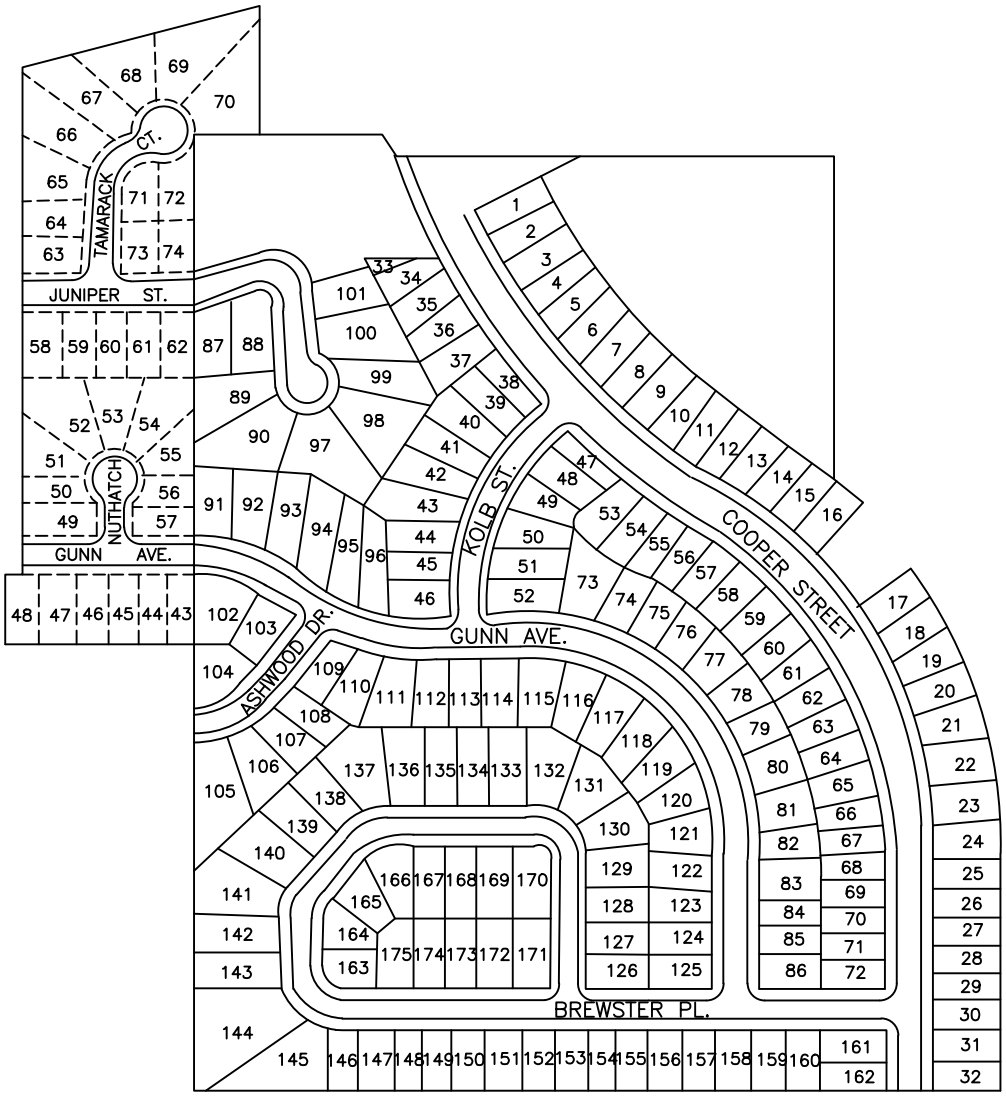
UNDERGROUND
STANDARDS

Issued by: Engineering Department
GrandBridge Energy Inc.

Effective: **September 7, 2023**

Approved by Gurdeep Bansal, P.Eng. Gurdeep Bansal

Approval is given in accordance with Ontario Regulation 22/04. There are no undue hazards. It is suitable for the intended application and will be adequately inspected.

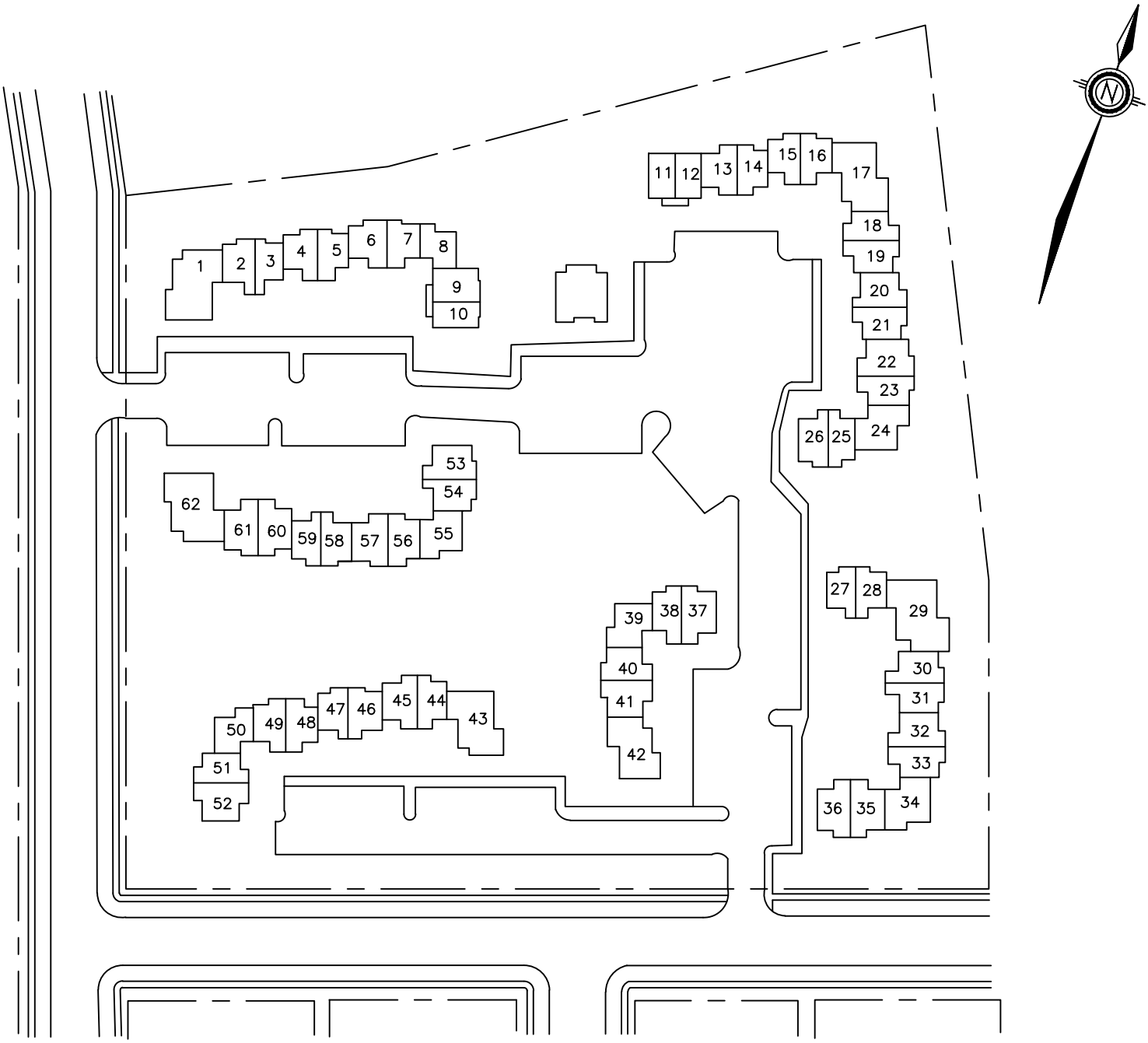


REV.	DATE			CHEK'D. BY
2.	SEPT 21/23	GBE LOGO UPDATE	T.X.	
1.	JUN 28/96	ADDED CURBS AND STREET NAMES	S.J.	

GrandBridge ENERGY

TITLE: EXAMPLE PLAN OF RESIDENTIAL SUBDIVISION.

DATE: MAY /93	SCALE: N.T.S.	W.O.No.:	DRAWN BY: BILL J.
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No. UGS-00A	



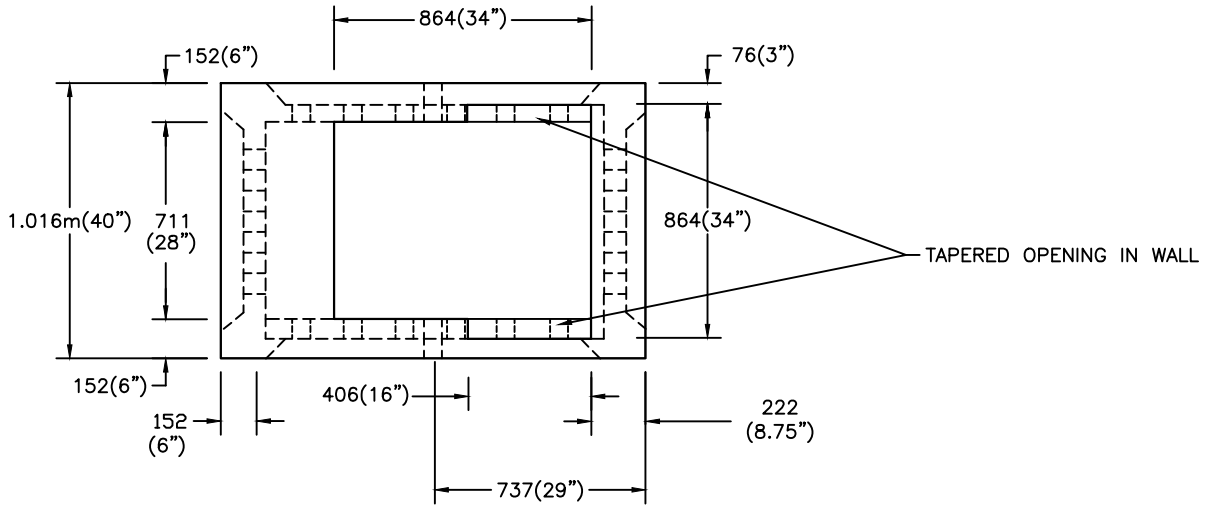
REV.	DATE			CHEK'D. BY
2.	SEPT 21/23	GBE LOGO UPDATE	R.S.	
1.	JUN 28/96	ADDED SIDEWALK	S.J.	

GrandBridge ENERGY

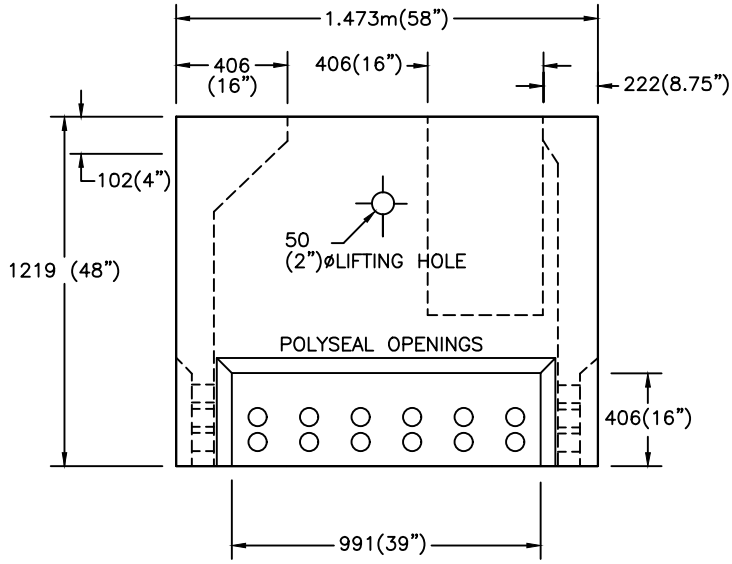
TITLE: EXAMPLE OF PLAN OF MULTIPLE UNIT DEVELOPMENT BLOCK.

DATE:	SCALE:	W.O.No.:	DRAWN BY:
MAY /93	N.T.S.		BILL J.

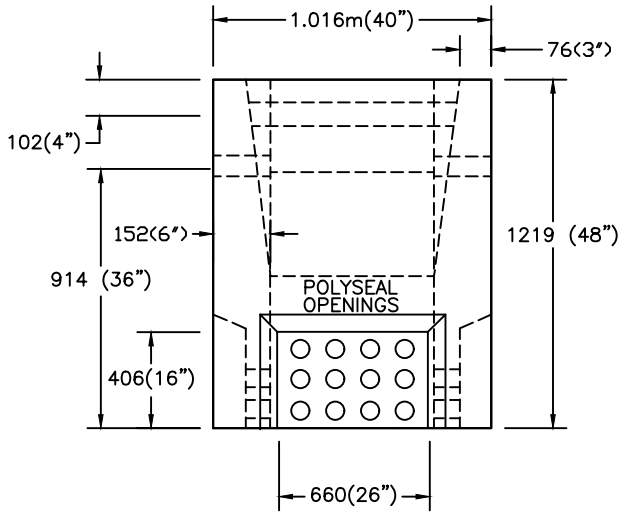
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS–00B



TOP VIEW



SIDE VIEW



FRONT VIEW

NOTES:

1. FOUNDATION TO BE PRE-CAST, REFER TO THE EQUIPMENT APPROVAL SHEET
2. CABLE COMPARTMENT OPENING SHALL BE TAPERED AS SHOWN
3. CONCRETE STRENGTH TO BE M IN. 30 MPA, AIR 5-7%
4. FOUNDATION TO BE STEEL REINFORCED WITH 4V4" % WELDED WIRE MESH OR EQUAL.
5. INSERTS SHALL BE THREADED.
6. FOUNDATION TO BE SUPPLIED WITH 2" DIA. LIFTING HOLES WITH PLUGS AS SHOWN.
7. INDIVIDUAL (POLYSEAL OR EQUAL) CABLE KNOCKOUTS TO BE PROVIDED AS SHOWN C/W DIMENSIONS TO SUIT 4" (ID) TYPE 2 PVC DUCT.
8. ALL DIMENSIONS IN MM UNLESS OTHERWISE NOTED.

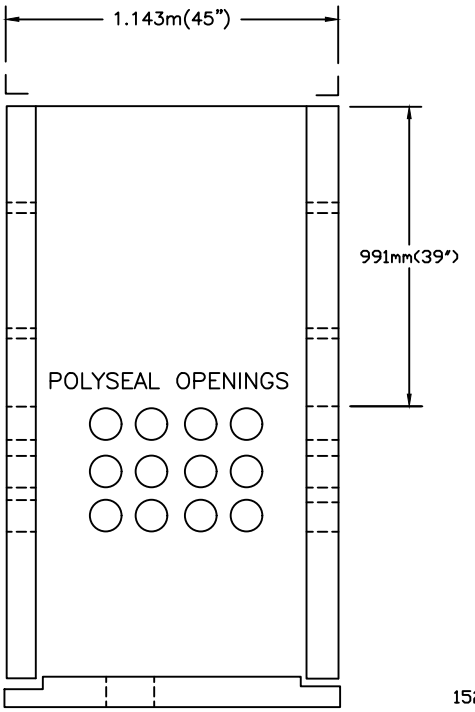
REV.	DATE			CHEK'D. BY
3.	SEPT. 21/23	GBE LOGO UPDATED	RS	
2.	MAY. 05/19	INCREASED END HOLES TO 12	KH	
1.	NOV. 24/06	MINOR UPDATE.	RS	

GrandBridge ENERGY

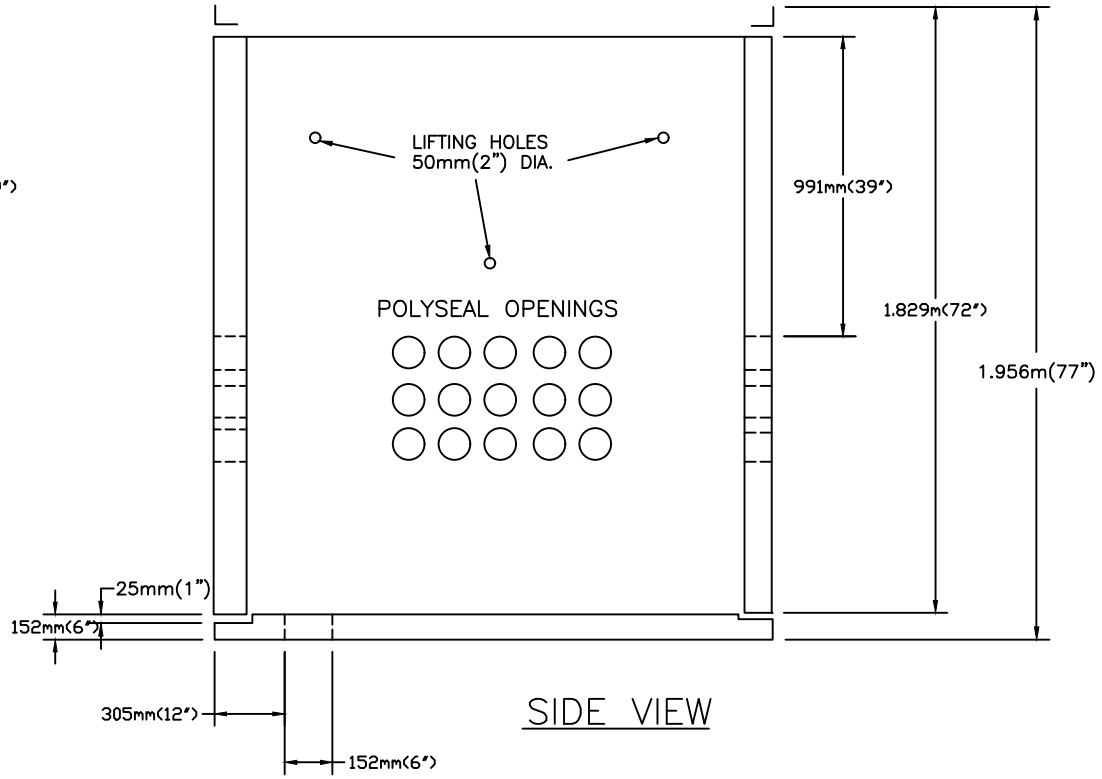
TITLE: PRECAST CONCRETE FOUNDATION FOR SINGLE PHASE MINI PAD TRANSFORMER

DATE: APR 2, 2023	SCALE:	W.O.No.:	DRAWN BY: EV

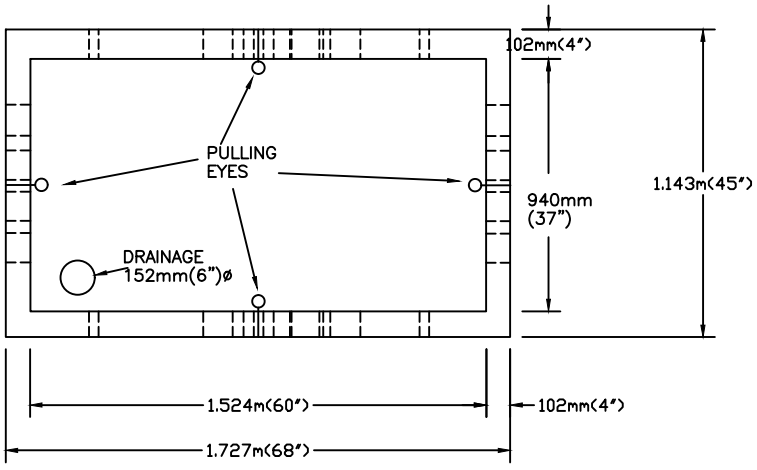
DESIGNED BY | APPROVED BY P.ENG. | DRAWING No. UGS-004



END VIEW



SIDE VIEW



TOP VIEW

NOTES:

1. UNDERGROUND VAULT TO BE SUPPLIED BY GBE APPROVED CONTRACTOR.
2. CONCRETE STRENGTH TO BE A MINIMUM OF 30 MPa.
3. VAULT TO BE STEEL REINFORCED.
4. VAULT TO BE SUPPLIED WITH LIFTING HOLES WITH PLUGS.
5. VAULT TO BE SUPPLIED WITH POLYSEAL DUCT OPENINGS TO SUIT 4" (ID) TYPE 2 PVC DUCT.
6. VAULT TO BE SUPPLIED WITH PULLING EYES ON EACH SIDE.
7. STEEL LIDS/FRAME MUST HAVE A PROVISION FOR GROUNDING.

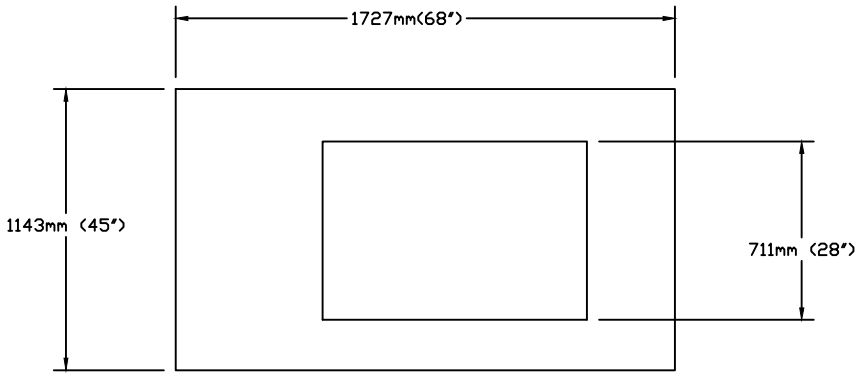
REV.	DATE			CHEK'D. BY
5.	SEPT 21/23	GBE LOGO UPDATED	T.X	
4.	NOV. 24/06	MINOR UPDATE.	R.S.	
3.	MAY 17/05	UPDATED NOTES.	R.S.	
2.	MAY 31/99	ADDED POLYSEAL OPENINGS AND PULLING EYES.	R.S.	
1.	NOV. 10/97	ADDED I.C.S. AS A SUPPLIER AND STYROFOAM FOR OPENINGS.	R.S.	

GrandBridge ENERGY

TITLE: UNDERGROUND PULLING VAULT

DATE:	SCALE:	W.O.No.:	DRAWN BY:
MAY/93	N.T.S.		BILL J.

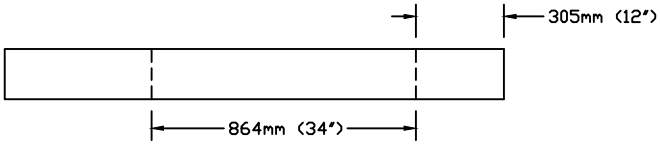
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS-005



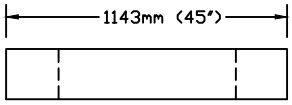
TOP VIEW

NOTE:

DIMENSIONS SHOWN ARE IN (mm) EXCEPT AS OTHERWISE NOTED.



SIDE VIEW



FRONT VIEW

NOTES:

1. CONCRETE STRENGTH TO BE A MINIMUM OF 30MPa.
2. LID IS TO BE STEEL REINFORCED.
3. THIS LID IS USED INSTEAD OF METAL COVER PLATES FOR THE TOP OF A 68" X 45" PRECAST VAULT. FOR DETAILS OF PRECAST VAULT, SEE DRAWING UGS-005.
4. A SUITABLE MEANS OF LIFTING THE LID SHALL BE PROVIDED.

REV.	DATE			CHEK'D. BY
1.	SEPT. 21/23	GBE LOGO UPDATED	RS	

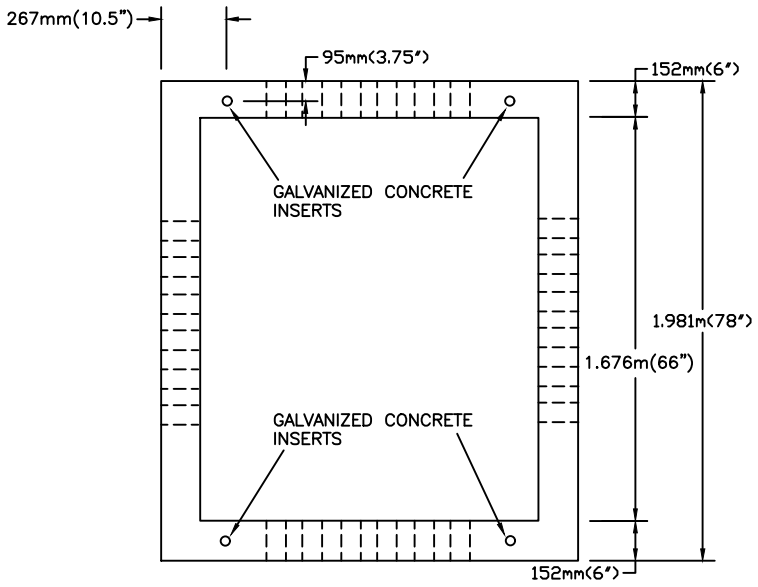
GrandBridge ENERGY

TITLE: PRECAST CONCRETE LID FOR 68" X 45" VAULT TO ACCEPT MINI PAD TRANSFORMER

DATE:	SCALE:	W.O.No.:	DRAWN BY:
JAN/05	N.T.S.		EV

DESIGNED BY | APPROVED BY P.ENG.

