ADDENDUM NO. 1
TO THE
SPECIFICATIONS AND CONTRACT DOCUMENTS

for

City Project No. FAC23008

Camas Operations Center Mechanical and Electrical Improvements

September 25, 2024

IMPORTANT: *This addendum must be signed and submitted with the proposal.*

TO ALL PLANHOLDERS:

The following changes, additions, and/or deletions are made a part of the contract documents and bid specifications for the construction of the *Camas Operations Center Mechanical and Electrical Improvements, FAC23008*, as fully and completely as if the same were set forth therein:

Memorandum of Changes:

Windsor Engineering (EOR) has provided MEP revision narrative regarding changes and clarifications to mechanical, electrical, and control plans and specifications. This document summarizes changes and clarifications.
See attached 2 sheets dated September 24, 2024.

Mechanical Plan Sheets M001, M101, and M501

Delete plan sheet M001, M101, and M501 in their entirety and replace with revised plan sheets.
See attached plan sheets M001, M101, and M501.

Electrical Plan Sheets E100, E201, and E601

Delete plan sheet E100, E201, and E601 in their entirety and replace with revised plan sheets.
See attach plan sheet E100, E201, and E601

Mechanical Specification Section 230923 Direct Digital Control System

Revise Acceptable Manufacturers to be Automated Logic and Reliable Controls
Delete Specification 230923 and replace in their entirety with revised specification. *See attached revised specification 230923.*

Receipt of this addendum is hereby acknowledged:

_____

Signature of Owner or Authorized Corporate Officer

ADDENDUM #1
FAC23008

MEMO

WINDSOR ENGINEERS

TO: City of Camas
FROM: Windsor Engineers
DATE: September 24, 2024
SUBJECT: Camas Operations Center – Bid Addendum Revisions

MEP Revision Narrative

The purpose of this memo is to clarify the changes to the design between the 100 CD Set dated 07/18/24, and the Bid Addendum Set dated 09/25/24. Windsor has provided 'For Reference' clouded drawings and this narrative. Please note that all changes may not be clarified on the narrative or the drawings. The prospective subcontractors shall review the current drawing set and identify all changes.

Sheet	Permit Comments	Revised Items
MECHANICAL		
M001	BAS Controls: • Clarify AHU-1 will be required to be integrated into controls system. • Clarify that TWP-1 will not be required to be integrated into the control system. • Add door switches to turn infrared heaters off when doors are open. • Windsor to clarify how the source capture system is controlled and if integration into the BAS is required.	• AHU-1 has been in the list of systems to be integrated into the BMS control system. • Packaged terminal heat pump (TWP-1) removed from the list of systems to be integrated into the BMS control system. • Note regarding door switches added to Infrared heater schedules. • Vehicle exhaust system added to the list of systems to be integrated into the BMS control system.
M101	• Relocate the source capture exhaust fan and wall penetration to minimize the chance of a coordination issue occurring with the garbage truck bay.	• Source Capture Fan and associated penetration have been relocated to avoid the garbage truck bay.
M501	• Revise infrared heater detail to include seismic bracing.	• Cables for seismic bracing have been added to the Infrared Heater Detail.

General Mechanical	• Windsor to verify seismic curbs are not required for rooftop exhaust fans.	• Called Austin from Waypoint and confirmed seismic curbs are not required for the exhaust fans.
Mechanical Specification Section 230923	• Revise spec to include Reliable and Automated Logic. In lieu of Johnson Barrow and Clima-tech	• Spec has been updated to simply mention Reliable and Automated Logic as the acceptable manufacturers.
ELECTRICAL		
E100	• Move generator and associated equipment to new location.	• Generator and associated equipment moved to other side of lift station.
E100	• Change route between utility transformer and 2SBD-1.	• Trench between utility transformer and 2SBD-1 has changed to go across the road.
E100	• Show site utilities.	• Sanitary sewer, water and sewer main lines showing.
E100	• Show that existing 2” and 1-1/4” conduits are being used.	• 2” conduit is shown to be used for 2LC-1 and 1-1/4” conduit shown to be used for generator annunciator panel.
E100	• Show generator concrete pad.	• Generator concrete pad shown along with structural detail.
E201	• Add start/stop switches for REF’s and GCF’s for local control.	• Start/stop switches now shown by panels for local control.
E601	• Show conduit and feeder requirements between 2SBD-1 and MDP.	• Requirements now shown for exact conduit and feeder size.
E601	• Verify feeder size to 2LC-1 still correct with 2LC-1 now further out.	• Feeder size upsized for to account for voltage drop.

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PIPE ACCESSORIES

- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- BALANCING VALVE
- MOTORIZED 2-WAY VALVE
- MOTORIZED 3-WAY VALVE
- GATE VALVE
- GLOBE VALVE
- LOCKED SHIELD VALVE
- PLUG VALVE
- PRESSURE REDUCING VALVE
- QUICK OPENING VALVE
- FLUID STRAINER
- HOSE BIBB

PIPING SYSTEMS

CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
STM	STEAM
REF	REFRIGERANT
CD	CONDENSATE DRAIN

DUCT ACCESSORIES

- BDD — BACKDRAFT DAMPER
- FD — FIRE DAMPER
- FSD — FIRE SMOKE DAMPER
- SD — SMOKE DAMPER
- M — MOTORIZED DAMPER
- VD — VOLUME DAMPER

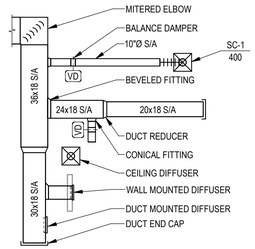
GENERAL SYMBOLS

- 1 — KEYNOTE
- X — REVISION TAG
- REVISION CLOUD
- X / XXX — DETAIL/PLAN CALLOUT
- N — NORTH ARROW
- MATCH LINE / SEE -/--- — MATCHLINE
- POINT OF CONNECTION
- POINT OF DEMOLITION
- CONTINUATION SYMBOL
- AREA TO BE DEMOLISHED
- AREA NOT IN CONTRACT

HVAC SYMBOLS & TAGS

- T — THERMOSTAT
- H — HUMIDISTAT
- TH — TEMPERATURE & HUMIDITY SENSOR
- HS — HUMIDITY SENSOR
- MS — MANUAL SWITCH
- S — SENSOR
- CO — CARBON MONOXIDE (CO) SENSOR
- CO_2 — CARBON DIOXIDE (CO_2) SENSOR
- NO_2 — NITROGEN DIOXIDE (NO_2) SENSOR
- DOOR UNDERCUT
- AHU-101 — EQUIPMENT TAG
- TYPE / SIZE CFM — DIFFUSER TAG

DUCTWORK LEGEND



DUCT SYSTEMS

DOWN	UP	
24x18 S/A		SUPPLY AIR
24x18 S-O/A		CONDITIONED OUTSIDE AIR
24x18 O/A		OUTSIDE AIR
24x18 R/A		RETURN AIR
24x18 T/A		TRANSFER AIR
24x18 E/A		EXHAUST AIR
24x18 L/A		RELIEF AIR
24x18 G/A		GREASE EXHAUST AIR
24x18 SE/A		SMOKE EXHAUST AIR
24x18 FLUE		FLUE GAS VENT
24"Ø C/A		COMBUSTION AIR

ABBREVIATIONS

Ø	ROUND
AC	AIR CONDITIONING
ADD	ADDENDUM
AFF	ABOVE FINISHED FLOOR
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY
ALT	ALTERNATE
AP	ACCESS PANEL
ARCH	ARCHITECT/ARCHITECTURAL
BFF	BELOW FINISHED FLOOR
BTU	BRITISH THERMAL UNITS
BTUH	BRITISH THERMAL UNITS PER HOUR
CAP	CAPACITY
CFM	CUBIC FEET PER MINUTE
CO	CLEAN OUT
D	DEGREE
DB	DRY BULB
DIA	DIAMETER
DN	DOWN
EAT	ENTERING AIR TEMPERATURE
ELEC	ELECTRICAL
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EA	EXHAUST AIR
(E)	EXISTING
°F	DEGREES FAHRENHEIT
FD	FIRE DAMPER
FL	FLOOR
FO	FUEL OIL
FOV	FUEL OIL VENT
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FPM	FEET PER MINUTE
FS	FLOOR SINK
FT	FOOT/FEET
GAL	GALLON
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
HP	HORSE POWER
ID	INDIRECT
IN	INCH
INV	INVERT
LB	POUND
LB/HR	POUNDS PER HOUR
LAT	LEAVING AIR TEMPERATURE
LP	LOW PRESSURE
LPG	LIQUEFIED PETROLEUM GAS
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
M/A	MIXED AIR
MAX	MAXIMUM
MBH	ONE THOUSAND BTU PER HOUR
MCF	ONE THOUSAND CUBIC FEET
MD	MOTORIZED DAMPER
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MUA	MAKE-UP/AIR
NC	NOISE CRITERIA
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NUMBER
NO	NORMALLY OPEN
NTS	NOT TO SCALE
O	OXYGEN
O/A	OUTSIDE AIR
PD	PRESSURE DROP
PRESS	PRESSURE
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
PWR	POWER
(R)	RELOCATE
R/A	RETURN AIR
RCP	RADIANT CEILING PANEL
REC	RECESSED
RED	REDUCER
RH	RELATIVE HUMIDITY
RL/A	RELIEF AIR
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SF	SQUARE FOOT
S/A	SUPPLY AIR
SF	SQUARE FOOT
SD	SMOKE DAMPER
SM	SURFACE MOUNT
SP	STANDPIPE
SP	STATIC PRESSURE
STM	STEAM
T	THERMOSTAT
TD	TEMPERATURE DROP
TEMP	TEMPERATURE
TYP	TYPICAL
UG	UNDERGROUND
VAC	VACUUM
V	VENT
VAV	VARIABLE AIR VOLUME
VENT	VENTILATION
WB	WET BULB
(X)	DEMOLISH

LIFE SAFETY NOTES

REFER TO LIFE SAFETY PLANS FOR LOCATIONS AND RATINGS OF WALL TYPES.

SMOKE PARTITION
SMOKE DAMPERS REQUIRED AT TRANSFER AIR OPENINGS ONLY.

FIRE BARRIERS (1-HR)
1.5-HR FIRE DAMPER REQUIRED AT TRANSFER AIR OPENINGS ONLY. DUCTS SHALL NOT PENETRATE EXIT PASSAGEWAY OR STAIRWAY ENCLOSURE.

SMOKE BARRIER (1-HR)
SMOKE DAMPERS REQUIRED AT ALL DUCT PENETRATIONS. TRANSFER AIR OPENINGS REQUIRE A 1.5-HR COMBINATION FIRE/SMOKE DAMPER.

FIRE BARRIER (2-HR)
1.5-HR FIRE DAMPER AT ALL DUCT PENETRATIONS.

FIRE/SMOKE BARRIER (2-HR)
1.5-HR COMBINATION FIRE/SMOKE DAMPERS ARE REQUIRED AT ALL DUCT PENETRATIONS.

SHAFT ENCLOSURES:
1.5-HOUR COMBINATION FIRE/SMOKE DAMPER IS REQUIRED AT EACH PENETRATION OF A SHAFT ENCLOSURE. IF THE SHAFT DOES NOT EXTEND ALL THE WAY TO THE BOTTOM OF THE BUILDING, PLACE A HORIZONTAL FIRE/SMOKE DAMPER AT THE FLOOR LEVEL WHERE THE DUCT EMERGES FROM THE BOTTOM OF THE SHAFT.

