URBAN DISTRIBUTION

DRAWING NUMBER	SHT.	DRAWING TITLE	DWG REV.	BOM REV.
B-14-00	1 – 2	GENERAL INFORMATION	D / -	
B-14-10	1 – 2	1Ø TAKE-OFF STRUCTURE	H	I / 0
B-14-11	1 – 2	SECONDARY TAKE-OFF STRUCTURE	F	E
B-14-12	1 – 2	SECONDARY TRANSFORMER TAKE-OFF STRUCTURE	E	E
B-14-13	1 – 2	SECONDARY TAKE-OFF USING CABLE TROUGH	0	0
B-14-14	1 – 2	REVERSE TAKE-OFF ON RADIAL	C	E
B-14-15	1 – 3	3Ø SINGLE-CIRCUIT TAKE-OFF STRUCTURE	J	J / A
B-14-16	1 – 3	3Ø SOLID BLADE DISCONNECT SINGLE-CIRCUIT TAKE-OFF STRUCTURE	M	L / A
B-14-17	1 – 3	3Ø GOPT TAKE-OFF STRUCTURE	H	G / F
B-14-18	1 – 3	INTELLIRUPTER 3Ø RECLOSER TAKE-OFF STRUCTURE	C	A / A
B-14-50	1 – 3	EASEMENT PLAN WITH NO REAR LANE FOR THREE PARTY JOINT USE	C/0/0	
B-14-51	1 – 3	EASEMENT PLAN WITH NO REAR LANE FOR TWO PARTY JOINT USE	A/0/0	
B-14-52	1 – 3	EASEMENT PLAN, FOUR PARTY TRENCHING – NO REAR LANE	B/C/D	
B-14-53	1 – 3	EASEMENT PLAN, FOUR PARTY TRENCHING – WITH REAR LANE	B/C/C	
B-14-54	1 – 3	EASEMENT PLAN WITH REAR LANE – TWO PARTY JOINT USE	A/0/0	
B-14-55	1 – 3	EASEMENT PLAN WITH REAR LANE – THREE PARTY JOINT USE	C/A/0	
B-14-56	1 – 2	OVERHEAD DISTRIBUTION WITH UNDERGROUND SERVICES	A / A	
B-14-57	1 – 3	EASEMENT PLAN W/ REAR LANE – 3 PARTY DISTRIBUTION 4 PARTY SERVICES	0/0/0	
B-14-59	1 – 2	FOUR PARTY SERVICES	G / D	
B-14-60	1 – 1	MOBILE TRAILER PLAN VIEW	0	
B-14-65	1 – 1	CONDUCTOR DEPTH OF COVER	D	
B-14-66	1 – 2	TRENCH LAYOUT - FOUR PARTY TRENCHING	A / A	
B-14-70	1 – 1	PRIMARY LOOP – POWER INSTALLATION METHODS	C	
B-14-75	1 – 1	SPARE CONDUIT IN BOX PADS	0	
B-14-80	1 – 3	TYPICAL DUCT BANK ARRANGEMENT AND BACKFILL IN – STREET AND IN – SIDEWALK CONSTRUCTION	0/0/0	
B-14-90	1 – 7	TYPICAL DUCT BANK ARRANGEMENT AND BACKFILL IN – STREET AND IN – SIDEWALK CONSTRUCTION	-/-/-/-/-/-/-	
B-14-91	1 – 6	TYPICAL DUCT BANK FORMATIONS	-/-/-/-/-/-	
B-14-92	1 – 6	TYPICAL MANHOLE VAULT AND DUCT BANK TIE-IN DETAILS	-/-/-/-/-/-	
B-14-93	1 – 2	MANHOLE VAULT BACKFILL IN–STREET AND IN–SIDEWALK CONSTRUCTION	-/-	
B-14-94	1 – 1	127mm CONDUIT SWEEP 30^0 / 45^0 / 90^0	-	
B-14-110	1 – 5	DUCT BANK AND MANHOLE VAULT WARM WEATHER CONSTRUCTION REQUIREMENTS AND SPECIFICATION	B/B/B/B/B	
B-14-111	1 – 6	COLD WEATHER CONCRETING REQUIREMENTS FOR BURIED CONCRETE CABLE DUCT BANKS	B/B/B/B/B/B	
		NOTE: OTHER B-14-100 SERIES DRAWINGS ARE 'D' SIZED AND NOT INCLUDED IN THIS SECTION. SEE EIN FOR DRAWINGS OR CONTACT DISTRIBUTION STANDARDS.		

*Sask**Power*** - DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK	DRN. **PP**	**INDEX**
L MOEN	**P PATEL**	CHKD. **LM**	
		2022/06/08	

DATE OF ISSUE: **2022-08-15** | DRAWING NO: **B-14-INDEX** | **SHEET 1 of 1** | REV. **AE**

URBAN UNDERGROUND DISTRIBUTION

1. URBAN RESIDENTIAL

1.1 THE DESIGN COMPONENTS FOR A URD SYSTEM ARE AS FOLLOWS:

- **A. O/H TO U/G TAKE-OFF STRUCTURES – SECTION B-12-XX**
- **B. PRIMARY FEEDER CONDUCTORS – SECTION C-26-XX**
- **C. SECONDARY DISTRIBUTION CONDUCTORS – SECTION C-26-XX**
- **D. SERVICE CONDUCTORS – SECTION C-26-XX**
- **E. PADMOUNTED TRANSFORMER – SECTION B-08-XX**
- **F. SWITCHING CUBICLES – SECTION B-26-XX**
- **G. SERVICE PEDESTALS – SECTION B-12-XX**
- **H. STREET LIGHTING – SECTION B-20-XX**
- **I. METERING COMPONENTS – SECTION B-24-XX**

2. URBAN COMMERCIAL & INDUSTRIAL

2.1 CONSISTS OF THREE Ø PRIMARY (5kV, 15kV & 25kV) FEEDERS TO COMMERCIAL & INDUSTRIAL, SINGLE Ø AND THREE Ø SERVICES.

2.2 THE DESIGN COMPONENTS FOR A COMMERCIAL URBAN SYSTEM ARE AS FOLLOWS:

- **A. O/H TO U/G TAKE-OFF STRUCTURES – SECTION B-12-XX**
- **B. PRIMARY FEEDER CONDUCTORS – SECTION C-26-XX**
- **C. PADMOUNTED TRANSFORMER – SECTION B-08-XX**
- **D. SWITCHING CUBICLES – SECTION B-26-XX**
- **E. DUCT BANK SYSTEMS – SECTION B-14-XX**
- **F. METERING – SECTION B-24-XX**

3. JOINT USE TAKE-OFFS

3.1 IN ORDER TO ACCOMMODATE JOINT- USE TAKE-OFF FACILITIES THE CABLE GUARD SHALL BE SHIFTED 45°. JOINT-USE TAKE-OFFS ARE NOT PERMITTED ON GROUND GRID 'C' OR ANY OTHER MULTI-ROD GROUND GRID STRUCTURES DUE TO CONGESTION ON THE POLE AND POSSIBLE DAMAGE TO THE GROUND GRID.

4. TAKE–OFF TRENCHING

4.1 TRENCH FOR CABLE TAKE-OFF TO BE IN LINE WITH O/H CIRCUIT FOR AT LEAST 1.2m TO HELP AVOID LEAN DUE TO TRENCH BACKFILL.

NOTES CONTINUTED ON SHEET 2

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URBAN UNDERGROUND DISTRIBUTION

5. GENERAL NOTES

5.1 INSTALL DETECTABLE PULL TAPE (STOCK CODE 713504) IN SPARE CONDUIT IN SITUATIONS WHERE NO OTHER DETECTABLE CABLE IS EXPECTED TO BE ENERGIZED WHEN SPARE CONDUIT WILL NEED TO BE LOCATED.

5.2 AVOID INSTALLING SECONDARY CONDUCTORS UNDER ROADWAYS WHEN POSSIBLE.

6. URBAN BACKFILL REQUIREMENTS

6.1 IN GREENFIELD CONSTRUCTION, TYPICALLY, THE NATURAL SOIL THAT IS EXCAVATED SHALL BE USED AS BACKFILL MATERIAL. IF THE SOIL IS NOT SUITABLE, DUE TO ROCKS, SNOW, FROZEN GROUND, OR OTHER FOREIGN MATERIAL, THEN CLEAN BACKFILL MATERIAL SHALL BE USED. FOR BROWNFIELD CONSTRUCTION IN SOME URBAN CENTERS SUCH AS REGINA AND SASKATOON, MANY HAVE THEIR OWN STANDARDS AND SPECIFICATIONS FOR BACKFILLING. PLEASE REFER TO EACH CITY'S WEBSITE FOR A COPY OF THEIR BACKFILL REQUIREMENTS AS THEY ARE NOT ALL THE SAME.

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BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
1	1 12 02	2	BOLT – MACHINE – 1/2" X 2"
2	1 13 12	2	BOLT – MACHINE – 5/8" X 12"
3	1 34 09	3	GUARD – CABLE – PLASTIC – 2-1/2" X 8'
4	1 34 11	1	GUARD – CABLE – STEEL – 2-1/2" X 8'
5	1 35 XX	1	BRACKET – CABLE POSITIONER
6	1 35 31	2	BRACKET – CUTOUTS, ARRESTORS AND TERMINATORS
7	1 78 12	2	SCREW – LAG – 1/2" X 4-1/2"
8	1 78 38	8	SCREW – LAG – 3/8" X 4"
9	1 85 01	0.25 lb	STAPLE – FENCE – 1-3/4"
10	1 93 22	2	WASHER – LOCK – 1/2"
11	1 93 27	2	WASHER – DOUBLE LOCK – 5/8”
12	1 93 30	2	WASHER – ROUND – 9/16"
13	1 93 42	2	WASHER – SQUARE – 2-1/4” X 2-1/4” X 13/16" HOLE
14	2 02 71	1	CLAMP – LIVE LINE
15	2 02 82	1	CLAMP – BAIL – #6-1/0 ACSR
16	2 12 62	1	CUTOUT – LOADBREAK – 27 kV – 100 AMP – SEE NOTE 1
17	2 83 02	3 m	WIRE – CU – #2/7 STR
18	2 83 04	6 m	WIRE – CU – #4/7 STR
19	5 12 06	2	CONNECTOR – CU – 4C4
20	5 46 18	2	LEAD STRAP
21	7 38 XX	1	FUSE LINK – TYPE “T"
22	7 69 64	0.30	WOOD SCREW – #14 – 2" HEX HEAD (100/BOX)
23	8 02 18	1	ARRESTER – 18 kV (URBAN)
24	8 35 06	1	TERMINATOR – #1 AL
25	71 35 00	1	CABLE PREP KIT
26	05 385 151	-	TAG HOLDER – ALUMINUM – FOR 10 – 1" TAGS – SEE NOTE 2
27	05 385 20X	-	TAG – NUMBER – YELLOW – SEE NOTE 2
27	05 385 209	-	TAG – DASH – YELLOW – SEE NOTE 2
27	05 385 25X	-	TAG – LETTER – YELLOW – SEE NOTE 2
28	05 638 32X	5	DECAL – NUMBER – BLACK – 1-1/2" – SEE NOTE 1
28	05 638 329	1	DECAL – DASH – BLACK – 1-1/2" – SEE NOTE 1
28	05 638 4XX	3	DECAL – LETTER – BLACK – 1-1/2" – SEE NOTE 1
29	05 640 000	1	SIGN – DANGER – HIGH VOLTAGE
30	05 640 006	1	SIGN – BLANK – REFLECTIVE – 3" X 18" – SEE NOTE 1
31	05 646 582	1	DECAL – WATCH FOR WIRES

MATERIAL LIST CONTINUED ON SHEET 3

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SaskPower - DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK	DRN. **OFF**	**SINGLE PHASE TAKE-OFF STRUCTURE**
L MOEN	**O.FRANCIS**	CHKD. **LM**	
		2020-12-04	

DATE OF ISSUE: **2021-01-20** | DRAWING NO: **B-14-10** | **SHEET 1 OF 3** | REV. **I**

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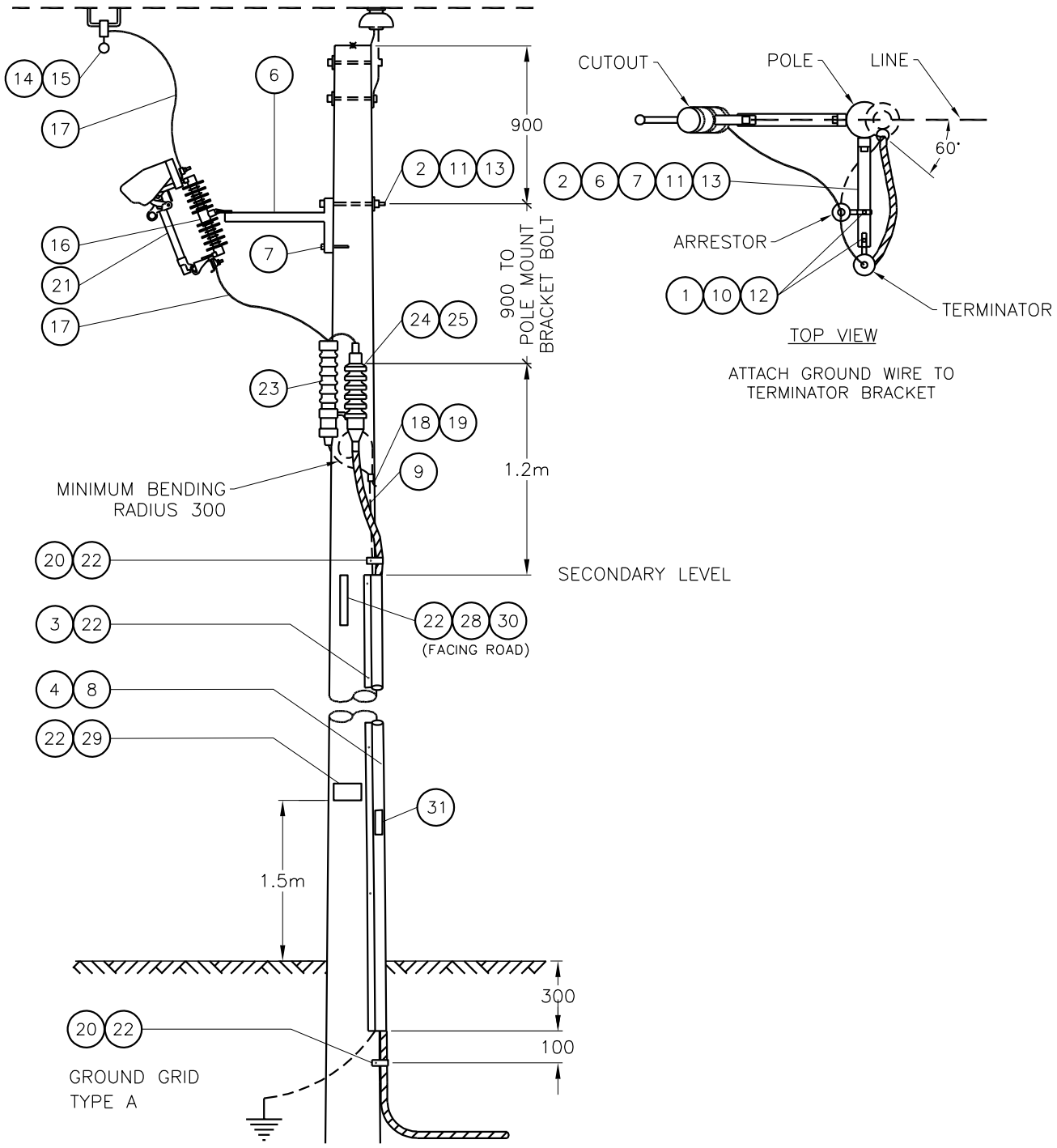

NOTES:

1. REFER TO B-14-00 FOR ADDITIONAL INSTALLATION NOTES.
2. GUARD TO BE BUILT ON SIDE AWAY FROM TRAFFIC.
3. GROUND BOTTOM OF CABLE GUARD TO GROUND ROD.
4. ENSURE SUFFICIENT CABLE SLACK AT BASE OF POLE IN CASE OF TERMINATOR FAILURE.
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.
6. REFER TO B-12-38 FOR TERMINATION DETAILS.

SCALE: N.T.S.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. O.FRANCIS	DRN.D.REDEKOPP CHKD. 2020-10-19	SINGLE-PHASE TAKE-OFF STRUCTURE
DATE OF ISSUE 2021-01-20	DRAWING NO. B-14-10	SHEET 2 of 3	REV. H

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
			NOTES: **1. LOADBREAK CUTOUT IS CAPABLE OF ACCOMMODATING UP TO 2/0 CU (STOCK CODE 28320). HOWEVER, THE CONNECTORS, TERMINATOR SIZE & RISER AMPACITY MUST MATCH THE UNDERGROUND CABLE. THE RISER TO THE SURGE ARRESTOR MUST REMAIN #2 CU DUE TO SIZE RESTRICTIONS.** **2. REFER TO A-30-05 FOR APPLICABLE STOCK CODES & MOUNTING DETAILS. CONFIGURATOR DEFAULTS TO THIS OPTION.** **3. WHEN SPACE IS AN ISSUE THIS TAG HOLDER MAY BE USED INSTEAD OF THE REFLECTIVE SIGN. REFER TO A-30-05 FOR MOUNTING DETAILS & B-30-26 FOR APPLICABLE STOCK CODES.**

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*Sask**Power*** - DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK	DRN. **JDA**	**SINGLE PHASE TAKE-OFF STRUCTURE**
L. MOEN	J. ARSENAULT	CHKD.	
		2019-04-08	

DATE OF ISSUE: **2020/02/12** | DRAWING NO: **B-14-10** | **SHEET 3 OF 3** | REV. **0**

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY A	QUANTITY B	DESCRIPTION
1	1 34 08	0	3	GUARD CABLE PLASTIC - 4" x 8'
1	1 34 09	3	0	GUARD CABLE PLASTIC - 2 1/2" x 8'
2	1 34 10	0	1	GUARD CABLE STEEL - 4" x 8'
2	1 34 11	1	0	GUARD CABLE STEEL - 2 1/2" x 8'
3	1 78 38	6	6	SCREW LAG - 3/8" x 4"
4	5 09 XX	3	3	CONNECTOR COMPRESSION
5	5 46 18	1	1	STRAP LEAD
6	7 69 64	0.28	0.28	SCREW WOOD - #14 x 2 1/2" (100/BOX)
7	05 640 000	1	1	SIGN - DANGER
8	05 646 582	1	1	DECAL – WATCH FOR WIRES

NOTE:

1. **USE COLUMN 'A' OR 'B' TO SUIT THE NUMBER OF CIRCUITS. COLUMN 'A' – 2-1/2" CABLE GUARD, COLUMN 'B' – 4" CABLE GUARD.**

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*Sask**Power*** - DISTRIBUTION STANDARDS

DRN.	DESIGN CHK.	APPROVAL	**SECONDARY TAKE-OFF STRUCTURE**
CHKD.			
DATE	DATE	DATE	

DATE OF ISSUE **2007/04/16** | DRAWING NO: **B-14-11** | **SHEET 1 OF 2** | REV. **E**

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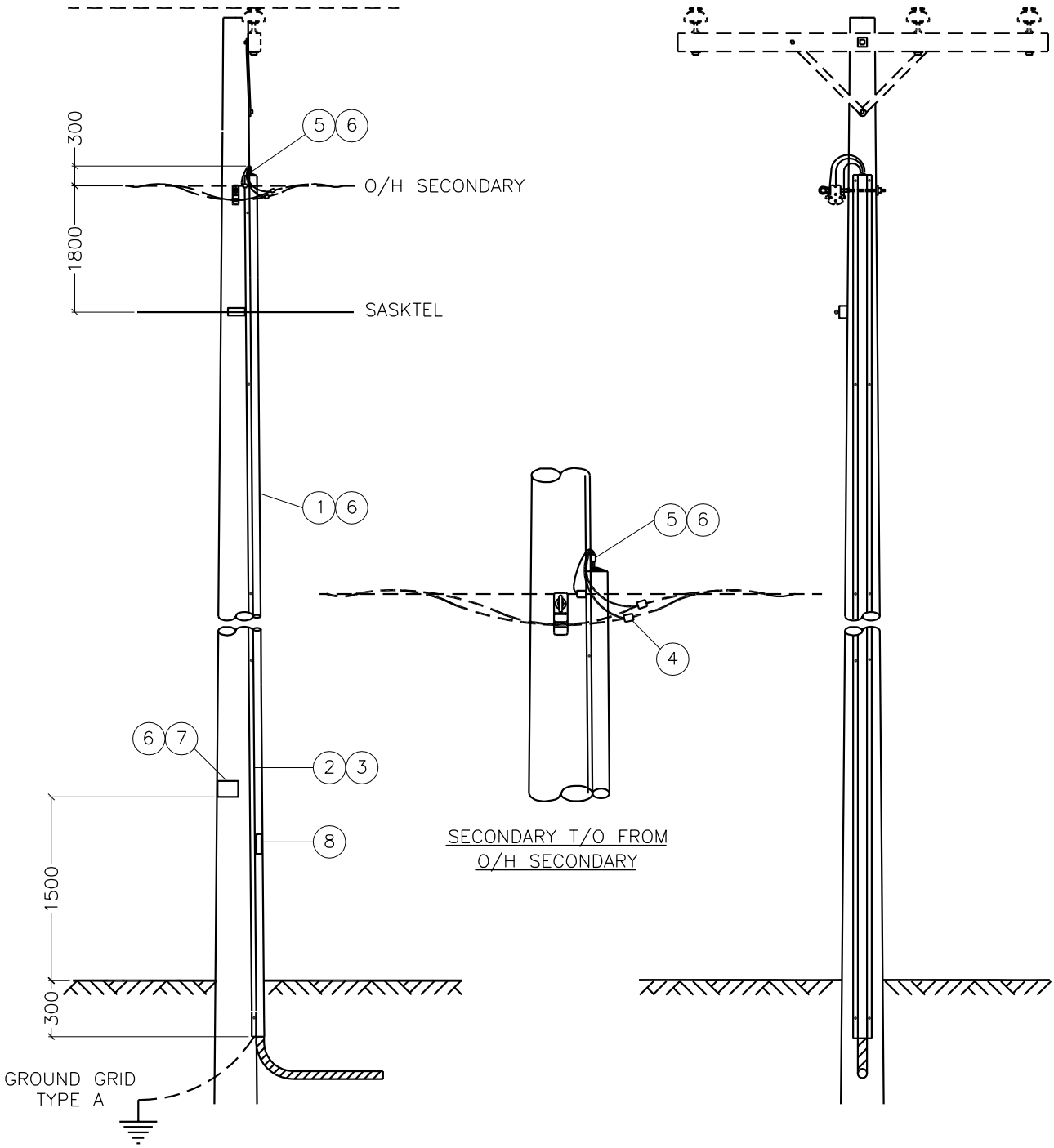

NOTES:

1. REFER TO B-14-00 FOR ADDITIONAL INSTALLATION NOTES.
2. GUARD TO BE BUILT ON SIDE AWAY FROM TRAFFIC.
3. GROUND BOTTOM OF CABLE GUARD TO GROUND ROD.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. D.DONAIS	DRN. D.REDEKOPP CHKD. 2017-10-31	SECONDARY TAKE-OFF STRUCTURE
DATE OF ISSUE 2016/05/04	DRAWING NO. B-14-11	SHEET 2 of 2	REV. F

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY A	QUANTITY B	DESCRIPTION
1	1 34 10	0	1	GUARD CABLE STEEL - 4" x 8'
1	1 34 11	1	0	GUARD CABLE STEEL - 2 1/2" x 8'
2	1 34 08	0	3	GUARD CABLE PLASTIC - 4" x 8'
2	1 34 09	3	0	GUARD CABLE PLASTIC - 2 1/2" x 8'
3	1 78 38	6	6	SCREW LAG - 3/8" x 4"
4	5 06 74	3	3	TERMINAL BLOCK - 6 OUTLET
5	5 46 18	1	1	STRAP LEAD
6	5 12 06	2	2	CONNECTOR CU – 4C4
7	7 69 64	0.28	0.28	SCREW WOOD - #14 x 2 1/2" (100/BOX)
8	05 640 000	1	1	SIGN - DANGER
9	05 646 582	1	1	DECAL – WATCH FOR WIRES

NOTE:

1. **USE COLUMN A OR B TO SUIT THE NUMBER OF CIRCUITS.**

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*Sask**Power*** - DISTRIBUTION STANDARDS

DRN.	DESIGN CHK.	APPROVAL	SECONDARY TRANSFORMER TAKE-OFF STRUCTURE
CHKD.			
DATE	DATE	DATE	

DATE OF ISSUE **2007/04/16** | DRAWING NO: **B-14-12** | **SHEET 1 OF 2** | REV. **E**

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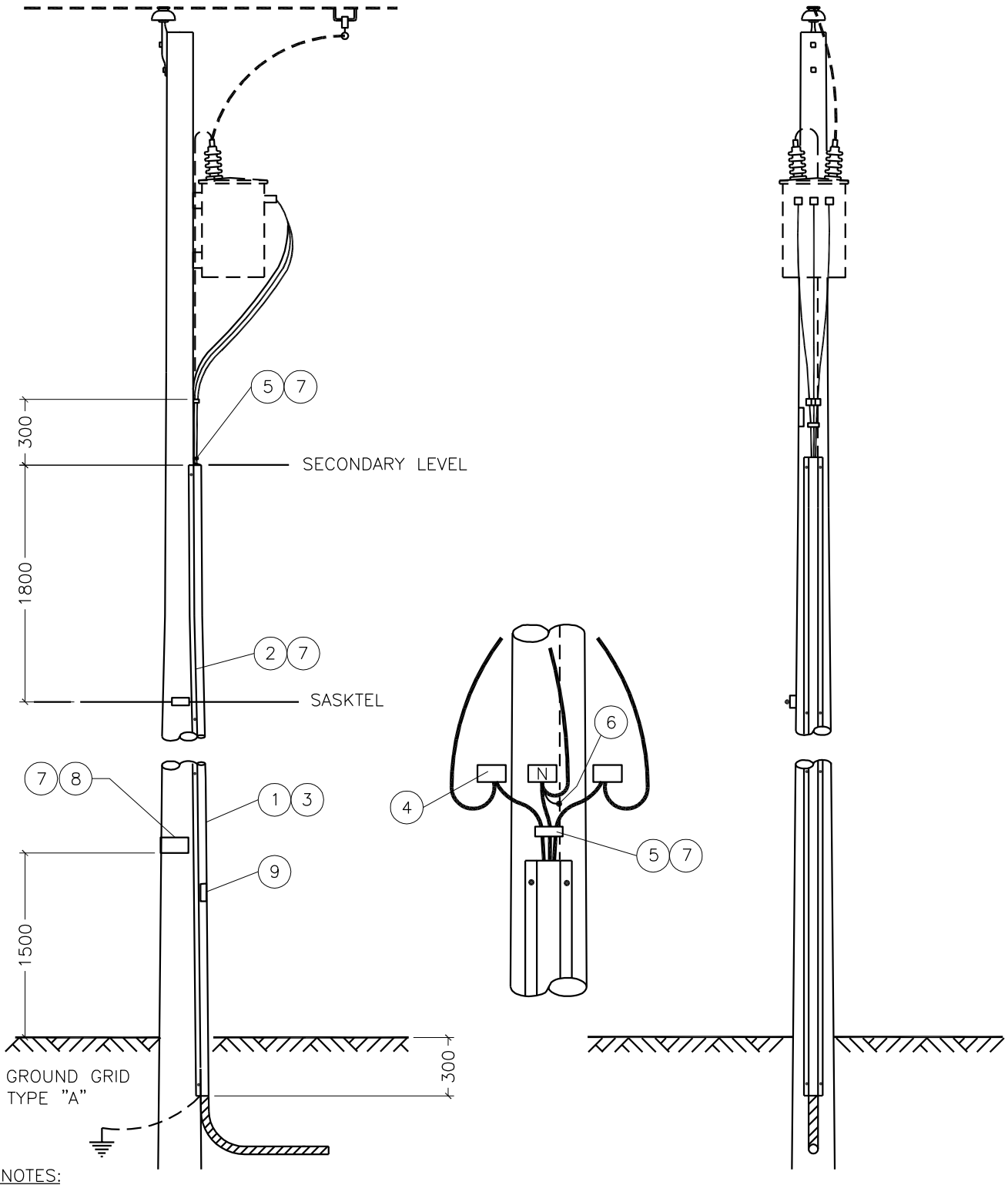

NOTES:

1. REFER TO B-14-00 FOR ADDITIONAL INSTALLATION NOTES.
2. FOR TRANSFORMERS WITH SPADE TYPE CONNECTORS SEE DRAWING B-08-31 BOX A.
3. GROUND BOTTOM OF CABLE GUARD TO GROUND ROD.
4. IF REQUIRED TO SUPPORT CABLES NEAR TERMINALS, USE A SPREADER BRACKET (CODE 1-21-04) & SQUARE WASHER (CODE 1-93-42).
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. D.DONAIS	DRN. D.REDEKOPP CHKD. 2017-10-31	SECONDARY TRANSFORMER TAKE-OFF STRUCTURE
DATE OF ISSUE 2017-11-03	DRAWING NO. B-14-12	SHEET 2 of 2	REV. E

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
1	1-13-16	4	BOLT MACHINE - 5/8" x 16"
2	1-32-86	4	GAIN POLE
3	1-85-01	1/2 lb	STAPLE FENCE - 1 3/4"
4	1-93-27	4	WASHER LOCK DOUBLE COIL - 5/8"
5	1-93-42	4	WASHER - SQUARE 2 ¼" x 2 ¼" x 13/16" HOLE
6	2-83-04	10 m	WIRE CU - #4/7 STR
7	5-06-74	3	TERMINAL BLOCK - 6 OUTLET (IF REQUIRED)
8	5-12-06	3	CONNECTOR CU - #4-#4
9	5-46-18	1	STRAP LEAD
10	7-69-64	2	SCREW WOOD - #14 x 2 1/2"
11	05-641-025	2	SIGN DANGER - SELF ADHESIVE
12	Purchase Locally	3	TROUGH CABLE - 12" x 8'

SaskPower - DISTRIBUTION STANDARDS

DRN.	DESIGN CHK.	APPROVAL	SECONDARY TAKE-OFF USING CABLE TROUGH
CHKD.			
DATE	DATE	DATE	

DATE OF ISSUE **90-04-02** | DRAWING NO: **B-14-13** | **SHEET 1 of 2** | REV. **0**

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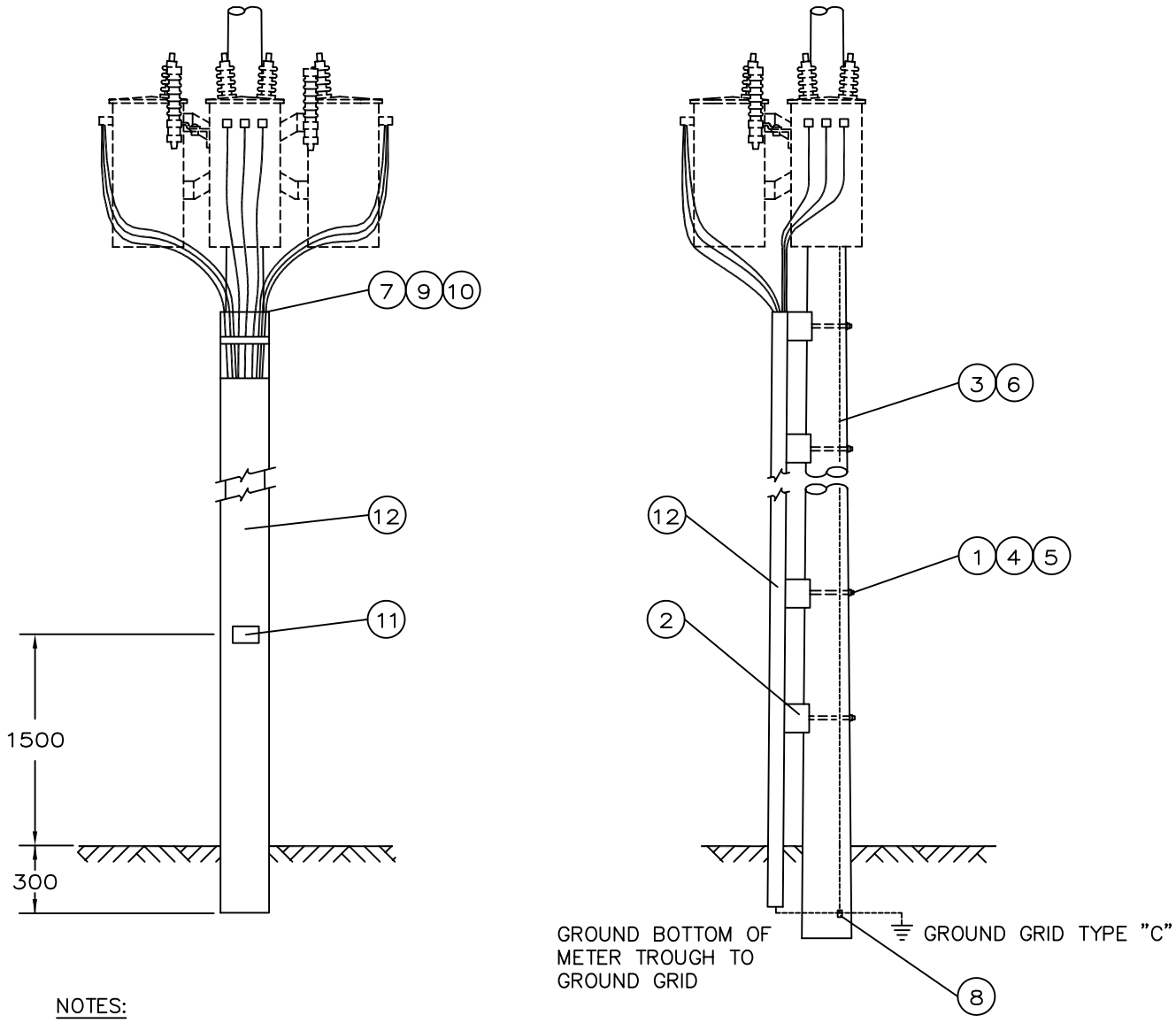

NOTES:

1. THIS STRUCTURE MUST BE FIRST AUTHORIZED BY THE REGION ENGINEER.
2. APPLICABLE ONLY IN THE CASE WHERE THE NUMBER OF CABLES IS UNWIELDY.
3. REFER TO A–33 FOR GROUNDING AND GROUND GRID TYPE.
4. REFER TO A–08–00 FOR SECONDARY RISER SIZE IF REQUIRED.
5. THE TRANSFORMER TANK AND CLUSTER BRACKET MUST BE GROUNDED SEPARATELY.
6. MINIMUM 12.2m POLE RURAL; MINIMUM 13.7m POLE URBAN.

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

SaskPower – DISTRIBUTION STANDARDS

DRN. D.F.K.	DESIGN CHK.	SAFETY APP.	APPROVAL	SECONDARY TAKE–OFF USING CABLE TROUGH
CHKD.				
DATE 89–11–17	DATE	DATE	DATE	
DATE OF ISSUE		DRAWING NO. B–14–13	SHEET 2 OF 2	REV. 0

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
1	1 12 02	2	BOLT – MACHINE – 1/2" X 2"
2	1 13 12	1	BOLT – MACHINE – 5/8" X 12"
3	1 34 09	3	GUARD – CABLE – PLASTIC – 2-1/2" X 8'
4	1 34 11	1	GUARD – CABLE – STEEL – 2-1/2" X 8'
5	1 35 XX	1	BRACKET – CABLE POSITIONER
6	1 35 31	1	BRACKET – "T" FOR ARRESTORS & CUTOUTS
7	1 78 12	1	SCREW – LAG – 1/2" X 4-1/2"
8	1 78 38	6	SCREW – LAG – 3/8" X 4"
9	1 85 01	1/4 lb	STAPLE – FENCE – 1-3/4"
10	1 93 22	2	WASHER – LOCK – 1/2"
11	1 93 27	1	WASHER – DOUBLE LOCK – 5/8"
12	1 93 30	2	WASHER – ROUND – 9/16"
13	1 93 42	1	WASHER – SQUARE – 2-1/4" X 2-1/4" X 13/16" HOLE
14	2 83 02	3 m	WIRE – CU – #2/7 STR
15	2 83 04	6 m	WIRE – CU – #4/7 STR
16	5 09 XX	2	CONNECTOR – AL – CRIMPIT (SEE NOTE 1)
17	5 12 06	2	CONNECTOR – CU – 4C4
18	5 12 08	1	CONNECTOR – CU – 2C4
19	5 46 18	2	LEAD STRAP
20	7 69 64	0.28	SCREW – WOOD – ROBERTSON #14 X 2-1/2" (100/BOX)
21	8 02 18	1	ARRESTER – 18 kV (URBAN)
22	8 35 05	1	TERMINATOR – #1 AL
23	71 35 00	1	CABLE PREP KIT
24	05 640 000	1	SIGN – DANGER
25	05 646 582	1	DECAL – WATCH FOR WIRES

NOTE:

1. REFER TO SECTION A-36 FOR SPECIFIC MATERIAL REQUIREMENTS

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SaskPower - DISTRIBUTION STANDARDS			
APPROVAL **L MOEN**	DESIGN CHK **O FRANCIS**	DRN. **OFF** CHKD. **LM**	**REVERSE TAKE-OFF ON RADIAL**
		2020-04-07	
DATE OF ISSUE: **2021-01-20**	DRAWING NO: **B-14-14**	**SHEET 1 OF 2**	REV. **E**

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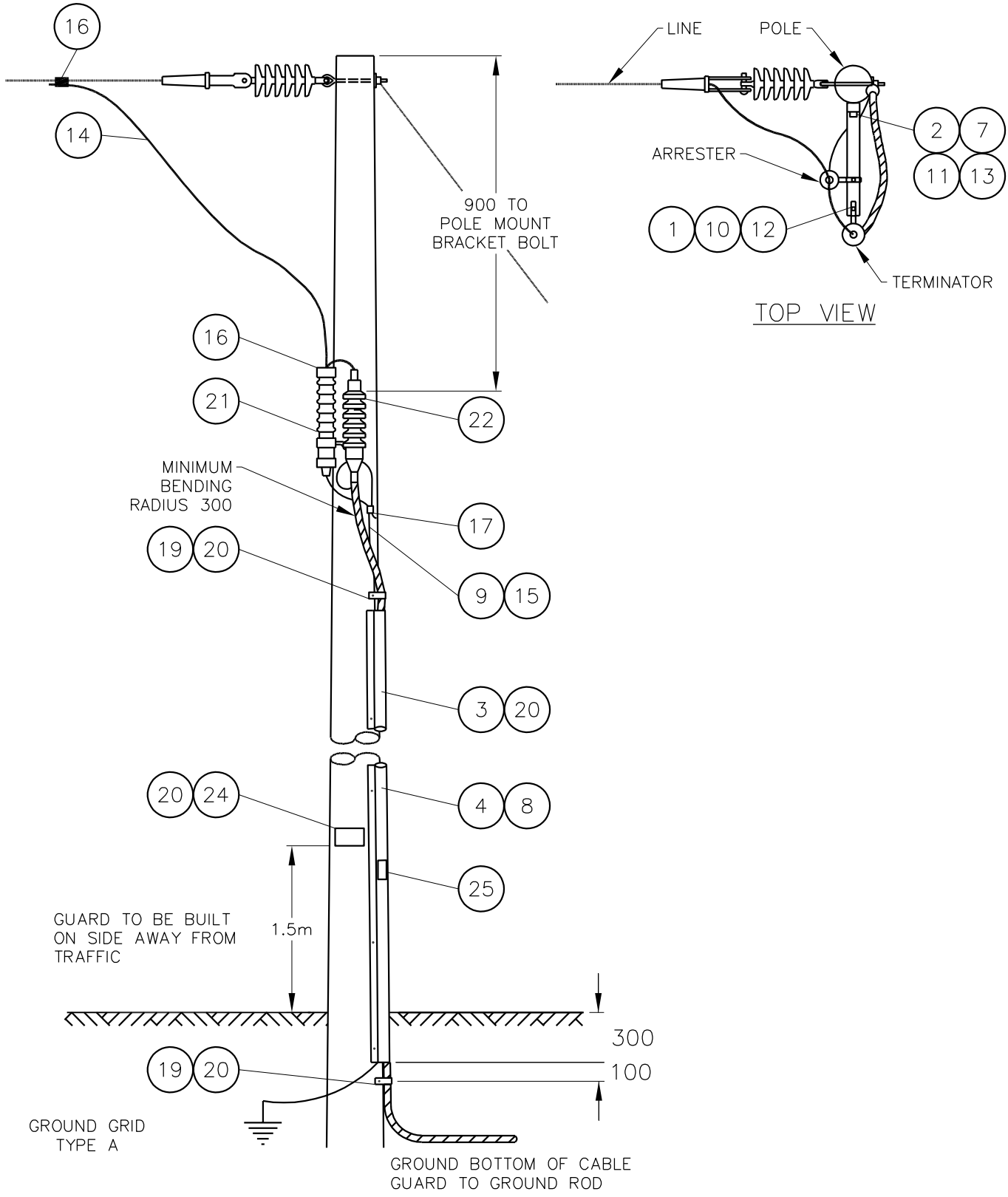

NOTES:
1. NORMAL DIRECTION OF FEED VIA UNDERGROUND CABLE.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SCALE: N.T.S.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN.D.REDEKOPP CHKD. 2021-01-07	REVERSE TAKE-OFF ON RADIAL
DATE OF ISSUE 2021-01-20	DRAWING NO. B-14-14	SHEET 2 of 2	REV. C

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
1	1 08 38	2	BOLT – CARRIAGE – 3/8" X 4-1/2"
2	1 12 02	6	BOLT – MACHINE – 1/2" X 2"
3	1 13 16	2	BOLT – MACHINE – 5/8" X 16"
4	1 19 32	4	BRACE – CROSSARM – 32"
5	1 29 10	2	CROSSARM – 4" X 5" X 10'
6	1 32 86	2	POLE GAIN – 12" X 6" X 6"
7	1 34 08	3	GUARD – CABLE – PLASTIC – 4" X 8'
8	1 34 10	1	GUARD – CABLE – STEEL – 4" X 8'
9	1 35 XX	3	BRACKET – CABLE POSITIONER
10	1 35 32	6	BRACKET – X ARM FOR CUTOUTS, ARRESTERS, OR TERMINATOR
11	1 78 12	4	SCREW – LAG – 1/2" X 4-1/2"
12	1 78 38	6	SCREW – LAG – 3/8" X 4"
13	1 85 01	½ lb	STAPLE – FENCE – 1-3/4"
14	1 93 22	6	WASHER – LOCK – 1/2"
15	1 93 25	2	WASHER – LOCK – DOUBLE COIL – 3/8"
16	1 93 27	2	WASHER – LOCK – DOUBLE COIL – 5/8"
17	1 93 30	6	WASHER – ROUND – 9/16" HOLE
18	1 93 42	4	WASHER – SQUARE – 2-1/4" X 2-1/4" X 13/16" HOLE
19	2 02 71	3	CLAMP – LIVE LINE
20	2 02 82	3	CLAMP – BAIL – #6-1/0 ACSR
21	2 12 62	3	CUTOUT – LOADBREAK – 27 kV – 100 AMP – SEE NOTE 1
22	2 83 02	9 m	WIRE – CU – #2/7 STR
23	2 83 04	11 m	WIRE – CU – #4/7 STR
24	5 09 XX	3	CONNECTOR – AL – CRIMPIT
25	5 12 06	2	CONNECTOR – CU – 4C4
26	5 46 18	3	LEAD STRAP
27	7 38 06	3	FUSE LINK – TYPE "T" – 6A

MATERIAL LIST CONTINUED ON SHEET 3

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SaskPower - DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK	DRN. OFF	3Ø SINGLE CIRCUIT TAKE-OFF STRUCTURE
L MOEN	O.FRANCIS	CHKD. LM	
		2020-12-07	

DATE OF ISSUE: 2021-01-20	DRAWING NO: B-14-15	SHEET 1 OF 3	REV. J

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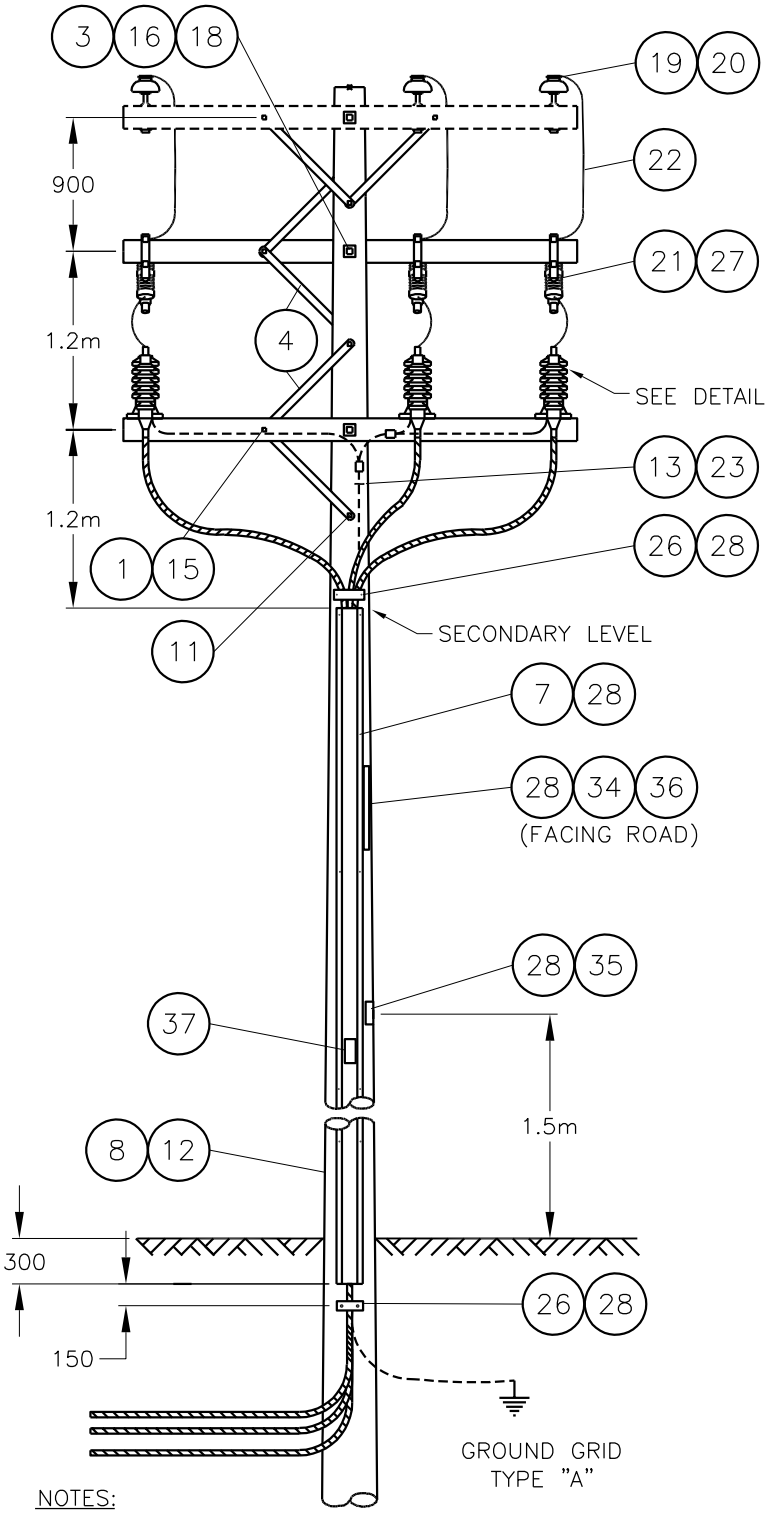
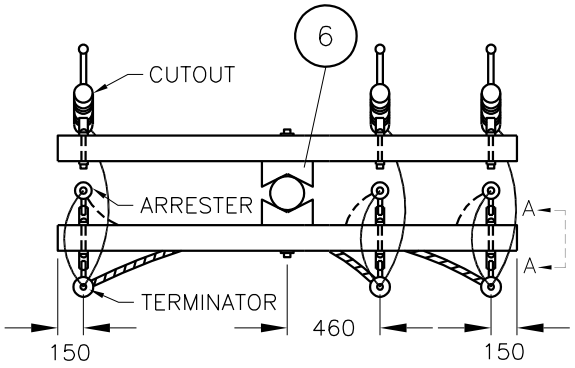
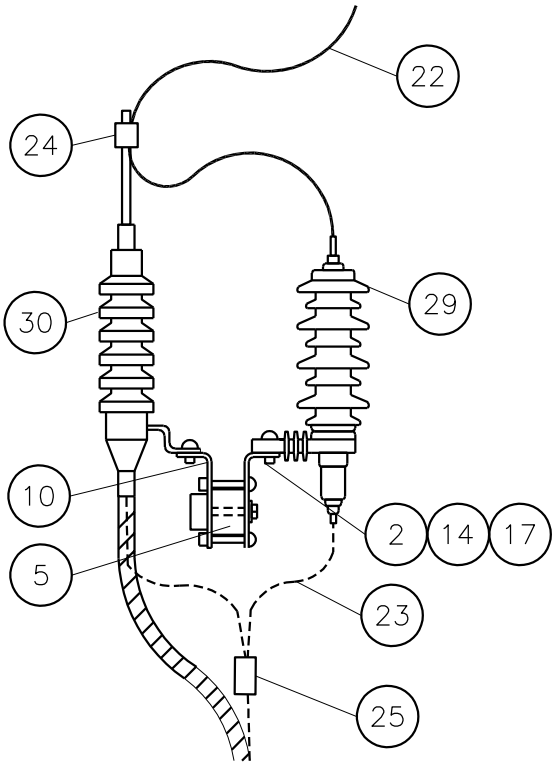