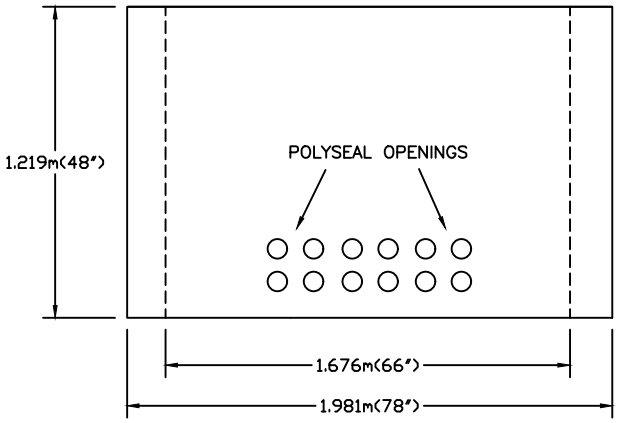
DRAWING No. UGS-005B



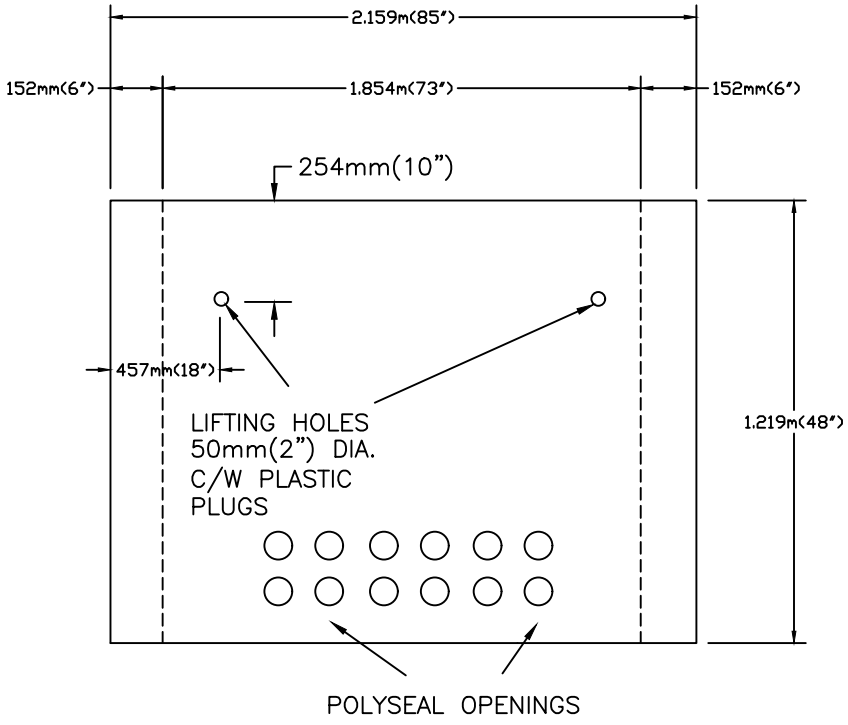
PLAN VIEW

NOTES:

1. ENCLOSURES TO BE USED FROM GBE APPROVED MANUFACTURER
2. CONCRETE STRENGTH TO BE A MIN. 30MPa.
3. ENCLOSURE TO BE STEEL REINFORCED.
4. ENCLOSURE TO BE SUPPLIED WITH 50mm(2") LIFTING HOLES(4 REQUIRED) C/W PLASTIC PLUGS.
5. ENCLOSURE TO BE SUPPLIED WITH POLYSEAL DUCT OPENINGS TO SUIT 4" (ID) TYPE 2 PVC DUCT.



SIDE VIEW



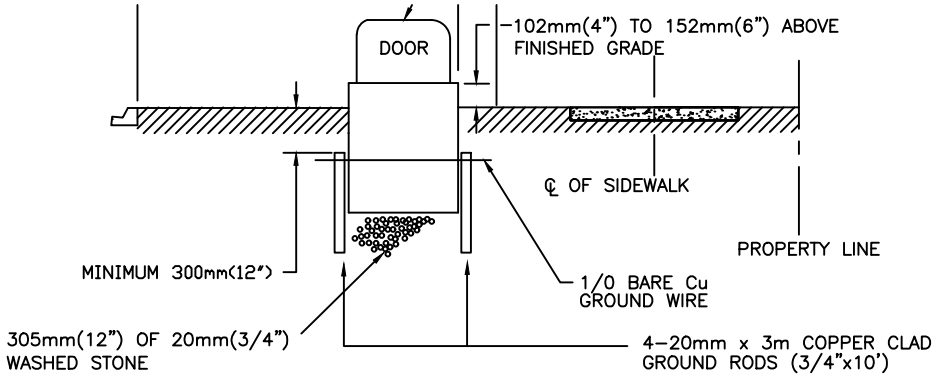
FRONT VIEW

REV.	DATE			CHEK'D. BY
3.	SEPT. 21/23	GBE LOGO UPDATED	R.S.	
2.	NOV. 24/06	MINOR UPDATE.	R.S.	
1.	OCT. 10/97	CHANGED FROM ICS#147 TO ICS#191.	R.S.	

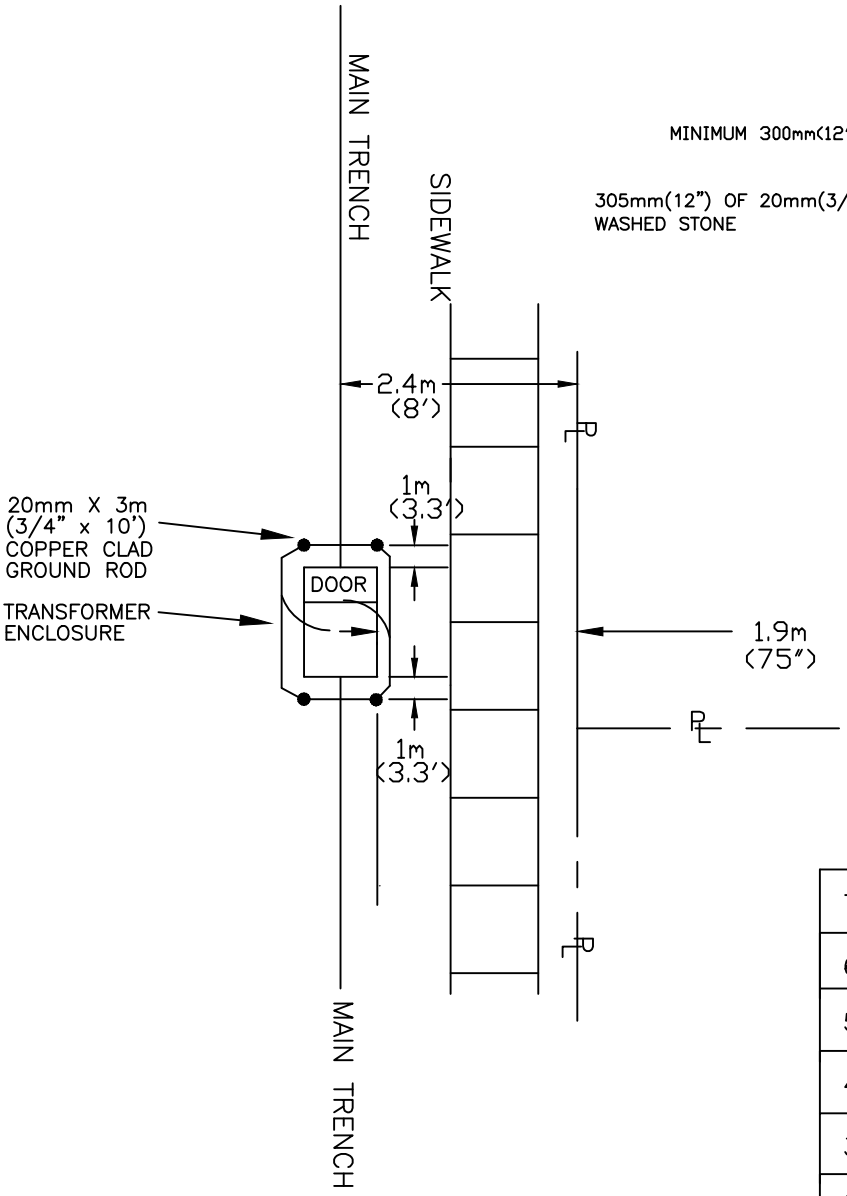
GrandBridge ENERGY

TITLE: PRECAST CONCRETE ENCLOSURE FOR THREE PHASE SWITCHING UNIT.

DATE: MAY/93	SCALE: N.T.S.	W.O.No.:	DRAWN BY: BILL J.
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No. UGS-008	



PROFILE



PLAN VIEW

TO CONNECT GROUND WIRE:

1. CLAMP ONE END TO FIRST ROD.
2. CARRY QUARTERWAY AROUND ENCLOSURE, CLAMP TO SECOND ROD.
3. CARRY HALFWAY AROUND ENCLOSURE, CLAMP TO THIRD ROD.
4. CARRY THREE-QUARTERWAY AROUND ENCLOSURE, CLAMP TO FOURTH ROD.
5. COMPLETE LOOP AROUND ENCLOSURE; CLAMP AGAIN TO FIRST ROD AND CARRY SUFFICIENT LENGTH INTO ENCLOSURE TO LEAVE 2.4m (8') TAIL. CUT GROUND WIRE AT THIS POINT.
6. CLAMP END OF CABLE AGAIN TO THIRD ROD AND CARRY SUFFICIENT LENGTH INTO ENCLOSURE TO LEAVE 2.4m(8') TAIL. CUT WIRE GROUND AT THIS POINT.

SEE DRAWING UGS-004 FOR MINI-PAD ENCLOSURE DETAILS.

NOTES:

1. GROUND RODS TO BE INSTALLED ON ALL FOUR CORNERS OF ENCLOSURE AS SHOWN.
2. 1/0 BARE Cu. GROUND WIRE TO BE CONNECTED TO GROUND ROD WITH APPROVED CLAMPS.(SIX REQUIRED)
3. 305mm(12") OF 20mm (3/4") WASHED STONE TO BE PLACED BELOW ENCLOSURE.
4. TOP OF ENCLOSURE TO BE 25-75mm (1-3") ABOVE FINISHED GRADE AND LEVEL.
5. 2.4m(8') COILS OF Cu. GROUND WIRE TO BE LEFT INSIDE ENCLOSURE.
6. PLYWOOD IS TO BE PLACED AND SECURED ON TOP OF ENCLOSURE BEFORE TRANSFORMERS ARE INSTALLED.
7. ONTARIO ELECTRICAL SAFETY CODE RULE 26-242 APPLIES TO PADMOUNT TRANSFORMER LOCATION. CONTRADICTION WILL NECESSITATE INSTALLATION OF BARRIER WALL BY DEVELOPER, AS SHOWN IN STANDARD DRAWING UGS-026.
8. DEPENDING ON TYPE OF LOT, TRANSFORMER AND STREET LIGHT POLE MAY BE SHIFTED ALONG LOT LINE TO PROVIDE MORE CLEARANCE TO DRIVEWAYS.
9. BELL ENDS SHALL BE INSTALLED ON ALL DUCTS INSIDE ENCLOSURE

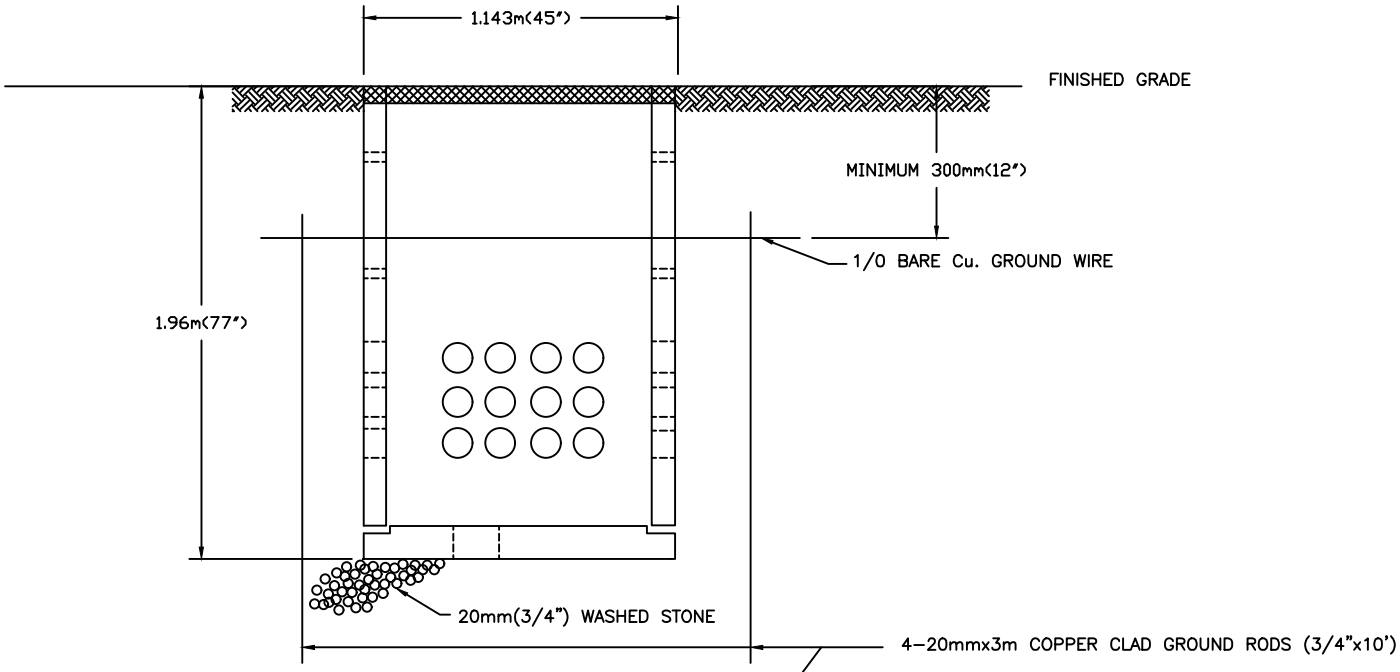
REV.	DATE			CHEK'D. BY
7.	SEPT. 21/23	GBE LOGO UPDATED	R.S.	
6.	DEC 18/12	CHANGED GRADE OF ENCLOSURE TO 102mm(4") to 152mm(6").	L.F.	
5.	NOV. 24/06	CHANGED DWG. REFERENCE FROM UGS-004A TO UGS-004.	R.S.	
4.	APR. 11/03	REVISED OFFSET FROM PROPERTY, ELECTRICAL SAFETY CODE REFERENCE.	E.V.	
3.	JULY 11/00	CHANGED GRADE OF ENCLOSURE FROM 4-6" TO 1-3". ADDED DUCT BELL END REQUIREMENT	E.V.	
2.	MAY 20/99.	CHANGED GRADE OF ENCLOSURE FROM 6" - 9" TO 4" - 6". CHANGED GROUND RODS FROM 6' GALVANIZED TO 10' COPPER CLAD. ADDED AMP SHEAR-LOK CONNECTORS.	R.S.	
1.	OCT. 21/97.	TRANSFORMER MOVED TO BOULEVARD FROM 3m EASEMENT.	R.S.	

GrandBridge ENERGY

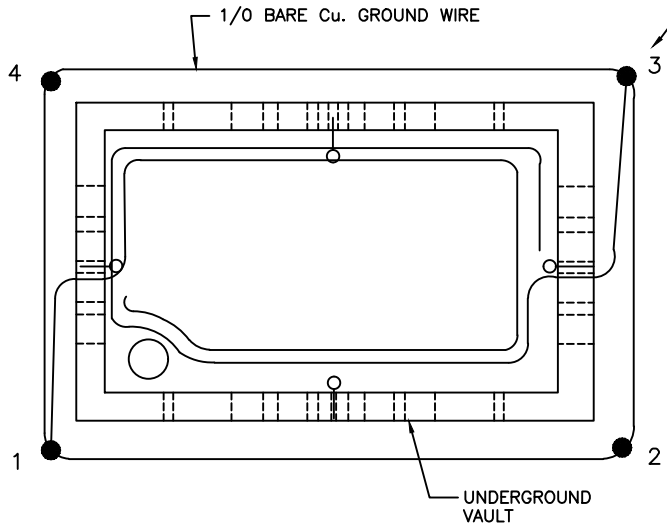
TITLE: TYPICAL MINI-PAD TRANSFORMER INSTALLATION AND LOCATION.

DATE:	SCALE:	W.O.No.:	DRAWN BY:
APR. 8/94	N.T.S.		S.TILLEY

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS-009



SIDE ELEVATION



PLAN VIEW

TO CONNECT GROUND WIRE:

1. CLAMP ONE END TO FIRST ROD.
2. CARRY QUARTERWAY AROUND VAULT, CLAMP TO SECOND ROD.
3. CARRY HALFWAY AROUND VAULT, CLAMP TO THIRD ROD.
4. CARRY THREE–QUARTERWAY AROUND VAULT, CLAMP TO FOURTH ROD.
5. COMPLETE LOOP AROUND VAULT; CLAMP AGAIN TO FIRST ROD AND CARRY SUFFICIENT LENGTH INTO VAULT TO LOOP AROUND VAULT ONCE. CUT GROUND WIRE AT THIS POINT.
6. CLAMP END OF CABLE AGAIN TO THIRD ROD AND CARRY SUFFICIENT LENGTH INTO VAULT TO LOOP AROUND VAULT ONCE. CUT WIRE GROUND AT THIS POINT.

NOTES:

1. GROUND RODS TO BE INSTALLED 1000mm(3.3') FROM VAULT AT EACH CORNER.
2. 1/0 BARE Cu. GROUND WIRE TO BE CONNECTED TO GROUND RODS WITH APPROVED COMPRESSION OR BOLTED JOINT CLAMPS. (SIX REQUIRED)
3. 305mm(12") OF 20mm(3/4") WASHED STONE TO BE PLACED BELOW VAULT.
4. TOP OF VAULT (INCLUDING SIDEWALK COVER PLATE) TO BE AT FINISHED GRADE. IN THE CASE OF VAULTS USED WITH LIDS FOR THE PLACEMENT OF SWITCHES, THE TOP OF THE LID IS TO BE 25–75mm (1–3") ABOVE FINISHED GRADE.
5. SUFFICIENT LENGTH OF 1/0 Cu. GROUND WIRE TO BE LEFT INSIDE VAULT TO LOOP AROUND VAULT ONCE.
6. FOR LOCATION PLEASE REFER TO SUBDIVISION DESIGN DRAWINGS.
7. BELL ENDS SHALL BE INSTALLED ON ALL DUCTS INSIDE ENCLOSURE

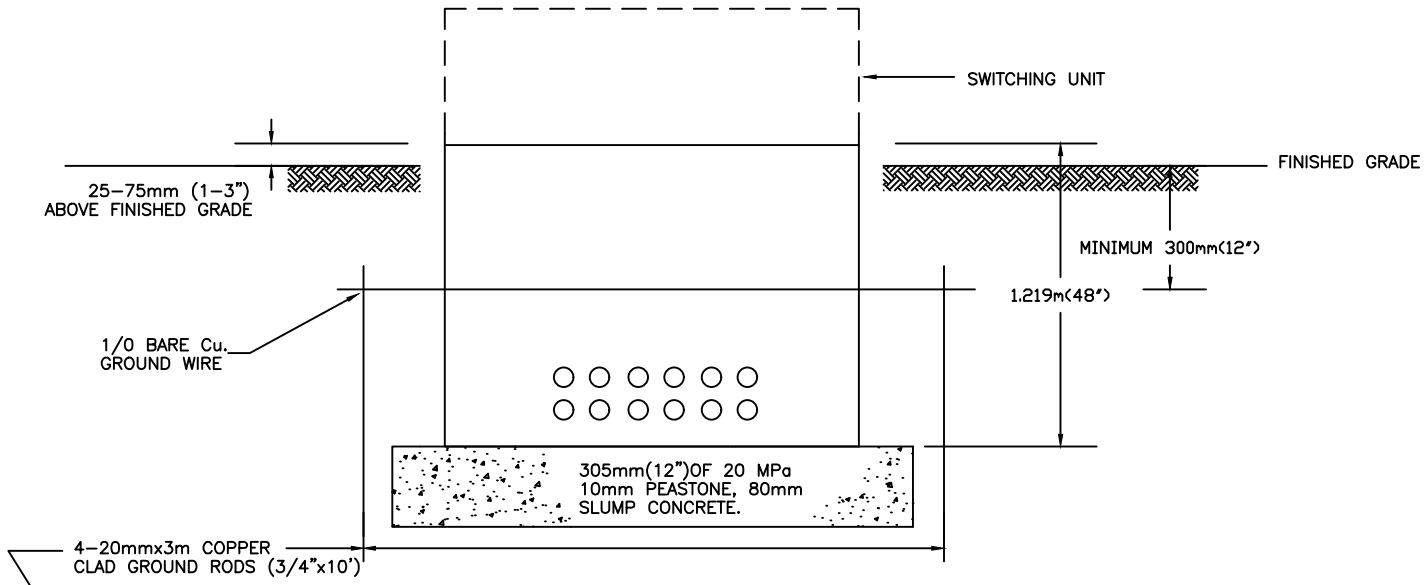
REV.	DATE			CHEK'D. BY
4.	SEPT. 21/23	GBE LOGO UPDATED. ADDED COMPRESSION CLAMPS	RS	
3.	JULY. 11/00	CHANGED GRADE OF VAULTS WITH SWITCHES FROM 4–6" to 1–3". ADDED DUCT BELL END REQ'MT	EV	
2.	MAY 20/99	CHANGED GRADE OF VAULTS WITH SWITCHES FROM 6"–9" TO 4"–6". CHANGED GROUND RODS FROM 6' GALVANIZED TO 10' COPPER CLAD. ADDED AMP SHEAR–LOK CONNECTORS. ADDED POLY SEAL OPENINGS TO VAULT.	RS	
1.	OCT. 22/97	GENERAL UPDATE	RS	

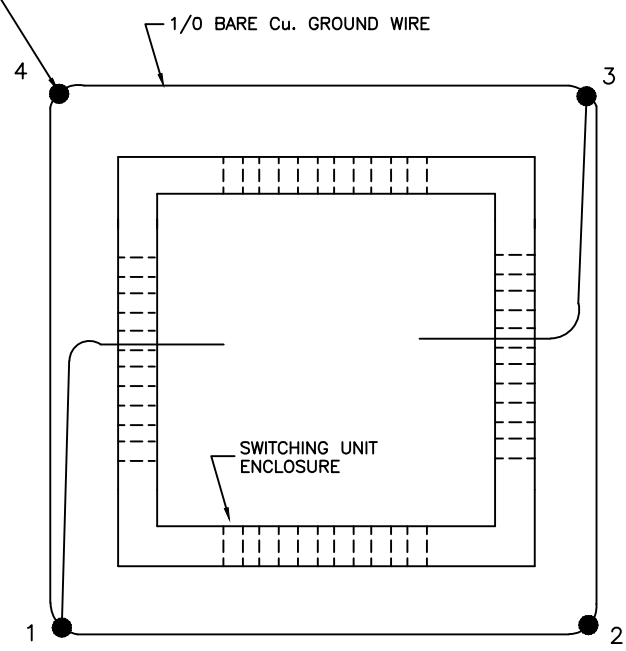
GrandBridge ENERGY

TITLE: TYPICAL PRECAST UNDERGROUND VAULT INSTALLATION.