2021 WSEC NOTES

- C403.1.2: LOAD CALCULATIONS PERFORMED PER ASHRAE STD 183 OR EQUIVALENT, USING DESIGN PARAMETERS PER C302 AND APPENDIX C; INCLUDE LOAD ADJUSTMENTS TO ACCOUNT FOR ENERGY RECOVERY.
- C403.3.1: EQUIPMENT AND SYSTEM SIZING: OUTPUT CAPACITIES OF HEATING AND COOLING EQUIPMENT AND SYSTEMS ARE NO GREATER THAN THE SMALLEST AVAILABLE EQUIPMENT SIZE THAT EXCEEDS THE CALCULATED LOADS. NO EXCEPTIONS APPLIED.
- C403.3.2 ECONOMIZERS DO NOT INCREASE THE BUILDING HEATING ENERGY USAGE DURING NORMAL OPERATION.
- C403.4.2: AUTOMATIC SETBACK AND SHUTDOWN: INDICATE ZONE THERMOSTATIC CONTROLS CONFIGURED WITH REQUIRED AUTOMATIC SETBACK AND MANUAL OVERRIDE FUNCTIONS, SETBACK TEMPERATURES, AND CONTROL METHOD (AUTOMATIC TIME CLOCK OR 7 DAY PROGRAMMABLE CONTROLS).
- C403.4.2.3: OPTIMUM START AND STOP: INDICATE ALL HVAC SYSTEMS ARE PROVIDED WITH AUTOMATIC START AND STOP CONTROLS; INDICATE START CONTROLS ARE CONFIGURED TO ADJUST THE EQUIPMENT START TIME AS REQUIRED TO BRING EACH AREA SERVED UP TO DESIGN TEMPERATURE JUST PRIOR TO SCHEDULED OCCUPANCY; INDICATE STOP CONTROLS ARE CONFIGURED TO REDUCE HEATING SETPOINT AND INCREASE COOLING SETPOINT BY AT LEAST 2°F PRIOR TO SCHEDULED UNOCCUPIED PERIODS.
- C408: COMMISSIONING: A CERTIFIED COMMISSIONING PROFESSIONAL SHALL COMPLETE A COMMISSIONING PROCESS ON ALL MECHANICAL, REFRIGERATION, SERVICE WATER HEATING, ELECTRICAL POWER, LIGHTING, AND ENERGY METERING SYSTEMS IN ACCORDANCE WITH APPLICABLE PORTIONS OF WSEC C408. PROCESS SHALL INCLUDE:
  1. A COMMISSIONING PLAN IN ACCORDANCE WITH WSEC C408.1.2.
  2. SYSTEM BALANCING IN ACCORDANCE WITH WSEC C408.2.2
  3. FUNCTIONAL PERFORMANCE TESTING IN ACCORDANCE WITH WSEC C408.2.3
  4. A FINAL COMMISIONING REPORT IN ACCORDANCE WITH WSEC C408.1.3.
  5. PROVIDING EVIDENCE SYSTEMS COMMISSIONED IN ACCORDANCE WITH WSEC C408.1.4.

CONTROL SEQUENCE OF OPERATION

SHOP EXHAUST FANS
1. ROOFTOP EXHAUST FANS OPERATION TO BE CONTROLLED BY CARBON MONOXIDE/NITROGEN DIOXIDE SENSORS. WHEN SENSORS DETECT 15 PPM OF EITHER CONTAMINANT, FANS TO TURN ON AND OPERATE AT FULL SPEED.
2. MAKEUP AIR TO BE PROVIDED BY EXISTING ROOFTOP INTAKE LOUVERS

INFRARED HEATERS
1. HEATING: UPON A CALL FOR HEATING FROM ZONE THERMOSTAT, THE INFRARED HEATER WILL BE FIRED AND OPERATE TO MAINTAIN SPACE TEMPERATURE SETPOINT.
   A. OCCUPIED SETPOINT TO BE 65 DEGREES F.
   B. UNOCCUPIED SETPOINT TO BE 45 DEGREES F.

PORTABLE OFFICE AIR HANDLING UNIT AND PACKAGED THROUGH WALL AIR CONDITIONER
SYSTEM TO BE A DIRECT REPLACEMENT OF THE EXISTING PACKAGED AIR HANDLING UNIT:
1. HEATING: HEATING OF CONDITIONED SPACES TO BE ACCOMPLISHED PRIMARILY VIA HEAT PUMP OPERATION. UPON A CALL FOR HEAT, THE UNIT SHALL SWITCH TO HEAT PUMP TO MAINTAIN SPACE TEMPERATURE SETPOINT. IF SPACE SETPOINT IS UNABLE TO BE REACHED, SUPPLEMENTAL ELECTRIC HEATING WILL BE ENERGIZED TO MAINTAIN SPACE SETPOINT.
2. COOLING: TO BE ACCOMPLISHED BY AIR HANDLING UNIT. UPON CALL FOR COOLING UNIT IS TO RUN COOLING CYCLE AND SUPPLY AIRFLOW AS NEEDED TO MAINTAIN SPACE SETPOINT.

MECHANICAL BASIS OF DESIGN

BUILDING DESCRIPTION
EXISTING BUILDING OF WOOD FRAMED CONSTRUCTION. THE PROJECT IS LOCATED IN CAMAS, WA.

MECHANICAL SCOPE DESCRIPTIONS
INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

SHOP:
- VENTILATION: ROOFTOP EXHAUST FANS FOR GENERAL SPACE, SOURCE CAPTURE SYSTEM FOR VEHICLE FUMES.
- HEATING: INFRARED HEATERS.

STREET PARKS STORAGE:
- VENTILATION: NONE.
- HEATING: INFRARED HEATERS.

PORTABLE BUILDING:
- VENTILATION: PACKAGED AHU.
- HEATING AND COOLING: PACKAGED AHU.

OFFICE SPACES (EXISTING):
- VENTILATION: EXISTING FURNACE UNITS.
- HEATING AND COOLING: EXISTING FURNACE UNITS.

RELIABLE CONTROLS BMS SYSTEM TO BE INSTALLED TO CONTROL THE FOLLOWING EQUIPMENT SYSTEMS:
- NEW CONTROL SYSTEM TO MONITOR AND CONTROL EXISTING AND NEW MECHANICAL EQUIPMENT AS DESCRIBED IN THE CONTROL SEQUENCE OF OPERATION.
- EXISTING EQUIPMENT (EQUIPMENT NUMBERS PER 4-2-93 SET):
  1. FURNACES (F-1, F-2, F-3)
  2. CONDENSING UNITS (CU-1, CU-2, CU-3)
  3. VENTILATION FAN (VF-1)
  4. ROOF EXHAUST FAN (REF-5)
- NEW EQUIPMENT
  1. AIR HANDLING UNIT (AHU-01)
  2. FANS (REF-1, REF-2, REF-3, REF-4, GCF-1, GCF-2, EF-1)
  3. VEHICLE EXHAUST SYSTEM (VEF-1)
     A. PROVIDE AUTOGATE AND VFD TO RAMP BETWEEN FAN SPEEDS.
  4. INFRARED HEATERS (IFH-1,2,3,4,5,6,7,8,9,10,11,12)
     A. PROVIDE DOOR SWITCHES AND INTERLOCK WITH INFRARED HEATER OPERATION.

1

CODES AND STANDARDS
BUILDING MECHANICAL SYSTEMS ARE DESIGN IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:
- 2021 INTERNATIONAL BUILDING CODE WITH WASHINGTON AMENDMENTS
- 2021 INTERNATIONAL MECHANICAL CODE WITH WASHINGTON AMENDMENTS
- 2021 WASHINGTON STATE ENERGY CODE
- 2021 UNIFORM PLUMBING CODE WITH WASHINGTON AMENDMENTS
- 2021 INTERNATIONAL FIRE CODE

HVAC DESIGN CRITERIA
PORTLAND TROUTDALE, OR

ASHRAE FUNDAMENTALS 2021

ELEVATION: 29'
LAT: 45.551 N
LONG: 122.409 W

OUTDOOR DESIGN CONDITIONS

WINTER: 25.4°F DB (99.6%)
SUMMER: 91.6°F DB (0.4%)
67.4°F WB (0.4%)

INDOOR DESIGN CONDITIONS
OFFICE SPACES
COOLING: 75°F +/- 2°F (LIVING ROOM ONLY)
HEATING: 70°F +/- 2°F (ENTIRE UNIT)
HEATING-ONLY SPACES
STREET PARTS STORAGE: 65°F +/- 2°F
SHOP: 65°F +/- 2°F

VENTILATION CRITERIA
COMPLY WITH 2021 WASHINGTON STATE MECHANICAL CODE CHAPTER 4. RESIDENTIAL SPACES VIA 403.4, ALL OTHERS VIA 403.3.1.

EXHAUST CRITERIA (MINIMUM RATES)

PUBLIC RESTROOMS:	PER WATER CLOSET / URINAL AS PER IMC
RESIDENTIAL BATHROOMS:	50 CFM INTERMITTENT / 20 CFM CONTINUOUS
RESIDENTIAL LAUNDRY AREAS:	20 CFM CONTINUOUS
TRASH ROOMS:	1 CFM/FT²
PARKING GARAGE:	0.06 CFM/FT² MIN. / 0.75 CFM/FT² MAX.

BUILDING ENVELOPE ASSUMPTIONS

ROOF:	R-15.4 CI (U-0.065)
STEEL FRAMED WALLS:	R-8 CI (U-0.124)
6" WOOD FRAMED WALLS:	R-15 BATT (U-0.089)
MASS WALLS:	R-6.6 CI (U-0.151)
OPAQUE DOOR:	U-1.45
FIXED GLAZING:	U-0.57
OPERABLE GLAZING:	U-0.67

WSEC COMPLIANCE PATHS
ADDITIONAL EFFICIENCY PACKAGE OPTIONS: (LIST OPTIONS THAT APPLY TO MECHANICAL)

