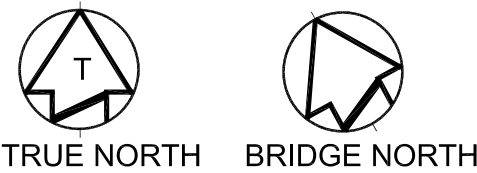
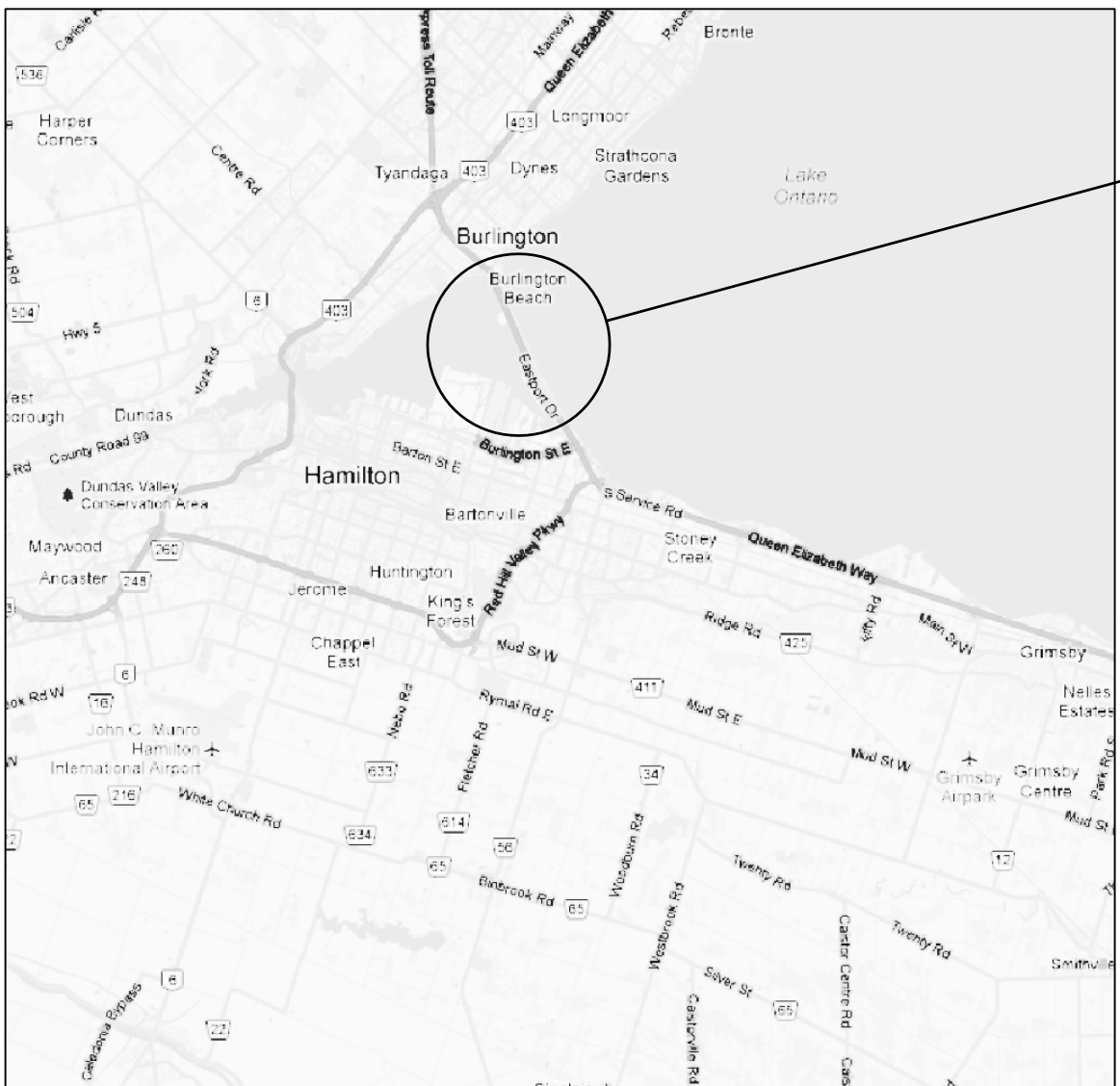




PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

ONTARIO REGION



PROJECT LOCATION

KEY PLAN

BURLINGTON CANAL VERTICAL LIFT BRIDGE
1157 Beach Boulevard – Hamilton, Canada L8H 6Z9
REPLACEMENT OF CONTROLS,
DRIVES, AND OVERHEAD CABLES

Canada PWGSC Proj. No.: R.012641.001

LIST OF DRAWINGS

FOR TENDER



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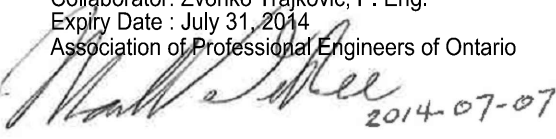
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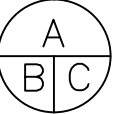
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Do not scale drawings.
Verify all dimensions and conditions on site and
immediately notify the Departmental Representative
of all discrepancies.



A

Detail No.
No. du détail

B

drawing no. - where detail required
dessin no. - où détail exigé

C

drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet

HAMILTONONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
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INDEX OF SHEETS

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GL-01

ABBREVIATIONS

A: AMPERES.
AB: ANCHOR BOLT.
ABBR: ABBREVIATIONS.
AC: ALTERNATING CURRENT.
A/C: AIR CONDITIONER.
AEC: ARCHITECTURALLY EXPOSED CONCRETE.
AESS: ARCHITECTURALLY EXPOSED STRUCTURAL STEEL.
AF: FACTORED AXIAL LOAD IN KIPS (KN)(+ INDICATES TENSION, - INDICATES COMPRESSION).
AFF: ABOVE FINISHED FLOOR.
AL: ALUMINUM.
ALT: ALTERNATE.
APPROX: APPROXIMATE.
ANOD: ANODIZED.
ARCH: ARCHITECTURE.
AROD: ANCHOR ROD.
ATS: AUTOMATIC TRANSFER SWITCH.
AUTO: AUTOMATIC.
AUX: AUXILIARY.
AVG: AVERAGE.
AWG: AMERICAN WIRE GUAGE.

B: BASE.
BCP: BORED CONCRETE PILE.
BET: BETWEEN.
BEW: BOTTOM EACH WAY.
BG: BARRIER GATE.
BKR: BREAKER.
BL: BLOWER.
BLL: BOTTOM LOWER LAYER.
BLDG: BUILDING.
BLK: BLOCK.
BLKD: BULKHEAD.
BLR: BLOWER.
BM: BEAM.
BOC: ELEVATED BOTTOM OF CAISSON (BORED CONCRETE PILE).
BOF: ELEVATED BOTTOM OF FOOTING.
BOP: ELEVATED BOTTOM OF PILE.
BOT: BOTTOM.
BP: BEARING/BASE PLATE.
BRG: BEARING.
BSMT: BASEMENT.
BUL: BOTTOM UPPER LAYER.
BUP: BOTTOM OF UNDERPINNING.

C: CONDUIT.
CA: COLUMN ABOVE ONLY (NO COLUMN BELOW).
CAB: CABINET.
CAM: CAMBER.
CANTIL: CANTILEVER.
CB: CIRCUIT BREAKER.
CB: COLUMN BELOW.
CC: CENTRE TO CENTRE.
CEL: CUT OFF ELEVATION FOR PILES.
CF: CONCRETE FIREPROOFED.
CIP: CAST-IN-PLACE.
CHAN: CHANNEL.
CJ: CONSTRUCTION JOINT.
CK: CORK.
CKT: CIRCUIT.
CL: CENTRELINE.
CLR: CLEAR.
CNT: STEEL DECK CORE NOMINAL THICKNESS.
COL: COLUMN.
CONC: CONCRETE.
CONT: CONTINUOUS.
CONT J: CONTROL JOINT.
COMP: COMPOSITE.
COMPL: COMPLETE.
CM: CENTIMETRE (NURSERY STOCK).
CP: CONTROL PANEL.
CP: CONNECTION PLATE.
CR: CONTACT RELAY.
CT: CERAMIC TILE.
CU: COPPER.
CUR: CURRENT.
CVT: CONDUCTIVE VINYL TILE.
C/W: COMPLETE WITH.

D: DEEP.
DC: DIRECT CURRENT.
DCA: DRILLED CONCRETE ANCHOR.
DEG: DEGREE.
DET: DETAIL.
DEV: DEVICE.
D.F-L: DOUGLAS FIR-LARCH.
DIA: DIAMETER.
DIFL: DIFFERENTIAL LOCK
DIM: DIMENSION.
DISC: DISCONNECT.
DISTR: DISTRIBUTION.
DL: DEAD LOAD.
DMA: DRILLED MASONRY ANCHOR.
DN: DOWN.
DO: DITTO.
DP: DEEP.
DS: DISCONNECT SWITCH.
DWG: DRAWING.
DWL: DOWEL.

E: ENCODER.
EA: EACH.
EC: EMPTY CONDUIT.
ECR: EPOXY COATED REINFORCEMENT.
EE: EACH END.
EF: EACH FACE.
EL/ELEV: ELEVATION.
ELEC: ELECTRIC.
ELEV: ELEVATOR.
EM: EMERGENCY.
EMBED: EMBEDMENT.
EMT: ELECTRIC METALLIC TUBING.
ENCL: ENCLOSURE.
EQ: EQUAL.
EQPT: EQUIPMENT.
EXH: EXHAUST.
EXIST: EXISTING.
EXPJ/EJ: EXPANSION JOINT.
EXP STRUCT: EXPOSED STRUCTURE.
E-STOP: EMERGENCY STOP.

FBO: FURNISH BY OTHERS.
FC: COMPRESSIVE STRENGTH OF CONCRETE IN MPA.
FD: FLOOR DRAIN.
FDN: FOUNDATION.
FDR: FEEDER.
FF: FAR FACE.
FIN: FINISH.
FL: FLOOR OR FLASHER.
FLD: FIELD.
FLEX: FLEXIBLE.
FLUOR: FLUORESCENT.
FMC: FULL MOMENT CONNECTION.
FR: FRAME.
FRR: FIRE RESISTANCE RATING.
FS: FOOT SWITCH OR FULLY SEATED
FTG: FOOTING.
FU: FUSE.
FUT: FUTURE.
FVMR: FULL VOLTAGE NON-REVERSING.
FVR: FULL VOLTAGE REVERSING.
FY: YIELD STRENGTH IN MPA.

G: GATE.
GA: GUAGE.
GALV: GALVANIZED STEEL.
GB: GRADE BEAM.
GC: GENERAL CONDITIONS.
GEN: GENERATOR.
GFCI: GROUND FAULT CIRCUIT INTERRUPTER.
GL: GRIDLINE.
GND: GROUND.
GR: GREEN
GT: GLASS TILE.
GSC: GALVANIZED STEEL CONDUIT.

H: HOT
HA: HAND AUTO.
HDG: HOT DIPPED GALVANIZED.
HDW: HARDWARE.
HDWD: HARDWOOD.
HEF: HORIZONTAL EACH FACE.
HH: HOOK-HOOK (HOOK EACH END).
HIC: HORIZONTAL IN CENTRE.
HK: HOOK.
HOA: HAND-OFF-AUTO
HOR: HORIZONTAL.
HPA: HAMILTON PORT AUTHORITY.
HR: HOUR.
HS: HAND SWITCH.
HSB: HIGH STRENGTH BOLT.
HT: HEIGHT.
HTR: HEATER.
HV: HIGH VOLTAGE.
HYD: HYDRANT.
HZ: HERTZ.

IBA: INTEGRITY BARS ADDED.
IBE: INTEGRITY BARS EXTERIOR.
IBI: INTEGRITY BARS INTERIOR.
ID: INSIDE DIAMETER.
IL: INDICATING LIGHT.
INCL: INCLINOMETER.
INS: INSULATION.
INTLK: INTERLOCK.
I/O: INPUT/OUTPUT.
IR: CURRENT RELAY

JB: JUNCTION BOX.
JG: JOIST GIRDER.
JT: JOINT.

K: KEY PAD/KEY OPERATED.

L: SINGLE ANGLE.
L: LATCHING.
LC: LOAD CENTRE OR LIGHTING CONTACTOR.
LD: TENSION DEVELOPMENT LENGTH OF REBAR.
LDC: COMPRESSION DEVELOPMENT LENGTH OF REBAR.
LE: LEFT END.
LED: LIGHT EMITTING DIODE.
LFMC: LIQUIDTIGHT FLEXIBLE METAL CONDUIT.
LG: LONG/LENGTH.
LINO: LINOLEUM.
LL: LOWER LEVEL BM/JOIST; LIVE LOAD IN PSF.
LLH: LONG LEG HORIZONTAL.
LLV: LONG LEG VERTICAL.
LP: LIGHTING PANEL.
LP: LOW POINT.
LR: LATCHING RELAY.
LSC: LIQUID-TIGHT FLEXIBLE METAL CONDUIT.
LSH: LONG SIDE HORIZONTAL.
LSV: LONG SIDE VERTICAL.
LT: LIGHT.
LTG: LIGHTING.
LUM: LUMINAIRE.

MA: MASTER.
MAB: MACHINERY BRAKE.
MAX: MAXIMUM.
MCC: MOTOR CONTROL CENTRE.
MCP: MOTOR CONTROL PANEL.
MCR: MOTOR CONTROL RELAY.
MACH: MACHINERY.
MECH: MECHANICAL.
MET: METAL.
MF: MOTOR FORWARD CONTACT.
MF: FACTORED MOMENT IN KIP FT.
MFR: MANUFACTURER.
MH: MAINTENANCE HOLE.
MIN: MINIMUM.
MISC: MISCELLANEOUS.
MLP: METAL LATH AND PLASTER.
MOB: MOTOR BRAKE.
MR: MOTOR REVERSE CONTACTOR.
MS: MOTOR STARTER.
MTD: MOUNTED.
MTF: FACTORED TORSION IN KIP FT.
MTG: MOUNTING.
MTR: MOTOR.
MTS: MANUAL TRANSFER SWITCH
MVA: MEGAVOLT-AMPERE.

MW: MEGAWATT.

N: NEUTRAL OR NORTH.
NA: NOT APPLICABLE.
NBC: NATIONAL BUILDING CODE.
NC: NORMALLY CLOSED.
NE: NORTHEAST.
NEUT: NEUTRAL.
NF: NEAR FACE.
NFC: NATIONAL FIRE CODE.
NIC: NOT IN CONTRACT.
NMC: NON-METALLIC CONDUIT.
NO.: NUMBER.
NO: NORMALLY OPEN.
NUSK: NORTH ULTIMATE SKEW
NTS: NOT TO SCALE.
NW: NORTHWEST.

OBC: ONTARIO BUILDING CODE.
OC: ON CENTRE.
OD: OUTSIDE DIAMETER.
OL: OVERLOAD.
OO: OUT TO OUT.
OPNG: OPENING.
OPR: OPERATOR.
OVHD: OVERHEAD.

P: PREFINISHED.
P: POINT LOAD IN KIPS.
P.A.: PUBLIC ADDRESS.
PB: PULL BOX.
PCC: PRECAST CONCRETE.
PE: PHOTOELECTRIC.
PG: PEDESTRIAN GATE.
PH: PHASE.
PL: PLATE.
PLC: PROGRAMMABLE LOGIC CONTROLLER.
PLYWD: PLYWOOD.
PNL: PANEL.
PR: PAIR.
PREFAB: PREFABRICATED.
PREFIN: PREFINISHED.
PRFL: PROFILE.
PS: POWER SUPPLY.
PSF: POUNDS PER SQUARE FOOT.
PT: PAINT.
PVC: POLYVINYL CHORIDE.
PWR: POWER.

R: RADIUS OR RAISED.
RA: ROCK ANCHOR.
RC: REINFORCED CONCRETE.
RCPT: RECEPTACLE.
RD: ROOF DRAIN.
REINF: REINFORCED/REINFORCING.
REL: RELEASE.
REQD: REQUIRED.
REQT: REQUIREMENT.
REV: REVSION.
RF: RIGHT FRAME.
RF: FACTORED VERTICAL REACTION IN KIPS.
RGS: RIGID HOT DIPPED GALVANIZED STEEL.
RHF: FACTORED HORIZONTAL REACTION IN KIPS.
RM: ROOM.

S: SMOKE DETECTOR OR SOUTH.
SAN SEW: SANITARY SEWER.
SC: SHORT CIRCUIT.
SCA: STEEL COLUMN ABOVE (NO STEEL COLUMN BELOW).
SCHD: SCHEDULE.
SCRN: SCREEN.
SDF: STEP DOWN FOOTING IN DIRECTION OF ARROW.
SDT: STATIC DISSIPATIVE TILE.
SE: SOUTHEAST.
SECT: SECTION.
SHLD: SHIELD.
SIM: SIMILAR.
SJ: STEEL JOIST.
SL: SLAVE.
SL: SLAB.
SLR: SEALER.
SLS: SERVICEABILITY LIMIT STATE.
SM: SURFACE MOUNT.
SOG: SLAB ON GRADE.
SP: SPARE.
SPA: SPACES.

SPF: SPRUCE PINE FIR.
SPL: SPAN LOCK.
SPEC: SPECIFICATION.
SPSW: SPEED SWITCH.
SS: STAINLESS STEEL.
STD: STANDARD.
STIR: STIRRUP.
STIFF: STIFFENER.
STL: STEEL.
STL BM: STEEL BEAM.
STL FL DK: STEEL FLOOR DECK.
STL PL: STEEL PLATE.
STR: STRUCTURE OR STRUCTURAL.
SUSK: SOUTH ULTIMATE SKEW
SW: SOUTHWEST.
SWBD: SWITCHBOARD
SWT: SWITCH
SWGR: SWITCHGEAR.

T: TOP.
T: THICKNESS.
TBR: TO BE REMOVED.
T&B: TOP AND BOTTOM.
TC: TERMINATION CABINET.
TEL: TELEPHONE.
TEW: TOP EACH WAY.
TG: TRAFFIC GATE.
THK: THICK.
THKNS: THICKNESS.
THR: THRESHOLD.
TJ: TIE JOIST.
TL: TRAFFIC LIGHT.
TLE: TOP LEFT END.
TL: TOP LOWER LAYER.
TMPD: TEMPERED.
TOC: TOP OF CAISSON (BORED CONCRETE PILE).
TOF: TOP OF FOOTING.
TOP: TOP OF PILE.
TOPG: TOPPING.
TPC: TOP OF PILE CAP.
TR: TIME RELAY.
TRE: TOP RIGHT END.
TRANSF: TRANSFORMER.
TRANSV: TRANSVERSE.
TS: TEMPERATURE SWITCH/THERMOSTAT.
TSP: TWISTED SHIELDED PAIR
TUL: TOP UPPER LEVEL.
TWR: TOWER.
TYP: TYPICAL.

U: UNLATCHING.
UGRD: UNDERGROUND.
ULS: ULTIMATE LIMIT STATE.
U/N: UNLESS NOTED.
UNO: UNLESS NOTED OTHERWISE.
UOS: UNLESS OTHERWISE SPECIFIED.
UPS: UNINTERRUPTIBLE POWER SUPPLY.
UPT: UPTURNED.
U/S: UNDERSIDE.

V: VERTICAL.
U/S: UNDERSIDE.
VA: VOLTAGE AMPERE.
VAC: VOLTAGE ALTERNATING CURRENT.
VB: VERTICAL BRACING.
VERT: VERTICAL.
VERT EF: VERTICAL EACH FACE.
VF: FACTORED SHEAR IN KIPS.
VFD: VARIABLE FREQUENCY DRIVE.
VIC: VERTICAL IN CENTRE.
VSC: VERTICALLY SLOTTED CONNECTION TO ALLOW FOR DEFLECTION.
VSF: VINYL SHEET FLOORING.
VT: VINYL TILE.
VXB: VERTICAL "X" BRACING.

W: WATT.
W: WIDE FLANGE.
W/: WITH.
W/O: WITHOUT.
WC: WIND COLUMN.
WD: WOOD.
WDV: WOOD VENEER.
WH: WALL HYDRANT.
WHMIS: WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM.
WP: WATERPROOFING.
WR: WASHROOM.

WSIB: WORKPLACE SAFETY AND INSURANCE BOARD.
WT: WEIGHT.
WTP: WATER TREATMENT PLANT.
WWA: WINDOW WASHING ANCHORS.
WWF: WELDED WIRE FABRIC.

XFMR: TRANSFORMER.

ZI: POSITION CURRENT SWITCH.
ZIY: POSITION INDICATING CONVERTER
ZRP: ZINC RICH PAINT.
ZS: POSITION LIMIT SWITCH.
ZT: POSITION TRANSMITTER
ZX: POSITION ELEMENT



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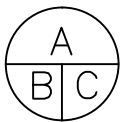
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Mark VanDeRee 2014-07-07



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
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project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

ABBREVIATIONS

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

approved by
approuvé par M. VanDeRee

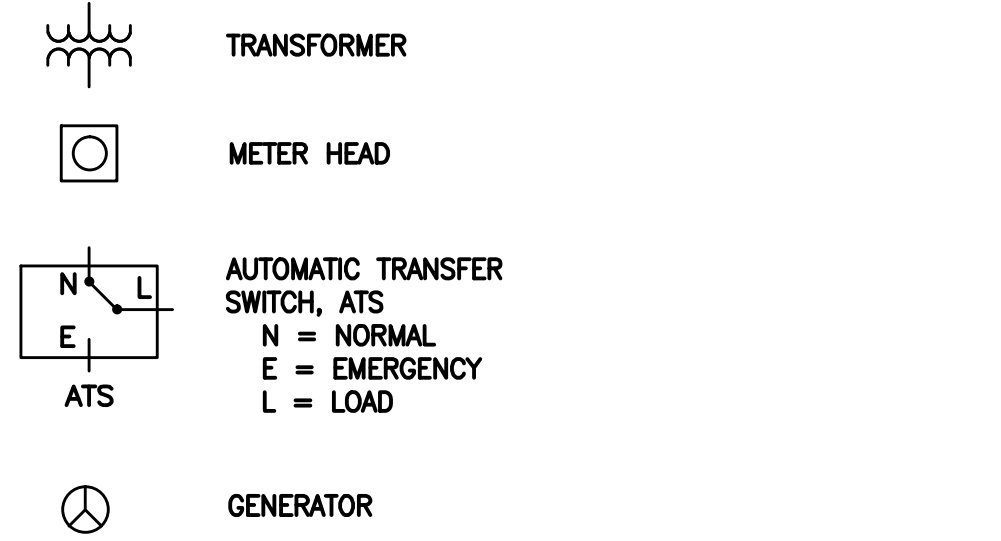
bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

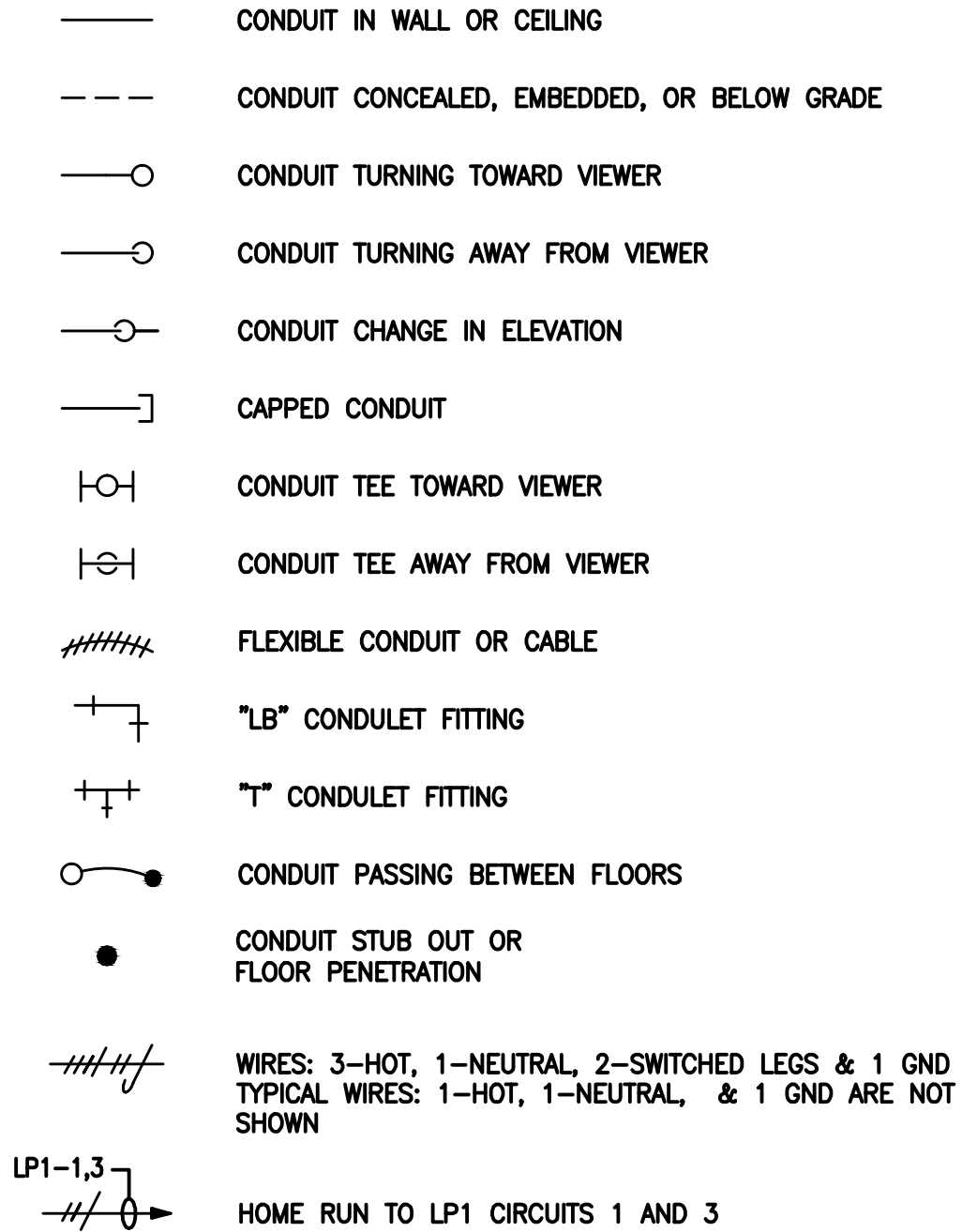
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no. du projet R.012641.001

drawing no.
dessiné no. GL-02

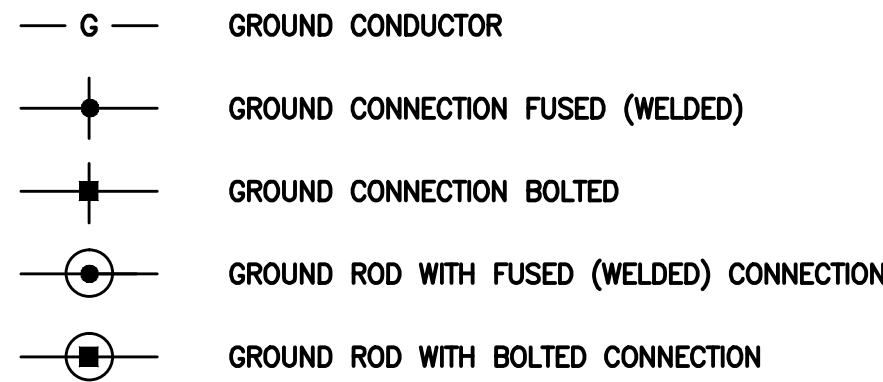
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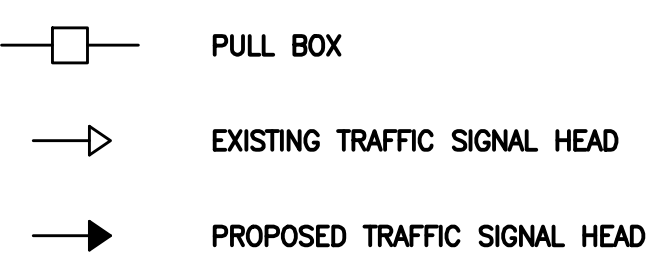
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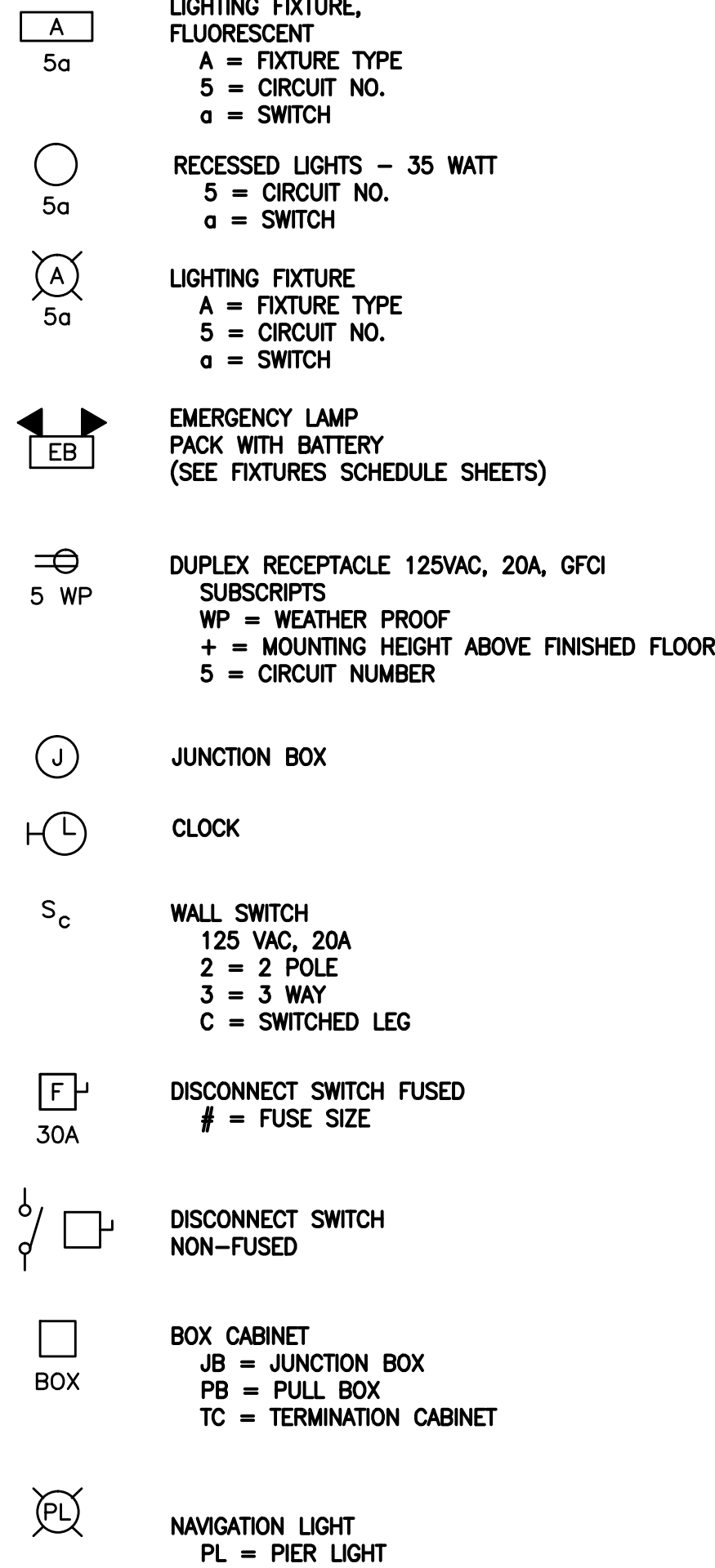
GROUNDING



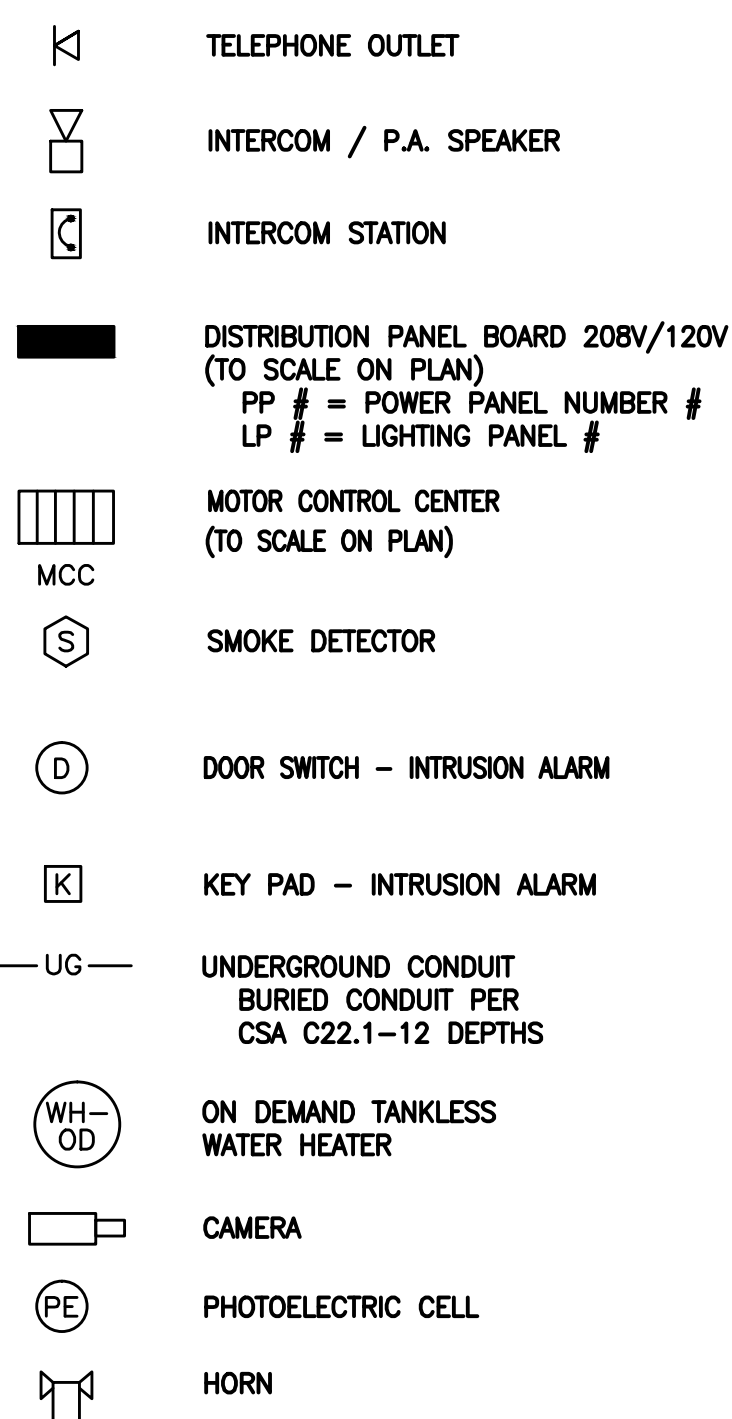
TRAFFIC



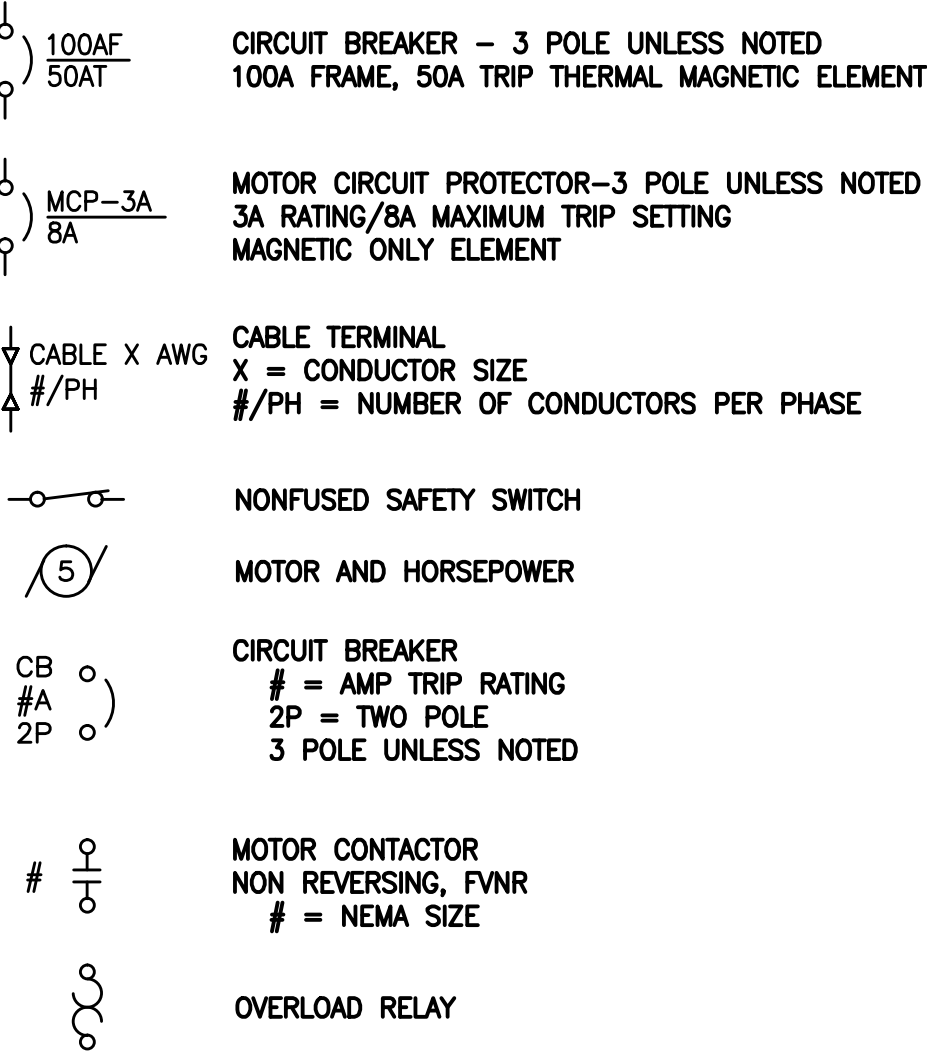
FIXTURES AND DEVICES



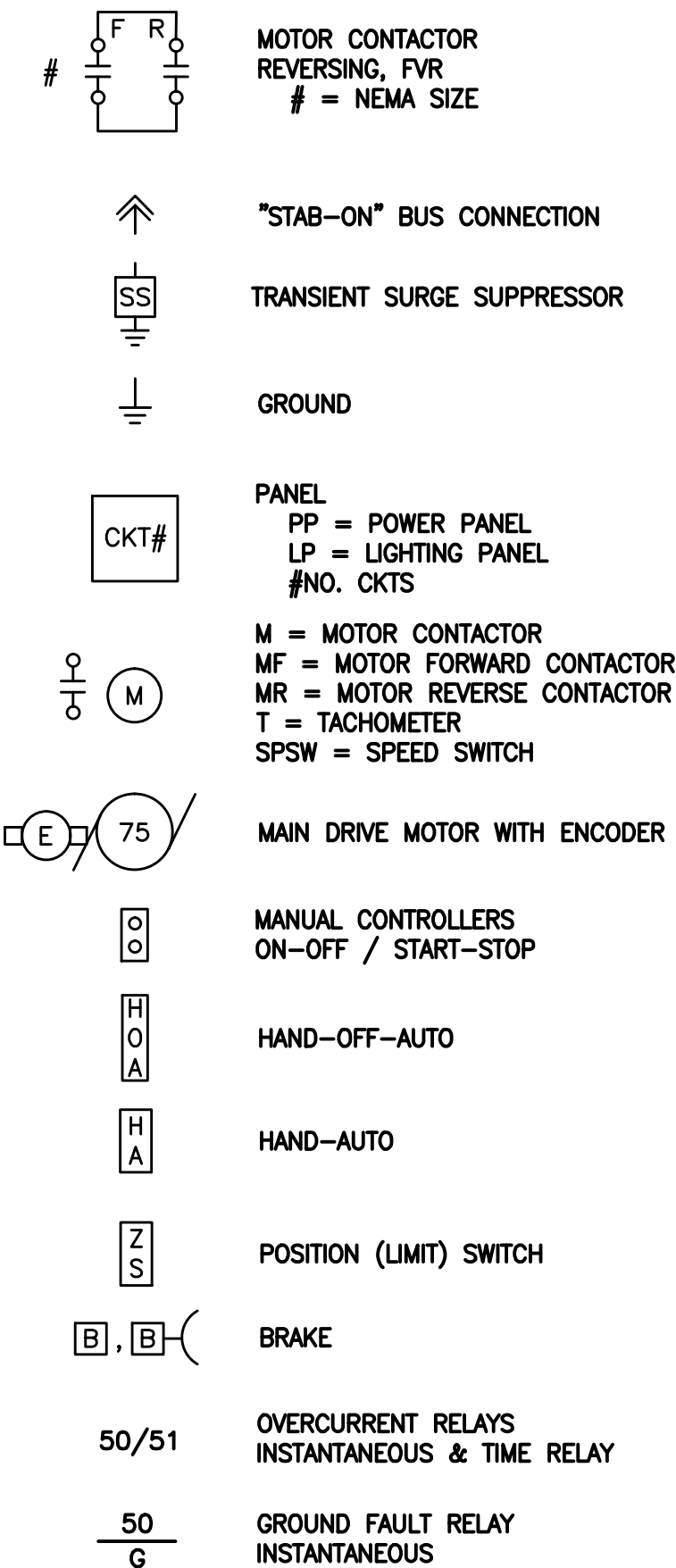
FIXTURES AND DEVICES (CONTINUED)



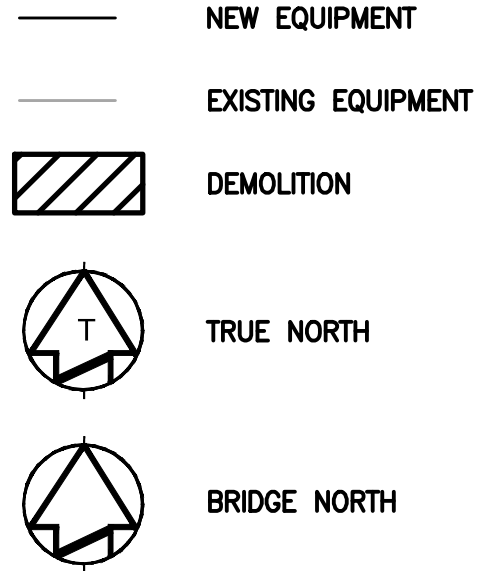
ONE LINE DIAGRAMS



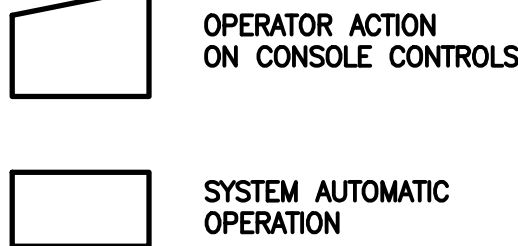
ONE LINE DIAGRAMS (CONTINUED)



GENERAL DRAWING LEGEND



OPERATING SEQUENCE



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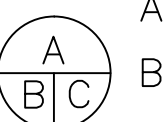
 Professional Engineers Ontario

Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
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titre du projet

HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
ONTARIO

REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

ELECTRICAL SYMBOLS 1

drawn by
dessiné par

J. Perez

designed by
conçu par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid submission
soumission

A. Ghubril

project manager
administrateur de projets

project date
date du projet

2013-05-31

project no.
no. du projet

R.012641.001

drawing no.
dessiné no.

E-01

ONE LINE DIAGRAMS (CONTINUED)

	POTENTIAL TRANSFORMER
	FUSE
	CURRENT TRANSFORMER
	AMMETER SWITCH
	VOLTMETER SWITCH
	AMMETER
	VOLTMETER
	WATT TRANSDUCER
	LINE/LOAD REACTOR
	KILOWATT METER
	MOTOR BLOWER
	GENERATOR
	CONTACTOR
	THERMOSTAT

SCHEMATIC DIAGRAMS

	PLC RELAY OUTPUT
	PLC RELAY OUTPUT W/ MOV SUPPRESSOR
	PLC DISCRETE INPUT
	PLC ANALOG INPUT
	PLC ANALOG OUTPUT
	MOTOR STARTER
	MOTOR CONTROL CENTRE SOUTH TOWER
	MOTOR CONTROL CENTRE NORTH TOWER
	CONTROL PANEL 1 (CP-1, MAIN BRIDGE CONSOLE)
	CONTROL PANEL 2 (CP-2, CONTROL PANEL)
	CONTROL PANEL 3 (CP-3, SOUTH I/O PANEL)
	CONTROL PANEL 4 (CP-4, NORTH I/O PANEL)
	NAVIGATION, PEDESTRIAN SIGNAL AND TRAFFIC SYSTEM CONTROL CONSOLE (CP-5)
	NAVIGATION, PEDESTRIAN SIGNAL AND TRAFFIC SYSTEM CONTROL PANEL (CP-6)
	NOT USED
	SOUTH TOWER AUXILIARY DRIVE HEIGHT METER PANEL (CP-8)
	NORTH TOWER AUXILIARY DRIVE HEIGHT METER PANEL (CP-9)
	DRIVE SYSTEM PANEL
	AERIAL CABLE INCLUDING: FROM TERMINAL BOX TO CABLE TO TERMINAL BOX (SEE NOTE 1)
	CABLE REEL
	MOTOR 1E DRIVE CABINET (SOUTH TOWER)
	MOTOR 3E DRIVE CABINET (NORTH TOWER)
	MOTOR 2W DRIVE CABINET (SOUTH TOWER)

SCHEMATIC DIAGRAMS (CONTINUED)

	MOTOR 4W DRIVE CABINET (NORTH TOWER)
	GATE OPERATOR
	SPAN LOCK OPERATOR (LOCAL CONTROL)
	EMERGENCY GEN. PANEL
	AUTO TRANSFER SWITCH
	FIELD MOUNTED EQUIPMENT TERMINAL (LIMIT SWITCH, ETC.)
	ENCODER
	PANEL WIRING
	FIELD WIRING
	SHIELDED TWISTED PAIR
	CONDUIT TEE (MAIN RUN TO AND FROM VIEWER)
	CIRCUIT BREAKER # = AMP TRIP RATING 2P = TWO POLE 3 POLE UNLESS NOTED

POSITION (LIMIT) SWITCHES – ZS

	NORMALLY CLOSED
	NORMALLY CLOSED HELD OPEN
	NORMALLY OPEN
	NORMALLY OPEN HELD CLOSED
	LIMIT SWITCHES ARE SHOWN WITH BRIDGE LOWERED, LOCKS ENGAGED AND TRAFFIC GATES UP

PRESSURE OR VACUUM SWITCH – PS

	NORMALLY OPEN CLOSED ON RISING PRESSURE
	NORMALLY CLOSED OPEN ON RISING PRESSURE

TEMPERATURE SWITCH OR THERMOSTAT – TS

	NORMALLY OPEN CLOSED ON RISING TEMPERATURE
	NORMALLY CLOSED OPEN ON RISING TEMPERATURE
	HEATER

LEVEL (FLOAT) SWITCH – LS

	NORMALLY OPEN CLOSED ON RISING LEVEL
	NORMALLY CLOSED OPEN ON RISING LEVEL

SCHEMATIC DIAGRAMS (CONTINUED)

	HAND SWITCHES – HS
	TOGGLE SWITCH
	SELECTOR SWITCH
	X CONDUCTING POSITION
	NORMAL DRIVE PULL
	SPRING RETURN TO CENTRE
	PUSH BUTTON
	NORMALLY OPEN
	NORMALLY CLOSED
	PUSH BUTTON, MAINTAINED NORMALLY CLOSED PUSH TO OPEN

KEY OPERATED

	MAINTAINED
	SPRING RETURN MOMENTARY CONTACTS
	RAISE LOWER MOMENTARY SPRING LOADED SWITCH WITH MECHANICAL INTERLOCK ON CONTACTS
	FOOT SWITCH
	INDICATING LIGHT R = RED G = GREEN A = AMBER B = BLUE W = WHITE Y = YELLOW

	RELAY COIL DF = DEVICE FUNCTION 27 = UNDERVOLTAGE CR = CONTROL RELAY TR = TIME DELAY RELAY L = LATCHING (NOTE 2) U = UNLATCHING M = MOTOR CONTACTOR MF = MOTOR FORWARD CONTACTOR MR = MOTOR REVERSE CONTACTOR PE = PHOTOELECTRIC RELAY LR = LATCHING RELAY (NOTE 2) C = POWER CONTACTOR LC = LIGHTING CONTACTOR FL = FLASHER
--	--

	SOLENOID OPERATOR VALVE
--	-------------------------

RELAY CONTACTS

	NORMALLY OPEN CONTACT
	NORMALLY CLOSED CONTACT

SCHEMATIC DIAGRAMS (CONTINUED)

	TIME DELAY RELAY CONTACTS
	TIME DELAY CLOSED ON ENERGIZATION
	TIME DELAY OPEN ON ENERGIZATION
	TIME DELAY CLOSED ON DEENERGIZATION
	TIME DELAY OPEN ON DEENERGIZATION
	INTERLOCKS (PLC CONTROLLED)
	EASTBOUND TRAFFIC GATES
	WESTBOUND TRAFFIC GATES
	SPANLOCKS
	SPAN OPERATION
	THERMAL MOTOR OVERLOAD
	E3-OL ELECTRONIC MOTOR OVERLOAD

PLC LADDER LOGIC SYMBOLS

	INPUT INSTRUCTIONS
	EXAMINE IF OPEN
	4–20 mA ANALOG INPUT
	CNT * COUNTER * DN=COUNTS DOWN UP=COUNTS UP
	OUTPUT INSTRUCTIONS
	MESSAGE DISPLAYED ALARM MESSAGE

NOTE:

1. AERIAL CABLE SYMBOL FOR CONDUCTORS INCLUDES NORTH AND SOUTH TOWER'S CONTROL CABLE MANUAL TRANSFER SWITCH AND REDUNDANT CONDUCTORS. REFER TO CONTROL CABLE TRANSFER SCHEMATIC DIAGRAM 25 FOR CONNECTIONS.

2. LATCHING RELAY SHELF STATE IS IN THE LATCHED CONDITION.

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project title titre du projet	HAMILTON ONTARIO BURLINGTON CANAL VERTICAL LIFT BRIDGE REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES
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drawing title titre du dessin	ELECTRICAL SYMBOLS 2
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drawn by dessiné par	J. Perez
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designed by conc par	G. Patino/B. Crouthamel
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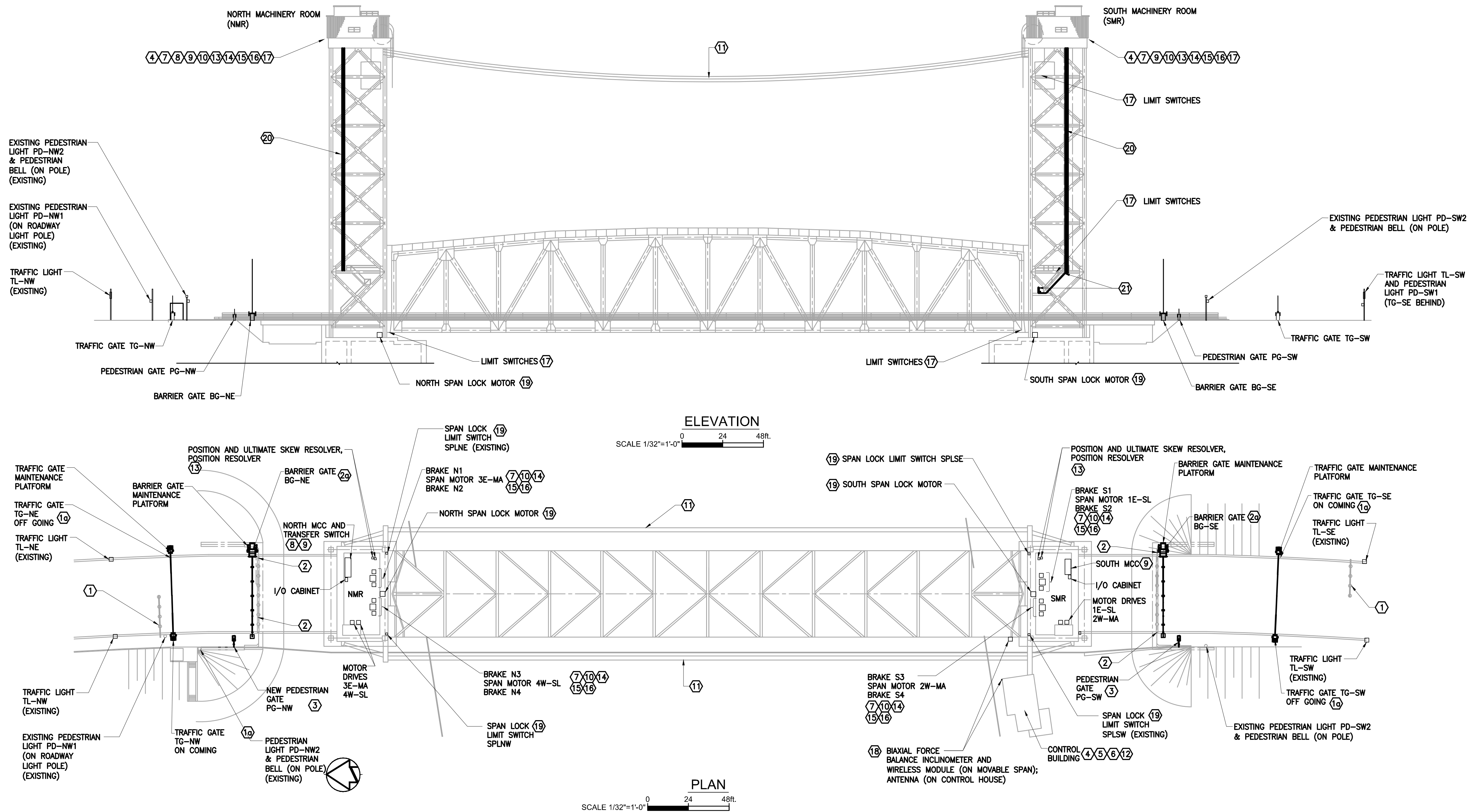
approved by approuvé par	M. VanDeRee
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bid soumission	A. Ghubril	project manager administrateur de projets
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project date date du projet	2013-05-31
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project no. no. du projet	R.012641.001
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drawing no. dessiné no.	E-02
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- 1 REMOVE EXISTING TRAFFIC GATES.
- 10 INSTALL NEW TRAFFIC GATES.
- 2 REMOVE EXISTING BARRIER/PEDESTRIAN GATES.
- 20 INSTALL NEW BARRIER GATES.
- 3 INSTALL NEW PEDESTRIAN GATES.
- 4 REMOVE EXISTING PLC CABINET. INSTALL NEW PLC CABINETS.
- 5 REMOVE EXISTING CONTROL CUBICLES.
- 6 REMOVE EXISTING MAIN DRIVE MOTOR RESISTORS.
- 7 REMOVE EXISTING MAIN DRIVE MOTORS. INSTALL NEW MAIN DRIVE MOTORS.
- 8 REMOVE EXISTING ATS SWITCH. INSTALL NEW ATS SWITCH.
- 9 REMOVE EXISTING MOTOR CONTROL CENTRE. INSTALL NEW MOTOR CONTROL CENTRE.
- 10 REMOVE EXISTING MOTOR DISCONNECT SWITCHES. REUSE DISCONNECT SWITCHES FROM EXISTING DRIVE MOTOR STATORS (PRIMARY WINDINGS) FOR NEW DRIVE MOTORS.
- 11 REMOVE EXISTING AERIAL CABLES. INSTALL NEW AERIAL CABLES EAST AND WEST.
- 12 REMOVE EXISTING UNINTERRUPTIBLE POWER SUPPLY (UPS). INSTALL NEW UNINTERRUPTIBLE POWER SUPPLY (UPS).
- 13 REMOVE EXISTING HEIGHT INDICATOR. INSTALL NEW POSITION AND ULTIMATE SKEW RESOLVER, AND POSITION RESOLVER. MODIFY EXISTING AUXILIARY DRIVE CONTROLS.
- 14 RELOCATE EXISTING AUXILIARY DRIVE PANELS. TWO TIMES DURING CONSTRUCTION. FIRST TO A TEMPORARY LOCATION. SECOND, TO THE FINAL LOCATION. ALL EXISTING AUXILIARY DRIVE EQUIPMENT TO REMAIN INTACT AND IN SERVICE EXCEPT AS NOTED IN THE PLANS.
- 15 INSTALL NEW VECTOR DRIVES.
- 16 INSTALL NEW BRAKING RESISTORS.
- 17 LIMIT SWITCHES: REMOVE FULLY SEATED LIMIT SWITCH, INSTALL AT ACCESSIBLE LOCATIONS NEW FULLY SEATED, NEARLY SEATED, NEARLY RAISED AND FULLY RAISED LIMIT SWITCHES.
- 18 INSTALL NEW BIAXIAL FORCE BALANCE INCLINOMETER, WIRELESS MODULE AND ANTENNA (ON MOVABLE SPAN). INSTALL ANTENNA ON CONTROL HOUSE.
- 19 SPAN LOCKS: INTERFACE AND CONNECT NEW POWER AND CONTROLS TO EXISTING SPAN LOCK MOTORS AND NEW & EXISTING LIMIT SWITCHES. REUSE EXISTING SPANLOCK MOTOR DISCONNECT SWITCHES, MOTORS, AND LIMIT SWITCHES. INSTALL NEW LEVER OPERATED LIMIT SWITCHES SPLSE AND SPLNW.
- 20 LADDER TYPE VERTICAL CABLE SUPPORT RACEWAY TO REMAIN.
- 21 ROUTE NEW CONDUITS AND CONDUCTORS FROM CONTROL ROOM TO TOWER IN EXISTING RACEWAY TRAY. SEE SHEET E-84 FOR DETAILS.
- 21 REFER ALL DISCIPLINES TO SPECIFICATIONS FOR SUGGESTED CONSTRUCTION SEQUENCE AND COMMISSIONING PROCESS.

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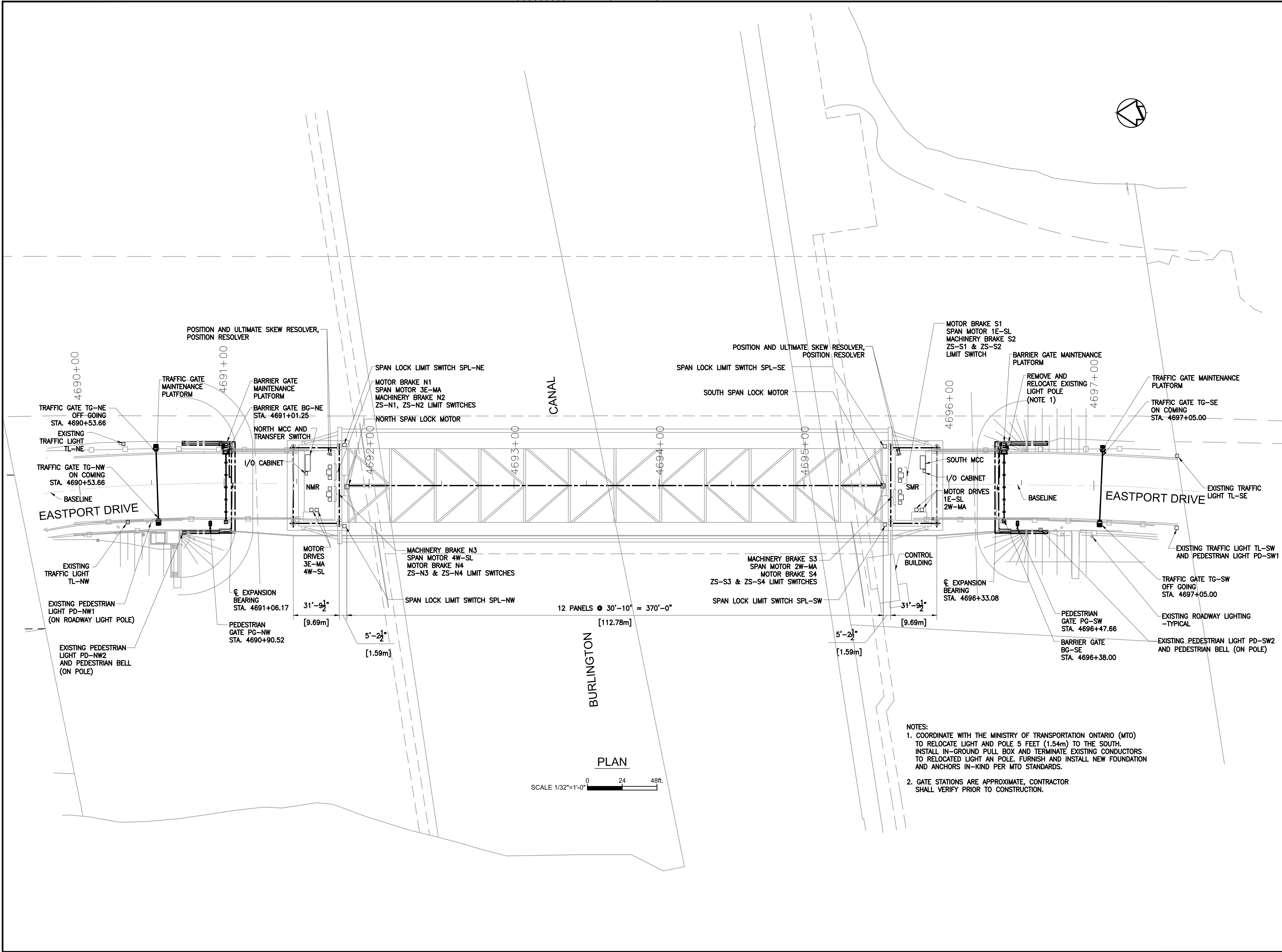
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titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
ELECTRICAL KEY PLAN AND ELEVATION

drawn by dessiné par	J. Perez	
designed by conc par	G. Patino/B. Crouthamel	
approved by approuvé par	M. VanDeRee	
bid soumission	A. Ghubril	project manager administrateur de projets
project date date du projet	2013-05-31	
project no. no. du projet	R.012641.001	
drawing no. dessiné no.	E-04	



NOTES:
1. COORDINATE WITH THE MINISTRY OF TRANSPORTATION ONTARIO (MTO) TO RELOCATE LIGHT AND POLE 5 FEET (1.54m) TO THE SOUTH. INSTALL IN-GROUND PULL BOX AND TERMINATE EXISTING CONDUCTORS TO RELOCATED LIGHT AN POLE. FURNISH AND INSTALL NEW FOUNDATION AND ANCHORS IN-KIND PER MTO STANDARDS.
2. GATE STATIONS ARE APPROXIMATE, CONTRACTOR SHALL VERIFY PRIOR TO CONSTRUCTION.

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Professional Engineers
Ontario

Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

Mark VanDeRee 2014-07-07

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HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE

REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

ELECTRICAL SITE PLAN

drawn by
dessiné par

J. Perez

designed by
conc par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur de projets

project date
date du projet

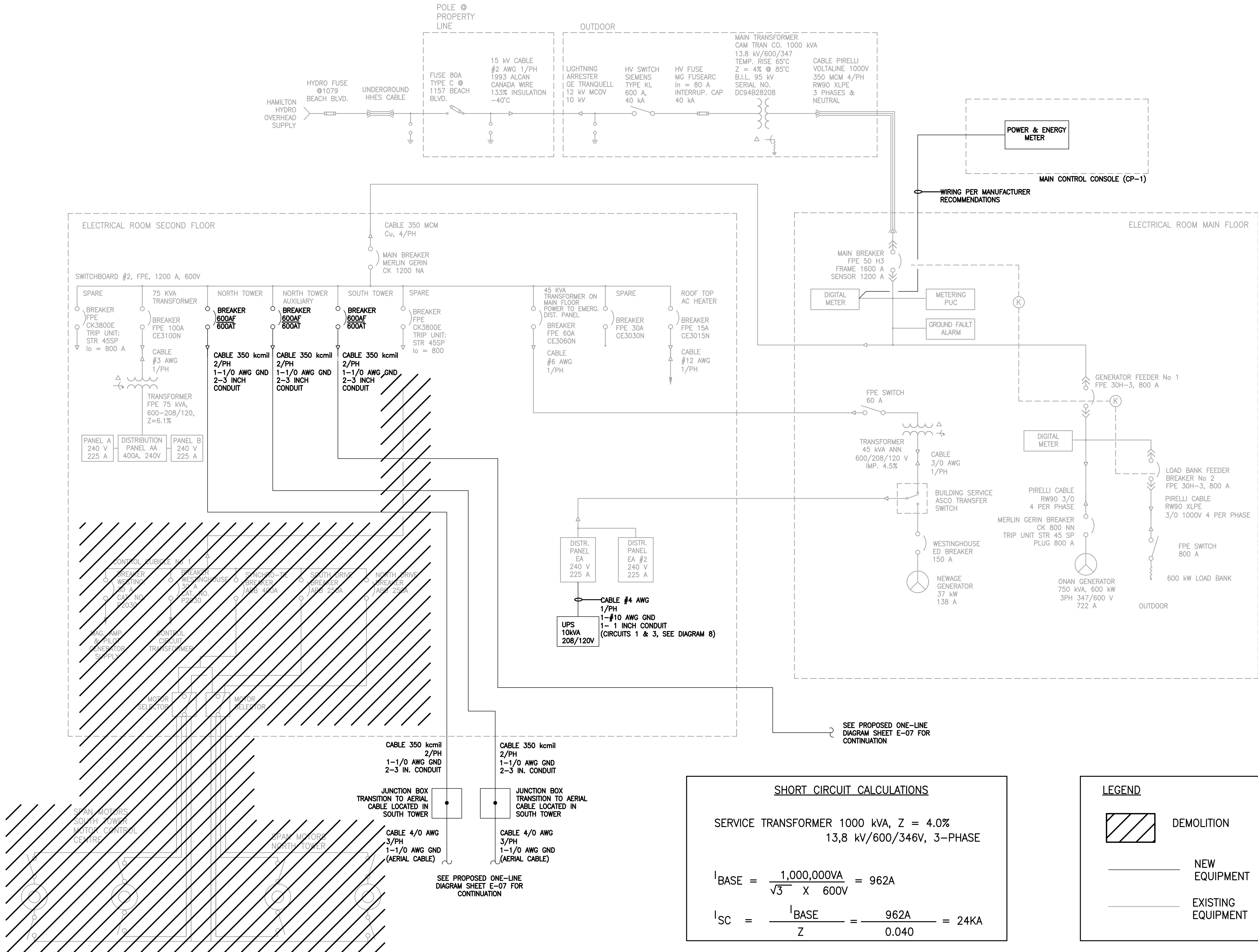
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Mark VanDeRee 2014-07-07

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HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE

REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

ONTARIO

drawing title
titre du dessin

ELECTRICAL ONE LINE DIAGRAM 1

drawn by
dessiné par

J. Perez

designed by
conc par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur de projets

project date
date du projet

2013-05-31

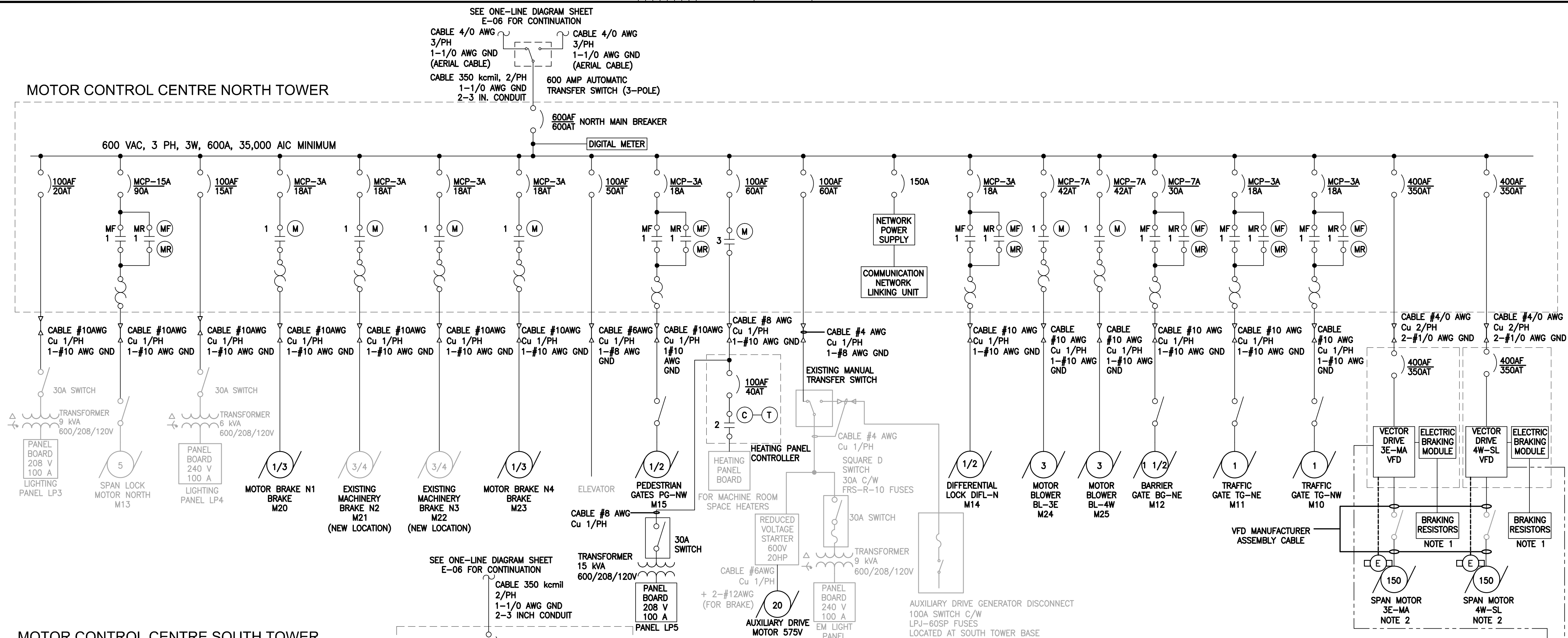
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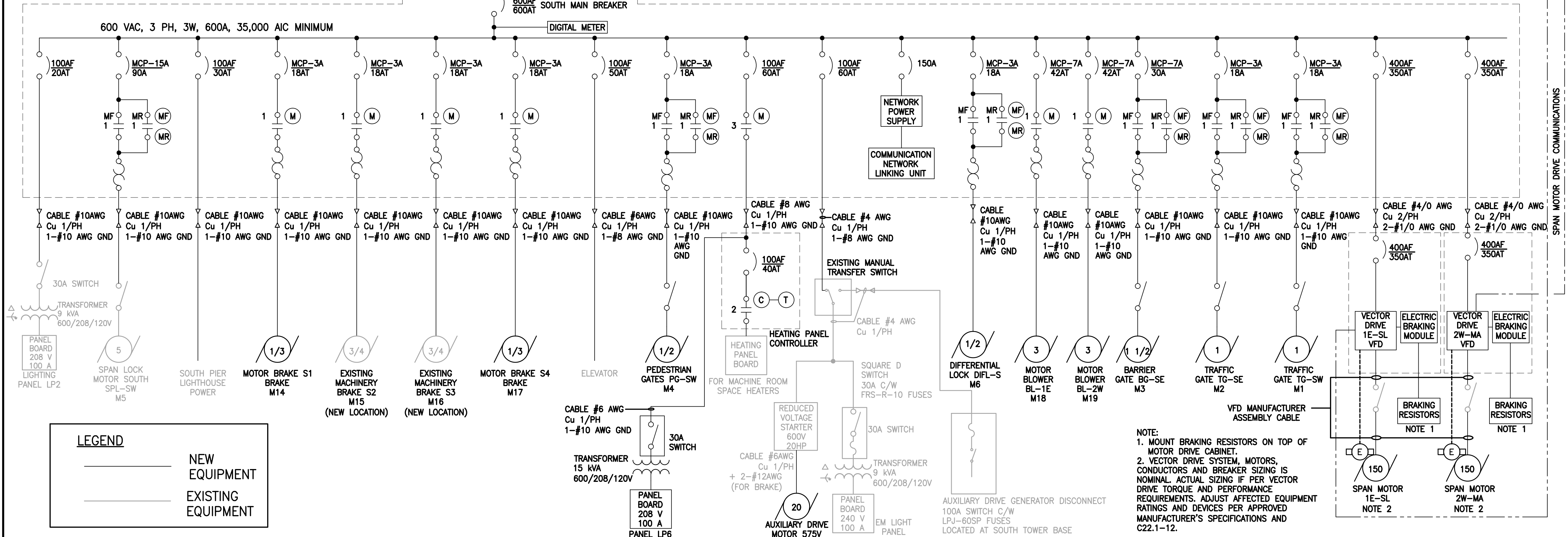
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E-06

MOTOR CONTROL CENTRE NORTH TOWER



MOTOR CONTROL CENTRE SOUTH TOWER

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Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
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2014-07-07



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VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

ELECTRICAL
ONE LINE DIAGRAM 2

drawn by
dessiné par

J. Perez

designed by
conc. par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project date
date du projet

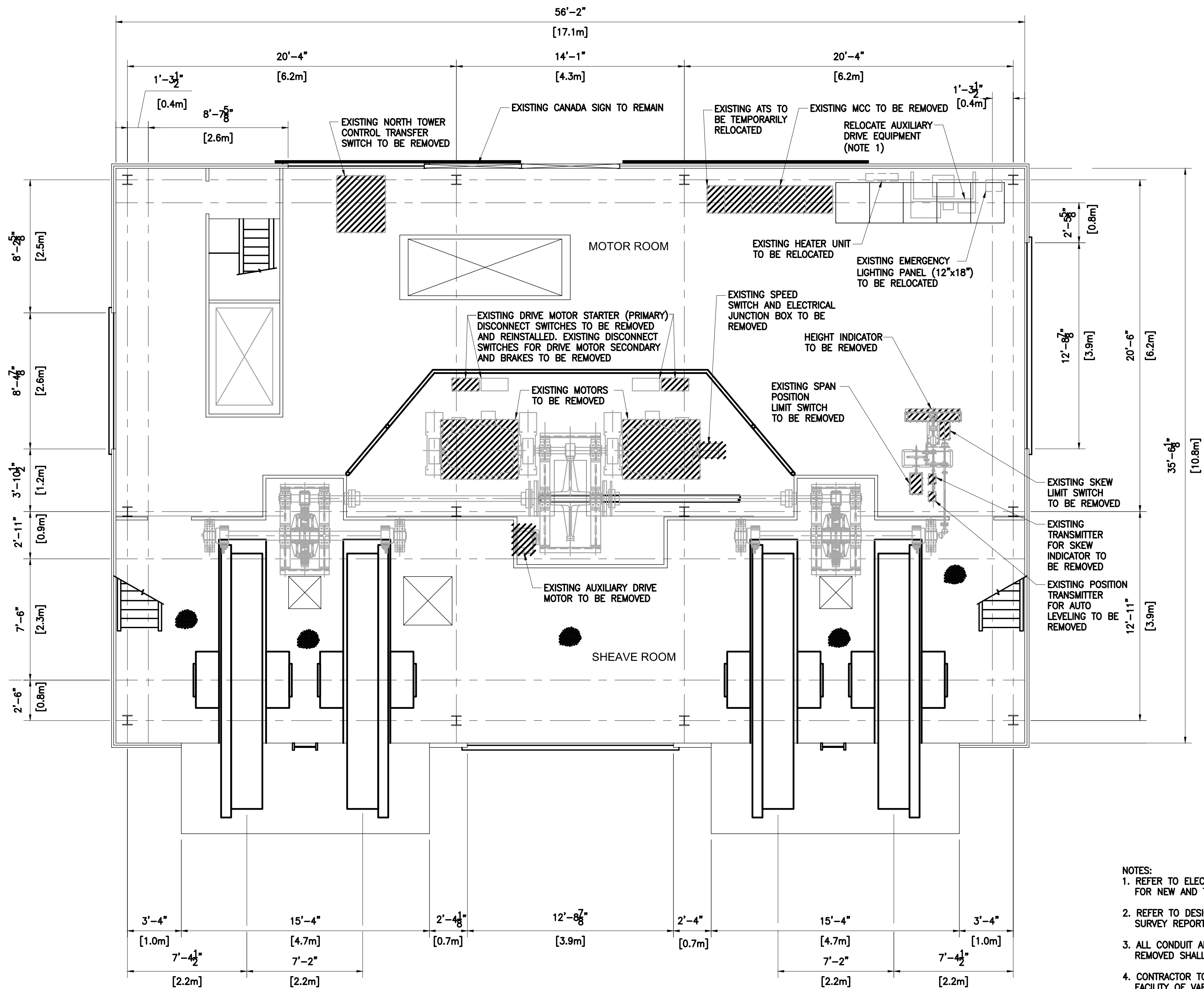
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dessin no.

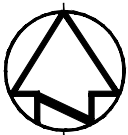
E-07



DEMOLITION PLAN-NORTH MACHINERY ROOM

SCALE 1/4"=1'-0"

- NOTES:
1. REFER TO ELECTRICAL EQUIPMENT LAYOUT PLAN SHEET E-13 FOR NEW AND TEMPORARY LOCATION.
 2. REFER TO DESIGNATED SUBSTANCE REPORT FOR HAZARDOUS MATERIAL SURVEY REPORT.
 3. ALL CONDUIT AND WIRING ASSOCIATED WITH ELECTRICAL EQUIPMENT TO BE REMOVED SHALL ALSO BE REMOVED.
 4. CONTRACTOR TO VERIFY EXISTING CABLE TRAY CONDITION THROUGHOUT FACILITY OF VARIOUS SIZES AND LENGTHS, REMOVAL OF EXISTING CABLES. CONTRACTOR TO RESTORE TO USABLE CONDITION AS NEEDED, FOLLOWING REMOVAL OF EXISTING CABLES.



Public Works and Government Services Canada
Architectural and Engineering Services
Ontario Region

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CANADA M4P 1E4
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Professional Engineers
Ontario

Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10

revision date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

- A Detail No.
No. du détail
- B drawing no. - where detail required
dessin no. - où détail exigé
- C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet

HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE ONTARIO

REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

ELECTRICAL DEMOLITION PLAN NORTH MACHINERY ROOM

drawn by
dessiné par

J. Perez

designed by
conc par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur de projets

project date
date du projet

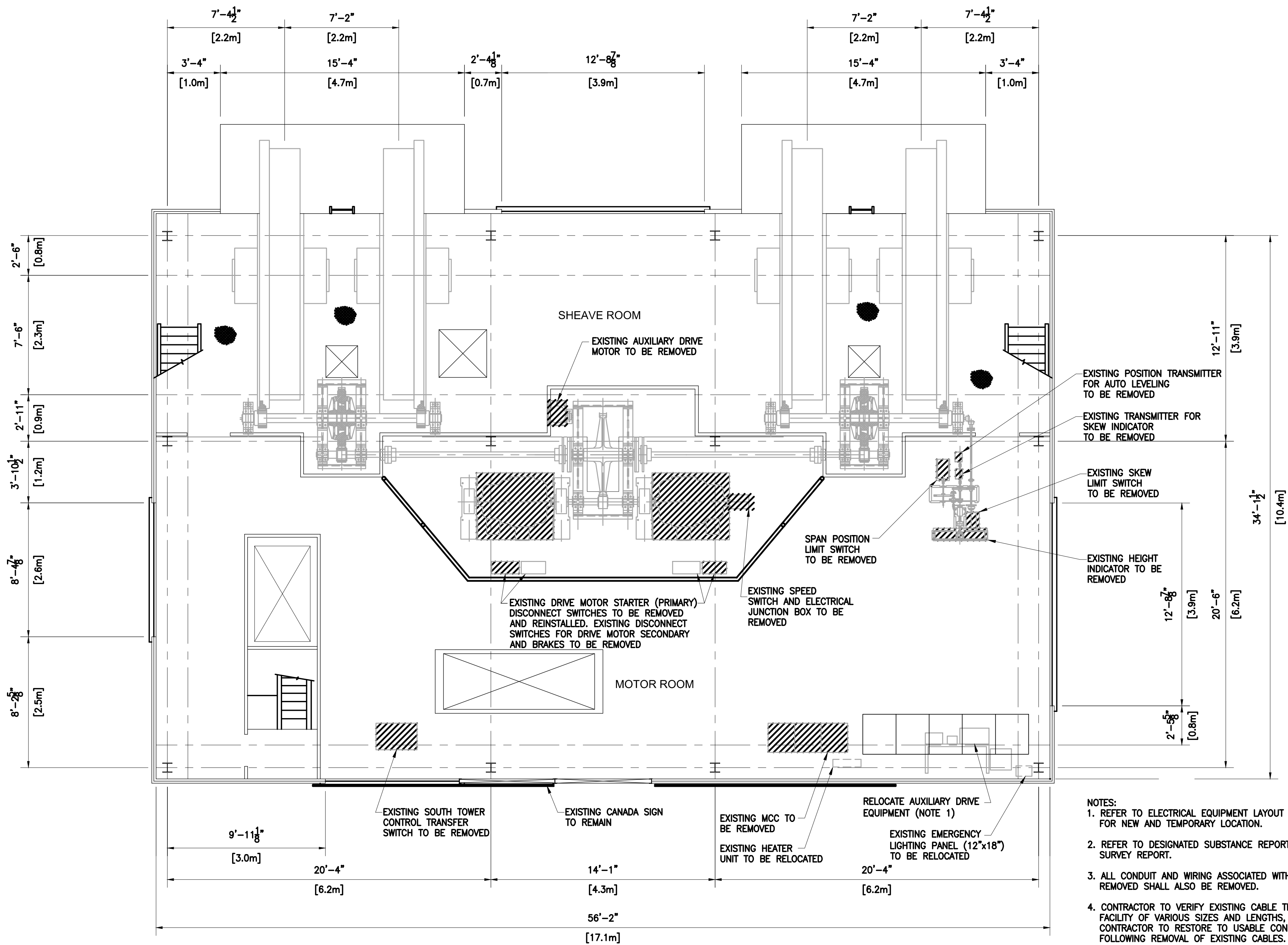
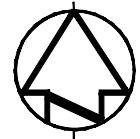
2013-05-31

project no.
no. du projet

R.012641.001

drawing no.
dessiné no.

E-08



DEMOLITION PLAN-SOUTH MACHINERY ROOM

SCALE 1/4"=1'-0" 0 1 5 10ft

- NOTES:
1. REFER TO ELECTRICAL EQUIPMENT LAYOUT PLAN SHEET E-13 FOR NEW AND TEMPORARY LOCATION.
 2. REFER TO DESIGNATED SUBSTANCE REPORT FOR HAZARDOUS MATERIAL SURVEY REPORT.
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 4. CONTRACTOR TO VERIFY EXISTING CABLE TRAY CONDITION THROUGHOUT FACILITY OF VARIOUS SIZES AND LENGTHS, REMOVAL OF EXISTING CABLES. CONTRACTOR TO RESTORE TO USABLE CONDITION AS NEEDED, FOLLOWING REMOVAL OF EXISTING CABLES.



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CANADA M4P 1E4
PHONE: 416-487-5256 FAX: 416-487-9766
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Ontario

Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada

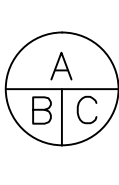
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date : July 31, 2014
Association of Professional Engineers of Ontario

Mark VanDeRee
2014-07-07



08	FOR TENDER 3	2014-06-26
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06	FOR TENDER	2013-06-04
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01	33% DESIGN SUBMITTAL	2012-12-10

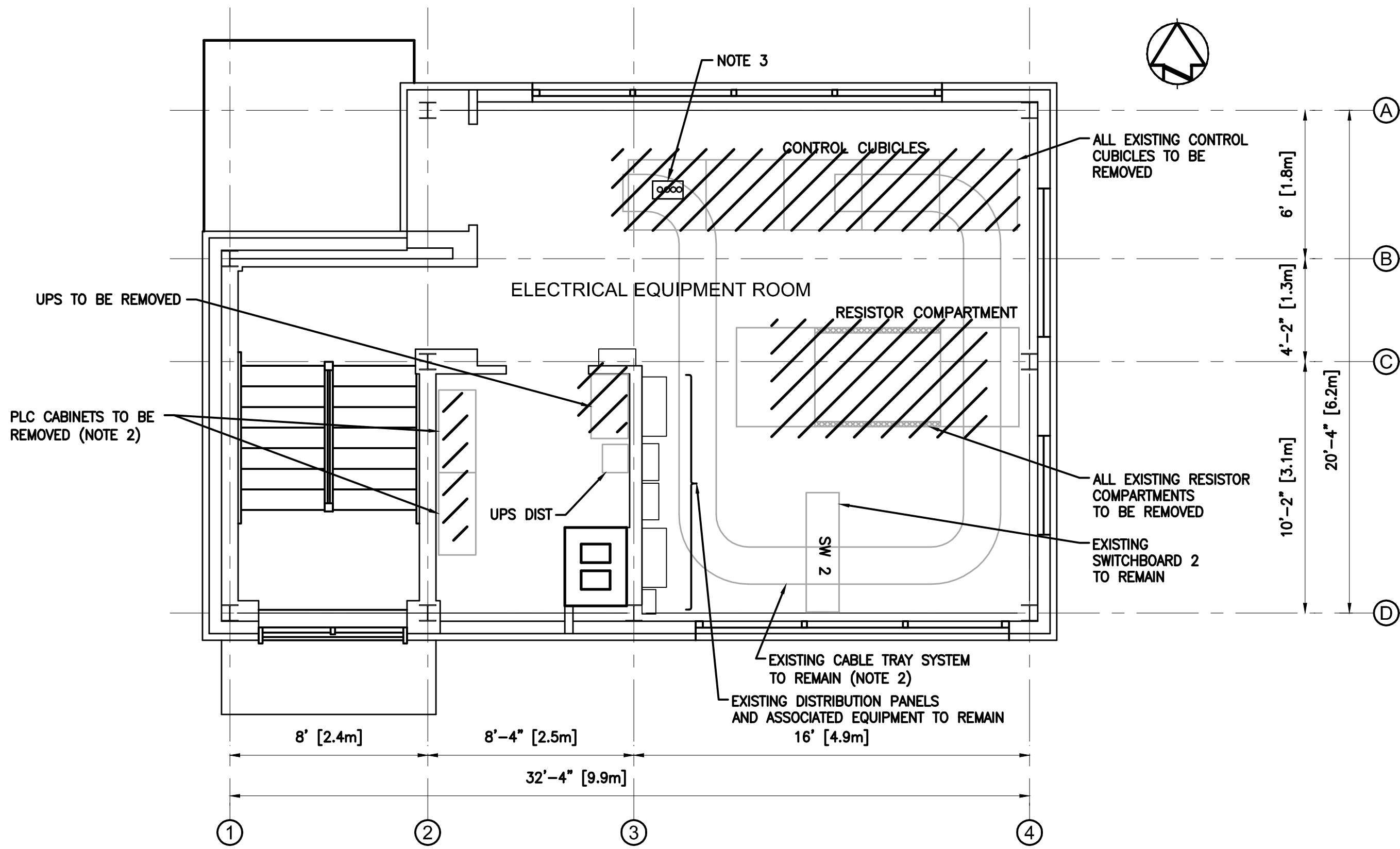
revision		date
Do not scale drawings. Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.		

	A	Detail No.
	B	drawing no. — where detail required dessin no. — où détail exigé
	C	drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
ONTARIO
**REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**

drawing title
titre du dessin
**ELECTRICAL DEMOLITION PLAN
SOUTH MACHINERY ROOM**

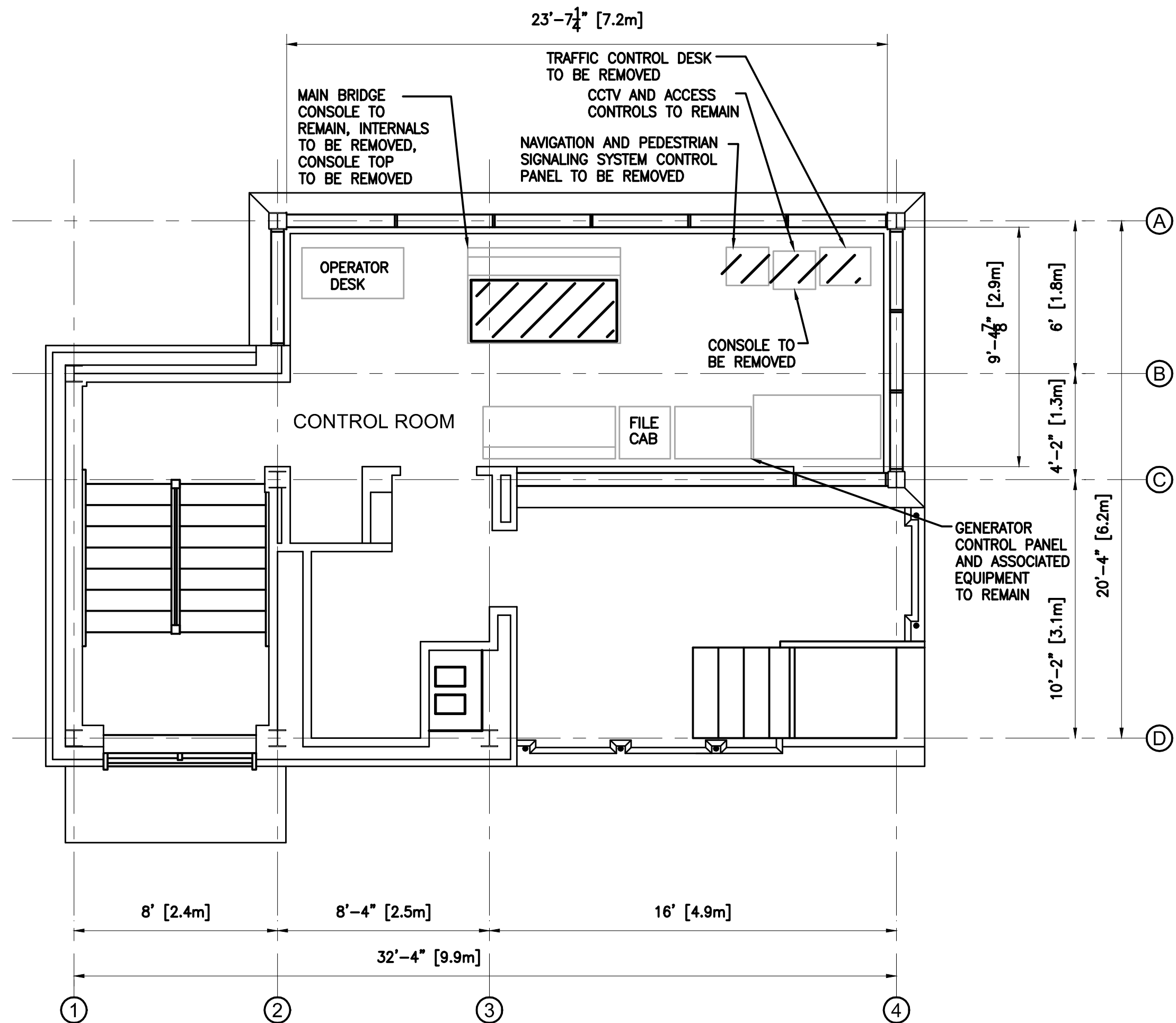
drawn by dessiné par	J. Perez	
designed by conc par	G. Patino/B. Crouthamel	
approved by approuvé par	M. VanDeRee	
bid soumission	A. Ghubril	project manager administrateur de projets
project date date du projet	2013-05-31	
project no. no. du projet	R.012641.001	
drawing no. dessiné no.	E-09	



SECOND FLOOR PLAN

SCALE 1/4"=1'-0" 0 1 5 10ft.

- NOTES:
1. REFER TO DESIGNATED SUBSTANCE REPORT FOR HAZARDOUS MATERIAL SURVEY REPORT.
 2. ALL CABLES ASSOCIATED WITH EQUIPMENT BEING REMOVED SHALL BE REMOVED. EXISTING CABLE TRAY SHALL REMAIN. CONTRACTOR SHALL VERIFY CABLE TRAY CONDITION AND RESTORE TO USABLE CONDITION AS NEEDED BEFORE LAYING NEW CABLES.
 3. EXISTING ROADWAY LIGHTING CONTROLS SHALL BE RELOCATED TO THE TRAFFIC CONTROL PANEL CP-6 ON THE 2ND FLOOR OF THE CONTROL HOUSE- REFER TO E-14.



THIRD FLOOR PLAN

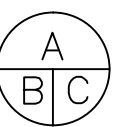
SCALE 1/4"=1'-0" 0 1 5 10ft.



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10

revision		date
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Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

-  A Detail No.
No. du détail
B drawing no. - where detail required
dessin no. - où détail exigé
C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
ONTARIO
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
ELECTRICAL DEMOLITION PLAN CONTROL HOUSE

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

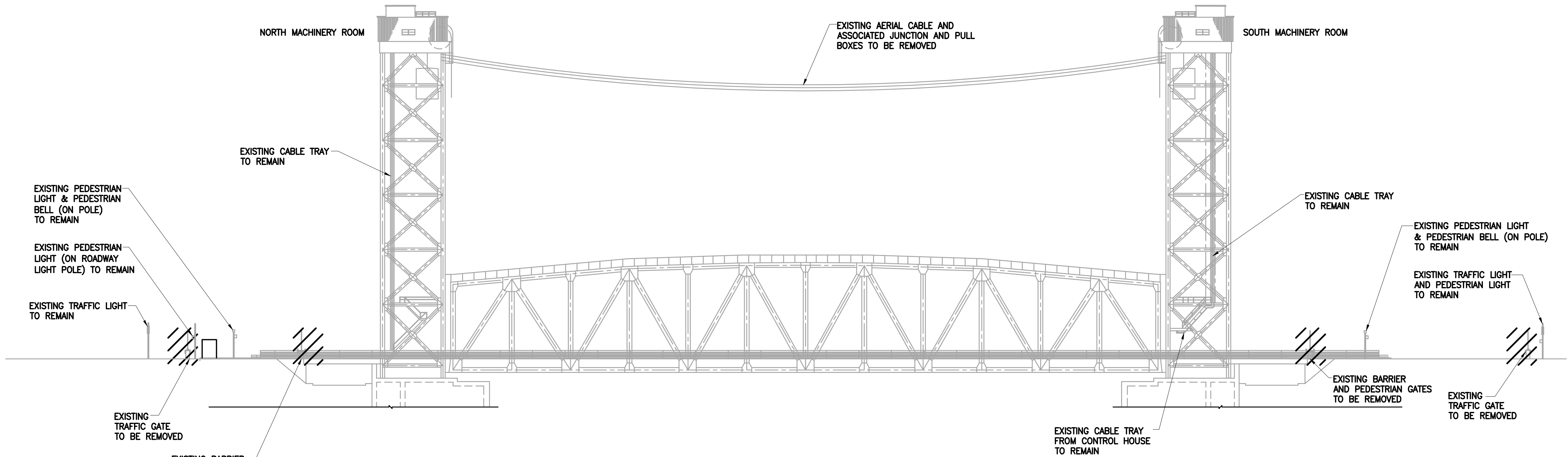
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

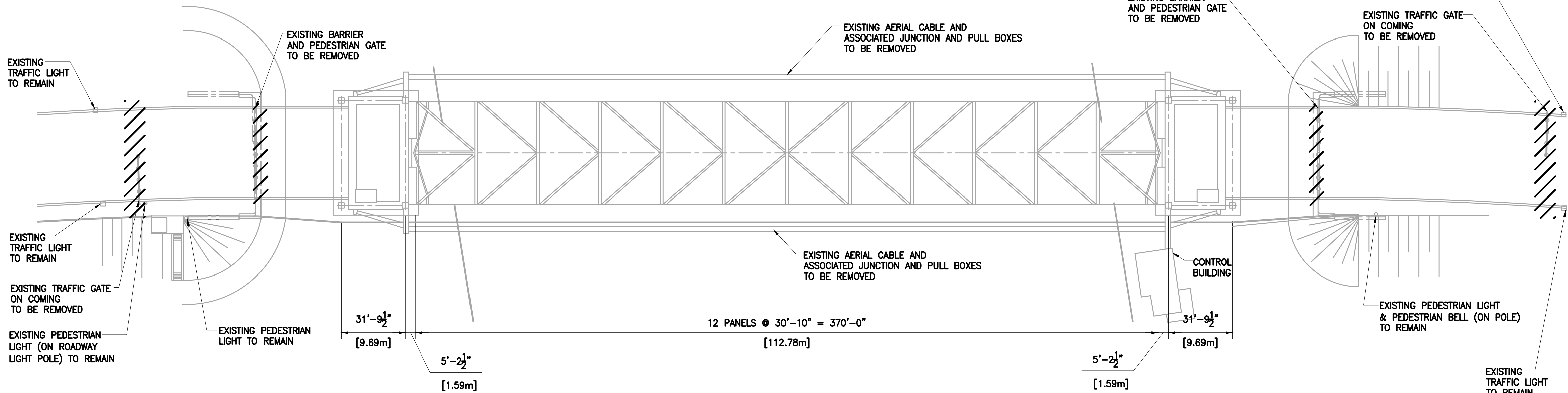
project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-10



ELEVATION

SCALE 1/32"=1'-0" 0 24 48ft.



PLAN

SCALE 1/32"=1'-0" 0 24 48ft.


NOTES:
1. REMOVE ALL CABLE AND CONDUCTORS ASSOCIATED WITH EQUIPMENT NO LONGER IN USE AND EQUIPMENT BEING REMOVED.

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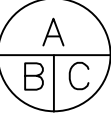
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
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01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

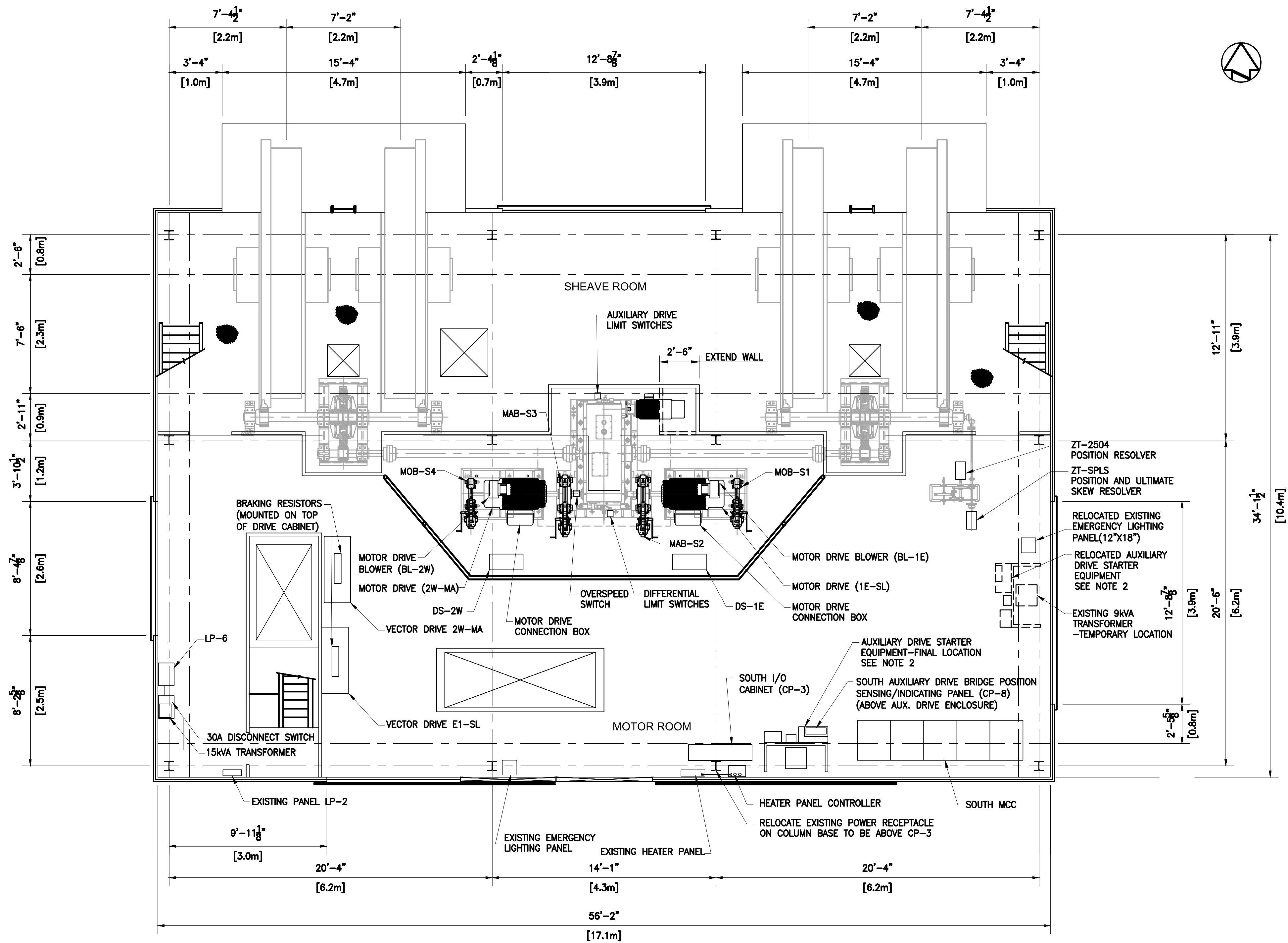
Do not scale drawings.
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	A Detail No. No. du détail
B	drawing no. - where detail required dessin no. - où détail exigé
C	drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
ELECTRICAL DEMOLITION PLAN ROADWAY

drawn by dessiné par	J. Perez	
designed by conc par	G. Patino/B. Crouthamel	
approved by approuvé par	M. VanDeRee	
bid soumission	A. Ghubril	project manager administrateur de projets
project date date du projet	2013-05-31	
project no. no. du projet	R.012641.001	
drawing no. dessiné no.	E-11	



ELECTRICAL EQUIPMENT LAYOUT PLAN - SOUTH MACHINERY ROOM

SCALE 1/4"=1'-0" 0 1 5 10ft.

NOTE:
1. DIMENSIONS SHOWN FOR REFERENCE ONLY.
FIELD VERIFICATION REQUIRED.
2. AUXILIARY DRIVE EQUIPMENT SHOWN IN TEMPORARY
LOCATION TO BE RELOCATED TO OLD MCC
LOCATION.



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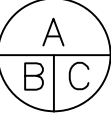
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
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2014-07-07




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01	33% DESIGN SUBMITTAL	2012-12-10
revision		date


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of all discrepancies.



A Detail No.
No. du détail



B drawing no. - where detail required
dessin no. - où détail exigé



C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
ELECTRICAL EQUIPMENT LAYOUT
PLAN - SOUTH MACHINERY
ROOM

drawn by
dessiné par J. Perez

designed by
conçu par G. Patino/B. Crouthamel

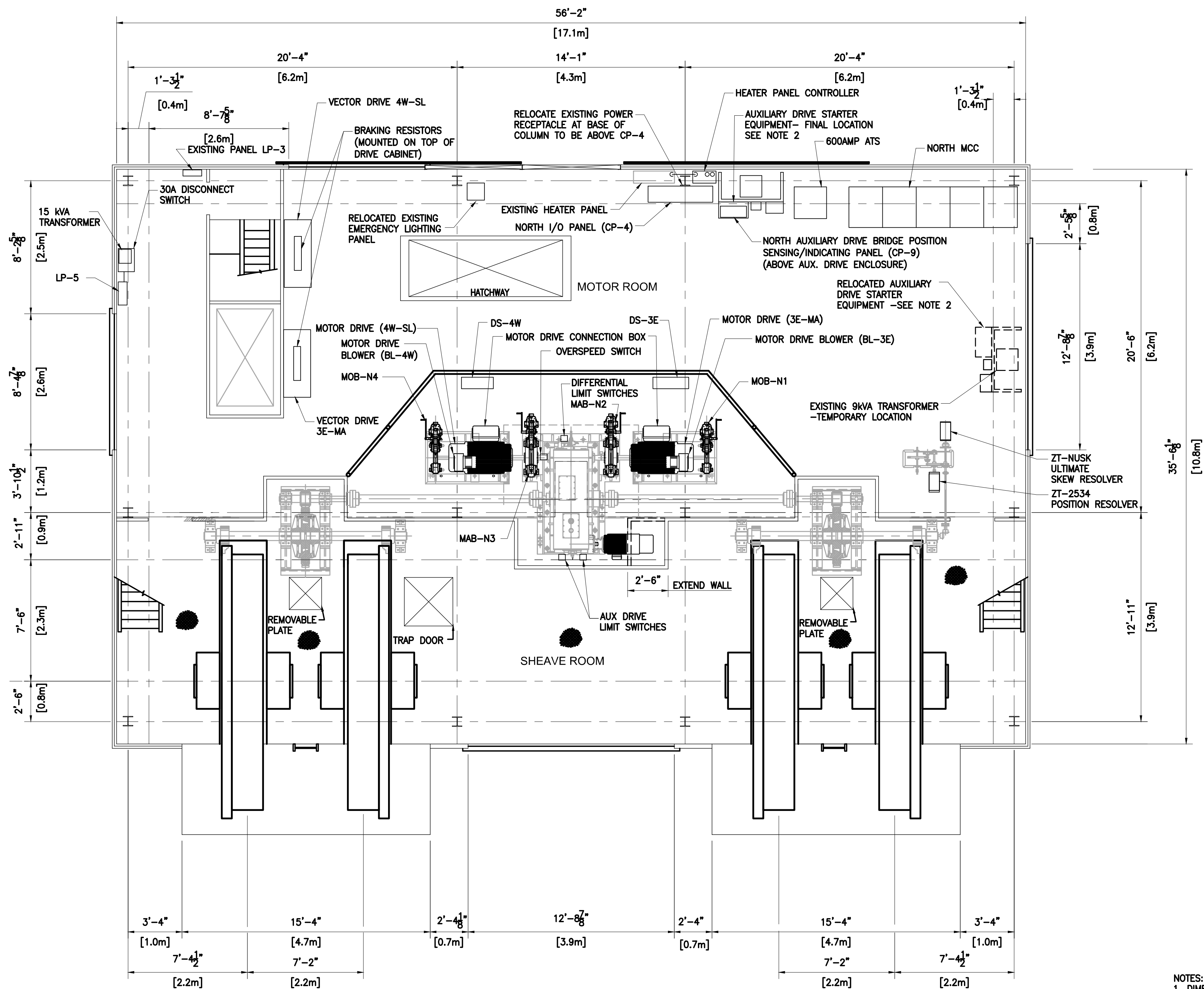
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-12



ELECTRICAL EQUIPMENT LAYOUT PLAN - NORTH MACHINERY ROOM

SCALE 1/4"=1'-0"

- NOTES:
1. DIMENSIONS SHOWN FOR REFERENCE ONLY. FIELD VERIFICATION REQUIRED.
 2. AUXILIARY DRIVE EQUIPMENT SHOWN IN TEMPORARY LOCATION TO BE RELOCATED TO OLD MCC LOCATION.

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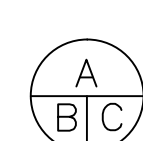

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TORONTO, ONTARIO
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 **Professional Engineers Ontario**
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario
2014-07-07



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revision		date

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	A Detail No. No. du détail
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	C drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
ELECTRICAL EQUIPMENT LAYOUT PLAN
NORTH MACHINERY ROOM

drawn by
dessiné par
J. Perez

designed by
conc par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

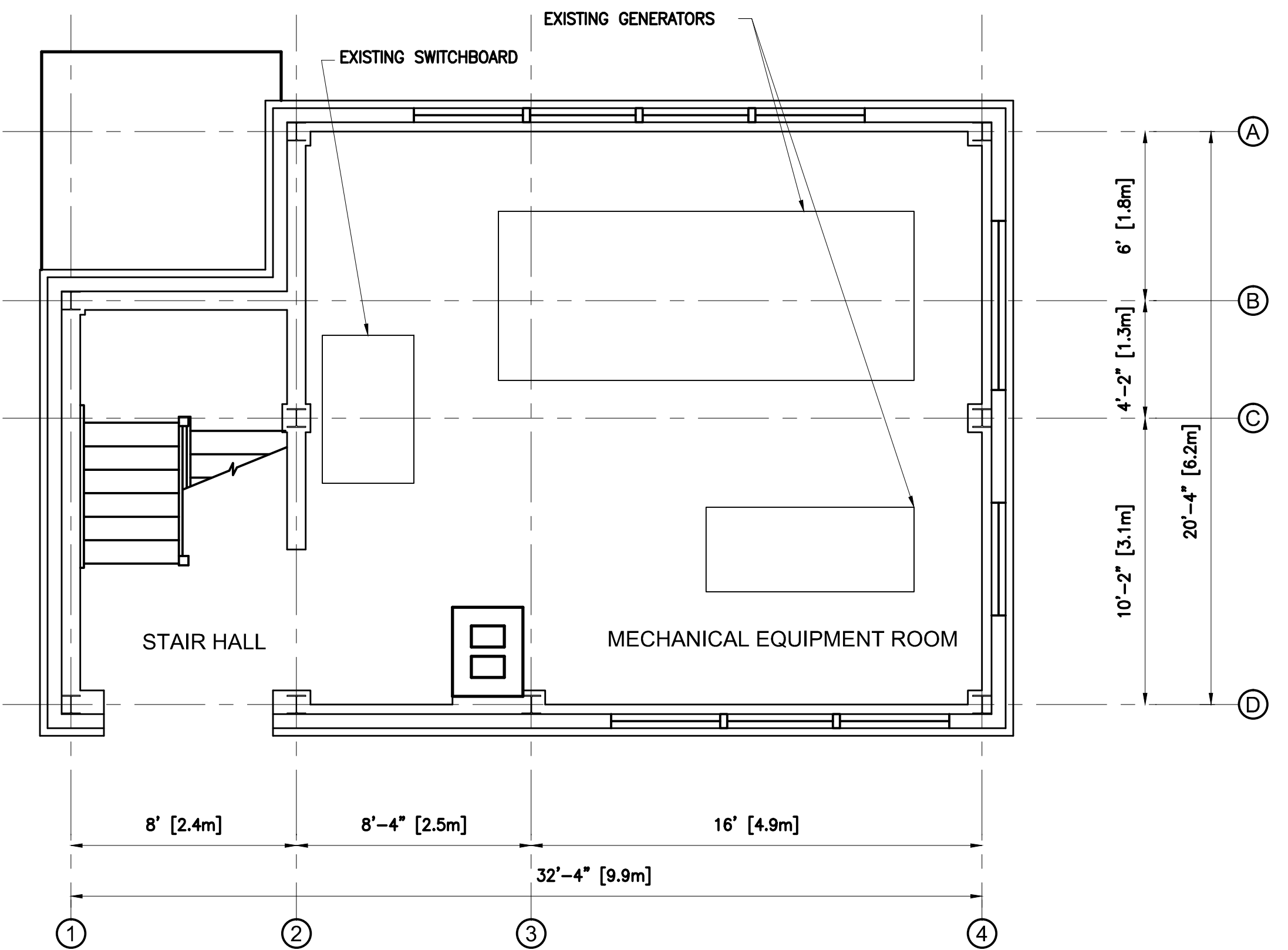
bid
soumission
A. Ghubril

project manager
administrateur de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

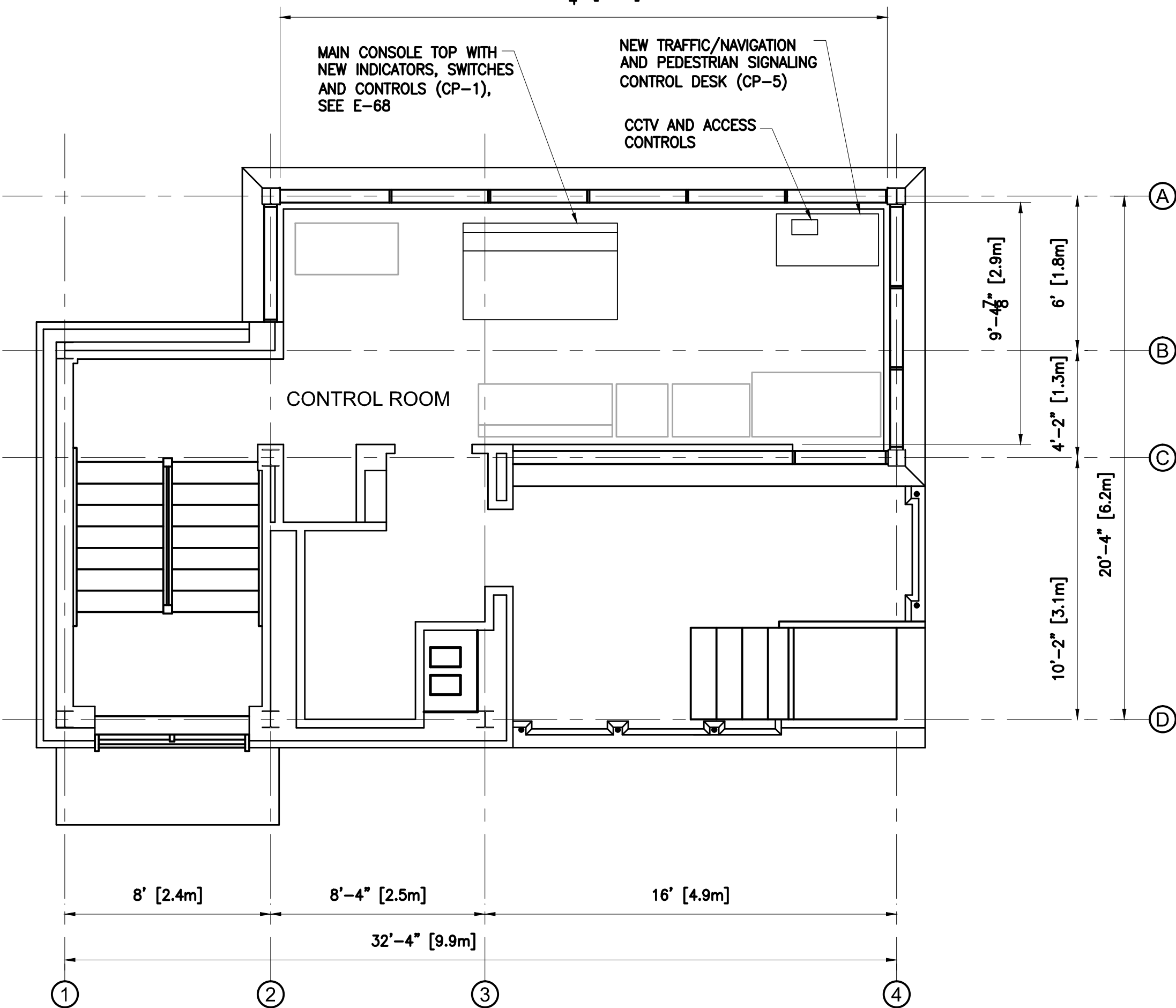
drawing no.
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E-13



GROUND FLOOR PLAN

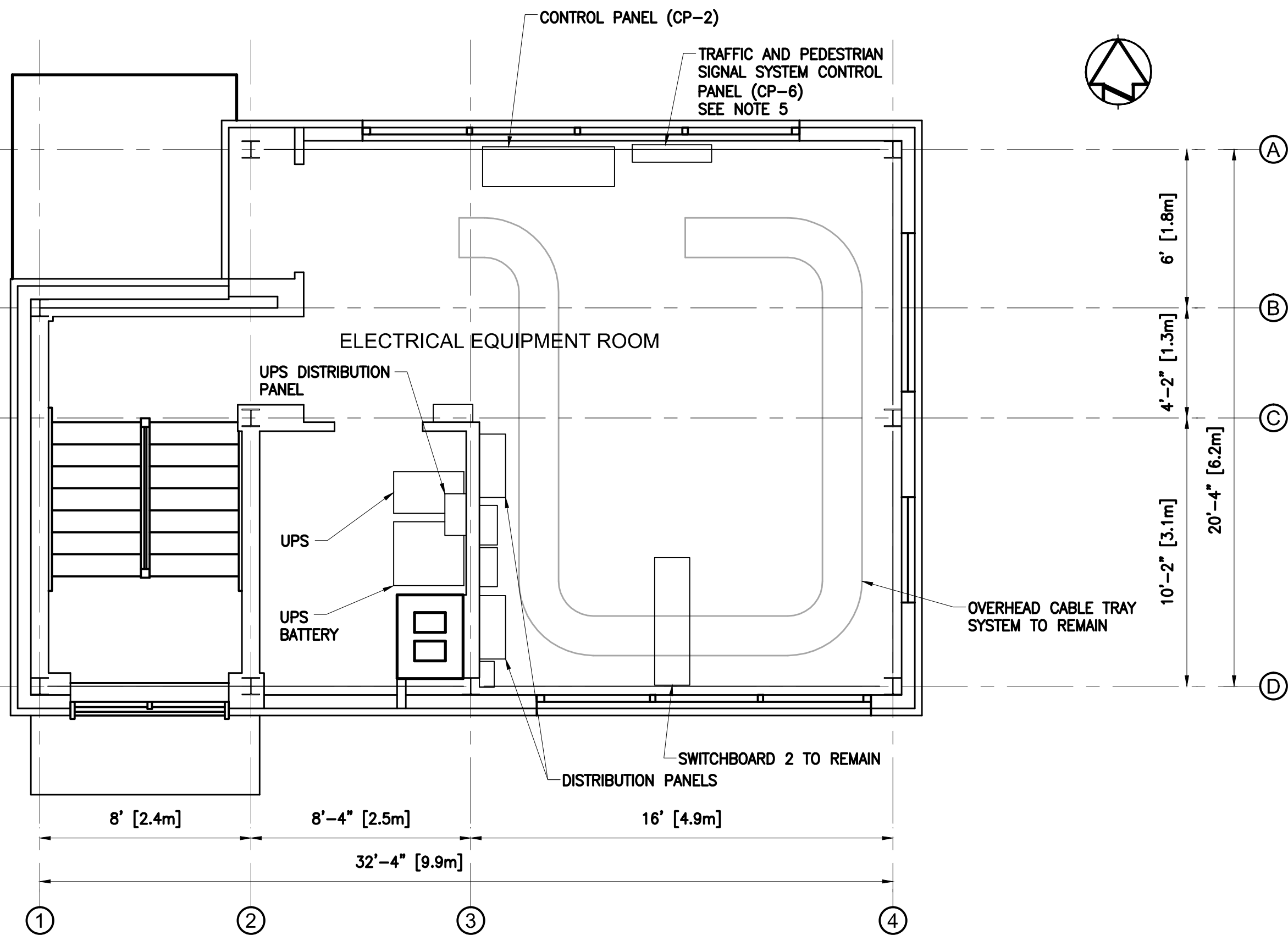
SCALE 1/4"=1'-0"

23'-7 1/4" [7.2m]



THIRD FLOOR PLAN

SCALE 1/4"=1'-0"



SECOND FLOOR PLAN

SCALE 1/4"=1'-0"

- NOTES:
1. REFER TO DEMOLITION DRAWINGS FOR ADDITIONAL INFORMATION.
 2. DIMENSIONS SHOWN FOR REFERENCE ONLY. FIELD VERIFICATION REQUIRED.
 3. REPLACE EXISTING UPS UNIT WITH NEW UPS UNIT AND EXTERNAL BATTERY PACK.
 4. EXISTING SWITCHBOARD NO. 2 TO REMAIN.
 5. REMOVE AND RELOCATE ROADWAY LIGHTING CONTROLS FROM EXISTING CONTROL CUBICLES (REFER TO E-10) AND INSTALL IN NEW CONTROL PANEL CP-6. FOR EXISTING ROADWAY LIGHTING PLANS, REFER TO DRAWING E3, PROJECT NO. 107732.



