Addendum ADD-#02

Project Name:	Energy Recovery and Dehumidification
Polar Project No.	2543
Issued Date:	January 9, 2026
Issued By:	Bryn Cubberley
Engineer of Record:	Ian Wellle

This addendum is issued prior to closing of bids to provide revisions, additions, clarifications, and/or information to the work. This addendum shall be read, interpreted, and coordinated with all other parts of the Contract Documents. The cost of all work contained herein is to be included in the Contract Sum. Addendum must be acknowledged as part of the Bid Form.

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1 Notices

1.1 Structural cash allowance (Appendix C) only includes work indicated on structural drawings. Dehumidifier roofing work, wall penetrations, and other associated work is to be included in base bid price.

2 Questions

2.1 Question: Can you please confirm that the existing Direct Digital Control system is Delta and that this is to remain. Currently the specification allows other DDC systems to be installed.
Response: existing control system is Delta. All new control systems are to be Delta.

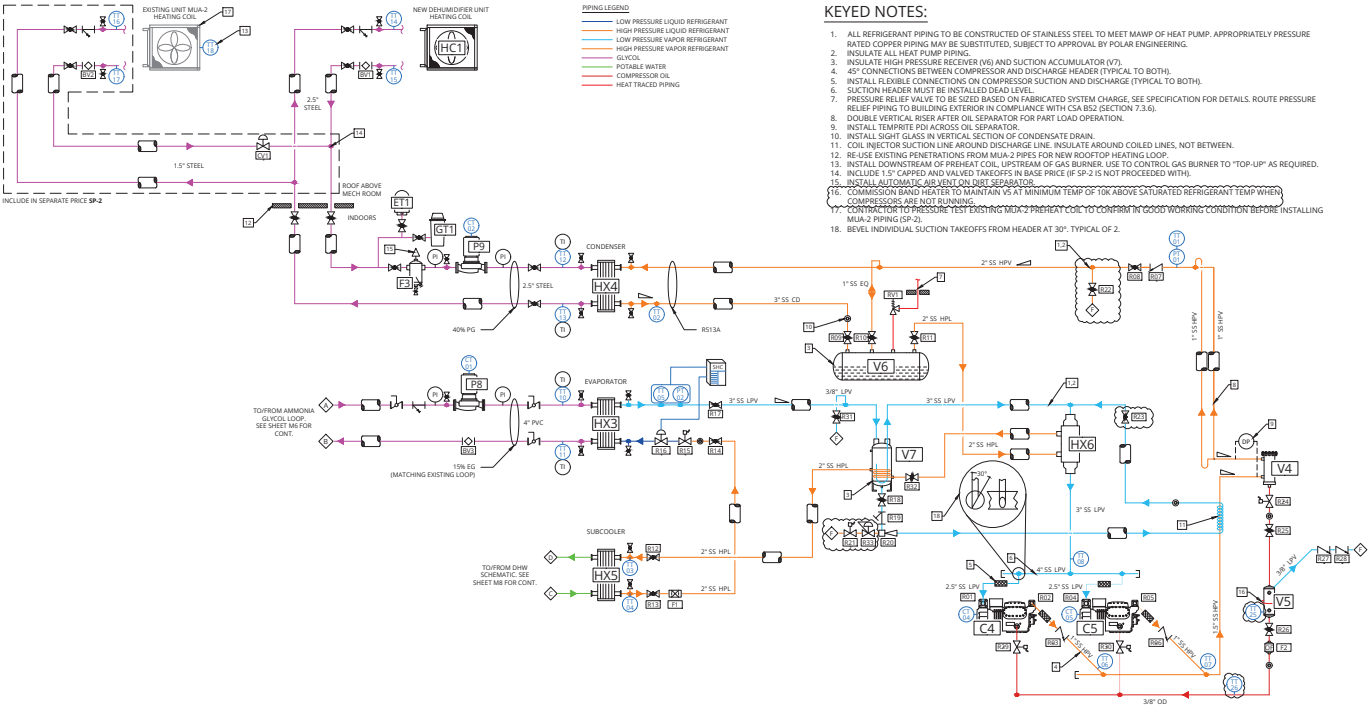
3 Drawing Revisions

3.1 Mechanical Drawings Sheets M7, M9, and M10.

a. Revise as per the enclosed.

3.2 Electrical Drawings Sheet E1.01 Motor List.

a. Revise as per the enclosed.



KEYED NOTES:

1. ALL REFRIGERANT PIPING TO BE CONSTRUCTED OF STAINLESS STEEL TO MEET MAWP OF HEAT PUMP. APPROPRIATELY PRESSURE RATED COPPER PIPING MAY BE SUBSTITUTED, SUBJECT TO APPROVAL BY POLAR ENGINEERING.
2. INSULATE ALL HEAT PUMP PIPING.
3. INSULATE HIGH PRESSURE RECEIVER (V6) AND SUCTION ACCUMULATOR (V7).
4. 45° CONNECTIONS BETWEEN COMPRESSOR AND DISCHARGE HEADER (TYPICAL TO BOTH).
5. INSTALL FLEXIBLE CONNECTIONS ON COMPRESSOR SUCTION AND DISCHARGE (TYPICAL TO BOTH).
6. SUCTION HEADER MUST BE INSTALLED DEAD LEVEL.
7. PRESSURE RELIEF VALVE TO BE SIZED BASED ON FABRICATED SYSTEM CHARGE, SEE SPECIFICATION FOR DETAILS. ROUTE PRESSURE RELIEF PIPING TO BUILDING EXTERIOR IN COMPLIANCE WITH CSA B52 (SECTION 7.3.6).
8. DOUBLE VERTICAL RISER AFTER OIL SEPARATOR FOR PART LOAD OPERATION.
9. INSTALL TEMPRITE PDI ACROSS OIL SEPARATOR.
10. INSTALL SIGHT GLASS IN VERTICAL SECTION OF CONDENSATE DRAIN.
11. COIL INJECTOR SUCTION LINE AROUND DISCHARGE LINE. INSULATE AROUND COILED LINES, NOT BETWEEN.
12. RE-USE EXISTING PENETRATIONS FROM MUA-2 PIPES FOR NEW ROOFTOP HEATING LOOP.
13. INSTALL DOWNSTREAM OF PREHEAT COIL, UPSTREAM OF GAS BURNER. USE TO CONTROL GAS BURNER TO "TOP-UP" AS REQUIRED.
14. INCLUDE 1.5" CAPPED AND VALVED TAKEOFFS IN BASE PRICE (IF SP-2 IS NOT PROCEEDED WITH).
15. INSTALL AUTOMATIC AIR VENT ON DIRT SEPARATOR.
16. COMMISSION BAND HEATER TO MAINTAIN V5 AT MINIMUM TEMP OF 10K ABOVE SATURATED REFRIGERANT TEMP WHEN COMPRESSORS ARE NOT RUNNING.
17. CONTRACTOR TO PRESSURE TEST EXISTING MUA-2 PREHEAT COIL TO CONFIRM IN GOOD WORKING CONDITION BEFORE INSTALLING MUA-2 PIPING (SP-2).
18. BEVEL INDIVIDUAL SUCTION TAKEOFFS FROM HEADER AT 30°. TYPICAL OF 2.