DATE:	SCALE:	W.O.No.:	DRAWN BY:
MAY/93	N.T.S.		BILL J.

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS–010





TO CONNECT GROUND WIRE:

1. CLAMP ONE END TO FIRST ROD.
2. CARRY QUARTERWAY AROUND ENCLOSURE, CLAMP TO SECOND ROD.
3. CARRY HALFWAY AROUND ENCLOSURE, CLAMP TO THIRD ROD.
4. CARRY THREE–QUARTERWAY AROUND ENCLOSURE, CLAMP TO FOURTH ROD.
5. COMPLETE LOOP AROUND ENCLOSURE; CLAMP AGAIN TO FIRST ROD AND CARRY SUFFICIENT LENGTH INTO ENCLOSURE TO LEAVE 3.6m (12') TAIL. CUT GROUND WIRE AT THIS POINT.
6. CLAMP END OF CABLE AGAIN TO THIRD ROD AND CARRY SUFFICIENT LENGTH INTO ENCLOSURE TO LEAVE 3.6m(12') TAIL. CUT WIRE GROUND AT THIS POINT.

NOTES:

1. GROUND RODS TO BE INSTALLED 1000mm(3.3') FROM ENCLOSURE AT EACH CORNER.
2. 1/0 BARE Cu. GROUND WIRE TO BE CONNECTED TO GROUND RODS WITH APPROVED COMPRESSION AND BOLTED JOINT CLAMPS.(SIX REQUIRED)
3. 3.6m(12') COILS OF Cu. GROUND WIRE TO BE LEFT INSIDE ENCLOSURE.
4. 305mm(12") OF 20 MPa 10mm PEASTONE CONCRETE, WINTER HANDLING WHEN REQUIRED, TO BE PLACED BELOW ENCLOSURE.
5. TOP OF ENCLOSURE TO BE 100mm(4") TO 150mm(6") ABOVE FINISHED GRADE.
6. PLYWOOD IS TO BE PLACED AND SECURED ON TOP OF ENCLOSURE BEFORE SWITCHING UNIT IS INSTALLED.
7. BELL ENDS ARE TO BE INSTALLED ON ALL DUCTS INSIDE ENCLOSURE.

SEE DRAWING UGS–008 FOR ENCLOSURE DETAILS.

REV.	DATE			CHEK'D. BY
4.	SEPT. 21/23	GBE LOGO, COMPRESSION CLAMP ADDED	RS	
3.	JUL. 11/00	CHANGED GRADE OF ENCLOSURE FROM 4–6" to 1–3".	EV	
2.	MAY 20/99	CHANGED GRADE OF ENCLOSURE FROM 6"–9" TO 4–6". CHANGED GROUND RODS FROM 6' GALVANIZED TO 10' COPPER CLAD. ADDED AMP SHEAR–LOK CONNECTORS. ADDED NOTE ABOUT BELL ENDS.	RS	
1.	OCT. 22/97	GENERAL UPDATE	RS	

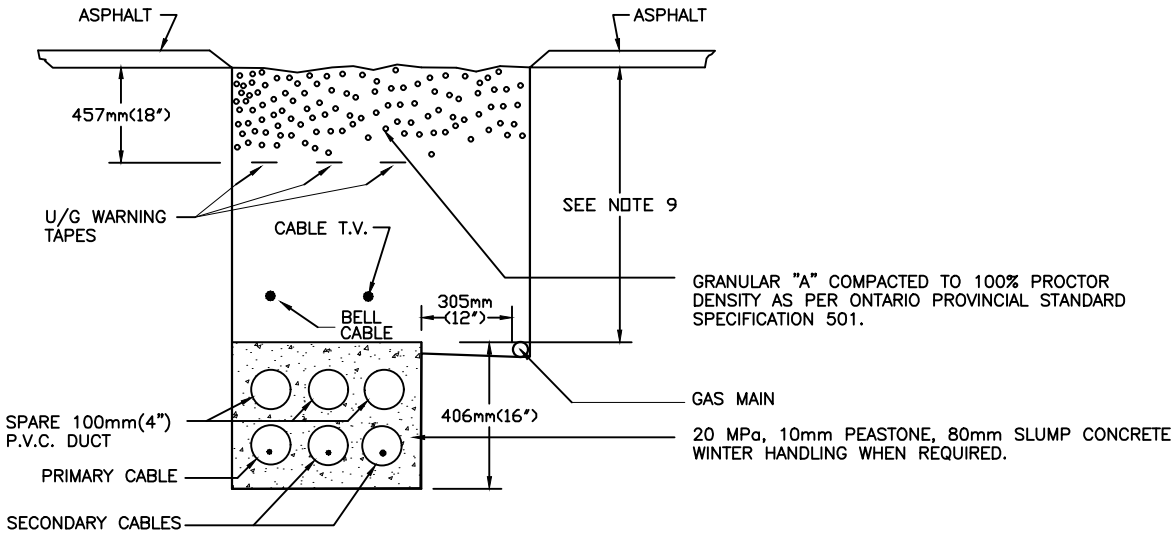
GrandBridge ENERGY

TITLE: TYPICAL THREE PHASE SWITCHING UNIT INSTALLATION.

DATE:	SCALE:	W.O.No.:	DRAWN BY:
MAY/93	N.T.S.		BILL J.

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS–012

TYPICAL ROAD CROSSING DUCT STRUCTURE



WARNING TAPE INFORMATION

TRENCH WIDTH	# OF WARNING TAPES	TAPE PLACEMENT
UP TO 305mm (12")	1	CENTRED ON THE TRENCH.
GREATER THAN 305mm (12") UP TO AND INCLUDING 762mm (30")	2 (OR MORE)	PLACED NO MORE THAN 76mm (3") FROM THE SIDE OF THE TRENCH AND NOT MORE THAN 305mm (12") APART.
GREATER THAN 762mm (30")	3 (OR MORE)	PLACED NO MORE THAN 76mm (3") FROM THE SIDE OF THE TRENCH AND NOT MORE THAN 305mm (12") APART.

NOTE: THE TRENCH WIDTH EXCLUDES THE ADDED WIDTH FOR JOINT USE GAS LINE INSTALLATION (IE. HYDRO PART OF TRENCH ONLY).

NOTES:

1. NUMBER OF 100mm(4") DUCTS MAY VARY AS TO THE NUMBER OF SERVICES CROSSING ROAD.
2. MAXIMUM OF ONE SECONDARY TRIPLEX CABLE PER 100mm(4") DUCT.
3. MAXIMUM OF ONE PRIMARY CABLE PER 100mm(4") DUCT.
4. MAXIMUM OF ONE STREET LIGHTING CABLE (3–#6 WIRES) PER 50mm(2") DUCT.
5. ONE SPARE 100mm (4") DUCT IS TO BE PLACED IN ALL ROAD CROSSINGS UNDER THE ROADWAY FROM 450mm (1.5') PAST EACH CURB. IN ADDITION, SPARE TRENCH DUCTS MAY PASS THROUGH THE ROAD CROSSING.
6. ALL HYDRO DUCTS TO BE ENCASED IN 100mm(4") ENVELOPE OF CONCRETE.
7. CONCRETE TO BE 20 MPa, 10mm PEASTONE, 80mm SLUMP. WINTER HANDLING WHEN REQUIRED.
8. SEE DRAWING No. UGS–014 FOR OTHER VARIATIONS OF CONCRETE ENCASED DUCTS.

9. CITY OF CAMBRIDGE AND TOWNSHIP OF NORTH DUMFRIES – MIN. 914mm (36") TO THE TOP OF CONCRETE.
BRANT COUNTY – MIN. 1000mm (39") TO MOST SHALLOW UTILITY (ie. BELL, ROGERS, HYDRO) (GAS IS NOT JOINT USE).
CITY OF BRANTFORD – MIN. 900mm (36") TO MOST SHALLOW UTILITY (ie. BELL, ROGERS, HYDRO) (GAS IS NOT JOINT USE).
FOLLOW OHSA FOR TRENCH DEPTHS/SHORING ETC.

REV.	DATE			CHEK'D. BY
7.	SEPT. 21/23	GBE LOGO UPDATED	RS	
6.	JAN. 12/18	REVISED MINIMUM COVER FOR ADDITION OF BRANT COUNT AND CITY OF BRANTFORD.	STW	
5.	NOV. 24/06	ADDED WARNING TAPE INFORMATION. REMOVED FLOWABLE FILL FOR REGION.	RS	
4.	APR. 11/03	Revised power cable configuration installation	EV	
3.	MAY 10/00	ADDED JOINT USE TRENCH WITH GAS.	RS	
2.	MAY 20/99	MINOR UPDATE.	RS	
1.	OCT. 22/97	GENERAL UPDATE	RS	

GrandBridge ENERGY

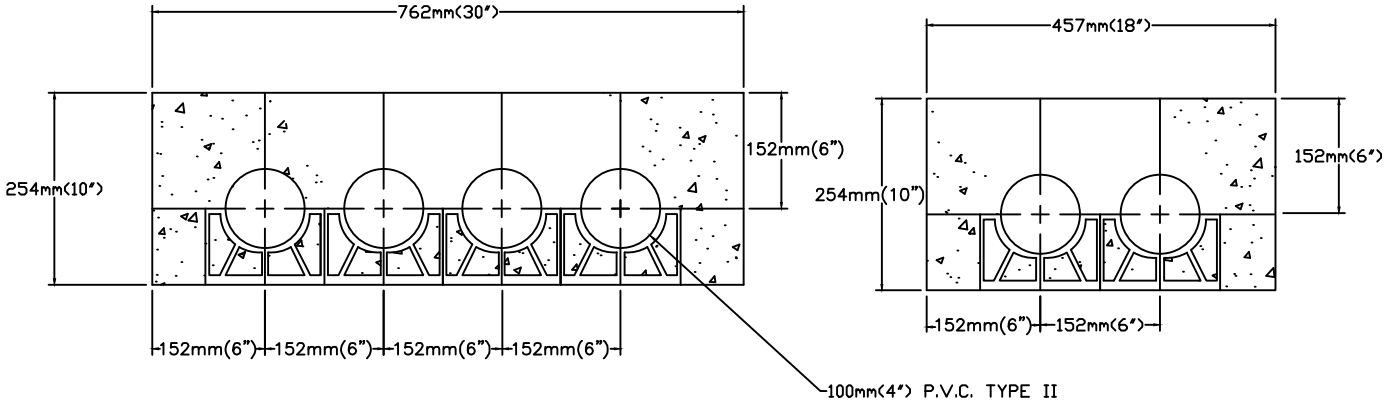
TITLE: HYDRO CROSSING UNDER ROADWAY– CONCRETE ENCASED DUCT STRUCTURE.

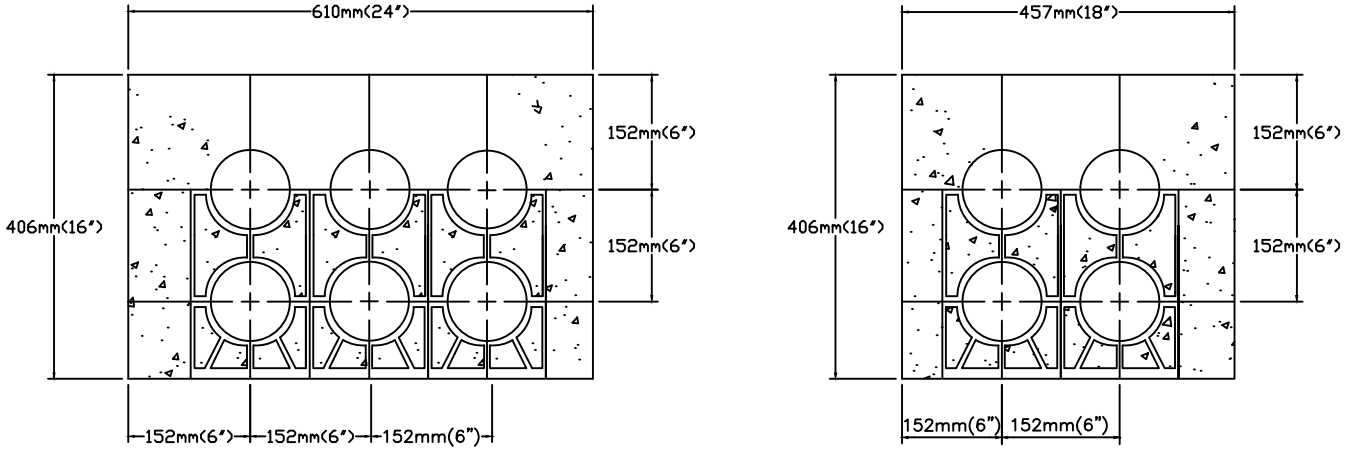
DATE: MAY/93	SCALE: N.T.S.	W.O.No.:	DRAWN BY: BILL J.

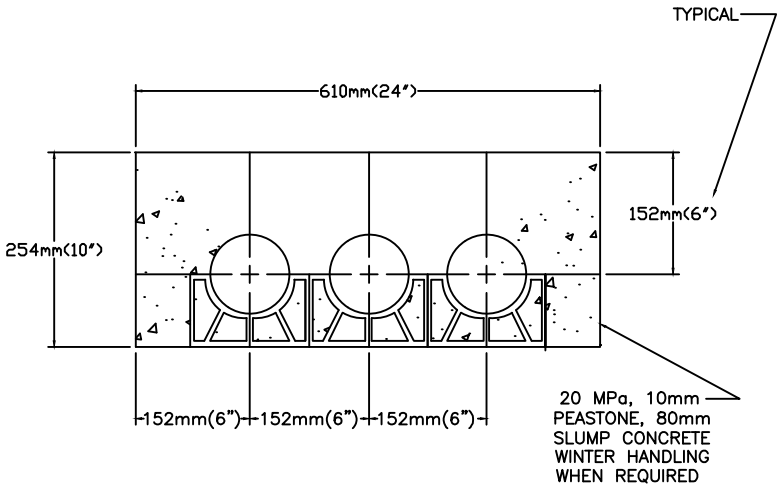
DESIGNED BY | APPROVED BY P.ENG. | DRAWING No. UGS–013

NOTES

1. DUCT BANK TO HAVE COVER AS SPECIFIED ON DRAWINGS UGS–013 & UGS–015 & TO BE GRADED TOWARDS THE CURB.
2. DUCT TO BE 100mm(4") TYPE II P.V.C.
3. ALL DUCT CONNECTIONS SHALL BE SOLVENT WELDED (GLUED) AS PER DUCT MANUFACTURER'S RECOMMENDATIONS.
4. ENDS OF DUCTS TO BE CAPPED & MARKED WITH MARKING DISC.
5. CONCRETE TO BE 20MPa, 10mm PEASTONE, 80mm SLUMP.
6. ALL DUCTS TO BE ENCASED WITH MIN. 100mm(4") CONCRETE.
7. ALL BOTTOM DUCTS TO HAVE A MIN. 50mm(2") CONC. UNDERNEATH.
8. SPACERS TO BE PLACED UNDER EACH DUCT LAYER WITH MAX. CENTRE TO CENTRE DISTANCE OF 3m(10').
9. DUCT JOINTS TO BE STAGGERED A MIN. OF 152mm(6") & LOCKED WITH AN APPROVED COUPLING.
10. BELL ENDS ARE TO BE USED FOR EACH TERMINATION IN PULLING PITS OR CONCRETE ENCLOSURES.
11. EACH DUCT TO BE CLEANED & 3/4", 2,500 Lbs. POLYESTER MEASURE/PULLING TAPE INSTALLED CONTINUOUSLY – (DO NOT TIE TAPE END TO END OR KNOT TOGETHER).
12. WIRE BANDING SHALL BIND DUCTS & SPACERS EVERY 3m(10'). DUCT BANK IS TO BE ANCHORED TO PREVENT FLOATING.







REV.	DATE			CHEK'D. BY
3.	SEPT. 21/23	GBE LOGO UPDATED.	RS	
2.	JAN. 11/18	REVISED AMOUNT OF COVER, NOTE #1.	RS	
1.	SEPT. 24/07	3/4" POLYESTER MEASURE/ PULLING TAPE	RS	

GrandBridge ENERGY

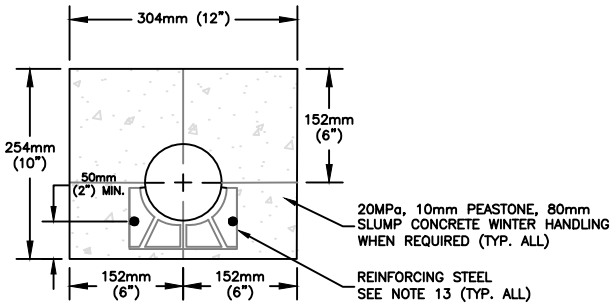
TITLE: TYPICAL CONCRETE ENCASED DUCT STRUCTURE

DATE: MAY/93	SCALE: N.T.S.	W.O.No.:	DRAWN BY: S. TILLEY

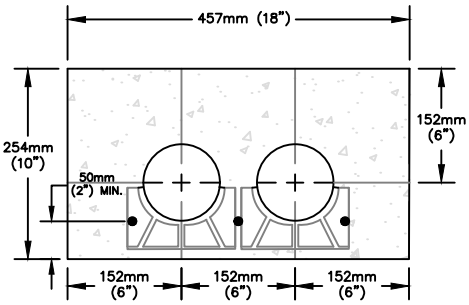
DESIGNED BY | APPROVED BY P.ENG. | DRAWING No. UGS–014

NOTES

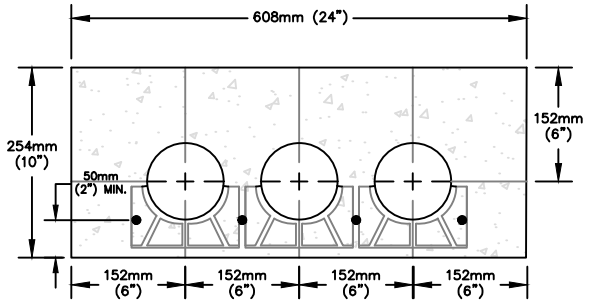
1. DUCT BANK TO HAVE COVER AS SPECIFIED ON DRAWINGS UGS–013 & UGS–015 & TO BE GRADED TOWARDS THE CURB.
2. DUCT TO BE 100mm(4") DB2/ES2 TYPE II PVC PER CSA 22.2 NO.211.1 (LATEST REVISION)
3. ALL DUCT CONNECTIONS SHALL BE SOLVENT WELDED (GLUED) AS PER DUCT MANUFACTURER'S RECOMMENDATIONS. WAIT MINIMUM 30 MINUTES BEFORE POURING CONCRETE AFTER APPLYING SOLVENT.
4. ENDS OF DUCTS TO BE CAPPED & MARKED WITH MARKING DISC.
5. CONCRETE TO BE 20MPa, 10mm PEASTONE, 80mm SLUMP.
6. ALL DUCTS TO BE ENCASED WITH MIN. 100mm(4") CONCRETE.
7. ALL BOTTOM DUCTS TO HAVE A MIN. 50mm(2") CONC. UNDERNEATH.
8. SPACERS TO BE PLACED UNDER EACH DUCT LAYER WITH MAX. CENTER TO CENTER DISTANCE OF 3.0m (10').
9. DUCT JOINTS TO BE STAGGERED A MIN. OF 152mm(6") & LOCKED WITH AN APPROVED COUPLING.
10. BELL ENDS ARE TO BE USED FOR EACH TERMINATION IN PULLING PITS OR CONCRETE ENCLOSURES.
11. EACH DUCT TO BE CLEANED & 3/4", 2,500 Lbs. POLYESTER MULE/PULLING TAPE INSTALLED CONTINUOUSLY – (DO NOT TIE TAPE END TO END OR KNOT TOGETHER).
12. CABLE TIES SHALL BIND DUCTS & SPACERS EVERY 2.0m (6'). DUCT BANK IS TO BE ANCHORED TO PREVENT FLOATING.
13. DUCTBANK SHALL BE REINFORCED WITH NON PRE–STRESSED 15mm (5/8") DEFORMED STEEL REINFORCING BARS. GRADE 400 AND CONFORMING WITH C.S.A. G30.18 (LATEST REVISION). REINFORCING BARS SHALL BE INSTALLED CONTINUOUSLY, MINIMUM 300mm OVERLAP AND TIED.



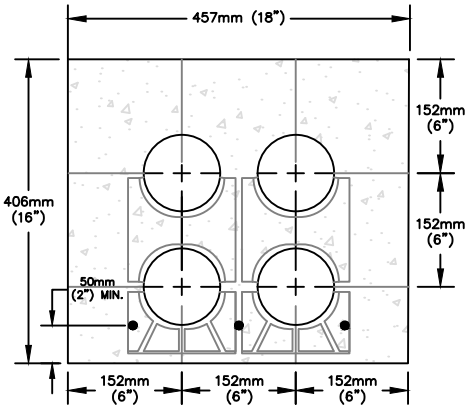
1 DUCT – 1W1H



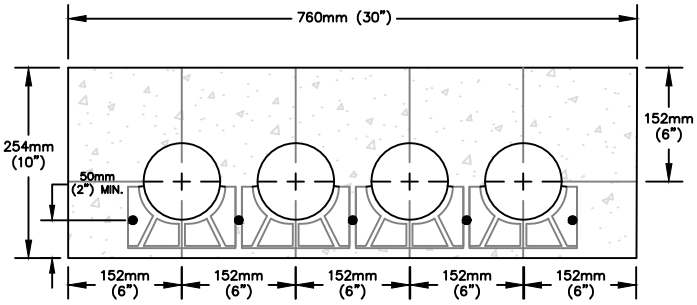
2 DUCTS – 2W1H



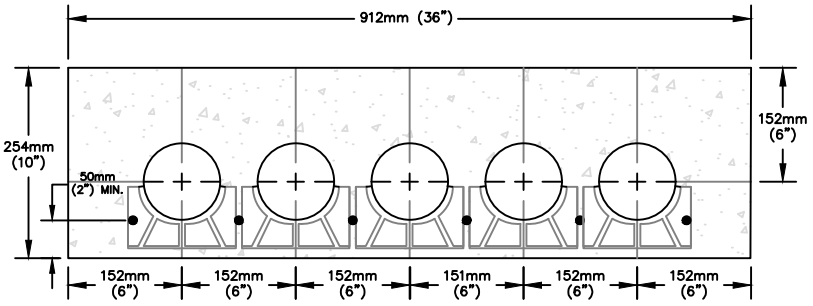
3 DUCTS – 3W1H



4 DUCTS – 2W2H



4 DUCTS – 4W1H



5 DUCTS – 5W1H

0	JUN. 23/15	ADD REINFORCEMENT BARS TO STANDARD DETAIL		SF

GrandBridge ENERGY

TITLE: TYPICAL CONCRETE ENCASED DUCT STRUCTURES WITH REINFORCEMENT – 1 TO 5 DUCTS

DATE:	SCALE:	W.O.No.:	DRAWN BY:
JUNE/23	N.T.S.		S. FREIHAUT

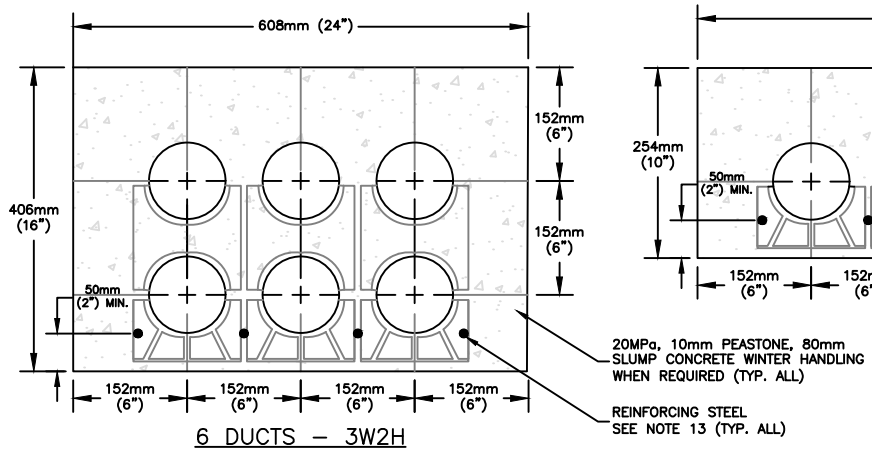
S. FREIHAUT
DESIGNED BY

P.Eng.
APPROVED BY P.ENG.

