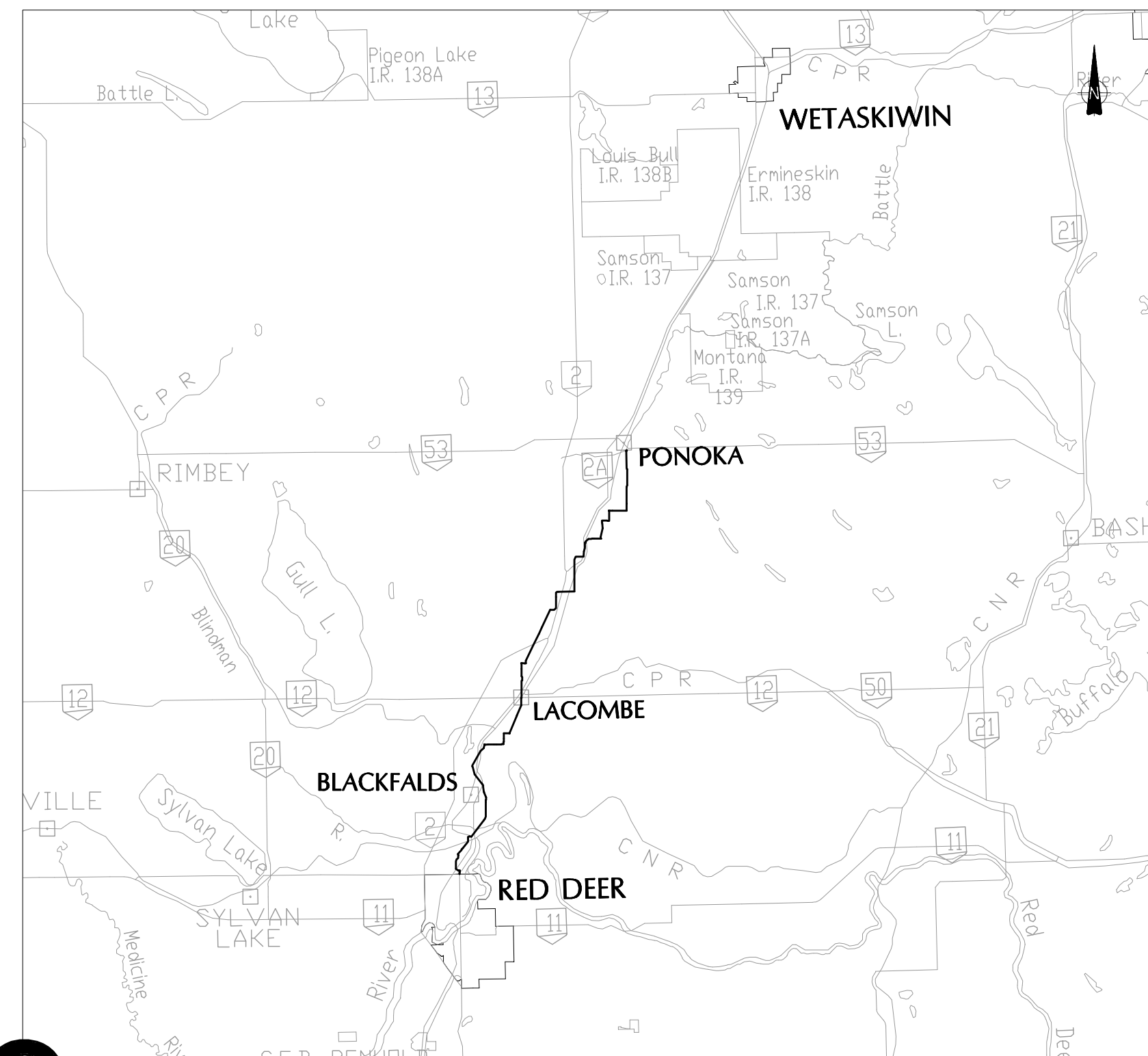


NORTH RED DEER RIVER WATER SERVICES COMMISSION ALBERTA

WATER TRANSMISSION PIPELINE CONTRACT No. 3 RECORD DRAWINGS



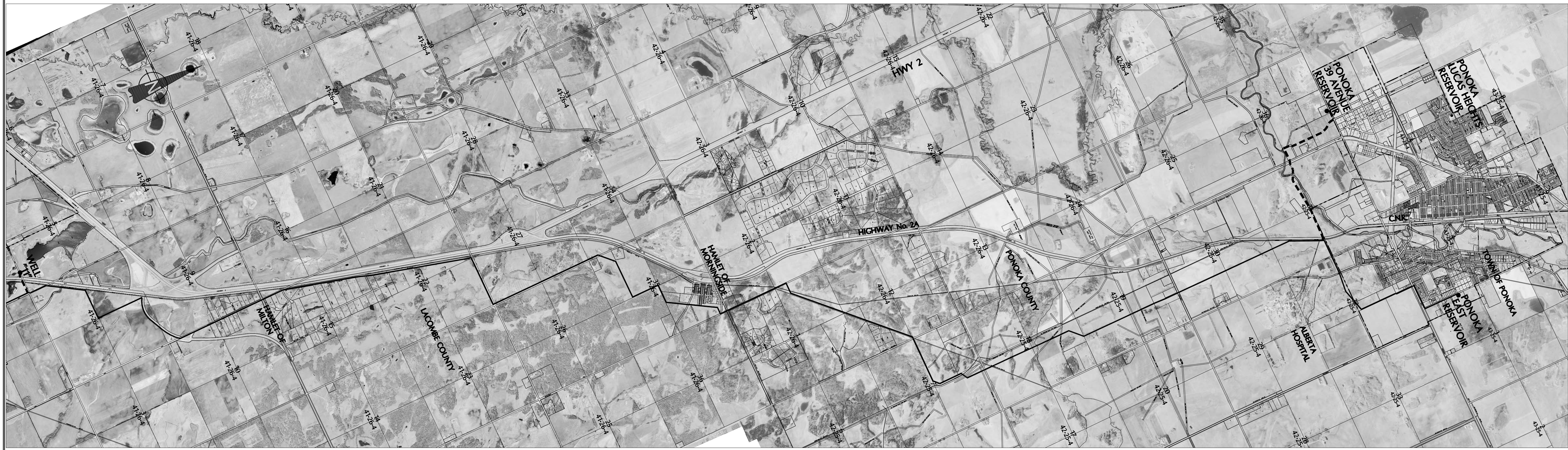
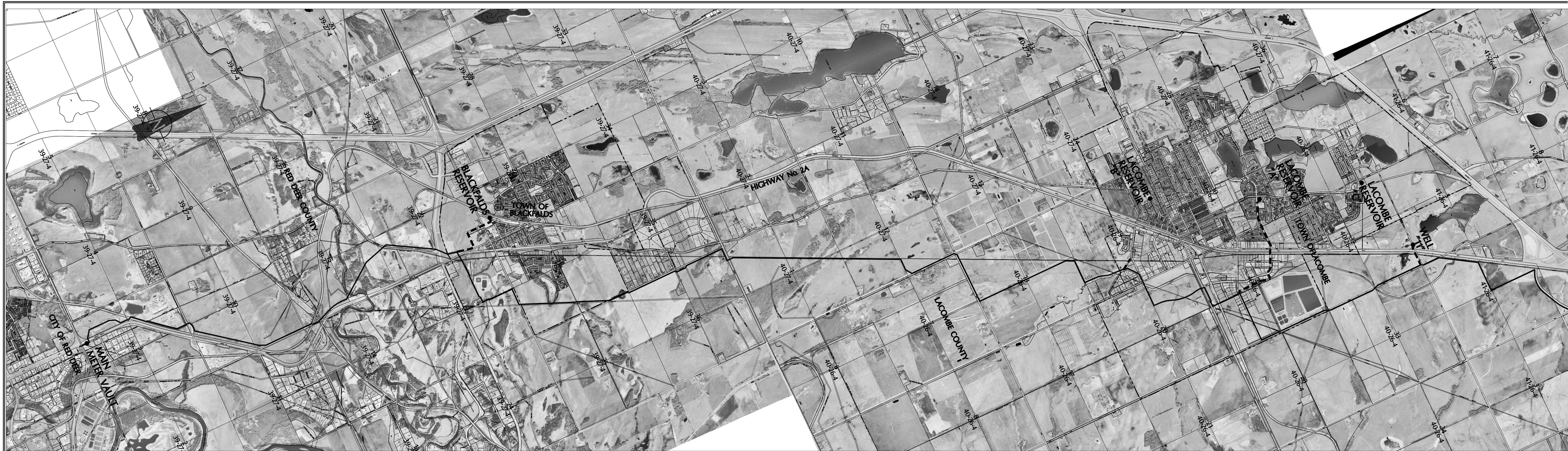
KEY PLAN

ASSOCIATED
ENGINEERING



LIST OF DRAWINGS

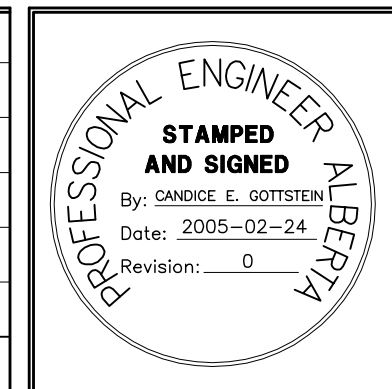
CIVIL		
3333-3-101	OVERALL LOCATION PLAN	
3333-3-102	OVERALL INDEX PLAN	
3333-3-103	PLAN PROFILE - BLACKFALDS - STA. 100+000.00 TO STA. 100+600.00	
3333-3-104	PLAN PROFILE - BLACKFALDS - STA. 100+600.00 TO STA. 100+999.75	
3333-3-105	PLAN PROFILE - LACOMBE - STA. 110+000.00 TO STA. 110+207.14	
3333-3-106	PLAN PROFILE - LACOMBE A - STA. 120+000.00 TO STA. 120+700.00	
3333-3-107	PLAN PROFILE - LACOMBE A - STA. 120+700.00 TO STA. 121+350.00	
3333-3-108	PLAN PROFILE - LACOMBE A - STA. 121+350.00 TO STA. 121+897.72	
3333-3-109	PLAN PROFILE - LACOMBE B WELL "9" - STA. 130+000.00 TO STA. 130+332.68	
3333-3-110	PLAN PROFILE - PONOKA 39AVE. - STA. 140+000.00 TO STA. 140+750.00	
3333-3-111	PLAN PROFILE - PONOKA 39AVE. - STA. 140+750.00 TO STA. 141+500.00	
3333-3-112	PLAN PROFILE - PONOKA 39AVE. - STA. 141+500.00 TO STA. 142+260.50	
3333-3-113	PLAN PROFILE - PONOKA 39AVE. - STA. 142+260.50 TO STA. 142+720.49	
3333-3-114	SITE PLAN - MAIN METER VAULT AND PONOKA - EAST RESERVOIR	
3333-3-115	CROSSING PLAN - A	
3333-3-116	CROSSING PLAN - B	
3333-3-117	CROSSING PLAN - C	
3333-3-118	DETAILS No. 1	
3333-3-119	DETAILS No. 2	
3333-3-120	DETAILS No. 3	
3333-3-121	BATTLE RIVER CROSSING	
STRUCTURAL		
3333-3-301	MAINLINE METER/VALVE VAULT PLAN, SECTIONS AND DETAILS	
3333-3-302	TOWN OF PONOKA 39th Ave RESERVOIR METER VAULT PLANS AND DETAILS	
3333-3-303	TOWN OF PONOKA EAST RESERVOIR METER VAULT PLANS AND DETAILS OPTION A	
3333-3-304	TOWN OF PONOKA EAST RESERVOIR METER VAULT PLANS AND DETAILS OPTION B	
3333-3-305	METER/VAULT VAULTS TYPICAL DETAILS AND GENERAL NOTES	
PROCESS/MECHANICAL		
3333-3-401	COMPOSITE PIPING LEGEND	3333-3-418 RESERVOIR FILL LINE BLACKFALDS WTP/RESERVOIR SECTION (SHEET 1)
3333-3-402	COMMODITY, EQUIPMENT, PIPE AND VALVE IDENTIFICATION LEGEND	3333-3-419 RESERVOIR FILL LINE BLACKFALDS WTP/RESERVOIR SECTION (SHEET 2)
3333-3-403	INSTRUMENTATION LEGEND	3333-3-420 RESERVOIR FILL LINE LACOMBE RESERVOIR "A" PUMPHOUSE PLAN
3333-3-404	P & I DIAGRAM TRANSMISSION LINE MAIN METER VAULT	3333-3-421 RESERVOIR FILL LINE LACOMBE RESERVOIR "A" MODIFIED PIPING SECTION
3333-3-405	P & I DIAGRAM TOWN OF BLACKFALDS RESERVOIR FILL SYSTEM	3333-3-422 RESERVOIR FILL LINE LACOMBE RESERVOIR "B" PUMPHOUSE PLAN
3333-3-406	P & I DIAGRAM TOWN OF LACOMBE RESERVOIR "A" FILL SYSTEM	3333-3-423 RESERVOIR FILL LINE LACOMBE RESERVOIR "B" MODIFIED PIPING SECTION
3333-3-407	P & I DIAGRAM TOWN OF LACOMBE RESERVOIR "B" FILL SYSTEM	3333-3-424 RESERVOIR FILL LINE LACOMBE RESERVOIR "C" MODIFIED PIPING PLAN
3333-3-408	P & I DIAGRAM TOWN OF LACOMBE RESERVOIR "C" FILL SYSTEM	3333-3-425 RESERVOIR FILL LINE LACOMBE RESERVOIR "C" MODIFIED PIPING SECTIONS
3333-3-409	P & I DIAGRAM TOWN OF PONOKA 39th Ave RESERVOIR FILL SYSTEM	3333-3-426 TOWN OF PONOKA 39th Ave RESERVOIR PUMPHOUSE AND VAULT PLAN
3333-3-410	P & I DIAGRAM TOWN OF PONOKA LUCAS HEIGHTS RESERVOIR	3333-3-427 TOWN OF PONOKA 39th Ave RESERVOIR PH AND VAULT SECTION
3333-3-411	P & I DIAGRAM PONOKA AND MONTANA FIRST NATION WATER SUPPLY SYSTEMS OPTION A	3333-3-428 TOWN OF PONOKA EAST RESERVOIR METER VAULT PLAN OPTION A
3333-3-412	P & I DIAGRAM PONOKA AND MONTANA FIRST NATION WATER SUPPLY SYSTEMS	3333-3-429 TOWN OF PONOKA EAST RESERVOIR METER VAULT PLAN & SECTION
3333-3-415	MAIN METER VAULT PLAN AND SECTION	3333-3-430 TOWN OF PONOKA EAST RESERVOIR METER VAULT SECTIONS
3333-3-416	RESERVOIR FILL LINE BLACKFALDS WTP/RESERVOIR LOWER FLOOR PLAN	3333-3-431 TOWN OF PONOKA LUCAS HEIGHTS PUMP STATION MODIFY FILL PIPING SYSTEM
3333-3-417	RESERVOIR FILL LINE BLACKFALDS WTP/RESERVOIR MAIN FLOOR PLAN	
ELECTRICAL		
3333-3-610	ELECTRICAL SITE PLAN	
3333-3-611	MAIN LINE METER VAULT - ELECTRICAL LAYOUT	
3333-3-612	MAIN LINE METER VAULT - SINGLE LINE DIAGRAM, PANEL LAYOUTS AND DETAILS	
3333-3-613	EAST RESERVOIR METER VAULT - PONOKA, ALBERTA - ELECTRICAL LAYOUT	
3333-3-614	EAST RESERVOIR METER VAULT - PONOKA, ALBERTA - ELECTRICAL LAYOUT	
3333-3-615	39 AVE. RESERVOIR OPTION 'A' - PONOKA, ALBERTA - PH AND METER VAULT -ELECTRICAL LAYOUT	
3333-3-616	39 AVE. RESERVOIR OPTION 'B' - PONOKA, ALBERTA - PH AND METER VAULT -ELECTRICAL LAYOUT	
3333-3-617	39 AVE. RESERVOIR - PONOKA, ALBERTA - SINGLE LINE DIAGRAM, PANEL LAYOUTS AND DETAILS - OPTION A & B	
INSTRUMENTATION		
3333-3-701	TYPICAL CABINET LAYOUT, POWER CONTROL SCHEMATIC AND MOUNTING DETAILS	
3333-3-702	TYPICAL I/O CARD WIRING DIAGRAM - SHEET 1 OF 2	
3333-3-703	TYPICAL I/O CARD WIRING DIAGRAM - SHEET 2 OF 2	



Title: 13-14-01
 Date: Jun 01, 2005
 Drawn: J. WONG
 Checked: K. CH'NG
 Approved: B. BIRCH
 Project: 0333-3-101
 Contract: 3333-3-101

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE	1:30,000		

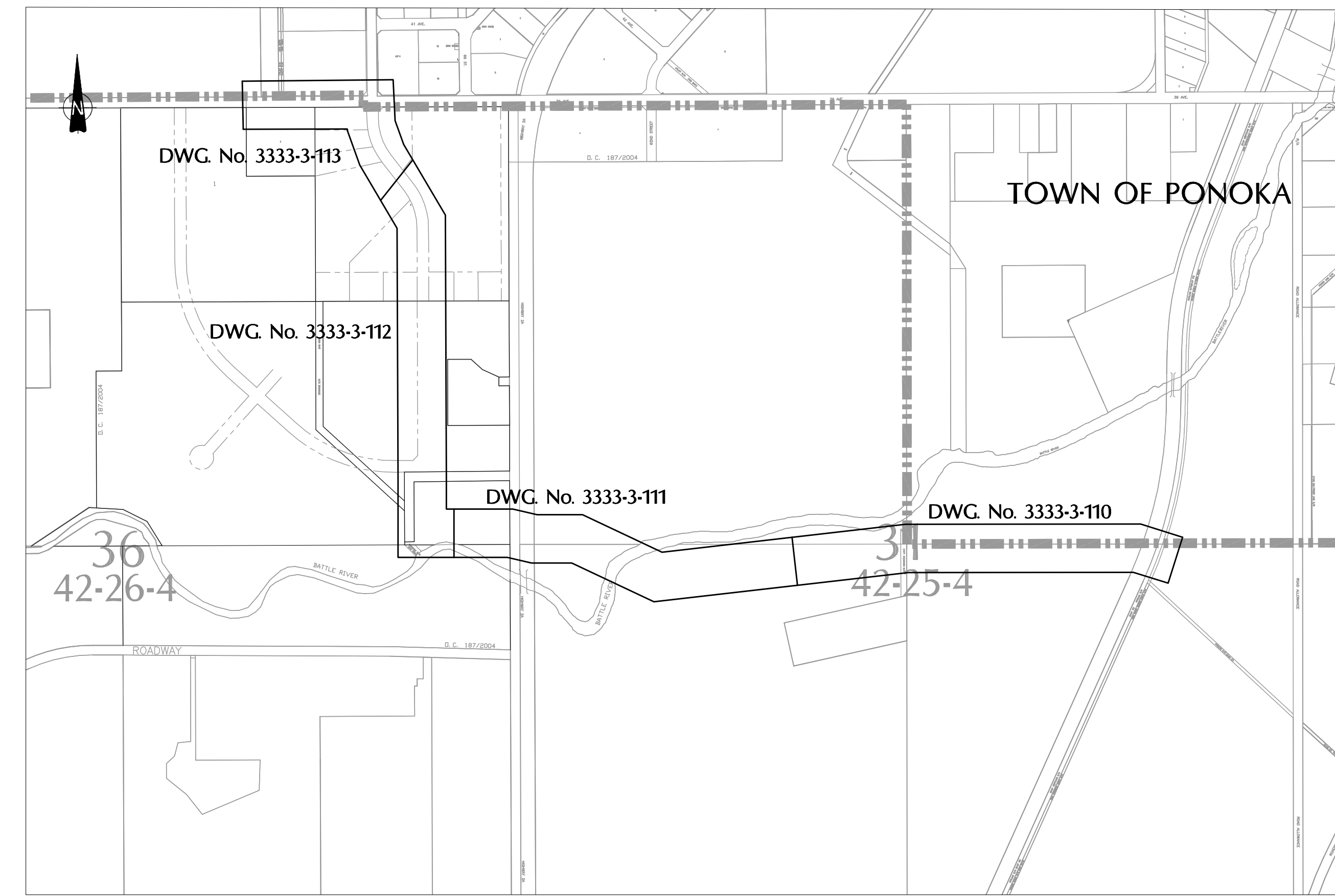
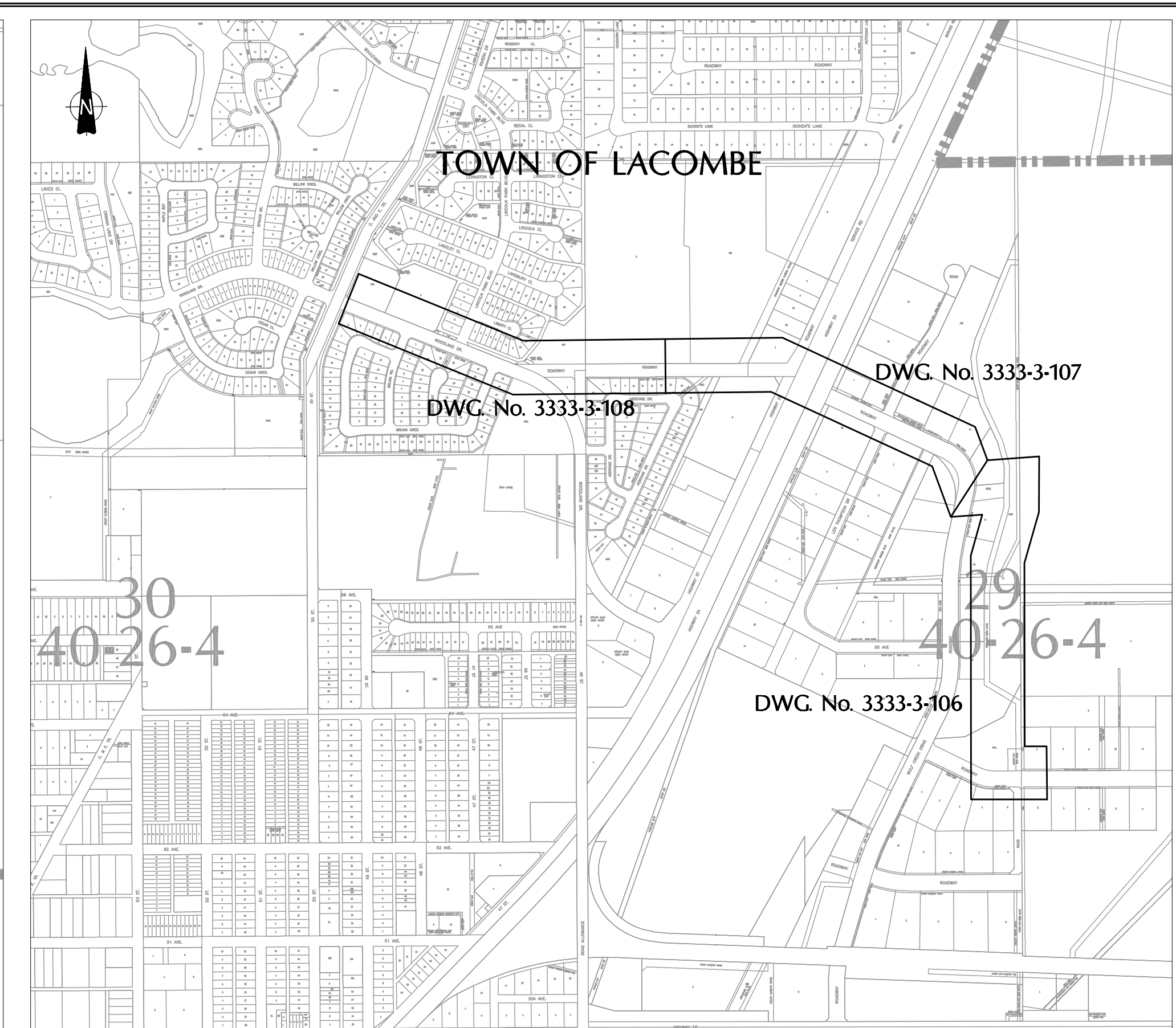
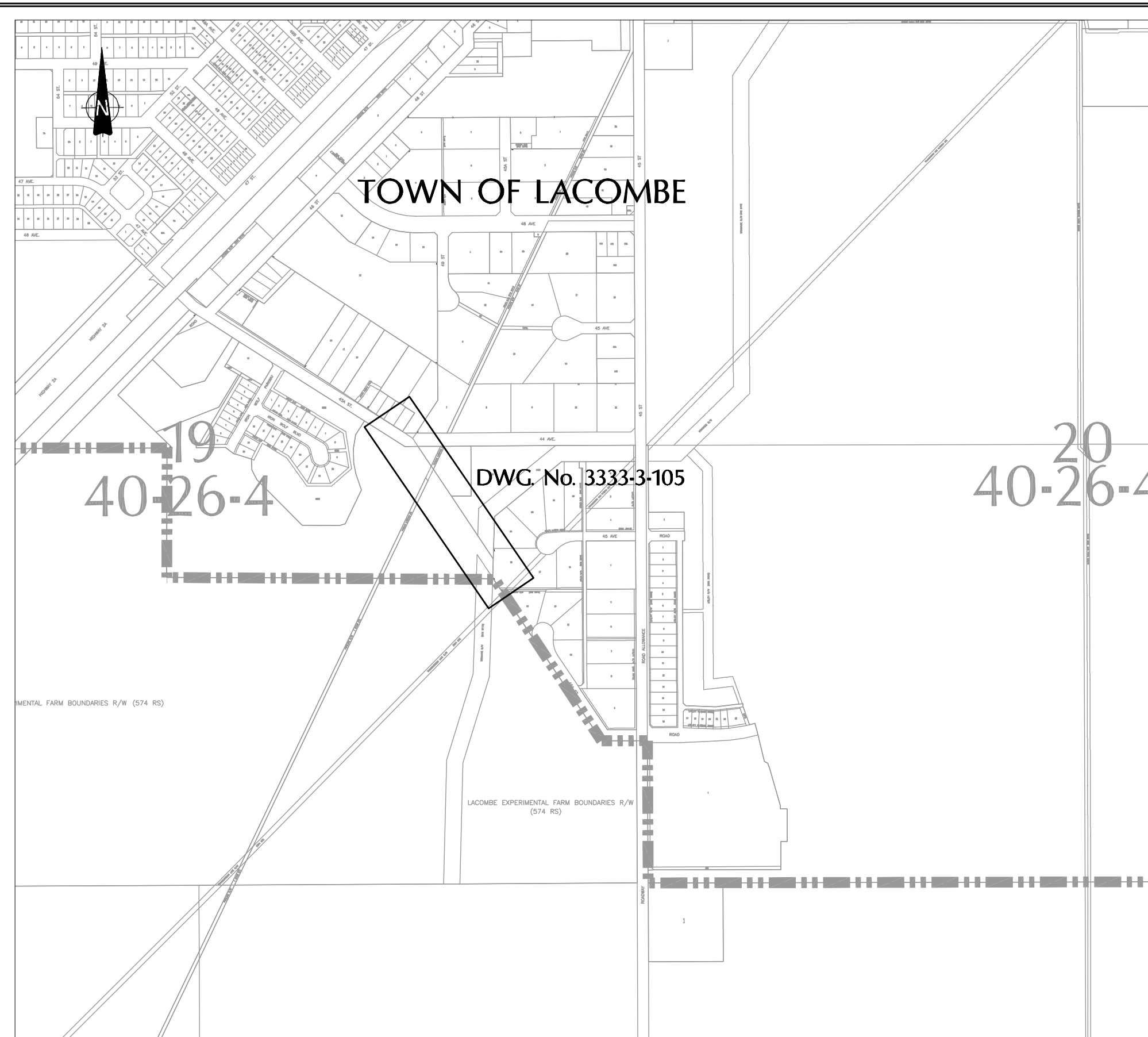
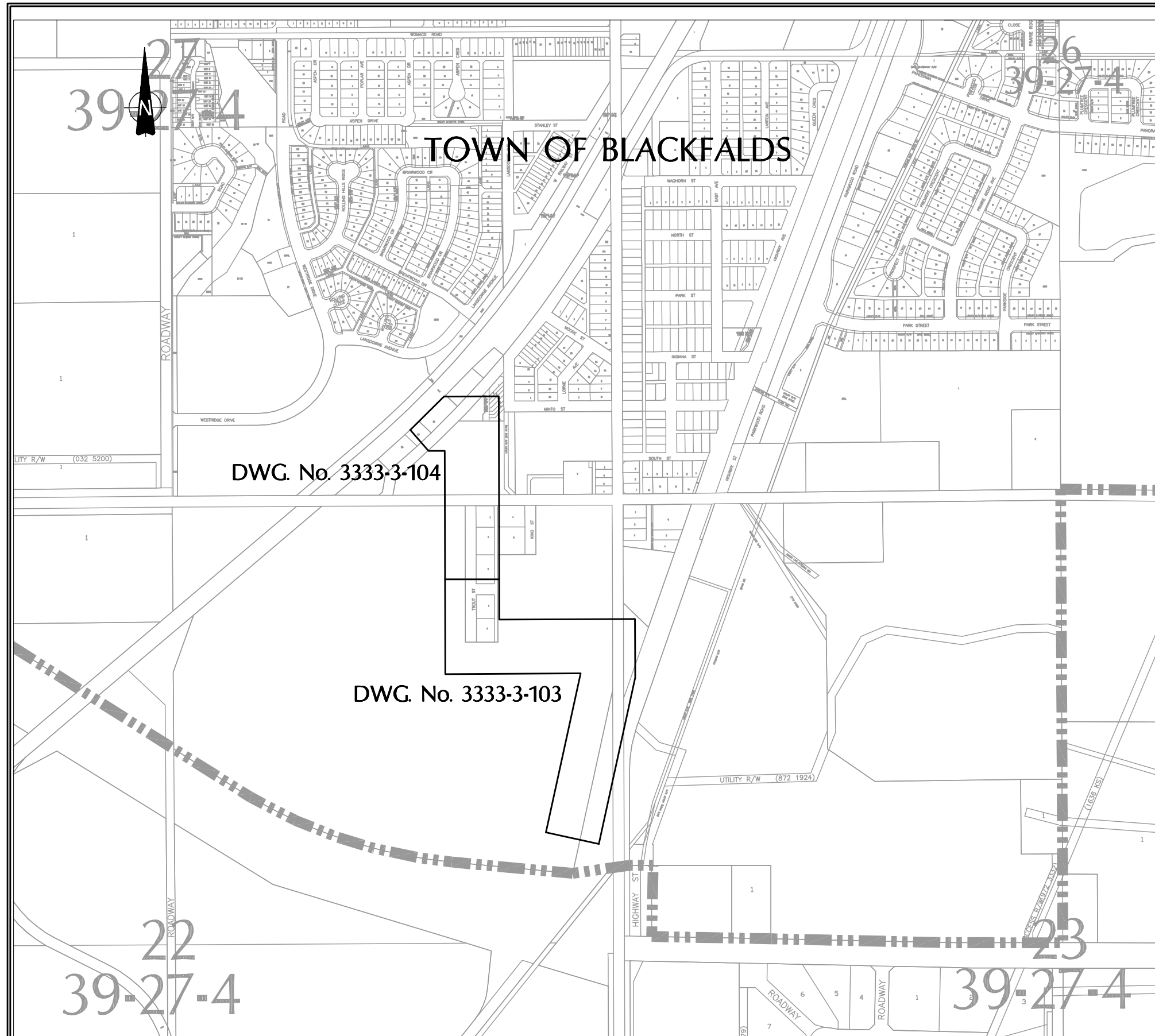


PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0



CLIENT
 NORTH RED DEER RIVER
 WATER SERVICES COMMISSION
 ALBERTA
 PROJECT
 WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE		
OVERALL LOCATION PLAN		
DRAWING NUMBER	REV. NO.	SHEET
3333-3-101	2	1/66



GENERAL NOTES:

- 1.) EXISTING UTILITY LOCATIONS ARE APPROXIMATELY ONLY. THE CONTRACTOR IS RESPONSIBLE TO LOCATE AND CONFIRM THE ELEVATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION.
- 2.) ALBERTA FIRST CALL TO BE CONTACTED 48 HOURS PRIOR TO CONSTRUCTION. [PHONE : 1-800-242-3447]
- 3.) REFER TO SPEC. - APPENDIX B : GEOTECHNICAL REPORT
- 4.) SUPPLY AND INSTALL CROSSING MARKERS AT HIGHWAY, COUNTY ROAD, RIVER AND RAILWAY CROSSINGS; AND AT DESIGNATED UTILITY CROSSINGS, QUARTER SECTION/PROPERTY LINES.
- 5.) MINIMUM DEPTH OF COVER 2.80m EXCEPT WHEN SHOWN OTHERWISE.

