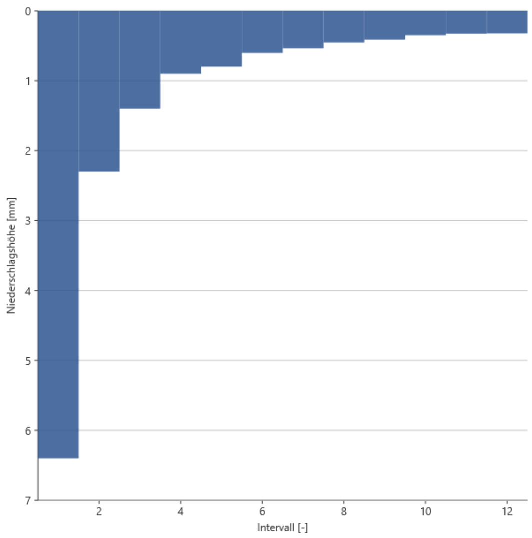
KOSTRA-DWD 2020

Nach den Vorgaben des Deutschen Wetterdienstes - Hydrometeorologie -

Modellregen

Rasterfeld	: Spalte 165, Zeile 115	INDEX_RC	: 115165
Ortsname	: Ottersleben (ST)		

Modellregentyp	: Euler Typ 1
Regendauer	: 60 min
Wiederkehrzeit	: 1 a
Intervalldauer	: 5 min
Gesamtregenhöhe	: 14,8 mm



Intervall	von [min]	bis [min]	Niederschlagshöhe [mm]
1	0,0	5,0	6,40
2	5,0	10,0	2,30
3	10,0	15,0	1,40
4	15,0	20,0	0,90
5	20,0	25,0	0,80
6	25,0	30,0	0,60
7	30,0	35,0	0,53
8	35,0	40,0	0,45
9	40,0	45,0	0,41
10	45,0	50,0	0,35
11	50,0	55,0	0,33
12	55,0	60,0	0,32

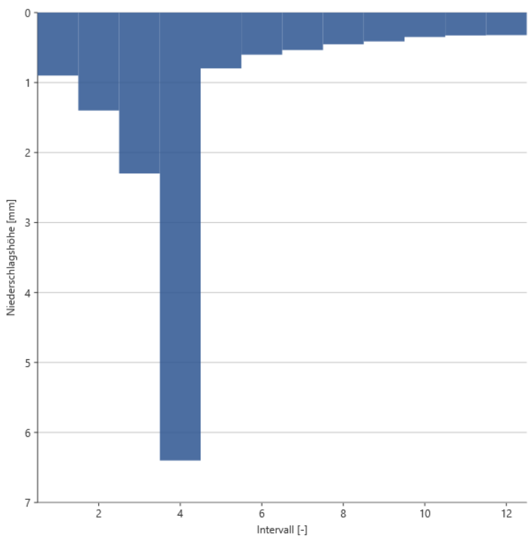
KOSTRA-DWD 2020

Nach den Vorgaben des Deutschen Wetterdienstes - Hydrometeorologie -

Modellregen

Rasterfeld	: Spalte 165, Zeile 115	INDEX_RC	: 115165
Ortsname	: Ottersleben (ST)		

Modellregentyp	: Euler Typ 2
Regendauer	: 60 min
Wiederkehrzeit	: 1 a
Intervalldauer	: 5 min
Gesamtregenhöhe	: 14,8 mm



Intervall	von [min]	bis [min]	Niederschlagshöhe [mm]
1	0,0	5,0	0,90
2	5,0	10,0	1,40
3	10,0	15,0	2,30
4	15,0	20,0	6,40
5	20,0	25,0	0,80
6	25,0	30,0	0,60
7	30,0	35,0	0,53
8	35,0	40,0	0,45
9	40,0	45,0	0,41
10	45,0	50,0	0,35
11	50,0	55,0	0,33
12	55,0	60,0	0,32

KOSTRA-DWD 2020

Nach den Vorgaben des Deutschen Wetterdienstes - Hydrometeorologie -

Niederschlagshöhen nach KOSTRA-DWD 2020

Rasterfeld : Spalte 165, Zeile 115 INDEX_RC : 115165
Ortsname : Ottersleben (ST)
Bemerkung :

Dauerstufe D	Niederschlagshöhen hN [mm] je Wiederkehrintervall T [a]								
	1 a	2 a	3 a	5 a	10 a	20 a	30 a	50 a	100 a
5 min	6,4	8,0	9,1	10,4	12,4	14,4	15,7	17,4	19,9
10 min	8,7	11,0	12,4	14,2	16,9	19,7	21,5	23,8	27,2
15 min	10,1	12,7	14,3	16,5	19,6	22,8	24,9	27,6	31,5
20 min	11,0	13,9	15,7	18,1	21,5	25,0	27,3	30,3	34,6
30 min	12,4	15,7	17,7	20,3	24,1	28,1	30,6	34,0	38,9
45 min	13,8	17,4	19,6	22,6	26,8	31,2	34,0	37,8	43,2
60 min	14,8	18,7	21,0	24,2	28,7	33,4	36,5	40,5	46,3
90 min	16,2	20,5	23,1	26,5	31,5	36,6	40,0	44,4	50,7
2 h	17,3	21,8	24,6	28,3	33,5	39,0	42,6	47,3	54,0
3 h	18,8	23,7	26,8	30,8	36,5	42,5	46,4	51,5	58,8
4 h	19,9	25,2	28,4	32,6	38,8	45,1	49,2	54,6	62,4
6 h	21,6	27,3	30,8	35,4	42,1	48,9	53,4	59,3	67,7
9 h	23,4	29,6	33,4	38,4	45,6	53,0	57,9	64,3	73,4
12 h	24,8	31,3	35,3	40,6	48,3	56,1	61,3	68,0	77,7
18 h	26,9	33,9	38,3	44,0	52,3	60,8	66,3	73,6	84,1
24 h	28,4	35,9	40,5	46,5	55,3	64,3	70,2	77,9	88,9
48 h	32,5	41,0	46,3	53,2	63,2	73,5	80,3	89,1	101,8
72 h	35,2	44,4	50,1	57,6	68,4	79,5	86,8	96,4	110,1
4 d	37,2	46,9	53,0	60,9	72,3	84,1	91,8	101,9	116,4
5 d	38,8	49,0	55,3	63,6	75,5	87,8	95,8	106,4	121,5
6 d	40,2	50,8	57,3	65,8	78,2	90,9	99,3	110,2	125,9
7 d	41,4	52,3	59,0	67,8	80,6	93,7	102,3	113,5	129,7

Legende

T Wiederkehrintervall, Jährlichkeit in [a]: mittlere Zeitspanne, in der ein Ereignis einen Wert einmal erreicht oder überschreitet

D Dauerstufe in [min, h, d]: definierte Niederschlagsdauer einschließlich Unterbrechungen

hN Niederschlagshöhe in [mm]

Niederschlagsspenden nach KOSTRA-DWD 2020

Rasterfeld : Spalte 165, Zeile 115 INDEX_RC : 115165
Ortsname : Ottersleben (ST)
Bemerkung :

Dauerstufe D	Niederschlagspenden rN [l/(s·ha)] je Wiederkehrintervall T [a]								
	1 a	2 a	3 a	5 a	10 a	20 a	30 a	50 a	100 a
5 min	213,3	266,7	303,3	346,7	413,3	480,0	523,3	580,0	663,3
10 min	145,0	183,3	206,7	236,7	281,7	328,3	358,3	396,7	453,3
15 min	112,2	141,1	158,9	183,3	217,8	253,3	276,7	306,7	350,0
20 min	91,7	115,8	130,8	150,8	179,2	208,3	227,5	252,5	288,3
30 min	68,9	87,2	98,3	112,8	133,9	156,1	170,0	188,9	216,1
45 min	51,1	64,4	72,6	83,7	99,3	115,6	125,9	140,0	160,0
60 min	41,1	51,9	58,3	67,2	79,7	92,8	101,4	112,5	128,6
90 min	30,0	38,0	42,8	49,1	58,3	67,8	74,1	82,2	93,9
2 h	24,0	30,3	34,2	39,3	46,5	54,2	59,2	65,7	75,0
3 h	17,4	21,9	24,8	28,5	33,8	39,4	43,0	47,7	54,4
4 h	13,8	17,5	19,7	22,6	26,9	31,3	34,2	37,9	43,3
6 h	10,0	12,6	14,3	16,4	19,5	22,6	24,7	27,5	31,3
9 h	7,2	9,1	10,3	11,9	14,1	16,4	17,9	19,8	22,7
12 h	5,7	7,2	8,2	9,4	11,2	13,0	14,2	15,7	18,0
18 h	4,2	5,2	5,9	6,8	8,1	9,4	10,2	11,4	13,0
24 h	3,3	4,2	4,7	5,4	6,4	7,4	8,1	9,0	10,3
48 h	1,9	2,4	2,7	3,1	3,7	4,3	4,6	5,2	5,9
72 h	1,4	1,7	1,9	2,2	2,6	3,1	3,3	3,7	4,2
4 d	1,1	1,4	1,5	1,8	2,1	2,4	2,7	2,9	3,4
5 d	0,9	1,1	1,3	1,5	1,7	2,0	2,2	2,5	2,8
6 d	0,8	1,0	1,1	1,3	1,5	1,8	1,9	2,1	2,4
7 d	0,7	0,9	1,0	1,1	1,3	1,5	1,7	1,9	2,1

Legende

T Wiederkehrintervall, Jährlichkeit in [a]: mittlere Zeitspanne, in der ein Ereignis einen Wert einmal erreicht oder überschreitet

D Dauerstufe in [min, h, d]: definierte Niederschlagsdauer einschließlich Unterbrechungen

rN Niederschlagsspende in [l/(s·ha)]

Toleranzwerte der Niederschlagshöhen und -spenden nach KOSTRA-DWD 2020

Rasterfeld : Spalte 165, Zeile 115 INDEX_RC : 115165
Ortsname : Ottersleben (ST)
Bemerkung :

Dauerstufe D	Toleranzwerte UC je Wiederkehrintervall T [a] in [±%]								
	1 a	2 a	3 a	5 a	10 a	20 a	30 a	50 a	100 a
5 min	15	14	13	13	13	13	13	13	13
10 min	9	10	10	11	12	13	13	14	14
15 min	10	12	13	14	15	16	16	17	17
20 min	12	14	15	16	17	18	18	19	19
30 min	14	16	17	18	19	20	21	21	22
45 min	15	17	18	19	21	22	22	23	23
60 min	16	18	19	20	21	22	23	23	24
90 min	16	18	19	21	22	23	23	24	24
2 h	16	18	19	21	22	23	23	24	24
3 h	16	18	19	20	22	22	23	24	24
4 h	15	18	19	20	21	22	23	23	24
6 h	15	17	18	19	21	22	22	23	23
9 h	14	16	18	19	20	21	21	22	22
12 h	14	16	17	18	19	20	21	21	22
18 h	13	15	16	18	19	20	20	21	21
24 h	13	15	16	17	18	19	20	20	21
48 h	13	15	15	16	17	18	19	19	20
72 h	13	14	15	16	17	18	18	19	19
4 d	13	14	15	16	17	18	18	18	19
5 d	13	14	15	16	17	17	18	18	19
6 d	14	15	15	16	17	17	18	18	19
7 d	14	15	15	16	17	17	18	18	19