1 / M7 P&ID - HEAT PUMP AND HYDRONIC INTEGRATION

PRIME CONSULTANT	CONSULTANT	CLIENT	ENGINEER OF RECORD	PROJECT TITLE
POLAR ENGINEERING		CITY OF PORT ALBERNI	IAN WELLE P.ENG.	ALBERNI VALLEY MULTIPLEX - ENERGY RECOVERY AND DEHUMIDIFICATION
PHONE 778-700-1086 WEBSITE www.polareng.ca	PHONE WEBSITE	PHONE 250-723-2146 WEBSITE www.portalberni.ca	EGBC PERMIT TO PRACTICE NUMBER 1003657	DRAWING TITLE HEAT PUMP AND HYDRONIC INTEGRATION

REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION
1	2024-11-13	EVN	BC	ISSUED FOR COORDINATION
2	2025-01-10	EVN	BC	ISSUED FOR REVIEW
3	2025-02-03	EVN	BC	ISSUED FOR TENDER
4	2025-02-07	EVN	BC	RE-ISSUED FOR TENDER
5	2025-10-30	AH	BC	RE-ISSUED FOR TENDER
6	-	-	-	-

PROJ # 2453
SHEET SIZE D
SHEET NAME M7

HEAT EXCHANGER SCHEDULE

TAG	DESCRIPTION	MAKE	MODEL	CAPACITY	HOT SIDE				COLD SIDE				NOTES
					FLUID	PRESSURE DROP (PSI)	INLET TEMP. (F)	OUTLET TEMP. (F)	FLUID	PRESSURE DROP (PSI)	INLET TEMP. (F)	OUTLET TEMP. (F)	
HX3	HEAT PUMP EVAPORATOR	ALFA LAVAL	ACH502DQ	860 MBH	15%EG	2.01	81	71	R513A	16.2	60	79	3
HX4	HEAT PUMP CONDENSER	ALFA LAVAL	CBH112	920 MBH	R513A	2.99	204	165	40%PG	7.76	140	160	3
HX5	HEAT PUMP SUBCOOLER	DOUCETTE	BPDW415	240 MBH	R513A	4.7	165	130	WATER	2.6	120	140	1,3
HX6	HEAT PUMP LIQUID-SUCTION HX	DOUCETTE	SLHE	38 MBH	R513A	4.1	165	158	R513A	4.1	80	90	2,3

NOTES:
1. DOUBLE-WALL VENTED FOR POTABLE WATER SERVICE.
2. INSTALL IN VERTICAL ORIENTATION PER MANUFACTURER RECOMMENDATIONS.
3. MINIMUM 450PSI DWP.

CONTROL VALVE SCHEDULE

TAG	LOCATION	TYPE	MAKE	MODEL	LINE SIZE (IN)	DESIGN FLOW RATE (GPM)	MINIMUM SHUT OFF PRESSURE (PSI)	CV	FAIL-SAFE	ELECTRICAL (V/PH/HZ)	NOTES
CV1	RTU-1 GLYCOL RETURN	2-WAY, MOD	BELIMO	-	1.5	17	75	19	CLOSED	24/1/60	1,2

NOTES:
1. SELECT VALVE AND ACTUATOR SUITABLE FOR OUTDOOR INSTALLATION.
2. INCLUDED IN SEPARATE PRICE SP-2.

DEHUMIDIFIER SCHEDULE

TAG	DESCRIPTION	MAKE	MODEL	SUPPLY AIR (CFM)	SUPPLY AIR ESP (IN-WC)	H_20 REMOVAL RATE (LB/HR)	REACT AIR (CFM)	POWER (V/PH/HZ)	HEATER (MBH)	NOTES
DH-1	DEHUMIDIFIER	ENGINEERED AIR	HE/DWDS00/C/O/MV	16,000	1.0	297	6,000	575/3/60	1590	1,2,3

NOTES:
1. REFER TO ELECTRICAL DRAWINGS FOR POWER DETAILS.
2. REFER TO STRUCTURAL FOR LOCATION & CURB DETAILS.
3. INCLUDES HYDRONIC REACTIVATION PRE-HEAT COIL.

FILTER SCHEDULE

TAG	DESCRIPTION	MAKE	MODEL	CAPACITY (GAL)	FLUID	NOTES
FL3	AIR & DIRT SEPARATOR	CALEFFI	NA546060AM	3.6	40% PG	1

NOTES:
1. ENSURE BLOWDOWN VALVE & MAGNETIC WELL HAVE ADEQUATE SERVICE CLEARANCE.

PUMP SCHEDULE

TAG	DESCRIPTION	MAKE	MODEL	FLUID	HEAD (PSI)	FLOW (GPM)	MOTOR HP	ELECTRICAL (V/PH/HZ)	NOTES
P-8	HEAT PUMP EVAPORATOR LOOP	TO SPEC	-	15% EG	10	180	1.5	575/3/60	
P-9	HEAT PUMP CONDENSER LOOP	TO SPEC	-	40% PG	24	82	3	575/3/60	
P-10	HEAT PUMP SUBCOOLER LOOP	TO SPEC	-	POTABLE WATER	8	23	0.5	120/1/60	1,2

NOTES:
1. INLINE CIRCULATOR-TYPE PUMP SUITABLE FOR POTABLE WATER SERVICE
2. VARIABLE SPEED PUMP.