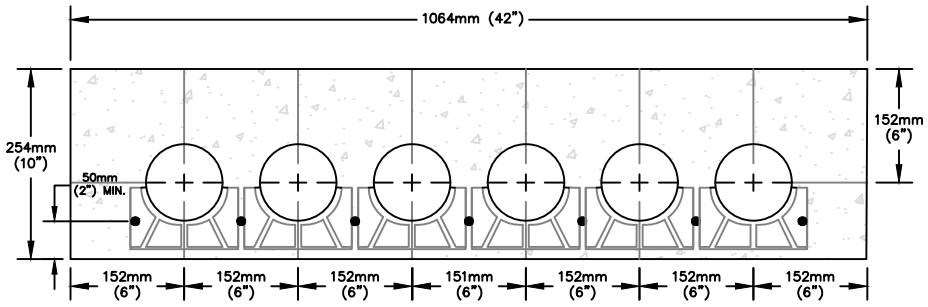
DRAWING No.
UGS–014–A

NOTES

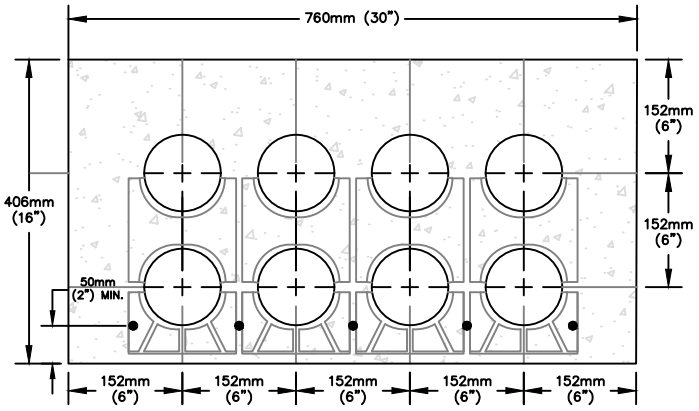
1. DUCT BANK TO HAVE COVER AS SPECIFIED ON DRAWINGS UGS–013 & UGS–015 & TO BE GRADED TOWARDS THE CURB.
2. DUCT TO BE 100mm(4") DB2/ES2 TYPE II PVC PER CSA 22.2 NO.211.1 (LATEST REVISION)
3. ALL DUCT CONNECTIONS SHALL BE SOLVENT WELDED (GLUED) AS PER DUCT MANUFACTURER'S RECOMMENDATIONS. WAIT MINIMUM 30 MINUTES BEFORE POURING CONCRETE AFTER APPLYING SOLVENT.
4. ENDS OF DUCTS TO BE CAPPED & MARKED WITH MARKING DISC.
5. CONCRETE TO BE 20MPa, 10mm PEASTONE, 80mm SLUMP.
6. ALL DUCTS TO BE ENCASED WITH MIN. 100mm(4") CONCRETE.
7. ALL BOTTOM DUCTS TO HAVE A MIN. 50mm(2") CONC. UNDERNEATH.
8. SPACERS TO BE PLACED UNDER EACH DUCT LAYER WITH MAX. CENTER TO CENTER DISTANCE OF 3.0m (10').
9. DUCT JOINTS TO BE STAGGERED A MIN. OF 152mm(6") & LOCKED WITH AN APPROVED COUPLING.
10. BELL ENDS ARE TO BE USED FOR EACH TERMINATION IN PULLING PITS OR CONCRETE ENCLOSURES.
11. EACH DUCT TO BE CLEANED & 3/4", 2,500 Lbs. POLYESTER MULE/PULLING TAPE INSTALLED CONTINUOUSLY – (DO NOT TIE TAPE END TO END OR KNOT TOGETHER).
12. CABLE TIES SHALL BIND DUCTS & SPACERS EVERY 2.0m (6'). DUCT BANK IS TO BE ANCHORED TO PREVENT FLOATING.
13. DUCTBANK SHALL BE REINFORCED WITH NON PRE–STRESSED 15mm (5/8") DEFORMED STEEL REINFORCING BARS. GRADE 400 AND CONFORMING WITH C.S.A. G30.18 (LATEST REVISION). REINFORCING BARS SHALL BE INSTALLED CONTINUOUSLY, MINIMUM 300mm OVERLAP AND TIED.



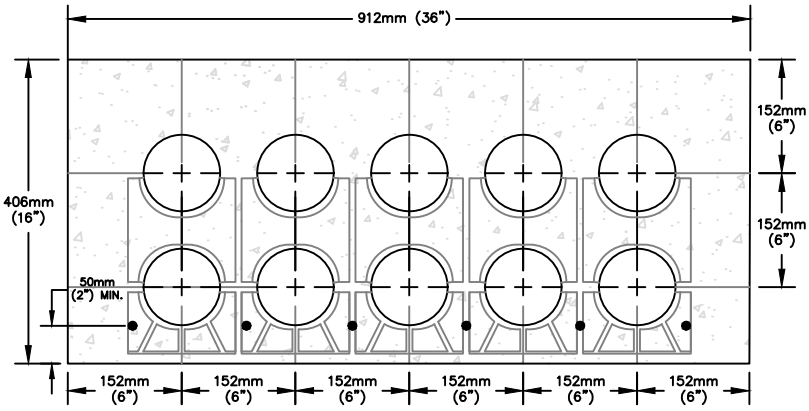
6 DUCTS – 3W2H



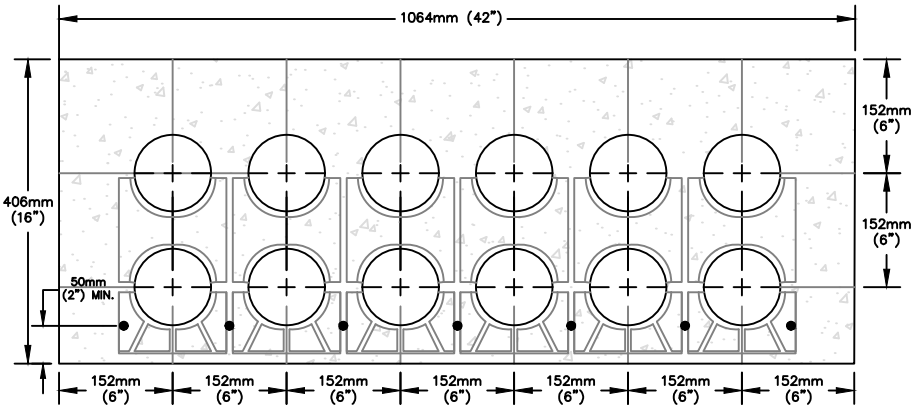
6 DUCTS – 6W1H



8 DUCTS – 4W2H



10 DUCTS – 5W2H



12 DUCTS – 6W2H

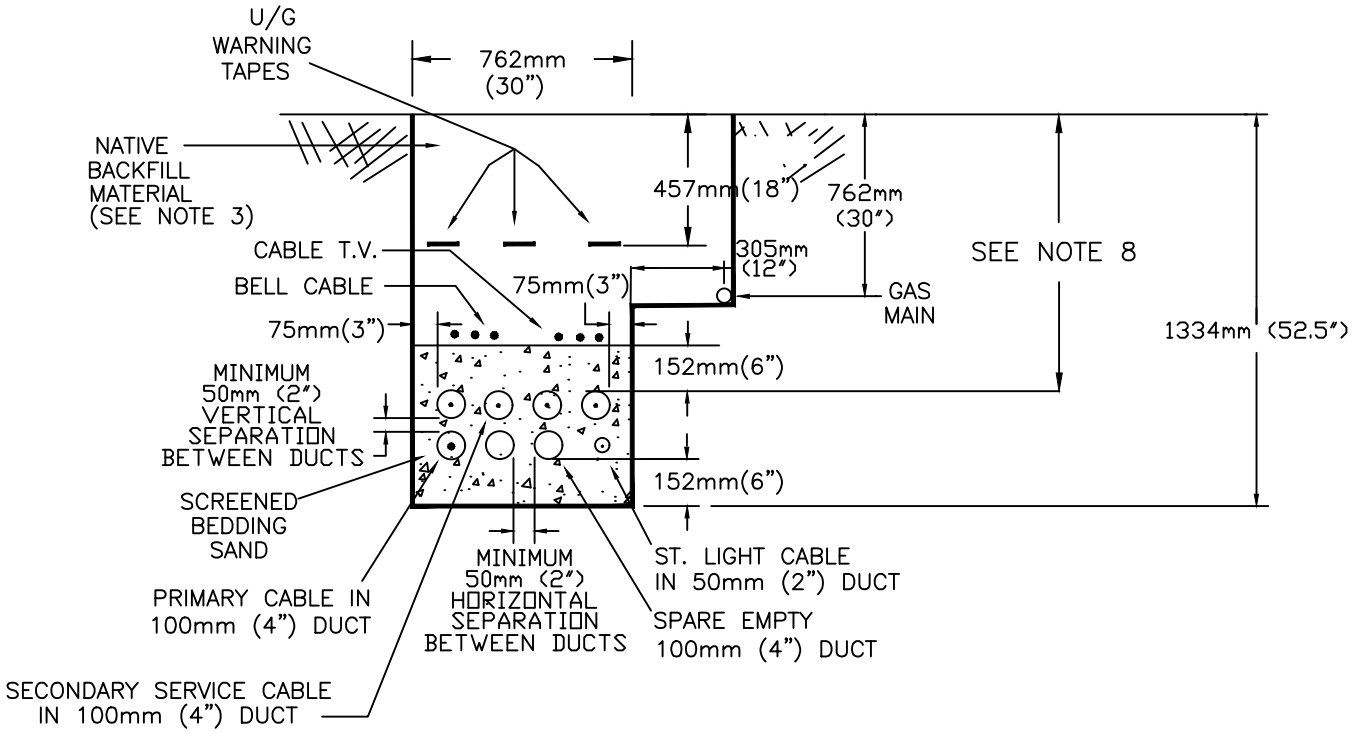
0	JUN. 23/15	ADD REINFORCEMENT BARS TO STANDARD DETAIL		SF

GrandBridge ENERGY

TITLE: TYPICAL CONCRETE ENCASED DUCT STRUCTURES WITH REINFORCEMENT – 6 TO 12 DUCTS

DATE:	SCALE:	W.O.No.:	DRAWN BY:
JUNE/23	N.T.S.		S. FREIHAUT

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
S. FREIHAUT	P.Eng.	UGS–014–B



WARNING TAPE INFORMATION

TRENCH WIDTH	# OF WARNING TAPES	TAPE PLACEMENT
UP TO 305mm (12")	1	CENTRED ON THE TRENCH.
GREATER THAN 305mm (12") UP TO AND INCLUDING 762mm (30")	2 (OR MORE)	PLACED NO MORE THAN 76mm (3") FROM THE SIDE OF THE TRENCH AND NOT MORE THAN 305mm (12") APART.
GREATER THAN 762mm (30")	3 (OR MORE)	PLACED NO MORE THAN 76mm (3") FROM THE SIDE OF THE TRENCH AND NOT MORE THAN 305mm (12") APART.

NOTE: THE TRENCH WIDTH EXCLUDES THE ADDED WIDTH FOR JOINT USE GAS LINE INSTALLATION (IE. HYDRO PART OF TRENCH ONLY).

NOTES

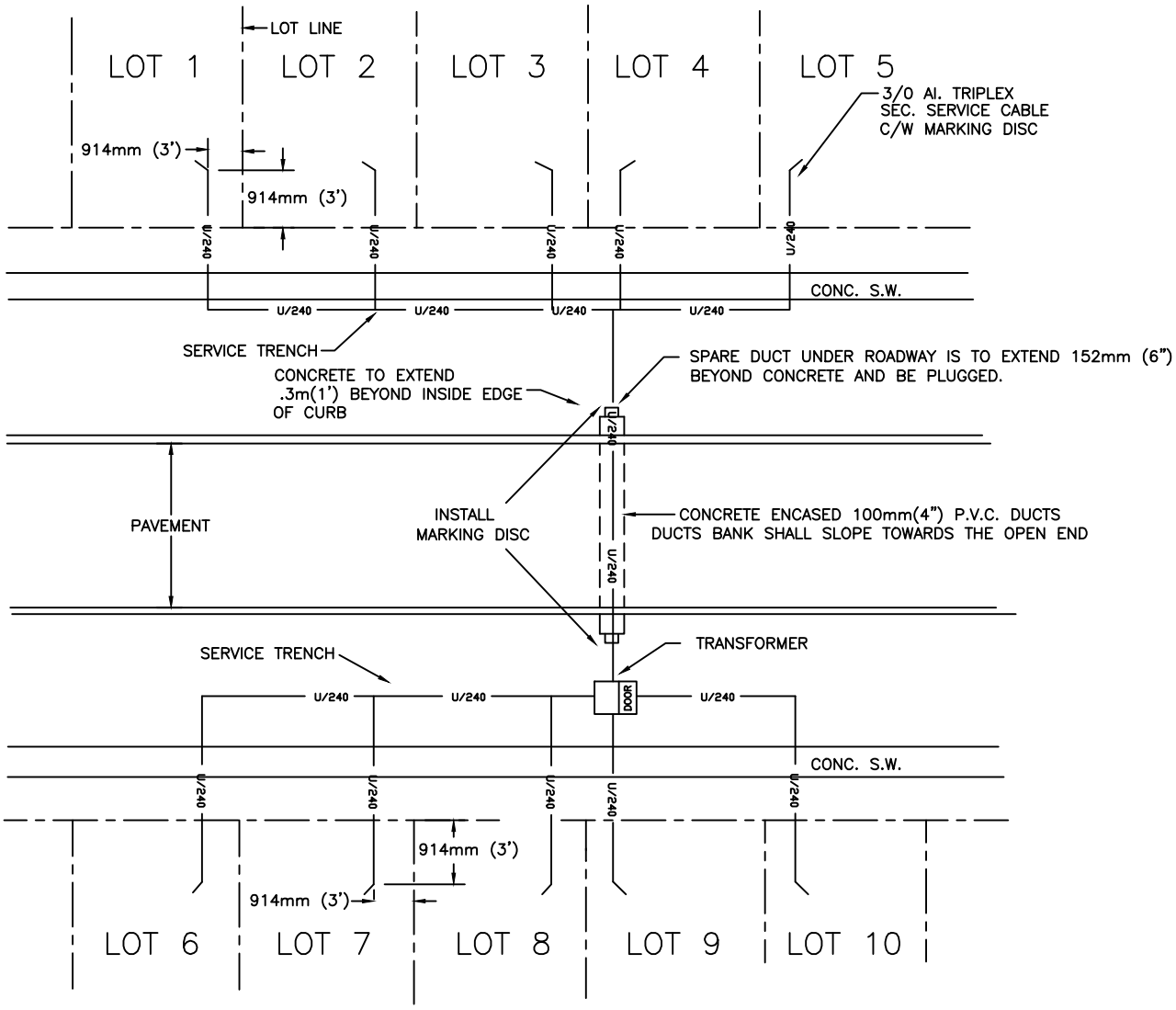
1) DEPTH OF ALL DUCTS TO BE AS INDICATED IN DETAIL/NOTES.
2) ALL DUCTS TO HAVE 152mm(6") OF CLEAN BEDDING SAND BELOW AND 152mm(6") ABOVE DUCTS.
3) NATIVE BACKFILL MATERIAL TO BE COMPACTED TO 98% PROCTOR DENSITY AS PER ONTARIO PROVINCIAL STANDARD SPECIFICATION 501.
4) SAND SHALL BE SCREENED BEDDING APPROVED BY GBE.
5) ALL CABLES ARE TO BE INSTALLED IN DIRECT BURIED DUCT (1 CABLE PER DUCT, 100mm DUCT FOR PRIMARY AND SECONDARY, 50mm DUCT FOR STREET LIGHTING).
6) ONE SPARE 100mm DUCT IS TO BE PLACED IN ALL TRENCHES. IN ADDITION, ONE SPARE 100mm DUCT IS TO BE PLACED FOR EACH PRIMARY CABLE IN THE TRENCH.
7) ALL DUCT CONNECTIONS SHALL BE SOLVENT WELDED (GLUED) AS PER DUCT MANUFACTURER'S RECOMMENDATIONS. 8)CITY OF CAMBRIDGE AND TOWNSHIP OF NORTH DUMFRIES –MIN. 914mm (36") TO THE TOP OF GBE DUCT. BRANT COUNTY – MIN. 1000mm (39") TO MOST SHALLOW UTILITY (ie. BELL, ROGERS, HYDRO) (GAS IS NOT JOINT USE). CITY OF BRANTFORD – MIN. 900mm (36") TO MOST SHALLOW UTILITY (ie. BELL, ROGERS, HYDRO) (GAS IS NOT JOINT USE).

REV.	DATE			CHEK'D. BY
7.	SEPT. 21/23	GBE LOGO UPDATED	RS	
6.	JAN. 12/18	REVISED DEPTH OF DUCTS FOR ADDITION OF BRANT COUNTY AND CITY OF BRANTFORD.	STW	
5.	NOV. 24/06	ADDED WARNING TAPE INFORMATION.	RS	
4.	APR. 11/03	Revised Sand Specification and Gas Plant Depth	EV	
3.	NOV. 22/00	REVISED GAS LOCATION	ST	
2.	MAY 10/00	ADDED JOINT USE TRENCH WITH GAS.	RS	
1.	OCT. 22/97	COMPLETE UPDATE	RS	

GrandBridge ENERGY

TITLE: TYPICAL TRENCH SECTIONS SHOWING HYDRO, BELL, CABLE T.V. & GAS

DATE: MAY/93	SCALE: N.T.S.	W.O.No.:	DRAWN BY: S. TILLEY
ENGINEERING DESIGNED BY		APPROVED BY P.ENG.	DRAWING No. UGS–015



NOTES

1) CONCRETE ENCASED DUCTS TO CROSS ROAD AT RIGHT ANGLES TO THE CURB, DUCTS BANK SHALL SLOPE TOWARDS THE OPEN END
2) CONCRETE STRENGTH 20MPa, 10mm PEASTONE & 80mm SLUMP. WINTER HANDLING WHEN REQUIRED.
3) DUCT STRUCTURE TO HAVE A MINIMUM OF 914mm (3') DEPTH (MEASURED FROM THE TOP OF THE DUCT STRUCTURE TO THE FINISH GRADE).
4) SPARE DUCTS TO HAVE 6mm (1/4") POLYPROPYLENE PULL ROPE INSTALLED AND BE PLUGGED.
5) ENDS OF SERVICE CABLES AND DUCTBANKS TO BE MARKED WITH AN ELECTRONIC MARKING DISC.

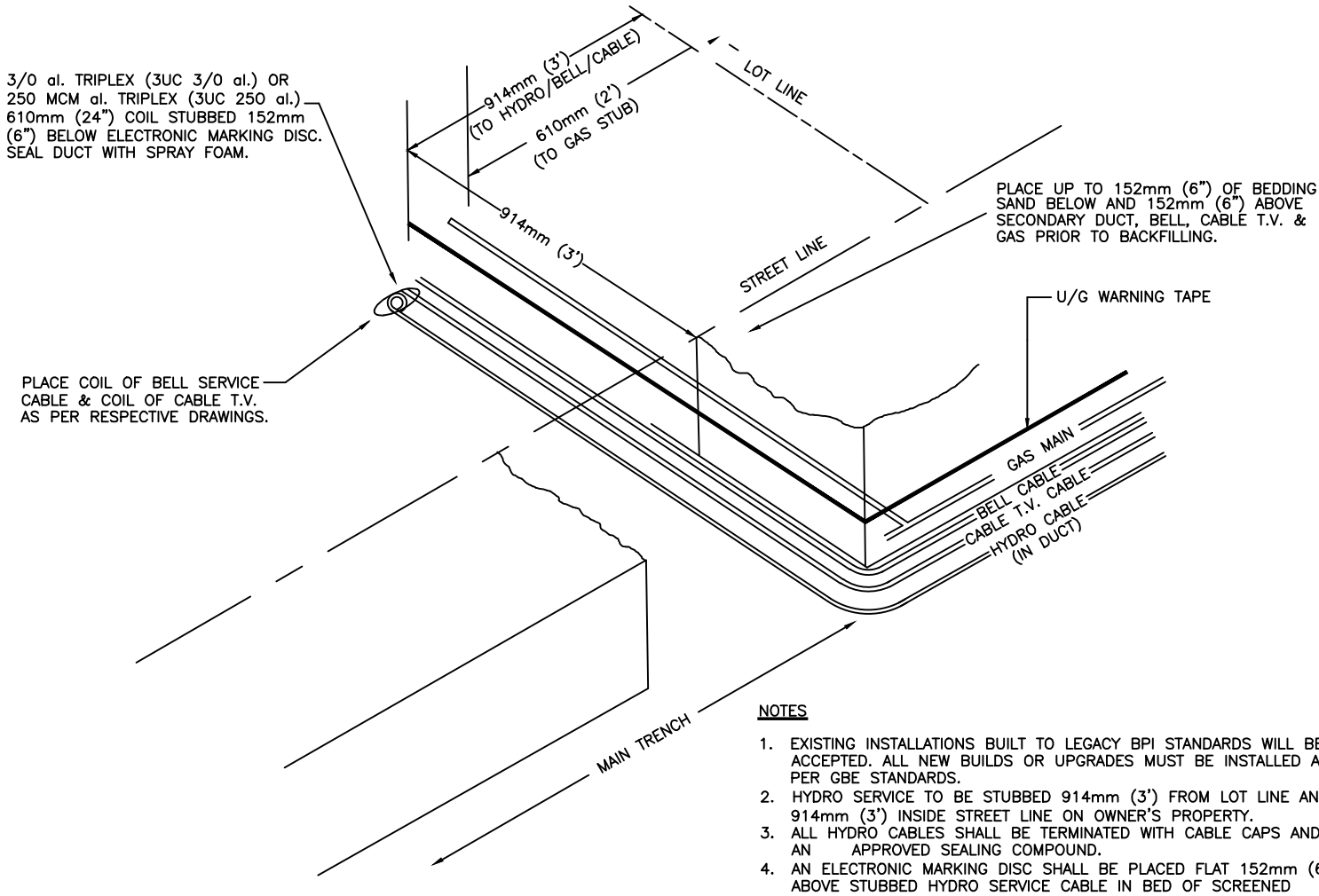
REV.	DATE			CHEK'D. BY
3.	SEPT. 21/23	GBE LOGO, SPECS UPDATED	RS	
2.	APR. 11/03	REMOVED REFERENCE TO OFFSETS.	EV	
1.	OCT. 23/97	MOVED TRANSFORMER OUT TO BOULEVARD.	RS	

GrandBridge ENERGY

TITLE: TYPICAL SERVICING LAYOUT.

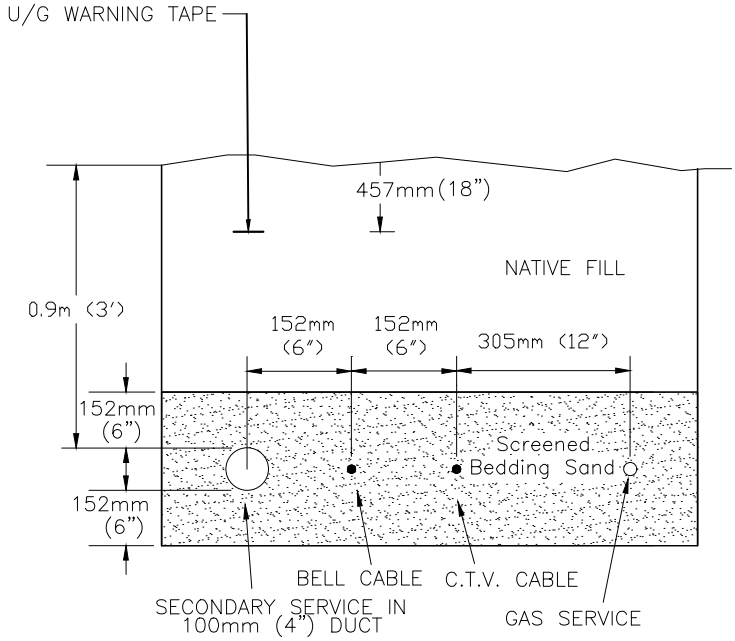
DATE:	SCALE:	W.O.No.:	DRAWN BY:
MAY/93	N.T.S.		S. TILLEY

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS-016



NOTES

1. EXISTING INSTALLATIONS BUILT TO LEGACY BPI STANDARDS WILL BE ACCEPTED. ALL NEW BUILDS OR UPGRADES MUST BE INSTALLED AS PER GBE STANDARDS.
2. HYDRO SERVICE TO BE STUBBED 914mm (3') FROM LOT LINE AND 914mm (3') INSIDE STREET LINE ON OWNER'S PROPERTY.
3. ALL HYDRO CABLES SHALL BE TERMINATED WITH CABLE CAPS AND AN APPROVED SEALING COMPOUND.
4. AN ELECTRONIC MARKING DISC SHALL BE PLACED FLAT 152mm (6") ABOVE STUBBED HYDRO SERVICE CABLE IN BED OF SCREENED BEDDING SAND.
5. CAUTION TO BE TAKEN WHEN PLACING THE ELECTRONIC MARKING DISC SO THAT IT IS NOT IN CONTACT WITH ANY CABLES.
6. MAINTAIN A MINIMUM OF 914mm (3') OF COVER OVER DUCTS.
7. GAS SERVICE SHALL BE LOCATED ON THE SIDE OF TRENCH CLOSEST TO THE PROPERY LINE.



