELESS NETWORKED LIGHT CONTROLLERS FUNCTIONALITY, ALSO PROVIDES:

2) SENSOR SHALL CONNECT DIRECTLY TO THE WIRELESS LIGHT CONTROLLER AND SHALL BE SUITABLE FOR

c. EACH WIRELESS LIGHT CONTROLLER SHALL PROVIDE MEASUREMENT CAPABILITY OF THE AMPERAGE, VOLTAGE,

CONTROL OF ONE COMMERCIAL LIGHT FIXTURE INCLUDING FLUORESCENT, HID, INDUCTION AND LEDS.

AS REQUIRED PER PANEL SCHEDULES SHOWN ON DRAWINGS, WITH AN EQUAL NUMBER OF INDIVIDUAL O-IOV DIMMING

SET POINT. A TIME DELAY OR ADAPTIVE SET POINT ADJUSTABLE BEHAVIOR MAY BE USED TO PREVENT THE

d. SENSOR MOUNTING TYPE SHALL MATCH PROJECT DESIGN REQUIREMENTS AS SHOWN ON PLANS.

e. THE SYSTEM SHALL SUPPORT THE FOLLOWING TYPES OF PHOTOCELL-BASED CONTROL:

- SENSING TECHNOLOGIES MAY REQUIRE COMMISSIONING DUE TO THE ACTIVE NATURE OF THEIR TECHNOLOGY, IF MANUFACTURER'S REPRESENTATIVE THROUGH PRE-CONSTRUCTION MEETINGS. c. SENSOR PROGRAMMING PARAMETER SHALL BE AVAILABLE AND CONFIGURABLE REMOTELY FROM THE
- 3. THE SUCCESSFUL BIDDER SHALL BE RESPONSIBLE FOR TESTING OF ALL LOW VOLTAGE NETWORK CABLE INCLUDED I) SENSORS SHALL HAVE OPTIONAL FEATURES FOR PHOTOSENSOR/DAYLIGHT OVERRIDE, DIMMING CONTROL,
 - IN THE BID. BIDDER IS RESPONSIBLE FOR VERIFICATION OF THE FOLLOWING MINIMUM PARAMETERS
 - a. WIRE MAP (CONTINUITY, PIN TERMINATION, SHORTS AND OPEN CONNECTIONS, ETC.)

c. INSERTION LOSS

- THE SUCCESSFUL BIDDER IS REQUIRED TO COORDINATE WITH THE OWNER'S REPRESENTATIVE TO SECURE ALL
- REQUIRED NETWORK CONNECTIONS TO THE OWNER'S IT NETWORK INFRASTRUCTURE.
- NETWORKED LIGHTING CONTROL SYSTEM. b. THE BIDDER SHALL PROVIDE, TO THE MANUFACTURER'S REPRESENTATIVE, ALL NECESSARY CONTACTS
- PERTAINING TO THE OWNER'S IT INFRASTRUCTURE, TO ENSURE THAT THE SYSTEM IS PROPERLY CONNECTED AND

C. COORDINATION WITH MECHANICAL DIVISION

- I. THE SUCCESSFUL BIDDER TO VERIFY INTEGRATION SCOPE WITH THE MECHANICAL CONTRACTOR PRIOR TO
- D. DOCUMENTATION AND DELIVERABLES
- I. THE INSTALLING CONTRACTOR SHALL BE RESPONSIBLE FOR DOCUMENTING INSTALLED LOCATION OF ALL

NETWORKED DEVICES, THIS INCLUDES RESPONSIBILITY TO PROVIDE AS-BUILT PLAN DRAWING SHOWING DEVICE ADDRESSES CORRESPONDING TO LOCATIONS OF INSTALLED EQUIPMENT.

- A. UPON COMPLETION OF INSTALLATION BY THE INSTALLER, INCLUDING COMPLETION OF ALL REQUIRED VERIFICATION AND DOCUMENTATION REQUIRED BY THE MANUFACTURER, THE SYSTEM SHALL BE STARTED UP AND PROGRAMMED BY AN
- I. LOW VOLTAGE NETWORK CABLE TESTING SHALL BE PERFORMED PRIOR TO SYSTEM STARTUP AT THE DISCRETION
- B. SYSTEM START-UP AND PROGRAMMING SHALL INCLUDE:
- 3. PROGRAMMING AND VERIFYING ALL SEQUENCE OF OPERATIONS.
- C. INITIAL START-UP AND PROGRAMMING IS TO OCCUR ON-SITE. ADDITIONAL PROGRAMMING MAY OCCUR ON-SITE OR REMOTELY OVER THE INTERNET AS NECESSARY.

PROJECT TURNOVER

I. SUBMIT SOFTWARE DATABASE FILE WITH DESIRED DEVICE LABELS AND NOTES COMPLETED.

I. PROVISIONS FOR ONSITE TRAINING FOR OWNER AND DESIGNATED ATTENDEES TO BE INCLUDED IN SUBMITTAL PACKAGE

PART 3 - EXECUTION

INSTALLATION REQUIREMENTS

- K. INSTALLATION PROCEDURES AND VERIFICATION
- I. THE SUCCESSFUL BIDDER SHALL REVIEW ALL REQUIRED INSTALLATION AND PRE-STARTUP PROCEDURES WITH THE 2. THE SUCCESSFUL BIDDER SHALL INSTALL AND CONNECT THE NETWORKED LIGHTING CONTROL SYSTEM COMPONENTS
- ACCORDING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS, WIRING DIAGRAMS, THE PROJECT SUBMITTALS AND PLANS SPECIFICATIONS.
- b. LENGTH

B. COORDINATION WITH OWNER'S IT NETWORK INFRASTRUCTURE

- a. THE BIDDER SHALL PROVIDE TO THE ENGINEER ALL NETWORK INFRASTRUCTURE REQUIREMENTS OF THE

- SUBMITTAL PHASE AND PROVIDE ALL NECESSARY SCHEDULES TO THE LIGHTING CONTROL MANUFACTURER.

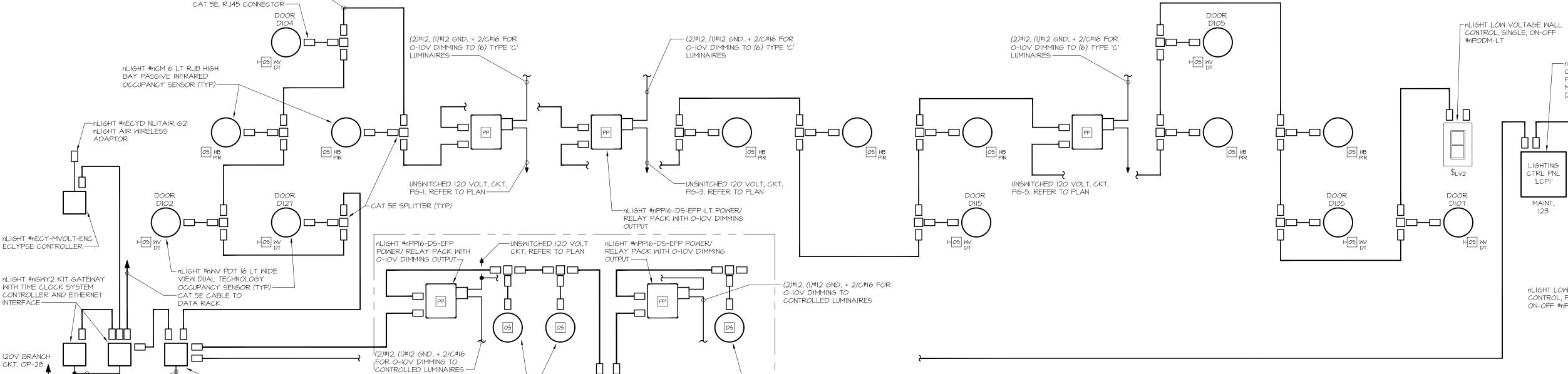
SYSTEM STARTUP

- AUTHORIZED REPRESENTATIVE OF THE MANUFACTURER.
- OF THE MANUFACTURER.
- VERIFYING OPERATIONAL COMMUNICATION TO ALL SYSTEM DEVICES. 2. PROGRAMMING THE NETWORK DEVICES INTO FUNCTIONAL CONTROL ZONES TO MEET THE REQUIRED SEQUENCE OF
- 4. CUSTOMIZATION OF OWNER'S SOFTWARE INTERFACES AND APPLICATIONS.

A. SYSTEM DOCUMENTATION

- 4) PHOTOCELL SHALL BE SUITABLE FOR CLOSED AND OPEN LOOP APPLICATIONS.

a. A COMMUNICATION BRIDGE DEVICE SHALL BE PROVIDED THAT INTERFACES WITH THE SYSTEM CONTROLLER VIA OWNER'S LAN CONNECTION AND INTERFACES WITH WIRELESS NETWORK. b. DEVICE SHALL BE CAPABLE OF COMMUNICATING WITH A GROUP OF A MINIMUM OF 250 WIRELESS NETWORKED DEVICES AND LUMINAIRES, SO AS TO REDUCE THE AMOUNT OF COMMUNICATION BRIDGES REQUIRED IN THE

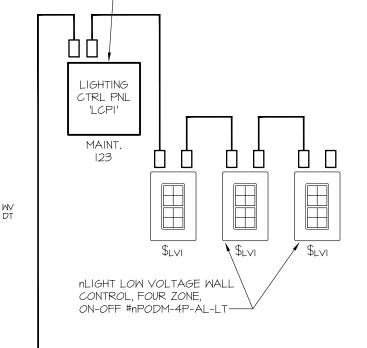


nLIGHT DAYLIGHT HARVEST-

ING PHOTOCELL, #nCM

ADCX-RJB---

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ISSUE FOR BID BOYERTOWN, PA 610,369,1319

MUHLENBERG TOWNSHIP PROPOSED PUBLIC WORKS BUILDING SCHEDULES AND DIAGRAMS

SITUATE IN MUHLENBERG TOWNSHIP BERKS COUNTY PENNSYLVANIA

D-19-0153-0144-EL502

- nLIGHT RELAY PANEL WITH 16 SINGLE POLE FIELD CONFIGURABLE RELAYS, AND O-IOV DIMMING OUTPUT PER RELAY, NLIGHT #ARP INTENCIO NLT - 10FCR -MVOLT - HLK - SM. REFER TO DRAWING EL501 FOR DIAGRAM

NETWORKED LIGHTING CONTROL WIRING DIAGRAM

BREAK / TRAINING RM 108

4. DEVICE SHALL AUTOMATICALLY DETECT ALL NETWORKED DEVICES CONNECTED TO IT, INCLUDING THOSE

CONNECTED TO WIRED AND WIRELESS COMMUNICATION BRIDGES. 6. SHALL BE CAPABLE OF CONNECTING TO THE CUSTOMERS LOCAL AREA NETWORK (LAN) VIA IEEE 802.11.X WIRELESS AND IEEE 802.3 WIRED CONNECTION.

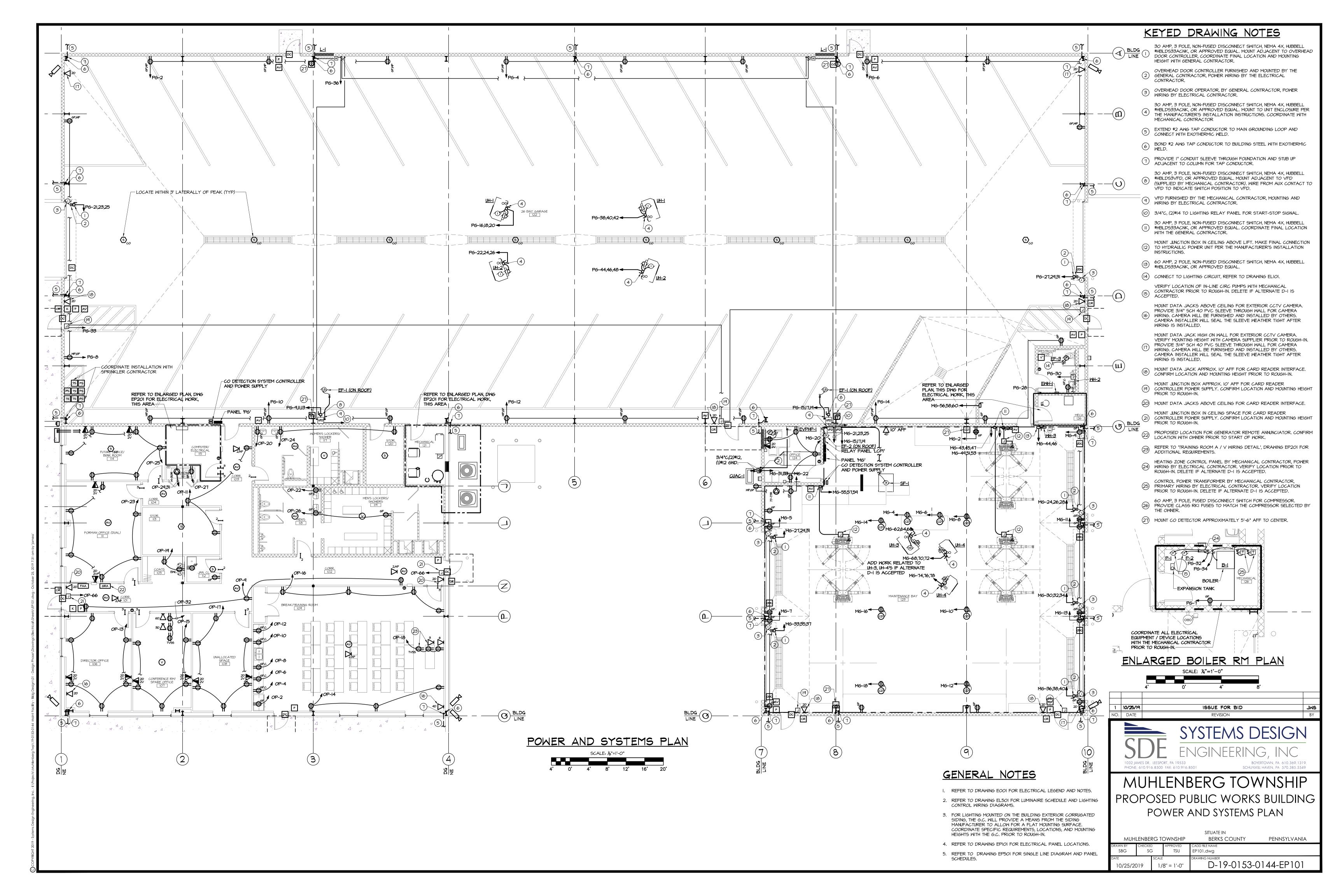
I. WIRED NETWORKED WALL SWITCHES, DIMMERS, SCENE CONTROLLERS

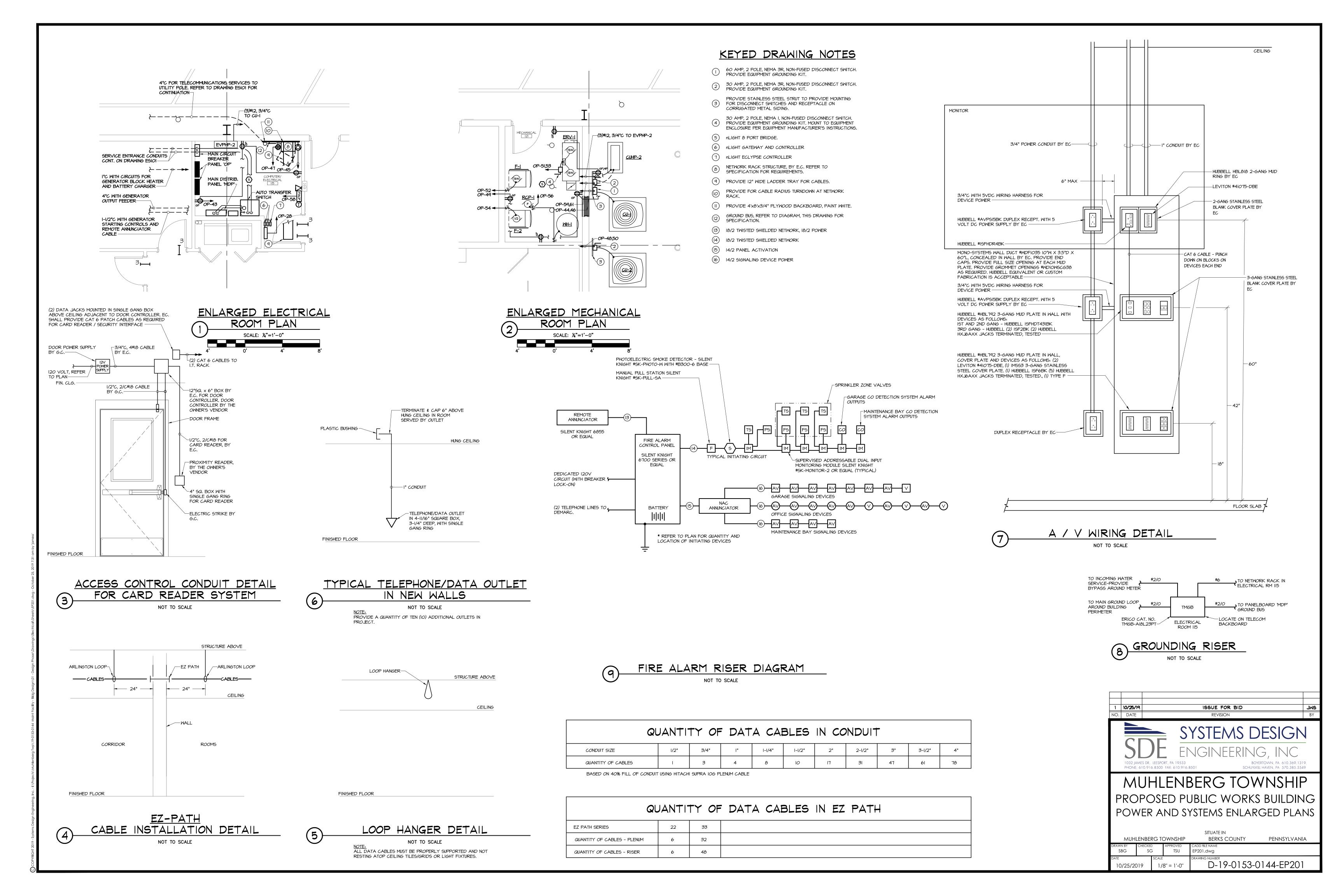
- 1) NUMBER OF CONTROL ZONES: 1, 2 OR 4 2) CONTROL TYPES SUPPORTED: ON/OFF OR ON/OFF/DIMMING
- 1) NUMBER OF SCENES: 1, 2 OR 4
- b) PRESET LEVEL SCENE TYPE

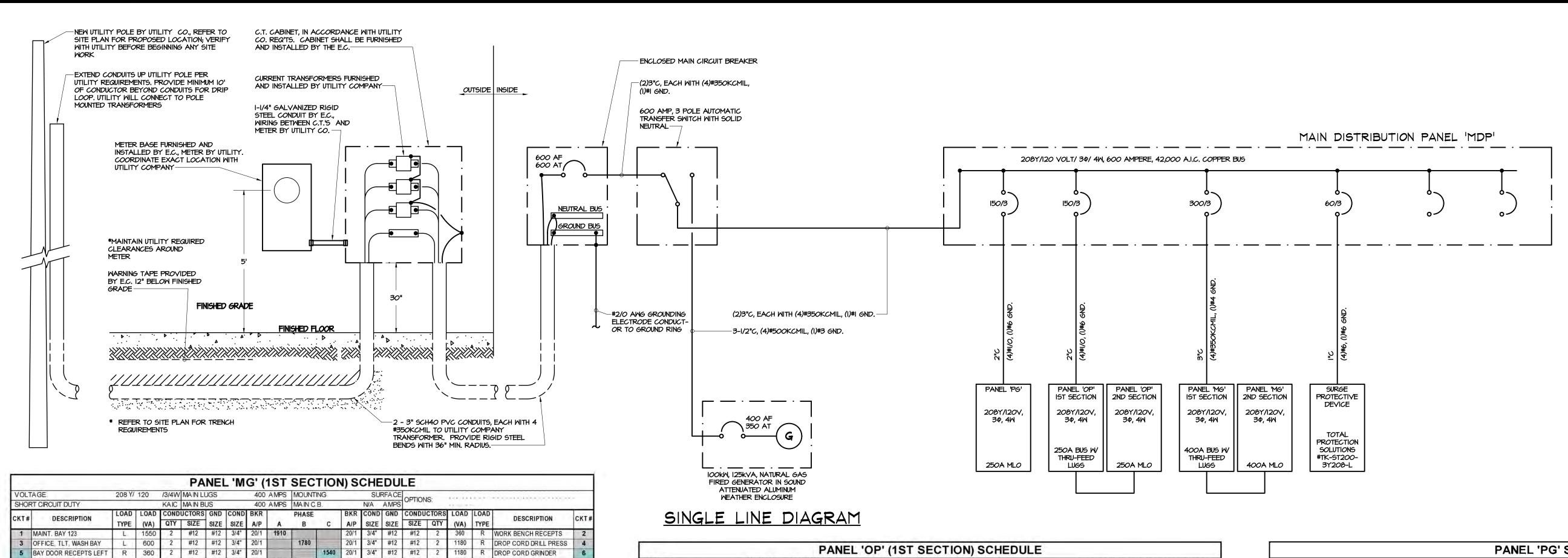
2. WIRED NETWORKED AUXILIARY INPUT / OUTPUT (I/O) DEVICES

- LOCAL OR GLOBAL SCENES AND PROFILES, RAMP LIGHT LEVEL UP OR DOWN, OR TOGGLE LIGHTS ON/OFF.
- a) INPUT SHALL BE PROGRAMMABLE TO FUNCTION AS A DAYLIGHT SENSOR.
- ON/OFF/DIMMING CONTROL OF UP TO 16 LOCAL CONTROL ZONES.

