

# FLYING DUST FIRST NATION

## WATER TREATMENT PLANT UPGRADES

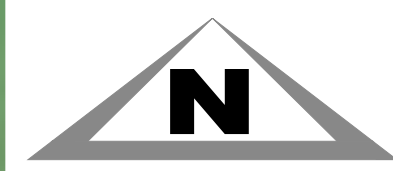
### RAW WATER MAIN

ISC PROJECT No. CT608

#### DRAWING INDEX

- 01 KEY PLAN
- 02 LOCATION PLAN
- 03 RWM PLAN & PROFILE
- 04 RWM PLAN & PROFILE
- 05 RWM PLAN & PROFILE
- 06 RWM PLAN & PROFILE
- 07 RWM PLAN & PROFILE
- 08 MISCELLANEOUS DETAILS





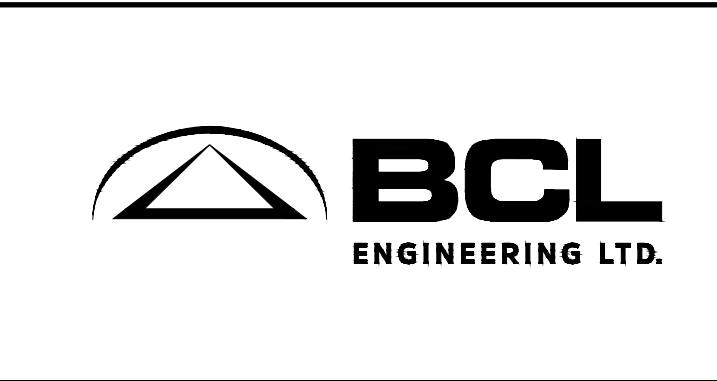
T:\gm\153 FLYING DUST FIRST NATION\05 WTP\RAW WATER MAIN\153\_05 - OVERALL DESIGN FILE - RWM.dwg 2022/07/27 4:37:16 PM

ASSOCIATION OF PROFESSIONAL ENGINEERS  
& GEOSCIENTISTS OF SASKATCHEWAN  
CERTIFICATE OF AUTHORIZATION  
**BCL ENGINEERING LTD.**  
NUMBER C0312  
PERMISSION TO CONSULT HELD BY:  
DISCIPLINE SASK. REG. No. SIGNATURE  
MUNICIPAL 9311

**PRELIMINARY ONLY  
NOT FOR CONSTRUCTION**

0 750 1500 Meters  
SCALES SHOWN REFER TO ANSI D PAPER SIZE.  
SCALES TO BE DOUBLED FOR ANSI B PAPER SIZES.

No.	REVISION	DATE	BY	STAMP
B	ISSUED FOR 90% REVIEW	2022/07/29	L.F.L.	
A	ISSUED FOR 50% REVIEW	2022/06/08	L.F.L.	

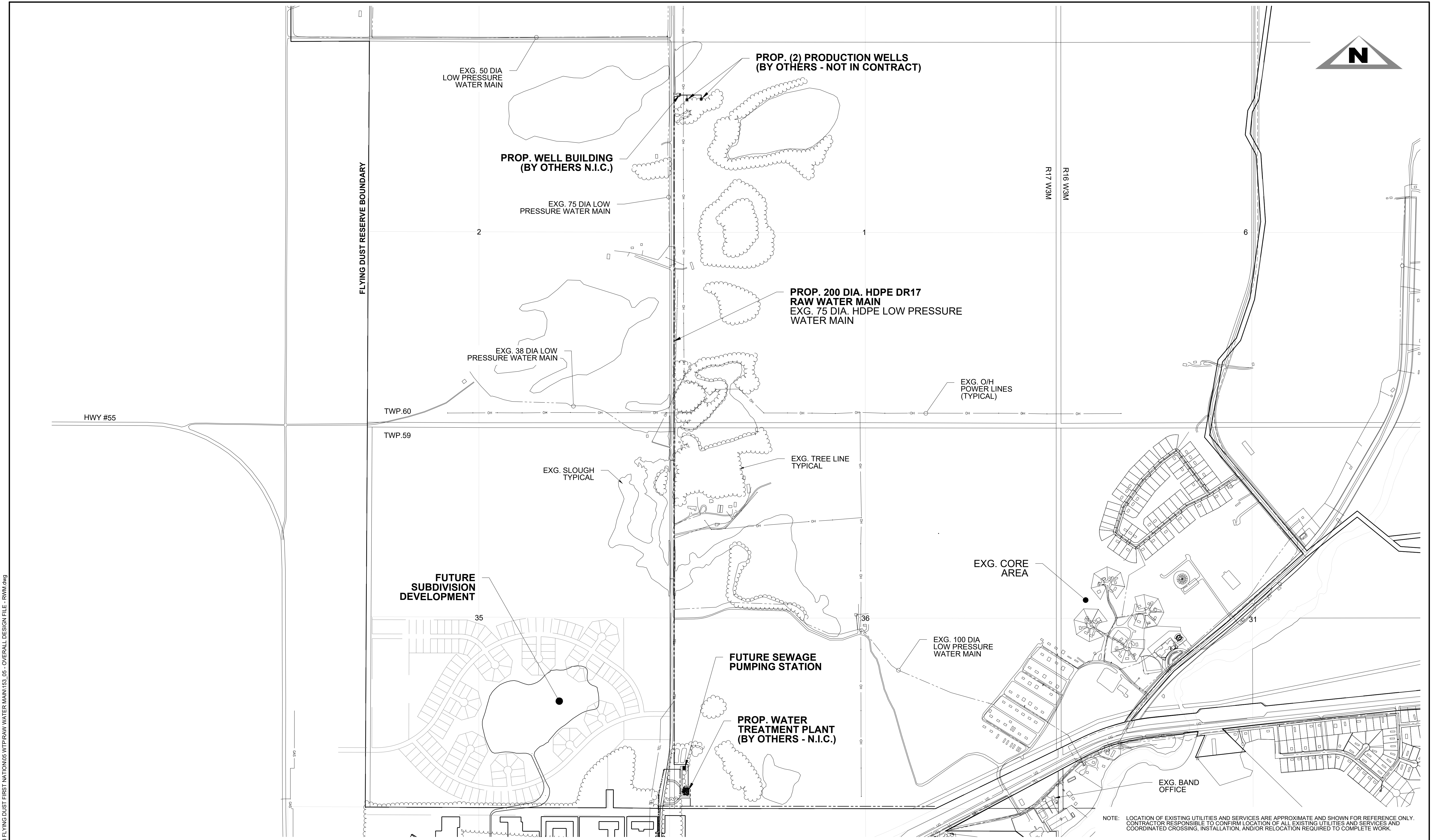


JOB No. 153.05  
DATE: 2022/07/29  
DRAWN: G.K.M.  
CHECKED: R.M.A.  
DESIGNED: L.F.L.

**FLYING DUST FIRST NATION**  
**WATER TREATMENT PLANT UPGRADES  
RAW WATER MAIN  
KEY PLAN**

SCALE: 1:15000 REV. No. **B** PROJECT No. CT608 SHEET: **01** OF **09**

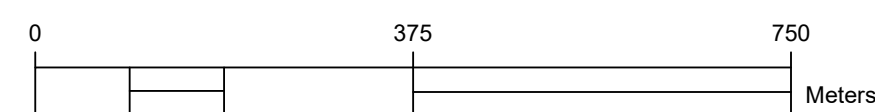




T:\gpm\153 FLYING DUST FIRST NATION\05 WTP\RAW WATER MAIN\153\_05 - OVERALL DESIGN FILE - RWM.dwg 2022/7/27 4:48:28 PM

ASSOCIATION OF PROFESSIONAL ENGINEERS  
& GEOSCIENTISTS OF SASKATCHEWAN  
CERTIFICATE OF AUTHORIZATION  
**BCL ENGINEERING LTD.**  
NUMBER C0312  
PERMISSION TO CONSULT HELD BY:  
DISCIPLINE SASK. REG. No. SIGNATURE  
MUNICIPAL 9311

**PRELIMINARY ONLY  
NOT FOR CONSTRUCTION**



SCALES SHOWN REFER TO ANSI D PAPER SIZE.  
SCALES TO BE DOUBLED FOR ANSI B PAPER SIZES.