SURVEY CONTROL MONUMENTS (NAD83 3TM GRID COORDINATE)

MONUMENT NO.	EASTING	NORTHING	ELEVATION
295782	12676.456	5798865.263	877.579
6973	13132.393	5799958.600	883.361
443606	13854.961	5803741.794	866.206
307520	14726.018	5804731.401	882.773

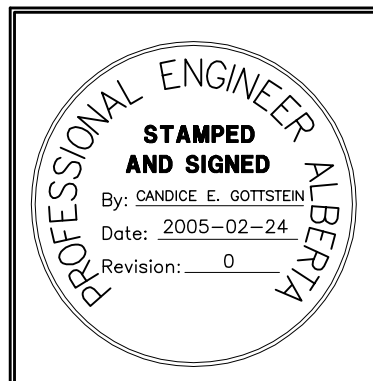
CO-ORDINATE AND ELEVATION VALUES SHOWN WERE OBTAINED FROM ALBERTA SURVEY CONTROL MARKER (ASCM) CONTRACTOR TO VERIFY VALUES PRIOR TO USE FOR LAYOUT. COMBINED FACTOR 0.999774

Title: 10/10/05
 Date: 04/12/20
 Drawn by: W. WONG
 Checked by: K. CH'NG
 Approved by: B. BIRCH
 Project No.: 0333-3-102
 Contract No.: 3333-3-102

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE	1:15000		

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE	1:15000		

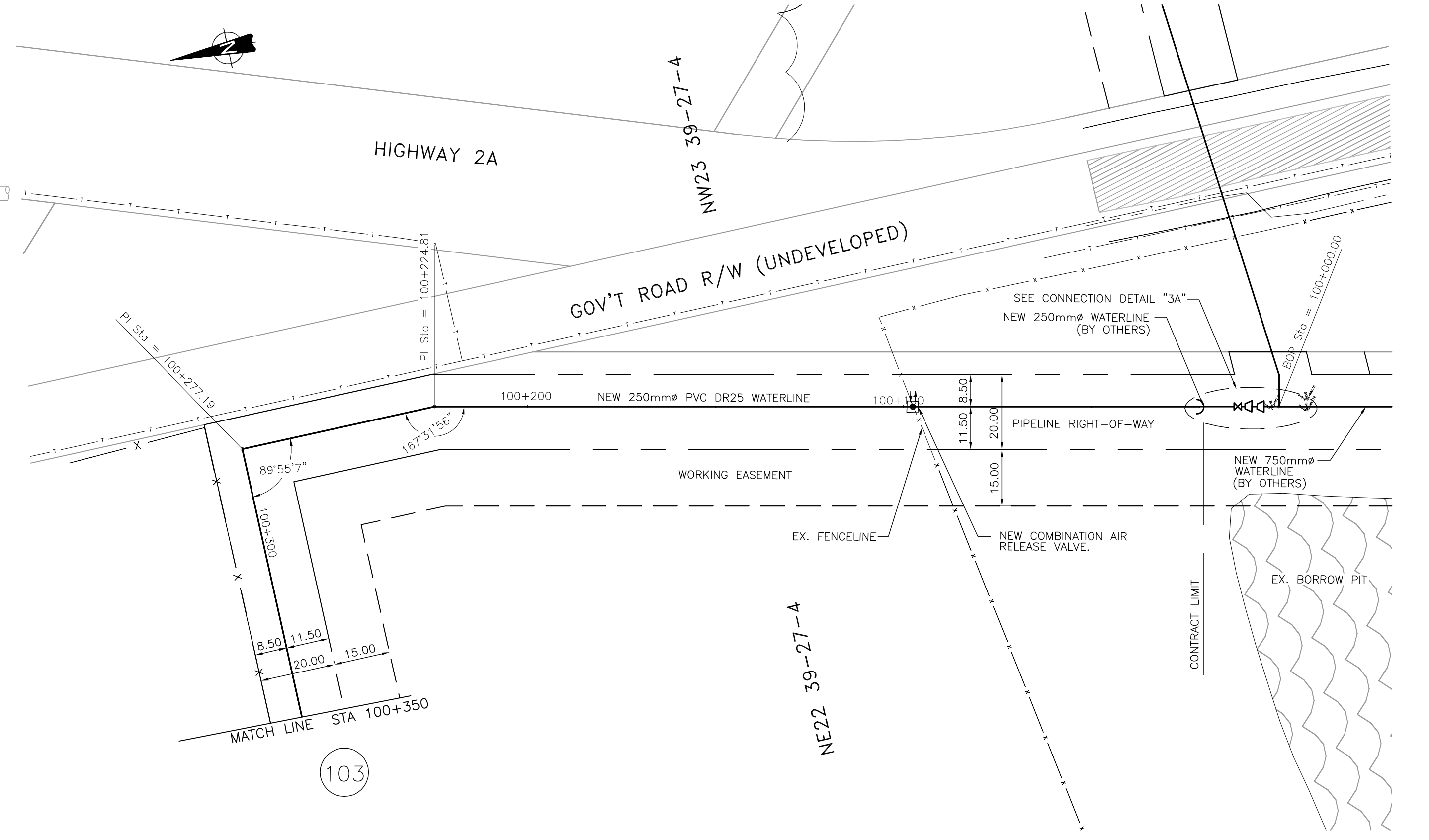
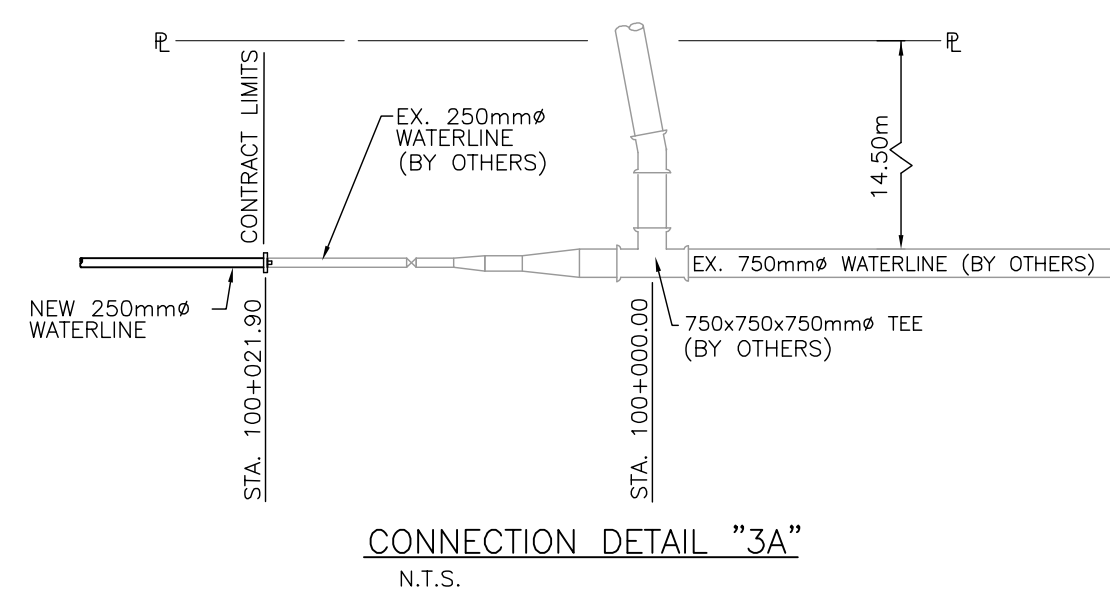
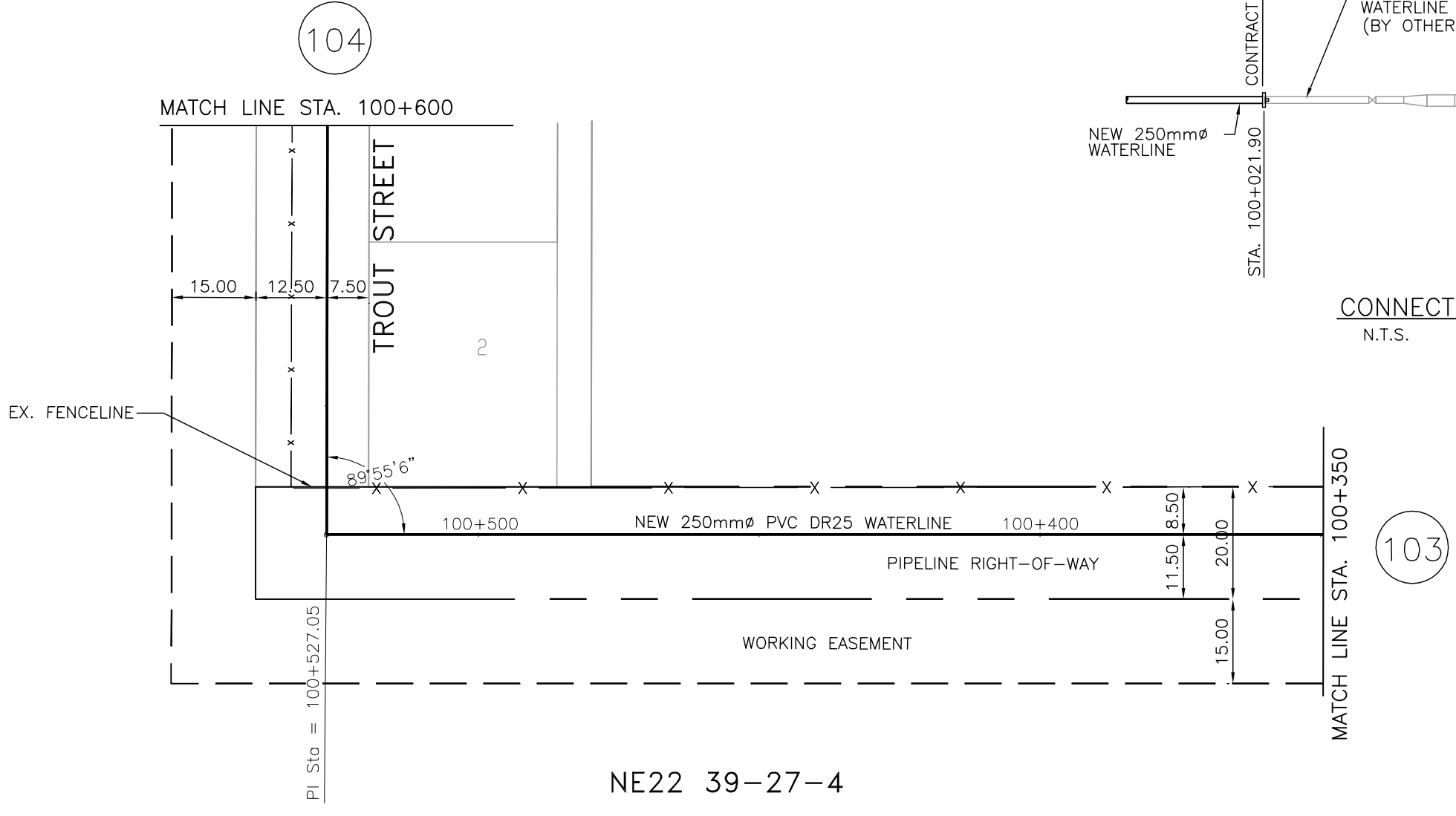


PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0



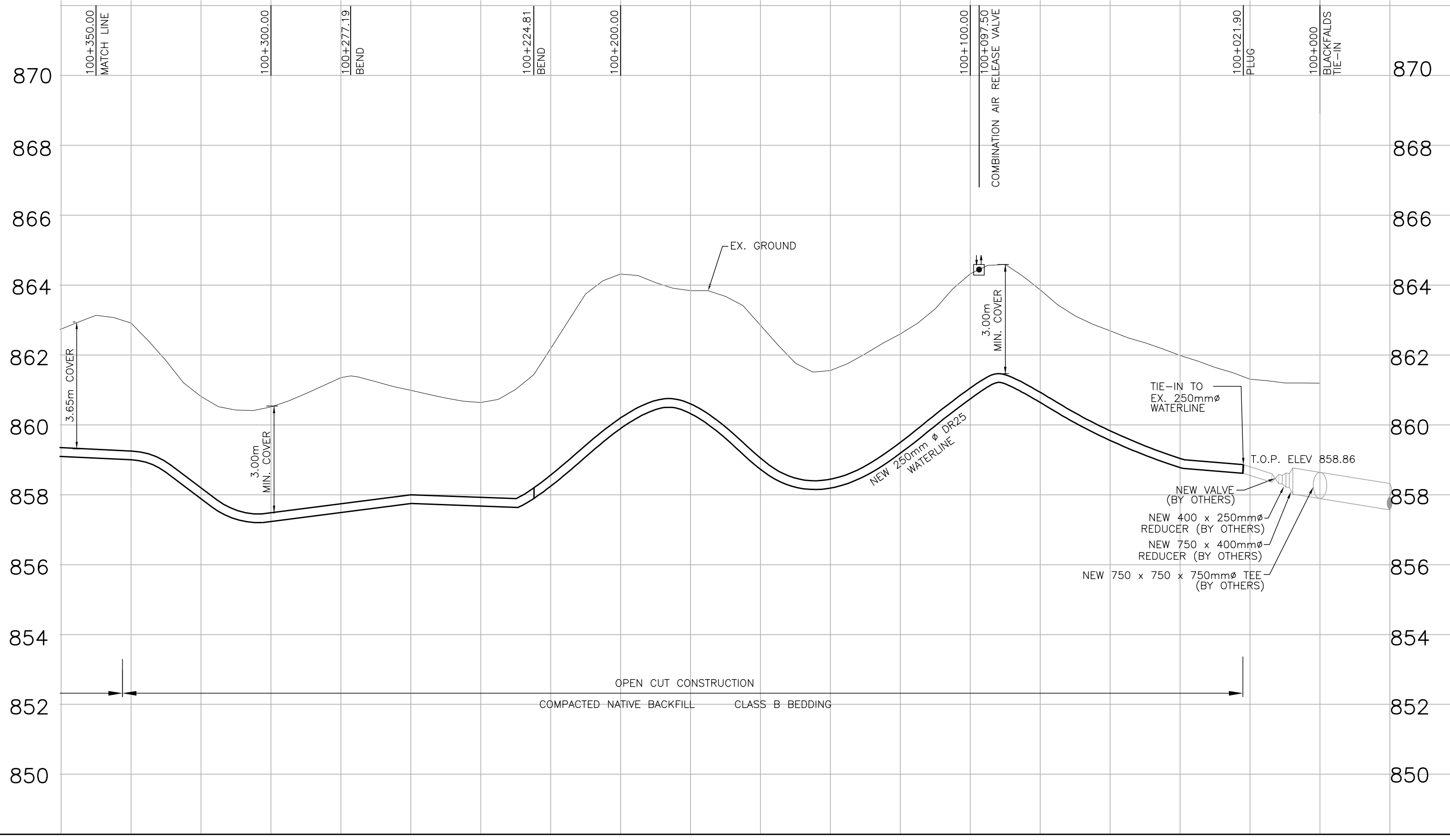
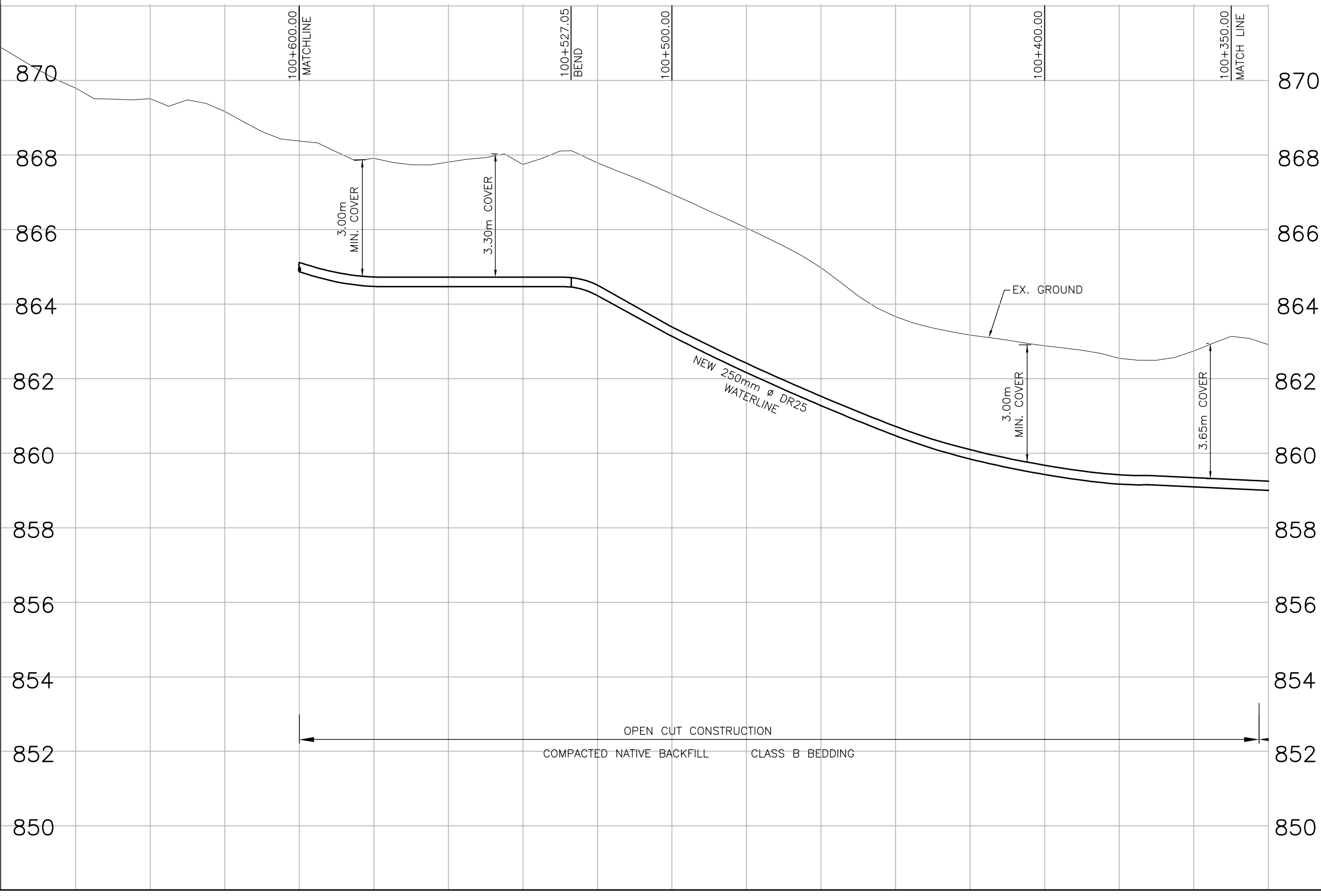
CLIENT
**NORTH RED DEER RIVER
 WATER SERVICES COMMISSION**
 ALBERTA
 PROJECT
WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE	DRAWING NUMBER	REV. NO.	SHEET
OVERALL INDEX PLAN	3333-3-102	2	2
			66



WATERLINE ALIGNMENT DATA - BLACKFALDS

CONTROL POINT	STATION	NORTHING	EASTING	DIRECTION	DISTANCE
BOP	100+000.0000	5805344.9218	13870.9591	N 12°18'04" E	224.8075
PI	100+224.8075	5805564.5679	13918.8546	N 00°10'00" W	52.3816
PI	100+277.1890	5805616.9493	13918.7022	S 89°45'07" W	249.8576
PI	100+527.0467	5805615.8677	13668.8469	N 00°09'58" W	408.3934
PI	100+935.4400	5806024.2594	13667.8620	S 89°45'19" W	53.7846
PI	100+989.2246	5806024.0297	13613.8779	N 46°46'00" W	10.5238
EOP	100+999.7485	5806031.2383	13606.2106		

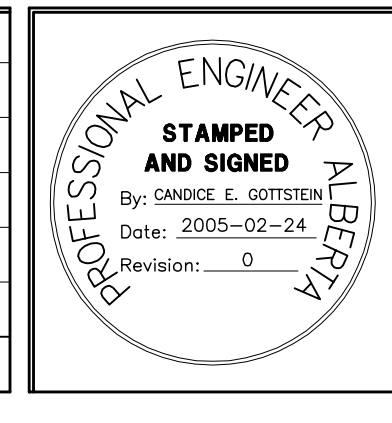


LEGEND

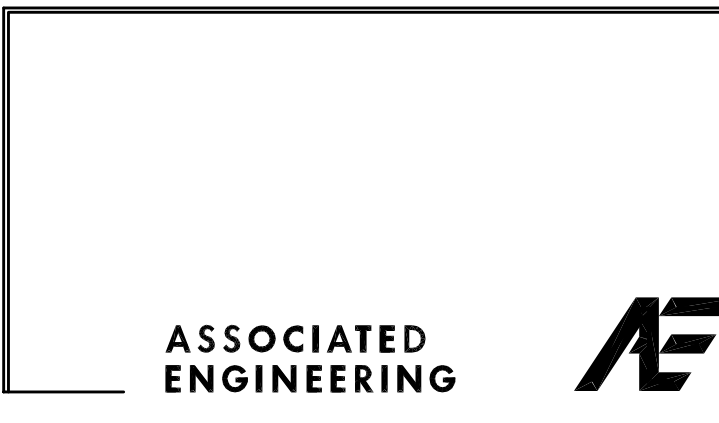
—	PROPOSED WATER TRANSMISSION PIPELINE	—	EXISTING FENCE
- - -	TEMPORARY WORKING EASEMENT LIMIT	—	EXISTING CULVERT
—	PERMANENT PIPELINE R.O.W.	—	EXISTING TREE LINE
c	EXISTING NATURAL GAS PIPELINE	—	EXISTING STREET LIGHT
t	EXISTING BURIED TELEPHONE LINE	*	BLOW OFF VALVE
—	EXISTING TEL. PEDESTAL		
c	EXISTING BURIED FIBRE OPTICS CABLE		
o	EXISTING OVERHEAD POWER LINE		
p	EXISTING UNDERGROUND POWER LINE		
f	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS		DATE	
DRAWN BY	W. WONG				
DESIGNED BY	C.G / C.M				
CHECKED BY	K. CH'NG				
APPROVED BY	B. BIRCH				
APPROVED BY					
SCALE	HOR.1:1000 VERT.1:100				



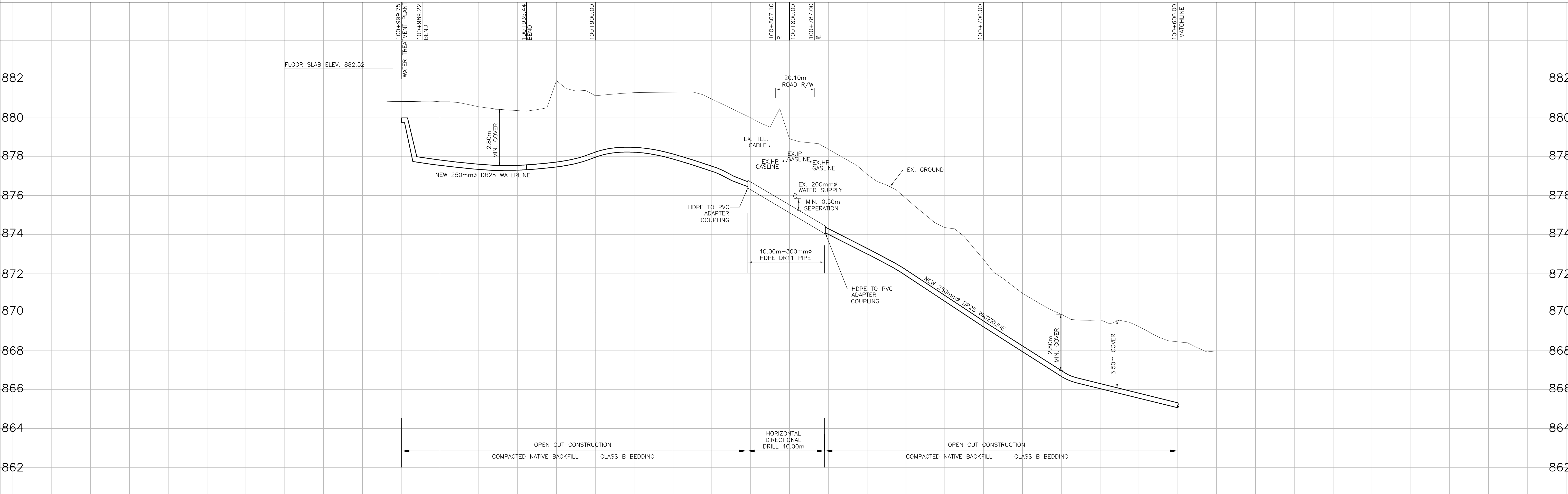
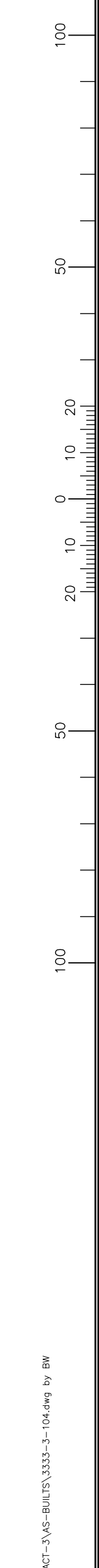
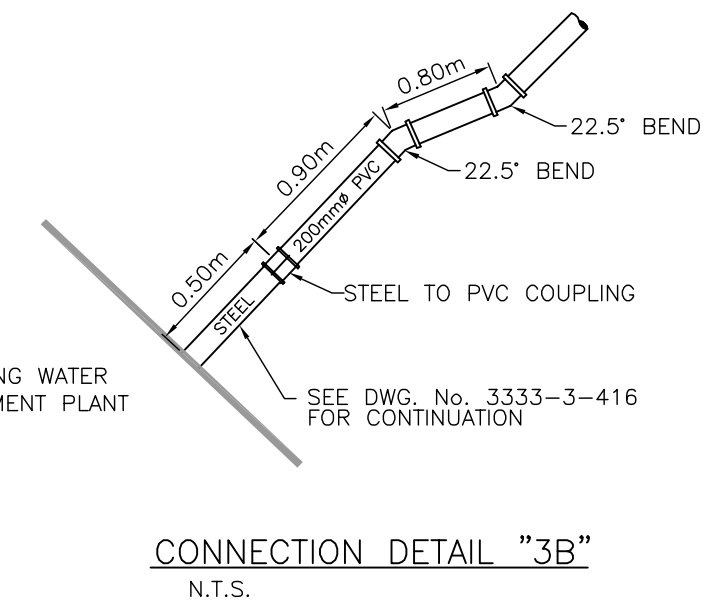
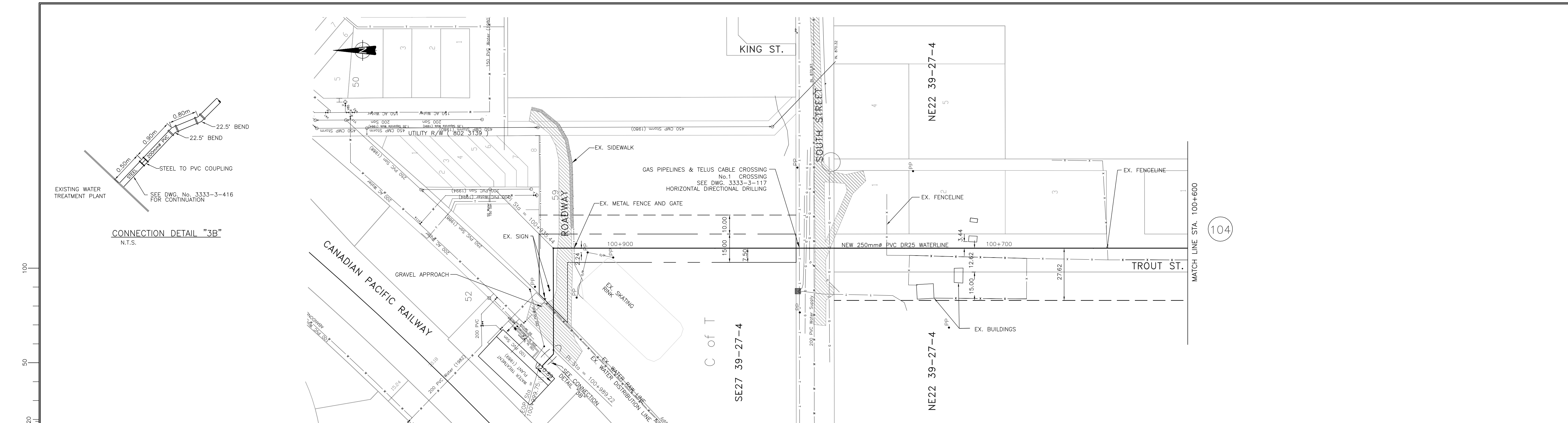
PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
By: BLAIR G. BIRCH
Date: 2005-02-24
Revision: 0



CLIENT
**NORTH RED DEER RIVER
WATER SERVICES COMMISSION**
ALBERTA
PROJECT
WATER TRANSMISSION PIPELINE
CONTRACT No. 3

TITLE PLAN PROFILE - BLACKFALDS STA. 100+000.00 TO STA. 100+600.00		
DRAWING NUMBER	REV. NO.	SHEET
3333-3-103	2	3
		66

Date: 06/03/24
 Drawn: W. WONG
 Checked: K. CH'NG
 Approved: B. BIRCH
 Project: 3333-3-103
 Contract: 3333-3-103-001
 Scale: HOR. 1:1000 VERT. 1:100
 Title: PLAN PROFILE - BLACKFALDS
 Station: STA. 100+000.00 TO STA. 100+600.00
 Drawing No: 3333-3-103
 Rev: 2
 Sheet: 3 of 66

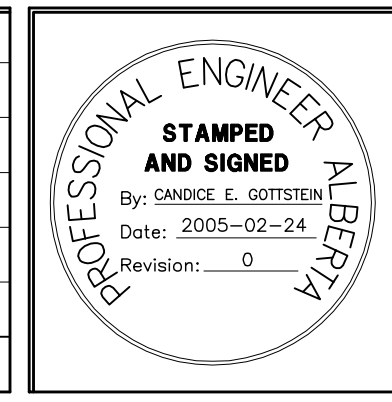


Title: 10/10/05
 Date: 04/12/20
 Drawn: W. WONG
 Checked: K. CH'NG
 Approved: B. BIRCH
 Project: 3333-3-104
 Contract: 3333-3-104

LEGEND	
	PROPOSED WATER TRANSMISSION PIPELINE
	TEMPORARY WORKING EASEMENT LIMIT
	PERMANENT PIPELINE R.O.W.
	EXISTING NATURAL GAS PIPELINE
	EXISTING BURIED TELEPHONE LINE
	EXISTING TEL. PEDESTAL
	EXISTING BURIED FIBRE OPTICS CABLE
	EXISTING OVERHEAD POWER LINE
	EXISTING UNDERGROUND POWER LINE
	EXISTING POWER POLE
	EXISTING FENCE
	EXISTING CULVERT
	EXISTING TREE LINE
	EXISTING STREET LIGHT
	BLOW OFF VALVE

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
SCALE	HOR.1:1000 VERT.1:100		

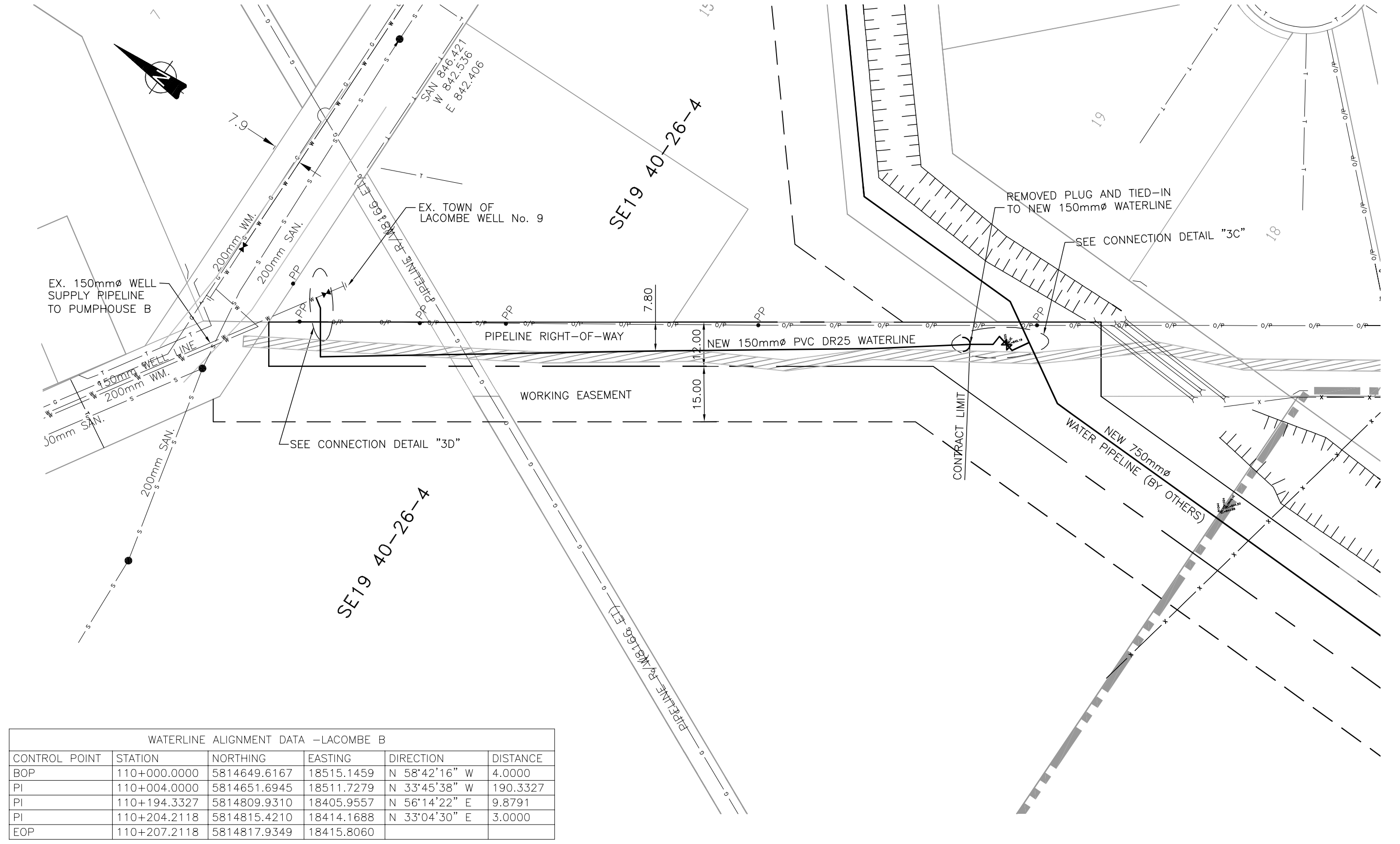
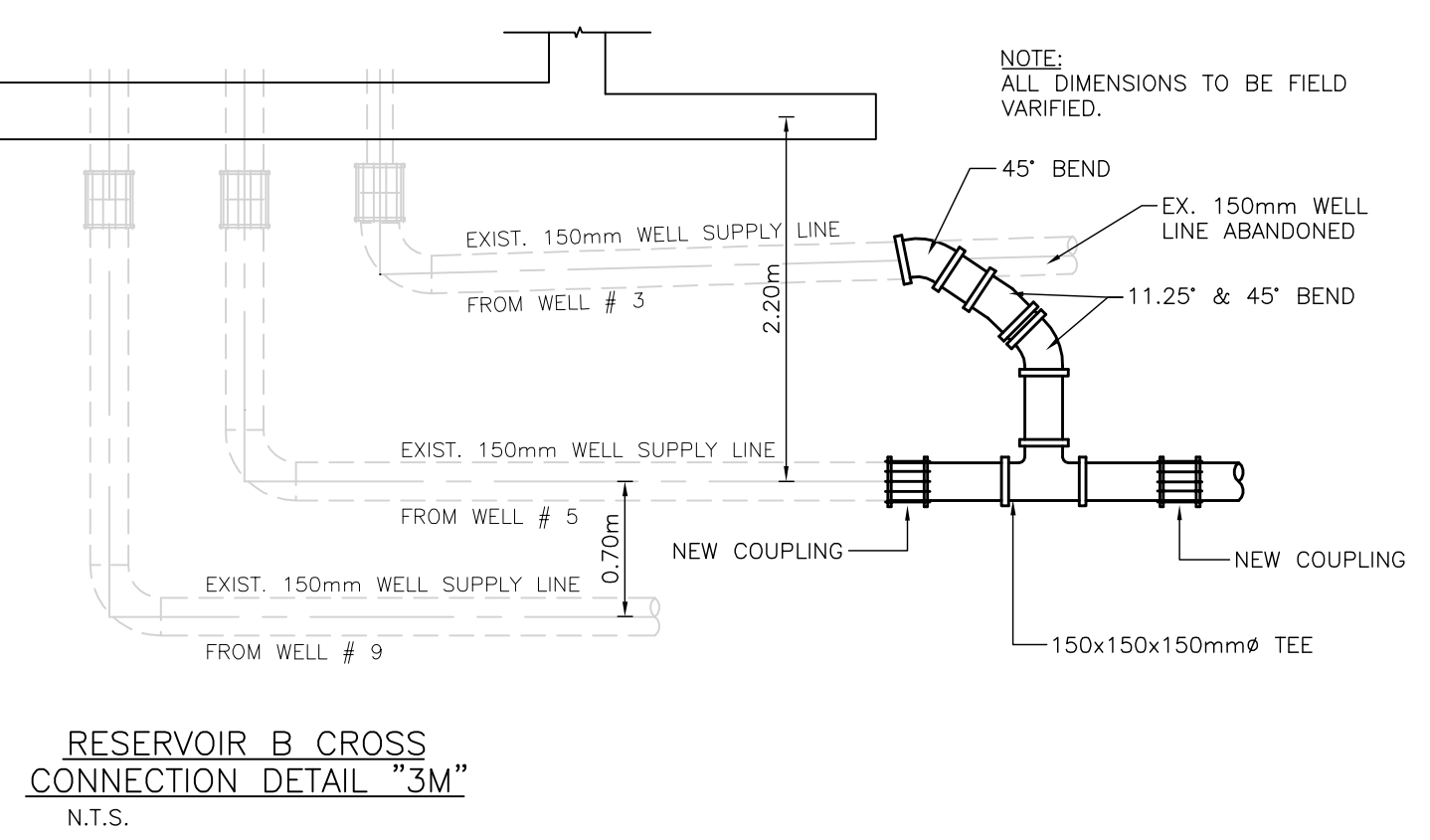
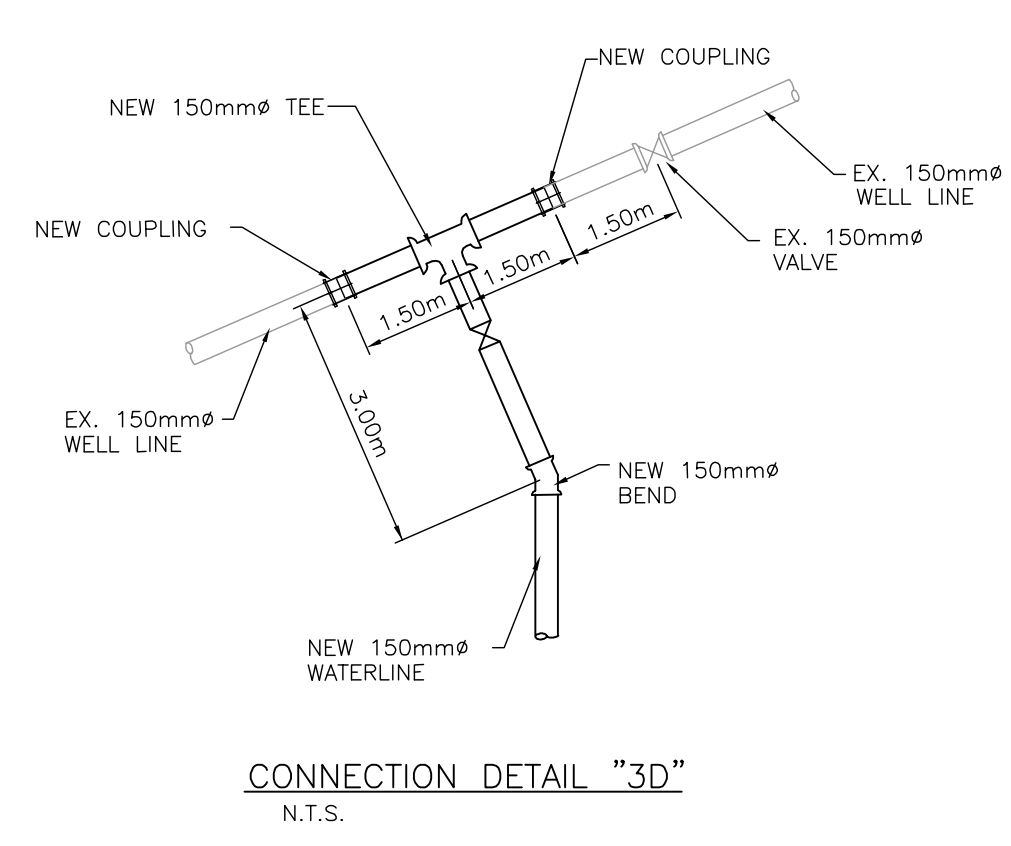
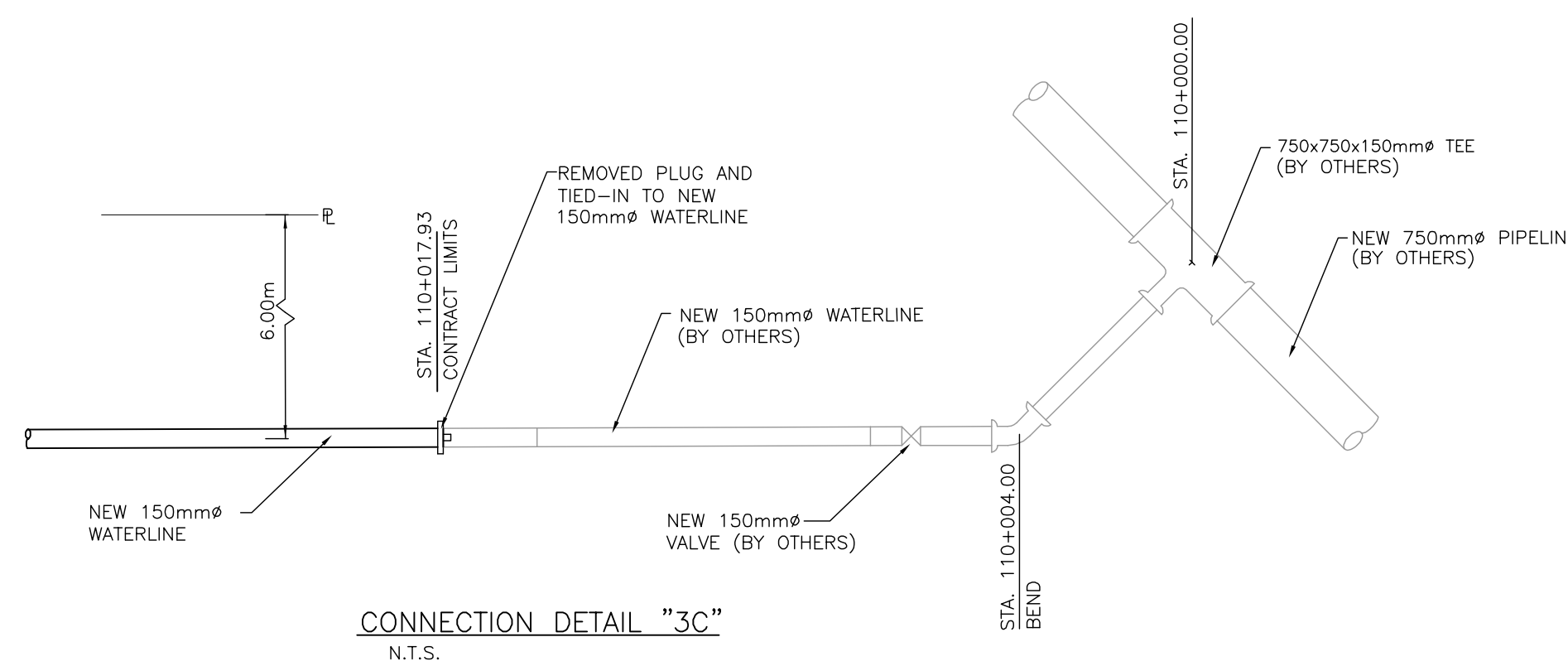


