


NOTES:

- TRENCH BOTTOM: TO BE FREE FROM DEBRIS AND SOIL. TRENCH SHOULD BE EXCAVATED TO TRENCH FLOOR TO ALLOW THE USE OF SOLE SHUTTERS (IF REQUIRED).
- PIPE BEDDING: - LAYER-1: CASTING DENSITY 1200kg/m<sup>3</sup> TO BE MIXED AND PLACED IN ACCORDANCE WITH THE APPROVED SUPPLIERS SPECIFICATIONS. OR SOIL CEMENT GROUT - THIS SHALL BE A PORTABLE MIXTURE OF PORTLAND CEMENT, SAND, AND WATER. THE MIX SHALL BE TESTED USING A 150mm LONG SEGMENT OF PIPE WITH AN INSIDE DIAMETER OF 75mm. WHEN THE FILLED PIPE IS LIFTED FROM AN END RATE, AN EVEN SPREAD OF MIX SHALL FLOW TO A DIAMETER OF 200mm. THE SOIL CEMENT GROUT OR THE CELLULAR LIGHTWEIGHT CONCRETE MIX SHALL BE DESIGNED IN A LABORATORY AND APPROVED BY THE ENGINEER.
- LAYER OF GEO-FABRIC (BLOW GRADE AG OR SIMILAR APPROVED) BOND BREAKER TO BE INSTALLED UN-BONDED TO THE EXTERNAL PIPE COATING AND SHALL EXTEND 300mm MINIMUM ABOVE THE SOIL CEMENT GROUT LAYER.
- THE BOND BREAKER IS TO BE FIXED TO THE PIPE WITH AN APPROVED NON-TOXIC STRAPPING TAPE.
- STAGE 1 BACKFILL: SELECTED GRANULAR MATERIAL COMPACTED TO 95% OF MAX DENSITY IN 200mm MAX. THICK LAYERS.
- STAGE 2 BACKFILL: BACKFILL SHALL COMPRESS LOOSE FINE SOIL BEING MAINTAINED OR COVERED SAND MATERIAL WITH A GRANULAR MATERIAL. GRANULAR MATERIALS SHALL CONTAIN NO CLUMP OR MATERIALS CHEMICALLY DETRIMENTAL TO THE PIPE AND SHALL BE FREE OF PEBBLES, STONES AND ROCKMENTS EXCEEDING 10mm.
- IN TERMS OF THE UNITED SOIL CLASSIFICATION SYSTEM, THE SOIL FOR STAGE 1 BACKFILL SHOULD BE SHALLER WELL GRADED TO THE COEFFICIENT OF CURVATURE, C<sub>u</sub> > 5 AND THE COEFFICIENT OF UNIFORMITY, C<sub>c</sub> IN THE RANGE : 1 < C<sub>c</sub> < 3.
- THE MAXIMUM dry DENSITY OF THE SOIL FOR STAGE 1 BACKFILL OBTAINED FROM THE MCASSTO-1150 TEST SHALL BE GREATER THAN 1500 kg/m<sup>3</sup>.
- IF THE TRENCH IS EXCAVATED IN HARD ROCK MATERIAL, THEN THE STAGE 1 BACKFILL SHOULD BE FLOW GRANULAR MATERIAL OR SOLID CONCRETE.
- STAGE 2 BACKFILL: SELECTED FILL MATERIAL COMPACTED TO 85% OF MAX DENSITY IN 300mm MAX. THICK LAYERS.
- IF THE DIFFERENCE IN PIPE DIAMETERS MEASURED BEFORE AND AFTER BACKFILLING SHOWS THAT THE PIPE DIAMETER, THE CONTRACTOR RESPONSIBLE FOR THE WORK SHALL REMOVE, REPLACE AND RE-COMPACT MATERIAL FOR THE FULL DEPTH OF BACKFILLING OVER THE LENGTH OF PIPE AFFECTED.
- THE SPRINGLINE ANGLE FOR ALL TRENCH CONDITIONS WILL BE 90° FROM PAYMENT LINE AND MEASUREMENT PURPOSES.