HVAC SHEET INDEX

GENERAL NOTES

1. REMOVE ALL UNUSED PIPING, DUCTWORK AND ACCESSORIES.
2. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING, PRIOR TO FINAL BID, ALL EXISTING CONDITIONS FOR PLUMBING AND MECHANICAL SYSTEMS WITHIN TENANT SPACE AND WITHIN CLOSE PROXIMITY OF TENANT SPACE.
3. THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND EQUIPMENT. FINAL LOCATIONS OF EQUIPMENT SHALL BE FIELD DETERMINED. ALL DISCREPANCIES IN THE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IN WRITING PRIOR TO SUBMISSION.
4. COORDINATE INSTALLATION OF PIPING, DUCTWORK, CONDUIT, LIGHTS, CABLE TRAY, STRUCTURE, AND EQUIPMENT TO PREVENT CONFLICTS.
5. THE CONTRACTOR SHALL BE FAMILIAR WITH ALL THE CONDITIONS BOTH EXISTING AND THOSE ILLUSTRATED BY THESE DOCUMENTS AS WELL AS THOSE WHICH CAN BE REASONABLY ANTICIPATED INCLUDING, BUT NOT LIMITED TO ARCHITECTURAL, ELECTRICAL, VENTILATION, PLUMBING, AND OTHER SYSTEMS INVOLVED ON THIS PROJECT.
6. FINAL PRODUCT SHALL BE A COMPLETE AND FUNCTIONING SYSTEM, AND SHALL CONFORM TO ALL REQUIREMENTS OF APPLICABLE FEDERAL, STATE AND LOCAL CODES, INCLUDING BUT NOT LIMITED TO THE INTERNATIONAL BUILDING CODE AND INTERNATIONAL MECHANICAL CODE.
7. EQUIPMENT FOR OTHER DISCIPLINES MAY BE SHOWN FOR REFERENCE ONLY. REFER TO OTHER DISCIPLINES' DRAWINGS FOR MORE DETAIL REGARDING EQUIPMENT SPECIFICATIONS AND INFORMATION.
8. PLANS SHALL GOVERN IN MATTERS OF QUANTITY, SPECIFICATIONS SHALL GOVERN IN MATTERS OF QUALITY. IN CASE OF DISCREPANCY BETWEEN DRAWINGS AND SPECIFICATIONS, THE SPECIFICATIONS SHALL GOVERN. PLANS ARE TO BE TIED TO SPECIFICATIONS FOR A COMPLETE DESIGN PACKAGE. NOTIFY ENGINEER OF ANY DISCREPANCY BETWEEN DRAWINGS AND SPECIFICATIONS.
9. ANYTHING MENTIONED IN THE SPECIFICATIONS AND NOT SHOWN ON THE DRAWINGS, OR SHOWN ON THE DRAWINGS AND NOT MENTIONED IN THE SPECIFICATIONS, SHALL BE OF LIKE EFFECT AS IF SHOWN OR MENTIONED IN BOTH.
10. LOCATE EQUIPMENT REQUIRING ACCESS 2'-0" MAXIMUM ABOVE CEILING.
11. ALL ROOF MOUNTED EQUIPMENT SHALL BE A MINIMUM 10'-0" FROM EDGE OF ROOF.
12. LOCATE DUCTWORK, PIPING AND MECHANICAL EQUIPMENT AWAY FROM THE SPACE ABOVE ELECTRICAL PANELS, TRANSFORMERS AND OTHER ELECTRICAL EQUIPMENT.
13. PROVIDE FIRE PROOFING FOR ALL PENETRATIONS OF FIRE RATED ASSEMBLIES. FIRE PROOFING MUST BE EQUIVALENT OR HIGHER TO THAT OF THE PENETRATED ASSEMBLY. REFER TO ARCHITECTURAL PLANS.
14. PROVIDE SLEEVES AND/OR OPENINGS TO RUN PIPES AND DUCTS THROUGH FOUNDATIONS, FLOORS, WALLS, AND ROOF. CONSULT STRUCTRAL ENGINEER OF RECORD FOR ALL STRUCTURAL PENETRATIONS. PROVIDE WATER-PROOFING AS NEEDED FOR ALL EXTERIOR PENETRATIONS.
15. ADJUST PIPING AND DUCTWORK SIZES TO PROPERLY CONNECT TO MECHANICAL EQUIPMENT.
16. REFER TO PLUMBING SERIES DRAWINGS FOR GAS AND A.C. CONDENSATE DRAIN PIPING.
17. PIPE AND DUCTWORK SIZES SHOWN SHALL BE CONTINUED IN THE DIRECTION OF FLOW UNTIL ANOTHER SIZE IS SHOWN.
18. FOR DETAILS, EQUIPMENT CONNECTIONS, DUCT AND PIPE SIZES NOT SHOWN ON THE SEGMENTS, REFER TO DETAILS, SCHEDULES, AND SPECIFICATIONS.
19. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE RESPECTIVE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AT A LEVEL OF QUALITY AND WORKMANSHIP CONSISTENT WITH THE SPECIFICATIONS.
20. LOCATIONS OF PIPING, DUCTWORK AND EQUIPMENT AS INDICATED ON THE DRAWINGS, ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. WORK SHALL BE COORDINATED WITH ALL OTHER TRADES TO AVOID INTERFERENCE IN THE FIELD.
21. INSTALL EXPOSED PIPING AND DUCTWORK AS HIGH AS PRACTICAL IN ROOMS WITHOUT CEILINGS.
22. THE MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY CONDUIT, WIRING, CONTROLS, AND APPURTENANCES FOR A COMPLETE AND OPERABLE HVAC SYSTEM.
23. INSULATE DUCTWORK AND PIPING SYSTEMS TO MEET LOCAL ENERGY CODE REQUIREMENTS. INSULATION MATERIAL TO MEET FLAME SPREAD AN SMOKE DEVELOPMENT RATING OF 25/50 OR LESS. WHERE SYSTEMS ARE EXPOSED TO DAMAGE THE INSULATION SHALL BE PROTECTED WITH A SHEET METAL OR PLASTIC COVER. WHERE DUCTWORK IS INSTALLED EXPOSED TO THE OUTSIDE, INSULATION IS TO BE EXECUTED USING LINED DUCTWORK.
24. SEISMIC ANCHORAGE AND RESTRAINTS MUST BE COORDINATED WITH STRUCTURAL ENGINEER AND AUTHORITY HAVING JURISDICTION.
25. LOCATE THERMOSTATS AND TEMPERATURE SENSORS A MINIMUM OF 8" AWAY FROM LIGHT SWITCHES. MOUNTING HEIGHT SHALL BE PER ARCHITECT AND IN CONFORMANCE WITH ADA GUIDELINES.
26. CONTRACTOR SHALL PROVIDE AND INSTALL ALL CONTROL WIRING.
27. CONDENSATE DRAINS SHALL BE SUPPLIED FOR ALL COOLING AND GAS EQUIPMENT. CONTRACTOR SHALL ENSURE PROPER INSTALLATION AND DRAINAGE AS REQUIRED BY FEDERAL, STATE, AND LOCAL CODES. CONDENSATE PIPING SHALL BE SCHEDULE 40 PVC.
28. PROVIDE A 4" HOUSEKEEPING PAD FOR EACH PIECE OF FLOOR-MOUNTED MECHANICAL EQUIPMENT. COORDINATE SIZES WITH MECHANICAL EQUIPMENT SELECTED.
29. ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK SHALL BE RATED FOR PRESSURE CLASS OF 2" W.G. UNLESS NOTED OTHERWISE.
30. CONTRACTOR SHALL BE REQUIRED TO REPLACE FILTERS ON HVAC EQUIPMENT AFTER ALL DUST PRODUCING CONSTRUCTION HAS BEEN COMPLETED AND PRIOR TO THE FINAL PUNCH.
31. REFER TO PIPING DRAWINGS FOR THERMOSTAT AND TEMPERATURE SENSOR LOCATIONS.
32. PROVIDE ACCES PANELS FOR SERVICING, ADJUSTING, AND REPLACING EQUIPMENT. INCLUDING BUT NOT LIMITED TO DAMPERS AND VALVING.
33. THERMOSTATS TO BE PROGRAMMABLE, HAVE 5°F DEADBAND, AUTOMATIC TIME-CLOCK, 2-HOUR OCCUPANT OVERRIDE, 10-HOUR BACKUP, SETBACKS TO 55°F (HEATING) AND 85°F (COOLING).
34. CONTRACTOR TO PROVIDE OPERATION & MAINTENANCE MANUALS AND AS-BUILT DRAWINGS FOR NEW SYSTEMS AND EQUIPMENT WITHIN 90 DAYS OF COMPLETION

* NOTE *
ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET. THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

WINDSOR ENGINEERS
Ridgefield, WA
Duluth + Minneapolis, MN
WindsorEngineers.com
Project No: 23196

JOSH NETTERLUND — STATE OF WASHINGTON — 23018610 — REGISTERED PROFESSIONAL ENGINEER

OPERATIONS CENTER
CITY OF CAMAS
1620 SE 8th AVE,
CAMAS, WA 98607

Revisions:

1 9/25/2024 BID ADDENDUM

Project No:

PROJECT MANAGER: LJE
DRAWN BY: JJS
CHECKED BY: CDH

Issue Date:
7/18/2024

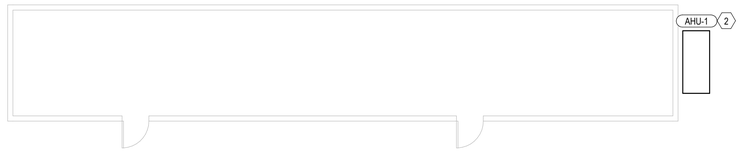
MECHANICAL
COVER PAGE

M001

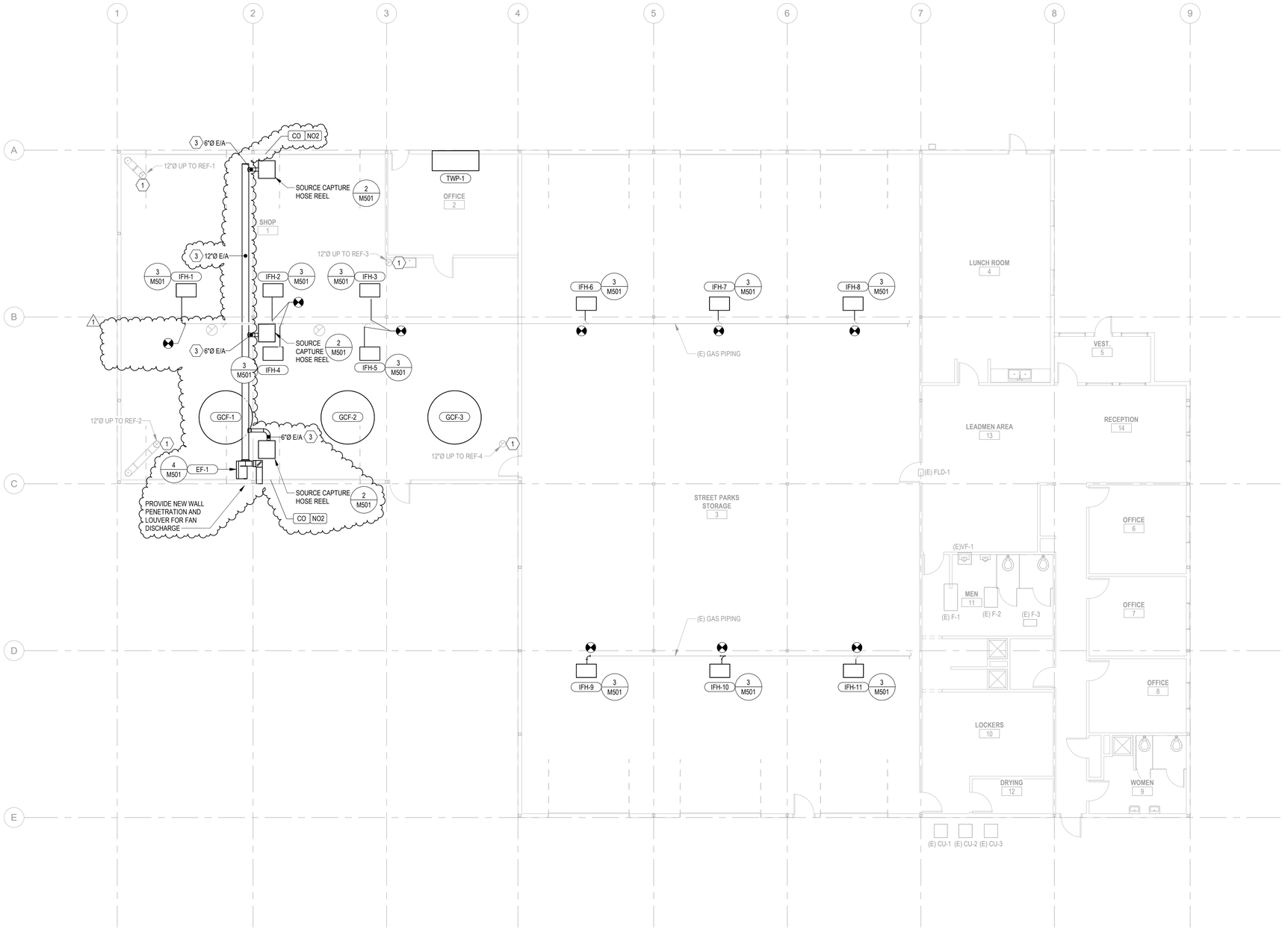
ADDENDUM #1
FAC23008

KEYNOTES

1 CONNECT EXISTING DUCT TO NEW ROOFTOP EXHAUST FAN.
2 CONNECT NEW VERTICAL AIR HANDLING UNIT TO EXISTING DUCT SYSTEM.
3 LOCATE DUCTWORK TIGHT TO STRUCTURE TO MAINTIAN CLEARANCE FOR GARBAGE TRUCK. COORDINATE HEIGHT WITH SHOP MANAGER.



