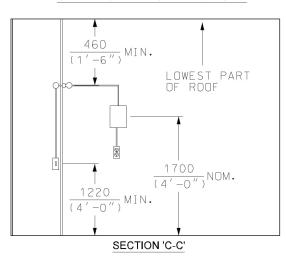
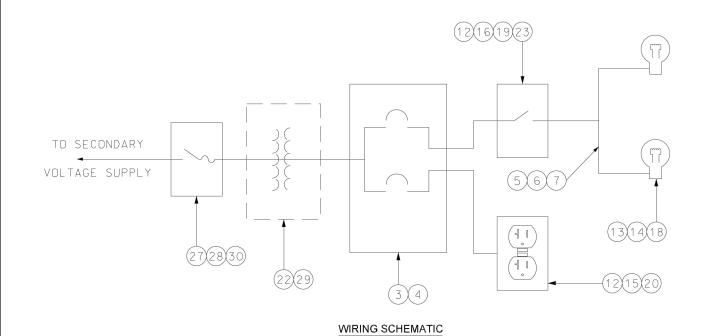


## PLAN VIEW SINGLE UNIT VAULT - NON-URD





DISTRIBUTION CONSTRUCTION STANDARD UG Transformers and Switchgears

Drafted By:

L.L.

TORONTO

Approved By: 2020-02-20

Designed By:

S.K.

### VAULT LIGHTING ARRANGEMENT

Rev:

Original Issue:

K.S. 2009-09-08

Scale: N.T.S.

3 | 13-2200

2/3

	BOM LEGEND
А	2 UNIT TRANSFORMER 120/208 V ROOM / VAULT
В	2 UNIT TRANSFORMER 347/600 V RDOM / VAULT
С	1-PHASE TRANSFORMER URD SYSTEM
D	3-PHASE 120/208 V TRANSFORMER URD SYSTEM
Ε	3-PHASE 347/600 V TRANSFORMER URD SYSTEM
F	3-PHASE 200 A SWITCH URD SYSTEM
G	3-PHASE 600 A SWITCH URD SYSTEM
Н	MODULAR SWITCH
I	1 UNIT TRANSFORMER 120/208 V ROOM / VAULT
J	2 UNIT TRANSFORMER 240/416 V ROOM / VAULT
K	1 UNIT TRANSFORMER 240/416 V ROOM / VAULT
L	1 UNIT TRANSFORMER 347/600 V ROOM / VAULT

	BILL OF MATERIALS	FOR 13-22	200											
ITEM	DESCRIPTION	ITEM					Q	UAN	TIT	Υ				
NO.		I.D.	А	В	С	D	E	F	G	Н	I	J	Κ	L
1	STRAP PIPE FOR 1/2" 1 HOLE COATED	100000653										15		15
2	ANCHOR THREADED CONCRETE 1/4" X 11/4"	2500100		30	20		30		30	40	30	30	30	30
3	PANEL CIRCUIT BREAKER 70 A 120/240 V	9656560	1	1	1	1	1	1	1	1	1	1	1	1
4	BREAKER CIRCUIT 20 A 120 V	9656680	2	2	2	2	2	2	2	2	2	2	2	2
5	CABLE #12 STR CU TW75 600 V BLACK	7150100	25	25	20	25	25	20						25
6	CABLE #12 STR CU TW75 600 V WHITE	7150102	20	20	10	20	20	10			20	20	20	20
7	CABLE #12 STR CU TW75 600 V GREEN	7150098	20	20	10	20	20	10	20	20	20	20	20	20
8	CONDUIT PVC RIGID 1/2" IN 10' LENGTHS	5230000	5	5	5	5	5	5	6	6	5	6	5	5
9	COUPLING PVC 1/2" FOR CONDUIT	5231027	6	6	6	6	6	6	6	6	6	6	6	6
10	ADAPTER MALE PVC 1/2" FOR CONDUIT	5232000	11	13	11	11	13	11	13	12	11	13	11	11
1 1	BEND PVC 1/2" 90 DEG FOR CONDUIT	5233000	5	5	5	5	5	5	5	5	5	5	5	5
12	BOX UTILITY PVC 2" DEEP FOR 1/2" CONDUIT	7405002	2	2	2	2	2	2	2	2	2	2	2	2
	BOX OCTOGON PVC 4" X 1 1/2" DEEP FOR 1/2" CONDUIT	7405003	3	3	2	3	3	3	3	3	3	4	3	3
14	LAMPHOLDER PORCELAIN 660 W 250 V KEYLESS	7440020	2	2	2	2	2	2	2	2	2	4	2	2
15	COVER PVC DUPLEX RECEPTACLE	7446000	1	1	1	1	1	1	1	1	1	1	1	1
16	COVER PVC TOGGLE SWITCH	7446002	1	1	1	1	1	1	1	2	1	2	1	1
17	TAPE PVC 3/4" X .0075" MIN LOW TEMPERATURE	7600001	1	1	1	1	1	1	1	1	1	1	1	1
18	LAMP 300 W 125/130 V PS30	8010051	2	2	2	2	2	2	2	2	2	4	2	2
19	SWITCH TOGGLE APPLIANCE 20 A 1 WAY	9653473	1	1	1	1	1	1	1	_	1	2	1	1
20	RECEPTACLE GROUND FAULT 20 A 125 V	9665648	1	1	1	1	1	1	1	1	1	1	1	1
21	LOCKNUT 1/2" CONDUIT	9655483	10		10	10	13	10	10	11	10	13	10	10
22	TRANSFORMER DRY TYPE 1PH 3 KVA 600-120/240 V	6621501	_	1	_	_	1	_	_	_	_	-	_	1
23	SWITCH TOGGLE APPLIANCE 20 A 3 WAY	9653472	_	-	_	-	-	-	-	2	-	-	-	-
24	CONNECTOR CU SPLIT U-BOLT #1-4/0 STR	7213000	1	1	1	1	1	1	1	1	1	1	1	1
25	CABLE #12 STR CU TW75 600 V RED	7190060	-	_	_	_	-	-	_	10	_	-		-
26	CEMENT SOLVENT FOR RIGID PVC CONDUIT	9652392	1	1	1	1	1	1	1	1	1	1	1	1
27	SWITCH SAFETY HEAVY DUTY 30A 600V AC	9653443	-	1	_	_	1	_	-	_	-	1	1	1
28	FUSE 600V 10A	7073017	-	2	_	_	2	-	-	_	-	-	-	2
29	TRANSFORMER DRY TYPE 1PH 3KVA 250V-120V	9662764	-		_	-	-	-	-	-	-	1	1	-
30	FUSE 600V 15A	9651286	-	_	_	_	_	-	_	_	-	2	2	_

\* SEE NOTE 3

### NOTES:

- 1) LIGHTING LAYOUTS IN THIS STANDARD ARE TO BE USED AS A GUIDELINE, LIGHTS AND ACCESORIES ARE TO BE ARRANGED TO SUIT SITE CONDITIONS.
- 2) 3 WAY TOGGLE SWITCHES SHALL BE INSTALLED NEAR EACH OF VAULT DOORS IN MODULAR SWITCHING VAULT.
- 3) QUANTITIES OF SOME MATERIALS MAY VARY DUE TO SIZE AND LAYOUT.
- 4) 1-PHASE TRANSFORMER AND 200 A SWITCH VAULT ON URD SYSTEM REQUIRES 1 LIGHT.
- 5) ALL EQUIPMENT TO BE MOUNTED ON WALLS IN URD NETWORK VAULTS.

### DISTRIBUTION CONSTRUCTION STANDARD **UG** Transformers and Switchgears VAULT LIGHTING ARRANGEMENT Approved By: I.S. 2020-02-20 TORONTO Designed By: Drafted By: Original Issue: Scale: 3 13-2200 3/3 S.K. K.S. 2009-09-08 N.T.S. L.L.

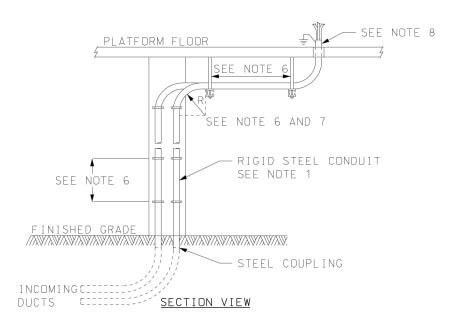


TABLE 1		
SERVICE TYPE SIZE AND TYPE OF CABLE	ITEM I.D.	MIN. CONDUIT SIZE FOR 3 CONDUCTOR
13.8 kV #1/0 3-1C TRIPLEX 15 kV AL TRXLPE	7180016	3 "
13.8 kV #3/0 3-1C TRIPLEX 15 kV Cu TRXLPE	7180020	3 "
13.8 kV 500 kcmil 3-1C TRIPLEX 15 kV Cu TRXLPE	7180032	4 "

- 1) RIGID NON-FERROUS THREADED STEEL CONDUIT TO BE USED FOR CABLE ROUTING, CONDUIT SHALL HAVE TAPERED THREAD AND BE MADE WATERTIGHT.
- 2) CONDUITS SHALL BE SECURELY ATTACHED TO HANGERS OR TO A SOLID SURFACE. THE TYPE OF SUPPORTS USED TO BE DETERMINED BASED ON FIELD CONDITIONS.
- 3) CONDUIT SIZE SHALL BE IN ACCORDANCE WITH TABLE 1 AND BE OF SUFFICIENT SIZE TO PERMIT THE CONDUCTORS TO BE DRAWN IN AND WITHDRAWN WITHOUT DAMAGE TO THE CABLES.
- 4) THE INCOMING PRIMARY SERVICE CABLES SHALL HAVE A DEDICATED CONDUIT PER RUN AND SHALL NOT BE SHARED WITH OTHER SERVICES, CONDUCTORS OR NEUTRAL.
- 5) THERE SHALL BE NO CABLE JOINTS OR SPLICES WITHIN CONDUIT.
- 6) CONDUIT SHALL BE SUPPORTED AT MAXIMUM 3000 mm (9'-10") INTERVALS AS WELL AS BEFORE AND AFTER ALL CHANGES OF DIRECTION.
- 7) CONDUIT BEND RADII AND CABLE PULLING FORCES SHALL NOT EXCEED THE LIMITS REFERENCED IN STD. 16-0220, 16-0260 AND 16-1260.
- 8) WHERE A CONDUIT ENTERS A BOX, FITTING, OR OTHER ENCLOSURE, A BUSHING SHALL BE PROVIDED TO PROTECT THE CABLE FROM ABRASION UNLESS THE DESIGN OF THE BOX, FITTING, OR ENCLOSURE IS SUCH AS TO AFFORD EQUIVALENT PROTECTION. ALL CUT ENDS SHALL BE REAMED OR OTHERWISE FINISHED TO REMOVE ROUGH EDGES.
- 9) WEATHERPROOF LABEL WILL BE AFFIXED AT REGULAR INTERVALS AROUND THE CONDUIT IN BLACK TEXT AGAINST AN ORANGE BACKGROUND THAT READS "DANGER HIGH VOLTAGE" ALONG WITH THE SYSTEM VOLTAGE, I.E. DANGER HIGH VOLTAGE 13800 V.
- 10) CONDUIT SHALL BE BONDED TO GROUND BUS OR GROUND LOOP OF INCOMING SWITCHGEAR, BONDING CABLE TO BE STRANDED BARE CU, NO SMALLER THAN #2/0, AND SECURED RELIABLY TO CONDUIT VIA MECHANICAL GROUND CONNECTOR.
- 11) IF EXPANSION JDINTS USED, BONDING JUMPERS ON CONDUIT ARE REQUIRED TO MAINTAIN CONTINUITY ACROSS JOINT.

DISTRIBUTION COUNTY				TEMPORARY	PRIM	IAR	Y SI	ERVICES	
TORONTO	Approved By: B.L. 2018	-03-01		CONE	DUIT R	OUT	ING		
HYDRO	Drafted By:	Designed By:	Original Issue:		Scale: N.T.S.	Rev:	0	15-8510	1/1

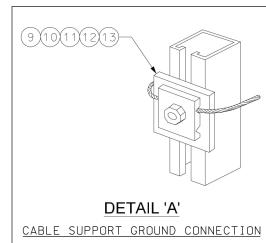
	BOM LEGEND								
	BOLLARD SIZE	TYPE	APPLICATION						
_			1-PHASE TRANSFORMER						
A	125 mm (5")	GALVANIZED PIPE	3-PHASE TRANSFORMER						
			SWITCHGEAR						

	BILL OF MATERIALS FOR 18-5000		
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A
1	WIRE #2/0 19 STR CU SD	7105160	1
2	CONNECTOR CU GROUND CLAMP 5" PIPE - #4 TO #2/0	7214140	1
3	CONNECTOR CU PARALLEL GRV COMPRESSION - #2/0 RUN TO #2/0 TAP	7213156	1

\* QUANTITIES SHOWN ARE PER BOLLARD.

DISTRIBUTION CO G	NSTRUCTION rounding	STANDARD	UNDERG	ROUND SYS	TEMS	
TORONTO	Approved By:	)15-11-24	GUARD PO	ST GROUNDING	G DETAIL	
HYDRO	Drafted By: B.W.	Designed By: E.H.	Original Issue: K . S . 2013-06-12	Scale: Rev: 3	18-5000	2/2





1800

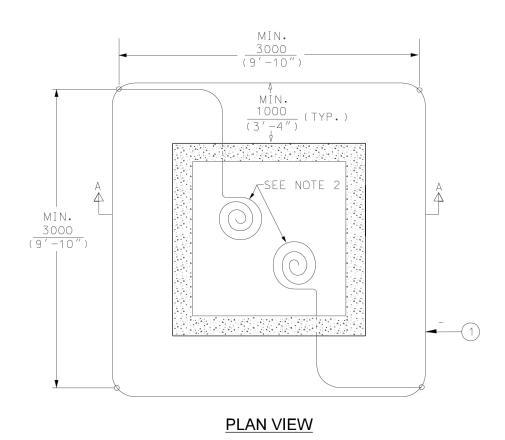
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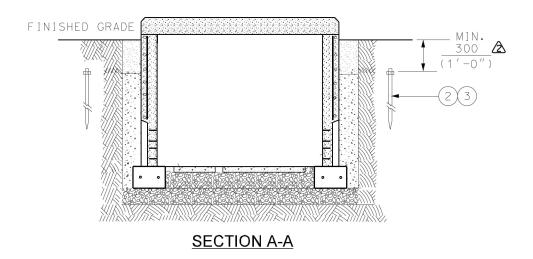
DISTRIBUTION CC Gr	NSTRUCTION ounding	STANDARD	ι	JNDERGROL	JND SYS	STEM	4
TORONTO	Approved By: E.M. 20	)17-03-31	CAE	INDING			
HYDRO	Drafted By:	Designed By:	Original Issue: C.P. 2001-01-10	Scale:	Rev: <b>4</b>	18-5100	1/2

				,
	BILL OF MATERIALS FOR 18-5100			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A	
1	ROD <sup>3</sup> / <sub>4</sub> " X 10' STEEL GALVANIZED	2470102	4	
2	CONNECTOR 3/4" ROD TO #2/O CU	7214200	4	
3	CONNECTOR CU TERMINAL LUG TINNED #2/0 STR 1/2" HOLE	9662106	2	4
4	ANCHOR CONCRETE SLEEVE 1/2" X 3" LONG	9653086	2	4
5	WIRE #2/0 19 STR CU SD	7105160	43	
6	CLIP CABLE CSA - CONDUCTOR MOUNTING	7210190	36	
7	ANCHOR THREADED CONCRETE 1/4" X 13/4"	2500052	36	
8	CONNECTOR COMPRESSION #2/0 CU TO #2/0 CU	7213156	34	4
9	NUT 1/2" CLAMPING C/W SPRING NUT	2520004	12	
10	BOLTED PARALLEL GROOVE GROUND CLAMP	7214105	12	
11	WASHER LOCK 1/2" GALV	2530116	12	
12	BOLT MACHINE 1/2" X 2" C/W HEX HEAD & NUT	2510330	12	
13	WASHER GALV SQUARE 11/2" X 11/2" C/W 9/16" HOLE	2530001	12	
14	CONNECTOR STIRRUP GROUNDING	7251095	2	
15	CONNECTOR CU U BOLT CLAMP 250-500 kcmil STR	7214413	4	4

\* QUANTITY IS BASED ON CABLE CHAMBER SIZE 3500 mm X 4000 mm

	NSTRUCTION Frounding	N STANDARD	UNE	ERGROUND SYS	TEM	4
TORONTO	Approved By:	2017-03-31	CABLE	CHAMBER GROU	NDING	
HYDRO	Drafted By:	Designed By:	Original Issue: C.P. 2001-01-10	Scale: Rev: 4	18-5100	2/2

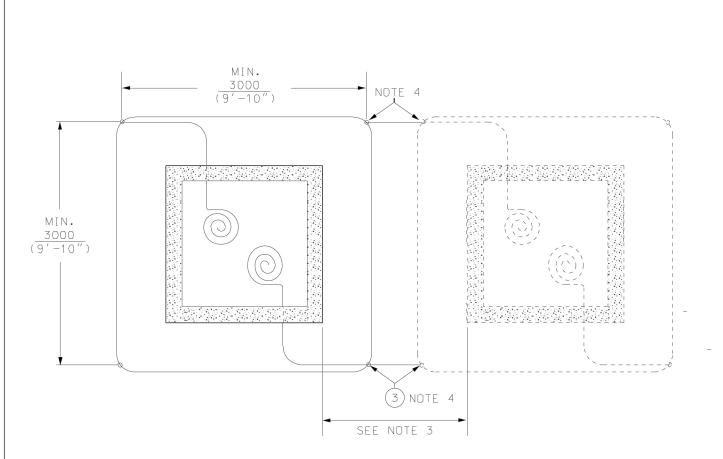




- 1) GROUNDING SHALL BE INSTALLED AS SHOWN, RODS TO BE CONNECTED BY 2/O BARE COPPER TO FORM A COMPLETE GROUND LOOP AROUND FOUNDATION.
- 2) LEAVE TWO COILS EACH 2000 mm (6'-7") INSIDE EACH FOUNDATION.

DISTRIBUTION CO	NSTRUCTION rounding	STANDARD	GROUND GRID				
TORONTO	Approved By: V.B. 2019	-05-27	PAD-MC	DUNTED EQUIPME	NT	2	
HYDRO	Drafted By:	Designed By:	Original Issue: K.S. 2012-08-30	Scale: Rev: 2	18-5500	1/3	

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### PLAN VIEW &

BONDING OF ADJACENT GROUND GRIDS SEPARATED BY LESS THAN 5 m

NOTES: 2

3) IF SEPARATION TO ANOTHER STRUCTURE IS LESS THAN 5 m, GROUNDING GRIDS SHALL BE BONDED.

4) IF GROUND GRIDS OVERLAP, GROUND RODS MAY BE SHARED BETWEEN GRIDS.

DISTRIBUTION CO	NSTRUCTION ounding	STANDARD		GRO	UND (	GRID		
TORONTO	Approved By: V.B. 2019	-05-27		PAD-MOUN	ITED E	QUIPME	ENT	<b>A</b>
HYDRO	Drafted By:	Designed By:	Original Issue	e: 2012-08-30	Scale: N.T.S.	Rev: 2	18-5500	2/3

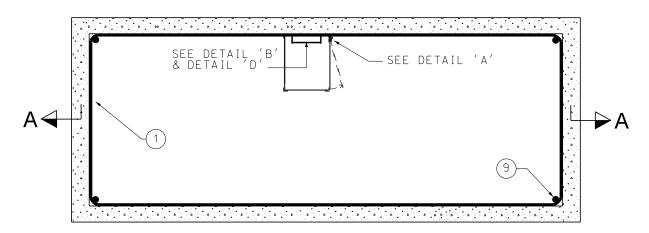


					<u> </u>				
					BOM LEGEND	)			
А	SINGLE	GROUND	GRID						
В	SINGLE	GROUND	GRID	WITH	SEPARATION	LESS	THAN	5	m

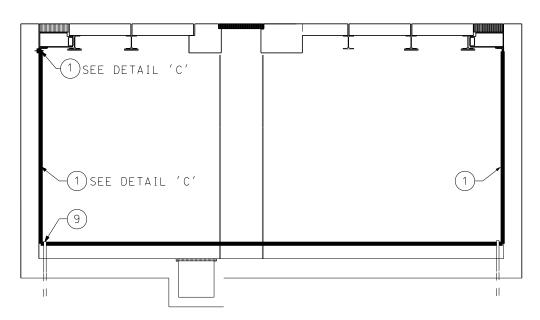
	BILL OF MATERIALS FOR 18-5500			
ITEM	DESCRIPTION	ITEM	Q	ГҮ
NO.	DESCRIFTION	I.D.	Α	В
_1	WIRE 2/0 19 STR CU SD	7105160	24	34
_2	ROD 3/4" X 10' GROUND STEEL GALVANIZED	2470102	4	4
3	CONNECTOR CU GROUND WRENCH LOCK 3/4" ROD TO 2/0 CU CONDUCTOR	7214200	6	10
	ASSOCIATED STANDARD'S (XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		<b>*****</b>	<b>*******</b>
4	GROUND ROD INSTALLATION STD.	18-4300	1	1



DISTRIBUTION CO	NSTRUCTION ounding	STANDARD		GROUND GRID						
		DAR MOUNTER FOUNDMENT								
TORONTO	V.B. 2019	-05-27	PAD-MOUNTED EQUIPMENT					2		
HYDRO	Drafted By:	Designed By:	Original Issu	ue:		Scale:	Rev:	2	10 5500	212
	N.H.	V.B.	K C	2012-08-30		N.T.S.		_	18-5500	3/3



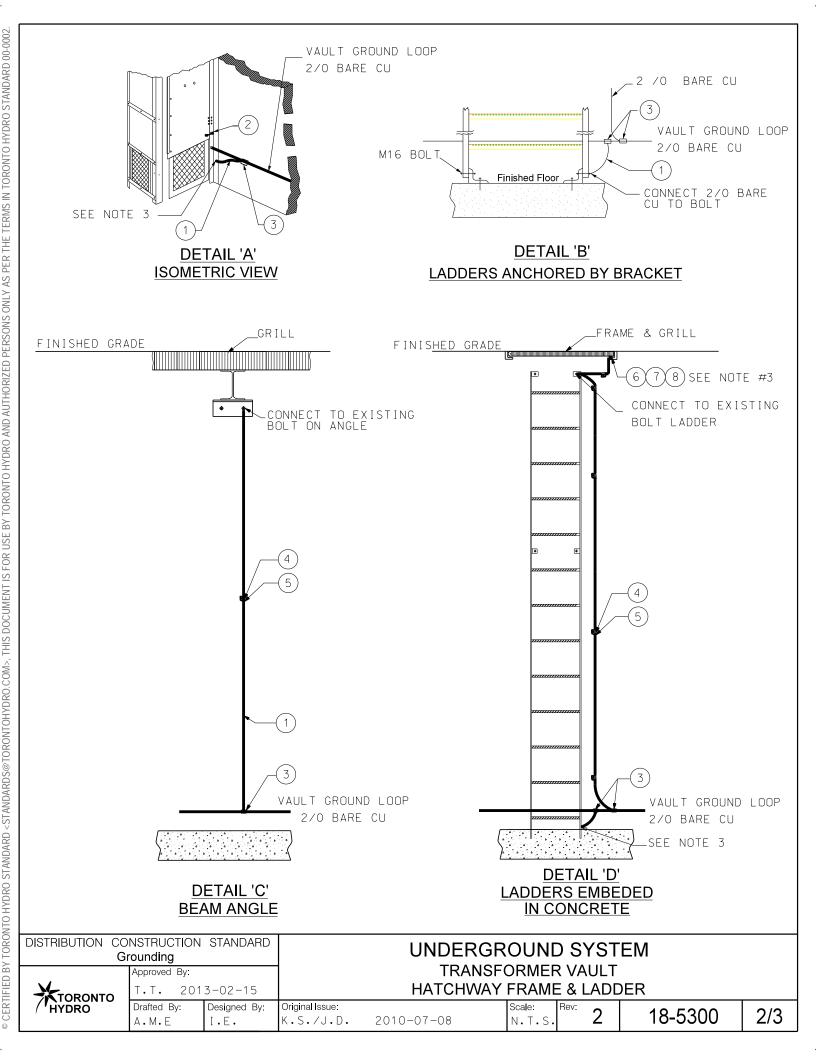
### VAULT PLAN VIEW



### **SECTION A-A**

- 1) ALL MATERIAL IS GALVANIZED IN ACCORDANCE WITH LATEST CSA STANDARD G-164 EXCEPT HINGES WHICH ARE STAINLESS STEEL.
- 2) LOCATION OF LADDER AND DOOR SHALL BE DETERMINED AS PER CONSTRUCTION DRAWING.
- 3) DRILL  $^{3}/_{8}$ " HOLE, INSTALL  $^{3}/_{8}$ " BOLT (2510237), NUT (2530035), AND WASHER (2530127) CONNECT 2/0 BARE CU BOLT.

	DISTRIBUTION CO	NSTRUCTION ounding	STANDARD	UNDERGROUND SYSTEM TRANSFORMER VAULT						
1	TORONTO	Approved By: T.T. 2013-02-15			HATCHWAY					
	HYDRO	Drafted By: A.M.E	Designed By:	Original Issue: K.S./J.D.		Scale: N.T.S.	Rev: 2	18-5300	1/3	



2

	BILL OF MATERIALS FOR 18-5300		
ITEM NO.	DESCRIPTION	I TEM I • D •	QTY A
1	WIRE 2/0 19 STR CU SD	7105160	20
2	GROUND STRAP FLAT BRAID C/W U-BOLT	9650096	1
3	CONNECTOR CU PARALLEL GROOVE COMPRESSION	7213156	8
4	CLIP CABLE CSA-CONDUCTOR MOUNTING HARDWARE	7210190	20
5	ANCHOR THREADED CONCRETE 1/4" X 13/4"	2500052	20
6	BOLT MACHINE 3/8" X 11/2" BLACK IRON	2510237	3
7	WASHER STAINLESS STEEL 3/8"	2530035	3
8	WASHER LOCK 3/8" STAINLESS STEEL	2530127	3
9	ROD <sup>3</sup> /4" X 10' GROUND STEEL GALVANIZED	2470102	4

DISTRIBUTION CC G	rounding	STANDARD	UNDERGROUND SYSTEM TRANSFORMER VAULT						
	Approved By: T.T. 201	, ,			FRAME & LAC				
HYDRO	Drafted By: A.M.E	Designed By:	Original Issue: K.S./J.D.	2010-07-08	Scale: Rev: 2	18-5300	3/3		

		JND CLEARANCES AS PER C (EDGE TO EDGE)			
	Utilities or	Plant	Vertical mm (feet)	Horizontal mm (feet)	
Railways	He	avy Rail (CN/CP/GO)	Refer to STD	). 31-1310	
Railways	Light F	Rail (TTC/LRT/Metrolinx)	Refer to STD	). 31-1200	
Hydro One		All Infrastructure	1000 (3'-4")	1000 (3'-4"	
	D. II	Manholes	1000 (3'-4")	1000 (3'-4"	
Communication	Bell Canada	Concrete Encased Ducts	600 (2'-0")	600 (2'-0")	
Communication	Carlaua	Direct Buried Ducts	300 (1'-0")	600 (2'-0")	
	Others	All Infrastructure	300 (1'-0")	600 (2'-0")	
Enwave Energy		Steam Pipes	600 (2'-0")	600 (2'-0")	
Corporation	(	Chilled Water Pipes	Pipes 300 (1'-0")  Open Trench) 300 (1'-0")		
	≤ NPS 3	00 mm (12") (Open Trench)	300 (1'-0")	600 (2'-0")	
Enbridge Gas National Energy	CER Regul	ated Pipelines and Vital Mains (Open Trench)	600 (2'-0")	1000 (3'-4"	
Board	ALL Pipelir	nes Directional Drilling/Boring	1000 (3'-4")	1000 (3'-4"	
		Regulator Stations	Consult with City	1000 (3'-4"	
		Trees	See Note 1 and Std. 31-040		
		Catch Basins	Consult with City	500 (1'-8")	
		Traffic Signal Ducts	300 (1'-0")	600 (2'-0")	
		< 150 (6") Dia.	150 (6")	600 (2'-0")	
	Storm	150 (6") < 750 (2'-6") Dia.	300 (1'-0")	750 (2'-6")	
	Sewer	≥ 750 (2'-6") Dia.	500 (1'-8")	900 (3'-0")	
		Maintenance Hole	-	600 (2'-0")	
City of Toronto	Sanitary/ Combined	< 100 (4") Dia.	150 (6")	600 (2'-0")	
City of Toronto		100 (4") < 375 (1'-3") Dia.	300 (1'-0")	750 (2'-6")	
	Sewer	≥ 375 (1'-3") Dia.	500 (1'-8")	900 (3'-0")	
		Maintenance Hole	-	600 (2'-0")	
		< 100 (4") Dia.	150 (6")	600 (2'-0")	
	10/-1	≥ 100 (4") < 400 (1'-4") Dia.	300 (1'-0")	750 (2'-6")	
	Water Mains	≥ 400 (1'-4") Dia.	500 (1'-8")	900 (3'-0")	
	Ivianio	Water Valve Chamber	See Note 5	600 (2'-0")	
		Fire Hydrant	400 (1'-4")	1500 (4'-11	
	F	Poles (Direct Buried)	See Std's. 03-240 04-51		
Toronto Hydro This to be used when	Reir	ase Mounted Poles/ nforced Sidewalk Bays	See No	ote 3	
other Utilities are installing their plant close to THESL	(No Gro	Chamber/Vault/Tap Boxes unding Outside Structures)	-	600 (2'-0")	
infrastructure)		Ints/Sub Vaults/Splice Vaults Inding Outside Structure)	Refer to STD		
		Ducts/Duct Banks	300 (1'-0")	600 (2'-0")	

DISTRIBUTION (	CONSTRUCTIO il Constructio		UNDERGROUND CLEARANCES							
1/2	Approved by:		ONDERORO	ONDERGROUND GELARANGEG						
HYDRO	Drafted by: J.D.	Designed by: B.D.	Original issue: J.D. 2000-12-28	Scale: N.T.S.	Rev. 9	31-0100	1/2			

### Notes:

- Any construction activity in the vicinity of trees shall be carried out in compliance with latest City of Toronto's "Tree Protection Policy and Specification for Construction Near Trees" document.
- 2. If the minimum clearances shown cannot be met, the subject utilities approval may be obtained for reduced clearances.
- 3. Horizontal clearance shall be from edge of reinforced sidewalk bay or pole base to edge of proposed plant. Contractor shall at no time cut into reinforced sidewalk bays and pole bases. Sidewalk bays and pole bases provide loading support for the pole. Plant can be installed under reinforced sidewalk bays by tunneling at a minimum vertical clearance of 600 mm (2'-0"). Plant shall not be installed under pole bases.

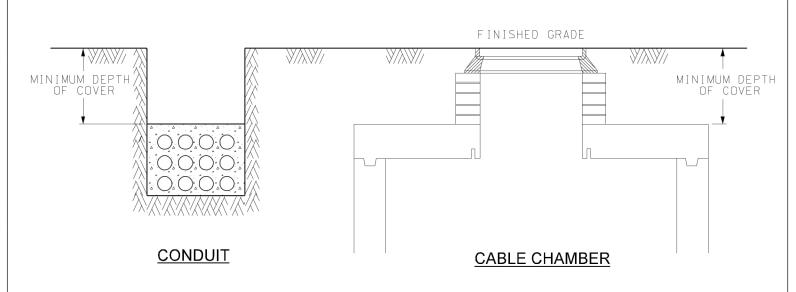


/9\ 4. If the minimum horizontal clearance for utilities installing plant close to THESL plant cannot be met due to existing field conditions, clearance can be reduced to 300mm (1'-0") with the Contractor/Customer providing the reasons for the reduced clearance. Approvals can be provided by Toronto Hydro Standards Department for reduced clearance.



- $/9 \setminus$  5. Any proposed horizontal clearance less than 300 mm (1'-0") will require an ESA deviation with the following supporting documentation:
  - a) A letter stamped and signed by a Professional Engineer of Ontario, outlining:
    - That the Contractor/Customer is responsible for all costs associated with support and inspection, as well as any damages and associated costs;
    - The method of protection and/or support. Support is required if Toronto Hydro plant is undermined;
    - That this is a unique scenario that requires a deviation from typical construction standard, and identify that the deviation is also from the typical clearances set out by Toronto Hydro and the City of Toronto.
  - b) Drawing which shall include:
    - Stamp and signature of a Professional Engineer in the Province of Ontario;
    - Length of the plant being supported and/or protected;
    - Method of protection and/or support system in both plan and section views;
    - Maximum deflection of the plant with the support;
    - Deflection monitoring system placement if soil settlement will occur on site;
    - Backfilling procedures.
  - Contact the City of Toronto for minimum vertical clearance to water valve chamber.
  - 7. For above grade clearance refer to:
    - 03-2300 Building and Permanent Structures
    - 03-2400 Poles and Private Fences
    - 04-4100 Pole Location Guidelines

	CONSTRUCTION CONSTRUCTION CONSTRUCTION		UNDERGROUND CLEARANCES						
1/2	Approved by:		GIVERGROOMS GLE/IIVINGEG						
TORONTO	Drafted by: J.D.	Designed by: B.D.	Original issue: J.D. 2000-12-28	Scale: N.T.S.	Rev. 9	31-0100	2/2		



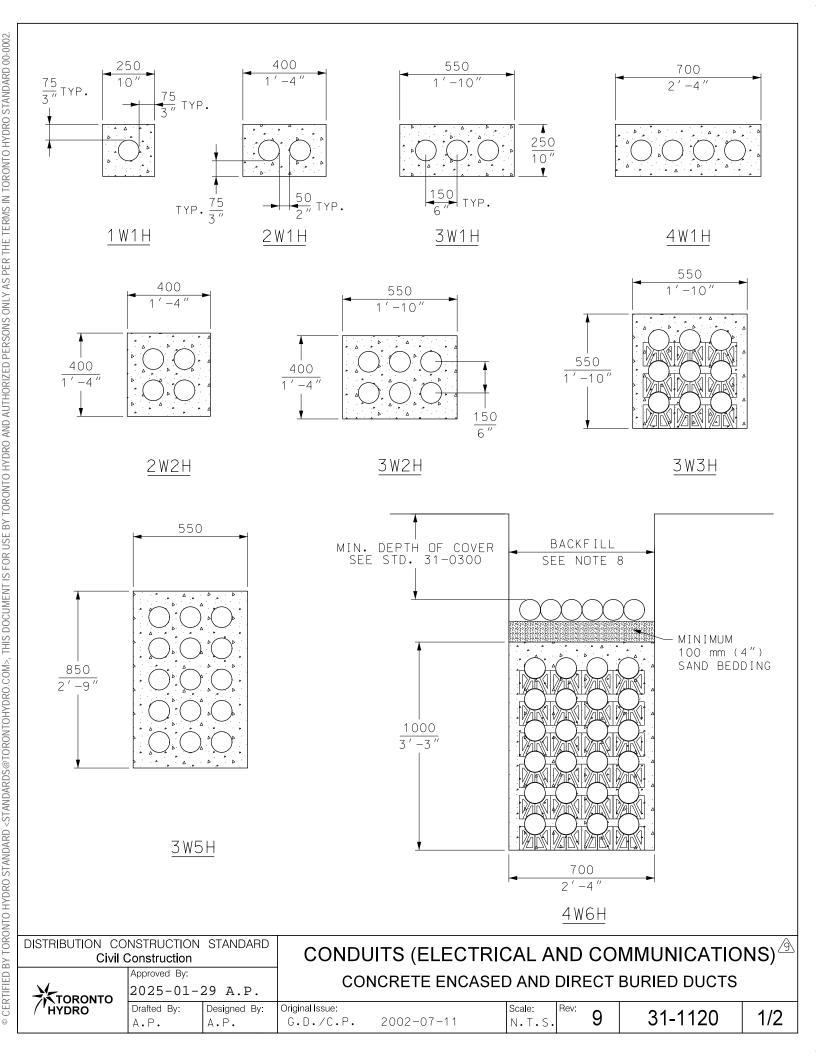
THE "MINIMUM DEPTH OF COVER" FOR THESL PLANT (CONDUITS AND CABLE CHAMBERS) SHALL BE AS FOLLOWS:

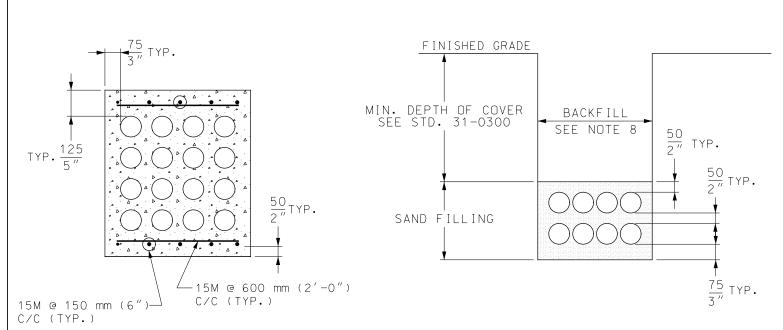
TYPE	MINIMUM DEPTH OF COVER	DESCRIPTION				
CURBED ROADS	1000 (3'-4")	FOR AREAS UNER THE ROAD, CURB, AND SIDEWALK, THE PORTION OF THE BOULEVARD WITHIN ONE METRE OF THE BACK OF CURB AND/OR SIDEWALK, AND THE ENTIRE RIGHT-OF-WAY WITHIN 30 METRES OF AN INTERSECTION, THE MINIMUM DEPTH OF COVER SHALL BE ONE METRE.	2			
UNCURBED ROADS	1300 (4'-3") BELOW THE CENTERLINE OF THE ROAD, OR 600 (2'-0") BELOW THE LOWEST POINT OF THE ADJACENT DITCH, WHICHEVER IS DEEPER.	FOR THE ENTIRE RIGHT-OF-WAY, FROM STREET-LINE TO STREET-LINE, ON UNCURBED ROADS.				
BOULEVARDS	800 (2′-8″)	EXCEPT WHERE SPECIFIED ABOVE, THE MINIMUM DEPTH OF COVER ON ALL STREETS SHALL BE 800 MILIMETRES.	2			

### NOTES:

1) THE DEPTHS OF COVER ARE IN ACCORDANCE WITH THE CITY'S MUNICIPAL CONSENT REQUIREMENTS DOCUMENT. 2) THE DEPTHS OF COVER APPLY TO ALL CONDUITS IRRESEPECTIVE OF THE TYPE AND METHOD OF INSTALLATION.

DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD		UNDERGROUND CLEARANCES						
TORONTO	Approved By: B.D. 2018-08-29			MINIMUM DEPTH OF COVER FOR TORONTO HYDRO STRUCTURES						
HYDRO	Drafted By:	Designed By:	Original Issue	e: 2010-10-21	Scale: N.T.S.	Rev: 2	31-0300	1/1		





### REINFORCED DUCT BANK

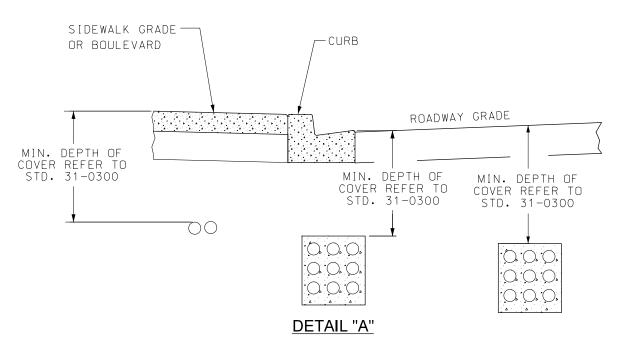
SEE NOTE 3

### **DIRECT BURIED DUCTS**

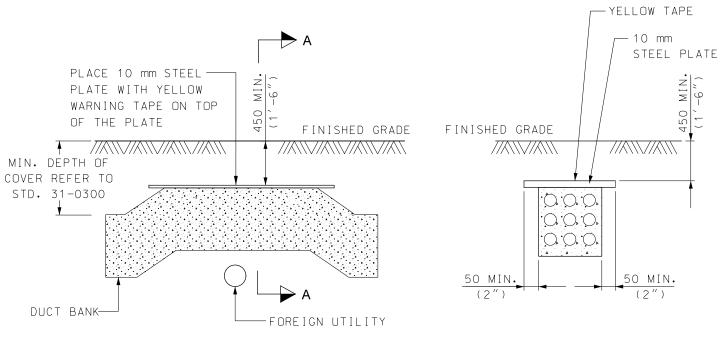
SEE NOTES 2, 9 AND 10

- 1) REFER TO STD. 31-0300 FOR MIN. DEPTH OF COVER.
- 2) IN AN OPEN TRENCH CONSTRUCTION, ENCASE THE DUCTS IN CONCRETE IF:
  - DUCTS ARE CARRYING PRIMARY CABLES (750 V OR MORE),
  - DUCTS ARE UNDER ROADWAY OR DRIVEWAY,
  - DUCT HAVE 90 DEGREE BENDS,
  - THE NUMBER OF DUCTS ARE MORE THAN 8.
  - IF NONE OF THE ABOVE CATEGORY APPLIES, THEN THE DUCTS SHALL BE DIRECT BURIED.
- 3) REINFORCED DUCT BANK SHALL BE USED ONLY IN POOR SOIL CONDITIONS OR WHERE THERE IS HIGH WATER TABLE.
- 4) CONCRETE SHALL BE A MIN. 20 MPa, WITH 10 mm (3/8") AGGREGATES.
- 5) REINFORCING SHALL CONFORM TO CSA STANDARD G30.18-09, Fy = 400 MPa.
- 6) ALL DUCTS SHALL BE 100 mm (4") IN DIAMETER UNLESS NOTED OTHERWISE.
- 7) HORIZONTAL AND VERTICAL SEPARATION BETWEEN DUCTS IS CONTROLLED DURING CONSTRUCTION BY PLASTIC DUCT SPACERS.
- 8) EXCAVATION SHALL BE BACKFILLED PER THESL CIVIL CONSTRUCTION WORK SPECIFICATION CV-CON-01 AND/OR TS4.60 CONSTRUCTION SPECIFICATION FOR UTILITY CUT AND RESTORATION.
  - 9) MAX. NUMBER OF DIRECT BURIED DUCTS SHALL BE 8. DUCTS MAY BE PLACED IN AN IRREGULAR FORMATION IN A MAX. OF TWO ROWS.
  - 10) RED DUCTS SHALL BE USED FOR ALL NEW AND REBUILD DIRECT BURIED DUCT BANKS CONTAINING ELECTRICAL SECONDARY SUPPLY CABLES AND OR COMMUNICATION CABLES.

	CONSTRUCTION ivil Construction		CONDUITS (ELECTRICAL AND COMMUNICATIONS)						
TORONT	Approved By: 2025-01-	Approved By: 2025-01-29 A.P.		NCRETE ENCAS	SED AND	DIRECT	BURIED DUCTS		
/ HYDRO	Drafted By:	Designed By:	Original Issue:	2002-07-11	Scale:	Rev: 9	31-1120	2/2	



NOTE: THIS ALSO APPLIES TO DIRECT BURIED DUCTS AND POLYPIPES

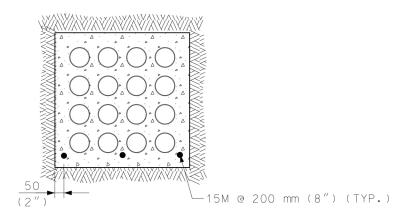


### <u>DETAIL "B"</u> REDUCED DEPTH OF COVER

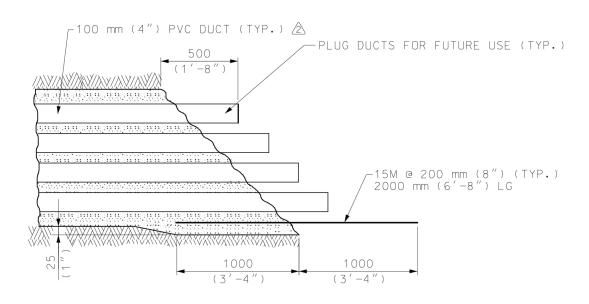
### SECTION A-A

- 1) IF UNDER SPECIFIC CIRCUMSTANCES MINIMUM DEPTH OF COVER REQUIREMENT CANNOT BE MET, REDUCED COVER MAY BE USED WITH CITY'S APPROVAL. THE REDUCED COVER SHALL NOT BE LESS THAN 450 mm (1'-6").
- 2) IF MINIMUM DEPTH OF COVER IS REDUCED, A 10 mm STEEL PLATE AND WARNING TAPE HAS TO BE PROVIDED AS SHOWN IN DETAIL "B".
- ↑ 3) STEEL PLATES SHALL BE EDGE TO EDGE WITH NO GAPS.

DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD	CONDUITS					
TORONTO	Approved By: 2025-01-	29 A.P.		DEPTH	OF CO	ONDUITS	6	
HYDRO	Drafted By:	Designed By:	Original Issue:	2000-12-19	Scale: N.T.S.	Rev: 7	31-1150	1/1



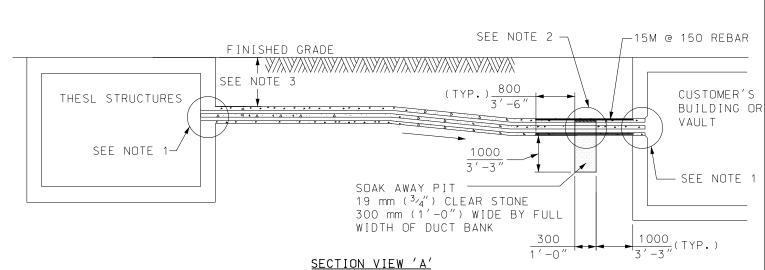
### TYPICAL CROSS SECTION.



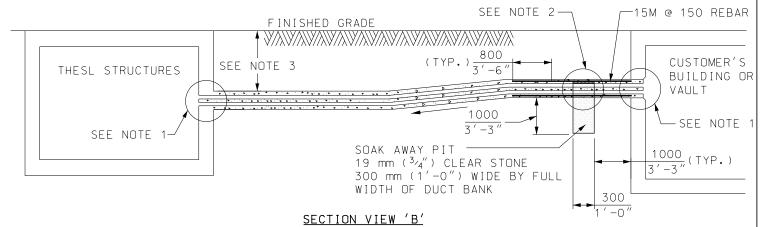
# CAPPING PROPOSED DUCTS FOR FUTURE EXTENSION

- 1) ALL REINFORCEMENT TO BE 15M BARS.
- 2) PROPOSED DUCTS TO BE STEPPED TO ACCOMODATE FUTURE CONNECTION, REINFORCEMENT TO BE INSTALLED AS SHOWN.
- 3) AT GRADE LEVEL, CONTRACTOR TO INDICATE TERMINATION POINT OF DUCT;
  - A) ON PRIVATE PROPERTY USE STAKE.
  - B) WITHIN CITY ALLOWANCE USE A METAL PLATE WITH RAISED LETTERS "TORONTO HYDRO MARKER", REFER TO STD. 31-8100 FOR DETAILS.

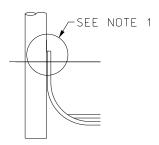
	NSTRUCTION Construction	STANDARD	Co	CONDUITS				
TORONTO	Approved By: J.D. 201	2-11-08	CAPPING PROPOSED D	UCTS FOR FU	TURE EXTENSIO	N		
HYDRO	Drafted By:	Designed By:	Original Issue: L.G. 2000-12-30	Scale: Rev: <b>2</b>	31-1160	1/1		



DUCTS FROM THESL STRUCTURES
TO CUSTOMER'S BUILDING/VAULT



DUCTS FROM THESL STRUCTURES TO CUSTOMER'S BUILDING/VAULT



### SECTION VIEW 'C'

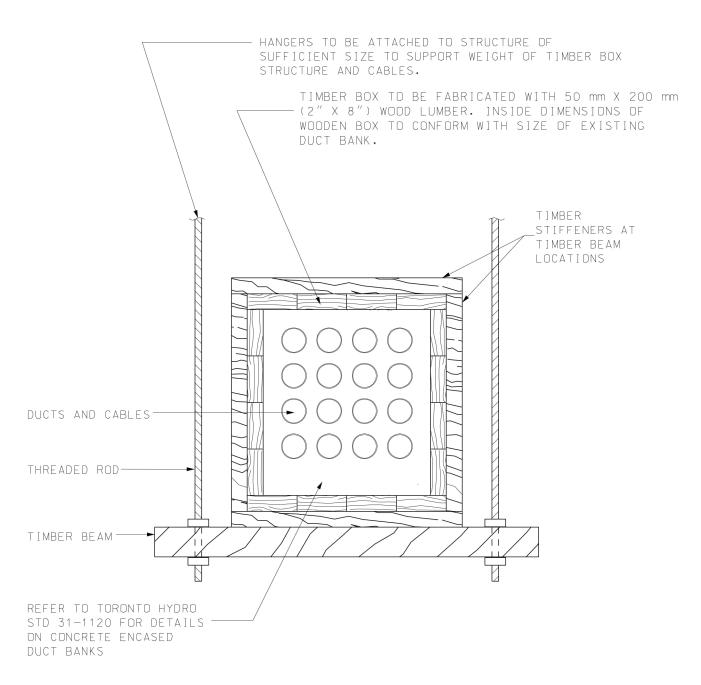
DUCTS FROM THESL POLES
TO CUSTOMER'S BUILDING/VAULT

040	DISTRIBUTION CO Civil (	NSTRUCTION Construction	STANDARD		C	ONDU	JITS		
ווו ורח ח	,	Approved By: 2025-01-	29 A.P.		SUPPLYING C	USTON	MER'S B	UILDING	
	HYDRO	Drafted By:	Designed By: A.P.	Original Issue:	2002-11-25	Scale: N.T.S.	Rev: 6	31-1230	1/2

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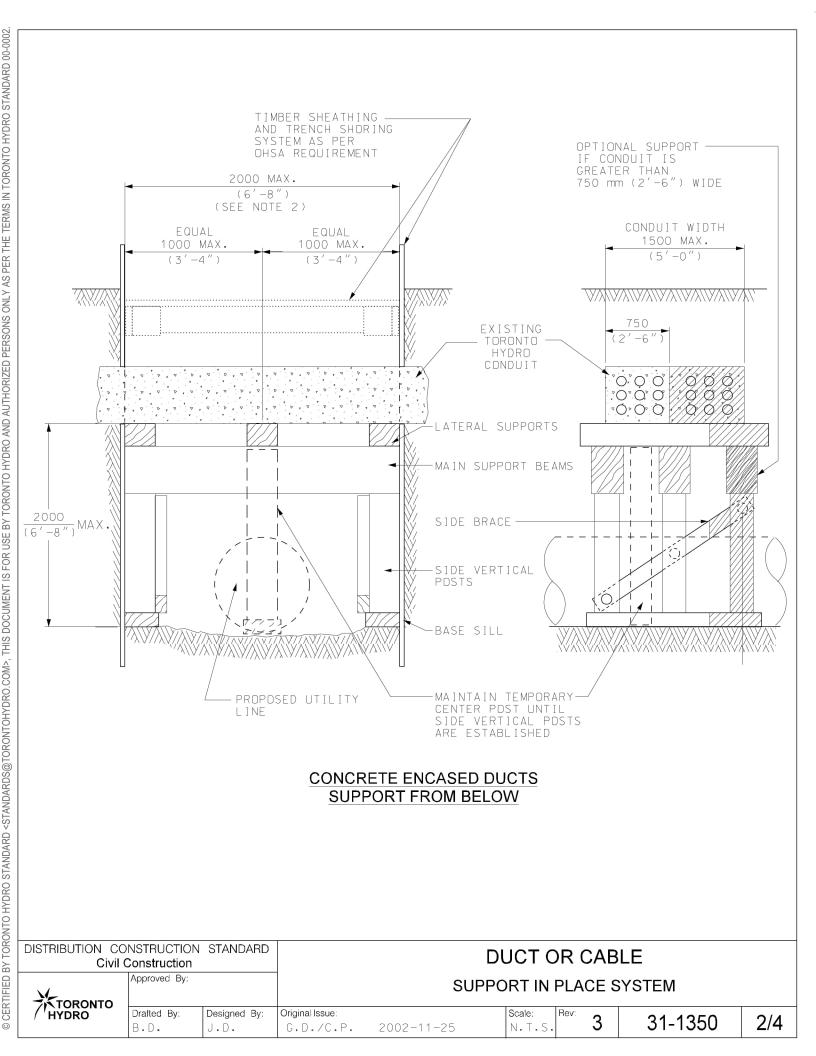
- 1) SEALANT SHALL BE APPLIED TO:
  - DUCTS EXITING THESL STRUCTURES (POLES, CABLE CHAMBERS, PADMOUNTS, SPLICE VAULTS, TAP/SPLICE BOXES AND VAULTS) WHEN FEEDING INTO CUSTOMER'S BUILDING/VAULTS AND ALSO DUCTS AT CUSTOMER'S BUILDING/VAULTS ENTRANCE POINT;
  - LOCATIONS WHERE EXISTING SEALANT (STOCK CODES 8940011, 9656790 OR 9656791) IS NOT ADEQUATE.
- 2) DRILL 4 DRAINAGE HOLES IN THE BOTTOM OF EACH DUCT. 13 mm ( $^{1}/_{2}$ ") DIA. AT 50 mm (2") CENTRES. FILL TO TOP OF DUCTS WITH 19 mm ( $^{3}/_{4}$ ") CLEAR STONE. TOP OFF WITH A LAYER OF 25 mm (1") STYROFOAM, AND A FINAL LAYER OF CONCRETE.
- 3) REFER TO STD. 31-0300 FOR MIN. DEPTH OF COVER.
- (4) FOR SERVICES NOT EXCEEDING 750 V, THE CUSTOMER'S MAIN SERVICE BOX SHALL BE AS CLOSE AS PRACTICABLE TO THE POINT WHERE THE SERVICE CONDUCTORS ENTER THE BUILDING, CONDUCTORS SHALL BE INSTALLED IN A MIN, 100 mm (4") RIGID PVC CONDUIT, WITH A MAXIMUM RUN LENGTH OF:
  - NO MORE THAN 1.5M INTO ROOMS OR AREAS WITH COMBUSTIBLE CONSTRUCTION, USING RIGID PVC CONDUIT FOR WIRING, OR
  - NO MORE THAN 7.5M INTO OTHER AREAS, USING RIGID PVC CONDUIT FOR WIRING.
  - 5) CUSTOMER IS RESPONSIBLE TO CONSTRUCT SOAKAWAY PIT ON CUSTOMER PROPERTY AS INDICATED ABOVE.

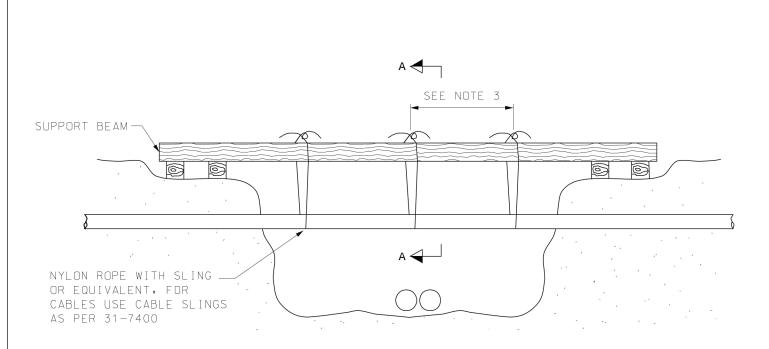
DISTRIBUTION CO	NSTRUCTION Construction	STANDARD		CONDUITS						
<b>V</b>	Approved By: 2025-01-	20 7 D		SUPPLYING	CUSTON	/IER'S BU	JILDING			
TORONTO	2023-01-	29 A.P.								
/ HYDRO	Drafted By:	Designed By:	Original Issue: Scale: Rev: 6 21 1220 2/2							
	IA.P.	IA.P.	G.D./C.P.	2002-11-25	IN.T.S.	ט	31-1230	212		



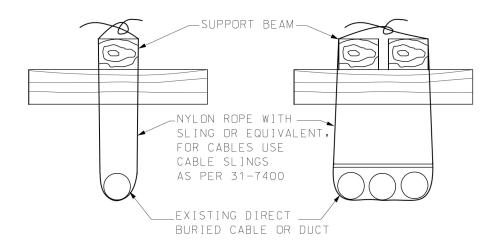
## CONCRETE ENCASED DUCTS TIMBER BOX DETAIL

	ONSTRUCTION Construction	STANDARD		DUC.	TOR	CABLE		
TORONTO	Approved By:			SUPPORT	IN PLA	ACE SYS	TEM	
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-11-25	Scale: N.T.S.	Rev: 3	31-1350	1/4





### DIRECT BURIED DUCT OR CABLE



SECTION 'A-A'

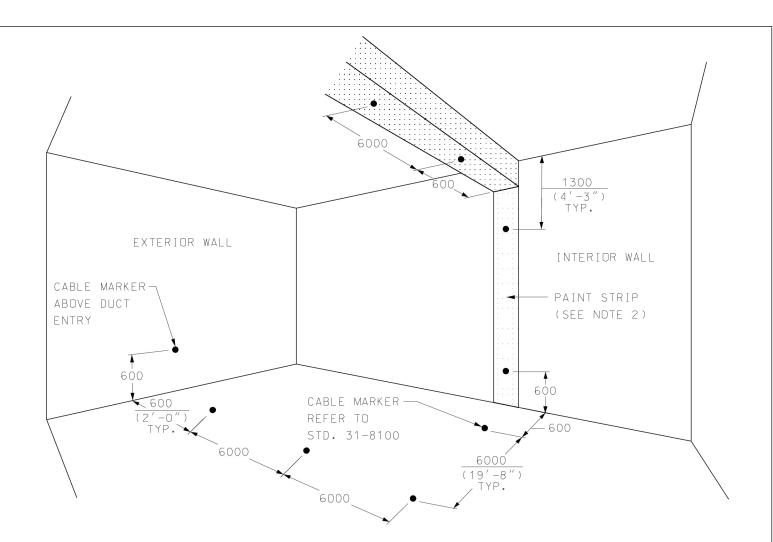
MULTIPLE CABLES OR DUCTS

	DISTRIBUTION CO Civil (	NSTRUCTION Construction	STANDARD		DUC	T OR CA	BLE	<u> </u>	
	TORONTO	Approved By:			SUPPOR <sup>-</sup>	Γ IN PLACE	SYS	STEM	
j )	HYDRO	Drafted By:	Designed By:	Original Issue:	2002-11-25	Scale: Rev:	3	31-1350	3/4

### NDTES: 3

- 1) THIS DRAWING IS TO BE USED ONLY AS A GUIDELINE AS THE SUPPORT STRUCTURE ELEMENTS WILL BE SITE SPECIFIC.
- 2) TEMPORARY SUPPORT IS REQUIRED WHENEVER THE UNDERGROUND CONDUIT IS UNDERMINED FOR MORE THAN 1200 mm (3'-11") IN LENGTH. ALL SUCH SUPPORTS SHALL MEET REQUIREMENTS OF NOTE #2.
- 3) THE CONTRACTOR/CONSULTANT SHALL PROVIDE A DETAILED DRAWING FOR THE SUPPORT SYSTEM SIGNED AND SEALED BY A PROFESSIONAL CIVIL ENGINEER OF ONTARIO TO SUIT SITE CONDITIONS, ENGINEER SHALL ACCOUNT FOR CABLE PULLING TENSION, LIVE LOADS, WIND LOADS, AND MAINTANENCE LOADS IN THEIR CALCULATIONS.
- 4) WHEN SUPPORTED FROM ABOVE, DIRECT BURIED DUCTS AND DIRECT BURIED CABLE, SPACING BETWEEN SUPPORTS SHALL NOT EXCEED 0.6 m (2'-0").
- 5) FOR CONCRETE ENCASED AND DIRECT BURIED DUCTS, VERTICAL OR HORIZONTAL DISPLACEMENT SHALL NOT EXCEED 19 mm (3/4") OR 10 mm (3/8"), RESPECTIVELY. STRUCTURAL DAMAGE OR DISPLACEMENT OUTSIDE OF THIS RANGE SHALL BE REPORTED TO TORONTO HYDRO.
- 6) FOR CONCRETE ENCASED AND DIRECT BURIED DUCTS, MONITORING OF SUPPORT STRUCTURE WITH RESPECT TO HORIZONTAL, VERTICAL, AND VIBRATIONAL MOVEMENTS SHALL BE PROVIDED.
- 7) TEMPORARY SUPPORT WILL REMAIN IN-PLACE UNTIL THE BACK FILL MATERIAL UNDER THE STRUCTURE HAS BEEN COMPACTED ADEQUATELY TO RESTORE SUPPORT, BACKFILL ON TOP TO BE AS PER CV-CDN-01,
- 8) ALTERNATIVE METHODS OF SUPPORT SYSTEM CAN BE CHOSEN BUT WILL REQUIRE TORONTO HYDRO TO REVIEW AND APPROVE.
- 9) TIMBER BOX TO BE PAINTED RED AND MARKED WITH SAFETY "DANGER" SIGN.
- 10)DAMAGED DIRECT BURIED DUCTS OR CONCRETE ENCASED DUCTS WILL REQUIRE TO BE REBUILT PRIOR TO SUPPORT IN PLACE INSTALLATION.
- 11)CONTRACTOR IS RESPONSIBLE TO MEET ALL REQUIREMENTS WITH CONSIDERATION TO SUPPORTING OR WORKING CLOSE TO LIVE ENERGIZED CABLES.

DISTRIBUTION CO	NSTRUCTION Construction	STANDARD		DU	CT OR CA	BLE		
TORONTO	Approved By:			SUPPOF	RT IN PLACE	SYS	STEM	
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-11-25	Scale: Rev:	3	31-1350	4/4



# <u>DUCT IDENTIFICATION IN GARAGE FLOOR,</u> CEILING OR INTERIOR WALL

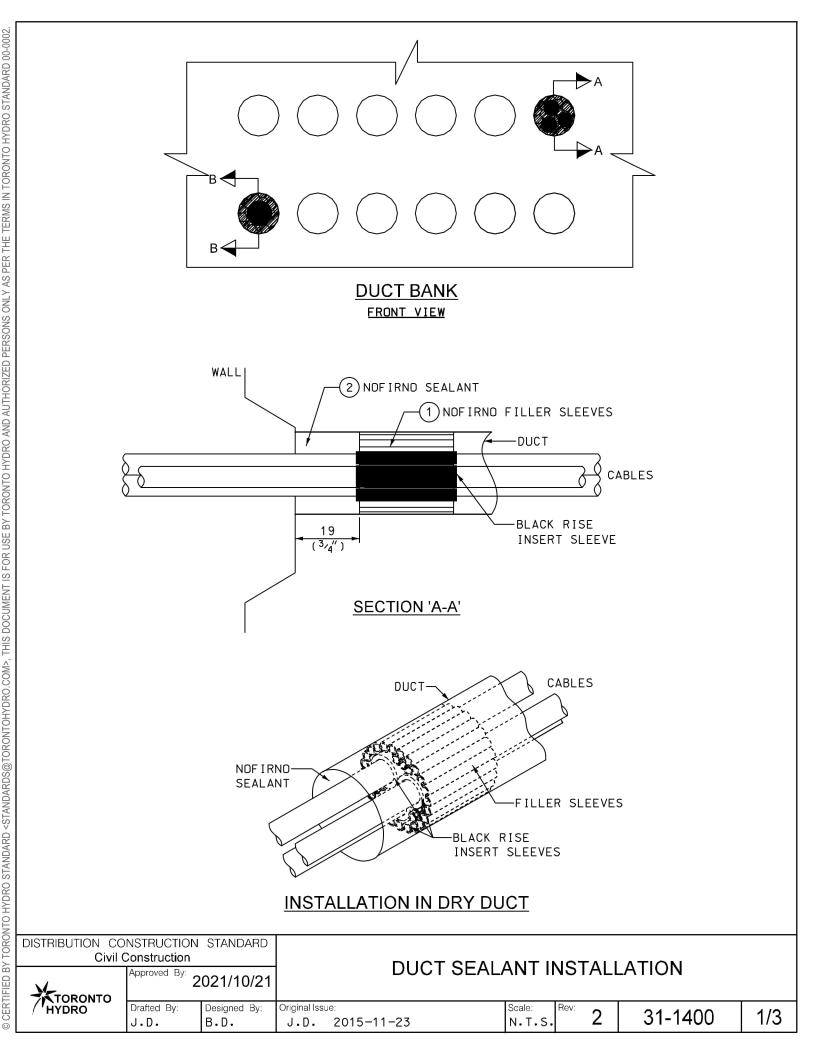


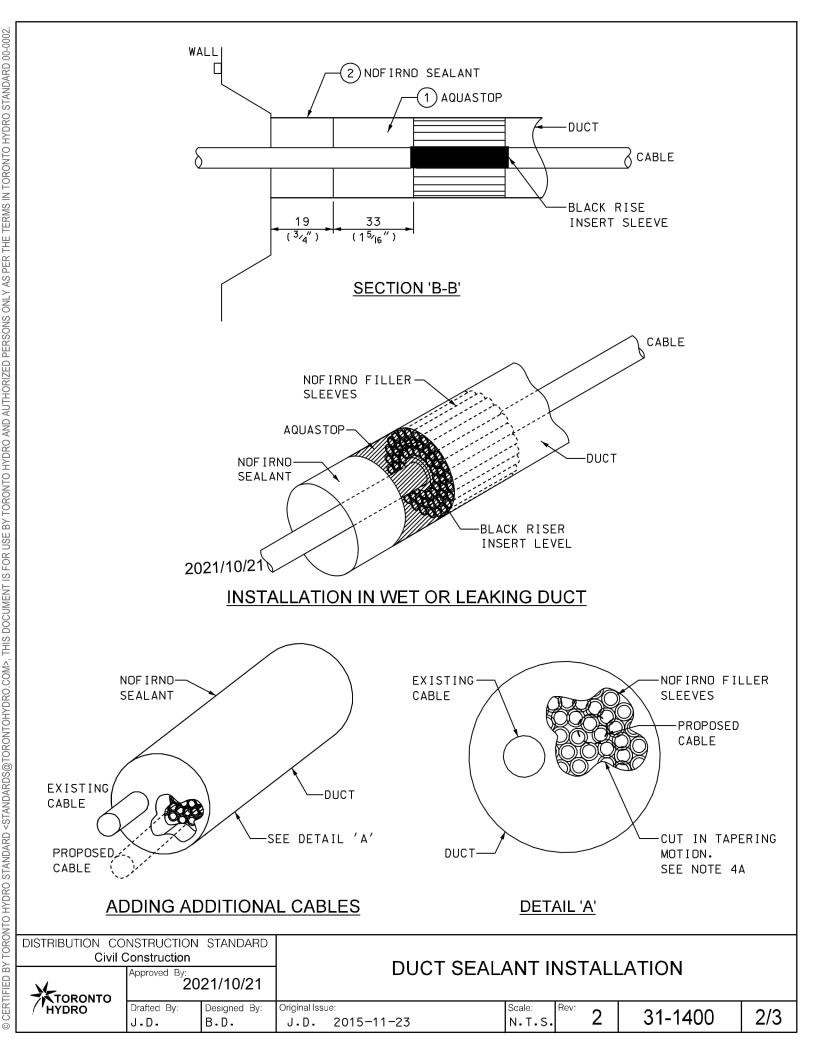
# DUCT IDENTIFICATION IN GROUND LEVEL FLOOR UNDER CARPET OR FLOORING

### NDTES: 1

- 1) CABLE MARKER TO BE INSTALLED FLUSH WITH SURFACE OF DUCT STRUCTURE.
- 2) PAINT STRIP TO BE 600 mm (2'-0") WIDE OR MAXIMUM WIDTH OF DUCT STRUCTURE.
- 3) FLUORESCENT PAINT TO BE RED EXTERIOR ACRYLIC LATEX.
- 4) LETTERING TO BE BLACK EXTERIOR LATEX PAINT.
- 5) PERMANENT IDENTIFICATION MUST BE COMPLETED BEFORE THE SERVICE IS ENERGIZED.

DISTRIBUTION CO	NSTRUCTION Construction	STANDARD		CONDUITS					
TORONTO	Approved By: J.D. 201	2-11-09	IDENTIFI	CATION OF HYDR	O DUC	TS IN BU	JILDING COMPLE	EXES	
HYDRO	Drafted By:	Designed By:	Original Issue:	2004-03-31	Scale: N.T.S.	Rev:	31-1360	1/1	





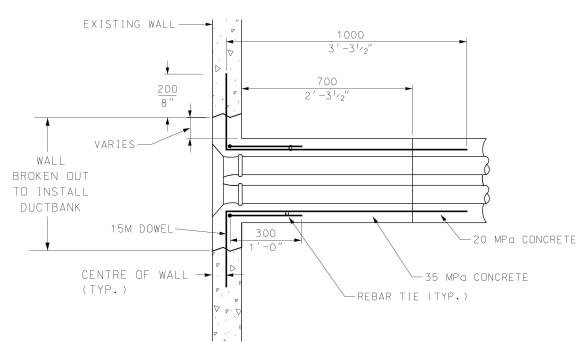
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		BILL OF MATERIALS FOR 31-1400		
	ITEM	DESCRIPTION	ITEM	QTY
	NO.	DESCRIPTION	I.D.	Α
*	1	DUCT SEALANT KIT	9665194	1
+	2	SEALANT	9665195	1
+	3	CAULKING GUN	2730104	1

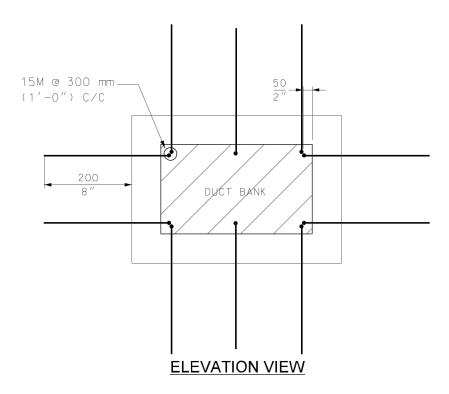
- + AS REQUIRED
- \* DUCT SEALANT KIT INCLUDES:
  - NOFIRNO FILLER SLEEVES
  - BLACK RISE INSERT SLEEVES
  - AQUASTOP

- 1) SEALANT SHALL BE APPLIED TO:
- 2
- DUCTS EXITING THESL STRUCTURES (POLES, CABLE CHAMBERS, PADMOUNTS, SPLICE VAULTS, TAP/SPLICE BOXES AND VAULTS) WHEN FEEDING INTO CUSTOMER'S BUILDING/VAULTS AND ALSO DUCTS AT CUSTOMER'S BUILDING/VAULTS ENTRANCE POINT;
- LOCATIONS WHERE EXISTING SEALANT (STOCK CODES 8940011, 9656790 OR 9656791) IS NOT ADEQUATE,
- 2) INSTALLATION IN DRY DUCT (AS PER SECTION 'A-A'):
  - A) CLEAN THE DUCT AND CABLE THOROUGHLY USING A CLOTH TO REMOVE ALL DEBRIS AND DIRT FROM INSIDE THE DUCT. DO NOT USE HAND SANITIZER CLOTHS OR CLOTHS MIXED WITH SOAPY MIXTURE.
  - B) PLACE BLACK RISE INSERT SLEEVES AROUND EACH CABLE.
  - C) FILL THE REMAINDER OF THE SPACE IN DUCT WITH RED NOFIRNO FILLER SLEEVES 22/15 (22 mm ( $\frac{9}{10}$ ") OUTER DIAMETER AND 15 mm ( $\frac{3}{5}$ ") INNER DIAMETER).
  - D) ADJUST THE SLEEVES SO THAT THEY ARE ALIGNED AND RECESSED, BY USING NEEDLE NOSE PLIERS.
  - E) OVERFILL THE DUCT WITH NOFIRNO SEALANT.
  - F) USING A WET CLOTH, COMPRESS AND SMOOTHEN THE NOFIRNO SEALANT FOR A SMOOTH SURFACE.
- 3) INSTALLATION IN WET OR LEAKING DUCTS (AS PER SECTION 'B-B'):
  - A) FOLLOW PROCEDURES AS PER 2A, 2B AND 2C.
  - B) INSERT THE AQUASTOP INTO THE DUCT AGAINST THE NOFIRNO FILLER SLEEVES.
  - C) TIGHTLY COMPRESS THE AQUASTOP AGAINST THE FILLER SLEEVES BY HAND OR BY USING A WOOD PIECE OR ANY OBJECT WITH A FLAT SURFACE.
  - D) ENSURE THE EDGES ARE PROPERLY SEALED BY SMEARING THE AQUASTOP RUBBER ALONG THE EDGES OF THE DUCT WALL. ENSURE THAT THERE IS AT LEAST 19 mm ( $^{3}$ / $_{4}''$ ) OF SPACING BETWEEN THE FINAL LAYER OF AQUASTOP STRIP AND DUCT EDGE.
  - E) INSPECT THE DUCT TO ENSURE THAT THE LEAKAGE HAS STOPPED. IN ORDER TO EXPEDITE DRYING TIME, USE A DRYER, DO NOT USE A HEAT GUN, AS PROLONGED USE WILL DAMAGE CABLE.
  - F) APPLY THE NOFIRNO SEALANT OVER THE AQUASTOP UNTIL THE DUCT OVERFLOWS.
  - G) USING A WET CLOTH, COMPRESS AND SMOOTHEN THE NOFIRNO SEALANT.
- 4) ADDING ADDITIONAL CABLES TO DRY DUCT CONTAINING NOFIRNO SEALANT (AS PER DETAIL 'A'):
  - A) USING A KNIFE, PENETRATE THE NOFIRNO SEALANT LAYER (AND AQUASTOP LAYER, IF APPLICABLE) AND BEGIN TO CUT SEALANT WIDE ENOUGH TO ACCOMMODATE THE DUTER DIAMETER OF THE CABLE TO BE PULLED INTO THE DUCT. A TAPERING MOTION SHALL BE USED TO ENSURE APPROPRIATE MASS IS AVAILABLE FOR RE-SEAL.
  - B) REMOVE THE APPROPRIATE AMOUNT OF NOFIRNO FILLER SLEEVES, IN ORDER TO ACCOMMODATE THE OUTER DIAMETER OF THE CABLE TO BE PULLED INTO THE DUCT.
  - C) PULL THE DESIRED CABLE THROUGH THE DUCT AND ADD A BLACK RISE INSERT SLEEVE AROUND THE CABLE.
  - D) PUSH THE RISE INSERT SLEEVES INTO THE DUCT AT A DEPTH OF 19 mm ( $^{3}4''$ ) FROM THE DUCT OPENING.
  - E) FOLLOW PROCEDURES AS PER 2D AND 2E.