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
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revision		date

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	B drawing no. - where detail required dessin no. - où détail exigé
	C drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
ELECTRICAL PLANS, ELECTRICAL
ROOM, AND CONTROL ROOM

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

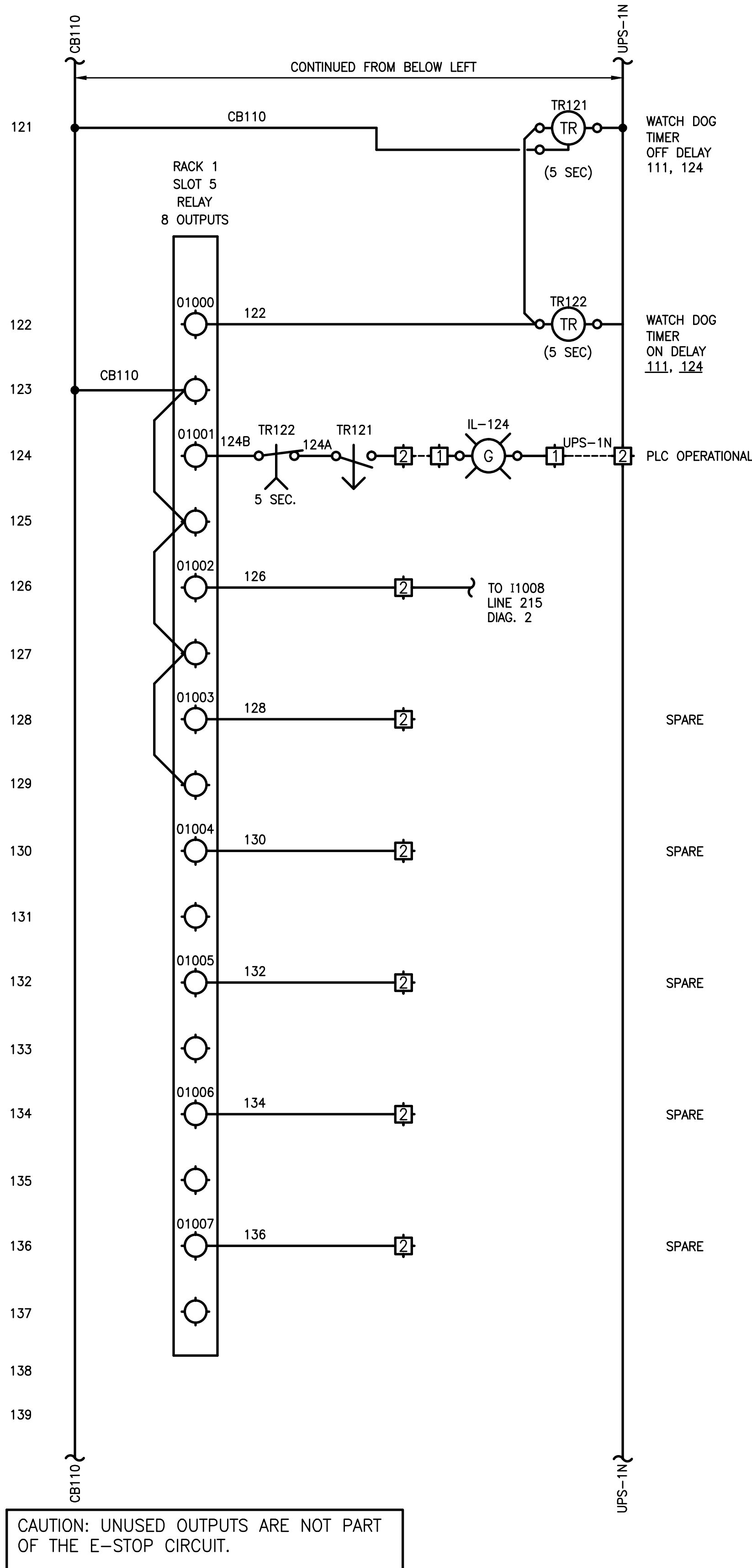
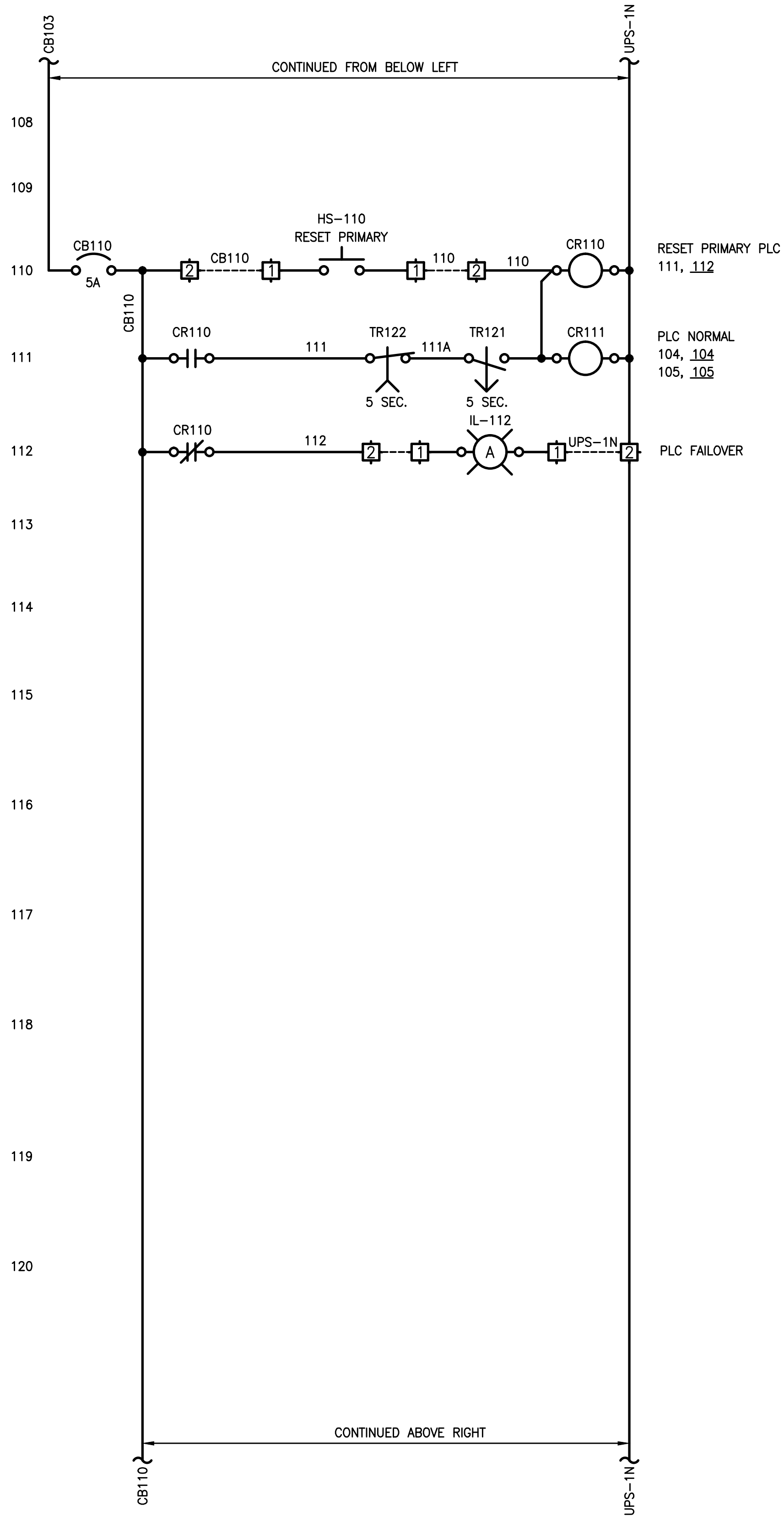
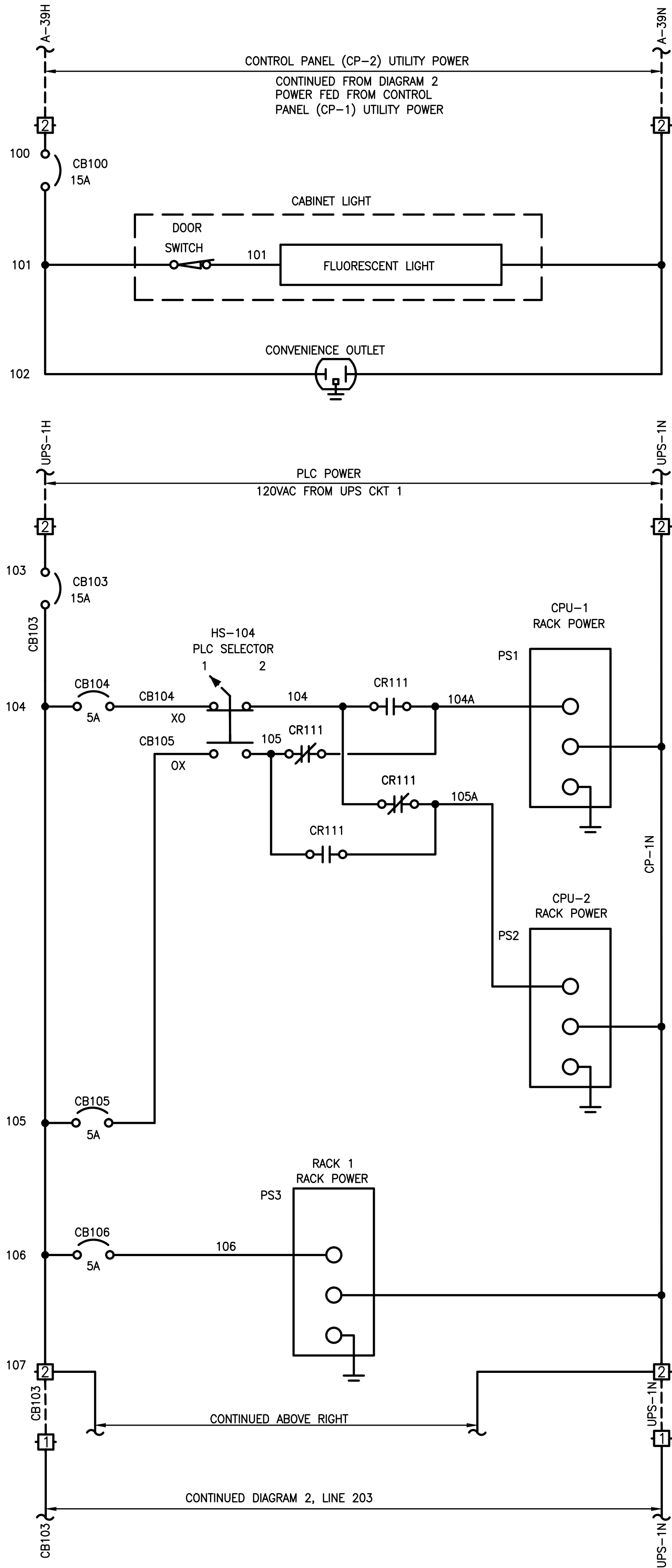
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-14



CONTROL PANEL (CP-2)



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
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A	Detail No. No. du détail
B	drawing no. - where detail required dessin no. - où détail exigé
C	drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-2 SCHEMATIC DIAGRAM 1

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

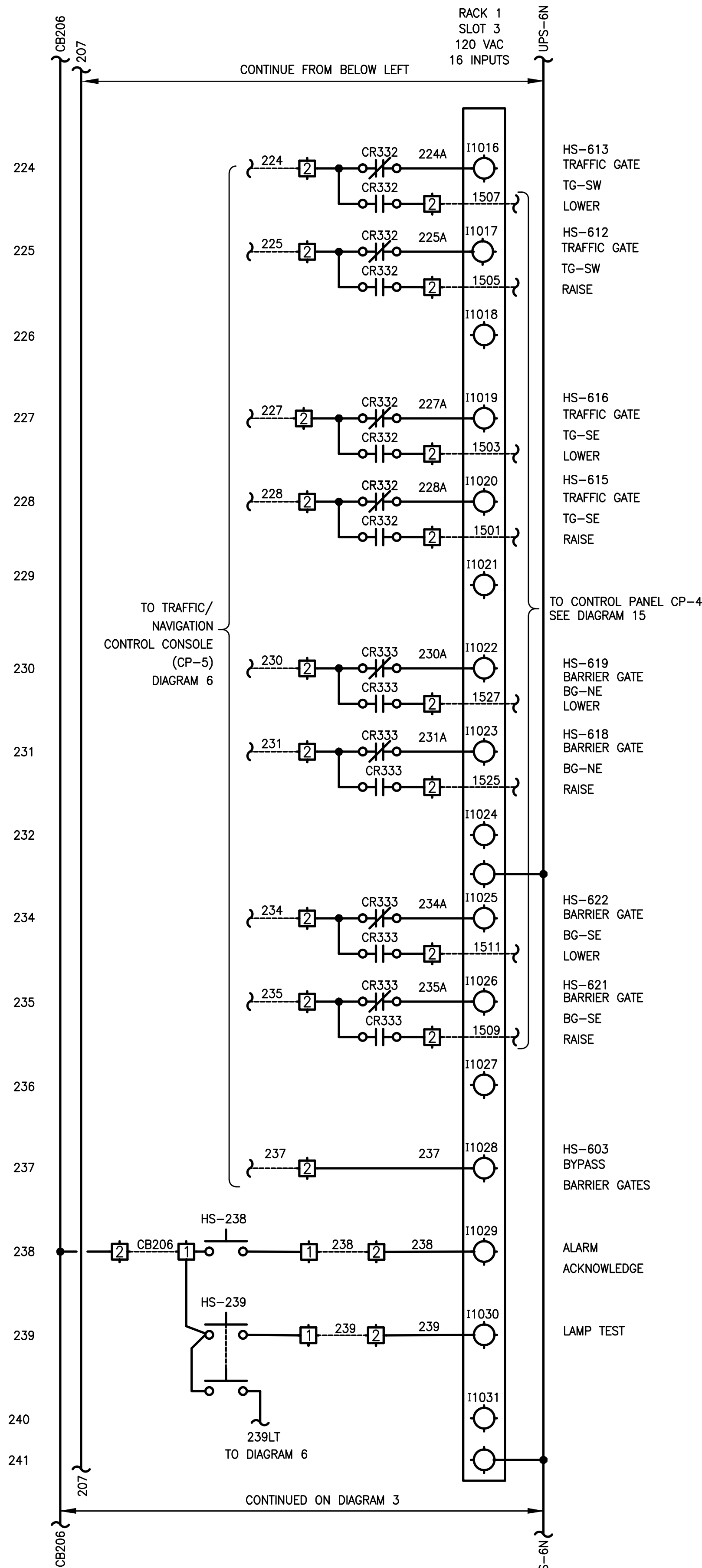
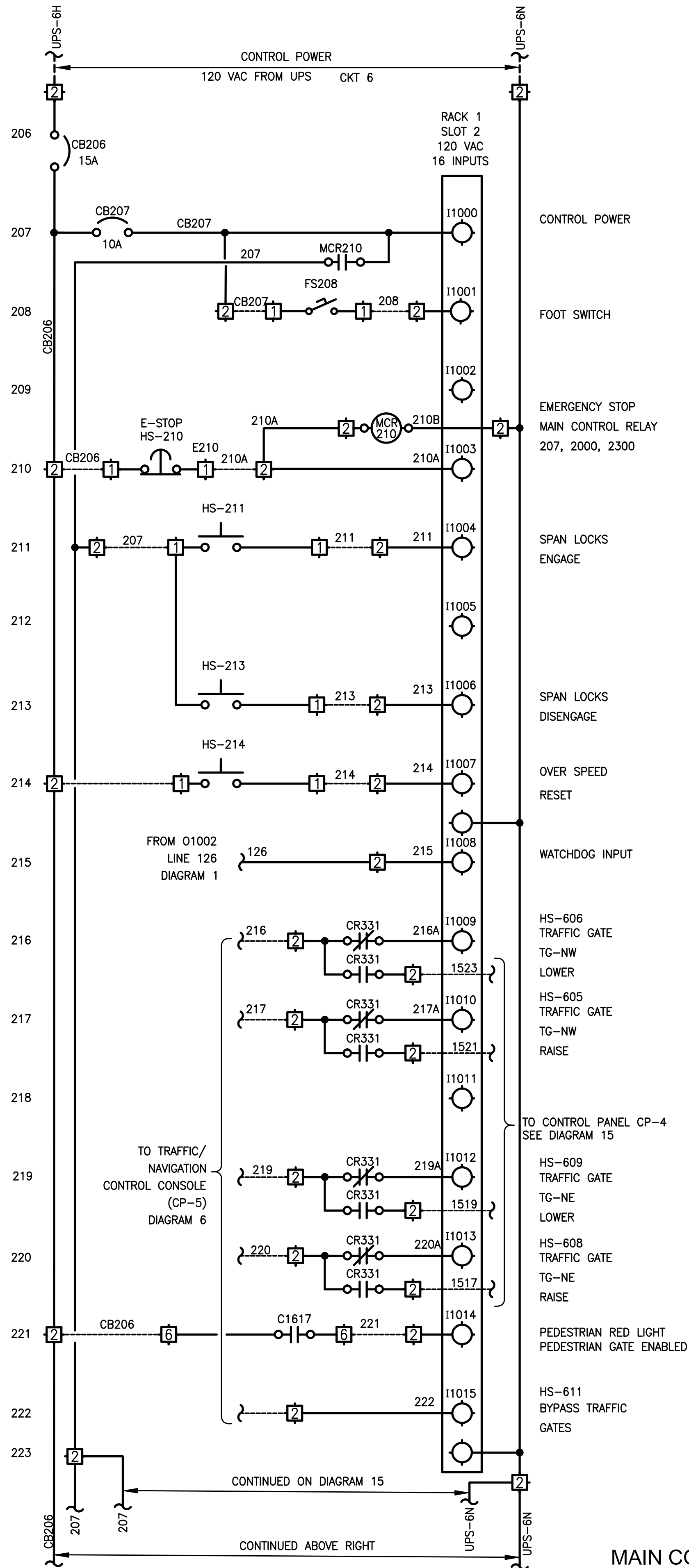
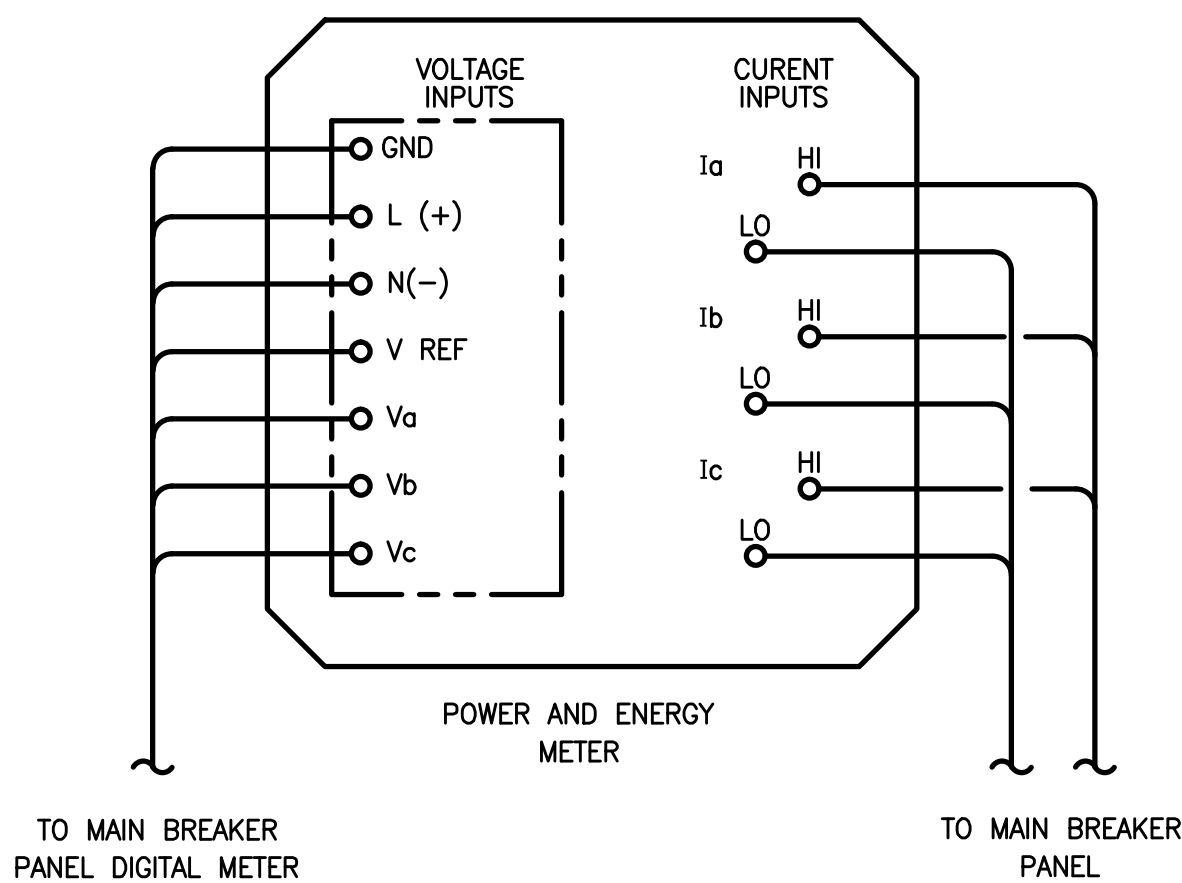
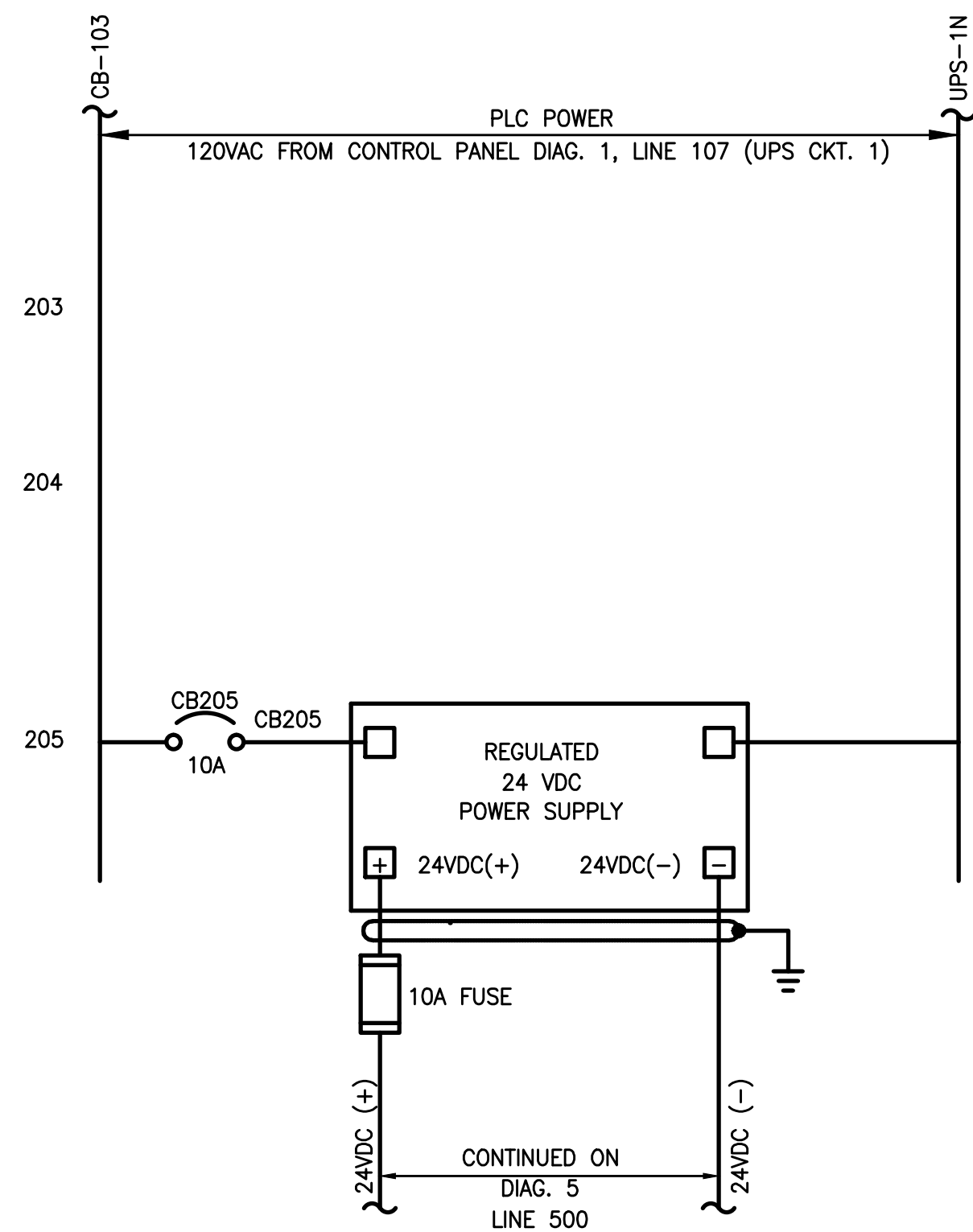
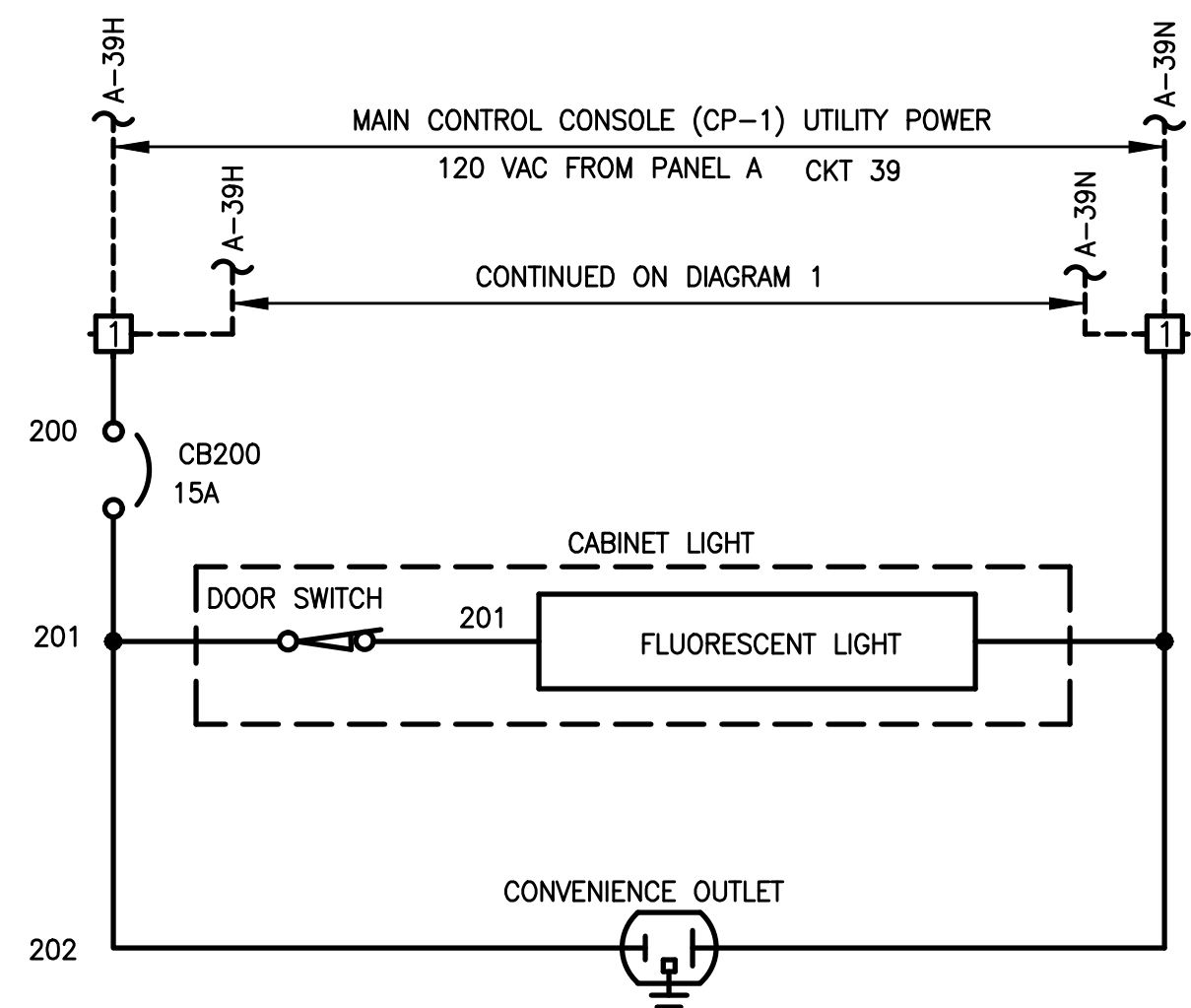
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-15



MAIN CONTROL CONSOLE (CP-1) INPUTS TO CONTROL PANEL (CP-2)

08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
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project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-1 & CP-2 SCHEMATIC DIAGRAM 2

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

approved by
approuvé par M. VanDeRee

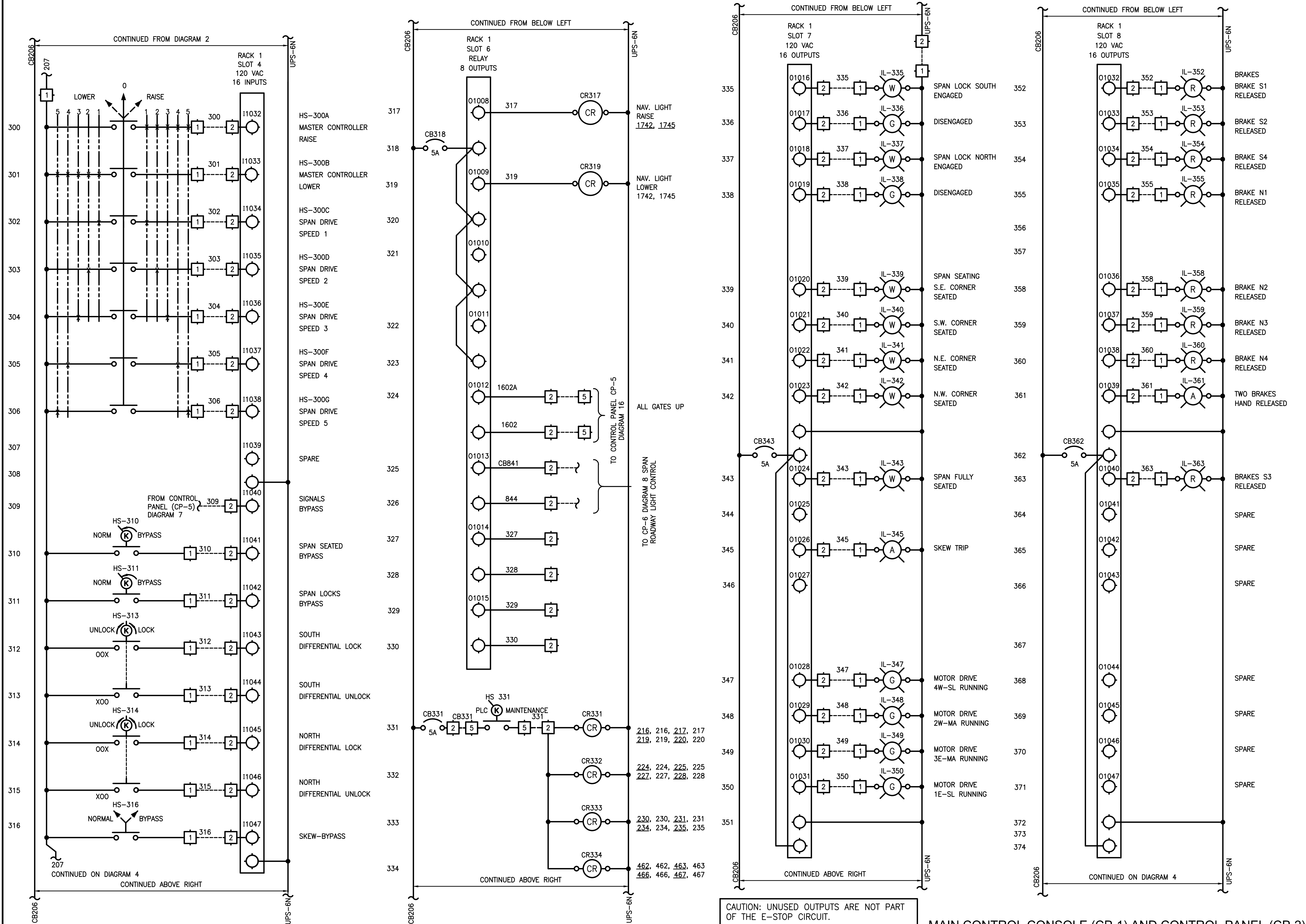
bid submission
soumission A. Ghubril

project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-16



CAUTION: UNUSED OUTPUTS ARE NOT PART OF THE E-STOP CIRCUIT.

MAIN CONTROL CONSOLE (CP-1) AND CONTROL PANEL (CP-2)

Public Works and Government Services Canada
Architectural and Engineering Services
Ontario Region

Travaux publics et Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario

2300 YONGE STREET, SUITE 2300
TORONTO, ONTARIO
CANADA M4P 1E4
PHONE: 416-487-5256 FAX: 416-487-9766
WWW.PBWORLD.COM

Professional Engineers Ontario
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

revision	description	date
08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

Detail No.	No. du détail
A	drawing no. - where detail required
B	dessin no. - où détail exigé
C	drawing no. - where detailed
	dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-1 & CP-2 SCHEMATIC DIAGRAM 3

drawn by
dessiné par
J. Perez

designed by
conc par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

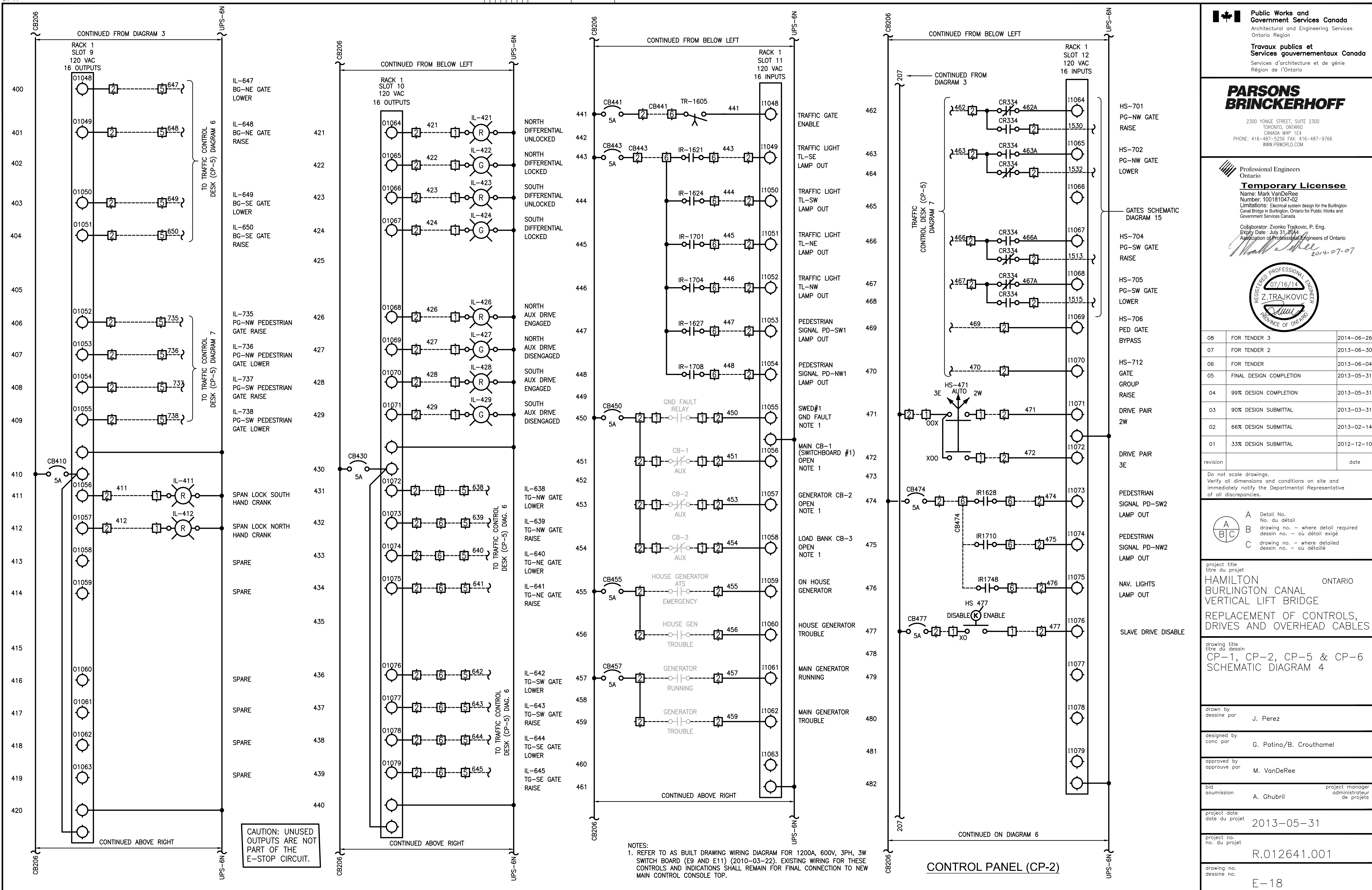
bid
soumission
A. Ghubril

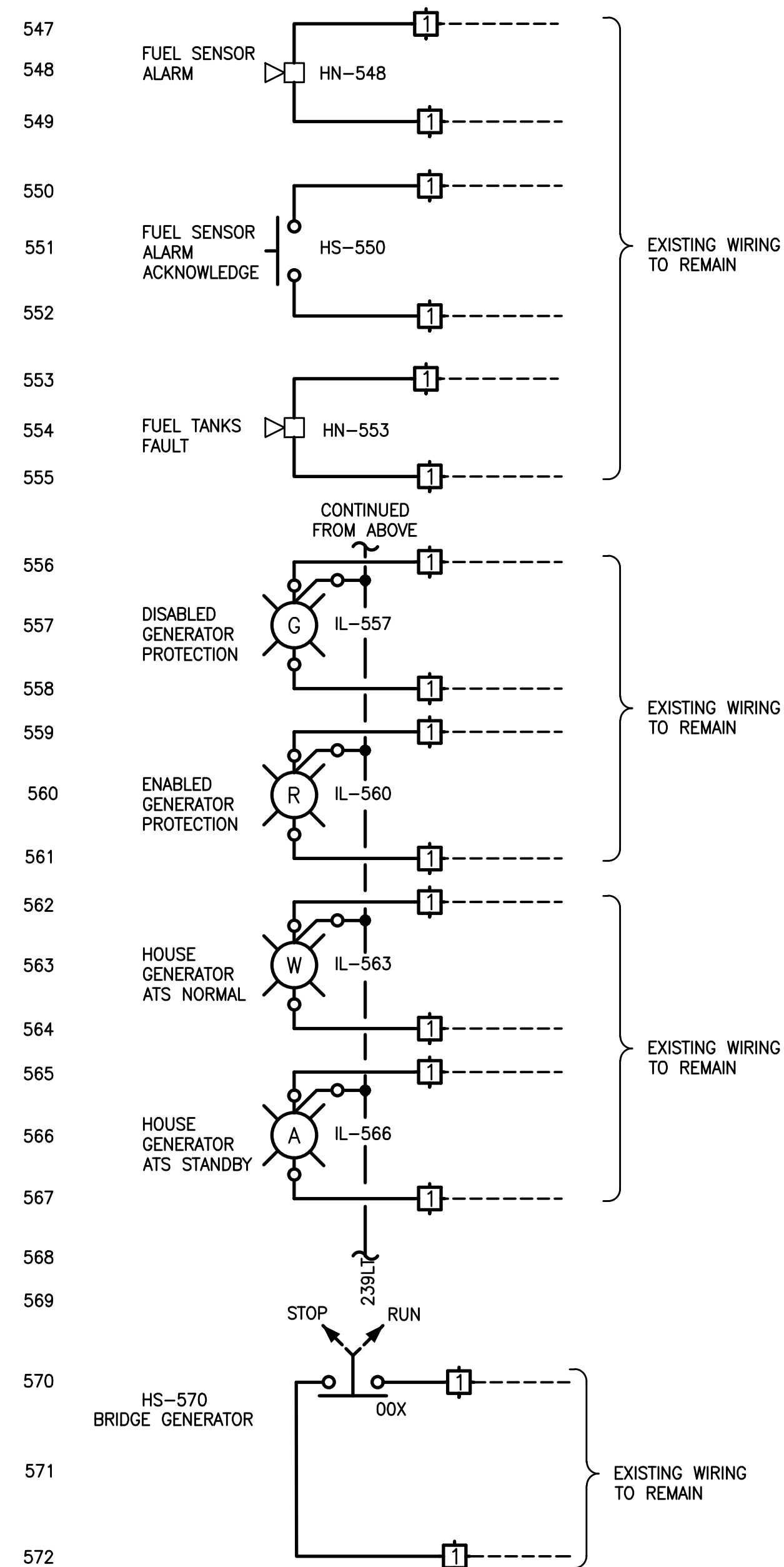
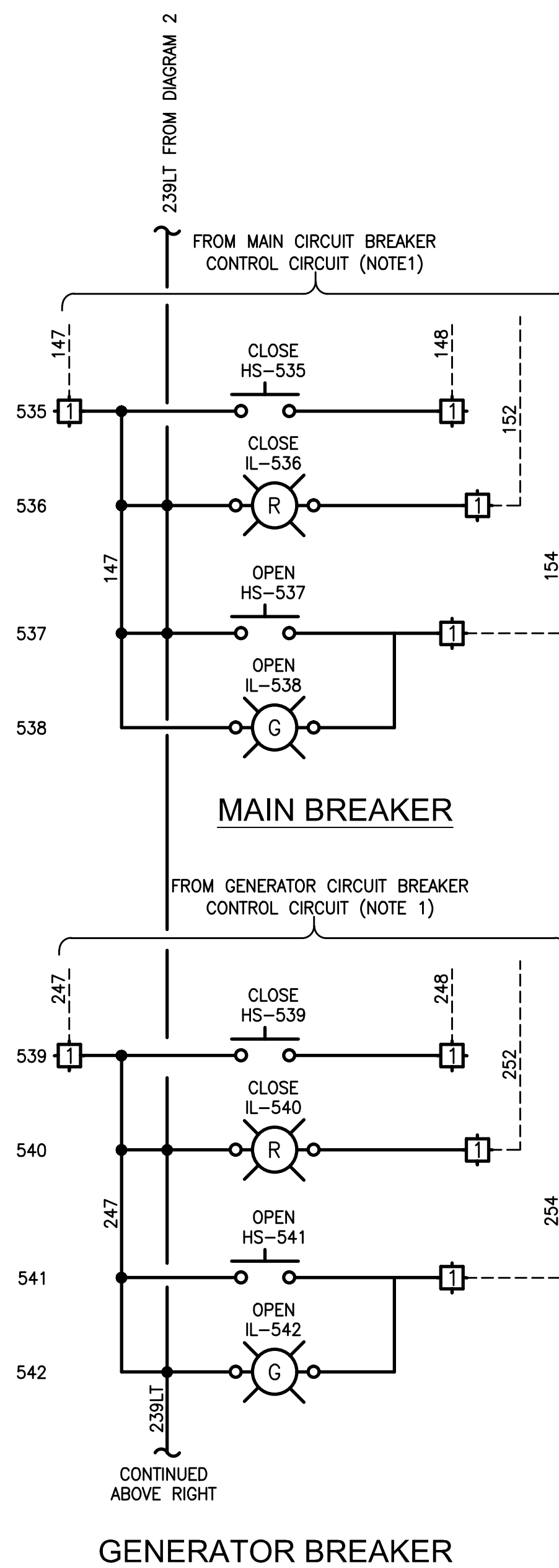
project manager
administrateur de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
E-17






NOTES:
1. REFER TO AS-BUILT SCHEMATIC DIAGRAM FOR 1200A, 600V, SWITCHBOARD 3PH, 3W
DRAWING (E-11) (2010-03-22). EXISTING WIRING FOR THESE CONTROLS AND
INDICATIONS SHALL REMAIN FOR FINAL CONNECTION TO NEW MAIN CONTROL CONSOLE TOP.

08	FOR TENDER 3	2014-06-21
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.


 A Detail No.
 No. du détail
 B drawing no. — where detail required
 dessin no. — où détail exigé
 C drawing no. — where detailed
 dessin no. — où détaillé

project title titre du projet	
HAMILTON	ONTARIO
BURLINGTON CANAL	
VERTICAL LIFT BRIDGE	
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES	

drawing title
titre du dessin
CP-1 & CP-2
SCHEMATIC DIAGRAM 5

drawn by
dessine par J. Perez

designed by
conc par G. Patino/B. Crouthamel

approved by
approuvé par M. VanDeRee

bid soumission	project manager administrateur
-------------------	-----------------------------------

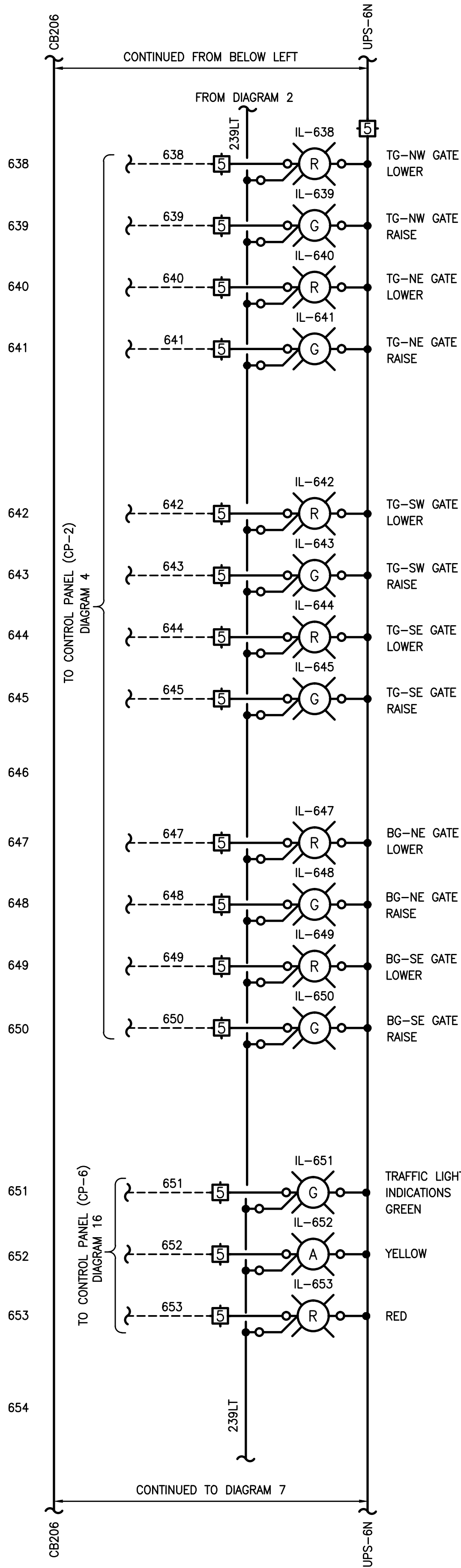
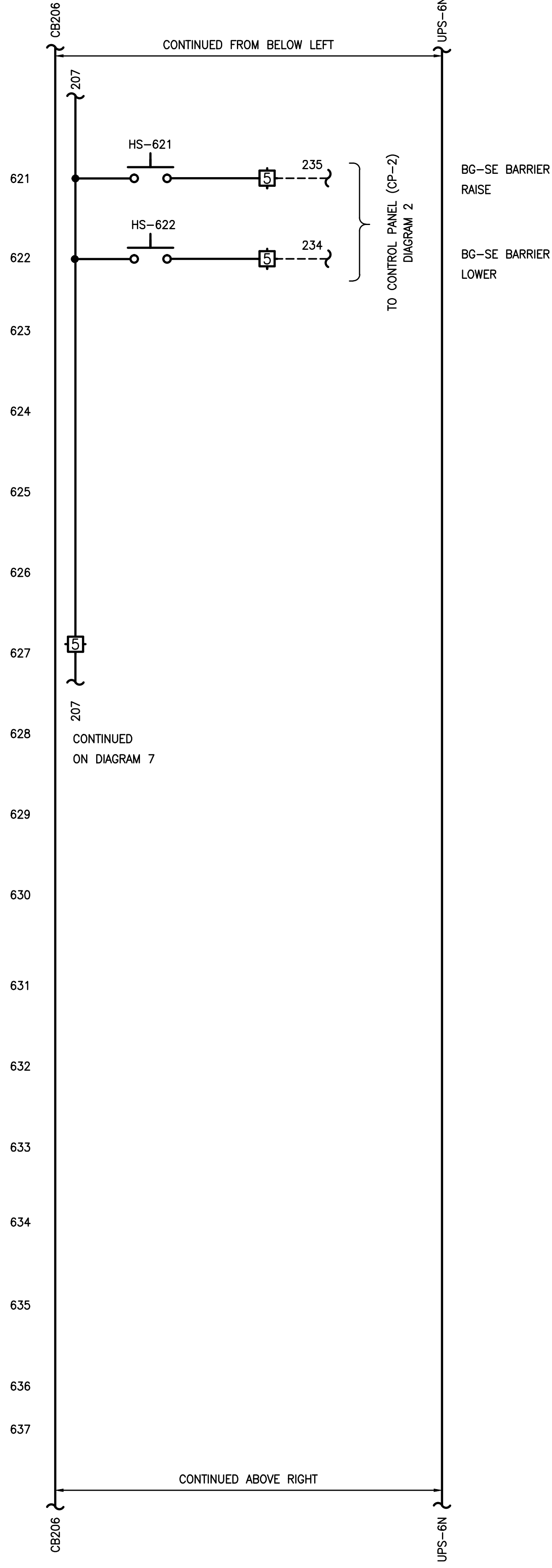
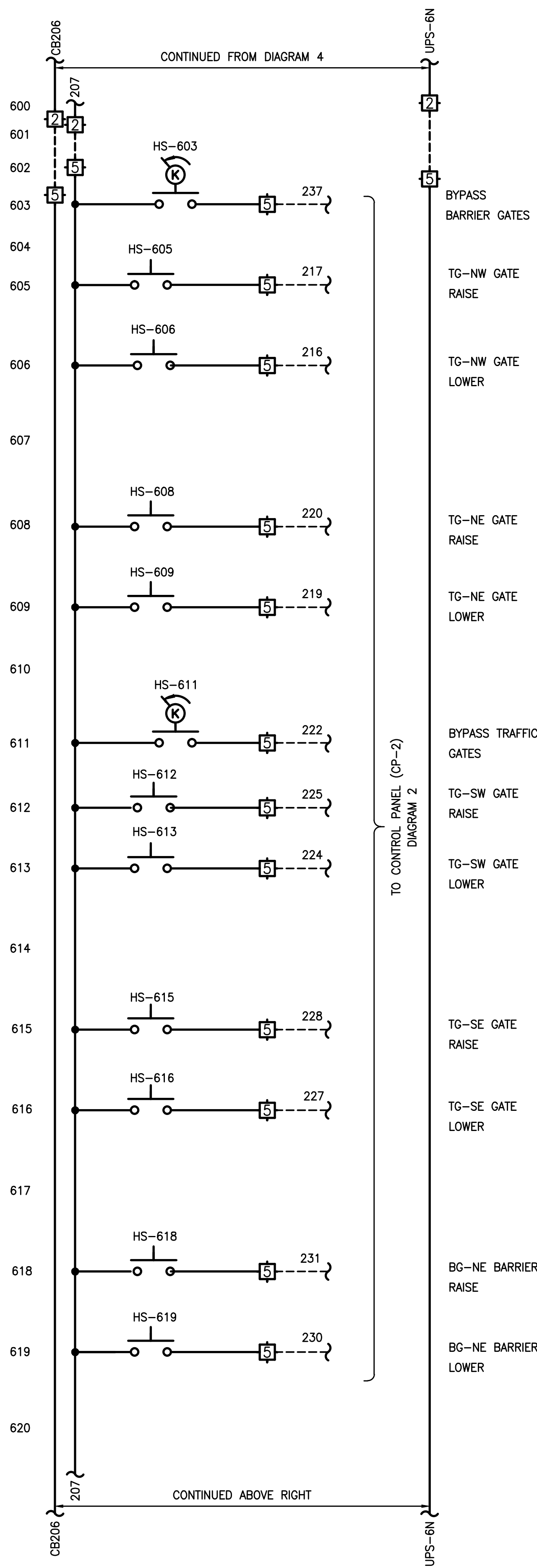
project date
date du projet 2013-05-31

project no.	
no. du projet	

R.012641.001

drawing no.
dessine no. 5 10

E-19

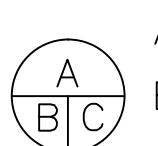




TRAFFIC/NAVIGATION CONTROL DESK (CP-5)

08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10

revision		date
----------	--	------

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

	A	Detail No.
	B	No. du détail
	C	drawing no. - where detail required dessin no. - où détail exigé
		drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-5 SCHEMATIC DIAGRAM 6

drawn by
dessiné par J. Perez

designed by
conçu par G. Patino/B. Crouthamel

approved by
approuvé par M. VanDeRee

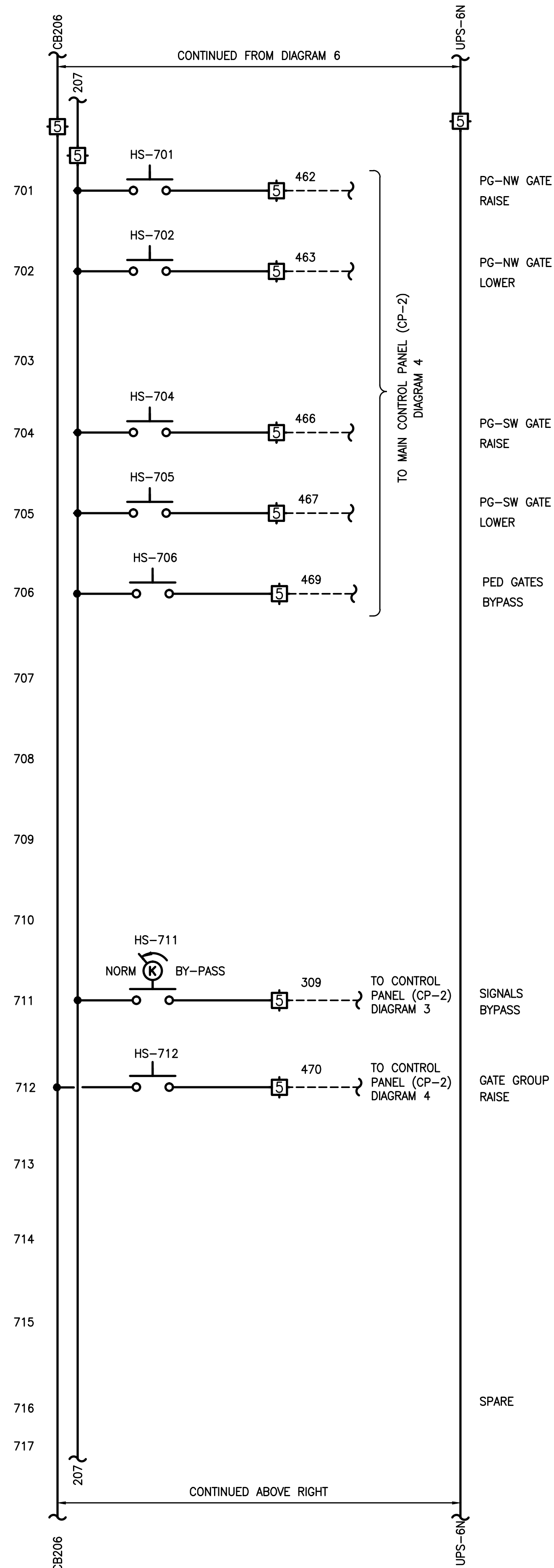
bid submission
soumission A. Ghubril

project manager
administrateur de projets

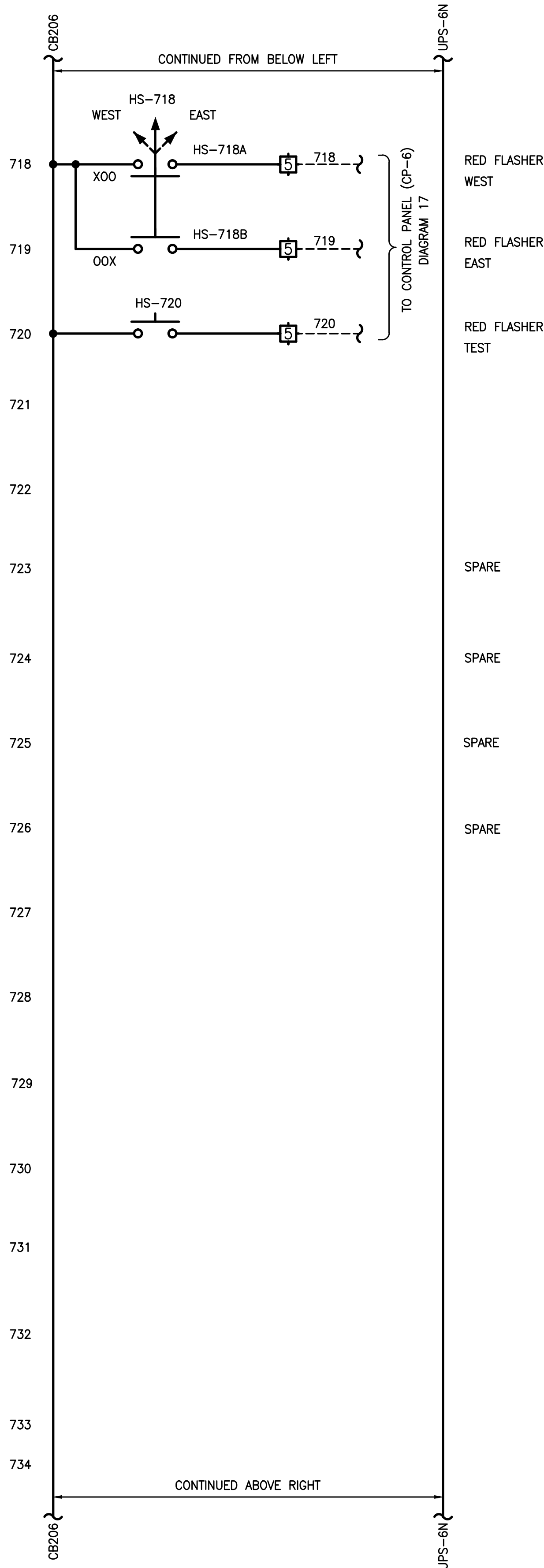
project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

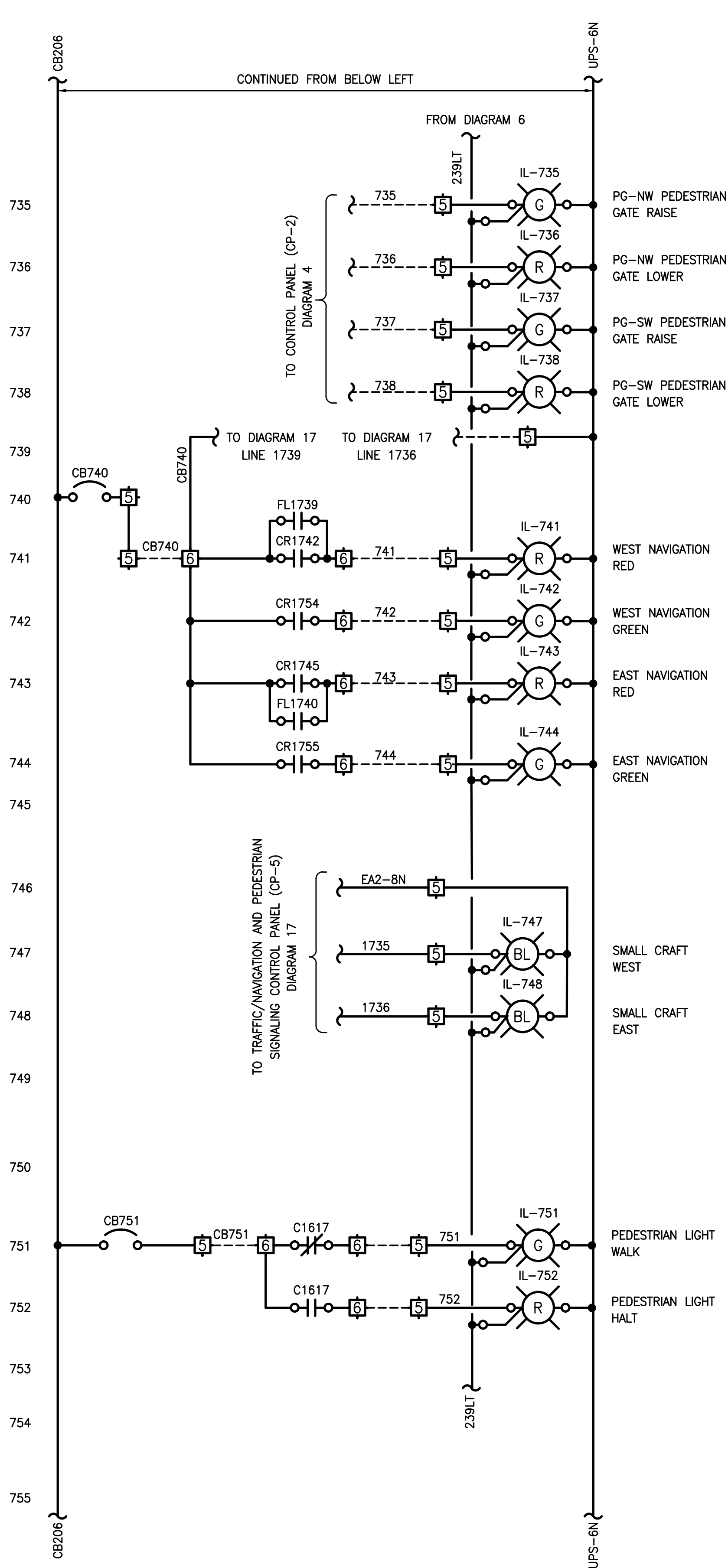
drawing no.
dessiné no. E-20



TRAFFIC/NAVIGATION CONTROL DESK (CP-5)



CAUTION: UNUSED OUTPUTS ARE NOT PART OF THE E-STOP CIRCUIT.



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

	A	Detail No. No. du détail
	B	drawing no. - where detail required dessin no. - où détail exigé
	C	drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-5
SCHEMATIC DIAGRAM 7

drawn by
dessiné par J. Perez

designed by
conçu par G. Patino/B. Crouthamel

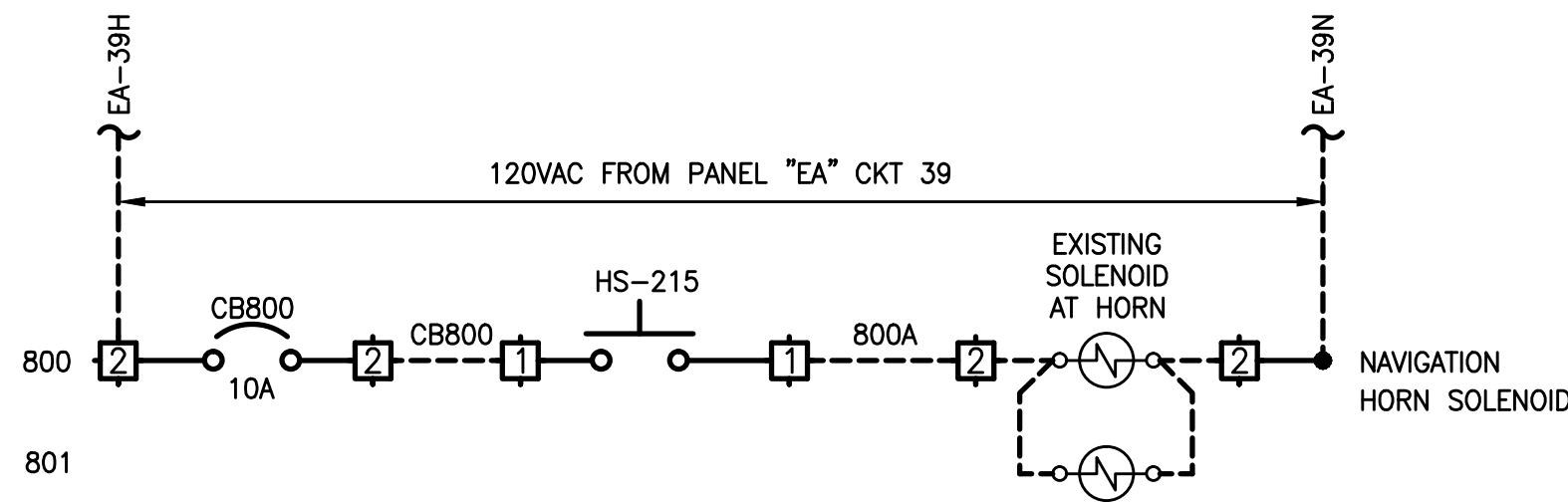
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

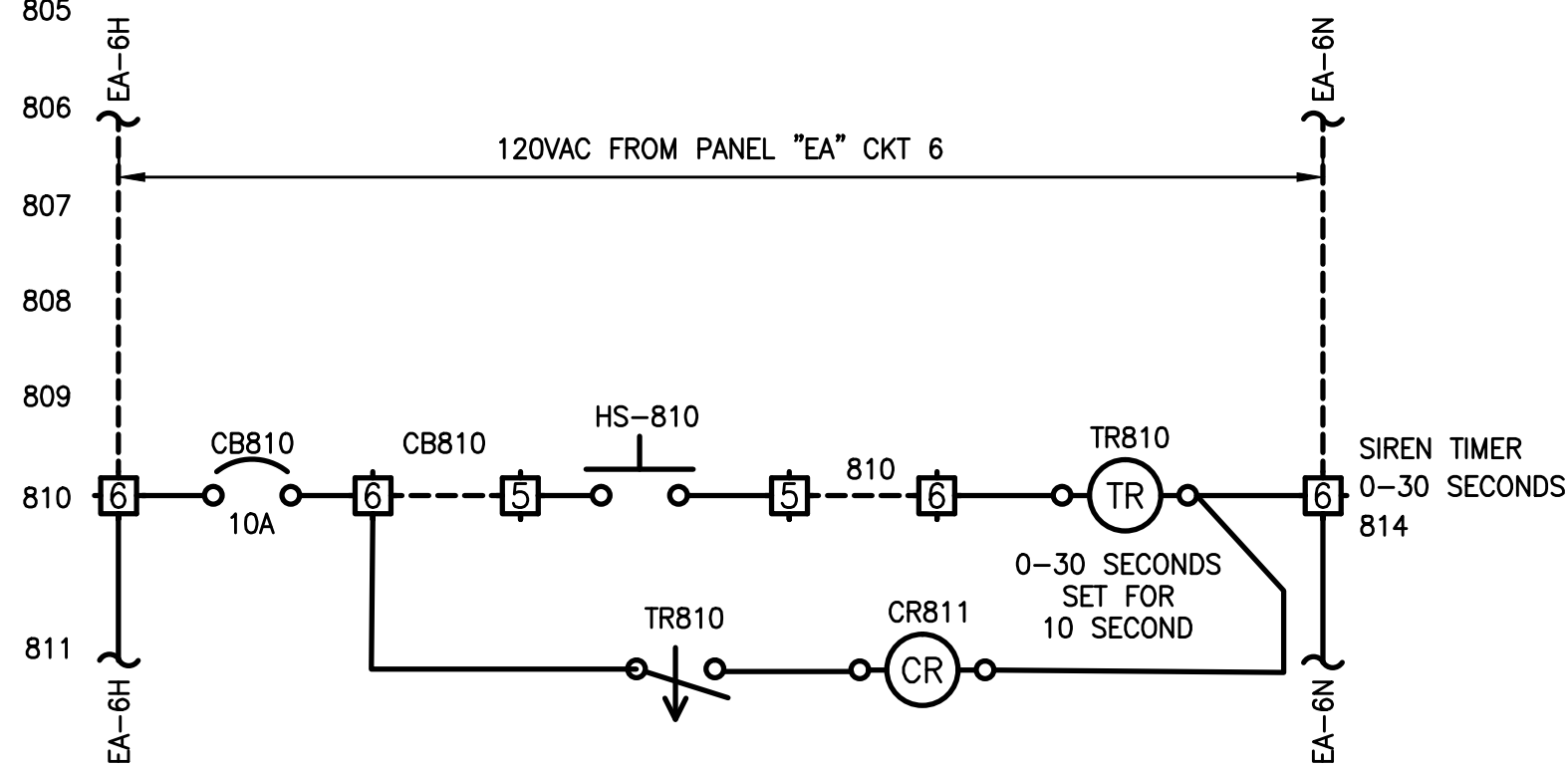
project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

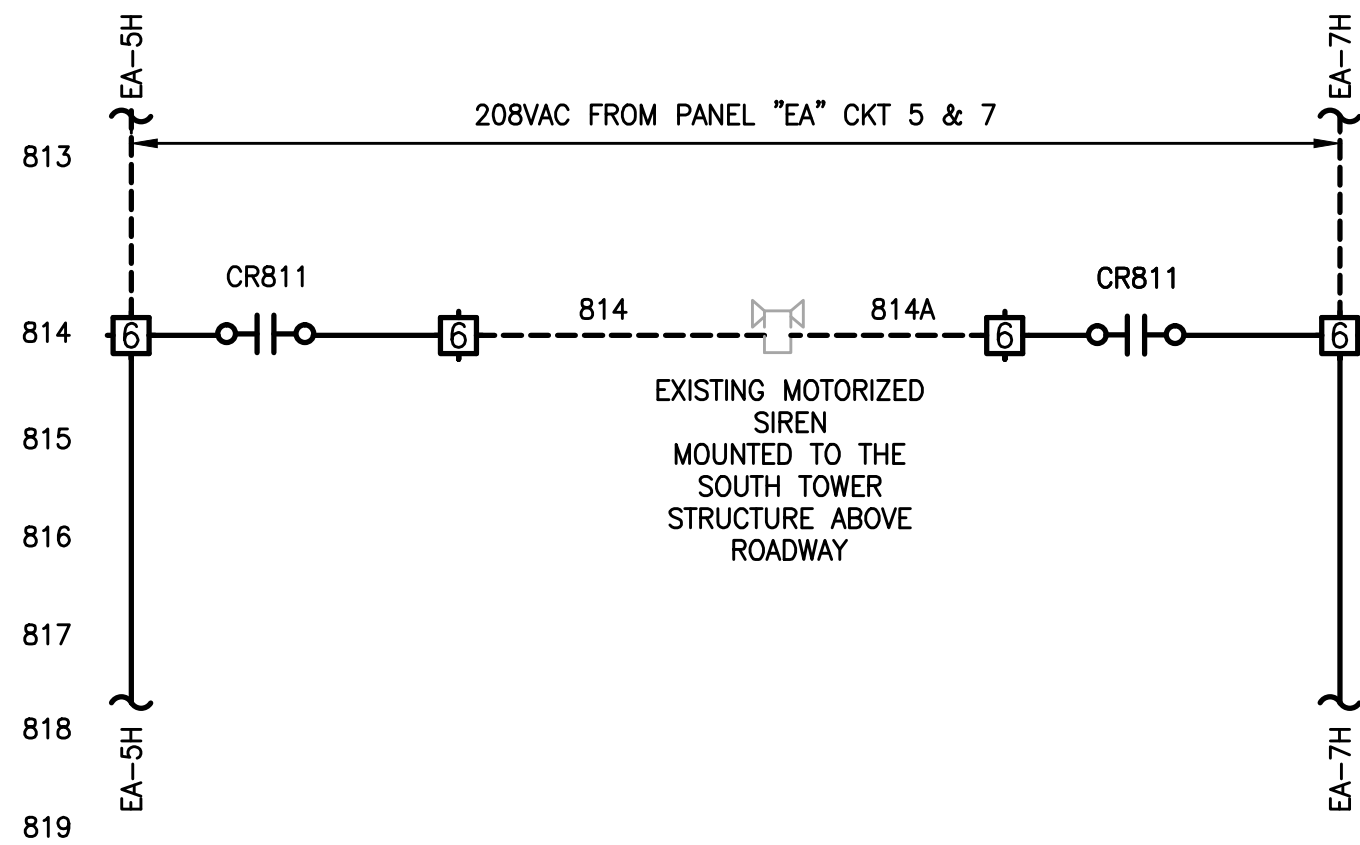
drawing no.
dessiné no. E-21



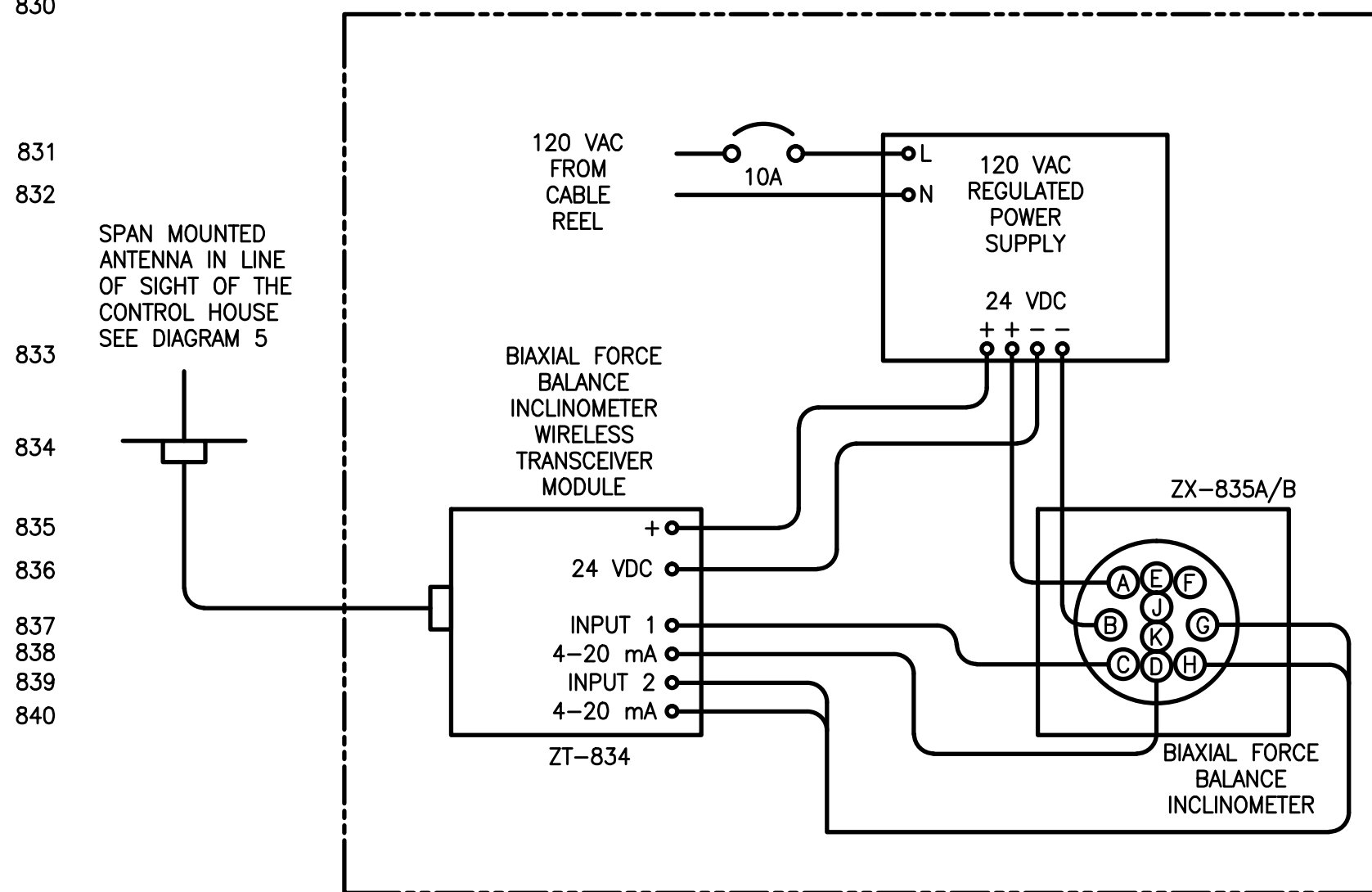
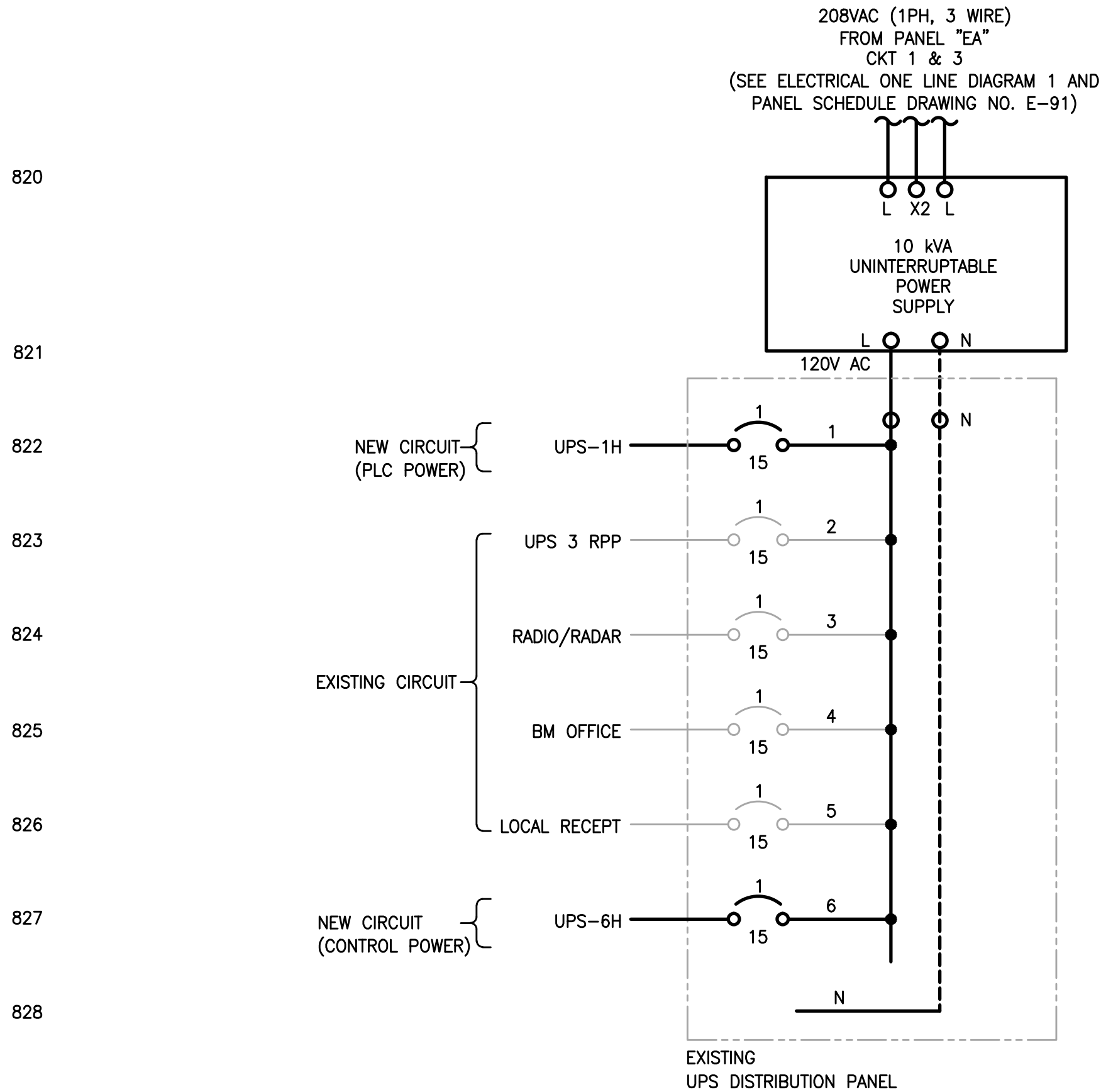
HORN CONTROL



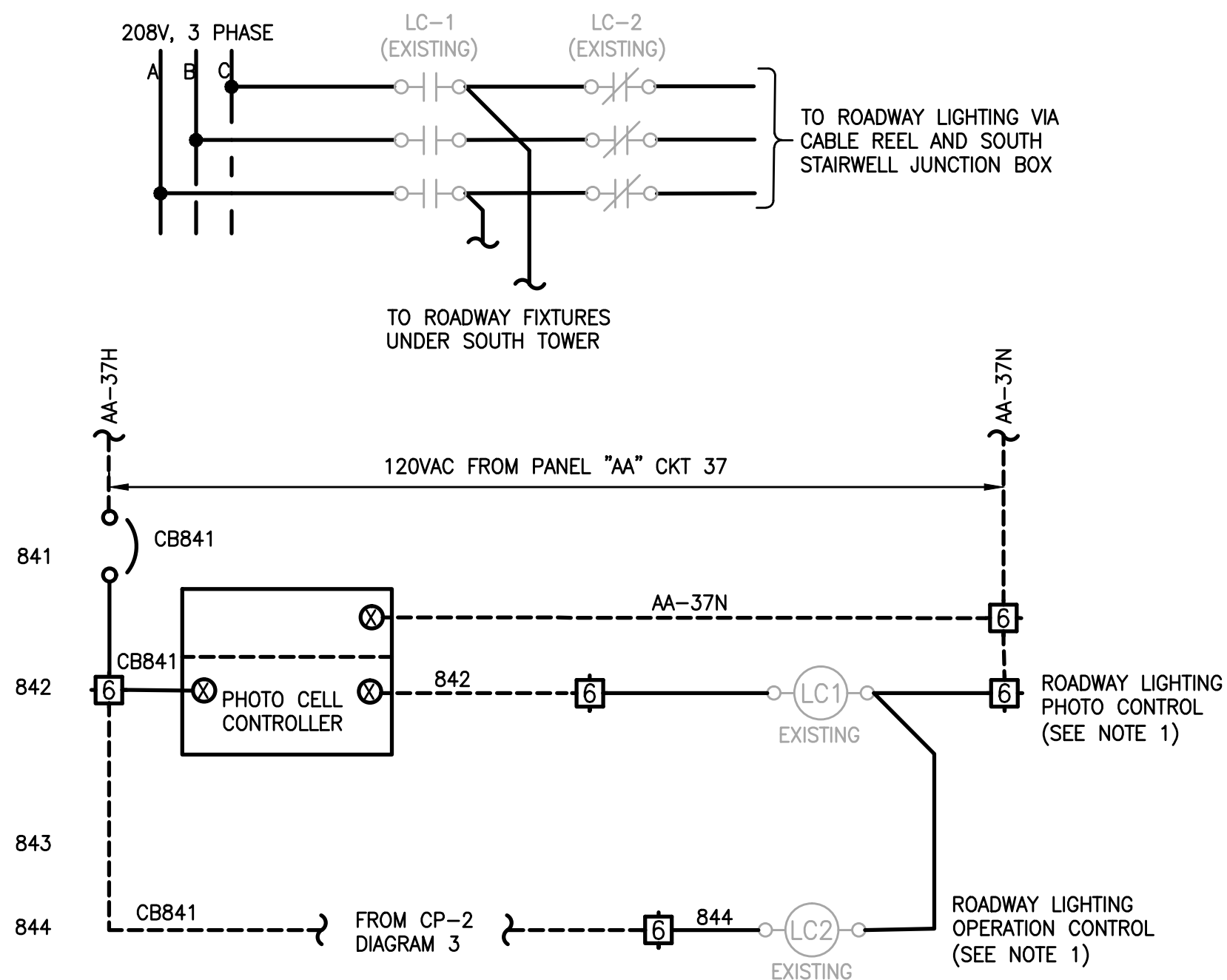
SIREN CONTROL



SIREN POWER



BIAXIAL INCLINOMETER TRANSCEIVER ZT-834



NOTE:
1. FOR EXISTING ROADWAY LIGHTING PLANS, REFER TO DRAWING E3,
PROJECT NO. 107732.

ROADWAY LIGHTING CONTROL



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and
immediately notify the Departmental Representative
of all discrepancies.

A	Detail No. No. du détail
B	drawing no. - where detail required dessin no. - où détail exigé
C	drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-1, CP-2, CP-5, & CP-6
SCHEMATIC DIAGRAM 8

drawn by
dessiné par J. Perez

designed by
conçu par G. Patino/B. Crouthamel

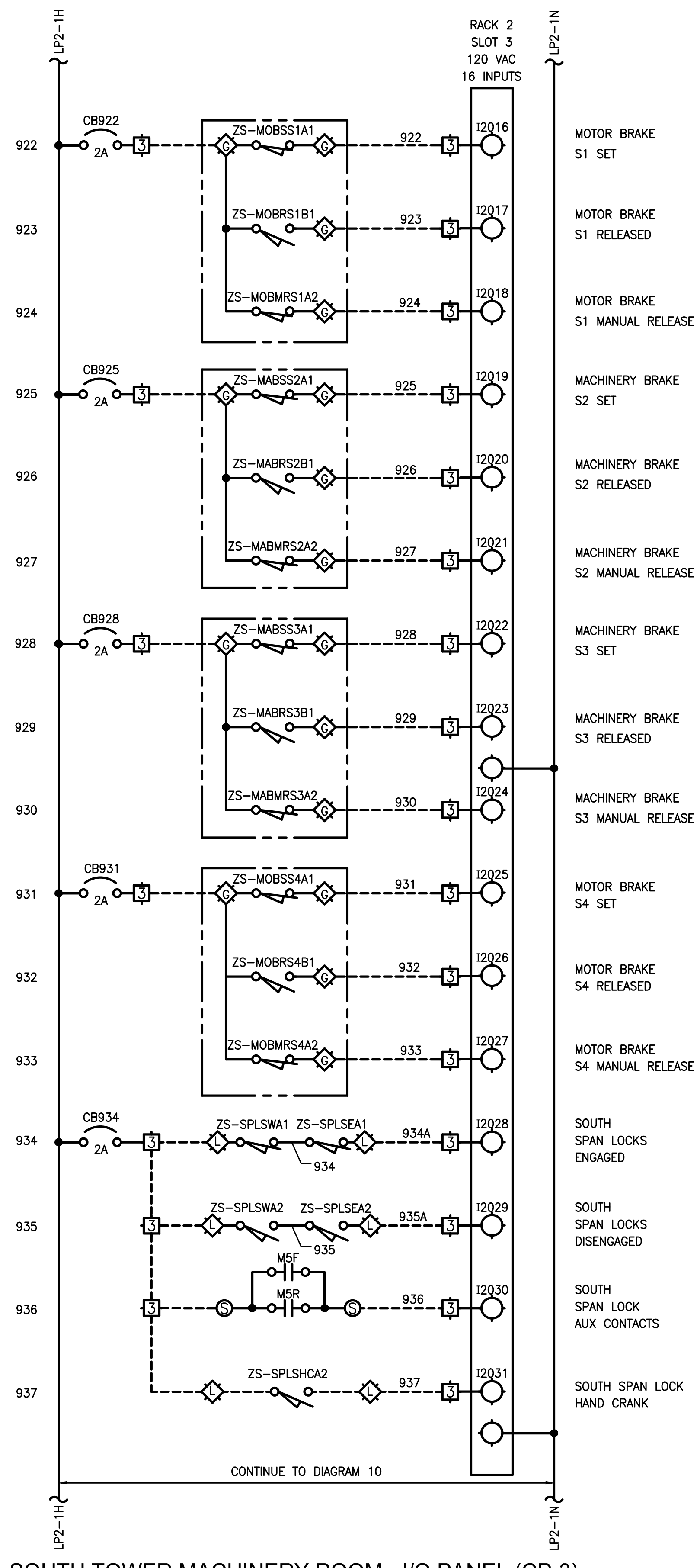
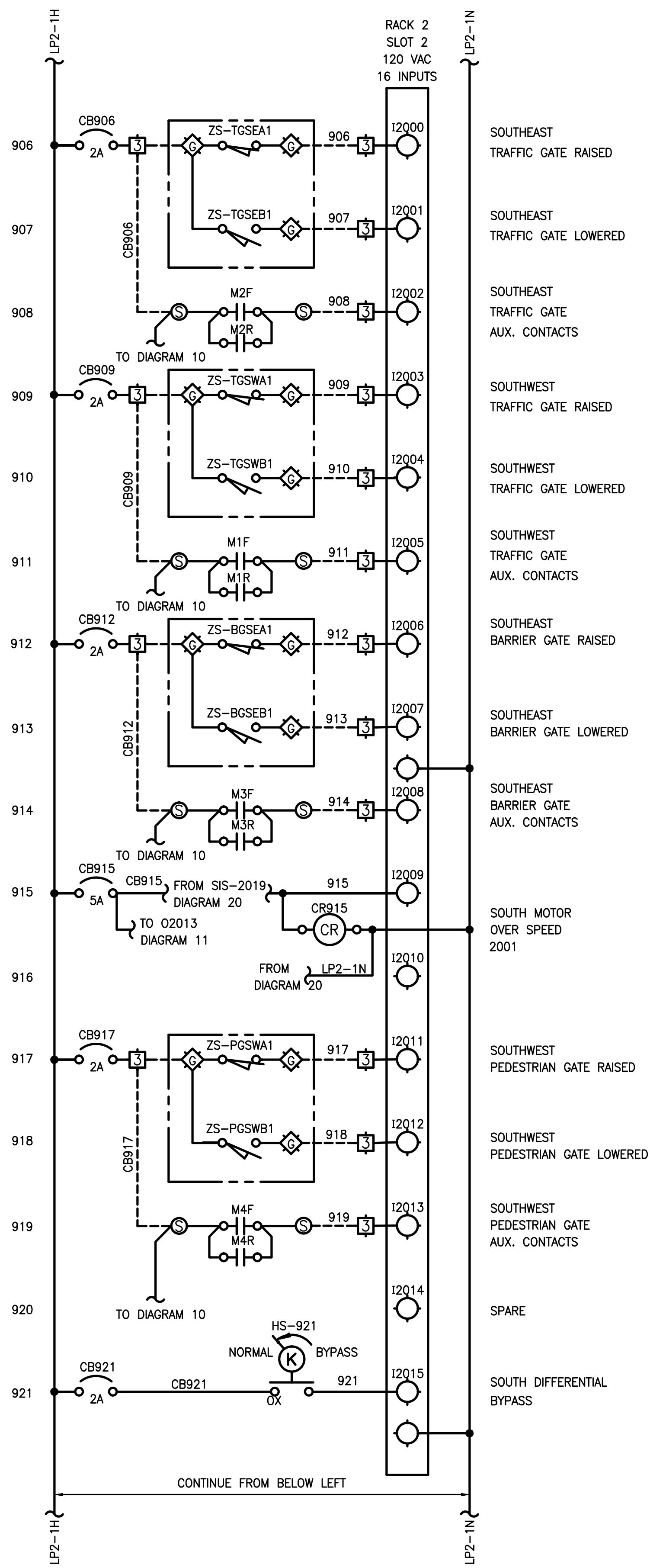
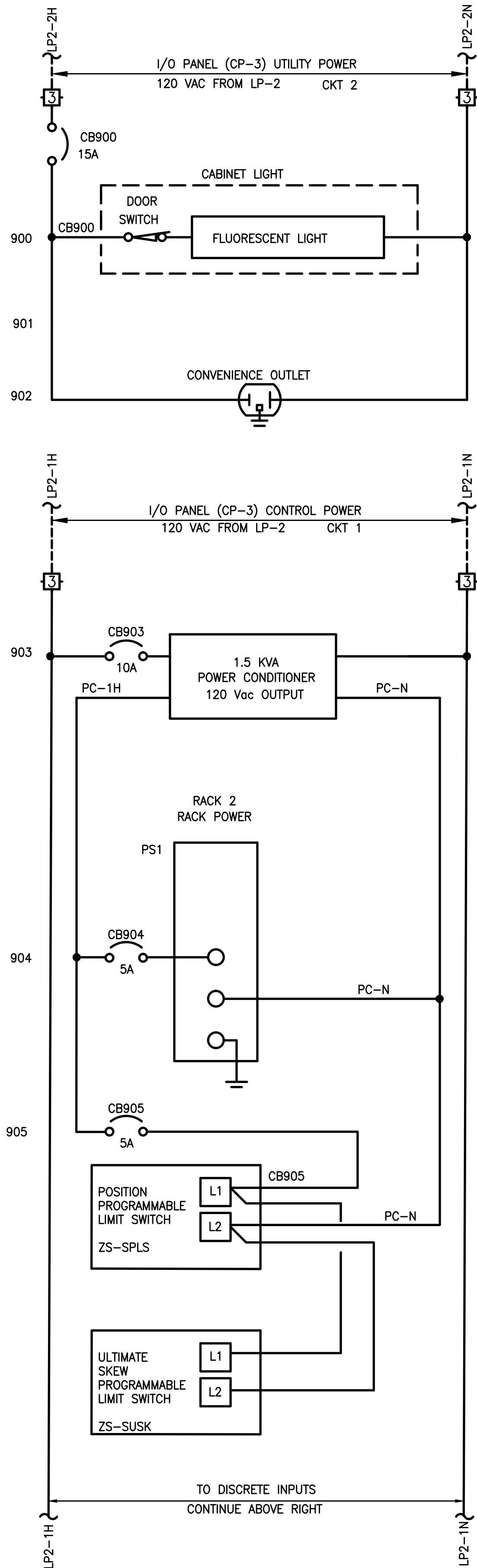
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-22



SOUTH TOWER MACHINERY ROOM - I/O PANEL (CP-3)



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

A	Detail No. No. du détail
B	drawing no. - where detail required dessin no. - où détail exigé
C	drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-3 SCHEMATIC DIAGRAM 9

drawn by
dessiné par
J. Perez

designed by
conc par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

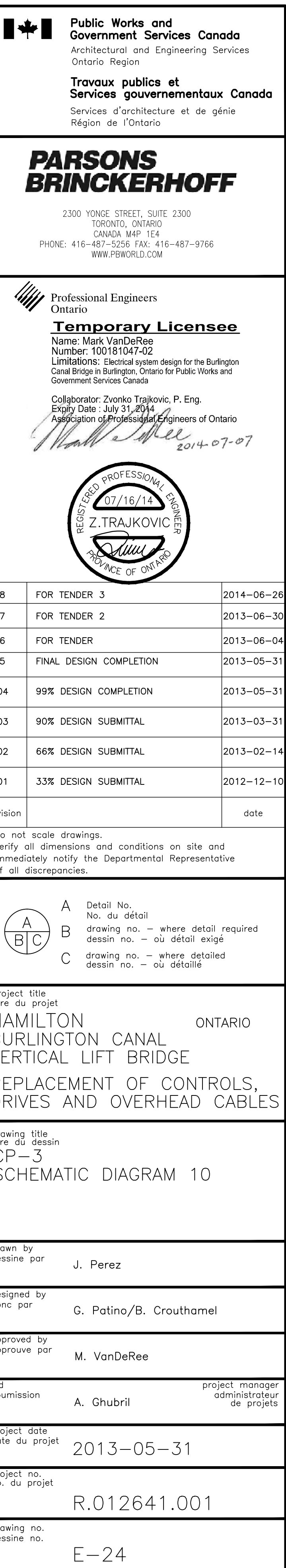
bid
soumission
A. Ghubril

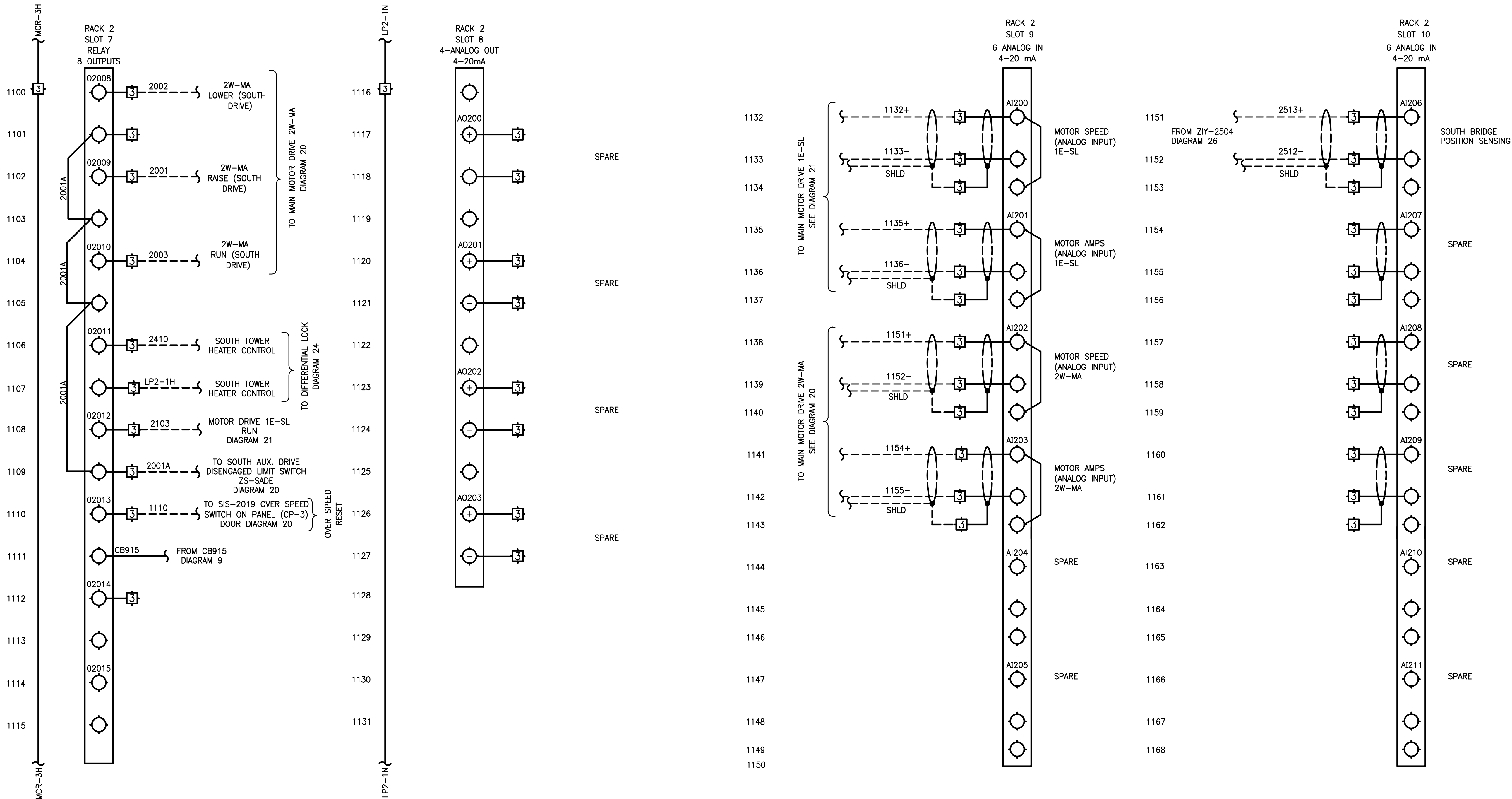
project manager
administrateur
de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
E-23





SOUTH TOWER MACHINERY ROOM I/O PANEL (CP-3)

08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

	A	Detail No.
	B	No. du détail
	C	drawing no. — where detail required dessin no. — où détail exigé
	C	drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-3 SCHEMATIC DIAGRAM 11

drawn by
dessiné par
J. Perez

designed by
conçu par
G. Patino/B. Crouthamel

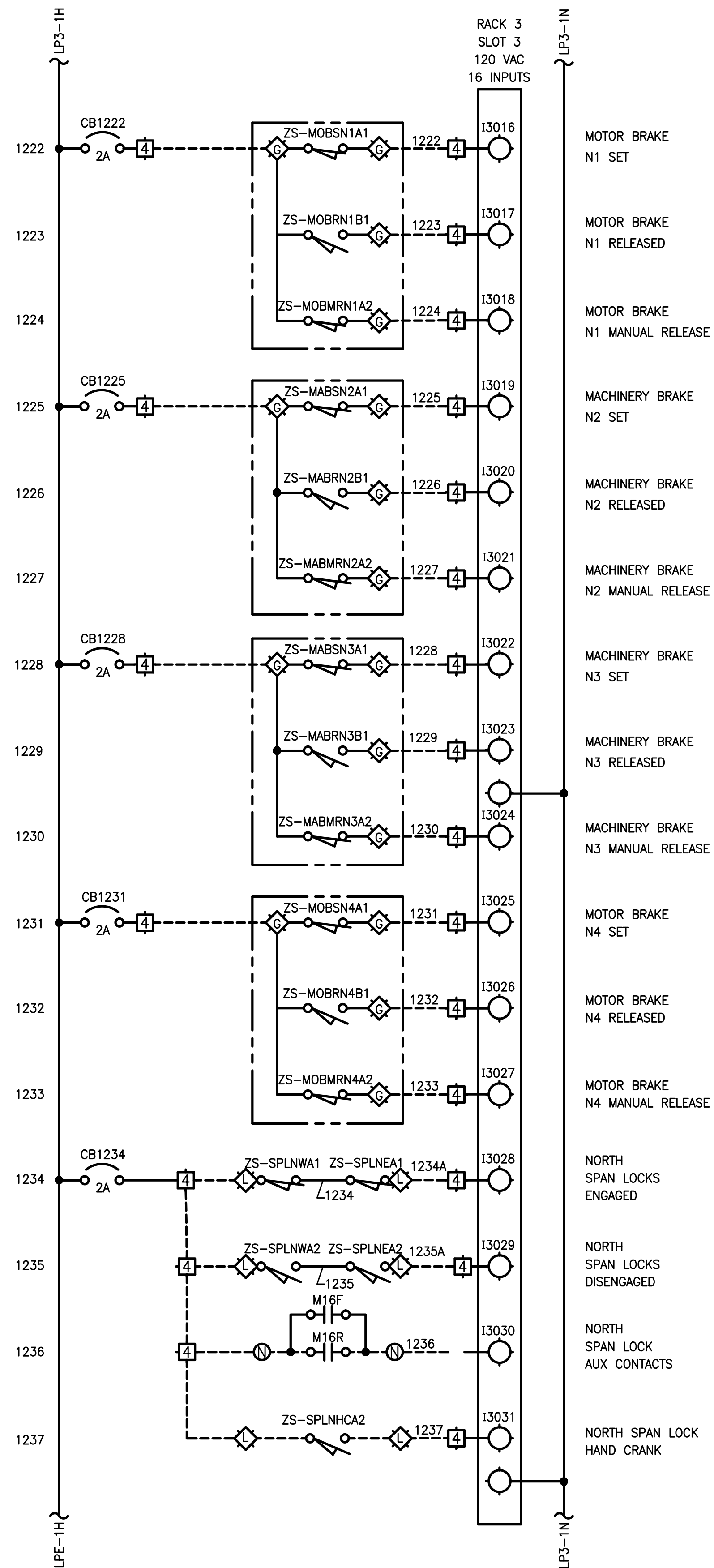
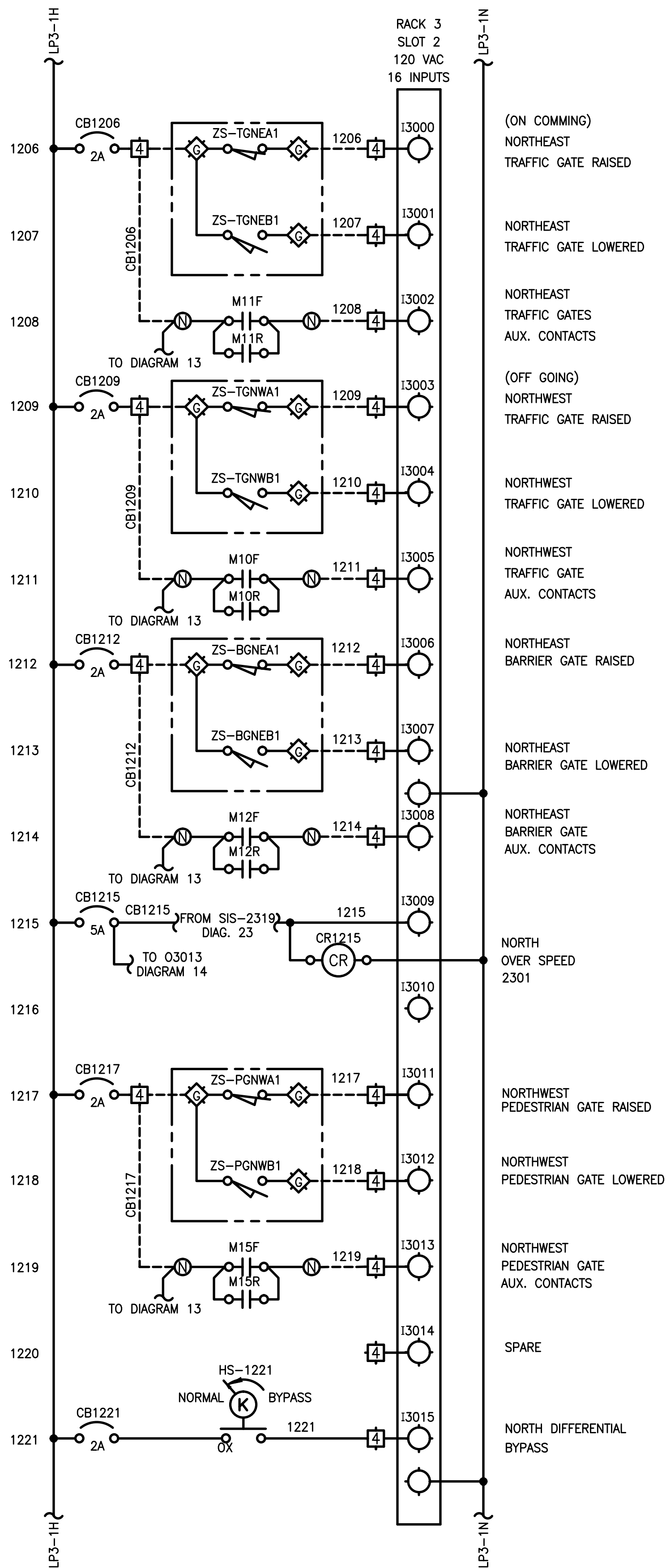
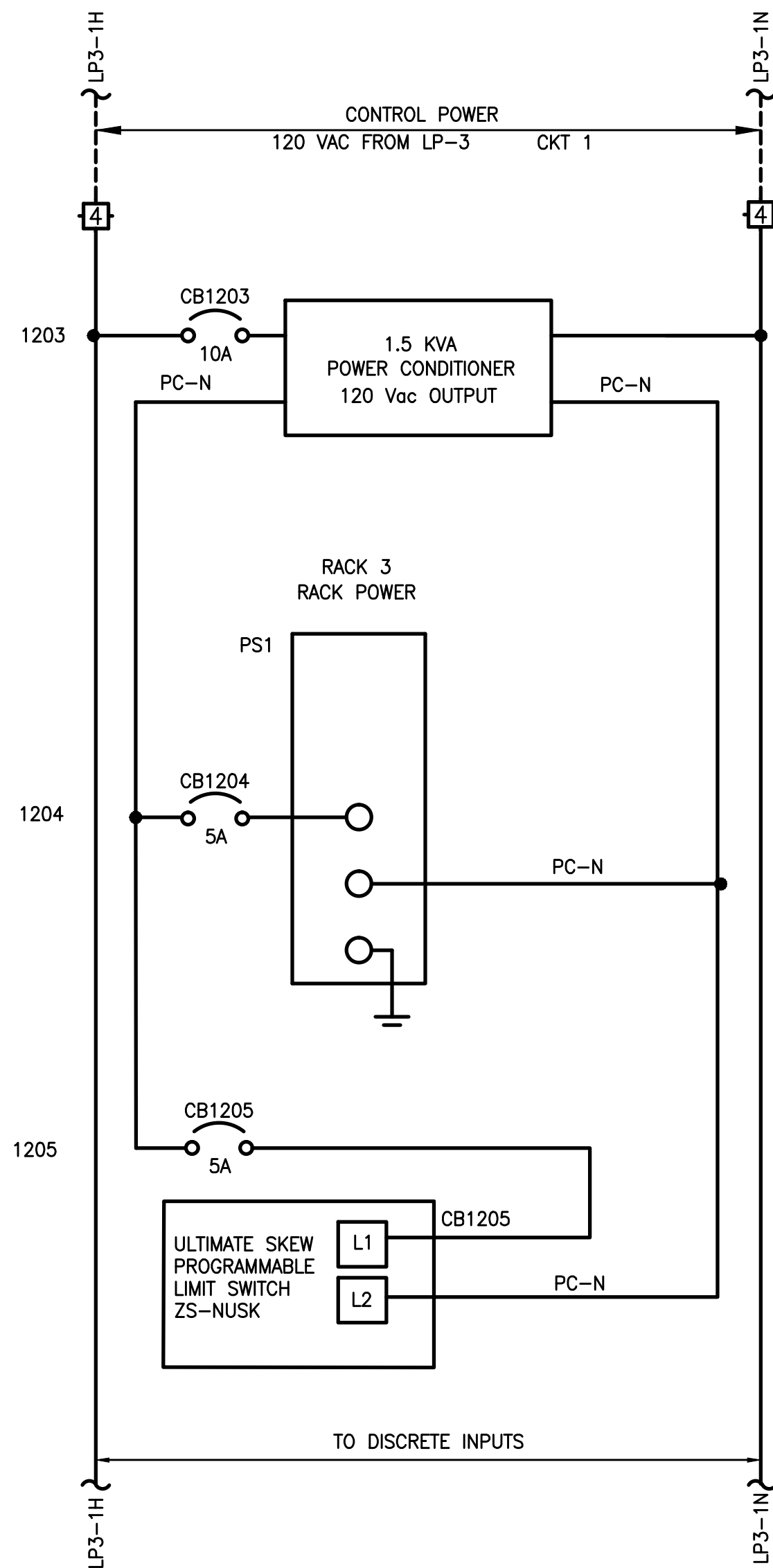
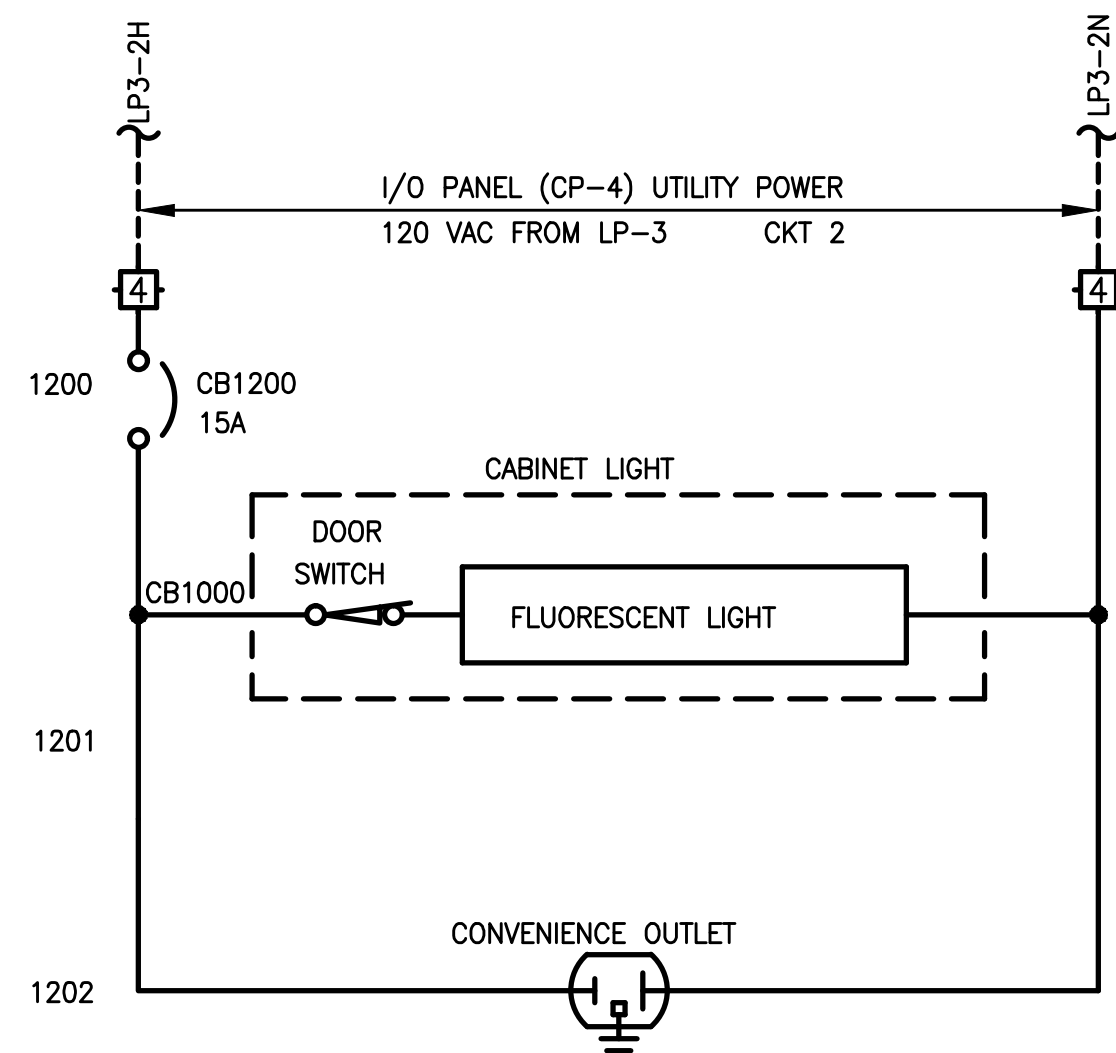
approved by
approuvé par
M. VanDeRee

bid
soumission
A. Ghubril

project manager
administrateur de projets
project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001


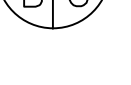
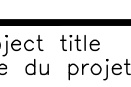
drawing no.
dessiné no.
E-25



NORTH TOWER MACHINE ROOM - I/O PANEL (CP-4)

08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

	A Detail No. No. du détail
	B drawing no. — where detail required dessin no. — où détail exigé
	C drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-4
SCHEMATIC DIAGRAM 12

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

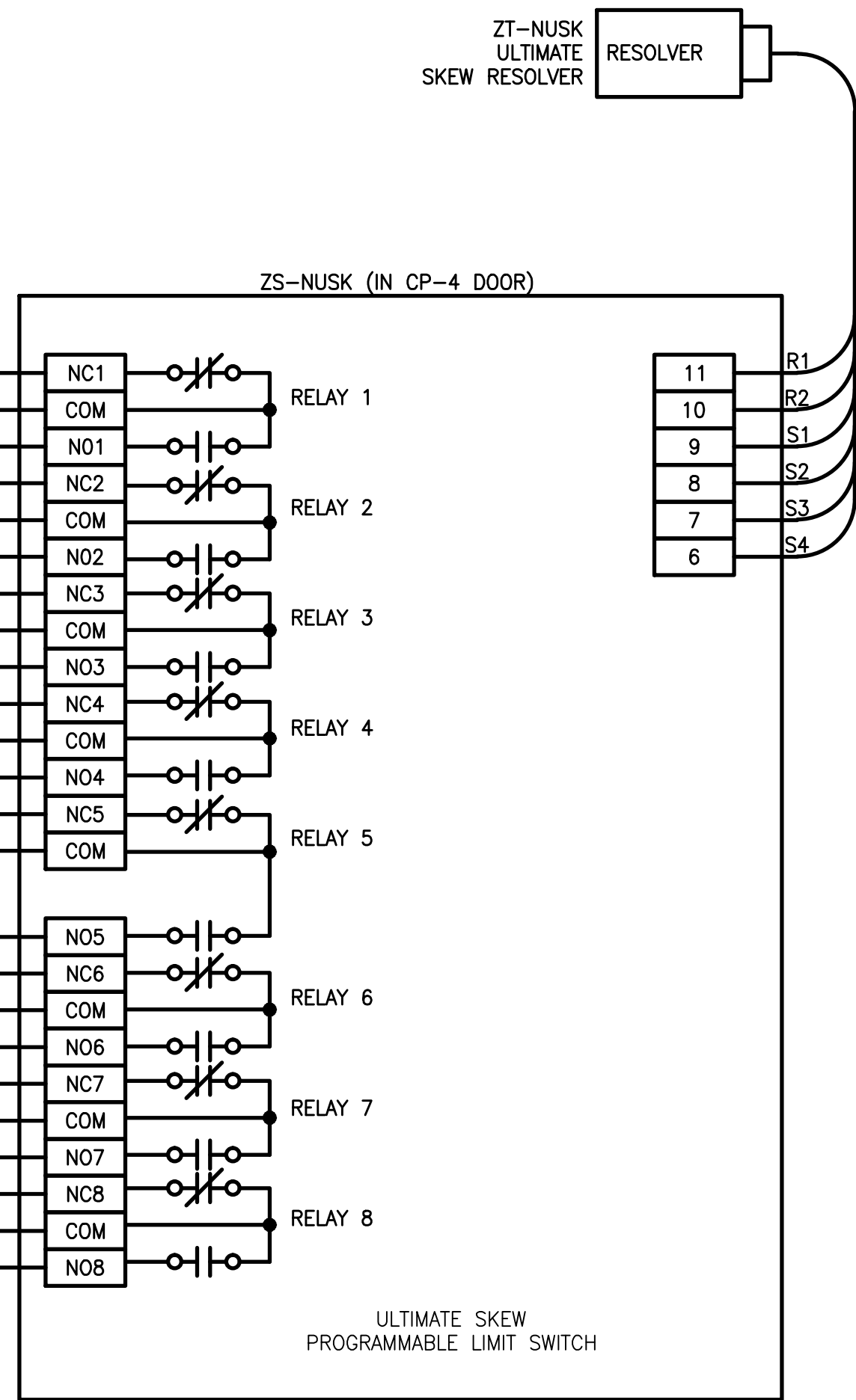
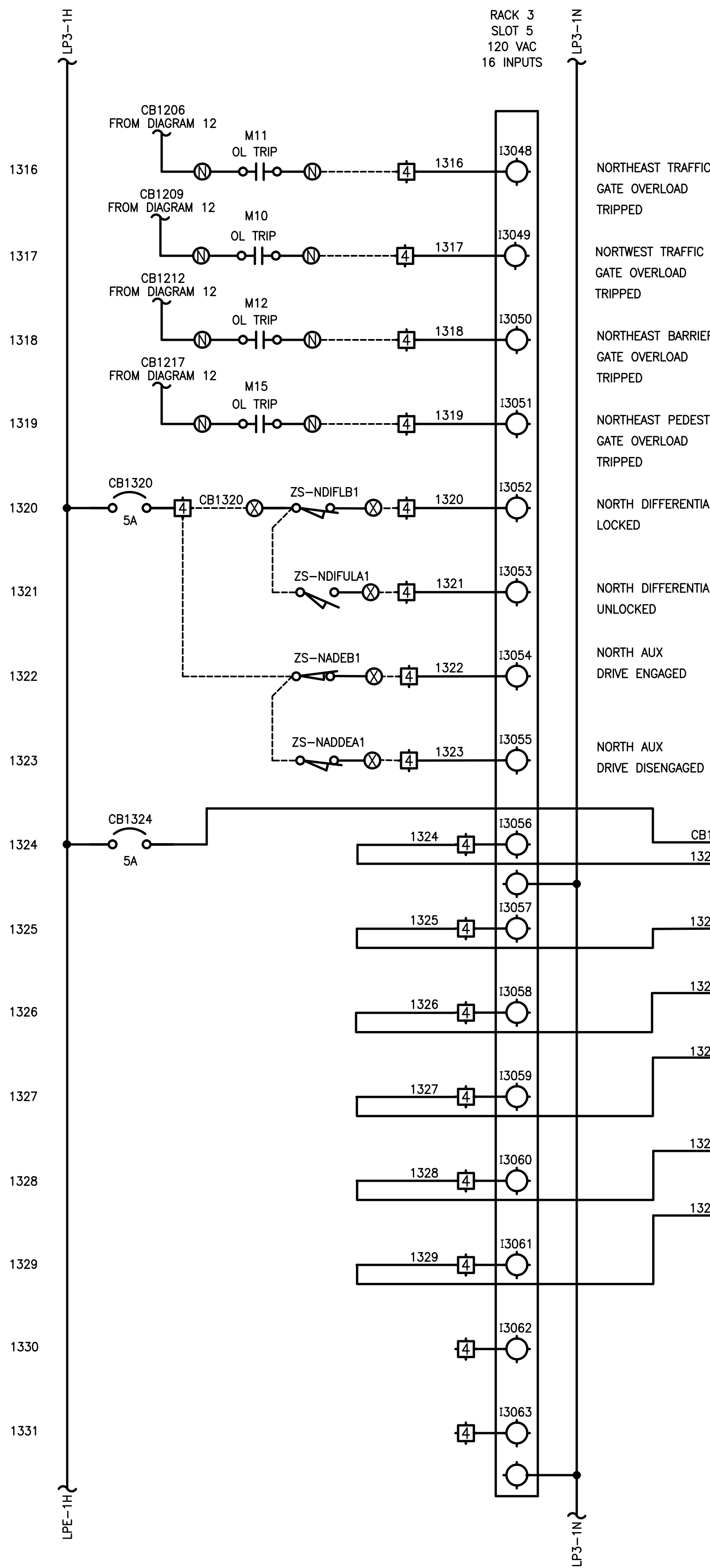
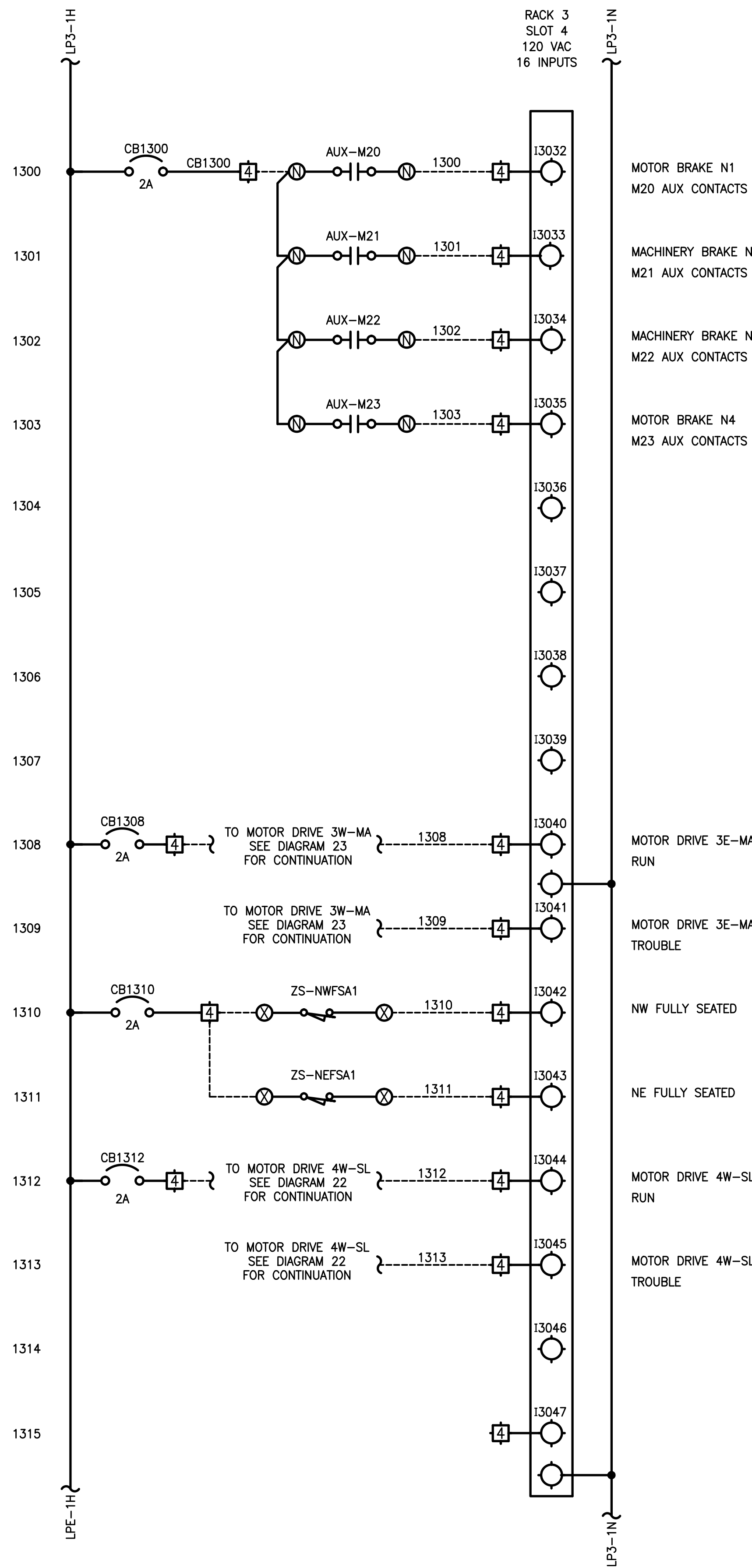
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-26



NORTH TOWER MACHINERY ROOM I/O PANEL (CP-4)



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

A	Detail No. No. du détail
B	drawing no. — where detail required dessin no. — où détail exigé
C	drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-4 SCHEMATIC DIAGRAM 13

drawn by
dessiné par
J. Perez

designed by
conçu par
G. Patino/B. Crouthamel

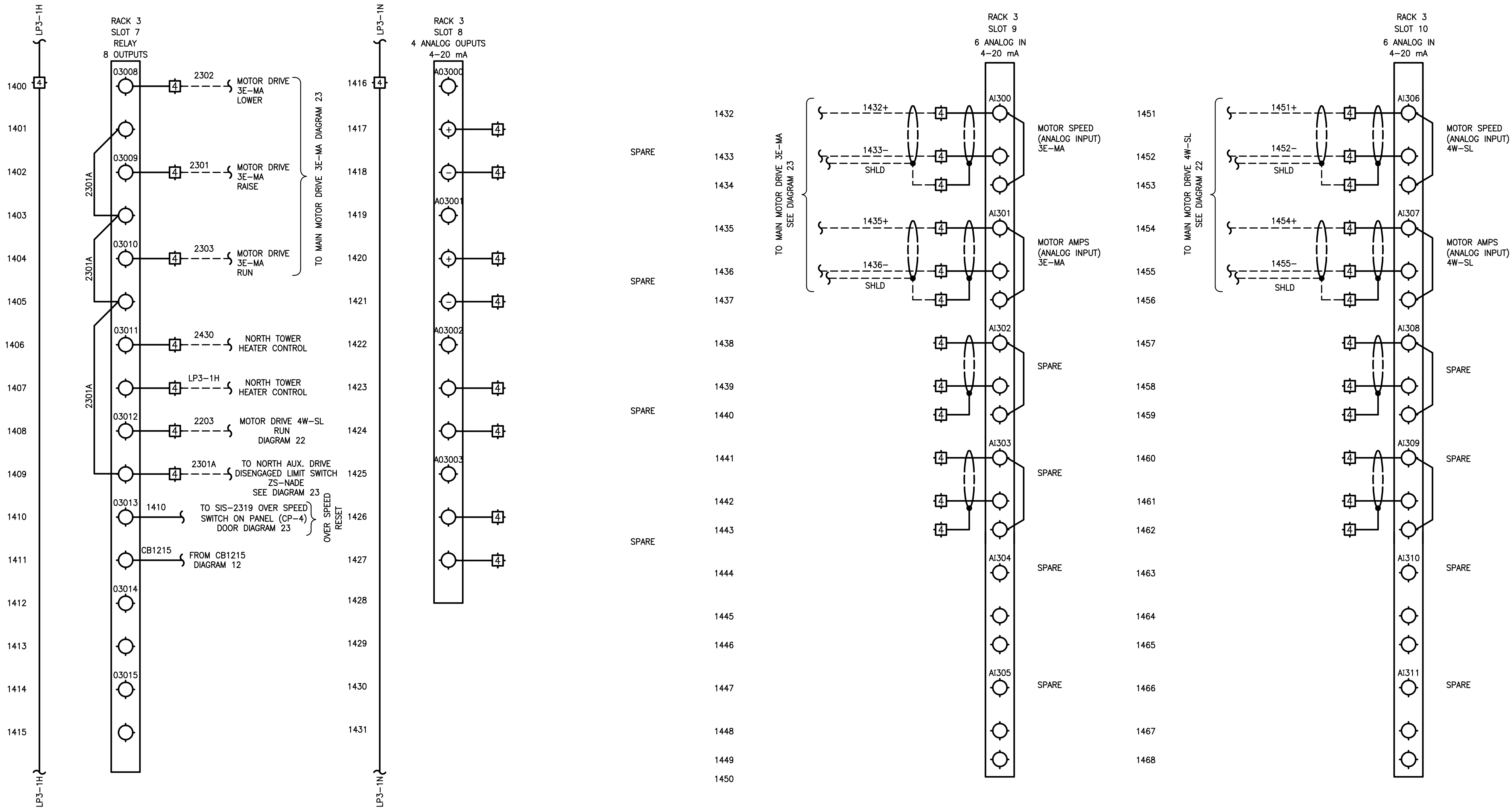
approved by
approuvé par
M. VanDeRee

bid
soumission
A. Ghubril

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
E-27



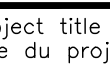


NORTH TOWER MACHINERY ROOM I/O PANEL (CP-4)



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and
immediately notify the Departmental Representative
of all discrepancies.