2 PORTABLE BUILDING MECHANICAL PLAN
SCALE: 1/8" = 1'-0"



1 LEVEL 1 MECHANICAL PLAN
SCALE: 1/8" = 1'-0"

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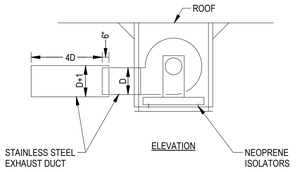
MECHANICAL
LEVEL 1 PLAN

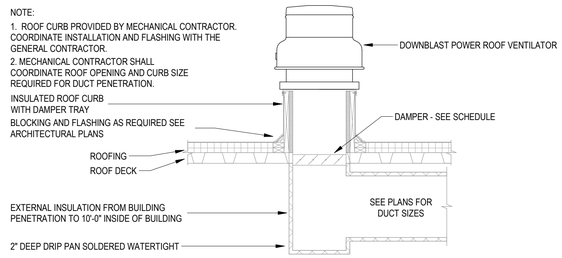
N

M101

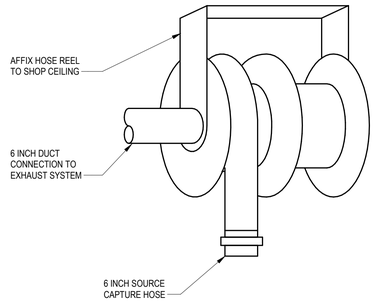
ADDENDUM #1
FAC23008



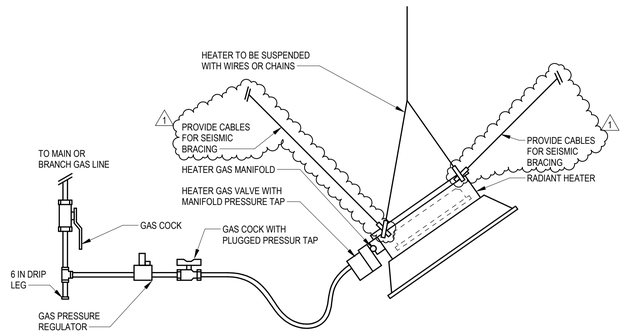
4 SOURCE CAPTURE EXHAUST FAN DETAIL
SCALE: NO SCALE



1 DOWNBLAST POWER ROOF VENTILATOR DETAIL
SCALE: NO SCALE



2 SOURCE CAPTURE SYSTEM
SCALE: NO SCALE



3 INFRARED HEATER DETAIL
SCALE: NO SCALE

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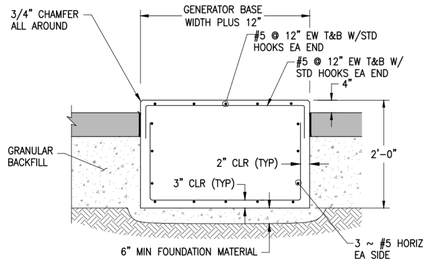
MECHANICAL
DETAILS

M501

ADDENDUM #1
FAC23008

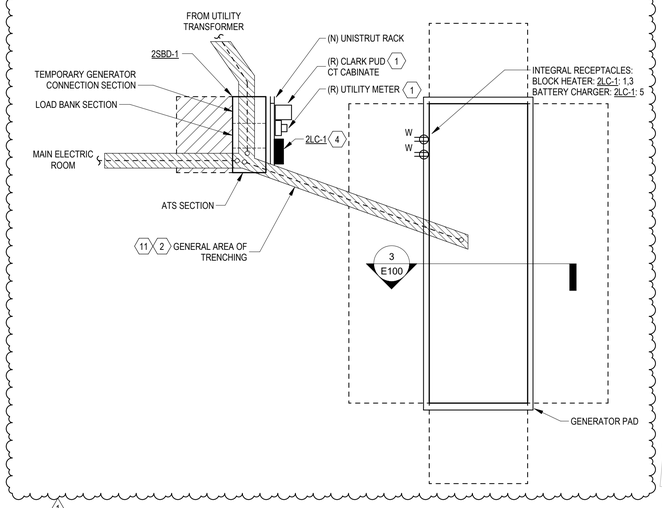


GENERATOR FOUNDATION NOTES:

A. THIS DETAIL IS DIAGRAMMATIC IN NATURE. ALL QUESTIONS PERTAINING TO THIS DETAIL TO BE REVIEWED AND APPROVED BY STRUCTURAL ENGINEER.

B. THE THICKNESS FROM THE GROUND TO THE TOP OF THE PAD SHOULD BE MAINTAINED AT NO LESS THAN 4 INCHES.

3 GENERATOR FOUNDATION SECTION
SCALE: N.T.S.



GENERATOR PLAN NOTES:

A. CONTRACTOR TO VERIFY ALL UNDERGROUND UTILITIES PRESENT ON THE OPERATIONS CENTER SITE AND THE LIFT STATION SITE PRIOR TO CONSTRUCTION.

B. BASIS OF DESIGN FOR GENERATOR: MTU 4R0120 DS80.

DIMENSIONS (L X W X H)*: 92" X 44.13" X 56"
* NOT INCLUDING SOUND ATTENUATED ENCLOSURE AND BASETANK.

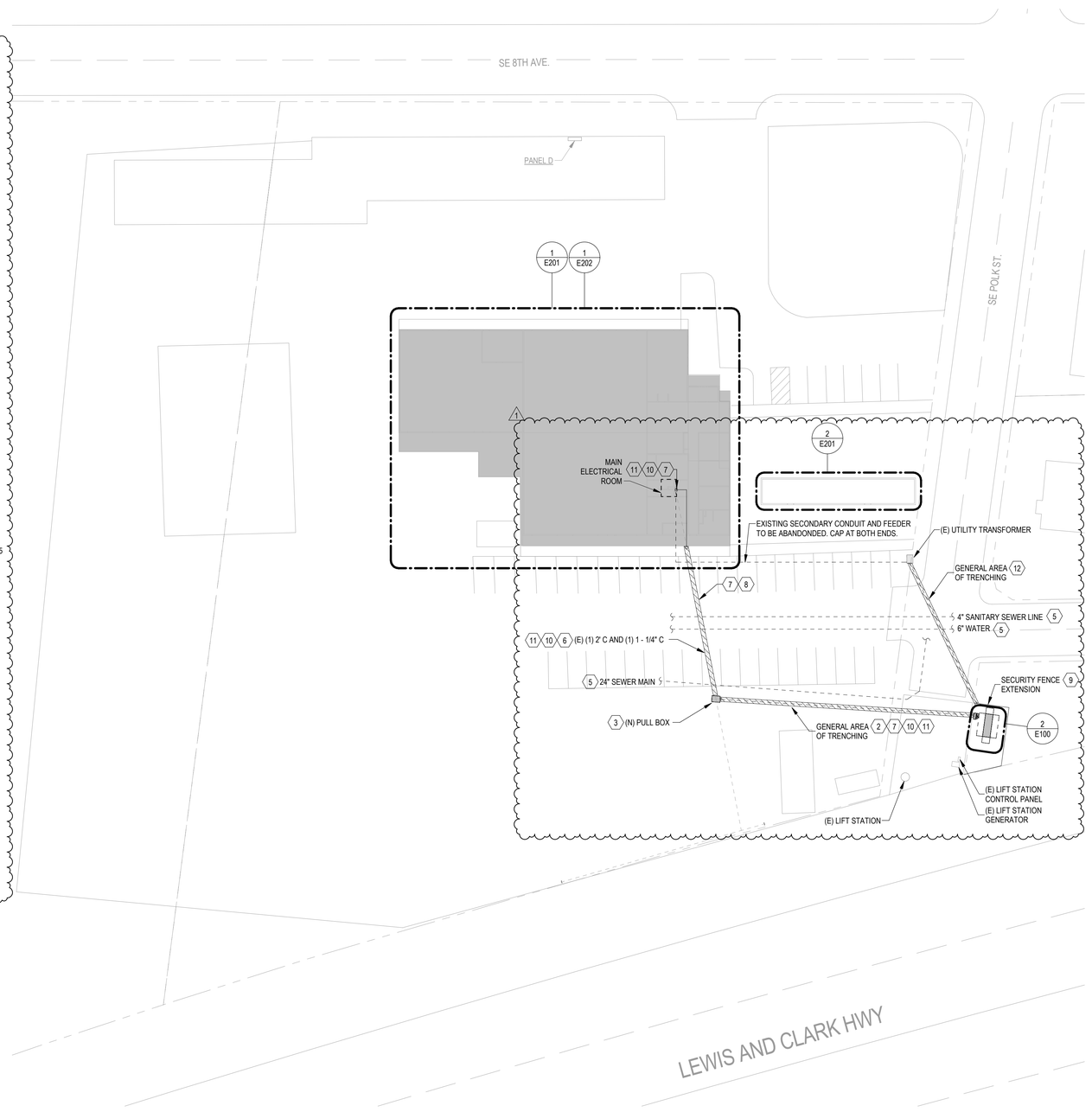
SUBMIT SHOP DRAWINGS FOR GENERATOR, LEVEL 2 SOUND ATTENUATED ENCLOSURE AND BASETANK TO ENGINEER PRIOR TO PROCUREMENT.

F. BASIS OF DESIGN FOR ATS, LOAD BANK AND TEMPORARY GENERATOR CONNECTION: TRYSTAR TATS-3.

DIMENSIONS (L X W X H): 40" X 16" X 54"
SUBMIT SHOP DRAWINGS FOR TATS-3 TO ENGINEER PRIOR TO PROCUREMENT.

G. PROVIDE GENERATOR START WIRES FROM ATS EQUIPMENT TO TEMPORARAY GENERATOR CONNECTION.

2 GENERATOR ENLARGED PLAN
NOT TO SCALE



1 ELECTRICAL SITE PLAN
SCALE: 1" = 30'-0"

GENERAL SITE NOTES:

A. ALL 20A CIRCUITS ON SITE TO BE #10 CU MINIMUM UNLESS NOTED OTHERWISE.

B. ALL UNDERGROUND CONDUITS TO BE 1" MINIMUM UNLESS NOTED OTHERWISE.

C. CLARK PUBLIC UTILITIES CONTACT:
ALEKSEY SHKURATKOV
ASHKURATKOV@CLARKPUD.COM
360-992-8593

KEYNOTES

1 NEW LOCATION OF EXISTING UTILITY EQUIPMENT. CONNECTIONS TO FOLLOW CLARK PUD UTILITY HANDBOOK GUIDELINES.
2 REFER TO ONELINE ON E601 FOR CONDUIT AND FEEDER SIZE.
3 PROVIDE NEW 15" X 15" PULL BOX FOR CONDUIT CONNECTION. PROVIDE CHRISTY TYPE N16 BOX OR APPROVED EQUAL. LID TO BE RATED FOR H-20 TYPE LOADS.
4 PROVIDE NEW 120/208V, 60A, 16 POLE LOAD CENTER. MOUNT TO UNISTRUT RACK. REFER TO SHEET E601 FOR ADDITIONAL INFORMATION.
1
5 UNDERGROUND CIVIL UTILITIES SHOWN FOR REFERENCE. ELECTRICAL CONTRACTOR TO VERIFY FINAL SITE CONDUIT ROUTING PLAN WITH THE CITY PRIOR TO INSTALLATION. REFER TO CITY OF CAMAS SITE CIVIL LOCATES FOR EXACT LOCATIONS OF UTILITIES.
6 UTILIZE EXISTING (1) 2" CONDUIT FOR 2LC-1 AND (1) 1-1/4" CONDUIT FOR GENERATOR ANNUNCIATOR.
7 CONDUITS FROM 2SBD-1 TO BE ROUTED AS FOLLOWS: CONDUITS BURIED UNDERGROUND IN NEW TRENCH INDICATED FROM 2SBD-1 TO NEW PULL BOX. FROM NEW PULL BOX, CONDUITS TO BE ROUTED UNDERGROUND UP TO BUILDING FOUNDATION. CONDUITS TO TURN UP, WALL MOUNT, AND ROUTE ALONG FACE OF BUILDING EXTERIOR THEN PENETRATE INTO BUILDING. ONCE INSIDE BUILDING, ROUTE OVERHEAD INTO ELECTRICAL ROOM AND TERMINATE INTO MDP FROM THE TOP.
8 CONTRACTOR TO VERIFY EXISTING FEEDER ROUTING TO SOUTH SIDE TRAILER PRIOR TO CONSTRUCTION. ADJUST LOCATION OF NEW TRENCH TO AVOID EXISTING LIVE FEEDER.
9 EXTENSION OF EXISTING SECURITY FENCE AROUND GENERATOR AND DISTRIBUTION EQUIPMENT SHOWN DIAGRAMMATICALLY. CONTRACTOR TO MATCH EXISTING FENCE TYPE AND HEIGHT. CONTRACTOR TO REVIEW FINAL LAYOUT WITH CITY OF CAMAS PRIOR TO CONSTRUCTION.
10 CONDUIT FOR 2LC-1 TO BE ROUTED AS FOLLOWS: ROUTE 2" CONDUIT BURIED UNDERGROUND IN NEW TRENCH INDICATED FROM 2LIC TO NEW PULL BOX. FROM NEW PULL BOX, INTERCEPT EXISTING 2" CONDUIT AND UTILIZE. AT BUILDING FOUNDATION, CONNECT NEW 2" CONDUIT TO EXISTING ONE, TURN UP, WALL MOUNT, AND ROUTE ALONG FACE OF BUILDING EXTERIOR THEN PENETRATE INTO BUILDING. ONCE INSIDE BUILDING, ROUTE OVERHEAD INTO ELECTRICAL ROOM AND TERMINATE INTO MDP FROM THE TOP.
11 CONDUIT FOR GENERATOR ANNUNCIATOR TO BE ROUTED AS FOLLOWS: ROUTE 1-1/4" CONDUIT BURIED UNDERGROUND IN NEW TRENCH INDICATED FROM GENERATOR TO NEW PULL BOX. FROM NEW PULL BOX, INTERCEPT EXISTING 1-1/4" CONDUIT AND UTILIZE. AT BUILDING FOUNDATION, CONNECT NEW 1-1/4" CONDUIT TO EXISTING ONE, TURN UP, WALL MOUNT, AND ROUTE ALONG FACE OF BUILDING EXTERIOR THEN PENETRATE INTO BUILDING. ONCE INSIDE BUILDING, ROUTE OVERHEAD INTO ELECTRICAL ROOM AND TERMINATE INTO MDP FROM THE TOP.
12 CONTRACTOR TO ENSURE TRENCH RESTORATION TO MATCH EXISTING HMA ROAD THICKNESS AND TO CONSIST OF A PATCH 1' WIDER THAN TRENCH WIDTH.

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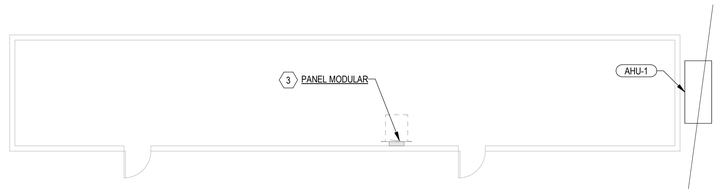
ELECTRICAL
SITE PLAN

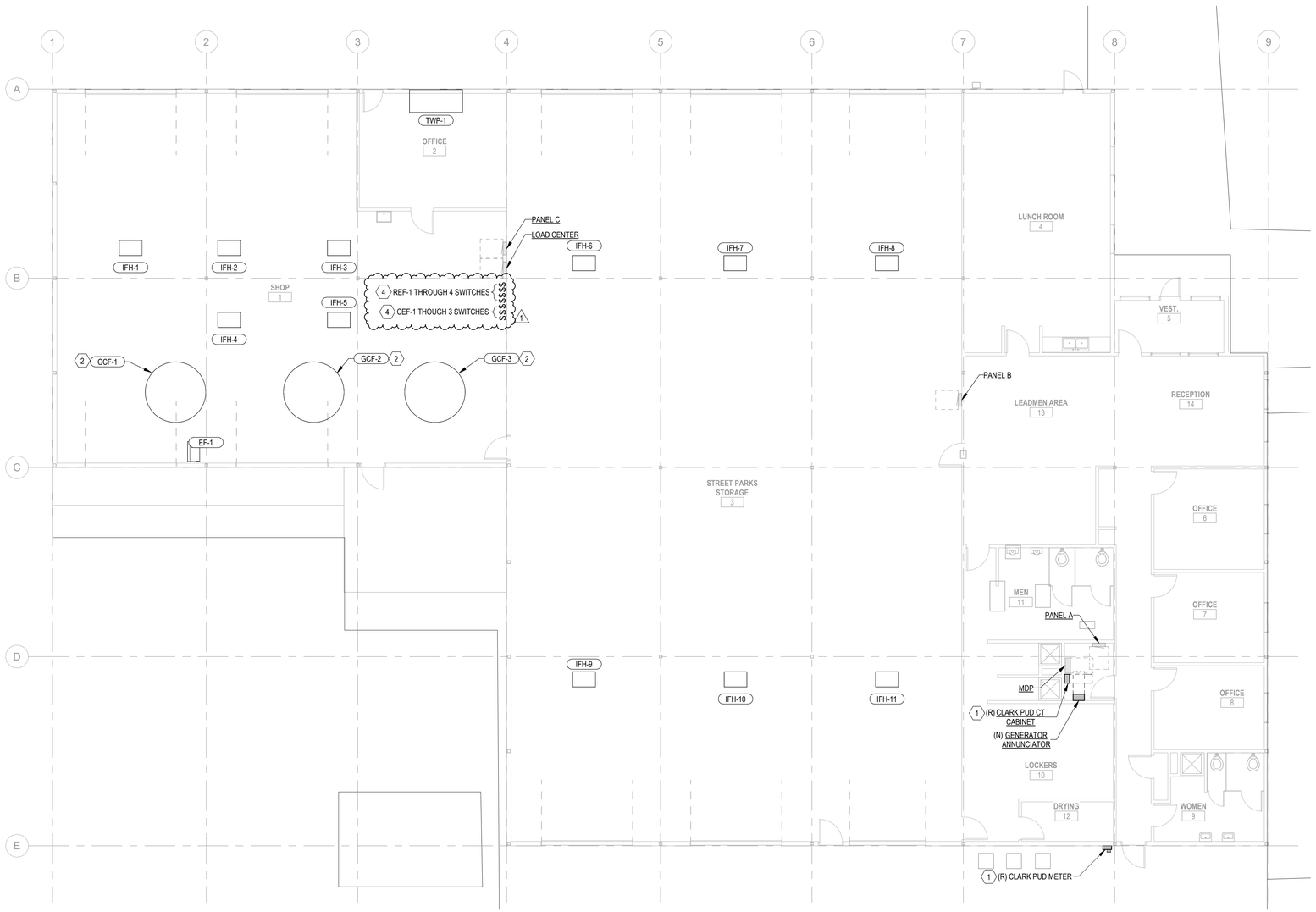
N

E100

ADDENDUM #1
FAC23008



2 PORTABLE BUILDING POWER PLAN
SCALE: 1/8" = 1'-0"



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

GENERAL NOTES:

A. ROUTE ALL NEW WIRING CONDUITS CONCEALED INSIDE WALLS OR ABOVE CEILINGS. ALL CONDUIT ROUTING SHALL FOLLOW BUILDING LINES WHERE POSSIBLE AND BE FULLY CONCEALED, EXCLUDING BACK-OF-HOUSE SPACES. COORDINATE ALL EXPOSED CONDUIT ROUTING WITH ARCHITECT PRIOR TO INSTALL.

B. ALL ELECTRICAL EQUIPMENT AND DEVICES SHOWN ARE EXISTING, UNLESS NOTED OTHERWISE. REFER TO PLAN NOTES FOR EXCEPTIONS.

KEYNOTES

1 EXISTING UTILITY EQUIPMENT TO BE RELOCATED. REFER TO E100 FOR NEW LOCATION OF EQUIPMENT. EXISTING CONDUIT AND FEEDER BETWEEN CT CABINET AND METER TO BE ABANDONED AND CAPPED AT BOTH ENDS.

2 NEW CEILING FANS TO BE CIRCUITED TO SAME LIGHTING CIRCUIT AS EXISTING CEILING FANS. CONTRACTOR TO VERIFY EXACT CIRCUIT PRIOR TO CONSTRUCTION.

3 APPROXIMATE LOCATION OF PANEL IN PORTABLE BUILDING. CONTRACTOR TO VERIFY EXISTING COOLING AND HEATING UNIT BREAKER LOT FOR REUSE PRIOR TO CONSTRUCTION.

1 4 PROVIDE EQUIPMENT START/STOP TYPE SWITCH IN AREA INDICATED FOR LOCAL CONTROL. PROVIDE ONE SWITCH PER PIECE OF EQUIPMENT.

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ELECTRICAL
LEVEL 1 PLAN

N

E201

(E)

PANEL PANEL B

VOLTAGE: 208Y/120 | AIC RATING: SEE ONE-LINE | NEMA RATING: NEMA-1 | LOCATION: STREET PARKS...
BUS RATING: 225 A | INTEGRAL SPD: NO | MOUNTING: SURFACE | SUPPLY FROM:
MAINS: MLO | FEED-THRU LUGS: NO

CKT	TRIP	POLE	DESCRIPTION	TYPE	A	B	C	TYPE	DESCRIPTION	POLE	TRIP	CKT
1	20 A	1	EXISTING LOAD	--	0			--	EXISTING LOAD	2	50 A	2
3	20 A	1	EXISTING LOAD	--		0						4
5	20 A	1	EXISTING LOAD	--			0	--	EXISTING LOAD	2	50 A	6
7	20 A	1	EXISTING LOAD	--	0							8
9	20 A	1	EXISTING LOAD	--		0		--	EXISTING LOAD	2	50 A	10
11	20 A	1	EXISTING LOAD	--			0					12
13	20 A	1	EXISTING LOAD	--	0			--	EXISTING LOAD	1	20 A	14
15	20 A	1	EXISTING LOAD	--		0		--	EXISTING LOAD	1	20 A	16
17	20 A	1	EXISTING LOAD	--			0	--	EXISTING LOAD	1	20 A	18
19	20 A	1	EXISTING LOAD	--	0			--	EXISTING LOAD	1	20 A	20
21	20 A	1	EXISTING LOAD	--		0		--	EXISTING LOAD	1	20 A	22
23	20 A	1	EXISTING LOAD	--			0	--	EXISTING LOAD	1	20 A	24
25	20 A	1	EXISTING LOAD	--	0			--	EXISTING LOAD	1	20 A	26
27	20 A	1	EXISTING LOAD	--		0		--	EXISTING LOAD	1	20 A	28
29	20 A	1	EXISTING LOAD	--			0	--	EXISTING LOAD	1	20 A	30
31	20 A	1	EXISTING LOAD	--	0	101		H	H: EXISTING LOAD/ IFH-7 - IFH-11	1	20 A	32 (N)
33	20 A	1	EXISTING LOAD	--			0	--	EXISTING LOAD	1	20 A	34
35	20 A	1	EXISTING LOAD	--		0		--	EXISTING LOAD	1	20 A	36
37	20 A	1	EXISTING LOAD	--	0			--	EXISTING LOAD	1	20 A	38
39	20 A	1	EXISTING LOAD	--		0		--	EXISTING LOAD	1	20 A	40
41	20 A	1	EXISTING LOAD	--			0	--	EXISTING LOAD	1	20 A	42
					101 VA	0 VA	0 VA					
					1 A	0 A	0 A					

