LOAD DESCRIPTION	LOAD	BRKR SIZE	CCT No.	PH	CCT No.	BRKR SIZE	LOAD	LOAD DESCRIPTION
	-	30	1	A	2	15	-	PO 15A
CP #2			3	B	4	15	-	PO 15B
		3P	5	C	6	15	-	PO 15C
		30	7	A	8	15	-	PO 15D
CP #1			9	B	10	15	-	PO 11B
		3P	11	C	12	15	-	PO 11A
FS - POWER		15	13	A	14	15	-	PO 11C
FV - 410		15	15	B	16	15	-	PO 11D
FV - 420		15	17	C	18	15	-	FILTER PLC
FV - 430		15	19	A	20	15	-	FILTER PLC
FV - 440		15	21	B	22	15		HEAT TAPE
P O 14A		15	23	C	24	2P		
P O 14B		15	25	A	26	15	-	ATT 33
BOOST PUMP		15	27	B	28			SPARE
P-030		2P	29	C	30			SPARE
CHLORINE REPT		15	31	A	32			SPARE
FURNACE		15	33	B	34			SPARE
EUH-3*		40	35	C	36	30		EUH-1*
			37	A	38	2P		
		3P	39	B	40	30		EUH-2*
			41	C	42	2P		

DESCRIPTION: PANEL 1.2

FED FROM: -

VOLTS: 120/208V
PHASE: 3
WIRE: 4
I.C. (KA): -
MAINS: 225A

MAIN BRKR: -
LOAD (KW): -
LOAD (AMPS): -
LOCATION: ELEC RM

FLUSH
SURFACE
SPRINKLERPROOF
FEED THRU LUGS

PHASE A: -
PHASE B: -
PHASE C: -
TOTAL: -

NOTES: * REMOVE EXISTING BREAKER AND CONNECT NEW EQUIPMENT ON THIS CIRCUIT

Electrical Short Form Specification May 9, 2023
Project #: 001-2023-0013

1.0 ELECTRICAL GENERAL REQUIREMENTS

1.1 SCOPE

The contractor shall supply, install, and commission all material and equipment per the specifications and as shown on the drawings. Include for all labour and services to ensure a complete and working installation.

1.2 RELATED DOCUMENTS AND WORK

Specifications are an integral part of the project package which may include drawings, documentation governing the general conditions of the contract, instructions to bidders, and drawings and specifications for other sections of the work. Examine the architectural, interior design, structural and mechanical engineering drawings and specifications to ensure that the work under this contract can be satisfactorily carried out. Report any discrepancies to the engineer.

Examine the site, local conditions, and all existing material which is intended for re-use and confirm that the condition of this equipment is suitable for its intended use in the new construction.

The contractor shall verify all field conditions and dimensions that affect selection and provision of materials and equipment. The contractor shall provide any disassembly, reassembly, relocation, demolition, cutting and patching required to provide work specified or indicated, including relocation and reinstallation of existing wiring and equipment.

Determine all existing conditions and factors which may affect the work, and include for all these items in the tender price.

These drawings are by nature schematic. For exact dimensions and sizes, refer to those shown on the architectural and interior design drawings or take physical measurements on site. Plan the installation and prepare equipment locations with reference to safety code clearances, ease of use, site conditions, existing equipment and obstructions, and good practice.

Provide all supplementary items, apparatuses, device and materials necessary for a sound, secure and complete installation.

If required to suit the job conditions and with confirmation from the Engineer, relocate outlets and equipment within 3 m of those locations indicated on the drawings without additional cost.

Mark revisions due to site conditions on the as-built drawings.

1.3 CODES, STANDARDS AND PERMIT

All work is to comply with the 25th edition of the Canadian Electrical Code (CEC) Part 1 2021, STANDATA as issued by Alberta EPB, the National Building Code - 2019 Alberta Edition, NBC(AE), the National Fire Code - 2019 Alberta Edition, NFC(AE), and all requirements of those authorities having jurisdiction. Obtain all necessary applicable permits, licenses and pay all fees. Display all permits prominently on the job site.

All equipment, products and services supplied under this contract are to be new, and certified by a testing agency accredited by the Standards Council of Canada such as: CSA, ULC or Warnock-Hersey.

