

CAMPUS SITE PLAN
 N.T.S.

SYMBOL	DESCRIPTION
[Symbol]	MOTOR-OPERATED SWITCH
[Symbol]	SOLENOID-OPERATED SWITCH
[Symbol]	CIRCUIT SWITCH WITH INTEGRATED MOTOR OPERATED DISCONNECT SWITCH
[Symbol]	LOAD BREAK SWITCH
[Symbol]	FUSED CUTOFF
[Symbol]	FUSE
[Symbol]	MV CIRCUIT BREAKER, DRAW-OUT TYPE
[Symbol]	POTENTIAL TRANSFORMER FUSED FIXED TYPE
[Symbol]	POTENTIAL TRANSFORMER FUSED DRAW-OUT TYPE
[Symbol]	CURRENT TRANSFORMER
[Symbol]	ZERO SEQUENCE CURRENT TRANSFORMER
[Symbol]	SOLID STATE RELAY - LONG TIME, SHORT TIME, INSTANTANEOUS AND GROUND TRIP UNIT
[Symbol]	PHASE OVERCURRENT RELAY
[Symbol]	RESIDUAL GROUND FAULT RELAY
[Symbol]	SOURCE GROUND FAULT RELAY
[Symbol]	VOLTAGE METER SWITCH
[Symbol]	AMPERAGE METER SWITCH
[Symbol]	SHORTING BLOCK
[Symbol]	AMPERAGE METER
[Symbol]	VOLTAGE METER
[Symbol]	DIGITAL METERING SYSTEM
[Symbol]	KILOWATT-HOUR METER
[Symbol]	POWER TRANSFORMER
[Symbol]	POWER TRANSFORMER WITH AUTOMATIC TAP CHANGER
[Symbol]	POWER TRANSFORMER WITH DOUBLE SECONDARY WINDINGS

SYMBOL	DESCRIPTION
[Symbol]	LINE OPENERS OR REMOVABLE LOOPS
[Symbol]	LV CIRCUIT BREAKER, DRAW-OUT
[Symbol]	LV CIRCUIT BREAKER, FIXED MOUNT
[Symbol]	RESISTOR
[Symbol]	GROUND
[Symbol]	POTENTIAL TRANSFORMER FUSED FIXED TYPE
[Symbol]	POTENTIAL TRANSFORMER FUSED DRAW-OUT TYPE
[Symbol]	CURRENT TRANSFORMER
[Symbol]	ZERO SEQUENCE CURRENT TRANSFORMER
[Symbol]	SOLID STATE RELAY - LONG TIME, SHORT TIME, INSTANTANEOUS AND GROUND TRIP UNIT
[Symbol]	PHASE OVERCURRENT RELAY
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[Symbol]	SOURCE GROUND FAULT RELAY
[Symbol]	VOLTAGE METER SWITCH
[Symbol]	AMPERAGE METER SWITCH
[Symbol]	SHORTING BLOCK
[Symbol]	AMPERAGE METER
[Symbol]	VOLTAGE METER
[Symbol]	DIGITAL METERING SYSTEM
[Symbol]	KILOWATT-HOUR METER

SYMBOL	DESCRIPTION
[Symbol]	KIRK INTERLOCK, LOCKED OPEN WITH KEY REMOVED.
[Symbol]	KIRK INTERLOCK, LOCKED CLOSED WITH KEY HELD.
[Symbol]	NEON VOLTAGE INDICATOR
[Symbol]	AB AIR CIRCUIT BREAKER
[Symbol]	CA CABLE
[Symbol]	F FEEDER CABLE
[Symbol]	FU FUSE
[Symbol]	GANG GANG OPERATED SWITCH
[Symbol]	LA LIGHTNING ARRESTOR
[Symbol]	LF LOOP FEEDER CABLE
[Symbol]	LS LOAD BREAK SWITCH
[Symbol]	N.C. NORMALLY CLOSED
[Symbol]	N.O. NORMALLY OPEN
[Symbol]	PILC PAPER INSULATED, LEAD COVERED
[Symbol]	PT POTENTIAL TRANSFORMER
[Symbol]	S SWITCH
[Symbol]	XLPE CROSS LINK POLYETHYLENE

SYMBOL	DESCRIPTION
[Symbol]	DUCT BANK # DENOTES DUCT NUMBER. SEE DUCT TABLE FOR DETAILS SHADED DUCT DENOTES SPARE DUCT
[Symbol]	FENCE
[Symbol]	HYDRO POLE
[Symbol]	GLY WIRE
[Symbol]	GROUND ROD
[Symbol]	GROUND ROD WITH INSPECTION PORT
[Symbol]	DUPLEX 5-15R RECEPTACLE C/W INTEGRAL GFCI PROTECTION
[Symbol]	WALL MOUNTED LUMINAIRE

DWG#	DRAWING NAME
ELECTRICAL	
E00	CAMPUS PLAN, PROJECT AREAS, AND LEGEND
E01	MEDIUM VOLTAGE SINGLE LINE DIAGRAM - EXISTING AND PHASE 1
E02	MEDIUM VOLTAGE SINGLE LINE DIAGRAM - PHASE 2 AND PHASE 3
E03	MEDIUM VOLTAGE SINGLE LINE DIAGRAM - PHASE 4 AND PHASE 5
E04	MEDIUM VOLTAGE SINGLE LINE DIAGRAM - FINAL
E05	115KV SUBSTATION LAYOUT - PHASE 1 DEMOLITION
E06	115KV SUBSTATION LAYOUT - PHASE 1 NEW CONSTRUCTION
E07	115KV SUBSTATION LAYOUT - PHASE 2 DEMOLITION
E08	115KV SUBSTATION LAYOUT - PHASE 2 NEW CONSTRUCTION
E09	115KV OVERHEAD LINE ROUTE AND DETAILS
E10	6.9KV DUCT BANK ROUTE AND DETAILS
E11	115KV SUBSTATION ELEVATIONS
E12	115KV SUBSTATION DETAILS
E13	115KV SUBSTATION GROUND GRID DETAIL
E14	DC CONTROLS - EXISTING CIRCUIT SWITCHER
E15	DC CONTROLS - NEW CIRCUIT SWITCHER
E16	TRANSFORMER PROTECTION SCHEMATIC
STRUCTURAL	
S01	GENERAL LAYOUT AND NOTES
S02	SWITCHGEAR ENCLOSURE PAD - SECTIONS AND DETAILS
S03	TRANSFORMER AND OCT SWITCHER PAD - SECTIONS AND DETAILS
S04	GANTRY STRUCTURE PAD - SECTIONS AND DETAILS
S05	115 KV KIRK KEY INTERLOCKS WHICH ARE TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.
S06	115 KV GANTRY STRUCTURE - GIRDER DETAILS

GENERAL NOTES:

- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN SOLID LINES.
- EXCEPT AS NOTED OTHERWISE ALL EQUIPMENT TO BE DEMOLISHED IS SHOWN IN THICK SOLID LINES.
- EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT IS SHOWN IN THICK SOLID LINES.
- ALL SPARE DUCTS ARE SHADED.
- ALL DUCT BANKS TERMINATED AT BUILDINGS AND MANHOLES ARE TO HAVE 10M REBAR EXTENDED 85mm INTO BUILDING FOUNDATIONS OR MANHOLE.
- NEW 115KV TRANSFORMER MUST BE DELIVERED TO SITE BEFORE MARCH 31, 2016.

PROJECT SPECIFIC NOTES:

- CONTRACTOR MUST COMPLETE SERVICE LOCATES IN ALL AREAS WHERE EXCAVATION IS BEING COMPLETED, BEFORE COMMENCING EXCAVATIONS AND SUPPORT EXISTING SERVICES AS REQUIRED DURING EXCAVATION.
- CONTRACTOR IS RESPONSIBLE FOR CONFIRMING PHASING AND ROTATION MATCHES EXISTING SYSTEM CONFIGURATION PRIOR TO ENERGIZING ANY NEW FEEDER CABLES OR NEW EQUIPMENT AND SHALL SUBMIT DOCUMENTATION STATING EXISTING PHASE ROTATION BEFORE DE-ENERGIZATION OF ANY FEEDER.
- CONTRACTOR IS RESPONSIBLE FOR THE SUPPLY, INSTALLATION, AND TERMINATION OF ALL NEW FEEDER CABLES IDENTIFIED IN THIS DRAWING SET.
- ALL WORK REQUIRING EQUIPMENT SHUTDOWNS MUST BE COORDINATED WITH THE NRC, AND COMPLETED DURING OVERTIME HOURS. SHUTDOWNS MUST BE COMPLETE 8 HOURS IN ADVANCE OF THE SITE'S REGULAR WORKING HOURS, WHICH ARE MONDAY TO FRIDAY 6AM TO 10PM.
- ALL NEW FEEDERS INSTALLED IN DUCTS MUST BE INSTALLED WITH A #2/DWG: GREEN, CU, INSULATED GROUND CONDUCTOR, UNLESS INDICATED OTHERWISE.
- MAN-TIE-MAN BREAKERS IN NEW 6900V SWITCHGEAR MUST BE EQUIPPED WITH NEW KIRK KEY INTERLOCKS WHICH ARE TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.
- BURIAL DEPTH SHOWN ON DRAWINGS ARE DESIGN DEPTHS. IF THE BURIAL DEPTH CANNOT BE ACHIEVED A LESSER DEPTH IS PERMITTED BASED ON APPROVAL FROM ENGINEER. HOWEVER ALL DUCTS MUST BE BURIED BELOW GRADE AND CONCRETE ENCASED.
- ALL EXISTING PILC CABLES ARE TO BE TREATED AS IF THEY ARE PCB CONTAMINATED AND DISPOSED OF AS PCB CONTAMINATED CABLES AT APPROPRIATE DISPOSAL FACILITY.
- ALL EXCAVATION IN 115KV SUBSTATION AND WITHIN 2 METERS OF EXISTING SERVICES MUST BE COMPLETED BY HYDRO VAC.

DESCRIPTION OF WORK:

- SUPPLY AND CONSTRUCT NEW OUTDOOR SUBSTATION AT BUILDING U-66 AS INDICATED IN DRAWINGS. EQUIPMENT TO BE SUPPLIED AND INSTALLED CONSISTS OF, BUT NOT LIMITED TO, 115KV OVERHEAD LINES AND ASSOCIATED INSULATORS, UTILITY POLES, 15/20 MVA TRANSFORMER, 6900V OUTDOOR WALK-IN ENCLOSURE AND SWITCHGEAR, AND ALL ASSOCIATED CABLES. ALL EQUIPMENT SHALL BE NEW.
 - ALL EXISTING 6900V LOADS CURRENTLY SUPPLIED FROM EXISTING SUBSTATION WILL BE RE-SUPPLIED FROM NEW OUTDOOR 6900V SWITCHGEAR.
 - SUPPLY AND INSTALL NEW GROUND GRID FOR 115KV SUBSTATION.
 - SUPPLY AND INSTALL NEW OIL CONTAINMENT FOR EXISTING 115KV, 12MVA TRANSFORMER AND NEW 115KV, 15/20MVA TRANSFORMER.
- PROJECT PHASING:**
- CONSTRUCT NEW 115KV SUBSTATION, INCLUDING INSTALLATION OF 115KV OVERHEAD LINE, 115KV TRANSFORMER, 6.9KV SWITCHGEAR, COMPLETE COMMISSIONING OF 6.9KV SWITCHGEAR, INCLUDING FULL BREAKER TESTING, RELAY TESTING, AND COMPLETION OF HYDRO ONE COVER TESTS.
 - ONCE 115KV SUBSTATION IS TESTED AND APPROVED BY HYDRO ONE, COMPLETE CAMPUS SHUTDOWN TO CONNECT NEW 115KV OVERHEAD LINE TO EXISTING 115KV OVERHEAD LINE. RE-SUPPLY U-70A FROM NEW SUBSTATION, REMOVE EXISTING U-70A MAGNABLAST BREAKER AND CUT CABLE TRENCH IN FLOOR OF U66 TO ALLOW ENTRY OF FEEDER CABLES.
 - UPON ENERGIZATION OF NEW 115KV SUBSTATION AND RE-SUPPLY SWITCHGEAR OF SWITCH U66-L52. MODIFY SWITCHGEAR BUS OF EXISTING LOAD BREAK SWITCHES U66-L51 AND U66-L52.
 - DURING ISOLATED SHUTDOWNS OF LOAD BREAK SWITCHES U66-L51 AND U66-L52 TERMINATE NEW FEEDER CABLES TO LOAD BREAK SWITCHES U66-L51 AND U66-L52 TO RE-SUPPLY LOADS FROM NEW 6.9KV SWITCHGEAR.
 - FOLLOWING THE DISCONNECTION OF THE EXISTING FEEDER SUPPLYING SWITCH U66-L52 AND RE-ENERGIZATION OF U66-L52 FROM NEW FEEDER, REMOVE EXISTING PILC CABLE AND INSTALL NEW CABLES IN EXISTING DUCTS TO SUPPLY U66-L53.
 - ONCE NEW FEEDER CABLES ARE INSTALLED SHUTDOWN SWITCHGEAR OF SWITCH U66-L52. MODIFY SWITCHGEAR BUS OF SWITCH U66-L52 TO ALLOW FOR TERMINATION OF FEEDERS TO SWITCHES U66-L52 AND U66-L53.
 - ONCE ALL LOADS WITH THE EXCEPTION OF THE 11,250HP COMPRESSOR ARE TRANSFERRED TO THE NEW SWITCHGEAR, REQUEST SHUTDOWN OF 11,250HP COMPRESSOR TO ISOLATE TRANSFORMER T1. DISCONNECT EXISTING 6.9KV BUS DUCT OF EXISTING TRANSFORMER AND INSTALL NEW 6.9KV FEEDERS FROM EXISTING TRANSFORMER'S SECONDARY TO NEW 6.9KV MAIN BREAKER AND CONNECT NEW 6.9KV SWITCHGEAR TO EXISTING 6.9KV SWITCHGEAR FOR RE-SUPPLY OF 11,250HP COMPRESSOR.

No.	Date	Revision	Date Imprimée	Page
C	15.07.23	RE-ISSUED FOR TENDER		D.V.G
C	15.07.17	ISSUED FOR TENDER		D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW		D.V.G
A	15.03.31	ISSUED FOR 60% REVIEW		D.V.G

Date Printed: _____ Date Imprimée: _____

- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

A	A Detail no. No. du détail	A
C	B Location drawing no. sur dessin no.	B C
	C Drawing no. dessin no.	

project: **BUILDING U-66
NEW 115 KV OUTDOOR
SUBSTATION**
 UPLANDS CAMPUS

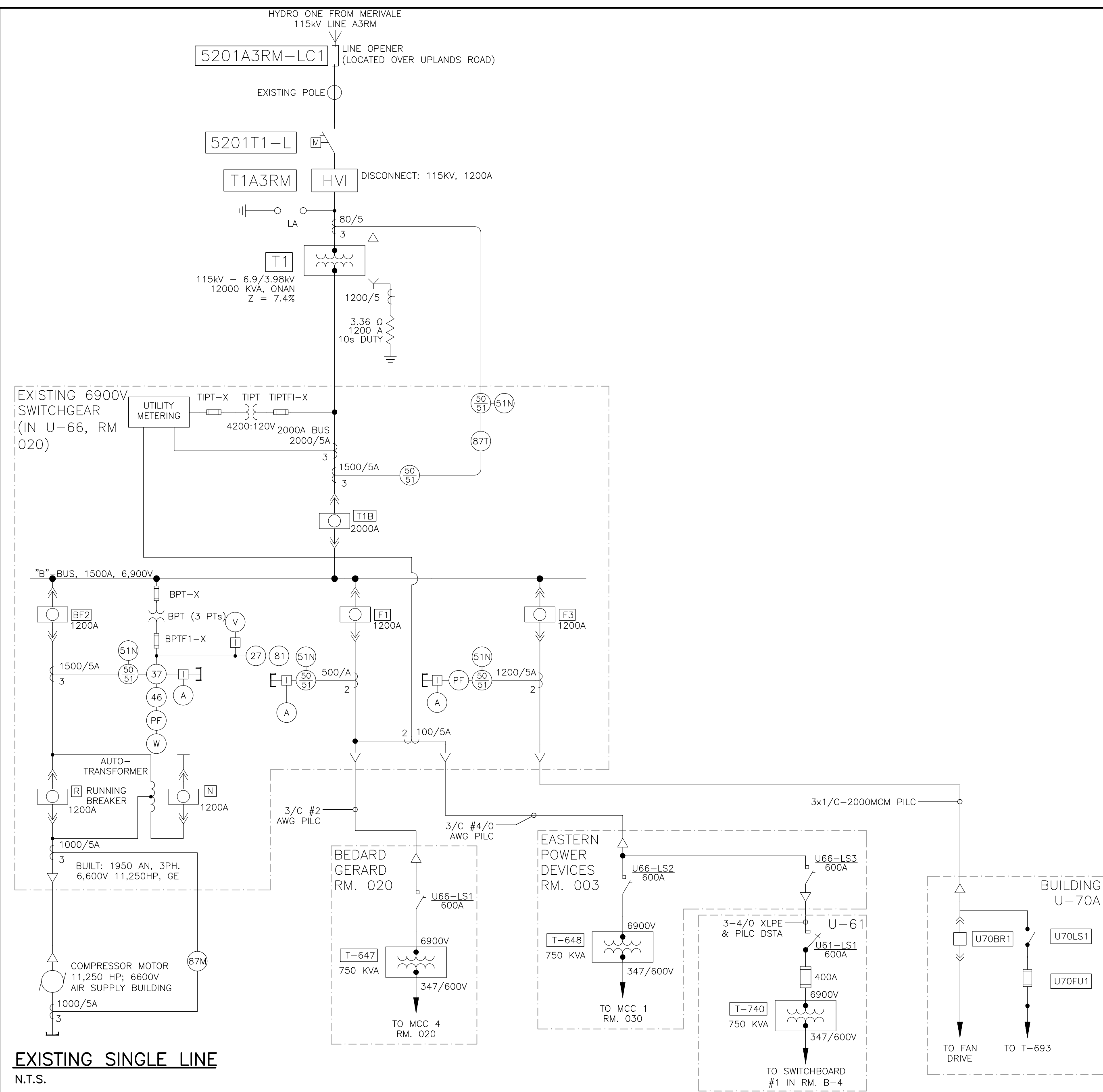
drawing: **ELECTRICAL
CAMPUS PLAN, PROJECT
AREAS, AND LEGEND**

designed	conçu	date	scale	sheet	of/du	total	date	scale	sheet	of/du	total
D. VAN GAAL		MARCH 2015		1	of/du	23					
drawn	dessiné										
H. SULLIVAN		N.T.S.									
checked	vérifié										
P. DYCK											
approved	approuvé	W.O. no.									
D. VAN GAAL											
dwg.no.		Stantec no. 163301846									
D-5078-E00											

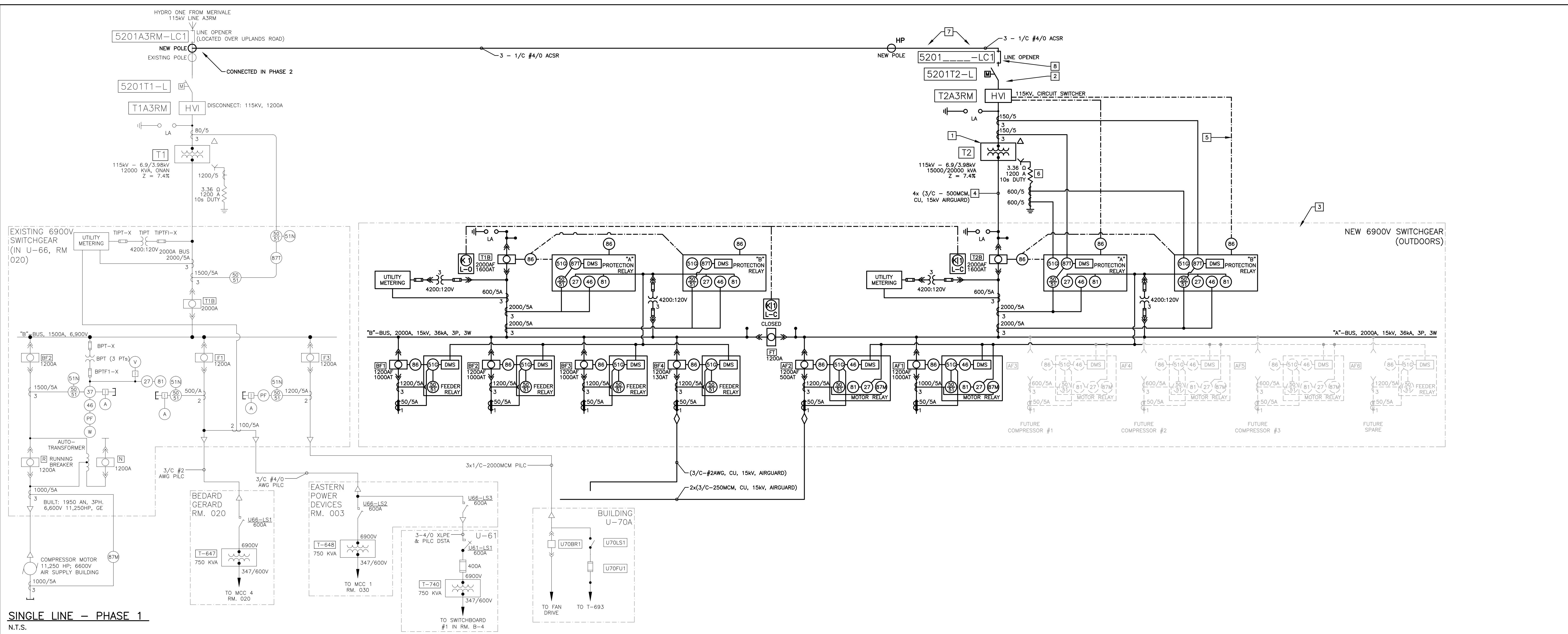
- GENERAL NOTES:
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- PHASE 1 - SCOPE OF WORK:
- DURING THIS PHASE OF THE PROJECT THE 115KV SUBSTATION WILL BE CONSTRUCTED AND ALL ASSOCIATED EQUIPMENT MUST BE INSTALLED INCLUDING, BUT NOT LIMITED TO 115KV CIRCUIT SWITCHER, 115KV TRANSFORMER, SUBSTATION GROUNDING, SUBSTATION FENCING AND NEUTRAL GROUNDING RESISTORS. ALSO, THE 6900V OUTDOOR WALK-IN ENCLOSURE MUST BE INSTALLED.
 - NEW FEEDERS WILL BE ROUTED TO U70-BR1 AND U70-L31 IN PREPARATION FOR RE-SUPPLY OF LOADS FOLLOWING THE ENERGIZATION OF THE NEW 115KV SUBSTATION.
 - UPON COMPLETION OF THIS PHASE THE 115KV SUBSTATION WILL BE ENERGIZED AND THE NEW 6900V SWITCHGEAR WILL BE CAPABLE OF ACCEPTING LOAD.

- DRAWING NOTES:
- SUPPLY AND INSTALL NEW PADMOUNTED OIL FILLED 15/20MVA, ONAN/ONAF, 115KV - 6900V/3984V, DELTA-WYE TRANSFORMER, ASSOCIATED CABLES, AND ALL ASSOCIATED CIVIL WORK AS PER LAYOUT DRAWINGS.
 - SUPPLY AND INSTALL ASSOCIATED STRUCTURAL SUPPORTS AND ALL ASSOCIATED CIVIL WORK AS PER LAYOUT DRAWINGS. SUPPLY AND INSTALL 115KV CIRCUIT SWITCHER WITH INTEGRATED DISCONNECT.
 - INSTALL NEW OUTDOOR WALK-IN ENCLOSURE AND SWITCHGEAR AND ASSOCIATED CIVIL WORK AS PER LAYOUT DRAWING.
 - INSTALL AND CONNECT NEW CONCRETE ENCASED DUCT BANK FROM SECONDARY OF NEW TRANSFORMER TO LINE SIDE OF NEW 6900V MAIN BREAKER.
 - SUPPLY AND INSTALL CONDUCTORS IN CONDUIT FROM TRANSFORMER AUXILIARY CONTROL PANEL TO SWITCHGEAR AUXILIARY CONTROL COMPARTMENT. CONDUCTORS TO BE USED FOR TRANSFORMER AUXILIARY ALARMS, TRIPS, GROUNDING RESISTOR'S CURRENT TRANSFORMERS AND 15/20MVA TRANSFORMER'S PRIMARY CURRENT TRANSFORMERS. SUPPLY AND INSTALL 10x(#10AWG, CU, RW90) FOR TRANSFORMER AUXILIARY COMPARTMENT TO 115KV CIRCUIT SWITCHER AUXILIARY COMPARTMENT.
 - SUPPLY AND INSTALL NEW 4000V, 1200A 10 SEC DUTY RESISTOR IN OUTDOOR ENCLOSURE. RESISTOR TO BE EQUIPPED WITH TWO CURRENT SENSORS. CURRENT SENSOR'S SECONDARY CONDUCTORS TO BE #10AWG, CU, RW90 AND ROUTED TO TRANSFORMER'S AUXILIARY COMPARTMENT TO ALLOW CONNECTION TO "A" AND "B" PROTECTION RELAYS.
 - SUPPLY AND INSTALL NEW 115KV UTILITY POLES, GUY WIRES, INSULATORS, OVERHEAD LINE, AND TAP CONDUCTORS.
 - SUPPLY AND INSTALL NEW 115KV LINE OPENER IN OVERHEAD LINE.



EXISTING SINGLE LINE
N.T.S.



SINGLE LINE - PHASE 1
N.T.S.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 60% REVIEW	D.V.G

No.	Date	Revision	By	Appr.
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- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

A	A
C	B C

PROJECT: BUILDING U-66
 NEW 115 KV OUTDOOR SUBSTATION
 UPLANDS CAMPUS

DRAWING: ELECTRICAL
 MEDIUM VOLTAGE SINGLE LINE
 DIAGRAM - PHASE 1

designed D. VAN GAAL	conçu D. VAN GAAL	date MARCH 2015	scale N.T.S.	sheet 2 of 23	date 23
drawn H. SULLIVAN	dessiné H. SULLIVAN				
checked P. DYCK	vérifié P. DYCK				
approved D. VAN GAAL	approuvé D. VAN GAAL				
dwg.no. D-5078-E01	dessin no. D-5078-E01				

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 - EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT IS SHOWN IN THICK SOLID LINES.
 - EXCEPT AS NOTED OTHERWISE ALL FUTURE EQUIPMENT IS SHOWN IN SHAKED DASHED LINES.
 - PHASE AND ROTATION OF ALL EXISTING LOADS MUST BE VERIFIED PRIOR TO SHUTDOWN AND WITNESSED BY ENGINEER.

- PHASE 2 - SCOPE OF WORK:
- COMPLETE SHUTDOWN OF EXISTING 115KV SUBSTATION TO ALLOW CONNECTION OF NEW 115KV OVERHEAD LINE TO EXISTING 115KV FEEDER.
 - DURING SHUTDOWN CONNECT BREAKER U70BR1 AND SWITCH U70L51 TO NEW 6900V FEEDERS.
 - DURING THE SCHEDULED SITE SHUTDOWN THE FLOOR IN THE EXISTING INDOOR ELECTRICAL ROOM WILL BE SAW CUT TO ALLOW INSTALLATION OF DUCT BANKS DURING THIS PHASE.
 - REMOVE EXISTING FEEDER BREAKER SUPPLYING U-70A.

- PHASE 3 - SCOPE OF WORK:
- INSTALL NEW FEEDERS TO SWITCH U66-LS2 AND U66-LS1 DURING NORMAL HOURS.
 - DURING SCHEDULED SHUTDOWN TERMINATE NEW FEEDER CABLES TO SWITCHES U66-LS2 AND U66-LS1.
 - FOLLOWING THE SHUTDOWN REMOVE EXISTING CABLES PREVIOUSLY SUPPLYING U66-LS2 AND U66-LS1.

- DRAWING NOTES:
- DURING SCHEDULED SHUTDOWN OF 115KV OVERHEAD LINE CONNECT NEW 115KV OVERHEAD LINE TO EXISTING 115KV OVERHEAD LINE.
 - DURING SCHEDULED SHUTDOWN OF 115KV OVERHEAD LINE SUPPLY AND INSTALL NEW LINE OPENER IN EXISTING 115KV OVERHEAD LINE AS PER LAYOUT DRAWINGS.
 - DURING SCHEDULED SHUTDOWN REMOVE INTERCONNECTING BUS BETWEEN BREAKER U70BR1 AND SWITCH U70L51.
 - DURING SCHEDULED SHUTDOWN TERMINATE NEW FEEDER CABLES TO BREAKER U70BR1.
 - DURING SCHEDULED SHUTDOWN TERMINATE NEW FEEDER CABLES TO SWITCH U70L51.
 - DURING SCHEDULED SHUTDOWN, REMOVE EXISTING FEEDER BREAKER, INSTALL NEW COVER OVER EXISTING SWITCHGEAR TO PREVENT ACCESS TO LIVE BUS ONCE ENERGIZED.
 - REMOVE 3x1/C-2000MCM, PILC CABLES FROM EXISTING DUCTS ONCE ISOLATED.
 - SUPPLY AND INSTALL NEW (3/C - #2AWG, CU, 15KV) AIRGUARD CABLE FROM NEW 6.9KV OUTDOOR SWITCHGEAR TO LINE SIDE OF EXISTING U66-LS1 LOAD BREAK SWITCH. TERMINATIONS TO BE COMPLETED DURING SCHEDULED SHUTDOWN.
 - SUPPLY AND INSTALL NEW (3/C - #2AWG, CU, 15KV) AIRGUARD CABLE FROM NEW 6.9KV OUTDOOR SWITCHGEAR TO LINE SIDE OF EXISTING LS2 LOAD BREAK SWITCH. TERMINATIONS TO BE COMPLETED DURING SCHEDULED SHUTDOWN.
 - REMOVE EXISTING 3/C-#2AWG U66 PILC CABLES ONCE ISOLATED AND DISPOSE OF OFFSITE.
 - ONCE ISOLATED REMOVE EXISTING 3/C-#4/0AWG PILC CABLES FROM EXISTING CABLE TRAYS AND UNDERGROUND DUCTS.
 - DURING THE SCHEDULED SHUTDOWN OF U66-LS2, SAW CUT FLOOR BELOW SWITCH U66-LS3 TO ALLOW THE NEW CABLES INSTALLED IN PHASE 4 TO BE ROUTED BELOW SWITCHGEAR FROM CELL OF SWITCH U66-LS2 TO CELL OF SWITCH U66-LS3. COVER EQUIPMENT TO PREVENT DUST SPREADING TO EQUIPMENT.
 - SUPPLY AND INSTALL SNUBBERS WITHIN 2.5m OF TRANSFORMER PRIMARY.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 60% REVIEW	D.V.G

No.	Date	Revision	By	Appr.