TOP VIEW

TOP CONDUCTOR ARM NOT SHOWN
RISERS WOULD BE STRAIGHT UP



DETAIL "A"

NOTES:

1. FOR DEADEND STRUCTURE THE TERMINATION CROSSARM IS UNDER THE GUY WIRE.
2. FRAMING ON A NEW STRUCTURE, THE PREFERRED LOCATION FOR THE ARRESTER ARM IS UNDER THE CONDUCTOR ARM.
3. REFER TO B-14-00 FOR ADDITIONAL INSTALLATION NOTES.
4. GROUND BOTTOM OF CABLE GUARD TO GROUND ROD.
5. REFER TO B-12-38 FOR TERMINATION DETAILS.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SCALE: N.T.S.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. O.FRANCIS	DRN.D.REDEKOPP CHKD.	3ø SINGLE-CIRCUIT TAKE-OFF STRUCTURE
		2020-10-19	
DATE OF ISSUE 2021-01-20	DRAWING NO. B-14-15	SHEET 2 of 3	REV. J

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
28	7 69 64	0.30	WOOD SCREW – #14 – 2" HEX HEAD (100/BOX)
29	8 02 18	3	ARRESTER – 18 kV (URBAN)
30	8 35 XX	3	TERMINATOR
31	71 35 00	3	CABLE PREP KIT
32	05 385 151	-	TAG HOLDER – ALUMINUM – FOR 10 – 1" TAGS – SEE NOTE 3
33	05 385 20X	-	TAG – NUMBER – YELLOW – SEE NOTE 3
33	05 385 209	-	TAG – DASH – YELLOW – SEE NOTE 3
33	05 385 25X	-	TAG – LETTER – YELLOW – SEE NOTE 3
34	05 638 32X	5	DECAL – NUMBER – BLACK – 1-1/2" – SEE NOTE 2
34	05 638 329	1	DECAL – DASH – BLACK – 1-1/2" – SEE NOTE 2
34	05 638 4XX	3	DECAL – LETTER – BLACK – 1-1/2" – SEE NOTE 2
35	05 640 000	1	SIGN – DANGER – HIGH VOLTAGE
36	05 640 006	1	SIGN – BLANK – REFLECTIVE – 3" X 18" – SEE NOTE 2
37	05 646 582	1	DECAL – WATCH FOR WIRES

NOTES:

1. **LOADBREAK CUTOUT IS CAPABLE OF ACCOMMODATING UP TO 2/0 CU (STOCK CODE 28320). HOWEVER, THE CONNECTORS, TERMINATOR SIZE & RISER AMPACITY MUST MATCH THE UNDERGROUND CABLE. THE RISER TO THE SURGE ARRESTOR MUST REMAIN #2 CU DUE TO SIZE RESTRICTIONS.**
2. **REFER TO A-30-05 FOR APPLICABLE STOCK CODES & MOUNTING DETAILS. CONFIGURATOR DEFAULTS TO THIS OPTION.**
3. **WHEN SPACE IS AN ISSUE THIS TAG HOLDER MAY BE USED INSTEAD OF THE REFLECTIVE SIGN. REFER TO A-30-05 FOR MOUNTING DETAILS & B-30-26 FOR APPLICABLE STOCK CODES.**

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SaskPower - DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK	DRN. **OFF**	**3Ø SINGLE CIRCUIT TAKE-OFF STRUCTURE**	
L MOEN	**O. FRANCIS**	CHKD. **LM**		
		2020-12-07		
DATE OF ISSUE: **2021-01-20**		DRAWING NO: **B-14-15**	**SHEET 3 OF 3**	REV. **A**

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
1	1 08 38	3	BOLT CARRIAGE – 3/8" x 4 1/2"
2	1 09 20	2	BOLT – DOUBLE ARMING – 5/8" x 20"
3	1 12 02	6	BOLT – MACHINE – 1/2" x 2"
4	1 12 08	6	BOLT – MACHINE – 1/2" x 8'
5	1 13 16	1	BOLT MACHINE – 5/8" x 16"
6	1 19 32	4	BRACE CROSSARM – 32"
7	1 21 31	3	PLATE – ADAPTER
8	1 29 10	3	CROSSARM – 4" x 5" x 10'
9	1 32 86	1	GAIN POLE – 12" x 6" x 6"
10	1 34 08	3	GUARD CABLE PLASTIC – 4" x 8'
11	1 34 10	1	GUARD CABLE STEEL – 4" x 8'
12	1 35 32	6	BRACKET – X ARM FOR CUTOUTS, ARRESTERS, OR TERMINATOR
13	1 78 12	4	SCREW LAG – 1/2" x 4 1/2"
14	1 78 38	6	SCREW – LAG 3/8" x 4"
15	1 85 01	0.5 lb	STAPLE FENCE – 1 3/4"
16	1 93 22	12	WASHER – LOCK – 1/2"
17	1 93 25	3	WASHER – LOCK – 3/8" DOUBLE COIL
18	1 93 27	6	WASHER – LOCK – 5/8" DOUBLE COIL
19	1 93 30	12	WASHER ROUND – 9/16" HOLE
20	1 93 42	12	WASHER SQUARE – 2-1/4" x 2-1/4" x 13/16" HOLE
21	2 65 87	9	HYLUG – 4/0 STR. AL & CU
22	2 71 76	3	DISCONNECT SOLID BLADE – 25 kV 400 AMP
23	2 83 04	14 m	WIRE CU – #4/7 STR
24	2 98 01	9m	WIRE CU – #4/0 BARE, 19 STRANDS
25	5 06 97	3	O/H FAULT INDICATOR
26	5 09 XX	3	CONNECTOR AL – CRIMPIT
27	5 12 02	3	COPPER – CRIMPIT
28	5 12 06	2	CONNECTOR CU – 4C4
29	5 46 18	3	STRAP LEAD

MATERIAL LIST CONTINUED ON SHEET 3

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SaskPower - DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK	DRN. **DCD**	**3Ø, SOLID BLADE DISCONNECT SINGLE-CIRCUIT TAKE-OFF STRUCTURE**
L. MOEN	**D. DONAIS**	CHKD.	
		2019-03-11	

DATE OF ISSUE: **2020/05/12** | DRAWING NO: **B-14-16** | **SHEET 1 OF 3** | REV. **K**

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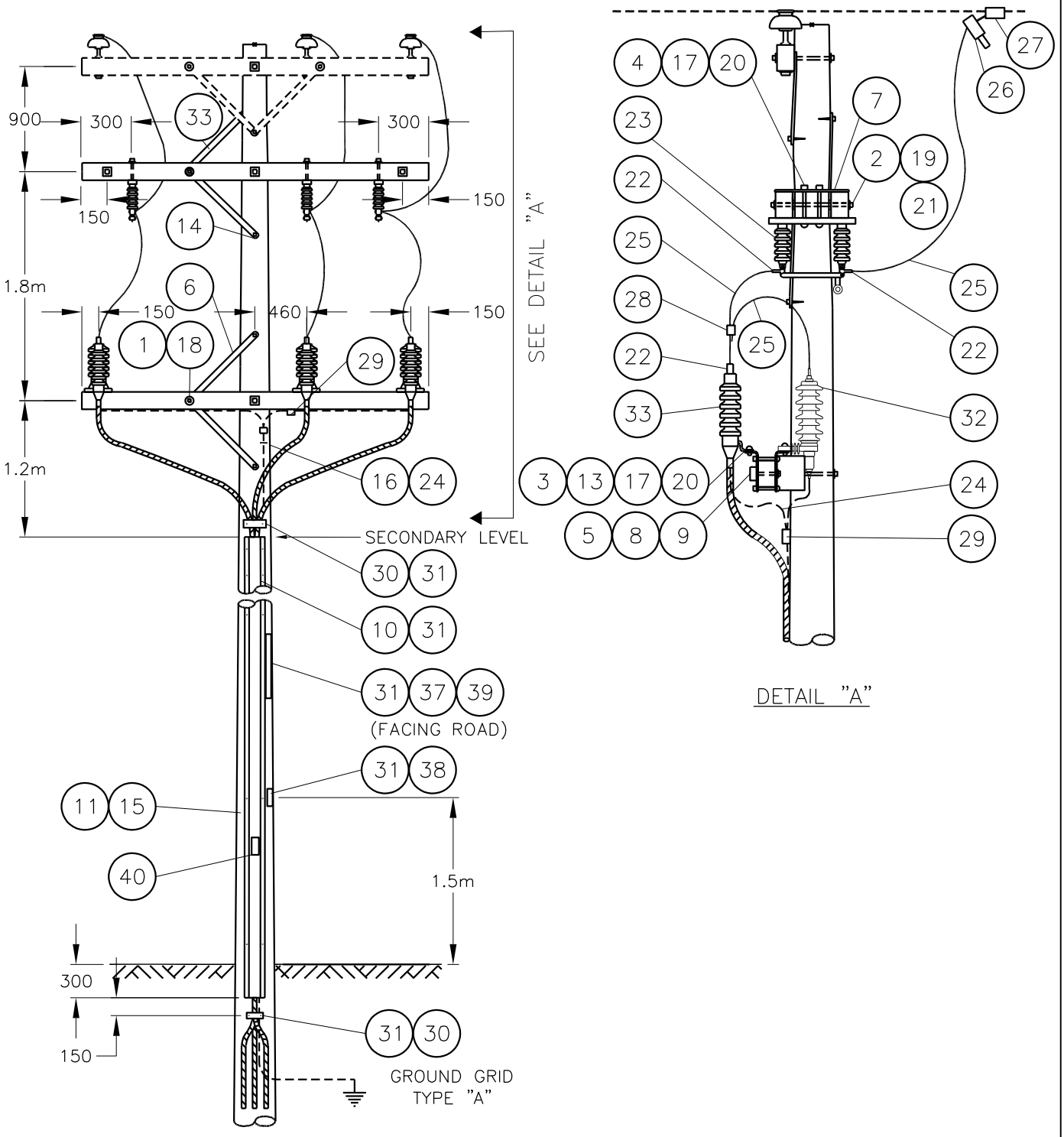

NOTES:

1. REFER TO B-14-00 FOR ADDITIONAL INSTALLATION NOTES.
2. GUARD TO BE BUILT ON SIDE AWAY FROM TRAFFIC.
3. GROUND BOTTOM OF CABLE GUARD TO GROUND ROD.
4. REFER TO B-12-38 FOR TERMINATION DETAILS.
5. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SCALE: N.T.S.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN.D.REDEKOPP CHKD. 2021-01-07	3ø, SOLID BLADE DISCONNECT, SINGLE-CIRCUIT TAKE-OFF STRUCTURE
DATE OF ISSUE 2021-01-20		DRAWING NO. B-14-16 SHEET 2 of 3	REV. M

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
31	7 69 64	0.30	WOOD SCREW – #14 – 2-1/2" ROUND ROBERTSON
32	8 02 18	3	ARRESTER – 18 kV (URBAN)
33	8 35 XX	3	TERMINATOR
34	71 35 00	3	CABLE PREP KIT
35	05 385 151	-	TAG HOLDER – ALUMINUM – FOR 10 – 1" TAGS – SEE NOTE 3
36	05 385 20X	-	TAG – NUMBER – YELLOW – SEE NOTE 3
36	05 385 209	-	TAG – DASH – YELLOW – SEE NOTE 3
36	05 385 25X	-	TAG – LETTER – YELLOW – SEE NOTE 3
37	05 638 32X	5	DECAL – NUMBER – BLACK – 1-1/2" – SEE NOTE 2
37	05 638 329	1	DECAL – DASH – BLACK – 1-1/2" – SEE NOTE 2
37	05 638 4XX	3	DECAL – LETTER – BLACK – 1-1/2" – SEE NOTE 2
38	05 640 000	1	SIGN – DANGER – HIGH VOLTAGE
39	05 640 006	1	SIGN – BLANK – REFLECTIVE – 3" X 18" – SEE NOTE 2
40	05 646 582	1	DECAL – WATCH FOR WIRES

NOTES:

1. **REFER TO A-30-05 FOR APPLICABLE STOCK CODES & MOUNTING DETAILS. CONFIGURATOR DEFAULTS TO THIS OPTION.**
2. **WHEN SPACE IS AN ISSUE THIS TAG HOLDER MAY BE USED INSTEAD OF THE REFLECTIVE SIGN. REFER TO A-30-05 FOR MOUNTING DETAILS & B-30-26 FOR APPLICABLE STOCK CODES.**

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BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
1	1 08 38	1	BOLT – CARRIAGE – 3/8" X 4-1/2"
2	1 12 02	15	BOLT – MACHINE – 1/2" X 2"
3	1 13 14	2	BOLT – MACHINE – 5/8" X 14"
4	1 13 16	2	BOLT – MACHINE – 5/8" X 16"
5	1 13 18	1	BOLT – MACHINE – 5/8" X 18"
6	1 14 12	2	BOLT – MACHINE – 3/4" X 12"
7	1 19 32	2	BRACE – CROSSARM – 32"
8	1 29 10	1	CROSSARM – 4" X 5" X 10'
9	1 32 86	1	POLE GAIN – WOOD
10	1 34 08	3	GUARD – CABLE – PLASTIC – 4" x 8'
11	1 34 10	1	GUARD – CABLE – STEEL – 4" x 8'
12	1 35 XX	3	BRACKET – CABLE POSITIONER
13	1 35 32	6	BRACKET – CROSSARM
14	1 35 38	9 m	WILDLIFE GUARD – RISER COVER
15	1 78 12	2	SCREW – LAG – 1/2" X 4-1/2"
16	1 78 38	6	SCREW – LAG – 3/8" X 4"
17	1 85 01	0.25 lb	STAPLE – FENCE – 1-3/4"
18	1 85 02	20	STAPLE – MOULDING
19	1 93 22	15	WASHER – LOCK – 1/2"
20	1 93 25	1	WASHER – LOCK – DOUBLE COIL – 3/8"
21	1 93 27	5	WASHER – LOCK – DOUBLE COIL – 5/8"
22	1 93 28	2	WASHER – LOCK – DOUBLE COIL – 3/4"
23	1 93 30	15	WASHER – ROUND – 9/16" HOLE
24	1 93 42	8	WASHER – SQUARE – 2-1/4" X 2-1/4" X 13/16" HOLE
25	2 27 00	3	MOULDING – GROUND WIRE
26	2 65 XX	6	HYLUG – SEE NOTE 1
27	2 69 45	1	GOPT – 25 kV – 600 A – LOAD BREAK
28	2 83 02	11 m	WIRE – CU – #2/7 STR
29	2 98 01	9 m	WIRE – CU – 4/0 19 STR
30	5 06 97	4	O/H FAULT INDICATOR
31	5 09 2X	3	CONNECTOR – AL – CRIMPIT – SEE NOTE 1
32	5 12 01	1	CONNECTOR – CU – 2C2

MATERIAL LIST CONTINUED ON SHEET 3

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SaskPower - DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK	DRN. **OFF**	3∅ GOPT TAKE-OFF STRUCTURE
L MOEN	**O.FRANCIS**	CHKD. **LM**	
		2020-12-08	

DATE OF ISSUE: **2021-01-20** | DRAWING NO: **B-14-17** | **SHEET 1 OF 3** | REV. **G**

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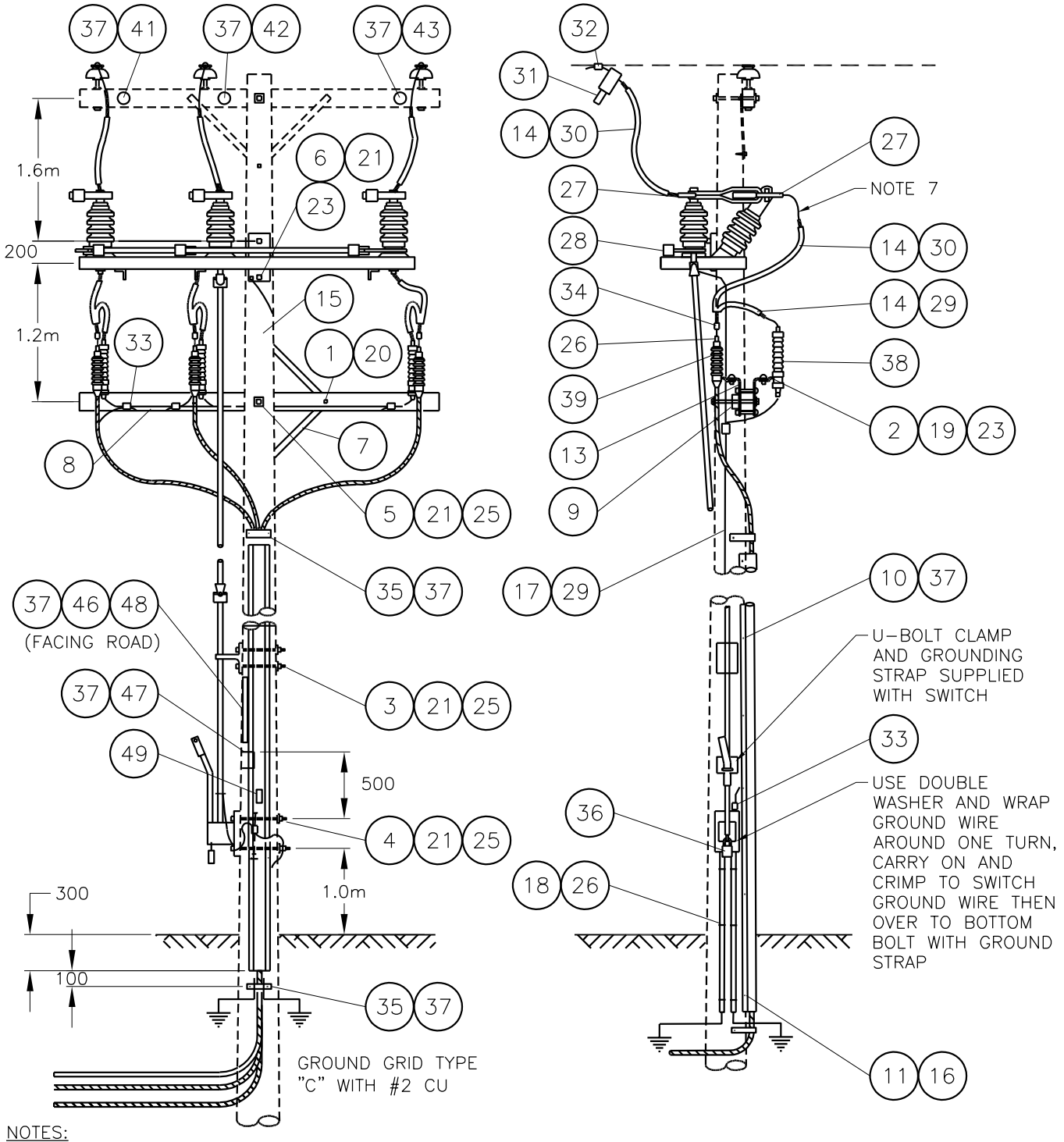

NOTES:

1. LOCATION OF GROUND GRID IS DEPENDANT ON LOCATION OF SWITCH HANDLE AND DRIVE BAR.
2. ALWAYS INSTALL WITH SWITCH HANDLE UP. FOR ROTATION TYPE HANDLE MOVEMENT, MOUNT AT HEIGHT SHOWN. FOR PULL DOWN TYPE, MOUNT SO HANDLE CLEARS THE GROUND AND IS NOT TOO HIGH WHEN UP.
3. REFER TO SECTION A-33 FOR GROUNDING DETAILS AND GROUND GRID TYPE "C".
4. MINIMUM 12.2m (40') POLE RURAL. MINIMUM 15.2m (50') POLE URBAN. STRUCTURE CAN BE BUILT ON EXISTING 13.7m (45') POLE IF USING ABSOLUTE MINIMUM CLEARANCE VALUES.
5. NO JOINT USE TAKEOFFS OR SECONDARY TAKEOFFS ARE ALLOWED ON THIS STRUCTURE DUE TO CONGESTION ON THE POLE.
6. REFER TO B-14-00 FOR ADDITIONAL INSTALLATION NOTES.
7. ALLOW FOR 150mm BETWEEN RISER COVER AND GOPT HYLUG FOR GROUNDING.
8. REFER TO B-12-38 FOR TERMINATION DETAILS.
9. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SCALE: N.T.S.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN.D.REDEKOPP CHKD. 2021-01-07	3ø GOPT TAKE-OFF STRUCTURE
DATE OF ISSUE 2021-01-20	DRAWING NO. B-14-17	SHEET 2 of 3	REV. H

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
33	5 12 02	3	CONNECTOR – CRIMPIT – 4/0 TO #2
34	5 46 18	2	LEAD STRAP
35	7 66 00	1	PADLOCK
36	7 69 64	0.32	WOOD SCREW – #14 – 2" HEX HEAD (100/BOX)
37	8 02 18	3	ARRESTER – 18 kV (URBAN)
38	8 35 XX	3	TERMINATOR
39	71 35 00	3	CABLE PREP KIT
40	05 116 362	1	DISC – PHASE MARKING – BLUE
41	05 116 366	1	DISC – PHASE MARKING – RED
42	05 116 368	1	DISC – PHASE MARKING – YELLOW
43	05 385 151	-	TAG HOLDER – ALUMINUM – FOR 10 – 1" TAGS – SEE NOTE 3
44	05 385 20X	-	TAG – NUMBER – YELLOW – SEE NOTE 3
44	05 385 209	-	TAG – DASH – YELLOW – SEE NOTE 3
44	05 385 25X	-	TAG – LETTER – YELLOW – SEE NOTE 3
45	05 638 32X	5	DECAL – NUMBER – BLACK – 1-1/2" – SEE NOTE 2
45	05 638 329	1	DECAL – DASH – BLACK – 1-1/2" – SEE NOTE 2
45	05 638 4XX	3	DECAL – LETTER – BLACK – 1-1/2" – SEE NOTE 2
46	05 640 000	1	SIGN – DANGER – HIGH VOLTAGE
47	05 640 006	1	SIGN – BLANK – REFLECTIVE – 3" X 18" – SEE NOTE 2
48	05 646 582	1	DECAL – WATCH FOR WIRES

NOTES:

1. **REFER TO SECTION A-36 FOR SPECIFIC MATERIAL REQUIREMENTS.**
2. **REFER TO A-30-05 FOR APPLICABLE STOCK CODES & MOUNTING DETAILS. CONFIGURATOR DEFAULTS TO THIS OPTION.**
3. **WHEN SPACE IS AN ISSUE THIS TAG HOLDER MAY BE USED INSTEAD OF THE REFLECTIVE SIGN. REFER TO A-30-05 FOR MOUNTING DETAILS & B-30-26 FOR APPLICABLE STOCK CODES.**

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BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
1	1 08 38	1	BOLT – CARRIAGE – 3/8” X 4-1/2”
2	1 12 02	3	BOLT – MACHINE – 1/2” X 2”
3	1 13 18	1	BOLT – MACHINE – 5/8” X 18”
4	1 14 12	2	BOLT – MACHINE – 3/4" X 12"
5	1 19 32	2	BRACE – CROSSARM – GALVANIZED – 1-1/4” X 32”
6	1 29 10	1	CROSSARM – WOOD – 10’ LONG – 3 PIN
7	1 32 86	1	POLE GAIN – WOOD
8	1 34 08	3	GUARD – CABLE – PLASTIC – 4” X 8’
9	1 34 10	1	GUARD – CABLE – STEEL – 4” X 8’
10	1 35 XX	3	BRACKET – CABLE POSITIONER
11	1 35 32	3	BRACKET – X ARM FOR CUTOUTS, ARRESTERS OR TERMINATOR
12	1 78 12	6	SCREW – LAG – 1/2” X 4-1/2”
13	1 78 38	10	SCREW – LAG – 3/8” X 4”
14	1 85 01	1 LB	STAPLE – FENCE
15	1 85 02	24	STAPLE – MOULDING
16	1 93 22	3	WASHER – LOCK – 1/2”
17	1 93 25	1	WASHER – LOCK – DOUBLE COIL – 3/8”
18	1 93 27	1	WASHER – LOCK – DOUBLE COIL – 5/8”
19	1 93 28	2	WASHER – LOCK – DOUBLE COIL – 3/4"
20	1 93 30	3	WASHER – ROUND – 1-3/8” X 9/16” HOLE
21	1 93 42	1	WASHER – SQUARE – 2-1/4” X 2-1/4” X 13/16” HOLE
22	1 93 94	1	WASHER – CURVED – 2-1/4” X 2-1/4” X 11/16” HOLE
23	1 93 96	2	WASHER – CURVED – 3” X 3” X 13/16” HOLE
24	2 05 30	3	JUMPER STUD – AMPACT (SEE NOTE 3)
25	2 05 31	3	JUMPER STUD DISCONNECT – AMPACT
26	2 06 XX	3	CONNECTOR – AMPACT (SEE NOTE 1 & 3)
27	2 06 94	3	AMPACT SHELL – YELLOW
28	2 27 00	4	MOULDING – GROUND WIRE – 10’
29	2 65 83	12	HYLUG – CU/AL – #2
30	2 65 97	12	HYLUG – CU/AL – 4/0
31	2 83 02	28 m	WIRE – CU – #2/7 STR
32	2 98 01	12 m	WIRE – CU – 4/0 19 STR

MATERIAL LIST CONTINUED ON SHEET 3 OF 3.

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SaskPower - DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK	DRN. **OFF**	**INTELLIRUPTER 3Ø RECLOSER TAKE-OFF STRUCTURE**
L MOEN	**O. FRANCIS**	CHKD. **LM**	
		2020-12-08	

DATE OF ISSUE: **2021-01-20** | DRAWING NO: **B-14-18** | **SHEET 1 OF 3** | REV. **A**

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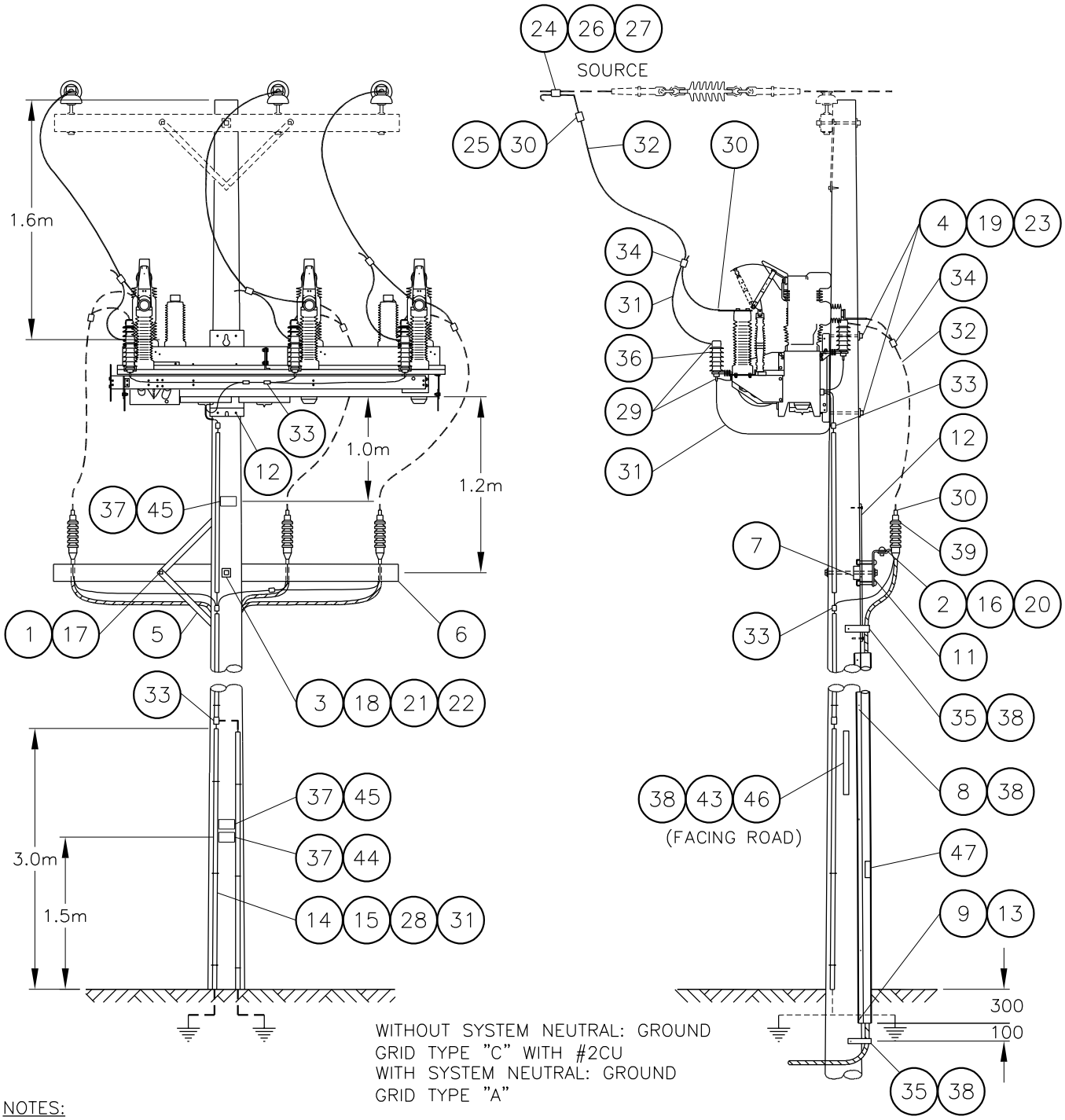
INTELLIRUPTER RECLOSER



NOTES:

1. INTELLIRUPTER GROUND MUST BE CONNECTED PRIOR TO ENERGIZATION AND MUST ALWAYS BE CONNECTED WHEN ENERGIZED. DAMAGE TO INTELLIRUPTER CONTROL CIRCUIT WILL OCCUR IF NOT GROUNDED.
2. MINIMUM 13.7m(45') CLASS 3 POLE REQUIRED FOR URBAN. MINIMUM 12.2m (40') CLASS 3 POLE REQUIRED FOR RURAL. CLASS 2 POLE REQUIRED FOR PELICAN STRUCTURE.
3. REFER TO SECTION A–33 FOR GROUNDING DETAILS AND LOCATION.
4. FOR DEADEND STRUCTURES, THE TERMINATOR CROSSARM IS UNDER THE GUYWIRE.
5. REFER TO B–14–00 FOR ADDITIONAL INSTALLATION NOTES.
6. GROUND BOTTOM OF CABLE GUARD TO GROUND ROD.
7. REFER TO B–12–38 FOR TERMINATION DETAILS.
8. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SCALE: N.T.S.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN.D.REDEKOPP CHKD. 2021–01–07	INTELLIRUPTER 3ø RECLOSER TAKE OFF STRUCTURE
DATE OF ISSUE 2021-01-20	DRAWING NO. B–14–18	SHEET 2 of 3	REV. C

BILL OF MATERIAL

ITEM NO.	CODE NO.	QUANTITY	DESCRIPTION
33	5 12 01	8	CONNECTOR – CRIMPIT – #2 TO #2
34	5 12 02	6	CONNECTOR – CRIMPIT – 4/0 TO #2
35	5 46 18	2	LEAD STRAP – 2” X 18”
36	6 02 21	6	ARRESTER – 21 kV (RURAL)
36	8 02 18	6	ARRESTER – 18 kV (URBAN)
37	7 69 62	0.12	WOOD SCREW – #10 – 1-1/2”" (100/BOX)
38	7 69 64	0.36	WOOD SCREW – #14 – 2" HEX HEAD (100/BOX)
39	8 35 XX	3	TERMINATOR
40	71 35 00	3	CABLE PREP KIT
41	05 385 151	-	TAG HOLDER – ALUMINUM – FOR 10 – 1" TAGS – SEE NOTE 5
42	05 385 20X	-	TAG – NUMBER – YELLOW – SEE NOTE 5
42	05 385 209	-	TAG – DASH – YELLOW – SEE NOTE 5
42	05 385 25X	-	TAG – LETTER – YELLOW – SEE NOTE 5
43	05 638 32X	5	DECAL – NUMBER – BLACK – 1-1/2" – SEE NOTE 4
43	05 638 329	1	DECAL – DASH – BLACK – 1-1/2" – SEE NOTE 4
43	05 638 4XX	3	DECAL – LETTER – BLACK – 1-1/2" – SEE NOTE 4
44	05 640 000	1	SIGN – DANGER – HIGH VOLTAGE
45	05 640 001	2	SIGN – WARNING – INTELLIRUPTER
46	05 640 006	1	SIGN – BLANK – REFLECTIVE – 3" X 18" – SEE NOTE 4
47	05 646 582	1	DECAL – WATCH FOR WIRES

NOTES:

1. **REFER TO SECTION A–36 FOR SPECIFIC MATERIAL REQUIREMENTS.**
2. **SPECIFY EXTRA CABLE LENGTH WHEN REQUIRED.**
3. **JUMPER STUD REQUIRES 477 KCMIL SIZED AMPACT.**
4. **REFER TO A-30-05 FOR APPLICABLE STOCK CODES & MOUNTING DETAILS. CONFIGURATOR DEFAULTS TO THIS OPTION.**
5. **WHEN SPACE IS AN ISSUE THIS TAG HOLDER MAY BE USED INSTEAD OF THE REFLECTIVE SIGN. REFER TO A-30-05 FOR MOUNTING DETAILS & B-30-26 FOR APPLICABLE STOCK CODES.**

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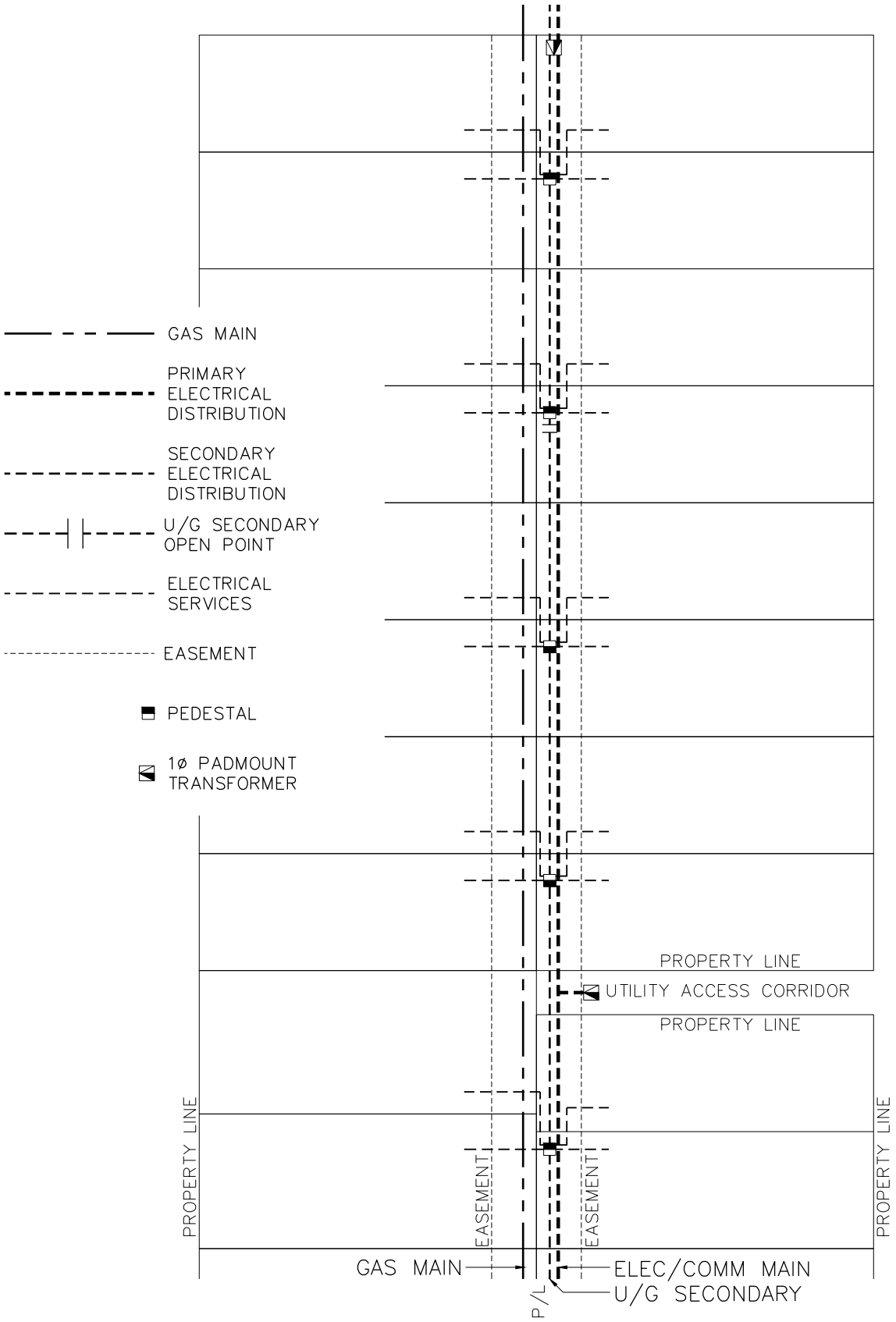
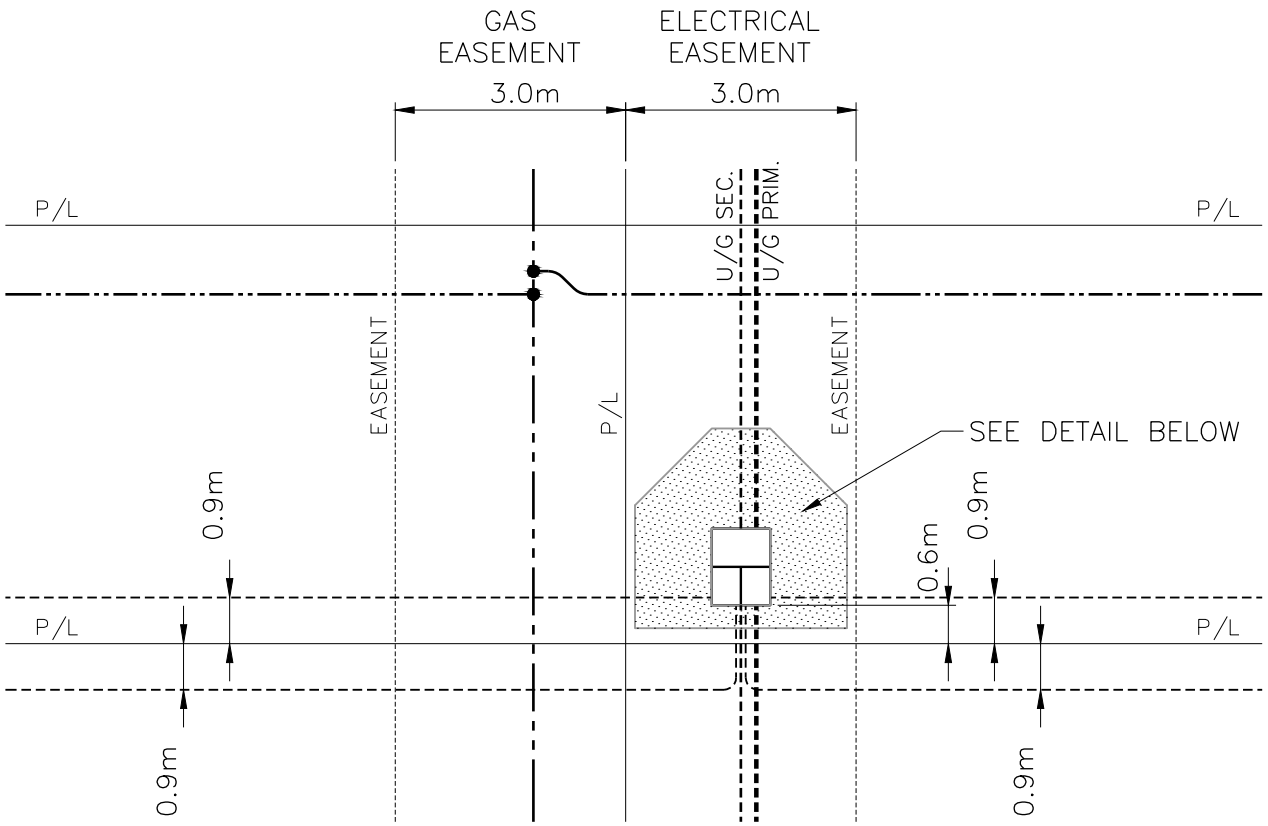


SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH NO REAR LANE FOR THREE PARTY JOINT USE OVERALL LAYOUT
DATE OF ISSUE : 2013/08/19	DRAWING NO. B-14-50	SHEET 1 of 3	REV. C



NOTE:

1. DIMENSIONS FOR PEDESTAL LOCATION ARE TO BE AT GROUND LINE.
2. GAS AND ELECTRICAL SERVICE CROSSING SHOULD BE AVOIDED IN TRENCH.
3. FOR CONDUCTOR/TRENCH LAYOUT, SEE DWG B-14-65.