All products are to meet the environmental standards and construction standards as outlined in lease agreement and architectural drawings, such as LEED.

1.4 SPECIFIED PRODUCTS AND SUBSTITUTIONS

The specifications of the products are performance based, unless otherwise specified. Products from one manufacturer must be available throughout the product line and must be used consistently in this project. The general configuration of components must be the same as those specified.

1.5 SHOP DRAWINGS

Submit shop drawings in electronic format (PDF) for each specified component to the engineer for review. Do not install material before these shop drawings have been approved in writing.

Shop drawings must include performance data, sizes, elevations and all detailed information for each product.

1.6 QUALITY CONTROL

Supervise the work at all times through a full time responsible and competent supervisor. Fully co-operate with other trades to properly co-ordinate and facilitate the installation and to avoid delays in carrying out the work.

Remove debris and waste material daily. On completion of the work, remove surplus materials, rubbish, tools and equipment and clean all exposed surfaces. Leave the project clean and ready for occupancy.

After project completion, measure individual phase currents to panel boards with normal loads operating and adjust branch circuit connections to obtain the best balance of current between phases. These circuit changes are to be made at a time convenient to the occupant.

1.7 GUARANTEE

The installation shall be completely tested to confirm that the equipment and systems that have been installed perform in the manner intended.

A letter of compliance from the electrical safety inspection authority shall be obtained at the time of completion.

The warranty shall cover repair or replacement of defective materials, equipment, workmanship, and installation that may be incurred during this period. Warranty work is to be done promptly and to the satisfaction of the customer. Warranty shall also cover correction of damage caused in making necessary repairs and replacements under warranty.

The satisfactory operation of all work is to be guaranteed for a period of twelve calendar months after final acceptance.

Submit warranty documentation within two weeks of completion when requested.

1.8 RECORD DRAWINGS

Keep a record set of the drawings on the site at all times and record any changes made. Branch circuit wiring is to be installed with the arrangement of circuits exactly as shown on the drawings. Conduit and cable locations and branch circuit designations may be modified to suit the installation but all such changes to circuitry and conduit locations must be recorded on as-built drawings.

On completion of the work submit these record drawings to the Engineer who will provide PDF pilots to the tenant and landlord. Include a cash allowance for the transfer of as built information to electronic format.

1.9 MAINTENANCE MANUALS

Submit to the Engineer three neatly bound, indexed, 3-ring loose leaf binders containing reviewed equipment drawings, list of lamps, maintenance instructions, list of supplier contacts, test and Verification results, and Inspection Certificates for all equipment installed.

1.10 VALUATION OF CHANGES

All quotations in response to a request for change must be submitted complete with a cost breakdown of materials and labour which itemizes all quantities, unit prices for material, and unit rates for labour.

1.11 CUTTING AND PATCHING

Locate and supervise all cutting and patching of the work of other trades that is required for electrical construction.

Prior to saw cutting, chipping, or core drilling an opening through the building structure, determine the location of existing services or reinforcing steel by x-raying, and obtain the written permission of the owner's structural engineer.

Arrange and pay all cutting and patching, saw cutting, chipping or concrete core drilling by a concrete cutting contractor that is approved to work in this building.

1.15 CASH ALLOWANCES

Include cash allowances for the following work.

Cash allowances are to be included in the base tender price and identified.

Cash allowances are not to be included in the tender price but identified separately.

1. Engineers fee for as-built drawings $ 500.00

1.17 DEMOLITION OF THE EXISTING INSTALLATION

Disconnect and remove completely all electrical equipment, wiring devices, boxes, components and power wiring back to the point of origin in the base building zone distribution boxes in the ceiling space or in the original panel boards.

Repair and make good existing wiring and components which have been affected by the demolition which serves adjacent areas or tenants.

Existing conduit and wiring in ceiling space may be reused if all current code requirements are complied with. Existing wiring devices and plates may be reused if in like new condition.

All existing electrical equipment and devices which are in good working condition and not being reused are to be turned over to the owner. Package all such materials, identify and turn over to the owner in an orderly fashion, or at the discretion of the owner, remove all materials from the site and dispose in accordance with the laws of Canada. Pay all costs and disposal fees.

