

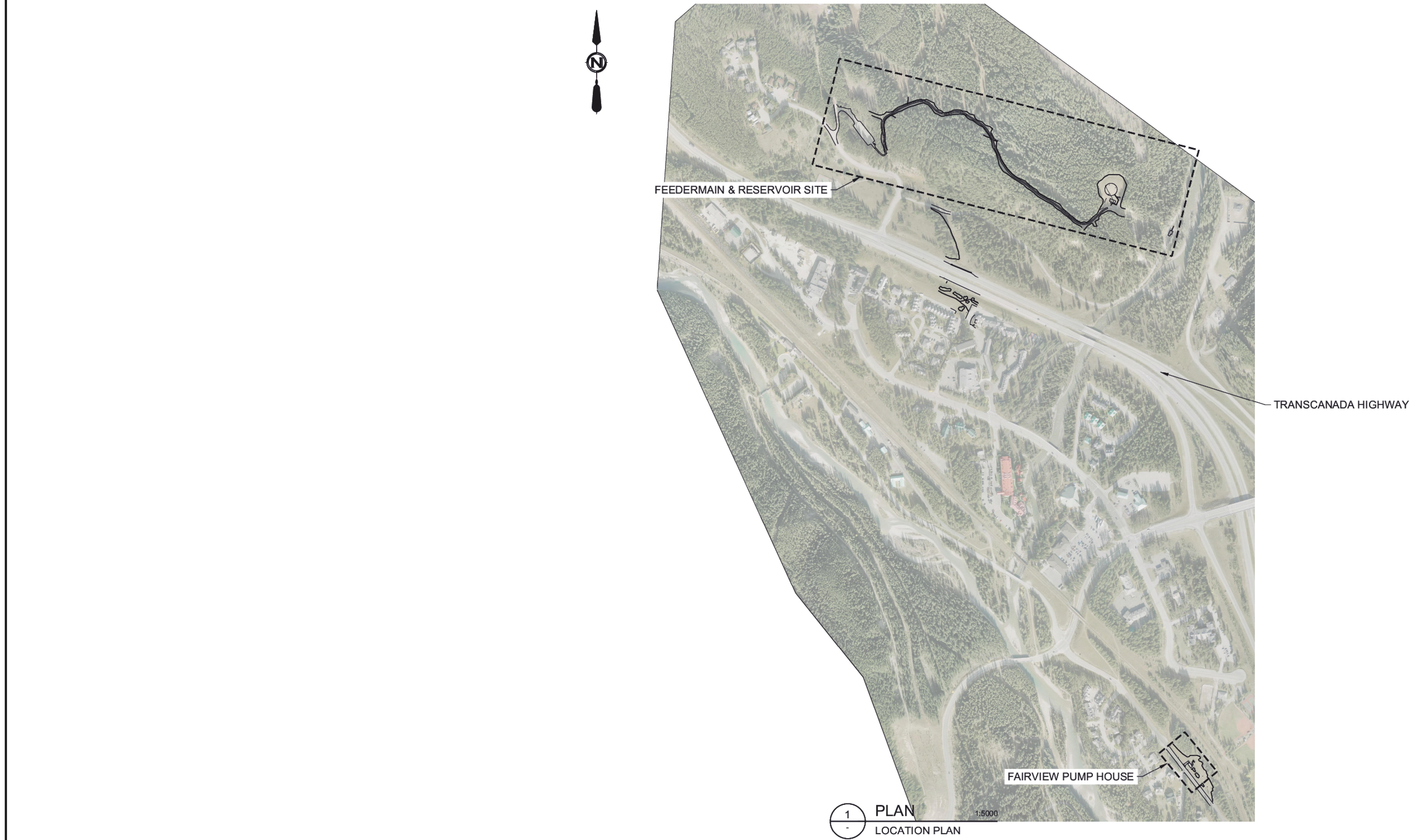
LAKE LOUISE TOWNSITE  
2018 WATER SYSTEM UPGRADES  
RESERVOIR CONTRACT  
BANFF NATIONAL PARK

AE Project No. 20173084-00

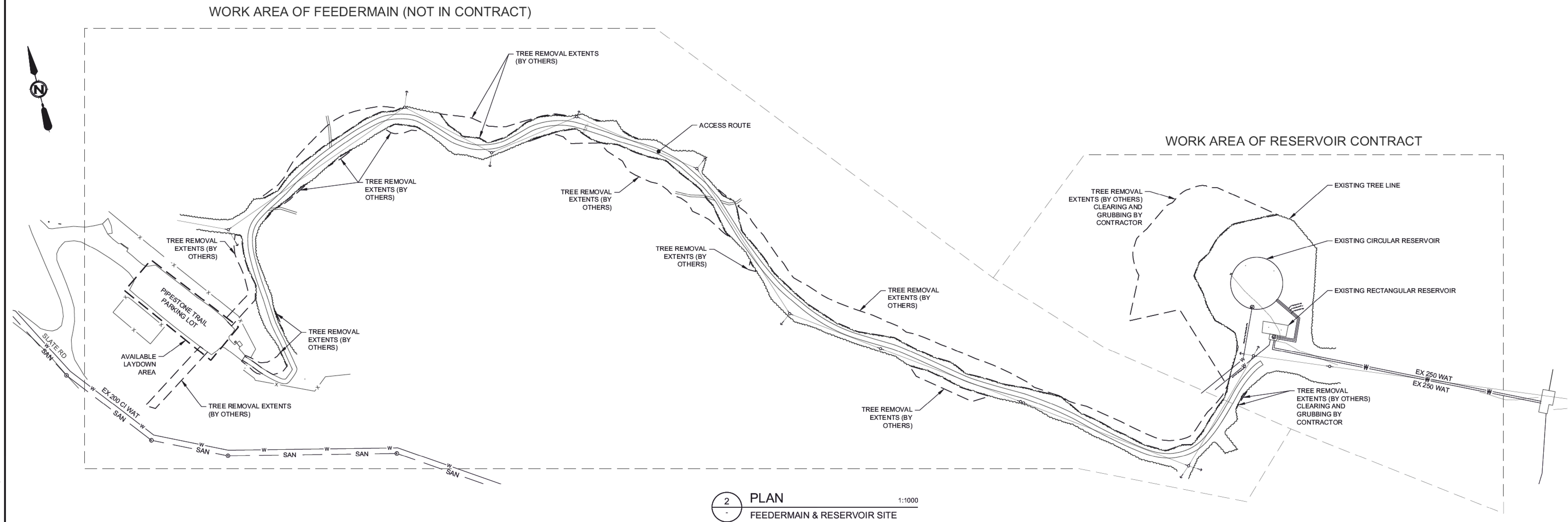
ISSUED FOR TENDER  
APRIL 09, 2018

SHEET LIST TABLE					
SHEET	DRAWING NAME	REVISION	DRAWING TITLE		
GENERAL					
1	3475-06-G-001	0	COVER PAGE AND DRAWING LIST		
CIVIL					
2	3084-01-C-100	0	LOCATION PLAN		
3	3084-01-C-101	0	EXISTING GROUND SITE PLAN		
4	3084-01-C-102	0	RESERVOIR SITE PLAN/YARD PIPING		
5	3084-01-C-103	0	RESERVOIR SITE GRADING PLAN		
6	3084-01-C-501	0	CIVIL DETAILS		
STRUCTURAL					
7	3084-01-S-101	0	RESERVOIR	FOUNDATION PLAN AND	GENERAL NOTES
8	3084-01-S-102	0	RESERVOIR	ROOF PLAN AND DETAILS	
9	3084-01-S-301	0	RESERVOIR	SECTION AND DETAILS	
10	3084-01-S-501	0	BASE SLAB, WALL, COLUMN	REINFORCING DETAILS	
11	3084-01-S-502	0	ROOF REINFORCING	PARTIAL PLAN AND DETAILS	
PROCESS					
12	3084-01-D-101	0	RESERVOIR	MIXING PIPING	
13	3084-01-D-501	0	PROCESS STANDARD DETAIL		
ELECTRICAL					
14	3084-01-E-001	0	ELECTRICAL LEGEND		
15	3084-01-E-002	0	ELECTRICAL SPECIFICATIONS AND	SINGLE LINE DIAGRAM	
16	3084-01-E-003	0	LEVEL TRANSMITTER PANEL	WIRING SCHEMATIC	
17	3084-01-E-101	0	ELECTRICAL SITE PLAN		
18	3084-01-E-501	0	LEVEL TRANSMITTER PANEL	DETAILS AND	BILL OF MATERIALS
19	3084-01-E-502	0	LEVEL TRANSMITTER PANEL	DETAILS	
20	3084-01-E-503	0	INSTALLATION DETAILS	PANEL ARRANGEMENT AND	UNDERGROUND CABLE / CONDUIT
21	3084-01-E-504	0	INSTALLATION DETAILS	SOLAR PANEL AND	LEVEL TRANSDUCER





1 PLAN  
LOCATION PLAN



2 PLAN  
FEEDERMAIN & RESERVOIR SITE

0	2018APR05	ISSUED FOR TENDER	B.P.	J.C.	
No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé	

Revision / Revision  
A detail number  
numéro de détail  
B source drawing no.  
no. de dessin  
C detail on drawing no.  
dessin sur dessin no.

Consultant's Name  
Nom de l'expert-conseil  
**AE** Associated Engineering  
APEGA Permit to Practice P 3979

Eng. Stamp  
Sceau de l'ingénieur  
Professional Engineer  
Ingénieur Professionnel  
2016-06-20

Client/client Parks Canada Agence Western and Northern Region	L'Agence Parcs Canada Ouest et Nord du Canada
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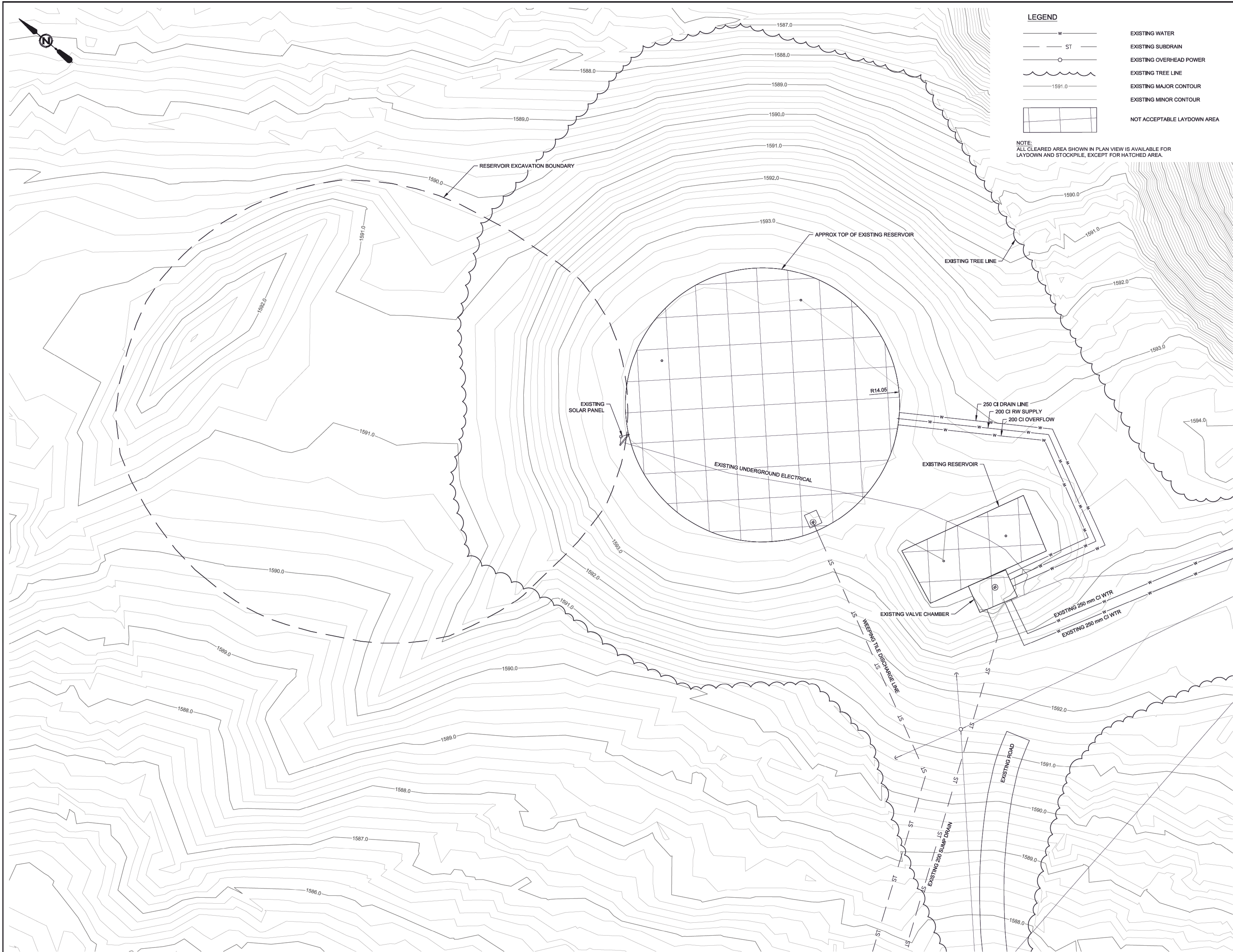
Project title/Titre du projet  
**LAKE LOUISE 2018  
WATER SYSTEM UPGRADES  
RESERVOIR CONTRACT  
BANFF NATIONAL PARK**

Drawing title/Titre du dessin  
**LOCATION PLAN**

Surveyed by/Arpenté par J. CHEN	Drawn by/Dessiné par B. PRATT	Date/Date 2018JAN11
Designed by/Conçu par J. CHEN	Reviewed by/Revisé par C. ARKELL	Scale/Echelle AS SHOWN
PWSC Project Manager/Administrateur de Projets TPSC J. GIBBONS		
Client Acceptance/Acceptation du client Approved by/Approuvé par		
Park Responsible Officer/Agent Responsable PWSC Project Manager/Administrateur de Projets PWSC		
Project No./No. du projet 20173084-00	Asset No./No. de l'actif 3084-01-C-100	Sheet No./ No. de la feuille 2
Drawing Reference No./No. de référence du dessin 3084-01-C-100		21



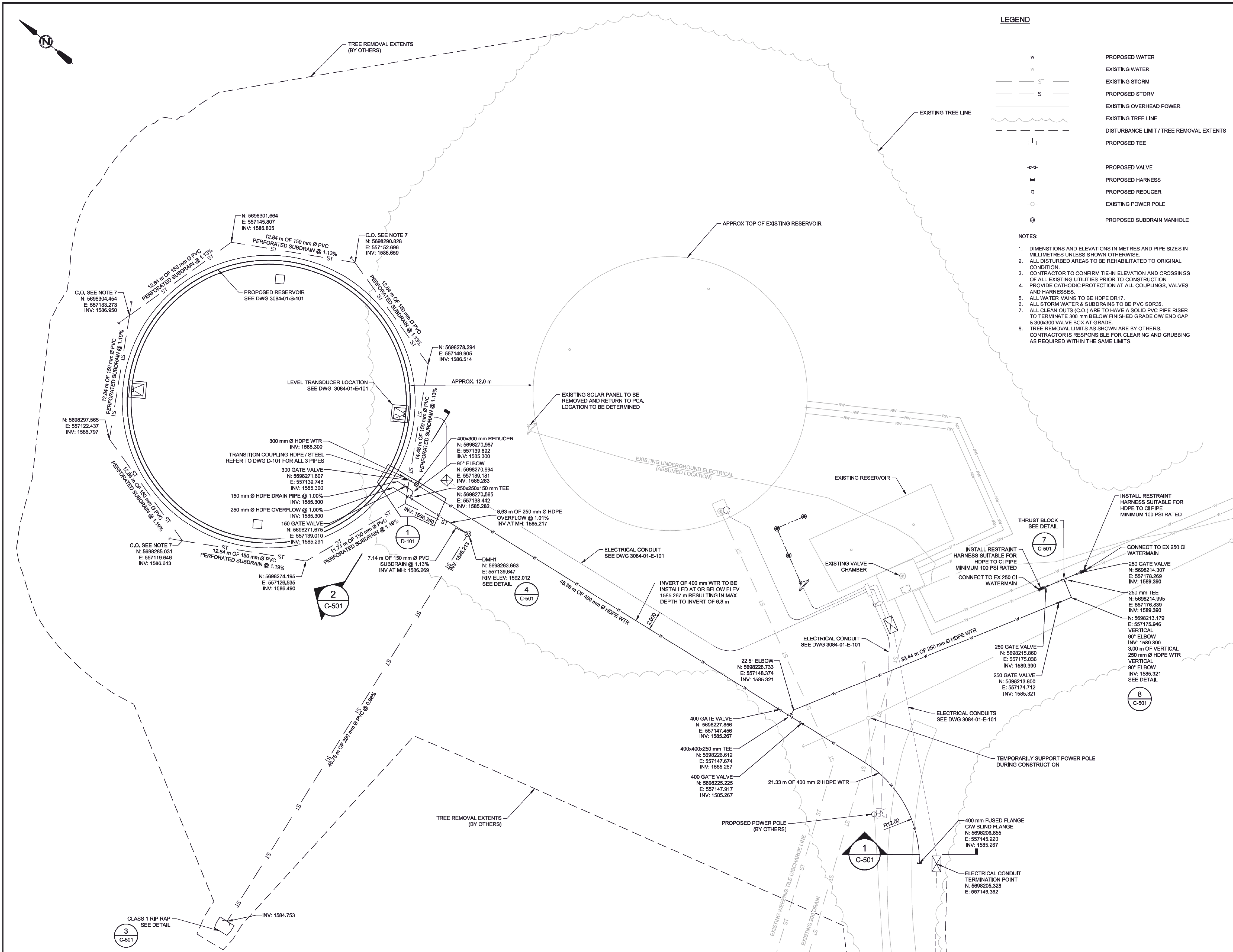
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DATE: 2018-03-16, Barry Pratt



1 PLAN 1:150

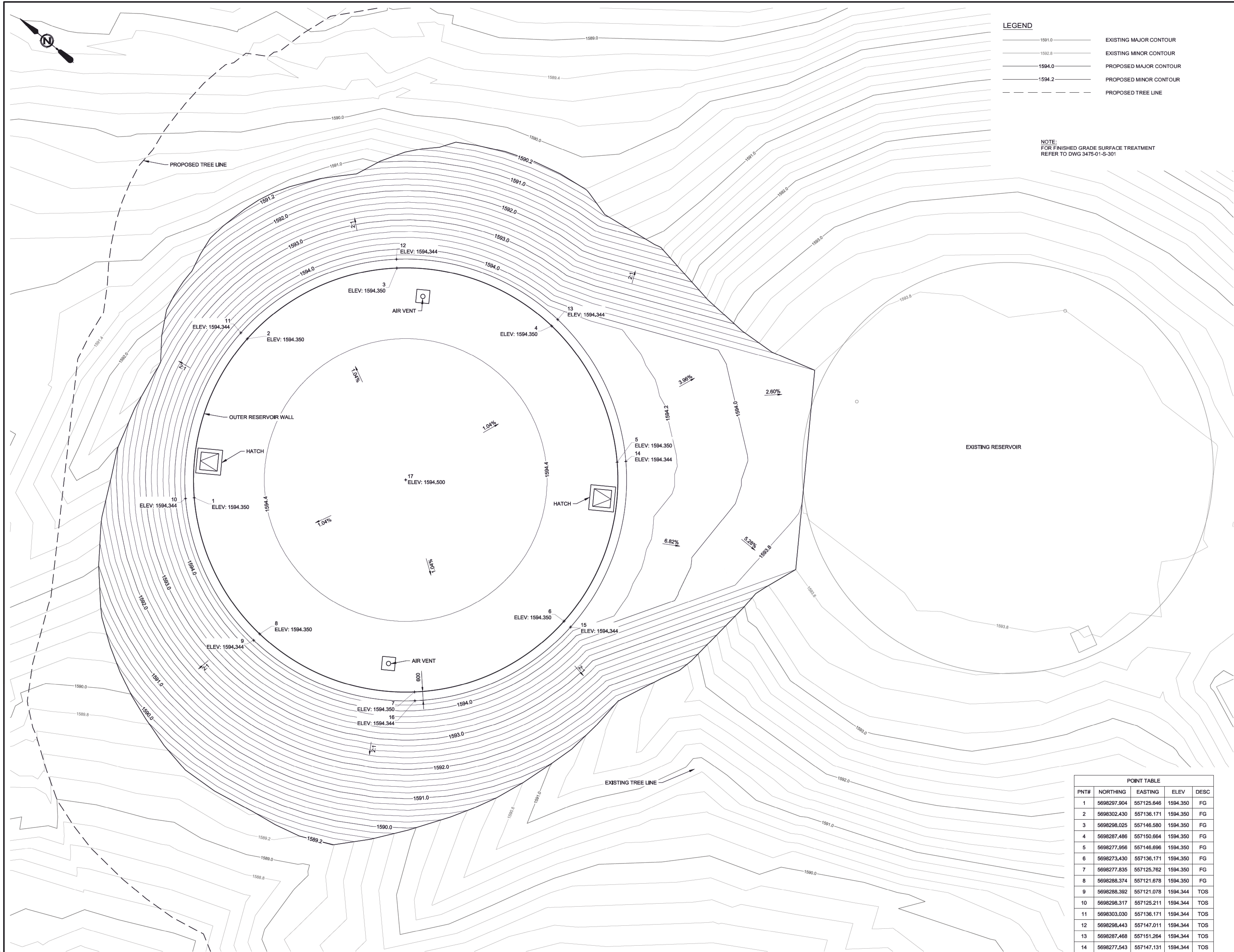
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No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé	
Revision / Révision					
A detail number A détail no.			A		
B source drawing no. B source de dessin no.			B/C		
C detail on drawing no. C détail sur dessin no.					
Consultant's Name Nom de l'expert-conseil			Eng. Stamp Sceau de l'ingénieur		
Client/client Parks Canada Agency Agence du Parc Canada Western and Northern Region			L'Agence Parcs Canada Ouest et Nord du Canada		
Project title/Titre du projet LAKE LOUISE 2018 WATER SYSTEM UPGRADES RESERVOIR CONTRACT BANFF NATIONAL PARK					
Drawing title/Titre du dessin EXISTING GROUND SITE PLAN					
Surveyed by/Arpenté par J. CHEN		Drawn by/Dessiné par B. PRATT		Date/Date 2018MAY07	
Designed by/Concepé par J. CHEN		Reviewed by/Révisé par C. ARNOLD		Scale/Echelle AS SHOWN	
PWSC Project Manager/Administrateur de Projets TPSC J. GIBBONS					
Client Acceptance/Acceptation du client			Approved by/Approuvé par		
Park Resource Officer/Agent Ressources			PWSC Project Manager/Administrateur de Projets TPSC		
Project No./No. du projet 20173084-00		Asset No./No. d'actif 20173084-00		Sheet No./No. de la feuille 3	
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\\S-gp\4s-01\projects\2017\3084\00\_Reservoir\_LSI\Working\_Dwg\100\_Civil\3084-01-C-103.dwg  
DATE: 2018-03-16, Barry Pratt



LEGEND	
	EXISTING MAJOR CONTOUR
	EXISTING MINOR CONTOUR
	PROPOSED MAJOR CONTOUR
	PROPOSED MINOR CONTOUR
	PROPOSED TREE LINE

NOTE:  
FOR FINISHED GRADE SURFACE TREATMENT  
REFER TO DWG 3475-01-S-301

0	2018APR09	ISSUED FOR TENDER	B.P.	J.C.	
No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé	

Revision / Revision  
A detail number  
numéro de détail  
B source drawing no.  
no. de dessin  
C detail on drawing no.  
détail sur dessin no.