4. WIRELESS NETWORK COMMUNICATION BRIDGE







VOLT	AGE	208 Y/	120	/3/4W	MAINL	UGS		400	AMPS	MOUNT	ING		SU	RFACE	OPTION	IS.	EC404007.8		*********************	Or .
SHOR	T CIRCUIT DUTY			KAIC	MAINB	US		400	AMPS	MAIN C.	B.		N/A	AMPS	OFTION	10.				
CKT#	DESCRIPTION	LOAD	LOAD	COND	UCTORS	GND	COND	BKR		PHASE		BKR	COND	GND	CONDU	CTORS	LOAD	LOAD	DESCRIPTION	СКТ
JIX 1 #		TYPE	(VA)	QTY	SIZE	SIZE	SIZE	A/P	Α	В	C	A/P	SIZE	SIZE	SIZE	QTY	(VA)	TYPE	DEGGKII IIGK	OIX.
1	MAINT, BAY 123	L.	1550	2	#12	#12	3/4"	20/1	1910			20/1	3/4"	#12	#12	2	360	R	WORK BENCH RECEPTS	2
3	OFFICE, TLT, WASH BAY	1.0	600	2	#12	#12	3/4"	20/1		1780		20/1	3/4"	#12	#12	2	1180	R	DROP CORD DRILL PRESS	4
5	BAY DOOR RECEPTS LEFT	R	360	2	#12	#12	3/4"	20/1			1540	20/1	3/4"	#12	#12	2	1180	R	DROP CORD GRINDER	6
7	BAY DOOR RECEPTS LEFT	R	360	2	#12	#12	3/4"	20/1	540			20/1	3/\4"	#12	#12	2	180	R	DROP CORD RIGHT	8
9	BAY DOOR RECEPTS RIGHT	R	360	2	#12	#12	3/4"	20/1		540		20/1	3/4"	#12	#12	2	180	R	DROP CORD RIGHT	10
11	BAY DOOR RECEPTS RIGHT	R	360	2	#12	#12	3/4"	20/1			540	20/1	3/4"	#12	#12	2	180	R	DROP CORD RIGHT	12
13	BAY DOOR RECEPTS RIGHT	R	360	2	#12	#12	3/4"	20/1	540			20/1	3/4"	#12	#12	2	180	R	DROP CORD LEFT	14
15		М	1325	H		1 - 1				1505		20/1	3/4"	#12	#12	2	180	R	DROP CORD LEFT	16
17	SUPPLY FAN - 3HP	M	1325	3	#12	#12	3/4"	20/3			1505	20/1	3/4"	#12	#12	2	180	R	DROP CORD LEFT	18
19	SF-1	M	1325				1291	100	2225			20/1	3/4"	#12	#12	2	900	R	OFFICE 124	20
21		М	1325	7			- 1			1865		20/1	3/4"	#12	#12	2	540	R	WELDING BOOTH CONVEN	22
23	EXHAUST FAN - 3HP	M	1325	3	#12	#12	3/4"	20/3			1905		17-7				580	M		24
25	EF-2	M	1325			1734	41		1905			15/3	3/4"	#12	#12	3	580	M	MAINTENANCE BAY DOOR	26
27		М	580							1160			F1			-	580	M	1HP	28
29	MAINTENANCE BAY DOOR	M	580	3	#12	#12	3/4"	15/3	-	-	1160						580	M		30
31	1HP	M	580		1000	1			1160			15/3	3/4"	#12	#12	3	580	M	MAINTENANCE BAY DOOR	32
33		М	580							1160		100	1,11		7.4	44.5	580	M	1HP	34
35	MAINTENANCE BAY DOOR	M	580	3	#12.	#12	3/4"	15/3			1160						580	M		36
37	1HP	M	580		1	13.1		(4)	1160			15/3	3/4"	#12	#12	3	580	M	MAINTENANCE BAY DOOR	38
39	EXT. WALL MOUNTED	SL.	500	2	#10	#10	3/4"	20/1		1080			YES		1-4	4.7	580	M	1HP	40
41	LIGHTING CTRL PNL 'LCP1'	1125	250	2	#12	#12	3/4"	20/1			250				10 10	10.00		1		42
ΓΟΤΑΙ	CONNECTED LOAD (VA)	A, B, C							25610	25260	19370	KVA	WITH D	VERSI	TY APPL	IED			70.2	2 KV
TOTAL	CONNECTED LOAD (AMP	A.B.C.							213.4	210.5	161.4	AMPS	WITH	DIVERS	SITY APP	PLIED			195.2	2 AMP

LOAD BREAKDOWN					
HEAT PUMP (HP) KVA	1	LIGHTING (L) KVA	2		2
KITCHEN EQUIPMENT (K) KVA	0	RECEPTA CLE (R) KVA	7	DIVERSIFIED	7
SITE LIGHTING (SL) KVA	1	MOTOR (M) KVA	51		51
ELECTRIC WATER HEATING (WH) KVA	8	ELECTRIC HEAT (EH) KVA	0		0
A STATE OF THE PARTY OF THE PAR		AIR CONDITIONING (AC) KVA	0		0
A CONTRACTOR OF THE CONTRACTOR		NON-LINEAR (N) KVA	0	DIVERSIFIED	0

VOLT	11.70	208 Y/	120		MAINL					MOUNT	Y / CY			RFACE	OPTION	IS:	COPPE	RBUS	DOOR-IN-DOOR CONSTRU	ICTION
SHOR	T CIRCUIT DUTY				MAINB				AMPS	MAIN C.	B.			AMPS	21,000		2.17			0110
KT#	DESCRIPTION	LOAD	LOAD	IN COLUMN	UCTORS	100000	COND		E 30	PHASE		BKR	COND			CTORS		LOAD	DESCRIPTION	СКТ
V	2.150 mm 1.50	TYPE	(VA)	QTY	SIZE	SIZE	SIZE	A/P	Α	В	С	A/P	SIZE	SIZE	SIZE	QTY	(VA)	TYPE	19970-1144 ·	NO.
43		M	1320				11.7	100	5470			50/2	1"	#10	#6	2	4150	WH	EYE WASH WATER HEATER	44
45	HYDRAULIC LIFT	M	1320	3	#10	#10	1"	30/3		5470						44,11	4150	WH	WH-3	46
47		М	1320								1320	50/2	1"	#10	#6	2			WELDING OUTLET	48
49		M	1320						1320											50
51	HYDRAULIC LIFT	M	1320	3	#10	#10	1"	30/3	1 -	1320		20/1							SPARE	52
53		M	1320								1320	20/1				4	a. Ca	5.0	SPARE	54
55	1.5.401. Pa	M	1320	L.CI		7.5	1024		4370	-ille-		1	15-3	1	1.77	i oʻ	3050	M	EVIL TOTAL	56
57	HYDRAULIC LIFT	M	1320	3	#10	#10	1"	30/3		4370		60/3	1-1/4"	#8	#4	3	3050	M	AIR COMPRESSOR	58
59		M	1320						170.00		4370						3050	M		60
61		M	1320					1	2030	and the same		1	1.2.	1-51	1	100	710	М	1.7 TO FIRE TO	62
63	FUTURE HYDRAULIC LIFT	M	1320					35/3	-	2030	-	15/3	3/4"	#12	#12	3	710	M	MAINTENANCE BAY 122	64
65		M	1320	H. I.				1	-		2030		17.1				710	M	UH-3	66
67		M	1320						1795				1			1	475	М		68
69	FUTURE HYDRAULIC LIFT	M	1320					35/3		1795		15/3	3/4"	#12	#12	3	475	M	MAINTENANCE BAY 122	70
71		M	1320	4-7				15.1			1795		1 10 1				475	M	UH-4	72
73	OFFICE MINI-SPLIT	HP	710	2	#12	#12	3/4"	15/2	1185				100	7	100	11-7	475	M		74
75		HP	710			100	15.7	100		1185		15/3	3/4"	#12	#12	3	475	M	MAINTENANCE BAY 122	76
77	SPARE						17 1	20/1			475		1			A.	475	М	UH-4	78
79	SPARE	-						20/1	0	TO THE	10011	20/1							SPARE	80
81	SPARE							20/1		0	-11	20/1							SPARE	82
83	SPARE							20/1			0	20/1							SPARE	84
85	SPARE							20/1	0			20/1							SPARE	86
87	SPARE							20/1		0		20/1							SPARE	88
89	SPARE							20/1			0	20/1							SPARE	90
91	SPACE							-/1	0	100		-/1							SPACE	92
93	SPACE							-/1		0		-/1			1	100-1			SPACE	94
95	SPACE	- 3	15					-/1			0	-/1	1		1 - 1				SPACE	96
	CONNECTED LOAD (VA)	A, B, C							16170	16170	11310	KVA 1	WITH D	VERSI	Y APPL	IED			43.7	KVA
	CONNECTED LOAD (AMF		134.8	134.8	94.3	A 1400	WITH	N/EDO	T DE				404.0	AMPS						

1 LIGHTING (L) KVA

MOTOR (M) KVA

0 RECEPTACLE (R) KVA

8 ELECTRIC HEAT (EH) KVA

AIR CONDITIONING (AC) KVA NON-LINEAR (N) KVA DIVERSIFIED

DIVERSIFIED

LOAD BREAKDOWN HEAT PUMP (HP) KVA

KITCHEN EQUIPMENT (K) KVA

ELECTRIC WATER HEATING (WH) KVA

SITE LIGHTING (SL) KVA

VOLT	AGE	208 Y/	120	/3/4W	MAINLU	JGS		250	AMPS	MOUNT	NG		SUF	RFACE	OPTION	ç.		474100	non-some company and a series of sec	10
SHOF	T CIRCUIT DUTY			KAIC	MAIN B	JS		250	AMPS	MAIN C.	B.	14.5	N/A	AMPS	OFTION		1 h h 1 100 a			
CKT#	DESCRIPTION	LOAD TYPE	LOAD (VA)	COND	UCTORS	GND SIZE	COND	BKR A/P	A	PHASE B	С	BKR A/P	COND	GND SIZE	CONDU	CTORS QTY	LOAD (VA)	LOAD TYPE	DESCRIPTION	CKT#
1	RMS 105, 111-115	L	400	2	#12	#12	3/4"	20/1	1300			20/1	3/4"	#12	#12	2	900	R	BREAK 109 - REFRIG	2
3	RMS 106 - 108	L	580	2	#12	#12	3/4"	20/1		2080		20/1	3/4"	#12	#12	2	1500	R	BREAK 109 - COUNTER	4
5	BREAK ROOM	L	625	2	#12	#12	3/4"	20/1			2125	20/1	3/4"	#12	#12	2	1500	R	BREAK 109 - COUNTER	6
7	RMS 117 - 121	L	575	2	#12	#12	3/4"	20/1	2075			20/1	3/4"	#12	#12	2	1500	R	BREAK 109 - COUNTER	8
9	CORRIDOR 101, 102	R	540	2	#12	#12	3/4"	20/1		2040		20/1	3/4"	#12	#12	2	1500	R	BREAK 109 - COUNTER	10
11	CORR. 103, 104, STOR. 113	R	540	2	#12	#12	3/4"	20/1			2040	20/1	3/4"	#12	#12	2	1500	R	BREAK 109 - COUNTER	12
13	DIRECTOR 106	R	1080	2	#12	#12	3/4"	20/1	1620			20/1	3/4"	#12	#12	2	540	R	BREAK 109 CONVENIENCE	14
15	CONFERENCE 107	R	900	2	#12	#12	3/4"	20/1		1620		20/1	3/4"	#12	#12	2	720	R	BREAK 109 CONVENIENCE	16
17	ROOM 108	R	1080	2	#12	#12	3/4"	20/1			1620	20/1	3/4"	#12	#12	2	540	R	BREAK 109 A / V	18
19	COATS 105, EWC	R	780	2	#12	#12	3/4"	20/1	2280			20/1	3/4"	#12	#12	2	1500	R	WOMEN'S 117	20
21	JAN 112	R	360	2	#12	#12	3/4"	20/1		1860		20/1	3/4"	#12	#12	2	1500	R	MEN'S 118	22
23	FOREMAN 111	R	1080	2	#12	#12	3/4"	20/1			2580	20/1	3/4"	#12	#12	2	1500	R	WOMEN'S 117	24
25	OFFICE 114	R	1080	2	#12	#12	3/4"	20/1	2580			20/1	3/4"	#12	#12	2	1500	R	MEN'S 118, 119	26
27	LAUNDRY 116 WASHER	R	1180	2	#12	#12	3/4"	20/1		1255		20/1	3/4"	#12	#12	2	75	L	LIGHTING CONTROL	28
29	LAUNDRY 116 DRYER	R	2500	3	#10	#10	3/4"	30/2			2700	20/1	3/4"	#12	#12	2	200	L	RMS 101-105	30
31		R	2500		1.5	(C.)		139.4	3040		-	20/1	3/4"	#12	#12	2	540	R	CONF. ROOM A/V OUTLETS	32
33	SPARE							20/1		0		20/1							SPARE	34
35	SPARE			1				20/1			0	20/1	7.7						SPARE	36
37	SPARE							20/1	0			20/1							SPARE	38
39	SPARE			,				20/1		0		20/1							SPARE	40
41	SPARE							20/1			0	20/1			-				SPARE	42
TOTA	CONNECTED LOAD (VA)	A, B, C							21940	15980	15725	KVA V	NITH DI	VERSI	YAPPL	IED			44.1	KVA
TOTAL	CONNECTED LOAD (AMP	A.B.C.							182.8	133.2	131.0	100000			ITY APP				122.6	AMPS

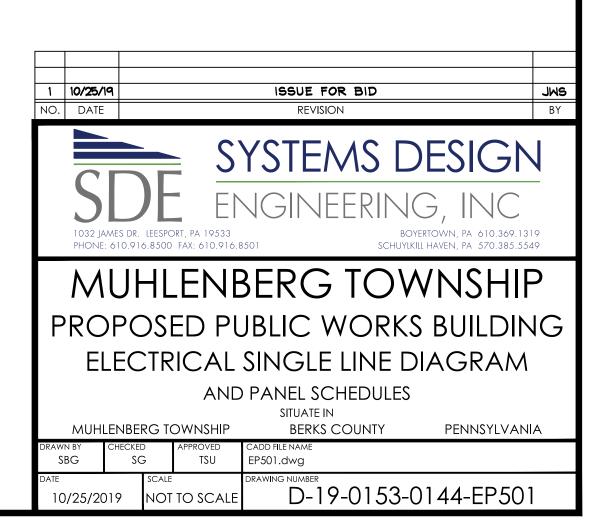
TOTAL CONNECTED LOAD (AMP) A,B,C,		182.8 133.2 131.0 AMPS WITH DIVERSITY A	PPLIED	122	2.6 AMPS
LOAD BREAKDOWN					
HEAT PUMP (HP) KVA	1	LIGHTING (L) KVA	3		3
KITCHEN EQUIPMENT (K) KVA	0	RECEPTA CLE (R) KVA	33	DIVERSIFIED	22
SITE LIGHTING (SL) KVA	1	MOTOR (M) KVA	4		4
ELECTRIC WATER HEATING (WH) KVA	2	ELECTRIC HEAT (EH) KVA	0		
Manual Control of the Control		AIR CONDITIONING (AC) KVA	9		11
		NON-LINEAR (N) KVA	1	DIVERSIFIED	

VOL	AGE	208 Y/	120	/3/4W	MAINL	JGS		250	AMPS	MOUNT	NG		SUF	RFACE	OPTION	c.	COPPE	D DI IC	DOOR-IN-DOOR CONSTRU	ICTIO
SHOP	RT CIRCUIT DUTY			KAIC	MAINB	US		250	AMPS	MAIN C.	B.		N/A	AMPS	OFTION	o.	COFFE	N 505,	DOOK-IN-DOOK CONSTRU	CHO
CKT#	DESCRIPTION	LOAD	LOAD (VA)	COND	UCTORS SIZE	GND	COND	BKR A/P	A	PHASE B	С	BKR A/P	COND	GND SIZE	CONDU	CTORS QTY	LOAD (VA)	LOAD TYPE	DESCRIPTION	СКТ
43	ELECTRICAL ROOM 115	R	540	2	#12	#12	3/4"	20/1	3320			50/2	1"	#10	#6	2	2780		CU-1	44
45	ELECTRICAL 115 DATA	R	1500	2	#12	#12	3/4"	20/1		4280			24	100	66.1	12	2780	AC	**	46
47	ROOM 115 BACKBOARD	R	360	2	#12	#12	3/4"	20/1			2025	30/2	3/4"	#10	#10	2	1665	AC	CU-2	48
49	MECHANICAL RM 121	R	720	2	#12	#12	3/4"	20/1	2385			11.0					1665	AC	100	50
51	SPARE							20/1		1215		15/1	3/4"	#12	#12	2	1215	M	F-1 3/4HP	52
53	SPARE							20/1			925	15/1	3/4"	#12	#12	2	925	M	F-2 1/2HP	54
55	GEN. BLOCK HEATER	WH	1500	2	#10	#10	1"	20/1	1750			20/1	3/4"	#12	#12	2	250	М	WATER HTR & RE-CIRC	56
57	GEN. BATTERY CHARGER	N	500	2	#12	#12	1"	20/1		750		20/1	3/4"	#12	#12	2	250	L	FIRE ALARM CONTROL	58
59	CUHP-2	HP	710	2	#12	#12	3/4"	15/2			1060	20/1	1"	#10	#10	2	350	SL	POLE MOUNTED LIGHTING	60
61		HP	710	44	- 1		11.3	14.74	990			20/1	1"	#10	#10	2	280	SL	POLE MOUNTED LIGHTING	62
63		M	600							880		20/1	1"	#10	#10	2	280	SL	POLE MOUNTED LIGHTING	64
65	ERV-1 (2) @ 3/4HP	M	600	3	#12	#12	3/4"	15/3			650	20/1	3/4"	#12	#12	2	50	Ŋ	OFFICE AREA CARD	66
67		M	600	164			IE.	120	600			20/1	-						SPARE	68
69	SPARE							20/1		0		20/1							SPARE	70
71	SPARE							20/1			Ū	20/1							SPARE	72
73	SPARE			-			16. 1	20/1	0			20/1			1	1 1 1			SPARE	74
75	SPACE						II I	-/1		0		-/1							SPACE	76
77	SPACE						177.1	-/1	-		0	-/1	1 1						SPACE	78
79	SPACE							-/1	0			-/1							SPACE	80
81	SPACE		1 - 1				100	-/1		0		-/1	1 = 1		15 - 14	1111			SPACE	82
83	SPACE			1			-	-/1			0	-/1							SPACE	84
TOTA	L CONNECTED LOAD (VA)	A, B, C							9045	7125	4660	KVA I	VITH DI	VERSI	TY APPL	IED			23.1	1 KV
TOTA	L CONNECTED LOAD (AMF) A.B.C.							75.4	59.4	38.8	AMPS	WITH	DIVERS	ITY APP	LIED			64.1	AMP

011100					The same of the sa	The second second	Acres 4							DITTOL			
TOTAL CONNECTED LOAD (VA)	A, B, C				9045	7125	4660	KVA W	VITH DI	/ERSIT	YAPPL	IED .				23.1	KVA
TOTAL CONNECTED LOAD (AMP)	A,B,C,				75.4	59.4	38.8	AMPS	WITH D	IV ERSI	TY APP	LIED				64.1	AMPS
LOAD BREAKDOWN																	
HEAT PUMP (HP) KVA				1	LIGHTIN	NG (L) KI	/A						0				0
KITCHEN EQUIPMENT (K) KVA				0	RECEP	TACLE (F	R) KVA						3	1	DIVERSIFIED		3
SITE LIGHTING (SL) KVA				1	MOTOR	(M) KV	A						4				4
ELECTRIC WATER HEATING (WH)	KVA			2	ELECTR	RIC HEAT	(EH) KI	/A					0				0
					AIR CO	NDITION	NG (AC)	KVA					9				11
					NON-LI	NEAR (N	KVA						1	1	DIVERSIFIED		1