2.0 MATERIALS AND METHODS

2.1 WIRING

2.1.1 General

All wiring shall be sized in accordance with Table 2 of the CEC and shall be of the RW90, R90, or T90 type. Unless otherwise specified, all wiring shall be in:

Electrical metallic tubing (EMT)

Rigid steel conduit

Metallic raceways.

Conduit is to run perpendicular to and parallel with building lines. Conduit runs are to be grouped and supported rigidly from the building structure in a neat and workmanlike manner.

All horizontal wiring in the ceiling space between junction boxes and homerun wiring to panelboards shall be installed in conduit. All wiring in finished areas is to be concealed above ceilings and within partitions.

No conductor smaller than #12AWG may be used for branch circuit wiring.

A common neutral may be employed for each group of three phase conductors within standard power or lighting branch circuits.

2.2 GROUNDING AND BONDING

2.2.1 General

All electrical equipment must be bonded. Install bonding in flexible conduit and non-metallic raceways sized in accordance with Table 16 of the CEC.

Bond the isolated ground terminals of isolated ground receptacles to the ground bar in the nearest upstream panelboard.

3.0 FIRE AND SMOKE SEALS

3.1 GENERAL

Provide fire stop materials and systems designed, tested and installed to resist the spread of fire and the passage of smoke through penetrations in fire rated assemblies. This includes fire rated masonry, drywall, concrete floors and walls as well as any openings or sleeves for future use.

Fire stop systems are to be installed after construction completion and all sleeves, conduit, wiring are to be installed as per manufacturer's recommendations.

3.2 SUBMIT TESTING NUMBERS OF PRODUCT

Contractor is to submit test design numbers as outlined in CAN4-S115-M for all penetrations to the Engineer for review prior to installation. Systems shall pass test procedures for fire resistance, temperature rise, leakage, and watertightness as applicable to meet the specified rating requirements for each fire stop condition. Provide at each penetration approved labelling stickers or tags for fire stop reporting.

Provide a reinforcing backing material and firmly pack the empty spaces with at least 100 mm of mineral wool. Recess the backing material 25 mm from the top of floor and apply the fire stop sealant compound. Sealant is to be trowel smooth and flush with the floor to ensure the installation is completely watertight.

Acceptable Manufacturers:

Rectorseal (Metacaulk)

Hilti Canada Ltd.

Roxtec

3M Canada Inc.

Note that use of materials that have not been tested in a system or that are not capable of obtaining an engineered judgement will not be accepted for use on this project.

3.3 FIRE STOPPING BAGS AND BRICKS

Supply and install fire stop bags, pillows, prefabricated sleeves, intumescent blocks or prefabricated cable pathways for removable penetrations through all fire compartment separations. All spaces within the penetration are to be firmly packed and completely sealed.

Acceptable Manufacturers:

Rectorseal (Metacaulk)

Hilti Canada Ltd.

Roxtec

3M Canada Inc.

4.0 MECHANICAL EQUIPMENT WIRING

Wire to and connect all motors and heating, ventilating and plumbing equipment, including line voltage and low voltage control wiring unless specifically shown otherwise.

4.1 SINGLE PHASE MOTOR STARTERS

Manual motor starters for single phase motors are to be general purpose, individually enclosed, quick-make quick-break, full voltage and equipped with overload relays and red pilot light. Integral overload heater is to be sized for the full load motor rating.

Starters shall also have the following features:

NEMA 1 enclosure for the starter

NEMA 1 enclosure for the starter

Lockable in the OFF position

2 Pole

208 Volt

Acceptable manufacturers:

Cutler-Hammer MS series
Schneider Electric Square D Type K (20HP Max)
Schneider Electric Square D Type F (1HP Max)

4.2 THREE PHASE MOTOR STARTERS

Motor Starters for three-phase motors are to be general purpose, individually enclosed full voltage across-the-line, magnetically operated with 120v control transformer and overload relays. Each starter is to be sized for the motor it controls. A Hand-off-auto selector switch and green ON pilot light are to be mounted on the cover.

Starters shall also have the following features:

NEMA 1 enclosure for the starter

Lockable in the OFF position

Complete with a set of NO/NC auxiliary contacts.