BREAKER KEY	LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
(A) = AFCI	C = CONTINUOUS GENERAL LOAD	0 VA	0.00%	0 VA	
(A/G) = AFCI/GFCI	D = DWELLING UNIT	0 VA	0.00%	0 VA	
(G) = GFCI	E = ELECTRIC HEAT	0 VA	0.00%	0 VA	
(L) = LOCKABLE	G = GENERAL NON-CONTINUOUS LOAD	0 VA	0.00%	0 VA	
(N) = SWITCHED NEUTRAL	H = HVAC EQUIPMENT	101 VA	100.00%	101 VA	
(S) = SHUNT TRIP	HM = HOTEL/MOTEL	0 VA	0.00%	0 VA	
(GFP) = GROUND FAULT PROTECTED	K = KITCHEN EQUIPMENT	0 VA	0.00%	0 VA	
	L = LIGHTING	0 VA	0.00%	0 VA	TOTAL CONNECTED LOAD: 101 VA
	LM = LARGEST MOTOR	0 VA	0.00%	0 VA	TOTAL DEMAND LOAD: 101 VA
	M = MOTOR	0 VA	0.00%	0 VA	TOTAL DEMAND AMPS: 0 A
	R = RECEPTACLE	0 VA	0.00%	0 VA	

(N)

PANEL 2LC-1

VOLTAGE: 208Y/120 | AIC RATING: SEE ONE-LINE | NEMA RATING: NEMA-3R | LOCATION:
BUS RATING: 60 A | INTEGRAL SPD: NO | MOUNTING: SURFACE | SUPPLY FROM: MDP
MAINS: MLO | FEED-THRU LUGS: NO

CKT	TRIP	POLE	DESCRIPTION	TYPE	A (VA)	B (VA)	C (VA)	TYPE	DESCRIPTION	POLE	TRIP	CKT
1	20 A	2	R: BLOCK HEATER	R	1040 --			--	SPACE	1	--	2
3						1040 --		--	SPACE	1	--	4
5	20 A	1	R: BATTERY CHARGER	R			1200 --	--	SPACE	1	--	6
7	20 A	1	SPARE	--	0 --			--	SPACE	1	--	8
9	20 A	1	SPARE	--		0 --		--	SPACE	1	--	10
11	20 A	1	SPARE	--			0 --	--	SPACE	1	--	12
13	20 A	1	SPARE	--	0 --			--	SPACE	1	--	14
15	20 A	1	SPARE	--		0 --		--	SPACE	1	--	16
					1040 VA	1040 VA	1200 VA					
					9 A	9 A	10 A					

BREAKER KEY	LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
(A) = AFCI	C = CONTINUOUS GENERAL LOAD	0 VA	0.00%	0 VA	
(A/G) = AFCI/GFCI	D = DWELLING UNIT	0 VA	0.00%	0 VA	
(G) = GFCI	E = ELECTRIC HEAT	0 VA	0.00%	0 VA	
(L) = LOCKABLE	G = GENERAL NON-CONTINUOUS LOAD	0 VA	0.00%	0 VA	
(N) = SWITCHED NEUTRAL	H = HVAC EQUIPMENT	0 VA	0.00%	0 VA	
(S) = SHUNT TRIP	HM = HOTEL/MOTEL	0 VA	0.00%	0 VA	
(GFP) = GROUND FAULT PROTECTED	K = KITCHEN EQUIPMENT	0 VA	0.00%	0 VA	
	L = LIGHTING	0 VA	0.00%	0 VA	TOTAL CONNECTED LOAD: 3280 VA
	LM = LARGEST MOTOR	0 VA	0.00%	0 VA	TOTAL DEMAND LOAD: 3280 VA
	M = MOTOR	0 VA	0.00%	0 VA	TOTAL DEMAND AMPS: 9 A
	R = RECEPTACLE	3280 VA	100.00%	3280 VA	

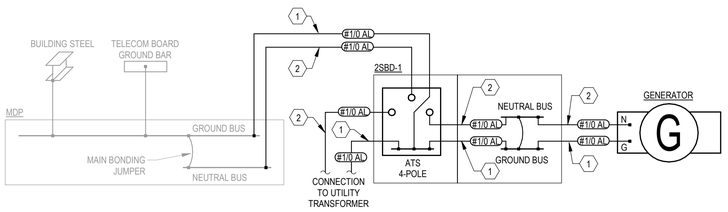
(E)

PANEL PANEL C

VOLTAGE: 208Y/120 | AIC RATING: SEE ONE-LINE | NEMA RATING: NEMA-1 | LOCATION: SHOP 1
BUS RATING: 225 A | INTEGRAL SPD: NO | MOUNTING: SURFACE | SUPPLY FROM:
MAINS: MLO | FEED-THRU LUGS: NO

CKT	TRIP	POLE	DESCRIPTION	TYPE	A	B	C	TYPE	DESCRIPTION	POLE	TRIP	CKT
1	15 A	1	EXISTING LOAD	--	0			--	EXISTING LOAD	2	50 A	2
3	20 A	1	EXISTING LOAD	--		0						4
5	20 A	1	EXISTING LOAD	--			0	--	EXISTING LOAD	2	50 A	6
7	20 A	1	EXISTING LOAD	--	0							8
9	20 A	1	EXISTING LOAD	--		0		--	EXISTING LOAD	2	50 A	10
11	20 A	1	EXISTING LOAD	--			0					12
13	20 A	1	EXISTING LOAD	--	0			--	EXISTING LOAD	1	20 A	14
15	20 A	1	EXISTING LOAD	--		0		--	EXISTING LOAD	1	20 A	16
17	20 A	1	EXISTING LOAD	--			0	252	M: EXISTING LOAD/ GCF-1/ GCF-2 / GCF-3	1	20 A	18 (N)
19	20 A	1	EXISTING LOAD	--	0			--	EXISTING LOAD	1	20 A	20
21	20 A	1	EXISTING LOAD	--		0		--	EXISTING LOAD	1	20 A	22
23	20 A	1	EXISTING LOAD	--			0	--	EXISTING LOAD	1	20 A	24
25	20 A	1	EXISTING LOAD	--	0			--	EXISTING LOAD	1	20 A	26
(N) 27	20 A	1	REF-1	M		528	0	--	EXISTING LOAD	1	20 A	28
(N) 29	20 A	1	REF-2	M			528 84	H	EXISTING LOAD/ IFH-1 - IFH-6	1	20 A	30 (N)
(N) 31	20 A	1	REF-3	M	528	530		M	TWP-1	2	20 A	32 (N)
(N) 33	20 A	1	REF-4	M			528 530					34
35	20 A	1	EXISTING LOAD	--			0 0	--	EXISTING LOAD	1	20 A	36
37					0	0						38
39	200 A	3	EXISTING LOAD	--		0	0	--	EXISTING LOAD	3	20 A	40
41							0 0					42
					1058 VA	1586 VA	864 VA					
					9 A	13 A	7 A					

BREAKER KEY	LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND	PANEL TOTALS
(A) = AFCI	C = CONTINUOUS GENERAL LOAD	0 VA	0.00%	0 VA	
(A/G) = AFCI/GFCI	D = DWELLING UNIT	0 VA	0.00%	0 VA	
(G) = GFCI	E = ELECTRIC HEAT	0 VA	0.00%	0 VA	
(L) = LOCKABLE	G = GENERAL NON-CONTINUOUS LOAD	0 VA	0.00%	0 VA	
(N) = SWITCHED NEUTRAL	H = HVAC EQUIPMENT	84 VA	100.00%	84 VA	
(S) = SHUNT TRIP	HM = HOTEL/MOTEL	0 VA	0.00%	0 VA	
(GFP) = GROUND FAULT PROTECTED	K = KITCHEN EQUIPMENT	0 VA	0.00%	0 VA	
	L = LIGHTING	0 VA	0.00%	0 VA	TOTAL CONNECTED LOAD: 3509 VA
	LM = LARGEST MOTOR	0 VA	0.00%	0 VA	TOTAL DEMAND LOAD: 3509 VA
	M = MOTOR	3425 VA	100.00%	3425 VA	TOTAL DEMAND AMPS: 10 A
	R = RECEPTACLE	0 VA	0.00%	0 VA	



GENERAL GROUNDING NOTES:

A. GENERATOR AND ACCOMPANYING EQUIPMENT TO BE CONNECTED TO EXISTING GROUNDING SYSTEM AS INDICATED.
B. LINES SHOWN BOLD REPRESENT NEW EQUIPMENT. LINES SHOWN FADED REPRESENT EXISTING EQUIPMENT UNO.

KEYNOTES

1 EQUIPMENT GROUNDING CONDUCTOR (INSULATED) INCLUDED WITH THE FEEDER.
2 NEUTRAL CONDUCTOR INCLUDED WITH THE FEEDER.

1 GROUNDING DIAGRAM
NOT TO SCALE

FEEDER SCHEDULE (CU & AL)

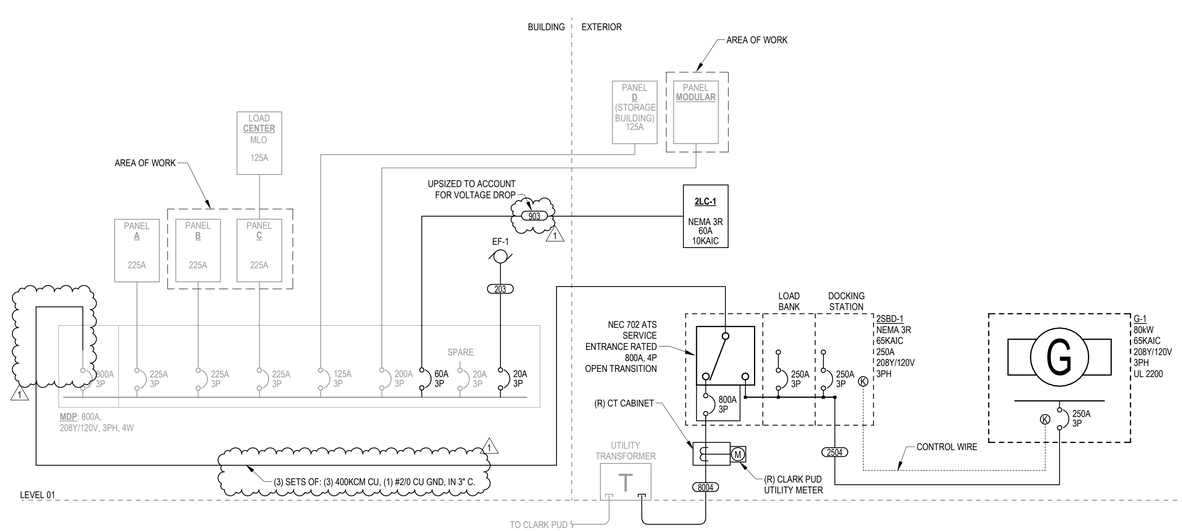
FEEDER AMPACITY	# OF SETS	PHASE AND NEUTRAL CONDUCTORS		GROUND		RACEWAY
		CONDUCTORS	MAT.	CONDUCTOR	MAT.	
20	1	#12	CU	#12	CU	3/4"
30	1	#10	CU	#10	CU	3/4"
40	1	#8	CU	#10	CU	3/4"
50	1	#6	CU	#10	CU	1"
60	1	#4	CU	#10	CU	1-1/4"
70	1	#4	CU	#8	CU	1-1/4"
80	1	#3	CU	#8	CU	1-1/4"
90	1	#2	CU	#8	CU	1-1/2"
100	1	#1	CU	#8	CU	1-1/2"
110	1	#1/0	AL	#6	CU	2"
125	1	#2/0	AL	#6	CU	2"
150	1	#3/0	AL	#6	CU	2"
175	1	#4/0	AL	#6	CU	3"
200	1	250 KCM	AL	#6	CU	3"
225	1	300 KCM	AL	#4	CU	3"
250	1	350 KCM	AL	#4	CU	3"
300	1	500 KCM	AL	#4	CU	4"
350	2	#4/0	AL	#3	CU	3"
400	2	250 KCM	AL	#3	CU	3"
450	2	300 KCM	AL	#2	CU	3"
500	2	350 KCM	AL	#2	CU	3"
600	2	500 KCM	AL	#1	CU	4"
800	3	400 KCM	AL	#1/0	CU	3"
1000	4	350 KCM	AL	#2/0	CU	3"
1200	4	500 KCM	AL	#3/0	CU	4"
1600	6	400 KCM	AL	#4/0	CU	4"
2000	8	350 KCM	AL	250 KCM	CU	4"
2500	10	350 KCM	AL	350 KCM	CU	4"
3000	10	500 KCM	AL	400 KCM	CU	4"
4000	12	600 KCM	AL	500 KCM	CU	4"

NOTE: PROVIDE GROUND CONDUCTOR WITH ALL FEEDERS EXCEPT SERVICE ENTRANCE CONDUCTORS.