GLYCOL FEED TANK SCHEDULE

TAG	MAKE	MODEL	MAKE-UP CAPACITY (GAL)	PUMP (GPM)	FILL PRESSURE (PSIG)	ELECTRICAL (V/PH/HZ)	NOTES
GT1	CALEFACTIO	GMP6	6	1.6	20	120/1/60	1,2,3,4

NOTES:
1. C/W REMOTE ALARM KIT (#GMPDC).
2. DIMENSIONS 12X12X39" WITH 12" CLEARANCE.
3. C/W LIQUID LEVEL GAUGE, PUMP SUCTION HOSE W/STRAINER, PRESSURE PUMP W/ CHECK VALVE, CUTOUT PIGGYBACK LEVEL FLOAT SWITCH, ADJUSTABLE PRV.
4. 0.5" HYDRONIC CONNECTION MAY BE OF FLEXIBLE TYPE. MINIMUM 50PSI RATING.

COMPRESSOR SCHEDULE

TAG	MAKE	MODEL	OPERATION (F)		CAPACITY (TR)	MOTOR (kW)	ELECTRICAL (V/PH/HZ)	NOTES
			SST	SDT				
C4	BITZER	6FE-50Y	50	165	56	61.6	208/3/60	1,2
C5	BITZER	6FE-50Y	50	165	56	61.6	208/3/60	1,2

NOTES:
1. TO BE SUPPLIED WITH MOTOR VERSION 1, BITZER CM-RC-01 IQ MODULE, BITZER SE-I1 COMPRESSOR PROTECTION MODULE, PRESSURE TRANSDUCER ADD-ON, VARISTEP CAPACITY CONTROL, BITZER OLM-IQ OIL LEVEL CONTROLLER MODULE, BITZER HEAD COOLING FAN.
2. COMPRESSORS TO BE PROVIDED WITH BITZER RECOMMENDED OIL (BSE 55). SUBSTITUTE OILS WILL NOT BE ACCEPTED.

BALANCING VALVES

TAG	MAKE	MODEL	DESCRIPTION	FAILSAFE	FLOW (GPM)	NOTES
BV1	TO SPEC	-	BALANCE DH1 FLOW	OPEN	82	1,2
BV2	TO SPEC	-	BALANCE MUA2 FLOW	OPEN	17	1,3
BV3	TO SPEC	-	BALANCE P8/HX3 FLOW	OPEN	140	1

NOTES:
1. C/W TEST PORTS AND MEMORY.
2. BALANCE TO DESIRED FLOW WITH CV1 CLOSED.
3. BALANCE TO DESIRED FLOW WITH CV2 OPEN.
4. PART OF SEPARATE PRICE SP-2.

REFRIGERATION VALVES

TAG	SERVICE	VALVE DESCRIPTION	MANUFACTURER	MODEL	NOTES
R01	C4	ISOLATION VALVE	BITZER	N/A	1
R02	C4	ISOLATION VALVE	BITZER	N/A	1
R03	C4	CHECK VALVE	DANFOSS	CHV 25 STRAIGHT	
R04	C5	ISOLATION VALVE	BITZER	N/A	1
R05	C5	ISOLATION VALVE	BITZER	N/A	1
R06	C5	CHECK VALVE	DANFOSS	CHV 25 STRAIGHT	
R07	DISCHARGE HEADER	CHECK VALVE	DANFOSS	CHV 50 STRAIGHT	
R08	DISCHARGE HEADER	ISOLATION VALVE	DANFOSS	SVA 50 STRAIGHT	
R09	V6	ISOLATION VALVE	DANFOSS	SVA 75 STRAIGHT	
R10	V6	ISOLATION VALVE	DANFOSS	SVA 25 STRAIGHT	
R11	V6	ISOLATION VALVE	DANFOSS	SVA 50 STRAIGHT	
R12	HX5	ISOLATION VALVE	DANFOSS	SVA 50 STRAIGHT	
R13	HX5	ISOLATION VALVE	DANFOSS	SVA 50 STRAIGHT	
R14	HX3	ISOLATION VALVE	DANFOSS	SVA 50 STRAIGHT	
R15	HX3	SOLENOID VALVE	DANFOSS	EVR 40 V2 NS S4	
R16	HX3	ELECTRONIC EXPANSION VALVE	EMERSON	EX8	
R17	HX3	ISOLATION VALVE	DANFOSS	SVA 75 STRAIGHT	
R18	V7	ISOLATION VALVE	DANFOSS	GBC V2	
R19	V7	STRAINER	TO SPEC	TO SPEC	
R20	V7	INJECTOR	PHILLIPS	20205L	7
R21	V7	SOLENOID VALVE	DANFOSS	EVR V2	
R22	V7	ISOLATION VALVE	DANFOSS	GBC V2	
R23	V7	ISOLATION VALVE	DANFOSS	GBC V2	
R24	V4	SOLENOID VALVE	SPORLAN	B6F1 + MKC-1	2
R25	V4	ISOLATION VALVE	DANFOSS	GBC 125 V2	
R26	V5	ISOLATION VALVE	DANFOSS	GBC 125 V2	
R27	V5	DIFFERENTIAL CHECK VALVE	SPORLAN	OCV-20	
R28	V5	DIFFERENTIAL CHECK VALVE	SPORLAN	OCV-20	
R29	C4	OIL LEVEL REGULATOR	BITZER	OLM-IQ	3
R30	C5	OIL LEVEL REGULATOR	BITZER	OLM-IQ	3
R31	SUCTION HEADER	ISOLATION VALVE	TO SPEC	TO SPEC	
R32	HX6	ISOLATION VALVE	DANFOSS	GBC V2	
R33	OIL INJECTOR	PRESSURE REGULATOR	DANFOSS	KVD1/2	6
F1	LIQUID LINE	FILTER DRIER	DANFOSS	DCR-096T-DM	
F2	OIL DRAIN LINE	COMPRESSOR OIL FILTER	TO SPEC	TO SPEC	4
RV1	V6	PRESSURE RELIEF VALVE	TO SPEC	TO SPEC	5

NOTES:
1. TO BE SUPPLIED WITH BITZER COMPRESSOR.
2. SOLENOID TO REMAIN CLOSED WHILE COMPRESSOR IS OFF. TIME DELAY SOLENOID OPEN AFTER COMP. START TO ALLOW OIL WARMUP.
3. PROVIDED OIL LEVEL CONTROL AND MONITORING. INTEGRATE WITH BITZER IQ MODULE.
4. CONTRACTOR TO SELECT OIL FILTER BASED ON COMPRESSOR MANUFACTURER RECOMMENDATION.
5. PRESSURE RELIEF VALVE TO BE SIZED BASED ON FABRICATED SYSTEM CHARGE. SEE SPECIFICATIONS FOR DETAILS. ROUTE PRESSURE RELIEF PIPING TO EXTERIOR OF THE BUILDING IN COMPLIANCE WITH ASHRAE 15 SP-2.
6. TUNE R33 SO THAT A GRADUAL STEADY OIL FLOW IS OBSERVED BACK TO SUCTION HEADER.
7. MANUFACTURER CHANGE.