Consultant's Name  
Nom de l'expert-conseil

Eng. Stamp  
Sceau de l'ingénieur

Client/client	Parks Canada Agence Western and Northern Region	L'Agence Parcs Canada Ouest et Nord du Canada
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Project title/Titre du projet  
**LAKE LOUISE 2018  
WATER SYSTEM UPGRADES  
RESERVOIR CONTRACT  
BANFF NATIONAL PARK**

Drawing title/Titre du dessin  
**RESERVOIR SITE GRADING PLAN**

Surveyed by/Arpenté par	Drawn by/Dessiné par	Date/Date
	B. PRATT	2018MAR06
Designed by/Conçu par	Reviewed by/Revisé par	Scale/Échelle
J. CHEN	C. ARKELL	AS SHOWN

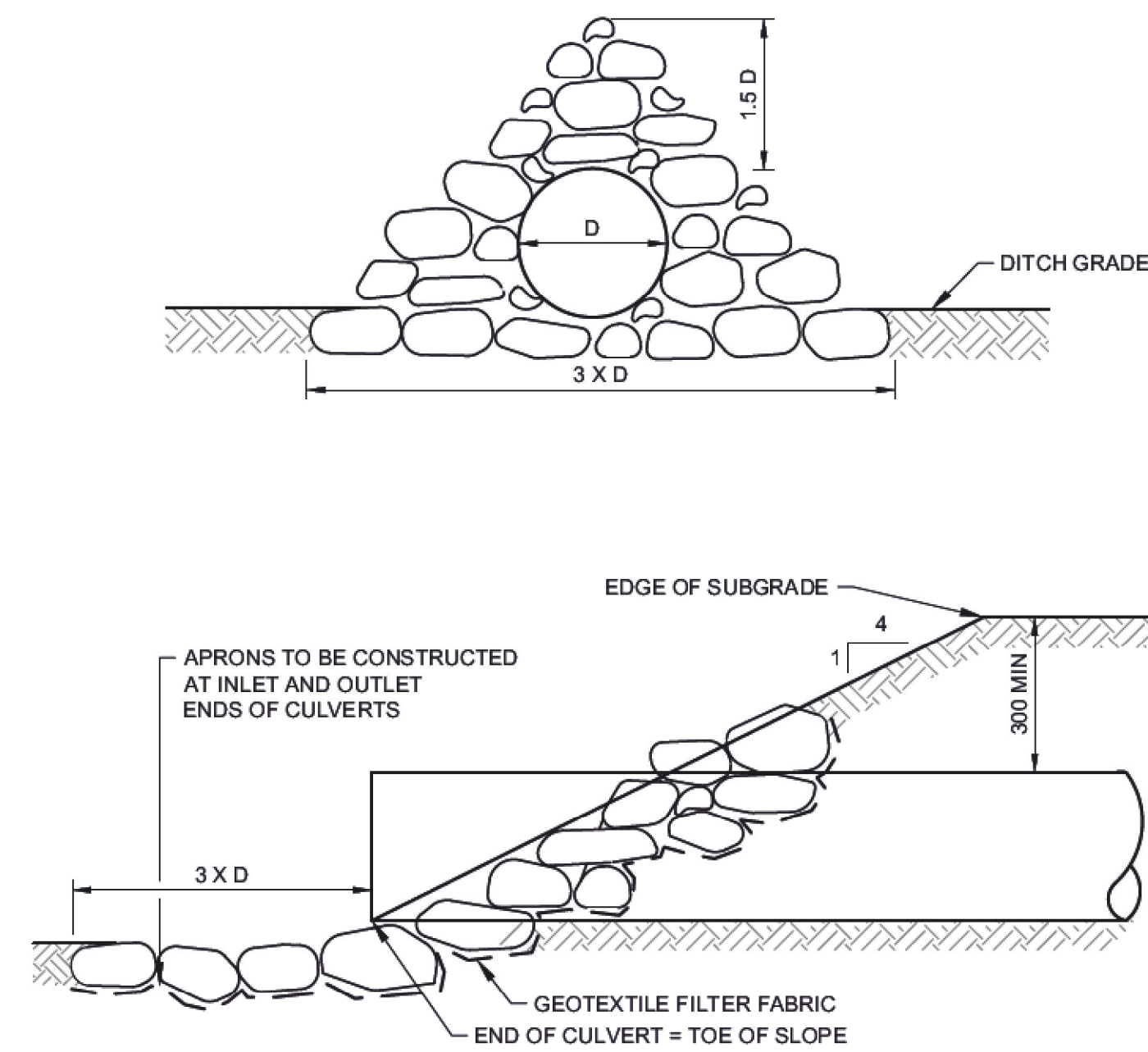
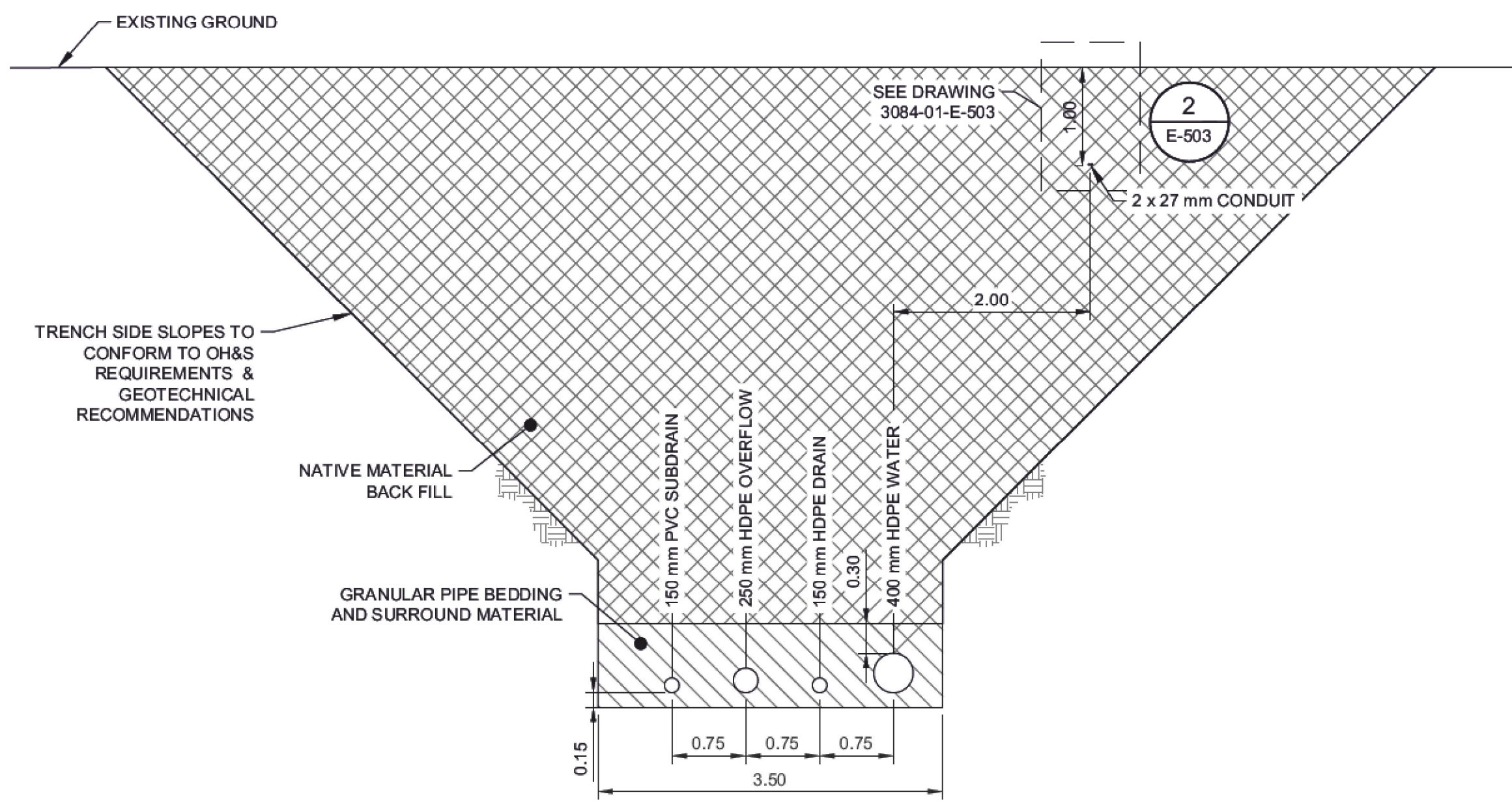
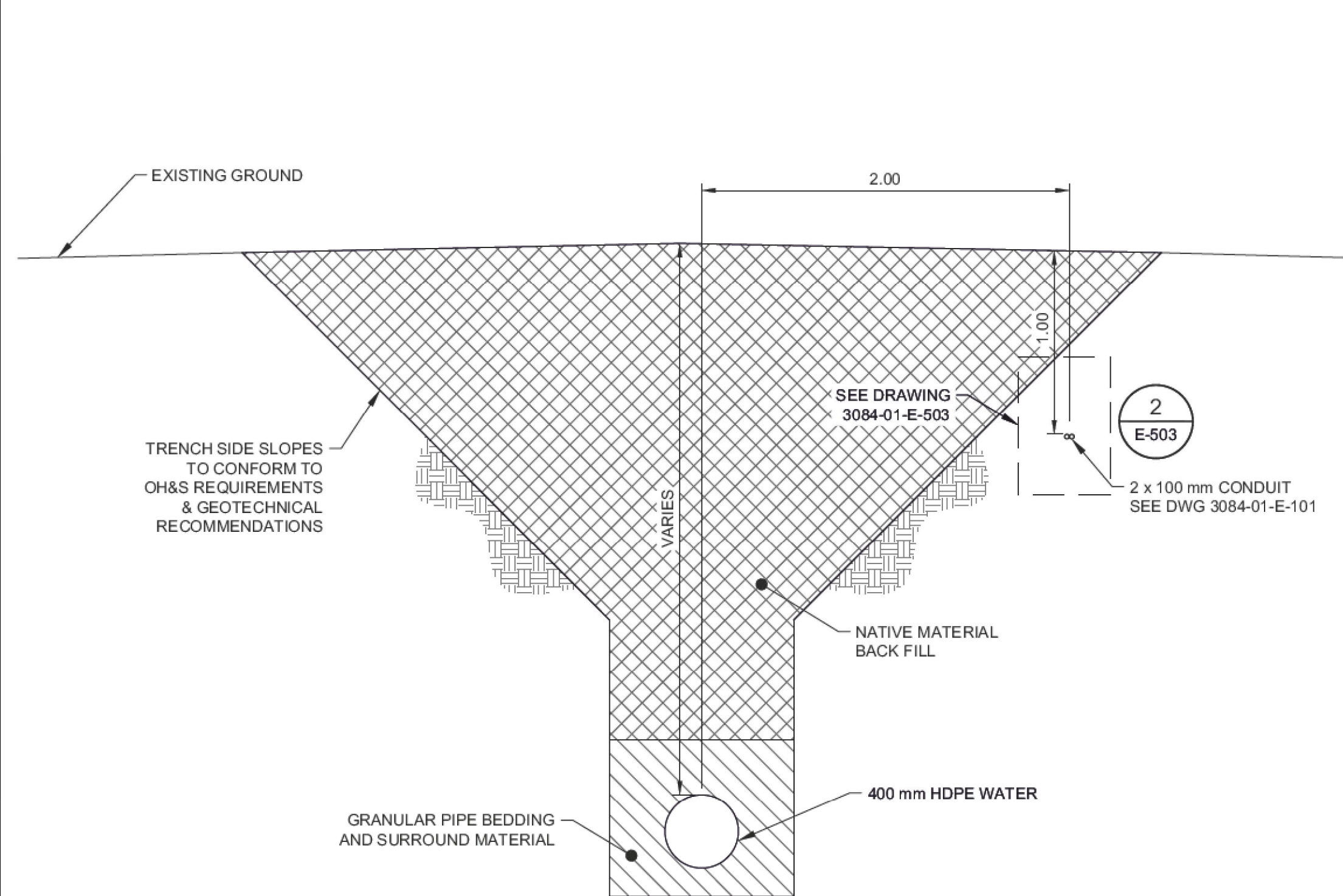
FWSC Project Manager/Administrateur de Projets TPSC  
J. GIBBONS  
Client Acceptance/Acceptation du client  
Approved by/Approuvé par

Project No./No. du projet	Asset No./No. d'actif	Sheet No./ No. de la feuille
20173084-00	1594.344	5
Drawing Reference No./No. de référence du dessin	3084-01-C-103	

POINT TABLE				
PNT#	NORTHING	EASTING	ELEV	DESC
1	5698297.904	557125.646	1594.350	FG
2	5698302.430	557136.171	1594.350	FG
3	5698298.025	557146.580	1594.350	FG
4	5698287.486	557150.664	1594.350	FG
5	5698277.956	557146.696	1594.350	FG
6	5698273.430	557136.171	1594.350	FG
7	5698277.835	557125.762	1594.350	FG
8	5698288.374	557121.678	1594.350	FG
9	5698288.392	557121.078	1594.344	TOS
10	5698298.317	557125.211	1594.344	TOS
11	5698303.030	557136.171	1594.344	TOS
12	5698298.443	557147.011	1594.344	TOS
13	5698287.468	557151.264	1594.344	TOS
14	5698277.543	557147.131	1594.344	TOS
15	5698272.830	557136.171	1594.344	TOS
16	5698277.417	557125.331	1594.344	TOS
17	5698287.930	557136.171	1594.500	FG

1 PLAN 1:100

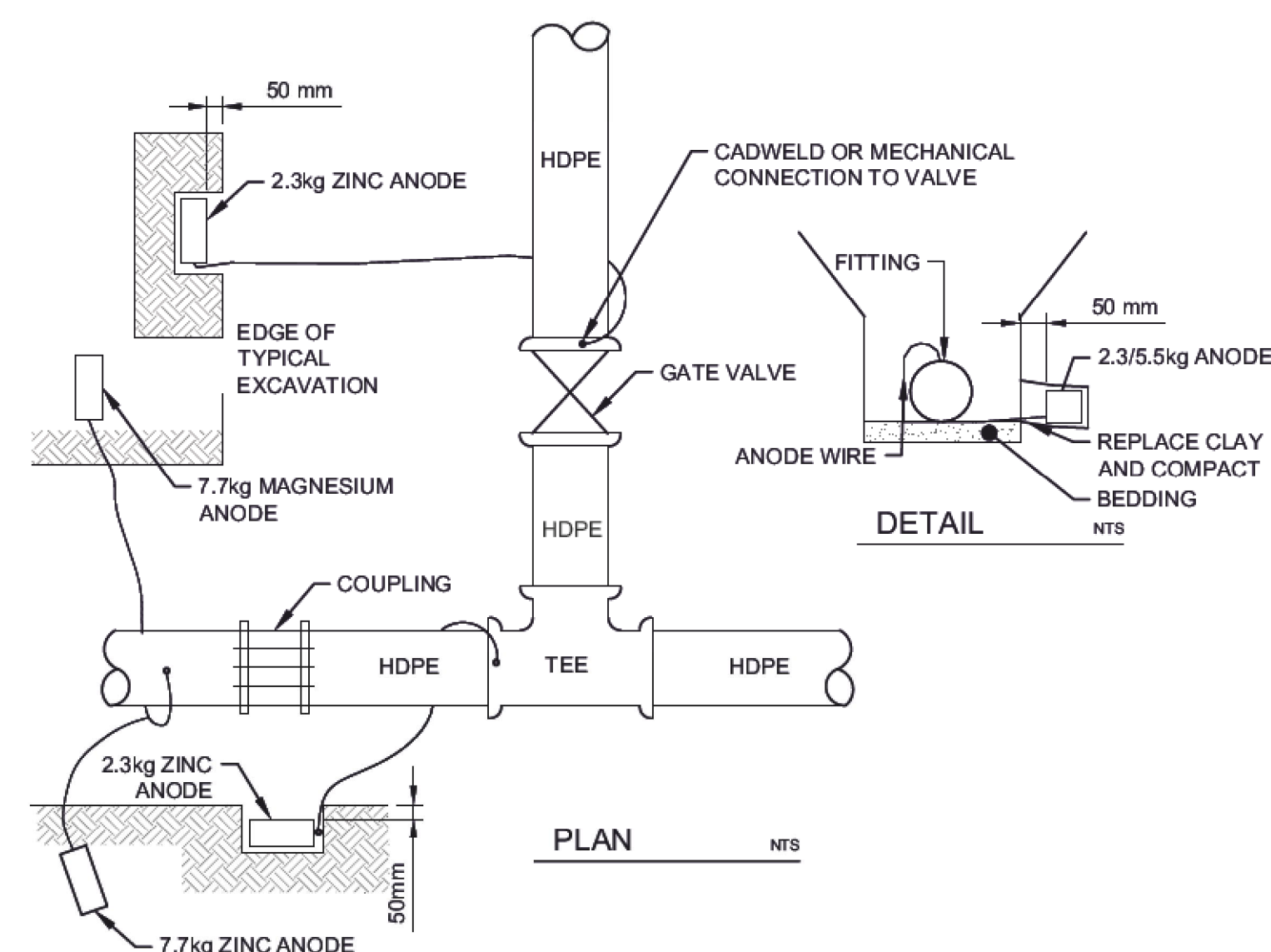
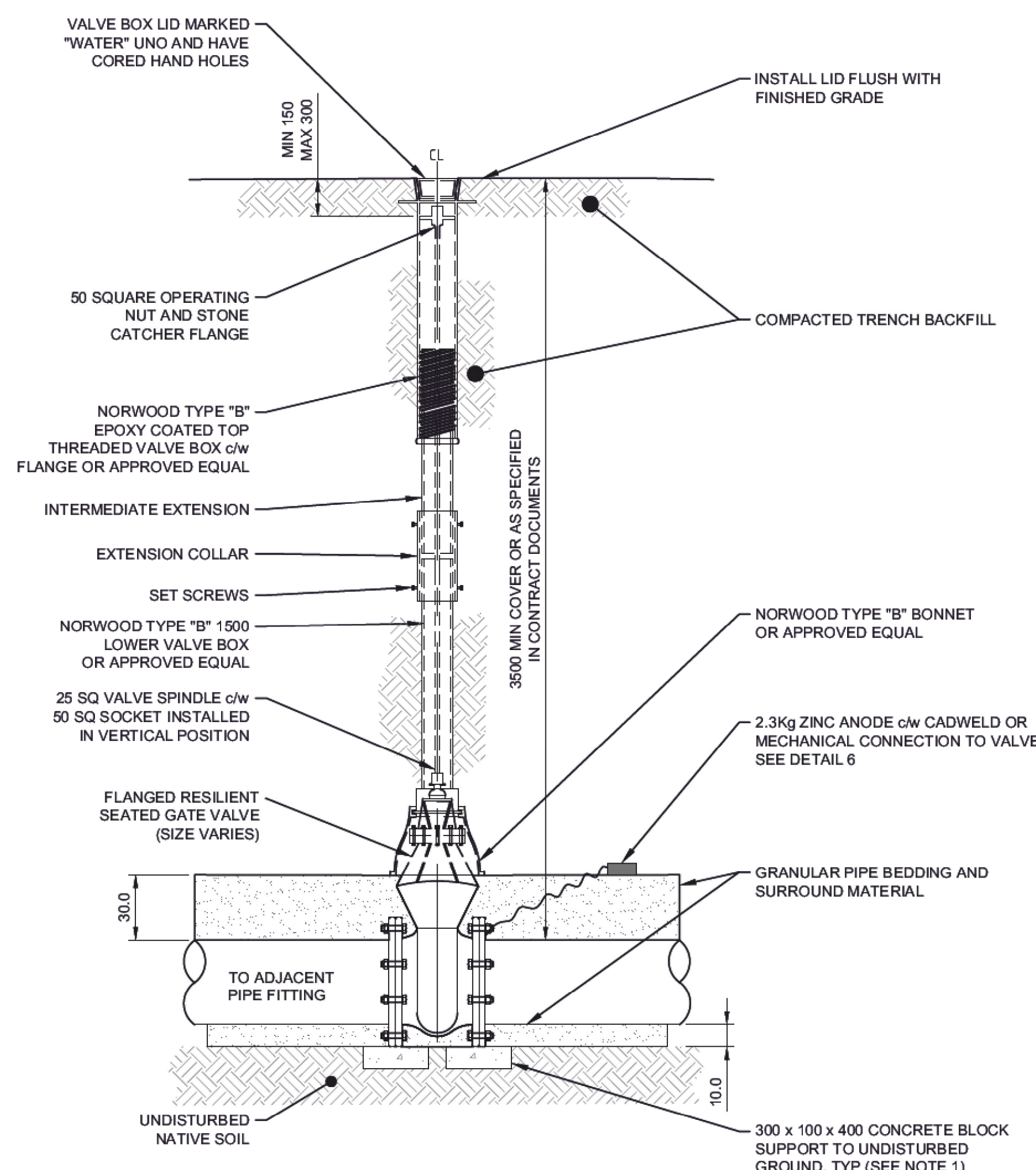
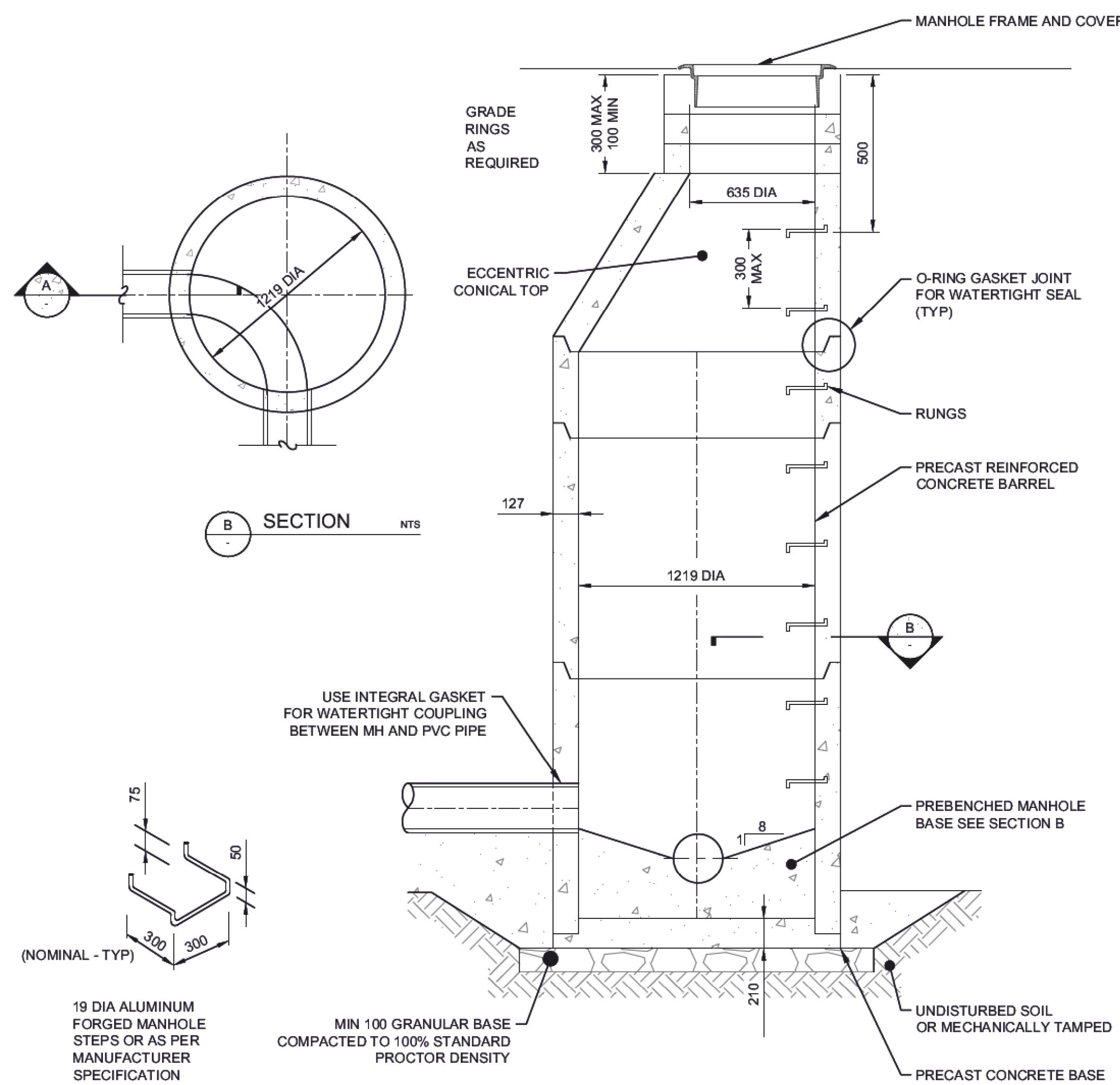