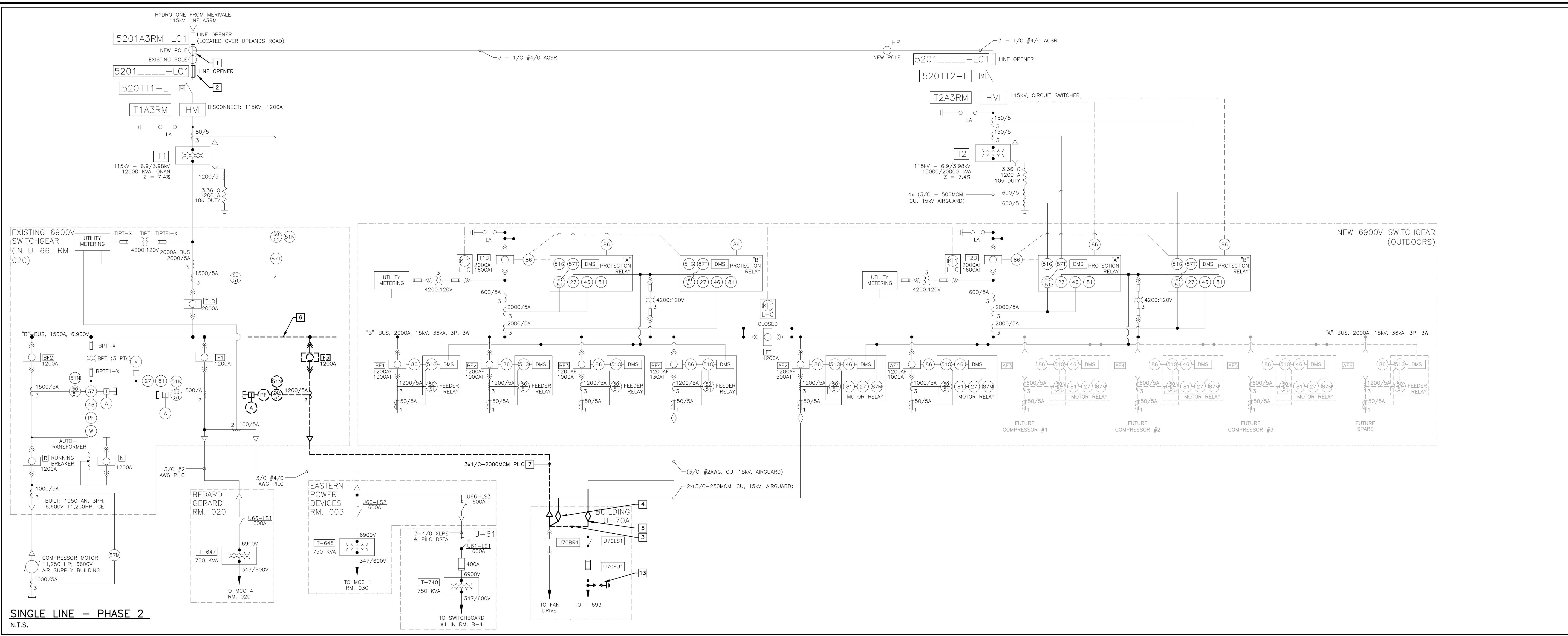
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- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

A	A
C	B C

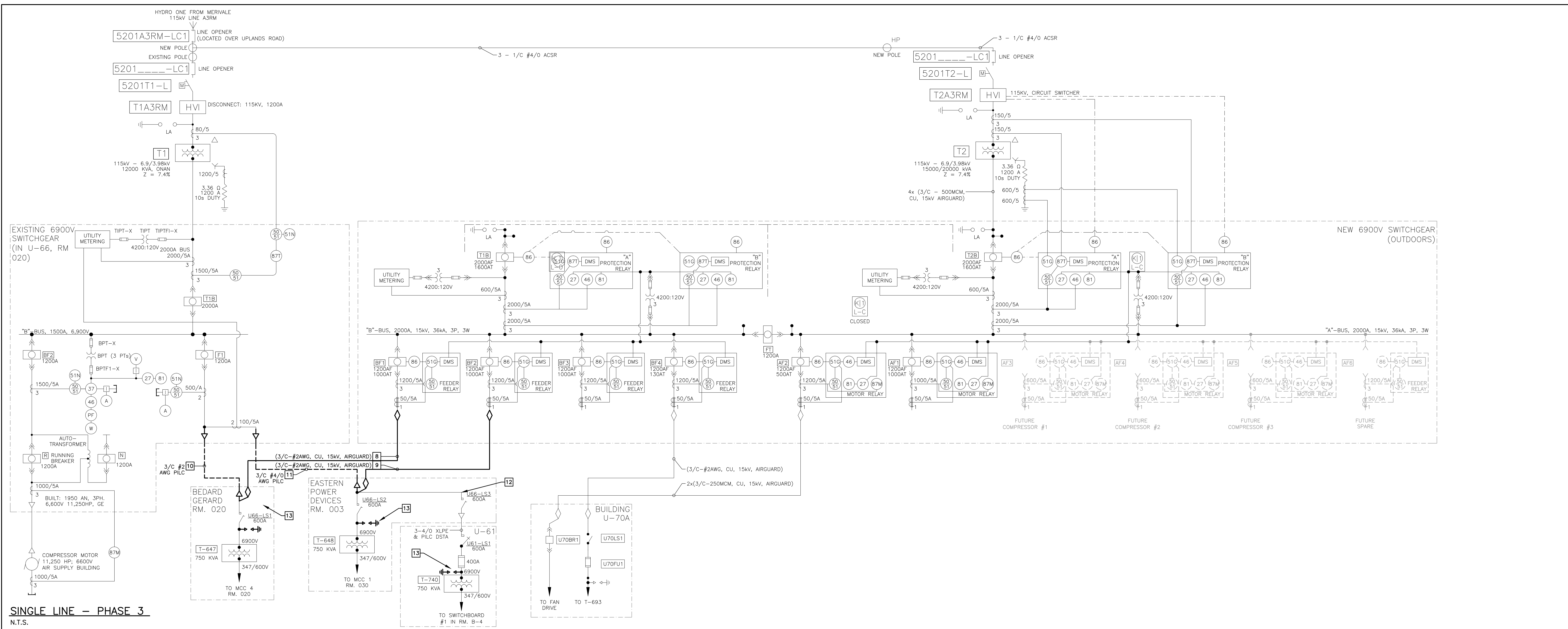
PROJECT: **BUILDING U-66
 NEW 115 KV OUTDOOR
 SUBSTATION**
 UPLANDS CAMPUS

DRAWING: **ELECTRICAL
 MEDIUM VOLTAGE SINGLE LINE
 DIAGRAM - PHASE 2 AND 3**

designed	D. VAN GAAL	conçu	DATE	MARCH 2015	scale	échelle
drawn	H. SULLIVAN	dessiné	sheet	N.T.S.	feuille	23
checked	P. DYCK	vérifié	3	of/ de	23	
approved	D. VAN GAAL	approuvé	W.O.no.		D.T.no.	
dwg.no.	D-5078-E02	dessin no.				



SINGLE LINE - PHASE 2
 N.T.S.

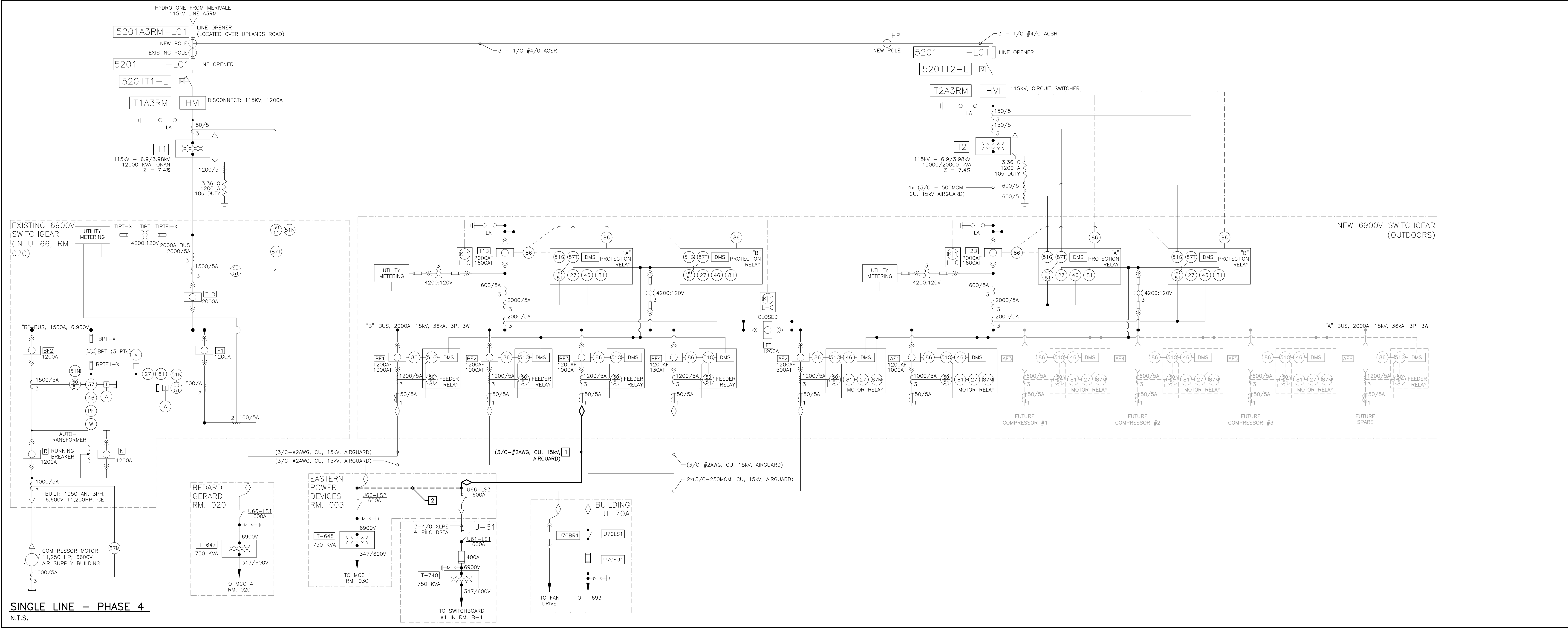


SINGLE LINE - PHASE 3
 N.T.S.

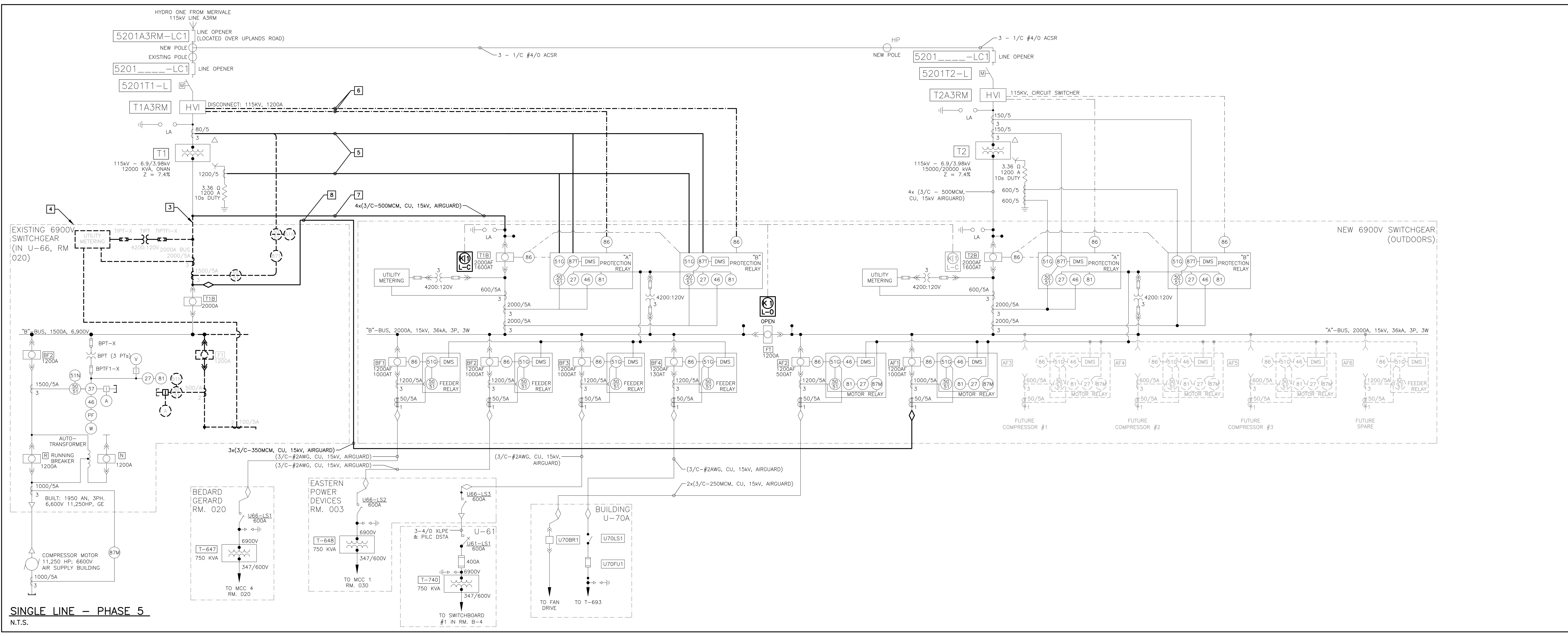
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- DRAWING NOTES:
- ONCE EXISTING FEEDER CABLE IS REMOVED INSTALL NEW (3/C-#2AWG, CU, 15KV, AIRGUARD) CABLES IN EXISTING CABLE TRAY AND DUCTS.
 - DURING SCHEDULED SHUTDOWN MODIFY BUS ON LINE SIDE OF SWITCH U66-L52 AND SWITCH U66-L53 TO ALLOW FOR TERMINATION OF NEW CABLES.
 - DURING A SCHEDULED SHUTDOWN ISOLATE TRANSFORMER T1 AND REMOVE TRANSFORMER SECONDARY BUS.
 - DURING A SCHEDULED SHUTDOWN REMOVE EXISTING 6.9KV FEEDER BREAKER F1. INSTALL STEEL COVER OVER EXPOSED BUS VERIFYING INSULATION INTEGRITY FOLLOWING THE INSTALLATION OF STEEL COVER.
 - CONNECT EXISTING CURRENT TRANSFORMERS TO NEW PROTECTION RELAYS INSTALLED WITHIN NEW 6.9KV SWITCHGEAR. SUPPLY AND INSTALL ALL REQUIRED CONDUIT AND WIRES FROM NEW 6.9KV SWITCHGEAR TO EXISTING TRANSFORMER'S CONTROL BOX. A MINIMUM OF 12x(#12AWG, RW90, CU) WIRES MUST BE INSTALLED.
 - CONNECT NORMALLY OPEN CONTACTS OF 86 LOCK-OUT RELAYS TO TRIP CIRCUIT OF 115KV CIRCUIT SWITCHER. CONNECT CIRCUIT SWITCHER STATUS CONTACTS TO PROTECTION RELAYS. SUPPLY AND INSTALL A MINIMUM OF 12x(#12AWG, RW90, CU) WIRES.
 - SUPPLY AND INSTALL NEW 4x(3/C-500MCM, CU, 15KV, AIRGUARD) CABLES FROM SECONDARY OF TRANSFORMER T1 TO LINE SIDE OF BREAKER T2B.
 - SUPPLY AND INSTALL NEW FEEDER CABLES TO LINE SIDE OF EXISTING MAIN BREAKER TO ALLOW THE RE-SUPPLY OF THE EXISTING 6,900V SWITCHGEAR (11,250HP COMPRESSOR).



SINGLE LINE - PHASE 4
 N.T.S.



SINGLE LINE - PHASE 5
 N.T.S.

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C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 99% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 66% REVIEW	D.V.G
No.	Date	Revision	By / Ppr.

- Date Printed: _____ Date Imprimée: _____
- Verify all dimensions and site conditions and be responsible for same
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A	A Detail no. / No. de détail
B	B Location drawing no. / sur dessin no.
C	C Drawing no. / dessin no.

PROJECT: **BUILDING U-66
 NEW 115 KV OUTDOOR
 SUBSTATION**
 UPLANDS CAMPUS

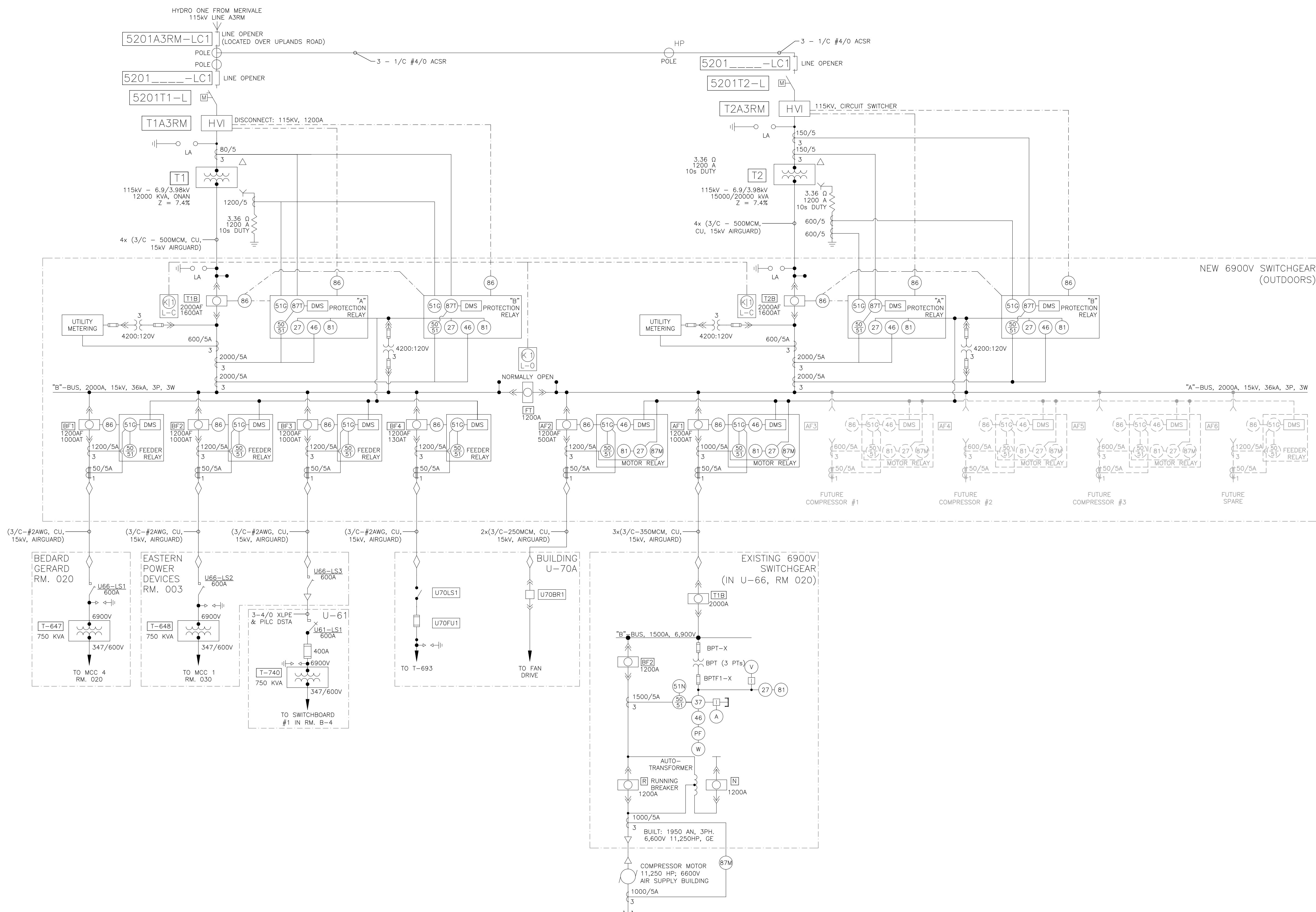
DRAWING: **ELECTRICAL
 MEDIUM VOLTAGE SINGLE LINE
 DIAGRAM - PHASE 4 AND 5**

designed	D. VAN GAAL	conçu	DATE	MARCH 2015	date	D-2642-E03
drawn	H. SULLIVAN	dessiné	scale	N.T.S.	échelle	
checked	P. DYCK	vérifié	sheet	4 of 26	feuille	
approved	D. VAN GAAL	approuvé	W.O.no.		D.T.no.	
dwg.no.			Stantec No.	163301846	dessin no.	

D-5078-E03

W:\projects\163301846_NRC_Colombes_115kV_Sub\Drawing\163301846_25singleline.dwg
 2015/07/23 11:22 AM by: [redacted]

GENERAL NOTES:
 1. EXCEPT AS NOTED OTHERWISE ALL FUTURE EQUIPMENT IS SHOWN IN SHADED DASHED LINES.



SINGLE LINE - FINAL
 N.T.S.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 66% REVIEW	D.V.G

Date Printed: _____ Date Imprimée: _____

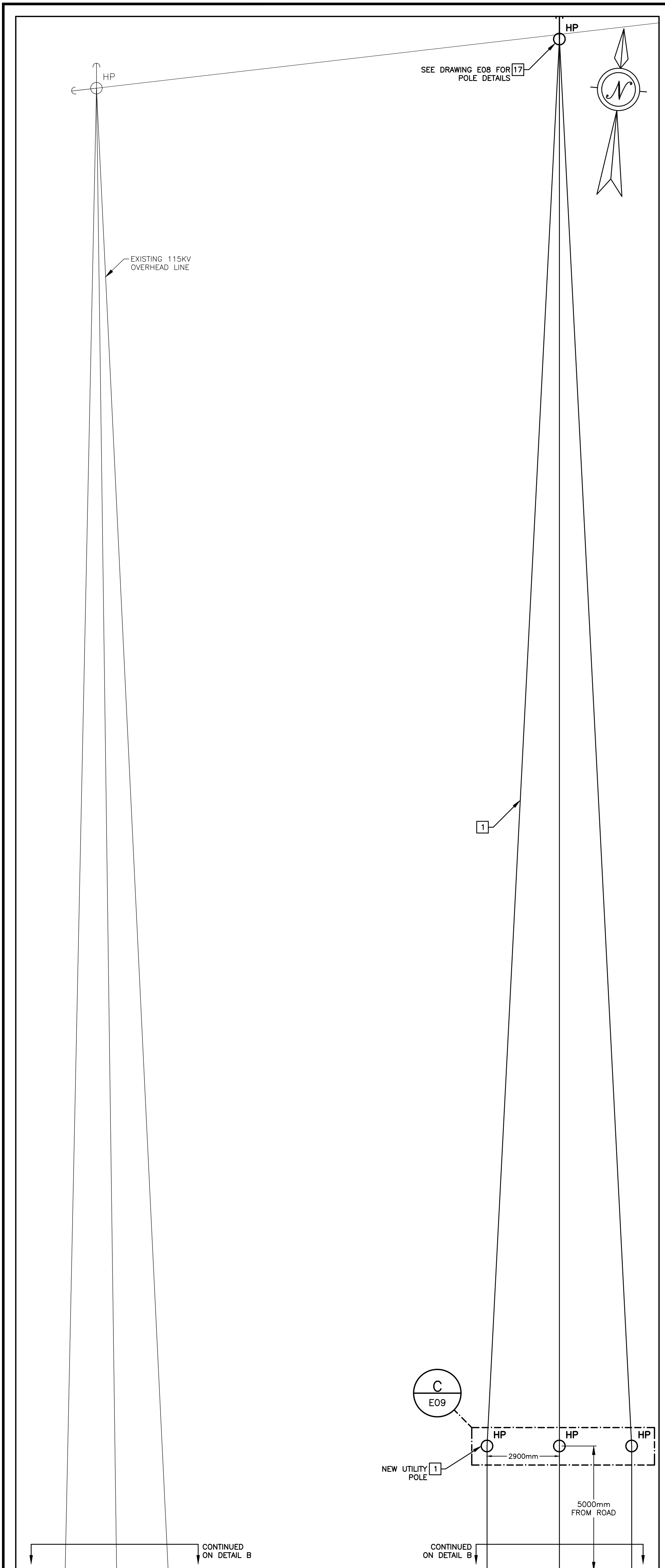
- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

A	A Detail no. No. du détail	A
B	B Location drawing no. sur dessin no.	B
C	C Drawing no. dessin no.	C

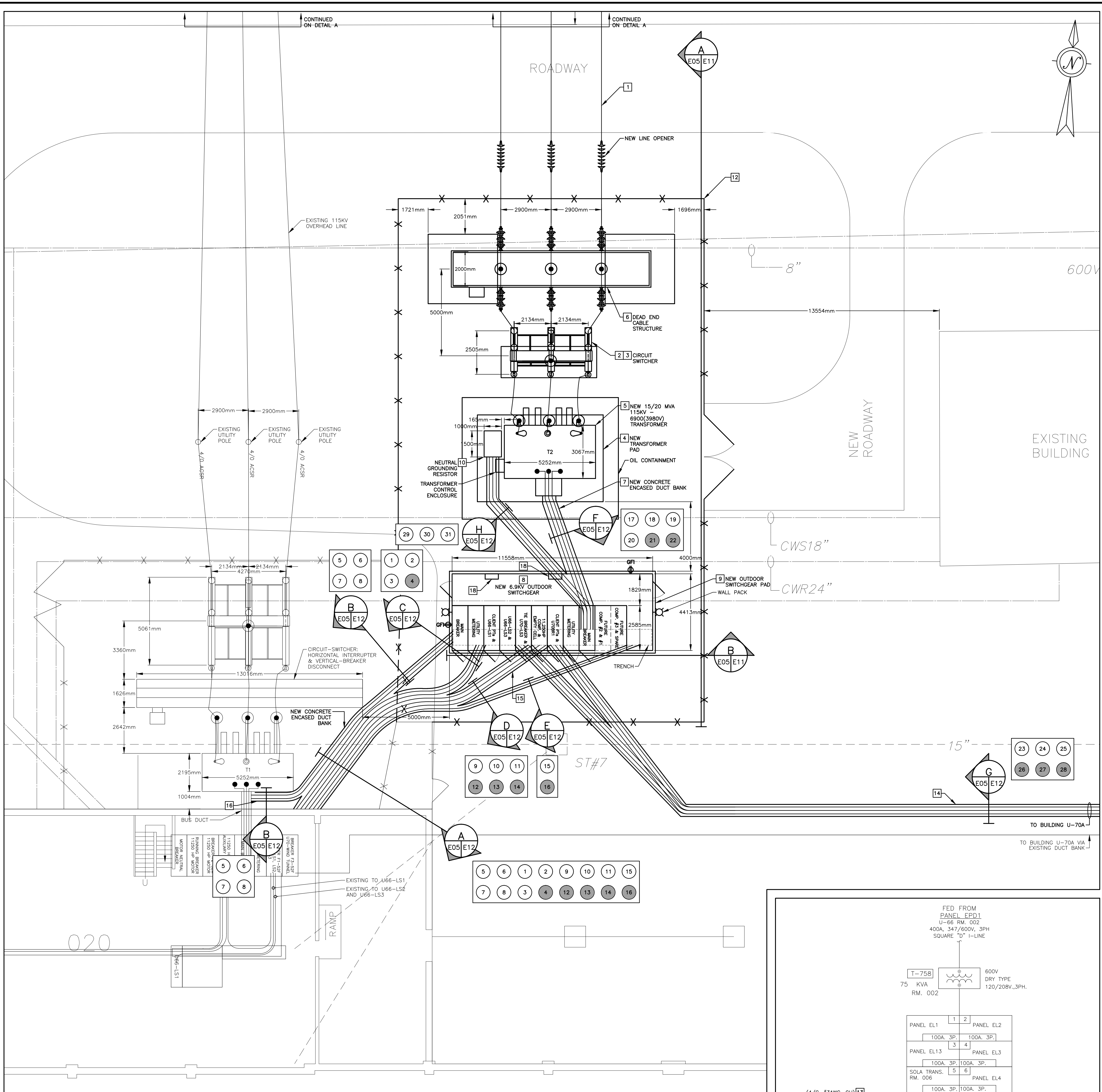
project: **BUILDING U-66
 NEW 115 KV OUTDOOR
 SUBSTATION**
 UPLANDS CAMPUS

drawing: **ELECTRICAL
 MEDIUM VOLTAGE SINGLE LINE
 DIAGRAM - FINAL**

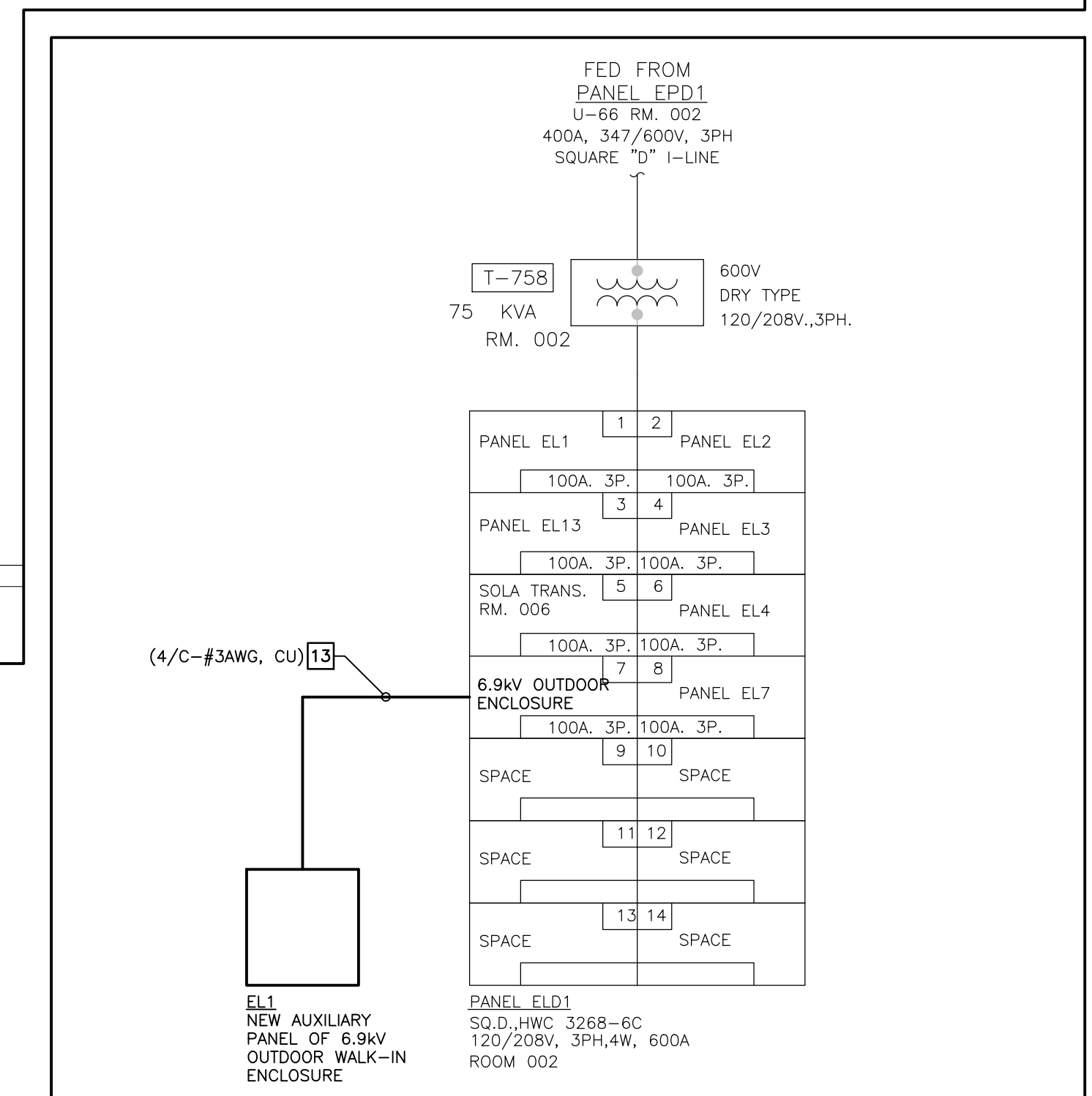
designed D. VAN GAAL	conçu D. VAN GAAL	date MARCH 2015	date	D-2642-E04
drawn H. SULLIVAN	dessiné H. SULLIVAN	scale N.T.S.	échelle	
checked P. DYCK	vérifié P. DYCK	sheet 5	of/du 23	
approved D. VAN GAAL	approuvé D. VAN GAAL	W.O.no. Stantec No: 163301846	D.T.no.	
dwg.no. D-5078-E04	dessin no.			



A 115kV POWER LINES
 E05 1:100



B 115kV SUBSTATION LAYOUT
 E05 1:100



C POWER FOR NEW OUTDOOR ENCLOSURE
 E05 N.T.S.

- GENERAL NOTES:**
- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN SOLID LINES.
 - EXCEPT AS NOTED OTHERWISE ALL EQUIPMENT TO BE DEMOLISHED IS SHOWN IN THICK DASHED LINES.
 - EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT IS SHOWN IN THICK SOLID LINES.
 - SHADED DUCTS IN DUCT BANK DETAILS DENOTE SPARE CONDUITS.
- DRAWING NOTES:**
- SUPPLY AND INSTALL NEW 115kV OVERHEAD LINE AND ASSOCIATED STRUCTURES.
 - SUPPLY AND INSTALL ALL STRUCTURAL FOUNDATIONS REQUIRED FOR INSTALLATION OF NEW 115kV CIRCUIT SWITCHER AS PER STRUCTURAL DRAWINGS.
 - SUPPLY AND INSTALL NEW 115kV CIRCUIT SWITCHER COMPLETE WITH MOTOR OPERATED LOAD BREAK.
 - SUPPLY AND INSTALL TRANSFORMER FOUNDATION AS PER STRUCTURAL DRAWINGS. SUPPLY AND INSTALL OIL CONTAINMENT SYSTEM FOR TRANSFORMER AS PER 'OLI-AGENT SOLUTION' DESIGN.
 - SUPPLY AND INSTALL NEW 15/20MVA, TRANSFORMER AND ASSOCIATED LIGHTNING ARRESTORS.
 - SUPPLY AND INSTALL NEW DEAD END 115kV OVERHEAD LINE STRUCTURE AS PER STRUCTURAL DRAWINGS.
 - SUPPLY AND INSTALL DUCT BANK AND CABLES FROM TRANSFORMER SECONDARY TO LINE SIDE OF MAIN 6.9kV BREAKER.
 - SUPPLY AND INSTALL NEW 6.9kV OUTDOOR WALK-IN ENCLOSURE AND ASSOCIATED SWITCHGEAR.
 - SUPPLY AND INSTALL FOUNDATION FOR NEW 6.9kV OUTDOOR WALK-IN ENCLOSURE AS PER STRUCTURAL DRAWINGS.
 - SUPPLY AND INSTALL NEW GROUND RESISTOR, GROUND RESISTOR TO BE SUPPORTED ON TRANSFORMER FOUNDATION.
 - REMOVE EXISTING SECTION OF SUBSTATION FENCE.
 - INSTALL NEW 115kV SUBSTATION FENCE.
 - SUPPLY AND INSTALL NEW DUCT AND ASSOCIATED CABLES FROM EXISTING PANEL EL1 TO AUXILIARY SUPPLY PANEL OF NEW 6.9kV OUTDOOR ENCLOSURE. ROUTE IN EMT AND UNDERGROUND DUCT AS REQUIRED.
 - SUPPLY AND INSTALL NEW CONCRETE ENCASED DUCT BANK FROM NEW 6.9kV SWITCHGEAR TO BUILDING U-70A.
 - SUPPLY AND INSTALL NEW DUCT BANK FROM FOUNDATION OF 6.9kV OUTDOOR SUBSTATION TO FOUNDATION OF BUILDING U66 AND PREPARE DUCTS FOR PASSAGE INTO BUILDING U66.
 - SUPPLY AND INSTALL DUCTS TO SECONDARY OF EXISTING TRANSFORMER T1.
 - CONNECT NEW 115kV OVERHEAD LINE TO EXISTING 115kV OVERHEAD LINE. PROVIDE AND INSTALL ALL REQUIRED DEAD END INSULATORS.
 - ENCLOSURE MANUFACTURER TO INSTALL METERING CABINETS 762mm x 762mm x 305mm SUPPLIED BY OTHERS.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 60% REVIEW	D.V.G

Date Printed: _____ Date Imprimée: _____
 • Verify all dimensions and site conditions and be responsible for same
 • Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

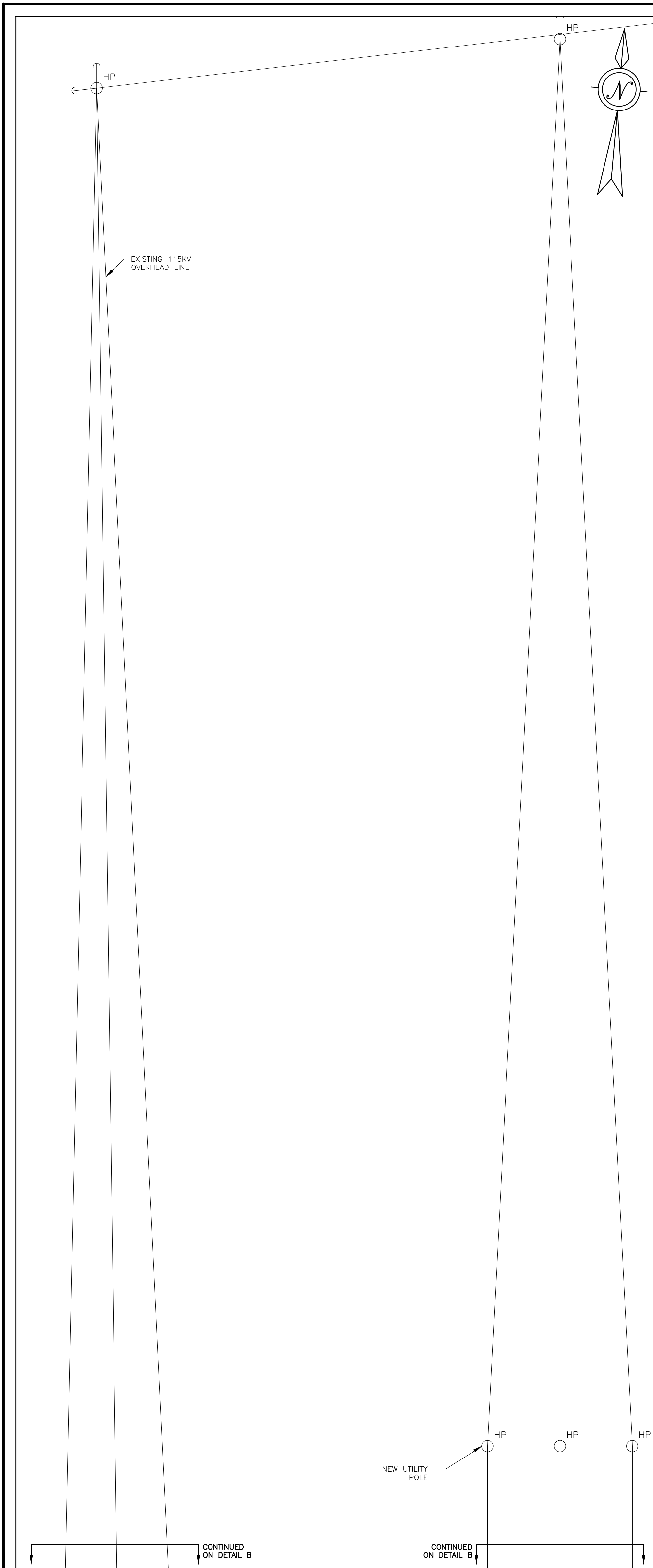
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C	B Location drawing no. sur dessin no.	B C
	C Drawing no. dessin no.	