No.	REVISION	DATE	BY	STAMP
B	ISSUED FOR 90% REVIEW	2022/07/29	L.F.L.	
A	ISSUED FOR 50% REVIEW	2022/06/08	L.F.L.	



JOB No. 153.05  
DATE: 2022/07/29  
DRAWN: G.K.M.  
CHECKED: R.M.A.  
DESIGNED: L.F.L.

**FLYING DUST FIRST NATION**

**WATER TREATMENT PLANT UPGRADES  
RAW WATER MAIN  
LOCATION PLAN**

SCALE: 1:7500 REV. No. **B** PROJECT No. CT608 SHEET: **02 OF 09**





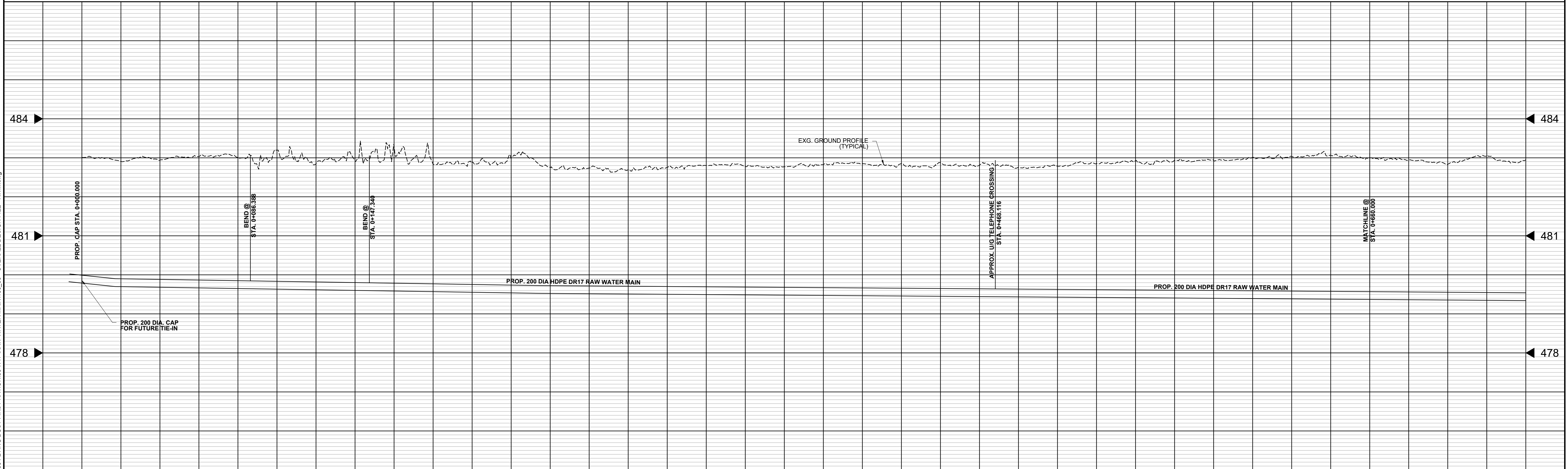
NOTE: LOCATION OF EXG. UTILITIES AND SERVICES ARE APPROXIMATE AND SHOWN FOR REFERENCE ONLY. CONTRACTOR RESPONSIBLE TO CONFIRM LOCATION OF ALL EXG. UTILITIES AND SERVICES AND COORDINATE CROSSING, INSTALLATION, AND/OR RELOCATION REQUIRE TO COMPLETE WORK.

RAW WATER MAIN TO BE INSTALLED AT LINES AND GRADES SHOWN, OR AS STAKED BY THE ENGINEER, TO BE LOCATED AT OUTSIDE DITCH EDGE AND HAVE A MINIMUM 3.0 M COVER. REFERENCE PART 23 SECTION A OF THE SPECIFICATIONS.

EXG. TREE LINE/SLOUGH SHOWN FOR ILLUSTRATIVE PURPOSES. ACTUAL TREE LINE/SLOUGH TO BE CONFIRMED BY CONTRACTOR.

BORING / DRILLING LENGTHS ARE SCHEMATIC ONLY. CONTRACTOR SHALL CONFIRM REQUIREMENTS IN FIELD.

SCALES:  
 PLAN: 1:1000 HORIZ.  
 PROFILE: 1:100 VERT.



T:\gpm\153 FLYING DUST FIRST NATION\05 WTP-RAW WATER MAIN\153\_05 - OVERALL DESIGN FILE - RWM.dwg

2022/7/27 4:48:18 PM

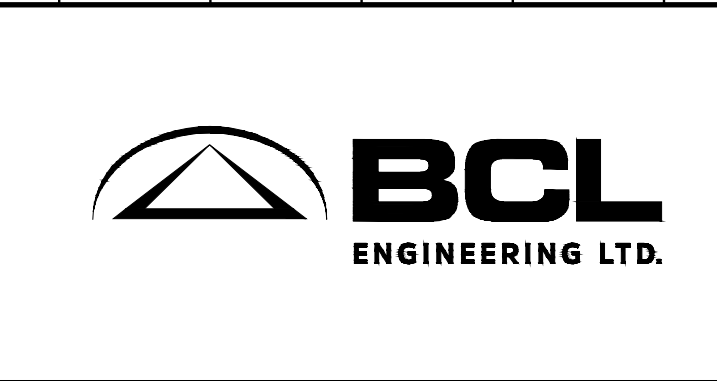
ASSOCIATION OF PROFESSIONAL ENGINEERS & GEOSCIENTISTS OF SASKATCHEWAN  
 CERTIFICATE OF AUTHORIZATION  
**BCL ENGINEERING LTD.**  
 NUMBER C0312  
 PERMISSION TO CONSULT HELD BY:  
 DISCIPLINE SASK. REG. No. SIGNATURE  
 MUNICIPAL 9311

**PRELIMINARY ONLY  
 NOT FOR CONSTRUCTION**

0 50 100 Meters

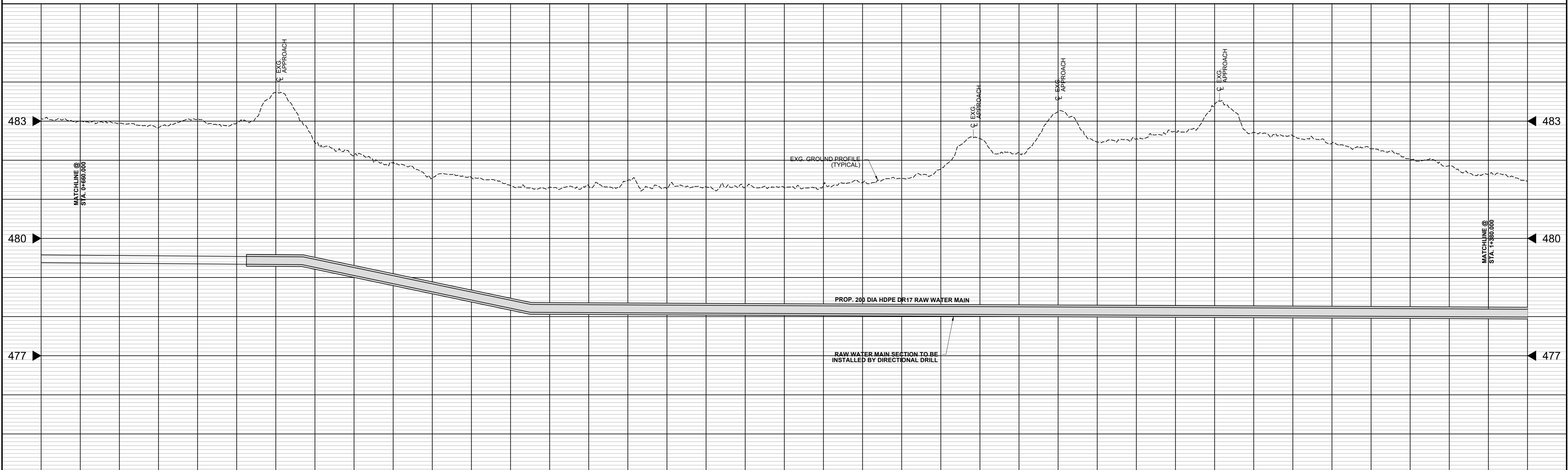
SCALES SHOWN REFER TO ANSI D PAPER SIZE.  
 SCALES TO BE DOUBLED FOR ANSI B PAPER SIZES.