1 DETAIL  
C-102 TYPICAL SECTION FEEDERMAIN TO RESERVOIR NTS

2 DETAIL  
C-102 COMMON TRENCH CONFIGURATION NTS

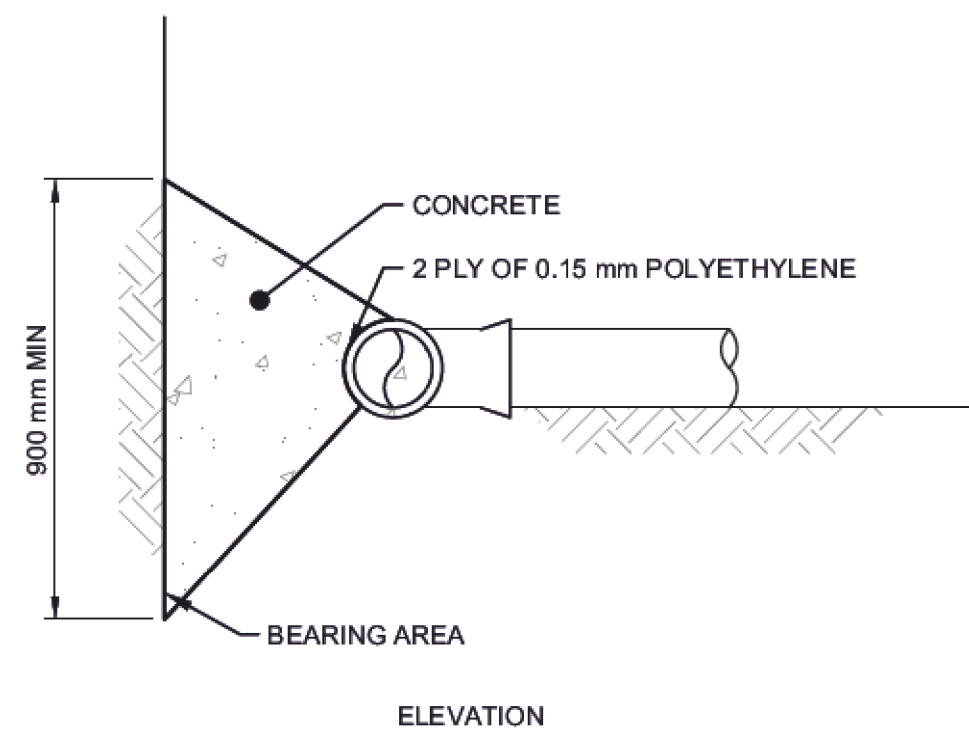
3 DETAIL  
C-102 RIP RAP NTS



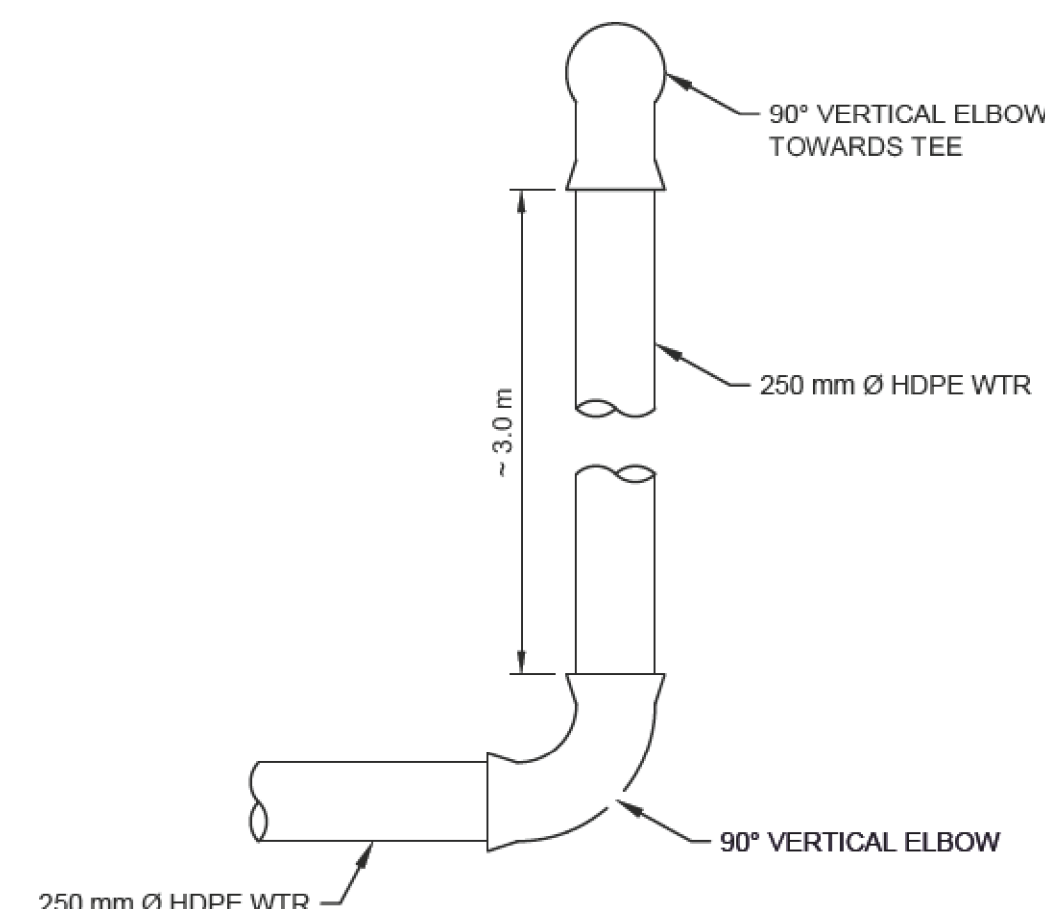
5 DETAIL  
C-102 WATER VALVE NTS

6 DETAIL  
C-102 CATHODIC PROTECTION NTS

- NOTES:
1. PRECAST RINGS, CONES AND BARRELS TO MEET CURRENT ASTM C478M STANDARDS.
  2. FOR MANHOLES OVER 4.8 m DEPTH, THE CAST-IN-PLACE BASE SHALL BE REINFORCED WITH 15M REBAR @ 300 c/c EACH WAY. SPECIAL BASE DESIGN REQUIRED FOR DEPTHS OVER 9.0 m.
  3. CHANNELING AND BENCHING TO BE FINISHED TO TROWEL SMOOTHNESS. CONTINUE MAIN PIPE WHERE POSSIBLE.
  4. CONICAL TOP TO BE USED WHERE DISTANCE FROM BENCH TO MH COVER EXCEEDS 2 m.
  5. VERTICAL SIDE OF CONICAL MH ON UPSTREAM SIDE.
  6. INSTALL SAFETY PLATFORMS FOR ALL MH OVER 6.0 m DEEP. LOCATED 2 m ABOVE PIPE.
  7. MANHOLE FRAME AND COVER TO BE AS PER STANDARD DETAIL DRAWINGS STM-12 TO STM-19.
  8. BENCHING CONCRETE SHALL BE A MINIMUM OF 30MPa COMPRESSIVE STRENGTH AT 28 DAYS, TYPE HS CEMENT.
  9. SAFETY STEPS TO BE SPACED AT 300 c/c MAX DISTANCE. FIRST STEP TO BE 500 MAX BELOW FRAME AND COVER. LAST STEP TO BE 300 MAX ABOVE BENCHING.
  10. COMPACT BACKFILL AROUND MANHOLES TO A MAXIMUM OF 97% STANDARD PROCTOR DENSITY.
  11. ALL DIMENSIONS SHOWN IN MILLIMETRES UNLESS NOTED OTHERWISE.



7 DETAIL  
C-102 THRUST BLOCK DETAIL NTS



8 DETAIL  
C-102 VERTICAL WATER LINE NTS

0	2018APR01	ISSUED FOR TENDER	B.P.	J.C.
No.	Date/Date	Description/Description	Drawn by/Dessiné par	Approved/Approuvé

Revision / Révision

A	detail number numéro de détail	A
B	source drawing no. no. de dessin	B/C
C	detail on drawing no. détail sur dessin no.	

Consultant's Name  
Nom de l'expert-consultant

Associated Engineering

Eng. Stamp  
Sceau de l'ingénieur

Client/Client	Parks Canada Agency	L'Agence Parcs Canada
Western and Northern Region		Ouest et Nord du Canada

Project title/Titre du projet

LAKE LOUISE 2018  
WATER SYSTEM UPGRADES  
RESERVOIR CONTRACT  
BANFF NATIONAL PARK

Drawing title/Titre du dessin

CIVIL DETAILS

Surveyed by/Arpenté par	Drawn by/Dessiné par	Date/Date
J. CHEN	B. PRATT	2018JAN12
Designed by/Conçu par	Reviewed by/Révisé par	Scale/Echelle
	C. ARKELL	AS SHOWN

PWSC Project Manager/Administrateur de Projet TPSC	J. GIBBONS
Client Acceptance/Acceptation du client	Approved by/Approuvé par

Project No./No. du projet	Asset No./No. du bien	Sheet No./No. de la feuille
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Drawing Reference No./No. de référence du dessin		
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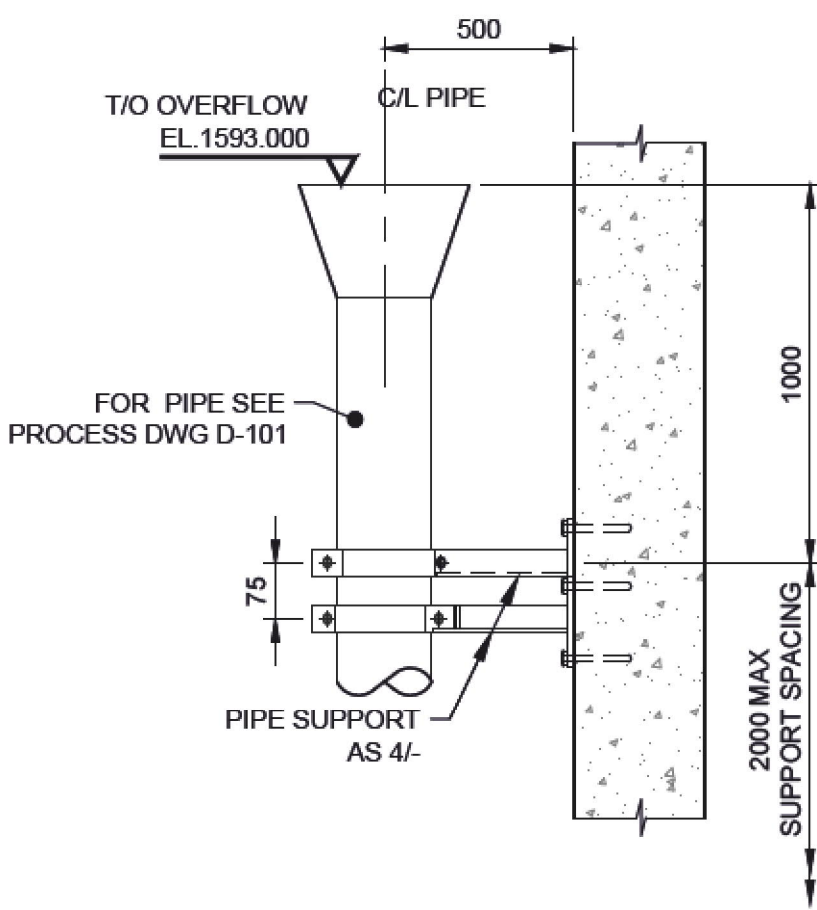
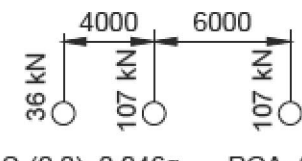


GENERAL NOTES

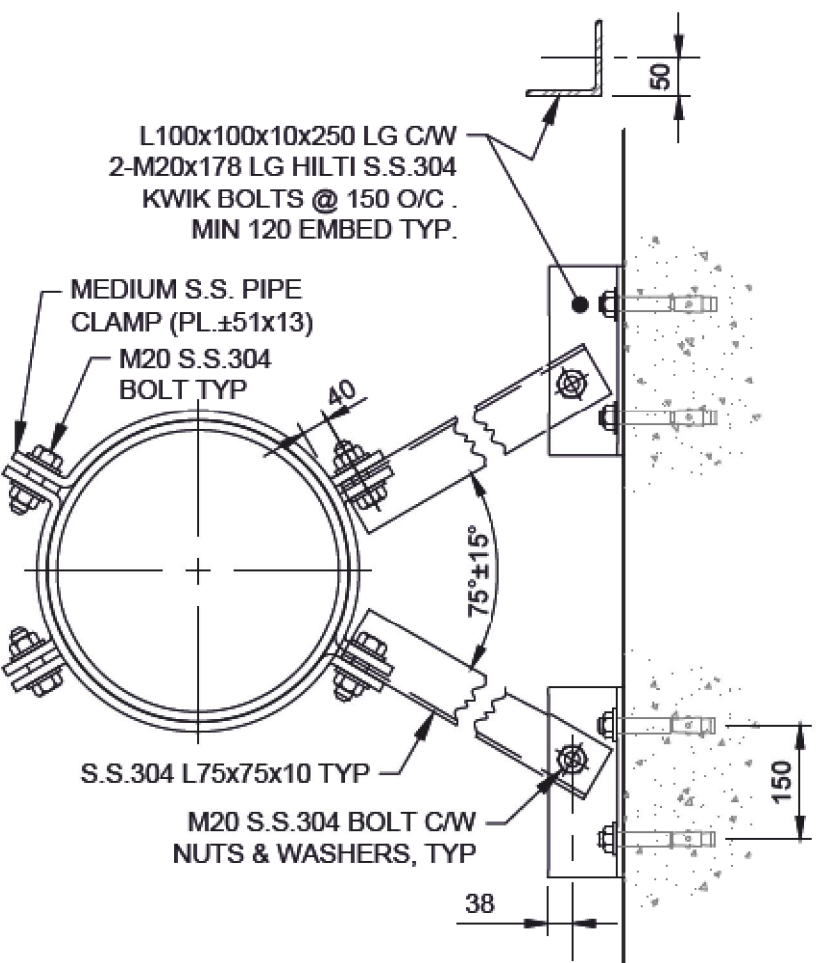
1. ALL WORKMANSHIP, COMPONENT DESIGN & MATERIAL SHALL BE TO THE NATIONAL BUILDING CODE OF CANADA 2015.
2. CHECK ALL DIMENSIONS, ELEVATIONS & DETAILS PRIOR TO CONSTRUCTION OR FABRICATION. REPORT ANY DISCREPANCIES OR DESIRED MODIFICATIONS TO THE ENGINEER. SETTING OUT COORDINATES ARE IN NAD83 UTM ZONE 11 COORDINATES & ARE GIVEN AT THE CENTER OF THE RESERVOIR & AT THE OUTSIDE FACE OF PERIMETER WALL BETWEEN GRIDS 2 & 3 AS SHOWN ON 1/-.
3. BASE SLAB FOUNDATION SHALL BE FOUNDED ON UNDISTURBED NATIVE CLAY TILL AS NOTED IN THE GEOTECHNICAL REPORT BY THURBER ENGINEERING LTD FILE 20495 DATED 20 FEBRUARY 2016. UNDER NO CIRCUMSTANCES IS THE SOIL UNDER THE STRUCTURE TO BE ALLOWED TO FREEZE, DRY OUT OR BECOME SATURATED PRIOR, DURING OR SUBSEQUENT TO CONSTRUCTION. GEOTECHNICAL ENGINEER TO APPROVE SUBGRADE PREPARATION.
4. REINFORCING STEEL: BILLET STEEL, GRADE 400W, DEFORMED BARS TO CAN/CSA G30.18. HOOK BARS AT OPPOSITE FACE AT DISCONTINUOUS ENDS. PROVIDE CLASS 'B' LAP SPLICES THROUGHOUT EXCEPT WHERE OTHER DIMENSIONS ARE SHOWN. TIE & SECURE IN PLACE PRIOR TO PLACING CONCRETE. WHERE REINFORCING IS SHOWN IN ONE DIRECTION ONLY, PROVIDE 15M @ 250 O/C EACH FACE & PERPENDICULAR TO THAT SHOWN.