DISTRIBUTION CO	NSTRUCTION Construction	STANDARD		DUCT SEA	1 ANT 1	NCTALI	ATION	
TORONTO	Approved By: 20	21/10/21		DUCT SEA	ALAINI II	NSTALI	_ATION	
HYDRO	Drafted By:	Designed By: B.D.	Original Issu	ue: 2015-11-23	Scale: N.T.S.	Rev: 2	31-1400	3/3



### **CONNECTION INTO EXISTING WALL**

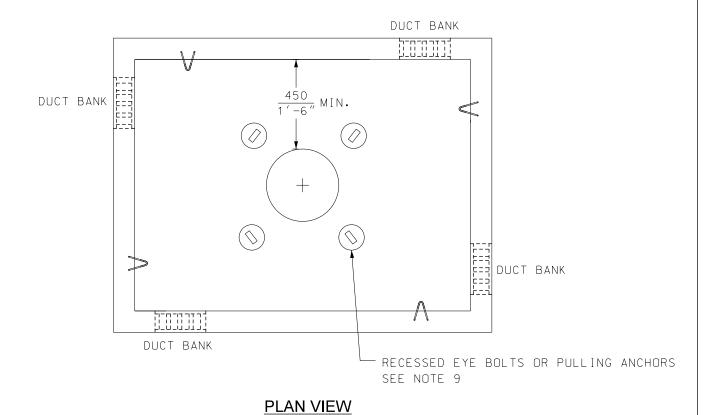


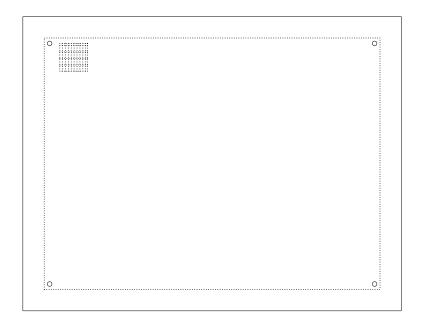
DISTRIBUTION CC Civil	NSTRUCTION Construction	STANDARD		CONDUITS NEW DUCT BANK RECESS					
 TORONTO	Approved By: B.D. 20	19-03-22		INSTALLATION IN			- 10		
HYDRO	Drafted By:	Designed By:	Original Issue:	2019-03-22	Scale:	Rev: 0	31-1600	1/2	

# PERSONS ONLY AS PER THE

- 1) DRILL 15M DOWEL BARS INTO EXISTING CONCRETE WALL FOR A LENGTH OF AT LEAST 200 mm (8"). USE HILTI HY-200 CHEMICAL ADHESIVE ANCHORS ACCORDING TO THE MANUFACTURERS INSTRUCTIONS.
- 2) ALL REINFORCEMENT BARS SHALL CONFORM TO LATEST CSA STANDARD G30.18, Fy=400 MPa.
- 3) WITHIN 700 MM OF EXTERIOR WALL FACE, CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPg and exposure class of C-1 as defined in CSA A23.1.
- 4) FOR CABLE CHAMBERS, IF CABLE PULLING LOOPS ARE REQUIRED, INSTALL IN ACCORDANCE TO TORONTO HYDRO STANDARD 31-8220. CABLE PULLING LOOP SHALL BE IN-LINE WITH AND ON OPPOSITE WALLS OF EACH DUCT FACE (TYPICAL 300 mm (1'-0") FROM FINISHED FLOOR).
- 5) DUCT BANK RECESS INSTALLATION SHALL APPLY TO DUCT CONFIGURATIONS GREATER THAN 6 DUCTS, NUMBER OF DUCTS WITHIN RECESS SHALL NOT EXCEED 24. DUCT CONFIGURATIONS SHALL BE IN ACCORDANCE WITH STD. 31-1120.
- 6) FOR DUCT BANK RECESS INSTALLED IN EXISTING STRUCTURES, CLEARANCES SHALL BE AS FOLLOWS:
  - MIN. 400 mm (1'-4") FROM CEILING;
  - MIN. 400 mm (1'-4") FROM ADJACENT WALLS;
  - MIN. 400 mm (1'-4") FROM OTHER DUCT BANKS.
  - MIN. 400 mm (1'-4") FROM FLOOR OR, IF APPLICABLE, MIN. 100 mm (4") ABOVE BACKWATER VALVE.
- 7) TO PREVENT DAMAGE TO REINFORCEMENT BARS ADJACENT TO RECESS, SAW OVERRUN SHALL BE AVOIDED DURING RECESS INSTALLATION.
- 8) INSTALLATION SHALL CONFORM TO THE LATEST EDITION OF TORONTO HYDRO TECHNICAL SPECIFICATION FOR CIVIL CONSTRUCTION WORK CV-CON-O1.
- 9) THE CONTRACTOR SHALL ENSURE THAT THE WALL IS STRUCTURALLY SOUND PRIOR TO COMMENCING WORK, MINIMUM WALL THICKNESS SHALL BE 200 mm (8"), OTHERWISE CORE DRILLING SHALL BE USED FOR STRUCTURES HAVING WALL THICKNESS LESS THAN 200 mm (8"), NO RECESS SHALL BE INSTALLED IN A SUBMERSIBLE TRANSFORMER VAULT.
- 10) DUCT BANK RECESS SHALL BE PERFORMED BY AN APPROVED TORONTO HYDRO CONTRACTOR TO ENSURE THAT CONSTRUCTION COMPLIES WITH TORONTO HYDRO CIVIL SPECIFICATIONS, STANDARDS AND ALL RELEVANT ACCEPTABLE PRACTICES AND METHODS APPROVED BY TORONTO HYDRO.
- 11) THE CONTRACTOR SHALL PROVIDE TEMPORARY PROTECTION TO ALL CABLES LOCATED INSIDE THE STRUCTURE, AND WILL CLEAN, REMOVE AND DISPOSE OF ALL DEBRIS RESULTING FROM THE CONSTRUCTION.
- 12) THIS INSTALLATION SHALL NOT APPLY TO STRUCTURES CONSTRUCTED WITH CONCRETE BLOCKS/BRICKS.

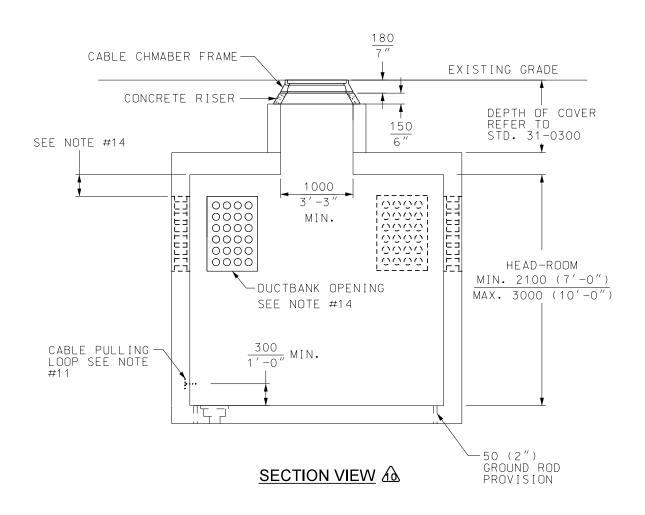
DISTRIBUTION CONSTRUCTION STANDARD Civil Construction				CONDUITS  NEW DUCT BANK RECESS						
	TORONTO	Approved By: B.D. 2019-03-22			INSTALLATION IN EXISTING STRUCTURES					
	HYDRO	Drafted By:	Designed By:	Original Issue:	2019-03-22	Scale: N.T.S.	Rev: 0	31-1600	2/2	



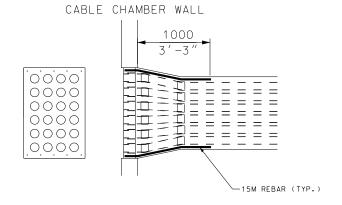


### FLOOR PLAN VIEW 👍

DISTRIBUTION CONSTRUCTION STANDARD  Civil Construction				CABLE CHAMBERS					
ر ا		Approved By: 2025-01-29 A.P.		PRECAST CHAMBER					
	HYDRO	Drafted By:	Designed By:	Original Issue:	2000-12-30	Scale: N.T.S.	Rev: 10	31-2160	1/3



CABLE CHAMBER								
TYPE	SIZ	ZES	NUMBER OF LIDS					
#	WIDTH	LENGTH						
1	2000 (6'-8")	2500 (8'-4")						
2	2000 (6'-8")	3000 (10′-0″)	1					
3	2500 (8'-4")	3000 (10′-0″)						
4	2500 (8'-4")	3500 (11′-8″)	1 OR 2					
5	2500 (8'-4")	4000 (13′-4″)	I UR Z					
6	3000 (10′-0″)	3000 (10′-0″)	1					
7	3000 (10′-0″)	3500 (11′-8″)						
8	3000 (10′-0″)	4000 (13′-4″)	1 OR 2					
9	3500 (11′-8″)	4000 (13′-4″)						



### **DETAIL 'A'**

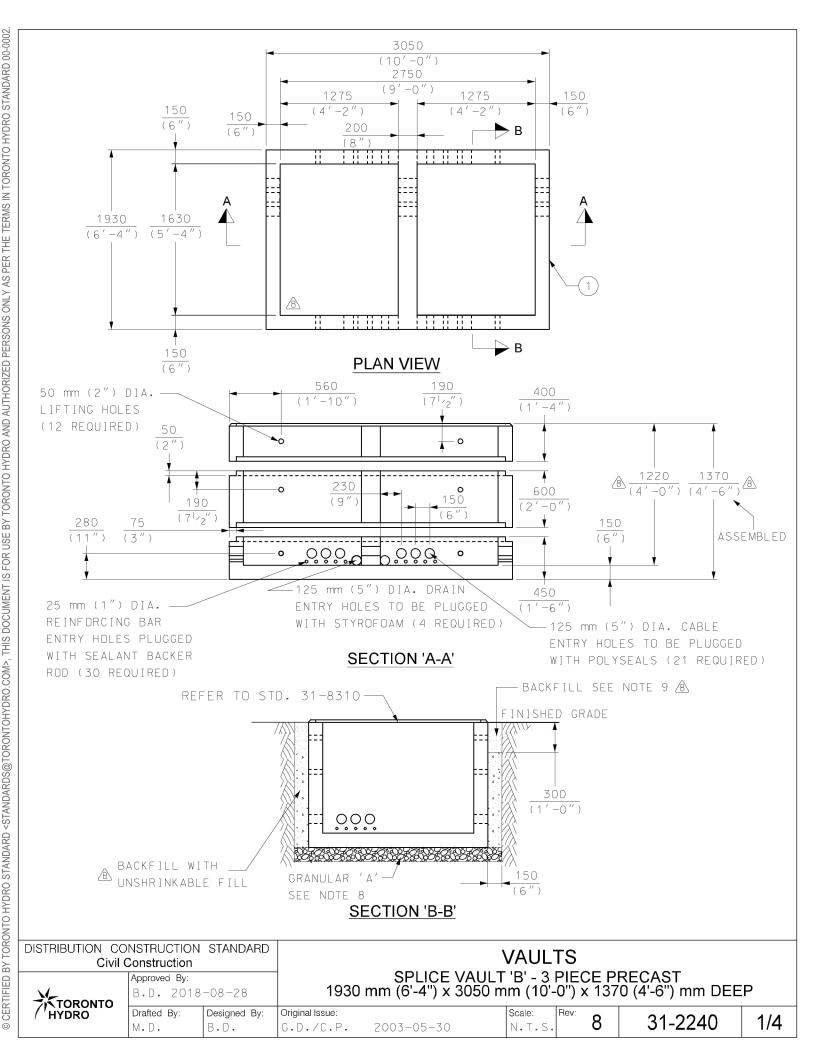
DUCTBANK CONNECTION TO PRECAST CABLE CHAMBER SEE NOTE 15

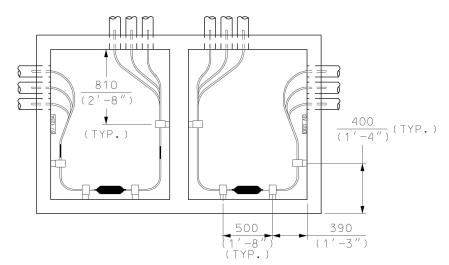
DISTRIBUTION CONSTRUCTION STANDARD  Civil Construction				CABLE CHAMBERS					
		Approved By: 2025-01-29 A.P.			PREC	AST CH	AMBER		
		Drafted By:	Designed By:	Original Issue:	2000-12-30	Scale: R	<sup>Rev:</sup> 10	31-2160	2/3

# USE BY TORONTO HYDRO AND AUTHORIZED PERSONS ONLY AS PER THE TERMS IN TORONTO HYDRO STANDARD 00-0002 CERTIFIED BY TORONTO HYDRO STANDARD <STANDARD@TORONTOHYDRO.COM>, THIS DOCUMENT IS FOR

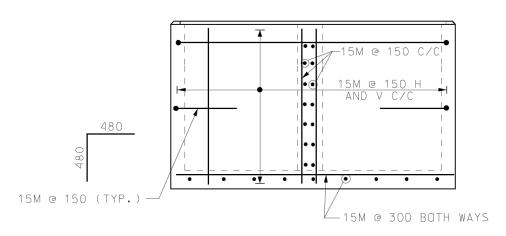
- 1) CHAMBER SHALL BE DESIGNED TO MEET CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6.
  DRAWINGS SHALL BE STAMPED AND SIGNED BY THE MANUFACTURER'S PROFESSIONAL ENGINEER.
  MANUFACTURER SHALL SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BY TORONTO HYDRO
  PRIOR TO FABRICATION
- 2) MINIMUM 28 DAY COMPRESSIVE STRENGTH OF CONCRETE SHALL BE 35 MPa AND MINIMUM CLASS OF EXPOSURE SHALL BE C-1.
- 3) REINFORCING STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF 400 MPa AS PER LATEST CSA SPEC. G.30.18. STRUCTURAL STEEL SHALL CONFORM TO CSA STANDARD G40.21, GRADE 300W.
- 4) ROOF ACCESS OPENINGS (NECK) SHALL BE A MINIMUM 1000 mm (3'-4") IN DIAMETER AND BE A MINIMUM 450 mm (1'-6") FROM WALL.
- 5) CHAMBER SIZES SHALL BE AS PER TABLE IN THIS STANDARD. MANUFACTURER CHAMBER SIZES CAN VARY FROM WHAT IS SHOWN. TORONTO HYDRO STANDARDS APPROVAL IS REQUIRED PRIOR TO FABRICATION.
- 6) CHAMBER HEAD-ROOM SHALL BE A MINIMUM OF 2100 mm (7'-0") AND MAXIMUM OF 3000 mm (10'-0").
- 7) CHAMBER ROOF SHALL BE A MINIMUM THICKNESS OF 250 mm (9").
- 8) NUMBER OF ACCESS OPENING (NECK) IN ROOF SLAB SHALL BE AS PER TABLE IN THIS STANDARD.
- 9) A MINIMUM OF 4 ROOF RECESS EYE BOLTS SHALL BE INSTALLED IN ROOF SLAB AS PER STD. 31-8230.
- 10) CHAMBER WALLS SHALL HAVE A MINIMUM THICKNESS OF 200 mm (8").
- 11) WALL CABLE PULLING LOOPS SHALL BE INSTALLED ON OPPOSITE WALL OF EACH DUCT FACE (TYPICAL 300 mm (1'-0") FROM FINISH FLOOR). EYE BOLTS SIMILAR TO STD. 31-8210.
- 12) CHAMBER FLOOR SHALL HAVE A SUMP HOLE LOCATED IN CORNER OF CHAMBER, SUMP HOLE SHALL ACCOMMODATE A GRATING SIZE OF 384 X 380 X 40 AS PER STD, 31-8280, ALTERNATIVE DRAIN CONFIGURATION SHALL REQUIRE A STANDARDS ENGINEER APPROVAL.
- 13) EXACT LOCATION OF FLOOR DRAIN OR SUMP HOLE SHALL BE DETERMINED AS PER CONSTRUCTION DRAWING.
- MAX. OF 4W6H DUCTBANK CONFIGURATION SHALL BE INSTALLED IN EACH WALL OF CABLE CHAMBER. LOCATION AND DEPTH OF DUCTBANKS SHALL BE AS PER PROJECT REQUIERMENTS.
- DUCT HOLES SHALL BE 125 mm (5") IN DIAMETER, 175 MM (7") CENTER ON CENTER, AND ALL DUCT HOLES SHALL BE PLUGGED WITH DUCT PLUGS.
  - 16) CHAMBER WALLS CAN BE BUILT IN SECTIONS, EACH SECTION SHALL BE SEALED TO PREVENT WATER FROM ENTERING THE CABLE CHAMBER.
  - 17) 4-50 (2") HOLES FOR GROUND ROD PROVISIONS SHALL BE PLACED IN EACH CORNER OF THE FLOOR SLAB. GROUND ROD PROVISIONS SHALL BE A MINIMUM 75 mm (3") FROM WALL.
  - 18) LIFTING OF CHAMBER INTO PLACE SHALL BE THE RESPONSIBILITY OF THE MANUFACTURER AND THE CONTRACTOR. MINIMUM OVERHEAD CLEARANCE OF 5500 mm (18'-0") IS NEEDED TO LIFT CHAMBER IN PLACE.
  - 19) THE EXTERIOR SURFACE OF THE ROOF AND NECK SHALL BE WATERPROOFED WITH A BITUMEN MEMBRANE.
  - 20) PARGING MIX ON ALL BRICK WORK SHALL BE ONE PART NON-SHRINK CEMENT AND THREE PARTS SAND AND APPLIED 15 mm THICK.
  - ,21) CABLE CHAMBER SHALL ONLY BE CORE DRILLED AT MANUFACTURE APPROVED LOCATIONS.
  - 22) DRILL 15M BARS INTO EXISTING DUCTBANK RECESS USE HILTI HY-200 CHEMICAL ADHESIVE ANCHORS ACCORDING TO THE MANUFACTURERS INSTRUCTIONS.
  - 23) ALL REINFORCEMENT BARS SHALL CONFORM TO LATEST CSA STANDARD G30.18, Fy=400 MPa

	DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD	CABLE CHAMBERS						
	Approved By:			PRECAST CHAMBER						
	TORONTO	2025-01-29 A.P.			11120	,, (01 01	i) (IVIDEIX			
		Drafted By:	Designed By:	Original Issue:		Scale:	Rev: 10	24 2460	2/2	
		LJ.D.	IA.P.	G.D./ .G.	2000-12-30	IN.T.S.	10 1	31-2160	1 3/3	

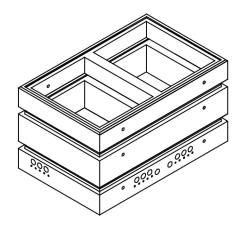




### TYPICAL SPLICE RACKING

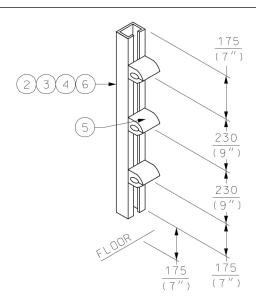


<u>DETAIL 'A'</u>
WALL AND FLOOR REINFORCEMENT



### **ISOMETRIC**

DISTRIBUTION CONSTRUCTION STANDARD  Civil Construction			VAULTS					
TORONTO	Approved By: B.D. 2018-08-28		1930	SPLICE VAULT 'B' - 3 PIECE PRECAST 1930 mm (6'-4") x 3050 mm (10'-0") x 1370 (4'-6") mm DEEP				P
HYDRO	Drafted By:	Designed By:	Original Issue:	2003-05-30	Scale: N.T.S.	Rev: 8	31-2240	2/4



### CABLE SUPPORT

#### NOTES:

#### MATERIAL:

- CONCRETE SHALL HAVE A MIN. 28-DAY COMPRESSIVE STRENGTH OF 35 MPg. CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST CSA-A23.1. ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2.
- MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS. 2)
- EXPOSURE CLASSIFICATION TO FREEZING AND THAWING IN A SATURATED CONDITION BUT WITH NO 3) CHLORIDES SHALL BE F-1. ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPa.
- 4) CONCRETE COVER ON PRECAST UNIT SHALL BE 50 mm (2").
- ALL EXPOSED EDGES SHALL HAVE 25 mm (1") CHAMFER.
- LIFTING HOLES CAN BE INSTALLED IN FOUNDATION WALLS FOR MANUFACTURER'S LIFTING PREFERENCE.
- 4-LIFTING ANCHORS FOR LIFTING PURPOSES BY OTHERS SHALL BE PROVIDED ON THE INSIDE OF ALL FOUNDATION WALLS. LIFTING ANCHORS SHALL BE GALVANIZED. LIFTING ANCHORS SHALL BE CAPABLE OF LIFTING THE PRECAST UNITS AND THIS SHALL BE CERTIFIED BY MANUFACTURER PRIOR TO DELIVERY.

#### INSTALLATION:

M.D.

B.D.

- PLACE 150 mm (6") GRANULAR "A" BEDDING ON UNDISTURBED SOIL CAPABLE OF SUSTAINING 75 KPa AND COMPACT TO 95% STANDARD PROCTOR DENSITY.
- EXCAVATION SHALL BE BACKFILLED TO FINISHED GRADE AS PER TORONTO HYDRO CIVIL SPECIFICATION CV-CON-01 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.
- √8\10) TORONTO HYDRO INSPECTOR SHALL BE PRESENT DURING THE INSTALLATION, 24-HOUR NOTICE IS REQUIRED PRIOR TO STARTING THE INSTALLATION.
- ≜ 11) DRAIN CONNECTION SHALL BE AS PER STANDARD 31-7100.
- √8\12) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.

G.D./C.P.

- 🕭 13) CONTRACTOR TO PLUG ALL HOLES (LIFTING AND GROUNDING) AND PARGED PRIOR TO BACKFILLING.
- ⚠ 14) PRECAST UNITS ARE DELIVERED BY CRANE-EQUIPPED TRUCKS. EXCAVATION MUST BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK. MIN, DVERHEAD CLEARANCE OF 5500 mm (18'-0") IS REQUIRED. CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE PRECAST UNITS INTO EXCAVATION.

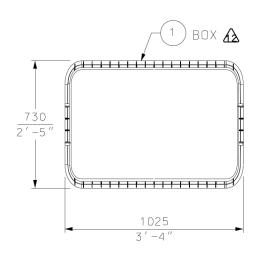
DISTRIBUTION CONSTRUCTION STANDARD  Civil Construction				VAULTS				
Approved By:  B.D. 2018-08-28		1930	SPLICE VAUL mm (6'-4") x 3050				P	
HYDRO	Drafted By:	Designed By:	Original Issue:	2003-05-30	Scale: Rev:	8	31-2240	3/4

2003-05-30

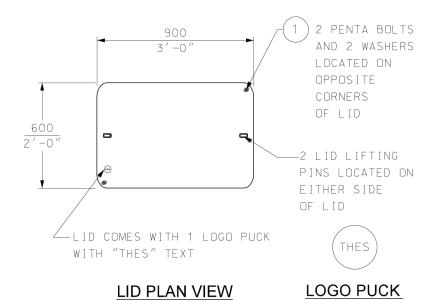
N.T.S.

	BILL OF MATERIALS FOR 31-2240			
ITEM NO.	DESCRIPTION		ITEM I.D.	QTY
1	ME, EP	3540040	1	
2	10′)	3520220	4	
3		2500057	24	
4		2530100	24	
5	CLAMP CABLE 11/4" HOLE THERMOPLASTIC		9663121	24
6	NUT PENTA 1/2"-13 UNC ZINC ALLOY		2520095	24
<b>*************************************</b>	ASSDCIATED STANDARDS	***************************************		XXXXXX
7	FRAME, BEAMS AND COVER	STD.	31-8310	1
8	GROUNDING	STD.	18-5400	1
9	VAULT LOCATION NUMBER	STD.	21-3100	1
10	DRAINING STRUCTURES	STD.	31-7100	1

DISTRIBUTION CONSTRUCTION STANDARD **VAULTS** Civil Construction SPLICE VAULT 'B' - 3 PIECE PRECAST 1930 mm (6'-4") x 3050 mm (10'-0") x 1370 (4'-6") mm DEEP Approved By: B.D. 2018-08-28 TORONTO HYDRO Rev: Drafted By: Designed By: Original Issue: Scale: 8 31-2240 4/4 N.T.S. G.D./C.P. 2003-05-30 M.D. B.D.





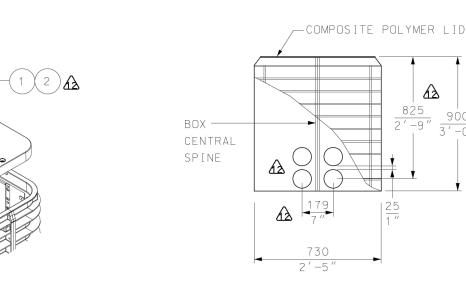


**DETAIL** 

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COMPOSITE POLYMER LID WEIGHS 50 LBS



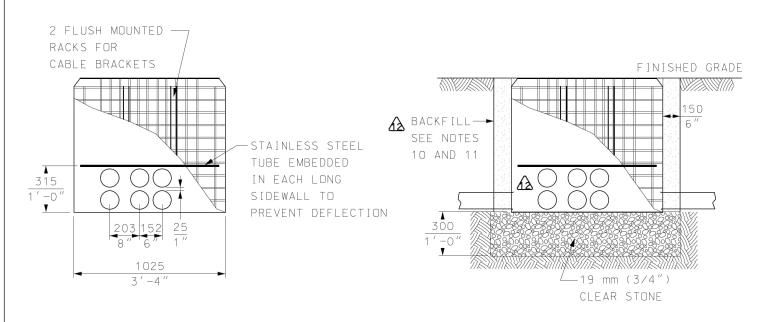
### **ISOMETRIC VIEW**

0

75 3"

**BOX SIDE VIEW - SHORT SIDEWALL** 

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE/TAP BOX				
Approved By:			TYPE 'A' - FOR SECONDARY CABLES ONLY				
HYDRO	Drafted By:	Designed By:	Original Issue:	2000-12-19	Scale: Rev: 12	31-3120	1/3



### BOX SIDE VIEW - LONG SIDEWALL ?

### **BOX SIDE VIEW - INSTALLATION DETAIL**

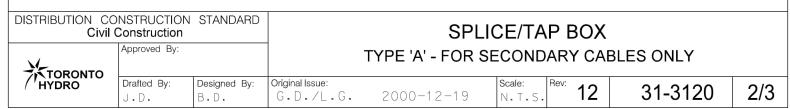


### LID DETAIL



### CABLE BRACKETS

	BOM LEGEND								
	А	SPLICE/TAP BOX TYPE 'A'							
12	В	REPLACEMENT ACCESSORIES							



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	BILL OF MATERIALS FOR 31-3120				
ITEM NO.	DESCRIPTION	ITEM I.D.	Q A	ГҮВ	
	1 - 600X900X900 HDPE BOX				
	1 - COMPOSITE POLYMER LID				
	2 - 8 mm PENTA HEAD BOLTS				
1	2 - WASHERS	9665466	1	_	
	2 - 4" STEP BRACKETS				
	2 - 4" HOOK BRACKETS				
2	LID KIT CW 1-600X900 LID, 2-PENTA BOLTS, 2-RETAINERS, 2-WASHERS	100001694	1-1	1	
3	BOLT DOWN KIT CW - PENTA LAG W/RETAINERS AND WASHERS (2/PACKAGE)	100001689	s—s	1	
4	4" STEP BRACKETS	100001690	1-1	1	
5	4" HOOK BRACKETS	100001691	1-1	1	

12

WHEN REQUIRED

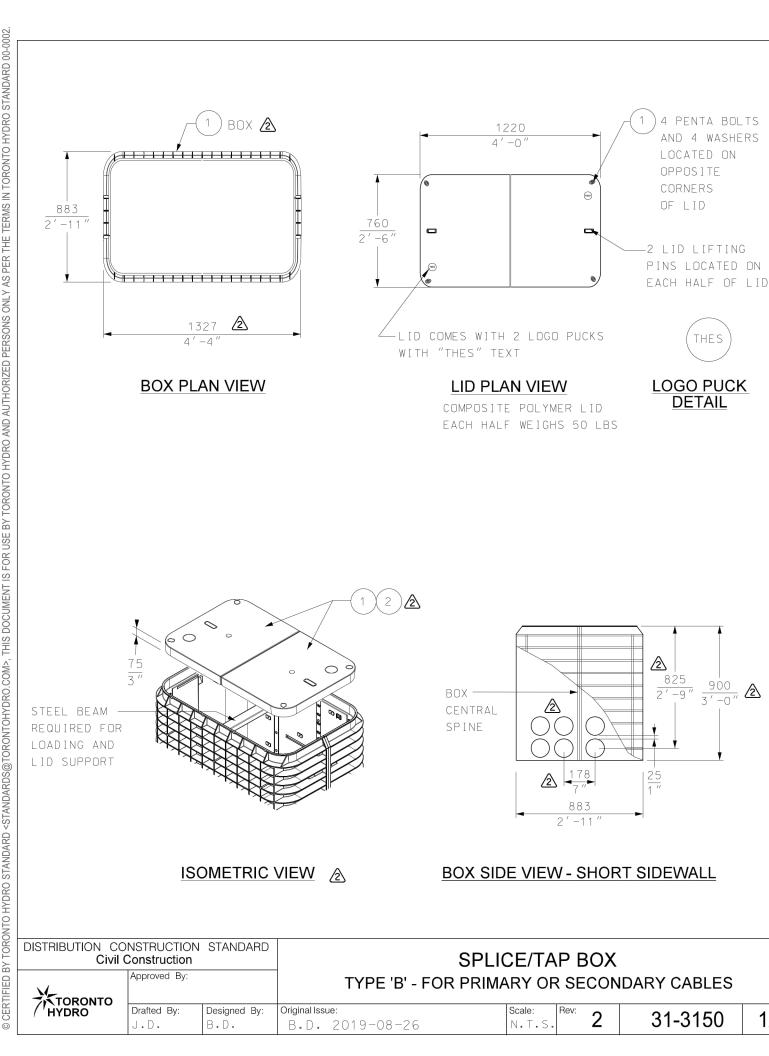
#### NOTES:

- 1) FOR LEGACY LID REPLACEMENTS ONLY, REFER TO FOLLOWING STOCK CODES:
  - COVER GREEN HDPE WITH LOCKING ASSEMBLY: ID# 9656831
  - GREEN EXTENSION RING 75mm: ID# 9662994
  - COVER POLYMER CONCRETE (GREY COLOR) WITH LOCKING ASSEMBLY: ID# 9662431
  - GREY EXTENSION RING 75mm: ID# 9662995
  - PENTA HEAD BOLT LOCKING ASSEMBLY: ID# 9663408
- AS SHOWN, BOX COMES WITH PRE DRILLED 125 mm (5") HOLES ON EACH SIDEWALL. IF REQUIRED A MAX. OF 2 ADDITIONAL HOLES CAN BE DRILLED IN THE SHORT SIDEWALL BY USING A STANDARD HOLE SAW OR A DRILL BIT. AVOID DRILLING HOLES OR CUTTING AT THE FOLLOWING LOCATIONS:
  - THE BOX'S CENTRAL SPINE (LOCATED IN THE SHORT SIDEWALLS),
  - TOP 300 mm (1'-0") OF THE BOX.
  - 3) BOX SHALL BE INSTALLED IN GRASSY OR PAVED BOULEVARDS, FOR INSTALLATION IN SIDEWALKS, APPROVAL IS REQUIRED FROM THE CITY OF TORONTO, FOR OPERATIONAL REASONS, BOX SHALL NOT BE INSTALLED IN ROADS, DRIVEWAYS OR AREAS WITH CONSISTENT VEHICULAR TRAFFIC.
  - 4) TO REMOVE A FROZEN LID, MANUFACTURER RECOMMENDS HITTING AROUND PENTA BOLT LOCATIONS WITH SLEDGE HAMMER TO LOOSEN BOLTS.
  - 5) LIFTING HOOK SHALL BE USED TO REMOVE LID (ITEM ID# 9666054).

