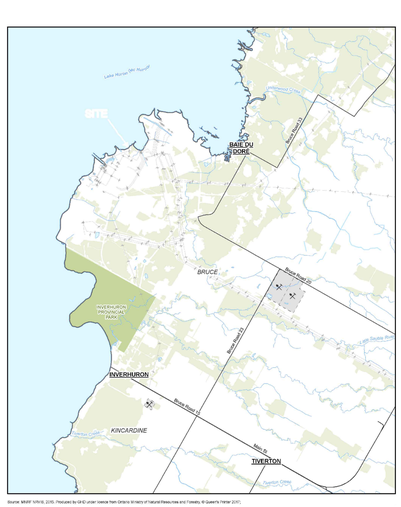
# BRUCE POWER
# 177 TIE ROAD, TIVERTON ON
# SEWAGE PROCESSING PLANT CONTROLS UPGRADE
## ISSUED FOR RFP
**FEBRUARY 7, 2020**
**11185554-02**




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## LOCATION MAP




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## AREA MAP

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| NK37-DRAW-53000-10044 | G-102 | ELECTRICAL LEGEND |
| NK37-DRAW-67960-10003 | G-103 | INSTRUMENTATION AND CONTROLS LEGEND |
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Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

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| | | | |
|---|---|---|---|
| Drawn | **A. LeGAULT** | Designer | **-** |
| Drafting Check | **B. PLETZ** | Design Check | **-** |
| Project Manager | **C. EVEREST** | Date | **07/05/19** |
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| Original Size **ANSI D** | | Bar is 20mm on original size drawing 0 — 20mm | |

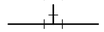
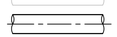
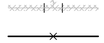
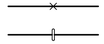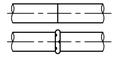
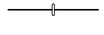
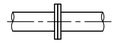
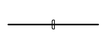
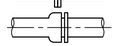
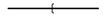
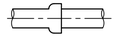
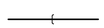
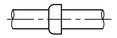
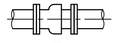
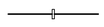
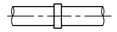
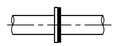
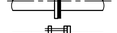
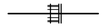
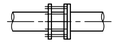
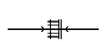
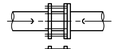
Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT COVER PAGE AND DRAWING INDEX**

Bruce Power Sheet No.
**NK37-DRAW-67960-10002**

Sheet No.
**G-100**
Sheet **1** of **44**

## PIPE AND PIPE FITTING SYMBOLS

| | SINGLE LINE | DOUBLE LINE |
|---|---|---|
| EXISTING PIPE |  |  |
| NEW PIPE |  |  |
| EXISTING PIPE TO BE ABANDONED |  |  |
| EXISTING PIPE TO BE REMOVED |  |  |
| WELDED JOINT |  |  |
| GROOVED JOINT |  |  |
| FLANGED JOINT |  |  |
| MECHANICAL JOINT |  |  |
| BELL AND SPIGOT JOINT (LEADED) |  |  |
| HUB AND SPIGOT JOINT (RUBBER GASKET) |  |  |
| BALL JOINT |  |  |
| PVC JOINT |  |  |
| GROOVED END ADAPTOR JOINT |  |  |
| FLANGED COUPLING ADAPTOR |  |  |
| FLANGED COUPLING ADAPTOR WITH THRUST TIES |  |  |
| FLEXIBLE COUPLING |  |  |
| FLEXIBLE COUPLING WITH THRUST TIES |  |  |
| STEEL BELLOWS EXPANSION JOINT |  |  |
| ELASTOMER BELLOWS EXPANSION JOINT |  |  |
| ELBOW UP |  |  |
| ELBOW DOWN |  |  |
| TEE UP |  |  |
| TEE DOWN |  |  |
| LATERAL UP |  |  |
| LATERAL DOWN |  |  |
| CONCENTRIC REDUCER |  |  |
| EXCENTRIC REDUCER |  |  |
| UNION |  |  |
| CAP |  |  |
| ANCHOR |  |  |
| ELBOW 90° |  |  |
| CROSS |  |  |
| TEE |  |  |
| ELBOW 45° |  |  |
| LATERAL |  |  |

## PROCESS PIPE IDENTIFICATION

| | |
|---|---|
| AC | ACID |
| AI | AIR, INSTRUMENT |
| ALP | AIR, LOW PRESSURE |
| AHP | AIR, HIGH PRESSURE |
| AS | AIR SCOUR |
| BD | BLOWDOWN |
| CD | CONDENSATE DRAIN |
| CG | CHLORINE GAS |
| D | DECANT |
| DDS | DEWATERED DIGESTED SLUDGE |
| DG | DIGESTER GAS |
| DR | DRAIN |
| DS | DIGESTED SLUDGE |
| EXH | EXHAUST |
| EW | EFFLUENT WATER |
| FC | FERRIC CHLORIDE |
| GW | GROUNDWATER |
| HP | HYDROGEN PEROXIDE |
| M | METHANOL |
| N | NUTRIENT |
| O | OXYGEN |
| OF | OVERFLOW |
| P | POLYMER |
| PW | POLISHED WATER |
| RAS | RETURN ACTIVATED SLUDGE |
| RW | RAW WATER |
| S | SUPERNATANT |
| SA | SAMPLE |
| SL | SLUDGE |
| SPD | SUMP PUMP DISCHARGE |
| TBS | THICKENED BOTTOM SLUDGE |
| TW | TREATED WATER |
| TWAS | THICKENED WASTE ACTIVATED SLUDGE |
| WAS | WASTE ACTIVATED SLUDGE |
| WW | WASH WATER |
| W1 | SERVICE WATER, NON-POTABLE |

PIPING DESIGNATION — 400-CLDI-RAS

400 - CLDI - RAS
- PIPE USE IDENTIFICATION LEGEND
- PIPE MATERIAL
- NOMINAL PIPE DIAMETER (mm)

## VALVE SYMBOLS

- FOUR WAY VALVE
- AIR AND VACUUM VALVE
- ANGLE GATE VALVE
- ANGLE GLOBE VALVE
- GLOBE VALVE
- GATE VALVE
- KNIFE GATE VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- DIAPHRAGM VALVE
- NEEDLE VALVE
- PLUG VALVE
- SEAT PORT — ECCENTRIC PLUG VALVE
- PRV — PRESSURE REDUCING VALVE
- PINCH VALVE
- PRESSURE RELIEF VALVE
- SELF-CONTAINED PRESSURE REGULATOR
- VALVE WITH ACTUATOR
- SOLENOID VALVE OPERATOR
- FI — FLOW INDICATOR
- TEMP. CONTROL VALVE
- CONTROL VALVE
  - FLOW DIRECTION
  - VALVE SYMBOL
- HOSE VALVE OR BIBB
- SP — SAMPLE PORT
- F — FLUSH
- MULTIPORT BALL VALVE (BALL VALVE SHOWN.) ARROWS INDICATE PATTERN, SEAT PORTS ARE IMPLIED

## EQUIPMENT SYMBOLS

- SG — SIGHT GLASS
- TRANSDUCER MOUNTING
- DISSOLVED OXYGEN ANALYZER
- INLINE MIXER
- INLINE CIRCULATING PUMP
- DIAPHRAGM PUMP
- CENTRIFUGAL PUMP OR BLOWER
- GEAR PUMP OR POSITIVE DISPLACEMENT BLOWER

## LEVEL SENSOR SYMBOLS

- CAPACITANCE LEVEL SWITCH
- ULTRASONIC LEVEL TRANSMITTER
- FLOAT SWITCH

## MISCELLANEOUS PIPING SYMBOLS

- BFP — BACKFLOW PREVENTOR
- DIRECTION OF SLOPE
- DIRECTION OF FLOW
- INSULATED LINE
- INSULATED LINE w/STEAM TRACE
- ELEC — INSULATED LINE w/ELECTRICAL TRACE
- P R L — LUBRICATOR, REGULATOR, FILTER

## GATE SYMBOLS

| EL. VIEW | PLAN VIEW |
|---|---|
|  | SLUICE |
| | BUTTERFLY |
| | FLAP |
| | SHEAR |
| | FABRICATED SLIDE |

## PIPE MATERIAL

| | |
|---|---|
| CS | CARBON STEEL |
| CI | CAST IRON |
| CLDI | CEMENT LINED DUCTILE IRON |
| CPVC | CHLORINATED POLYVINYL CHLORIDE |
| CU | COPPER |
| DI | DUCTILE IRON |
| ELS | EPOXY LINED STEEL |
| FRP | FIBERGLASS REINFORCED PLASTIC |
| GALVS | GALVANIZED STEEL |
| HDPE | HIGH DENSITY POLYETHYLENE |
| PVC | POLYVINYL CHLORIDE |
| SST | STAINLESS STEEL |

## HVAC SYMBOLS

- OED — OPEN END DUCT
- T — ROOM THERMOSTAT
- T G — ROOM THERMOSTAT w/GUARD
- SUPPLY AIR DUCT SECTION UP
- SUPPLY AIR DUCT SECTION DOWN
- RETURN/EXHAUST AIR DUCT SECTION UP
- RETURN/EXHAUST AIR DUCT SECTION DOWN
- FLEXIBLE CONNECTION
- TURNING VANES
- SUPPLY AIR DIFFUSER
- INSULATED DUCT
- OPPOSED BLADE DAMPER
- FD — FIRE DAMPER
- BDD — BACKDRAFT DAMPER
- BD — BALANCING DAMPER
- M — DAMPER MOTOR
- DG — DOOR GRILLE
- UH — UNIT HEATER

## BUILDING SERVICES PIPE IDENTIFICATION

| | |
|---|---|
| HW | HOT WATER |
| HWR | HOT WATER RECIRCULATION |
| CW | COLD WATER |
| S | COLD WATER (SOFT) |
| SAN | SANITARY SEWER |
| STM | STORM SEWER |
| RWL | RAIN WATER LEADER |
| V | VENT |
| G | GAS |
| F | FIRE STANDPIPE |
| SPK | SPRINKLER |
| HWS | HEATING WATER SUPPLY |
| HWR | HEATING WATER RETURN |
| CHWS | CHILLED WATER SUPPLY |
| CHWR | CHILLED WATER RETURN |
| LPS | LOW PRESSURE STEAM |
| LPC | LOW STEAM CONDENSATE |
| FT | FLOAT & THERMOSTATIC TRAP |
| CWS | CONDENSER WATER SUPPLY |
| CWR | CONDENSER WATER RETURN |
| RD | ROOF DRAIN |
| CO | CLEANOUT |
| FD | FLOOR DRAIN |
| HD | HUB DRAIN |

## GENERAL PIPING NOTES

1. SYMBOLS SHOWN HERE FOR SINGLE LINE FITTINGS ARE GENERIC ONLY. REFER TO PIPING SPECIFICATIONS FOR SPECIFIC END CONNECTIONS FOR SINGLE LINE PIPE AND FITTINGS.
2. SIZE OF FITTINGS SHOWN ON PLANS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS NOTED OTHERWISE. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.
3. ALL FLEXIBLE CONNECTORS OR FLANGED ADAPTERS SHALL BE PROVIDED WITH THRUST TIES, BLOCKS, OR ANCHORS, UNLESS NOTED OTHERWISE. THRUST PROTECTION SHALL BE ADEQUATE FOR PRESSURES SPECIFIED.
4. NUMBER AND LOCATION OF UNIONS SHOWN ON DRAWINGS IS ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.

ISSUED FOR RFP

**DRAFT**


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Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

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| B | 50% OF 100% REVIEW | AL | CE | 07/05/19 |
| A | 50% DESIGN REVIEW | AL | CE | 05/17/19 |

| | | | |
|---|---|---|---|
| Drawn | A. LeGAULT | Designer | - |
| Drafting Check | B. PLETZ | Design Check | - |
| Project Manager | C. EVEREST | Date | 07/05/19 |
| This document shall not be used for construction unless signed and sealed for construction. | | Scale | NTS |
| Original Size | ANSI D | Bar is 20mm on original size drawing: 0 — 20mm | |

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT MECHANICAL LEGEND**

Bruce Power Sheet No.
**NK37-DRAW-79600-10035**

Sheet No.
**G-101**

Sheet **2** of **44**

## GROUNDING SYMBOLS

- GROUND ROD
- GROUND CABLE CONNECTION AND GROUND STUB
- ROD ELECTRODE AND GROUND INSPECTION WELL
- ROD GROUNDING ELECTRODE
- CORNER SET GROUNDING ELECTRODES
- GROUND CABLE EMBEDDED OR BURIED, CABLE UP
- GROUND CABLE EXPOSED, CABLE DOWN
- GROUND CABLE CONNECTION TO EQUIPMENT
- GROUND CABLE CONNECTION TO BUILDING STEEL COLUMN

## CIRCUIT SYMBOLS

- RECTIFIER BRIDGE
- RESISTOR
- TIME DELAY CAPSULE N/O (15 SECS.)
- TIME DELAY CAPSULE N/C (10 SECS.)
  1. ENTER TIME DELAY REQ'D. (e.g. 10 SECS.)
- NORMALLY OPEN RELAY CONTACT
- NORMALLY CLOSED RELAY CONTACT
- RELAY COIL (CR)
- METER: CTR-COUNTER (AM)
  AM-AMMETER
  VM-VOLTMETER
  WHM-WAT (HOURMETER)
- TRANSFORMER (T1)
- PILOT LIGHT (LENS COLOUR) (R)
- POLARIZED CAPACITOR
- FIXED CAPACITOR
- LIGHT EMITTING DIODE
- ZENER DIODE
- DIODE
- ARC SUPPRESSOR
- FUSE (5A)
- BATTERY
- TERMINAL WITH DESIGNATION (1A)
- GROUND
- BREAKER STABS
- THERMAL OVERLOAD
- MOTOR OVERLOAD
- MAGNETIC OVERLOAD
- CIRCUIT BREAKER
- MOTOR (XX)
- MOTOR (100A)
- WIRE LABELING (XX, XX, XX)

## SWITCH SYMBOLS

- LIMIT SWITCH N/O
- LIMIT SWITCH N/C
- TIME DELAY N/O DELAY ON CLOSING
- TIME DELAY N/C DELAY ON OPENING
- TIME DELAY N/C DELAY ON CLOSING
- TIME DELAY N/O DELAY ON OPENING
- TIME DELAY COIL
- PROXIMITY LIMIT SWITCH N/O
- PROXIMITY LIMIT SWITCH N/C
- FOOT OPERATED L/S CLOSED
- FOOT OPERATED L/S OPEN
- FLOW OPERATED L/S CLOSED
- FLOW OPERATED L/S OPEN
- FLOAT OPERATED L/S CLOSED
- FLOAT OPERATED L/S OPEN
- PRESSURE OPERATED L/S CLOSED
- PRESSURE OPERATED L/S OPEN
- TEMPERATURE OPERATED L/S CLOSED
- TEMPERATURE OPERATED L/S OPEN
- 2 POSITION SELECTOR SWITCH
- 3 POSITION SELECTOR SWITCH
- SOLENOID
- PUSHBUTTON CLOSED
- PUSHBUTTON OPEN
- DISCONNECT SWITCH N/O
- MAINTAINED EMERGENCY STOP
- HAND-OFF AUTO SELECTOR SWITCH (H O A, X O O, O O X, O X)

## LAYOUT SYMBOLS

- PHOTOCELL EMITTER
- PHOTOCELL RECEIVER
- HORN
- BUZZER
- BELL
- SENSING ELEMENT
- PILOT LIGHT C/W TEST SWITCH (LENS COLOUR)
- SWITCH SINGLE POLE 120V
- SWITCH DOUBLE POLE 120V
- SWITCH THREE WAY 120V
- DUPLEX RECEPTACLE 120V, 20A;
- DUPLEX RECEPTACLE WITH GROUND FAULT PROTECTION, 120V, 20A (GF)
- DUPLEX RECEPTACLE WEATHER PROOF, 120V, 20A (WP)
- TWIST LOCK RECEPTACLE 120V (TW)
- THERMOSTAT (T)
- KW, RATING REQUIRED. 'A' DENOTES ELECTRIC UNIT HEATER, C/W CEILING-MOUNTED BRACKETS. (E.U.H. 2.0 A)
- MOTORIZED DOOR OPERATOR
- POWER TRANSFORMER - T1
- WELDING RECEPTACLE
- TELEPHONE OUTLET MOUNTED 12" ABOVE FINISHED FLOOR LEVEL
- TELEPHONE OUTLET MOUNTED 4'-6" ABOVE FINISHED FLOOR LEVEL
- SINGLE PHASE MANUAL MOTOR STARTER
- THREE PHASE MANUAL MOTOR STARTER/DISCONNECT SWITCH
- START-STOP PUSHBUTTON AND PILOT LIGHT
- LOCKABLE DISCONNECT SWITCH
- FIRE ALARM PULL STATION MOUNTED 4'-6" ABOVE FINISHED FLOOR LEVEL
- PHOTO ELECTRIC SMOKE DETECTOR (P, E)
- SPRINKLER FLOW ALARM SWITCH CONNECTED TO FIRE ALARM SYSTEM
- SOLENOID VALVE CONNECTED TO FIRE ALARM SYSTEM (SV)
- 115V, DUPLEX RECEPTACLE (GFI, A-1)
  GFI - GROUND FAULT CIRCUIT INTERUPTER
  WP - WEATHERPROOF
- DATA GRADE TELEPHONE OUTLET
- LOCAL CONTROL STATION (CSD1)
- HEAT DETECTOR (H)
- FIRE BELL (F)
- FIRE ALARM STROBE (S)
- FIRE ALARM INTEGRATED BELL AND LIGHT UNIT

## LIGHTING SYMBOLS

- STROBE LIGHT - TYPE S
- LIGHTING FIXTURE - TYPE A
- FLUORESCENT LIGHTING FIXTURE - TYPE F
- LIGHTING FIXTURE WALL MOUNTED TYPE A
- EXIT LIGHT AND CEILING MOUNTED OUTLET BOX. DIRECTIONAL ARROWS AS INDICATED. SHADED AREAS DENOTE FACES.
- EMERGENCY BATTERY PACK WITH CHARGER AND SEALED BEAM HEADS
- EMERGENCY BATTERY PACK WITH CHARGER, EXIT LIGHT AND SEALED BEAM HEADS
- EMERGENCY LIGHTING REMOTE HEAD
- EXIT LIGHT - WALL MOUNTED
- FIRE ALARM PANEL
- LIGHTING OR DISTRIBUTION PANEL 208/120V, 3Ø, 4W - PANEL ID NUMBER AS SHOWN (DP01)
- DISTRIBUTION PANEL 240/120V, 1Ø, 3W - PANEL ID NUMBER AS SHOWN (UPS01)

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**177 TIE ROAD, TIVERTON, ON**

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| D | 100% DESIGN REVIEW | AL | CE | 12/16/19 |
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| B | 50% OF 100% REVIEW | AL | CE | 07/05/19 |
| A | 50% DESIGN REVIEW | AL | CE | 05/17/19 |

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| Drafting Check **B. PLETZ** | Design Check **-** |
| Project Manager **C. EVEREST** | Date **07/05/19** |
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Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT ELECTRICAL LEGEND**

Bruce Power Sheet No.
**NK37-DRAW-53000-10044**

Sheet No.
**G-102**
Sheet **3** of **44**

Plot Date: 10 March 2021 - 9:37 AM Plotted By: Jason Spenler CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)GN\11185554-02(004)GN-WA003.dwg

## PRIMARY ELEMENT SYMBOLS

- TURBINE FLOW METER
- MAGNETIC FLOW METER
- POSITIVE DISPLACEMENT FLOW METER
- WEIR
- VORTEX FLOW METER
- ROTAMETER
- ULTRASONIC LEVEL TRANSMITTER
- FLOAT
- OPEN DRAIN OR SEWER
- CLOSED DRAIN OR SEWER
- SPECIFICATION CHANGE
- CAP
- HOSE CONNECTION
- BLIND FLANGE
- STRAINER
- INLINE MIXER
- FLEXIBLE PIPE

## PUMP AND COMPRESSOR SYMBOLS

- CENTRIFUGAL PUMP (DRY PIT)
- CENTRIFUGAL WET PIT PUMP OR TURBINE PUMP
- CHEMICAL FEED PUMP
- DIAPHRAGM PUMP
- GEAR PUMP OR BLOWER (POSITIVE DISPLACEMENT)
- PISTON PUMP
- PROGRESSIVE CAVITY PUMP
- SUBMERSIBLE SUMP PUMP
- COMPRESSOR (CENTRIFUGAL) BLOWER OR TURBINE
- COMPRESSOR (PISTON)
- EJECTOR

NOTE:

ON LOSS OF PRIMARY POWER (PNEUMATIC, ELECTRICAL, OR HYDRAULIC)
XX: AS = ADJUSTABLE SPEED
CS-1 = CONSTANT SPEED (SINGLE SPEED)
CS-2 = CONSTANT SPEED (TWO SPEED)

## ACTUATOR SYMBOLS

- PNEUMATIC WITH POSITIONER
- PHEUMATIC WITH SOLENOID
- ELECTRIC
- ELECTRIC WITH POSITIONER
- ELECTROHYDRAULIC
- HYDRAULIC
- PNEUMATIC WITH VOLUME BOOSTER
- SOLENOID
- MANUAL

NOTE:

ON LOSS OF PRIMARY POWER (PNEUMATIC, ELECTRICAL, OR HYDRAULIC)
XX: FD = FAIL OPEN
FC = FAIL CLOSED
FLP = FAIL TO LAST POSITION

## INTERFACE SYMBOLS

- PROCESS INTERFACE
- SIGNAL INTERFACE
- A INTERFACE LETTER
- D DESTINATION DRAWING NUMBER
- S SOURCE DRAWING NUMBER

INTERFACE TO/FROM PROCESS EXTERNAL TO PROJECT

## INSTRUMENTATION SYMBOLS

- PROGRAMMABLE LOGIC CONTROL FIELD MOUNTED
- PROGRAMMABLE LOGIC CONTROL NORMALLY ACCESSIBLE (BOARD MOUNTED)
- PROGRAMMABLE LOGIC CONTROL BEHIND BOARD MOUNTED
- PROGRAMMABLE LOGIC CONTROL AUX. LOCATION
- DISCRETE INSTRUMENT/ELECTRICAL DEVICE FIELD MOUNTED
- DISCRETE INSTRUMENT/ELECTRICAL DEVICE NORMALLY ACCESSIBLE (BOARD MOUNTED)
- DISCRETE INSTRUMENT/ELECTRICAL DEVICE BEHIND BOARD MOUNTED
- DISCRETE INSTRUMENT/ELECTRICAL DEVICE AUX. LOCATION
- SHARED DISPLAY/CONTROL DEVICE FIELD MOUNTED
- SHARED DISPLAY/CONTROL DEVICE NORMALLY ACCESSIBLE (BOARD MOUNTED)
- SHARED DISPLAY/CONTROL DEVICE BEHIND BOARD MOUNTED
- SHARED DISPLAY/CONTROL DEVICE AUX. LOCATION
- LOCAL INDICATOR LIGHT R - RED, Y - YELLOW, G - GREEN
- INDICATOR LIGHT NORMALLY ACCESSIBLE
- UNDEFINED COMPLEX INTERCONNECTING LOGIC

## INSTRUMENTATION LINES

- ELECTRIC ANALOG SIGNAL
- ELECTRIC BINARY SIGNAL
- PNEUMATIC SIGNAL
- PNEUMATIC BINARY SIGNAL
- INTERNAL SYSTEM LINK

## ISA LETTER COMBINATIONS

| First-Letters | Initiating or Measured Variable | Controllers: Recording | Controllers: Indicating | Controllers: Blind | Controllers: Self-Actuated Control Valves | Readout Devices: Recording | Readout Devices: Indicating | Switches and Alarm Devices *: High ** | Switches and Alarm Devices *: Low | Switches and Alarm Devices *: Comb | Transmitters: Recording | Transmitters: Indicating | Transmitters: Blind | Solenoids, Relays, Computing Devices | Primary Element | Test Point | Well or Probe | Viewing Device, Glass | Safety Device | Final Element |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | Analysis | ARC | AIC | AC | | AR | AI | ASH | ASL | ASHL | ART | AIT | AT | AY | AE | AP | AW | | | AV |
| B | Burner/Combustion | BRC | BIC | BC | | BR | BI | BSH | BSL | BSHL | BRT | BIT | BT | BY | BE | | BW | BG | | BZ |
| C | User's Choice | | | | | | | | | | | | | | | | | | | |
| D | User's Choice | | | | | | | | | | | | | | | | | | | |
| E | Voltage | ERC | EIC | EC | | ER | EI | ESH | ESL | ESHL | ERT | EIT | ET | EY | EE | | | | | EZ |
| F | Flow Rate | FRC | FIC | FC | FCV, FICV | FR | FI | FSH | FSL | FSHL | FRT | FIT | FT | FY | FE | FP | | FG | | FV |
| FQ | Flow Quantity | FQRC | FQIC | | | FQR | FQI | FQSH | FQSL | | | FQIT | FQT | FQY | FQE | | | | | FQV |
| FF | Flow Ratio | FFRC | FFIC | FFC | | FFR | FFI | FFSH | FFSL | | | | | | FE | | | | | FFV |
| G | User's Choice | | | | | | | | | | | | | | | | | | | |
| H | Hand | | HIC | HC | | | | | | HS | | | | | | | | | | HV |
| I | Current | IRC | IIC | | | IR | II | ISH | ISL | ISHL | IRT | IIT | IT | IY | IE | | | | | IZ |
| J | Power | JRC | JIC | | | JR | JI | JSH | JSL | JSHL | JRT | JIT | JT | JY | JE | | | | | JV |
| K | Time | KRC | KIC | KC | KCV | KR | KI | KSH | KSL | KSHL | KRT | KIT | KT | KY | KE | | | | | KV |
| L | Level | LRC | LIC | LC | LCV | LR | LI | LSH | LSL | LSHL LSHH | LRT | LIT | LT | LY | LE | | LW | LG | | LV |
| M | User's Choice | | | | | | | | | | | | | | | | | | | |
| N | User's Choice | | | | | | | | | | | | | | | | | | | |
| O | User's Choice | | | | | | | | | | | | | | | | | | | |
| P | Pressure/Vacuum | PRC | PIC | PC | PCV | PR | PI | PSH | PSL | PSHL | PRT | PIT | PT | PY | PE | PP | | | PSV, PSE | PV |
| PD | Pressure, Differential | PDRC | PDIC | PDC | PDCV | PDR | PDI | PDSH | PDSL | | PDRT | PDIT | PDT | PDY | PE | PP | | | | PDV |
| Q | Quantity | QRC | QIC | | | QR | QI | QSH | QSL | QSHL | QRT | QIT | QT | QY | QE | | | | | QZ |
| R | Radiation | RRC | RIC | RC | | RR | RI | RSH | RSL | RSHL | RRT | RIT | RT | RY | RE | | RW | | | RZ |
| S | Speed/Frequency | SRC | SIC | SC | SCV | SR | SI | SSH | SSL | SSHL | SRT | SIT | ST | SY | SE | | | | | SV |
| T | Temperature | TRC | TIC | TC | TCV | TR | TI | TSH | TSL | TSHL | TRT | TIT | TT | TY | TE | TP | TW | | TSE | TV |
| TD | Temperature, Differential | TDRC | TDIC | TDC | TDCV | TDR | TDI | TDSH | TDSL | | TDRT | TDIT | TDT | TDY | TE | TP | TW | | | TDV |
| U | Multivariable | | | | | UR | UI | | | | | | | UY | | | | | | UV |
| V | Vibration/Machinery Analysis | | | | | VR | VI | VSH | VSL | VSHL | VRT | VIT | VT | VY | VE | | | | | VZ |
| W | Weight/Force | WRC | WIC | WC | WCV | WR | WI | WSH | WSL | WSHL | WRT | WIT | WT | WY | WE | | | | | WZ |
| WD | Weight/Force, Differential | WDRC | WDIC | WDC | WDCV | WDR | WDI | WDSH | WDSL | | WDRT | WDIT | WDT | WDY | WE | | | | | WDZ |
| X | Unclassified | | | | | | | | | | | | | | | | | | | |
| Y | Event/State/Presence | | YIC | YC | | YR | YI | YSH | YSL | | | | YT | YY | YE | | | | | YZ |
| Z | Position/Dimension | ZRC | ZIC | ZC | ZCV | ZR | ZI | ZSH | ZSL | ZSHL | ZRT | ZIT | ZT | ZY | ZE | | | | | ZV |
| ZD | Gauging/Deviation | ZDRC | ZDIC | ZDC | ZDCV | ZDR | ZDI | ZDSH | ZDSL | | ZDRT | ZDIT | ZDT | ZDY | ZDE | | | | | ZDV |

Note: This table is not all-inclusive.

* A, alarm, the annunciating device, may be used in the same fashion as S, switch, the actuating device.

** The letters H and L may be omitted in the undefined case.

Other Possible Combinations:

| | | | |
|---|---|---|---|
| FO | (Restriction Orifice) | PFR | (Ratio) |
| FRK, HIK | (Control Stations) | KQI | (Running Time Indicator) |
| FX | (Accessories) | QQI | (Indicating Counter) |
| TJR | (Scanning Recorder) | WKIC | (Rate-of-Weight-Loss Controller) |
| LLH | (Pilot Light) | HMS | (Hand Momentary Switch) |
| LCH | (Level Control High) | LCL | (Level Control Low) |

## VALVE SYMBOLS

- FOUR WAY VALVE
- AIR AND VACUUM VALVE
- ANGLE GATE VALVE
- ANGLE GLOBE VALVE
- GLOBE VALVE
- GATE VALVE
- KNIFE GATE VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- DIAPHRAGM VALVE
- NEEDLE VALVE
- PLUG VALVE
- SEAT PORT — ECCENTRIC PLUG VALVE
- PRV — PRESSURE REDUCING VALVE
- PINCH VALVE
- PRESSURE RELIEF VALVE
- SELF-CONTAINED PRESSURE REGULATOR
- VALVE WITH ACTUATOR
- SOLENOID VALVE OPERATOR
- FI — FLOW INDICATOR
- TEMP. CONTROL VALVE
- CONTROL VALVE — FLOW DIRECTION VALVE SYMBOL
- HOSE VALVE OR BIBB
- SP — SAMPLE PORT
- F — FLUSH
- MULTIPORT BALL VALVE (BALL VALVE SHOWN.) ARROWS INDICATE PATTERN, SEAT PORTS ARE IMPLIED

## PIPING DESIGNATION

16 - CLDI - RAS

- 16 — NOMINAL PIPE DIAMETER (INCH)
- CLDI — PIPE MATERIAL
- RAS — PIPE USE IDENTIFICATION LEGEND

## PIPE MATERIAL

| | |
|---|---|
| CS | CARBON STEEL |
| CI | CAST IRON |
| CLDI | CEMENT LINED DUCTILE IRON |
| CPVC | CHLORINATED POLYVINYL CHLORIDE |
| CU | COPPER |
| DI | DUCTILE IRON |
| ELS | EPOXY LINED STEEL |
| FRP | FIBERGLASS REINFORCED PLASTIC |
| GALVS | GALVANIZED STEEL |
| HDPE | HIGH DENSITY POLYETHYLENE |
| PVC | POLYVINYL CHLORIDE |
| SST | STAINLESS STEEL |

## LEVEL SENSOR SYMBOLS

CAPACITANCE LEVEL SWITCH — ULTRASONIC LEVEL TRANSMITTER — FLOAT SWITCH

## GATE SYMBOLS

EL. VIEW — PLAN VIEW

- SLUICE
- BUTTERFLY
- FLAP
- SHEAR
- FABRICATED SLIDE


## LEVEL SENSOR SYMBOLS

CAPACITANCE LEVEL SWITCH — ULTRASONIC LEVEL TRANSMITTER — FLOAT SWITCH

## GATE SYMBOLS

EL. VIEW — PLAN VIEW

- SLUICE
- BUTTERFLY
- FLAP
- SHEAR
- FABRICATED SLIDE


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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

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| E | ISSUED FOR RFP | AL | CE | 02/07/20 |
| D | 100% DESIGN REVIEW | AL | CE | 12/16/19 |
| C | 90% DESIGN REVIEW | AL | CE | 11/04/19 |
| B | 50% OF 100% REVIEW | AL | CE | 07/05/19 |
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| Drafting Check | B. PLETZ | Design Check | - |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT INSTRUMENTATION AND CONTROLS LEGEND**

Bruce Power Sheet No.
**NK37-DRAW-67960-10003**

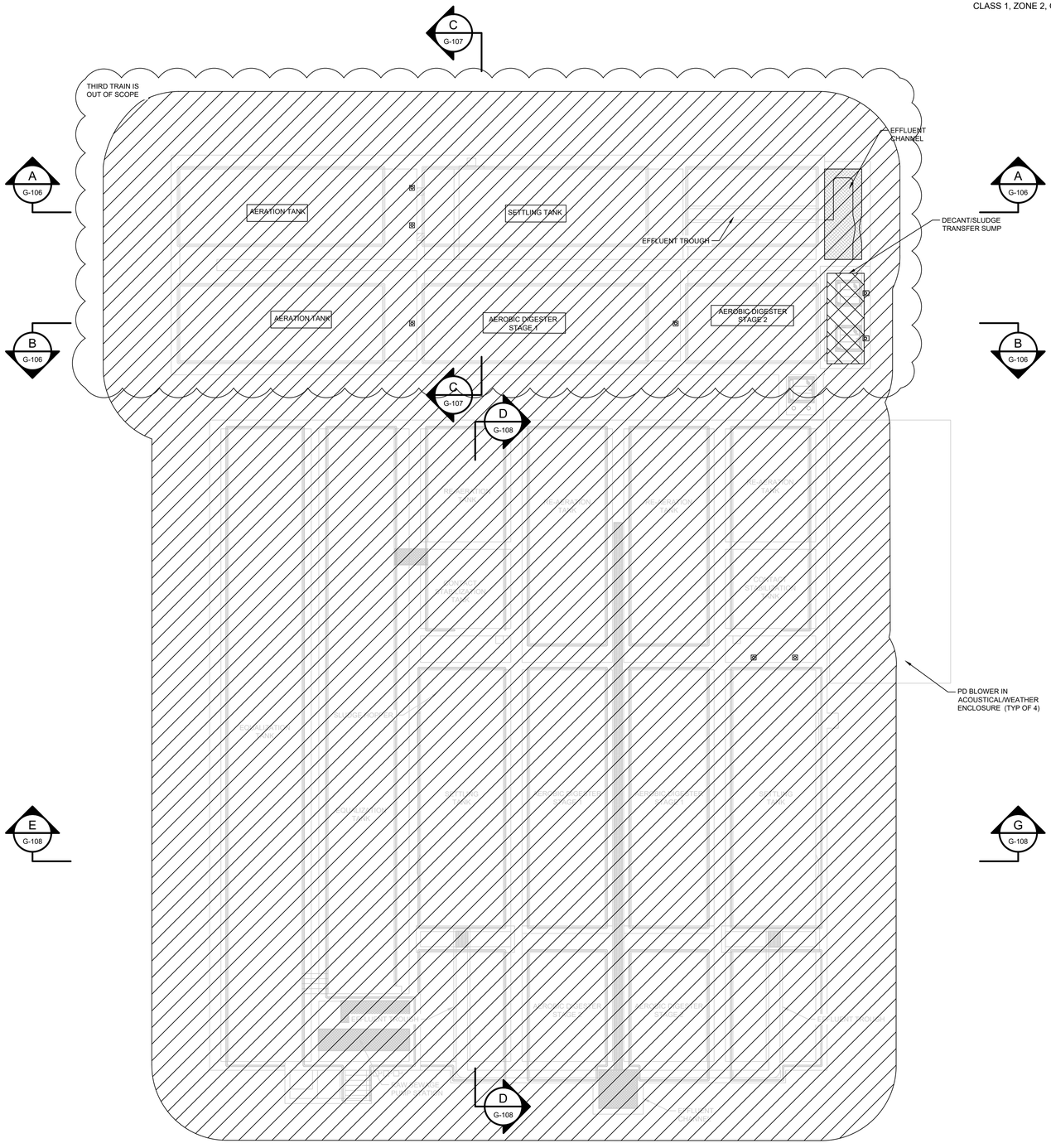
Sheet No.
**G-103**

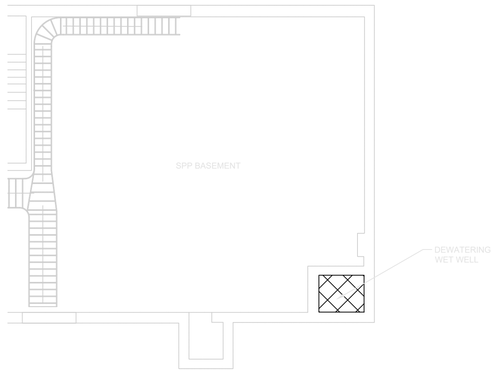
Sheet **4** of **44**

HAZARDOUS AREA CLASSIFICATIONS

CLASS 1, ZONE 1, GROUP IIA

CLASS 1, ZONE 2, GROUP IIA




E
G-108

## EXISTING SPP DEWATERING WET WELL

1:100

G
G-108

## TREATMENT TRAINS HAZARDOUS AREA LAYOUT

1:100

NOTES:

1. EXISTING ELECTRICAL/ CONTROL/ MECHANICAL COMPONENTS OF EXISTING TRAINS (EXCEPTION RAS/WAS PUMPS) ARE NOT INCLUDED IN THE SCOPE OF THIS PROJECT.