VOLT	AGE	208 Y/	120	/3/4W	MAIN LU	JGS		250	AMPS	MOUNT	NG		SU	RFACE	OPTION	c.	CODDC	D DI IC	DOOD IN DOOD CONST	LICTIO
SHOR	T CIRCUIT DUTY			KAIC	MAIN BI	US		250	AMPS	MAIN C.	B.		N/A	AMPS	OPTION	5:	WPPE	K BUS,	DOOR-IN-DOOR CONSTR	COCTIO
CKT#	DESCRIPTION	LOAD	LOAD	COND	UCTORS	GND	COND	BKR		PHASE		BKR	COND	GND	CONDU	CTORS	LOAD	LOAD	DESCRIPTION	скт
OK I #	DESCRIPTION	TYPE	(VA)	QTY	SIZE	SIZE	SIZE	A/P	Α	В	С	A/P	SIZE	SIZE	SIZE	QTY	(VA)	TYPE	DESCRIPTION	CKI
1	PARKING GARAGE 122	L	1440	2	#12	#12	3/4"	20/1	1980			20/1	3/4"	#12	#12	2	540	R	RECEPTS A1-A4	2
3	PARKING GARAGE 122	L	1440	2	#12	#12	3/4"	20/1		1980		20/1	3/4"	#12	#12	2	540	R	RECEPTS A4 - A8	4
5	PARKING GARAGE 122	L	1440	2	#12	#12	3/4"	20/1			1980	20/1	3/4"	#12	#12	2	540	R	RECEPTS A8 - B10	6
7	RESTROOM 125	R	180	2	#12	#12	3/4"	20/1	540	1 1		20/1	3/4"	#12	#12	2	360	R	RECEPTS B1 - E1	8
9		М	795] [1335		20/1	3/4"	#12	#12	2	540	R	RECEPTS F1 - F4	10
11	EXHAUST FAN 1-1/2HP	М	795	3	#12	#12	3/4"	20/3			1335	20/1	3/4"	#12	#12	2	540	R	RECEPTS F4 - F8	12
13	EF-1	М	795						1335	1 1		20/1	3/4"	#12	#12	2	540	R	RECEPTS F8 - E10	14
15		М	795	ľ			1 1			2045		1	İ	ľ]	1	1250	[м [16
17	EXHAUST FAN 1-1/2HP	М	795	3	#12	#12	3/4"	20/3			2045	20/3	3/4"	#12	#12	3	1250	М	GARAGE 122 - UH-1	18
19	EF-1	М	795						2045								1250	М		20
21		М	580							1830							1250	М		2
23	PARKING BAY DOOR	М	580	3	#12	#12	3/4"	15/3			1830	20/3	3/4"	#12	#12	3	1250	М	GARAGE 122 - UH-2	24
25	1 HP	М	580						1830			1					1250	М		26
27		М	580							2080		20/1	3/4"	#10	#10	2	1500	EH	RESTROOM 125 EWH-1	28
29	PARKING BAY DOOR	М	580	3	#12	#12	3/4"	15/3			2980	20/1	3/4"	#10	#10	2	2400	WH	RESTROOM 125 WH-2	30
31	1 HP	М	580						1680			20/1	3/4"	#10	#10	2	1100	М	CIRC PUMPS P-1, P-2	32
33	GARAGE CARD READERS	N	50	2	#12	#12	3/4"	20/1		550		20/1	3/4"	#10	#10	2	500	М	BOILER, CONTROLS	34
35	SPARE	i :	İ	ľ		•	1 1	20/1		1	200	20/1	3/4"	#10	#10	2	200	м	LOUVERS (L-1)	36
37	SPARE	i :	İ			•	1 1	20/1	1250			1		İ	i i		1250	м		31
39	SPARE	<u> </u>	İ			•	1 1	20/1		1250		20/3	3/4"	#12	#12	3	1250	M	GARAGE 122: UH-1	40
41	SPARE	<u> </u>	İ	ľ		•	1 1	20/1		1	1250	1					1250	M		42
43	SPARE			Ì				20/1	1250								1250	М		44
45	SPARE							20/1		1250		20/3	3/4"	#12	#12	3	1250	М	GARAGE 122: UH-2	46
47	SPARE							20/1			1250	1					1250	М		48
49	SPACE							-/1	0			-/1							SPACE	50
51	SPACE							-/1		0		-/1							SPACE	52
53	SPACE							-/1			0	-/1							SPACE	54

LOAD BREAKDOWN					
HEAT PUMP (HP) KVA	0	LIGHTING (L) KVA	4		4
KITCHEN EQUIPMENT (K) KVA	0	RECEPTACLE (R) KVA	4	DIVERSIFIED	4
SITE LIGHTING (SL) KVA	0	MOTOR (M) KVA	25		25
ELECTRIC WATER HEATING (WH) KVA	2	ELECTRIC HEAT (EH) KVA	2		2
		AIR CONDITIONING (AC) KVA	0		0
		NON-LINEAR (N) KVA	0	DIVERSIFIED	0



					GAS FIRED	FURNA	CE W/ D	X SPLI	T SYSTE	M COO.	LING CO	IL SCHEDULE		
		OA.			COOLII	NG COIL			HEATING				BASIS OF DESIGN	
TAG	CFM	CFM	ESP"	HP	TYPE	TOTAL MBH	SENSIBLE MBH	TYPE	INPUT MBH	OUTPUT MBH	VOLTAGE	MANUFACTURER	MODEL	NOTES
F-1/CC-1	1600	450	0.38	0.75	DX	47.5	-	GAS	88.0	<i>8</i> 5. <i>0</i>	I20V-IΦ	LENNOX	SLP98UH090XV48C/CX35-60C-6F	1, 3 5, 6, 7, 8
F-2/CC-I	1050	250	0.25	0.5	DX	35.8	-	GAS	88.0	<i>8</i> 5. <i>0</i>	120V-IP	LENNOX	SLP98UH090XV36C/CX-35-48C-6F	2, 4, 5, 6, 7, 8

I. UNIT TO BE PAIRED WITH AIR COOLED CONDENSING UNIT CU-I. 2. UNIT TO BE PAIRED WITH AIR COOLED CONDENSING UNIT CU-2.

3. PROVIDE WITH 7 DAY PER WEEK/24HOUR PER DAY, 2 PROGRAM PER DAY, HEATING/COOLING/DEHUMIDIFYING, PROGRAMMABLE, WALL MOUNTED THERMOSTAT (ICOMFORT S30). PROVIDE REMOTE TEMPERATURE SENSOR FOR MOUNTING IN RETURN AIR DUCT.

4. PROVIDE WITH 7 DAY PER WEEK/24HOUR PER DAY, 2 PROGRAM PER DAY, HEATING/COOLING/DEHUMIDIFYING, PROGRAMMABLE, WALL MOUNTED THERMOSTAT (ICOMFORT 530).

5. PROVIDE WITH PVC CONCENTRIC VENT TERMINAL FOR ROOF INSTALLATION, FLUE CONDENSATE TRAP ASSEMBLY, AND ACID NEUTRALIZATION KIT. 6. PROVIDE WITH FLOAT SWITCH FOR SECONDARY DRAIN PAN. SWITCH TO "DIVERSITECH" MODEL CS-3 (OR EQUAL).

7. PROVIDE WITH RETURN AIR BASE FOR UPFLOW FURNACE. 8. PROVIDE WITH SIDE RETURN FILTER AND FILTER RACK.

		DUCTLE	SS SPLIT SYSTEM H	EAT P	UMP EV	/APOR/	ATOR S	CHEI	DULE	<u> </u>	
TAG	MAUNFACTURER	MODEL No.	STYLE	REFRIG. TYPE	COOLING TOTAL MBH	SENSIBLE	HEATING CAPACITY MBH @17°F AMB.	MOA	MOP	VOLTAGE	NOTES
EVPHP-I	MISTSUBISHI/TRANE	MSZ-FHO6NA	WALL-MTD DUCTLESS SPLIT	R-410A	6.0	5.8	5.9	1.0	15	208/230V-IP	1, 3, 4
EVPHP-2	MISTSUBISHI/TRANE	MSZ-FHO6NA	WALL-MTD DUCTLESS SPLIT	R-410A	6.0	5.8	5.9	1.0	15	208/230V-IP	2, 3, 4

I. UNIT TO BE PAIRED WITH AIR COOLED CONDENSING UNIT CUHP-

2. UNIT TO BE PAIRED WITH AIR COOLED CONDENSING UNIT CUHP-2.

3. PROVIDE WITH 7 DAY PER WEEK/24HOUR PER DAY, 2 PROGRAM PER DAY, HEATING/COOLING/DEHUMIDIFYING, PROGRAMMABLE, WALL MOUNTED THERMOSTAT.

4. PROVIDE WITH FLOAT SWITCH FOR SECONDARY DRAIN PAN TO SHUT UNIT DOWN IF CONDENSATE LEVEL BECOMES TOO HIGH.

					F	AN S	CHEDULE	=			
						FAN	MOTOR		BASIS (OF DESIGN	NOTEC
TAG	TYPE	MOUNTING	CFM	ESP"	DRIVE	RPM	HP	VOLTAGE	MANUFACTURER	MODEL	NOTES
EF-I	EXHAUST	ROOF	6600	0.375	BELT	600	1.5	208V-3¢	GREENHECK	<i>G</i> B-260-15	1, 2, 3
EF-2	EXHAUST	ROOF	6850	1.5	BELT	775	3.0	208V-3¢	GREENHECK	6B-300-30	1, 2, 3
EF-3	EXHAUST	CEILING	75	0.125	DIRECT	930	0.1	120V-IP	GREENHECK	SP-80-VG	2, 4, 5
EF-4	EXHAUST	CEILING	50	0.25	DIRECT	930	0.1	120V-IФ	GREENHECK	SP-80-VG	2, 4, 5
SF-I	SUPPLY	INLINE	6900	1.375	BELT	865	3.0	208V-3¢	GREENHECK	B5Q-300HP-30	3, 6, 7

NOTES: I. PROVIDE WITH 12" HIGH SLOPED ROOF CURB.

- 2. PROVIDE WITH GRAVITY BACKDRAFT DAMPER
- 3. FAN TO BE PROVIDED WITH VFD.
- 4. PROVIDE WITH VARIABLE SPEED ECM MOTOR WITH ON BOARD POTENTIOMETER FOR SPEED ADJUSTMENT.
- 5. PROVIDE WITH ALUMINUM HOODED WALL CAP. 6. PROVIDE FAN WITH RIGHT SIDE DISCHARGE ARRANGEMENT.
- 7. PROVIDE WITH VIBRATION ISOLATION HANGERS.

ENERGY RE

					ENE	RGY R	RECOVE	RY VE	NTILATOR	2		
TAG	SUPPLY	SUPPLY	SUPPLY MOTOR	EXHAUST	EXHAUST	EXHAUST MOTOR	WINTER LAT	SUMMER LAT	\/O TACE	BASIS O	DESIGN	NOTES
TAG	CFM	ESP"	HP	CFM	ESP"	<u> </u>	DB/WB	DB/WB	VOLTAGE	MANUFACTURER	MODEL	NOTES
ERV-I	700	0.5	0.75	700	0.625	0.75	49.7/40.7	77.8/66.8	208/230-34	RENEWAIRE	HEIXINH	1, 2, 3, 4, 5, 6
ERV-2	6900	_	-	6850	-	1	47.3/38.7	87.3/74.1	-	RENEWAIRE	(2)CA4XIN	3, 7
									•	·	·	

NOTES: I. PROVIDE WITH DISCONNECT SWITCH FOR SINGLE POINT POWER CONNECTION 2. PROVIDE LOW LEAK ISOLATION DAMPERS ON BOTH AIRSTREAMS.

- 3. PROVIDE UNIT WITH 2" THICK MERY 7 DISPOSABLE FILTERS.
- 4. SUPPLY BOTH SUPPLY AND EXHAUST FANS WITH ECM MOTORS FOR SPEED ADJUSTMENT. PROVIDE LOCAL POTENTIOMETER CONTROL OF FAN SPEED. 5. PROVIDE WITH BYPASS ECONOMIZER DAMPER.
- 6. PROVIDE A LOW VOLTAGE RELAY TO ACCEPT A STOP/START SIGNAL FROM EACH OF THE (2) ASSOCIATED FURNACES. 7. PROVIDE WITH DUCT FLANGES ON EACH AIRSTREAM FOR (2) STACKED UNITS.

	GAS FIRED UNIT HEATER SCHEDULE														
	FUEL	INPUT	OUTPUT	·	6) (–	- In		. / 01 = 1 = =	BASIS O	= DESIGN	NOTES		
TAG	TYPE	(MBH)	(MBH)	CFM	0.∨.	EAT	LAT	HP	FLA	VOLTAGE	MANUFACTURER	MODEL	NOTES		
UH-I	NATURAL GAS	400	384	6460	1115	50	105	(2) @ I.O	10.4	208V-3¢	STERLING	HU400	1, 2, 3, 4, 5		
UH-2	NATURAL GAS	300	285	4850	1100	50	105	(2) @ 1.0	10.4	208V-3¢	STERLING	HU400	1, 2, 3, 4, 5		
UH-3	NATURAL GAS	150	143	2660	930	65	114	(2) @ 0.5	5.9	208V-3¢	STERLING	HU150	1, 2, 3, 4, 5, 6		
UH-4	NATURAL GAS	100	96	1610	980	65	116	0.5	3.4	208V-3¢	STERLING	HUIOO	1, 2, 3, 4, 5, 6		

BOILER

SEALED COMBUSTION

PUMP SCHEDULE

INLINE

I. PROVIDE FULLY MODULATING GAS BURNER WITH 3:1 TURNDOWN

. PROVIDE WITH REMOTE MOUNTED 2-STAGE DIGITAL WALL THERMOSTAT, 3. PROVIDE WITH WITH PVC CONCENTRIC VENT TERMINAL FOR ROOF INSTALLATION.

LOCATION

PROVIDE WITH FACTORY STANDARD "SAGE 2.3" SINGLE ZONE CONTROL SYSTEM

PROVIDE WITH CONDENSATE TRAP, FLOW SWITCH AND ACID NEUTRALIZING KIT.

PROVIDE WITH PVC CONCENTRIC VENT TERMINAL FOR ROOF INSTALLATION.

PROVIDE WITH AUXILIARY LOW WATER CUT-OFF WITH MANUAL RESET.

4. PROVIDE ACID NEUTRALIZING KIT FOR UNIT CONDENSATE DRAIN. 5. PROVIDE UNIT WITH VIBRATION ISOLATION HANGERS.

MODEL

B-I U.S. BOILER COMPANY ASPN-399 MECH. ROOM HEATING

PROVIDE ASME RELIEF VALVE, SET BY FACTORY AT 30 PSI..

6. UNIT(S) TO BE ADDED UNDER ALTERNATE BID B-I.

MANUFACTURER

	AIR C	OOLED COM	NDENS	SING U	NIT SCHE	EDULE (GAS F	FURNACES)	
TAG	CAPACITY	STAGES OF	OA.	MIN.	VOLTAGE	BASIS C	PF DESIGN	NOTES
IAG	(MBH)	UNLOADING	TEMP.	S.E.E.R.	VOLTAGE	MANUFACTURER	MODEL	NOTES
CU-I	47.5	MODULATING	4 5	21	208/230-14	LENNOX	XC25-048	I
CU-2	35.8	MODULATING	4 5	23	208/230-14	LENNOX	XC25-036	2

I. CU-I TO BE PAIRED WITH FURNACE F-I AND COOLING COIL CC-I. 2. CU-2 TO BE PAIRED WITH FURNACE F-2 AND COOLING COIL CC-2.

	DUCTLESS SPLIT SYSTEM CONDENSING UNIT SCHEDULE											
TAG	TAG MAUNFACTURER MODEL No. STYLE REFRIG. COOLING HEATING CAPACITY CAPACITY MBH MBH MBH MBH MBH MBH MBH MBH MBH MBH											
CUHP-	MISTSUBISHI/TRANE	MUZ-FHO6NAH	PAD MOUNTED	R-410A	6.0	5.9	Ш	15	208/230V-IP	1, 3		
CUHP-2	P-2 MISTSUBISHI/TRANE MUZ-FHO6NAH PAD MOUNTED R-4IOA 6.0 5.9 II I5 208/230V-I4 2, 3									2, 3		

I. UNIT TO BE PAIRED WITH EVAPORATOR UNIT EVPHP-I

2. UNIT TO BE PAIRED WITH EVAPORATOR UNIT EVPHP-2. 3. PROVIDE UNIT WITH HYPER HEAT OPTION FOR OPERATION DOWN TO -13°F.

EM	TVDE	NECK	MODULE	CEM		BASIS OF	DESIGN	NOTES
NO.	TYPE	SIZE	SIZE	CFM	BLOW	MANUFACTURER	MODEL	NOTES
2- I	SUPPLY	8"Ф	12"x12"	175-220	4-WAY	TITUS	TDV-AA	1
D-2	SUPPLY	6"Ф	6"x6"	55-70	I-WAY	TITUS	TDV-AA	1
D-3	SUPPLY	8"Ф	9"x9"	70-125	4-WAY	TITUS	TDV-AA	1
0-4	SUPPLY	6"Ф	6"x6"	25-60	2-WAY	TITUS	TDV-AA	1
D-5	SUPPLY	6"Ф	9"x9"	70-100	2-MAY	TITUS	TDV-AA	1
kG-I	RETURN	-	8"×8"	160-200	-	TITUS	350RL	
6-2	RETURN	-	20"x20"	800	-	TITUS	350RL	
6-3	RETURN	-	6"x6"	60	-	TITUS	350RL	
:6-I	EXHAUST	-	10"x10"	250	1	TITUS	350RL	
G-2	EXHAUST	-	6"x6"	25-100	-	TITUS	350RL	

NOTES: I. ALL DIFFUSERS SHALL BE 24x24 LAY-IN.

	GRAVITY VENTILATOR SCHEDULE										
TAG	TAG DUTY AIRFLOW (CFM) VELOCITY FREE AREA (SQ. FT.) SIZE SERVICE MANUFACTURER MODEL NOTES										
GRV-I	GRV-I RELIEF 700 520 I.36 I4xI4 ERV-I GREENHECK FGR I, 2, 3										

PROVIDE WITH BIRD SCREEN.

CAPACITY

INPUT

(MBH)

LOCATION

MECH. ROOM

PROVIDE WITH HIGH CAPACITY AIR VENT.

OUTPUT

(MBH)

379

95

SERVICE

HOT WATER

MODEL NUMBERS REFER TO EQUIPMENT AS MANUFACTURED BY BELL AND GOSSETT

PROVIDE WITH 12" HIGH ROOF CURB. PROVIDE WITH GRAVITY OPERATED BACKDRAFT DAMPER

LOUVER SCHEDULE										
-1.5	BASIS OF DESIGN									
TAG	TYPE	CFM	FPM	SIZE	MANUFACTURER	MODEL	NOTES			
L-I	INTAKE	6600	680	48"x56"	GREENHECK	ESD-603	1, 2			
L-2	INTAKE	6900	710	48"x56"	GREENHECK	ESD-603	1, 2			
L-2	INTAKE	700	510	24"xl6"	GREENHECK	ESD-603	1			

NOTES: I. PROVIDE LOUVER WITH FLANGED FRAME, ALUMINUM INSECT SCREEN, AND KYNAR 500 FINISH 2. PROVIDE LOUVER WITH LOW LEAK, FAIL CLOSED, 2-POSITION DAMPER WITH 120V ACTUATOR AND AUX. CONTACTS FOR SIGNAL INPUT FROM VFD.

VOLTAGE

120V-ΙΦ

(FT HD)

2.0

BURNER

FULL MODULATION

AIR SEPARATOR SCHEDULE

FLUID

WATER

CONTROLS AND SEQUENCES OF OPERATION:

(F-I/CC-I/CU-I) AND TRAINING ROOM (F-2/CC-2/CU-2) SHALL HAVE TEMPERATURE AND VENTILATION CONTROL PROVIDED THROUGH PROGRAMMABLE WALL THERMOSTATS FURNISHED WITH THE EQUIPMENT.

GENERAL NOTES

WORKING ORDER ALL SYSTEMS SHOWN.

OTHERS, THEY SHALL BE PROVIDED BY THIS CONTRACTOR.

OTHER TRADES. REMAINS WITH THE CONTRACTOR. .

COMPUTER DISK TO THE ARCHITECT CONTAINING AUTOCAD DRAWING FILE.

PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF THE NEC.

INSTALL WORK AS INDICATED.

APPROVALS TO THE OWNER.

STANDARDS.

BE ELIMINATED.