No.	REVISION	DATE	BY	STAMP
B	ISSUED FOR 90% REVIEW	2022/07/29	L.F.L.	
A	ISSUED FOR 50% REVIEW	2022/06/08	L.F.L.	



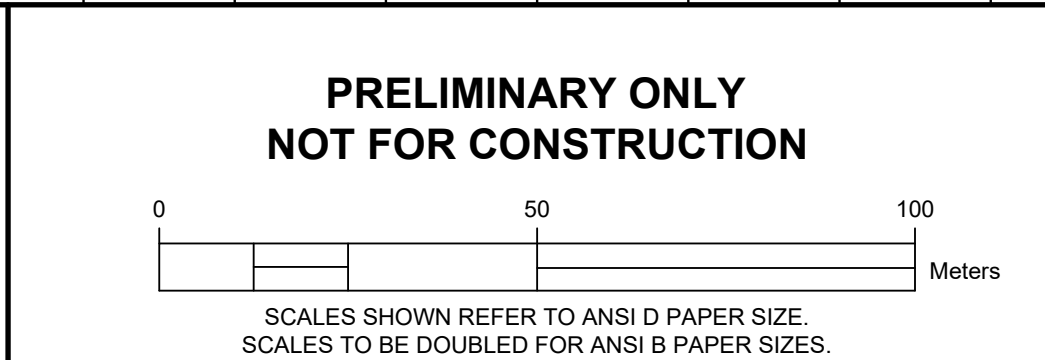
JOB No. 153.05	<b>FLYING DUST FIRST NATION</b>			
DATE: 2022/07/29	<b>WATER TREATMENT PLANT UPGRADES</b>			
DRAWN: G.K.M.	<b>RAW WATER MAIN</b>			
CHECKED: R.M.A.	<b>PLAN &amp; PROFILE</b>			
DESIGNED: L.F.L.	<b>STA 0 + 000.000 TO 0 + 660.000</b>			
SCALE: 1:1000	REV. No. <b>B</b>	PROJECT No. <b>CT608</b>	SHEET: <b>03 OF 09</b>	



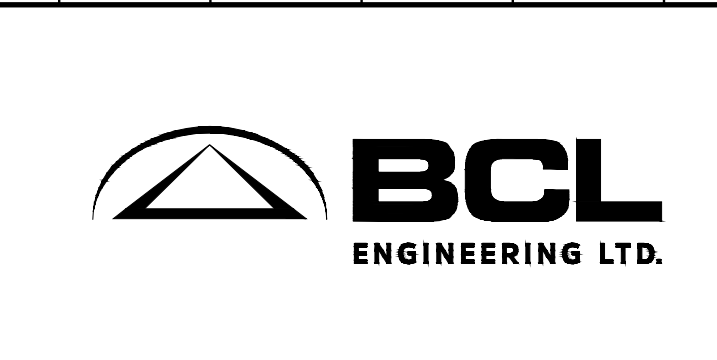


T:\dgn\153 FLYING DUST FIRST NATION\05 WTP-RAW WATER MAIN\153\_05 - OVERALL DESIGN FILE - RWM.dwg 2022/07/27 4:50:31 PM

ASSOCIATION OF PROFESSIONAL ENGINEERS & GEOSCIENTISTS OF SASKATCHEWAN  
 CERTIFICATE OF AUTHORIZATION  
**BCL ENGINEERING LTD.**  
 NUMBER C0312  
 PERMISSION TO CONSULT HELD BY:  
 DISCIPLINE SASK. REG. No. SIGNATURE  
 MUNICIPAL 9311



No.	REVISION	DATE	BY	STAMP
B	ISSUED FOR 90% REVIEW	2022/07/29	L.F.L.	
A	ISSUED FOR 50% REVIEW	2022/06/08	L.F.L.	



JOB No. 153.05  
 DATE: 2022/07/29  
 DRAWN: G.K.M.  
 CHECKED: R.M.A.  
 DESIGNED: L.F.L.

**FLYING DUST FIRST NATION**  
**WATER TREATMENT PLANT UPGRADES**  
**RAW WATER MAIN**  
**PLAN & PROFILE**  
**STA 0 + 720.000 TO 1 + 380.000**

SCALE: 1:1000  
 REV. No. **B**  
 PROJECT No. **CT608**  
 SHEET: **04 OF 09**





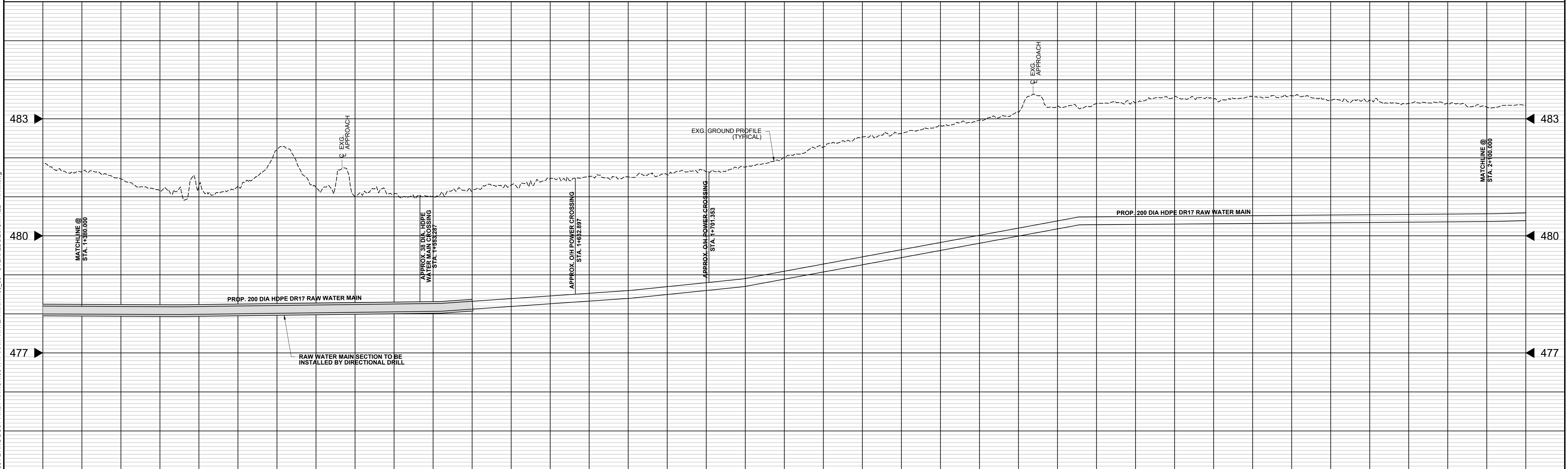
NOTE: LOCATION OF EXG. UTILITIES AND SERVICES ARE APPROXIMATE AND SHOWN FOR REFERENCE ONLY. CONTRACTOR RESPONSIBLE TO CONFIRM LOCATION OF ALL EXG. UTILITIES AND SERVICES AND COORDINATE CROSSING, INSTALLATION, AND/OR RELOCATION REQUIRE TO COMPLETE WORK.

RAW WATER MAIN TO BE INSTALLED AT LINES AND GRADES SHOWN, OR AS STAKED BY THE ENGINEER, TO BE LOCATED AT OUTSIDE DITCH EDGE AND HAVE A MINIMUM 3.0 M COVER, REFERENCE PART 23 SECTION A OF THE SPECIFICATIONS.