PROJECT: **BUILDING U-66
 NEW 115 KV OUTDOOR
 SUBSTATION**
 UPLANDS CAMPUS

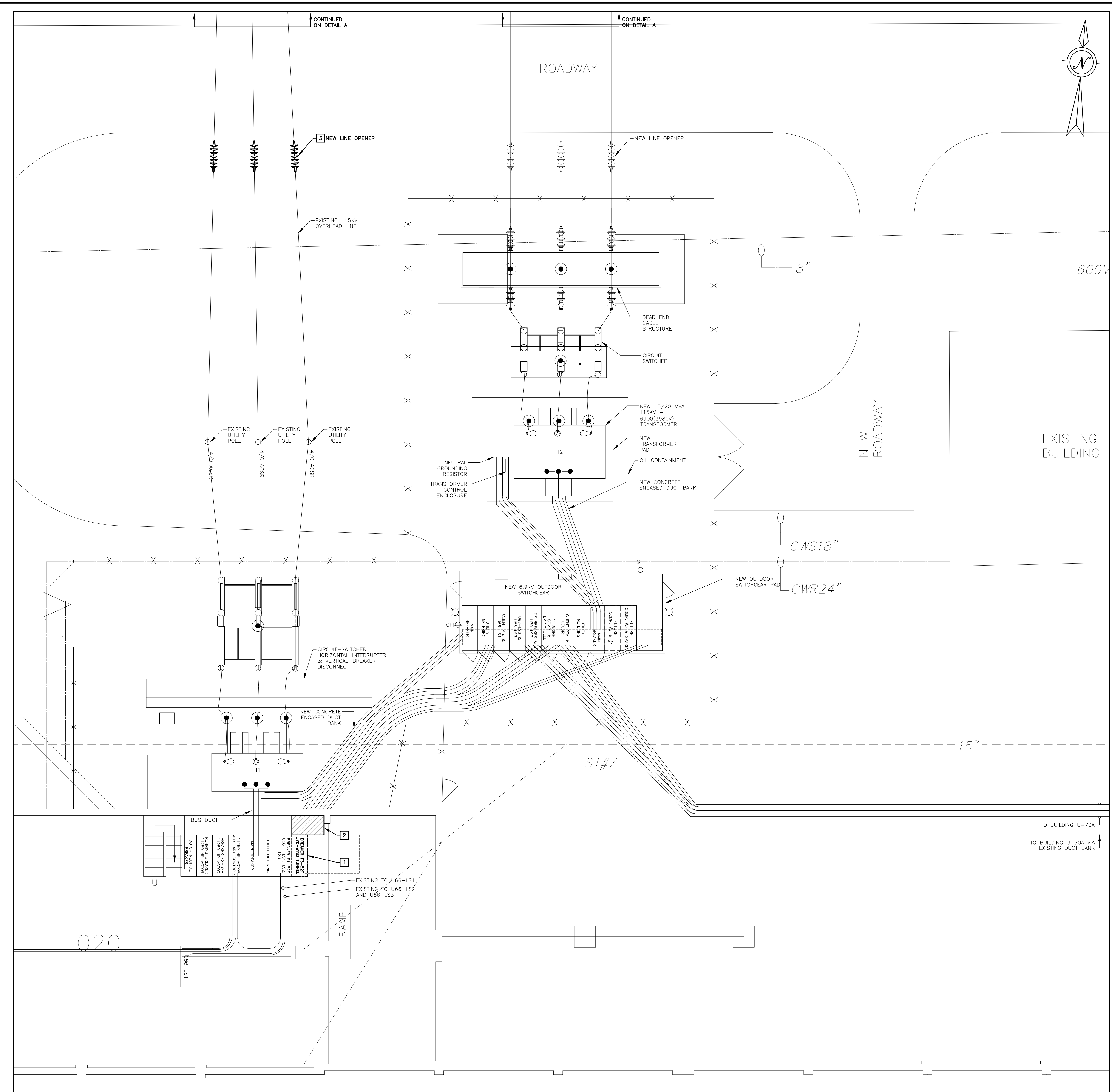
DRAWING: **ELECTRICAL
 115 KV SUBSTATION LAYOUT
 PHASE 1**

designed by	D. VAN GAAL	congrat	MARCH 2015	date	
drawn by	H. SULLIVAN	dessiné	AS SHOWN	échelle	
checked by	P. DYCK	vérifié	sheet 6	of/du	23
approved by	D. VAN GAAL	W.O.no.		D.T.no.	
dwg.no.		Stantec No.	163301846	dessin no.	
			D-5078-E05		

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 2015/07/23 11:22 AM by: h.sullivan, h.sullivan



A 115KV POWER LINES
E06 1:100



B 115KV SUBSTATION LAYOUT
E06 1:100

GENERAL NOTES:

- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN SOLID LINES.
- EXCEPT AS NOTED OTHERWISE ALL EQUIPMENT TO BE DEMOLISHED IS SHOWN IN THICK DASHED LINES.
- EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT IS SHOWN IN THICK SOLID LINES.

DRAWING NOTES:

- DURING COMPLETE FACILITY SHUTDOWN REMOVE EXISTING U-70A FEEDER BREAKER. REMOVE U-70A FEEDER BREAKER FROM EXISTING SWITCHGEAR BY REMOVING SHIPPING SPLITS AND SWITCHGEAR CELL. AFTER REMOVAL OF U-70A FEEDER BREAKER COVER OPENING CREATED AS A RESULT OF THE REMOVAL OF THE U-70A FEEDER BREAKER WITH A STEEL PLATE. GROUND STEEL PLATE TO SWITCHGEAR. HIPOUT SWITCHGEAR TO CONFIRM AN ADEQUATE INSULATION RATING IS MAINTAINED.
- DURING COMPLETE FACILITY SHUTDOWN SAW CUT AND TRENCH FLOOR BEHIND EXISTING SWITCHGEAR TO ALLOW ENTRY OF DUCT BANKS INTO U66. TRENCH TO BE 1000mm DEEP WITH A POURED CONCRETE FLOOR AND WALLS. TRENCH WALLS TO BE A MINIMUM 150mm THICK. TRENCH WALLS TO BE INTERCONNECTED WITH EXISTING FLOOR SLAB USING 10M REBAR. REBAR TO EXTEND 85mm INTO EXISTING FLOOR SLAB AND HELD IN PLACE WITH ADHESIVE ANCHORAGE HILTI HIT-HY 200.
- SUPPLY AND INSTALL NEW 115KV LINE OPENERS IN EXISTING 115KV OVERHEAD LINE DURING SYSTEM WIDE SHUTDOWN.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 66% REVIEW	D.V.G

Date Printed: _____ Date Imprimée: _____
 ● Verify all dimensions and site conditions and be responsible for same
 ● Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

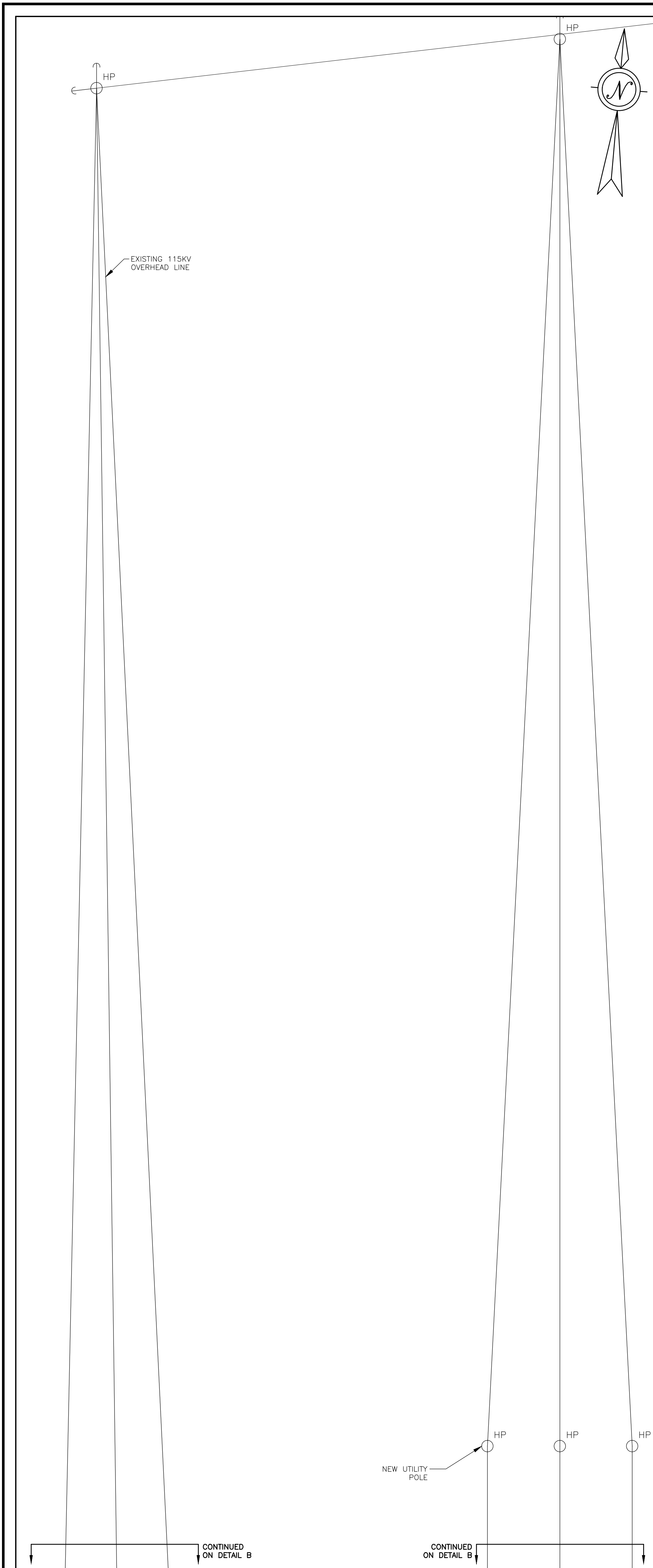
A	A Detail no. No. du détail	A
C	B Location drawing no. sur dessin no.	B C
C	C Drawing no. dessin no.	

project: **BUILDING U-66
NEW 115 KV OUTDOOR
SUBSTATION**
 UPLANDS CAMPUS

drawing: **ELECTRICAL
115 KV SUBSTATION LAYOUT
PHASE 2**

designed D. VAN GAAL	conçu MARCH 2015	date	scale AS SHOWN	échelle
drawn H. SULLIVAN	dessiné	scale	sheet 7	feuille 23
checked P. DYCK	vérifié	W.O.no.	D.T.no.	
approved D. VAN GAAL	approuvé	W.O.no. Stantec No: 163301846	D.T.no.	
dwg.no. D-5078-E06	dessin no.			

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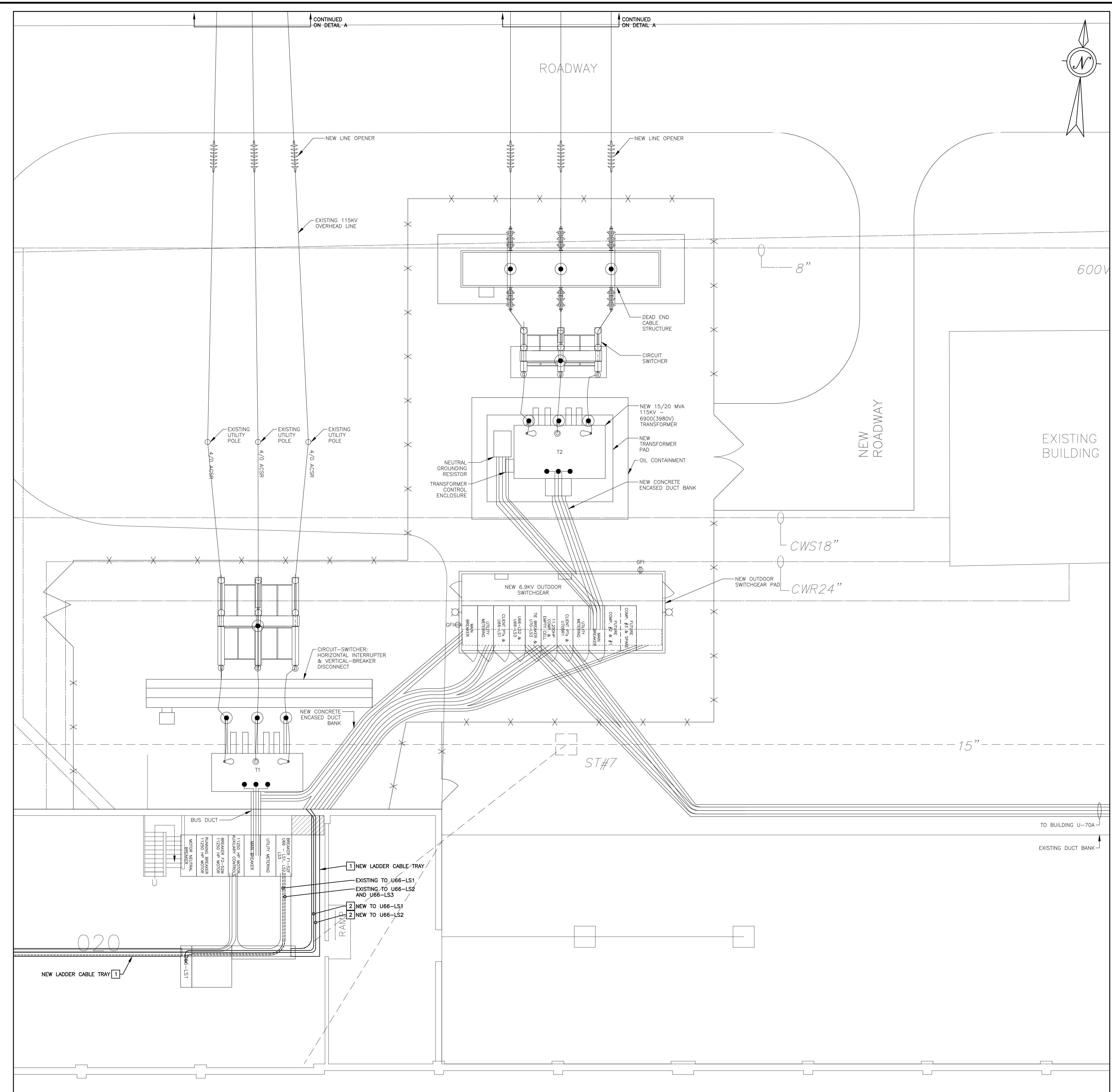
A 115KV POWER LINES
E07 1:100

GENERAL NOTES:

- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN SOLID LINES.
- EXCEPT AS NOTED OTHERWISE ALL EQUIPMENT TO BE DEMOLISHED IS SHOWN IN THICK DASHED LINES.
- EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT IS SHOWN IN THICK SOLID LINES.

DRAWING NOTES:

- SUPPLY AND INSTALL NEW 304.8mm LADDER CABLE TRAY FROM NEW CABLE PIT TO EXISTING CABLE PIT LOCATED IN SOUTHWEST CORNER OF ROOM 020. REFER TO DRAWING E10.
- ROUTE NEW FEEDER CABLES FROM RESPECTIVE FEEDER BREAKERS OF 6.9KV SWITCHGEAR TO LOAD BREAK SWITCHES U66-LS1, U66-LS2, AND U66-LS3.



B 115KV SUBSTATION LAYOUT
E07 1:100

National Research Council Canada / Conseil national de recherche Canada
Administrative Services and Property Management Branch / Division des services administratifs et gestion de l'immobilier

NRC - CNRC

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON Canada K2C 3G4
Tel: 613.722.4420
Fax: 613.722.2799
www.stantec.com

No.	Date	Revision	By	Appr.
C	15.07.23	RE-ISSUED FOR TENDER		D.V.G
C	15.07.17	ISSUED FOR TENDER		D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW		D.V.G
A	15.03.31	ISSUED FOR 60% REVIEW		D.V.G

Date Printed: _____ Date Imprimée: _____

● Verify all dimensions and site conditions and be responsible for same
● Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

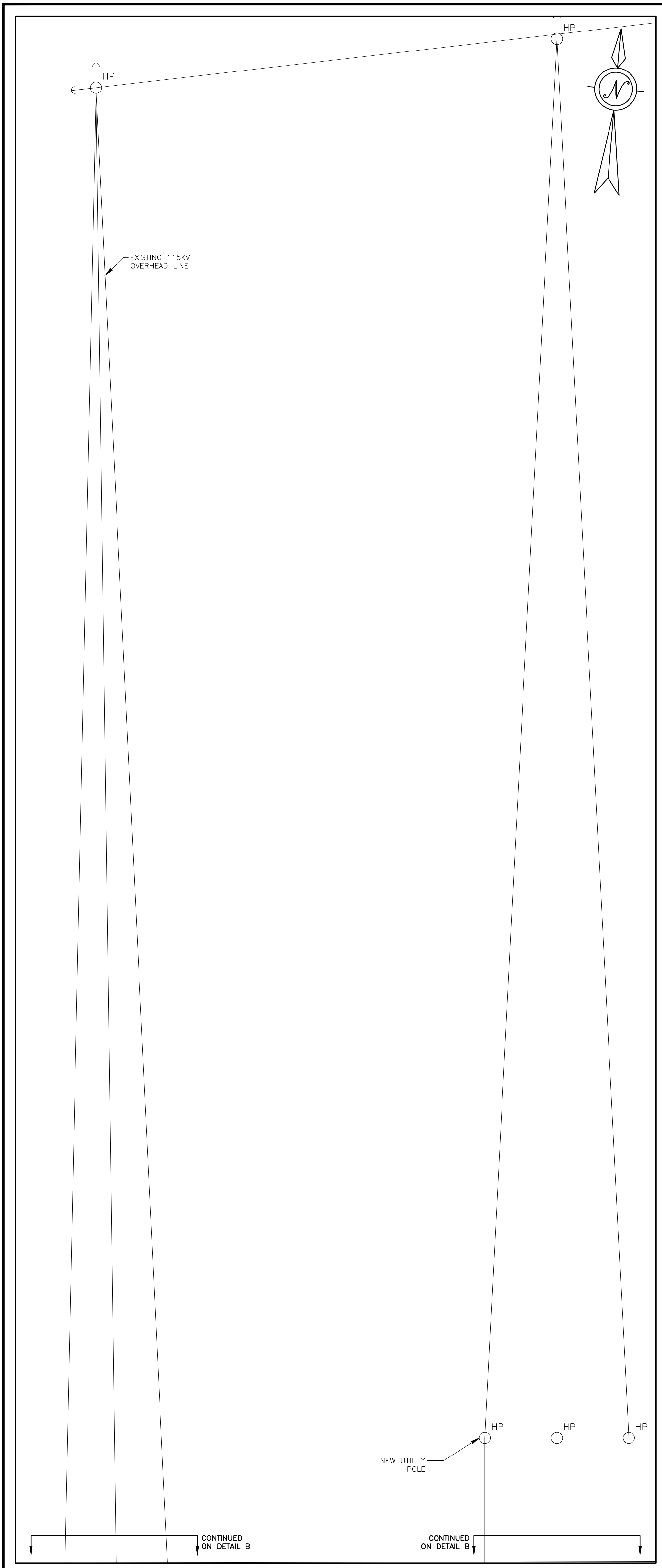
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B	B Location drawing no. sur dessin no.	B C
C	C Drawing no. dessin no.	

project: **BUILDING U-66
NEW 115 KV OUTDOOR
SUBSTATION**
UPLANDS CAMPUS

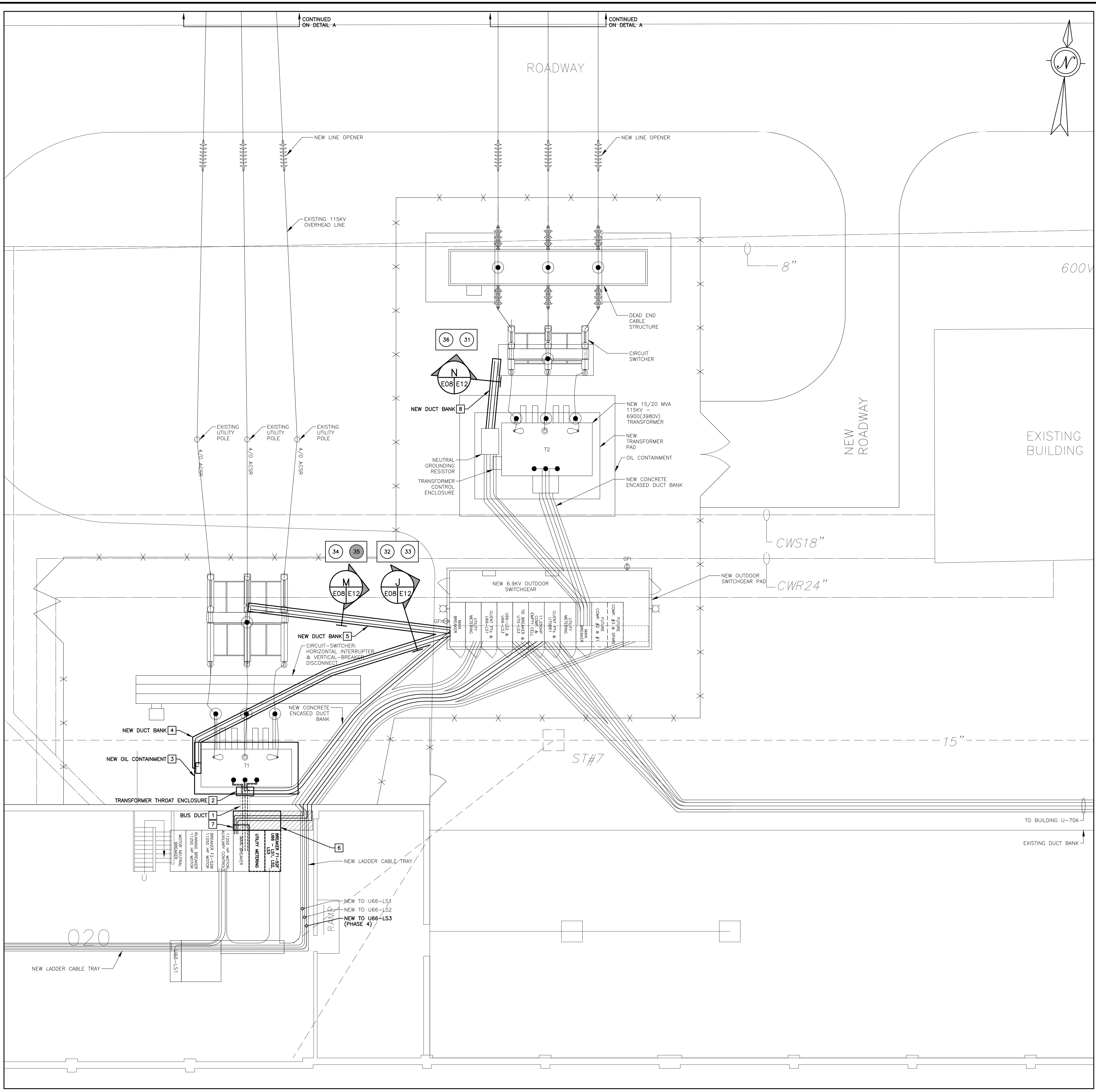
drawing: **ELECTRICAL
115 KV SUBSTATION LAYOUT
PHASE 3**

designed D. VAN GAAL	conçu D. VAN GAAL	date MARCH 2015	scale AS SHOWN	sheet 8	of/da 23
drawn H. SULLIVAN	dessiné H. SULLIVAN	checked P. DYCK	verified P. DYCK	approved D. VAN GAAL	approved D. VAN GAAL
dwg.no. D-5078-E07	Shantec No: 163301846	D-2642-E07			
D-5078-E07					

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2015/07/23 11:22 AM by: h.sullivan, h.sullivan



A 115KV POWER LINES
E08 1:100



B 115KV SUBSTATION LAYOUT
E08 1:100

- GENERAL NOTES:**
- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN SOLID LINES.
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 - EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT IS SHOWN IN THICK SOLID LINES.
 - SHADED DUCTS IN DUCT BANK DETAILS DENOTE SPARE CONDUITS.

- DRAWING NOTES:**
- ONCE ALL EXISTING LOADS ARE TRANSFERRED FROM THE EXISTING 6.9KV SWITCHGEAR TO THE NEW 6.9KV SWITCHGEAR, WITH THE EXCEPTION OF THE 11250HP COMPRESSOR, DISCONNECT AND REMOVE EXISTING 6.9KV BUS DUCT.
 - SUPPLY AND INSTALL NEW TRANSFORMER THROAT ENCLOSURE TO ALLOW FOR TERMINATION OF NEW SECONDARY FEEDER CABLES AT TRANSFORMER SECONDARY AND AT NEW 6.9KV MAIN BREAKER.
 - DURING SCHEDULED SHUTDOWN COMPLETE INSTALLATION OF OIL CONTAINMENT SYSTEM FOR TRANSFORMER T1.
 - SUPPLY AND INSTALL NEW DUCT BANK FROM CONTROL BOX OF TRANSFORMER T1 TO MAIN BREAKER TO ACCOMMODATE ROUTING OF CURRENT TRANSFORMER WIRES AND TRANSFORMER ALARM WIRES FROM TRANSFORMER TO MAIN BREAKER. ROUTE DUCT TO AVOID EXISTING GANTRY FOUNDATION.
 - SUPPLY AND INSTALL NEW DUCT BANK FROM NEW 6.9KV OUTDOOR SWITCHGEAR TO CONTROL BOX OF EXISTING 115KV CIRCUIT SWITCHER TO HOUSE STATUS AND TRIP SIGNAL WIRES.
 - EXTEND CABLE TRENCH TO EXISTING MAIN BREAKER, CONSTRUCTION OF TRENCH TO MATCH REQUIREMENTS STATED ON DRAWING E08.
 - INSTALL NEW METAL ENCLOSED CELL IN REAR OF SWITCHGEAR TO EXTEND EXISTING SWITCHGEAR AS REQUIRED TO PERMIT TERMINATION OF NEW CABLES.
 - SUPPLY AND INSTALL NEW DUCT BANK FROM NEW GROUND RESISTOR TO NEW 115KV CIRCUIT SWITCHER TO HOUSE CIRCUIT SWITCHER AUXILIARY WIRES.

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 400 - 1331 Clyde Avenue Tel. 613.722.4420
 Ottawa ON Canada Fax. 613.722.2799
 K2C 3G4 www.stantec.com

No.	Date	Revision	By	Appr.
C	15.07.23	RE-ISSUED FOR TENDER		D.V.G
C	15.07.17	ISSUED FOR TENDER		D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW		D.V.G
A	15.03.31	ISSUED FOR 60% REVIEW		D.V.G

Date Printed: _____ Date Imprimée: _____

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- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

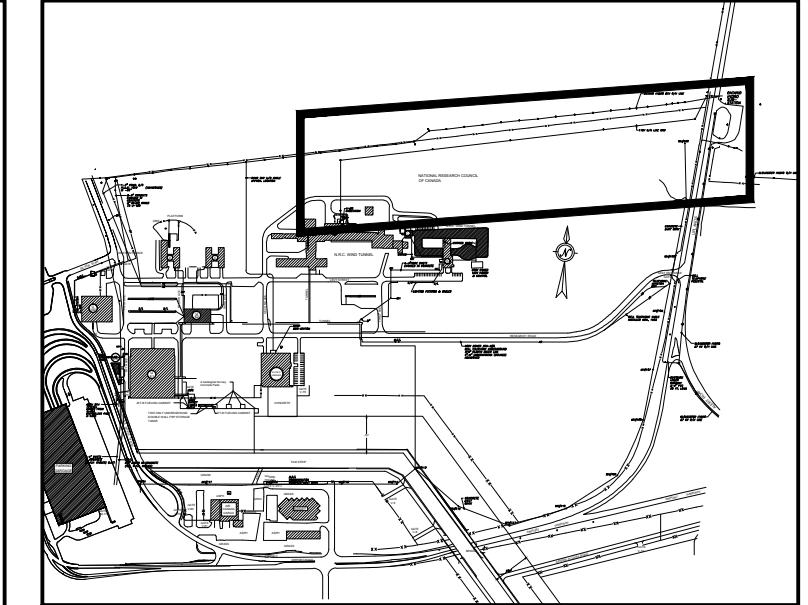
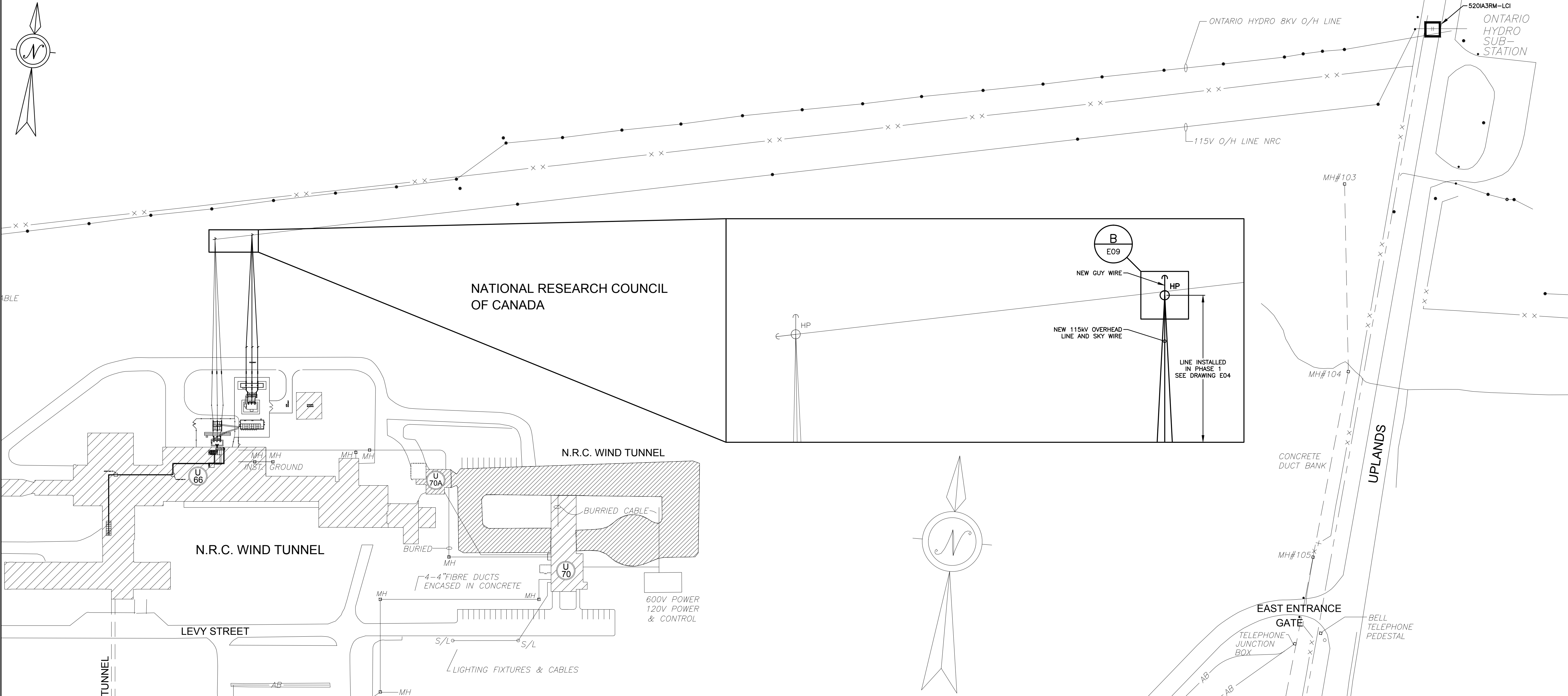
A	A Detail no. No. du détail	A
C	B Location drawing no. sur dessin no.	B C
	C Drawing no. dessin no.	