CLASS B SPLICE LENGTH TABLE		
BAR	TOP BARS*	OTHERS
10M	600	450
15M	900	700
20M	1200	900
25M	1800	1400

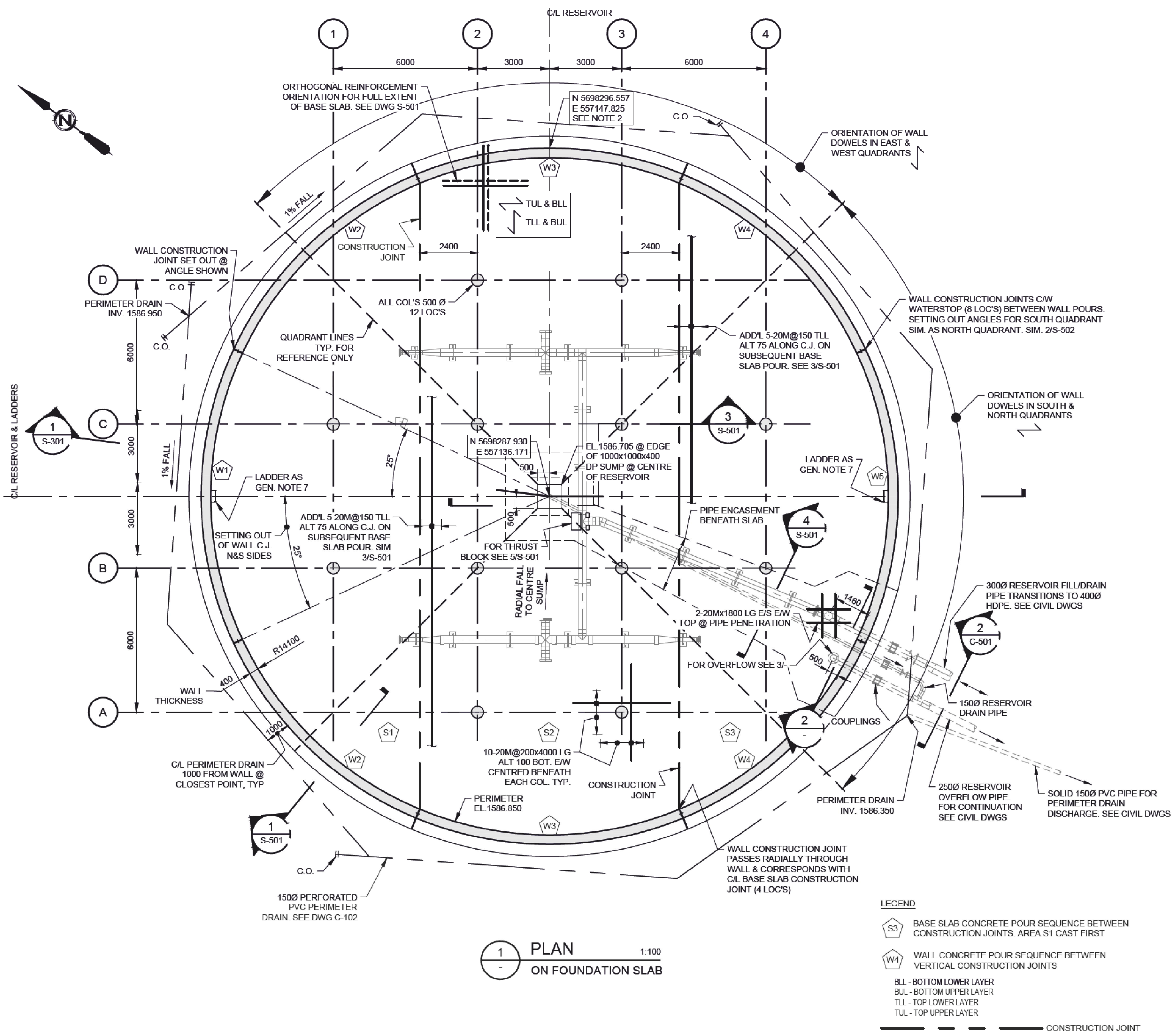
- \* A TOP BAR IS DEFINED AS A BAR HAVING A MINIMUM OF 300mm OF CONCRETE BENEATH IT. CONCRETE COVER TO REINF. STEEL: 50mm UNLESS SPECIFICALLY NOTED.
- ENSURE ALL REINFORCING STEEL IS 50mm CLEAR OF ANY EMBEDDED ELECTRICAL CONDUIT
- CONCRETE: THE CONCRETE HAS BEEN DESIGNED CSA A23.3-14, DESIGN OF CONCRETE STRUCTURES.
- 4.1. THE CONCRETE SHALL BE CONSTRUCTED & TESTED ACCORDING TO CSA A23.1/A23.2, CONCRETE MATERIALS & METHODS OF CONCRETE CONSTRUCTION. METHOD OF TEST & STANDARD PRACTICES FOR CONCRETE - SEE SPECIFICATIONS FROM VARIOUS CONCRETE TYPES & REQUIREMENTS.
- MAXIMUM SLUMP: 80mm
- 4.2. CONSOLIDATE ALL CONCRETE USING INTERNAL VIBRATORS
- 4.3. ALL CONCRETE EXPOSURE CLASS F-1 TO CSA A23.1. MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS: 35 MPa.
5. SANDBLAST CLEAN & ROUGHEN ALL CONSTRUCTION JOINTS TO A FULL 5mm AMPLITUDE.
6. PROVIDE 20mm CHAMFER AT ALL EXPOSED CONCRETE EDGES UNLESS NOTED OTHERWISE.
7. LADDERS: ALL LADDERS TO BE AISI S.S. 304 & CONFORM TO OH&S PIP STANDARD STF05501 FIXED LADDERS & CAGES FABRICATION DETAILS TECHNICAL CORRECTION JANUARY 2017. SEE 1/- & 1/S-301.
8. DESIGN CRITERIA:
- 8.1. RESERVOIR ROOF SLAB LIVE LOAD = 10 kPa SOIL C/W 4.8 kPa UNIFORM LIVE LOAD OR SERVICE TRUCK AXLE LOADS
- 8.2. SNOW LOAD  $S_s = 5.5 \text{ kPa}$   $S_u = 0.1 \text{ kPa}$
- 8.3. SEISMIC (POST DISASTER STRUCTURE):  $S_d(0.2)=0.279g$   $S_d(0.5)=0.185g$   $S_d(1.0)=0.099g$   $S_d(2.0)=0.046g$   $PGA=0.128g$   $I_e=1.5$
- 8.4. FOUNDATION DESIGN BEARING PRESSURE = 250 kPa (FACTORED)



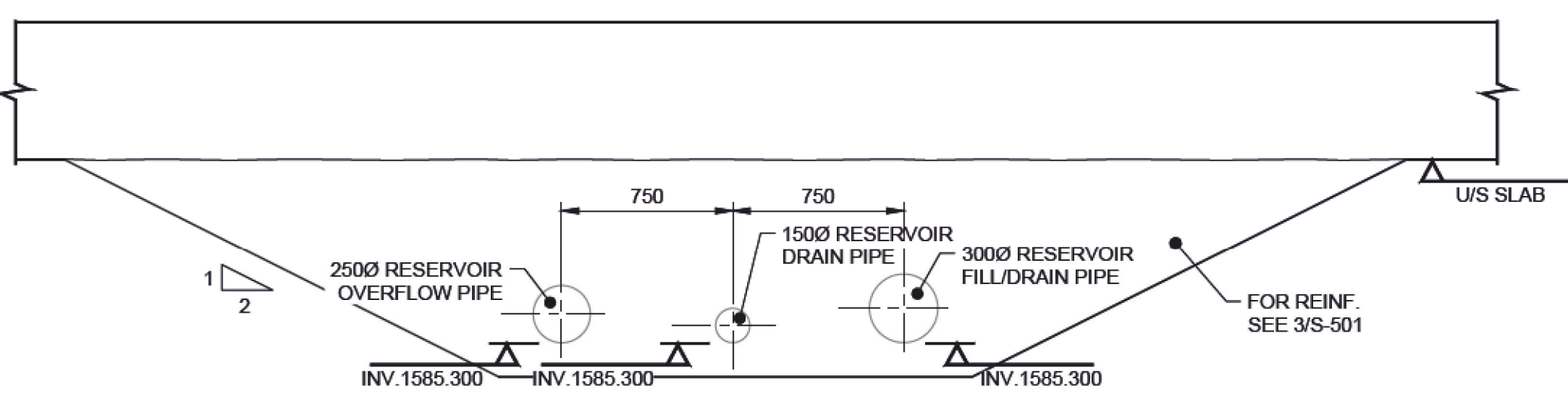
DETAIL 1:20  
SHOWING OVERFLOW  
PIPE & SUPPORT FOR  
LOCATION SEE 1/-



DETAIL 1:10  
SHOWING OVERFLOW  
PIPE SUPPORT AS 3/-



- LEGEND
- S3 BASE SLAB CONCRETE POUR SEQUENCE BETWEEN CONSTRUCTION JOINTS. AREA S1 CAST FIRST
- W4 WALL CONCRETE POUR SEQUENCE BETWEEN VERTICAL CONSTRUCTION JOINTS
- BLL - BOTTOM LOWER LAYER  
BUL - BOTTOM UPPER LAYER  
TLL - TOP LOWER LAYER  
TUL - TOP UPPER LAYER
- CONSTRUCTION JOINT



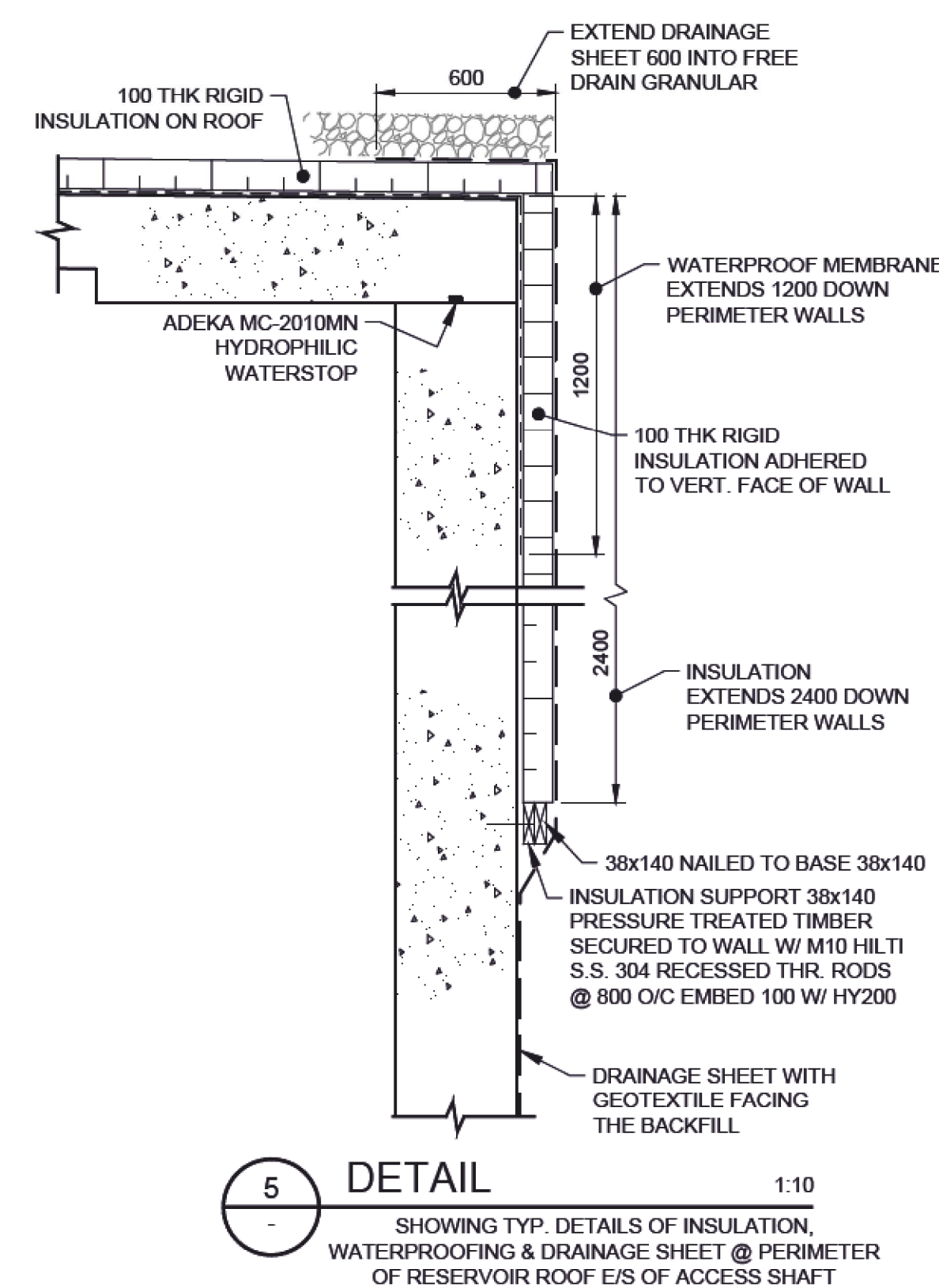
SECTION 1:25  
SHOWING PIPE ENCASEMENT @  
RESERVOIR WALL. SEE 1/- & 2/S-301

2018MAR23				ISSUED FOR TENDER	M.C.	R.P.
No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé		
Revision / Revision						
A detail number numéro de détail				A		
B source drawing no. de dessin no.				B/C		
C detail on drawing no. détail sur dessin no.						
Consultant's Name Nom de l'expert-conseil				Emp. Number Numéro de l'ingénieur		
APEGA Permit to Practice P 3979				2018-Mar-19		
Client/client						
		Parks Canada Agence		L'Agence Parcs Canada		
Western and Northern Region		Ouest et Nord du Canada				
Project title/Titre du projet						
LAKE LOUISE 2018 WATER SYSTEM UPGRADES RESERVOIR CONTRACT BANFF NATIONAL PARK						
Drawing title/Titre du dessin						
RESERVOIR FOUNDATION PLAN AND						
Surveyed by/Arpenté par		Drawn by/Dessiné par		Date/Date		
M. COOPER		M. COOPER		2018FEB13		
Designed by/Conçue par		Reviewed by/Revisé par		Scale/Echelle		
R. PROTIC		J. LUSSELL		AS SHOWN		
PWSC Project Manager/Administrateur de Projets TPSCC						
J. GIBBONS						
Client Acceptance/Acceptation du client				Approved by/Approuvé par		
Park Responsible Officer/Agent Responsable				PWSC Project Manager/Administrateur de Projets TPSCC		
Project No./No. du projet		Asset No./No. d'actif		Sheet No./ No. de la feuille		
20173084-00				7		
Drawing Reference No./No. de référence du dessin						
3084-01-S-101				21		





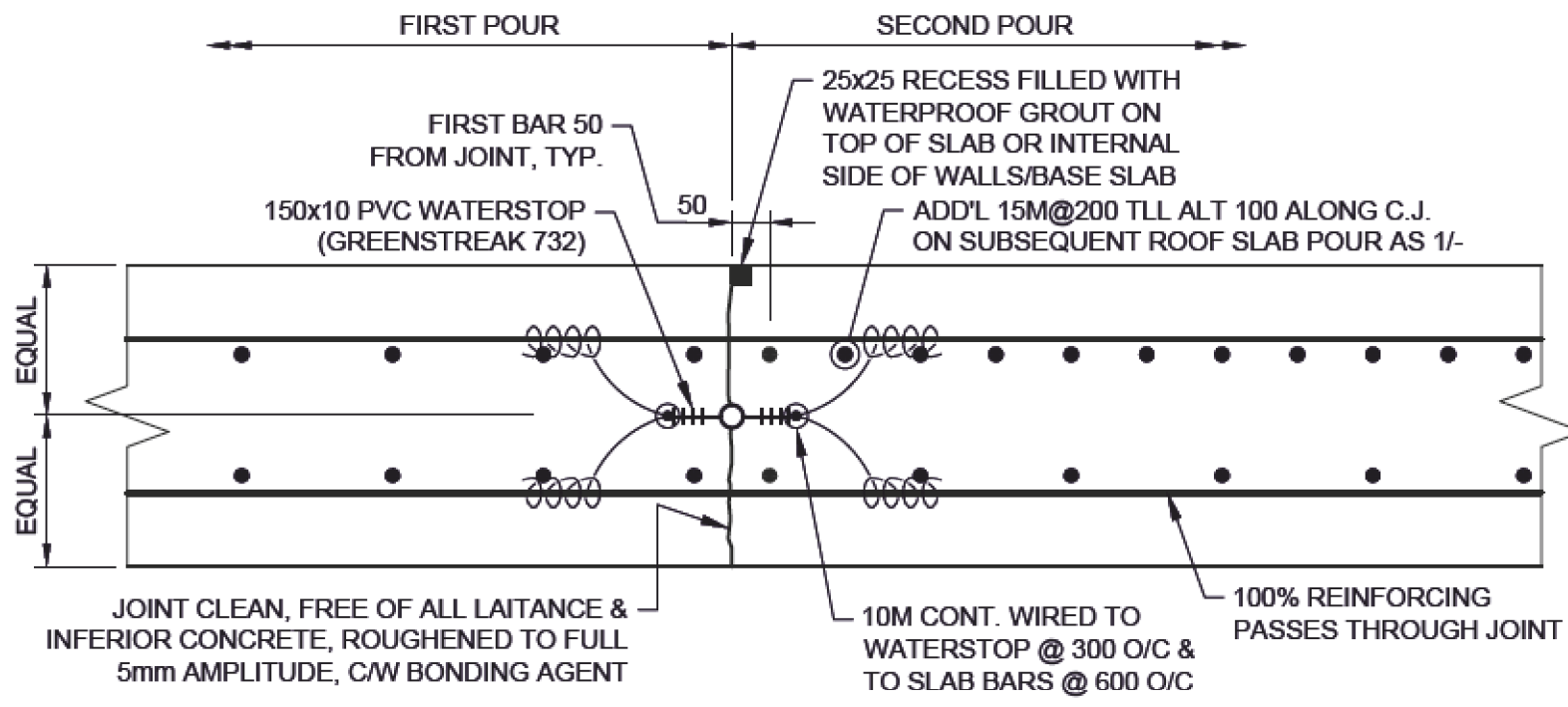
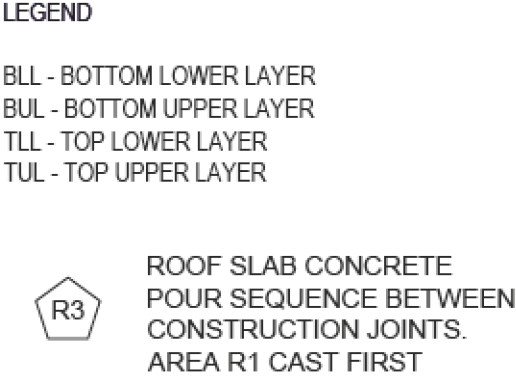
















2 DETAIL NTS  
S-301 TYP. ROOF CONSTRUCTION JOINT  
SIM. FOR BASE SLAB & WALLS

1 PLAN 1:50  
PARTIAL PLAN ON ROOF REINF

0	2018MAR23	ISSUED FOR TENDER	M.C.	R.P.
No.	Date/Date	Description/Description	Drawn by Designing por	Approved Approve

Revision / Revision		
	<p>A detail number numero de detail</p> <p>B source drawing no. de dessin no.</p> <p>C detail on drawing no. detail sur dessin no.</p>	

Consultant's Name Nom de l'expert-conseil	Eng. Stamp Sceau de l'ingénieur
 <b>Associated Engineering</b>	
<b>APEGA Permit to Practice P 3979</b>	
2019-Mar-19	

Client/client	Parks Canada Agency	L'Agence Parcs Canada
	Western and Northern Region	Ouest et Nord du Canada

Project title/Titre du projet

LAKE LOUISE 2018  
WATER SYSTEM UPGRADES  
RESERVOIR CONTRACT  
BANFF NATIONAL PARK

Drawing title/Titre du dessin

ROOF REINFORCING  
PARTIAL PLAN AND DETAILS

Surveyed by/Arpenté par M. COOPER	Drawn by/Dessiné par M. COOPER	Date/Date 2018FEB13
Designed by/Concept par R. PROTIC	Reviewed by/Revisé par J. LISELLA	Scale/Échelle AS SHOWN

PWGSC Project Manager/Administrateur de Projets TPSGC	
Client Acceptance/Acceptation du client	Approved by/Approuvé par

_____ Park Responsible Officer/Agent Responsable	_____ PWSC Project Manager/Administrateur de Projets TPSC
---	--

Project No./No. du projet 20173084-00	Asset No./No. du-bien	Sheet No./ No. de la feuille
Drawing Reference No./No. de référence du dessin 3084-01-S-502		11 21



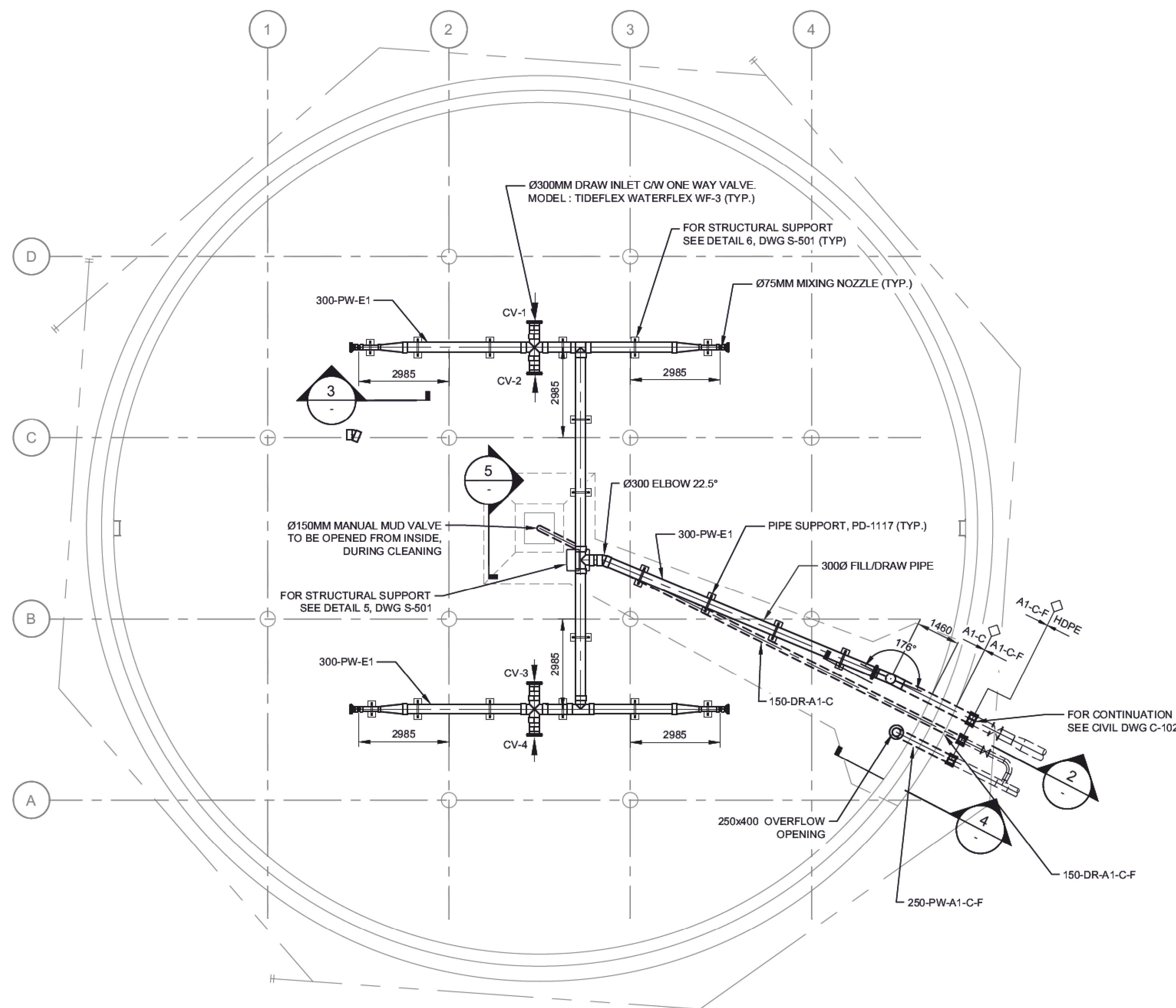
300 - PW - A1 - A - D

EXTERNAL PIPE COATING  
INTERNAL PIPE LINING  
PIPE MATERIAL CODE  
COMMODITY  
LINE SIZE (IN MILLIMETRES)