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STAMPED AND SIGNED
 By: BLAIR G. BIRCH
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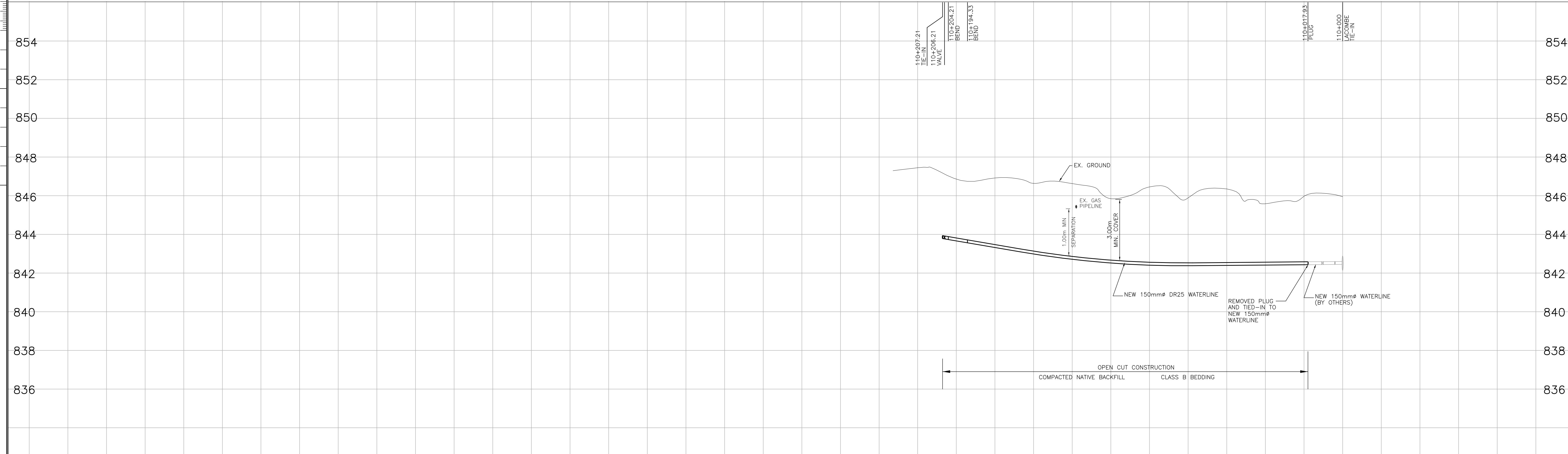


CLIENT
 NORTH RED DEER RIVER
 WATER SERVICES COMMISSION
 ALBERTA
 PROJECT
 WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE PLAN PROFILE - BLACKFALDS STA. 100+600.00 TO STA. 100+999.75		
DRAWING NUMBER 3333-3-104	REV. NO. 2	SHEET 4
		66



WATERLINE ALIGNMENT DATA - LACOMBE B					
CONTROL POINT	STATION	NORTHING	EASTING	DIRECTION	DISTANCE
BOP	110+000.0000	5814649.6167	18515.1459	N 58°42'16" W	4.0000
PI	110+004.0000	5814651.6945	18511.7279	N 33°45'38" W	190.3327
PI	110+194.3327	5814809.9310	18405.9557	N 56°14'22" E	9.8791
PI	110+204.2118	5814815.4210	18414.1688	N 33°04'30" E	3.0000
EOP	110+207.2118	5814817.9349	18415.8060		

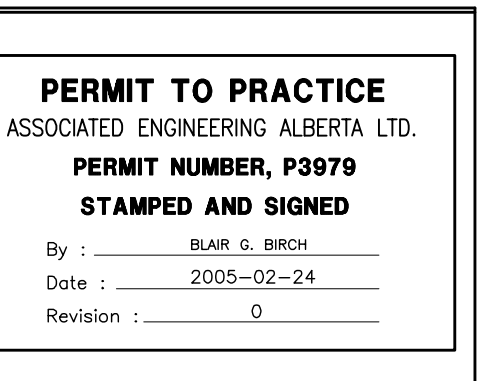
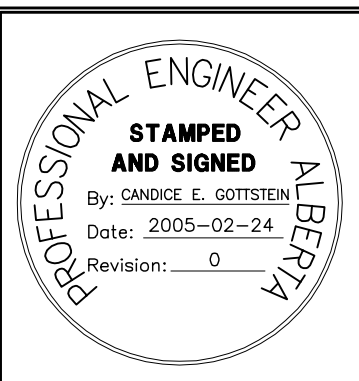


Date: 05/02/24
 Drawn: W. WONG
 Checked: K. CH'NG
 Approved: B. BIRCH
 Project: WATER TRANSMISSION PIPELINE CONTRACT - 3333-3-105-049 BY BW

LEGEND	
	PROPOSED WATER TRANSMISSION PIPELINE
	TEMPORARY WORKING EASEMENT LIMIT
	PERMANENT PIPELINE R.O.W.
	EXISTING NATURAL GAS PIPELINE
	EXISTING BURIED TELEPHONE LINE
	EXISTING TEL. PEDESTAL
	EXISTING BURIED FIBRE OPTICS CABLE
	EXISTING OVERHEAD POWER LINE
	EXISTING UNDERGROUND POWER LINE
	EXISTING POWER POLE
	EXISTING FENCE
	EXISTING CULVERT
	EXISTING TREE LINE
	EXISTING STREET LIGHT
	BLOW OFF VALVE

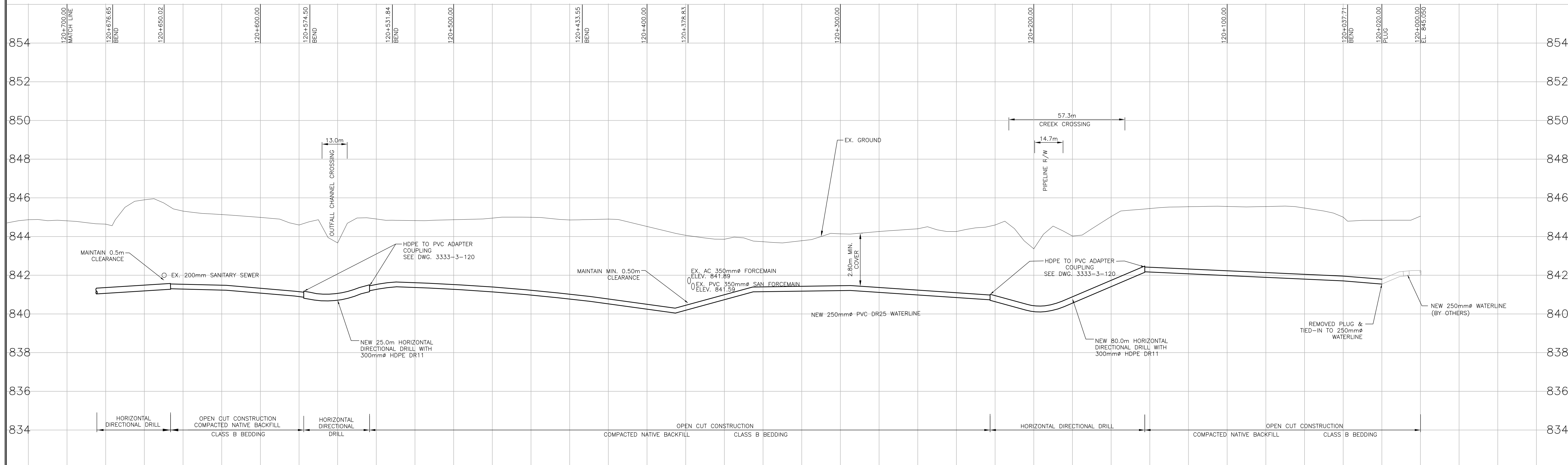
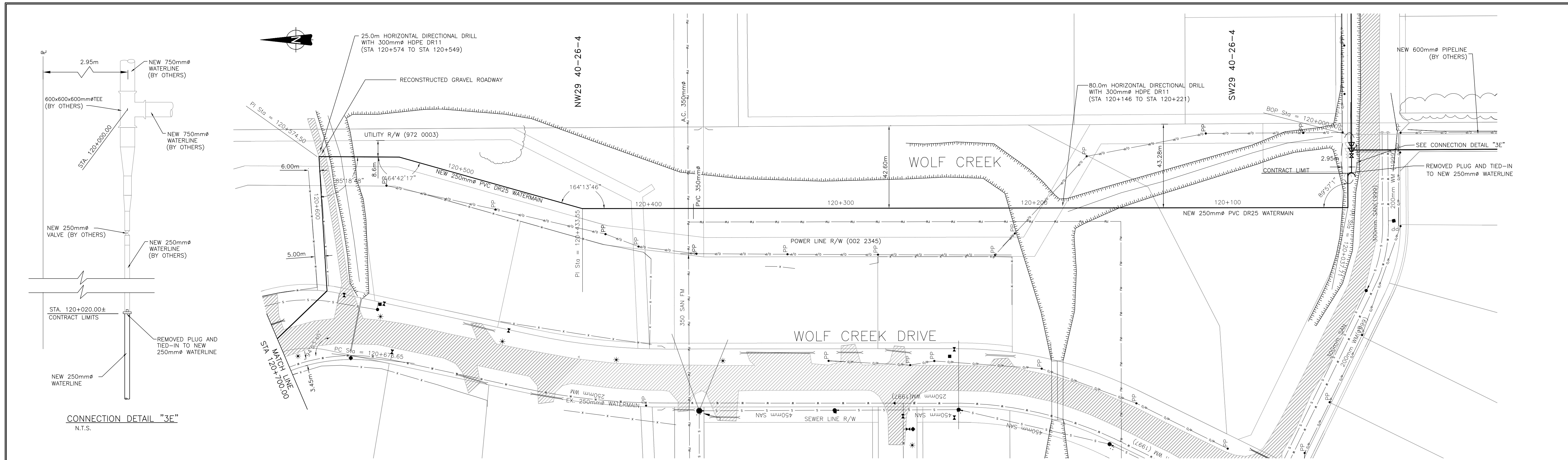
No.	DATE	REVISION	BY	APP.
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1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G. / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
SCALE	HOR.1:1000 VERT.1:100		



CLIENT	NORTH RED DEER RIVER WATER SERVICES COMMISSION ALBERTA
PROJECT	WATER TRANSMISSION PIPELINE CONTRACT No. 3

TITLE	PLAN PROFILE-LACOMBE B WELL "9"
	STA. 110+000.00 TO STA. 110+207.14
DRAWING NUMBER	3333-3-105
REV. NO.	2
SHEET	5

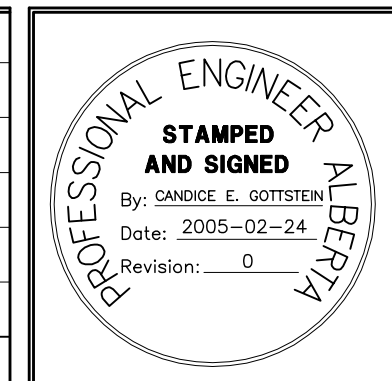


LEGEND

—	PROPOSED WATER TRANSMISSION PIPELINE	—	EXISTING FENCE
- - -	TEMPORARY WORKING EASEMENT LIMIT	—	EXISTING CULVERT
—	PERMANENT PIPELINE R.O.W.	—	EXISTING TREE LINE
o	EXISTING NATURAL GAS PIPELINE	—	EXISTING STREET LIGHT
—	EXISTING BURIED TELEPHONE LINE	*	BLOW OFF VALVE
—	EXISTING TEL. PEDESTAL		
—	EXISTING BURIED FIBRE OPTICS CABLE		
o	EXISTING OVERHEAD POWER LINE		
—	EXISTING UNDERGROUND POWER LINE		
PP	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS		DATE	
DRAWN BY	W. WONG				
DESIGNED BY	C.G. / C.M				
CHECKED BY	K. CH'NG				
APPROVED BY	B. BIRCH				
APPROVED BY					
SCALE	1:1000				

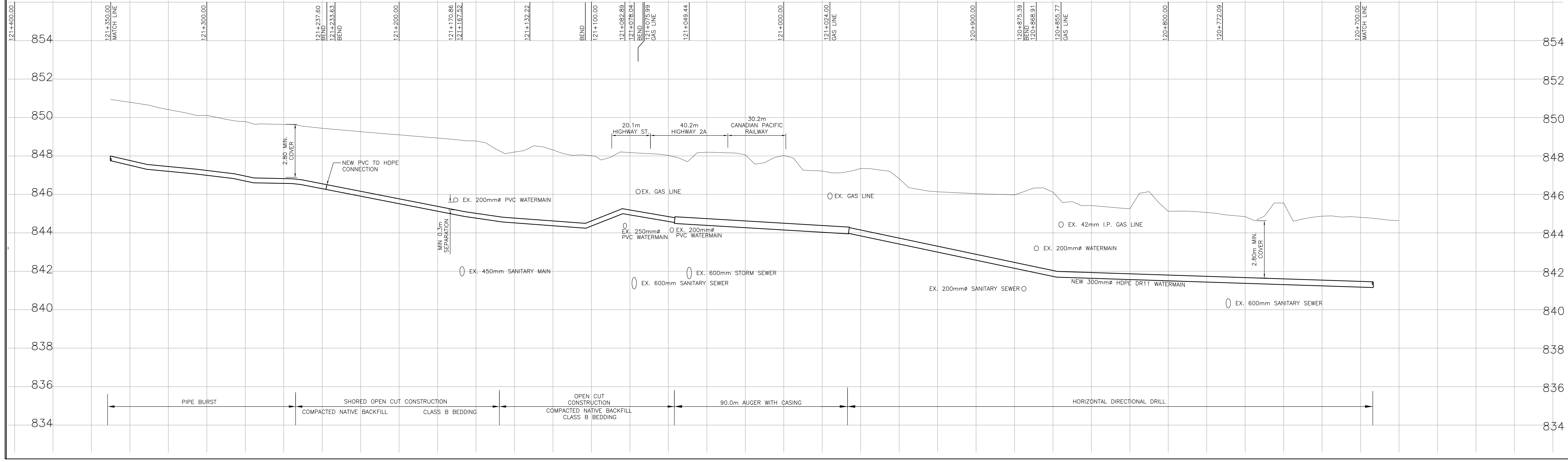
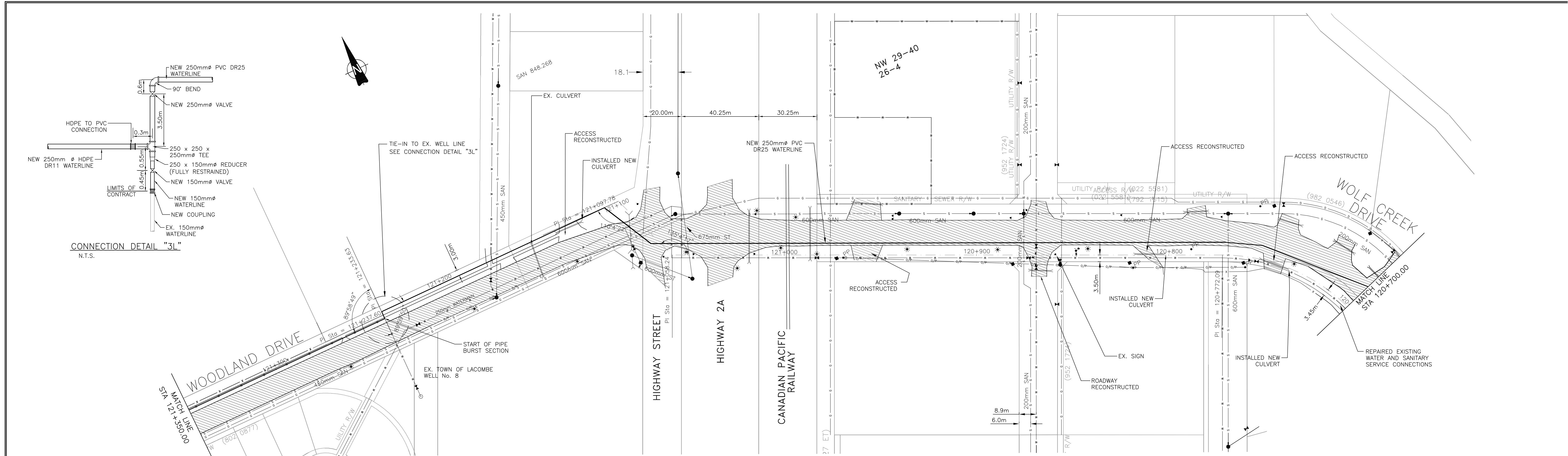


PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0



CLIENT
NORTH RED DEER RIVER WATER SERVICES COMMISSION
 ALBERTA
 PROJECT
WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE PLAN PROFILE - LACOMBE A STA. 120+000.00 TO STA. 120+700.00		
DRAWING NUMBER 3333-3-106	REV. NO. 2	SHEET 6

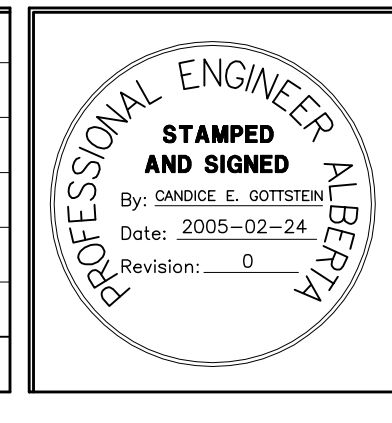


LEGEND

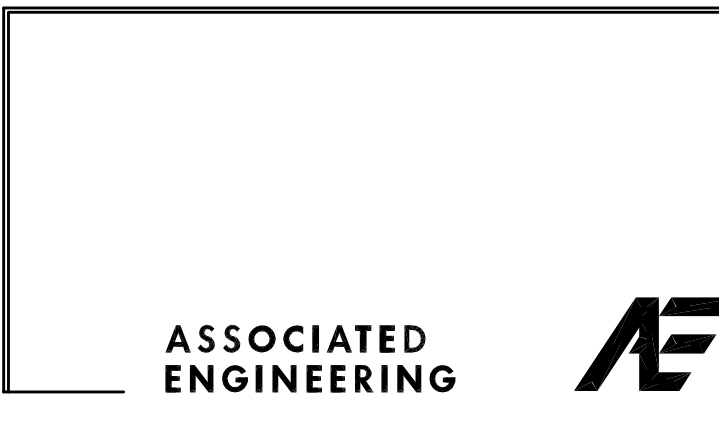
—	PROPOSED WATER TRANSMISSION PIPELINE	—	EXISTING FENCE
- - -	TEMPORARY WORKING EASEMENT LIMIT	—	EXISTING CULVERT
—	PERMANENT PIPELINE R.O.W.	—	EXISTING TREE LINE
—	EXISTING NATURAL GAS PIPELINE	—	EXISTING STREET LIGHT
—	EXISTING BURIED TELEPHONE LINE	—	BLOW OFF VALVE
—	EXISTING TEL. PEDESTAL		
—	EXISTING BURIED FIBRE OPTICS CABLE		
—	EXISTING OVERHEAD POWER LINE		
—	EXISTING UNDERGROUND POWER LINE		
—	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G. / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE			

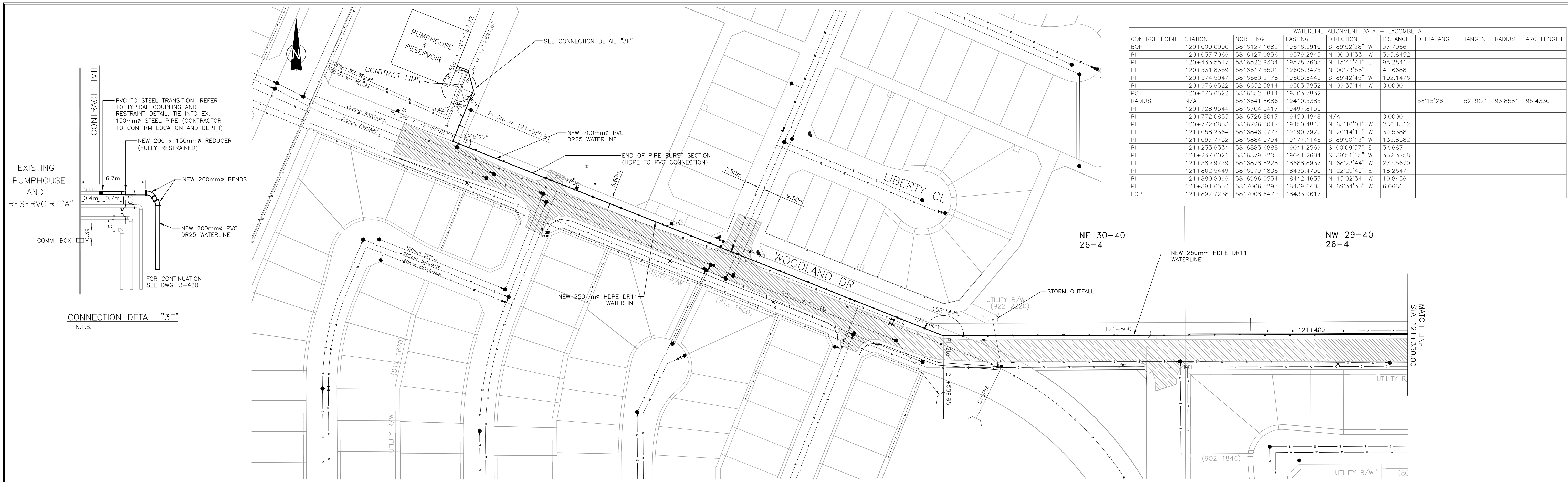


PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0

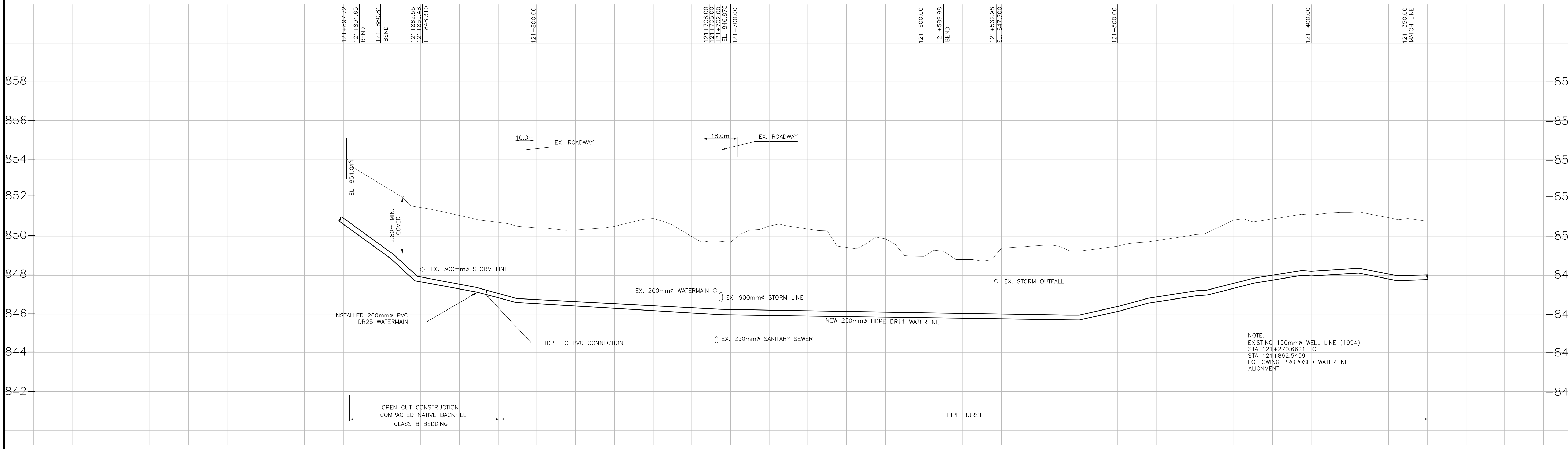


CLIENT
NORTH RED DEER RIVER WATER SERVICES COMMISSION
 ALBERTA
 PROJECT
WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE	PLAN PROFILE - LACOMBE A		
	STA. 120+700.00 TO STA. 121+350.00		
DRAWING NUMBER	REV. NO.	SHEET	
3333-3-107	2	7	
		66	



WATERLINE ALIGNMENT DATA - LACOMBE A									
CONTROL POINT	STATION	NORTHING	EASTING	DIRECTION	DISTANCE	DELTA ANGLE	TANGENT	RADIUS	ARC LENGTH
BOP	120+000.0000	5816127.1682	19616.9910	S 89°52'28" W	37.7066				
PI	120+037.7066	5816127.0856	19579.2845	N 00°04'33" W	395.8452				
PI	120+433.5517	5816522.9304	19578.7603	N 15°41'41" E	98.2841				
PI	120+531.8359	5816617.5501	19605.3475	N 00°23'58" E	42.6688				
PI	120+574.5047	5816660.2178	19605.6449	S 85°42'45" W	102.1476				
PI	120+676.6522	5816652.5814	19503.7832	N 06°33'14" W	0.0000				
PC	120+676.6522	5816652.5814	19503.7832						
RADIUS	N/A	5816641.8686	19410.5385			58°15'26"	52.3021	93.8581	95.4330
PI	120+728.9544	5816704.5417	19497.8135						
PI	120+772.0853	5816726.8017	19450.4848	N/A	0.0000				
PI	120+772.0853	5816726.8017	19450.4848	N 65°10'01" W	286.1512				
PI	121+058.2364	5816846.9777	19190.7922	N 20°14'19" W	39.5388				
PI	121+097.7752	5816884.0754	19177.1146	S 89°50'13" W	135.8582				
PI	121+233.6334	5816883.6888	19041.2569	S 00°09'57" E	3.9687				
PI	121+237.6021	5816879.7201	19041.2684	S 89°51'15" W	352.3758				
PI	121+589.9779	5816878.8228	18688.8937	N 68°23'44" W	272.5670				
PI	121+862.5449	5816979.1806	18435.4750	N 22°29'49" E	18.2647				
PI	121+880.8096	5816996.0554	18442.4637	N 15°02'34" W	10.8456				
PI	121+891.6552	5817006.5293	18439.6488	N 69°34'35" W	6.0686				
EOP	121+897.7238	5817008.6470	18433.9617						

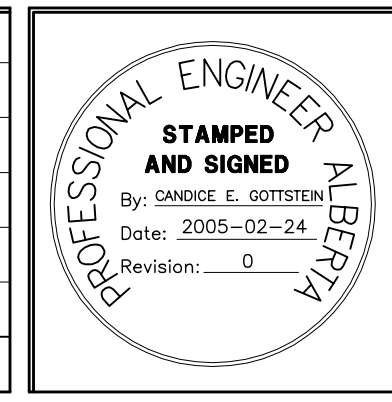


LEGEND

—	PROPOSED WATER TRANSMISSION PIPELINE	—	EXISTING FENCE
- - -	TEMPORARY WORKING EASEMENT LIMIT	—	EXISTING CULVERT
—	PERMANENT PIPELINE R.O.W.	—	EXISTING TREE LINE
c	EXISTING NATURAL GAS PIPELINE	—	EXISTING STREET LIGHT
t	EXISTING BURIED TELEPHONE LINE	*	BLOW OFF VALVE
■	EXISTING TEL. PEDESTAL		
c	EXISTING BURIED FIBRE OPTICS CABLE		
o/h	EXISTING OVERHEAD POWER LINE		
p	EXISTING UNDERGROUND POWER LINE		
PP	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G. / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE			



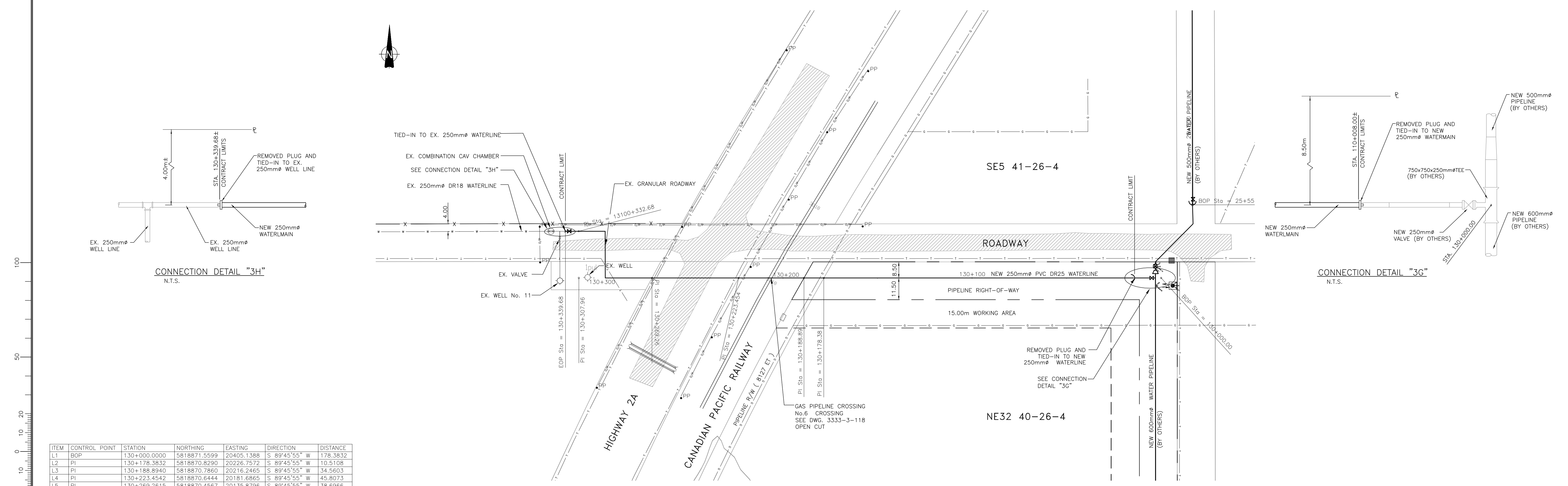
PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
By: BLAIR G. BIRCH
Date: 2005-02-24
Revision: 0