PROJECT: **BUILDING U-66
NEW 115 KV OUTDOOR
SUBSTATION**
 UPLANDS CAMPUS

DRAWING: **ELECTRICAL
115 KV SUBSTATION LAYOUT
PHASE 4 AND 5**

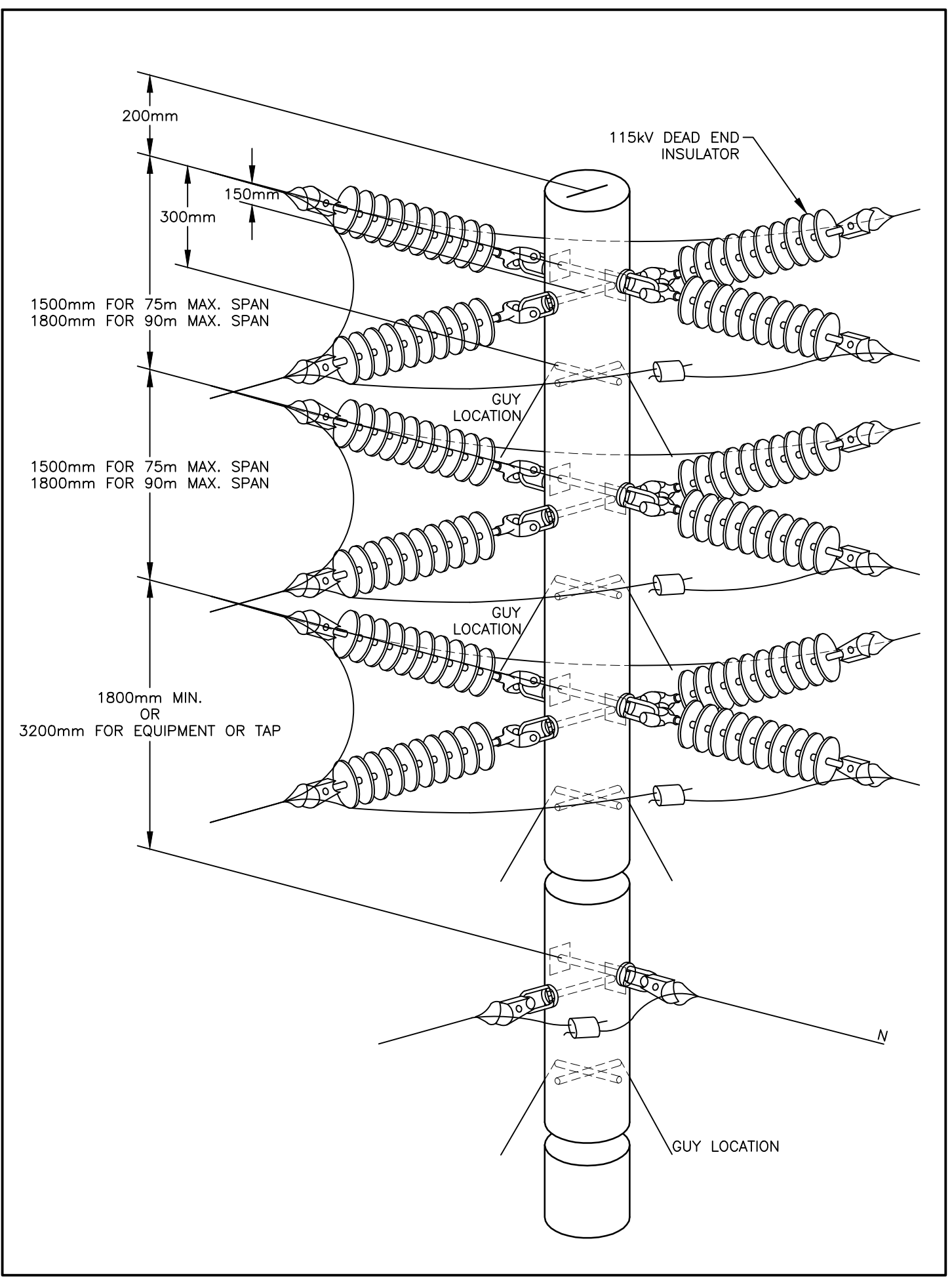
designed	checked	date	scale
D. VAN GAAL	P. DYCK	MARCH 2015	AS SHOWN
drawn	checked	sheet	of/da
H. SULLIVAN	P. DYCK	9	23
approved	approved	W.O.no.	D.T.no.
D. VAN GAAL	D. VAN GAAL		
dwg.no.	Shantec No:	163301846	
D-5078-E08	dessin no.		

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 2015/07/23 11:22 AM by: h.sullivan, h.sullivan
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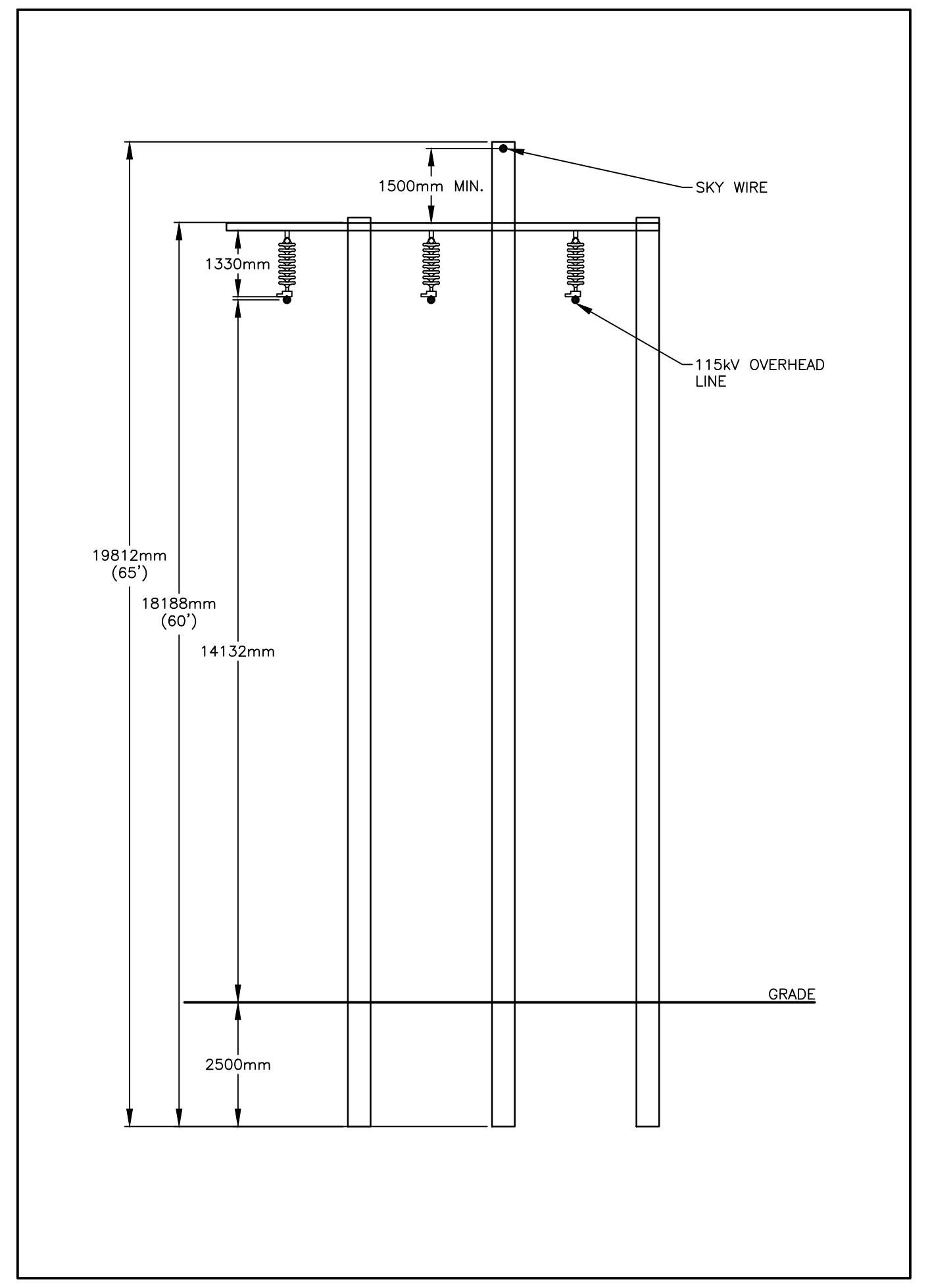


LOCALITY PLAN
N.T.S.

115kV OVERHEAD LINE
1:1000



B NEW 115KV 3-PHASE LINE DETAIL
N.T.S.



C TYPICAL 115KV OVERHEAD LINE - POLE DETAIL
N.T.S.

- GENERAL NOTES:**
- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN SOLID LINES.
 - EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT IS SHOWN IN THICK SOLID LINES.
 - SHADED DUCTS IN DUCT BANK DETAILS DENOTE SPARE CONDUITS.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 60% REVIEW	D.V.G

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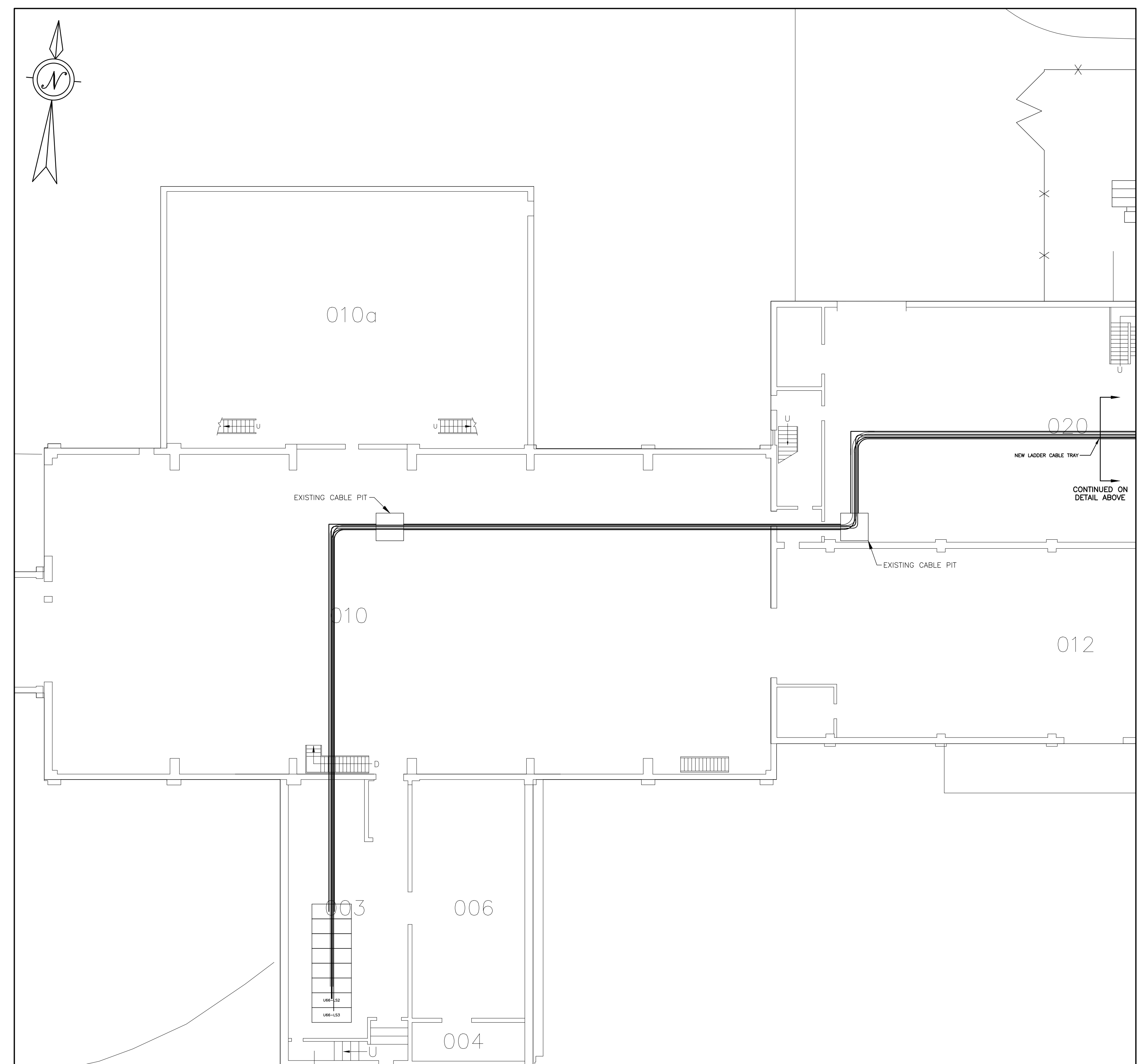
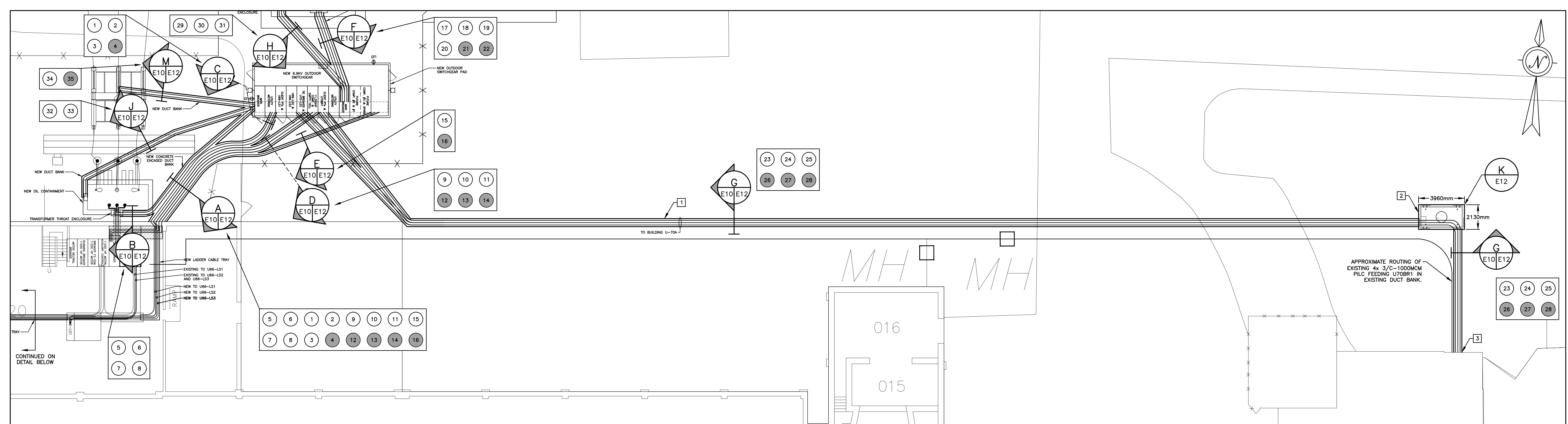
A	A Detail no. No. du détail	A
C	B Location drawing no. sur dessin no.	B C
	C Drawing no. dessin no.	

project: **BUILDING U-66
NEW 115 KV OUTDOOR
SUBSTATION**
UPLANDS CAMPUS

drawing: **ELECTRICAL
115KV OVERHEAD LINE
ROUTE AND DETAILS**

designed D. VAN GAAL	conçu D. VAN GAAL	date MARCH 2015	date	D-2642-E09
drawn H. SULLIVAN	dessiné H. SULLIVAN	scale AS SHOWN	échelle	
checked P. DYCK	vérifié P. DYCK	sheet 10	of/du 23	
approved D. VAN GAAL	approuvé D. VAN GAAL	W.O.no. Shantec No: 163301846	D.T.no.	
dwg.no. D-5078-E09	dessin no.			

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2015/07/23 11:28 AM by: h.sullivan, techn



- GENERAL NOTES:**
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 - EXCEPT AS NOTED OTHERWISE ALL EQUIPMENT TO BE DEMOLISHED IS SHOWN IN THICK DASHED LINES.
 - EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT IS SHOWN IN THICK SOLID LINES.
 - SHADED DUCTS IN DUCT BANK DETAILS DENOTE SPARE CONDUITS.
- DRAWING NOTES:**
- SUPPLY AND INSTALL NEW CONCRETE ENCASED DUCT BANK FROM BASE OF 6.9KV OUTDOOR SWITCHGEAR TO BUILDING U-70A. DUCTS TO BE ROUTED PARALLEL TO EXISTING DUCT BANK, SPACED 500mm APART. RE-INSTATE SURFACES TO EQUAL OR BETTER CONDITION.
 - SUPPLY AND INSTALL NEW MANHOLE, SIZED 2280mm (H) x 3660mm (L) x 1830mm (W) INSIDE DIMENSIONS. RE-INSTATE SURFACES TO EQUAL OR BETTER CONDITION.
 - DURING SCHEDULED SHUTDOWN REMOVE EXISTING DUCT BANK, TERMINATE NEW DUCT BANK TO BUILDING U-70A FOUNDATION. CONNECT NEW DUCT BANK TO EXISTING PENETRATIONS OF EXISTING DUCT BANK. RE-INSTATE SURFACES TO EQUAL OR BETTER CONDITION.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 66% REVIEW	D.V.G
No.	Date	Revision	By / Ppr.

Date Printed: _____ Date Imprimée: _____
 ● Verify all dimensions and site conditions and be responsible for same
 ● Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

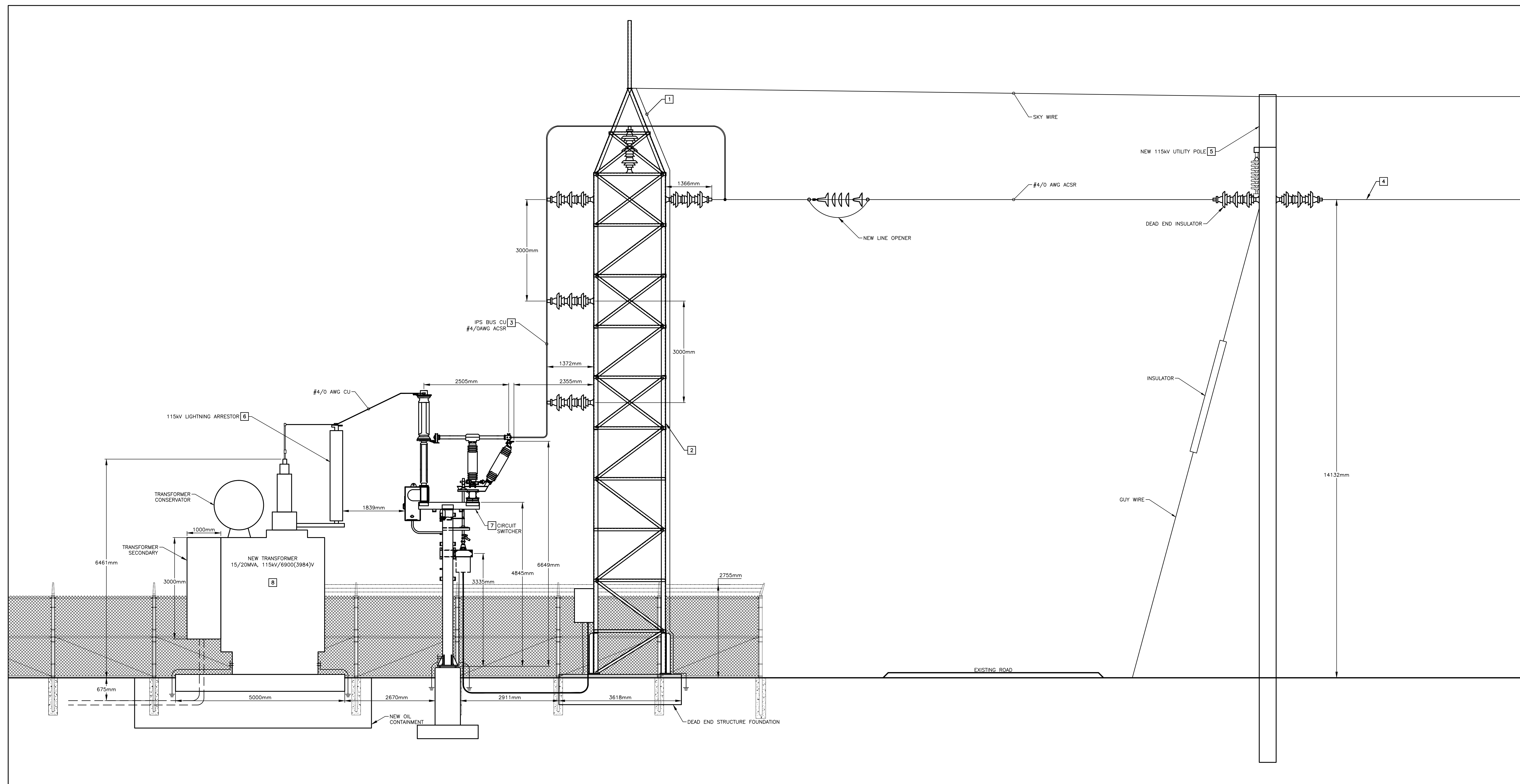
A	A Detail no. No. du détail	A
C	B Location drawing no. sur dessin no.	B C
	C Drawing no. dessin no.	

project: **BUILDING U-66**
NEW 115 KV OUTDOOR
SUBSTATION
 UPLANDS CAMPUS

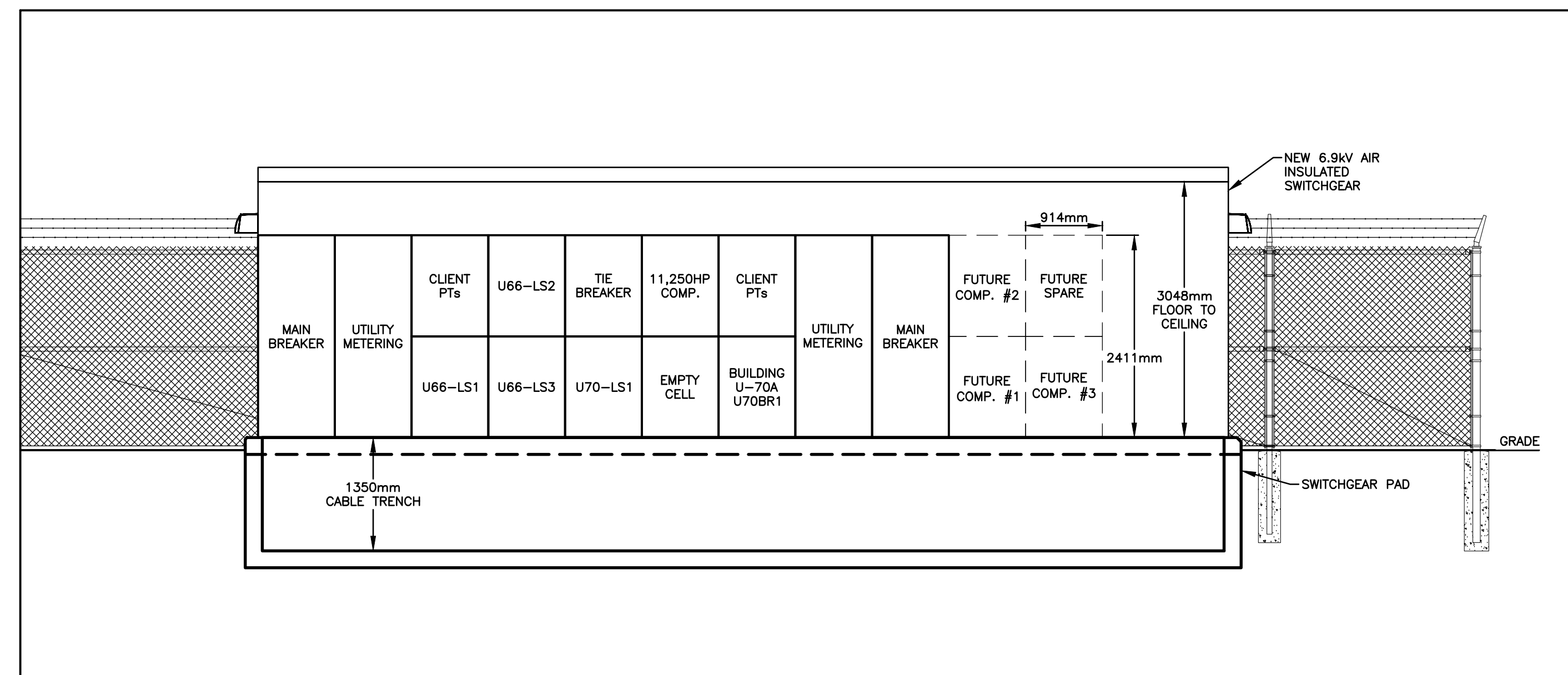
drawing: **ELECTRICAL**
6.9KV DUCT BANK ROUTE
AND DETAILS

designed D. VAN GAAL	conçu D. VAN GAAL	date MARCH 2015	date MARCH 2015	D-2642-E10 sheet no. dessin no.
drawn H. SULLIVAN	dessiné H. SULLIVAN	scale N.T.S.	échelle N.T.S.	
checked P. DYCK	vérifié P. DYCK	sheet 11	of/du 23	
approved D. VAN GAAL	W.O.no. D. VAN GAAL	D.T.no. D. VAN GAAL		
dwg.no. D-5078-E10	Shantec No: 163301846	Stantec No: 163301846	dessin no. D-5078-E10	

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 2015/07/23 11:26 AM by: h.sullivan, technicien



A CROSS SECTIONAL VIEW OF 115 KV SUBSTATION - NEW EQUIPMENT
 E05 1:50



B CROSS SECTIONAL VIEW OF 6.9KV SUBSTATION - NEW EQUIPMENT
 E05 1:50

- DRAWING NOTES:**
- SUPPLY AND INSTALL LIGHTNING RODS ON TOP OF NEW 115KV DEAD END STRUCTURE. GROUND LIGHTNING RODS TO 115KV SUBSTATION GROUND GRID WITH A MINIMUM OF #1AWG BARE COPPER CONDUCTORS. INSTALL A MINIMUM OF TWO (2) #1AWG BARE COPPER CONDUCTORS FOR EACH LIGHTNING ROD ROUTED DOWN OPPOSITE SIDES OF STRUCTURE. BOND DOWN CONDUCTORS TO STRUCTURE AT 1.5m INTERVALS.
 - SUPPLY, INSTALL, AND CONSTRUCT 115KV DEAD END STRUCTURE AS PER STRUCTURAL DRAWINGS.
 - SUPPLY AND INSTALL IPS BUS OVER AND DOWN 115KV DEAD END STRUCTURE. TERMINATE IPS BUS TO LINE SIDE OF CIRCUIT SWITCHER. IPS BUS TO BE SUPPORTED DOWN STRUCTURE EVERY 3 METRES.
 - INITIAL TENSION ON LINE MUST BE 10.9kN FOR EACH CONDUCTOR.
 - SUPPLY AND INSTALL NEW WOODEN UTILITY POLE AND ASSOCIATED DEAD END INSULATORS. REFER TO DETAIL C ON DRAWING E09.
 - SUPPLY AND INSTALL NEW 115KV LIGHTNING ARRESTORS ON NEW 15/20MVA TRANSFORMER. LIGHTNING ARRESTOR MUST BE MOUNTED ON TRANSFORMER WITH FACTORY MADE SUPPORT STRUCTURE INSTALLED BY TRANSFORMER MANUFACTURER.
 - SUPPLY AND INSTALL NEW 115KV CIRCUIT SWITCHER WITH INTEGRATED DISCONNECT AND ASSOCIATED SUPPORT STRUCTURES.
 - SUPPLY AND INSTALL NEW 15/20MVA TRANSFORMER AND ASSOCIATED SUPPORT STRUCTURES.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 60% REVIEW	D.V.G

Date Printed: _____ Date Imprimée: _____

- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

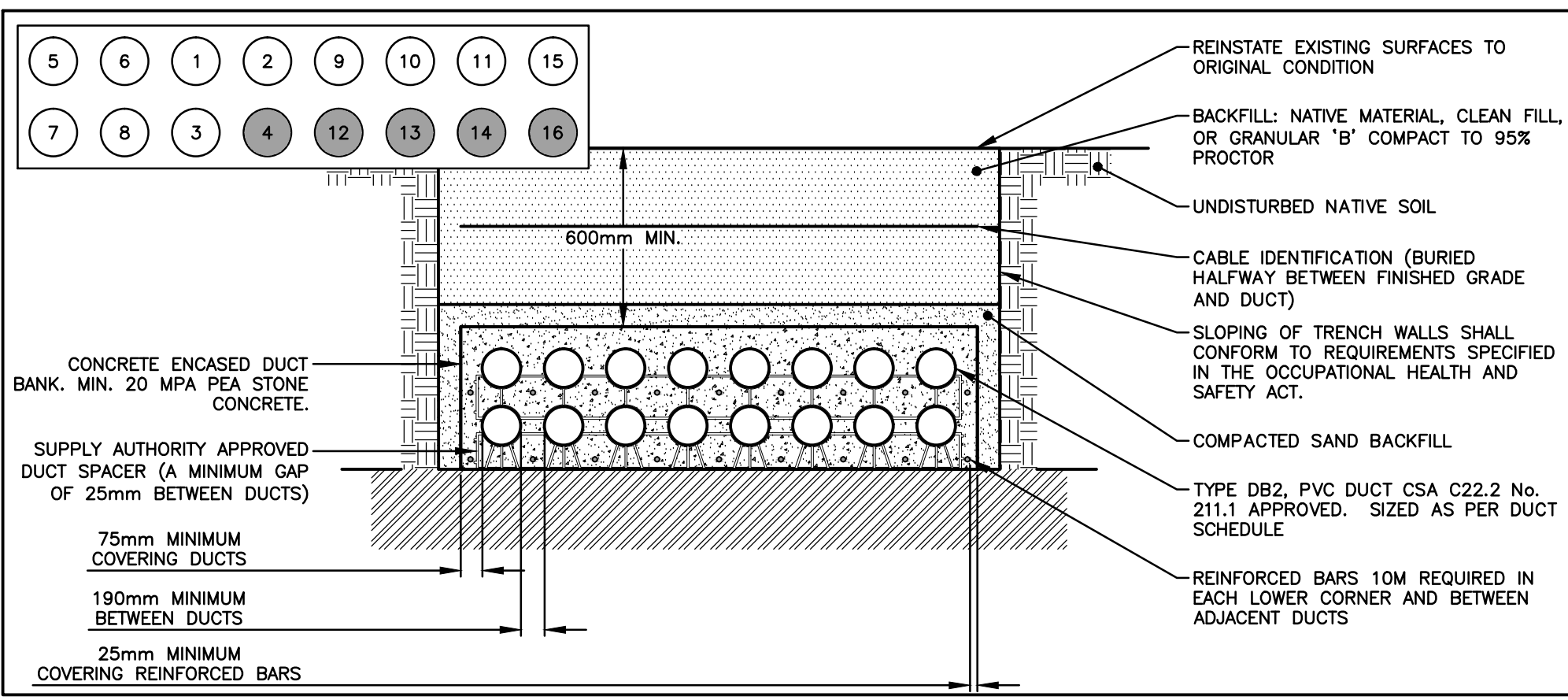
A	A Detail no. / No. du détail	A
C	B Location drawing no. / sur dessin no.	B C
	C Drawing no. / dessin no.	

project: **BUILDING U-66
 NEW 115 KV OUTDOOR
 SUBSTATION**
 UPLANDS CAMPUS

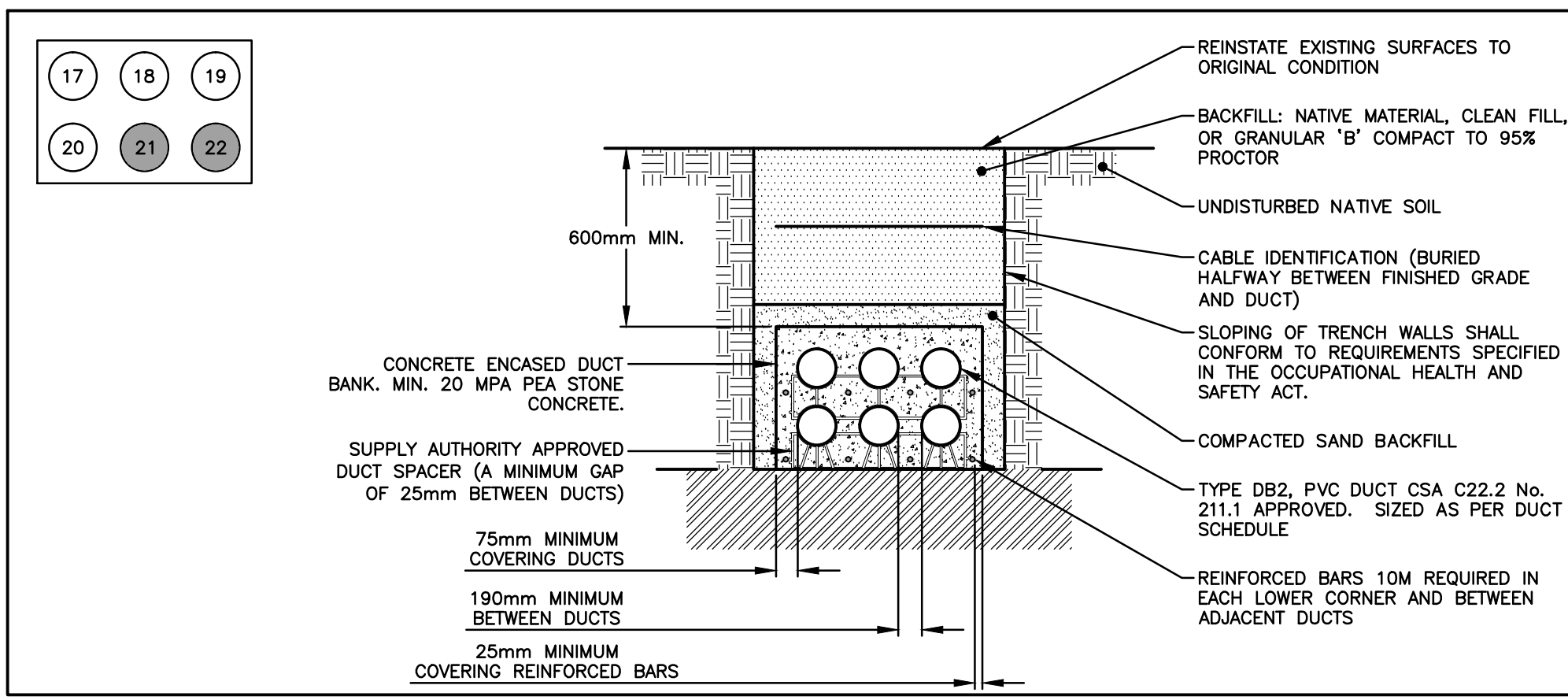
drawing: **ELECTRICAL
 115 KV SUBSTATION
 ELEVATIONS**

designed	D. VAN GAAL	conçu	DATE	MARCH 2015	date
drawn	H. SULLIVAN	dessiné	scale	AS SHOWN	échelle
checked	P. DYCK	vérifié	sheet	12 of 23	feuille
approved	D. VAN GAAL	approuvé	W.O.no.		D.T.no.
dwg.no.	D-5078-E11	Shantec No:	163301846		
		dwg.no.			