EXG. TREE LINE/SLOUGH SHOWN FOR ILLUSTRATIVE PURPOSES. ACTUAL TREE LINE/SLOUGH TO BE CONFIRMED BY CONTRACTOR.

BORING / DRILLING LENGTHS ARE SCHEMATIC ONLY. CONTRACTOR SHALL CONFIRM REQUIREMENTS IN FIELD.

SCALES:  
 PLAN: 1:1000 HORIZ.  
 PROFILE: 1:100 VERT.



T:\dgm\153 FLYING DUST FIRST NATION\05 WTP\RAW WATER MAIN\153\_05 - OVERALL DESIGN FILE - RWM.dwg 2022/7/27 4:51:43 PM

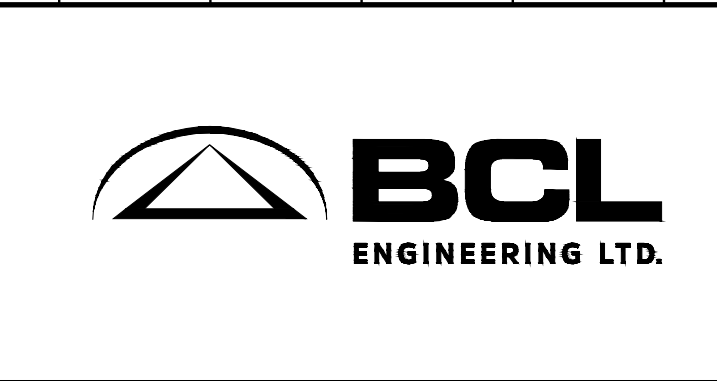
ASSOCIATION OF PROFESSIONAL ENGINEERS & GEOSCIENTISTS OF SASKATCHEWAN  
 CERTIFICATE OF AUTHORIZATION  
**BCL ENGINEERING LTD.**  
 NUMBER C0312  
 PERMISSION TO CONSULT HELD BY:  
 DISCIPLINE SASK. REG. No. SIGNATURE  
 MUNICIPAL 9311

**PRELIMINARY ONLY  
 NOT FOR CONSTRUCTION**

0 50 100 Meters

SCALES SHOWN REFER TO ANSI D PAPER SIZE.  
 SCALES TO BE DOUBLED FOR ANSI B PAPER SIZES.

No.	REVISION	DATE	BY	STAMP
B	ISSUED FOR 90% REVIEW	2022/07/29	L.F.L.	
A	ISSUED FOR 50% REVIEW	2022/06/08	L.F.L.	



JOB No. 153.05	<b>FLYING DUST FIRST NATION</b>			
DATE: 2022/07/29	<b>WATER TREATMENT PLANT UPGRADES</b>			
DRAWN: G.K.M.	<b>RAW WATER MAIN</b>			
CHECKED: R.M.A.	<b>PLAN &amp; PROFILE</b>			
DESIGNED: L.F.L.	<b>STA 1 + 380.000 TO 2 + 100.000</b>			
SCALE: 1:1000	REV. No. B	PROJECT No. CT608	SHEET: 05 OF 09	





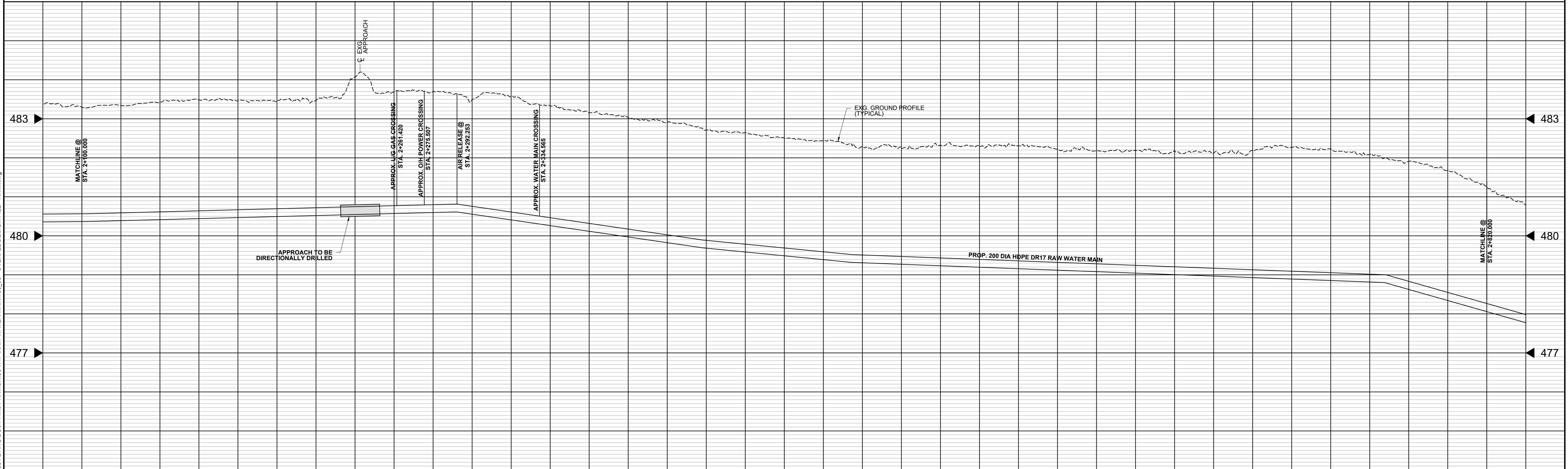
NOTE: LOCATION OF EXG. UTILITIES AND SERVICES ARE APPROXIMATE AND SHOWN FOR REFERENCE ONLY. CONTRACTOR RESPONSIBLE TO CONFIRM LOCATION OF ALL EXG. UTILITIES AND SERVICES AND COORDINATE CROSSING, INSTALLATION, AND/OR RELOCATION REQUIRE TO COMPLETE WORK.

RAW WATER MAIN TO BE INSTALLED AT LINES AND GRADES SHOWN, OR AS STAKED BY THE ENGINEER, TO BE LOCATED AT OUTSIDE DITCH EDGE AND HAVE A MINIMUM 3.0 M COVER. REFERENCE PART 23 SECTION A OF THE SPECIFICATIONS.

EXG. TREE LINE/SLOUGH SHOWN FOR ILLUSTRATIVE PURPOSES. ACTUAL TREE LINE/SLOUGH TO BE CONFIRMED BY CONTRACTOR.

BORING / DRILLING LENGTHS ARE SCHEMATIC ONLY. CONTRACTOR SHALL CONFIRM REQUIREMENTS IN FIELD.

SCALES:  
 PLAN: 1:1000 HORIZ.  
 PROFILE: 1:100 VERT.



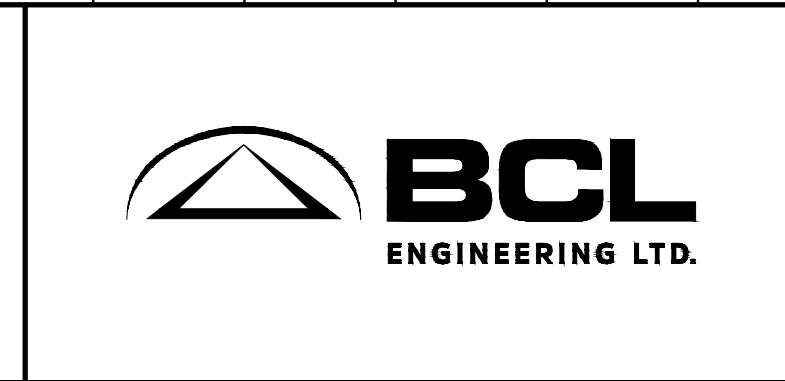
T:\dgn\153 FLYING DUST FIRST NATION\05 WTP-RAW WATER MAIN\153\_05 - OVERALL DESIGN FILE - RWM.dwg 2022/07/27 4:54:14 PM

ASSOCIATION OF PROFESSIONAL ENGINEERS & GEOSCIENTISTS OF SASKATCHEWAN  
 CERTIFICATE OF AUTHORIZATION  
**BCL ENGINEERING LTD.**  
 NUMBER C0312  
 PERMISSION TO CONSULT HELD BY:  
 DISCIPLINE SASK. REG. No. SIGNATURE  
 MUNICIPAL 9311

**PRELIMINARY ONLY  
NOT FOR CONSTRUCTION**

SCALES SHOWN REFER TO ANSI D PAPER SIZE.  
SCALES TO BE DOUBLED FOR ANSI B PAPER SIZES.