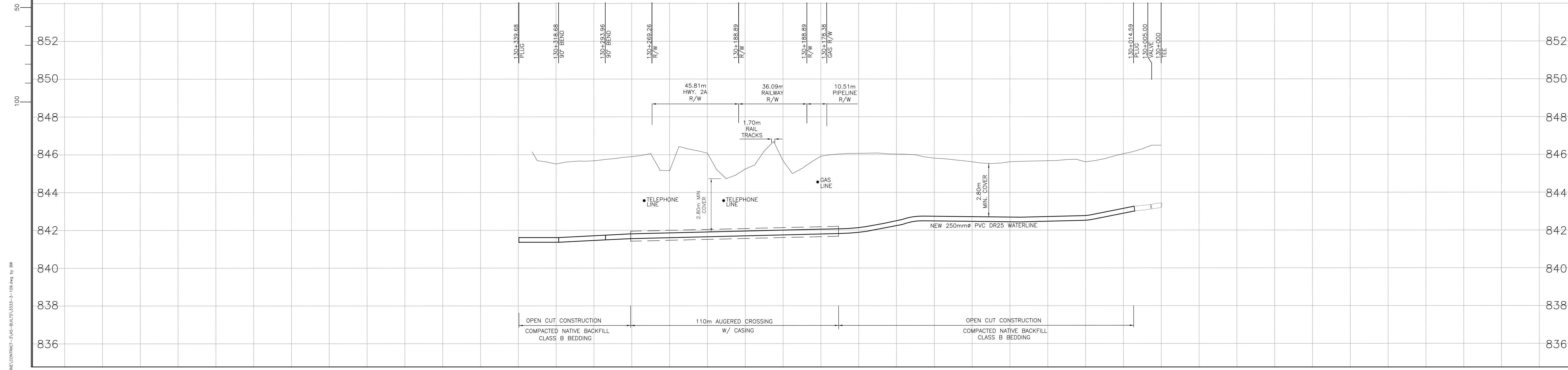
CLIENT
NORTH RED DEER RIVER WATER SERVICES COMMISSION
ALBERTA

PROJECT
WATER TRANSMISSION PIPELINE
CONTRACT No. 3

TITLE PLAN PROFILE - LACOMBE A STA. 121+350.00 TO STA. 121+897.72		
DRAWING NUMBER 3333-3-108	REV. NO. 2	SHEET 8 66



ITEM	CONTROL POINT	STATION	NORTHING	EASTING	DIRECTION	DISTANCE
L1	BOP	130+000.0000	5818871.5599	20405.1388	S 89°45'55" W	178.3832
L2	PI	130+178.3832	5818870.8290	20226.7572	S 89°45'55" W	10.5108
L3	PI	130+188.8940	5818870.7860	20216.2465	S 89°45'55" W	34.5603
L4	PI	130+223.4542	5818870.6444	20181.6865	S 89°45'55" W	45.8073
L5	PI	130+269.2615	5818870.4567	20135.8796	S 89°45'55" W	38.6966
L6	PI	130+307.9581	5818870.2982	20097.1833	N 00°23'36" W	24.7258
L7	PI	130+332.6839	5818895.0233	20097.0135	S 89°36'24" W	7.0000
EOP		130+339.6839	5818894.9753	20090.0137		

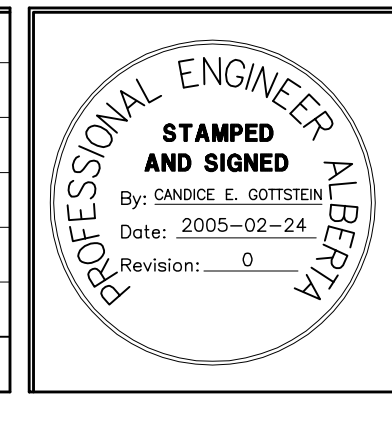


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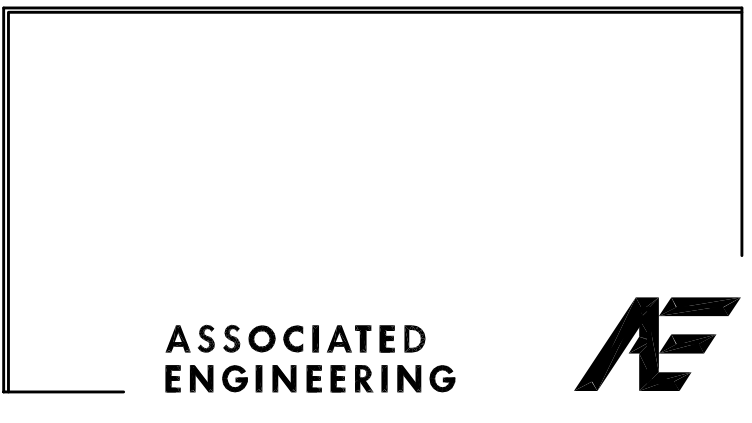
	PROPOSED WATER TRANSMISSION PIPELINE		EXISTING FENCE
	TEMPORARY WORKING EASEMENT LIMIT		EXISTING CULVERT
	PERMANENT PIPELINE R.O.W.		EXISTING TREE LINE
	EXISTING NATURAL GAS PIPELINE		EXISTING STREET LIGHT
	EXISTING BURIED TELEPHONE LINE		BLOW OFF VALVE
	EXISTING TEL. PEDESTAL		
	EXISTING BURIED FIBRE OPTICS CABLE		
	EXISTING OVERHEAD POWER LINE		
	EXISTING UNDERGROUND POWER LINE		
	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS		DATE	
DRAWN BY	W. WONG				
DESIGNED BY	C.G / C.M				
CHECKED BY	K. CH'NG				
APPROVED BY	B. BIRCH				
APPROVED BY					
SCALE	HOR.1:1000		VERT.1:100		



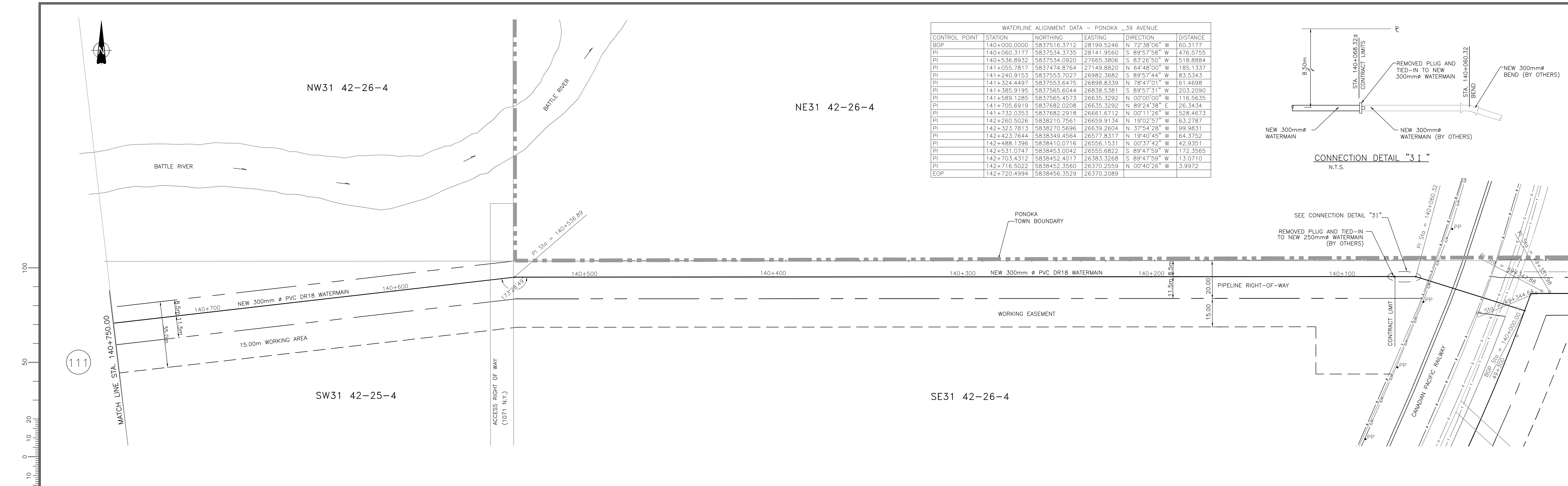
PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0



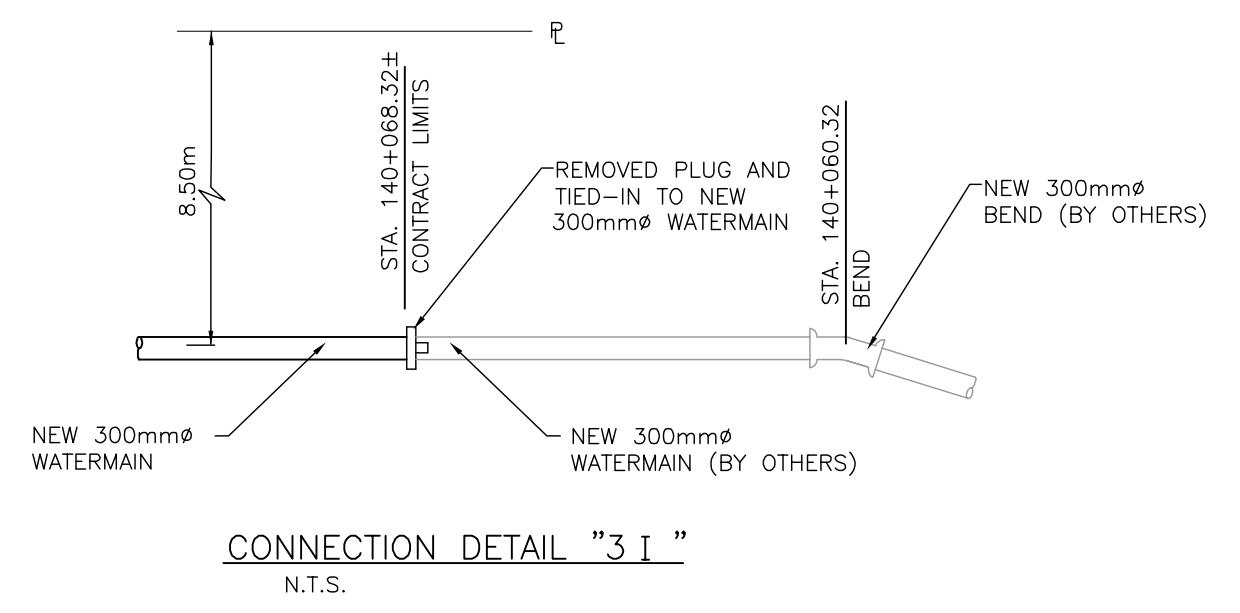
CLIENT
**NORTH RED DEER RIVER
 WATER SERVICES COMMISSION**
 ALBERTA
 PROJECT
WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE PLAN PROFILE-- LACOMBE WELL "11" STA. 130+000.00 TO STA. 130+332.68		
DRAWING NUMBER	REV. NO.	SHEET
3333-3-109	2	9
		66

Date: Jun 01, 2006
 Title: 3333-3-109
 Project: WATER TRANSMISSION PIPELINE
 Client: NORTH RED DEER RIVER WATER SERVICES COMMISSION
 Drawn by: W. WONG
 Checked by: K. CH'NG
 Approved by: B. BIRCH
 Date: 2005-02-24
 Revision: 0



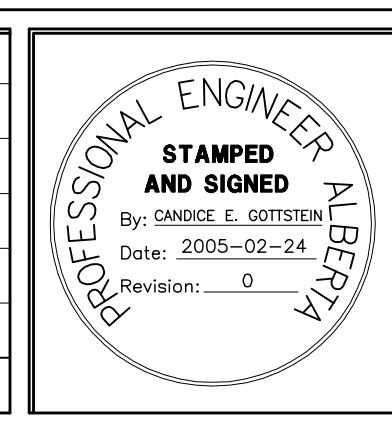
WATERLINE ALIGNMENT DATA - PONOKA 39 AVENUE					
CONTROL POINT	STATION	NORTHING	EASTING	DIRECTION	DISTANCE
BOP	140+000.0000	5837516.3712	28199.5246	N 72°38'06" W	60.3177
PI	140+060.3177	5837534.3735	28141.9560	S 89°57'58" W	476.5755
PI	140+536.8932	5837534.0920	27665.3806	S 83°26'50" W	518.8884
PI	141+055.7817	5837474.8764	27149.8820	N 64°48'00" W	185.1337
PI	141+240.9153	5837553.7027	26982.3682	S 89°57'44" W	83.5343
PI	141+324.4497	5837553.6475	26898.8339	N 78°47'01" W	61.4698
PI	141+385.9195	5837565.6044	26838.5381	S 89°57'31" W	203.2090
PI	141+589.1285	5837565.4573	26635.3292	N 00°00'00" W	116.5635
PI	141+705.6919	5837682.0208	26635.3292	N 89°24'38" E	28.3434
PI	141+732.0353	5837682.2918	26661.6712	N 00°11'26" W	528.4673
PI	142+260.5026	5838210.7561	26659.9134	N 19°02'57" W	63.2787
PI	142+323.7813	5838270.5696	26639.2604	N 37°54'28" W	99.9831
PI	142+423.7644	5838349.4564	26577.8317	N 19°40'45" W	64.3752
PI	142+488.1396	5838410.0716	26556.1531	N 00°37'42" W	42.9351
PI	142+531.0747	5838453.0042	26555.6822	S 89°47'59" W	172.3565
PI	142+703.4312	5838452.4017	26383.3268	S 89°47'59" W	13.0710
PI	142+716.5022	5838452.3560	26370.2559	N 00°40'26" W	3.9972
EOP	142+720.4994	5838456.3529	26370.2089		



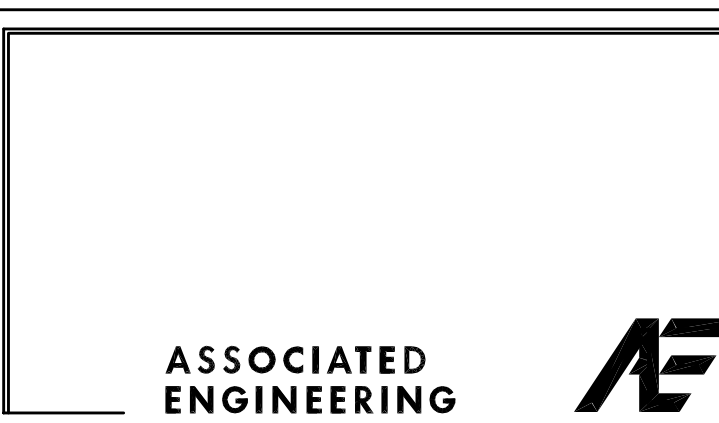
LEGEND	
	PROPOSED WATER TRANSMISSION PIPELINE
	TEMPORARY WORKING EASEMENT LIMIT
	PERMANENT PIPELINE R.O.W.
	EXISTING NATURAL GAS PIPELINE
	EXISTING BURIED TELEPHONE LINE
	EXISTING TEL. PEDESTAL
	EXISTING BURIED FIBRE OPTICS CABLE
	EXISTING OVERHEAD POWER LINE
	EXISTING UNDERGROUND POWER LINE
	EXISTING POWER POLE
	EXISTING FENCE
	EXISTING CULVERT
	EXISTING TREE LINE
	EXISTING STREET LIGHT
	BLOW OFF VALVE

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G. / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE	HOR.1:1000 VERT.1:100		



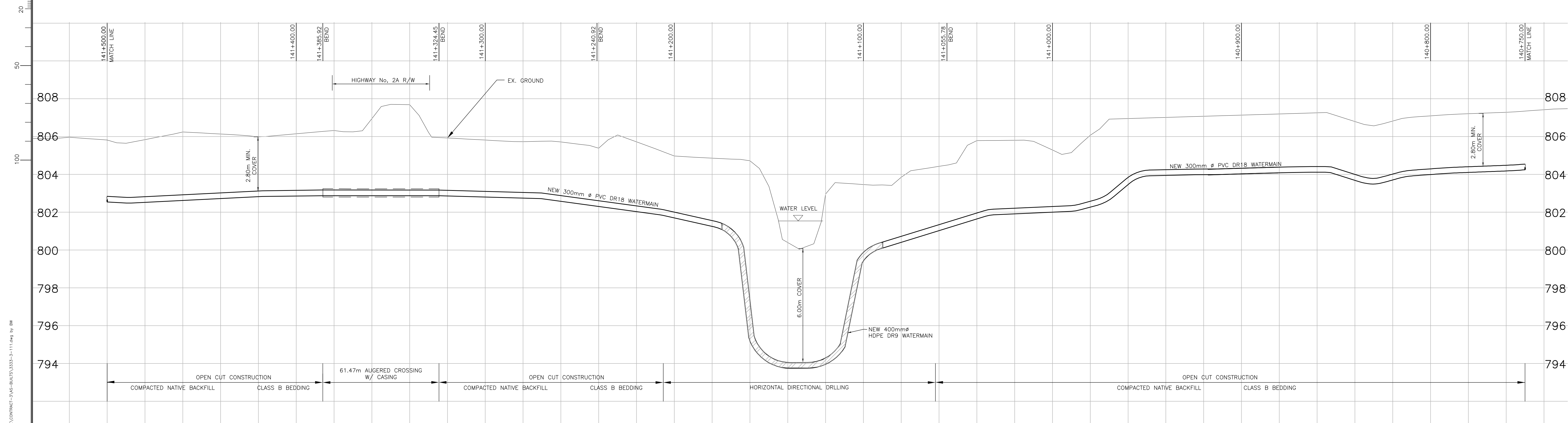
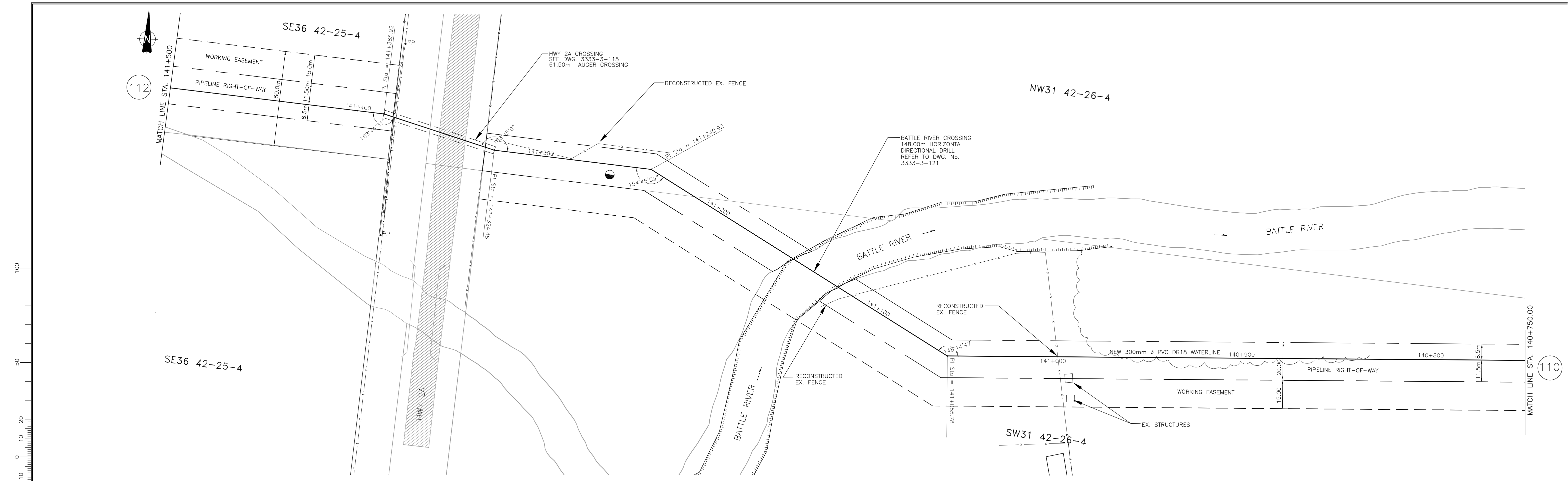
PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
By: BLAIR G. BIRCH
Date: 2005-02-24
Revision: 0



CLIENT
**NORTH RED DEER RIVER
WATER SERVICES COMMISSION**
ALBERTA
PROJECT
WATER TRANSMISSION PIPELINE
CONTRACT No. 3

TITLE		
PLAN PROFILE - PONOKA 39 AVE.		
STA. 140+000.00 TO STA. 140+750.00		
DRAWING NUMBER	REV. NO.	SHEET
3333-3-110	2	10
		66

Date: Jun 03, 2008
 Drawn: W. Wong
 Checked: K. Ch'ng
 Approved: B. Birch
 Project: 3333-3-110
 Title: PLAN PROFILE - PONOKA 39 AVE.
 Scale: HOR. 1:1000 VERT. 1:100
 Sheet: 10 of 66

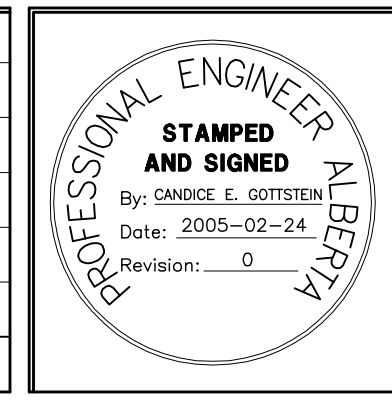


LEGEND

—	PROPOSED WATER TRANSMISSION PIPELINE	—	EXISTING FENCE
- - -	TEMPORARY WORKING EASEMENT LIMIT	—	EXISTING CULVERT
—	PERMANENT PIPELINE R.O.W.	—	EXISTING TREE LINE
—	EXISTING NATURAL GAS PIPELINE	—	EXISTING STREET LIGHT
—	EXISTING BURIED TELEPHONE LINE	—	BLOW OFF VALVE
—	EXISTING TEL. PEDESTAL		
—	EXISTING BURIED FIBRE OPTICS CABLE		
—	EXISTING OVERHEAD POWER LINE		
—	EXISTING UNDERGROUND POWER LINE		
—	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G. / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE	HOR.1:1000 VERT.1:100		



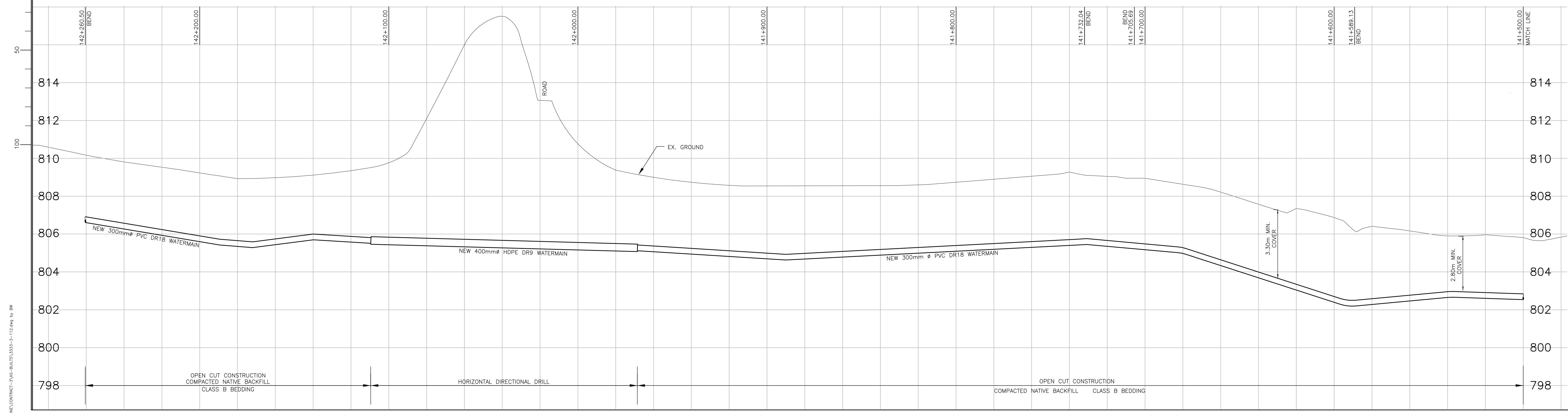
PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0



CLIENT
NORTH RED DEER RIVER
WATER SERVICES COMMISSION
 ALBERTA
 PROJECT
WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE PLAN PROFILE – PONOKA 39 AVE. STA. 140+750.00 TO STA. 141+500.00		
DRAWING NUMBER 3333-3-111	REV. NO. 2	SHEET 11 66

Date: Jun 01, 2006
 Drawn: W. Wong
 Checked: K. Ch'ng
 Approved: B. Birch
 Project: 3333-3-111
 Title: PLAN PROFILE - PONOKA 39 AVE.
 Stationing: 140+750.00 TO 141+500.00
 Scale: HOR. 1:1000 VERT. 1:100
 Drawing No: 3333-3-111-2
 Revision: 0

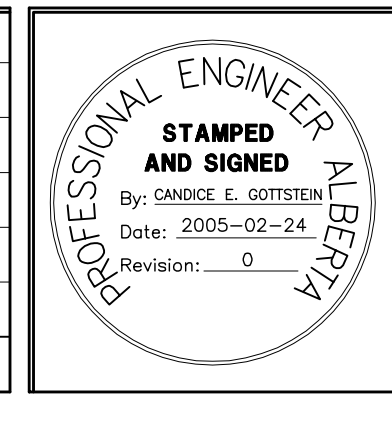


LEGEND

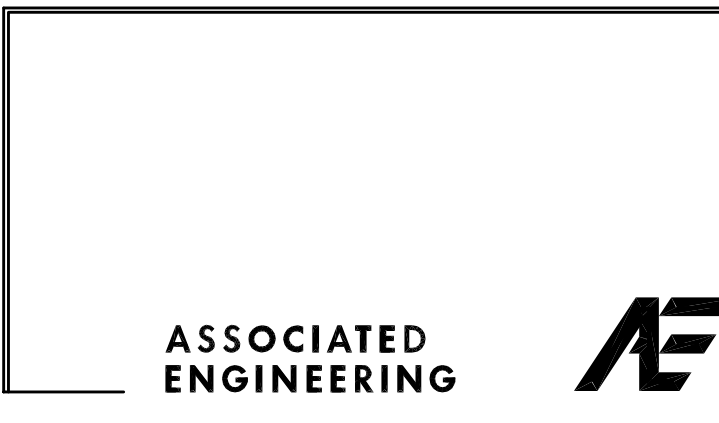
	PROPOSED WATER TRANSMISSION PIPELINE		EXISTING FENCE
	TEMPORARY WORKING EASEMENT LIMIT		EXISTING CULVERT
	PERMANENT PIPELINE R.O.W.		EXISTING TREE LINE
	EXISTING NATURAL GAS PIPELINE		EXISTING STREET LIGHT
	EXISTING BURIED TELEPHONE LINE		BLOW OFF VALVE
	EXISTING TEL. PEDESTAL		
	EXISTING BURIED FIBRE OPTICS CABLE		
	EXISTING OVERHEAD POWER LINE		
	EXISTING UNDERGROUND POWER LINE		
	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
3	06/03/24	RECORD DRAWING	C.J.	B.B.
2	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
1	05/03/07	ADDENDUM #1	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G. / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE	HOR.1:1000 VERT.1:100		



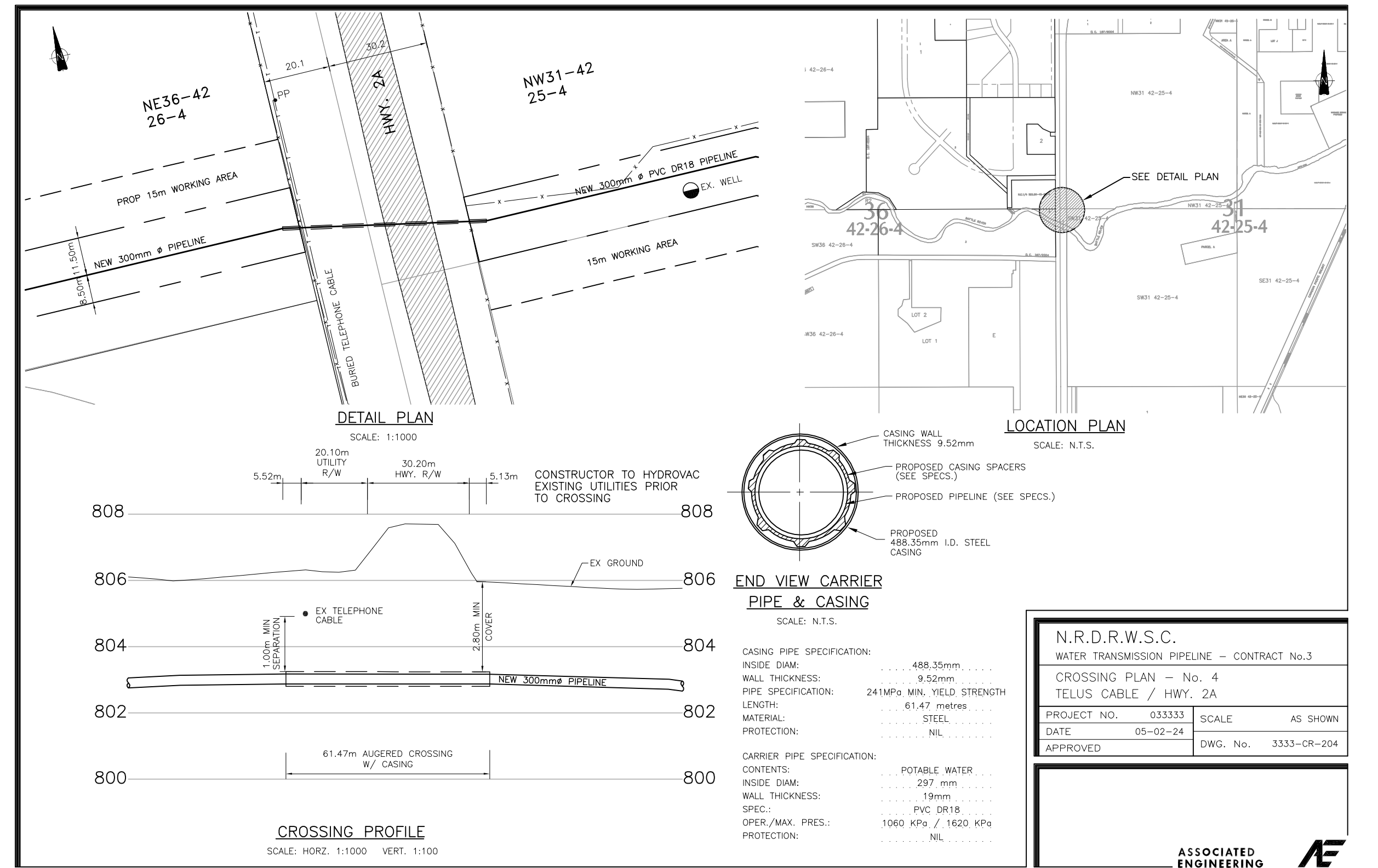
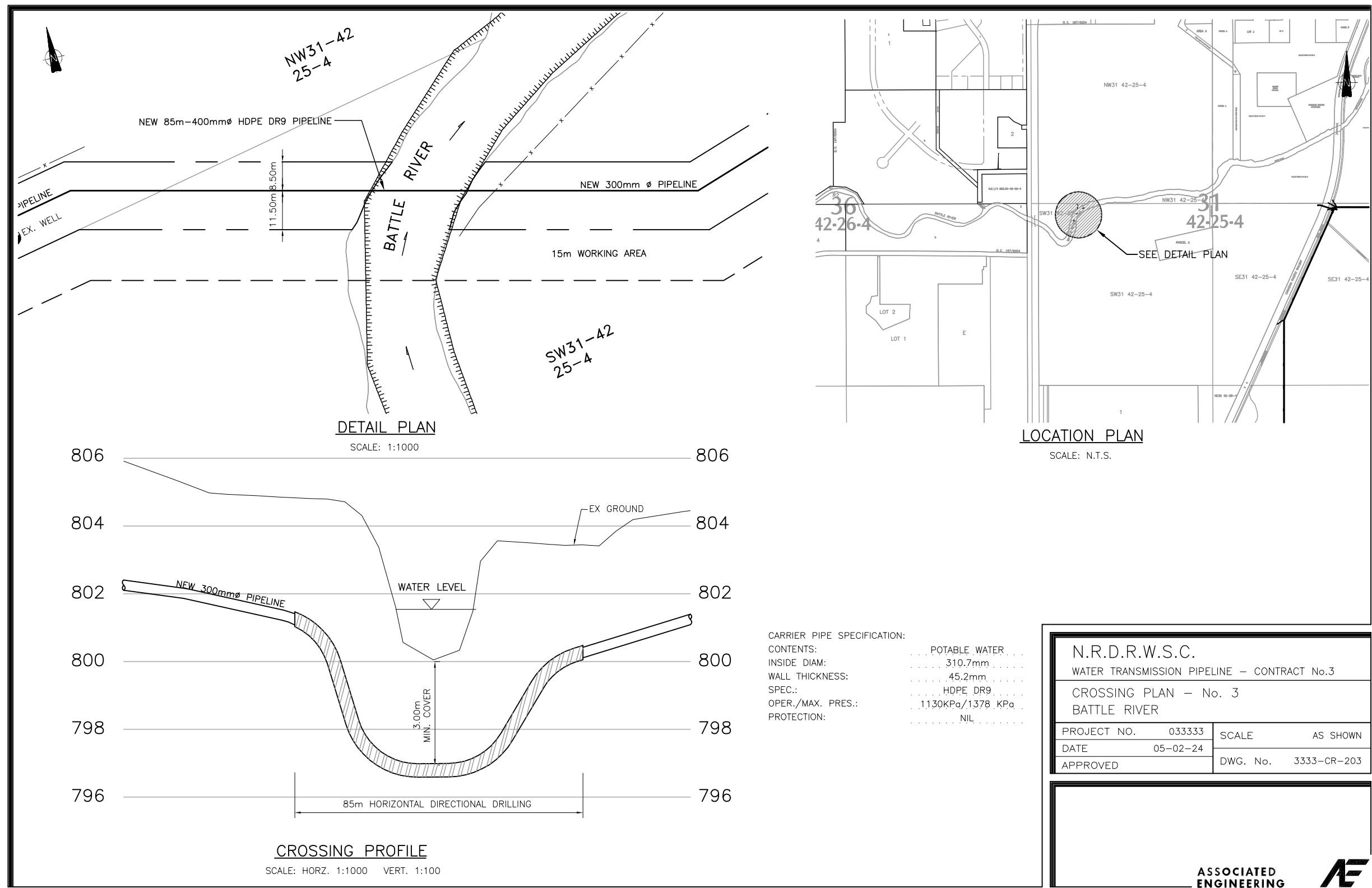
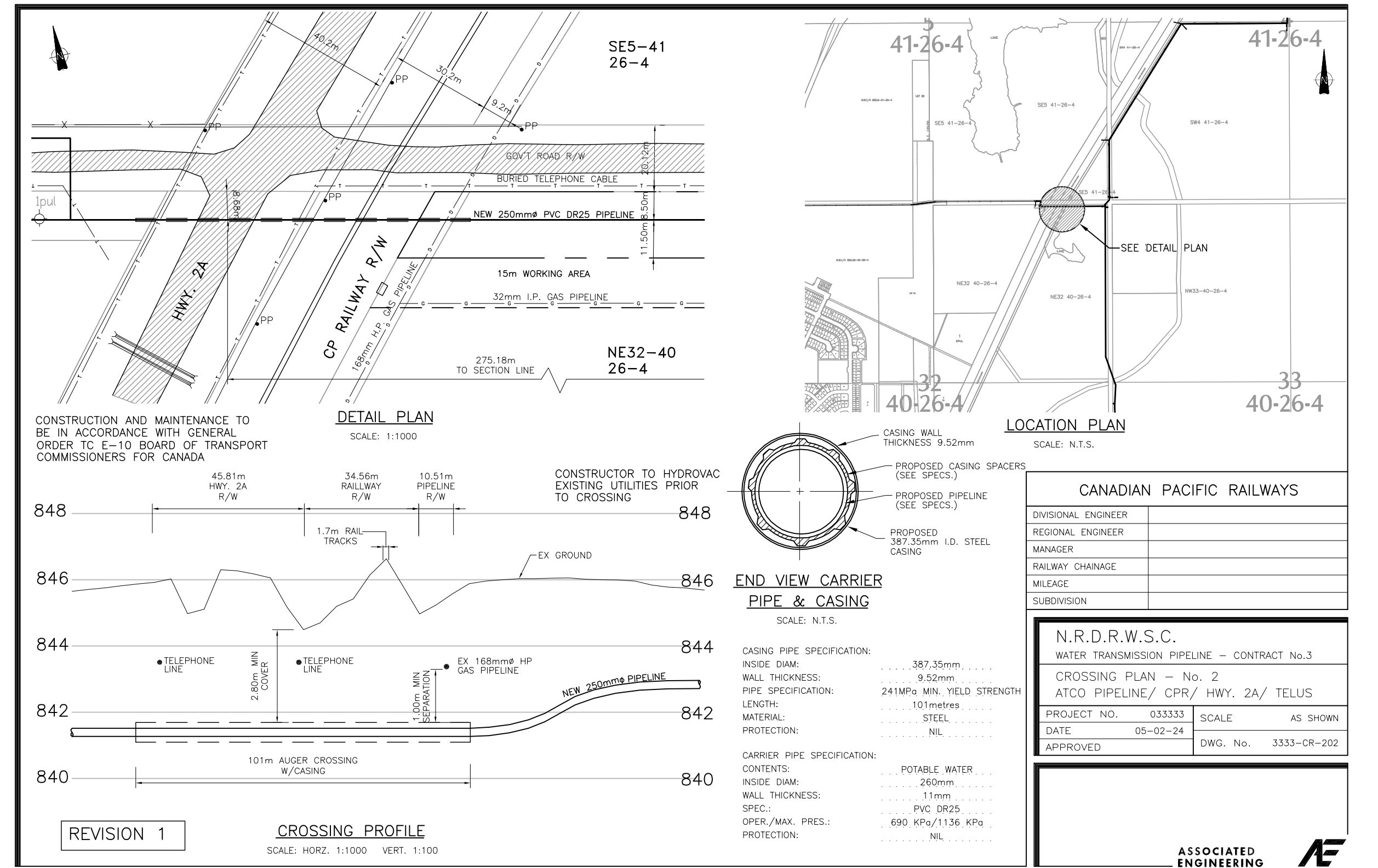
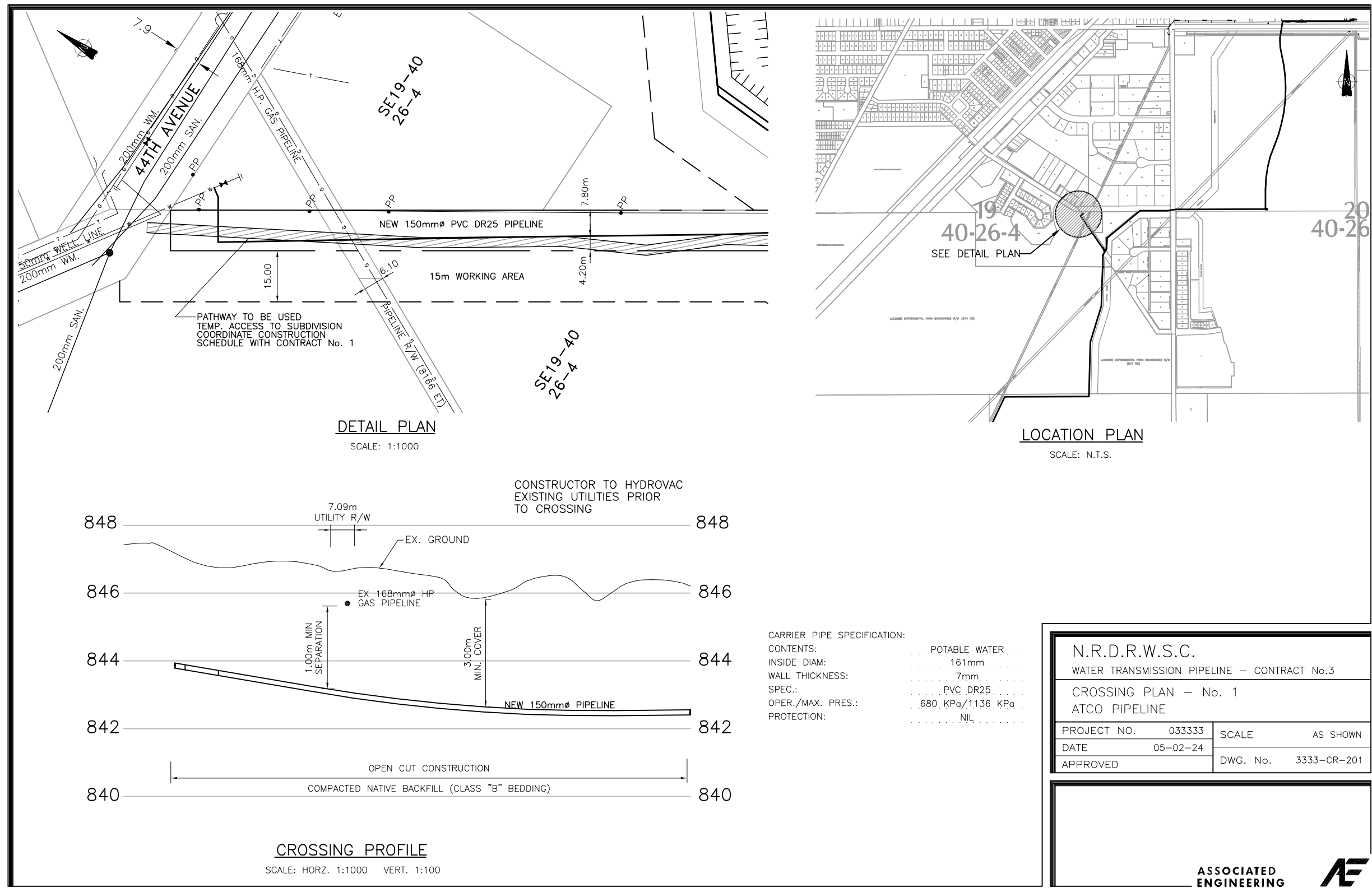
PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0