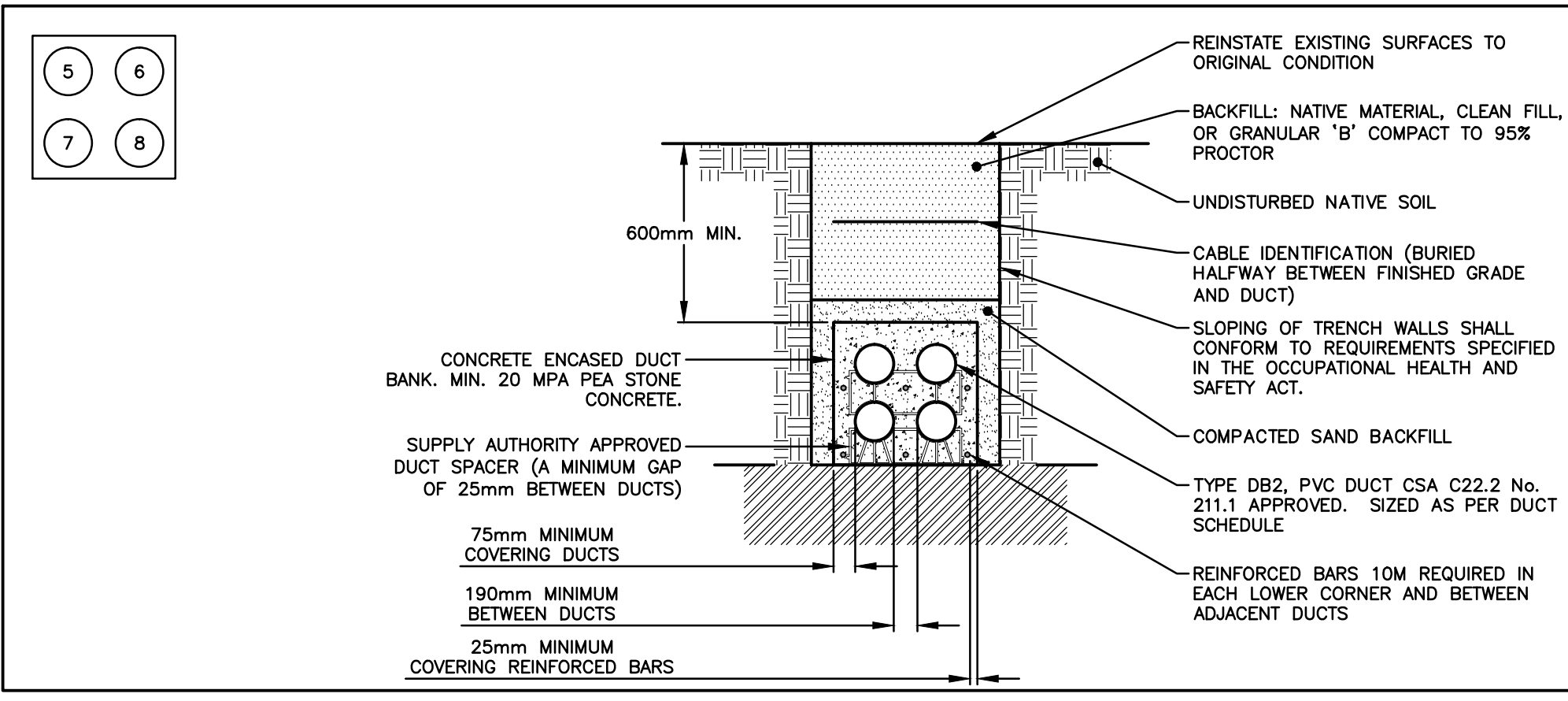
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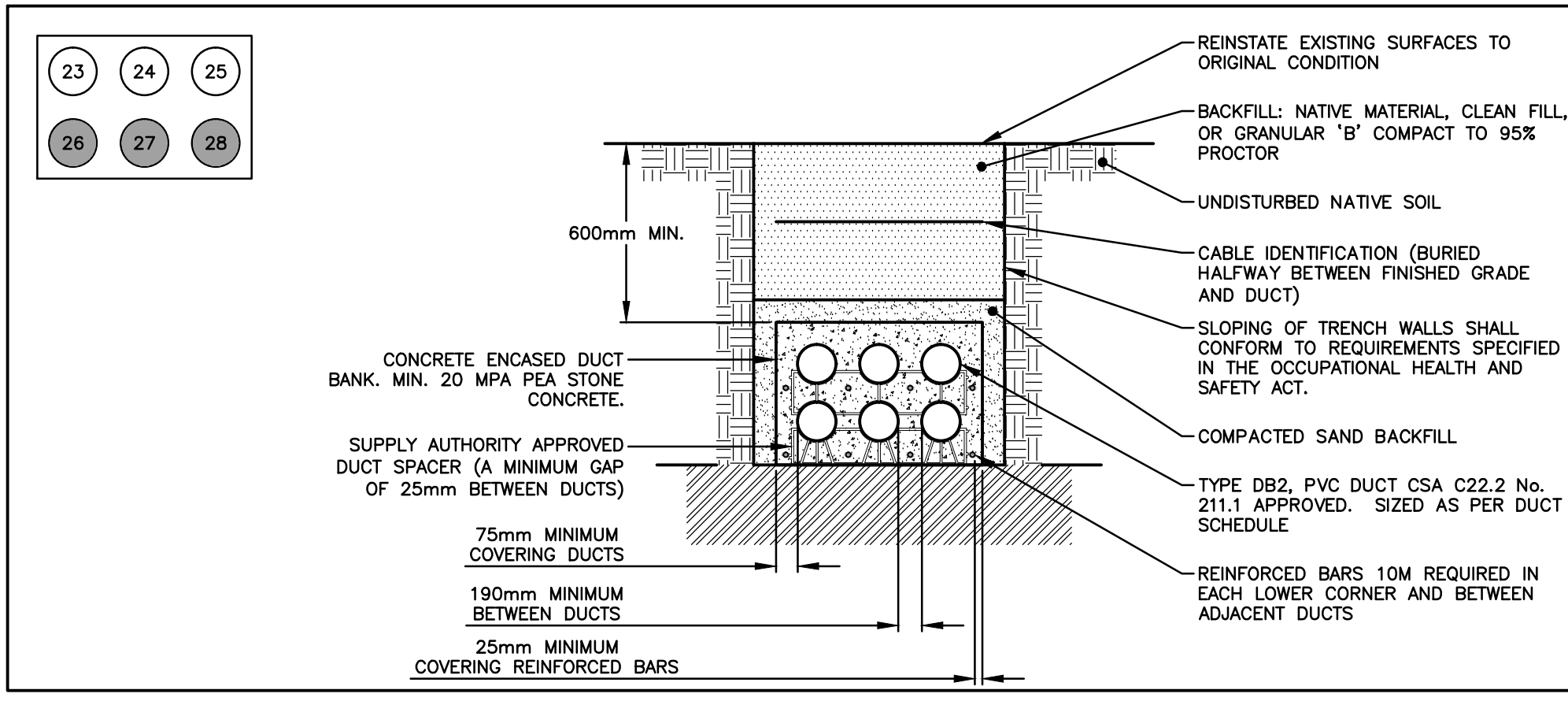
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E05 N.T.S.



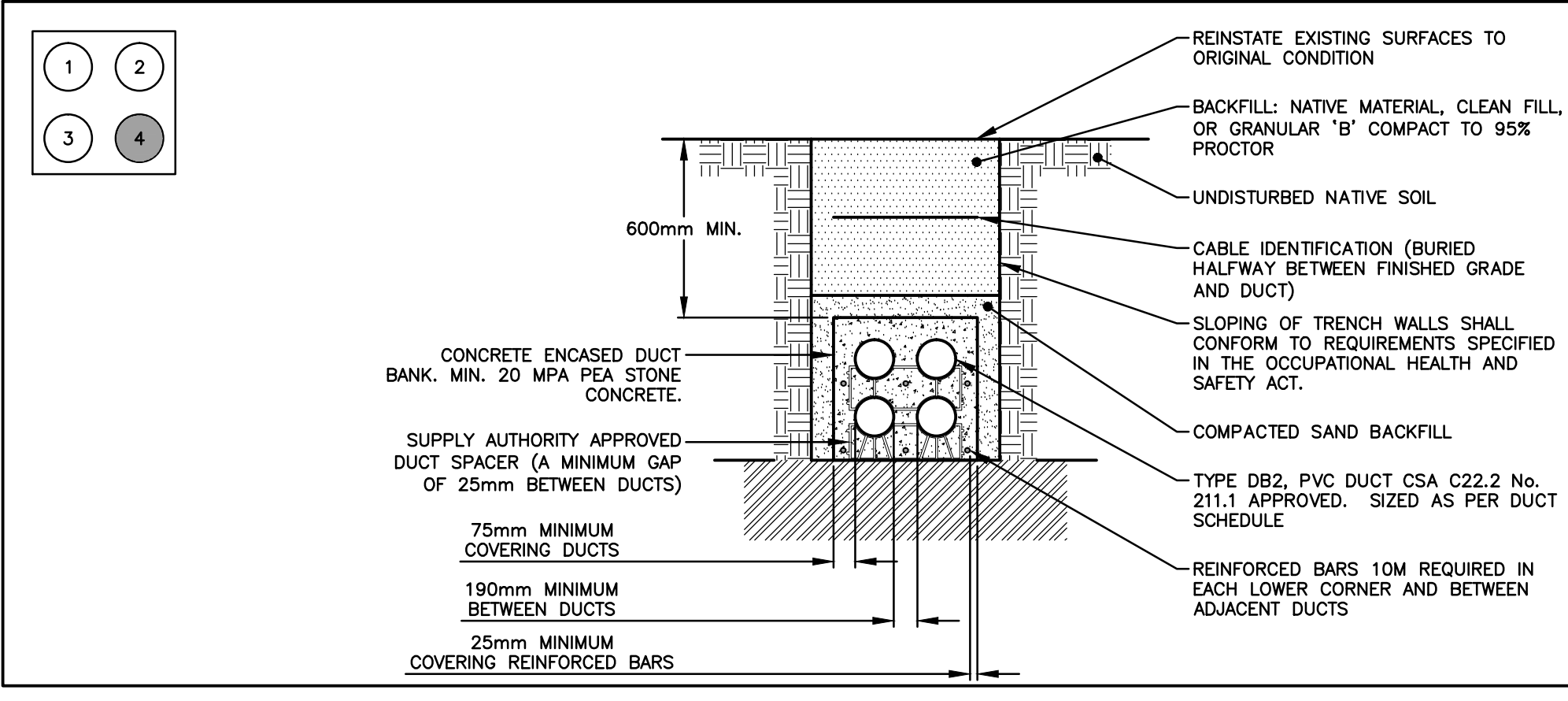
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E05 N.T.S.



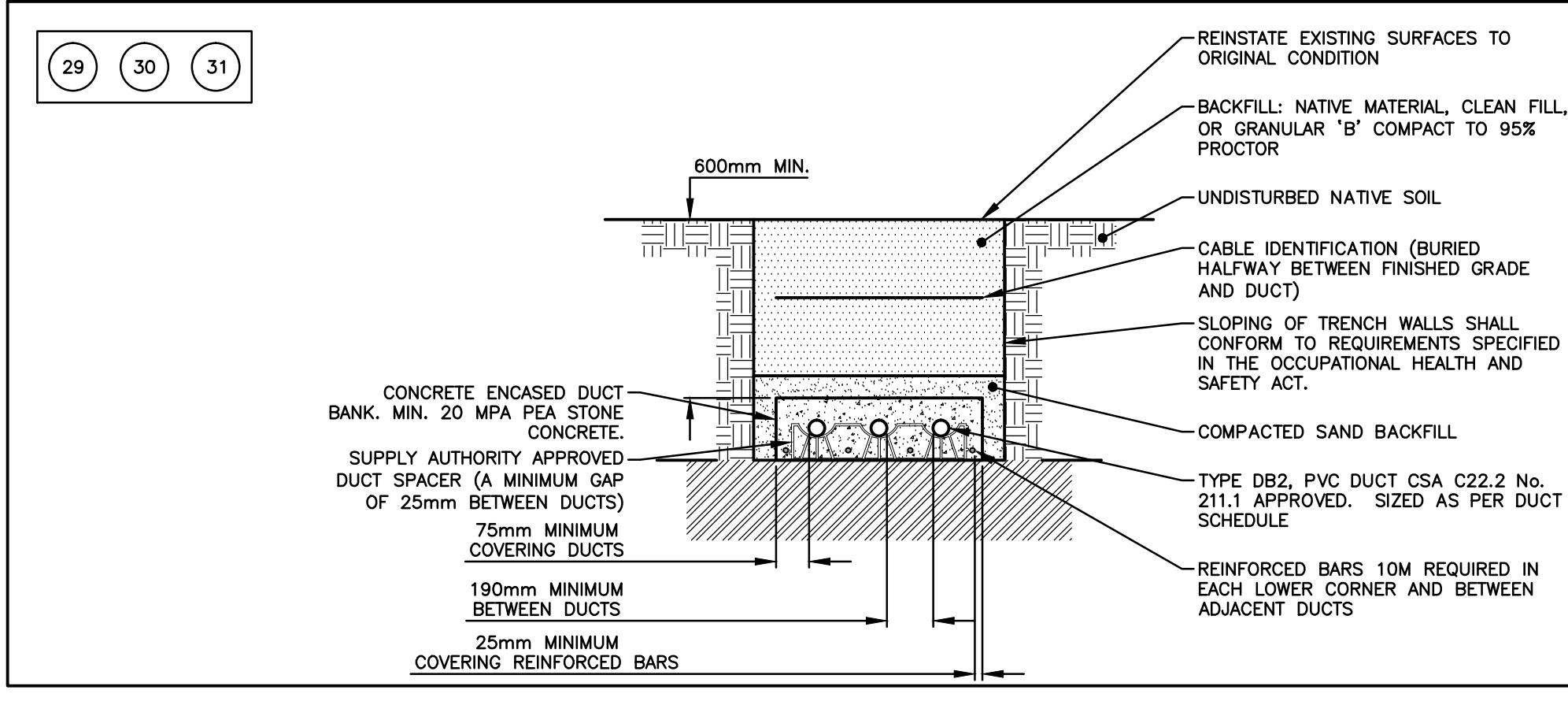
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E05 N.T.S.



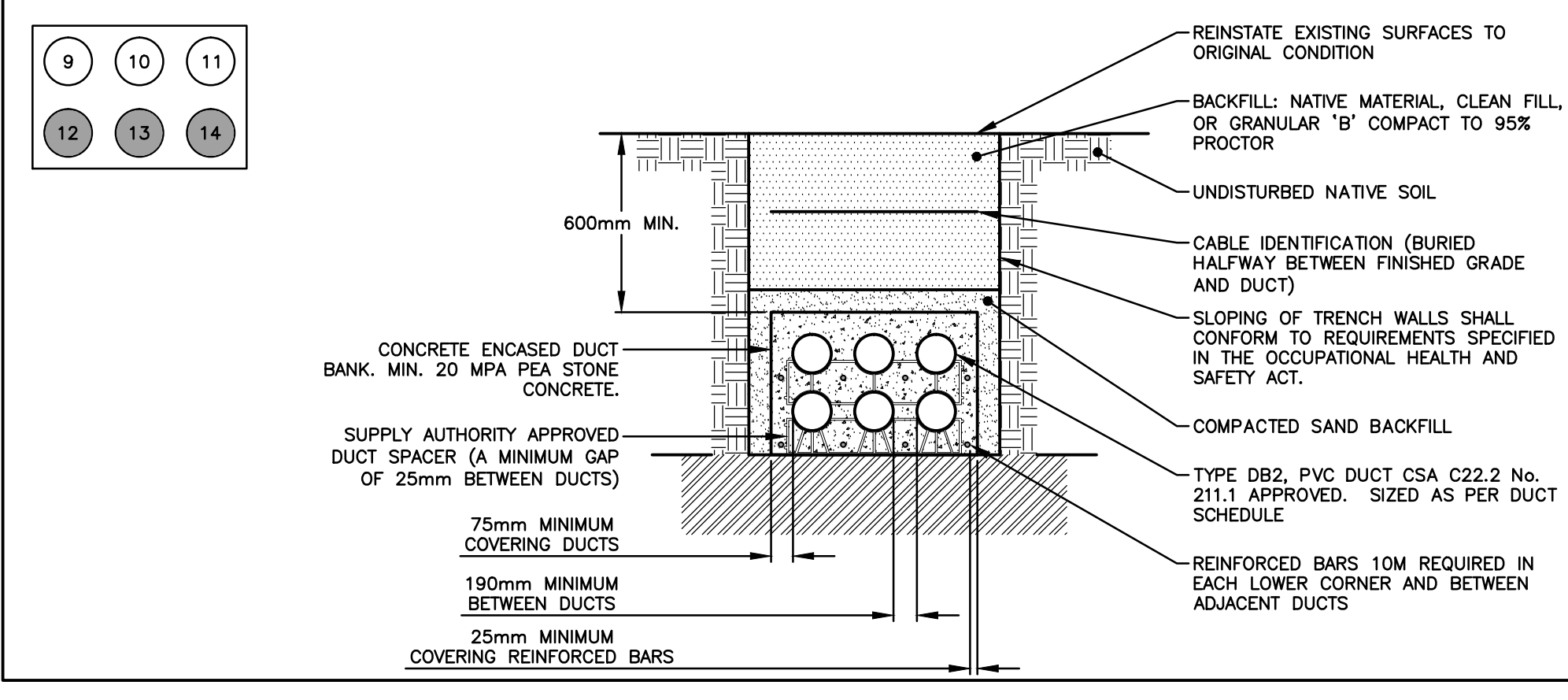
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E05 N.T.S.



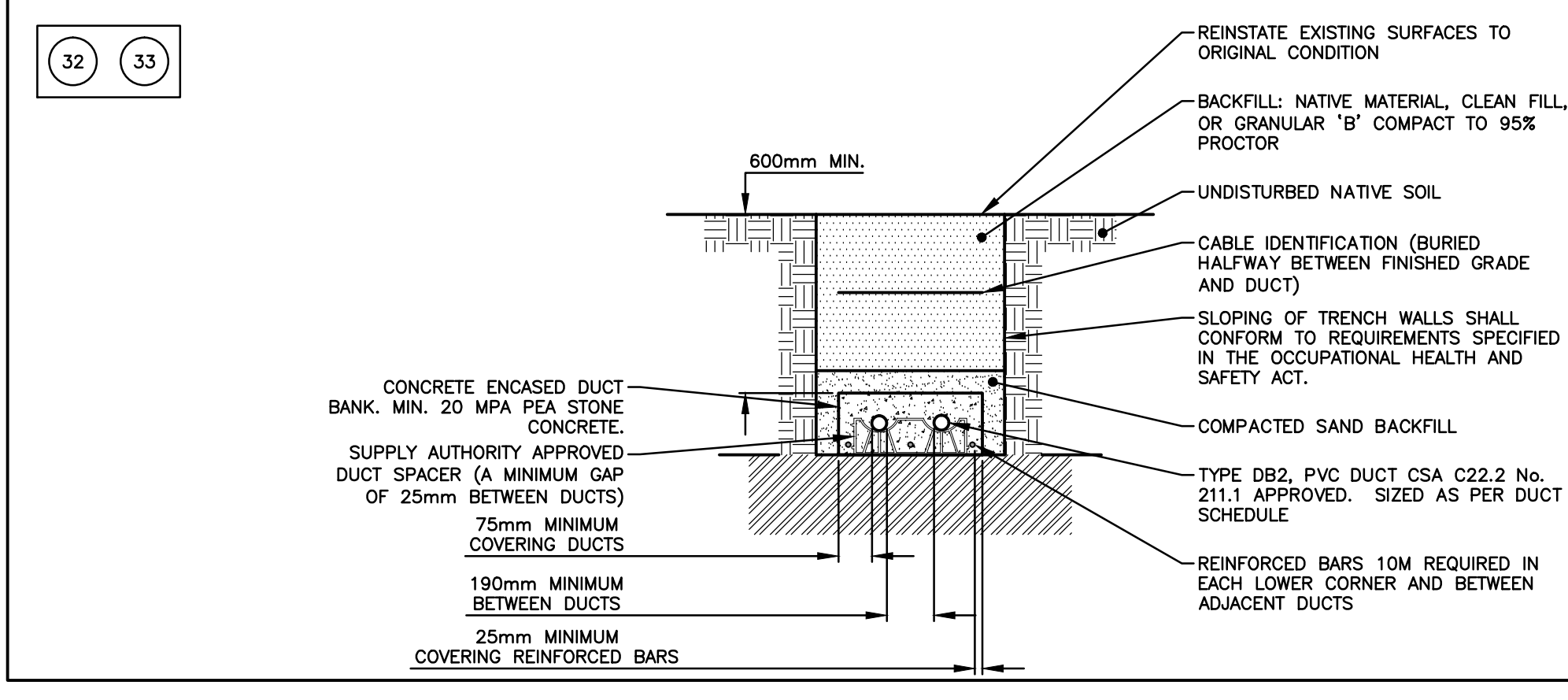
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E05 N.T.S.



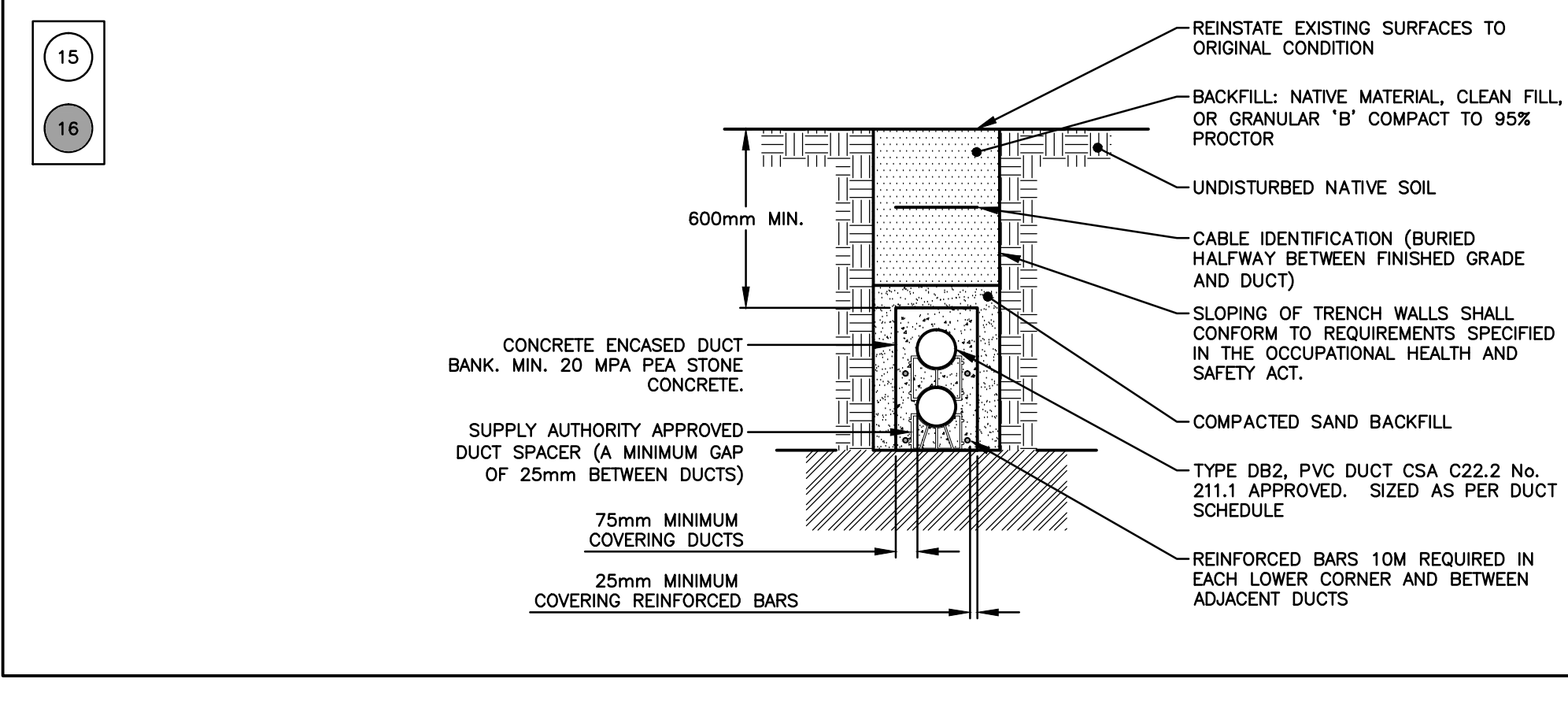
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E05 N.T.S.



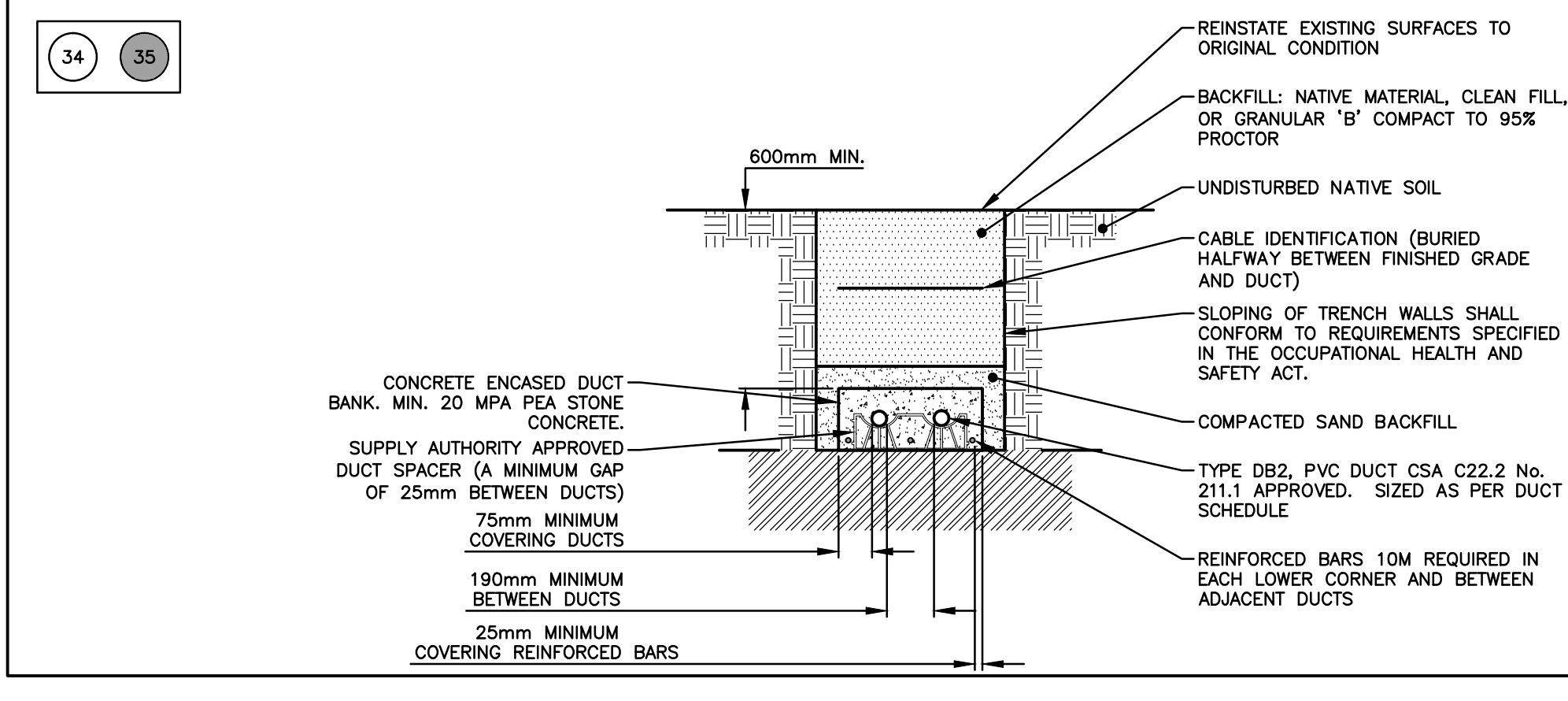
D NEW (3x2) CONCRETE ENCASED DUCT BANK
E05 N.T.S.



J NEW (2x1) CONCRETE ENCASED DUCT BANK
E08 N.T.S.



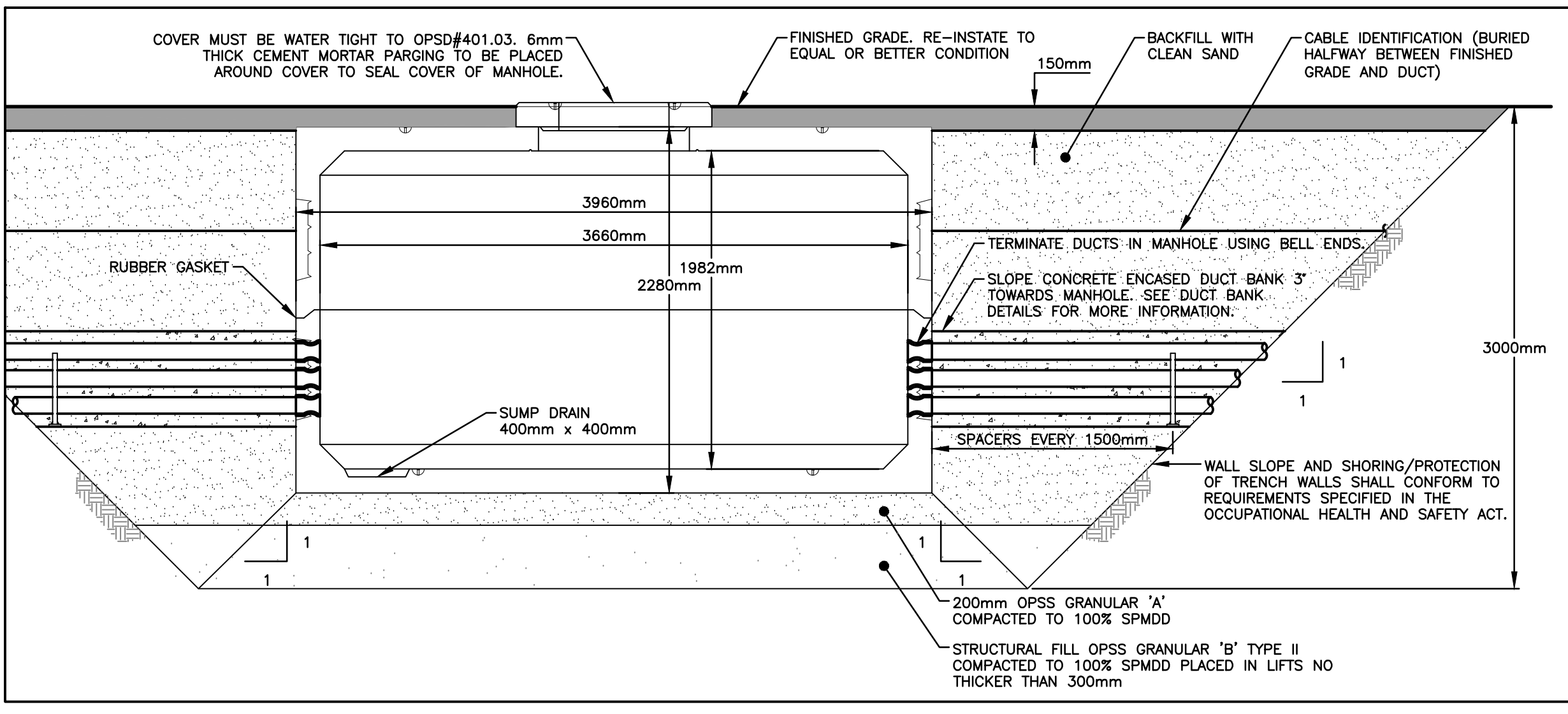
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E05 N.T.S.