No.	REVISION	DATE	BY	STAMP
B	ISSUED FOR 90% REVIEW	2022/07/29	L.F.L.	
A	ISSUED FOR 50% REVIEW	2022/06/08	L.F.L.	

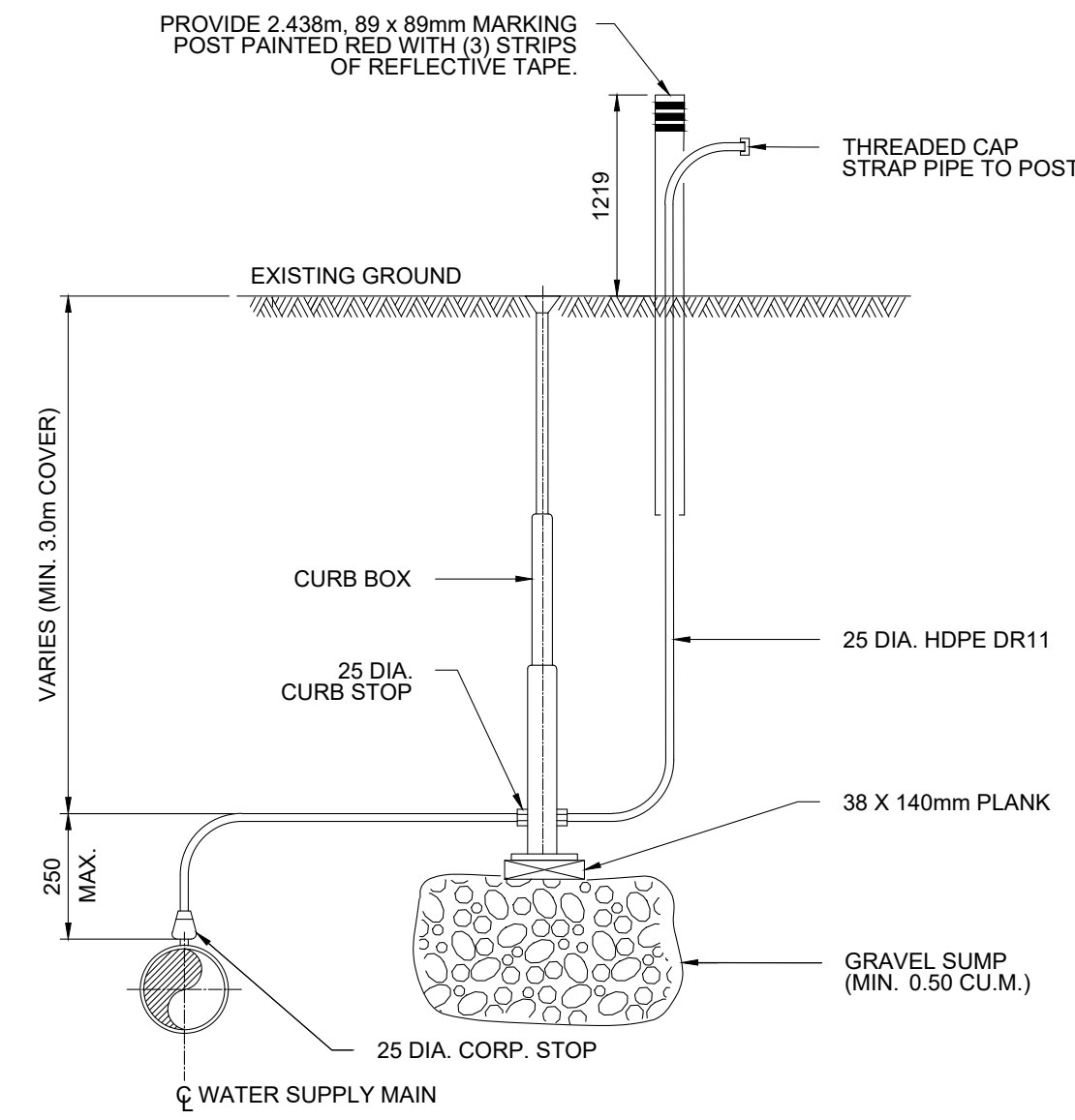


JOB No. 153.05	<b>FLYING DUST FIRST NATION</b>			
DATE: 2022/07/29	<b>WATER TREATMENT PLANT UPGRADES</b>			
DRAWN: G.K.M.	<b>RAW WATER MAIN</b>			
CHECKED: R.M.A.	<b>PLAN &amp; PROFILE</b>			
DESIGNED: L.F.L.	<b>STA 2 + 100.000 TO 2 + 820.000</b>			
SCALE: 1:1000	REV. No. <b>B</b>	PROJECT No. <b>CT608</b>	SHEET: <b>06 OF 09</b>	