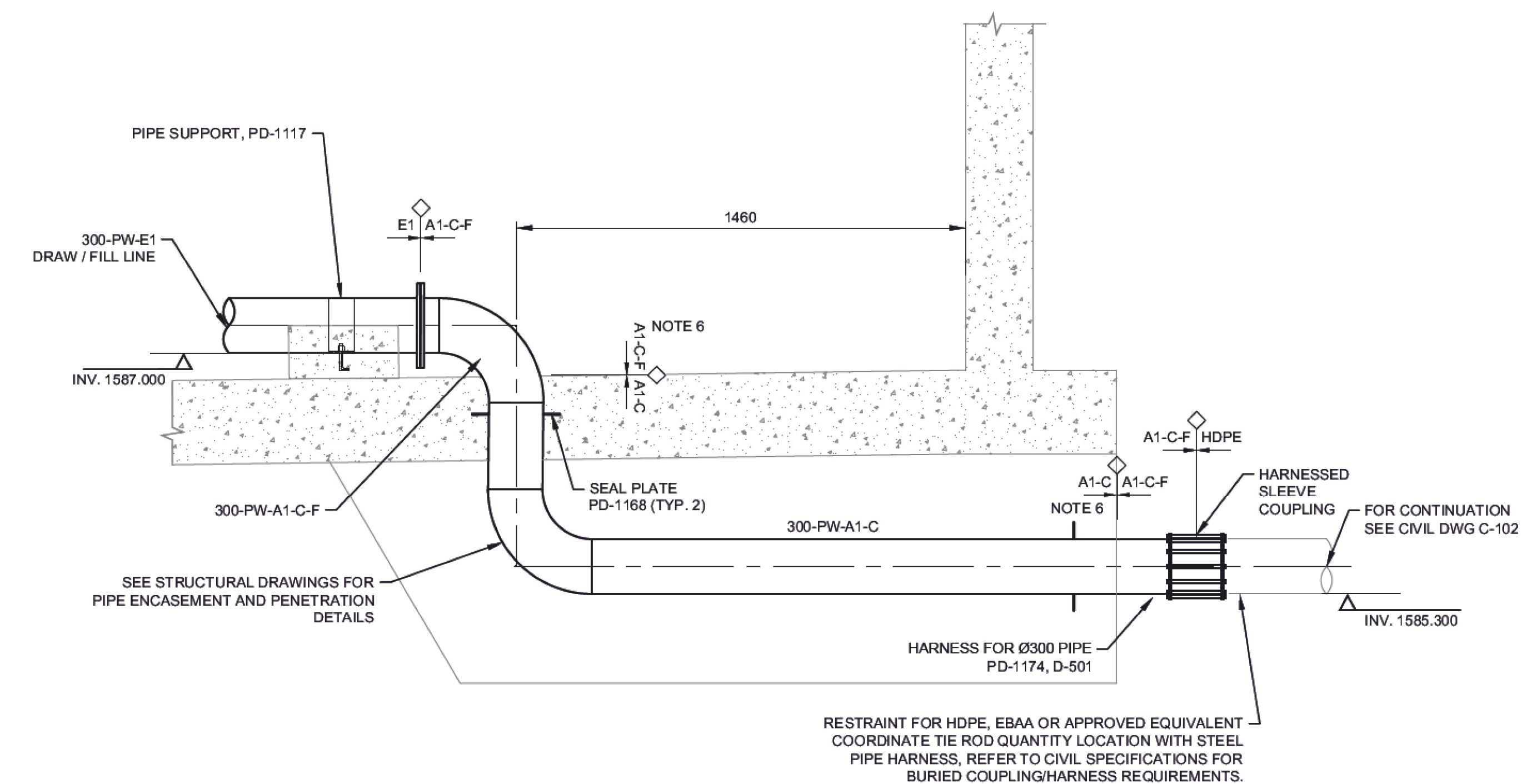
CODE LETTERS USED  
DEPENDS ON  
COATING REQUIRED

<u>CODE</u>	<u>MATERIAL AND FLANGE RATING</u>
A1	STEEL PIPE 900mm Dia AND SMALLER 150 POUND FLANGE RATING
E1	PVC PIPE (PRESSURE PIPE)

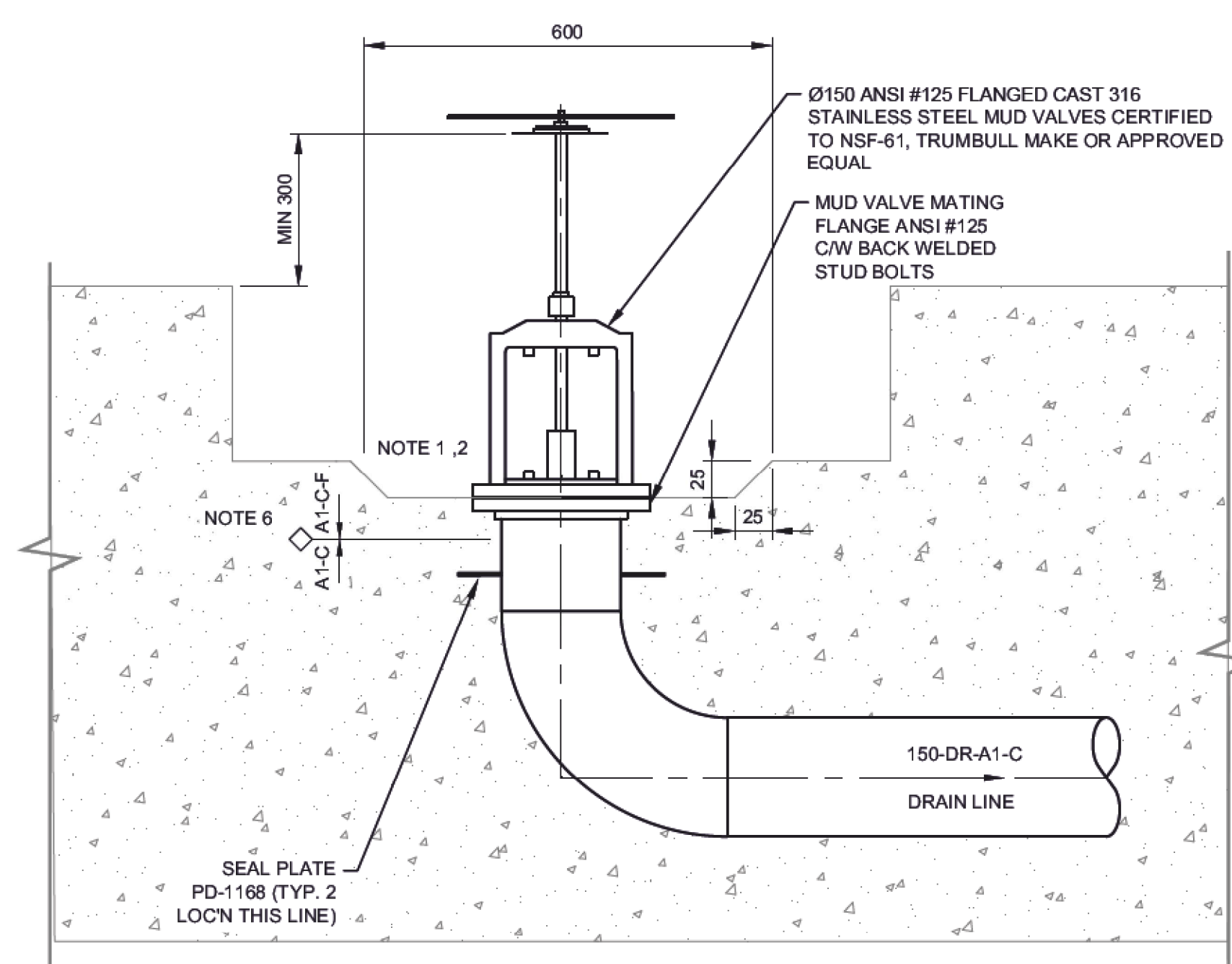
- NOTES:
- 1. TEMPORARY SPACER FLANGE PROUD OF CONCRETE LEVEL TO PROTECT STUD THREADS AND MAKE AREA FOR MUD VALVE FLANGES AND YOKES.
  - 2. MUD VALVE IS 355mm AT WIDEST PART, CONTRACTOR TO FORM OUT MINIMUM 600mm DIAMETER.
  - 3. COORDINATE PIPING INSTALLATION WITH STRUCTURAL SLAB REINFORCEMENT INSTALLATION.
  - 4. NO FLANGED OR GROOVED COUPLING PERMISSIBLE IN CONCRETE ENCASEMENT.
  - 5. FIELD WELDING AND COATING MUST BE APPROVED BY THE DEPARTMENTAL REPRESENTATIVE PRIOR TO PIPE SHOP FABRICATION.
  - 6. NO POXY ENCASED PIPING HAS BARE STEEL EXTERIOR, NO EPOXY COATING.
  - 7. TERMINATE EPOXY COATING 50mm Inside CONCRETE.
  - 8. FOR STANDARD DETAIL, EXAMPLE PD-XXXX, REFER TO DWG D-501.



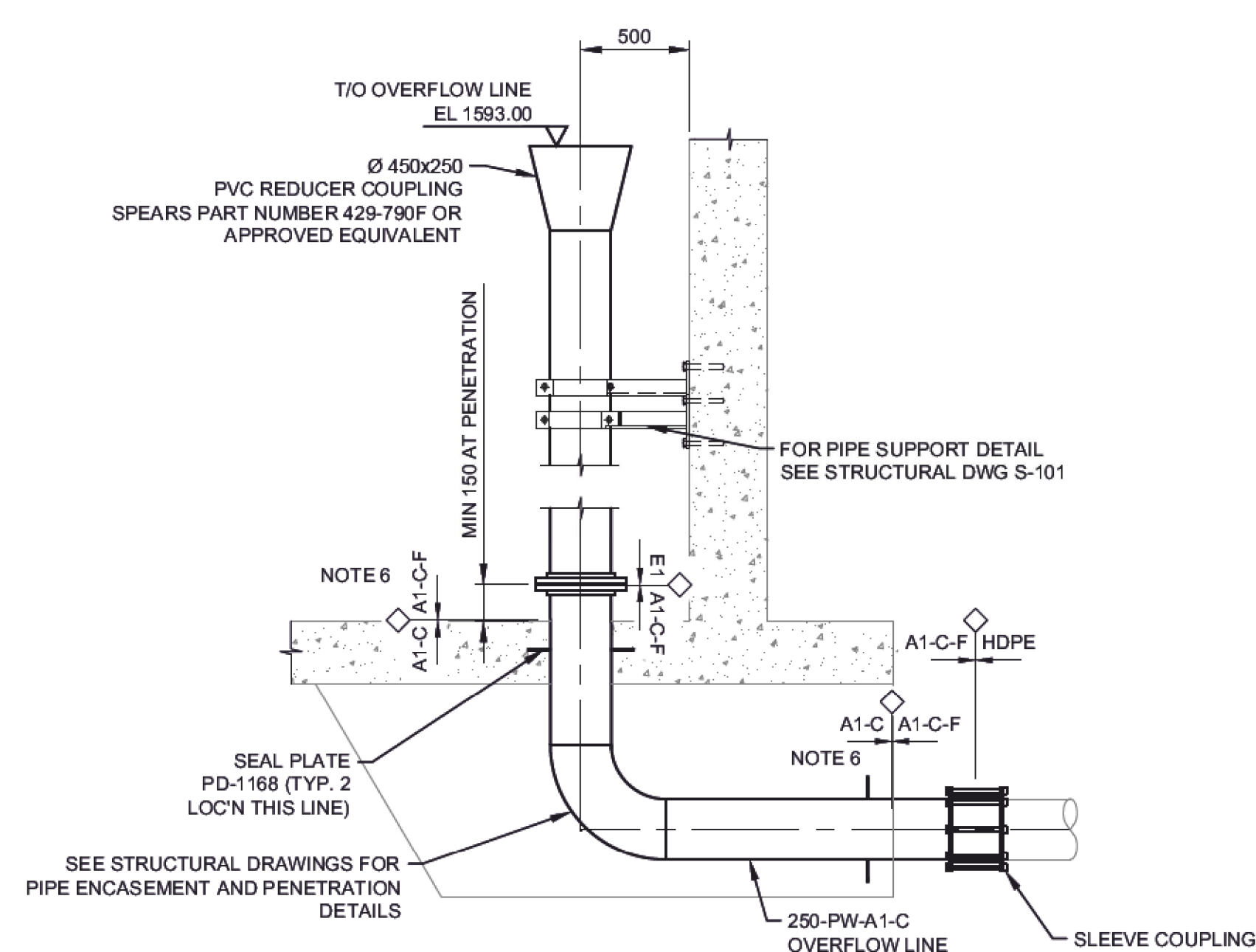
1 PLAN 1:100



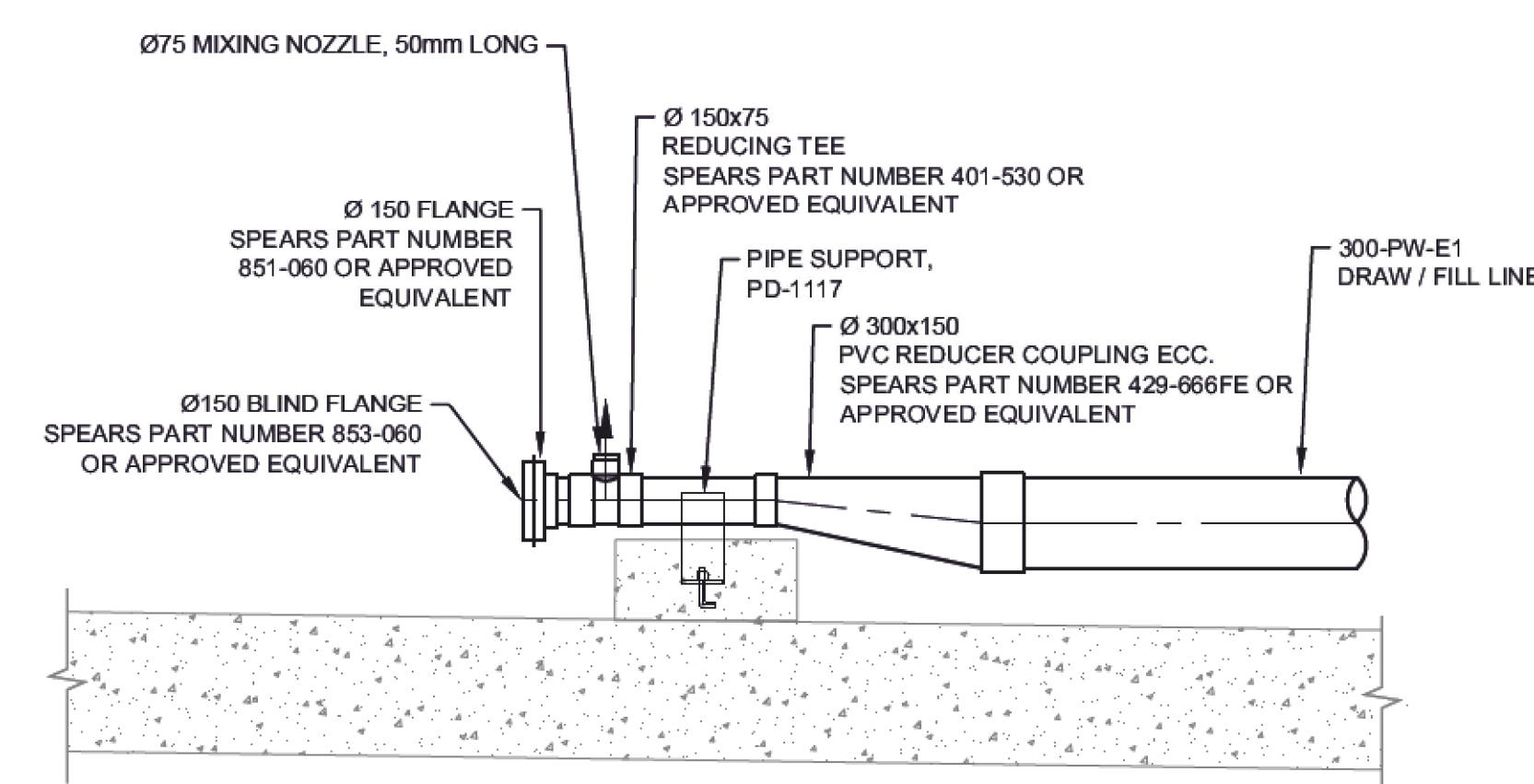
2 DETAIL NTS  
PIPE PENETRATION



5 DETAIL NTS



4 DETAIL NTS



3 DETAIL 1:25

0	2018APR08	ISSUED FOR TENDER	SHF	JW	
No.	Date/Date	Description/Description	Drawn by Design	Approved Approved	

Revision / Revision	
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<p>Consulter's Name Nom de l'expert-consult</p>	<p>Eng. Stamp Sceau de l'ingénieur</p>
 <p><b>Associated Engineering</b></p>	
<p><b>APEGA Permit to Practice P 3979</b></p>	
<p>2018-Apr-09</p>	


**Cliant / client**  
**Parks Canada**  
**Agency**  
**Western and**  
**Northern Region**

Project title/thru du projet

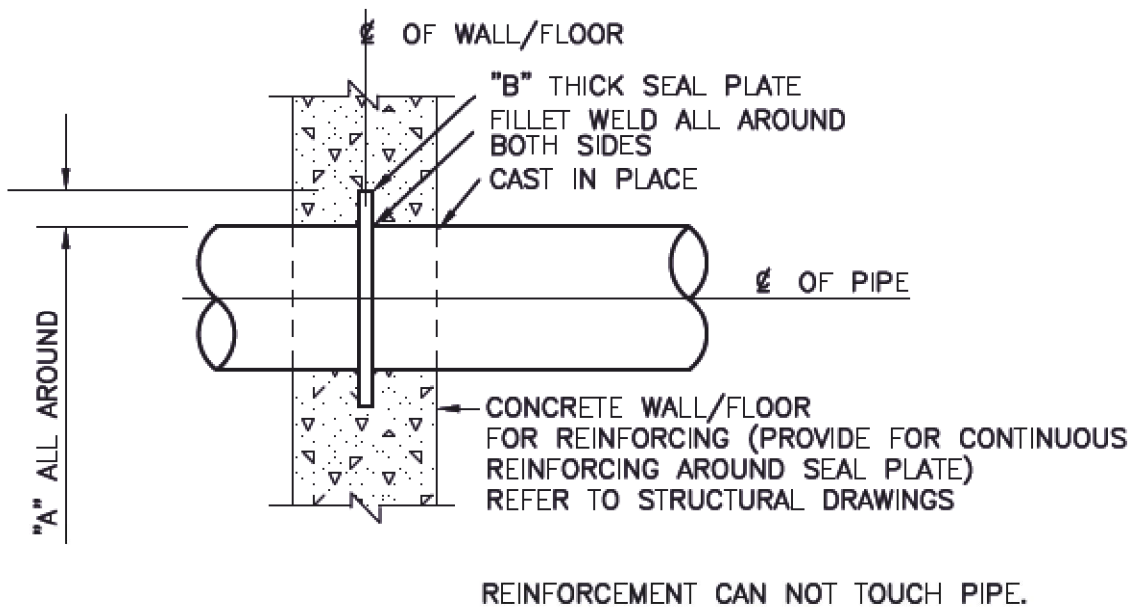
LAKE LOUISE 2018  
WATER SYSTEM UPGRADES  
RESERVOIR CONTRACT  
BANFF NATIONAL PARK

Drawing title/Title du dessin

RESERVOIR  
MIXING PIPING

Surveyed by/Avisé(e) par	Drawn up/Établi(e) par	Date/Date
	SHAFARI	2018FEB23
Designed by/Conçu(e) par	Reviewed by/Vérifié(e) par	Sec'y/Étali(e)
J.WHITE	J.HUBER	AS SHOWN
PRISC Project Manager/Administrateur de Projets TPR02 J. GIBSON		
C'ty: Acceptance/Acceptation du client	Approved by/Approuvé(e) par	
Part. Resources Other/Opport. Resources		PRISC Project Manager/Administrateur de Projets TPR02
Project No./No. du projet	Asset No./No. du bien	Sheet No./No. de la feuille
20170300-00		12
Drawing Reference/No. de référence du dessin		21
3084-01-D-101		