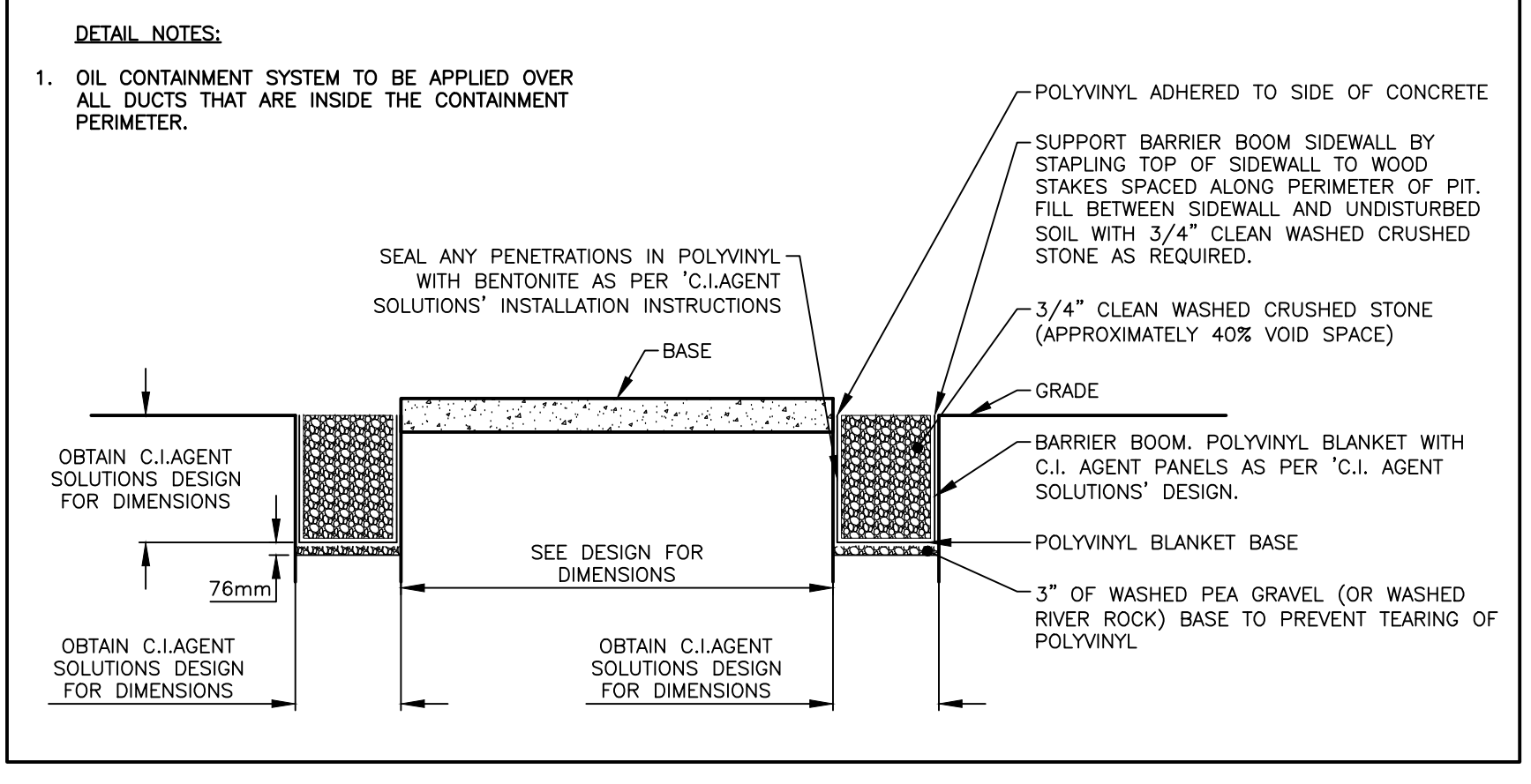
M NEW (2x1) CONCRETE ENCASED DUCT BANK
E08 N.T.S.

		DUCT SCHEDULE			
NO.	FROM	TO	DIAM.	FEEDER HOUSED IN DUCT	CONDUCTOR(S)
1	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING U-66 6.9kV SUBSTATION	129 mm	LS1	(3/C-#2AWG, 15kV, AIRGUARD)
2	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING U-66 6.9kV SUBSTATION	129 mm	LS2	(3/C-#4/0AWG, 15kV, AIRGUARD)
3	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING U-66 6.9kV SUBSTATION	129 mm	LS3	(3/C-#2AWG, 15kV, AIRGUARD)
4	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING U-66 6.9kV SUBSTATION	129 mm	SPARE	NYLON ROPE
5	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING U-66 6.9kV SUBSTATION	129 mm	FEEDS TO T1 SECONDARY	(3/C-500MCM, 15kV, AIRGUARD)
6	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING U-66 6.9kV SUBSTATION	129 mm	FEEDS TO T1 SECONDARY	(3/C-500MCM, 15kV, AIRGUARD)
7	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING U-66 6.9kV SUBSTATION	129 mm	FEEDS TO T1 SECONDARY	(3/C-500MCM, 15kV, AIRGUARD)
8	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING U-66 6.9kV SUBSTATION	129 mm	FEEDS TO T1 SECONDARY	(3/C-500MCM, 15kV, AIRGUARD)
9	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-66	129 mm	FEED TO EXISTING T1 MAIN BREAKER	(3/C-500MCM, 15kV, AIRGUARD)
10	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-66	129 mm	FEED TO EXISTING T1 MAIN BREAKER	(3/C-350MCM, 15kV, AIRGUARD)
11	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-66	129 mm	FEED TO EXISTING T1 MAIN BREAKER	(3/C-350MCM, 15kV, AIRGUARD)
12	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-66	129 mm	SPARE	NYLON ROPE
13	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-66	129 mm	SPARE	NYLON ROPE
14	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-66	129 mm	SPARE	NYLON ROPE
15	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING PANEL ELD1 IN BUILDING U-66	129 mm	AUXILIARY PANEL OF 6.9kV OUTDOOR WALK-IN ENCLOSURE	(4/C-#3AWG, RW90, CU)
16	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-66	129 mm	SPARE	NYLON ROPE
17	NEW 115kV 15/20MVA TRANSFORMER	NEW 6.9kV OUTDOOR SUBSTATION	129 mm	TRANSFORMER SECONDARY CABLES	(3/C-500MCM, 15kV, AIRGUARD)
18	NEW 115kV 15/20MVA TRANSFORMER	NEW 6.9kV OUTDOOR SUBSTATION	129 mm	TRANSFORMER SECONDARY CABLES	(3/C-#250MCM, CU, 15kV, AIRGUARD)
19	NEW 115kV 15/20MVA TRANSFORMER	NEW 6.9kV OUTDOOR SUBSTATION	129 mm	TRANSFORMER SECONDARY CABLES	(3/C-500MCM, 15kV, AIRGUARD)
20	NEW 115kV 15/20MVA TRANSFORMER	NEW 6.9kV OUTDOOR SUBSTATION	129 mm	TRANSFORMER SECONDARY CABLES	(3/C-500MCM, 15kV, AIRGUARD)
21	NEW 115kV 15/20MVA TRANSFORMER	NEW 6.9kV OUTDOOR SUBSTATION	129 mm	SPARE	NYLON ROPE
22	NEW 115kV 15/20MVA TRANSFORMER	NEW 6.9kV OUTDOOR SUBSTATION	129 mm	SPARE	NYLON ROPE
23	NEW 6.9kV OUTDOOR SUBSTATION	SWITCH U70L51 IN BUILDING U-70A	129 mm	TO LABORATORY BUILDING AND FAN DRIVE BUILDING U-70A	(3/C-#2AWG, CU, 15kV, AIRGUARD)
24	NEW 6.9kV OUTDOOR SUBSTATION	BREAKER U70B1 IN BUILDING U-70A	129 mm	TO LABORATORY BUILDING AND FAN DRIVE BUILDING U-70A	(3/C-#250MCM, CU, 15kV, AIRGUARD)
25	NEW 6.9kV OUTDOOR SUBSTATION	BREAKER U70B1 IN BUILDING U-70A	129 mm	TO LABORATORY BUILDING AND FAN DRIVE BUILDING U-70A	(3/C-#250MCM, CU, 15kV, AIRGUARD)
26	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-70A	129 mm	SPARE	NYLON ROPE
27	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-70A	129 mm	SPARE	NYLON ROPE
28	NEW 6.9kV OUTDOOR SUBSTATION	BUILDING U-70A	129 mm	SPARE	NYLON ROPE
29	NEW 6.9kV OUTDOOR SUBSTATION	NEW 115kV 15/20MVA TRANSFORMER	50 mm	TRANSFORMER CT WIRING	14x(#10AWG, RW90, CU)
30	NEW 6.9kV OUTDOOR SUBSTATION	NEW 115kV 15/20MVA TRANSFORMER	50 mm	AUXILIARY POWER TO TRANSFORMER FANS	4x(#12AWG, RW90, CU)
31	NEW 6.9kV OUTDOOR SUBSTATION	NEW 115kV 15/20MVA TRANSFORMER / NEW 115kV CIRCUIT SWITCHER	50 mm	TRANSFORMER ALARM / CIRCUIT SWITCHER AUXILIARY WIRING	12x(#12AWG, RW90, CU)
32	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING TRANSFORMER T1 CONTROL BOX	50 mm	TRANSFORMER CT WIRING	10x(#10AWG, RW90, CU)
33	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING TRANSFORMER T1 CONTROL BOX	50 mm	TRANSFORMER ALARM WIRING	4x(#12AWG, RW90, CU)
34	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING 115kV CIRCUIT SWITCHER	50 mm	STATUS AND TRIP SIGNAL WIRING	10x(#12AWG, RW90, CU)
35	NEW 6.9kV OUTDOOR SUBSTATION	EXISTING 115kV CIRCUIT SWITCHER	50 mm	SPARE	NYLON ROPE
36	NEW 115kV 15/20MVA TRANSFORMER	NEW 115kV CIRCUIT SWITCHER	50 mm	CIRCUIT SWITCHER AUXILIARY WIRING	6x(#12AWG, RW90, CU)

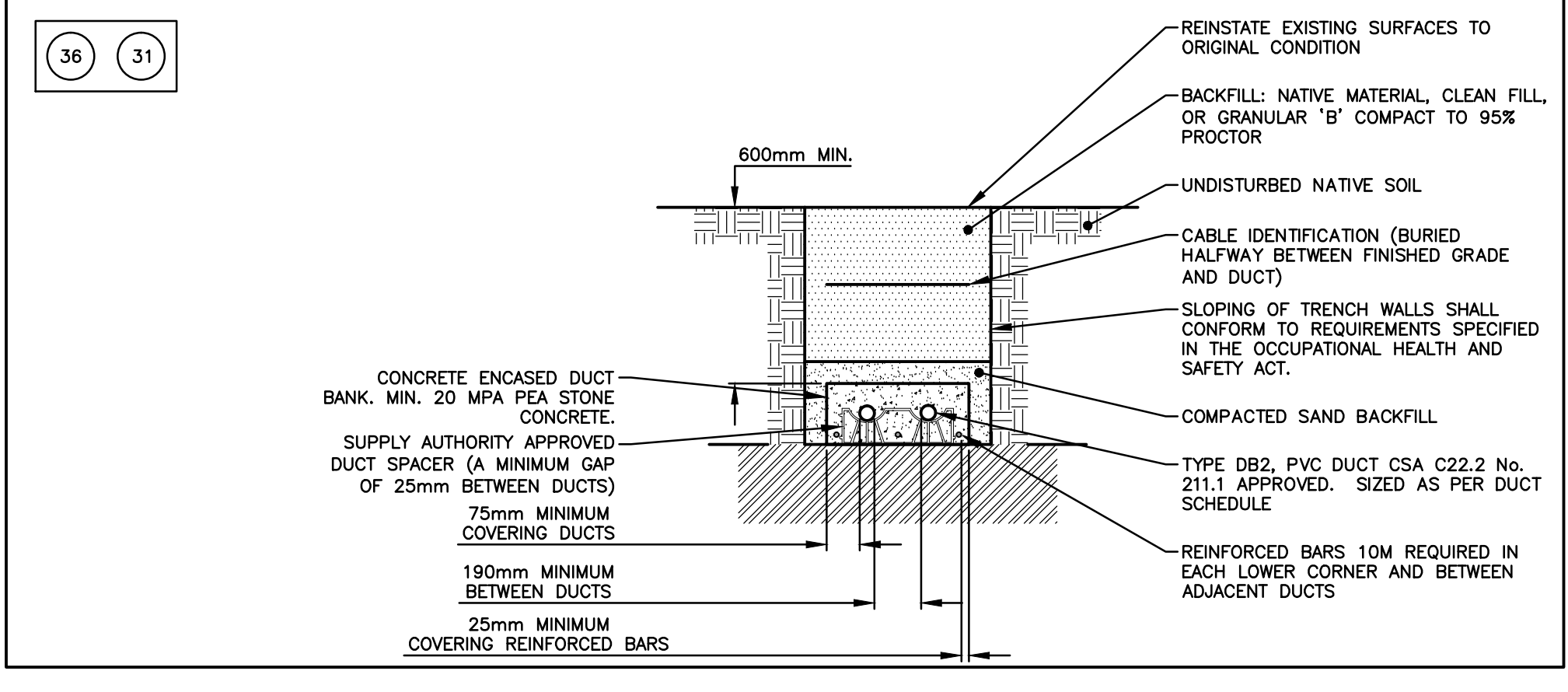
LEGEND:
 DENOTED DUCT NUMBER. SEE DUCT TABLE FOR DETAILS.
 SHADED DUCT DENOTES SPARE DUCT.



K MANHOLE INSTALLATION DETAIL
E10 1:40



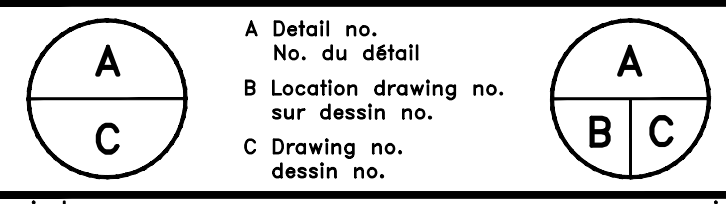
L TRANSFORMER OIL CONTAINMENT DETAIL
E05 1:40



N NEW (2x1) CONCRETE ENCASED DUCT BANK
E08 N.T.S.

No.	Date	Revision	By	Appr.
C	15.07.23	RE-ISSUED FOR TENDER		D.V.G.
C	15.07.17	ISSUED FOR TENDER		D.V.G.
B	15.07.08	ISSUED FOR 90% REVIEW		D.V.G.
A	15.03.31	ISSUED FOR 60% REVIEW		D.V.G.

Date Printed: _____ Date Imprimée: _____
 • Verify all dimensions and site conditions and be responsible for same.
 • Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité.



project: **BUILDING U-66 NEW 115 KV OUTDOOR SUBSTATION UPLANDS CAMPUS**
 drawing: **ELECTRICAL 115 KV SUBSTATION DETAILS**

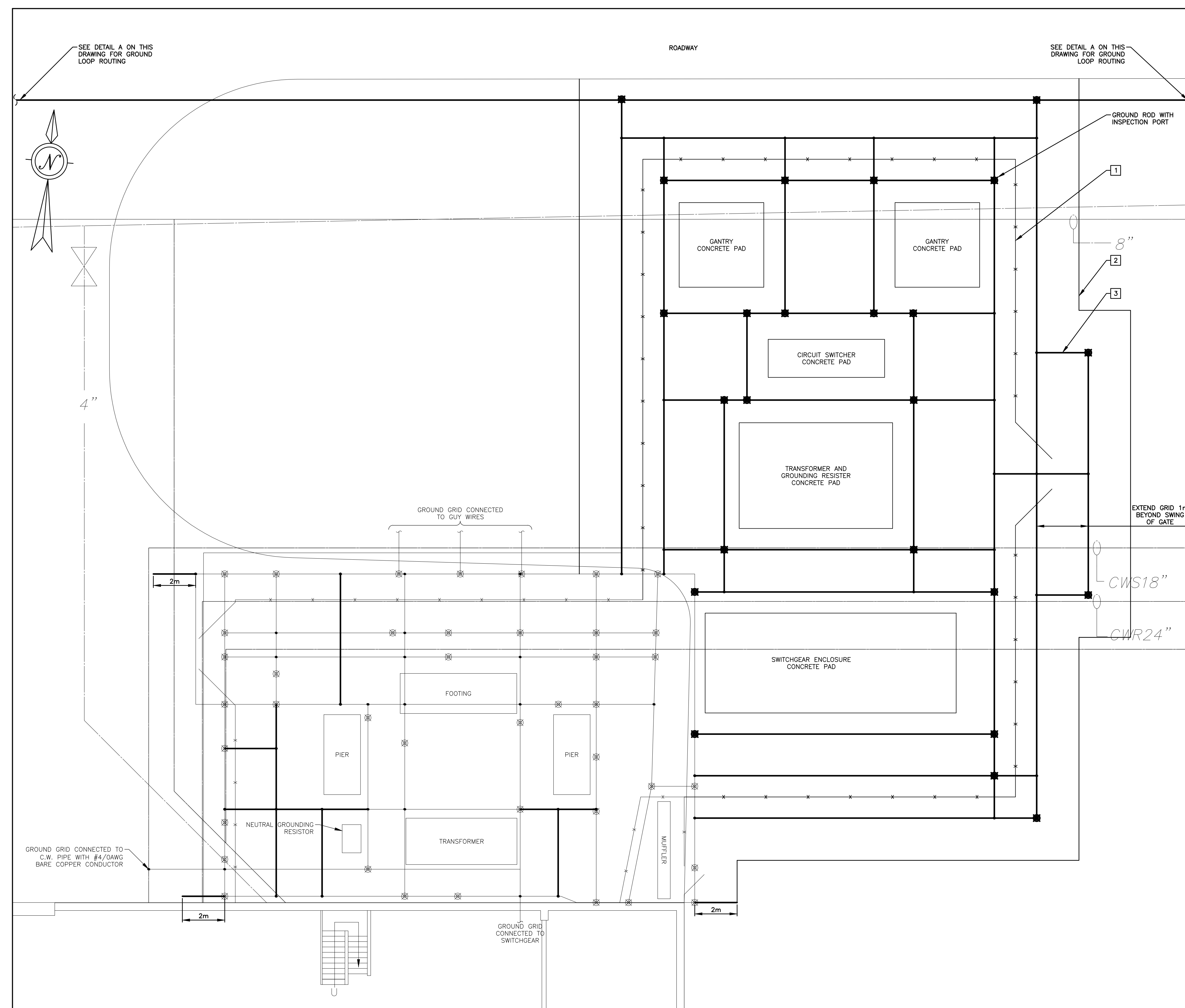
designed	checked	approved	date	scale	sheet	of/total	date	scale	sheet	of/total	date
D. VAN GAAL	P. DYCK	D. VAN GAAL	MARCH 2015	AS SHOWN	13	of/26	23				

dwg.no. **D-5078-E12**

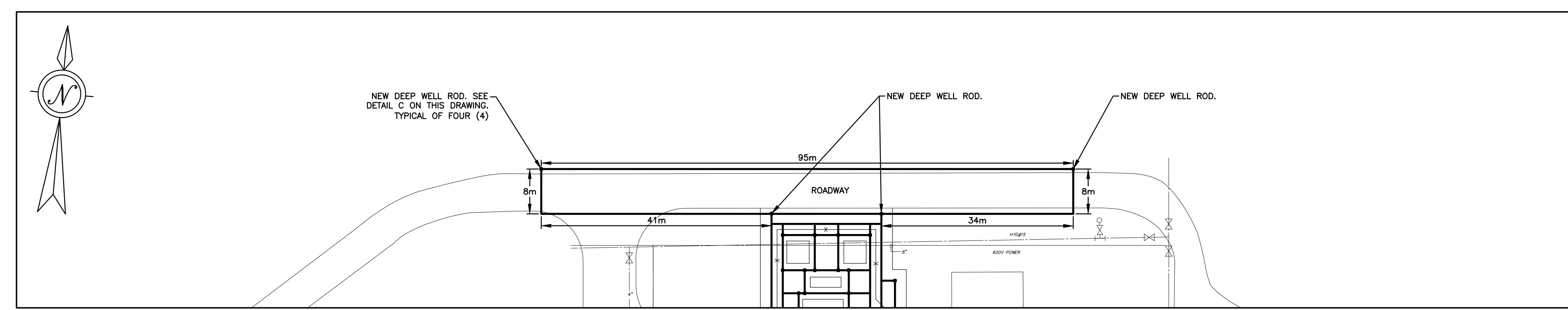
W:\projects\16301846_NRC-CNRC_115kV_Sub_Grounding\16301846_Electrical.dwg
 2015/07/23 11:28 AM by: dvanmaal, rjones

- GENERAL NOTES:
- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN LINES.
 - EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT IS SHOWN IN THICK LINES.
 - ALL CONNECTIONS BELOW GRADE MUST BE EXOTHERMIC WELDS OR COMPRESSION CONNECTIONS.
 - ALL GROUND CONDUCTORS MUST BE A MINIMUM #4/0 AWG BARE COPPER CONDUCTORS.
 - ALL EQUIPMENT MUST BE GROUNDED WITH A MINIMUM OF TWO #4/0 AWG BARE COPPER CONDUCTORS CONNECTED TO GROUND GRID.
 - NEW GROUND GRID MUST BE CONNECTED TO EXISTING GROUND GRID DURING COMPLETE SHUTDOWN OF EXISTING 115KV SUBSTATION.

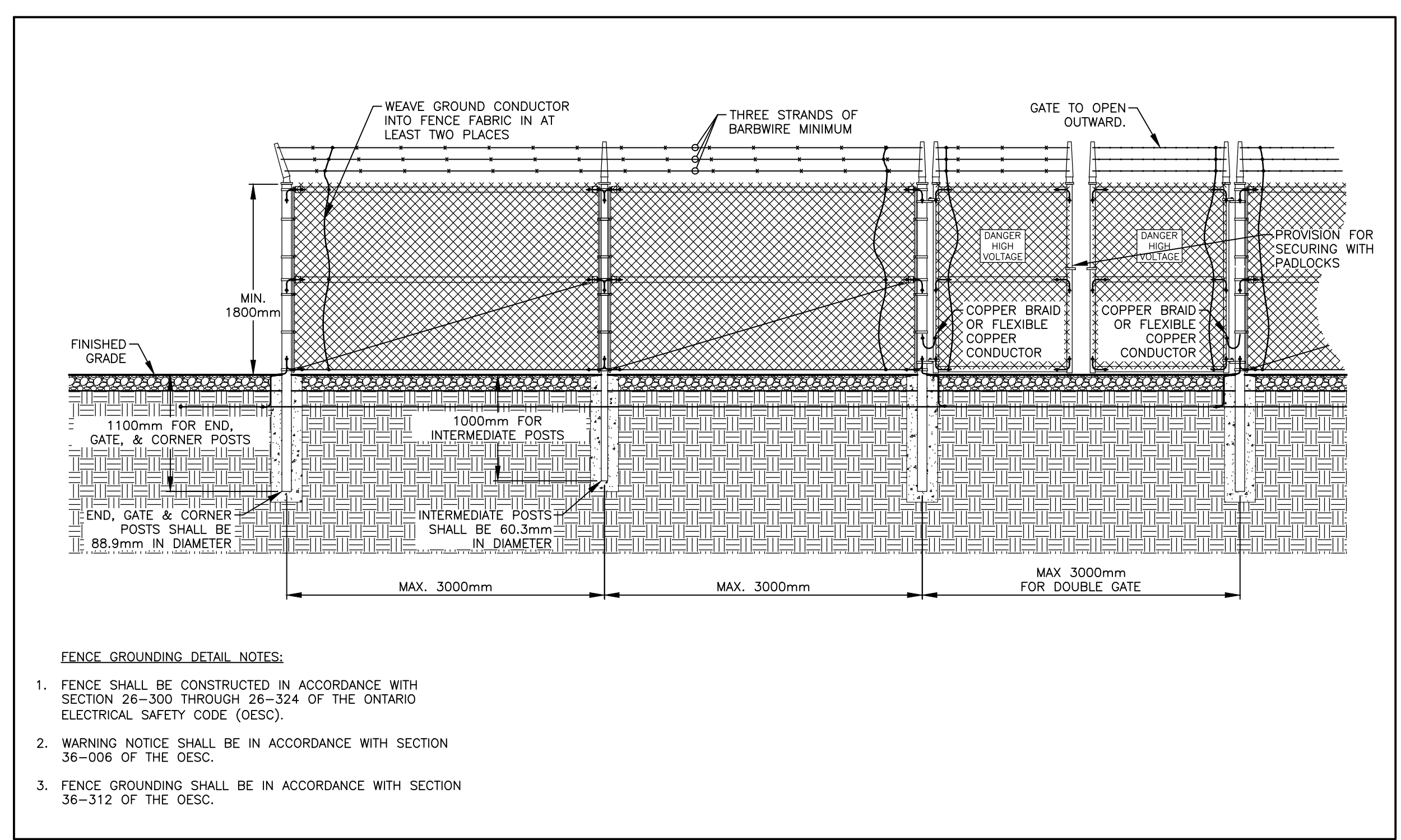
- DRAWING NOTES:
- SUPPLY AND INSTALL NEW FENCING, GROUND FENCE AS PER DETAIL B ON THIS DRAWING.
 - SUPPLY AND INSTALL NEW LAYER OF 150mm CRUSHED STONE OVER COMPLETE SUBSTATION EXTENDING 2000mm BEYOND GROUND GRID.
 - SUPPLY AND INSTALL 6m x 19mm COPPER CLAD STEEL GROUND RODS.



115 KV SUBSTATION - GROUND GRID
 1:100

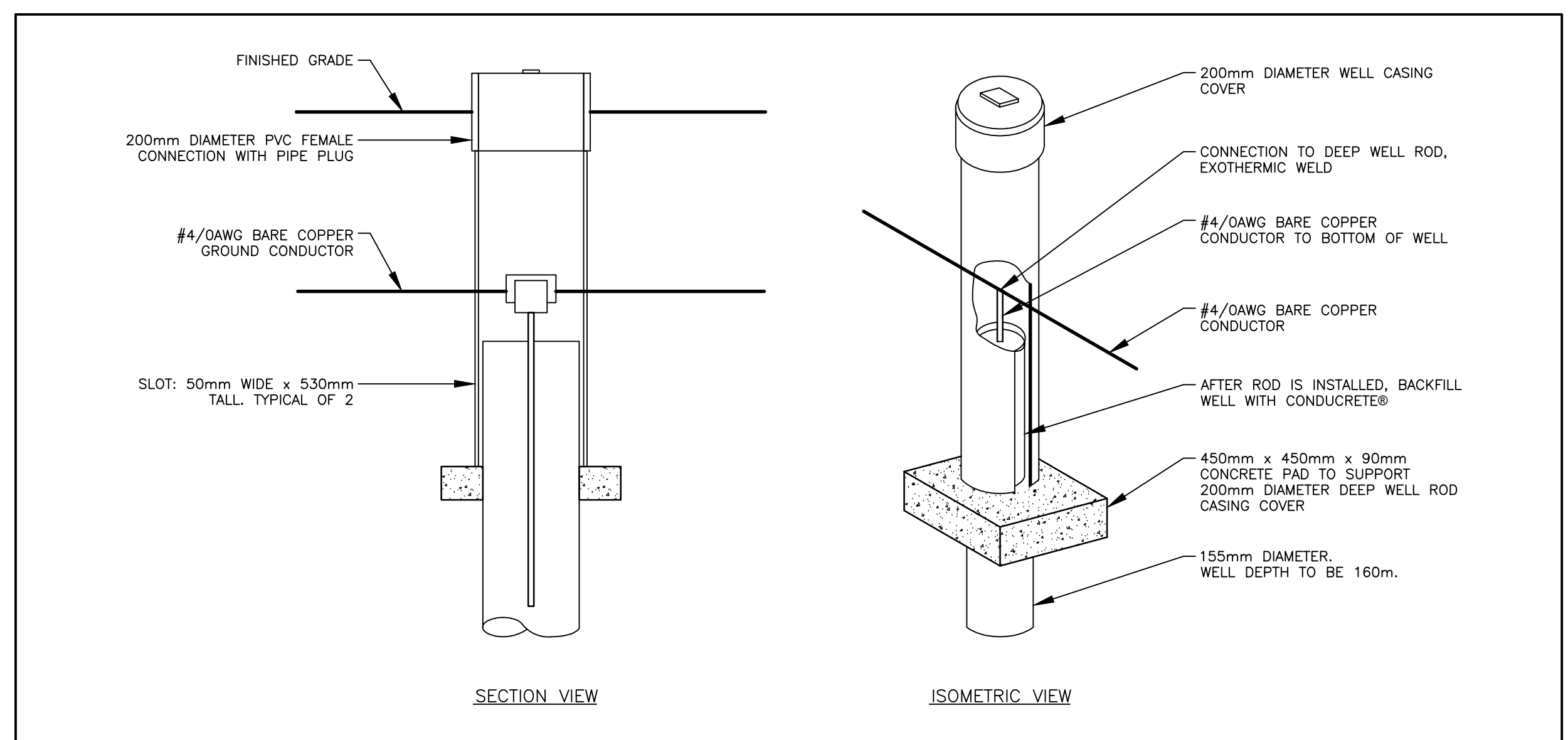


A GROUND LOOP DETAIL
 E13 1:500



- FENCE GROUNDING DETAIL NOTES:
- FENCE SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 26-300 THROUGH 26-324 OF THE ONTARIO ELECTRICAL SAFETY CODE (DESC).
 - WARNING NOTICE SHALL BE IN ACCORDANCE WITH SECTION 36-006 OF THE OESC.
 - FENCE GROUNDING SHALL BE IN ACCORDANCE WITH SECTION 36-312 OF THE OESC.

B ELEVATION FENCE GROUNDING DETAIL
 E13 1:40



C DEEP WELL GROUND ROD DETAIL
 E13 N.T.S.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 66% REVIEW	D.V.G

Date Printed: _____ Date Imprimée: _____

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A	A Detail no. No. du détail	A
C	B Location drawing no. sur dessin no.	B C
	C Drawing no. dessin no.	