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| A | 90% DESIGN REVIEW | MT | CE | 11/04/19 |

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Project No. **11185554-02**

Title

**SEWAGE PROCESSING PLANT TREATMENT TRAINS HAZARDOUS AREA SITE LAYOUT**

Bruce Power Sheet No.

**NK37-DRAW-79600-10003**

Sheet No.

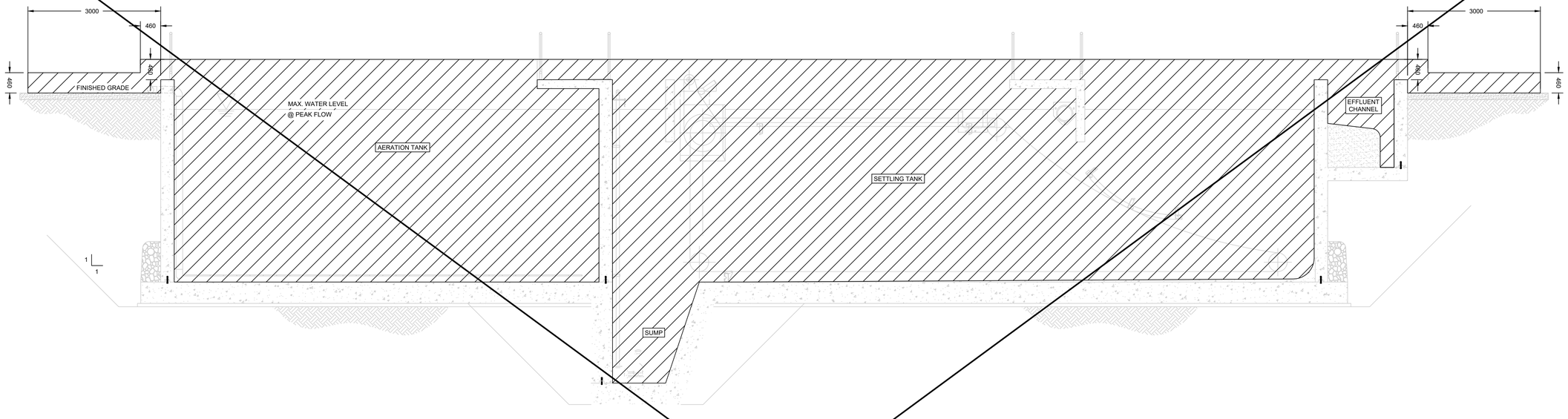
**G-105**

Sheet **5** of **44**

HAZARDOUS AREA CLASSIFICATIONS

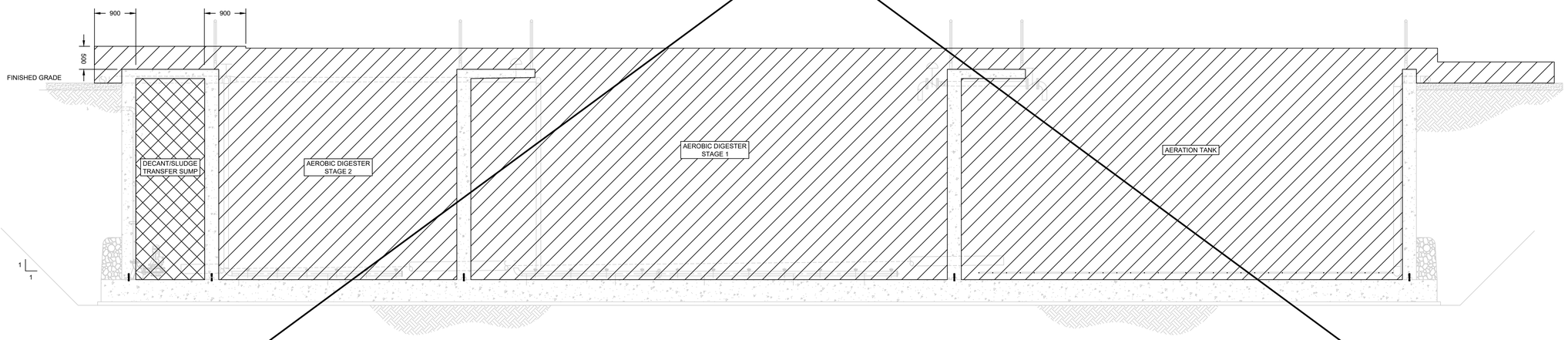
CLASS 1, ZONE 1, GROUP IIA

CLASS 1, ZONE 2, GROUP IIA




SECTION A
1:50
G-105

**FOR REFERENCE**




SECTION B
1:50
G-105

NOTES:

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Project No. **11185554-02**

Title

**SEWAGE PROCESSING PLANT HAZARDOUS AREA SECTIONS (1 OF 3)**

Sheet No.

**NK37-DRAW-79600-10032**

Sheet No.

**G-106**

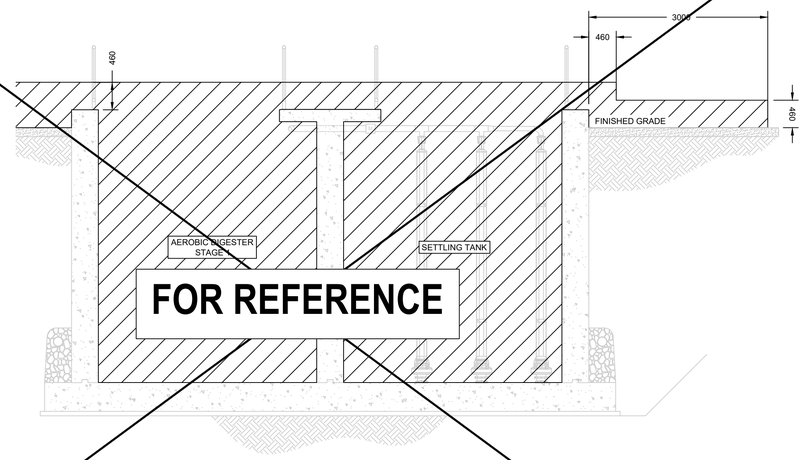
Sheet **6** of **44**


Plot Date: 10 March 2021 - 9:37 AM Plotted By: Jason Spenler CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)GN\11185554-02(004)GN-WA006.dwg

HAZARDOUS AREA CLASSIFICATIONS

CLASS 1, ZONE 1, GROUP IIA

CLASS 1, ZONE 2, GROUP IIA




SECTION C
1:50
G-105

NOTES:

1. EXISTING ELECTRICAL/ CONTROL/ MECHANICAL COMPONENTS OF EXISTING TRAINS (EXCEPTION RAS/WAS PUMPS) ARE NOT INCLUDED IN THE SCOPE OF THIS PROJECT.

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0 0.5 1.0 1.5m

Client

**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project

**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| C | ISSUED FOR RFP | MT | CE | 02/07/20 |
| B | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| A | 90% DESIGN REVIEW | MT | CE | 11/04/19 |

| | | | |
|---|---|---|---|
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| Drafting Check | B. PLETZ | Design Check | - |
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Project No. **11185554-02**

Title

**SEWAGE PROCESSING PLANT HAZARDOUS AREA SECTIONS (2 OF 3)**

Sheet No.

**NK37-DRAW-79600-10033**

Sheet No.

**G-107**

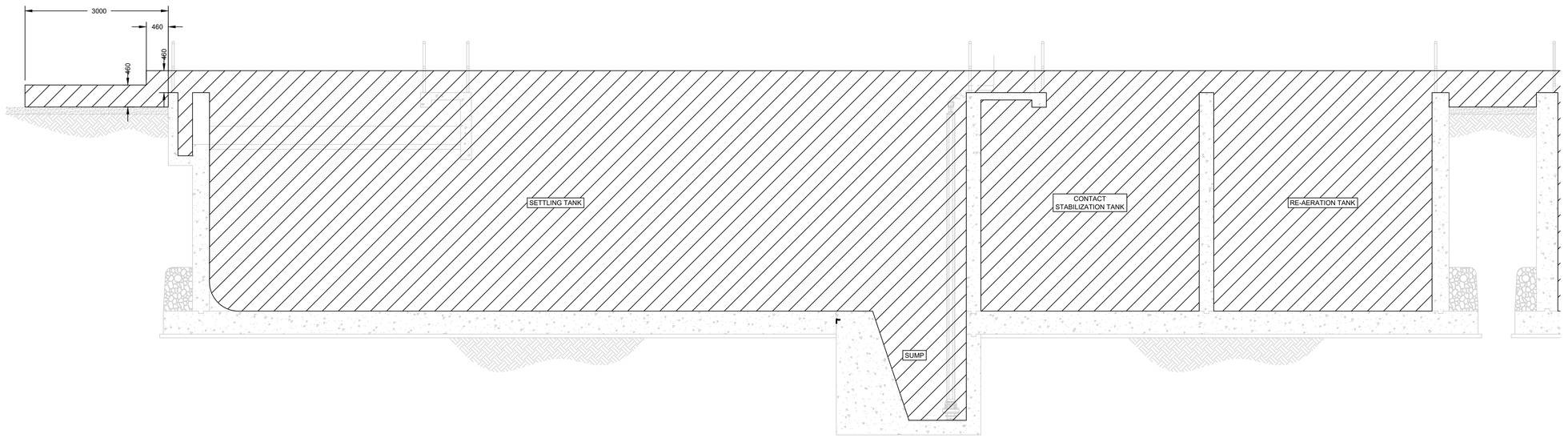
Sheet **7** of **44**


Plot Date: 10 March 2021 - 9:37 AM Plotted By: Jason Spenler CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)GN\11185554-02(004)GN-WA006.dwg

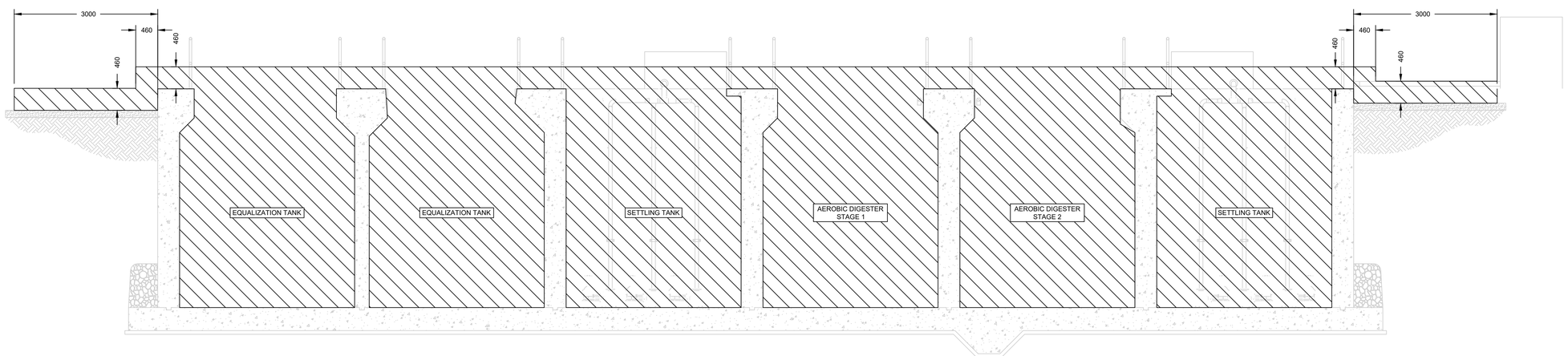
HAZARDOUS AREA CLASSIFICATIONS

CLASS 1, ZONE 1, GROUP IIA

CLASS 1, ZONE 2, GROUP IIA




SECTION D
1:50
G-105




SECTION E
1:50
G-105

NOTES:

1. EXISTING ELECTRICAL/ CONTROL/ MECHANICAL COMPONENTS OF EXISTING TRAINS (EXCEPTION RAS/WAS PUMPS) ARE NOT INCLUDED IN THE SCOPE OF THIS PROJECT.

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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

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| C | ISSUED FOR RFP | MT | CE | 02/07/20 |
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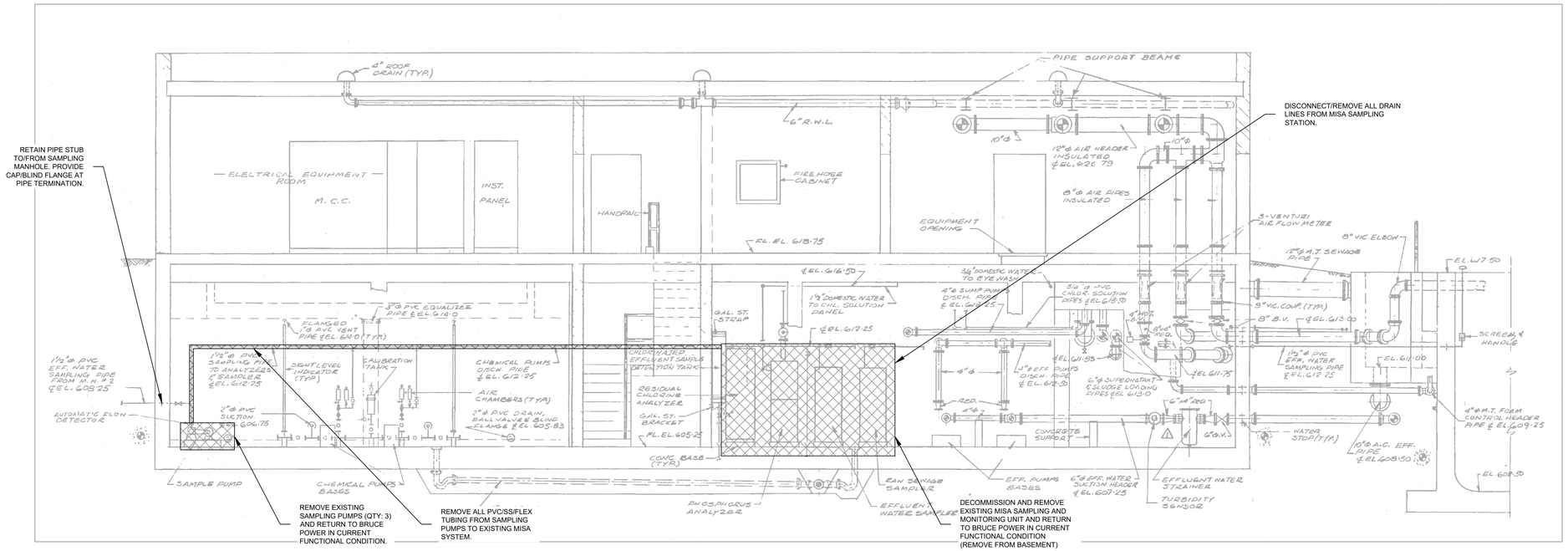
Title
**SEWAGE PROCESSING PLANT HAZARDOUS AREA SECTIONS (3 OF 3)**

Sheet No.
**NK37-DRAW-79600-10034**

Sheet No.
**G-108**

Sheet 8 of 44

Plot Date: 10 March 2021 - 9:37 AM Plotted By: Jason Spenler CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)GN\11185554-02(004)GN-WA006.dwg




EXISTING CONTROL BUILDING BASEMENT - SECTIONAL VIEW
N.T.S.



CONTINUES TO MISA SAMPLING SKID

EXISTING SAMPLING PUMPS



EXISTING MISA SAMPLING STATION

NOTES:
1. EXECUTE REMOVALS IN A ORDERLY AND CAREFUL MANNER.
2. REMOVE MATERIALS AS WORK PROGRESSES. UPON CONNECTION OF WORK, LEAVE AREAS IN CLEAN CONDITION.
3. DISPOSAL OF MATERIALS AND EQUIPMENT (NOT RETAINED BY BRUCE POWER) SHALL BE SPECIFIED IN A PLAN TO BE DEVELOPED BY CONTRACTOR.
4. CUT, REMOVE AND DISPOSE OF CONCRETE EQUIPMENT PADS AND SUPPORTS. CUT EMBEDDED REINFORCEMENT MINIMUM 25mm BELOW THE SURFACE OF THE CONCRETE AND GROUT THE HOLE.
5. REFER TO CORRESPONDING ELECTRICAL REMOVAL DRAWING (ER-102).
6. CONTRACTOR SHALL TAKE THE STEPS TO CONTROL RELEASE OF DUST DURING REMOVALS.

ISSUED FOR RFP

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Project
**SPP CONTROLS UPGRADE**

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|---|---|---|---|---|
| E | ISSUED FOR RFP | MC | CE | 02/07/20 |
| D | 100% DESIGN REVIEW | MC | CE | 12/16/19 |
| C | 90% DESIGN REVIEW | MC | CE | 11/04/19 |
| B | 50% OF 100% REVIEW | MC | CE | 07/05/19 |
| A | 50% DESIGN REVIEW | MC | CE | 05/17/19 |

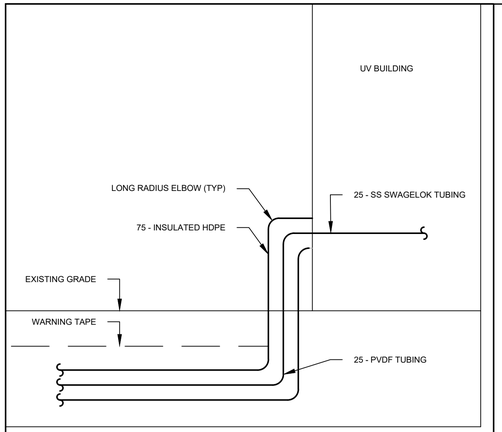
| | | | |
|---|---|---|---|
| Drawn | **M. CORREALE** | Designer | **C. EVEREST** |
| Drafting Check | **B. PLETZ** | Design Check | **H. BREWER** |
| Project Manager | **C. EVEREST** | Date | **07/05/2019** |
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| Original Size **ANSI D** | | Bar is 20mm on original size drawing 0 20mm | |

Project No. **11185554-02**

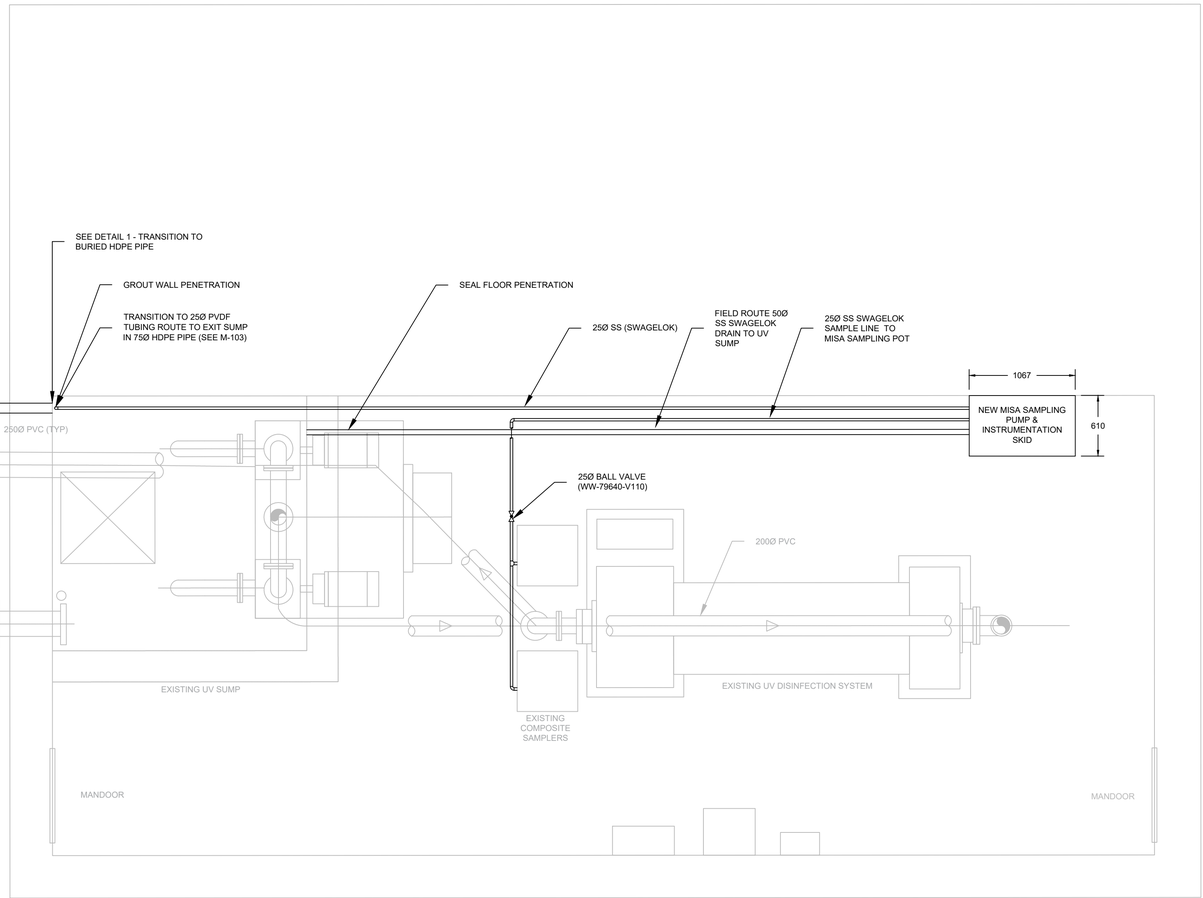
Title
**SEWAGE PROCESSING PLANT PROCESS SECTION/ DETAILS REMOVALS EXISTING MISA SYSTEM**

Bruce Power Sheet No.
-

Sheet No.
**M-101**
Sheet **9** of **44**




1 **TRANSITION TO BURIED HDPE PIPE**
NTS




EXISTING UV BUILDING

NOTES:
1. FIELD ROUTE PIPING (AS SHOWN/SPECIFIED) WITHIN UV BUILDING ALONG NORTH WALL OF UV ROOM.
2. CONNECTION FROM EXISTING COMPOSITE SAMPLERS TO MISA SAMPLING POT SHALL BE CONSTRUCTED IN MINIMUM TWO (2) PARTS TO FACILITATE DISASSEMBLY AND STORAGE.

ISSUED FOR RFP

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0 0.3 0.6 0.9m

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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

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| E | 100% DESIGN REVIEW | MC | CE | 12/16/19 |
| D | 90% DESIGN REVIEW | MC | CE | 11/04/19 |
| C | 50% OF 100% REVIEW | MC | CE | 07/05/19 |
| B | 50% DESIGN REVIEW | MC | CE | 05/17/19 |
| F | ISSUED FOR RFP | MC | CE | 02/07/20 |

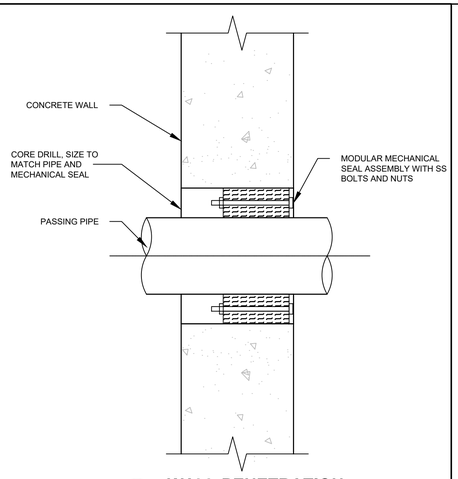
| | | | |
|---|---|---|---|
| Drawn | **M. CORREALE** | Designer | **C. EVEREST** |
| Drafting Check | **B. PLETZ** | Design Check | **H. BREWER** |
| Project Manager | **C. EVEREST** | Date | **07/05/2019** |
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| Original Size **ANSI D** | | Bar is 20mm on original size drawing 0 20mm | |

Project No. **11185554-02**

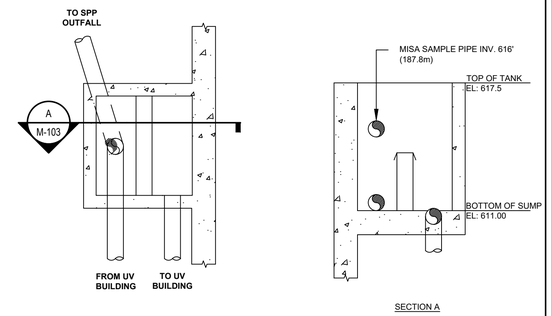
Title
**SEWAGE PROCESSING PLANT**
**UV BUILDING**
**PROCESS PLAN ADDITIONS**

Bruce Power Sheet No.
**NK37-DRAW-79690-10006**

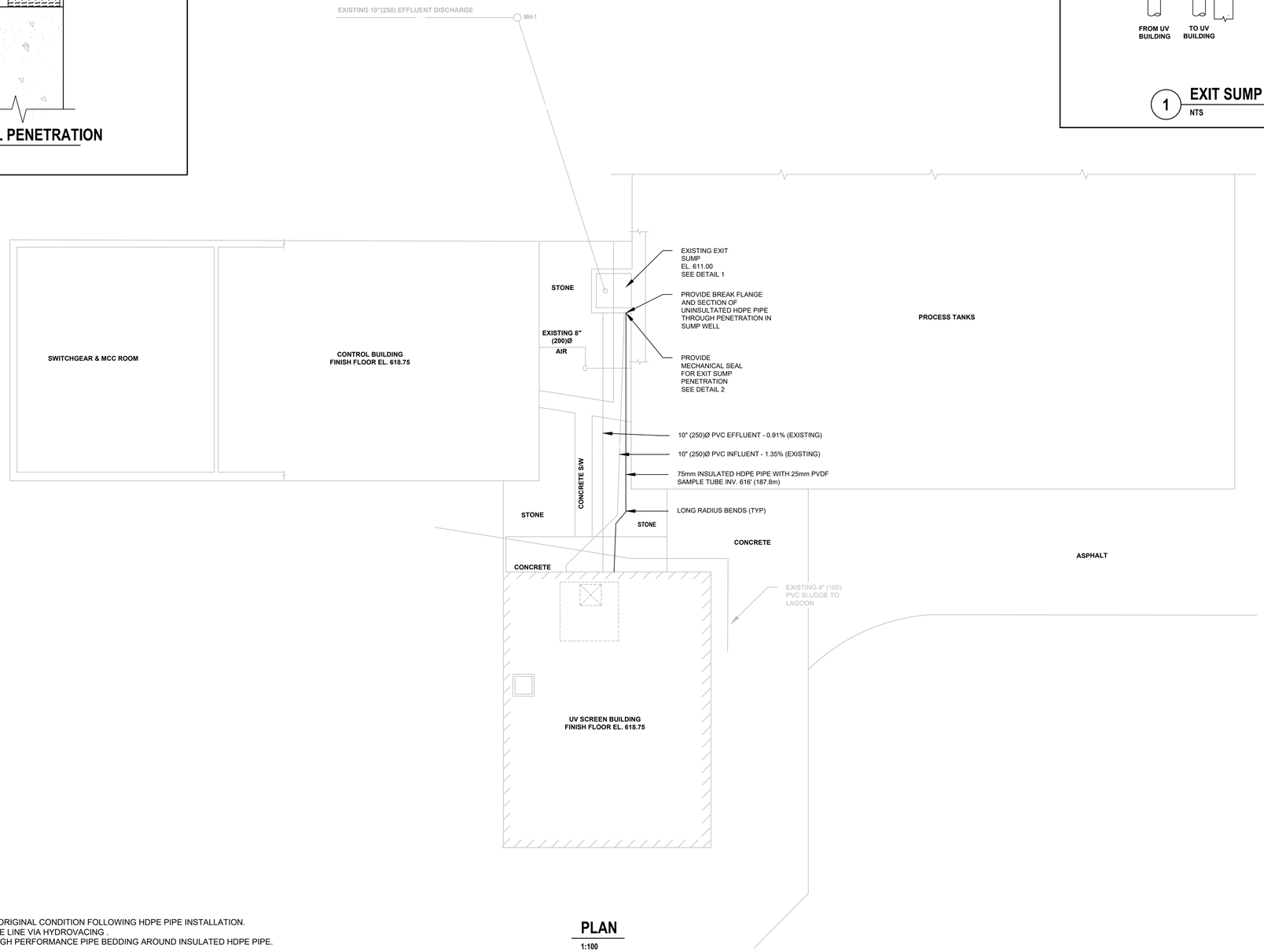
Sheet No.
**M-102**
Sheet **10** of **44**




## 2 WALL PENETRATION
NTS




## 1 EXIT SUMP WEIR
NTS




## PLAN
1:100

NOTES:
1. RESTORE EXISTING SURFACE TO ORIGINAL CONDITION FOLLOWING HDPE PIPE INSTALLATION.
2. EXECUTE TRENCHING FOR SAMPLE LINE VIA HYDROVACING .
3. PROVIDE 150mm (ALL SIDES) OF HIGH PERFORMANCE PIPE BEDDING AROUND INSULATED HDPE PIPE.

ISSUED FOR RFP

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0 1 2 3m

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Project
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| D | ISSUED FOR RFP | MC | CE | 02/07/20 |
| C | 100% DESIGN REVIEW | MC | CE | 12/16/19 |
| B | 90% DESIGN REVIEW | MC | CE | 11/04/19 |
| A | 50% OF 100% REVIEW | MC | CE | 07/05/19 |

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Original Size
**ANSI D**

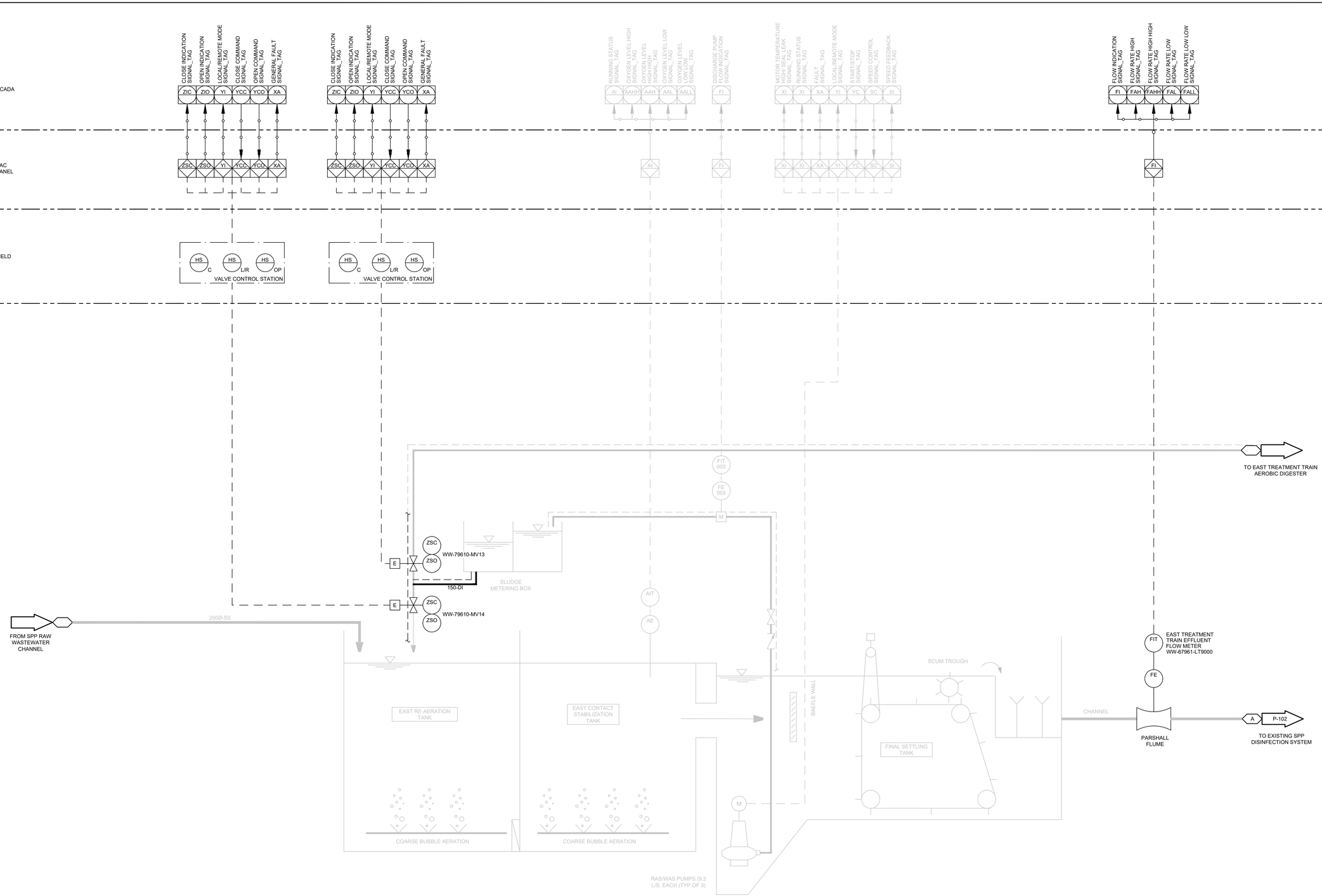
Bar is 20mm on original size drawing
0 20mm

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT**
**MISA SAMPLE**
**PIPING FROM EXIT SUMP**

Bruce Power Sheet No.
**NK37-DRAW-79690-10007**

Sheet No.
**M-103**
Sheet **11** of **44**




NOTES:
1. REFER TO DWG ER-104 FOR DETAILS ASSOCIATED WITH EXISTING CONTROL VALVE REMOVAL.
2. REFER TO DWG E-100 FOR INSTALL LOCATION FOR MV13 AND MV14.

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| D | 90% DESIGN REVIEW | MC | CE | 11/04/19 |
| C | 50% OF 100% REVIEW | MC | CE | 07/05/19 |
| B | 50% DESIGN REVIEW | MT | CE | 05/17/19 |
| F | ISSUED FOR RFP | MC | CE | 02/07/20 |

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| Project Manager | C. EVEREST | Date | 07/05/2019 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 — 20mm |

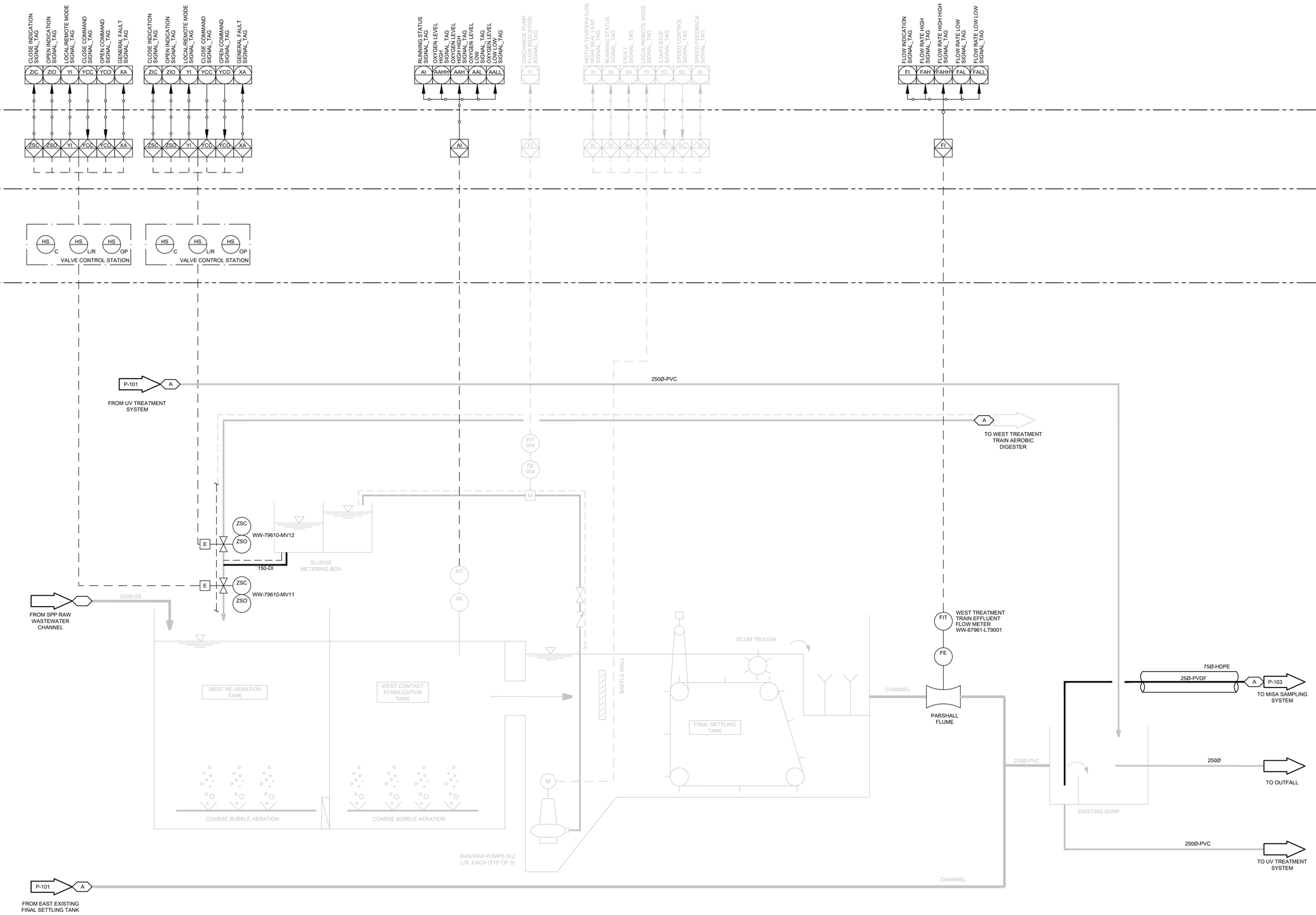
Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT**
**EXISTING SPP**
**EXISTING TREATMENT TRAINS**
**P&ID (1 OF 2)**

Bruce Power Sheet No.
**NK37-DRAW-79600-10037**

Sheet No.
**P-101**
Sheet **12** of **44**

Plot Date: 11 March 2021 - 2:16 PM Plotted By: Jason Spenler CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)PR\11185554-02(004)PR-WA001.dwg




NOTES:
1. REFER TO DWG ER-104 FOR DETAILS ASSOCIATED WITH EXISTING CONTROL VALVE REMOVAL.
2. REFER TO DWG E-100 FOR INSTALL LOCATION FOR MV11 AND MV12.