CONTROL DAMPER SCHEDULE

TAG	DESCRIPTION	MAKE	MODEL	SUPPLY AIR (CFM)	WIDTH (IN)	HEIGHT (IN)	NOTES
CD1	CONTROL DAMPER	TAMCO	SERIES 1000	16,000	40	40	1
CD2	CONTROL DAMPER	TAMCO	SERIES 1000	5,000	30	30	1
CD3	CONTROL DAMPER	TAMCO	SERIES 1000	16,000	40	40	2,3
CD4	CONTROL DAMPER	TAMCO	SERIES 1000	5,000	24	24	2,3

NOTES:
1. INSTALL WITH MODULATING ACTUATOR
2. INSTALL WITH 2 POSITION ACTUATOR
3. NEMA 3 OR EQUIVALENT RATING FOR OUTDOOR INSTALLATION.

GRILLE & DIFFUSER SCHEDULE

TAG	DESCRIPTION	MAKE	MODEL	AIRFLOW (CFM)	SIZE	NOTES
RG1	RETURN GRILLE	PRICE INDUSTRIES	80 SERIES EGG CRATE	16,000	48" x 40"	
RG2	RETURN LOUVER	PRICE INDUSTRIES	80 SERIES EGG CRATE	5,000	36" x 24"	
SG1	HIGH CAPACITY DRUM LOUVER	PRICE INDUSTRIES	HCD	5,333	54" x 15"	1
SG2	AIRFOIL GRILLE	PRICE INDUSTRIES	20/30 - MODEL 22	5,000	30" x 30"	
SG3	FABRIC DIFFUSER	DUCTSOX	VERONA NP	16,000	44"	2,3

NOTES:
1. TYPICAL OF THREE.
2. 160 RUN, DIFFUSER HOLES AT 9 O'CLOCK AND 10:30.
3. PART OF SEPARATE PRICE SP-1.

EXPANSION TANK SCHEDULE

TAG	PURPOSE	MAKE	MODEL	CAPACITY	FLUID	AIR-SIDE CHARGE	NOTES
ET1	UNDERFLOOR EXPANSION TANK	AMTROL	AX-20V-DD	16.5 GAL	40% PG	20 PSIG	1

NOTES:
1. DIAPHRAGM EXPANSION TANK.

PRESSURE VESSEL SCHEDULE

TAG	DESCRIPTION	DUTY	DIAMETER	LENGTH	OP TEMP (F)	OP PRESS (PSIA)	DWP (PSI)	MAKE	MODEL	NOTES
V4	OIL SEPARATOR	R513A	8-5/8"	39"	204	344	650	TEMPRITE	928	2
V5	OIL RESERVOIR	R513A	6"	13-1/2"	204	344	650	TEMPRITE	47058	
V6	HIGH PRESSURE RECEIVER	R513A	-	-	165	344	MIN. 450	TO SPEC	TO SPEC	1
V7	SUCTION ACCUMULATOR W BOIL OFF COIL	R513A	14"	42"	50	66	MIN. 450	HENRY	AF-14042+	3

NOTES:
1. TO BE SELECTED BY CONTRACTOR. RECEIVER MUST ACCOMMODATE 100% REFRIGERANT CHARGE AT 80% FILL LEVEL.
2. 3/8" SAE OIL RETURN CONNECTION.
3. VESSEL TO BE RE-RATED BY MANUFACTURER TO ACHIEVE MINIMUM DWP OF 450PSI @ -20F MDMT.

PRIME CONSULTANT
POLAR ENGINEERING
PHONE 778-700-1086 WEBSITE www.polareng.ca

CONSULTANT
PHONE WEBSITE

CLIENT
CITY OF PORT ALBERNI
PHONE 250-723-2146 WEBSITE www.portalberni.ca

ENGINEER OF RECORD
IAN WELLE P.ENG.
EGBC PERMIT TO PRACTICE NUMBER 1003657

PROJECT TITLE
ALBERNI VALLEY MULTIPLEX - ENERGY RECOVERY AND DEHUMIDIFICATION

DRAWING TITLE
MECHANICAL SCHEDULES

REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION
1	2024-11-13	EVN	BC	ISSUED FOR COORDINATION
2	2025-01-10	EVN	BC	ISSUED FOR REVIEW
3	2025-02-03	EVN	BC	ISSUED FOR TENDER
4	2025-02-07	EVN	BC	RE-ISSUED FOR TENDER
5	2025-10-30	AH	BC	RE-ISSUED FOR TENDER
6	-	-	-	-