FEEDER SCHEDULE KEY:
(YYY#X) YYY = FEEDER AMPACITY
= PROVIDE QUANTITY OF CURRENT CARRYING CONDUCTORS
'X' = REFER TO TRANSFORMER SCHEDULE FOR GEC AND BONDING.

LOAD CALCULATION AT MDP (800A RATED)

MONTH W/ HIGHEST DEMAND - AUG '23	34.0	kVA
DEMAND @ 125% (NEC 220.87)	42.5	kVA
ADDED MECHANICAL LOAD	3.6	kVA
ADDED RECEPTACLE LOAD	3.28	kVA
NEW TOTAL BUILDING LOAD	49.4	kVA
NEW TOTAL BUILDING LOAD (A) @ 208V	137.2	A



2 ONE-LINE DIAGRAM - ELECTRICAL
NOT TO SCALE

ADDENDUM #1
FAC23008

GENERAL NOTES:

A. CONTROLS WIRING: PROVIDE ALL CONDUIT AND CONDUCTORS FOR CONTROL WIRING OF GENERATOR AND AUTOMATIC TRANSFER SWITCH INTERCONNECTIONS. COORDINATE ALL REQUIREMENTS WITH EQUIPMENT SUBMITTALS.

B. LINES SHOWN BOLD REPRESENT NEW EQUIPMENT. LINES SHOWN FADED REPRESENT EXISTING EQUIPMENT UNO.

STANDBY DIESEL GENERATOR NOTES

A. PROVIDE DIESEL FUEL DAY BELLY TANK, UL-142, DOUBLE WALL, SIZED FOR MINIMUM 24 HOURS OF RUN TIME AT 75% LOAD. PROVIDE ALL COMPONENTS NECESSARY FOR AN OPERABLE SYSTEM, INCLUDING FUEL PUMP, LEAK DETECTION, SECONDARY CONTAINMENT, AND CONTROL WIRING. COORDINATE INSTALLATION WITH DIV. 22.

B. PROVIDE SELECTIVE COORDINATION STUDY FOR ALL EMERGENCY AND STANDBY OVERCURRENT DEVICES AND MAKE ANY ADJUSTMENTS NECESSARY FOR A FULLY COORDINATED SYSTEM.

C. PROVIDE EXHAUST FLEX CONNECTION AND CRITICAL GRADE OR BETTER MUFFLER (SILENCER). COORDINATE INSTALLATION WITH DIV. 23. PROVIDE WEATHERPROOF, SOUND-ATTENUATED ENCLOSURE.

D. PROVIDE GENERATOR FACTORY TESTING AND FULL CONNECTED BUILDING LOAD TEST.

E. GENERATOR SHALL BE UL-2200 LISTED.

F. PROVIDE REMOTE ANNUNCIATOR IN MAIN ELECTRICAL ROOM.

WINDSOR ENGINEERS
Ridgefield, WA
Duluth + Minneapolis, MN
WindsorEngineers.com
Project No: 23196

BRANDON A. WINDSOR
STATE OF WASHINGTON
53614
REGISTERED PROFESSIONAL ENGINEER
9/24/24

OPERATIONS CENTER
CITY OF CAMAS
1620 SE 8th AVE,
CAMAS, WA 98607

Revisions:

1 9/25/2024 BID ADDENDUM

Project No:

PROJECT MANAGER: LJE
DRAWN BY: MBK
CHECKED BY: BAW

Issue Date:
7/18/2024

ELECTRICAL

ONE-LINE DIAGRAM, SCHEDULES AND DETAILS

E601

SECTION 230923
DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC

PART 1 GENERAL

1.01 REFERENCE STANDARDS

A. MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests; 2019h.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL (DIR) - Online Certifications Directory; Current Edition.

1.02 SUBMITTALS

A. Product Data: Provide data for each system component and software module.

B. Shop Drawings:
   1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
   2. List connected data points, including connected control unit and input device.
   3. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations.
   4. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
   5. Indicate description and sequence of operation of operating, user, and application software.

C. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.

D. Installer's Qualification Statement.

E. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
   1. Revise shop drawings to reflect actual installation and operating sequences.
   2. Include submittals data in final "Record Documents" form.

F. Operation and Maintenance Data:
   1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
   2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
   3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

G. Warranty: Submit manufacturer's 2-year warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.03 QUALITY ASSURANCE

A. Perform work in accordance with NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience.

D. Control system shall be open source and non-proprietary.

1.04 WARRANTY

A. Provide five-year manufacturer's warranty for field programmable micro-processor based units.

1.05 PROTECTION OF SOFTWARE RIGHTS

A. Prior to delivery of software, the Owner and the party providing the software will enter into a software license agreement with provisions for the following:

1. Limiting use of software to equipment provided under these specifications.
2. Limiting copying.
3. Preserving confidentiality.
4. Prohibiting transfer to a third party.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Equipment supplier (for at least a portion of the euqipment) shall provide and install the control system for uniformity/integration ease.

B. Acceptable manufacturers:
   1. Reliable Controls
   2. Automated Logic

ADDENDUM-1
09.24.2024

2.02 SYSTEM DESCRIPTION

A. Automatic temperature control field monitoring and control system using field programmable micro-processor based units.

B. Base system on distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.

C. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.

D. Controls for variable air volume terminals, radiation, reheat coils, unit heaters, fan coils, and the like when directly connected to the control units. Individual terminal unit control is specified in Section 230913.

E. Provide control systems consisting of thermostats, control valves, dampers and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.

F. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

2.03 OPERATOR INTERFACE

A. PC Based Work Station:
   1. Resides on high speed network with building controllers.
   2. Connected to server for full access to all system information.

B. Workstation, controllers, and control backbone to communicate using an acceptable common industry protocol and addressing.

C. Hardware:
   1. Laptop:
      a. Laptop(s) to be provided by DDC controls manufacturer.
      b. Quantity: Provide allowance for ____ computer(s).
      c. Minimum RAM: As recommended by Supplier..
      d. Minimum Processing Speed: As recommended by Supplier..
      e. Minimum Hard Drive Memory: As recommended by Supplier..
      f. Drives: As recommended by Supplier..
      g. Ports: As recommended by Supplier..
      h. Display: External 32" display as well as min. 15" laptop screen..
      i. Network Connection:
         1) Ethernet interface card.

2.04 CONTROLLERS

A. Building Controllers:
   1. General:

a. Manage global strategies by one or more, independent, standalone, microprocessor based controllers.
b. Provide sufficient memory to support controller's operating system, database, and programming requirements.
c. Share data between networked controllers.
d. Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allowing for central monitoring and alarms.
e. Utilize real-time clock for scheduling.
f. Continuously check processor status and memory circuits for abnormal operation.
g. Controller to assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
h. Communication with other network devices to be based on assigned protocol.

2. Communication:
   a. Controller to reside on a BACnet network using ISO 8802-3 (ETHERNET) Data Link/Physical layer protocol.
   b. Perform routing when connected to a network of custom application and application specific controllers.
   c. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.
3. Anticipated Environmental Ambient Conditions:
   a. Outdoors and/or in Wet Ambient Conditions:
      1) Mount within waterproof enclosures.
      2) Rated for operation at 40 to 150 degrees F.
   b. Conditioned Space:
      1) Mount within dustproof enclosures.
      2) Rated for operation at 32 to 120 degrees F.
4. Local Keypad and Display for each Controller:
   a. Use for interrogating and editing data.
   b. System security password prevents unauthorized use.
5. Provisions for Serviceability:
   a. Diagnostic LEDs for power, communication, and processor.
   b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.
6. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
7. Power and Noise Immunity:
   a. Maintain operation at 90 to 110 percent of nominal voltage rating.
   b. Perform orderly shutdown below 80 percent of nominal voltage.
   c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet.

B. Input/Output Interface:
1. Hardwired inputs and outputs tie into the DDC system through building, custom application, or application specific controllers.
2. All Input/Output Points:
   a. Protect controller from damage resulting from any point short-circuiting or grounding and from voltage up to 24 volts of any duration.
   b. Provide universal type for building and custom application controllers where input or output is software designated as either binary or analog type with appropriate properties.
3. Binary Inputs:
   a. Allow monitoring of On/Off signals from remote devices.
   b. Provide wetting current of 12 mA minimum, compatible with commonly available control devices and protected against the effects of contact bounce and noise.

c. Sense dry contact closure with power provided only by the controller.

4. Analog Inputs:
   a. Allow for monitoring of low voltage 0 to 10 VDC, 4 to 20 mA current, or resistance signals (thermistor, RTD).
   b. Compatible with and field configurable to commonly available sensing devices.
5. Binary Outputs:
   a. Used for On/Off operation or a pulsed low-voltage signal for pulse width modulation control.
   b. Outputs provided with three position (On/Off/Auto) override switches.
   c. Status lights for building and custom application controllers to be selectable for normally open or normally closed operation.
6. Analog Outputs:
   a. Monitoring signal provides a 0 to 10 VDC or a 4 to 20 mA output signal for end device control.
   b. Provide status lights and two position (AUTO/MANUAL) switch for building and custom application controllers with manually adjustable potentiometer for manual override on building and custom application controllers.
   c. Drift to not exceed 0.4 percent of range per year.
7. System Object Capacity:
   a. System size to be expandable to twice the number of input output objects required by providing additional controllers, including associated devices and wiring.
   b. Hardware additions or software revisions for the installed operator interfaces are not to be required for future, system expansions.

2.05 POWER SUPPLIES AND LINE FILTERING

A. Power Supplies:
1. Provide UL listed control transformers with Class 2 current limiting type or over-current protection in both primary and secondary circuits for Class 2 service as required by the NEC.
2. Limit connected loads to 80 percent of rated capacity.
3. Match DC power supply to current output and voltage requirements.
4. Unit to be full wave rectifier type with output ripple of 5.0 mV maximum peak to peak.
5. Regulation to be 1 percent combined line and load with 100 microsecond response time for 50 percent load changes.
6. Provide over-voltage and over-current protection to withstand a 150 percent current overload for 3 seconds minimum without trip-out or failure.
7. Operational Ambient Conditions: 32 to 120 degrees F.
8. EM/RF meets FCC Class B and VDE 0871 for Class B and MIL-STD-810 for shock and vibration.
9. Line voltage units UL recognized and CSA approved.

B. Power Line Filtering:
1. Provide external or internal transient voltage and surge suppression component for all workstations and controllers.
2. Minimum surge protection attributes:
   a. Dielectric strength of 1000 volts minimum.
   b. Response time of 10 nanoseconds or less.
   c. Transverse mode noise attenuation of 65 dB or greater.
   d. Common mode noise attenuation of 150 dB or greater at 40 to 100 Hz.