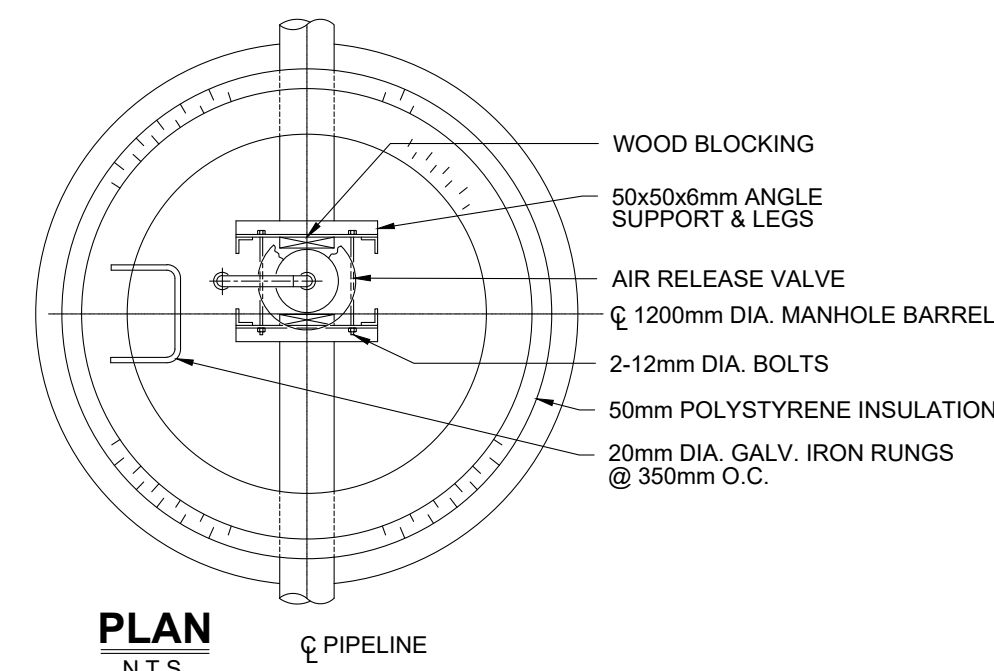




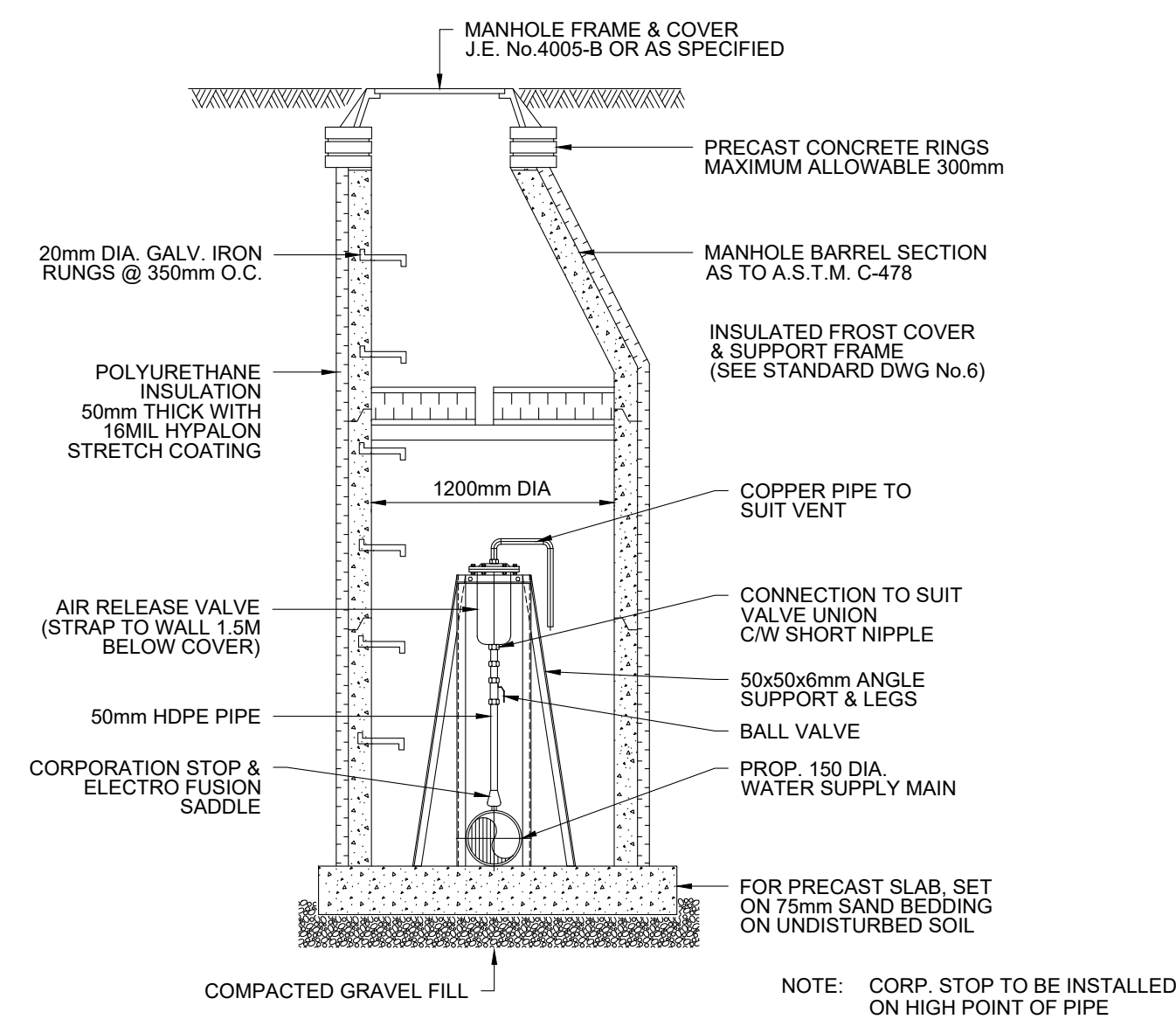




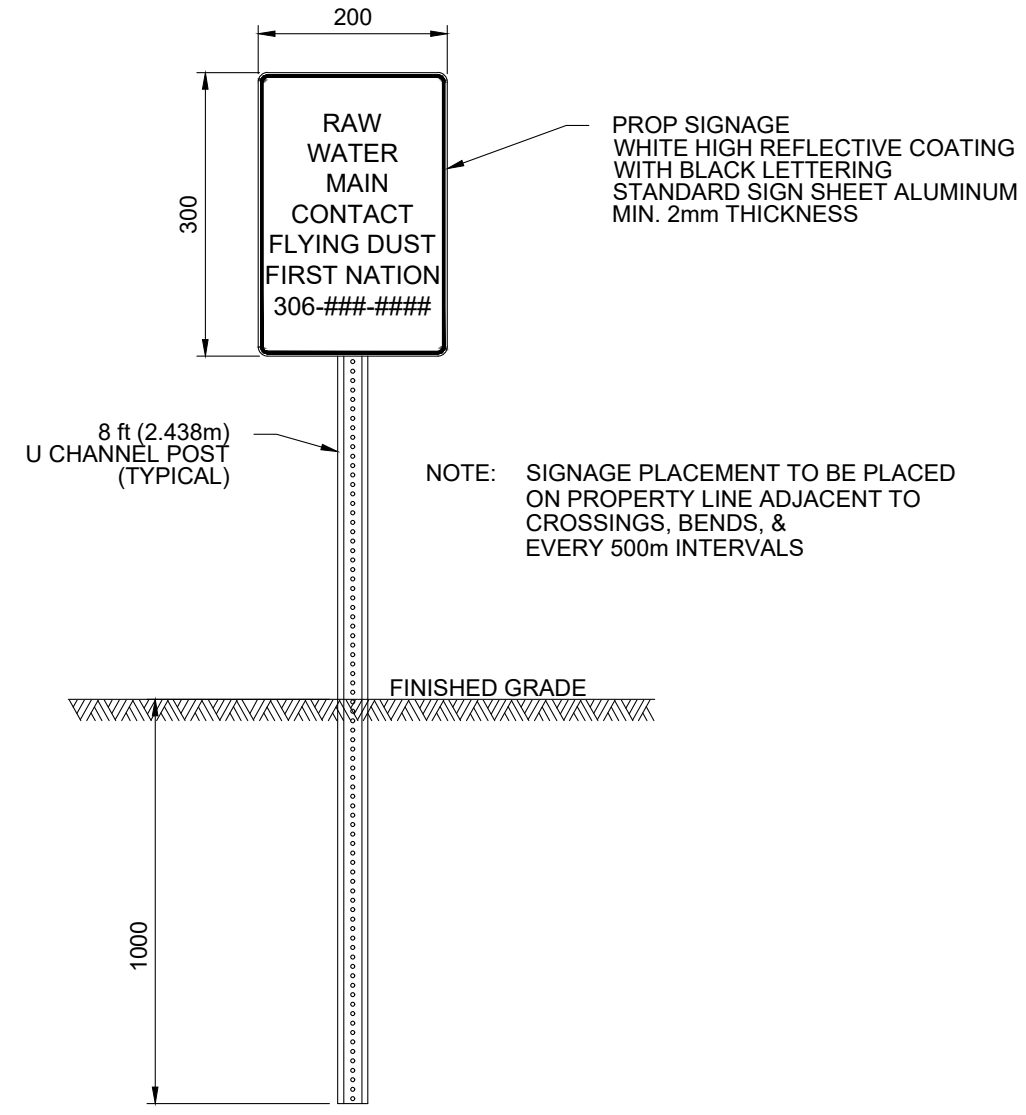
**MANUAL AIR RELEASE**  
SCALE N.T.S.