GAS MAIN

GAS SERVICES

PRIMARY ELECTRICAL DISTRIBUTION

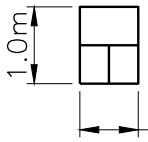
SECONDARY ELECTRICAL DISTRIBUTION

ELECTRICAL SERVICES

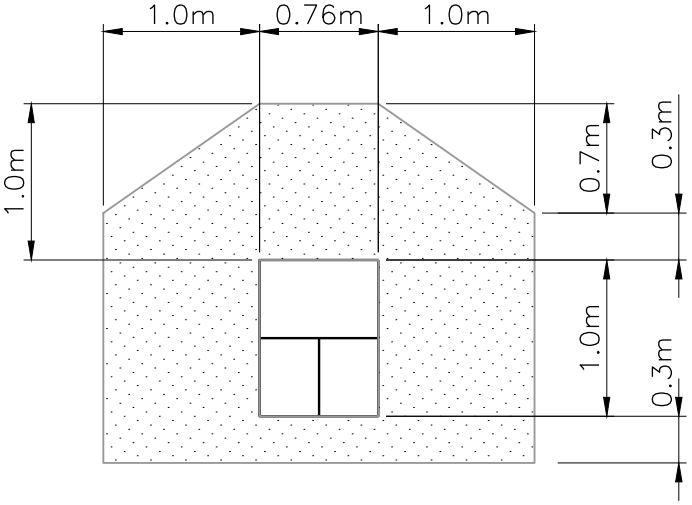
PROPERTY LINES

EASEMENT

CLEAR ZONE AROUND PEDESTAL



3 COMPARTMENT PEDESTAL



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SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH NO REAR LANE FOR THREE PARTY JOINT USE PEDESTAL INSTALLATION DETAILS
DATE OF ISSUE : 2013/08/19	DRAWING NO. B-14-50	SHEET 2 of 3	REV. 0

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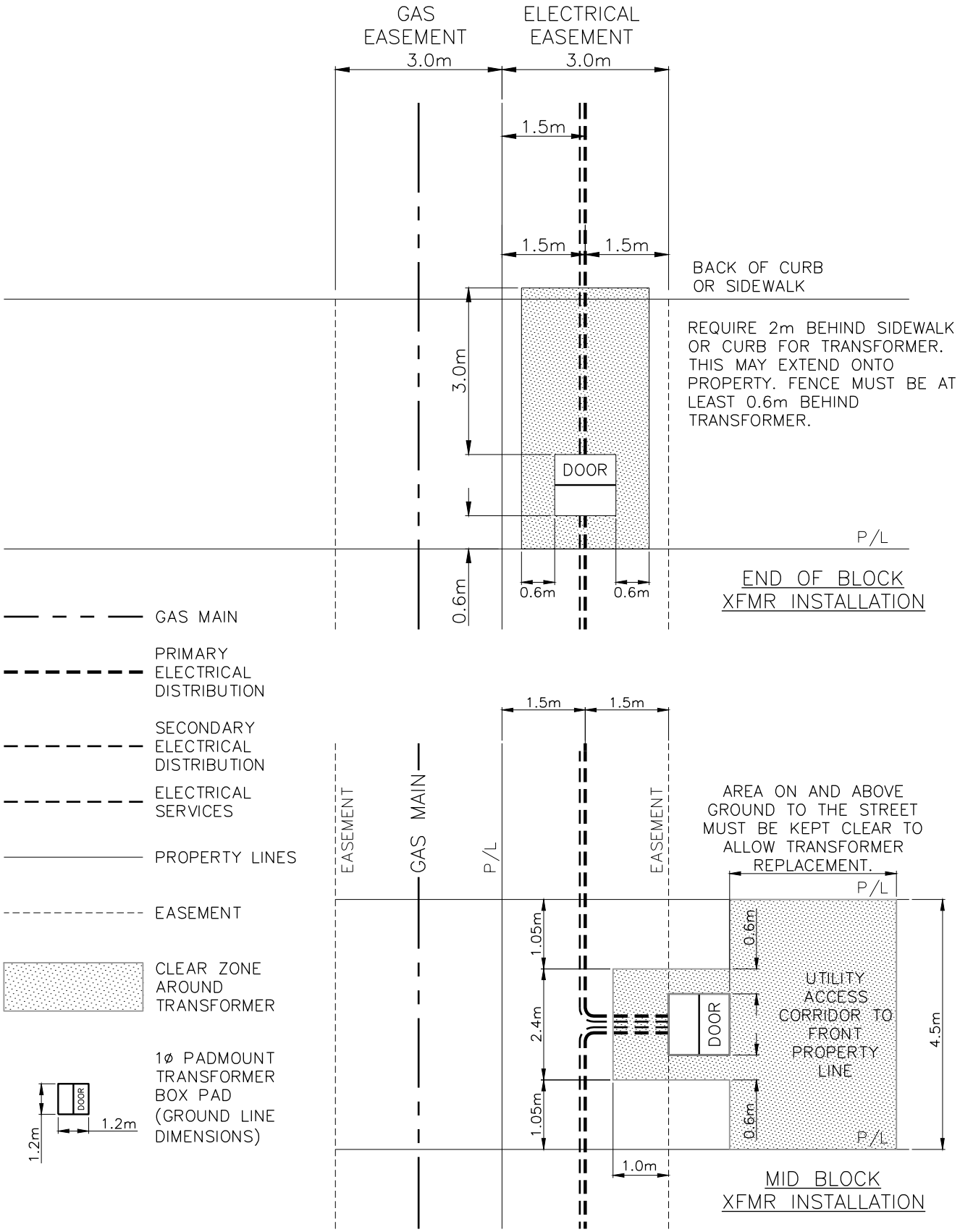
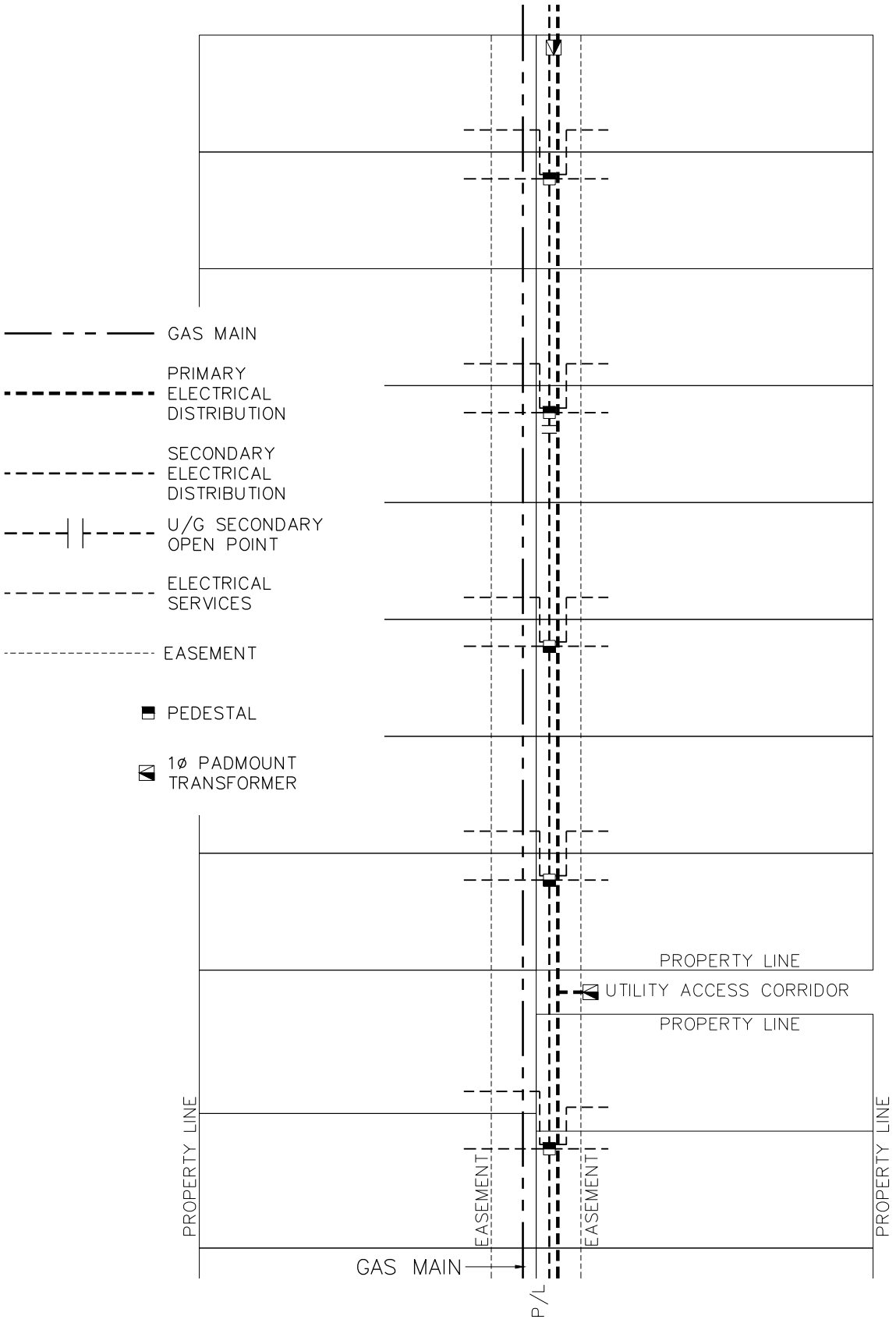


SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH NO REAR LANE FOR THREE PARTY JOINT USE PADMOUNT TRANSFORMER DETAILS
DATE OF ISSUE: **2013/08/19**	DRAWING NO. B-14-50	SHEET 3 of 3	REV. 0



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SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH NO REAR LANE FOR TWO PARY JOINT USE OVERALL LAYOUT
DATE OF ISSUE 2013/08/19	DRAWING NO. B-14-51	SHEET 1 of 3	REV. A

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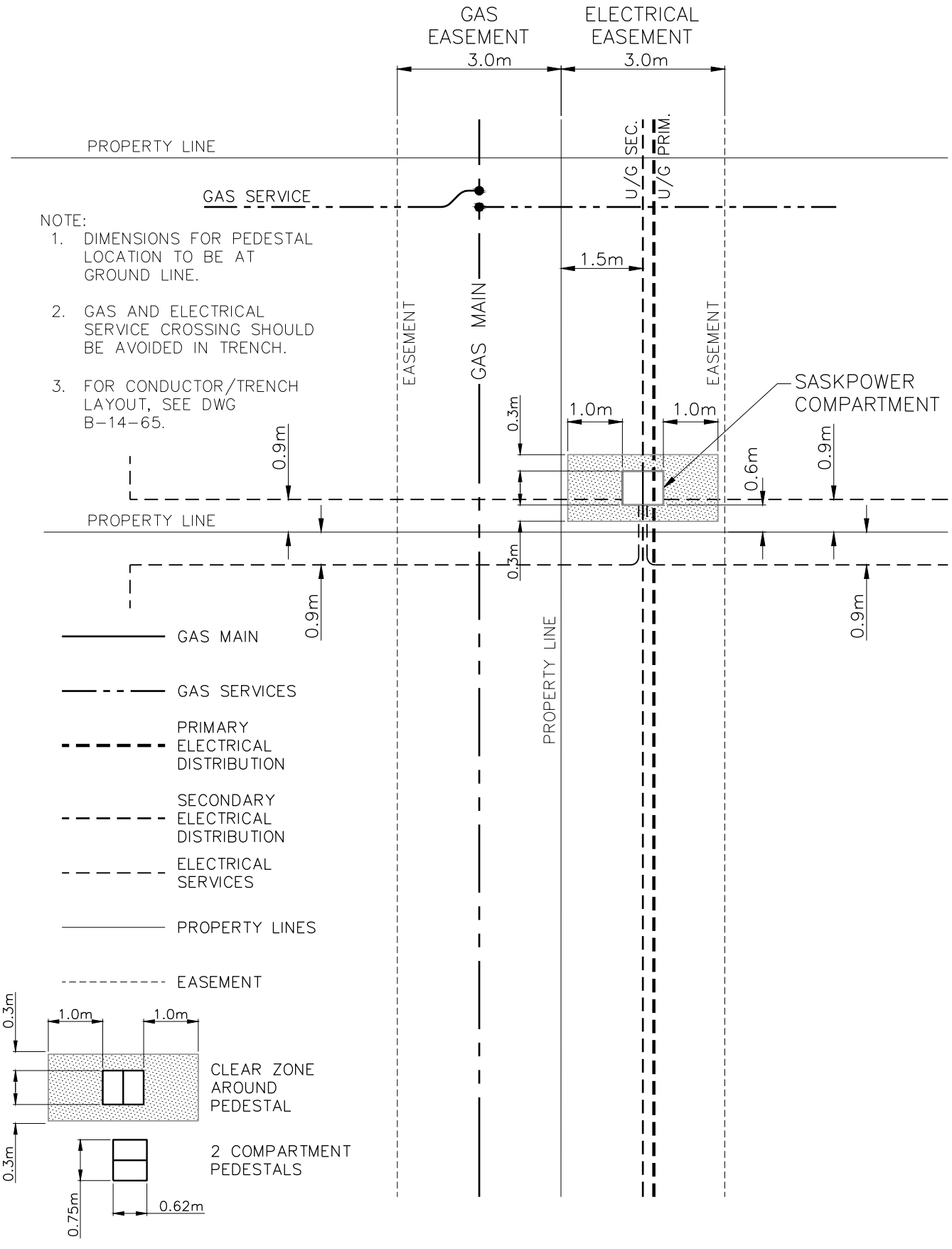
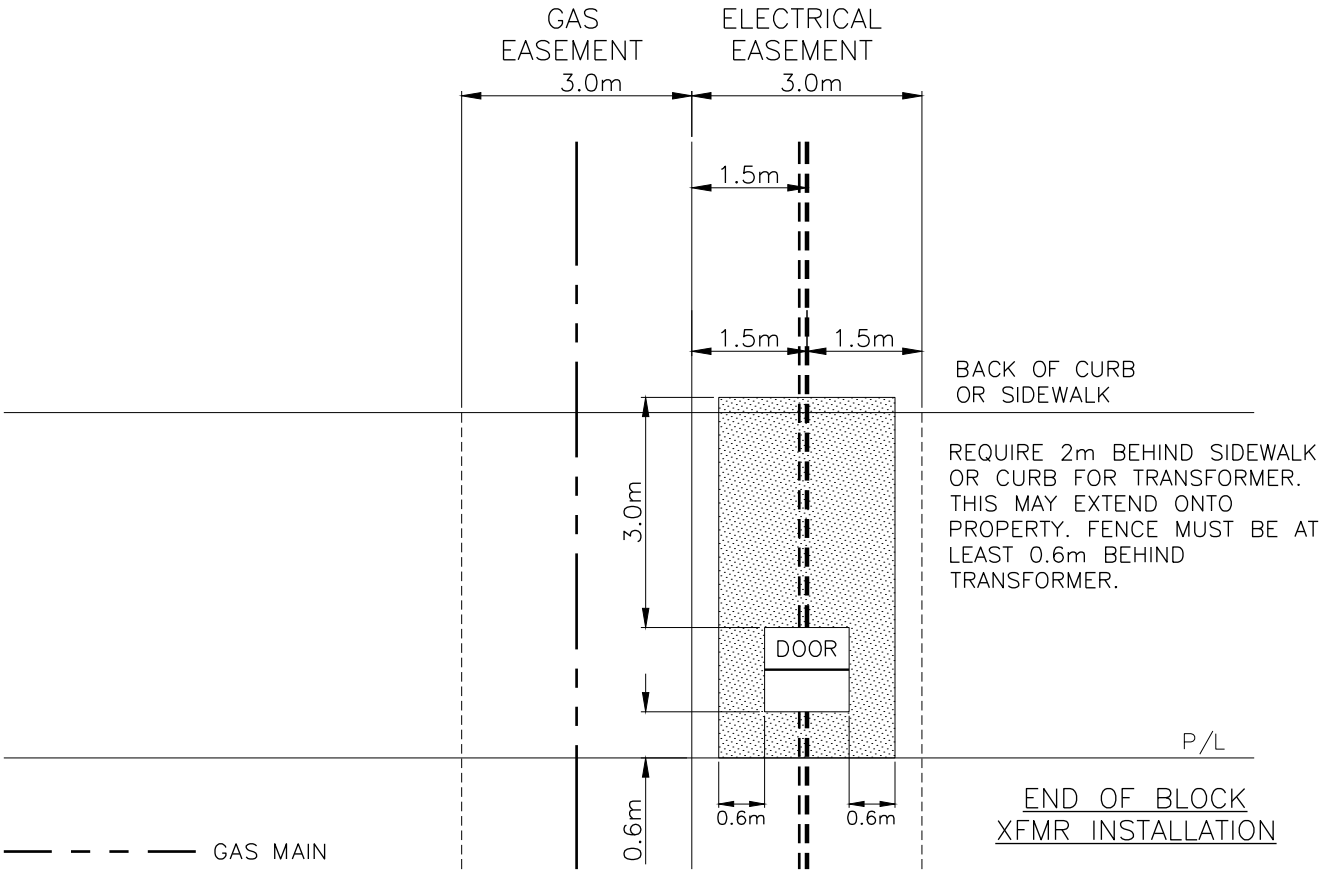
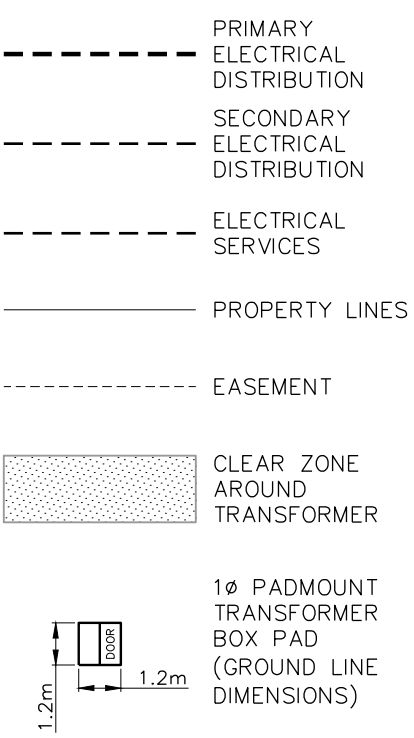
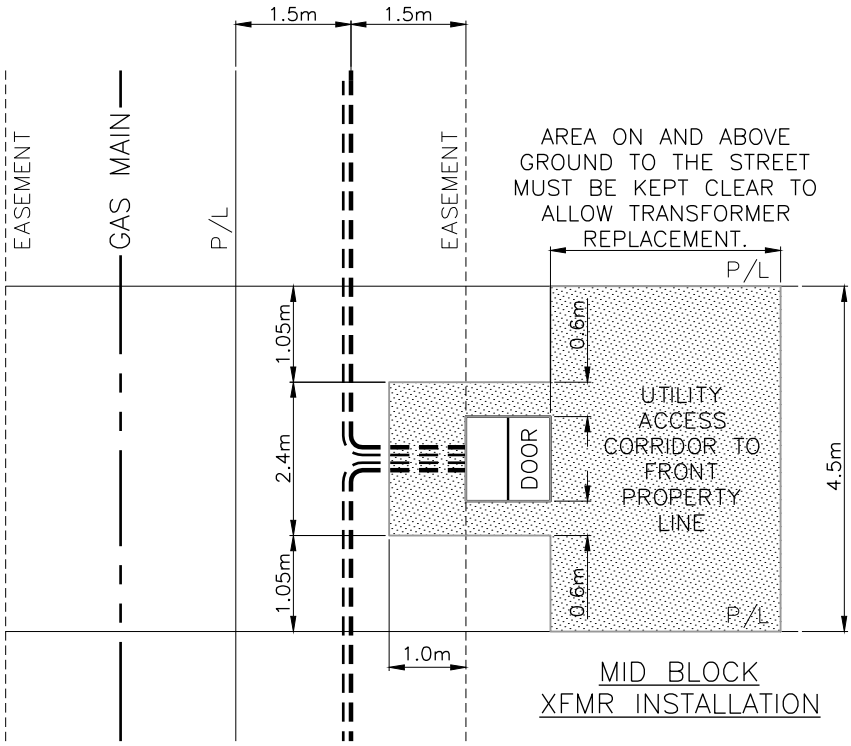


SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH NO REAR LANE FOR TWO PARTY JOINT USE PEDESTAL INSTALLATION DETAILS
DATE OF ISSUE : **2013/08/19**	DRAWING NO. B-14-51	SHEET 2 of 3	REV. 0







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SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-02-11	EASEMENT PLAN WITH NO REAR LANE FOR TWO PARTY JOINT USE PADMOUNT TRANSFORMER DETAIL
DATE OF ISSUE: 2013/08/19	DRAWING NO. B-14-51	SHEET 3 of 3	REV. 0

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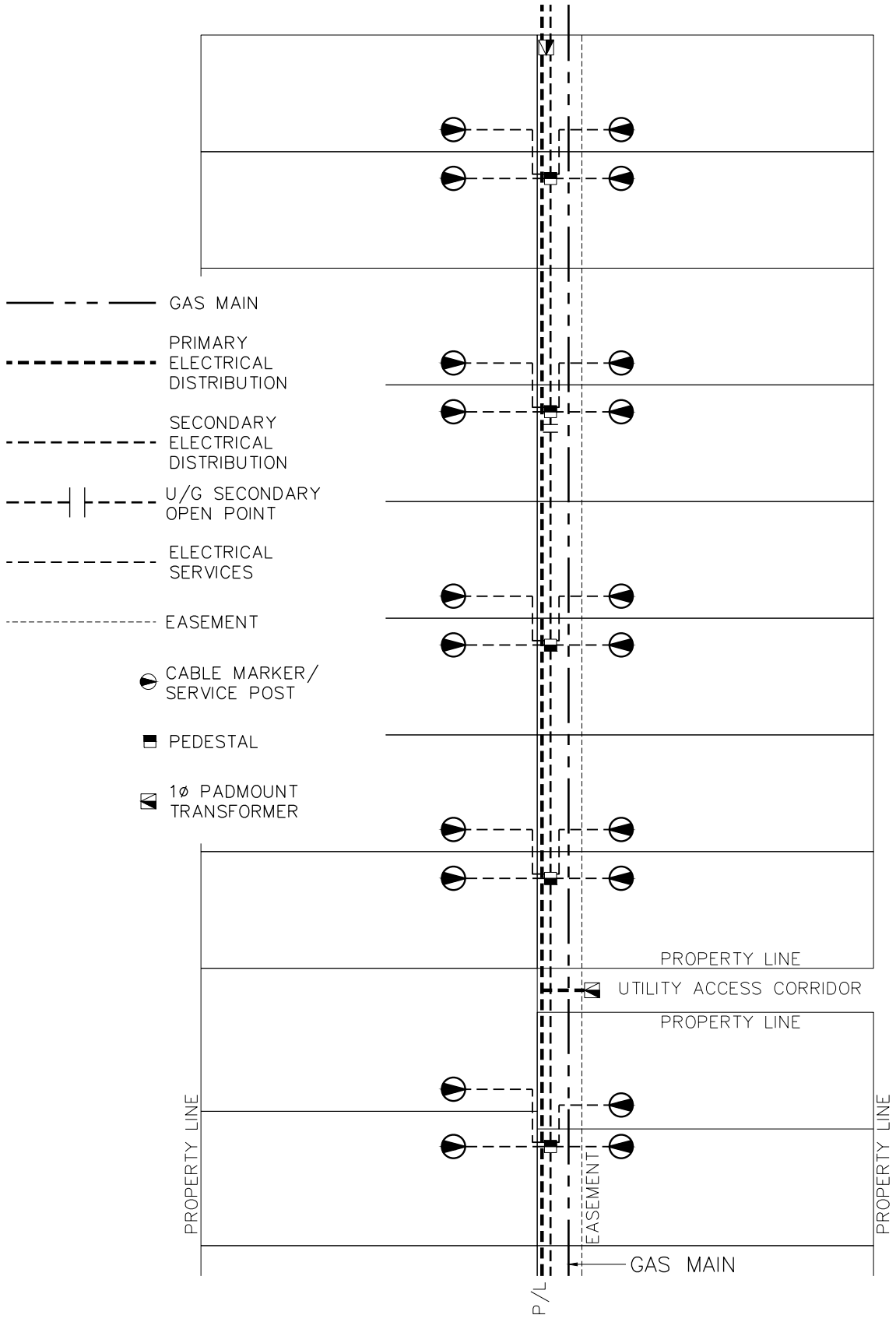
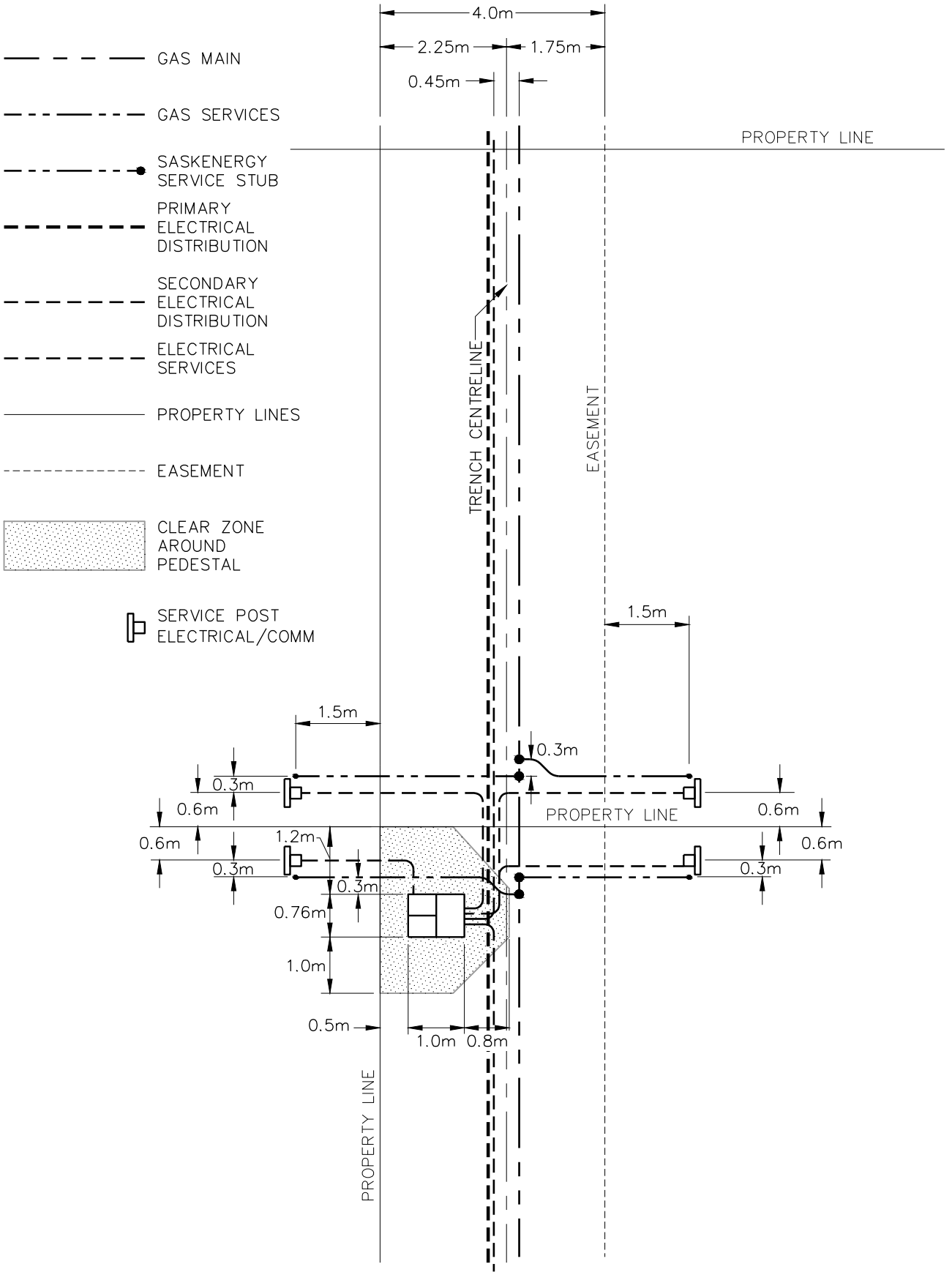


SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-08-16	EASEMENT PLAN, FOUR PARTY TRENCHING, NO REAR LANE OVERALL LAYOUT
DATE OF ISSUE : 2013/08/19	DRAWING NO. B-14-52	SHEET 1 of 3	REV. B



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SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M.ERETH	DESIGN CHK. L.BAILEY	DRN. A.GATZKE CHKD. 2014-09-23	EASEMENT PLAN, FOUR PARTY TRENCHING, NO REAR LANE PEDESTAL INSTALLATION DETAILS
DATE OF ISSUE 2015/04/28	DRAWING NO. B-14-52	SHEET 2 of 3	REV. C

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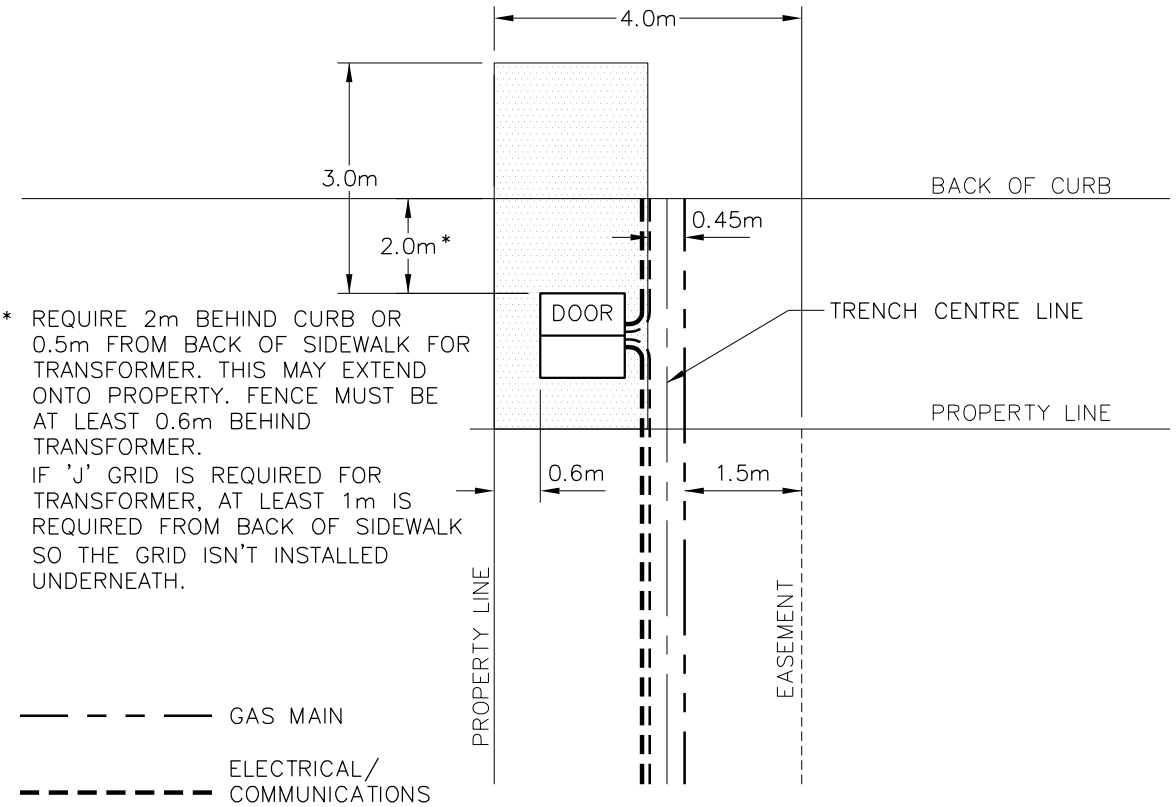
END OF BLOCK TRANSFORMER INSTALLATION



* REQUIRE 2m BEHIND CURB OR 0.5m FROM BACK OF SIDEWALK FOR TRANSFORMER. THIS MAY EXTEND ONTO PROPERTY. FENCE MUST BE AT LEAST 0.6m BEHIND TRANSFORMER.
IF 'J' GRID IS REQUIRED FOR TRANSFORMER, AT LEAST 1m IS REQUIRED FROM BACK OF SIDEWALK SO THE GRID ISN'T INSTALLED UNDERNEATH.

GAS MAIN

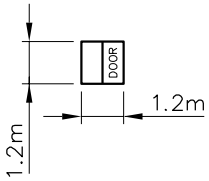
ELECTRICAL/ COMMUNICATIONS DISTRIBUTION

PROPERTY LINES

EASEMENT

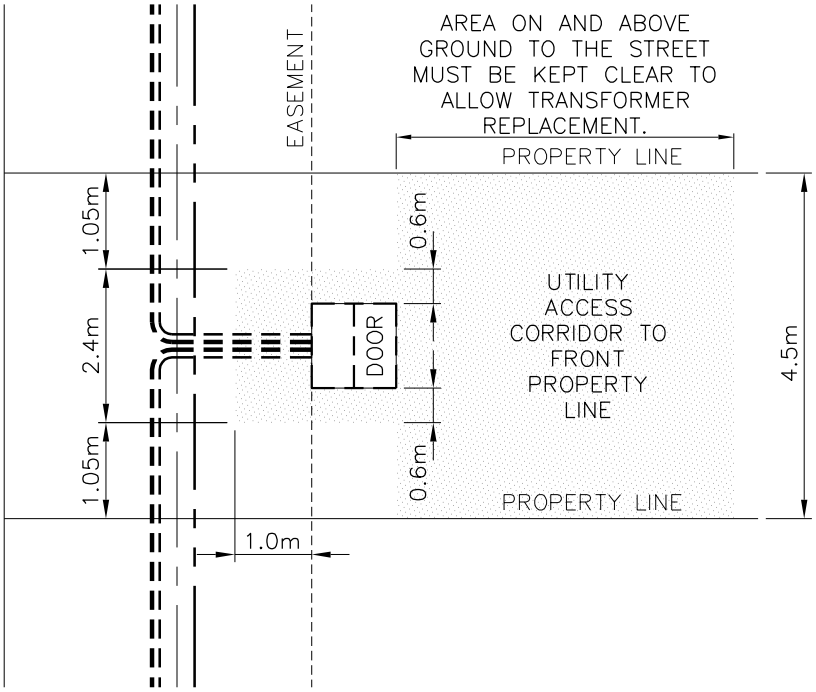
U/G SECONDARY

CLEAR ZONE AROUND TRANSFORMER

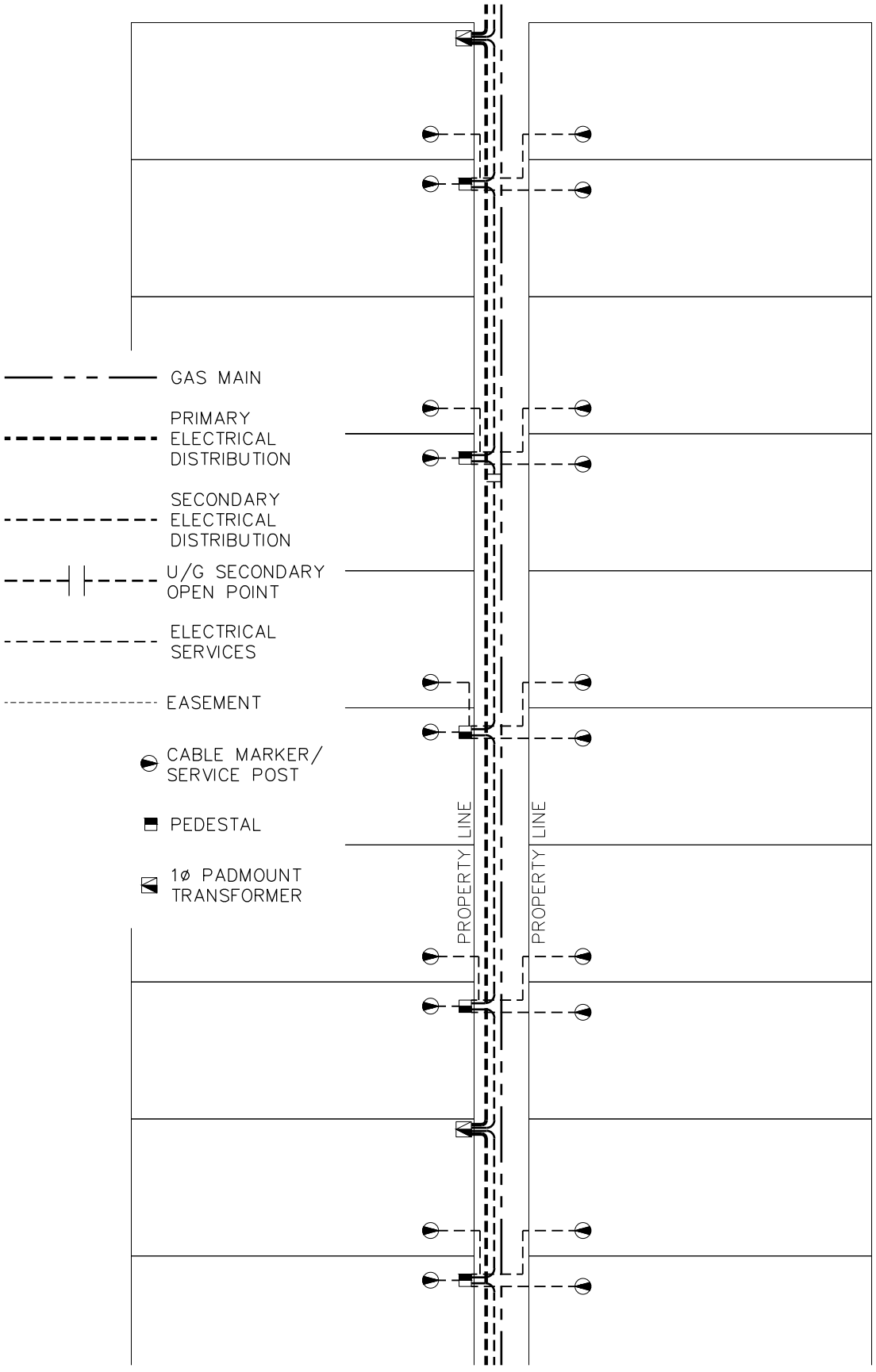


1ø PADMOUNT TRANSFORMER BOX PAD (GROUND LINE DIMENSIONS)

MID BLOCK TRANSFORMER INSTALLATION



SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. A.UHREN	DRN. Y.HAO CHKD. A.UHREN 2016-12-22	EASEMENT PLAN, FOUR PARTY TRENCHING, NO REAR LANE PADMOUNT TRANSFORMER DETAILS
DATE OF ISSUE 2017/05/03		DRAWING NO. B-14-52	SHEET 3 of 3 REV. D



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SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-08-16	EASEMENT PLAN, FOUR PARTY TRENCHING, WITH REAR LANE OVERALL PLAN
DATE OF ISSUE : 2013/08/19	DRAWING NO. B-14-53	SHEET 1 of 3	REV. B

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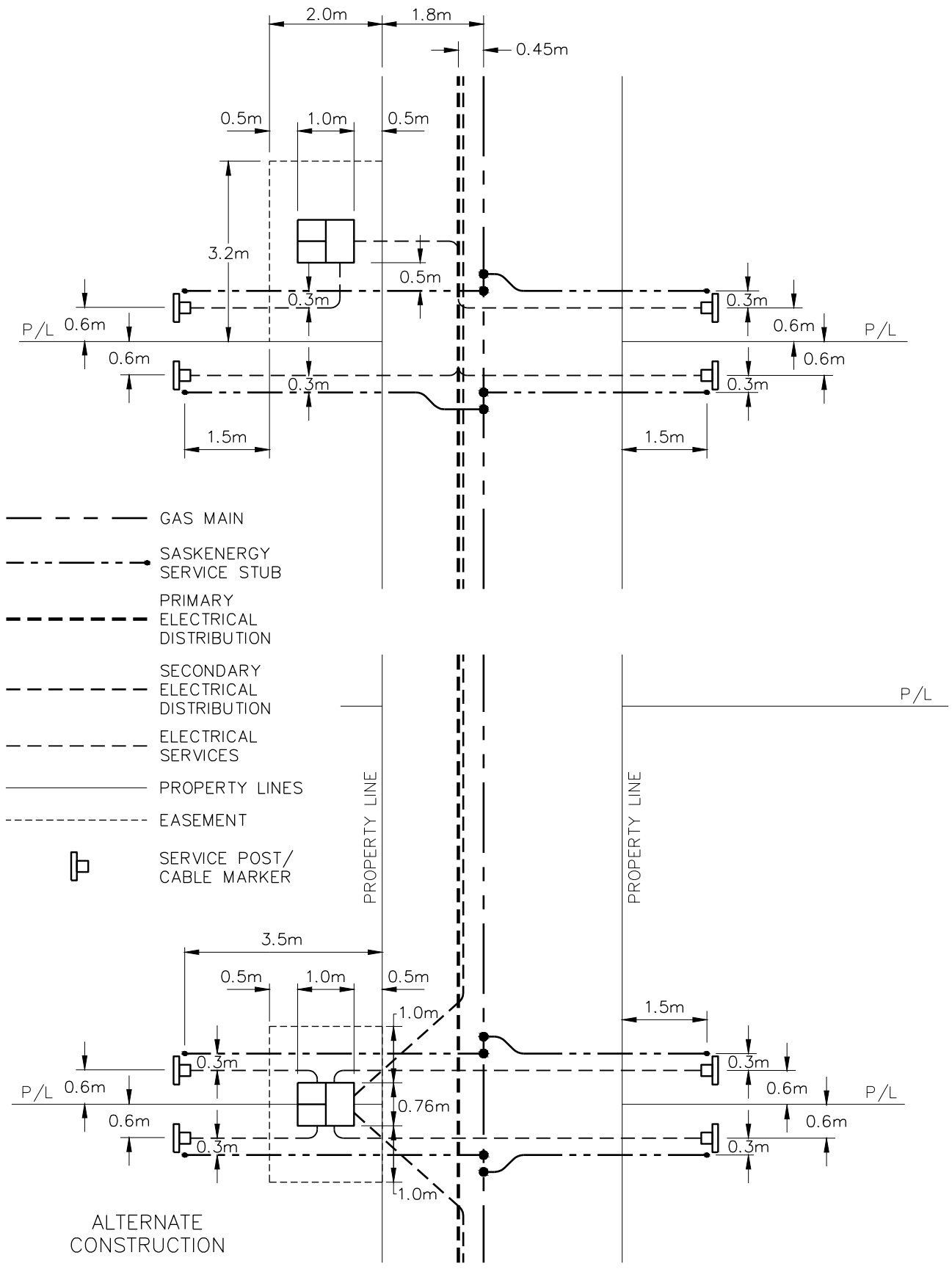


SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M.ERETH	DESIGN CHK. L.BAILEY	DRN. A.GATZKE CHKD. 2015-03-18	EASEMENT PLAN, FOUR PARTY TRENCHING, WITH REAR LANE PEDESTAL INSTALLATION DETAILS
DATE OF ISSUE 2015/04/28	DRAWING NO. B-14-53	SHEET 2 of 3	REV. C

GAS MAIN

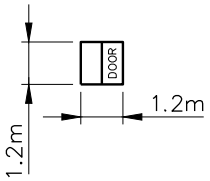
PRIMARY ELECTRICAL DISTRIBUTION

SECONDARY ELECTRICAL DISTRIBUTION

PROPERTY LINES

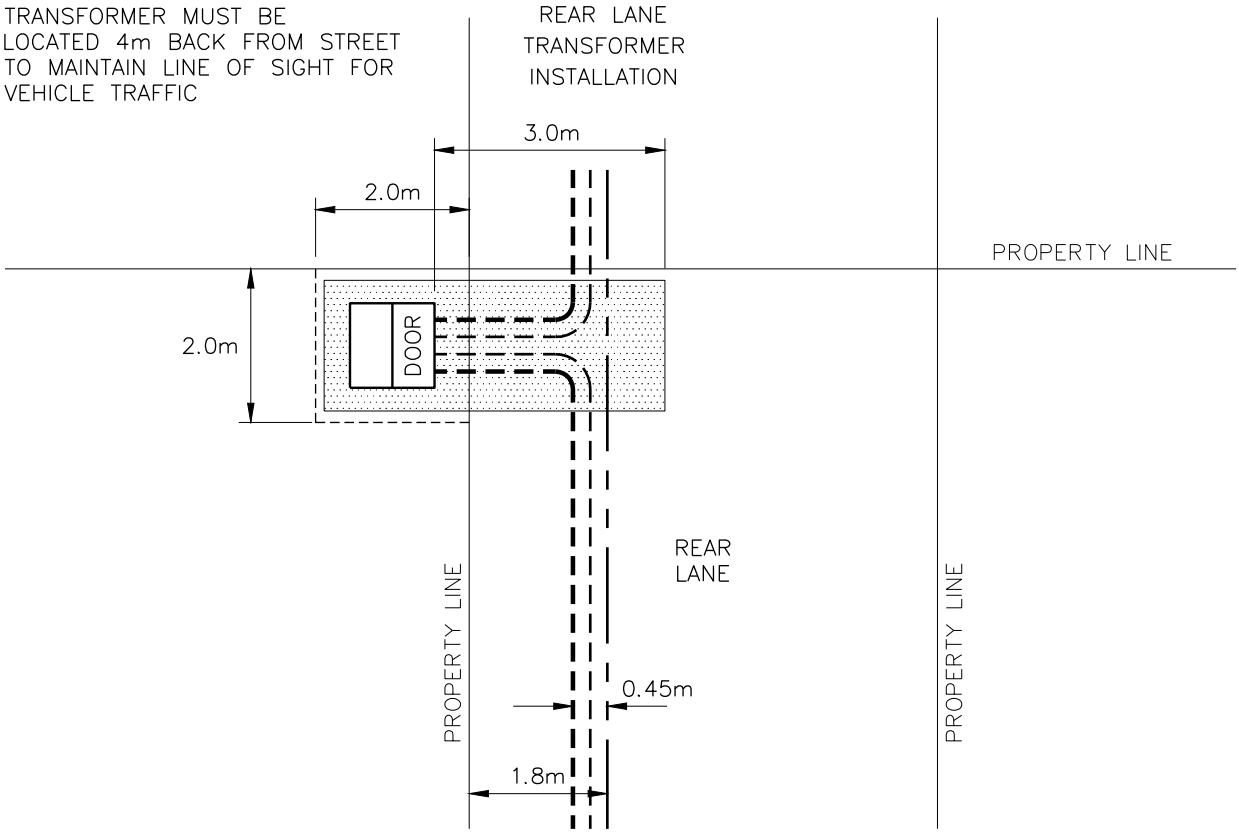
EASEMENT

CLEAR ZONE AROUND TRANSFORMER



1ø PADMOUNT TRANSFORMER BOX PAD (GROUND LINE DIMENSIONS)

TRANSFORMER MUST BE LOCATED 4m BACK FROM STREET TO MAINTAIN LINE OF SIGHT FOR VEHICLE TRAFFIC



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SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M.ERETH	DESIGN CHK. L.BAILEY	DRN. A.GATZKE CHKD. 2014-09-23	EASEMENT PLAN, FOUR PARTY TRENCHING, WITH REAR LANE PADMOUNT TRANSFORMER DETAILS
DATE OF ISSUE 2015/04/28	DRAWING NO. B-14-53	SHEET 3 of 3	REV. C

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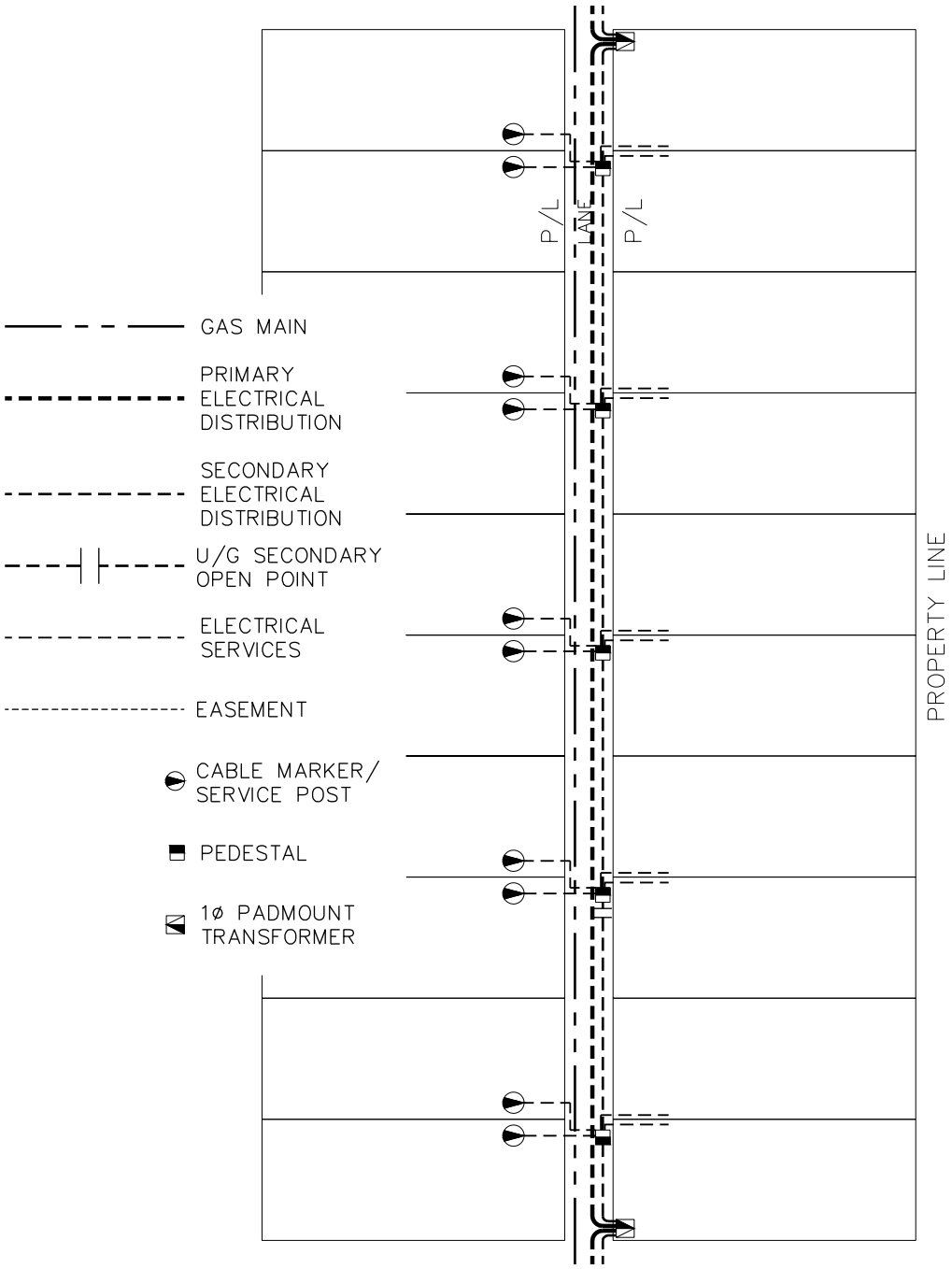
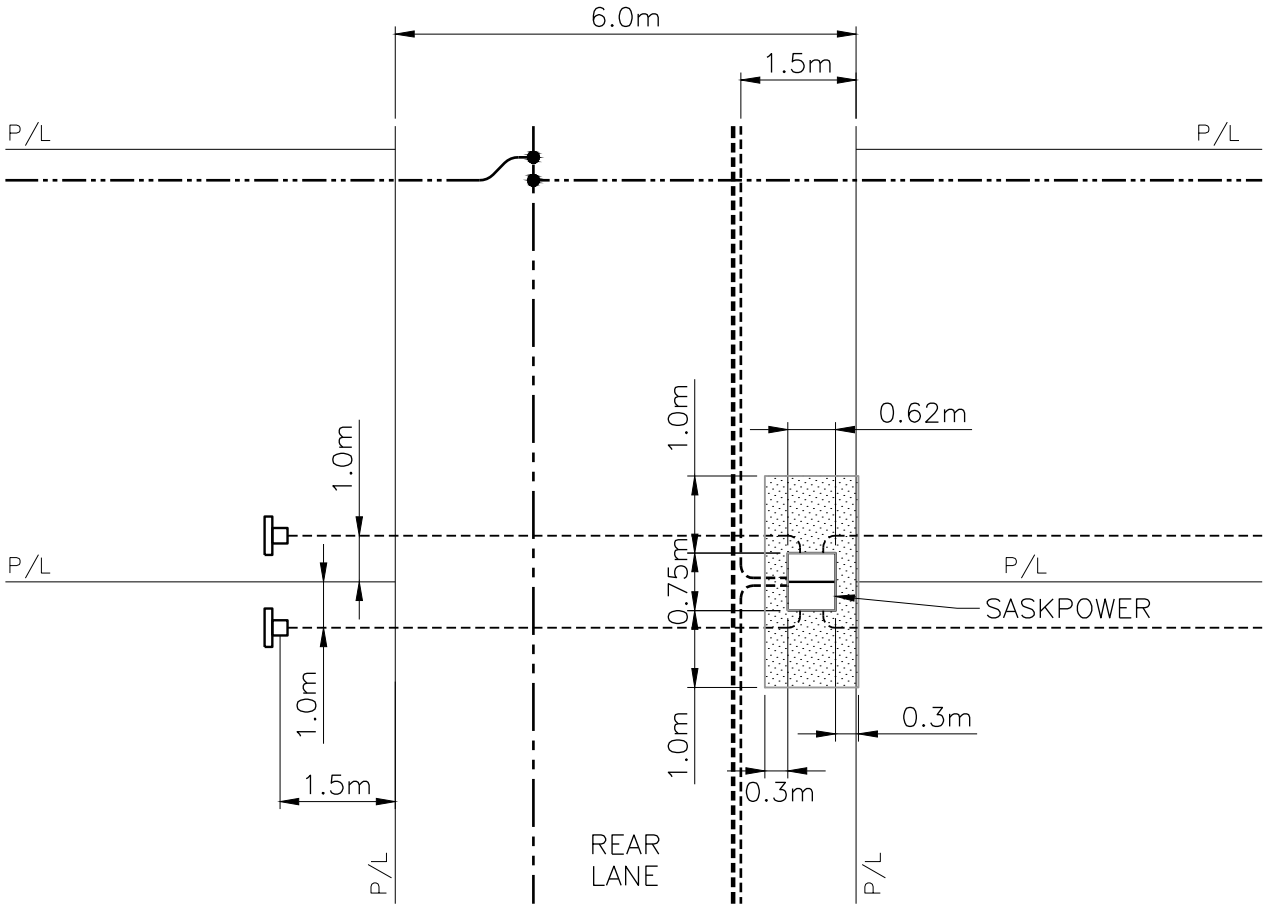


SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH REAR LANE FOR 2 PARTY JOINT USE OVERALL LAYOUT
DATE OF ISSUE: 2013/08/19	DRAWING NO. B-14-54	SHEET 1 of 3	REV. A



NOTE:

1. DIMENSIONS FOR PEDESTAL LOCATION TO BE AT GROUND LINE.
2. GAS AND ELECTRICAL SERVICE CROSSING SHOULD BE AVOIDED IN TRENCH.
3. FOR CONDUCTOR/TRENCH LAYOUT, SEE DWG B-14-65.