Legende

T Wiederkehrintervall, Jährlichkeit in [a]: mittlere Zeitspanne, in der ein Ereignis einen Wert einmal erreicht oder überschreitet

D Dauerstufe in [min, h, d]: definierte Niederschlagsdauer einschließlich Unterbrechungen

UC Toleranzwert der Niederschlagshöhe und -spende in [±%]

Niederschlagshöhen nach KOSTRA-DWD 2020

Rasterfeld : Spalte 165, Zeile 116 INDEX_RC : 116165
Ortsname : Langenweddingen (ST)
Bemerkung :

Dauerstufe D	Niederschlagshöhen hN [mm] je Wiederkehrintervall T [a]								
	1 a	2 a	3 a	5 a	10 a	20 a	30 a	50 a	100 a
5 min	6,3	8,0	9,0	10,4	12,4	14,4	15,7	17,4	19,9
10 min	8,7	11,0	12,4	14,3	16,9	19,7	21,5	23,9	27,3
15 min	10,1	12,7	14,4	16,5	19,7	22,9	25,0	27,7	31,7
20 min	11,1	14,0	15,8	18,2	21,6	25,1	27,4	30,4	34,8
30 min	12,4	15,7	17,7	20,4	24,3	28,2	30,8	34,2	39,1
45 min	13,8	17,4	19,7	22,7	26,9	31,3	34,2	38,0	43,4
60 min	14,8	18,7	21,1	24,3	28,9	33,6	36,7	40,7	46,5
90 min	16,2	20,5	23,1	26,6	31,6	36,8	40,2	44,6	50,9
2 h	17,2	21,8	24,6	28,3	33,6	39,1	42,7	47,4	54,2
3 h	18,7	23,7	26,8	30,8	36,6	42,5	46,5	51,6	58,9
4 h	19,9	25,1	28,4	32,6	38,8	45,1	49,2	54,7	62,5
6 h	21,5	27,2	30,7	35,3	42,0	48,9	53,4	59,2	67,7
9 h	23,3	29,5	33,3	38,3	45,5	52,9	57,8	64,1	73,3
12 h	24,6	31,1	35,2	40,4	48,1	55,9	61,1	67,8	77,4
18 h	26,6	33,7	38,0	43,7	52,0	60,4	66,0	73,3	83,7
24 h	28,1	35,6	40,2	46,2	54,9	63,9	69,7	77,4	88,4
48 h	32,1	40,6	45,8	52,7	62,6	72,9	79,6	88,3	100,9
72 h	34,7	43,8	49,5	56,9	67,6	78,7	85,9	95,4	109,0
4 d	36,6	46,3	52,2	60,1	71,4	83,1	90,7	100,7	115,1
5 d	38,2	48,3	54,5	62,7	74,5	86,7	94,6	105,1	120,0
6 d	39,5	50,0	56,4	64,9	77,1	89,7	98,0	108,8	124,2
7 d	40,7	51,4	58,1	66,8	79,4	92,4	100,9	112,0	127,9

Legende

T Wiederkehrintervall, Jährlichkeit in [a]: mittlere Zeitspanne, in der ein Ereignis einen Wert einmal erreicht oder überschreitet

D Dauerstufe in [min, h, d]: definierte Niederschlagsdauer einschließlich Unterbrechungen

hN Niederschlagshöhe in [mm]

KOSTRA-DWD 2020

Nach den Vorgaben des Deutschen Wetterdienstes - Hydrometeorologie -

Niederschlagsspenden nach KOSTRA-DWD 2020

Rasterfeld : Spalte 165, Zeile 116 INDEX_RC : 116165
Ortsname : Langenweddingen (ST)
Bemerkung :

Dauerstufe D	Niederschlagspenden rN [l/(s·ha)] je Wiederkehrintervall T [a]								
	1 a	2 a	3 a	5 a	10 a	20 a	30 a	50 a	100 a
5 min	210,0	266,7	300,0	346,7	413,3	480,0	523,3	580,0	663,3
10 min	145,0	183,3	206,7	238,3	281,7	328,3	358,3	398,3	455,0
15 min	112,2	141,1	160,0	183,3	218,9	254,4	277,8	307,8	352,2
20 min	92,5	116,7	131,7	151,7	180,0	209,2	228,3	253,3	290,0
30 min	68,9	87,2	98,3	113,3	135,0	156,7	171,1	190,0	217,2
45 min	51,1	64,4	73,0	84,1	99,6	115,9	126,7	140,7	160,7
60 min	41,1	51,9	58,6	67,5	80,3	93,3	101,9	113,1	129,2
90 min	30,0	38,0	42,8	49,3	58,5	68,1	74,4	82,6	94,3
2 h	23,9	30,3	34,2	39,3	46,7	54,3	59,3	65,8	75,3
3 h	17,3	21,9	24,8	28,5	33,9	39,4	43,1	47,8	54,5
4 h	13,8	17,4	19,7	22,6	26,9	31,3	34,2	38,0	43,4
6 h	10,0	12,6	14,2	16,3	19,4	22,6	24,7	27,4	31,3
9 h	7,2	9,1	10,3	11,8	14,0	16,3	17,8	19,8	22,6
12 h	5,7	7,2	8,1	9,4	11,1	12,9	14,1	15,7	17,9
18 h	4,1	5,2	5,9	6,7	8,0	9,3	10,2	11,3	12,9
24 h	3,3	4,1	4,7	5,3	6,4	7,4	8,1	9,0	10,2
48 h	1,9	2,3	2,7	3,0	3,6	4,2	4,6	5,1	5,8
72 h	1,3	1,7	1,9	2,2	2,6	3,0	3,3	3,7	4,2
4 d	1,1	1,3	1,5	1,7	2,1	2,4	2,6	2,9	3,3
5 d	0,9	1,1	1,3	1,5	1,7	2,0	2,2	2,4	2,8
6 d	0,8	1,0	1,1	1,3	1,5	1,7	1,9	2,1	2,4
7 d	0,7	0,8	1,0	1,1	1,3	1,5	1,7	1,9	2,1

Legende

T Wiederkehrintervall, Jährlichkeit in [a]: mittlere Zeitspanne, in der ein Ereignis einen Wert einmal erreicht oder überschreitet

D Dauerstufe in [min, h, d]: definierte Niederschlagsdauer einschließlich Unterbrechungen

rN Niederschlagsspende in [l/(s·ha)]

Toleranzwerte der Niederschlagshöhen und -spenden nach KOSTRA-DWD 2020

Rasterfeld : Spalte 165, Zeile 116 INDEX_RC : 116165
Ortsname : Langenweddingen (ST)
Bemerkung :

Dauerstufe D	Toleranzwerte UC je Wiederkehrintervall T [a] in [±%]							
	1 a	2 a	3 a	5 a	10 a	20 a	30 a	50 a	100 a
5 min	16	14	14	13	13	13	13	13	13
10 min	9	10	10	11	12	13	13	13	14
15 min	10	12	13	14	15	16	16	17	17
20 min	11	14	15	16	17	18	18	19	19
30 min	14	16	17	18	19	20	20	21	22
45 min	15	17	18	19	21	22	22	23	23
60 min	16	18	19	20	21	22	23	23	24
90 min	16	18	19	21	22	23	23	24	24
2 h	16	18	20	21	22	23	23	24	24
3 h	16	18	19	20	22	23	23	24	24
4 h	15	18	19	20	21	22	23	23	24
6 h	15	17	18	20	21	22	22	23	23
9 h	14	17	18	19	20	21	21	22	23
12 h	14	16	17	18	20	21	21	22	22
18 h	14	16	17	18	19	20	20	21	21
24 h	13	15	16	17	18	19	20	20	21
48 h	13	15	16	17	18	18	19	19	20
72 h	13	15	15	16	17	18	18	19	19
4 d	13	15	15	16	17	18	18	19	19
5 d	14	15	15	16	17	18	18	18	19
6 d	14	15	15	16	17	18	18	18	19
7 d	14	15	15	16	17	18	18	18	19

Legende

T Wiederkehrintervall, Jährlichkeit in [a]: mittlere Zeitspanne, in der ein Ereignis einen Wert einmal erreicht oder überschreitet

D Dauerstufe in [min, h, d]: definierte Niederschlagsdauer einschließlich Unterbrechungen

UC Toleranzwert der Niederschlagshöhe und -spende in [±%]

Ermittlung der abflusswirksamen Flächen A_u nach Arbeitsblatt DWA-A 138

Flächentyp	Art der Befestigung mit empfohlenen mittleren Abflussbeiwerten Ψ_m	Teilfläche $A_{E,i}$ [m²]	$\Psi_{m,i}$ gewählt	Teilfläche $A_{u,i}$ [m²]
Schrägdach	Metall, Glas, Schiefer, Faserzement: 0,9 - 1,0			
	Ziegel, Dachpappe: 0,8 - 1,0			
Flachdach (Neigung bis 3° oder ca. 5%)	Metall, Glas, Faserzement: 0,9 - 1,0			
	Dachpappe: 0,9			
	Kies: 0,7			
Gründach (Neigung bis 15° oder ca. 25%)	humusiert <10 cm Aufbau: 0,5			
	humusiert >10 cm Aufbau: 0,3			
Straßen, Wege und Plätze (flach)	Asphalt, fugenloser Beton: 0,9	326.936	0,90	294.242
	Pflaster mit dichten Fugen: 0,75			
	fester Schotterbelag: 0,6	495.921	0,60	297.553
	Pflaster mit offenen Fugen: 0,5			
	lockerer Kiesbelag, Schotterrasen: 0,3			
	Verbundsteine mit Fugen, Sickersteine: 0,25			
	Rasengittersteine: 0,15			
Böschungen, Bankette und Gräben	toniger Boden: 0,5			
	lehmiger Sandboden: 0,4			
	Kies- und Sandboden: 0,3			
Gärten, Wiesen und Kulturland	flaches Gelände: 0,0 - 0,1	163.383	0,00	
	steiles Gelände: 0,1 - 0,3			

Gesamtfläche Einzugsgebiet A_E [m²]	**986.240**
Summe undurchlässige Fläche A_u [m²]	**591.795**
resultierender mittlerer Abflussbeiwert Ψ_m [-]	**0,60**

Bemerkungen:

Ermittlung der abflusswirksamen Flächen A_u nach Arbeitsblatt DWA-A 138

Flächentyp	Art der Befestigung mit empfohlenen mittleren Abflussbeiwerten Ψ_m	Teilfläche $A_{E,i}$ [m^2]	$\Psi_{m,i}$ gewählt	Teilfläche $A_{u,i}$ [m^2]
Schrägdach	Metall, Glas, Schiefer, Faserzement: 0,9 - 1,0	1.994	1,00	1.994
	Ziegel, Dachpappe: 0,8 - 1,0			
Flachdach (Neigung bis 3° oder ca. 5%)	Metall, Glas, Faserzement: 0,9 - 1,0			
	Dachpappe: 0,9			
	Kies: 0,7			
Gründach (Neigung bis 15° oder ca. 25%)	humusiert <10 cm Aufbau: 0,5			
	humusiert >10 cm Aufbau: 0,3			
Straßen, Wege und Plätze (flach)	Asphalt, fugenloser Beton: 0,9	49.721	0,90	44.749
	Pflaster mit dichten Fugen: 0,75	953	0,75	715
	fester Schotterbelag: 0,6			
	Pflaster mit offenen Fugen: 0,5			
	lockerer Kiesbelag, Schotterrasen: 0,3			
	Verbundsteine mit Fugen, Sickersteine: 0,25			
	Rasengittersteine: 0,15			
Böschungen, Bankette und Gräben	toniger Boden: 0,5			
	lehmiger Sandboden: 0,4			
	Kies- und Sandboden: 0,3			
Gärten, Wiesen und Kulturland	flaches Gelände: 0,0 - 0,1	933.572	0,00	
	steiles Gelände: 0,1 - 0,3			