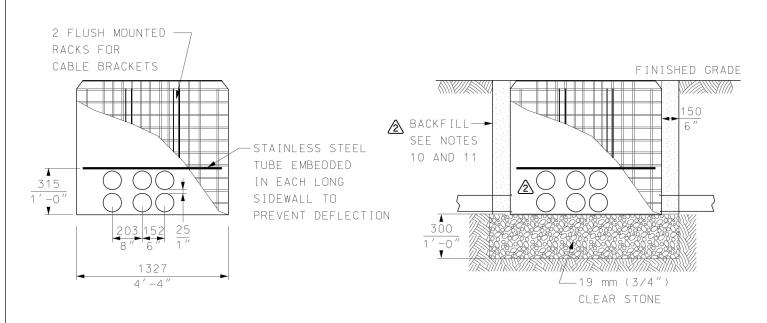
#### INSTALLATION NOTES:

- 6) EXCAVATE 150 mm (6") LARGER THAN THE WIDTH AND LENGTH OF THE BOX.
- 7) EXCAVATE 300 mm (1'-0") DEEPER THAN THE OVERALL DEPTH OF THE BOX. TAMP THE BOTTOM OF THE EXCAVATION TO COMPRESS AND FLATTEN ANY LOOSE SOIL.
- 8) PLACE 300 mm (1' -0") OF 19 mm (3#4") CRUSHED STONE BEDDING OVER THE ENTIRE FLOOR OF THE EXCAVATION. THE CRUSHED STONE SHALL BE FREE OF SOIL AND OTHER ORGANIC MATTER. THIS PREVENTS SETTLEMENT, AIDS IN DRAINAGE, AND PROVIDES A SOLID BEDDING. AS AN ALTERNATIVE, A DRY MIX OF CEMENT AND CRUSHED ROCK IN A 1:10 RATIO MAY BE USED TO FORM A HIGHER STRENGTH BEDDING.
- 9) PLACE THE BOX IN THE EXCAVATION AND LEVEL SO THAT THE BOX IS FLUSH WITH FINISHED GRADE BY ADDING/ADJUSTING THE BEDDING.
- 10) COMPLETE EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 mm (4") FROM FINISHED GRADE. CARE SHALL BE TAKEN SO NOT TO CAUSE EXCESSIVE DAMAGE TO THE BOX'S CELLULAR RIBS DURING THE BACKFILLING PROCESS.
- 11) BACKFILL THE REMAINING 100 mm (4") TO FINISHED GRADE AS PER SPECIFICATION #CV-CON-01 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE/TAP BOX				
TORONTO	Approved By:		TYPE 'A' - FOR SECONDARY CABLES ONLY				
HYDRO	Drafted By:	Designed By:	Original Issue:	2000-12-19	Scale: Rev: 12	31-3120	3/3



1/3



### BOX SIDE VIEW - LONG SIDEWALL &

### **BOX SIDE VIEW - INSTALLATION DETAIL**



### CABLE BRACKETS

		BOM LEGEND								
	А	SPLICE/TAP BOX TYPE 'B'								
2	В	REPLACEMENT ACCESSORIES								

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction			SPLICE/TAP BOX			
Approved By:		TYPE 'B' - FOR PRIMARY OR SECONDARY CABLES				
HYDRO	Drafted By:	Designed By:	Original Issue: B.D. 2019-08-26	Scale: Rev: 2	31-3150	2/3

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BILL OF MATERIALS FOR 31-3150									
ITEM NO.	DESCRIPTION	ITEM I.D.	Q A	TY B	1				
1	1 - 760×1220×900 mm HDPE BOX ⚠ 1 - COMPOSITE POLYMER LID 4 - 8 mm PENTA HEAD BOLTS 4 - WASHERS 2 - 4" STEP BRACKETS 2 - 4" HOOK BRACKETS	9665467	1	_					
2	LID KIT CW 1-600X900 LID, 2-PENTA BOLTS, 2-RETAINERS, 2-WASHERS	100001693	-	1	7				
3	BOLT DOWN KIT CW - PENTA LAG W/RETAINERS AND WASHERS (2/PACKAGE)	100001689	_	1	*				
4	4" STEP BRACKETS	100001690	-,	1	>				
5	4" HOOK BRACKETS	100001691	-	1	ĸ				

\* WHEN REQUIRED

#### NOTES:

<u>^</u>

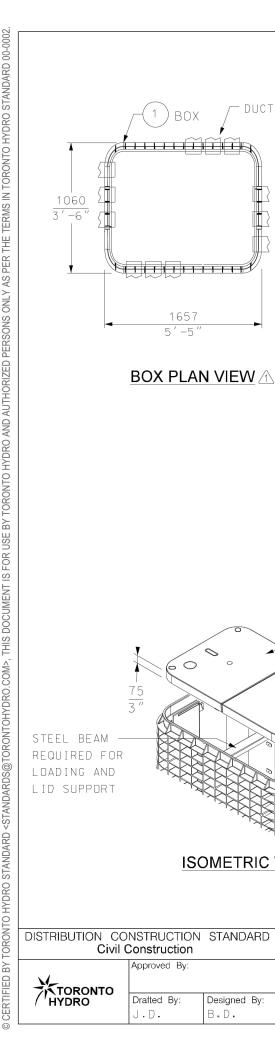
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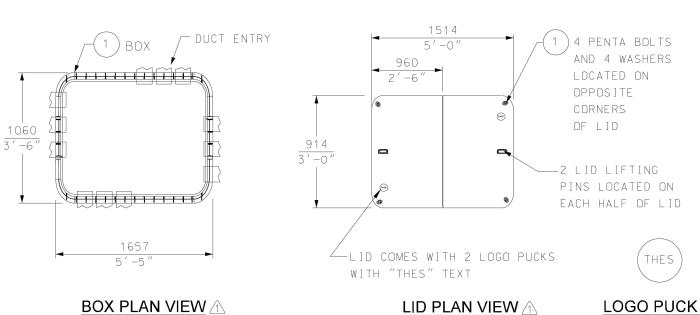
- 1) FOR LEGACY LID REPLACEMENTS ONLY, REFER TO FOLLOWING STOCK CODES:
  - COVER GREEN HDPE WITH LOCKING ASSEMBLY: ID# 9656868
  - GREEN EXTENSION RING 75mm: ID# 9662996
  - COVER POLYMER CONCRETE (GREY COLOR) WITH LOCKING ASSEMBLY: ID# 9662430
  - GREY EXTENSION RING 75mm: ID# 9662997
  - PENTA HEAD BOLT LOCKING ASSEMBLY: ID# 9663408
- AS SHOWN, BOX COMES WITH PRE DRILLED 125 mm (5") HOLES ON EACH SIDEWALL. IF REQUIRED A MAX. OF 2 ADDITIONAL HOLES CAN BE DRILLED IN ALL SIDEWALLS BY USING A STANDARD HOLE SAW OR A DRILL BIT. AVOID DRILLING HOLES OR CUTTING AT THE FOLLOWING LOCATIONS:
  - THE BOX'S CENTRAL SPINE (LOCATED IN THE SHORT SIDEWALLS),
  - TOP 300 mm (1'-0") OF THE BOX.
  - 3) BOX SHALL BE INSTALLED IN GRASSY OR PAVED BOULEVARDS. FOR INSTALLATION IN SIDEWALKS, APPROVAL IS REQUIRED FROM THE CITY OF TORONTO, FOR OPERATIONAL REASONS, BOX SHALL NOT BE INSTALLED IN ROADS, DRIVEWAYS OR AREAS WITH CONSISTENT VEHICULAR TRAFFIC.
  - 4) TO REMOVE A FROZEN LID, MANUFACTURER RECOMMENDS HITTING AROUND PENTA BOLT LOCATIONS WITH SLEDGE HAMMER TO LOOSEN BOLTS.
  - 5) LIFTING HOOK SHALL BE USED TO REMOVE LID (ITEM ID# 9666054).

#### INSTALLATION NOTES:

- 6) EXCAVATE 150 mm (6") LARGER THAN THE WIDTH AND LENGTH OF THE BOX.
- 7) EXCAVATE 300 mm (1'-0") DEEPER THAN THE OVERALL DEPTH OF THE BOX. TAMP THE BOTTOM OF THE EXCAVATION TO COMPRESS AND FLATTEN ANY LOOSE SOIL.
- 8) PLACE 300 mm (1' -0") OF 19 mm (3#4") CRUSHED STONE BEDDING OVER THE ENTIRE FLOOR OF THE EXCAVATION, THE CRUSHED STONE SHALL BE FREE OF SOIL AND OTHER ORGANIC MATTER, THIS PREVENTS SETTLEMENT, AIDS IN DRAINAGE, AND PROVIDES A SOLID BEDDING. AS AN ALTERNATIVE, A DRY MIX OF CEMENT AND CRUSHED ROCK IN A 1:10 RATIO MAY BE USED TO FORM A HIGHER STRENGTH BEDDING.
- 9) PLACE THE BOX IN THE EXCAVATION AND LEVEL SO THAT THE BOX IS FLUSH WITH FINISHED GRADE BY ADDING/ADJUSTING THE BEDDING.
- 10) COMPLETE EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 mm (4") FROM FINISHED GRADE. CARE SHALL BE TAKEN SO NOT TO CAUSE EXCESSIVE DAMAGE TO THE BOX'S CELLULAR RIBS DURING THE BACKFILLING PROCESS.
- 11) BACKFILL THE REMAINING 100 mm (4") TO FINISHED GRADE AS PER SPECIFICATION #CV-CON-01 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.

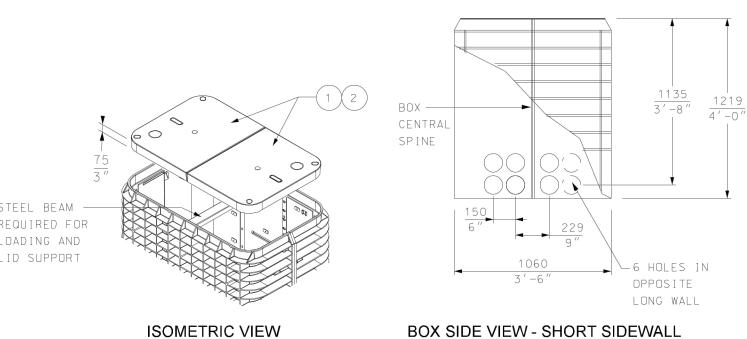
Civil Construction STANDARD			SPLI	CE/TA	PE	3OX		
TORONTO	Approved By:		TYPE 'B' - FOR PRIMARY OR SECONDARY CABLES					
HYDRO	Drafted By:	Designed By:	Original Issue: B.D. 2019-08-26	Scale:	Rev:	2	31-3150	3/3



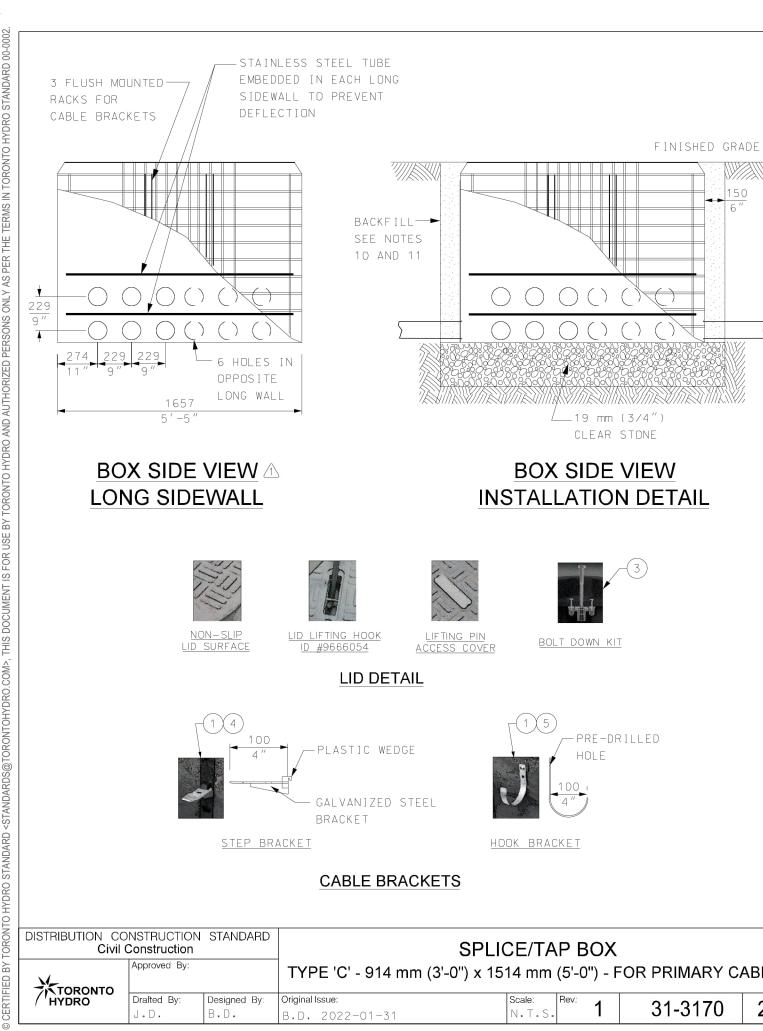


COMPOSITE POLYMER LID

**DETAIL** 



DISTRIBUTION CONSTRUCTION STANDARD Civil Construction		SPLIC	CE/TA	P B	ОХ		$\triangle$	
TORONTO	Approved By:		TYPE 'C' - 914 mm (3'-0") x 15	14 mm	(5'-0	") - F	FOR PRIMARY CA	ABLES
HYDRO	Drafted By: J.D.	,	Original Issue: B.D. 2022-01-31	Scale: N.T.S.	Rev:	1	31-3170	1/3



SPLICE/TAP BOX Civil Construction Approved By: TYPE 'C' - 914 mm (3'-0") x 1514 mm (5'-0") - FOR PRIMARY CABLES TORONTO HYDRO Drafted By: Designed By Original Issue: 31-3170 2/3 N.T.S. J.D. B.D. B.D. 2022-01-31

	BOM LEGEND	
А	SPLICE/TAP BOX TYPE 'C'	
В	REPLACEMENT ACCESSORIES	

	BILL OF MATERIALS FOR 31-3170				
ITEM NO.	DESCRIPTION	ITEM I.D.	Q ·	ТҮВ	
1	1 - 1060×1657×1219 mm HDPE BOX 1 - COMPOSITE POLYMER LID 4 - 8 mm PENTA HEAD BOLTS 4 - WASHERS 2 - 4" STEP BRACKETS (WITH 2 WEDGES) 2 - 4" HOOK BRACKETS		1	_	
2	LID KIT CW 1-915x1514 LID, 2-PENTA BOLTS, 2-RETAINERS, 2-WASHERS		-	1	*
3	BOLT DOWN KIT CW - PENTA LAG W/RETAINERS AND WASHERS (2/PACKAGE)	100001689	-	1	*
4	4" STEP BRACKETS	100001690	_	1	*
5	4" HDDK BRACKETS	100001691	-	1	*

\* WHEN REQUIRED

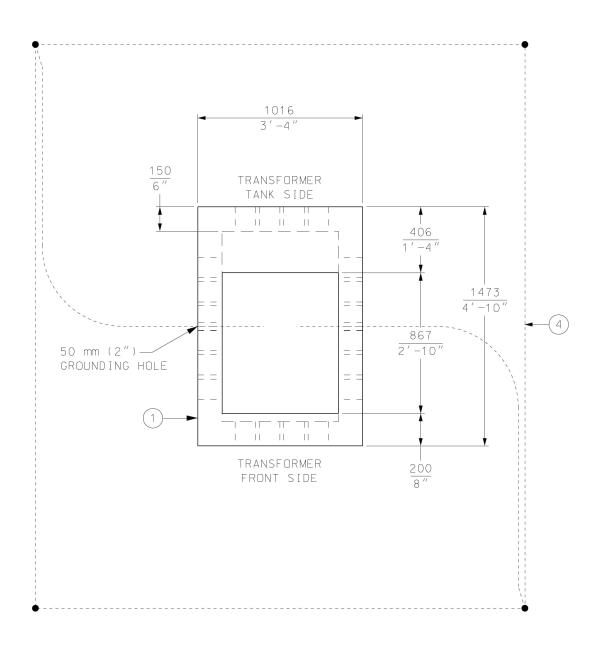
#### NOTES:

- 1) FOR LEGACY LID REPLACEMENTS ONLY, REFER TO FOLLOWING STOCK CODES:
  - COVER GREEN HDPE WITH LOCKING ASSEMBLY: ID# 9663405
  - PENTA HEAD BOLT LOCKING ASSEMBLY: ID# 9663408
- 2) AS SHOWN, BOX COMES WITH PRE DRILLED 125 mm (5") HOLES ON EACH SIDEWALL, IF REQUIRED, A MAX, OF 2 ADDITIONAL HOLES CAN BE DRILLED IN ALL SIDEWALLS BY USING A STANDARD HOLE SAW OR A DRILL BIT, AVOID DRILLING HOLES OR CUTTING AT THE FOLLOWING LOCATIONS:
  - THE BOX'S CENTRAL SPINE (LOCATED IN THE SHORT SIDEWALLS),
  - TOP 300 mm (1'-0") OF THE BOX.
- 3) BOX SHALL BE INSTALLED IN GRASSY OR PAVED BOULEVARDS. FOR INSTALLATION IN SIDEWALKS, APPROVAL IS REQUIRED FROM THE CITY OF TORONTO. FOR OPERATIONAL REASONS, BOX SHALL NOT BE INSTALLED IN ROADS, DRIVEWAYS OR AREAS WITH CONSISTENT VEHICULAR TRAFFIC.
- 4) TO REMOVE A FROZEN LID, MANUFACTURER RECOMMENDS HITTING AROUND PENTA BOLT LOCATIONS WITH SLEDGE HAMMER TO LOOSEN BOLTS.
- 5) LIFTING HOOK SHALL BE USED TO REMOVE LID (ITEM ID# 9666054).

#### INSTALLATION NOTES:

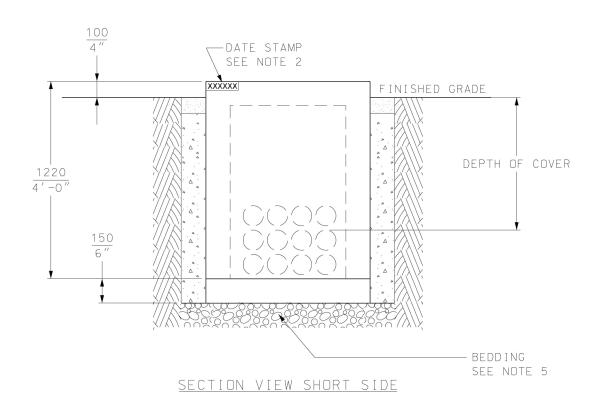
- 6) EXCAVATE 150 mm (6") LARGER THAN THE WIDTH AND LENGTH OF THE BOX.
- 7) EXCAVATE 300 mm (1'-0") DEEPER THAN THE OVERALL DEPTH OF THE BOX. TAMP THE BOTTOM OF THE EXCAVATION TO COMPRESS AND FLATTEN ANY LOOSE SOIL.
- 8) PLACE 300 mm (1' -0") OF 19 mm (34") CRUSHED STONE BEDDING OVER THE ENTIRE FLOOR OF THE EXCAVATION. THE CRUSHED STONE SHALL BE FREE OF SDIL AND OTHER ORGANIC MATTER. THIS PREVENTS SETTLEMENT, AIDS IN DRAINAGE, AND PROVIDES A SOLID BEDDING. AS AN ALTERNATIVE, A DRY MIX OF CEMENT AND CRUSHED ROCK IN A 1:10 RATIO MAY BE USED TO FORM A HIGHER STRENGTH BEDDING.
- 9) PLACE THE BOX IN THE EXCAVATION AND LEVEL SO THAT THE BOX IS FLUSH WITH FINISHED GRADE BY ADDING/ADJUSTING THE BEDDING.
- 10)COMPLETE EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 mm (4") FROM FINISHED GRADE. CARE SHALL BE TAKEN SO NOT TO CAUSE EXCESSIVE DAMAGE TO THE BOX'S CELLULAR RIBS DURING THE BACKFILLING PROCESS.
- 11)BACKFILL THE REMAINING 100 mm (4") TO FINISHED GRADE AS PER SPECIFICATION #CV-CON-01 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.

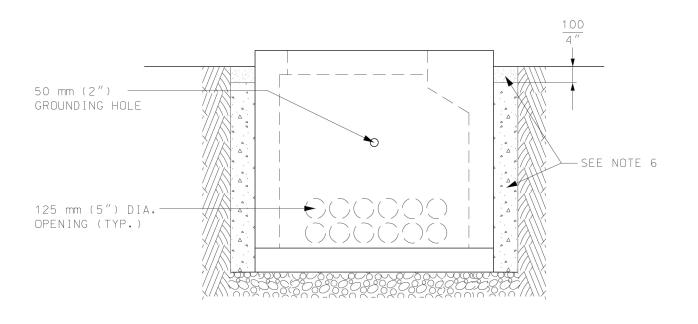
DISTRIBUTION CONSTRUCTION STANDARD  Civil Construction			SPLIC	CE/TA	P BOX		
TORONTO	Approved By:		TYPE 'C' - 914 mm (3'-0") x 15	14 mm	(5'-0") - F	FOR PRIMARY CA	ABLES
HYDRO	Drafted By:	Designed By:	Original Issue: B.D. 2022-01-31	Scale:	Rev: 1	31-3170	3/3



AA PAD-MOUNT PLAN VIEW

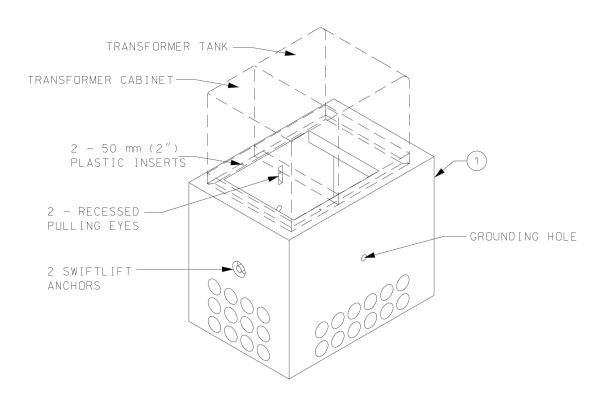
5	DISTRIBUTION CONSTRUCTION STANDARD Civil Construction  PAD-MOUNTS						14	
TORONTO	Approved By:			SINGLE PHASE 1016 mm (3'-4") x 1473 mm (4'-10")				
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-07-11	Scale: R	Rev: 14	31-4020	1/4



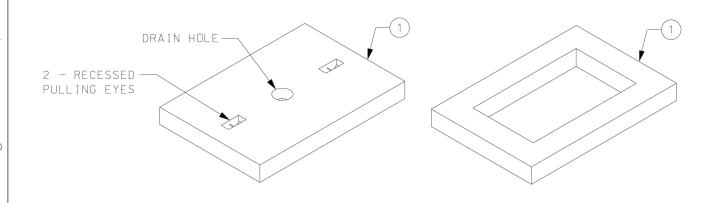


SECTION VIEW LONG SIDE

DISTRIBUTION CO	NSTRUCTION Construction	STANDARD	PAD-MOUNTS						
TORONTO	Approved By:			SINGLE PHASE 1016 mm (3'-4") x 1473 mm (4'-10")					
	Drafted By:	Designed By:	Original Issue:	2002-07-11	Scale: Rev: 14	31-4020	2/4		







BOTTOM SLAB ISOMETRIC VIEW

DISTRIBUTION CO Civil (	NSTRUCTION Construction	STANDARD	PAD-MOUNTS				14	
TORONTO	Approved By:		SINGLE PHASE 1016 mm (3'-4") x 1473 mm (4'-10")				<b>4'-10</b> ")	
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-07-11	Scale: N.T.S.	Rev: <b>14</b>	31-4020	3/4



	BILL OF MATERIALS FOR 31-4020			
ITEM NO.	DESCRIPTION		ITEM I.D.	QTY A
1	PAD-MOUNT WITH BOTTOM SLAB 1016 (3'-4") X 1473 (4'-10")	1	100002162	1
	ASSOCIATED STANDARDS ************************************			<b>*****</b>
2,	GUARD POSTS (BOLLARDS)	STD.	31-4080	1
3	CLEARANCE ZONE	STD.	31-4100	1
4	GROUNDING REQUIREMENTS	STD.	18-5500	1

#### NOTES:



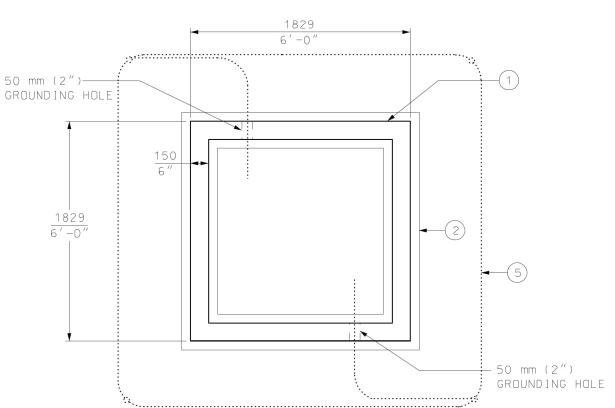
#### MATERIALS:

- 1) CONCRETE SHALL HAVE A MIN, 28-DAY COMPRESSIVE STRENGTH OF 35 MPg, CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST CSA-A23.1, ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2.
- 2) MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS.
- 3) CONCRETE EXPOSURE CLASSIFICATION SHALL BE C-1.
- 4) ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPa.

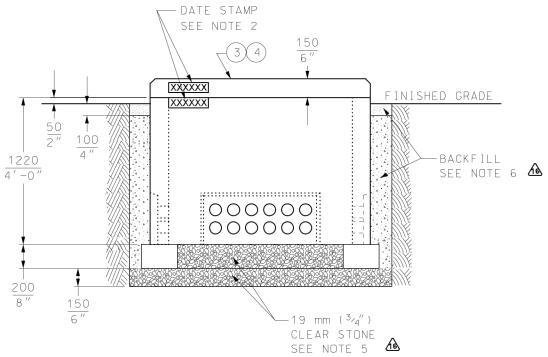
#### INSTALLATION:

- 5) PLACE 19 mm (3/4") CLEAR STONE BEDDING ON UNDISTURBED SOIL CAPABLE OF SUSTAINING 175 kPg and compact to 98% standard proctor density.
- 6) EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 MM (4") FROM FINISHED GRADE. BACKFILL THE REMAINING 100 MM (4") TO FINISHED GRADE AS PER TORONTO HYDRO CIVIL SPECIFICATION CV-CON-O1.
- 7) FOR VEHICULAR TRAFFIC REFER TO GUARD POSTS (BOLLARDS) STD. 31-4080.
- 8) FOR CLEARANCE ZONE AROUND PAD-MOUNT REFER TO STD. 31-4100.
- 9) PAD-MOUNT LOCATION SHALL BE KEPT CLEAR OF OBSTRUCTIONS FOR ACCESS BY TORONTO HYDRO PERSONNEL AND EQUIPMENT.
- 10) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.
- 11) CONTRACTOR SHALL PLUG GROUNDING HOLES AND PARGED PRIOR TO BACKFILLING.
- 12) PRECAST UNITS ARE DELIVERED BY CRANE-EQUIPPED TRUCKS, EXCAVATION MUST BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK, MIN, OVERHEAD CLEARANCE OF 5.5 m (18'-0") IS REQUIRED, CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE UNITS INTO EXCAVATION.

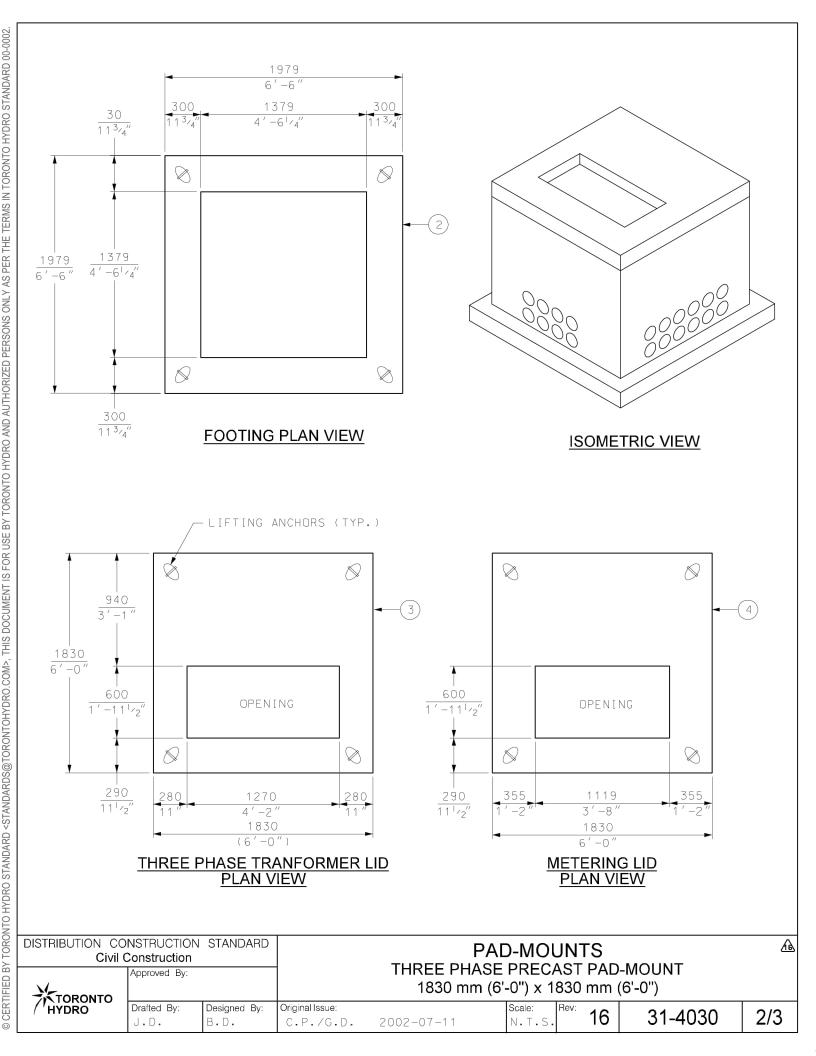
DISTRIBUTION CO	NSTRUCTION Construction	STANDARD	PAD-MOUNTS					14
TORONTO	Approved By:		SINGLE PHASE 1016 mm (3'-4") x 1473 mm (4'-10")					
HYDRO	Drafted By:  J.D.	Designed By:	Original Issue:	2002-07-11	Scale: N.T.S.	Rev: <b>14</b>	31-4020	4/4



# PAD-MOUNT AND FOOTING PLAN VIEW



<u>1</u>2 **PAD-MOUNTS** THREE PHASE PRECAST PAD-MOUNT 1830 mm (6'-0") x 1830 mm (6'-0") Scale: 16 31-4030 1/3 N.T.S 2002-07-11



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	BILL OF MATERIALS FOR 31-4030		
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY
	FOUNDATION PAD 1830 mm x 1830 mm x 1220 mm DEEP	3540014	1
2	STRIP FOOTING (FLOOR) 1980 mm × 1980 mm × 200 mm, 300 mm WIDE	9656479	1
3	LID (COVER) 1830 mm × 1830 mm × 150 mm DEEP - FOR THREE PHASE TRANSFORMER PAD	3540022	1
4	LID (COVER) 1830 mm X 1830 mm X 150 mm - FOR THREE PHASE METERING PAD	9662541	1
	ASSOCIATED STANDARDS		XXXX
5	GUARD POSTS (BOLLARDS) STI	0.31-4080	1
6	CLEARANCE ZONE STI	).31-4100	1
7	GROUNDING REQUIREMENTS STI	0.18 - 5500	) 1

#### NOTES:

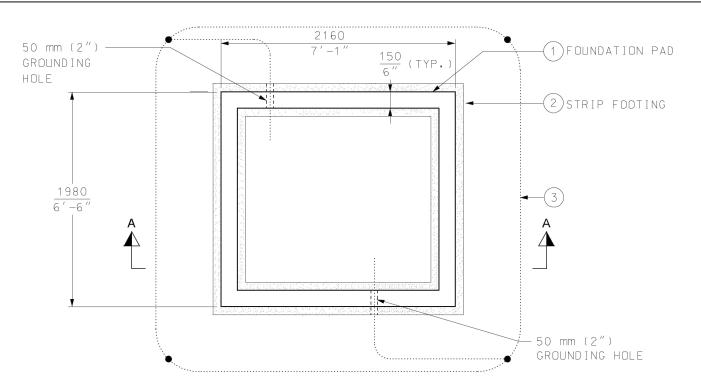
#### MATERIALS:

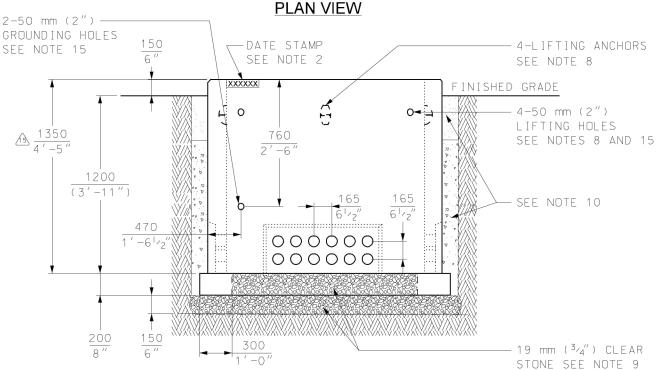
- 1) CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPg, CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST EDITION OF CSA-A23.1. ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2.
- 2) MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS.
- 3) CONCRETE EXPOSURE CLASSIFICATION SHALL BE C-1.
- 4) ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPa.

#### INSTALLATION:

- 5) PLACE 19 mm ( $^34''$ ) CLEAR STONE BEDDING ON UNDISTURBED SOIL CAPABLE OF SUSTAINING 175 kPa AND COMPACT TO 98% STANDARD PROCTOR DENSITY.
- 6) EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 100 MM (4") FROM FINISHED GRADE, BACKFILL THE REMAINING 100 MM (4") TO FINISHED GRADE AS PER TORONTO HYDRO CIVIL SPECIFICATION CV-CON-O1.
- 7) FOR VEHICULAR TRAFFIC REFER TO GUARD POSTS (BOLLARDS) STD. 31-4080.
- 8) PAD-MOUNT LOCATION SHALL BE KEPT CLEAR OF OBSTRUCTIONS FOR ACCESS BY TORONTO HYDRO PERSONNEL AND EQUIPMENT.
- 9) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.
- 10) CONTRACTOR SHALL PLUG GROUNDING HOLES AND PARGED PRIOR TO BACKFILLING, CONTRACTOR SHALL PLUG TOP SLAB LIFTING ANCHOR OPENINGS WITH CAULKING PRIOR TO PLACEMENT OF TRANSFORMER.
- 11) PRECAST UNITS SHALL BE DELIVERED BY CRANE-EQUIPPED TRUCKS, EXCAVATION SHALL BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK, MINIMUM OVERHEAD CLEARANCE OF 5500 mm (18'-0") IS REQUIRED, CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE PRECAST UNITS INTO EXCAVATION,
- 12) CUSTOMER TO PROVIDE 3000 mm (10 $^{\prime}$ -0 $^{\prime\prime}$ ) OF FLAT LEVEL GROUND SURFACE ON OPERATING SIDE (IN-FRONT) OF TRANSFORMER FOR OPERATIONAL NEEDS.

DISTRIBUTION C Civi	Construction	STANDARD		PAD-MOUNTS  THREE PHASE PRECAST PAD-MOUNT							
TORONTO	Approved By:				(6'-0") x 1830						
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-07-11	Scale: Rev:	16	31-4030	3/3			

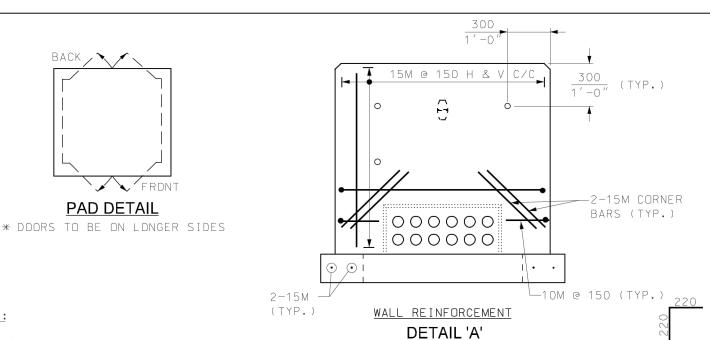




### SECTION 'A-A'

	BILL OF MATERIALS FOR 31-4050								
ITEM NO.									
1	FOUNDATION PAD 1980 mm x 2160 mm x 1350 mm DEEP	3540024	1						
2	STRIP FOOTING (FLOOR) 2130 mm x 2310 mm x 200 mm, 300 mm WIDE		1						
	ASSOCIATED STANDARDS (%)								
3	GROUNDING REQUIREMENTS STD.	18-5500	1						

DISTRIBUTION CO	NSTRUCTION Construction	STANDARD		PAD-MOUNTS						
TORONTO	Approved By: B.D. 20	20-09-25		THREE PHASE 1980 mm x						
/ HYDRO	Drafted By:	Designed By:	Original Issue: Scale: Rev: 15 31-4050							



#### NOTES:

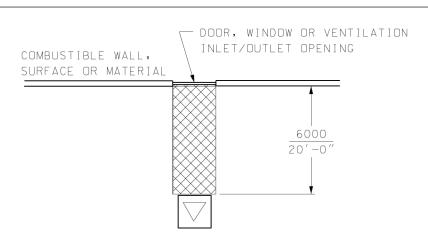
#### MATERIALS:

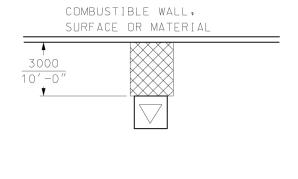
- 1) CONCRETE SHALL HAVE A MIN. 28-DAY COMPRESSIVE STRENGTH OF 35 MPg. CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST CSA-A23.1. ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2.
- 2) MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS.
- 3) EXPOSURE CLASSIFICATION TO FREEZING AND THAWING IN A SATURATED CONDITION BUT WITH NO CHLORIDES SHALL BE F-1.
- 4) ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPa.
- 5) CONCRETE COVER ON PRECAST STRIP FOOTING SHALL BE 50 mm (2"), ALL OTHERS SHALL BE 30 mm (1 $^{1}$ / $_{4}$ "). ALL EXPOSED EDGES SHALL HAVE 25 mm (1") CHAMFER.
- 6) PROVIDE 90° STANDARD HOOK FOR WALL HORIZONTAL REINFORCING BARS.
- 7) 4 13 mm ( $^{1}$ / $_{2}$ ") THREADED INSERTS FOR TRANSFORMER MOUNTING SHALL BE ADDED. THE INSERTS TO BE PLUGGED BY THE MANUFACTURER TO PREVENT ENTRY OF FOREIGN MATTER DURING TRANSIT.
- 8) LIFTING HOLES CAN BE INSTALLED IN FOUNDATION WALLS FOR MANUFACTURER'S LIFTING PREFERENCE, IN ADDITION, 4-LIFTING ANCHORS FOR LIFTING PURPOSES SHALL BE PROVIDED ON THE INSIDE OF ALL FOUNDATION WALLS AND ON TOP OF STRIP FOOTING AS SHOWN IN THIS STANDARD, LIFTING ANCHORS SHALL BE GALVANIZED, LIFTING ANCHORS SHALL BE CAPABLE OF LIFTING THE PRECAST UNITS AND THIS SHALL BE CERTIFIED BY MANUFACTURER'S PROFESSIONAL ENGINEER.