	A Detail No. No. du détail
	B drawing no. - where detail required dessin no. - où détail exigé
	C drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
ONTARIO
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CP-4 SCHEMATIC DIAGRAM 14

drawn by
dessiné par J. Perez

designed by
conçu par G. Patino/B. Crouthamel

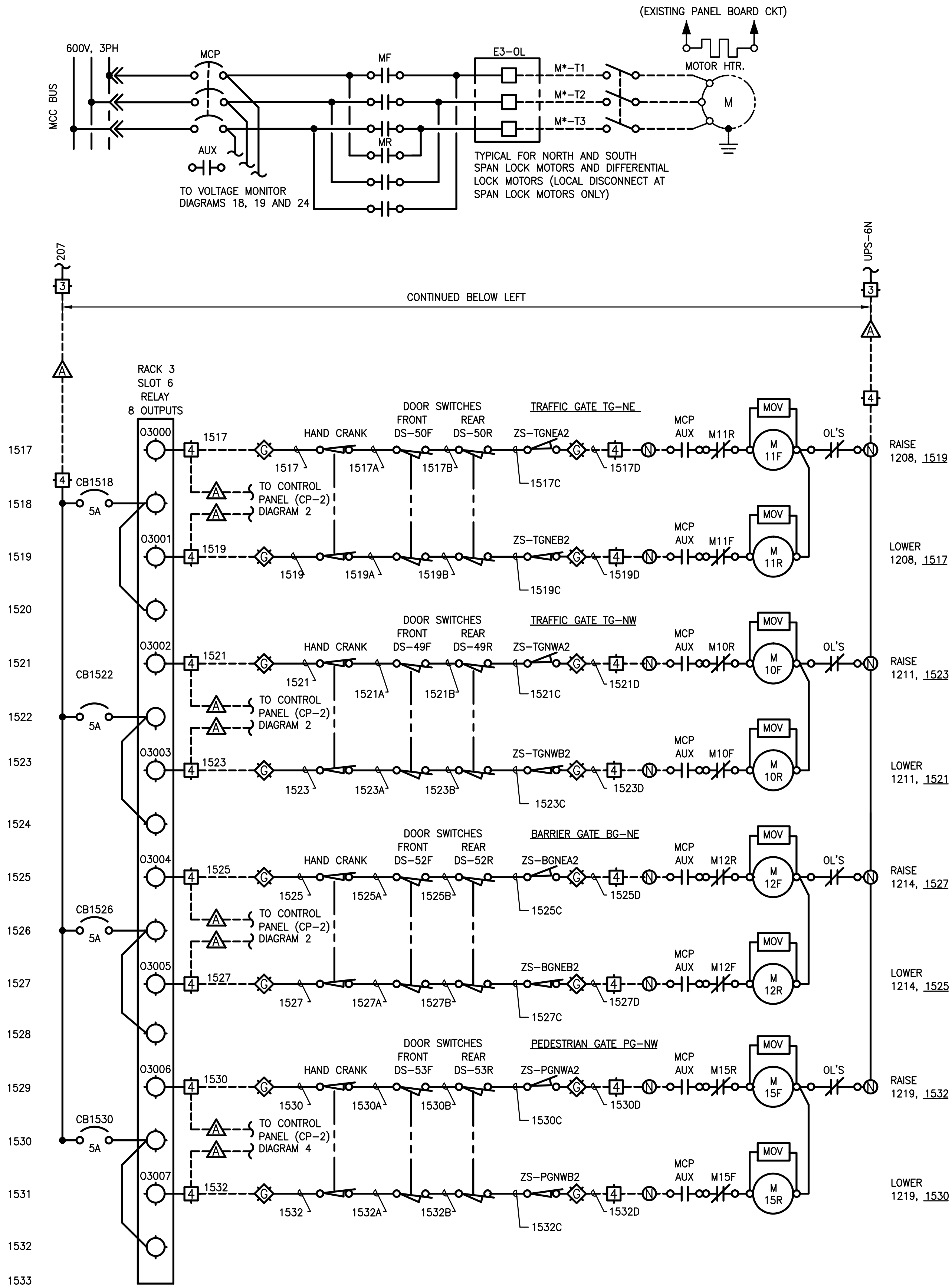
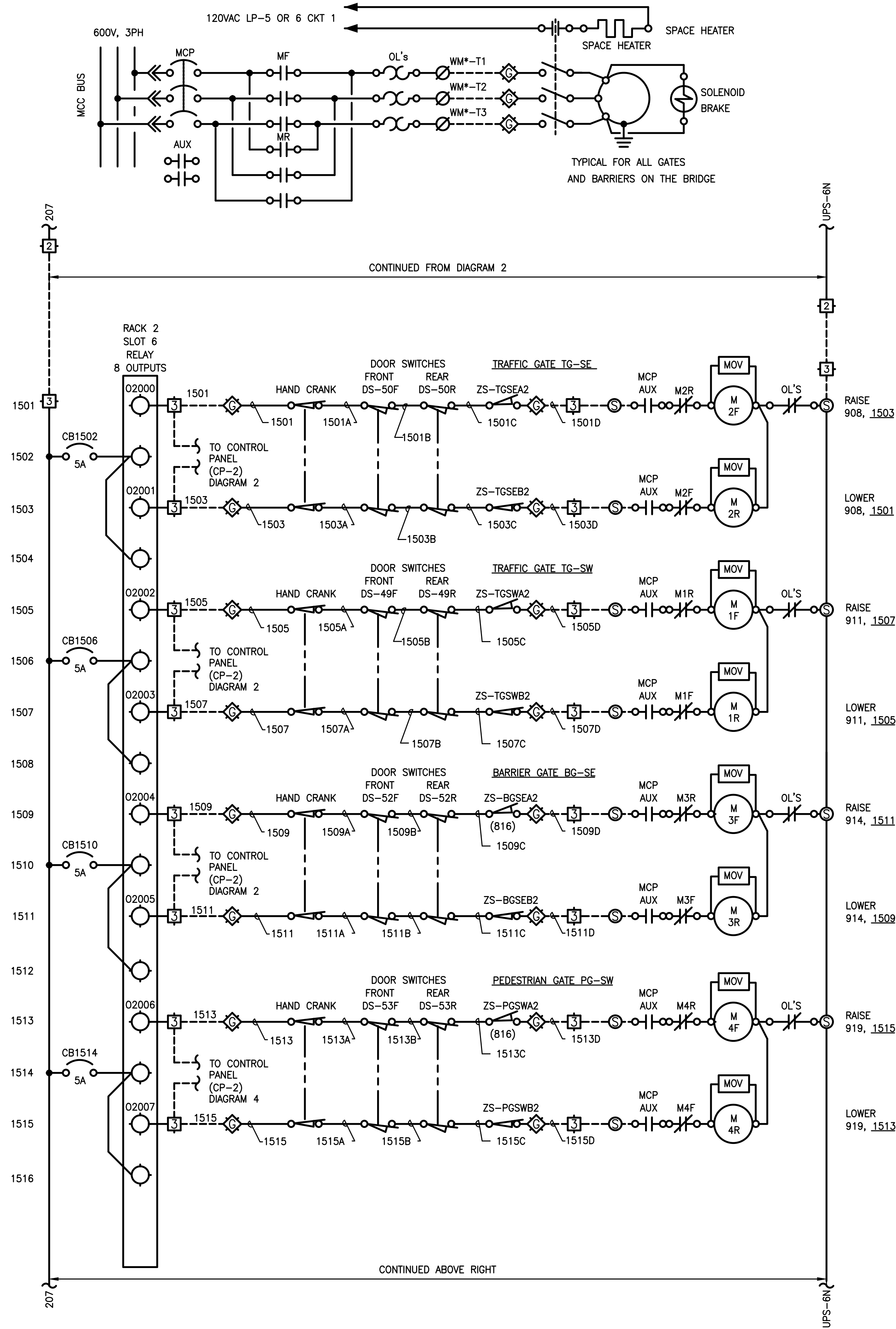
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-28



TRAFFIC, BARRIER, AND PEDESTRIAN GATES

Public Works and Government Services Canada
Architectural and Engineering Services
Ontario Region
Travaux publics et Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario

PARSONS BRINCKERHOFF
2300 YONGE STREET, SUITE 2300
TORONTO, ONTARIO
CANADA M4P 1E4
PHONE: 416-487-5256 FAX: 416-487-9766
WWW.PBWORLD.COM

Professional Engineers Ontario
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario
2014-07-07



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

A	Detail No.
B	No. du détail
C	drawing no. - where detail required dessin no. - où détail exigé
C	drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
GATES SCHEMATIC DIAGRAM 15

drawn by
dessiné par
J. Perez

designed by
conc. par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

bid
soumission
A. Ghubril

project date
date du projet
2013-05-31

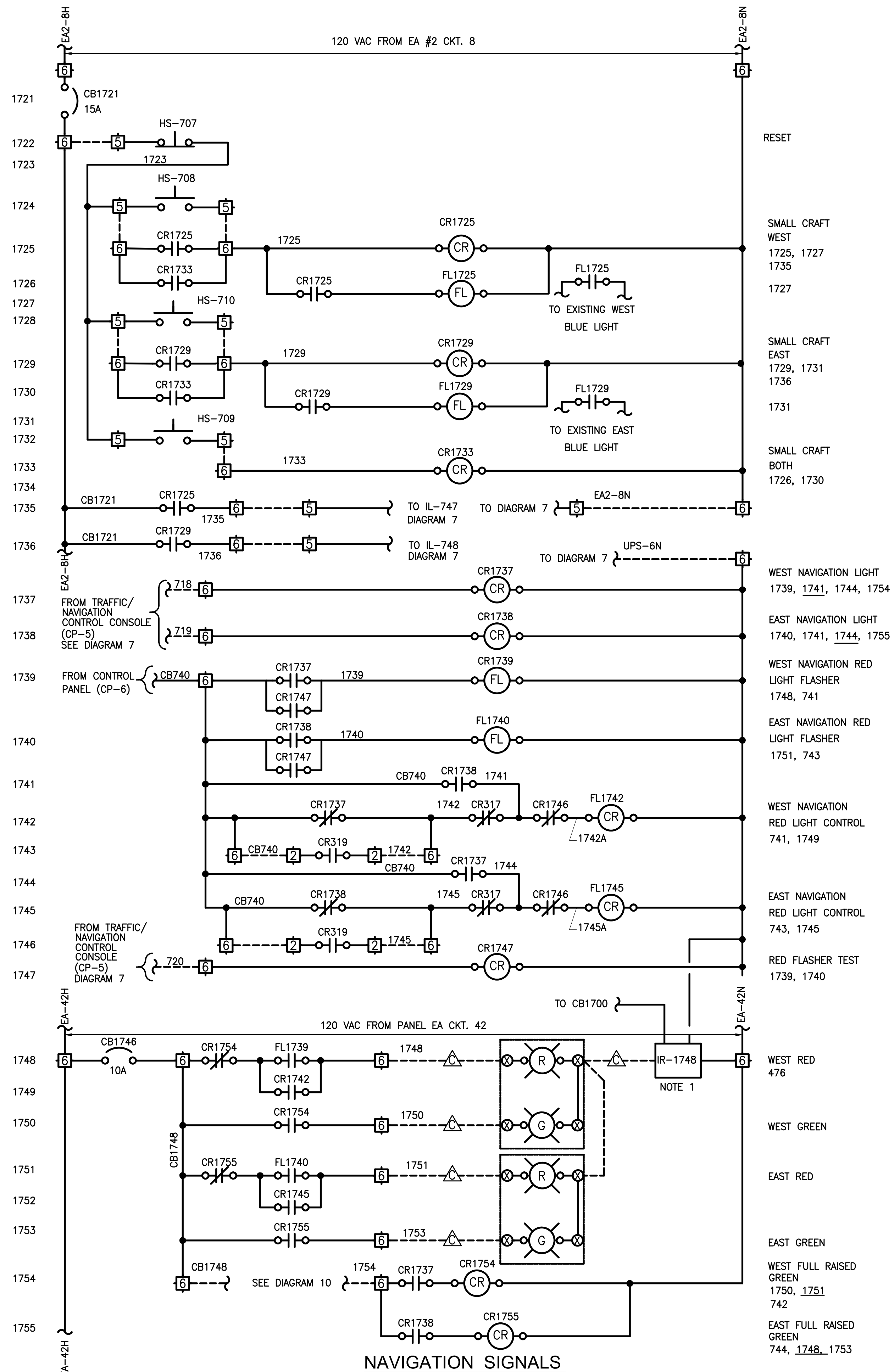
project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
E-29





NOTES:
1. CURRENT RELAY IR-1748 SHALL HAVE
ADJUSTABLE TRIP FROM 0.5 AMP TO 2.5 AMP



Do not scale drawings.
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immediately notify the Departmental Representative
of all discrepancies.

A Detail No.
No. du détail

B drawing no. — where detail required
dessin no. — où détail exigé

C drawing no. — where detailed
dessin no. — où détaillé

project title
titre du projet

HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
SIGNALS
SCHEMATIC DIAGRAM 17

drawn by
dessine par J. Perez

designed by
conc par G. Patino/B. Crouthamel

approved by
approuvé par M. VanDeRee

bid	project manager
soumission	administrateur de projets

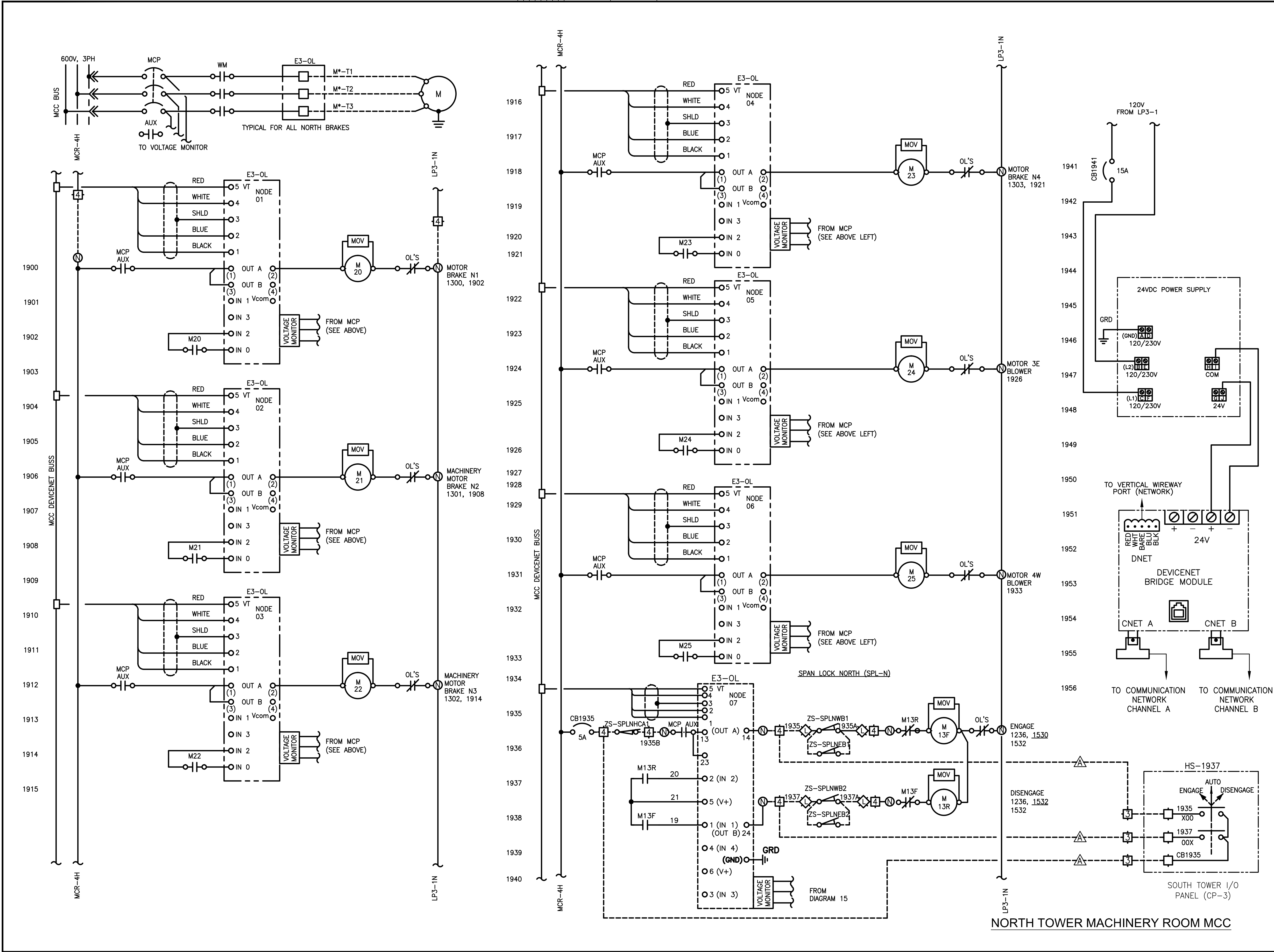
project date
date du projet 2013-05-31

project no.
no. du projet

B 012641 001

drawing no.
dessine no. 5 74





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Ontario Region

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Région de l'Ontario

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TORONTO, ONTARIO
CANADA M4P 1E4
PHONE: 416-487-5256 FAX: 416-487-9766
WWW.PBWORLD.COM

Professional Engineers Ontario
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

2014-07-07

revision	description	date
08	FOR TENDER 3	2014-06-26
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01	33% DESIGN SUBMITTAL	2012-12-10

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	A	Detail No.
	B	No. du détail
	C	drawing no. - where detail required dessin no. - où détail exigé
		drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
MCC NORTH TOWER SCHEMATIC DIAGRAM 19

drawn by
dessiné par
J. Perez

designed by
conçu par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

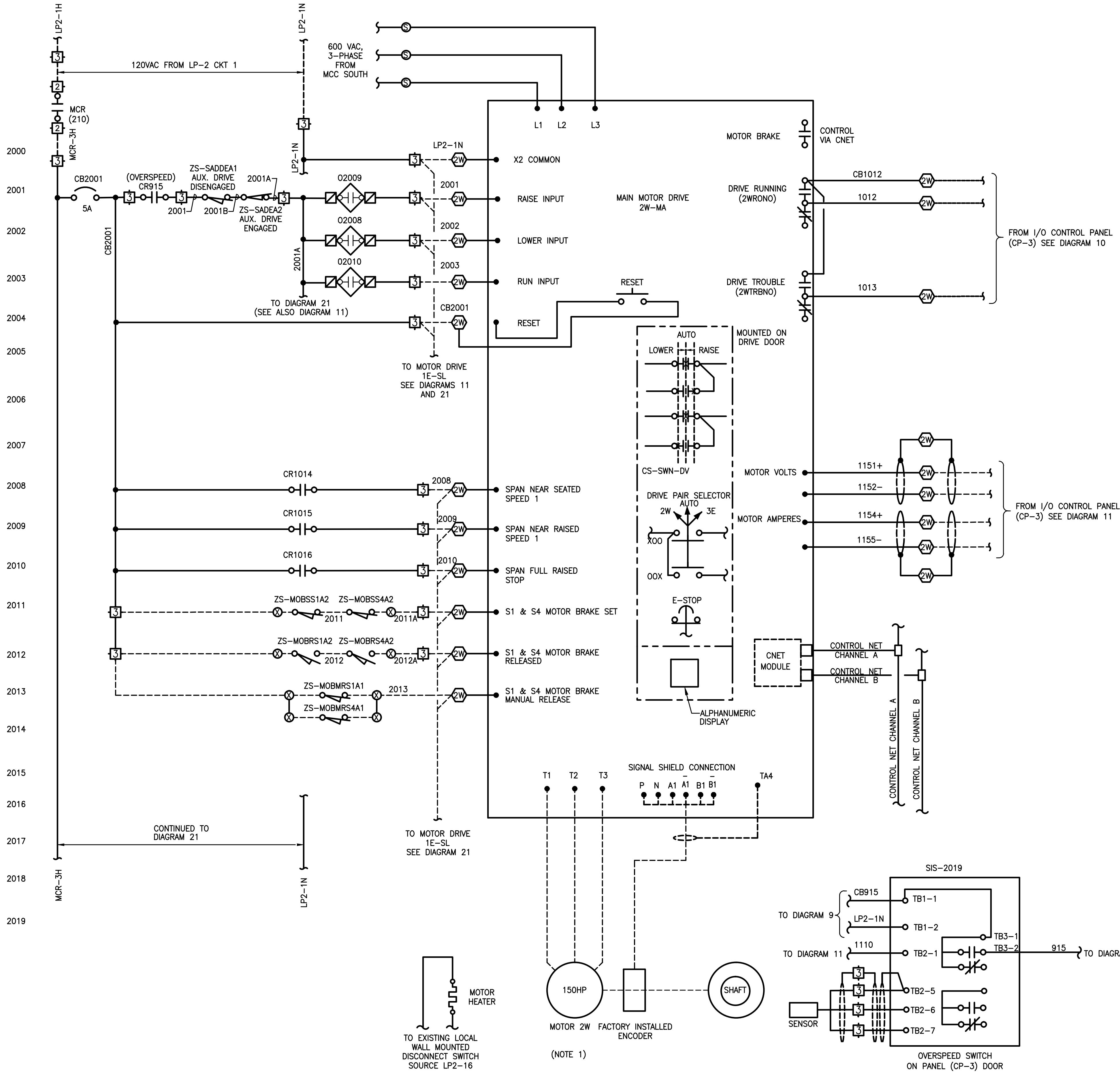
bid
soumission
A. Ghubril

project manager
administrateur de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

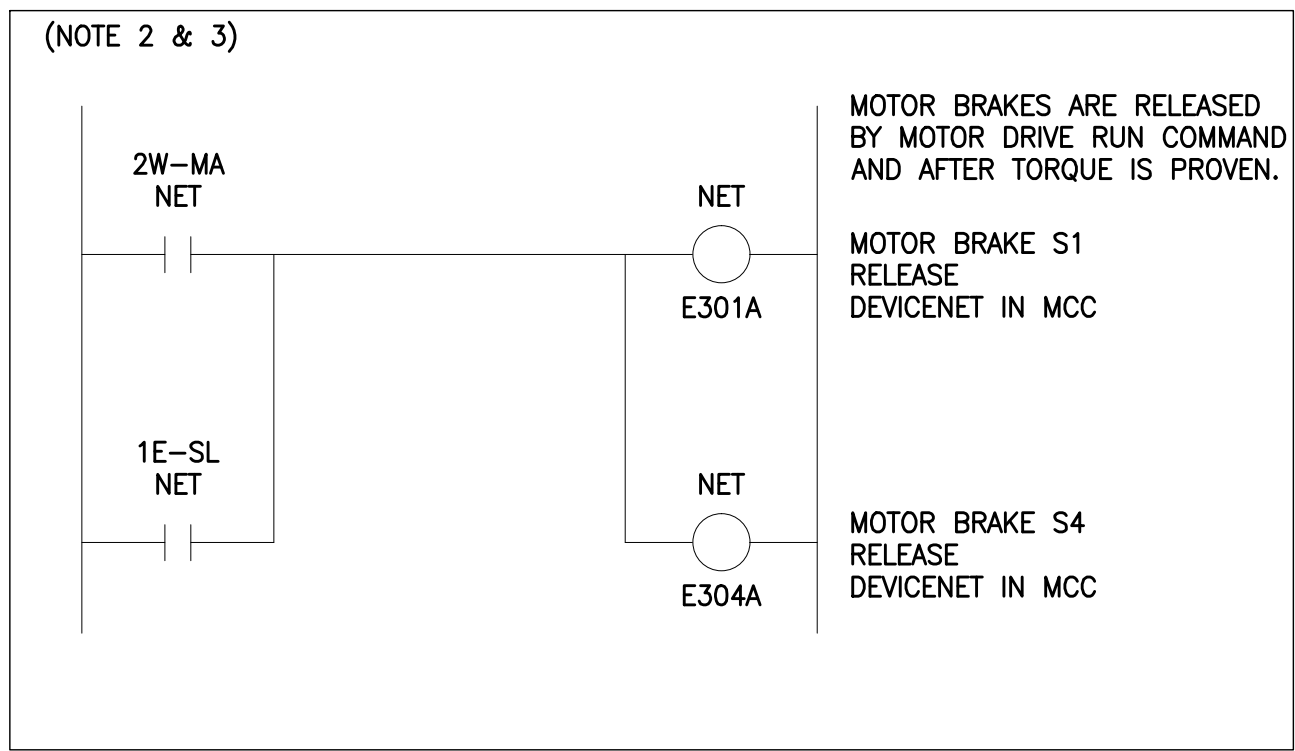
drawing no.
dessiné no.
E-33



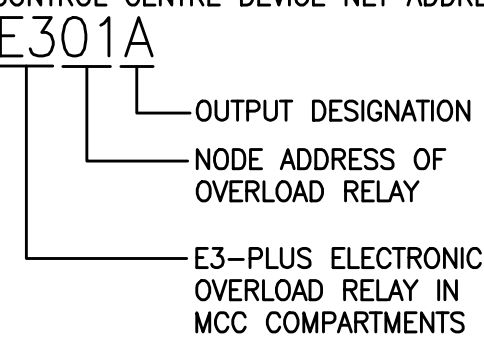
CONTROLNET INPUTS	
1	SPEED 1
2	SPEED 2
3	SPEED 3
4	SPEED 4
5	SPEED 5
6	SPAN FULLY SEATED

CONTROLNET OUTPUTS	
1	MOTOR BRAKE RELEASE

CNET MODULE DEVICENET PROGRAMMING



- NOTE:
1. FINAL MOTOR HORSEPOWER RATING SHALL BE BASED ON SPECIFICATION REQUIREMENTS FOR TORQUE/SPEED CHARACTERISTICS OF MOTOR AND DRIVE SYSTEM.
 2. THE LADDER DIAGRAMS ON THIS SHEET ARE INTENDED TO SHOW TYPICAL INTERLOCK LOGIC AND STYLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE DEVELOPMENT OF THE PROGRAMS IN ACCORDANCE WITH THESE PLANS AND WRITTEN DESCRIPTIONS IN THE TECHNICAL SPECIAL PROVISIONS.
 3. MOTOR CONTROL CENTRE DEVICE NET ADDRESSING:



SOUTH TOWER MACHINERY ROOM
MOTOR DRIVE 2W-MA

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Architectural and Engineering Services
Ontario Region
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Professional Engineers
Ontario
Temporary Licensee
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2014-07-07

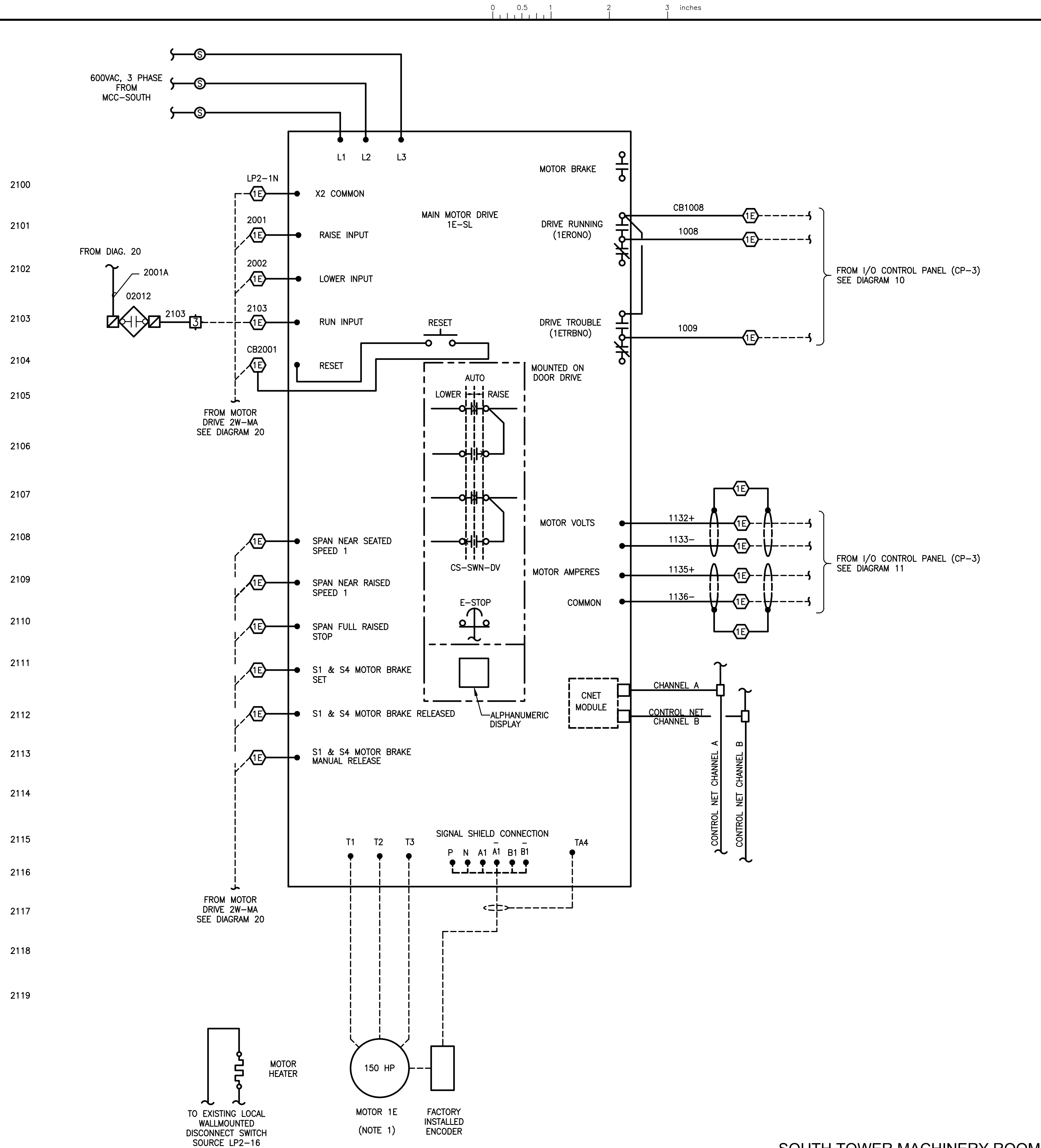
revision	description	date
08	FOR TENDER 3	2014-06-26
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B	No. du détail
C	drawing no. — where detail required dessin no. — où détail exigé
C	drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
DRIVE SOUTH TOWER SCHEMATIC DIAGRAM 20

drawn by dessiné par	J. Perez	project manager administrateur de projets
designed by conc par	G. Patino/B. Crouthamel	
approved by approuvé par	M. VanDeRee	
bid soumission	A. Ghubril	
project date date du projet	2013-05-31	
project no. no. du projet	R.012641.001	
drawing no. dessiné no.	E-34	




SOUTH TOWER MACHINERY ROOM
MOTOR DRIVE 1E-SL

CONTROLNET INPUTS		
1	SPEED 1	
2	SPEED 2	
3	SPEED 3	
4	SPEED 4	
5	SPEED 5	
6	SPAN FULLY SEATED	

CONTROLNET OUTPUTS	
1	MOTOR BRAKE RELEASE

NOTE:
1. FINAL MOTOR HORSEPOWER RATING SHALL BE BASED ON SPECIFICATION REQUIREMENTS FOR TORQUE/SPEED CHARACTERISTICS OF MOTOR AND DRIVE SYSTEM.




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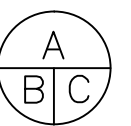
Professional Engineers
Ontario

Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
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revision		date

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A Detail No.
No. du détail
B drawing no. — where detail required
dessin no. — où détail exigé
C drawing no. — where detailed
dessin no. — où détaillé

project title
titre du projet

HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

DRIVE SOUTH TOWER
SCHEMATIC DIAGRAM 21

drawn by
dessiné par

J. Perez

designed by
conc par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur
de projets

project date
date du projet

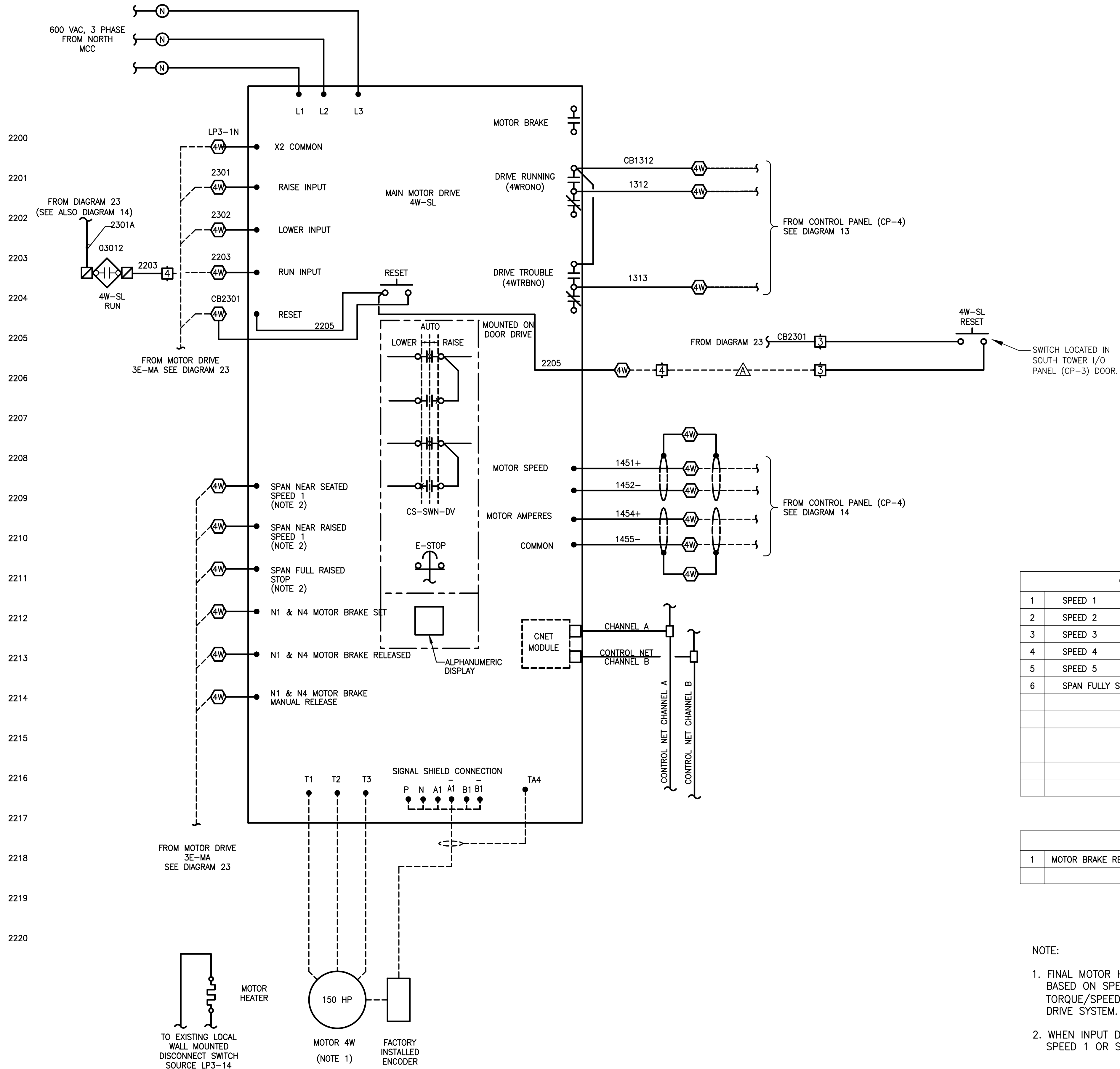
2013-05-31

project no.
no. du projet

R.012641.001

drawing no.
dessiné no.

E-35



NORTH TOWER MACHINERY ROOM
MOTOR DRIVE 4W-SL

CONTROLNET INPUTS	
1	SPEED 1
2	SPEED 2
3	SPEED 3
4	SPEED 4
5	SPEED 5
6	SPAN FULLY SEATED




CONTROLNET OUTPUTS	
1	MOTOR BRAKE RELEASE

- NOTE:
1. FINAL MOTOR HORSEPOWER RATING SHALL BE BASED ON SPECIFICATION REQUIREMENTS FOR TORQUE/SPEED CHARACTERISTICS OF MOTOR AND DRIVE SYSTEM.
 2. WHEN INPUT DEENERGIZES, DRIVE DEFAULTS TO SPEED 1 OR STOPS.



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06	FOR TENDER	2013-06-04
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01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

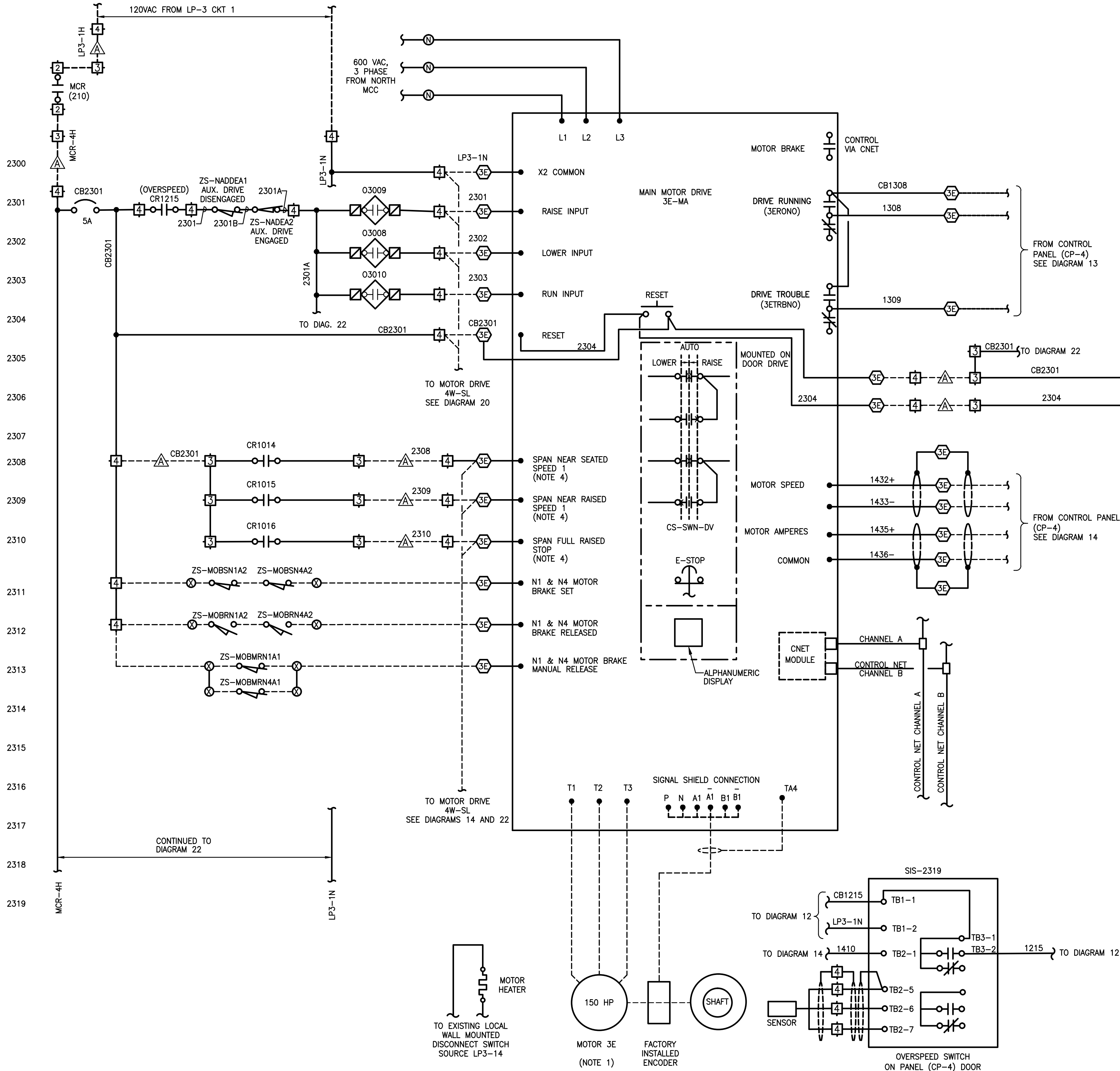
Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

	A Detail No. No. du détail
	B drawing no. — where detail required dessin no. — où détail exigé
	C drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
DRIVE NORTH TOWER SCHEMATIC DIAGRAM 22

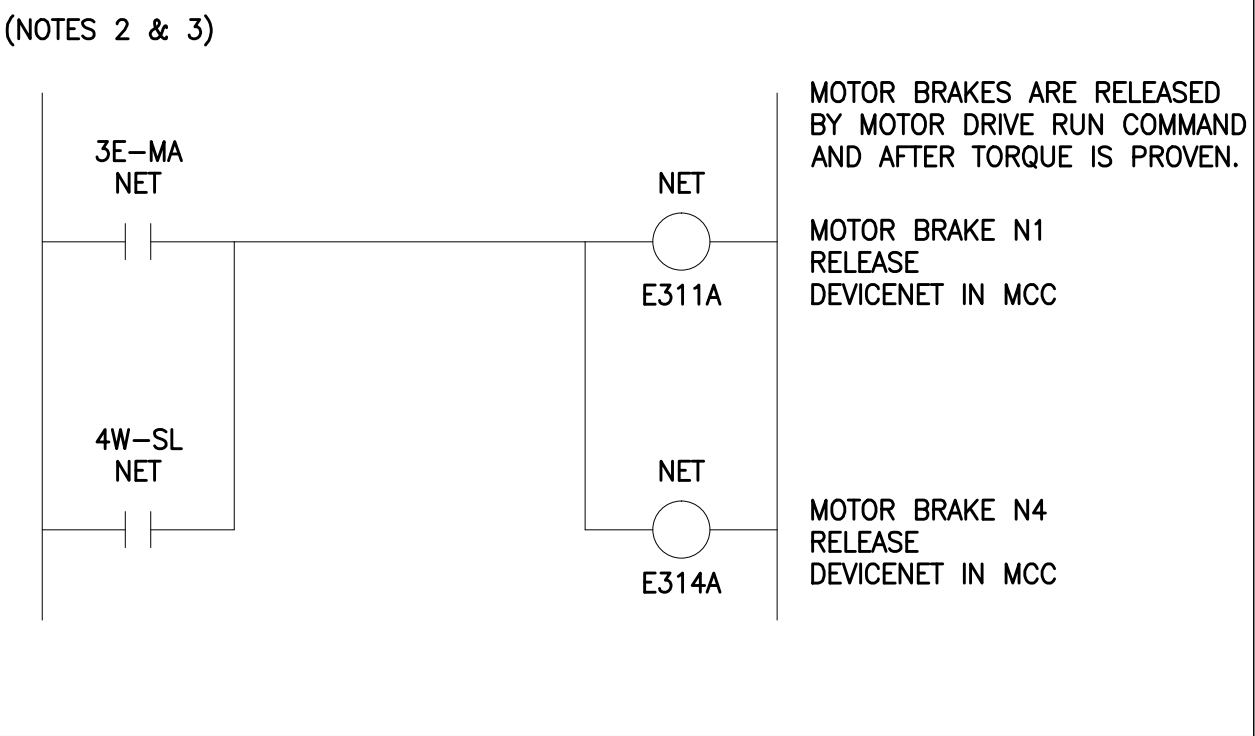
drawn by dessiné par	J. Perez
designed by conçu par	G. Patino/B. Crouthamel
approved by approuvé par	M. VanDeRee
bid soumission	A. Ghubril
project manager administrateur de projets	
project date date du projet	2013-05-31
project no. no. du projet	R.012641.001
drawing no. dessiné no.	E-36



CONTROLNET INPUTS	
1	SPEED 1
2	SPEED 2
3	SPEED 3
4	SPEED 4
5	SPEED 5
6	SPAN FULLY SEATED

CONTROLNET OUTPUTS	
1	MOTOR BRAKE RELEASE

CNET MODULE DEVICENET PROGRAMMING



- NOTE:
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 - MOTOR CONTROL CENTRE DEVICE NET ADDRESSING
E301A
— OUTPUT DESIGNATION
— NODE ADDRESS OF OVERLOAD RELAY
— E3-PLUS ELECTRONIC OVERLOAD RELAY IN MCC COMPARTMENTS
 - WHEN INPUT DEENERGIZES, DRIVE DEFAULTS TO SPEED 1 OR STOPS.

NORTH TOWER MACHINERY ROOM
MOTOR DRIVE 3E-MA

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Professional Engineers
Ontario

Temporary Licensee

Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

2014-07-07



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revision		date

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A	Detail No. No. du détail
B	drawing no. — where detail required dessin no. — où détail exigé
C	drawing no. — where detailed dessin no. — où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
DRIVE NORTH TOWER
SCHEMATIC DIAGRAM 23

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

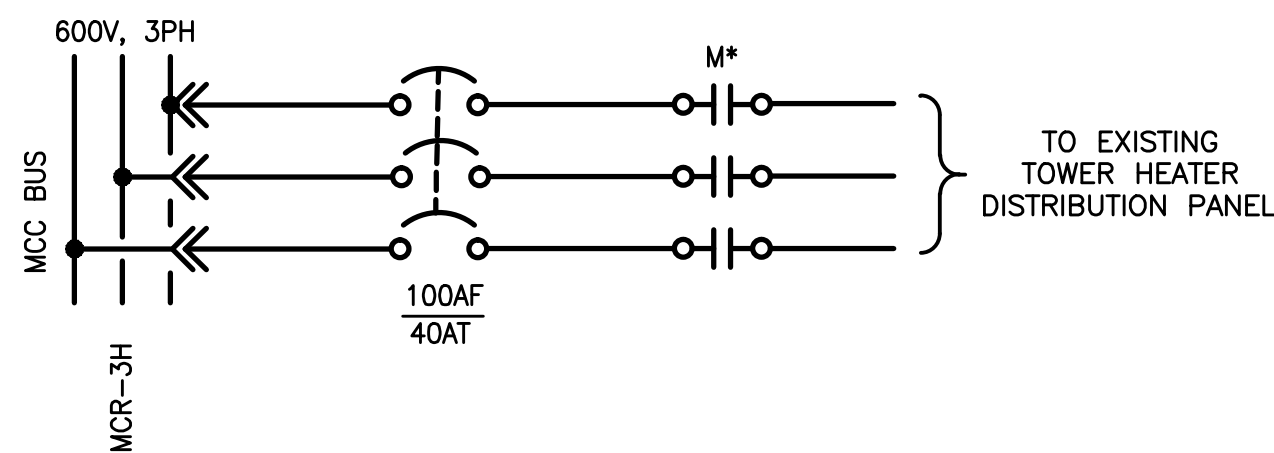
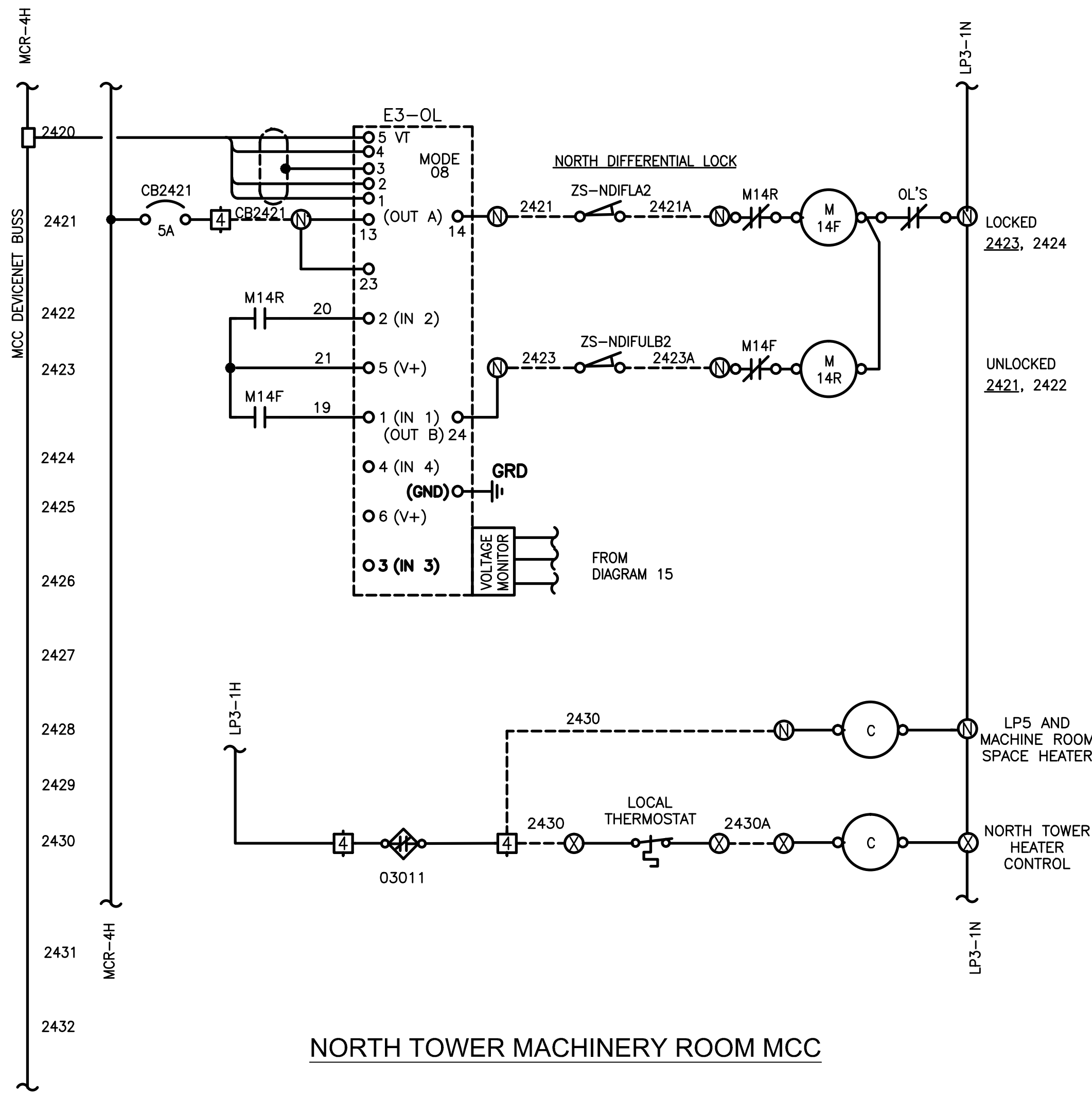
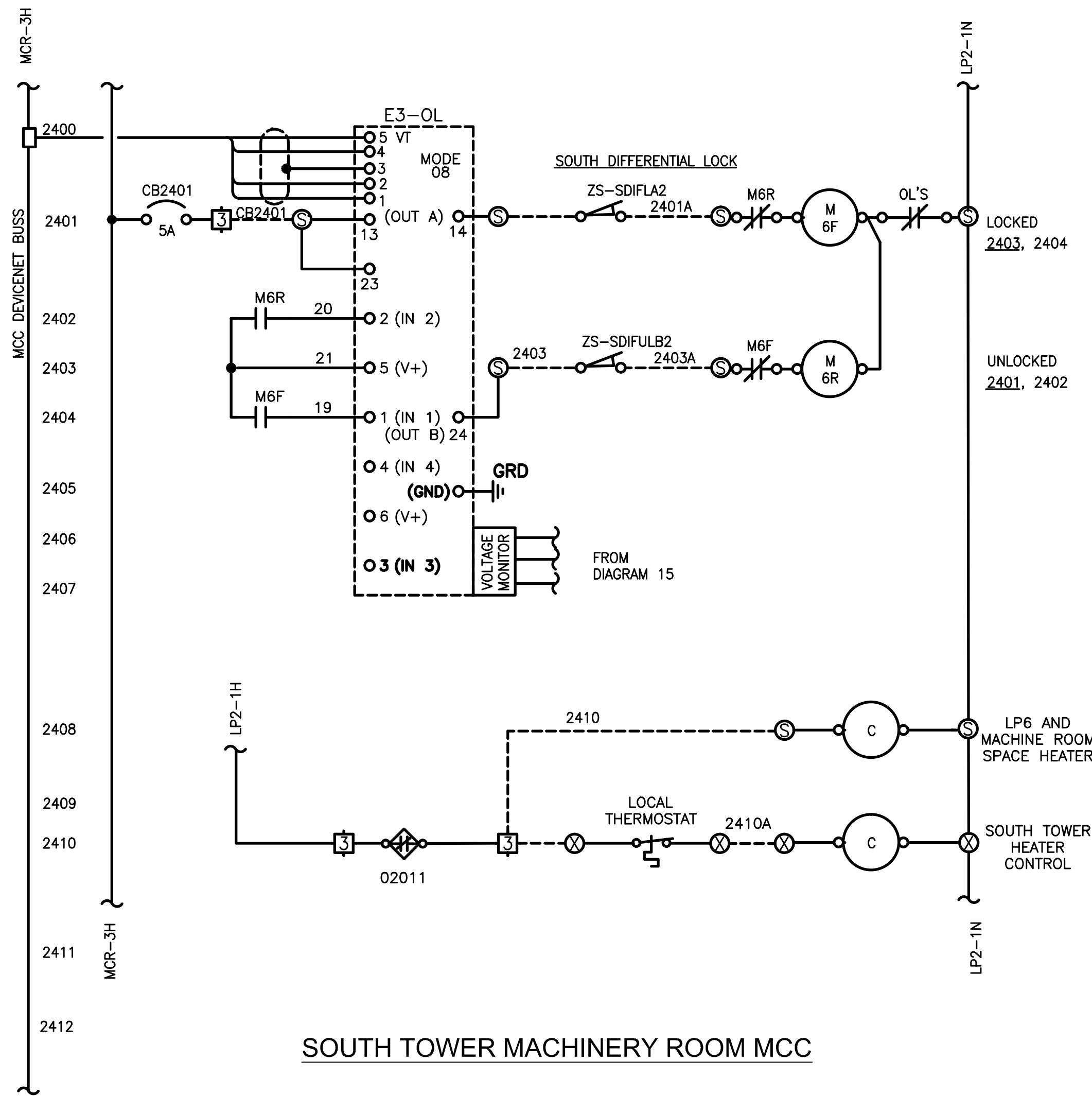
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-37



*NORTH TOWER - M26
SOUTH TOWER - M25



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
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project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
DIFFERENTIAL LOCK SCHEMATIC DIAGRAM 24

drawn by
dessiné par
J. Perez

designed by
conçu par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

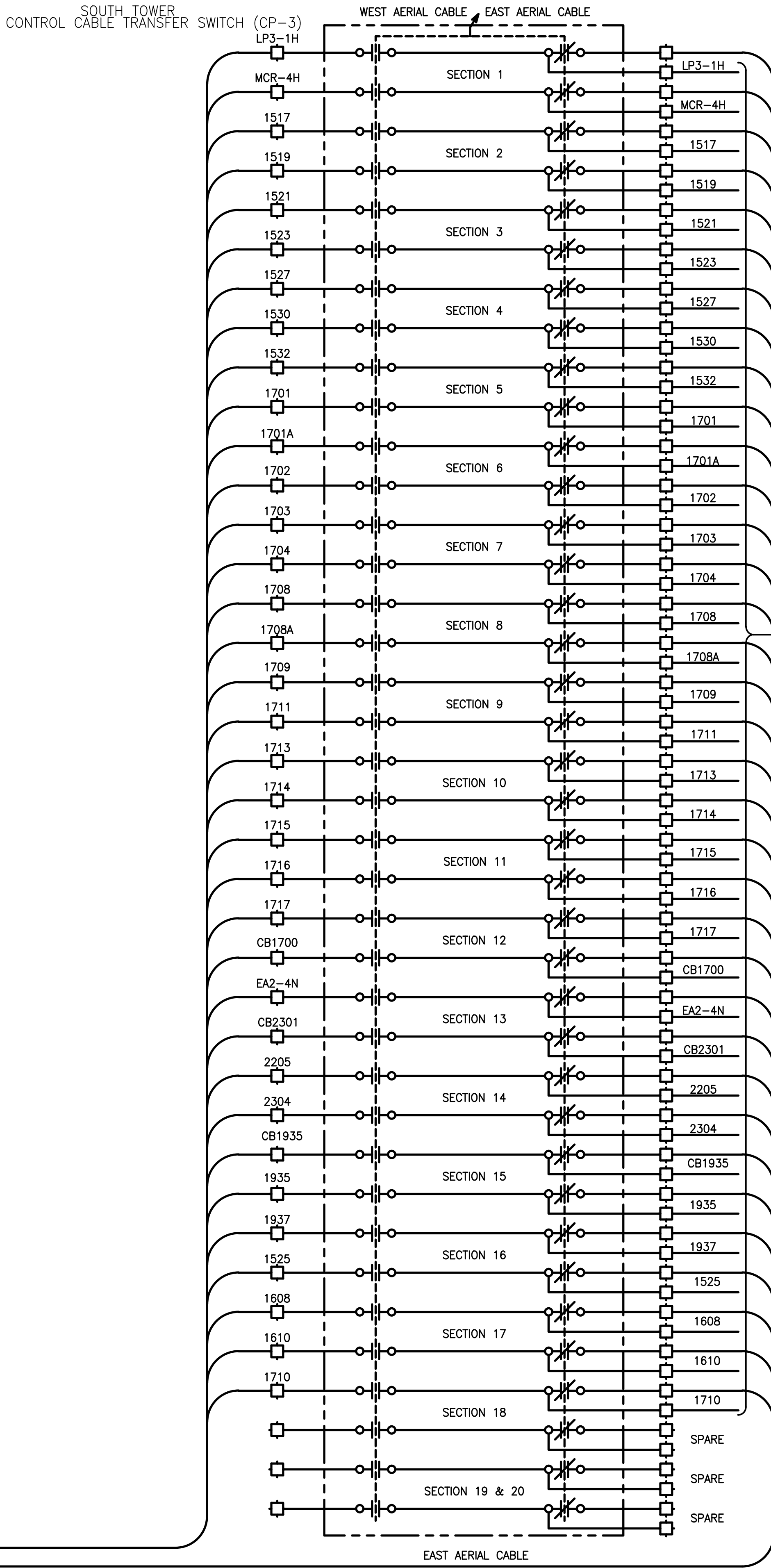
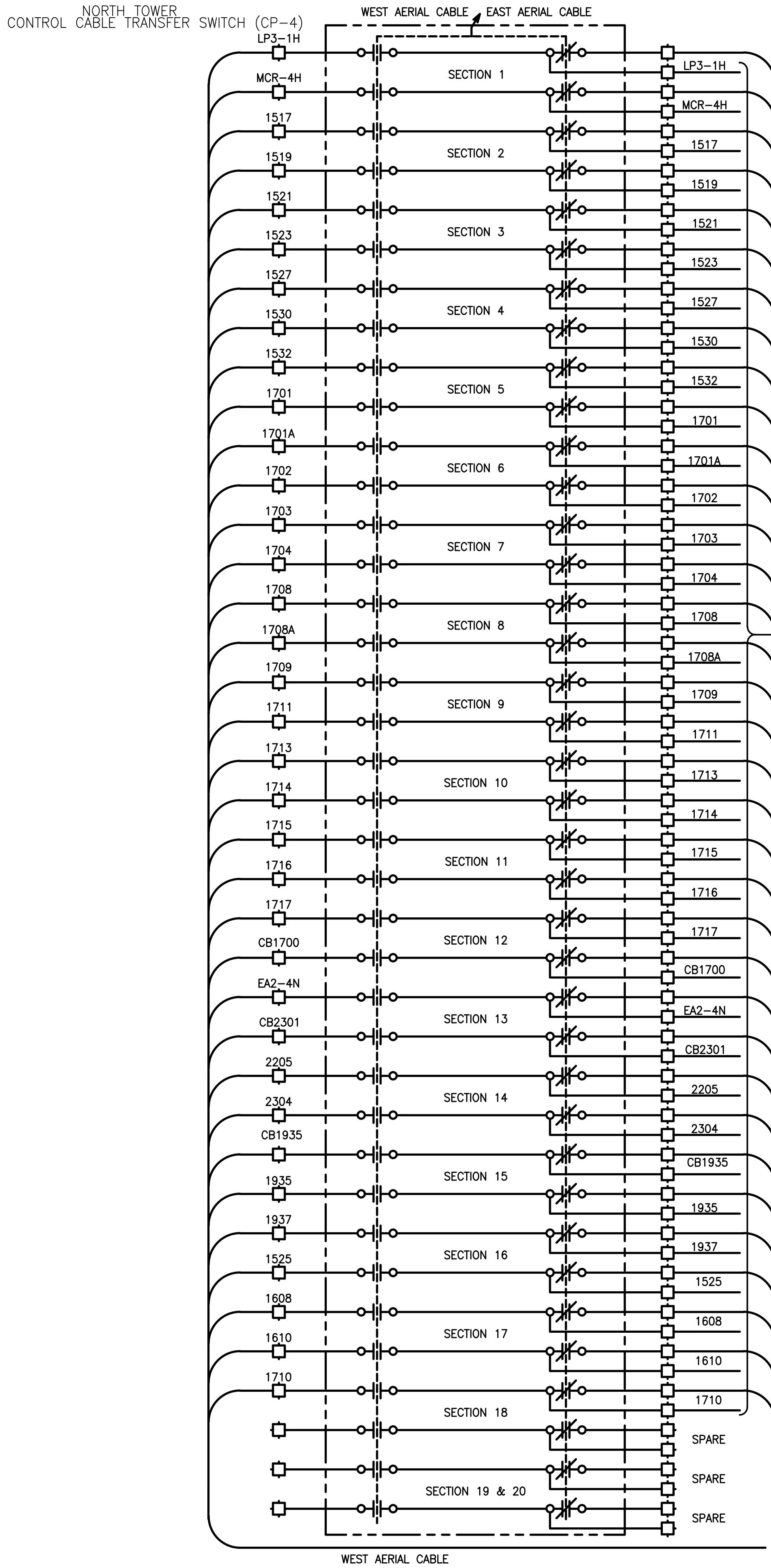
bid
soumission
A. Ghubril

project manager
administrateur de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
E-38




NORTH AND SOUTH TOWERS CONTROL CABLE TRANSFER SWITCH

 **Public Works and Government Services Canada**
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Travaux publics et Services gouvernementaux Canada
Services d'architecture et de génie
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CANADA M4P 1E4
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 **Professional Engineers Ontario**
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

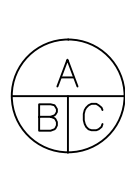
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

Mark VanDeRee
2014-07-07



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 **A** Detail No.
No. du détail
B drawing no. - where detail required
dessin no. - où détail exigé
C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
**CONTROL CABLE TRANSFER
SCHEMATIC DIAGRAM 25**

drawn by
dessiné par
J. Perez

designed by
conc par
G. Patino/B. Crouthamel

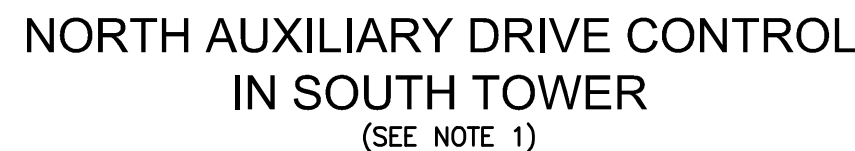
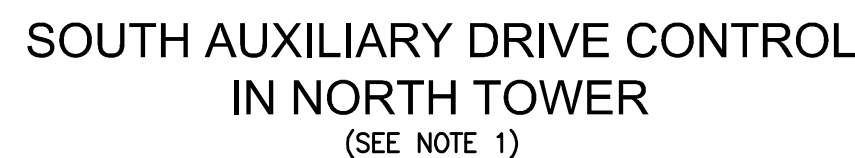
approved by
approuvé par
M. VanDeRee

bid
soumission
A. Ghubril project manager
administrateur de projets

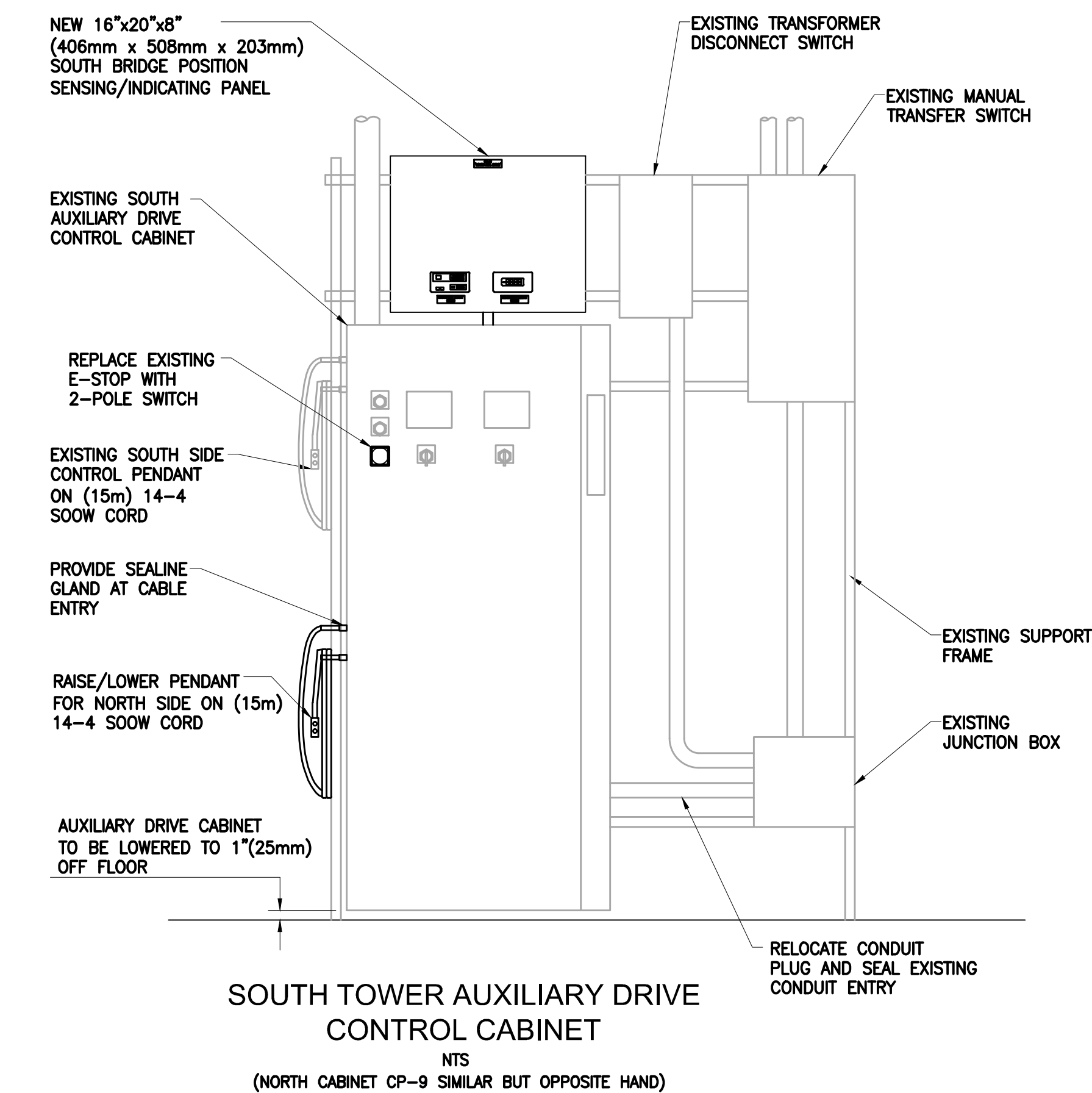
project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
E-39



- NOTES:
1. REFER TO BURLINGTON CANAL LIFT BRIDGE AUXILIARY DRIVE SYSTEM DRAWING No. 7231-10, REV 2, DATED JAN 15, 2010
 2. INSTALL SECOND NORMALLY CLOSED CONTACT BLOCK ON DOOR MOUNTED ESTOP SWITCH. SWITCH ACTION IS MAINTAINED.
 3. RAISE/LOWER PENDANT SWITCHES ARE SPRING LOADED, MOMENTARY PUSHBUTTON PISTOL GRIP-THUMB OPERATED TYPE, RATED 10A.



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CANADA M4P 1E4
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Temporary Licensee

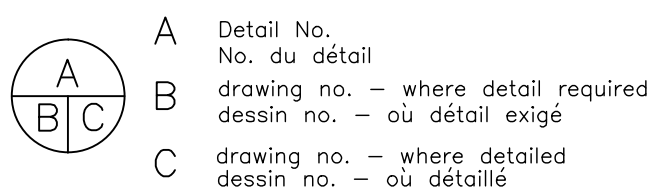
Name: Mark VanDeRee
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project title
titre du projet

HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE

REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

CP-8 & CP-9 AUX DRIVE
REMOTE CONTROL MODIFICATION
& BRIDGE POSITION
& INDICATION

drawn by
dessine par J. Perez

designed by
conc par G. Patino/B. Crouthame

approved by
approuvé par M. VanDeRee

bid project manager
soumission administrateur
A. Ghubril de projets

project date
date du projet 2013-05-31

project no.
no. du projet

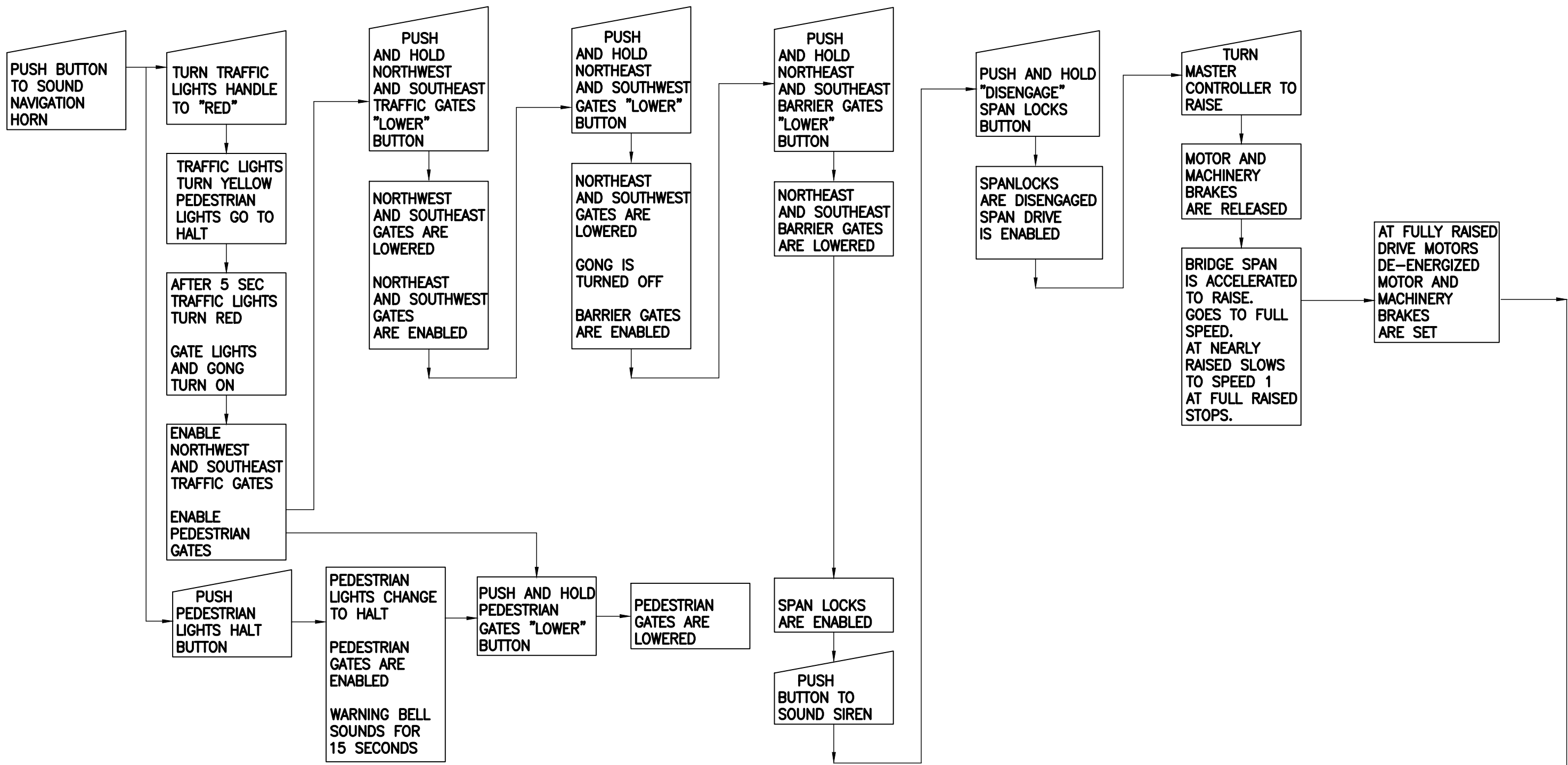
R.012641.001

drawing no.
dessine no.

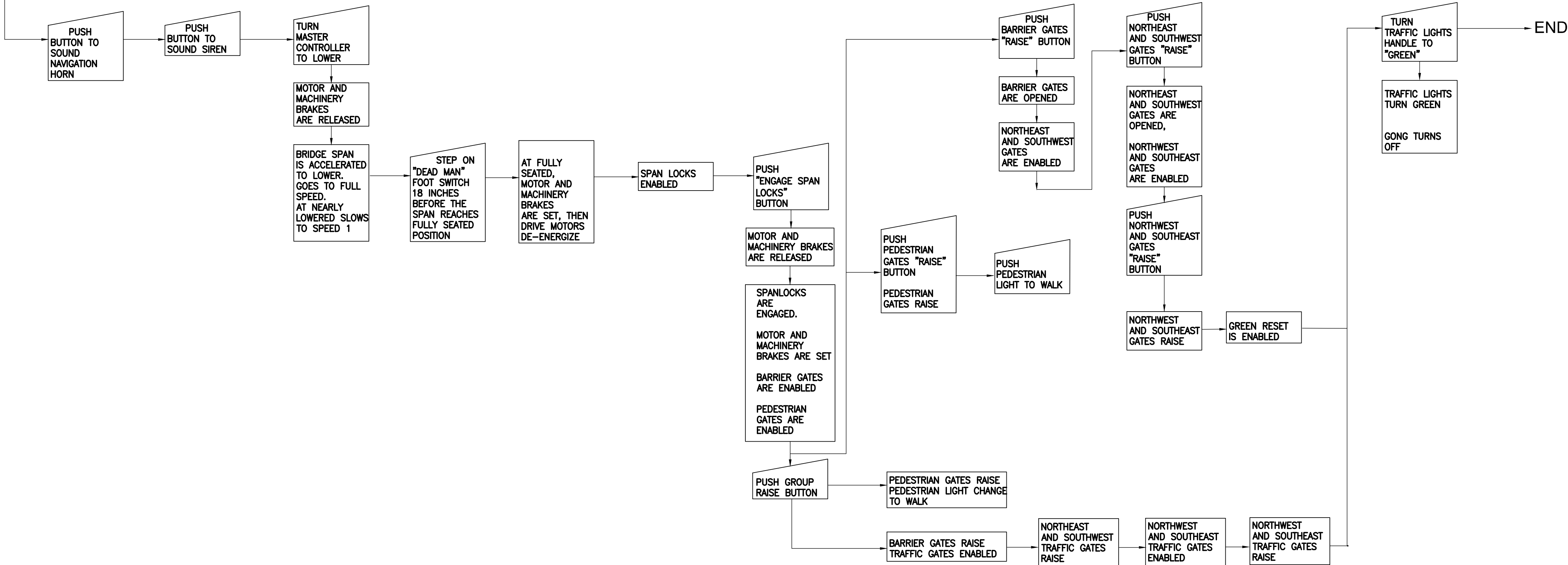
E-41

RAISING BRIDGE

BEGIN



LOWERING BRIDGE




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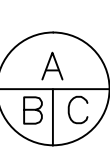


 **Professional Engineers Ontario**
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
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01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
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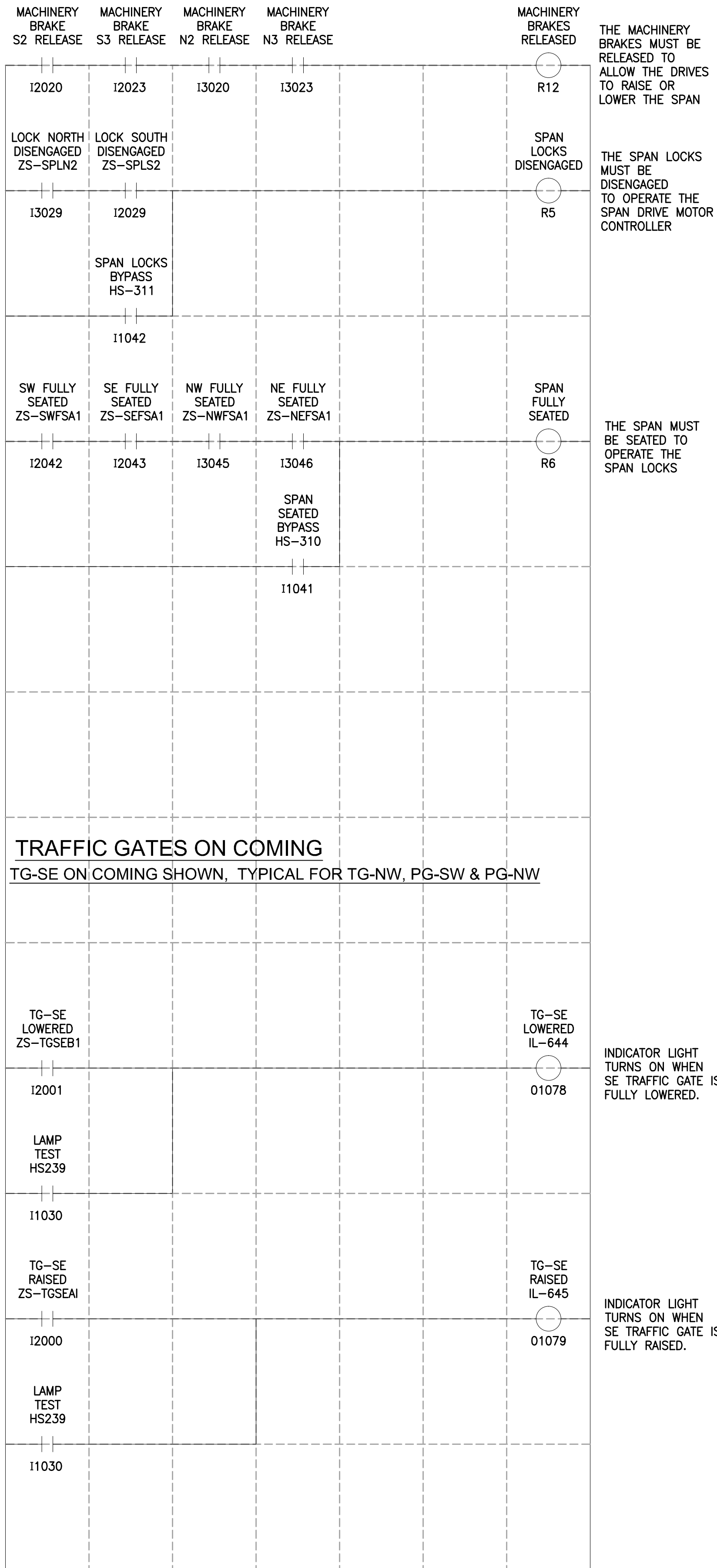
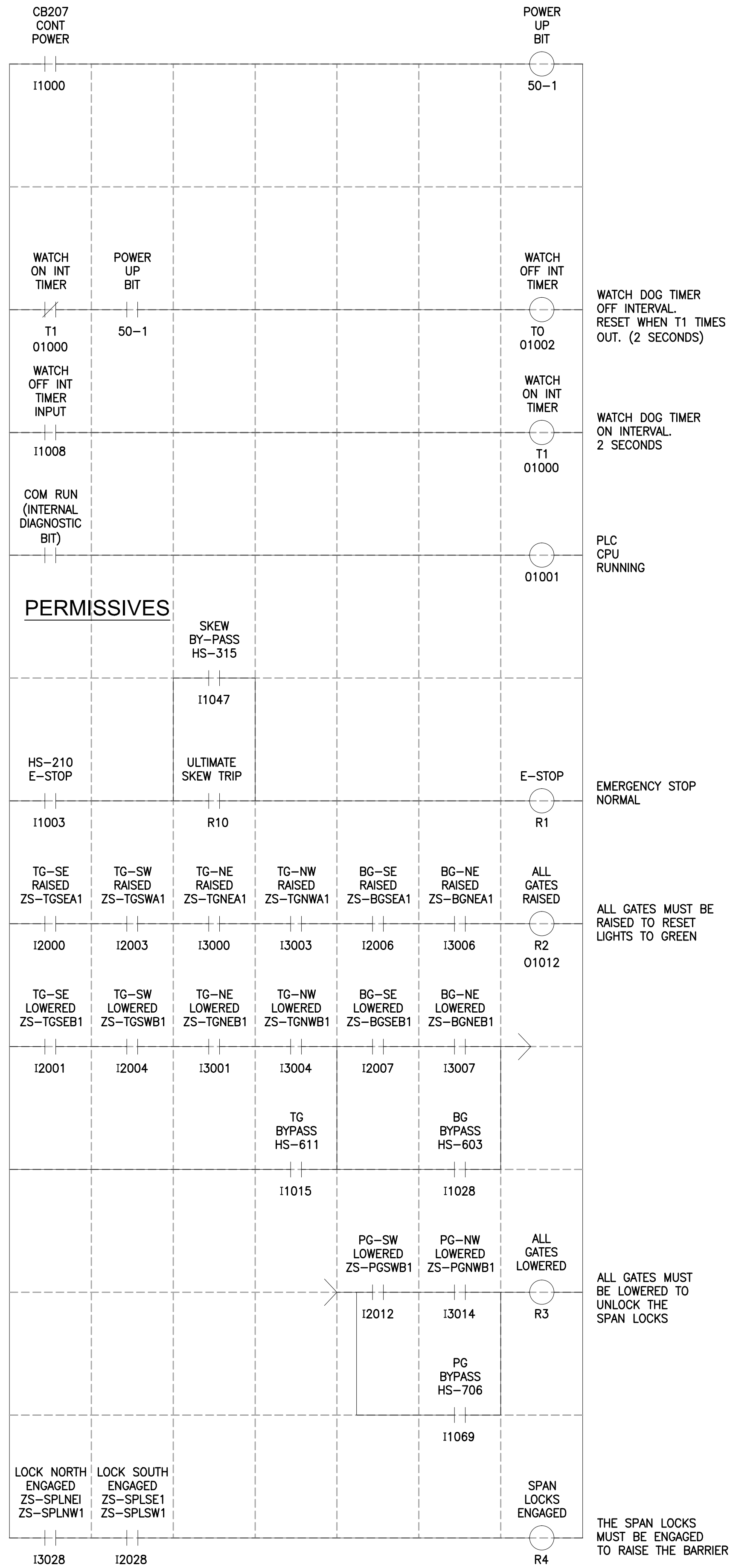
-  A Detail No.
No. du détail
-  B drawing no. — where detail required
dessin no. — où détail exigé
-  C drawing no. — where detailed
dessin no. — où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
OPERATION SEQUENCE

drawn by dessiné par	J. Perez
designed by conc par	G. Patino/B. Crouthamel
approved by approuvé par	M. VanDeRee
bid soumission	A. Ghubril
project manager administrateur de projets	
project date date du projet	2013-05-31
project no. no. du projet	R.012641.001
drawing no. dessiné no.	E-44

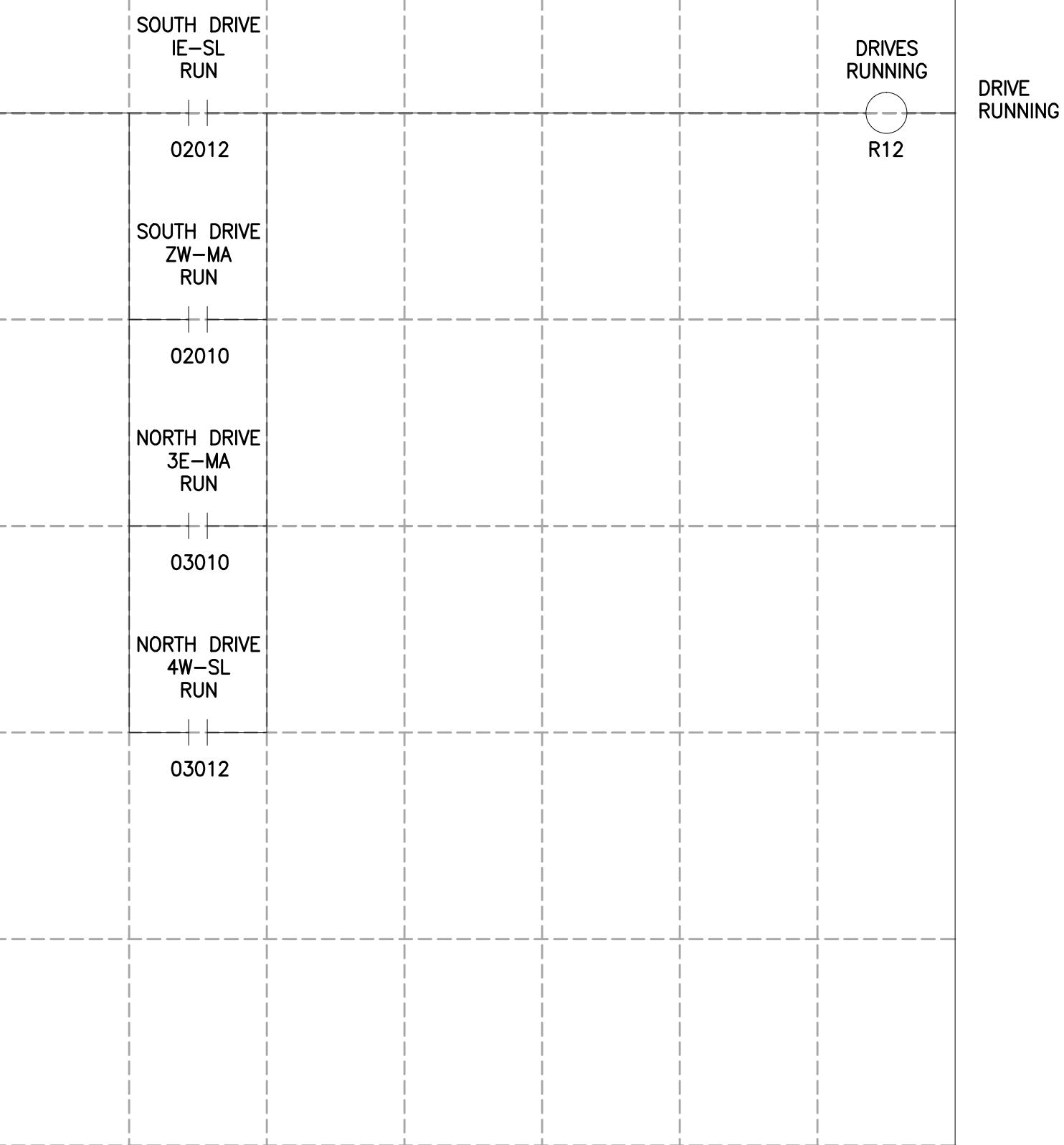
GENERAL START UP



TRAFFIC GATES ON COMING

TG-SE ON COMING SHOWN, TYPICAL FOR TG-NW, PG-SW & PG-NW

MOTOR DRIVES RUNNING



NOTE:

THE LADDER DIAGRAMS ON THIS AND THE FOLLOWING SHEETS ARE INTENDED TO SHOW TYPICAL INTERLOCK LOGIC AND STYLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE DEVELOPMENT OF THE PLC PROGRAMS IN ACCORDANCE WITH THESE PLANS AND WRITTEN DESCRIPTIONS IN THE SPECIFICATIONS.

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revision		date

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A	Detail No.
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C	drawing no. - where detailed

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
PLC LADDER DIAGRAM 1: GENERAL, PERMISSIVES, GATES

drawn by
dessiné par
J. Perez

designed by
conç par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

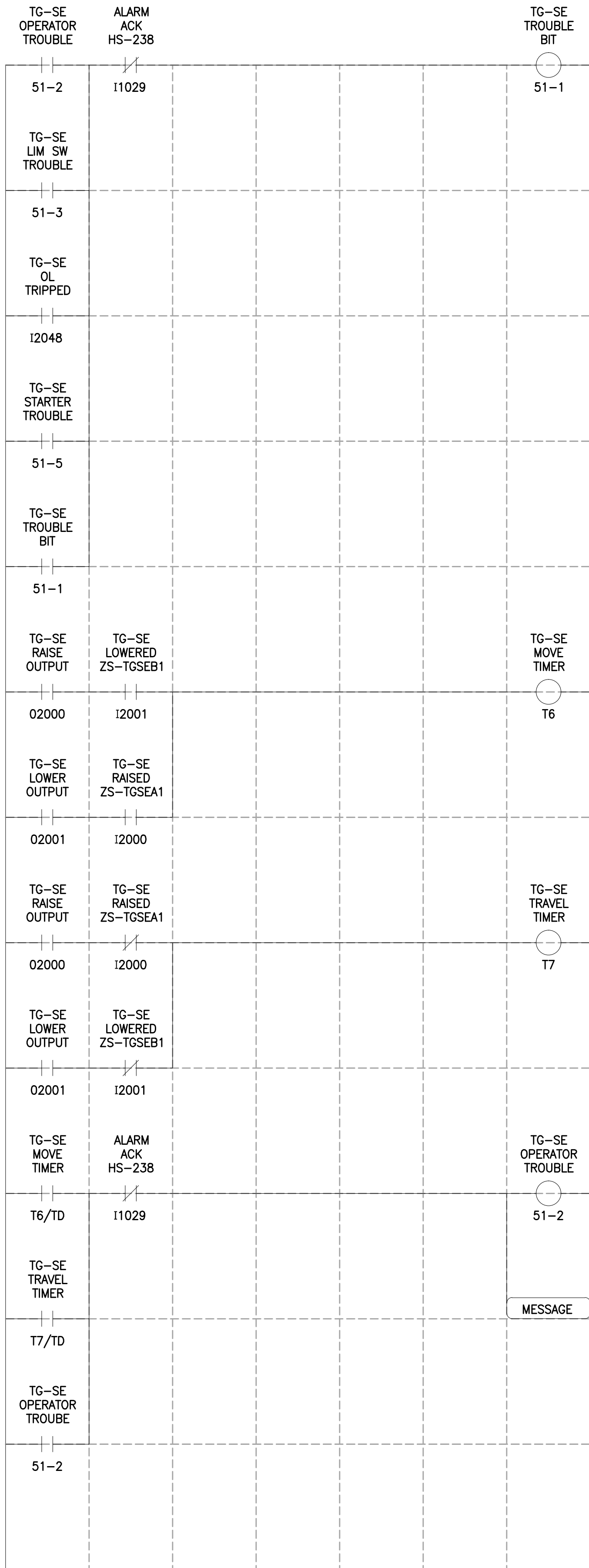
bid
soumission
A. Ghubril

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
E-45

TG-SE ON COMING SHOWN, TYPICAL FOR TG-NW



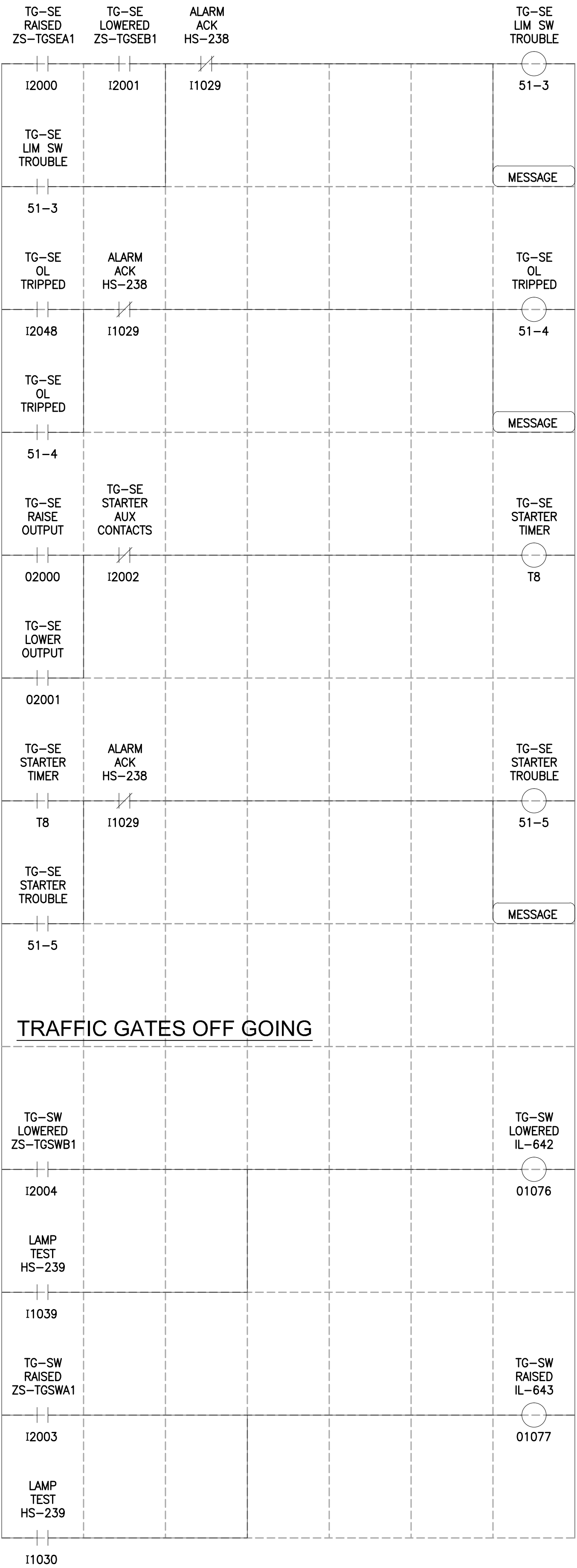
TROUBLE SETS IF EITHER TIMER IS ALLOWED TO TIME OUT. ALARM IS HELD ON UNTIL ACKNOWLEDGE BUTTON IS PUSHED

2 SECOND TIME DELAY TO PROVE GATE IS MOVING WHEN OUTPUT IS ON

8 SECOND TIME DELAY TO PROVE GATE HAS GONE TO FULL TRAVEL

SOUTH EAST GATE TRAFFIC OPERATOR TROUBLE

NOTE:
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"SOUTH EAST GATE TRAFFIC SWITCH TROUBLE"

"SOUTH EATS GATE TRAFFIC OVERLOAD TRIPPED"

1 SECOND TIME DELAY TO PROVE STARTER HAS CLOSED

"SOUTHEAST GATE TRAFFIC STARTER TROUBLE"

INDICATOR LIGHT TURNS ON WHEN SW TRAFFIC GATE IS FULLY LOWERED.

INDICATOR LIGHT TURNS ON WHEN SW TRAFFIC GATE IS FULLY RAISED.



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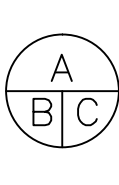
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Collaborator: Zvonko Trajkovic, P. Eng.
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2014-07-07



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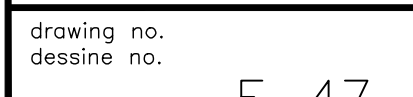
project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

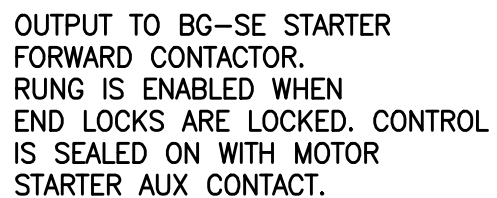
drawing title
titre du dessin
PLC LADDER DIAGRAM 2:
GATES

drawn by dessiné par	J. Perez
designed by concé par	G. Patino/B. Crouthamel
approved by approuvé par	M. VanDeRee
bid soumission	A. Ghubril
project manager administrateur de projets	
project date date du projet	2013-05-31
project no. no. du projet	R.012641.001
drawing no. dessiné no.	E-46



1 SECOND TIME DELAY TO PROVE
STARTER HAS CLOSED





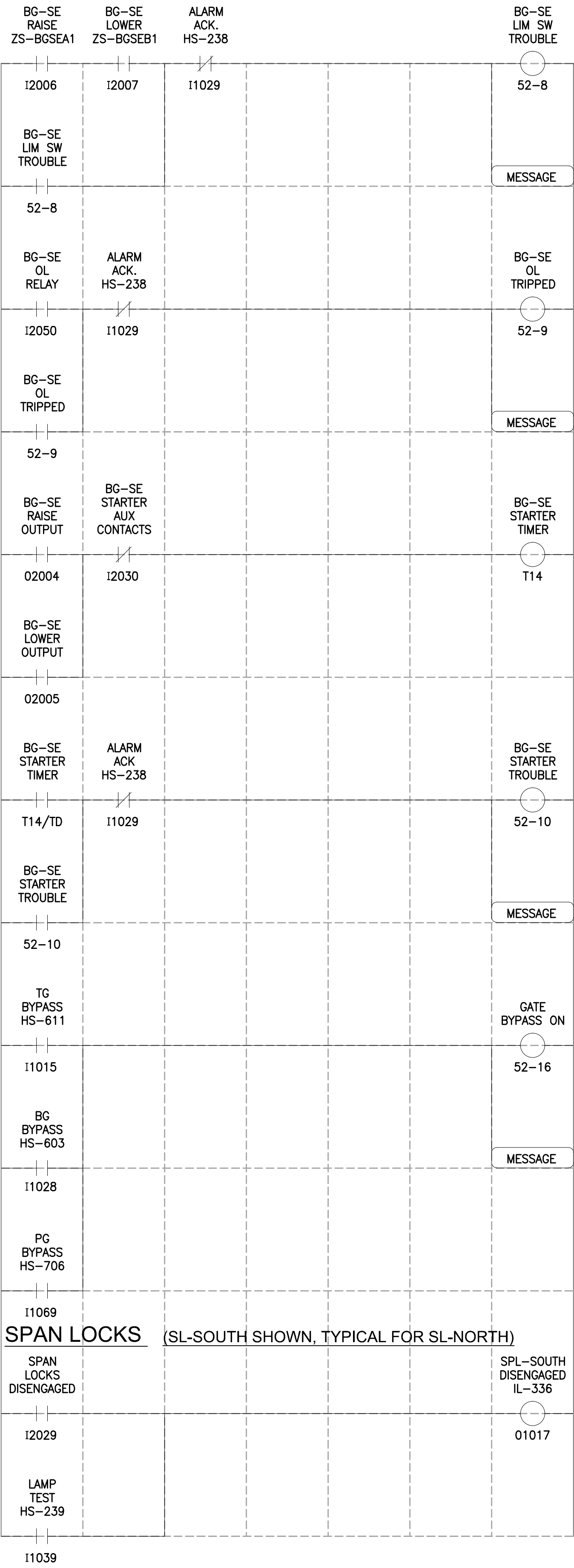
THE LADDER DIAGRAMS ON THIS AND THE FOLLOWING SHEETS ARE INTENDED TO SHOW TYPICAL INTERLOCK LOGIC AND STYLE AND INTENDED OPERATION SEQUENCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE DEVELOPMENT OF THE WORKING PLC PROGRAMS IN ACCORDANCE WITH THESE PLANS AND WRITTEN DESCRIPTIONS IN THE SPECIFICATIONS.



drawing no.
dessine no.

E-48

BARRIER GATE (CONT'D)



"SOUTHEAST BARRIER GATE LIMIT SWITCH TROUBLE"

"SOUTHEAST BARRIER GATE OVERLOAD TRIPPED"

1 SECOND TIME DELAY TO PROVE STARTER HAS CLOSED

SET ALARM IF TIMER T20 IS TIMED OUT.

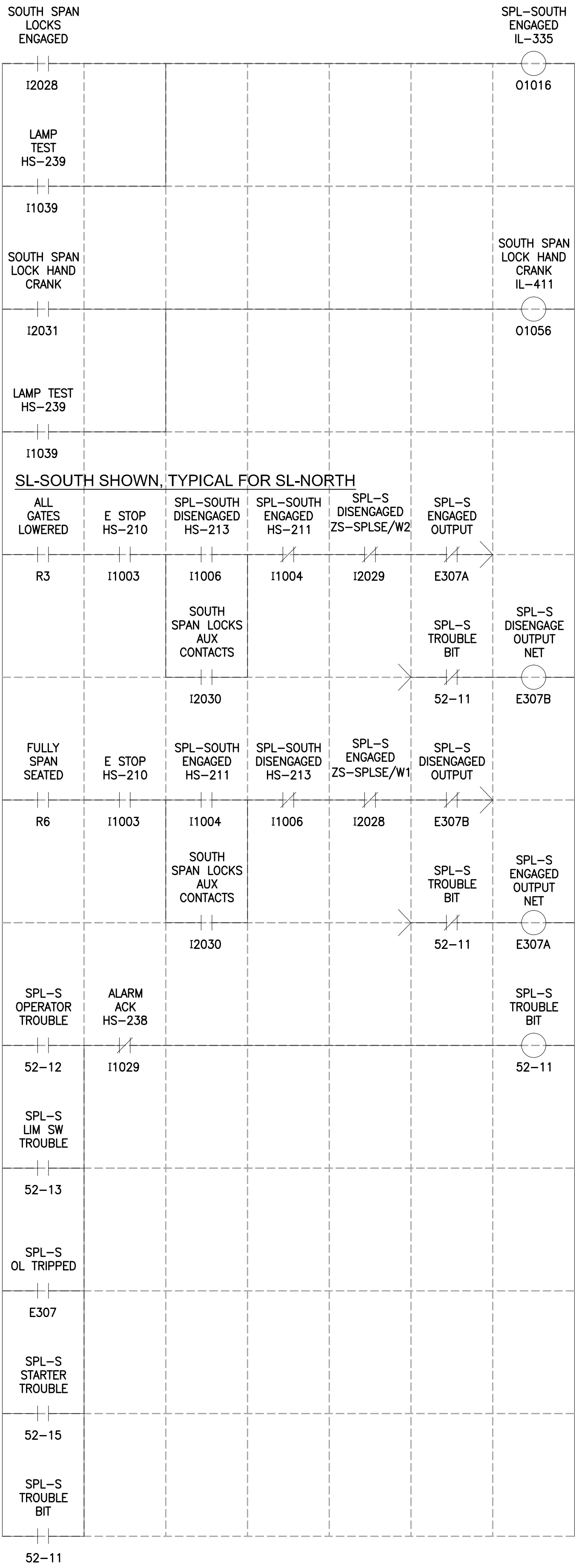
"BARRIER GATE STARTER TROUBLE"

GATE BYPASS IS INITIATED

GATE BYPASS ON

INDICATOR GLOWS STEADY WHEN SOUTH LOCKS ARE DISENGAGED

SPAN LOCKS (CONT'D)



INDICATOR LIGHT GLOWS STEADY WHEN SOUTH LOCKS ARE ENGAGED

INDICATOR LIGHT GLOWS STEADY WHEN SOUTH LOCK HAND CRANK IS ENGAGED.

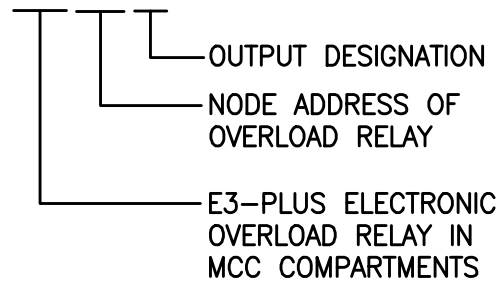
OUTPUT TO SPL-S STARTER REVERSE CONTACTOR. RUNG IS ENABLED WHEN ALL GATES ARE LOWERED. DEVICE NET OUTPUT.

OUTPUT TO SPL-S STARTER FORWARD CONTACTOR. RUNG IS ENABLED WHEN BRIDGE IS SEATED. DEVICE NET OUTPUT IN MOTOR CENTRE.

ALARM IS HELD ON UNTIL ACKNOWLEDGE BUTTON IS PUSHED

- NOTE:
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 - MOTOR CONTROL CENTRE DEVICE NET ADDRESSING

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HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE

REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

PLC LADDER DIAGRAM 5:
GATES, LOCKS

drawn by
dessiné par

J. Perez

designed by
conc par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur de projets

project date
date du projet

2013-05-31

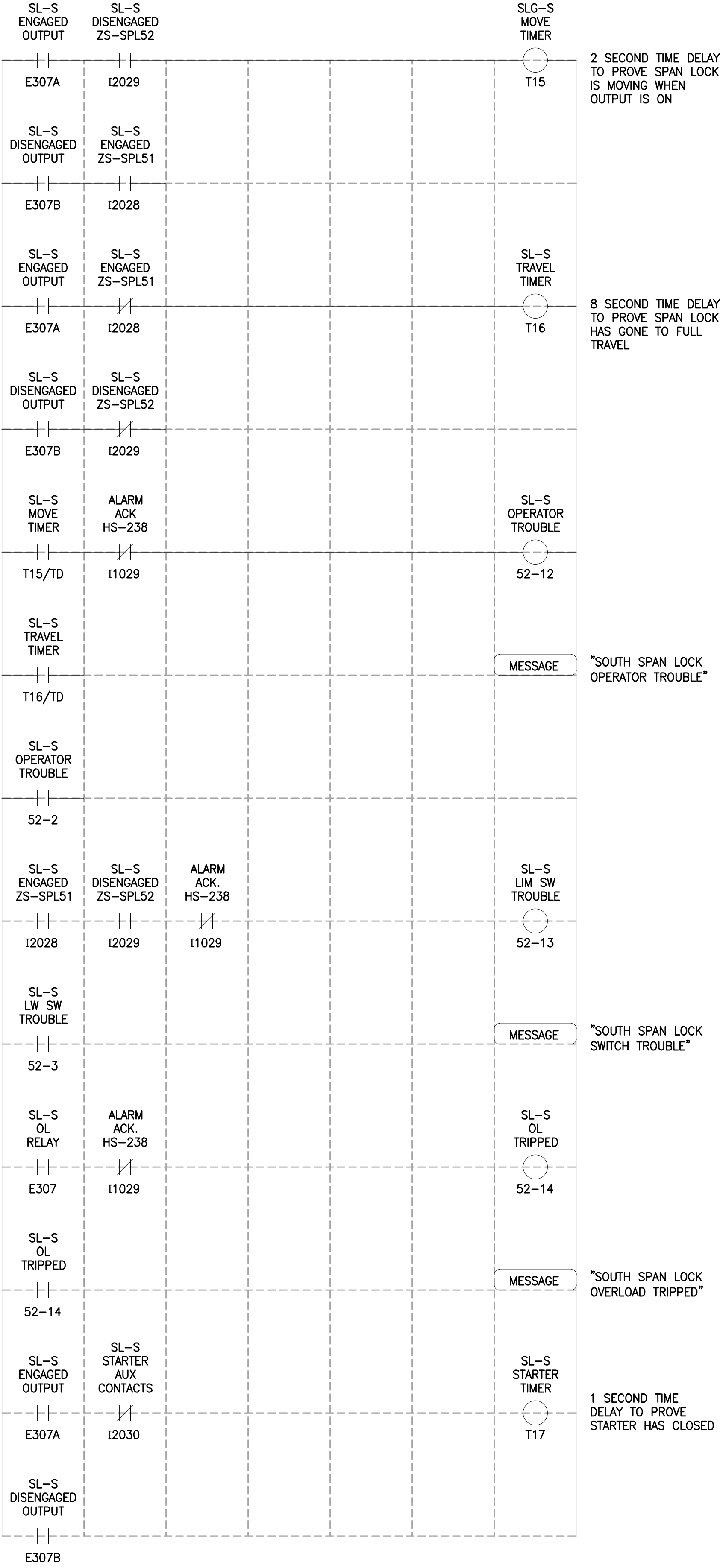
project no.
no. du projet

R.012641.001

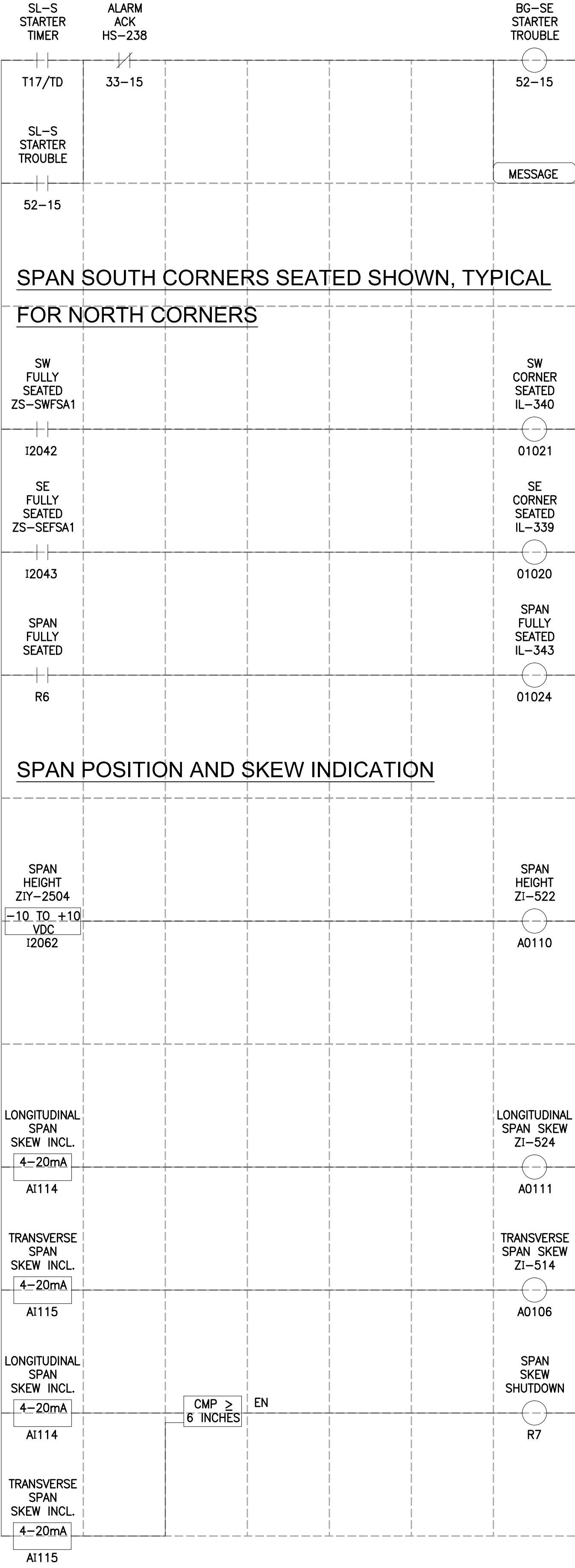
drawing no.
dessiné no.