GAS MAIN

GAS SERVICES

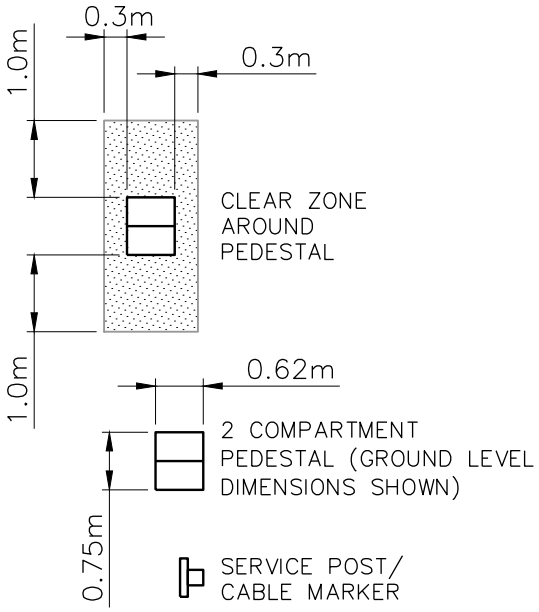
PRIMARY ELECTRICAL DISTRIBUTION

SECONDARY ELECTRICAL DISTRIBUTION

ELECTRICAL SERVICES

PROPERTY LINES

EASEMENT



SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH REAR LANE FOR 2 COMPARTMENT PEDESTALS PEDESTAL INSTALLATION DETAILS
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GAS MAIN

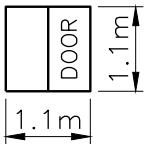
PRIMARY ELECTRICAL DISTRIBUTION

SECONDARY ELECTRICAL DISTRIBUTION

PROPERTY LINES

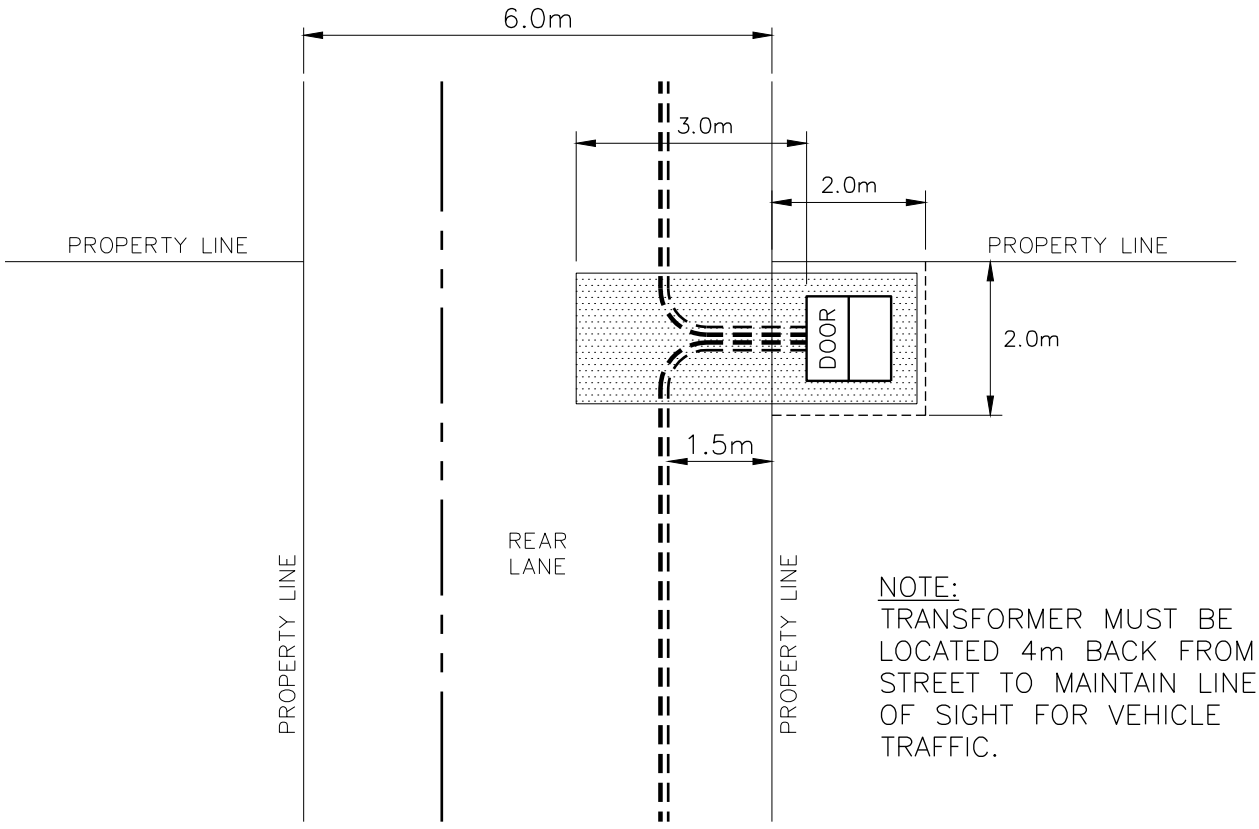
EASEMENT

CLEAR ZONE AROUND TRANSFORMER



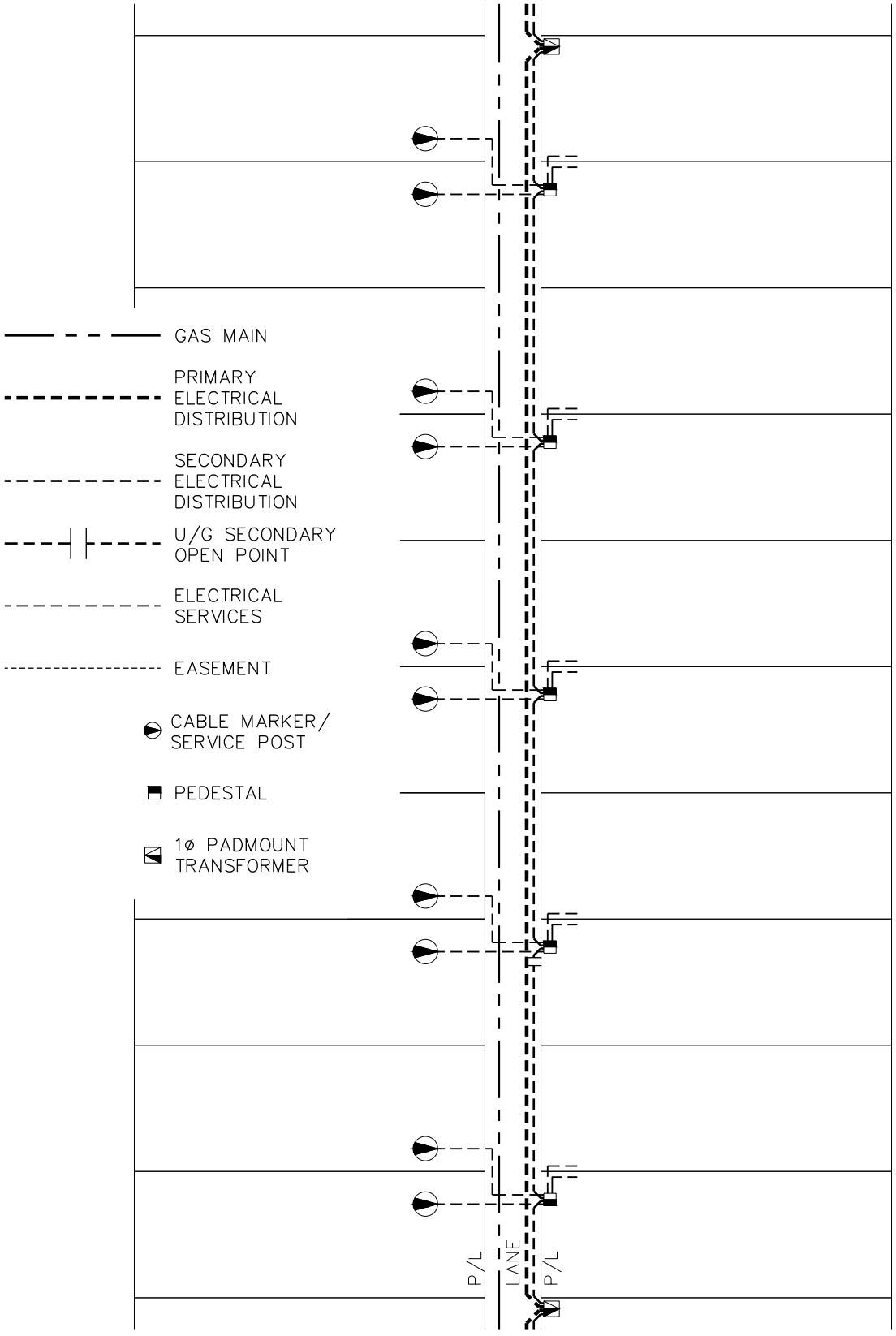
PADMOUNT TRANSFORMER

REAR LANE TRANSFORMER INSTALLATION



NOTE:
TRANSFORMER MUST BE LOCATED 4m BACK FROM STREET TO MAINTAIN LINE OF SIGHT FOR VEHICLE TRAFFIC.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH REAR LANE 2 PARTY DISTRIBUTION PADMOUNT TRANSFORMER DETAILS
DATE OF ISSUE: 2013/08/19	DRAWING NO. B-14-54	SHEET 3 of 3	REV. 0



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SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH REAR LANE 3 PARTY JOINT USE 3 PARTY SERVICES, OVERALL LAYOUT
DATE OF ISSUE : 2013/08/19	DRAWING NO. B-14-55	SHEET 1 of 3	REV. C

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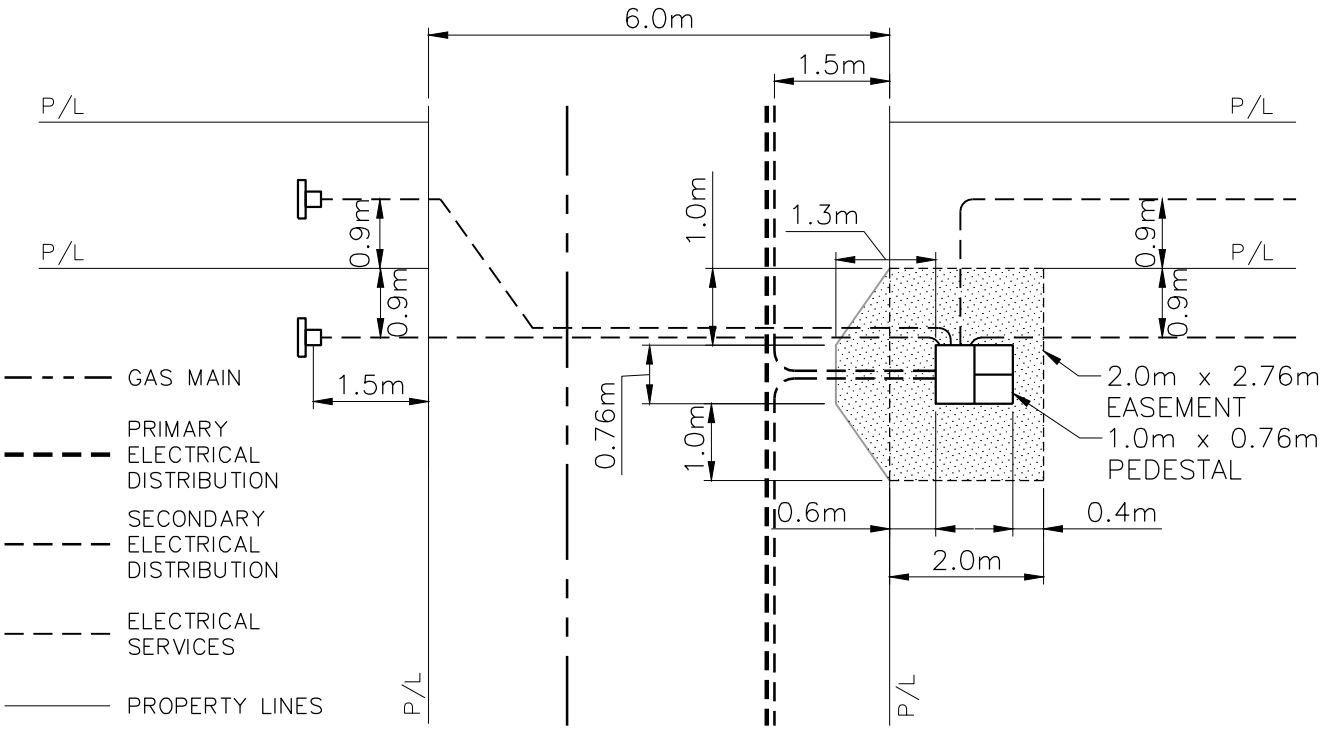
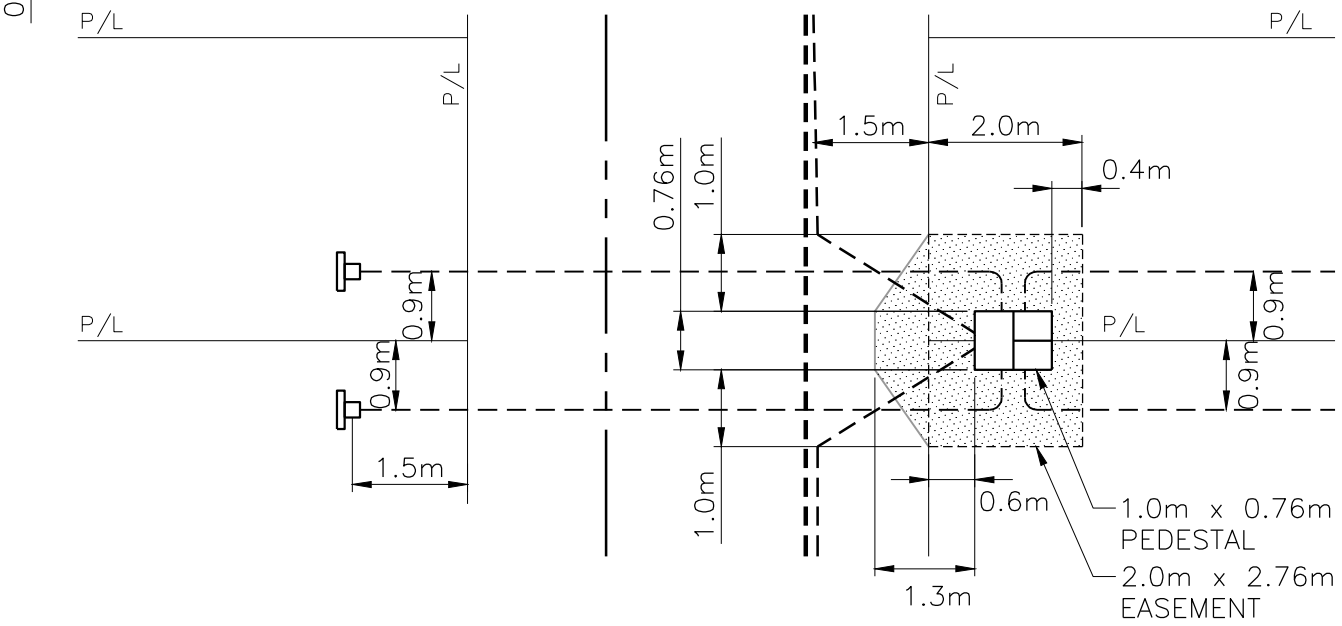


NOTE:

1. DIMENSIONS FOR PEDESTAL LOCATION ARE TO BE AT GROUND LINE.
2. GAS AND ELECTRICAL SERVICE CROSSING SHOULD BE AVOIDED IN TRENCH.
3. FOR CONDUCTOR/TRENCH LAYOUT, SEE DWG B-14-65.
4. ENSURE THE PROPERTY PIN IS NOT DISTURBED DURING THE INSTALLATION OF THE PEDESTAL.

ALTERNATE CONSTRUCTION



SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. L.BAILEY	DRN. A.GATZKE CHKD. 2015-06-04	EASEMENT PLAN WITH REAR LANE 3 PARTY DISTRIBUTION, 3 PARTY SERVICES PEDESTAL INSTALLATION DETAILS
DATE OF ISSUE 2016/02/05	DRAWING NO. B-14-55	SHEET 2 of 3	REV. A

GAS MAIN

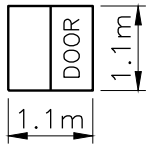
PRIMARY ELECTRICAL DISTRIBUTION

SECONDARY ELECTRICAL DISTRIBUTION

PROPERTY LINES

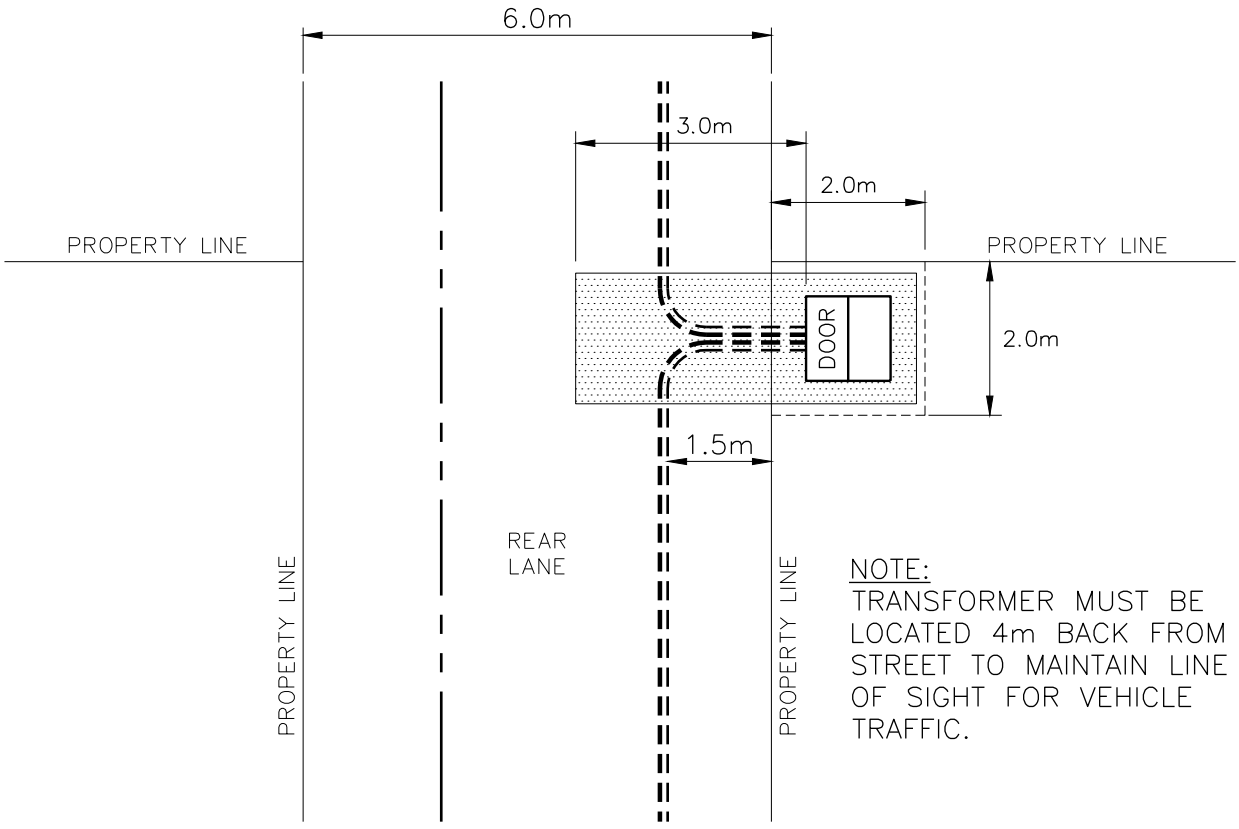
EASEMENT

CLEAR ZONE AROUND TRANSFORMER



PADMOUNT TRANSFORMER

REAR LANE TRANSFORMER INSTALLATION



NOTE:
TRANSFORMER MUST BE LOCATED 4m BACK FROM STREET TO MAINTAIN LINE OF SIGHT FOR VEHICLE TRAFFIC.

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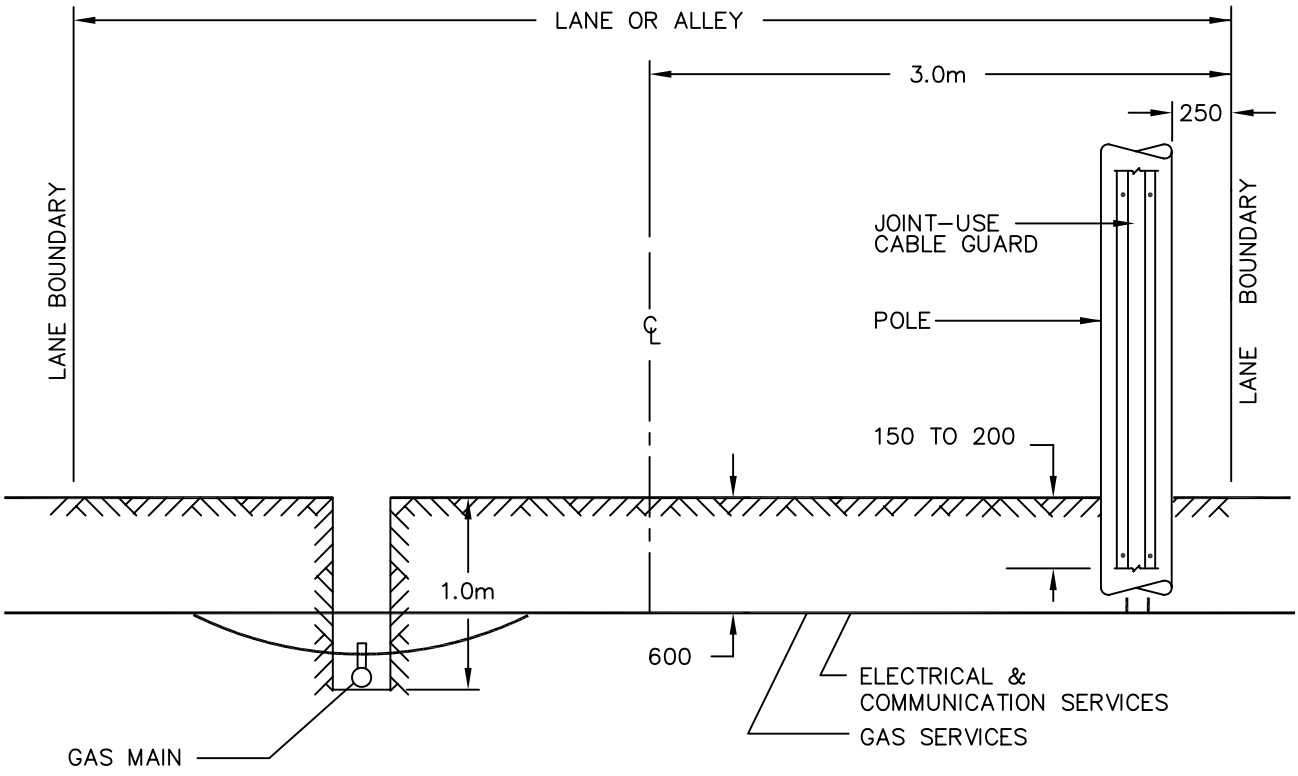
SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH REAR LANE 3 PARTY DISTRIBUTION PADMOUNT TRANSFORMER DETAILS
DATE OF ISSUE : 2013/08/19	DRAWING NO. B-14-55	SHEET 3 of 3	REV. 0



EASEMENT CROSS SECTION WITH REAR LANE

NOTE:

1. FOR METERING SEE DWG. B-24-10.
2. FOR SECONDARY TAKE-OFF STRUCTURE SEE DRAWING B-28-01

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

SaskPower – DISTRIBUTION STANDARDS				
DRN.	DESIGN CHK.	SAFETY APP.	APPROVAL	OVERHEAD DISTRIBUTION WITH UNDERGROUND SERVICES
CHKD.				
DATE 92-02-20	DATE	DATE	DATE	
DATE OF ISSUE		DRAWING NO. B-14-56	SHEET 1 of 2	REV. 0

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SPC/AUTODRAFT

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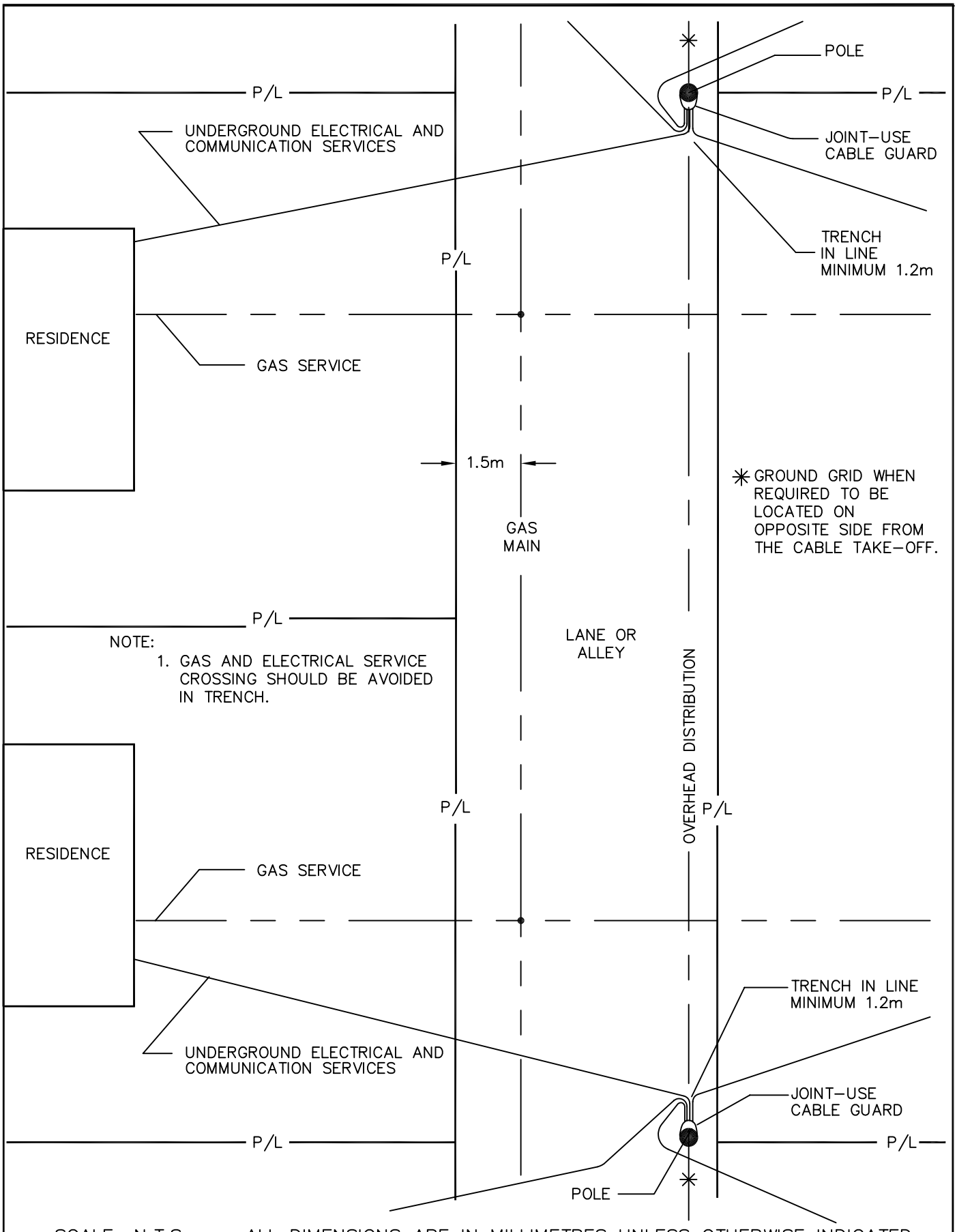

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

SaskPower – DISTRIBUTION STANDARDS

DRN.	DESIGN CHK.	SAFETY APP.	APPROVAL	OVERHEAD DISTRIBUTION WITH UNDERGROUND SERVICES
CHKD.				
DATE 92-02-20	DATE	DATE	DATE	
DATE OF ISSUE		DRAWING NO. B-14-56	SHEET 2 of 2	REV. 0

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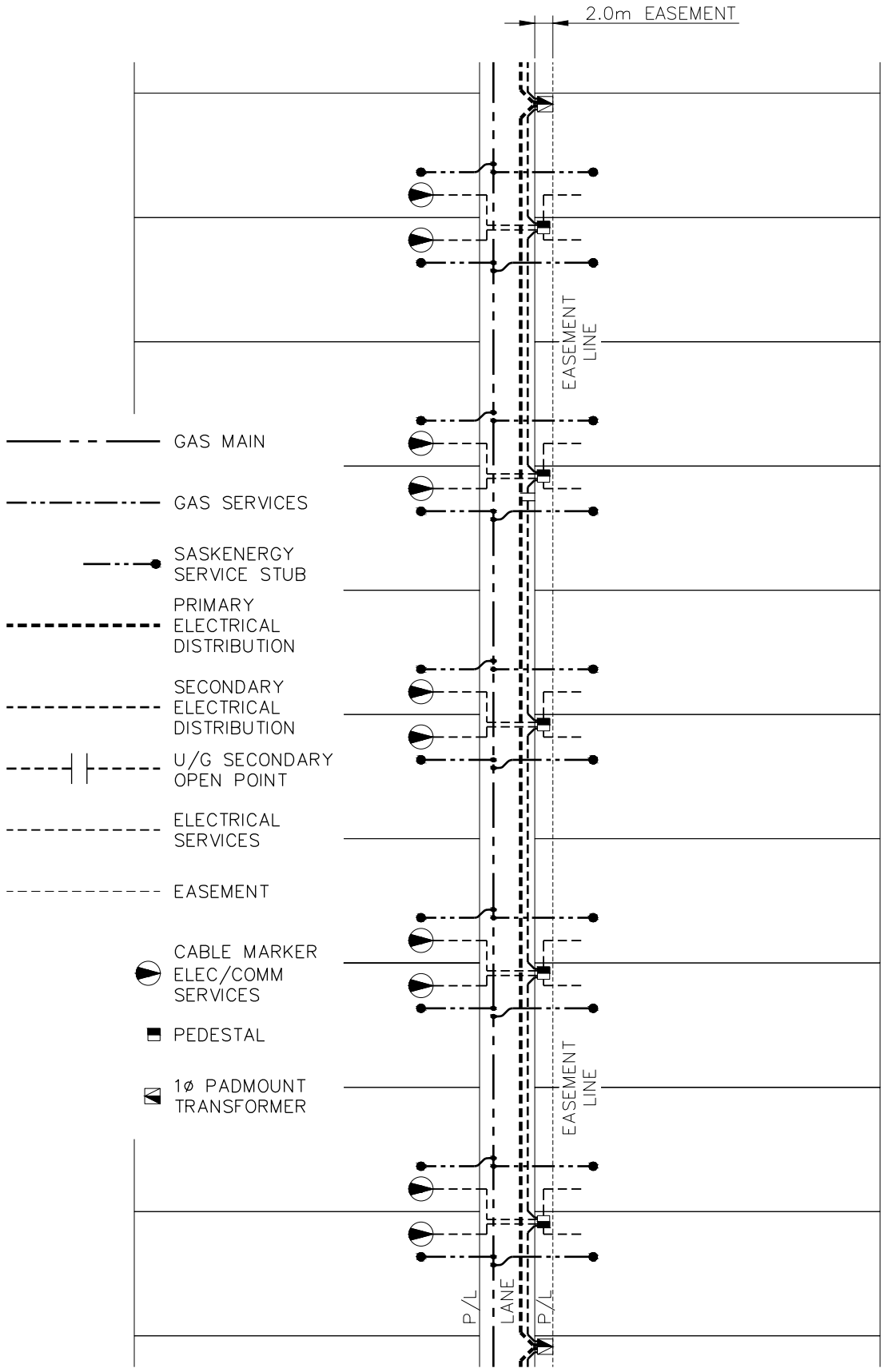
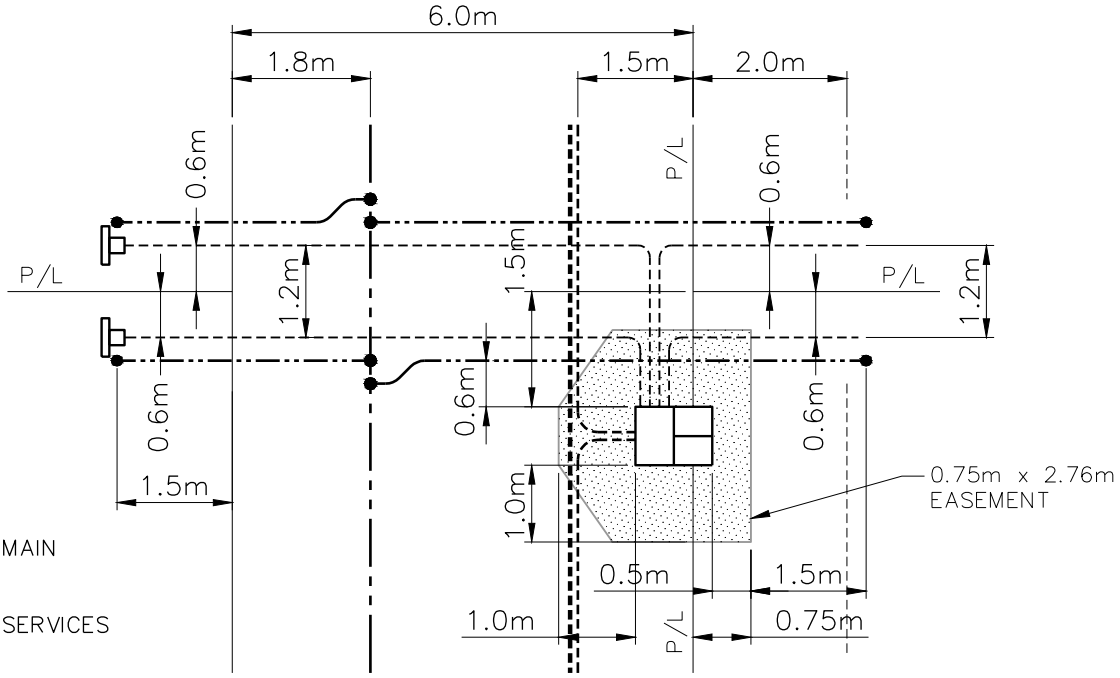


SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M.ERETH	DESIGN CHK. L.BAILEY	DRN. A.GATZKE CHKD. 2014-07-23	EASEMENT PLAN WITH REAR LANE 3 PARTY DISTRIBUTION 4 PARTY SERVICES, OVERALL LAYOUT
DATE OF ISSUE 2015/04/28		DRAWING NO. B-14-57 SHEET 1 of 3	REV. 0



GAS MAIN

GAS SERVICES

SASKENERGY SERVICE STUB

PRIMARY ELECTRICAL DISTRIBUTION

SECONDARY ELECTRICAL DISTRIBUTION

ELECTRICAL SERVICES

PROPERTY LINES

EASEMENT

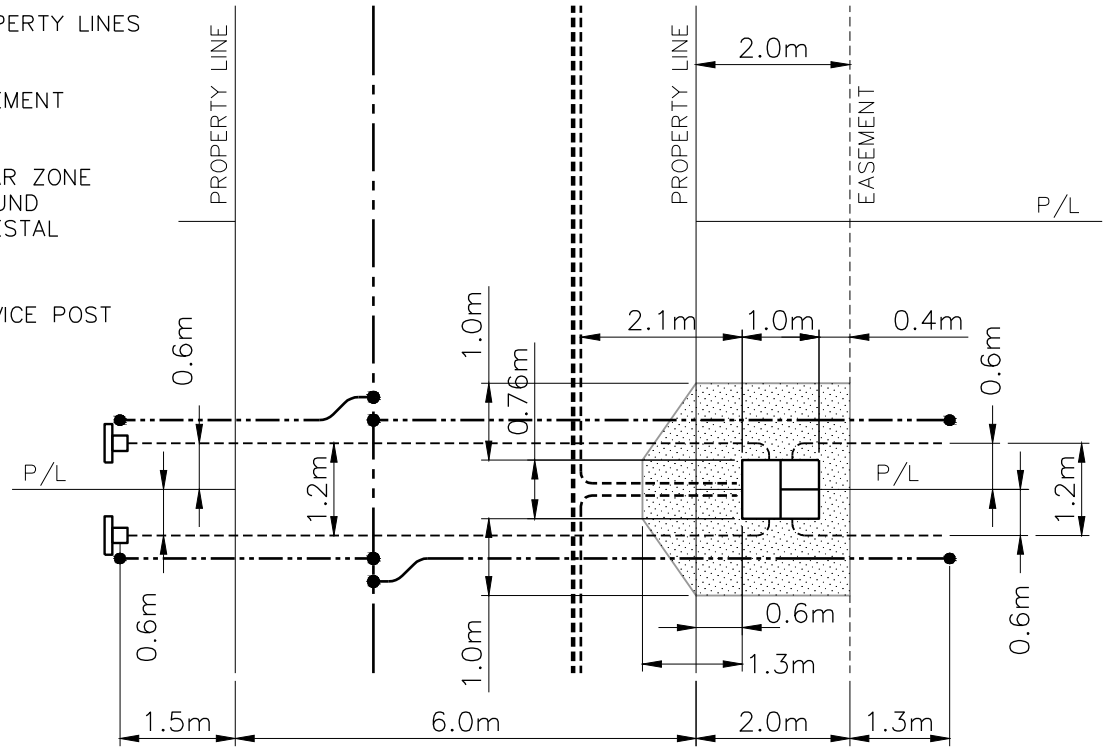
CLEAR ZONE AROUND PEDESTAL

SERVICE POST

NOTE:

1. DIMENSIONS FOR PEDESTAL LOCATION ARE TO BE ABOVE GROUND PORTION.
2. GAS AND ELECTRICAL SERVICE CROSSING SHOULD BE AVOIDED IN TRENCH.
3. FOR CONDUCTOR/TRENCH LAYOUT, SEE DWG B-14-65.