- OCCUPIED/UNOCCUPIED SCHEDULES (FURNISHED BY THE OWNER) SHALL BE PROGRAMMED INTO THE RESPECTIVE THERMOSTAT FOR EACH OF THE SPACES. EACH THERMOSTAT SHALL HAVE AN OVERRIDE BUTTON THAT WILL ALLOW THE THE UNIT TO OPERATE ON OCCUPIED SETTINGS FOR A TWO HOUR (ADJ.) TIME PERIOD BEFORE REVERTING BACK TO UNOCCUPIED.
- EACH THERMOSTAT SHALL SEND A CONTACT CLOSURE SIGNAL, WHENEVER THE RESPECTIVE SYSTEM IS IN OCCUPIED MODE WHETHER SCHEDULED OR THROUGH THE OVERRIDE, TO THE CONTROL RELAY IN ERV-I TO ENERGIZE ERV-I. COORDINATE CONTROL SIGNAL WIRING WITH RELAY PROVIDED WITH THE ERV.
- UPON RECEIPT OF A CONTACT CLOSURE SIGNAL FROM EITHER OF THE FURNACES, BOTH THE OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL OPEN AND BOTH FANS SHALL ENERGIZE AND RUN CONTINUOUSLY UNTIL THE CONTACT CLOSE SIGNAL IS
- AT ANYTIME DURING OPERATION OF ERV-I SHOULD THE OUTSIDE AIR ENTHALPY BECOME LOWER THAN THE EXHAUST AIR ENTHALPY. AS MEASURED BY THE ERV'S INTERNAL CONTROLS, THE EXHAUST AIR DAMPER SHALL CLOSE AND THE BYPASS DAMPER SHALL OPEN ALLOW THE EXHAUST AIR TO BYPASS THE TOTAL ENERGY
- EXCHANGER. DURING OCCUPIED OPERATION THE FURNACE FANS SHALL RUN CONTINUOUSLY. DURING UNOCCUPIED OPERATION THE FANS SHALL CYCLE WITH A CALL FOR EITHER HEATING OR COOLING. NOTE; WHEN THE FAN FOR FURNACE F-I/CC-I IS ENERGIZED SPACE TEMPERATURE SHALL BE READ AT A REMOTE TEMPERATURE SENSOR LOCATED IN THE COMMON RETURN DUCT FOR THE SYSTEM.
- DURING EITHER OCCUPIED OR UNOCCUPIED MODE, SHOULD THE SPACE TEMPERATURE RISE ABOVE THE COOLING TEMPERATURE SETPOINT THE RESPECTIVE CONDENSING UNIT SHALL ENERGIZE ON ITS LOWEST SPEED AND RAMP UP TOWARDS ITS HIGHEST SPEED UNTIL THE SPACE TEMPERATURE IS RESTORED TO THE SETPOINT.
- DURING EITHER OCCUPIED OR UNOCCUPIED MODE, SHOULD THE SPACE TEMPERATURE FALL BELOW THE HEATING TEMPERATURE SETPOINT THE RESPECTIVE GAS FURNACE SHALL FIRE ON ITS LOWEST FIRING AND MODULATE TOWARDS HIGH FIRE UNTIL THE SPACE TEMPERATURE IS RESTORED TO THE SETPOINT.
- 2. THE HEAT PUMPS SERVING OFFICE 124 (EVPHP-I/CUHP-I) AND COMPUTER/ELECTRICAL ROOM 115 (EVPHP-2/CUHP-2) SHALL HAVE TEMPERATURE CONTROL PROVIDED THROUGH PROGRAMMABLE WALL THERMOSTATS FURNISHED WITH THE EQUIPMENT.
- 2.1. OCCUPIED/UNOCCUPIED SCHEDULES (FURNISHED BY THE OWNER) SHALL BE PROGRAMMED INTO THE RESPECTIVE THERMOSTAT FOR EACH OF THE SPACES. EACH THERMOSTAT SHALL HAVE AN OVERRIDE BUTTON THAT WILL ALLOW THE THE UNIT TO OPERATE ON OCCUPIED SETTINGS FOR A TWO HOUR (ADJ.) TIME PERIOD BEFORE REVERTING BACK TO UNOCCUPIED.
- 2.2. DURING OCCUPIED AND UNOCCUPIED OPERATION THE HEAT PUMP EVAPORATOR FANS SHALL CYCLE WITH A CALL FOR EITHER HEATING OR COOLING.
- DURING EITHER OCCUPIED OR UNOCCUPIED MODE, SHOULD THE SPACE TEMPERATURE RISE ABOVE THE COOLING TEMPERATURE SETPOINT THE RESPECTIVE CONDENSING UNIT SHALL ENERGIZE ON COOLING AND RUN CONTINUOUSLY UNTIL THE SPACE
- TEMPERATURE IS RESTORED TO THE SETPOINT. 2.4. DURING EITHER OCCUPIED OR UNOCCUPIED MODE, SHOULD THE SPACE TEMPERATURE FALL BELOW THE HEATING TEMPERATURE SETPOINT THE RESPECTIVE CONDENSING UNIT SHALL ENERGIZE ON HEATING AND RUN CONTINUOUSLY UNTIL THE SPACE TEMPERATURE IS RESTORED TO THE SETPOINT.

THE GAS FURNACES WITH SPLIT SYSTEM AIR CONDITIONING SERVING THE OFFICE AREAS 3. THE GAS FIRED UNIT HEATERS SERVING 26 BAY GARAGE 122 ((2) UH-1 & (2) UH-2) AND SERVICE BAY 123 ((IUH-2 & (2) UH-4 - PROVIDED UNDER ALTERNATE BID B-I) SHALL HAVE TEMPERATURE CONTROL PROVIDED THROUGH TWO STAGE DIGITAL WALL THERMOSTATS FURNISHED WITH THE EQUIPMENT.

CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS REQUIRED TO FABRICATE, INSTALL AND PLACE IN

2. DRAWINGS INDICATE THE GENERAL LOCATION AND ARRANGEMENT OF THE CONSTRUCTION. SO FAR AS PRACTICAL,

AT NO COST TO THE OWNER, RELOCATE INSTALLED ITEMS WHERE FAILURE TO COORDINATE HAS OCCURRED.

5. CONTRACTOR SHALL FABRICATE AND INSTALL ALL HVAC SYSTEMS IN STRICT ACCORDANCE WITH THE 2015

7. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING, WITHOUT ADDITIONAL CHARGE, ANY CONSTRUCTION OF OTHER TRADES DAMAGED BY HIM DURING THE COURSE OF THIS CONSTRUCTION.

9. AT THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE COMPLETE AND ACCURATE 'AS

II. INSTALL THERMOSTATS WITH TOP OF BOX AT 48" A.F.F IN ACCORDANCE WITH ANSI AII7.I-2009 SECTION 308.

12. UNDER ALTERNATE BID B-I MODIFY THE HEATING SYSTEM SERVING SERVICE BAY 123 AS FOLLOWS: ELIMINATE THE

RADIANT FLOOR SLAB HEATING SYSTEM INCLUDING ELIMINATION OF THE BOILER AND ANCILLARY BOILER EQUIPMENT, ALL HEATING HOT WATER DISTRIBUTION PIPING INCLUDING PUMPS AND TRIM, THE RADIANT FLOOR PANELS, AND ALL ASSOCIATED SYSTEM CONTROLS. PROVIDE 3 GAS FIRED UNITS HEATERS ((1) UH-3 AND (2) UH-4) ALONG WITH COMBUSTION VENTS, CONDENSATE DRAINS, AND ASSOCIATED OPERATING CONTROLS. VENTILATION SYSTEM AND CONTROLS SHALL REMAIN EXCEPT THE HOT WATER HEATING COIL HC-I ALONG WITH ITS OPERATING CONTROLS SHALL

HAVING JURISDICTION. CONTRACTOR SHALL PROCURE ALL REQUIRED PERMITS, CERTIFICATES AND AGENCY

APPROVALS (NOTE: PERMIT FEES WILL BE WAVED). PROVIDE COPIES OF ALL REQUIRED CERTIFICATIONS AND

6. CONTRACTOR SHALL PROVIDE COMPLETE AND OPERATIONAL SYSTEMS AS SHOWN AND INDICATED. ALL WORK SHALL BE PERFORMED IN A WORKMANLIKE AND PROFESSIONAL MANNER CONSISTENT WITH ALL APPLICABLE INDUSTRY

8. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF ALL MAJOR MANUFACTURED ITEMS REQUIRED ON THIS PROJECT. REFER TO DIVISION I SPECIFICATIONS FOR MINIMUM NUMBER OF COPIES TO BE SUBMITTED OR FOR ELECTRONIC

FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, IN PARTICULAR DEVIATIONS THAT IMPACT THE WORK OF

SUBMISSION PROCEDURES, APPROVAL OF SHOP DRAWINGS SHALL ONLY BE CONSTRUED TO APPLY TO GENERAL LAYOUT AND CONFORMANCE TO THE DESIGN CONCEPT OF THE PROJECT. THE RESPONSIBILITY FOR ANY DEVIATION

CONSTRUCTED DOCUMENTATION' FOR ALL SYSTEMS INSTALLED OR ALTERED UNDER THIS CONTRACT. PROVIDE

IO. CONTRACTOR SHALL PROVIDE ALL LABOR, DEVICES, WIRE, CONDUIT, ETC. REQUIRED FOR EQUIPMENT INSTALLATION OF SYSTEM CONTROLS UNLESS SPECIFICALLY INDICATED TO BE BY OTHERS. REQUIRED ELECTRICAL WORK SHALL BE

4. UNLESS ITEMS OF MATERIAL, EQUIPMENT OR WORK ARE SPECIFICALLY NOTED TO BE PROVIDED OR FURNISHED BY

3. CONTRACTOR SHALL THOROUGHLY COORDINATE AND SCHEDULE CONSTRUCTION WITH THE GENERAL CONTRACTOR AND ALL OTHER PROJECT CONTRACTORS PRIOR TO FABRICATION AND INSTALLATION OF SYSTEMS. CONTRACTOR SHALL,

INTERNATIONAL MECHANICAL CODE (IMC 2015) AND ALL OTHER APPLICABLE REQUIREMENTS OF THE LOCAL AUTHORITY

- 3.1. 26 BAY GARAGE 122 SHALL HAVE A SINGLE TEMPERATURE SETPOINT OF 55°F (ADJ.) AND SERVICE BAY 123 SHALL HAVE A SINGLE TEMPERATURE SETPOINT OF 70°F
- 3.2. SHOULD THE SPACE TEMPERATURE FALL BELOW THE SETPOINT THE RESPECTIVE GAS UNIT HEATER SHALL FIRE ON ITS LOWEST FIRING AND MODULATE TOWARDS HIGH FIRE UNTIL THE SPACE TEMPERATURE IS RESTORED TO THE SETPOINT.
- 4. THE VENTILATION SYSTEM SERVING 26 BAY GARAGE I22 ((2) EF-I & (2) L-I) SHALL BE CONTROLLED THROUGH THE LIGHTING CONTROL AND FIRE ALARM SYSTEMS AS FOLLOWS.
- 4.I. DURING SCHEDULED OCCUPIED PERIODS THE LIGHT CONTROL PANEL SHALL SEND A CONTACT CLOSURE SIGNAL TO THE VFD FOR EACH FAN EXHAUST FAN (EF-I) TO START, RAMP UP TO LOW SPEED FOR NORMAL VENTILATION (1650 CFM DETERMINED THROUGH BALANCING AND PROGRAMMED INTO THE VFD) AND RUN CONTINUOUSLY AT THAT SPEED UNTIL THE SIGNAL IS BROKEN.
- 4.2. DURING SCHEDULED UNOCCUPIED PERIODS, SHOULD A MOTION SENSOR DETECT OCCUPANCY. THE LIGHT CONTROL PANEL SHALL SEND A CONTACT CLOSURE SIGNAL TO THE VFD FOR EACH FAN EXHAUST FAN (EF-I) TO START, RAMP UP TO LOW SPEED FOR NORMAL VENTILATION (1650 CFM DETERMINED THROUGH BALANCING AND PROGRAMMED INTO THE VFD) AND RUN FOR A PRE-PROGRAMMED (ADJ.) TIME DURATION WHEN THE SIGNAL IS BROKEN.
- THE FIRE ALARM SYSTEM WILL MONITOR SPACE CARBON MONOXIDE (CO) AND NITROGEN DIOXIDE (NO₃) LEVELS. SHOULD THE LEVELS EXCEED THE ALLOWABLE LIMITS OF THESE GASES, THE FIRE ALARM SYSTEM SHALL SEND A CONTACT CLOSURE SIGNAL TO THE VFD FOR EACH EXHAUST FAN (EF-I). TO START THE FAN (IF NOT ALREADY RUNNING) AND DRIVE IT TO MAXIMUM SPEED TO PROVIDE THE SCHEDULED EMERGENCY VENTILATION. THE FANS SHALL RUN CONTINUOUSLY AT FULL SPEED UNTIL THE FIRE ALARM SIGNAL IS BROKEN.
- WHENEVER THE EXHAUST FANS ARE ENERGIZED, AN AUXILIARY CONTACT CLOSURE SIGNAL SHALL BE SENT FOR THE FAN VFD TO THE ASSOCIATED LOUVER (L-I) MOTOR OPERATED DAMPER TO OPEN THE DAMPER AND MAINTAIN THAT POSITION UNTIL THE SIGNAL IS BROKEN.
- SIGNAL WIRING FROM THE LIGHTING CONTROLS AND THE FIRE ALARM SYSTEM TO THE EXHAUST FAN VFD'S SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. SIGNAL WIRING FROM THE EXHAUST FAN VFD TO THE LOUVER MOTOR OPERATED DAMPER SHALL BE BY THIS CONTRACTOR.
- ALL POWER WIRING SHALL BE BY THE E.C.
 - THE EXHAUST FANS SERVING RESTROOM 125 (EF-3) AND OFFICE (EF-4) SHALL BE ENERGIZED BY A CONTACT CLOSURE SIGNAL FROM THE MOTION DETECTORS SERVING THE LIGHTING AND SHALL RUN CONTINUOUSLY FOR A PRE-PROGRAMMED (ADJ.) TIME DURATION WHEN THE SIGNAL IS BROKEN.

ISSUE FOR BID

MUHLENBERG TOWNSHIP

BOYERTOWN, PA 610,369,1319

SCHUYLKILL HAVEN, PA 570,385,5549

6. FOR CONTROLS OF SYSTEMS SERVING MAINTENANCE BAY 123 REFER TO P&ID ON DRAWING H301.

1032 IAMES DR. LEESPORT PA 19533

PHONE: 610.916.8500 FAX: 610.916.850

ELECTRIC WALL HEATER SCHEDULE BASIS OF DESIGN TOTAL NOTES WATTS VOLTAGE MBH MANUFACTURER MODEL CWHII5IDSF EMH-I 5120 1500 Q-MARK 120V-ΙΦ

NOTES: I. PROVIDE HEATER WITH INTEGRAL SNAP ACTION THERMOSTAT.

	EXPANSION TANK SCHEDULE										
TAG	TAG MODEL LOCATION DUTY PRE-CHARGE AIR PRESSURE PSI TANK VOLUME GAL. DIA. HT. SIZE SETTING NOTES										
ET-I	ET-I D-40V MECH. ROOM HOT WATER I2 21.7 II.3 I6¼" 24½" ½" 30 I, 2, 3, 4										
NOTES:	I. MODE	L NUMBERS REFER	TO EQUIPMENT AS	MANUFACTURED	BY BELL	AND GOSSETT					

2. PROVIDE ASME RATED TANK WITH CHARGING VALVE CONNECTION, TANK PURGE, AND DRAIN VALVE

LOCATION

MECH. ROOM

MECH. ROOM

3. PROVIDE PRESSURE RELIEF VALVE 4. ELIMINATE UNDER ALTERNATE BID B-I

6. ELIMINATE UNDER ALTERNATE BID B-I

PROVIDE WITH SYSTEM AUTOMATIC FILL VALVE. ELIMINATE UNDER ALTERNATE BID B-I **VOLTAGE**

TAG | MODEL

AS-I | IAS-2

ALLOW

PRESS

WORKING

80

FUEL

| NAT. GAS | 399

BOILER SCHEDULE

DROP

(FT HD)

0.8

120V-ΙΦ

120V-ΙΦ

FLOW

(GPM)

ENT

(F)

HEATED

TEMP TEMP

WATER 90° 140° 20

LEAV

	_
REMARKS	
1, 2, 3, 4	
1, 2, 3, 4	N
	-

COIL TO BE FULLY CASED WITH COMPANION FLANGES FOR MOUNTING IN DUCTWORK 2. ELIMINATE UNDER ALTERNATE BID B-I

RATE

(GPM)

20

TYPE SIZE MBH MANUFACTURER 169.8 | 43.7 | 70.0 | 0.12 | 17.02 | 140 | 120 | 0.66

CONNECTION

SIZE

3/4"

HOT WATER | 10 | 15 | 1750 RPM MODEL NUMBERS REFER TO EQUIPMENT AS MANUFACTURED BY BELL AND GOSSETT

PUMPED

HEAD

HOT WATER | 20 | 15 | 1750 RPM

MOTOR

SPEED

PROVIDE WITH ECM MOTOR WITH MANUAL SPEED ADJUSTMENT POTENTIOMETER.

RADIANT

PROVIDE PUMP WITH VIBRATION ISOLATION HANGERS

4. ELIMINATE UNDER ALTERNATE BID B-I

ECOCIRC XL 36-45 HOT WATER

MODEL No.

P-2 | ECOCIRC XL 36-45 |

DUCT HEATING COIL SCHEDULE BASIS OF DESIGN DUCT **TOTAL** PIPING A.P.D." GPM ENT LNT N.P.D RUN OUTS 2" HC-I | HOT WATER | 6900 | 42x42