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| C | 50% OF 100% REVIEW | MC | CE | 07/05/19 |
| B | 50% DESIGN REVIEW | MC | CE | 05/17/19 |
| F | ISSUED FOR RFP | MC | CE | 02/07/20 |

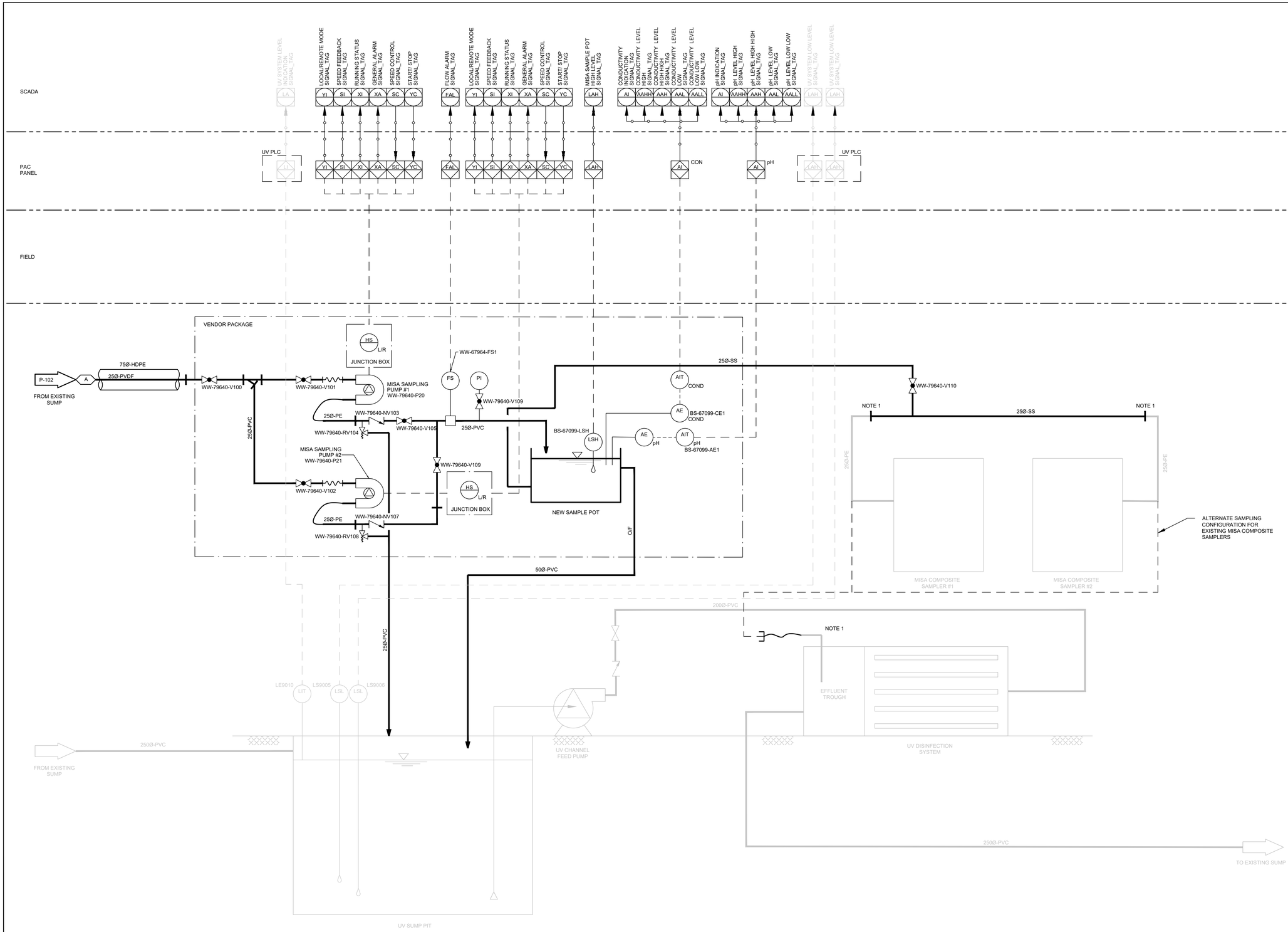
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| Drafting Check | B. PLETZ | Design Check | H. BREWER |
| Project Manager | C. EVEREST | Date | 07/05/2019 |
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Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT EXISTING SPP EXISTING TREATMENT TRAINS P&ID (2 OF 2)**

Bruce Power Sheet No.
**NK37-DRAW-79600-10038**

Sheet No.
**P-102**
Sheet 13 of 44




NOTES

1. SUCTION TUBING FROM MISA COMPOSITE SAMPLERS CAN ALSO REROUTE TO UV SYSTEM EFFLUENT TROUGH USING EXISTING HARDWARE (FLEX TUBE AND STANDPIPE).
2. MISA SAMPLING PUMP JUNCTION BOXES ARE INCLUDED IN THE PUMP VENDOR PACKAGE.

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Project
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| D | 90% DESIGN REVIEW | MC | CE | 11/04/19 |
| C | 50% OF 100% REVIEW | MC | CE | 07/05/19 |
| B | 50% DESIGN REVIEW | MC | CE | 05/17/19 |
| F | ISSUED FOR RFP | MC | CE | 02/07/20 |

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|---|---|---|---|
| Drawn | M. CORREALE | Designer | C. EVEREST |
| Drafting Check | B. PLETZ | Design Check | H. BREWER |
| Project Manager | C. EVEREST | Date | 07/05/2019 |
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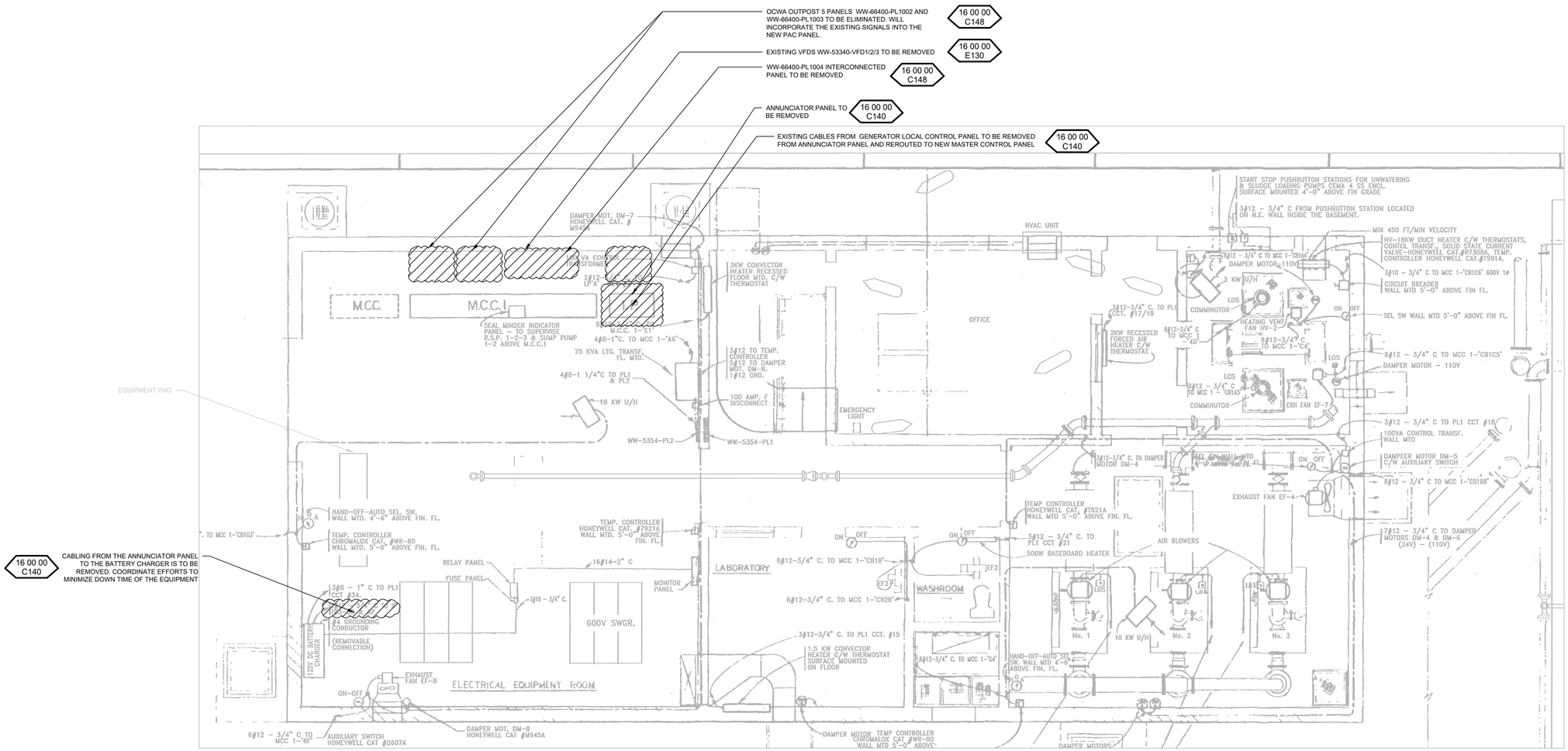
Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT**
**MISA SAMPLING SYSTEM**
**P&ID**

Bruce Power Sheet No.
**NK37-DRAW-79640-10039**

Sheet No.
**P-103**
Sheet **14** of **44**

Plot Date: 11 March 2021 - 2:16 PM Plotted By: Jason Spenler CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)PR\11185554-02(004)PR-WA002.dwg




NOTES:

1. THE BASELINE INFORMATION ON THIS DRAWING ORIGINATED FROM BRUCE POWER DRAWING NK37-DDE-53000-0102 REV 6. THIS DRAWING SHOULD BE USED AS A REFERENCE FOR REMOVALS ONLY.
2. DEMOLITION AND DECOMMISSIONING WORK MUST NOT INTERFERE WITH FUNCTIONALITY OF THE NETWORK STATION AND ASSOCIATED SERVERS. ENSURE THAT WORK SPACE IS KEPT CLEAN AND DEBRIS FREE. PREVENT DAMAGE TO EXISTING SYSTEM BY INSTALLING FIELD BARRIERS DURING THE COURSE OF WORK.

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Project
**SPP CONTROLS UPGRADE**

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| D | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| C | 90% DESIGN REVIEW | MT | CE | 11/04/19 |
| B | 50% OF 100% REVIEW | MT | CE | 07/05/19 |
| A | 50% DESIGN REVIEW | MT | CE | 05/17/19 |
| No. | Issue | Drawn | Approved | Date |

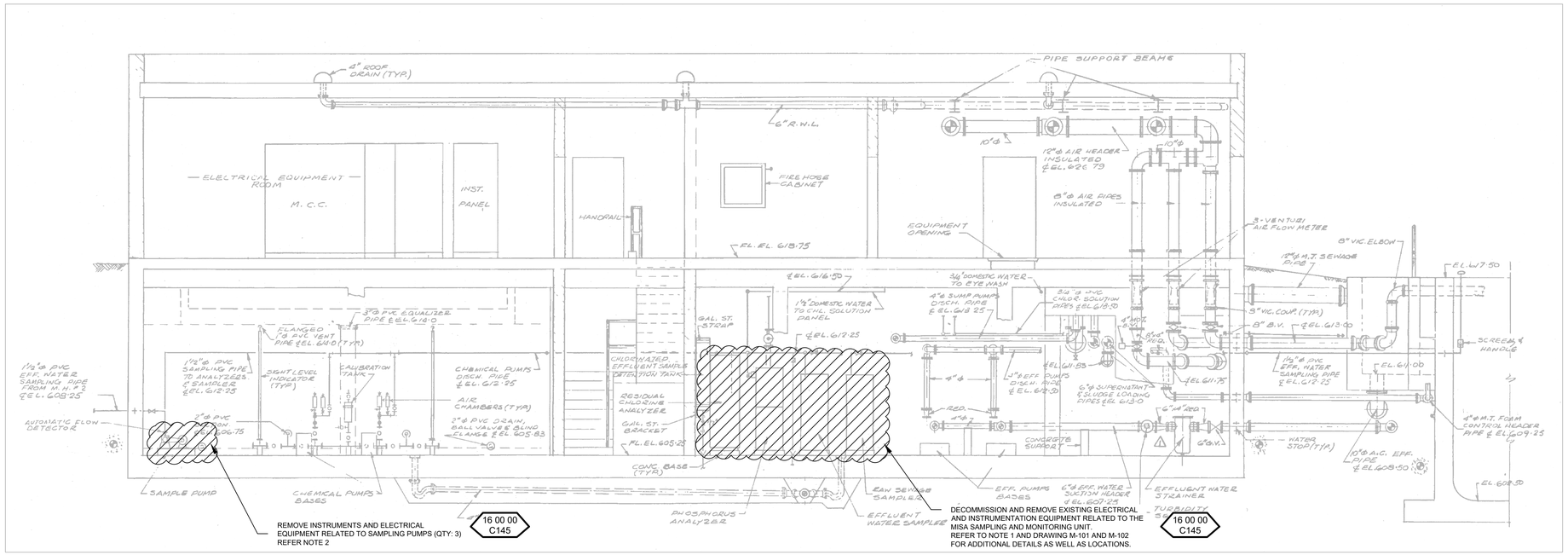
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| Drawn | **M. TUPPER** | Designer | **L. MONSHIZADEH** |
| Drafting Check | **B. PLETZ** | Design Check | **M. CADACIO** |
| Project Manager | **C. EVEREST** | Date | **07/05/19** |
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| Original Size **ANSI D** | | Bar is 20mm on original size drawing 0 20mm | |

Project No. **11185554-01**

Title
**SEWAGE PROCESSING PLANT CONTROL BUILDING ELECTRICAL ROOM REMOVALS PLAN**

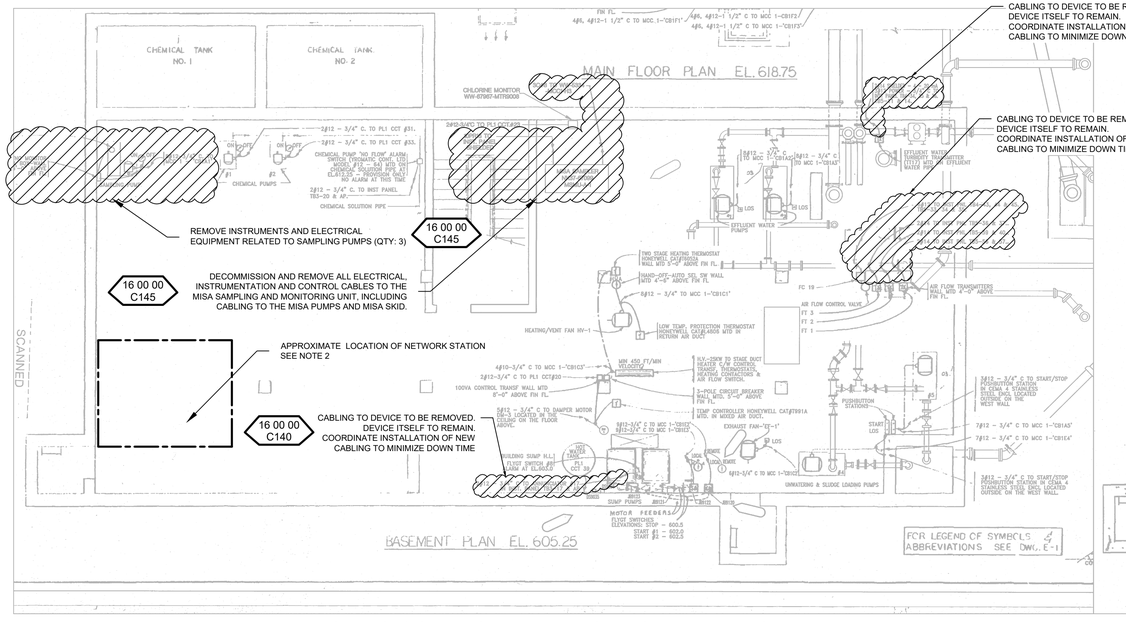
Bruce Power Sheet No.
-

Sheet No.
**ER-101**
Sheet **15** of **44**



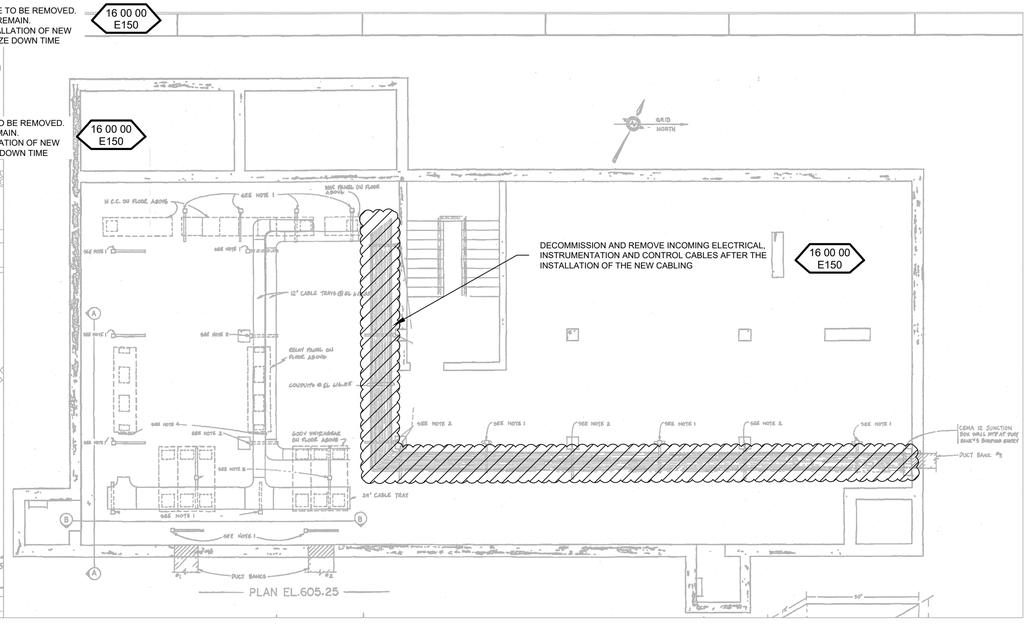

## EXISTING CONTROL BUILDING BASEMENT - SECTIONAL VIEW

N.T.S.




## EXISTING CONTROL BUILDING BASEMENT - TOP VIEW

N.T.S.




## EXISTING CONTROL BUILDING BASEMENT CONDUIT AND CABLE TRAY ROUTING - TOP VIEW

N.T.S.

NOTES:

1. THE BASELINE INFORMATION ON THIS DRAWING ORIGINATED FROM BRUCE POWER DRAWING NK37-DDE-53000-0102 AND NK37-DDE-27600-0105 REV. 06. THIS DRAWING SHOULD BE USED AS A REFERENCE FOR REMOVALS ONLY.
2. DEMOLITION AND DECOMMISSIONING WORK MUST NOT INTERFERE WITH FUNCTIONALITY OF THE NETWORK STATION AND ASSOCIATED SERVERS. ENSURE THAT WORK SPACE IS KEPT CLEAN AND DEBRIS FREE. PREVENT DAMAGE TO EXISTING SYSTEM BY INSTALLING FIELD BARRIERS DURING THE COURSE OF WORK.
3. PHOTOS SHOWING THE EXISTING MISA SYSTEM AND SAMPLE PUMPS CAN BE FOUND ON DRAWING M-101

ISSUED FOR RFP

**DRAFT**

GHD Limited
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Client
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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| E | ISSUED FOR RFP | MT | CE | 02/07/20 |
| D | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| C | 90% DESIGN REVIEW | MT | CE | 11/04/19 |
| B | 50% OF 100% REVIEW | MT | CE | 07/05/19 |
| A | 50% DESIGN REVIEW | MT | CE | 05/17/19 |

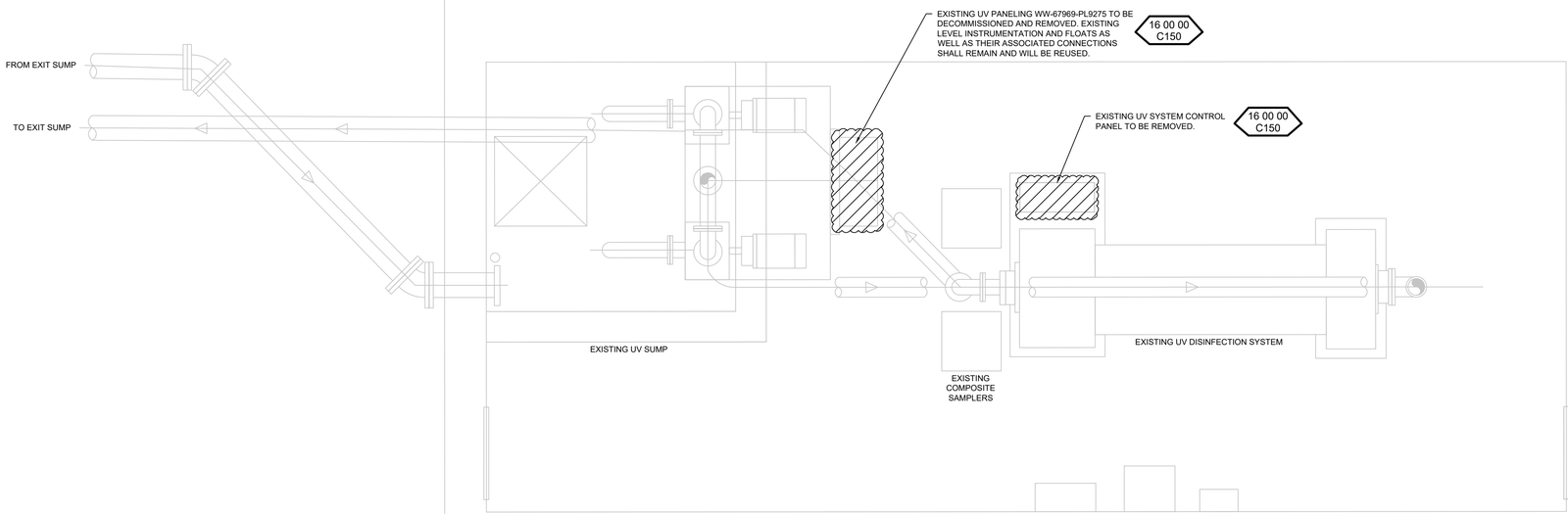
| | | | |
|---|---|---|---|
| Drawn | **M. TUPPER** | Designer | **M. TUPPER** |
| Drafting Check | **B. PLETZ** | Design Check | **M. CADACIO** |
| Project Manager | **C. EVERETT** | Date | **07/05/19** |
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| Original Size **ANSI D** | | Bar is 20mm on original size drawing 0 20mm | |

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT ELECTRICAL REMOVALS EXISTING MISA SYSTEM**

Bruce Power Sheet No.
**-**

Sheet No.
**ER-102**
Sheet **16** of **44**




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0 0.3 0.6 0.9m

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Project
**SPP CONTROLS UPGRADE**

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|---|---|---|---|---|
| E | ISSUED FOR RFP | MT | CE | 02/07/20 |
| D | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| C | 90% DESIGN REVIEW | MT | CE | 11/04/19 |
| B | 50% OF 100% REVIEW | MT | CE | 07/05/19 |
| A | 50% DESIGN REVIEW | MT | CE | 05/17/19 |

| | | | |
|---|---|---|---|
| Drawn | M. TUPPER | Designer | M. TUPPER |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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Original Size
**ANSI D**

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0 20mm

Project No. **11185554-02**

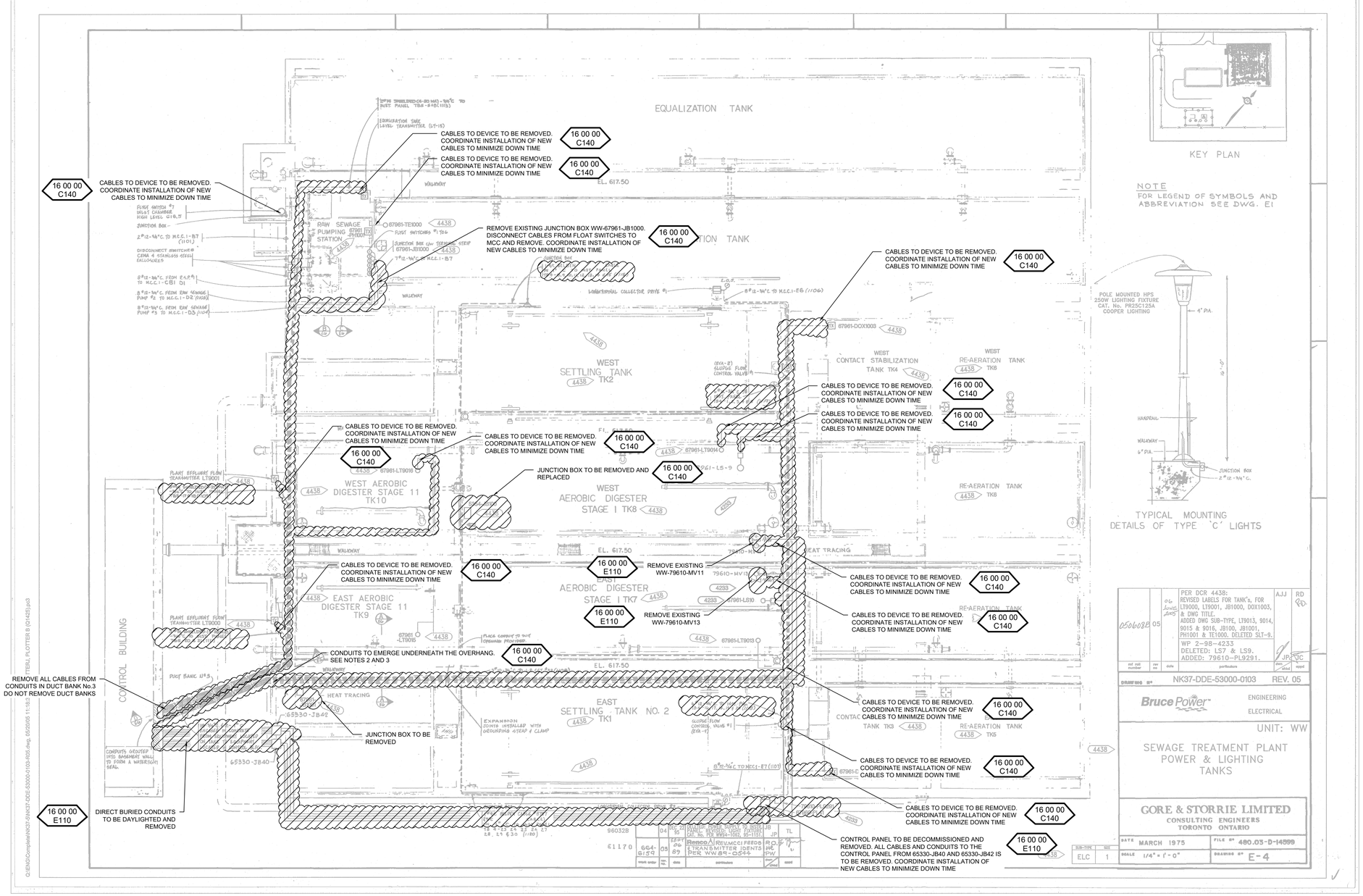
Title
**SEWAGE PROCESSING PLANT**
**UV BUILDING**
**ELECTRICAL REMOVALS PLAN**

Bruce Power Sheet No.
-

Sheet No.
**ER-103**
Sheet **17** of **44**

NOTES:

1. THIS DRAWINGS SCALE IS AN APPROXIMATION AND IS TO BE USED FOR REFERENCING PURPOSES ONLY. CONTRACTOR TO EXPECT AT MINIMUM A 10% DIFFERENCE IN LENGTHS SHOWN VERSUS ACTUAL LENGTHS
2. THIS DRAWING HAS BEEN PREPARED USING INFORMATION FROM DRAWING NK37-DDE-53000-0103 REV. 6 UPDATED ON JUNE 06, 2005. WHILE THIS DRAWING IS BELIEVED TO BE ACCURATE, GHD DOES NOT WARRANT ITS COMPLETENESS.
3. ALL FIELD INSTRUMENTATION SHALL REMAIN IN THE FIELD AND WILL HAVE NEW CABLES INSTALLED TO EACH DEVICE FROM SPECIFIED LOCATIONS. CONTRACTOR TO ENSURE INSTRUMENTATION REMAINS FUNCTIONAL UNTIL IT IS READY TO BE SWITCHED OVER.
4. CABLES CONNECTED TO THE MCC AND THE LIGHTING PANEL WILL REMAIN IN THE FIELD UNLESS STATED OTHERWISE. ALL CABLES FROM THE INSTRUMENTATION ANNUNCIATOR PANELS WILL BE REMOVED.
5. CONTRACTOR TO REMOVE ALL CABLES AND CONDUITS WHERE SAFE TO DO SO. ANY INACCESSIBLE CABLES DUE TO SAFETY CONCERNS SHALL HAVE LOCATIONS RECORDED AND BE DECOMMISSIONED BY SEVERING ACCESSIBLE CABLE ENDS, GROUTING AND CAPPING CONDUIT, AND ABANDONING IN PLACE




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0 0.6 1.2 1.8m

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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| C | ISSUED FOR RFP | MT | CE | 02/07/20 |
| B | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| A | 90% DESIGN REVIEW | MT | CE | 11/04/19 |

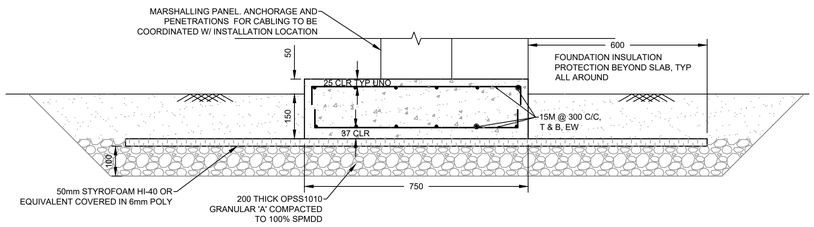
| | | | |
|---|---|---|---|
| Drawn | M. TUPPER | Designer | M. TUPPER |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 12/10/19 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 20mm |

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT SITE REMOVALS PLAN**

Bruce Power Sheet No.
-

Sheet No.
**ER-104**
Sheet 18 of 44

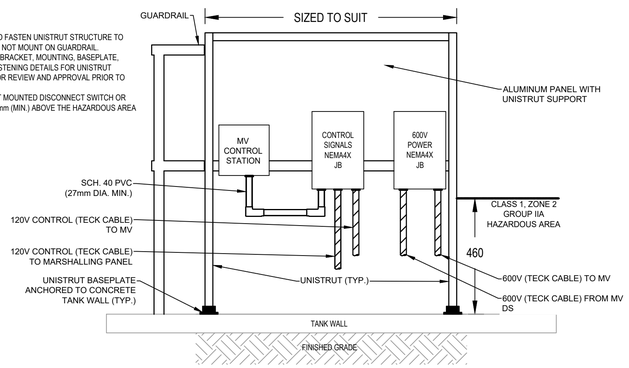



## DETAIL A — FIELD MARSHALLING PANEL SLAB ON GRADE

N.T.S. — E-100

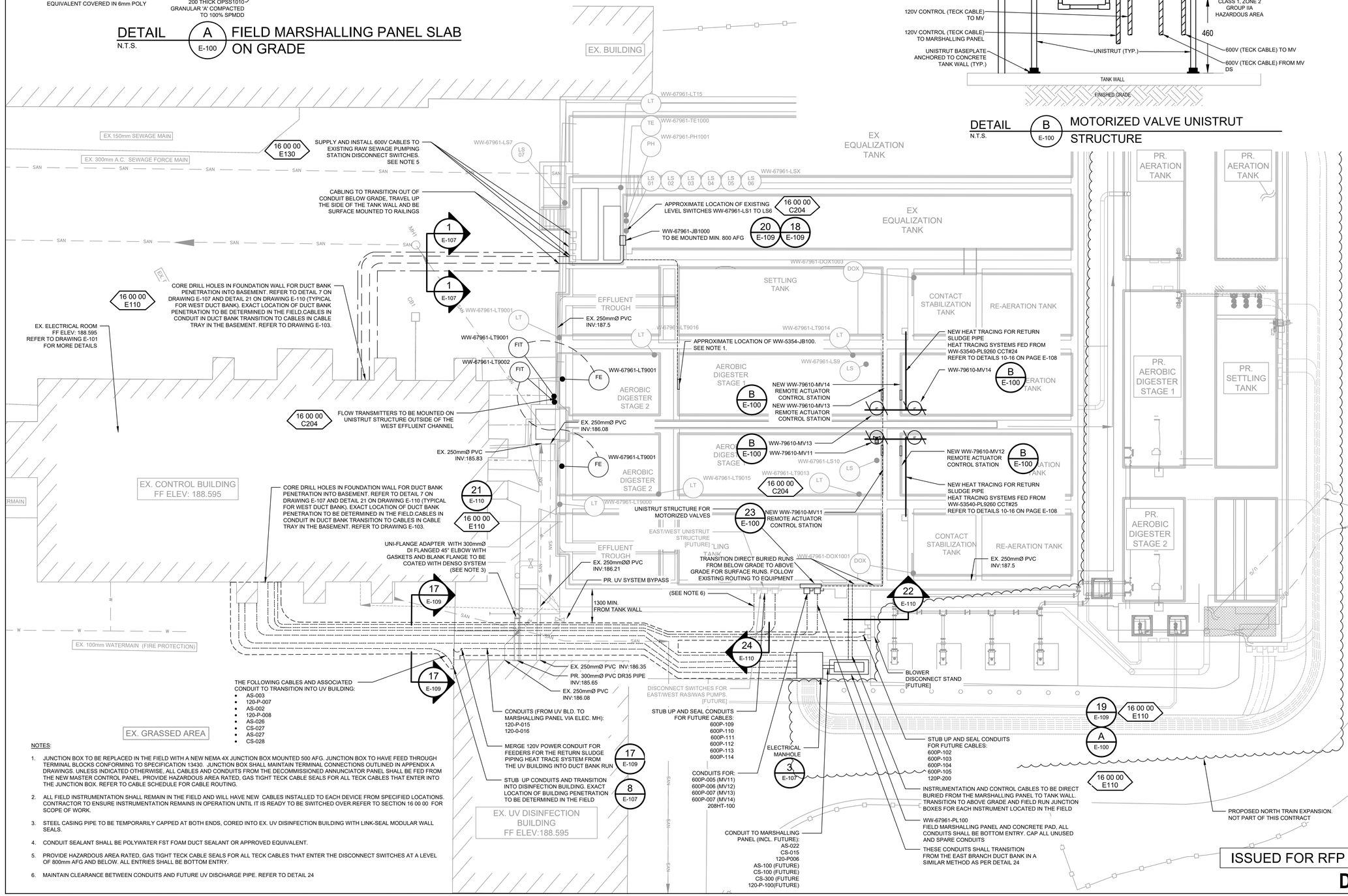
NOTES:

1. CONTRACTOR TO DESIGN AND FASTEN UNISTRUT STRUCTURE TO EXISTING SETTLING TANK, DO NOT MOUNT ON GUARDRAIL.
2. CONTRACTOR SHALL SUBMIT BRACKET, MOUNTING, BASEPLATE, UNISTRUT, ANCHORS AND FASTENING DETAILS FOR UNISTRUT STRUCTURE TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION
3. THE BOTTOM OF THE LOWEST MOUNTED DISCONNECT SWITCH OR JUNCTION BOX SHALL BE 250mm (MIN.) ABOVE THE HAZARDOUS AREA




## DETAIL B — MOTORIZED VALVE UNISTRUT STRUCTURE

N.T.S. — E-100




NOTES:

1. JUNCTION BOX TO BE REPLACED IN THE FIELD WITH A NEW NEMA 4X JUNCTION BOX MOUNTED 500 AFG. JUNCTION BOX TO HAVE FEED THROUGH TERMINAL BLOCKS CONFORMING TO SPECIFICATION 13430. JUNCTION BOX SHALL MAINTAIN TERMINAL CONNECTIONS OUTLINED IN APPENDIX A DRAWINGS. UNLESS INDICATED OTHERWISE, ALL CABLES AND CONDUITS FROM THE DECOMMISSIONED ANNUNCIATOR PANEL SHALL BE FED FROM THE NEW MASTER CONTROL PANEL. PROVIDE HAZARDOUS AREA RATED, GAS TIGHT TECK CABLE SEALS FOR ALL TECK CABLES THAT ENTER INTO THE JUNCTION BOX. REFER TO CABLE SCHEDULE FOR CABLE ROUTING.
2. ALL FIELD INSTRUMENTATION SHALL REMAIN IN THE FIELD AND WILL HAVE NEW CABLES INSTALLED TO EACH DEVICE FROM SPECIFIED LOCATIONS. CONTRACTOR TO ENSURE INSTRUMENTATION REMAINS IN OPERATION UNTIL IT IS READY TO BE SWITCHED OVER.REFER TO SECTION 16 00 00 FOR SCOPE OF WORK.
3. STEEL CASING PIPE TO BE TEMPORARILY CAPPED AT BOTH ENDS, CORED INTO EX. UV DISINFECTION BUILDING WITH LINK-SEAL MODULAR WALL SEALS.
4. CONDUIT SEALANT SHALL BE POLYWATER FST FOAM DUCT SEALANT OR APPROVED EQUIVALENT.
5. PROVIDE HAZARDOUS AREA RATED, GAS TIGHT TECK CABLE SEALS FOR ALL TECK CABLES THAT ENTER THE DISCONNECT SWITCHES AT A LEVEL OF 800mm AFG AND BELOW. ALL ENTRIES SHALL BE BOTTOM ENTRY.
6. MAINTAIN CLEARANCE BETWEEN CONDUITS AND FUTURE UV DISCHARGE PIPE. REFER TO DETAIL 24