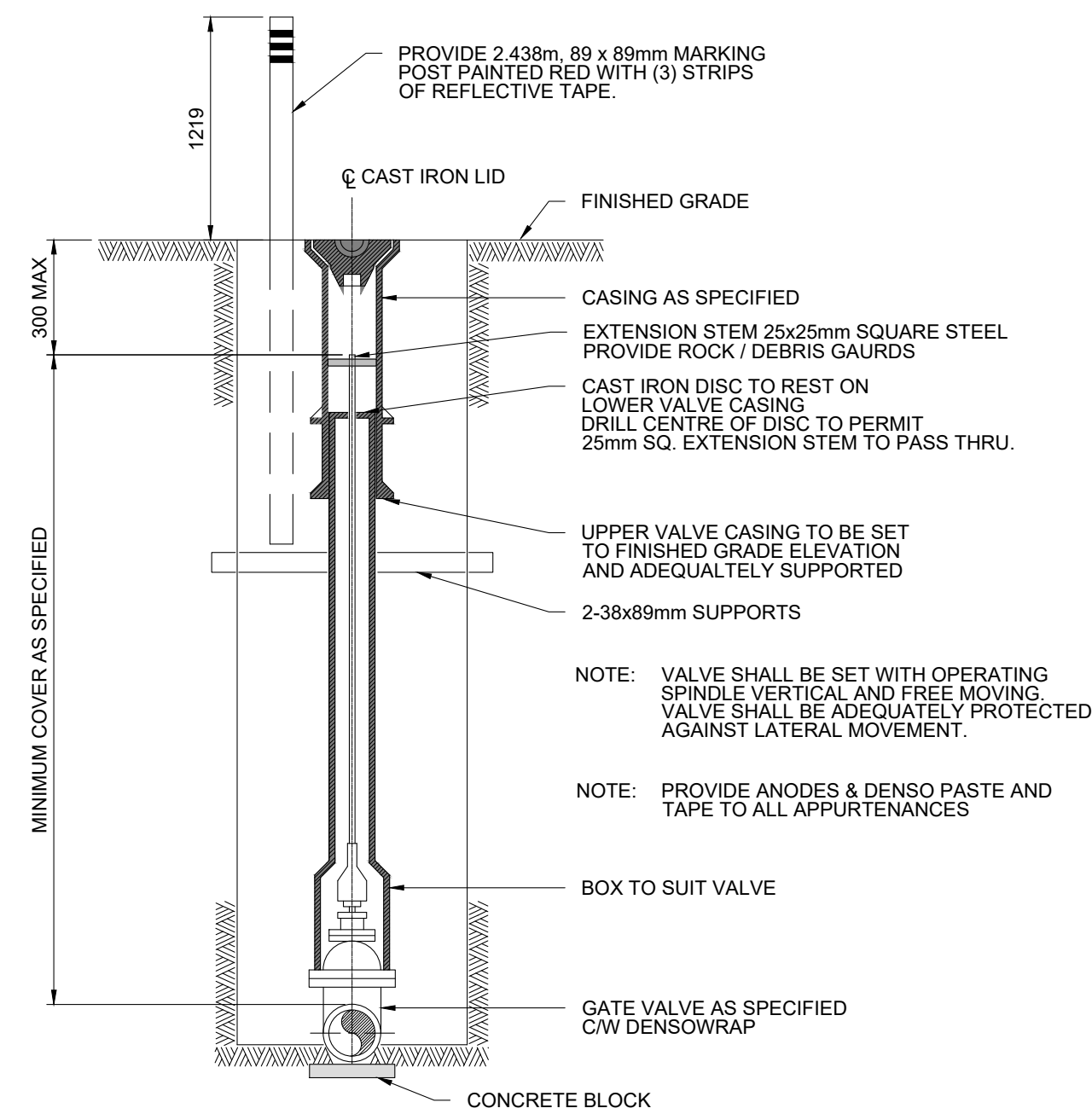
**PLAN**  
SCALE N.T.S.



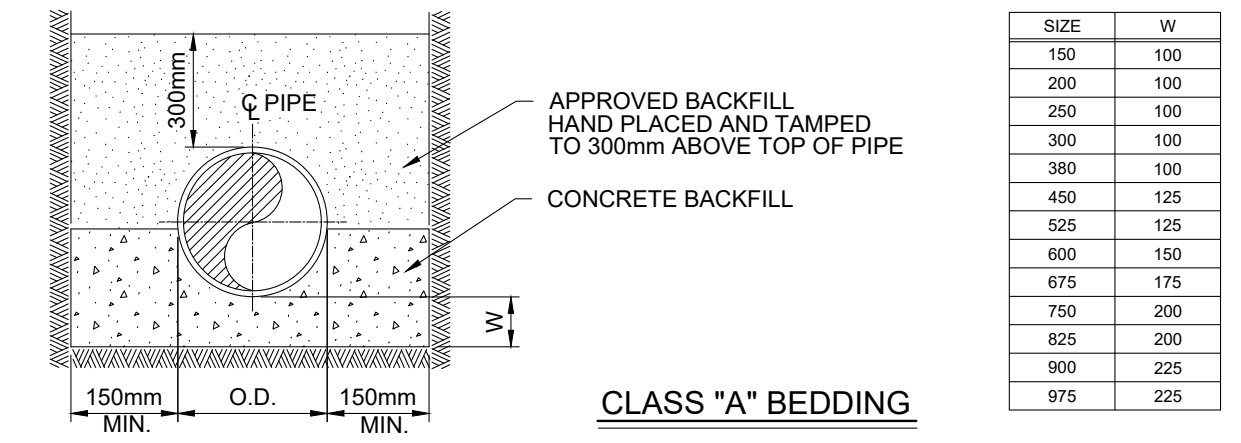
**AUTOMATIC AIR RELEASE**  
SCALE N.T.S.



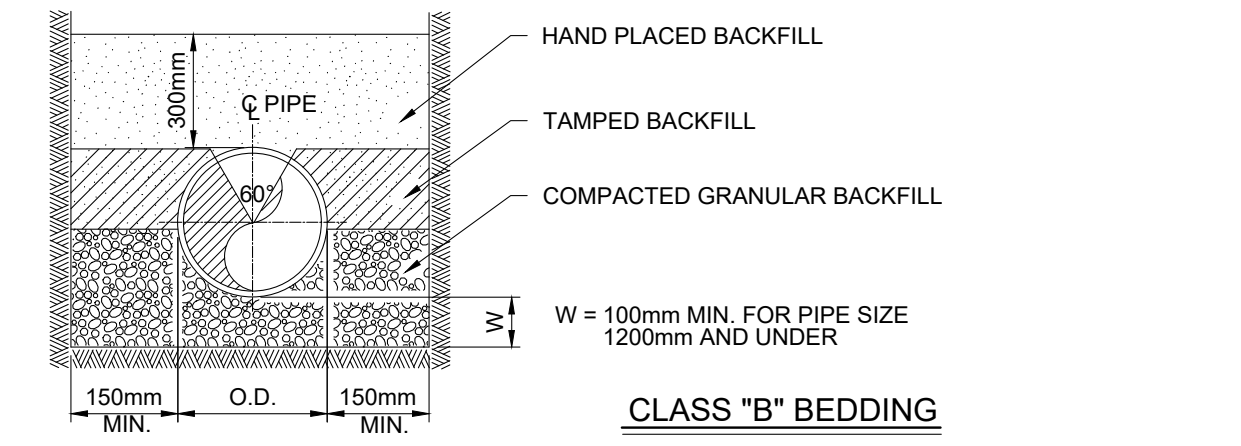
**SIGNAGE DETAIL**  
SCALE N.T.S.