PROJ # 2453
SHEET SIZE D
SHEET NAME M9

INPUTS - BUILDING AUTOMATION SYSTEM

TAG	DESCRIPTION	PURPOSE	LOCATION	SIGNAL	DISPLAY UNITS	NOTES
TT01	TEMP SENSOR	HP DISCHARGE TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT02	TEMP SENSOR	HP CONDENSING TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT03	TEMP SENSOR	HX5 ENTERING REFRIG TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT04	TEMP SENSOR	HX5 LEAVING REFRIG TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT05	TEMP SENSOR	HP EVAPORATING TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT06	TEMP SENSOR	C4 DISCHARGE TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT07	TEMP SENSOR	C5 DISCHARGE TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT08	TEMP SENSOR	SUCTION HEADER TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT10	TEMP SENSOR	HX3 ENTERING GLYCOL TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT11	TEMP SENSOR	HX3 LEAVING GLYCOL TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT12	TEMP SENSOR	HX4 ENTERING GLYCOL TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT13	TEMP SENSOR	HX4 LEAVING GLYCOL TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT14	TEMP SENSOR	DH1 HEATING COIL ENTERING TEMP	DH1 - ROOFTOP	AI	F	
TT15	TEMP SENSOR	DH1 HEATING COIL LEAVING TEMP	DH1 - ROOFTOP	AI	F	
TT16	TEMP SENSOR	MUA-2 HEATING COIL ENTERING TEMP	MUA2 - ROOFTOP	AI	F	3
TT17	TEMP SENSOR	MUA-2 HEATING COIL LEAVING TEMP	MUA2 - ROOFTOP	AI	F	3
TT18	TEMP SENSOR	MUA-2 HEATING COIL AIR LEAVING TEMP	MUA2 - ROOFTOP	AI	F	3
TT20	TEMP SENSOR	HX5 LEAVING GLYCOL TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT21	TEMP SENSOR	HX5 ENTERING GLYCOL TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT22	TEMP SENSOR	TK-2 (PREHEAT TANK) TEMP	ZAMBONI AREA	AI	F	
TT23	TEMP SENSOR	TK-2 (PREHEAT TANK) SUPPLY TEMP	ZAMBONI AREA	AI	F	
TT24	TEMP SENSOR	TK-23 (FINAL HEAT TANK) SUPPLY TEMP	ZAMBONI AREA	AI	F	
TT25	TEMP SENSOR	V-5 OIL TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
TT26	TEMP SENSOR	OIL RETURN TEMP	HP SKID - COMPRESSOR ROOM	AI	F	
PT01	PRESSURE TRANSDUCER	HP DISCHARGE PRESS	HP SKID - COMPRESSOR ROOM	AI	PSI	
PT02	PRESSURE TRANSDUCER	HP SUCTION PRESS	HP SKID - COMPRESSOR ROOM	AI	PSI	
PS01	PRESSURE SENSOR	SUPPLY DUCT PRESSURE	ROOFTOP - DH1 SUPPLY DUCTING	AI	Pa	
CT01	CURRENT TRANSDUCER	P8 STATUS	HP SKID - COMPRESSOR ROOM	AI	A	
CT02	CURRENT TRANSDUCER	P9 STATUS	HP SKID - COMPRESSOR ROOM	AI	A	
CT03	CURRENT TRANSDUCER	P10 STATUS	HP SKID - COMPRESSOR ROOM	AI	A	
CT04	CURRENT TRANSDUCER	C4 STATUS	HP SKID - COMPRESSOR ROOM	AI	A	
CT05	CURRENT TRANSDUCER	C5 STATUS	HP SKID - COMPRESSOR ROOM	AI	A	
RD01	REFRIGERANT DETECTOR	R513A DETECTION	COMPRESSOR ROOM	AI	PPM	1,2
RH01	RH & TEMP SENSOR	WEYERHAUSER RH & TEMP	WEYERHAUSER ARENA	AI	%, F	
RH02	RH & TEMP SENSOR	COULSON RH & TEMP	COULSON ARENA	AI	%, F	
DP01	DEWPOINT SENSOR	WEYERHAUSER DEWPOINT	WEYERHAUSER ARENA	AI	F	
DP02	DEWPOINT SENSOR	COULSON DEWPOINT	COULSON ARENA	AI	F	
AQ01	CO2 SENSOR	WEYERHAUSER CO2	WEYERHAUSER ARENA	AI	PPM	
AQ02	CO & NO2 SENSOR	WEYERHAUSER CO/NO2	WEYERHAUSER ARENA	AI	PPM/PPB	
AQ03	CO2 SENSOR	COULSON CO2	COULSON ARENA	AI	PPM	
AQ04	CO & NO2 SENSOR	COULSON CO/NO2	COULSON ARENA	AI	PPM/PPB	
AQ05	CO2 SENSOR	EXTERIOR CO2	OUTSIDE	AI	PPM	
AL01	LEVEL ALARM	GT1 LOW LEVEL ALARM	HP SKID - COMPRESSOR ROOM	DI	-	

NOTES:
1. FOR R513A REFRIGERANT.
2. INSTALL NEAR GROUND LEVEL, WHERE REFRIGERANT IS LIKELY TO ACCUMULATE.
3. PART OF SEPARATE PRICE SP-2.

OUTPUTS - BUILDING AUTOMATION SYSTEM

EQUIPMENT TO CONTROL		PURPOSE	LOCATION	SIGNAL
TAG	DESCRIPTION			
R15	SOLENOID VALVE	LIQUID REFRIGERANT SHUT-OFF	HP SKID - COMPRESSOR ROOM	DO
R16	ELECTRONIC EXPANSION VALVE	LIQUID REFRIGERANT CONTROL	HP SKID - COMPRESSOR ROOM	AO
R24	SOLENOID VALVE	V4/V5 OIL WARM-UP CONTROL	HP SKID - COMPRESSOR ROOM	DO
R21	SOLENOID VALVE	REFRIGERANT EJECTOR LIQUID FEED CONTROL	HP SKID - COMPRESSOR ROOM	DO
C4	HP COMPRESSOR	COMPRESSOR START	HP SKID - COMPRESSOR ROOM	DO
C4	HP COMPRESSOR	COMPRESSOR CAPACITY CONTROL	HP SKID - COMPRESSOR ROOM	AO
C5	HP COMPRESSOR	COMPRESSOR START	HP SKID - COMPRESSOR ROOM	DO
C5	HP COMPRESSOR	COMPRESSOR CAPACITY CONTROL	HP SKID - COMPRESSOR ROOM	AO
P8	HP EVAPORATOR PUMP	PUMP START	HP SKID - COMPRESSOR ROOM	DO
P9	HP CONDENSER PUMP	PUMP START	HP SKID - COMPRESSOR ROOM	DO
P10	HP SUBCOOLER PUMP	PUMP START	HP SKID - COMPRESSOR ROOM	DO
P10	HP SUBCOOLER PUMP	PUMP SPEED CONTROL	HP SKID - COMPRESSOR ROOM	AO
CV1	HP CONDENSER LOOP CONTROL VALVE	DH1/MUA-1 HEATING COIL TEMP CONTROL	ROOFTOP	AO
CD1	CONTROL DAMPER	WEYERHAUSER SUPPLY AIR	WEYERHAUSER SUPPLY DUCT	AO
CD2	CONTROL DAMPER	COULSON SUPPLY AIR	COULSON SUPPLY DUCT	AO
CD3	CONTROL DAMPER	WEYERHAUSER RETURN AIR	WEYERHAUSER RETURN DUCT	DO
CD4	CONTROL DAMPER	COULSON RETURN AIR	COULSON RETURN DUCT	DO