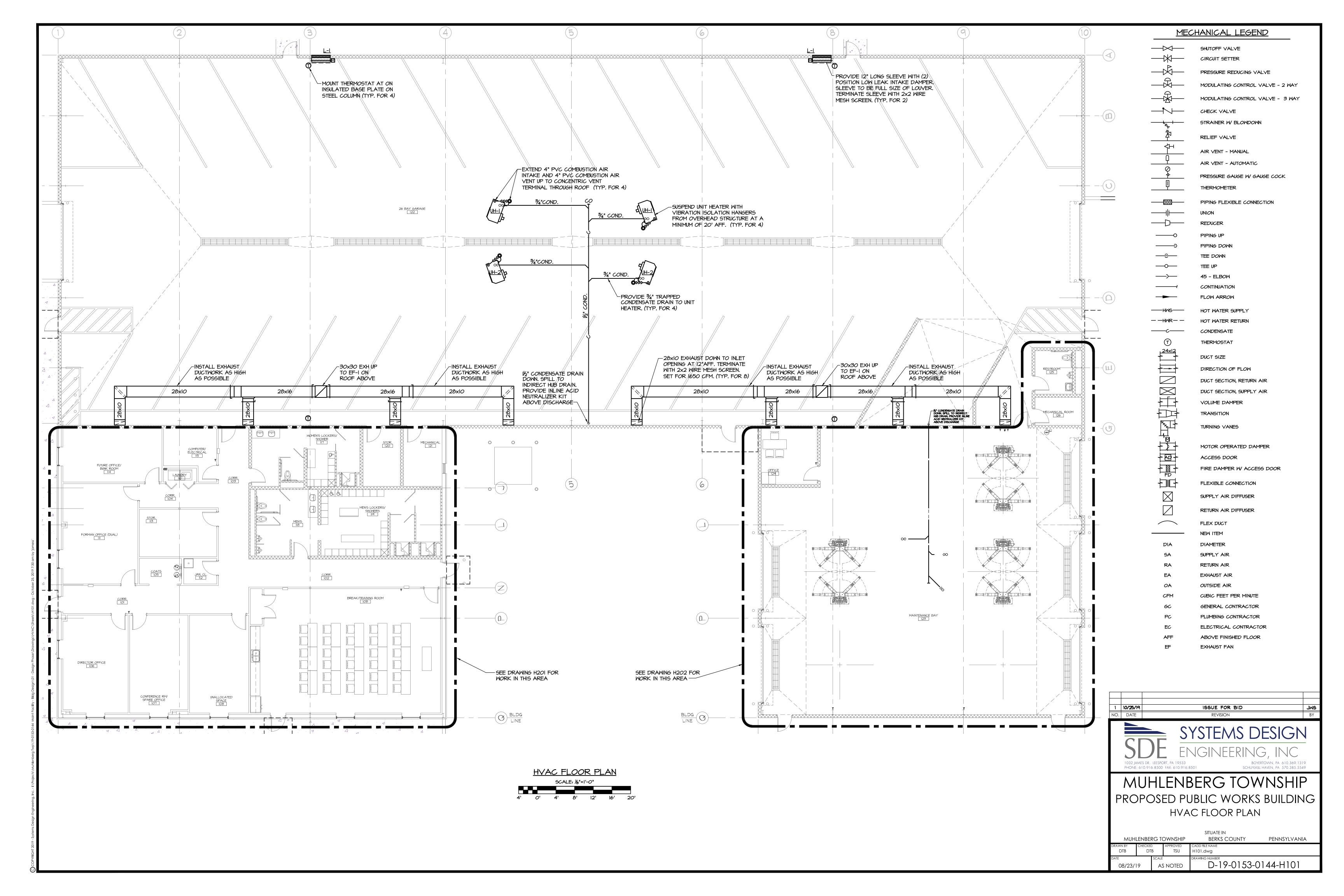
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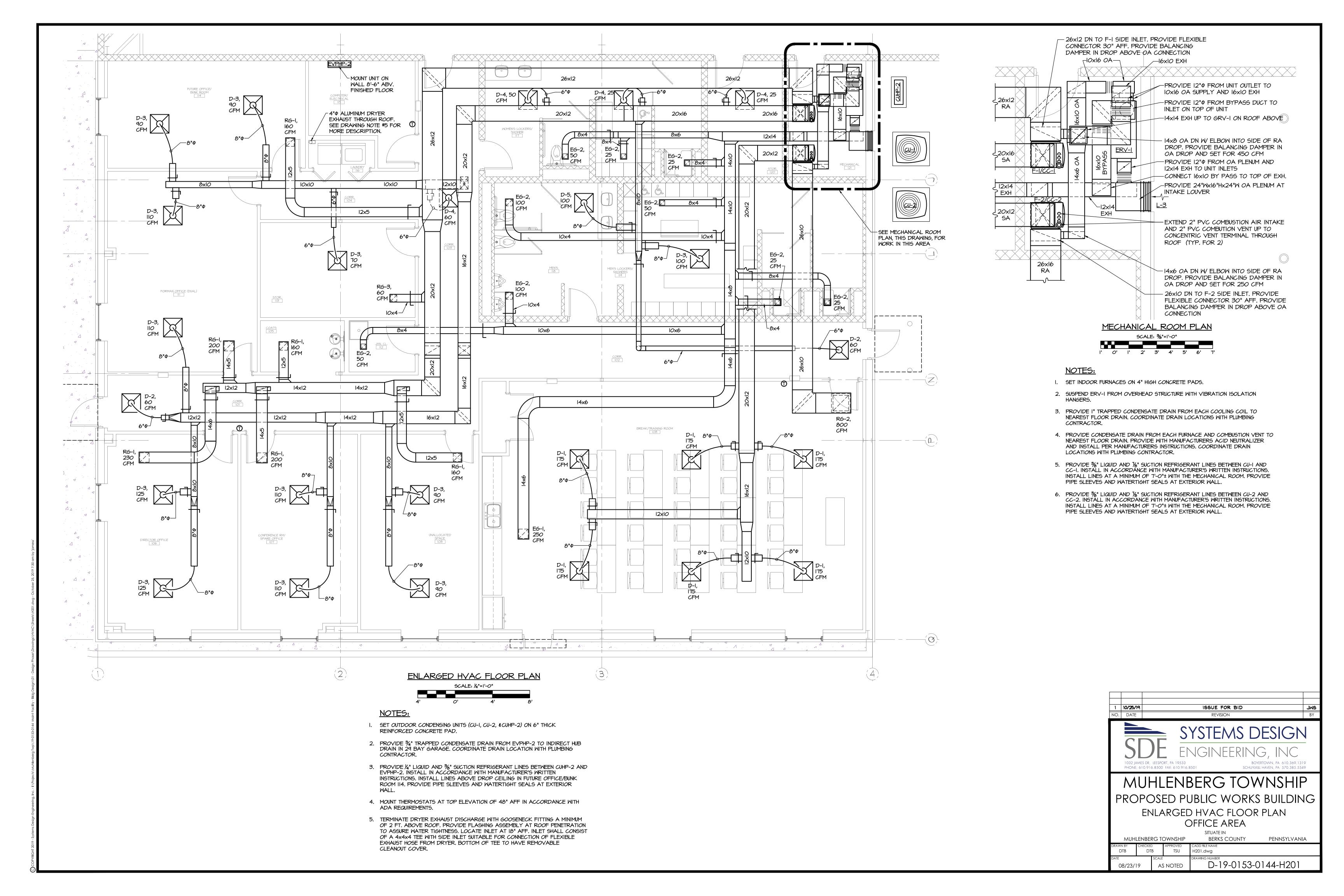
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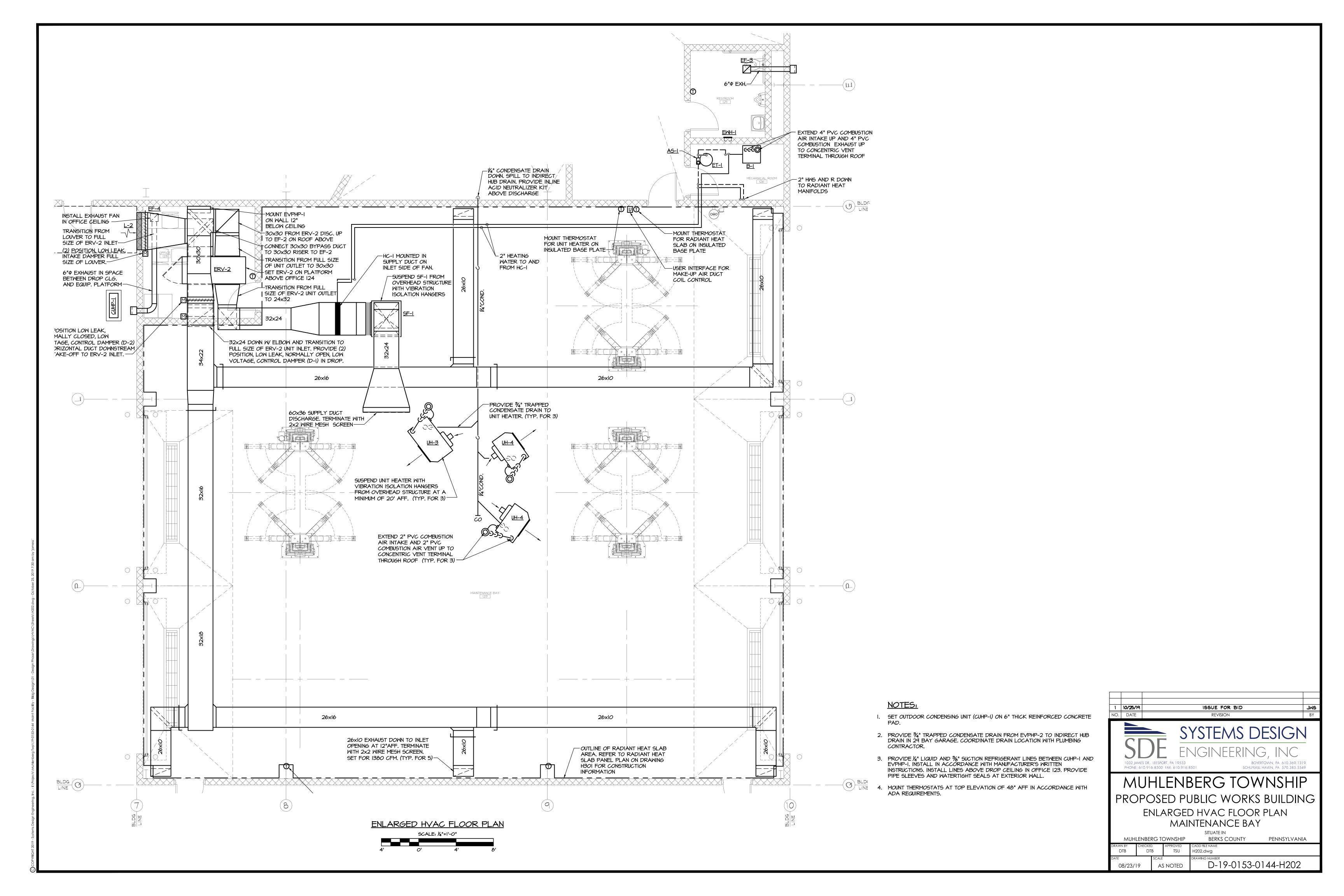
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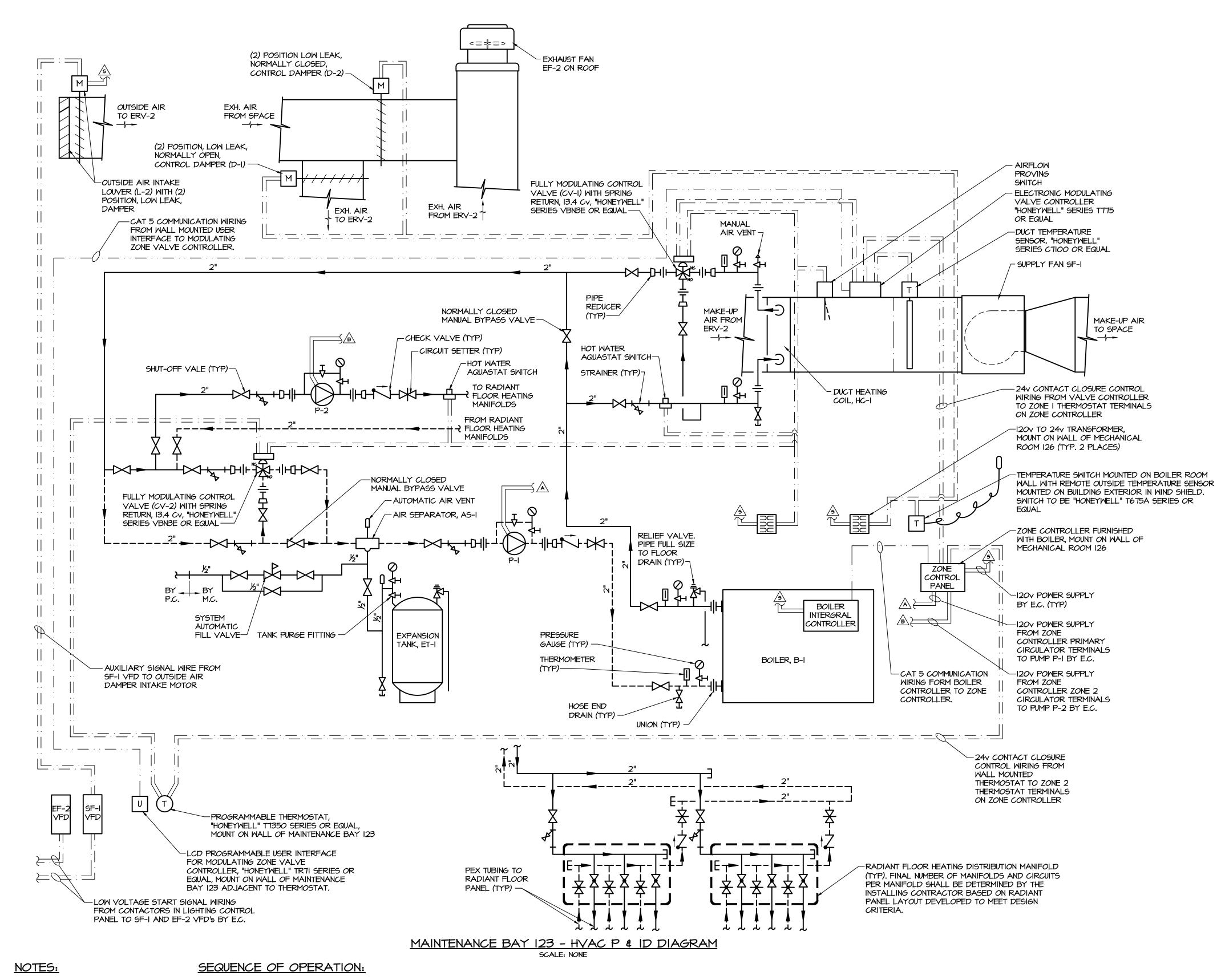
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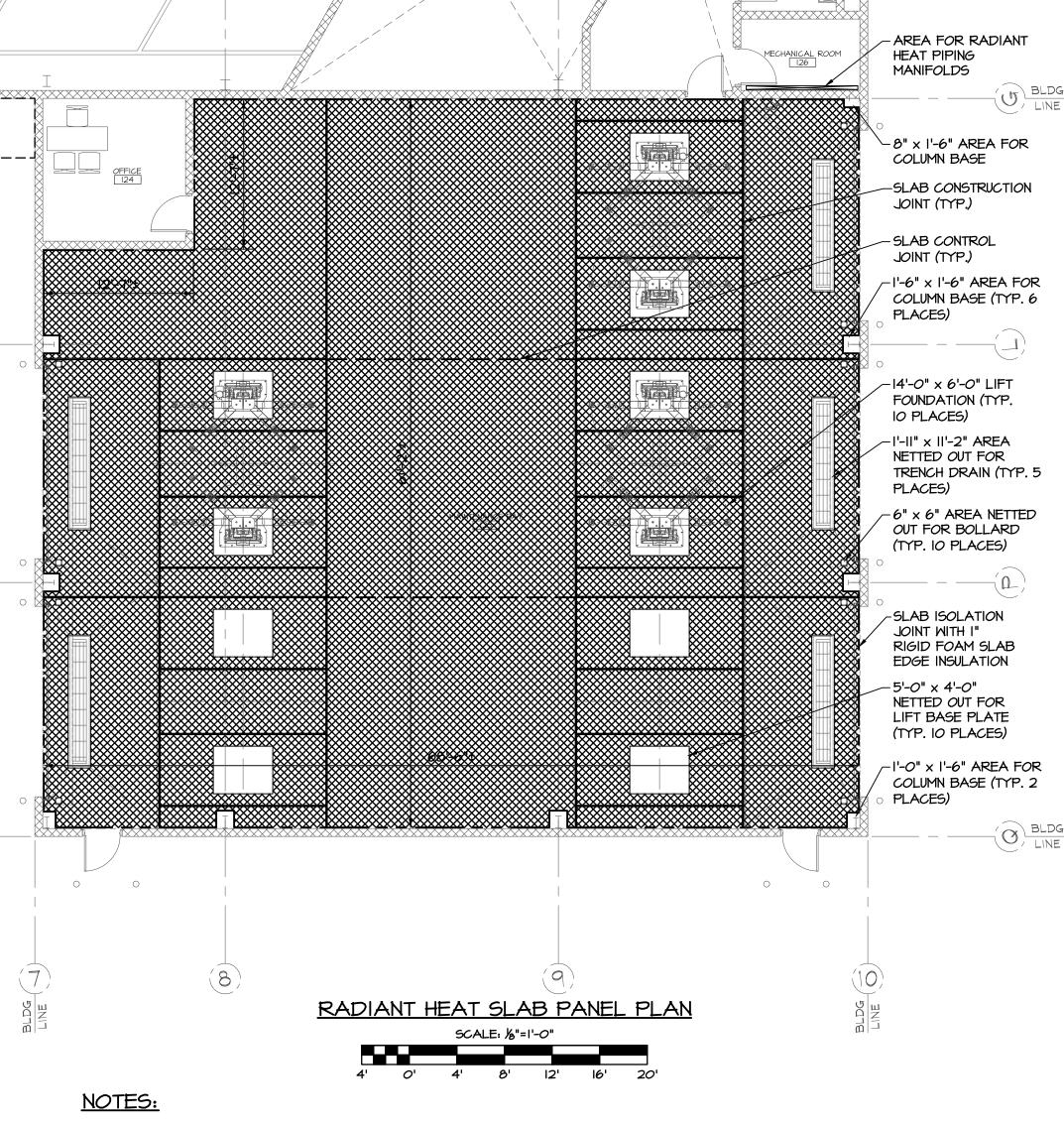
PROPOSED PUBLIC WORKS BUILDING HVAC SCHEDULES AND GENERAL NOTES MUHI ENBERG TOWNSHIP BERKS COUNTY PENNSYLVANIA DTB D-19-0153-0144-H100











- HATCHED FLOOR SLAB AREA TO BE PANELIZED AS A RADIANT HEAT SLAB. THE HEATING OUTPUT OF THE SLAB SHALL BE 125 MBH.
- 2. 2" RIGID FOAM INSULATION SHALL BE PROVIDED BELOW THE SLAB, BELOW THE LIFT FOUNDATIONS, AND AROUND THE SIDES OF THE LIFT FOUNDATIONS.
- 3. THE FLOOR SLAB IS 1/2 INCHES THICK AND THE REINFORCING IS EMBEDDED AT 3 INCHES BELOW THE TOP OF THE SLAB. THE LIFT FOUNDATIONS ARE 12 INCHES THICK AND THE REINFORCING IS EMBEDDED AT 3 INCHES BELOW THE TOP OF THE FOUNDATION.
- 4. THE RADIANT FLOOR PANELS SHALL BE CONSTRUCTED UTILIZING 1/2 INCH OR % INCH PEX TUBING WITH OXYGEN BARRIER EMBEDDED IN THE FLOOR AND OR THE LIFT FOUNDATIONS AT THE UNDERSIDE OF THE REINFORCING. TUBING SHALL BE SUPPORTED BY WIRE TIES TO THE REINFORCING. SPACING FOR THE HEAT SLAB TUBING SHALL BE DETERMINED BY THE CONTRACTOR BASED ON THE PANELIZED FLOOR AREA AND THE DESIRED MBH OUTPUT.
- 5. THE NUMBER OF RADIANT PANELS, THE TUBING SIZE AND LAYOUT, AND THE MANIFOLD CONFIGURATION SHALL BE DETERMINED BY THE INSTALLING CONTRACTOR. LAYOUT SHALL BE CONFIGURED SUCH THAT THE HEATING WATER FLOW THROUGH ANY INDIVIDUAL LOOP DOES NOT EXCEED I.O GPM AND THE PRESSURE DROP THROUGH ANY SINGLE CIRCUIT DOES NOT EXCEED IO FT. HEAD.
- 6. A LAYOUT DRAWING INDICATING ALL TUBING, FITTINGS SUPPORTS, AND INSTALLATION DETAILS SHALL BE SUBMITTED TO AND APPROVED BY THE ENGINEER BEFORE THE CONTRACTOR CAN RELEASE ANY MATERIAL TO THE JOB SITE AND BEGIN THE INSTALLATION.
- 7. THE INSTALLING CONTRACTOR SHALL FOLLOW THE RADIANT TUBING MANUFACTURER'S WRITTEN GUIDELINES FOR THE DESIGN AND INSTALLATION OF THE RADIANT FLOOR PANELS PAYING PARTICULAR ATTENTION TO THE DETAILS FOR INSTALLATION THROUGH CONSTRUCTION AND CONTROL
- 6. THE INSTALLING CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE INSTALLATION WITH THE GENERAL CONTRACTOR WITH RESPECT TO LAYOUT, INSTALLATION DETAILS, AND INSTALLATION SCHEDULES.

- UNLESS OTHERWISE INDICATED TO BE PROVIDED BY THE E.C. ALL LOW VOLTAGE CONTROL, SIGNAL AND COMMUNICATION WIRING SHALL BE INSTALLED BY THIS CONTRACTOR IN ACCORDANCE WITH THE 2014 NATIONAL ELECTRIC CODE (2014 NEC).
- POWER WIRING TO ALL CONTROL DEVICES SHALL BE PROVIDED BY THE E.C. COORDINATE POWER REQUIREMENTS LOCATIONS OF ALL DEVICES WITH THE
- POWER WIRING TO SF-I AND EF-2 VFD'S AND POWER WIRING FROM THE VFD TO THE FAN SHALL BE BY THE E.C.
- OCCUPIED/UNOCCUPIED TEMPERATURE CONTROL FOR MAINTENANCE BAY 123 HEATING SHALL BE CONTROLLED THROUGH THE PROGRAMMABLE WALL THERMOSTAT. OCCUPIED/UNOCCUPIED TEMPERATURE CONTROL SHALL INCLUDE OCCUPANCY SCHEDULE PROGRAMMING WITH MANUAL OVERRIDE AND TEMPERATURE SETPOINT PROGRAMMING.
- 2. OCCUPIED/UNOCCUPIED VENTILATION CONTROL FOR MAINTENANCE BAY 123 HEATING SHALL BE CONTROLLED THROUGH THE LIGHTING CONTROL PANEL. OCCUPIED/UNOCCUPIED VENTILATION CONTROL SHALL INCLUDE OCCUPANCY SCHEDULE PROGRAMMING WITH MANUAL OVERRIDE. DISCHARGE TEMPERATURE CONTROL OF VENTILATION AIR SHALL BE PROGRAMMED THROUGH THE WALL MOUNTED USER INTERFACE FOR THE MODULATING HC-I VALVE CONTROLLER.MOD
- OCCUPANCY SCHEDULE FOR MAINTENANCE BAY 123 SHALL BE COORDINATED WITH THE OWNER. SCHEDULES FOR BOTH HEATING AND VENTILATION SHALL PROGRAMMED TO BE IDENTICAL. COORDINATE PROGRAMMING OF THE VENTILATION CONTROLS WITH THE E.C.
- 4. THE INTEGRAL BOILER CONTROLLER AND ZONE CONTROLLER SHALL OPERATE THE HEATING SYSTEM AS FOLLOWS REGARDLESS OF OCCUPANCY MODE. THE BOILER SHALL OPERATE AS A COLD START DEVICE.
- 4.I. HEATING ZONE I SHALL BE HEATING COIL HC-I TEMPERING THE MAKE-UP AIR. (SEE BELOW FOR MAKE-UP AIR TEMPERATURE CONTROL). IF THE
- MAKE-UP AIR SYSTEM REQUIRES HEAT A CALL FOR HEAT SHALL BE SIGNALED ON ZONE I IN THE ZONE CONTROL PANEL 4.2. HEATING ZONE 2 SHALL BE THE RADIANT HEAT SLAB PROVIDING SPACE TEMPERATURE CONTROL. (SEE BELOW FOR SPACE TEMPERATURE
- CONTROL). IF THE SPACE REQUIRES HEAT A CALL FOR HEAT SHALL BE SIGNALED ON ZONE 2 IN THE ZONE CONTROL PANEL.
- 4.3. THE ZONE CONTROL PANEL SHALL ENERGIZE THE PRIMARY CIRCULATION PUMP (P-I) AND THE PUMP SHALL RUN CONTINUOUSLY ANY TIME ZONE I OR ZONE 2 HAS A CALL FOR HEAT.

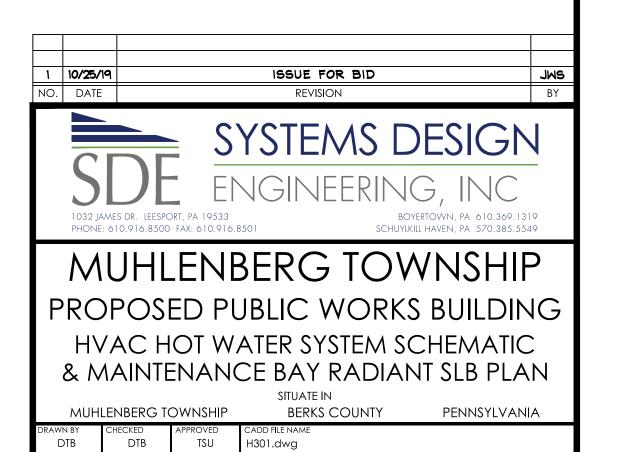
ON A CALL FOR HEAT ON ONLY ZONE I OR SIMULTANEOUSLY ON ZONE I & 2, THE BOILER SHALL BE FIRED THROUGH THE INTEGRAL CONTROLLER

- THE ZONE CONTROL PANEL SHALL ENERGIZE THE RADIANT SLAB CIRCULATION PUMP (P-2) AND THE PUMP SHALL RUN CONTINUOUSLY ANY TIME ZONE 2 HAS A CALL FOR HEAT.
- TO MAINTAIN A HOT WATER SUPPLY TEMPERATURE OF 140° F (ADJ.). 4.6. ON A CALL FOR HEAT ON ONLY ZONE 2, THE BOILER SHALL BE FIRED THROUGH THE INTEGRAL CONTROLLER TO TO MAINTAIN A HOT WATER

SUPPLY TEMPERATURE OF 110° F (ADJ.).