ISSUED FOR RFP

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Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| E | ISSUED FOR RFP | MT | CE | 02/07/20 |
| D | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| C | 90% DESIGN REVIEW | MT | CE | 11/04/19 |
| B | 50% OF 100% REVIEW | MT | CE | 07/05/19 |
| A | 50% DESIGN REVIEW | MT | CE | 05/17/19 |

| | | | |
|---|---|---|---|
| Drawn | M. TUPPER | Designer | M.TUPPER |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 20mm |

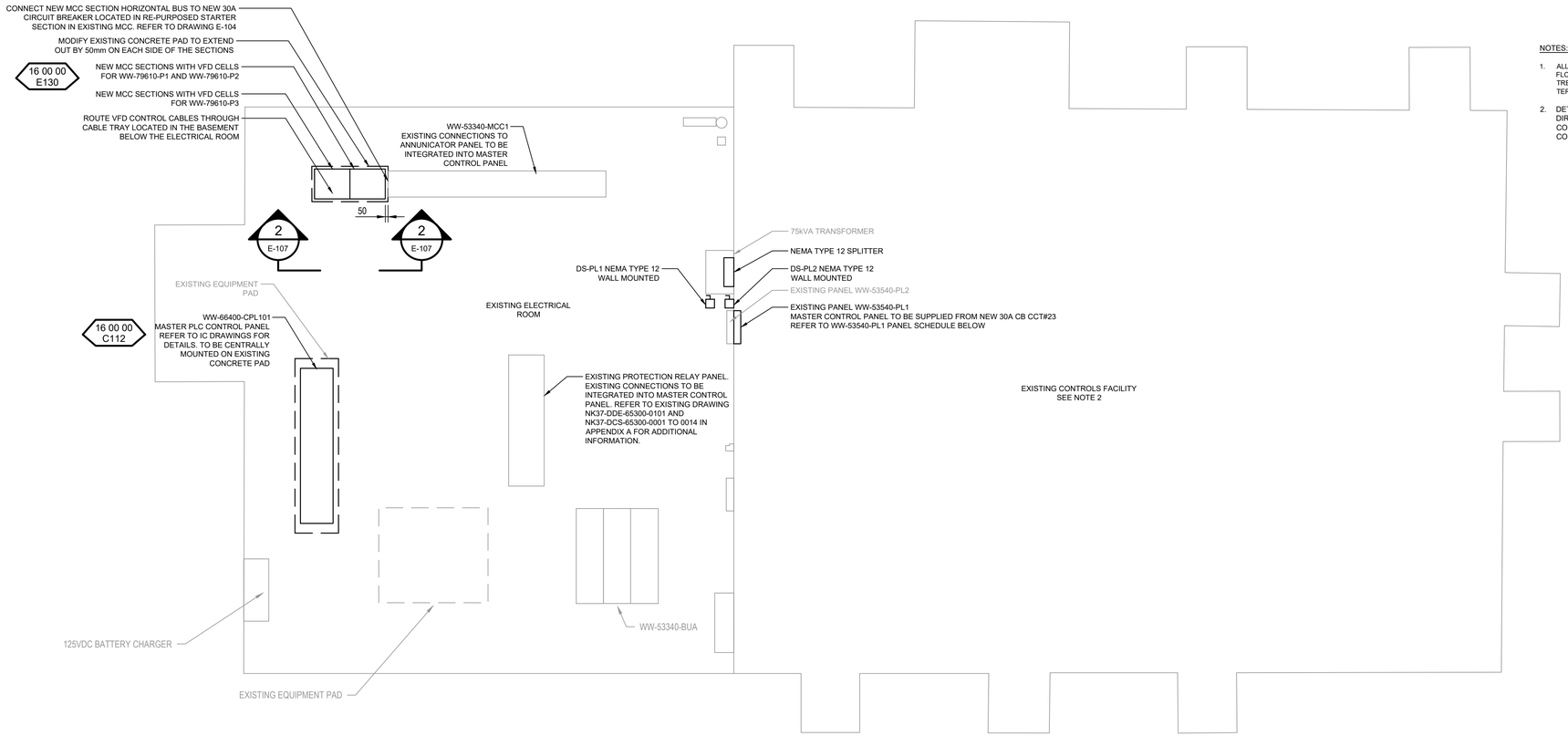
Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT ELECTRICAL SITE PLAN**

Bruce Power Sheet No.
**NK37-DRAW-53000-10048**

Sheet No.
**E-100**
Sheet **19** of **44**

Plot Date: 11 March 2021 - 4:50 PM Plotted By: Neil Hamilton CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)EL\11185554-02(004)EL-WA100.dwg




## EXISTING CONTROL BUILDING LAYOUT

1:50

NOTES:

1. ALL CABLE RUNS ARE TO TRANSITION THROUGH EXISTING OPENINGS IN THE FLOOR AND BE ROUTED THROUGH CABLE TRAYS (EXISTING AND NEW) IN THE TREATMENT ROOM BEFORE STUBBING UP INTO THERE RESPECTIVE TERMINATIONS.
2. DETAILS FOR THE FACILITY HAVE BEEN OMITTED AS THEY ARE NOT DIRECTLY RELATED TO THE SCOPE OF WORK DEFINED UNDER THIS CONTRACT. FOR MORE INFORMATION PLEASER REFER TO BRUCE POWER CONTROL BUILDING POWER DRAWING NK37-DDE-53000-0102 REV. 6

| SERVICE DESCRIPTION | WATTS | CKT. NO. | BRANCH CB | A B C | BRANCH CB | CKT. NO. | WATTS | SERVICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| CONTROL TRANSFORMER FOR DAMPER (DM-7 & DM-8) | | 1 | 15A | | 15A | 2 | | ELECTRICAL EQUIPMENT ROOM LIGHTING 2.0kW |
| VESTIBULE LIGHTING 0.7kW | | 3 | 15A | | 15A | 4 | | |
| LAB LIGHTING 1.4kW | | 5 | 15A | | 15A | 6 | | OFFICE & EYEWASH ROOM LIGHTING 0.6kW |
| COMMINUTOR ROOM WASHROOM LIGHTING 0.5kW | | 7 | 15A | | 15A | 8 | | BLOWER ROOM LIGHTING 0.6kW |
| BASEMENT LIGHTING 3.0kW | | 9 | 15A | | 15A | 10 | | RECEPTACLES ELECT. EQUIPMENT |
| | | 11 | 15A | | 15A | 12 | | RECEPT. VEST. EYEWASH ROOM OFFICE COMMINUTOR RM. |
| | | 13 | 15A | | 15A | 14 | | RECPT. LAB (1) REFRIGERATOR, WEST WALL |
| LAB HEATER 1.5kW (730-HTR-9) | | 15 | 15A | | 15A | 16 | | RECEPTACLES BLOWER RM. & OUTSIDE RECEPT. N. WALL |
| EYEWASH ROOM HEATER 2.0kW (730-HTR-10) | | 17 | 15A | | 15A | 18 | | CONTROL TRANSFORMER FOR DAMPER (DM-4 & 5, 6) |
| | | 19 | 15A | | 15A | 20 | | CONTROL TRANSFORMER FOR DAMPER (DM-1, 2, 3) |
| WASHROOM HEATER 0.5kW (730-HTR-11) | | 21 | 15A | | 15A | 22 | | RECEPTACLES BASEMENT |
| MAIN CONTROL PANEL WW-66400-CPL101 | | 23 | 30A | | 15A | 24 | | RECEPTACLES BASEMENT |
| INSTRUMENT PANEL | | 25 | 15A | | 15A | 26 | | INSTRUMENT PANEL FOR RAW SEWAGE PUMP CONTROL |
| SPARE | | 27 | 15A | | 15A | 28 | | OFFICE RECEPTACLES |
| POLYMER SKID | | 29 | 15A | | 15A | 30 | | STRIPPED BUS - DO NOT USE |
| CHEMICAL PUMP (79660-P1) | | 31 | 15A | | 15A | 32 | | TANK LIGHTING 0.5kW |
| CHEMICAL PUMP (79660-P2) | | 33 | 15A | | 15A | 34 | | BATTERY CHARGER |
| DVR's 1 TO 7 IN MCC1 | | 35 | 15A | | 15A | 36 | | RECEPTACLES LAB, DISHWASHER EAST WALL |
| HEATING TRACING SLUDGE WASTING LINES | | 37 | 15A | | 15A | 38 | | RECEPTACLES ABOVE CEILING - JIFFY POLE |
| HOT WATER HEATER | | 39 | 15A | | 15A | 40 | | SPARE |
| | | 41 | | | 15A | 42 | | SPARE |
| | | | | N | | | | |
| | | | | GND | | | | |

DISCONNECT AND REMOVE CABLING COMING FROM THIS CIRCUIT. CIRCUIT TO BE MARKED AS SPARE

DISCONNECT AND REMOVE CABLING COMING FROM THIS CIRCUIT. CIRCUIT TO BE MARKED AS SPARE

BUS HAS BEEN STRIPPED AND SHALL NOT BE USED.

REMOVE HEAT TRACING. REMOVE WIRE AND CONDUIT. LABEL BREAKER AS "SPARE"

| | | | |
|---|---|---|---|
| PANEL MTD.: | WALL MOUNTED | ENCLOSURE: | RECESSED MOUNTED |
| MANUFACTURER: | FEDERAL PIONEER | TYPE: | - |
| MAIN BREAKER: | N/A | MAIN LUGS: | 225A |

120/208V, 3-PH, 225A, 42CCT
EXISTING LIGHTING PANEL WW-53540-PL1 SCHEDULE

| SERVICE DESCRIPTION | WATTS | CKT. NO. | BRANCH CB | A B C | BRANCH CB | CKT. NO. | WATTS | SERVICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| EMERGENCY LIGHTING ELECT. EQUIPMENT ROOM | | 1 | 15A | | 15A | 2 | | EMERGENCY LIGHTING BLOWER ROOM |
| EMERGENCY LIGHTING OFFICE AND STAIRWELL | | 3 | 15A | | 15A | 4 | | EMERGENCY LIGHTING BASEMENT |
| EMERGENCY LIGHTING VESTIBULE | | 5 | 15A | | 15A | 6 | | OUTSIDE WALL LIGHTING |
| 3 RECEPTACLES SOUTH WALL OF LAB | | 7 | 15A | | 15A | 8 | | |
| 3 RECEPTACLES SOUTH WALL OF LAB | | 9 | 15A | | | 10 | | |
| 3 RECEPTACLES NORTH AND EAST WALL OF LAB | | 11 | 15A | | 30A | 12 | | OFFICE HVAC UNIT ACU#1 |
| 3 RECEPTACLES NORTH AND EAST WALL OF LAB | | 13 | 15A | | | 14 | | |
| RECEPTACLES LIGHT FUME HOOD (FUH1) | | 15 | 15A | | | 16 | | |
| FUME HOOD FAN (FUH1) | | 17 | 15A | | 15A | 18 | | ELECTRICAL ROOM RECEPTACLE BY DATA CONCENTRATOR |
| JIFFY POLE #2 ELECTRICAL ROOM | | 19 | 15A | | 20A | 20 | | OUTPOST 5 AND X-LINK PANELS |
| SPARE | | 21 | 30A | | 15A | 22 | | OFFICE COUNTER RECEPTACLES |
| SPARE | | 23 | | | | 24 | | |
| | | | | N | | | | |
| | | | | GND | | | | |

REMOVE WIRE AND CONDUIT. LABEL BREAKER AS SPARE.

| | | | |
|---|---|---|---|
| PANEL MTD.: | WALL MOUNTED | ENCLOSURE: | WALL MOUNTED |
| MANUFACTURER: | FEDERAL PIONEER | TYPE: | - |
| MAIN BREAKER: | N/A | MAIN LUGS: | 100A |

120/208V, 3-PH, 100A, 24CCT
EXISTING LIGHTING PANEL WW-53540-PL2 SCHEDULE

ISSUED FOR RFP

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Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| D | ISSUED FOR RFP | MT | CE | 02/07/20 |
| C | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| B | 90% DESIGN REVIEW | MC | CE | 11/04/19 |
| A | 50% OF 100% REVIEW | MC | CE | 07/05/19 |

| | | | |
|---|---|---|---|
| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 05/08/19 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 20mm |

Project No. **11185554-01**

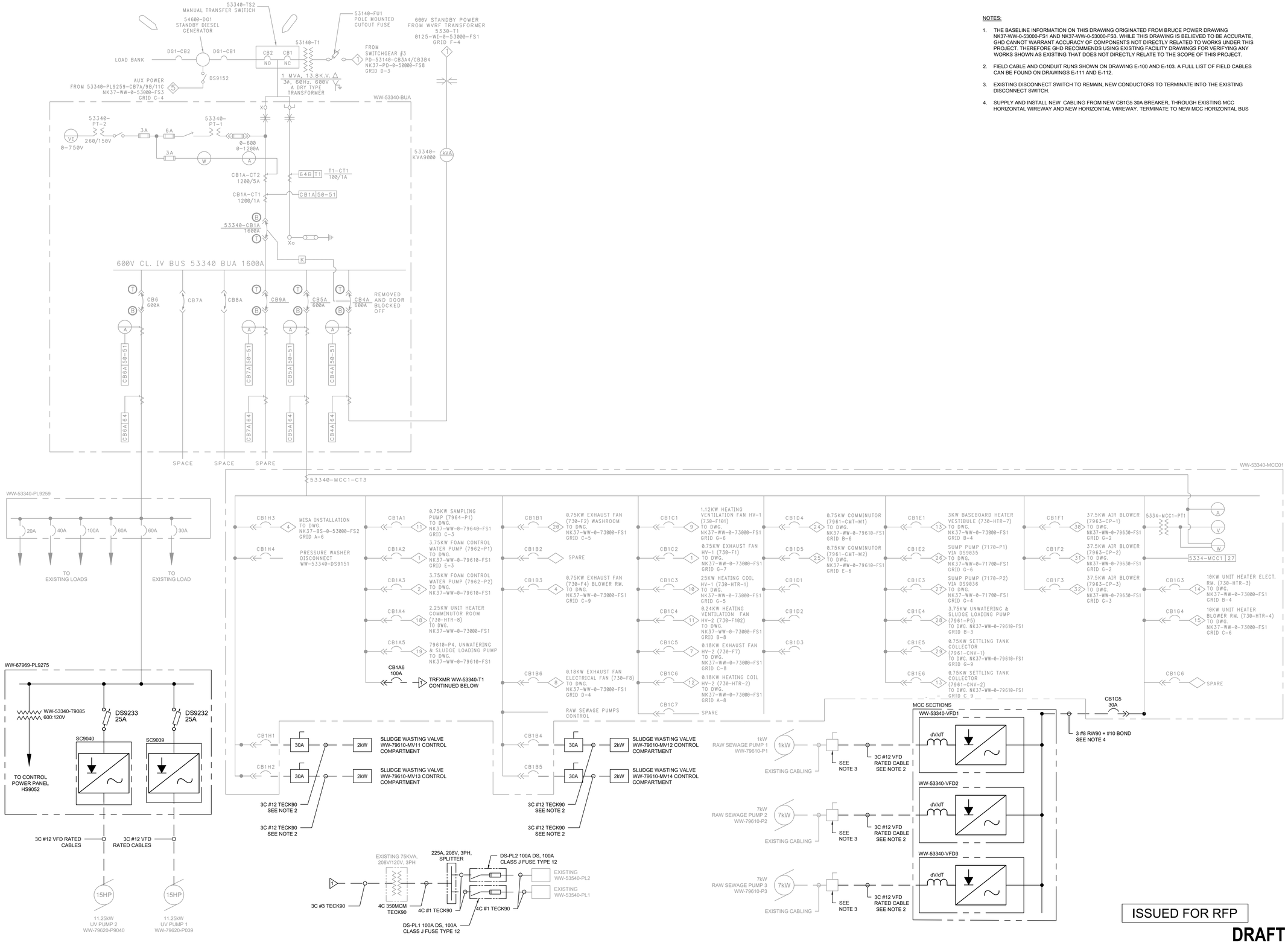
Title
**SEWAGE PROCESSING PLANT CONTROL BUILDING ELECTRICAL ROOM POWER PLAN**

Bruce Power Sheet No.
**NK37-DRAW-53000-10049**

Sheet No.
**E-101**

Sheet **20** of **44**

Plot Date: 11 March 2021 - 3:17 PM Plotted By: Neil Hamilton CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)EL\11185554-02(004)EL-WA101.dwg




NOTES:

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2. FIELD CABLE AND CONDUIT RUNS SHOWN ON DRAWING E-100 AND E-103. A FULL LIST OF FIELD CABLES CAN BE FOUND ON DRAWINGS E-111 AND E-112.
3. EXISTING DISCONNECT SWITCH TO REMAIN, NEW CONDUCTORS TO TERMINATE INTO THE EXISTING DISCONNECT SWITCH.
4. SUPPLY AND INSTALL NEW CABLING FROM NEW CB1G5 30A BREAKER, THROUGH EXISTING MCC HORIZONTAL WIREWAY AND NEW HORIZONTAL WIREWAY. TERMINATE TO NEW MCC HORIZONTAL BUS

ISSUED FOR RFP

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455 Phillip Street
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**T** 519 884 0510 **F** 519 884 0525 **W** www.ghd.com

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Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| E | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| D | 90% DESIGN REVIEW | MT | CE | 11/04/19 |
| C | 50% OF 100% REVIEW | MT | CE | 07/05/19 |
| B | 50% DESIGN REVIEW | MT | CE | 05/17/19 |
| F | ISSUED FOR RFP | MT | CE | 02/07/20 |

| | | | |
|---|---|---|---|
| Drawn | **M. TUPPER** | Designer | **M. TUPPER** |
| Drafting Check | **B. PLETZ** | Design Check | **M. CADACIO** |
| Project Manager | **C. EVEREST** | Date | **07/05/19** |
| This document shall not be used for construction unless signed and sealed for construction. | | Scale | **NTS** |

Original Size **ANSI D**

Bar is 20mm on original size drawing
0 20mm

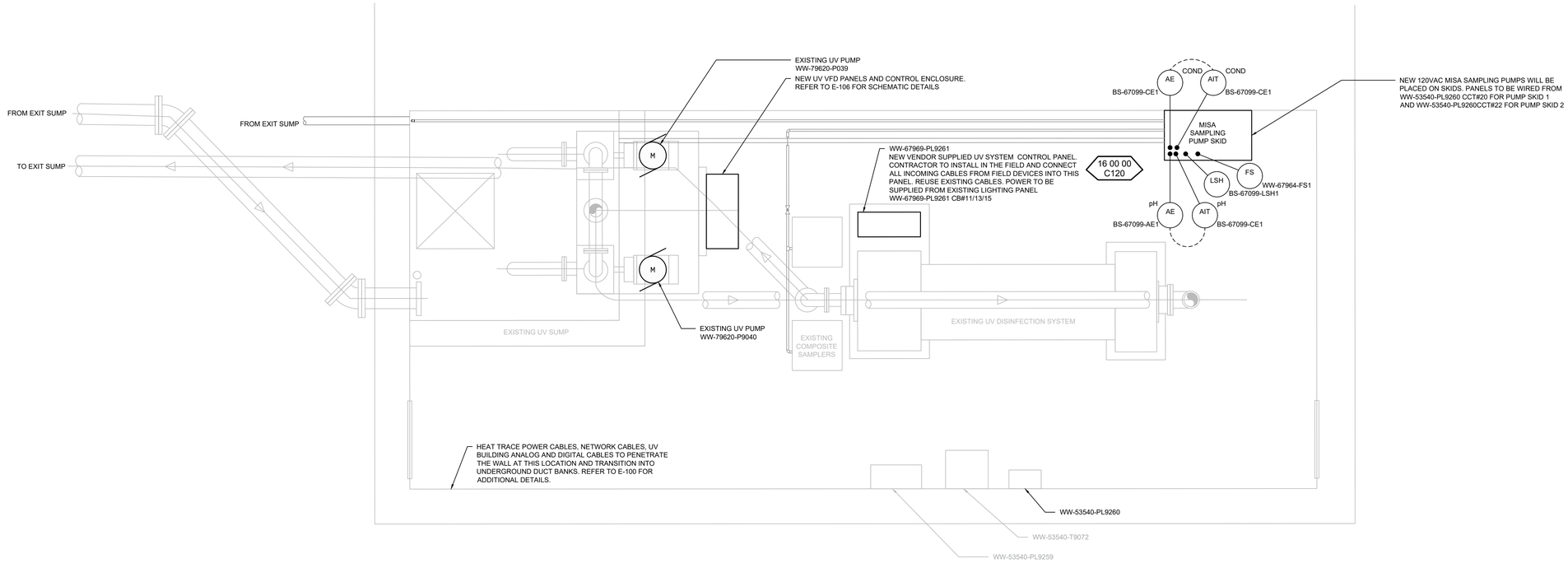
Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT SITE WIDE SINGLE LINE DIAGRAM**

Bruce Power Sheet No.
**NK37-DRAW-53000-10052**

Sheet No.
**E-104**

Sheet **23** of **44**




## UV DISINFECTION BUILDING- ELECTRICAL AND INSTRUMENTATION LAYOUT

1:30

| SERVICE DESCRIPTION | WATTS | CKT. NO. | BRANCH CB | A B C | BRANCH CB | CKT. NO. | WATTS | SERVICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| LIGHTING & ELU9080 | | 1 | 15A | | 15A | 2 | | RECEPTACLES (3) |
| LIGHTING | | 3 | 15A | | 15A | 4 | | RECEPTACLES (3) |
| LIGHTING & ELU9081 | | 5 | 15A | | 15A | 6 | | LIGHTING |
| EXTERIOR | | 7 | 15A | | 15A | 8 | | RECEPTACLES |
| RECEPT. MISA SAMPLER SA1 & SA3 | | 9 | 15A | | 15A | 10 | | EXTERIOR RECEPTACLES |
| WW-67969-PL9261 | | 11 | 15A | | 15A | 12 | | EXTERIOR RECEPTACLES |
| | | 13 | | | 15A | 14 | | EXTERIOR RECEPTACLES |
| | | 15 | | | 15A | 16 | | RECEPTACLES |
| UV TRANSMITTER WW-67969-LIT9010 | | 17 | 15A | | 15A | 18 | | WW-67969 AIT9002 |
| 3000W WATER HTR. 9062 WW-71514-HTR9062 | | 19 | 20A | | 15A | 20 | | MISA SAMPLING SYSTEM PUMP #1 |
| | | 21 | | | 15A | 22 | | MISA SAMPLING SYSTEM PUMP #2 |
| MgOH MIXER WW-53540-MS1 VIA WW-53540-RE4<br>WW-53540-MS2 VIA WW-53540-RE5 | | 23 | 20A | | 20A GFEP | 24 | | HEAT TRACING FOR WEST TREATMENT TRAIN |
| | | 25 | | | 20A GFEP | 26 | | HEAT TRACING FOR EAST TREATMENT TRAIN |
| HEAT TRACE | | 27 | 15A | | | 28 | | SPACE |
| RECEPTACLE | | 29 | 20A | | | 30 | | SPACE |
| SPACE | | 31 | | | | 32 | | SPACE |
| SPACE | | 33 | | | | 34 | | SPACE |
| SPACE | | 35 | | | | 36 | | SPACE |
| SPACE | | 37 | | | | 38 | | SPACE |
| SPACE | | 39 | | | | 40 | | SPACE |
| SPACE | | 41 | | | | 42 | | SPACE |
| | | | | N<br>GND | | | | |

| | | | |
|---|---|---|---|
| PANEL MTD.: | WALL MOUNTED | ENCLOSURE: | - |
| MANUFACTURER: | CUTLER HAMMER | TYPE: | - |
| MAIN BREAKER: | N/A | MAIN LUGS: | 225A |
| FEEDER SIZE: | - | FEEDER ENTRY: | BOTTOM ENTRY |

## 120/208V, 3-PH, 42 CCT
## EXISTING LIGHTING PANEL WW-53540-PL9260 SCHEDULE

ISSUED FOR RFP

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Waterloo Ontario N2L 3X2 Canada
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0 0.3 0.6 0.9m

Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| E | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| D | 90% DESIGN REVIEW | MT | CE | 11/04/19 |
| C | 50% OF 100% REVIEW | MT | CE | 07/05/19 |
| B | 50% DESIGN REVIEW | MT | CE | 05/17/19 |
| E | ISSUED FOR RFP | MT | CE | 02/07/20 |

Drawn **M. TUPPER** | Designer **M. TUPPER**
Drafting Check **B. PLETZ** | Design Check **M. CADACIO**
Project Manager **C. EVEREST** | Date **07/05/19**
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Original Size **ANSI D** | Bar is 20mm on original size drawing 0 20mm

Project No. **11185554-02**

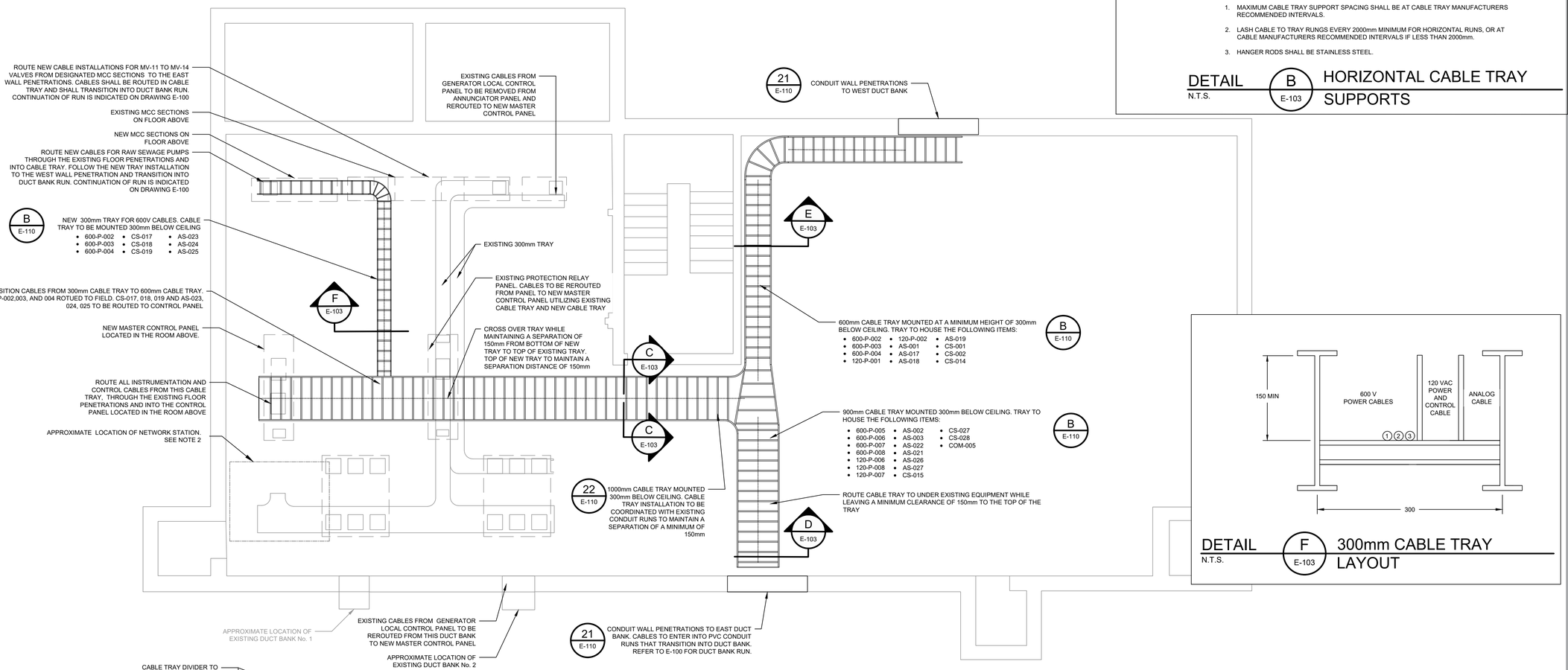
Title
**SEWAGE PROCESSING PLANT UV BUILDING POWER AND INSTRUMENTATION PLAN**

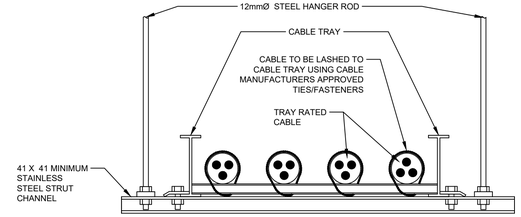
Bruce Power Sheet No.
**NK37-DRAW-53000-10050**

Sheet No.
**E-102**
Sheet **21** of **44**

NOTES:

1. THIS DRAWING SCALE IS AN APPROXIMATION AND IS TO BE USED FOR REFERENCING PURPOSES ONLY TO SHOW APPROXIMATIONS FOR EXISTING CABLE TRAY ROUTING. THIS DRAWING HAS BEEN PREPARED USING INFORMATION FROM DRAWING NK37-DDE-53000-0102 REV. 6 UPDATED ON JUNE 18, 2003. WHILE THIS DRAWING IS BELIEVED TO BE ACCURATE, GHD DOES NOT WARRANT ITS COMPLETENESS.
2. WORK MUST NOT INTERFERE WITH FUNCTIONALITY OF THE NETWORK STATION AND ASSOCIATED SERVERS. ENSURE THAT WORK SPACE IS KEPT CLEAN AND DEBRIS FREE. PREVENT DAMAGE TO EXISTING SYSTEM BY INSTALLING FIELD BARRIERS DURING THE COURSE OF WORK.



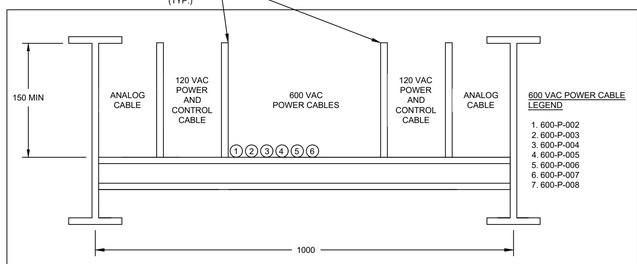

NOTES:

1. MAXIMUM CABLE TRAY SUPPORT SPACING SHALL BE AT CABLE TRAY MANUFACTURERS RECOMMENDED INTERVALS.
2. LASH CABLE TO TRAY RUNGS EVERY 2000mm MINIMUM FOR HORIZONTAL RUNS, OR AT CABLE MANUFACTURERS RECOMMENDED INTERVALS IF LESS THAN 2000mm.
3. HANGER RODS SHALL BE STAINLESS STEEL.

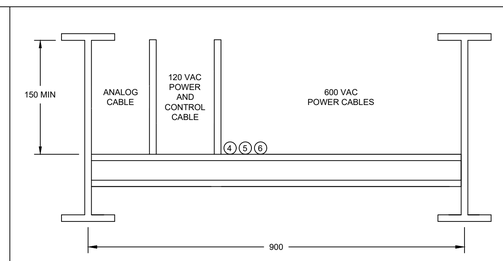
DETAIL B E-103 HORIZONTAL CABLE TRAY SUPPORTS
N.T.S.



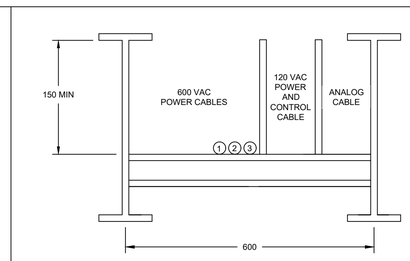

DETAIL F E-103 300mm CABLE TRAY LAYOUT
N.T.S.




DETAIL C E-103 1000mm MAIN CABLE TRAY LAYOUT
N.T.S.




DETAIL D E-103 900mm EAST CABLE TRAY LAYOUT
N.T.S.




DETAIL E E-103 600mm WEST CABLE TRAY LAYOUT
N.T.S.

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0 0.5 1 1.5m

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Project
**SPP CONTROLS UPGRADE**

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| C | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| B | 50% DESIGN REVIEW | MT | CE | 11/04/19 |
| A | 50% DESIGN REVIEW | MT | CE | 05/17/19 |

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|---|---|---|---|
| Drawn | M. TUPPER | Designer | M. TUPPER |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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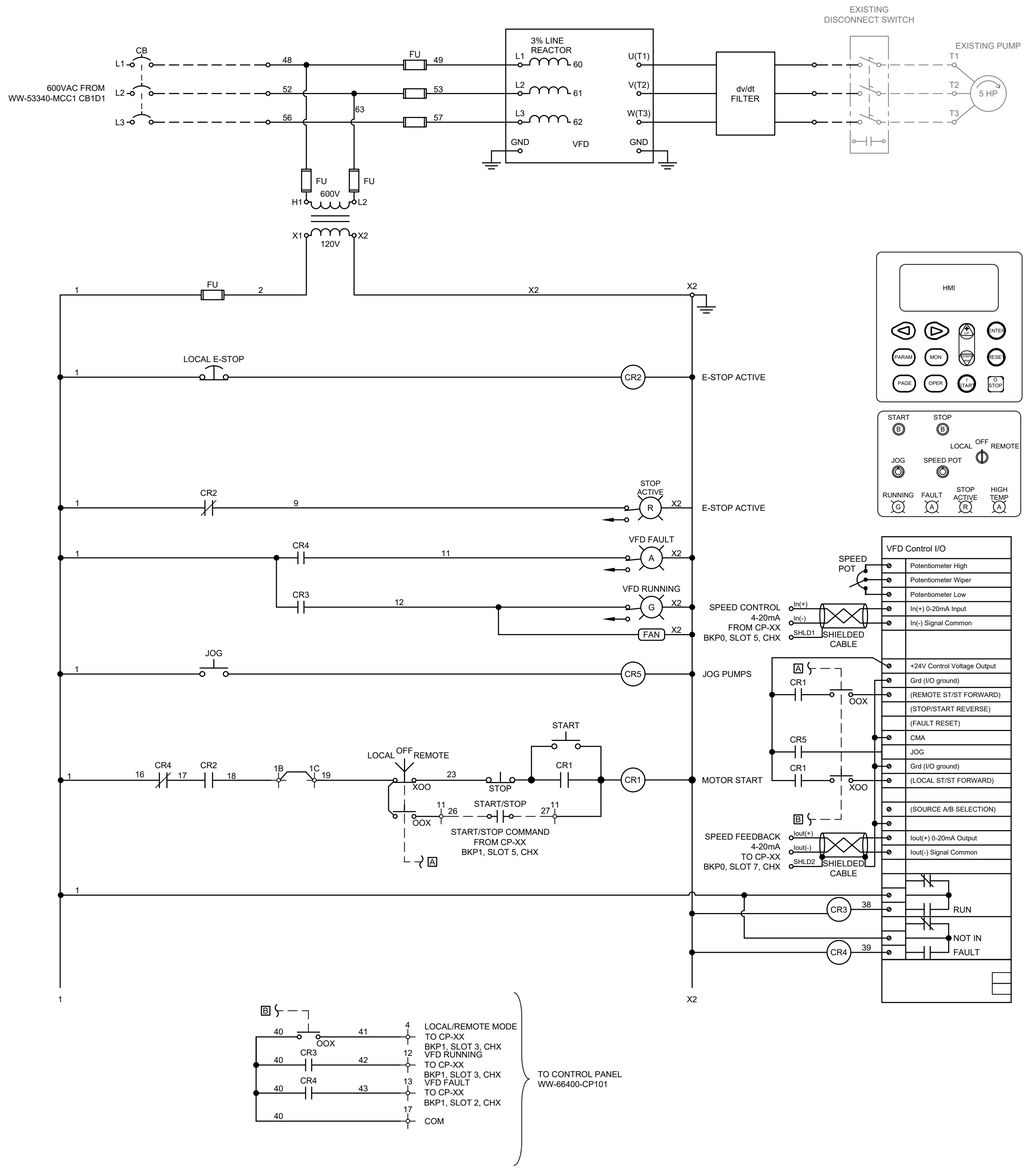
Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT SPP BASEMENT CABLE TRAY AND CONDUIT ROUTES**

Bruce Power Sheet No.
**NK37-DRAW-53000-10051**

Sheet No.
**E-103**

Sheet 22 of 44




## TYPICAL VFD CONTROLLED PUMP WIRING SCHEMATIC

TYPICAL OF:

- SEWAGE WASTEWATER PUMPS WW-79610-P1, WW-79610-P2, WW-79610-P3

ISSUED FOR RFP

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| A | 50% OF 100% REVIEW | MT | CE | 07/05/19 |

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|---|---|---|---|
| Drawn | **M. TUPPER** | Designer | **M. TUPPER** |
| Drafting Check | **B. PLETZ** | Design Check | **M. CADACIO** |
| Project Manager | **C. EVEREST** | Date | **07/05/19** |
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| Original Size | **ANSI D** | Bar is 20mm on original size drawing | 0 20mm |

Project No. **11185554-02**

Title

**SEWAGE PROCESSING PLANT MOTOR CONTROL SCHEMATICS (1 OF 2)**

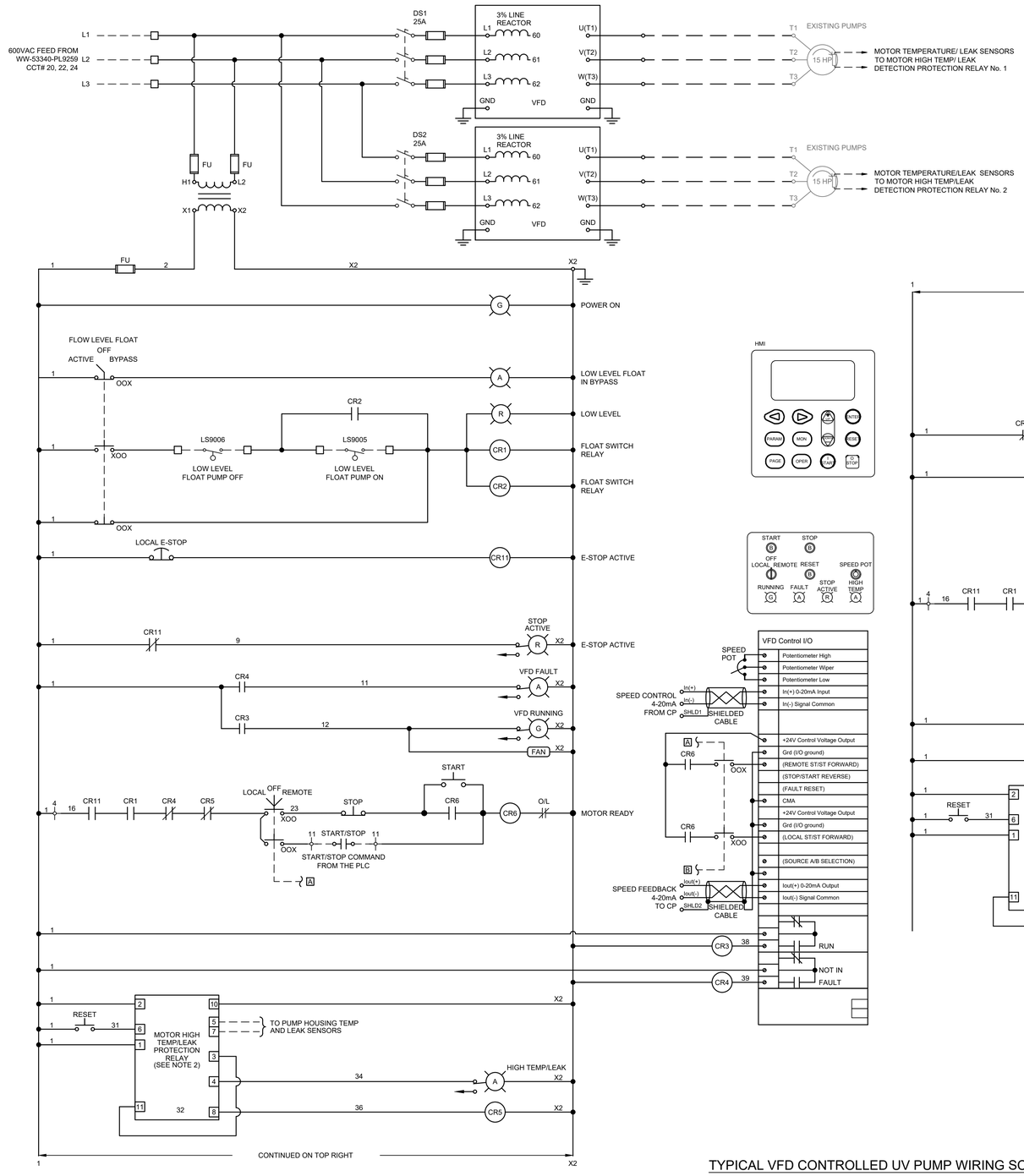
Bruce Power Sheet No.