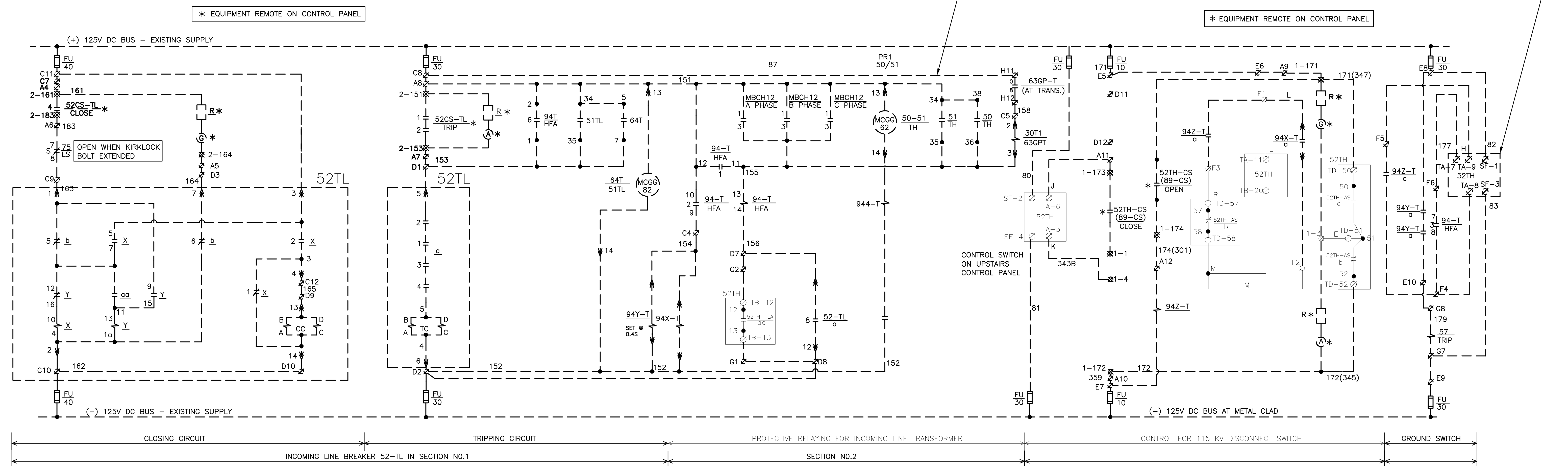
project: **BUILDING U-66
 NEW 115 KV OUTDOOR
 SUBSTATION**
 UPLANDS CAMPUS

drawing: **ELECTRICAL
 115 KV SUBSTATION GROUND
 GRID LAYOUT**

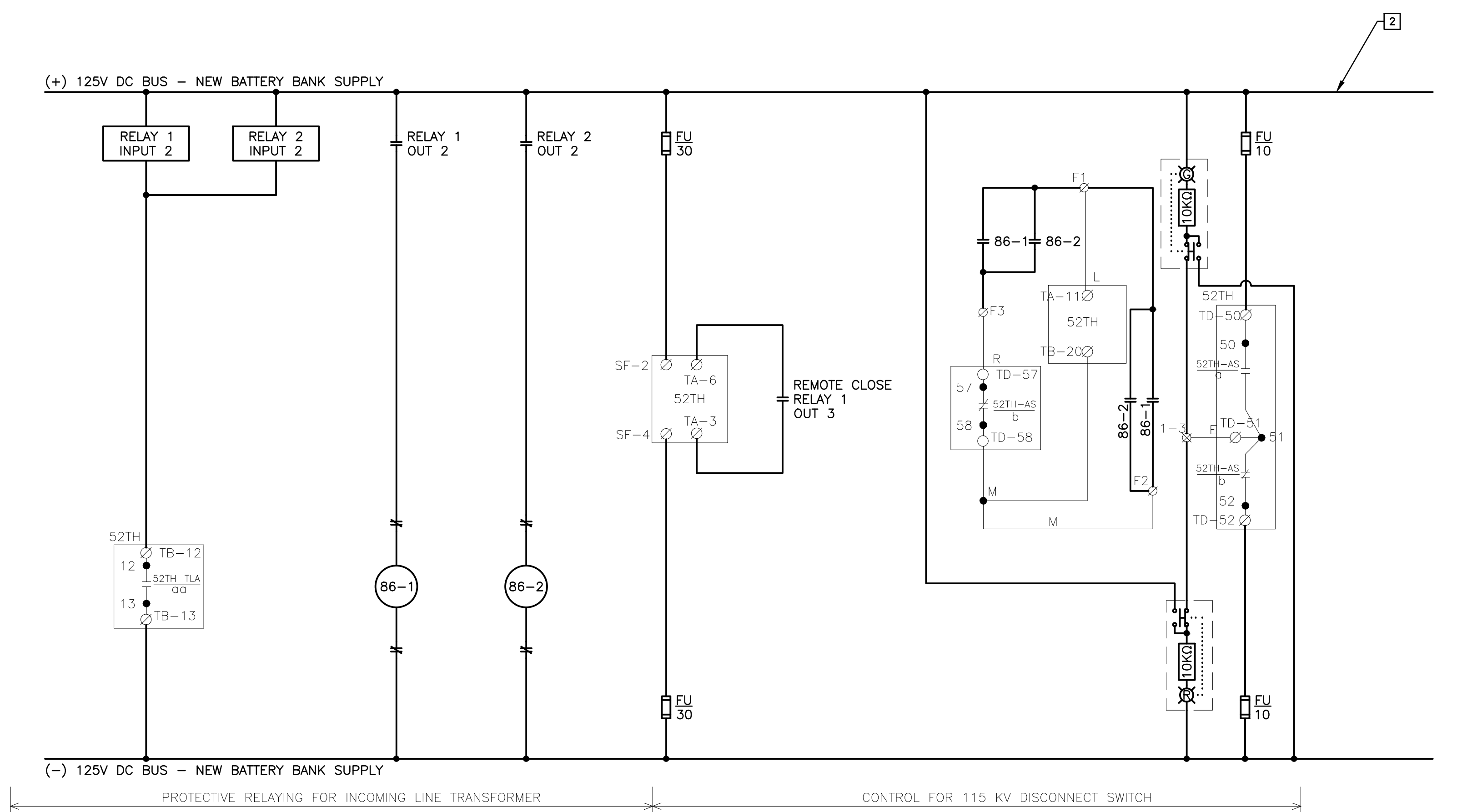
designed D. VAN GAAL	conçu D. VAN GAAL	date MARCH 2015	date MARCH 2015	D-5078-E13 03 23 23 23
drawn H. SULLIVAN	dessiné H. SULLIVAN	scale AS SHOWN	échelle AS SHOWN	
checked P. DYCK	vérifié P. DYCK	sheet 14	feuille 14	
approved D. VAN GAAL	approuvé D. VAN GAAL	W.O.no. Shantec No: 163301846	D.T.no. Shantec No: 163301846	
dwg.no. D-5078-E13	dessin no. D-5078-E13			

- GENERAL NOTES:**
- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN LINES.
 - EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT AND EQUIPMENT TO BE DEMOLISHED IS SHOWN IN THICK LINES.
 - ALL CONTROL WIRES MUST BE A MINIMUM #14AWG, RW90, CU.
 - CONTRACTOR IS RESPONSIBLE FOR TERMINATING CABLES AT TERMINAL BLOCKS OF CIRCUIT SWITCHER AND AT TERMINAL BLOCKS OF NEW 6.9KV SWITCHGEAR LOCATED IN OUTDOOR WALK IN ENCLOSURE.
 - ALL RELAYS, INDICATING LIGHTS, TRIP RELAYS, AND PISTOL GRIPS INSTALLED IN THE EXISTING 6.9KV SWITCHGEAR ARE TO BE DISCONNECTED FROM EXISTING CIRCUIT SWITCHER CONTROL CIRCUITS WHEN 6.9KV SWITCHGEAR IS REMOVED.
 - CONTRACTOR TO CONFIRM EXISTING WIRING IN PRESENCE OF ENGINEER PRIOR TO IMPLEMENTING WIRING CHANGES.
 - CONTROL WIRING OF NEW 6.9KV MAIN BREAKER TO BE COMPLETED AS PER SPECIFICATIONS.

- DRAWING NOTES:**
- DISCONNECT ALL WIRES INTERCONNECTING EXISTING 6.9KV SWITCHGEAR TO EXISTING CIRCUIT SWITCHER ONCE TRANSFORMER T1 IS SHUTDOWN AND RESUPPLYING NEW 6.9KV SUBSTATION.
 - INTERCONNECT NEW PROTECTIVE RELAYS TO CONTROL CIRCUIT OF 115KV CIRCUIT SWITCHER AND 115KV INTEGRATED DISCONNECT SWITCH.



DC CONTROL FOR EXISTING MAIN 6.9KV CIRCUIT BREAKER, 115KV CIRCUIT SWITCHER, AND INTEGRATED DISCONNECT -- DEMOLITION
 N.T.S.



DC CONTROL FOR EXISTING MAIN 6.9KV CIRCUIT BREAKER, 115KV CIRCUIT SWITCHER, AND INTEGRATED DISCONNECT -- NEW CONSTRUCTION
 N.T.S.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 60% REVIEW	D.V.G

No.	Date	Revision	By	Appr.
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- Date Printed: _____ Date Imprimée: _____
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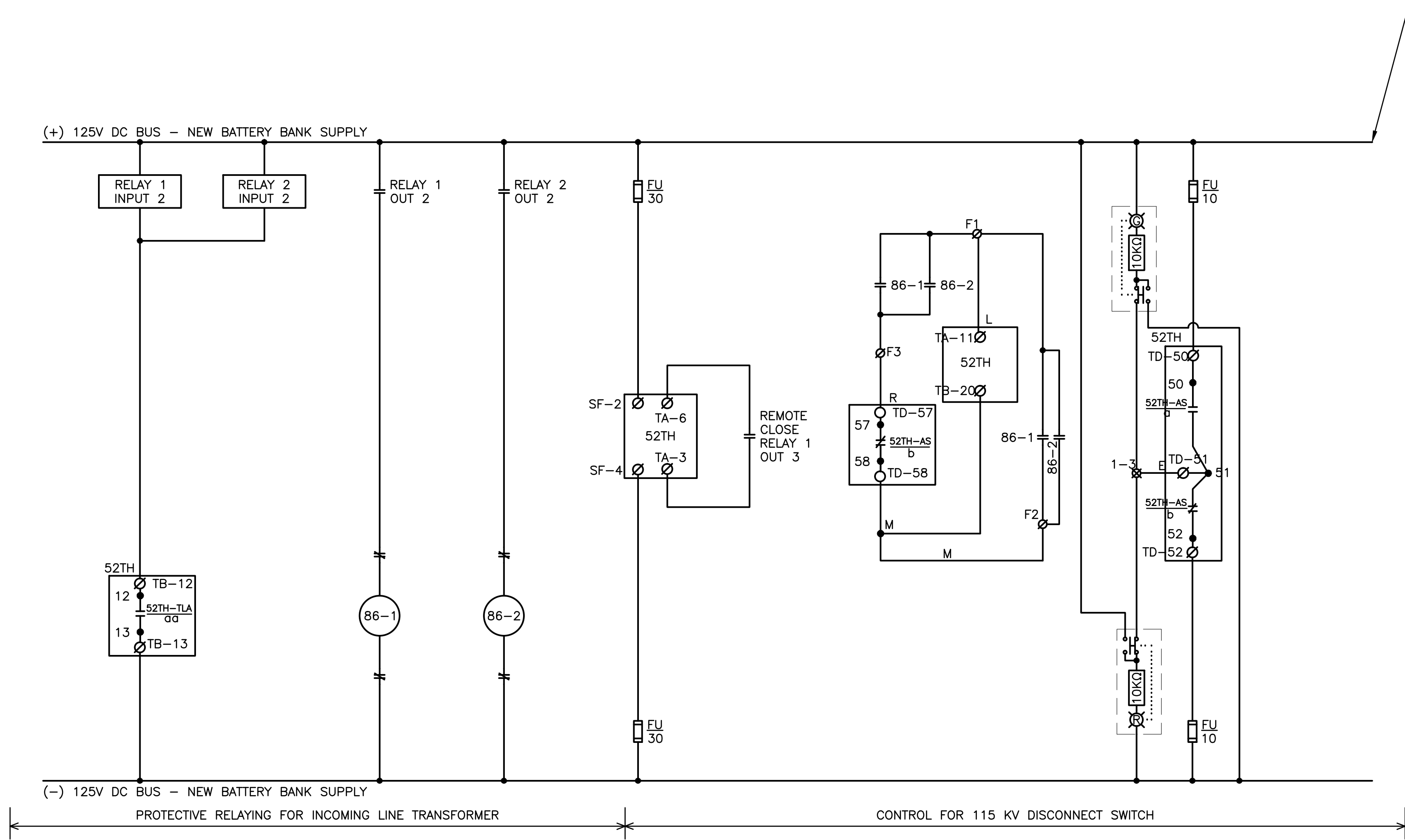
A	A Detail no. No. du détail	A
B	B Location drawing no. sur dessin no.	B C
C	C Drawing no. dessin no.	

project: **BUILDING U-66
 NEW 115 KV OUTDOOR
 SUBSTATION**
 UPLANDS CAMPUS

drawing: **ELECTRICAL
 DC CONTROLS - EXISTING
 CIRCUIT SWITCHER AND DISC.**

designed D. VAN GAAL	conçu D. VAN GAAL	date MARCH 2015	scale N.T.S.	sheet 15	of/du 23	date 2015	scale N.T.S.	sheet 15	of/du 23
checked P. DYCK	vérifié P. DYCK	approved D. VAN GAAL	W.O.no. Shantec No. 163301846	D.T.no. D. VAN GAAL	dessein no. D-5078-E14				

- GENERAL NOTES:
- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN LINES.
 - EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT AND EQUIPMENT TO BE DEMOLISHED IS SHOWN IN THICK LINES.
 - ALL CONTROL WIRES MUST BE A MINIMUM #14AWG, RW90, CU.
 - CONTRACTOR IS RESPONSIBLE FOR TERMINATING CABLES AT TERMINAL BLOCKS OF CIRCUIT SWITCHER AND AT TERMINAL BLOCKS OF NEW 6.9KV SWITCHGEAR LOCATED IN OUTDOOR WALK IN ENCLOSURE.
- DRAWING NOTES:
- [1] CONTRACTOR TO SUPPLY AND INSTALL ALL EQUIPMENT, CONDUIT, AND WIRING REQUIRED TO INTERCONNECT NEW 115KV CIRCUIT SWITCHER TO NEW PROTECTION RELAYS LOCATED IN NEW 6.9KV SWITCHGEAR.

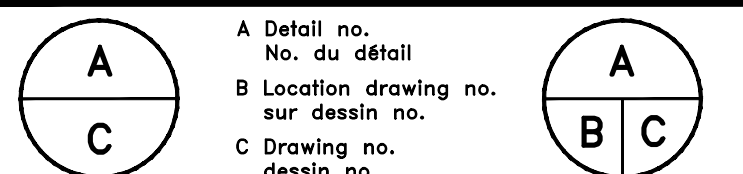


DC CONTROL FOR NEW 115KV TRANSFORMER, 115KV CIRCUIT SWITCHER, AND INTEGRATED DISCONNECT - NEW CONSTRUCTION
 N.T.S.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 66% REVIEW	D.V.G

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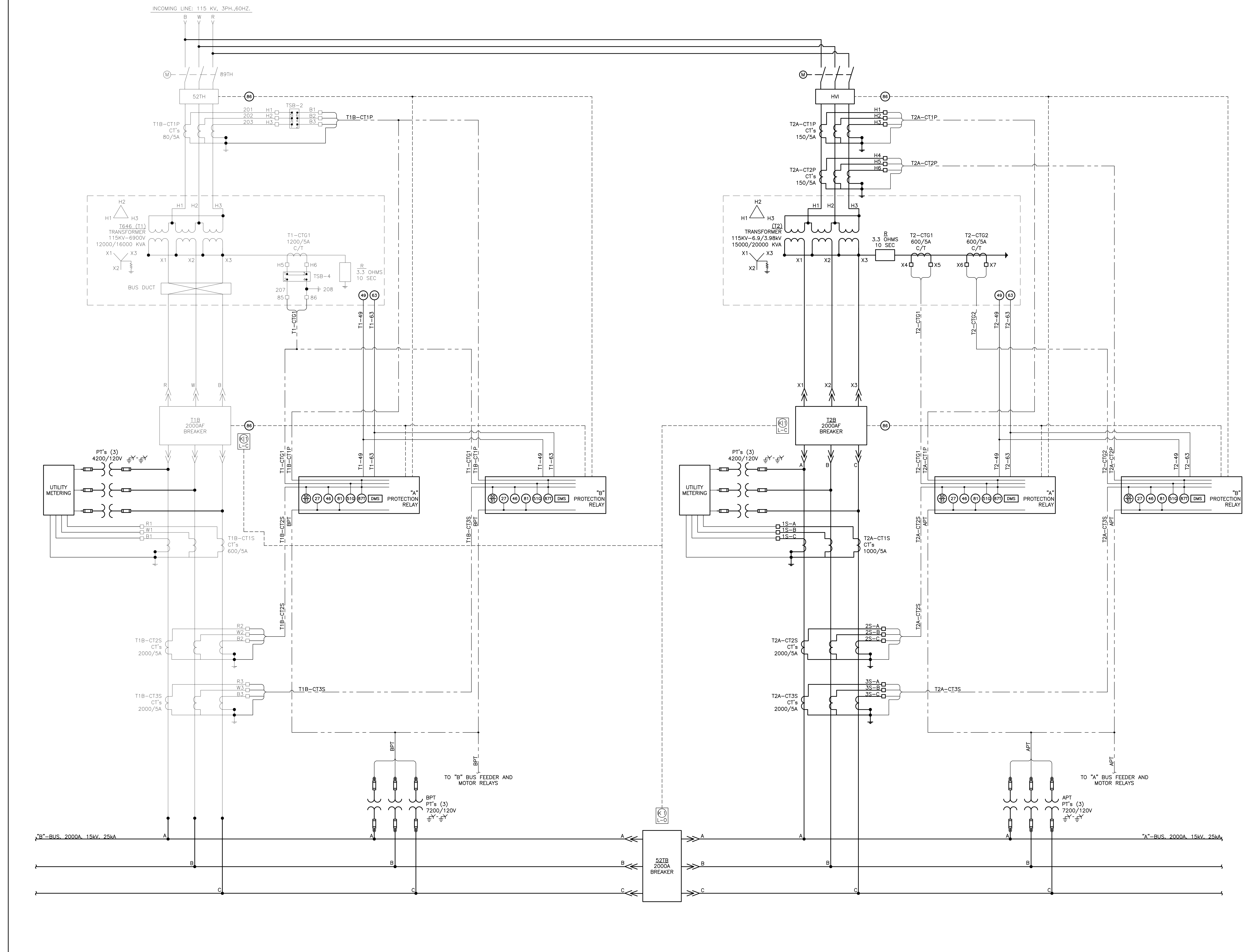


project / projet
BUILDING U-66
NEW 115 KV OUTDOOR
SUBSTATION
 UPLANDS CAMPUS

drawing / dessin
ELECTRICAL
DC CONTROLS
NEW CIRCUIT SWITCHER

designed / conçu	D. VAN GAAL	date	MARCH 2015	D-5078-E15 23 23 23
drawn / dessiné	H. SULLIVAN	scale	N.T.S.	
checked / vérifié	P. DYCK	sheet / feuille	16 of / de 23	
approved / approuvé	D. VAN GAAL	W.O.no.		
dwg.no.	D-5078-E15	Shantec No.	163301846	

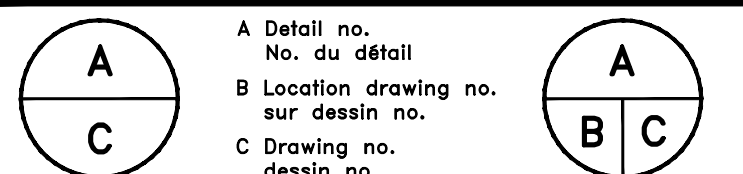
- GENERAL NOTES:**
- EXCEPT AS NOTED OTHERWISE ALL EXISTING EQUIPMENT TO REMAIN IS SHOWN IN THIN LINES.
 - EXCEPT AS NOTED OTHERWISE ALL NEW EQUIPMENT AND EQUIPMENT TO BE DEMOLISHED IS SHOWN IN THICK LINES.
 - ALL CONTROL WIRES MUST BE A MINIMUM #13AWG, RW90, CU.
 - CONTRACTOR IS RESPONSIBLE FOR TERMINATING CABLES AT TERMINAL BLOCKS OF CIRCUIT SWITCHER AND AT TERMINAL BLOCKS OF NEW 6.9KV SWITCHGEAR LOCATED IN OUTDOOR WALK IN ENCLOSURE.
 - ALL RELAYS, INDICATING LIGHTS, TRIP RELAYS, AND PISTOL GRIPS INSTALLED IN THE EXISTING 6.9KV SWITCHGEAR ARE TO BE DISCONNECTED FROM EXISTING CIRCUIT SWITCHER CONTROL CIRCUITS WHEN 6.9KV SWITCHGEAR IS REMOVED.



EXISTING AND NEW 115KV TRANSFORMER - PROTECTION SCHEMATIC
 NEW CONSTRUCTION
 N.T.S.

C	15.07.23	RE-ISSUED FOR TENDER	D.V.G
C	15.07.17	ISSUED FOR TENDER	D.V.G
B	15.07.08	ISSUED FOR 90% REVIEW	D.V.G
A	15.03.31	ISSUED FOR 66% REVIEW	D.V.G
No.	Date	Revision	By / Pgr:

- Date Printed: _____ Date Imprimée: _____
- Verify all dimensions and site conditions and be responsible for same.
 - Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité.

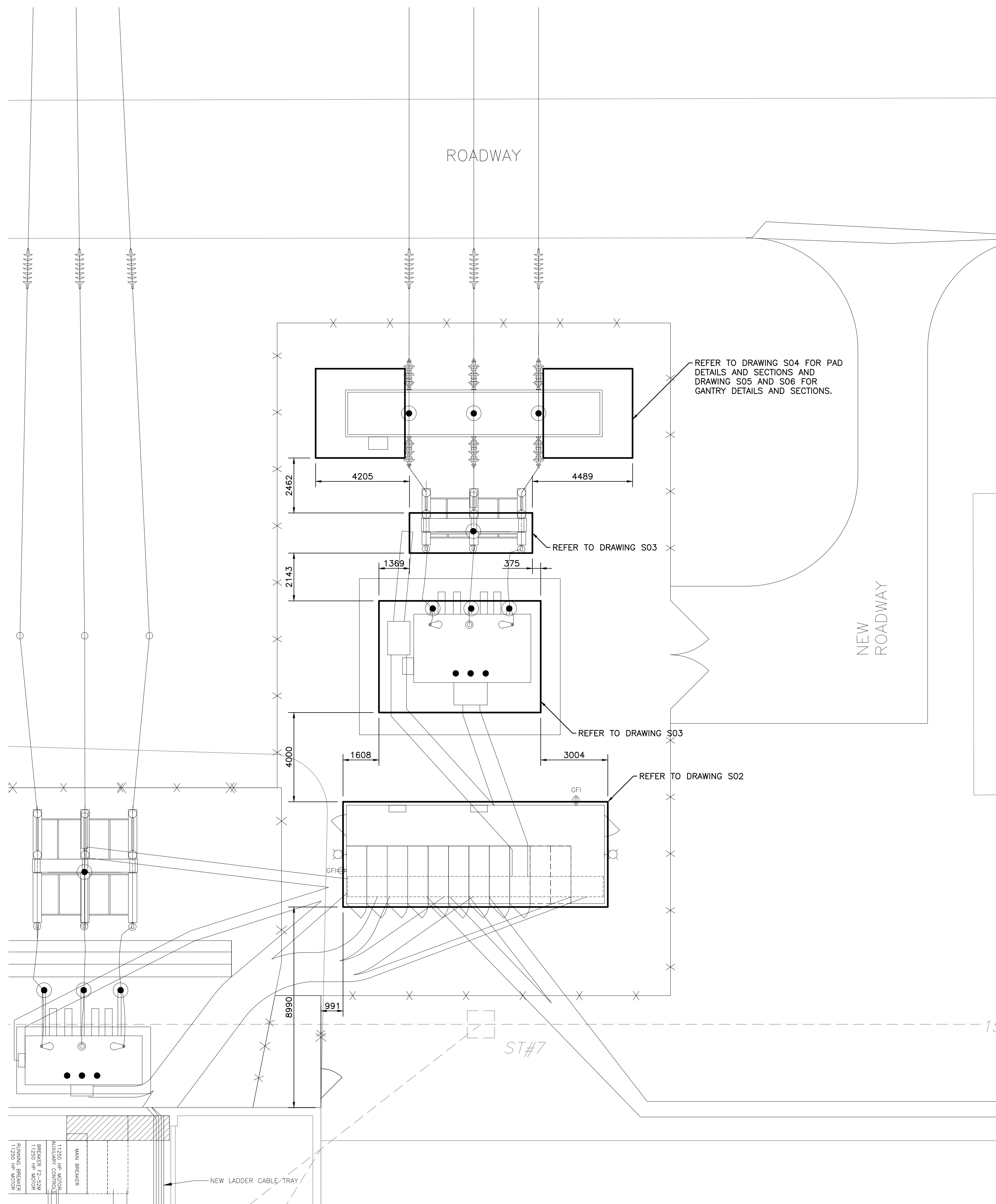


PROJECT: BUILDING U-66
 NEW 115 KV OUTDOOR SUBSTATION
 UPLANDS CAMPUS

ELECTRICAL
 TRANSFORMER PROTECTION SCHEMATIC

designed D. VAN GAAL	conçu D. VAN GAAL	date MARCH 2015	date MARCH 2015	D-2042-E16
drawn H. SULLIVAN	dessiné H. SULLIVAN	scale N.T.S.	échelle N.T.S.	
checked P. DYCK	vérifié P. DYCK	sheet 17	of/du 23	
approved D. VAN GAAL	W.O.no. D. VAN GAAL	D.T.no. D. VAN GAAL	Shantec No: 163301846	
dwg.no. D-5078-E16	dessin no. D-5078-E16			

W:\active\163301846\NRC_Uplands_115KV_Sub_Station\163301846_Electrical.dwg
 2015/07/23 11:52 AM by: h.sullivan, technicien



FOUNDATION LAYOUT
 1:100

GENERAL NOTES

1. ALL CODES REFERENCED ARE TO BE THE LATEST VERSION AT THE DATE OF ISSUE.
2. DESIGN IS BASED ON THE NATIONAL BUILDING CODE NBCC 2010, C22.3 No. 1-10.
3. READ THESE DESIGN NOTES IN CONJUNCTION WITH THE CONTRACT SPECIFICATIONS AND ALL OTHER CONTRACT DOCUMENTS.
4. OBTAIN ENGINEER'S APPROVAL BEFORE CUTTING, BORING, OR SLEEVING LOAD-BEARING MEMBERS UNLESS NOTED OTHERWISE.
5. THE STRUCTURAL DRAWINGS ARE FOR THE COMPLETED PROJECT. STABILITY OF THE EXISTING STRUCTURE DURING CONSTRUCTION REMAINS THE RESPONSIBILITY OF THE CONTRACTOR.
6. REFER TO ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR SMALL OPENINGS, SLEEVES, RECESSES, DEPRESSIONS, SUMPS, TRENCHES, CURBS, HOUSEKEEPING PADS, EQUIPMENT BASES, AND SLOPES NOT INDICATED ON THE STRUCTURAL DRAWINGS.
7. OPENINGS AND SLEEVES INDICATED ON THE STRUCTURAL DRAWINGS ARE FOR REFERENCE ONLY. COORDINATE ALL OPENING LOCATIONS AND DIMENSIONS WITH THE APPROPRIATE CONSULTANT AND THE SUB-CONTRACTOR PRIOR TO CONSTRUCTION.
8. REVIEW ALL DRAWINGS AND CHECK DIMENSIONS PRIOR TO IMPLEMENTING THE WORK. REPORT ANY DISCREPANCIES TO THE CONSULTANT FOR CLARIFICATION BEFORE PROCEEDING.
9. COORDINATE PLACEMENT AND LOCATION OF ITEMS BY SUBSEQUENT TRADES. RELEVANT TRADES SHALL REVIEW PRIOR TO ERECTION AND/OR INSTALLATION.
10. OWNER MAY ADJUST SLAB SIZE BASED ON CONTRACTOR SELECTED EQUIPMENT AT NO ADDITIONAL COST TO OWNER.
11. NOTIFY THE ENGINEER A MINIMUM OF 24 HOURS PRIOR TO ANY REQUIRED SITE REVIEWS.
12. EXISTING STRUCTURE, BEAMS AND/OR SUPPORTS ARE NOT TO BE IMPACTED OR MODIFIED UNLESS NOTED.

EXISTING STRUCTURES

1. THE STRUCTURAL DESIGN IS BASED ON INFORMATION GATHERED FROM THE RECORD DRAWINGS AND FROM LIMITED VISUAL OBSERVATIONS ON SITE.
2. VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS ON SITE PRIOR TO IMPLEMENTING AFFECTED WORK.
3. NOTIFY THE CONSULTANT OF ANY SITE CONDITIONS THAT DIFFER FROM THE CONTRACT DOCUMENTS OR THE RECORD DRAWINGS.

DESIGN LOADS

1. UNLESS NOTED OTHERWISE, THE LOADS NOTED IN TABLES AND ON DRAWINGS ARE UNFACTORED.
2. CLIMATIC INFORMATION REFER TO CLIMATIC INFORMATION TABLE BELOW
3. SITE INFORMATION REFER TO SITE INFORMATION TABLE BELOW

DELEGATED DESIGN

1. PORTIONS OF THE DETAILED DESIGN ARE DELEGATED TO THE CONTRACTOR. RETAIN A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF ONTARIO TO COMPLETE THE DESIGN.
2. SUBMIT SHOP DRAWINGS FOR COMPONENTS REQUIRING DELEGATED DESIGN UNDER THE SEAL AND SIGNATURE OF THE ENGINEER RESPONSIBLE FOR THE DESIGN.
3. THE FOLLOWING COMPONENTS REQUIRE DELEGATED DESIGN:
 - 3.1 STRUCTURAL STEEL CONNECTIONS
 - 3.2 CONCRETE MIX DESIGN
 - 3.3 REBAR DETAILS
4. THE ENGINEER RESPONSIBLE FOR THE DESIGN IS ALSO RESPONSIBLE FOR REVIEW OF FABRICATION AND INSTALLATION OF THE COMPONENTS. UPON COMPLETION OF THE WORK, CERTIFY IN WRITING TO THE CONSULTANT THAT SUCH REVIEW HAS BEEN COMPLETED.
5. REFER TO SPECIFICATIONS FOR FURTHER REQUIREMENTS.

FOUNDATION AND GEOTECHNICAL NOTES

1. FOUNDATION DESIGN IS BASED ON THE FOUNDATION INVESTIGATION SOILS REPORT PREPARED BY Stantec Consulting Ltd., TITLED "DRAFT - GEOTECHNICAL INVESTIGATION PROPOSED COMPRESSOR PLANT ADDITION AND SUBSTATION EXPANSION, NATIONAL RESEARCH COUNCIL CANADA", AND DATED "JULY 17, 2014". ENSURE THAT THE REQUIREMENTS OUTLINED IN THE REPORT ARE READ AND UNDERSTOOD PRIOR TO COMMENCING WITH FOUNDATION WORK.
2. STRIP FOOTINGS HAVE BEEN DESIGNED BASED ON A FACTORED BEARING RESISTANCE OF 350 kPa.
3. BEAR ALL FOOTINGS ON UNDISTURBED SOIL NOTWITHSTANDING THE ELEVATIONS INDICATED ON THE DRAWINGS.
4. BRING OVER-EXCAVATION AND CAVITIES IN THE FOOTING BASE UP TO THE REQUIRED LEVELS WITH COMPACTED OPSS GRANULAR 'B' TYPE 2
5. REMOVE ALL ORGANIC MATERIAL FROM THE BUILDING AREA AS OUTLINED IN THE GEOTECHNICAL REPORT AND DISPOSE OF OFF SITE.
6. REMOVE ALL LOOSE OR SATURATED MATERIAL AND GROUNDWATER FROM THE BASE OF FOOTING EXCAVATIONS BY APPROVED METHODS PRIOR TO PLACING FOUNDATIONS.
7. PROTECT EXCAVATIONS FOR FOOTINGS FROM RAIN, SNOW, FREEZING TEMPERATURES, STANDING WATER, LOSS OF MOISTURE AND DEGRADATION BY APPROVED METHODS.
8. BEARING SURFACES TO BE INSPECTED IN THE FIELD BY A PROFESSIONAL GEOTECHNICAL ENGINEER REGISTERED IN THE PROVINCE OF ONTARIO PRIOR TO PLACING CONCRETE.
9. GEOTECHNICAL TESTING AGENCY TO BE APPROVED BY AND RESPONSIBLE TO THE ENGINEER AND PAID FOR BY THE CONTRACTOR. PROVIDE A MINIMUM OF 24 HOURS NOTICE PRIOR TO REQUIRED INSPECTION.
10. UNLESS OTHERWISE SHOWN ON PLAN, FOUNDATION ELEMENTS ARE TO BE CENTERED UNDER WALLS, GRADE BEAMS, AND COLUMNS.
11. PROVIDE DOWELS FROM FOOTINGS TO MATCH ALL VERTICAL COLUMN REINFORCEMENT OR AS NOTED ON THE DRAWINGS.
12. BACKFILL MATERIAL TO CONSIST OF OPSS GRANULAR 'B' TYPE 2 AND BE COMPACTED TO 100% OF STANDARD PROCTOR MAXIMUM DRY DENSITY IN MAXIMUM LIFTS OF 300 mm.
13. BACKFILL WALLS BELOW GRADE EVENLY ON BOTH SIDES ENSURING THAT NO PORTION OF THE FILL IS PLACED MORE THAN 600 mm ABOVE ANY OTHER PORTION OF THE FILL DURING BACKFILLING.

CLIMATIC INFORMATION	
TO BE READ IN CONJUNCTION WITH DESIGN NOTES	
SNOW LOAD (1/50), S _s	2.4 kPa
SNOW LOAD (1/50), S _r	0.4 kPa
ONE DAY RAIN (1/50)	91mm
HOURLY WIND PRESSURE (1/10)	0.32 kPa
HOURLY WIND PRESSURE (1/50)	0.41 kPa
SEISMIC RESPONSE, S _a (0.2)	0.63
SEISMIC RESPONSE, S _a (0.5)	0.31
SEISMIC RESPONSE, S _a (1.0)	0.14
SEISMIC RESPONSE, S _a (2.0)	0.046
SEISMIC RESPONSE, P _{GA}	0.32

CAST-IN-PLACE REINFORCED CONCRETE

1. CONCRETE MATERIALS, QUALITY, MIXING, PLACING, FORMWORK AND OTHER CONSTRUCTION PRACTICES TO CONFORM TO CSA-A23.1.
2. SUPPLY CONTROLLED CONCRETE IN ACCORDANCE WITH CSA-A23.1 WITH PROPERTIES NOTED IN SPECIFICATION 033000.
3. USE TYPE GU CEMENT FOR ALL CONCRETE UNLESS NOTED OTHERWISE.
4. NOTIFY CONSULTANT 24 HOURS PRIOR TO CONCRETE POURS TO ALLOW FOR REVIEW OF REINFORCEMENT.
5. DO NOT USE ADMIXTURES CONTAINING CALCIUM CHLORIDE.
6. FOR FLOOR SLABS, DESIGN THE CONCRETE MIX WITH AGGREGATE GRADING AND WATER TO CEMENTING MATERIALS RATIO TO MINIMIZE SHRINKAGE.
7. FIELD AND LABORATORY TESTING OF CONCRETE TO BE COMPLETED BY A THIRD PARTY TESTING AND INSPECTION AGENCY APPROVED BY AND RESPONSIBLE TO THE ENGINEER. TESTING AGENCY SHALL BE CERTIFIED TO CSA-A283 AND TESTING TO BE COMPLETED IN ACCORDANCE WITH CSA-A23.2. TESTING PAID FOR BY CONTRACTOR.

CONCRETE REINFORCEMENT

1. REINFORCEMENT STEEL TO CONFORM TO CSA-G30.18 GRADE 400.
2. DO NOT WELD REINFORCEMENT UNLESS APPROVED IN WRITING BY THE ENGINEER. REINFORCEMENT TO BE WELDED TO CONFORM TO CSA-G30.18, GRADE 400W. WELDING ONLY PERMITTED BY AN ORGANIZATION CERTIFIED TO CSA-W186.
3. NOTIFY THE ENGINEER PRIOR TO CONCRETE PLACEMENT TO ALLOW FOR REVIEW OF REINFORCEMENT.
4. SUBMIT SHOP DRAWINGS AND DETAILS FOR ALL REINFORCEMENT FOR REVIEW PRIOR TO FABRICATION.
5. CLEAR CONCRETE COVER TO REINFORCEMENT

CAST PERMANENTLY AGAINST EARTH	75mm
REMINDER	60mm
6. REINFORCEMENT SPLICES - DO NOT SPLICE REINFORCEMENT.
7. EMBEDMENT OF DOWELS ARE DIMENSIONED ON THE DRAWINGS.
8. WELDED WIRE MESH TO CONFORM TO ASTM A497/A497M.
9. ALL REINFORCEMENT TO BE SUPPORTED AT 900mm MAXIMUM SPACING.