Non-combination enclosure

Combined in the same enclosure with a fusible disconnect switch

3 Pole

208 Volt

Acceptable manufacturers:

Cutler-Hammer ECN05 (non-combination up to 1600HP 600v)

Cutler-Hammer ENC17 (combination)

Schneider Electric

5.0 LIGHTING AND POWER PANELBOARDS

5.1 REUSE OF EXISTING PANELBOARDS

Revise existing panel board directories to indicate the loads controlled. Directories must be typewritten. Install new circuit breakers in existing panel boards.

5.2 CIRCUIT BREAKERS

Circuit breakers are to be bolt-in type, moulded case, with thermal-magnetic trip mechanisms.

Circuit breakers shall be products of the same manufacturer as the panel boards in which they are mounted and are to match their current interrupting capacity.

Circuit breakers for emergency and exit light circuits are to be fitted with lock-on tabs.

All breakers shall be fully rated.

Acceptable manufacturers:

EATON BAB (240/120V) 10kA I.C.

EATON QBHW (240/120V) 22kA I.C.

Siemens BL, ED4, QJ2, FD6, JXD6

5.3 FUSED AND NON-FUSED DISCONNECT SWITCHES

Safety disconnect switches are to be quick make, quick break under full load and equipped with lockable handle interlocks which will permit opening of the door in the off position only.

Disconnect switches shall have the following characteristics:

Voltage Rating: 208/120 Volt

Ampere Rating: 30A 60A

Configuration: 2 Pole 3 Pole

Construction:

Indoor

Outdoor

General Duty

Non-Fused

Outdoor with NEMA 3R enclosure

Acceptable manufacturers:

EATON Cutler-Hammer Type DG (general duty up to 250V)

EATON Cutler-Hammer Type DH (heavy duty up to 600V)

Schneider Electric Square D Class 3100 (general duty up to 250V)

Schneider Electric Square D Class 3100 (general duty up to 250V)

ELECTRICAL SYMBOL LEGEND

NEW	EXISTING	DESCRIPTION
POWER		
		DUPLEX RECEPTACLE OUTLET
		DUPLEX RECEPTACLE C/W GROUND FAULT CIRCUIT INTERRUPTER (GFCI)
		TWISTLOCK RECEPTACLE OUTLET - RATING AS NOTED
		DIRECT CONNECTION TO EQUIPMENT AS NOTED
		GROUND BAR
		ELECTRICAL PANELBOARD AS NOTED - RECESSED
		ELECTRICAL PANELBOARD AS NOTED
		ELECTRICAL PANELBOARD AS NOTED - RECESSED
		ELECTRICAL CABINET AS NOTED
		CENTRAL DISTRIBUTION PANEL AS NOTED
		TRANSFORMER AS NOTED
RB.28	RB.28	ELECTRICAL CIRCUIT FROM PANEL RB, NO 28

ELECTRICAL SYMBOL LEGEND

NEW	EXISTING	DESCRIPTION
MECHANICAL EQUIPMENT		
		MOTOR OUTLET AS NOTED
		NON-FUSED DISCONNECT SWITCH
		FUSED DISCONNECT SWITCH
		MANUAL MOTOR STARTER
		MAGNETIC MOTOR STARTER
		NON-FUSED DISCONNECT SWITCH + STARTER COMBO
VD	VD	VARIABLE FREQUENCY DRIVE
T	T	LINE VOLTAGE THERMOSTAT
XXX	XXX	MECHANICAL EQUIPMENT NUMBER