E-49

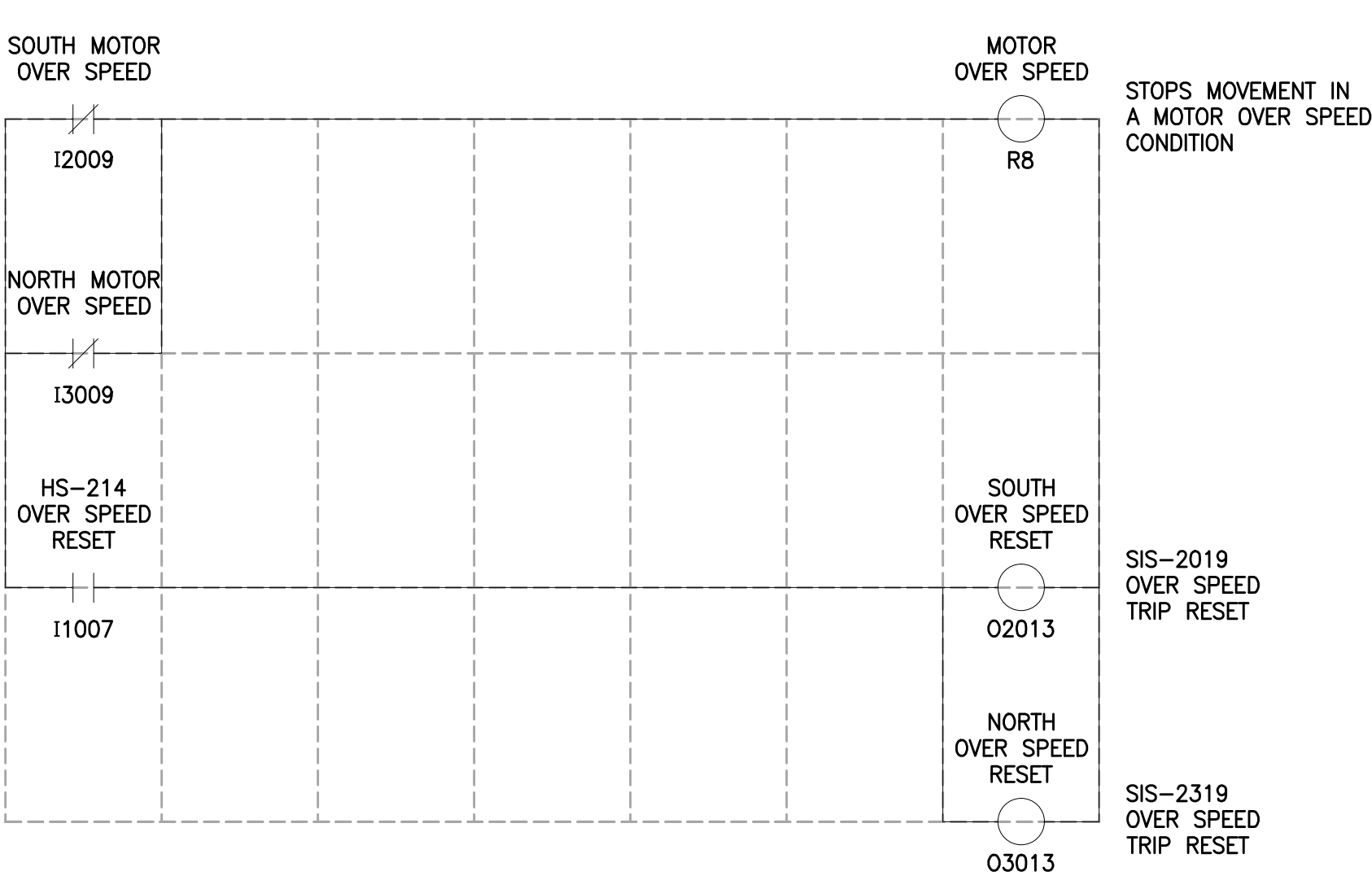
SPAN LOCKS (CONT'D)



SPAN LOCKS (CONT'D)



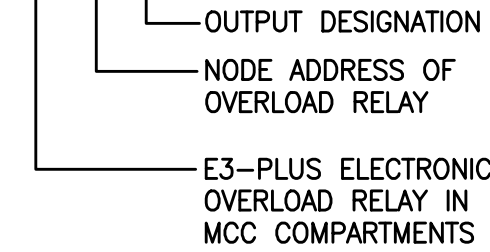
SOUTH MOTOR OVERSPEED



NOTE:

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REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
PLC LADDER DIAGRAM 6:
LOCKS, SPAN SEATED, SKEW,
OVERSPEED

drawn by
dessiné par
J. Perez

designed by
conçue par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

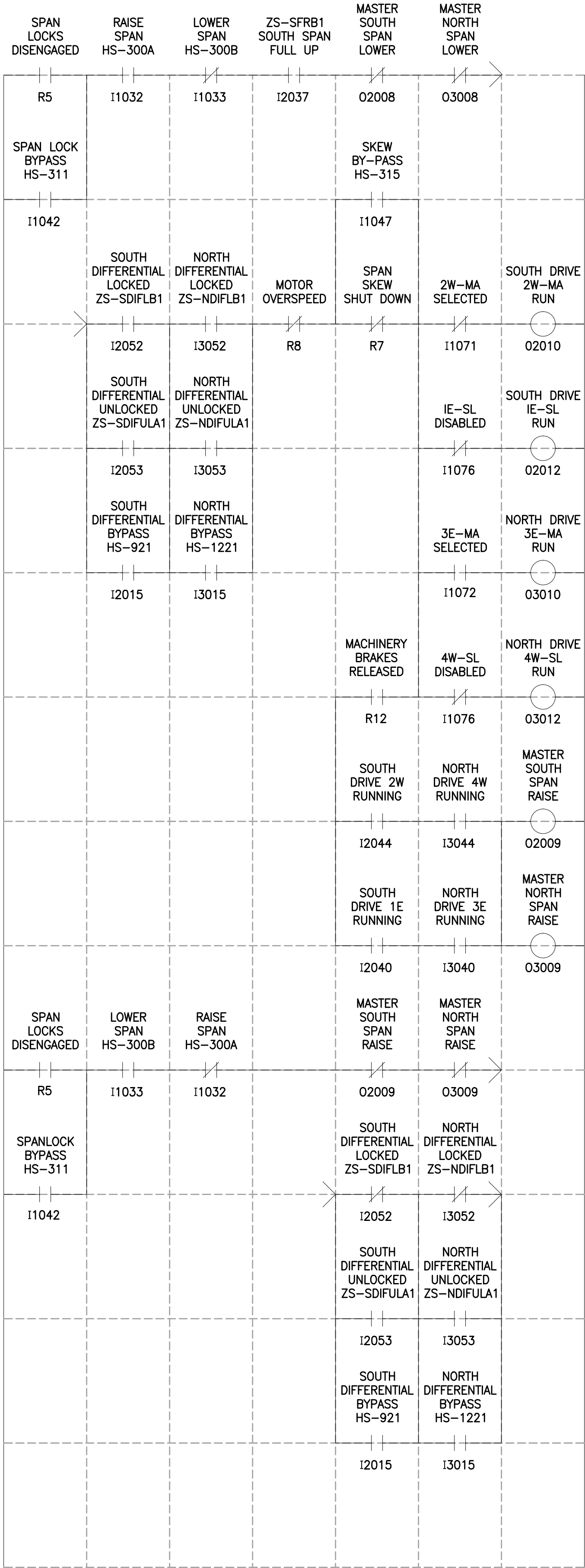
bid
soumission
A. Ghubril

project date
date du projet
2013-05-31

project no.
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R.012641.001

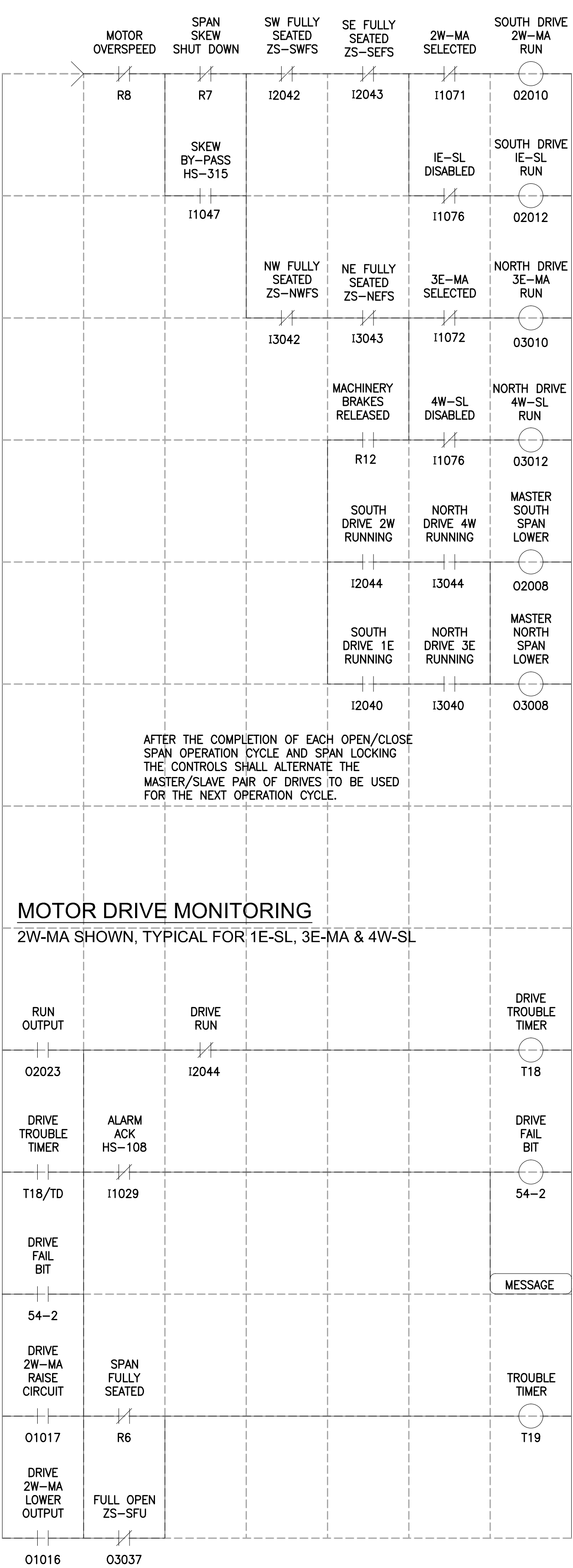
drawing no.
dessiné no.
E-50

SPAN DRIVES COMMANDS



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SPAN DRIVES COMMANDS CONT.



MOTOR DRIVES RUN

SPAN LOWER

TIMER STARTS ON OUTPUT TO
DRIVE RUN AND STOPS WHEN
DRIVE RUN CONTACT CLOSSES
TIMER PERIOD IS 5 SECONDS.

"MOTOR DRIVE
2W-MA
NOT RESPONDING"


TIMER STARTS ON OUTPUT TO
DRIVE OPEN AND STOPS WHEN
SPAN RISES FROM FULL CLOSED
OR STARTS ON OUTPUT TO DRIVE
CLOSE AND STOPS WHEN LEAF
LOWERS FROM FULL OPEN.
TIMER PERIOD IS 5 SECONDS.

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Mark VanDeRee
2014-07-07



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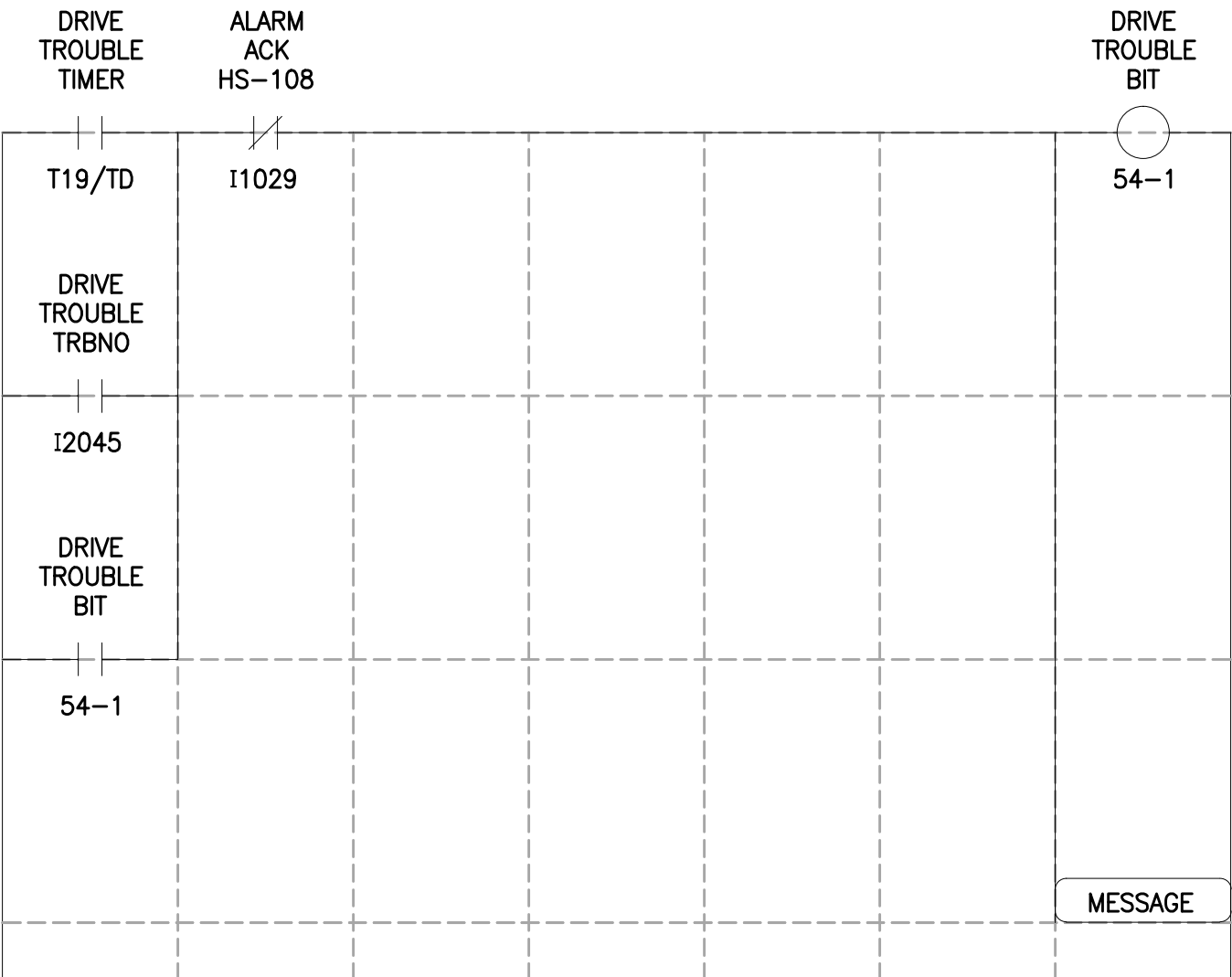
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<div>B</div>	B	No. du détail
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VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

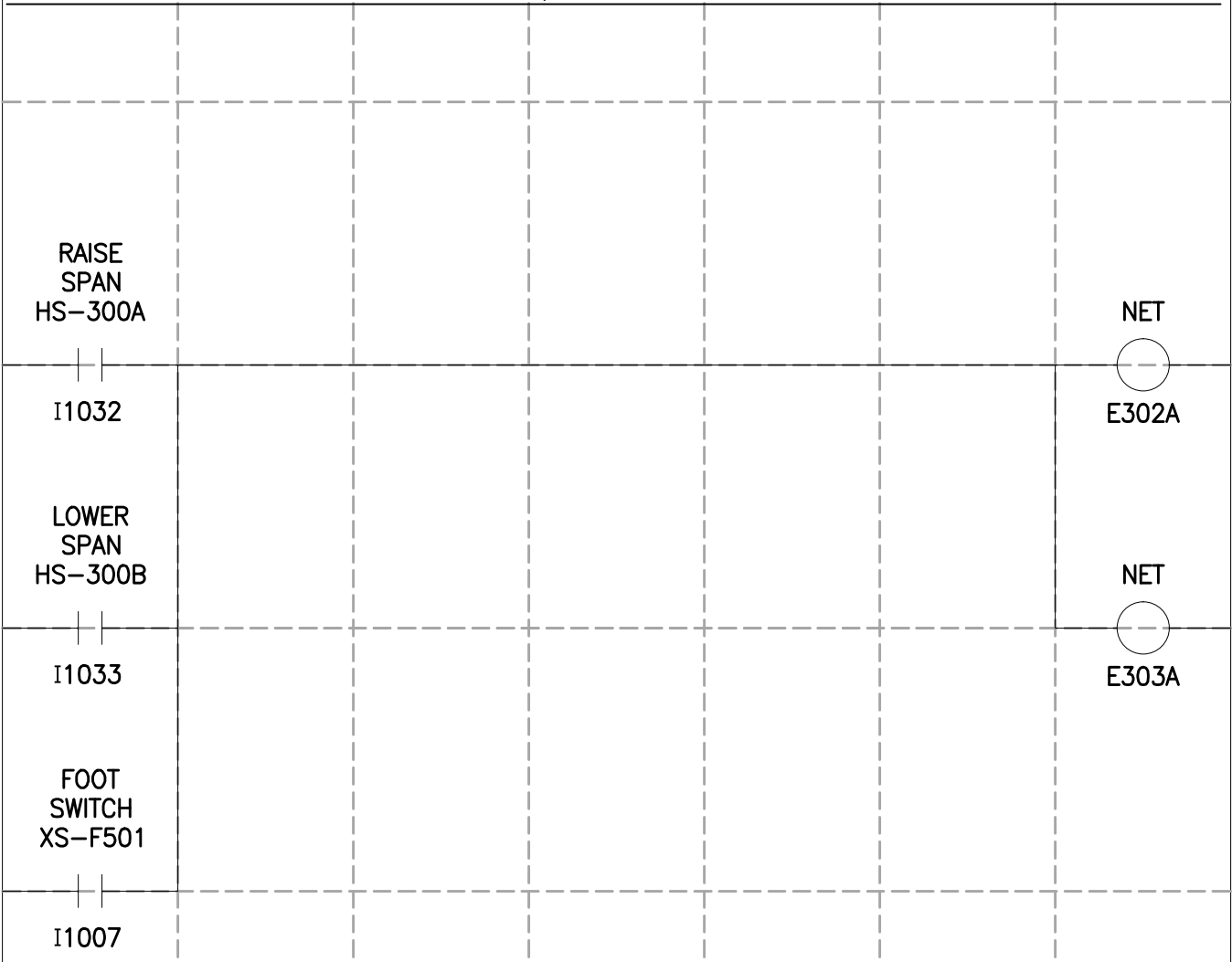
drawing title
titre du dessin
PLC LADDER DIAGRAM 7:
DRIVES

drawn by dessiné par	J. Perez
designed by conç par	G. Patino/B. Crouthamel
approved by approuvé par	M. VanDeRee
bid soumission	A. Ghubril
project manager administrateur de projets	
project date date du projet	2013-05-31
project no. no. du projet	R.012641.001
drawing no. dessiné no.	E-51

MOTOR DRIVE MONITORING CONT.

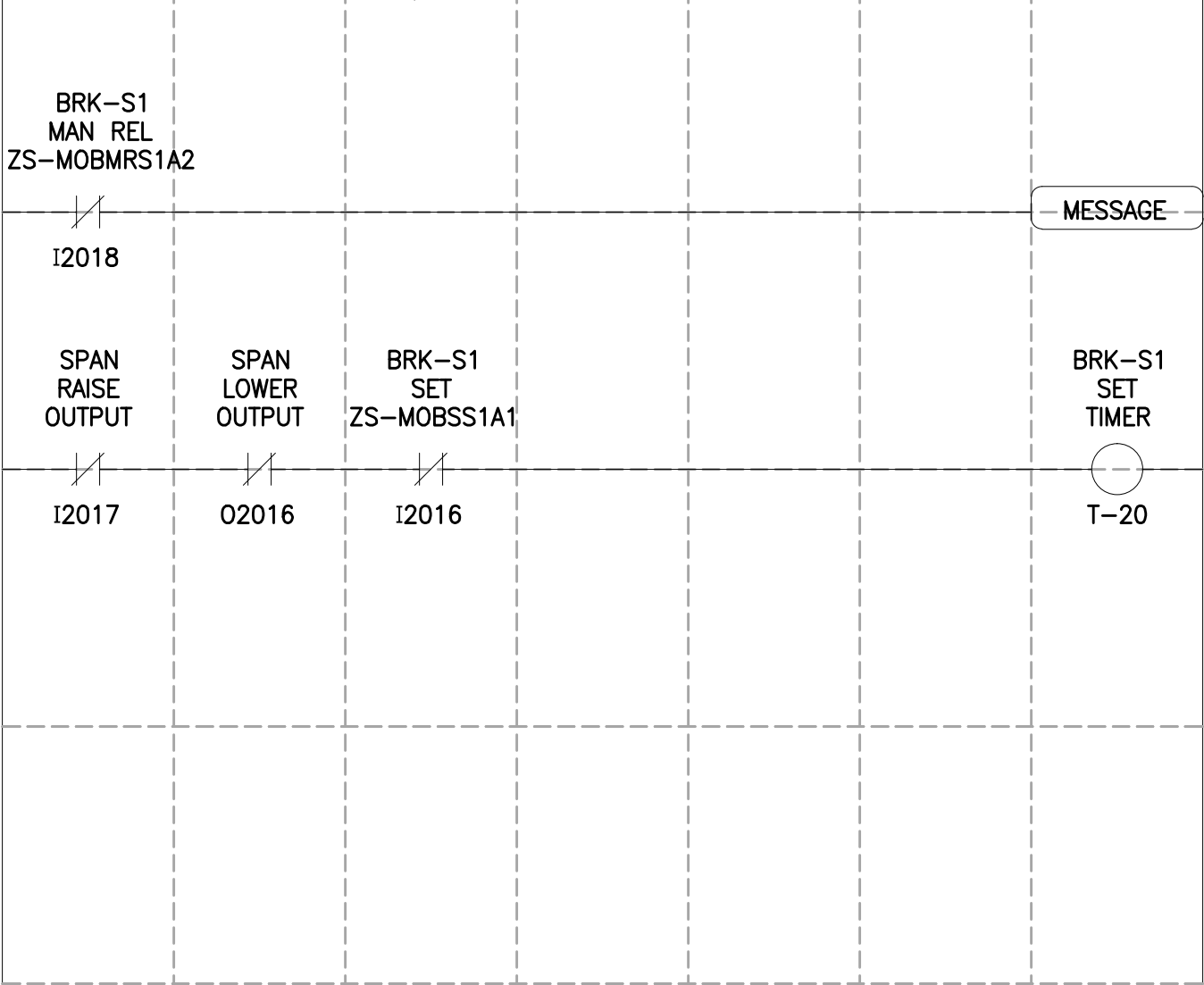


SOUTH BRAKES SHOWN, TYPICAL FOR NORTH BRAKES

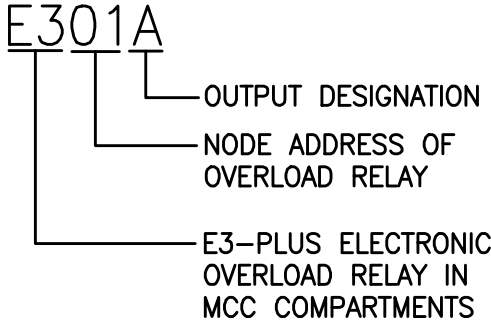


BRAKE MONITORING

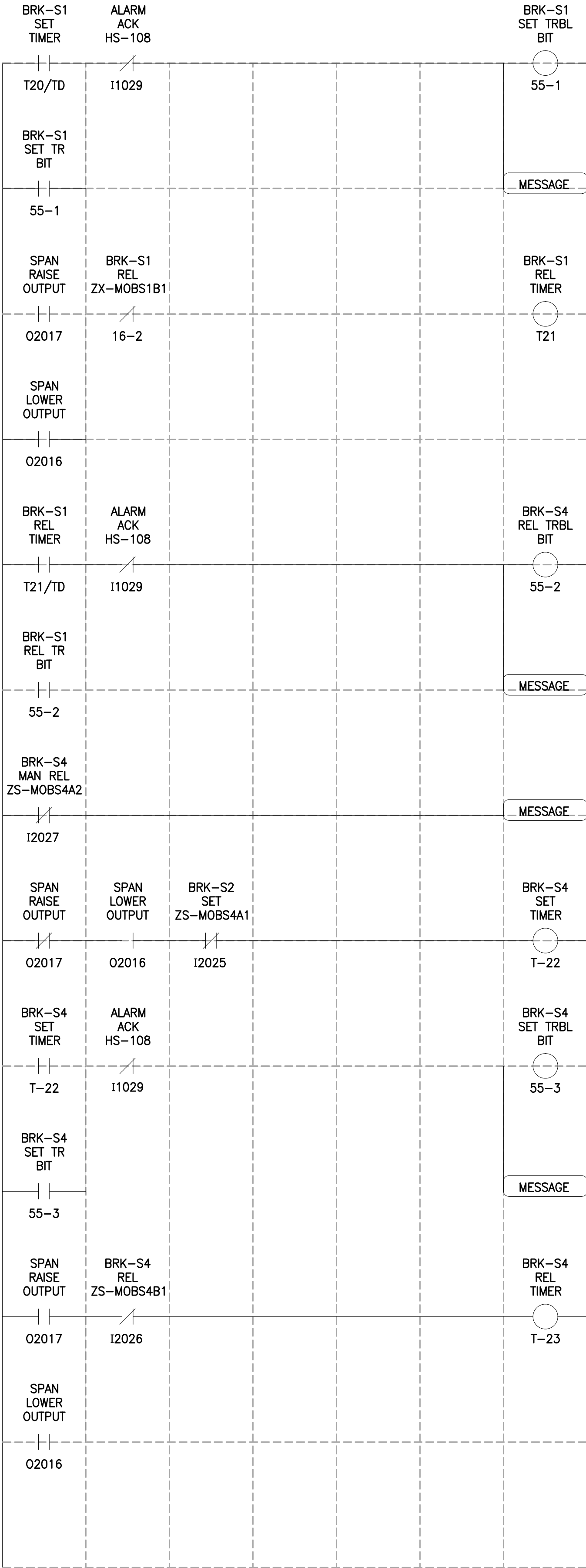
SOUTH BRAKES SHOWN, NORTH SIMILAR



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BRAKE MONITORING CONT.



"MOTOR BRAKE S1
FAILED TO SET"

COORDINATE TIMEOUT WITH DRIVE
LOGIC TO TRIGGER MESSAGE
BEFORE "DRIVE TROUBLE" FROM
DRIVE

"MOTOR BRAKE S4
FAIL TO RELEASE"

"MOTOR BRAKE S4
MANUAL RELEASE"

"MOTOR BRAKE S4
FAILED TO SET"

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06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
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of all discrepancies.

A	Detail No.
B	drawing no. - where detail required
C	dessin no. - où détail exigé
C	drawing no. - where detailed
C	dessin no. - où détaillé

project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
PLC LADDER DIAGRAM 8:
DRIVES, BRAKES

drawn by
dessiné par
J. Perez

designed by
conç par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

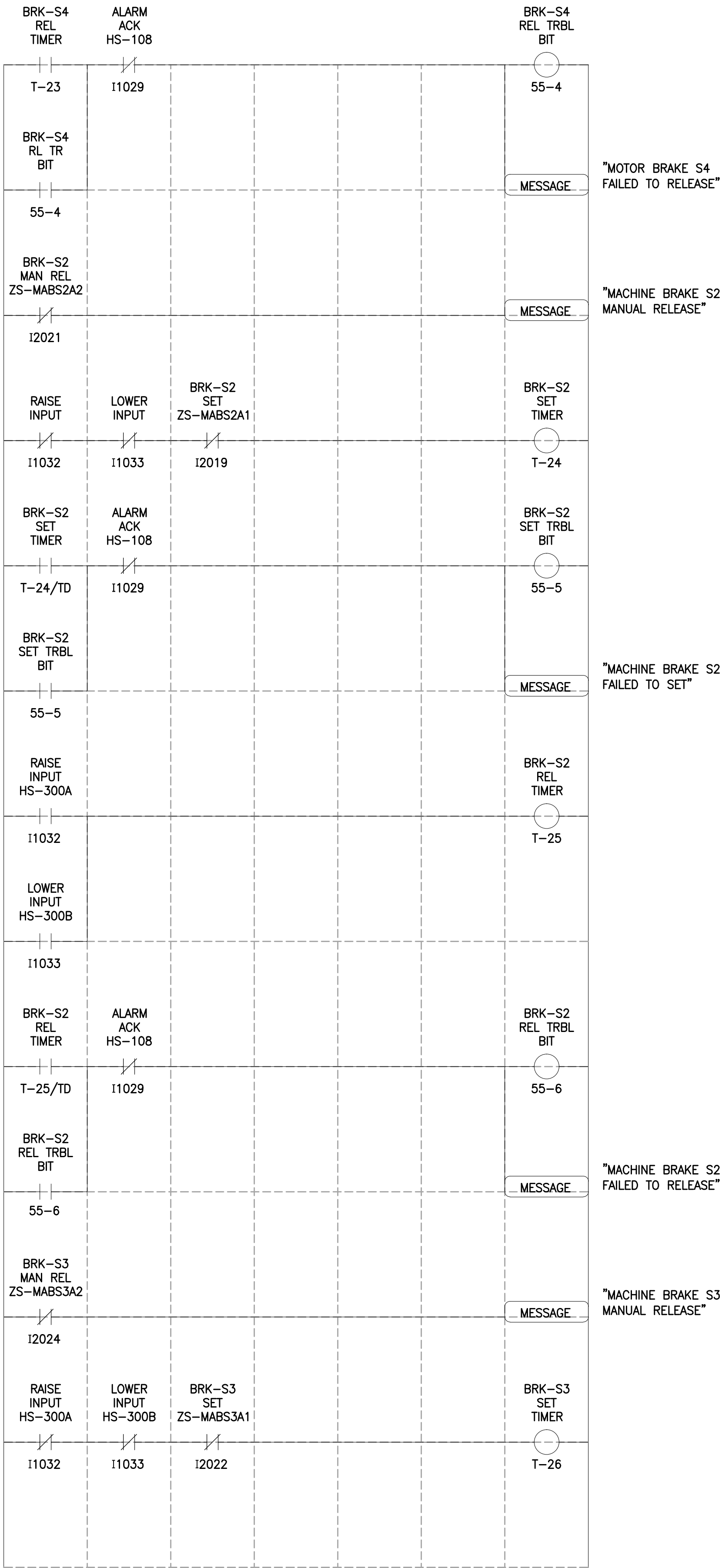
bid
soumission
A. Ghubril project manager
administrateur
de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

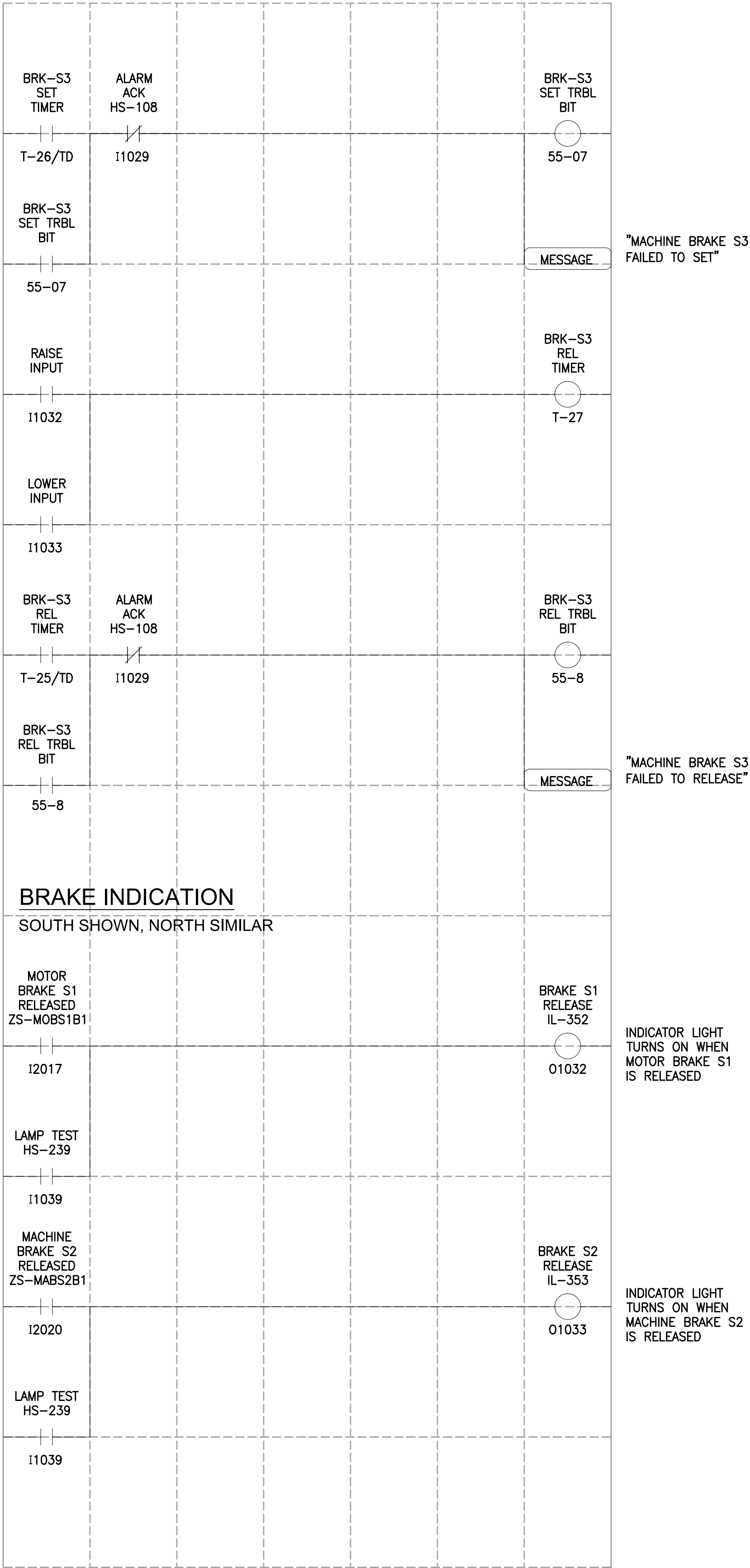
drawing no.
dessiné no.
E-52

BRAKE MONITORING (CONT'D)




NOTE:
THE LADDER DIAGRAMS ON THIS AND THE FOLLOWING SHEETS ARE INTENDED TO SHOW TYPICAL INTERLOCK LOGIC AND STYLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE DEVELOPMENT OF THE PLC PROGRAMS IN ACCORDANCE WITH THESE PLANS AND WRITTEN DESCRIPTIONS IN THE SPECIFICATIONS.

BRAKE MONITORING (CONT'D)



BRAKE INDICATION
SOUTH SHOWN, NORTH SIMILAR




Public Works and
Government Services Canada
Architectural and Engineering Services
Ontario Region

Travaux publics et
Services gouvernementaux Canada

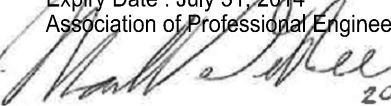
Services d'architecture et de génie
Région de l'Ontario


**PARSONS
BRINCKERHOFF**

2300 YONGE STREET, SUITE 2300
TORONTO, ONTARIO
CANADA M4P 1E4
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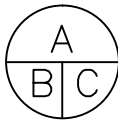
Professional Engineers
Ontario

Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

2014-07-07



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01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

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A Detail No.
No. du détail
B drawing no. - where detail required
dessin no. - où détail exigé
C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
PLC LADDER DIAGRAM 9:
BRAKES

drawn by
dessine par
J. Perez

designed by
conç par
G. Patino/B. Crouthamel

approved by
approuve par
M. VanDeRee

bid
soumission
A. Ghubril

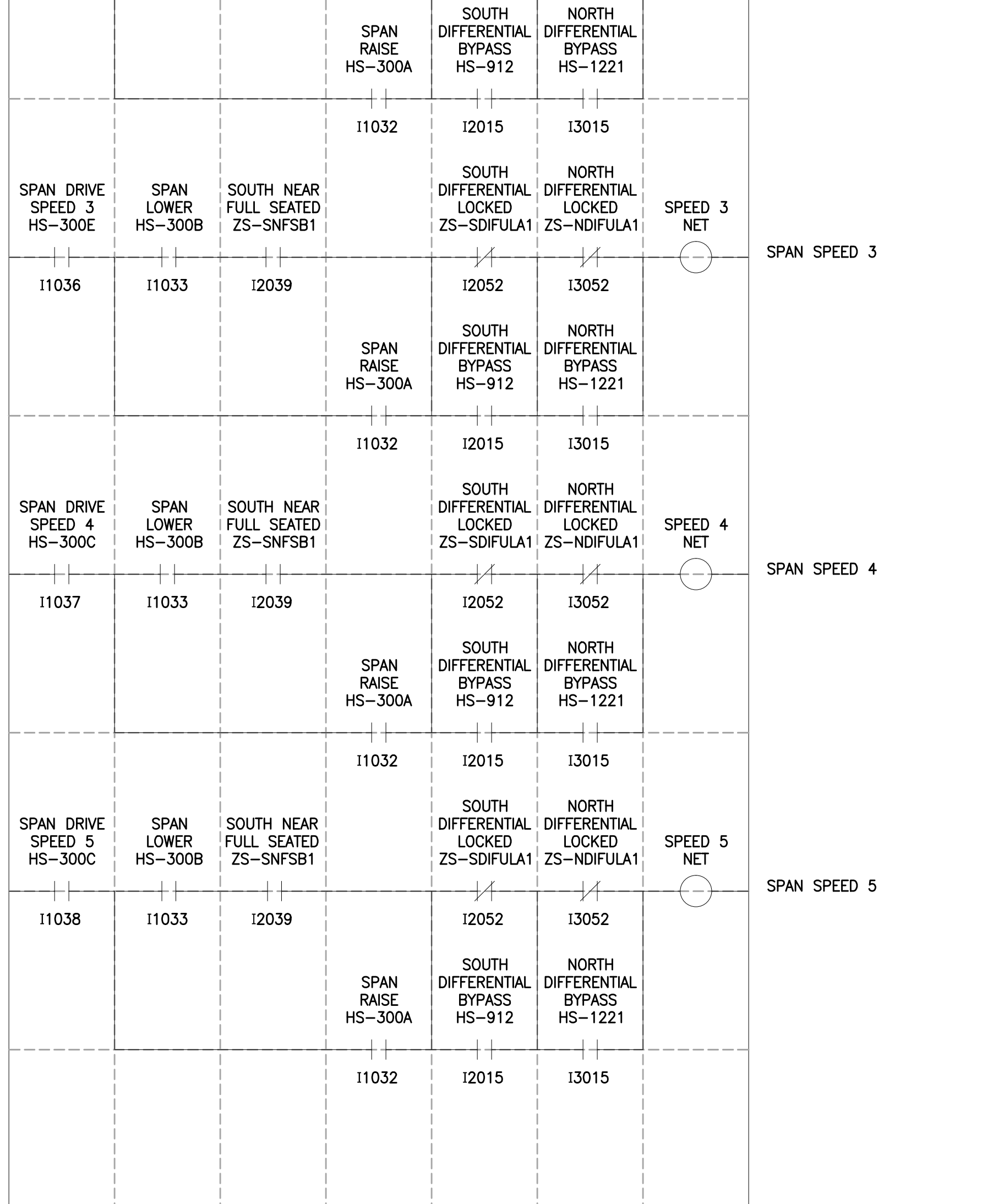
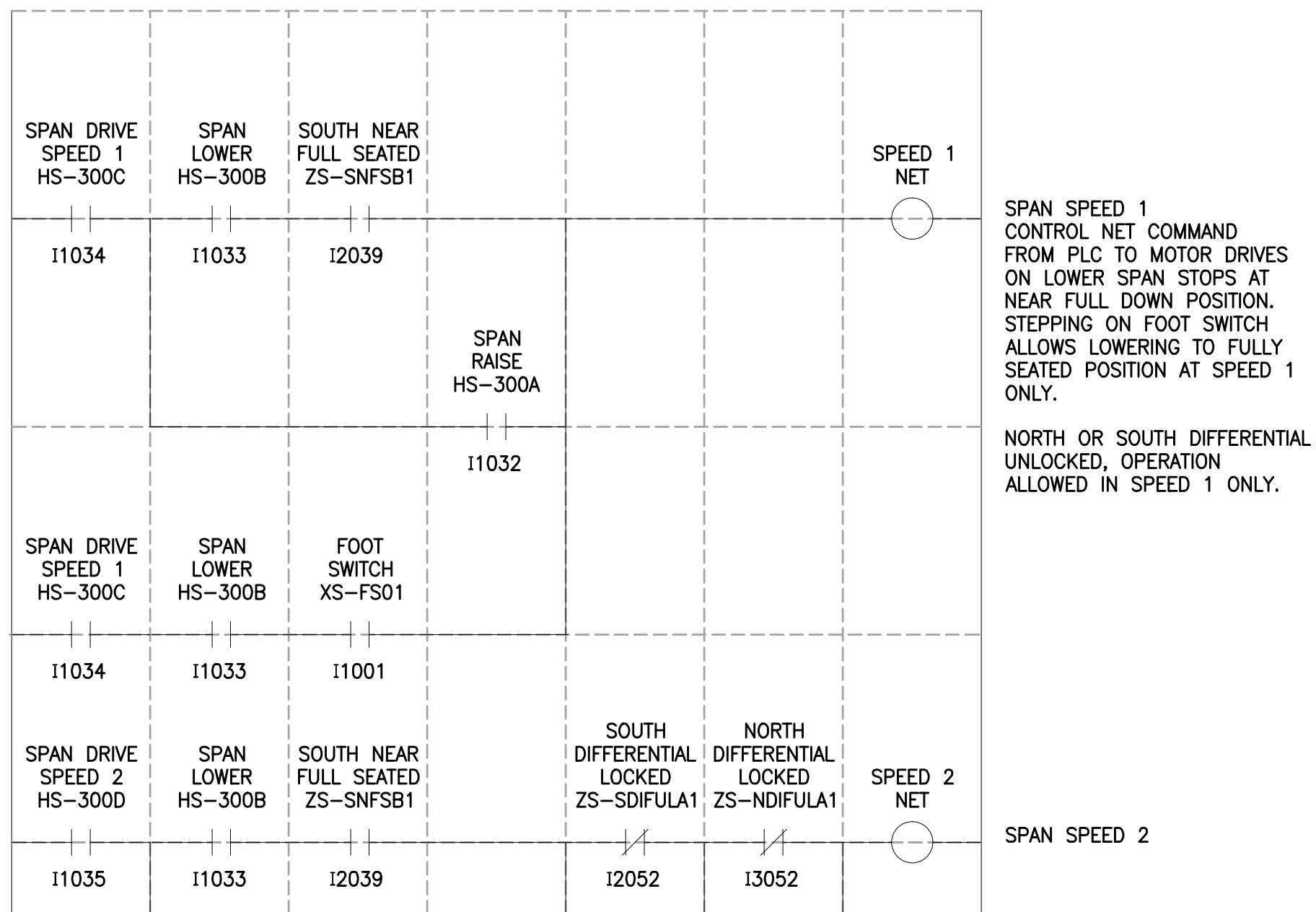
project manager
administrateur
de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessine no.
E-53

SOUTH SHOWN, NORTH SIMILAR



 **Public Works and
Government Services Canada**
Architectural and Engineering Services
Ontario Region

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Région de l'Ontario

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TORONTO, ONTARIO
CANADA M4P 1E4
PHONE: 416-487-5256 FAX: 416-487-9766
WWW.PBWORLD.COM

Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada


Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date : July 31, 2014
Association of Professional Engineers of Ontario

2014-07-0



08	FOR TENDER 3	2014-06-28
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
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02	66% DESIGN SUBMITTAL	2013-02-14
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revision		date

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No. du détail

B drawing no. — where detail required
dessin no. — où détail exigé

C drawing no. — where detailed
dessin no. — où détaillé

project title
titre du projet

HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE

REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

PLC LADDER DIAGRAM 10:
BRAKES, SPAN SPEED, GATE
GROUP RAISE

drawn by
dessine par

designed by
conc par G. Patino/B. Crouthamel

approved by
approuvé par M. VanDeRee

bid	project manager
soumission	administrateur
	de projets

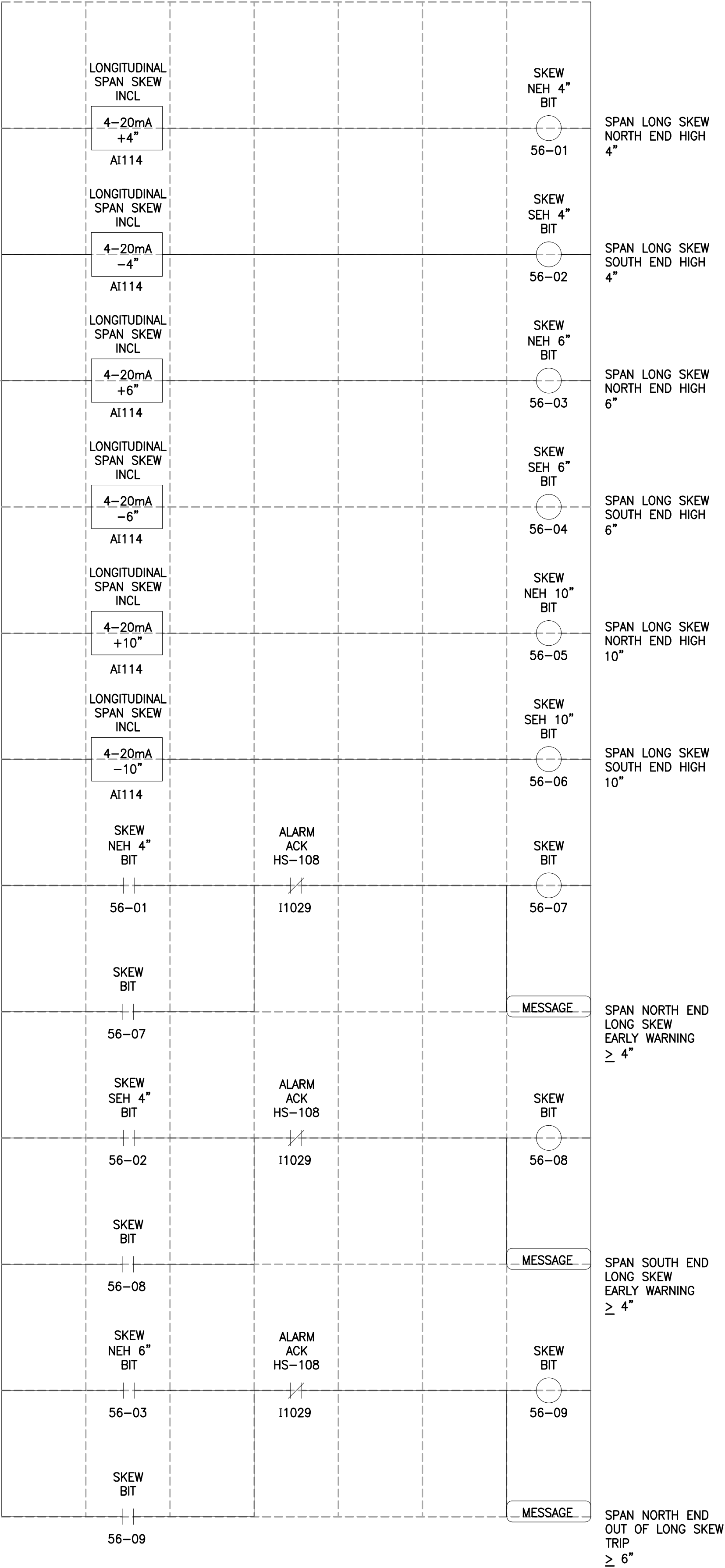
project date date du projet	2013-05-31
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project no. no. du projet	R.012641.001
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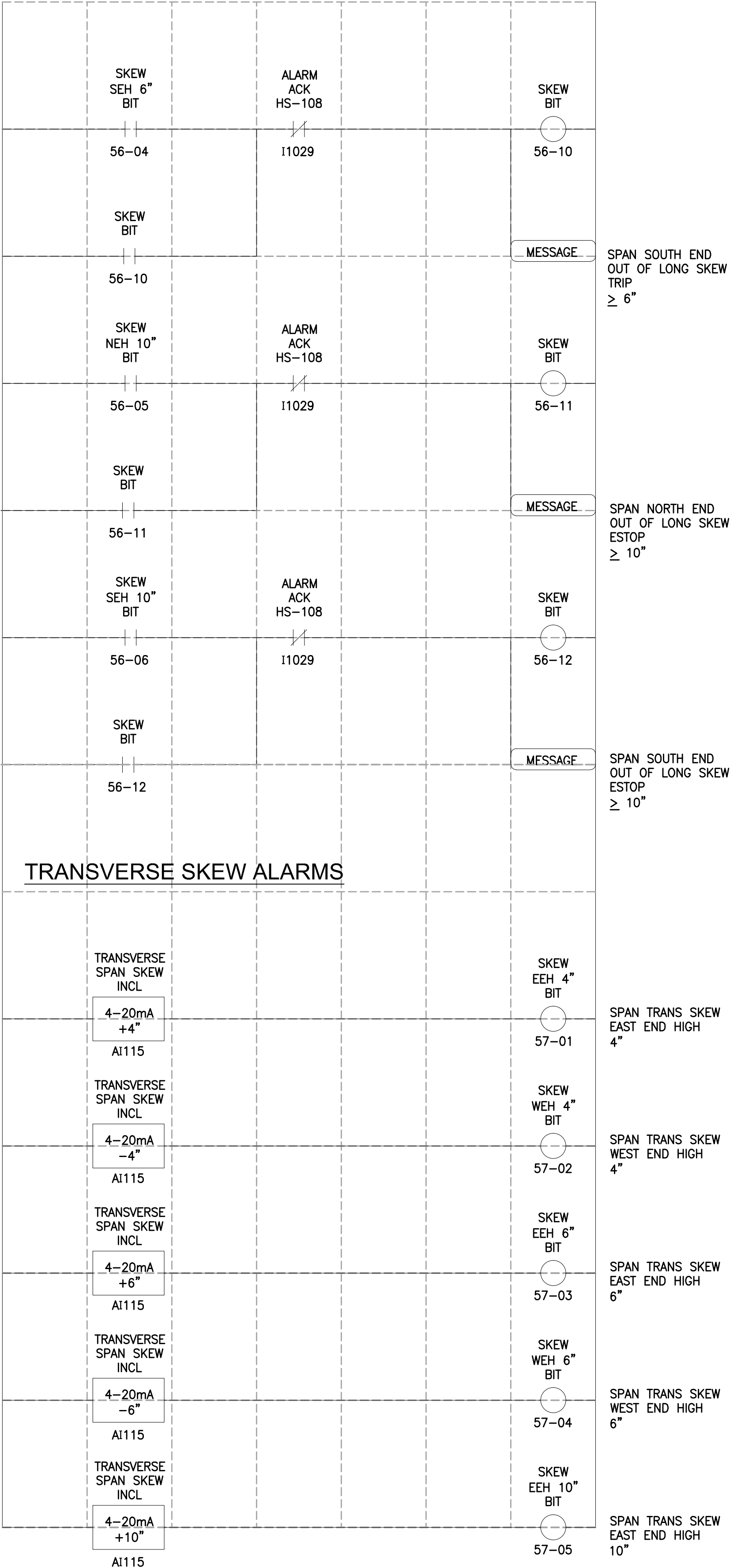
drawing no.
dessine no.

E-54

LONGITUDINAL SKEW ALARMS

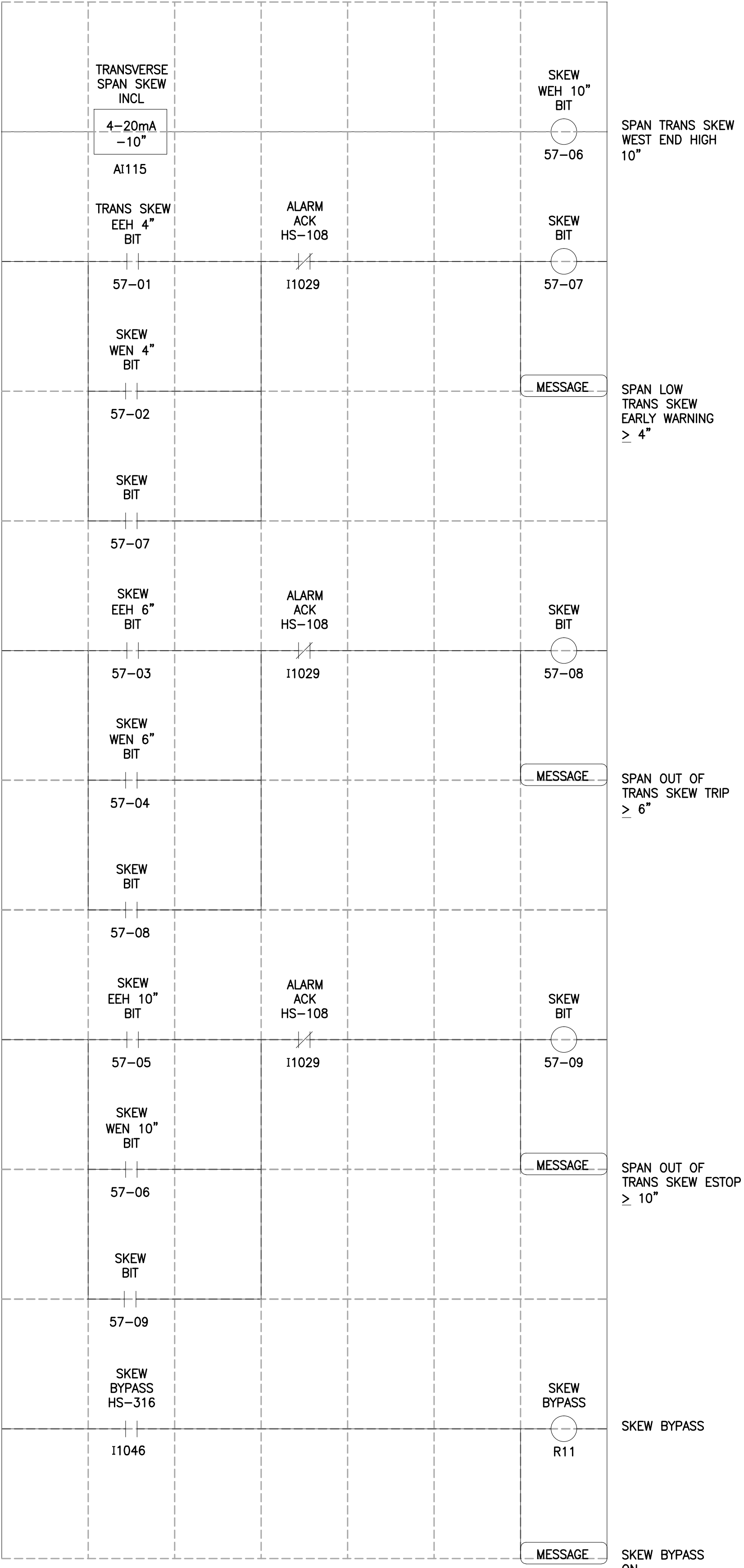


LONGITUDINAL SKEW ALARMS CONT.



TRANSVERSE SKEW ALARMS

TRANSVERSE SKEW ALARMS CONT.



NOTE:
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CANADA M4P 1E4
PHONE: 416-487-5256 FAX: 416-487-9766
WWW.PBWORLD.COM

Professional Engineers
Ontario
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario
2014-07-07



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revision		date

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B	drawing no. - where detail required
C	drawing no. - where detailed

project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
PLC LADDER DIAGRAM 11:
SKEW

drawn by
dessiné par
J. Perez

designed by
conç par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

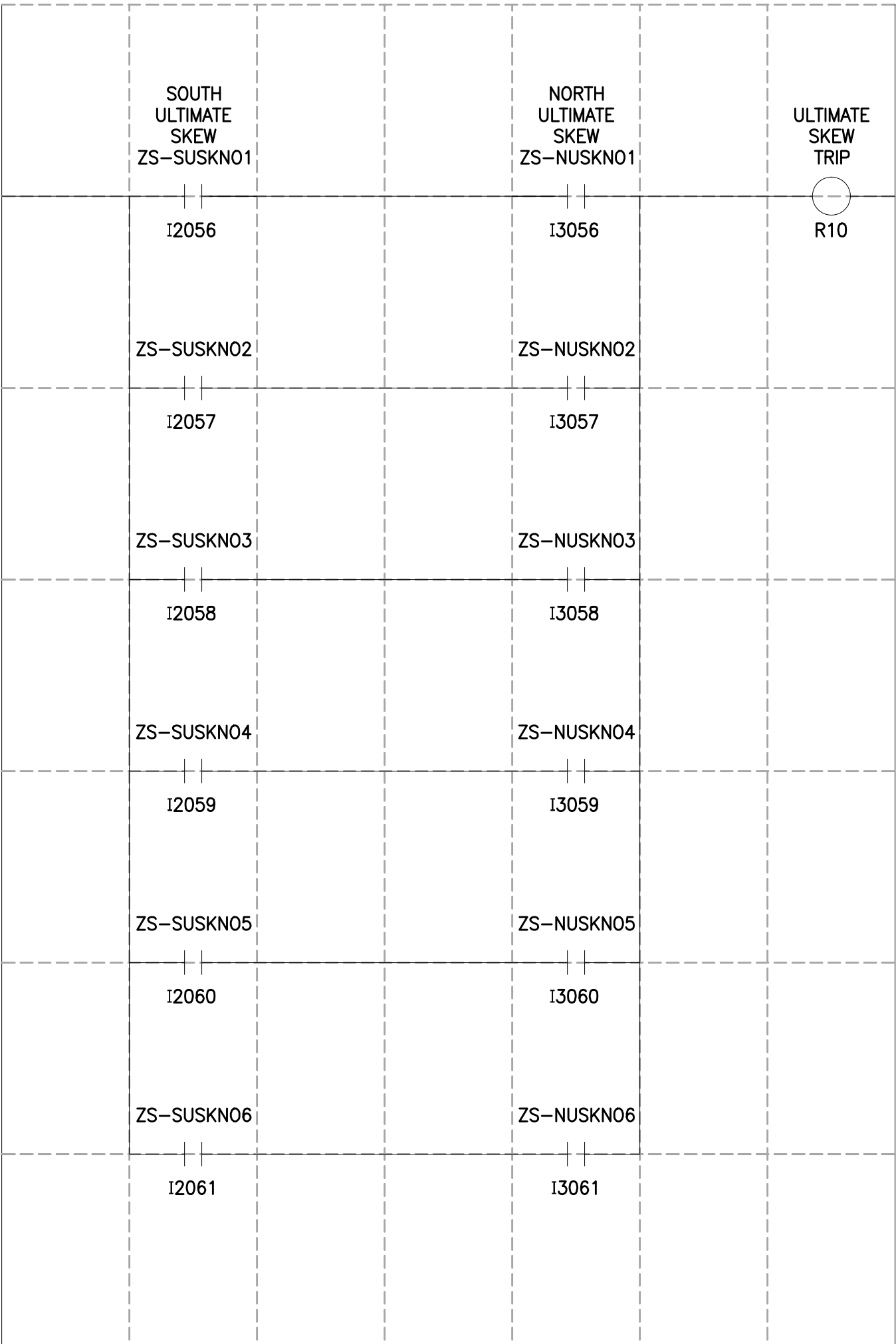
bid
soumission
A. Ghubril
project manager
administrateur
de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

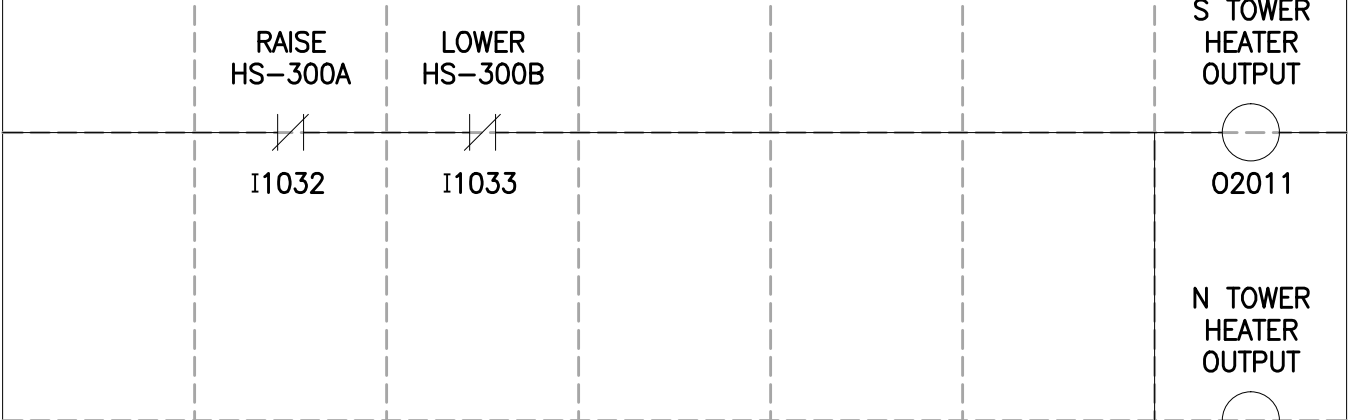
drawing no.
dessiné no.
E-55

SKREW ULTIMATE TRIP



(NOTE 2)

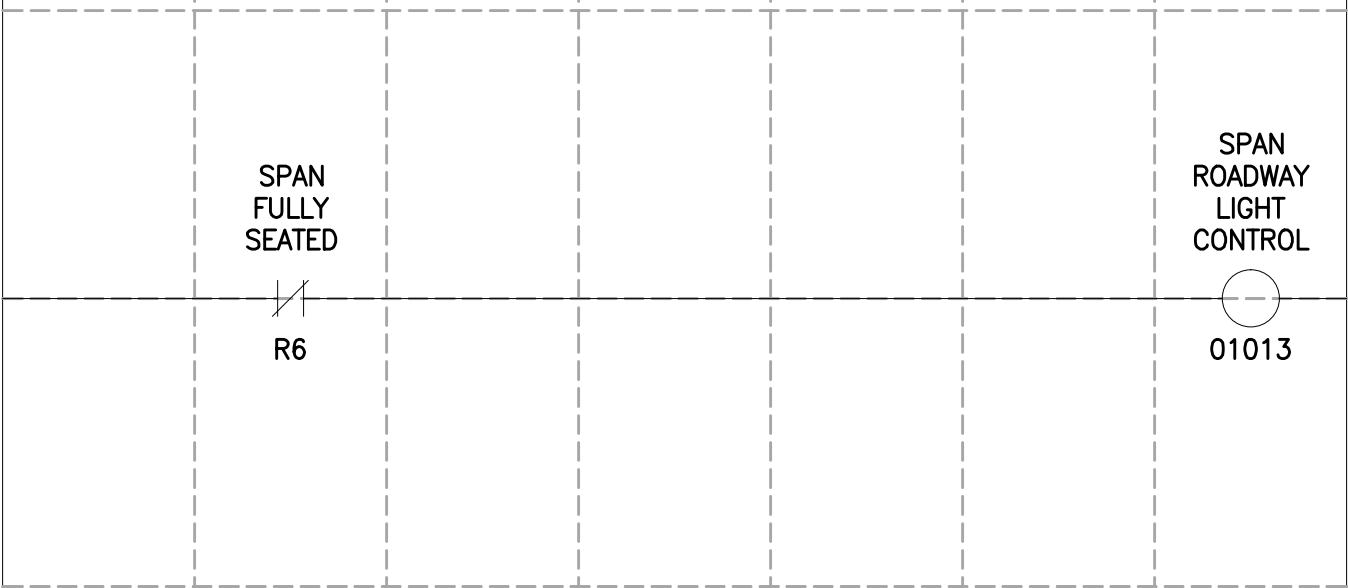
TOWER MACHINE ROOM HEATERS



SOUTH TOWER
HEATER CONTROL
OFF DURING
SPAN OPERATION

NORTH TOWER
HEATER CONTROL
OFF DURING
SPAN OPERATION

SPAN ROADWAY LIGHTING CONTROL



SPAN ROADWAY
LIGHTING IS TURNED
OFF WHEN SPAN
IS NOT FULLY SEATED

NAVIGATION LIGHT CONTROL

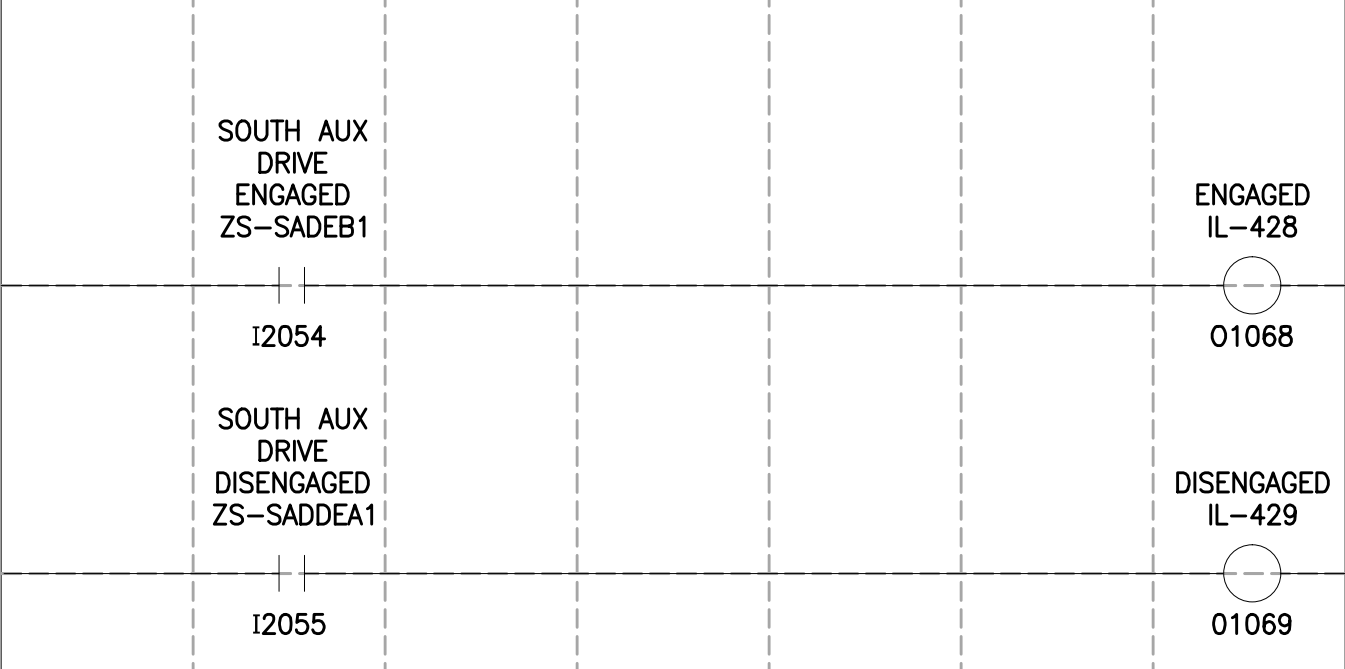


NAVIGATION LIGHT
RAISE

NAVIGATION LIGHT
LOWER

SOUTH AUXILIARY DRIVE

DUPLICATE FOR NORTH AUXILIARY DRIVE

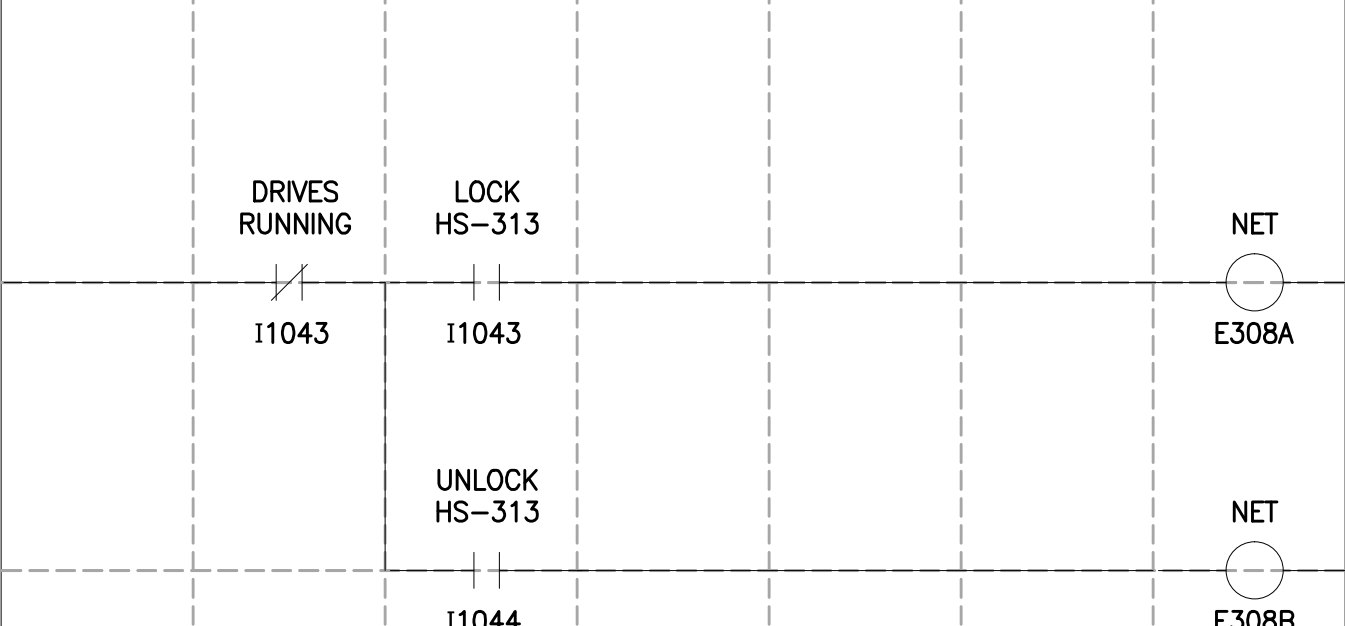


SOUTH AUXILIARY
DRIVE ENGAGED

SOUTH AUXILIARY
DRIVE DISENGAGED

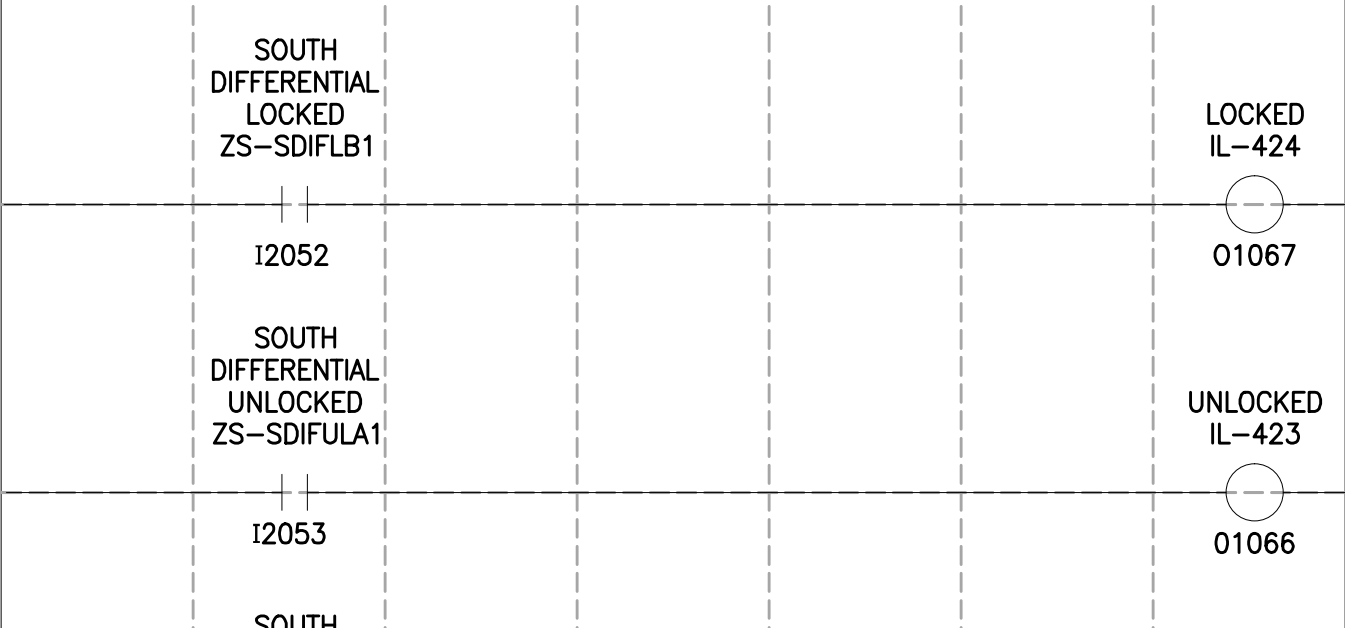
SOUTH DIFFERENTIAL LOCK

DUPLICATE FOR NORTH DIFFERENTIAL



SOUTH DIFFERENTIAL
UNLOCK

SOUTH DIFFERENTIAL
LOCK



SOUTH DIFFERENTIAL
LOCKED

SOUTH DIFFERENTIAL
UNLOCKED

"SOUTH DIFFERENTIAL
BYPASSED"

MESSAGE

SOUTH
DIFFERENTIAL
BYPASS
HS-921
I2015

NOTE:

1. THE LADDER DIAGRAMS ON THIS AND THE FOLLOWING SHEETS ARE INTENDED TO SHOW TYPICAL INTERLOCK LOGIC AND STYLE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE DEVELOPMENT OF THE PLC PROGRAMS IN ACCORDANCE WITH THESE PLANS AND WRITTEN DESCRIPTIONS IN THE SPECIFICATIONS.
2. AT LOGIC STATE "TRUE" (LOGIC-1) SKEW IS NORMAL-NO TRIP.

NORTH TOWER MACHINERY ROOM (CP-4)

SOUTH TOWER MACHINERY ROOM (CP-3)

MAIN BRIDGE CONSOLE (CP-1) (3rd FLOOR CONTROL HOUSE)

CONTROL DESK DISPLAY

CPU2
ETHERNET PORT

CPU1
ETHERNET PORT

CONTROLNET-B (RG-6 COAX)

CONTROLNET-A (RG-6 COAX)

END OF LINE
DEVICES

ETHERNET CABLE

ETHERNET CABLE

CONTROL PANEL (CP-2) (2nd FLOOR CONTROL HOUSE)

CPU1
SLOT NO. 0 1 2 3

CPU2
SLOT NO. 0 1 2 3

POWER SUPPLY

CONTROLLER

COMMUNICATION

SYNCHLINK

ETHERNET/IP

ETHERNET CABLE

SYNCHLINK FIBER OPTIC

CONTROLNET-B (RG-6 COAX)

CONTROLNET-A (RG-6 COAX)

CONTROLNET-B (RG-6 COAX)

CONTROLNET-A (RG-6 COAX)

CONTROLNET-B (RG-6 COAX)

CONTROLNET-A (RG-6 COAX)

I/O RACK 1
SLOT NO. 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

POWER SUPPLY

COMMUNICATION

SYNCHLINK

INPUT 16PT

INPUT 16PT

INPUT 16PT

RELAY OUTPUT 8 PTS

RELAY OUTPUT 8 PTS

120VAC OUTPUT 16 PTS

120VAC OUTPUT 16 PTS

120VAC OUTPUT 16 PTS

120VAC OUTPUT 16 PTS

RELAY INPUT 16 PTS

RELAY INPUT 16 PTS

ANALOG OUTPUT 4 PTS

ANALOG OUTPUT 4 PTS

ANALOG OUTPUT 4 PTS

ANALOG INPUT 4 PTS

ANALOG INPUT 4 PTS

ANALOG INPUT 4 PTS

ANALOG INPUT 4 PTS

CONTROLNET-B (RG-6 COAX)

CONTROLNET-A (RG-6 COAX)

CONTROLNET-B (RG-6 COAX)

CONTROLNET-A (RG-6 COAX)

PANEL VIEW

I/O RACK 3
SLOT NO. 0 1 2 3 4 5 6 7 8 9 10 11 12

POWER SUPPLY

COMMUNICATION

SYNCHLINK

INPUT 16PT

INPUT 16PT

INPUT 16PT

INPUT 16PT

OUTPUT 8PT

RELAY OUTPUT 8PTS

ANALOG OUTPUT 4PTS

ANALOG INPUT 4PTS

ANALOG INPUT 4PTS

ANALOG INPUT 4PTS

SPACE

SPACE

SYNCHLINK FIBER OPTIC

CONTROLNET-B (RG-6 COAX)

CONTROLNET-A (RG-6 COAX)

END OF LINE
DEVICES

NORTH TOWER MCC

3E-MA
MOTOR
DRIVE

4W-SL
MOTOR
DRIVE

BURLINGTON CANAL

PANEL VIEW

I/O RACK 2
SLOT NO. 0 1 2 3 4 5 6 7 8 9 10 11 12

POWER SUPPLY

COMMUNICATION

SYNCHLINK

INPUT 16PT

INPUT 16PT

INPUT 16PT

INPUT 16PT

RELAY OUTPUT 8 PTS

RELAY OUTPUT 8 PTS

ANALOG OUTPUT 4 PTS

ANALOG OUTPUT 4 PTS

ANALOG INPUT 6 PTS

ANALOG INPUT 6 PTS

SPACE

SPACE

SYNCHLINK FIBER OPTIC

CONTROLNET-B (RG-6 COAX)

CONTROLNET-A (RG-6 COAX)

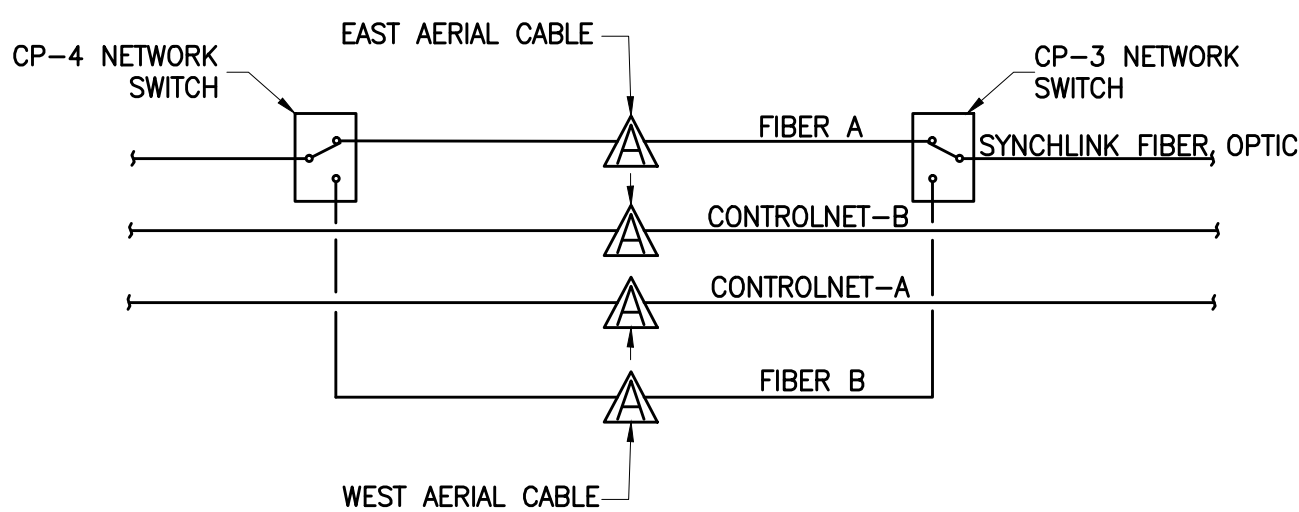
COMMUNICATIONS
THROUGH AERIAL CABLES
SEE

1
E60/E60

SOUTH TOWER MCC

1E-SL
MOTOR
DRIVE

2W-MA
MOTOR
DRIVE



1
E60/E60

DETAIL



Public Works and
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Architectural and Engineering Services
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Travaux publics et
Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario

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Professional Engineers
Ontario

Temporary Licensee

Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada

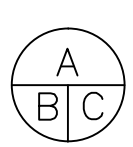
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

2014-07-07



08	FOR TENDER 3	2014-06-26
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revision		date

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No. du détail
B drawing no. - where detail required
dessin no. - où détail exigé
C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet
**HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**

drawing title
titre du dessin
PLC ARCHITECTURE DIAGRAM

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril

project manager
administrateur
de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-60

RACK-1 (CP-2)

RACK 1 – SLOT 2 120VAC 16 PT. INPUT MODULE		
PT	TAGNAME	WIRE #
I1000	CB207	CB207
I1001	FS208	208
I1002	SPARE	
I1003	HS-210	210A
I1004	HS-211	211
I1005	SPARE	212
I1006	HS-213	213
I1007	HS-214	214
I1008	O1002	126
I1009	HS-606	216A
I1010	HS-605	217A
I1011	SPARE	
I1012	HS-609	219A
I1013	HS-608	220A
I1014	C1617	221
I1015	HS-611	222

RACK 1 – SLOT 3 120VAC 16 PT. INPUT MODULE		
PT	TAGNAME	WIRE #
I1016	HS-613	224A
I1017	HS-612	225A
I1018	SPARE	
I1019	HS-616	227A
I1020	HS-615	228A
I1021	SPARE	
I1022	HS-619	230A
I1023	HS-618	231A
I1024	SPARE	
I1025	HS-622	234A
I1026	HS-621	235A
I1027	SPARE	
I1028	HS-603	237
I1029	HS-238	238
I1030	HS-239	239
I1031	SPARE	

RACK 1 – SLOT 4 120VAC 16 PT. INPUT MODULE		
PT	TAGNAME	WIRE #
I1032	HS-300A	300
I1033	HS-300B	301
I1034	HS-300C	302
I1035	HS-300D	303
I1036	HS-300E	304
I1037	HS-300F	305
I1038	HS-300G	306
I1039	SPARE	
I1040	HS-711	309
I1041	HS-310	310
I1042	HS-311	311
I1043	HS-313	312
I1044	HS-313	313
I1045	HS-314	314
I1046	HS-314	315
I1047	HS-316	316

RACK 1 – SLOT 5 120VAC 8 PT. RELAY OUTPUT MODULE		
PT	TAGNAME	WIRE #
O1000	TR-122	122
O1001	IL-124	124
O1002	I1008	126
O1003	SPARE	128
O1004	SPARE	130
O1005	SPARE	132
O1006	SPARE	134
O1007	SPARE	136

RACK 1 – SLOT 6 120VAC 8 PT. RELAY OUTPUT MODULE		
PT	TAGNAME	WIRE #
O1008	NAV LIGHTS RAISE	317
O1009	NAV LIGHTS LOWER	319
O1010	SPARE	
O1011	SPARE	
O1012	LR1602	1602A
O1013	ROADWAY LIGHT	CB841/844
O1014	SPARE	327
O1015	SPARE	329

RACK 1 – SLOT 7 120VAC 16 PT. OUTPUT MODULE		
PT	TAGNAME	WIRE #
O1016	IL-335	335
O1017	IL-336	336
O1018	IL-337	337
O1019	IL-338	338
O1020	IL-339	339
O1021	IL-340	340
O1022	IL-341	341
O1023	IL-342	342
O1024	IL-343	343
O1025	SPARE	
O1026	IL-345	345
O1027	SPARE	
O1028	IL-347	347
O1029	IL-348	348
O1030	IL-349	349
O1031	IL-350	350

RACK 1 – SLOT 8 120VAC 16 PT. OUTPUT MODULE		
PT	TAGNAME	WIRE #
O1032	IL-352	352
O1033	IL-353	353
O1034	IL-354	354
O1035	IL-355	355
O1036	IL-358	358
O1037	IL-359	359
O1038	IL-360	360
O1039	IL-361	361
O1040	IL-363	363
O1041	SPARE	
O1042	SPARE	
O1043	SPARE	
O1044	SPARE	
O1045	SPARE	
O1046	SPARE	
O1047	SPARE	

RACK-1 CONTINUED

RACK 1 – SLOT 9 120VAC 16 PT. OUTPUT MODULE		
PT	TAGNAME	WIRE #
O1048	IL-647	647
O1049	IL-648	648
O1050	IL-649	649
O1051	IL-650	650
O1052	IL-735	735
O1053	IL-736	736
O1054	IL-737	737
O1055	IL-738	738
O1056	IL-411	411
O1057	IL-412	412
O1058	SPARE	
O1059	SPARE	
O1060	SPARE	
O1061	SPARE	
O1062	SPARE	
O1063	SPARE	

RACK 1 – SLOT 10 120VAC 16 PT. OUTPUT MODULE		
PT	TAGNAME	WIRE #
O1064	IL-421	421
O1065	IL-422	422
O1066	IL-423	423
O1067	IL-424	424
O1068	IL-426	426
O1069	IL-427	427
O1070	IL-428	428
O1071	IL-429	429
O1072	IL-638	638
O1073	IL-639	639
O1074	IL-640	640
O1075	IL-641	641
O1076	IL-642	642
O1077	IL-643	643
O1078	IL-644	644
O1079	IL-645	645

RACK 1 – SLOT 11 120VAC 16 PT. INPUT MODULE		
PT	TAGNAME	WIRE #
I1048	TR-1605	441
I1049	IR-1621	443
I1050	IR-1624	444
I1051	IR-1701	445
I1052	IR-1704	446
I1053	IR-1627	447
I1054	IR-1708	448
I1055	GFR	450
I1056	CB-1	451
I1057	CB-2	453
I1058	CB-3	454
I1059	ATS	455
I1060	HOUSE GENERATOR	456
I1061	GEN RUN	457
I1062	GEN TRB	459
I1063	SPARE	

RACK 1 – SLOT 12 120VAC 16 PT. INPUT MODULE		
PT	TAGNAME	WIRE #
I1064	HS-701	462A
I1065	HS-702	463A
I1066	SPARE	
I1067	HS-704	704A
I1068	HS-705	705A
I1069	HS-706	469
I1070	HS-712	470
I1071	HS-471 2W	471
I1072	HS-471 3E	472
I1073	IR-1628	474
I1074	IR-1710	475
I1075	IR-1748	476
I1076	HS-477	477
I1077	SPARE	479
I1078	SPARE	480
I1079	SPARE	482

RACK 1 – SLOT 13 4-20mA 4 PT. ANALOG OUTPUT MODULE		
PT	TAGNAME	WIRE #
AO100	ZI-500	+ZI-500
		-ZI-501
AO101	ZI-502	+ZI-502
		-ZI-503
AO102	ZI-504	+ZI-504
		-ZI-505
AO103	ZI-506	+ZI-506
		-ZI-507

RACK-1 CONTINUED

RACK 1 – SLOT 14 4-20mA 4 PT. ANALOG OUTPUT MODULE		
PT	TAGNAME	WIRE #
AO104	ZI-510	+ZI-510
		-ZI-511
AO105	ZI-512	+ZI-512
		-ZI-513
AO106	ZI-514	+ZI-514
		-ZI-515
AO107	SPARE	

RACK 1 – SLOT 15 4-20mA 4 PT. ANALOG OUTPUT MODULE		
PT	TAGNAME	WIRE #
AO108	ZI-518	+ZI-518
		-ZI-519
AO109	ZI-520	+ZI-520
		-ZI-521
AO110	ZI-522	+ZI-522
		-ZI-523
AO111	ZI-524	+ZI-524
		-ZI-525

RACK 1 – SLOT 16 4-20mA 4 PT. ANALOG INPUT MODULE		
PT	TAGNAME	WIRE #
AI112	SPARE	
AI113	SPARE	
AI114	INCLINOMETER	ZX-532
	OUPTUT 1	ZX-533
AI115	INCLINOMETER	ZX-535
	OUTPUT 2	ZX-536

NOTES:

1. CONTRACTOR SHALL CONNECT I/O POINTS IN THE SLOT AND POSITIONS INDICATED. CONTRACTOR SHALL ASSIGN ADDRESSES AS REQUIRED FOR THE EQUIPMENT PROVIDED AND FILL THE ADDRESS BLOCK ON THIS DRAWING "AS BUILT".



Public Works and
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Région de l'Ontario

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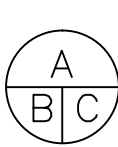
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario



2014-07-07



08	FOR TENDER 3	2014-06-26
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06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
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project title
titre du projet

HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

PLC I/O SCHEDULE 1

drawn by
dessine par

J. Perez

designed by
concé par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur
de projets

project date
date du projet

2013-05-31

project no.
no. du projet

R.012641.001

drawing no.
dessiné no.

E-61

RACK-2 (CP-3)

RACK 2 – SLOT 2 120VAC 16 PT. INPUT MODULE			RACK 2 – SLOT 3 120VAC 16 PT. INPUT MODULE			RACK 2 – SLOT 4 120VAC 16 PT. INPUT MODULE			RACK 2 – SLOT 5 120VAC 16 PT. INPUT MODULE			RACK 2 – SLOT 6 120VAC 8 PT. OUTPUT MODULE			RACK 2 – SLOT 7 120VAC 8 PT. OUTPUT MODULE			RACK 2 – SLOT 8 4CW ANALOG OUTPUT MODULE		
PT	TAGNAME	WIRE #	PT	TAGNAME	WIRE #	PT	TAGNAME	WIRE #	PT	TAGNAME	WIRE #	PT	TAGNAME	WIRE #	PT	TAGNAME	WIRE #	PT	TAGNAME	WIRE #
I2000	ZS–TGSEA1	906	I2016	ZS–MOBSS1A1	922	I2032	SPARE		I2048	M2 OL TRIP	1017	O2000	TG–SE RAISE	1501	O2008	2W–MA LOWER	2002	A0200	SPARE	
I2001	ZS–TGSEB1	907	I2017	ZS–MOBRS1B1	923	I2033	AUX–M14	1001	I2049	M1 OL TRIP	1018	O2001	TG–SE LOWER	1503	O2009	2W–MA RAISE	2001			
I2002	M2F/M2R	908	I2018	ZS–MOBMRS1A2	924	I2034	AUX–M15	1002	I2050	M3 OL TRIP	1019	O2002	TG–SW RAISE	1505	O2010	2W–MA RUN	2003			
I2003	ZS–TGSWA1	909	I2019	ZS–MABSS2A1	925	I2035	AUX–M16	1003	I2051	M4 OL TRIP	1020	O2003	TG–SW LOWER	1507	O2011	S TOWER HTR CNTR.	2410			
I2004	ZS–TGSWB1	910	I2020	ZS–MABRS2B1	926	I2036	AUX–M17	1004	I2052	ZS–SDIFLB1	1021	O2004	BG–SE RAISE	1509	O2012	IE–SL RUN	2103	A0201	SPARE	
I2005	M1F/M1R	911	I2021	ZS–MABMRS2A2	927	I2037	ZS–SFRB1	1005A	I2053	ZS–SDIFULA1	1022	O2005	BG–SE LOWER	1511	O2013	SIS–2019	1110			
I2006	ZS–BGSEA1	912	I2022	ZS–MABSS3A1	928	I2038	ZS–SNRB1	1006A	I2054	ZS–SADEB1	1023	O2006	PG–SW RAISE	1513	O2014	SPARE				
I2007	ZS–BGSEB1	913	I2023	ZS–MABRS3B1	929	I2039	ZS–SNFSB1	1007A	I2055	ZS–SADDEA1	1024	O2007	PG–SW LOWER	1515	O2015	SPARE				
I2008	M3F/M3R	914	I2024	ZS–MABMRS3A2	930	I2040	1ERONO	1008	I2056	ZS–SUSK N01	1025							A0202	SPARE	
I2009	SIS–2019	915	I2025	ZS–MOBSS4A1	931	I2041	1ETRBN0	1009	I2057	ZS–SUSK N02	1026									
I2010	SPARE		I2026	ZS–MOBRS4B1	932	I2042	ZS–SWFSA1	1010	I2058	ZS–SUSK N03	1027									
I2011	ZS–PGSWA1	917	I2027	ZS–MOBMRS4A2	933	I2043	ZS–SEFSA1	1011	I2059	ZS–SUSK N04	1028									
I2012	ZS–PGSWB1	918	I2028	ZS–SLPSEA1/SWA1	934	I2044	2WRONO	1012	I2060	ZS–SUSK N05	1029							A0203	SPARE	
I2013	M4F/M4R	919	I2029	ZS–SLPSEA2/SWA2	935	I2045	2WTRBN0	1013	I2061	ZS–SUSK N06	1030									
I2014	SPARE		I2030	ZS–M5F/M5R	936	I2046	SPARE		I2062	SPARE	1031									
I2015	HS–921	921	I2031	ZS–SPLSHCA2	937	I2047	SPARE		I2063	SPARE										

RACK-2 CONTINUED

RACK 2 – SLOT 9 6 PT ANALOG INPUT MODULE		
PT	TAGNAME	WIRE #
AI200	1E–SL MOTOR SPEED	+1132
		–1133
AI201	1E–SL MOTOR AMPS	+1135
		–1136
AI202	2W–MA MOTOR SPEED	+1151
		–1152
AI203	2W–MA MOTOR AMPS	+1154
		–1155
AI204	SPARE	
AI205	SPARE	

RACK-3 (CP-4)

RACK 2 – SLOT 10 6 PT ANALOG INPUT MODULE		
PT	TAGNAME	WIRE #
AI206	ZIY–2504	+2513
		–2512
AI207	SPARE	
AI208	SPARE	
AI209	SPARE	
AI210	SPARE	
AI211	SPARE	

RACK 3 – SLOT 2 120VAC 16 PT. INPUT MODULE		
PT	TAGNAME	WIRE #
I3000	ZS–TGNEA1	1206
I3001	ZS–TGNEB1	1207
I3002	M11F/M11R	1208
I3003	ZS–TGNWA1	1209
I3004	ZS–TGNWB1	1210
I3005	M10F/M10R	1211
I3006	ZS–BGNEA1	1212
I3007	ZS–BGNEB1	1213
I3008	M12F/M12R	1214
I3009	SIS–2319	1215
I3010	SPARE	
I3011	ZS–PGNWA1	1217
I3012	ZS–PGNWB1	1218
I3013	M15F/M15R	1219
I3014	SPARE	
I3015	HS–1221	1221

RACK 3 – SLOT 3 120VAC 16 PT. INPUT MODULE		
PT	TAGNAME	WIRE #
I3016	ZS–MOBSN1A1	1222
I3017	ZS–MOBRN1B1	1223
I3018	ZS–MOBMRN1A2	1224
I3019	ZS–MABSN2A1	1225
I3020	ZS–MABRN2B1	1226
I3021	ZS–MABMRN2A2	1227
I3022	ZS–MABSN3A1	1228
I3023	ZS–MABRN3B1	1229
I3024	ZS–MABMRN3A2	1230
I3025	ZS–MOBSN4A1	1231
I3026	ZS–MOBRN4B1	1232
I3027	ZS–MOBMRN4A2	1233
I3028	ZS–SPLNEA1/NWA1	1234A
I3029	ZS–SPLNEA2/NWA2	1235A
I3030	ZS–M16F/M16R	1236
I3031	ZS–SPLNHCA2	1237

RACK 3 – SLOT 4 120VAC 16 PT. INPUT MODULE		
PT	TAGNAME	WIRE #
I3032	AUX–M20	1300
I3033	AUX–M21	1301
I3034	AUX–M22	1302
I3035	AUX–M23	1303
I3036	SPARE	
I3037	SPARE	
I3038	SPARE	
I3039	SPARE	
I3040	3ERONO	1308
I3041	3ETRBN0	1309
I3042	ZS–NWFS A1	1310
I3043	ZS–NEFSA1	1311
I3044	4WRONO	1312
I3045	4WTRBN0	1313
I3046	SPARE	
I3047	SPARE	

RACK 3 – SLOT 5 120VAC 16 PT. INPUT MODULE		
PT	TAGNAME	WIRE #
I3048	M11 OL TRIP	1316
I3049	M10 OL TRIP	1317
I3050	M12 OL TRIP	1318
I3051	M15 OL TRIP	1319
I3052	ZS–NDIFLB1	1320
I3053	ZS–NDIFULA1	1321
I3054	ZS–NADEB1	1322
I3055	ZS–NADDEA1	1323
I3056	ZS–NUSK N01	1324
I3057	ZS–NUSK N02	1325
I3058	ZS–NUSK N03	1326
I3059	ZS–NUSK N04	1327
I3060	ZS–NUSK N05	1328
I3061	ZS–NUSK N06	1329
I3062	SPARE	
I3063	SPARE	

RACK 3 – SLOT 6 120VAC 8 PT. OUTPUT MODULE		
PT	TAGNAME	WIRE #
O3000	TG–NE RAISE	1517
O3001	TG–NE LOWER	1519
O3002	TG–NW RAISE	1521
O3003	TG–NW LOWER	1523
O3004	BG–NE RAISE	1525
O3005	BG–NE LOWER	1527
O3006	PG–NW RAISE	1530
O3007	PG–NW LOWER	1532

RACK-3 CONTINUED

RACK 3 – SLOT 7 120VAC 8 PT. OUTPUT MODULE		
PT	TAGNAME	WIRE #
O3008	3E–MA LOWER	2302
O3009	3E–MA RAISE	2301
O3010	3E–MA RUN	2303
O3011	N TOWER HTR CNTR.	2430
O3012	4W–SL RUN	2203
O3013	SIS–2319	1410
O3014	SPARE	
O3015	SPARE	

RACK 3 – SLOT 8 4 PT ANALOG OUTPUT MODULE		
PT	TAGNAME	WIRE #
A0300	NORTH HEIGHT INDICATION	+1417
		–1418
A0301	SOUTH HEIGHT INDICATION	+1420
		–1421
A0302	SPARE	
A0303	SPARE	

RACK 3 – SLOT 9 6 PT ANALOG INPUT MODULE		
PT	TAGNAME	WIRE #
AI300	3E–MA MOTOR SPEED	+1432
		–1433
AI301	3E–MA MOTOR AMPS	+1435
		–1436
AI302	SPARE	
AI303	SPARE	
AI304	SPARE	
AI305	SPARE	

RACK 3 – SLOT 10 6 PT ANALOG INPUT MODULE		
PT	TAGNAME	WIRE #
AI306	4W–SL MOTOR SPEED	+1451
		–1452
AI307	4W–SL MOTOR AMPS	+1454
		–1455
AI308	SPARE	
AI309	SPARE	
AI310	SPARE	
AI311	SPARE	

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Architectural and Engineering Services
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**Travaux publics et
Services gouvernementaux Canada**
Services d'architecture et de génie
Région de l'Ontario

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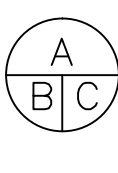
**Professional Engineers
Ontario**
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario
Mark VanDeRee
2014-07-07



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project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
PLC I/O SCHEDULE 2

drawn by
dessiné par
J. Perez

designed by
conç. par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

bid
soumission
A. Ghubril project manager
administrateur
de projets

project date
date du projet
2013–05–31

project no.
no. du projet
R.012641.001

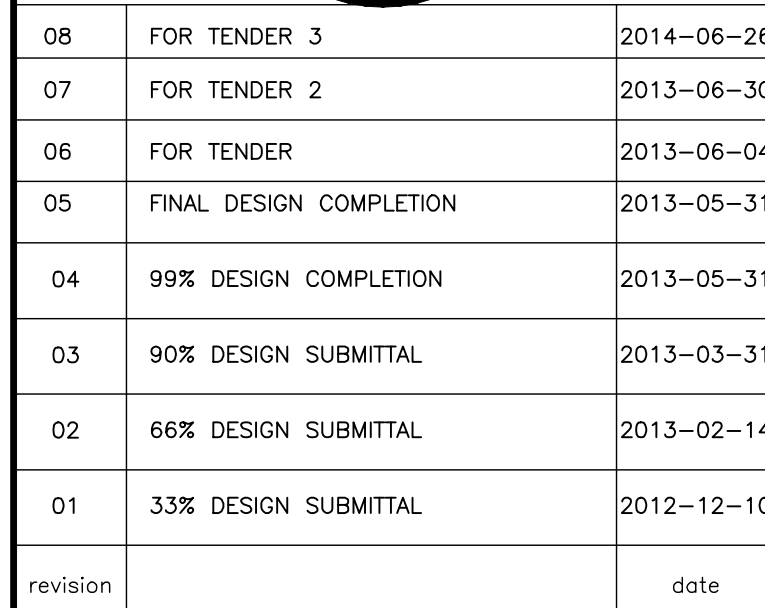
drawing no.
dessiné no.
E–62




NTS



NTS



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project title	
titre du projet	
HAMILTON	ONTARIO
BURLINGTON CANAL	
VERTICAL LIFT BRIDGE	
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES	

drawing title	titre du dessin
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4	4
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100	100

GATE DETAILS 1

drawn by
dessine par J. Perez

designed by
conc par G. Patino/B. Crouthamel

approved by	
approuve par	M.

bid soumission	A. Ghubril	project manager administrateur de projets
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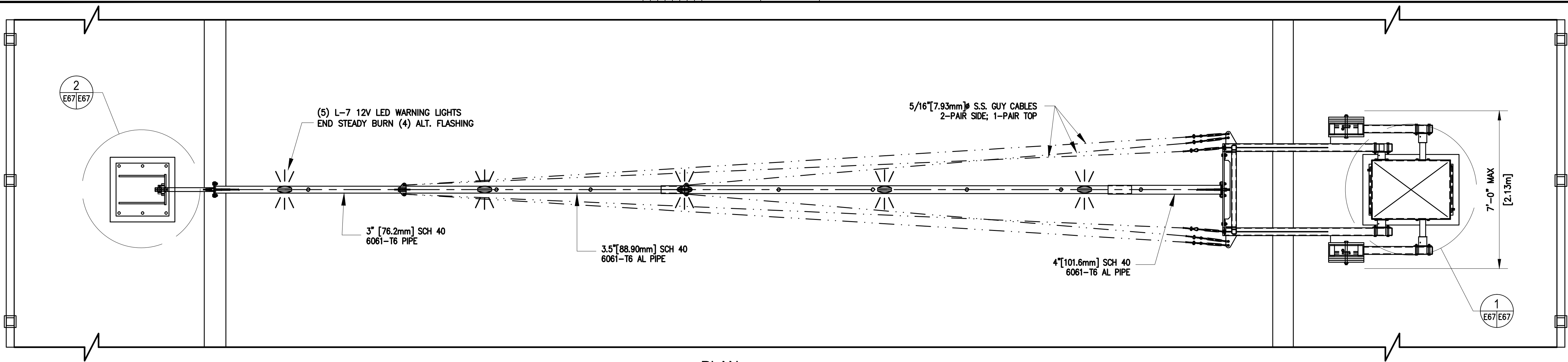
project date date du projet	2013-05-31
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project no.
no. du projet

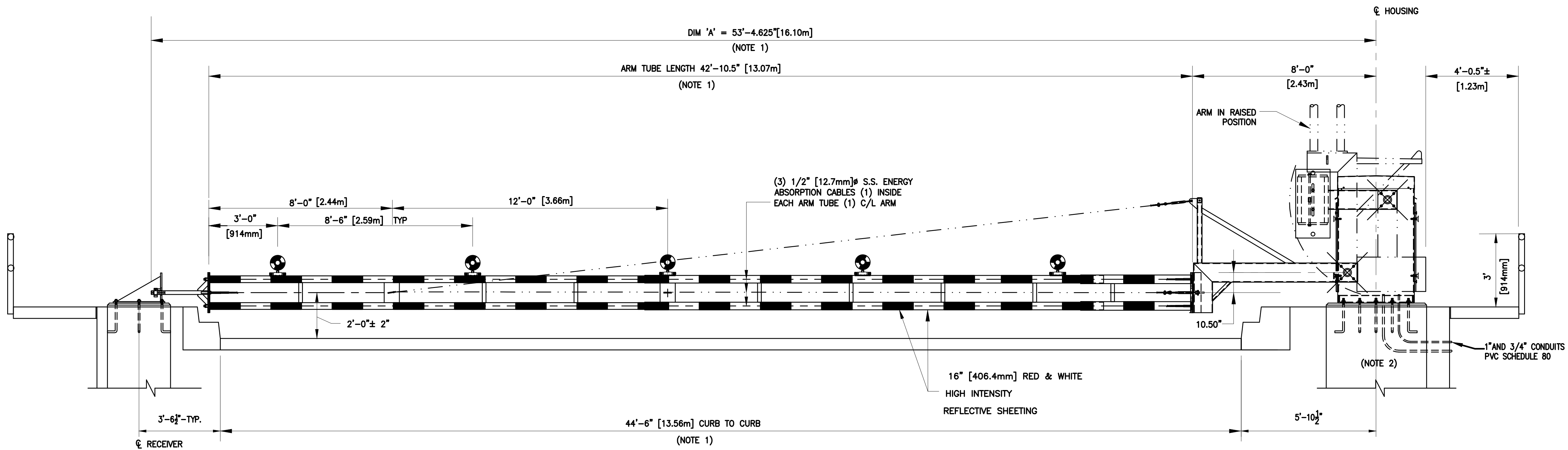
R.012641.001

drawing no.
dessine no.

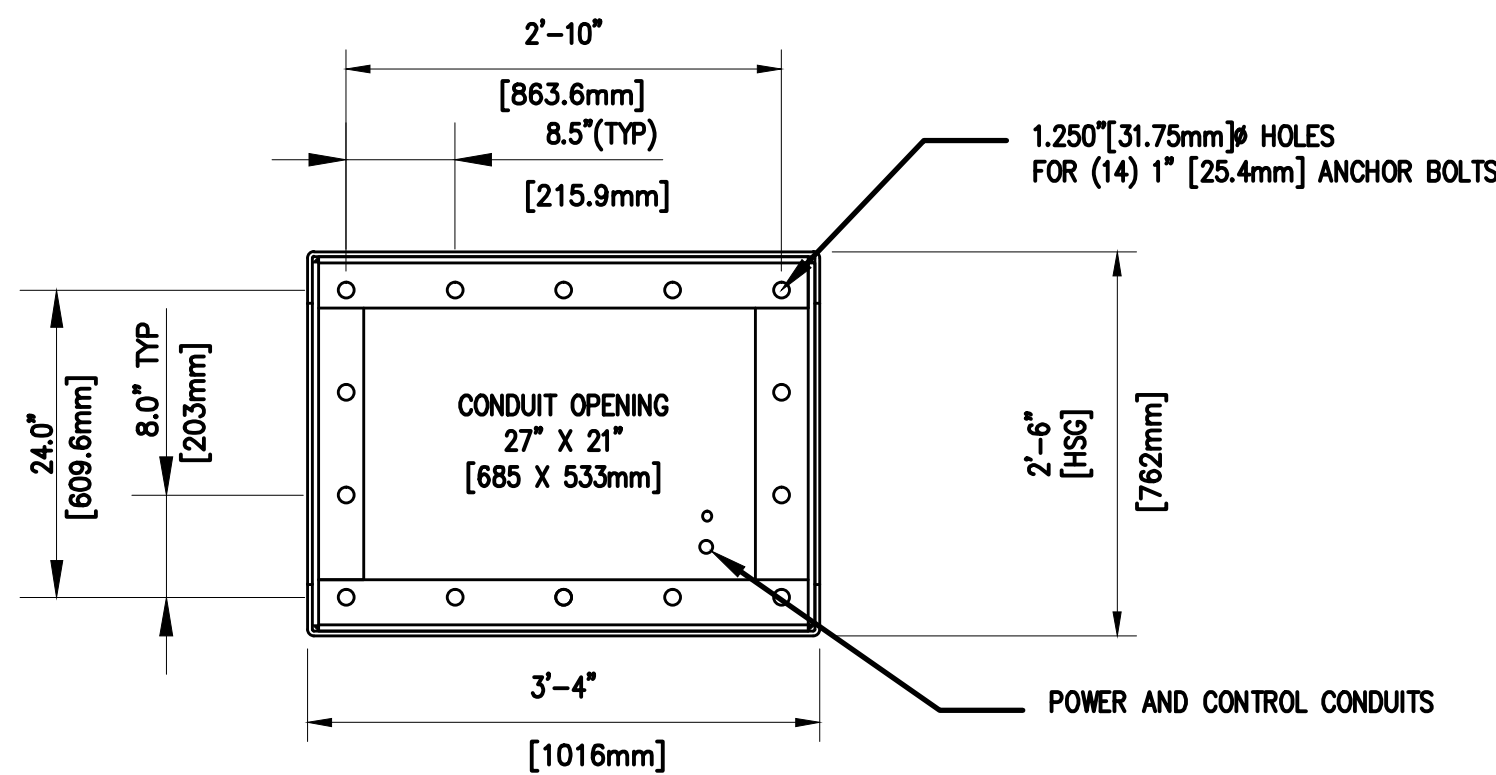
F-66



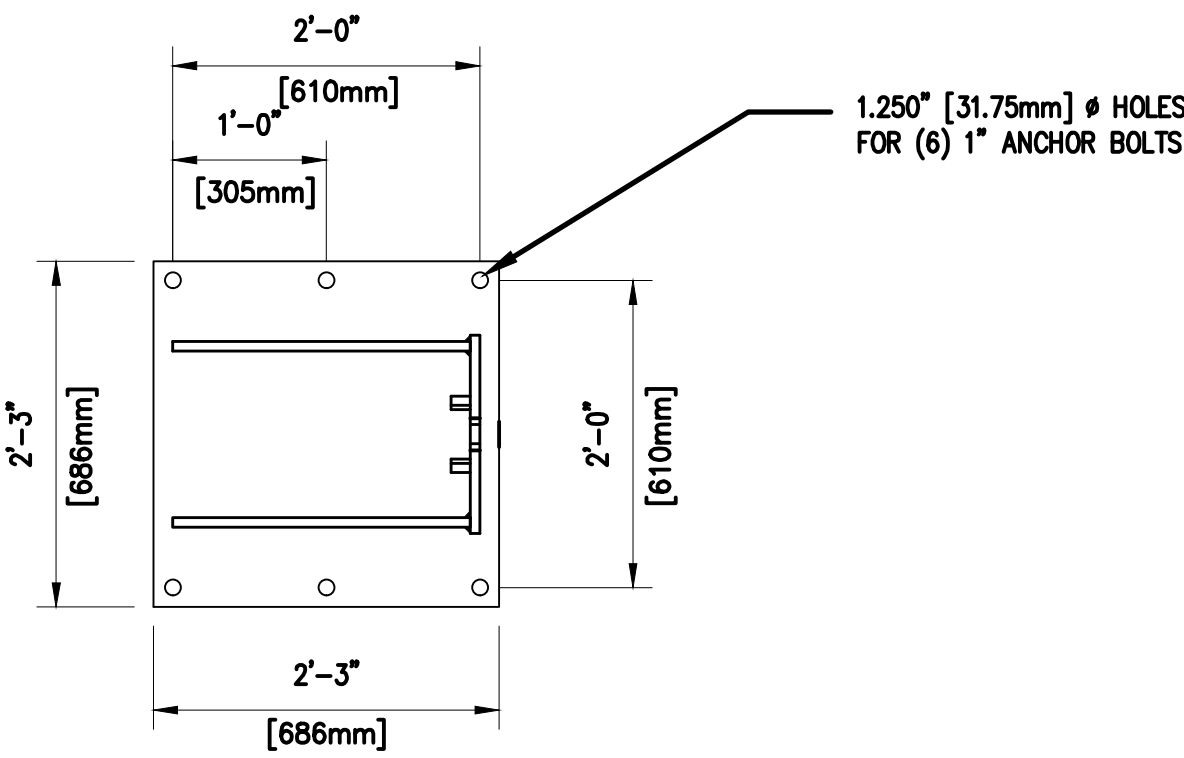
PLAN



ELEVATION



1 E67/E67
DETAIL
OPERATOR HOUSING



2 E67/E67
DETAIL
RECEIVER SOCKET

BARRIER GATE DETAILS

NTS

NOTES:

1. FINAL ANCHOR BOLTS AND FINAL DIMENSIONS NOTED TO BE VERIFIED BY CONTRACTOR AND SUBMITTED IN SHOP DRAWINGS BASED ON FINAL FIELD CONDITIONS, FOUNDATION ALIGNMENTS, AND GATE MANUFACTURERS.
2. SEE STRUCTURAL DRAWINGS FOR GATE HOUSING FOUNDATION DETAIL.

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project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

GATE DETAILS 2

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

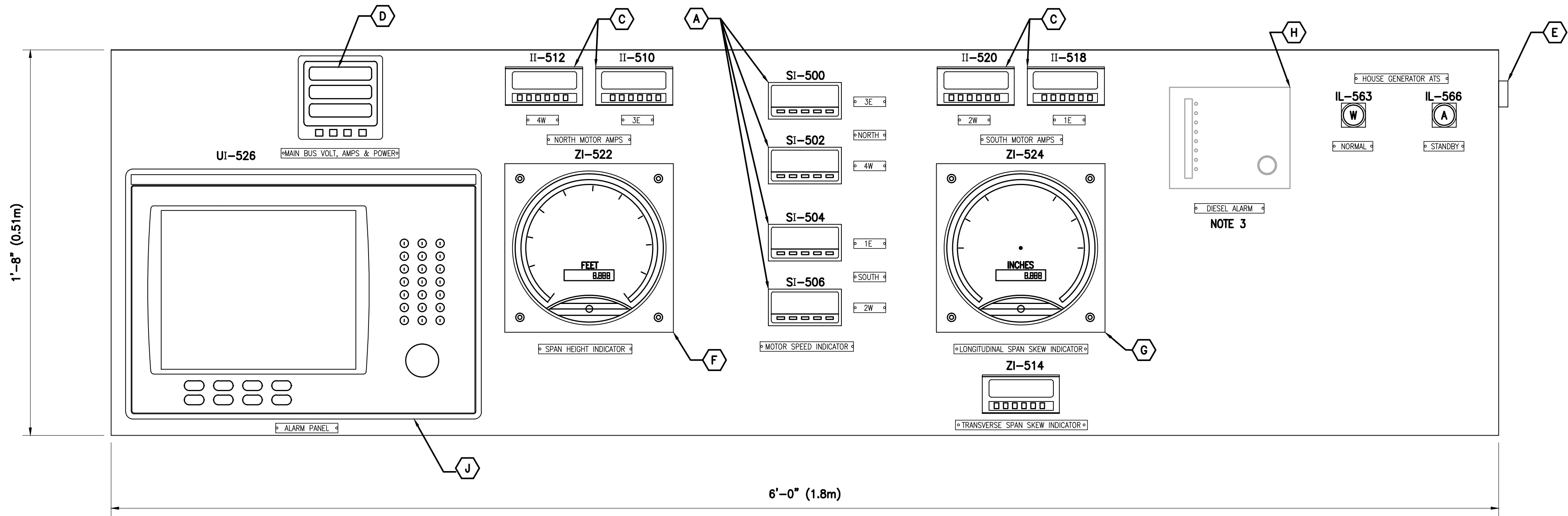
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

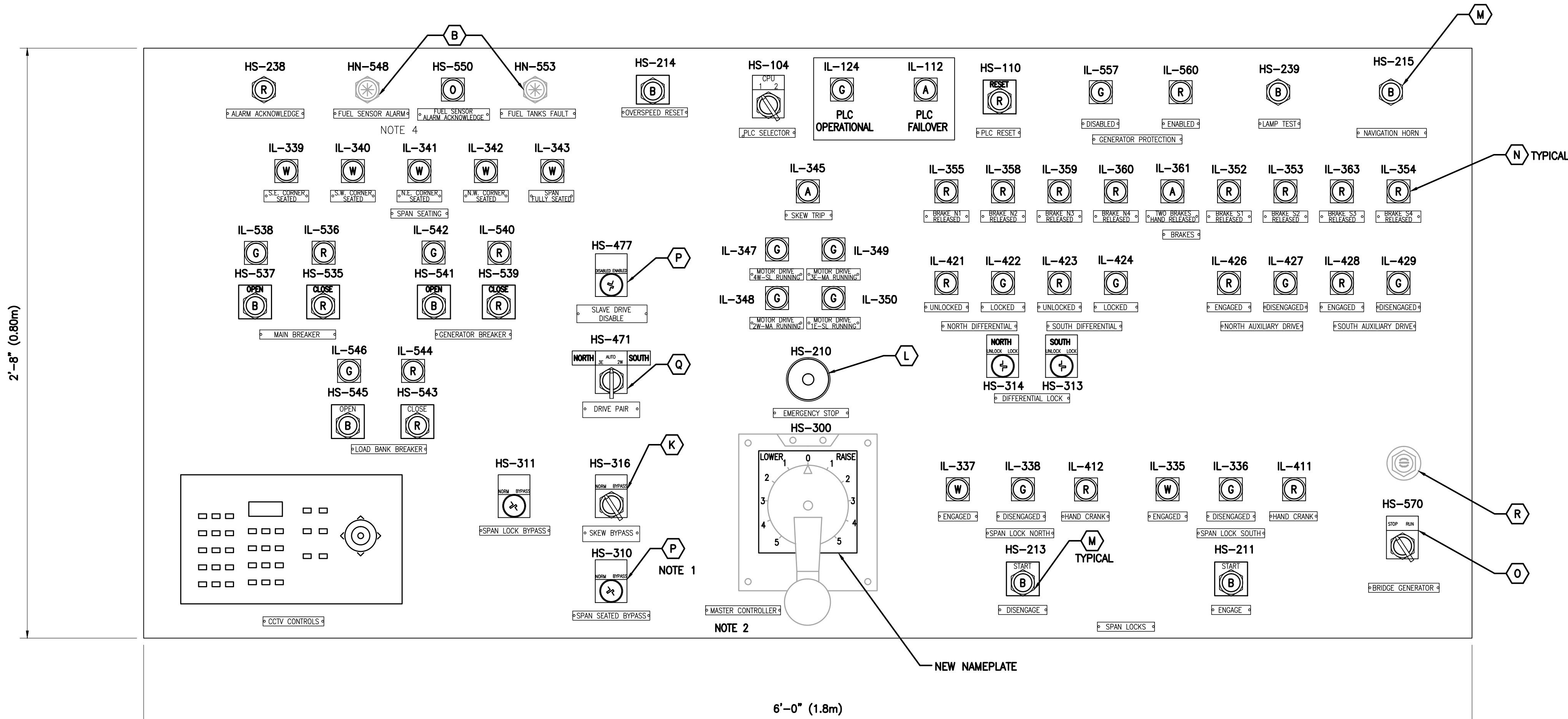
project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-67



MAIN CONTROL CONSOLE TOP PANEL (CP-1)

SCALE 3"=1'-0"



MAIN CONTROL CONSOLE BOTTOM PANEL (CP-1)

SCALE 3"=1'-0"

COMPONENT LIST

- A TACHOMETER
- B EXISTING 30 MM BUZZER
- C AMMETER
- D POWER & ENERGY METER-EPM 9000
- E ETHERNET PORT
- F LED SPAN POSITION INDICATOR - BG-261TC (LED)
- G LED SPAN SKEW INDICATOR - BG-261TC (LED)
- H EXISTING 600KW DIESEL ALARM PANEL
- I 15 INCH OPERATOR GRAPHIC TOUCH SCREEN HUMAN MACHINE INTERFACE (HMI) PLUS 6-1500 (WITH WIRELESS MOUSE) 6" DEEP GLARE REDUCING SHROUDED BEZEL
- J 2 POSITION MOMENTARY SPRING LOADED SWITCH WITH LEVER OPERATOR
- K 63 MM 2-POSITION PUSH-PULL SWITCH. MAINTAIN POSITION MUSHROOM TYPE.
- L 30.5 MM CONTACT PUSH BUTTON
- M 30.5 MM PILOT LIGHT
- N 2 POSITION MAINTAIN SWITCH WITH LEVER OPERATOR, 30.5 mm
- O 2 POSITION MOMENTARY SPRING LOADED CYLINDER LOCK OPERATOR, 30.5 mm, NOTE 1
- P 3 POSITION MAINTAINED SELECTOR SWITCH, 30.5 mm, LEVER OPERATOR
- R EXISTING MARINE RADIO PLUG

LEGEND

INDICATING LIGHTS

- R RED
- G GREEN
- A AMBER
- B BLUE
- O ORANGE
- W WHITE

PUSH BUTTONS

- B BLACK
- R RED

NOTE

- ALL KEYLOCK BYPASS SWITCHES HAVE MOMENTARY ACTION SPRING LOADED RETURN TO NORMAL POSITION.
- EXISTING MASTER CONTROLLER TO BE INSTALLED IN NEW MAIN CONTROL BOTTOM PANEL.
- EXISTING DIESEL ALARM DISPLAY TO BE INSTALLED IN NEW MAIN CONTROL TOP PANEL.
- EXISTING FUEL SENSOR ALARM BUZZER, FUEL TANK FAULTS BUZZER, AND ACKNOWLEDGE BUTTON ARE TO BE REUSED, FIELD INSTALLED AND WIRED.