CLIENT
 NORTH RED DEER RIVER
 WATER SERVICES COMMISSION
 ALBERTA
 PROJECT
 WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE PLAN PROFILE - PONOKA 39 AVE. STA. 141+500.00 TO STA. 142+260.50	DRAWING NUMBER 3333-3-112	REV. NO. 3	SHEET 12 66
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Date: Jun 01, 2006
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REDUCED DRAWING
DO NOT SCALE

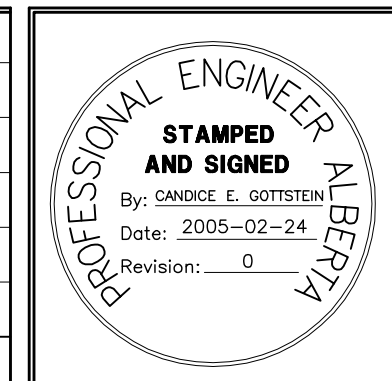
Date: 12/21/2009
 Drawn: J.W. Wong
 Checked: K. Ch'ng
 Project: 033333-3-115-049
 Title: WATER TRANSMISSION PIPELINE - CROSSING PLAN - A
 Scale: AS SHOWN
 Drawing No: 3333-CR-201

LEGEND

—	PROPOSED WATER TRANSMISSION PIPELINE	—	EXISTING FENCE
- - -	TEMPORARY WORKING EASEMENT LIMIT	—	EXISTING CULVERT
—	PERMANENT PIPELINE R.O.W.	—	EXISTING TREE LINE
—	EXISTING NATURAL GAS PIPELINE	—	EXISTING STREET LIGHT
—	EXISTING BURIED TELEPHONE LINE	—	BLOW OFF VALVE
—	EXISTING TEL. PEDestal		
—	EXISTING BURIED FIBRE OPTICS CABLE		
—	EXISTING OVERHEAD POWER LINE		
—	EXISTING UNDERGROUND POWER LINE		
—	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
SCALE	AS NOTED		

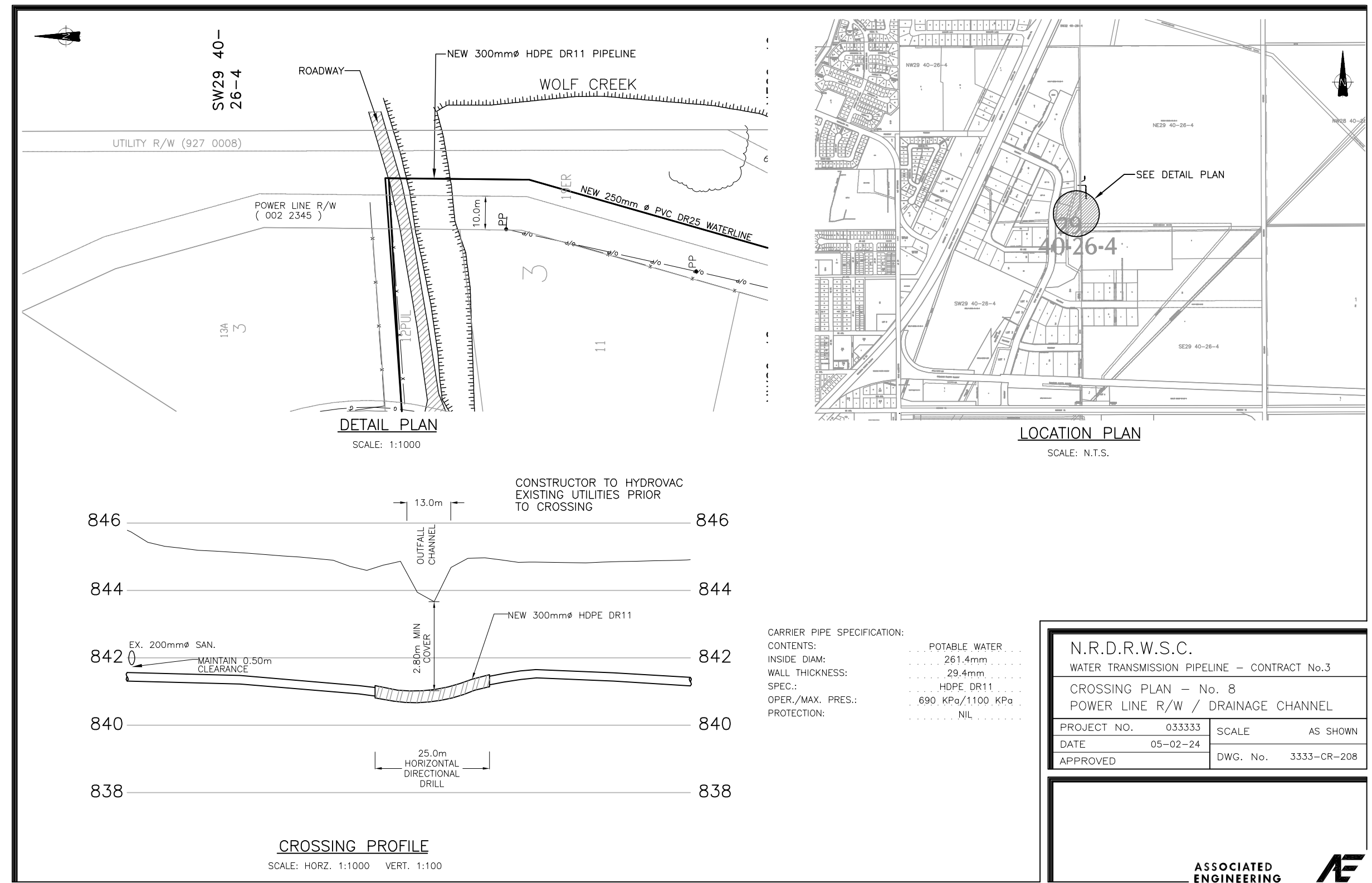
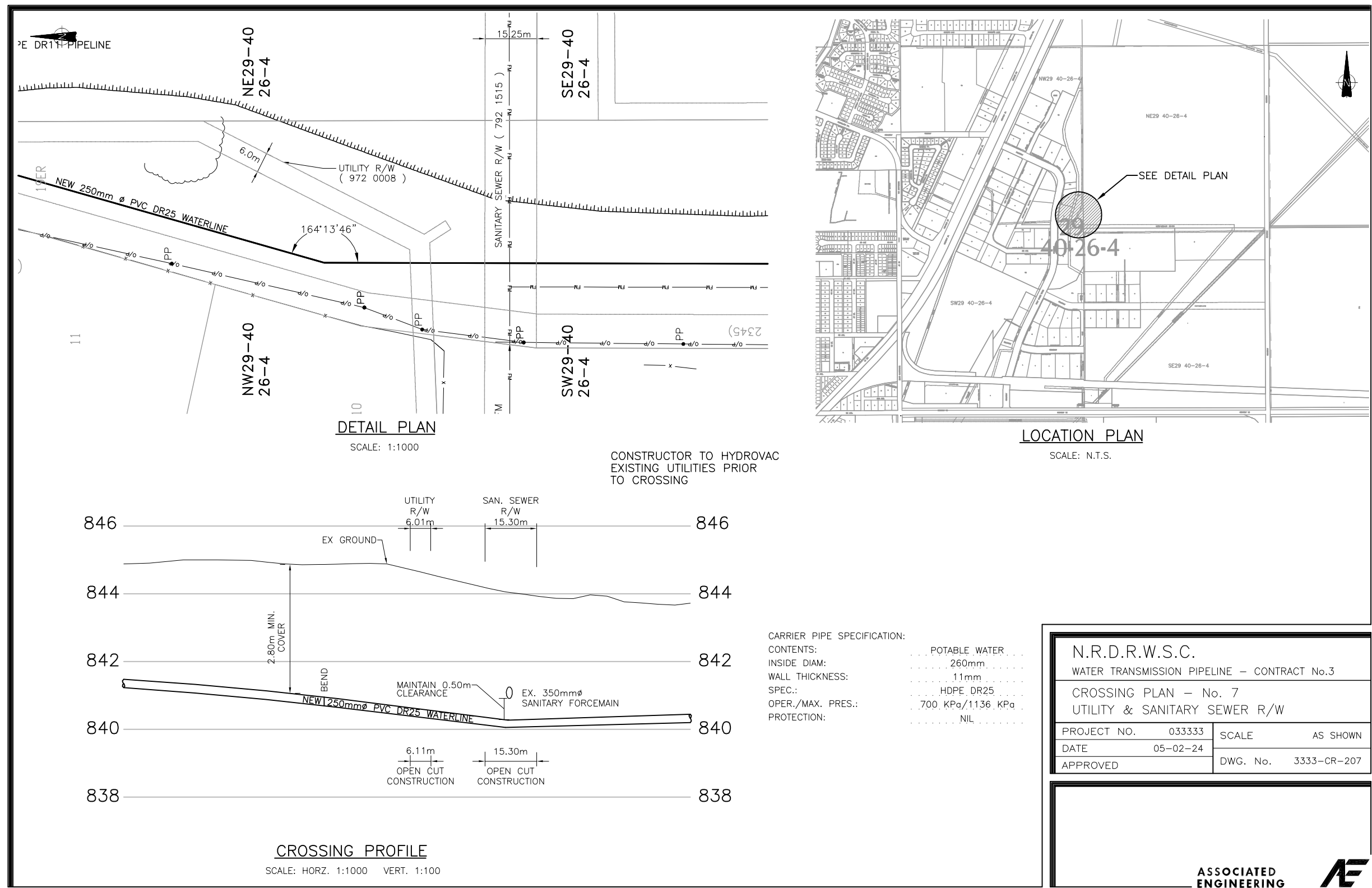
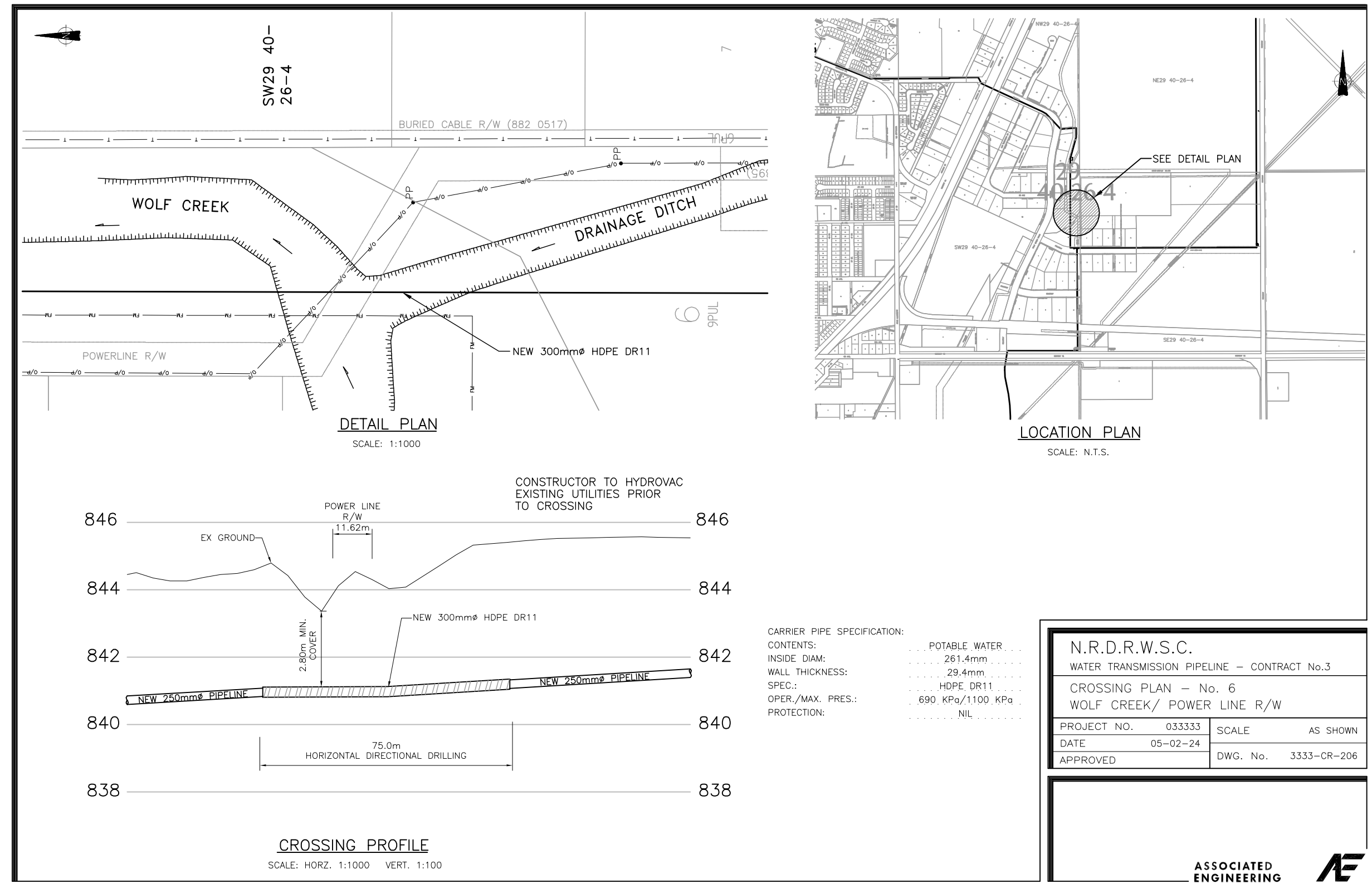
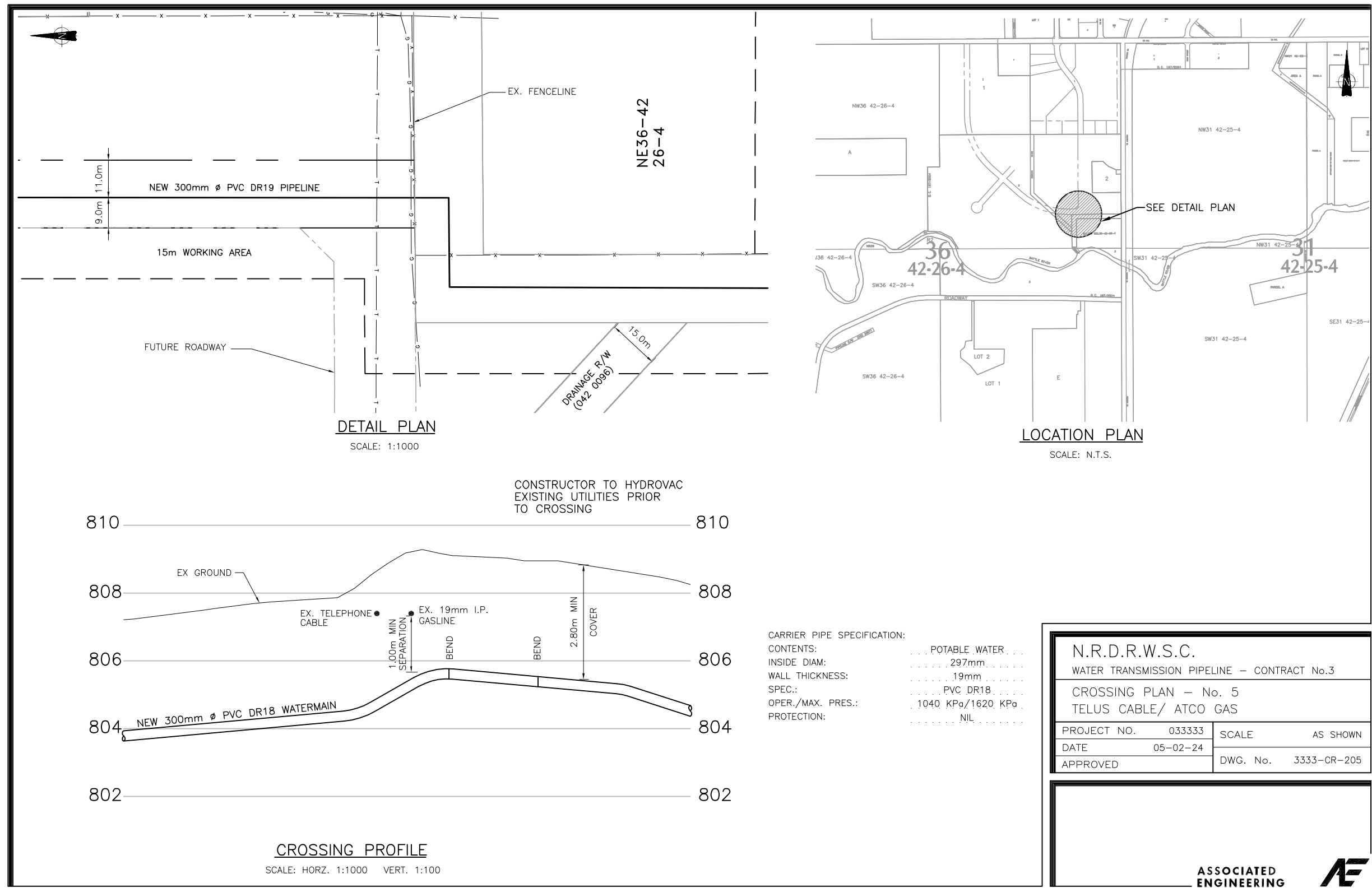


PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0



CLIENT
**NORTH RED DEER RIVER
 WATER SERVICES COMMISSION**
 ALBERTA
 PROJECT
WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE	CROSSING PLAN - A
DRAWING NUMBER	3333-3-115
REV. NO.	2
SHEET	15
	66



REDUCED DRAWING
DO NOT SCALE

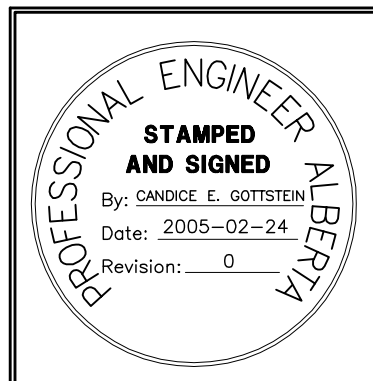
Date: 12/23/2009
 Drawn: J.W. Wong
 Checked: C.G. / C.M.
 Project: 033333-3-116-049
 Title: WATER TRANSMISSION PIPELINE - CONTRACT - 3-116-049
 Scale: AS SHOWN
 Date: 05-02-24
 Approved: B. Birch
 Project: 033333-3-116-049
 Title: WATER TRANSMISSION PIPELINE - CONTRACT - 3-116-049
 Scale: AS SHOWN

LEGEND

—	PROPOSED WATER TRANSMISSION PIPELINE	—	EXISTING FENCE
- - -	TEMPORARY WORKING EASEMENT LIMIT	—	EXISTING CULVERT
—	PERMANENT PIPELINE R.O.W.	—	EXISTING TREE LINE
—	EXISTING NATURAL GAS PIPELINE	—	EXISTING STREET LIGHT
—	EXISTING BURIED TELEPHONE LINE	—	BLOW OFF VALVE
—	EXISTING TEL. PEDESTAL		
—	EXISTING BURIED FIBRE OPTICS CABLE		
—	EXISTING OVERHEAD POWER LINE		
—	EXISTING UNDERGROUND POWER LINE		
—	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G. / C.M.		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE	AS NOTED		

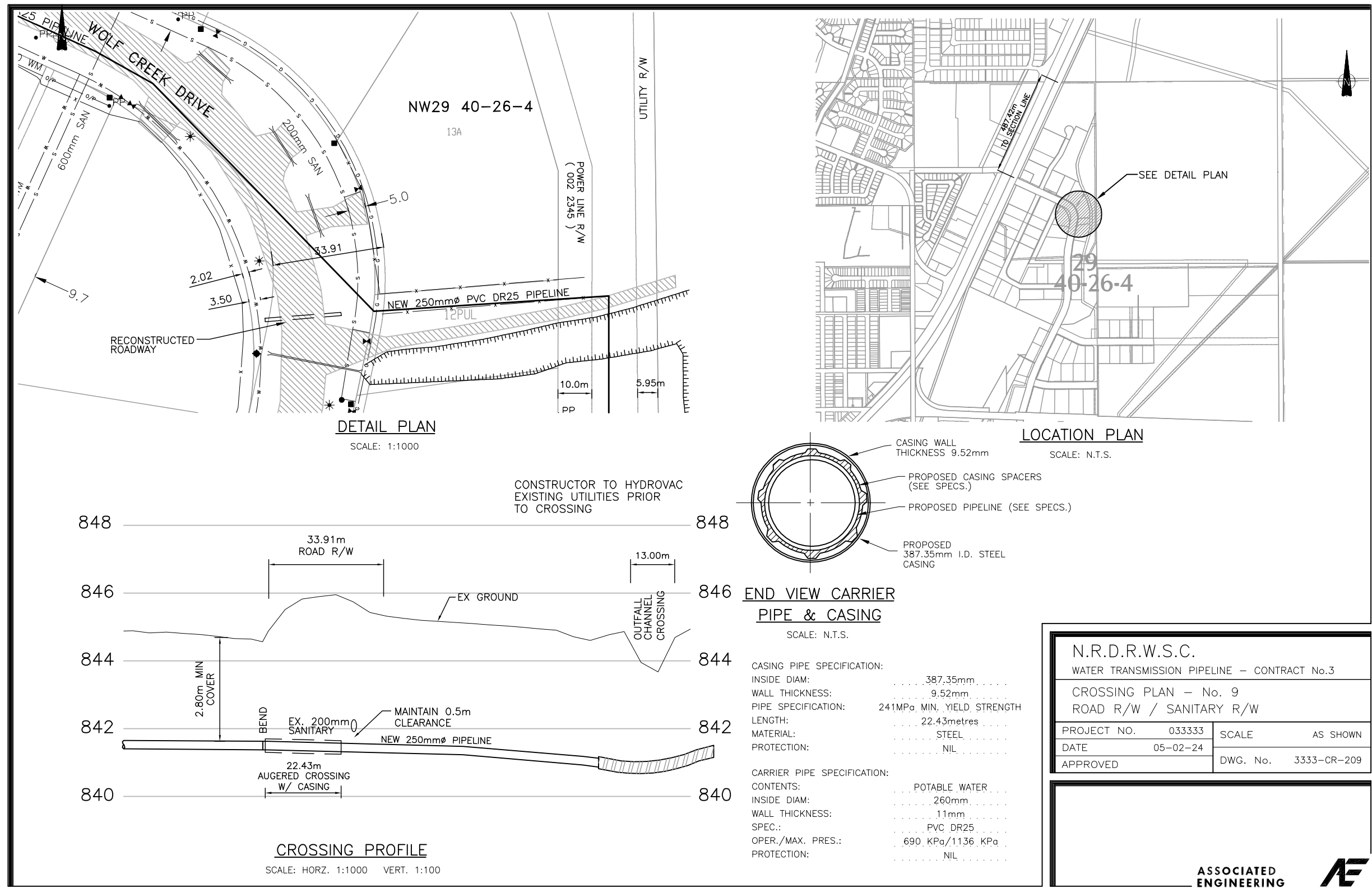


PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0



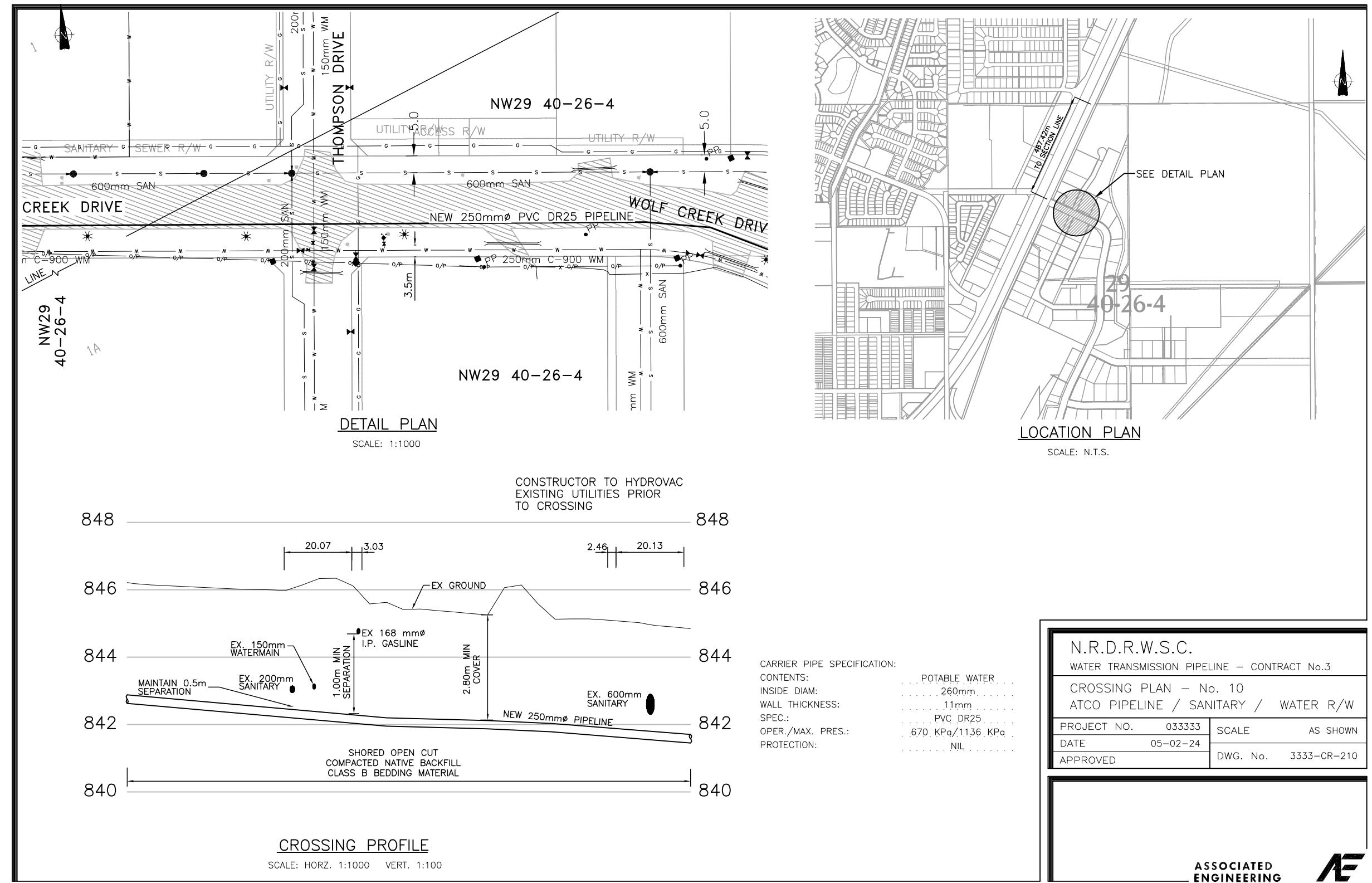
CLIENT
**NORTH RED DEER RIVER
 WATER SERVICES COMMISSION**
 ALBERTA
 PROJECT
WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE	CROSSING PLAN - B
DRAWING NUMBER	3333-3-116
REV. NO.	1
SHEET	16
	66