Gesamtfläche Einzugsgebiet A_E [m^2]	**986.240**
Summe undurchlässige Fläche A_u [m^2]	**47.458**
resultierender mittlerer Abflussbeiwert Ψ_m [-]	**0,05**

Bemerkungen:

Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Vorhaben „Intel Project OWL“ - Wasserrecht

Auftraggeber:

Beckenbemessung:

Versickerungsbecken 1 (Becken 1)
kf=1,0x10^-5m/s

Eingabedaten:

$$V_{erf} = [(A_u + L_o * b_o) * 10^{-7} * r_{D(n)} - Q_{s,m} - Q_{dr}] * D * 60 * f_Z * f_A$$

$$Q_{s,m} = (Q_{s,max} + Q_{s,min}) / 2 = [k_{f,m} / 2 * (A_{s,Sohle} + A_{s,Böschung}) + k_{f, Sohle} / 2 * A_{s,Sohle}] / 2$$

Einzugsgebietsfläche	A_E	m^2	986.240
Abflussbeiwert gem. Tabelle 2 (DWA-A 138)	Ψ_m	-	0,94
undurchlässige Fläche	A_u	m^2	927.066
gewählte Länge der Sohlfläche (Rechteckbecken)	L_s	m	333,0
gewählte Breite der Sohlfläche (Rechteckbecken)	b_s	m	74,4
versickerungswirksame Sohlfläche	$A_{s,Sohle}$	m^2	24.768
gewählte max. Einstauhöhe (Rechteckbecken)	z	m	1,77
gewählte Böschungsneigung (Rechteckbecken)	1:m	-	3,0
Beckenlänge an Böschungsoberkante	L_o	m	343,6
Beckenbreite an Böschungsoberkante	b_o	m	85,0
versickerungswirksame Böschungsfläche	$A_{s,Böschung}$	m^2	4.439
Durchlässigkeitsbeiwert der Sohle	$k_{f,Sohle}$	m/s	1,0E-05
Durchlässigkeitsbeiwert der Böschung	$k_{f,Böschung}$	m/s	1,0E-05
mittlerer/flächengewichteter Durchlässigkeitsbeiwert	$k_{f,m}$	m/s	1,0E-05
Drosselabfluss	Q_{dr}	l/s	0,0
gewählte Regenhäufigkeit	n	1/Jahr	0,1
Zuschlagsfaktor	f_Z	-	1,15
Fließzeit zur Berechnung des Abminderungsfaktors	t_f	min	0
Abminderungsfaktor	f_A	-	1,000

Ergebnisse:

maßgebende Dauer des Bemessungsregens	D	min	1080
maßgebende Regenspende	$r_{D,n}$	l/(s*ha)	8,1
erforderliches Speichervolumen	$\mathbf{V_{erf}}$	$\mathbf{m^3}$	**47666**
vorhandenes Speichervolumen	**V**	$\mathbf{m^3}$	**47714**
vorhandene minimale Versickerungsrate	$Q_{s,min}$	m^3/s	1,2E-01
vorhandene maximale Versickerungsrate	$Q_{s,max}$	m^3/s	1,5E-01
mittlere Versickerungsrate	$Q_{s,m}$	m^3/s	1,3E-01
Entleerungszeit	t_E	h	98,2

Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Vorhaben „Intel Project OWL“ - Wasserrecht

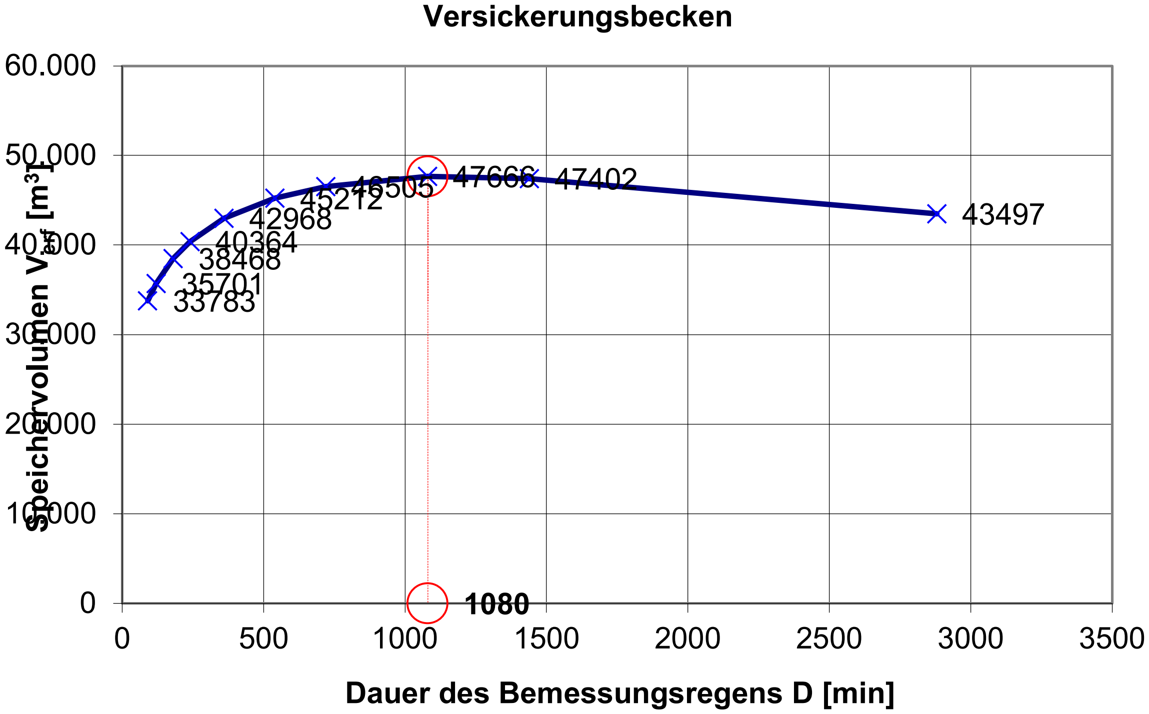
Auftraggeber:

Beckenbemessung:

Versickerungsbecken 1 (Becken 1)
kf=1,0x10^-5m/s

örtliche Regendaten: **Berechnung:**

D [min]	$r_{D(n)}$ [l/(s*ha)]	V_{erf} [m^3]
90	58,3	33783
120	46,5	35701
180	33,8	38468
240	26,9	40364
360	19,5	42968
540	14,1	45212
720	11,2	46505
1080	8,1	47666
1440	6,4	47402
2880	3,7	43497



Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Vorhaben „Intel Project OWL" - Wasserrecht

Auftraggeber:

Beckenbemessung:

Versickerungsbecken 1 (Becken 1)
kf=7,0x10^-6m/s

Eingabedaten:

$\mathbf{V_{erf} = [(A_u + L_o * b_o) * 10^{-7} * r_{D(n)} - Q_{s,m} - Q_{dr}] * D * 60 * f_Z * f_A}$

$\mathbf{Q_{s,m} = (Q_{s,max} + Q_{s,min}) / 2 = [k_{f,m} / 2 * (A_{s,Sohle} + A_{s,Böschung}) + k_{f, Sohle} / 2 * A_{s,Sohle}] / 2}$

Einzugsgebietsfläche	A_E	m^2	986.240
Abflussbeiwert gem. Tabelle 2 (DWA-A 138)	Ψ_m	-	0,94
undurchlässige Fläche	A_u	m^2	927.066
gewählte Länge der Sohlfläche (Rechteckbecken)	L_s	m	333,0
gewählte Breite der Sohlfläche (Rechteckbecken)	b_s	m	74,4
versickerungswirksame Sohlfläche	$A_{s,Sohle}$	m^2	24.768
gewählte max. Einstauhöhe (Rechteckbecken)	z	m	1,98
gewählte Böschungsneigung (Rechteckbecken)	1:m	-	3,0
Beckenlänge an Böschungsoberkante	L_o	m	344,9
Beckenbreite an Böschungsoberkante	b_o	m	86,3
versickerungswirksame Böschungsfläche	$A_{s,Böschung}$	m^2	4.981
Durchlässigkeitsbeiwert der Sohle	$k_{f,Sohle}$	m/s	7,0E-06
Durchlässigkeitsbeiwert der Böschung	$k_{f,Böschung}$	m/s	7,0E-06
mittlerer/flächengewichteter Durchlässigkeitsbeiwert	$k_{f,m}$	m/s	7,0E-06
Drosselabfluss	Q_{dr}	l/s	0,0
gewählte Regenhäufigkeit	n	1/Jahr	0,1
Zuschlagsfaktor	f_Z	-	1,20
Fließzeit zur Berechnung des Abminderungsfaktors	t_f	min	0
Abminderungsfaktor	f_A	-	1,000

Ergebnisse:

maßgebende Dauer des Bemessungsregens	D	min	2880
maßgebende Regenspende	$r_{D,n}$	l/(s*ha)	3,7
erforderliches Speichervolumen	$\mathbf{V_{erf}}$	$\mathbf{m^3}$	**53627**
vorhandenes Speichervolumen	**V**	$\mathbf{m^3}$	**53896**
vorhandene minimale Versickerungsrate	$Q_{s,min}$	m^3/s	8,7E-02
vorhandene maximale Versickerungsrate	$Q_{s,max}$	m^3/s	1,0E-01
mittlere Versickerungsrate	$Q_{s,m}$	m^3/s	9,5E-02
Entleerungszeit	t_E	h	156,9

Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Vorhaben „Intel Project OWL“ - Wasserrecht

Auftraggeber:

Beckenbemessung:

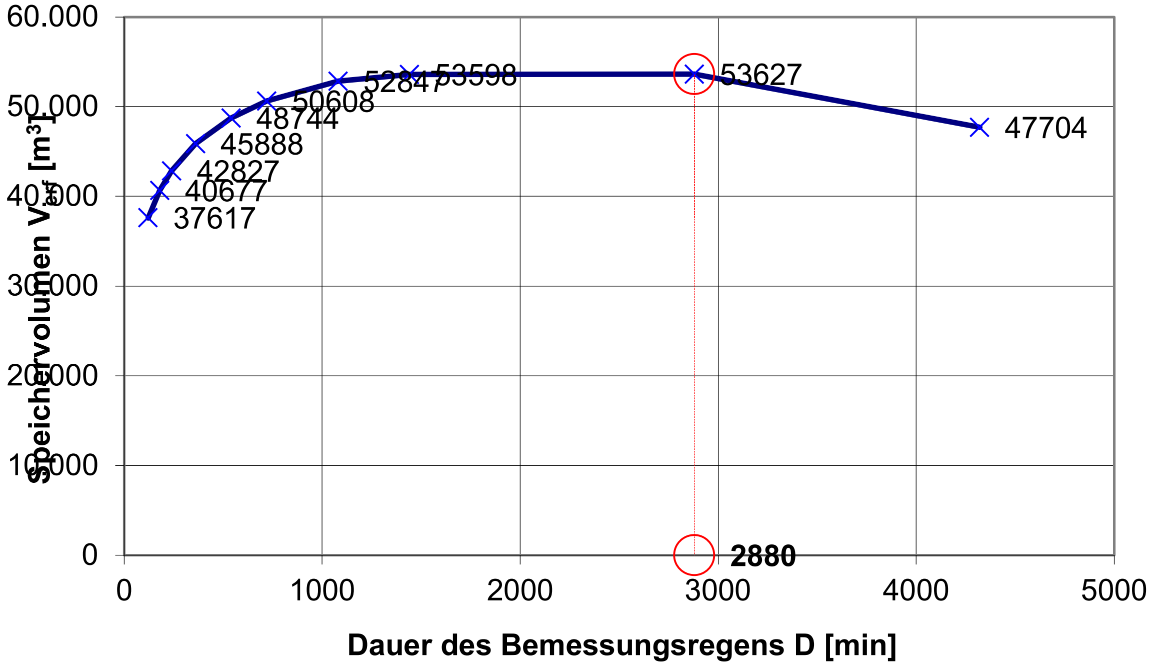
Versickerungsbecken 1 (Becken 1)
kf=7,0x10^-6m/s

örtliche Regendaten:

D [min]	$r_{D(n)}$ [l/(s*ha)]
120	46,5
180	33,8
240	26,9
360	19,5
540	14,1
720	11,2
1080	8,1
1440	6,4
2880	3,7
4320	2,6

Berechnung:

V_{erf} [m³]
37617
40677
42827
45888
48744
50608
52847
53598
53627
47704



Bewertungsverfahren
nach Merkblatt DWA-M 153

Versickerungsbecken 1 (Becken1)

Gewässer (Tabellen 1a und 1b)	Typ	Gewässer-punkte G
Grundwasser außerhalb von Trinkwassereinzugsgebieten	G12	**10**

Fläche	Flächenanteil		Flächen F_i / Luft L_i		Abfluss-belastung B_i
Belastung aus der Fläche / Herkunftsfläche gem. Tabelle A.3	(Abschnitt 4)		(Tab. A.3 / A.2)		
Einfluss aus der Luft gem. Tabelle A.2	$A_{u,i}$ [m²] o. [ha]	f_i	Typ	Punkte	$B_i = f_i * (L_i + F_i)$
stark befahrene Lkw-Zufahrten in Gewerbe-, Industrie- o. ähnlichen Gebieten z.B. Deponien	927066	1	F7	45	53
Einflussbereiche von Gewerbe und Industrie mit Staubemission durch Produktion etc.			L4	8	
	∑ = 927066	∑ = 1			**B = 53**

Die Abflussbelastung B = 53 ist größer als G = 10. Eine Regenwasserbehandlung ist erforderlich!

Bewertungsverfahren
nach Merkblatt DWA-M 153

Versickerungsbecken 1 (Becken1)

maximal zulässiger Durchgangswert D_{max} = G / B:		G / B = 10/53 = 0,19
gewählte Versickerungsfläche A_S =	29207	Au : As = 31,7 : 1

vorgesehene Behandlungsmaßnahme (Tabellen 4a, 4b und 4c)	**Typ**	**Durchgangswert D_i**
Versickerung durch 30 cm bewachsenen Oberboden (15 : 1 < A u: As ≤ 50 : 1)	D1	0,45
Retentionsbodenfilteranlage zur weitergehenden Regenwasserbehandlung im Trennsystem nach DWA-M 178	D11	0,15
Durchgangswert D = Produkt aller D_i (Abschnitt 6.2.2):		**D = 0,07**

Emissionswert E = B * D:	**E = 53 * 0,07 = 3,58**

Die vorgesehene Behandlung ist ausreichend, da E ≤ G (E = 3,58; G = 10).

Bemerkungen:

Engelbosteler Damm 22, 30167 Hannover, Tel.: 0511-97193-0, Fax: 0511-97193-77, www.itwh.de
Lizenznummer: ATV0248-1062

Ermittlung der abflusswirksamen Flächen A_u nach Arbeitsblatt DWA-A 138

Flächentyp	Art der Befestigung mit empfohlenen mittleren Abflussbeiwerten Ψ_m	Teilfläche $A_{E,i}$ [m²]	$\Psi_{m,i}$ gewählt	Teilfläche $A_{u,i}$ [m²]
Schrägdach	Metall, Glas, Schiefer, Faserzement: 0,9 - 1,0	205.096		
	Ziegel, Dachpappe: 0,8 - 1,0			
Flachdach (Neigung bis 3° oder ca. 5%)	Metall, Glas, Faserzement: 0,9 - 1,0			
	Dachpappe: 0,9			
	Kies: 0,7			
Gründach (Neigung bis 15° oder ca. 25%)	humusiert <10 cm Aufbau: 0,5			
	humusiert >10 cm Aufbau: 0,3			
Straßen, Wege und Plätze (flach)	Asphalt, fugenloser Beton: 0,9	145.666	0,90	131.099
	Pflaster mit dichten Fugen: 0,75			
	fester Schotterbelag: 0,6	24.169	0,60	14.501
	Pflaster mit offenen Fugen: 0,5			
	lockerer Kiesbelag, Schotterrasen: 0,3			
	Verbundsteine mit Fugen, Sickersteine: 0,25			
	Rasengittersteine: 0,15			
Böschungen, Bankette und Gräben	toniger Boden: 0,5			
	lehmiger Sandboden: 0,4			
	Kies- und Sandboden: 0,3			
Gärten, Wiesen und Kulturland	flaches Gelände: 0,0 - 0,1	401.731	0,00	
	steiles Gelände: 0,1 - 0,3			

Gesamtfläche Einzugsgebiet A_E [m²]	**776.662**
Summe undurchlässige Fläche A_u [m²]	**145.600**
resultierender mittlerer Abflussbeiwert Ψ_m [-]	**0,19**

Bemerkungen:

Ermittlung der abflusswirksamen Flächen A_u nach Arbeitsblatt DWA-A 138

Flächentyp	Art der Befestigung mit empfohlenen mittleren Abflussbeiwerten Ψ_m	Teilfläche $A_{E,i}$ [m²]	$\Psi_{m,i}$ gewählt	Teilfläche $A_{u,i}$ [m²]
Schrägdach	Metall, Glas, Schiefer, Faserzement: 0,9 - 1,0	197.522	1,00	197.522
	Ziegel, Dachpappe: 0,8 - 1,0			
Flachdach (Neigung bis 3° oder ca. 5%)	Metall, Glas, Faserzement: 0,9 - 1,0			
	Dachpappe: 0,9			
	Kies: 0,7			
Gründach (Neigung bis 15° oder ca. 25%)	humusiert <10 cm Aufbau: 0,5			
	humusiert >10 cm Aufbau: 0,3			
Straßen, Wege und Plätze (flach)	Asphalt, fugenloser Beton: 0,9	113.471	0,90	102.124
	Pflaster mit dichten Fugen: 0,75	218.446	0,75	163.835
	fester Schotterbelag: 0,6			
	Pflaster mit offenen Fugen: 0,5			
	lockerer Kiesbelag, Schotterrasen: 0,3			
	Verbundsteine mit Fugen, Sickersteine: 0,25			
	Rasengittersteine: 0,15			
Böschungen, Bankette und Gräben	toniger Boden: 0,5			
	lehmiger Sandboden: 0,4			
	Kies- und Sandboden: 0,3			
Gärten, Wiesen und Kulturland	flaches Gelände: 0,0 - 0,1	247.223	0,00	
	steiles Gelände: 0,1 - 0,3			

Gesamtfläche Einzugsgebiet A_E [m²]	**776.662**
Summe undurchlässige Fläche A_u [m²]	**463.481**
resultierender mittlerer Abflussbeiwert Ψ_m [-]	**0,60**

Bemerkungen:

Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Auftraggeber:

Beckenbemessung:

Versickerungsbecken 2 (Becken 2)
kf 5x10^-6m/s

Eingabedaten:

$V_{erf} = [(A_u + L_o * b_o) * 10^{-7} * r_{D(n)} - Q_{s,m} - Q_{dr}] * D * 60 * f_Z * f_A$

$Q_{s,m} = (Q_{s,max} + Q_{s,min}) / 2 = [k_{f,m} / 2 * (A_{s,Sohle} + A_{s,Böschung}) + k_{f, Sohle} / 2 * A_{s,Sohle}] / 2$

Einzugsgebietsfläche	A_E	m^2	776.662
Abflussbeiwert gem. Tabelle 2 (DWA-A 138)	Ψ_m	-	0,94
undurchlässige Fläche	A_u	m^2	730.062
gewählte Länge der Sohlfläche (Rechteckbecken)	L_s	m	240,00
gewählte Breite der Sohlfläche (Rechteckbecken)	b_s	m	126,08
versickerungswirksame Sohlfläche	$A_{s,Sohle}$	m^2	30.258
gewählte max. Einstauhöhe (Rechteckbecken)	z	m	1,10
gewählte Böschungsneigung (Rechteckbecken)	1:m	-	3,0
Beckenlänge an Böschungsoberkante	L_o	m	246,60
Beckenbreite an Böschungsoberkante	b_o	m	132,7
versickerungswirksame Böschungsfläche	$A_{s,Böschung}$	m^2	2.460
Durchlässigkeitsbeiwert der Sohle	$k_{f,Sohle}$	m/s	1,0E-05
Durchlässigkeitsbeiwert der Böschung	$k_{f,Böschung}$	m/s	1,0E-05
mittlerer/flächengewichteter Durchlässigkeitsbeiwert	$k_{f,m}$	m/s	1,0E-05
Drosselabfluss	Q_{dr}	l/s	0,0
gewählte Regenhäufigkeit	n	1/Jahr	0,1
Zuschlagsfaktor	f_Z	-	1,15
Fließzeit zur Berechnung des Abminderungsfaktors	t_f	min	0
Abminderungsfaktor	f_A	-	1,000

Ergebnisse:

maßgebende Dauer des Bemessungsregens	D	min	720
maßgebende Regenspende	$r_{D,n}$	l/(s*ha)	11,2
erforderliches Speichervolumen	V_{erf}	m^3	**34621**
vorhandenes Speichervolumen	V	m^3	**34628**
vorhandene minimale Versickerungsrate	$Q_{s,min}$	m^3/s	1,5E-01
vorhandene maximale Versickerungsrate	$Q_{s,max}$	m^3/s	1,6E-01
mittlere Versickerungsrate	$Q_{s,m}$	m^3/s	1,6E-01
Entleerungszeit	t_E	h	61,1

Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Auftraggeber:

Beckenbemessung:

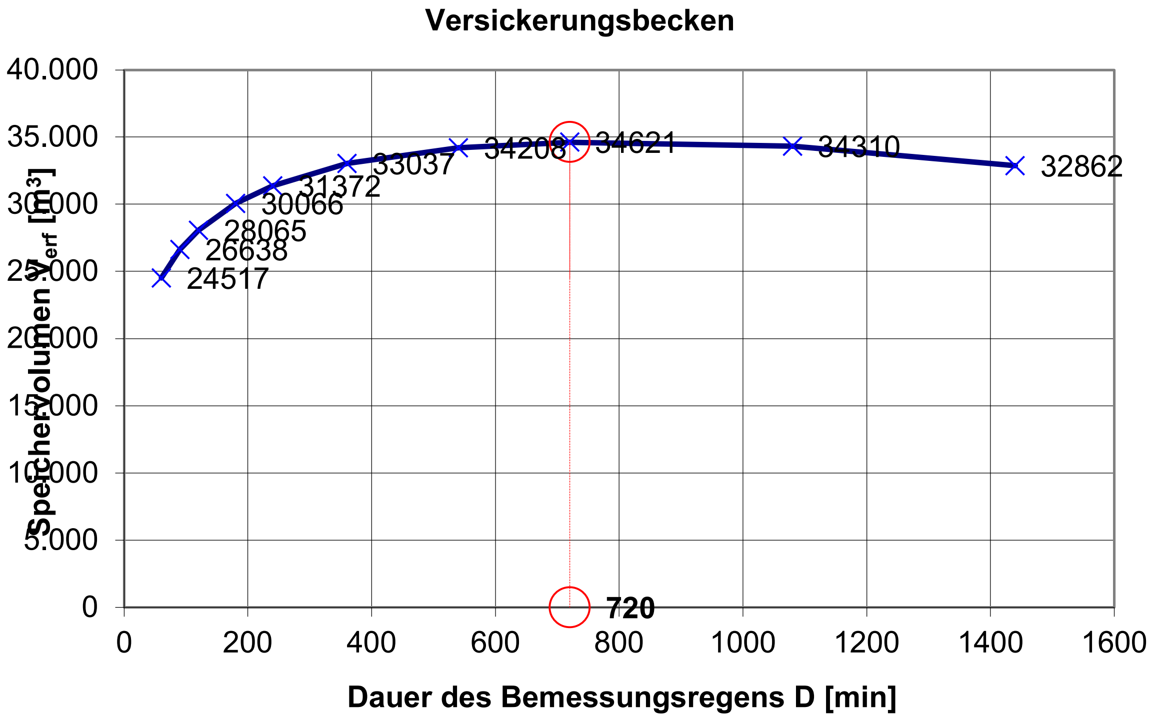
Versickerungsbecken 2 (Becken 2)
kf 5x10^-6m/s

örtliche Regendaten:

D [min]	$r_{D(n)}$ [l/(s*ha)]
60	79,7
90	58,3
120	46,5
180	33,8
240	26,9
360	19,5
540	14,1
720	11,2
1080	8,1
1440	6,4

Berechnung:

V_{erf} [m^3]
24517
26638
28065
30066
31372
33037
34208
34621
34310
32862



Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Auftraggeber:

Beckenbemessung:

Versickerungsbecken 2 (Becken 2)
kf 5x10^-6m/s

Eingabedaten:

$V_{erf} = [(A_u + L_o * b_o) * 10^{-7} * r_{D(n)} - Q_{s,m} - Q_{dr}] * D * 60 * f_Z * f_A$

$Q_{s,m} = (Q_{s,max} + Q_{s,min}) / 2 = [k_{f,m} / 2 * (A_{s,Sohle} + A_{s,Böschung}) + k_{f, Sohle} / 2 * A_{s,Sohle}] / 2$

Einzugsgebietsfläche	A_E	m^2	776.662
Abflussbeiwert gem. Tabelle 2 (DWA-A 138)	Ψ_m	-	0,94
undurchlässige Fläche	A_u	m^2	730.062
gewählte Länge der Sohlfläche (Rechteckbecken)	L_s	m	240,00
gewählte Breite der Sohlfläche (Rechteckbecken)	b_s	m	126,08
versickerungswirksame Sohlfläche	$A_{s,Sohle}$	m^2	30.258
gewählte max. Einstauhöhe (Rechteckbecken)	z	m	1,20
gewählte Böschungsneigung (Rechteckbecken)	1:m	-	3,0
Beckenlänge an Böschungsoberkante	L_o	m	247,20
Beckenbreite an Böschungsoberkante	b_o	m	133,3
versickerungswirksame Böschungsfläche	$A_{s,Böschung}$	m^2	2.688
Durchlässigkeitsbeiwert der Sohle	$k_{f,Sohle}$	m/s	7,0E-06
Durchlässigkeitsbeiwert der Böschung	$k_{f,Böschung}$	m/s	7,0E-06
mittlerer/flächengewichteter Durchlässigkeitsbeiwert	$k_{f,m}$	m/s	7,0E-06
Drosselabfluss	Q_{dr}	l/s	0,0
gewählte Regenhäufigkeit	n	1/Jahr	0,1
Zuschlagsfaktor	f_Z	-	1,15
Fließzeit zur Berechnung des Abminderungsfaktors	t_f	min	0
Abminderungsfaktor	f_A	-	1,000

Ergebnisse:

maßgebende Dauer des Bemessungsregens	D	min	1080
maßgebende Regenspende	$r_{D,n}$	l/(s*ha)	8,1
erforderliches Speichervolumen	V_{erf}	m^3	**37814**
vorhandenes Speichervolumen	**V**	m^3	**37911**
vorhandene minimale Versickerungsrate	$Q_{s,min}$	m^3/s	1,1E-01
vorhandene maximale Versickerungsrate	$Q_{s,max}$	m^3/s	1,2E-01
mittlere Versickerungsrate	$Q_{s,m}$	m^3/s	1,1E-01
Entleerungszeit	t_E	h	95,2

Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Auftraggeber:

Beckenbemessung:

Versickerungsbecken 2 (Becken 2)
kf 5x10^-6m/s

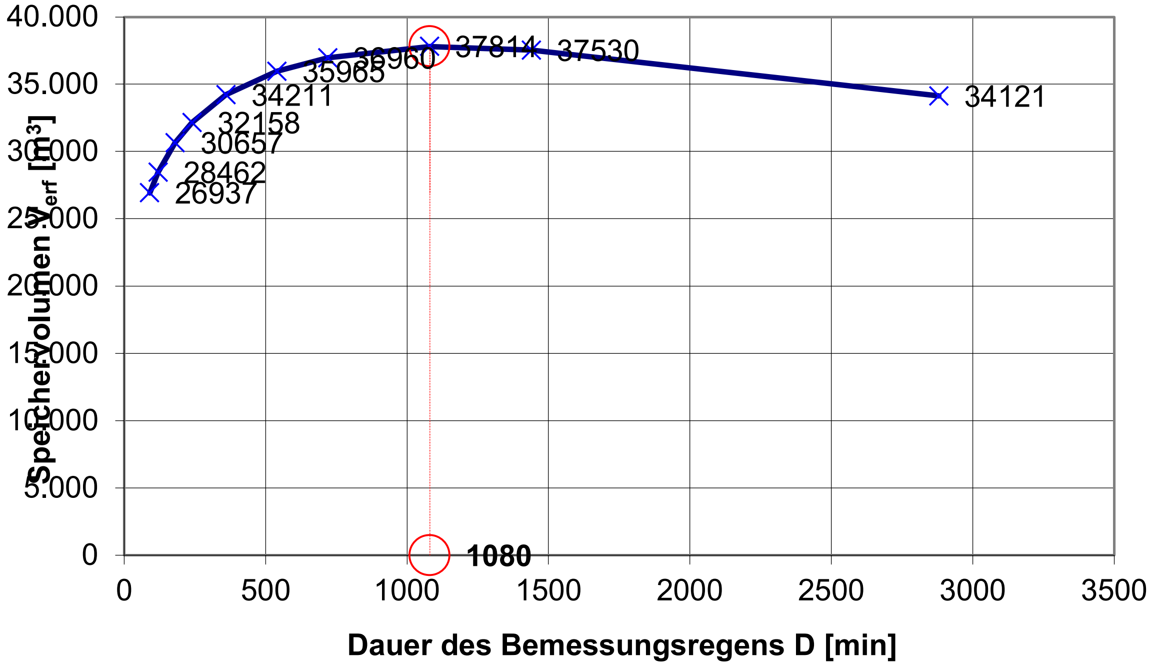
örtliche Regendaten:

D [min]	$r_{D(n)}$ [l/(s*ha)]
90	58,3
120	46,5
180	33,8
240	26,9
360	19,5
540	14,1
720	11,2
1080	8,1
1440	6,4
2880	3,7

Berechnung:

V_{erf} [m³]
26937
28462
30657
32158
34211
35965
36960
37814
37530
34121

Versickerungsbecken



Bewertungsverfahren
nach Merkblatt DWA-M 153

Versickerungsbecken 2 (Becken2)

Gewässer (Tabellen 1a und 1b)	**Typ**	**Gewässer-punkte G**
Grundwasser außerhalb von Trinkwassereinzugsgebieten	G12	**10**

Fläche	**Flächenanteil**		**Flächen F_i / Luft L_i**		**Abfluss-belastung B_i**
Belastung aus der Fläche / Herkunftsfläche gem. Tabelle A.3	(Abschnitt 4)		(Tab. A.3 / A.2)		
Einfluss aus der Luft gem. Tabelle A.2	$A_{u,i}$ [m²] o. [ha]	f_i	Typ	Punkte	$B_i = f_i * (L_i + F_i)$
stark befahrene Lkw-Zufahrten in Gewerbe-, Industrie- o. ähnlichen Gebieten z.B. Deponien	730062	1	F7	45	53
Einflussbereiche von Gewerbe und Industrie mit Staubemission durch Produktion etc.			L4	8	
	∑ = 730062	∑ = 1			**B = 53**

Die Abflussbelastung B = 53 ist größer als G = 10. Eine Regenwasserbehandlung ist erforderlich!

Bewertungsverfahren
nach Merkblatt DWA-M 153

Versickerungsbecken 2 (Becken2)

maximal zulässiger Durchgangswert D_{max} = G / B:		G / B = 10/53 = 0,19
gewählte Versickerungsfläche A_S =	32718	Au : As = 22,3 : 1

vorgesehene Behandlungsmaßnahme (Tabellen 4a, 4b und 4c)	**Typ**	**Durchgangswert D_i**
Versickerung durch 30 cm bewachsenen Oberboden (15 : 1 < A u: As ≤ 50 : 1)	D1	0,45
Retentionsbodenfilteranlage zur weitergehenden Regenwasserbehandlung im Trennsystem nach DWA-M 178	D11	0,15
Durchgangswert D = Produkt aller D_i (Abschnitt 6.2.2):		**D = 0,07**

Emissionswert E = B * D:	**E = 53 * 0,07 = 3,58**

Die vorgesehene Behandlung ist ausreichend, da E ≤ G (E = 3,58; G = 10).