#### INSTALLATION:

- 9) PLACE 19 mm ( $^3\nu_4$ ") CLEAR STONE BEDDING ON UNDISTURBED SOIL CAPABLE OF SUSTAINING 75 kPg and compact to 98% standard proctor density.
- 10) EXCAVATION SHALL BE BACKFILLED TO FINISHED GRADE AS PER TORONTO HYDRO CIVIL SPECIFICATION CV-CON-01 CLAUSE 5.1.17 AND/OR CITY OF TORONTO'S LATEST BACKFILLING REQUIREMENT.
- 11) TORONTO HYDRO INSPECTOR SHALL BE PRESENT DURING THE INSTALLATION, 24-HOUR NOTICE IS REQUIRED PRIOR TO STARTING THE INSTALLATION.
- 12) FOR VEHICULAR TRAFFIC REFER TO GUARD POSTS (BOLLARDS) STD. 31-4080.
- 13) PAD-MOUNT LOCATION SHALL BE KEPT CLEAR OF OBSTRUCTIONS FOR ACCESS BY TORONTO HYDRO PERSONNEL AND EQUIPMENT.
- 14) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.
- 15) CONTRACTOR TO PLUG ALL HOLES (LIFTING AND GROUNDING) AND PARGED PRIOR TO BACKFILLING.
- 16) PRECAST UNITS ARE DELIVERED BY CRANE-EQUIPPED TRUCKS, EXCAVATION MUST BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK, MIN, OVERHEAD CLEARANCE OF 5.5 m (18'-0") IS REQUIRED, CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE UNITS INTO EXCAVATION.
- 17) WHEN LOCATING PAD-MOUNT, A 3.0 m (10'-0") AREA OF FLAT GROUND SURFACE IS REQUIRED INFRONT OF THE OPERATING SIDE (DOOR SIDE) OF TRANSFORMER FOR OPERATIONAL NEEDS.
- 18) THE FOUNDATION SHALL BE ORIENTED WITH THE LONG SIDE (DOOR SIDE OF SWITCHGEAR) PARALLEL TO THE CURB. FOR SCADA-OPERATED SWITCHGEARS ENSURE THAT LOW VOLTAGE AND SWITCHING COMPARTMENTS ARE NOT IN CONFLICT WITH VEHICULAR AND PEDESTRIAN TRAFFIC.

DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD		PAD-MOUNTS						
	Approved By:			THREE PHASE PMH 9/11 SWITCHGEAR  1980 mm x 2160 mm x 1350 mm						
TORONTO		20-09-25		1980 mm x			U mm			
/ 'HYDRO	Drafted By:	Designed By:	Original Issue:	2002-07-11	Scale:	Rev: 15	31-4050	2/2		



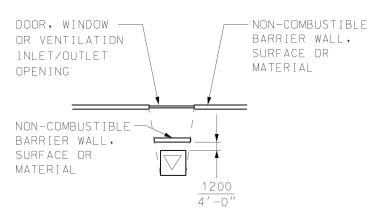


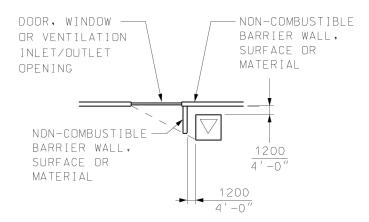
### **⚠ DETAIL 'A' - PLAN VIEW**

SEE NOTE 2A

### **▲ DETAIL 'B' - PLAN VIEW**

SEE NOTE 2B



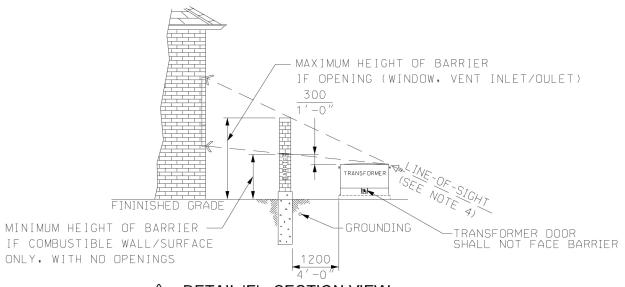


### **⚠** DETAIL 'C' - PLAN VIEW

SEE NOTE 2C

## **△** DETAIL 'D' - PLAN VIEW

SEE NDTE 2C

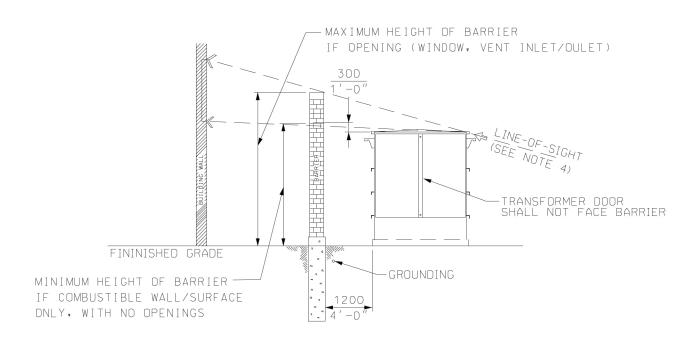


### **△** DETAIL 'E' - SECTION VIEW

SINGLE PHASE PADMOUNT TRANSFORMER, LINE OF SIGHT

DISTRIBUTION CONSTRUCTION STANDARD PADMOUNT TRANSFORMERS ◬ Civil Construction WITHOUT INTERNAL CURRENT LIMITING FUSE AND Approved By PRESSURE RELIEF DEVICE B.D. 2022-01-31 ⅓ TORONTO HYDRO Drafted By: Original Issue: Designed By: Scale: 1/2 31-4070 2004-11-30 N.T.S. B.D. G.D./L.G. J.D.

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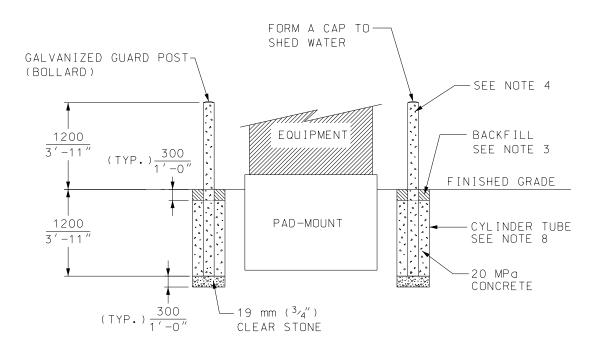
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THREE PHASE PADMOUNT TRANSFORMER, LINE OF SIGHT

#### NOTES:

- ♠ 1) PADMOUNT TRANSFORMERS WITH AN INTERNAL CURRENT LIMITING FUSE AND PRESSURE RELIEF DEVICE SHALL
  FOLLOW CLEARANCES AS SPECIFIED IN STD 31-4100. THIS SHALL APPLY TO ALL NEW PADMOUNT
  TRANSFORMERS.
- A 2) PADMOUNT TRANSFORMERS WITHOUT AN INTERNAL CURRENT LIMITING FUSE AND PRESSURE RELIEF DEVICE (WHICH INCLUDES ALL LEGACY PADMOUNT TRANSFORMERS) SHALL FOLLOW CLEARANCES AS SPECIFIED IN THIS STANDARD:
  - A) 6000 mm (20'-0") FROM ANY DOOR, WINDOW DR VENTILATION INLET/DUTLET OPENING, DR
  - B) 3000 mm (10'-0") FROM ANY COMBUSTIBLE WALL, SURFACE OR MATERIAL ON A BUILDING, OR
  - C) IF 3A AND 3B CANNOT BE MET, A BARRIER WITH NON-COMBUSTIBLE SURFACE OR MATERIAL IS CONSTRUCTED BETWEEN THE TRANSFORMER AND ANY DOOR, WINDOW, VENTILATION INLET/DUTLET OPENING.
- 🙆 3) NON-COMBUSTIBLE BARRIER SURFACE OR MATERIAL SHALL PROVIDE A MINIMUM OF 3 HOUR FIRE RATING,
- 4) NON-COMBUSTIBLE BARRIER SURFACE OR MATERIAL SHALL EXTEND TO A PROJECTION LINE FURTHEST FROM THE CORNER OF THE TRANSFORMER AS PER DETAILS 'E' AND 'F'.
- ⚠ 5) NON-COMBUSTIBLE BARRIER SHALL BE DESIGNED AND INSTALLED BY CUSTOMER.
- 🙆 6) NON-COMBUSTIBLE BARRIER WALL SHALL BE REINFORCED CONCRETE, BRICK OR CONCRETE BLOCK.
  - 7) REFERENCE RULE 26-242 ONTARIO ELECTRICAL SAFETY CODE.

	DISTRIBUTION CO Civil (	NSTRUCTION Construction	STANDARD		PADMOUN				ß
1		Approved By:		] <b>VVI</b> !	THOUT INTERNAL	. CURREI	N I LIMI	HNG FUSE AND	
i :	TORONTO	B.D. 2022	-01-31		PRESSL	IRE RELI	EF DEV	ICE	ß
í	HYDRO	Drafted By:	Designed By:	Original Issue:		Scale: F	Rev:	24.4070	2/2
)		J.D.	B.D.	G.D./I.G.	2004-11-30	N.T.S.	5	31- <del>4</del> 0/0	212

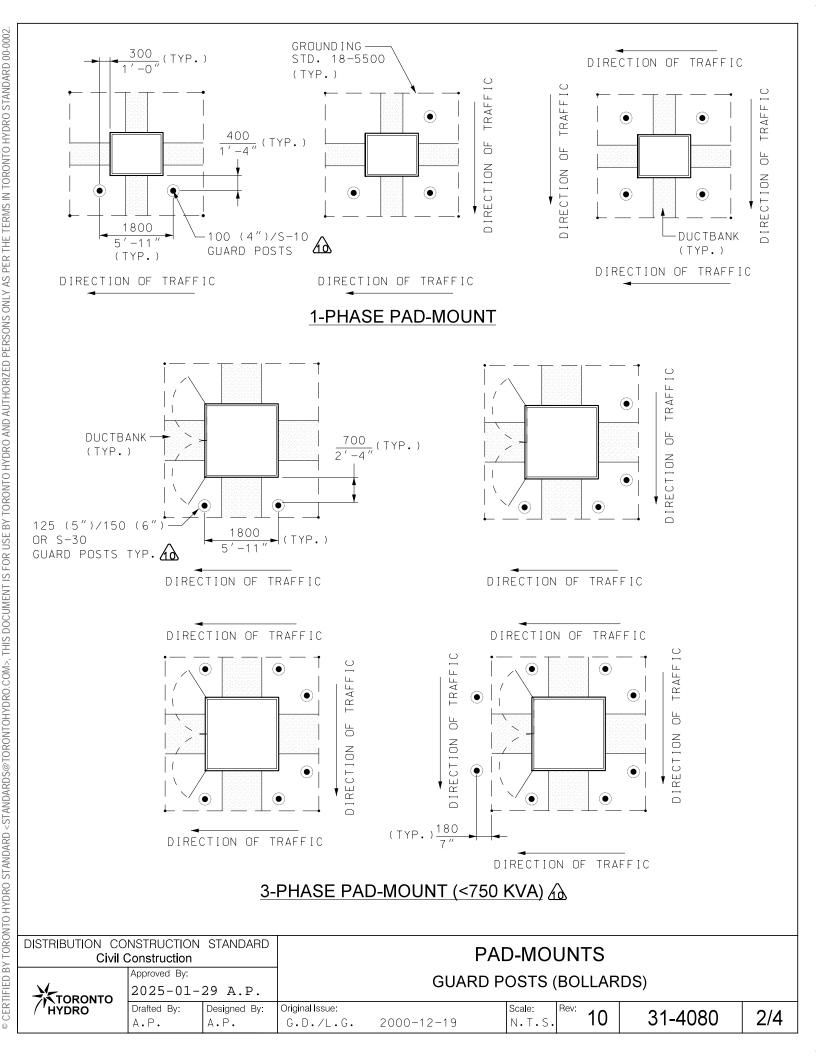


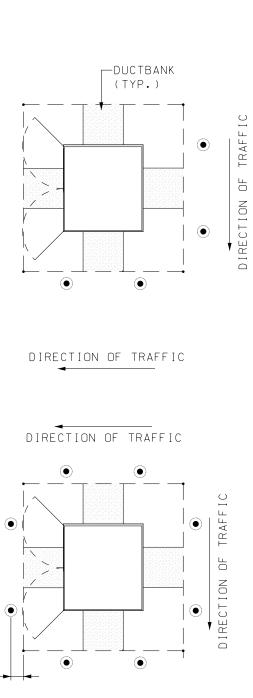
### PAD-MOUNT ELEVATION VIEW

#### NOTES:

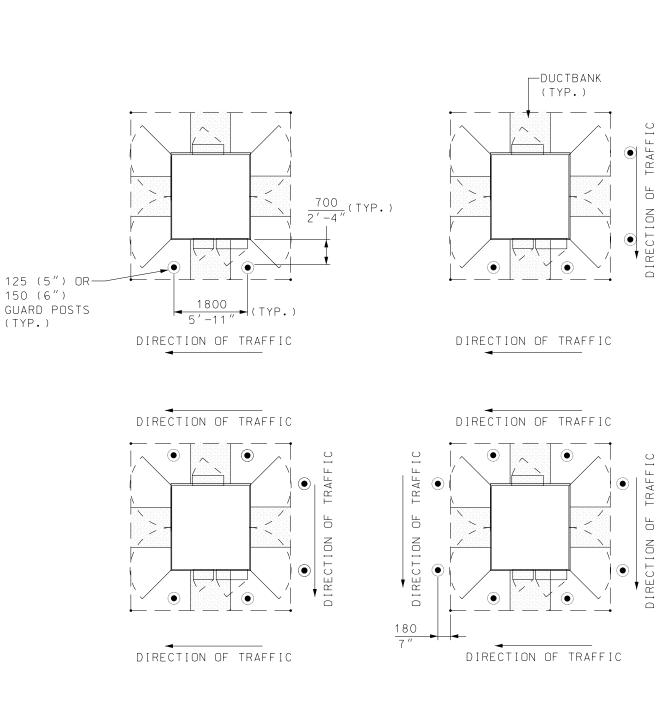
- 1) INSTALL GUARD POSTS (BOLLARDS) IF THE EQUIPMENT IS LESS THAN 1000 mm (3'-4") FROM THE CURB OR ANYWHERE TORONTO HYDRO DEEMS NECESSARY.
- 2) NUMBER OF GUARD POSTS AND LOCATIONS SHOWN ARE TYPICAL ARRANGEMENTS, ACTUAL NUMBER OF GUARD POSTS AND LOCATIONS SHALL BE DETERMINED BY TORONTO HYDRO DESIGNER OR INSPECTOR, USING THE FOLLOWING CRITERIA:
  - A) GUARD POST INSTALLATIONS SHALL ALLOW EQUIPMENT DOORS TO BE OPENED THROUGH THEIR FULL RANGE.
  - B) DISTANCE BETWEEN GUARD POSTS AND OUTSIDE EDGE OF THE PAD-MOUNT SHALL BE AS INDICATED IN THIS STANDARD UNLESS OTHERWISE NOTED.
  - C) GUARD POST INSTALLATIONS SHALL ALLOW TORONTO HYDRO PERSONNEL UNIMPEDED ACCESS TO THE EQUIPMENT.
  - D) THE MAX. DISTANCE BETWEEN TWO GUARD POSTS SHALL BE AS INDICATED IN THIS STANDARD.
- 3) BACKFILL REMAINING EXCAVATION AND COMPACT AS PER CIVIL SPECIFICATION CV-CON-01.
- 4) FILL GUARD POSTS WITH 20 MPa CONCRETE.
- 5) PAINT GUARD POST WITH SAFETY YELLOW PAINT, FOR PROPER ADHESION OF PAINT, GUARD POST SHALL BE CLEANED AND PRIMED PRIOR TO PAINTING. A REFLECTIVE STRIP IF REQUIRED SHALL BE PLACED AT EACH POST.
- 6) ALL GUARD POSTS SHALL BE GROUNDED. REFER TO STD. 18-5000 FOR GROUNDING DETAILS. REFER TO STANDARDS 31-4020, 31-4030, 31-4050 FOR PAD-MOUNT CIVIL DETAILS.
- 7) CONTRACTOR TO INSTALL A CONSTRUCTION JOINT AROUND THE GUARD POSTS EXCEPT IN GRASSY BOULEVARDS.
- 10 8) MIN. CYLINDER TUBE SIZES:
  - 200 mm (8") FOR 100 mm (4") AND 125 mm (5") GUARD POST
  - 250 mm (10") FOR 150 mm (6") GUARD POST
- 9) USE 100 mm (4") OR ASTM F3016 S-10 RATED REMOVABLE GUARD POSTS FOR 1-PHASE PADS AND 125 mm (5") /150 mm (6") OR ASTM F3016 RATED S-20 REMOVABLE GUARD POST FOR 3-PHASE AND SWITCHGEAR PADS.
- 10) REMOVABLE BOLLARD SHALL ONLY BE USED AT CUSTOMER FACING LOCATION WITH STANDARDS APPROVAL AND TORONTO HYDRO APPROVED PAD LOCK.

DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD		Р	AD-MOUNTS		
TORONTO	Approved By: 2025-01-	29 A.P.		GUARD	POSTS (BOLLA	RDS)	
HYDRO	Drafted By:	Designed By:	Original Issue:	2000-12-19	Scale: Rev: 10	31-4080	1/4

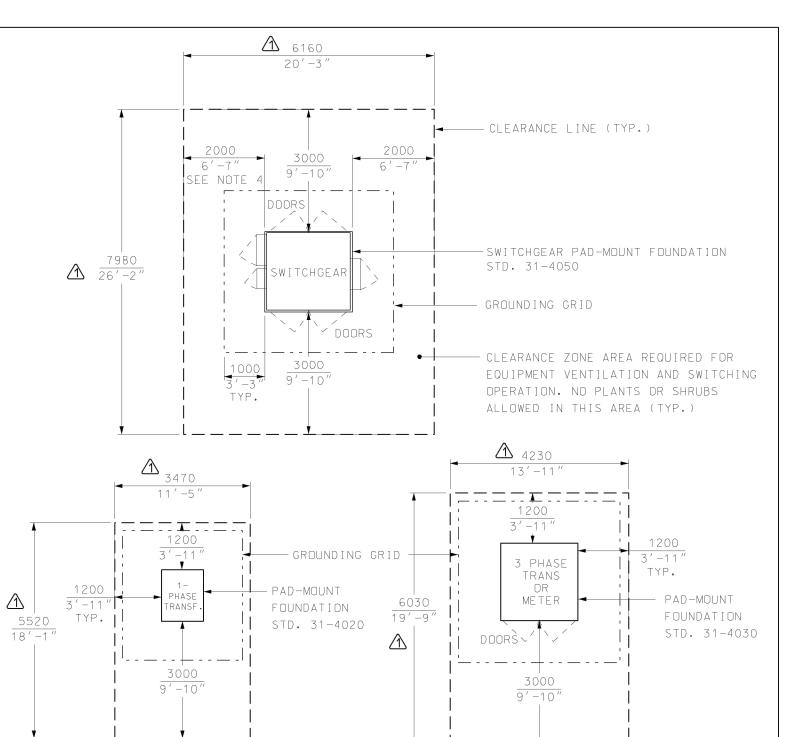




DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD		PAD-MOUNTS					
TORONTO	Approved By: 2025-01-	29 A.P.		GUARD P	OSTS (	BOLLAR	DS)		
Drafted By: Designed By: A.P. A.P.			Original Issue:	2000-12-19	Scale:	Rev: 10	31-4080	3/4	



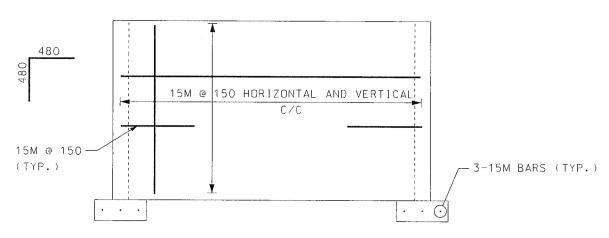
**GUARD POSTS (BOLLARDS)** 31-4080 4/4



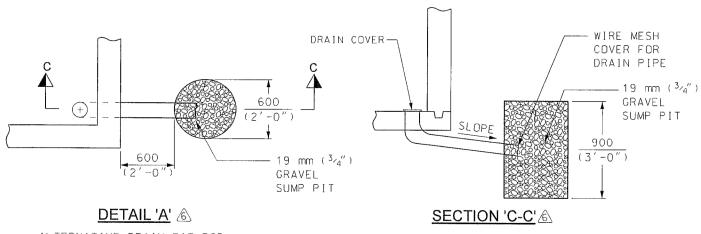
#### NOTES:

- 1) ANY AND ALL OBJECTS WITHIN THE CLEARANCE ZONE AREA, ARE SUBJECT TO REMOVAL WITHOUT ANY PRIOR NOTICE SHOULD OPERATIONAL OR EMERGENCY CONDITIONS EXIST.
- 2) TORONTO HYDRO SHALL NOT BE HELD RESPONSIBLE FOR ANY COSTS ASSOCIATED WITH THE REMOVAL OR RESULTING DAMAGE TO ANY OBJECTS WITHIN THE CLEARANCE ZONE AREA. THE DEVELOPER/OWNER ASSUMES ALL RESPONSIBILITY FOR ENCROACHING WITHIN THE CLEARANCE ZONE AREA.
- 3) FINAL FINISHED GRADE WITHIN CLEARANCE ZONE SHALL NOT BE ALTERED.
- 4) IN CASES WHERE THE DESIGN REQUIRES A VALUE LESS THAN THE SPECIFIED LIMITATION, CONTACT STANDARDS AND MATERIALS FOR APPROVAL PRIDR TO IMPLEMENTATION.
- 5) REFER TO STANDARD 31-4080 GUARD POSTS (BOLLARDS) PLACEMENT FOR DETAILS.
- ⚠ 6) REFER TO STANDARD 18-5500 FOR PAD-MOUNTED EQUIPMENT GROUNDING DETAILS.

DI	ISTRIBUTION CO Civil (	NSTRUCTION Construction	STANDARD	P	PAD-MOUNTS				
1-	TORONTO	Approved By:		CLI	EARANCE ZONE				
		Drafted By:	Designed By:	Original Issue: B.D. 2019-08-26	Scale: Rev: 1	31-4100	1/1		

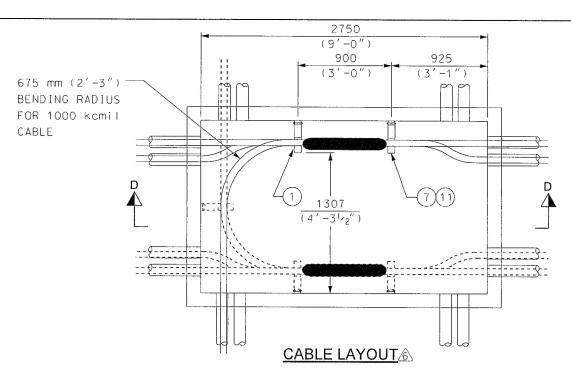


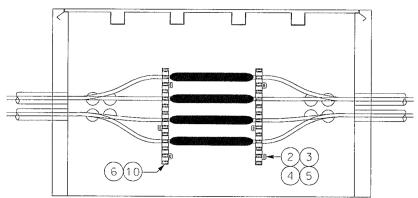
### PRECAST OPTION STRUCTURE REINFORCING DETAIL &



ALTERNATIVE DRAIN PIT FOR CAST-IN PLACE OPTION

DISTRIBUTION CC	NSTRUCTION Construction	STANDARD		SPLICE VAULT 'A' FOR 1000 kcmil CABLES					
TORONTO	Approved By:	2017/02/10		1625 mm (5					
/ HYDRO	Dhafted By: B.D.	Designed By: J.D.	Original Issue:	2003-05-30	Scale: N.T.S.	Rev: 6	31-5120	3/5	





## SECTION 'D-D' &

	BILL OF MATERIALS FOR 31-5120			
ITEM NO.	DESCRIPTION	ITEM I.D.	OTY	
1	TIE CABLE TY-RAP 14.6" LENGTH		2320047	6
2	ANCHOR DROP-IN FOR 1/2" BOLTS 2" LONG		2500018	6
3	BOLT MACHINE HEX 1/2" X 2" STAINLESS STEET	_	2550245	6
4	WASHER ROUND FOR 1/2" STAINLESS STEEL BOL	Т	2530036	6
5	WASHER LOCK 1/2" STAINLESS STEEL		2530128	6
6	CABLE RACK TYPE C	7360300	4 (	
7	CABLE ARM 2 WAY TYPE C		7340303	16
<b>*********</b>	ASSOCIATED STANDARDS	<b>******</b>	***************************************	
8	GROUNDING REQUIREMENTS S	TD.	18-5200	1
9	SPLICE VAULT COVER	TD.	31-8310	- 1
10	CABLE RACK S	TD.	31-8260	1
11	CABLE ARMS S	TD.	31-8270	1
12	SUPPORT OF CABLES ON CABLE ARMS S	TD.	16-4540	1
13	TYPICAL DRAIN CONNECTION TO SEWER S	TD.	31-7100	1

DISTRIBUTION CONSTRUCTION STANDARD SPLICE VAULT 'A' Civil Construction FOR 1000 kcmil CABLES Approved By: 1625 mm (5'-4") X 2750 mm (9'-0") 2017/02/10 TORONTO Designed By: Original Issue: Scale: 31-5120 4/5 B.D. J.D. G.D./C.P. 2003-05-30 N.T.S

#### NOTES:

#### GENERAL NOTES:

- 1) DESIGN IN ACCORDANCE WITH CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6-06, CL-625-ONT LIVE LOADING.
- 2) CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPg. CONCRETE PRODUCTION AND PLACEMENT SHALL CONFORM TO LATEST CSA-A23.1, ALL TESTING SHALL CONFORM TO LATEST CSA-A23.2. EXPOSURE CLASSIFICATION TO BE C-1 DUE TO EXPOSURE TO CHLORIDES WITH OR WITHOUT FREEZING AND THAWING CONDITIONS. ALL REINFORCING TO CONFORM TO LATEST CSA STANDARD G30.18, Fy = 400 MPg.
- 3) CONCRETE COVER SHALL BE:
  - A) BARS AT INSIDE FACES......40 mm (11/2")
  - B) BARS AT OUTSIDE FACES......50 mm (2")
  - C) CONCRETE PLACED AGAINST THE EARTH......75 mm (3")
- 4) ALL EXPOSED EDGES SHALL HAVE 25 mm CHAMFER.
- 5) EXCAVATION SHALL BE BACKFILLED WITH UNSHRINKABLE FILL TO WITHIN 300 mm (1'-0") FROM FINISHED GRADE.
- 6) BACKFILL THE REMAINING 300 mm (1'-0") TO FINISHED GRADE AS PER SPEC. #CV-CON-01 CLAUSE 5.1.17.
- 7) TORONTO HYDRO INSPECTOR SHALL BE PRESENT DURING THE INSTALLATION, 24-HOUR NOTICE IS REQUIRED PRIOR TO STARTING THE INSTALLATION.
- 8) FOR VEHICULAR TRAFFIC REFER TO GUARD POSTS (BOLLARDS) STD. 31-4080. LOCATION SHALL BE KEPT CLEAR OF OBSTRUCTIONS FOR ACCESS BY TORONTO HYDRO PERSONNEL AND EQUIPMENT.
- 9) SPLICE VAULT 'A' CAN BE USED TO ACCOMMODATE THE INSTALLATION OF 1000 kcmil Cables with the Following conditions:
  - EDGE OF DUCTS ENTER AND EXIT THE VAULT 150 mm (6") FROM THE ADJACENT WALL TO ELIMINATE THE INTRODUCTION OF BENDS IN THE CABLES,
  - NO LOOPING OF CABLES INSIDE THE VAULT,
  - SPLICES ARE DONE ALONG THE LONGER WALLS,
  - MAXIMUM OF TWO CIRCUITS.
- 10) ANY SOFT SPOTS ENCOUNTERED UNDER VAULT SHALL BE REMOVED AND FILLED WITH MASS CONCRETE OF 15 MPg MINIMUM STRENGTH TO UNDERSIDE OF FLOOR SLAB. IF NOT ENCOUNTERED, PLACE 150 mm (6") GRANULAR "A" BEDDING AND COMPACT TO 95% STANDARD PROCTOR DENSITY.
- 11) DO NOT PLACE FLOOR SLAB IN FROZEN GROUND.
- 12) STRUCTURAL STEEL SHALL CONFORM TO CSA STANDARD G40.21 LATEST EDITION GRADE 300W.
- 13) ALL EXPOSED STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED AS PER CSA SEC. G164 LATEST EDITION.
- 14) UNUSED CABLE ENTRY DUCTS SHALL BE PLUGGED WITH DUCT PLUGS AND PARGED PRIOR TO BACKFILLING.

#### CAST-IN-PLACE OPTION:

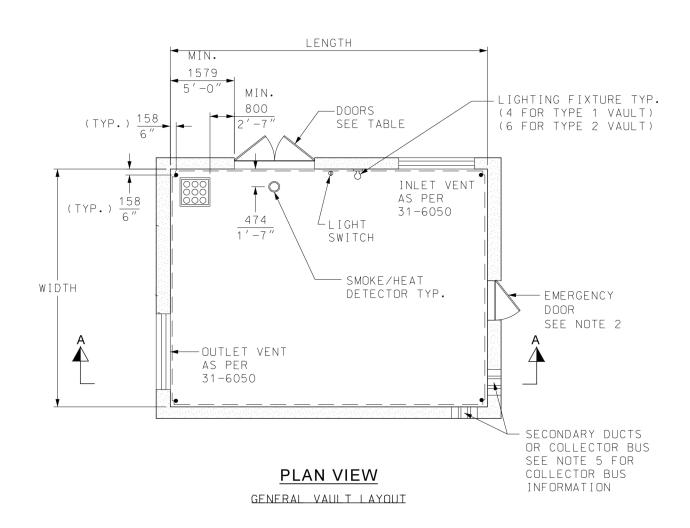
- 15) VAULT SHALL BE DRAINED AS FOLLOWS:
  - OPTION 1 DRAIN INTO CITY'S SEWERS AS PER STD. 31-7100.
  - OPTION 2 DRAIN INTO A TO GRAVEL SUMP PIT AS SHOWN IN THIS STANDARD.
- 16) LOCATION OF DRAIN PIPE SHALL BE DETERMINED AS PER PROJECT'S SITE CONDITIONS.

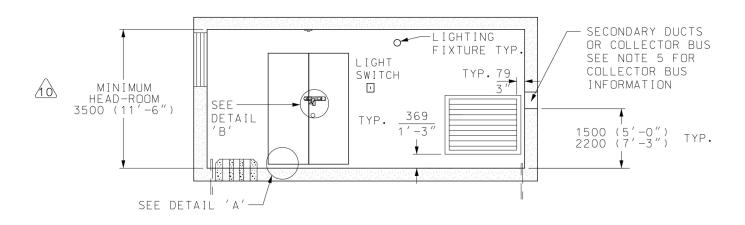
#### PRECAST OPTION:

- 17) MANUFACTURER SHALL ADD DATE OF MANUFACTURE STAMP ON ALL PRECAST UNITS.
- 18) PROVIDE 90° STANDARD HOOK FOR WALL HORIZONTAL REINFORCING BARS.
- 19) LIFTING HOLES CAN BE INSTALLED IN FOUNDATION WALLS FOR MANUFACTURER'S LIFTING PREFERENCE.
- 20) 4-LIFTING ANCHORS FOR LIFTING PURPOSES BY OTHERS SHALL BE PROVIDED ON THE INSIDE OF ALL FOUNDATION WALLS AND ON TOP OF STRIP FOOTING AS SHOWN IN THIS STANDARD. LIFTING ANCHORS SHALL BE GALVANIZED. LIFTING ANCHORS SHALL BE CAPABLE OF LIFTING THE PRECAST UNITS.
- 21) CONTRACTOR TO PLUG ALL HOLES (LIFTING AND GROUNDING) AND PARGED PRIOR TO BACKFILLING.
- 22) PRECAST UNITS ARE DELIVERED BY CRANE-EQUIPPED TRUCKS, EXCAVATION MUST BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK. MINIMUM OVERHEAD CLEARANCE OF 5500 mm (18'-0") IS REQUIRED. CONTRACTOR SHALL ASSIST SUPPLIER IN LOWERING THE PRECAST UNITS INTO EXCAVATION.