ALTERNATE CONSTRUCTION



SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M.ERETH	DESIGN CHK. L.BAILEY	DRN. A.GATZKE CHKD. 2014-12-15	EASEMENT PLAN WITH REAR LANE 3 PARTY DISTRIBUTION, 4 PARTY SERVICES PEDESTAL INSTALLATION DETAILS
DATE OF ISSUE 2015/04/28	DRAWING NO. B-14-57	SHEET 2 of 3	REV. –

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GAS MAIN

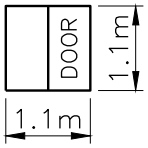
PRIMARY ELECTRICAL DISTRIBUTION

SECONDARY ELECTRICAL DISTRIBUTION

PROPERTY LINES

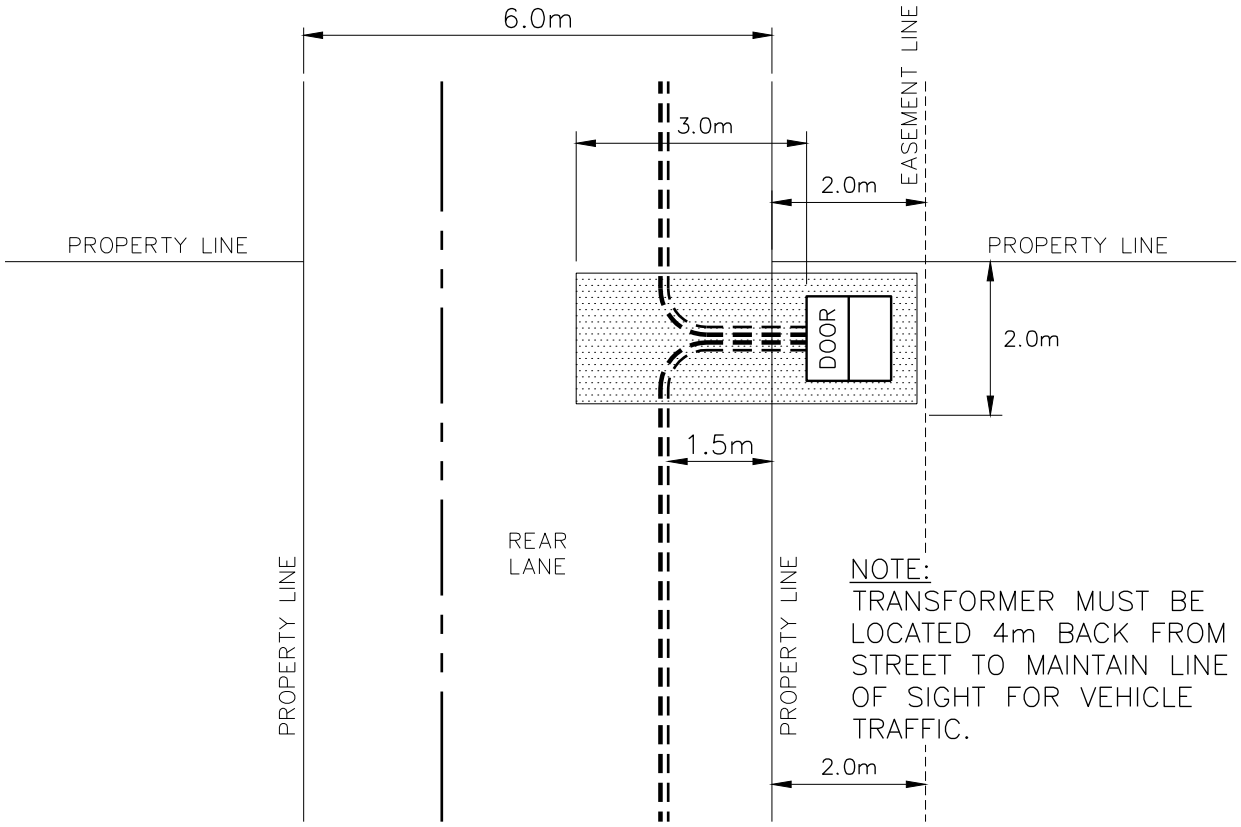
EASEMENT

CLEAR ZONE AROUND TRANSFORMER



PADMOUNT TRANSFORMER

REAR LANE TRANSFORMER INSTALLATION



NOTE:
TRANSFORMER MUST BE LOCATED 4m BACK FROM STREET TO MAINTAIN LINE OF SIGHT FOR VEHICLE TRAFFIC.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. L. BAILEY	DRN. DC CHKD. 2013-03-11	EASEMENT PLAN WITH REAR LANE 3 PARTY DISTRIBUTION PADMOUNT TRANSFORMER DETAILS
DATE OF ISSUE 2015/04/28	DRAWING NO. B-14-57	SHEET 3 of 3	REV. 0

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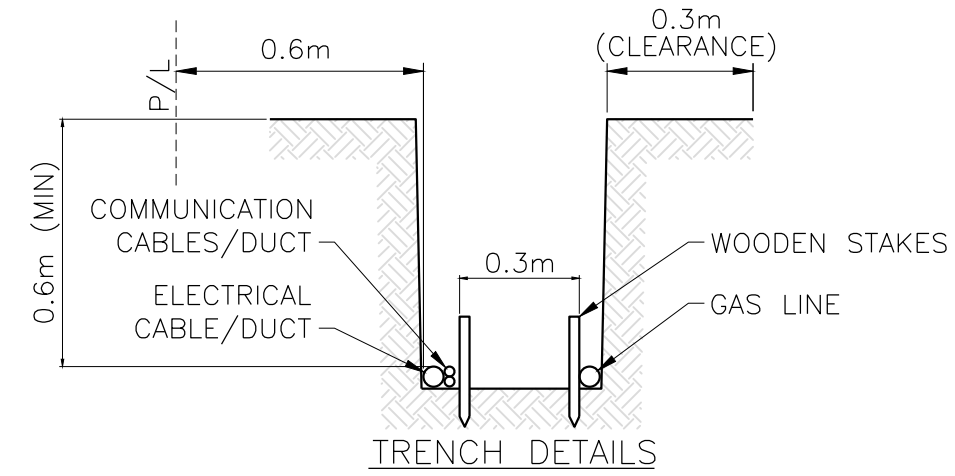
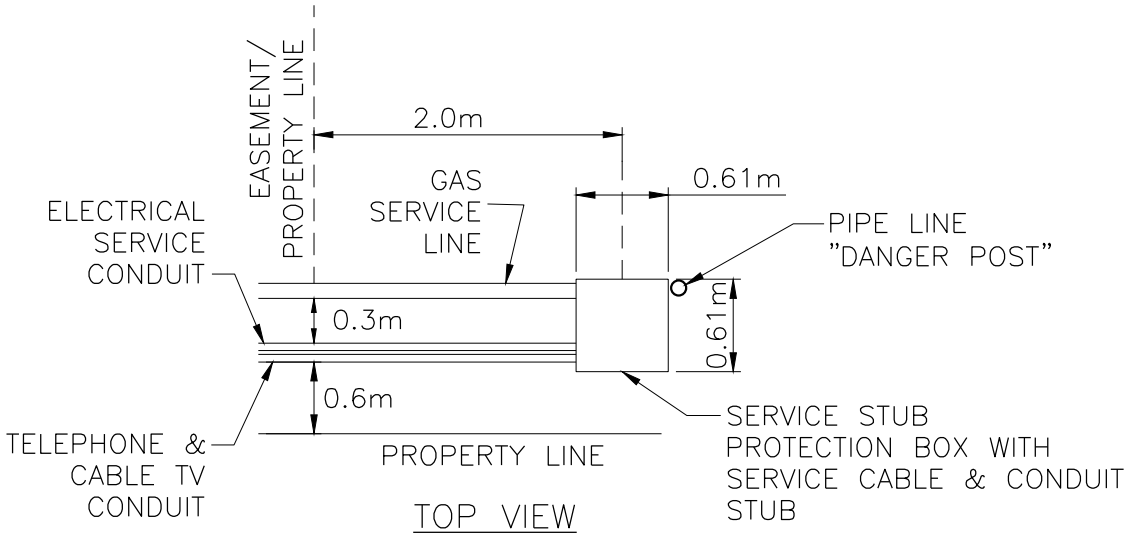
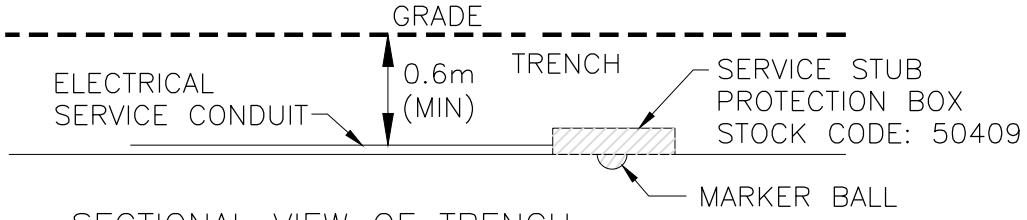


TRENCH DETAILS



TOP VIEW



SECTIONAL VIEW OF TRENCH
SHOWING SERVICE STUB PROTECTION
BOX INSTALLATION

NOTES:

1. ELECTRICAL CABLES AND CONDUITS TO BE KEPT AGAINST WALL OF TRENCH.
2. 38mm SQUARE WOODEN STAKES ARE SPACED 3m APART ALONG TRENCH TO KEEP CONDUIT IN PLACE.
3. SERVICE SHALL BE TAKEN TO A SERVICE STUB PROTECTION BOX AT THE TIME OF INSTALLATION OF DISTRIBUTION FOR FOUR PARTY SERVICES.
4. ENDS OF CONDUIT SHALL BE CAPPED.
5. SASKENERGY TRACER WIRE TO BE WRAPPED AROUND "DANGER POST" & BROUGHT ABOVE GRADE.
6. INSTALL MARKER BALL UNDER SERVICE STUB PROTECTION BOX. SEE DRAWING B-30-16 FOR UNDERGROUND MARKER BALL INSTALLATION DETAILS.

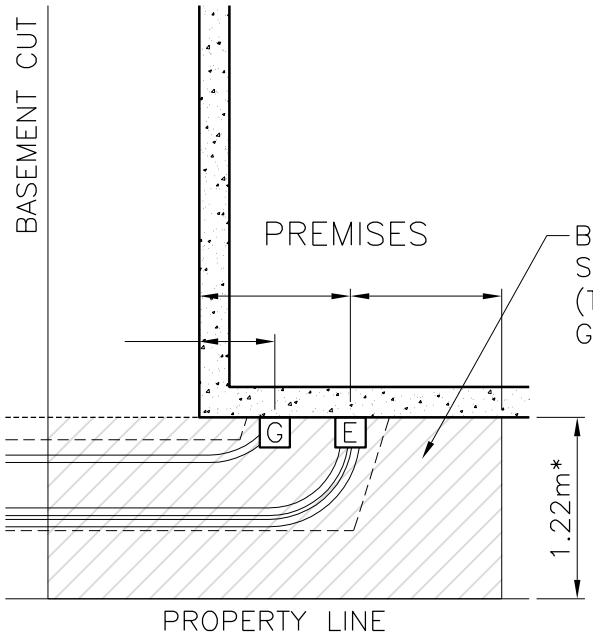
SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. A.UHREN	DRN. Y.HAO CHKD. 2016-08-30	FOUR PARTY TRENCHING SERVICE STUB PROTECTION BOX LAYOUT & DETAIL
DATE OF ISSUE 2016/11/08	DRAWING NO. B-14-59	SHEET 1 of 2	REV. F

REFER TO ELECTRIC SERVICE REQUIREMENTS
FOR ALL DETAILS AND DIMENSIONS

LEGEND

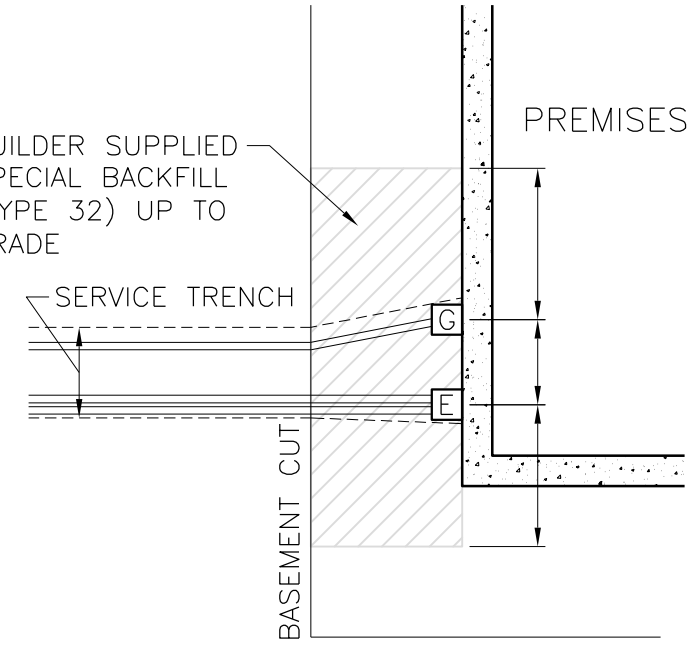
G GAS METER

E ELECTRIC METER

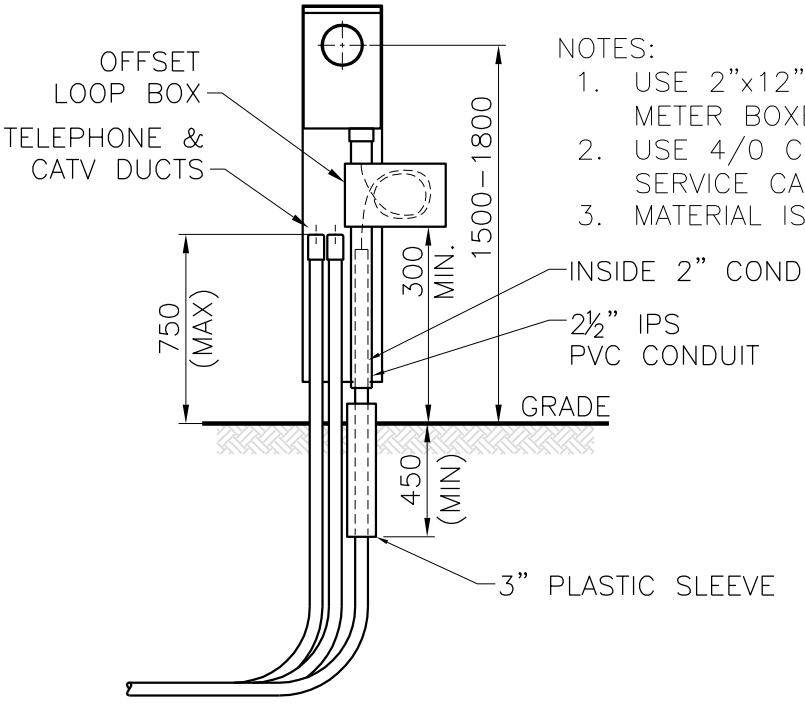


* IF LESS THAN 1.22m, METERS
TO BE LOCATED ON BACK WALL

METERS LOCATED
ON SIDE WALL



METERS LOCATED
ON BACK WALL



NOTES:
1. USE 2"x12" BOARD TO FIT 12" METER BOXES.
2. USE 4/0 Cu. CONDUCTOR IF SERVICE CABLE > 200ft.
3. MATERIAL IS CUSTOMER SUPPLIED.

ELECTRIC/TELEPHONE/
CABLE ENTRANCE

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SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN. E.GOTANA CHKD. 2017–11–23	FOUR PARTY TRENCHING SERVICE TRENCH LAYOUT METERING DETAIL
DATE OF ISSUE 2018-06-07	DRAWING NO. B–14–59	SHEET 2 of 2	REV. C

SPC/AUTODRAFT

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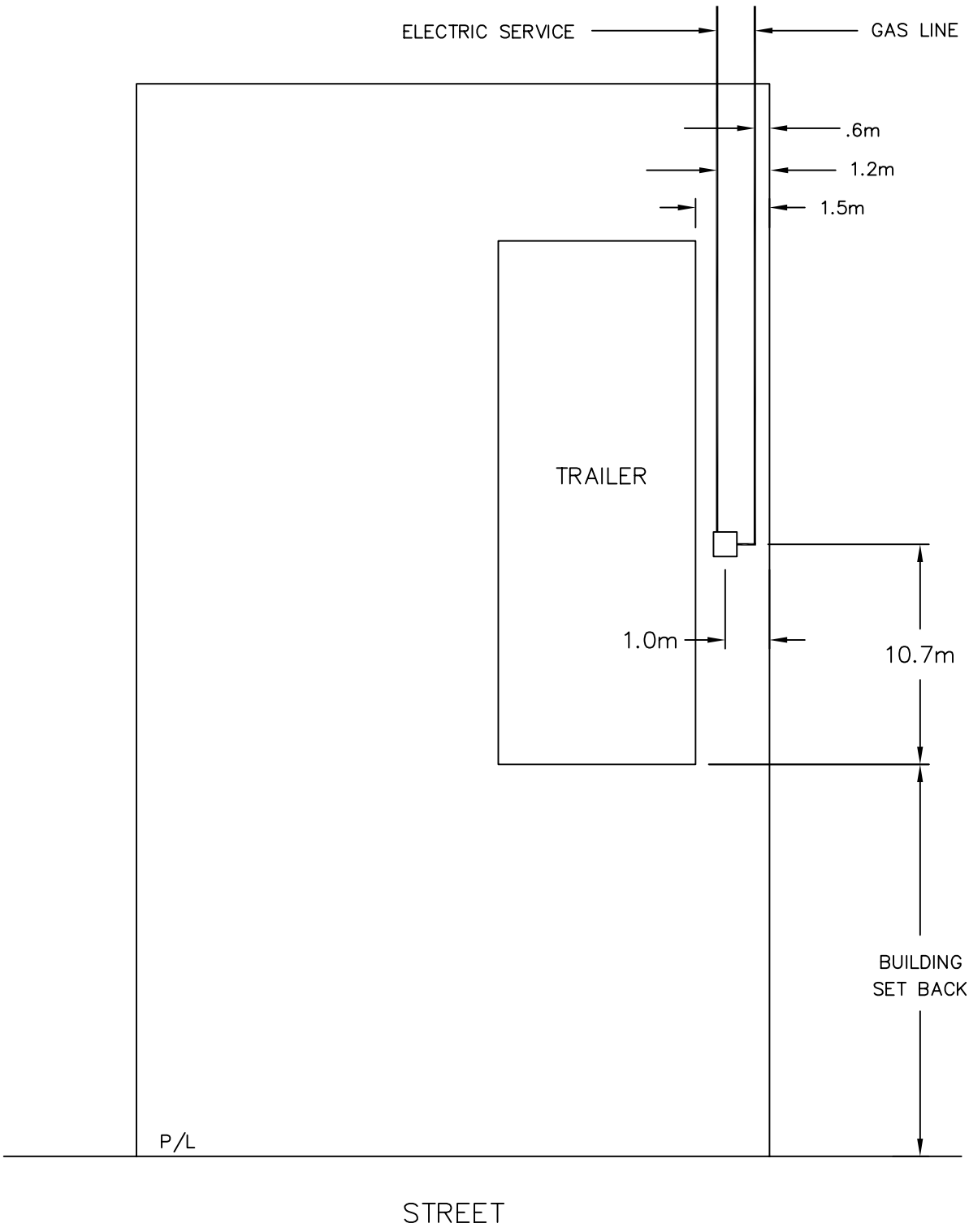

NOTE:
1. FOR METER INSTALLATION SEE DWG. B-24-15

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

SASKATCHEWAN POWER CORP. – DISTRIBUTION ENGINEERING STANDARDS					
DRN. BP CHKD. FTK DATE 87-04-11	DESIGN CHK. DATE	SAFETY APP. DATE	APPROVAL DATE	MOBILE TRAILER PLAN VIEW	
DATE OF ISSUE 87-06-01			DRAWING NO. B-14-60	SHEET 1 of 1	REV. 0

UNDERGROUND CABLE - DEPTH OF COVER

	UNDER YARDS OR PARKS
WITH PRIMARY IN TRENCH	900 (MIN) 1200 (MAX)
WITHOUT PRIMARY IN TRENCH	600 (MIN) 1000 (MAX)
SERVICE TO RESIDENCE	600 (MIN) 750 (MAX)
PRIMARY CABLE IN DUCT (SEE NOTE 3)	900 (MIN) 1200 (MAX)

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NOTE:

1. **PER CSA C22.3 NO.7 'UNDERGROUND SYSTEMS', COMMUNICATION CABLES ARE ALLOWED TO BE IN DIRECT CONTACT (RANDOM SEPARATION) WITH PRIMARY CABLES WITH A PHASE TO GROUND VOLTAGE OF LESS THAN 22kV PROVIDED THAT:**
   - **A. THE DISTANCE BETWEEN ANY TWO CONNECTIONS BETWEEN THE COMMUNICATION SHIELD AND SASKPOWER'S MULTIGROUNDED NEUTRAL IS NOT GREATER THAN 300m.**
   - **B. FOR PRIMARY CABLE THERE SHALL BE NO FEWER THAN FIVE CONNECTIONS BETWEEN THE NEUTRAL AND GROUND PER KILOMETER. WHERE THESE REQUIREMENTS CANNOT BE MET, FIXED SEPARATION AS PER C26-02.01 MUST BE USED.**

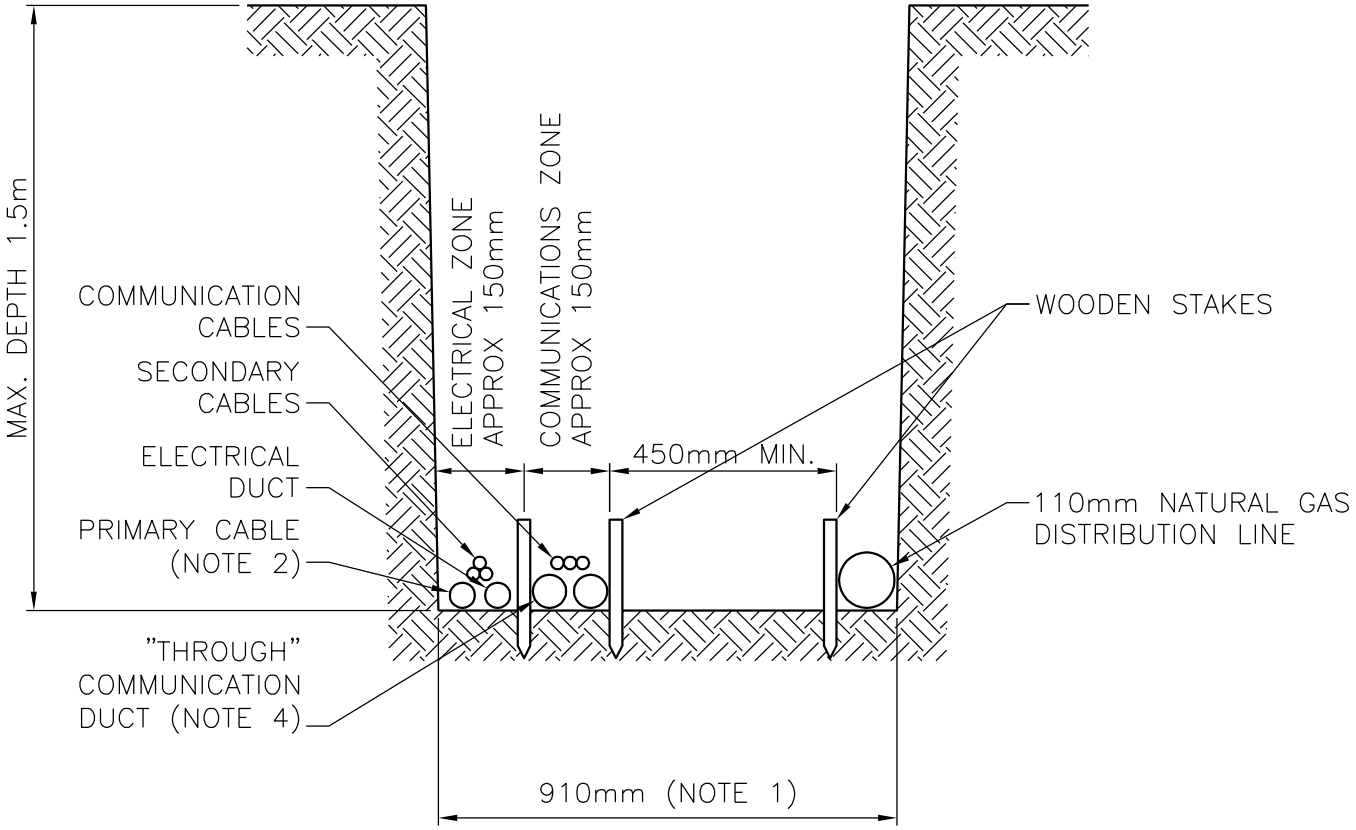
CABLES WITH VOLTAGES IN EXCESS OF 22kV LINE-GROUND REQUIRE FIXED SEPARATION.

2. **FOR DEPTH OF COVER UNDER ROADWAYS AND DITCHES, REFER TO SECTION C-26-21.**

3. **TYPICAL CONSTRUCTION IS TO FOLLOW THE DEPTH OF COVER VALUES NOTED ABOVE. DEPTH MAY BE REDUCED TO 450mm FOR CABLE IN DUCT IN EXTENUATING CIRCUMSTANCES IF MECHANICAL PROTECTION IS INSTALLED AS PER CSA C22.3 NO. 7-15 SECTION 7.3.**

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED

SaskPower - DISTRIBUTION STANDARDS			
APPROVAL **L. MOEN**	DESIGN CHK **J. ARSENAULT**	DRN. **JDA** CHKD. **2018-09-25**	**CONDUCTOR DEPTH OF COVER**
DATE OF ISSUE: 2019-01-02		DRAWING NO: **B-14-65**	**SHEET 1 of 1** REV. **D**



NOTES:

1. 910mm WILL ACCOMMODATE UP TO 4" NATURAL GAS LINE. LARGER GAS LINES WILL REQUIRE A WIDER TRENCH.
2. ELECTRICAL CABLES AND CONDUITS TO BE KEPT AGAINST WALL OF TRENCH.
3. MINIMUM 0.9m COVER OVER ELECTRICAL CABLES/CONDUITS AND GAS MAINS. THIS MAY BE REDUCED TO 0.8m FOR COMMUNICATION CABLES/CONDUITS.
4. "THROUGH" COMMUNICATION DUCTS (THOSE WHICH CONTINUE THROUGH THE SUBDIVISION AND DON'T TERMINATE IN LOCAL PEDESTAL) SHOULD BE PLACED AT THE BOTTOM OF THE TRENCH.
5. 38mm SQUARE WOODEN STAKES ARE SPACED 3m APART ALONG TRENCH.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. M. ERETH	DRN. DC CHKD.	TRENCH LAYOUT FOUR PARY DISTRIBUTION
DATE OF ISSUE 2012-12-05	DRAWING NO. B-14-66	SHEET 1 of 2	REV. A

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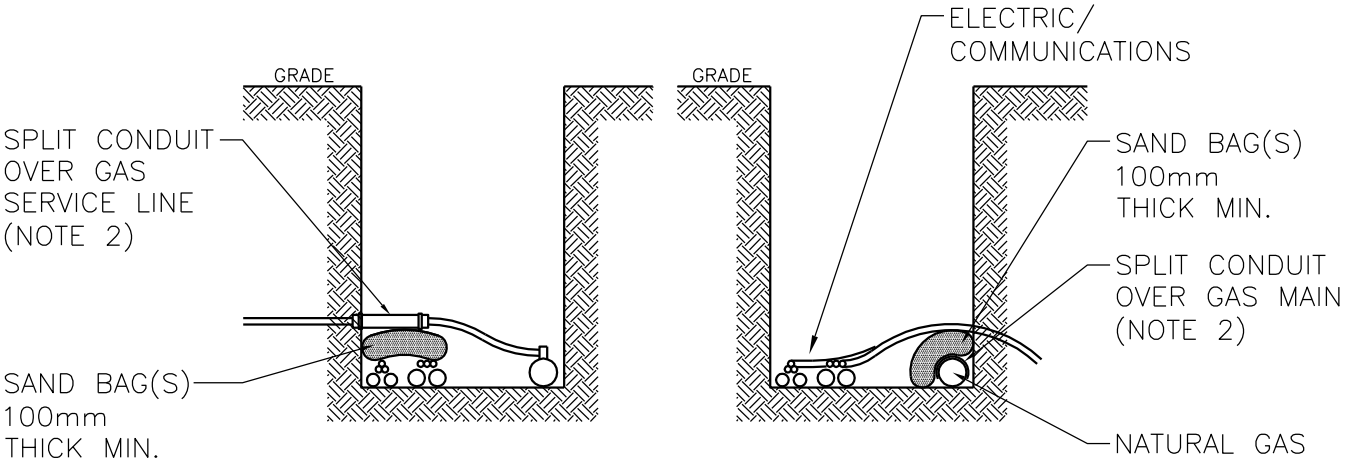
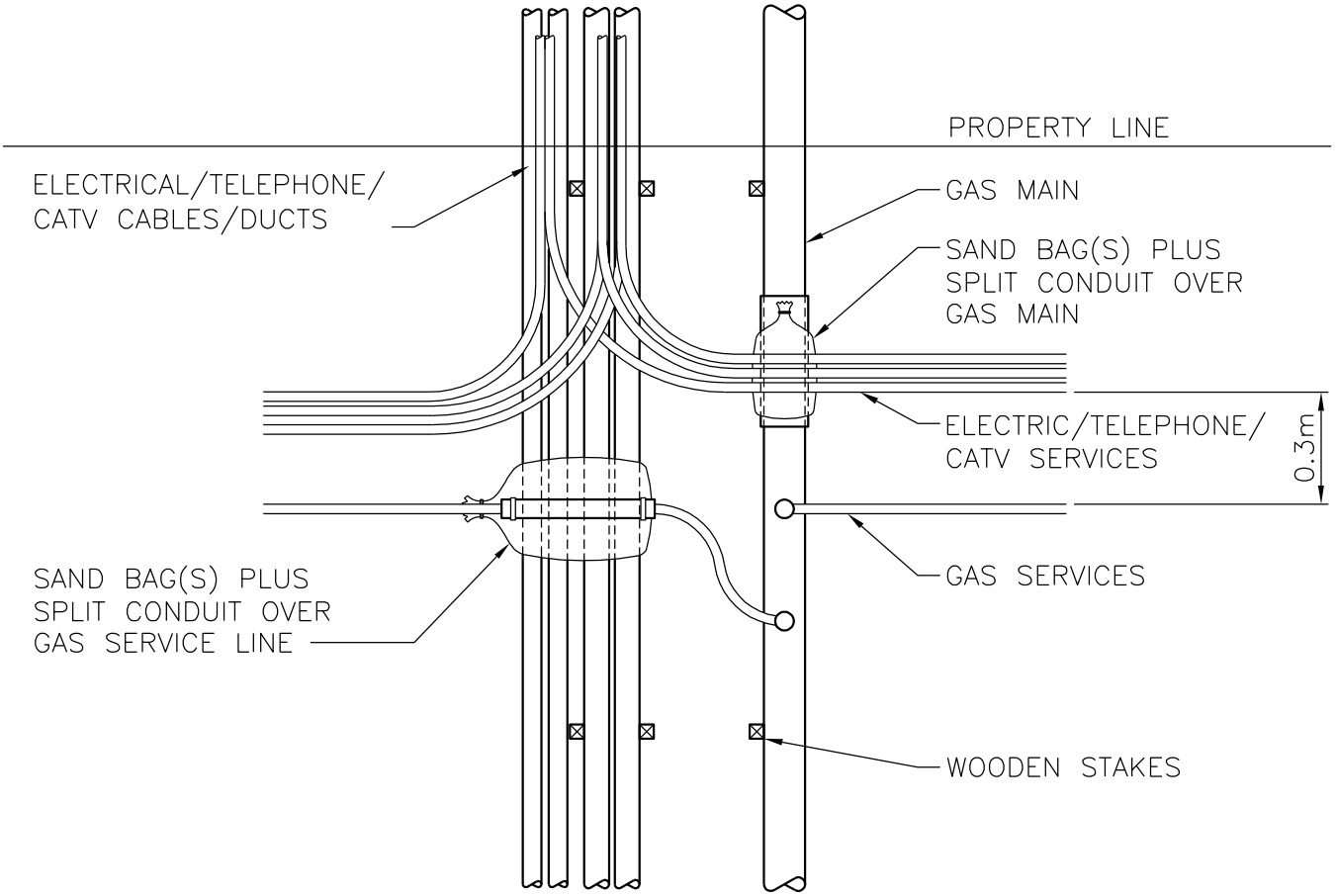


CROSSING OF ELECTRIC/
COMMUNICATIONS AND GAS



NOTES:

1. PLACE 1 OR MORE SAND BAGS OVER MAIN TRENCH UTILITIES TO ENSURE THERE WILL BE NO CONTACT.
2. SPLIT CONDUIT OVER GAS LINE SHALL BE 25mm GREATER IN DIAMETER THAN THE PIPE LINE COVERED.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M. ERETH	DESIGN CHK. M. ERETH	DRN. DC CHKD.	TRENCH LAYOUT FOUR PARTY DISTRIBUTION CROSSING DETAILS
DATE OF ISSUE 2012-12-05	DRAWING NO. B-14-66	SHEET 2 of 2	REV. A

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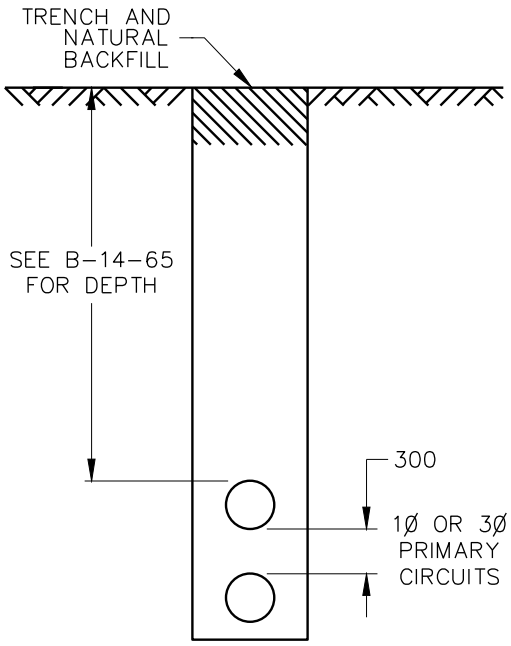
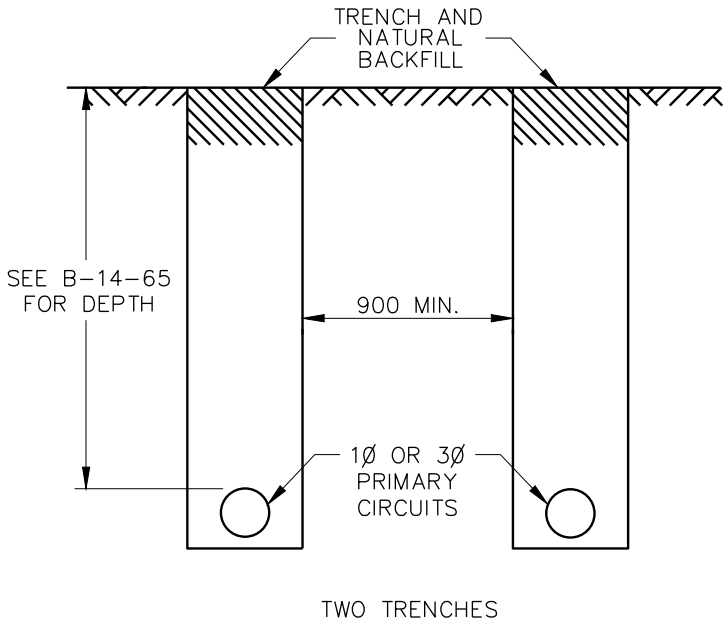
PRIMARY LOOP: INSTALLATION METHODS

METHOD #1
FOR RURAL USE ONLY

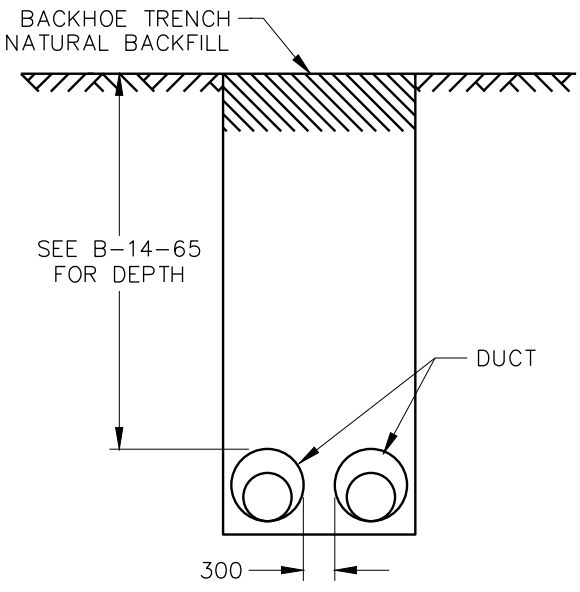


METHOD #2



TWO TRENCHES

METHOD #3



300 BETWEEN NEAREST CONDUCTORS OF DIFFERENT CIRCUITS

NOTE:
1) ENGINEERING TO APPROVE USE OF SAND IN TRENCH FOR ANY OF THE METHODS.

SCALE: N.T.S. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL M.ERETH	DESIGN CHK. A.UHREN	DRN. A.GATZKE CHKD.	PRIMARY LOOP POWER INSTALLATION METHODS
		2015-03-10	
DATE OF ISSUE 2015/04/28	DRAWING NO. B-14-70	SHEET 1 of 1	REV. C

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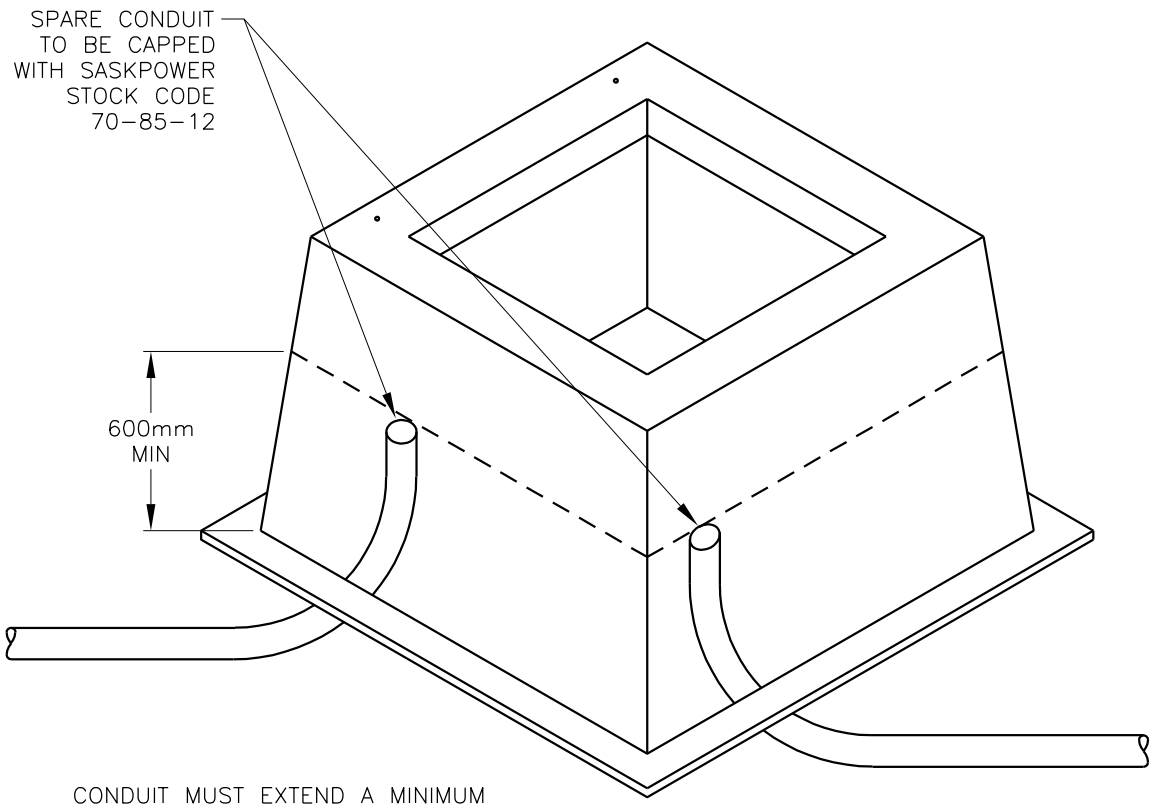
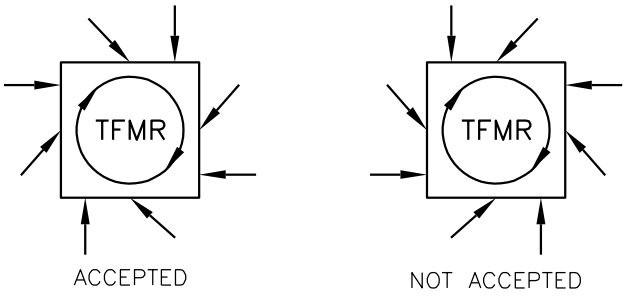


CONDUIT MUST EXTEND A MINIMUM 600mm INSIDE OF THE VAULT. END OF CONDUIT MUST BE ABOVE WATER LEVEL AND BELOW VAULT LIP.



CONDUIT MAY ENTER VAULT FROM ANY SIDE, BUT THE ANGLE OF ENTRY MUST BE IN A DIRECTION TANGENTIAL TO THE STANDARD CLOCKWISE COIL OF PRIMARY CABLES.

NOTES:

1. ALL WORK INSIDE TRANSFORMER TO BE COMPLETED BY A POWER LINE TECHNICIAN (PLT).
2. MULE-TAPE PULL STRING (SASKPOWER STOCK CODE 71-35-04) TO BE INSTALLED IN ALL CONDUIT.
3. THE DESIGNATION OF THE POLE OR TRANSFORMER THAT THE CONDUIT ORIGINATES FROM SHOULD BE MARKED ON THE CONDUIT AS PER CSM B-26-46.
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SCALE: N.T.S.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. B.GEBHART	DRN.D.REDEKOPP CHKD.	SPARE CONDUIT IN BOX PADS
		2020-09-08	
DATE OF ISSUE 2021-01-20	DRAWING NO. B-14-75	SHEET 1 of 1	REV. –

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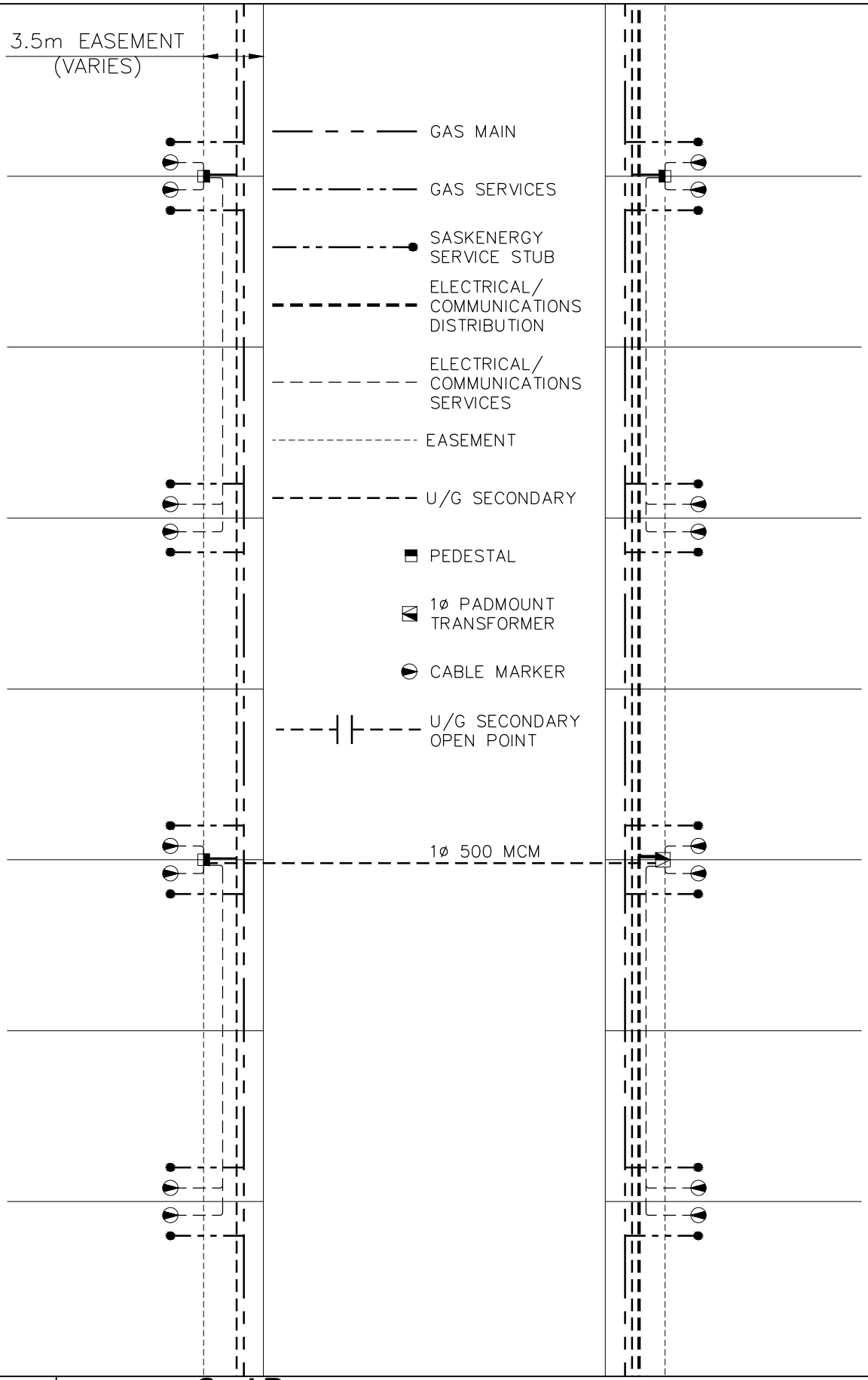
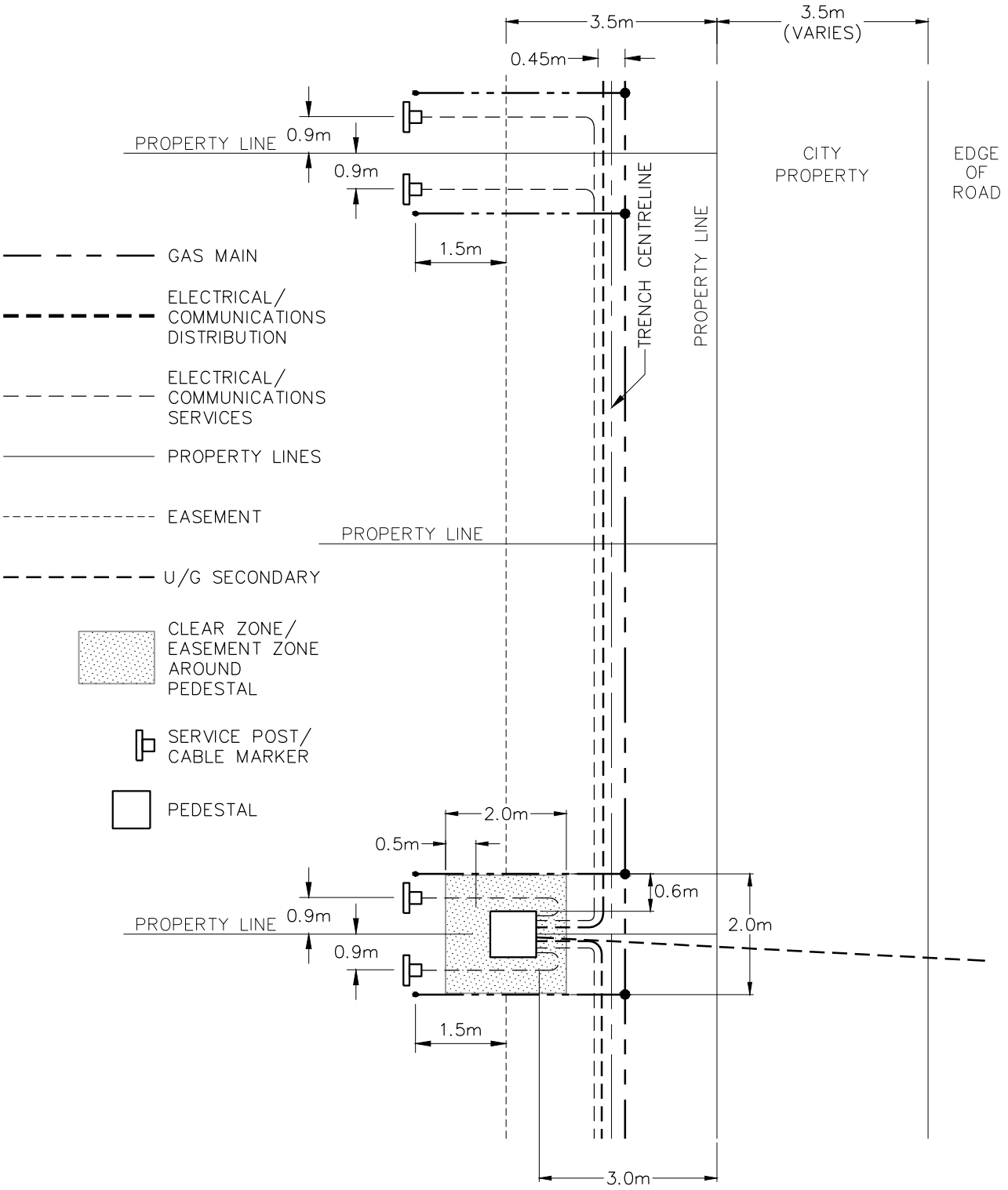


SaskPower – DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK.	DRN. SL	EASEMENT PLAN, FOUR PARTY TRENCHING, FRONT STREET DISTRIBUTION OVERALL PLAN
L.MOEN	S.PRIER	CHKD.	

DATE OF ISSUE 2016/02/05	DRAWING NO. B-14-80	SHEET 1 of 3	REV. 0



NOTES:

1. USE 5" DUCT (CONDUIT) FOR ROAD CROSSING WITH 500MCM CABLE.
2. SPARE DUCT SHALL BE INSTALLED.
3. ROAD CROSSING WITH 500MCM CABLE SHALL BE OFF-SET TO AVOID PROPERTY PIN.