CROSS SECTION – SERVICE TRENCH FROM MAIN TRENCH TO SERVICE STUB

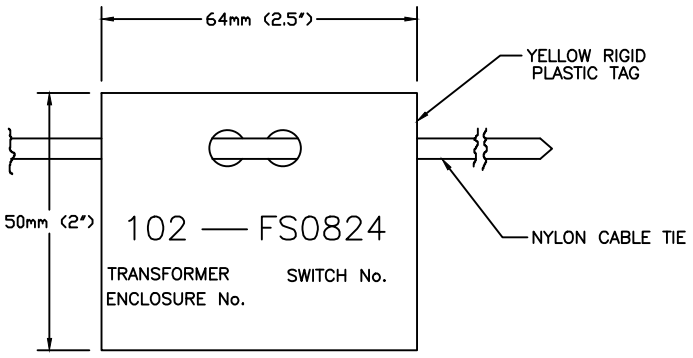
REV.	DATE			CHEK'D. BY
6.	SEPT. 21/23.	GBE LOGO UPDATED	RS	
5.	APR. 25/11.	ADDED NOTE ABOUT USING SPRAY FOAM TO SEAL DUCT	ST	
4.	NOV. 10/06	GENERAL UPDATE	PG	
3.	NOV. 24/03	CHANGED REFERENCE TO MASONRY SAND, ADDED NOTE 6.	EV	
2.	MAY 10/00	ADDED JOINT USE TRENCH WITH GAS.	RS	
1.	OCT. 23/97	REVISED CABLE LOCATIONS.	RS	

GrandBridge ENERGY

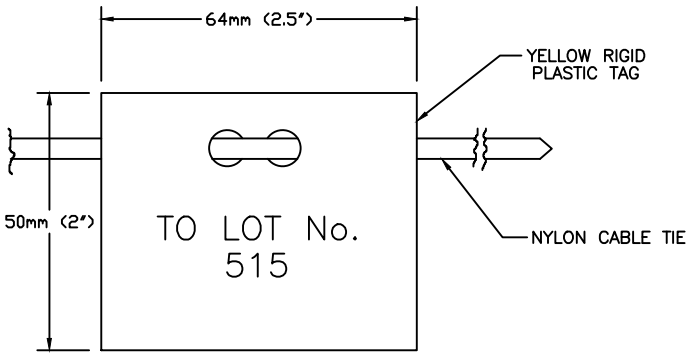
TITLE: TYPICAL TERMINATION OF SERVICES ON PROPERTY

DATE:	SCALE:	W.O.No.:	DRAWN BY:
MAY/93	N.T.S.		S. TILLEY

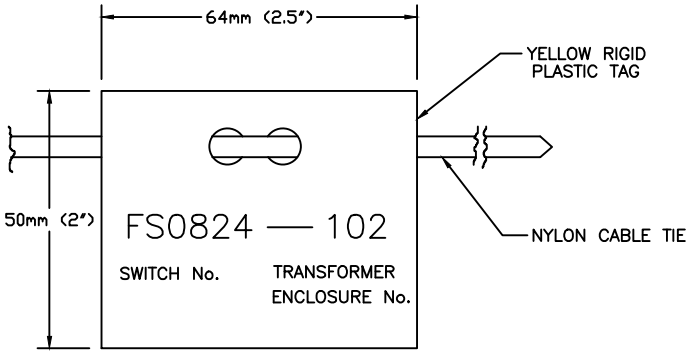
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS–017



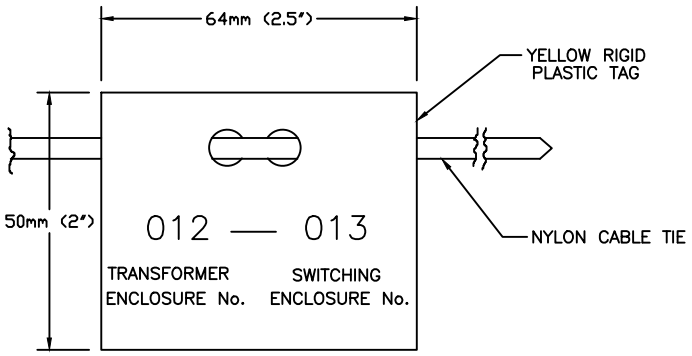
PRIMARY CABLE TAG INSIDE ENCLOSURE



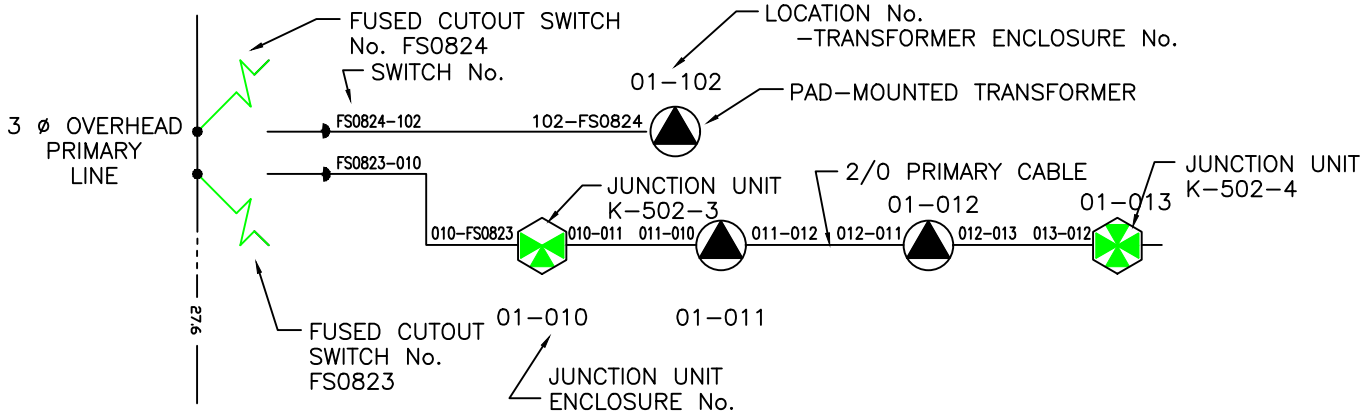
SECONDARY CABLE TAG INSIDE ENCLOSURE



PRIMARY CABLE TAG AT TERMINAL POLE



PRIMARY CABLE TAG INSIDE ENCLOSURE



EXAMPLE OF PRIMARY SCHEMATIC SHOWING NUMBERING SYSTEM

NOTES:
1) ALL TAGS TO BE YELLOW RIGID PLASTIC.
2) ALL TAG SIZES TO BE 50mm X 64mm (2" X 2.5")
3) ALL PRIMARY & SECONDARY CABLES LEFT IN ENCLOSURES ARE TO BE IDENTIFIED AND TAGGED.
4) ALL PRIMARY CABLES COILED AT TERMINAL POLES ARE TO BE IDENTIFIED AND TAGGED.
5) ALL TAGS ARE TO BE PERMANENTLY AFFIXED TO THE CABLES USING NYLON CABLE TIES.
6) TAGS ARE TO BE MARKED USING A WATERPROOF AND FADEPROOF MARKER.

REV.	DATE			CHEK'D. BY
2.	SEPT. 21/23	GBE LOGO UPDATED	RS	
1.	OCT. 23/97	GENERAL UPDATE	RS	

GrandBridge ENERGY

TITLE: CABLE IDENTIFICATION AND TAGGING

DATE:	SCALE:	W.O.No.:	DRAWN BY:
MAY/93	N.T.S.		S. TILLEY

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS—018

MATERIAL LIST

1) TIMBER –6"X6" PRESSURE TREATED
   4–16' LENGTHS
   1–12' LENGTH

CUT 1–16' INTO 3–5'–3" LENGTHS
1–16' INTO 3–4'–4" LENGTHS +1–2'–9" LENGTH
1–16' INTO 1–4'–4" + 2–3'–5" + 1–2'–9" + 1–2'–0" LENGTH
1–16' INTO 2–3' + 3–2' + 4–1' LENGTH
1–12' INTO 1–5'–3" + 2–3'–0" LENGTH

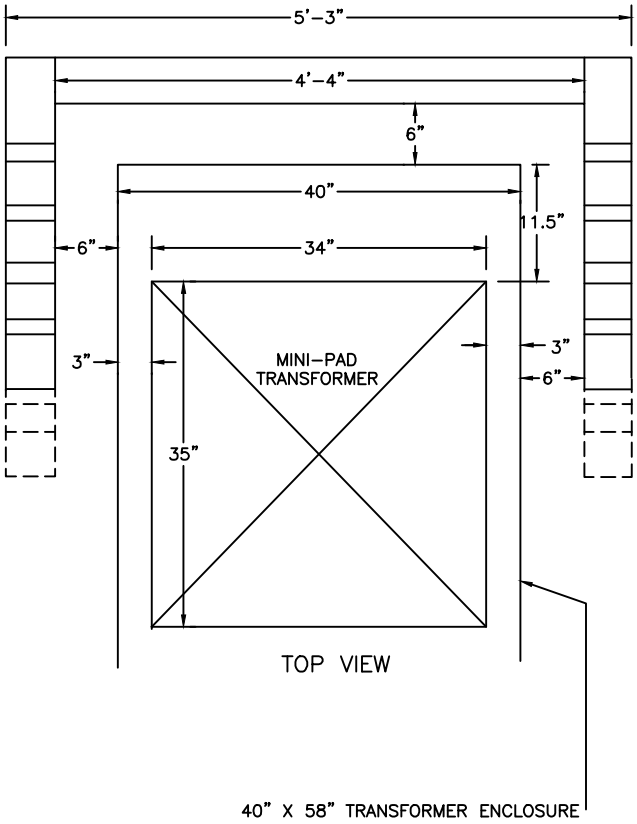
NOTES

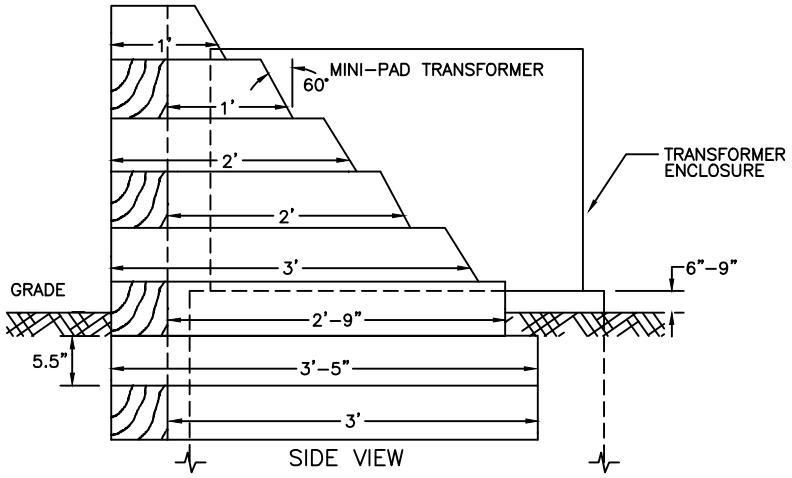
1) ALL TIMBER TO BE BEST CONSTRUCTION GRADE JACK OR RED PINE PRESSURE TREATED WITH PRESSURE TREAT OR EQUAL.

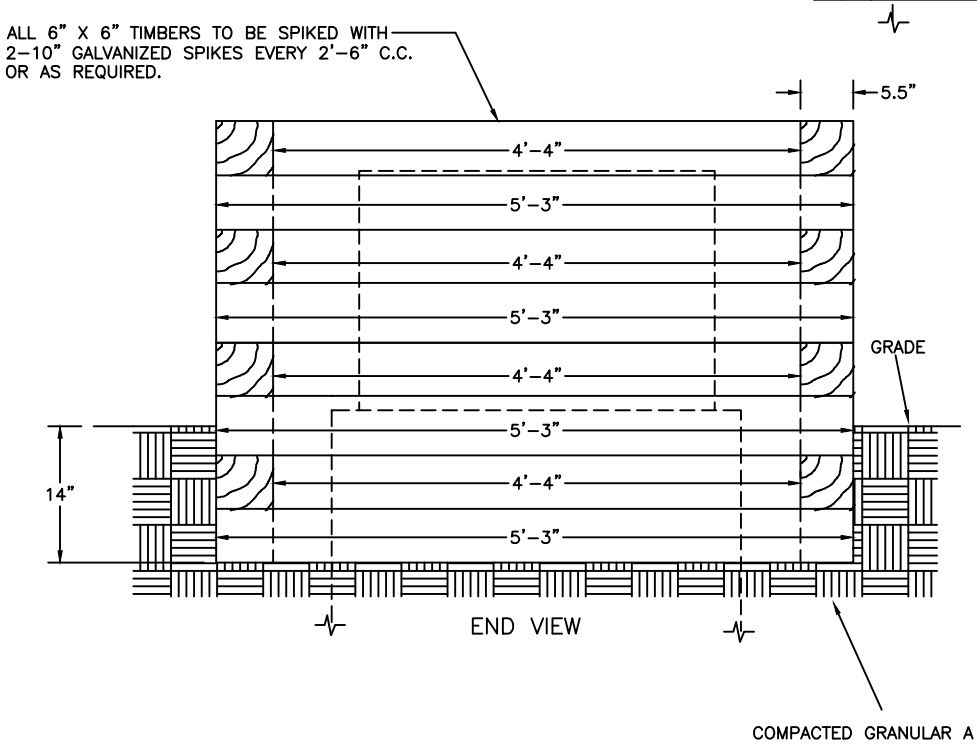
2) TIMBER EDGING TO BE INSTALLED LEVEL, TRUE & SQUARE.

3) ALL NAILS TO BE HOT DIPPED GALVANIZED.

4) CUT TIMBER ENDS TO BE TREATED WITH 2 COATS PENTOX OR EQUIVALENT.







REV.	DATE			CHEK'D. BY
2.	SEPT. 21/23	GBE LOGO UPDATED	RS	
1.	JUL 02/96	ROTATED AND REARRANGED DRAWING	SJ	

GrandBridge ENERGY

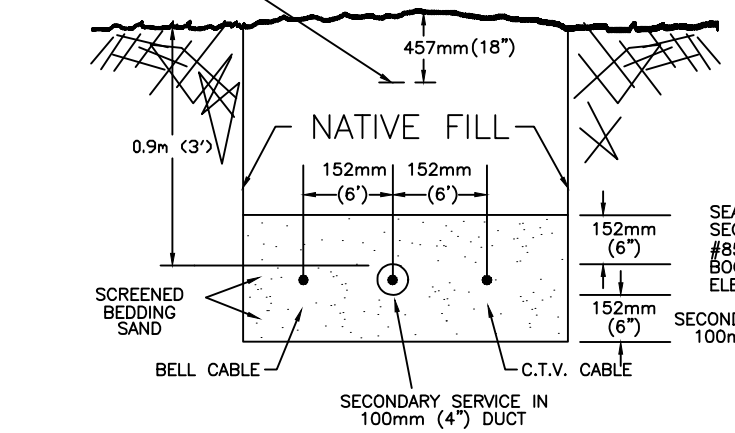
TITLE: 6" X 6" PRESSURE TREATED TIMBER BARRIER WALL FOR 1ø TRANSFORMER ENCLOSURE.

DATE:	SCALE:	W.O.No.:	DRAWN BY:
MAY/93	N.T.S.		S.L.TILLEY

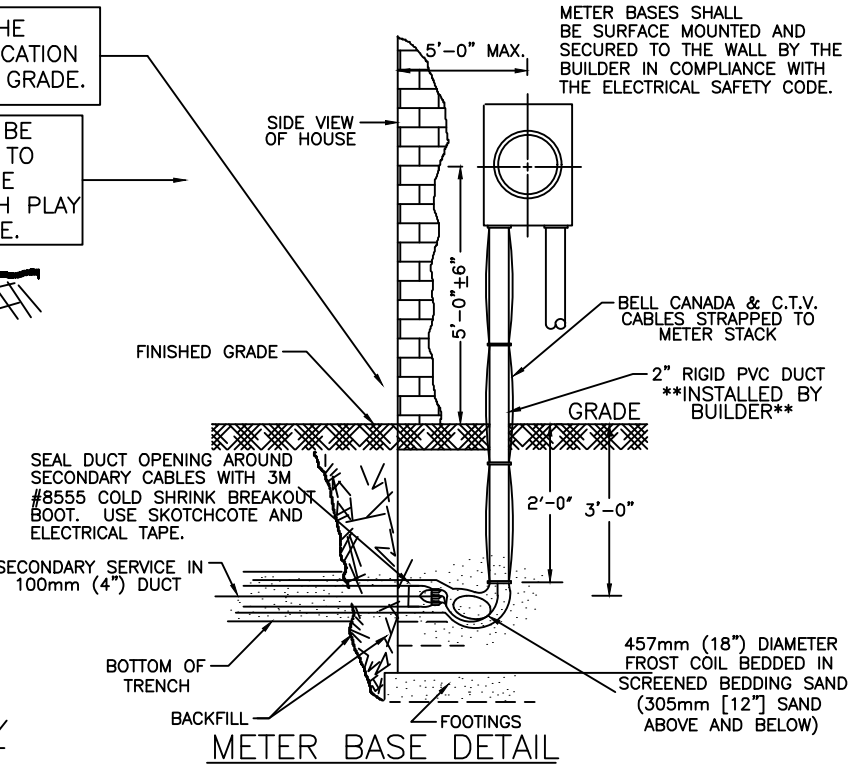
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS–026

BUILDER SHALL PAINT A MARK ON THE FOUNDATION AT THE METER BASE LOCATION IDENTIFYING THE LEVEL OF FINISHED GRADE.

LINE SIDE SERVICE WIRES SHALL BE TRAINED AS CLOSE AS POSSIBLE TO THE OUTSIDE OF THE METER BASE ENCLOSURE TO PROVIDE AS MUCH PLAY IN THE CONDUCTORS AS POSSIBLE.

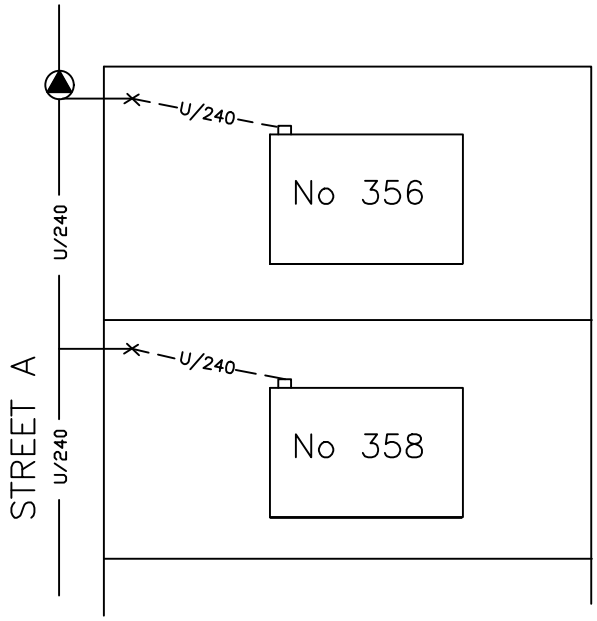


CROSS-SECTION OF SECONDARY SERVICE TRENCH



METER BASE DETAIL

*EXISTING INSTALLATIONS BUILT TO LEGACY BPI STANDARDS WILL BE ACCEPTED. ALL NEW BUILDS OR UPGRADES MUST BE INSTALLED AS PER GBE STANDARDS.



SECONDARY SERVICE LOCATION DETAIL

LEGEND

SECONDARY SERVICES TO BE INSTALLED _____ — —U/240

SECONDARY INSTALLED WITH MAIN DISTRIBUTION SYSTEM _____ ——U/240

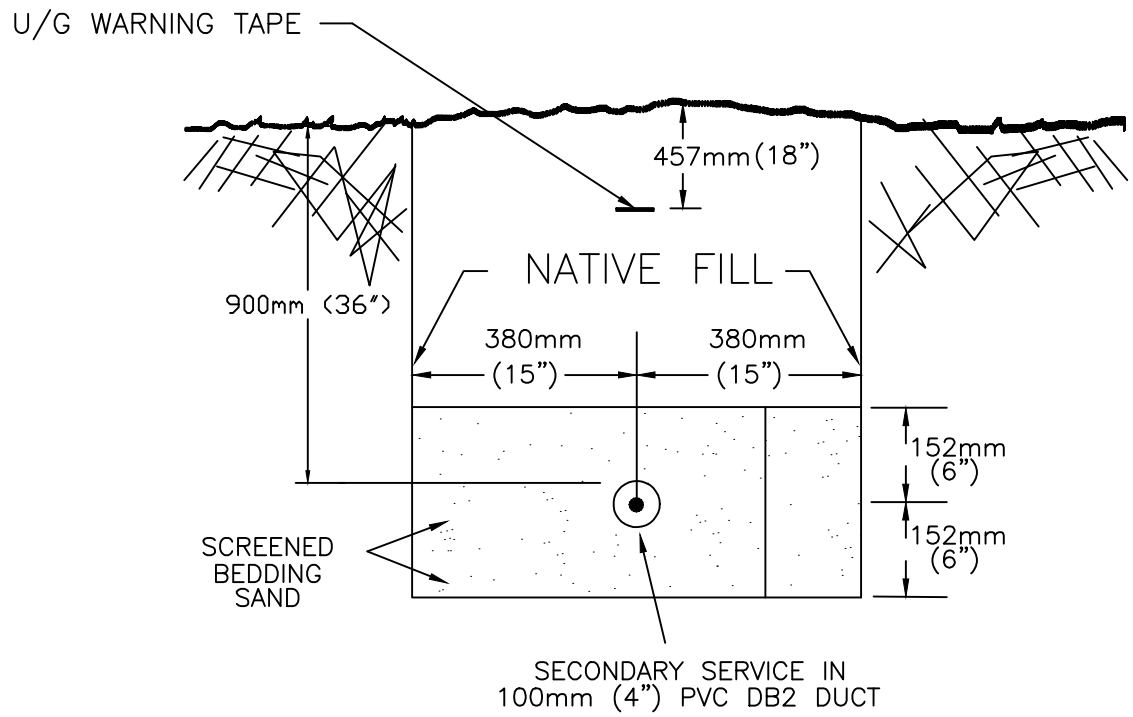
REV.	DATE			CHEK'D. BY
9.	SEPT. 21/23	GBE LOGO UPDATED, NOTES UPDATED	RS	
8.	OCT. 27/15	UPDATED METERBASE HEIGHT	SJ	
7.	Nov. 10/06	GENERAL UPDATE	P.G.	
6.	Nov. 26/03	ADDED OPTION RE:6" SAND BASE	E.V.	
5.	April 10/03	ADDED REFERENCE TO THE ELECTRICAL SAFETY CODE AND REFERENCE TO BUILDER INSTALLED 2" DOWNPIPE METER BASE TO 2' BELOW GRADE.	E.V.	
4.	JUNE 04/99	ADDED DETAIL ABOUT SEALING DUCT OPENING AROUND SECONDARY CABLES.	R.S.	
3.	MAR. 26/98	CHANGED HEIGHT OF METER BASE FROM 5'-8" +/-4" TO 5'-6" +/- 6". ADDED NOTE FOR BUILDER TO MARK GRADE ON FOUNDATION.	R.S.	
2.	OCT. 24/97	GENERAL UPDATE.	R.S.	
1.	OCT. 27/94	ADDED FROST LOOP.	S.W.	