Bemerkungen:

Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Vorhaben „Intel Project OWL“ - Wasserrecht

Auftraggeber:

Beckenbemessung:

Versickerungsbecken 3 (Becken 3)
kf=1,0x10^-5m/s

Eingabedaten:

$$V_{erf} = [(A_u + L_o * b_o) * 10^{-7} * r_{D(n)} - Q_{s,m} - Q_{dr}] * D * 60 * f_Z * f_A$$

$$Q_{s,m} = (Q_{s,max} + Q_{s,min}) / 2 = [k_{f,m} / 2 * (A_{s,Sohle} + A_{s,Böschung}) + k_{f, Sohle} / 2 * A_{s,Sohle}] / 2$$

Einzugsgebietsfläche	A_E	m^2	976.080
Abflussbeiwert gem. Tabelle 2 (DWA-A 138)	Ψ_m	-	0,94
undurchlässige Fläche	A_u	m^2	917.515
gewählte Länge der Sohlfläche (Rechteckbecken)	L_s	m	218,0
gewählte Breite der Sohlfläche (Rechteckbecken)	b_s	m	82,2
versickerungswirksame Sohlfläche	$A_{s,Sohle}$	m^2	17.910
gewählte max. Einstauhöhe (Rechteckbecken)	z	m	2,05
gewählte Böschungsneigung (Rechteckbecken)	1:m	-	3,0
Beckenlänge an Böschungsoberkante	L_o	m	230,3
Beckenbreite an Böschungsoberkante	b_o	m	94,5
versickerungswirksame Böschungsfläche	$A_{s,Böschung}$	m^2	3.843
Durchlässigkeitsbeiwert der Sohle	$k_{f,Sohle}$	m/s	1,0E-05
Durchlässigkeitsbeiwert der Böschung	$k_{f,Böschung}$	m/s	1,0E-05
mittlerer/flächengewichteter Durchlässigkeitsbeiwert	$k_{f,m}$	m/s	1,0E-05
Drosselabfluss	Q_{dr}	l/s	100,0
gewählte Regenhäufigkeit	n	1/Jahr	0,1
Zuschlagsfaktor	f_Z	-	1,10
Fließzeit zur Berechnung des Abminderungsfaktors	t_f	min	0
Abminderungsfaktor	f_A	-	1,000

Ergebnisse:

maßgebende Dauer des Bemessungsregens	D	min	720
maßgebende Regenspende	$r_{D,n}$	l/(s*ha)	11,2
erforderliches Speichervolumen	V_{erf}	m^3	**40526**
vorhandenes Speichervolumen	**V**	m^3	**40591**
vorhandene minimale Versickerungsrate	$Q_{s,min}$	m^3/s	9,0E-02
vorhandene maximale Versickerungsrate	$Q_{s,max}$	m^3/s	1,1E-01
mittlere Versickerungsrate	$Q_{s,m}$	m^3/s	9,9E-02
Entleerungszeit	t_E	h	56,6

Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Vorhaben „Intel Project OWL“ - Wasserrecht

Auftraggeber:

Beckenbemessung:

Versickerungsbecken 3 (Becken 3)
kf=1,0x10^-5m/s

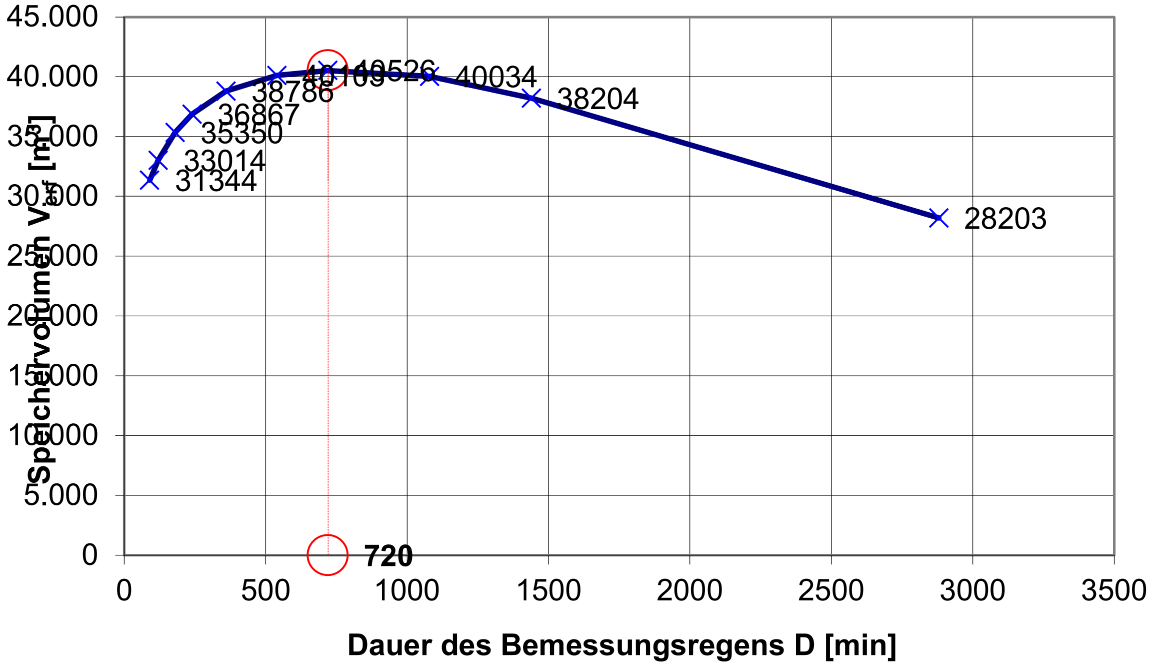
örtliche Regendaten:

D [min]	$r_{D(n)}$ [l/(s*ha)]
90	58,3
120	46,5
180	33,8
240	26,9
360	19,5
540	14,1
720	11,2
1080	8,1
1440	6,4
2880	3,7

Berechnung:

V_{erf} [m³]
31344
33014
35350
36867
38786
40103
40526
40034
38204
28203

Versickerungsbecken



Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Vorhaben „Intel Project OWL" - Wasserrecht

Auftraggeber:

Beckenbemessung:

Versickerungsbecken 3 (Becken 3)
kf=7,0x10^-6m/s

Eingabedaten:

$V_{erf} = [(A_u + L_o * b_o) * 10^{-7} * r_{D(n)} - Q_{s,m} - Q_{dr}] * D * 60 * f_Z * f_A$

$Q_{s,m} = (Q_{s,max} + Q_{s,min}) / 2 = [k_{f,m} / 2 * (A_{s,Sohle} + A_{s,Böschung}) + k_{f,\,Sohle} / 2 * A_{s,Sohle}] / 2$

Einzugsgebietsfläche	A_E	m^2	976.080
Abflussbeiwert gem. Tabelle 2 (DWA-A 138)	Ψ_m	-	0,94
undurchlässige Fläche	A_u	m^2	917.515
gewählte Länge der Sohlfläche (Rechteckbecken)	L_s	m	218,0
gewählte Breite der Sohlfläche (Rechteckbecken)	b_s	m	82,2
versickerungswirksame Sohlfläche	$A_{s,Sohle}$	m^2	17.910
gewählte max. Einstauhöhe (Rechteckbecken)	z	m	2,30
gewählte Böschungsneigung (Rechteckbecken)	1:m	-	3,0
Beckenlänge an Böschungsoberkante	L_o	m	231,8
Beckenbreite an Böschungsoberkante	b_o	m	96,0
versickerungswirksame Böschungsfläche	$A_{s,Böschung}$	m^2	4.333
Durchlässigkeitsbeiwert der Sohle	$k_{f,Sohle}$	m/s	7,0E-06
Durchlässigkeitsbeiwert der Böschung	$k_{f,Böschung}$	m/s	7,0E-06
mittlerer/flächengewichteter Durchlässigkeitsbeiwert	$k_{f,m}$	m/s	7,0E-06
Drosselabfluss	Q_{dr}	l/s	100,0
gewählte Regenhäufigkeit	n	1/Jahr	0,1
Zuschlagsfaktor	f_Z	-	1,20
Fließzeit zur Berechnung des Abminderungsfaktors	t_f	min	0
Abminderungsfaktor	f_A	-	1,000

Ergebnisse:

maßgebende Dauer des Bemessungsregens	D	min	1080
maßgebende Regenspende	$r_{D,n}$	l/(s*ha)	8,1
erforderliches Speichervolumen	V_{erf}	m^3	**45951**
vorhandenes Speichervolumen	**V**	m^3	**46085**
vorhandene minimale Versickerungsrate	$Q_{s,min}$	m^3/s	6,3E-02
vorhandene maximale Versickerungsrate	$Q_{s,max}$	m^3/s	7,8E-02
mittlere Versickerungsrate	$Q_{s,m}$	m^3/s	7,0E-02
Entleerungszeit	t_E	h	75,2

Bemessung von Versickerungsbecken
Alternative Bemessung in Anlehnung an Arbeitsblatt DWA-A 138

Vorhaben „Intel Project OWL“ - Wasserrecht

Auftraggeber:

Beckenbemessung:

Versickerungsbecken 3 (Becken 3)
kf=7,0x10^-6m/s

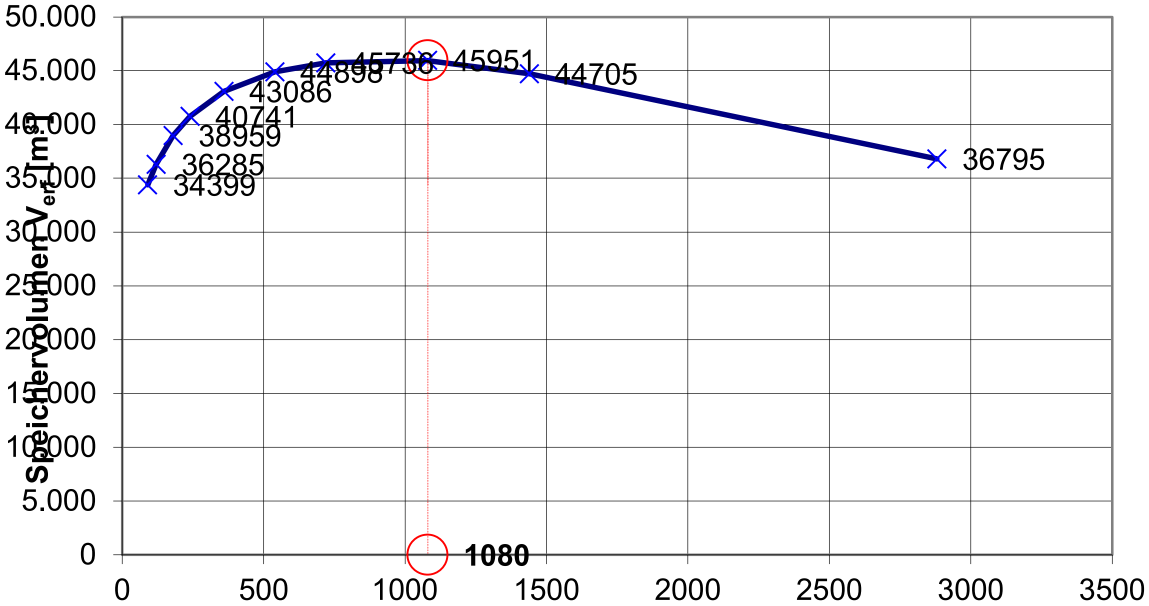
örtliche Regendaten:

D [min]	$r_{D(n)}$ [l/(s*ha)]
90	58,3
120	46,5
180	33,8
240	26,9
360	19,5
540	14,1
720	11,2
1080	8,1
1440	6,4
2880	3,7

Berechnung:

V_{erf} [m^3]
34399
36285
38959
40741
43086
44898
45736
45951
44705
36795

Versickerungsbecken



Bewertungsverfahren
nach Merkblatt DWA-M 153

Drosselabfluss 100l/s in den Seerennengraben

Gewässer (Tabellen 1a und 1b)	Typ	Gewässer-punkte G
Fließgewässer mit v < 0,10 m/s (kein Marschgewässer) (siehe G8)	G24	**10**

Fläche	**Flächenanteil**		**Flächen F_i / Luft L_i**		**Abfluss-belastung B_i**
Belastung aus der Fläche / Herkunftsfläche gem. Tabelle A.3	(Abschnitt 4)		(Tab. A.3 / A.2)		
Einfluss aus der Luft gem. Tabelle A.2	$A_{u,i}$ [m²] o. [ha]	f_i	Typ	Punkte	$B_i = f_i * (L_i + F_i)$
stark befahrene Lkw-Zufahrten in Gewerbe-, Industrie- o. ähnlichen Gebieten z.B. Deponien	917515	1	F7	45	53
Einflussbereiche von Gewerbe und Industrie mit Staubemission durch Produktion etc.			L4	8	
	∑ = 917515	∑ = 1			**B = 53**

Die Abflussbelastung B = 53 ist größer als G = 10. Eine Regenwasserbehandlung ist erforderlich!