SaskPower – DISTRIBUTION STANDARDS				
APPROVAL L.MOEN	DESIGN CHK. S.PRIER	DRN. DC/SL CHKD.	EASEMENT PLAN, FOUR PARTY TRENCHING, FRONT STREET DISTRIBUTION PEDESTAL INSTALLATION DETAILS	
DATE OF ISSUE 2016/02/05		DRAWING NO. B-14-80	SHEET 2 of 3	REV. 0

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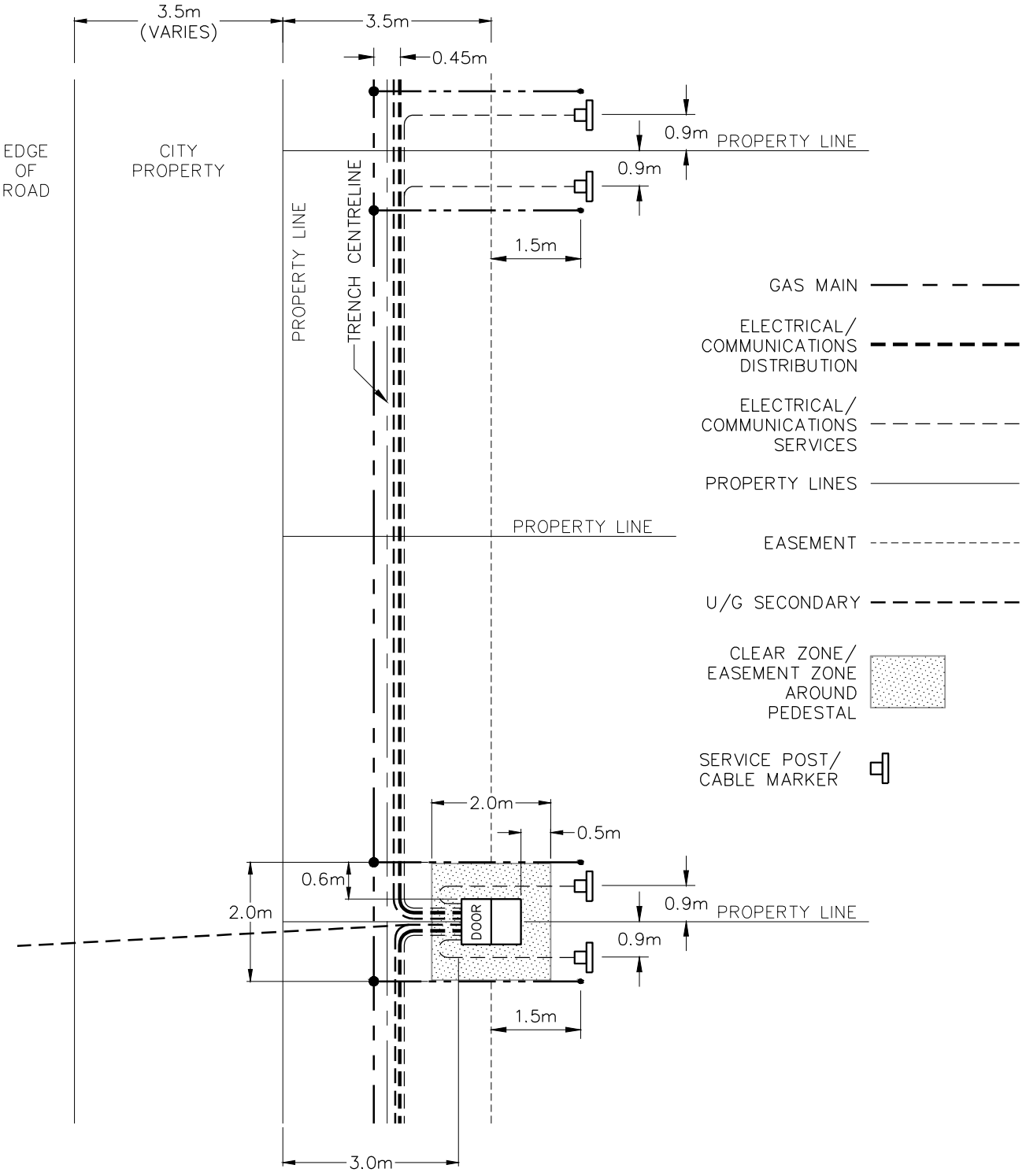

NOTES:
1. ROAD CROSSING WITH 500MCM CABLE SHALL BE OFF-SET TO AVOID PROPERTY PIN.

	SaskPower – DISTRIBUTION STANDARDS			
	APPROVAL L.MOEN	DESIGN CHK. S.PRIER	DRN. DC/SL CHKD.	EASEMENT PLAN, FOUR PARTY TRENCHING, FRONT STREET DISTRIBUTION PADMOUNT TRANSFORMER DETAILS
	DATE OF ISSUE 2016/02/05	DRAWING NO. B-14-80	SHEET 3 of 3	REV. 0

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REFERENCE:

1. THE CONCRETE CONSTRUCTION DEPENDS ON THE WEATHER REFER TO "COLD WEATHER CONCRETING REQUIREMENTS FOR BURIED CONCRETE CABLE DUCT BANKS", OR "DUCT BANK AND MANHOLE VAULT WARM WEATHER CONSTRUCTION REQUIREMENTS AND SPECIFICATIONS".

2. THE DUCT BANK FORMATIONS AND DIMENSIONS ARE REFERENCED TO DRAWINGS "TYPICAL DUCT BANK FORMATIONS", SHEETS 1 THROUGH 6.

NOTES:

1. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED.

2. CONCRETE TO BE MINIMUM 25 MPA, FROM AN APPROVED READY MIX CONCRETE SUPPLIER, AND COMPLY WITH ALL THE LATEST CSA STANDARDS FOR QUALITY, WORKMANSHIP, STORAGE, HANDLING WEATHER REQUIREMENTS MIXTURES, AND TESTING.

3. REINFORCING TO CONFORM TO CSA STANDARD G30.18–M92, FY=400MPA

4. REBAR TO BE FASTENED TO SPACERS WITH WIRE TIES SUPPLIED BY CONTRACTOR.

5. ALL DUCT BANKS TO BE SURVEYED EVERY 10 METERS AT EDGES & CENTER LINE BEFORE BACKFILL INSTALLED.

6. SASKPOWER MAY SPECIFY TYPE 32 BASE FILL BE USED RATHER THAN LOW SHRINK CONCRETE IF TEMPERATURES ARE A FACTOR. BASE FILL WOULD NEED TO BE INSTALLED IN 150mm LIFTS AND TAMPED TO 95% PROCTOR.

7. THE 150mm FROM THE OUTSIDE OF THE CONDUIT SPACER TO THE EDGE OF THE TRENCH INCLUDES ROOM FOR SHORING IF REQUIRED. AN ABSOLUTE MINIMUM OF 75mm OF CONCRETE IS REQUIRED TO EXTEND HORIZONTALLY FROM THE OUTER EDGE OF THE CONDUIT SPACER. ANY VALUE LESS THAN THIS NEEDS TO BE APPROVED BY ENGINEERING.

8. WHEN NECESSARY, A PUMPER TRUCK OR OTHER SUFFICIENT MEANS IS TO BE USED TO ENSURE CONCRETE IS NOT DROPPED INTO PLACE FROM LARGE HEIGHTS. DROPPING CONCRETE INTO PLACE CAN CAUSE AGGREGATE SEPARATION OR DAMAGE TO DUCT BANK.

9. AT COLD JOINTS BETWEEN EXISTING AND NEW CONCRETE OR WHEN CONSTRUCTION JOINTS ARE ALLOWED, 10MIL STEEL DOWELS, 600MM LONG, SHALL BE PLACED AT 1.0 METER INTERVALS AS PER CITY OF REGINA STANDARD CONSTRUCTION SPECIFICATION SECTION 2240.

10. REBAR TO BE LASHED TO SPACERS AS CLOSE TO TOP OF SPACER AS POSSIBLE, AWAY FROM CONDUITS.

11. REBAR AT THE BOTTOM LAYER TO BE LASHED TO SPACERS THROUGH THE SPACE PROVIDED.

12. REINFORCING TO CONFORM TO CSA STANDARD G30.18–M92, FY=400MPA.

13. DETAILS C & D ARE BASED ON THE CITY OF REGINA REQUIREMENTS. FOR LOCATIONS OUTSIDE OF THE CITY OF REGINA, THE REQUIREMENTS WILL NEED TO BE IDENTIFIED BY ENGINEERING.

14. IF THE DUCT BANK WILL BE BUILT OUTSIDE OF THE CITY OF REGINA, CONFIRM MINIMUM TRENCH DEPTH OF THE FORMATION AND BACK FILL REQUIREMENT WITH LOCAL MUNICIPALITY.

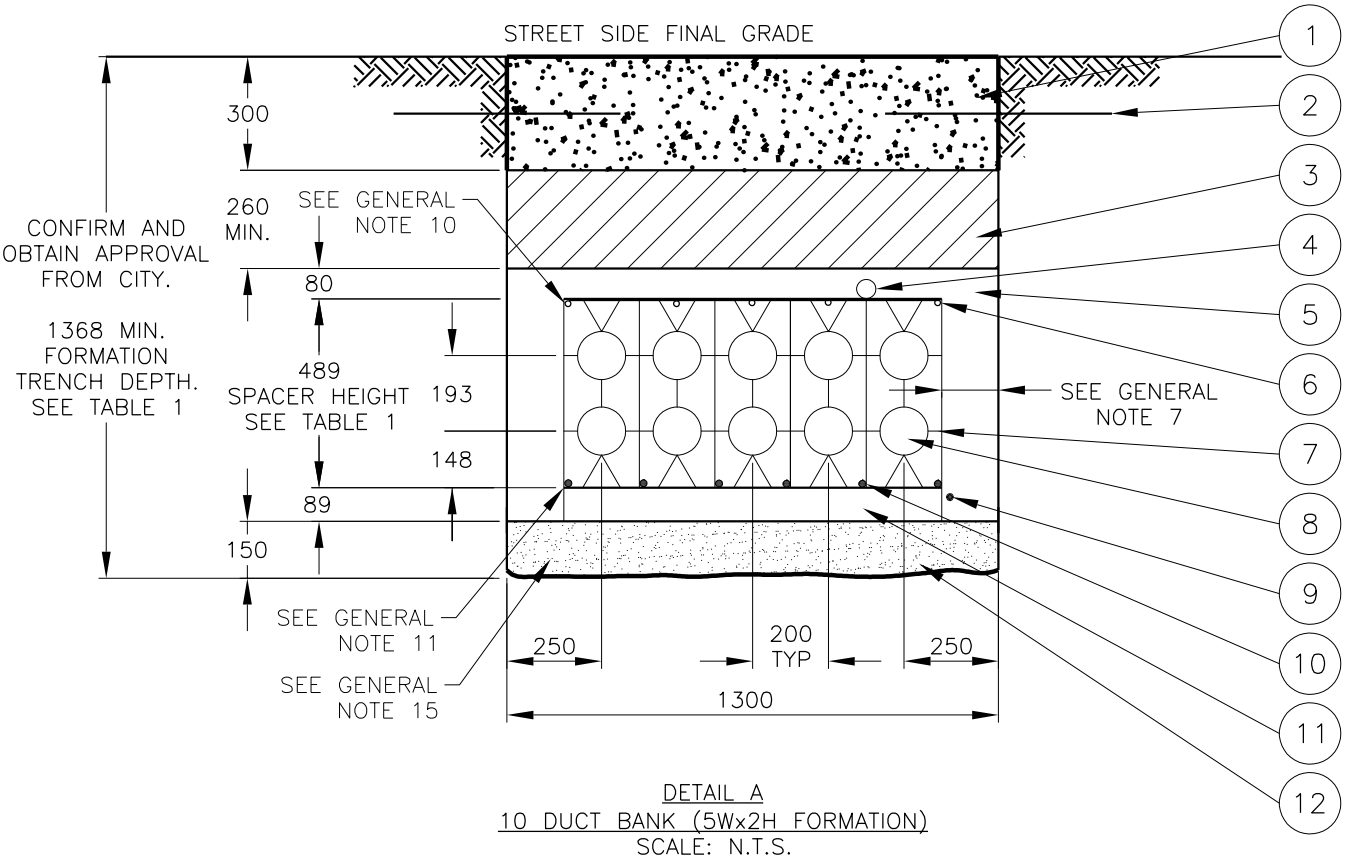
15. IN LOCATIONS WHERE COMPACTING IS RESTRICTED AND WITH ENGINEERS APPROVAL, THE TYPE 32 BASE FILL CAN BE REPLACED WITH #57 STONE COMPLETELY ENCLOSED BY FILTRATION FABRIC AND GEOTECH FABRIC. SEE DETAIL "E" AND "F".

#57 STONE SIEVE SIZE REQUIREMENT:
- PERCENT PASSING 1 1/2 INCHES (38mm) 100%
- PERCENT PASSING 1 INCH (25mm) 95% TO 100%
- PERCENT PASSING 3/4 INCH (19mm) 0% TO 15%

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN.D.REDEKOPP CHKD. 2021-06-09	TYPICAL DUCT BANK ARRANGEMENT AND BACKFILL IN-STREET AND IN-SIDEWALK CONSTRUCTION
DATE OF ISSUE 2021-08-16	DRAWING NO. B-14-90	SHEET 1 of 7	REV. 0

MATERIAL NOTES	
ITEM	DESCRIPTION
1	CONCRETE–32 MPS. CONCRETE TO BE VIBRATED INTO PLACE
2	10MIL REBAR DOWELS (SEE GENERAL NOTE 9)
3	LOW SHRINK CONCRETE 0.25–0.75 MPa. CONCRETE TO BE VIBRATED INTO PLACE (SEE GENERAL NOTE 6)
4	50.8mm (2") I.D HPDE CONTINUOUS DUCT. CABLE TIE TO TOP OF FORMATION
5	CONCRETE–25 MPA SULPHATE RESISTANT TYPE HS. CONCRETE TO BE VIBRATED IN PLACE (SEE GENERAL NOTE 8)
6	15 MIL REBAR BARS CONTINUOUS (TOP AND LATERAL SIDES)
7	PLASTIC SPACERS & BASES @ 1500mm O.C.
8	127mm (5") I.D. PVC BELL AND SPIGOT–SCHEDULE 40–6m LENGTHS
9	4/0 Cu GROUND WIRE
10	20MIL REBAR BARS CONTINUOUS AT THE BOTTOM LAYER
11	WOOD SLEEPERS 89mm*140mm (4"x6")
12	TYPE 32 BASE FILL COMPACTED TO 95% PROCTOR



DETAIL A
10 DUCT BANK (5Wx2H FORMATION)
SCALE: N.T.S.

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SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. J.ARSENAULT	DRN.D.REDEKOPP CHKD. 2019–04–12	TYPICAL DUCT BANK ARRANGEMENT AND BACKFILL IN–STREET AND IN–SIDEWALK CONSTRUCTION
DATE OF ISSUE 2021-08-16	DRAWING NO. B–14–90	SHEET 2 of 7	REV. –

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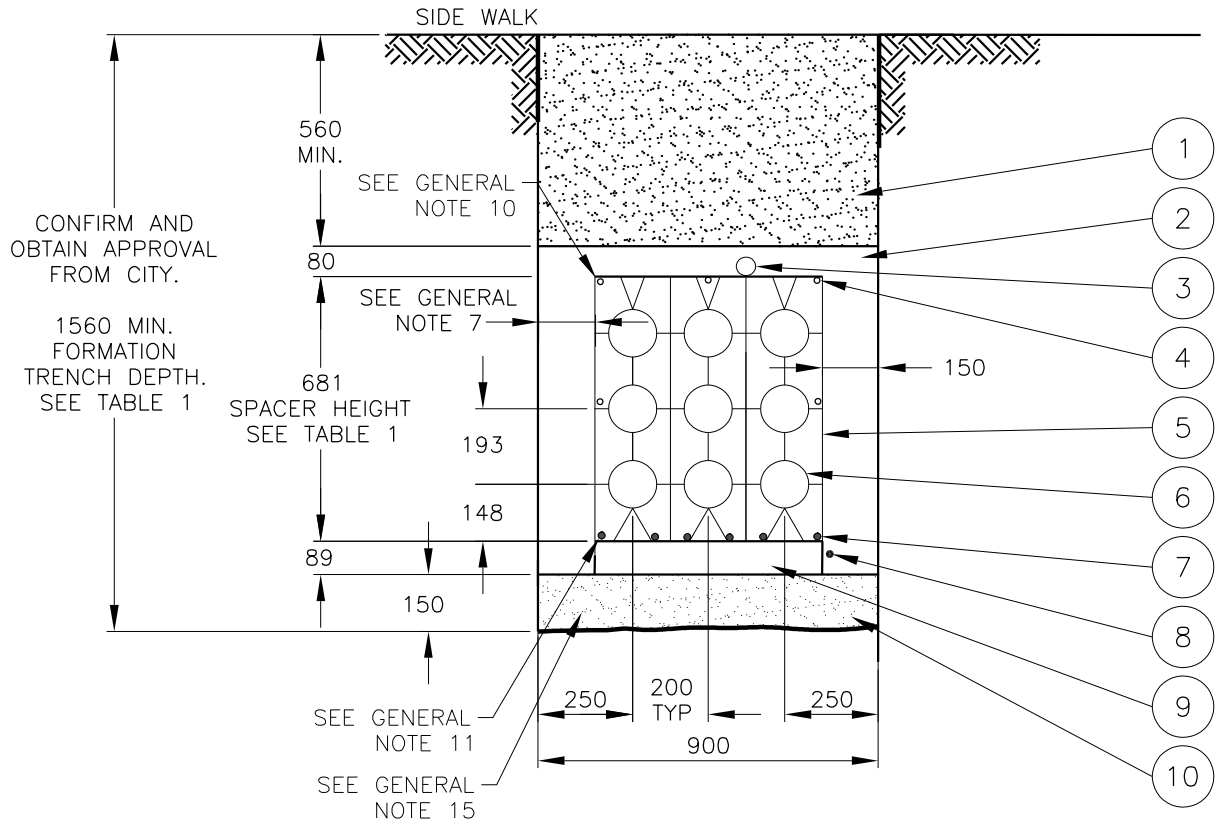
MATERIAL NOTES	
ITEM	DESCRIPTION
1	TYPE 32 BASE FILL, INSTALLED IN 150mm LIFTS AND COMPACTED TO 95% PROCTOR
2	CONCRETE–25 MPa SULPHATE RESISTANT TYPE HS. CONCRETE TO BE VIBRATED IN PLACE. (SEE NOTE 8)
3	50.8mm (2") I.D. HPDE CONTINUOUS DUCT. CABLE TIE TO TOP OF FORMATION
4	15MIL OF REBAR BARS CONTINUOUS (TOP AND LATERAL SIDES)
5	PLASTIC SPACERS & BASES @ 1500mm O.C.
6	127mm (5") I.D. PVC BELL AND SPIGOT–SCHEDULE 40–6m LENGTHS
7	20MIL REBAR BARS CONTINUOUS AT THE BOTTOM LAYER
8	4/0 Cu GROUND WIRE
9	WOOD SLEEPERS 89mmx140mm (4"x6"), PLACE UNDER SPACER
10	TYPE 32 BASE FILL COMPACTED TO 95% PROCTOR

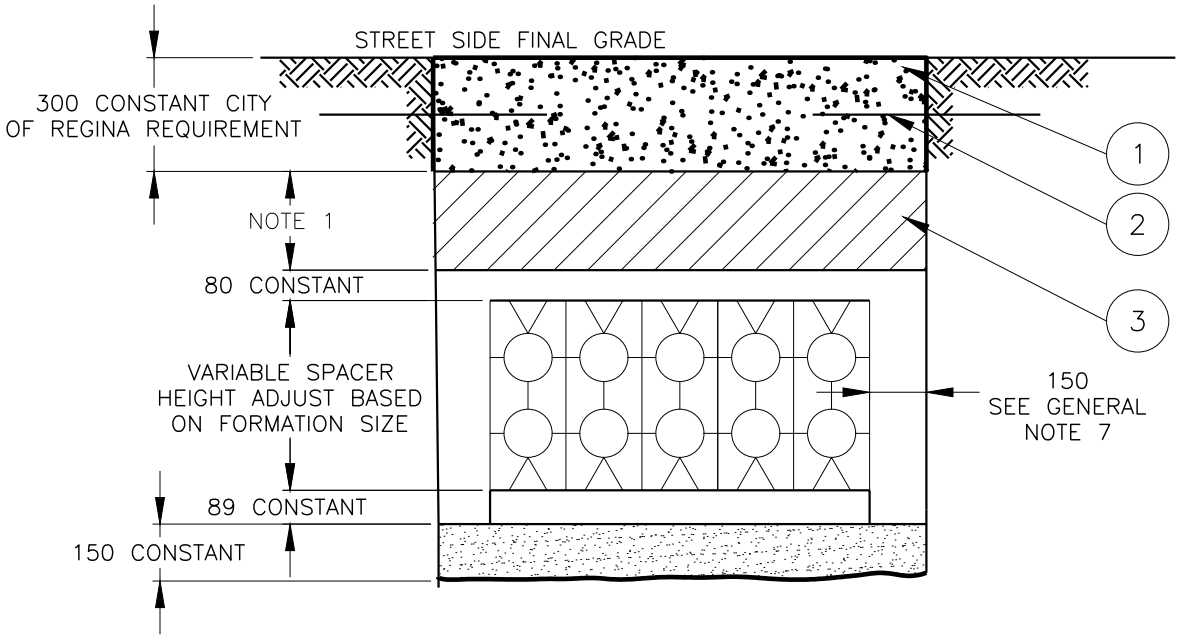


DETAIL B
9 DUCT BANK (3Wx3H FORMATION)
IN–SIDEWALK CONSTRUCTION
SCALE: N.T.S.

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN.D.REDEKOPP CHKD. 2021–06–15	TYPICAL DUCT BANK ARRANGEMENT AND BACKFILL IN–STREET AND IN–SIDEWALK CONSTRUCTION
DATE OF ISSUE 2021-08-16	DRAWING NO. B–14–90	SHEET 3 of 7	REV. –

MATERIAL NOTES	
ITEM	DESCRIPTION
1	CONCRETE–32 MPS. CONCRETE TO BE VIBRATED INTO PLACE
2	10MIL REBAR DOWELS (SEE GENERAL NOTE 9)
3	LOW SHRINK CONCRETE 0.25–0.75 MPa. CONCRETE TO BE VIBRATED INTO PLACE (SEE GENERAL NOTE 6)



DETAIL C1
TYPICAL IN–STREET CONSTRUCTION LAYERS
CONCRETE UNDER ASPHALT &
CITY HAS PLANS TO REPAVE STREET
SCALE: N.T.S.

NOTES:

1. VARIABLE, ADJUST BASED ON OVERALL DEPTH. DEPTH MAY BE REDUCED WITH APPROVAL FROM CITY.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

APPROVED FOR CONSTRUCTION

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN.D.REDEKOPP CHKD. 2021–06–10	TYPICAL DUCT BANK ARRANGEMENT AND BACKFILL IN–STREET AND IN–SIDEWALK CONSTRUCTION
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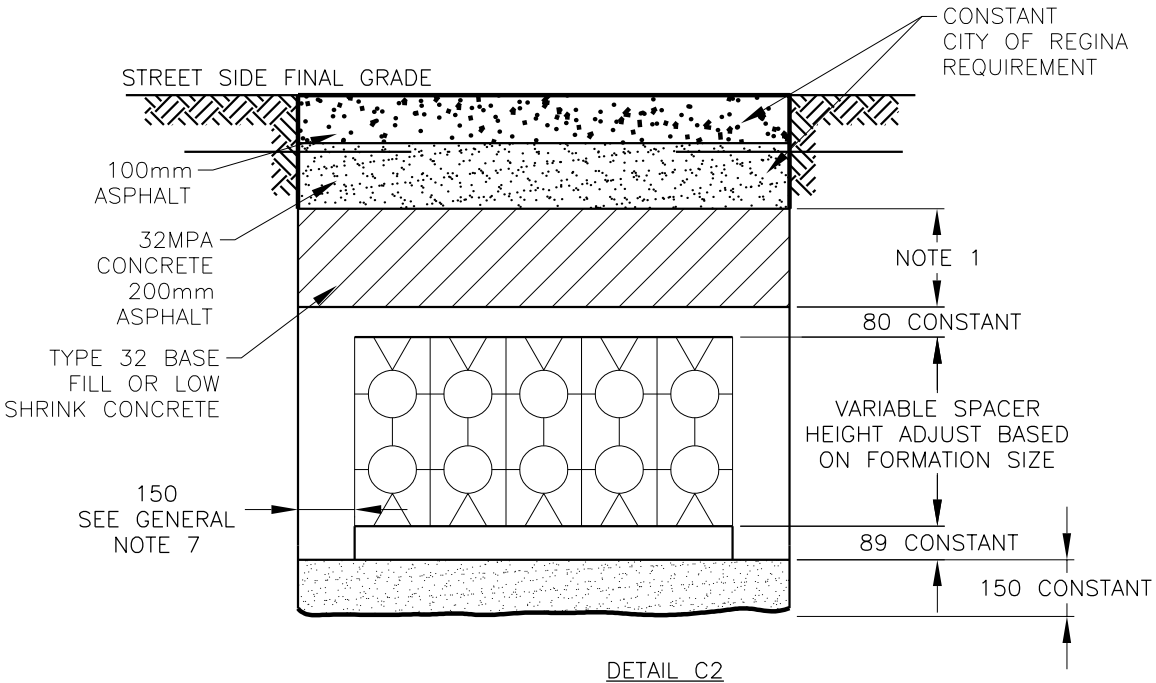
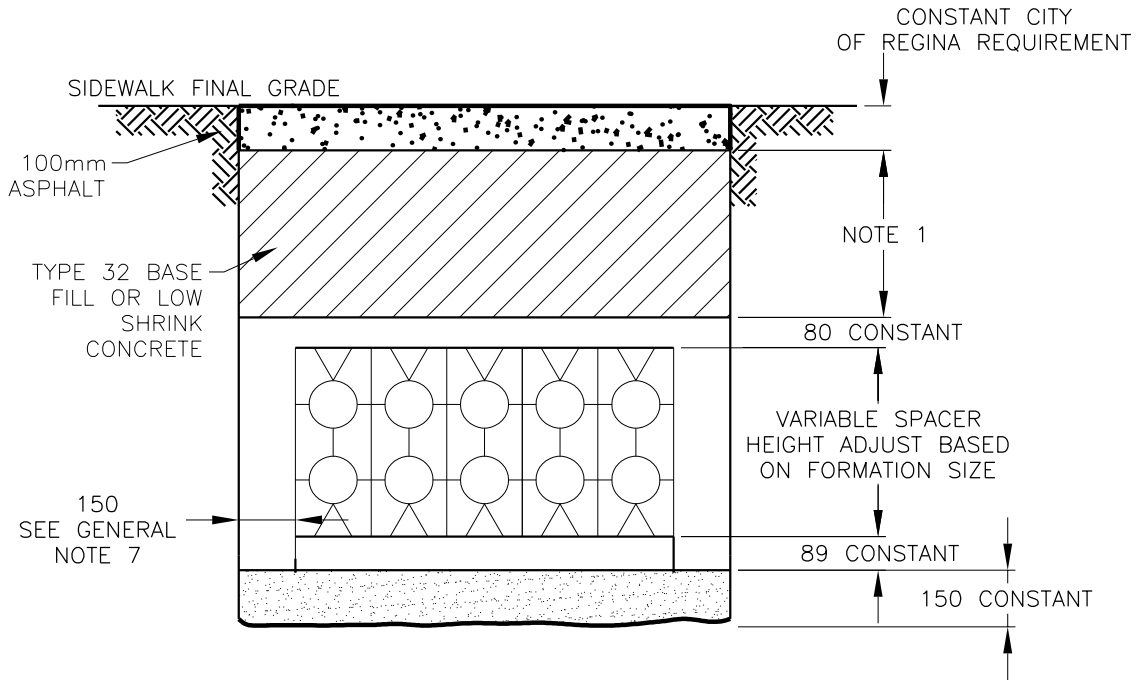


DETAIL C2
TYPICAL IN-STREET CONSTRUCTION LAYERS,
CONCRETE UNDER ASPHALT & CITY HAS
NO PLANS TO REPAVE STREET
SCALE: N.T.S.



DETAIL C3
TYPICAL IN-STREET CONSTRUCTION LAYERS,
NO CONCRETE UNDER ASPHALT
SCALE: N.T.S.

NOTES:

1. VARIABLE, ADJUST BASED ON OVERALL DEPTH. DEPTH MAY BE REDUCED WITH APPROVAL FROM CITY.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

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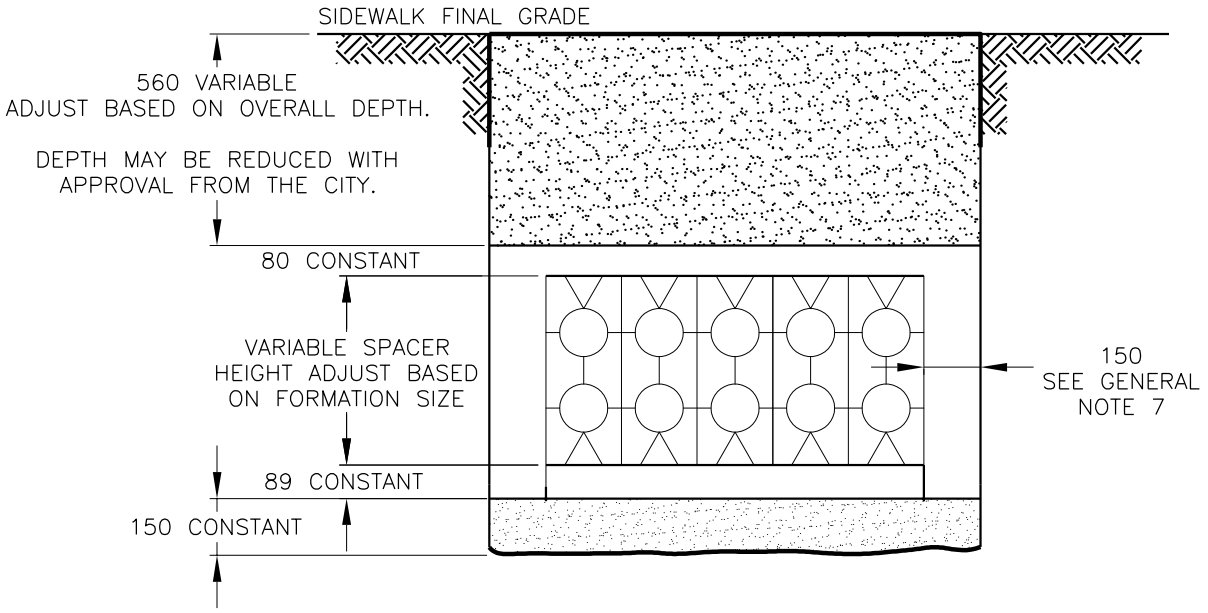
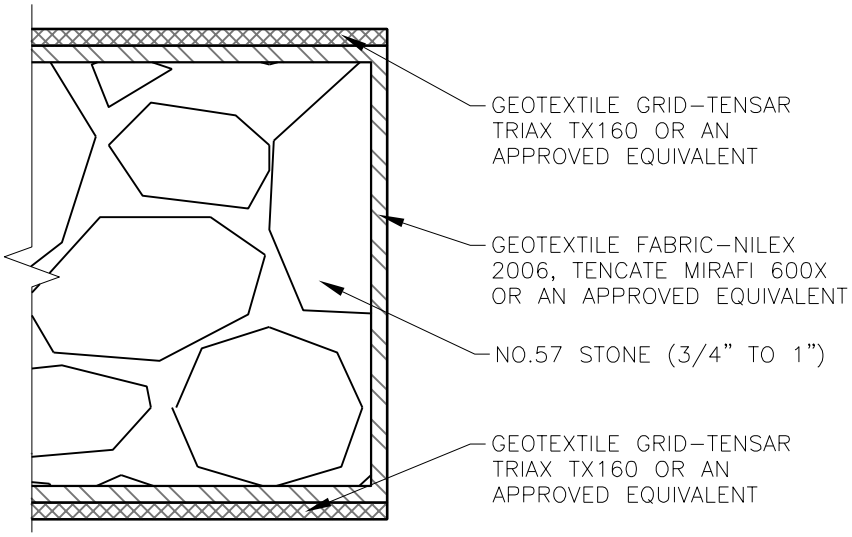


DETAIL D
TYPICAL IN-SIDEWALK CONSTRUCTION LAYERS
SCALE: N.T.S.



DETAIL E
ALTERNATIVE BASE FILL SECTION
SCALE: N.T.S.

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APPROVAL L.MOEN	DESIGN CHK. J.ARSENAULT	DRN.D.REDEKOPP CHKD. 2019-04-15	TYPICAL DUCT BANK ARRANGEMENT AND BACKFILL IN-STREET AND IN-SIDEWALK CONSTRUCTION
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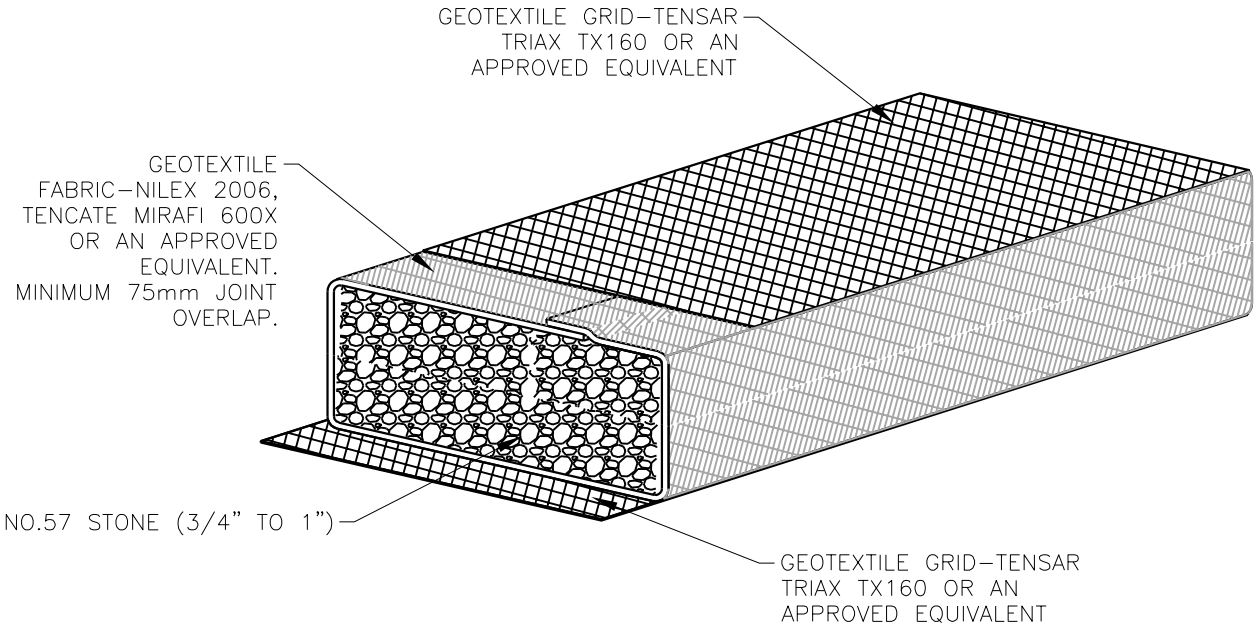

DETAIL F
ALTERNATIVE BASE FILL
SCALE: N.T.S.

TABLE 1 (MINIMUM TRENCH DEPTH)		
WxH	SPACER HEIGHT (mm)	MIN TRENCH DEPTH OF FORMATION (mm)
2x2	489	1368
3x2	489	1368
4X2	489	1368
5x2	489	1368
6x2	489	1368
8x2	489	1368
2x3	681	1560
3x3	681	1560
4x3	681	1560
5x3	681	1560
2x4	873	1752
3x4	873	1752
4x4	873	1752

* CONFIRM MINIMUM TRENCH DEPTHS OF THE FORMATION, AND OBTAIN APPROVAL FROM THE CITY (PROJECT SPECIFIC).

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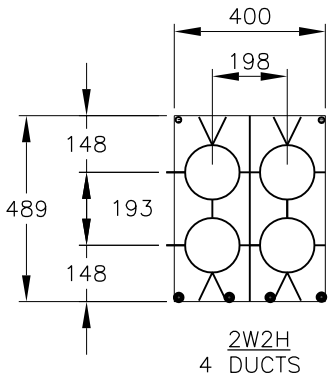
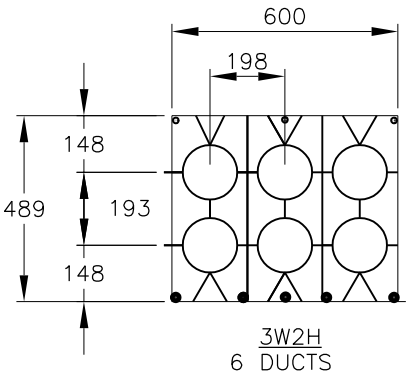
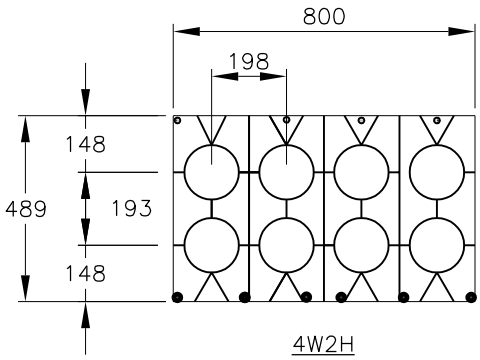


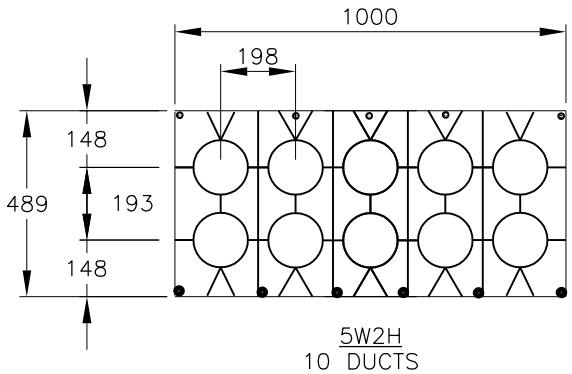
2W2H
4 DUCTS



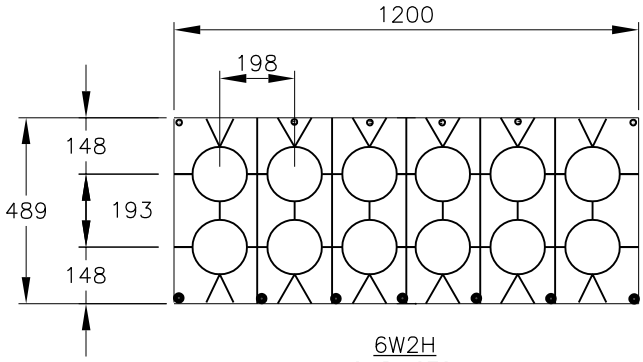
3W2H
6 DUCTS



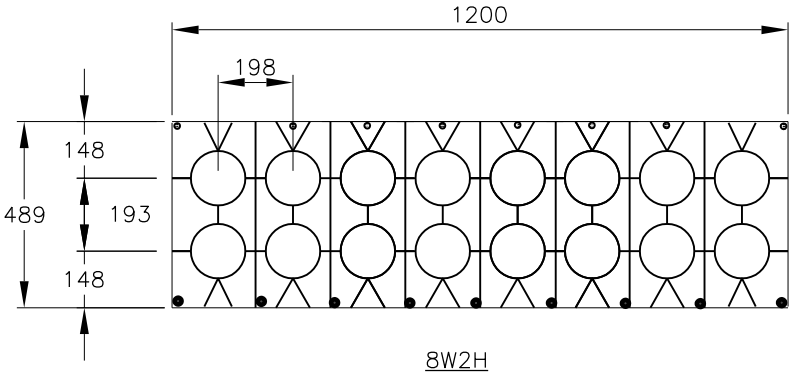
4W2H
8 DUCTS



5W2H
10 DUCTS



6W2H
12 DUCTS



8W2H
16 DUCTS

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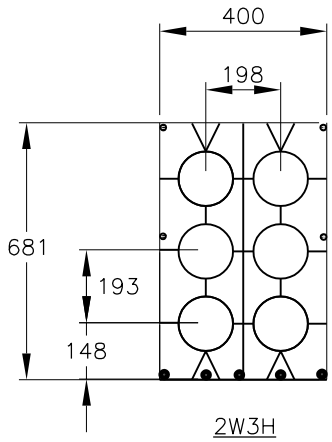
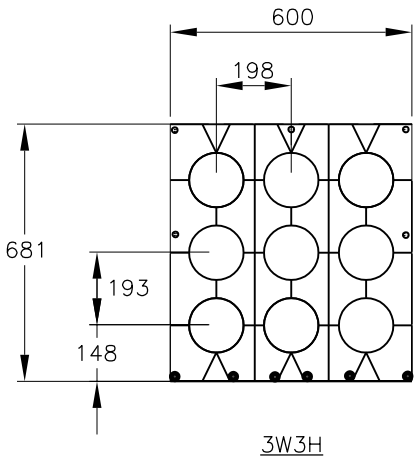
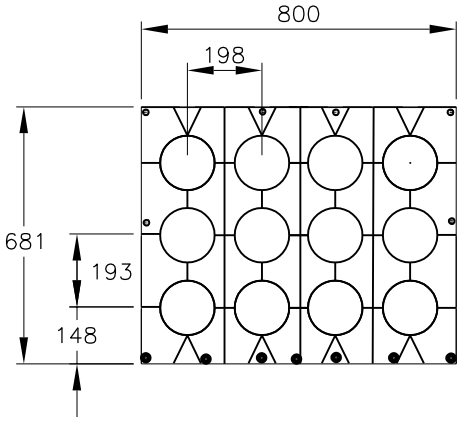


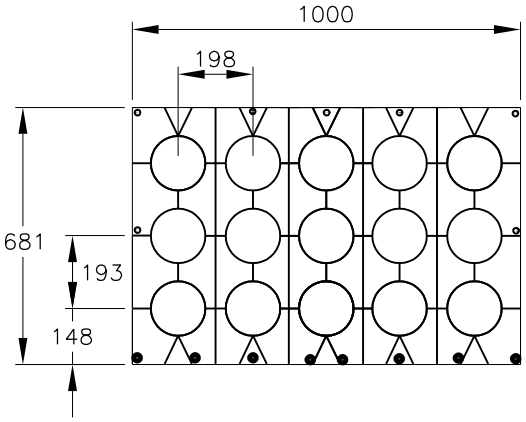
2W3H
6 DUCTS



3W3H
9 DUCTS



4W3H
12 DUCTS



5W3H
15 DUCTS

SaskPower – DISTRIBUTION STANDARDS			
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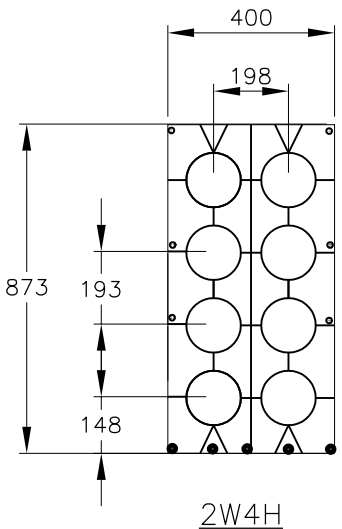
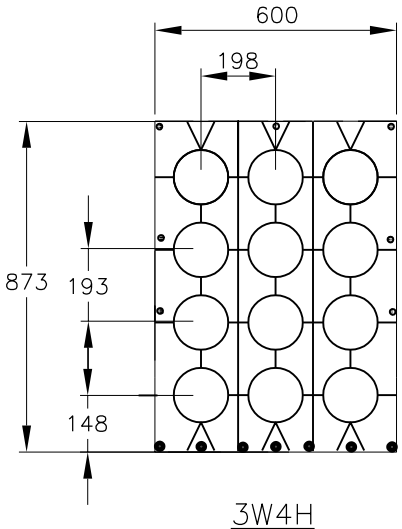
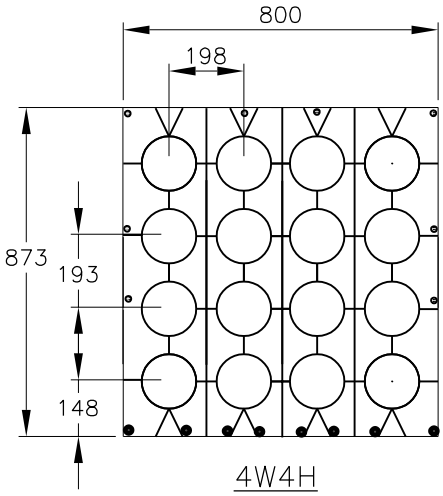


2W4H
8 DUCTS



3W4H
12 DUCTS



4W4H
16 DUCTS

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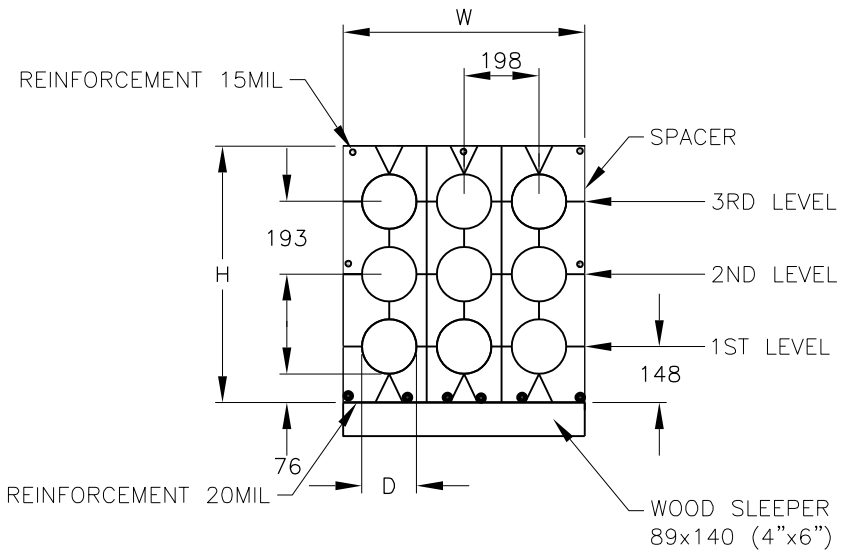

INSIDE DUCT DIAMETER (d)	127
OUTSIDE DUCT DIAMETER (D)	144

DUCTS	
NUMBER OF DUCTS WxH	WxH
2x2 (4)	400x489
3x2 (6)	600x489
4x2 (8)	800x489
5x2 (10)	1000x489
6x2 (12)	1200x489
8x2 (2)	1600x489
2x3 (6)	400x681
3x3 (9)	600x681
4x3 (12)	800x681
5x3 (15)	1000x681
2x4 (8)	400x873
3x4 (12)	600x873
4x4 (16)	800x873

NOTES:

1) ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

2) A CONCRETE ENCASED DUCT IS TO BE DENOTED BY ITS MATRIX. EX) 3 ROWS AND 4 COLUMN DUCT ARRANGEMENT WILL BE 3W4H.