GrandBridge ENERGY

TITLE: SECONDARY SERVICE INSTALLATION DETAILS JOINT TRENCH-HYDRO, BELL, CABLE T.V. PROPERTY LINE TO METER BASE.

DATE:	SCALE:	W.O.No.:	DRAWN BY:
MAY/93	N.T.S.		S.L.TILLEY

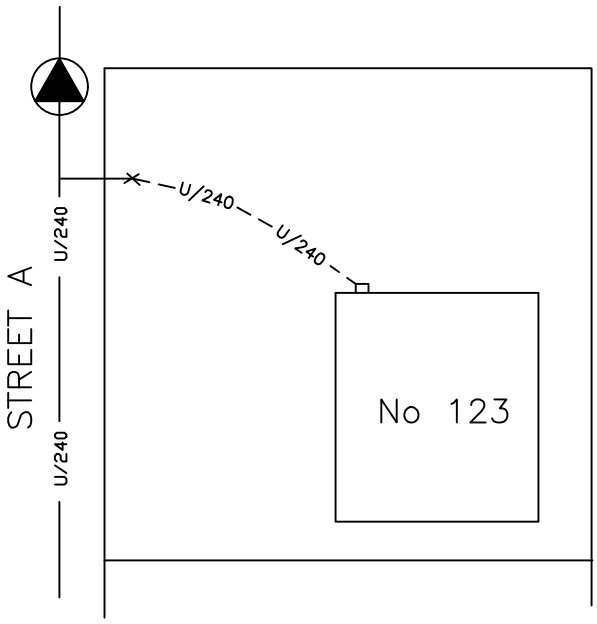
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS-027



CROSS-SECTION OF SECONDARY SERVICE TRENCH

NOTES :

1. PLACE 6" SAND PADDING BELOW AND ABOVE THE DUCT.
2. PLACE WARNING TAPE 18" BELOW GRADE.
3. 36" DEPTH OF COVER IS REQUIRED.
4. ALL PIPE JOINTS TO BE GLUED.
5. INSTALL 3/8" NYLON OR 3/4" MULE TAPE.
6. BACKFILL MUST BE FREE OF DEBRIS AND ROCKS.
7. TRENCH/DUCTS MUST BE INSPECTED BY ENERGY+ UNDERGROUND INSPECTOR PRIOR TO BACKFILL.



SECONDARY SERVICE LOCATION DETAIL

LEGEND

SECONDARY SERVICES TO BE INSTALLED _____ – –U/240– –

SECONDARY INSTALLED WITH MAIN DISTRIBUTION SYSTEM _____ ——U/240——

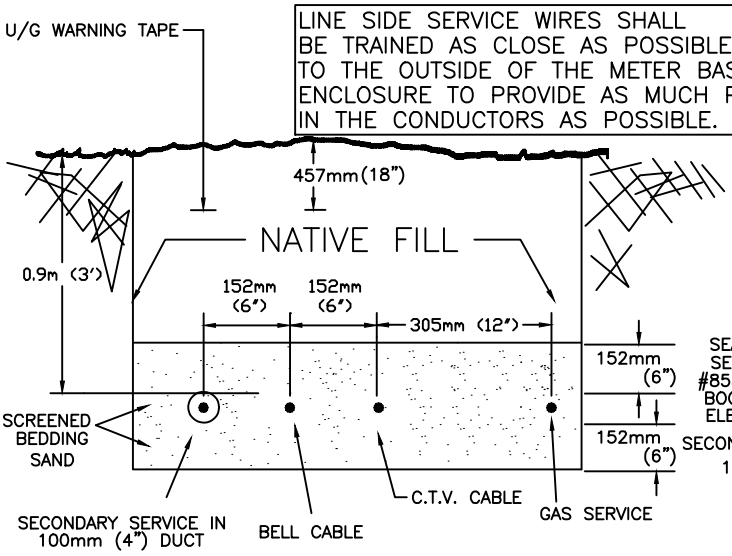
REV.	DATE			CHEK'D. BY
2.	SEPT. 13/21	GBE LOGO UPDATED	RS	
1.	JUL 13/21	SECONDARY TRENCH STANDARD		

GrandBridge ENERGY

TITLE: CUSTOMER INSTALLED TRENCH/DUCT(S) & GBE INSTALLED CABLE SECONDARY TRENCH SPECS PROPERTY LINE TO METER BASE.			
DATE: JUL/21	SCALE: N.T.S.	W.O.No.:	DRAWN BY: ZS
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No. UGS-027A	

BUILDER SHALL PAINT A MARK ON THE FOUNDATION AT THE METER BASE LOCATION IDENTIFYING THE LEVEL OF FINISHED GRADE.

LINE SIDE SERVICE WIRES SHALL BE TRAINED AS CLOSE AS POSSIBLE TO THE OUTSIDE OF THE METER BASE ENCLOSURE TO PROVIDE AS MUCH PLAY IN THE CONDUCTORS AS POSSIBLE.

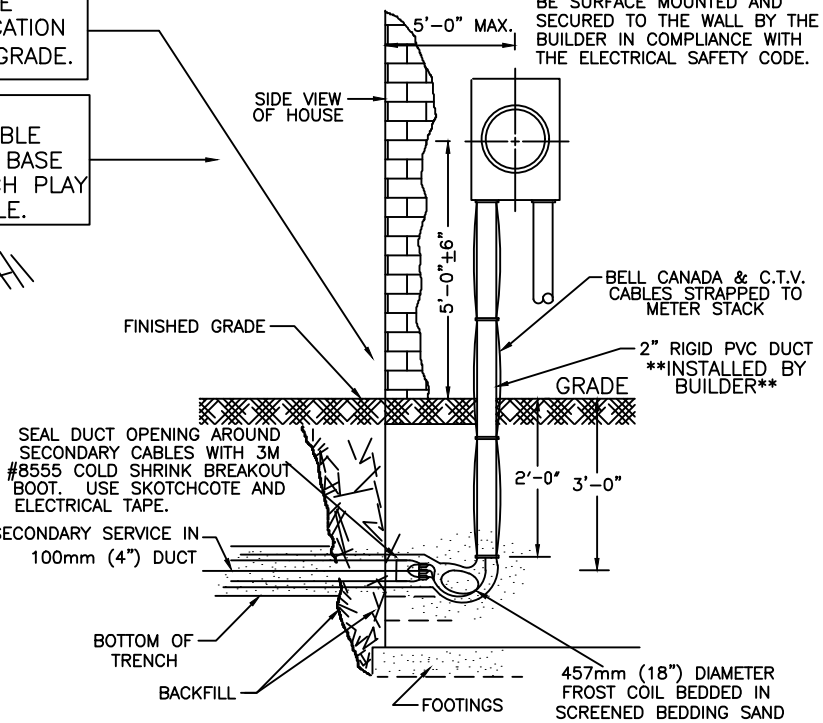


CROSS-SECTION OF SECONDARY SERVICE TRENCH

NOTE: GAS SERVICE SHALL BE LOCATED ON SIDE OF TRENCH CLOSEST TO LOT LINE.

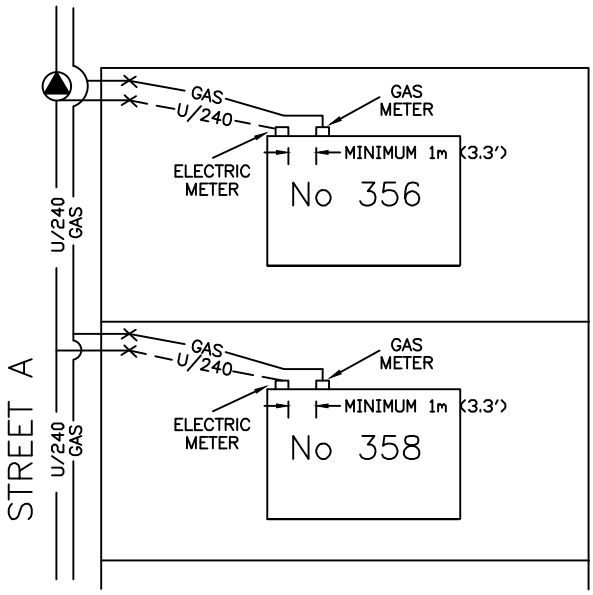
*EXISTING INSTALLATIONS BUILT TO LEGACY BPI STANDARDS WILL BE ACCEPTED. ALL NEW BUILDS OR UPGRADES MUST BE INSTALLED AS PER GBE STANDARDS.

METER BASES SHALL BE SURFACE MOUNTED AND SECURED TO THE WALL BY THE BUILDER IN COMPLIANCE WITH THE ELECTRICAL SAFETY CODE.



METER BASE DETAIL

NOTE: GAS NOT SHOWN ON METER BASE DETAIL. GAS SERVICE SHALL EXTEND PAST ELECTRIC METER. GAS METER SHALL BE LOCATED AT LEAST 1m (3.3') AWAY FROM ELECTRIC METER.



SECONDARY SERVICE LOCATION DETAIL

LEGEND

SECONDARY SERVICES TO BE INSTALLED ———— — —U/240

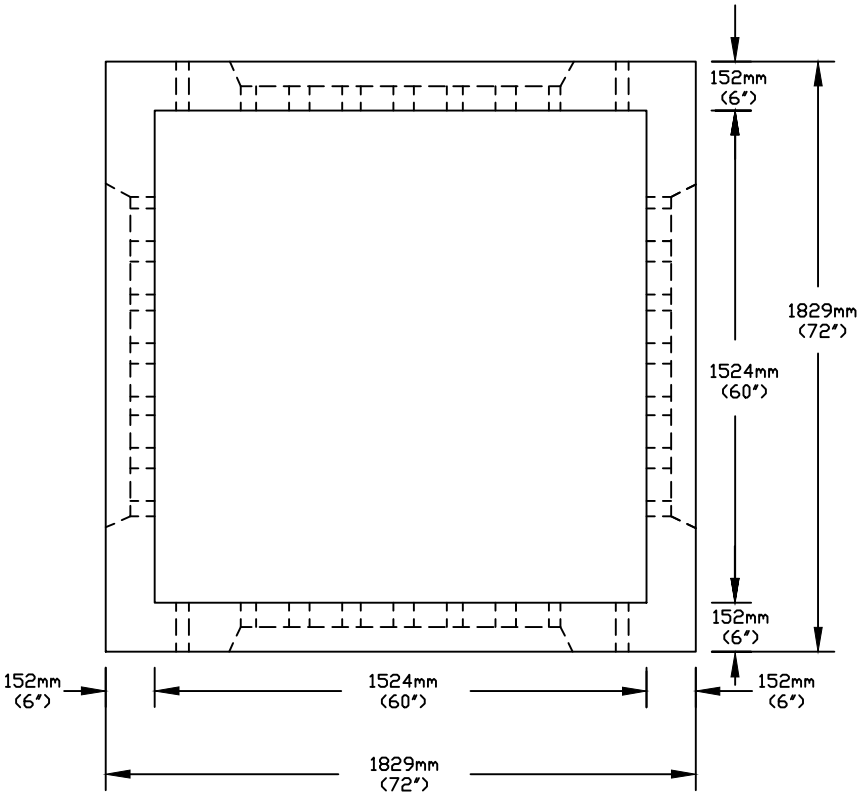
SECONDARY INSTALLED WITH MAIN DISTRIBUTION SYSTEM ———— ——U/240

REV.	DATE			CHEK'D. BY
8.	SEPT. 21/23	GBE LOGO UPDATED	R.S.	
7.	OCT. 27/15	UPDATED METERBASE HEIGHT	S.J.	
6.	NOV. 10/06	GENERAL UPDATE	P.G.	
5.	April 10/03	ADDED REFERENCE TO THE ELECTRICAL SAFETY CODE AND REFERENCE TO BUILDER INSTALLED 2" DOWNPIPE METER BASE TO 2' BELOW GRADE.	E.V.	
6.	MAY 10/00	ADDED JOINT USE TRENCH WITH GAS.	R.S.	
4.	JUNE 4/99	ADDED DETAIL ABOUT SEALING DUCT OPENING AROUND SECONDARY CABLES.	R.S.	
3.	MAR. 26/98	CHANGED HEIGHT OF METER BASE FROM 5'-8" +/-4" TO 5'-6" +/- 6". ADDED NOTE FOR BUILDER TO MARK GRADE ON FOUNDATION.	R.S.	
2.	OCT. 24/97	GENERAL UPDATE.	R.S.	
1.	OCT. 27/94	ADDED FROST LOOP.	S.W.	

GrandBridge ENERGY

TITLE: SECONDARY SERVICE INSTALLATION DETAILS JOINT TRENCH-HYDRO, BELL, CABLE T.V. & GAS PROPERTY LINE TO METER BASE.

DATE: MAY/93	SCALE: N.T.S.	W.O.No.:	DRAWN BY: S.L.TILLEY
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No. UGS-027G	



NOTES:

1) CONCRETE STRENGTH IS A MINIMUM OF 30MPa (4350psi).

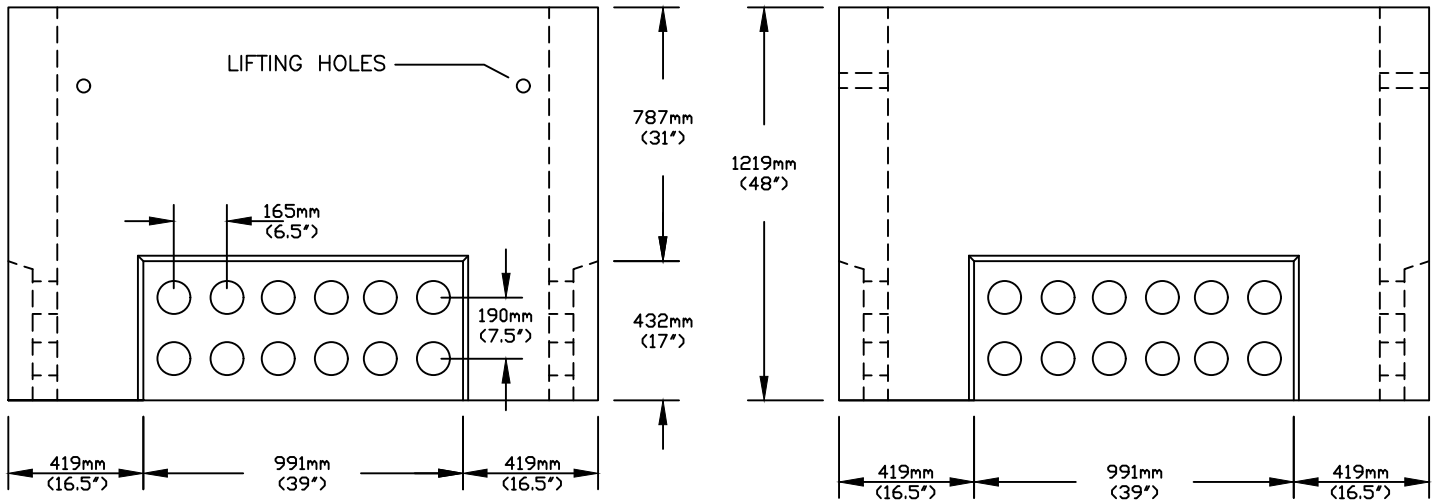
2) ENCLOSURE IS STEEL REINFORCED.

3) ENCLOSURE IS SUPPLIED WITH LIFTING HOLES. C/W PLUGS

4) TOTAL OF 48 PVC SEALS FOR 100mm (4") DUCTS.

5) ENCLOSURE SHALL SUPPORT TRANSFORMERS UP TO 1000KVA
(i.e weight of 5000kg)

6) ENCLOSURE IS TO BE SUPPLIED BY APPROVED MANUFACTURERS



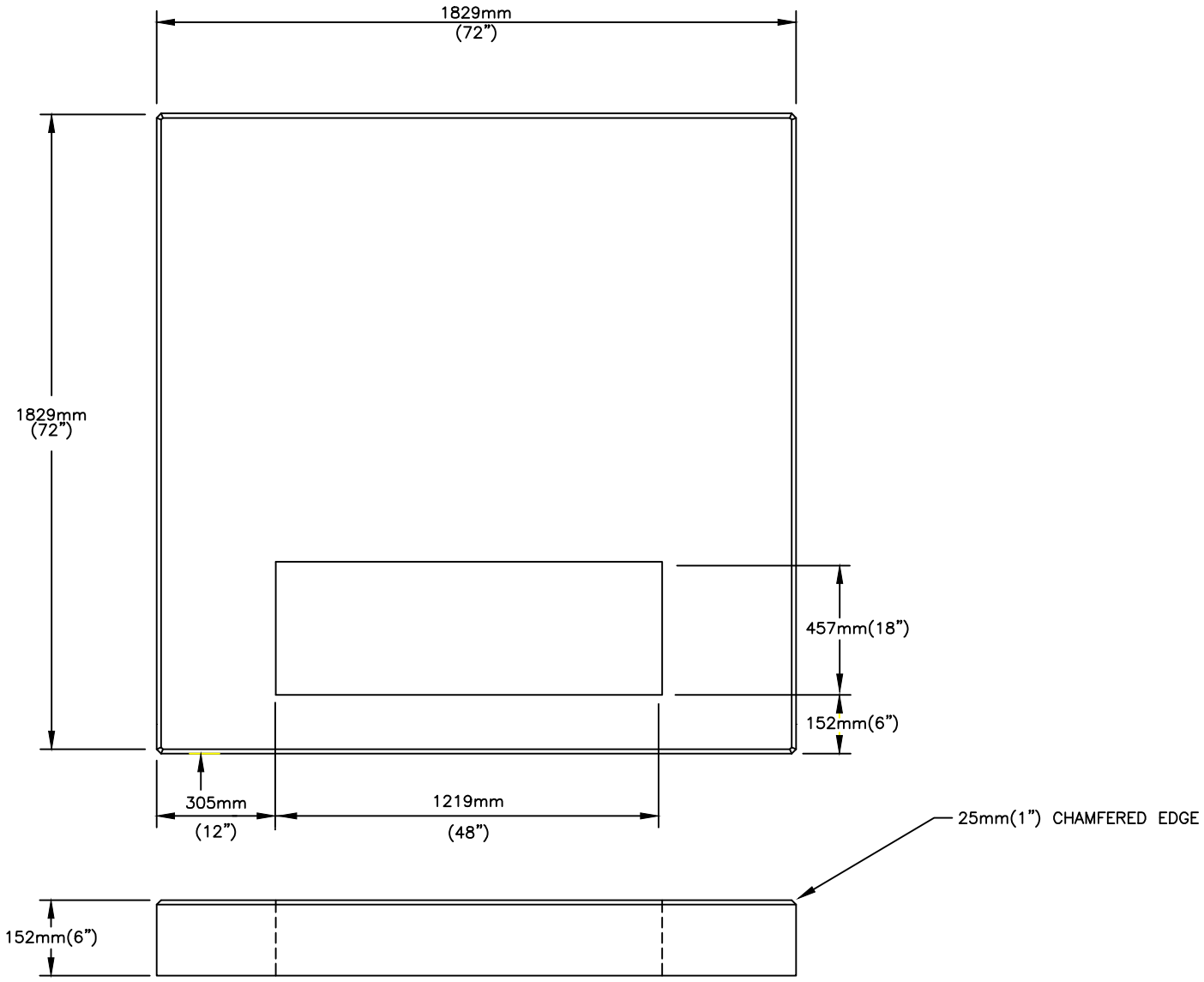
REV.	DATE		CHEK'D. BY
4.	SEPT. 21/23	GBE LOGO UPDATED	R.S.
3.	MAR. 28/17	REVISED SIZING OF TRANSFORMER	A.P.
2.	NOV. 14/97	GENERAL UPDATE.	R.S.
1.	MAY 6/96	ADDED PVC SEALS.	D.H.

GrandBridge ENERGY

TITLE: PRECAST CONCRETE ENCLOSURE FOR THREE PHASE PADMOUNT TRANSFORMER UP TO 1000KVA

DATE: NOV./93	SCALE: N.T.S.	W.O.No.:	DRAWN BY: R.S.

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No. UGS-029



NOTES:

1) LID IS TO BE SUPPLIED WITH LIFTING PROVISIONS.
2) LID IS TO BE SUPPLIED BY APPROVED MANUFACTURERS
3) LID SHALL SUPPORT TRANSFORMERS 150KVA TO 500KVA (i.e weight of 3000 kg.)

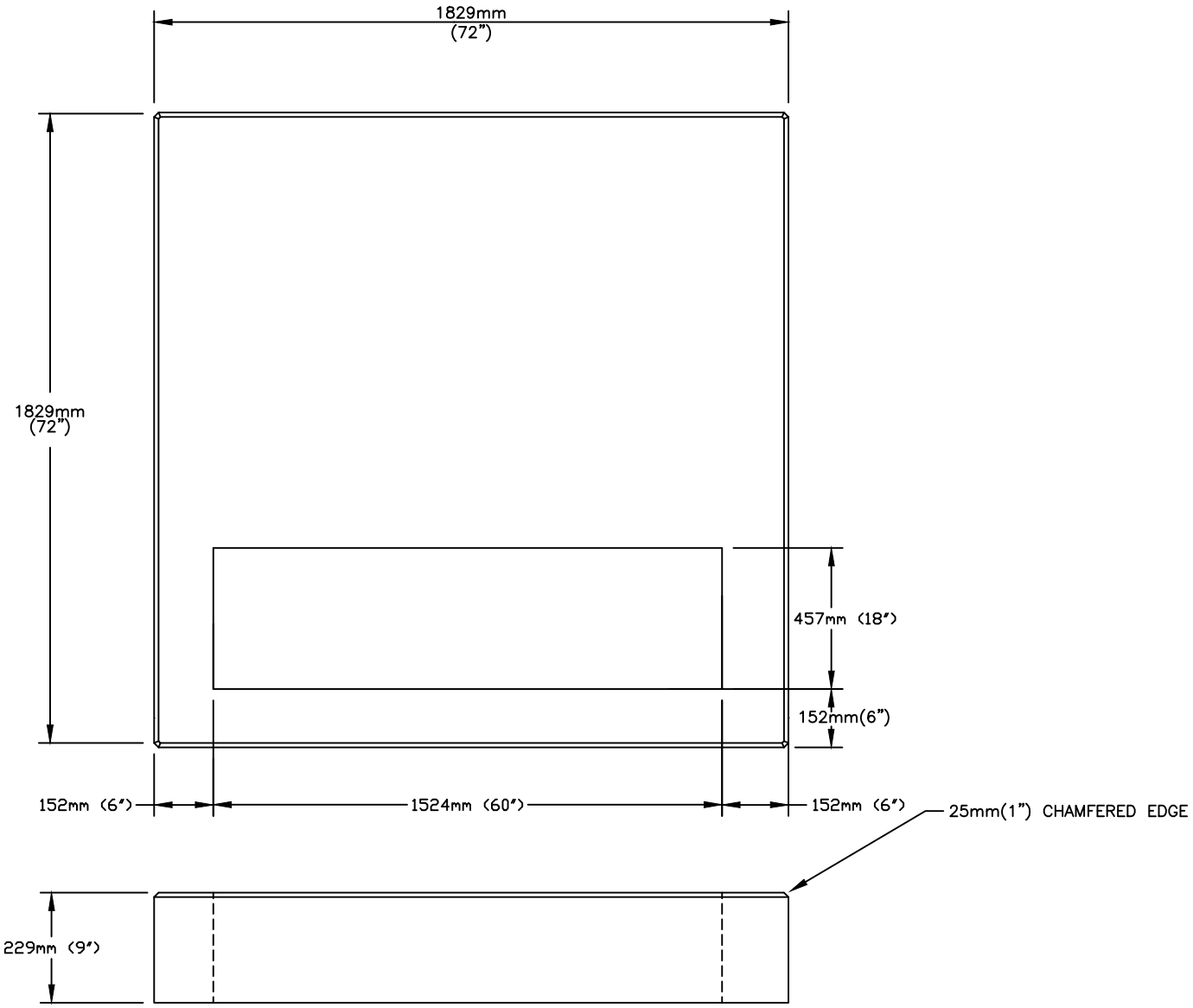
REV.	DATE			CHEK'D. BY
3.	SEPT. 21/23	GBE LOGO UPDATED	RS	
2.	APR. 25/11.	REVISED MAX. TRANSFORMER SIZE TO 500kVA.	ST	
1.	MAY 2/96	REVISED LENGTH TO MATCH 3 ø PADMOUNT TRANSFORMER ENCLOSURE.	D.H.	