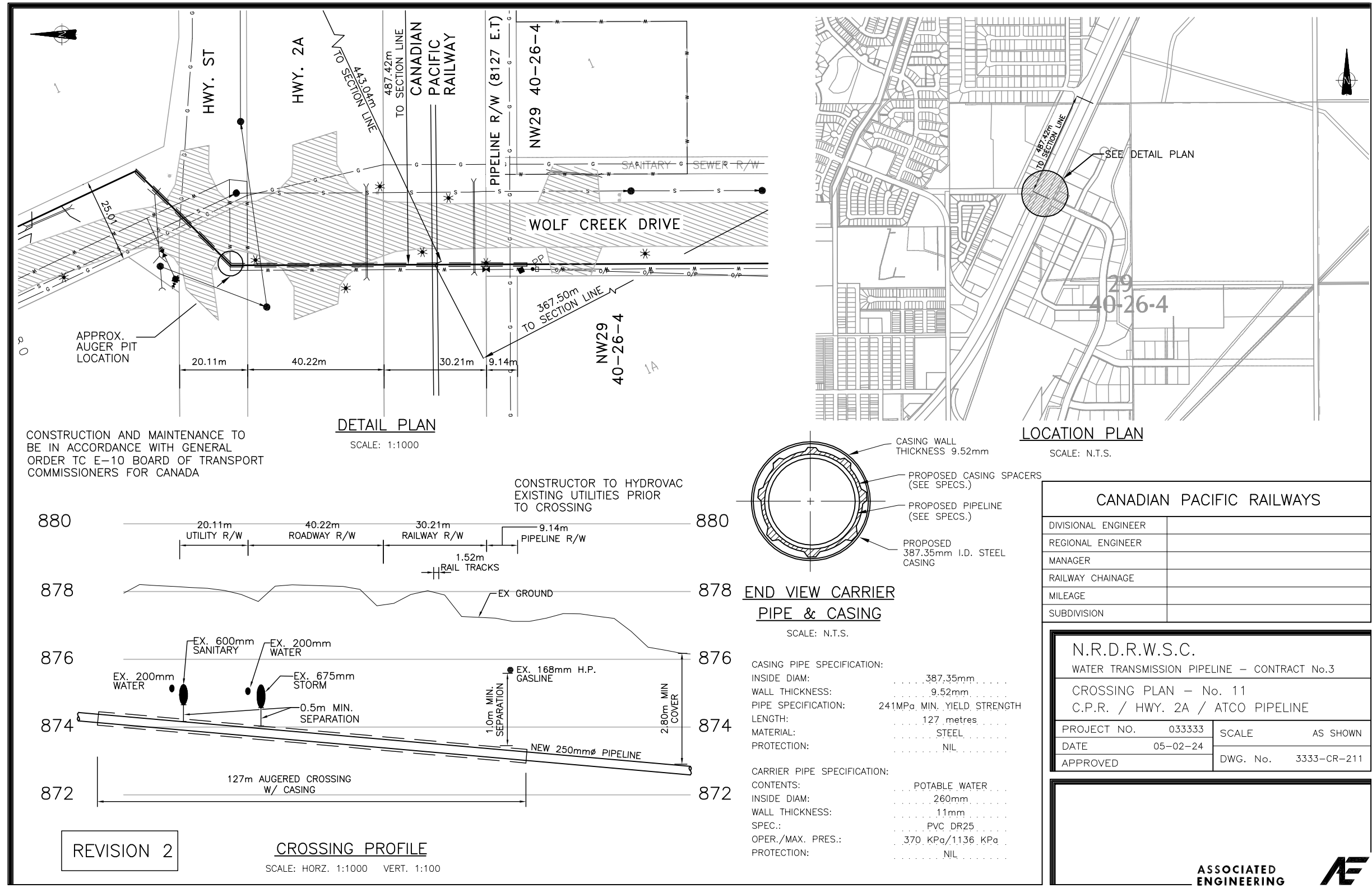
N.R.D.R.W.S.C.
 WATER TRANSMISSION PIPELINE - CONTRACT No.3
 CROSSING PLAN - No. 9
 ROAD R/W / SANITARY R/W
 PROJECT NO. 033333 SCALE AS SHOWN
 DATE 05-02-24 DWG. No. 3333-CR-209
 APPROVED

ASSOCIATED ENGINEERING



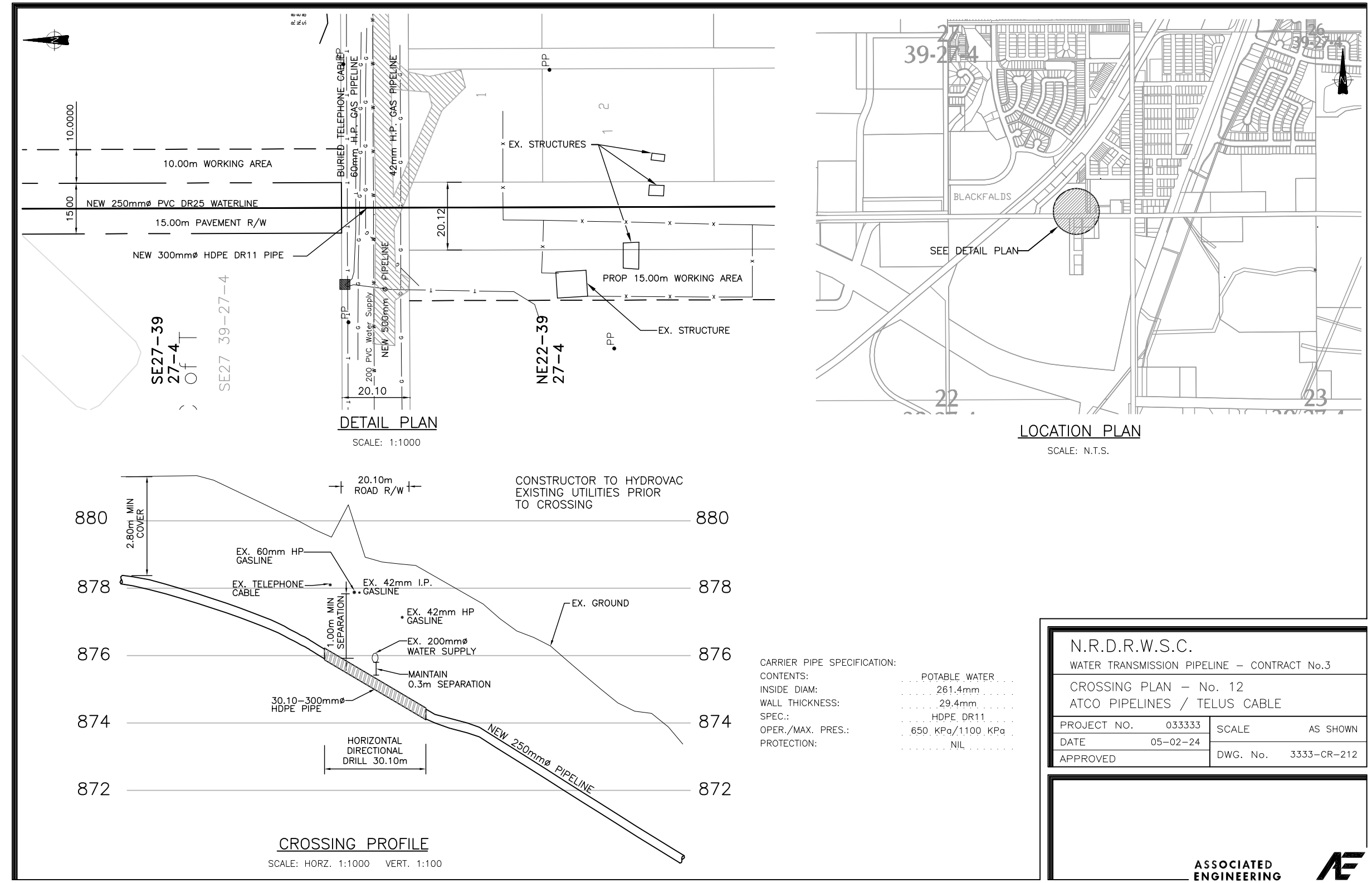
N.R.D.R.W.S.C.
 WATER TRANSMISSION PIPELINE - CONTRACT No.3
 CROSSING PLAN - No. 10
 ATCO PIPELINE / SANITARY / WATER R/W
 PROJECT NO. 033333 SCALE AS SHOWN
 DATE 05-02-24 DWG. No. 3333-CR-210
 APPROVED

ASSOCIATED ENGINEERING



N.R.D.R.W.S.C.
 WATER TRANSMISSION PIPELINE - CONTRACT No.3
 CROSSING PLAN - No. 11
 C.P.R. / HWY. 2A / ATCO PIPELINE
 PROJECT NO. 033333 SCALE AS SHOWN
 DATE 05-02-24 DWG. No. 3333-CR-211
 APPROVED

ASSOCIATED ENGINEERING



N.R.D.R.W.S.C.
 WATER TRANSMISSION PIPELINE - CONTRACT No.3
 CROSSING PLAN - No. 12
 ATCO PIPELINES / TELUS CABLE
 PROJECT NO. 033333 SCALE AS SHOWN
 DATE 05-02-24 DWG. No. 3333-CR-212
 APPROVED

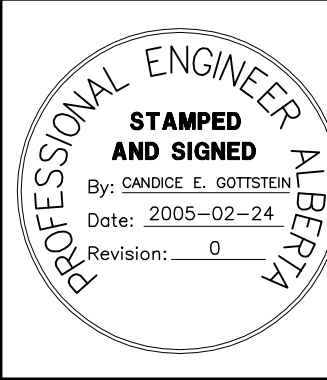
ASSOCIATED ENGINEERING

LEGEND

—	PROPOSED WATER TRANSMISSION PIPELINE	—	EXISTING FENCE
- - -	TEMPORARY WORKING EASEMENT LIMIT	—	EXISTING CULVERT
—	PERMANENT PIPELINE R.O.W.	—	EXISTING TREE LINE
—	EXISTING NATURAL GAS PIPELINE	—	EXISTING STREET LIGHT
—	EXISTING BURIED TELEPHONE LINE	—	BLOW OFF VALVE
—	EXISTING TEL. PEDESTAL		
—	EXISTING BURIED FIBRE OPTICS CABLE		
—	EXISTING OVERHEAD POWER LINE		
—	EXISTING UNDERGROUND POWER LINE		
—	EXISTING POWER POLE		

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G. / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
SCALE	AS NOTED		



PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0

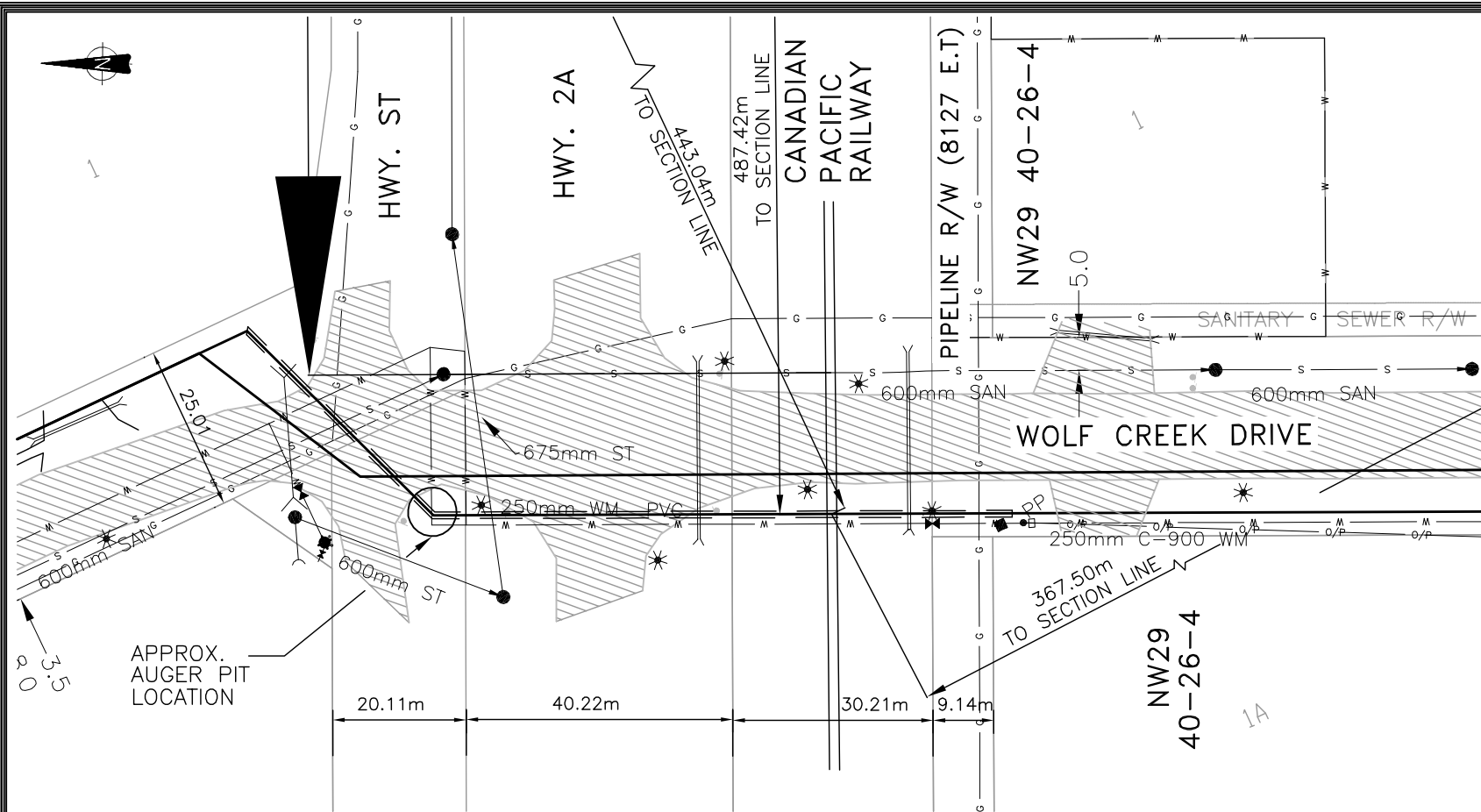
ASSOCIATED ENGINEERING

CLIENT
NORTH RED DEER RIVER WATER SERVICES COMMISSION
 ALBERTA
 PROJECT
WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE	CROSSING PLAN - C
DRAWING NUMBER	3333-3-117
REV. NO.	2
SHEET	17
	66

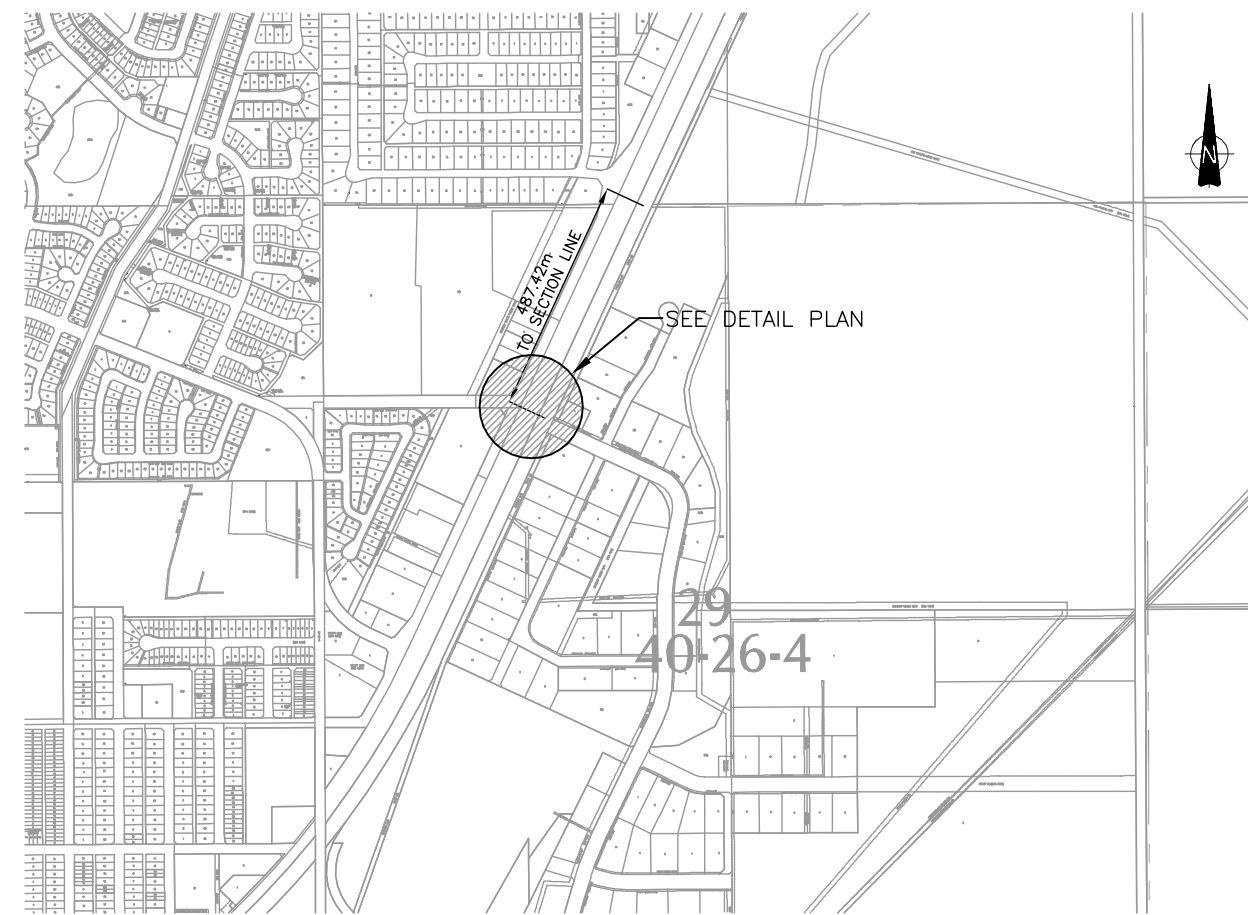
REDUCED DRAWING
DO NOT SCALE

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 Time: 10:00:00 AM
 User: W. Wong
 Plot: 3333-3-117.dwg
 Plot Device: HPGL2
 Plot Style: acad.ctb
 Scale: 1:1
 Sheet: 17 of 17
 Title: CROSSING PLAN - C
 Author: W. Wong
 Date: 05-02-24
 Project: 3333-3-117



DETAIL PLAN

SCALE: 1:1000

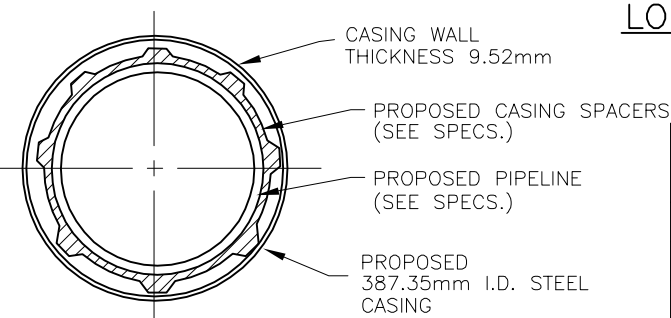


LOCATION PLAN

SCALE: N.T.S.

CONSTRUCTION AND MAINTENANCE TO BE IN ACCORDANCE WITH GENERAL ORDER TC E-10 BOARD OF TRANSPORT COMMISSIONERS FOR CANADA

CONSTRUCTOR TO HYDROVAC EXISTING UTILITIES PRIOR TO CROSSING

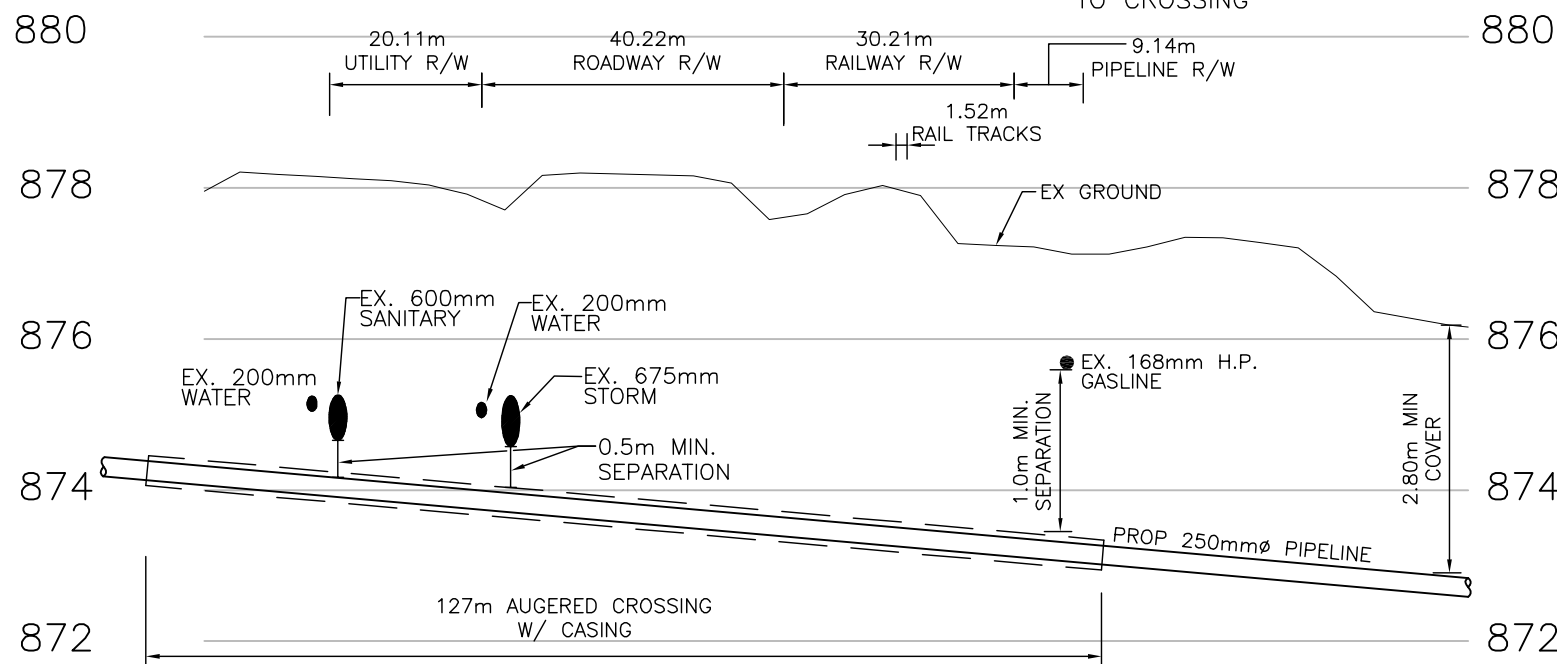


END VIEW CARRIER PIPE & CASING

SCALE: N.T.S.

CASING PIPE SPECIFICATION:
 INSIDE DIAM: 387.35mm
 WALL THICKNESS: 9.52mm
 PIPE SPECIFICATION: 241MPa MIN. YIELD STRENGTH
 LENGTH: 127 metres
 MATERIAL: STEEL
 PROTECTION: NIL

CARRIER PIPE SPECIFICATION:
 CONTENTS: POTABLE WATER
 INSIDE DIAM: 260mm
 WALL THICKNESS: 11mm
 SPEC.: PVC DR25
 OPER./MAX. PRES.: 370 KPa/1136 KPa
 PROTECTION: NIL



CROSSING PROFILE

SCALE: HORZ. 1:1000 VERT. 1:100

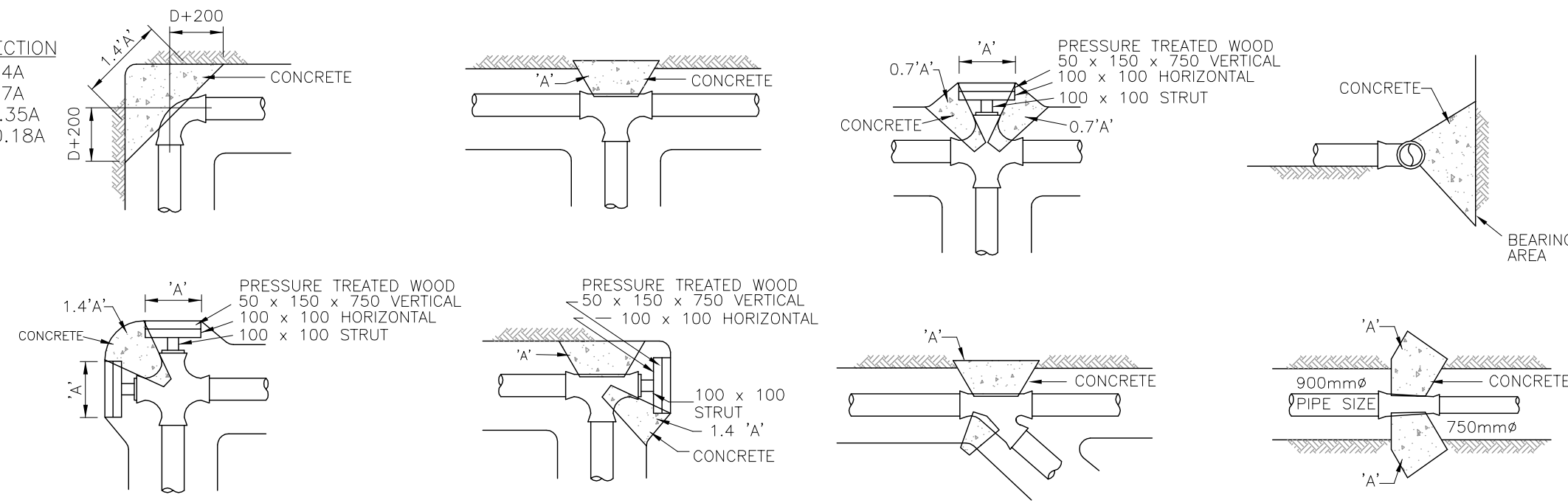
CANADIAN PACIFIC RAILWAYS	
DIVISIONAL ENGINEER	
REGIONAL ENGINEER	
MANAGER	
RAILWAY CHAINAGE	
MILEAGE	
SUBDIVISION	

N.R.D.R.W.S.C.	
WATER TRANSMISSION PIPELINE - CONTRACT No.3	
CROSSING PLAN - No. 11	
C.P.R. / HWY. 2A / ATCO PIPELINE	
PROJECT NO. 033333	SCALE AS SHOWN
DATE 05-02-24	DWG. No. 3333-CR-211
APPROVED	



BEND DEFLECTION

90°	1.4A
45°	0.7A
22 1/2°	0.35A
11 1/4°	0.18A



THRUST BLOCK DESIGN IS BASED ON :

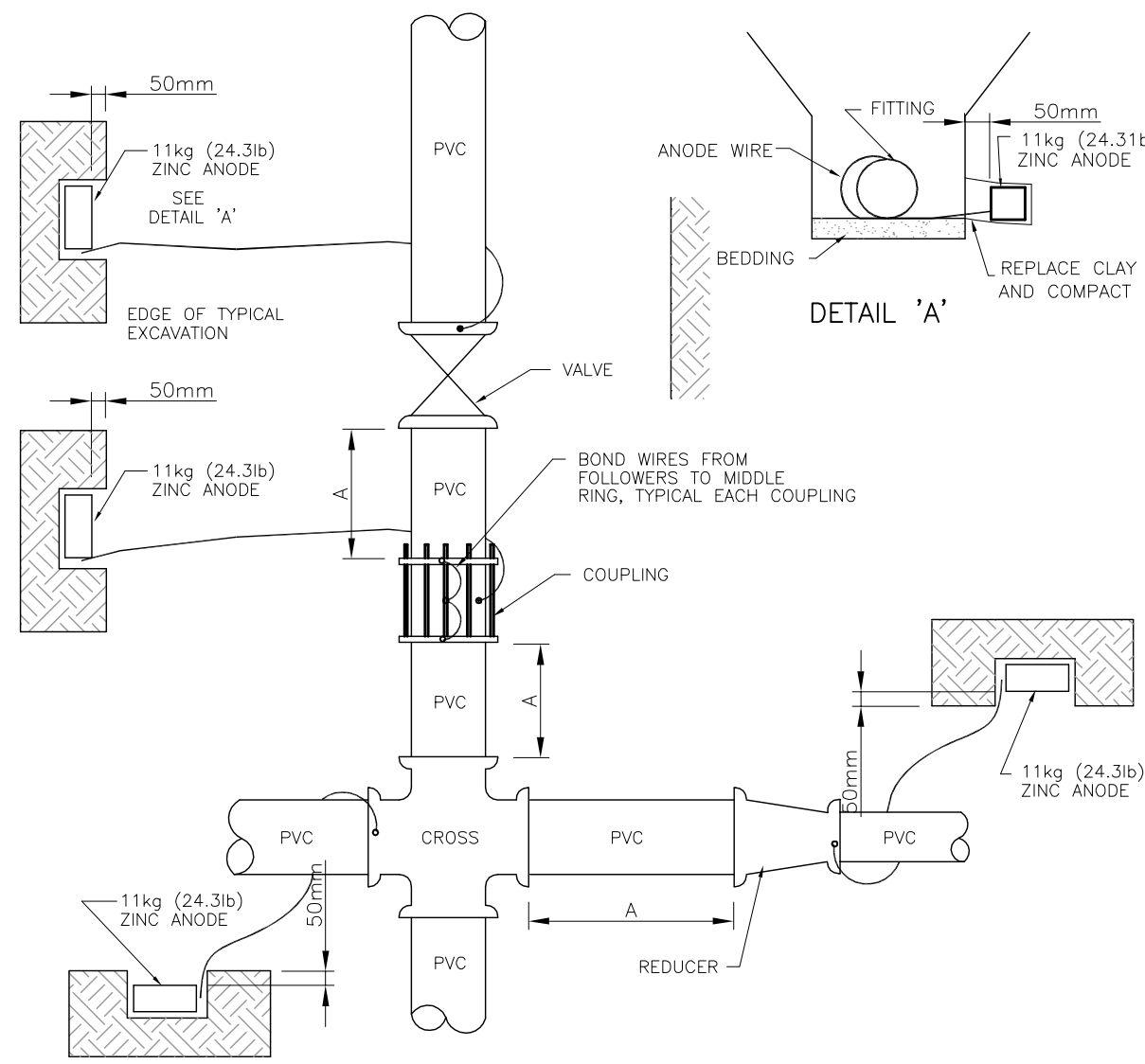
- 1050kPa MAX. SYSTEM PRESSURE OR 700kPa OPERATING PRESSURE PLUS A SURGE ALLOWANCE OF 345kPa (2fps SURGE ALLOWANCE AT 25psi/fps)
- THRUST BLOCK DESIGN ASSUMES A MIN. VERTICAL SOIL BEARING OF 100kPa
- THRUST BLOCK BEARING AREA BASED ON P.V.C. PIPE (AWWA C900 AND C905)
- CONCRETE 20MPa TYPE 50 CEMENT.

TABLE - FOR CALCULATION OF BASIC THRUST BLOCK BEARING AREA 'A' (IN SQUARE METRES)

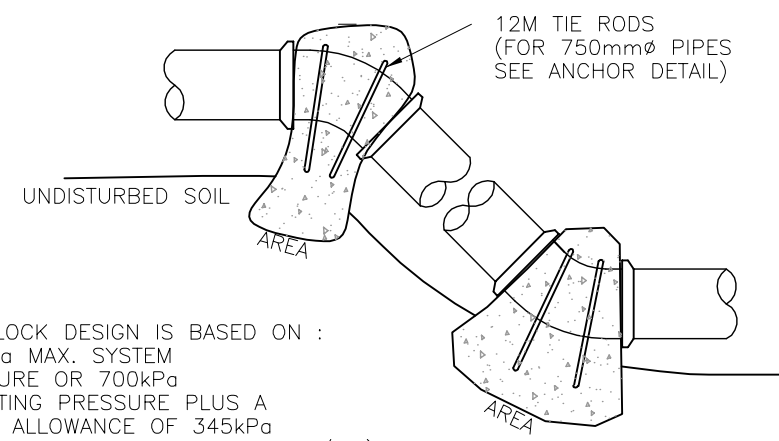
PIPE SIZE	150	200	250	300	350	400	450	500	600
'A'	0.40	0.68	1.06	1.54	2.08	2.72	3.44	5.0	5.95

POURED CONCRETE THRUST BLOCKS FOR HORIZONTAL TEES AND BENDS
N.T.S.

ANODE INSTALLATION DETAIL
N.T.S.



- NOTES:
- MINIMUM DISTANCE FROM ANODE TO PIPE, FITTING, VALVE, OR HYDRANT IS 150mm.
 - INSTALL ANODE AT APPROX. PIPE DEPTH IN NATIVE SOIL.
 - BOND WIRES MAY BE USED TO PROTECT UP TO TWO FITTINGS WITH ONE ANODE WHEN DIMENSION 'A' DOES NOT EXCEED ONE (1) METER.
 - ALL ZINC ANODES ON FITTINGS AND VALVES ARE 11kg (24.3lb).
 - ZINC ANODES TO BE EMBEDDED INTO TRENCH WALL TO PROVIDE FOR A MINIMUM OF 50mm OF NATIVE CLAY COMPLETELY SURROUNDING THE ANODE.
 - ANODES TO BE AT LEAST 300mm CLEAR OF THRUST BLOCK.



THRUST BLOCK DESIGN IS BASED ON :

- 1050kPa MAX. SYSTEM PRESSURE OR 700kPa OPERATING PRESSURE PLUS A SURGE ALLOWANCE OF 345kPa (2fps SURGE ALLOWANCE AT 25psi/fps)
- THRUST BLOCK DESIGN ASSUMES A MIN. VERTICAL SOIL BEARING OF 100kPa
- THRUST BLOCK BEARING AREA BASED ON P.V.C. PIPE (AWWA C900 DR18 AND C905 DR25)
- CONCRETE 20MPa TYPE 50 CEMENT.
- UNIT WEIGHT OF CONCRETE ASSUMED IS 2400kg/m³

DOWNWARD THRUST

TABLE - FOR CALCULATION OF BASIC THRUST BLOCK BEARING AREA (IN SQUARE METRES)
CONCRETE UNIT WEIGHT 2400kg/cu.m

PIPE SIZE	150	200	250	300	350	400	450	500
11.25'	0.04	0.07	0.11	0.15	0.21	0.27	0.34	0.38
22.50'	0.08	0.13	0.21	0.30	0.41	0.53	0.67	0.73
30'	0.10	0.18	0.28	0.40	0.54	0.71	0.89	0.97
45'	0.15	0.26	0.41	0.59	0.80	1.05	1.32	1.44

UPWARD THRUST (GRAVITY)

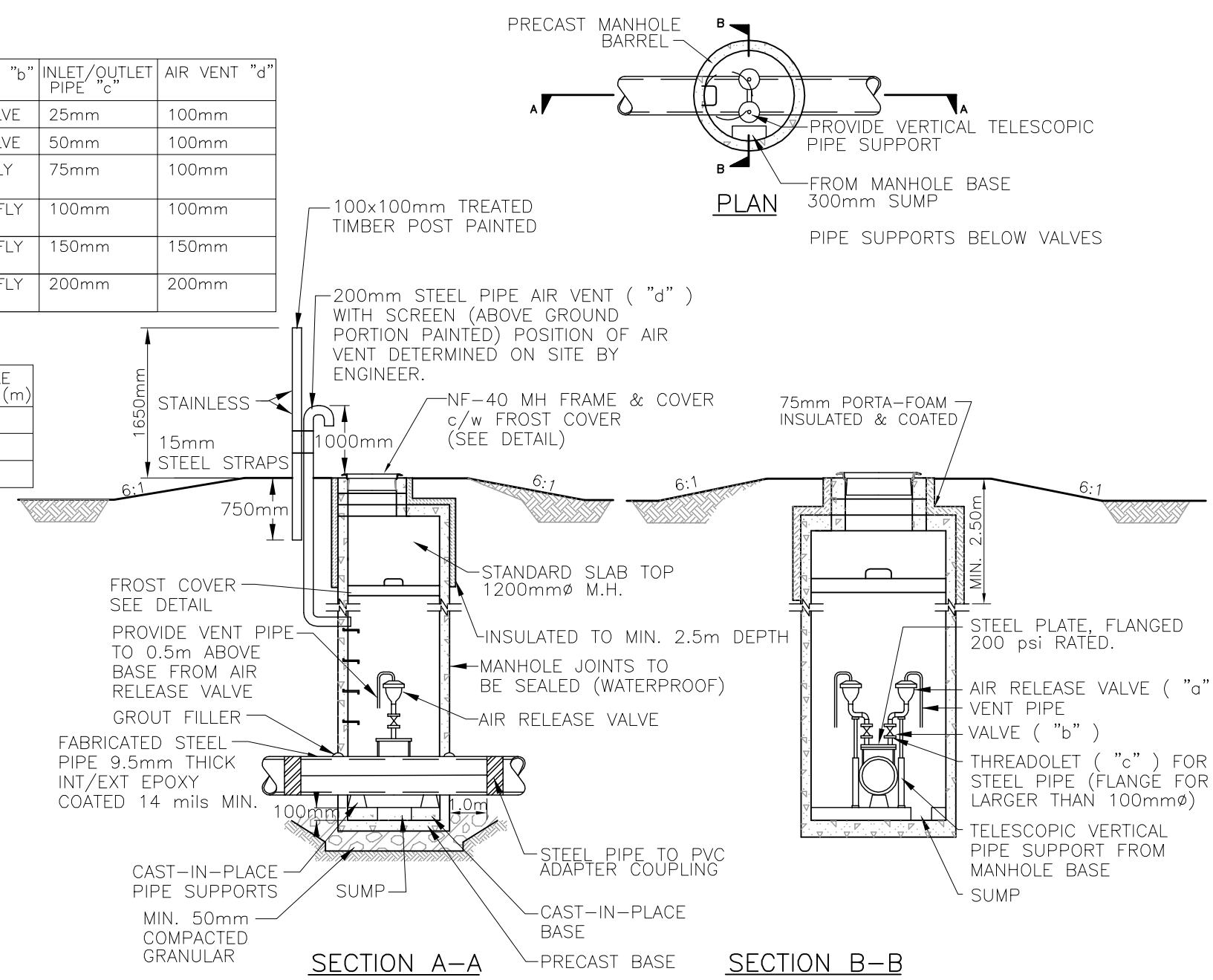
TABLE - FOR CALCULATION OF BASIC THRUST BLOCK BEARING AREA (IN SQUARE METRES)
CONCRETE UNIT WEIGHT 2400kg/cu.m

PIPE SIZE	150	200	250	300	350	400	450	500
11.25'	0.16	0.28	0.45	0.64	0.87	1.14	1.44	1.75
22.50'	0.32	0.57	0.88	1.27	1.73	2.26	2.82	3.41
30'	0.42	0.75	1.17	1.69	2.30	3.00	3.80	4.60
45'	0.62	1.11	1.73	2.50	3.40	4.44	5.62	6.81

VERTICAL THRUST BLOCK DETAIL
N.T.S.