MINIMUM TENSILE REINFORCEMENT:

(BOTTOM LAYER REBAR)

As(min)=(0.2x(fc)^0.5)/(fy)x(bxh−A(duct))

WHERE:

As(min): MINIMUM AREA OF TENSILE REINFORCEMENT
fc': CONCRETE STRENGTH (MPa)
fy: STEEL STRENGTH (MPa)
b: WIDTH OF DUCT BANK
h: HEIGHT OF DUCT BANK
A(duct): THE EMPTY DUCT AREA

W= 200 + (n−1)x198
H= 300 + (N−1)x193

W: WIDTH OF ENTIRE SPACER
H: HEIGHT OF ENTIRE SPACER
n: NUMBER OF CONDUIT IN WIDTH
N: NUMBER OF CONDUIT IN HEIGHT

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APPROVAL L.MOEN	DESIGN CHK. J.ARSENAULT	DRN.D.REDEKOPP CHKD.	TYPICAL DUCT BANK FORMATIONS
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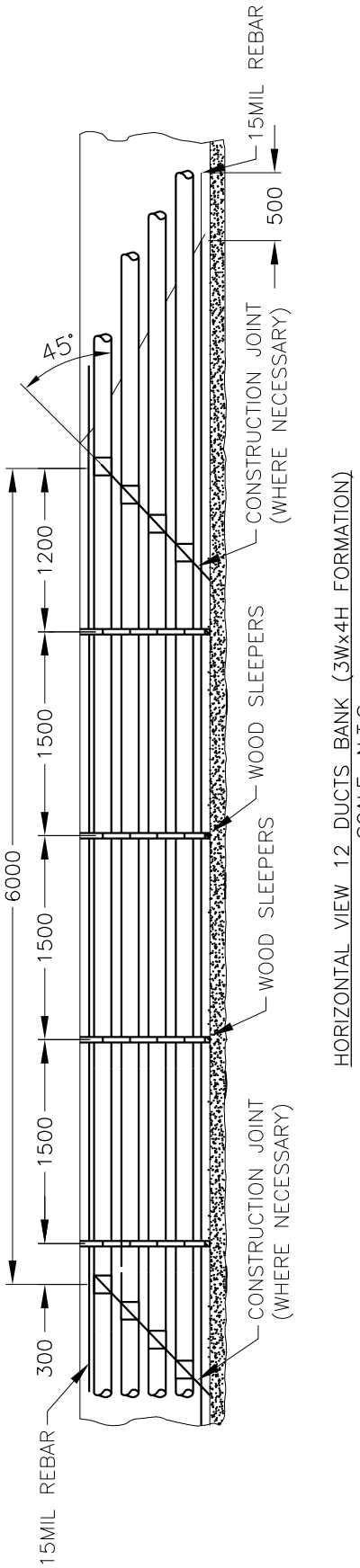

HORIZONTAL VIEW 12 DUCTS BANK (3Wx4H FORMATION)
SCALE: N.T.S.

NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED. 2. DUCTS TO BE STAGGERED AS SHOWN.
2. SECTION CUT VIEW REFER TO "TYPICAL DUCT BANK ARRANGEMENT AND BACKFILL IN-STREET AND IN-SIDEWALK CONSTRUCTION".

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DUCT BANK FORMATION AND MANHOLE VAULT BILL OF MATERIALS

MATERIAL LIST	STOCK CODE NUMBER	NOTES
VAULT CONCRETE CABLE IN–STREET 7'x12' 3 PIECE UNIT	50668	
VAULT CONCRETE CABLE IN–STREET 8'x12' 4 PIECE UNIT WITH 2 PIECE WALL	50666	
305mm (12") STANDARD CONCRETE TRANSITION RING (RISER) FOR MANHOLE VAULTS	SUPPLIED WITH VAULT	
CAST IRON FRAME AND COVER	SUPPLIED WITH VAULT	
CAST IRON FRAME AND COVER GRADING RINGS	NON STOCK CODE	ORDER FROM CAST IRON FRAME AND COVER SUPPLIER
150mm (6") MODIFIED CONCRETE TRANSITION RING (COLLAR) FOR MANHOLE VAULTS		1 UNIT SUPPLIED WITH VAULT
230mm (9") MODIFIED CONCRETE TRANSITION RING (COLLAR) FOR MANHOLE VAULTS		1 UNIT SUPPLIED WITH VAULT
WIRE CU 4/0 19 STR MHD BARE	29801	
3/4" x 10' SECTIONAL GROUND ROD – COPPER BONDED	26022	
SECTIONAL GROUND ROD COUPLER – COPPER	21002	
CONNECTOR–CU COMP – 4/0 TO 3/4" ROD	51250	
5" CONDUIT PVC BELL AND SPIGOT – 20' LENGTHS – SCHEDULE 40	704505	
2" HDPE PLASTIC PIPE (CONTINUOUS CONDUIT)	708502	
SPACER BLACK PLASTIC – 5" – 2" SPACING	708245	
SPACER BLACK PLASTIC – 5" – 2" SPACING BASE	708246	
PLASTIC TIE WRAPS 11"	702911	
5" SOLID BELL END FOR PVC SCHEDULE 40 CONDUITS	704510	
20 MIL STEEL REBAR 20' LENGTHS	NON STOCK CODE	
15 MIL STEEL REBAR 20' LENGTHS	NON STOCK CODE	
10 MIL STEEL REBAR 20' LENGTHS	NON STOCK CODE	
CONDUIT PULL TAPE (2500 LBS)	713503	
5" BLANK DUCT PLUG	703159	
2" BLANK DUCT PLUG	708512	
WOOD SLEEPER 89mm x 140mm (4" x 6")	NON STOCK CODE	
HILTI – RE 500 EPOXY ADHESIVE	NON STOCK CODE	
SIKADUR 32 HI–MOD/BONDING AGENTS	NON STOCK CODE	
PRIMER FOR CONCRETE SEALANT	703147	APPLIED DIRECTLY TO THE CONDUIT, FOR PVC USE ONLY
CONCRETE SEALANT	703146	
SAND	NON STOCK CODE	
TYPE 32 BASE FILL	NON STOCK CODE	
TYPE 32 MPA CONCRETE	NON STOCK CODE	
TYPE 32 MPA CONCRETE – SULFATE RESISTANT (TYPE HS)	NON STOCK CODE	

IF TYPE 32 BASE FILL COMPACTING IS RESTRICTED AND #57 STONE IS USED FOR BASEFILL

MATERIAL LIST	STOCK CODE NUMBER	NOTES
FILTRATION FABRIC	NON STOCK CODE	NILEX 2006, TENCATE MIRAFI 600X OR AN APPROVED EQUIVALENT
GEOTECH FABRIC	NON STOCK CODE	TEMSAR TRIAX TX160 OR AN APPROVED EQUIVALENT
#57 STONE	NON STOCK CODE	REQUIREMENT REFER TO B_14_90

SaskPower – DISTRIBUTION STANDARDS

APPROVAL	DESIGN CHK.	DRN.D.REDEKOPP	TYPICAL DUCT BANK FORMATIONS
L.MOEN	L.MOEN	CHKD.	
		2021–06–09	

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KEY NOTES:

1. TYPICAL FORMATION OR DUCT ENTRY INTO VAULT TO BE AS FOLLOWS:
   - MINIMUM 305mm FROM BOTTOM OF VAULT COVER SLAB
   - MINIMUM 305mm FROM BASE SLAB
   - MINIMUM 305mm FROM INSIDE EDGE OF VAULT WALLS
   - MINIMUM 305mm FROM WALL JOINTS FOR VAULTS WITH A TWO PIECE WALL SECTION.

   THE "NO CORE ZONE" IS APPLICABLE ONLY TO CORING CONDUITS. ENGINEERING APPROVAL TO BE OBTAINED TO CORE CONDUITS IN THE "NO CORE ZONE".

2. DO NOT CORE THROUGH MANHOLE VAULT WALL REBAR. REFER TO MANHOLE VAULT STANDARD DRAWING FOR LOCATION OF REBAR.
   - INSTALL END BELLS FOR ALL 156mm DUCT. REFER TO DETAIL "A".
   - PARGE AROUND ALL CORED HOLES WITH CONCRETE SEALANT 703146, PRIMER 703147 NEEDS TO BE APPLIED TO THE CONDUITS FOR THE SEALANT, OR EQUIVALENT. (INSIDE AND OUTSIDE OF VAULT WALL). REFER TO DETAIL "D".

3. ALL VAULTS TO HAVE GROUND ROD INSTALLED.
   - CORE Ø50mm HOLE IN BASE SLAB.
   - OFFSET FROM MANHOLE ENTRY HOLE AND 102mm MAXIMUM CLEARANCE FROM VAULT WALLS.
   - SEAL AROUND GROUND ROD WITH CONCRETE SEALANT.
   - INSTALL 2x3m COPPER RODS (26022) AND COUPLER (21002) WITH CONNECTOR (51250).
   - RUN 4/0 COPPER AROUND INSIDE PERIMETER OF THE VAULT.

4. REFER TO DETAIL "B".

5. MANHOLE VAULT – NARROW WALL: DUCT BANK TO BE CENTERED WITH VAULT WALL OR OFF SET FROM EDGE OF VAULT 305mm MIN.

6. MANHOLE VAULT – LONG WALL: DUCT BANK TO BE OFF SET FROM VAULT WALL 305mm MIN. AVOID COMING IN CENTER OF WALL AS THIS WILL CAUSE ISSUES WITH PULLING LARGE SIZE CABLES THROUGH VAULT.

7. DUCT BANK SHOULD BE TIED INTO MANHOLE VAULT AT DIFFERENT ELEVATIONS, WHEN POSSIBLE, TO HELP WITH CABLE RACKING.

NOTES:

1. IF REBAR IN VAULT WALLS ARE CUT DURING CORING, THE CORED HOLE WHERE REBAR CUT IS TO BE IDENTIFIED ON AS BUILT.

2. DUCT BANK WILL HAVE A "NO TRAP" DESIGN FOR THE SLOPE, WHICH ALLOWS WATER TO DRAIN INTO VAULTS. AS A GUIDELINE, THE SLOPE SHOULD BE BETWEEN 0.67% AND 1.3% (WHICH IS IN ALIGNMENT WITH THE GOVERNMENT OF SASKATCHEWAN PLUMBING AND DRAINAGE REGULATIONS FOR MINIMUM SLOPE FOR 6" AND 4" SEWER PIPE). ENGINEERING APPROVAL REQUIRED FOR SLOPES OUTSIDE OF THESE GUIDELINES.

3. ALL MANHOLE AND DUCT BANK LOCATIONS TO BE SURVEYED IN.

4. IN THE SECTION OF CONNECTION BETWEEN DUCT BANK AND VAULTS, THE OPEN TIES SHOULD BE COMPLETELY COVERED BY RUBBER HOSE FOR ELECTRICAL ISOLATION FROM LONGITUDINAL REBAR. LEAVE EXTRA 100 mm HOSE ON THE BOTH SIDES OF THE OPEN TIES' END, FOLD THE SLEEVE BACK AND TIE IT ON THE REBAR (OPEN TIE).

5. REFER TO M2–58 SPECIFICATION FOR VAULT DETAILS.

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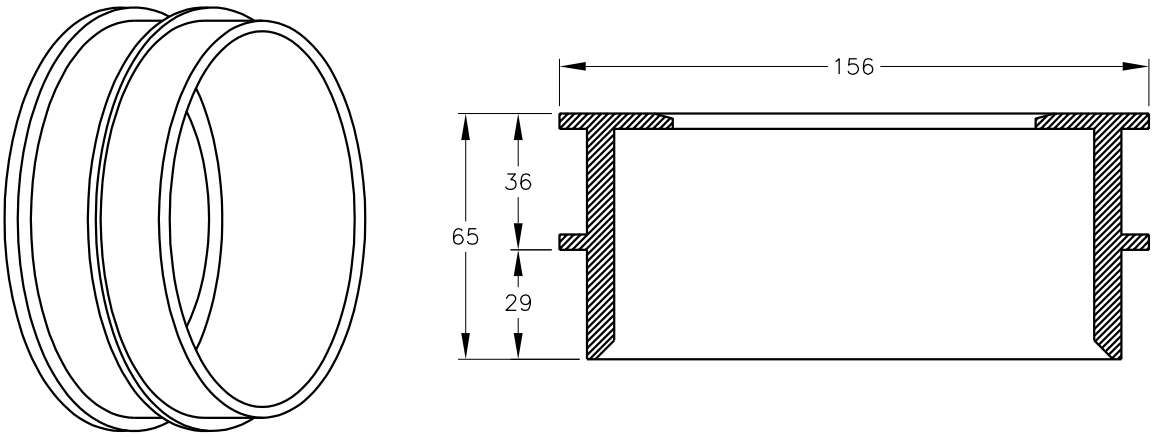
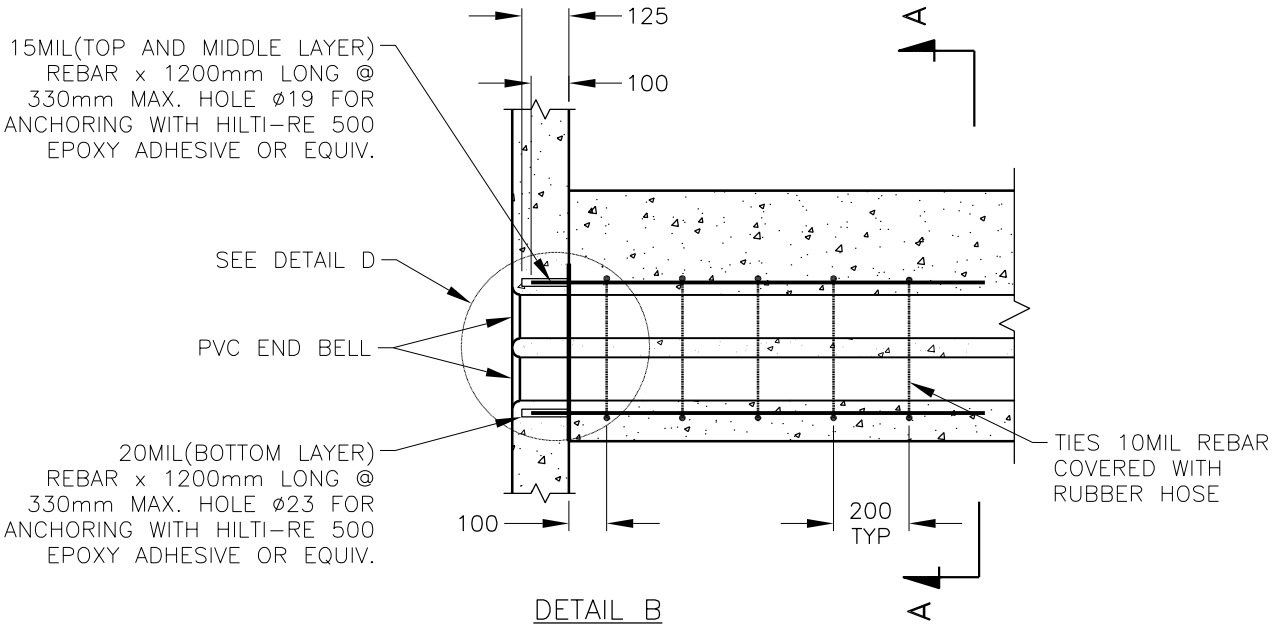


DETAIL A
SCALE: NTS
(TYPICAL END BELLS DETAIL)



DETAIL B
SCALE: NTS
CONNECTION OF DUCT BANK
TO EXISTING CABLE VAULT
(OPEN REBAR TIES)

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

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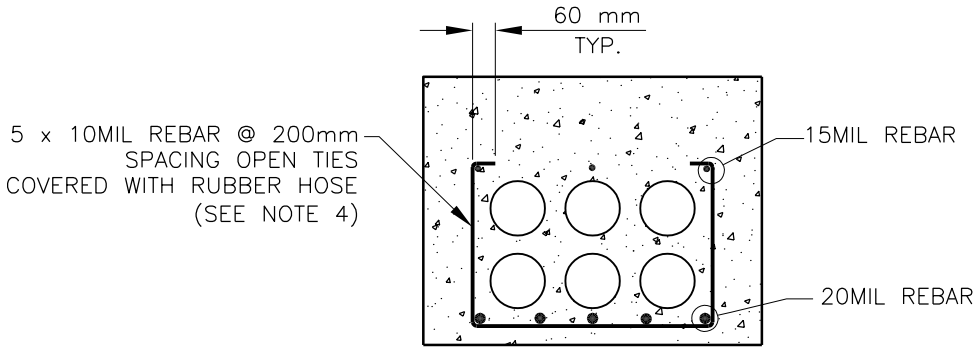
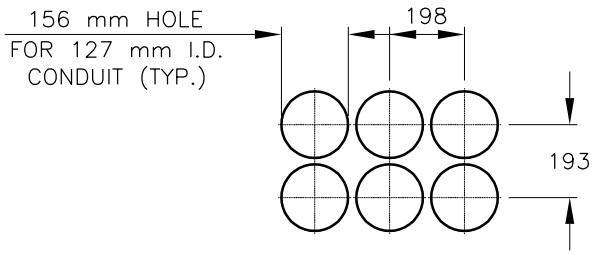
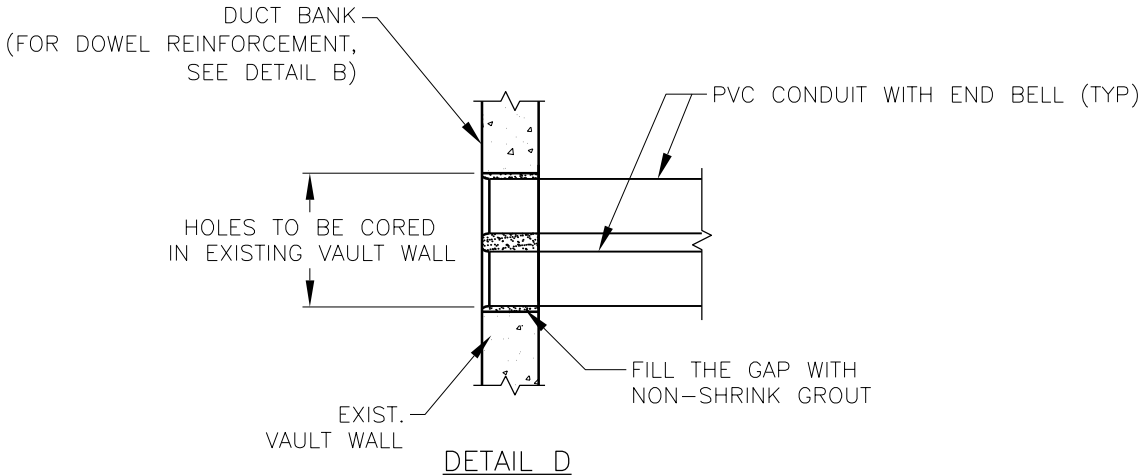


SECTION A–A
SCALE: NTS



DETAIL C
SCALE: NTS

(TYPICAL SPACING FOR CORED HOLES
INTO EXISTING VAULTS)



DETAIL D
SCALE: NTS

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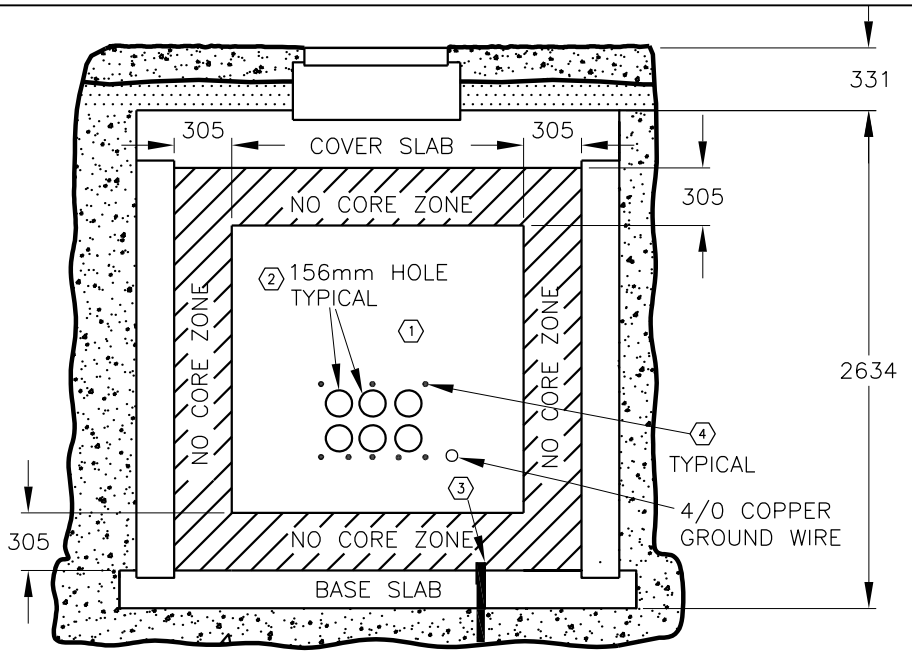
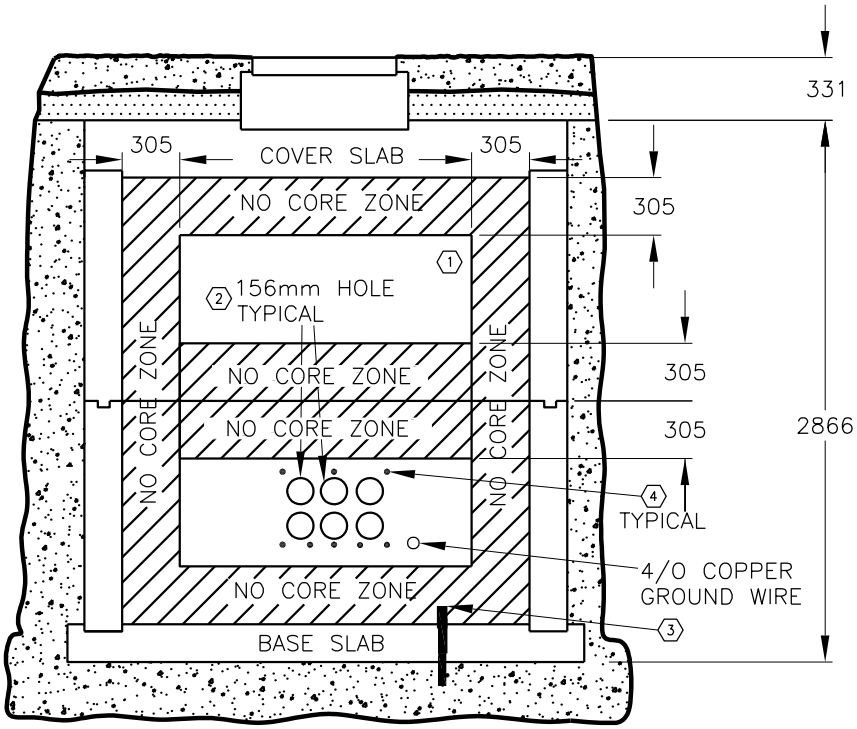


DETAIL E
SCALE: NTS

TYPICAL 1 PIECE WALL MANHOLE VAULT AND FORMATION TIE–IN
(SHORT SIDE WALL)



DETAIL F
SCALE: NTS

TYPICAL 2 PIECE WALL MANHOLE VAULT AND FORMATION TIE–IN
(SHORT SIDE WALL)

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. J.ARSENAULT	DRN.D.REDEKOPP CHKD. 2019–02–14	TYPICAL MANHOLE VAULT AND DUCT BANK TIE IN DETAILS
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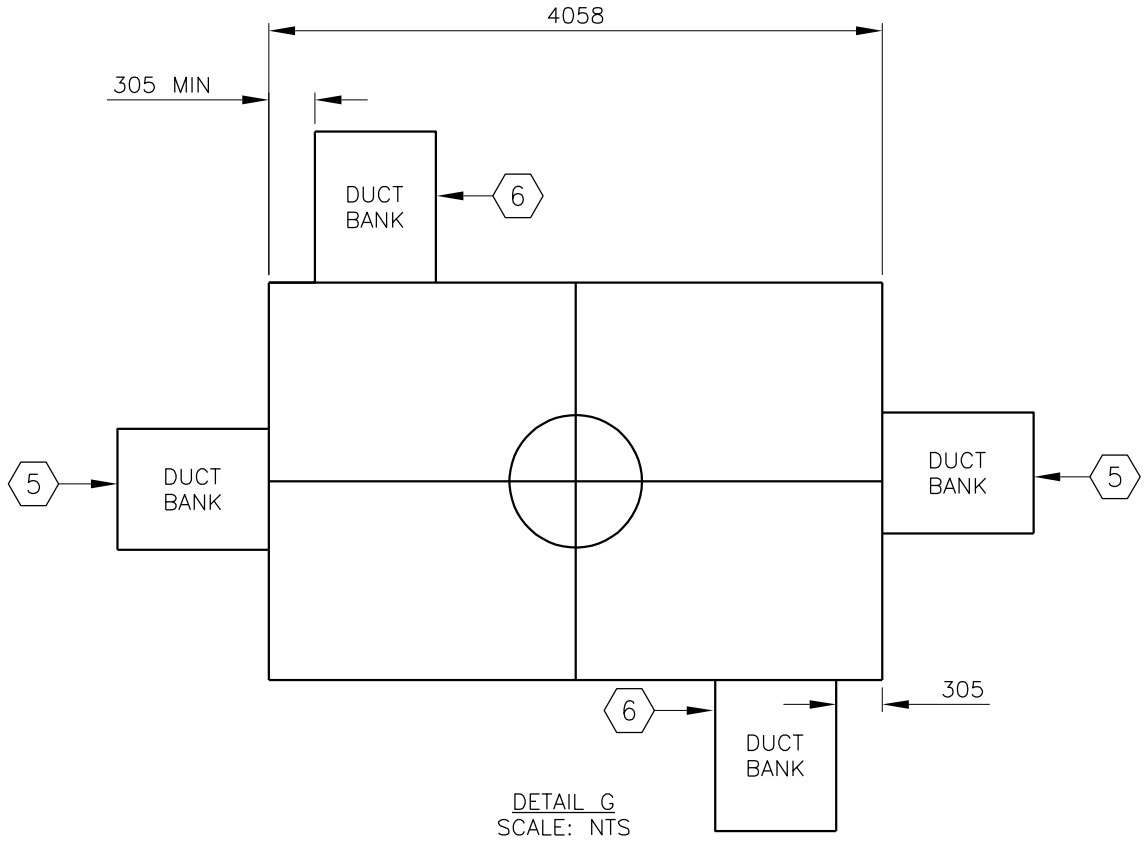

DETAIL G
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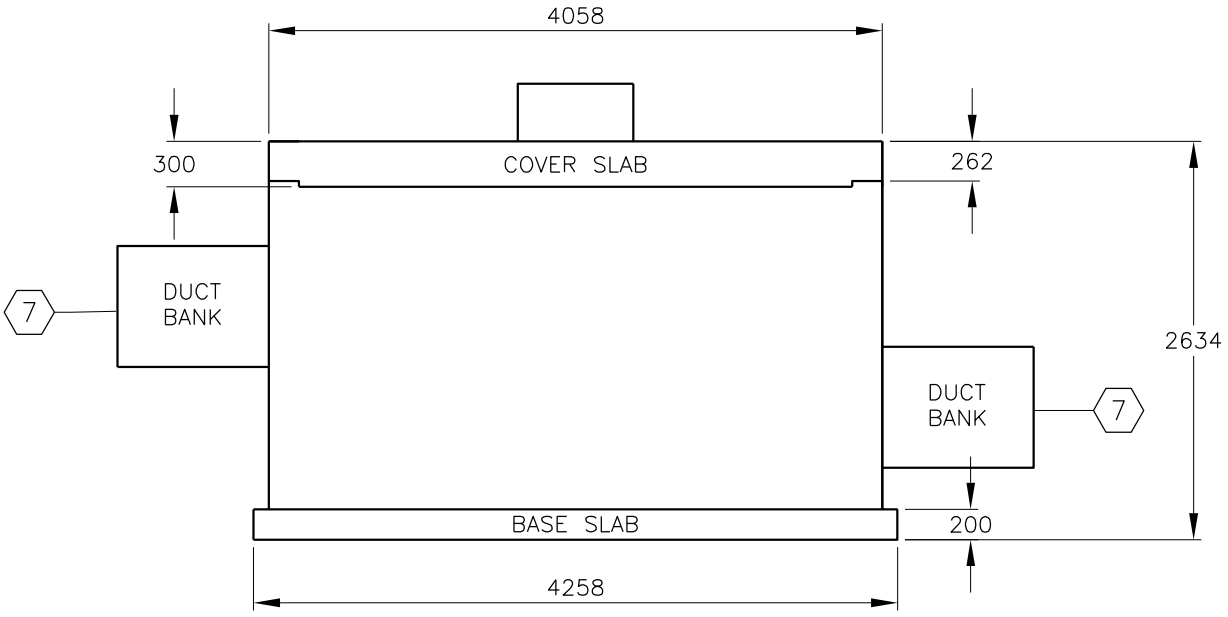

DETAIL H
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APPROVAL L.MOEN	DESIGN CHK. J.ARSENAULT	DRN.D.REDEKOPP CHKD. 2019-02-14	TYPICAL MANHOLE VAULT AND DUCT BANK TIE IN DETAILS
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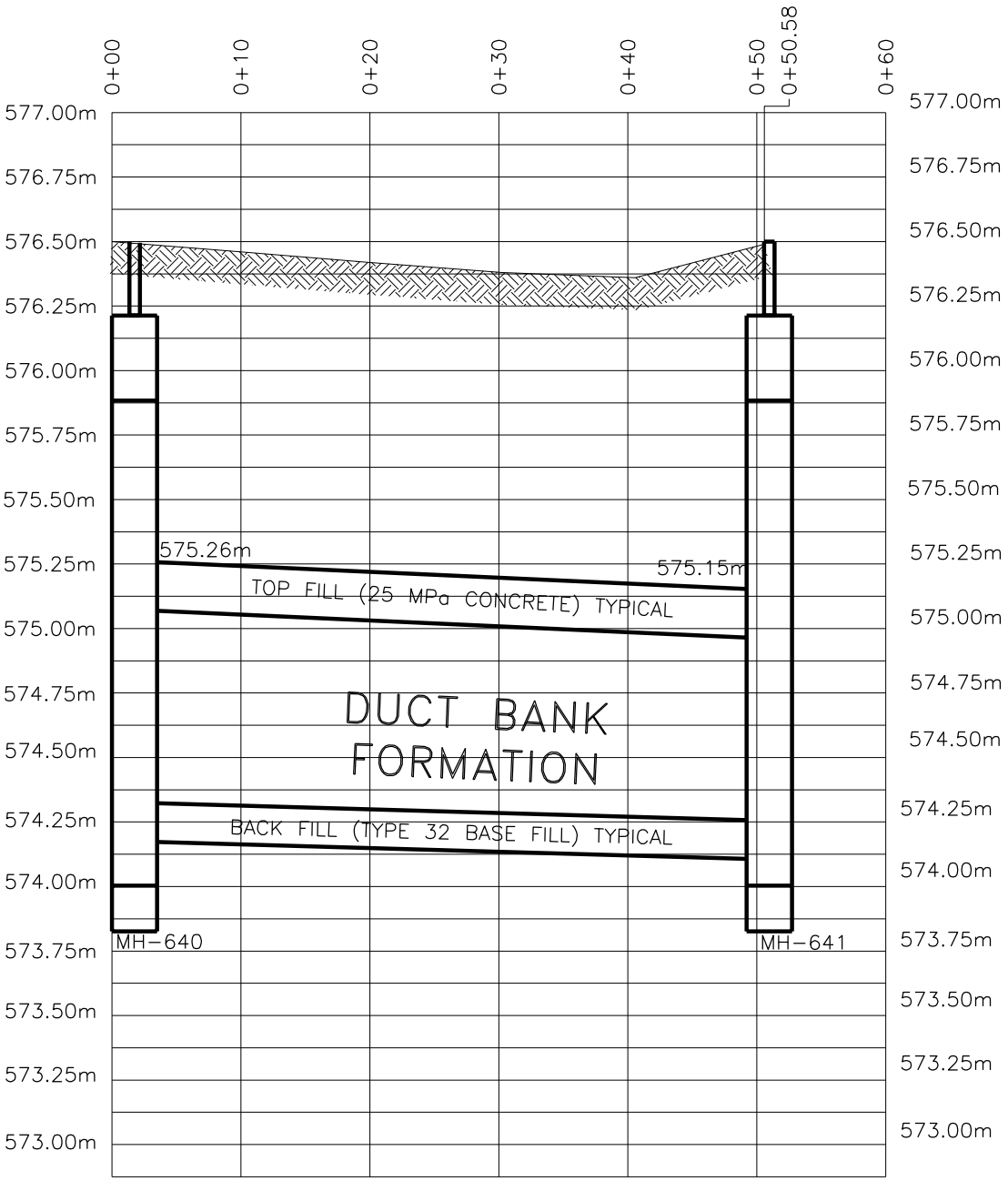

DETAIL I
SCALE: NTS

	SaskPower – DISTRIBUTION STANDARDS			
	APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN.D.REDEKOPP CHKD. 2021-06-09	TYPICAL MANHOLE VAULT AND DUCT BANK TIE IN DETAILS
	DATE OF ISSUE 2021-08-16	DRAWING NO. B-14-92	SHEET 6 of 6	REV. –

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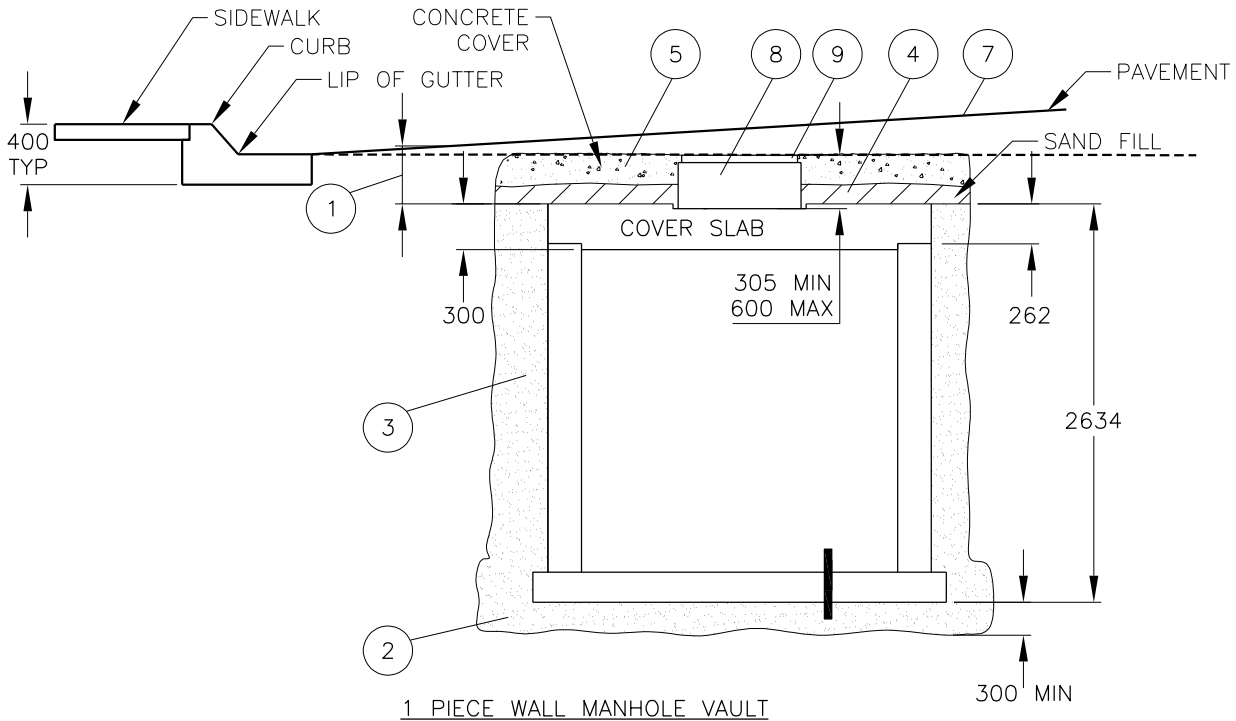

1 PIECE WALL MANHOLE VAULT
TYPICAL BACKFILL IN STREET CONSTRUCTION
1:50

KEY NOTES:

(1) –MINIMUM DEPTH REQUIRED FROM TOP OF FINAL FILL LAYER (PAVEMENT OR BASEFILL) TO TOP OF VAULT COVER SLAB IS 305mm.
–MAXIMUM DEPTH ALLOWED FROM TOP OF FINAL FILL LAYER TO TOP OF COVER SLAB IS 600mm.
- THIS IS DUE TO VAULT CONSTRUCTION DESIGN RESTRICTIONS DEFINED BY MANUFACTURER.
- ENGINEERING TO APPROVE DEPTHS GREATER THAN 600mm.

–MAXIMUM AND MINIMUM DEPTHS INCLUDES STANDARD CONCRETE TRANSITION RING (RISER), MODIFIED CONCRETE TRANSITION RING (COLLAR) (IF REQUIRED), CAST IRON FRAME AND COVER, AND CAST IRON FRAME AND COVER GRADING RINGS (IF REQUIRED).

(2) ALL VAULTS TO BE PLACED ON MINIMUM OF 300mm TYPE 32 BASE FILL MATERIAL – TAMPED TO 95% PROCTOR. BASE FILL TO BE INSTALLED IN MAXIMUM 150mm LIFTS.

(3) BACKFILL AROUND VAULTS WITH TYPE 32 BASE FILL MATERIAL IN UNIFORM LAYERS NOT EXCEEDING 300mm IN THICKNESS UP TO SUBGRADE LEVEL. COMPACT EACH LAYER BEFORE PLACING SUCCEEDING LAYER. LOW SHRINK CONCRETE 0.25 TO 0.75MPA VIBRATED IN PLACE CAN ALSO BE USED.

(4) PLACE 50mm OF SAND BETWEEN VAULT COVER SLAB AND 32MPa CONCRETE BACKFILL. TO BE USED AS A BOND BREAKER BETWEEN VAULT COVER SLAB AND CONCRETE FILL LAYER.

(5) FOR IN–STREET CONSTRUCTION, CITY OF REGINA REQUIRES APPROXIMATELY 305mm OF 32 MPA CONCRETE COVER OVER VAULT COVER SLAB. REFER TO CITY OF REGINA CONSTRUCTION STANDARD 1390 3.5.3

(6) FOR IN–SIDEWALK CONSTRUCTION, FINAL FILL LAYER TO GRADE TO BE TYPE 32 BASE FILL MATERIAL TAMPED TO 95% PROCTOR. CITY OF REGINA TO REPLACE SIDEWALK.

(7) PAVEMENT FINAL GRADE TO BE DONE BY THE CITY OF REGINA. GRADING RINGS MAY BE REQUIRED TO RAISE MANHOLE ENTRY TO FINAL STREET GRADE ONCE CITY HAS REPAVED STREET. WHEN DESIGNING VAULT INSTALLATION CONSIDER SLOPE OF ROAD WAY.

(8) STANDARD CONCRETE TRANSITION RING

(9) CAST IRON FRAME AND COVER

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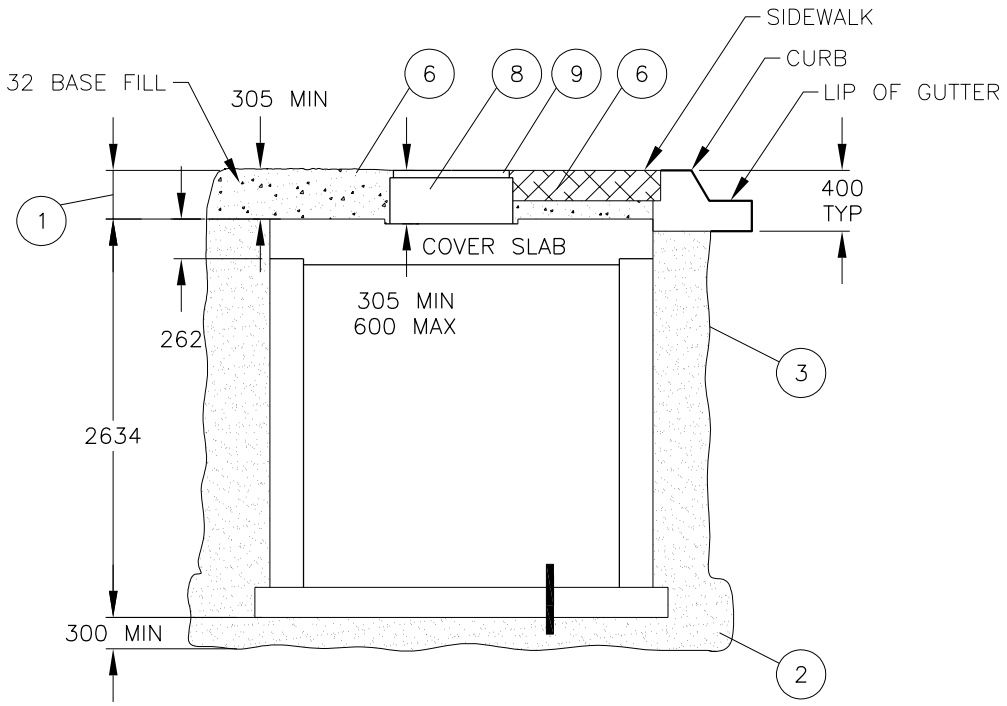

1 PIECE WALL MANHOLE VAULT
TYPICAL BACKFILL IN SIDEWALK CONSTRUCTION
1:50

NOTES:

1. ALL DIMENSION IN mm UNLESS OTHERWISE STATED.
2. ALL EXCAVATION TO BE FREE OF ICE, SNOW AND DEBRIS AT TIME OF BACKFILLING.
3. DEPTH OF GUTTER MAY BE LOWER THAN TOP EDGE OF MANHOLE VAULT.
4. FOLLOW THE CITY STANDARD 1390 3.5.3. CONCRETE REPAIR TO PAVEMENT:
   –THE CITY MAY ON OCCASION REQUEST THAT THE CUT BE REPAIRED WITH 305mm OF CONCRETE FROM THE TOP OF EXISTING ASPHALT.
   –THE CONCRETE SHALL BE LEVEL WITH THE EXISTING ASPHALT.
   –THE CONCRETE SHALL BE BROOM FINISHED PERPENDICULAR TO THE DIRECTION OF TRAVEL.
5. MANHOLE VAULTS TO BE GPS'D AND SURVEYED AT EACH CORNER BEFORE BACKFILL INSTALLED.
6. MANHOLE VAULTS ARE SUPPLIED WITH STANDARD 305mm (12") THICK CONCRETE TRANSITION RING AND 64MM (2.5") THICK CAST IRON FRAME AND COVER.
7. MODIFIED CONCRETE TRANSITION RINGS (COLLARS) CAN BE USED IN CONJUNCTION WITH THE STANDARD CONCRETE TRANSITION RING TO ADJUST TO THE BURIED DEPTH OF THE MANHOLE VAULT.
   –TYPICAL MODIFIED TRANSITION RINGS ARE 150mm (6") AND 230mm (9") THICK.
   –THE MODIFIED TRANSITION RINGS TO BE PLACED ON TOP ON STANDARD TRANSITION RING. REFER TO M2–58 SPECIFICATION FOR VAULT DETAILS.
8. ADDITIONAL CAST IRON FRAME AND COVER GRADING RINGS MAY BE REQUIRED TO ADJUST THE MANHOLE VAULT ENTRY WAY TO FINAL GRADE.
   –ENGINEERING IS RESPONSIBLE TO ORDER THIS ADDITIONAL MATERIAL.
9. REFER TO M2–58 SPECIFICATION FOR VAULT DETAILS.

REFERENCE:

1. THE CONSTRUCTION DEPENDS ON THE WEATHER CONDITIONS. REFER TO "COLD WEATHER CONCRETING REQUIREMENTS FOR BURIED CONCRETE CABLE DUCT BANKS", OR "DUCT BANK AND MANHOLE VAULT WARM WEATHER CONSTRUCTION REQUIREMENTS AND SPECIFICATION"

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. J.ARSENAULT	DRN.D.REDEKOPP CHKD. 2019–02–14	MANHOLE VAULT BACKFILL IN–STREET & IN–SIDEWALK CONSTRUCTION
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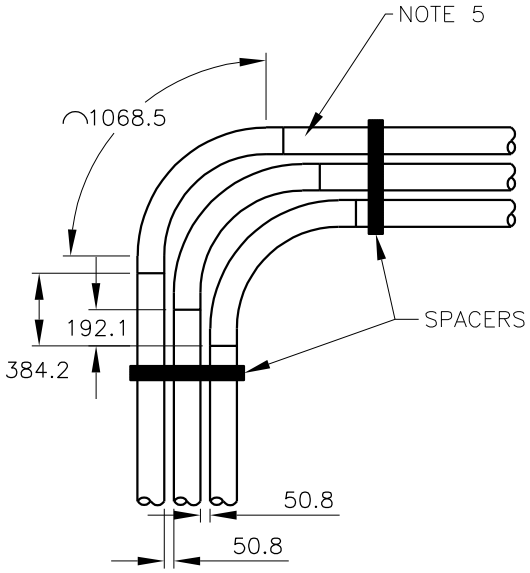
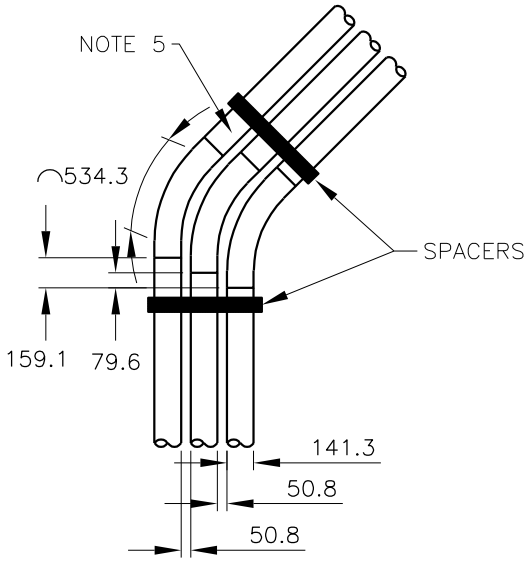
DUCT BANK SWEEPS

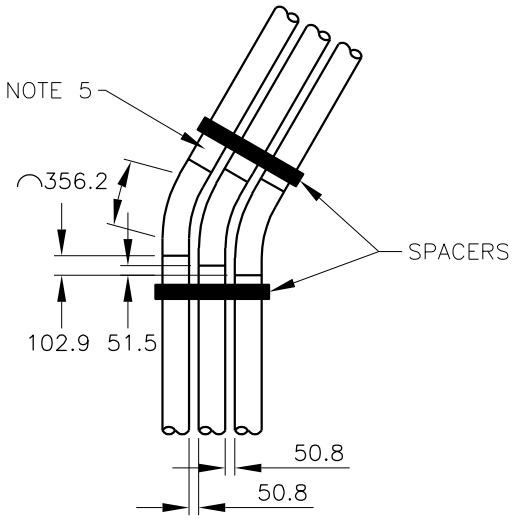
SWEEP (DEGREES)	DIAMETER (mm)	T (EXPANSION JOINT) (mm)	R (RADIUS OF CURVE) (mm)	ADJACENT PARALLEL BEND SHIFT (mm)
30	141.3	92.075	609.6	51.47
45	141.3	92.075	609.6	79.57
90	141.3	92.075	609.6	192.1



90° SWEEP OF 3x3 DUCT BANK



45° SWEEP OF 3x3 DUCT BANK



30° SWEEP OF 3x3 DUCT BANK

LEGEND:

⌒ – ARC LENGTH

NOTES:

1. FOR SMALL DEGREE BEND IN DUCT BANK (LESS THAN 30°), BEND PVC PIPES TO FIT.
2. FOR BENDS GREATER THAN 30°, USE SWEEPS OR ELBOWS.
3. SPACERS ARE USED AT THE BEGINNING AND END OF BENDS.
4. THE OFFSET OF BENDING BETWEEN TWO ADJACENT PARALLEL PIPES IS DIFFERENT ACCORDING TO THE DEGREE OF SWEEPS.
5. FORM AROUND ELBOWS FROM SPACER TO SPACER. REFER TO B-14-90 NOTE 7 FOR FORM SPACING FROM CONDUITS.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE INDICATED.