GrandBridge ENERGY

TITLE: 152mm (6") THREE PHASE PRECAST CONCRETE PAD.

DATE: NOV. 15/93.	SCALE: N.T.S.	W.O.No.:	DRAWN BY: S.L.TILLEY

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No. UGS-029A



NOTES:

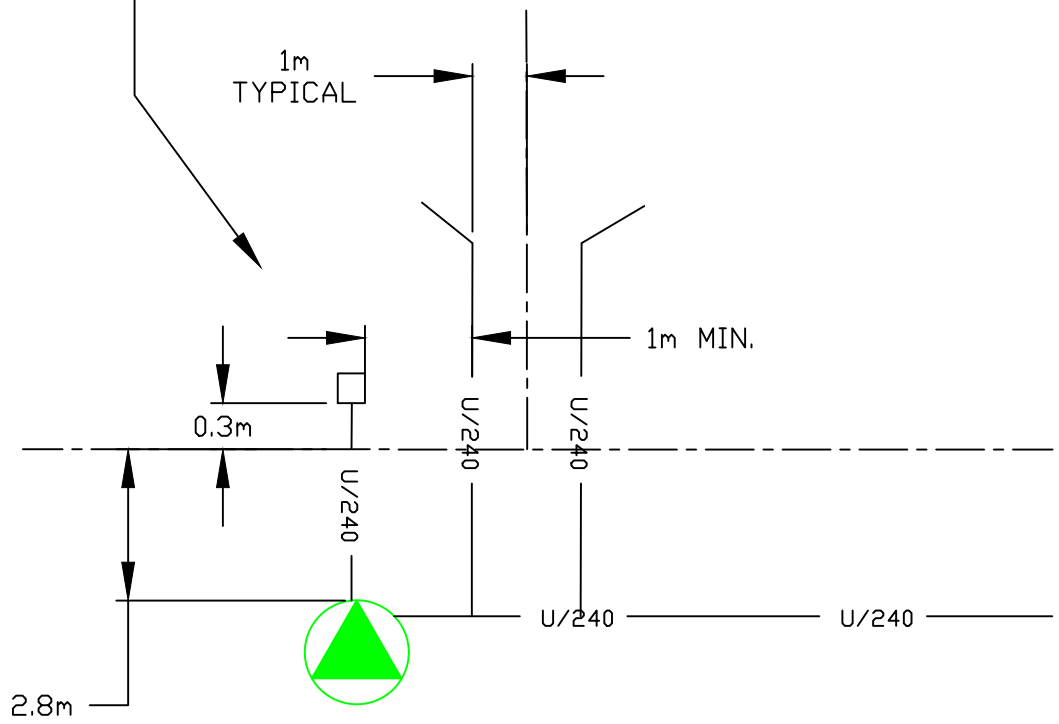
2) LID IS TO BE SUPPLIED FROM APPROVED MANUFACTURER
3) LID IS TO BE SUPPLIED WITH LIFTING PROVISIONS.
4) LID AND ENCLOSURE BELOW SHALL SUPPORT A TRANSFORMERS 750KVA TO 1000KVA (i.e weight of 5000kg)

3.	SEPT 21 2023	GBE LOGO UPDATED	RS	
2.	MARCH 28 2017	REVISED TO REFLECT ACCEPTABLE TRANSFORMER SIZES	AP	
1.	APR. 25/11.	REVISED TITLE TO REFLECT ACCEPTABLE TRANSFORMER SIZES.	ST	

GrandBridge ENERGY

TITLE:	229mm (9") THREE PHASE PRECAST PRECAST PAD TO ACCEPT 750kVA – 1000KVA TRANSFORMERS		
DATE: AUG.6/99	SCALE: N.T.S.	W.O.No.:	DRAWN BY: S.T./R.S.
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.	UGS-029B

DEVELOPER IS TO INSTALL A 6"x6" WOLMANIZED PRESSURE TREATED POST TO MOUNT METER BASE ON AS PER ESA CODE. INSTALL 1–3/0 AL. TRI. IN 1–100mm D.B. DUCT FROM THE Tx. TO THE POST. LEAVE MIN. 3m TAILS AT Tx. (SEE DRAWING UGS–027 FOR SECONDARY CONDUCTOR AND METER BASE INSTALLATION.)



NOTES:

1) A 'TEMPORARY SERVICE CHARGE' WILL APPLY FOR SERVICE AT LOCATION.

2) 6"x6" POST IS TO BE INSATALLED AT TRANSFORMER LOCATIONS ONLY. MIN. 1m FROM LOT SERVICE STUB.

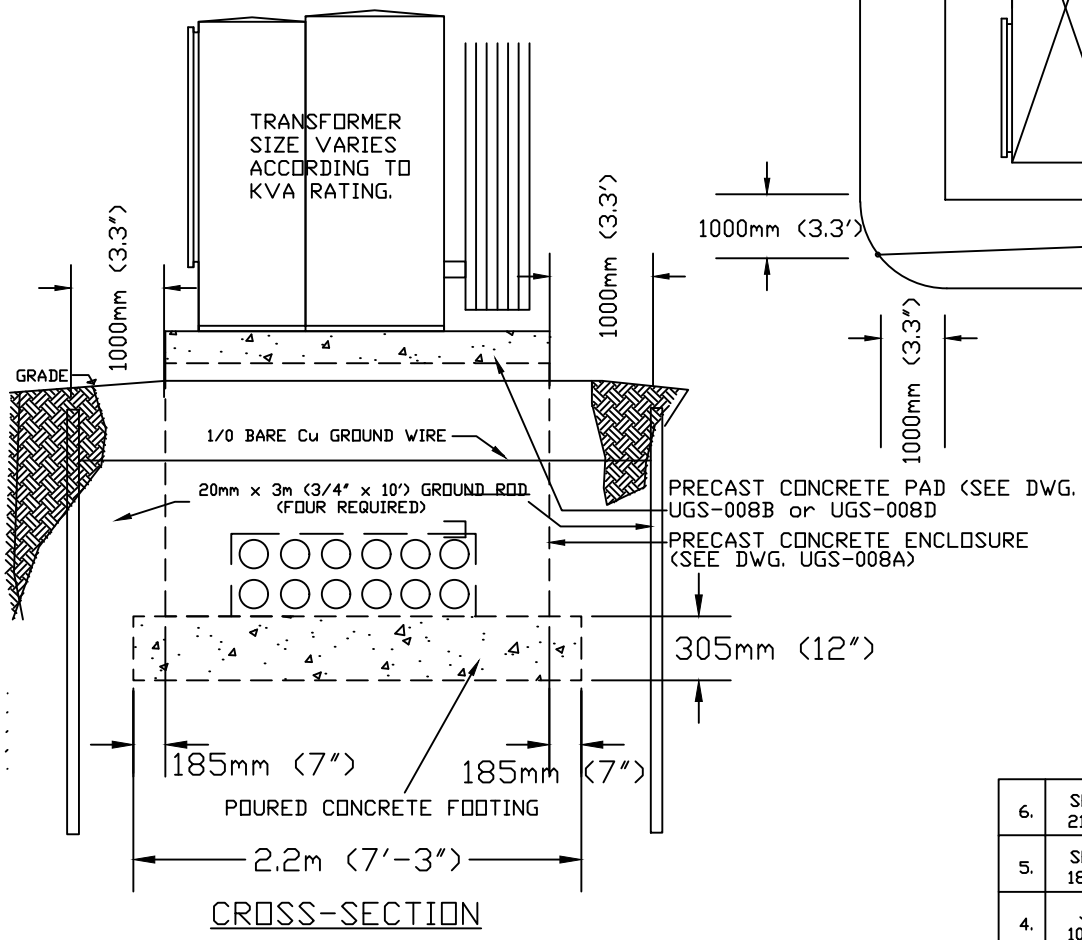
REV.	DATE			CHEK'D. BY
2.	SEPT. 21/23	GBE LOGO UDPATED	R.S.	
1.	MAY 03/00	GENERAL UPDATE	B.B.	

GrandBridge ENERGY

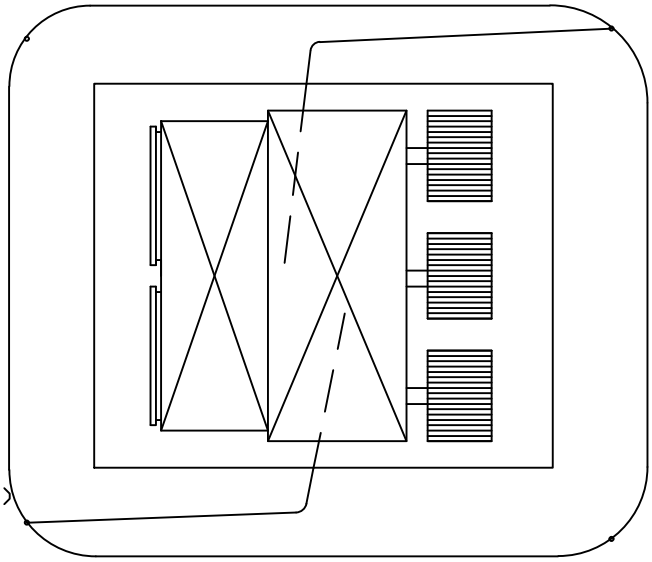
TITLE: DETAIL FOR TEMPORARY METER PANEL IN SUBDIVISIONS.			
DATE: MAY 3/00	SCALE: N.T.S.	W.O.No.:	DRAWN BY: S.L.TILLEY
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No. UGS–030	

NOTES:

1. FOUR 20mm x 3m (3/4" x 10') COPPER CLAD GROUND RODS ARE TO BE INSTALLED 305mm (12") FROM TRANSFORMER ENCLOSURE & DIAGONALLY INSTALLED FROM THE CORNERS.
2. 1/0 BARE Cu GROUND WIRE IS TO BE CONNECTED TO GROUND ROD WITH APPROVED COMPRESSION AND BOLTED JOINT CLAMPS. (SIX REQUIRED)
3. 305mm THICK POURED CONCRETE FOOTING IS TO BE INSTALLED BELOW ENCLOSURE
4. 3m (10') COILS OF Cu GROUND WIRE ARE TO BE LEFT INSIDE ENCLOSURE.
5. 20MM PLYWOOD IS TO BE SECURED ON TOP OF PAD UNTIL TRANSFORMER IS INSTALLED.
6. EXCAVATION DEPTH TO BE 1.45m (4'9") BELOW FINISHED GRADE.



CROSS-SECTION



PLAN VIEW

REV.	DATE			CHEK'D. BY
6.	SEPT. 21/23.	GBE LOGO UPDATE	RS	
5.	SEPT. 18/17.	REVISED SPEC'S FOR TX SIZES	STW	
4.	JUN. 10/13	EXCAVATION DEPTH SPECIFIED.	DC	
3.	SEPT. 01/06	GENERAL UPDATE	STW	
2.	Jan 06/00	GROUND RODS CHANGED TO 3m	KE	
1.	NOV. 14/97	GENERAL UPDATE.	R.S.	

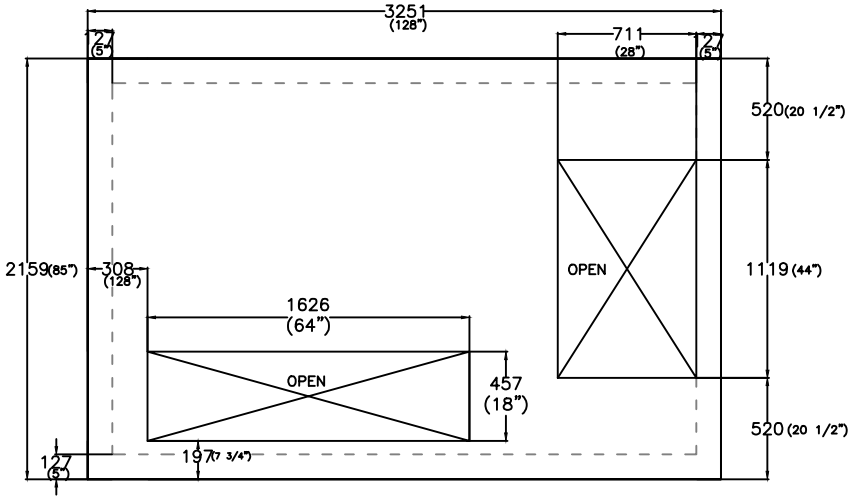
SEE DWG. UGS-029 FOR THREE PHASE ENCLOSURE DETAILS AND
UGS-029A (500 KVA & BELOW) AND
UGS-029B (750-1000 KVA & ABOVE) FOR THREE PHASE PAD DETAILS
UGS-033 & UGS-035 (1500 KVA & ABOVE FOR THREE PHASE PAD DETAILS

GrandBridge ENERGY

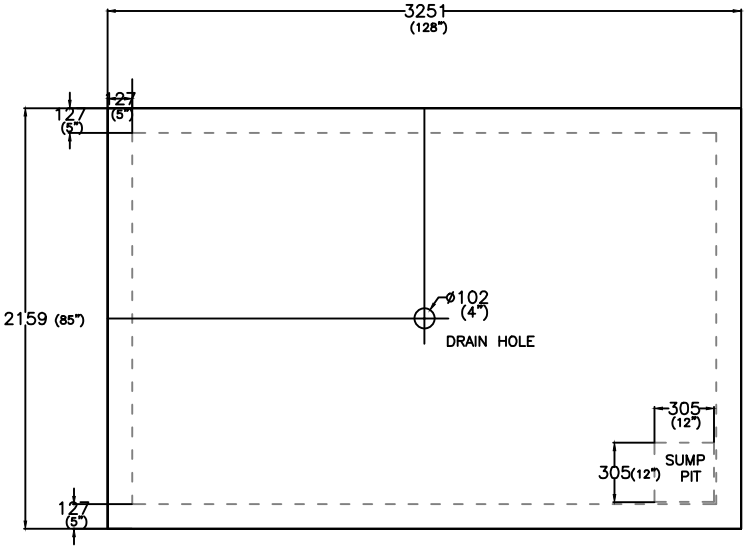
TITLE: TYPICAL THREE PHASE PADMOUNT TRANSFORMER INSTALLATION DETAIL

DATE:	SCALE:	W.O.No.:	DRAWN BY:
NOV.16/93	N.T.S.		R.S.

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS-031



PADMOUNT FOUNDATION LID



PADMOUNT FOUNDATION FLOOR

MAXIMUM TRANSFORMER WEIGHT MOUNTED ON FOUNDATION SHOULD NOT EXCEED 8,150 Kg.

NOTES:

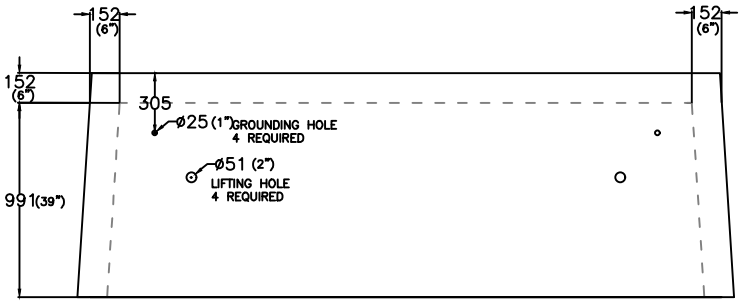
1. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS (UNLESS NOTED OTHERWISE ON DRAWINGS SHALL BE AS FOLLOWS:
   356MPa WITH 6% ± 1% AIR ENTRAINMENT (CLASS "C–1") FOR CONCRETE EXPOSED TO WEATHER WITH A MAX. WATER/CEMENT RATIO OF 0.40 AND A MIN. CEMENT CONTENT OF 350kg/m3
2. CALCIUM CHLORIDE ADMIXTURES SHALL NOT BE USED.
3. ALL REINFORCING BARS SHALL BE NEW DEFORMED "HI–BOND" FUSION BONDED CONFORMING WITH CSA STANDARD G30.18 WITH A MINIMUM YIELD STRESS OF 400 MPa.
4. CONCRETE MATERIALS CONSTRUCTION AND TESTING SHALL CONFORM TO THE REQUIREMENTS OF CAN/ CSA– A23.1 AND CAN/ CSA– A23.2 LATEST EDITION
5. ALL METAL COMPONENTS AND HARDWARE HOT DIPPED GALVANIZED UNLESS OTHERWISE NOTED.
6. FOR SIZE, LOCATION AND ORIENTATION OF DUCT BANKS/ CONDUITS ENTERING MANHOLE REFER TO ELECTRICAL DRAWINGS
7. REFER TO PRECAST SUPPLIER'S DRAWINGS FOR REMAINDER OF DETAILS
8. DESIGN CRITERIA:
   CANADIAN HIGHWAY BRIDGE DESIGN CODE CSA S6.00:
   LIVE LOAD = 70% OF CL–625–ONT TRUCK.
9. 1" (25mm0 CONCRETE COVER. FOR INSIDE WALL CEILING AND FLOOR.
10. SEE UGS–033 PG.2 FOR ENCLOSURE DETAILS.
11. SEE UGS–035 FOR INSTALLATION DETAILS

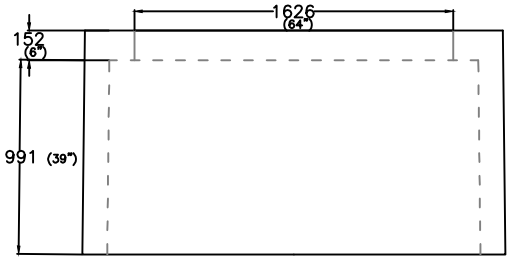
REV.	DATE			CHEK'D. BY
1.	SEPT. 22/23	GBE LOGO UPDATED	TX	

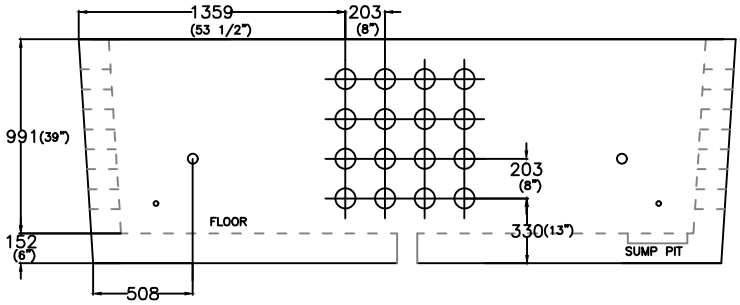
GrandBridge ENERGY

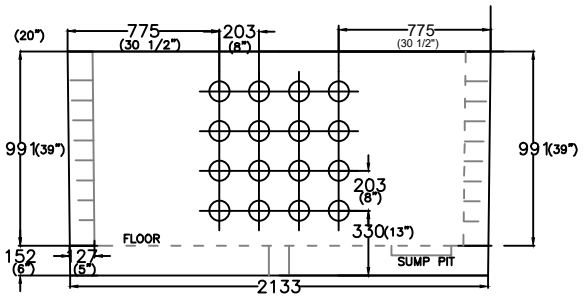
TITLE: LID AND FLOOR FOR 192C–SP TRANSFORMER ENCOSURE FOR 1500 KVA TRANSFORMER AND UP

DATE: APRIL/17	SCALE: N.T.S.	W.O.No.:	DRAWN BY:
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No. UGS–033	PAGE 1 OF 2









MAXIMUM TRANSFORMER WEIGHT MOUNTED ON FOUNDATION SHOULD NOT EXCEED 8,150 Kg.

Notes:

1. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS (UNLESS NOTED OTHERWISE ON DRAWINGS SHALL BE AS FOLLOWS:
   356MPa WITH 6% ± 1% AIR ENTRAINMENT (CLASS "C–1") FOR CONCRETE EXPOSED TO WEATHER WITH A MAX. WATER/CEMENT RATIO OF 0.40 AND A MIN. CEMENT CONTENT OF 350kg/m3
2. CALCIUM CHLORIDE ADMIXTURES SHALL NOT BE USED.
3. ALL REINFORCING BARS SHALL BE NEW DEFORMED "HI–BOND" FUSION BONDED CONFORMING WITH CSA STANDARD G30.18 WITH A MINIMUM YIELD STRESS OF 400 MPa.
4. CONCRETE MATERIALS CONSTRUCTION AND TESTING SHALL CONFORM TO THE REQUIREMENTS OF CAN/ CSA– A23.1 AND CAN/ CSA– A23.2 LATEST EDITION
5. ALL METAL COMPONENTS AND HARDWARE HOT DIPPED GALVANIZED UNLESS OTHERWISE NOTED.
6. FOR SIZE, LOCATION AND ORIENTATION OF DUCT BANKS/ CONDUITS ENTERING MANHOLE REFER TO ELECTRICAL DRAWINGS
7. REFER TO PRECAST SUPPLIER'S DRAWINGS FOR REMAINDER OF DETAILS
8. DESIGN CRITERIA:
   CANADIAN HIGHWAY BRIDGE DESIGN CODE CSA S6.00:
   LIVE LOAD = 70% OF CL–625–ONT TRUCK.
9. 1" (25mm0 CONCRETE COVER. FOR INSIDE WALL CEILING AND FLOOR.
10. SEE UGS–033 Pg.1 FOR LID AND FLOOR DETAILS.
11. SEE USG–035 FOR INSTALLATION DETAILS.

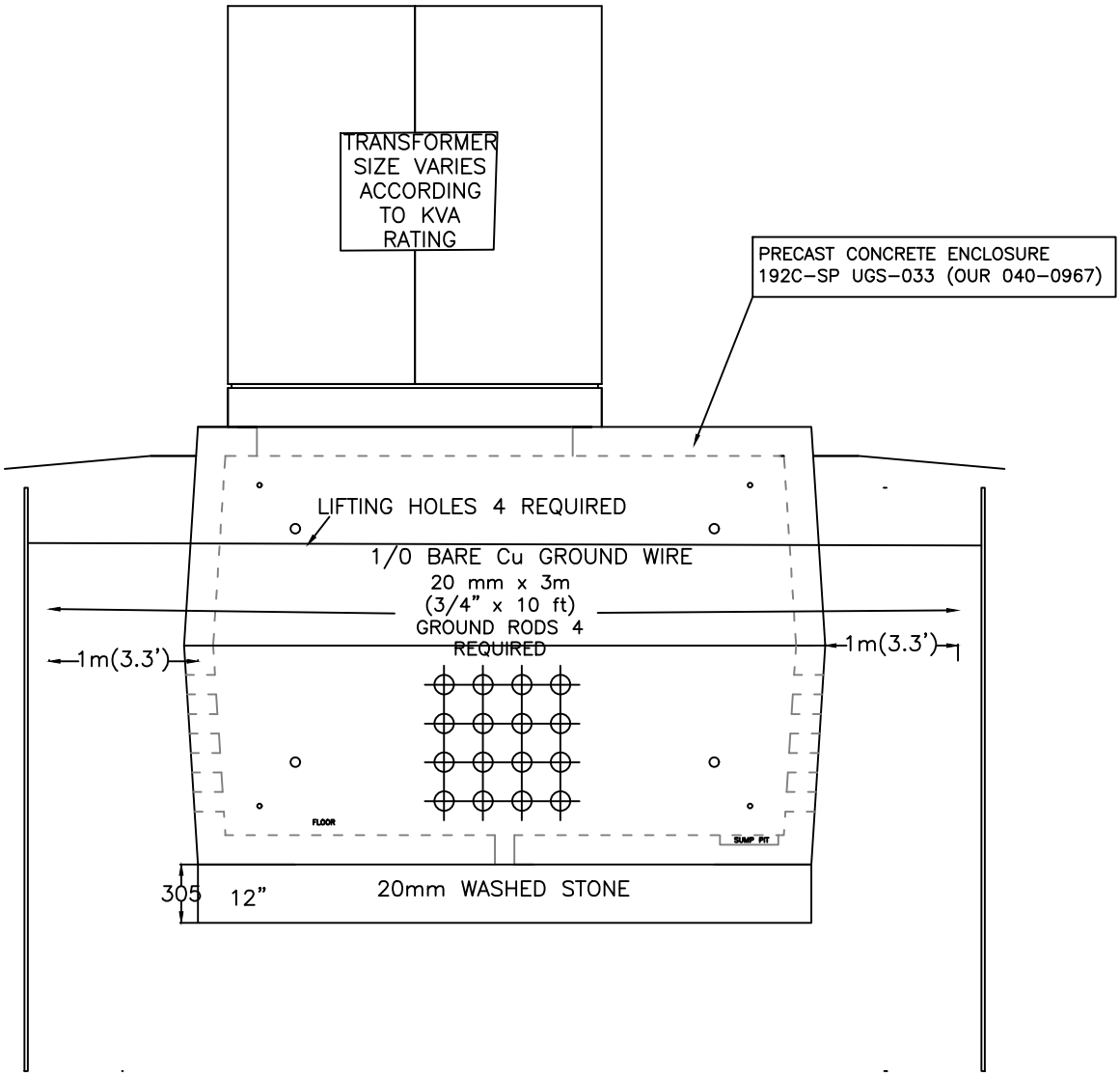
REV.	DATE			CHEK'D. BY
1.	SEPT. 22/23	GBE LOGO UPDATED	TX	

GrandBridge ENERGY

TITLE:
192C–SP TRANSFORMER ENCLOSURE FOR 1500 KVA AND UP

DATE:	SCALE:	W.O.No.:	DRAWN BY:
APRIL/17	N.T.S.		