COMBINATION AIR VALVE "a"	ISOLATION VALVE "b"	INLET/OUTLET PIPE "c"	AIR VENT "d"
25mm	25mm BALL VALVE	25mm	100mm
50mm	50mm BALL VALVE	50mm	100mm
75mm	75mm BUTTERFLY VALVE	75mm	100mm
100mm	100mm BUTTERFLY VALVE	100mm	100mm
150mm	150mm BUTTERFLY VALVE	150mm	150mm
200mm	200mm BUTTERFLY VALVE	200mm	200mm

MAINLINE PIPE DIAMETER (mm)	MANHOLE DIAMETER (m)
400 AND UNDER	1.2
450 - 500	1.5
600 - 750	1.8



COMBINATION AIR RELEASE VALVE ASSEMBLY
N.T.S.

Time: 12:23pm Date: Jun 01, 2006 File: C:\033333\CIVIL\design\CIVIL\CONTRACT_PIPELINE\CONTRACT-3\AS-BUILT\3333-3-118.dwg by BW Xref: 3333-BPL_3

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE			

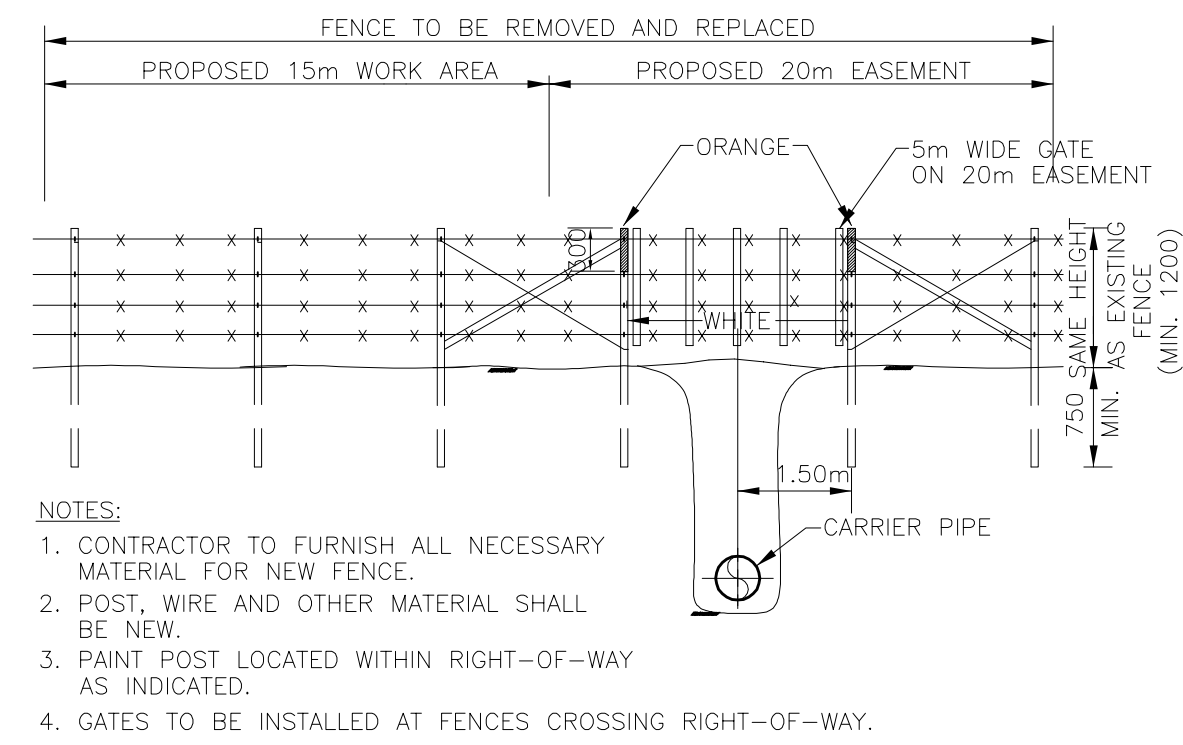
PROFESSIONAL ENGINEER
ALBERTA
By: CANDICE E. GOTTSTEIN
Date: 2005-02-24
Revision: 0

PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
By: BLAIR G. BIRCH
Date: 2005-02-24
Revision: 0

ASSOCIATED ENGINEERING

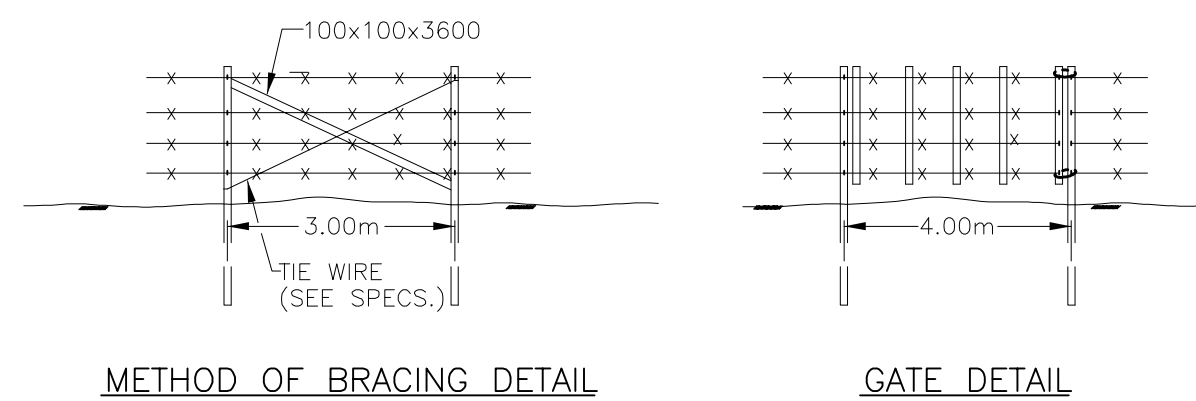
CLIENT	NORTH RED DEER RIVER WATER SERVICES COMMISSION
PROJECT	WATER TRANSMISSION PIPELINE
CONTRACT No.	3

TITLE	DETAILS No. 1
DRAWING NUMBER	3333-3-118
REV. NO.	2
SHEET	18
	66



- NOTES:
1. CONTRACTOR TO FURNISH ALL NECESSARY MATERIAL FOR NEW FENCE.
 2. POST, WIRE AND OTHER MATERIAL SHALL BE NEW.
 3. PAINT POST LOCATED WITHIN RIGHT-OF-WAY AS INDICATED.
 4. GATES TO BE INSTALLED AT FENCES CROSSING RIGHT-OF-WAY.

EXISTING FENCE AT RIGHT-OF-WAY CROSSING

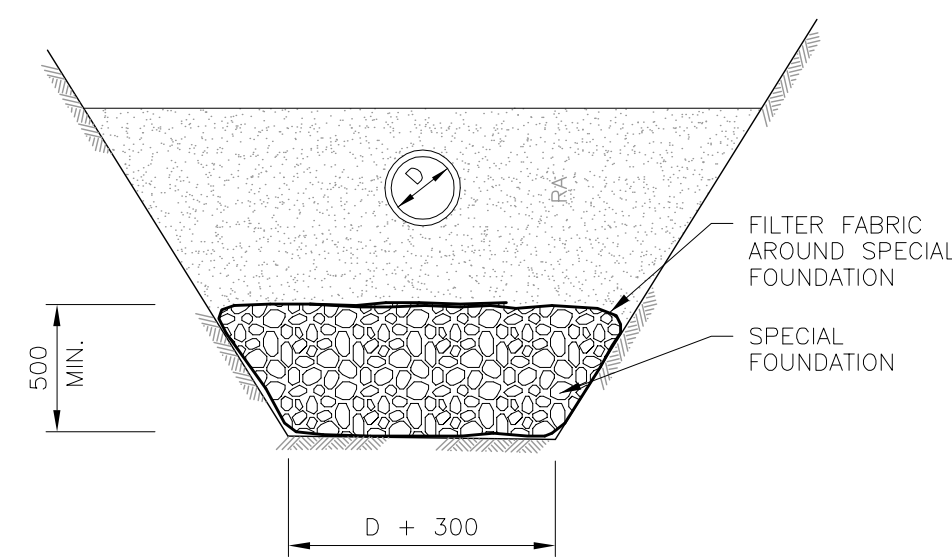


METHOD OF BRACING DETAIL

GATE DETAIL

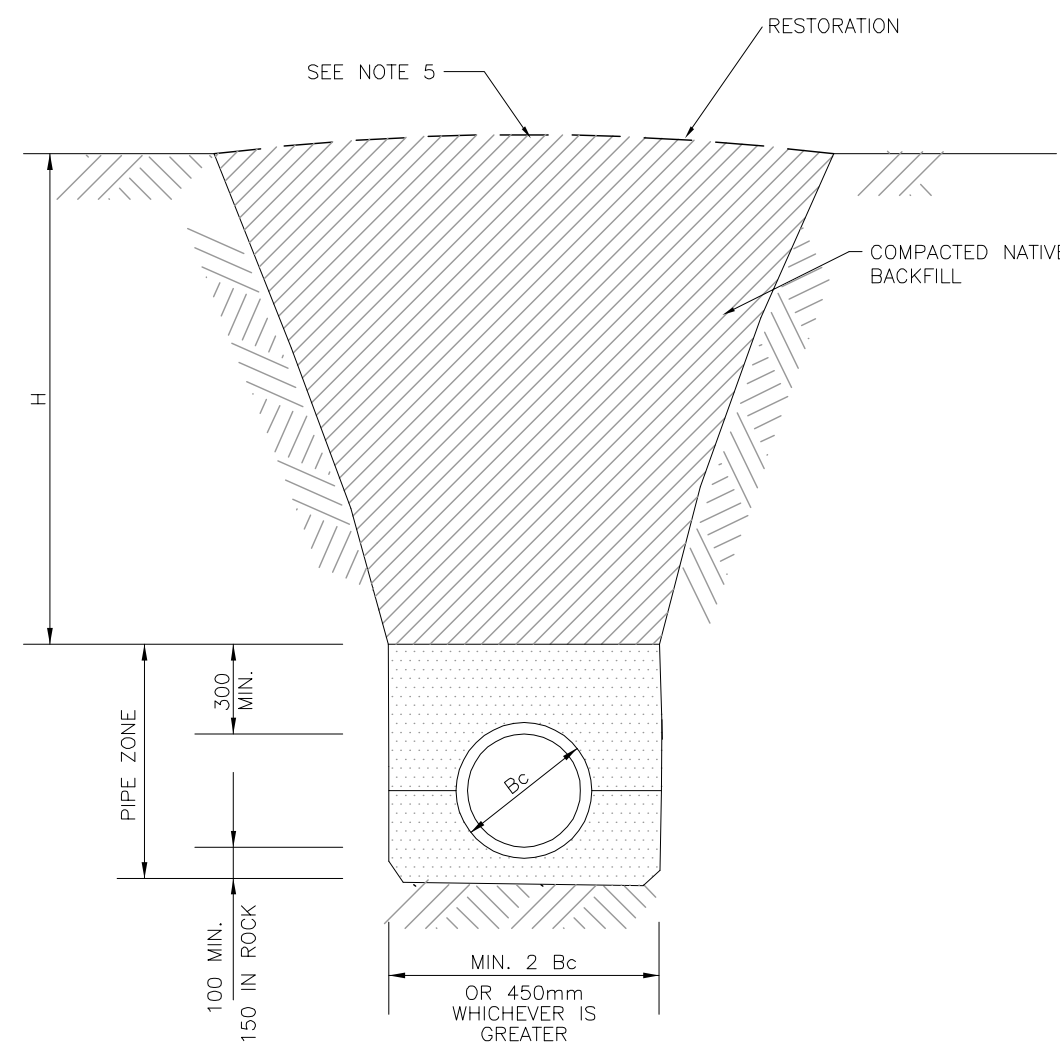
FENCE RESTORATION DETAIL
N.T.S.

NOTE:
MINIMUM DISTANCE FOR BRACE POSTS IS 400m ON TANGENTS AND 200m LONG CURVES.



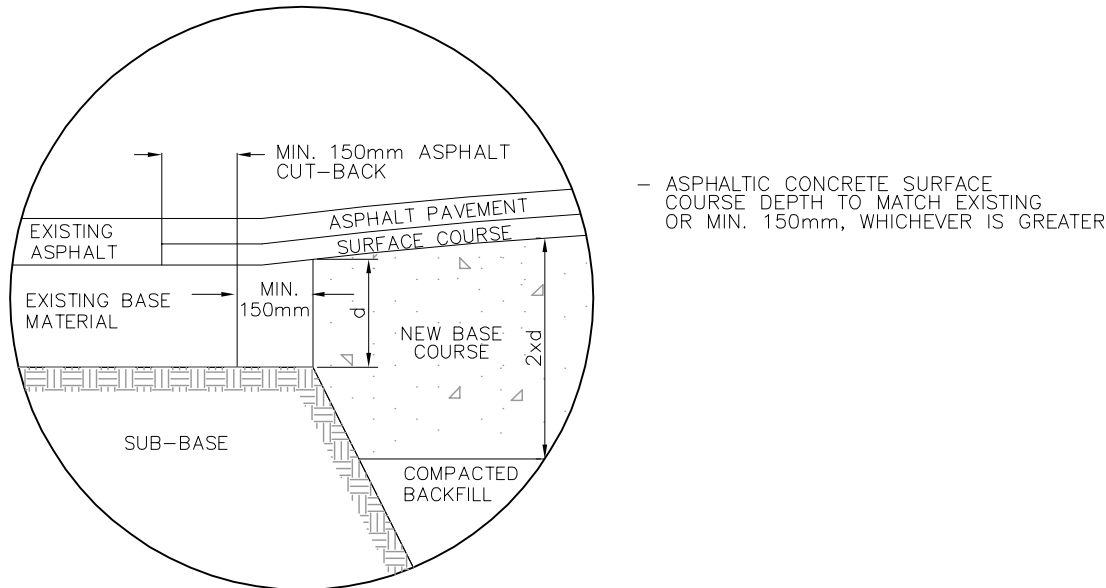
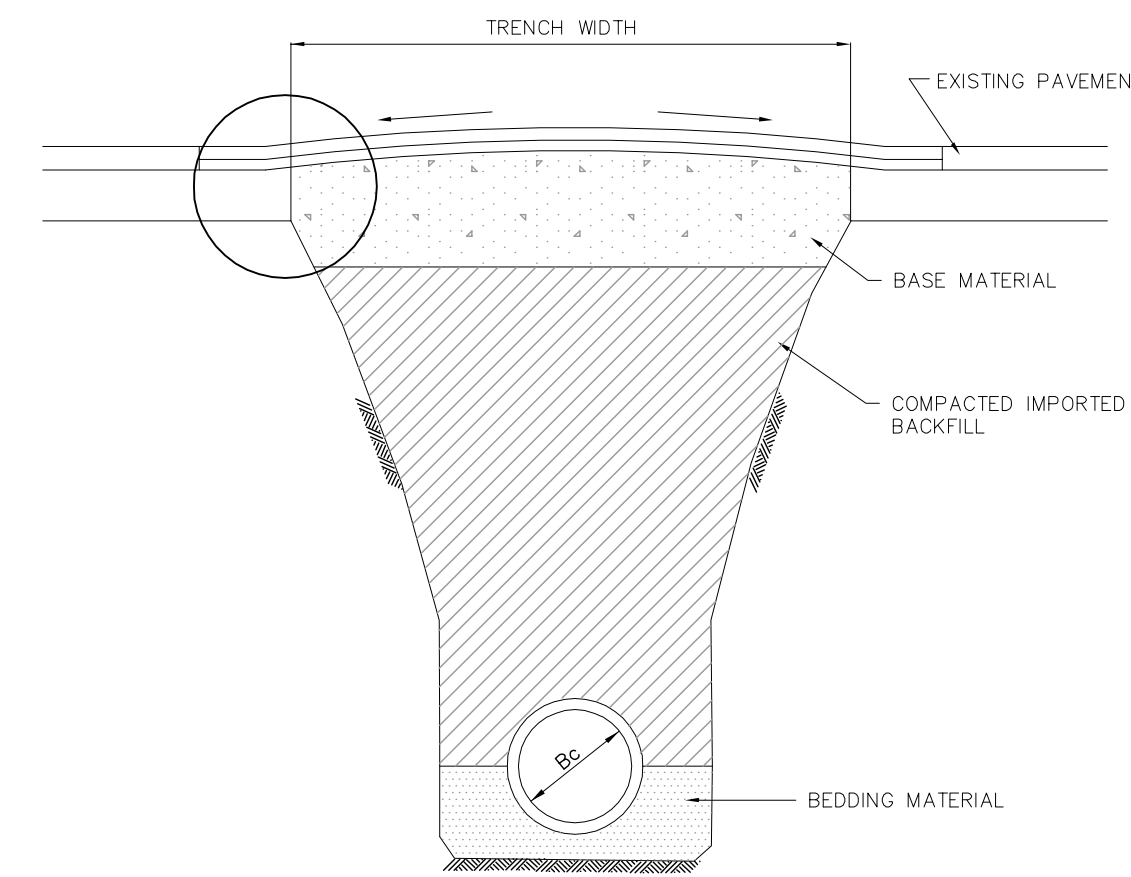
- NOTES:
- WHEN CUT BACK SLOPES ARE TO BE USED IN LIEU OF CAGES AND SHORING, THESE SLOPES ARE TO MEET REQUIREMENTS OF LOCAL CODES.

SPECIAL FOUNDATION DETAIL
N.T.S.



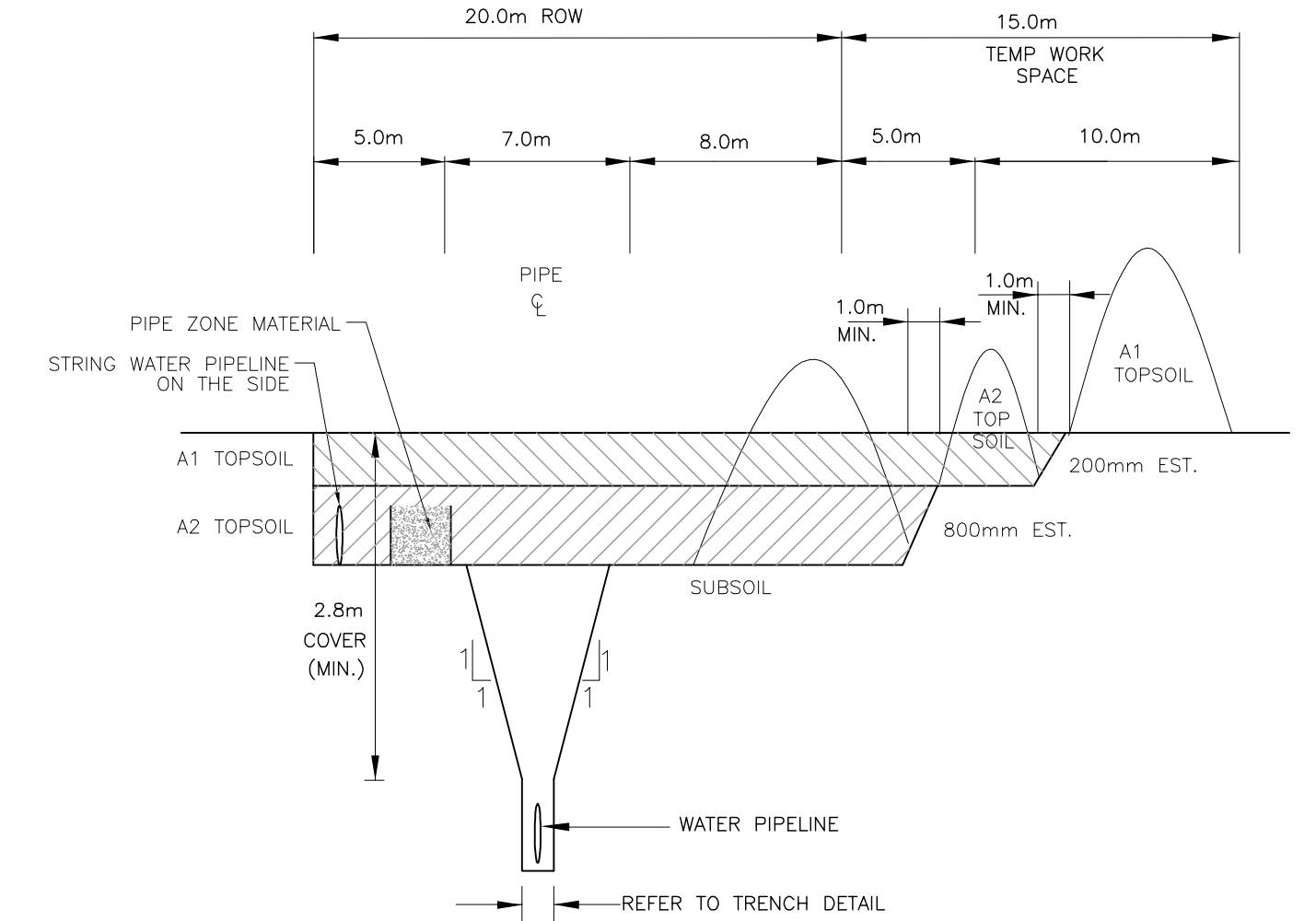
- NOTES:
1. WHEN CUT BACK SLOPES ARE TO BE USED IN LIEU OF CAGES AND SHORING, THESE SLOPES ARE TO MEET REQUIREMENTS OF LOCAL CODES.
 2. SEE SPECIFICATIONS FOR MINIMUM COVER ABOVE PIPE.
 3. MIN. PIPE ZONE WIDTH IS SPECIFIED TO ALLOW PROPER PIPE ZONE COMPACTION.
 4. Bc = OUTSIDE PIPE DIAMETER.
 5. FOR UNCOMPACTED BACKFILL, CROWN TRENCH BY 0.1 x H.

SINGLE TRENCH DETAIL
N.T.S.

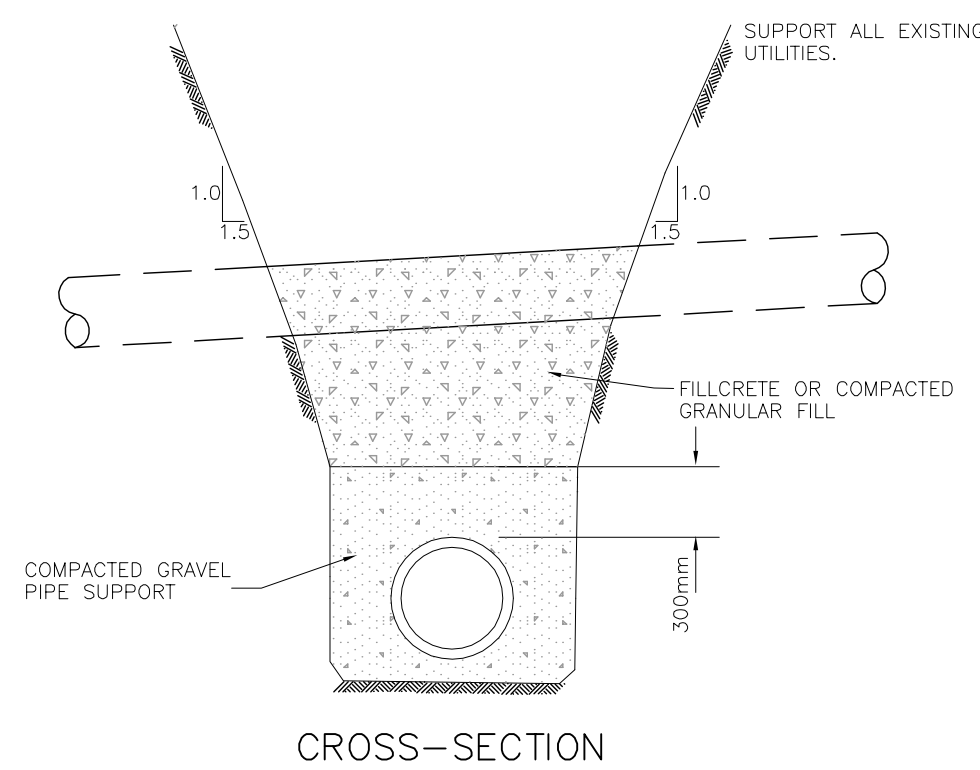


ASPHALTIC CONCRETE SURFACE COURSE DEPTH TO MATCH EXISTING OR MIN. 150mm, WHICHEVER IS GREATER

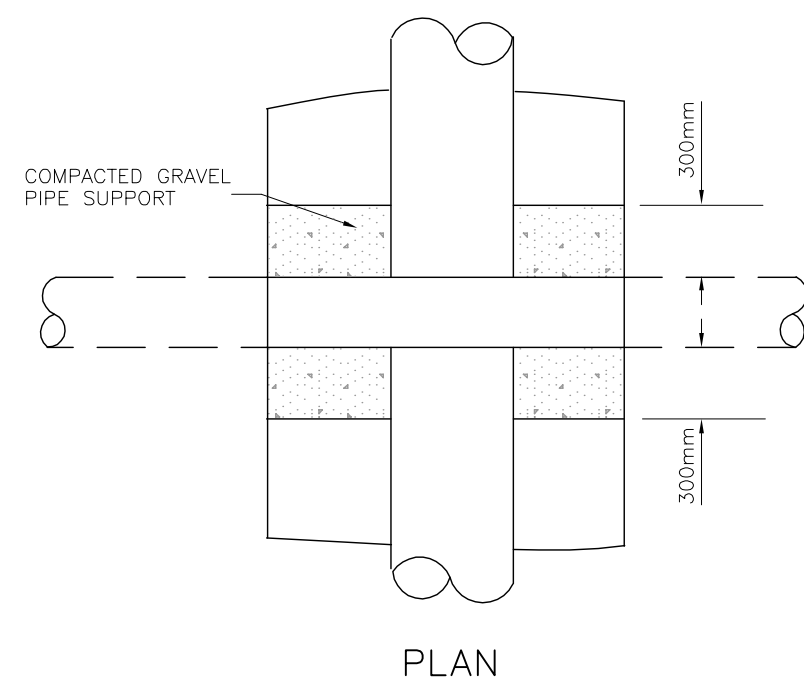
PAVEMENT RESTORATION DETAIL
N.T.S.



BACKHOE CONSTRUCTION ZONE DETAIL - (3 LIFT)
N.T.S.

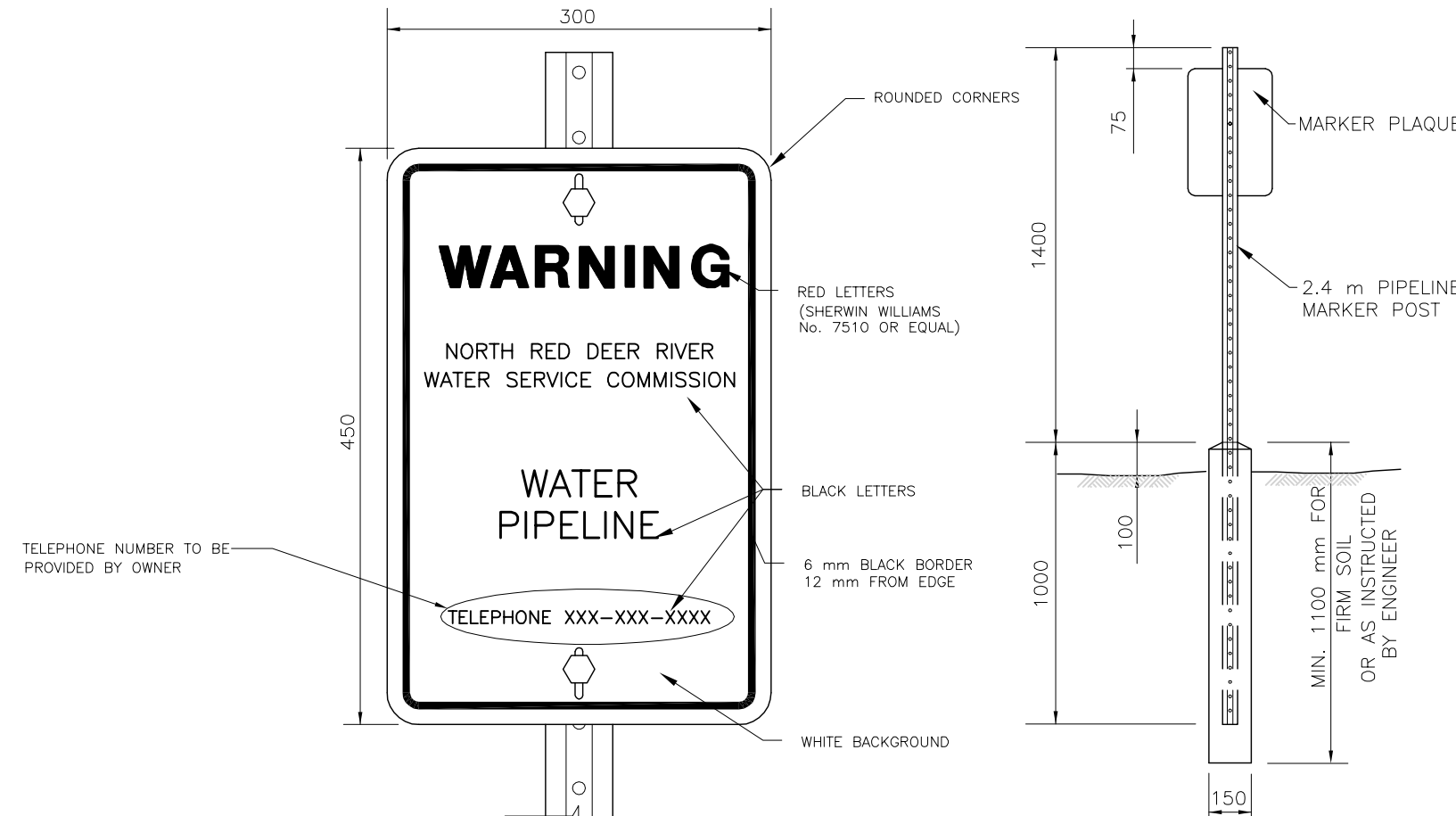


CROSS-SECTION



PLAN

TYPICAL UTILITY CROSSING DETAIL
N.T.S.

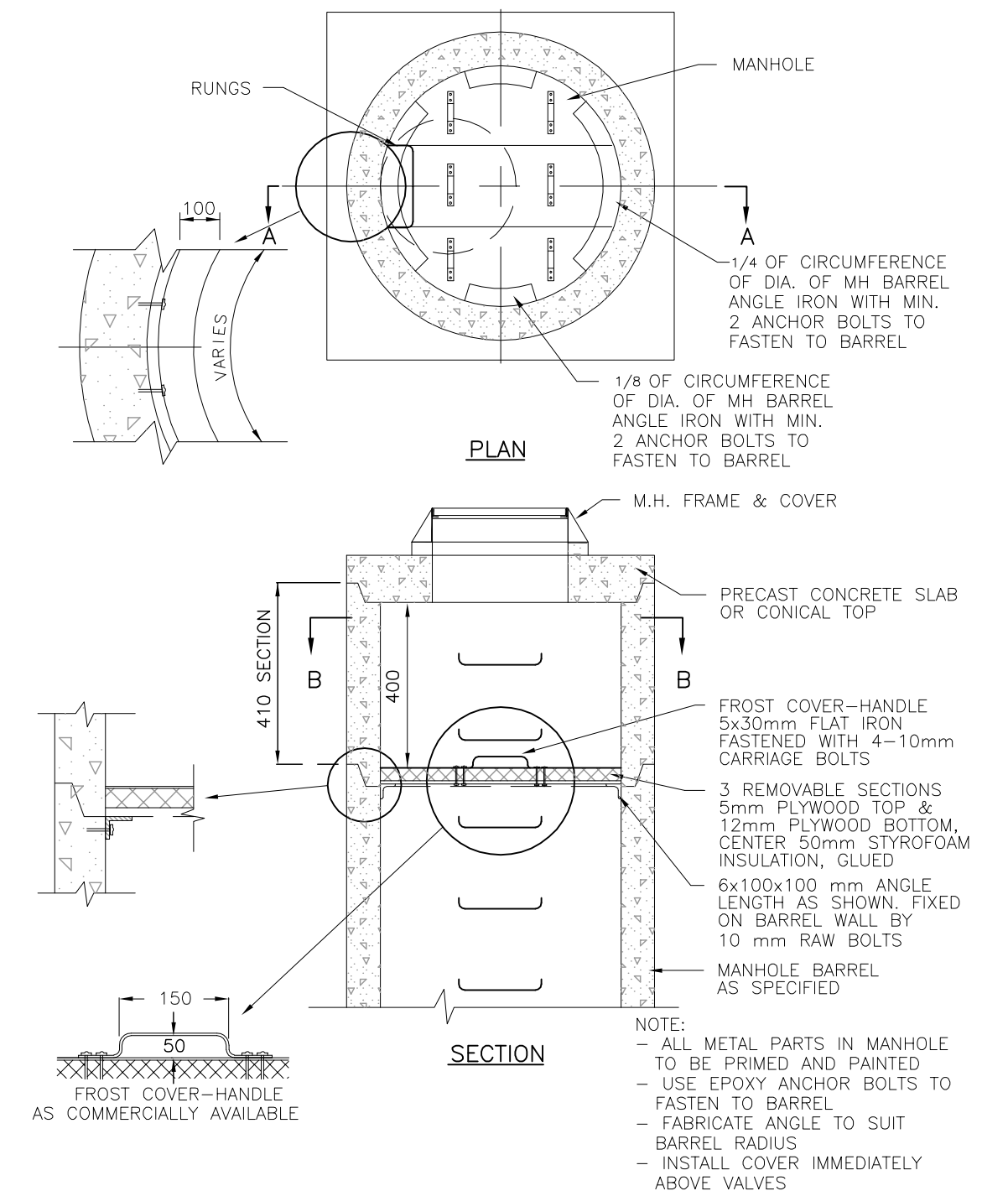


PIPELINE WARNING MARKER
N.T.S.