5. THE SPACE VENTILATION SHALL BE CONTROLLED AS FOLLOWS:

- 5.I. WHEN THE SPACE GOES INTO OCCUPIED MODE (THROUGH SCHEDULE OR OVERRIDE) AT THE LIGHT CONTROL PANEL A CONTACT CLOSURE SIGNAL SHALL BE SENT TO THE VFD'S FOR SUPPLY FAN (SF-I) AND EXHAUST FAN (EF-2) TO START THE FANS. THE FANS SHALL START AT LOW SPEED, RAMP UP TO FULL SPEED AND RUN CONTINUOUSLY UNTIL THE SPACE GOES INTO UNOCCUPIED MODE AND CONTACT CLOSURE SIGNAL IS BROKEN.
- 5.2. AN AUXILIARY CONTACT CLOSURE SIGNAL SHALL BE SET FROM THE SF-I VFD TO OUTSIDE AIR INTAKE LOUVER (L-2) MOTOR OPERATED DAMPER TO OPEN THE DAMPER SHALL REMAIN OPEN UNTIL THE SPACE GOES INTO UNOCCUPIED MODE AND CONTACT CLOSURE SIGNAL IS BROKEN.
- 5.3. THE EXHAUST CONTROL DAMPERS SHALL BE IN THEIR NORMAL POSITION ALLOWING THE EXHAUST AIR TO PASS THROUGH ERV-2 TO PRE-CONDITION THE OUTSIDE AIR THROUGH A TOTAL HEAT EXCHANGE. SHOULD THE OUTSIDE AIR TEMPERATURE RISE ABOVE 70°F (AD.J.), AS SENSED BY THE OUTSIDE AIR TEMPERATURE SWITCH, THE DAMPERS SHALL OPEN OR CLOSE TO THE OPPOSITE POSITION FROM NORMAL TO ALLOW THE EXHAUST AIR TO GO DIRECTLY TO THE EXHAUST FAN (EF-2) WITHOUT PASSING THROUGH ERV-2. THE DAMPERS SHALL REMAIN IN THIS POSITION UNTIL THE OUTSIDE AIR TEMPERATURE DROPS BELOW THE SETPOINT.
- 5.4. IN OCCUPIED MODE SHOULD THE MAKE-UP AIR SUPPLY TEMPERATURE DROP BELOW 70°F (ADJ.) AS SENSED AT THE MAKE-UP AIR DUCT
- TEMPERATURE SENSOR A CALL FOR HEAT SHALL BE SENT TO THE ZONE I TERMINAL IN THE THE BOILER ZONE CONTROLLER. ONCE THE SUPPLY WATER TEMPERATURE RISES ABOVE 120°F (ADJ.) AT THE HOT WATER AQUASTAT SWITCH AND AIRFLOW IS POSITIVELY PROVEN AT THE AIRFLOW PROVING SWITCH THE MODULATING TEMPERATURE CONTROL VALVE (CV-I) SHALL BE ENABLED
- THE ELECTRONIC VALVE CONTROLLER SHALL MODULATE THE THREE WAY CONTROL VALVE (CV-I) OPEN TO THE HEATING COIL (HC-I) TO RESTORE THE MAKE-UP AIR TEMPERATURE TO THE SETPOINT.
- 6. THE SPACE TEMPERATURE SHALL BE CONTROLLED AS FOLLOWS REGARDLESS OF OCCUPIED/UNOCCUPIED OPERATIONAL MODE.
- 6.1. SHOULD THE SPACE TEMPERATURE DROP BELOW THE SETPOINT AT THE PROGRAMMABLE WALL THERMOSTAT A CALL FOR HEAT SHALL BE SENT TO THE ZONE 2 TERMINAL IN THE THE BOILER ZONE CONTROLLER.
- 6.2. IF THE SUPPLY WATER TEMPERATURE IS EQUAL TO OR LESS THAN 110°F (ADJ.) AT THE HOT WATER AQUASTAT SWITCH THE MODULATING TEMPERATURE CONTROL VALVE (CV-2) SHALL BE ENABLED
- 6.3. THE THERMOSTAT SHALL MODULATE THE THREE WAY CONTROL VALVE (CV-2) OPEN TO THE RADIANT FLOOR HEATING DISTRIBUTION MANIFOLDS TO RESTORE THE SPACE TEMPERATURE TO THE SETPOINT.



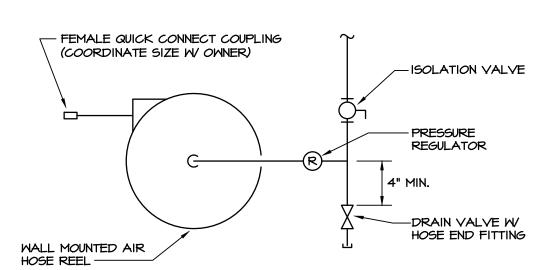
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PLL	PLUMBING FIXTURE SCHEDULE									
SYMBOL	FIXTURE	CM	HM	SAN	VENT	MOUNTING	MANUFACTURER	MODEL	REMARKS	
MC-I	WATER CLOSET (ADA)	l"	-	4"	-	WALL	AMERICAN STANDARD	2257.101	PROVIDE WITH SLOAN III-1.28 MANUAL FLUSH VALVE WITH HANDLE TO OPEN SIDE OF TOILET ROOM PER ADA REQUIREMENTS AND AMERICAN STANDARD 5905.100 SEAT	
MC-2	WATER CLOSET	1"	-	4"	-	WALL	AMERICAN STANDARD	2257.101	PROVIDE WITH SLOAN III-1.28 MANUAL FLUSH VALVE AND AMERICAN STANDARD 5905.100 SEAT	
UR-I	URINAL (ADA)	1/2"	-	2"	I-I/2"	WALL	AMERICAN STANDARD	6590.00IEC	PROVIDE WITH SLOAN 186 SMO-0.125-OR BATTERY FLUSH VALVE AND WALL HANGER BRACKETS	
UR-2	URINAL (ADA)	1/2"	-	2"	I-I/2"	MALL	AMERICAN STANDARD	6590.00IEC	PROVIDE WITH SLOAN 186 SMO-0.125-OR BATTERY FLUSH VALVE AND WALL HANGER BRACKETS	
LAV-I	LAVAT <i>O</i> RY	1/2"	1/2"	I-I/4"	I-I/4"	COUNTER	AMERICAN STANDARD	0419.444EC	PROV. W AMERICAN STD. 6114.115.002 FAUCET, WATTS LFMMV BELOW DECK THERMOSTATIC MIXING VALVE, GRID STRAINER WITH OFF-SET TAILPIECE, ANGLE STOPS, WALL HANGER BRACKETS AND 'TRUBRO' PRE-CUT LAV SHIELD	
LAV-2	LAVAT <i>O</i> RY	l/2"	1/2"	I-I/4"	I-I/4"	WALL	AMERICAN STANDARD	<i>0</i> 355. <i>0</i> 12	PROVIDE WITH AMERICAN STANDARD 7500.170 FAUCET, GRID STRAINER WITH OFF-SET TAILPIECE, ANGLE STOPS, WALL HANGER BRACKETS AND 'TRUBRO' PRE-CUT LAV SHIELD.	
MSB-I	MOP SERVICE BASIN	1/2"	1/2"	3"	2"	FL00R	FIAT	MSB2424	PROVIDE WITH GRID STRAINER, MODEL 889-CC MOP HANGER, MODEL 830-AA FAUCET WITH INTEGRAL STOPS, VACUUM BREAKER, PAIL HOOK AND THREADED HOSE END FITTING. FOR USE WITH WH-2	
SH-I	SHOWER TRIM	1/2"	1/2"	2"	I-I/2"	WALL	AMERICAN STANDARD	TU6625G.213	PROVIDE WITH ZURN ZN415B7-Q-4 DRAIN WITH ADJUSTABLE CHROME PLATED TOP AND SEDIMENT BUCKET. PROVIDE FREEDOM SHOWERS MODEL APFSLR-280225 SHOWER SEAT.	
SK-I	SINK	l/2"	1/2"	I-I/2"	I-I/2"	COUNTER	ELKAY	LRADQ331965PD	PROVIDE WITH ELKAY FAUCET MODEL LK5000, ELKAY MODEL, LKDS99 DRAIN FITTING, CHROME PLATED P-TRAP W OFFSET TAILPIECE, AND CHROME PLATED QUARTER TURN ANGLE STOPS	
EW-I	EYE WASH	1/2" -		-	-	MALL	ACORN	50410	ADA COMPLIANT COMBINATION EMERGENCY EYE WASH SAFETY SHOWER WITH ANSI Z358.I-2014 THERMOSTATIC MIXING VALVE	
DF-I	DRINKING FOUNTAIN	1/2"	-	I-I/2"	I-I/4"	WALL	ELKAY	EDFPBII7C	PROVIDE WITH WALL CARRIER	

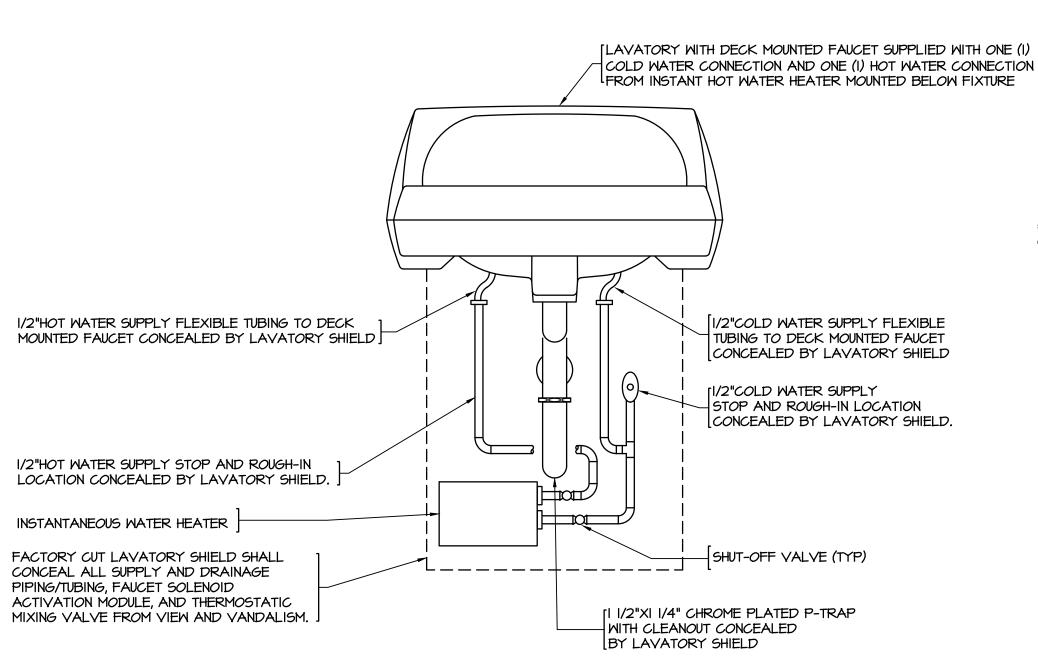
NOTE: ALL FIXTURES FURNISHED BY THE CONTRACTOR.

MA	WATER HEATER SCHEDULE											
ITEM	TANK RECOVERY GAS BASIS OF DESIGN											
NO.	TYPE / FUEL	CAPACITY			VOLTAGE	MANUFACTURER	MODEL	NOTES				
MH-I	NATURAL GAS	60 GALLONS	125,000	145 @ 100°F	(2) 3"	120-14	BRADFORD WHITE	EF-60T-125E-3N(A)	1, 2, 3, 4, 5			
ИH-2	ELECTRIC	INSTANTANEOUS	4.1 KW	-	-	208-14	CHRONOMITE	M-20L/208-MM	6			
MH-3	ELECTRIC	INSTANTANEOUS	8.3 KW	N/A	N/A	208-14	CHRONOMITE	M-40EW/208	7			

- I. PROVIDE WITH AMTROL MODEL ST-5C EXPANSION TANK.
- 2. PROVIDE DRAIN PAN WITH 3/4" THREADED OUTLET FITTING. PAN TO HAVE MINIMUM DIAMETER EQUAL TO HEATER TANK DIAMETER +10" AND A MINIMUM DEPTH OF 3".
- 3. PROVIDE WITH BELL AND GOSSETT ECOCIRC 19-16 SERIES, MODEL 6050B2004LF RECIRC. PUMP. 0.5 GPM AT 3 FT HD, 120V-14, 60 WATTS MAX. PROVIDE W/ AQS-I/2 PIPE MOUNTED AQUASTAT.
- 4. PROVIDE WITH 3" PVC CONCENTRIC VENT TERMINATION KIT.
- 5. PROVIDE ACID NEUTRALIZER FOR FLUE GAS CONDENSATE.
- 6. FOR USE WITH FIXTURE LAV-2. CONCEAL WITHIN LAV SHIELD.
- 7. FOR USE WITH EYE WASH, EW-I.

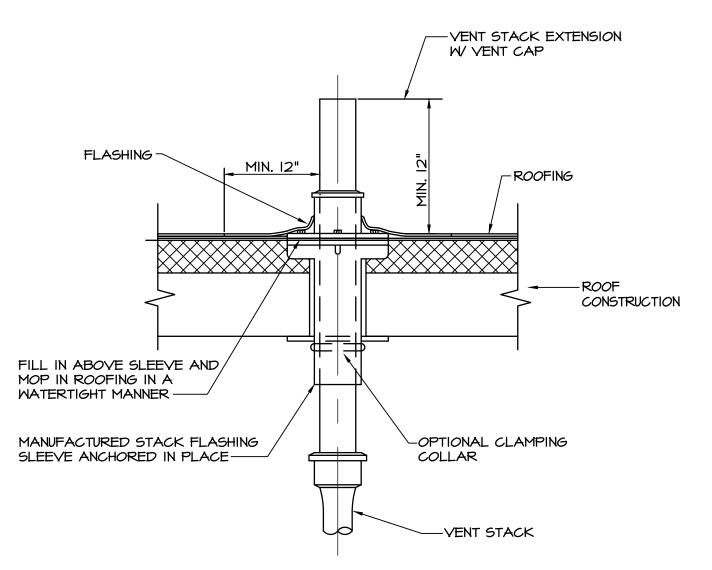


TYPICAL COMPRESSED AIR DROP DETAIL SCALE: NONE

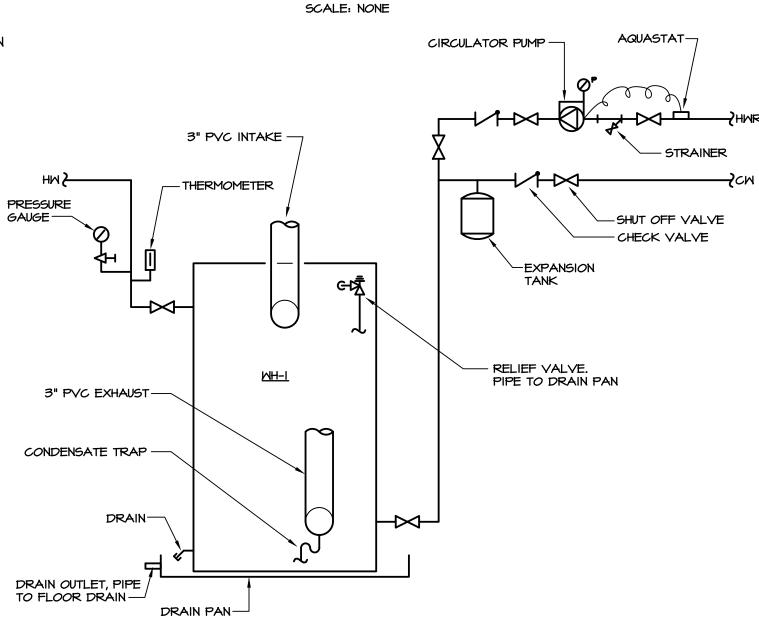


INSTANTANEOUS WATER HEATER DETAIL

SCALE: NONE



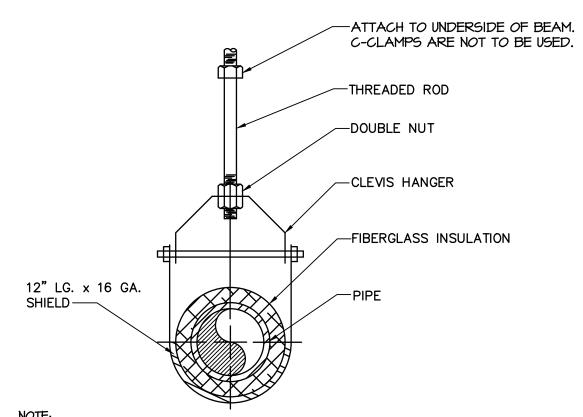
VENT THROUGH ROOF DETAIL



WATER HEATER PIPING DETAIL

MISCELLANEOUS EQUIPMENT

- FD-1: 2" FLOOR DRAIN. ZURN MODEL ZN-415B W/ ZURN MODEL ZIO72-2 TRAP SEAL DEVICE.
- <u>FD-2</u>: 4" FLOOR DRAIN. ZURN MODEL ZN-415B W/ ZURN MODEL Z1072-4 TRAP SEAL DEVICE.
- IMD-I: 2" INDIRECT WASTE DRAIN. ZURN MODEL ZN-415B W/ INDIRECT WASTE FUNNEL AND ZURN MODEL ZIO72-2 TRAP SEAL DEVICE.
- FCO: FLOOR CLEAN OUT (FULL LINE SIZE). ZURN MODEL ZN-1400.
- MCO: WALL CLEAN OUT (FULL LINE SIZE). ZURN MODEL Z-1446 W/ BRONZE PLUG AND POLISHED
- HB-1: 3/4" COLD WATER HOSE BIBB. WOODFORD MODEL 21-CP.
- HB-2: 34" NON-FREEZE WALL HYDRANT. WOODFORD MODEL 67.
- HB-3: 片" HOT AND COLD WATER MIXING HOSE BIBB. WOODFORD MODEL 122C
- TDM-I: TRENCH DRAIN MODULE, ZURN MODEL Z882-8201-EI-DGC W/ CLOSED END CAP AND CLASS 'C' DUCTILE IRON GRATE.
- CB-I: 24xI2 TRENCH DRAIN CATCH BASIN. ZURN MODEL Z887-I2-U4-IA (Z882) DGC-4 W CLASS 'C' DUCTILE IRON GRATE, 4" NO-HUB BOTTOM OUTLET ADAPTER, ZURN Z882 INLET ADAPTERS AS REQUIRED AND LIFT OUT SEDIMENT BUCKET.
- CB-2: 24x24 TRENCH DRAIN CATCH BASIN. ZURN MODEL Z887-24-U4-DGC-4 W/ CLASS 'C' DUCTILE IRON GRATE, 4" NO-HUB BOTTOM OUTLET ADAPTER AND LIFT OUT SEDIMENT BUCKET.
- $\underline{\text{MB-I}}$: WASHING MACHINE OUTLET BOX. GUY GRAY MODEL DLWBI. DUAL LEVER, $\underline{\text{K}}$ " TOP SUPPLIES, 2" CENTER DRAIN BOTTOM OUTLET.
- WHA: WATER HAMMER ARRESTOR (SIZED PER PLUMBING DRAINAGE INSTITUTE WH-201 GUIDELINES). ZURN SERIES 1260XL.
- $\underline{\text{HR-I}}$: SPRING RETRACTABLE WALL MOUNTED AIR HOSE REEL AND HOSE, $\cancel{1}$ $\cancel{1}$ $\cancel{1}$ HOSE 100'-0" LONG. REELCRAFT MODEL 82100 OLP
- <u>HR-2:</u> SPRING RETRACTABLE WALL MOUNTED AIR HOSE REEL AND HOSE, ½"ゆ HOSE 50'-0" LONG. REELCRAFT MODEL B5850 OLP
- OI-I: OIL INTERCEPTOR. ROCKFORD MODEL ROI-1000. PROVIDE WITH HEAVY TRAFFIC REINFORCED COVERS AND INTEGRAL EXTENSION(S) AS REQUIRED.
- SI-I: SOLIDS INTERCEPTOR. ROCKFORD MODEL RCB-60. PROVIDE WITH HEAVY TRAFFIC REINFORCED COVERS AND INTEGRAL EXTENSION AS REQUIRED.