DESIGNED BY	APPROVED BY P.ENG.	DRAWING No.
		UGS–033



NOTES:

1. FOUR 20mm X 3m (3/4" X 10') COPPER CLAD GROUND RODS ARE TO BE INSTALLED 1m (3.3') FROM TRANSFORMER ENCLOSURE & DIAGONALLY INSTALLED FROM THE CORNERS.
2. 1/0 BARE Cu GROUND WIRE IS TO BE CONNECTED TO THE GROUND ROD WITH APPROVED COMPRESSION OR BOLTED JOINT CLAMPS (SIX REQUIRED)
3. 305mm OF 20mm WASHED STONE IS TO BE INSTALLED BELOW ENCLOSURE.
4. 3m (10') COILS OF CU GROUND WIRE TO BE LEFT INSIDE ENCLOSURE.
5. 20mm PLYWOOD IS TO BE SECURED ON TOP OF PAD UNTIL TRANSFORMER IS INSTALLED
6. EXCAVATION DEPTH IS TO BE 2.44m (7')
7. SEE UGS-033 FOR ENCLOSURE DETAILS.

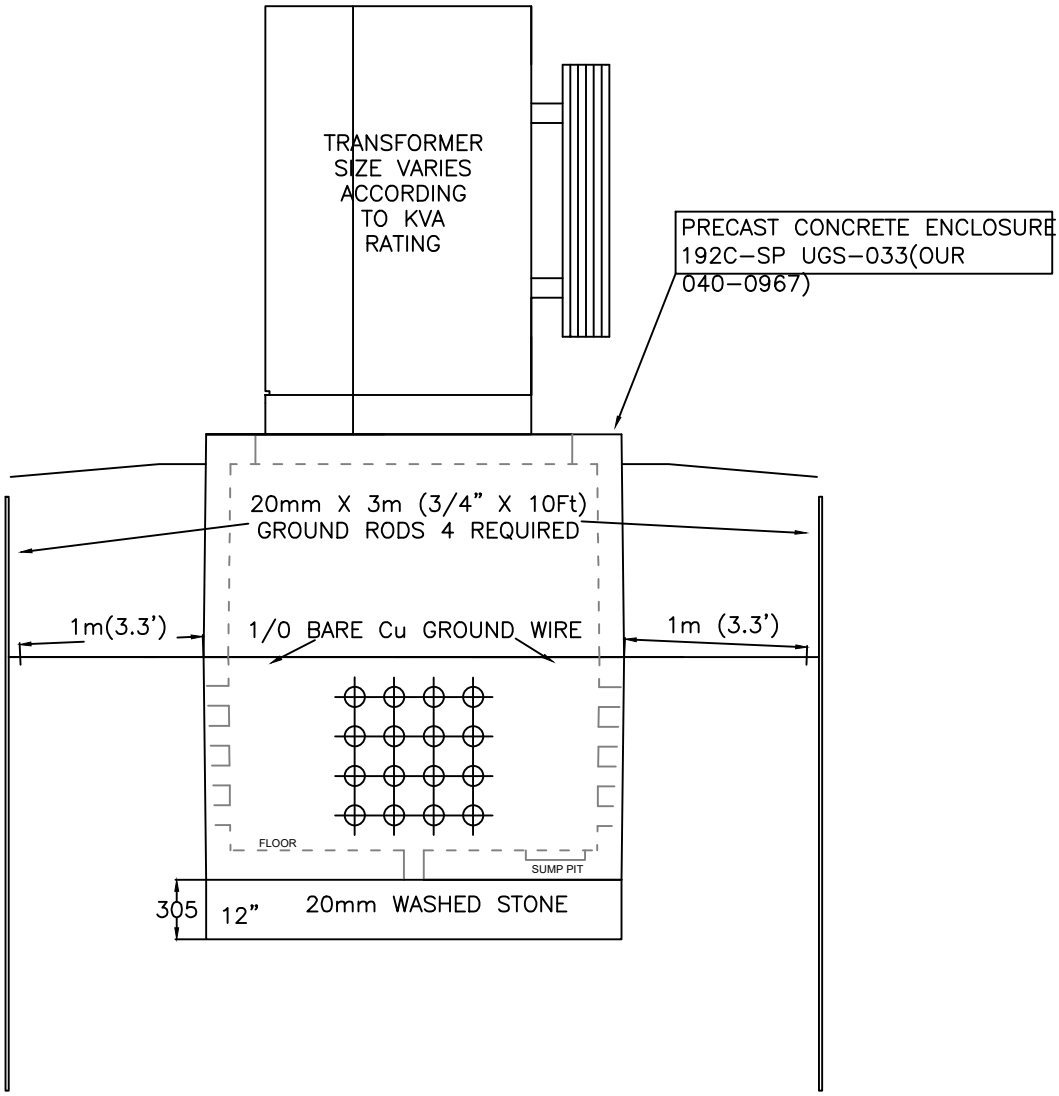
REV.	DATE			CHEK'D. BY
1.	SEPT. 29/23	GBE LOGO UPDATED TO INCLUDE COMPRESSION CLAMPS AND GROUND ROD DISTANCE	TX	

GrandBridge ENERGY

TITLE: INSTALLATION DETAIL FOR 192C-P TRANSFORMER ENCLOSURE PROFILE VIEW (LENGTH)

DATE:	SCALE:	W.O.No.:	DRAWN BY:
APRIL/17	N.T.S.		

DESIGNED BY | APPROVED BY P.ENG. | DRAWING No. UGS-035



NOTES:

1. FOUR 20mm X 3m (3/4" X 10') COPPER CLAD GROUND RODS ARE TO BE INSTALLED 1m (3.3') FROM TRANSFORMER ENCLOSURE & DIAGONALLY INSTALLED FROM THE CORNERS.

2. 1/0 BARE Cu GROUND WIRE IS TO BE CONNECTED TO THE GROUND ROD WITH APPROVED COMPRESSION OR BOLTED JOINT CLAMPS (SIX REQUIRED)

3. 305mm of 20mm WASHED STONE IS TO BE INSTALLED BELOW ENCLOSURE.

4. 3m (10') COILS OF CU GROUND WIRE TO BE LEFT INSIDE ENCLOSURE.

5. 20mm PLYWOOD IS TO BE SECURED ON TOP OF PAD UNTIL TRANSFORMER IS INSTALLED

6. EXCAVATION DEPTH IS TO BE 2.44m (7')

7. SEE UGS-033 FOR ENCLOSURE DETAILS

REV.	DATE			CHEK'D. BY
1.	SEPT. 29/23	GBE LOGO UPDATED TO INCLUDE COMPRESSION CLAMPS AND GROUND ROD DISTANCE	TX	

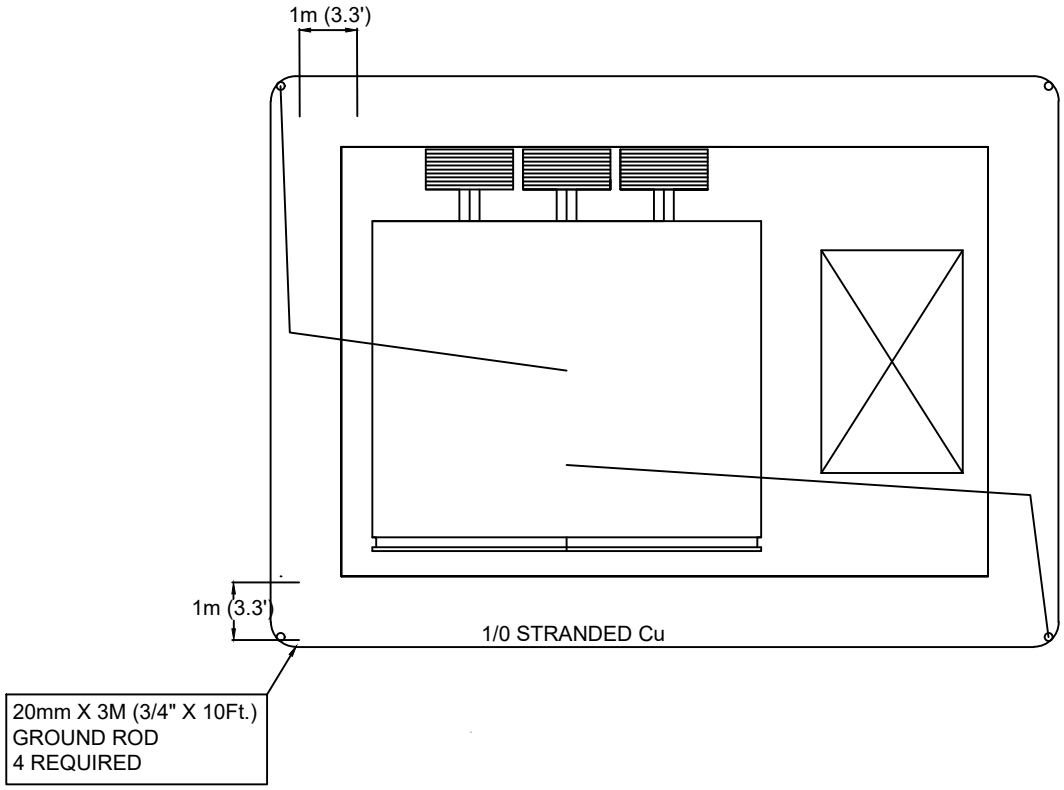
GrandBridge ENERGY

TITLE: INSTALLATION DETAIL FOR 192C-P TRANSFORMER ENCLOSURE PROFILE VIEW (WIDTH)

DATE:	SCALE:	W.O.No.:	DRAWN BY:
APRIL/17	N.T.S.		

DESIGNED BY | APPROVED BY P.ENG.

DRAWING No. UGS-035



NOTES:

1. FOUR 20mm X 3m (3/4" X 10') COPPER CLAD GROUND RODS ARE TO BE INSTALLED 1000mm (3.3') FROM TRANSFORMER ENCLOSURE & DIAGONALLY INSTALLED FROM THE CORNERS.

2. 1/0 BARE Cu GROUND WIRE IS TO BE CONNECTED TO THE GROUND ROD WITH APPROVED COMPRESSION OR BOLTED JOINT CLAMPS (SIX REQUIRED)

3. 305mm OF 20mm WASHED STONE IS TO BE INSTALLED BELOW ENCLOSURE.

4. 3m (10') COILS OF CU GROUND WIRE TO BE LEFT INSIDE ENCLOSURE.

5. 20mm PLYWOOD IS TO BE SECURED ON TOP OF PAD UNTIL TRANSFORMER IS INSTALLED

6. EXCAVATION DEPTH IS TO BE 2.44m (7')

7. SEE USG-033 FOR ENCLOSURE DETAILS

REV.	DATE			CHEK'D. BY
1.	SEPT. 29/23	GBE LOGO UPDATED TO INCLUDE COMPRESSION CLAMPS AND GROUND ROD DISTANCE	TX	

GrandBridge ENERGY

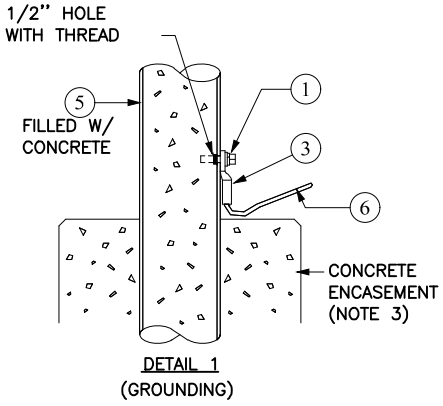
TITLE: INSTALLATION DETAIL FOR 192C–P TRANSFORMER ENCLOSURE TOP VIEW

DATE: APRIL/17	SCALE: N.T.S.	W.O.No.:	DRAWN BY:

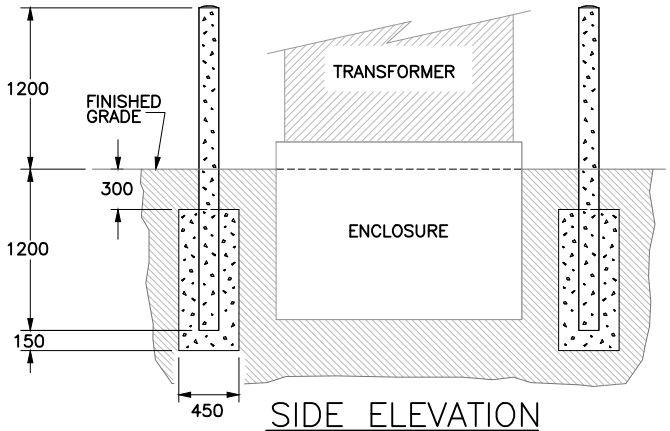
DESIGNED BY	APPROVED BY P.ENG.	DRAWING No. UGS–035

NOTES:

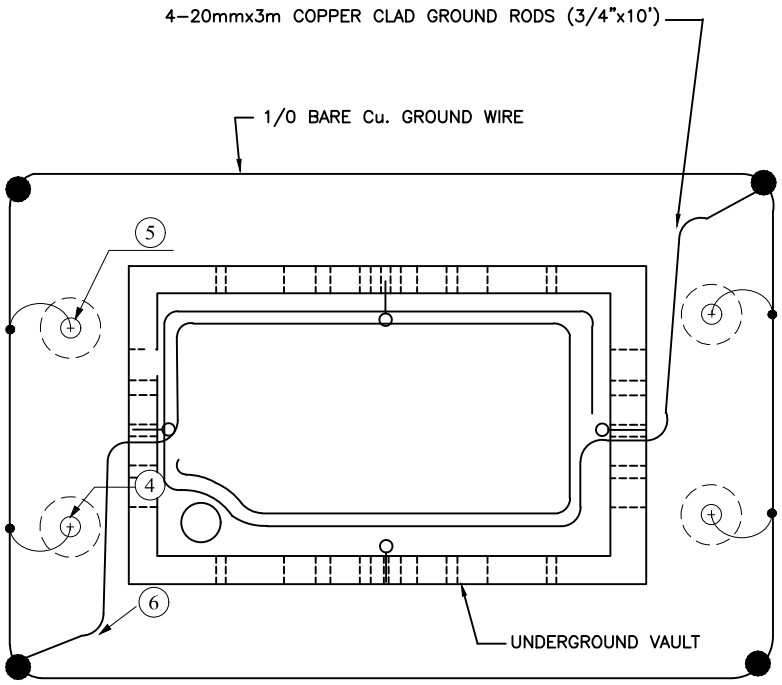
1. GUARD POSTS SHALL BE 150 mm DIA. x 2.4 m LONG x 6 mm THICK GALVANIZED STEEL PIPE FILLED WITH CONCRETE.
2. LOCATION AND NUMBER OF GUARD POSTS SHALL BE DETERMINED AND FINALIZED BY GBE INSPECTOR INSPECTOR WITH THE FOLLOWING CRITERIA:
   - 2.1. SHALL ALLOW EQUIPMENT DOORS (INCLUDING SUB–COMPARTMENT'S DOORS) TO BE OPENED THROUGH THEIR FULL RANGE
   - 2.2. SHALL ALLOW DISTRIBUTOR PERSONNEL UNIMPEDED ACCESS TO THE EQUIPMENT AND PERMIT COMPLETE AND SAFE OPERATION OF THE EQUIPMENT.
   - 2.3. 500 mm MINIMUM CLEARANCE BETWEEN THE GUARD POST'S CONCRETE ENCASEMENT AND THE UTILITY CORRIDOR.
   - 2.4. 100 mm MINIMUM CLEARANCE BETWEEN THE GUARD POST'S CONCRETE ENCASEMENT AND THE GROUND GRID.
3. THE GUARD POSTS SHALL BE CONCRETE ENCASED IN 20 MPa CONCRETE WITH 10 mm PEA GRAVEL AGGREGATE.
4. WHERE GUARD POSTS ARE INSTALLED IN BACKFILL OR DISTURBED EARTH, ENSURE BACKFILL MATERIAL IS THOROUGHLY COMPACTED.
5. GUARD POSTS SHALL BE PAINTED WITH "SAFETY–YELLOW" (MUNICIPAL STANDARD). FOR PROPER ADHESION OF PAINT, GUARD POSTS MUST BE CLEANED (FREE FROM DIRT, GREASE/OIL AND EXHAUST FUMES) AND PRIMED PRIOR TO PAINTING. PRETREATMENT PRIMER MUST BE COMPATIBLE WITH GALVANIZED COATING, SUCH AS MODIFIED ACRYLIC WATER–BORNE PRIMERS.
   FOR HIGH ADHESION OF PAINT, BRUSH OR SWEEP BLAST THE GALVANIZED POSTS IMMEDIATELY PRIOR TO PAINTING. INCORRECT TECHNIQUE OF BLASTING MAY RESULT IN DAMAGES TO THE GALVANIZED COATING. THEREFORE IT IS HIGHLY RECOMMENDED THAT A PERSON WITH EXPERTISE AND ABILITY TO FOLLOW STRICT PRETREATMENT REQUIREMENTS AND PROCEDURES BE USED.



DETAIL 1
(GROUNDING)



SIDE ELEVATION



PLAN VIEW

BILL OF MATERIALS			
ITEM #	DESCRIPTION	QTY	PART NO.
1	BOLT, HEX, WASHER, NUT, 1/2" x 1-1/2"	1/POST	002-0035
2	CEMENT, CONCRETE	VARIES	N/A
3	CONNECTOR, LUG, 1/0 AWG Cu, 2-HOLE	1/POST	012-0133
4	CONNECTOR, GROUND	1/POST	003-0252
5	BOLLARD GUARD	VARIES	N/A
6	WIRE, COPPERWELD 7#7	VARIES	070-0540

REV.	DATE			CHEK'D. BY
3.	SEPT 21/23	GBE LOGO UPDATED		RS
2.	JULY 3/19	REVISED CNDHI TO ENERGY+		STW
1.	NOV 03/16	UPDATED BOM		SJ

GrandBridge ENERGY

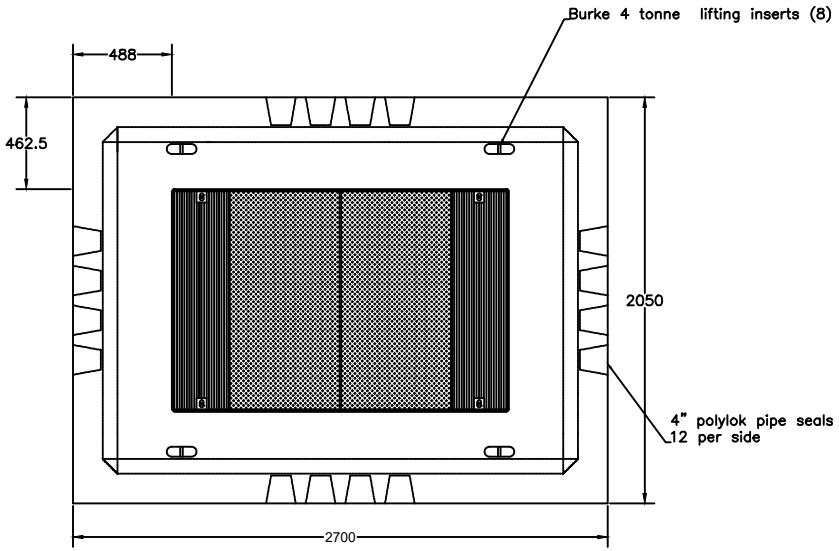
TITLE:
TYPICAL BOLLARD GUARD POST INSTALLATION

DATE:	SCALE:	W.O.No.:	DRAWN BY:
SEPT/10	N.T.S.		B.GORDON

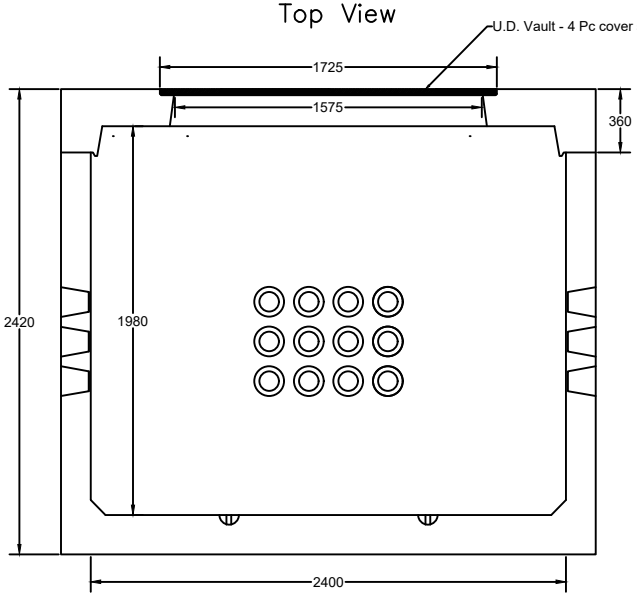
DESIGNED BY | APPROVED BY P.ENG.

DRAWING No.
UGS–040

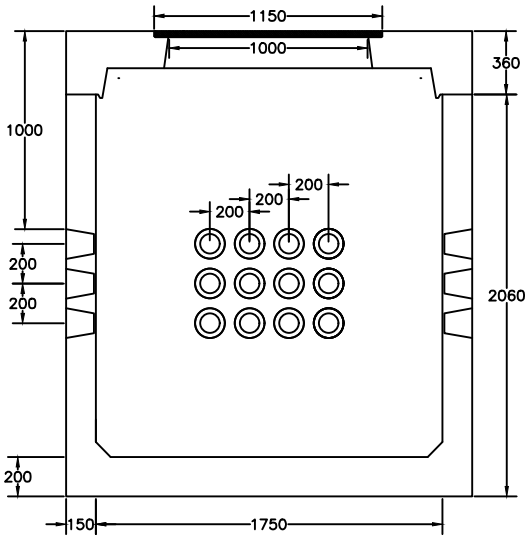
6–8 Electrical Pull Pit
104 S Style with UD Access



Top View



Side View



End View

NOTES:
1. Concrete: 35mpa air 5–7%
2. Reinforcing: Grade 400W
3. Finish: Steel form smooth
4. Weight: 9750 kgs
5. Ductways and openings can be resized or moved.
6. Not Traffic Rated
7. All dimensions in mm

REV.	DATE			CHEK'D. BY
2.	OCT 05/23	GBE LOGO UPDATED	RS	
1.	MAR 16/22	GENERAL UPDATES FROM MANUFACTURER – LID AND DUCT ENTRY HOLES	SF	

GrandBridge ENERGY

TITLE: PRECAST CONCRETE PULL VAULT FOR 28kV 500MCM AND LARGER CABLE

DATE:	SCALE:	W.O.No.:	DRAWN BY:
APRIL/21	N.T.S.		

DESIGNED BY

APPROVED BY P.ENG.

DRAWING No. UGS–042