**NK37-DRAW-53000-10053**

Sheet No.

**E-105**

Sheet **24** of **44**




NOTES:

1. EXISTING LOW LEVEL FLOATS
2. HIGH TEMP/LEAK DETECTOR SUPPLIED BY PUMP MANUFACTURER, INSTALLED BY MCC MANUFACTURER. MAKE REQUIRED MODIFICATIONS FOR APPROVED EQUIPMENT.

## TYPICAL VFD CONTROLLED UV PUMP WIRING SCHEMATIC

TYPICAL OF:

- UV PUMPS WW-79620-P039, WW-79620-P040

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| Drawn | **M. TUPPER** | Designer | **M. TUPPER** |
| Drafting Check | **B. PLETZ** | Design Check | **M. CADACIO** |
| Project Manager | **C. EVEREST** | Date | **07/05/19** |
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Project No. **11185554-02**

Title

**SEWAGE PROCESSING PLANT MOTOR CONTROL SCHEMATICS (2 OF 2)**

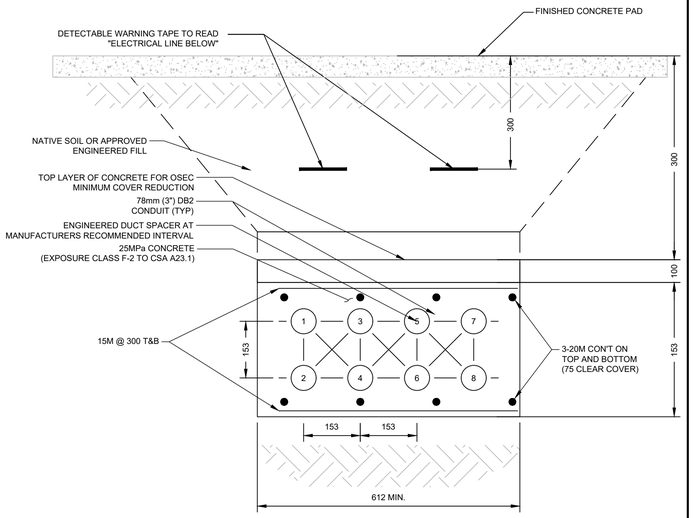
Bruce Power Sheet No.

**NK37-DRAW-53000-10054**

Sheet No.

**E-106**

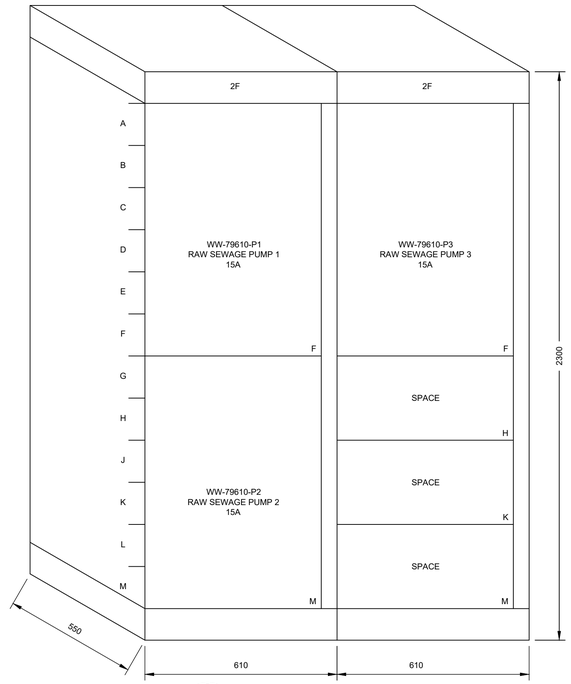
Sheet **25** of **44**




CABLE LEGEND:

1. 600-P-002
2. 600-P-003
3. 600-P-004
4. 120-P-001
5. CS-014
6. AS-001
7. 120-P-02
8. SPARE

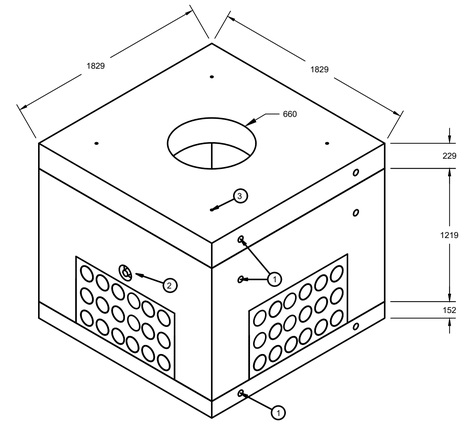
DETAIL 1 N.T.S. E-100 — WEST DUCT BANK ARRANGEMENT



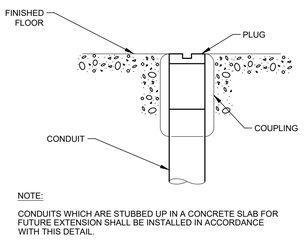

DETAIL 2 N.T.S. E-101 — NEW MCC SECTIONS ELEVATION VIEW

NOTES:

1. CONSTRUCTION PROPERTIES: 32MPa MINIMUM STRENGTH, 6-8% AIR ENTRAINMENT
2. CABLE ENTRY OPENINGS- PVC SEALS FOR 100 I.D. DUCT, 50mm LIFTING HOLES.
3. REINFORCING- STEEL TO CSA CAN A23.1
4. WEIGHT: WALLS - 6000LBS/2730kg (APPROX)
   LID - 3050 LBS/ 1385kg (APPROX)
   TOTAL - 9050 LBS/ 4115kg (APPROX)
5. LOADING AS PER CSA S6-06
6. UTILICON UA7272LHD OR APPROVED EQUIVALENT.
7. MANHOLE TO BE PLACED ON MIN. 400mm GRANULAR 'B' LEVELING SURFACE, COMPACTED TO 100% SPMDD
8. PROVIDE COVER AND OTHER ACCESORIES.



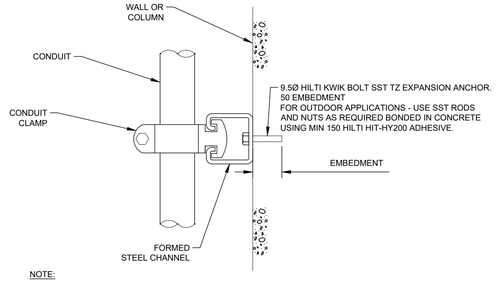

DETAIL 3 N.T.S. E-100 — PRECAST CONCRETE MANHOLE PULLING CHAMBER




NOTE:

CONDUITS WHICH ARE STUBBED UP IN A CONCRETE SLAB FOR FUTURE EXTENSION SHALL BE INSTALLED IN ACCORDANCE WITH THIS DETAIL.

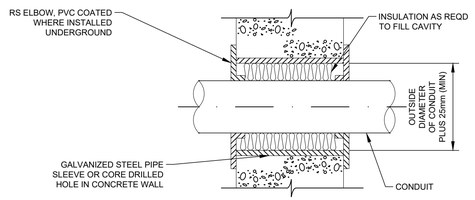
DETAIL 4 N.T.S. E-101 — FLUSH CONDUIT STUB




NOTE:

SUPPORT ALL EXPOSED CONDUITS ON FORMED STEEL CHANNELS.

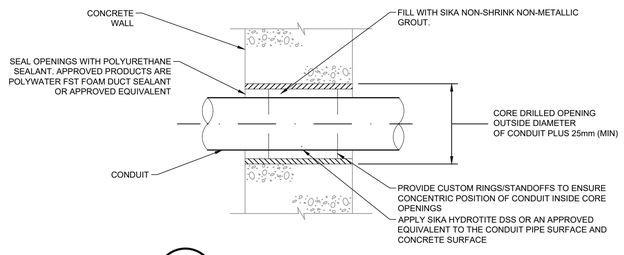
DETAIL 5 N.T.S. VARIOUS — CONDUIT SUPPORT ON STRUCTURE



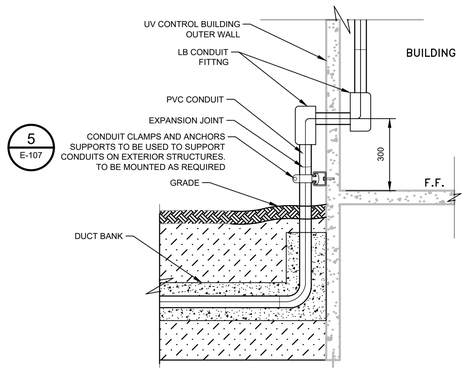

NOTE:

CONDUITS WHICH INDIVIDUALLY PASS THRU AN INTERIOR WALL SHALL BE INSTALLED IN ACCORDANCE WITH THIS DETAIL. IF WALL IS A FIRE WALL, FILL CAVITY WITH FIRE STOP SEALANT SPECIFIED.

DETAIL 6 N.T.S. VARIOUS — INTERIOR WALL PENETRATION




DETAIL 7 N.T.S. E-100 — OUTER WALL PENETRATION




DETAIL 8 N.T.S. E-100 — CONDUIT TRANSITION FROM BELOW GRADE TO BUILDING

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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

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| D | ISSUED FOR RFP | MT | CE | 02/07/20 |
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| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 — 20mm |

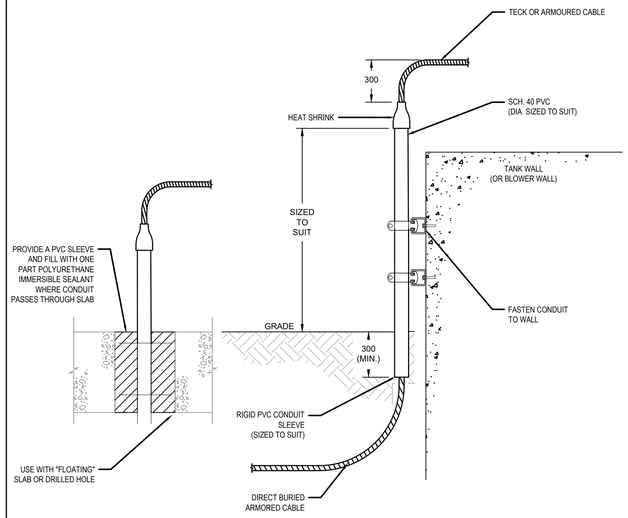
Project No. **11185554-01**

Title
**SEWAGE PROCESSING PLANT ELECTRICAL DETAILS (1 OF 4)**

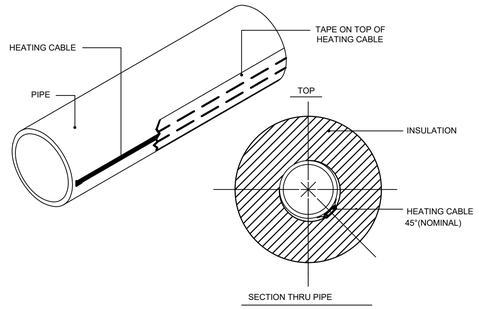
Bruce Power Sheet No.
**NK37-DRAW-53000-10055**

Sheet No.
**E-107**

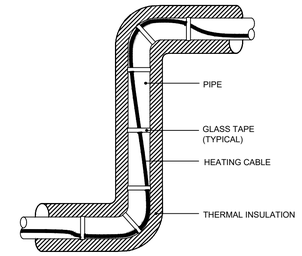
Sheet **26** of **44**



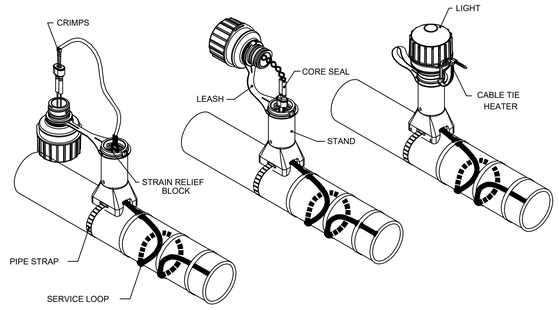

DETAIL 9 CONDUIT TRANSITION AND SUPPORT
N.T.S. E-100



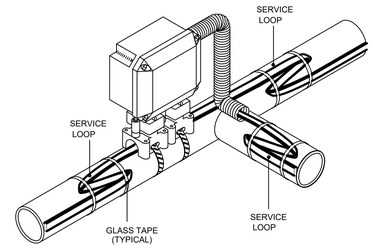

DETAIL 10 TYPICAL PLACEMENT OF TAPE OVER HEAT TRACING CABLE
N.T.S. E-100



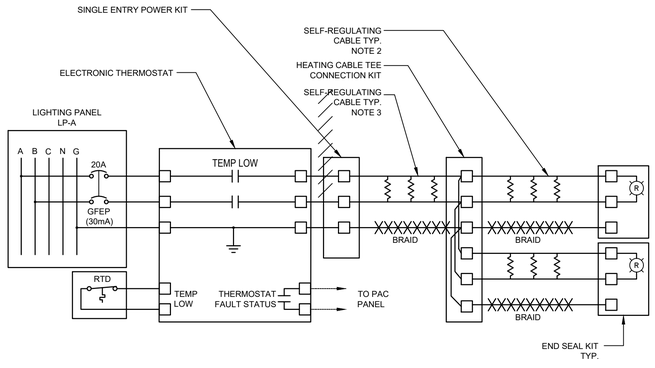

DETAIL 11 TYPICAL ELBOW INSTALLATION
N.T.S. E-100




DETAIL 12 TYPICAL HEAT TRACING END SEAL KIT
N.T.S. E-100



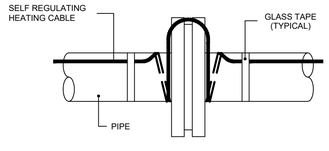

DETAIL 13 TYPICAL HEAT TRACING TEE KIT INSTALLATION
N.T.S. E-100




NOTES:

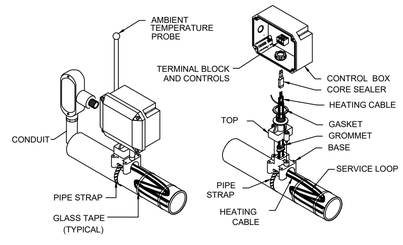
1. CIRCUIT BREAKER SIZE TO BE SIZED BASED ON REQUIREMENTS OF SPECIFIC HEAT TRACING CIRCUIT. AMP RATING AND NUMBER OF POLES SHALL BE SUBJECT TO CHANGE ON A CASE BY CASE BASES. REFER TO PANEL SCHEDULE ON E-03 FOR ADDITIONAL DETAILS.
2. HEAT TRACE CIRCUITS TO RAN AS REQUIRED
3. CABLE TO BE SIZED AS APPROPRIATE TO HANDLE FULL LOAD OF ALL CIRCUITS AND THEIR INRUSH CURRENT.

DETAIL 14 TYPICAL HEAT TRACING WIRING SCHEMATIC
N.T.S. E-100




TYPICAL HEAT TRACING ON FLANGE
N.T.S.

DETAIL 15 TYPICAL HEAT TRACING ON FLANGE
N.T.S. E-100




DETAIL 16 HEAT TRACING POWER CONNECTION KIT
N.T.S. E-100

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**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| D | ISSUED FOR RFP | MT | CE | 02/07/20 |
| C | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| B | 90% DESIGN REVIEW | MT | CE | 11/04/19 |
| A | 50% OF 100% REVIEW | MT | CE | 07/05/19 |

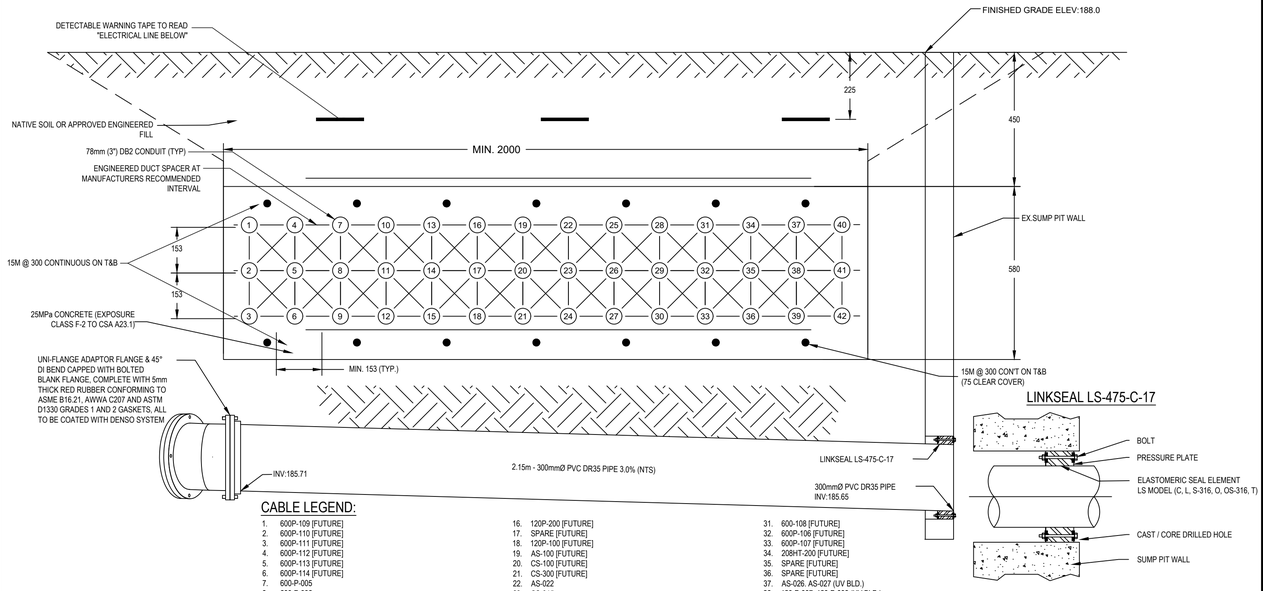
| | | | |
|---|---|---|---|
| Drawn | **M. TUPPER** | Designer | **L. MONSHIZADEH** |
| Drafting Check | **B. PLETZ** | Design Check | **M. CADACIO** |
| Project Manager | **C. EVEREST** | Date | **07/05/19** |
| This document shall not be used for construction unless signed and sealed for construction. | | Scale | **NTS** |
| Original Size **ANSI D** | | Bar is 20mm on original size drawing 0 20mm | |

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT ELECTRICAL DETAILS (2 OF 4)**

Bruce Power Sheet No.
**NK37-DRAW-53000-10056**

Sheet No.
**E-108**
Sheet **27** of **44**



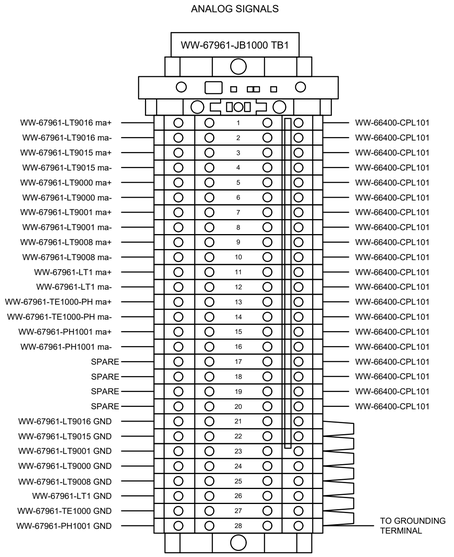

## CABLE LEGEND:

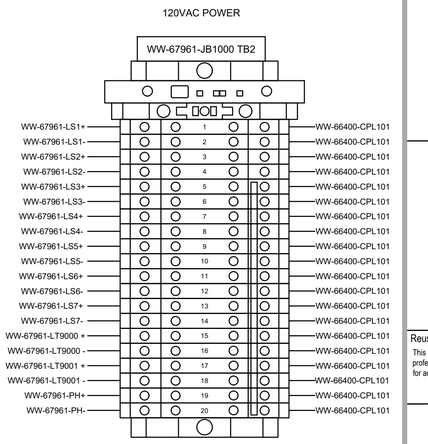
1. 600P-109 [FUTURE]
2. 600P-110 [FUTURE]
3. 600P-111 [FUTURE]
4. 600P-112 [FUTURE]
5. 600P-113 [FUTURE]
6. 600P-114 [FUTURE]
7. 600-P-005
8. 600-P-006
9. 600-P-007
10. 600-P-008
11. 208HT-100 [FUTURE]
12. 600P-102 [FUTURE]
13. 600P-103 [FUTURE]
14. 600P-104 [FUTURE]
15. 600P-105 [FUTURE]
16. 120P-200 [FUTURE]
17. SPARE [FUTURE]
18. 120P-100 [FUTURE]
19. AS-100 [FUTURE]
20. CS-100 [FUTURE]
21. CS-300 [FUTURE]
22. AS-022
23. CS-015
24. 120-P006
25. 600P-119 [FUTURE]
26. 600P-120 [FUTURE]
27. 600P-115 [FUTURE]
28. 600P-116 [FUTURE]
29. 600P-117 [FUTURE]
30. 120LP [FUTURE]
31. 600-108 [FUTURE]
32. 600P-106 [FUTURE]
33. 600P-107 [FUTURE]
34. 208HT-200 [FUTURE]
35. SPARE [FUTURE]
36. SPARE [FUTURE]
37. AS-026, AS-027 (UV BLD.)
38. 120-P-007, 120-P-008 (UV BLD.)
39. AS-002,AS-003 (UV BLD.)
40. CS-027, CS-028 BETWEEN CONTROL BUILDING AND UV BUILDING; 120-P-015 AND 120-P-016 BETWEEN UV BUILDING AND MARSHALLING PANEL
41. SPARE (UV BLD.)
42. COM-005(UV BLD.)

NOTES:

1. CONDUITS 1 - 6 RUN BETWEEN THE CONTROL BUILDING AND THE EAST/WEST RAS/WAS PUMPS DISCONNECT STAND. CONDUITS 7 - 11 RUN BETWEEN THE CONTROL BUILDING AND THE MOTORIZED VALVE DISCONNECT STAND. CONDUITS 12-16 RUN BETWEEN THE CONTROL BUILDING AND THE BLOWER DISCONNECT STAND.
2. CONDUITS 17 - 36 RUNS BETWEEN THE CONTROL BUILDING AND ELECTRICAL MANHOLE.
3. CONDUITS 17 - 24 RUNS BETWEEN THE CONTROL BUILDING AND MARSHALLING PANEL VIA ELECTRICAL MANHOLE.
4. CONDUITS 37 - 42 RUNS BETWEEN THE CONTROL BUILDING AND THE UV BUILDING.

DETAIL 17 (E-100) — EAST DUCT BANK ARRANGEMENT
N.T.S.

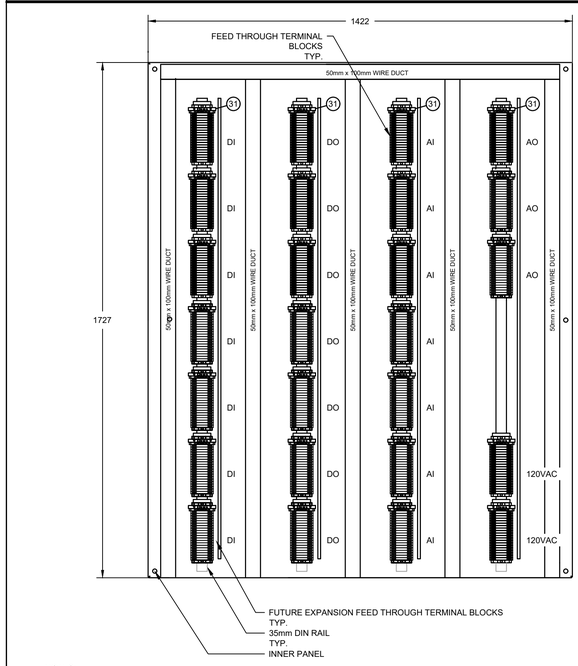


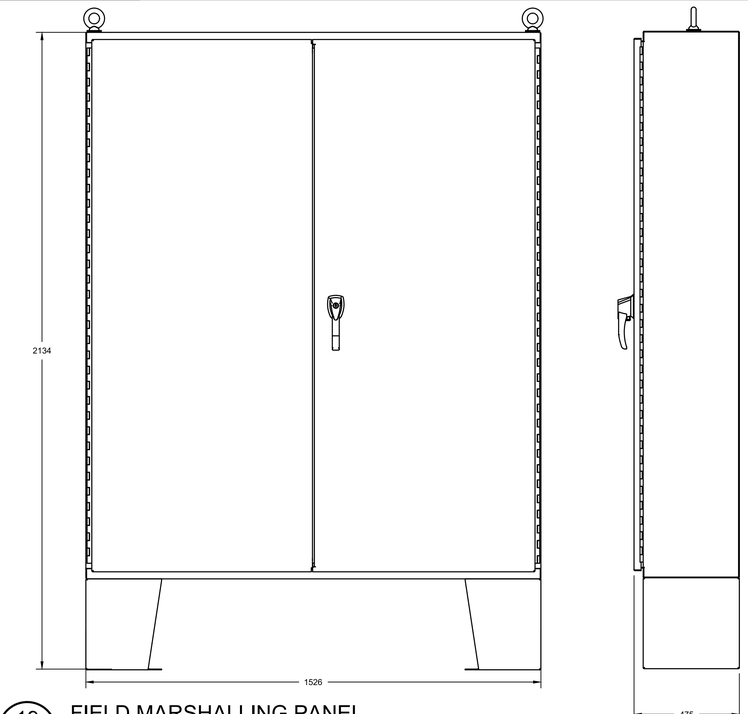




NOTES:

1. THE SECOND 4-20mA OUTPUT OF PH1001 TRANSMITTER SHALL BE USED AND CONFIGURED FOR WW-67961-TE1000, AS AN ANALOG SIGNAL INPUT TO MASTER PLC.
2. WW-67961-TE1000 SHALL BE CONNECTED TO PH1001 AS AN INPUT.REFER TO VENDOR CATALOGUE FOR CONNECTION.

DETAIL 18 (E-100) — WW-67961-JB1000 JUNCTION BOX TERMINATIONS
N.T.S.

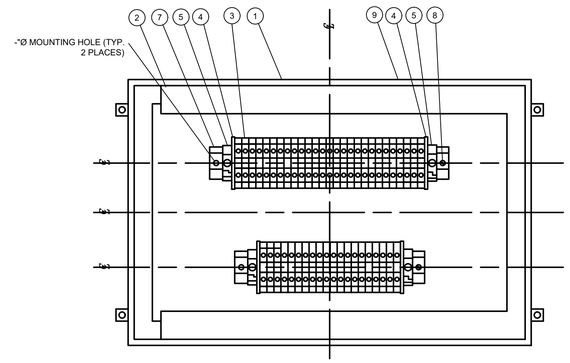



NOTES:

1. FREE STANDING, NEMA TYPE 4X ENCLOSURE. ENCLOSURE TO BE MOUNTED FREESTANDING IN THE FIELD WITH ASSOCIATE CABLING TRANSITIONING TO DUCT BANKS BELOW. REFER TO SPECIFICATION 16160 ARTICLE 2.4 FOR ADDITIONAL DETAILS OF ENCLOSURES.
2. REFER TO THE BOM ON DRAWING NK37-DRAW-53000-10059 FOR ITEMS AND ASSOCIATED DESCRIPTIONS.
3. REFER TO DRAWING E-100 DETAIL A FOR SLAB MOUNTING DETAILS.

DETAIL 19 (E-100) — FIELD MARSHALLING PANEL WW-67961-PL100
N.T.S.




| ITEM | DESCRIPTION | QTY. |
|---|---|---|
| 1 | ENCLOSURE, NEMA 4X, HINGED COVER, LOCKABLE. 406 W x 356 H x 254 D | 1 |
| 2 | MOUNTING PANEL, WHITE | 1 |
| 3 | 600V, 22-12 AWG FEED THRU TERMINAL BLOCKS | A/R |
| 4 | END SECTION | A/R |
| 5 | END BRACKET | A/R |
| 6 | MARKING STRIP | A/R |
| 7 | DIN RAIL | AR |
| 8 | MACHINE SCREW, 10-32 x 1/2", SELF TAPPING, S.S. | A/R |
| 9 | WIREWAY | A/R |
| 9 | WIREWAY | A/R |

DETAIL 20 (E-100) — WW-67961-JB1000 JUNCTION BOX LAYOUT
N.T.S.

ISSUED FOR RFP **DRAFT**

GHD Limited
455 Phillip Street
Waterloo Ontario N2L 3X2 Canada
**T** 519 884 0510 **F** 519 884 0525 **W** www.ghd.com

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Client
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**177 TIE ROAD, TIVERTON, ON**

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| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 — 20mm |

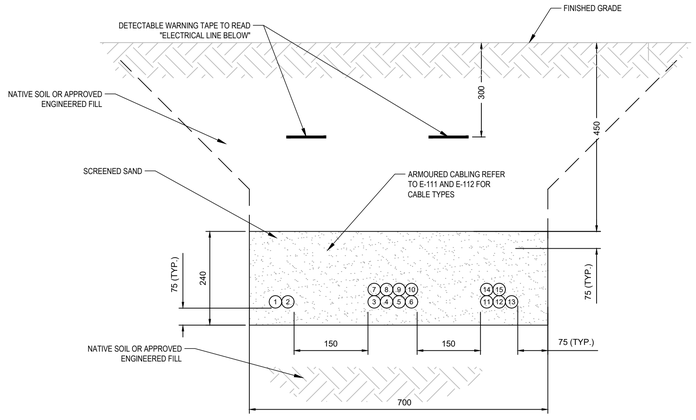
Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT ELECTRICAL DETAILS (3 OF 4)**

Bruce Power Sheet No.
**NK37-DRAW-53000-10080**

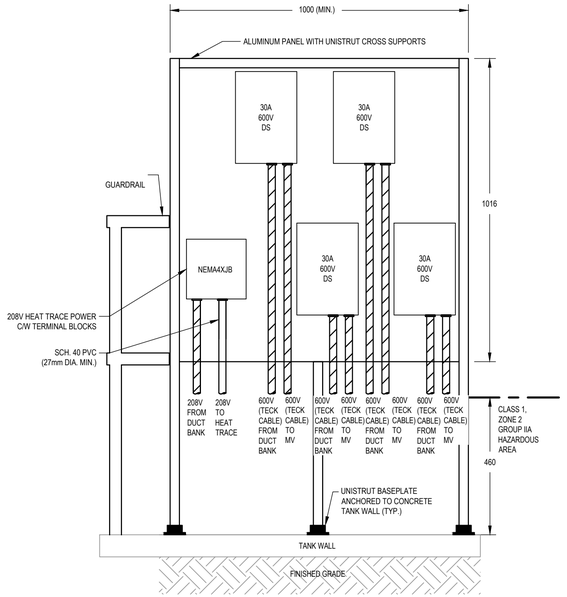
Sheet No.
**E-109**

Sheet **28** of **44**




1. 120-P-002
2. 120-P-014
3. CS-036
4. CS-037
5. CS-038
6. CS-039
7. CS-003
8. CS-004
9. CS-005
10. CS-006
11. AS-013
12. AS-014
13. AS-015
14. AS-016
15. AS-020

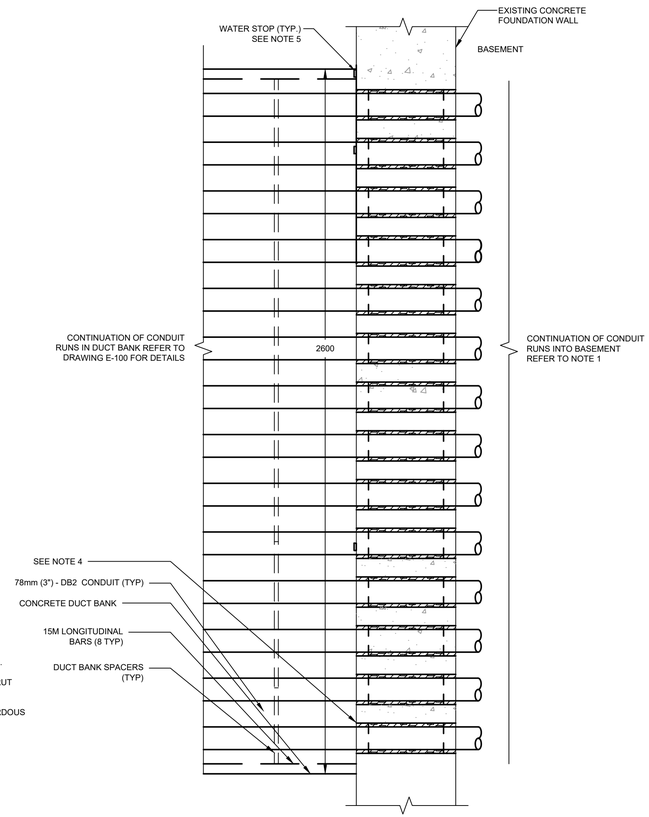
DETAIL N.T.S. 22 E-103 DIRECT BURIED CABLES FROM MARSHALLING PANEL AND MANHOLE



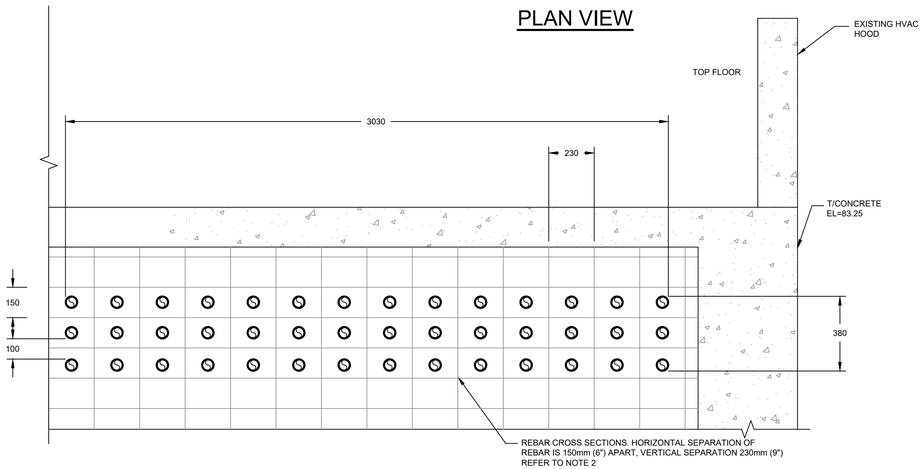

NOTES:

1. CONTRACTOR TO DESIGN AND FASTEN UNISTRUT STRUCTURE TO EXISTING SETTLING TANK, DO NOT MOUNT ON GUARDRAIL.
2. CONTRACTOR SHALL SUBMIT BRACKET, MOUNTING, BASEPLATE, UNISTRUT, ANCHORS AND FASTENING DETAILS FOR UNISTRUT STRUCTURE TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION
3. THE BOTTOM OF THE LOWEST MOUNTED DISCONNECT SWITCH OR JUNCTION BOX SHALL BE 250mm (MIN.) ABOVE THE HAZARDOUS AREA

DETAIL N.T.S. 23 E-100 MOTORIZED VALVE UNISTRUT STRUCTURE



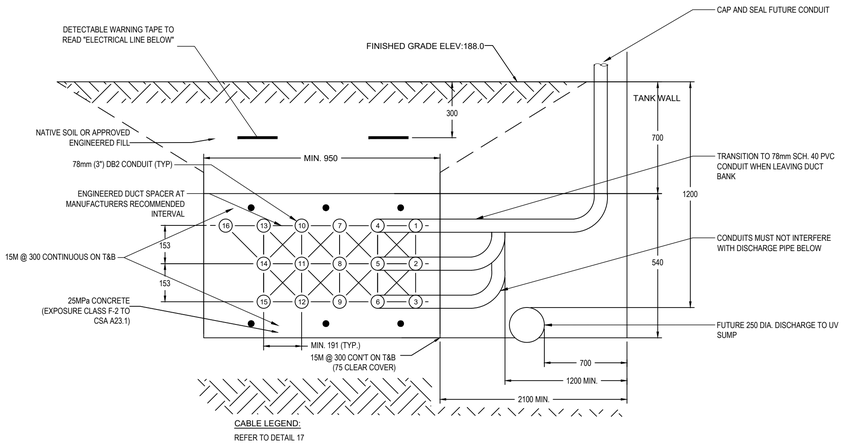

PLAN VIEW




DETAIL N.T.S. 21 E-100 EAST & WEST FOUNDATION WALL PENETRATIONS

NOTES:

1. CONDUIT RUNS TO CONTINUE ON TO MCC AND MASTER CONTROL PANEL AS SPECIFIED ON THE DRAWINGS E-103 AND E-111. ALL CONDUITS FOR NORTH TRAIN EXPANSION AND DESIGNATED SPARES SHALL BE CAPPED UNTIL SUCH TIME THAT THEY ARE UTILIZED.
2. X-RAY AREA TO LOCATE EXISTING REBAR. ALLOW FOR ADJUSTMENTS BASED ON FINDINGS FROM X-RAY PHOTOGRAPHY. CORE DRILL OPENINGS FOR PVC CONDUIT AT PRECISE LOCATIONS
3. SHOWN DETAIL IS FOR THE EAST WALL PENETRATION . WEST WALL PENETRATION HAS IDENTICAL REBAR SEPARATION. WALL PENETRATION ON THE WEST WALL SHALL FOLLOW A SIMILAR INSTALLATION LAYOUT
4. DUCT BANK TO BE POURED TO BE FLUSHED AGAINST THE FOUNDATION WALL. DUCT BANK REBAR TO BE DOWELED INTO EXTERIOR WALLS.
5. WATER STOP TO BE OF A SYNTHETIC RUBBER WATERSTOP THAT SWELLS UP TO 1000% OF ITS ORIGINAL VOLUME TO SEAL CONSTRUCTION JOINTS. KRYTONITE SWELLING WATERSTOP OR AN APPROVED EQUIVALENT PRODUCT SHALL BE USED. INSTALLATION SHALL FOLLOW MANUFACTURERS INSTRUCTIONS.
6. CONDUITS TO BE FIELD BENT TO ACHIEVE ANGLES FOR WALL PENETRATIONS.