REVISIONS

No.	DATE	CHECKED	APPROVED	DESCRIPTION

NUMBER	TITLE



**RAYD WATER**  
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DESIGN OFFICE MANAGER  
C. J. MURPHY  
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D. KATSENY  
DESIGN OFFICE MANAGER  
D. KATSENY

SUP. No. \_\_\_\_\_

CONTRACT No. \_\_\_\_\_

DRAWN BY: T. PHUTHA  
DATE: 09/12/2016

CHECKED: \_\_\_\_\_  
SECTION HEAD: \_\_\_\_\_  
APPROVED: \_\_\_\_\_  
DATE: 10/04/2017

PIPELINES AND BOOSTERS  
TYPICAL DETAILS

TRENCH EXCAVATION AND BACKFILLING

STATION

W/S

DRG. TYPE

SCALE N.T.S.

REVISION

DRG No. RO 27141

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TABLE OF TRENCH WIDTHS  
FOR PIPE INSTALLATION

PIPE DIAMETER	W (F)	PIPE DIA FOUNDATION
200	300	150
250	350	150
300	400	150
350	450	150
400	500	150
450	550	150
500	600	150
550	650	150
600	700	150
650	750	150
700	800	150
750	850	150
800	900	150
850	950	150
900	1000	150
950	1050	150
1000	1100	150
1050	1150	150
1100	1200	150
1150	1250	150
1200	1300	150
1250	1350	150
1300	1400	150
1350	1450	150
1400	1500	150
1450	1550	150
1500	1600	150
1550	1650	150
1600	1700	150
1650	1750	150
1700	1800	150
1750	1850	150
1800	1900	150
1850	1950	150
1900	2000	150
1950	2050	150
2000	2100	150
2050	2150	150
2100	2200	150
2150	2250	150
2200	2300	150
2250	2350	150
2300	2400	150
2350	2450	150
2400	2500	150
2450	2550	150
2500	2600	150
2550	2650	150
2600	2700	150
2650	2750	150
2700	2800	150
2750	2850	150
2800	2900	150
2850	2950	150
2900	3000	150
2950	3050	150
3000	3100	150
3050	3150	150
3100	3200	150
3150	3250	150
3200	3300	150
3250	3350	150
3300	3400	150
3350	3450	150
3400	3500	150
3450	3550	150
3500	3600	150
3550	3650	150
3600	3700	150
3650	3750	150
3700	3800	150
3750	3850	150
3800	3900	150
3850	3950	150
3900	4000	150
3950	4050	150
4000	4100	150
4050	4150	150
4100	4200	150
4150	4250	150
4200	4300	150
4250	4350	150
4300	4400	150
4350	4450	150
4400	4500	150
4450	4550	150
4500	4600	150
4550	4650	150
4600	4700	150
4650	4750	150
4700	4800	150
4750	4850	150
4800	4900	150
4850	4950	150
4900	5000	150
4950	5050	150
5000	5100	150
5050	5150	150
5100	5200	150
5150	5250	150
5200	5300	150
5250	5350	150
5300	5400	150
5350	5450	150
5400	5500	150
5450	5550	150
5500	5600	150
5550	5650	150
5600	5700	150
5650	5750	150
5700	5800	150
5750	5850	150
5800	5900	150
5850	5950	150
5900	6000	150
5950	6050	150
6000	6100	150
6050	6150	150
6100	6200	150
6150	6250	150
6200	6300	150
6250	6350	150
6300	6400	150
6350	6450	150
6400	6500	150
6450	6550	150
6500	6600	150
6550	6650	150
6600	6700	150
6650	6750	150
6700	6800	150
6750	6850	150
6800	6900	150
6850	6950	150
6900	7000	150
6950	7050	150
7000	7100	150
7050	7150	150
7100	7200	150
7150	7250	150
7200	7300	150
7250	7350	150
7300	7400	150
7350	7450	150
7400	7500	150
7450	7550	150
7500	7600	150
7550	7650	150
7600	7700	150
7650	7750	150
7700	7800	150
7750	7850	150
7800	7900	150
7850	7950	150
7900	8000	150
7950	8050	150
8000	8100	150