WARNING MARKER POST
N.T.S.

- NOTES:
1. PLAQUE TO BE MADE OF 12 GA STEEL OR 2 mm ALUMINUM, ACCORDING TO E.R.C.B. REGULATIONS, OR AS SUPPLIED BY "ALBERTA TRAFFIC SUPPLY LTD." REMOVE ALL SHARP EDGES.
 2. MARKER POST AND FRAME EXPOSED STEEL PARTS SHALL BE GALVANIZED.
 3. ALL MARKINGS ON PLAQUE SHALL BE PERMANENT WEATHER RESISTANT AND AS APPROVED BY ENGINEER.
 4. PLAQUE SHALL BE ATTACHED TO MARKER POST WITH SUITABLE CADMIUM PLATED H.D. MACHINE BOLTS C/W NUTS & WASHERS.
 5. CONCRETE SHALL BE 21 kPa COMPRESSIVE STRENGTH AFTER 28 DAYS.
 6. MARKER POST SHALL BE INSTALLED IN COMPACTED SOIL AND FULLY TAMPED AROUND CONCRETE BASE, TO THE SATISFACTION OF FIELD ENGINEER.
 7. MARKER POSTS ARE TO BE INSTALLED ON BOTH SIDES OF CROSSED RIGHT OF WAY, AS CLOSE TO FENCE AS POSSIBLE. PLAQUES SHALL BE FACING RIGHT OF WAY. PLAQUES SHALL BE PLACED ABOVE PIPE AND NOT TO THE SIDE.

WARNING SIGN DETAIL
N.T.S.

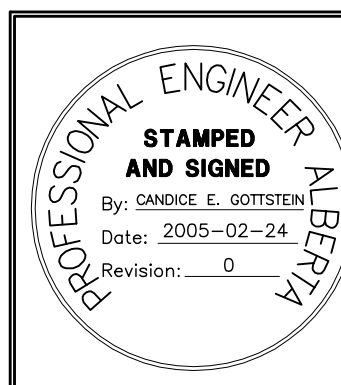


FROST COVER DETAIL
N.T.S.

Time: 12:23pm
Date: Jun 01, 2006
File: C:\033333\CIVIL\design\CONTRACT_PIPELINE\CONTRACT_PIPELINE\CONTRACT-3\AS-BUILTS\3333-3-119.dwg by BW
Xref: 3333-BR1_3

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G. / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE			



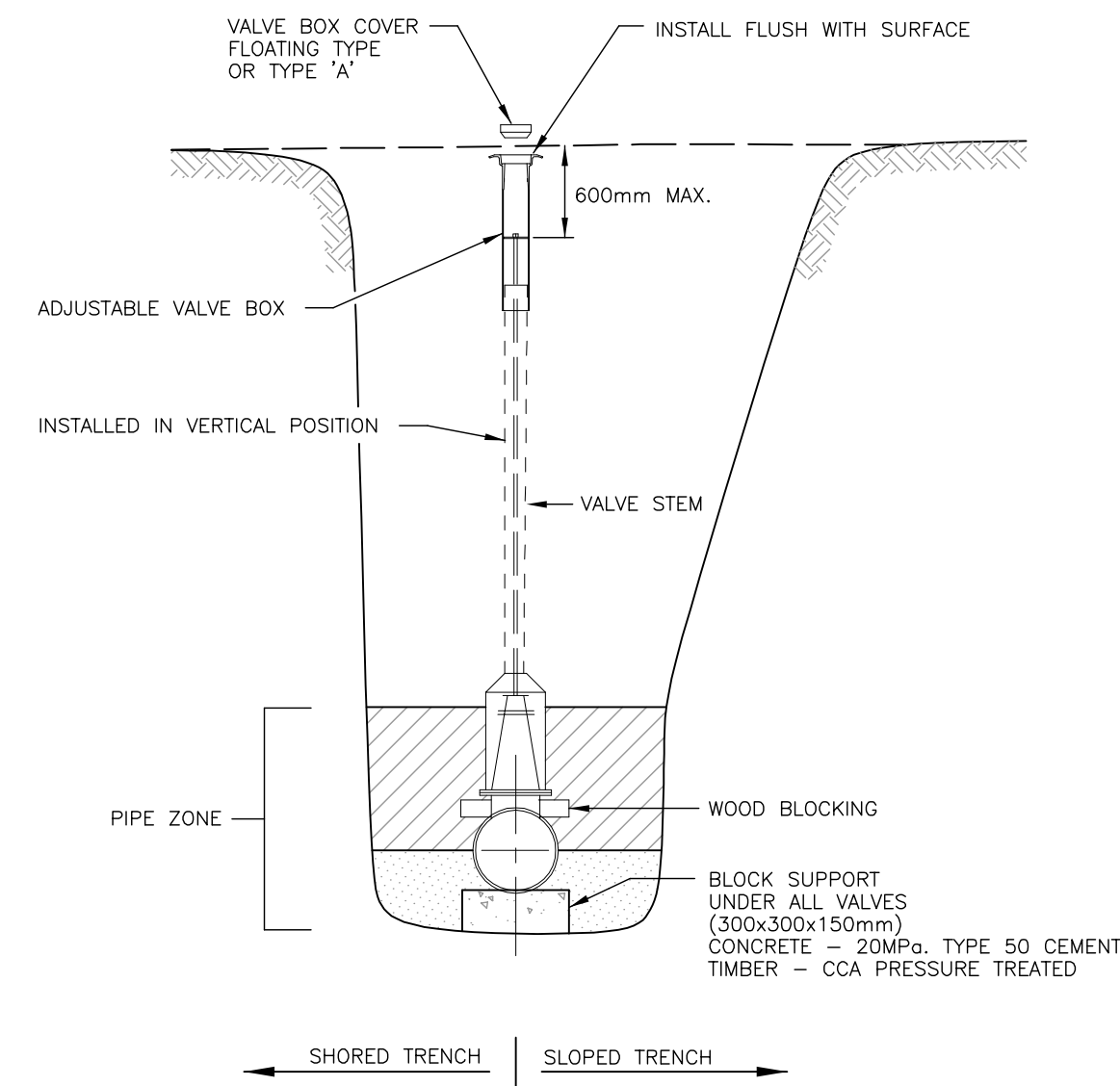
PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
By: BLAIR G. BIRCH
Date: 2005-02-24
Revision: 0

ASSOCIATED ENGINEERING



CLIENT
NORTH RED DEER RIVER WATER SERVICES COMMISSION
ALBERTA
PROJECT
WATER TRANSMISSION PIPELINE
CONTRACT No. 3

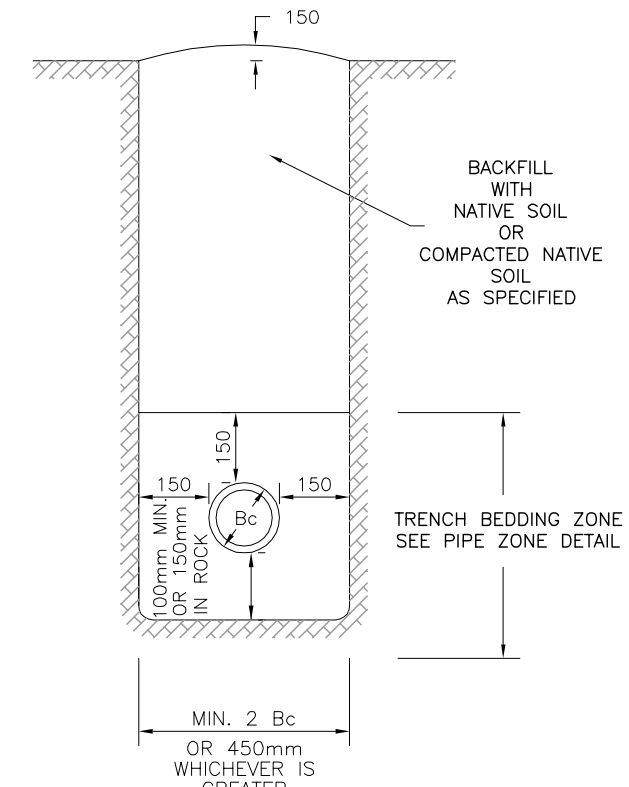
TITLE		DRAWING NUMBER	REV. NO.	SHEET
DETAILS No. 2		3333-3-119	2	19
				66



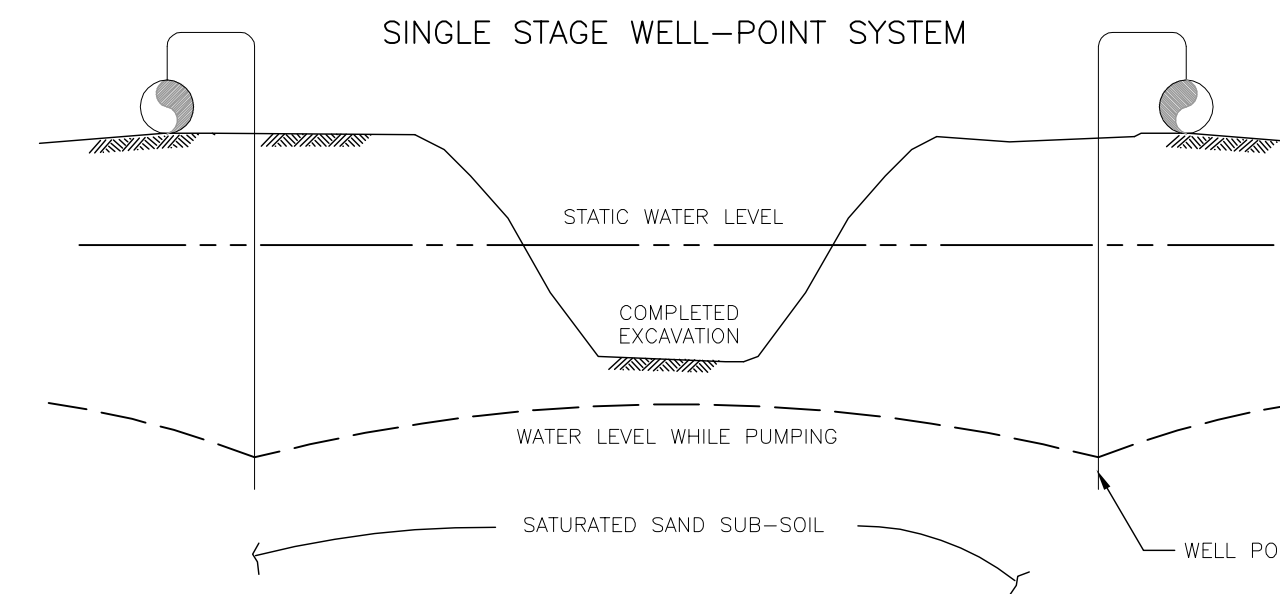
NOTES:

- FOR VALVES LESS THAN 400mm USE FLOATING TYPE OR TYPE 'A' VALVE BOX. (NORWOOD FOUNDRY)
- ALL BOLTS TO BE STAINLESS STEEL WRAPPED WITH DENSO MASTIC AND DENSO TAPE.

VALVE INSTALLATION DETAIL (400mm AND SMALLER)
N.T.S.



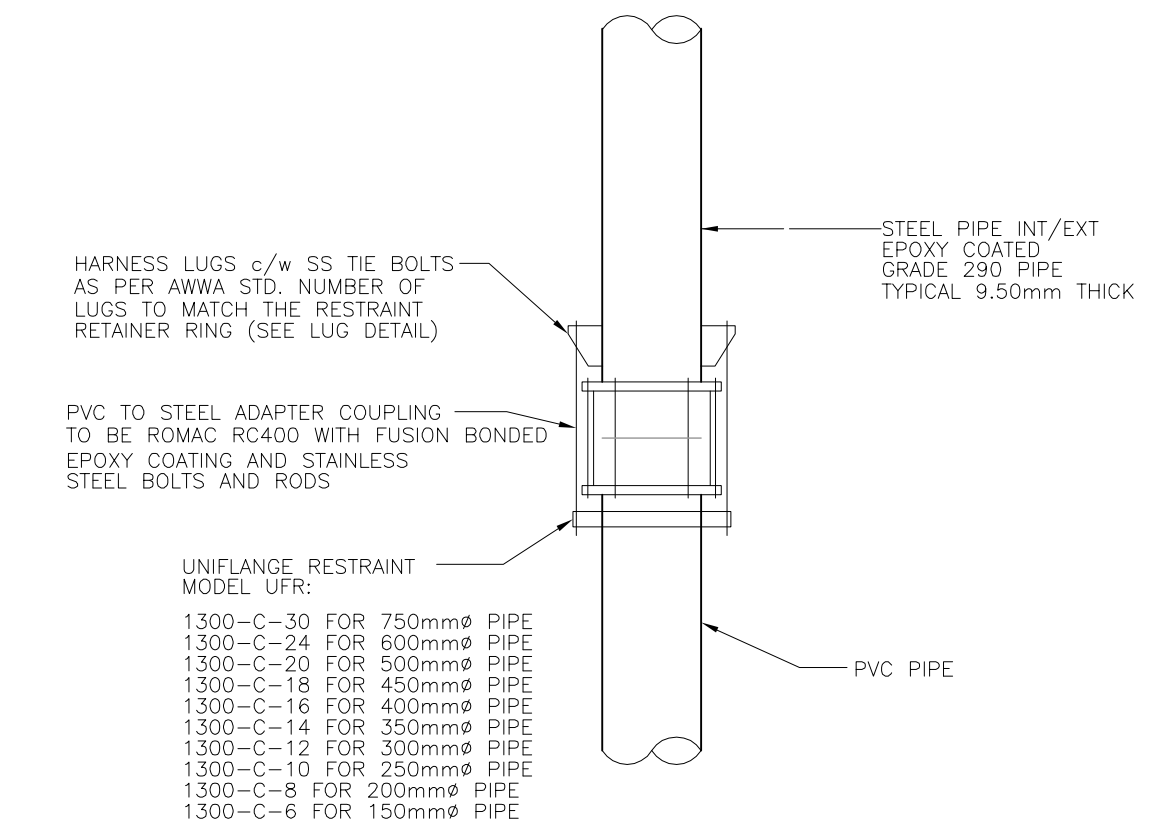
VERTICAL TRENCH DETAIL
N.T.S.



NOTE

- ONE OR MORE STAGES OF A WELL-POINT DEWATERING SYSTEM MAY BE REQUIRED, DEPENDING UPON THE DEPTH TO WHICH THE WATER TABLE MUST BE LOWERED.
- SECOND STAGE OF WELL-POINT SYSTEM IS INSTALLED AT A LOWER LEVEL AFTER EXCAVATING TO THE DEPTH PERMITTED BY PUMPING FROM THE FIRST STAGE ALONE. PUMPING THE SECOND STAGE THEN DEPRESSES THE WATER TABLE FURTHER TO PERMIT CONTINUING THE EXCAVATION TO THE DESIRED DEPTH.
- CONTRACTOR TO CONFIRM DEWATERING SYSTEM TO BE UTILIZED PRIOR TO CONSTRUCTION.

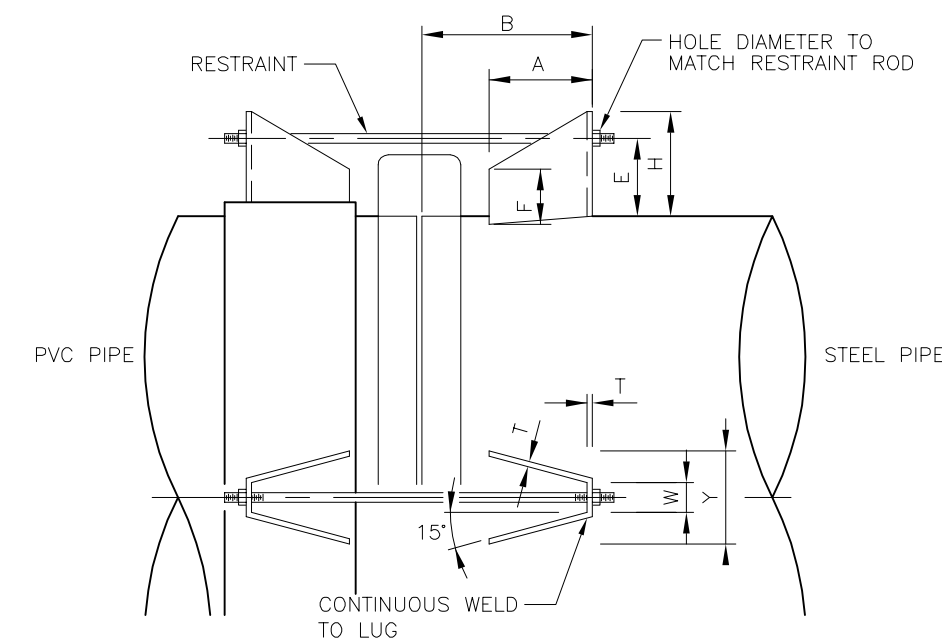
CONCEPTUAL DEWATERING METHOD DETAIL
N.T.S.



NOTE

- WRAP COUPLING, HARNESS AND BOLTS WITH DENSO MASTIC AND TAPE
- PROVIDE CATHODIC PROTECTION

TYPICAL COUPLING AND RESTRAINT (PVC TO STEEL)
N.T.S.



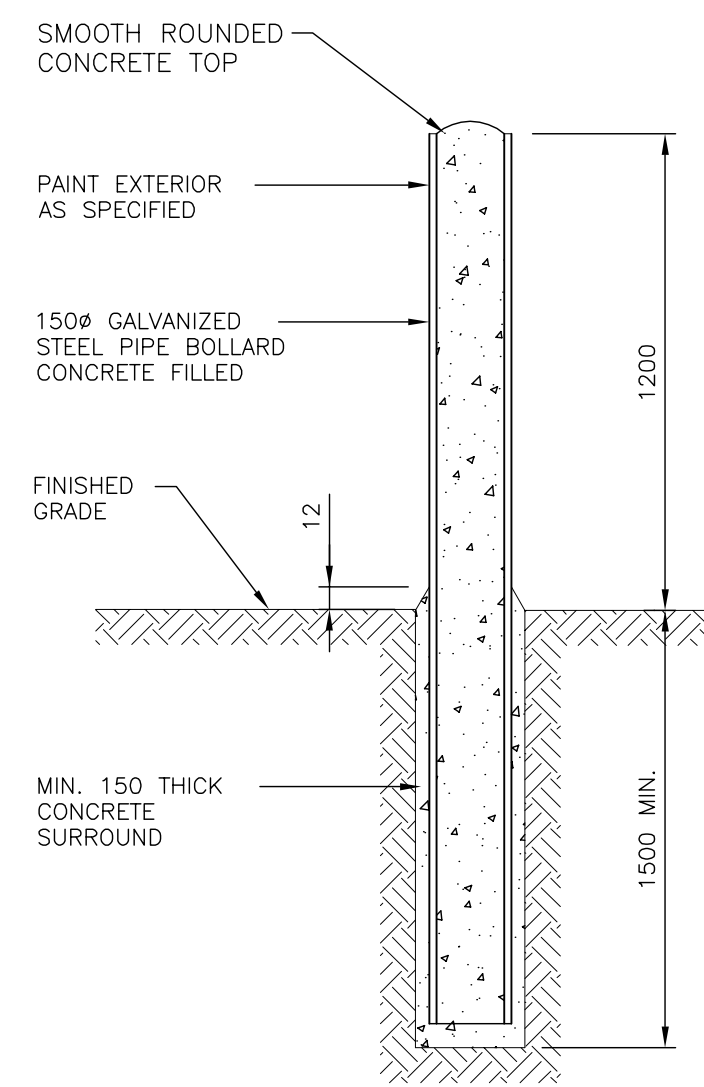
PIPE 1200 & SMALLER

DIMENSIONS BASED ON DRESSER STYLE 38 OR ROBAR STYLE 1506 COUPLING USING 178mm LONG MIDDLE RING DESIGN PRESSURE 200 PSI MAX. PLACE JOINT HARNESS TIE BOLTS ON PIPE AS SHOWN

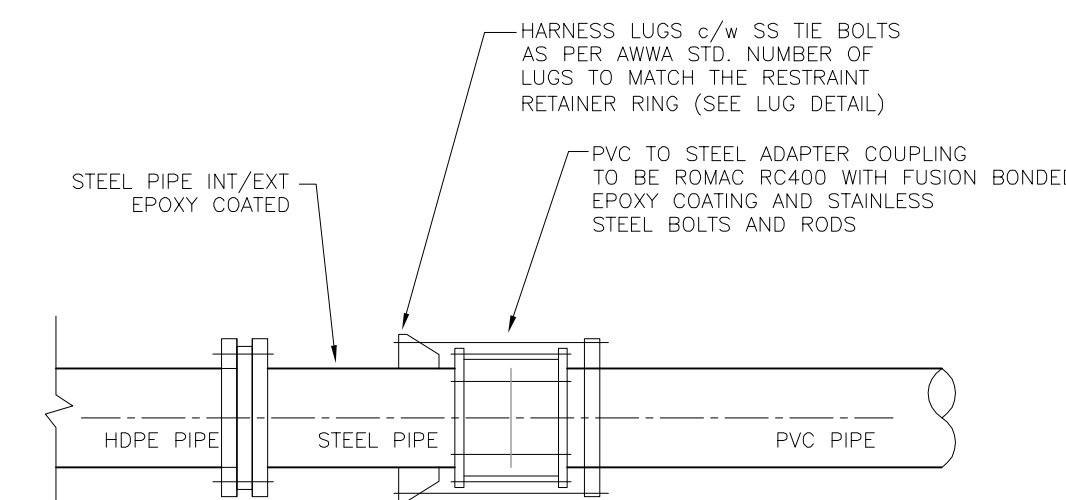
MATERIAL AS PIPE FOR CARBON STEEL PIPE - FABRICATE LUG PLATES FROM CARBON STEEL PIPE ASTM A283, GRADE B, OR ASTM A285, GRADE C OR EQUAL BOLTS AND NUTS TO BE STAINLESS STEEL

PIPE SIZE	LUG DIMENSIONS							
	A	W	Y	T	H	E	F	B
50-100	75	40	50	10	90	75	50	260
150-300	95	45	90	10	140	100	50	285
350-600	130	55	120	10	140	100	50	315
750-900	190	75	180	13	150	130	65	370
1050-1200	225	80	195	13	160	145	65	400

LUG DETAIL
N.T.S.



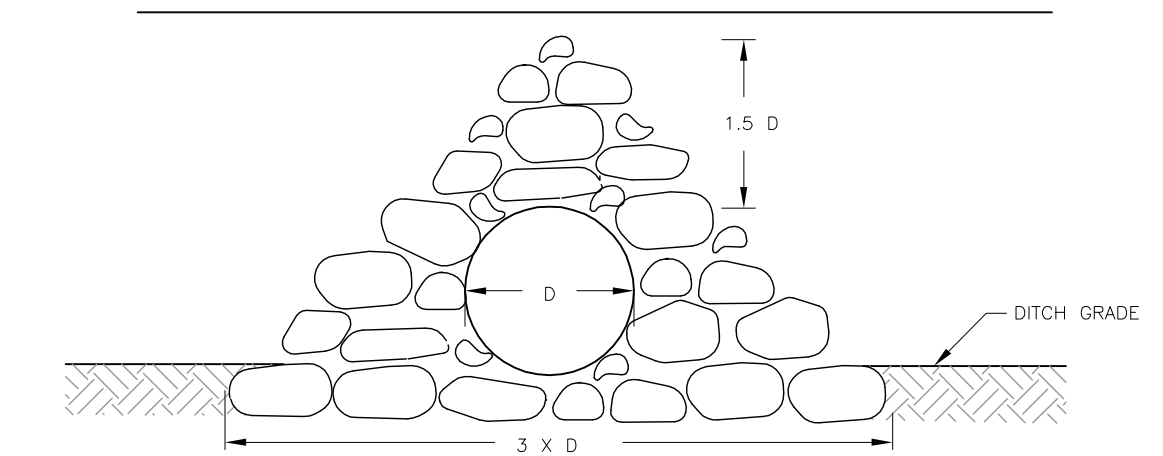
BOLLARD DETAIL
N.T.S.



NOTE

- WRAP ADAPTOR, RESTRAINT HARNESS AND FLANGED CONNECTION WITH DENSO MASTIC AND TAPE
- PROVIDE CATHODIC PROTECTION ON COMPLETED ASSEMBLY

TYPICAL COUPLING AND RESTRAINT (HDPE TO PVC CONNECTION)
N.T.S.



NOTE:

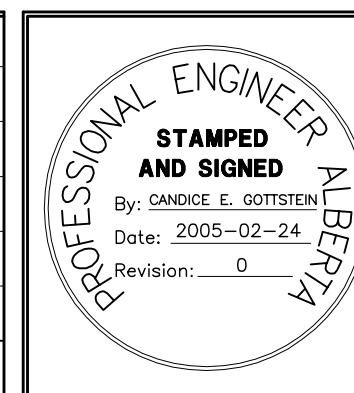
ROCKS AND Boulders SHALL BE SELECTED AS NEARLY CUBICAL IN FORM AS PRACTICABLE AND OF A SIZE GREATER THAN 17 Kg. THE STONES SHALL BE PLACED WITH THEIR BEDS AT RIGHT ANGLES TO THE SLOPE, THE LARGER STONES BEING USED IN THE BOTTOM COURSES AND THE SMALLER STONES AT TOP. THEY SHALL BE LAID IN CLOSE CONTACT SO AS TO BREAK JOINTS AND IN SUCH MANNER THAT THE WEIGHT OF THE STONES IS CARRIED BY THE EARTH AND NOT BY THE ADJACENT STONES.

CULVERT INSTALLATION DETAIL
N.T.S.

Time: 8:59 AM
 Plot Size: 11.0 x 17.0
 AutoCAD File: 033333\CIVIL\DESIGN\CONTRACT_PIPELINE\CONTRACT-3\3333-3-120.DWG (FK)
 Xrefs: 3333-BDR_3

No.	DATE	REVISION	BY	APP.
2	06/03/24	RECORD DRAWING	C.J.	B.B.
1	05/04/05	CONSTRUCTION ISSUE	W.W.	B.B.
0	05/02/24	BID ISSUE	W.W.	B.B.
A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE			

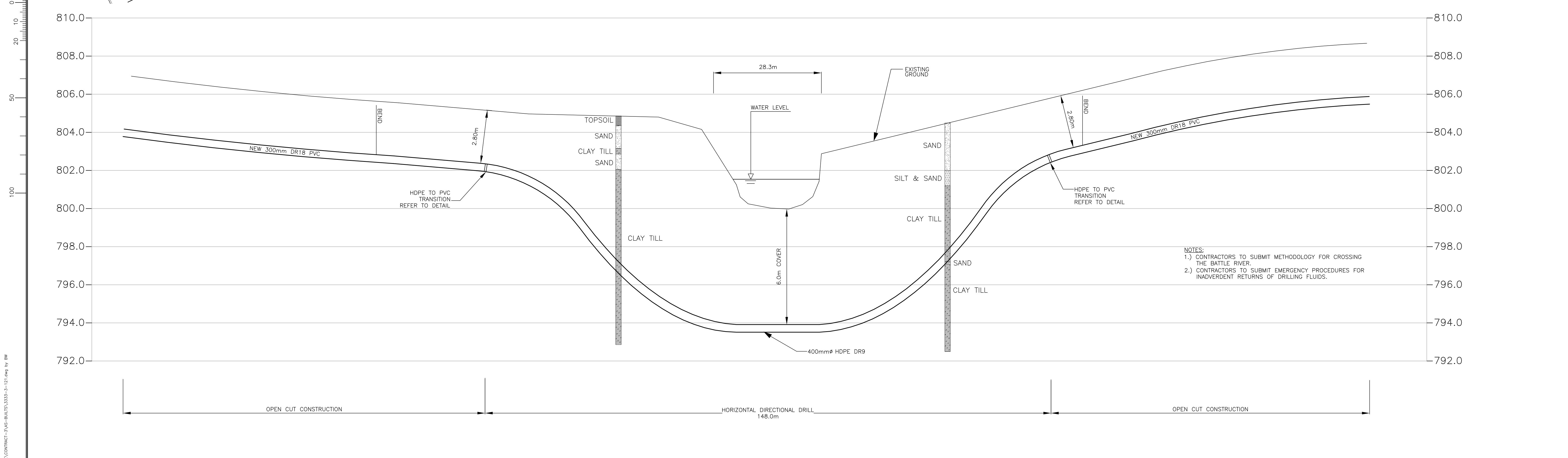
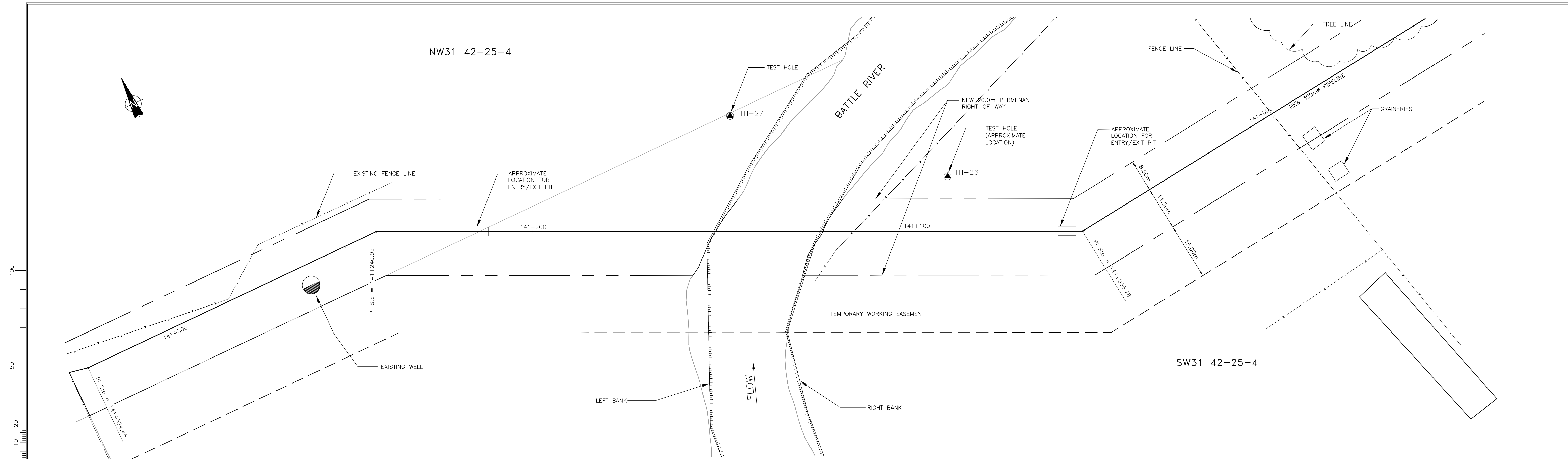


PERMIT TO PRACTICE
ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
By: BLAIR G. BIRCH
Date: 2005-02-24
Revision: 0

ASSOCIATED ENGINEERING

CLIENT
NORTH RED DEER RIVER WATER SERVICES COMMISSION
ALBERTA
PROJECT
WATER TRANSMISSION PIPELINE
CONTRACT No. 3

TITLE		REV. NO.		SHEET
DETAILS No. 3				
DRAWING NUMBER		REV. NO.		SHEET
3333-3-120		2		20
				66

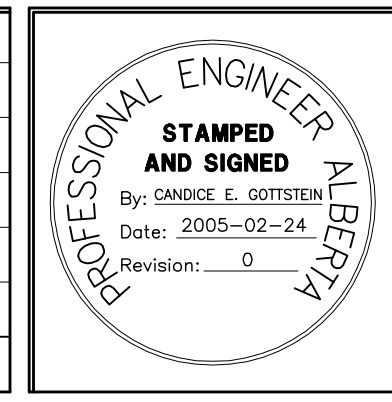


NOTES:
 1.) CONTRACTORS TO SUBMIT METHODOLOGY FOR CROSSING THE BATTLE RIVER.
 2.) CONTRACTORS TO SUBMIT EMERGENCY PROCEDURES FOR INADVERTENT RETURNS OF DRILLING FLUIDS.

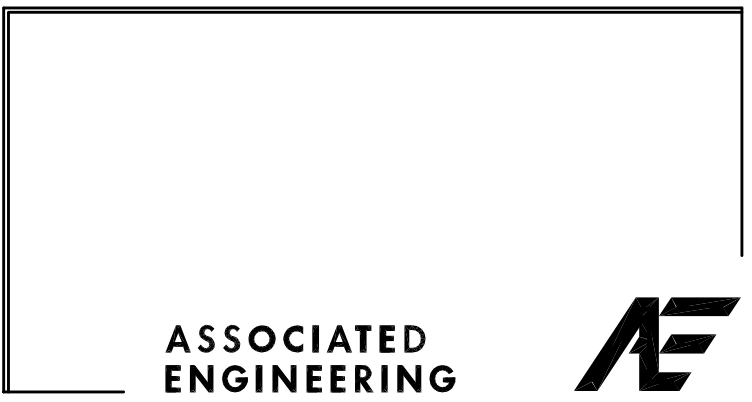
LEGEND	
—	PROPOSED WATER TRANSMISSION PIPELINE
- - -	TEMPORARY WORKING EASEMENT LIMIT
—	PERMANENT PIPELINE R.O.W.
c	EXISTING NATURAL GAS PIPELINE
t	EXISTING BURIED TELEPHONE LINE
—	EXISTING TEL. PEDESTAL
c	EXISTING BURIED FIBRE OPTICS CABLE
o	EXISTING OVERHEAD POWER LINE
p	EXISTING UNDERGROUND POWER LINE
—	EXISTING POWER POLE
- - -	EXISTING FENCE
—	EXISTING CULVERT
—	EXISTING TREE LINE
—	EXISTING STREET LIGHT
⊗	BLOW OFF VALVE

No.	DATE	REVISION	BY	APP.
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A	04/12/20	PRELIMINARY ISSUE	W.W.	B.B.

PROJECT No.	033333	INITIALS	DATE
DRAWN BY	W. WONG		
DESIGNED BY	C.G / C.M		
CHECKED BY	K. CH'NG		
APPROVED BY	B. BIRCH		
APPROVED BY			
SCALE	HOR.1:1000 VERT.1:100		



PERMIT TO PRACTICE
 ASSOCIATED ENGINEERING ALBERTA LTD.
PERMIT NUMBER, P3979
STAMPED AND SIGNED
 By: BLAIR G. BIRCH
 Date: 2005-02-24
 Revision: 0



CLIENT
 NORTH RED DEER RIVER
 WATER SERVICES COMMISSION
 ALBERTA
 PROJECT
 WATER TRANSMISSION PIPELINE
 CONTRACT No. 3

TITLE BATTLE RIVER CROSSING		
DRAWING NUMBER 3333-3-121	REV. NO. 2	SHEET 21
		66

Date: Jun 01, 2008
 Drawn: W. Wong
 Checked: K. Ch'ng
 Approved: B. Birch
 Project: 033333-3-121
 Title: BATTLE RIVER CROSSING
 Scale: HOR. 1:1000 VERT. 1:100
 Sheet: 21 of 66