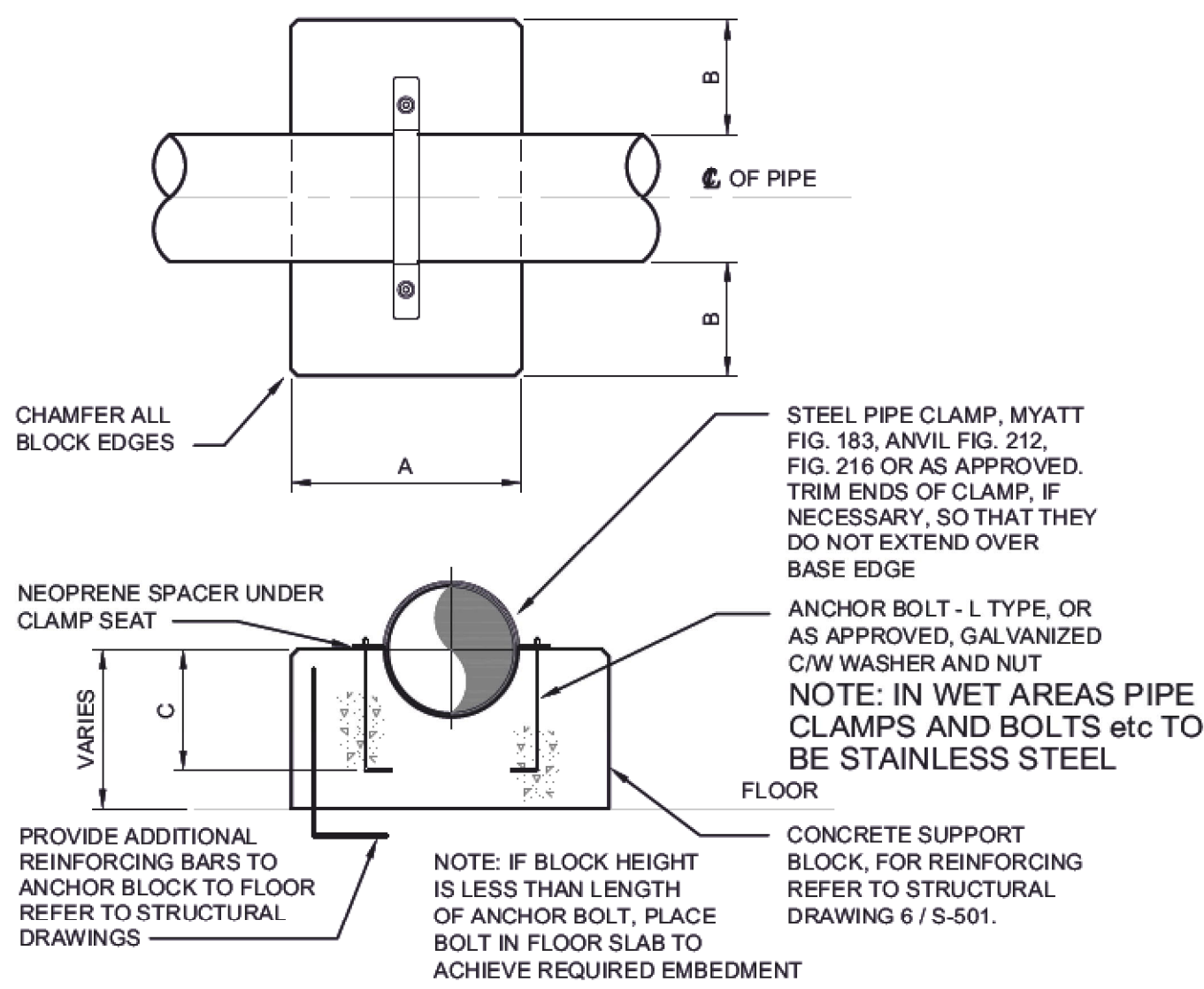




PIPE SIZE	40 TO 100	125 TO 200	250 TO 400	450 TO 600	750 & LARGER
A	75	75	75	100	100
B	6	6	6	6	6

FOR PIPES 50mm DIA. & LARGER

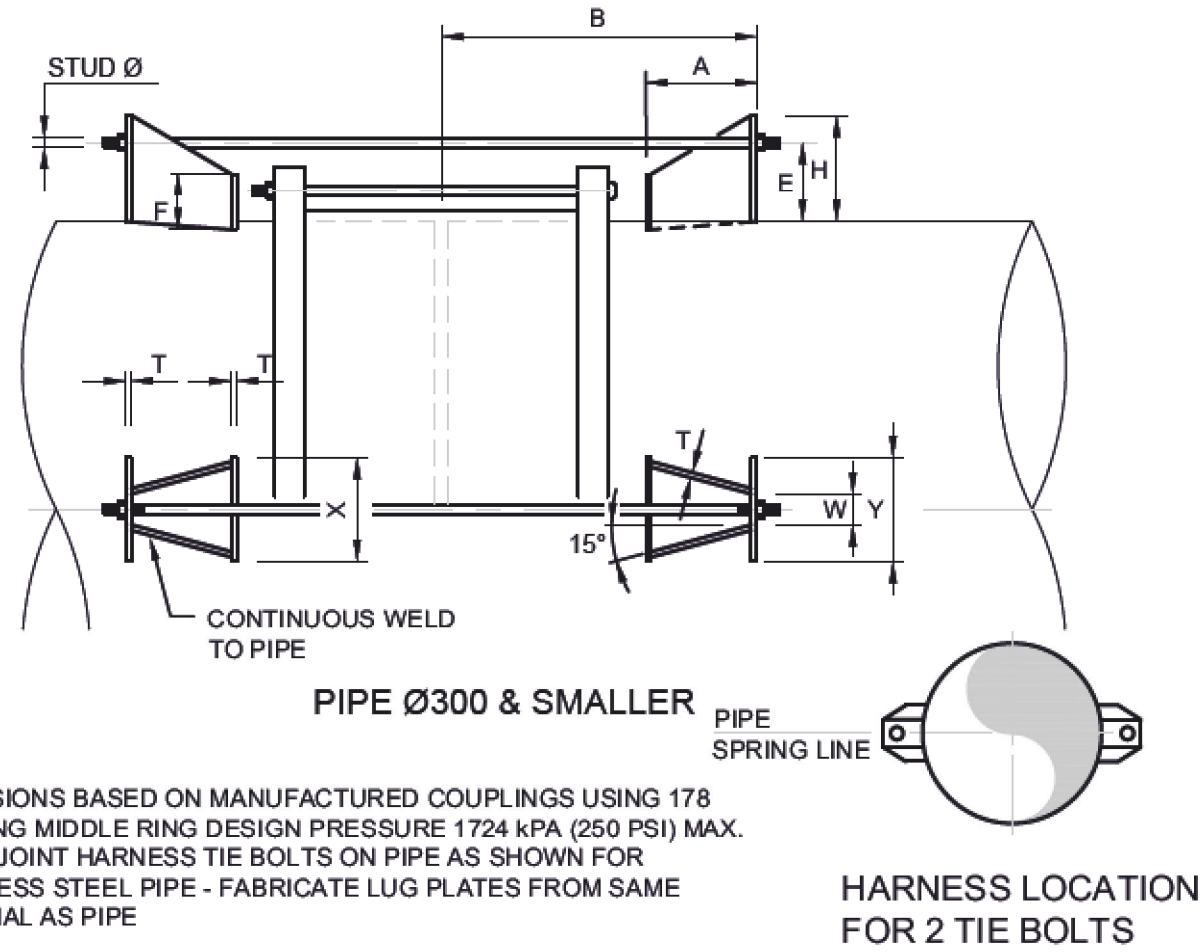
1168 DETAIL NTS  
D-101 SEAL PLATE (PD-1168)



NOTE  
ANCHOR BOLTS MAY BE REPLACED WITH HILTI HSL OR HIT HY 200 OR AS APPROVED

PIPE SIZE	50 & 65	80 & 100	125 & 150	200 & 250	300 TO 400	450 TO 600	750 & 900	1050 & LARGER
A	100	100	150	200	250	300	400	CUSTOM DESIGN FOR EACH APPLICATION
B	50	75	100	150	200	200	300	
BOLT Ø x C	M8 x 90 (MIN)	M12 x 110 (MIN)	M16 x 130 (MIN)	M19 x 170 (MIN)	M22 x 210 (MIN)	M25 x 210 (MIN)	M38 x 305 (MIN)	

1117 DETAIL NTS  
D-101 CONCRETE SUPPORT BLOCK WITH STRAP HORIZONTAL PIPE (PD-1117)




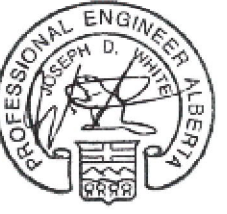

DIMENSIONS BASED ON MANUFACTURED COUPLINGS USING 178 mm LONG MIDDLE RING DESIGN PRESSURE 1724 kPa (250 PSI) MAX. PLACE JOINT HARNESS TIE BOLTS ON PIPE AS SHOWN FOR STAINLESS STEEL PIPE - FABRICATE LUG PLATES FROM SAME MATERIAL AS PIPE

FOR CARBON STEEL PIPE - FABRICATE LUG PLATES FROM CARBON STEEL PIPE ASTM A283, GRADE B, OR ASTM A285, GRADE C OR EQUAL STUD DIAMETER DETERMINED ASSUMING 52000 PSI ALLOWABLE STRESS BOLTS AND NUTS TO BE STAINLESS STEEL

NOTE:  
HARNESS CHART INFORMATION BASED ON MAX. PRESSURE AND LARGEST BOLT SIZE FOR THAT PARTICULAR PIPE SIZE. FOR OTHER BOLT SIZES REFER TO AWWA M-11 TABLES 13-4, 13-5, 13-5A AND HARNESS LUG DETAIL FIGURE 13-20

NOMINAL PIPE SIZE MILLIMETRES	CPLG OD (MAX)	MAX STUD DIA	MAX HOLE DIA	LUG DIMENSIONS (MILLIMETRES)									TIE BOLT
				A	W	T	H	E	F	Y	X	B	
150	266	16	19	127	35	10	98	76	51	127	127	300	2
200	316	16	19	127	35	10	98	76	51	127	127	305	2
250	386	19	22	127	38	10	108	79	51	127	127	310	2
300	428	22	25	140	41	13	108	79	51	127	127	310	2

1174 DETAIL NTS  
D-101 PIPE HARNESS - AWWA TYPE P HARNESS LUG (PD-1174)

0	2018APR02	ISSUED FOR TENDER	SHF	JW				
No.	Date/Date	Description	Drawn by Dessiné par	Approved Approuvé				
Revision / Révision								
A					A			
C					B/C			
Consultant's Name Nom de l'expert-consultant			Eng. Status Statut de l'ingénieur					
 Associated Engineering APEGA Permit to Practice P 3979			 2018-Apr-02					
Client/Client  Parks Canada Agency Western and Northern Region								
L'Agence Parcs Canada Ouest et Nord du Canada								
Project title/Titre du projet  LAKE LOUISE 2018 WATER SYSTEM UPGRADES RESERVOIR CONTRACT BANFF NATIONAL PARK								
Drawing title/Titre du dessin  PROCESS STANDARD DETAIL								
Surveyed by/Arpenté par	Drawn by/Dessiné par	Date/Date						
	SHFARAJI	2018FEB23						
Designed by/Conçu par	Reviewed by/Revisé par	Scale/Echelle						
J.WHITE	J.HUBER	AS SHOWN						
PWDC Project Manager/Administrateur de Projets TPDC J. GIBBONS								
Client Acceptance/Acceptation du client			Approved by/Approuvé par					
Perk Resonance Officer/Agent Ressources			PWDC Project Manager/Administrateur de Projets PWDC					
Project No./No. du projet	Asset No./No. du bien	Sheet No./No. de la feuille						
20173004-00		13						
Drawing Reference No./No. de référence du dessin								
3084-01-D-501								



## LAYOUT SYMBOLS



1. ALL EQUIPMENT TO BE CSA APPROVED. ALL EQUIPMENT INSTALLED TO CSA C22.2. CANADIAN ELECTRICAL CODE AND TO MANUFACTURERS RECOMMENDATIONS. WHERE WIRING SIZE OR CONDUIT SIZE IS NOT SHOWN, SIZE IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE.
2. ALL ELECTRICAL WORK TO BE CARRIED OUT BY QUALIFIED, LICENSED ELECTRICIANS OR APPRENTICES AS PER THE CONDITIONS OF THE PROVINCIAL ACT RESPECTING MANPOWER VOCATIONAL TRAINING AND QUALIFICATION. EMPLOYEES REGISTERED IN A PROVINCIAL APPRENTICES PROGRAM SHALL BE PERMITTED, UNDER THE DIRECT SUPERVISION OF A QUALIFIED LICENSED ELECTRICIAN, TO PERFORM SPECIFIC TASKS - THE ACTIVITIES PERMITTED SHALL BE DETERMINED BASED ON THE LEVEL OF TRAINING ATTAINED AND THE DEMONSTRATION OF ABILITY TO PERFORM SPECIFIC DUTIES.
3. THE WORK OF THIS DIVISION TO BE CARRIED OUT BY A CERTIFIED MASTER ELECTRICIAN WHO HOLDS A VALID MASTER ELECTRICAL CONTRACTOR LICENSE AS ISSUED BY THE PROVINCE THAT THE WORK IS BEING CONSTRUCTED.
4. IF THIS SPECIFICATION OR THE REFERENCED DRAWINGS CONFLICT IN ANY WAY WITH THE REQUIREMENTS OF THE APPLICABLE CODES AND/OR STANDARDS, THE MORE RIGOROUS REQUIREMENT SHALL PREVAIL. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLIANCE WITH APPLICABLE CODES AND/OR STANDARDS.
5. THE CONTRACTOR SHALL PROVIDE ALL MATERIAL, LABOUR, EQUIPMENT AND TRANSPORTATION AS NECESSARY TO COMPLETE THE PROJECT IN CONFORMITY WITH THE CONTRACT DOCUMENTS. IN GENERAL, THIS WORK INCLUDES EVERYTHING ESSENTIAL FOR A COMPLETE ELECTRICAL SYSTEM IN OPERATING ORDER AS SHOWN OR IMPLIED ON THE DRAWINGS OR HEREINAFTER SPECIFIED.
6. SUBMIT TO ELECTRICAL INSPECTION DEPARTMENT AND UTILITY, THE NECESSARY NUMBER OF DRAWINGS AND SPECIFICATIONS FOR EXAMINATION AND APPROVAL PRIOR TO COMMENCEMENT OF WORK. FURNISH CERTIFICATES OF ACCEPTANCE FROM ELECTRICAL INSPECTION DEPARTMENT AND OTHER AUTHORITIES HAVING JURISDICTION ON COMPLETION OF WORK TO ENGINEER. CONTRACTOR IS RESPONSIBLE FOR APPLICATION AND PAYMENT OF ELECTRICAL PERMIT INCLUDING COORDINATION OF SAFETY INSPECTIONS THROUGH SUPERIOR SAFETY CODES INC. OR SIMILAR OUTFIT.
7. CONTRACTOR SHALL FURNISH ALL SCAFFOLDING, RIGGING, HOISTING AND SERVICES NECESSARY FOR DELIVERY, ERECTION AND INSTALLATION OF ALL EQUIPMENT AND APPARATUS REQUIRED TO BE INSTALLED BY THE CONTRACTOR. ALL EQUIPMENT SHALL BE REMOVED BY THE CONTRACTOR UPON COMPLETION OF THE PROJECT.
8. THE DRAWINGS DEPICTING ELECTRIC WORK ARE DIAGRAMMATIC AND SHOW, IN THEIR APPROXIMATE LOCATION, SYMBOLS REPRESENTING ELECTRICAL EQUIPMENT AND DEVICES. THE EXACT LOCATION OF SUCH EQUIPMENT AND DEVICES SHALL BE ESTABLISHED IN THE FIELD.
9. CONTRACTOR SHALL FURNISH AND INSTALL ALL SUCH WORK, PIPING, STRUCTURAL SUPPORTS, ELECTRICAL WIRING AND CONDUIT AND ANY OTHER ADDITIONAL EQUIPMENT FOR A COMPLETE OPERATIONAL SYSTEM.
10. UNLESS SPECIFICALLY STATED TO THE CONTRARY, NO MEASUREMENT OF AN ELECTRICAL DRAWING BY SCALE SHALL BE USED AS A DIMENSION. DIMENSIONS NOTED ON THE ELECTRICAL DRAWINGS ARE SUBJECT, IN EACH CASE, TO MEASUREMENTS OF ADJACENT OR PREVIOUSLY COMPLETED WORK AND ALL SUCH MEASUREMENTS NECESSARY SHALL BE TAKEN BEFORE UNDERTAKING ANY WORK DEPENDENT UPON THEM.
11. IN THE EVENT OF A CONFLICT BETWEEN THE DRAWINGS AND SPECIFICATIONS THIS CONTRACTOR SHALL BASE HIS BID ON THE GREATER QUANTITY, COST OR QUALITY OF THE ITEM IN QUESTION, UNLESS SUCH CONFLICT IS RESOLVED BY AN ADDENDUM.
12. COORDINATE INSTALLATION WITH STRUCTURAL AND MECHANICAL TRADES.
13. PROVIDE SHOP DRAWINGS FOR ENGINEERS TO REVIEW.
14. PROVIDE ONE (1) SOFT COPY AND TWO (2) HARD COPIES OF OPERATION AND MAINTENANCE MANUALS INCLUDING:
  - 14.1. RED LINE RECORD DRAWINGS
  - 14.2. EQUIPMENT AND CABLING TEST AND COMMISSIONING INFORMATION
  - 14.3. MAINTENANCE PROCEDURES
  - 14.4. EQUIPMENT CUT SHEET AND MANUALS
  - 14.5. SHOP DRAWINGS
15. CLEAN AND TOUCH UP SURFACES OF SHOP PAINTED EQUIPMENT SCRATCHED OR MARRED DURING SHIPMENT OR INSTALLATION, TO MATCH ORIGINAL PAINT. EQUIPMENT WITH SCRATCHES, DENTS OR OTHER DAMAGE THAT CANNOT BE COMPLETELY RESTORED BY PAINTING SHALL BE REPLACED.
16. PROVIDE WARNING SIGNS TO MEET REQUIREMENTS OF ELECTRICAL INSPECTION DEPARTMENT AND ENGINEER.
17. CONTRACTOR TO ARRANGE INSTALLATION OF UTILITY SUPPLY AND PROVIDE REQUIRED DOCUMENTATION IN A TIMELY MANNER TO PROVIDE POWER. CONTRACTOR TO WIRE FROM UTILITY SUPPLY POINT TO POWER DISTRIBUTION PANEL.

1. POWER DISTRIBUTION PANEL AND LEVEL TRANSMITTER PANEL AS PER DRAWINGS

2. CONDUIT:
- 2.1 1mm MINIMUM SIZE CONDUIT.
  - 2.2 RIGID METAL CONDUIT TO CSA C22.2 NO. 45, GALVANIZED STEEL, THREADED.
  - 2.3 ELECTRICAL METALLIC TUBING TO CSA C22.2 NO. 83, WITH WEATHERPROOF COUPLING.
  - 2.4 RIGID PVC BUILDING TO CSA C22.2 NO. 211.1
  - 2.5 FLEXIBLE PVC CONDUIT TO CAN/CSA 22.2 NO. 227.3.
  - 2.6 ALL CONDUITS WITH INSULATED GROUND BUSHING.
3. WIRING AND CABLES:
- 3.1 POWER CABLE: TECK 90 CABLE TO CAN/CSA C22.2 NO. 131. RATED 600 V, WITH RW90 XLPE INSULATION, THERMOPLASTIC POLYVINYL CHLORIDE MATERIAL, ALUMINUM ARMOUR AND OVERALL PVC JACKET RATED 74, BUILDING WIRE TO BE RATED 600V RW90 XLPE, STRANDED FOR NO 10 AWG AND LARGER. POWER AND CONTROLS TO BE RUN IN SEPARATE CONDUITS. CABLE FITTING TO BE WEATHERPROOF.
  - 3.2 PHOTOVOLTAIC WIRE: RPV90 TO CSA22.2 NO. 271 AND 38 RATED 600 V, WITH CROSS-LINKED POLYETHYLENE (XLPE) INSULATION, RATED 50° FOR WET OR DRY LOCATION, UV AND SUNLIGHT RESISTANT, MEETS ICE COLD BEND AND COLD IMPACT TEST AT -40°C.
  - 3.3 INTERNAL CONTROL PANEL WIRING: RATED NO. 14 AWG, 600 V PVC TYPE INSULATION RATED FOR -40°C TO +105°C, CSA RATING TR-32, UL STYLE 1015, TINNED, STRANDED COPPER CONDUCTOR.
  - 3.4 INSTRUMENT CABLE NO. 16 AWG, 300 V, INDIVIDUAL SHIELDED TWISTED PAIR, MULTIPAIR CABLE TO BE PROVIDED WITH OVERLAP SHIELD. MANUFACTURER TO BE BELDEN.
  - 3.5 ULTRASONIC LEVEL TRANSMITTER: FACTORY SUPPLIED CABLE, ULTRASONIC LEVEL TRANSDUCER BRACKET TO BE STAINLESS STEEL.
4. GROUNDING TO BE COPPER GROUND PLATE. GROUNDING CONNECTORS TO BE NON-CORRODING. NECESSARY FOR CORROSION GROUNDING SYSTEM. ALL GROUNDING CONNECTIONS TO BE COATED WITH COATED WITH CORROSION INHIBITOR SUCH AS DE-OX OR SIMILAR. MANUFACTURER - BURNDY, TYPE AS REQUIRED. GROUND CONDUCTOR SIZE AND GROUND BUS AS SHOWN ON DRAWINGS. PERFORM GROUND CONTINUITY AND RESISTANCE TESTS USING METHOD SUITABLE FOR THE SITE CONDITIONS. PROVIDE TEST RESULTS TO ENGINEER FOR REVIEW. GROUND RESISTANCE OF 5 OHMS OR LESS.
5. U/G PULL BOX TO BE HUBBELL CATALOG #PG3060B36, 162mmx1 x 914mmx1 POLYMER CONCRETE MATERIAL, TIER 22, OPEN BOTTOM COMPLETE WITH TAMPER PROOF LID. SLOPE GROUND AWAY FROM JUNCTION BOX LID. INSTALL ON 150MM DEEP COMPACTED CRUSHED GRAVEL. GRAVEL TO EXTEND 150MM OUT FROM SIDE OF PULL BOX.
6. STRUT TO BE GALVANIZED STEEL. REPAIR CUT AND DRILLED SECTION WITH GALVANIZING COMPOUND. ALL CUT EDGES TO BE DEBURRED.