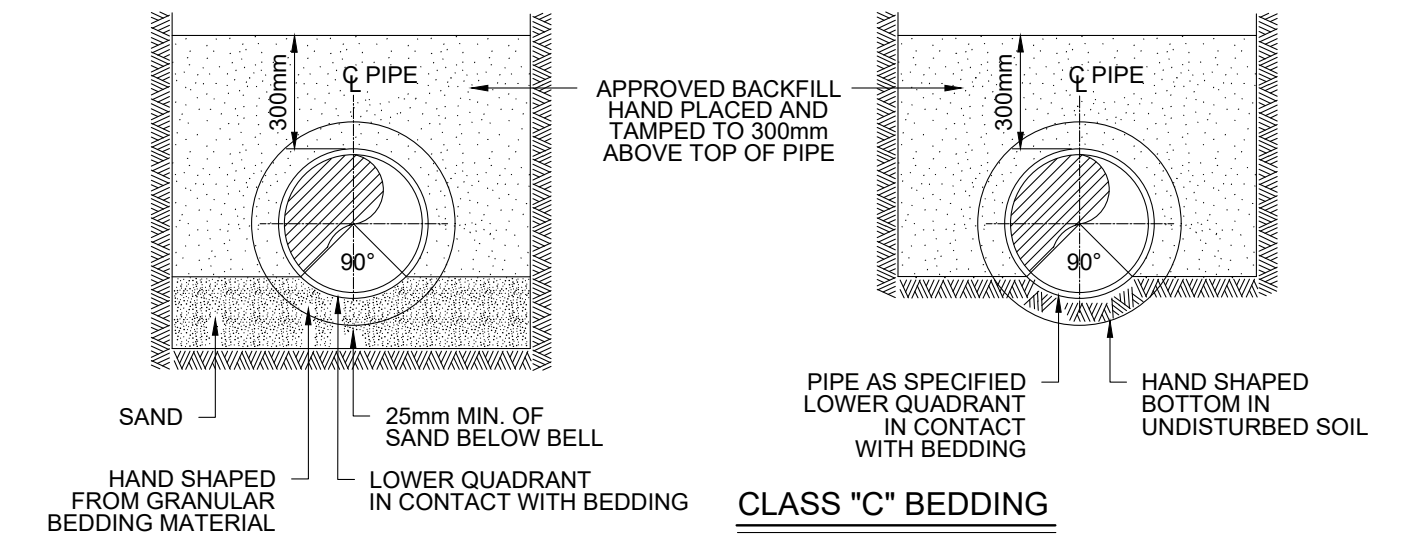
**GATE VALVE INSTALLATION**  
SCALE N.T.S.



**CLASS "A" BEDDING**

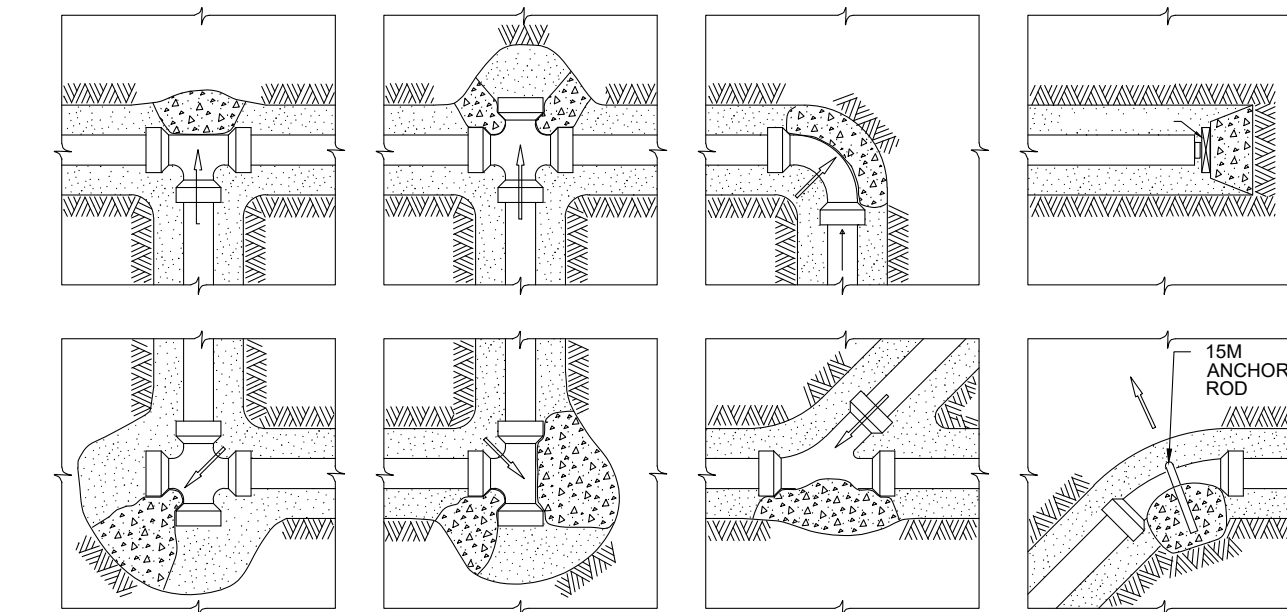


**CLASS "B" BEDDING**

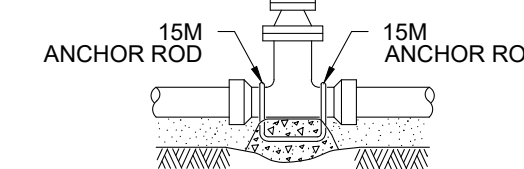


**CLASS "C" BEDDING**

**PIPE BEDDING**  
SCALE N.T.S.



**THRUST BLOCKS FOR FITTINGS**



**GATE VALVE ANCHORS**

WORKING PRESSURE kPa	SIZE OF VALVE REQUIRING ANCHORAGE
345 - 690	300 AND UP
690 - 1035	250 AND UP
1035 - 1380	ALL SIZES

THRUST AT FITTINGS						
THRUST OF WATER PRESSURE						
PIPE SIZE	DEAD END OR TEE	90° BEND	45° BEND	22 1/2° BEND	11 1/2° BEND	
100	.012	.018	.010	.005	.002	
150	.025	.036	.019	.010	.005	
200	.044	.062	.033	.017	.010	
250	.071	.100	.054	.028	.014	
300	.100	.141	.077	.039	.021	
350	.135	.190	.105	.053	.026	
400	.174	.248	.135	.068	.034	

NOTE: TO OBTAIN TOTAL THRUST AT FITTING MULTIPLY ABOVE VALUES BY MAXIMUM ALLOWABLE WORKING PRESSURE OF PIPE IN kPa

SAFE BEARING LOADS	
SOIL TYPE	SAFE BEARING LOAD kPa
SOFT CLAY	100
SAND OR HARD CLAY	250
SAND AND GRAVEL	400
SAND, GRAVEL CEMENTED WITH CLAY	500
SHALE	1000

SAMPLE CALCULATION:  
FOR WORKING PRESSURE OF 1035 kPa AND 250 DIA. PIPE AT 45° (0.054m²) IN SOFT CLAY (100kPa)  
AREA REQUIRED =  $1035 \times 0.054 = 0.559m^2$

**REACTION BLOCKING AND ANCHORAGE**  
SCALE N.T.S.

T:\dgn\153 FLYING DUST FIRST NATION\05 WTP\RAW WATER MAIN\153\_05 - OVERALL DESIGN FILE - RWM.dwg 2022/07/27 4:40:24 PM

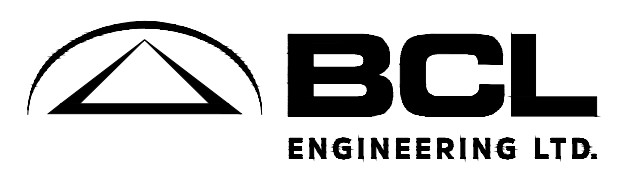
ASSOCIATION OF PROFESSIONAL ENGINEERS & GEOSCIENTISTS OF SASKATCHEWAN CERTIFICATE OF AUTHORIZATION  
**BCL ENGINEERING LTD.**  
NUMBER C0312  
PERMISSION TO CONSULT HELD BY:  
DISCIPLINE SASK. REG. No. SIGNATURE  
MUNICIPAL 9311

**PRELIMINARY ONLY  
NOT FOR CONSTRUCTION**

0 1.25 2.5 Meters

SCALES SHOWN REFER TO ANSI D PAPER SIZE.  
SCALES TO BE DOUBLED FOR ANSI B PAPER SIZES.

No.	REVISION	DATE	BY	STAMP
B	ISSUED FOR 90% REVIEW	2022/07/29	L.F.L.	
A	ISSUED FOR 50% REVIEW	2022/06/08	L.F.L.	



JOB No.	153.05	<b>FLYING DUST FIRST NATION</b>		
DATE:	2022/07/29	<b>WATER TREATMENT PLANT UPGRADES RAW WATER MAIN MISCELLANEOUS DETAILS</b>		
DRAWN:	G.K.M.	SCALE:	1:25	REV. No. <b>B</b>
CHECKED:	R.M.A.	PROJECT No.	CT608	SHEET: <b>08</b> OF <b>09</b>
DESIGNED:	L.F.L.			