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APPROVAL L.MOEN	DESIGN CHK. L.MOEN	DRN.D.REDEKOPP CHKD. 2021-05-18	127mm CONDUIT SWEEP 30°/45°/90°
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A. SASKPOWER DUCT BANK AND CABLE MANHOLE VAULT BASE FILL COMPACTION TESTING REQUIREMENTS AND RECOMMENDATIONS

THE FOLLOWING INFORMATION DEFINES THE REQUIREMENTS AND RECOMMENDATIONS FOR BASE FILL COMPACTION TESTING OF CONCRETE ENCASED DUCT BANKS AND CABLE MANHOLE VAULTS.

I. BASELINE MEASUREMENTS TESTS:

1. REQUIREMENT: STANDARD PROCTOR TEST – COMPLETED FOR THE TYPE 32 BASE FILL MATERIALS TO BE USED. THIS DEFINES THE BASELINE VALUE OF THE COMPACTED DENSITY AND MOISTURE CONTENT OF THE FILL MATERIAL FOR THE COMPACTION TESTS THAT WILL BE PERFORMED.

2. REQUIREMENT: SIEVE TEST – COMPLETED TO VERIFY THAT TYPE 32 BASE FILL MATERIAL IS BEING SUPPLIED.

3. REQUIREMENT: THESE TESTS NEED TO BE COMPLETED AT LEAST ONCE AT THE BEGINNING OF THE PROJECT BEFORE THE FILL MATERIALS ARE USED. TYPICALLY THESE MATERIALS WILL BE STOCK PILED ON SITE. REPEAT TESTS SHOULD BE COMPLETED IF AND WHEN THE STOCK PILES ARE REPLENISHED.

4. REQUIREMENT: COPIES OF THE COMPACTION TESTS NEED TO BE INCLUDED WITH THE PROJECT AS-BUILT. SASKPOWER STAFF MAY REQUEST TO SEE THESE TEST RESULTS DURING CONSTRUCTION TO VERIFY THAT THE MINIMUM REQUIREMENTS ARE BEING MET.

II. COMPACTION TESTING FOR MANHOLE VAULTS AND CONCRETE ENCASED DUCT BANK:

1. RECOMMENDATION: TYPE 32 BASE FILL SHOULD BE INSTALLED IN LIFTS NO GREATER THAN 6 INCHES (150mm) – THIS WILL REDUCE RISK OF HAVING TO REMOVE FILL MATERIALS AND START OVER IF THE DESIRED COMPACTION CANNOT BE ACHIEVED.

   - IF THE TOTAL FILL TO BE INSTALLED IS 200mm (8"), THEN DO TWO LAYERS OF 100mm (4")

2. RECOMMENDATION: COMPACTION TESTS SHOULD BE COMPLETED WITH EACH LIFT. THIS WILL REDUCE RISK OF HAVING TO REMOVE FILL MATERIALS AND START OVER IF THE DESIRED COMPACTION CANNOT BE ACHIEVED (TYPICALLY 95% PROCTOR).

   - WHEN COMPACTION IS CHECKED ON THE 1ST FILL LAYER (SAY 150mm), THE TEST PROBE SHOULD NOT GO INTO THE CLAY BENEATH THE FILL. WHEN A SECOND LAYER OF FILL IS ADDED ON TOP OF THE 1ST LAYER (SAY ANOTHER 150mm), THE TEST PROBE SHOULD NOW EXTEND INTO THE 1ST LAYER (GO IN 200mm)

3. REQUIREMENT: 3 TESTS SHOULD BE COMPLETED FOR EVERY 20m OF FILL PLACED.

4. RECOMMENDATION: IF THERE ARE ISSUES GETTING COMPACTION, THEN THE AREA SHOULD BE SPRAYED WITH WATER AND TAMPED. IF TOO MUCH WATER IS ADDED, THEN THE MATERIALS WILL HAVE TO BE REMOVED OR LEFT TO DRY.

5. REQUIREMENT: COPIES OF THE COMPACTION TESTS NEED TO BE INCLUDED WITH THE PROJECT AS-BUILT. SASKPOWER STAFF MAY REQUEST TO SEE THESE TEST RESULTS DURING CONSTRUCTION TO VERIFY THAT THE MINIMUM REQUIREMENTS ARE BEING MET.

OTHER:

1. UTILIZING THE RIGHT SIZE OF TAMPING MACHINE FOR THE JOB WILL HELP WITH COMPACTION AND REDUCE TIME.
2. THESE REQUIREMENTS AND RECOMMENDATIONS WILL NEED TO BE PROVIDED TO CONSTRUCTION WITH THE DESIGN AND WORK ORDER.

REFERENCES:

THESE REQUIREMENTS AND RECOMMENDATIONS WERE DEVELOPED BY DISTRIBUTION REVITALIZATION WITH INPUT FROM THE SASKPOWER CIVIL DEPARTMENT AND LESSONS LEARNED FROM THE 2013 CAPITAL POINT DUCT BANK PROJECT, 2013 EVRAZ STADIUM DUCT BANK PROJECT AND THE 2013 BROADWAY AVENUE DUCT BANK PROJECT.

B. SASKPOWER CONCRETE & CONCRETE TESTING SPECIFICATIONS FOR DUCT BANK AND BACK FILL – WARM WEATHER CONSTRUCTION

THE FOLLOWING INFORMATION DEFINES THE CONCRETE AND CONCRETE TESTING SPECIFICATIONS FOR CONCRETE DUCT BANK FORMATIONS AS WELL AS FOR CONCRETE BACK FILL OF DUCT BANK FORMATION TRENCHES IN WARM WEATHER

NOTE: FOR THE PURPOSE OF THIS SPECIFICATION, COLD WEATHER REQUIREMENTS WILL APPLY WHEN (REF CSA A23.1 SECTION 7.4.1.5.1):

- THE AMBIENT TEMPERATURE IS LESS THAN FIVE DEGREE CELSIUS (5 °C).
- IF THE FORECASTS PREDICTS A DROP IN TEMPERATURE BELOW FIVE DEGREE CELSIUS (5 °C) LESS THAN 24 HOURS PRIOR TO CONCRETING.

I. CONCRETE SPECIFICATIONS – DUCT BANK FORMATION

25 MPa PORTLAND CEMENT CONCRETE MIX

(TO BE USED FOR WARM WEATHER DUCT BANK FORMATION CONSTRUCTION)

- SULPHATE RESISTANT TYPE HS
- AIR CONTENT 5% TO 8% (ABSOLUTE MIN AND MAX)
- MAXIMUM WATER /CEMENTING MATERIALS RATIO BY WEIGHT 0.50
- SPECIFIED SLUMP 90mm + – 20mm (+ – 20mm IS ABSOLUTE MIN AND MAX)
- REACH COMPRESSIVE STRENGTH AT 28 DAYS

30 MPa PORTLAND CEMENT CONCRETE MIX

(TO BE USED FOR COLD WEATHER DUCT BANK CONSTRUCTION (REFER TO COLD WEATHER CONCRETING REQUIREMENTS DOCUMENT)

- SULPHATE RESISTANT TYPE HS
- AIR CONTENT 5% TO 8% (ABSOLUTE MIN AND MAX)
- MAXIMUM WATER /CEMENTING MATERIALS RATIO BY WEIGHT 0.50
- SPECIFIED SLUMP 90mm + – 20mm (+ – 20mm IS ABSOLUTE MIN AND MAX)
- REACH COMPRESSIVE STRENGTH AT 28 DAYS

REFERENCES:

5 TO 8% AIR ENTRAINMENT IS A COMMON PRACTICE RECOMMENDED FOR NEARLY ALL CONCRETES, PRINCIPALLY TO IMPROVE RESISTANCE TO FREEZING WHEN EXPOSED TO WATER AND DE–ICING CHEMICALS. AIR–ENTRAINED CONCRETE CONTAINS BILLIONS OF MICROSCOPIC AIR CELLS. THESE RELIEVE INTERNAL PRESSURE ON THE CONCRETE BY PROVIDING TINY CHAMBERS FOR THE EXPANSION OF WATER WHEN IT FREEZES. (MIKE CABRAL, PERSONAL COMMUNICATION, OCTOBER 30, 2012)

THE CONCRETE SUPPLIER WILL REFER TO ASTM STANDARD C260 FOR AIR–ENTRAINING, WHICH REFER TO THE SPECIFICATION FOR THE FABRICATION OF AIR–ENTRAINING PRODUCTS THAT ARE ACCEPTED IN THE CONCRETE. (MIKE CABRAL, PERSONAL COMMUNICATION, OCTOBER 30, 2012)

II. CONCRETE SPECIFICATIONS – TRENCH BACKFILL

TYPE 32 MPa PORTLAND CEMENT CONCRETE MIX

TO BE USED AS FINAL BACK FILL OF DUCT BANK TRENCHES IN ROADWAYS (TOP 300mm)

- AIR CONTENT 6.5% +– 1%
- MAXIMUM WATER /CEMENTING MATERIALS RATIO BY WEIGHT 0.45
- SPECIFIED SLUMP 70mm +– 20mm
- REACH COMPRESSIVE STRENGTH AT 28 DAYS

(CITY OF REGINA STANDARD CONSTRUCTION SPECIFICATIONS, SECTION 2500 "SUPPLY OF PORTLAND CEMENT CONCRETE", 2010)

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LOW SHRINK 0.25–0.75MPa PORTLAND CEMENT CONCRETE MIX

TO BE USED AS WARM WEATHER BACKFILL ON TOP OF DUCT BANK FORMATION (IN STREET CONSTRUCTION)

- MAXIMUM WATER /CEMENTING MATERIALS RATIO BY WEIGHT 0.50
- SPECIFIED SLUMP 175mm +– 30mm
- REACH COMPRESSIVE STRENGTH AT 28 DAYS

(CITY OF REGINA STANDARD CONSTRUCTION SPECIFICATIONS, SECTION 2500 "SUPPLY OF PORTLAND CEMENT CONCRETE", 2010)

III. TESTING REQUIREMENTS: SASKPOWER DUCT BANK STRUCTURE – 25 OR 30 MPa TYPE HS CONCRETE

SLUMP, AIR ENTRAINMENT & TEMPERATURE

- SLUMP, AIR ENTRAINMENT AND TEMPERATURE TESTS SHALL BE PERFORMED AND DOCUMENTED ON THE SELECTED TRUCK(S). CONCRETE THAT DOES NOT MEET SPECIFICATION MAY BE RE–TESTED AT THE ENGINEER'S OR SASKPOWER SITE INSPECTORS DISCRETION. FOLLOWING A TEST FAILURE, THE NEXT TRUCK SHALL BE TESTED.
- IF ADDITIONAL WATER IS ADDED TO THE MIX AFTER SLUMP AND AIR TESTS ARE COMPLETED THEN THE SLUMP AND AIR TESTS NEED TO BE REPEATED.

COMPRESSIVE STRENGTH

- COMPRESSIVE STRENGTH SAMPLES SHALL BE TAKEN AT THE SAME TIME AS SLUMP AND AIR ENTRAINMENT TESTS. FOUR (4) CYLINDERS (100mm X 200mm OR 150mm DIAMETER BY 300mm) SHALL BE TAKEN FOR EACH SET OF TESTS. ALL FOUR (4) CYLINDERS SHALL BE TRANSPORTED TO THE TESTING LAB FOR CURING AFTER THE SAMPLES ARE TAKEN. ONE CYLINDER SHALL BE TESTED IN 7 DAYS, AND THE OTHER TWO CURED CYLINDERS SHALL BE TESTED IN 28 DAYS. THE FOURTH CYLINDER SHALL BE TESTED IN 56 DAYS IF THE RESULTS OF THE FIRST THREE ARE DOUBTFUL.
- THE DATE AND TIME AS WELL AS THE LOCATION OF THE TESTS HAVE TO BE DOCUMENTED. REFERENCING CAN BE MADE WITH RESPECT TO THE LOCATIONS OF THE MANHOLE VAULTS (E.G. X METERS EAST OF MANHOLE 632)
- TESTING WILL BE COMPLETED ON THE FIRST DELIVERY OF THE PROJECT AND BE CONDUCTED APPROXIMATELY EVERY 25 CUBIC METERS.

IV. TESTING REQUIREMENTS: FINAL BACK FILL TO STREET GRADE – 32 MPa CONCRETE

SLUMP, AIR ENTRAINMENT & TEMPERATURE

- SLUMP, AIR ENTRAINMENT AND TEMPERATURE TESTS SHALL BE PERFORMED AND DOCUMENTED ON THE SELECTED TRUCK(S). CONCRETE THAT DOES NOT MEET SPECIFICATION MAY BE RE–TESTED AT THE ENGINEER'S DISCRETION. FOLLOWING A TEST FAILURE, THE NEXT TRUCK SHALL BE TESTED.
- IF ADDITIONAL WATER IS ADDED TO THE MIX AFTER SLUMP AND AIR TESTS ARE COMPLETED THEN THE SLUMP AND AIR TESTS NEED TO BE REPEATED.

COMPRESSIVE STRENGTH

- COMPRESSIVE STRENGTH SAMPLES SHALL BE TAKEN AT THE SAME TIME AS SLUMP AND AIR ENTRAINMENT TESTS. SIX (6) CYLINDERS (100mm X 200mm OR 150mm DIAMETER BY 300mm) SHALL BE TAKEN FOR EACH SET OF TESTS. ALL SIX (6) CYLINDERS SHALL BE TRANSPORTED TO THE TESTING LAB FOR CURING. ONE CYLINDER SHALL BE TESTED AFTER 72 HOURS TO VERIFY IF THE CONCRETE HAS REACHED 20 MPa (MINIMUM VALUE NEEDED TO OPEN THE STREET TO TRAFFIC), ONE CYLINDER IN 7 DAYS, AND THE OTHER TWO CURED CYLINDERS SHALL BE TESTED IN 28 DAYS. THE FIFTH CYLINDER SHALL BE TESTED IN 56 DAYS IF THE RESULTS OF THE FIRST FOUR ARE DOUBTFUL. THE SIXTH CYLINDER WILL BE A SPARE IF ADDITIONAL TEST RESULTS NEED TO BE VERIFIED.
- THE DATE AND TIME AS WELL AS THE LOCATION OF THE TESTS NEED TO BE DOCUMENTED. REFERENCING CAN BE MADE WITH RESPECT TO THE LOCATIONS OF THE MANHOLE VAULTS (E.G. X METERS EAST OF MANHOLE 632)
- TESTING WILL BE COMPLETED ON THE FIRST DELIVERY OF THE PROJECT, THE LAST DELIVERY, AND BE CONDUCTED APPROXIMATELY EVERY 25 CUBIC METERS.
- VERBAL CONFIRMATION TO SASKPOWER SITE INSPECTOR OF 72 HOUR CYLINDER TEST RESULTS NEEDS TO BE PROVIDED IMMEDIATELY AFTER TEST RESULTS DETERMINED.
- AS PER THE CITY OF REGINA SPECIFICATIONS:

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- SECTION 2400 3.12 OPENING TO TRAFFIC, THAT STATES "NO TRAFFIC SHALL BE ALLOWED ON PAVEMENT UNTIL THE CONCRETE HAS REACHED ITS COMPRESSIVE STRENGTH OF 20 MPa".
- 20 MPa IS APPROXIMATELY 70% OF 32 MPa CONCRETE. AS A GENERAL RULE, IT WILL TAKE APPROXIMATELY 7 DAYS FOR CONCRETE TO REACH 70% OF ITS STRENGTH.
- THIS WILL BE A FACTOR ON WHEN A SECTION OF ROAD CAN BE OPENED FOR TRAFFIC (UNLESS STEEL PLATES ARE PLACED ACROSS THE CONCRETE OR APPROVAL GRANTED BY THE CITY)

V. GENERAL TESTING REQUIREMENTS

AN INDEPENDENT ACCREDITED TESTING LABORATORY, WILL BE HIRED TO PERFORM SLUMP, TEMPERATURE, AIR ENTRAINMENT, AND STRENGTH TESTS IN ACCORDANCE WITH THE LATEST EDITION OF CAN/CSA A23.2 04 METHODS OF TEST AND STANDARD PRACTICES FOR CONCRETE. CERTIFIED COPIES OF ALL TEST RESULTS SHALL BE SENT DIRECTLY TO SASKPOWER DISTRIBUTION REVITALIZATION.

VI. CONDUIT TESTING REQUIREMENTS

ONCE THE DUCT BANK CONCRETE HAS BEEN POURED OVER THE CONDUITS IT IS A MANDATORY REQUIREMENT TO CLEAN THE CONDUITS AND VERIFY THEIR INTEGRITY.

CLEANING AND VERIFICATION OF NEWLY INSTALLED CONDUITS IS PERFORMED BY:

- PULLING AN APPROVED CLEANING DEVICE THROUGH THE DUCTS BY MEANS OF A WINCH LINE
- TAIL THE CLEANING DEVICE WITH A SECOND WINCH LINE TO PERMIT WITHDRAWAL IN CASE OF BLOCKAGE.
- WHEN EXTRACTING WINCH LINE TAIL WITH ONE 100% POLYPROPYLENE PULLING ROPE IN EACH DUCT, LEAVING IT IN PLACE AS A FUTURE FISH LINE.
- PERFORM THIS FOR EACH DUCT.

C. SASKPOWER CONCRETE PLACEMENT FOR CONCRETE DUCT BANKS

I. GENERAL REQUIREMENTS – IN STREET CONSTRUCTION – WARM WEATHER

THE FOLLOWING OUTLINES THE GENERAL REQUIREMENTS FOR PLACING OF CONCRETE FOR IN STREET CONCRETE DUCT BANK CONSTRUCTION WITH WARM WEATHER. (FOR COLD WEATHER CONSTRUCTION REFERS TO COLD WEATHER CONCRETING REQUIREMENTS)

- THE CEMENT CONCRETE SHALL BE TAMPED IN SUCH A MANNER AS TO WORK THE COARSE AGGREGATE AWAY FROM THE FORMS AND EXPOSED SURFACES, TO PREVENT THE EMPTY SPACES AROUND THE CONDUITS AND ALONG THE FORMWORK, USE CEMENT VIBRATOR WHERE THE SPEED USED IN PLACING CONCRETE SHALL BE A MINIMUM OF 5000 CYCLES PER MINUTE. CEMENT CONCRETE EXPOSED ON TOP OF THE CONCRETE DUCTS MUST BE EQUALIZED AND SMOOTHED.
- ONCE THE CONCRETE IS POURED FOR THE DUCT BANK FORMATION IT IS A GOOD PRACTICE TO WAIT UNTIL THE CONCRETE SETS (APPROXIMATELY 24 HOURS) BEFORE PLACING THE NEXT LAYER OF FILL ABOVE IT (LOW SHRINK). THEN WAIT AN ADDITIONAL 24HOURS UNTIL THE LOW SHRINK SETS BEFORE PLACING THE TOP LAYER OF 32 MPa CONCRETE OR TYPE 32 BASE FILL.

  - NOTE: IF THE MAXIMUM SPECIFIED SLUMP VALUE OF THE DUCT BANK CONCRETE IS EXCEEDED, IT COULD START TO GET TOO RUNNY AND WILL NEED MORE TIME TO SET. IF THE SLUMP IS OVER THE MAXIMUM SPECIFIED VALUE AND IS STILL USED, THEN AN ADDITIONAL 24 HOUR DELAY WILL NEED TO OCCUR (TOTAL 48 HOURS) BEFORE BACK FILLING IS COMPLETED.

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- ALL MEANS NEED TO BE TAKEN TO ENSURE THAT THE CONCRETE FOR THE DUCT BANK IS NOT POURED OVER THE CONDUITS FROM A HIGH ELEVATION AS THIS MAY CAUSE DAMAGE TO THE CONDUITS OR PUSH THE REBAR OUT OF PLACE. IF NECESSARY, A CONCRETE PUMPER TRUCK SHOULD BE USED TO OBTAIN A LOWER POUR. THIS MAY BE REQUIRED FOR THE DEEPER TRENCHES.

- AS PER THE CITY OF REGINA SPECIFICATIONS:

  SECTION 2400 3.12 OPENING TO TRAFFIC, THAT STATES "NO TRAFFIC SHALL BE ALLOWED ON PAVEMENT UNTIL THE CONCRETE HAS REACHED ITS COMPRESSIVE STRENGTH OF 20 MPa".

  - 20 MPa IS APPROXIMATELY 70% OF 32 MPa CONCRETE. AS A GENERAL RULE, IT WILL TAKE APPROXIMATELY 7 DAYS FOR CONCRETE TO REACH 70% OF ITS STRENGTH.
  - THIS WILL BE A FACTOR ON WHEN A SECTION OF ROAD CAN BE OPENED FOR TRAFFIC (UNLESS STEEL PLATES ARE PLACED ACROSS THE CONCRETE OR APPROVAL GRANTED BY THE CITY)
  - CONFIRMATION NEEDS TO BE SENT TO THE CITY OF REGINA THAT THE AFOREMENTIONED REQUIREMENTS HAVE BEEN MET.

II. GENERAL REQUIREMENTS – IN SIDEWALK CONSTRUCTION – WARM WEATHER

THE FOLLOWING OUTLINES THE GENERAL REQUIREMENTS FOR PLACING OF CONCRETE FOR IN SIDEWALK CONCRETE DUCT BANK CONSTRUCTION WHERE THE TRENCH IS BACKFILLED TO GRADE WITH TYPE 32 BASE FILL MATERIALS RATHER THAN LOW SHRINK CONCRETE.

- ONCE THE CONCRETE IS POURED FOR THE DUCT BANK FORMATION IT IS A GOOD PRACTICE TO WAIT 72 HOURS BEFORE PLACING THE NEXT LAYER OF TYPE 32 BASE FILL ABOVE AND ANY TAMPING ACTIVITIES TO AVOID DAMAGE TO THE DUCT BANK STRUCTURE.

  - NOTE: IF THE MAXIMUM SPECIFIED SLUMP VALUE OF THE DUCT BANK CONCRETE IS EXCEEDED, IT COULD START TO GET TOO RUNNY AND WILL NEED MORE TIME TO SET. IF THE SLUMP IS OVER THE MAXIMUM SPECIFIED VALUE AND IS STILL USED, THEN AN ADDITIONAL 24 HOUR DELAY WILL NEED TO OCCUR (TOTAL 96 HOURS) BEFORE BACK FILLING IS COMPLETED.

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NOTE:

IF ANY OF THE FOLLOWING CONDITIONS EXIST, THEN THESE REQUIREMENTS AND SPECIFICATIONS ARE NO LONGER VALID AND THE "COLD WEATHER CONCRETING REQUIREMENTS FOR BURIED CONCRETE CABLE DUCT BANKS" WILL NEED TO BE REFERENCED. (REF CSA A23.1 SECTION 7.4.1.5.1):

- THE AMBIENT TEMPERATURE IS LESS THAN FIVE DEGREE CELSIUS (5 °C).
- IF THE FORECASTS PREDICTS A DROP IN TEMPERATURE BELOW FIVE DEGREE CELSIUS (5 °C) LESS THAN 24 HOURS PRIOR TO CONCRETING.

SaskPower – DISTRIBUTION STANDARDS			
APPROVAL L.MOEN	DESIGN CHK. Y.PATEL	DRN.E.GOTANA CHKD.	DUCT BANK AND MANHOLE VAULT WARM WEATHER CONSTRUCTION REQUIREMENTS AND SPECIFICATION
		2021-09-02	
DATE OF ISSUE 2022-01-10	DRAWING NO. B-14-110	SHEET 5 of 5	REV. B

COLD WEATHER CONCRETING REQUIREMENTS FOR BURIED CONCRETE CABLE DUCT BANKS

THIS SPECIFICATION PERTAINS TO THE SUPPLY, PLACEMENT, PROTECTION AND CURING OF CONCRETE FOR THE CONSTRUCTION OF BURIED CONCRETE ENCASED CABLE DUCT BANKS AND THE SUBSEQUENT CONCRETE BACKFILL DURING COLD WEATHER CONDITIONS AND SHALL MEET THE REQUIREMENTS OF THE LATEST CSA STANDARD CAN/CSA–A23.1 ''CONCRETE MATERIALS AND METHODS FOR CONCRETE CONSTRUCTION'' .

1.0 COLD WEATHER DEFINITION

FOR THE PURPOSE OF THIS SPECIFICATION, COLD WEATHER REQUIREMENTS WILL APPLY WHEN (REF CSA A23.1 SECTION 7.4.1.5.1):

- THE AMBIENT TEMPERATURE IS LESS THAN FIVE DEGREE CELSIUS (5 °C).
- IF THE FORECASTS PREDICTS A DROP IN TEMPERATURE BELOW FIVE DEGREE CELSIUS (5 °C) LESS THAN 24 HOURS PRIOR TO CONCRETING.

1.1.1 ALL CONCRETING IN AN OPEN AIR ENVIRONMENT IS PROHIBITED IF THE AMBIENT TEMPERATURE IS LESS THAN MINUS FIFTEEN DEGREE CELSIUS (–15 °C) (EXTREME) (REF QUEBEC HYDRO TECHNICAL SPECIFICATION FOR THE CONSTRUCTION OF DISTRIBUTION DUCT BANKS)

1.1.2 IN THE CASE WHERE IT IS REQUIRED TO POUR CONCRETE IN AMBIENT TEMPERATURES BELOW MINUS FIFTEEN DEGREE CELSIUS (–15 °C), WILL BE PROVIDED A DETAILED METHOD FOR PROTECTING THE FRESH CONCRETE DURING THE DELIVERY, PLACEMENT, AND CURING OPERATIONS FROM BEING EXPOSED TO THE EXTREME AMBIENT TEMPERATURES. THIS METHOD SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER OF RECORD.

2.0 COLD WEATHER CONCRETE SUPPLY

REQUIREMENT SPECIFIED IN SECTION 2.1 FOR THE HEATING AND MIXING OF THE MATERIAL IS THAT OF THE CONCRETE SUPPLIER.
THE PURCHASER OF THE CONCRETE SHALL INSURE THAT THE CONCRETE IS PREPARED BASED ON THE TEMPERATURE REQUIREMENTS FOR THE CONCRETE MATERIALS AND THAT THE CONCRETE IS WITHIN THE SPECIFIED TEMPERATURE RANGES WHEN RECEIVED AT THE SITE PER SECTION 3.0

2.1 HEATING OF MATERIALS FOR CONCRETE MIXING.

2.1.1 DURING THE MIXING OPERATION, THE TEMPERATURE OF THE CONCRETE MIX SHALL NOT EXCEED THIRTY DEGREE CELSIUS (30°C). THE TEMPERATURE OF THE CONCRETE MIX, WHEN PLACED, SHALL NOT BE LESS THAN FIFTEEN DEGREE CELSIUS (15°C).

2.1.2 THE WATER SHALL BE HEATED TO A TEMPERATURE NOT GREATER THAN SIXTY–FIVE DEGREE CELSIUS (65°C).

2.1.3 IF THE ATMOSPHERIC TEMPERATURE IS, OR WAS AT ANY TIME DURING THE PREVIOUS 24 HOURS, LESS THAN –1°C, OR IF THE AGGREGATE STOCKPILES CONTAIN FROZEN MATERIAL, THE AGGREGATE SHALL BE HEATED TO A TEMPERATURE OF BETWEEN TWENTY (20°C) AND NOT GREATER THAN SIXTY–FIVE DEGREE CELSIUS (65°C).

2.1.4 WATER HEATED OVER 30°C SHALL NOT BE BROUGHT INTO DIRECT CONTACT WITH THE CEMENT, BUT SHALL BE ADDED INTO THE MIXER AND MIXED WITH THE AGGREGATE BEFORE THE CEMENT IS ADDED.

2.1.5 THE HEATING SYSTEM SHALL PROVIDE UNIFORM HEAT TO AVOID LOCAL OVERHEATING.

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3.0 COLD WEATHER PLACEMENT OF CONCRETE

3.1 PLACING OF CONCRETE – GENERAL

3.1.1 ALL PLACED CONCRETE SHALL MEET THE REQUIREMENTS OF CAN/CSA A23.1

3.1.2 ALL CONCRETE SHALL BE PLACED SO AS TO AVOID SEGREGATION OF MATERIALS AND DISPLACEMENT OF THE REINFORCING AND DUCT SPACERS FROM THE EXACT POSITION SHOWN ON THE DRAWINGS.

3.1.3 CONCRETE SHALL BE HANDLED FROM THE MIXER TO THE PLACE OF FINAL DEPOSIT AS RAPIDLY AS PRACTICABLE. CONCRETE SHALL BE PLACED IN A CONTINUOUS MANNER. CONSTRUCTION JOINTS WILL BE PERMITTED AND CONSTRUCTED AS PER THE DETAILS PROVIDED ON DRAWINGS. CONCRETE TRANSPORTED SHALL BE DISCHARGED AT THE JOB AND PLACED IN ITS FINAL POSITION IN THE FORMS WITHIN 1–1/2 HOURS AFTER THE INTRODUCTION OF THE MIXING WATER TO THE CEMENT AND AGGREGATE, OR THE CEMENT TO THE AGGREGATE. ANY ALLOWED DEVIATION FROM THE MAXIMUM PLACEMENT TIME WILL BE DECIDED BY THE ENGINEER.

3.1.3.1 NOTE: THE ABSOLUTE MAXIMUM TIME IS 2 HOURS, WHICH INCLUDES ANY DELAYS IN DELIVERY TIME.

3.1.4 THE CONCRETE SHALL BE MIXED ONLY IN SUCH QUANTITIES AS ARE REQUIRED FOR IMMEDIATE USE, AND ANY WHICH HAS DEVELOPED INITIAL SET SHALL NOT BE USED. REVIBRATION OF PARTIALLY SET CONCRETE, WHICH IS IN ITS FINAL POSITION, MAY BE ALLOWED UNDER THE DIRECTION OF THE ENGINEER, IF THE REVIBRATION IS DONE WITHIN TWO (2) HOURS OF MIXING THE CONCRETE.

3.1.4.1 NOTE: ENSURE THAT JOINTS OF CONCRETE ARE MIXED TOGETHER.

3.1.5 IN PREPARATION FOR THE PLACING OF CONCRETE, ALL CONSTRUCTION DEBRIS AND EXTRANEOUS MATTER SHALL BE REMOVED FROM THE INTERIOR OF FORMS.

3.1.6 CONCRETE SHALL BE COMPACTED, USING A MECHANICAL VIBRATOR HAVING A FREQUENCY OF AT LEAST 5000 IMPULSES PER MINUTE, AND BE OF SUFFICIENT LENGTH TO REACH EVERY EXTREMITY. THE VIBRATORS SHALL BE MANIPULATED SO AS TO THOROUGHLY WORK THE CONCRETE AROUND THE REINFORCEMENT, AND AT THE EXTREMITIES OF THE FOOTING.

3.1.7 CONCRETE PLACED IN A MANNER WHICH MAY RESULT IN SEGREGATION, VOIDS, OR DIRT POCKETS, WILL BE SUFFICIENT CAUSE FOR REJECTION OF THE STRUCTURE AND/OR AFFECTED PARTS.

3.1.8 ICE AND SNOW SHALL BE REMOVED FROM THE FORMWORK, REINFORCING AND THE BOTTOM OF THE EXCAVATIONS. WHEN AMBIENT TEMPERATURE IS MINUS ONE DEGREE CELSIUS (–1°C) OR LESS, ALL SURFACES (EXISTING CONCRETE STRUCTURES, FORMWORK AND STEEL REINFORCEMENTS) WITH WHICH THE POURED CONCRETE WILL COME IN CONTACT MUST BE HEATED BY THE CONTRACTOR TO A TEMPERATURE OF BETWEEN ZERO DEGREE CELSIUS (0 °C) AND TWENTY DEGREE CELSIUS (20 °C) FOR THE PERIOD OF 24 HOURS PRIOR TO CONCRETING.

3.1.9 THE TEMPERATURE OF THE CONCRETE AS IT IS BEING POURED SHOULD BE BETWEEN TEN DEGREE CELSIUS (10 °C) AND THIRTY DEGREE CELSIUS (30 °C) PER TABLE 14 OF THE CAN/CSA 23.1.

- IF THE CONCRETE TEMPERATURE IS LESS THAN TEN DEGREE CELSIUS (10 °C) AND GREATER THAN THIRTY DEGREE CELSIUS (30 °C) IT WILL BE REJECTED
- ANY CONCRETE WHICH IS FROZEN IS CONSIDERED DEFECTIVE AND MUST BE REMOVED AND REPLACED.

3.1.10 ALL CONCRETING IN AN OPEN AIR ENVIRONMENT IS PROHIBITED IF THE AMBIENT TEMPERATURE IS LESS THAN MINUS FIFTEEN DEGREE CELSIUS (–15 °C).

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3.1.11 IN THE CASE WHERE IT IS REQUIRED TO POUR CONCRETE IN AMBIENT TEMPERATURES BELOW MINUS FIFTEEN DEGREE CELSIUS (−15 °C), A DETAILED METHOD WILL BE PROVIDED FOR PROTECTING THE FRESH CONCRETE FROM EXPOSURE TO THE EXTREME AMBIENT TEMPERATURES DURING THE POURING OPERATION. THIS METHOD SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER OF RECORD.

3.1.12 CONCRETE SHALL NOT BE PLACE ON OR AGAINST FROZEN SUBGRADE OR GROUND.

3.1.13 FOR AREAS OR OPEN EXCAVATIONS EXPOSED TO THE AMBIENT TEMPERATURE THAT IS TO RECEIVE CONCRETE, PROTECTION WILL BE PROVIDED TO ENSURE THAT FROST DOES NOT PENETRATE THE GROUND.

3.1.14 ACCELERATOR OR SO CALLED ANTIFREEZE COMPOUNDS ARE NOT PERMITTED UNLESS APPROVED IN WRITING BY THE ENGINEER.

4.0 PROTECTION REQUIREMENT OF PLACED CONCRETE

4.1 PROTECTION REQUIREMENT

4.1.1 SPECIFIC PROTECTIVE MEASURES SHALL BE PUT IN PLACE BASED ON THE AMBIENT TEMPERATURE IN ORDER TO ENSURE PROPER CONCRETE CURING.

4.1.2 THE AIR TEMPERATURE SURROUNDING THE CONCRETE DURING THE CURING PERIOD SHALL BE MAINTAINED TO A MINIMUM OF TEN DEGREES CELSIUS (10 °C).

4.1.3 DURING THE PERIOD OF PROTECTION, THERMOMETERS (MAX/MIN THERMOMETERS ARE RECOMMENDED) MUST BE INSTALLED IN SUFFICIENT NUMBERS AS TO PROPERLY VERIFY AND RECORD THE SURFACE TEMPERATURE OF THE CURING CONCRETE, AND THE AMBIENT TEMPERATURE. ONE (1) THERMOMETER PLACED OUTSIDE ANY THERMAL PROTECTION PROVIDED FOR THE CONCRETE TO MEASURE THE AMBIENT TEMPERATURE, AND ONE (1) THERMOMETER FOR EVERY 15 LINEAR METERS OF NEWLY CONSTRUCTED DUCT BANK OR SECTION OF DUCT BANK IF LESS THAN 15 LINEAR METERS IN LENGTH OF WHICH THE TEMPERATURE MONITORING IS SUBJECT TO.

5.0 METHODS OF PROTECTION FOR PLACED CONCRETE

5.1 AMBIENT TEMPERATURE BETWEEN FIVE (5°C) AND MINUS FIVE (− 5°C) DEGREE CELSIUS

FOR TEMPERATURE BETWEEN FIVE (5°C) AND MINUS FIVE (− 5°C) DEGREE CELSIUS, FOR THE NEWLY PLACED CONCRETE THE CONTRACTOR SHALL PROVIDE PROTECTION THAT CONSISTS OF COMPLETELY COVERING UP ALL CONCRETED SURFACES WITH A LAYER OF;

- INSULATING BLANKETS OR TARPS AT LEAST 25mm IN THICKNESS. EACH LAYER OF THE INSULATING MATERIAL MUST BE COMPRISED OF A CELLULAR FOAM SHEET ENCASED IN A WATERPROOF COVER AND HAVE A THERMAL RESISTANCE VALUE (RSI) OF 0.40.
  OR
- 50mm OF CLEAN DRY STRAW, AND THEN COVERED WITH A TARPAULIN OR POLYETHYLENE SHEET.

5.2 AMBIENT TEMPERATURE BETWEEN MINUS FIVE (−5°C) AND MINUS FIFTEEN (− 15°C) DEGREE CELSIUS,

FOR AMBIENT TEMPERATURES BELOW MINUS FIVE DEGREE CELSIUS (−5°C) DOWN TO MINUS FIFTEEN DEGREE CELSIUS (−15 °C) THE THICKNESS OF THE INSULATING MATERIAL MUST BE INCREASED TO:

- FOR BLANKETS OR TARPS , 75mm TO PROVIDE A MINIMUM THERMAL RESISTANCE VALUE (RSI) OF 1.20
  OR
- FOR CLEAN DRY STRAW, 250mm

THE INSULATING MATERIAL MUST BE PLACED IN A MANNER WHICH PREVENTS ANY CONCRETED SURFACE DIRECT CONTACT WITH THE OUTSIDE AIR FOR THE DURATION OF THE REQUIRED PROTECTION PERIOD. THE JOINTS OF THE INSULATING MATERIAL MUST BE OVERLAPPED BY AT LEAST 100mm.

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5.3 FOR AMBIENT TEMPERATURES BELOW MINUS FIFTEEN (−15) DEGREE CELSIUS SEE SECTION 1.1. KEPT CLEAR OF CONCRETE AND FORM SURFACES TO PERMIT FREE CIRCULATION OF AIR, AND SHALL REMAIN INTACT FOR AT LEAST TWENTY FOUR (24) HOURS AFTER ARTIFICIAL HEAT IS DISCONTINUED.

6.0 PROTECTION PERIOD FOR CURING CONCRETE

6.1 DUCT BANK CONCRETE CURING PERIOD

AS SOON AS THE CONCRETE HAS SET SUFFICIENTLY, ANY CONCRETE SURFACES EXPOSED TO CONDITIONS CAUSING PREMATURE DRYING SHALL BE PROTECTED BY COVERING WITH CANVAS, BURLAP, SAND, OR OTHER SATISFACTORY MATERIAL, AND KEPT MOIST (BLANKETS SHOULD NOT TOUCH CONCRETE).

THE COLD WEATHER PROTECTION FOR THE CONCRETE MUST BE MAINTAINED FOR A MINIMUM OF SEVENTY−TWO (72) HOURS. AFTER THIS TIME THE PROTECTION AND THE FORMWORK CAN BE REMOVED AND BACKFILLING OPERATIONS CAN COMMENCE. REFER TO SECTION 7.0

6.2 ROADWAYS FINAL CONCRETE BACKFILL CONCRETE CURING PERIOD

THE FOLLOWING STEPS ARE REQUIRED FOR THE FINAL 300mm OF TYPE 32 MPa CONCRETE BACKFILL IN ROADWAYS:

6.2.1 THE CONCRETE TEMPERATURE SHALL BE MAINTAINED AT ALL SURFACES AT NOT LESS THAN TEN DEGREES CELSIUS (10°C) FOR FOUR (4) DAYS, AND NOT LESS THAN FIVE DEGREES CELSIUS (5°C) FOR AN ADDITIONAL TWO (2) DAYS AFTER PLACING.

6.2.2 MEANS SHALL BE PROVIDED TO HUMIDIFY AIR WITHIN ENCLOSURES, AND TO KEEP CONCRETE AND FORMWORK CONTINUOUSLY MOIST IF DRY HEAT IS USED.

6.2.3 THE CONCRETE SHALL BE KEPT ABOVE FREEZING TEMPERATURES FOR PERIODS OF SEVEN (7) DAYS.

6.2.4 AT THE END OF SPECIFIED PROTECTION PERIOD, THE TEMPERATURE OF CONCRETE SHALL BE REDUCED GRADUALLY AT A RATE NOT EXCEEDING TEN DEGREES CELSIUS (10°C) PER DAY, UNTIL OUTSIDE AIR TEMPERATURE IS REACHED.

6.2.5 ACCELERATOR OR SO CALLED ANTIFREEZE COMPOUNDS ARE NOT PERMITTED UNLESS APPROVED IN WRITING BY THE ENGINEER.

6.2.6 ALL PROTECTIVE COVERINGS SHALL BE KEPT CLEAR OF CONCRETE AND FORM SURFACES TO PERMIT FREE CIRCULATION OF AIR, AND SHALL REMAIN INTACT FOR AT LEAST TWENTY FOUR (24) HOURS AFTER ARTIFICIAL HEAT IS DISCONTINUED.

7.0 BACKFILL MATERIAL

THE CONTRACTOR SHALL INSTALL THE APPROPRIATE BACKFILL MATERIAL PER THE CONTRACT DOCUMENTS. ALL CONCRETE BACKFILL AND FINISHING CONCRETE SHALL BE PROTECTED AND CURED AS SPECIFIED IN THE PREVIOUS SECTIONS.

DURING BACKFILLING OPERATIONS IN TEMPERATURES BELOW MINUS FIVE DEGREE CELSIUS (−5°C) THE CONCRETE MUST NOT BE EXPOSED TO THE AMBIENT TEMPERATURE FOR MORE THAN TWO (2) HOURS.

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8.0 CONCRETE TESTING

AN INDEPENDENT ACCREDITED TESTING LABORATORY, WILL BE HIRED TO PERFORM SLUMP, AIR ENTRAINMENT AND STRENGTH TESTS IN ACCORDANCE WITH THE LATEST EDITION OF CAN/CSA A23.2 04 METHODS OF TEST AND STANDARD PRACTICES FOR CONCRETE. CERTIFIED COPIES OF ALL TEST RESULTS SHALL BE SENT DIRECTLY TO SASKPOWER.

- SLUMP, AIR ENTRAINMENT & TEMPERATURE

  SLUMP, AIR ENTRAINMENT AND TEMPERATURE TESTS SHALL BE PERFORMED AND DOCUMENTED ON THE FIRST CONCRETE TRUCK OF THE DAY ARRIVING ON SITE. CONCRETE THAT DOES NOT MEET SPECIFICATION MAY BE RE-TESTED AT THE ENGINEER'S DISCRETION. FOLLOWING A TEST FAILURE, THE NEXT TRUCK SHALL BE TESTED. A SET OF SLUMP AND AIR ENTRAINMENT TESTS SHALL BE MADE (AND DOCUMENTED) FOR EACH 15 CUBIC METRE OF CONCRETE (ROUGHLY EVERY THIRD TRUCK), OR PORTION THEREOF, PLACED IN ANY ONE DAY.

NOTE: IF THE TESTS COMPLETED FOR THE FIRST TRUCK ARE NOT GOOD, HAVE SLUMP AND AIR TESTS COMPLETED FOR THE 2ND TRUCK.

NOTE: IF AIR OR WATER NEEDS TO BE ADDED DUE TO LOW TEST VALUES, IT IS THE SUPPLIER'S RESPONSIBILITY TO ENSURE THAT THE CORRECT QUANTITIES OF AIR OR WATER ARE ADDED. ONCE MODIFICATIONS ARE DONE IN THE MIX, THE SLUMP AND AIR TESTS MUST BE REPEATED.

NOTE: AIR OR WATER SHOULD ONLY BE ADDED WITH APPROVAL FROM SASKPOWER AND ONLY IF THE AIR OR SLUMP IS TESTED OUTSIDE OF THE SPECIFICATION.

NOTE: IF THE CONCRETE SPECIFICATIONS ARE NOT MET, THE DELIVERY IS TO BE REJECTED.

- COMPRESSIVE STRENGTH

  COMPRESSIVE STRENGTH SAMPLES SHALL BE TAKEN WITH THE SAME FREQUENCY AS SLUMP AND AIR ENTRAINMENT TESTS. FOUR (4) CYLINDERS (100mm X 200mm OR 150mm DIAMETER BY 300mm) SHALL BE TAKEN FOR EACH SET OF TESTS. ALL FOUR (4) CYLINDERS SHALL BE TRANSPORTED TO THE TESTING LAB FOR CURING ONE DAY AFTER THE SAMPLE IS TAKEN. ONE CYLINDER SHALL BE TESTED IN 7 DAYS, AND THE OTHER TWO CURED CYLINDERS SHALL BE TESTED IN 28 DAYS. THE FOURTH CYLINDER SHALL BE TESTED IN 56 DAYS IF THE RESULTS OF THE FIRST THREE ARE DOUBTFUL. THE TEST RESULTS, DATE, TIME AS WELL AS THE LOCATION OF THE TESTS NEEDS TO BE DOCUMENTED.

NOTE: IT IS TYPICAL FOR THE CONCRETE TO REACH 70% OF ITS STRENGTH

ALL OF THE ABOVE TESTS SHALL BE ARRANGED FOR, COORDINATED AND PAID FOR BY THE CONTRACTOR. SASKPOWER RESERVES THE RIGHT TO TAKE ADDITIONAL TESTS, AT ITS EXPENSE.

9.0 CONCRETE SPECIFICATIONS – DUCT BANK FORMATION

- REFER TO SPECIFIC PROJECT SPECIFICATIONS AS IT COULD VARY

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10.0 CONCRETE SPECIFICATIONS – TRENCH BACK FILL

TYPE 32 MPa PORTLAND CEMENT CONCRETE MIX

- TO BE USED AS FINAL BACK FILL OF DUCT BANK TRENCHES IN ROADWAYS (TOP 300mm)
- AIR CONTENT 6.5% +– 1%
- MAXIMUM WATER /CEMENTING MATERIALS RATIO BY WEIGHT 0.45
- SPECIFIED SLUMP 70mm +– 20mm
- REACH COMPRESSIVE STRENGTH IN 28 DAYS
  REFERENCE CITY OF REGINA STANDARD CONSTRUCTION SPECIFICATIONS, SECTION 2500 "SUPPLY OF PORTLAND CEMENT CONCRETE".

LOW SHRINK 0.25–0.75MPa PORTLAND CEMENT CONCRETE MIX

- TO BE USED AS WARM WEATHER BACK FILL ON TOP OF THE DUCT BANK FORMATION
- MAXIMUM WATER /CEMENTING MATERIALS RATIO BY WEIGHT 0.50
- SPECIFIED SLUMP 175mm +– 30mm
- REACH COMPRESSIVE STRENGTH IN 28 DAYS
  REFERENCE CITY OF REGINA STANDARD CONSTRUCTION SPECIFICATIONS, SECTION 2500 "SUPPLY OF PORTLAND CEMENT CONCRETE"

REFERENCES:

- CAN /CSA–A23.1 CONCRETE MATERIALS AND METHODS FOR CONCRETE CONSTRUCTION
- SASKPOWER SPECIFICATION FOR CONCRETE FOUNDATIONS NO. B400–10
- CIMA COLD WEATHER CONCRETING REQUIREMENTS FOR BURIED CONCRETE CABLE DUCT BANKS
- QUEBEC HYDRO TECHNICAL SPECIFICATION FOR THE CONSTRUCTION OF DISTRIBUTION DUCT BANKS

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