1. RACEWAY: RIGID PVC AND PVC JUNCTION BOXES, RIGID PVC BELOW GRADE, RIGID GALVANIZED STEEL FOR INCOMING SERVICE ABOVE GRADE AND LIQUID TIGHT FLEX FOR CONNECTION TO INSTRUMENTATION AND CONTROL EQUIPMENT. INSTALL PULL STRINGS IN EMPTY CONDUITS. INSTALL EXPANSION JOINTS WHERE CONDUITS ENTER CONTROL PANELS AND PER MANUFACTURER'S RECOMMENDATIONS.
2. BURIED CONDUITS INSTALLED 1000mm BELOW GRADE, 100mm FROM EACH SIDE OF THE TRENCH ON SAND BEDDING (75mm ABOVE AND BELOW CONDUIT) WITH YELLOW MARKER TAPE 300mm ABOVE THE CABLE. BACKFILL AND COMPACT WITH NATIVE BACKFILL.
3. INSTALL CONDUIT AND SLEEVES FIRST TO POURING OF CONCRETE. SLEEVES THROUGH CONCRETE: SCHEDULE 40 STEEL PIPES, SIZED FOR FREE PASSAGE OF CONDUIT OR CABLE, AND PROTRUDING 50mm.
4. SEAL ALL CONDUITS ENTERING PANELS.
2. WIRING:
  - 2.1. POWER CIRCUITS TO BE RUN IN SEPARATE CONDUITS FROM CONTROL AND INSTRUMENTATION CIRCUIT.
  - 2.2. ALL WIRING TERMINATIONS MADE ON TERMINALS.
3. CONFIGURATION AND CALIBRATION OF INSTRUMENTS TO BE DONE BY SUPPLIER.
4. BONDING CONDUCTOR SIZE AS SHOWN OR AS REQUIRED BY THE CEC. RUN A GROUND CONDUCTOR IN EACH CONDUIT.
5. TAG WIRING, CABLES AND CONDUITS PER PLANT STANDARDS. TAG CABLE AND CONDUITS WHERE THEY ENTER CONTROL PANELS, LARGE JUNCTION BOXES, MOTOR CONTROL CENTRES, OR WHERE THE CABLE OR CONDUIT PASSES THROUGH WALLS AND AT END DEVICES.
6. TAG EQUIPMENT AND JUNCTION BOXES IN ACCORDANCE WITH PLANT STANDARDS.
7. TESTING AND COMMISSIONING:
  - 7.1. ASSIST THE OWNER WITH CONFIRMING INSTRUMENTATION AND CONTROL WIRING LOOP CHECKS BETWEEN THE FIELD DEVICE AND THE PUMP HOUSE P.L.C. PROVIDE ALL NECESSARY POWER SUPPLY AND INSTRUMENTS FOR TESTING ANALOG AND DIGITAL SIGNALS.
  - 7.2. TEST ANALOG INPUT SIGNALS BY NOTING THE READING ON THE FIELD DEVICE AND MEASURE THE mA SIGNAL INTO THE P.L.C. CHECK THAT THE mA READING IS APPROPRIATE FOR THE PROCESS VARIABLE AND THE SPAN OF THE INSTRUMENT.
  - 7.3. THE OPERATION OF THE EQUIPMENT AND ELECTRICAL SYSTEMS DOES NOT CONSTITUTE AN ACCEPTANCE OF THE WORK BY THE OWNER. THE FINAL REVIEW IS TO BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT AND DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND THE SPECIFICATIONS.
8. QUALITY CONTROL:
  - 8.1. ALL CABLE CONNECTIONS MUST PASS VISUAL INSPECTION FOR WORKMANSHIP AND CONFORMANCE WITH STANDARD PRACTICE.
  - 8.2. CONTROL WIRING SHALL BE CHECKED FOR PROPER CONNECTION IN ACCORDANCE WITH INTERCONNECTION DIAGRAMS OR TABLES AND FOR TIGHTNESS OF TERMINAL CONTACTS AND CONTINUITY THROUGH EACH 'RUN' OF CONTROL CIRCUITING.
  - 8.3. COMPLETE AND ACCURATE RECORDS OF ALL CABLE TESTS AND INSPECTION SHALL BE MADE.
  - 8.4. ALL BREAKERS, SWITCHES AND CONTACTORS SHALL BE GIVEN COMPLETE OPERATIONAL TESTS TO DETERMINE THAT ALL DESIGN FUNCTIONS ARE SATISFACTORILY PERFORMED.
  - 8.5. ALL SWITCHES (CONTROL, INSTRUMENT, DISCONNECT, SAFETY, ETC.) SHALL BE INSPECTED AND TESTED AS TO CLEANLINESS AND OPERATION.
  - 8.6. FUSES SHALL BE INSPECTED FOR CORRECT RATING.
  - 8.7. COORDINATE ALL TESTING OF INSTRUMENTS AND EQUIPMENT WITH THE SUPPLIER OR CONTRACTOR OF THOSE DEVICES.
  - 8.8. ALL WIRE AND CABLE SHALL BE TESTED FOR CONTINUITY.
  - 8.9. WIRE AND CABLE SHALL BE MEGGERED ONLY AFTER INSTALLATION. EACH PHASE SHALL BE TESTED BETWEEN CONDUCTOR AND GROUND BETWEEN PHASES.
  - 8.10. MEGGER POWER CIRCUITS AND FEEDERS TO 350 V WITH A 500 V INSTRUMENT. INSULATION RESISTANCE LEVEL SHALL NOT BE LESS THAN 25 MEGOHM AS DETERMINED WITH ALL SWITCHBOARDS, PANELBOARDS, FUSE HOLDERS, SWITCHES AND OVERCURRENT DEVICES IN PLACE.
  - 8.11. PERFORM CONTINUITY AND RESISTANCE TESTS ON INSTRUMENTATION AND CONTROL WIRING.
  - 8.12. PERFORM GROUND CONTINUITY AND RESISTANCE TESTS USING METHOD SUITABLE FOR THE SITE CONDITIONS. CARRY OUT TESTS IN THE PRESENCE OF AN OWNER'S REPRESENTATIVE.
  - 8.13. PROVIDE ALL TEST RESULTS TO ENGINEER FOR REVIEW.
  - 8.14. SHOULD IT BE FOUND BY THE ENGINEER THAT ANY EQUIPMENT OR ANY PORTION OF THE ELECTRICAL SYSTEM INSTALLED UNDER THIS CONTRACT FAILS TO COMPLY WITH THE CONTRACT DOCUMENTS WITH RESPECT TO QUALITY OF WORKMANSHIP OR MATERIALS, SUCH SHALL BE REPLACED BY THE CONTRACTOR AND ALL OTHER WORK DISTURBED BY CORRECTION OF DEFECTS OR IMPERFECTIONS SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
  - 8.15. UPON COMPLETION OF THE INSTALLATION, THE CONTRACTOR SHALL FURNISH CERTIFICATES OF APPROVAL FROM ALL AUTHORITIES HAVING JURISDICTION. DEMONSTRATE THAT ALL WORK IS COMPLETE AND IN IDEAL OPERATING CONDITION, WITH RACEWAY AND CONDUIT SYSTEM PROPERLY GROUNDED, ALL WIRING FREE FROM SHORTS, AND THAT THE ENTIRE INSTALLATION IS FREE FROM PHYSICAL DEFECTS. IN THE PRESENCE OF THE ENGINEER AND THE OWNER, THE CONTRACTOR SHALL DEMONSTRATE THE PROPER OPERATION OF ALL MISCELLANEOUS SYSTEMS.




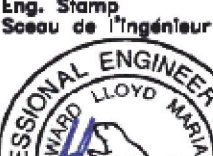
1. PROGRAMMING OF THE NEW LEVEL TRANSMITTER TO PUMP HOUSE CONTROLLER WILL BE DONE BY CONTRATOR PRIOR TO HANDING OVER TO PARKS CANADA AGENCY.




1. SINGLE LINE DIAGRAM TO BE ENGRAVED ON A 225 mm WIDTH x 250 mm HEIGHT LAMACOID. BACKGROUND COLOR TO BE BLACK AND SINGLE LINE DIAGRAM TO BE WHITE. ELECTRONIC AUTOCAD FILE WILL BE MADE AVAILABLE UPON REQUEST.
2. LAMACOID WILL BE INSTALLED ON THE FRONT SIDE OF DISTRIBUTION PANEL.

1 DIAGRAM N.T.S.  
SOLAR SYSTEM AND  
CUSTOMER DISTRIBUTION SINGLE LINE

0	2018MAR29	ISSUED FOR TENDER	J.D.	J.C.
No.	Date/Date	Description/Description	Drawn by Designé par	Approved Approuvé

<p>Revision / Révision</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>A detail number numero de detail</p> </div> <div style="text-align: center;">  <p>A B source drawing no. de dessin no. C detail on drawing no. detail sur dessin no.</p> </div> </div>	
<p>Consultant's Name Nom de l'expert-conseil</p>	
<p>Eng. Stamp Sceau de l'ingénieur</p>	
<div style="display: flex; align-items: center;">  <div> <p><b>Associated Engineering</b></p> </div> </div>	
<p>APEGA Permit to Practice P 3375</p>	
<div style="display: flex; justify-content: space-between;">  <div> <p>2018-03-29</p> </div> </div>	

 <p>Parks Canada Agency</p>	<p>L'Agence Parcs Canada</p>
<p>Western and Northern Region</p>	<p>Ouest et Nord du Canada</p>

Project title/Titre du projet

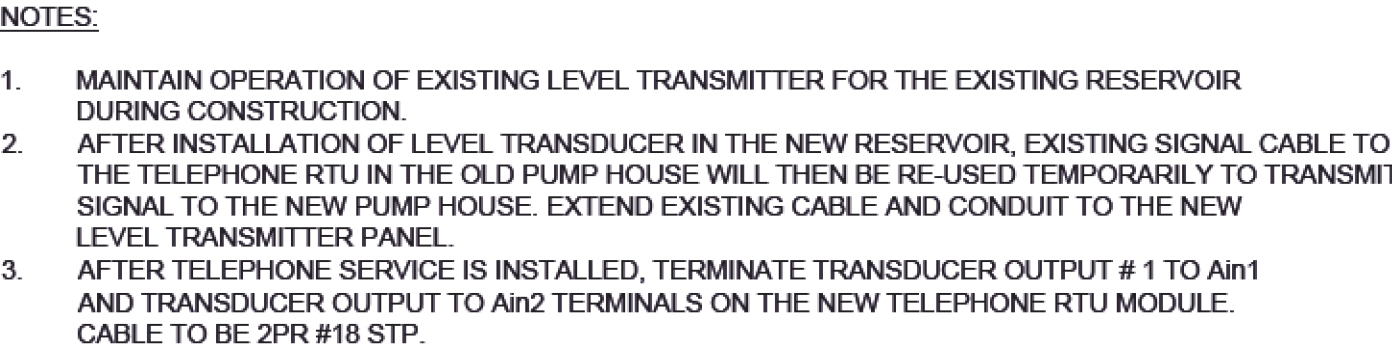
LAKE LOUISE 2018  
WATER SYSTEM UPGRADES  
RESERVOIR CONTRACT  
BANFF NATIONAL PARK

Drawing title/Titre du dessin


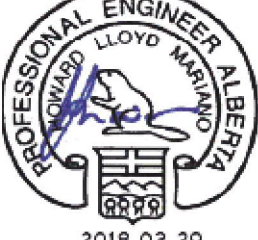

ELECTRICAL SPECIFICATIONS AND  
SINGLE LINE DIAGRAM

Surveyed by/Enquêté par	Drawn by/Dessiné par	Date/Date
Designed by/Conçue par	Reviewed by/Revisé par	Date/Date
PWSC Project Manager/Le/Leintendant de Projet PWSC J. O'BONNS		
Client Acceptance/Acceptation du client	Approved by/Approuvé par	
Park Resources Officer/Agent Ressources PWSC Project Manager/Le/Leintendant de Projet PWSC		
Project No./No. du projet	Asset No./No. du bien	Sheet No./No. de la feuille
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Drawing Reference/No. de référence du dessin		21
3084-01-E-002		



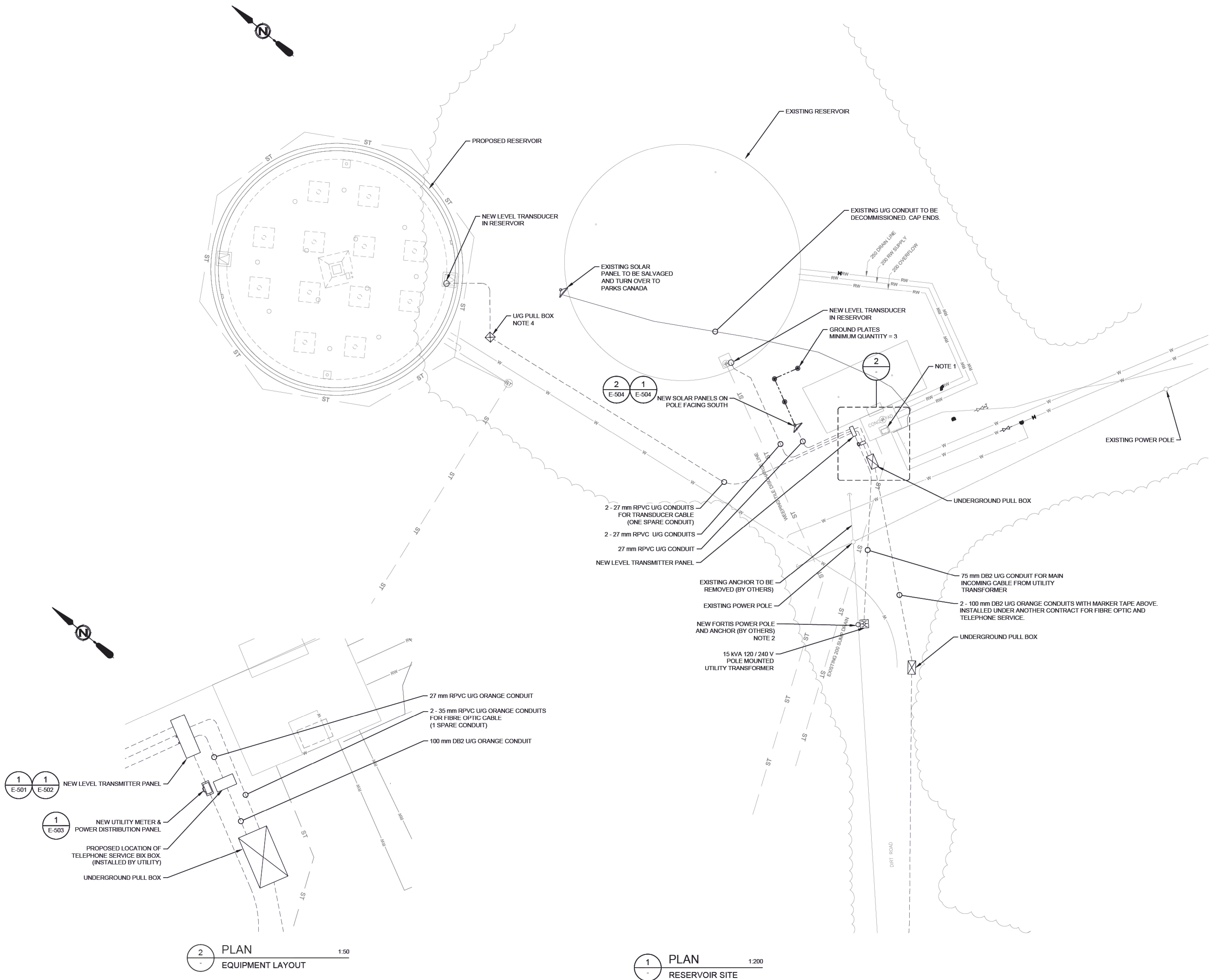


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DATE: 2018-03-19, Howard Mariano

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No.	Date/Déle	Description/Description				Drawn by Dessiné par	Approved Approuvé		
Revision / Révision									
A detail number Numéro de détail						B source drawing no. No. du dessin d'origine			
C detail aux design no. Détail sur dessin no.						A C			
<b>Consultant's Name  Nom de l'architecte-consultant</b>						<b>Eng. Stamp  Sceau de l'ingénieur</b>			
 <b>Associated Engineering</b>									
APEGA Permit to Practice P 3979									
Client/détient  Parks Canada Agency      L'Agence Parcs Canada									
Western and Northern Region						Ouest et Nord du Canada			
Project title/Titre du projet									
LAKE LOUISE 2018 WATER SYSTEM UPGRADES RESERVOIR CONTRACT BANFF NATIONAL PARK									
Drawing title/Titre du dessin									
LEVER TRANSMITTER PANEL WIRING SCHEMATIC									
Surveyed by/Arsenié par									
Designed by/Concept par						Drawn by/Dessiné par		Date/Date	
H. MARSHO						J. DONG		2018FEB23	
Reviewed by/Révisé par						Social/Échelle		AS SHOWN	
D. STABLEFORD									
FWSC Project Manager/Administrateur de Projet TPSGC									
Client Acceptance/Acceptation du client									
Approved by/Approuvé par									
Park Responsible Officer/Agent Responsable									
FWSC Project Manager/Administrateur de Projet TPSGC									
Project No./No. du projet				Assist No./No. du s/in			Sheet No./ No. de la feuille		
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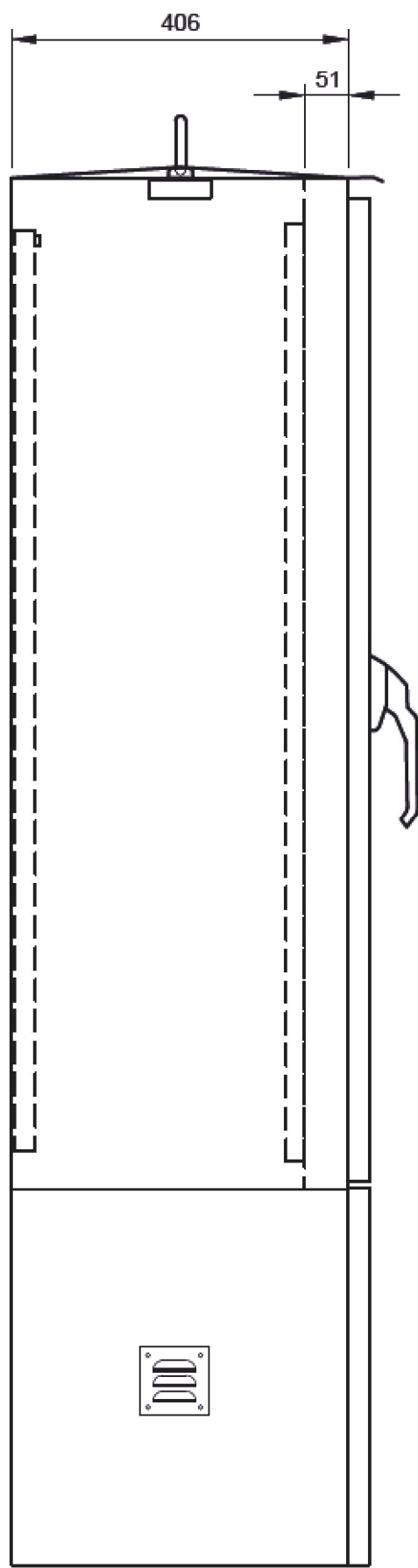


- NOTES:
1. MAINTAIN OPERATION OF EXISTING RESERVOIR LEVEL TRANSMITTER DURING CONSTRUCTION OF THIS CONTRACT.
  2. SUPPLY AND INSTALL GALVANIZED STEEL CABLE GUARD (100mmØ, 2400mm LONG) SECURED ON POLE.
  3. PROVIDE PULL CORD IN ALL SPARE UNDERGROUND CONDUITS.
  4. U/G PULL BOX TO BE HUBBELL QUARZITE PG STYLE, TIER 8, OPEN BOTTOM, 450mm DEEP, 610mm x 330mm, TAMPER PROOF LID. SLOPE GROUND AWAY FROM JUNCTION BOX LID. INSTALL ON 150mm DEEP COMPACTED CRUSHED GRAVEL. GRAVEL TO EXTEND 150mm OUTSIDE FROM SIDE OF PULL BOX.