CABLE LEGEND:
REFER TO DETAIL 17

DETAIL N.T.S. 24 E-100 EAST DUCT BANK BRANCH

GHD Limited
455 Phillip Street
Waterloo Ontario N2L 3X2 Canada
**T** 519 884 0510 **F** 519 884 0525 **W** www.ghd.com

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Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

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| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 20mm |

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT ELECTRICAL DETAILS (4 OF 4)**

Bruce Power Sheet No.
**NK37-DRAW-53000-10081**

Sheet No.
**E-110**

Sheet **29** of **44**

ISSUED FOR RFP **DRAFT**

## Control Cables

| EQ Tag / Inst Tag | Description | From | Signal Type | Cable Type | Cable tag | Dwg # | Comment | TO |
|---|---|---|---|---|---|---|---|---|
| WW_67961_LIT9000, 9001, PH1001 | East Train RAS/WAS Pumps Outlet Flow | WW_67961_JB1000 | Power 120 VAC | 14C # 12 AWG Teck Cable | 120-P-001 | E-109 | Plant | Master PLC, WW_66400_CPL101 |
| WW_67961_PH1001-HTR, DOs | Equalization Tank PH-HTR , DO1001 &1003 | WW-53540-JB100 | Power 120 VAC | 14C# 12 AWG TECK 90 | 120-P-002 | NK3-DRAW-76961-10001 | (POWER FOR DOX1001, DOX1003 and PH HEATER ) | Master PLC, WW_66400_CPL101 |
| WW_67961_PH1001-HTR | Equalization Tank PH-HTR | WW_67961_PH1001-HTR | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-003 | NK3-DRAW-76961-10001 | (POWER FOR PH1001-HTR) | WW-53540-JB100 |
| WW_67961_DO1001 | Dissolved Oxy. Tank 3 | WW_67961_DO1001 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-004 | E-100 | POWER FOR DOX1001 | WW-53540-JB100 |
| WW_67961_DO1003 | Dissolved Oxy. Tank 4 | WW_67961_DO1003 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-005 | E-100 | POWER FOR DOX1003 | WW-53540-JB100 |
| WW-67961-PL100 | New Marshalling Cabient East, WW-67961-PL100 | WW-67961-PL100 | Power 120 VAC | 50C# 12 AWG TECK 90 | 120-P-006 | E-109 | Plant | Master PLC, WW_66400_CPL101 |
| BS_ 67099_AIT001 | MISA PH Transmitter | BS_ 67099_AIT001 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-007 | E-102 | UV Building | Master PLC, WW_66400_CPL101 |
| BS_ 67099_CIT001 | MISA Conductivity Transmitter | BS_ 67099_CIT001 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-008 | E-102 | UV Building | Master PLC, WW_66400_CPL101 |
| WW_67961_LIT9000 | East Train RAS/WAS Pumps Outlet Flow | WW_67961_LIT9000 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-009 | E-109 | Plant | WW_67961_JB1000 |
| WW_67961_LIT9001 | West Train RAS/WAS Pumps Outlet Flow | WW_67961_LIT9001 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-010 | E-109 | Plant | WW_67961_JB1000 |
| WW_67961_PH1001 | Equalization Tank PH | WW_67961_PH1001 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-011 | E-109 | Plant | WW_67961_JB1000 |
| WW_67966_LIT1001 | Chemical Alum Tank1 Level | WW_67966_LIT1001 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-012 | | Maybe not required and to be loop-powered | Master PLC, WW_66400_CPL101 |
| WW_67966_LIT1002 | Chemical Alum Tank2 Level | WW_67966_LIT1002 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-013 | | Maybe not required and to be loop-powered | Master PLC, WW_66400_CPL101 |
| WW_67961_FT1000 | Inlet Flow rate to SPP | WW_67961_FT1000 | Power 120 VAC | 2C# 12 AWG TECK 90 | 120-P-014 | | | New Marshalling Cabient East, WW-67961-PL100 |
| WW_67961_LT1, LIT9000, 9001, PH100 | Equalization Tank Level Indication (2WIRE TRANSMITTER) 24 VDC | WW_67961_JB1000 | 4-20mA | 16 pair twisted pair ACIC | AS-001 | E-109 | Loop powered signal | Master PLC, WW_66400_CPL101 |
| BS_ 67099_AIT001 | MISA PH Transmitter | BS_ 67099_AIT001 | 4-20mA | 1 pair twisted pair ACIC | AS-002 | E-102 | UV Building | Master PLC, WW_66400_CPL101 |
| BS_ 67099_CIT001 | MISA Conductivity Transmitter | BS_ 67099_CIT001 | 4-20mA | 1 pair twisted pair ACIC | AS-003 | E-102 | UV Building | Master PLC, WW_66400_CPL101 |
| WW_67961_LT1 | Equalization Tank Level Indication (2WIRE TRANSMITTER) 24 VDC | WW_67961_LT1 | 4-20mA | 1 pair twisted pair ACIC | AS-004 | E-109 | Plant, may use existing cable | WW_67961_JB1000 |
| WW_67961_LIT9000 | East Train RAS/WAS Pumps Outlet Flow | WW_67961_LIT9000 | 4-20mA | 1 pair twisted pair ACIC | AS-005 | E-109 | Plant | WW_67961_JB1000 |
| WW_67961_LIT9001 | West Train RAS/WAS Pumps Outlet Flow | WW_67961_LIT9001 | 4-20mA | 1 pair twisted pair ACIC | AS-006 | E-109 | Plant | WW_67961_JB1000 |
| WW_67961_PH1001 | Equalization Tank PH | WW_67961_PH1001 | 4-20mA | 2 pair twisted pair ACIC | AS-007 | E-109 | Plant, may use existing cable | WW_67961_JB1000 |
| WW_67961_LT9008 | Dewatering Well Level Transmitter | WW_67961_LT9008 | 4-20mA | 1 pair twisted pair ACIC | AS-008 | E-109 | Plant, may use existing cable | WW_67961_JB1000 |
| WW_67961_LT9015 | Tank 9 Level Transmitter | WW_67961_LT9015 | 4-20mA | 1 pair twisted pair ACIC | AS-009 | E-109 | Plant, may use existing cable | WW_67961_JB1000 |
| WW_67961_LT9016 | Tank 10 Level Transmitter | WW_67961_LT9016 | 4-20mA | 1 pair twisted pair ACIC | AS-010 | E-109 | Plant, may use existing cable | WW_67961_JB1000 |
| WW_67966_LIT1001 | Chemical Alum Tank1 Level | WW_67966_LIT1001 | 4-20mA | 1 pair twisted pair ACIC | AS-011 | NK3-DRAW-79660-FS1 | Basement | Master PLC, WW_66400_CPL101 |
| WW_67966_LIT1002 | Chemical Alum Tank2 Level | WW_67966_LIT1002 | 4-20mA | 1 pair twisted pair ACIC | AS-012 | NK3-DRAW-79660-FS1 | Basement | Master PLC, WW_66400_CPL101 |
| WW_67961_DOT1001 | Dissolved Oxy. Tank 3 | WW_67961_DOT1001 | 4-20mA | 1 pair twisted pair ACIC | AS-013 | E-100 | | New Marshalling Cabient East, WW-67961-PL100 |
| WW_67961_DOT1003 | Dissolved Oxy. Tank 4 | WW_67961_DOT1003 | 4-20mA | 1 pair twisted pair ACIC | AS-014 | E-100 | | New Marshalling Cabient East, WW-67961-PL100 |
| WW_67961_LT9013 | Tank 7 Level Transmitter | WW_67961_LT9013 | 4-20mA | 1 pair twisted pair ACIC | AS-015 | NK3-DDE-53000-0103 | Loop pwered signal, Locted in Plant | New Marshalling Cabient East, WW-67961-PL100 |
| WW_67961_LT9014 | Tank 8 Level Transmitter | WW_67961_LT9014 | 4-20mA | 1 pair twisted pair ACIC | AS-016 | NK3-DDE-53000-0103 | Loop pwered signal, Locted in Plant | New Marshalling Cabient East, WW-67961-PL100 |
| WW_67963_FT1 | Air Flow to EQ. Tank | WW_67963_FT1 | 4-20mA | 1 pair twisted pair ACIC | AS-017 | NK3-WW-0-79630-FS1 & NK37-D3S-67960-9510 | Loop pwered signal, Main Floor | Master PLC, WW_66400_CPL101 |
| WW_67963_FT2 | Air Flow to West Train | WW_67963_FT2 | 4-20mA | 1 pair twisted pair ACIC | AS-018 | NK3-WW-0-79630-FS1 & NK37-D3S-67960-9510 | Loop pwered signal, Main Floor | Master PLC, WW_66400_CPL101 |
| WW_67963_FT3 | Air Flow to East Train | WW_67963_FT3 | 4-20mA | 1 pair twisted pair ACIC | AS-019 | NK3-WW-0-79630-FS1 & NK37-D3S-67960-9510 | Loop pwered signal, Main Floor | Master PLC, WW_66400_CPL101 |
| WW_67961_FT1000 | Inlet Flow rate to SPP | WW_67961_FT1000 | 4-20mA | 1 pair twisted pair ACIC | AS-020 | | | New Marshalling Cabient East, WW-67961-PL100 |
| WW_67170_LIT1000 | Basement Sump Level Transmitter | WW_67170_LIT1000 | 4-20mA | 1 pair twisted pair ACIC | AS-021 | NK3-WW-0-71700-FS1& NK37-D3S-67960-9508 | Loop powered signal, located in basement | Master PLC, WW_66400_CPL101 |
| New Marshalling Cabient East, WW | New Marshalling Cabient East,WW-67961-PL100 | New Marshalling Cabient East, WW-67961-PL100 | 4-20mA | 24 pair twisted pair ACIC | AS-022 | E-109 | | Master PLC, WW_66400_CPL101 |
| WW_79610_P1 | Raw Wastewater P1 | VFD-CELL1 | 4-20mA | 2 pair twisted pair ACIC | AS-023 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_P2 | Raw Wastewater P2 | VFD-CELL2 | 4-20mA | 2 pair twisted pair ACIC | AS-024 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_P3 | Raw Wastewater P3 | VFD-CELL3 | 4-20mA | 2 pair twisted pair ACIC | AS-025 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79640_P01 | MISA Sampling Pump1 | VFD-SKID MOUNT | 4-20mA | 2 pair twisted pair ACIC | AS-026 | | UV Building | Master PLC, WW_66400_CPL101 |
| WW_79640_P02 | MISA Sampling Pump2 | VFD-SKID MOUNT | 4-20mA | 2 pair twisted pair ACIC | AS-027 | | UV Building | Master PLC, WW_66400_CPL101 |
| WW_67099_LSH01 | MISA Pot High Level | WW_67099_LSH01 | Control Signal | 2C # 14AWG Teck Cable | CS-001 | E-102 | | Master PLC, WW_66400_CPL101 |
| WW_67964_FSL01 | MISA Flow Switch | WW_67964_FSL01 | Control Signal | 2C # 14AWG Teck Cable | CS-002 | E-102 | | Master PLC, WW_66400_CPL101 |
| WW_67961_LS9 | West Digester Stage Level Switch | WW_67961_LS9_LAH | Control Signal | 2C # 14AWG Teck Cable | CS-003 | NK3-DDE-53000-0103 | Plant | New Marshalling Cabient East, WW-67961-PL100 |
| WW_67961_LS10 | East Digester Stage Level Switch | WW_67961_LS10_LAH | Control Signal | 2C # 14AWG Teck Cable | CS-004 | NK3-DDE-53000-0103 | Plant | New Marshalling Cabient East, WW-67961-PL100 |
| | West Sludge return piping Heat Tracing Controller General Fault | _XA | Control Signal | 2C # 14AWG Teck Cable | CS-005 | NK3-DDE-53000-0103 | Plant | New Marshalling Cabient East, WW-67961-PL100 |
| | East Sludge return piping Heat Tracing Controller General Fault | _XA | Control Signal | 2C # 14AWG Teck Cable | CS-006 | NK3-DDE-53000-0103 | Plant | New Marshalling Cabient East, WW-67961-PL100 |
| WW_67961_LS1 | Equalization Tank LS1 | WW_67961_LS1 | Control Signal | 2C # 14AWG Teck Cable | CS-007 | E-109 | Plant, may use exisiting cable | WW_67961_JB1000 |
| WW_67961_LS2 | Equalization Tank LS2 | WW_67961_LS2 | Control Signal | 2C # 14AWG Teck Cable | CS-008 | E-109 | Plant, may use exisiting cable | WW_67961_JB1000 |
| WW_67961_LS3 | Equalization Tank LS3 | WW_67961_LS3 | Control Signal | 2C # 14AWG Teck Cable | CS-009 | E-109 | Plant, may use exisiting cable | WW_67961_JB1000 |
| WW_67961_LS4 | Equalization Tank LS4 | WW_67961_LS4 | Control Signal | 2C # 14AWG Teck Cable | CS-010 | E-109 | Plant, may use exisiting cable | WW_67961_JB1000 |
| WW_67961_LS5 | Equalization Tank LS5 | WW_67961_LS5 | Control Signal | 2C # 14AWG Teck Cable | CS-011 | E-109 | Plant, may use exisiting cable | WW_67961_JB1000 |
| WW_67961_LS6 | Equalization Tank LS6 | WW_67961_LS6 | Control Signal | 2C # 14AWG Teck Cable | CS-012 | E-109 | Plant, may use exisiting cable | WW_67961_JB1000 |
| WW_67961_LS7 | Equalization Tank LS7 | WW_67961_LS7 | Control Signal | 2C # 14AWG Teck Cable | CS-013 | E-109 | Plant, may use exisiting cable | WW_67961_JB1000 |
| WW_67961_LS1,2,3,4,5,6,7 | Equalization Tank LSs | WW_67961_JB1000 | Control Signal | 15C #14 AWG Teck Cable | CS-014 | E-109 | Plant | Master PLC, WW_66400_CPL101 |
| | | New Marshalling Cabient East, WW-67961-PL100 | Control Signal | 50C # 14AWG Teck Cable | CS-015 | | | Master PLC, WW_66400_CPL101 |
| WW_67170_LS1000 | Base Sum High Level | WW_67170_LS1000 | Control Signal | 2C # 14AWG Teck Cable | CS-016 | NK3-WW-0-71700-FS1 | Basement | Master PLC, WW_66400_CPL101 |
| WW_79610_P1 | Raw Wastewater P1 | VFD-CELL1 | Control Signal | 12C # 14AWG Teck Cable | CS-017 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_P2 | Raw Wastewater P2 | VFD-CELL2 | Control Signal | 12C # 14AWG Teck Cable | CS-018 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_P3 | Raw Wastewater P3 | VFD-CELL3 | Control Signal | 12C # 14AWG Teck Cable | CS-019 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79630_CP1 | Blower CP1 | MCC Section-Breaker CB1F1 | Control Signal | 10C # 14AWG Teck Cable | CS-020 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79630_CP2 | Blower CP2 | MCC Section-Breaker CB1F2 | Control Signal | 10C # 14AWG Teck Cable | CS-021 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79630_CP3 | Blower CP3 | MCC Section-Breaker CB1F3 | Control Signal | 10C # 14AWG Teck Cable | CS-022 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_CMT1 | Comminutor CMT1 | MCC Section-Breaker CB1D4 | Control Signal | 10C # 14AWG Teck Cable | CS-023 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_CMT2 | Comminutor CMT2 | MCC Section-Breaker CB1D5 | Control Signal | 10C # 14AWG Teck Cable | CS-024 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79640_P01 | MISA Sampling Pump1 | VFD-SKID MOUNT | Control Signal | 10C # 14AWG Teck Cable | CS-027 | | UV Building | Master PLC, WW_66400_CPL101 |
| WW_79640_P02 | MISA Sampling Pump2 | VFD-SKID MOUNT | Control Signal | 10C # 14AWG Teck Cable | CS-028 | | UV Building | Master PLC, WW_66400_CPL101 |
| WW_79660_P1 | Alum P1 | WW_79660_P1 | Control Signal | 5C # 14AWG Teck Cable | CS-029 | | Basement | Master PLC, WW_66400_CPL101 |
| WW_79660_P2 | Alum P2 | WW_79660_P2 | Control Signal | 5C # 14AWG Teck Cable | CS-030 | | Basement | Master PLC, WW_66400_CPL101 |
| WW_79650_P1000 | Polymer Pump | PL1000 | Control Signal | 5C # 14AWG Teck Cable | CS-031 | | Basement | Master PLC, WW_66400_CPL101 |
| WW_79610_CNV1 | West Settlig Tank | MCC Section-Breaker CB1E5 | Control Signal | 7C # 14AWG Teck Cable | CS-032 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_CNV2 | East Settlig Tank | MCC Section-Breaker CB1E6 | Control Signal | 7C # 14AWG Teck Cable | CS-033 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_P4 | Dewatering P4 | MCC Section-Breaker CB1A5 | Control Signal | 10C # 14AWG Teck Cable | CS-034 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_P5 | Dewatering P5 | MCC Section-Breaker CB1E4 | Control Signal | 10C # 14AWG Teck Cable | CS-035 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_79610_MV11 | West Train WAS Motorized Valve1 | WW_79610_MV11 | Control Signal | 12C # 14AWG Teck Cable | CS-036 | | WW_79610_MV11 | New Marshalling Cabient East, WW-67961-PL100 |
| WW_79610_MV12 | West Train WAS Motorized Valve2 | WW_79610_MV12 | Control Signal | 12C # 14AWG Teck Cable | CS-037 | | WW_79610_MV12 | New Marshalling Cabient East, WW-67961-PL100 |
| WW_79610_MV13 | West Train WAS Motorized Valve1 | WW_79610_MV13 | Control Signal | 12C # 14AWG Teck Cable | CS-038 | | WW_79610_MV13 | New Marshalling Cabient East, WW-67961-PL100 |
| WW_79610_MV14 | West Train WAS Motorized Valve2 | WW_79610_MV14 | Control Signal | 12C # 14AWG Teck Cable | CS-039 | | WW_79610_MV14 | New Marshalling Cabient East, WW-67961-PL100 |
| WW_71700_P1 | Basement Sump Pump 1 | MCC Section-Breaker CB1E2 | Control Signal | 10C # 14AWG Teck Cable | CS-040 | | Electrical Room | New Marshalling Cabient East, WW-67961-PL100 |
| WW_71700_P2 | Basement Sump Pump 2 | MCC Section-Breaker CB1E3 | Control Signal | 10C # 14AWG Teck Cable | CS-041 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_5330_T1 | Transformer1 | WW_5330_T1 | Control Signal | 5C # 14AWG Teck Cable | CS-042 | | Transformer | Master PLC, WW_66400_CPL101 |
| WW_55100_RF9000 | Battery Charger | WW_55100_RF9000 | Control Signal | 2C # 14AWG Teck Cable | CS-043 | | WW_55100_RF9000 | Master PLC, WW_66400_CPL101 |
| WW_5330_CB4A | Standby Supply Incinerator Bld. Trip | WW-6530-PL3 | Control Signal | 2C # 14AWG Teck Cable | CS-044 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_5330_CB5A, CB56, CB7A | MCC 5334MCC1 & 2 Trip | WW-6530-PL2 | Control Signal | 7C # 14AWG Teck Cable | CS-045 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_5330_BUA | BUA BKR Trip | | Control Signal | 2C # 14AWG Teck Cable | CS-046 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_5334_MCC1_XA | MCC1 UnderVoltage | MCC1-End Section | Control Signal | 2C # 14AWG Teck Cable | CS-047 | | Electrical Room | Master PLC, WW_66400_CPL101 |
| WW_66400_CPT1000_XA | Plant Computer Failure | WW_66400_CPT1000 | Control Signal | 2C # 14AWG Teck Cable | CS-048 | | Control Bulding | Master PLC, WW_66400_CPL101 |
| WW_FIELDPOWR_XA | Field Power Alarm | | Control Signal | 2C # 14AWG Teck Cable | CS-049 | | | Master PLC, WW_66400_CPL101 |
| WW-54600-DG1 | Generator Alarm Signals | WW-54600-DG1 | Control Signal | Existing cables | Existing cables | | Exiting cables shall be re-routed to new mater PLC from Annaciator Panel | Master PLC, WW_66400_CPL101 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| WW_67961_TE1000 | Equalization Tank TE | WW_67961_TE1000 | RTD Signal | Triad # 18 AWG twisted | TR-001 | | Will be connected to existing PH transmitter as an input | WW_67961_PH1001 |

NOTES:
1) ALL CONDUCTORS ARE COPPER(CU) UNLESS STATED OTHERWISE.
2) ALL ARMOURED CONTROL SIGNAL CABLES SHALL BE RATED FOR 600V.
3) ALL 208/120V POWER CABLES SHALL BE RATED FOR 600V.
4) ALL ARMOURED 4-20mA INSTRUMENTATION CABLES SHALL BE #16AWG AND RATED FOR 300V.

ISSUED FOR RFP

**DRAFT**

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Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| C | ISSUED FOR RFP | MT | CE | 02/07/20 |
| B | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| A | 90% DESIGN REVIEW | MT | CE | 11/04/19 |

| | | | |
|---|---|---|---|
| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
| This document shall not be used for construction unless signed and sealed for construction. | | Scale | NTS |

Original Size
**ANSI D**

Bar is 20mm on original size drawing
0 20mm

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT CONTROLS AND INSTRUMENTATION CABLE LIST**

Bruce Power Sheet No.
**NK37-DRAW-67960-10006**

Sheet No.
**E-111**

Sheet **30** of **44**

## Power Cables

| Tag | Description | From | Signal Type | Cable Type | Cable tag | Dwg # | Comment | TO |
|---|---|---|---|---|---|---|---|---|
| WW-53340-MCC01 | Sewage Pump 1, 2, and 3 | WW-53340-MCC01 CB1G5 | 600V Power | 3 #8 AWG RW90 + #10 BOND IN 53mm RMC | 600-P-001 | E-101 | Electrical Room | WW-53340-VFD1 |
| WW-53340-VFD1 | Sewage Pump 1 | WW-53340-VFD1 | 600V Power | 3C #12 AWG VFD Rated Armoured Cable | 600-P-002 | E-100, E-101, E-104 | Conduit run from electrical room to pump disconnects | WW-79610-P1 |
| WW-53340-VFD2 | Sewage Pump 2 | WW-53340-VFD2 | 600V Power | 3C #12 AWG VFD Rated Armoured Cable | 600-P-003 | E-100, E-101, E-104 | Conduit run from electrical room to pump disconnects | WW-79610-P2 |
| WW-53340-VFD3 | Sewage Pump 3 | WW-53340-VFD3 | 600V Power | 3C #12 AWG VFD Rated Armoured Cable | 600-P-004 | E-100, E-101, E-104 | Conduit run from electrical room to pump disconnects | WW-79610-P3 |
| WW-79610-MV11 | Sludge Wasting Control Valve MV-11 | WW-53340-MCC01 CB1B4 | 600V Power | 3C #12 TECK90 | 600-P-005 | E-100, E-101, E-104 | Conduit run from electrical room to local valve control panel. | WW-79610-MV11 |
| WW-79610-MV12 | Sludge Wasting Control Valve MV-12 | WW-53340-MCC01 CB1H1 | 600V Power | 3C #12 TECK90 | 600-P-006 | E-100, E-101, E-104 | Conduit run from electrical room to local valve control panel | WW-79610-MV12 |
| WW-79610-MV13 | Sludge Wasting Control Valve MV-13 | WW-53340-MCC01 CB1B5 | 600V Power | 3C #12 TECK90 | 600-P-007 | E-100, E-101, E-104 | Conduit run from electrical room to local valve control panel | WW-79610-MV13 |
| WW-79610-MV14 | Sludge Wasting Control Valve MV-14 | WW-53340-MCC01 CB1H2 | 600V Power | 3C #12 TECK90 | 600-P-008 | E-100, E-101, E-104 | Conduit run from electrical room to local valve control panel | WW-79610-MV14 |
| WW-79620-P9039 | UV Pumps 1 | WW-67969-PL9275 | 600V Power | 3C #12 AWG VFD Rated Armoured Cable | 600-P-009 | E-102, E-104 | Power for UV Pump 1 | WW-79620-P9039 |
| WW-79620-P9040 | UV Pumps 2 | WW-67969-PL9275 | 600V Power | 3C #12 AWG VFD Rated Armoured Cable | 600-P-010 | E-102, E-104 | Power for UV Pump 2 | WW-79620-P9040 |
| WW-53340-T1 | Low Voltage Transformer primary power | WW-53340-MCC01CB1A6 | 600V Power | 3C #3 TECK90 | 600-P-011 | E-103, E-104 | Power cable run from MCC to Low voltage Tranformer | WW-53340-T1 |
| | Heat Trace | WW-53540-PL9260 CB 24 | 120V Power | 3C #10 TECK90 | 120-P-015 | E-100, E-102 | Power for heat trace from UV control buidling to Sludge Wasting Pipes | West Sludge Wasting Heat Trace |
| | Heat Trace | WW-53540-PL9260 CB 26 | 120V Power | 3C #10 TECK90 | 120-P-016 | E-100, E-102 | Power for heat trace from UV control buidling to Sludge Wasting Pipes | East Sludge Wasting Heat Trace |
| WW-79640-P20 | MISA Sampling Skid #1 | WW-53540-PL9260 CB 20 | 120V Power | 2C #12 AWG TECK90 | 120-P-017 | E-102 | Power for MISA Sampling Skid 1 | WW-79640-P20 |
| WW-79640-P21 | MISA Sampling Skid #2 | WW-53540-PL9260 CB 22 | 120V Power | 2C #12 AWG TECK90 | 120-P-018 | E-102 | Power for MISA Sampling Skid 2 | WW-79640-P21 |
| WW-66400-CPL101 | Control Panel Power | WW-53540-PL1 CB 23 | 120V Power | 2C #8AWG TECK90 | 120-P-019 | E-100 | Power for Main Control Panel | WW-66400-CPL101 |
| WW-79640-P21 | UV Pump Control Panel | WW-67969-PL9261 | 208V Power | 3C #12 AWG TECK90 | 208-P-001 | E-102 | Power for UV Control Panel | WW-79640-P21 |
| WW-53340-T1 | Low Voltage Transformer Secondary power | WW-53540-T1 | 208V Power | 4C 350MCM TECK90 | 208-P-002 | E-103, E-104 | Power cable run from Low voltage Tranformer to splitter | Splitter |
| WW-53540-P1 | incoming cable to WW-53540-PL1 Disconnect | Splitter | 208V Power | 4C #1 TECK90 | 208-P-003 | E-103, E-104 | Power cable run from splitter to Disconnect Switch for PL1 | PL1 Disconnect Switch |
| WW-53540-P1 | incoming cable to WW-53540-PL1 Disconnect | Disconnect PL1 | 208V Power | 4C #1 TECK90 | 208-P-003A | E-103, E-104 | Power cable run fromDisconnect Switch to PL1 | WW-53540-PL1 |
| WW-53540-P1 | incoming cable to WW-53540-PL2 Disconnect | Splitter | 208V Power | 4C #1 TECK90 | 208-P-004 | E-103, E-104 | Power cable run from splitter to Disconnect Switch for PL2 | PL2 Disconnect Switch |
| WW-53540-P1 | incoming cable to WW-53540-PL2 Disconnect | Disconnect PL2 | 208V Power | 4C #1 TECK90 | 208-P-004A | E-103, E-104 | Power cable run fromDisconnect Switch to PL2 | WW-53540-PL2 |
| **Communication Cables** | | | | | | | | |
| | Electrical Room | OUTPOST5-PL1001,Data Concentration Panel | Ethernet Comm. | Cat 6, 550Mhz transfer rate 24 AWG, BLUE, RJ45 Ethernet Network Cable | COM-001 | IC-110, NK37-DRAW-53000-10065 | Electrical Room | Master PLC, WW_66400_CPL101 |
| | Electrical Room | New SCADA Node | Ethernet Comm. | Cat 6, 550Mhz transfer rate 24 AWG, BLUE, RJ45 Ethernet Network Cable | COM-002 | IC-110, NK37-DRAW-53000-10065 | Electrical Room | Master PLC, WW_66400_CPL101 |
| | Control Room | New SCADA Node | Ethernet Comm. | Cat 6, 550Mhz transfer rate 24 AWG, BLUE, RJ45 Ethernet Network Cable | COM-003 | IC-110, NK37-DRAW-53000-10065 | Electrical Room | Master PLC, WW_66400_CPL101 |
| | Basement, Control Building | NAC, Network Cabient | Ethernet Comm. | Cat 6, 550Mhz transfer rate 24 AWG, BLUE, RJ45 Ethernet Network Cable | COM-004 | IC-110, NK37-DRAW-53000-10065 | Electrical Room | Master PLC, WW_66400_CPL101 |
| | UV Buliding | UV PLC, | Ethernet Comm. | Cat 6, 550Mhz transfer rate 24 AWG, BLUE, RJ45 Ethernet Network Cable | COM-005 | IC-110, NK37-DRAW-53000-10065 | Electrical Room | Master PLC, WW_66400_CPL101 |

NOTES:
1) ALL CONDUCTORS ARE COPPER(CU) UNLESS STATED OTHERWISE.
2) ALL 600V POWER CABLES SHALL BE RATED FOR 1000V.

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Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| C | ISSUED FOR RFP | MT | CE | 02/07/20 |
| B | 100% DESIGN REVIEW | MT | CE | 12/16/19 |
| A | 90% DESIGN REVIEW | MT | CE | 11/04/19 |

Drawn **M. TUPPER** | Designer **L. MONSHIZADEH**
Drafting Check **B. PLETZ** | Design Check **M. CADACIO**
Project Manager **C. EVEREST** | Date **07/05/19**
This document shall not be used for construction unless signed and sealed for construction. | Scale **NTS**
Original Size **ANSI D** | Bar is 20mm on original size drawing (0 — 20mm)

Project No. **11185554-02**

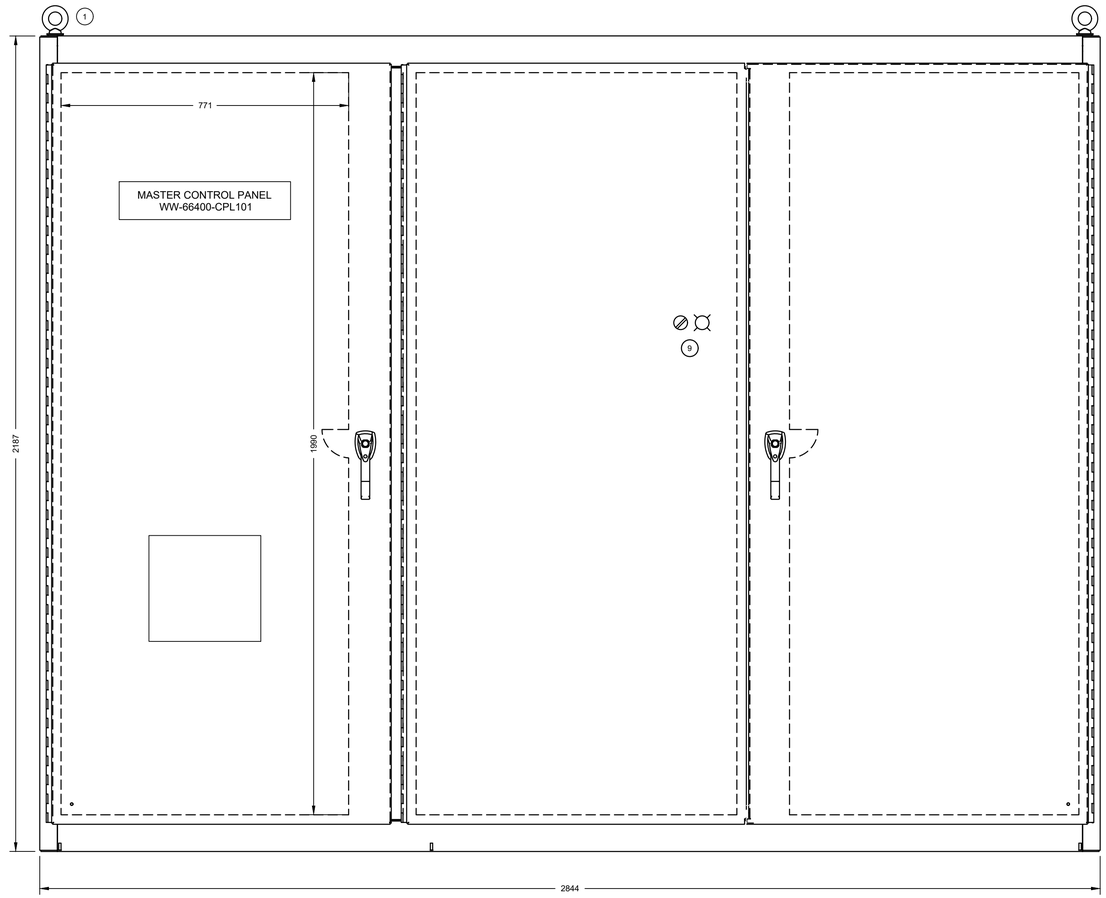
Title
**SEWAGE PROCESSING PLANT POWER AND NETWORK CABLE LIST**

Bruce Power Sheet No.
**NK37-DRAW-53000-10082**

Sheet No.
**E-112**
Sheet **31** of **44**

GENERAL NOTES:

1. REFER TO XXXX-XXXX-XXXXX-XXXXX FOR BILL OF MATERIALS




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0 0.8 1.6 2.4m

Client
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**177 TIE ROAD, TIVERTON, ON**

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| C | 100% DESIGN REVIEW | NG | LT | 12/16/19 |
| B | 90% DESIGN REVIEW | NG | LT | 11/04/19 |
| A | 50% OF 100% REVIEW | MT | CE | 07/05/19 |

| | | | |
|---|---|---|---|
| Drawn | **M. TUPPER** | Designer | **L. MONSHIZADEH** |
| Drafting Check | **B. PLETZ** | Design Check | **M. CADACIO** |
| Project Manager | **C. EVEREST** | Date | **07/05/19** |
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| Original Size **ANSI D** | | Bar is 20mm on original size drawing 0 20mm | |

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT CONTROL PANEL LAYOUT (1 OF 2)**

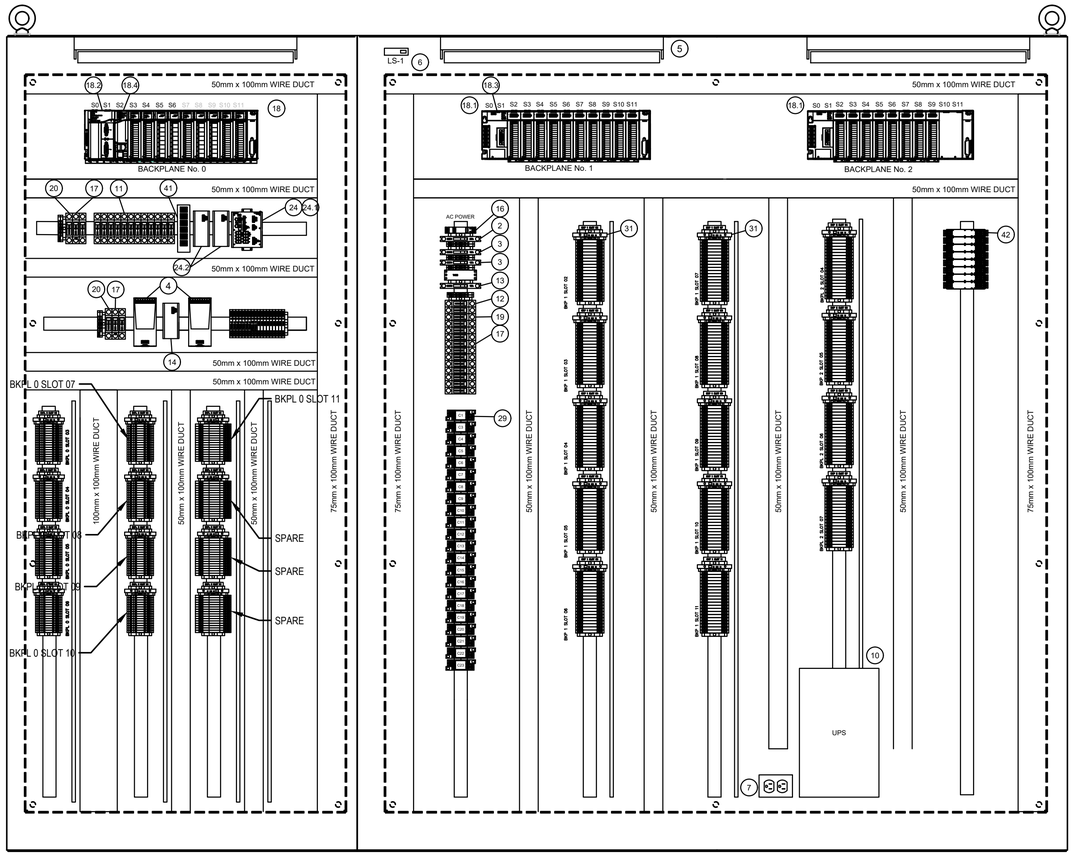
Bruce Power Sheet No.