8050	8150	150
8100	8200	150
8150	8250	150
8200	8300	150
8250	8350	150
8300	8400	150
8350	8450	150
8400	8500	150
8450	8550	150
8500	8600	150
8550	8650	150
8600	8700	150
8650	8750	150
8700	8800	150
8750	8850	150
8800	8900	150
8850	8950	150
8900	9000	150
8950	9050	150
9000	9100	150
9050	9150	150
9100	9200	150
9150	9250	150
9200	9300	150
9250	9350	150
9300	9400	150
9350	9450	150
9400	9500	150
9450	9550	150
9500	9600	150
9550	9650	150
9600	9700	150
9650	9750	150
9700	9800	150
9750	9850	150
9800	9900	150
9850	9950	150
9900	10000	150
9950	10050	150
10000	10100	150
10050	10150	150
10100	10200	150
10150	10250	150
10200	10300	150
10250	10350	150
10300	10400	150
10350	10450	150
10400	10500	150
10450	10550	150
10500	10600	150
10550	10650	150
10600	10700	150
10650	10750	150
10700	10800	150
10750	10850	150
10800	10900	150
10850	10950	150
10900	11000	150
10950	11050	150
11000	11100	150
11050	11150	150
11100	11200	150
11150	11250	150
11200	11300	150
11250	11350	150
11300	11400	150
11350	11450	150
11400	11500	150
11450	11550	150
11500	11600	150
11550	11650	150
11600	11700	150
11650	11750	150
11700	11800	150
11750	11850	150
11800	11900	150
11850	11950	150
11900	12000	150
11950	12050	150
12000	12100	150
12050	12150	150
12100	12200	150
12150	12250	150
12200	12300	150
12250	12350	150
12300	12400	150
12350	12450	150
12400	12500	150
12450	12550	150
12500	12600	150
12550	12650	150
12600	12700	150
12650	12750	150
12700	12800	150
12750	12850	150
12800	12900	150
12850	12950	150
12900	13000	150
12950	13050	150
13000	13100	150
13050	13150	150
13100	13200	150
13150	13250	150
13200	13300	150
13250	13350	150
13300	13400	150
13350	13450	150
13400	13500	150
13450	13550	150
13500	13600	150
13550	13650	150
13600	13700	150
13650	13750	150
13700	13800	150
13750	13850	150
13800	13900	150
13850	13950	150
13900	14000	150
13950	14050	150
14000	14100	150
14050	14150	150
14100	14200	150
14150	14250	150
14200	14300	150
14250	14350	150
14300	14400	150
14350	14450	150
14400	14500	150
14450	14550	150
14500	14600	150
14550	14650	150
14600	14700	150
14650	14750	150
14700	14800	150
14750	14850	150
14800	14900	150
14850	14950	150
14900	15000	150
14950	15050	150
15000	15100	150
15050	15150	150
15100	15200	150
15150	15250	150
15200	15300	150
15250	15350	150
15300	15400	150
15350	15450	150
15400	15500	150
15450	15550	150
15500	15600	150
15550	15650	150
15600	15700	150
15650	15750	150
15700	15800	150
15750	15850	150
15800	15900	150
15850	15950	150
15900	16000	150
15950	16050	150
16000	16100	150
16050	16150	150
16100	16200	150
16150	16250	150
16200	16300	150
16250	16350	150
16300	16400	150
16350	16450	150
16400	16500	150
16450	16550	150
16500	16600	150
16550	16650	150
16600	16700	150
16650	16750	150
16700	16800	150
16750	16850	150
16800	16900	150
16850	16950	150
16900	17000	150
16950	17050	150
17000	17100	150
17050	17150	150
17100	17200	150
17150	17250	150
17200	17300	150
17250	17350	150
17300	17400	150
17350	17450	150