DISTRIBUTION CO Civil (	NSTRUCTION Construction	STANDARD	SPLICE VAULT 'A' FOR 1000 kcmil CABLES							
TORONTO	-	2017/02/10		S (9'-0")						
/ HYDRO	Drafted By: B.D.	Designed By:	Original Issue: G.D./C.P.	2   24 E420   E1						

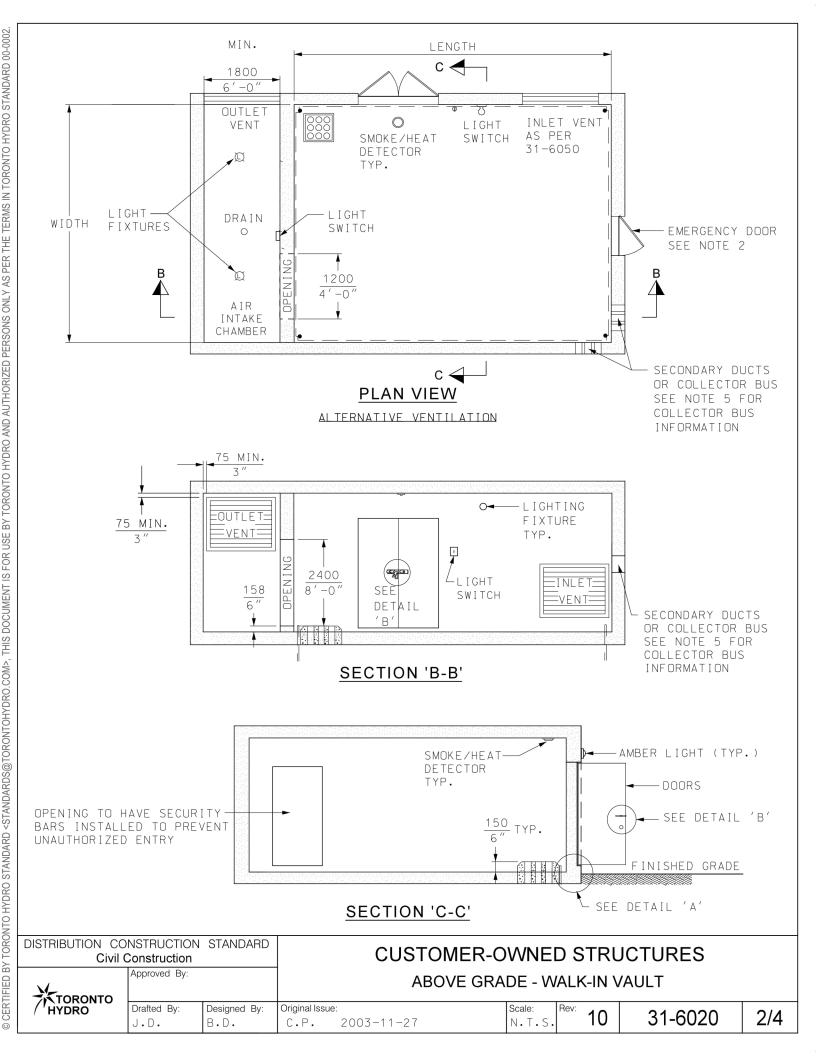
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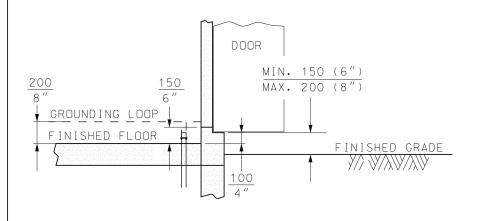


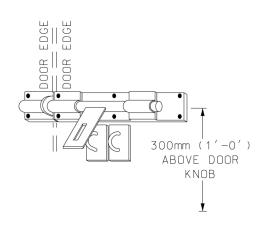


SECTION 'A-A'

DISTRIBUTION CC Civil (	Construction	STANDARD		CUSTOMER-OWNED STRUCTURES						
TORONTO	Approved By:			ABOVE GRADE - WALK-IN VAULT						
HYDRO	Drafted By:	Designed By:	Original Issue	e: 2003-11-27	Scale: N.T.S.	Rev: 10	31-6020	1/4		







DETAIL 'A'
DOOR AND GROUNDING DETAIL

DETAIL 'B'

DOOR PAD BOLT

250 mm (10") BOLT

		ABOVE GI	RADE - WALK-IN	VAULT SIZES	
TYPE	TX. RATING	LENGTH	WIDTH	DOORS	ELECTRICAL EQUIPMENT
1	UP TO 2000 KVA	8000 (26′-3″)	6000 (19′-8″)	1200×2400 HIGH (4′×8′)	REFER TO SECTION 13
2	2500 - 4000 kVA	10000 (32′-0″)	8000 (26′-3″)	1200×3000 HIGH (4′×10′)	STANDARDS FOR DETAILS

	ABOVE GRADE - WALK-IN VAULT MIN. LOADING (SUSPENDED SLAB)											
TYPE	TX. RATING	ROOM AREA	10	* DEAD LOAD (APPROXIMATE)	10	LIVE LOAD						
1	UP TO 2000 KVA	48 m²	10	17,110 kg		REFER TO						
2	2500 - 4000 KVA	80 m²	10	30,200 kg		O BUILDING CODE FOR DETAILS						

\* DEAD LOAD = TOTAL AGGREGATE WEIGHT OF ELECTRICAL EQUIPMENT X 1.2 SAFETY FACTOR (ELECTRICAL EQUIPMENT = TRANSFORMERS WITH OR WITHOUT PROTECTORS)

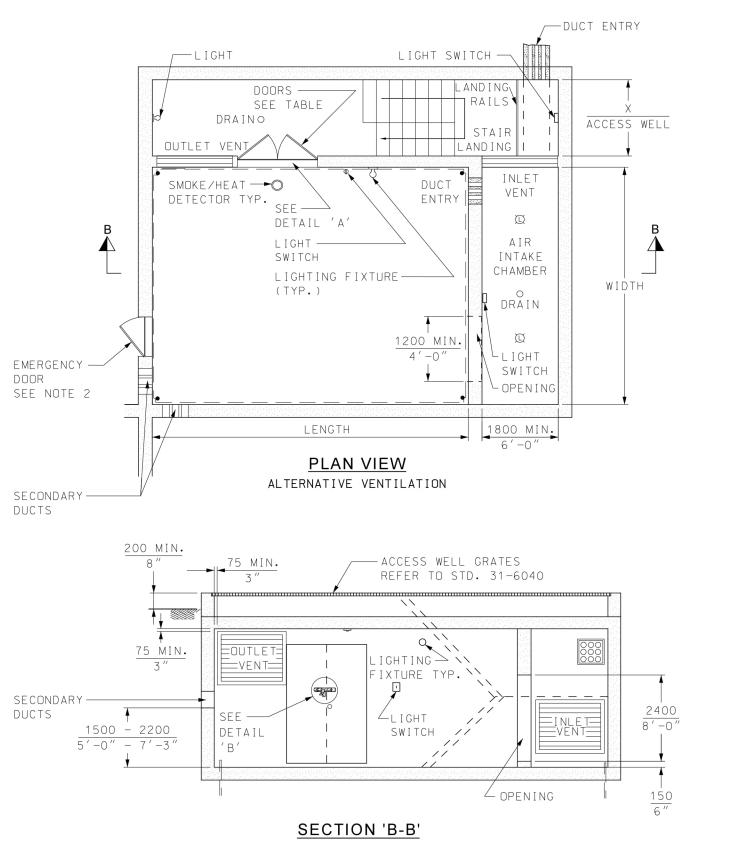
DISTRIBUTION CO	NSTRUCTION Construction	STANDARD		CUSTOMER-C	WNE	D STRU	JCTURES	
TORONTO	Approved By:			ABOVE GRA	DE - W	ALK-IN \	/AULT	
HYDRO	Drafted By:	Designed By: B.D.	Original Issu	e: 2003-11-27	Scale: N.T.S.	Rev: 10	31-6020	3/4

# NOTES:

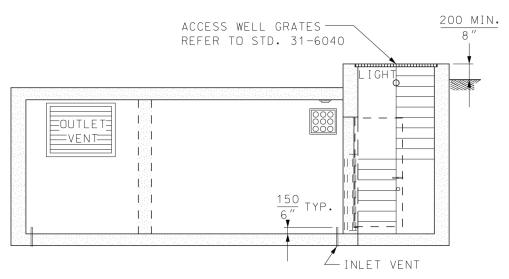
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- 1) THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE LATEST REVISION OF TORONTO HYDRO REQUIREMENTS FOR THE DESIGN AND CONSTRUCTION OF CUSTOMER-OWNED STRUCTURES DOCUMENT CONDITION OF SERVICE REF. 5.
- 2) EMERGENCY DOOR IS REQUIRED IN NEW TRANSFORMER VAULTS, LOCATION OF WHICH SHALL BE APPROVED BY TORONTO HYDRO REPRESENTATIVE. EMERGENCY DOOR SHALL HAVE PANIC HARDWARE INSTALLED TO ALLOW DOOR TO OPEN FROM THE INSIDE. THERE SHALL BE NO METHOD OF OPENING AN EMERGENCY DOOR FROM THE OUTSIDE.
- 3) LOCATION OF ELECTRICAL LIGHT FIXTURE CAN BE INSTALLED AS SHOWN OR AN ALTERNATE LOCATION CAN BE CHOSEN PROVIDED ADEQUATE SPACE AND CLEARANCE IS PROVIDED TO ALLOW FOR PROPER OPERATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT.
- 4) DOORS, LOUVER, SECURITY BARS AND ANY METAL PRODUCT SHALL BE GROUNDED BY CONNECTING 2/0 FLEX STRANDED COPPER TO THE GROUNDING LOOP, CONNECTION SHALL BE BY USING PARALLEL GROOVE CLAMPS AND GROUNDING LUG.
- 5) FOR ADJACENT ELECTRICAL ROOMS, COLLECTOR BUSES OR BUS STUBS CAN BE INSTALLED INSTEAD OF DUCTS AT A MINIMUM HEIGHT OF 2134 mm (7'-0") ABOVE FINISHED FLOOR WITH 600 mm (1'-115/8") CLEARANCE ON EITHER SIDE TO ALLOW PROPER TERMINATION OF CABLES, COLLECTOR BUS TO BE INSTALLED AS PER SECTION 13 AND ALLOW PROPER UNHINDERED OPERATION AND ACCESS OF EQUIPMENT, SEE STD. 15-1500 FOR COLLECTOR BUS DETAILS.
- 6) FOR SUSPENDED SLAB DESIGN, DEFINED LOAD CAPACITY IS TO BE A MINIMUM. THE VAULT DESIGN MUST COMPLY WITH THE MOST RECENT VERSION OF THE ONTARIO BUILDING CODE (OBC) AND BE SEALED BY A PROFESSIONAL ENGINEER OF ONTARIO. INCREASED CAPACITY MAY BE REQUIRED DEPENDING ON EXTERNAL FACTORS OR JOINT USE EQUIPMENT ROOMS.
- 7) ALL LISTED KVA RATINGS ARE AGGREGATED.
- 8) SAFETY FACTOR (S.F.) OF 1.2 SHALL BE ASSUMED IN THE DEAD LOAD CALCULATIONS
- 9) FOR SCENARIOS WITH TRANSFORMER CAPACITY GREATER THAN 4 MVA, CUSTOMER TO ATTAIN EQUIPMENT SHOP DRAWINGS AND DETERMINE THE REQUIRED LOADING OUTSIDE OF THE LISTED REQUIREMENTS.
- 10) GROUND RODS SHALL BE A MINIMUM 3000 mm (10'-0") APART.

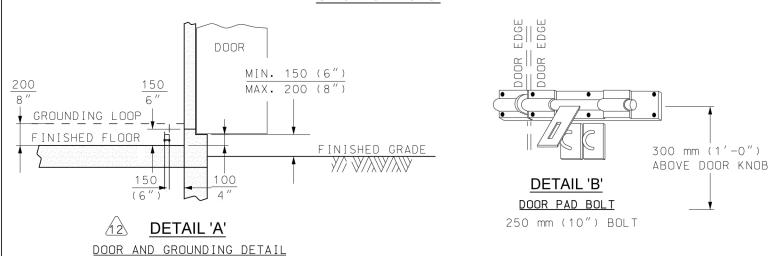
DISTRIBUTION CC	NSTRUCTION Construction	STANDARD		CUSTOMER	-OWNE	D STRU	JCTURES	
TORONTO	Approved By:			ABOVE G	RADE - W	ALK-IN V	/AULT	
HYDRO	Drafted By:	Designed By:	Original Issu	e: 2003-11-27	Scale: N.T.S.	Rev: 10	31-6020	4/4



**CUSTOMER-OWNED STRUCTURES** BELOW-GRADE WALK-IN VAULT 12 31-6030 2/4



# SECTION 'C-C'



	ABOVE GRADE - WALK-IN VAULT SIZES												
TYPE	TX. RATING	LENGTH	WIDTH	ACCESS WELL	DOORS	ELECTRICAL EQUIPMENT							
1	UP TO 2000 KVA	8000 (26′-3″)	6000 (19′-8″)	1900 (6′-3″)	1200×2400 HIGH (4′×8′)	REFER TO SECTION 13							
2	2500 - 4000 kVA	10000 (32′-0″)	8000 (26′-3″)	3000 (10'-0")	1200×3000 HIGH (4'×10')	STANDARDS FOR DETAILS							

	ABOVE GRADE - WALK-IN VAULT MIN. LOADING (SUSPENDED SLAB)											
TYPE	TX. RATING	12 LIVE LOAD										
1	UP TO 2000 KVA	48 m²	12	17,110 kg	REFER TO							
2	2500 - 4000 KVA	80 m²	12	30,200 kg	ONATRIO BUILDING CODE FOR DETAILS							

\* DEAD LOAD = TOTAL AGGREGATE WEIGHT OF ELECTRICAL EQUIPMENT X 1.2 SAFETY FACTOR (ELECTRICAL EQUIPMENT = TRANSFORMERS WITH OR WITHOUT PROTECTORS)

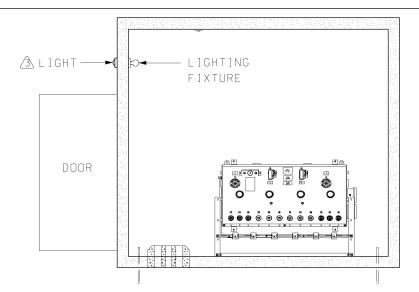
DISTRIBUTION CC Civil (	NSTRUCTION  Construction	STANDARD		CUSTOMER-OWNED STRUCTURES				
TORONTO	Approved By:			BELOW-GRADE WALK-IN VAULT				
HYDRO	Drafted By: B • D •	Designed By: B • D •	Original Issue	e: 2003-11-27	Scale: N.T.S. Rev: 12	31-6030	3/4	

# 7 <u>.</u>

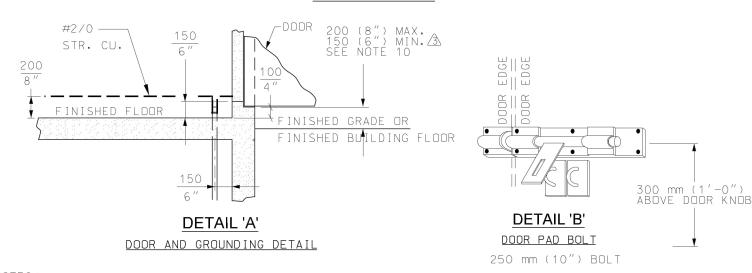
### NOTES:

- 1) THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE LATEST REVISION OF TORONTO HYDRO REQUIREMENTS FOR THE DESIGN AND CONSTRUCTION OF CUSTOMER-OWNED STRUCTURES DOCUMENT CONDITION OF SERVICE REF. 5.
- 2) EMERGENCY DOOR IS REQUIRED IN NEW TRANSFORMER VAULTS, LOCATION OF WHICH SHALL BE APPROVED BY TORONTO HYDRO REPRESENTATIVE. EMERGENCY DOOR SHALL HAVE PANIC HARDWARE INSTALLED TO ALLOW DOOR TO OPEN FROM THE INSIDE. THERE SHALL BE NO METHOD OF OPENING AN EMERGENCY DOOR FROM THE OUTSIDE.
- 3) LOCATION OF ELECTRICAL LIGHT FIXTURE CAN BE INSTALLED AS SHOWN OR AN ALTERNATE LOCATION CAN BE CHOSEN PROVIDED ADEQUATE SPACE AND CLEARANCE IS PROVIDED TO ALLOW FOR PROPER OPERATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT.
- 4) DOORS, LOUVER, SECURITY BARS AND ANY METAL PRODUCT SHALL BE GROUNDED BY CONNECTING 2/O FLEX STRANDED COPPER TO THE GROUNDING LOOP. CONNECTION SHALL BE BY USING PARALLEL GROOVE CLAMPS AND GROUNDING LUG.
- 5) FOR ADJACENT ELECTRICAL ROOMS, COLLECTOR BUSES OR BUS STUBS CAN BE INSTALLED INSTEAD OF DUCTS AT A MINIMUM HEIGHT OF 2134 mm (7'-0") ABOVE FINISHED FLOOR WITH 600 mm (1'-115/8") CLEARANCE ON EITHER SIDE TO ALLOW PROPER TERMINATION OF CABLES. COLLECTOR BUS TO BE INSTALLED AS PER SECTION 13 AND ALLOW PROPER UNHINDERED OPERATION AND ACCESS OF EQUIPMENT. SEE STD. 15-1500 FOR COLLECTOR BUS DETAILS.
- 6) FOR SUSPENDED SLAB DESIGN, DEFINED LOAD CAPACITY IS TO BE A MINIMUM, THE VAULT DESIGN MUST COMPLY WITH THE MOST RECENT VERSION OF THE ONTARIO BUILDING CODE (OBC) AND BE SEALED BY A PROFESSIONAL ENGINEER OF ONTARIO. INCREASED CAPACITY MAY BE REQUIRED DEPENDING ON EXTERNAL FACTORS OR JOINT USE EQUIPMENT ROOMS.
- 7) ALL LISTED KVA RATINGS ARE AGGREGATED.
- 8) SAFETY FACTOR (S.F.) OF 1.2 SHALL BE ASSUMED IN THE DEAD LOAD CALCULATIONS
- 9) FOR SCENARIOS WITH TRANSFORMER CAPACITY GREATER THAN 4 MVA, CUSTOMER TO ATTAIN EQUIPMENT SHOP DRAWINGS AND DETERMINE THE REQUIRED LOADING OUTSIDE OF THE LISTED REQUIREMENTS.
- 12 10) GROUND RODS SHALL BE A MINIMUM 3000 mm (10'-0") APART.

DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD		CUSTOMER-OWNED STRUCTURES				
TORONTO	Approved By:			BELOV	V-GRADE V	VALK-IN \	<b>VAULT</b>	
	Drafted By: B.D.	Designed By: B.D.	Original Issue	e: 2003-11-27	Scale: N.T.S	. Rev: 12	31-6030	4/4



### SECTION 'B-B'

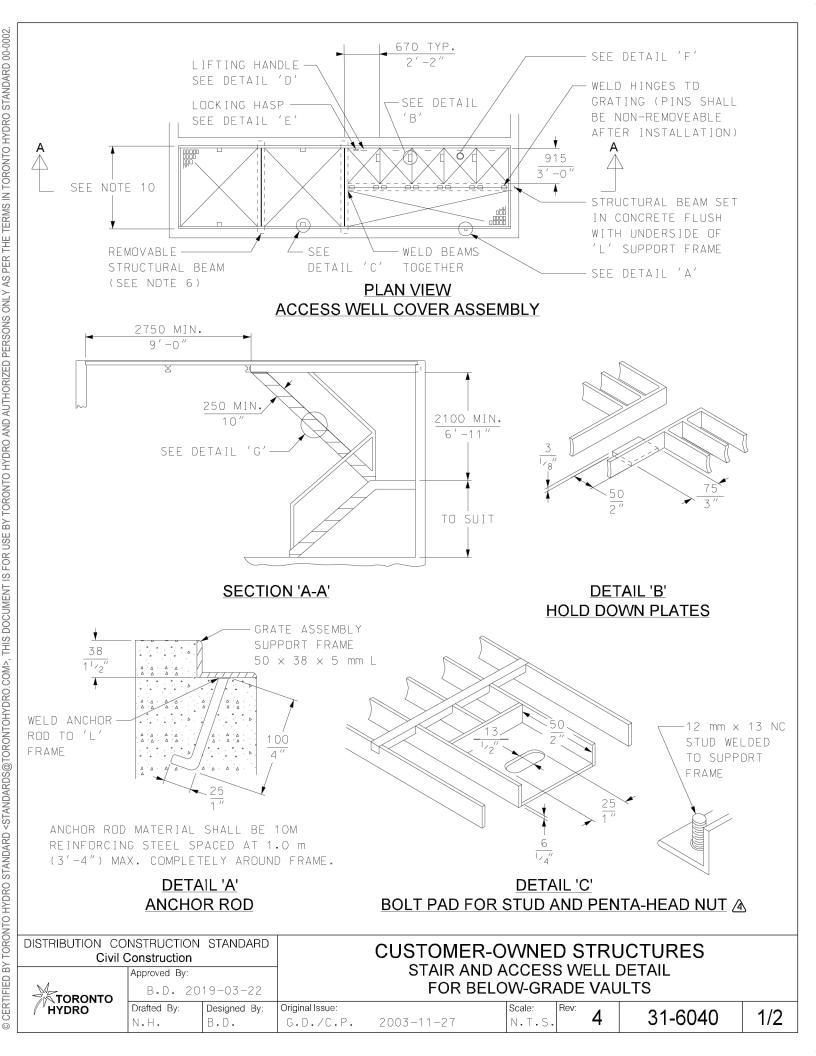


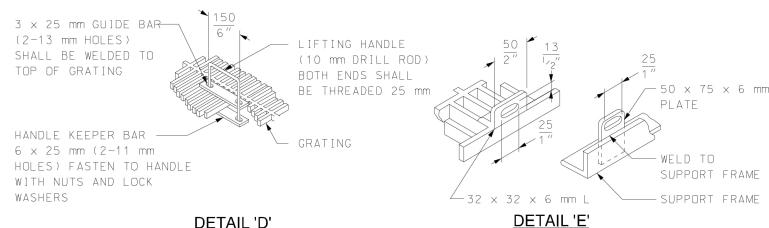
### NOTES:

- 1) THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE TORONTO HYDRO REQUIREMENTS FOR THE DESIGN AND CONSTRUCTION OF CUSTOMER-OWNED STRUCTURES DOCUMENT.
- 2) LIGHTING SHALL BE INSTALLED AS PER CUSTOMER-OWNED STRUCTURES DOCUMENT, LIGHTING SHALL BE LOCATED SO THAT THERE IS ADEQUATE SPACE FOR THE RELAMPING OR MAINTENANCE.
- 3) LOCATION OF ELECTRICAL EQUIPMENT CAN BE INSTALLED AS SHOWN OR AN ALTERNATE LOCATION CAN BE CHOSEN PROVIDED ADEQUATE SPACE AND CLEARANCE IS PROVIDED TO ALLOW FOR PROPER OPERATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT. REFER TO STD. 13-7840 FOR SWITCH DIMENSIONS.
- 4) LOCATION OF INCOMING AND DUTGOING CONDUIT ONLY SHOWN FOR GUIDELINE PURPOSES.
- 5) SWITCH VAULTS DO NOT REQUIRE VENTILATION.
- 6) REFER TO STD, 31-6040 FOR BELOW GRADE VAULT STAIR AND ACCESS WELL DETAILS,
- 7) IF REQUIRED, AN EMERGENCY DOOR CAN BE INSTALLED WITH APPROVAL FROM TORONTO HYDRO.
- 8) EMERGENCY DOOR SHALL HAVE PANIC HARDWARE INSTALLED TO ALLOW DOOR TO OPEN FROM THE INSIDE. THERE SHALL BE NO METHOD OF OPENING AN EMERGENCY DOOR FROM THE OUTSIDE.
- 9) DOORS, LOUVER, SECURITY BARS AND ANY METAL PRODUCT SHALL BE GROUNDED BY CONNECTING #2/O FLEX STRANDED COPPER TO THE GROUNDING LOOP, CONNECTION SHALL BE BY USING PARALLEL GROOVE CLAMPS AND GROUNDING LUG.
- ⚠10)HEIGHT DF CURB AT EXTERIOR THRESHOLD DF DOOR SHALL BE MINIMUM 150 mm (6") AND MAXIMUM 200 mm (8") WHEN FACING EXTERIOR FINISHED GRADE. IF VAULT EXIT IS WITHIN BUILDING, MINIMUM 100 mm (4")

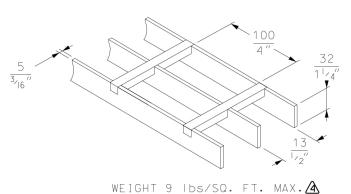
  CURB SHALL BE MAINTAINED.

DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD	CUSTOMER-C	WNE	D STF	RUC	CTURES	
TORONTO	Approved By: B.D. 202	0-09-25	ABOVE-GRADE WALK-IN OF	R BELO	W GR	ADE	SWITCHING V	AULT
HYDRO	Drafted By:	Designed By:	Original Issue:	Scale:	Rev: 3		31-6035	2/2

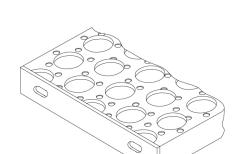




# <u>DETAIL 'D'</u> GRATE LIFTING HANDLE



<u>DETAIL 'F'</u> TYPICAL GRATING



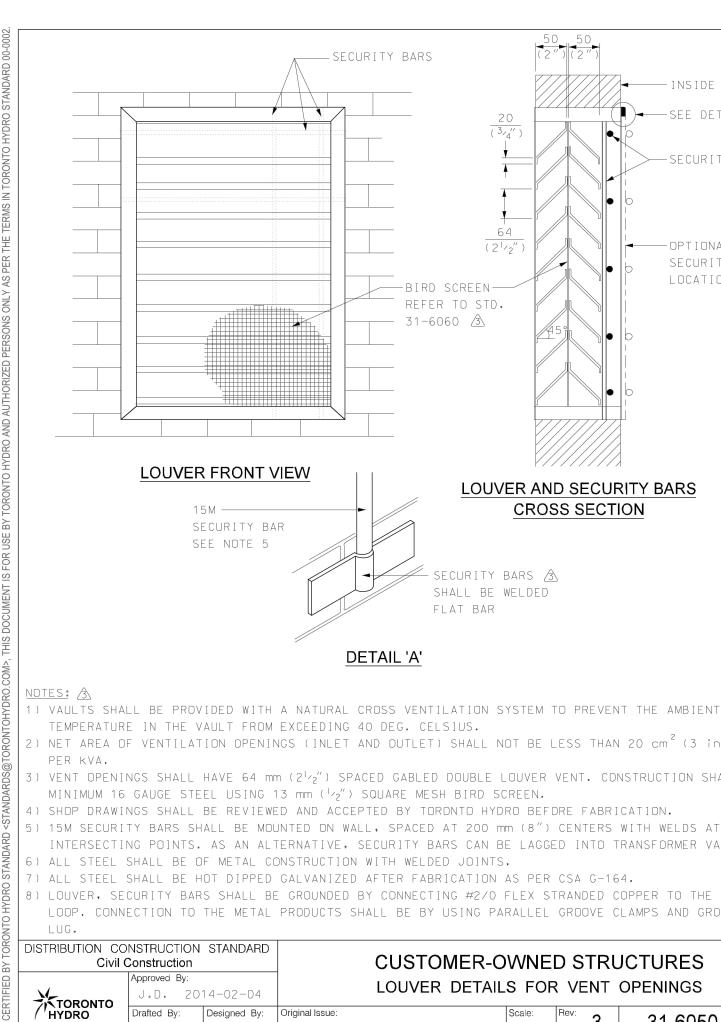
TYPICAL GRATE LOCKING HASP

<u>DETAIL 'G'</u> SAFETY GRIP STAIR TREAD

### NOTES:

- A 1) ACCESS WELL COVER (GRATINGS AND BEAMS) SHOWN IN THIS STANDARD ARE FOR TYPICAL VAULTS LOCATED IN PEDESTRIAN TRAFFIC DNLY, CUSTOMER'S ENGINEER SHALL BE RESPONSIBLE FOR DESIGN OF OVERALL COVER (GRATINGS AND BEAMS) BASED ON VAULT LOCATION AND LOADING REQUIREMENTS, ALL SHOP DRAWINGS SHALL BE STAMPED BY CUSTOMER'S ENGINEER OR MANUFACTURER PRIOR TO BEING ACCEPTED BY TORONTO HYDRO FOR INSTALLATION.
  - 2) ALL METAL COMPONENTS SHALL BE HOT DIPPED GALVANIZED AS PER CSA G-164. CLEANED, PRIMED AND PAINTED AFTER WELDING.
- ⚠ 3) ACCESS WELL SHALL BE COMPLETE WITH STANDARD GRATING TYPE 'BB-6' AS MANUFACTURED BY BORDEN METAL PRODUCTS AS APPROVED EQUIVALENT.
  - 4) LOCKING HASPS FOR GRATING SHALL BE SUPPLIED BY DWNER AS PER DIAGRAM, LOCKS SHALL BE SUPPLIED BY TORONTO HYDRO.
  - 5) PENTA-HEAD NUTS ARE REQUIRED FOR GRATING.
  - 6) BEAM SHALL BE SEATED IN A SUITABLE SADDLE (METAL OR CONCRETE) WITH NO FASTENING DEVICES (BOLTS).
- A 7) CUSTOMER'S ENGINEER SHALL BE RESPONSIBLE FOR DESIGN OF STAIRS, HANDRAIL AND GUARDS AS PER
  ONTARIO BUILDING CODE REQUIREMENTS FOR AN EXIT STAIR.
  - 8) STAIRS, HANDRAIL AND GUARDS SHALL BE OF ALL METAL CONSTRUCTION WITH WELDED JOINTS AND SHALL BE HOT DIPPED GALVANIZED AS PER CSA SPEC. G-164.
  - 9) STAIR TREADS AND LANDING SHALL BE AMICO-ISG SAFETY GRIP GRATING OR APPROVED EQUIVALENT.
  - 10) REFER TO STD. 31-6030 FOR ACCESS WELL DETAILS, WIDTH OF GRATING SHALL SUIT THE WIDTH OF ACCESS WELL.
  - 11) ALL GRATINGS SHALL BE BOLTED DOWN.

### DISTRIBUTION CONSTRUCTION STANDARD CUSTOMER-OWNED STRUCTURES Civil Construction STAIR AND ACCESS WELL DETAIL Approved By FOR BELOW-GRADE VAULTS B.D. 2019-03-22 TORONTO HYDRO Drafted By: Designed By: Original Issue: Scale: 31-6040 2/2 N.T.S N.H. B.D. G.D./C.P. 2003-11-27



- 1) VAULTS SHALL BE PROVIDED WITH A NATURAL CROSS VENTILATION SYSTEM TO PREVENT THE AMBIENT
- 2) NET AREA OF VENTILATION OPENINGS (INLET AND DUTLET) SHALL NOT BE LESS THAN 20 cm2 (3 in2)
- 3) VENT OPENINGS SHALL HAVE 64 mm (21/2") SPACED GABLED DOUBLE LOUVER VENT, CONSTRUCTION SHALL BE OF

-INSIDE WALL FACE

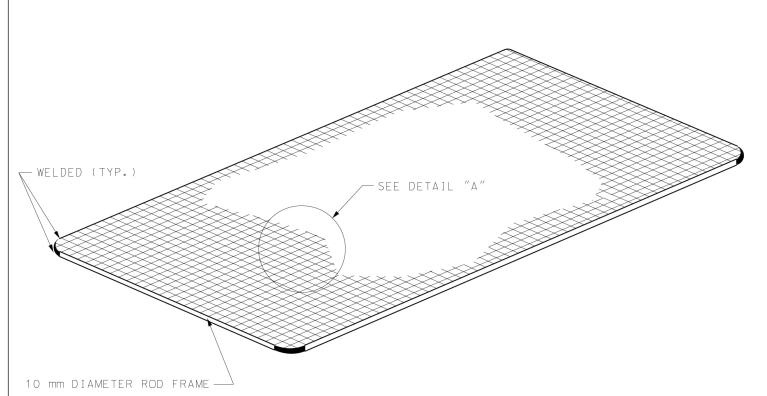
SEE DETAIL 'A'

SECURITY BARS

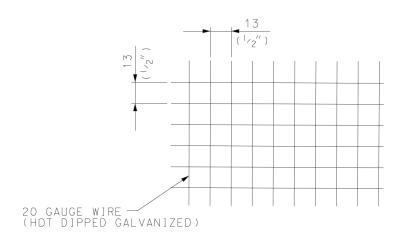
OPTIONAL SECURITY BAR LOCATION

- INTERSECTING POINTS. AS AN ALTERNATIVE, SECURITY BARS CAN BE LAGGED INTO TRANSFORMER VAULT WALL.
- 8) LOUVER, SECURITY BARS SHALL BE GROUNDED BY CONNECTING #2/O FLEX STRANDED COPPER TO THE GROUNDING LOOP, CONNECTION TO THE METAL PRODUCTS SHALL BE BY USING PARALLEL GROOVE CLAMPS AND GROUNDING LUG.

DISTRIBUTION CO Civil (	NSTRUCTION Construction	STANDARD		CUSTOMER-O	WNED STRU	JCTURES	
TORONTO	Approved By:	14-02-04		LOUVER DETAILS	S FOR VENT	OPENINGS	
HYDRO	Drafted By:	Designed By:	Original Issue		Scale: Rev: 3	31-6050	1/1



# ISOMETRIC VIEW



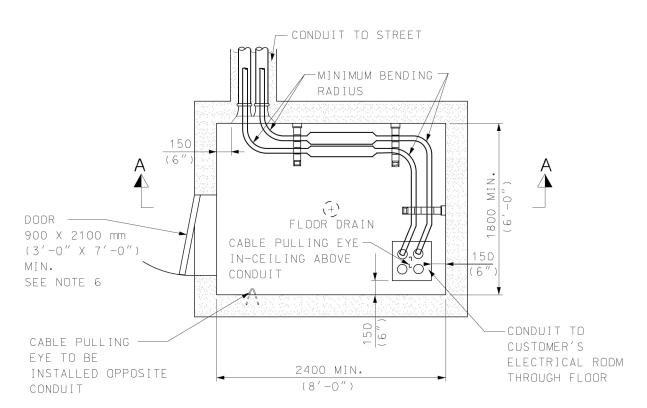
DETAIL "A"

13 mm (1/2") WELDED WIRE MESH

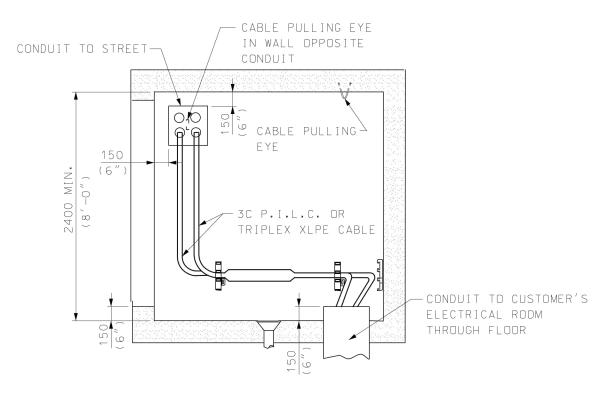
### NOTES: 2

- 1) BIRD SCREEN TO BE OF METAL CONSTRUCTION WITH WELDED JOINTS.
- 2) BIRD SCREEN AND ALL MOUNTING TO BE HOT DIPPED GALVANIZED AFTER FABRICATION AS PER CSA G-164.
- 3) SHOP DRAWINGS MUST BE REVIEWED AND ACCEPTED BY TORONTO HYDRO BEFORE FABRICATION.

[	DISTRIBUTION CO Civil (	NSTRUCTION Construction	STANDARD		CUSTON	IER-OWNED S	TRU	JCTURES	
	S. /	Approved By:	3-02-12		E	BIRD SCREEN DE	TAIL	S	
	HYDRO	Drafted By:	Designed By:	Original Issu	e: 2003-11-27	Scale: Rev: N.T.S.	2	31-6060	1/1

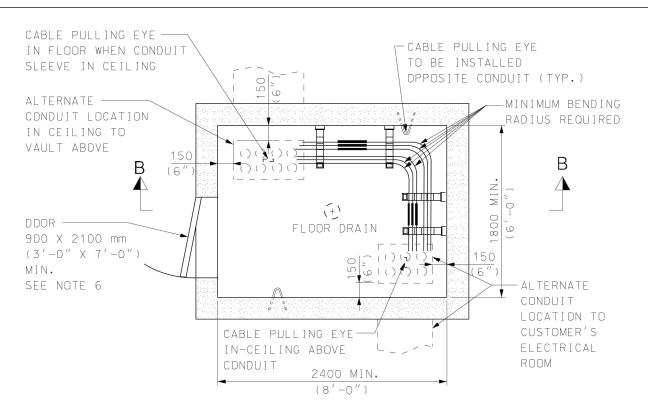


# PLAN VIEW ROOM FOR HIGH-VOLTAGE CABLES

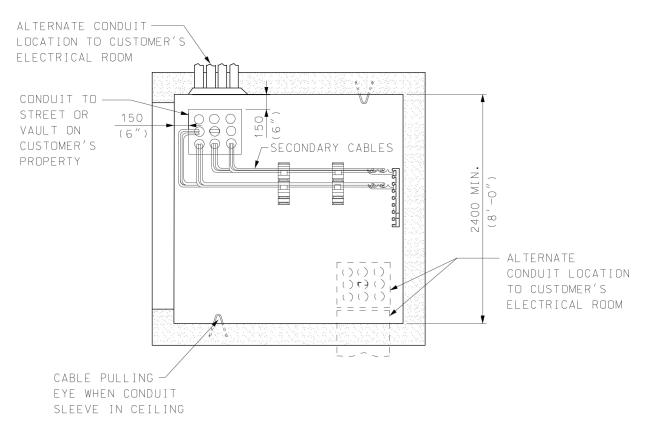


SECTION "A-A"

	NSTRUCTION Construction	STANDARD		CUSTOMER-				
TORONTO	Approved By: J.D. 201	3-02-11	TYPICAL	• • • • • •	LE PULL R OF HIGH AN		S W VOLTAGE CAI	BLES
HYDRO	Drafted By:	Designed By:	Original Issue:	2004-07-30	Scale: Rev:	3	31-6070	1/3



# PLAN VIEW ROOM FOR LOW-VOLTAGE CABLES



### SECTION "B-B"

DISTRIBUTION CO	NSTRUCTION Construction	STANDARD		CUSTOMER-C					
	Approved By:		CABLE PULL ROOMS						
TORONTO	J.D. 201	3-02-11	TYPICAL	INSTALLATION O	F HIGH A	AND LO	W VOLTAGE CAI	BLES	
HYDRO	Drafted By:	Designed By:	Original Issue:		Scale: F	Rev:	24 6070	2/2	
	D.I.	LJ.D.	G.D./C.P.	2004-07-30	N.T.S.	J	31-6070	L 2/3	

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### NOTES: 3

- 1) WHEN HIGH VOLTAGE PRIMARY CABLES OR LOW VOLTAGE SECONDARY CABLES ARE ROUTED THROUGH THE CABLE PULL ROOM, THE FOLLOWING POINTS ARE TO BE CONSIDERED IN DETERMINING THE CONSTRUCTION REQUIREMENTS AND GENERAL LAYDUT:
  - A) IN ALL CASES, IT SHALL BE POSSIBLE TO MAKE CABLE JOINTS IN THE ROOM.
  - B) JOINTS IN CABLE SHALL BE HORIZONTAL.
  - C) THE WALL ON WHICH THE CABLE JOINT IS TO BE RACKED SHALL BE LONG ENOUGH TO ACCOMMODATE THE JOINT AND TWO CABLE BENDS. THE CABLE JOINT MUST BE AT LEAST 300 mm (1'-0'') FROM THE FLOOR.
- 2) THE WALLS OF THE ROOM SHALL BE AT LEAST 2400 mm (8'-0") LONG AND 1800 mm (6'-0") WIDE, AND THE MINIMUM HEADROOM SHALL BE 2400 mm (8'-0"). LARGER DIMENSIONS ARE REQUIRED WHEN:

  A) STEPS, RAILINGS, COLUMNS ARE LOCATED IN THE "CLEAR" WORKING AREA.
  - B) MORE THAN 2 CIRCUITS ARE INSTALLED.
  - C) CONDUITS ARE LOCATED SUCH THAT THE CABLES SHALL ENCIRCLE THE PULL ROOM, HEADROOM DIMENSIONS TO INCREASE IN SUCH CASES.
- 3) CABLE PULLING EYES ARE TO BE INSTALLED AND LOCATED AS PER STD. 31-8210.
- 4) THE CONDUIT ENTRANCES SHALL BE LOCATED NEAR THE CORNERS OF THE ROOM AND BE AS FAR APART AS POSSIBLE AND SHALL BE OFFSET FROM EACH OTHER. ALSO, THE DUCTS THAT GO TO THE STREET MUST SLOPE AWAY FROM THE PULL ROOM.
- 5) LIGHTING AND DRAINAGE MUST BE PROVIDED BY THE CUSTOMER, LIGHT TO BE LOCATED IN THE CENTER OF ROOM.
- 6) PULL ROOM TO BE EQUIPPED WITH A DOOR AND FRAME HAVING A FIRE RATING OF 1.5 HOURS.
- 7) WHERE POSSIBLE, THE DOORWAY SHALL BE LOCATED OPPOSITE A DUCT FACE AND POSITIONED SO THAT IT DOES NOT INTERFERE WITH JOINTING OR CABLE INSTALLATION.
- 8) PADLOCK HASP TO BE PROVIDED FOR DOOR (OR PROVISION FOR TORONTO HYDRO CYLINDER LOCK 29 mm (1'- $^{1}$ / $_{4}$ ") DIAMETER CYLINDER).
- 9) NO FOREIGN EQUIPMENT OR PIPES ARE ALLOWED IN THE PULL ROOM.
- 10) CABLE RACKS AND ARMS WILL BE SUPPLIED AND INSTALLED BY TORONTO HYDRO AND CHARGED TO THE CUSTOMER.
- 11) 24 HR. ACCESS IS REQUIRED.
- 12) THE ABOVE REQUIREMENTS ARE TO BE SHOWN ON THE CUSTOMER'S DRAWINGS FOR TORONTO HYDRO'S REVIEW AND ACCEPTANCE.