Bewertungsverfahren
nach Merkblatt DWA-M 153

Drosselabfluss 100l/s in den Seerennengraben

maximal zulässiger Durchgangswert D_{max} = G / B:		G / B = 10/53 = 0,19
gewählte Versickerungsfläche A_S =		

vorgesehene Behandlungsmaßnahme (Tabellen 4a, 4b und 4c)	**Typ**	**Durchgangswert D_i**
Retentionsbodenfilteranlage zur weitergehenden Regenwasserbehandlung im Trennsystem nach DWA-M 178	D11	0,15
Durchgangswert D = Produkt aller D_i (Abschnitt 6.2.2):		**D = 0,15**
Emissionswert E = B * D:		**E = 53 * 0,15 = 7,95**

Die vorgesehene Behandlung ist ausreichend, da E ≤ G (E = 7,95; G = 10).

Bemerkungen:

Bewertungsverfahren
nach Merkblatt DWA-M 153

Versickerungsbecken 3 (Becken3)

Gewässer (Tabellen 1a und 1b)	**Typ**	**Gewässer-punkte G**
Grundwasser außerhalb von Trinkwassereinzugsgebieten	G12	**10**

Fläche	**Flächenanteil**		**Flächen F_i / Luft L_i**		**Abfluss-belastung B_i**
Belastung aus der Fläche / Herkunftsfläche gem. Tabelle A.3	(Abschnitt 4)		(Tab. A.3 / A.2)		
Einfluss aus der Luft gem. Tabelle A.2	$A_{u,i}$ [m²] o. [ha]	f_i	Typ	Punkte	$B_i = f_i * (L_i + F_i)$
stark befahrene Lkw-Zufahrten in Gewerbe-, Industrie- o. ähnlichen Gebieten z.B. Deponien	917515	1	F7	45	53
Einflussbereiche von Gewerbe und Industrie mit Staubemission durch Produktion etc.			L4	8	
	∑ = 917515	∑ = 1			**B = 53**

Die Abflussbelastung B = 53 ist größer als G = 10. Eine Regenwasserbehandlung ist erforderlich!

Bewertungsverfahren
nach Merkblatt DWA-M 153

Versickerungsbecken 3 (Becken3)

maximal zulässiger Durchgangswert D_{max} = G / B:		G / B = 10/53 = 0,19
gewählte Versickerungsfläche A_S =	21753	Au : As = 42,2 : 1

vorgesehene Behandlungsmaßnahme (Tabellen 4a, 4b und 4c)	**Typ**	**Durchgangswert D_i**
Retentionsbodenfilteranlage zur weitergehenden Regenwasserbehandlung im Trennsystem nach DWA-M 178	D11	0,15
Versickerung durch 30 cm bewachsenen Oberboden (15 : 1 < A u: As ≤ 50 : 1)	D1	0,45
Durchgangswert D = Produkt aller D_i (Abschnitt 6.2.2):		**D = 0,07**

Emissionswert E = B * D:	**E = 53 * 0,07 = 3,58**

Die vorgesehene Behandlung ist ausreichend, da E ≤ G (E = 3,58; G = 10).

Bemerkungen:

Berechnungen Retentionsbodenfilter

Für das Vorhaben „Intel Project OWL“

Auftraggeber:	**Jacobs Engineering Ireland Limited** Parkring 20 85748 Garching bei München
Datum:	19.03.2024
bearbeitet durch:	

IVW Ingenieurbüro
Calbische Straße 17
39122 Magdeburg
0391 40 60 300

Projektleiter M.Keitz	Projektbearbeiterin M. Voigt

Retensionsfilterbemessung
Becken 1,2 und 3

Retensionsbodenfilter	Bemessungs-regenereignis	Abfluss-beiwert Ψ	abflusswirksame Einzugsfläche m^2	abfuss-wirksame Fläche m²	Abfluß-menge [m³/s]	Vorstufe mit 0,5 m³/ha A_E	erf. Fläche in m² bei Einstau h= 0,5m
Retensionsbodenfilter RBF 1 für Versickerungsbecken 1	$r_{(15;10)}$ = 217,80	0,94	**986.240**	**927.066**	**20,19**	**49,31**	**98,62**
RBF 1a	$r_{(15;10)}$ = 217,80	0,94	817.883	768.810	16,74	40,89	81,79
RBF 1b	$r_{(15;10)}$ = 217,80	0,94	168.357	158.256	3,45	8,42	16,84
Retensionsbodenfilter RBF 2 für Versickerungsbecken 2	$r_{(15;10)}$ = 217,80	0,94	**776.662**	**730.062**	**15,90**	**38,83**	**77,67**
RBF 2a	$r_{(15;10)}$ = 217,80	0,94	513.075	482.291	10,50	25,65	51,31
RBF 2b	$r_{(15;10)}$ = 217,80	0,94	263.587	247.772	5,40	13,18	26,36
Retensionsbodenfilter RBF 3 für Versickerungsbecken 3	$r_{(15;10)}$ = 217,80	0,94	**976.080**	**917.515**	**19,98**	**48,80**	**97,61**
			2.738.982,00	**2.574.643,08**			

		RBF1	RBF1a	RBF1b	RBF2	RBF2a	RBF2b	RBF3
AF in m²	*Bodenfilteroberfläche*	6.668,25	5.529,94	1.138,31	5.251,23	3.469,05	1.782,19	6.599,56
B RBF,zu in kg/a	*mittlere jährliche Zulauffracht zum Retentionsbecken*	49.134	40.747	8.388	38.693	25.561	13.132	48.628
b krit in kg/m²*a	*zulässige mittl. jährl. spezif. Filterflächenbelastung bezogen auf Bodenfilterf*	7,00	7,00	7,00	7,00	7,00	7,00	7,00
n B soll	*erforderlicher mittlerer jährlicher Frachtrückhalt im RBF Becken*	0,95	0,95	0,95	0,95	0,95	0,95	0,95
Q Dr RBF	*Drosselabfluss des Filterkörpers in l/s*	333,41	276,50	56,92	262,56	173,45	89,11	329,98
q Dr RBF	*Drosselabflussspende in l/s*m²*	0,05	0,05	0,05	0,05	0,05	0,05	0,05
	Beckengeometrie							
	l in m	100,00	76,60	63,50	225,00	70,70	100,00	103,00
	b in m	66,70	72,22	17,92	23,35	49,07	18,25	64,08
	A in m²	6.670	5.532	1.138	5.254	3.469	1.825	6.600

aus DWA A178:

$$A_F = \frac{B_{RBF,zu}}{b_{krit}} \cdot \eta_{B,soll} \qquad (1)$$

mit

A_F	(m^2)	Bodenfilteroberfläche
$B_{RBF,zu}$	(kg/a)	mittlere jährliche Zulauffracht zum Retentionsbodenfilterbecken
b_{krit}	(kg/(m^2·a))	zulässige, mittlere jährliche spezifische Filterflächenbelastung bezogen auf die Bodenfilteroberfläche
$\eta_{B,soll}$	(–)	erforderlicher, mittlerer jährlicher Frachtrückhalt im Retentionsbodenfilterbecken

Die Ergebnisse der Retentionsfilterbemessung sind in der Unterlage 2.3 dargestellt. Zusätzliche Bemessungsparameter für die einzelnen Retentionsbodenfilter sind nachfolgend aufgeführt.

1. Retentionsbodenfilter 1a vor Versickerungsbecken 1:

- A Einzugsgebietsgröße RW-Teilnetz 1a: ca. 817.883,00 m² = 81,7883 ha
- $A_{E,b,a}$ befestigte angeschlossene Fläche: ca. 768.810,00 m² = 76,8810 ha (ψ = 0,94)
- A_F Größe Filteroberfläche (geschätzt): im Regelfall 75 m²/ha befestigte angeschlossene Fläche
- b_{spez_F} zulässige mittl. Filteroberflächenbelastung: 4 kg/(m² x a) ≤ b_F ≤ b_{krit} = 7 kg/(m² x a)
- $B_{AFS,F,zu}$ (mittlere) jährliche AFS_{fein} -Zulauffracht zum Bodenfilter = 530 kg/(ha x a) im Trennsystem
- η_F Wirkungsgrad RBF im Trennsystem = 0,95
- jährliche Niederschlagsmenge für Magdeburg – Ottersleben: 518,3 mm bzw. 518,3 l/m²*

Der Retentionsbodenfilter bildet eine Reinigungsstufe zur Behandlung des Niederschlagswassers. Die Bemessung erfolgt anhand der DWA-M 178.