CONCRETE FORMWORK

1. DESIGN, FABRICATION, ERECTION, AND OTHER CONSTRUCTION PRACTICES TO CONFORM TO CAN/CSA-S269.3.

STRUCTURAL STEEL

1. DESIGN, FABRICATION, ERECTION, AND OTHER CONSTRUCTION PRACTICES TO CONFORM TO CSA-S16 AND THE CISC CODE OF STANDARD PRACTICE FOR STRUCTURAL STEEL.
2. STEEL TO BE FABRICATED AND ERECTED BY A SHOP CERTIFIED BY THE CANADIAN WELDING BUREAU TO THE REQUIREMENTS OF CSA-W47.1, DIVISION 1 OR 2.1 ONLY.
3. SUBMIT SHOP DRAWINGS SHOWING ALL STRUCTURAL STEEL MEMBERS FOR REVIEW PRIOR TO FABRICATION. WELDING TO CONFORM TO CSA-W59.
4. WELDING TO REINFORCEMENT STEEL ONLY BY A SHOP CERTIFIED TO CSA-W186 WITH REINFORCEMENT CONFORMING TO CSA-G30.18, GRADE 400W.
5. ALL EXPOSED WELDS TO BE CONTINUOUS. GRIND ALL EXPOSED WELDS SMOOTH, INCLUDING PAINTED STEEL.
6. SUPPLY STEEL WITH PROPERTIES NOTED IN SPECIFICATION 05 12 23.
7. ALL STEEL TO BE SHOP GALVANIZED TO CONFORM TO CAN/CSA-G164.
8. STRUCTURAL STEEL SHALL CONFORM TO CSA G40.20/G40.21 GRADE 300W.
9. CONNECTIONS NOT DETAILED ON THE STRUCTURAL DRAWINGS SHALL BE DESIGNED AND DETAILED BY A PROFESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE PROVINCE OF ONTARIO AT THE STEEL FABRICATOR'S EXPENSE.
10. PROVIDED A MINIMUM OF 2 BOLTS IN BOLTED CONNECTIONS.
11. ALL BOLTED CONNECTIONS TO USE SNUG-TIGHTENED HIGH-STRENGTH BOLTS UNLESS OTHERWISE NOTED ON THE DRAWINGS.
12. UNLESS NOTED OTHERWISE, DESIGN CONNECTIONS FOR NON-COMPOSITE BEAMS FOR A FACTORED SHEAR FORCE EQUAL TO 100% OF THE TOTAL BEAM LOAD TABULATED IN THE CISC HANDBOOK OF STEEL CONSTRUCTION.
13. PROVIDE 10 mm PLATE STIFFENERS EACH SIDE OF BEAM WHERE AT ALL BEARING CONNECTIONS UNLESS OTHERWISE NOTED ON THE DRAWINGS.
14. DO NOT SPLICE MATERIAL WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER. WHERE GRANTED, A COMPLETE NON-DESTRUCTIVE EXAMINATION WILL BE MANDATORY AND PAID FOR BY THE SUB-CONTRACTOR.
15. SQUARE CUT OR FULL STRENGTH WELD ALL COLUMNS AT BASE PLATES AND AT TOP WHERE BEARING UNDER CONTINUOUS BEAMS.
16. CLEAN, PREPARE AND PRIME ALL STRUCTURAL STEEL AND ANCHOR PLATES. DO NOT PRIME ANCHOR BOLTS OR SURFACES IN CONTACT WITH CONCRETE.
17. TOUCH-UP FIELD WELDS, CONNECTIONS AND ABRASIONS TO MATCH THE SHOP PRIMER.
18. SHOP AND FIELD INSPECTION OF STEEL FABRICATION AND ERECTION TO BE COMPLETED BY A THIRD PARTY TESTING AND INSPECTION AGENCY APPROVED BY AND RESPONSIBLE TO THE ENGINEER. TESTING AGENCY SHALL BE CERTIFIED TO CSA-W178. TESTING PAID FOR BY CONTRACTOR.
19. ALL GROUT UNDER BEARING PLATES AND BASE PLATES SHALL BE NON-METALLIC, NON-SHRINK TYPE WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 50 MPa, INSTALLED IN ACCORDANCE WITH THE SPECIFICATION AND MANUFACTURER'S RECOMMENDATIONS. PROVIDE GROUT WEEP HOLES IN COLUMN BASE PLATES WHERE SHOWN.

SITE INFORMATION	
TO BE READ IN CONJUNCTION WITH DESIGN NOTES	
IMPORTANCE CATEGORY	NORMAL
WIND EXPOSURE TYPE	OPEN TERRAIN
INTERNAL PRESSURE CATEGORY	1
FOUNDATION SITE CLASS	D

No.	Date	Revision	By	Appr.
C	15.07.23	RE-ISSUED FOR TENDER		T.M.
C	15.07.17	ISSUED FOR TENDER		T.M.
B	15.07.08	ISSUED FOR 90% REVIEW		T.M.
A	15.03.31	ISSUED FOR 66% REVIEW		T.M.

Date Printed: _____ Date Imprimée: _____

- Verify all dimensions and site conditions and be responsible for same
- Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

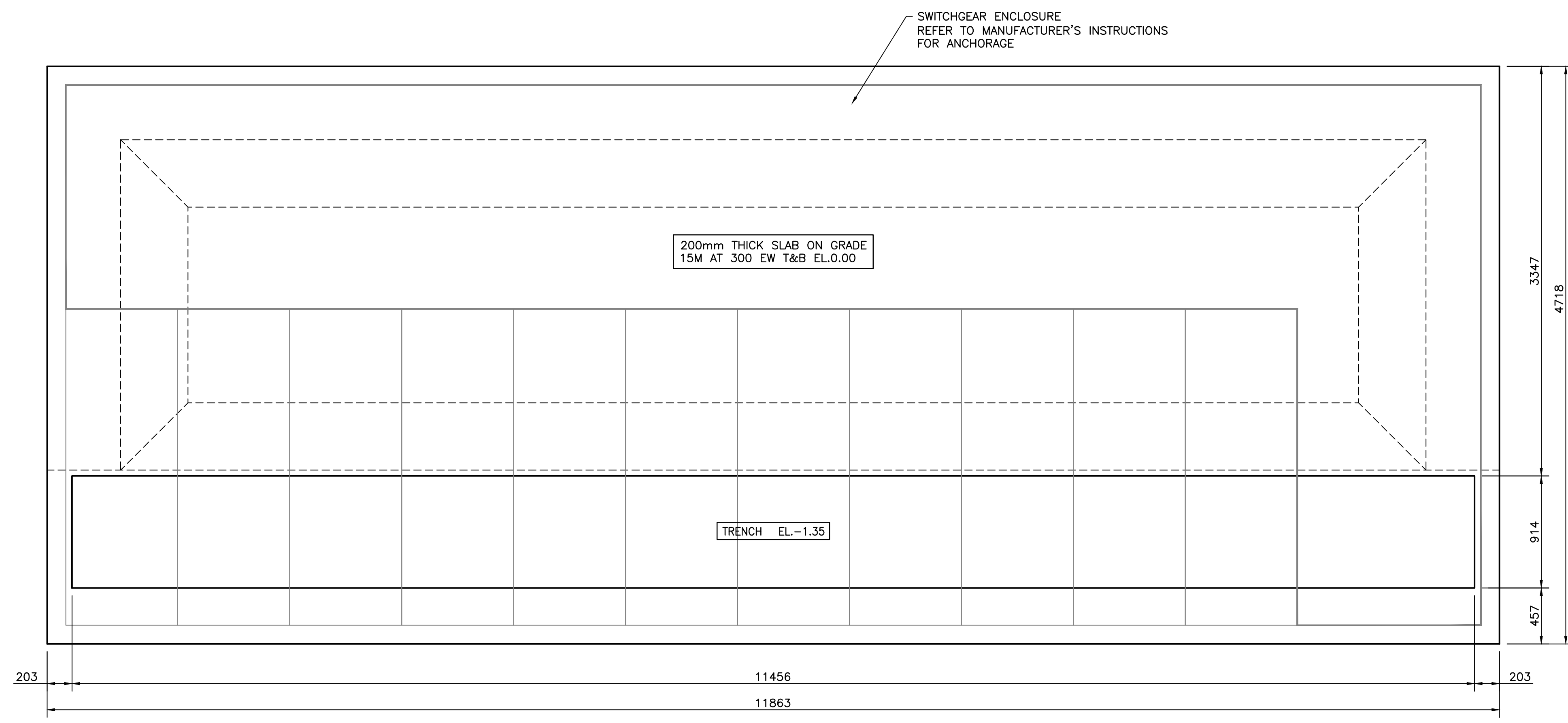
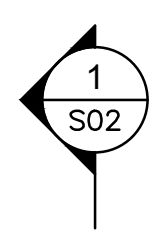
A	A Detail no. No. du détail	A
B	B Location drawing no. sur dessin no.	B C
C	C Drawing no. dessin no.	

project: **BUILDING U-66
 NEW 115 KV OUTDOOR
 SUBSTATION**
 UPLANDS CAMPUS

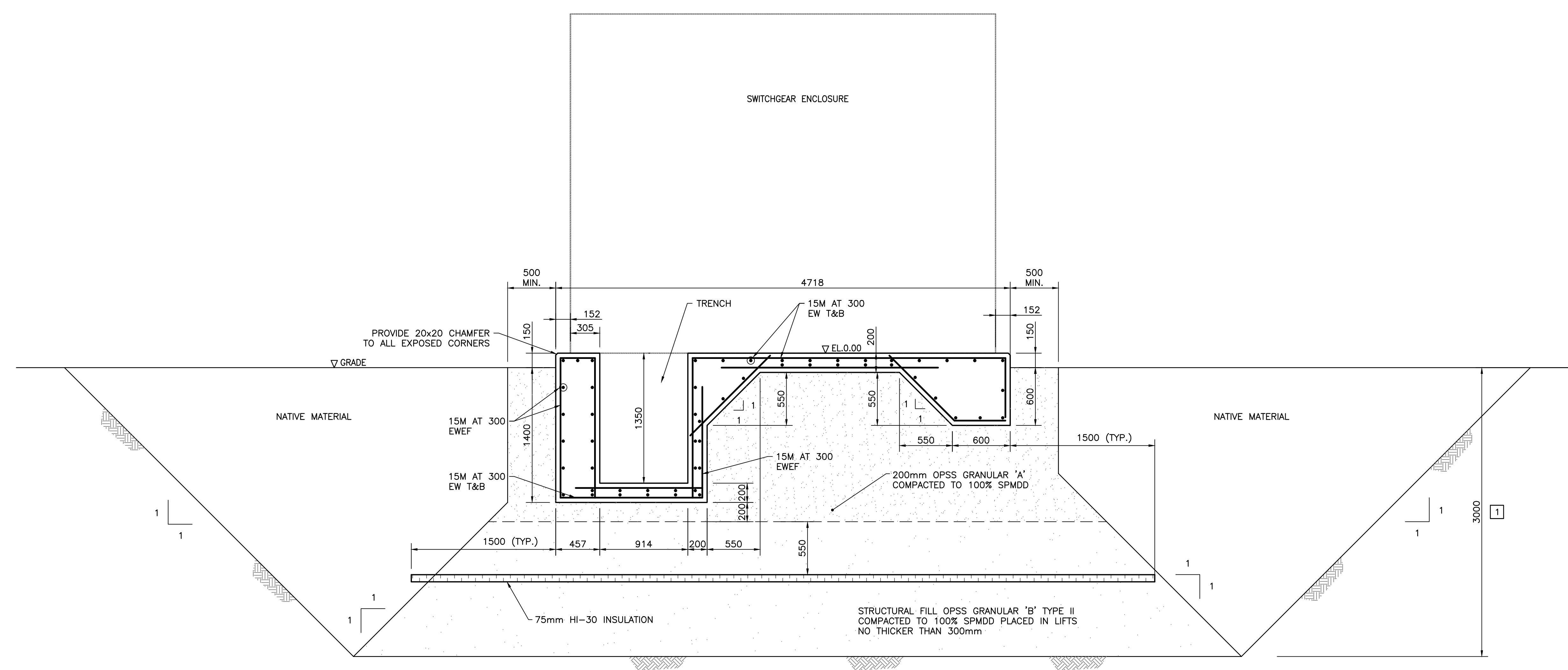
drawing: **STRUCTURAL
 GENERAL LAYOUT AND NOTES**

designed	conçu	date	date	D-2642-S01
T. MILLER		MARCH 2015		
drawn	dessiné	scale	échelle	D-2642-S01
Y. WY		1:100		
checked	vérifié	sheet	feuille	D-2642-S01
		18	of/ de 23	
approved	approuvé	W.O. no.	D.T. no.	D-5078-S01
dwg. no.	dessin no.			

DRAWING NOTES:
 1 EXCAVATE NATIVE FILL TO A DEPTH OF 3 METERS BELOW EXISTING GRADE. REMOVED ALL EXCESS MATERIAL FROM SITE.



SWITCHGEAR ENCLOSURE
 FOUNDATION PLAN
 1:25



1 SECTION
 S02 1:25

C	15.07.23	RE-ISSUED FOR TENDER	T.M.
C	15.07.17	ISSUED FOR TENDER	T.M.
B	15.07.08	ISSUED FOR 90% REVIEW	T.M.
A	15.03.31	ISSUED FOR 66% REVIEW	T.M.

Date Printed: _____ Date Imprimée: _____

- Verify all dimensions and site conditions and be responsible for same
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A	A Detail no. No. du détail	A
C	B Location drawing no. sur dessin no.	B C
	C Drawing no. dessin no.	

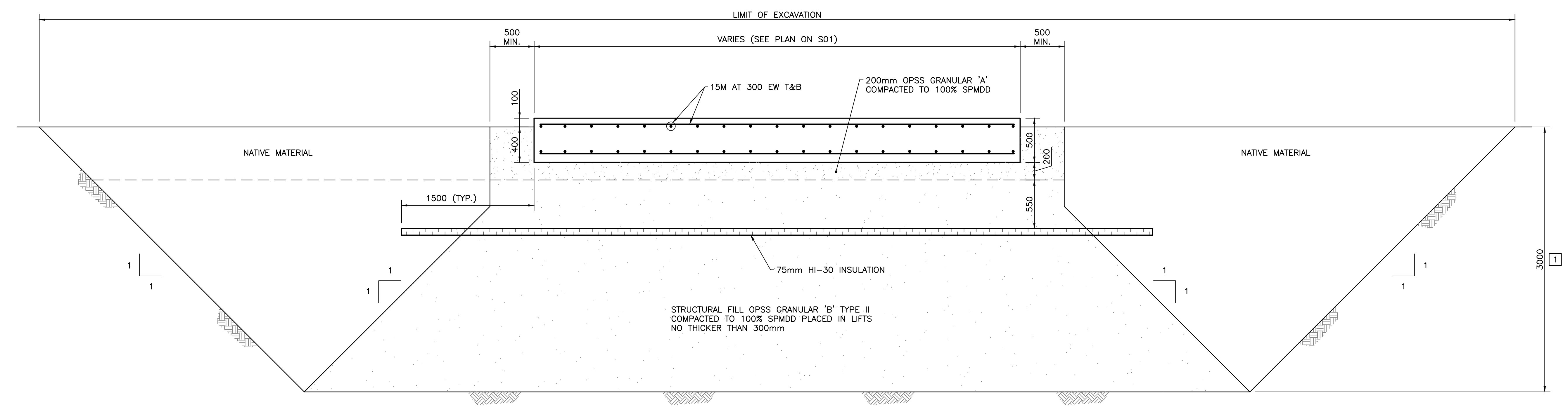
project: BUILDING U-66
 NEW 115 KV OUTDOOR SUBSTATION
 UPLANDS CAMPUS

drawing: STRUCTURAL SWITCHGEAR ENCLOSURE PAD SECTIONS AND DETAILS

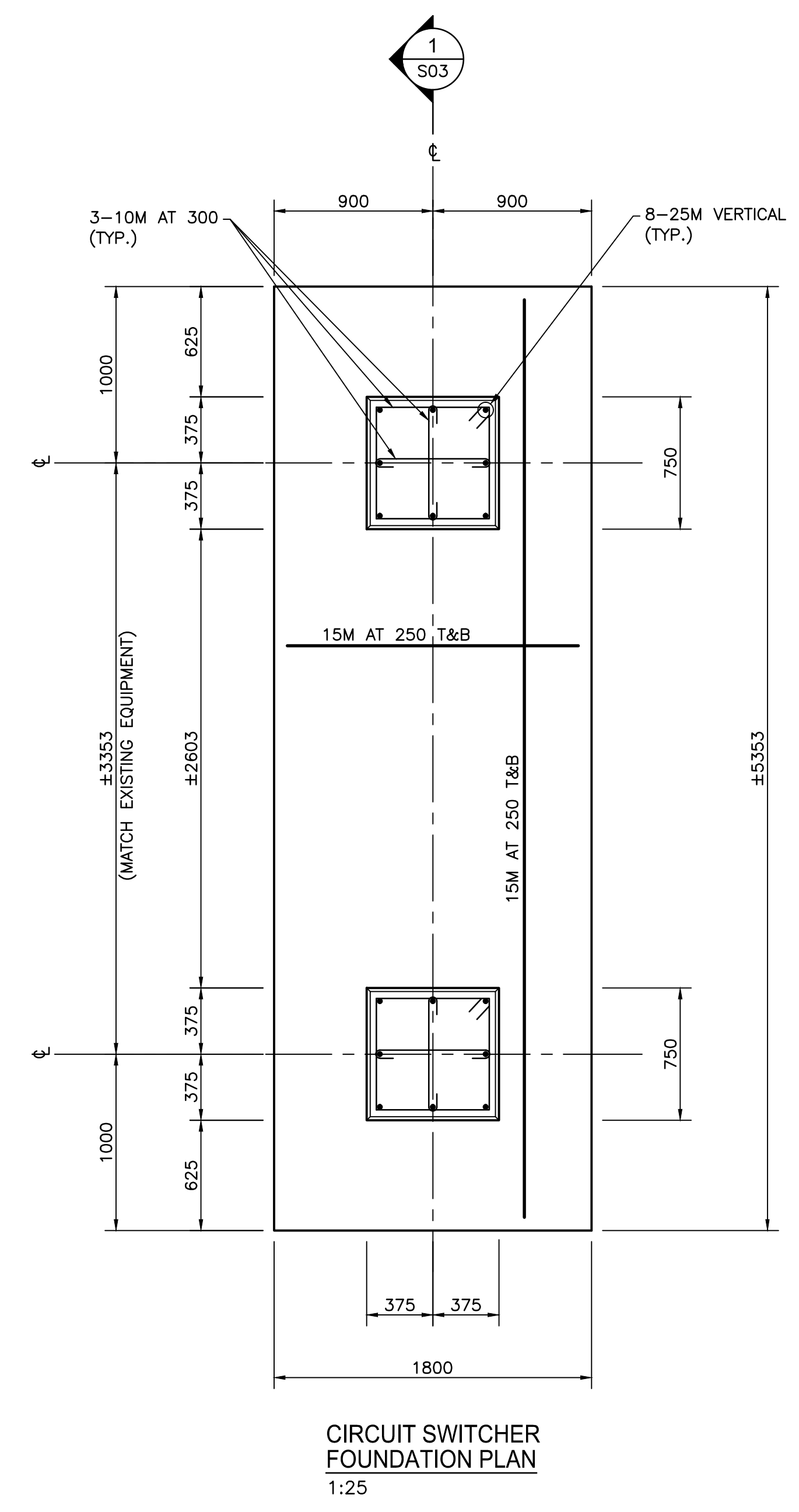
designed T. MILLER	conçu T. MILLER	date MARCH 2015	date MARCH 2015
drawn Y. WY	dessiné Y. WY	scale 1:25	échelle 1:25
checked	vérifié	sheet 19 of/ de 23	feuille 19 of/ de 23
approved	approuvé	W.O. no.	D.T. no.
		Stantec No: 163301846	
dwg. no.			dessin no.

D-2642-S02
 D-5078-S02

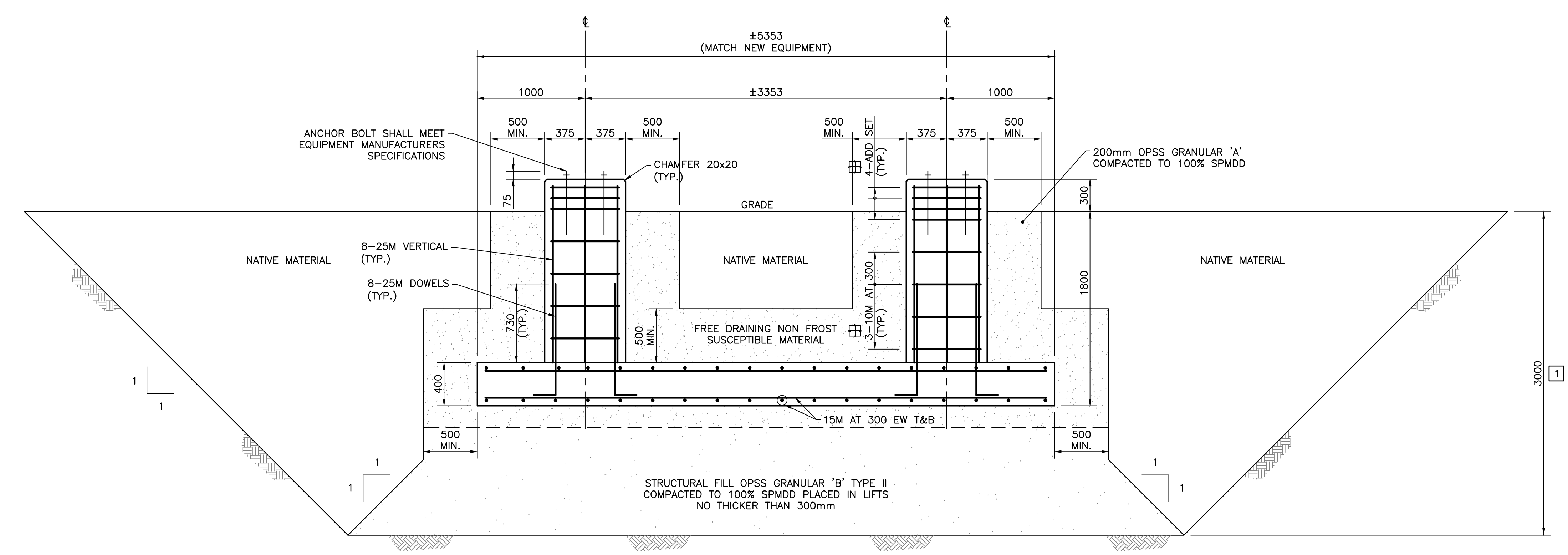
DRAWING NOTES:
 1 EXCAVATE NATIVE FILL TO A DEPTH OF 3 METERS BELOW EXISTING GRADE. REMOVED ALL EXCESS MATERIAL FROM SITE.



TRANSFORMER PAD - TYPICAL SECTION
 1:25



CIRCUIT SWITCHER FOUNDATION PLAN
 1:25



SECTION
 1 S03
 1:25

C	15.07.23	RE-ISSUED FOR TENDER	T.M.
C	15.07.17	ISSUED FOR TENDER	T.M.
B	15.07.08	ISSUED FOR 90% REVIEW	T.M.
A	15.03.31	ISSUED FOR 66% REVIEW	T.M.

- Date Printed: _____ Date Imprimée: _____
- Verify all dimensions and site conditions and be responsible for same
 - Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité

A	A Detail no. No. du détail	A
C	B Location drawing no. sur dessin no.	B C
	C Drawing no. dessin no.	

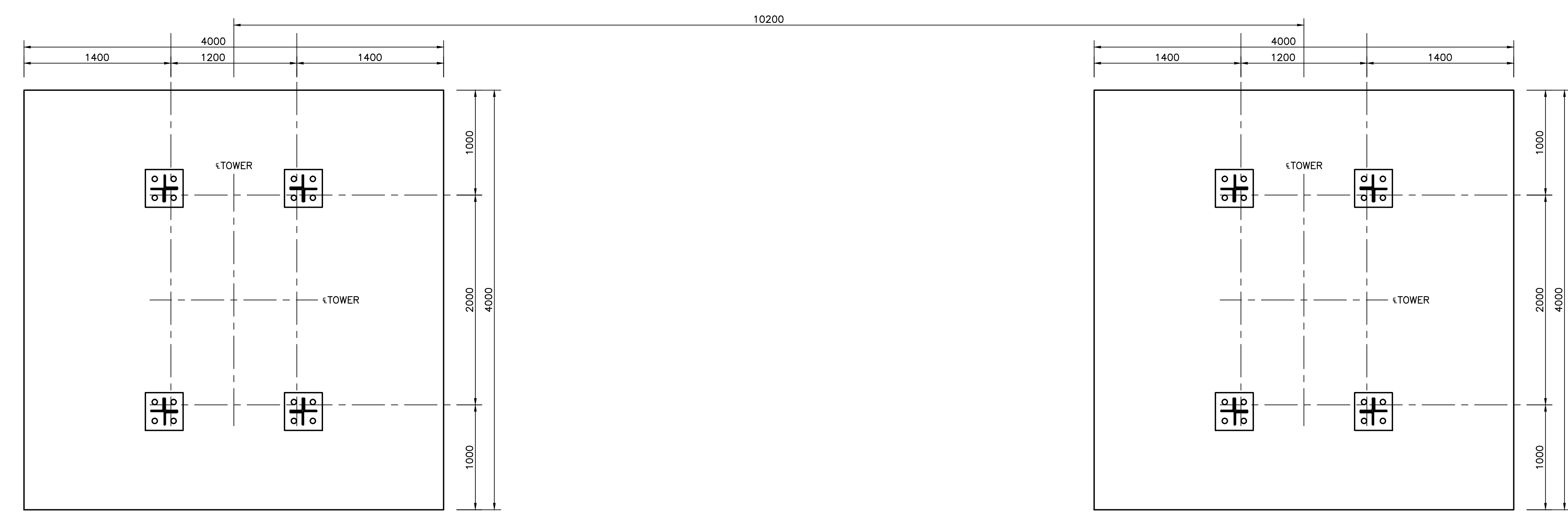
project: BUILDING U-66
 NEW 115 KV OUTDOOR SUBSTATION
 UPLANDS CAMPUS

drawing: STRUCTURAL
 TRANSFORMER + CCT SWITCHER PAD - SECTIONS AND DETAILS

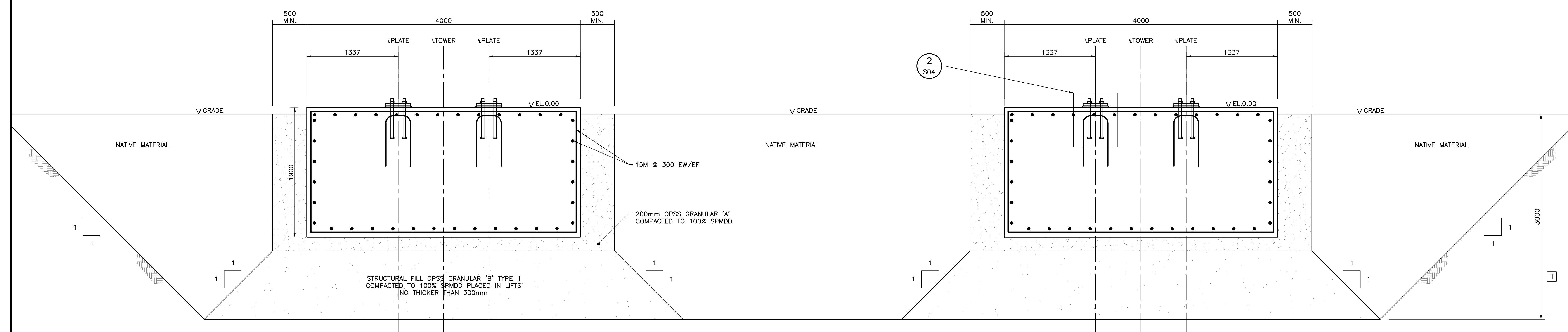
designed T. MILLER	conçu T. MILLER	date MARCH 2015	date MARCH 2015	D-2642-S03
drawn Y. WY	dessiné Y. WY	scale 1:25	échelle 1:25	
checked	vérifié	sheet 20	feuille 23	
approved	approuvé	W.O.no.	D.T.no.	
dwg.no.		Shantec No: 163301846	dessin no.	

D-5078-S03

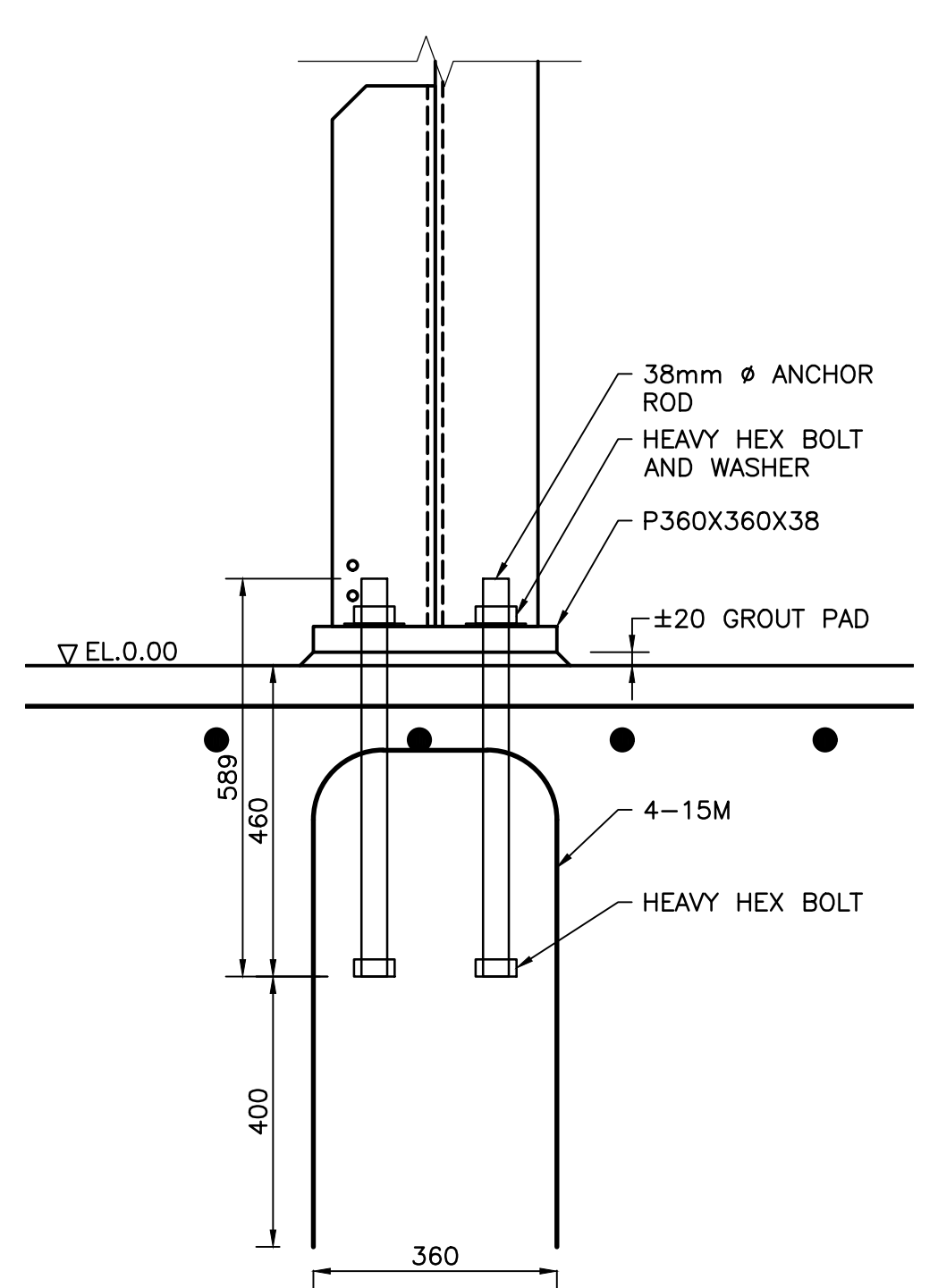
DRAWING NOTES:
 1 EXCAVATE NATIVE FILL TO A DEPTH OF 3 METERS BELOW EXISTING GRADE. REMOVED ALL EXCESS MATERIAL FROM SITE.



GANTRY FOUNDATION PLAN
 1:25



1 SECTION
 1:25



2 PLATE DETAIL
 1:10

C	15.07.23	RE-ISSUED FOR TENDER	T.M.
C	15.07.17	ISSUED FOR TENDER	T.M.
B	15.07.08	ISSUED FOR 90% REVIEW	T.M.
A	15.03.31	ISSUED FOR 66% REVIEW	T.M.

Date Printed: _____ Date Imprimée: _____
 • Verify all dimensions and site conditions and be responsible for same.
 • Vérifier toutes les dimensions et l'état des lieux et en assumer la responsabilité.

A	A Detail no. / No. du détail	A
C	B Location drawing no. / sur dessin no.	B C
	C Drawing no. / dessin no.	

project: BUILDING U-66
 NEW 115 KV OUTDOOR SUBSTATION
 UPLANDS CAMPUS

drawing: STRUCTURAL
 GANTRY BASE
 SECTIONS AND DETAILS

designed T. MILLER	conçu MARCH 2015	date	scale AS SHOWN	échelle	sheet 21	of/da 23	feuille	D-2642-S04
drawn Y. WY	dessiné	scale	AS SHOWN	échelle	sheet 21	of/da 23	feuille	D-2642-S04
checked	vérifié	sheet 21	of/da 23	feuille				
approved	approuvé	W.O. no.	D.T. no.					
dwg. no.	Shantec No: 163301846							
								D-5078-S04