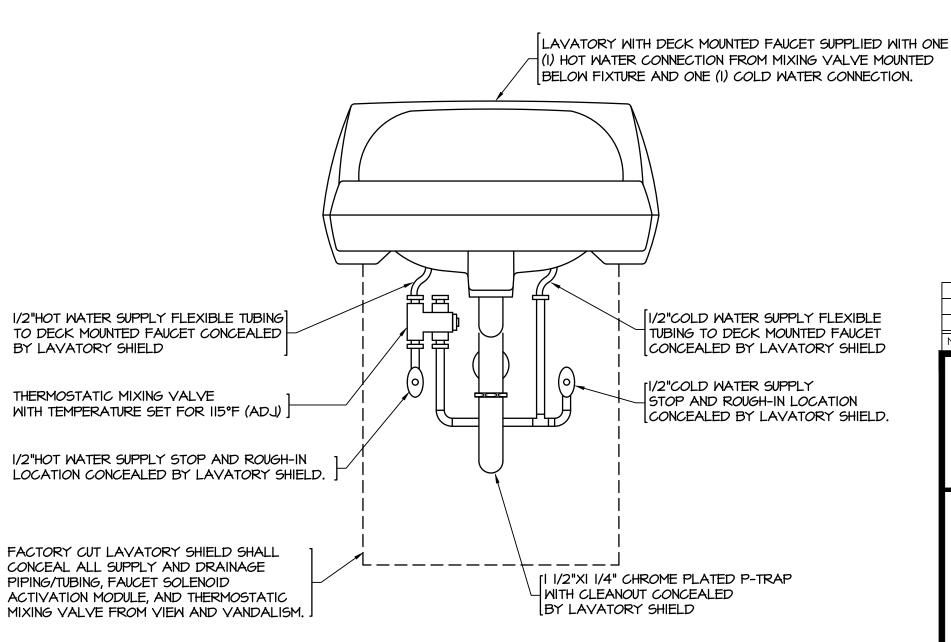
I. ALL MAT'L AND HARDWARE TO BE GALVANIZED OR FACTORY WHITE POWDER

CLEVIS HANGER DETAIL

SCALE: NONE

PLUMBING NOTES

- CONTRACTOR SHALL EXAMINE ALL DRAWINGS AND SPECIFICATIONS AND VISIT THE SITE TO BECOME ACQUAINTED WITH THE CONSTRUCTION AND THE EXTENT OF THE
- 2. CONTRACTOR SHALL PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE, WHETHER SPECIFIED OR IMPLIED.
- 3. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2015 INTERNATIONAL MECHANICAL CODE, 2015 INTERNATIONAL FUEL GAS CODE, 2015 INTERNATIONAL PLUMBING CODE AND ALL OTHER REQUIREMENTS OF THE LOCAL AUTHORITIES HAVING
- 4. CONTRACTOR SHALL GIVE ALL NOTICES, OBTAIN AND PAY FOR ALL PERMITS, DEPOSITS AND FEES NECESSARY.
- 5. DO NOT SCALE THE DRAWINGS FOR EXACT DIMENSIONS, THE DESIGN DRAWINGS ARE DIAGRAMMATIC AND INDICATED THE GENERAL LAYOUT AND CONNECTIONS, CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSION, ETC AT THE JOB SITE.
- 6. CONTRACTOR SHALL REVIEW THE WORK OF OTHER TRADES TO PREVENT INTERFERENCE BETWEEN BEAMS, STRUCTURES, PIPING, LIGHTING FIXTURES ETC. BEFORE PROCEEDING WITH NEW WORK.
- 7. CONTRACTOR SHALL GUARANTEE THE ENTIRE JOB AGAINST DEFECTS IN WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE (I) YEAR FROM THE DATE OF FINAL ACCEPTANCE. THIS GUARANTEE SHALL BE BINDING REGARDLESS OF MANUFACTURER'S GUARANTEE AND CONTRACTOR SHALL REMOVE AND REPLACE ALL DEFECTIVE MATERIAL REGARDLESS OF CAUSE (EXCEPT FOR DEFECTS TRACEABLE TO IMPROPER MAINTENANCE OR MALICIOUS DESTRUCTION OCCURRING AFTER THE SYSTEM HAS BEEN TURNED OVER).
- 8. ALL MATERIALS USED ANYWHERE IN THE WORK SHALL HAVE NFPA RATING AS
- FOLLOWS: A. FLAME SPREAD-NOT OVER 25
- B. SMOKE DEVELOPED- NOTE OVER 50 C. FUEL CONTRIBUTED- NOTE OVER 25
- ALL MATERIALS SHALL BE 'SELF EXTINGUISHING' 9. SUBMIT TO THE ENGINEER FOR APPROVAL, DUPLICATE SPECIFICATION SHEETS OF ALL FIXTURE OR EQUIPMENT SUPPLIED OR INSTALLED
- IO. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING OR EXCEEDING WALL/CEILING/FLOOR ASSEMBLY RATINGS FOR ALL PENETRATIONS, CONTRACTOR SHALL VERIFY LOCATION AND RATING OF ALL FIRE ASSEMBLIES AND PROVIDE INTUMESCENT COLLARS AT ALL PIPE PENETRATIONS FIRE DAMPERS WITH ACCESS PANELS AT ALL DUCT PENETRATION AND FIRE RATED CAULKING AS REQUIRED.
- II. ALL MECHANICAL EQUIPMENT AND APPLIANCES INSTALLED SHALL BEAR THE LABEL OF AN APPROVED AGENCY.
- 12. EQUIPMENT AND MATERIAL ARE SPECIFIED TO ESTABLISH A STANDARD OF QUALITY. ALL MATERIAL AND EQUIPMENT USED FOR THIS CONTRACT SHALL BE NEW AND UNUSED AND OF THE LATEST MODEL OR DESIGN AVAILABLE.
- 13. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL STRUCTURAL STEEL, SUPPORTS, BRACES, HANGERS, ETC. REQUIRED FOR HIS CONTRACT UNLESS OTHERWISE NOTED. CONTRACTOR SHALL COORDINATE ALL EQUIPMENT SUPPORT LOCATION AND INSTALLATION WITH ROOFING AND STRUCTURAL CONTRACTOR.
- 14. CONTRACTOR SHALL INFORM THE ENGINEER OF ANY QUESTIONS OR DISCREPANCIES PRIOR TO PRECURSOR AND/OR FABRICATION OF ANY MATERIAL AND INSTALLATION.
- 15. SUPPORT ALL EQUIPMENT AND PIPING WITH VIBRATION ISOLATION HANGERS AS REQUIRED TO PROVIDE A VIBRATION FREE INSTALLATION.
- 16. UPON COMPLETION OF THE WORK, REMOVE ALL EXCESS MATERIAL, DEBRIS, TOOLS, AND EQUIPMENT FROM THE SITE, AND LEAVE THE PREMISES IN A BROOM CLEAN CONDITION.
- 17. CONTRACTOR SHALL PROVIDE THREE (3) COMPLETE SETS OF BOUND OPERATING AND MAINTENANCE INSTRUCTIONS. CONTRACTOR SHALL INSTRUCT THE OWNER OR HIS AGENT WITH REGARD TO THE PROPER USE OF THE SYSTEM UNTIL SUCH INSTRUCTION IS COMPLETE TO THE OWNER'S SATISFACTION.
- 18. UNDER ALTERNATE BID C-I ELIMINATE THE GAS BRANCH PIPING FEEDING THE BOILER, ELIMINATE THE DOMESTIC FEED WATER TO THE HOT WATER HEATING SYSTEM AND ELIMINATE THE FLOOR DRAIN IN MECHANICAL ROOM 126 ALONG WITH ALL ASSOCIATED BRANCH PIPING. ADD GAS DISTRIBUTION AND BRANCH PIPING TO (3) UNIT HEATERS IN MAINTENANCE BAY 123 AND PROVIDE AN ADDITION IDW-I FOR UNIT HEATER CONDENSATE DRAIN DISCHARGE ALONG THE WALL SEPARATING MAINTENANCE BAY 123 AND 26 BAY GARAGE 122 BETWEEN COLUMN LINES 8 AND 9.



LAVATORY MIXING VALVE DETAIL

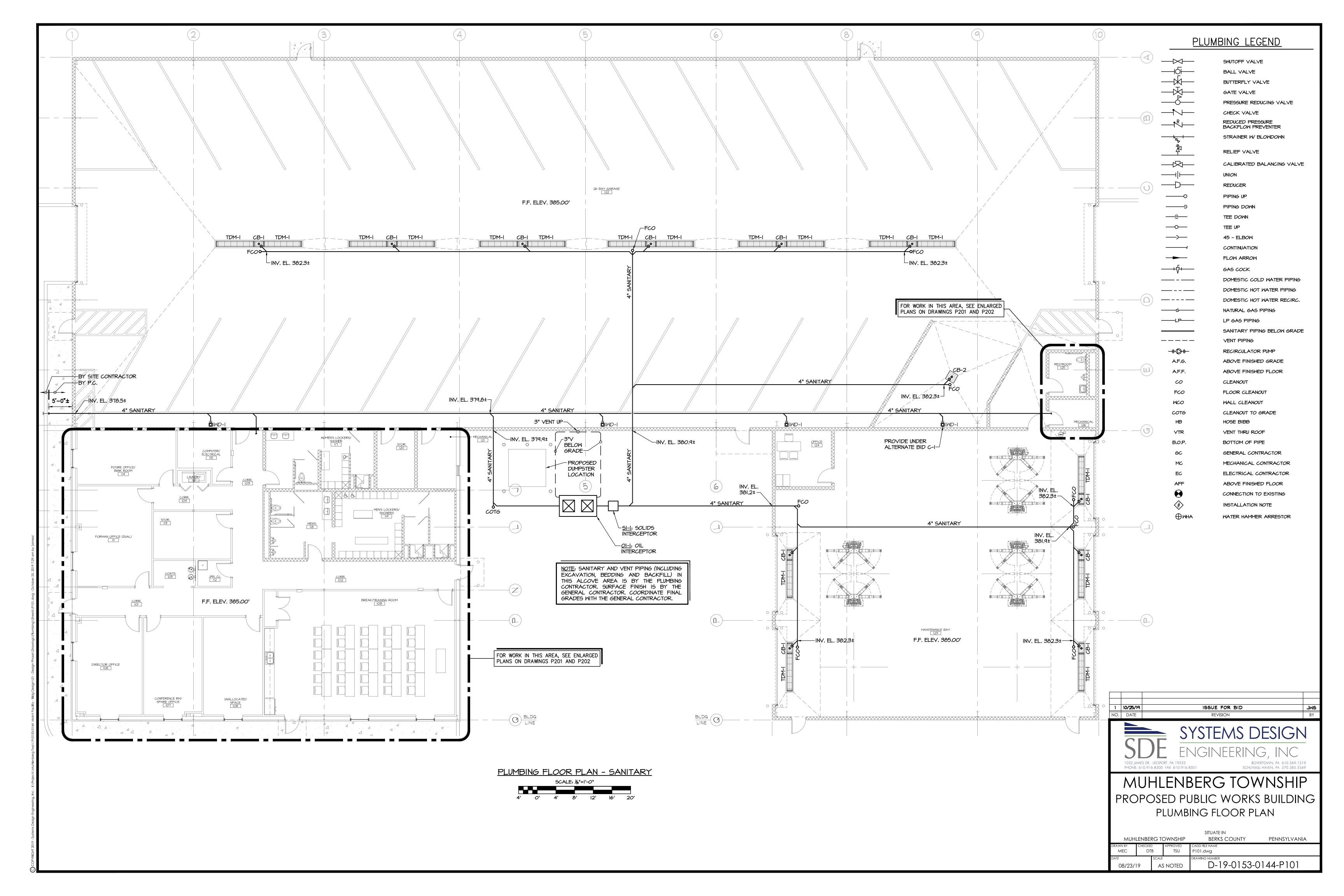
SCALE: NONE

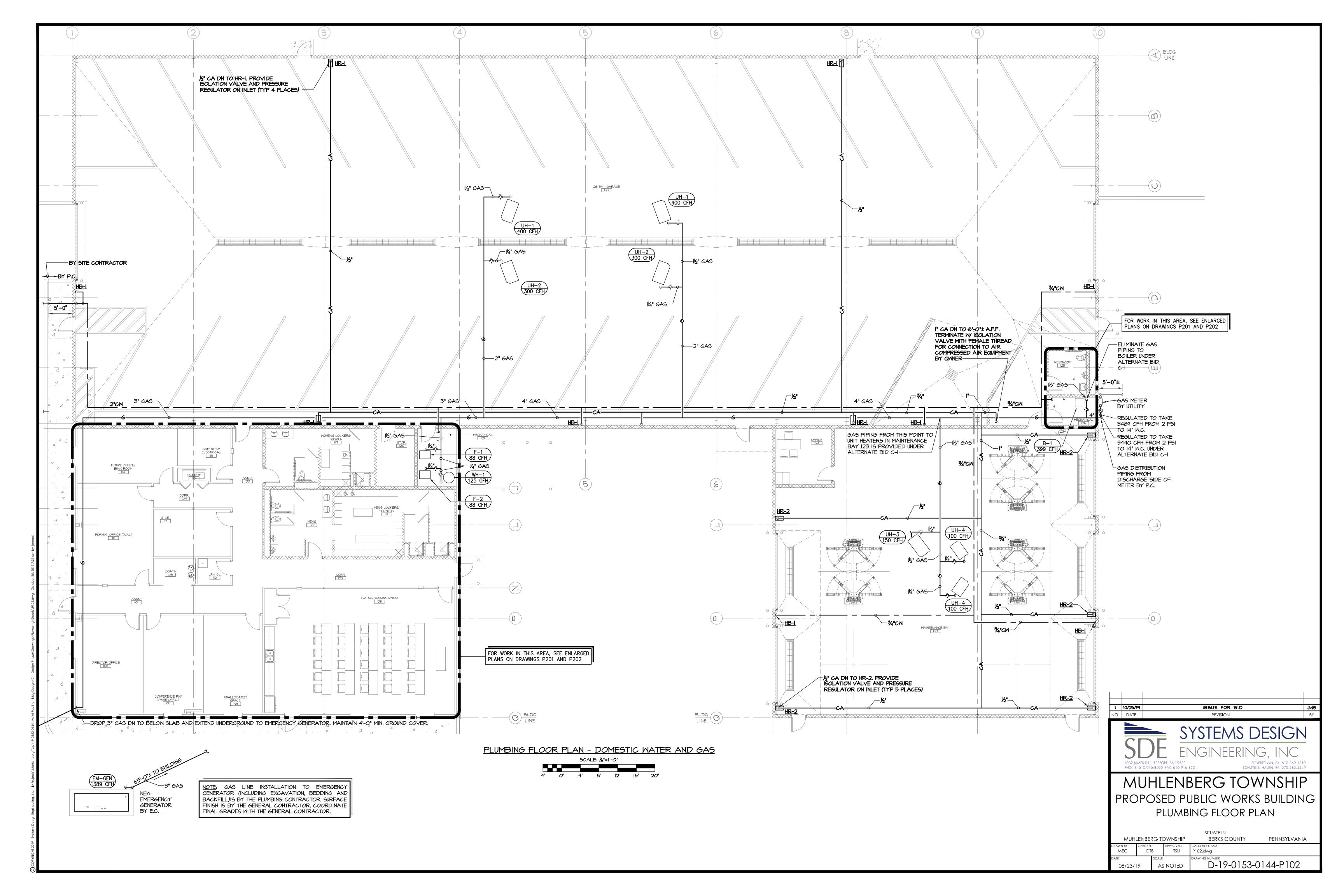
10/25/19 ISSUE FOR BID MUHLENBERG TOWNSHIP

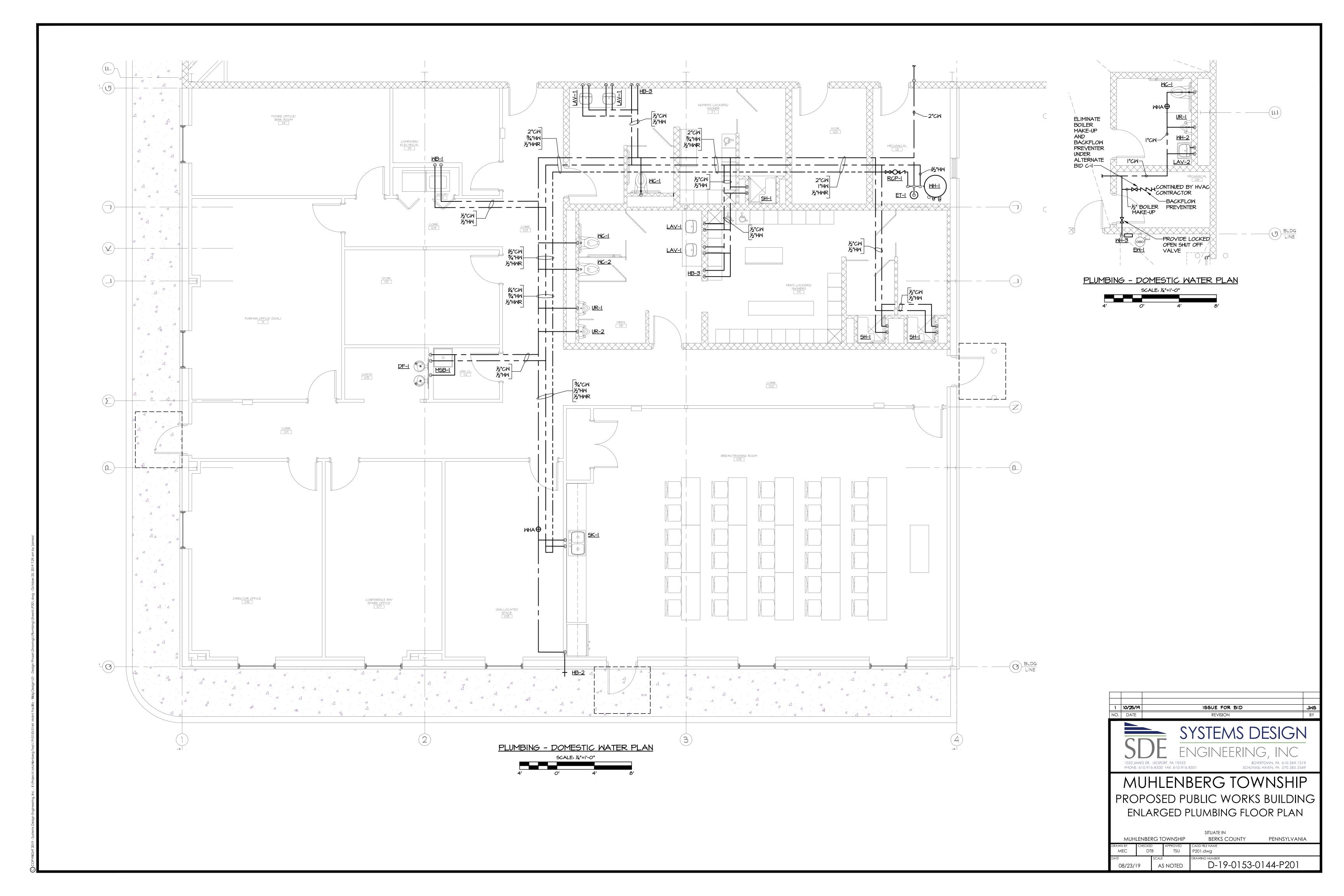
PROPOSED PUBLIC WORKS BUILDING PLUMBING SCHEDULES AND DETAILS

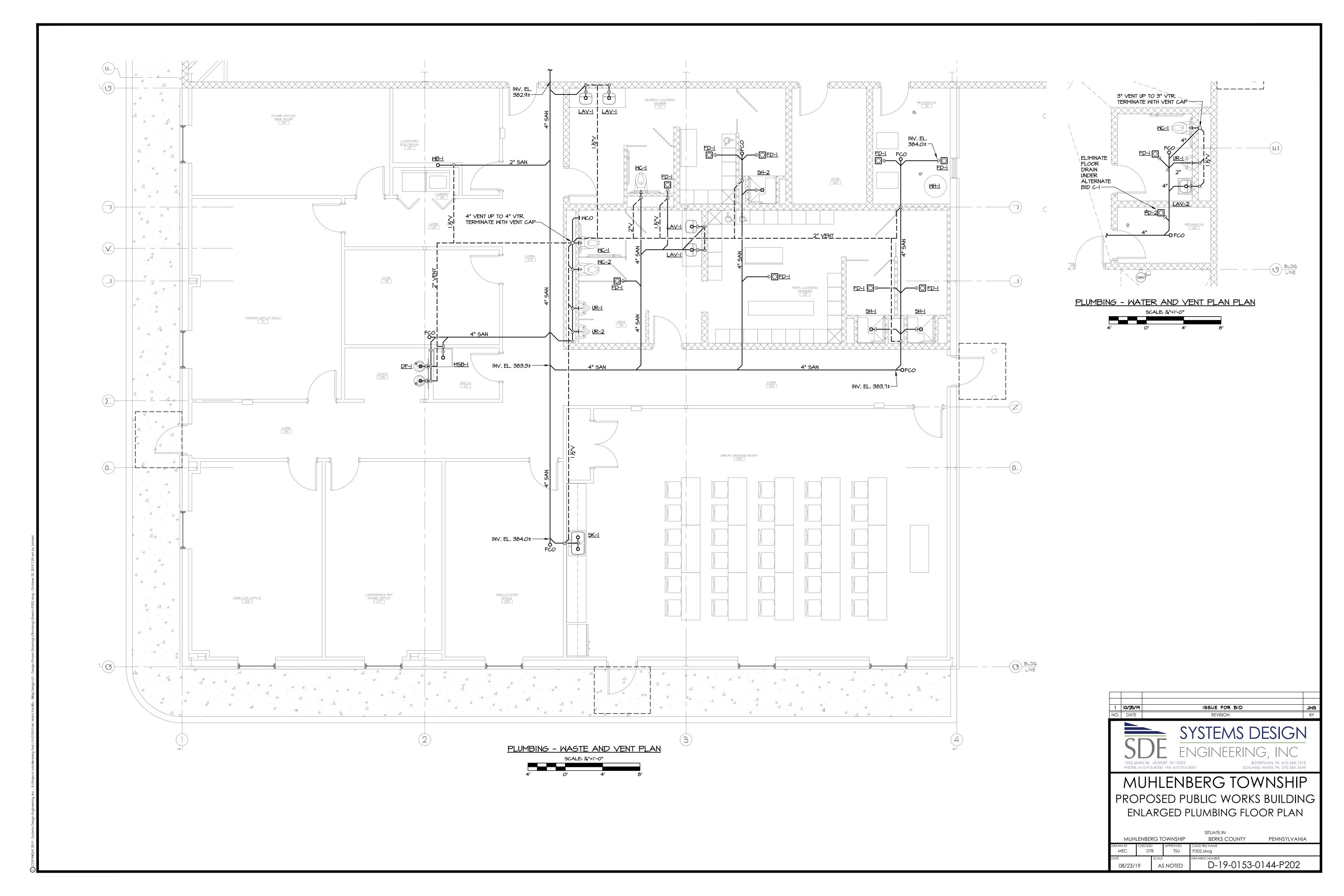
BERKS COUNTY PENNSYLVANIA MUHLENBERG TOWNSHIP