ELECTRICAL SYMBOL LEGEND

NEW	EXISTING	DESCRIPTION
GENERAL DESIGNATION		
		CONDUIT RUN IN WALL / CEILING
		CONDUIT WITH 3 PHASE CONDUCTOR, ONE NEUTRAL CONDUCTOR AND ONE ISOLATED GROUND CONDUCTOR
		CONDUIT RUN UP
		CONDUIT RUN DOWN
		CONDUIT ENDS, STUB OR CAPPED
		CONDUIT CONTINUATION
		CONDUIT HOMERUN TO PANELBOARD
		WIRE INTERCEPTION
		CONDUIT RUN UNDER FLOOR, IN SLAB OR BELOW GRADE
		COMMUNICATION CABLE
		CONDUIT RUN IN WALL / CEILING (DC CIRCUIT)
		LIGHTING ZONE
1234		ROOM NUMBER
+1000		DENOTES MOUNTING HEIGHT ABOVE FINISHED FLOOR
WP		ADJACENT LETTERS DENOTES WEATHER PROOF
R		ADJACENT LETTER DENOTES DEVICE OR OUTLET TO BE REMOVED OR RELOCATED AS INDICATED
2		ADDENDUM / CHANGE NOTICE NUMBER
P1		KEYNOTE NUMBER - LETTER DENOTES ELECTRICAL SYSTEM TYPE

1 VIEW TITLE
EX-XX SCALE: AS INDICATED

ELECTRICAL SYMBOL LEGEND

NEW	EXISTING	DESCRIPTION
BOXES		
		JUNCTION BOX AS NOTED
P	P	POWER JUNCTION BOX
P	P	POWER JUNCTION BOX - BASE BUILDING

ELECTRICAL DRAWING LIST

SHEET NO.	SHEET NAME
E001	SYMBOL LEGEND, SPECIFICATIONS, MECHANICAL SCHEDULE AND DRAWING LIST
E101	ELECTRICAL PLANS

MECHANICAL EQUIPMENT SCHEDULE

MAN. = SINGLE PHASE MANUAL STARTER
MAG. = THREE PHASE MAGNETIC STARTER
PVNR. = FULL VOLTAGE NON REVERSING
VFD = VARIABLE FREQUENCY DRIVE
PL = PILOT LIGHT
PB = PUSHBUTTON
HOA = HAND OFF AUTO SW.

EQUIPMENT NUMBER	DESCRIPTION	LOCATION	RATING kW	RATING HP	RATING FLA	VOLTS	PHASE	MOTOR STARTER TYPE MAN	MOTOR STARTER TYPE MAG	MOTOR STARTER TYPE VFD	FED FROM	BREAKER	FEEDER	LOCAL DISCONNECT	CONTROL DEVICE
EUH-1	ELECTRIC UNIT HEATER	RM. 007	5	-	-	208	1	X			PNL E1.2	30A-2P	2#8AWG Cu - 21mmC	X	TSTAT
EUH-2	ELECTRIC UNIT HEATER	RM. 006	5	-	-	208	1	X			PNL E1.2	30A-2P	2#8AWG Cu - 21mmC	X	TSTAT
EUH-3	ELECTRIC UNIT HEATER	RM. 005	10	-	-	208	3		X		PNL E1.2	40A-3P	3#8AWG Cu - 21mmC	X	TSTAT

NORTH ARROW

CONSULTANT

STAMPS

ISSUE SCHEDULE

NO	YYYY/MM/DD	ISSUE
1	2023/05/16	ISSUED FOR CONSTRUCTION

ELECTRICAL ENGINEER

m+b
electrical consulting engineers
450, 10055 - 106 Street N.W. Edmonton AB T5J 2Y2
P: +780.498.6532 www.mbeng.ca

OWNER/CLIENT

PROFESSIONAL ENGINEER ALBERTA MAX MCLEOD 88 88

PERMIT TO PRACTICE
Mulvey + Banani International (Alberta) Inc.
Signature
APEGA ID 78467
Date May 16, 2023
PERMIT NUMBER: P03468
The Association of Professional Engineers and Geoscientists of Alberta

PERMIT NO: P03468

SCALE: AS NOTED

PROJECT NAME AND ADDRESS

WATER
TREATMENT PLANT
DRUMHELLER

DRAWING TITLE

DRAWING LIST, SCHEDULES, AND SYMBOL LEGEND

PRINTED ON 2023-05-16	CHECKED BY MM
DRAWN BY EE	JOB No. 001-2023-0013
PERMIT NO. --	DWG No. E001

DEMO POWER KEYNOTES:

D1 TRACE AND DE-ENERGIZE CIRCUIT FEEDING EXISTING UNIT HEATERS. DEMOLISH AND SAFELY DISPOSE CONDUIT AND WIRING.