DISTRIBUTION	CONSTRUCTION	STANDARD
С	ivil Construction	
	Approved By:	

J.D.

TORONTO HYDRO CUSTOMER-OWNED STRUCTURES

CABLE PULL ROOMS

TYPICAL INSTALLATION OF HIGH AND LOW VOLTAGE CABLES

Drafted By: Designed By: J.D.

2013-02-11

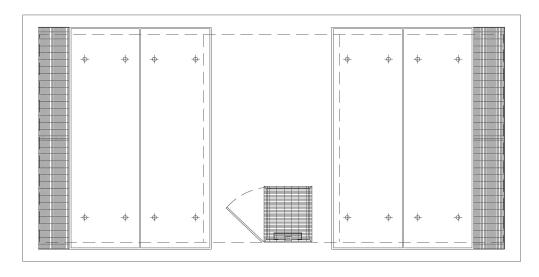
Original Issue:

2004-07-30

Scale: Rev:

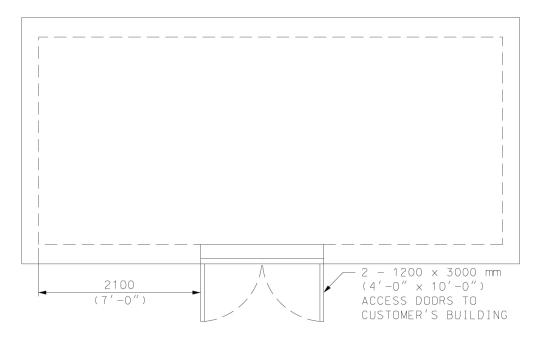
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31-6070



### △ BELOW GRADE - TOP ENTRY

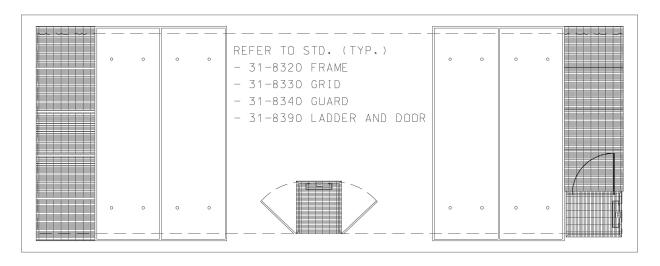
13-2010 - 4.16 kV (MAX. 3 - 167 kVA TRANSFORMERS) ELECTRICAL EQUIPMENT LAYOUT
13-4020 - 13.8 kV COMPACT RADIAL (MAX. 1000 kVA TRANSFORMER) ELECTRICAL EQUIPMENT LAYOUT
13-4040 - 13.8 kV COMPACT LOOP (MAX. 1000 kVA TRANSFORMER) ELECTRICAL EQUIPMENT LAYOUT
31-5110 - CIVIL STRUCTURE (PROPOSED) - 3000 x 6700 x 3660 mm (10'-0" x 22'-0" x 12'-0")
31-5170 - CIVIL STRUCTURE (EXISTING) - 2290 x 6400 x 3660 mm (7'-6" x 21'-0" x 12'-0")



# ABOVE GRADE - WALK-IN

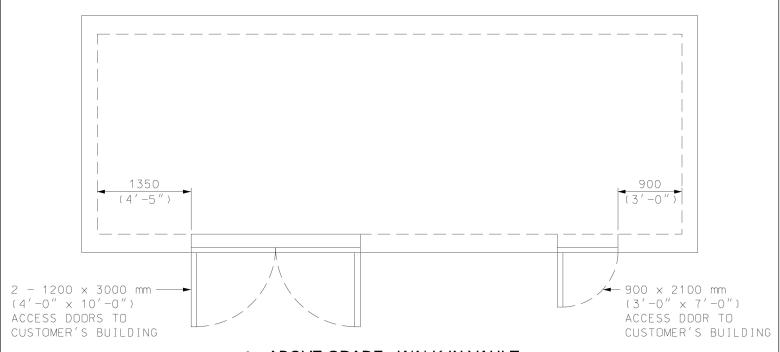
13-2010 - 4.16 kV (MAX, 3 - 167 kVA TRANSFORMERS) ELECTRICAL EQUIPMENT LAYOUT
13-4040 - 13.8 kV COMPACT LOOP (MAX, 2000 kVA TRANSFORMER) ELECTRICAL EQUIPMENT LAYOUT
CIVIL STRUCTURE - 3000 x 7300 x 3660 mm (10'-0" x 24'-0" x 12'-0")

57 10	Civil (	Construction	STANDARD		CUSTOMER-O	WNE	D STRU	JCTURES	4
KIIFIEUI	TORONTO	Approved By:	)14-02-04		4.16 kV - 13.8 kV	TRANS	SFORME	R VAULTS	
© CER	HYDRO	Drafted By:	Designed By:	Original Issue:	2003-11-27	Scale: N.T.S.	Rev: 4	31-6080	1/3



## **BELOW GRADE - TOP ENTRY**

13-4010 - 13.8 kV RADIAL (MAX. 2500 kVA TRANSFORMER) ELECTRICAL EQUIPMENT LAYOUT CIVIL STRUCTURE -  $3000 \times 8530 \times 3660 \text{ mm} (10'-0" \times 28'-0" \times 12'-0")$ 



### ABOVE GRADE - WALK-IN VAULT

13-4010 - 13.8 kV RADIAL (MAX. 2500 kVA TRANSFORMER) ELECTRICAL EQUIPMENT LAYOUT 13-5010 - 13.8 kV NETWORK (MAX. 2000 kVA TRANSFORMERS) CIVIL STRUCTURE - 3000  $\times$  8530  $\times$  3660 mm (10'-0"  $\times$  28'-0"  $\times$  12'-0")

C.P./G.D

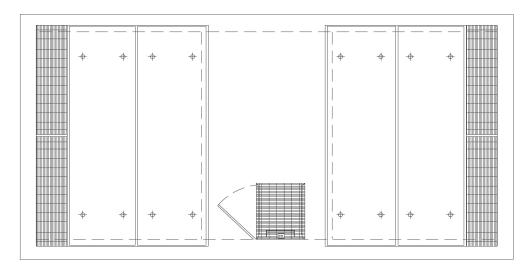
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J.D.

DISTRIBUTION CC	NSTRUCTION Construction	STANDARD		CUSTOMER-0	OWNE	D STRU	JCTURES	4
TORONTO	Approved By:	14-02-04		4.16 kV - 13.8 k\	/ TRAN	SFORME	R VAULTS	
HYDRO	Drafted By:	Designed By:	Original Issue:	2003-11-27	Scale:	Rev: 4	31-6080	2/3

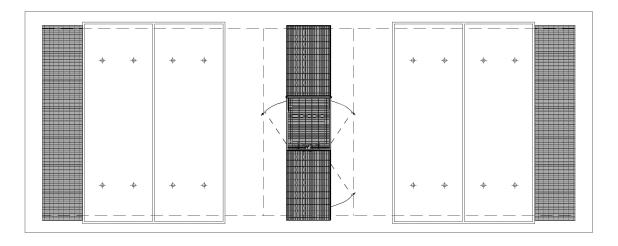
2003-11-27

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# BELOW GRADE - TOP ENTRY

13-5010 - 13.8 kV NETWORK (MAX. 2000 kVA TRANSFORMERS) ELECTRICAL EQUIPMENT LAYOUT 31-5180 - MAX. 750 kVA TRANSFORMERS - 2290  $\times$  6700  $\times$  3660 mm (7'-6"  $\times$  22'-0"  $\times$  12'-0")



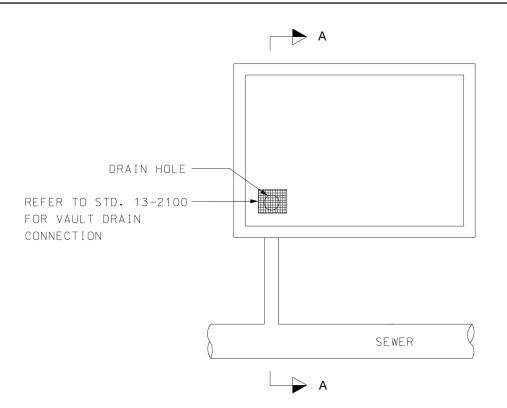
### BELOW GRADE - TOP ENTRY

13-5010 - 13.8 kV NETWORK (MAX. 2000 kVA TRANSFORMERS) ELECTRICAL EQUIPMENT LAYOUT 31-5130 - MAX. 2000 kVA TRANSFORMERS - 3000  $\times$  8530  $\times$  3660 mm (10'-0"  $\times$  28'-0"  $\times$  12'-0")

### NOTE:

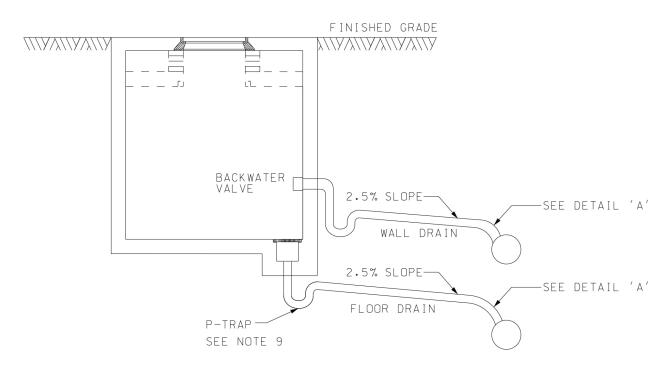
1) THIS DRAWING SHALL BE READ IN CONJUNCTION WITH STD. 31-6000 AND STD. 31-6010.

	DISTRIBUTION CONSTRUCTION STANDARD  Civil Construction			CUSTOMER-OWNED STRUCTURES					
TORONTO	Approved By:	)14-02-04		4.16 kV - 13.8 kV	TRANSFORME	R VAULTS			
HYDRO	Drafted By:	Designed By:	Original Issue:	2003-11-27	Scale: Rev: 4	31-6080	3/3		



# <u>PLAN VIEW</u>

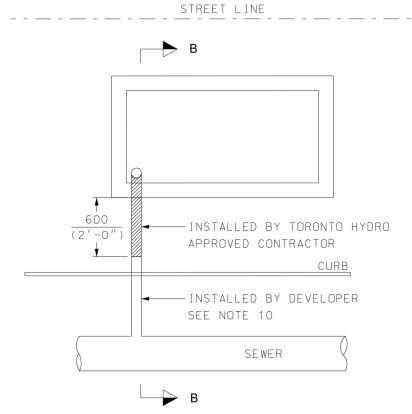
# CABLE CHAMBERS AND TRANSFORMER VAULTS DRAIN CONNECTION TO SEWER



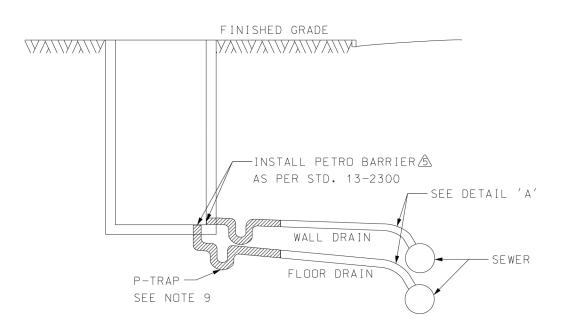
SECTION 'A-A'

ONLY 1 DRAIN SHALL BE INSTALLED

DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD			DRAININ	C STRUC	CTUDE	:c	
TORONTO	Approved By: J.D. 2018	-03-07			DRAININ	G STRUC	CIUKE	.5	
HYDRO	Drafted By:	Designed By:	Original Issue	: 2007-10-19		Scale: Rev	<sup>v:</sup> 5	31-7100	1/5

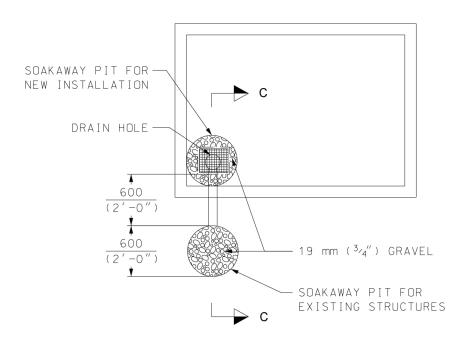


PLAN VIEW
SUBMERSIBLE VAULTS DRAIN CONNECTION TO SEWER



SECTION 'B-B'
ONLY 1 DRAIN SHALL BE INSTALLED

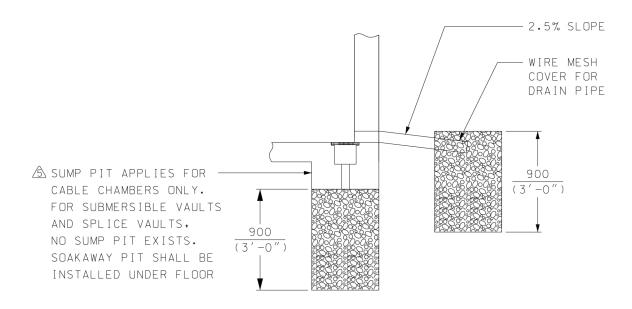
DISTRIBUTION CO	NSTRUCTION Construction	STANDARD			DDAININ	IC STD	LICTLI	<u> </u>	C	
TORONTO	Approved By: J.D. 2018	-03-07			DRAININ	IG STR	UCTU	ベヒ	5	
HYDRO	Drafted By: B • D •	Designed By:	Original Issue	2007-10-19		Scale: N.T.S.	Rev: 5		31-7100	2/5



PLAN VIEW

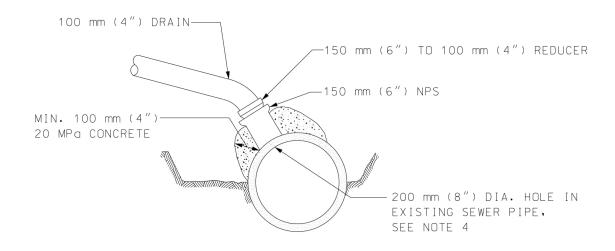
SOAKAWAY PIT CONNECTION FOR CABLE CHAMBERS.

SPLICE VAULTS AND SUBMERSIBLE VAULTS



SECTION 'C-C'
ONLY 1 DRAIN SHALL BE INSTALLED

DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD			DRAININ	C STDII	ICTUDE	:c	
TORONTO	Approved By: J.D. 2018-03-07				DRAININ	GSIKU	CIUKE	:5	
HYDRO	Drafted By:	Designed By:	Original Issue	: 2007-10-19		Scale: Re	ev: 5	31-7100	3/5



# **DETAIL 'A'**

	* DRAIN CONNECTION TO SEWE	R OPTIONS		
STRUCTURE	OPTION 1	OPTION 2	COMMENTS	
CABLE CHAMBERS	STORM SEWER OR COMBINED SEWER			
SWITCHING VAULTS	WHEN STORM SEWER NOT PRESENT	SEE NOTE 13	NOT REQUIRED	
TRANSFORMER VAULTS	STORM SEWER OR COMBINED SEWER	SANITARY SEWER		
SUBMERSIBLE VAULTS	WHEN STORM SEWER NOT PRESENT	SEE NOTE 13	REQUIRED	

\* SEE NOTE 15

<u>\$</u>

	DRAINAGE ORDE	R OF PRIORITY 1	. 2. AND 3	
	NETWORK/URD/ CRD VAULT			
DRAIN TO SEWER	1	1	1	1
SOAKAWAY PIT (NO SEWER CONNECTION)	2	2	2	_
NO DRAIN PROVISION	3	3	_	_

		Construction	STANDARD			DDAININ	NG STRUC	TLIDE	:c	
וו ה	TORONTO	Approved By: J.D. 2018	-03-07			DRAININ	NG STRUC	IUKE	-5	
	HYDRO	Drafted By: B • D •	Designed By:	Original Issue	: 2007-10-19		Scale: Rev: N.T.S.	5	31-7100	4/5

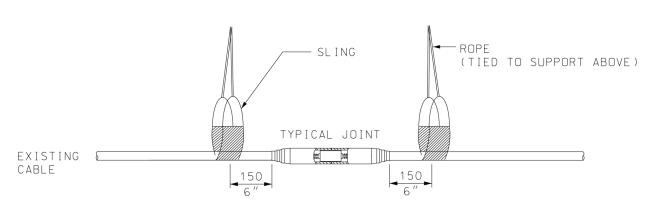
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### NOTES

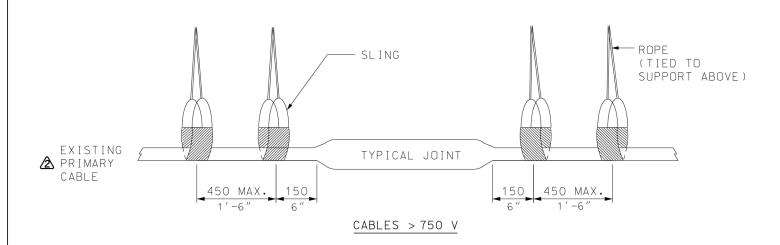
- 1) DRAIN CONNECTION TO SEWER IS THE PREFERRED OPTION AS PER TABLE SHOWN ABOVE.
- (A3) FOR CABLE CHAMBERS AND SPLICE VAULTS, IF SEWER CONNECTIONS AND SOAKAWAY PITS ARE NOT FEASIBLE, STRUCTURES SHALL BE CONSTRUCTED WITHOUT DRAINAGE PROVISION.
  - 4) SEWER CONNECTIONS FROM TORONTO HYDRO STRUCTURE TO CITY SEWERS SHALL BE 150 mm (6") NPS IN SIZE WITH A 150 (6") X 100 mm (4") REDUCER CONNECTION TO 100 mm (4") DRAIN. THE SEWER CONNECTIONS SHALL BE DRILLED OR CORED, NOT MANUALLY BROKEN WITH HAMMER AND CHISEL. SEWER CONNECTIONS SHALL NOT BE MADE DIRECTLY UNDERNEATH ANY DUCT RUN. NO HORIZONTAL BENDS IN THE DRAIN LINE ARE ALLOWED.
  - 5) ALL DRAIN LENGTHS, BENDS AND COUPLINGS SHALL BE 100 mm (4") DIA. METER PVC.
  - 6) IN A SUBMERSIBLE VAULT, FLOOR DRAIN CONNECTION IS PREFERRED. IF THE SEWER IS AT A HIGHER ELEVATION, DRAIN CAN BE INSTALLED IN WALL. DRAIN SHALL BE LOCATED IN THE SECONDARY CABLES COMPARTMENT ONLY. SEE NOTES 10 AND 11.
  - 7) ENTIRE DRAIN LENGTH SHALL BE INSTALLED ON BEDDING OF 75 mm (3") OF GRANULAR 'A' MATERIAL.
  - 8) ALL CONNECTIONS TO SEWERS SHALL BE INSTALLED TO CITY OF TORONTO STANDARDS AND APPROVED ON SITE BY THE AUTHORIZED REPRESENTATIVE OF THE CITY OF TORONTO.
  - 9) P-TRAPS WITH 90° ELBOWS ARE REQUIRED FOR EVERY DRAIN TO SEWER CONNECTION AND SHALL BE AT LEAST 100 mm (4") NPS, PVC.
  - 10) IN NEW DEVELOPMENTS, DEVELOPER SHALL INSTALL 100 mm (4") DRAIN PIPE FROM SEWER AND TO TERMINATE PIPE 600 mm (2'-0") FROM SUBMERSIBLE VAULT WALL AND TO PLACE A CAP AND MARKER POST FOR FUTURE CONNECTION.
  - 11) IN NEW DEVELOPMENTS, DEVELOPER SHALL INSTALL THE SEWER PIPE AT A REQUIRED DEPTH SO THAT THE PROPOSED DRAIN FROM TORONTO HYDRO STRUCTURE TO THE SEWER WILL HAVE A 2.5% SLOPE.
  - 12) 100 mm (4") PVC BACKWATER OR CHECK VALVES SHALL BE INSTALLED IN ALL VAULTS AND CABLE CHAMBERS WHENEVER THE WALL DRAINPIPE CONNECTION IS AT OR ABOVE THE CHAMBER FLOOR.

    THE VALVES SHALL BE POSITIONED VERTICALLY ABOVE THE CHAMBER OR VAULT SUMP PIT IN THE WALL ON THE SIDE OF THE CONNECTING DRAIN TO THE CITY SEWER.
  - 13) THE VALVE SHALL BE A MINIMUM OF 450 mm (1'-6") AND A MAXIMUM OF 1500 mm (4'-11") ABOVE THE FLOOR, BUT NEVER HIGHER THAN THE INVERT LEVEL OF THE LOWEST DUCT ENTERING THE VALUE OR CHAMBER. THE VALVE SHALL BE IN GOOD WORKING CONDITION WHEN INSTALLED.
- △ 14) APPLICATIONS FOR DRAIN CONNECTION TO SEWER (OPTION 1 OR 2) SHALL BE APPROVED BY CITY OF TORONTO ENVIRONMENTAL MONITORING AND PROTECTION (EM&P) DESIGNATED STAFF. EM&P REVIEW WILL INCUR EXTRA TIME FOR APPROVAL BASED ON THE COMPLEXITY AND SIZE OF THE PROPOSED INFASTRUCTURE.
  - 15) CONNECTION TO ANY SEWER SYSTEM:
    - THE JOINING OF ANY DUCT BANK, WHICH DRAIN TO A VAULT, WILL BE EXECUTED IN ACCORDANCE TO THE MANUFACTURER'S RECOMENDATIONS TO ACHIEVE WATER TIGHTNESS USING MECHANICAL COUPLINGS, GLUED CONNECTIONS, OR OTHER BEST AVAILABLE TECHNOLOGIES.

DISTRIBUTION CO	NSTRUCTION Construction	STANDARD				IO OTD	LICTUDE	-0	
TORONTO	Approved By: J.D. 2018	-03-07		DRAINING STRUCTURES					
HYDRO	Drafted By: B • D •	Designed By:	Original Issue	: 2007-10-19		Scale: N.T.S.	Rev: 5	31-7100	5/5



# <u>△ CABLES</u> < 750 V OR FIBRE COMMUNICATION </p>



_	<u> </u>											
	BOM LEGEND											
	Α	CABLE	SLINGS	TO	SUPPORT	CABLES	>750	V				
	В	CABLE	SLINGS	TO	SUPPORT	CABLES	<750	V	OR	FIBRE	COMMUNICATION	

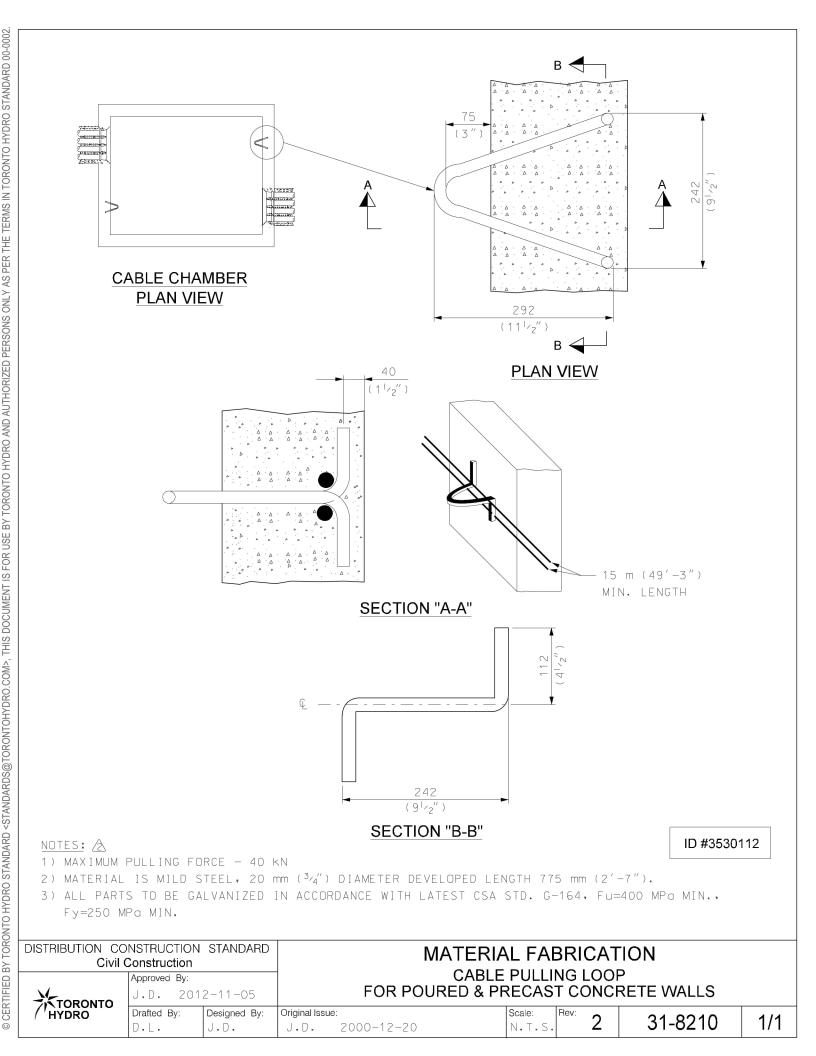
				Е	BILL	OF	MATER	ΙAΙ	LS FOR	3 3	1-7400				
ITEM NO.		DESCRIPTION										I TEM	Q T	ГҮВ	
1	CABLE	SLING	6 "	Χ	18"	REI	NFORCE	ΞD	WITH	1 "	NYLON	STRAP	9662943	4	2

◬

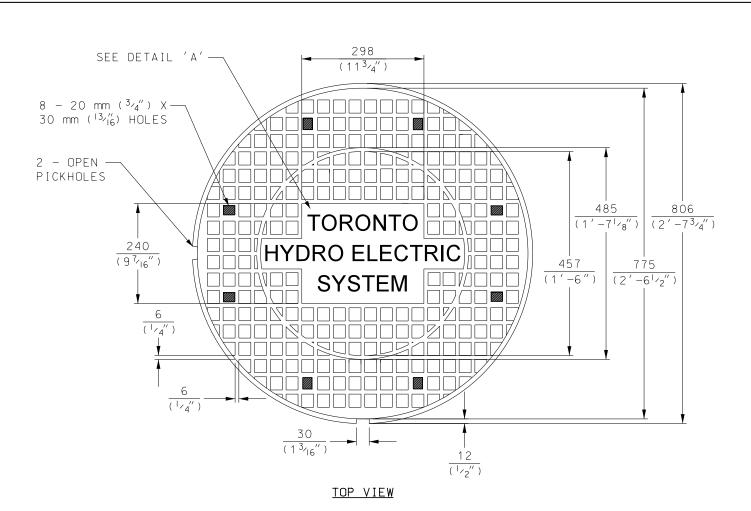
### NOTES: /2

- 1) ENSURE CABLE, JOINTS AND GROUNDING INTEGRITY PRIOR AND AFTER INSTALLATION OF TEMPORARY CABLE SUPPORTS. PCB SAMPLING IS REQUIRED PRIOR TO COMMENCING THE WORK IF CONTAMINATION IS SUSPECTED.
- 2) SEPARATE SUPPORT SLINGS ARE REQUIRED WHEN SUPPORTING CABLES > 750V OR < 750V OR FIBRE COMMUNICATION WITHIN THE STRUCTURE UNTIL PERMANENT SUPPORTS (CABLE RACKING) ARE INSTALLED.
- 3) AT NO TIME DIFFERENT CABLE TYPES SHALL BE SUPPORTED ON SAME SUPPORT SLING.
- 4) CONTRACTOR IS RESPONSIBLE TO VERIFY IF THIRD PARTY COMMUNICATION CABLES WITHIN THE STRUCTURE REQUIRE SPECIFIC OR ADDITIONAL SUPPORT REQUIREMENTS.
- 5) AT ALL TIMES WHEN INSTALLING THE TEMPORARY CABLE SUPPORT SLINGS, THE EXISTING CABLE'S ROUTE AND JOINT ELEVATION SHALL BE MAINTAINED TO AVOID ADDING UNNECESSARY MECHANICAL STRESSES.
- 6) REFER TO STD. 16-1280 FOR CABLE TESTING IF CABLES ARE TO REMAIN IN PLACE AND NOT REPLACED.

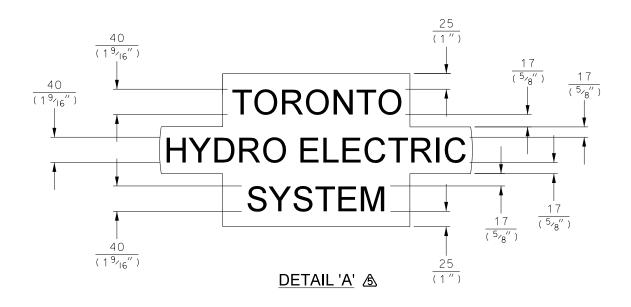
DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD		TEMPORAR'	Y SUPPO	ORT OF	CABLES	Æ
TORONTO	Approved By:		IN R	EBUILD STRUCT	URES (CA	BLE CHA	AMBERS, VAULT	S)
HYDRO	Drafted By:	Designed By: B.D.	Original Issue:	2013-05-31	Scale: N.T.S.	Rev: 2	31-7400	1/1



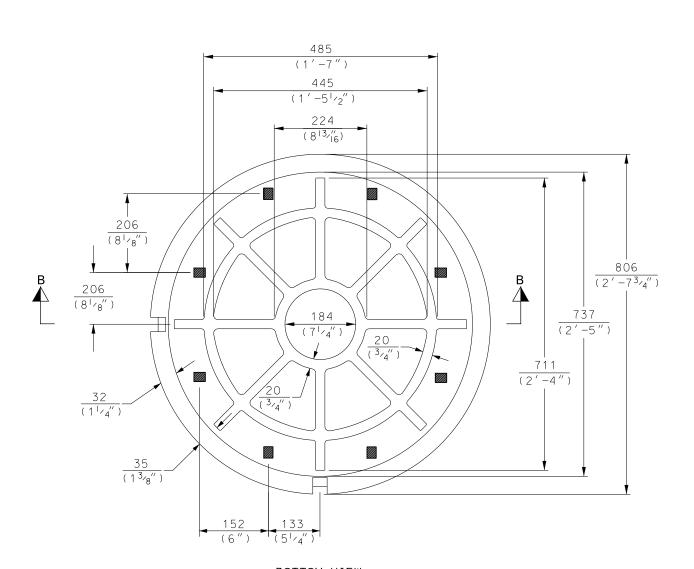




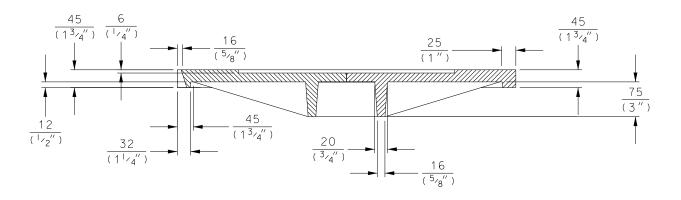
# CABLE CHAMBER LID &



DISTRIBUTION CC Civil (	NSTRUCTION Construction	STANDARD		C	ABLE CI				⋬
,	Approved By: 2025-01-	29 A.P.		UNDERGROUI	FRAME A ND CONS			I MATERIALS	
	Drafted By:	Designed By:	Original Issue	e: 2004-03-31	Scale:	Rev:	5	31-8250	2/4



# BOTTOM VIEW CABLE CHAMBER LID &



# SECTION 'B-B' &

	DISTRIBUTION CO Civil (	NSTRUCTION Construction	STANDARD	CABLE CHAMBER FRAME AND LID						
	,	Approved By: 2025-01-	29 A.P.		UNDERGRO				N MATERIALS	
i	HYDRO	Drafted By:	Designed By:	Original Issue	e: 2004-03-31		Scale: N.T.S.	Rev: 5	31-8250	3/4

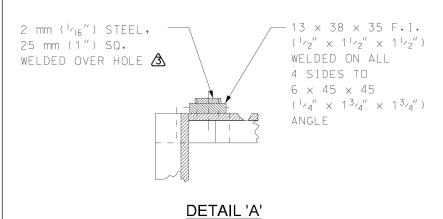


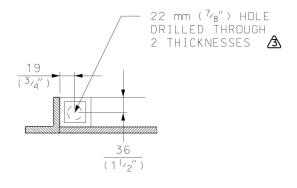
	BILL OF MATERIALS FOR 31-8250		
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A
	CABLE CHAMBER CAST IRON LID AND 7" FRAME	9662442	1
2	CABLE CHAMBER 7" CAST IRON FRAME	3530116	1
3	CABLE CHAMBER CAST IRON LID	3530505	1

### NOTES: A

- 1) DESIGN LOAD SHALL BE IN ACCORDANCE WITH CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6, CL-625 ONT LIVE LOADING.
- 2) GREY CAST IRON, CLASS 200 MPA, MASS=150 kg (330 lbs).
- 3) WORKMANSHIP AND FINISH SHALL BE AS PER ASTM A48, PAINT BOTH SIDES BLACK WITH ASPHALT OR PITCH.
- 4) CABLE CHAMBER LID DESIGN SHALL MEET NON-SLIP REQUIREMENTS AS OUTLINED IN THE STANDARD PRACTICE FOR SAFE WALKING SURFACES DOCUMENT ASTM F1637 AND THE CITY OF TORONTO ACCESSIBILITY DESIGN GUIDLINES.