Public Works and Government Services Canada
Architectural and Engineering Services
Ontario Region

Travaux publics et Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario

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CANADA M4P 1E4
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Professional Engineers
Ontario

Temporary Licensee

Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

2014-07-07



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project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
MAIN CONTROL CONSOLE
LAYOUT AND DETAILS

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

approved by
approuvé par M. VanDeRee

bid soumission project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-68

COMPONENT LIST

- (A) 30.5 MM PILOT LIGHT
(B) 30.5 MM PUSH BUTTON
(C) HEAVY DUTY PISTOL GRIP TYPE W
(D) CCTV AND ACCESS CONTROL
(E) ETHERNET PORT
(F) SIDE PANEL 36"x28" [914x710mm]
(G) REAR PANEL
(H) EXISTING P.A. SYSTEM
(I) DESK CONSOLE
(J) PLC/MAINTENANCE KEY SWITCH
(K) 4" WIREWAY
(L) 70 TERMINAL BLOCKS
(M) FOOT SWITCH FS-208
(N) VENTILATION GRILL

LEGEND

INDICATING LIGHTS

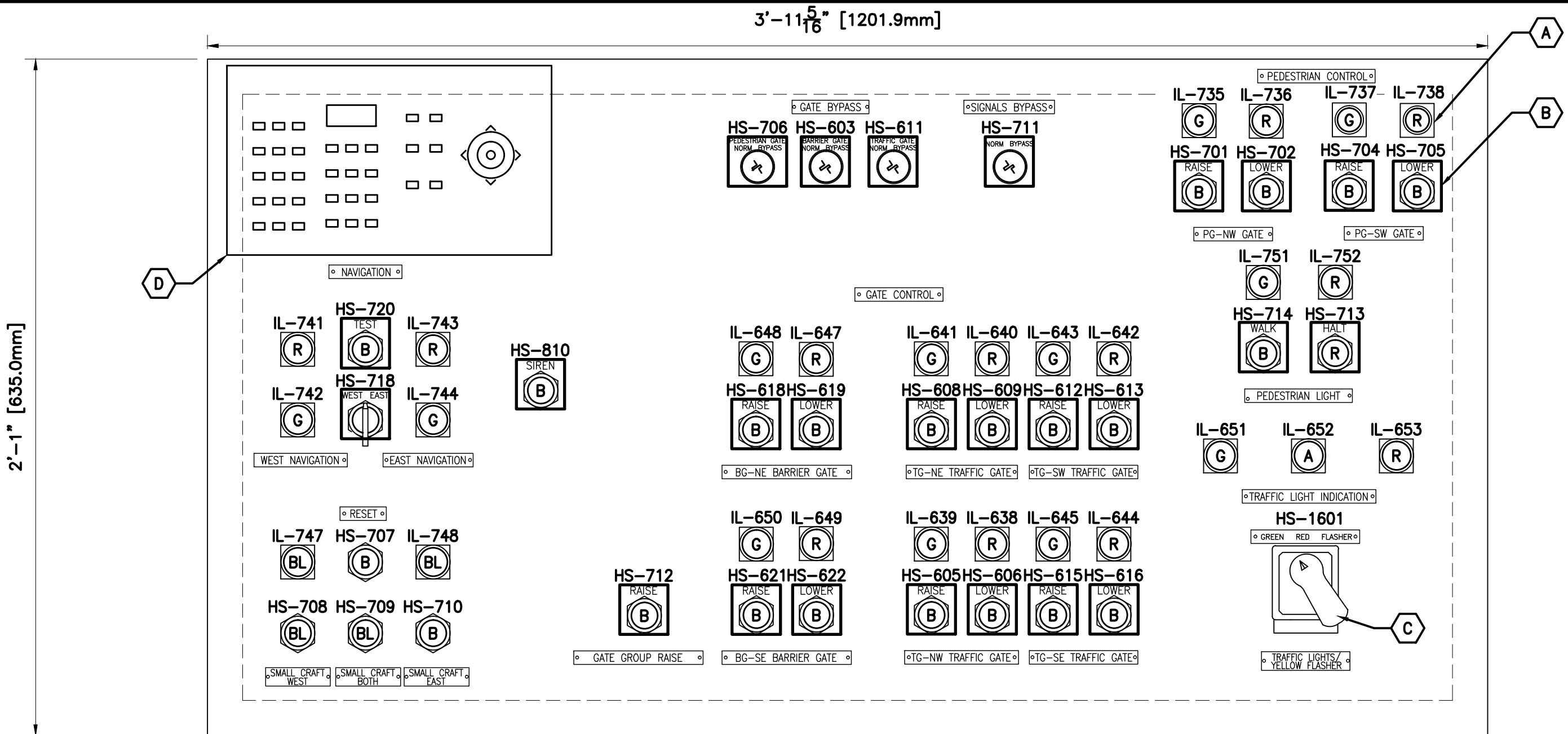
- (R) RED
(G) GREEN
(A) AMBER
(BL) BLUE
(O) ORANGE

PUSH BUTTONS

- (B) BLACK
(BL) BLUE

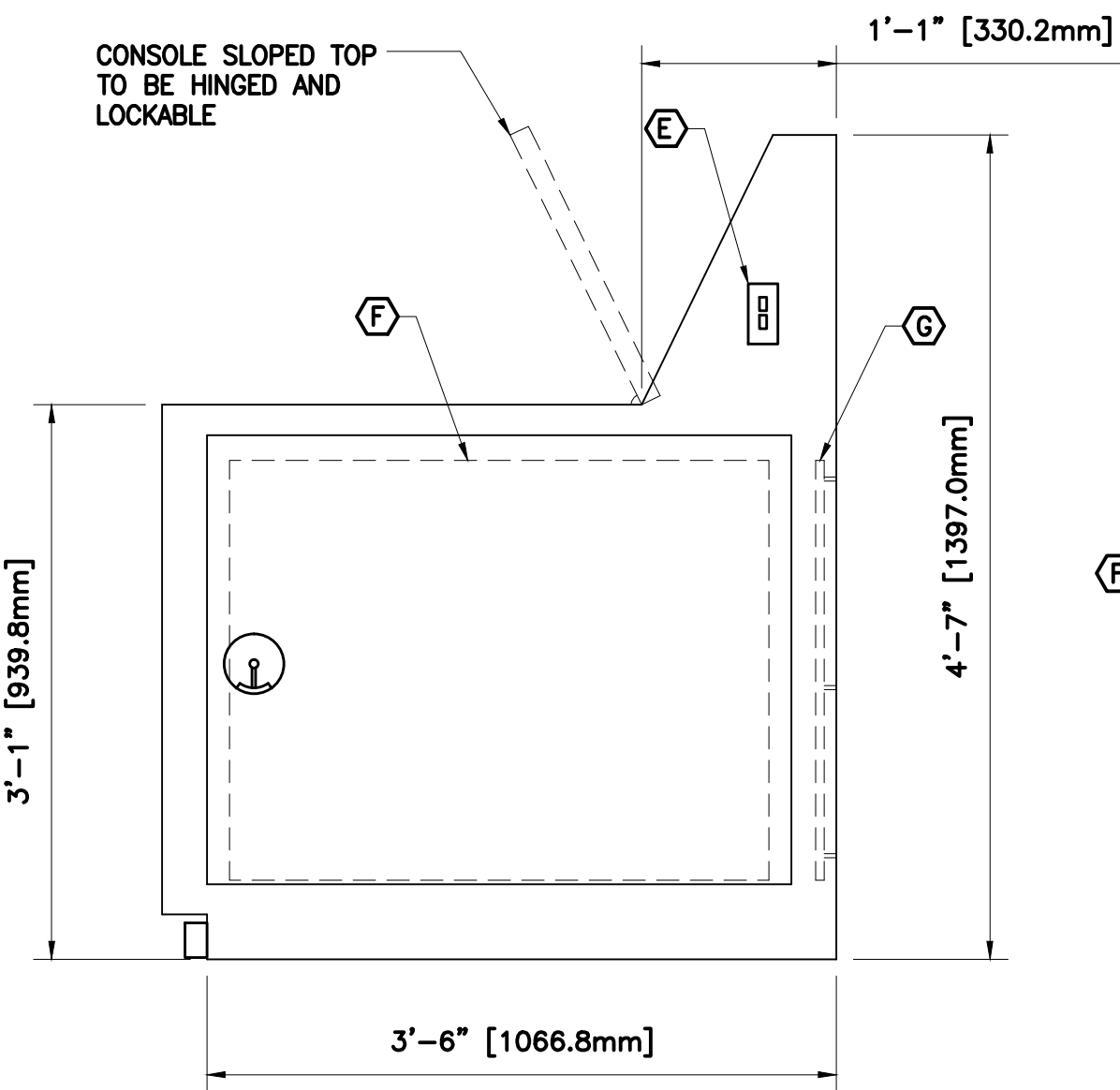
NOTE

1. ALL KEYLOCK BYPASS SWITCHES HAVE MOMENTARY ACTION SPRING LOADED RETURN TO NORMAL POSITION.



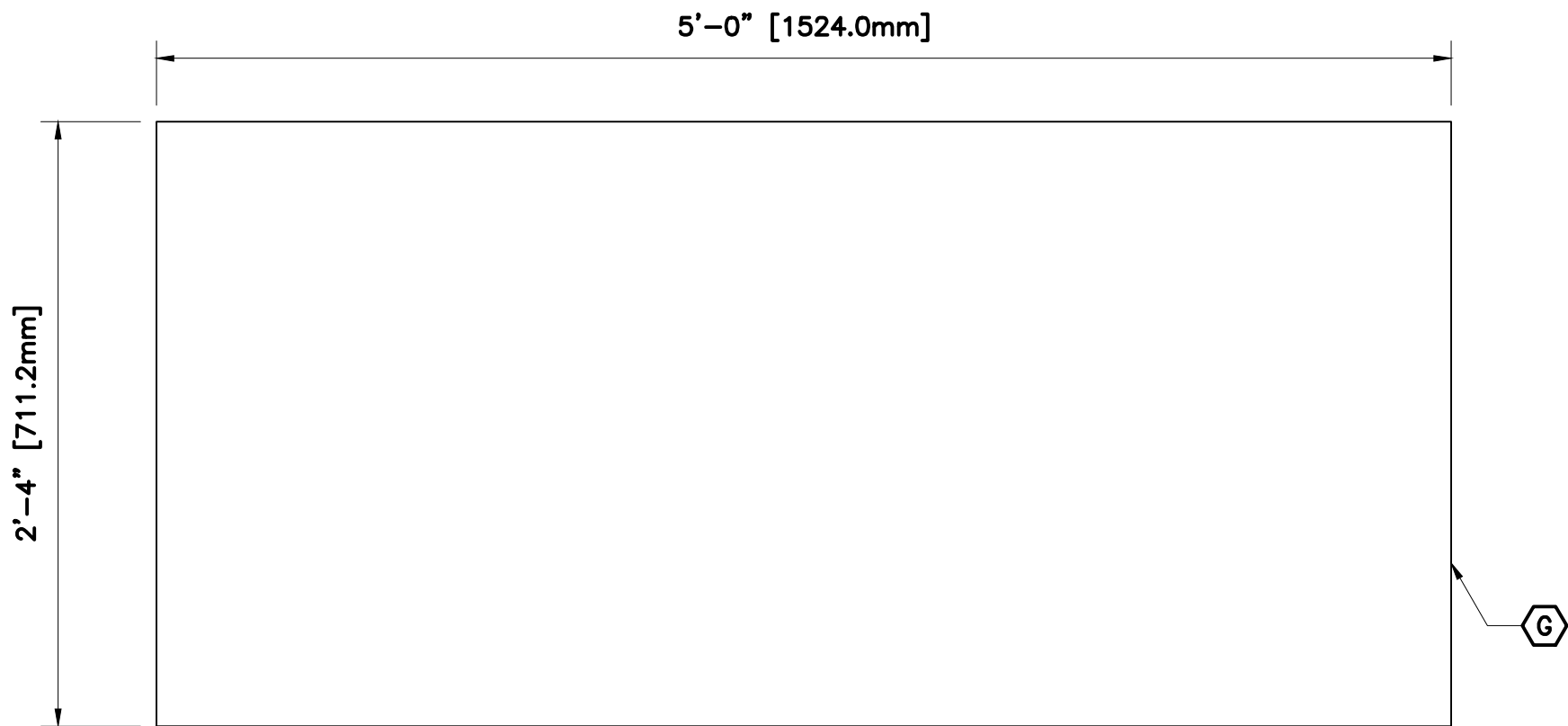
PLAN
NAVIGATION, PEDESTRIAN SIGNAL AND TRAFFIC
SYSTEM CONTROL CONSOLE (CP-5)

SCALE 3"=1'-0" 0 0.5 1ft.



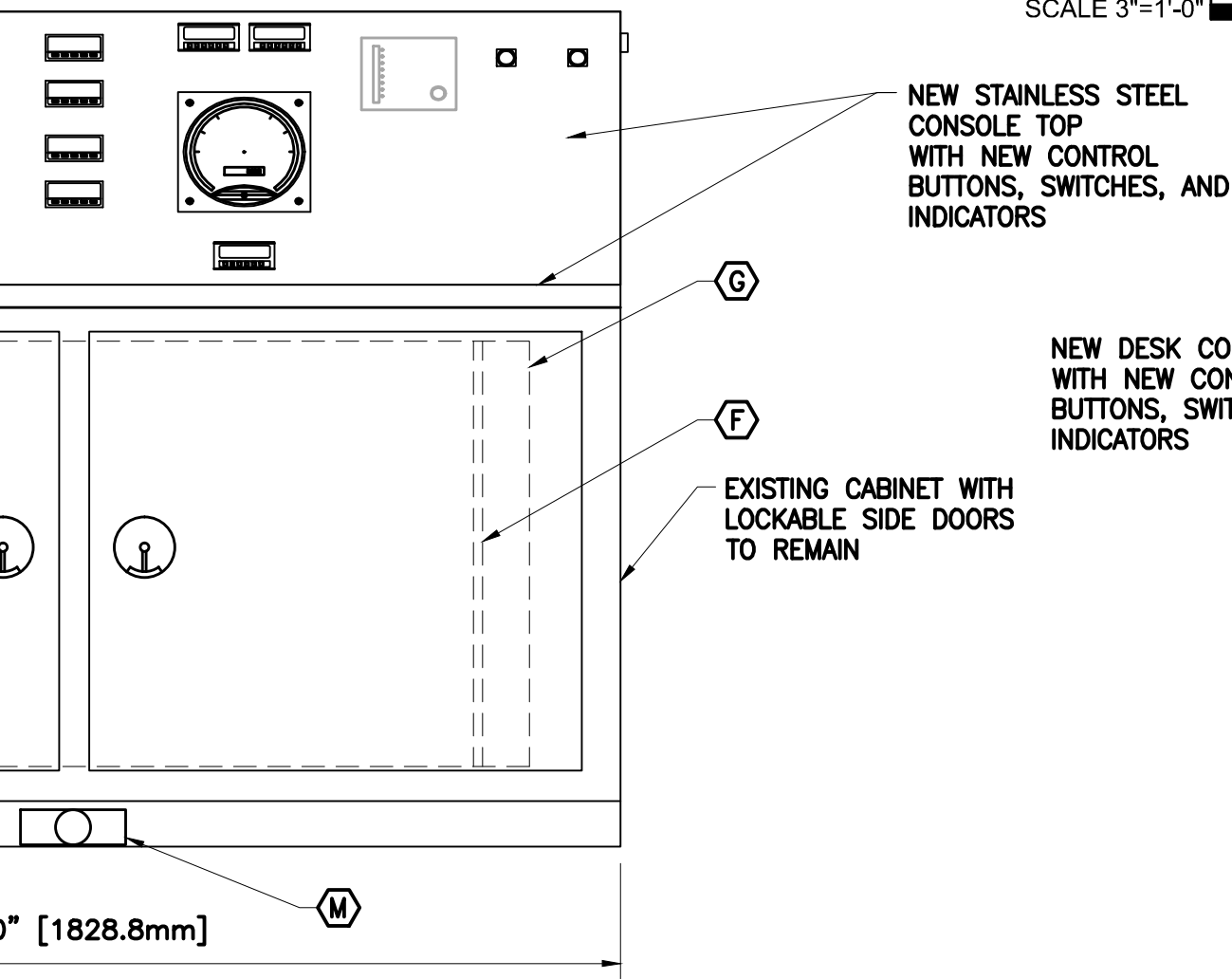
MAIN CONTROL CONSOLE (CP-1)

SCALE 1"=1'-0" 0 1 2 3ft.



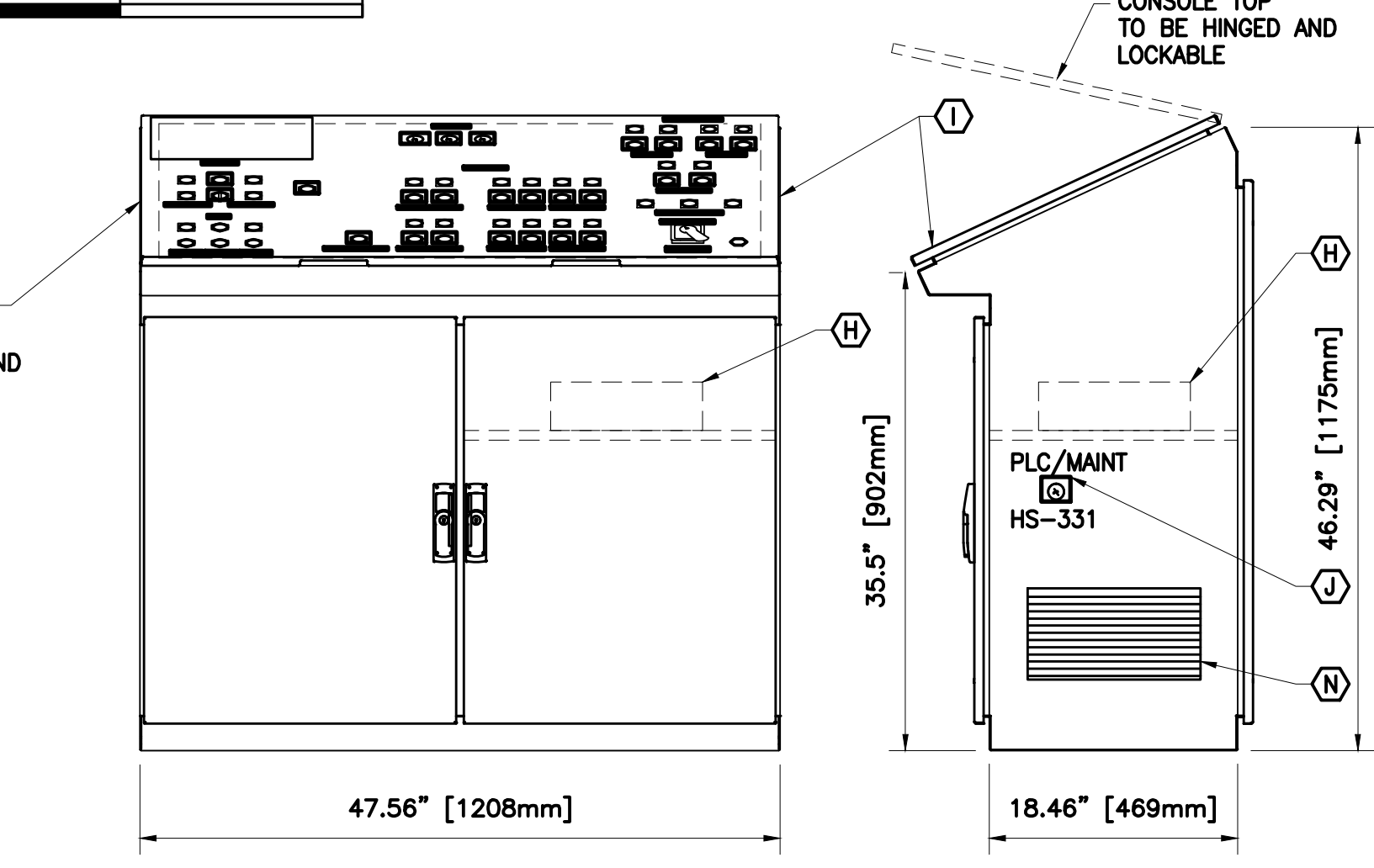
MAIN CONTROL CONSOLE (CP-1) REAR PANEL

SCALE 1 1/2"=1'-0" 0.5 0 1ft.



MAIN CONTROL CONSOLE (CP-1) RIGHT SIDE PANEL

SCALE 1 1/2"=1'-0" 0.5 0 1ft.



MAIN CONTROL CONSOLE (CP-1) LEFT SIDE PANEL

SCALE 1 1/2"=1'-0" 0.5 0 1ft.

NAVIGATION, PEDESTRIAN SIGNAL AND TRAFFIC
SYSTEM CONTROL CONSOLE (CP-5)

SCALE 1"=1'-0" 0 1 2 3ft.

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Ontario**

Temporary Licensee

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Collaborator: Zvonko Trajkovic, P. Eng.
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project title
titre du projet
**HAMILTON BURLINGTON CANAL
VERTICAL LIFT BRIDGE**
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
**MAIN CONSOLE,
TRAFFIC CONTROL AND
NAVIGATION LIGHT CONSOLE**

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

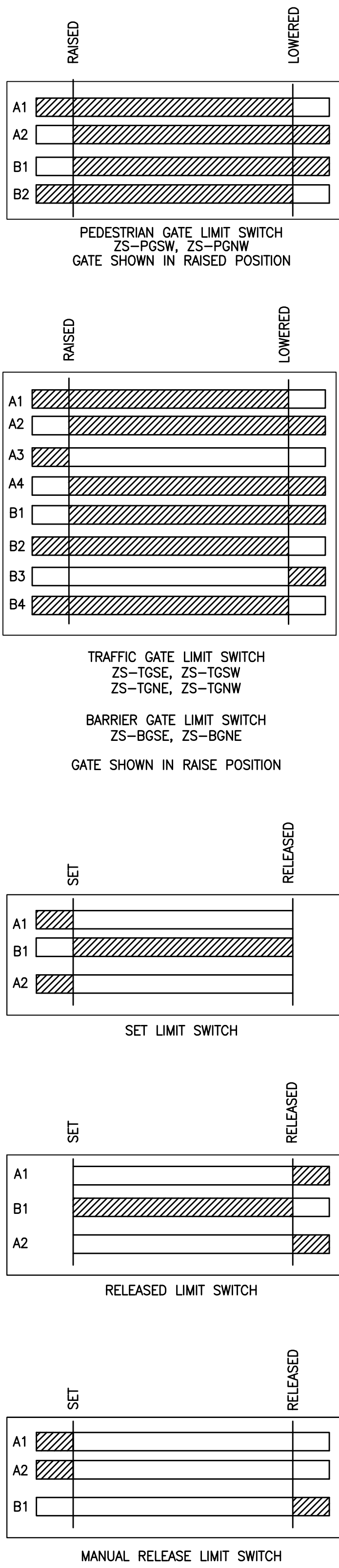
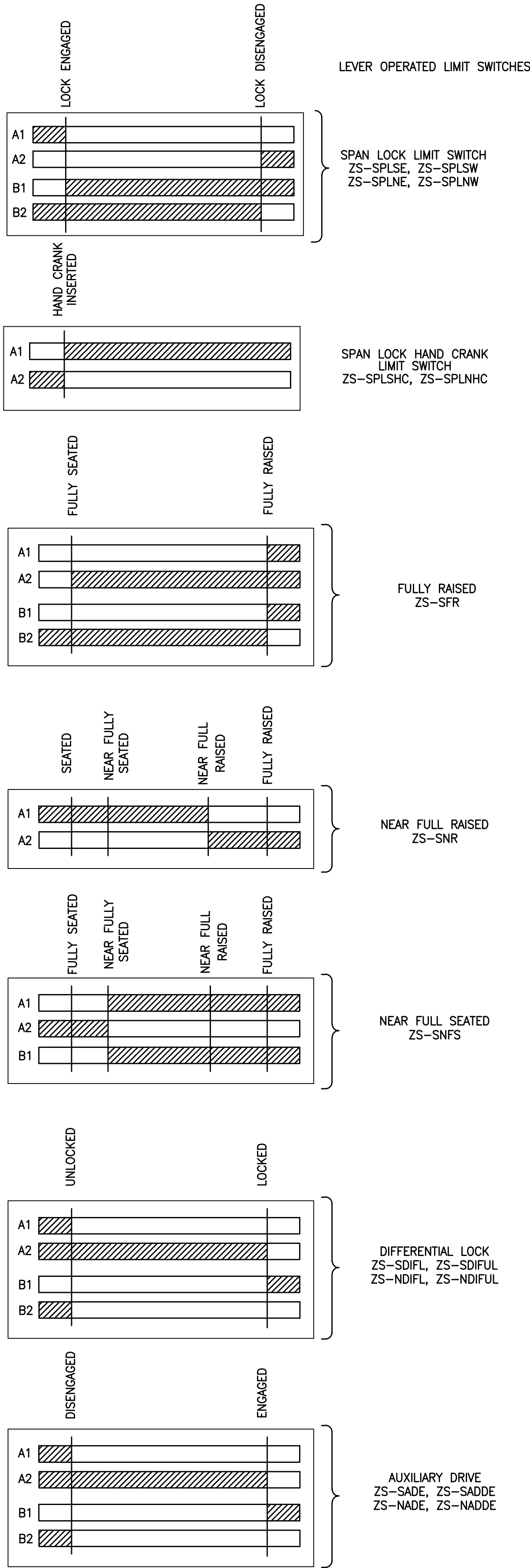
approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

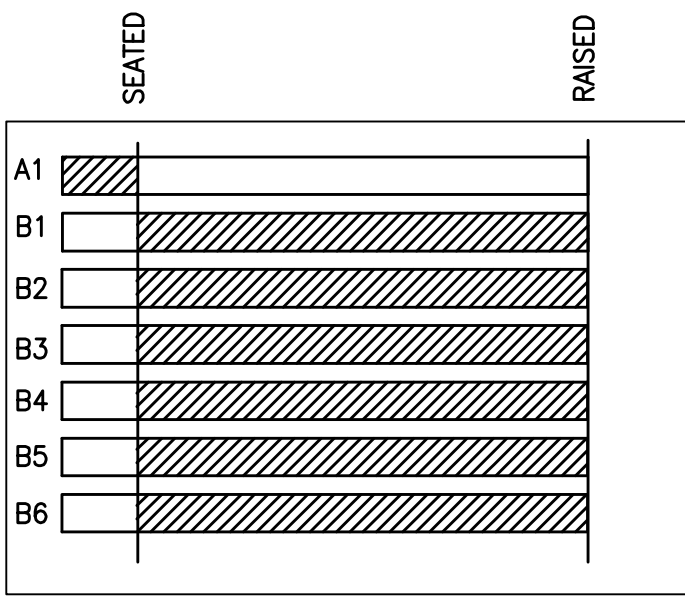
drawing no.
dessiné no. E-69



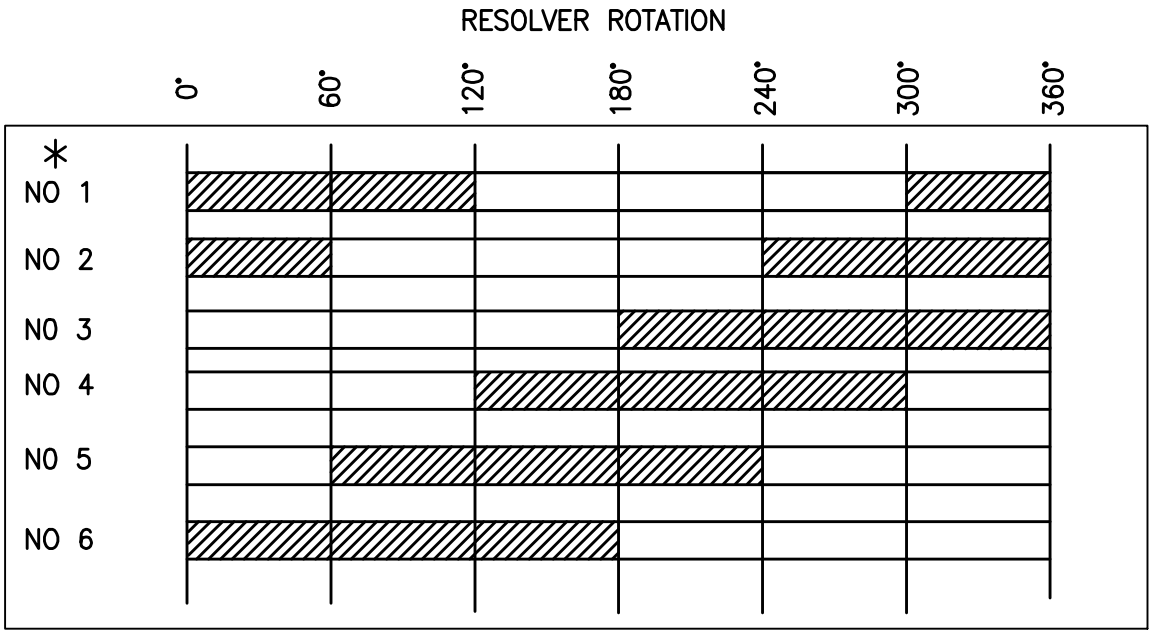
LEVER OPERATED
MOTOR BRAKE LIMIT SWITCHES
ZS-MOBSS1, ZS-MOBSS4, ZS-MOBSN1, ZS-MOBSN4
MACHINERY BRAKE LIMIT SWITCHES
ZS-MABSS2, ZS-MABSS3, ZS-MABSN2, ZS-MABSN3

MOTOR BRAKE LIMIT SWITCHES
ZS-MOBRs1, ZS-MOBRs4, ZS-MOBRN1, ZS-MOBRN4
MACHINERY BRAKE LIMIT SWITCHES
ZS-MABRS2, ZS-MABRS3, ZS-MABRN2, ZS-MABRN3

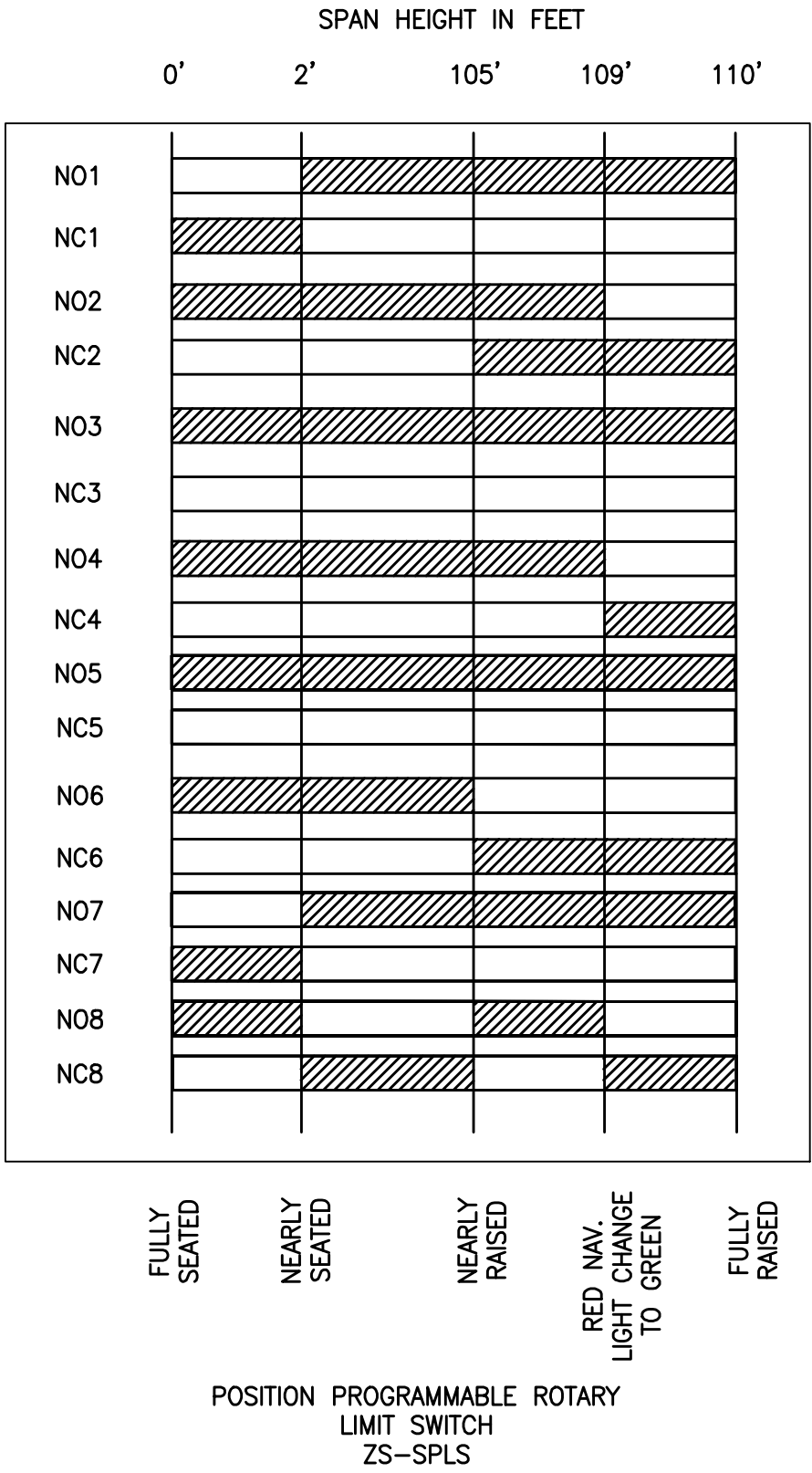
MOTOR BRAKE LIMIT SWITCHES
ZS-MOBMRS1, ZS-MOBMRS4, ZS-MOBMRN1, ZS-MOBMRN4
MACHINERY BRAKE LIMIT SWITCHES
ZS-MABMRS2, ZS-MABMRS3, ZS-MABMRN2, ZS-MABMRN3



LEVER OPERATED
FULLY SEATED LIMIT SWITCH
ZS-SWFS, ZS-SEFS
ZS-NWFS, ZS-NEFS
BRIDGE SHOWN IN SEATED
POSITION



ULTIMATE SKEW PROGRAMMABLE
ROTARY LIMIT SWITCH
ZS-SUSK-*, ZS-NUSK-*



NEAR FULLY SEATED
SPEED 1

NEAR FULLY RAISED
SPEED 1

FULL RAISED
STOP

NAVIGATION SIGNAL
RED TO GREEN
(SOUTH ONLY)

FULL RAISED

NEAR FULLY RAISED

NEAR FULLY SEATED



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**HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**

drawing title
titre du dessin
LIMIT SWITCH DEVELOPMENT

drawn by
dessiné par
J. Perez

designed by
conc par
G. Patino/B. Crouthamel

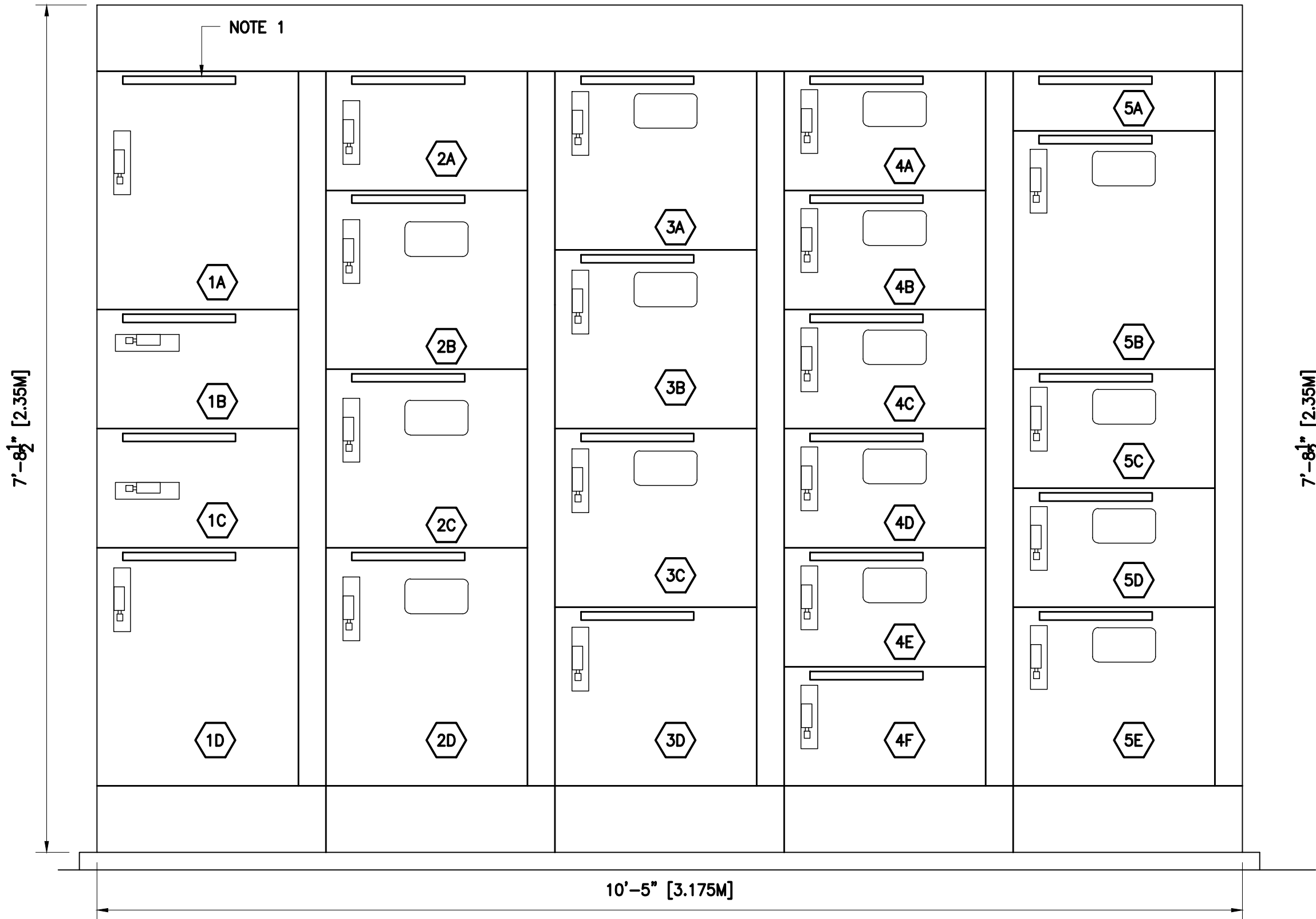
approved by
approuvé par
M. VanDeRee

bid
soumission
A. Ghubril project manager
administrateur
de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

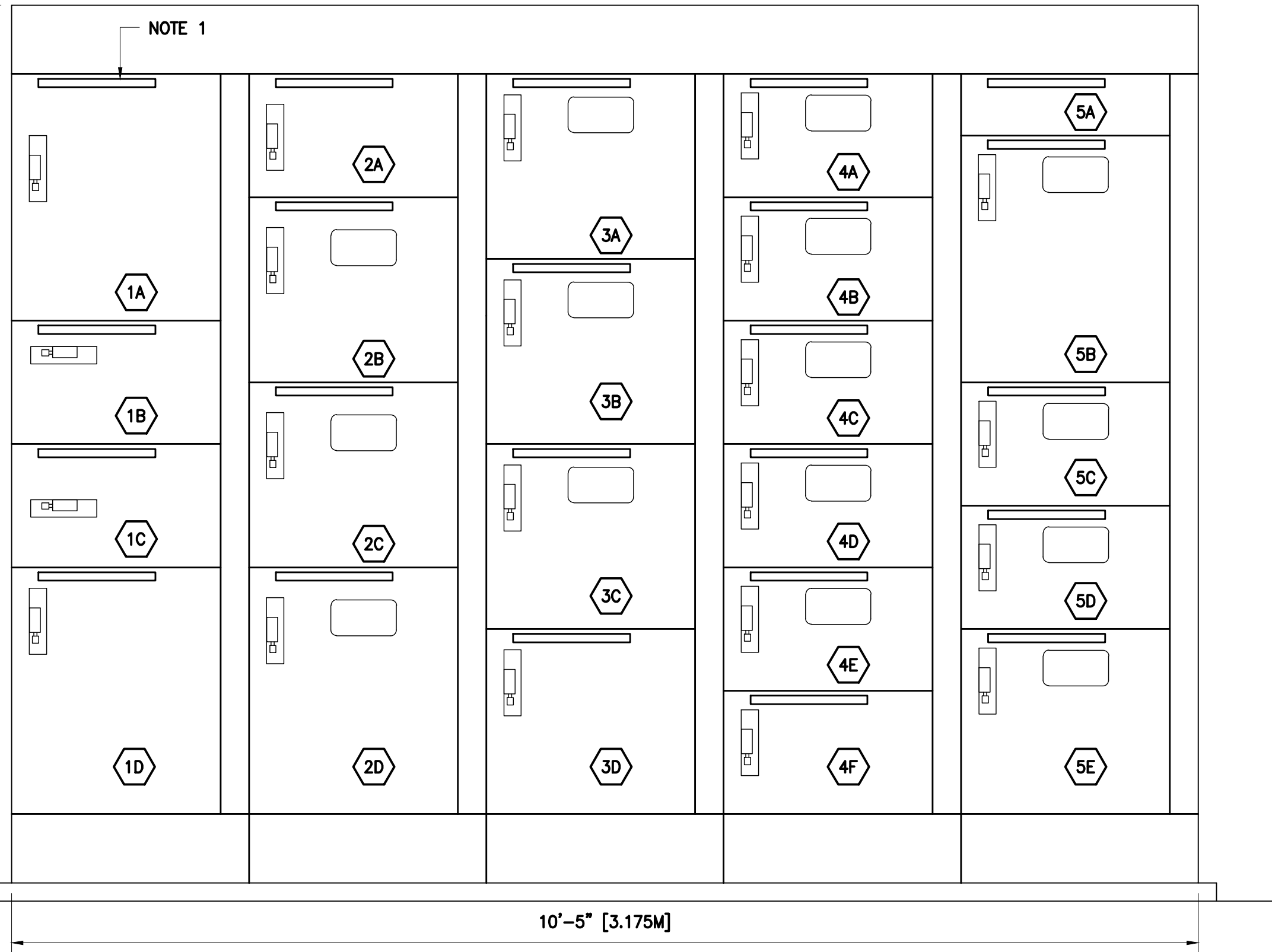
drawing no.
dessiné no.
E-74



SOUTH MOTOR CONTROL CENTRE
SCALE: 1"=1'-0"

SOUTH MCC SCHEDULE

UNIT LOC	NAMEPLATE DESIGNATION	UNIT TYPE	SIZE	HP	FRAME AMPS	TRIP AMPS
1A	600 AMP MCB	MAIN BREAKER			600	600
1B	LP-2	BREAKER			100	20
1C	SOUTH PIER LIGHTHOUSE POWER VECTOR DRIVE E1-SL	BREAKER		200	400	350
2A	DIFFERENTIAL LOCK, DIFL-S	MCP FVR	1	1/2		18
2B	1/2 HP REVERSING PG-SW	MCP FVNR	1	1/2		18
2C	20 HP AUX DRIVE MOTOR	BREAKER		20	100	60
2D	VECTOR DRIVE 2W-MA	BREAKER		200	400	350
3A	5 HP REVERSING SPAN LOCK	MCP FVR	1	5		90
3B	1.5 HP REVERSING BG-SE	MCP FVR	1	1.5		30
3C	1 HP REVERSING TG-SE	MCP FVR	1	1		18
3D	1 HP REVERSING TG-SW	MCP FVR	1	1		18
4A	CONTROLNET TO DEVICENET LINKING UNIT					
4B	1/3 HP MOTOR BRAKE S1	MCP FVNR	1	1/3		18
4C	3/4 HP MACHINERY BRAKE S2	MCP FVNR	1	3/4		18
4D	3/4 HP MACHINERY BRAKE S3	MCP FVNR	1	3/4		18
4E	1/3 HP MACHINERY BRAKE S4	MCP FVNR	1	1/3		18
4F	ELEVATOR	BREAKER			100	50
5A	SPACE (DOOR)					
5B	MACHINE ROOM SPACE HEATER	BREAKER			100	60
5C	MOTOR BLOWER BL-1E	MCP FVNR	1	3	100	42
5D	MOTOR BLOWER BL-2W	MCP FVNR	1	3	100	42
5E	NETWORK POWER SUPPLY UNIT	POWER SUPPLY			150	




NORTH MOTOR CONTROL CENTRE
SCALE: 1"=1'-0"

NORTH MCC SCHEDULE

UNIT LOC	NAMEPLATE DESIGNATION	UNIT TYPE	SIZE	HP	FRAME AMPS	TRIP AMPS
1A	600 AMP MCB	MAIN BREAKER			600	600
1B	LP-4	BREAKER			100	15
1C	LP-3	BREAKER			100	20
1D	VECTOR DRIVE 3E-MA	BREAKER		200	400	350
2A	DIFFERENTIAL LOCK DIFL-N	MCP FVR	1	1/2		18
2B	1/2 HP REVERSING PG-NW	MCP FVR	1	1/2		18
2C	20 HP AUX DRIVE MOTOR	BREAKER		20	100	60
2D	VECTOR DRIVE 4W-SL	BREAKER		200	400	350
3A	5 HP REVERSING SPAN LOCK	MCP FVR	1	5		90
3B	1.5 HP REVERSING BG-NE	MCP FVR	1	1.5		30
3C	1 HP REVERSING TG-NE	MCP FVR	1	1		18
3D	1 HP REVERSING TG-NW	MCP FVR	1	1		18
4A	CONTROLNET TO DEVICENET LINKING UNIT					
4B	1/3 HP MOTOR BRAKE N1	MCP FVNR	1	1/3		18
4C	3/4 HP MACHINERY BRAKE N2	MCP FVNR	1	3/4		18
4D	3/4 HP MACHINERY BRAKE N3	MCP FVNR	1	3/4		18
4E	1/3 HP MOTOR BRAKE N4	MCP FVNR	1	1/3		18
4F	ELEVATOR	BREAKER			100	50
5A	SPACE (DOOR)					
5B	MACHINE ROOM SPACE HEATER	BREAKER			100	60
5C	MOTOR BLOWER BL-3E	MCP FVNR	1	3	100	42
5D	MOTOR BLOWER BL-4W	MCP FVNR	1	3	100	42
5E	NETWORK POWER SUPPLY UNIT	POWER SUPPLY			150	

NOTES:
1. PROVIDE NAMEPLATE FOR EACH COMPARTMENT-TYPICAL




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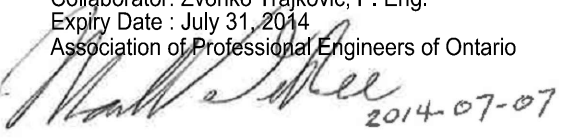



Professional Engineers Ontario

Temporary Licensee

Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

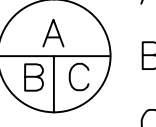
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date : July 31, 2014
Association of Professional Engineers of Ontario


2014-07-07



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dessin no. - où détail exigé
C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet

HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

ONTARIO

drawing title
titre du dessin

ELECTRICAL EQUIPMENT ELEVATIONS

drawn by
dessiné par

J. Perez

designed by
conc par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur de projets

project date
date du projet

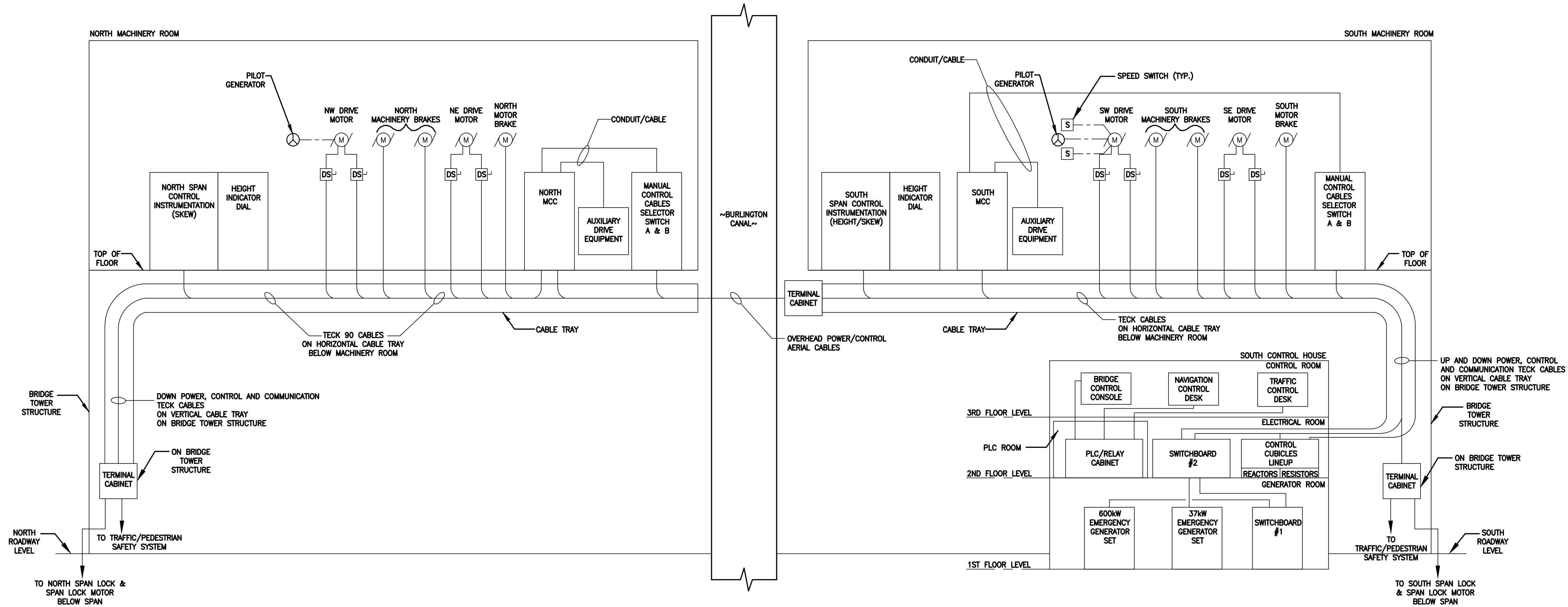
2013-05-31

project no.
no. du projet

R.012641.001

drawing no.
dessiné no.

E-76





EXISTING NORTH & SOUTH BRIDGE
ELECTRICAL OPERATING SYSTEMS DIAGRAM
(TO REMAIN OPERATIONAL UNTIL MAIN DRIVE DEMOLITION BEGINS,
SEE SEQUENCE NOTES ON SPECIFICATIONS)

- NOTES:
1. FOR NEW BRIDGE CONDUIT ROUTING DIAGRAMS, SEE DWG. E-78 AND E-79.



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titre du projet
**HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**

drawing title
titre du dessin
**EXISTING NORTH & SOUTH
BRIDGE ELECTRICAL OPERATING
SYSTEMS DIAGRAM**

drawn by
dessiné par D. Buro

designed by
conc par D. Raffington/J. Chin

approved by
approuvé par M. VanDeRee

bid
soumission A. Ghubril project manager
administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-77



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Architectural and Engineering Services
Ontario Region

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Professional Engineers
Ontario

Temporary Licensee

Name: Mark VanDeRee
Number: 100181047-02

Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada


Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date : July 31, 2014
Association of Professional Engineers of Ontario

Mark VanDeRee 2014-07-02



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project title titre du projet	
HAMILTON	ONTARIO
BURLINGTON CANAL	
VERTICAL LIFT BRIDGE	
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES	

drawing title
titre du dessin

CONDUIT ROUTING DIAGRAM
NORTH

drawn by
dessine par

designed by conc par	D. Raffington/J. Chin
-------------------------	-----------------------

approved by
approuvé par M. VanDeRee

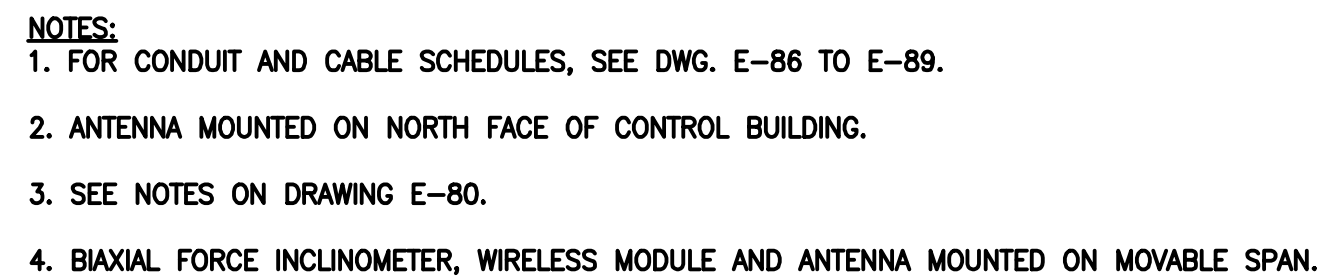
bid soumission	project manager administrateur de projets
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project date
date du projet 2013-05-31

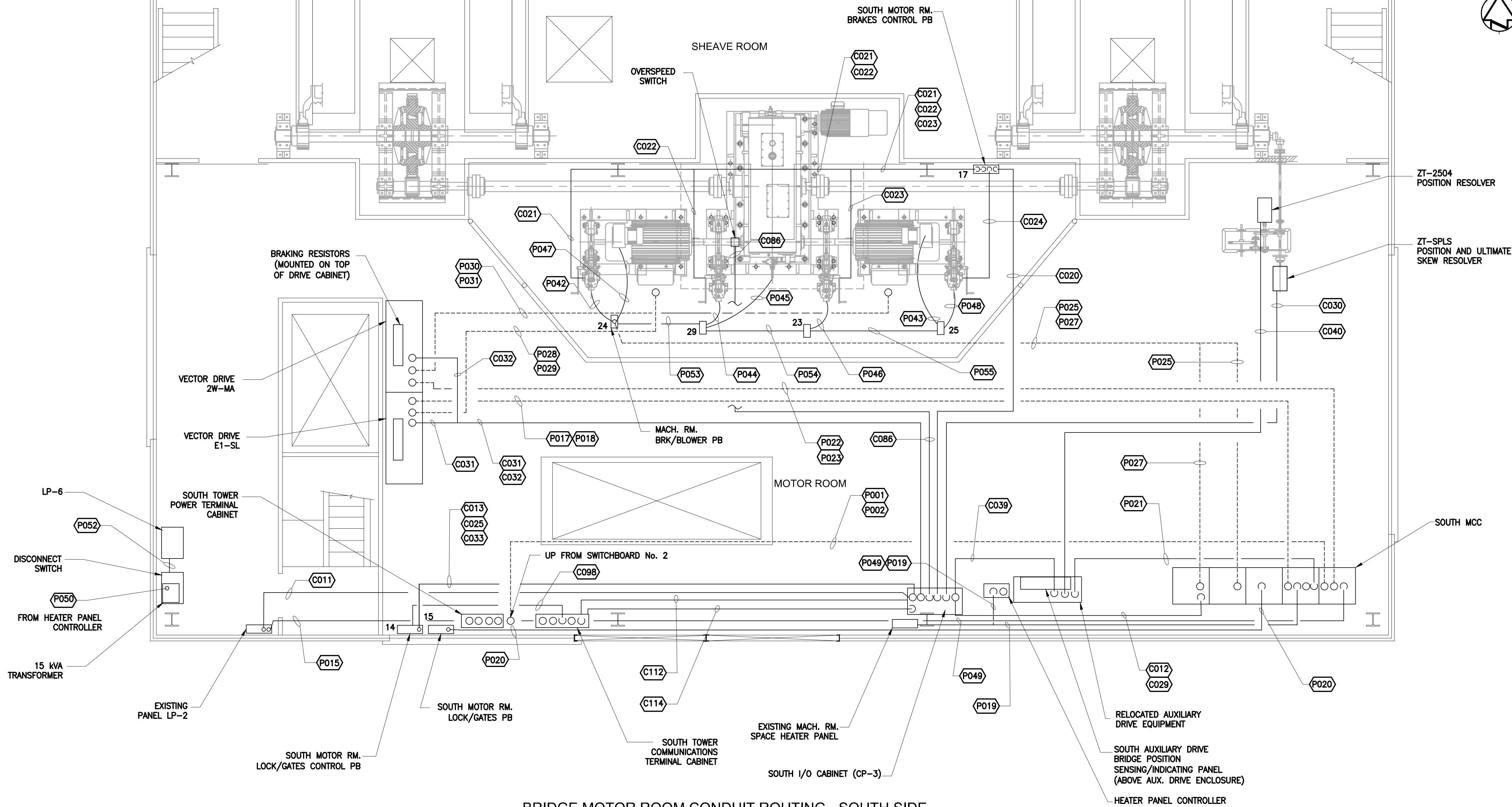
project no.
no. du projet

R.012641.001

drawing no.
dessine no. E-78



BRIDGE ELECTRICAL CONDUIT ROUTING DIAGRAM
SOUTH SIDE



BRIDGE MOTOR ROOM CONDUIT ROUTING - SOUTH SIDE

- NOTES:
1. ALL CONDUIT RUNS AND EQUIPMENT LOCATIONS, UNLESS SPECIFICALLY DIMENSIONED, ARE APPROXIMATE ONLY. EXACT LOCATION SHALL BE DETERMINED IN THE FIELD AND SHALL CLEAR ALL OBSTRUCTIONS.
 2. THE CONDUIT QUANTITY AND SIZES SHALL BE ADJUSTED TO ADEQUATELY SERVE THE MAKE AND MODEL OF FINAL EQUIPMENT.
 3. ALL CONDUIT ROUTING SHOWN ARE DIAGRAMMATIC. EXACT ROUTING OF ALL CONDUITS SHALL BE DETERMINED IN THE FIELD TO MINIMIZE LENGTH OF RUN AND NUMBER OF BOXES REQUIRED, AND AVOID PHYSICAL INTERFERENCES AND DUPLICATE RUNS. FIELD VERIFY THE LOCATIONS OF ALL ELECTRICAL EQUIPMENT.
 4. NOT ALL CONDUIT ROUTING ARE SHOWN ON THE PLAN. FOR ALL CONDUITS AND CABLE SIZES, REFER TO THE CONDUIT AND CABLE SCHEDULES, ON DRAWINGS E-87 THRU E-89.
 5. ALL ELECTRICAL PULL BOXES AND JUNCTION BOXES SHALL BE STAINLESS STEEL, TYPE 316 AND SHALL BE RATED NEMA 4X.
 6. ALL CONDUIT AND FITTING SHALL BE RIGID GALVANIZED STEEL PVC COATED.
 7. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL PULL BOXES REQUIRED TO FACILITATE THE ROUTING AND PULLING OF CONDUITS AND WIRES.
 8. WHENEVER THE NUMBER OF CONDUIT BENDS EXCEEDS 180° AND NO SPLICE IS INVOLVED, THE CONTRACTOR SHALL USE MOGUL TYPE FITTINGS.

- NOTES CONTINUED:
9. CONDUITS SHOWN DASHED ARE SURFACE MOUNTED UNDERNEATH THE MOTOR ROOM FLOOR AND STUBBED UP AT THE APPROXIMATE LOCATION SHOWN ON THE PLAN. SURFACE MOUNTED CONDUITS UNDERNEATH THE MOTOR ROOM FLOOR SHALL STAY CLEAR OF THE MOTOR ROOM HATCH DOOR.
 10. CONDUITS SHOWN SOLID ARE SURFACE MOUNTED INSIDE THE MOTOR ROOM. SURFACE MOUNTED CONDUITS INSIDE THE MOTOR ROOM SHALL STAY CLEAR OF THE EXISTING CRANE AND MOTOR ROOM HATCH DOOR.
 11. POWER FEEDERS P001 AND P002 GOING UP THE SOUTH TOWER STRUCTURE SHALL BE SURFACE MOUNTED UNDERNEATH THE MOTOR ROOM FLOOR AND STUBBED UP INSIDE THE SOUTH TOWER MCC. POWER FEEDERS P003, P004, P005, AND P006 GOING UP THE SOUTH TOWER STRUCTURE SHALL BE STUBBED UP AT THE LOCATION OF THE SOUTH TOWER POWER TERMINAL CABINET. POWER AERIAL FEEDERS P007, P008, P009, P010, P011, AND P012 LEAVING THE SOUTH TOWER POWER TERMINAL CABINET SHALL PENETRATE THE SOUTH MOTOR ROOM FLOOR, LAY ON THE EXISTING SOUTH TOWER CABLE TRAY, AND SUSPENDED FROM THE SOUTH TOWER TO THE NORTH TOWER. POWER AERIAL CABLES GOING TO THE NORTH TOWER SHALL BE LAID ON THE EXISTING NORTH TOWER CABLE TRAY, AND TERMINATED AT THE NORTH MOTOR ROOM ATS.

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Professional Engineers Ontario
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
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04	99% DESIGN COMPLETION	2013-05-31
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02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

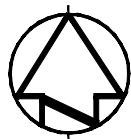
Do not scale drawings.
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A	Detail No.
B	drawing no. - where detail required
C	drawing no. - where detailed

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
BRIDGE MOTOR ROOM CONDUIT ROUTING-SOUTH SIDE

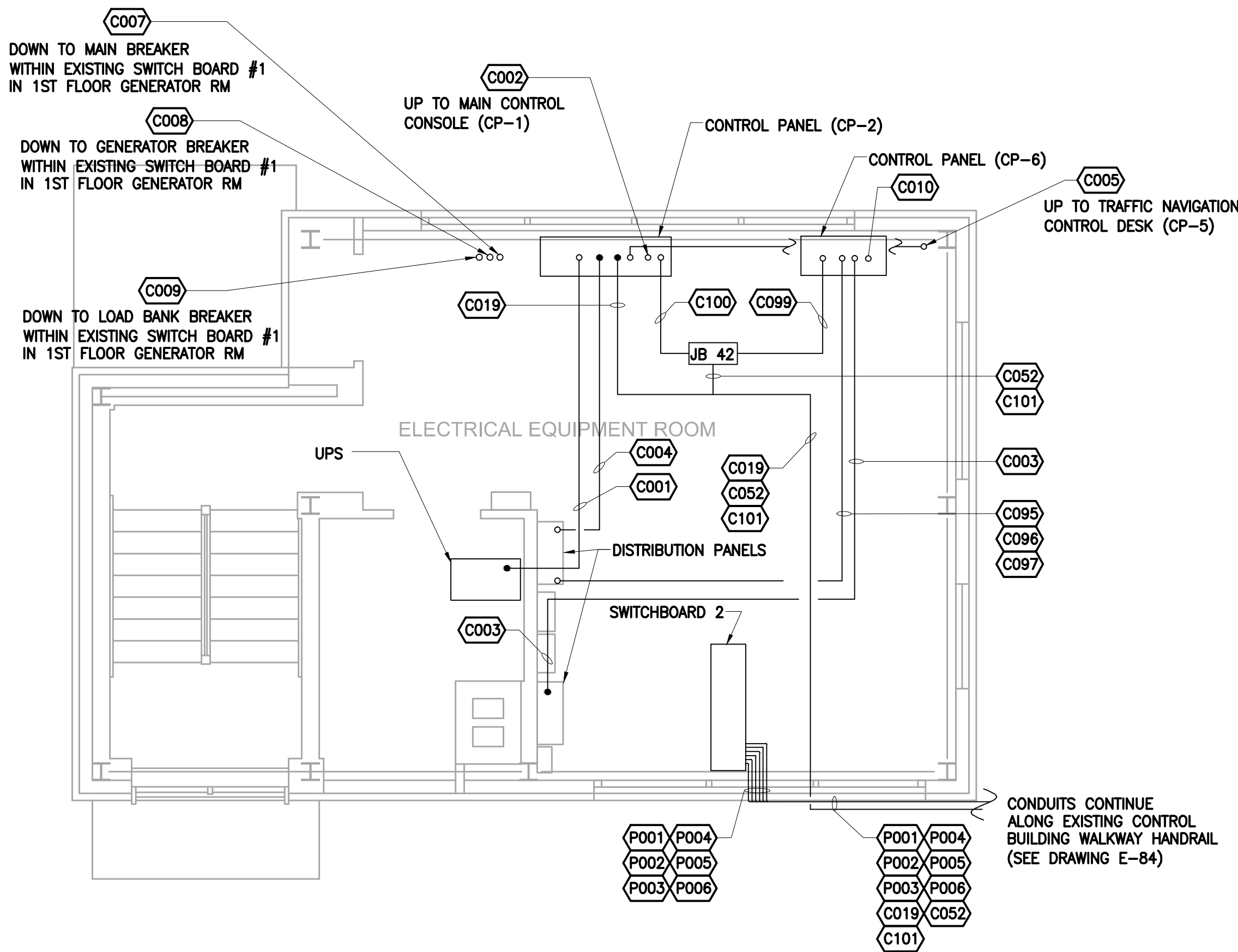
drawn by dessiné par	D. Buro
designed by conc par	D. Raffington/J. Chin
approved by approuvé par	M. VanDeRee
bid soumission	A. Ghubril
project manager administrateur de projets	
project date date du projet	2013-05-31
project no. no. du projet	R.012641.001
drawing no. dessiné no.	E-80



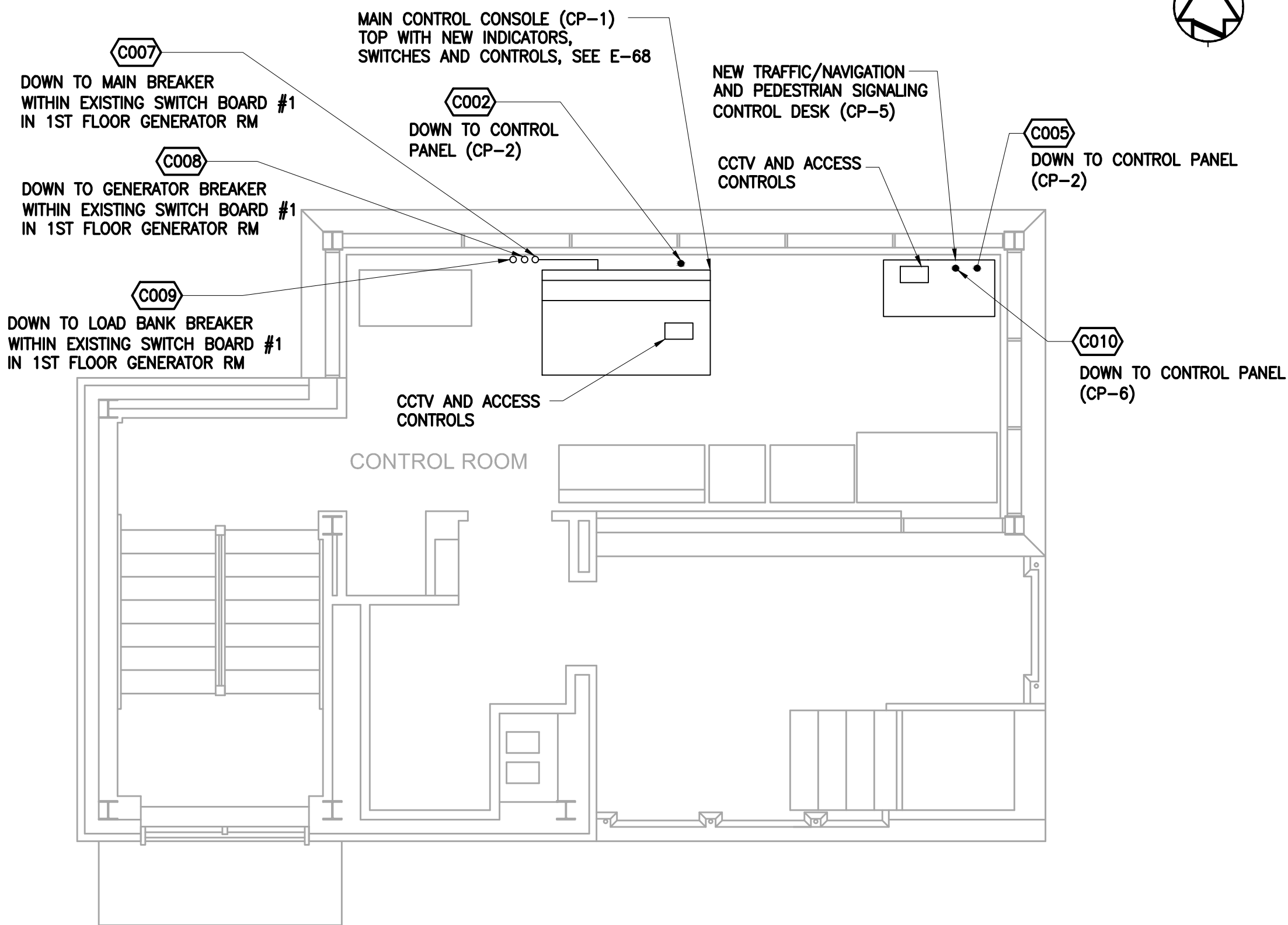
0 1 5 8
SCALE 3/8"=1'-0"

8. WHENEVER THE NUMBER OF CONDUIT BENDS EXCEEDS 180° AND NO SPLICE IS INVOLVED, THE CONTRACTOR SHALL USE MUGUL TYPE FITTINGS.
9. CONDUITS SHOWN DASHED ARE SURFACE MOUNTED UNDERNEATH THE MOTOR ROOM FLOOR AND STUBBED UP AT THE APPROXIMATE LOCATION SHOWN ON THE PLAN. SURFACE MOUNTED CONDUITS UNDERNEATH THE MOTOR ROOM FLOOR SHALL STAY CLEAR OF THE MOTOR ROOM HATCH DOOR.
10. CONDUITS SHOWN SOLID ARE SURFACE MOUNTED INSIDE THE MOTOR ROOM. SURFACE MOUNTED CONDUITS INSIDE THE MOTOR ROOM SHALL STAY CLEAR OF THE EXISTING CRANE AND MOTOR ROOM HATCH DOOR.
11. AERIAL POWER FEEDERS P007, P008, P009, P010, P011, AND P012 GOING TO THE NORTH TOWER SHALL BE LAID ON THE EXISTING NORTH TOWER CABLE TRAY, AND TERMINATED AT THE NORTH MOTOR ROOM ATS.

drawing no.
dessine no.



SECOND FLOOR PLAN



THIRD FLOOR PLAN

- NOTES:
1. ALL CONDUIT RUNS AND EQUIPMENT LOCATIONS, UNLESS SPECIFICALLY DIMENSIONED, ARE APPROXIMATE ONLY. EXACT LOCATION SHALL BE DETERMINED IN THE FIELD AND SHALL CLEAR ALL OBSTRUCTIONS.
 2. THE CONDUIT QUANTITY AND SIZES SHALL BE ADJUSTED TO ADEQUATELY SERVE THE MAKE AND MODEL OF FINAL EQUIPMENT.
 3. ALL CONDUIT ROUTING SHOWN IS DIAGRAMMATIC. EXACT ROUTING OF ALL CONDUITS SHALL BE DETERMINED IN THE FIELD TO MINIMIZE LENGTH OF RUN AND NUMBER OF BOXES REQUIRED, AND AVOID PHYSICAL INTERFERENCES AND DUPLICATE RUNS. FIELD VERIFY THE LOCATIONS OF ALL ELECTRICAL EQUIPMENT.
 4. NOT ALL CONDUIT ROUTING ARE SHOWN ON THE PLAN. FOR ALL CONDUITS AND CABLE SIZES, REFER TO THE CONDUIT AND CABLE SCHEDULES, ON DRAWINGS E-86 THRU E-89.
 5. ALL ELECTRICAL PULL BOXES AND JUNCTION BOXES SHALL BE STAINLESS STEEL, TYPE 316 AND SHALL BE RATED NEMA 4X.
 6. ALL CONDUIT AND FITTING SHALL BE RIGID GALVANIZED STEEL PVC COATED.
 7. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL PULL BOXES REQUIRED TO FACILITATE THE ROUTING AND PULLING OF CONDUITS AND WIRES.
 8. WHENEVER THE NUMBER OF CONDUIT BENDS EXCEEDS 180° AND NO SPLICE IS INVOLVED, THE CONTRACTOR SHALL USE MOGUL TYPE FITTINGS.
 9. CONDUITS SHOWN SOLID ARE SURFACE MOUNTED INSIDE THE CONTROL HOUSE BUILDING.

CONTROL BUILDING CONDUIT ROUTING



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
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01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

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project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CONTROL BUILDING CONDUIT ROUTING

drawn by
dessiné par
D. Buro

designed by
conc par
D. Raffington/J. Chin

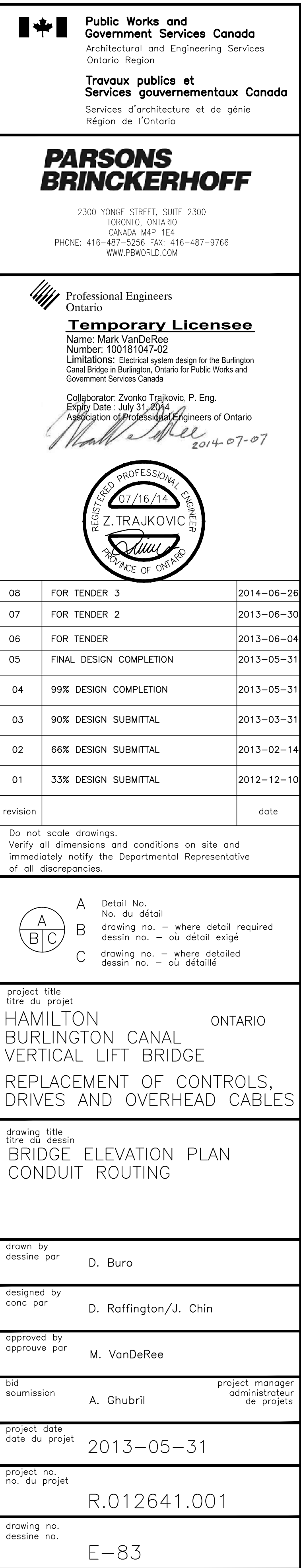
approved by
approuvé par
M. VanDeRee

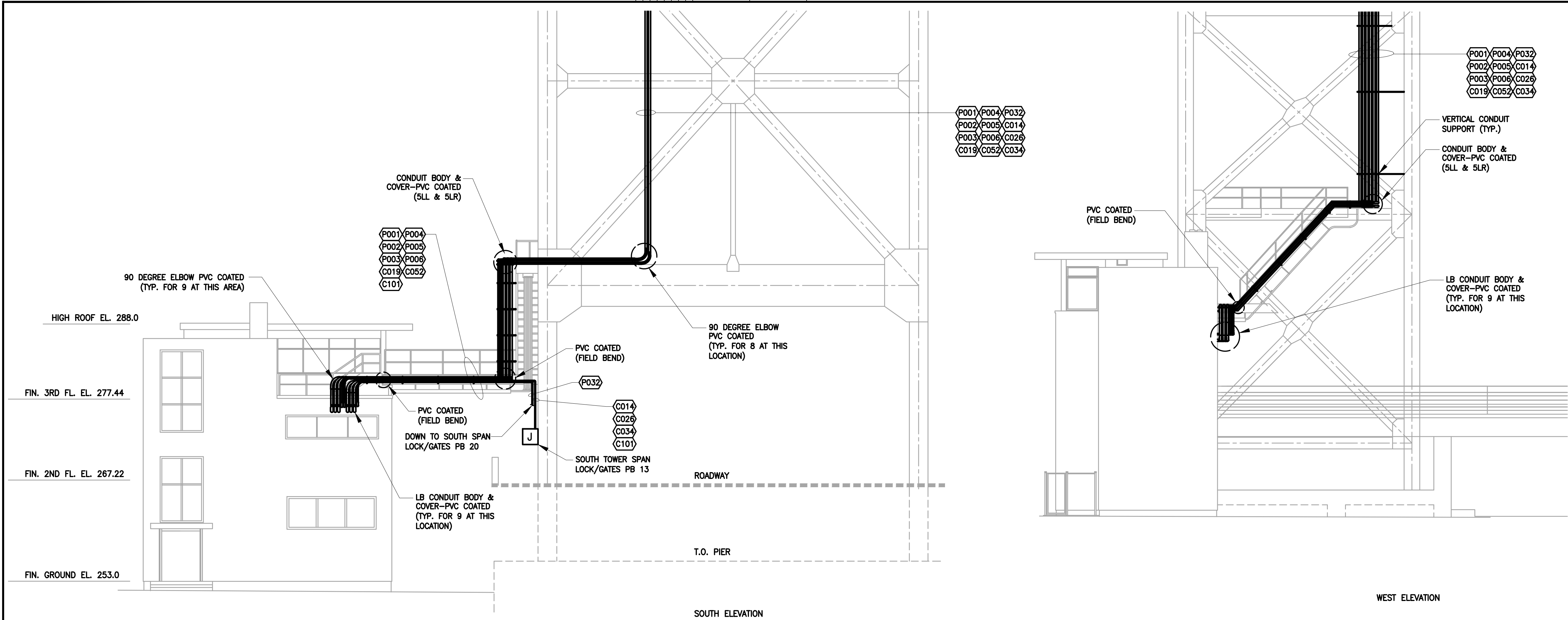
bid
soumission
A. Ghubril

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

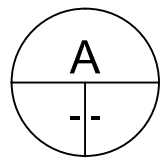
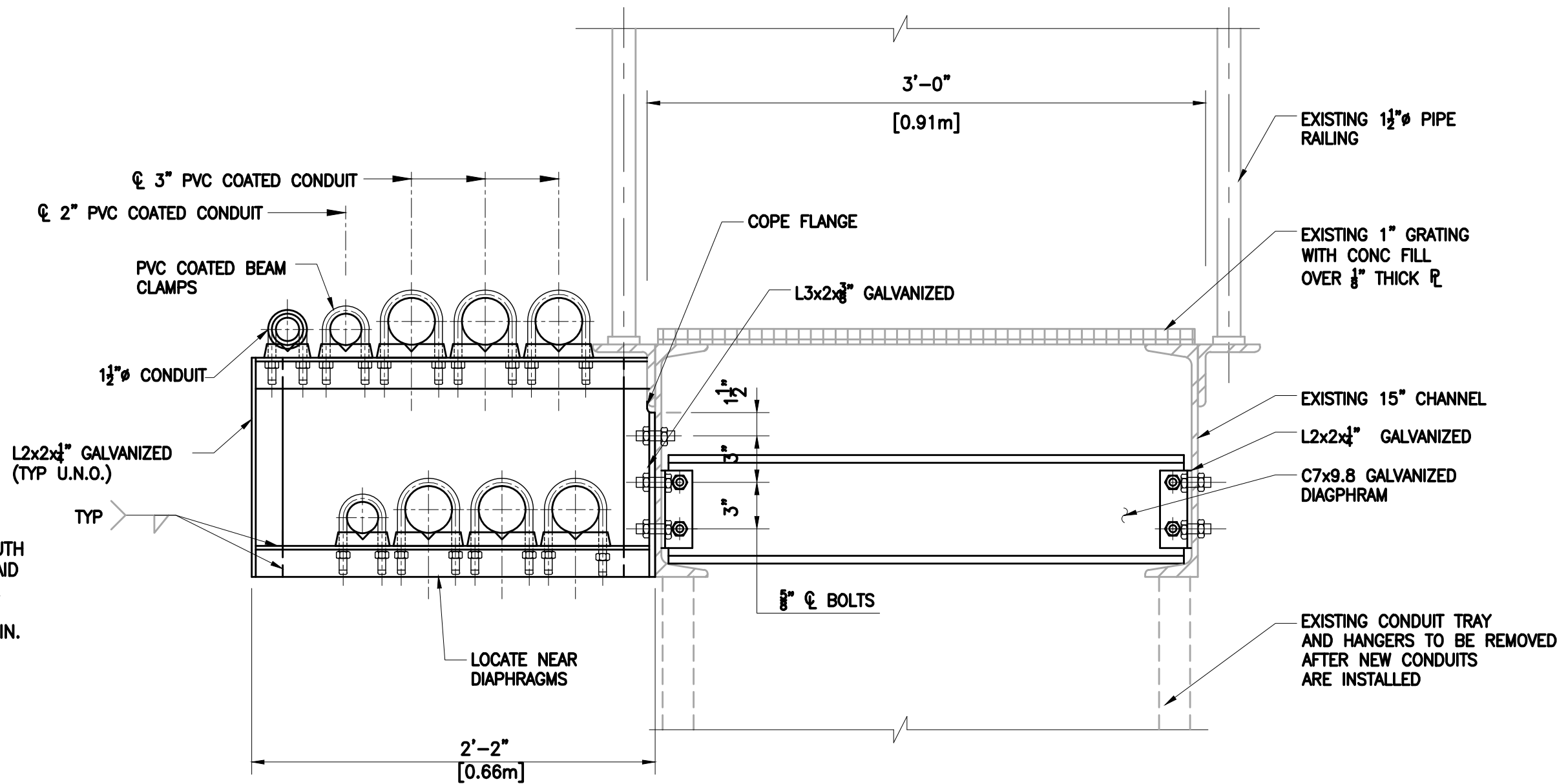
drawing no.
dessiné no.
E-82



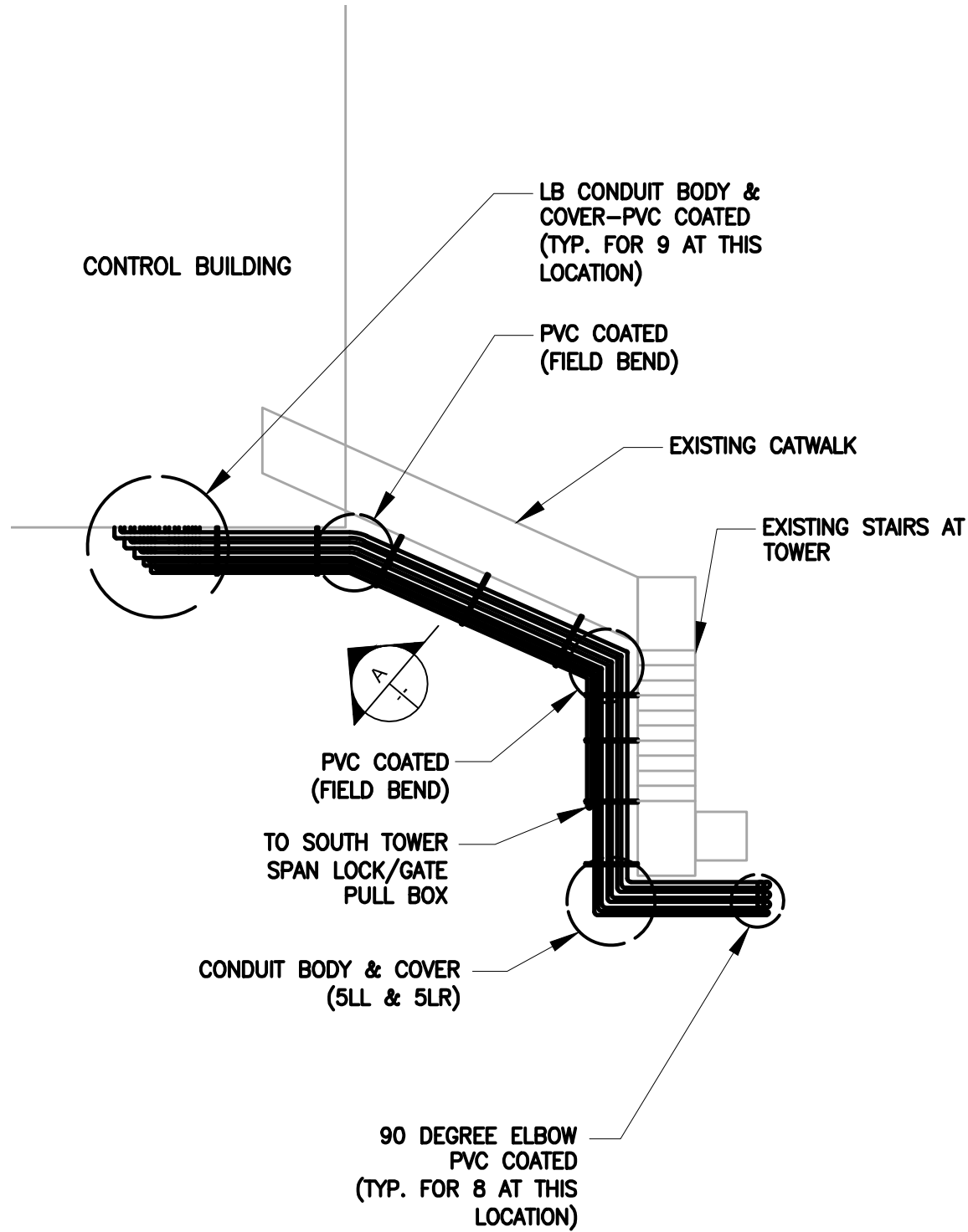


CONTROL BUILDING CONDUIT ROUTING ELEVATION

- NOTE:
1. ALL CONDUIT RUNS AND EQUIPMENT LOCATIONS, UNLESS SPECIFICALLY DIMENSIONED, ARE APPROXIMATE ONLY. EXACT LOCATION SHALL BE DETERMINED IN THE FIELD AND SHALL CLEAR ALL OBSTRUCTIONS.
 2. ALL CONDUIT ROUTING SHOWN ARE DIAGRAMMATIC. EXACT ROUTING OF ALL CONDUITS SHALL BE DETERMINED IN THE FIELD TO MINIMIZE LENGTH OF RUN AND AVOID PHYSICAL INTERFERENCES. FIELD VERIFY THE LOCATIONS OF ALL ELECTRICAL EQUIPMENT.
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 9. ALL EXISTING WIRING FOR CCTV SYSTEM, PA SYSTEM, AND FIRE PROTECTION SYSTEM SHALL REMAIN. THESE SYSTEMS SHALL BE OPERATIONAL DURING THE CONSTRUCTION PERIOD.



SCALE: 1/2" = 1'-0"




CONTROL BUILDING CONDUIT ROUTING PLAN

 **Public Works and Government Services Canada**
Architectural and Engineering Services
Ontario Region

Travaux publics et Services gouvernementaux Canada
Services d'architecture et de génie
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 **Professional Engineers Ontario**

Temporary Licensee

Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

Mark VanDeRee 2014-07-07



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revision		date

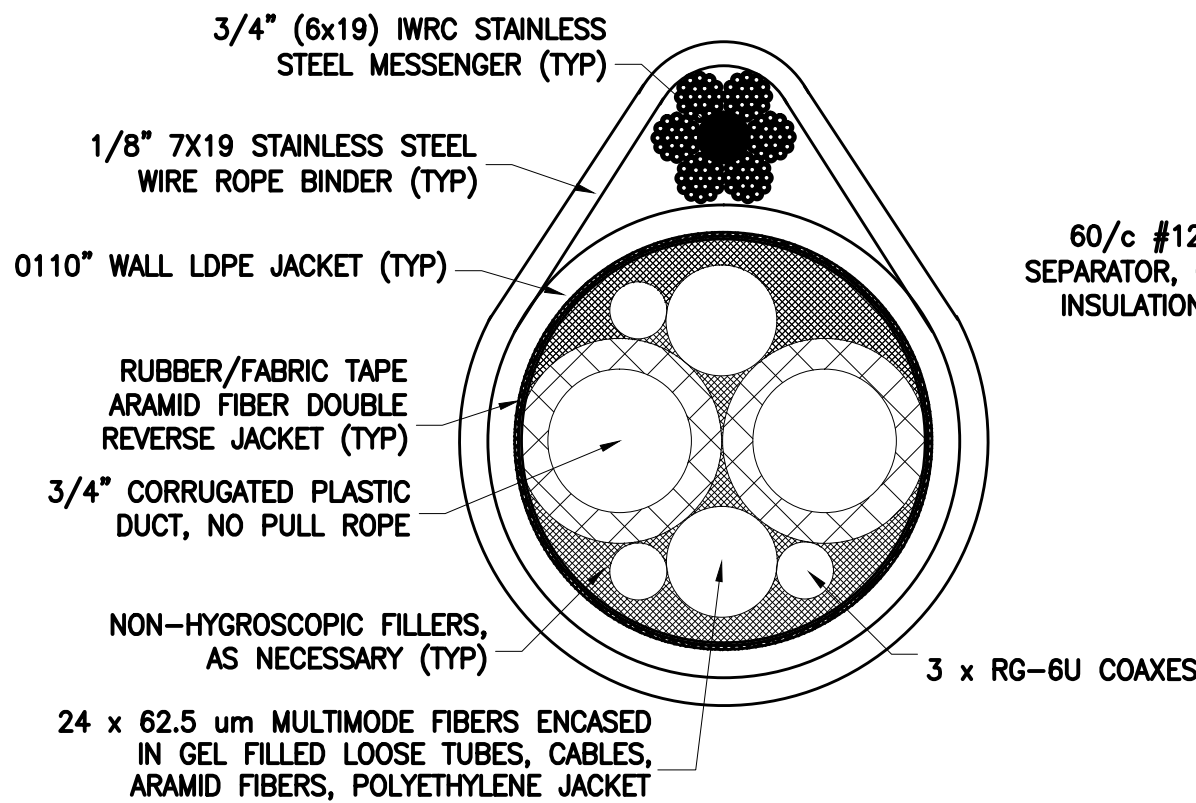
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project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
CONTROL BUILDING ELEVATION CONDUIT ROUTING

drawn by dessiné par	D. Buro
designed by conc. par	D. Raffington/J. Chin
approved by approuvé par	M. VanDeRee
bid soumission	A. Ghubril
project manager administrateur de projets	
project date date du projet	2013-05-31
project no. no. du projet	R.012641.001
drawing no. dessiné no.	E-84



60/c #12 AWG 65/30 TC, SEPARATOR, 0.045" WALL EPR INSULATION - 2,000 VOLTS

3/c #4/0 AWG 2107/30 BC, SEPARATOR 0.080" WALL EPR INSULATION - 2,000 VOLTS

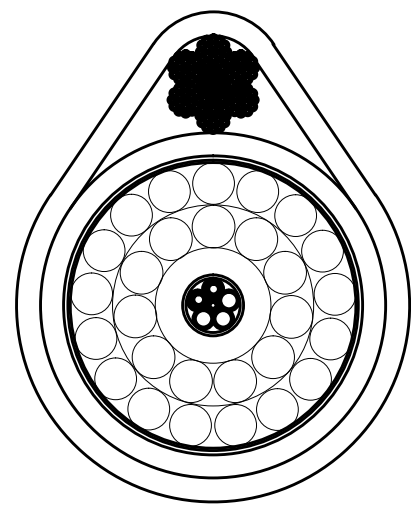
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1/c #1/0 AWG 1045/30 BC, SEPARATOR, 0.130" WALL EPR INSULATION -2,000 VOLTS

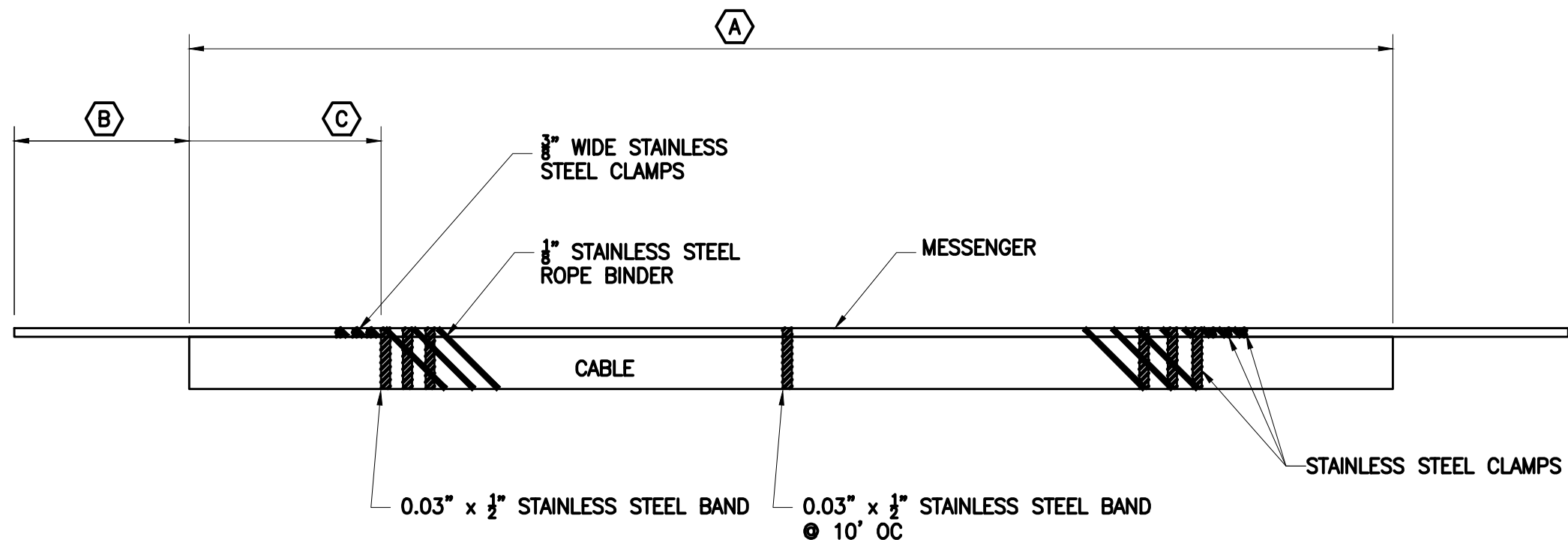
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1/c #6 AWG 266/w BC, SEPARATOR, 0.060" WALL EPR INSULATION - 2,000 VOLTS

3/c #1/0 AWG 1045/w BC, SEPARATOR, 0.060" WALL EPR INSULATION - 2,000 VOLTS



VIEW-A



A B C BY MANUFACTURER

CABLE/MESSENGER ASSEMBLY DETAIL
NTS



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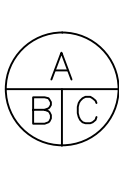
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date : July 31, 2014
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2014-07-07



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No. du détail

B drawing no. - where detail required
dessin no. - où détail exigé

C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
AERIAL CABLE DETAILS

drawn by
dessiné par J. Perez

designed by
conc par G. Patino/B. Crouthamel

approved by
approuvé par M. VanDeRee

bid soumission A. Ghubril project manager administrateur de projets

project date
date du projet 2013-05-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. E-85

CONDUIT AND CABLE SCHEDULE 1 (NOTE 1)

CONDUIT AND CABLE SCHEDULE 1 (CONTINUED)

FEEDER NO.	CONDUIT		FROM	TO	SERVICE	CONTAINS CABLES	INSULATION 600V	REMARKS
	SIZE [INCHES]	MATERIAL						
P001	3	PVC RGS	SWITCHBOARD #2	MCC - SOUTH TOWER	POWER FOR MCC SOUTH TOWER	3 #350 kcmil, 1# 1/0 AWG GND	RW90, XLPE	
P002	3	PVC RGS	SWITCHBOARD #2	MCC - SOUTH TOWER	POWER FOR MCC SOUTH TOWER	3 #350 kcmil, 1# 1/0 AWG GND	RW90, XLPE	
P003	3	PVC RGS	SWITCHBOARD #2	SOUTH TOWER TC	POWER FOR NORTH TOWER 600A ATS	3 #350 kcmil, 1# 1/0 AWG GND	RW90, XLPE	
P004	3	PVC RGS	SWITCHBOARD #2	SOUTH TOWER TC	POWER FOR NORTH TOWER 600A ATS	3 #350 kcmil, 1# 1/0 AWG GND	RW90, XLPE	
P005	3	PVC RGS	SWITCHBOARD #2	SOUTH TOWER TC	POWER FOR NORTH TOWER 600A ATS	3 #350 kcmil, 1# 1/0 AWG GND	RW90, XLPE	
P006	3	PVC RGS	SWITCHBOARD #2	SOUTH TOWER TC	POWER FOR NORTH TOWER 600A ATS	3 #350 kcmil, 1# 1/0 AWG GND	RW90, XLPE	
P007			SOUTH TOWER POWER TC	NORTH TOWER 600A ATS	POWER FOR NORTH TOWER 600A ATS	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	AERIAL CABLES
P008			SOUTH TOWER POWER TC	NORTH TOWER 600A ATS	POWER FOR NORTH TOWER 600A ATS	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	AERIAL CABLES
P009			SOUTH TOWER POWER TC	NORTH TOWER 600A ATS	POWER FOR NORTH TOWER 600A ATS	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	AERIAL CABLES
P010			SOUTH TOWER POWER TC	NORTH TOWER 600A ATS	POWER FOR NORTH TOWER 600A ATS	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	AERIAL CABLES
P011			SOUTH TOWER POWER TC	NORTH TOWER 600A ATS	POWER FOR NORTH TOWER 600A ATS	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	AERIAL CABLES
P012			SOUTH TOWER POWER TC	NORTH TOWER 600A ATS	POWER FOR NORTH TOWER 600A ATS	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	AERIAL CABLES
P013	3	PVC RGS	NORTH TOWER 600A ATS	MCC- NORTH TOWER	POWER FOR MCC NORTH TOWER	3 #350 kcmil, 1# 1/0 AWG GND	RW90, XLPE	
P014	3	PVC RGS	NORTH TOWER 600A ATS	MCC- NORTH TOWER	POWER FOR MCC NORTH TOWER	3 #350 kcmil, 1# 1/0 AWG GND	RW90, XLPE	
P015	3/4	PVC RGS	SOUTH TOWER MCC	EXISTING 30A DISCONNECT SWITCH	POWER FOR LIGHTING PANEL LP2	3 #10 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P016	3/4	PVC RGS	SOUTH TOWER MCC	SOUTH PIER LIGHTHOUSE	POWER FOR SOUTH PIER LIGHTHOUSE	3 #10 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P017	3	PVC RGS	SOUTH TOWER MCC	VECTOR DRIVE E1-SL	POWER FOR VECTOR DRIVE E1-SL	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P018	3	PVC RGS	SOUTH TOWER MCC	VECTOR DRIVE E1-SL	POWER FOR VECTOR DRIVE E1-SL	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P019	1	PVC RGS	SOUTH TOWER MCC	MACH. RM SPACE HTR CONT.	POWER FOR SPACE HTR CABINET	3 #8 AWG, 1 #10 AWG GND	RW90, XLPE	
P020	2	PVC RGS	SOUTH TOWER MCC	SOUTH MOTOR RM LOCK/GATES PB	POWER FOR LOCKS/GATES/BARRIER	15 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P021	1-1/2	PVC RGS	SOUTH TOWER MCC	EXISTING (20HP) AUX MTS	POWER FOR EXISTING (20HP) AUX. MTS	3 #4 AWG, 1 #8 AWG GND	RW90, XLPE	
P022	3	PVC RGS	SOUTH TOWER MCC	VECTOR DRIVE 2W-MA	POWER FOR VECTOR DRIVE 2W-MA	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P023	3	PVC RGS	SOUTH TOWER MCC	VECTOR DRIVE 2W-MA	POWER FOR VECTOR DRIVE 2W-MA	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P024								
P025	1-1/2	PVC RGS	SOUTH TOWER MCC	MACH. RM BRK/BLOWER PB 24	POWER BRAKES S1, S2, S3, AND S4	12 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P026	1-1/2	PVC RGS	SOUTH TOWER MCC	SOUTH ELEVATOR	POWER FOR SOUTH ELEVATOR	3 #6 AWG, 1 #8 AWG GND	RW90, XLPE	
P027	1-1/2	PVC RGS	SOUTH TOWER MCC	MACH. RM BRK/BLOWER PB 24	POWER FOR DIFL-S, BL-1E, BL-2W	9 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P028	3	PVC RGS	VECTOR DRIVE E1-SL	SPAN MOTOR E1-SL	POWER FOR SPAN MOTOR E1-SL	3 #4/0 AWG, 3# 4 AWG GND (VFD MFG. ASSEMBLY CABLE)	RW90, XLPE (2kV INSULATED ASSEMBLY CABLE)	TERMINATES TO LOCAL DISC. SWITCH BETWEEN VFD & MOTOR
P029	3	PVC RGS	VECTOR DRIVE E1-SL	SPAN MOTOR E1-SL	POWER FOR SPAN MOTOR E1-SL	3 #4/0 AWG, 3# 4 AWG GND (VFD MFG. ASSEMBLY CABLE)	RW90, XLPE (2kV INSULATED ASSEMBLY CABLE)	TERMINATES TO LOCAL DISC. SWITCH IN BETWEEN VFD AND MOTOR
P030	3	PVC RGS	VECTOR DRIVE 2W-MA	SPAN MOTOR 2W-MA	POWER FOR SPAN MOTOR 2W-MA	3 #4/0 AWG, 3# 4 AWG GND (VFD MFG. ASSEMBLY CABLE)	RW90, XLPE (2kV INSULATED ASSEMBLY CABLE)	TERMINATES TO LOCAL DISC. SWITCH IN BETWEEN VFD AND MOTOR
P031	3	PVC RGS	VECTOR DRIVE 2W-MA	SPAN MOTOR 2W-MA	POWER FOR SPAN MOTOR 2W-MA	3 #4/0 AWG, 3# 4 AWG GND (VFD MFG. ASSEMBLY CABLE)	RW90, XLPE (2kV INSULATED ASSEMBLY CABLE)	TERMINATES TO LOCAL DISC. SWITCH IN BETWEEN VFD AND MOTOR
P032	2	PVC RGS	SOUTH MOTOR RM. LOCK/GATES PB 15	SOUTH SPAN LOCK/GATES PB 20	POWER FOR LOCKS/GATES/BARRIER	15 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P033	1	PVC RGS	SOUTH SPAN LOCK/GATES PB 20	SPAN LOCK MOTOR SOUTH	POWER FOR SPAN LOCK SOUTH SPL-SW	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P034	1-1/2	PVC RGS	SOUTH SPAN LOCK/GATES PB 20	SOUTH PASSAGE PB 12	POWER FOR GATES/BARRIER	12 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P035	1	PVC RGS	SOUTH PASSAGE NW PB 12	PEDESTRIAN GATE PG-SW	POWER FOR PED. GATE PG-SW	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P036	1	PVC RGS	SOUTH PASSAGE NW PB 12	SOUTH PASSAGE SW PB 22	POWER FOR GATES/BARRIER	9 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P037	1	PVC RGS	SOUTH PASSAGE SW PB 22	TRAFFIC GATE TG-SW	POWER FOR GATE TG-SW	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P038								
P039	1	PVC RGS	SOUTH PASSAGE SW PB 22	SOUTH PASSAGE SE PB 21	POWER FOR GATES/BARRIER	6 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P040	1	PVC RGS	SOUTH PASSAGE SE PB 21	BARRIER GATE BG-SE	POWER FOR GATE BG-SE	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P041	1	PVC RGS	SOUTH PASSAGE SE PB 21	TRAFFIC GATE TG-SE	POWER FOR GATE TG-SE	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P042	3/4	LFMC	MACH. RM BRK/BLOWER PB 24	MOTOR BRAKE S1	POWER FOR MOTOR BRAKE S1	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P043	3/4	LFMC	MACH. RM BRK/BLOWER PB 25	MOTOR BLOWER BL-1E	POWER FOR MOTOR BLOWER BL-1E	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P044	3/4	LFMC	MACH. RM BRK/BLOWER PB 29	MACHINERY BRAKE S2	POWER FOR MACHINERY BRAKE S2	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P045	3/4	LFMC	MACH. RM BRK/BLOWER PB 29	SOUTH DIFFERENTIAL LOCK DIFL-S	POWER FOR DIFF LOCK DIFL-S	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P046	3/4	LFMC	MACH. RM BRK/BLOWER PB 23	MACHINERY BRAKE S3	POWER FOR MACHINERY BRAKE S3	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P047	3/4	LFMC	MACH. RM BRK/BLOWER PB 24	MOTOR BLOWER BL-2W	POWER FOR MOTOR BLOWER BL-2W	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P048	3/4	LFMC	MACH. RM BRK/BLOWER PB 25	MOTOR BRAKE S4	POWER FOR MOTOR BRAKE S4	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P049	1	PVC RGS	MACH. RM SPACE HTR CONT.	MACH. RM SPACE HTR	POWER FOR MACH. RM SPACE HTR	3 #8 AWG, 1 #10 AWG GND	RW90, XLPE	
P050	1	PVC RGS	MACH. RM SPACE HTR CONT.	30A DISCONNECT SWITCH	POWER FOR 15kVA TRANSFORMER	3 #8 AWG, 1 #10 AWG GND	RW90, XLPE	600V
P051	1	PVC RGS	30A DISCONNECT SWITCH	15kVA TRANSFORMER	POWER FOR 15kVA TRANSFORMER	3 #8 AWG, 1 #10 AWG GND	RW90, XLPE	600V
P052	1	PVC RGS	15kVA TRANSFORMER	PANEL LP-6	POWER FOR LP-6	4 #2 AWG, 1 #2 AWG GND	RW90, XLPE	208/120V
P053	1-1/2	PVC RGS	MACH. RM. BRK/BLOWER PB 24	MACH. RM. PB 29	POWER FOR DIFL-S, BL-1E, BRAKES S2,S3,S4	15 #10 AWG, 1#10 AWG GND	RW90, XLPE	
P054	1-1/2	PVC RGS	MACH. RM. PB 29	MACH. RM. PB 23	POWER FOR BL-1E, BRAKES S3, S4	9 #10 AWG, 1#10 AWG GND	RW90, XLPE	
P055	1	PVC RGS	MACH. RM. PB 23	MACH. RM. PB 25	POWER FOR BL-1E, BRAKE S4	6 #10 AWG, 1#10 AWG GND	RW90, XLPE	
P056	1-1/2	PVC RGS	MACH. RM. BRK/BLOWER PB 31	MACH. RM. PB 32	POWER FOR DIFL-N, BL-3E, BRAKES N2,N3,N4	15 #10 AWG, 1#10 AWG GND	RW90, XLPE	
P057	1-1/2	PVC RGS	MACH. RM. PB 32	MACH. RM. PB 33	POWER FOR BL-3E, BRAKES N3, N4	9 #10 AWG, 1#10 AWG GND	RW90, XLPE	

FEEDER NO.	CONDUIT		FROM	TO	SERVICE	CONTAINS CABLES	INSULATION 600V	REMARKS
	SIZE [INCHES]	MATERIAL						
P058	1	PVC RGS	MACH. RM. PB 33	MACH. RM. PB 34	POWER FOR BL-3E, BRAKE N4	6 #10 AWG, 1#10 AWG GND	RW90, XLPE	
P059								
P060	3/4	PVC RGS	NORTH TOWER MCC	EXISTING 30A DISCONNECT SWITCH	POWER FOR LIGHTING PANEL LP3	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P061	3/4	PVC RGS	NORTH TOWER MCC	EXISTING 30A DISCONNECT SWITCH	POWER FOR LIGHTING PANEL LP4	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P062	3	PVC RGS	NORTH TOWER MCC	VECTOR DRIVE 3E-MA	POWER FOR VECTOR DRIVE 3E-MA	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P063	3	PVC RGS	NORTH TOWER MCC	VECTOR DRIVE 3E-MA	POWER FOR VECTOR DRIVE 3E-MA	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P064	1	PVC RGS	NORTH TOWER MCC	MACH. RM SPACE HTR CONT.	POWER FOR SPACE HTR CABINET	3 #8 AWG, 1 #10 AWG GND	RW90, XLPE	
P065	3/4	PVC RGS	NORTH TOWER MCC	NORTH MOTOR LOCK/GATES PB 30	POWER FOR LOCKS/GATES/BARRIER	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P066	1-1/2	PVC RGS	NORTH TOWER MCC	EXISTING (20HP) AUX MTS	POWER FOR EXISTING (20HP) AUX. MTS	3 #4 AWG, 1 #8 AWG GND	RW90, XLPE	
P067	3	PVC RGS	NORTH TOWER MCC	VECTOR DRIVE 4W-SL	POWER FOR VECTOR DRIVE 4W-SL	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P068	3	PVC RGS	NORTH TOWER MCC	VECTOR DRIVE 4W-SL	POWER FOR VECTOR DRIVE 4W-SL	3 #4/0 AWG, 1# 1/0 AWG GND	RW90, XLPE	
P069	1-1/2	PVC RGS	NORTH TOWER MCC	NORTH MOTOR RM LOCK/GATES PB 7	POWER FOR LOCK/GATES/BARRIER	12 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P070	1-1/2	PVC RGS	NORTH TOWER MCC	MACH. RM BRK/BLOWER PB 31	POWER BRAKES N1, N2, N3, AND N4	12 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P071	1-1/2	PVC RGS	NORTH TOWER MCC	NORTH ELEVATOR	POWER FOR NORTH ELEVATOR	3 #6 AWG, 1 #8 AWG GND	RW90, XLPE	
P072	1-1/2	PVC RGS	NORTH TOWER MCC	MACH. RM BRK/BLOWER PB 31	POWER FOR DIFL-S, BL-1E, BL-2W	9 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P073	3	PVC RGS	VECTOR DRIVE 3E-MA	SPAN MOTOR 3E-MA	POWER FOR SPAN MOTOR 3E-MA	3 #4/0 AWG, 3# 4 AWG GND (VFD MFG. ASSEMBLY CABLE)	RW90, XLPE (2kV INSULATED ASSEMBLY CABLE)	TERMINATES TO LOCAL DISC. SWITCH BETWEEN VFD & MOTOR
P074	3	PVC RGS	VECTOR DRIVE 3E-MA	SPAN MOTOR 3E-MA	POWER FOR SPAN MOTOR 3E-MA	3 #4/0 AWG, 3# 4 AWG GND (VFD MFG. ASSEMBLY CABLE)	RW90, XLPE (2kV INSULATED ASSEMBLY CABLE)	TERMINATES TO LOCAL DISC. SWITCH IN BETWEEN VFD AND MOTOR
P075	3	PVC RGS	VECTOR DRIVE 4W-SL	SPAN MOTOR 4W-SL	POWER FOR SPAN MOTOR 4W-SL	3 #4/0 AWG, 3# 4 AWG GND (VFD MFG. ASSEMBLY CABLE)	RW90, XLPE (2kV INSULATED ASSEMBLY CABLE)	TERMINATES TO LOCAL DISC. SWITCH IN BETWEEN VFD AND MOTOR
P076	3	PVC RGS	VECTOR DRIVE 4W-SL	SPAN MOTOR 4W-SL	POWER FOR SPAN MOTOR 4W-SL	3 #4/0 AWG, 3# 4 AWG GND (VFD MFG. ASSEMBLY CABLE)	RW90, XLPE (2kV INSULATED ASSEMBLY CABLE)	TERMINATES TO LOCAL DISC. SWITCH IN BETWEEN VFD AND MOTOR
P077	2	PVC RGS	NORTH MOTOR RM. LOCK/GATES PB 30	NORTH SPAN LOCK/GATES PB 5	POWER FOR LOCK/GATES/BARRIER	15 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P078	1	PVC RGS	NORTH SPAN LOCK/GATES PB 5	SPAN LOCK MOTOR NORTH	POWER FOR SPAN LOCK NORTH SPL-NW	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P079	1-1/2	PVC RGS	NORTH SPAN LOCK/GATES PB 5	NORTH PASSAGE SW PB	POWER FOR GATES/BARRIER	12 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P080	1	PVC RGS	NORTH PASSAGE SW PB 2	PEDESTRIAN GATE PG-NW	POWER FOR PED. GATE PG-NW	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P081	1	PVC RGS	NORTH PASSAGE SW PB 2	NORTH PASSAGE NW PB 1	POWER FOR GATES/BARRIER	9 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P082	1	PVC RGS	NORTH PASSAGE NW PB 1	TRAFFIC GATE TG-NW	POWER FOR GATE TG-NW	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P083								
P084	1	PVC RGS	NORTH PASSAGE NW PB 1	NORTH PASSAGE NE PB 10	POWER FOR GATES/BARRIER	6 #10 AWG, 1#10 AWG GND	RW90, XLPE	
P085	1	PVC RGS	NORTH PASSAGE NE PB 10	BARRIER GATE BG-NE	POWER FOR GATE BG-NE	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P086	1	PVC RGS	NORTH PASSAGE NE PB 10	TRAFFIC GATE TG-NE	POWER FOR GATE TG-NE	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P087	3/4	LFMC	MACH. RM BRK/BLOWER PB 31	MOTOR BRAKE N1	POWER FOR MOTOR BRAKE N1	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P088	3/4	LFMC	MACH. RM BRK/BLOWER PB 34	MOTOR BLOWER BL-3E	POWER FOR MOTOR BLOWER BL-3E	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P089	3/4	LFMC	MACH. RM BRK/BLOWER PB 32	MACHINERY BRAKE N2	POWER FOR MACHINERY BRAKE N2	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P090	3/4	LFMC	MACH. RM BRK/BLOWER PB 32	NORTH DIFFERENTIAL LOCK	POWER FOR DIFF LOCK DIFL-N	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P091	3/4	LFMC	MACH. RM BRK/BLOWER PB 33	MACHINERY BRAKE N3	POWER FOR MACHINERY BRAKE N3	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P092	3/4	LFMC	MACH. RM BRK/BLOWER PB 31	MOTOR BLOWER BL-4W	POWER FOR MOTOR BLOWER BL-4W	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P093	3/4	LFMC	MACH. RM BRK/BLOWER PB 34	MOTOR BRAKE N4	POWER FOR MOTOR BRAKE N4	3 #10 AWG, 1 #10 AWG GND	RW90, XLPE	
P094								
P095								
P096	1	PVC RGS	MACH. RM HTR CONT.	MACH. RM SPACE HTR	POWER FOR MACH. RM SPACE HTR	3 #8 AWG, 1 #10 AWG GND	RW90, XLPE	
P097	1	PVC RGS	MACH. RM HTR CONT.	30A DISCONNECT SWITCH	POWER FOR 15kVA TRANSFORMER	3 #8 AWG, 1#10 AWG GND	RW90, XLPE	600V
P098	1	PVC RGS	30A DISCONNECT SWITCH	15kVA TRANSFORMER	POWER FOR 15kVA TRANSFORMER	3 #8 AWG, 1#10 AWG GND	RW90, XLPE	600V
P099	1	PVC RGS	15kVA TRANSFORMER	PANEL LP-5	POWER FOR LP-5	4 #2 AWG, 1#2 AWG GND	RW90, XLPE	208/120V

NOTES:
1. CONDUIT AND CABLE SCHEDULE AND SERVICE DESIGNATIONS ARE INTENDED AS A GUIDE FOR THE CONTRACTOR AND ARE NOT CONSIDERED TO BE COMPLETE. THE CONTRACTOR MUST COMPLETE THE SCHEDULE AND SUBMIT WITH THE SHOP DRAWINGS BASED ON CONTRACTOR SELECTED EQUIPMENT BRANDS AND MODELS AND FINAL CONFIGURATIONS.