2.06 LOCAL AREA NETWORK (LAN)

A. Provide communication between control units over local area network (LAN).

B. LAN Capacity: Not less than 60 stations or nodes.

C. Break in Communication Path: Alarm and automatically initiate LAN reconfiguration.

D. LAN Data Speed: Minimum 19.2 Kb.

E. Communication Techniques: Allow interface into network by multiple operation stations and by auto-answer/auto-dial modems. Support communication over telephone lines utilizing modems.

F. Transmission Median: Fiber optic or single pair of solid 24 gauge twisted, shielded copper cable.

G. Network Support: Time for global point to be received by any station, shall be less than 3 seconds. Provide automatic reconfiguration if any station is added or lost. If transmission cable is cut, reconfigure two sections with no disruption to system's operation, without operator intervention.

2.07 SYSTEM SOFTWARE

A. Operating System:
   1. Concurrent, multi-tasking capability.
      a. Common Software Applications Supported: Microsoft Excel.
      b. Acceptable Operating Systems: Windows 11.
   2. System Graphics:
      a. Allow up to 10 graphic screens, simultaneously displayed for comparison and monitoring of system status.
      b. Animation displayed by shifting image files based on object status.
      c. Provide method for operator with password to perform the following:
         1) Move between, change size, and change location of graphic displays.
         2) Modify on-line.
         3) Add, delete, or change dynamic objects consisting of:
            (a) Analog and binary values.
            (b) Dynamic text.
            (c) Static text.
            (d) Animation files.
   3. Custom Graphics Generation Package:
      a. Create, modify, and save graphic files and visio format graphics in PCX formats.
      b. HTML graphics to support web browser compatible formats.
      c. Capture or convert graphics from AutoCAD.
   4. Standard HVAC Graphics Library:
      a. HVAC Equipment:
         1) Condensing Unit / Heat pumps
         2) Air Handlers.
         3) Exhuast Fans.
         4) Kitchen Hoods.
         5) Exhaust Systems
         6) Unit Heaters.
      b. Ancillary Equipment:
         1) Fans.
         2) Coils.
         3) Duct heaters
         4) Dampers.

B. Workstation System Applications:
   1. Automatic System Database Save and Restore Functions:
      a. Current database copy of each Building Controller is automatically stored on hard disk.
      b. Automatic update occurs upon change in any system panel.
      c. In the event of database loss in any system panel, the first workstation to detect the loss automatically restores the database for that panel unless disabled by the operator.
   2. Manual System Database Save and Restore Functions by Operator with Password Clearance:
      a. Save database from any system panel.

b. Clear a panel database.
c. Initiate a download of a specified database to any system panel.

3. Software provided allows system configuration and future changes or additions by operators under proper password protection.
4. On-line Help:
   a. Context-sensitive system assists operator in operation and editing.
   b. Available for all applications.
   c. Relevant screen data provided for particular screen display.
   d. Additional help available via hypertext.
5. Security:
   a. Operator log-on requires user name and password to view, edit, add, or delete data.
   b. System security selectable for each operator.
   c. System supervisor sets passwords and security levels for all other operators.
   d. Operator passwords to restrict functions accessible to viewing and/or changing system applications, editor, and object.
   e. Automatic, operator log-off results from keyboard or mouse inactivity during user-adjustable, time period.
   f. All system security data stored in encrypted format.
6. System Diagnostics:
   a. Operations Automatically Monitored:
      1) Workstations.
      2) Printers.
      3) Modems.
      4) Network connections.
      5) Building management panels.
      6) Controllers.
   b. Device failure is annunciated to the operator.
7. Alarm Processing:
   a. All system objects are configurable to "alarm in" and "alarm out" of normal state.
   b. Configurable Objects:
      1) Alarm limits.
      2) Alarm limit differentials.
      3) States.
      4) Reactions for each object.
8. Alarm Messages:
   a. Descriptor: English language.
   b. Recognizable Features:
      1) Source.
      2) Location.
      3) Nature.
9. Configurable Alarm Reactions by Workstation and Time of Day:
   a. Logging.
   b. Printing.
   c. Starting programs.
   d. Displaying messages.
   e. Dialing out to remote locations.
   f. Paging.
   g. Providing audible annunciation.
   h. Displaying specific system graphics.
10. Custom Trend Logs:
    a. Definable for any data object in the system including interval, start time, and stop time.
    b. Trend Data:
       1) Sampled and stored on the building controller panel.

2) Archivable on hard disk.
3) Retrievable for use in reports, spreadsheets and standard database programs.
4) Archival on LAN accessible storage media including hard disk, tape, Raid array drive, and virtual cloud environment.
5) Protected and encrypted format to prevent manipulation, or editing of historical data and event logs.

11. Alarm and Event Log:
    a. View all system alarms and change of states from any system location.
    b. Events listed chronologically.
    c. Operator with proper security acknowledges and clears alarms.
    d. Alarms not cleared by operator are archived to the workstation hard disk.
12. Object, Property Status and Control:
    a. Provide a method to view, edit if applicable, the status of any object and property in the system.
    b. Status Available by the Following Methods:
        1) Menu.
        2) Graphics.
        3) Custom Programs.
13. Reports and Logs:
    a. Reporting Package:
        1) Allows operator to select, modify, or create reports.
        2) Definable as to data content, format, interval, and date.
        3) Archivable to hard disk.
    b. Real-time logs available by type or status such as alarm, lockout, normal, etc.
    c. Stored on hard disk and readily accessible by standard software applications, including spreadsheets and word processing.
    d. Set to be printed on operator command or specific time(s).
14. Reports:
    a. Standard:
        1) Objects with current values.
        2) Current alarms not locked out.
        3) Disabled and overridden objects, points and SNVTs.
        4) Objects in manual or automatic alarm lockout.
        5) Objects in alarm lockout currently in alarm.
        6) Logs:
            (a) Alarm History.
            (b) System messages.
            (c) System events.
            (d) Trends.
    b. Custom:
        1) Daily.
        2) Weekly.
        3) Monthly.
        4) Annual.
        5) Time and date stamped.
        6) Title.
        7) Facility name.
    c. Tenant Override:
        1) Monthly report showing total, requested, after-hours HVAC and lighting services on a daily basis for each tenant.
        2) Annual report showing override usage on a monthly basis.
    d. Electrical, Fuel, and Weather:
        1) Electrical Meter(s):

(a) Monthly showing daily electrical consumption and peak electrical demand with time and date stamp for each meter.
(b) Annual summary showing monthly electrical consumption and peak demand with time and date stamp for each meter.

2) Fuel Meter(s):
(a) Monthly showing daily natural gas consumption for each meter.
(b) Annual summary showing monthly consumption for each meter.

3) Weather:
(a) Monthly showing minimum, maximum, average outdoor air temperature and heating/cooling degree-days for the month.

C. Workstation Applications Editors:
1. Provide editing software for each system application at PC workstation.
2. Downloaded application is executed at controller panel.
3. Full screen editor for each application allows operator to view and change:
a. Configuration.
b. Name.
c. Control parameters.
d. Set-points.
4. Scheduling:
a. Monthly calendar indicates schedules, holidays, and exceptions.
b. Allows several related objects to be scheduled and copied to other objects or dates.
c. Start and stop times adjustable from master schedule.
5. Custom Application Programming:
a. Create, modify, debug, edit, compile, and download custom application programming during operation and without disruption of all other system applications.
b. Programming Features:
1) English oriented language, based on BASIC, FORTRAN, C, or PASCAL syntax allowing for free form programming.
2) Alternative language graphically based using appropriate function blocks suitable for all required functions and amenable to customizing or compounding.
3) Insert, add, modify, and delete custom programming code that incorporates word processing features such as cut/paste and find/replace.
4) Allows the development of independently, executing, program modules designed to enable and disable other modules.
5) Debugging/simulation capability that displays intermediate values and/or results including syntax/execution error messages.
6) Support for conditional statements (IF/THEN/ELSE/ELSE-F) using compound Boolean (AND, OR, and NOT) and/or relations (EQUAL, LESS THAN, GREATER THAN, NOT EQUAL) comparisons.
7) Support for floating-point arithmetic utilizing plus, minus, divide, times, square root operators; including absolute value; minimum/maximum value from a list of values for mathematical functions.
8) Language consisting of resettable, predefined, variables representing time of day, day of the week, month of the year, date; and elapsed time in seconds, minutes, hours, and days where the variable values cab be used in IF/THEN comparisons, calculations, programming statement logic, etc.
9) Language having predefined variables representing status and results of the system software enables, disables, and changes the set points of the controller software.

2.08 CONTROLLER SOFTWARE

A. All applications reside and operate in the system controllers and editing of all applications occurs at the operator workstation.

B. System Security:
1. User access secured via user passwords and user names.

2. Passwords restrict user to the objects, applications, and system functions as assigned by the system manager.
3. User Log On/Log Off attempts are recorded.
4. Automatic Log Off occurs following the last keystroke after a user defined delay time.

C. Object or Object Group Scheduling:
1. Weekly Schedules Based on Separate, Daily Schedules:
a. Include start, stop, optimal stop, and night economizer.
b. 10 events maximum per schedule.
c. Start/stop times adjustable for each group object.

D. Provide standard application for equipment coordination and grouping based on function and location to be used for scheduling and other applications.

E. Alarms:
1. Binary object is set to alarm based on the operator specified state.
2. Analog object to have high/low alarm limits.
3. All alarming is capable of being automatically and manually disabled.
4. Alarm Reporting:
a. Operator determines action to be taken for alarm event.
b. Alarms to be routed to appropriate workstation.
c. Reporting Options:

F. Maintenance Management: System monitors equipment status and generates maintenance messages based upon user-designated run-time limits.

G. PID Control Characteristics:
1. Direct or reverse action.
2. Anti-windup.
3. Calculated, time-varying, analog value, positions an output or stages a series of outputs.
4. User selectable controlled variable, set-point, and PED gains.

H. Staggered Start Application:
1. Prevents all controlled equipment from simultaneously restarting after power outage.
2. Order of equipment startup is user selectable.

I. Energy Calculations:
1. Accumulated instantaneous power or flow rates are converted to energy use data.
2. Algorithm calculates a rolling average and allows window of time to be user specified in minute intervals.
3. Algorithm calculates a fixed window average with a digital input signal from a utility meter defining the start of the window period that in turn synchronizes the fixed-window average with that used by the power company.

J. Anti-Short Cycling:
1. All binary output objects protected from short-cycling.
2. Allows minimum on-time and off-time to be selected.

K. On-Off Control with Differential:
1. Algorithm allows binary output to be cycled based on a controlled variable and set-point.
2. Algorithm to be direct-acting or reverse-acting incorporating an adjustable differential.

L. Run-Time Totalization:
1. Totalize run-times for all binary input objects.
2. Provides operator with capability to assign high run-time alarm.

PART 3 EXECUTION

3.01 INSTALLERS

A. Installer List:
1. Equipment supplier to install controls system..

2. Substitution Limitations: See call for bid information for request date deadline. Provide product data with substitution request.

3.02 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

3.03 INSTALLATION

A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.

B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation. Refer to Section 230993.

C. Provide conduit and electrical wiring in accordance with Section 260583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.04 MANUFACTURER'S FIELD SERVICES

A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

B. Provide operation training to instruct Owner's representative in operation of systems plant and equipment for a minimum of a 1 day period.

3.05 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate complete and operating system to Owner.

3.06 MAINTENANCE

A. Provide service and maintenance of energy management and control systems for one years from Date of Substantial Completion.

B. Provide two complete inspections, one in each season, to inspect, calibrate, and adjust controls as required, and submit written reports.

C. Provide complete service of systems, including call backs. Make minimum of 4 complete normal inspections of approximately 6 hours duration in addition to normal service calls to inspect, calibrate, and adjust controls, and submit written reports.

D. Provide 2-Year warranty on all parts and labor.

END OF SECTION