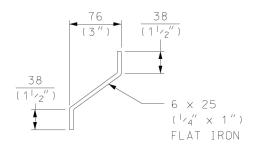
DISTRI	CIVIL CONSTRUCTION STAND  Civil Construction  Approved By:  2025-01-29 A.  Drafted By: Designed		STANDARD		(	CABLE CHAI			⋬
1	TOPONTO	' '	29 A.P.		UNDERGROU	FRAME AND IND CONSTRU		I MATERIALS	
		Drafted By:	Designed By:	Original Issue	e: 2004-03-31	Scale: Re	•v: <b>5</b>	31-8250	4/4

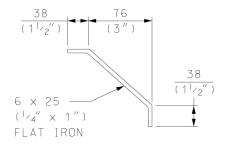




### **DETAIL 'B'**

# DETAILS OF HOUSING FOR HINGE PIN



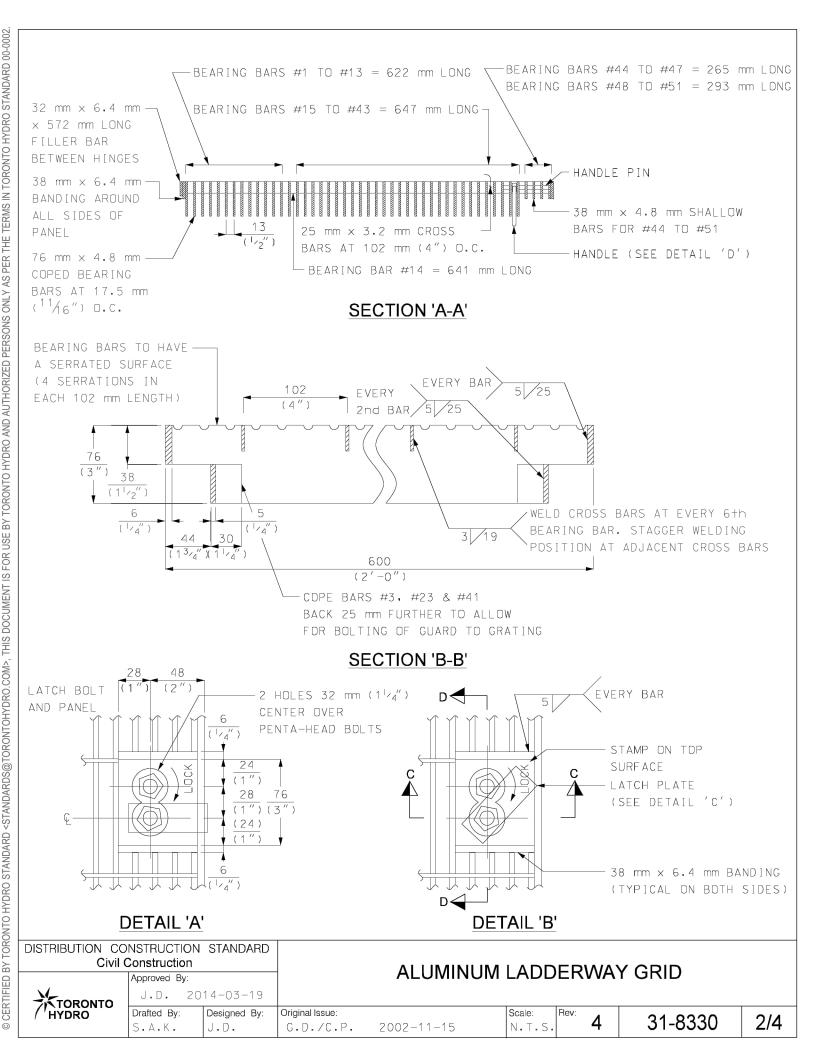


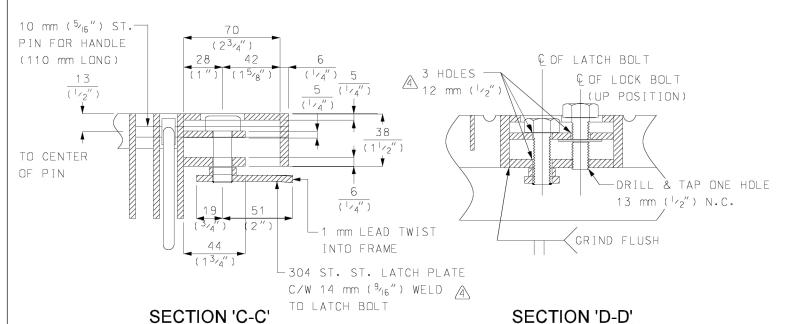
DETAIL 'C' 6 REQUIRED

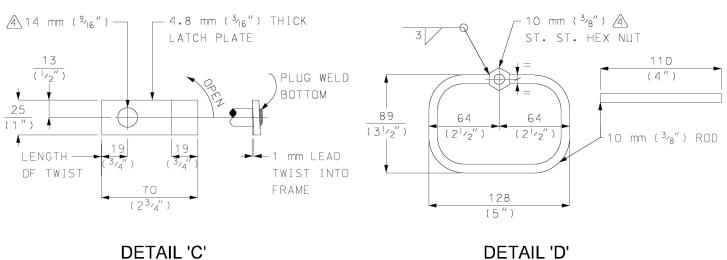
DETAIL 'D' 2 REQUIRED

# **DETAIL OF ANCHORS**

DISTRIBUTION CO Civil C	NSTRUCTION Construction	STANDARD	LADDERWAY GRID FRAME								
TORONTO	Approved By:	15-09-21		FOR TRA	NSFOR	RMER VA	LT				
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-11-15	Scale: N.T.S.	Rev: 3	31-8320	2/2			

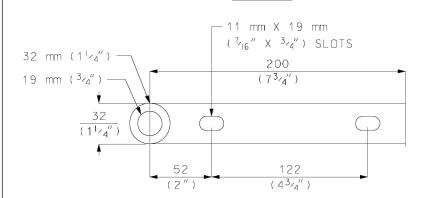




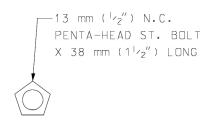


**DETAIL 'D'** 

DISTRIBUTION CO	NSTRUCTION Construction	STANDARD		ALUMINUM	1 V D D		V GDID	
TORONTO	Approved By:	14-03-19		ALOMINOM	LADD	LIVVA	I GNID	
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-11-15	Scale: N.T.S.	Rev:	31-8330	3/4



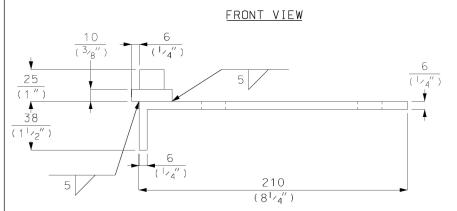
### TOP VIEW



**DETAIL 'E'** 

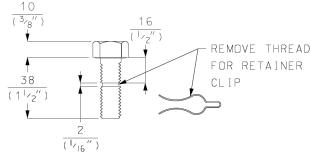
TOP VIEW

DETAIL 'F'



### FRONT VIEW

PENTA-HEAD LOCK BOLT & CLIP



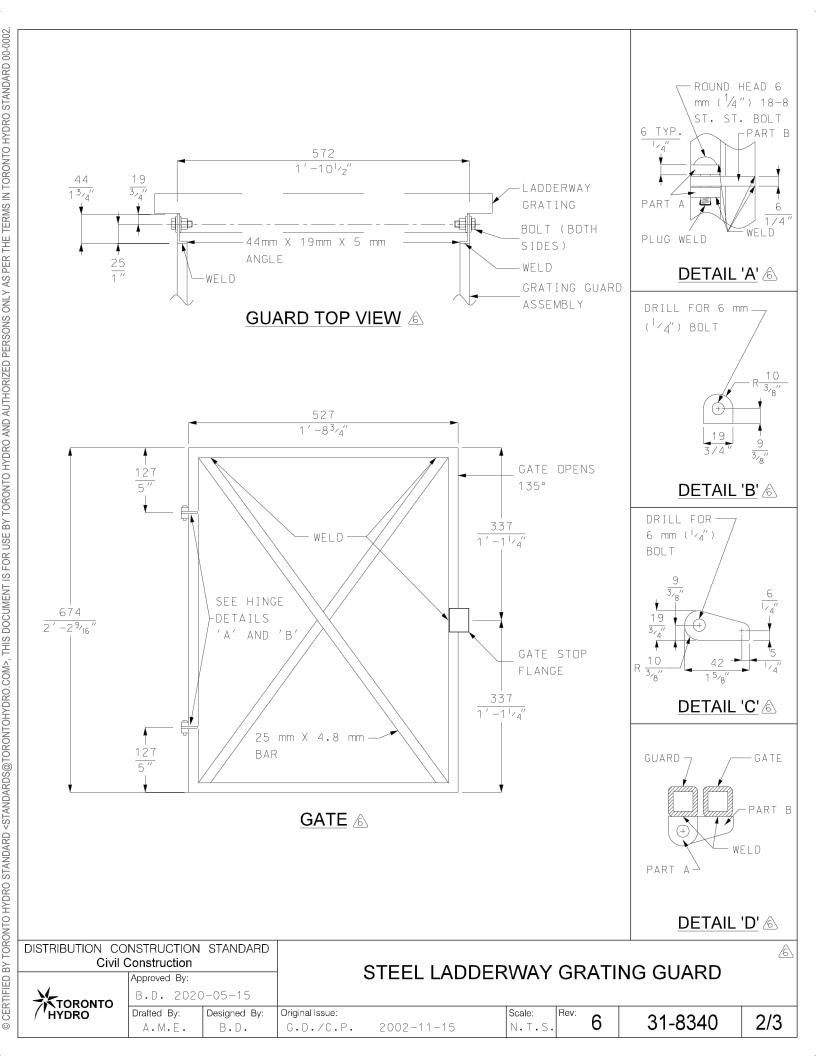
**DETAIL 'G'** 

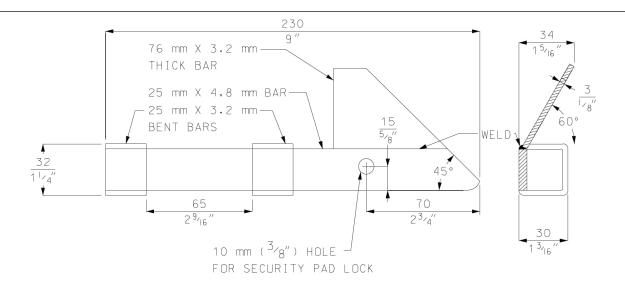
**DETAIL 'H'** 

### NOTES:

- 1) BEARING BAR MATERIAL SHALL BE 6061-T6 ALUMINUM. CROSS BARS SHALL BE NOTCHED AND HYDRAULICALLY PRESSED INTO DOVETAIL SLOTS IN BEARING BARS TO PROVIDE A POSITIVE WEDGED CONNECTION.
- 2) DESIGN SHALL MEET CANADIAN HIGHWAY BRIDGE DESIGN CODE CAN/CSA-S6-06, CL-625-ONT LIVE LOADING.
- 3) HINGE BOLTS, PENTA-HEAD LATCH BOLTS, LATCH PLATE, AND HANDLES SHALL BE 304 MILL FINISH STAINLESS STEEL.
- 4) ALUMINUM GRID FINISH SHALL BE CLEAN ANODIZED TO AA-C22A31 STANDARD.
- 5) ALL STAINLESS STEEL ITEMS SHALL BE INSTALLED AFTER ANODIZING.
- 6) REFER TO STD. 31-8340 FOR ALUMINUM LADDERWAY GRATING GUARD.
- 7) DESIGNED ACCORDING TO STANDARD PRACTICE FOR SAFE WALKING SURFACES, F1637-09 AND CITY OF TORONTO ACCESSIBILITY DESIGN GUIDELINES, LATEST REVISION.

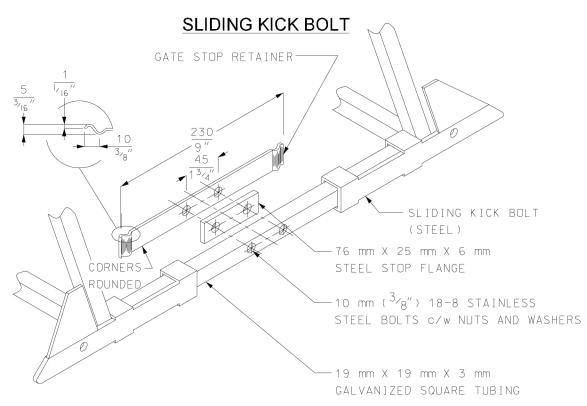
DISTRIBUTION CO	NSTRUCTION Construction	STANDARD		ALUMINUM	1 V D D	EDIA/A	V CRID	
V_	Approved By:	014-03-19		ALUMINUM	LADD	CRVVA	1 GRID	
TORONTO	Drafted By:	Designed By:	Original Issue:	2002-11-15	Scale:	Rev: 4	31-8330	4/4





ELEVATION

SECTION

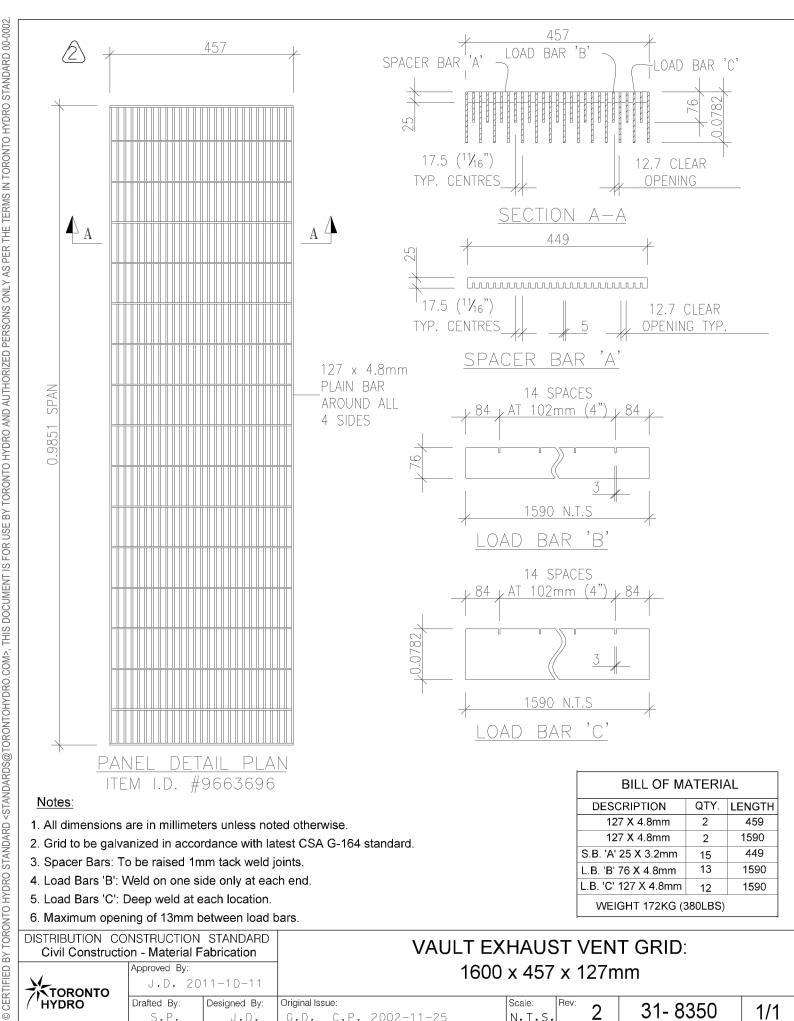


# SLIDING KICK BOLT ASSEMBLY &

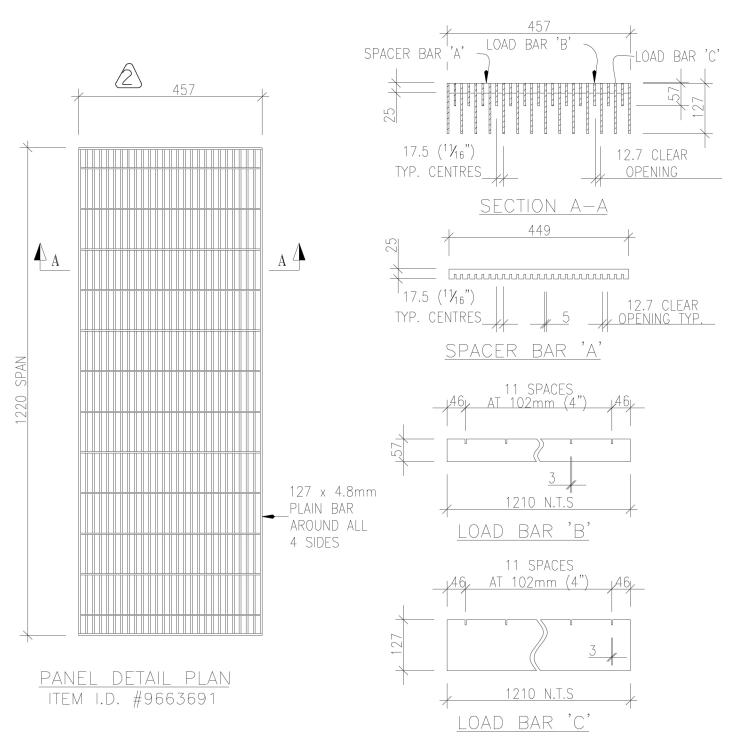
### NOTES:

- 1) GUARD AND GATE TO BE FABRICATED OF 19 mm X 19 mm X 3.2 mm GALVANIZED CARBON STEEL SQUARE TUBING.
- 2) WELD ALL JOINTS.
- 3) WHERE POSSIBLE, DRILL/PUNCH ALL HOLES, WELD ALL HINGES AND GATE STOP FLANGE PRIOR TO GALVANIZING.
- 4) ETCH SURFACE AND APPLY "TIGER DRYLAC COATING" IN "SAFETY ORANGE GL/SM" TO GUARD AND GATE.
- 5) LADDERWAY GRATING GUARD TO BE ORDERED IN COMBINATION WITH ALUMINUM GRATING. LADDERWAY GRATING KIT ITEM ID# 9663631.

	DISTRIBUTION CO		STANDARD					<u></u>
ורח חו		Approved By:	05.45	}	STEEL LADDERWAY GRATING GUARD			
@ OFINE	TORONTO HYDRO	B.D. 2020 Drafted By: A.M.E.	Designed By:	Original Issue:	2002-11-15	Scale: Rev: 6	31-8340	3/3



Approved By: 1600 x 457 x 127mm J.D. 2011-10-11 TORONTO Drafted By: Designed By: Original Issue: Rev: **HYDRO** Scale: 31-8350 1/1 S.P. N.T.S. J.D. G.D. C.P. 2002-11-25

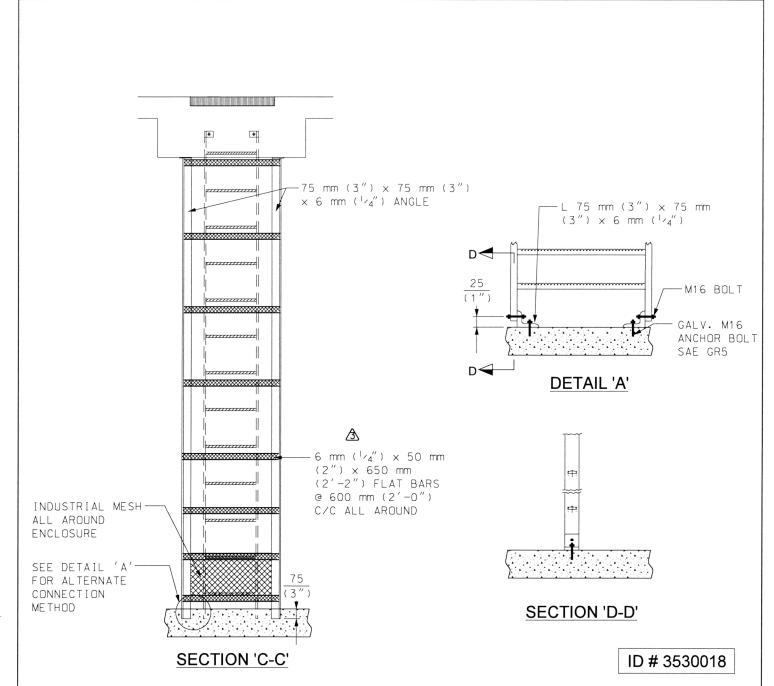


### Notes:

- 1. All dimensions are in millimeters unless noted otherwise.
- 2. Grid to be galvanized in accordance with latest CSA G-164 standard.
- 3. Spacer Bars: To be raised 1mm tack weld joints.
- 4. Load Bars 'B': Weld on one side only at each end.
- 5. Load Bars 'C': Deep weld at each location.
- 6. Maximum opening of 13mm between load bars.

BILL OF MATERIAL							
DESCRIPTION	QTY.	LENGTH					
127 X 4.8mm	2	459					
127 X 4.8mm	2	1210					
S.B. 'A' 25 X 3.2mm	15	449					
L.B. 'B' 76 X 4.8mm	13	1210					
L.B. 'C' 127 X 4.8mm	12	1210					
WEIGHT 121KG (267LBS)							

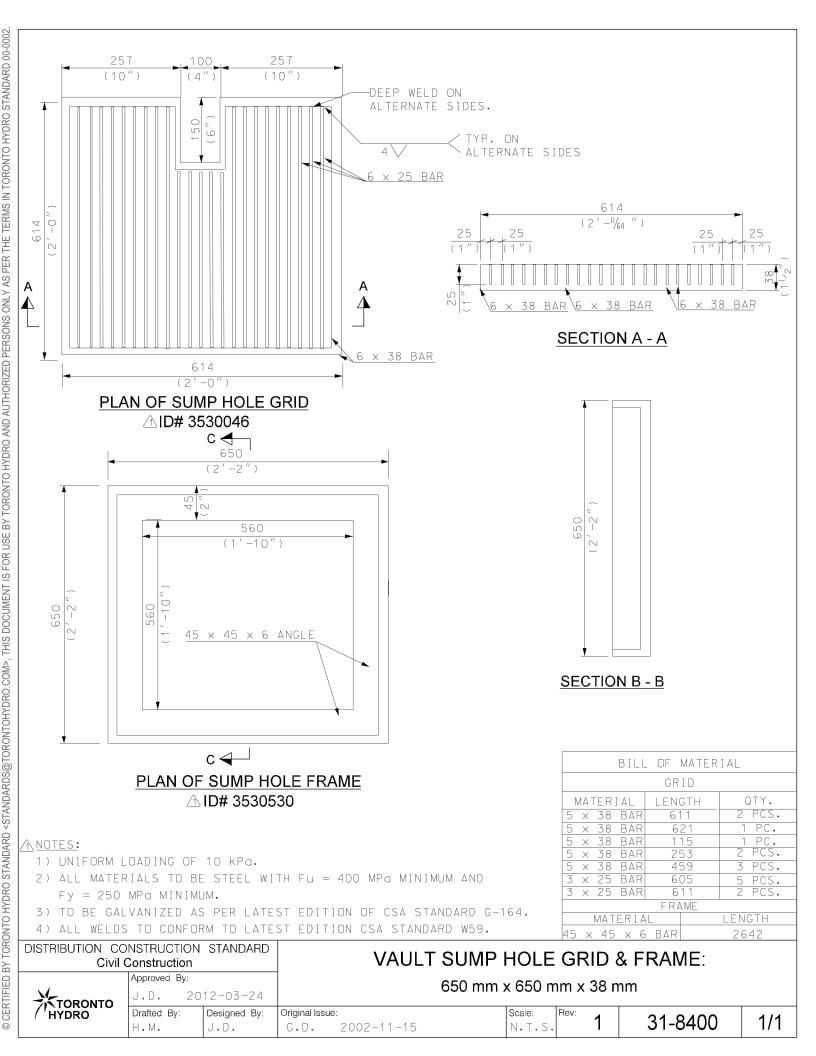
Γ	DISTRIBUTION CO Civil Construction			VAUL	T EXHAUST VEN	T GRID:	
	TORONTO	Approved By:	11-10-11		1220 x 457 x 127n	nm	
	/ 'HYDRO	Drafted By:	Designed By:	Original Issue: G.D. C.P. 2002-11-25	Scale: Rev: 2	31- 8360	1/1

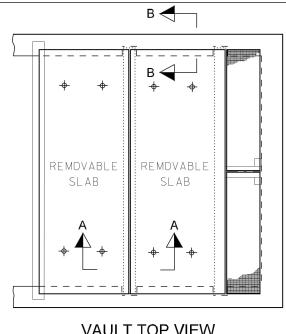


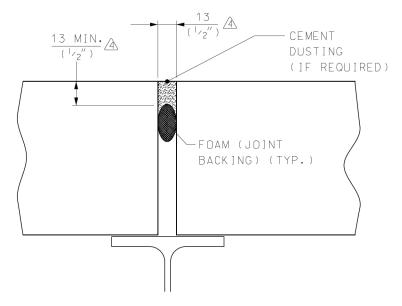
### NOTES:

- 1) ALL MATERIAL SHALL BE GALVANIZED IN ACCORDANCE WITH CSA-G-164, EXCEPT HINGES WHICH ARE STAINLESS STEEL.
- 2) STEEL ELEMENTS SHALL BE IN ACCORDANCE WITH CAN3-G312.2-M GRADE 260W.
- 🐧 3) REBARS SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.19 (R2014) GRADE 400W.
  - 4) LOCATION OF LADDER AND DOOR SHALL BE DETERMINED AS PER CONSTRUCTION DRAWING.
  - 5) DOOR AND ENCLOSURE ONLY INSTALLED IN VAULTS WITH HEADROOM GREATER THAN 2200 mm (7'-3").
  - 6) INDUSTRIAL MESH MOUNTED ON ALL OPEN SIDES OF THE ENCLOSURE.

DISTRIBUTION CO	NSTRUCTION Construction	STANDARD			VAUL	т.			
TORONTO	Approved By:	2015/11/16		TRANSFORMER VAULT LADDER					
/ HYDRO	Drafted By: B.W.	Designed By:	Original Issue	: 2000-12-19	Scale: N.T.S.	Rev:	3	31-8390	2/2

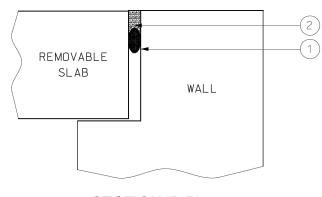






## **VAULT TOP VIEW**

# SECTION 'A-A'

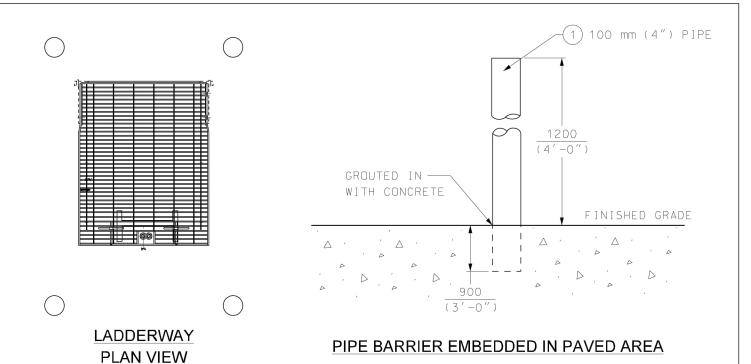


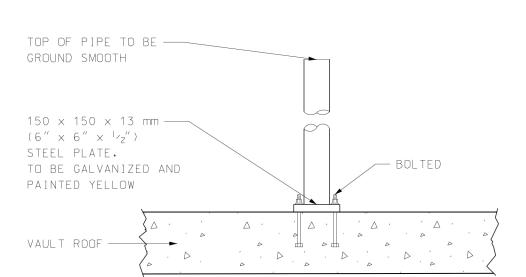
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SLC	1101	N D	-0

	BILL OF MATERIALS FOR 31-8410			
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY A	
1	FOAM <sup>7</sup> /8" DIA, X 850' GAP FILLER FOR VAULT SLABS	9664496	1 2	4
2	COMPOUND JOINT SEALANT 2 PART 5.7 L CONTAINER GREY IN COLOUR	8940080	1 2	4

- 1) NEW CONSTRUCTION: CONCRETE JOINT INTERFACES SHALL BE CLEAN, DRY AND FREE OF DUST AND LODSE MATERIAL. A THOROUGH WIRE BRUSHING OR GRINDING MAY BE REQUIRED. THE PRESENCE OF FORM RELEASE AGENTS, OR OTHER CONTAMINANTS SHALL REQUIRE GRINDING TO EXPOSE SOUND, VIRGIN CONCRETE.
- 2) REMEDIAL APPLICATIONS: ALL PREVIOUS SEALANTS, MASTICS OR JOINT FILLERS SHALL BE REMOVED BY ROUTING OR SAW CUTTING, JOINT INTERFACES SHALL BE GRINDED TO EXPOSE SOUND, VIRGIN CONCRETE.
- 3) SEALANT SUPPORT: FOAM (JOINT BACKING) SHALL BE USED TO CONTROL SEALANT DEPTH. FOAM (JOINT BACKING) SHALL BE ROUND.
- 4) MIXING: IF REQUIRED, THE SEALANT SHALL BE THOROUGHLY MIXED IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS ON CONTAINER LABEL, BEFORE APPLICATION.
- 5) APPLICATION: THE SEALANT SHALL BE APPLIED DIRECTLY FROM THE CONTAINER INTO JOINTS OR BY STANDARD CAULKING GUN.
- △6) IF EXISTING JOINT IS LARGER THAN THE SPECIFIED 13 mm (1/2"), LARGER GAP FILLERS ARE AVAILABLE: FOAM 1" DIA. GAP FILLER (9664495) AND FOAM 1 1/4" DIA. GAP FILLER (9664494)

DISTRIBUTION CC	NSTRUCTION Construction	STANDARD		MATER	RIAL FABRICAT	ION			
TORONTO	Approved By: B.D. 2018-08-31			CAULKING	OF REMOVABLE	E SLABS			
HYDRO	Drafted By: ∪.K.	Designed By: B.D.	Original Issue:	2002-11-15	Scale: Rev: 4	31-8410	1/1		





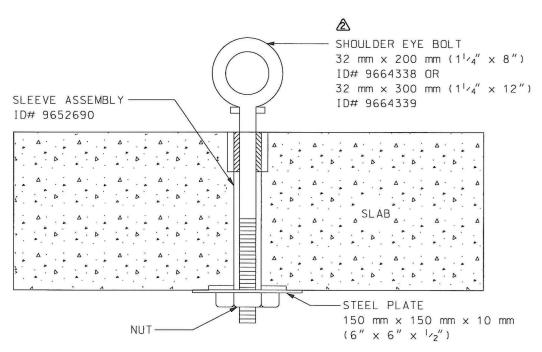
# PIPE BARRIER BOLTED TO ROOF

	BILL OF MATERIALS FOR 31-8450		
ITEM NO.	DESCRIPTION	ITEM I.D.	QTY
1	100 mm (4") PIPE	9652745	4

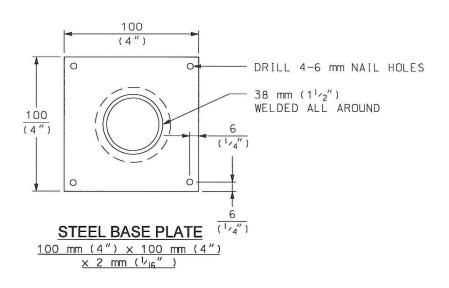
# NOTES: A

- 1) PIPE SHALL BE FILLED WITH CONCRETE WHEN INSTALLED.
- 2) PIPE SHALL BE GALVANIZED AND PAINTED YELLOW.
- 3) ALL HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH CSA-G-164.

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction					LADDERWAY		
TORONTO	Approved By:	013-11-07			PIPE BARRIER		
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-11-15	Scale: Rev: 1	31-8450	1/1

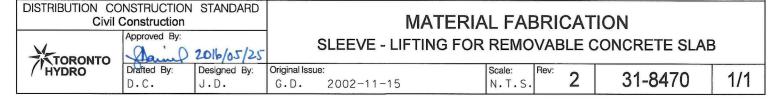


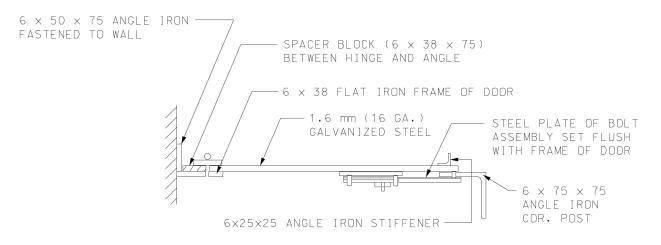
## SECTION SHOWING METHOD OF LIFTING



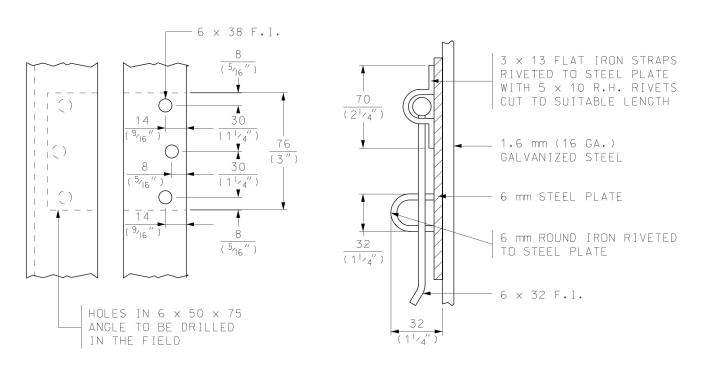
### NOTES:

1) ASSEMBLY SHALL BE GALVANIZED IN ACCORDANCE WITH CSA-G-164.





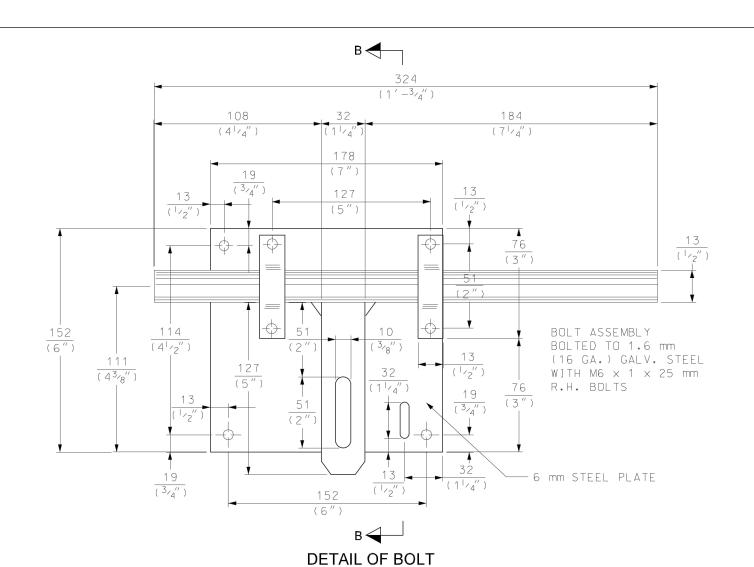
## **SECTION A-A**



**DETAIL OF HINGE** 

SECTION B-B

DISTRIBUTION CO Civil C	NSTRUCTION Construction	STANDARD		MATERIA	AL FAE	BRICAT	TON	
TORONTO	Approved By: J.D. 2	013-11-07		DOOR FOR T	RANSF	FORMER	VAULT	
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-11-15	Scale: N.T.S.	Rev: 1	31-8500	2/3



BILL OF MATERIALS	
DESCRIPTION	QTY.
6 mm x 38 mm FLAT IRON	5944 mm
6 mm x 32 mm FLAT IRON	127 mm
6 mm x 50 mm FLAT IRON	705 mm
13 mm ROUND IRON	229 mm
6 mm ROUND IRON	89 mm
6 mm × 25 mm × 25 mm ANGLE IRON	1626 mm
6 mm STEEL PLATE 152 mm x 178 mm	1 PC
3 mm x 13 mm F.I. STRAPS, 95 mm LONG	2 PCS
75 mm × 75 mm HEAVY BUTT HINGES	1 1/2 PR
5 mm x 16 mm R.H. RIVETS	4
1.6 mm GALV. STEEL, 1626 mm x 717 mm	1 PC
M6 x 1 x 25 mm R.H. BOLTS	52
RUBBER SHEET, 152 mm X 203 mm	1 PC
25 mm BAND IRON	152 mm
6 mm F.I. SPACER BLOCKS 38 mm x 75 mm	3 PCS

DISTRIBUTION CONSTRUCTION STANDARD Civil Construction				MATE	RIAL FABRI	CAT	ION	
TORONTO	Approved By:	013-11-07		DOOR FO	R TRANSFOR	MER	VAULT	
HYDRO	Drafted By:	Designed By:	Original Issue:	2002-11-15	Scale: Rev:	1	31-8500	3/3