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Architectural and Engineering Services
Ontario Region

Travaux publics et Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario

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Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

Mark VanDeRee 2014-07-07



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

A

B

C

Detail No.
No. du détail
drawing no. — where detail required
dessin no. — où détail exigé
drawing no. — where detailed
dessin no. — où détaillé

project title
titre du projet
**HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE**
**REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**

drawing title
titre du dessin

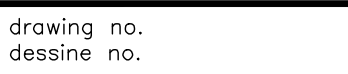
CONDUIT AND CABLE SCH. 1

drawn by dessine par	D. Buro	
designed by conc par	D. Raffington/J. Chin	
approved by approuve par	M. VanDeRee	
bid soumission	A. Ghubril	project manager administrateur de projets
project date date du projet	2013-05-31	
project no. no. du projet	R.012641.001	
drawing no. dessine no.	E-86	

CONDUIT AND CABLE SCHEDULE 2 (CONTINUED)

FEEDER NO.	CONDUIT		FROM	TO	SERVICE	CONTAINS CABLES	INSULATION 600V	REMARKS
	SIZE [INCHES]	MATERIAL						
C016	1-1/2	PVC RGS	SOUTH TOWER LOCK/GATE CONTROL PB 13	SOUTH PASSAGE SOUTHWEST CONTROL PB 40	CB909, 909, 910, 1505, 1507, 1505D, 1507D, 1630, CB1620, EA2-6N, 1608, 1609, 1621, 1622, 1623, 1624, 1627, 1628, 1627A, 1628A, 1629, 1630, GND, 4-SP	26 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C017	1	PVC RGS	SOUTH TOWER LOCK/GATE CONTROL PB 13	BARRIER GATE SOUTHEAST BG-SE	CB912, 912, 913, 1509, 1511, 1509D, 1511D, 1634, CB1620, EA2-6N, GND, 2-SP	12 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C018	1	PVC RGS	SOUTH TOWER LOCK/GATE CONTROL PB 13	PEDESTRIAN GATE SOUTHWEST PD-SW	CB917, 917, 918, 1513, 1515, 1513D, 1515D, GND, 2-SP	9 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C019	1-1/2	PVC RGS	SOUTH TOWER I/O PANEL CP-3	CONTROL PANEL CP-2	1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, MCR-3H, LP2-1H, MCR-4H, LP3-1H, 2-SP COMM. CHANNEL A COMM. CHANNEL B	14 #12 AWG, 1 #12 AWG GND COAXIAL	RW90, XLPE	
C020	1-1/2	PVC RGS	SOUTH TOWER I/O PANEL CP-3	SOUTH MOTOR. RM BRAKE CONTROL PB 17	CB922, 922, 923, 924, CB925, 925, 926, 927, CB928, 928, 929, 930, CB931, 931, 932, 933, GND, 4-SP	20 #12AWG, 1 #12AWG GND	RW90, XLPE	
C021	3/4	PVC RGS	SOUTH MOTOR. RM BRAKE CONTROL PB 17	MOTOR BRAKE S1	CB922, 922, 923, 924, GND, 1-SP	5 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C022	3/4	PVC RGS	SOUTH MOTOR. RM BRAKE CONTROL PB 17	MACHINERY BRAKE S2	CB925, 925, 926, 927, GND, 1-SP	5 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C023	3/4	PVC RGS	SOUTH MOTOR. RM BRAKE CONTROL PB 17	MACHINERY BRAKE S3	CB928, 928, 929, 930, GND, 1-SP	5 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C024	3/4	PVC RGS	SOUTH MOTOR. RM BRAKE CONTROL PB 17	MOTOR BRAKE S4	CB931, 931, 932, 933, GND, 1-SP	5 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C025	1	PVC RGS	SOUTH TOWER I/O PANEL CP-3	SOUTH MOTOR. RM LOCK/GATE CONTROL PB 14	CB934, 934A, 935A, 937, 1836, 1836A, 1838, 1838A, CB1836, 1836B, GND, 2-SP	12 #12AWG, 1 #12AWG GND	RW90, XLPE	
C026	1	PVC RGS	SOUTH MOTOR. RM LOCK/GATE CONTROL PB 14	SOUTH TOWER LOCK/GATE CONTROL PB 13	CB934, 934A, 935A, 937, 1836, 1836A, 1838, 1838A, CB1836, 1836B, GND, 2-SP	12 #12AWG, 1 #12AWG GND	RW90, XLPE	
C027	3/4	PVC RGS	SOUTH TOWER LOCK/GATE CONTROL PB 13	SOUTHWEST SPAN LOCK LIMIT SWITCH ZS-SPLSW	CB934, 934A, 935A, 1836, 1836A, 1838, 1838A, GND, 2-SP	9 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C028	3/4	PVC RGS	SOUTH TOWER LOCK/GATE CONTROL PB 13	ZS-SPLSHC SOUTH SPAN LOCK HAND CRANK LIMIT SWITCH	CB934, 937, CB1836, 1836B, GND, 1-SP	5 #12 AWG, 1 #12 AGW GND	RW90, XLPE	
C029	1-1/2	PVC RGS	SOUTH TOWER I/O PANEL CP-3	SOUTH TOWER MOTOR CONTROL CENTER (CONT.)	1836B, 1836, 1836A, 1838, 1838A, CB934, 936, GND, 2-SP COMM. CHANNEL A COMM. CHANNEL B	9 #12 AWG, 1 #12 AWG GND COAXIAL	RW90, XLPE	CONDUIT C012 IS ALSO INSTALLED BETWEEN CP-3 AND SOUTH TOWER MCC
C030	3/4	PVC RGS	SOUTH TOWER I/O PANEL CP-3	ULTIMATE SKEW RESOLVER	MFR CABLE	MFR CABLE		
C031	1-1/2	PVC RGS	SOUTH TOWER I/O PANEL CP-3	MOTOR DIRVE IE-SL	CB1008, 1008, 1009, CB2001, 2001, 2002, 2103, LP2-1N, GND, 1-SP COMM. CHANNEL A COMM. CHANNEL B 1132+, 1133-, 1135+, 1136-, 1-SP TSP	9 #12 AWG, 1 #12 AWG GND COAXIAL 3 TWISTED SHIELDED PAIR	RW90, XLPE	
C032	1-1/2	PVC RGS	SOUTH TOWER I/O PANEL CP-3	MOTOR DRIVE 2W-MA	CB1012, 1012, 1013, CB2001, 2001, 2002, 2003, LP2-1N, GND, 2-SP COMM. CHANNEL A COMM. CHANNEL B 1151+, 1152-, 1154+, 1155-, 1-SP TSP	10 #12 AWG, 1 #12 AWG GND COAXIAL 3 TWISTED SHIELDED PAIR	RW90, XLPE	
C033	1-1/2	PVC RGS	SOUTH TOWER I/O PANEL CP-3	SOUTH MOTOR. RM LOCK/GATE CONTROL PB 14	CB1010, 1010, 1011, CB1014, 1014, 1007, 1007A, 1015, 1008, 1006A, 1016, 1005, 1005A, GND, 1-SP	14 # 12AWG, 1 #12AWG GND	RW90, XLPE	
C034	3/4	PVC RGS	SOUTH MOTOR. RM LOCK/GATE CONTROL PB 14	SOUTH TOWER LOCK/GATE CONTROL PB 13	CB1010, 1010, 1011, GND, 1-SP	4 # 12AWG, 1 #12AWG GND	RW90, XLPE	
C035	3/4	PVC RGS	SOUTH TOWER LOCK/GATE CONTROL PB 13	ZS-SWFS SOUTHWEST FULLY SEATED LIMIT SWITCH	CB1010, 1010, GND, 1-SP	3 #12 AWG, 1 #12 AGW GND	RW90, XLPE	
C036	3/4	PVC RGS	SOUTH TOWER LOCK/GATE CONTROL PB 13	ZS-SDFS SOUTHEAST FULLY SEATED LIMIT SWITCH	CB1010, 1011, GND, 1-SP	3 #12 AWG, 1 #12 AGW GND	RW90, XLPE	
C037	3/4	PVC RGS	SOUTH TOWER I/O PANEL CP-3	ZS-SDFIL SOUTH DIFFERENTIAL LOCKED LIMIT SWITCH	CB1021, 1021, 1022, GND, 1-SP	4 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C038	3/4	PVC RGS	SOUTH TOWER I/O PANEL CP-3	ZS-SADE SOUTH AUX. DRIVE ENGAGED LIMIT SWITCH	CB1021, 1023, 1024, GND, 1-SP	4 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C039	3/4	PVC RGS	SOUTH TOWER I/O PANEL CP-3	SOUTH AUX. DRIVE BRIDGE POSITION SENSING/INDICATING PANEL	2513+, 2512-, 2543+, 2542-, 1-SP TSP	3 TWISTED SHIELDED PAIR		

2. BOND AERIAL 1/0 GROUND CONDUCTOR TO EXISTING NORTH AND SOUTH GROUNDING SYSTEM CONDUCTORS.




CONDUIT AND CABLE SCHEDULE 3

FEEDER NO.	CONDUIT		FROM	TO	SERVICE	CONTAINS CABLES	INSULATION 600V	REMARKS
	SIZE [INCHES]	MATERIAL						
C040	3/4	PVC RGS	SOUTH SPAN POSITION RESOLVER ZT-2504	SOUTH AUX. DRIVE BRIDGE POSITION SENSING/INDICATING PANEL	MFR. CABLE	MFR. CABLE		6 CONDUCTORS WITH OVERALL SHIELD
C041	3/4	PVC RGS	SOUTH TOWER I/O PANEL CP-2 (BIAXIAL TILT SENSOR WIRELESS MODULE)	ANTENNA MOUNTED ON NORTH FACE OF CONTROL HOUSE (FOR SOUTH SPAN SKEW INCLINOMETER)	MFR. CABLE	MFR. CABLE		
C042	3/4	PVC RGS	ZS-SDIFL SOUTH DIFFERENTIAL LOCKED LIMIT SWITCH	ZS-SDIFUL SOUTH DIFFERENTIAL UNLOCKED LIMIT SWITCH	CB1021, 1021, 1022, GND, 1-SP	4 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C043	3/4	PVC RGS	ZS-SADDE SOUTH AUX. DRIVE ENGAGED LIMIT SWITCH	ZS-SADDE SOUTH AUX. DRIVE DISENGAGE LIMIT SWITCH	CB1021, 1023, 1024, GND, 1-SP	4 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C044	3/4	PVC RGS	NORTH TOWER I/O PANEL CP-4	NORTH TOWER DISTRIBUTION PANEL LP-3	LP3-1H, LP3-1N, LP3-2H, LP3-2N, GND	5 #10 AWG, 1 #10 GND	RW90, XLPE	
C045	2	PVC RGS	NORTH TOWER I/O PANEL CP-4	NORTH TOWER MOTOR CONTROL CENTER	MCR-4H, LP3-1N, CB1206, 1208, CB1209, 1211, CB1212, 1214, CB1217, 1219, 1316, 1317, 1318, 1319, 1517D, 1519D, 1521D, 1523D, 1525D, 1527D, 1530D, 1532D, CB1234, 1236, CB1935, 1935, 1935A, 1937, 1937A, 1300, 1301, CB1300, 1302, 1303, GND, 7-SP COMM. CHANNEL A COMM. CHANNEL B	41 #12 AWG, 1 #12 AWG GND COAXIAL	RW90, XLPE	
C046	2	PVC RGS	NORTH TOWER I/O PANEL CP-4	NORTH MOTOR RM GATE/LOCK CONTROL PB 36	CB1206, 1206, 1207, 1517, 1517D, 1519, 1519D, CB1209, 1209, 1210, 1521, 1521D, 1523, 1523D, CB1212, 1212, 1213, 1525, 1525D, 1527, 1527D, CB1217, 1217, 1218, 1530, 1530D, 1532, 1532D, 1608, 1610, GND, 6-SP	36 #12 AWG, 1 #12AWG GND	RW90, XLPE	
C047	2	PVC RGS	NORTH MOTOR RM GATE/LOCK CONTROL PB 36	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	CB1206, 1206, 1207, 1517, 1517D, 1519, 1519D, CB1209, 1209, 1210, 1521, 1521D, 1523, 1523D, CB1700, EA2-4N, CB1212, 1212, 1213, 1525, 1525D, 1527, 1527D, CB1217, 1217, 1218, 1530, 1530D, 1532, 1532D, 1608, 1610, CB1700, EA2-4N, 1713, 1715, 1716, 1717, 1701, 1702, 1703, 1701A, 1704, 1708, 1708A, 1709, 1710, 1711, GND, 6-SP	54 #12 AWG, 1 #12AWG GND	RW90, XLPE	
C048	1-1/2	PVC RGS	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	NORTH PASSAGE NORTHEAST CONTROL PB 38	CB1206, 1206, 1207, 1517, 1517D, 1519, 1519D, 1608, 1610, CB1700, EA2-4N, 1701, 1702, 1703, 1701A, 1716, GND, 2-SP	18 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C049	1-1/2	PVC RGS	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	NORTH PASSAGE NORTHWEST CONTROL PB 37	CB1209, 1209, 1210, 1521, 1521D, 1523, 1523D, CB1700, EA2-4N, 1713, 1715, 1701, 1702, 1703, 1704, 1711, GND, 2-SP	18 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C050	1	PVC RGS	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	BARRIER GATE NORTHEAST BG-NE	CB1212, 1212, 1213, 1525, 1525D, 1527, 1527D, CB1700, EA2-4N, 1717, GND, 2-SP	12 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C051	1	PVC RGS	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	PEDESTRIAN GATE NORTHWEST PG-NW	CB1217, 1217, 1218, 1530, 1530D, 1532, 1532D, GND, 2-SP	9 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C052	2	PVC RGS	SOUTH TOWER COMMUNICATIONS TERMINAL CABINETS	JB-42 (CONTROL HOUSE ELECTRICAL EQUIPMENT RM., 2ND FLOOR)	1517, 1519, 1521, 1523, 1525, 1525D, 1527, 1527D, 1530, 1532, 1608, 1610, LP3-1H, MCR-4H, CB1700, EA2-4N, 1713, 1715, 1716, 1717, 1701, 1702, 1703, 1701A, 1704, 1708, 1708A, 1709, 1710, 1711, GND, 4-SP	34 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C053	1-1/2	PVC RGS	NORTH TOWER I/O PANEL CP-4	NORTH MOTOR RM BRAKE CONTROL PB 35	CB1222, 1222, 1223, 1224, CB1225, 1225, 1226, 1227, CB1228, 1228, 1229, 1230, CB1231, 1231, 1232, 1233, GND, 4-SP	20 #12AWG, 1 #12AWG GND	RW90, XLPE	
C054	3/4	PVC RGS	NORTH MOTOR RM BRAKE CONTROL PB 35	MOTOR BRAKE N1	CB1222, 1222, 1223, 1224, GND, 1-SP	5 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C055	3/4	PVC RGS	NORTH MOTOR RM BRAKE CONTROL PB 35	MACHINERY BREAK N2	CB1225, 1225, 1226, 1227, GND, 1-SP	5 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C056	3/4	PVC RGS	NORTH MOTOR RM BRAKE CONTROL PB 35	MACHINERY BREAK N3	CB1228, 1228, 1229, 1230, GND, 1-SP	5 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C057	3/4	PVC RGS	NORTH MOTOR RM BRAKE CONTROL PB 35	MOTOR BREAKE N4	CB1231, 1231, 1232, 1233, GND, 1-SP	5 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C058	1-1/2	PVC RGS	NORTH TOWER I/O PANEL CP-4	NORTH MOTOR RM GATE/LOCK CONTROL PB 36	CB1234, 1234A, 1235A, 1237, 1935, 1935A, 1937, 1937A, CB1935, 1935B, 1608, 1610, CB1700, EA2-4N, 1713, 1715, 1716, 1717, 1701, 1702, 1703, 1701A, 1704, 1708, 1708A, 1709, 1710, 1711, GND, 4-SP	32#12AWG, 1 #12AWG GND	RW90, XLPE	
C059	1	PVC RGS	NORTH MOTOR RM GATE/LOCK CONTROL PB 36	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	CB1234, 1234A, 1235A, 1237, 1935, 1935A, 1937, 1937A, CB1935, 1935B, 1608, 1610, GND, 2-SP	14 #12AWG, 1 #12AWG GND	RW90, XLPE	
C060	1	PVC RGS	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	NORTHWEST SPAN LOCK LIMIT SWITCH ZS-SPLNW	CB1234, 1234A, 1235A, 1935, 1935A, 1937, 1937A, GND, 2-SP	9 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C061	3/4	PVC RGS	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	ZS-SPLNHC NORTH SPAN LOCK HAND CRANK LIMIT SWITCH	CB1234, 1237, CB1935, 1935B, GND, 1-SP	5 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C062	3/4	PVC RGS	NORTH TOWER I/O PANEL CP-4	ULTIMATE SKEW RESOLVER	MFR CABLE	MFR CABLE		

CONDUIT AND CABLE SCHEDULE 3 (CONTINUED)


FEEDER NO.	CONDUIT		FROM	TO	SERVICE	CONTAINS CABLES	INSULATION 600V	REMARKS
	SIZE [INCHES]	MATERIAL						
C063	1-1/2	PVC RGS	NORTH TOWER I/O PANEL CP-4	MOTOR DRIVE 3E-MA	CB1308, 1308, 1309, CB2301, 2301, 2302, 2303, 2304, LP3-1N, GND, 2-SP COMM. CHANNEL A COMM. CHANNEL B 1432+, 1433-, 1435+, 1436-, 1-SP TSP	11 #12 AWG, 1 #12 AWG GND COAXIAL 3 TWISTED SHIELDED PAIR	RW90, XLPE	
C064	1-1/2	PVC RGS	NORTH TOWER I/O PANEL CP-4	MOTOR DRIVE 4W-SL	CB1312, 1312, 1313, CB2301, 2301, 2203, LP3-1N, 2205, GND, 2-SP COMM. CHANNEL A COMM. CHANNEL B 1451+, 1452-, 1454+, 1455-, 1-SP TSP	10 #12 AWG, 1 #12 AWG GND COAXIAL 3 TWISTED SHIELDED PAIR	RW90, XLPE	
C065	1	PVC RGS	NORTH TOWER I/O PANEL CP-4	NORTH MOTOR RM GATE/LOCK CONTROL PB 36	CB1310, 1310, 1311, GND, 2-SP	5 #12AWG, 1 #12AWG GND	RW90, XLPE	
C066	1	PVC RGS	NORTH MOTOR RM GATE/LOCK CONTROL PB 36	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	CB1310, 1310, 1311, GND, 2-SP	5 #12AWG, 1 #12AWG GND	RW90, XLPE	
C067	3/4	PVC RGS	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	ZS-NWFS NORTHWEST FULLY SEATED LIMIT SWITCH	CB1310, 1310, GND, 1-SP	3 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C068	3/4	PVC RGS	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	ZS-NEFS NORTHEAST FULLY SEATED LIMIT SWITCH	CB1310, 1311, GND, 1-SP	3 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C069	3/4	PVC RGS	NORTH TOWER I/O PANEL CP-4	ZS-NDIFL NORTH DIFFERENTIAL LOCKED LIMIT SWITCH	CB1320, 1320, 1321, GND, 1-SP	4 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C070	3/4	PVC RGS	NORTH TOWER I/O PANEL CP-4	ZS-NADE NORTH AUX DRIVE ENGAGED LIMIT SWITCH	CB1320, 1322, 1323, GND, 1-SP	4 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C071	3/4	PVC RGS	NORTH TOWER I/O PANEL CP-4	NORTH AUX. DRIVE BRIDGE POSITION SENSING/INDICATION PANEL	2512-, 2513+, 2542-, 2543+, 1-SP TSP	3 TWISTED SHIELDED PAIR		
C072	1	PVC RGS	SOUTHWEST SPAN LOCK LIMIT SWITCH ZS-SPLSW	SOUTHEAST SPAN LOCK LIMIT SWITCH ZS-SPLSE	934, 935, 934A, 935A, 1836, 1836A, 1838, 1838A, GND, 1-SP	9 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C073	1	PVC RGS	SOUTH PASSAGE SOUTHEAST CONTROL PB 41	TRAFFIC GATE SOUTHEAST TG-SE	CB906, 906, 907, 1501, 1501D, 1503, 1503D, 1608, 1609, 1632, 1633, CB1620, EA2-6N, GND, 1-SP	14 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C074								
C075	3/4	PVC RGS	ZS-NDIFL NORTH DIFFERENTIAL LOCKED LIMIT SWITCH	ZS-NDIFUL NORTH DIFFERENTIAL UNLOCKED LIMIT SWITCH	CB1320, 1321, GND, 1-SP	3 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C076	3/4	PVC RGS	ZS- NADE NORTH AUX DRIVE ENGAGED LIMIT SWITCH	ZS-NADDE NORTH AUX. DRIVE DISENGAGED LIMIT SWITCH	CB1320, 1323, GND, 1-SP	3 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C077A			SOUTH TOWER COMMUNICATIONS TERMINAL CABINET	NORTH TOWER I/O PANEL CP-4	LP3-1H, MCR-4H, 207, UPS-6N, 1517, 1519, 1521, 1523, 1525, 1527, 1530, 1532, 1701, 1701A, 1702, 1703, 1704, 1708, 1708A, 1709, 1710, 1711, 1713, 1715, 1716, 1717, CB1700, 1608, 1610, EA2-4N, CB1935, 1935, 1937, 2205, CB2301, 2308, 2309, 2310, 2304, GND, 20-SP	59 #12 AWG, 1 # 12 AWG GND	RW90	AERIAL CABLE
C077B			SOUTH TOWER COMMUNICATIONS TERMINAL CABINET	NORTH TOWER I/O PANEL CP-4	COMM. CHANNEL A COMM. CHANNEL B, SP 3/4" INTERDUCT WITH: SYNCHLINK FIBER OPTIC CABLE & 2512-, 2513+, 2542-, 2543+ MEDIA 100 BASEFX MULTIMODE FIBER - DOUBLE JACKET	3-COAXIAL RG-6 SYNCHLINK FIBER OPTIC CABLE, 2 TWISTED SHIELDED PAIR 48 FIBER NETWORK		AERIAL CABLE
C077C			EXISTING CCTV CABINET - SOUTH	EXISTING CCTV CABINET - NORTH	CCTV SYSTEM CAMERA POWER P.A. SYSTEM FIRE PROTECTION HEAT DETECTORS	2 #1/0 AWG, 1000 V 1 #6 AWG GND 14 #12 AWG 8 #10 AWG	XLPE RW90 RW90	AERIAL CABLE
C078A			SOUTH TOWER COMMUNICATIONS TERMINAL CABINET	NORTH TOWER I/O PANEL CP-4	SOUTH SYSTEM GROUND, NOTE 2 NORTH SYSTEM GROUND, NOTE 2	1 #1/0 AWG GND	RW90	AERIAL CABLE
C078B			SOUTH TOWER COMMUNICATIONS TERMINAL CABINET	NORTH TOWER I/O PANEL CP-4	LP3-1H, MCR-4H, 207, UPS-6N, 1517, 1519, 1521, 1523, 1525, 1527, 1530, 1532, 1701, 1701A, 1702, 1703, 1704, 1708, 1708A, 1709, 1710, 1711, 1713, 1715, 1716, 1717, CB1700, 1608, 1610, EA2-4N, CB1935, 1935, 1937, 2205, CB2301, 2308, 2309, 2310, 2304, GND, 20-SP	59 #12 AWG, 1 #12 AWG GND	RW90	AERIAL CABLE
			SOUTH TOWER COMMUNICATIONS TERMINAL CABINET	NORTH TOWER I/O PANEL CP-4	COMM. CHANNEL A COMM. CHANNEL B, SP 3/4" INTERDUCT WITH: SYNCHLINK FIBER OPTIC CABLE & 2512-, 2513+, 2542-, 2543+ MEDIA 100 BASEFX MULTIMODE FIBER - DOUBLE JACKET	3-COAXIAL RG-6 SYNCHLINK FIBER OPTIC CABLE, 2 TWISTED SHIELDED PAIR 48 FIBER NETWORK		AERIAL CABLE

NOTES:
1. CONDUIT AND CABLE SCHEDULE AND SERVICE DESIGNATIONS ARE INTENDED AS A GUIDE FOR THE CONTRACTOR AND ARE NOT CONSIDERED TO BE COMPLETE. THE CONTRACTOR MUST COMPLETE THE SCHEDULE AND SUBMIT WITH THE SHOP DRAWINGS BASED ON CONTRACTOR SELECTED EQUIPMENT BRANDS AND MODELS AND FINAL CONFIGURATIONS.
2. BOND AERIAL 1/0 GROUND CONDUCTOR TO EXISTING NORTH AND SOUTH GROUNDING SYSTEM CONDUCTORS.




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Architectural and Engineering Services
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Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.

A

B

C

Detail No.
No. du détail

drawing no. - where detail required
dessin no. - où détail exigé

drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet

HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

CONDUIT AND CABLE SCH. 3

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date du projet

2013-05-31

project no.
no. du projet

R.012641.001

drawing no.
dessiné no.

E-88


CONDUIT AND CABLE SCHEDULE 4

FEEDER NO.	CONDUIT		FROM	TO	SERVICE	CONTAINS CABLES	INSULATION 600V	REMARKS
	SIZE [INCHES]	MATERIAL						
C078C			EXISTING CCTV CABINET - SOUTH	EXISTING CCTV CABINET - NORTH	CCTV SYSTEM CAMERA POWER	2 #1/0 AWG, 1000 V 1 #6 AWG GND	XLPE	AERIAL CABLE
					P.A. SYSTEM FIRE PROTECTION	14 #12 AWG	RW90	
					HEAT DETECTORS	8 #10 AWG	RW90	
			SOUTH SYSTEM GROUND, (SEE NOTE 2)	NORTH SYSTEM GROUND, (SEE NOTE 2)		1 #1/0 AWG GND	RW90	
C079	1	PVC RGS	SOUTH TOWER I/O PANEL CP-3	SOUTH MOTOR ROOM LOCK/GATE PB 14	CB1014, 1014, 1015, 1016, 1005, 1005A, 1006, 1006A, 1007, 1007A, GND, 1-SP	11 #12 AWG, 1#12 GND	RW90, XLPE	
C080	3/4	PVC RGS	SOUTH MOTOR ROOM LOCK/GATE PB 14	NEAR FULL SEATED LIMIT SWITCH ZS-SNFS	CB1014, 1014, 1007, 1007A, GND, 1-SP	5 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C081	3/4	PVC RGS	SOUTH MOTOR ROOM LOCK/GATE PB 14	NEAR FULLY RAISED LIMIT SWITCH ZS-SNFR	CB1014,1015, 1006, 1006A, GND, 1-SP	5 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C082	3/4	PVC RGS	SOUTH MOTOR ROOM LOCK/GATE PB 14	FULLY RAISED LIMIT SWITCH ZS-SFR	CB1014, 1016, 1005, 1005A, GND, 1-SP	5 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C083	3/4	PVC RGS	NORTH PASSAGE NORTHEAST CONTROL PB 38	TRAFFIC LIGHT TL-NE	1701, 1702, 1703, 1701A, GND, 2-SP	6 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C084	3/4	PVC RGS	SOUTH PASSAGE SOUTHWEST CONTROL PB 40	TRAFFIC LIGHT TL-SW AND PEDESTRIAN LIGHT PD-SW1	1621, 1622, 1623, 1624, 1627, 1628, 1627A, GND, 2-SP	9 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C085	3/4	PVC RGS	NORTH TOWER I/O PANEL CP-4	NORTH TOWER OVERSPEED SWITCH	MFR. CABLE	MFR. CABLE		
C086	3/4	PVC RGS	SOUTH TOWER I/O PANEL CP-3	SOUTH TOWER OVERSPEED SWITCH	MFR. CABLE	MFR. CABLE		
C087	3/4	PVC RGS	NORTH PASSAGE NORTHWEST CONTROL PB 37	TRAFFIC LIGHT TL-NW	1701, 1702, 1703, 1704, GND, 2-SP	6 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C088	3/4	PVC RGS	DRIVE MOTOR 2W-MA ENCODER	VECTOR DRIVE 2W-MA	MFR. CABLE	MFR. CABLE		
C089	3/4	PVC RGS	DRIVE MOTOR 1E-SL ENCODER	VECTOR DRIVE 1E-SL	MFR. CABLE	MFR. CABLE		
C090	3/4	PVC RGS	DRIVE MOTOR 4W-SL ENCODER	VECTOR DRIVE 4W-SL	MFR. CABLE	MFR. CABLE		
C091	3/4	PVC RGS	DRIVE MOTOR 3E-MA ENCODER	VECTOR DRIVE 3E-MA	MFR. CABLE	MFR. CABLE		
C092	3/4	PVC RGS	SOUTH PASSAGE SOUTHEAST CONTROL PB 41	TRAFFIC LIGHT TL-SE	1621, 1622, 1623, 1621A, GND, 2-SP	6 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C093	3/4	PVC RGS	NORTH SPAN POSITION RESOLVER ZT-2534	NORTH AUX. DRIVE BRIDGE POSITION SENSING/INDICATION PANEL	MFR. CABLE	MFR. CABLE		
C094	3/4	PVC RGS	MAIN CONTROL CONSOLE CP-2	HOUSE GENERATOR ATS	CB455, 455, GND, 2-SP (NEW CONDUCTORS INSTALLED IN EXISTING CONDUIT)	4 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C095	1	PVC RGS	DISTRIBUTION PANEL EA	TRAFFIC AND PEDESTRIAN SIGNAL SYSTEM CONTROL PANEL CP-6	EA-5H, EA-7H, EA-6H, EA-6N, GND, 2-SP	6 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C096	3/4	PVC RGS	DISTRIBUTION PANEL EA2	TRAFFIC AND PEDESTRIAN SIGNAL SYSTEM CONTROL PANEL CP-6	EA2-4H, EA2-4N, EA-5H, EA-7H, EA-6H, EA-6N, GND, 2-SP	8 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C097	3/4	PVC RGS	DISTRIBUTION PANEL AA	TRAFFIC AND PEDESTRIAN SIGNAL SYSTEM CONTROL PANEL CP-6	AA-37H, AA-37N, GND, 2-SP	4 #12 AWG, 1#12 AWG GND	RW90, XLPE	
C098	1	PVC RGS	SOUTH TOWER COMMUNICATIONS TERMINAL CABINET	SOUTH MOTOR. RM LOCK/GATE CONTROL PB 14	SPARE CONDUIT WITH PULL STRING			
C099	2	PVC RGS	JB-42 (CONTROL HOUSE ELECTRICAL EQUIPMENT RM., 2ND FLOOR)	TRAFFIC AND PEDESTRIAN SIGNAL SYSTEM CONTROL PANEL CP-6	CB206, 221, 443, 444, 445, 446, 447, 448, CB474, 474, 475, 476, CB841, 844, CB740, 1742, 1745, 1608, 1609, 1610, 1621, 1622, 1623, 1621A, 1624, 1627, 1628, 1627A, 1628A, 1629, EA2-6N, 1630, 1632, 1633, 1634, CB1620, CB1700, EA2-4N, 1713, 1715, 1716, 1717, CB1748, 1754, UPS-6N, 1701, 1702, 1703, 1701A, 1704, 1708, 1708A, 1709, 1710, 1711, GND, 6-SP	61#12 AWG,1 #12 AWG GND	RW90, XLPE	
C100	2	PVC RGS	SOUTH TOWER I/O PANEL CP-2	JB-42 (CONTROL HOUSE ELECTRICAL EQUIPMENT RM., 2ND FLOOR)	CB206, 221, 443, 444, 445, 446, 447, 448, CB474, 474, 475, 476, CB841, 844, CB740, 1517, 1519, 1521, 1523, 1525, 1527, 1530, 1532, 1742, 1745, MCR-4H, LP3-1N, UPS-6N, GND, 2-SP	30 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C101	2	PVC RGS	JB-42 (CONTROL HOUSE ELECTRICAL EQUIPMENT RM., 2ND FLOOR)	SOUTH TOWER LOCK/GATE CONTROL PB 13	1608, 1609, 1621, 1622, 1623, 1621A, 1624, 1627, 1628, 1627A, 1628A, 1629, EA2-6N, 1630, 1631, 1632, 1633, 1634, CB1620, CB1748, 1754, GND, 3-SP	24 #12 AWG,1 #12 AWG GND	RW90, XLPE	
C102	3/4	PVC RGS	CONROL PANEL CP-2	EXISTING HOUSE GENERATOR ANNUNCIATOR PANEL	CB455, 456, GND, 1-SP	3 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C103	3/4	PVC RGS	CONTROL PANEL CP-2	EXISTING MAIN GENERATOR ANNUNCIATOR PANEL	CB457, 457, 459, GND, 1-SP	4 #12 AWG, 1 #12 AWG GND	RW90, XLPE	

CONDUIT AND CABLE SCHEDULE 4 (CONTINUED)


FEEDER NO.	CONDUIT		FROM	TO	SERVICE	CONTAINS CABLES	INSULATION 600V	REMARKS
	SIZE [INCHES]	MATERIAL						
C104	3/4	PVC RGS	SOUTH PASSAGE SOUTHWEST CONTROL PB 40	EXISTING PEDESTRIAN LIGHT PD-SW2 AND PEDESTRIAN BELL	1627, 1628, 1628A, 1629, EA2-6N, GND, 1-SP	6 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C105	1	PVC RGS	SOUTH PASSAGE SOUTHWEST CONTROL PB 40	TRAFFIC GATE SOUTHWEST TG-SW	CB909, 909, 910, 1505, 1505D,1507, 1507D, 1630, CB1620, EA2-6N, 1608, 1609, GND, 1-SP	13 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C106	3/4	PVC RGS	NORTHWEST SPAN LOCK LIMIT SWITCH ZS-SPLNW	NORTHEAST SPAN LOCK LIMIT SWITCH ZS-SPLNE	1234, 1234A, 1235, 1235A, 1935, 1935A, 1937, 1937A, GND, 1-SP	9 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C107	1	PVC RGS	NORTH PASSAGE NORTHWEST CONTROL PB 37	TRAFFIC GATE NORTHWEST TG-NW	CB1209, 1209, 1210, 1521, 1521D, 1523, 1523D, 1713, 1715, CB1700, EA2-4N, GND, 1-SP	12 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C108	1	PVC RGS	NORTH TOWER SPAN LOCK/GATES CONTROL PB 3	PEDESTRIAN LIGHT PB 39	1708, 1708A, 1709, 1710, 1711, EA2-4N, GND, 1-SP	7 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C109	EXISTING CONDUIT		PEDESTRIAN LIGHT PB 39	PEDESTRIAN LIGHT PD-NW1	1708, 1708A, 1709, GND, 1-SP	4 #12 AWG, 1 #12 AWG GND	RW90, XLPE	NEW WIRING IN EXIST. CONDUIT
C110	EXISTING CONDUIT		PEDESTRIAN LIGHT PB 39	PEDESTRIAN LIGHT PD-NW2 AND PEDESTRIAN BELL	1708, 1708A, 1710, 1711, EA2-4N, GND, 1-SP	6 #12 AWG, 1 #12 AWG GND	RW90, XLPE	NEW WIRING IN EXIST. CONDUIT
C111	1	PVC RGS	NORTH PASSAGE NORTHEAST CONTROL PB 38	TRAFFIC GATE NORTHEAST TG-NE	CB1206, 1206, 1207, 1517, 1517D, 1519, 1519D, 1608, 1610, EA2-4N, CB1700, 1716, GND, 1-SP	13 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C112	1-1/2	PVC RGS	SOUTH TOWER I/O PANEL CP-3	SOUTH TOWER COMMUNICATIONS TERMINAL CABINET	2205, CB2301, 2308, 2309, 2310, 2304, CB1935, 1935, 1937, 207, UPS-6N, GND, 4-SP	15 #12 AWG, 1 #12 AWG GND	RW90, XLPE	
C113	NOT USED							
C114	3/4	PVC RGS	SOUTH TOWER I/O PANEL CP-3	SOUTH TOWER COMMUNICATIONS TERMINAL CABINET	2512-, 2513+, 2542-, 2543+, GND, 1-SP TSP	3 TWISTED SHIELDED PAIR		

NOTES:
1. CONDUIT AND CABLE SCHEDULE AND SERVICE DESIGNATIONS ARE INTENDED AS A GUIDE FOR THE CONTRACTOR AND ARE NOT CONSIDERED TO BE COMPLETE. THE CONTRACTOR MUST COMPLETE THE SCHEDULE AND SUBMIT WITH THE SHOP DRAWINGS BASED ON CONTRACTOR SELECTED EQUIPMENT BRANDS AND MODELS AND FINAL CONFIGURATIONS.
2. BOND AERIAL 1/0 GROUND CONDUCTOR TO EXISTING NORTH AND SOUTH GROUNDING SYSTEM CONDUCTORS.




Public Works and Government Services Canada
Architectural and Engineering Services
Ontario Region


Travaux publics et Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario



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Professional Engineers Ontario
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Name: Mark VanDeRee
Number: 100161047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date : July 31, 2014
Association of Professional Engineers of Ontario



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date
Do not scale drawings. Verify all dimensions and conditions on site and immediately notify the Departmental Representative of all discrepancies.		
<div><div><div><div>A</div><div>B</div><div>C</div></div><div><div>A</div><div>B</div><div>C</div></div></div><div><div>Detail No. No. du détail</div><div>drawing no. - where detail required dessin no. - où détail exigé</div><div>drawing no. - where detailed dessin no. - où détaillé</div></div></div>		
project title titre du projet HAMILTON ONTARIO BURLINGTON CANAL VERTICAL LIFT BRIDGE REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES		
drawing title titre du dessin CONDUIT AND CABLE SCH. 4		
drawn by dessiné par	D. Buro	
designed by conc par	D. Raffington/J. Chin	
approved by approuvé par	M. VanDeRee	
bid soumission	A. Ghubril	project manager administrateur de projets
project date date du projet	2013-05-31	
project no. no. du projet	R.012641.001	
drawing no. dessiné no.	E-89	

EXISTING ELECTRICAL PANEL SCHEDULE (PANEL NO: LP-EA2)

SERVICE VOLTAGE: 120/208V
MOUNTING: SURFACE

BUS RATING:
BUS CONNECTION:

LOCATION: CONTROL BUILDING ELECTRICAL ROOM

DESCRIPTION	VOLT AMPS			BREAKER		BUS CONN. CKT No	BUS CONN. CKT No	BREAKER		VOLT AMPS			DESCRIPTION	
	A	B	C	POLE	AMP			AMP	POLE	A	B	C		
BATTERY CHARGER				1	15	1	●	2	15	1			TRAFFIC & PEDESTRIAN SIGNALS CONTROL POWER	
DAMPERS & CONTROLS				1	15	3	●	4	15	1			NORTH TRAFFIC SIGNALS	
BLOCK HEATER				1	15	5	●	6	15	1			SOUTH TRAFFIC SIGNALS	
NAVIGATION HORN COMPRESSOR				3	20	7	●	8	15	1			NAVIGATION SIGNAL – CONTROL POWER	
			9			●	10							SPACE
			11			●	12							SPACE
SPACE						13	●	14					SPACE	
SPACE						15	●	16					SPACE	
SPACE						17	●	18					SPACE	
SPACE						19	●	20					SPACE	
SPACE						21	●	22					SPACE	
SPACE						23	●	24					SPACE	
SPACE						25	●	26					SPACE	
SPACE						27	●	28					SPACE	
SPACE						29	●	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	
TOTAL							S/N						TOTAL	

BUS A: MAIN BREAKER RATING: LINE AMPS:
BUS B: PHASING:
BUS C:
TOTAL LOAD: AIC =

EXISTING ELECTRICAL PANEL SCHEDULE (PANEL NO: LP-3)

SERVICE VOLTAGE: 120/208V
MOUNTING: SURFACE

BUS RATING:
BUS CONNECTION:

LOCATION: NORTH MOTOR ROOM

DESCRIPTION	VOLT AMPS			BREAKER		BUS CONN. CKT No	BUS CONN. CKT No	BREAKER		VOLT AMPS			DESCRIPTION
	A	B	C	POLE	AMP			AMP	POLE	A	B	C	
NORTH I/O PANEL CP-4				1	15	1	●	2	15	1			RECEPTACLES
SHEAVE ROOM LIGHTS				1	15	3	●	4	15	1			MOTOR ROOM LIGHTS
ELEVATOR PENTHOUSE				1	15	5	●	6	15	1			MOTOR ROOM EXHAUST FAN
SHEAVE ROOM HOIST				1	15	7	●	8	15	1			ELEVATOR CONTROL
MOTOR ROOM HEAT CONTROL				2	30	9	●	10	15	1			MOTOR ROOM CEILING FANS
PENTHOUSE HEATER				2	30	11	●	12	15	1			ELEVATOR LIGHTS
RECEPTACLES				1	15	13	●	14	20	1			RECEPTACLES BELOW PANEL
			15			●	16	15	1			MOTOR ROOM HOIST	
SPARE				1	20	17	●	18	15	1			CANADA SIGN
TOTAL							S/N						TOTAL

BUS A: MAIN BREAKER RATING: LINE AMPS:
BUS B: PHASING:
BUS C:
TOTAL LOAD: AIC =

EXISTING ELECTRICAL PANEL SCHEDULE (PANEL NO: LP-2)

SERVICE VOLTAGE: 120/208V
MOUNTING: SURFACE


BUS RATING:
BUS CONNECTION:

LOCATION: SOUTH MOTOR ROOM

DESCRIPTION	VOLT AMPS			BREAKER		BUS CONN. CKT No	BUS CONN. CKT No	BREAKER		VOLT AMPS			DESCRIPTION
	A	B	C	POLE	AMP			AMP	POLE	A	B	C	
SOUTH I/O PANEL CP-3				1	15	1	●	2	15	1			RECEPTACLES
LIGHTS				1	15	3	●	4	15	1			HEATER CONTROL
ELEVATOR PENTHOUSE UTF				1	15	5	●	6	15	1			SPARE-EXIT & EMERGENCY SIGN
FAN				1	15	7	●	8	15	1			ELEVATOR CONTROL
SPARE				2	30	9	●	10	15	1			CEILING FANS
			11			●	12	15	1			HEATER PENTHOUSE	
LIGHTS				1	15	13	●	14	20	1			RECEPTACLES BELOW PANEL
CANADA SIGN LIGHTS				1	15	15	●	16	15	1			MOTOR HEATERS
ELEVATOR LIGHTS				1	15	17	●	18	20	1			SPARE
TOTAL							S/N						TOTAL

BUS A: MAIN BREAKER RATING: LINE AMPS:
BUS B: PHASING:
BUS C:
TOTAL LOAD: AIC =


NOTE:
1. SCHEDULE AND SERVICE DESIGNATIONS ARE INTENDED AS A GUIDE FOR THE CONTRACTOR AND ARE NOT CONSIDERED TO BE COMPLETE. THE CONTRACTOR MUST COMPLETE THE SCHEDULE AND SUBMIT WITH THE SHOP DRAWINGS BASED ON CONTRACTOR SELECTED EQUIPMENT BRANDS AND MODELS AND FINAL CONFIGURATIONS.




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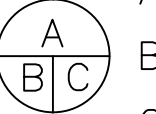
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada

Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario



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revision		date

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A Detail No.
No. du détail
B drawing no. – where detail required
dessin no. – où détail exigé
C drawing no. – where detailed
dessin no. – où détaillé

project title
titre du projet

HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE

ONTARIO

REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

ELECTRICAL PANEL SCHEDULE 1

drawn by
dessiné par

J. Perez

designed by
conc par

G. Patino/B. Crouthamel

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur de projets

project date
date du projet

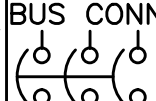
2013-05-31

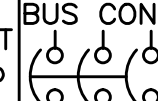
project no.
no. du projet

R.012641.001

drawing no.
dessiné no.

E-90

ELECTRICAL PANEL SCHEDULE (PANEL NO: LP-5)														
SERVICE VOLTAGE: <u>120/208V</u>			BUS RATING: <u>100A</u>			LOCATION: <u>NORTH MOTOR ROOM</u>								
MOUNTING: <u>SURFACE</u>			BUS CONNECTION: <u> </u>											
DESCRIPTION	VOLT AMPS			BREAKER		CKT No	BUS CONN. 	CKT No	BREAKER		VOLT AMPS			DESCRIPTION
	A	B	C	POLE	AMP				AMP	POLE	A	B	C	
TRAFFIC, BARRIER, AND PEDESTRIAN GATE HEATERS	1.6k			1	20	1	●	2	15	1				SPARE
RECEPTACLES, BG-NE AND TG-NE		800		1	20	3	●	4	15	1				SPARE
RECEPTACLES, TG-NW AND PG-NW			800	1	20	5	●	6	15	1				SPARE
SPARE				1	15	7	●	8	15	1				SPARE
SPARE				2	30	9	●	10	15	1				SPARE
						11	●	12	15	1				SPARE
SPARE				1	15	13	●	14	20	1				SPARE
SPARE				1	15	15	●	16	15	1				SPARE
SPARE				1	15	17	●	18	20	1				SPARE
SPACE				1	15	19	●	20	15	1				SPACE
SPACE				1	15	21	●	22	15	1				SPACE
SPACE				1	15	23	●	24	15	1				SPACE
TOTAL							S/N							TOTAL
BUS A: <u>1600</u>			MAIN BREAKER RATING: <u>100A</u>			LINE AMPS: <u>27</u>								
BUS B: <u>800</u>						PHASING: <u>3</u>								
BUS C: <u>800</u>														
TOTAL LOAD: <u>3200</u>			AIC = 25k											

ELECTRICAL PANEL SCHEDULE (PANEL NO: LP-6)														
SERVICE VOLTAGE: <u>120/208V</u>			BUS RATING: <u>100A</u>			LOCATION: <u>SOUTH MOTOR ROOM</u>								
MOUNTING: <u>SURFACE</u>			BUS CONNECTION: <u> </u>											
DESCRIPTION	VOLT AMPS			BREAKER		CKT No	BUS CONN. 	CKT No	BREAKER		VOLT AMPS			DESCRIPTION
	A	B	C	POLE	AMP				AMP	POLE	A	B	C	
TRAFFIC, BARRIER, AND PEDESTRIAN GATE HEATERS	1.6k			1	20	1	●	2	15	1				SPARE
RECEPTACLES, BG-SE AND TG-SE		800		1	20	3	●	4	15	1				SPARE
RECEPTACLES, TG-SW AND PG-SW			800	1	20	5	●	6	15	1				SPARE
SPARE				1	15	7	●	8	15	1				SPARE
SPARE				2	30	9	●	10	15	1				SPARE
						11	●	12	15	1				SPARE
SPARE				1	15	13	●	14	20	1				SPARE
SPARE				1	15	15	●	16	15	1				SPARE
SPARE				1	15	17	●	18	20	1				SPARE
SPACE						19	●	20						SPACE
SPACE						21	●	22						SPACE
SPACE						23	●	24						SPACE
TOTAL							S/N							TOTAL
BUS A: <u>1600</u>			MAIN BREAKER RATING: <u>100A</u>			LINE AMPS: <u>27</u>								
BUS B: <u>800</u>						PHASING: <u>3</u>								
BUS C: <u>800</u>														
TOTAL LOAD: <u>3200</u>			AIC = 25k											

EXISTING ELECTRICAL PANEL SCHEDULE (PANEL NO: LP-EA)														
SERVICE VOLTAGE: <u>120/208V</u>			BUS RATING: <u>225@240V</u>			LOCATION: <u>CONTROL BUILDING ELECTRICAL ROOM</u>								
MOUNTING: <u>SURFACE</u>			BUS CONNECTION: <u> </u>											
DESCRIPTION	VOLT AMPS			BREAKER		CKT No	BUS CONN.	CKT No	BREAKER		VOLT AMPS			DESCRIPTION
	A	B	C	POLE	AMP				POLE	A	B	C		
TO UPS	5k		5k	2	60	1	●	2	30	2				NORTH DIESEL HEATER
SIREN POWER				2	30	3	●	4						
						5		6	15	1				SIREN CONTROL
SPACE						7	●	8						SPACE
						9	●	10	15	1				CD1
CARD ACCESS				1	15	11		12	15	1				PUMP
2ND FLOOR SOUTHEAST CORNER RECEPTACLES				1	15	13	●	14	15	1				CAMERA NEW FCL 3RD
TANK MONITOR RECEPTACLES				1	15	15	●	16	15	1				SOUTHEAST CAMERA
LOAD BANK HEATER				1	15	17		18	15	1				ELEVATOR PIT RECEPTACLE & LIGHT (SOUTH)
FUEL PUMP				1	15	19	●	20	15	1				PLC ROOM RECEPTACLES
2ND FLOOR FURNACE				1	15	21	●	22	15	1				3RD FLOOR STAIRWELL FAN
1ST FLOOR RADIANT HEATER				1	15	23		24	15	1				CAMERA/MONITOR RECEPTACLE 3RD FLOOR
3RD FLOOR LIGHTS				1	15	25	●	26	15	1				3RD FLOOR CEILING HEATER FAN
3RD FLOOR BLIND MOTORS				1	15	27	●	28	15	1				2ND & 3RD FLOOR RECEPTACLES
SPARE				1	15	29		30	15	1				2ND FLOOR LIGHTS
SPARE				1	15	31	●	32	15	1				FIRE ALARM
1ST FLOOR LIGHTS				1	15	33		34	15	1				STAIRWELL LIGHTS
2ND FLOOR LIGHTS PLC ROOM				1	15	35	●	36	15	1				SPARE
2ND FLOOR LIGHTS				1	15	37		38	15	1				SPARE
NAVIGATION HORN				1	15	39		40	15	1				SPARE
1ST FLOOR HEAT TRACE				1	15	41	●	42	15	1				NAVIGATION SIGNALS
TOTAL							S/N							TOTAL
BUS A: _____			MAIN BREAKER RATING: <u>NONE</u>			LINE AMPS: _____								
BUS B: _____						PHASING: <u>3 PHASE/4W</u>								
BUS C: _____														
TOTAL LOAD: _____			AIC =											

EXISTING ELECTRICAL PANEL SCHEDULE (PANEL NO: LP-A)														
SERVICE VOLTAGE: 120/208V			BUS RATING: 225A@240V			LOCATION: CONTROL BUILDING ELECTRICAL ROOM								
MOUNTING: SURFACE			BUS CONNECTION: _____											
DESCRIPTION	VOLT AMPS			BREAKER		CKT No	BUS CONN.	CKT No	BREAKER		VOLT AMPS			DESCRIPTION
	A	B	C	POLE	AMP				AMP	POLE	A	B	C	
SPACE						1	●	2						2, 4, AND 6 3RD FLOOR PONY PANEL (SP)
SPACE						3	●	4	30	3				
SPACE						5	●	6						
KITCHENETTE				2	30	7	●	8	30	2				SOUTH DIESEL HEATER
						9	●	10						
SPARE				1	15	11	●	12	40	2				SPARE
SPARE				1	15	13	●	14						
RESISTORS FANS/LOUVERS				2	15	15	●	16	15	2				SPARE
						17	●	18						
SPACE						19	●	20	15	2				SPARE
SPACE						21	●	22						
SPACE						23	●	24						SPACE
SPACE						25	●	26						SPACE
1ST FLOOR LIGHTS				1	15	27	●	28						SPACE
CABLE REEL LIGHT				1	15	29	●	30						SPACE
SECURITY ALARM				1	15	31	●	32						SPACE
2ND & 3RD FLOOR RECEPTACLES				1	15	33	●	34						SPACE
2ND FLOOR RECEPTACLES				1	15	35	●	36	15	1				SPARE
SOUTH UNDERPASS LIGHTS (VIA SPAN LIGHTS)				1	15	37	●	38	15	1				SPARE
RECEPTACLES & LIGHT CP1-CP2 IN CONTROL CUBIC				1	15	39	●	40	15	1				SPARE
SPARE				1	15	41	●	42	15	1				SPARE
TOTAL							S/N							TOTAL
BUS A: _____			MAIN BREAKER RATING: 100 AMP IN			LINE AMPS: _____								
BUS B: _____						PANEL AA								
BUS C: _____						PHASING: 3 PHASE/4W								
TOTAL LOAD: _____						AIC = _____								

ELECTRICAL EQUIPMENT LIST (PARTIAL SHOWING MAJOR EQUIPMENT)

NO.	ITEM	QTY.	DESCRIPTION	FUNCTION	LOCATION	COMMENTS
1	CB	3	CB, 3P, 600AF/600AT	PROTECTION	ELEC EQUIP RM 2ND FLR	FROM SWBD #2
2	ATS	1	ATS, 3P, 600A	FDR TRANSFER PROTECTION	NORTH MTR RM	FROM N TWR
3	BUS	1	600A, 600VAC, 3PH, 3W BUS	SERVICE DISTR	SOUTH MCC	FROM S TWR
4	CB	1	CB, 3P, 600AF/600AT	FDR	SOUTH MCC	FROM S TWR
5	CB LP2	1	CB, 3P, 100AF/20AT	PROTECTION	SOUTH MCC	FROM S TWR
6	MCP SPAN LOCK MTR SOUTH	1	CB, 3P, 15A/90AT	PROTECTION	SOUTH MCC	FROM S TWR
7	CB SOUTH PIER LIGHTHOUSE	1	CB, 3P, 100AF/30AT	PROTECTION	SOUTH MCC	FROM S TWR
8	MCP MTR BRAKE S1, S4	2	CB, 3P, 3A/18AT	PROTECTION	SOUTH MCC	FROM S TWR
9	MCP MACH BRAKE S2, S3	2	CB, 3P, 3A/18AT	PROTECTION	SOUTH MCC	FROM S TWR
10	CB ELEVATOR	1	CB, 3P, 100AF/50AT	PROTECTION	SOUTH MCC	FROM S TWR
11	MCP PEDESTRIAN GATE PG-SW	1	CB, 3P, 3A/18AT	PROTECTION	SOUTH MCC	FROM S TWR
12	CB	1	CB, 3P, 100AF/40AT	PROTECTION	SOUTH MCC	FROM S TWR
13	CB	1	CB, 3P, 100AF/60AT	PROTECTION	SOUTH MCC	FROM S TWR
14	CB NETWORK POWER SUPPLY	1	CB, 3P, 150A	PROTECTION	SOUTH MCC	FROM S TWR
15	MCP DIFF LOCK DIFL-S	1	CB, 3P, 3A/18AT	PROTECTION	SOUTH MCC	FROM S TWR
16	MCP MTR BLOWER BL-1E, BL-2W	2	CB, 3P, 7A/42AT	PROTECTION	SOUTH MCC	FROM S TWR
17	MCP BARRIER GATE BG-SE	1	CB, 3P, 7A/30AT	PROTECTION	SOUTH MCC	FROM S TWR
18	MCP TRAFFIC GATES TG-SE, TG-SW	2	CB, 3P, 3A/18AT	PROTECTION	SOUTH MCC	FROM S TWR
19	CB VECTOR DRIVES 1E-MA, 2W-SL	2	CB, 3P, 400AF/350AT	PROTECTION	SOUTH MCC	FROM S TWR
20	STR SPAN LOCK SOUTH	1	COMB FVR MAG STR	MTR STARTING	SOUTH MCC	FROM S TWR
21	STR MTR. BRAKE S1, S4	2	COMB FVNR MAG STR	MTR STARTING	SOUTH MCC	FROM S TWR
22	STR MACH. BRAKE S3, S4	2	COMB FVNR MAG STR	MTR STARTING	SOUTH MCC	FROM S TWR
23	STR PED. GATE	1	COMB FVR MAG STR	MTR STARTING	SOUTH MCC	FROM S TWR
24	STR. DIFF. LOCK DIFL-S	1	COMB FVR MAG STR	MTR STARTING	SOUTH MCC	FROM S TWR
25	STR MTR. BLOWERS BL-1E, BL-2W	2	COMB FVNR MAG STR	MTR STARTING	SOUTH MCC	FROM S TWR
26	STR BARRIER GATE BG-SE	1	COMB FVR MAG STR	MTR STARTING	SOUTH MCC	FROM S TWR
27	STR TRAFFIC GATES TG-SE, TG-SW	2	COMB FVR MAG STR	MTR STARTING	SOUTH MCC	FROM S TWR
28	OL SPAN LOCK SOUTH	1	OL, SW	PROTECTION	SOUTH MCC	FROM S TWR
29	OL MTR. BRAKE S1, S4	2	OL, SW	PROTECTION	SOUTH MCC	FROM S TWR
30	OL MACH. BRAKES S3, S4	2	OL, SW	PROTECTION	SOUTH MCC	FROM S TWR
31	OL PED. GATE PG-SW	1	OL, SW	PROTECTION	SOUTH MCC	FROM S TWR
32	OL DIFF. LOCK DIFL-S	1	OL, SW	PROTECTION	SOUTH MCC	FROM S TWR
33	OL MTR. BLOWERS BL-1E, BL-2W	2	OL, SW	PROTECTION	SOUTH MCC	FROM S TWR
34	OL BARRIER GATE BG-SE	1	OL, SW	PROTECTION	SOUTH MCC	FROM S TWR
35	OL TRAFFIC GATES TG-SE, TG-SW	2	OL, SW	PROTECTION	SOUTH MCC	FROM S TWR
36	CB VECTOR DRIVES 1E-MA, 2W-SL	2	CB, 3P, 400AF/350AT	PROTECTION	SOUTH VECTOR DRIVES	FROM S TWR
37	VECTOR DRIVES 1E-MA, 2W-SL	2	VFD DRIVES	SPEED CONTROL DRIVES MTRS.	SOUTH MTR. RM.	FROM S TWR
38	ELECTRIC BRAKING MODULES 1E-MA, 2W-SL	2	DYNAMIC BRAKE MODULE		SOUTH VECTOR DRIVES	FROM S TWR
39	BRAKING RESISTORS	2	DYNAMIC BRAKE RESISTORS		SOUTH VECTOR DRIVES	FROM S TWR
40	SPAN MTRS. 1E-MA, 2W-SL	2	DRIVE MOTORS AND ENCODERS		SOUTH MTR. RM.	FROM S TWR
41	DS SPAN MTRS 1E-MA, 2W-SL	2	DISC SW	PROTECTION	SOUTH MTR. RM.	EXIST FROM S TWR
42	DS LP2	1	DISC SW	PROTECTION	LP2 SOUTH MTR RM.	EXIST FROM S TWR
43	DS SPAN LOCK SOUTH	1	DISC SW	PROTECTION	SPAN LOCK SOUTH	EXIST FROM S TWR
44	DS PED. GATE PG-SW	1	DISC SW	PROTECTION	PED. GATE PG-SW CABINET	FROM S TWR
45	DS BARRIER GATE BG-SE	1	DISC SW	PROTECTION	BARRIER GATE BG-SE CABINET	FROM S TWR
46	DS TRAFFIC GATES TG-SE, TG-SW	2	DISC SW	PROTECTION	TRAFFIC GATE CABINETS TG-SE, TG-SW	FROM S TWR
47	SOUTH PIER LIGHTHOUSE	1	SOUTH PIER HOUSE SERVICE FDR		SOUTH PIER	EXIST FROM S TWR
48	ELEVATOR SOUTH	1	ELEVATOR EQUIPMENT	ELEVATOR FDR	SOUTH MTR RM	EXIST FROM S TWR
49	AUX. DRIVE MTS	1	MTS, 3P	FDR TRANSFER PROTECTION	SOUTH MTR RM	EXIST FROM S TWR
50	MTR. BRAKES S1, S4	2	SOUTH MTR. BRAKES 1/3 HP		SOUTH MTR RM	FROM S TWR
51	MACH. BRAKES S2, S3	2	SOUTH MACH. BRAKES 3/4 HP		SOUTH MTR RM	EXIST BRAKES
52	PED GATE PG-SW	1	PED. GATE MTR, 1 HP		SW SIDEWALK APPROACH	FROM S TWR
53	HEATING PANEL	1	PANEL BD	ROOM HEATING DISTR	SOUTH MTR RM	EXIST FROM S TWR
54	TRANSF.	1	STEP DOWN TRANSF		SOUTH MTR RM	EXIST FROM S TWR
55	LP2	1	PANEL BD	MISC LIGHTING DISTR	SOUTH MTR RM	EXIST FROM S TWR
56	MCP AUX. DRIVE	1	CB, 3P, 50A/150AT	PROTECTION	SOUTH MTR RM	EXIST FROM S TWR
57	AUX. DRIVE PNL	1	STR AUX DRIVE		SOUTH MTR RM	FROM S TWR
58	DS	1	DISC SW	PROTECTION	SOUTH MTR RM	EXIST FROM S TWR
59	TRANSF	1	STEP DOWN TRANSF		SOUTH MTR RM	EXIST FROM S TWR
60	EM. PNL.	1	EM PANEL BD	EM LTG DISTR	SOUTH MTR RM	EXIST FROM S TWR
61	AUX. DRIVE MTR	1	AUX DRIVE MTR, 20 HP		SOUTH MTR RM	FROM S TWR
62	DIFF LOCK MTR DIFL-S	1	DIFF LOCK MTR, 1/2 HP		SOUTH MTR RM	FROM S TWR
63	MTR BLOWERS BL-1E, BL-2W	2	MTR BLOWER, 3 HP		SOUTH MTR RM	FROM S TWR
64	BARRIER GATE BG-SE	1	BARRIER GATE MTR, 1-1/2 HP		SE ROADWAY APPROACH	FROM S TWR
65	TRAFFIC GATES TG-SE, TG-SW	2	TRAFFIC GATE MTRS, 1 HP		SE, SW ROADWAY	FROM S TWR
66	SPAN LOCK MTR SOUTH	1	SPAN LOCK MTR, 5 HP		BELOW SPAN SOUTH	FROM S TWR
67	DIGITAL METER	1	DIGITAL METER	LOCAL METERING	SOUTH MCC	FROM S TWR
68	NETWORK POWER SUPPLY	1	COMM NETWORK POWER SUPPLY		SOUTH MCC	FROM S TWR
69	COMMUNICATION NETWORK LINKING UNIT	1	PLC COMMUNICATION LINKING UNIT	REMOTE PLC COMM.	SOUTH MCC	FROM S TWR
70	-	-	-	-	-	NOT USED

ELECTRICAL EQUIPMENT LIST (PARTIAL SHOWING MAJOR EQUIPMENT CONTINUED)

NO.	ITEM	QTY.	DESCRIPTION	FUNCTION	LOCATION	COMMENTS
71	BUS	1	600A, 600VAC, 3PH, 3W BUS	SERVICE DISTR	NORTH MCC	FROM N TWR
72	CB	1	CB, 3P, 600AF/600AT	FDR	NORTH MCC	FROM N TWR
73	CB LP3	1	CB, 3P, 100AF/20AT	PROTECTION	NORTH MCC	FROM N TWR
74	MCP SPAN LOCK MTR NORTH	1	CB, 3P, 15A/90AT	PROTECTION	NORTH MCC	FROM N TWR
75	CB	1	CB, 3P, 100AF/15AT	PROTECTION	NORTH MCC	FROM N TWR
76	MCP MTR BRAKES N1, N4	2	CB, 3P, 3A/18AT	PROTECTION	NORTH MCC	FROM N TWR
77	MCP MACH BRAKES N2, N3	2	CB, 3P, 3A/18AT	PROTECTION	NORTH MCC	FROM N TWR
78	CB ELEVATOR	1	CB, 3P, 100AF/50AT	PROTECTION	NORTH MCC	FROM N TWR
79	MCP PED GATE PG-NW	1	CB, 3P, 3A/18AT	PROTECTION	NORTH MCC	FROM N TWR
80	CB HEATING PNL	1	CB, 3P, 100AF/40AT	PROTECTION	NORTH MCC	FROM N TWR
81	CB AUX DRIVE	1	CB, 3P, 100AF/60AT	PROTECTION	NORTH MCC	FROM N TWR
82	CB NETWORK PWR SUPPLY	1	CB, 3P, 150A	PROTECTION	NORTH MCC	FROM N TWR
83	MCP DIFF LOCK DIFL-N	1	CB, 3P, 3A/18AT	PROTECTION	NORTH MCC	FROM N TWR
84	MCP MTR BLOWERS BL-3E, BL-4W	2	CB, 3P, 7A/42AT	PROTECTION	NORTH MCC	FROM N TWR
85	MCP BARRIER GATE BG-NE	1	CB, 3P, 7A/42AT	PROTECTION	NORTH MCC	FROM N TWR
86	MCP TRAFFIC GATES TG-NE, TG-NW	2	CB, 3P, 3A/18AT	PROTECTION	NORTH MCC	FROM N TWR
87	CB VECTOR DRIVES 3E-MA, 4W-SL	2	CB, 3P, 400AF/350AT	PROTECTION	NORTH MCC	FROM N TWR
88	STR SPAN LOCK NORTH	1	COMB FVR MAG STR	MTR STARTING	NORTH MCC	FROM N TWR
89	STR MTR BRAKES N1, N4	2	COMB FVNR MAG STR	MTR STARTING	NORTH MCC	FROM N TWR
90	STR MACH BRAKES N2, N3	2	COMB FVNR MAG STR	MTR STARTING	NORTH MCC	FROM N TWR
91	STR PED GATE PG-NW	1	COMB FVR MAG STR	MTR STARTING	NORTH MCC	FROM N TWR
92	STR DIFF LOCK DIFL-N	1	COMB FVR MAG STR	MTR STARTING	NORTH MCC	FROM N TWR
93	STR MTR BLOWERS BL-3E, BL-4W	2	COMB FVNR MAG STR	MTR STARTING	NORTH MCC	FROM N TWR
94	STR BARRIER GATE BG-NE	1	COMB FVR MAG STR	MTR STARTING	NORTH MCC	FROM N TWR
95	STR TRAFFIC GATES TG-NE, TG-NW	2	COMB FVR MAG STR	MTR STARTING	NORTH MCC	FROM N TWR
96	OL SPAN LOCK NORTH	1	OL, SW	PROTECTION	NORTH MCC	FROM N TWR
97	OL MTR BRAKES N1, N4	2	OL, SW	PROTECTION	NORTH MCC	FROM N TWR
98	OL MACH BRAKES N2, N3	2	OL, SW	PROTECTION	NORTH MCC	FROM N TWR
99	OL PED GATE PG-NW	1	OL, SW	PROTECTION	NORTH MCC	FROM N TWR
100	OL DIFF LOCK DIFL-N	1	OL, SW	PROTECTION	NORTH MCC	FROM N TWR
101	OL MTR BLOWERS BL-3E, BL-4W	2	OL, SW	PROTECTION	NORTH MCC	FROM N TWR
102	OL BARRIER GATE BG-NE	1	OL, SW	PROTECTION	NORTH MCC	FROM N TWR
103	OL TRAFFIC GATES TG-NE, TG-NW	2	OL, SW	PROTECTION	NORTH MCC	FROM N TWR
104	CB VECTOR DRIVES 3E-MA, 4W-SL	2	CB, 3P, 400AF/350AT	PROTECTION	NORTH VECTOR DRIVES	FROM N TWR
105	VECTOR DRIVES 3E-MA, 4W-SL	2	VFD DRIVES	SPEED CONTROL DRIVES MTRS.	NORTH MTR RM	FROM N TWR
106	ELECTRIC BRAKING MODULES 3E-MA, 4W-SL	2	DYNAMIC BRAKE MODULE		NORTH VECTOR DRIVES	FROM N TWR
107	BRAKING RESISTORS	2	DYNAMIC BRAKE RESISTORS		NORTH VECTOR DRIVES	FROM N TWR
108	SPAN MTRS 3E-MA, 4W-SL	2	DRIVE MOTORS AND ENCODERS		NORTH MTR RM	FROM N TWR
109	DS SPAN MTRS 3E-MA, 4W-SL	2	DISC SW	PROTECTION	NORTH MTR RM	EXIST FROM N TWR
110	DS LP3	1	DISC SW	PROTECTION	LP3 NORTH MTR RM	FROM N TWR
111	DS SPAN LOCK NORTH	1	DISC SW	PROTECTION	SPAN LOCK SOUTH	EXIST N TWR
112	DS LP3	1	DISC SW	PROTECTION	LP3 NORTH MTR RM	EXIST FROM N TWR
113	DS PED GATE PG-NW	1	DISC SW	PROTECTION	PED GATE PG-NW CABINET	FROM N TWR
114	DS BARRIER GATE BG-NE	1	DISC SW	PROTECTION	BARRIER GATE BG-NE CABINET	FROM N TWR
115	DS TRAFFIC GATES TG-NE, TG-NW	2	DISC SW	PROTECTION	TRAFFIC GATES TG-NW, TG-NW	FROM N TWR
116	ELEVATOR NORTH	1	ELEVATOR EQUIPMENT	ELEVATOR FDR	NORTH MTR RM	FROM N TWR
117	AUX DRIVE MTS	1	MTS, 3P	FDR TRANSFER PROTECTION	NORTH MTR RM	FROM N TWR
118	MTR BRAKES N1, N4	2	NORTH MTR BRAKES, 1/3 HP		NORTH MTR RM	FROM N TWR
119	MTR BRAKES N2, N3	2	NORTH MACHINE BRAKES, 3/4 HP		NORTH MTR RM	FROM N TWR
120	PED GATE PG-NW	1	PED GATE MTR, 1 HP		NW SIDEWALK APPROACH	FROM N TWR
121	HEATING PANEL	1	PANEL BD	ROOM HEATING DISTR	NORTH MTR RM	FROM N TWR
122	TRANSF	1	STEP DOWN TRANSF		NORTH MTR RM	EXIST FROM N TWR
123	LP3	1	PANEL BD	MISC LIGHTING DISTR	NORTH MTR RM	EXIST FROM N TWR
124	MCP AUX DRIVE	1	CB, 3P, 50A/150AT	PROTECTION	NORTH MTR RM	EXIST FROM N TWR
125	AUX. DRIVE PNL	1	STR AUX DRIVE		NORTH MTR RM	FROM N TWR
126	DS	1	DISC SW	PROTECTION	NORTH MTR RM	EXIST FROM N TWR
127	TRANSF	1	STEP DOWN TRANSF		NORTH MTR RM	EXIST FROM N TWR
128	EM PNL	1	EM PANEL BD	EM LTG DISTR	NORTH MTR RM	EXIST FROM N TWR
129	AUX DRIVE MTR	1	AUX DRIVE MTR, 20 HP		NORTH MTR RM	FROM N TWR
130	DIFF LOCK MTR DIFL-N	1	DIFF LOCK MTR, 1-1/2 HP		NORTH MTR RM	FROM N TWR
131	MTR BLOWERS BL-3E, BL-4W	2	MTR BLOWER, 3 HP		NORTH MTR RM	FROM N TWR
132	BARRIER GATE BG-NE	1	BARRIER GATE MTR, 1-1/2 HP		NE ROADWAY APPROACH	FROM N TWR
133	TRAFFIC GATES TG-NE, TG-NW	2	TRAFFIC GATE MTRS, 1 HP		NE, NW ROADWAY APPROACH	FROM N TWR
134	SPAN LOCK MTR NORTH	1	SPAN LOCK MTR, 5 HP		BELOW SPAN SOUTH	FROM N TWR
135	TRANSF	1	STEP DOWN TRANSF		NORTH MTR RM	EXIST FROM N TWR
136	LP4	1	PANEL BD	MISC LIGHTING DISTR	NORTH MTR RM	EXIST FROM N TWR
137	DIGITAL METER	1	DIGITAL METER	LOCAL METERING	NORTH MCC	FROM N TWR
138	NETWORK POWER SUPPLY	1	COMM NETWORK POWER SUPPLY		NORTH MCC	FROM N TWR
139	COMMUNICATION NETWORK LINKING UNIT	1	PLC COMMUNICATION LINKING UNIT	REMOTE PLC COMM.	NORTH MCC	FROM N TWR
140	-	-	-	-	-	NOT USED

NOTES:
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Architectural and Engineering Services
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Services d'architecture et de génie
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Professional Engineers
Ontario

Temporary Licensee

Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada

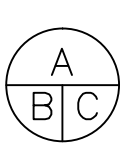
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario

2014-07-07



08	FOR TENDER 3	2014-06-26
07	FOR TENDER 2	2013-06-30
06	FOR TENDER	2013-06-04
05	FINAL DESIGN COMPLETION	2013-05-31
04	99% DESIGN COMPLETION	2013-05-31
03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

Do not scale drawings.
Verify all dimensions and conditions on site and
immediately notify the Departmental Representative of
all discrepancies.



A Detail No.
No. du détail
B drawing no. - where detail required
dessin no. - où détail exigé
C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL ONTARIO
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
ELECTRICAL EQUIPMENT LIST 1

drawn by
dessiné par
D. Buro

designed by
conc par
D. Raffington/J. Chin

approved by
approuvé par
M. VanDeRee

bid
soumission
A. Ghubril project manager
administrateur
de projets

project date
date du projet
2013-05-31


project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
E-92

ELECTRICAL EQUIPMENT LIST (PARTIAL SHOWING MAJOR EQUIPMENT CONTINUED)


NO.	ITEM	QTY.	DESCRIPTION	FUNCTION	LOCATION	COMMENTS
141	ULTIMATE SKEW RESOLVER	2	ULTIMATE SKEW RESOLVER	SPAN ULTIMATE SKEW CONTROL	NORTH AND SOUTH MTR RM	FROM S TWR
142	SPAN POSITION TRANSMITTER	1	HEIGHT ENCODER	SPAN HEIGHT CONTROL	SOUTH MTR RM	FROM S TWR
143	MAIN PLC PNL CP-1	1	I/O PNL CP-1	BRIDGE CONTROL	CONTROL RM	FROM S CONTROL BUILDING
144	CONTROL PNL CP-2, CPU 1, CPU 2	1	I/O PNL CP-2 AND CENTRAL PROCESS UNITS	BRIDGE CONTROL	ELECTRICAL EQUIPMENT RM	FROM S CONTROL BUILDING
145	PLC PNL CP-3	1	I/O PNL CP-3	BRIDGE CONTROL	SOUTH MTR RM	FROM S TWR
146	PLC PNL CP-4	1	I/O PNL CP-4	BRIDGE CONTROL	NORTH MTR RM	FROM N TWR
147	SPEED SWITCH	2	DRIVE MOTOR HOSILOS SPEED SWITCH	DRIVE MOTOR PROTECTION	NORTH AND SOUTH MTR RM	FROM N AND S TWR
148	HEIGHT METER	4	LOCAL SPAN HEIGHT METER	LOCAL SPAN POSITION INDICATION	NORTH AND SOUTH MTR RM	FROM N AND S TWR
149	LS	4	PLUNGER TYPE LS	SPAN FULLY SEATED	NW, NE, SW, SE CORNER BELOW SPAN	FROM N AND S TWR
150	LS	3	LEVER TYPE LS	REDUNDANT SPAN NEAR FULL OPEN, FULL OPEN, & NEAR FULL SEATED	SOUTH END OF SPAN STRUCTURE AT CW	FROM S TWR
151	LS	24	LEVER TYPE LS	MTR, MACH BRAKE ENGAGED, RELEASE, MAN. RELEASE	NORTH AND SOUTH MTR RM	FROM N AND S TWR
152	SKEW INCLINOMETER	1	WIRELESS TILT METER	ADDITIONAL SPAN SKEW CONTROL	SPAN MOVABLE STRUCTURE SOUTH SIDE	FROM S CONTROL BUILDING
153	SKEW INCLINOMETER TRANSCIEVER	1	TILT TRANSCIEVER	ADDITIONAL SPAN SKEW CONTROL	NORTH FACE OF CONTROL BUILDING	FROM S CONTROL BUILDING
154	NORTH LOCAL CONTROL PNL CP-7	1	LOCAL SPAN CONTROL PNL	LOCAL SPAN CONTROL	SOUTH MTR RM	FROM S TWR
155	PNL CP-6	1	TRAFFIC/PED SIGNAL SYSTEM CONTROL PNL	LOCAL TRAFFIC/PED. CONTROL	ELECTRICAL EQUIPMENT RM	FROM S CONTROL BUILDING
156	UPS	1	UPS POWER SUPPLY	PLC, CCTV, RADAR, ETC. POWER BACKUP	UPS RM	FROM S CONTROL BUILDING
157	UPS DIST. PNL	1	UPS PNL BD	UPS LOADS	UPS RM	FROM S CONTROL BUILDING
158	UPS BATTERY	1	UPS BATTERY PACK	UPS BACKUP	UPS RM	FROM S CONTROL BUILDING
159	CONTROL DESK CP-5	1	TRAFFIC/NAVIGATION/PED CONTROL DESK	TRAFFIC/NAV.PED. CONTROL	CONTROL RM	FROM S CONTROL BUILDING
160	LS	4	LEVER TYPE LS	AUX. DRIVE ENGAGED, DISENGAGED	NORTH AND SOUTH MTR RM	FROM N AND S TWR
161	LS	4	LEVER TYPE LS	SPAN LOCK ENGAGED, DISENGAGED	BELOW SPAN NORTH AND SOUTH	FROM N AND S TWR
162	LS	2	MICROSWITCH TYPE LS	SPAN LOCK HANDCRANK	BELOW SPAN NORTH AND SOUTH	FROM N AND S TWR
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Public Works and Government Services Canada
Architectural and Engineering Services
Ontario Region

Travaux publics et Services gouvernementaux Canada
Services d'architecture et de génie
Région de l'Ontario




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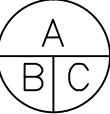
Professional Engineers
Ontario

Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington Canal Bridge in Burlington, Ontario for Public Works and Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date : July 31, 2014
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A

B

C

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project title
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HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

ONTARIO

drawing title
titre du dessin

ELECTRICAL EQUIPMENT LIST 2

drawn by
dessiné par

D. Buro

designed by
conc par

D. Raffington/J. Chin

approved by
approuvé par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur de projets

project date
date du projet

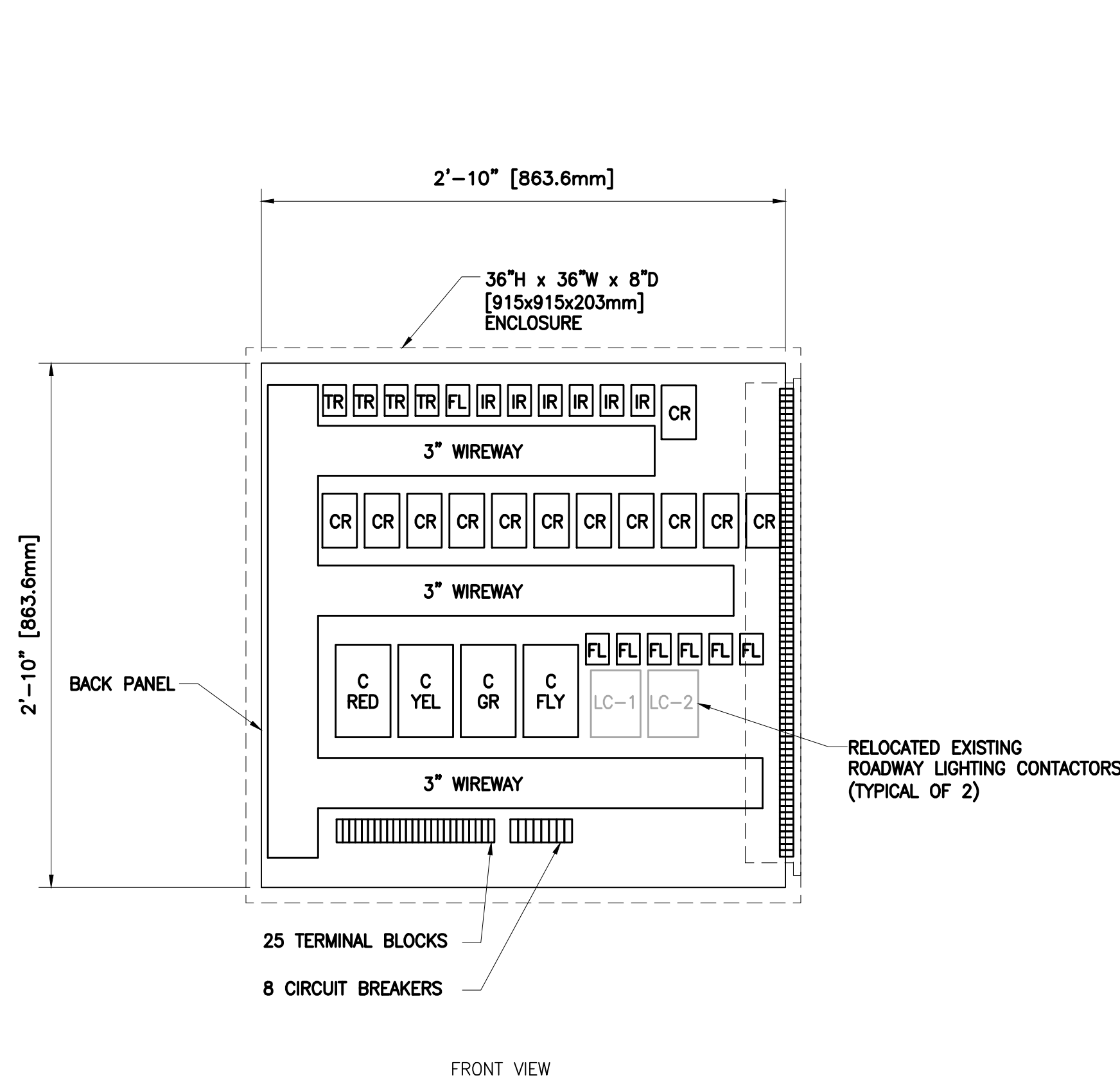
2013-05-31

project no.
no. du projet

R.012641.001

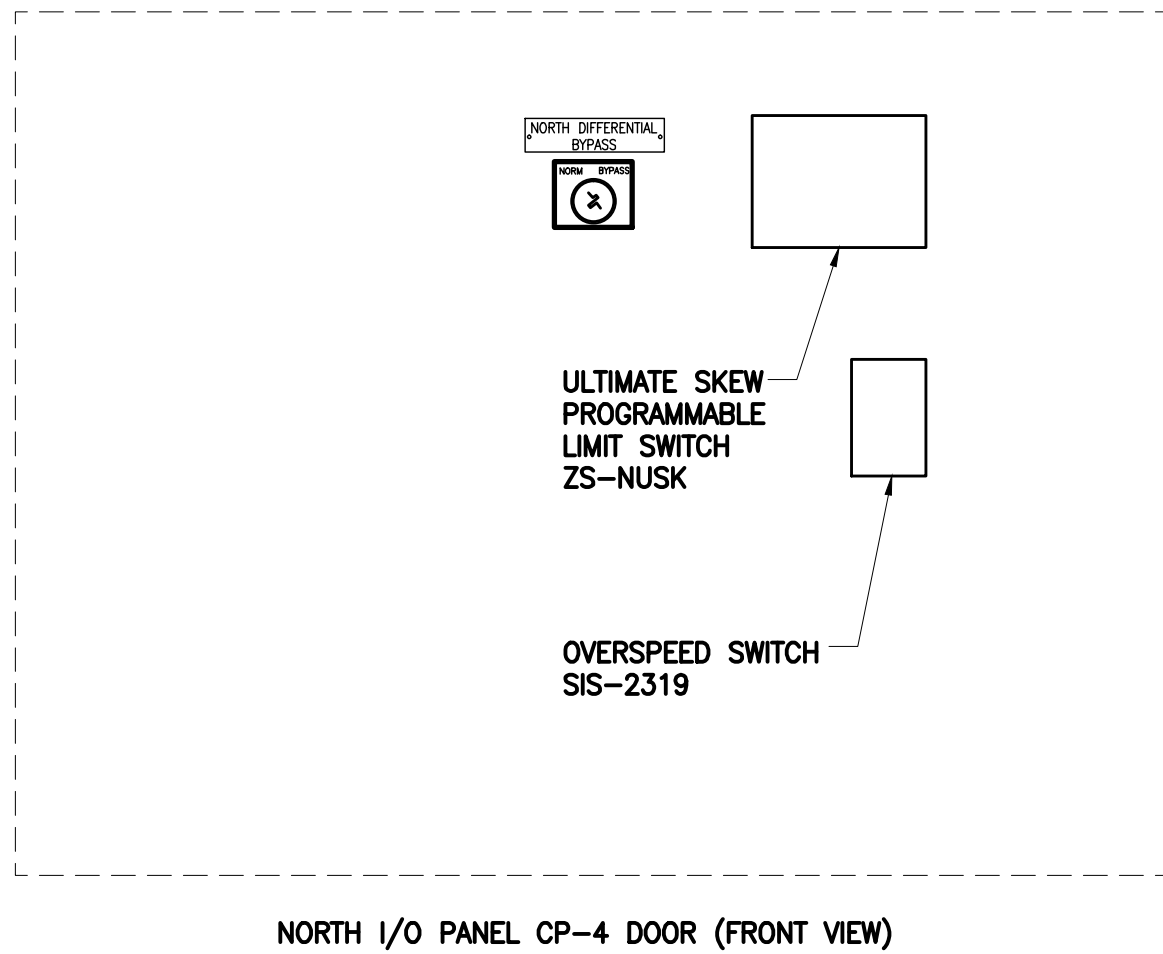
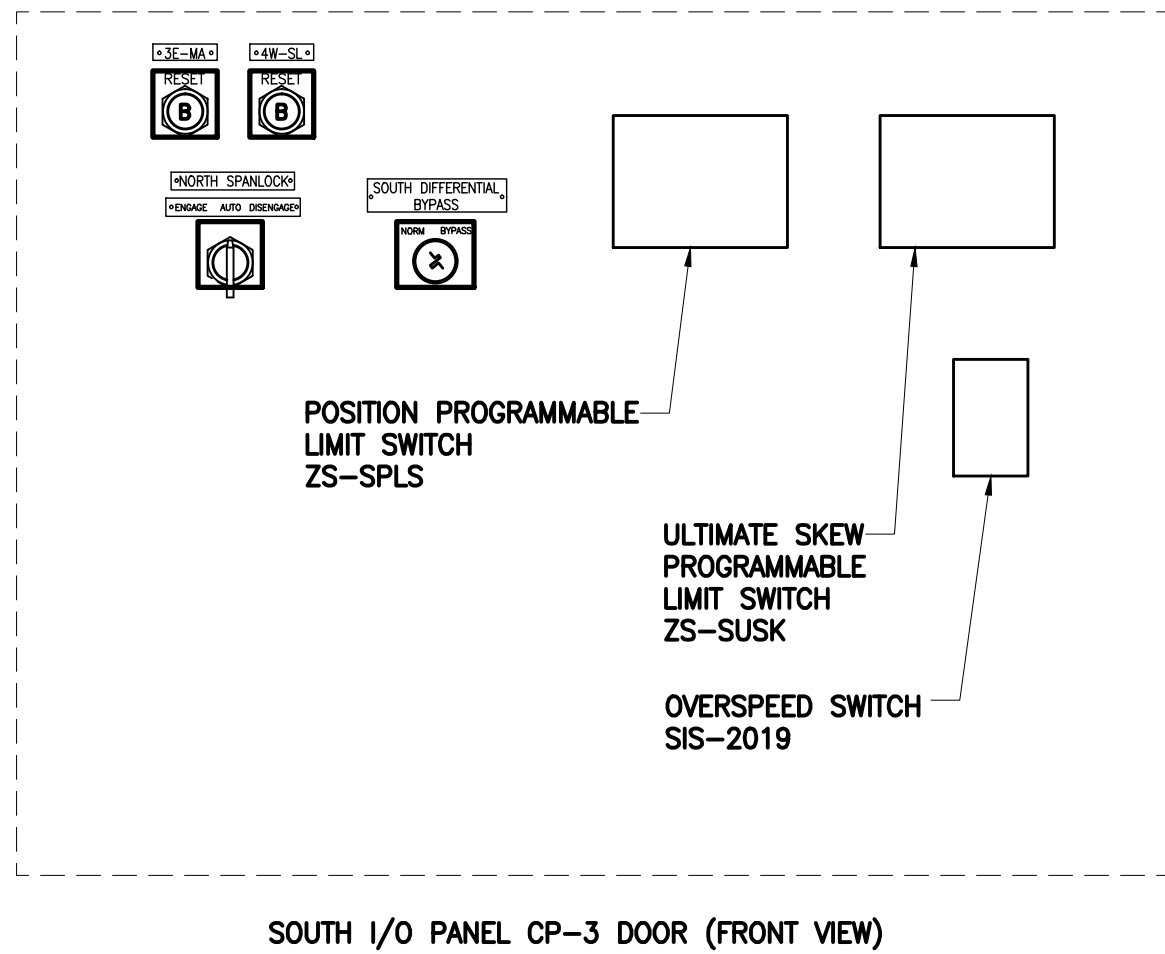
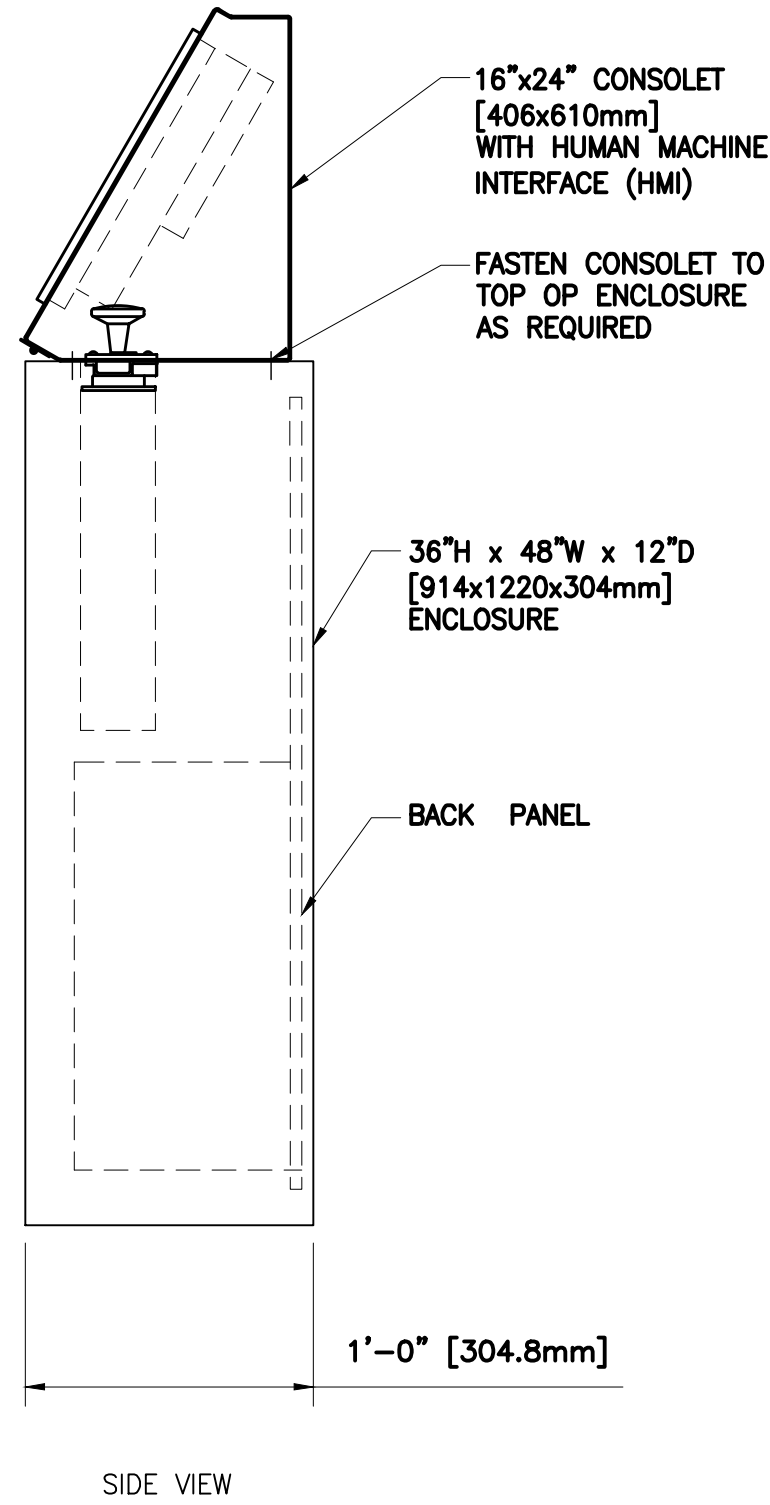
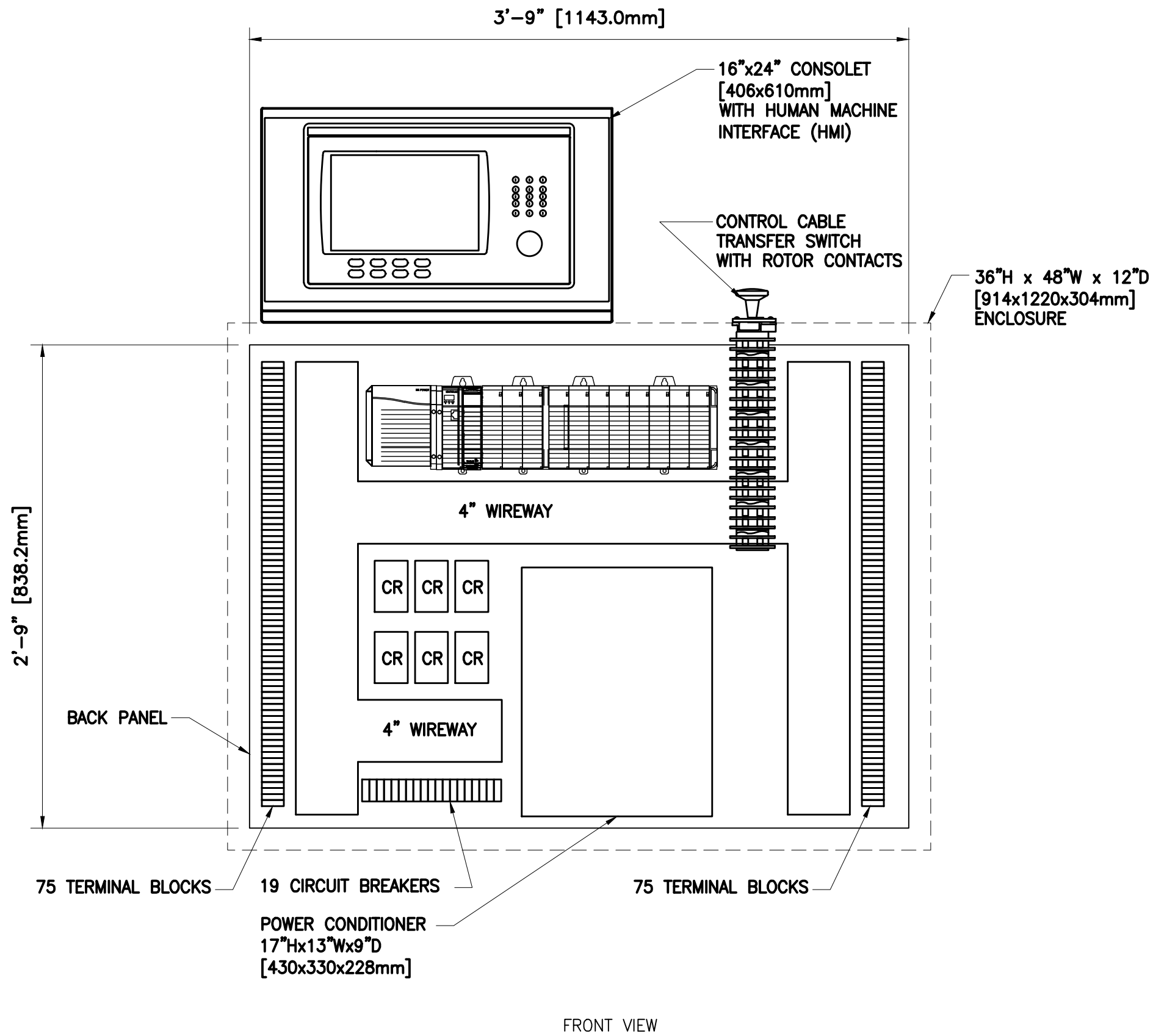
drawing no.
dessiné no.

E-93



TRAFFIC CONTROL PANEL (CP-6)

SCALE 1 1/2"=1'-0"




NORTH AND SOUTH I/O PANEL (CP-3 & CP-4)

SCALE 1 1/2"=1'-0"

- NOTES:
- FOR LOCATIONS OF PANELS CP-3 AND CP-4, REFER TO DRAWINGS E-12 AND E-13.

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 **Professional Engineers Ontario**

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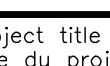
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Mark VanDeRee 2014-07-07



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03	90% DESIGN SUBMITTAL	2013-03-31
02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10
revision		date

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	B drawing no. - where detail required dessin no. - où détail exigé
	C drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
ELECTRICAL DETAILS 1

drawn by
dessiné par
J. Perez

designed by
conc par
G. Patino/B. Crouthamel

approved by
approuvé par
M. VanDeRee

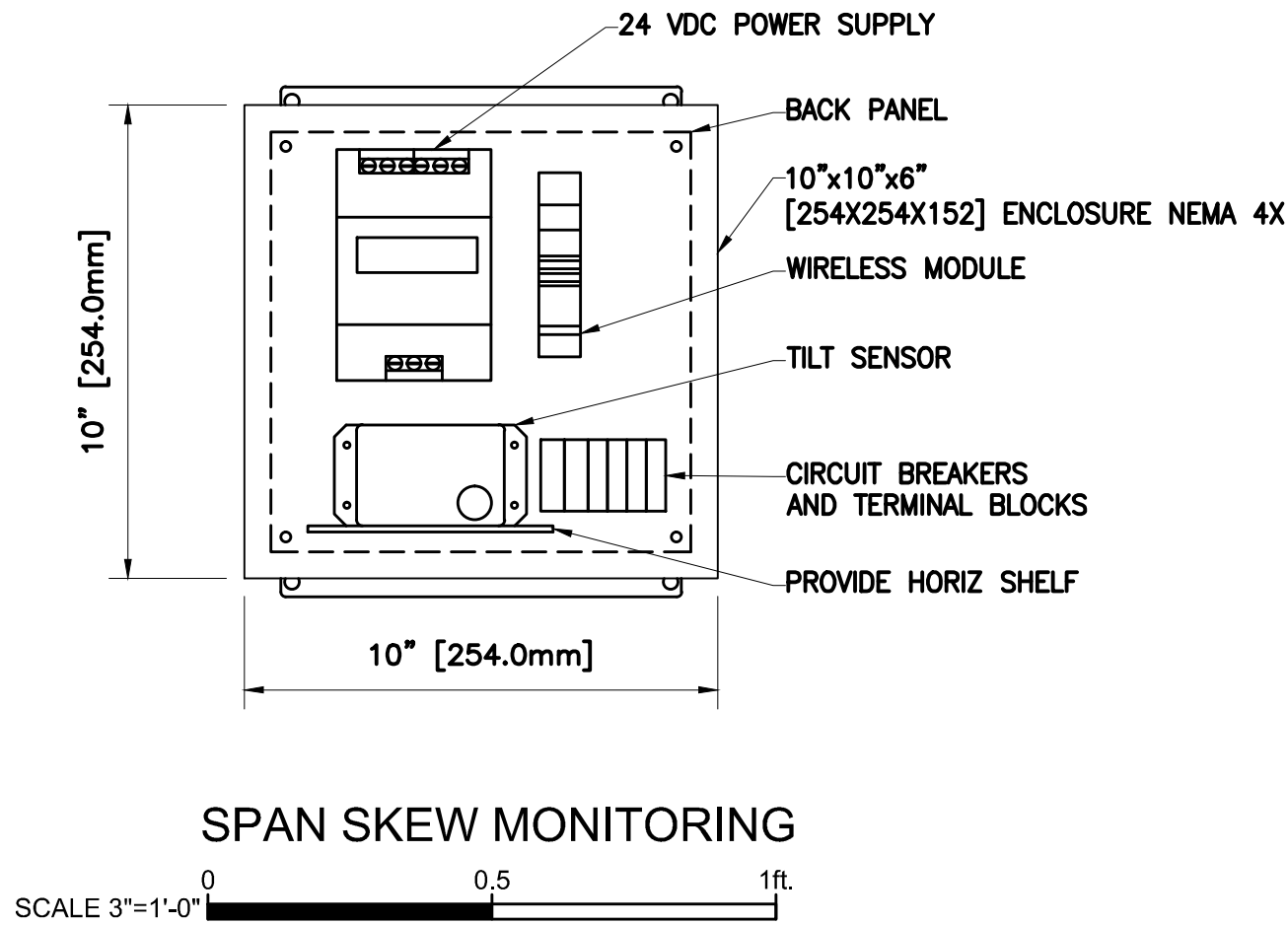
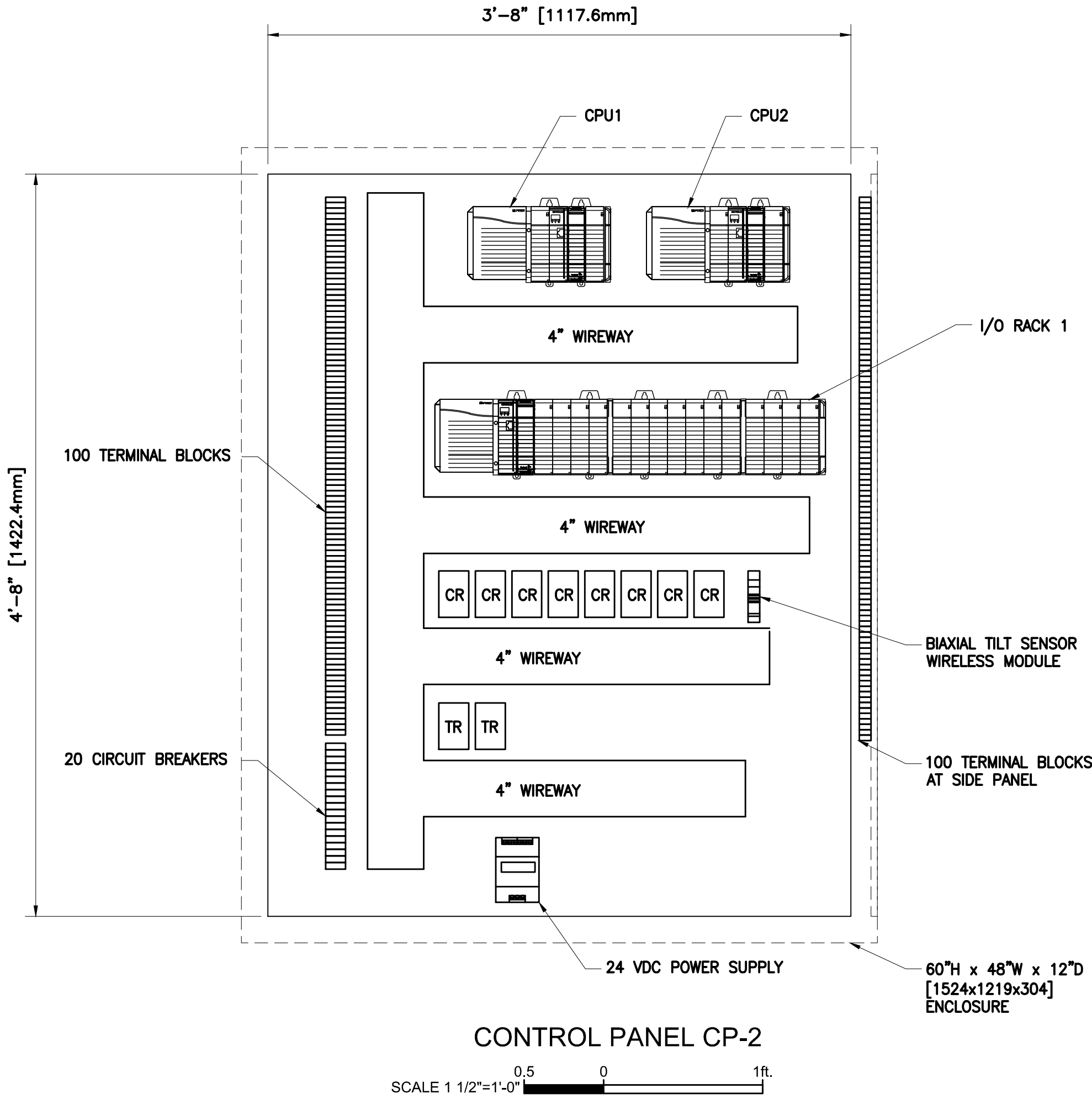
bid
soumission
A. Ghubril


project manager
administrateur de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
E-94






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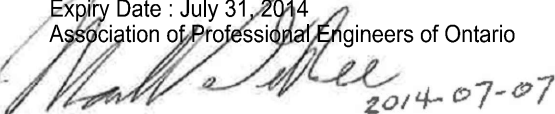



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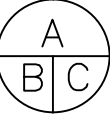
Temporary Licensee
Name: Mark VanDeRee
Number: 100181047-02
Limitations: Electrical system design for the Burlington
Canal Bridge in Burlington, Ontario for Public Works and
Government Services Canada
Collaborator: Zvonko Trajkovic, P. Eng.
Expiry Date: July 31, 2014
Association of Professional Engineers of Ontario


2014-07-07

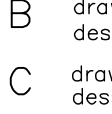


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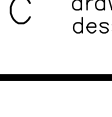
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REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

ELECTRICAL DETAILS 2

drawn by
dessine par

J. Perez

designed by
conc par

G. Patino/B. Crouthamel

approved by
approuve par

M. VanDeRee

bid
soumission

A. Ghubril

project manager
administrateur de projets

project date
date du projet

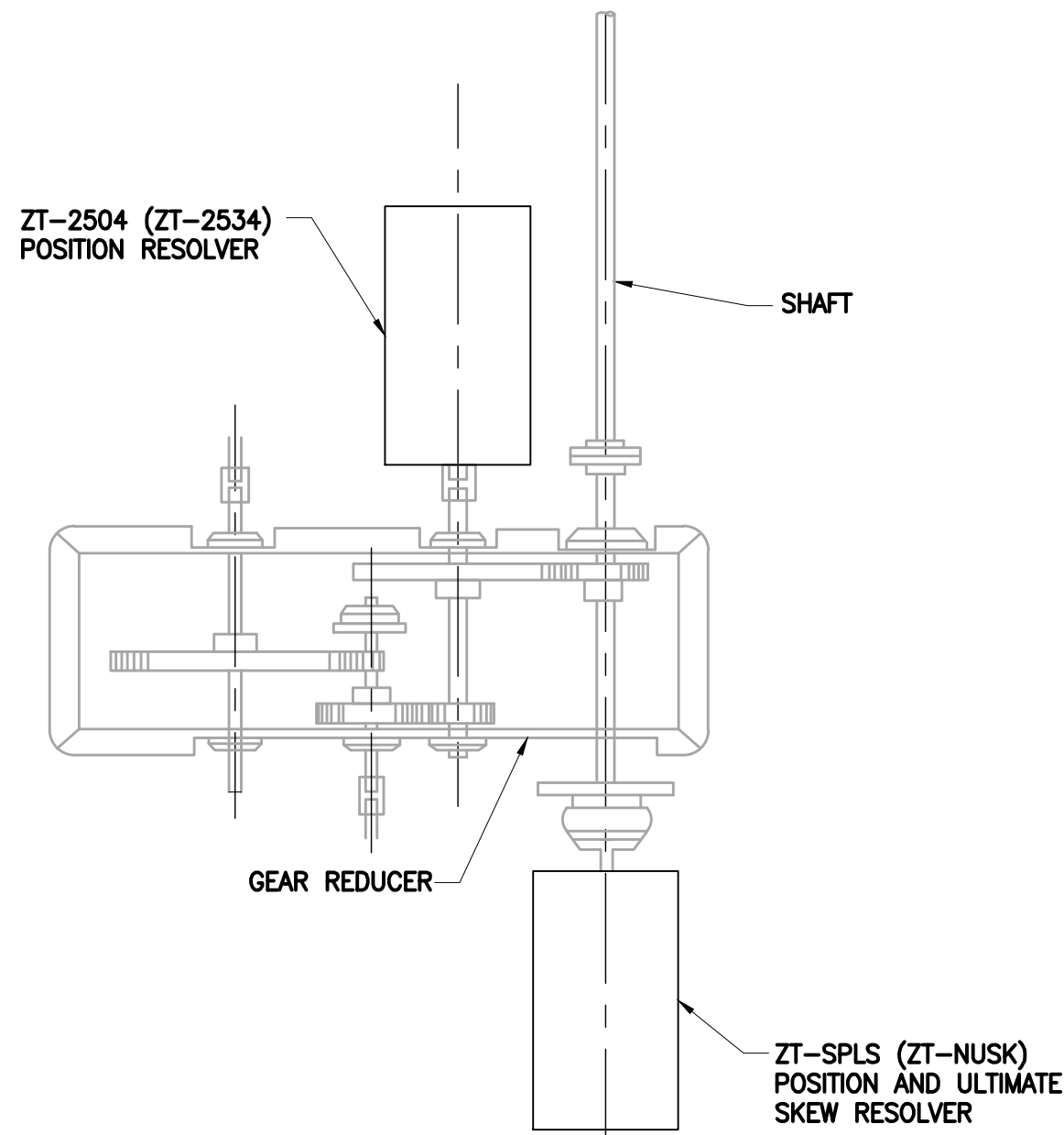
2013-05-31

project no.
no. du projet

R.012641.001

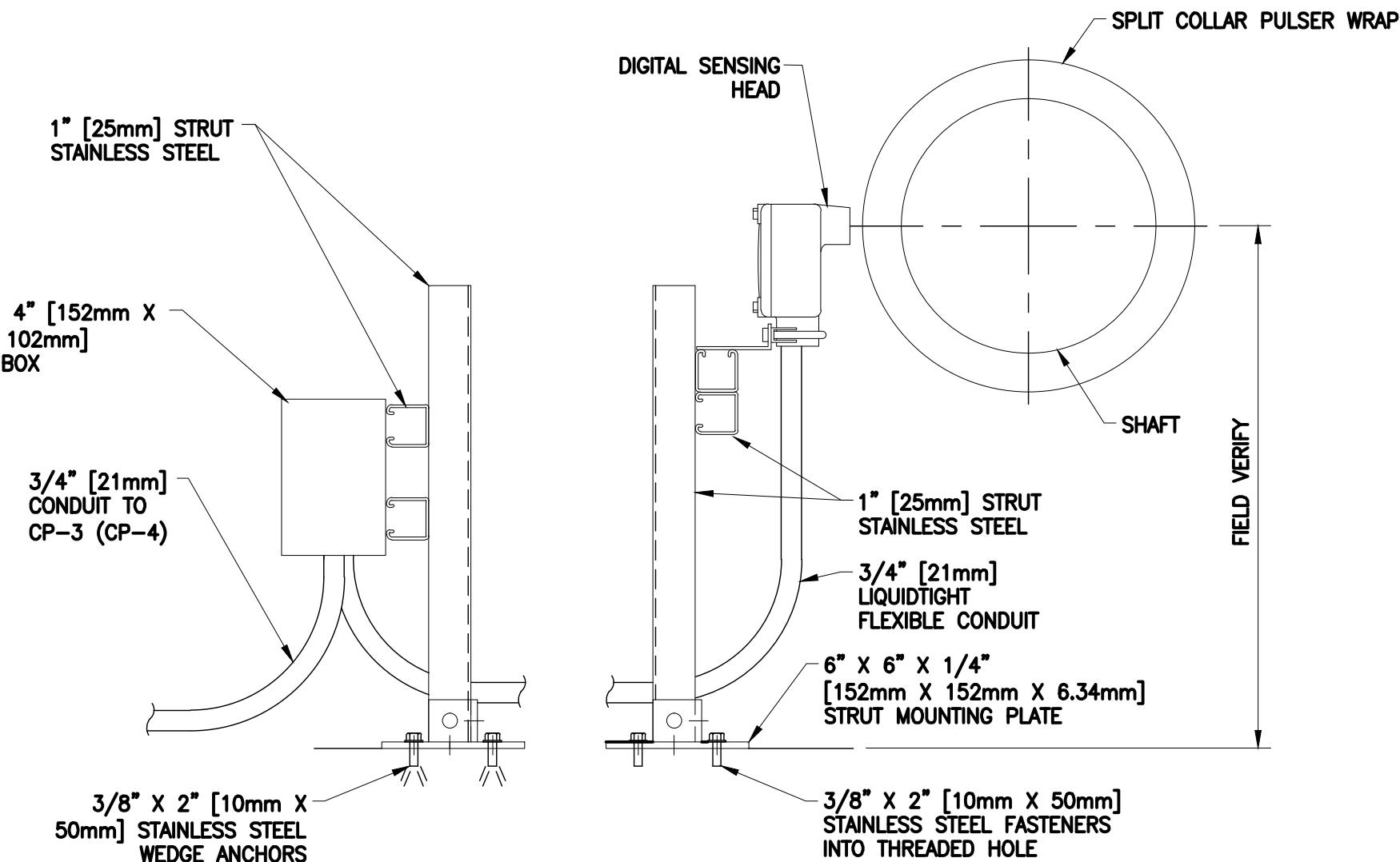
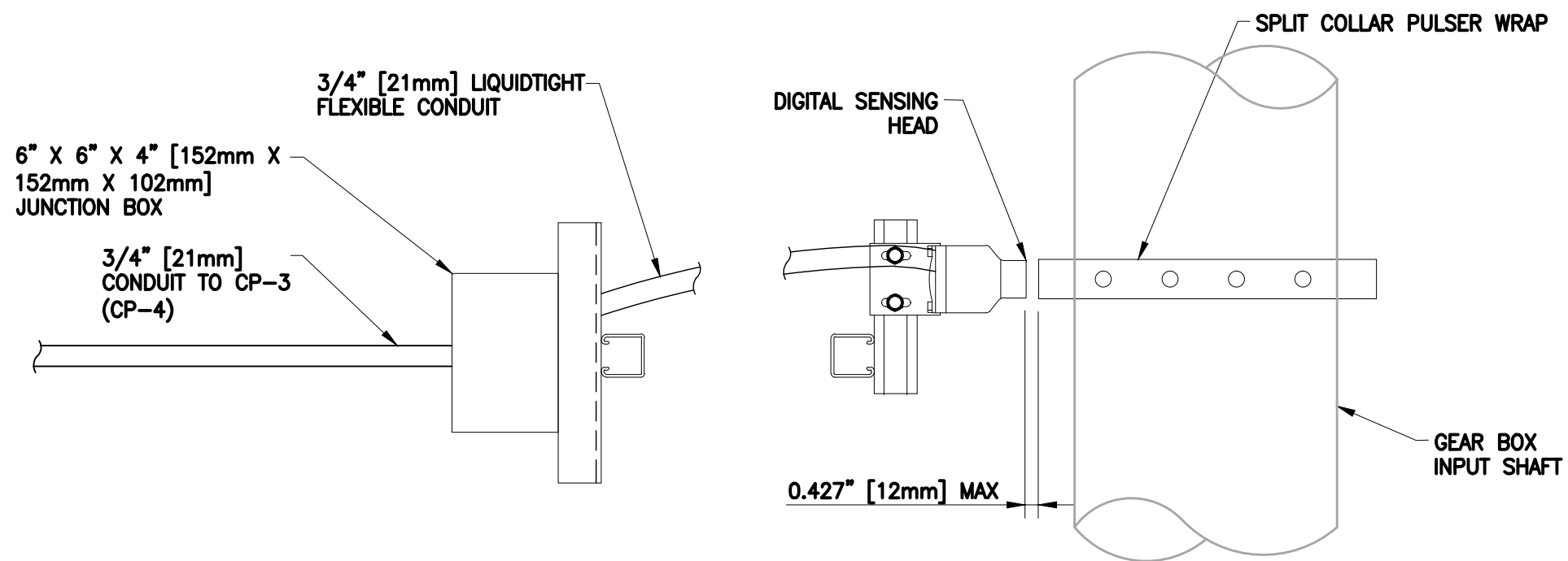
drawing no.
dessine no.

E-95



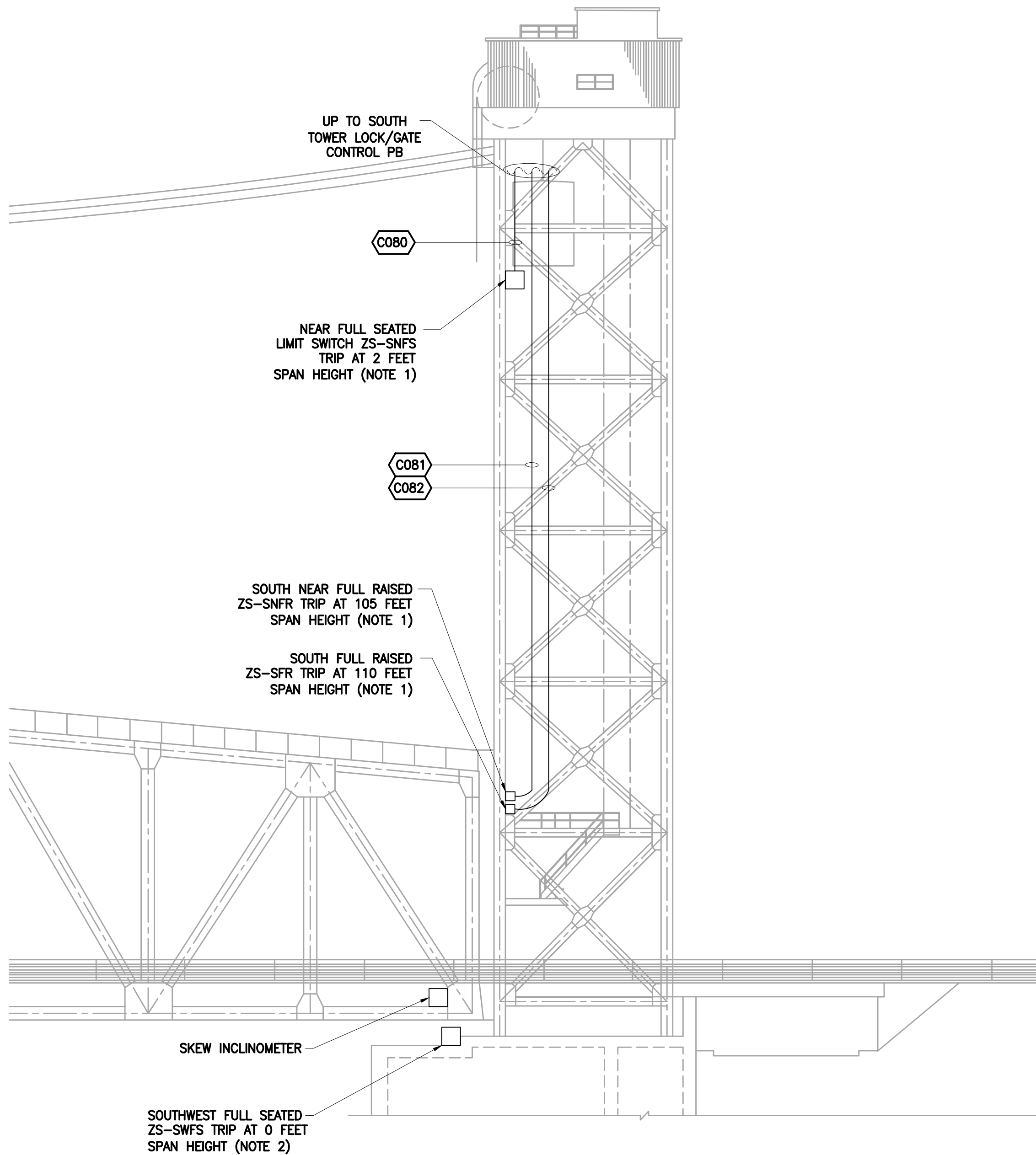
SOUTH TOWER POSITION AND SKEW RESOLVERS
(NORTH TOWER SIMILAR)

NTS



SIS-2019 (SIS-2319) OVERSPEED SWITCH INSTALLATION DETAIL

NTS



REDUNDANT POSITION LIMIT SWITCHES

NTS

- NOTES:
1. LOCATE AND MOUNT LIMIT SWITCHES ON BRIDGE STRUCTURE AND ACTUATING TARGETS ON COUNTERWEIGHT.
 2. INSTALL 4 NEW FULL SEATED LIMIT SWITCHES IN THE SAME LOCATION AS EXISTING FULL SEATED LIMIT SWITCHES.

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REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
ELECTRICAL DETAILS 3

drawn by dessiné par	J. Perez	
designed by conc par	G. Patino/B. Crouthamel	
approved by approuvé par	M. VanDeRee	
bid soumission	A. Ghubril	project manager administrateur de projets
project date date du projet	2013-05-31	
project no. no. du projet	R.012641.001	
drawing no. dessiné no.	E-96	

STRUCTURAL NOTES

1. DESIGN SPECIFICATIONS
- 1.1 NEW COMPONENTS: CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN / CSA-06 WITH SUPPLIMENTS 1 AND 2 ISSUED MAY 2010 AND OCT.2011 RESPECTIVELY
- 1.2 EXISTING COMPONENTS TO REMAIN EVALUATED BY SERVICEABILITY LIMIT STATES.
2. CONSTRUCTION SPECIFICATIONS
- 2.1 CANADA NATIONAL MASTER SPECIFICATION (NMS).
3. LIVE LOAD
- 3.1 NEW COMPONENTS : CL-625-ONT VEHICULAR LIVE LOADING .
4. GENERAL
- 4.1 DO NOT SCALE THESE DRAWINGS.
- 4.2 DIMENSIONS AND DETAILS SHOWN IN THESE PLANS ARE BASED ON THE ORIGINAL CONSTRUCTION PLANS. THE CONTRACTOR SHALL VERIFY DIMENSIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION. ANY NECESSARY ADJUSTMENTS SHALL BE SUBMITTED BY THE CONTRACTOR FOR THE DEPARTMENTAL REPRESENTATIVE REVIEW.
- 4.3 COORDINATE ALL WORK SHOWN ON THE STRUCTURAL DRAWINGS WITH MECHANICAL, ELECTRICAL , ALL OTHER DISCIPLINES AND EXISTING CONDITIONS (EXISTING CONDITIONS ARE ASSUMED). REPORT ANY INCONSISTENCIES TO THE DEPARTMENTAL REPRESENTATIVE BEFORE PROCEEDING WITH THE WORK.
- 4.4 FOR MATERIALS , REFER TO THE VARIOUS DIVISIONS OF SPECIFICATIONS.
- 4.5 CONTRACTOR SHALL TAKE MEASURES TO PROTECT EXISTING UTILITIES AND FACILITIES DURING CONSTRUCTION.
- 4.6 EXISTING REINFORCING STEEL IS SHOWN IN IMPERIAL UNITS. NEW REINFORCING STEEL IS SHOWN IN METRIC UNITS.
- 4.7 EXISTING AND NEW STRUCTURAL STEEL MEMBERS ARE SHOWN IN IMPERIAL SECTIONS.
- 4.8 ALL THE NEW REINFORCEMENT BARS TO BE GALVANIZED WITH Fy=58 KSI (400 MPa). SEE SPECIFICATION.
- 4.9 CONCRETE STRENGTH FOR ALL NEW ELEMENTS TO BE f'c=5.08 KSI (35 MPa). SEE SPECIFICATION.
- 4.10 ALL THE NEW BOLTS SHOWN AS HSB TO BE A325 UNLESS NOTES OTHERWISE ON DRAWINGS.
5. EXISTING STRUCTURE
- 5.1 EXISTING STRUCTURAL INFORMATION IS BASED UPON DRAWINGS PREPARED BY C.C. PARKER AND ASSOCIATES LTD DATED 13/11/1958 AND 23/4/1982.
- 5.2 EXISTING CONDITIONS ARE ASSUMED. REPORT ANY VARIATIONS TO THE DEPARTMENTAL REPRESENTATIVE. BEFORE PROCEEDING WITH THE WORK.
6. FOUNDATIONS
- 6.1 FOUNDATION DESIGN IS BASED UPON A GEOTECHNICAL REPORT PREPARED FOR THE PROJECT BY SOIL-MAT ENGINEERS AND CONSULTANTS LTD., REPORT NO. SM 135013-G, DATED APRIL 23, 2013.
- 6.2 SET FOUNDATIONS ON UNDISTURBED SOIL CAPABLE OF SUPPORTING AN ALLOWABLE BEARING PRESSURE OF 14.5 PSI (100KPa) AT ULS AND 10.9 PSI (75KPa) AT SLS.
- 6.3 FOUNDATION OF NEW BARRIER, TRAFFIC AND PEDESTRIAN GATES ARE DESIGNED FOR THE FORCES SHOWN ON DRAWING S-13.

INDEX OF DRAWINGS

- S-01 - STRUCTURAL NOTES, ABBREVIATIONS AND INDEX OF DRAWINGS
- S-02 - GENERAL PLAN AND ELEVATION
- S-03 - DEMOLITION DETAILS -1-
- S-04 - DEMOLITION DETAILS -2-
- S-05 - DEMOLITION DETAILS -3-
- S-06 - DEMOLITION DETAILS -4-
- S-07 - DEMOLITION DETAILS -5-
- S-08 - MACHINERY ROOM FLOOR PLAN AND SLAB DETAIL
- S-09 - SHEAVE ROOM WALL DETAILS
- S-10 - GATE SUPPORT DETAILS
- S-11 - MISCELLANEOUS DETAILS
- S-12 - ABUTMENT AND GATE FOUNDATION DETAILS
- S-13 - LOAD TABLE AND DETAILS


ABBREVIATIONS

A.ROD	ANCHOR ROD
AEC	ARCHITECTURALLY EXPOSED CONCRETE
AESS	ARCHITECTURALLY EXPOSED STRUCTURAL STEEL
AF	FACTORED AXIAL LOAD (+ INDICATES TENSION, - INDICATES COMPRESSION)
ALT.	ALTERNATE
ARCH.	ARCHITECTURAL
B, BOT.	BOTTOM
BCP	BORED CONCRETE PILE
BEW	BOTTOM EACH WAY
BLL	BOTTOM LOWER LAYER
BM.	BEAM
BOC	ELEV BOT. OF CAISSON (BORED CONCRETE PILE)
BOF	ELEV BOTTOM OF FOOTING
BOP	ELEV BOTTOM OF PILE
BP	BEARING/BASE PLATE
BSMT.	BASEMENT
BUL	BOTTOM UPPER LAYER
BUP	BOTTOM OF UNDERPINNING
CA	COLUMN ABOVE ONLY (NO COLUMN BELOW)
CAM.	CAMBER
CANT.	CANTILEVER
CB	COLUMN BELOW
C/C	CENTRE TO CENTRE
CEL	CUT OFF ELEVATION FOR PILES
CF	CONCRETE FIREPROOFED
CIP	CAST-IN-PLACE
CJ	CONSTRUCTION JOINT
CL	CLEAR
CL	CENTRELINE
CNT	STEEL DECK CORE NOMINAL THICKNESS
COMP.	COMPOSITE
COL.	COLUMN
CONC.	CONCRETE
CONT.	CONTINUOUS
CP	CONNECTION PLATE
DCA	DRILLED CONCRETE ANCHOR
DET.	DETAIL
D.F-L	DOUGLAS FIR-LARCH
DIA.	DIAMETER
DIM.	DIMENSION
DL	DEAD LOAD IN PSF
DMA	DRILLED MASONRY ANCHOR
DN.	DOWN
DO	DITTO
DP.	DEEP
DWG.	DRAWING
DWL.	DOWEL
EA.	EACH
ECR	EPOXY COATED REINFORCEMENT
EE	EACH END
EF	EACH FACE
EJ, EXP.JT.	EXPANSION JOINT
EL., ELEV.	ELEVATION
EMBED.	EMBEDMENT
EQ.	EQUAL
EX., EXIST.	EXISTING
FD	FLOOR DRAIN
FF	FAR FACE
FIN.	FINISHED
FL.	FLOOR
FMC	FULL MOMENT CONNECTION
FT.	FEET
FTG.	FOOTING
f'c	COMPRESSIVE STRENGTH OF CONC
fy	YIELD STRENGTH
GALV.	GALVANIZED STEEL
GB	GRADE BEAM
GL	GRIDLINE
G/R	GUIDE RAIL
h	TOTAL THICKNESS
H, HOR.	HORIZONTAL
HDG	HOT DIPPED GALVANIZED
HEF	HORIZONTAL EACH FACE
HH	HOOK-HOOK (HOOK EACH END)
HIC	HORIZONTAL IN CENTRE
HK.	HOOK
HP	HIGH POINT
HSB	HIGH STRENGTH BOLT
IBA	INTEGRITY BARS ADDED
IBE	INTEGRITY BARS EXTERIOR
IBI	INTEGRITY BARS INTERIOR
IN.	INCH, INCHES
JG	JOIST GIRDER
kN	KILO NEWTON
kPa	KILO PASCAL
KSI	KILO POUNDS PER SQUARE INCH
LB.	POUND, POUNDS
ld	TENSION DEVELOPMENT LENGTH OF REBAR
ldc	COMPRESSION DEVELOPMENT LENGTH OF REBAR
L	SINGLE ANGLE
LL	DOUBLE ANGLES

LE	LEFT END
LG.	LONG/LENGTH
UL	UPPER LEVEL BM/JOIST
LL	LOWER LEVEL BM/JOIST
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LSV	LONG SIDE VERTICAL
LSH	LONG SIDE HORIZONTAL
LP	LOW POINT
MAX.	MAXIMUM
Mf	FACTORED MOMENT
MJ	MOVEMENT JOINT
MIN.	MINIMUM
► — —	MOMENT CONNECTION
MPa	MEGA PASCAL
MTf	FACTORED TORSION
NF	NEAR FACE
NTS	NOT TO SCALE
O/C	ON CENTRE
O/O	OUT TO OUT
OPEN, OPG.	OPENING
P	POINT LOAD
Pf	FACTORED POINT LOAD
PSI	POUNDS PER SQUARE INCH
PL OR P	PLATE
PSF	POUND PER SQUARE FOOT
RA	ROCK ANCHOR
R/C	REINFORCED CONCRETE
RD	ROOF DRAIN
REINF.	REINFORCEMENT
RE	RIGHT END
RF	RIGID FRAME
Rf	FACTORED VERTICAL REACTION
RHf	FACTORED HORIZONTAL REACTION
SCA	STEEL COLUMN ABOVE (NO STEEL COLUMN BELOW)
⊕ SDF	STEP DOWN FOOTING IN DIRECTION OF ARROW
SDL	SUPERIMPOSED DL (EXCLUDING SELF-WEIGHT)
SECT.	SECTION
SIM.	SIMILAR
SJ	STEEL JOIST
SLS	SERVICEABILITY LIMIT STATE
SL	SLAB
SL1, SL2	SHELF ANGLE 1, ETC
SOG	SLAB ON GRADE
SPA	SPACES
SPF	SPRUCE PINE FIR
SS	STAINLESS STEEL
STIR.	STIRRUP
STIFF.	STIFFENER
t	THICKNESS
T	TOP
TBR	TO BE REMOVED
TEW	TOP EACH WAY
THK.	THICK
TJ	TIE JOIST
TLE	TOP LEFT END
TLL	TOP LOWER LAYER
TOC	TOP OF CAISSON (BORED CONCRETE PILE)
TOF	TOP OF FOOTING
TOP	TOP OF PILE
TPC	TOP OF PILE CAP
TRE	TOP RIGHT END
TUL	TOP UPPER LAYER
TYP.	TYPICAL
ULS	ULTIMATE LIMIT STATE
U/S	UNDERSIDE
U/N	UNLESS NOTED
UPT.	UPTURNED
VB	VERTICAL BRACING
V, VEF	VERTICAL, VERTICAL EACH FACE
VF	FACTORED SHEAR
VIC	VERTICAL IN CENTRE
V, VERT., VERTS.	VERTICAL, VERTICALS
VSC	VERTICALLY SLOTTED CONNECTION
VXB	VERTICAL 'X' BRACING
WC	WIND COLUMN
WWF	WELDED WIRE FABRIC
ZRP	ZINC RICH PAINT
A	A - DETAIL NO.
B	B - DRAWING NO. - WHERE DETAIL REQUIRED
C	C - DRAWING NO. - WHERE DETAILED
⊕	COUNTERSUNK HOLE

STRUCTURAL WORK ITEMS

- 1 DEMOLISH AND PROPERLY DISPOSE OF STRUCTURAL ELEMENTS AS SHOWN ON THE DEMOLITION PLANS. STRUCTURAL DEMOLITION ITEMS INCLUDE THE CONTROL HOUSE WALL, MOTOR ROOM R/C FLOOR SLAB/WALL, REINFORCED CONCRETE SUPPORT FOR GATES, CURBING, PIPE RAILING, GUIDE RAIL, SIDEWALK, MISCELLANEOUS STRUCTURAL STEEL COMPONENTS AND HARDWARE.
- 2 DESIGN, FURNISH , INSTALL AND REMOVE TEMPORARY STRUCTURES INCLUDING FLOOR SLAB SUPPORT, TEMPORARY SHIELDING , TEMPORARY SHEETING, EQUIPMENT/MACHINERY HOISTING STRUCTURES.
- 3 EXCAVATE AND PROPERLY BACKFILL FOR CONSTRUCTION OF NEW GATES.
- 4 CONSTRUCT NEW R/C STRUCTURAL ELEMENTS AS SHOWN ON THE PLANS. NEW R/C ELEMENTS INCLUDE GATE SUPPORTS, PLATFORMS, CURBS, SIDEWALKS AND NEW FLOOR SLABS.
- 5 APPLY EPOXY WATERPROOFING ON CONCRETE SURFACES AS SHOWN ON THE CONTRACT PLANS.
- 6 FURNISH & INSTALL NEW STRUCTURAL STEEL COMPONENTS AS SHOWN ON THE CONTRACT PLANS. NEW STRUCTURAL STEEL COMPONENTS INCLUDE DECK JOINT CHECKERED PLATES, STEEL ARMORING, PIPE RAILING, MISCELLANEOUS STEEL ELEMENTS, CONDUIT SUPPORT (SEE ELECTRICAL PLANS) ON CATWALK AND MISCELLANEOUS HARDWARE.
- 7 FURNISH AND INSTALL NEW WALL PANELS, SIDING, FLASHING ETC.
- 8 FURNISH AND INSTALL NEW ROADWAY GUIDE RAIL, POSTS, HARDWARE ETC AND SHOWN ON THE CONTRACT PLANS.
- 9 PROVIDE MAINTENANCE AND PROTECTION OF TRAFFIC AND TRAFFIC CONTROL DEVICES AS DETAILED IN THE CONTRACT SPECIFICATIONS.
- 10 RESTORE SITE TO THE SATISFACTION OF THE DEPARTMENTAL REPRESENTATIVE.