INPUTS - TO BUILDING AUTOMATION SYSTEM FROM DH1

TAG	DESCRIPTION	PURPOSE	LOCATION	SIGNAL	DISPLAY UNITS
DH-S1	TEMP SENSOR	PROCESS AIR INLET TEMP	DH1	AI	F
DH-S2	RH SENSOR	PROCESS AIR INLET RH		AI	%
DH-S3	TEMP SENSOR	PROCESS AIR OUTLET TEMP		AI	F
DH-S4	RH SENSOR	PROCESS AIR OUTLET RH		AI	%
DH-S5	TEMP SENSOR	REGEN AIR INLET TEMP		AI	F
DH-S6	RH SENSOR	REGEN AIR INLET RH		AI	%
DH-S7	TEMP SENSOR	REGEN AIR OUTLET TEMP		AI	F
DH-S8	RH SENSOR	REGEN AIR OUTLET RH		AI	%
DH-S9	TEMP SENSOR	REGEN AIR PREHEAT COIL LEAVING TEMP		AI	F
DH-S10	TEMP SENSOR	REGEN AIR GAS BURNER LEAVING TEMP		AI	F
DH-S11	FILTER STATUS	PROCESS FILTER STATUS		DI	-
DH-S12	FILTER STATUS	REGEN FILTER STATUS		DI	-
DH-S13	FAN POWER	PROCESS FAN POWER		AI	A
DH-S14	FAN POWER	REGEN FAN POWER		AI	A

OUTPUTS - TO DH1 FROM BUILDING AUTOMATION SYSTEM

EQUIPMENT TO CONTROL		PURPOSE	LOCATION	SIGNAL
TAG	DESCRIPTION			
DH1	DEHUM ON/OFF	DEHUM ON/OFF	DH1	DO
	HUMIDISTAT	START REGEN		DO
	REGEN HEATER	REGEN TEMP		AO
	PROCESS AIRFLOW	FAN SPEED		AO
	MIXING DAMPER	OA & RA MIXING RATIO		AO
	DUCT HIGH PRESS	HIGH PRESS CUT-OFF		DO
	FIRE ALARM	FIRE SIGNAL FROM BMS		DO

GENERAL SPECIFICATIONS - DELTA CONTROLS BUILDING AUTOMATION SYSTEM

1. INSTALL LONG TERM TREND RECORDING EQUIPMENT AS REQUIRED TO STORE MIN 10,000 DATA POINT TRENDS (2YR AT 15MIN POLLS) FOR MIN 100 SEPARATE TRENDLOGS.
2. ONLY DELTA CONTROLS BRAND IS ACCEPTED. ALLOW $5 SEQ FOR TRENDS SETUP PROCESS.
3. A BEFORE DRAWING FOR DETAILED DIAGNOSTICS TO BE CREATED, TRIGGER TO PROVIDE DETAIL UPON CONTRACT AWARD.

SITE-SPECIFIC HEAT PUMP CONTROL STRATEGY - DELTA CONTROLS BUILDING AUTOMATION SYSTEM

HP1 (C4/5)
1. COMPRESSORS SHALL BE STAGED WITH C4 AS THE LEAD COMPRESSOR.
2. MAXIMUM 4 COMPRESSOR STARTS PER HOUR.
3. MINIMUM COMPRESSOR RUNTIME IS 5 MINUTES.
4. MINIMUM HEAT PUMP EVAPORATION TEMPERATURE IS 40F.
5. ONLY ENABLE HP1 WHEN DH1 IS ENABLED AND CALLING FOR DEHUMIDIFICATION (REGEN IS ON).
   5.1. ENSURE P8 AND P9 ARE CONFIRMED ENABLED BEFORE STARTING HP1.
6. CONTROL HEAT PUMP CAPACITY USING BITZER IQ MODULES ON EACH COMPRESSOR TO MAINTAIN HX4 LEAVING WATER TEMPERATURE (TT4X) AT 165F.
   6.1. DISABLE HP WHEN TT13 < 170F.
   6.2. MINIMUM HP CAPACITY IS 30% OF TOTAL CAPACITY, EQUIVALENT TO ONE COMPRESSOR AT 60% CAPACITY.

SUPERHEAT CONTROLLER AND EXPANSION VALVE
1. CONTROL SUPERHEAT USING VALVE R16 BASED ON PT02 AND TT05.
2. MAINTAIN MINIMUM 20F SUPERHEAT AT HX3 OUTLET.

OIL WARM-UP SOLENOID
1. VALVE R24 IS NORMALLY CLOSED.
2. OPEN R24 WITH 2-MINUTE DELAY WHEN HP1 IS ENABLED.
   2.1. CONFIRM DURING COMMISSIONING THAT 2-MINUTE DELAY IS SUFFICIENT FOR OIL SEPARATOR (V4) TO REACH OPERATING TEMP. ADJUST DELAY AS REQUIRED.
3. CLOSE R24 WHEN HP1 IS DISABLED.

P8
4. ENABLE P8 WHEN HP1 IS ENABLED.

P9
1. ENABLE P9 WHEN HP1 IS ENABLED.

P10
1. ENABLE P10 WHEN HP1 IS ENABLED AND TT22 < 140F.
2. WHEN ENABLING P-10, RAMP UP SPEED LINEARLY FROM 30% TO 100% OVER A MINIMUM ELAPSED TIME OF 30 SECONDS.
3. WHEN DISABLING P-10 (TT22 SETPOINT REACHED), RAMP DOWN SPEED LINEARLY FROM 100% TO 30% OVER A MINIMUM ELAPSED TIME OF 30 SECONDS BEFORE SHUTTING DOWN.

CV1
1. MODULATE CV1 TO MAINTAIN SUPPLY AIR TEMP SETPOINT OF MUA-2.
2. ALLOW FOR TRANSFER OF SUPPLY AIR SETPOINT FROM MUA-2 TO DELTA CONTROLS SYSTEM TO CONTROL CV1.