Sheet No.
**IC-101**

Sheet **32** of **44**

GENERAL NOTES:

1. REFER TO IC-106 FOR BILL OF MATERIALS
2. WIRING TO INTRINSICALLY SAFE RELAYS TO BE ROUTED SEPARATELY FROM OTHER WIRING IN CONTROL PANEL.
3. THIS COLUMN OF THE CONTROL PANEL HAS BEEN RESERVED FOR INTRINSICALLY SAFE BARRIERS AND WIRING.




NOTE 1

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0 0.8 1.6 2.4m

Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
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| A | 90% DESIGN REVIEW | NG | LT | 11/04/19 |

| | | | |
|---|---|---|---|
| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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| Original Size **ANSI D** | | Bar is 20mm on original size drawing 0 20mm | |

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT CONTROL PANEL LAYOUT (2 OF 2)**

Bruce Power Sheet No.

Sheet No.
**IC-101A**
Sheet **33** of **44**

| ITEM NO. | NAME/TAG | MANUFACTURER | MODEL/PART NO. | DESCRIPTION | QUANTITY |
|---|---|---|---|---|---|
| | | | | | |
| 1 | WW-66400-CPL101 | HAMMOND | 1422MD320 | NEMA 12 2187mmH x 2845mmW x 511mmD (86.12"x112"x20.12") ENCLOSURE | 2 |
| 2 | CB | ABB | S201U-Z20 | 20A 120VAC CIRCUIT BREAKER | 1 |
| 3 | CB, UCB | ABB | S201U-Z10 | 10A 120VAC CIRCUIT BREAKER | 2 |
| 4 | PS1, PS2 | PHOENIX | 2866750 | 24VDC 5A POWER SUPPLY, UNIT-PS/1AC/24DC/3.5 | 2 |
| 5 | LED | HAMMOND | FLK10LED | 26" 120VAC LED LIGHT KIT | 1 |
| 6 | SW | OMRON | A20GQ-B7-K | PANEL LIGHT SWITCH | 1 |
| 7 | SURGE SUPPRESSOR | HUBBELL | HBL5260ISA | 125VAC 15A DUPLEX RECEPTACLE WITH SURGE PROTECTION | 1 |
| 8 | REC | HUBBELL | RR20I | 125VAC 20A DUPLEX RECEPTACLE | 1 |
| 9 | P.T.T | ALLEN BRADLEY | 800TCQTH2 WAP | PUSH TO TEST LAMPS | 1 |
| 10 | UPS | EATON | 9SX3000 | 120VAC UPS 3000VA TOWER MOUNTED UPS | 1 |
| 11 | UCB | ALLEN BRADLEY | 1492-SPM1B010 | CIRCUIT BREAKER, SUPPLEMENTARY, 1.0A | AS REQ'D |
| 12 | CB, UCB | ALLEN BRADLEY | 1492-SPM1B005 | CIRCUIT BREAKER, SUPPLEMENTARY, 0.5A | AS REQ'D |
| 13 | CB | ABB | S201U-Z15 | 15A 120VAC CIRCUIT BREAKER | 1 |
| 14 | PS3 | PHOENIX | 2868606 | 24VDC 2x5A REDUNDANCY MODULE STEP DIODE | |
| 15 | DIN RAIL | PHOENIX CONTACT | 1201730 | STEEL 35x7.5mm DIN RAIL | AS REQ'D |
| 16 | SURGE PROTECTOR | PHOENIX CONTACT | 2856812 | 120VAC IN/OUT SURGE PROTECTOR, 26A | 1 |
| 17 | UCB | ALLEN BRADLEY | 1492-SPM1B020 | CIRCUIT BREAKER, SUPPLEMENTARY, 2A | AS REQ'D |
| 18 | PAC-BACKPLANE | GE AUTOMATION | IC695CHS012 | RX3I 12 SLOT UNIVERSAL BACKPLANE | 1 |
| 18.1 | PAC- EXPANSION BACKPLANE | GE AUTOMATION | IC64CHS392 | RX3I 10 SLOT EXPANSION BACKPLANE | 1 |
| 18.2 | PAC-PS | GE AUTOMATION | IC694-PSA040 | RX3I POWER SUPPLY | 1 |
| 18.3 | PAC- EXPANSION PS | GE AUTOMATION | IC694-PWR321 | RX3I EXPANSION POWER SUPPLY | 1 |
| 18.4 | PAC- CPU | GE AUTOMATION | IC695-CPE305 | RX3I CPU MODULE | 1 |
| 18.5 | PAC- EXPANSION MODULE | GE AUTOMATION | IC695LRE001 | RX3I EXPANSION MODULE | 1 |
| 18.6 | EXPANSION IO BUS TERMINAROR PLUG | GE AUTOMATION | IC693ACC307 | RX3I IO BUS TERMINATOR | AS REQ'D |
| 18.7 | EXPANSION CABLE | GE AUTOMATION | IC693CBL302 | CABLE, I/O BASE EXPANSION, 2 METER, SHIELDED | AS REQ'D |
| | | | | | |
| 18.9 | PAC- DI | GE AUTOMATION | IC694-MDL240 | RX3I 16 PT, 120VAC DIGITAL INPUT MODULE | 13 |
| 18.10 | PAC- DO | GE AUTOMATION | IC694-MDL916 | RX3I 16 PT DIGITAL OUTPUT MODULE | 5 |
| 18.11 | PAC- AI | GE AUTOMATION | IC694-ALG626 | RX3I 16 PT ANALOG INPUT MODULE | 5 |
| 18.12 | PAC- AO | GE AUTOMATION | IC694-ALG808 | RX3I 8 PT ANALOG OUTPUT MODULE | 4 |
| 19 | UCB | ALLEN BRADLEY | 1492-SPM1B100 | CIRCUIT BREAKER, SUPPLEMENTARY, 10A | AS REQ'D |
| 20 | UCB | ALLEN BRADLEY | 1492-SPM1B150 | CIRCUIT BREAKER, SUPPLEMENTARY, 15A | AS REQ'D |

| ITEM NO. | NAME/TAG | MANUFACTURER | MODEL/PART NO. | DESCRIPTION | QUANTITY |
|---|---|---|---|---|---|
| 21 | TB | WEIDMULLER | 1020100000 | TERMINAL BLOCK, WDU 4 | AS REQ'D |
| 22 | TB | WEIDMULLER | | TERMINAL BLOCK ENO BRACKET WEW 35, 2 | AS REQ'D |
| 23 | TB | WEIDMULLER | 1806120000 | TERMINAL BLOCK END BRACKET MARKER, EM 8/30 | AS REQ'D |
| 24 | ETH SW | CISCO | IE-2000-16TC-G-E | INDUSTRIAL ETHERNET SWITTCH, 16-10/100 BASE-TX RJ-45 DOWNLINK PORTS, 2-GIGABIT COMBO (SFP/RJ-45) UPLINK PORTS, 2-100 SFP UPLINK SLOTS | 1 |
| 24.1 | TRANSCEIVER | CISCO | GLC-SX-MM-RGD | SFP TRANSCEIVER, 1000BASE-FX, MMF | 2 |
| 24.2 | PS1, PS2 | CISCO | PWR-IE50W-AC | INDUSTRIAL IE-2000 SERIES POWER SUPPLY, 50W, 100-240VAC, 24VDC OUTPUT | 2 |
| 25 | CB | ALLEN BRADLEY | 1492-SPM1B030 | CIRCUIT BREAKER, SUPPLEMENTARY, 30A | AS REQ'D |
| 26 | FU | WEIDMULLER | 1880410000 | FUSED TERMINAL BLOCK, 10-60V AC/DC, LED INDICATOR, WSI 4/2/LD | AS REQ'D |
| 27 | FU | WEIDMULLER | 1880450000 | FUSED TERMINAL BLOCK END PLATE, WAP WSI 4/2 | AS REQ'D |
| 28 | FU | BUSSMAN | GMA-500-R | FUSE, 0.5A, FAST ACTING, FOR AI FUSED TERMINALS (INCLUDES 20 SPARES) | AS REQ'D |
| 29 | CR | WEIDMULLER | 1122770000 | RELAY & BASE, 120VAC COIL, 3PDT, 6A CONTACT RATING, LED STATUS INDICATION | AS REQ'D |
| 30 | TB | WEIDMULLER | 1909120000 | PLUG IN CROSS CONNECTION FOR DO RELAYS | AS REQ'D |
| 31 | TB | WEIDMULLER | 1041100000 | DI TERMINAL BLOCK, TWO LEVEL, SCREW CLAMPS, WDK 2.5 ZQV | AS REQ'D |
| 32 | TB | WEIDMULLER | 1059100000 | END PLATE FOR DI TERMINAL BLOCK, TWO LEVEL, WDK 2.5 ZQV | AS REQ'D |
| 33 | TB | WEIDMULLER | 1909000000 | PLUG IN JUMPERS, 20-POLE, FOR WDK 2.5 ZQV | AS REQ'D |
| 34 | INTERPOSING RELAY | ALLEN BRADLEY | 700 HLT1U24 | 24VDC, 6A INTERPOSING RELAY | AS REQ'D |
| 35 | TB | WEIDMULLER | 9532440000 | AI TERMINAL BLOCK, TWO LEVEL FUSED, SCREW CLAMPS, KDKS 1/35 DB | AS REQ'D |
| 36 | TB | WEIDMULLER | 9532470000 | END PLATE FOR AI TERMINAL BLOCK, TWO LEVEL FUSED, SCREW CLAMPS, KDKS 1/35 DB | AS REQ'D |
| 37 | FU | BUSSMAN | GMA-500-R | FUSE, 0.5A, FAST ACTING, FOR AI FUSED TERMINALS (INCLUDES 20 SPARES) | AS REQ'D |
| 38 | TB | WEIDMULLER | | AO TERMINAL BLOCK, TWO LEVEL, DISCONNECTING, SCREW CLAMPS, DKT4 | AS REQ'D |
| 39 | TB | WEIDMULLER | | END PLATE FOR AO TERMINAL BLOCK, TWO LEVEL, DISCONNECTING, SCREW CLAMPS, DKT5 | AS REQ'D |
| 40 | TB | ALLEN BRADLEY | 1492-SPM1B020 | W SERIES TERMINAL BLOCK MARKER, WS 12/6 MC, 12mm LENGTH, WHITE | AS REQ'D |
| 41 | PP#A | WEIDMULLER | 1880410000 | OPTICOM PANEL MOUNTED FIBER PATCH PANEL | AS REQ'D |
| 42 | SR | PEPPERL + FUCHS | KFA5-SR2-EX2.W | SAFETY RELAY RAIL MOUNTED | AS REQ'D |
| 43 | INTERPOSING RELAY | ALLEN BRADLEY | 700 HLT1U1 | 120VAC, 6A INTERPOSING RELAY | AS REQ'D |

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**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| D | ISSUED FOR RFP | NG | LT | 02/07/20 |
| C | 100% DESIGN REVIEW | NG | LT | 12/16/19 |
| B | 90% DESIGN REVIEW | NG | LT | 11/04/19 |
| A | 50% OF 100% REVIEW | MT | CE | 07/05/19 |

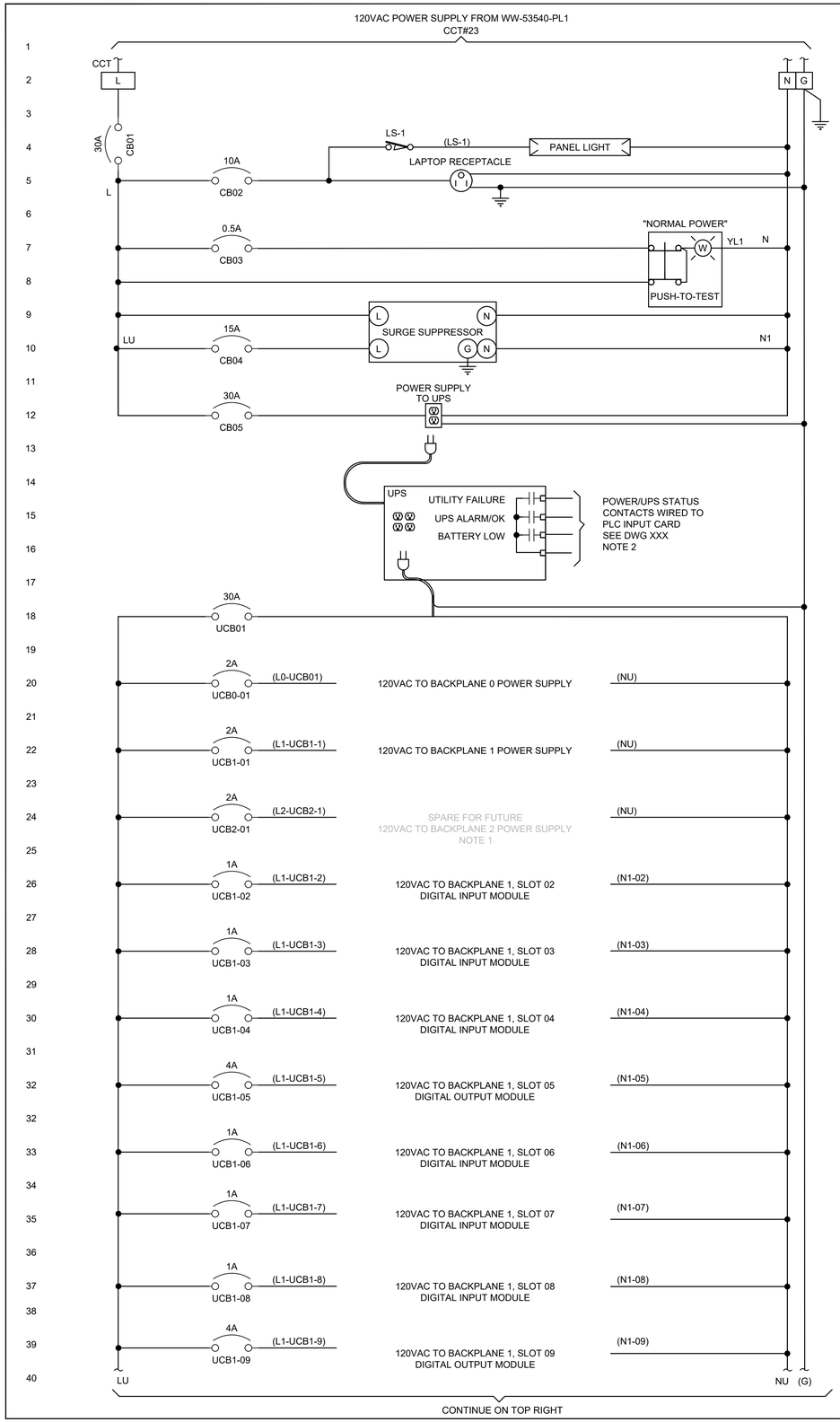
Drawn **M. TUPPER** | Designer **L. MONSHIZADEH**
Drafting Check **B. PLETZ** | Design Check **M. CADACIO**
Project Manager **C. EVEREST** | Date **07/05/19**
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Original Size **ANSI D** | Bar is 20mm on original size drawing (0 — 20mm)

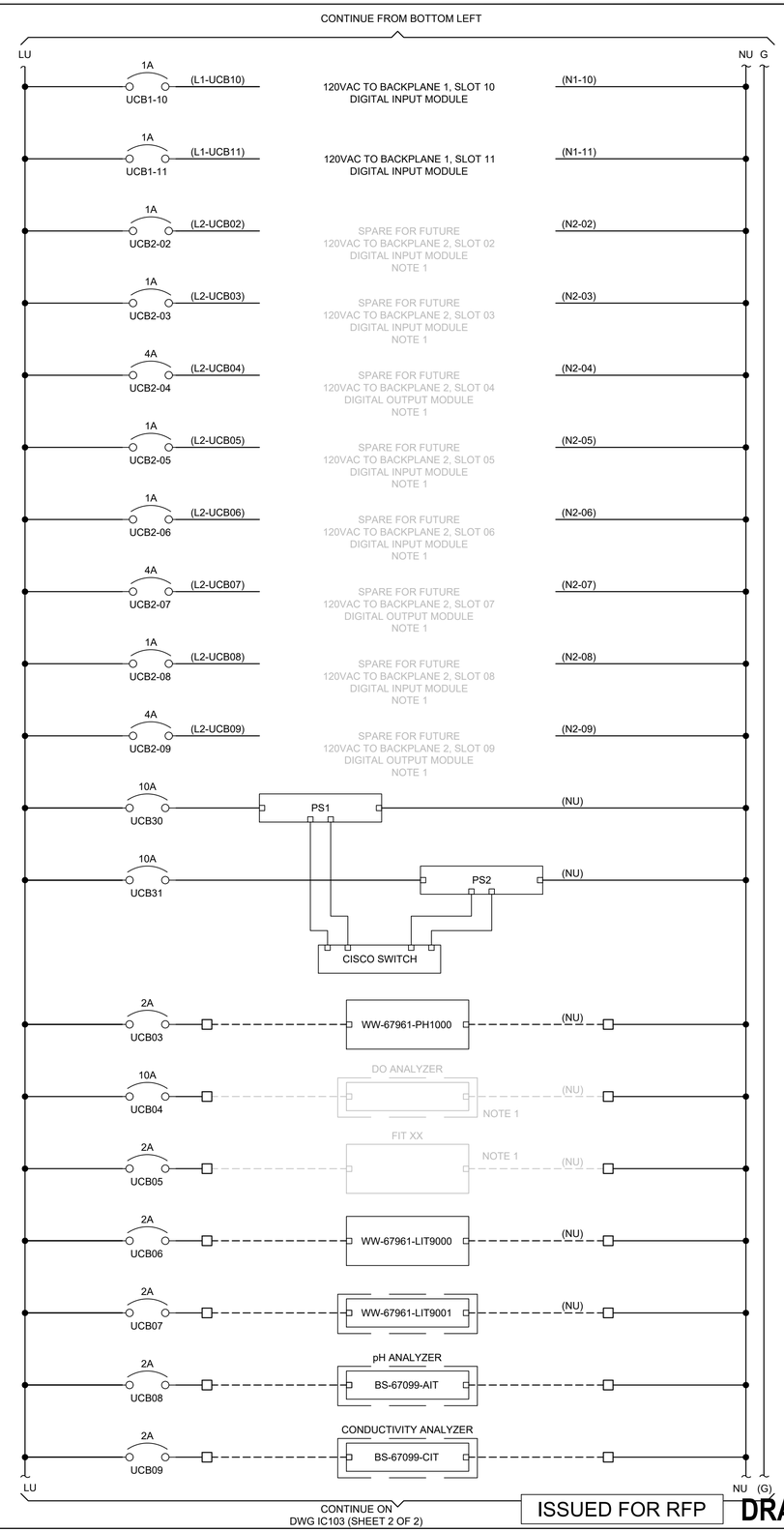
Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT CONTROL PANEL BILL OF MATERIALS**

Bruce Power Sheet No.
**NK37-DRAW-53000-10059**

Sheet No.
**IC-102**
Sheet **34** of **44**




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NOTES:

1. THESE SECTIONS BELONG TO FUTURE EXPANSION PROJECT AND SHOULD BE CONSIDERED AS SPARES ONLY.
2. REFER TO IO LIST. CONTROL PANELS' BUILDER SHALL ISSUE DETAILS DRAWING.

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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
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| A | 50% OF 100% REVIEW | MT | CE | 07/05/19 |

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|---|---|---|---|
| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 — 20mm |

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT**
**120VAC POWER DISTRIBUTION**
**(1 OF 2)**

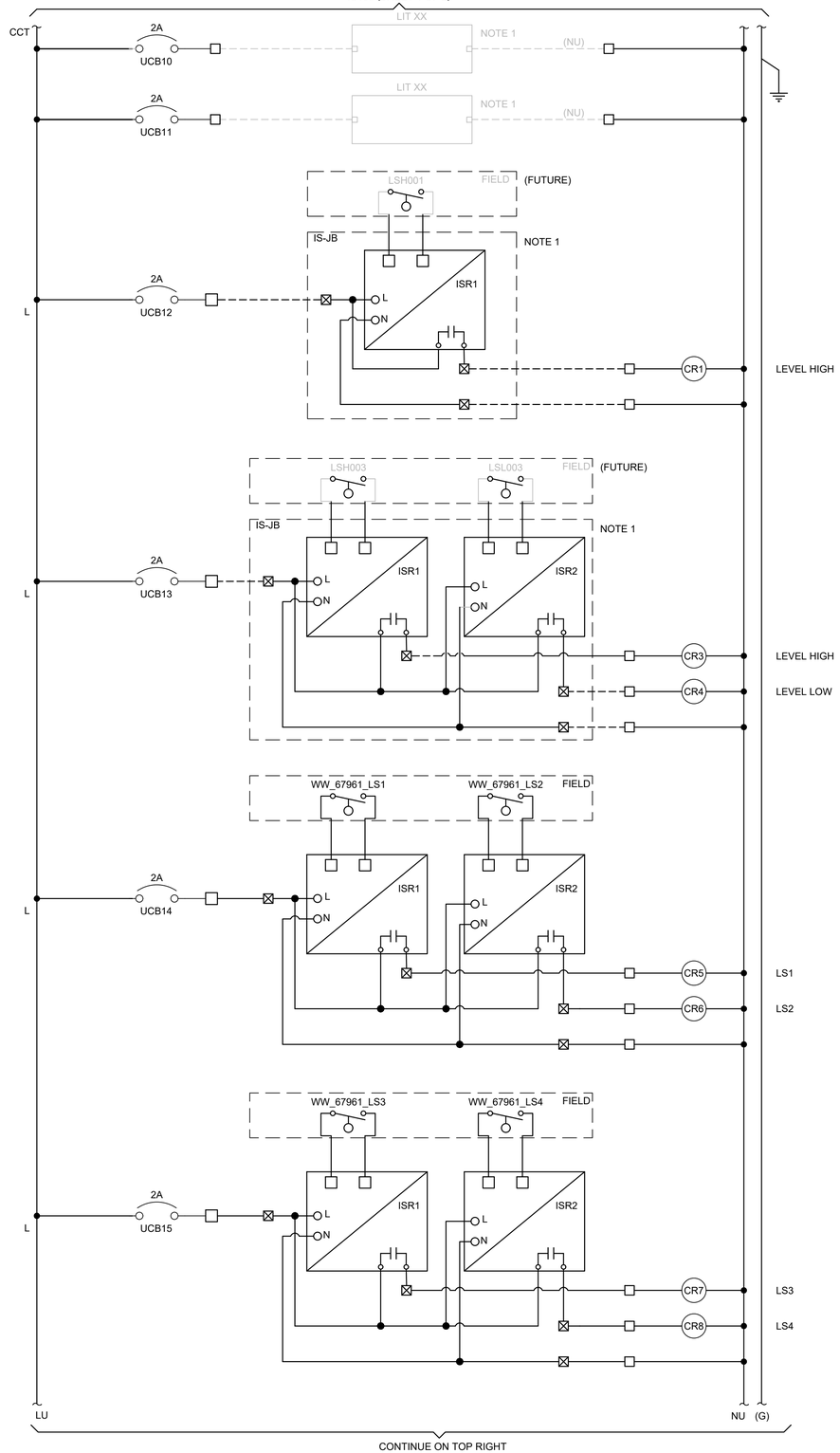
Bruce Power Sheet No.
**NK37-DRAW-53540-10046**

Sheet No.
**IC-103**

Sheet **35** of **44**

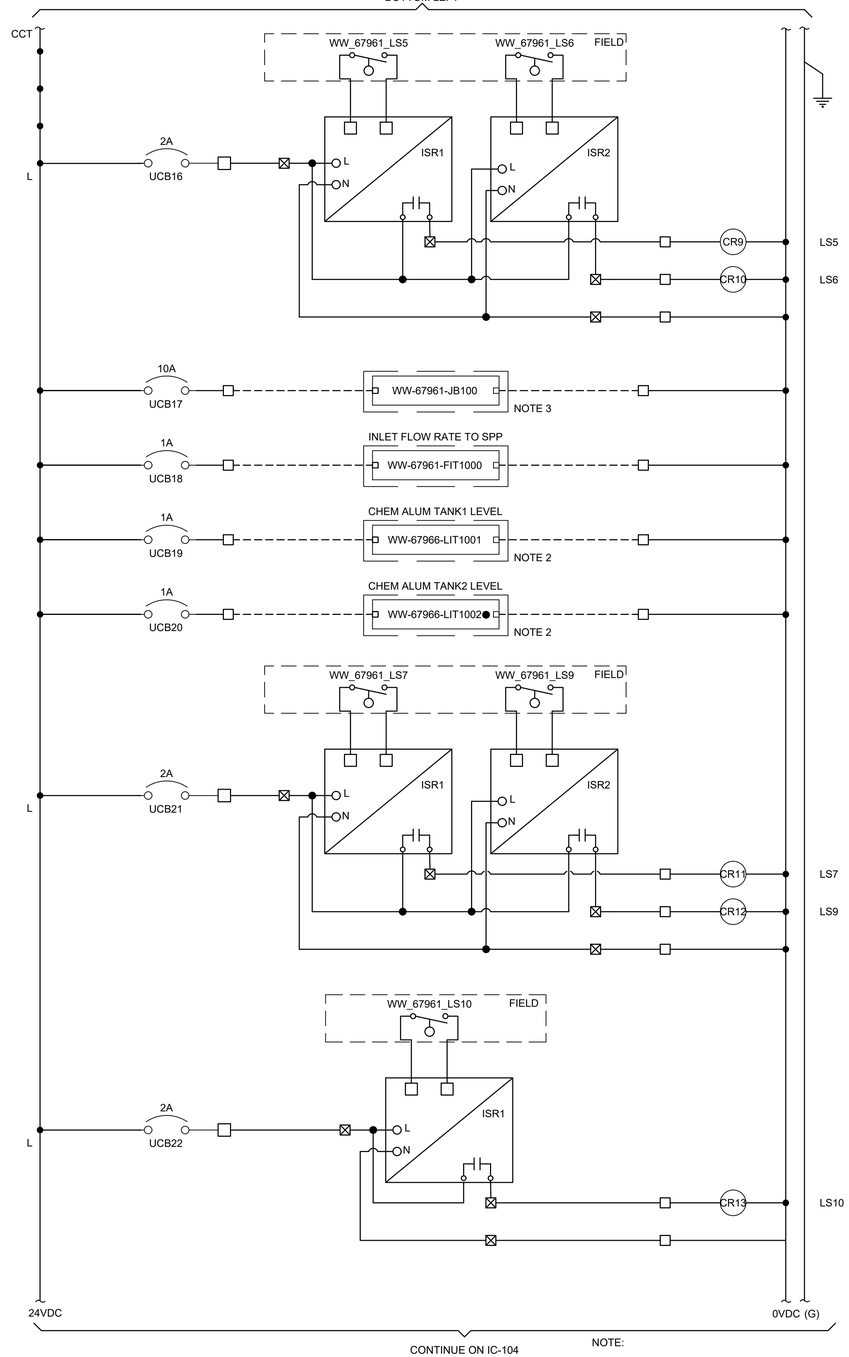
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Plotted By: Neil Hamilton
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CONTINUED FROM DRAWING
IC103 (SHEET 1 OF 2)




CONTINUE ON TOP RIGHT

CONTINUED FROM
BOTTOM LEFT




CONTINUE ON IC-104

NOTE:

1. INSTALLED IN THIS PROJECT RESERVED FOR FUTURE USE.
2. IF THE LEVEL TRANSMITTER IS A 4-WIRE, REQUIRES POWER. FOR ALL EXISTING INSTRUMENTS, REQUIRED POWER SUPPLY MUST BE CONFIRMED BEFORE CONNECTION.
3. WW-67961-JB100 IS CONNECTED TO:
   WW-67971-PH1001-HTR EQUALIZATION TANK pH 1A
   WW-67961-DOX1001 & WW-67961-DOX1003, REFER TO APPENDIX A

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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

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| C | ISSUED FOR RFP | NG | LT | 02/07/20 |
| B | 100% DESIGN REVIEW | NG | LT | 12/16/19 |
| A | 90% DESIGN REVIEW | NG | LT | 11/04/19 |

| | | | |
|---|---|---|---|
| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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Original Size
**ANSI D**

Bar is 20mm on original size drawing
0 20mm

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT 120VAC POWER DISTRIBUTION (2 OF 2)**

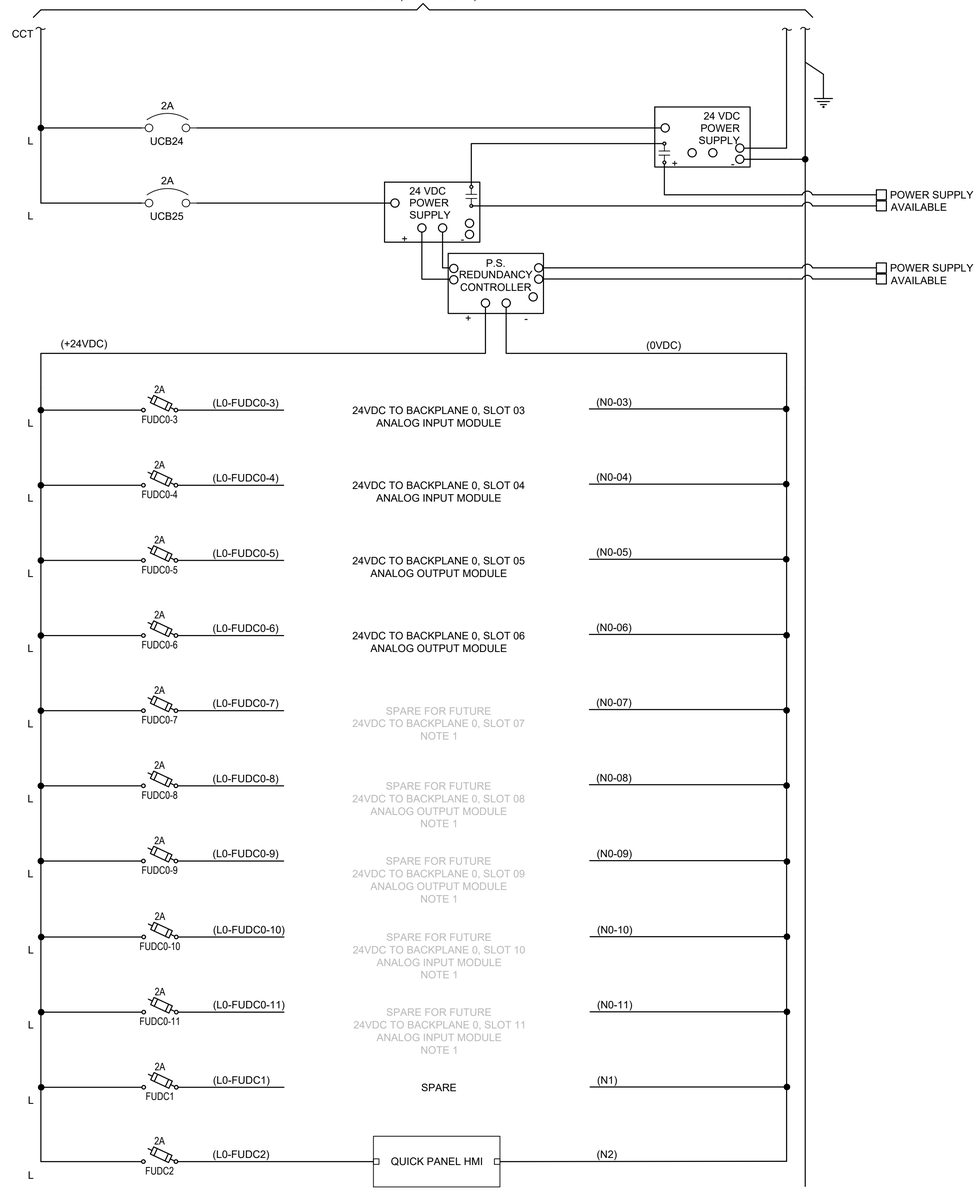
Bruce Power Sheet No.
**NK37-DRAW-53540-10047**

Sheet No.
**IC-103A**

Sheet **36** of **44**


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CONTINUED FROM DRAWING
IC103 (SHEET 2 OF 2)




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Project

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|---|---|---|---|
| Drawn | **M. TUPPER** | Designer | **L. MONSHIZADEH** |
| Drafting Check | **B. PLETZ** | Design Check | **M. CADACIO** |
| Project Manager | **C. EVEREST** | Date | **07/05/19** |
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| Original Size | **ANSI D** | Bar is 20mm on original size drawing | 0 20mm |

Project No. **11185554-02**

Title

**SEWAGE PROCESSING PLANT**
**120VAC AND 24VDC**
**POWER DISTRIBUTION**

Bruce Power Sheet No.