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BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
STRUCTURAL NOTES,
ABBREVIATIONS AND
INDEX OF DRAWINGS

drawn by
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D. BRAND/L. KHAZOVA

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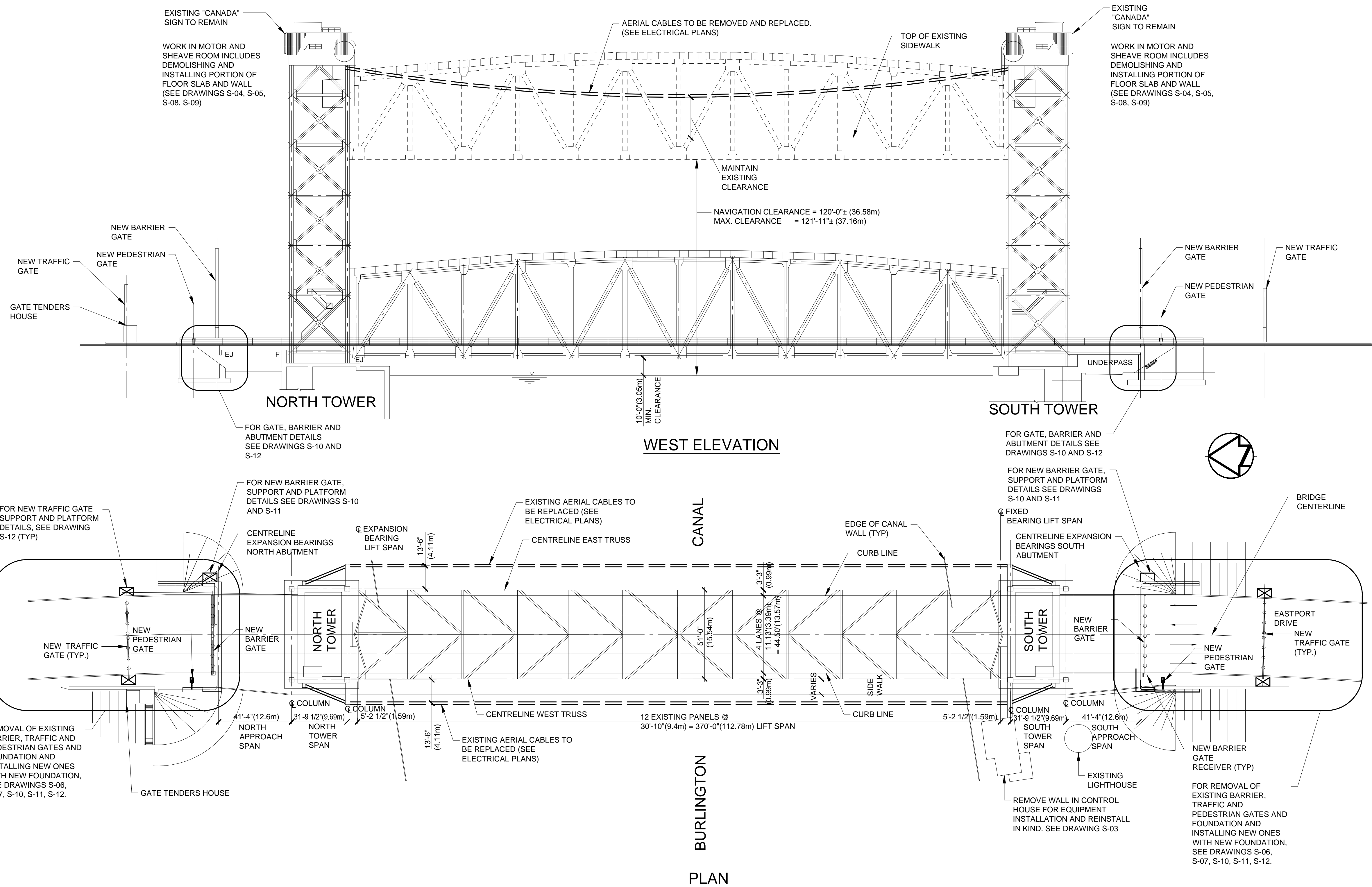
project manager
administrateur
de projets

project date
date du projet
2013-03-31

project no.
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R.012641.001

drawing no.
dessiné no.
S-01

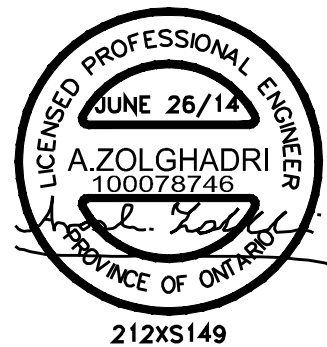
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BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**

drawing title
titre du dessin
GENERAL PLAN AND ELEVATION

drawn by
dessiné par **D. BRAND/L. KHAZOVA**

designed by
conçu par **A. ZOLGHADRI/E. SKROBACZ**

approved by
approuvé par **M. VANDEREE**

bid
soumission **A. GHUBRIL** project manager
administrateur de projets

project date
date du projet **2013-03-31**

project no.
no. du projet **R.012641.001**

drawing no.
dessiné no. **S-02**

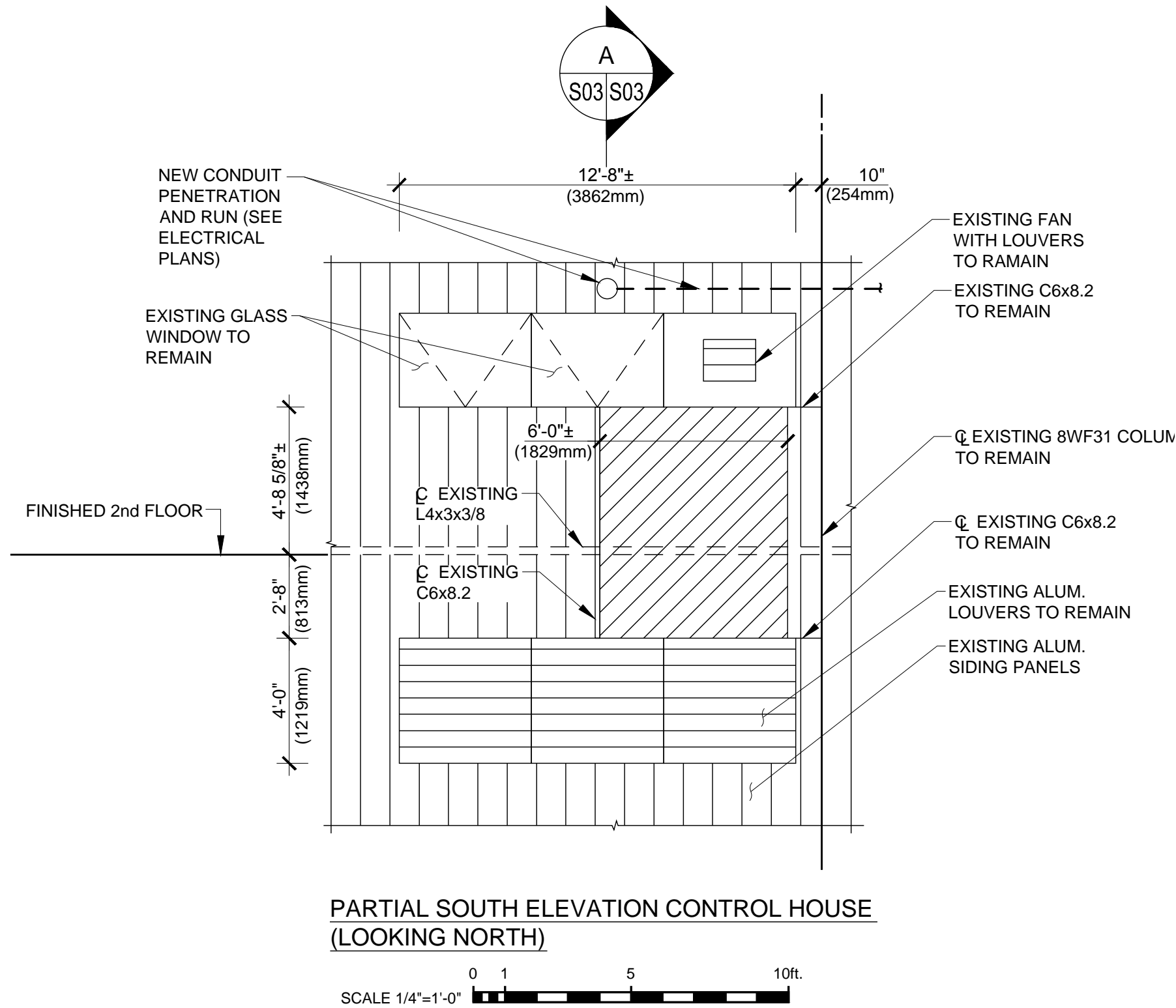
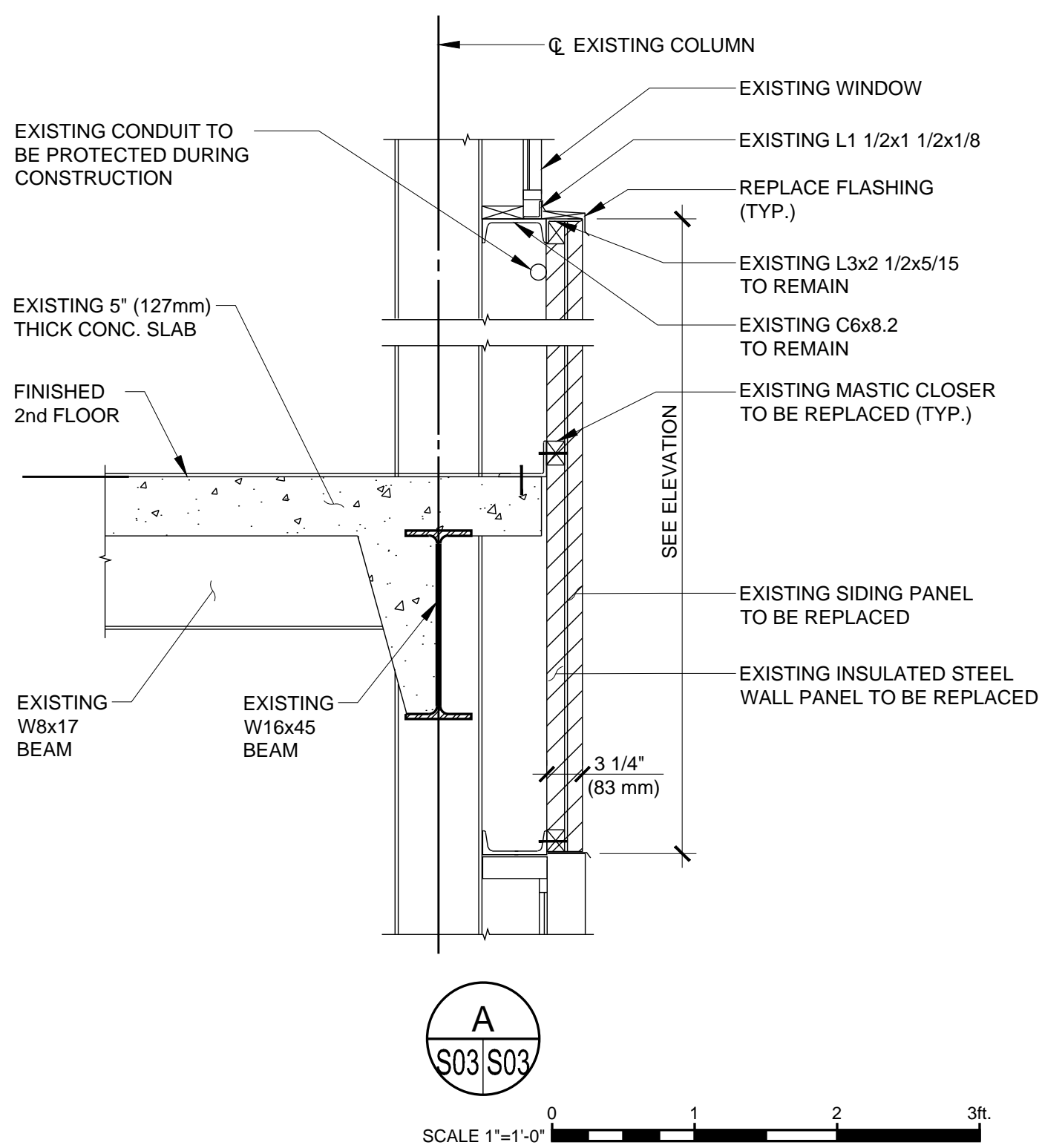
SCALE 1/32"=1'-0" 0 5 10 25 50 100ft.

GENERAL DEMOLITION NOTES

- FOR DETAILS OF FLOOR SLAB REMOVAL IN THE MOTOR ROOM , SEE DRAWING S-04.
- FOR DETAILS OF MACHINERY REMOVAL, SEE THE MECHANICAL DEMOLITION PLAN, H-02.
- THE EXISTING INFORMATION SHOWN IN THESE DRAWINGS IS TAKEN FROM THE ORIGINAL PLANS AND A LIMITED FIELD SURVEY PERFORMED DURING THE DESIGN PHASE. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS AND ELEVATIONS PRIOR TO THE COMMENCEMENT OF WORK. IF FIELD CONDITIONS DIFFER FROM THOSE SHOWN, THE CONTRACTOR SHALL USE FIELD INFORMATION TO MAKE APPROPRIATE CHANGES TO THE PLANS BEFORE SUBMITTING THEM TO THE DEPARTMENTAL REPRESENTATIVE FOR REVIEW.
- CONTRACTOR SHALL SUPPORT THE INSULATED CEILING OVER THE GEAR BOX DURING REMOVAL OPERATIONS. CONTRACTOR SHALL SUBMIT DETAILS OF TEMPORARY SUPPORT TO THE DEPARTMENTAL REPRESENTATIVE FOR REVIEW PRIOR TO THE START OF CONSTRUCTION.
- THE CONTRACTOR SHALL SUBMIT A PLAN TO THE DEPARTMENTAL REPRESENTATIVE SHOWING THE METHOD AND EQUIPMENT THAT WILL BE USED TO REMOVE THE EXISTING STRUCTURE.
- REMOVAL OF THE EXISTING STRUCTURE SHALL NOT BEGIN UNTIL THE REMOVAL PLAN HAS BEEN REVIEWED BY THE DEPARTMENTAL REPRESENTATIVE, AND HEALTH AND SAFETY MEASURES HAVE BEEN TAKEN.
- ALL REMOVAL MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE SUITABLY DISPOSED OF OFF SITE.
- THE CONTRACTOR SHALL PROTECT ALL EXISTING ACTIVE UTILITIES DURING CONSTRUCTION AT ALL TIMES.
- THE INFORMATION PRESENTED HEREIN IS FOR INFORMATIONAL PURPOSES ONLY AND IS NOT GUARANTEED TO BE CORRECT. BIDDERS SHALL VISIT THE PROJECT SITE PRIOR TO SUBMITTING BIDS TO ASCERTAIN THE EXTENT OF THE WORK.
- THE CONTRACTOR SHALL USE CAUTION WHILE REMOVING STRUCTURAL COMPONENTS. PROPERLY SIZED REMOVAL EQUIPMENT SHOULD BE SELECTED AND JUDICIOUS REMOVAL METHODS SHALL BE USED TO ENSURE THAT DEMOLITION ACTIVITIES DO NOT DAMAGE PORTIONS OF THE EXISTING STRUCTURE THAT ARE TO REMAIN.

CONTROL HOUSE WALL REMOVAL AND RECONSTRUCTION NOTES

- TEMPORARY WALL REMOVAL IS REQUIRED FOR THE PURPOSE OF REMOVING AND INSTALLING SELECTED ELECTRICAL EQUIPMENT IN THE CONTROL HOUSE. SEE THE ELECTRICAL PLANS FOR DETAILS OF SPECIFIC EQUIPMENT TO BE REMOVED AND REINSTALLED.
- CONTRACTOR SHALL TAKE MEASURES TO PROTECT EXISTING EQUIPMENT, UTILITIES AND BUILDING STRUCTURE TO REMAIN OPERATIONAL DURING DEMOLITION AND CONSTRUCTION.
- CONTRACTOR SHALL PROVIDE A WATERTIGHT ENCLOSURE AROUND OPENING, WHEN WALL IS REMOVED. CONTRACTOR SHALL PROVIDE DETAILS OF ENCLOSURE PRIOR TO CONSTRUCTION.
- SEE THE PROJECT SPECIFICATIONS FOR SPECIFIC DETAILS AND LIMITATIONS OF WALL REMOVAL AND RECONSTRUCTION.
- WALL OPENING SHALL BE RECONSTRUCTED TO MATCH THE MATERIALS AND DETAILS OF THE EXISTING WALL TO REMAIN, EXCEPT AS NOTED. NEW WALL SHALL BE WATERTIGHT AND INSULATED. OUTSIDE OF NEW WALL SHALL BE PAINTED TO MATCH THE COLOR OF THE EXISTING CONTROL HOUSE. ALL MATERIALS USED FOR RECONSTRUCTION SHALL BE NEW.
- REMOVAL LIMITS MAY BE MODIFIED TO MATCH JOINTS IN INSULATED WALL PANELS.
- ALL NEW HARDWARE (SCREWS AND BOLTS) USED FOR WALL RECONSTRUCTION SHALL BE STAINLESS STEEL ASTM TYPE 316 OR EQUIVALENT.

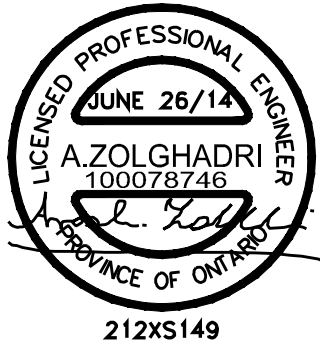


LEGEND

 DENOTES REMOVAL.



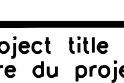
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04	99% DESIGN COMPLETION	2013-05-31
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02	66% DESIGN SUBMITTAL, NOT FOR CONSTRUCTION	2013-02-14
01	33% DESIGN SUBMITTAL, NOT FOR CONSTRUCTION	2012-12-10

revision	date
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	A Detail No. No. du détail
	B drawing no. - where detail required dessin no. - où détail exigé
	C drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
DEMOLITION DETAILS -1-

drawn by
dessiné par
L. KHAZOVA

designed by
conc par
A. ZOLGHADRI/E. SKROBACZ

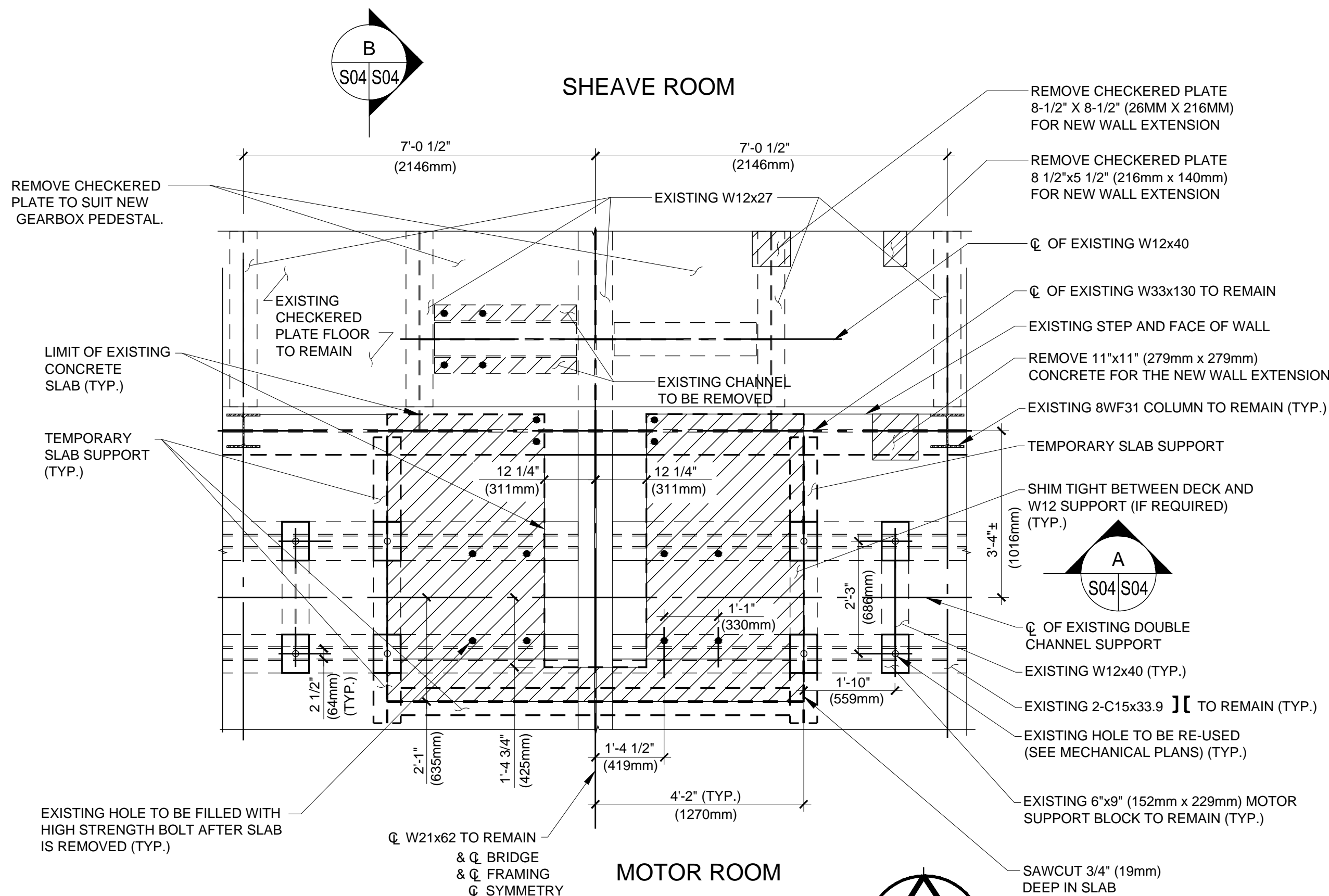
approved by
approuvé par
M. VANDEREE

bid
soumission
A. GHUBRIL project manager
administrateur
de projets

project date
date du projet
2013-03-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
S-03

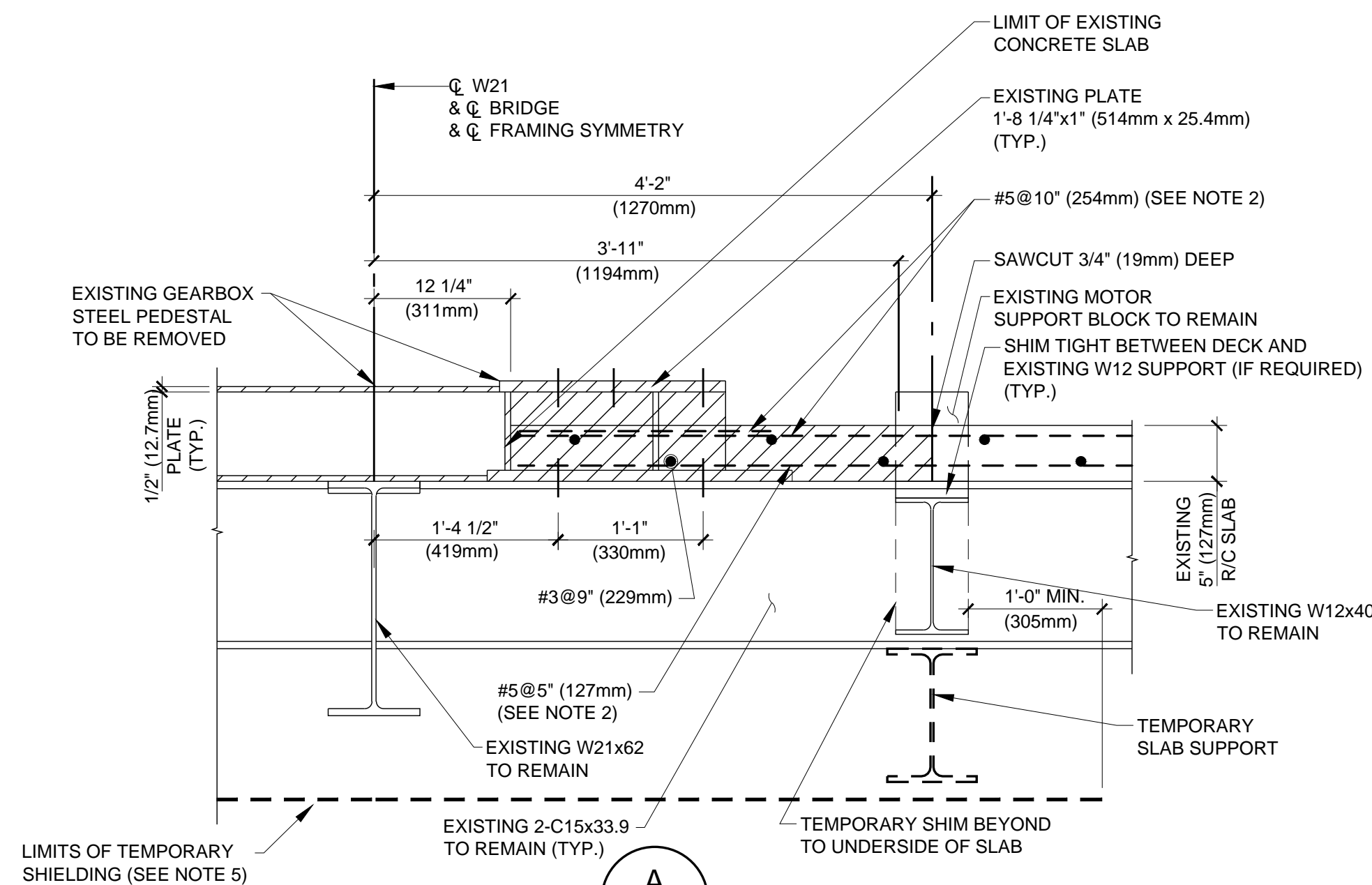


NOTE:
EXISTING GEARBOX PEDESTAL
AND WALL NOT SHOWN

MOTOR ROOM CONCRETE FLOOR SLAB REMOVAL PLAN SOUTH TOWER

NORTH TOWER SIMILAR AND OPPOSITE HAND

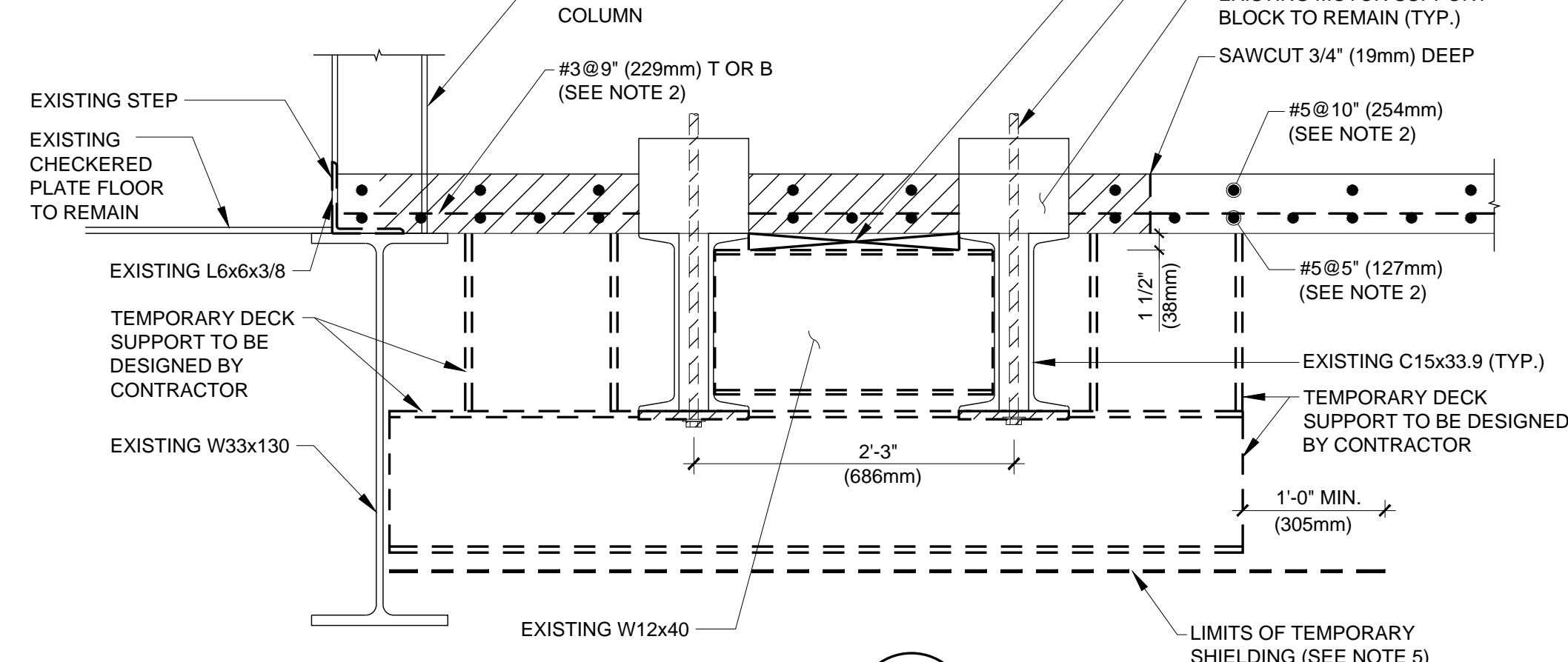
SCALE 1/2"=1'-0"



NOTE:
EXISTING GEARBOX NOT SHOWN.

SCALE 1"=1'-0"

SHEAVE ROOM



MOTOR ROOM

LEGEND

DENOTES REMOVAL.

NOTES:

1. CONCRETE SLAB REMOVAL IS REQUIRED IN ORDER TO FACILITATE REMOVAL OF EXISTING GEAR BOX STEEL PEDESTAL. SEE MECHANICAL PLANS.
2. EXISTING REINFORCEMENT SHALL BE CUT SO THAT IT PROTRUDES 6" (152mm) MINIMUM BEYOND LIMITS OF CONCRETE REMOVAL.
3. FOR NEW CONCRETE SLAB DETAILS, SEE DRAWING S-08.
4. FOR DETAILS OF NEW GEARBOX AND PEDESTAL, SEE THE MECHANICAL PLANS.
5. THE TEMPORARY SHIELDING SHALL BE DESIGNED AND DETAILED BY THE CONTRACTOR AND SUBMITTED TO THE DEPARTMENTAL REPRESENTATIVE FOR REVIEW. THE TEMPORARY SHIELDING SHALL BE DESIGNED TO SUPPORT A LIVE LOAD OF AT LEAST 115 POUNDS PER SQUARE FOOT (5.5 kN/m²) AND SHALL BE INSTALLED PRIOR TO SLAB REMOVAL. TEMPORARY SHIELDING SHALL ALSO ACT AS A THERMAL BARRIER IN ORDER TO MAINTAIN ROOM TEMPERATURE INSIDE THE MOTOR ROOM.
6. FOR GENERAL DEMOLITION NOTES, SEE DRAWING S-03.

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dessin no. - où détail exigé
C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
DEMOLITION DETAILS -2-

drawn by
dessiné par L. KHAZOVA

designed by
conc par A. ZOLGHADRI/E. SKROBACZ

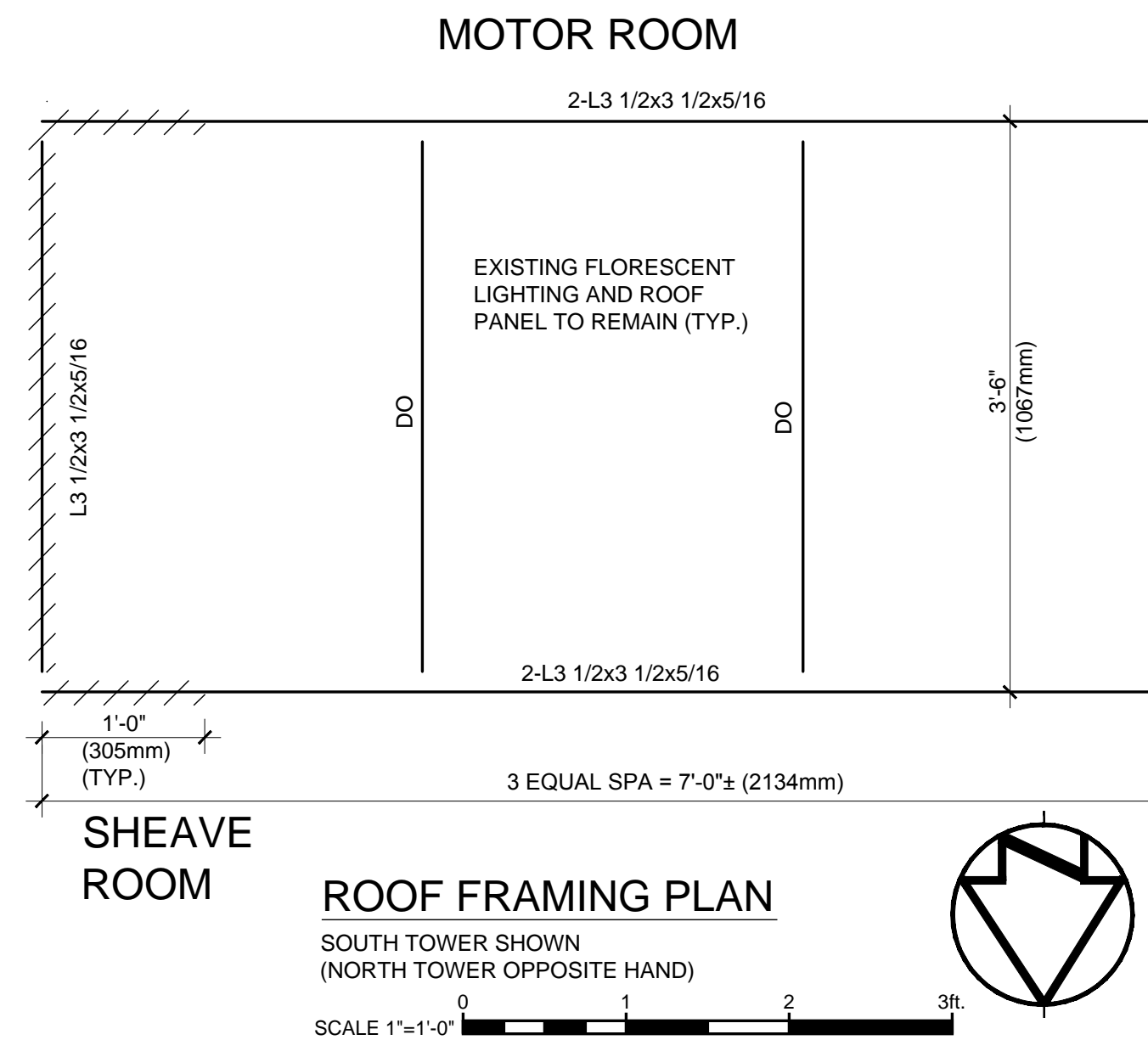
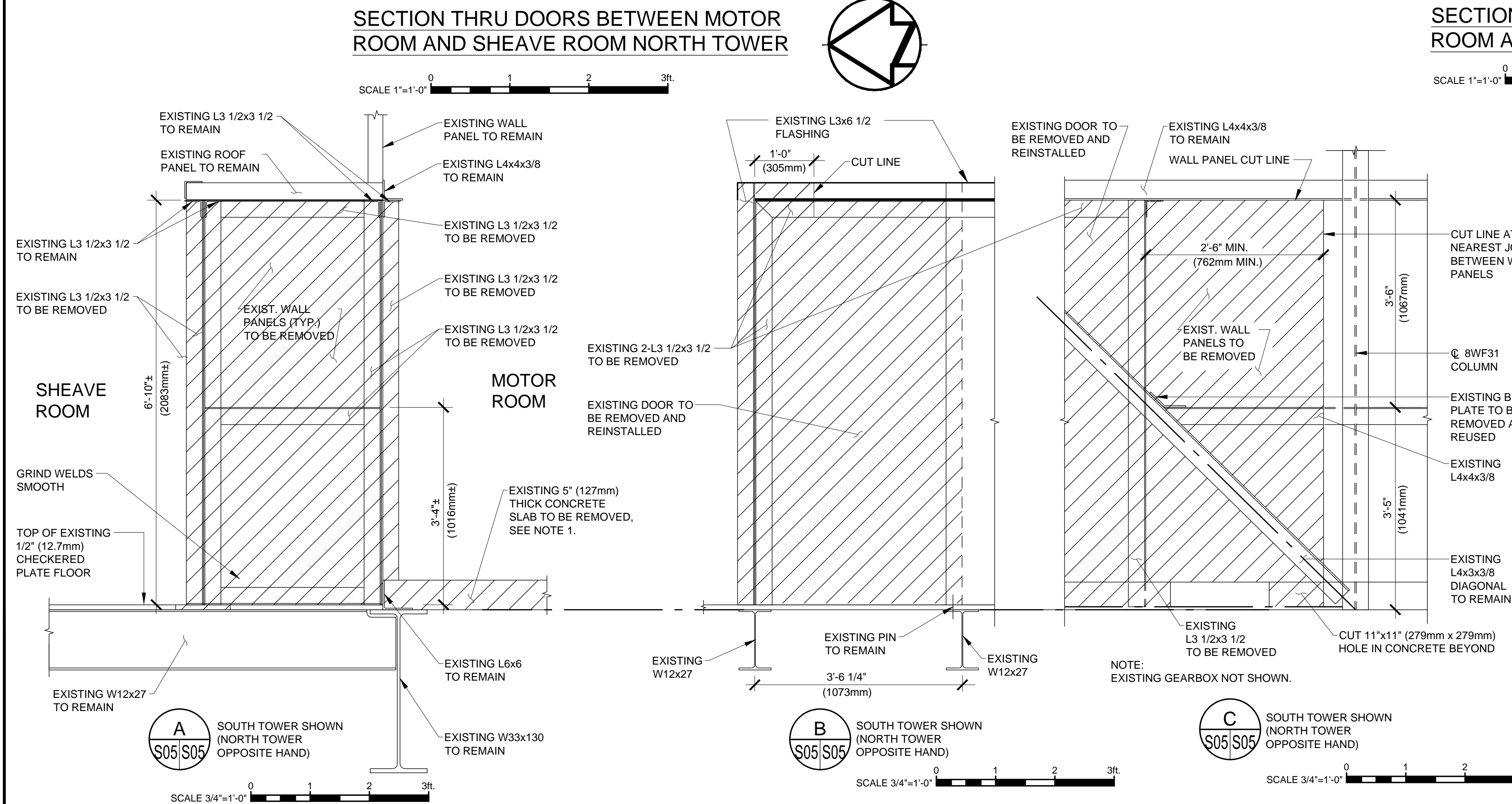
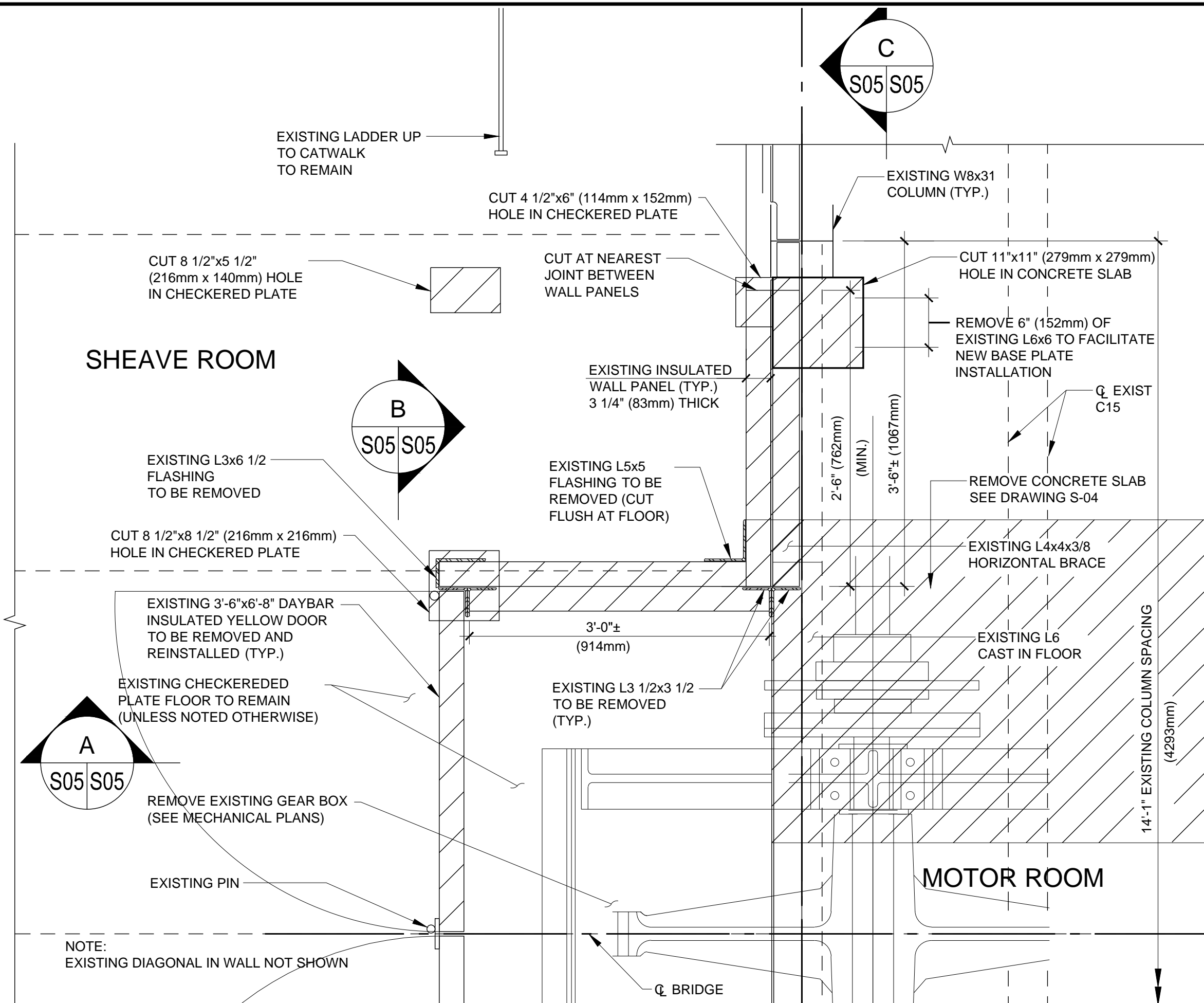
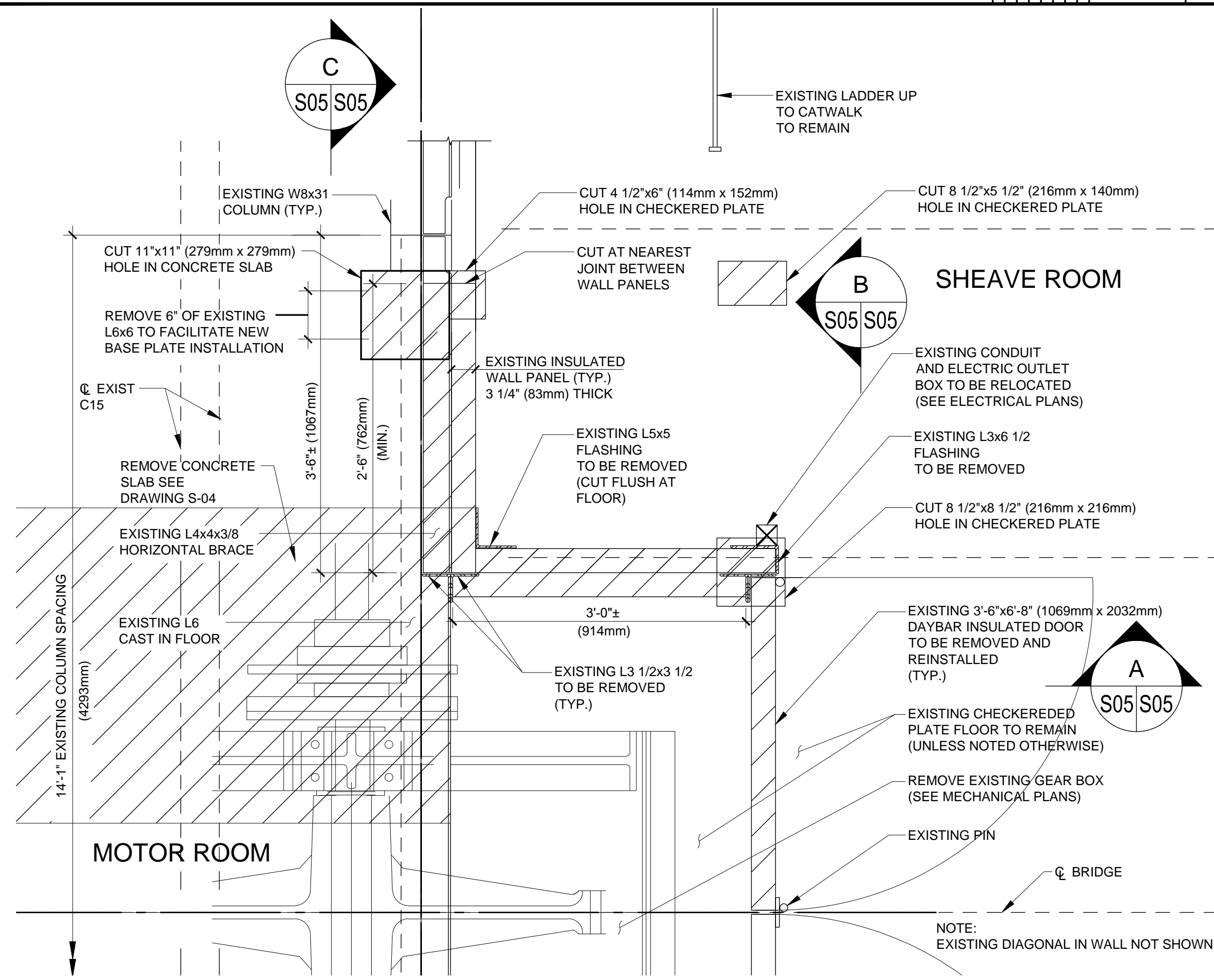
approved by
approuvé par M. VANDEREE

bid
soumission A. GHUBRIL project manager
administrateur de projets

project date
date du projet 2013-03-31

project no.
no. du projet R.012641.001

drawing no.
dessiné no. S-04



- NOTE:
- FOR GENERAL DEMOLITION NOTES, SEE DRAWING S-03.

LEGEND

/// DENOTES REMOVAL.

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01	33% DESIGN SUBMITTAL NOT FOR CONSTRUCTION	2012-12-10

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	drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet

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REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

DEMOLITION DETAILS -3-

drawn by
dessiné par

L. KHAZOVA

designed by
conc par

A. ZOLGHADRI/E. SKROBACZ

approved by
approuvé par

M. VANDEREE

bid
soumission

A. GHUBRIL

project date
date du projet

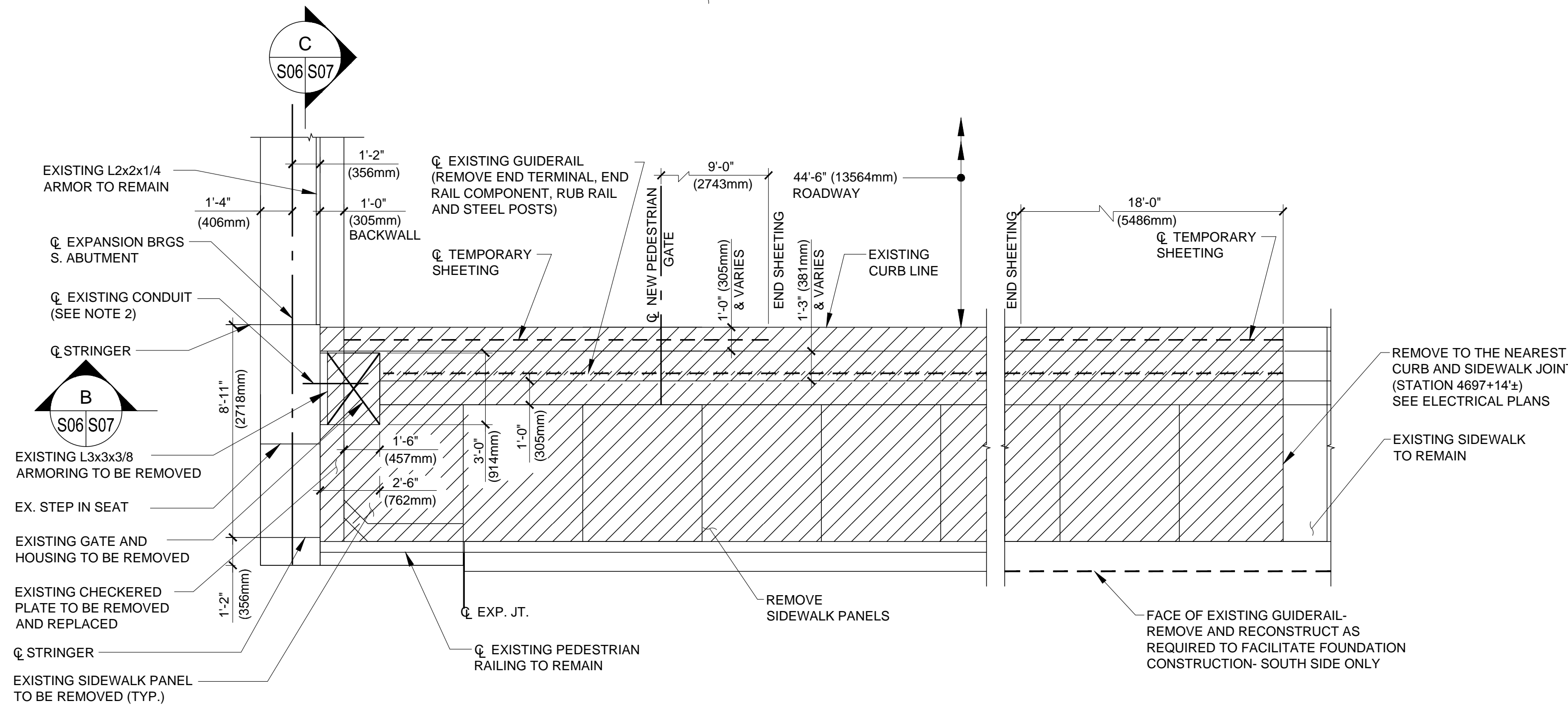
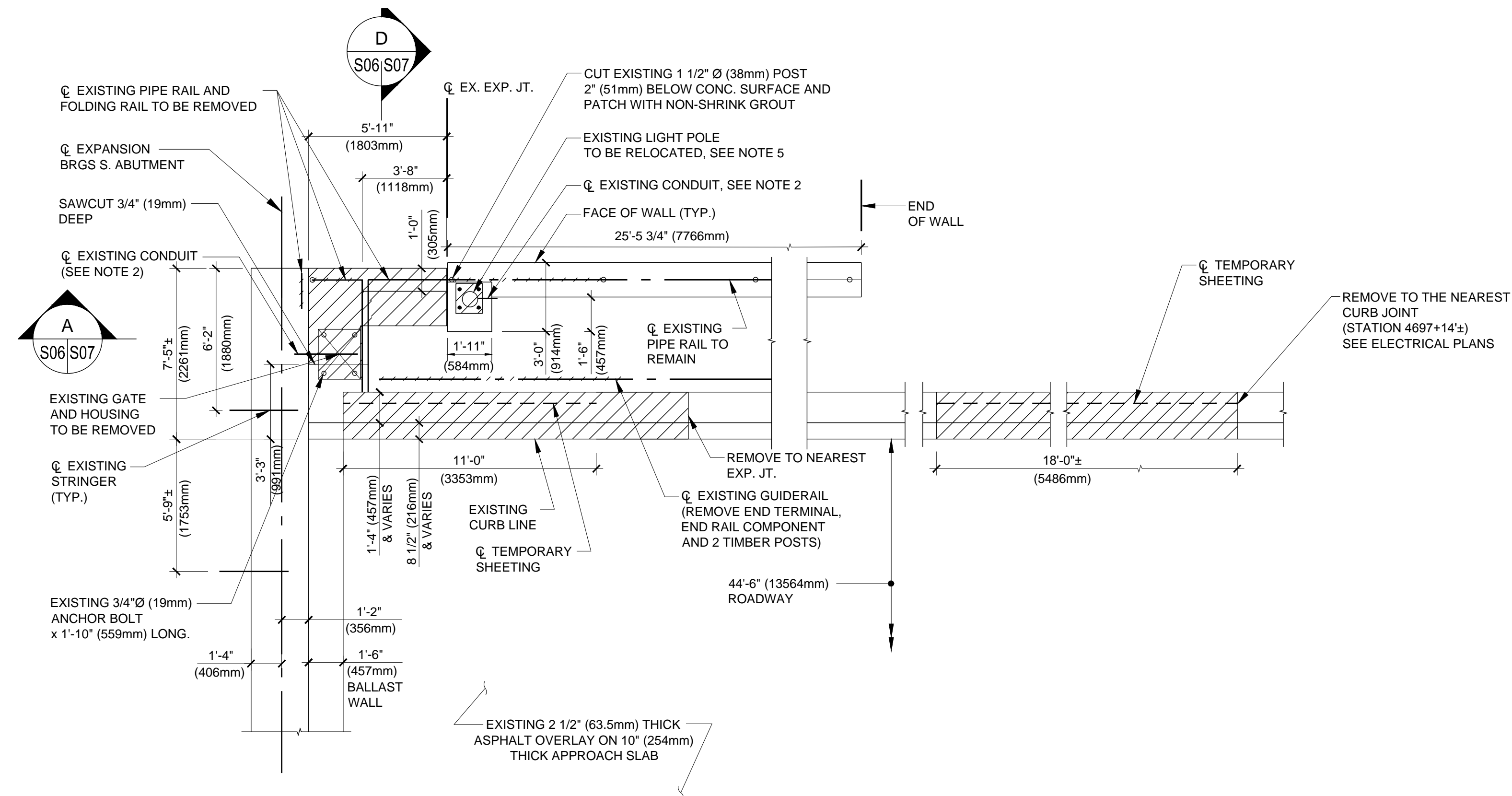
2013-03-31

project no.
no. du projet

R.012641.001

drawing no.
dessiné no.

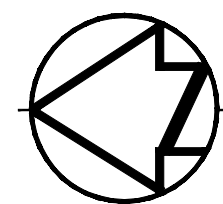
S-05



SOUTH ABUTMENT DEMOLITION PLAN

NORTH TOWER SIMILAR AND OPPOSITE HAND

SCALE 1/4"=1'-0"



NOTES:

- EXISTING ANCHOR BOLTS FOR BARRIER/TRAFFIC GATES AND LIGHT POLE SHALL BE CUT 2" (51mm) BELOW THE CONCRETE SURFACE AND PATCHED WITH NON SHRINK GROUT TO MATCH THE COLOR OF THE ADJACENT CONCRETE.
- EXISTING CONDUITS THAT WILL BE ABANDONED SHALL BE CUT AT CONCRETE SURFACE AND PLUGGED.
- REMOVE EXISTING GUIDE RAIL, RUB RAIL, SPACER BLOCKS AND POSTS AS SHOWN ON THE PLANS.
- EXISTING REINFORCEMENT EXPOSED BY REMOVAL OPERATIONS SCHEDULED TO REMAIN SHALL BE FIELD BLASTED AND EPOXY COATED.
- FOR LIGHT POLE RELOCATION DETAILS, SEE ELECTRICAL PLANS.
- FOR GENERAL DEMOLITION NOTES SEE DRAWING S-03.
- THE CONTRACTOR SHALL TAKE MEASURES TO PREVENT DAMAGE TO EXISTING STRUCTURES THAT WILL REMAIN INCLUDING WINGWALLS, ABUTMENTS AND THE GATE TENDERS HOUSE AT THE NORTHWEST CORNER OF THE BRIDGE DURING DEMOLITION AND CONSTRUCTION OF NEW GATE FOUNDATIONS. CONTRACTORS EXCAVATION METHODS SHALL NOT UNDERMINE THE FOUNDATION FOR THE EXISTING GATE TENDERS HOUSE AT THE NORTHWEST CORNER OF THE BRIDGE.
- CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN DRIVING SHEETING ADJACENT TO EXISTING STRUCTURES TO REMAIN.
- PRIOR TO THE START OF CONSTRUCTION OF GATE SUPPORTS, THE CONTRACTOR SHALL PERFORM A FIELD SURVEY OF EXISTING ABUTMENTS, WINGWALLS, AND GATE TENDERS HOUSE. A PHOTOGRAPHIC INVENTORY DOCUMENTING EXISTING CONDITIONS SHALL BE SUBMITTED TO THE DEPARTMENTAL REPRESENTATIVE PRIOR TO THE START OF CONSTRUCTION.
- EXISTING GUIDERAIL AND BRIDGE RAILING THAT IS TO REMAIN AND IS IMPACTED BY THE CONSTRUCTION ACTIVITIES SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT THE COMPLETION OF CONSTRUCTION.
- SIDEWALK REMOVAL AND RECONSTRUCTION LIMITS ON THE NORTH APPROACH SHALL EXTEND A MINIMUM OF 9 FEET NORTH OF EXISTING TRAFFIC GATE.

LEGEND

 DENOTES REMOVAL.

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revision

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dessin no. - où détail exigée
C drawing no. - where detailed
dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES ONTARIO

drawing title
titre du dessin
DEMOLITION DETAILS -4-

drawn by
dessiné par
L. KHAZOVA

designed by
conc par
A. ZOLGHADRI/E. SKROBACZ

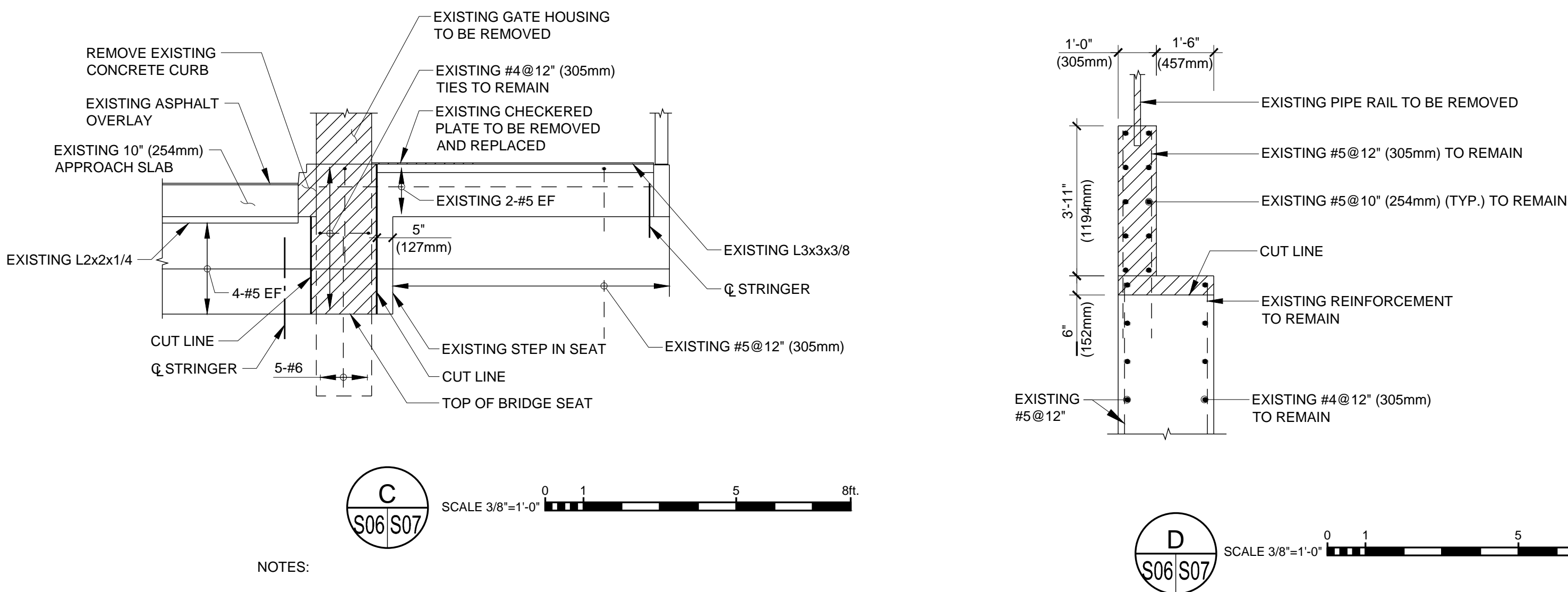
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approuvé par
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bid
soumission
A. GHUBRIL project manager
administrateur de projets

project date
date du projet
2013-03-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
S-06



1. FOR GENERAL DEMOLITION NOTES SEE DRAWING S-03
2. ONLY SELECTED EXISTING REINFORCEMENT IS SHOWN ON THIS DRAWING.
3. EXISTING ELECTRICAL CONDUIT AND JUNCTION BOXES ARE NOT SHOWN ON THIS DRAWING.
4. EXISTING BARRIER GATE ANCHOR BOLTS ARE NOT SHOWN ON THIS DRAWING.

1. ONLY SELECTED EXISTING REINFORCEMENT IS SHOWN
2. ELECTRICAL CONDUIT AND JUNCTION BOXES NOT SHOWN.
SEE ELECTRICAL DRAWINGS.

 DENOTES REMOVAL.

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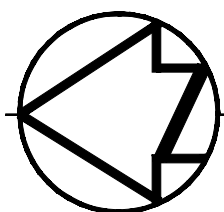
project title titre du projet	
HAMILTON	ONTARIO
BURLINGTON CANAL	
VERTICAL LIFT BRIDGE	
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES	

DEMOLITION DETAILS -5-

drawing no.
dessine no. S-07



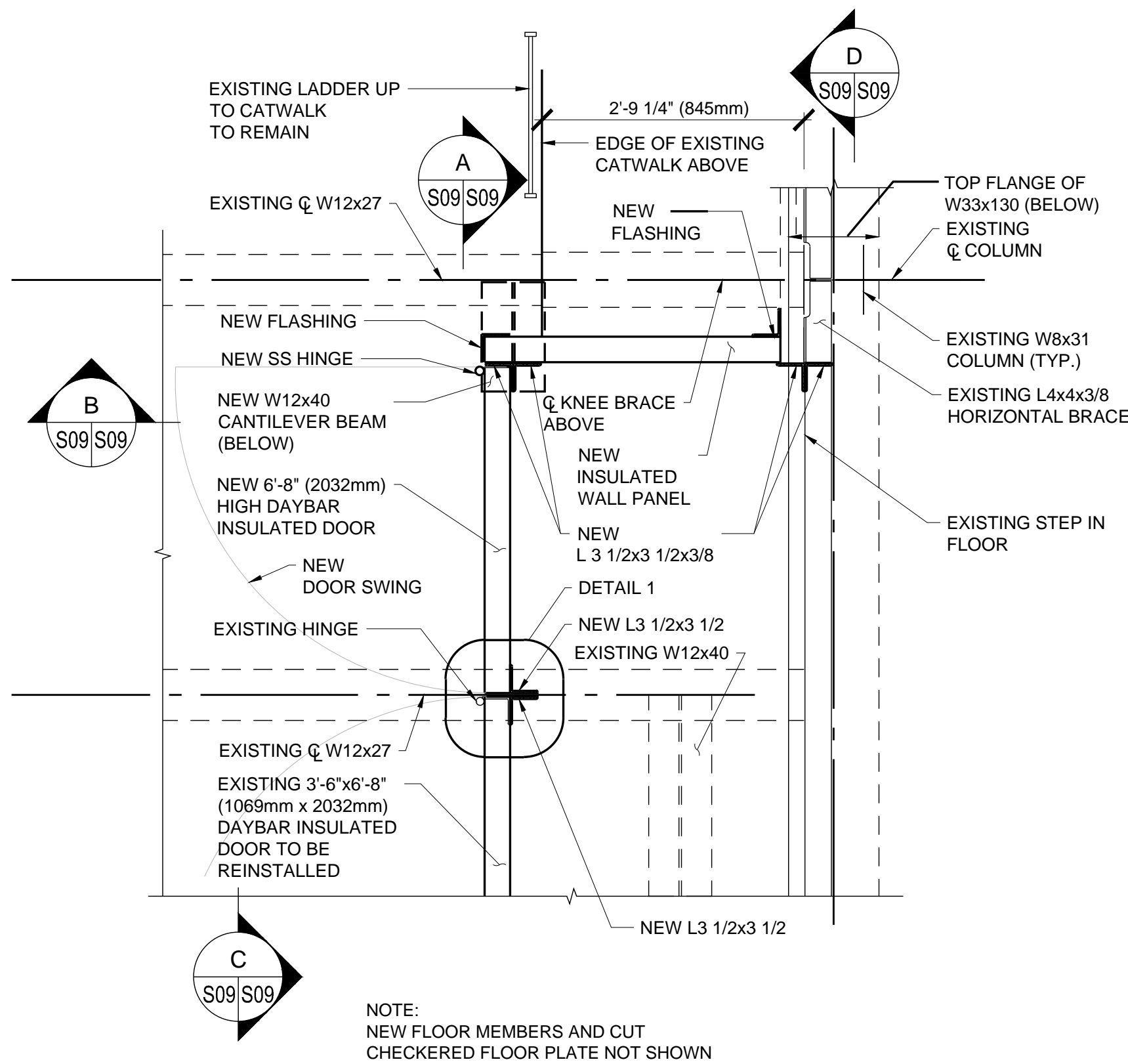
NOTE:
PRIMARY EXISTING FRAMING MEMBERS IN FLOOR SHOWN
NOT ALL MEMBERS LABELED. MECHANICAL AND
ELECTRICAL EQUIPMENT NOT SHOWN. WALL PROPOSED
MEMBERS IN SHEAVE ROOM NOT SHOWN.



SEE MECHANICAL DRAWINGS
FOR NEW BOLTS AT GEAR BOX
PEDESTALS. INSTALL BOLTS
BETWEEN THE EXISTING
DOUBLE CHANNELS (TYP.)

NORTH TOWER SIMILAR AND OPPOSITE HAND

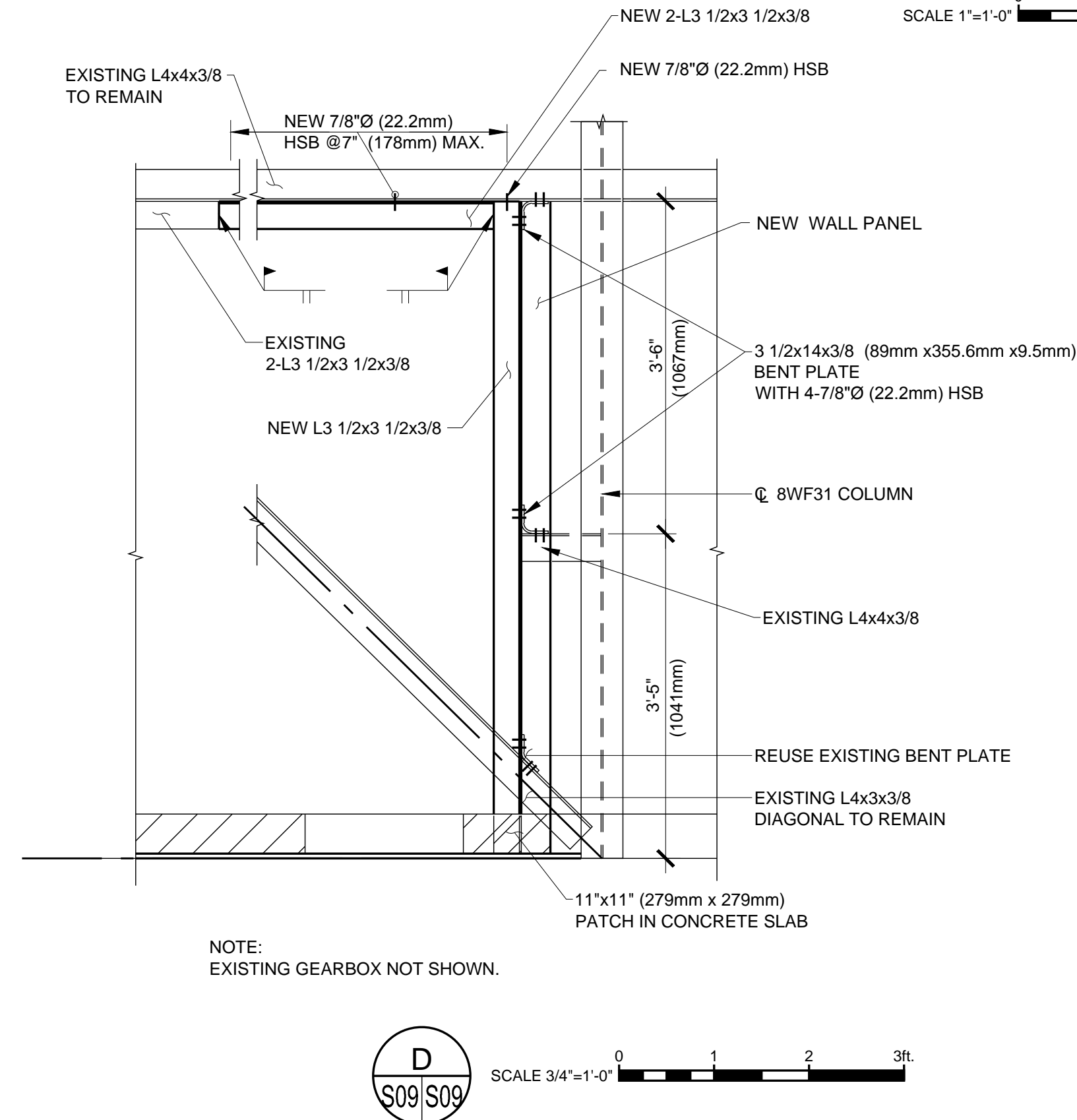
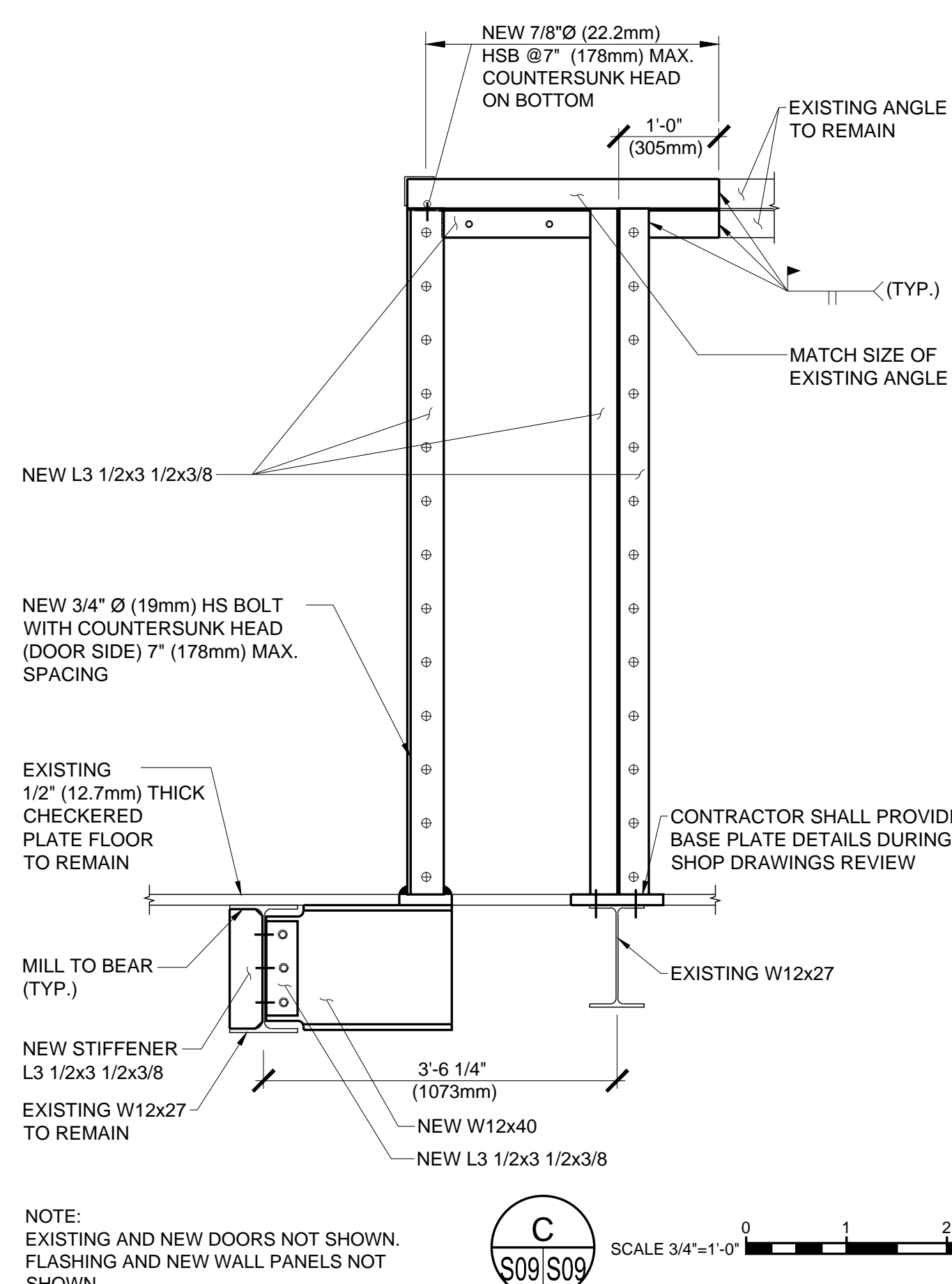
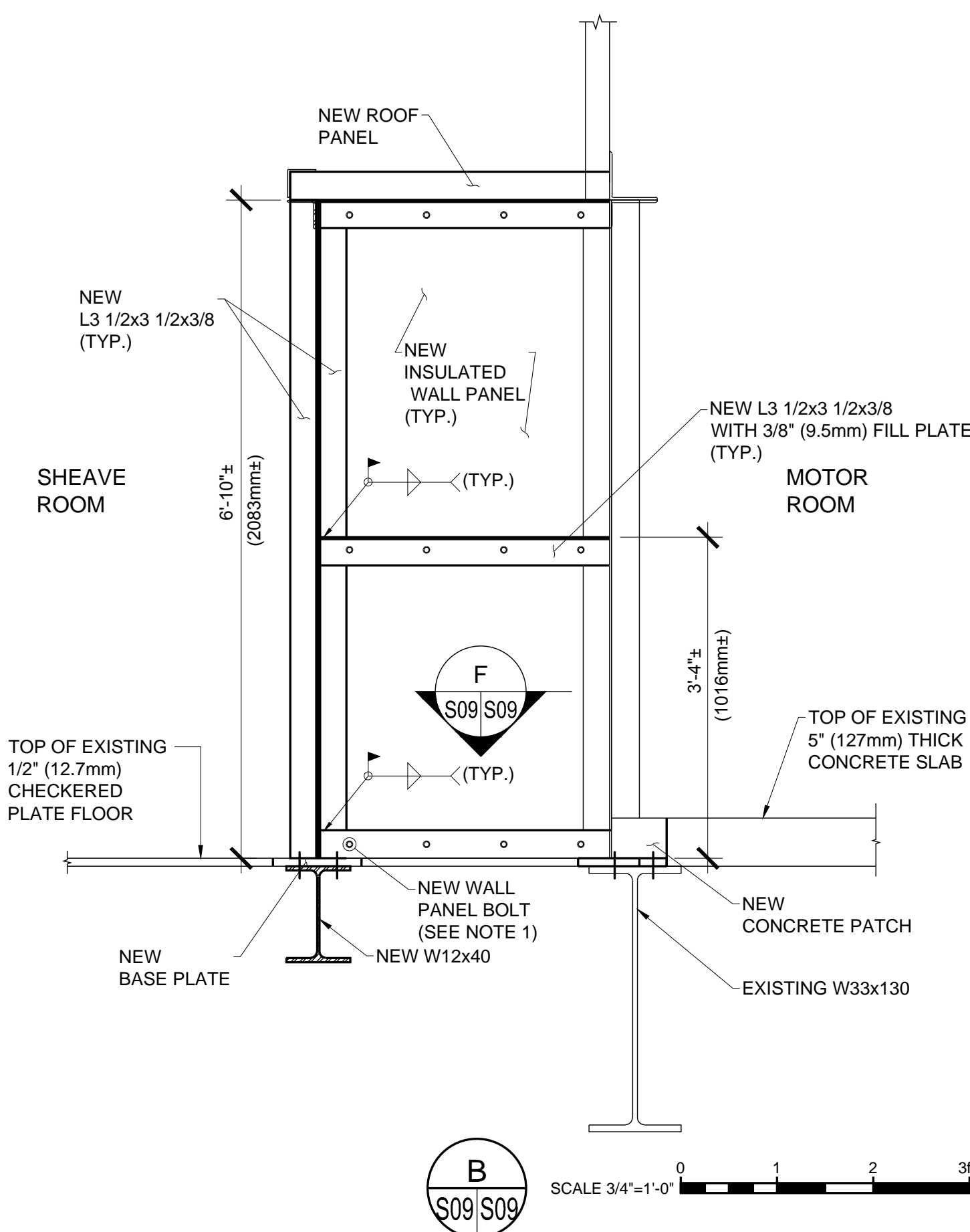
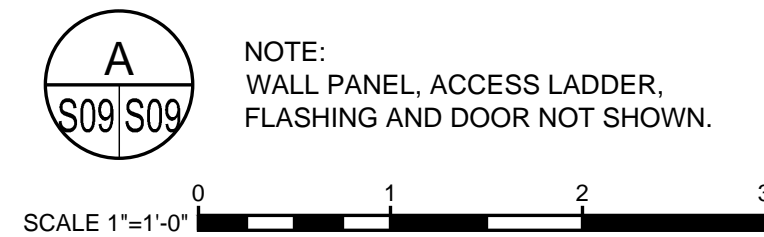
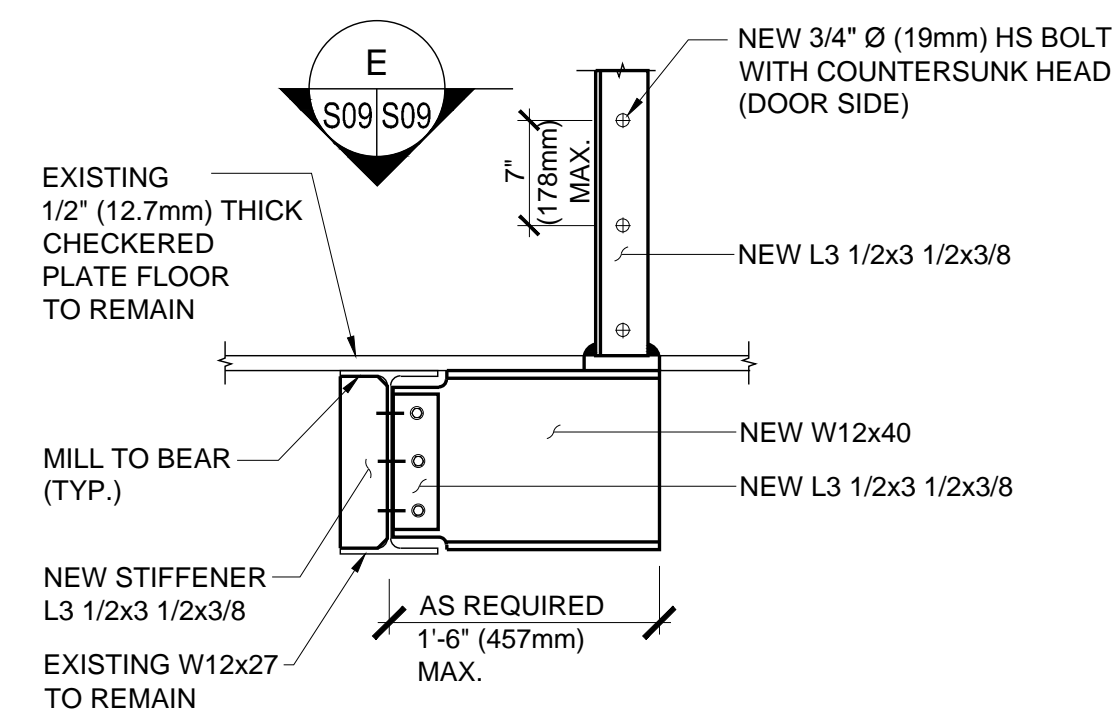
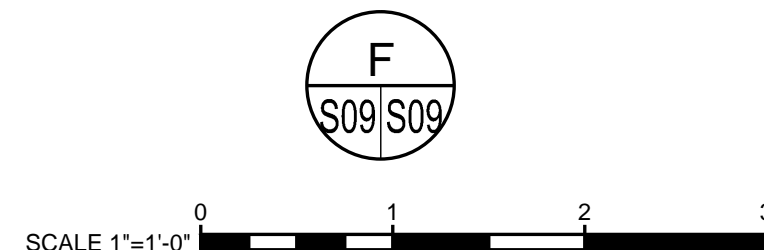
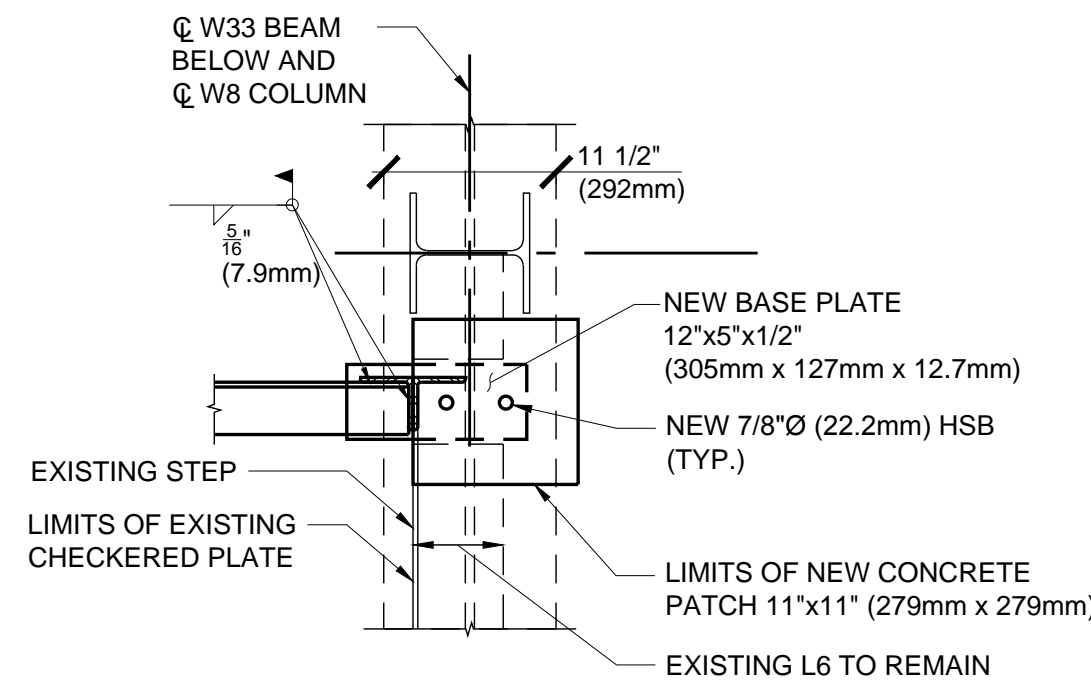
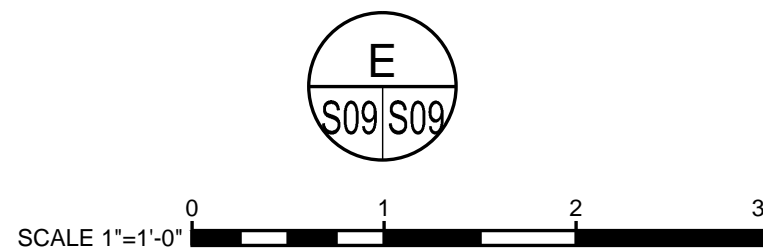
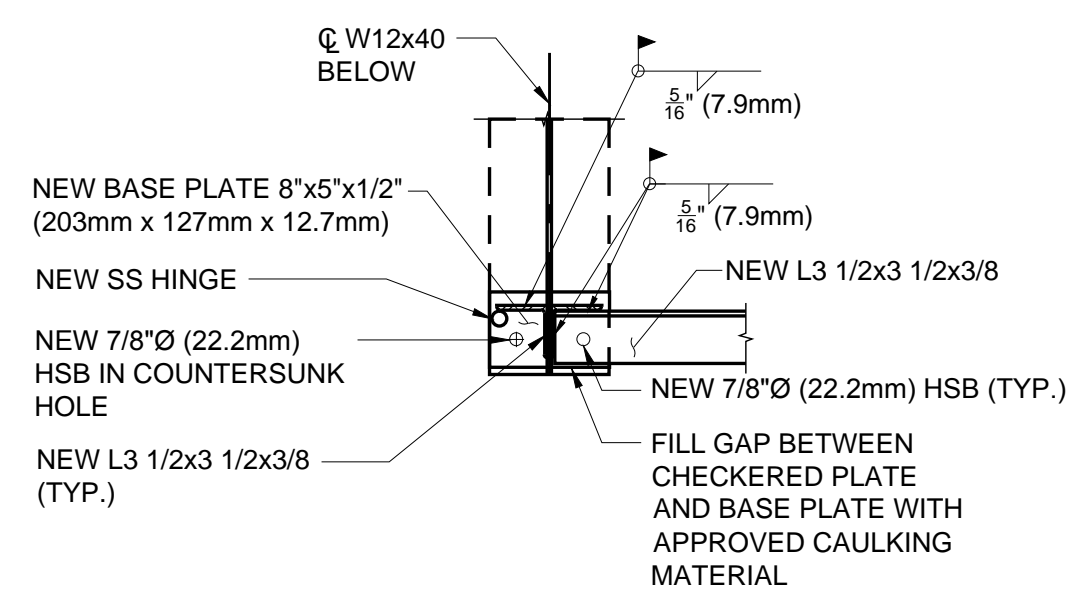
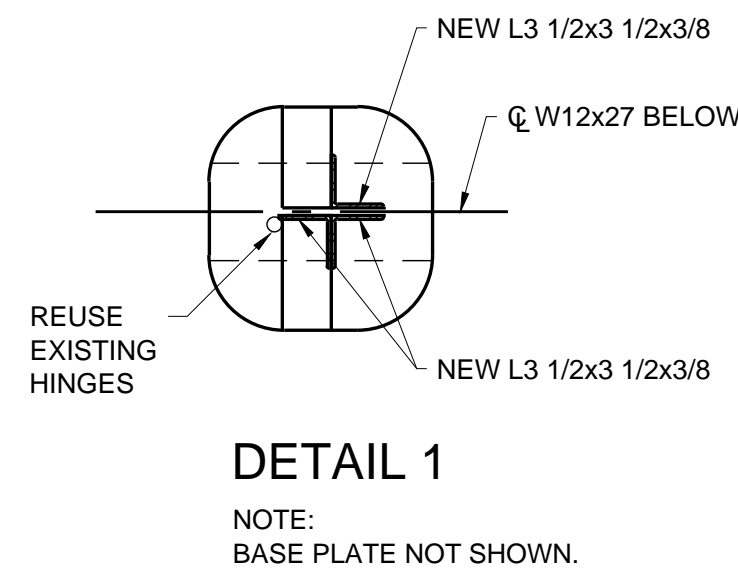




SOUTH TOWER SHEAVE ROOM PART PLAN

NORTH TOWER SIMILAR AND OPPOSITE HAND

SCALE 3/4"=1'-0"



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revision		date

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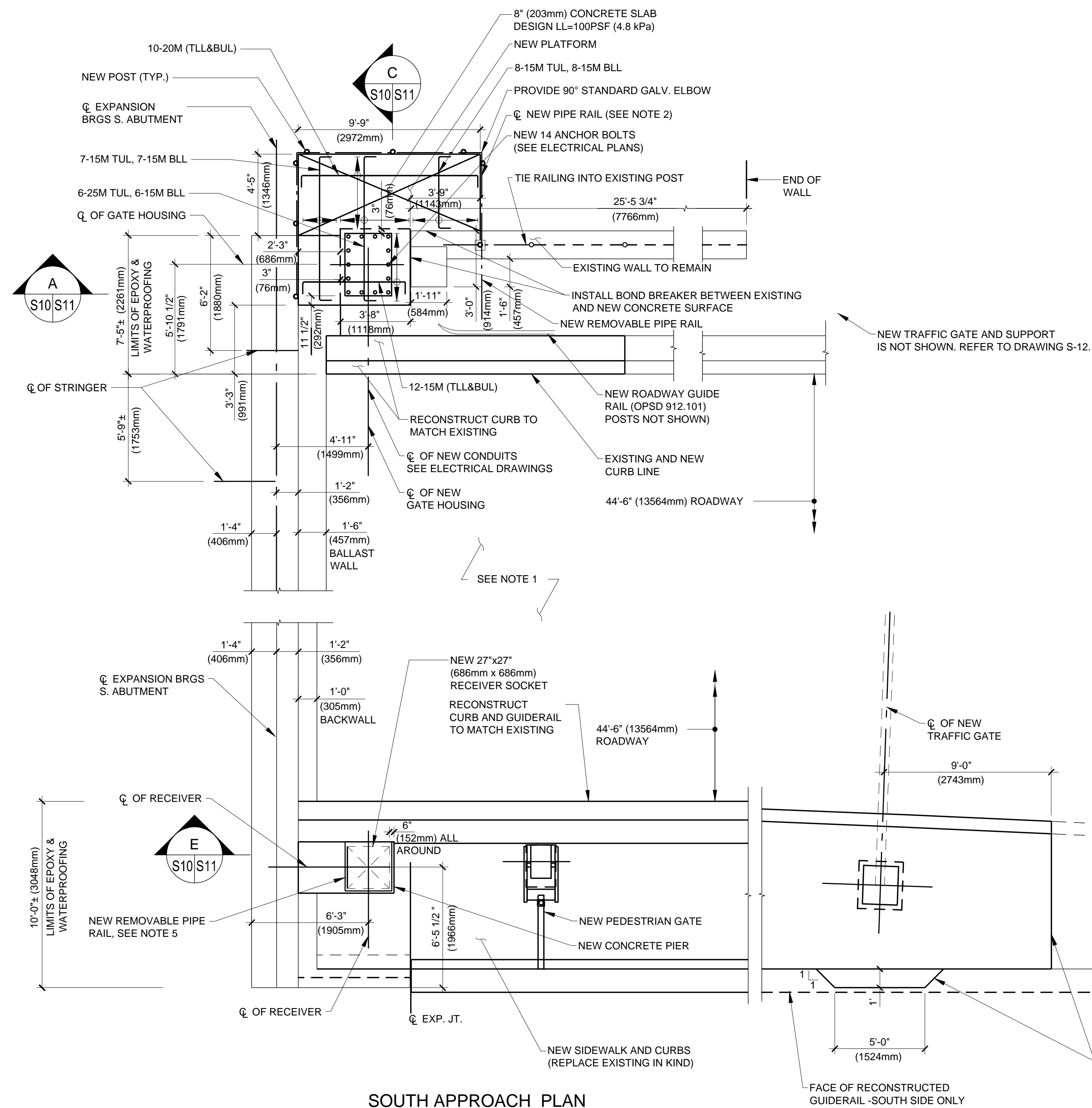
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C	drawing no. - where detailed dessin no. - où détaillé

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HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
SHEAVE ROOM WALL DETAILS

drawn by dessiné par	L. KHAZOVA
designed by conc par	A. ZOLGHADRI/E. SKROBACZ
approved by approuvé par	M. VANDEREE
bid soumission	A. GHUBRIL
project manager administrateur de projets	

project date date du projet	2013-03-31
project no. no. du projet	R.012641.001
drawing no. dessiné no.	S-09



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titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES
ONTARIO

drawing title
titre du dessin
GATE SUPPORT DETAILS

drawn by
dessiné par
L. KHAZOVA

designed by
conç par
A. ZOLGHADRI/E. SKROBACZ

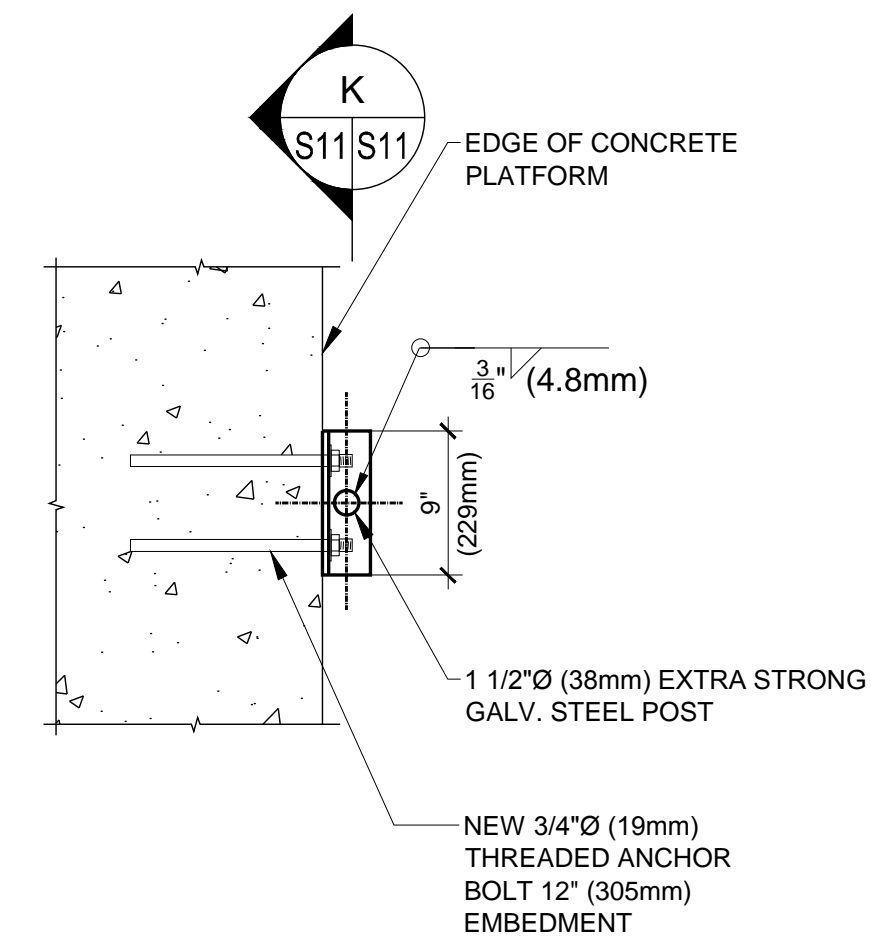
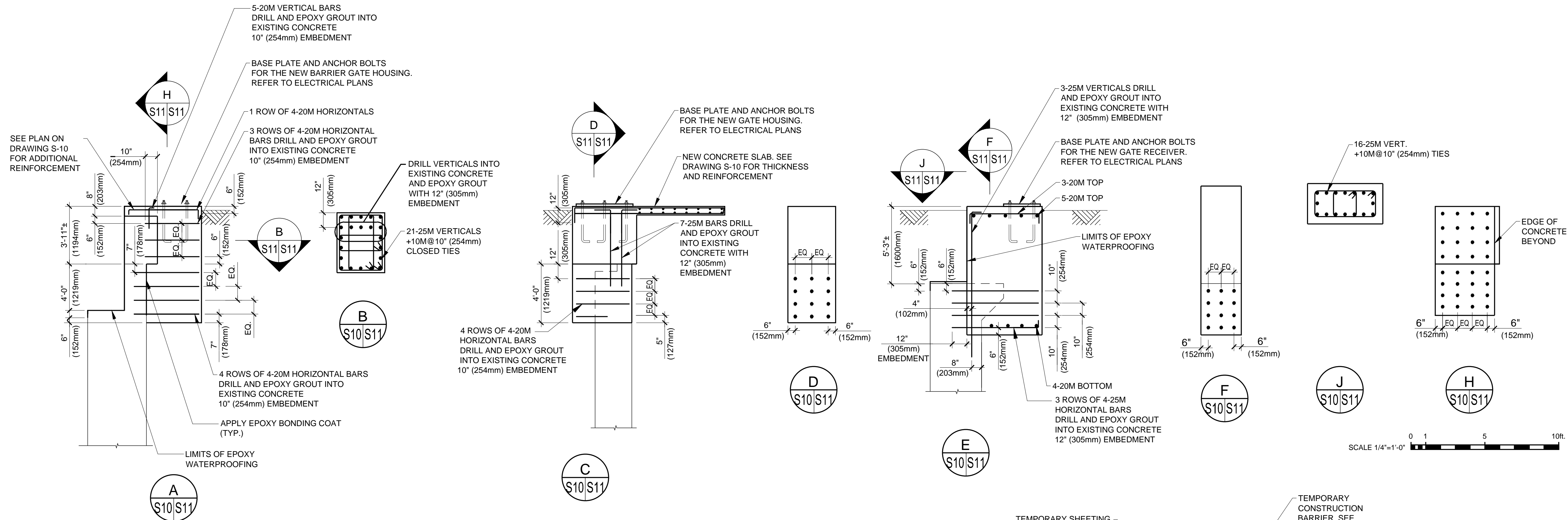
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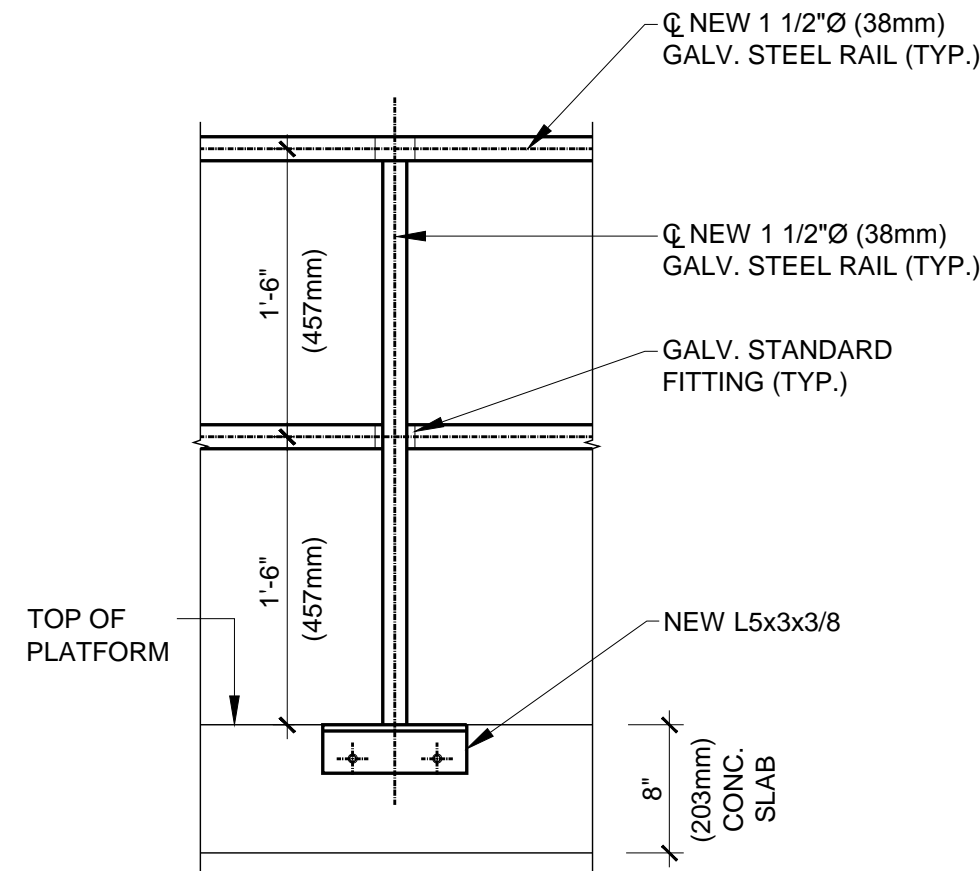
project date
date du projet
2013-03-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
S-10

TYPICAL PIPE RAIL SUPPORT PLAN
ON CONCRETE EDGE

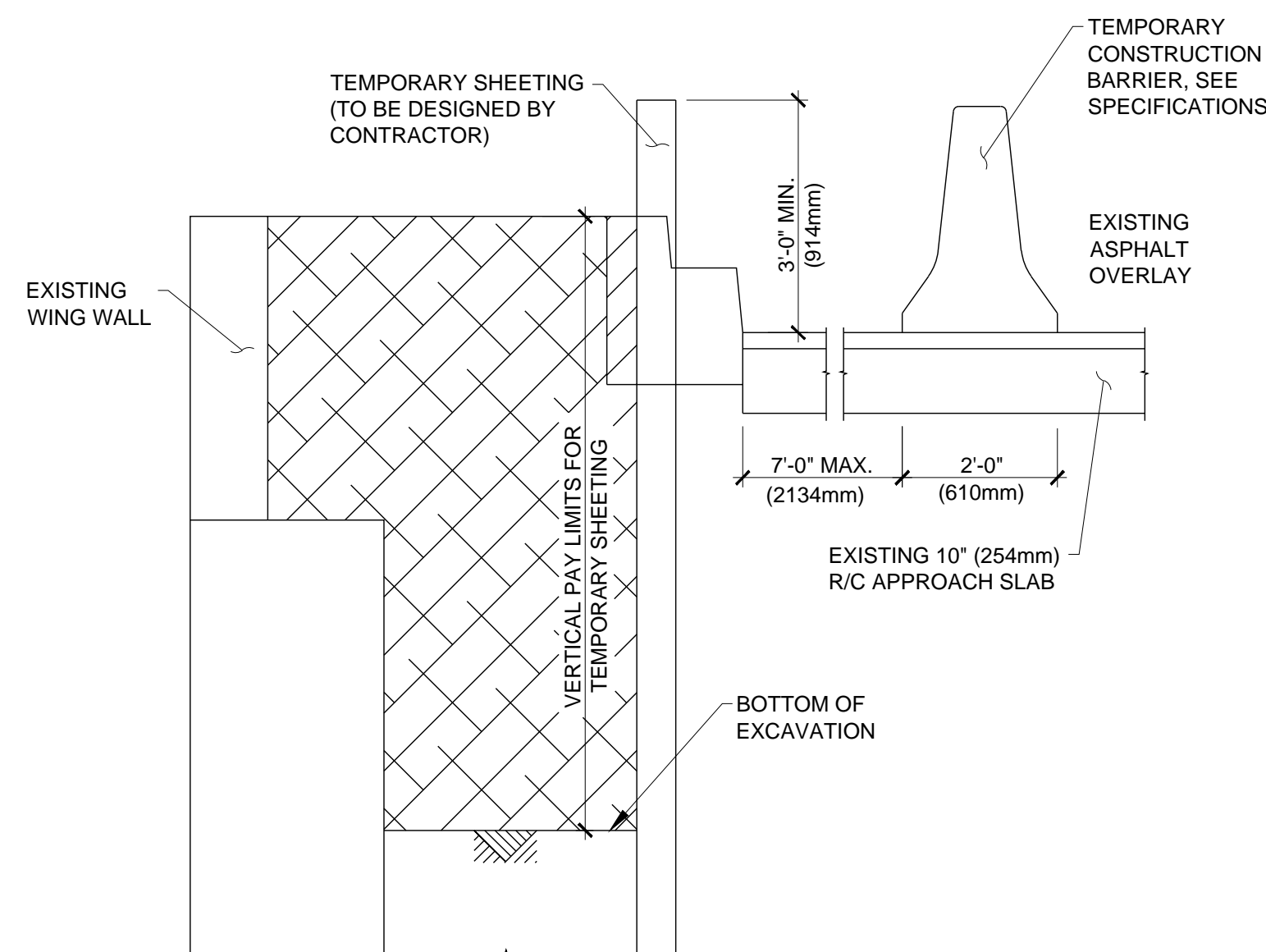
SCALE 1"=1'-0"



TOP OF PLATFORM

K
S11/S11

SCALE 1"=1'-0"

PAY LIMITS FOR
TEMPORARY SHEETING
N.T.S.

NOTE:

EXISTING GUIDERAIL AND PEDESTRIAN RAILING NOT SHOWN

LEGEND

1. PAY LIMIT FOR EXCAVATION.

NOTE

1. NOT ALL REINFORCEMENT ARE SHOWN IN EACH SECTION.
2. APPLY EPOXY WATERPROOFING TO LIMITS SHOWN
EXTEND 6" (152mm) DOWN FROM SEAT ON ALL FACES
WITHIN PLAN LIMITS.