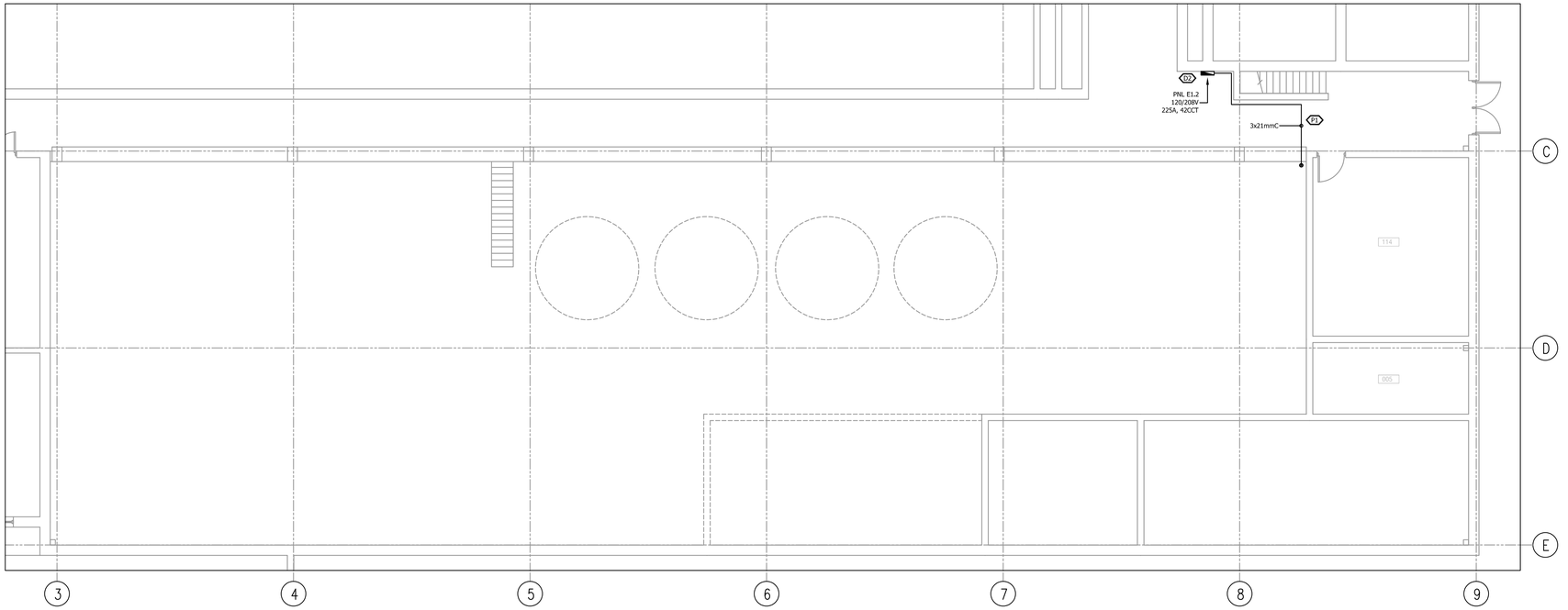
D2 REMOVE EXISTING BREAKERS FROM CIRCUITS 35-42. REUSE EXISTING CIRCUIT SLOTS FOR NEW BREAKERS AS SHOWN.

CONSTRUCTION POWER KEYNOTES:

P1 CONNECT NEW CONDUIT TO EXISTING CONDUIT RACK. FOLLOW EXISTING BUILDING ROUTING.

GENERAL NOTES:

A. ALL CONDUIT PENETRATIONS THROUGH WALLS SHALL BE FIRE CAULKED.
B. ELECTRICAL CONTRACTOR SHALL RETURN REMOVED BREAKERS IN PANEL TO MAINTENANCE PERSONNEL.
C. PANEL SCHEDULE SHALL BE UPDATED TO REFLECT CONNECTED UNIT HEATERS.
D. CONTRACTOR SHALL SUPPLY AND INSTALL REQUIRED ELECTRIC HEATING RELAY REQUIRED FOR THERMOSTAT CONTROL.
E. THERMOSTAT SHALL BE SUPPLIED AND INSTALLED BY ELECTRICAL. COORDINATE WITH MECHANICAL ON SITE.