**NK37-DRAW-66400-10001**

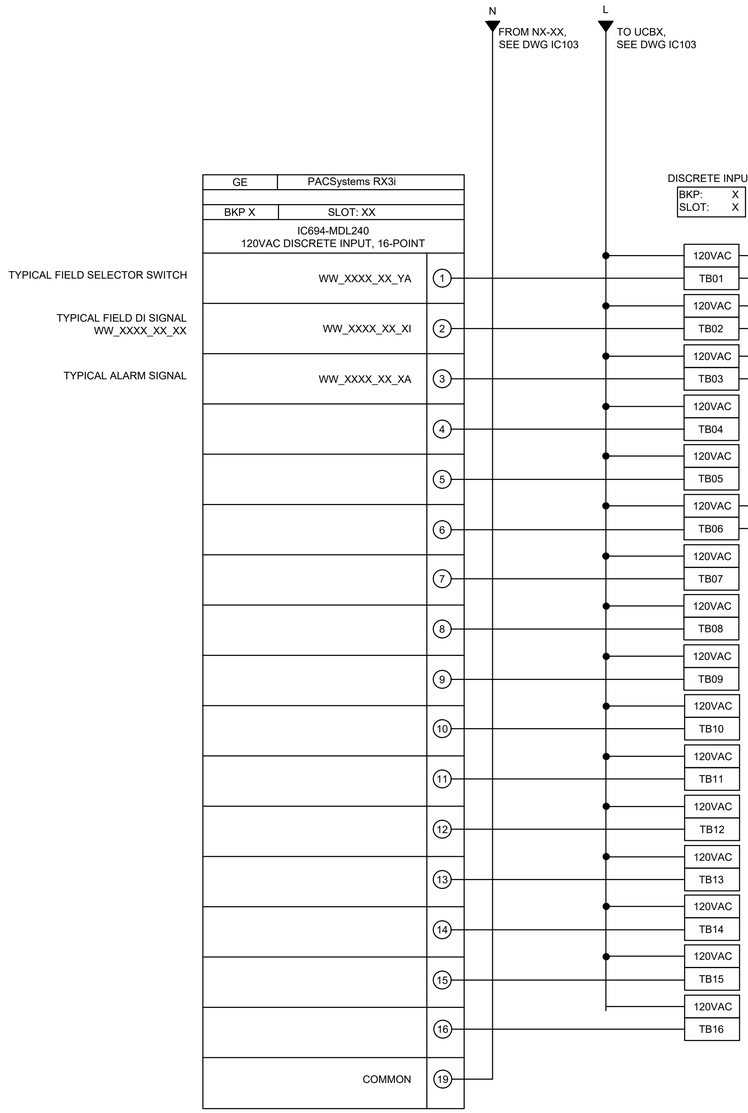
Sheet No.

**IC-104**

Sheet **37** of **44**


Plot Date: 10 March 2021 - 5:11 PM Plotted By: Neil Hamilton CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)IC\11185554-02(004)IC-WA004.dwg

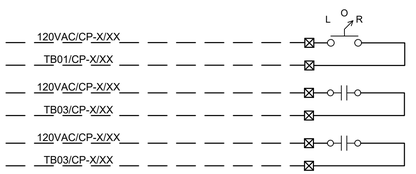
## CONTROL PANEL




## FIELD

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE TO PRODUCE COMPLETE PANEL DRAWINGS FOR ALL INTERNAL MODULES AND FIELD WIRING (POWER SIGNALS AND COMMUNICATION) INSTALLED UNDER THIS CONTRACT.
2. FOR THOSE SIGNALS WHICH ARE NOT DRY CONTACT AND ALREADY WETTED IN OTHER PANELS, USE INTERPOSE RELAY.




TYPICAL FIELD SELECTOR SWITCH (SIGNAL TAG NAME)

TYPICAL FIELD STATUS CONTACT (SIGNAL TAG NAME)

TYPICAL FIELD ALARM/ FAULT CONTACT (SIGNAL TAG NAME)

EXTERNAL POWER SUPPLY 24VDC/120VAC

0VDC

TYPICAL FOR DI SIGNALS WHICH ARE WETTED IN OTHER PANELS.

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| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 20mm |

Project No. **11185554-02**

Title

**SEWAGE PROCESSING PLANT TYPICAL DISCRETE INPUT MODULE**

Bruce Power Sheet No.

**NK37-DRAW-66400-10002**

Sheet No.

**IC-105**

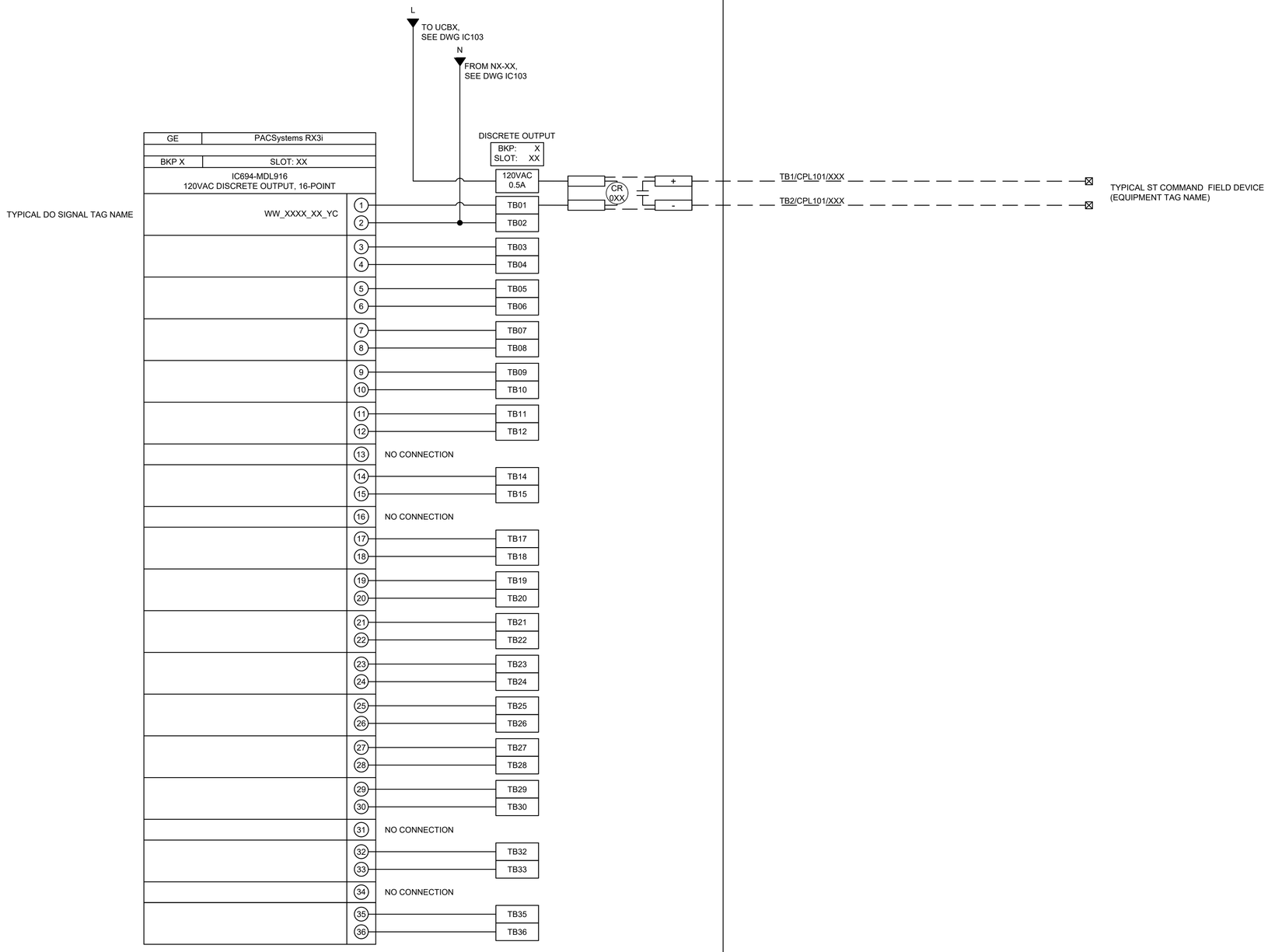
Sheet **38** of **44**


Plot Date: 10 March 2021 - 5:12 PM Plotted By: Neil Hamilton CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\111855554-02(004)\IC\11185554-02(004)IC-WA005.dwg

CONTROL PANEL

FIELD

COM




GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE TO PRODUCE COMPLETE PANEL DRAWINGS FOR ALL INTERNAL MODULES AND FIELD WIRING (POWER SIGNALS AND COMMUNICATION) INSTALLED UNDER THIS CONTRACT.
2. USING NO OR NC CONTACTS OF CRXX RELAY DEPENDS ON FIELD CIRCUIT DEVICE.

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| | | | |
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| Drawn | **M. TUPPER** | Designer | **L. MONSHIZADEH** |
| Drafting Check | **B. PLETZ** | Design Check | **M. CADACIO** |
| Project Manager | **C. EVEREST** | Date | **07/05/19** |
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Original Size

**ANSI D**

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0 20mm

Project No. **11185554-02**

Title

**SEWAGE PROCESSING PLANT TYPICAL DISCRETE OUTPUT MODULE**

Bruce Power Sheet No.

**NK37-DRAW-66400-10003**

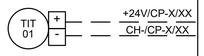
Sheet No.

**IC-106**

Sheet **39** of **44**


Plot Date: 10 March 2021 - 5:12 PM Plotted By: Neil Hamilton CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)\C\11185554-02(004)IC-WA006.dwg

## FIELD




## CONTROL PANEL

FROM FUCDX-XX, SEE DWG IC104 — +24VDC 0VDC — TO N0-XX, SEE DWG IC104

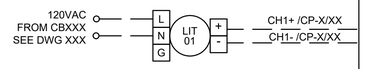
ANALOG INPUT
BKP: X
SLOT: XX

| GE | PACSystems RX3i |
|---|---|
| BKP: X | SLOT: XX |
| IC695-ALG626 ANALOG INPUT, CURRENT, 16 CHANNEL | |

| | | |
|---|---|---|
| +24V CH1+ SHD | X/XX/CH1+ | 1 TO 19 | TYPICAL 2 WIRE LOOP POWERED DEVICE WW_XXXX_TITXX |
| +24V CH2+ SHD | X/XX/CH2+ | 2 TO 20 | |
| +24V CH3+ SHD | X/XX/CH3+ | 3 TO 21 | |
| +24V CH4+ SHD | X/XX/CH4+ | 4 TO 22 | |
| | | 5 | COMMON |
| +24V CH5+ SHD | X/XX/CH5+ | 6 TO 24 | |
| +24V CH6+ SHD | X/XX/CH6+ | 7 TO 25 | |
| +24V CH7+ SHD | X/XX/CH7+ | 8 TO 26 | |
| +24V CH8+ SHD | X/XX/CH8+ | 9 TO 27 | |
| +24V CH9+ SHD | X/XX/CH9+ | 10 TO 28 | |
| +24V CH10+ SHD | X/XX/CH10+ | 11 TO 29 | |
| +24V CH11+ SHD | X/XX/CH11+ | 12 TO 30 | |
| +24V CH12+ SHD | X/XX/CH12+ | 13 TO 31 | |
| | | 14 | COMMON |
| +24V CH13+ SHD | X/XX/CH13+ | 15 TO 33 | |
| +24V CH14+ SHD | X/XX/CH14+ | 16 TO 34 | |
| +24V CH15+ SHD | X/XX/CH15+ | 17 TO 35 | |
| +24V CH16+ SHD | X/XX/CH16+ | 18 TO 36 | |
| | X/XX/IRTN1 | 19 FROM 1 | CHANNEL 1 CURRENT RETURN |
| | X/XX/IRTN2 | 20 FROM 2 | CHANNEL 2 CURRENT RETURN |
| | X/XX/IRTN3 | 21 FROM 3 | CHANNEL 3 CURRENT RETURN |
| | X/XX/IRTN4 | 22 FROM 4 | CHANNEL 4 CURRENT RETURN |
| | | 23 | COMMON |
| | X/XX/IRTN5 | 24 FROM 6 | CHANNEL 5 CURRENT RETURN |
| | X/XX/IRTN6 | 25 FROM 7 | CHANNEL 6 CURRENT RETURN |
| | X/XX/IRTN7 | 26 FROM 8 | CHANNEL 7 CURRENT RETURN |
| | X/XX/IRTN8 | 27 FROM 9 | CHANNEL 8 CURRENT RETURN |
| | X/XX/IRTN9 | 28 FROM 10 | CHANNEL 9 CURRENT RETURN |
| | X/XX/IRTN10 | 29 FROM 11 | CHANNEL 10 CURRENT RETURN |
| | X/XX/IRTN11 | 30 FROM 12 | CHANNEL 11 CURRENT RETURN |
| | X/XX/IRTN12 | 31 FROM 13 | CHANNEL 12 CURRENT RETURN |
| | | 32 | COMMON |
| | X/XX/IRTN13 | 33 FROM 15 | CHANNEL 13 CURRENT RETURN |
| | X/XX/IRTN14 | 34 FROM 16 | CHANNEL 14 CURRENT RETURN |
| | X/XX/IRTN15 | 35 FROM 17 | CHANNEL 15 CURRENT RETURN |
| | X/XX/IRTN16 | 36 FROM 18 | CHANNEL 16 CURRENT RETURN |

TYPICAL 2-WIRE ANALOG INPUT TERMINATION LAYOUT

## FIELD




## CONTROL PANEL

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE TO PRODUCE COMPLETE PANEL DRAWINGS FOR ALL INTERNAL MODULES AND FIELD WIRING (POWER SIGNALS AND COMMUNICATION) INSTALLED UNDER THIS CONTRACT.
2. ALL CABLE SHIELDS WILL BE CONNECTED TO A GROUND BAR.
3. +24VDC IS NOT REQUIRED FOR 4-WIRE TRANSMITTER

+24VDC 0VDC

FROM FUCDX-XX, SEE DWG IC104 — TO N0-XX, SEE DWG I104

ANALOG INPUT
BKP: X
SLOT: XX

| GE | PACSystems RX3i |
|---|---|
| BKP: X | SLOT: X |
| IC695-ALG626 ANALOG INPUT, CURRENT, 16 CHANNEL | |

| | | |
|---|---|---|
| +24V CH1+ CH1- SHD | X/XX/CH1+ X/XX/CH1- | 1 2 | TYPICAL LOOP POWERED 4 WIRE DEVICE WW_XXXX_LIT01 |
| +24V CH2+ CH2- SHD | X/XX/CH2+ X/XX/CH2- | 3 4 | |
| | | 5 | COMMON |
| +24V CH3+ CH3- SHD | X/XX/CH3+ X/XX/CH3- | 6 7 | |
| +24V CH4+ CH4- SHD | X/XX/CH4+ X/XX/CH4- | 8 9 | |
| +24V CH5+ CH5- SHD | X/XX/CH5+ X/XX/CH5- | 10 11 | |
| +24V CH6+ CH6- SHD | X/XX/CH6+ X/XX/CH6- | 12 13 | |
| | | 14 | COMMON |
| +24V CH7+ CH7- SHD | X/XX/CH7+ X/XX/CH7- | 15 16 | |
| +24V CH8+ CH8- SHD | X/XX/CH8+ X/XX/CH8- | 17 18 | |
| | | 19 | CHANNEL 1 CURRENT RETURN |
| | | 20 | NO CONNECTION |
| | | 21 | CHANNEL 2 CURRENT RETURN |
| | | 22 | NO CONNECTION |
| | | 23 | COMMON |
| | | 24 | CHANNEL 3 CURRENT RETURN |
| | | 25 | NO CONNECTION |
| | | 26 | CHANNEL 4 CURRENT RETURN |
| | | 27 | NO CONNECTION |
| | | 28 | CHANNEL 5 CURRENT RETURN |
| | | 29 | NO CONNECTION |
| | | 30 | CHANNEL 6 CURRENT RETURN |
| | | 31 | NO CONNECTION |
| | | 32 | COMMON |
| | | 33 | CHANNEL 7 CURRENT RETURN |
| | | 34 | NO CONNECTION |
| | | 35 | CHANNEL 8 CURRENT RETURN |
| | | 36 | NO CONNECTION |

ISSUED FOR RFP

TYPICAL 4-WIRE ANALOG INPUT TERMINATION LAYOUT

**DRAFT**


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Client
**BRUCE POWER**
**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| D | ISSUED FOR RFP | NG | LT | 02/07/20 |
| C | 100% DESIGN REVIEW | NG | LT | 12/16/19 |
| B | 90% DESIGN REVIEW | NG | LT | 11/04/19 |
| A | 50% OF 100% REVIEW | MT | CE | 07/05/19 |

| | |
|---|---|
| Drawn **M. TUPPER** | Designer **L. MONSHIZADEH** |
| Drafting Check **B. PLETZ** | Design Check **M. CADACIO** |
| Project Manager **C. EVEREST** | Date **07/05/19** |
| This document shall not be used for construction unless signed and sealed for construction. | Scale **NTS** |
| Original Size **ANSI D** | Bar is 20mm on original size drawing 0 20mm |

Project No. **11185554-02**

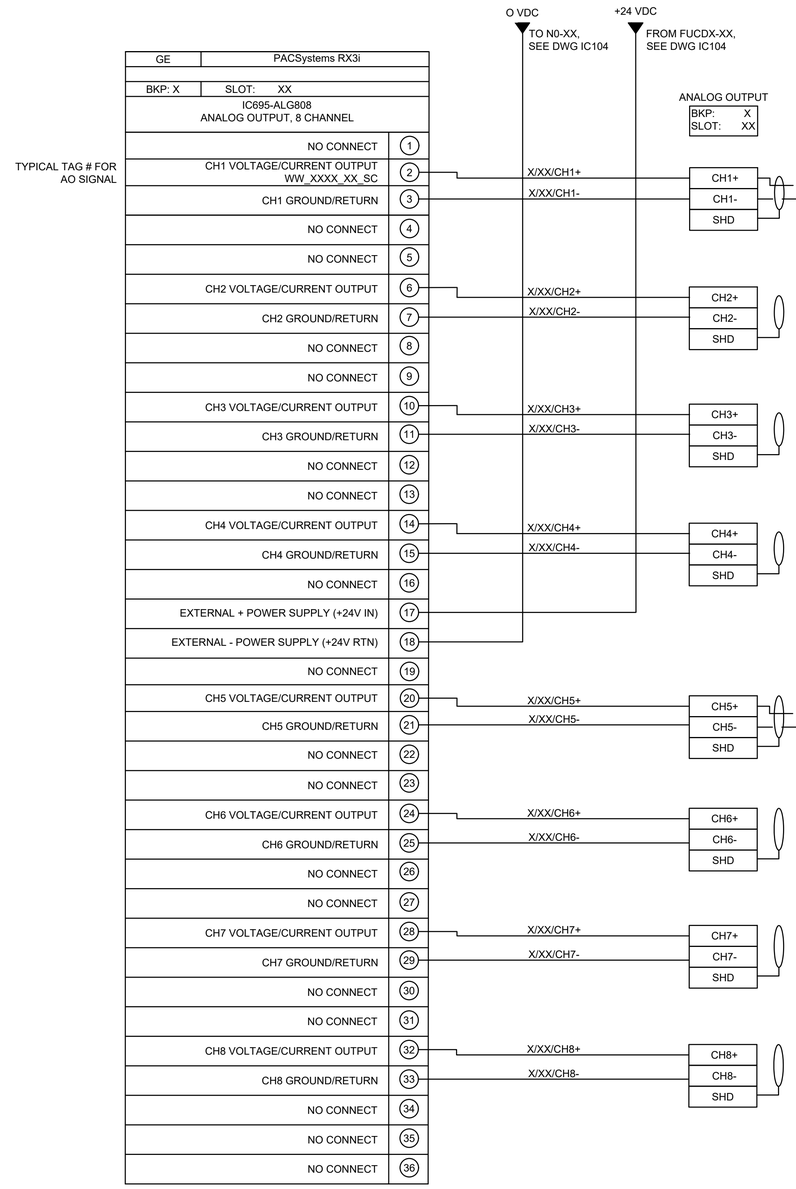
Title
**SEWAGE PROCESSING PLANT TYPICAL ANALOG INPUT MODULE**

Bruce Power Sheet No.
**NK37-DRAW-53000-10062**

Sheet No.
**IC-107**
Sheet **40** of **44**


Plot Date: 10 March 2021 - 5:12 PM Plotted By: Neil Hamilton CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)IC\11185554-02(004)IC-WA007.dwg

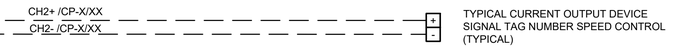
## CONTROL PANEL



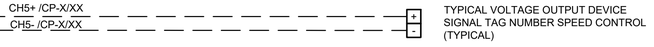

## FIELD

GENERAL NOTES:

1. CONTRACTOR IS RESPONSIBLE TO PRODUCE COMPLETE PANEL DRAWINGS FOR ALL INTERNAL MODULES AND FIELD WIRING (POWER SIGNALS AND COMMUNICATION) INSTALLED UNDER THIS CONTRACT.
2. ALL CABLE SHIELDS WILL BE CONNECTED TO A GROUND BAR.




TYPICAL CURRENT OUTPUT DEVICE SIGNAL TAG NUMBER SPEED CONTROL (TYPICAL)




TYPICAL VOLTAGE OUTPUT DEVICE SIGNAL TAG NUMBER SPEED CONTROL (TYPICAL)

ISSUED FOR RFP

**DRAFT**


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Project

**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| D | ISSUED FOR RFP | NG | LT | 02/07/20 |
| C | 100% DESIGN REVIEW | NG | LT | 12/16/19 |
| B | 90% DESIGN REVIEW | NG | LT | 11/04/19 |
| A | 50% OF 100% REVIEW | MT | CE | 07/05/19 |

| | | | |
|---|---|---|---|
| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 20mm |

Project No. **11185554-02**

Title

**SEWAGE PROCESSING PLANT TYPICAL ANALOG OUTPUT MODULE**

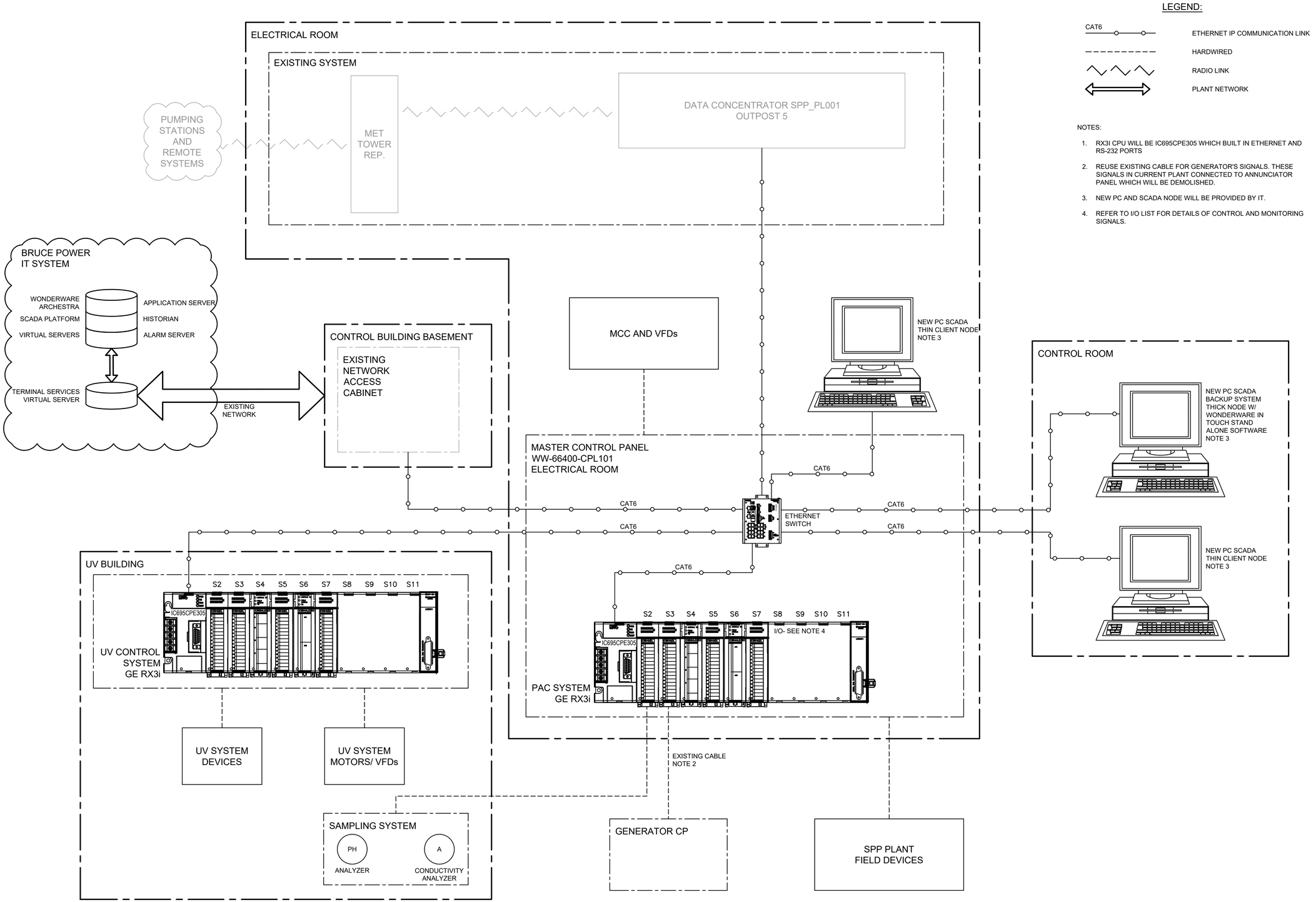
Bruce Power Sheet No.

**NK37-DRAW-53000-10063**

Sheet No.

**IC-108**

Sheet **41** of **44**




LEGEND:

- CAT6 — ETHERNET IP COMMUNICATION LINK
- HARDWIRED
- RADIO LINK
- PLANT NETWORK

NOTES:

1. RX3I CPU WILL BE IC695CPE305 WHICH BUILT IN ETHERNET AND RS-232 PORTS
2. REUSE EXISTING CABLE FOR GENERATOR'S SIGNALS. THESE SIGNALS IN CURRENT PLANT CONNECTED TO ANNUNCIATOR PANEL WHICH WILL BE DEMOLISHED.
3. NEW PC AND SCADA NODE WILL BE PROVIDED BY IT.
4. REFER TO I/O LIST FOR DETAILS OF CONTROL AND MONITORING SIGNALS.

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|---|---|---|---|---|
| E | 100% DESIGN REVIEW | NG | LT | 12/16/19 |
| D | 90% DESIGN REVIEW | NG | LT | 11/04/19 |
| C | 50% OF 100% REVIEW | MT | CE | 07/05/19 |
| B | 50% DESIGN REVIEW | MT | CE | 05/17/19 |
| F | ISSUED FOR RFP | NG | LT | 02/07/20 |

| | | | |
|---|---|---|---|
| Drawn | M. TUPPER | Designer | L. MONSHIZADEH |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
| This document shall not be used for construction unless signed and sealed for construction. | | Scale | NTS |

Original Size
**ANSI D**

Bar is 20mm on original size drawing
0 — 20mm

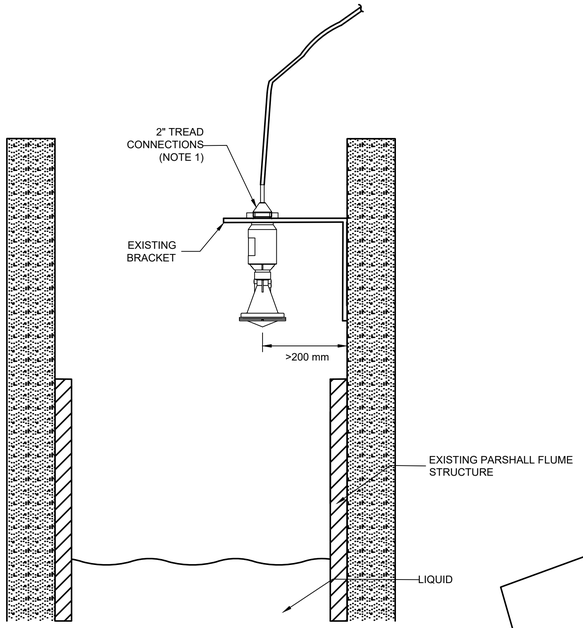
Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT NETWORK ARCHITECTURE**

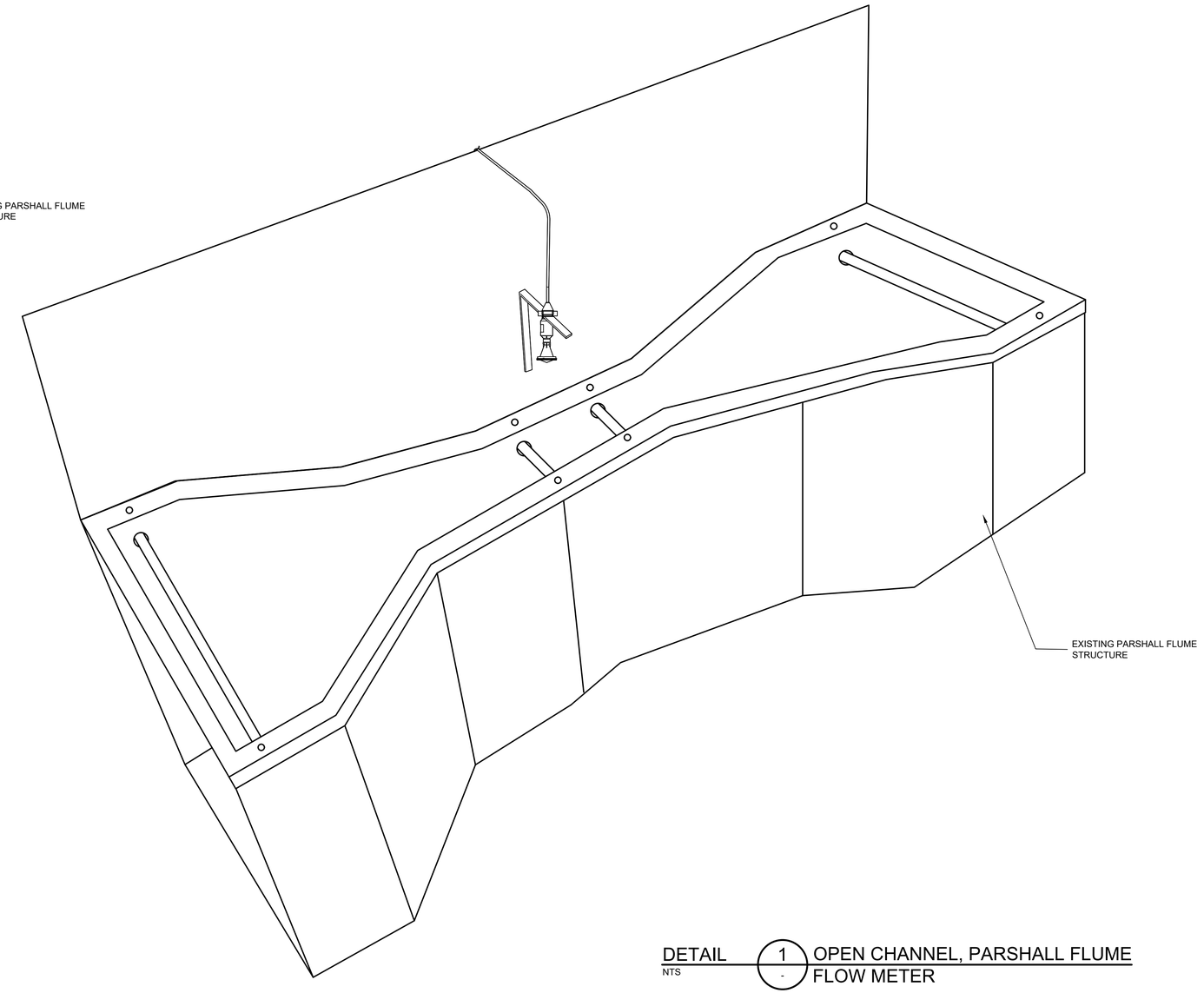
Bruce Power Sheet No.
**NK37-DRAW-66400-10004**

Sheet No.
**IC-110**
Sheet **42** of **44**

Plot Date: 10 March 2021 - 5:12 PM Plotted By: Neil Hamilton CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000si\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)IC\11185554-02(004)IC-WA010.dwg




RADAR/ ULTRASONIC
SENSOR MOUNTING




DETAIL 1 - NTS — OPEN CHANNEL, PARSHALL FLUME FLOW METER

NOTES:

1. USE EXISTING FITTING TO INSTALL THE NEW SENSOR.
2. EXISTING FITING IS FOR 2" NPT. IT MAY REQUIRE ADAPTER FOR CONNECTION.
3. CONDUIT (AND CABLE) ENTRY CONNECTION TO THE INSTRUMENT SHALL BE 300MM FLEXIBLE, THE BALANCE IN RIGID CONDUIT

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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| C | ISSUED FOR RFP | NG | LT | 02/07/20 |
| B | 100% DESIGN REVIEW | NG | LT | 12/16/19 |
| A | 90% DESIGN REVIEW | NG | LT | 11/04/19 |

| | | | |
|---|---|---|---|
| Drawn | N.GIDDY | Designer | L. TOOSI |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
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Original Size
**ANSI D**

Bar is 20mm on original size drawing
0 — 20mm

Project No. **11185554-02**

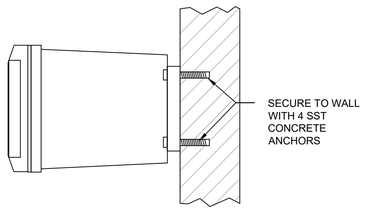
Title
**SEWAGE PROCESSING PLANT INSTRUMENTATION INSTALLATION DETAILS (1 OF 2)**

Bruce Power Sheet No.
**NK37-DRAW-67960-10007**

Sheet No.
**IC-111**
Sheet **43** of **44**

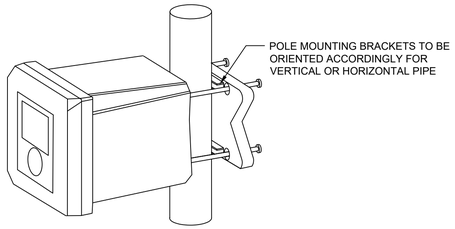
Plot Date: 10 March 2021 - 5:12 PM Plotted By: Neil Hamilton CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\111855554-02(004)IC\11185554-02(004)IC-WA011.dwg

EXISTING SYSTEM

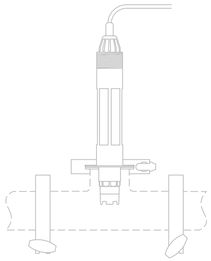


SECURE TO WALL WITH 4 SST CONCRETE ANCHORS

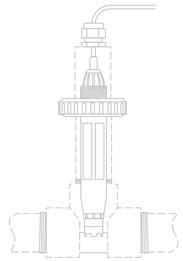
WALL MOUNT



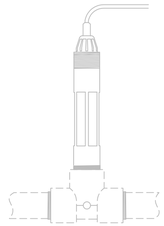

PIPE MOUNT



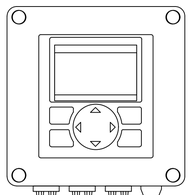
SENSOR SANITARY MOUNT



SENSOR UNION MOUNT



SENSOR FLOW-THROUGH MOUNT



TRANSMITTER/CONTROLLER

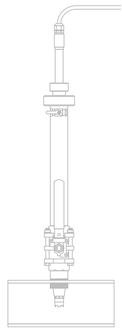




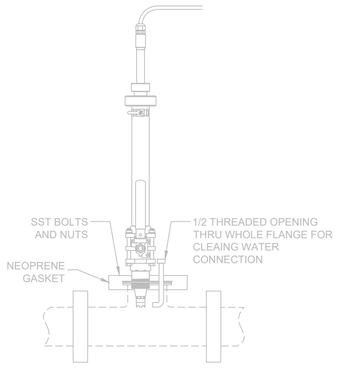

CONDUCTIVITY / pH SENSOR

NOTES:

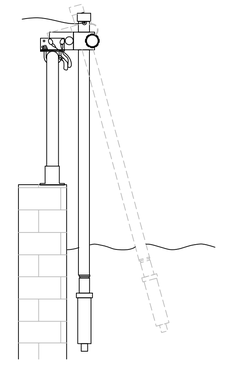
1. LOCATE INSTRUMENTS AS SHOWN ON PLANS.
2. MANUFACTURER'S MOUNTING HARDWARE AND BRACKET TO BE USED. STAINLESS HARDWARE TO BE USED.
3. CONDUIT (AND CABLE) ENTRY CONNECTION TO THE INSTRUMENT SHALL BE 900mm FLEXIBLE, THE BALANCE IN RIGID CONDUIT.



SENSOR INSERTION MOUNT




SENSOR INSERTION IN FLANGE MOUNT



SENSOR IMMERSION MOUNT

DETAIL 2 - CONDUCTIVITY / pH TRANSMITTER INSTALLATION
NTS

DETAIL 3 - CONDUCTIVITY / pH SENSOR MOUNTING
NTS

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Waterloo Ontario N2L 3X2 Canada
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**177 TIE ROAD, TIVERTON, ON**

Project
**SPP CONTROLS UPGRADE**

| No. | Issue | Drawn | Approved | Date |
|---|---|---|---|---|
| C | ISSUED FOR RFP | NG | LT | 02/07/20 |
| B | 100% DESIGN REVIEW | NG | LT | 12/16/19 |
| A | 90% DESIGN REVIEW | NG | LT | 11/04/19 |

| | | | |
|---|---|---|---|
| Drawn | N.GIDDY | Designer | L. TOOSI |
| Drafting Check | B. PLETZ | Design Check | M. CADACIO |
| Project Manager | C. EVEREST | Date | 07/05/19 |
| This document shall not be used for construction unless signed and sealed for construction. | | Scale | NTS |
| Original Size | ANSI D | Bar is 20mm on original size drawing | 0 — 20mm |

Project No. **11185554-02**

Title
**SEWAGE PROCESSING PLANT INSTRUMENTATION INSTALLATION DETAILS (2 OF 2)**

Bruce Power Sheet No.
**NK37-DRAW-67960-10008**

Sheet No.
**IC-112**
Sheet **44** of **44**

Plot Date: 10 March 2021 - 5:13 PM Plotted By: Neil Hamilton CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11185000s\11185554\11185554-REPORTS\11185554-02(004)\11185554-02(004)\IC\11185554-02(004)IC-WA012.dwg