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02	66% DESIGN SUBMITTAL NOT FOR CONSTRUCTION	2013-02-14
01	33% DESIGN SUBMITTAL NOT FOR CONSTRUCTION	2012-12-10
revision		date

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A	Detail No.
B	No. du détail
C	drawing no. - where detail required dessin no. - où detail exigé
	drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
**REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**
ONTARIO

drawing title
titre du dessin
MISCELLANEOUS DETAILS

drawn by
dessiné par
L. KHAZOVA

designed by
conc par
A. ZOLGHADRI/E. SKROBACZ

approved by
approuvé par
M. VANDEREE

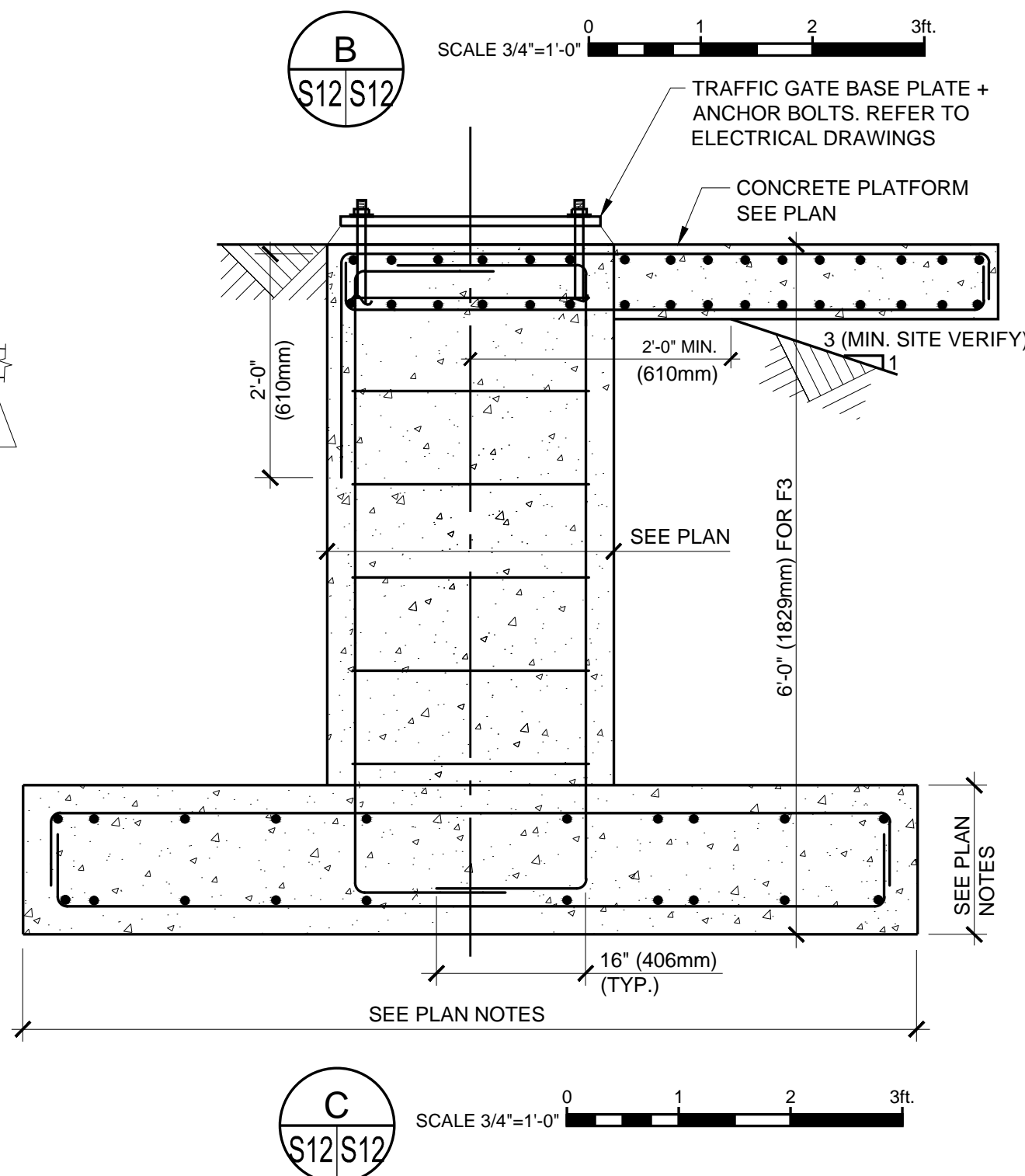
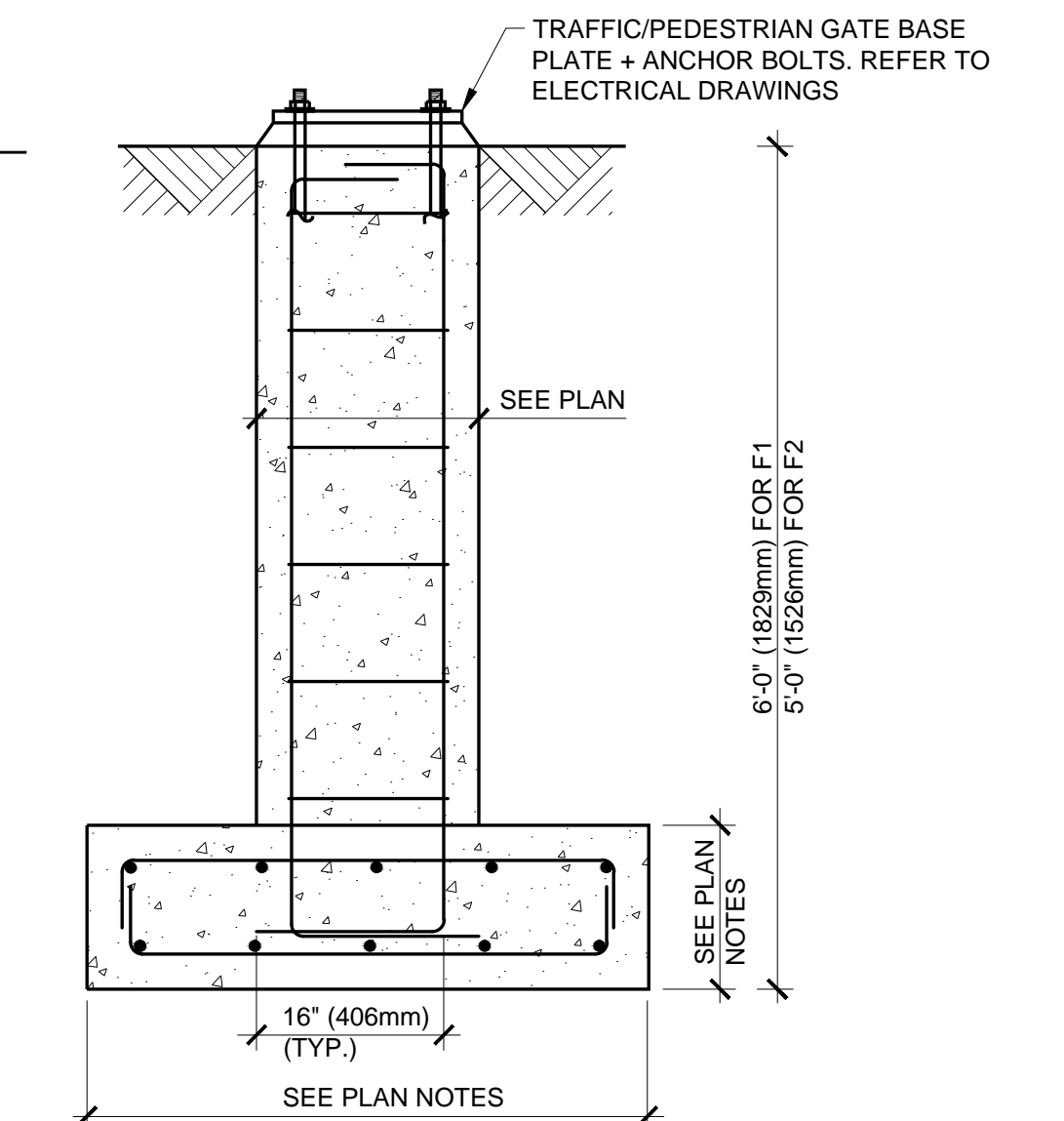
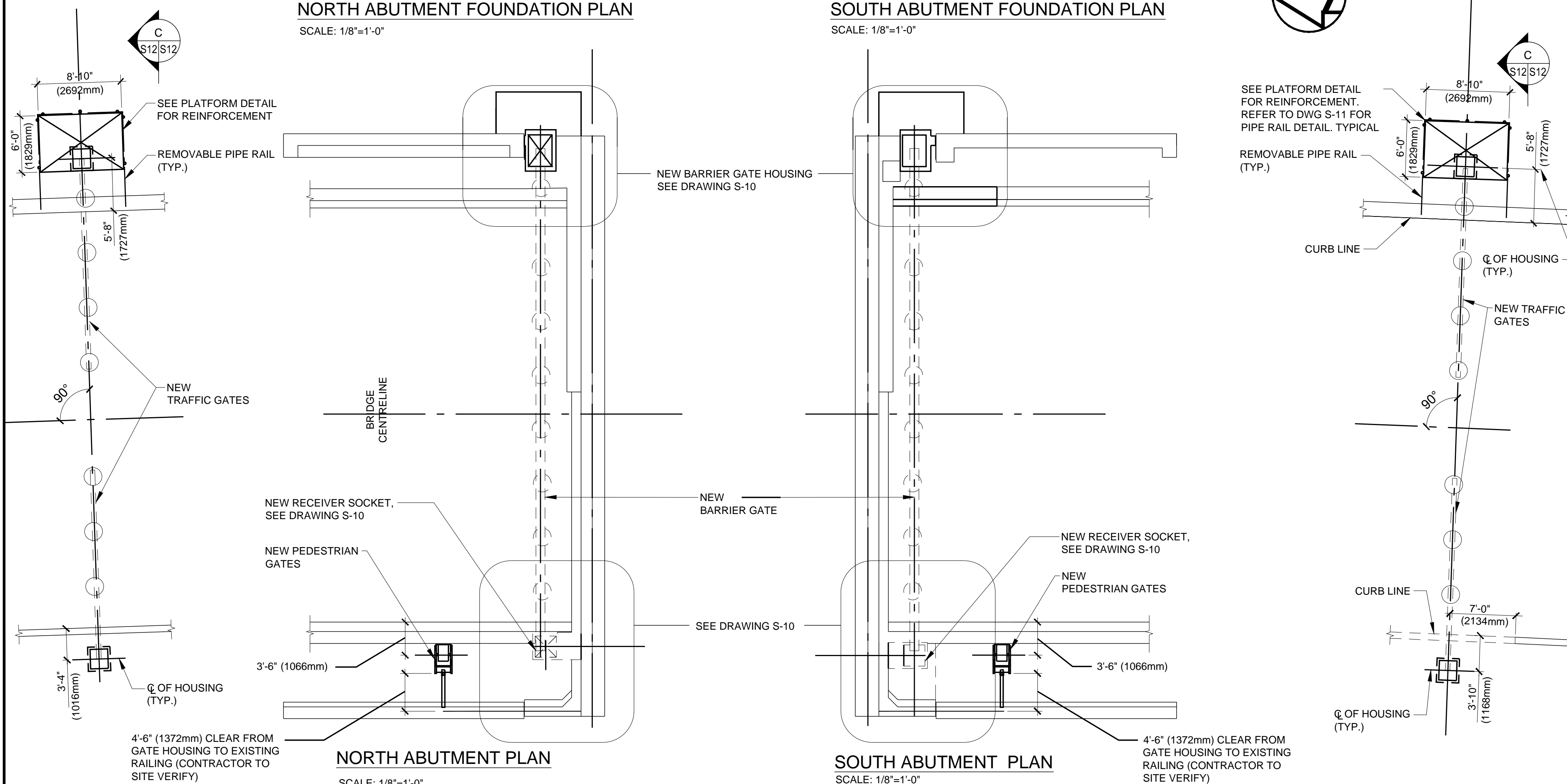
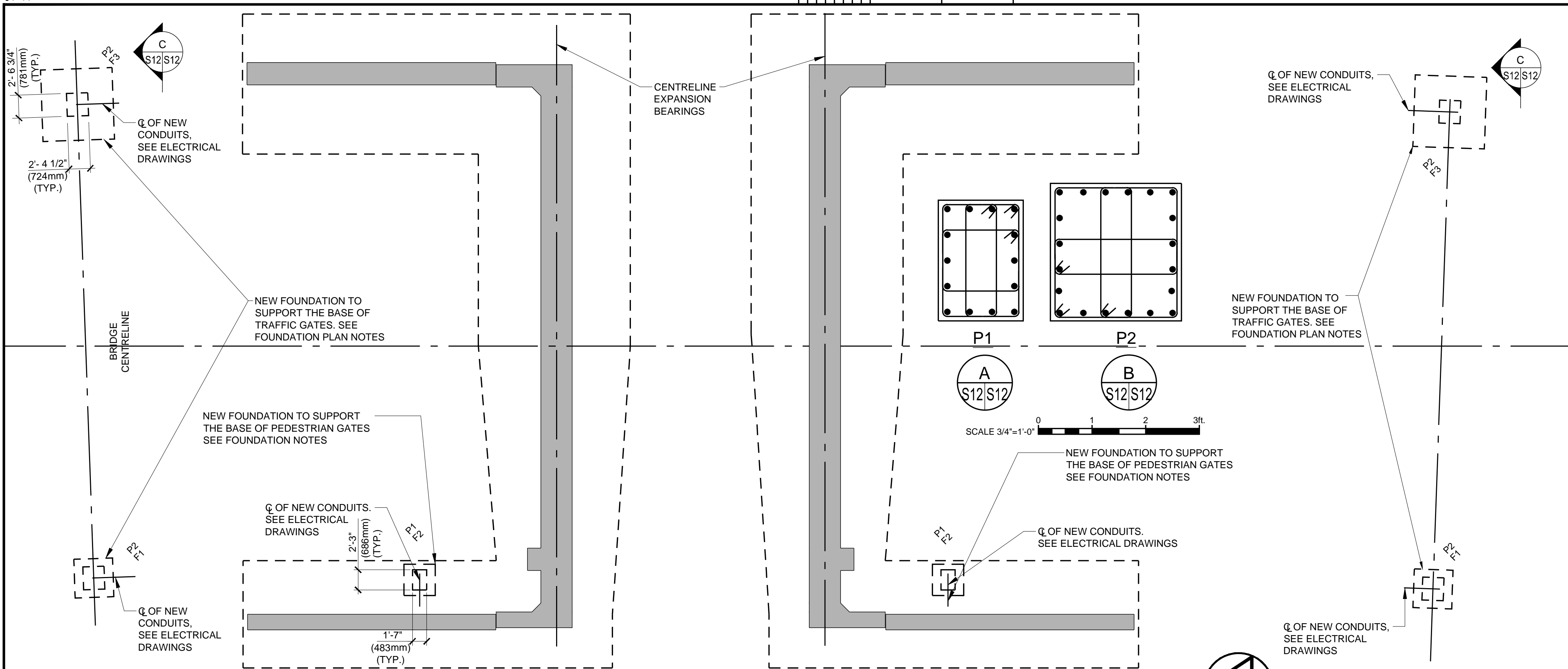
bid
soumission
A. GHUBRIL

project manager
administrateur
de projets

project date
date du projet
2013-03-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
S-11



07	FOR TENDER 3	2014-06-26
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revision date

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C	drawing no. - where detailed dessin no. - où détaillé

project title
titre du projet

**HAMILTON ONTARIO
BURLINGTON CANAL
VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**

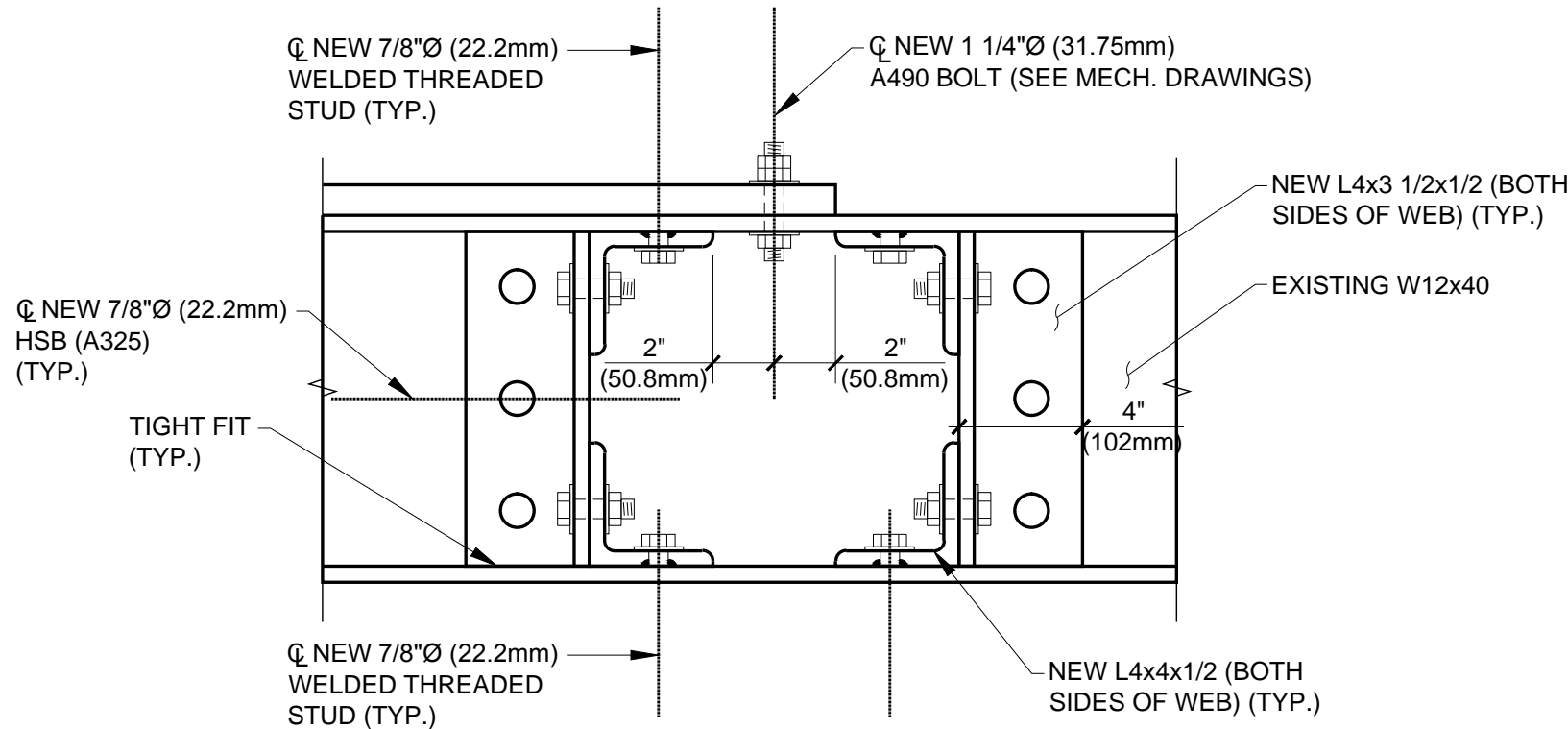
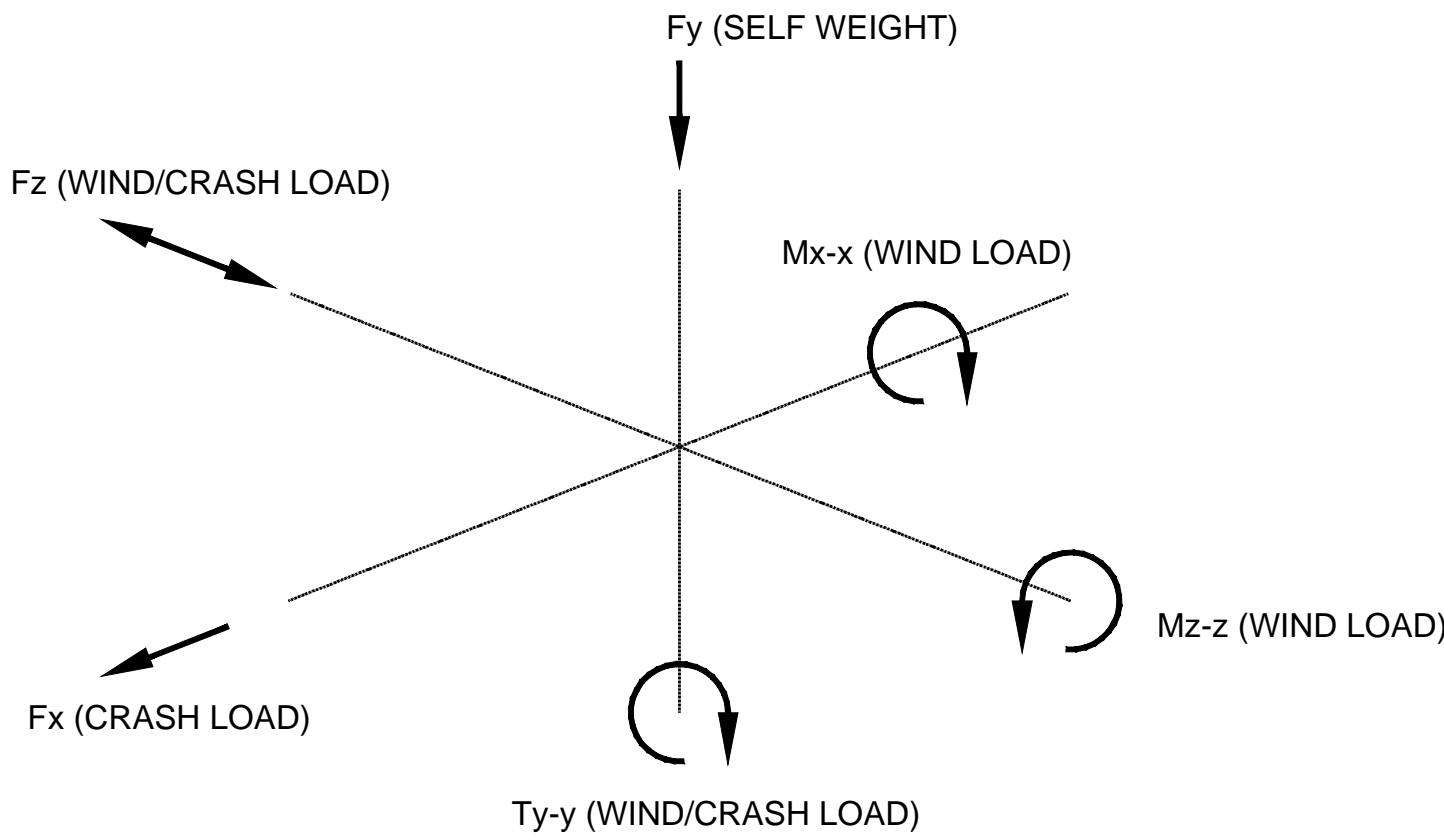
drawing title
titre du dessin

**ABUTMENT AND GATE
FOUNDATION DETAILS**

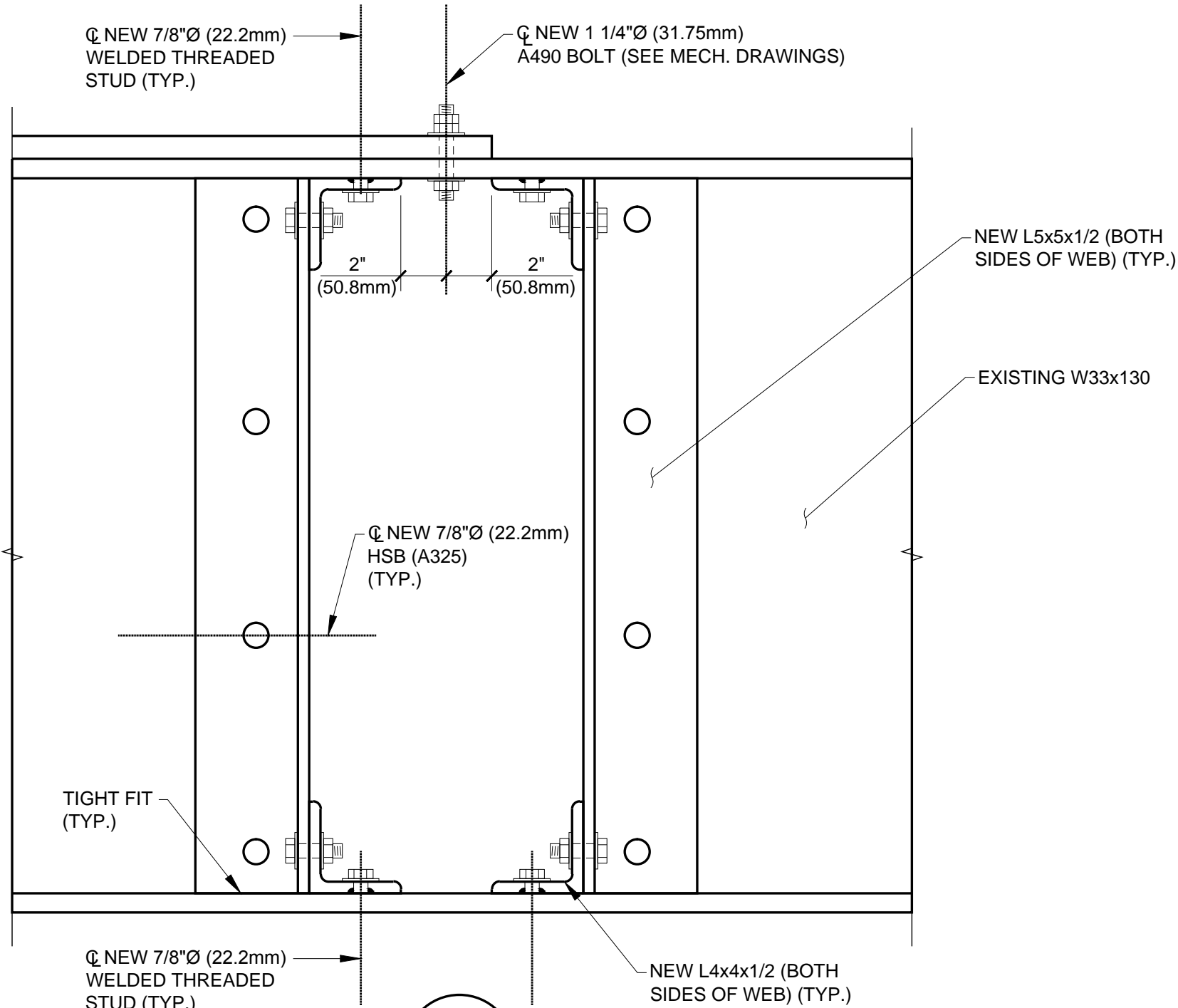
drawn by dessiné par	D. BRAND/L. KHAZOVA
designed by conç par	A. ZOLGHADRI/E. SKROBACZ
approved by approuvé par	M. VANDEREE
bid soumission	A. GHUBRIL
project date date du projet	2013-03-31
project no. no. du projet	R.012641.001
drawing no. dessiné no.	S-12

REACTION FORCES AT THE BASE OF GATES

BARRIER GATE MAIN HOUSING:	BARRIER GATE RECIEVER:
Fx = 29315 lb (130kN)	Fx = 29315 lb (130kN)
Fy = 9000 lb (40kN)	Fy = 150lb (0.7kN)
Fz = 27068 lb (120kN)	Fz = 27068 lb (120kN)
Mx-x = 72659 ft.lb (98.5kN.m)	Mz-z = 23275 ft.lb (31.6kN.m)
Mz-z = 72659 ft.lb (98.5kN.m)	Ty-y =27068 ft.lb (23.1kN.m)
Ty-y =173685 ft.lb (235.5kN.m)	
TRAFFIC GATE:	PEDESTRIAN GATE:
Fy = 1500 lb (6.7kN)	Fy = 600 lb (2.7kN)
Fz = 1147 lb (5.1kN)	Fz = 813 lb (3.6kN)
Mx-x = 9833 ft.lb (13.3kN.m)	Mx-x = 2988 ft.lb (4kN.m)
Mz-z = 9833 ft.lb (13.3kN.m)	Mz-z = 2988 ft.lb (4kN.m)
Ty-y = 5690 ft.lb (7.7kN.m)	Ty-y = 602 ft.lb (0.8kN.m)



A
S08 S13
SCALE 2"=1'-0"



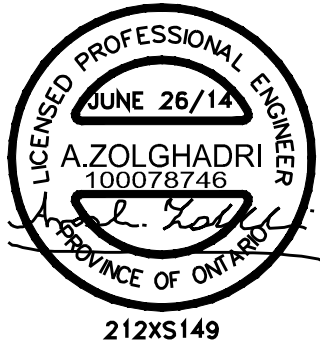
B
S08 S13
SCALE 2"=1'-0"

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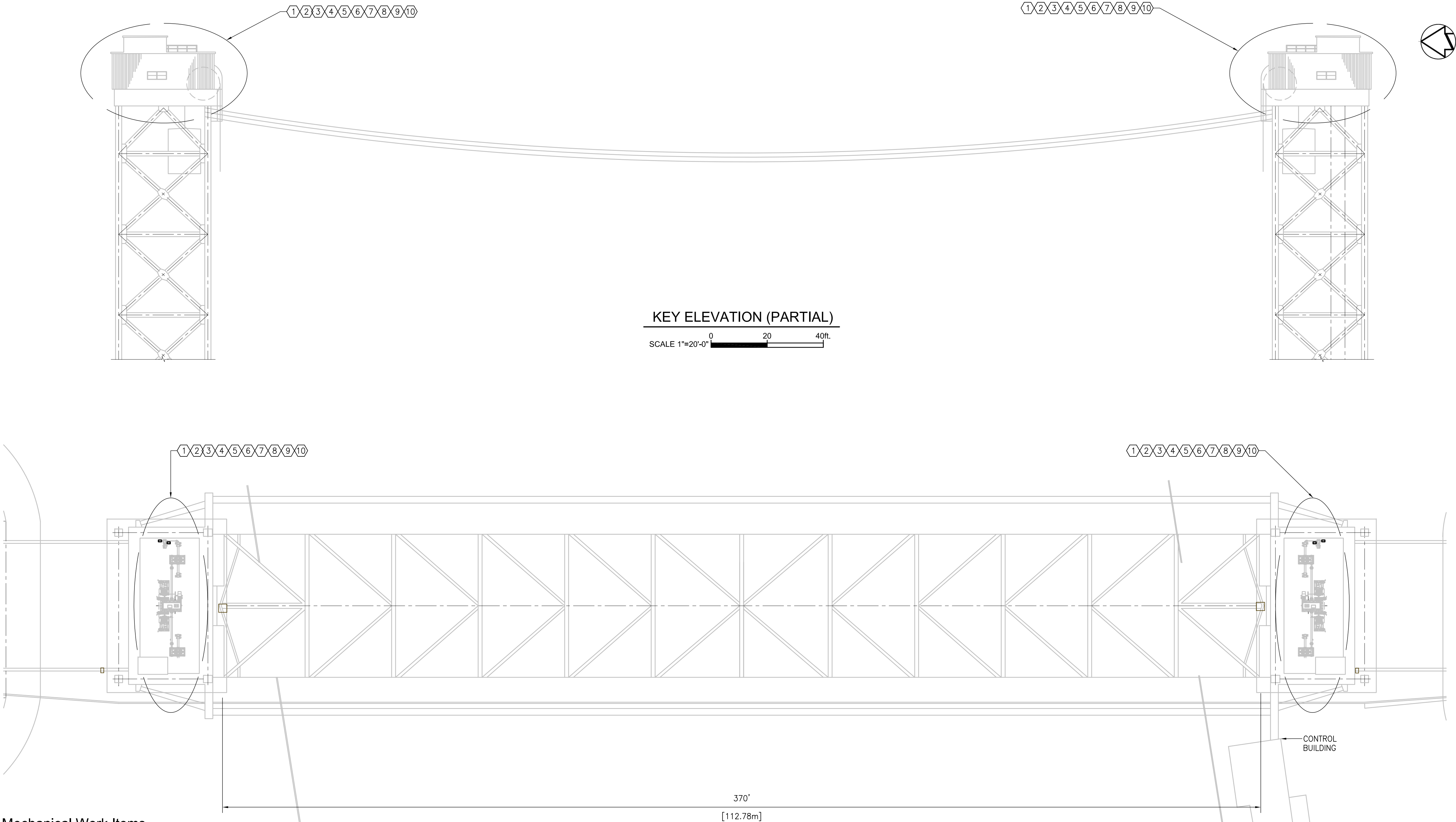
revision		date
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project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
**REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**
ONTARIO

drawing title
titre du dessin
LOAD TABLE AND DETAILS

drawn by dessine par	D. BRAND/L. KHAZOVA
designed by conc par	A. ZOLGHADRI/E. SKROBACZ
approved by approuve par	M. VANDEREE
bid soumission	A. GHUBRIL
project manager administrateur de projets	
project date date du projet	2013-03-31
project no. no. du projet	R.012641.001
drawing no. dessine no.	S-13



Mechanical Work Items

- 1 REMOVE AND DISPOSE OF EXISTING MECHANICAL ELEMENTS AS SHOWN ON THE DEMOLITION DRAWINGS.
- 2 REMOVE AND REUSE EXISTING MACHINERY BRAKES (4) AS SHOWN ON THE DRAWINGS.
- 3 REMOVE AND RETURN TO DEPARTMENTAL REPRESENTATIVE MOTOR BRAKES (2) AS SHOWN IN THE DRAWINGS.
- 4 FURNISH AND INSTALL NEW MOTOR BRAKES (4).
- 5 FURNISH AND INSTALL NEW GEARBOX PEDESTALS (2).
- 6 FURNISH AND INSTALL NEW MOTOR PEDESTALS (4).
- 7 FURNISH AND INSTALL NEW CUSTOM GEARBOXES (2).
- 8 FURNISH AND INSTALL NEW COUPLINGS. ONE EXISTING SPARE FLOATING SHAFT COUPLING ASSEMBLY FROM DEPARTMENTAL REPRESENTATIVE MAY BE REUSED AND MODIFIED AS NECESSARY FOR ONE OF THE REQUIRED REPLACEMENT ASSEMBLIES.
- 9 ONE OF THE REMOVED FLOATING SHAFT COUPLING ASSEMBLIES SHALL BE MACHINED TO LENGTH AND ASSEMBLED WITH A NEW FLEXIBLE COUPLING HUB TO MATCH NEW INSTALLATION. NEW ASSEMBLY SHALL BE RETURNED TO DEPARTMENTAL REPRESENTATIVE AS A SPARE.
- 10 THE SECOND REMOVED FLOATING SHAFT ASSEMBLY SHALL BE MODIFIED WITH A NEW FLEXIBLE HUB TO MATCH NEW INSTALLATION. NEW ASSEMBLY SHALL BE RETURNED TO DEPARTMENTAL REPRESENTATIVE AS A SPARE.
- 11 FURNISH SPARE PARTS AS DESCRIBED IN THE DRAWINGS AND SPECIFICATIONS.
- 12 PREPARE FLOOR FOR MOUNTING MACHINERY IN ACCORDANCE WITH THE STRUCTURAL DRAWINGS AND SPECIFICATIONS.

KEY PLAN
SCALE 1"=20'-0"

General Machinery Notes

1. ALL MECHANICAL WORK TO BE PERFORMED IN ACCORDANCE WITH CAN/CSA-S6-06 CANADIAN HIGHWAY BRIDGE DESIGN CODE.
2. ALL MECHANICAL WORK TO BE COORDINATED WITH STRUCTURAL AND ELECTRICAL WORK.
3. DIMENSIONS SHOWN ON THE DRAWINGS ARE NOMINAL. CONTRACTOR MUST FIELD VERIFY ALL DIMENSIONS PRIOR TO THE START OF ANY AND ALL WORK. CONTRACTOR MUST SHOW ALL DIMENSIONS WITH APPROPRIATE TOLERANCES TO OBTAIN REQUIRED FITS BETWEEN MATING COMPONENTS ON SHOP DRAWINGS.
4. FINAL DRILLING AND REAMING OF MACHINERY TO BE PERFORMED AFTER ALL ALIGNMENT WORK IS COMPLETE. ALIGNMENT TO BE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AS LISTED IN THEIR REGULARLY PUBLISHED LITERATURE AND THE SPECIFICATIONS.
5. PROVIDE INSPECTION AND TESTING PER THE SPECIFICATIONS.



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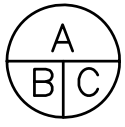
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	C	drawing no. — where detailed

project title
titre du projet

HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE

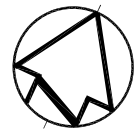
ONTARIO

REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin

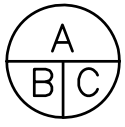
MECHANICAL KEY PLAN
AND ELEVATION

drawn by dessiné par	J. PEREZ	project manager administrateur de projets
designed by conc par	M. ELZA	
approved by approuvé par	M. VANDEREE	
bid soumission	A. Ghubril	
project date date du projet	2013-05-31	
project no. no. du projet	R.012641.001	
drawing no. dessiné no.	H-01	



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titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE ONTARIO
**REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**

drawing title
titre du dessin
**MECHANICAL DEMOLITION PLAN
MACHINERY ROOMS**

drawn by
dessiné par
J. PEREZ

designed by
conc par
M. ELZA

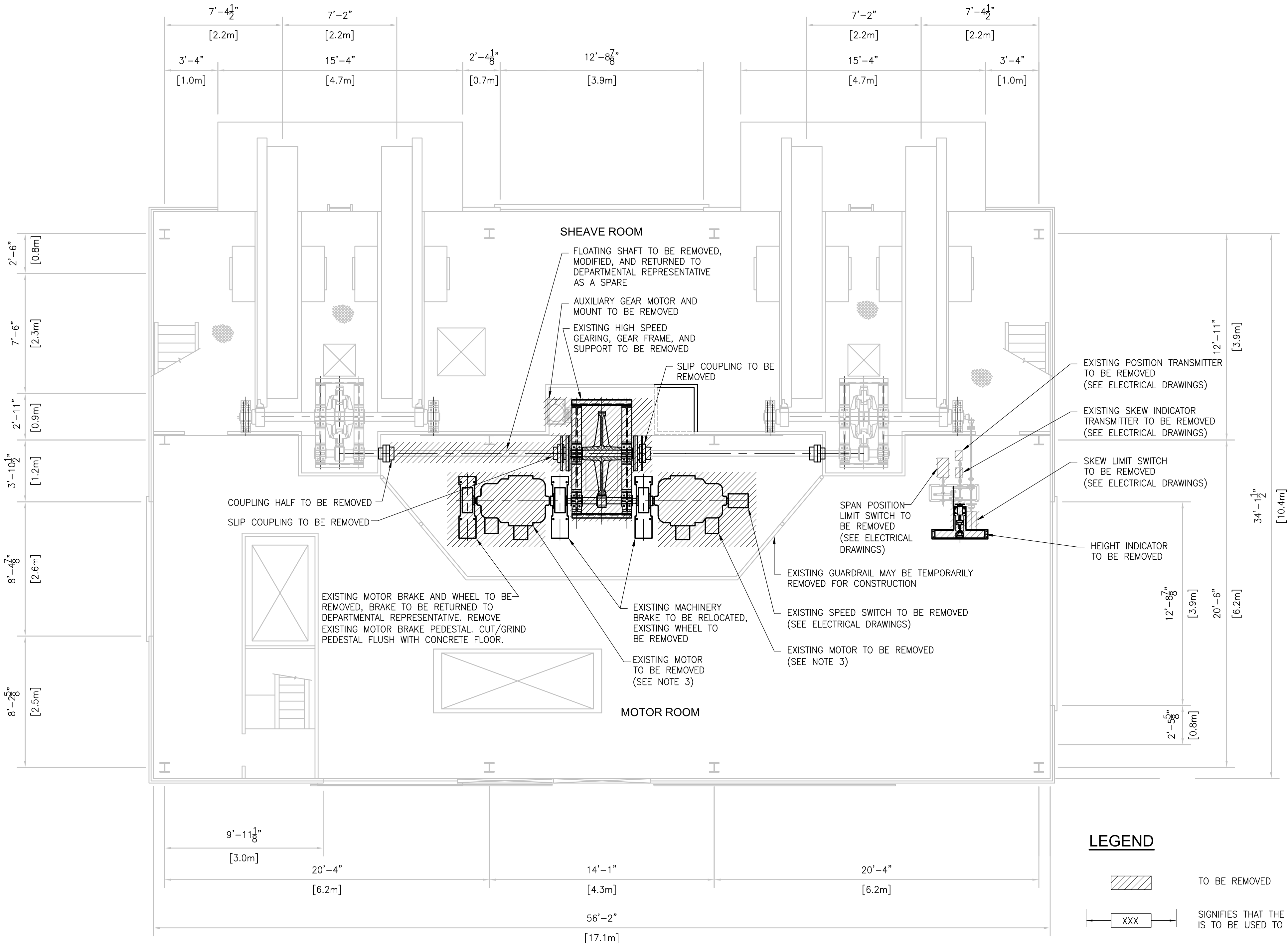
approved by
approuvé par
M. VANDEREE

bid
soumission
A. Ghubril project manager
administrateur de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
H-02



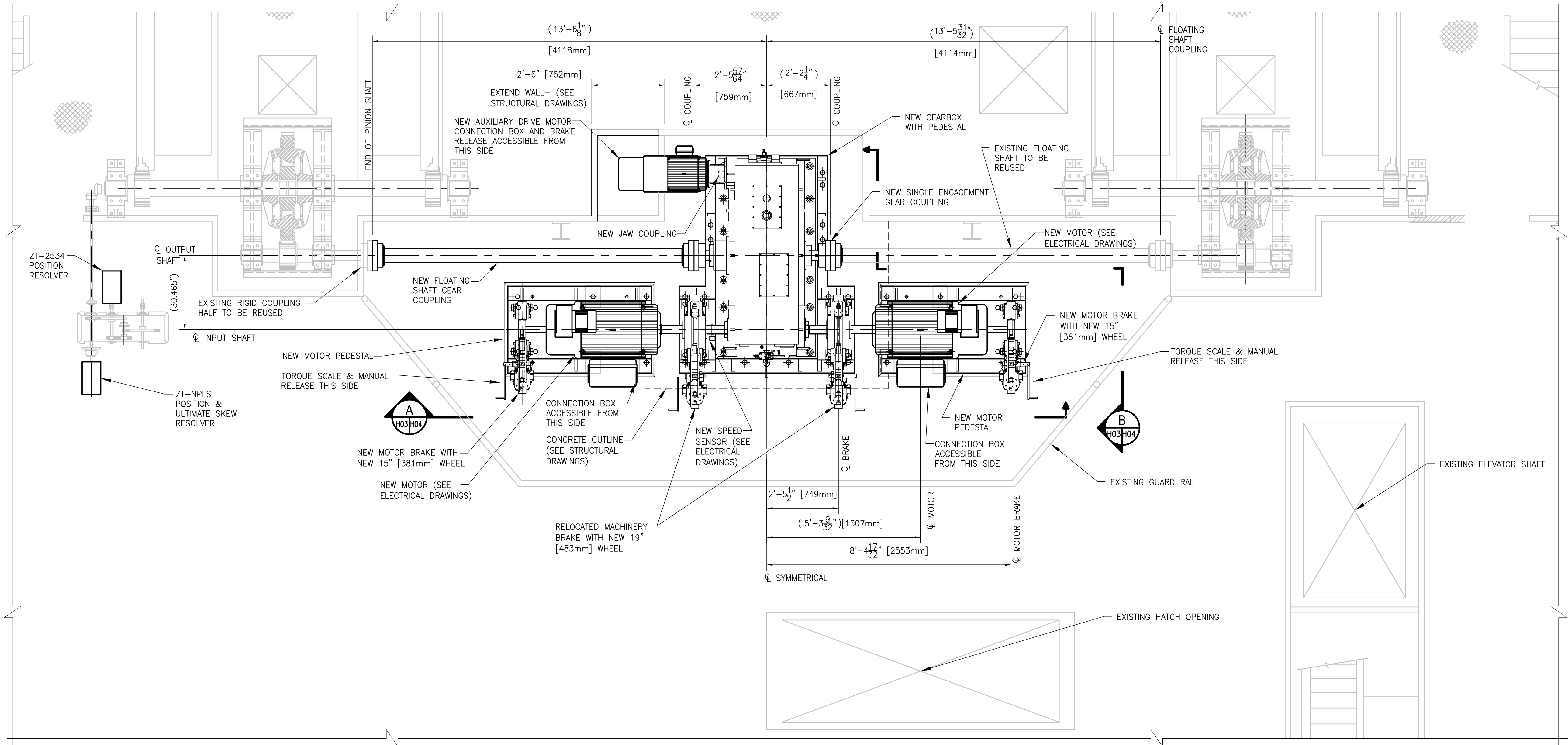
NOTES:

- DEMOLITION OF MECHANICAL EQUIPMENT SHALL BE COORDINATED WITH ELECTRICAL AND STRUCTURAL WORK.
- CARE SHALL BE TAKEN NOT TO DAMAGE MATERIALS THAT ARE TO REMAIN OR BE REUSED.
- EXISTING CONCRETE FLOOR UNDER MOTOR IS UNFINISHED. GRIND FLOOR IN THIS AREA TO BE SMOOTH AND FLUSH WITH SURROUNDING FLOOR.

EXISTING MACHINERY FLOOR PLAN - SOUTH

SOUTH MACHINERY ROOM SHOWN
NORTH SIMILAR

SCALE 1/4"=1'-0" 



NEW PARTIAL PLAN
NORTH MACHINERY ROOM SHOWN
SOUTH SIMILAR AND OPPOSITE HAND
SCALE 1/2"=1'-0"

NOTES:

1. SEE STRUCTURAL PLANS FOR FLOOR PREPARATION DETAILS.
2. SHIMS, FASTENERS, NUTS, WASHERS, KEYS, SET SCREWS, LEVELING SCREWS, GROUT, FILL PLATES, BREATHERS, GREASE FITTINGS, LUBRICANTS, AND OPERATING FLUIDS ARE CONSIDERED ANCILLARY TO THE LISTED EQUIPMENT AND SHALL BE PROVIDED WITH THE COMPONENTS AS REQUIRED.

MECHANICAL EQUIPMENT SCHEDULE	
COMPONENT	QUANTITY
GEARBOX	2 – ONE LEFT HAND AND ONE RIGHT HAND
MOTOR BRAKE	5 – TWO LEFT HAND AND THREE RIGHT HAND (ONE RIGHT HAND AS SPARE)
15" [381mm] BRAKE WHEEL	4
19" [483mm] BRAKE WHEEL/COUPLING	5 (ONE AS SPARE)
MOTOR PEDESTAL	4
GEARBOX PEDESTAL	2
FLOATING SHAFT GEAR COUPLING	2 COMPLETE ASSEMBLIES PLUS 2 FLEXIBLE COUPLING HALVES FOR INSTALLATION ON SPARE FLOATING SHAFT ASSEMBLIES.
SINGLE ENGAGEMENT GEAR COUPLING	2
FLEXIBLE GEAR COUPLING HALF FOR SPARE FLOATING SHAFTS	2
JAW COUPLING	3 (ONE AS SPARE)

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<div><div>A</div><div>B</div><div>C</div></div>	A Detail No. No. du détail B drawing no. – where detail required dessin no. – où détail exigé C drawing no. – where detailed dessin no. – où détaillé
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project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE ONTARIO
**REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES**

drawing title
titre du dessin
**MECHANICAL EQUIPMENT
LAYOUT PLAN**

drawn by
dessiné par
J. PEREZ

designed by
conc par
M. ELZA

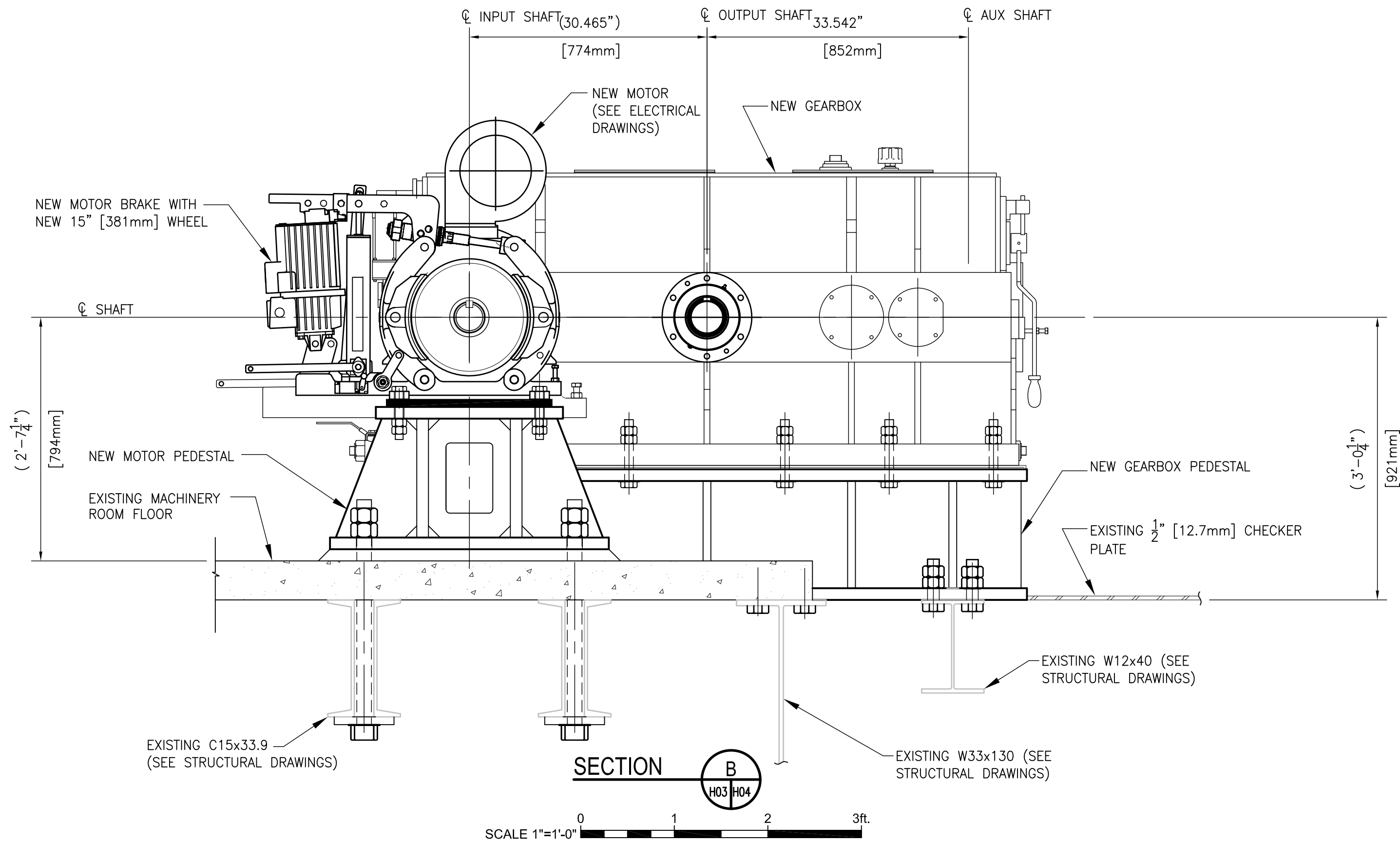
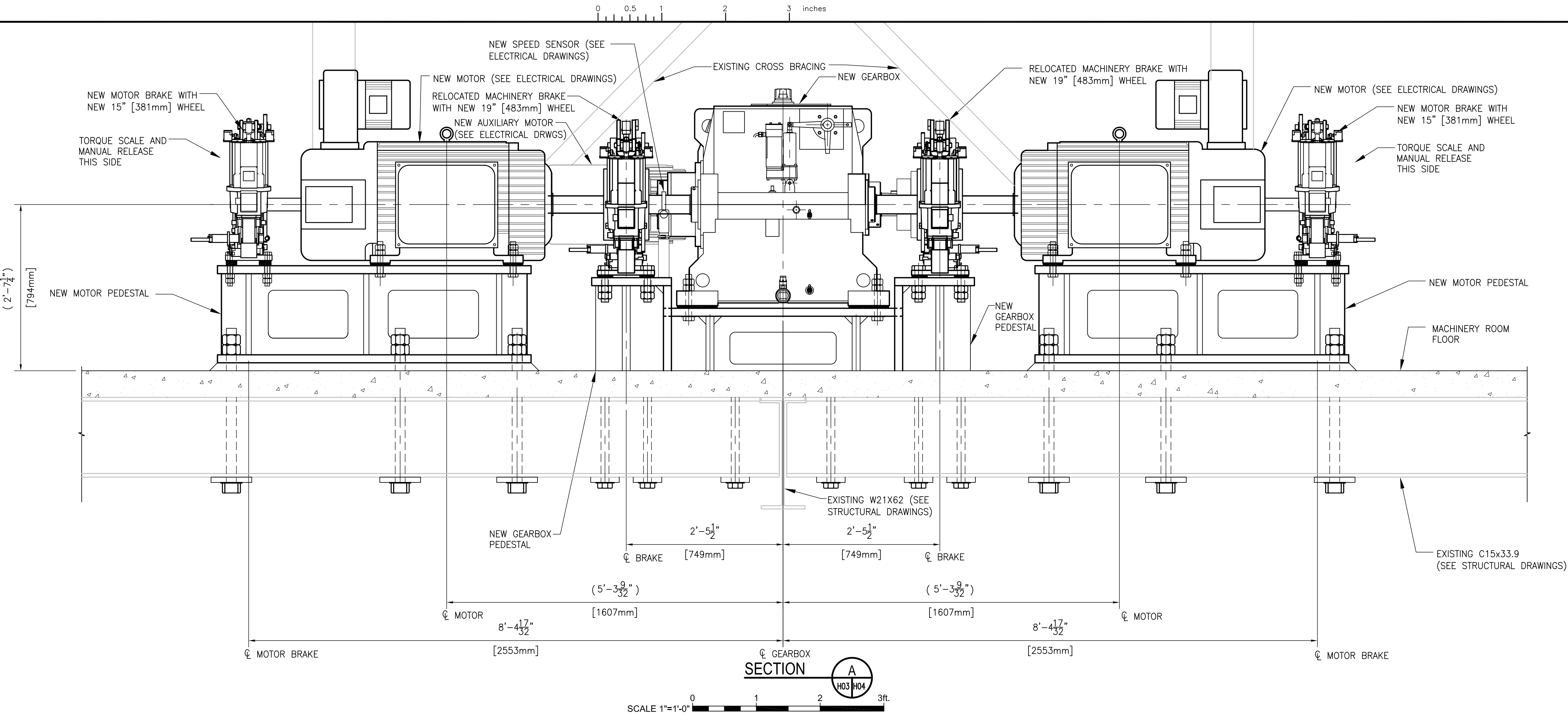
approved by
approuvé par
M. VANDEREE

bid
soumission
A. Ghubril project manager
administrateur
de projets

project date
date du projet
2013-05-31

project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
H-03



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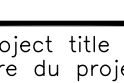
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VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
MECHANICAL EQUIPMENT
ELEVATIONS/SECTIONS

drawn by
dessiné par **J. PEREZ**

designed by
conc par **M. ELZA**

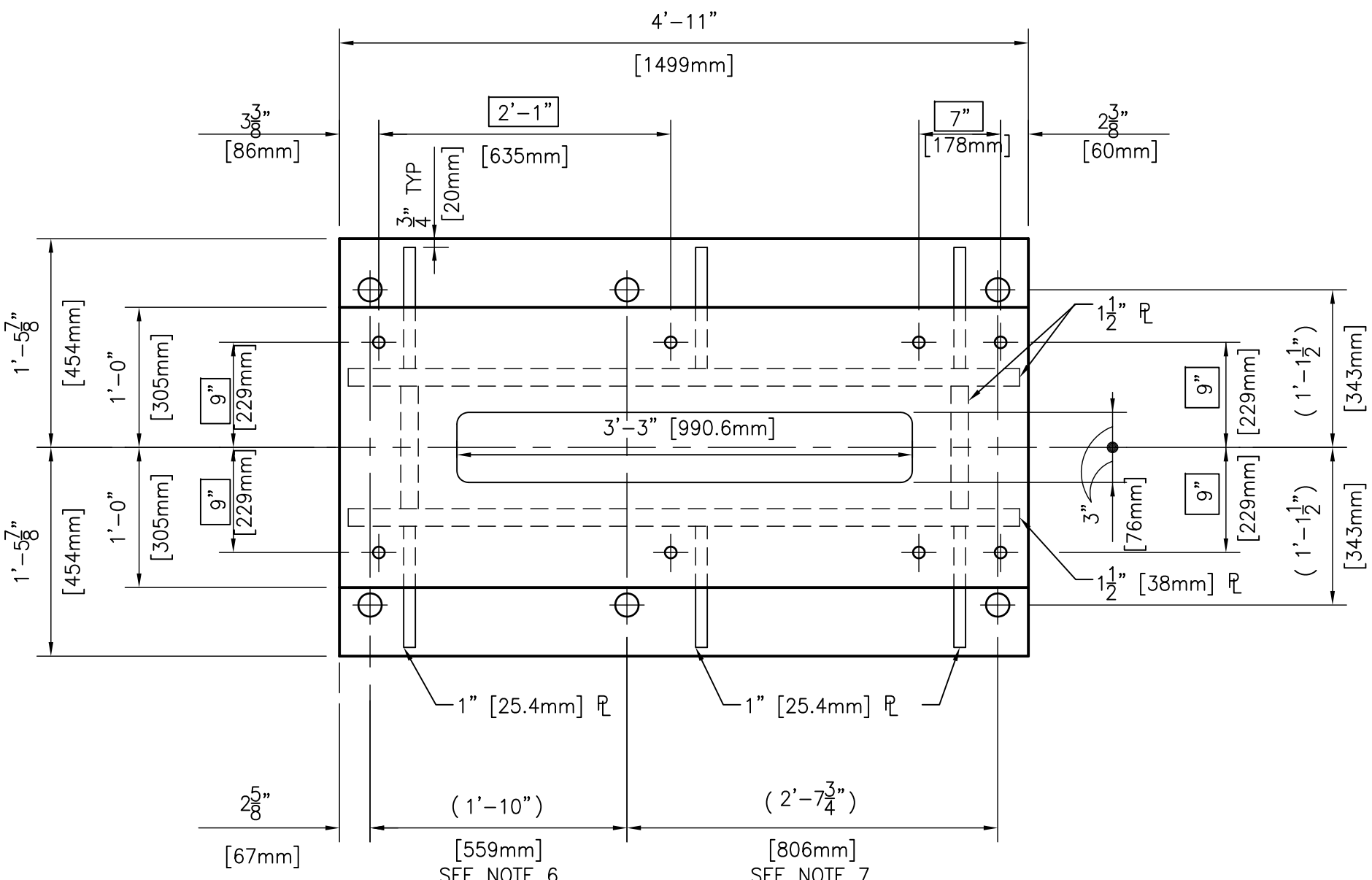
approved by
approuvé par **M. VANDEREE**

bid
soumission **A. Ghubril** project manager
administrateur de projets

project date
date du projet **2013-05-31**

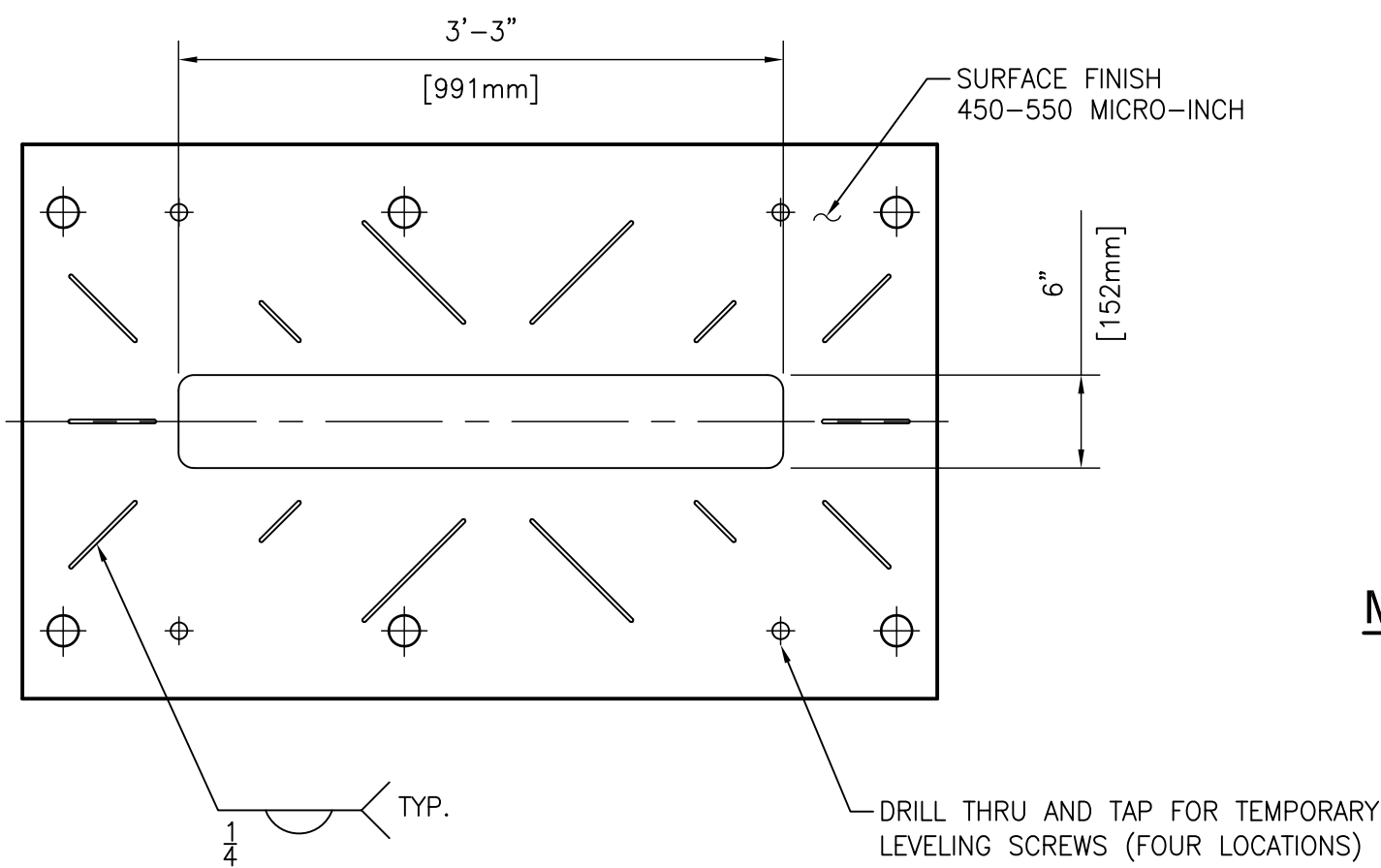
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no. du projet **R.012641.001**

drawing no.
dessiné no. **H-04**



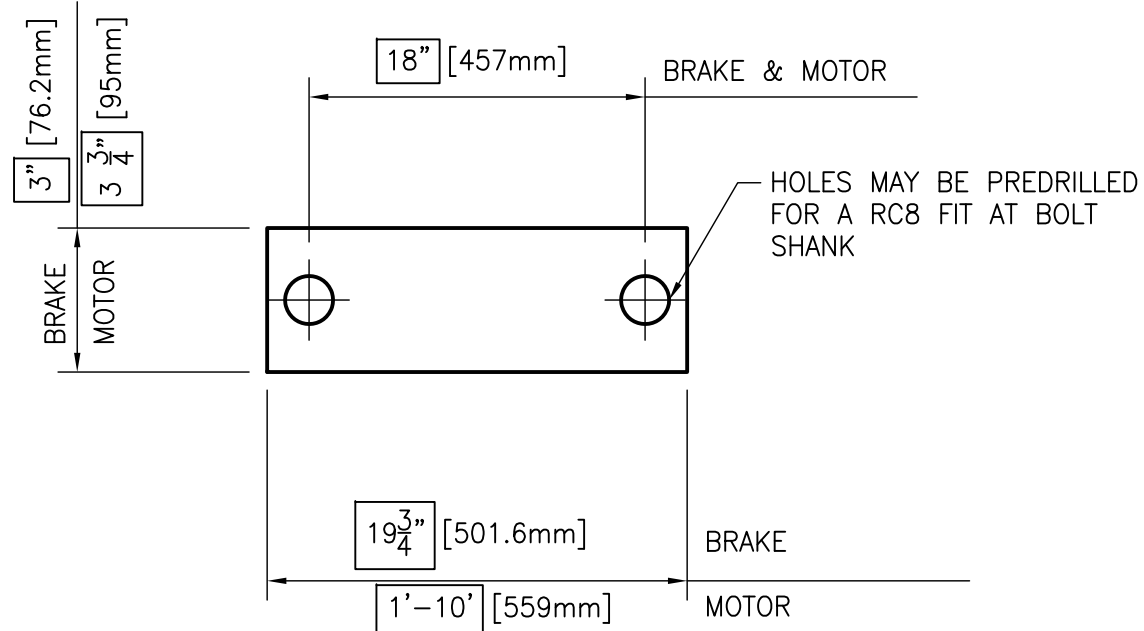
MOTOR PEDESTAL
PLAN

SCALE 1"=1'-0"



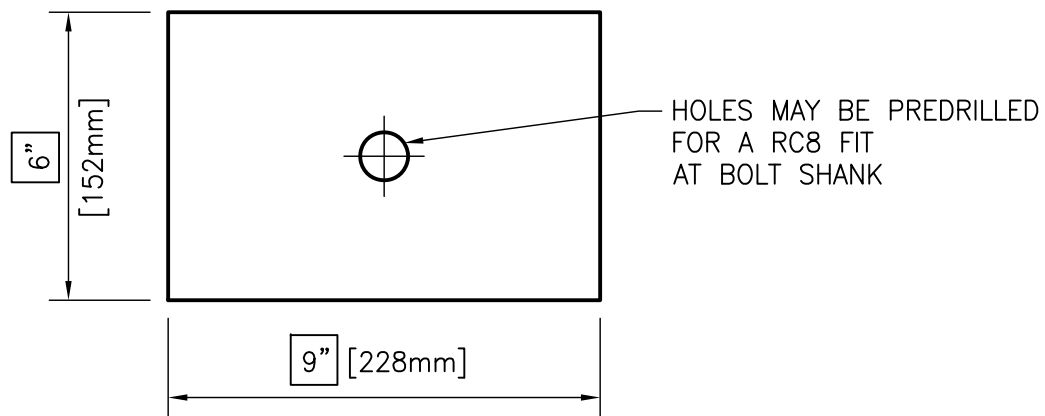
MOTOR PEDESTAL BOTTOM

SCALE 1"=1'-0"



MOTOR AND MOTOR BRAKE SHIM PACK & FILL PLATE DETAIL

SCALE: NTS
ASTM A666
STAINLESS STEEL TYPE 316
(8-REQUIRED) FOR BRAKE AND MOTOR

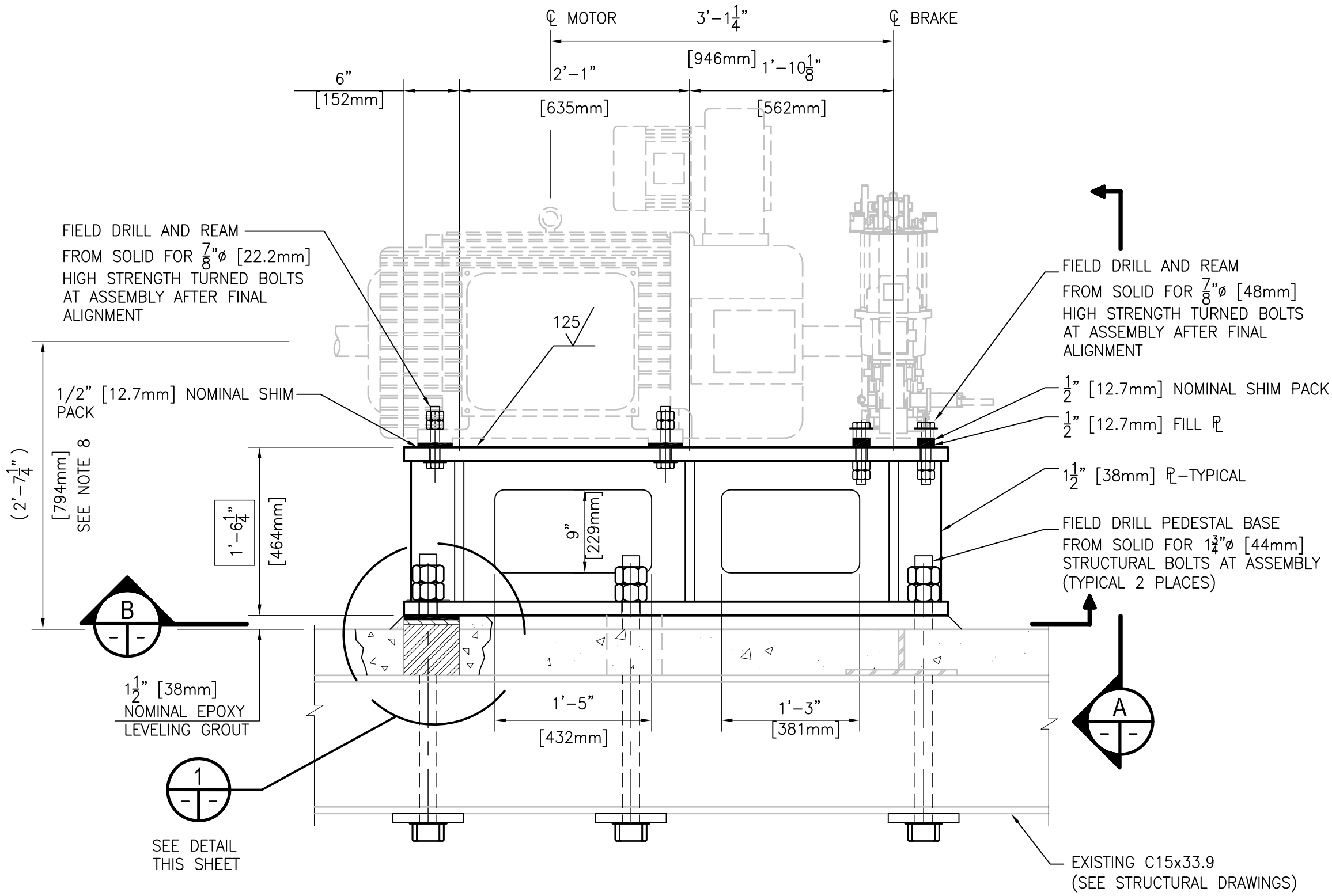


MOTOR PEDESTAL SHIM PACK & FILL PLATE DETAIL

SCALE: NTS
ASTM A666
STAINLESS STEEL TYPE 316
(16-REQUIRED)

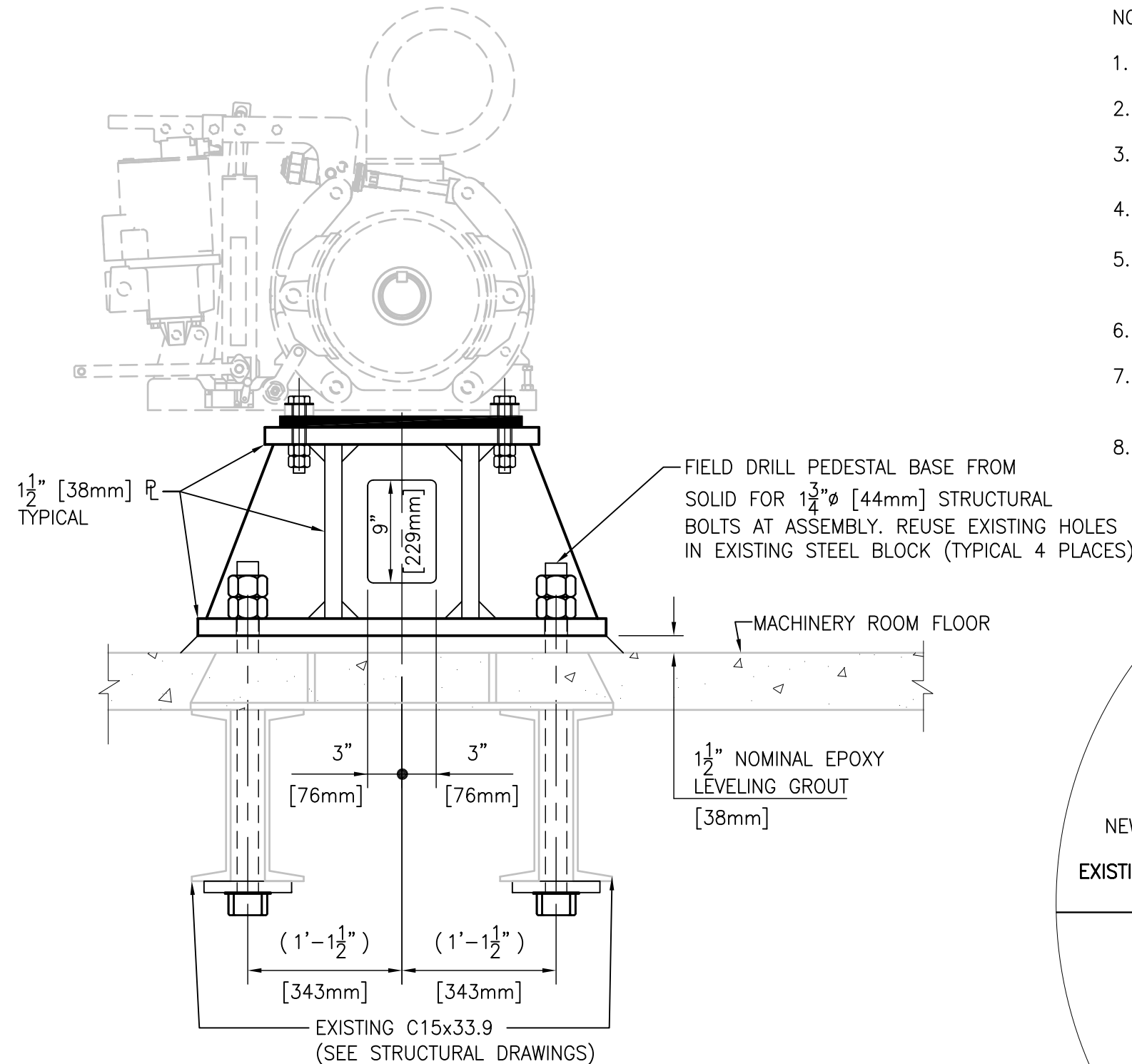
NOTES:

1. CONNECT ALL ADJOINING PLATES WITH COMPLETE JOINT PENETRATION WELDS.
2. STRESS RELIEVE WELDMENT AFTER WELDING AND PRIOR TO FINAL MACHINING.
3. DIMENSIONS SHOWN ARE FINAL DIMENSIONS AFTER MACHINING.
4. MINIMUM PLATE THICKNESS AFTER FINAL MACHINING IS 1/2" (38mm) EXCEPT AS NOTED.
5. TOP AND BOTTOM HORIZONTAL SURFACES OF WELDMENT TO BE MACHINED FLAT AND PARALLEL WITHIN 0.010" (0.254mm) OVER ENTIRE SURFACE.
6. ANCHOR BOLT LOCATIONS BASED ON EXISTING MOTOR MOUNTS.
7. CONCRETE ANCHOR BOLTS TO AVOID EXISTING MOTOR BRAKE MOUNT WEB (ONE LOCATION EACH TOWER)
8. HEIGHT OF MOTOR SHAFT TO MATCH HEIGHT OF EXISTING OUTPUT SHAFT.



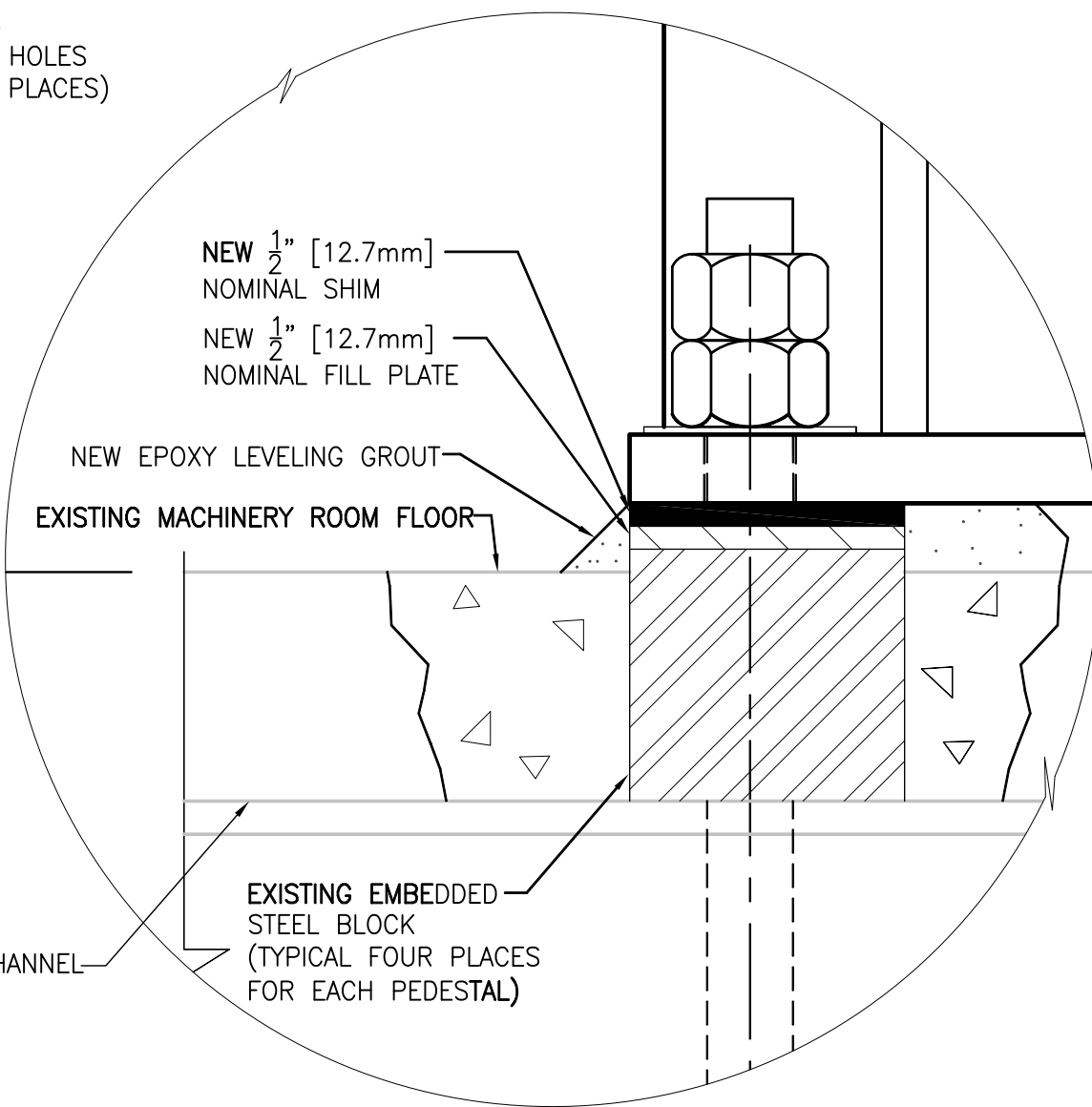
MOTOR PEDESTAL
ELEVATION

ASTM A709/A709M GRADE 36
(4-REQUIRED)
SCALE 1"=1'-0"



MOTOR PEDESTAL

SCALE 1"=1'-0"



1 DETAIL
SCALE: 3"=1'-0"

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project title
titre du projet
HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
MOTOR PEDESTAL DETAILS

drawn by
dessiné par
J. PEREZ

designed by
conc par
M. ELZA

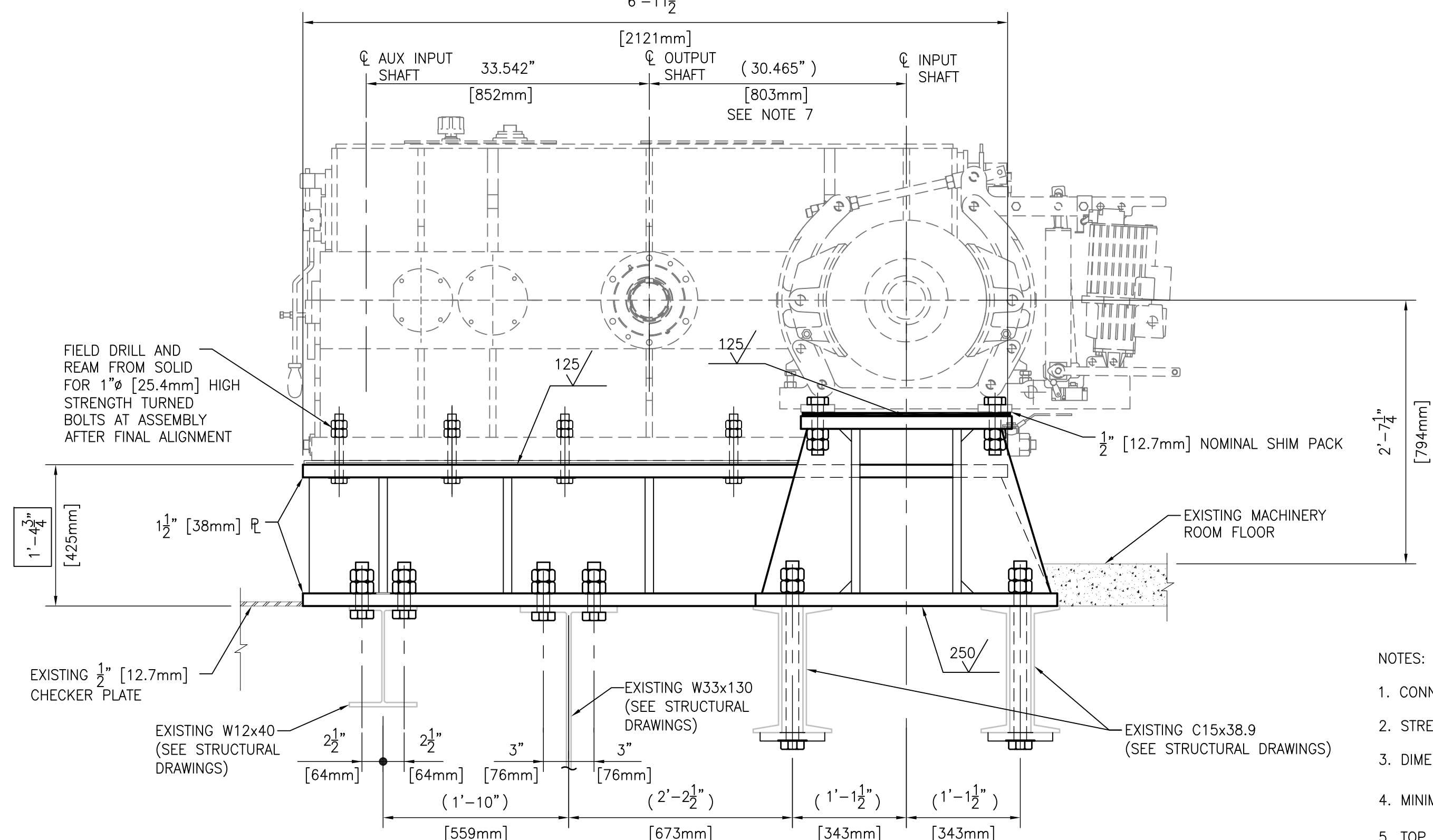
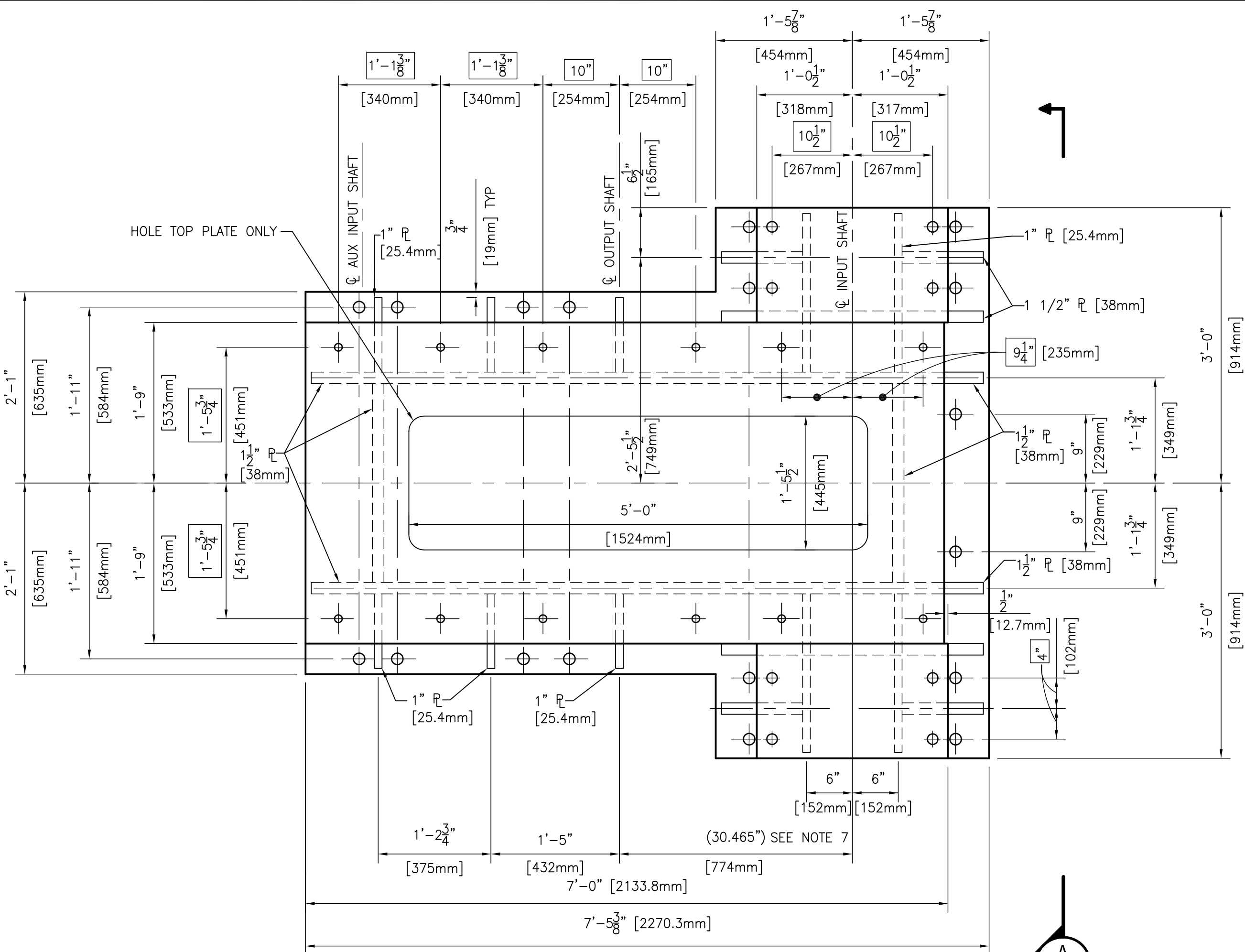
approved by
approuvé par
M. VANDEREE

bid
soumission
A. Ghubril

project date
date du projet
2013-05-31

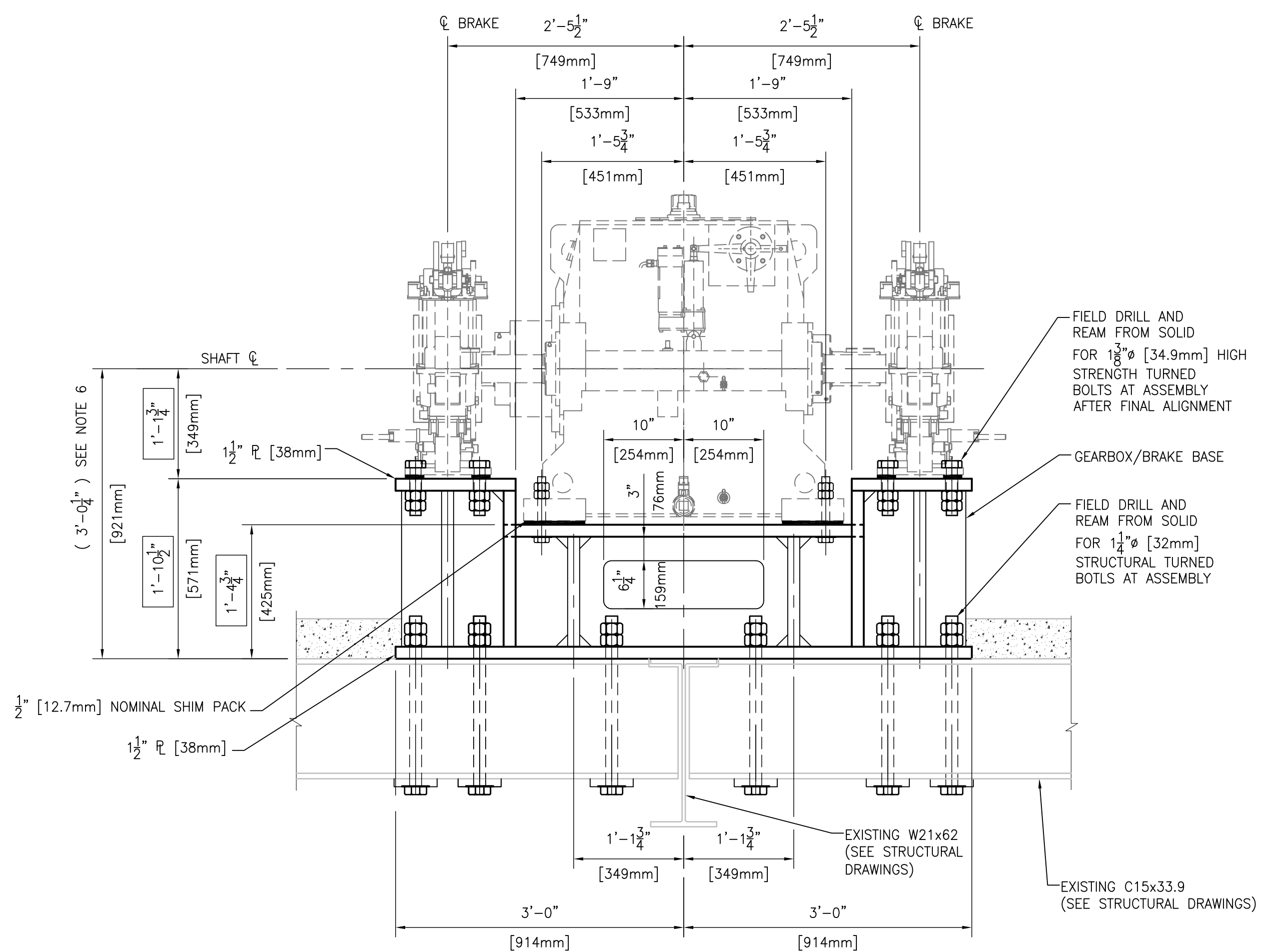
project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
H-05



NOTES:

- CONNECT ALL ADJOINING PLATES WITH COMPLETE JOINT PENETRATION WELDS.
- STRESS RELIEVE WELDMENT AFTER WELDING AND PRIOR TO FINAL MACHINING.
- DIMENSIONS SHOWN ARE FINAL DIMENSIONS AFTER MACHINING.
- MINIMUM PLATE THICKNESS AFTER FINAL MACHINING IS 1/2" [38mm] EXCEPT AS NOTED.
- TOP AND BOTTOM HORIZONTAL SURFACE OF WELDMENT TO BE MACHINED FLAT AND PARALLEL WITHIN 0.010" [0.254mm] OVER ENTIRE SURFACE.
- MAINTAIN EXISTING HEIGHT OF OUTPUT SHAFT.
- MAINTAIN EXISTING SPACING BETWEEN INPUT AND OUTPUT SHAFTS.



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02	66% DESIGN SUBMITTAL	2013-02-14
01	33% DESIGN SUBMITTAL	2012-12-10

revision date

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project title
titre du projet

HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE ONTARIO

REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

GEARBOX PEDESTAL DETAIL

drawn by
dessiné par

J. PEREZ

designed by
conc. par

M. ELZA

approved by
approuvé par

M. VANDEREE

bid
soumission

A. Ghubril

project manager
administrateur
de projets

project date
date du projet

2013-05-31

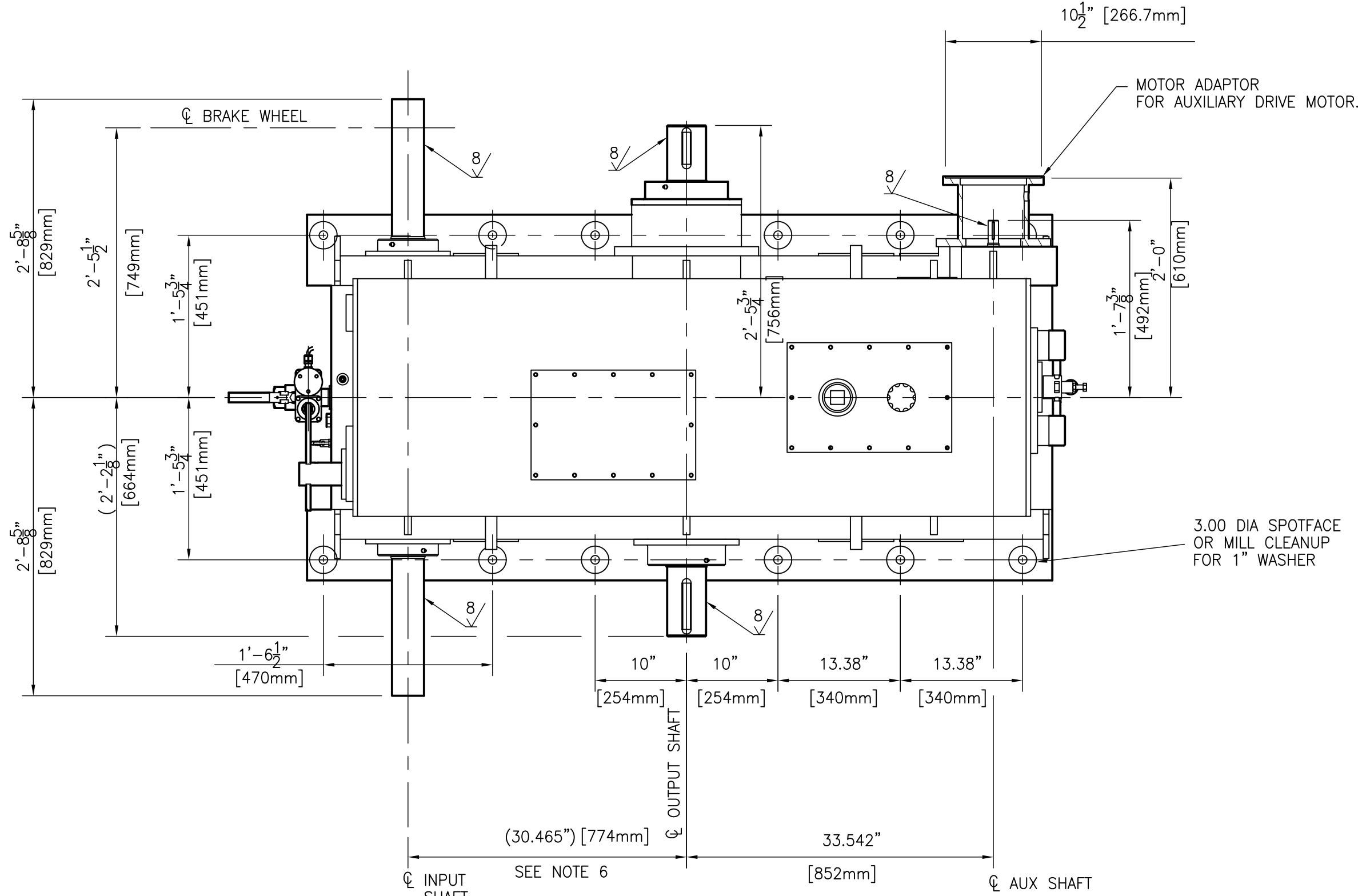
project no.
no. du projet

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drawing no.
dessiné no.

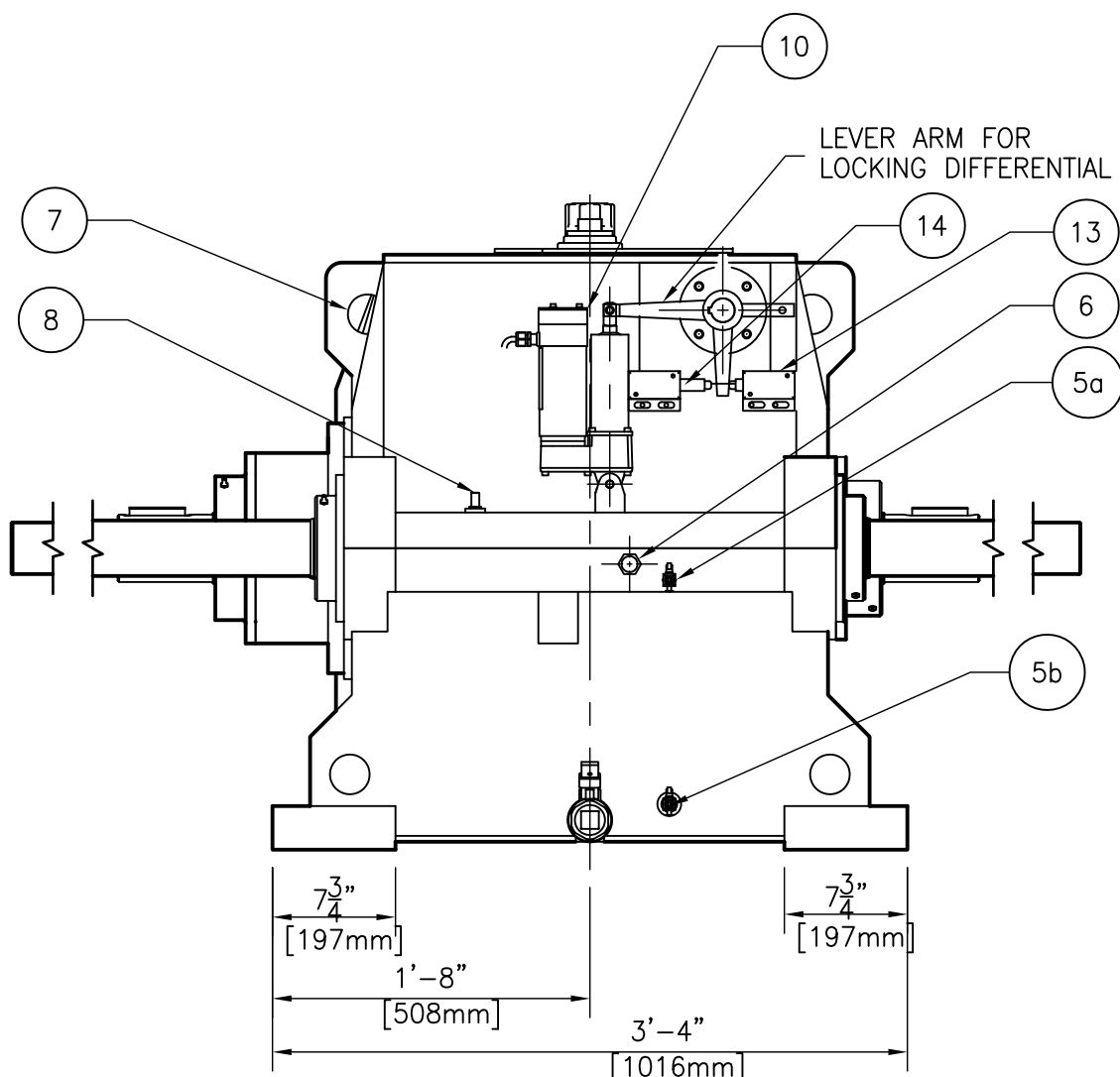
H-06

- ① HYGROSCOPIC BREATHER
- ② OIL FILL PORT - 2 1/2 NPT
- ③ BALL VALVE WITH LOCKABLE OPTION (STAINLESS STEEL)
- ④ INSPECTION COVER WITH CORK NEOPRENE GASKET (2)
- ⑤ OIL SAMPLING COCKS
(a) NEAR OIL LEVEL
(b) NEAR FLOOR
- ⑥ OIL LEVEL SIGHT GLASS
- ⑦ LIFTING LUGS (4)
- ⑧ OIL LEVEL DIPSTICK
- ⑨ GREASE FITTING WITH RELIEF 180° -TYP. (5)
- ⑩ ELECTRICAL OPERATOR FOR DIFFERENTIAL CLUTCH
- ⑪ AUXILIARY DRIVE ENGAGED LIMIT SWITCH
ZS-SADE (SOUTH)
ZS-NADE (NORTH)
- ⑫ AUXILIARY DRIVE DISENGAGED LIMIT SWITCH
ZS-SADD (SOUTH)
ZS-NADD (NORTH)
- ⑬ DIFFERENTIAL LOCKED LIMIT SWITCH
ZS-SDIFL (SOUTH)
ZS-NDIFL (NORTH)
- ⑭ DIFFERENTIAL UNLOCKED LIMIT SWITCH
ZS-SDIFUL (SOUTH)
ZS-NDIFUL (NORTH)



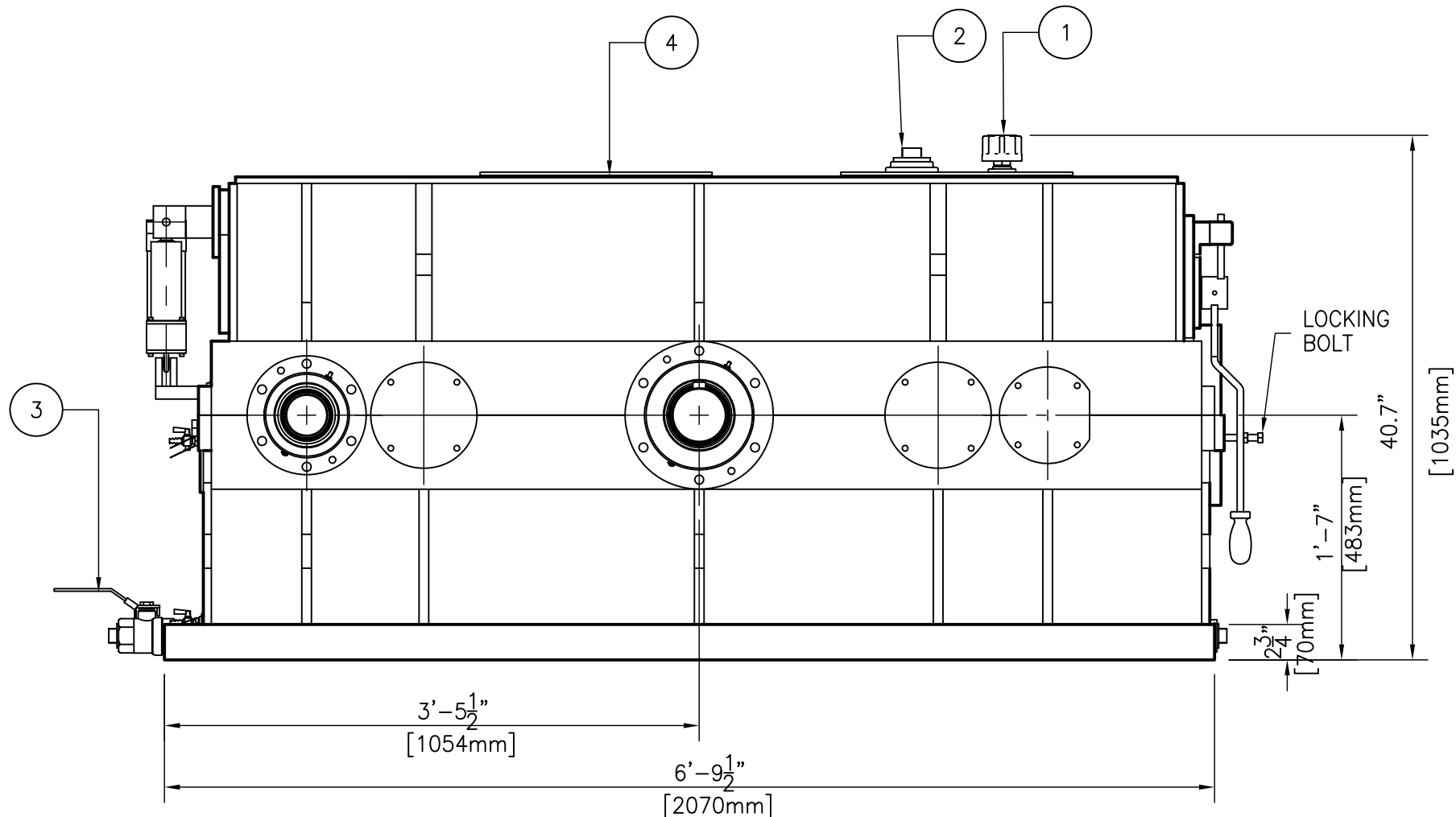
GEARBOX
PLAN

SCALE 1"=1'-0"



GEARBOX
END VIEW

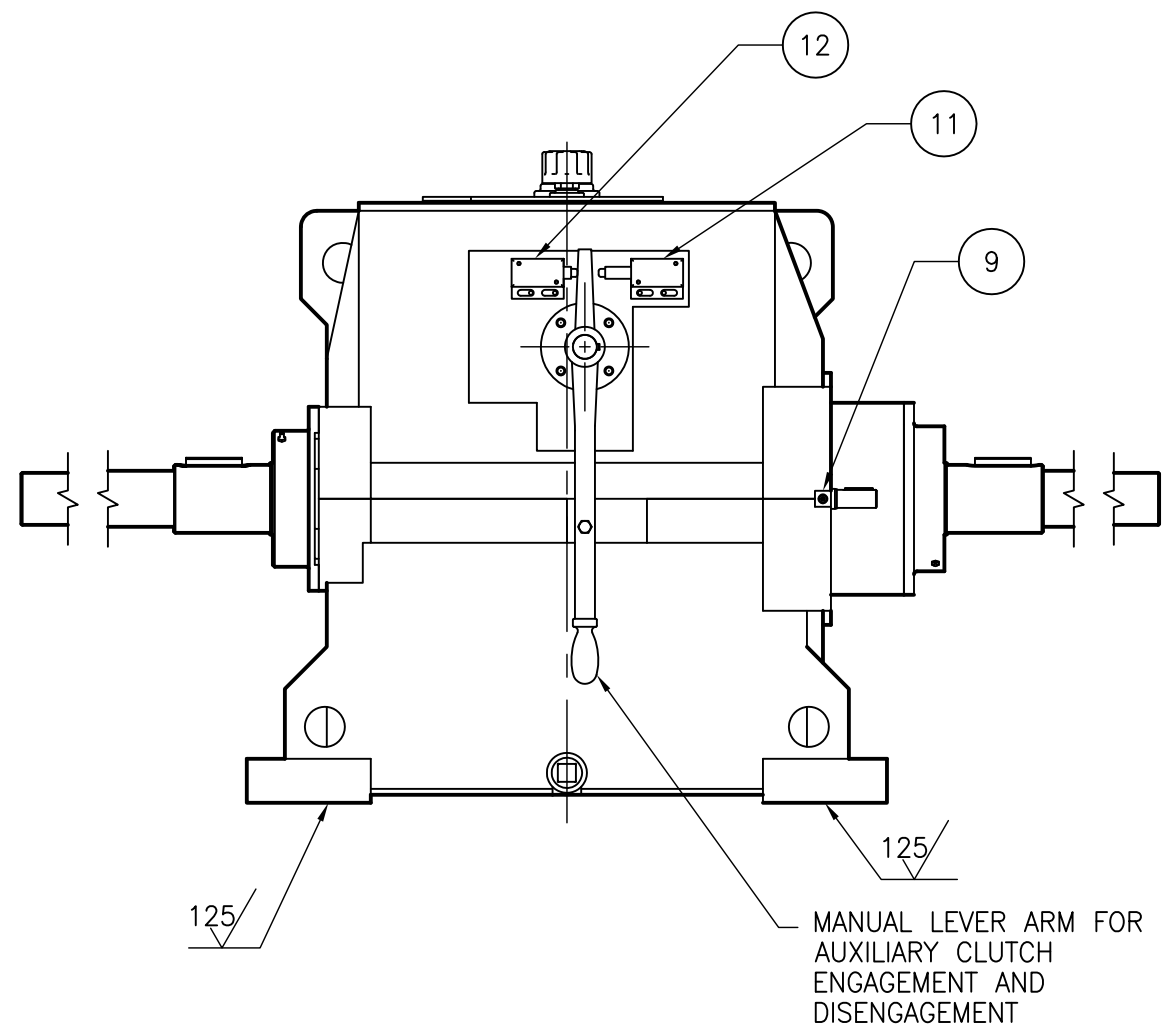
SCALE 1"=1'-0"



GEARBOX
ELEVATION

SCALE 1"=1'-0"

(2-REQUIRED)
(NORTH GEARBOX SHOWN SOUTH SIMILAR AND OPPOSITE HAND)



GEARBOX
REAR VIEW

SCALE 1"=1'-0"

NOTES:

- GEARBOX SHALL HAVE A NAME PLATE RATING OF 150 HP @ 580 RPM AT A SERVICE FACTOR OF 1.0. AT THE MAIN INPUT SHAFT.
- GEARBOX SHALL HAVE A NAME PLATE RATING OF 20 HP @ 1750 RPM AT A SERVICE FACTOR OF 1.0 AT THE AUXILIARY INPUT SHAFT.
- MAIN DRIVE INPUT TO OUTPUT RATIO, 6.227:1
- AUXILIARY DRIVE INPUT TO OUTPUT RATIO, 152.08:1
- DO NOT OPERATE MAIN MOTOR WITH AUXILIARY CLUTCH ENGAGED, DOING SO WILL RESULT IN EXCESSIVE SPEEDS AT THE AUXILIARY INPUT AND MOTOR SHAFTS AND COULD RESULT IN CATASTROPHIC FAILURE.
- MAINTAIN EXISTING SPACING BETWEEN INPUT AND OUTPUT SHAFTS.

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HAMILTON BURLINGTON CANAL VERTICAL LIFT BRIDGE
REPLACEMENT OF CONTROLS,
DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
**MECHANICAL EQUIPMENT
GEARBOX DETAILS**

drawn by
dessiné par
J. PEREZ

designed by
conç par
M. ELZA

approved by
approuvé par
M. VANDEREE

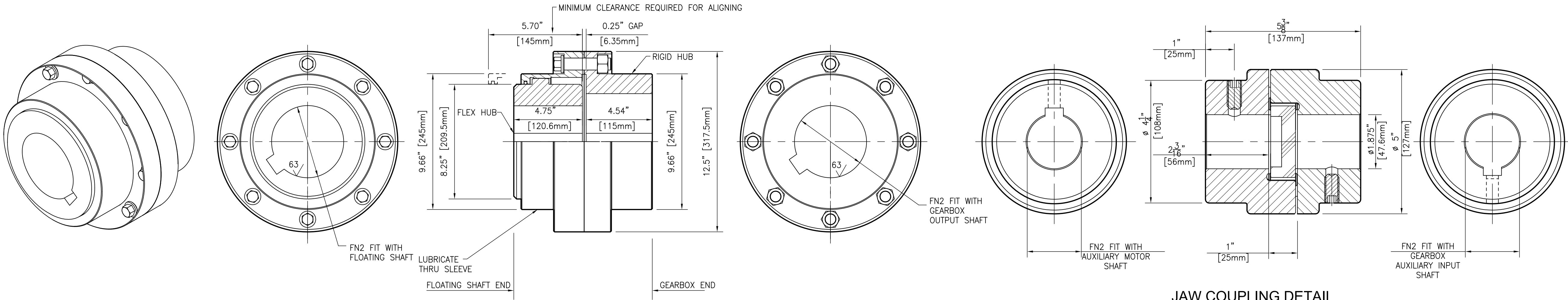
bid
soumission
A. Ghubril

project manager
administrateur
de projets

project date
date du projet
2013-05-31

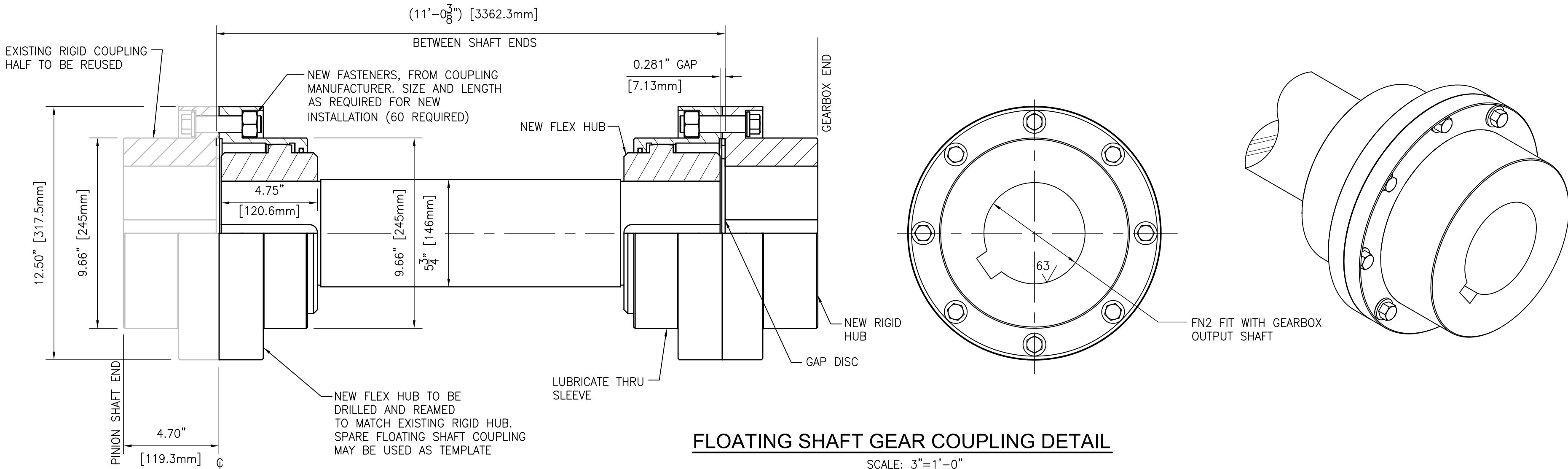
project no.
no. du projet
R.012641.001

drawing no.
dessiné no.
H-07



SINGLE ENGAGEMENT GEAR COUPLING DETAIL

GEAR COUPLING MINIMUM TORQUE RATING 190,000 IN-LB [21,467 Nm]
COUPLINGS TO HAVE SHROUDED BOLTS
(2 COMPLETE ASSEMBLIES REQUIRED,
2 ADDITIONAL FLEX HALVES REQUIRED
FOR INSTALLATION ON SPARE FLOATING SHAFT ASSEMBLIES)



FLOATING SHAFT GEAR COUPLING DETAIL

GEAR COUPLING MINIMUM TORQUE RATING 190,000 IN-LB [21,467 Nm]
COUPLING TO HAVE SHROUDED BOLTS
(2 REQUIRED)

NOTES:

- EXISTING FLOATING SHAFT GEAR COUPLINGS ARE HAMILGEAR 5F. NEW FLEXIBLE HUB COUPLING HALVES TO BE DRILLED AND REAMED TO MATCH. SPARE FLOATING SHAFT COUPLING MAY BE USED AS TEMPLATE
- ALL COUPLING AND BRAKEWHEEL CONNECTIONS TO BE FURNISHED WITH NEW SQUARE KEYS.

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REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
MECHANICAL EQUIPMENT
GENERAL DETAILS 1 of 2

drawn by
dessiné par
J. PEREZ

designed by
conc par
M. ELZA

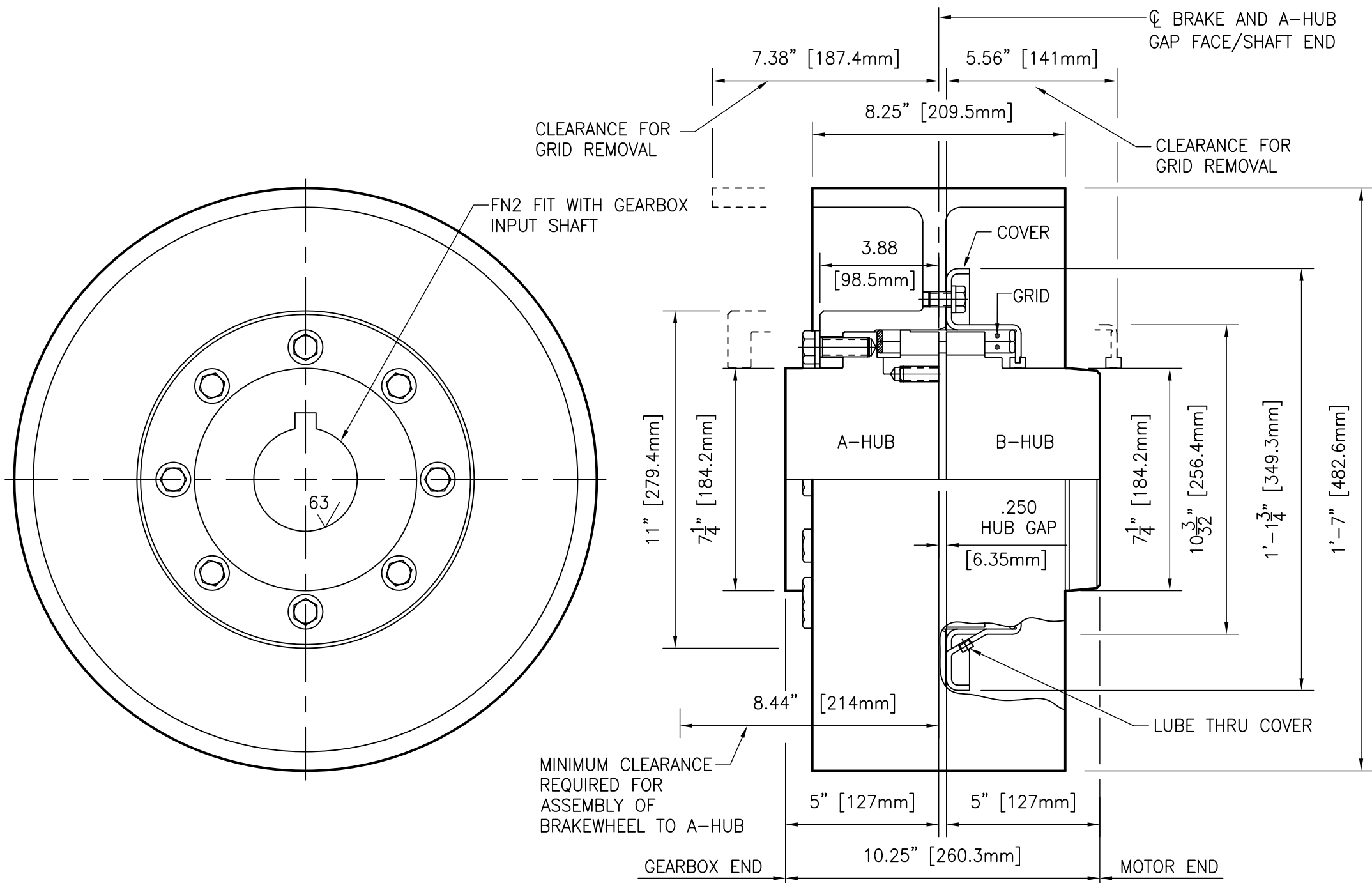
approved by
approuvé par
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bid
soumission
A. Ghubril

project manager
administrateur de projets
2013-05-31

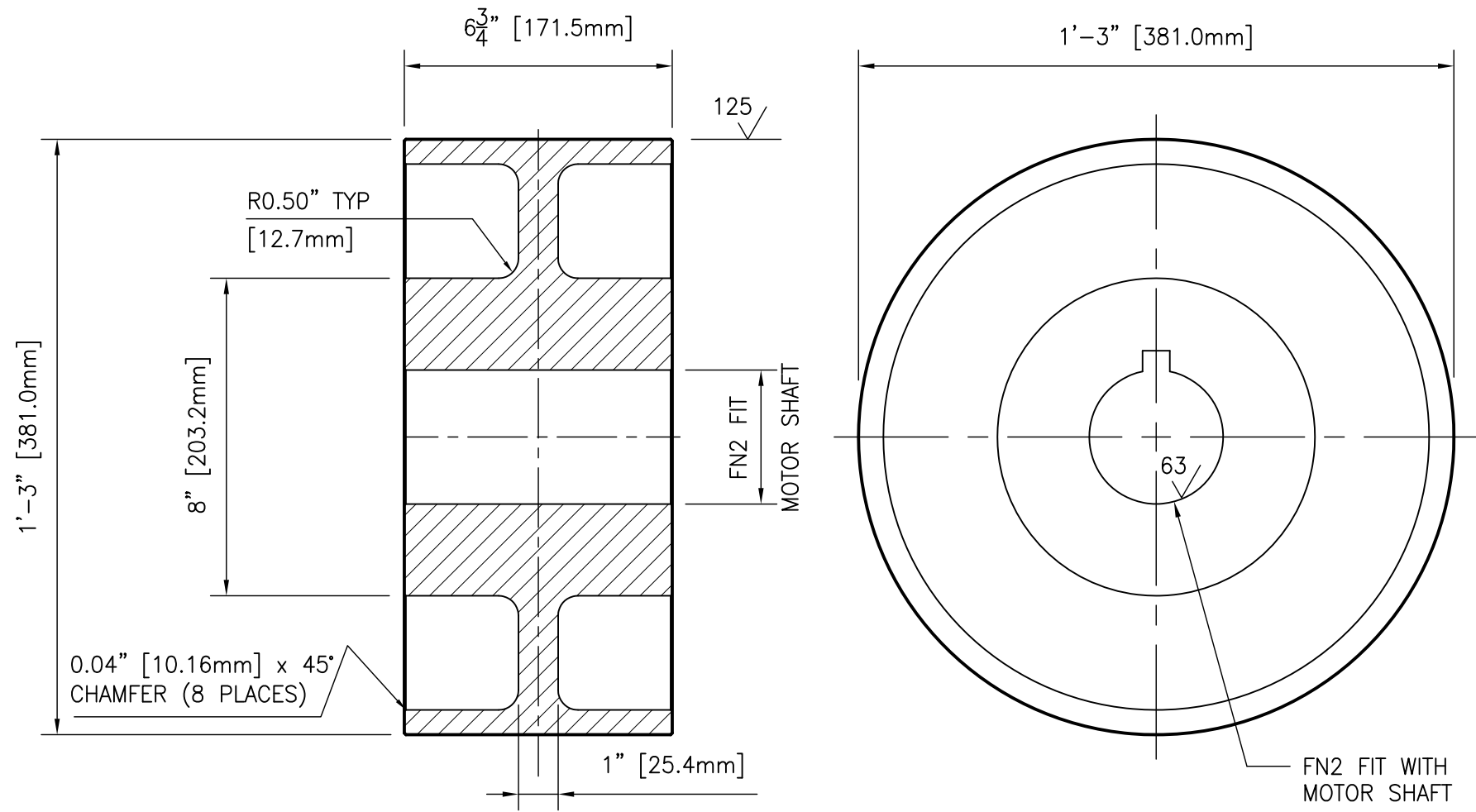
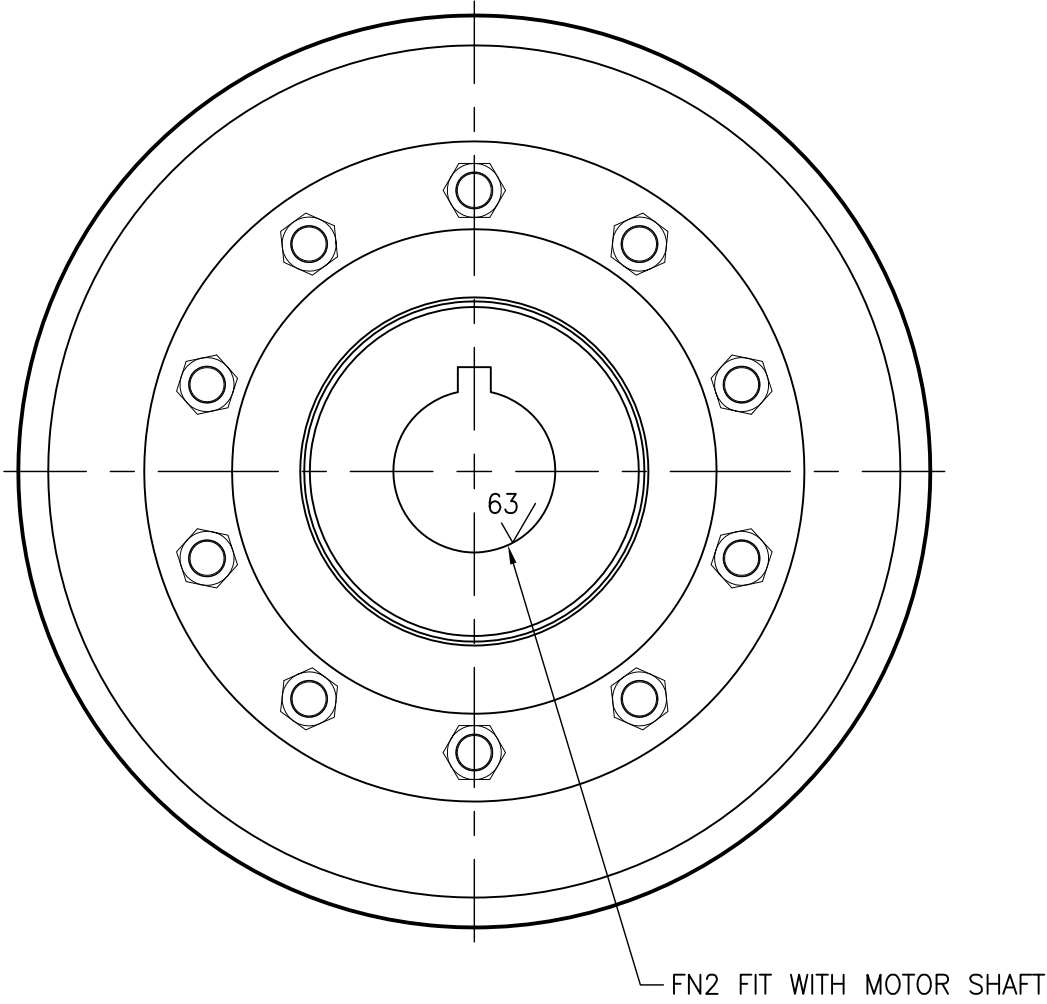
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no. du projet
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drawing no.
dessiné no.
H-08



MACHINERY BRAKEWHEEL/COUPLING DETAIL

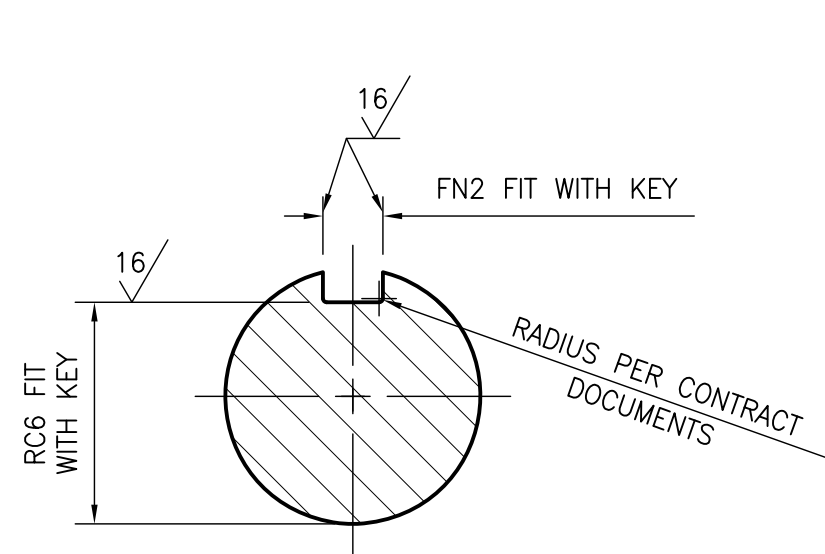
SCALE: 3"=1'-0"
COUPLING BRAKE MINIMUM TORQUE RATING 2000 FT-LB [2,712 Nm]
(5 REQUIRED, 1 AS SPARE)



MOTOR BRAKEWHEEL DETAIL

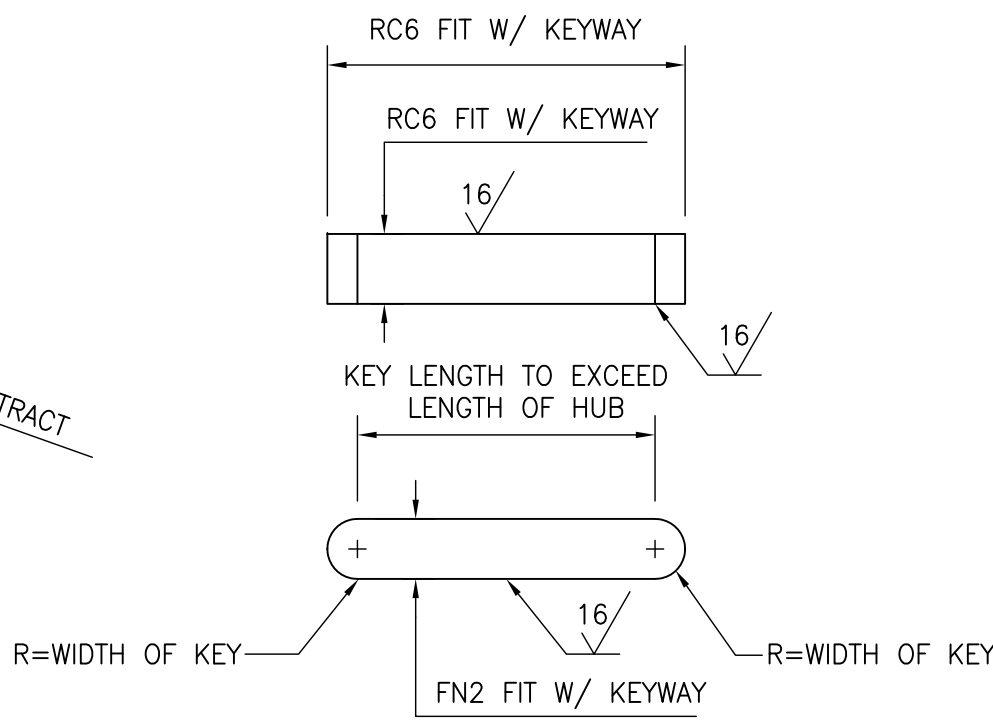
SCALE: 3"=1'-0"
15" [381mm] WHEELS (4 REQUIRED)

NOTES:
1. KEY DIMENSIONS TO BE PER CONTRACT DOCUMENTS.



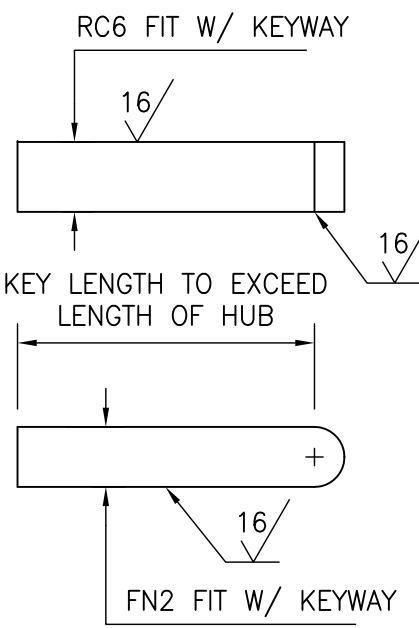
TYPICAL KEYWAY DETAIL

NTS



MOTOR BRAKE WHEEL
SQUARE KEY DETAIL

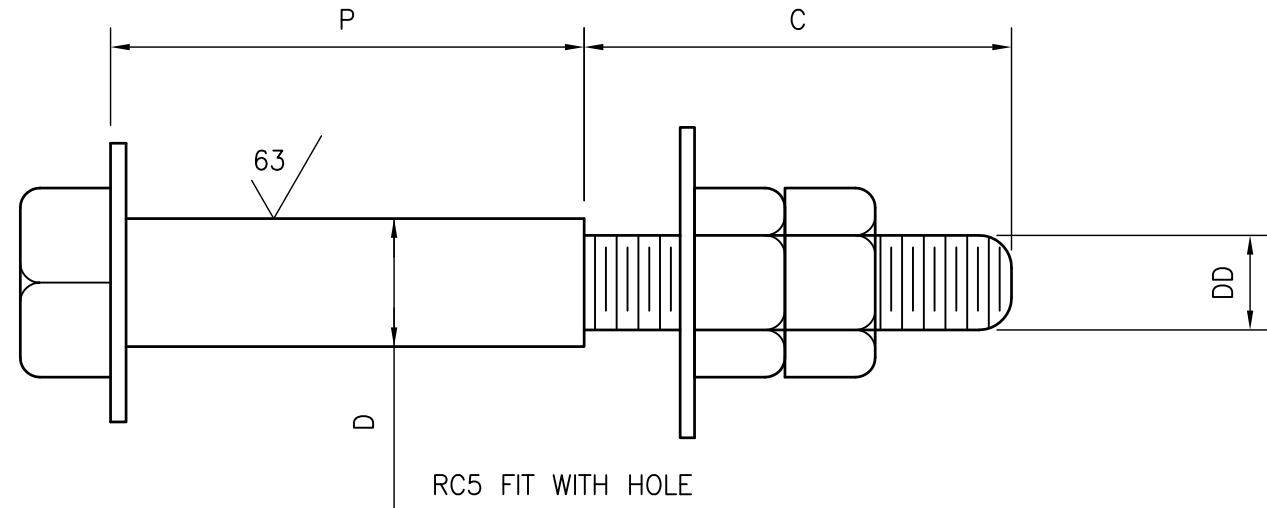
NTS
ASTM A668/A668M
CLASS D



TYPICAL SQUARE KEY DETAIL

NTS

ASTM A668/A668M
CLASS D



TYPICAL HIGH STRENGTH TURNED BOLT DETAIL

NTS

DD= THREAD SIZE, ONE STANDARD SIZE
SMALLER THAN NOMINAL BOLT
DIAMETER

C= THREAD LENGTH, SUFFICIENT FOR
WASHER AND DOUBLE NUT PLUS
NOMINAL SHIM THICKNESS

P= SHANK LENGTH, GRIP LESS NOMINAL
SHIM THICKNESS

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REPLACEMENT OF CONTROLS, DRIVES AND OVERHEAD CABLES

drawing title
titre du dessin
MECHANICAL EQUIPMENT
GENERAL DETAILS 2 of 2

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dessiné par
J. PEREZ

designed by
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M. ELZA

approved by
approuvé par
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bid
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project manager
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drawing no.
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H-09