2 E101 MAIN FLOOR ELECTRICALPLAN
SCALE: 1:100
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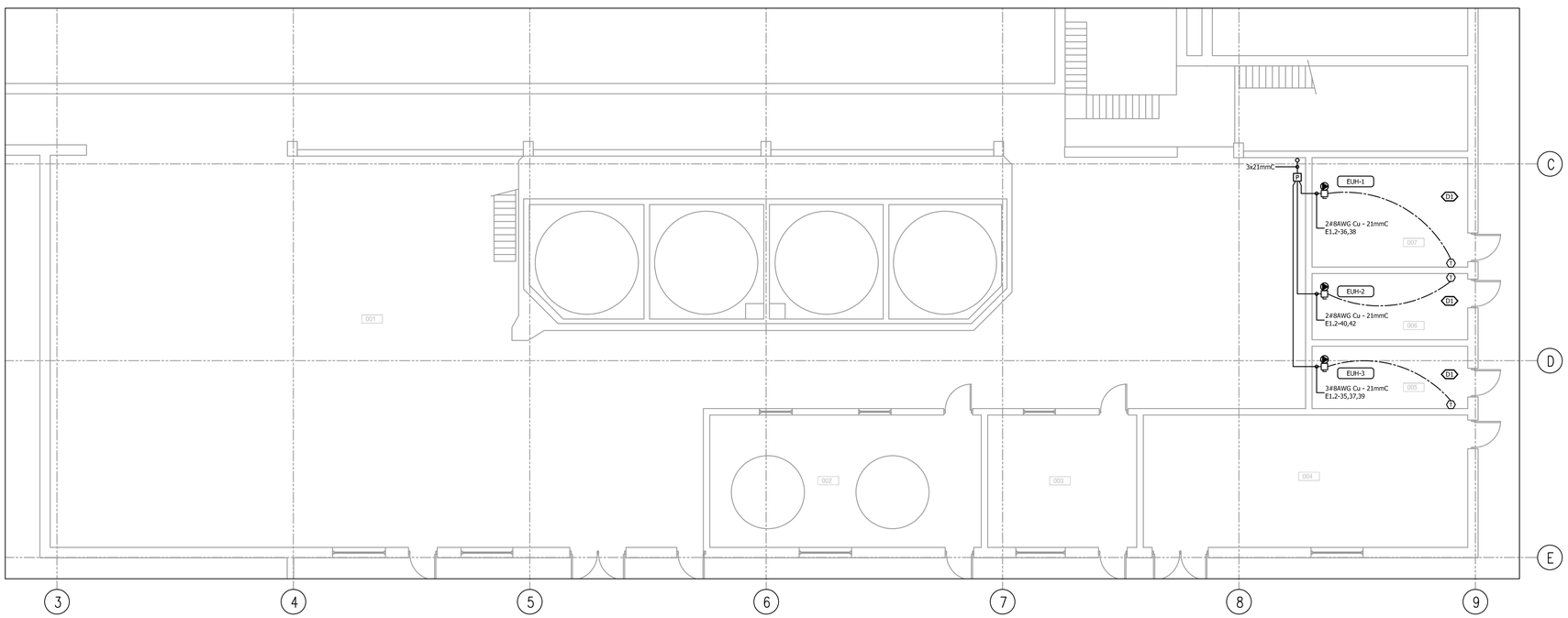

1 E101 LOWER LEVEL ELECTRICALPLAN
SCALE: 1:100
0 1000 2000 3000 4000 5000 6000

NORTH ARROW

CONSULTANT

STAMPS

ISSUE SCHEDULE

NO	YYYY/MM/DD	ISSUE
1	2023/05/16	ISSUED FOR CONSTRUCTION

ELECTRICAL ENGINEER

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OWNER/CLIENT

PROFESSIONAL ENGINEER ALBERTA MAX MCLEOD

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SCALE: AS NOTED

PROJECT NAME AND ADDRESS

WATER
TREATMENT PLANT
DRUMHELLER

DRAWING TITLE

ELECTRICAL PLANS

PRINTED ON 2023-05-16	CHECKED BY MM
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