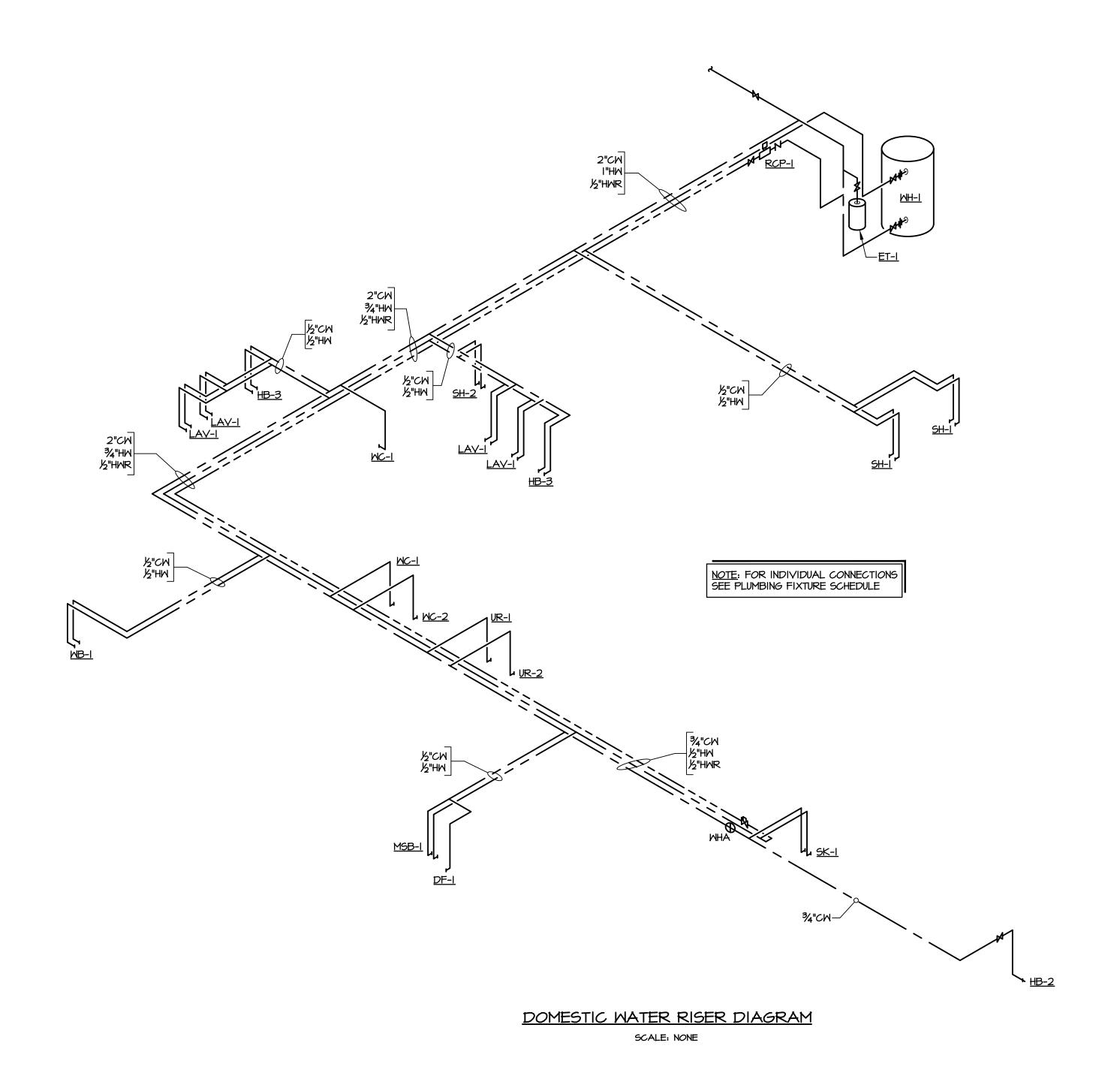
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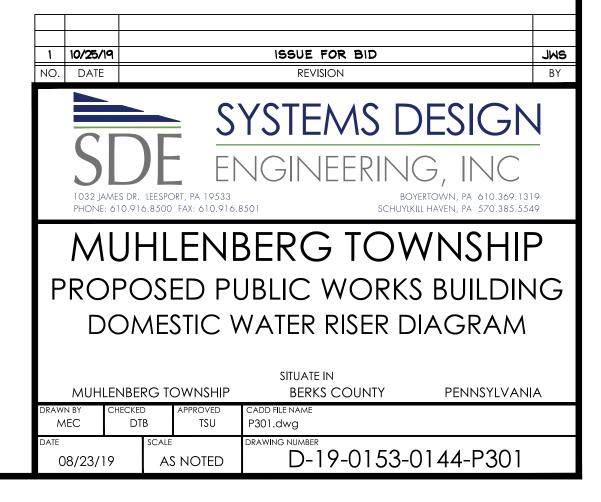


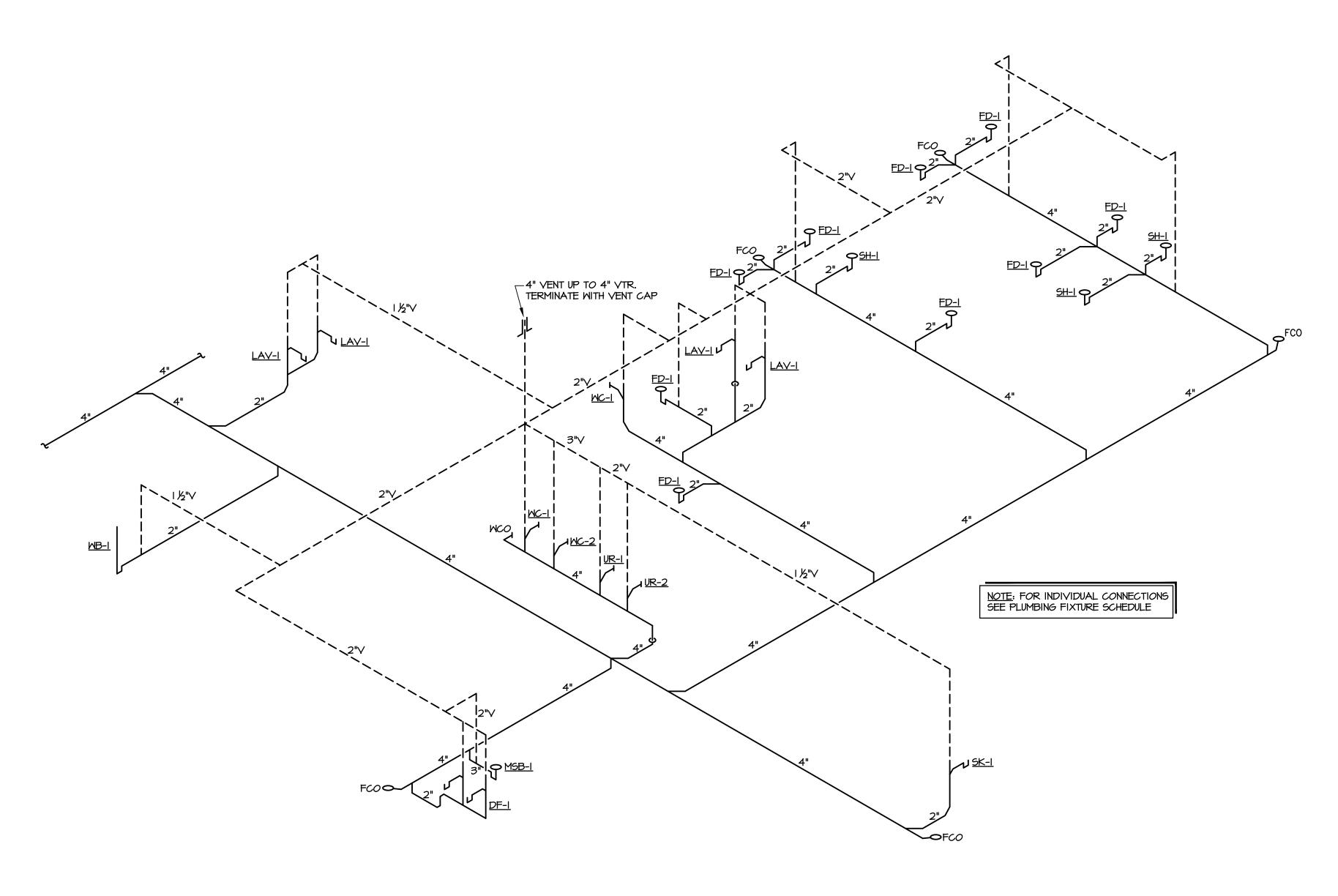




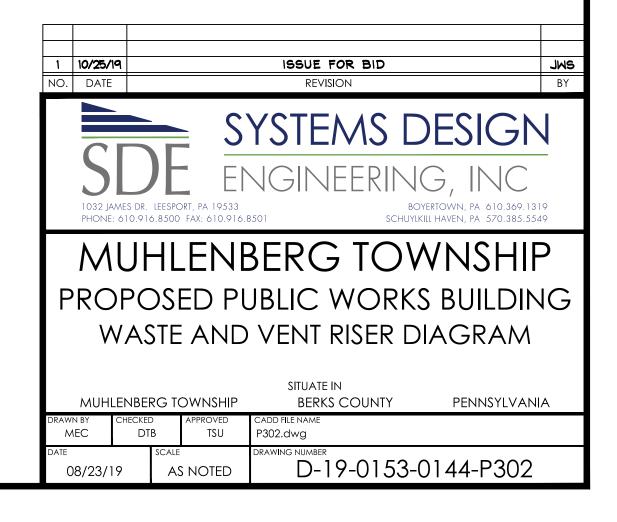


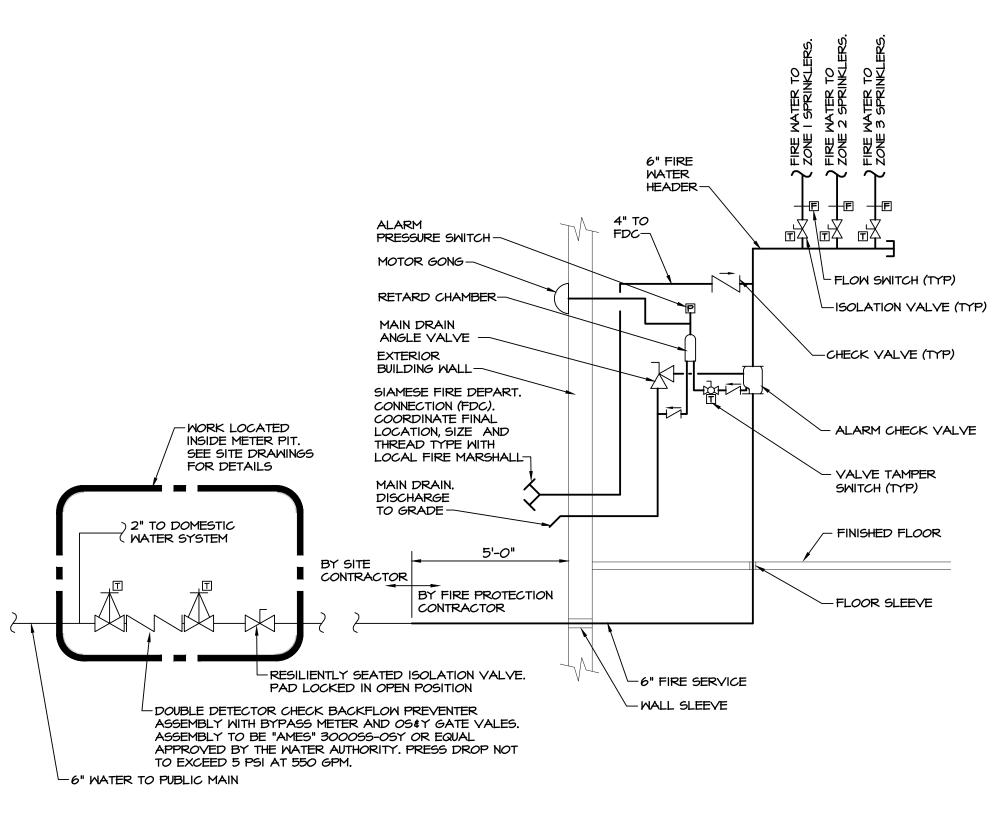






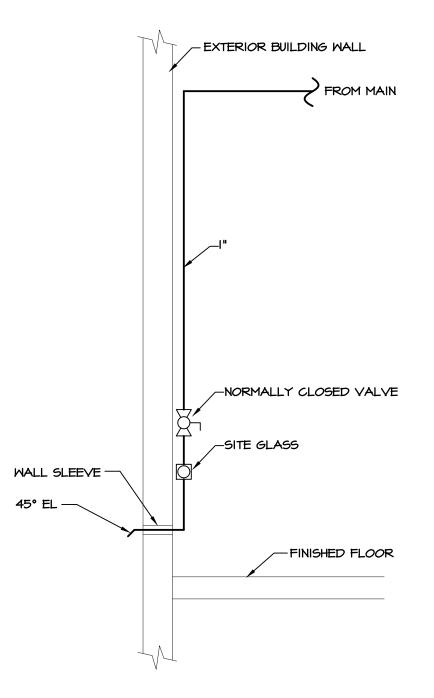
WASTE AND VENT RISER DIAGRAM
SCALE: NONE





FIRE PROTECTION RISER DETAIL

SCALE: NONE



INSPECTOR TEST DRAIN DETAIL

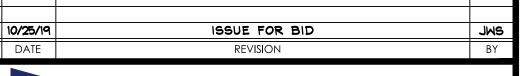
SCALE: NONE

GENERAL NOTES:

- I. THE FIRE PROTECTION WORK IS TO BE A DESIGN BUILD, HYDRAULICALLY CALCULATED WET SPRINKLER SYSTEM. SYSTEM LAYOUT AND HYDRAULIC CALCULATIONS SHALL BE BASED ON THE FIRE HAZARDS INDICATED ON THE PLAN. THE FIRE PROTECTION CONTRACTOR MUST PROVIDE HYDRAULIC CALCULATIONS BASED ON CURRENT FLOW TEST DATA OBTAINED FROM THE LOCAL WATER AUTHORITY AND HIS/HER PROPOSED SYSTEM LAYOUT. THE SYSTEM SHALL BE DESIGNED TO PROVIDE THE WORST CASE DEMAND BASED ON THE AREA DENSITY CURVE TABLE INDICATED IN FIGURE 19.3.3.1.1 OF THE 2019 EDITION OF NEPA 13.
- 2. SPRINKLER PIPING AND HEADS SHOWN ARE FOR REFERENCE ONLY. CONTRACTOR SHALL FIELD VERIFY DESIGN CONDITIONS AND COORDINATE WITH OTHER PROJECT CONTRACTORS TO DEVELOP THE FINAL SPRINKLER LAYOUT. COMPLETE LAYOUT AND HYDRAULIC CALCULATIONS SHALL BE APPROVED BY THE LOCAL AUTHORITY HAVING JURISDICTION AND THE OWNER'S INSURANCE CARRIER PRIOR TO STARTING CONSTRUCTION.
- 3. EACH OF THE PROPOSED AREAS SERVED BY THE WET PIPE SYSTEM SHALL BE DESIGNED AS AN INDEPENDENT FIRE ZONES. EACH ZONE SHALL HAVE ITS OWN SUPERVISED ISOLATION VALVE, ALARM FLOW SWITCH AND INSPECTOR'S TEST
- 4. SUPERVISORY DEVICES AND ALARM DEVICES INDICATED SHALL BE FURNISHED AND INSTALLED BY THE FIRE PROTECTION CONTRACTOR. ADDRESSABLE FIRE ALARM SYSTEM INTERFACE DEVICES AND FIRE ALARM SYSTEM LOOP WIRING SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. THE FIRE PROTECTION CONTRACTOR SHALL COORDINATE THE NUMBER OF DEVICES, THE LOCATION OF DEVICES, AND FIRE ALARM SYSTEM COMPATIBILITY WITH THE ELECTRICAL CONTRACTOR PROVIDING THE FIRE ALARM SYSTEM.
- 5. COORDINATION OF NEW HEAD HEAD LOCATIONS SHALL BE THE RESPONSIBILITY OF THE FIRE PROTECTION CONTRACTOR. FINAL LOCATIONS SHALL BE COORDINATED WITH OTHER TRADES. PENDANT SPRINKLER HEADS INSTALLED IN SUSPENDED CEILINGS SHALL BE INSTALLED AT THE CENTER OF A CEILING TILE BASED ON A 2x2 CEILING GRID (NOTE: THE ACTUAL CEILING GRID MAY BE 2x4 BUT HEAD LAYOUT SHALL BE BASED ON A 2x2) UNLESS INDICATED OR OTHERWISE APPROVED BY THE OWNER OR ARCHITECT.
- 6. THE CONTRACTOR SHALL EXAMINE ALL DRAWINGS AND SPECIFICATIONS AND VISIT THE SITE TO BECOME ACQUAINTED WITH THE CONSTRUCTION AND THE EXTENT OF THE WORK.
- 7. CONTRACTOR SHALL PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE FIRE PROTECTION SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE, WHETHER SPECIFIED OR IMPLIED.
- 8. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2015 INTERNATIONAL FIRE CODE (IFC 2015), THE 2019 NFPA 13 STANDARD, AND ALL OTHER REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. IN ADDITION WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE OWNER'S INSURANCE CARRIER.
- 9. CONTRACTOR SHALL GIVE ALL NOTICES, OBTAIN AND PAY FOR ALL PERMITS, DEPOSITS AND FEES NECESSARY.
- IO. DO NOT SCALE THE DRAWINGS. THE DESIGN DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LAYOUT AND CONNECTIONS, CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS, ETC PRIOR TO BEGINNING CONSTRUCTION.
- II. CONTRACTOR SHALL REVIEW THE WORK OF OTHER TRADES AND COORDINATE WITH SAID TRADES TO AVOID INTERFERENCE WITH BEAMS, STRUCTURES, PIPING, DUCTWORK, LIGHTING FIXTURES ETC. BEFORE PROCEEDING WITH NEW WORK
- 12. CONTRACTOR SHALL GUARANTEE THE ENTIRE JOB AGAINST DEFECTS IN WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE (I) YEAR FROM THE DATE OF FINAL ACCEPTANCE. THIS GUARANTEE SHALL BE BINDING REGARDLESS OF MANUFACTURER'S GUARANTEE AND CONTRACTOR SHALL REMOVE AND REPLACE ALL DEFECTIVE MATERIAL REGARDLESS OF CAUSE (EXCEPT FOR DEFECTS TRACEABLE TO IMPROPER MAINTENANCE OR MALICIOUS DESTRUCTION OCCURRING AFTER THE SYSTEM HAS BEEN TURNED OVER).
- 13. ALL EQUIPMENT AND APPLIANCES INSTALLED SHALL BEAR THE LABEL OF AN APPROVED AGENCY.
- 14. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL STRUCTURAL STEEL, SUPPORTS, BRACES, HANGERS, ETC. REQUIRED FOR HIS CONTRACT UNLESS OTHERWISE NOTED.
- 15. CONTRACTOR SHALL INFORM THE ENGINEER OF ANY QUESTIONS OR DISCREPANCIES PRIOR TO PURCHASING AND/OR FABRICATION OF ANY MATERIAL AND INSTALLATION.
- 16. UPON COMPLETION ALL PIPING SHALL BE HYDROSTATICALLY TESTING AT 200 PSI FOR A PERIOD OF TWO HOURS. TESTING SHALL BE PERFORMED IN ACCORDANCE WITH NFPA 13 AND SHALL BE CONDUCTED IN THE PRESENCE OF THE AUTHORITY HAVING JURISDICTION.
- 17. UPON COMPLETION OF THE WORK, REMOVE ALL EXCESS MATERIAL, DEBRIS, TOOLS, AND EQUIPMENT FROM THE SITE, AND LEAVE THE PREMISES IN A CLEAN CONDITION.
- 18. FIRE HYDRANT FLOW TEST DATA SHALL BE INCLUDED WITH THE SPECIFICATIONS. CONTRACTOR SHALL BASE HIS/HER HYDRAULIC CALCULATION ON THE WORST CASE RESIDUAL PRESSURE INDICATED IN THE REPORT. CONTRACTOR SHALL COORDINATE INCOMING SERVICE LINE TO 5 FT. OUTSIDE OF THE BUILDING WITH THE SITE OR GENERAL CONTRACTOR. CONTRACTOR SHALL ARRANGE FOR AN ADDITIONAL FLOW TEST TO CONFIRM ADEQUACY OF THE RESIDUAL PRESSURE AT THE POINT OF CONNECTION, 5 FT. OUTSIDE OF THE BUILDING LINE AFTER THE SERVICE HAS BEEN INSTALLED BY THE SITE OR GENERAL CONTRACTOR AND PRIOR TO COMPLETING HYDRAULIC CALCULATIONS AND COMMENCING INSTALLATION WORK INSIDE THE FACILITY.

FIRE PROTECTION LEGEND

 0	PIPING UP
 5	PIPING DOWN
	TEE DOWN
—	TEE UP
	45 - ELBOW
─	CONTINUATION
-F—	FIRE SPRINKLER PIPE (WET SYSTEM)
×	UPRIGHT SPRINKLER HEAD
•	PENDANT SPRINKLER HEAD
⊠ _H	HIGH TEMPERATURE UPRIGHT SPRINKLER HEAD
T	TAMPER SMITCH
E	FLOM SMITCH
P	WATER PRESSURE SWITCH





MUHLENBERG TOWNSHIP PROPOSED PUBLIC WORKS BUILDING

FIRE PROTECTION LEGEND,
DETAILS, AND GENERAL NOTES

				SITUATE IN				
MUHI	LENBE	RG TO	PIHSNWC	BERKS COUNTY PENNSYLVANI				
DRAWN BY	CHECKED APPROVED		APPROVED	CADD FILE NAME				
DTB	DTB DTB TSU		TSU	FP100.dwg				
DATE	DATE SCALE			DRAWING NUMBER				
08/23/19		AS	NOTED	D-19-0153-0144-FP100				