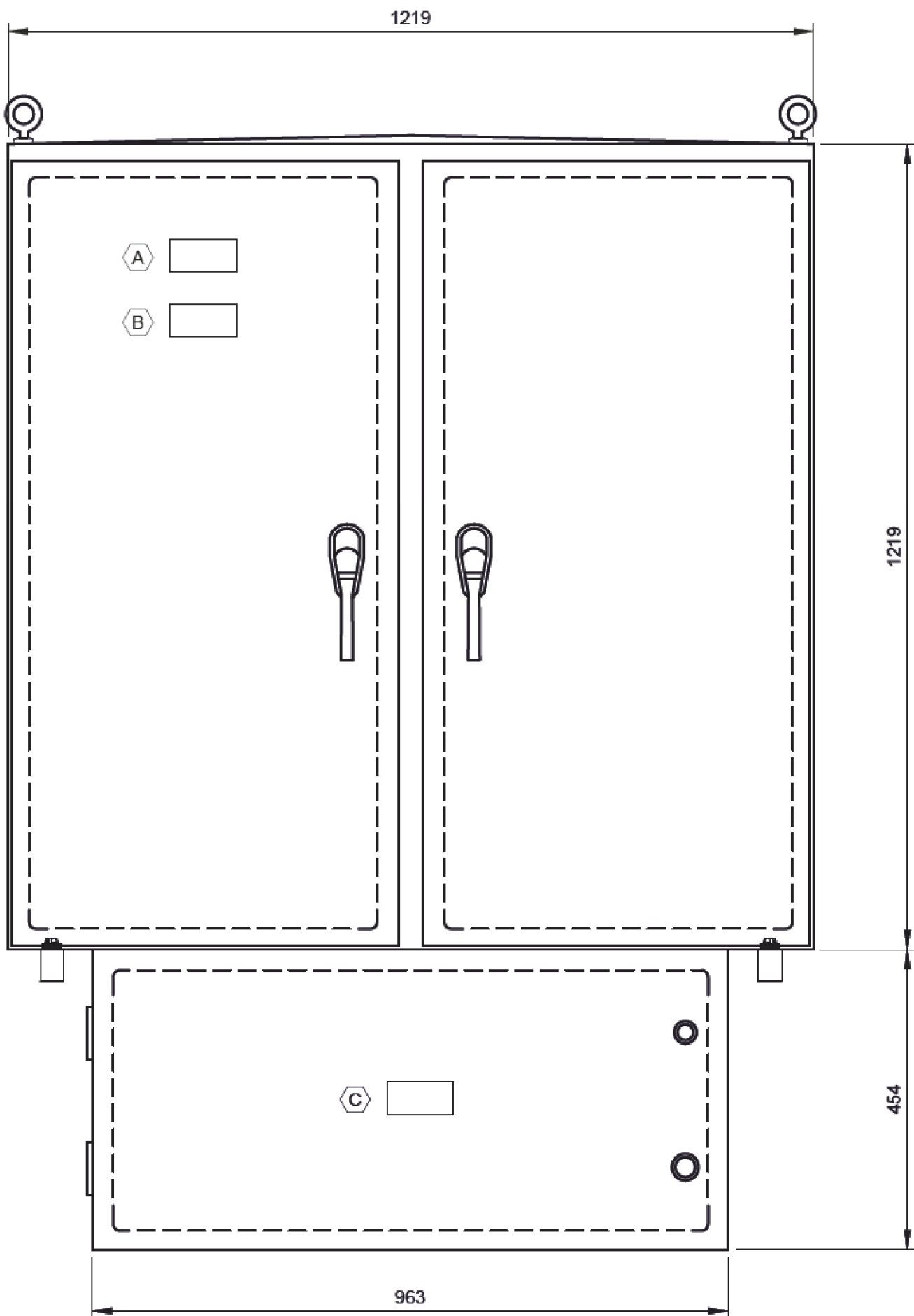


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No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé	
Revision / Révision					
A detail number numéro de détail		A			
B source drawing no. de dessin no.		B/C			
C detail on drawing no. détail sur dessin no.		C			
Consultant's Name Nom de l'expert-conseil			Eng. Stamp Sceau de l'ingénieur		
Client/Client					
		Parks Canada Agency		L'Agence Parcs Canada	
Western and Northern Region		Ouest et Nord du Canada			
Project title/Titre du projet					
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Drawing title/Titre du dessin					
ELECTRICAL SITE PLAN					
Surveyed by/Arpenté par		Drawn by/Dessiné par		Date/Date	
J. DONG		J. DONG		2018JAN15	
Designed by/Conçue par		Reviewed by/Revisé par		Scale/Échelle	
H. MARIANO		D. STABLEFORD		AS SHOWN	
PWSC Project Manager/Administrateur de Projets TPSC					
J. GIBBONS					
Client Acceptance/Acceptation du client			Approved by/Approuvé par		
Park Responsible Officer/Agent Responsable			PWSC Project Manager/Administrateur de Projets TPSC		
Project No./No. du projet		Asset No./No. d'actif		Sheet No./ No. de la feuille	
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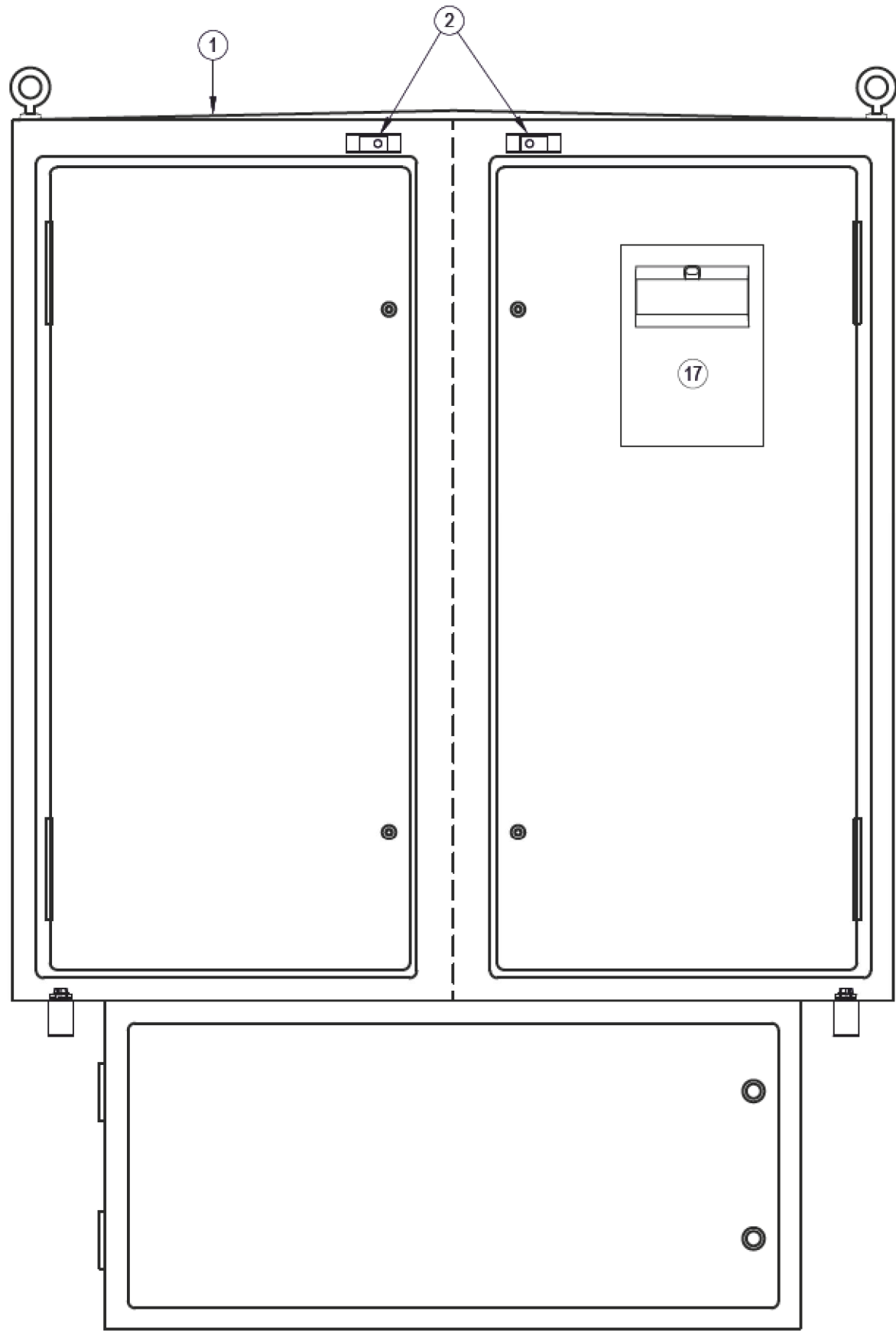




LEFT SIDE VIEW



FRONT VIEW



FRONT VIEW  
(DOORS REMOVED)




1  
-  
DETAIL  
LEVEL MONITORING PANEL LMP-01  
1:8

BILL OF MATERIAL

ITEM No.	QTY	DESCRIPTION	MANUFACTURER	MODEL
1	1	CSA TYPE 4X 48"H X 60"W X 16"D FREEDOM 2 ENCLOSURE C/W BACK PANELS, SIDE PANEL, PADLOCKING KITS & INNER DOORS. PANEL INTERIOR TO BE INSULATED WITH 12.5 mm (1/2") THICK FOAM BOARD FOIL WITH TAPED EDGES	ACE	M3676-0217
2	2	DOOR SWITCH	HOFFMAN	ALFSWD
3	2	ENCLOSURE LED LIGHT	HOFFMAN	LEDA1M35
4	2	ENCLOSURE FAN & FILTER	HOFFMAN	HF0416414
5	2	STAINLESS STEEL LOUVERS C/W FILTER	HOFFMAN	AVK33SS6 c/w AFLT33
6	2	CABINET HEATER, 100 W, 120 V	HOFFMAN	DAH1001A
7	2	THERMOSTAT	HOFFMAN	ATEMNO
8	2	GROUND BAR c/w ISOLATION STAND-OFF	PANDUIT	UGB2/0-414-12 & UGB-IN-SO
9	AS REQ'D	25 mmW x 50 mmW PANDUIT	PANDUIT	F1X2WH6
10	AS REQ'D	50 mmW x 50 mmW PANDUIT	PANDUIT	F2X2WH6
11	AS REQ'D	SAK 4/EN TERMINAL BLOCKS	WEIDMULLER	0467460000
12	AS REQ'D	ASK 1/EN FUSE TERMINAL BLOCKS	WEIDMULLER	0474560000
13	AS REQ'D	EK 4/35 GROUND TERMINAL BLOCKS	WEIDMULLER	0661160000
14	AS REQ'D	EW35 END STOPS	WEIDMULLER	383560000
15	AS REQ'D	DIN RAIL	WEIDMULLER	514510000
16	1	LIGHTNING / SURGE ARRESTER	PHOENIX CONTACT	VAL-MS-T1/T2 1000DC-PV/2+V - 2801160
17	1	LEVEL TRANSMITTER	SIEMENS MULTIRANGER 200	7ML5033-2CB101A + 7ML1830-2AK
18	2	2 POLE DIN-RAIL FUSE HOLDER	EATON BUSSMANN	CHPV2U
19	1	4 POLE DIN-RAIL FUSE HOLDER	EATON BUSSMANN	CHM4DU
20	AS REQ'D	FAST ACTING PHOTOVOLTAIC FUSE, 10A, 5A	EATON BUSSMANN	PVM-10, PVM-5
21	AS REQ'D	PROTECTIVE COVER	EATON BUSSMANN	FSCVR
22	1	CHARGE CONTROLLER	MORNINGSTAR	PS-15
23	1	REDUNDANCY MODULE WITH PROTECTIVE COATING	PHOENIX CONTACT	QUINT - ORING/24DC/2X20/1X40 - 2320186
24	1	DC POWER SUPPLY	PHOENIX CONTACT	QUINT - PS/1AC/24VDC/5
25	2	BATTERY	STARK ENERGY	AGM-12121-CI
26	2	BATTERY INSULATION KIT	DEI	010480
27	1	120 W (24 V) PHOTOVOLTAIC MODULE	AMERESCO SOLAR	120J-B (24V)
28	2	LEVEL TRANSDUCER c/w FACTORY CABLE	MILLTRONICS	XPS-15
29	2	STAINLESS STEEL VENT DRAIN, TYPE 4X.	HOFFMAN H2OMIT	AVDR4SS4
30	1	TELEPHONE RTU TRANSMITTER	WEIDMULLER	991652
31	1	FIBRE OPTIC PATCH PANEL	DINSPACE	SNAP-12SC-SM




LAMACOID NAMEPLATE SCHEDULE

ITEM	QTY.	LINE 1	LINE 2	TEXT COLOR	LAMACOID COLOR	
(A)	1	CAUTION:	MULTIPLE SOURCES OF POWER	WHITE	RED	50 x 100
(B)	1	LEVEL TRANSMITTER	PANEL	BLACK	WHITE	50 x 100
(C)	1	BATTERY SECTION		BLACK	WHITE	50 x 100

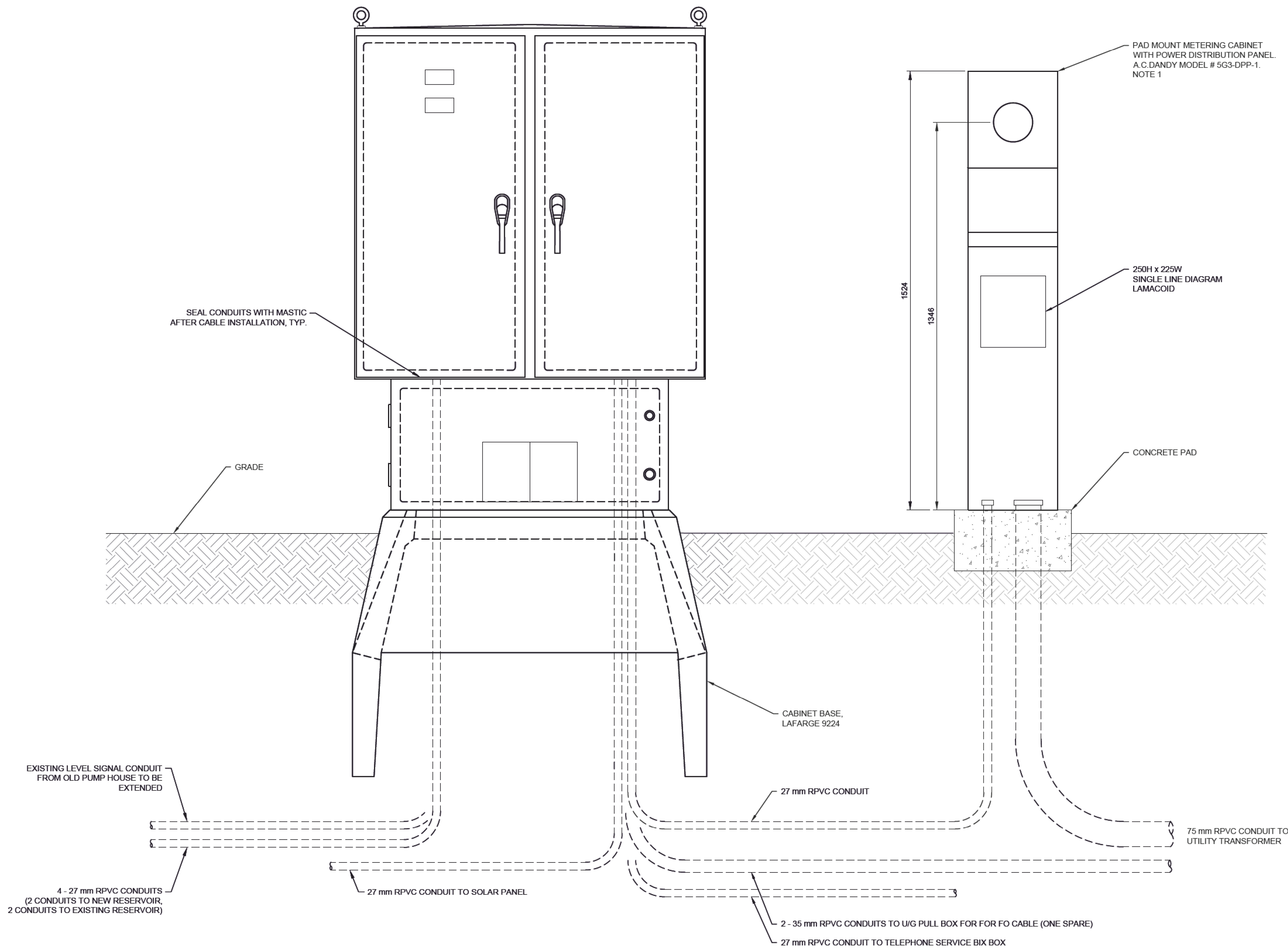
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No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé							
Revision / Revision											
A detail number numéro de détail		B source drawing no. de dessin no.		C detail on drawing no. détail sur dessin no.							
Consultant's Name Nom de l'expert-conseil		Eng. Stamp Sceau de l'ingénieur									
 <b>Associated Engineering</b>											
APEGA Permit to Practice P 3979		2018-03-29									
Client/client											
 Parks Canada Agence		L'Agence Parcs Canada									
Western and Northern Region		Ouest et Nord du Canada									
Project title/Titre du projet											
LAKE LOUISE 2018 WATER SYSTEM UPGRADES RESERVOIR CONTRACT BANFF NATIONAL PARK											
Drawing title/Titre du dessin											
LEVEL TRANSMITTER PANEL DETAILS AND											
Surveyed by/Arpenté par		Drawn by/Dessiné par		Date/Date							
		J. DONG		2018FEB19							
Designed by/Conçue par		Reviewed by/Revise par		Scale/Echelle							
H. MARIANO		D. STABLEFORD		AS SHOWN							
PWSC Project Manager/Administrateur de Projets TPSC											
J. GIBBONS											
Client Acceptance/Acceptation du client			Approved by/Approuvé par								
Park Responsible Officer/Agent Responsable		PWSC Project Manager/Administrateur de Projets PWSC									
Project No./No. du projet		Asset No./No. du bien		Sheet No./ No. de la feuille							
20173084-00				18							
Drawing Reference No./No. de référence du dessin				21							
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0	2018/MAR/03	ISSUED FOR TENDER	J.D.	J.C.	
No.	Date/Date	Description / Description	Drawn by Dessiné par	Approved Approuvé	
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Consultant's Name Nom de l'expert-consult			Eng. Stamp Sceau de l'ingénieur		
 <b>Associated Engineering</b>			 <small>PROFESSIONAL ENGINEER ONTARIO INGÉNIEUR PROFESSIONNEL ONTARIO 1980</small> 2018-03-29		
<b>APEGA Permit to Practice P 3979</b>					
Client/client		Parks Canada Agency	L'Agence Parcs Canada		
		Western and Northern Region	Ouest et Nord du Canada		
Project title/Titre du projet					
LAKE LOUISE 2018 WATER SYSTEM UPGRADES RESERVOIR CONTRACT BANFF NATIONAL PARK					
Drawing title/Titre du dessin					
LEVEL TRANSMITTER PANEL DETAILS					
Surveyed by/Argentié par		Drawn by/Dessiné par J. DONG		Date/Date 2018FEB16	
Designed by/Concept par K. MARGAND		Reviewed by/Révisé par D. STABLEFORD		Scale/Echelle AS SHOWN	
PWOSC Project Manager/Administrateur de Projet PWOSC J. GUINDON					
Client's Approval/Acceptation du client			Approved by/Approuvé par		
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Part Responsible Officer/Agent Responsable			PWOSC Project Manager/Administrateur de Projet PWOSC		
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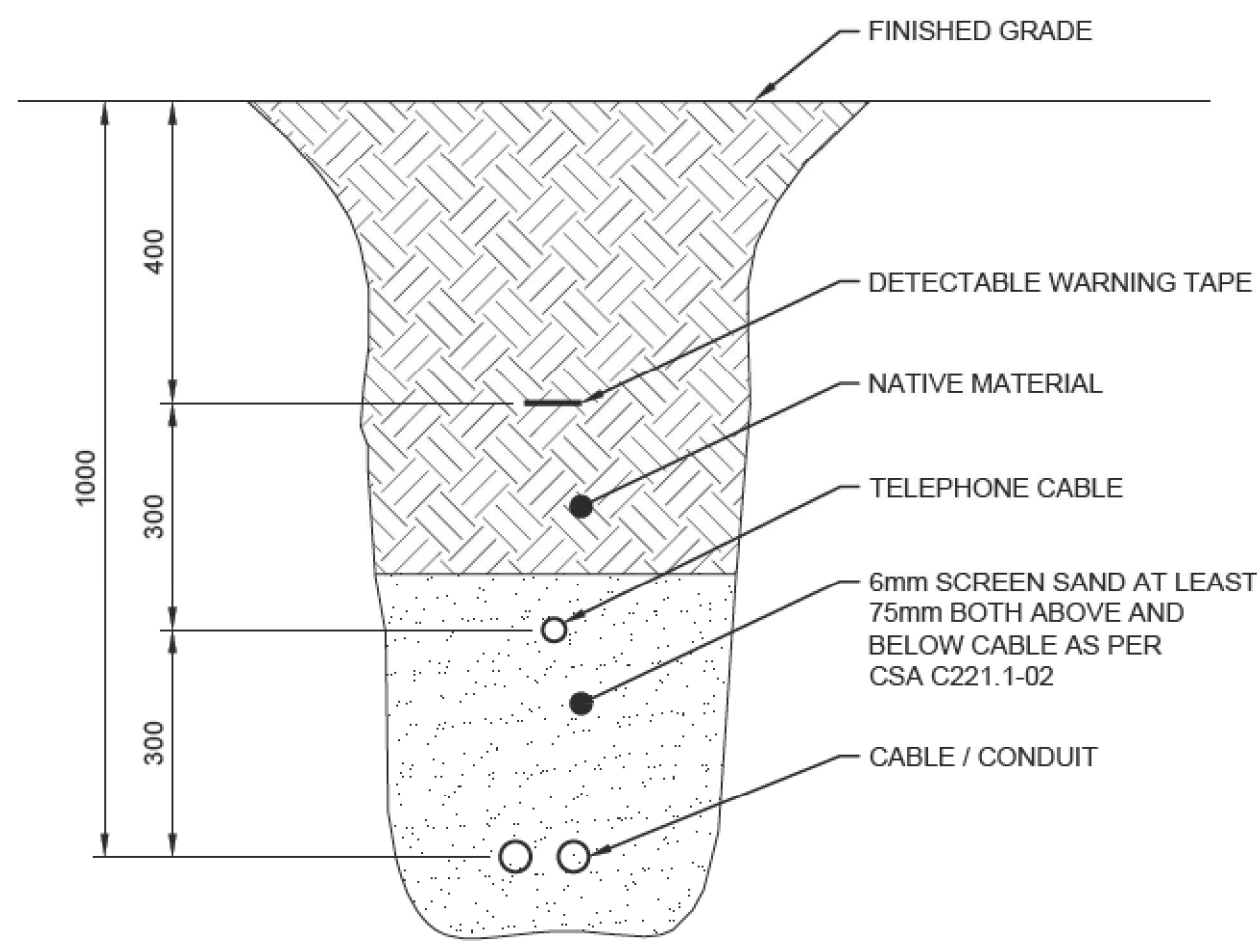





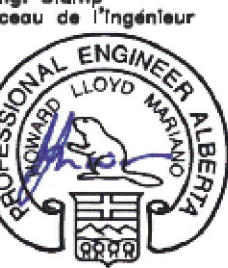

1 DETAIL  
- PANEL ARRANGEMENT 1:8

NOTES:

- PAD MOUNTED METERING CABINET WITH POWER DISTRIBUTION PANEL TO BE A.C. DANDY MODEL # 5G3-DPP-1, 1524mmH x 311.2mmW x 165.1mmD.
  - EEMAC 3R ENCLOSURE.
  - RAIN PROOF & STEEL RESISTANT FOR OUTDOOR USE.
  - BUILT IN METER SOCKET IN ACCORDANCE WITH FORTIS ALBERTA REQUIREMENTS.
  - MAIN BREAKER AND 8 CIRCUIT PANEL.
  - SERVICE ENTRANCE RATED 120/240 V 10 KAIC.
  - GALVANIZED STEEL c/w ASA 61 GREY POWDER COAT FINISH.
  - CONCRETE BASE MOUNT STYLE PEDESTAL c/w BOTTOM OPENING.
  - MAIN BREAKER COVER IS HINGED UP, PADLOCKABLE & SEALABLE. SAFETY SOFT MACHINE FORMED CORNERS ON ROOF & DOORS.
  - 2" PVC UTILITY SUPPLY RISER CONDUIT IS ON THE LEFT SIDE & LEVEL TO BOTTOM OF THE CABINET FROM METER SOCKET.
- 20 A DUPLEX 5 mA GFCI RECEPTACLE #5-20R & 1P 20A CB, FULLY CSA APPROVED ASSEMBLY - SERVICE ENTRANCE RATED, LUGS ARE CU/AL RATED.
- BRANCH CIRCUIT BREAKERS TO BE 15 A 1 P.



2 DETAIL  
- TYPICAL UNDERGROUND DIRECT BURIED CABLE AND CONDUIT INSTALLATION N.T.S.

0	2018MAR20	ISSUED FOR TENDER	J.D.	J.C.	
No.	Date/Date	Description/Description	Drawn by Dessiné par	Approved Approuvé	
Revision / Revision					
A detail number numéro de détail			A		
B source drawing no. de dessin no.			B/C		
C detail on drawing no. détail sur dessin no.					
Consultant's Name Nom de l'expert-conseil			Eng. Stamp Sceau de l'ingénieur		
 Associated Engineering APEGA Permit to Practice P 3979			 LLOYD M. MILLER 2018-03-29		
Client/Client					
 Parks Canada Agency		L'Agence Parcs Canada			
Western and Northern Region		Ouest et Nord du Canada			
Project title/Titre du projet					
LAKE LOUISE 2018 WATER SYSTEM UPGRADES RESERVOIR CONTRACT BANFF NATIONAL PARK					
Drawing title/Titre du dessin					
INSTALLATION DETAILS PANEL ARRANGEMENT AND					
Surveyed by/Arpenté par		Drawn by/Dessiné par		Date/Date	
		J. DONG		2018FEB23	
Designed by/Conçue par		Reviewed by/Revisé par		Scale/Echelle	
H. MARIANO		D. STABLEFORD		AS SHOWN	
PWSC Project Manager/Administrateur de Projets TPSCC					
J. GIBBONS					
Client Acceptance/Acceptation du client			Approved by/Approuvé par		
Park Responsible Officer/Agent Responsable			PWSC Project Manager/Administrateur de Projets PWSC		
Project No./No. du projet		Asset No./No. de l'actif		Sheet No./ No. de la feuille	
20173084-00				20	
Drawing Reference No./No. de référence du dessin					
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