DEHUMIDIFIER CONTROL STRATEGY - DELTA CONTROLS BUILDING AUTOMATION SYSTEM

1. INTEGRATE DEHUMIDIFIER, SENSORS, & DAMPERS INTO BUILDING AUTOMATION SYSTEM AND UPDATE GRAPHICS PACKAGE.
2. WEYERHAUSER AND COULSON ARENA SETPOINTS ARE CONTROLLED VIA DEW POINT TEMPERATURE. CONTRACTOR TO COORDINATE DEWPOINT TEMPERATURES WITH POLAR ENGINEERING DURING CONSTRUCTION.
3. THE DEHUMIDIFIER WILL PRIORITIZE ENERGY RECOVERY VIA THE HYDRONIC COIL WHEN AVAILABLE.
4. THE GAS BURNER WILL SUPPLEMENT THE HYDRONIC COIL TO MAINTAIN A MINIMUM REACTIVATION TEMPERATURE OF 150°F.
5. IF THE ARENA SETPOINT CANNOT BE MAINTAINED AT 150°F REACTIVATION TEMPERATURE, THE GAS HEATER WILL INCREASE THE REACTIVATION TEMPERATURE ABOVE 150°F TO MAINTAIN THE ARENA SETPOINT.
6. IMPLEMENT DEMAND CONTROL VENTILATION BY MODULATING THE DEHUMIDIFIER MIXING BOX. MAINTAIN WEYERHAUSER AND COULSON ARENA CO2 LEVELS WITHIN 700PPM OF OUTDOOR CO2 LEVELS.
7. ADD BUTTONS TO GRAPHICS FOR 'ICE OUT' IN THE WEYERHAUSER AND COULSON ARENAS.
8. CONTROL DAMPERS AND UNIT CFM AS FOLLOWS:
   8.1. WHEN WEYERHAUSER 'ICE OUT' IS ACTIVE, REDUCE CFM TO 5,000, CLOSE CD1, REDIRECTING 100% OF THE SUPPLY AIR TO COULSON ARENA. OPEN CD1 AS REQUIRED TO MAINTAIN ACCEPTABLE CO2 LEVELS.
   8.2. WHEN COULSON 'ICE OUT' IS ACTIVE, CLOSE CD3, REDIRECTING 100% OF THE SUPPLY AIR TO WEYERHAUSER ARENA. OPEN CD3 AS REQUIRED TO MAINTAIN ACCEPTABLE CO2 LEVELS.
   8.3. WHEN 'ICE OUT' IS ACTIVE FOR BOTH SPACES, TURN THE DEHUMIDIFIER OFF.
   8.4. WHEN 'ICE OUT' IS INACTIVE FOR BOTH SPACES, MAINTAIN 16,000 CFM. MODULATE CD1 AND CD2 TO EQUIALIZE HUMIDITY LEVELS BETWEEN THE TWO ARENAS.
      8.4.1. DAMPERS MUST MODULATE WITHIN A SET RANGE (TO BE SET BY BALANCING CONTRACTOR) TO ENSURE NO MORE THAN 5,000 CFM IS DIRECTED TO COULSON ARENA IN ANY CONDITION.

CONTROL MODIFICATIONS TO EXISTING EQUIPMENT - DELTA CONTROLS BUILDING AUTOMATION SYSTEM

P5
1. ENABLE P5 DURING ICE-IN SEASON.

P6
1. UPDATE EXISTING PUMP P6 PROGRAMMING TO MEET CONTROL INTENT BELOW.
2. DEFINE UF_MIN_SP AS THE MINIMUM DESIRED UNDERFLOOR TEMPERATURE (45F).
3. DEFINE UF_MAX_SP AS THE MAXIMUM DESIRED UNDERFLOOR TEMPERATURE (80F).
4. DEFINE UF_AVG_TEMP AS THE AVERAGE OF EXISTING UNDERFLOOR TEMPERATURE SENSORS.
5. DEFINE UF_SUPPLY_TEMP AS THE EXISTING UNDERFLOOR SUPPLY GLYCOL TEMPERATURE.
6. ENABLE P6 CONTINUOUSLY DURING ICE-IN SEASON UNLESS EITHER OF THE FOLLOWING CONDITIONS ARE TRUE:
   6.1. UF_AVG_TEMP < UF_MIN_SP AND UF_SUPPLY_TEMP < UF_AVG_TEMP.
   6.2. UF_AVG_TEMP > UF_MAX_SP AND UF_SUPPLY_TEMP > UF_AVG_TEMP.

F-17 (EXISTING AMMONIA PLANT EXHAUST FAN)
1. UPDATE F-17 CONTROL SEQUENCE TO RUN AS USUAL, WITH THE FOLLOWING NEW CONDITION.
2. MONITOR NEW RS13A REFRIGERANT DETECTOR (RD02)
   2.1. IF A REFRIGERANT LEAK IS DETECTED BY RD02, CONTROL F-17 TO REFRIGERANT LEAK FLOW RATE.
   2.2. MINIMUM RUNTIME OF 1 HOUR AT REFRIGERANT LEAK FLOW RATE.

MD-6 (EXISTING MOTORIZED DAMPER ON AMMONIA PLANT INTAKE LOUVRE)
1. PER F-17 SEQUENCE ABOVE, ENSURE MD-6 OPENS WHEN A REFRIGERANT LEAK IS DETECTED AND REMAINS OPEN WHILE F-17 IS OPERATING AT REFRIGERANT LEAK FLOW RATE.

MUA-2
1. CREATE GRAPHIC FOR MUA-2 IN DELTA CONTROLS SYSTEM WITH ALL RELEVANT INFORMATION FOR UNIT OPERATION AND MONITORING.
2. INCLUDE CV-1 AND HEATING COIL TEMPERATURE SENSORS.
3. CONTROL MUA-2 GAS BURNER TO TRIM AS REQUIRED TO MAINTAIN DISCHARGE TEMP SETPOINT WITH HYDRONIC COIL PROVIDING PRE-HEAT.

PRIME CONSULTANT
POLAR ENGINEERING
PHONE 778-700-1086 WEBSITE www.polareng.ca

CONSULTANT
PHONE WEBSITE

CLIENT
CITY OF PORT ALBERNI
PHONE 250-723-2146 WEBSITE www.portalberni.ca

ENGINEER OF RECORD
IAN WELLÉ P.ENG.
EGBC PERMIT TO PRACTICE NUMBER 1003657

PROJECT TITLE
ALBERNI VALLEY MULTIPLEX - ENERGY RECOVERY AND DEHUMIDIFICATION

DRAWING TITLE
CONTROLS

REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION
1	2024-11-13	EVN	BC	ISSUED FOR COORDINATION
2	2025-01-10	EVN	BC	ISSUED FOR REVIEW
3	2025-02-03	EVN	BC	ISSUED FOR TENDER
4	2025-02-07	EVN	BC	RE-ISSUED FOR TENDER
5	2025-10-30	AH	BC	RE-ISSUED FOR TENDER
6	-	-	-	-

PROJ # 2453
SHEET SIZE D
SHEET NAME M10

SYMBOL LEGEND

SYMBOL	MOUNTING	DESCRIPTION
	455mm C.O.D. A.F.F.	DUPLEX RECEPTACLE, 1 GANG
	1150mm C.O.D. A.F.F.	SP 1 GANG SWITCH
	2400mm C.O.D. A.F.F.	REMOTE EMERGENCY LIGHT, DOUBLE HEADS, WALL MOUNTED
M	–	MECHANICAL EQUIPMENT CONNECTION
FF 2.5kW	–	ELECTRIC FORCE FLOW HEATER, RECESSED, 2500W c/w BUILT-IN THERMOSTAT

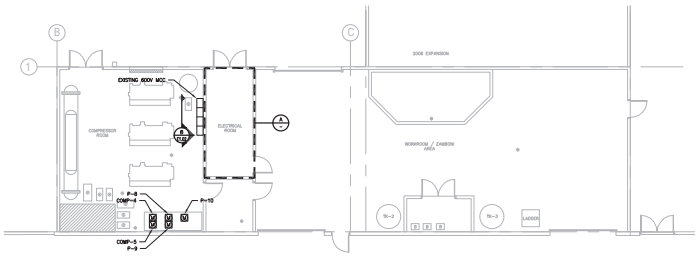
ABBREVIATIONS:
(E) – EXISTING ELECTRICAL DEVICE
(R) – RELOCATE EXISTING ELECTRICAL DEVICE
(X) – REMOVE EXISTING ELECTRICAL DEVICE
(A.F.F.) – ABOVE FINISHED FLOOR
(C.O.D.) – CENTER OF DEVICE

MECHANICAL EQUIPMENT SCHEDULE

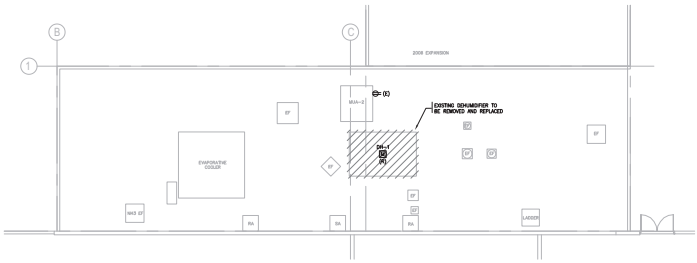
ITEM	DESCRIPTION	VOLTS/PHASE/FREQ	HP	kW	FLA	MCA	MOCP	DISC.	STARTER	CONTROL	NOTES
DH–1	DEHUMIDIFIER	575/3/60				43.4	60	60A–3P–HP	INTEGRAL	BY MECH	1
P–8	HEAT PUMP EVAPORATOR LOOP PUMP	575/3/60	1.5					15A–3P	RELAY	BY MECH	1,2
P–9	HEAT PUMP CONDENSOR LOOP PUMP	575/3/60	3					15A–3P	RELAY	BY MECH	1,2
P–10	HEAT PUMP SUBCOOLER LOOP PUMP	120/1/60	0.5					15A–1P	RELAY	BY MECH	1,2
COMP–4	COMPRESSOR	208/3/60		61.6				40A–3P	PACKAGED	BY MECH	1,3
COMP–5	COMPRESSOR	208/3/60		61.6				40A–3P	PACKAGED	BY MECH	1,3

NOTES:
1. PROVIDE POWER POINT CONNECTION AND DISCONNECT AS REQUIRED.
2. ELECTRICAL TO SUPPLY AND INSTALL STARTER AS REQUIRED.
3. MECHANICAL TO SUPPLY STARTER, ELECTRICAL TO INSTALL.

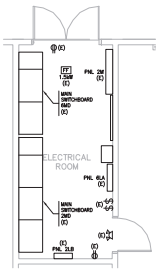
ELECTRICAL CONTRACTOR MUST CONFIRM LOCATION, VOLTAGE, PHASE, AMPACITY OF ALL MECHANICAL EQUIPMENT BEFORE CONNECTION. REPORT ANY MAJOR DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING. ELECTRICAL IS NOT RESPONSIBLE FOR REMOVING INSTALLED, LIVED AND BREAKING FOR UNCOORDINATED MECHANICAL EQUIPMENT CONNECTION.



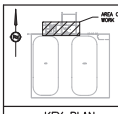
GROUND FLOOR AREA ENLARGEMENT
SCALE: 1/8" = 1'-0"



ROOF LEVEL AREA ENLARGEMENT
SCALE: 1/8" = 1'-0"



A ELEC. ROOM ENLARGEMENT
SCALE: 1/4" = 1'-0"



KEY PLAN

NO.	DATE	REVISION
4	DEC 12 2025	ISSUED FOR ADDENDUM
3	OCT 28 2025	ISSUED FOR TENDER
2	FEB 03 2025	ISSUED FOR TENDER
1	JAN 17 2025	ISSUED FOR REVIEW

KB ENGINEERING LTD
ELECTRICAL CONSULTING ENGINEERS
#1 1530 NORTHFIELD ROAD TEL 250-754-4448
NANAIMO, BC, V9S 3B3 KBENGINEERING.CA
EGBC PERMIT #1001907

CLIENT

PROJECT
ALBERNI VALLEY MULTIPLEX DEHUMIDIFIER REPLACEMENT

TITLE
ELECTRICAL LAYOUT

PROJECT NO. 24–4762	SEAL
DATE JANUARY, 2025	
SCALE AS SHOWN	

DRAWING NO.
E1.01