1. Bemessung der Bodenfilteroberfläche

A_F = 5.532 m² (gewählt); B x L = 76,60 m * 72,22 m

$A_F = B_{AFS,F,zu} / b_{spez\_F} * \eta_F$ = 530 kg/(ha * a) x 76,881 ha / 7 kg/(m² * a) * 0,95 = $\underline{\underline{5.530\ m^2}}$

2. Berechnung des Drosselabflusses aus dem Filterbecken

$q_{Dr,RBF}$ = 0,05 l/(s*m²) im Trennsystem

mittlere Drosselabflussspende bezogen auf die Bodenfilteroberfläche unter Einhaltung der in der DWA-M 178 geforderten Korngrößenverteilung

$$Q_{Dr,RBF} = q_{Dr,RBF} * A_F = 0{,}05l/(s*m^2) * 5.532m^2 = \underline{\underline{276{,}60l/s}}$$

3. Festlegung der nutzbaren Tiefe u. Böschungsneigung im Retentionsraum

Tiefe h_{RBF} = 1,00 m (gewählt) – nutzbare Tiefe zw. Beckensohle RBF + OK Trenndamm RBF

Böschungsneigung Bn = 1 : 3

Das Porenvolumen sandiger Filtersubstrate kann pauschal zu 15 % des Speichervolumens herangezogen werden. Somit ergibt sich:

Retentionsvolumen: $V_{RBF} = \frac{A_F + A_O}{2} * h$ A_O = Fläche am Zulauf

$$V_{RBF} = \frac{A_F + [L + (h_{RBF} * n) * 2] * [B + (h_{RBF} * n) * 2]}{2} * h$$

$$V_{RBF} = \frac{5.532m^2 + [76{,}60m + (1{,}00m * 3) * 2] * [72{,}20m + (1{,}00m * 3) * 2]}{2} * 1{,}00m$$

$$V_{RBF} = \frac{5.530m^2 + 6.459{,}32m^2}{2} * 1{,}00m = \underline{\underline{5.994{,}66m^3}}$$ zzgl. 15 % des Filtervolumens:

$$V_{RBF} = \frac{4.466m^2 + [71{,}80m + (0{,}80m * 3) * 2] * [66{,}20m + (0{,}80m * 3) * 2]}{2} * 0{,}80m$$

$$V_{RBF} = \frac{4.466m^2 + 5.530m^2}{2} * 0{,}80m = 3.998{,}40\ m^3 x\ 0{,}15 = \underline{\underline{599{,}76m^3}}$$

$$V_{RBF} = 5.994{,}66\ m^3 + 599{,}76\ m^3 = \underline{\underline{6.594{,}42m^3\ Gesamtspeichervolumen\ im\ RBF}}$$

4. Berechnung des hydraulischen Filterdurchsatz

Für den Bereich südlich von Magdeburg - Ottersleben wird eine jährliche Niederschlagsmenge von ca. 518,3 mm bzw. 518,3 l/m²*a angegeben. Diese Werte wurden auf der Internetseite www.wetteronline.de als klimatische Angaben der Wetterstation für die Region Magdeburg abgerufen und bilden die Grundlage zur Ermittlung des Filterdurchsatzes.

- Jahresniederschlagsmenge: ~ 518,3 mm/a = 518,3 l/m²*a
- befestigte Fläche auf dem Gebiet: 76,881 ha

$$VQ_F = 76{,}8810ha * 0{,}5183m^3/m^2 * a = \underline{\underline{398.470m^3/a}}$$

5. Nachweis der hydraulischen Flächenbelastung

$$b_{spez\_F} = \frac{B_{AFS,F,zu}}{A_F} * \eta_{AFS\_F} = \frac{\frac{530kg}{ha*a}*76{,}881ha}{5.532m^2} * 0{,}95 = \underline{\underline{6{,}997kg/(m^2 * a)}}$$

$$b_{spez\_F} = 6{,}997kg/(m^2 * a) \leq 7\ kg/(m^2 * a)$$

6. Berechnung der Einstaudauer

bei Vollfüllung des Retentionsraumes

$$t_E = 2 * \frac{h}{k_f} = 2 * \frac{1{,}00m}{1{,}0 * 10^{-4}m/s} = 20.000s = \underline{\underline{5{,}55h}}$$

2. Retentionsbodenfilter 1b vor Versickerungsbecken 1:

- A Einzugsgebietsgröße RW-Teilnetz 1b: ca. 168.357,00 m² = 16,8357 ha
- $A_{E,b,a}$ befestigte angeschlossene Fläche: ca. 158.256,00 m² = 15,8256 ha (ψ = 0,94)
- A_F Größe Filteroberfläche (geschätzt): im Regelfall 75 m²/ha befestigte angeschlossene Fläche
- b_{spez_F} zulässige mittl. Filteroberflächenbelastung: 4 kg/(m² x a) ≤ b_F ≤ b_{krit} = 7 kg/(m² x a)
- $B_{AFS,F,zu}$ (mittlere) jährliche AFS_{fein} -Zulauffracht zum Bodenfilter = 530 kg/(ha x a) im Trennsystem
- η_F Wirkungsgrad RBF im Trennsystem = 0,95
- jährliche Niederschlagsmenge für Magdeburg – Ottersleben: 518,3 mm bzw. 518,3 l/m²*

Der Retentionsbodenfilter bildet eine Reinigungsstufe zur Behandlung des Niederschlagswassers. Die Bemessung erfolgt anhand der DWA-M 178.

1. Bemessung der Bodenfilteroberfläche

A_F = 1.141 m² (gewählt); B x L = 63,50 m * 17,92 m

A_F = $B_{AFS,F,zu}$ / b_{spez_F} * η_F = 530 kg/(ha * a) x 15,8256 ha / 7 kg/(m² * a) * 0,95 = 1.138 m²

2. Berechnung des Drosselabflusses aus dem Filterbecken

$q_{Dr,RBF}$ = 0,05 l/(s*m²) im Trennsystem

mittlere Drosselabflussspende bezogen auf die Bodenfilteroberfläche unter Einhaltung der in der DWA-M 178 geforderten Korngrößenverteilung

$$Q_{Dr,RBF} = q_{Dr,RBF} * A_F = 0{,}05l/(s * m^2) * 1.138m^2 = \underline{\underline{56{,}90\ l/s}}$$

3. Festlegung der nutzbaren Tiefe u. Böschungsneigung im Retentionsraum

Tiefe h_{RBF} = 1,00 m (gewählt) – nutzbare Tiefe zw. Beckensohle RBF + OK Trenndamm RBF

Böschungsneigung Bn = 1 : 3

Das Porenvolumen sandiger Filtersubstrate kann pauschal zu 15 % des Speichervolumens herangezogen werden. Somit ergibt sich:

Retentionsvolumen: $V_{RBF} = \frac{A_F + A_O}{2} * h$ A_O = Fläche am Zulauf

$$V_{RBF} = \frac{A_F + [L + (h_{RBF} * n) * 2] * [B + (h_{RBF} * n) * 2]}{2} * h$$

$$V_{RBF} = \frac{1.138m^2 + [63{,}50m + (1{,}00m * 3) * 2] * [17{,}92m + (1{,}00m * 3) * 2]}{2} * 1{,}00m$$

$$V_{RBF} = \frac{1.138m^2 + 1.662{,}44m^2}{2} * 1{,}00m = \underline{\underline{1.400{,}00m^3}}$$ zzgl. 15 % des Filtervolumens:

$$V_{RBF} = \frac{817m^2 + [58{,}70m + (0{,}80m * 3) * 2] * [13{,}12m + (0{,}80m * 3) * 2]}{2} * 0{,}80m$$

$$V_{RBF} = \frac{817m^2 + 1.138m^2}{2} * 0{,}80m = 782{,}00\, m^3 x\, 0{,}15 = \underline{\underline{117{,}30m^3}}$$

$$V_{RBF} = 1.400{,}00\, m^3 + 117{,}30\, m^3 = \underline{\underline{1.517{,}30m^3\ Gesamtspeichervolumen\ im\ RBF}}$$

4. Berechnung des hydraulischen Filterdurchsatz

Für den Bereich südlich von Magdeburg - Ottersleben wird eine jährliche Niederschlags-menge von ca. 518,3 mm bzw. 518,3 l/m²*a angegeben. Diese Werte wurden auf der Internetseite www.wetteronline.de als klimatische Angaben der Wetterstation für die Region Magdeburg abgerufen und bilden die Grundlage zur Ermittlung des Filterdurchsatzes.

- Jahresniederschlagsmenge: ~ 518,3 mm/a = 518,3 l/m²*a
- befestigte Fläche auf dem Gebiet: 15,8256 ha

$$VQ_F = 15{,}8256ha * 0{,}5183m^3/m^2 * a = \underline{\underline{82.024m^3/a}}$$

5. Nachweis der hydraulischen Flächenbelastung

$$b_{spez\_F} = \frac{B_{AFS,F,zu}}{A_F} * \eta_{AFS\_F} = \frac{\frac{530kg}{ha*a} 15{,}8256ha}{1.138\ ^2} * 0{,}95 = \underline{\underline{7{,}001kg/(m^2 * a)}}$$

$$b_{spez\_F} = 7{,}001kg/(m^2 * a) \leq 7\ kg/(m^2 * a)$$

6. Berechnung der Einstaudauer

bei Vollfüllung des Retentionsraumes

$$t_E = 2 * \frac{h}{k_f} = 2 * \frac{1{,}00m}{1{,}0 * 10^{-4} m/s} = 20.000s = \underline{\underline{5{,}55h}}$$

3. Retentionsbodenfilter 2a vor Versickerungsbecken 2:

- A Einzugsgebietsgröße RW-Teilnetz 2a: ca. 513.075,00 m² = 51,3075 ha
- $A_{E,b,a}$ befestigte angeschlossene Fläche: ca. 482.291,00 m² = 48,2291 ha (ψ = 0,94)
- A_F Größe Filteroberfläche (geschätzt): im Regelfall 75 m²/ha befestigte angeschlossene Fläche
- b_{spez_F} zulässige mittl. Filteroberflächenbelastung: 4 kg/(m² x a) ≤ b_F ≤ b_{krit} = 7 kg/(m² x a)
- $B_{AFS,F,zu}$ (mittlere) jährliche AFS_{fein} -Zulauffracht zum Bodenfilter = 530 kg/(ha x a) im Trennsystem
- η_F Wirkungsgrad RBF im Trennsystem = 0,95
- jährliche Niederschlagsmenge für Magdeburg – Ottersleben: 518,3 mm bzw. 518,3 l/m²*

Der Retentionsbodenfilter bildet eine Reinigungsstufe zur Behandlung des Niederschlagswassers. Die Bemessung erfolgt anhand der DWA-M 178.

1. Bemessung der Bodenfilteroberfläche

A_F = 3.469 m² (gewählt); B x L = 70,70 m * 49,07 m

A_F = $B_{AFS,F,zu}$ / b_{spez_F} * η_F = 530 kg/(ha * a) x 48,2291 ha / 7 kg/(m² * a) * 0,95 = 3.469 m²

2. Berechnung des Drosselabflusses aus dem Filterbecken

$q_{Dr,RBF}$ = 0,05 l/(s*m²) im Trennsystem

mittlere Drosselabflussspende bezogen auf die Bodenfilteroberfläche unter Einhaltung der in der DWA-M 178 geforderten Korngrößenverteilung

$$Q_{Dr,RBF} = q_{Dr,RBF} * A_F = 0{,}05 l/(s * m^2) * 3.469 m^2 = \underline{\underline{173{,}45\ l/s}}$$

3. Festlegung der nutzbaren Tiefe u. Böschungsneigung im Retentionsraum

Tiefe h_{RBF} = 1,00 m (gewählt) – nutzbare Tiefe zw. Beckensohle RBF + OK Trenndamm RBF

Böschungsneigung Bn = 1 : 3

Das Porenvolumen sandiger Filtersubstrate kann pauschal zu 15 % des Speichervolumens herangezogen werden. Somit ergibt sich:

Retentionsvolumen: $V_{RBF} = \frac{A_F + A_O}{2} * h$ A_O = Fläche am Zulauf

$$V_{RBF} = \frac{A_F + [L + (h_{RBF} * n) * 2] * [B + (h_{RBF} * n) * 2]}{2} * h$$

$$V_{RBF} = \frac{3.469 m^2 + [70{,}70 m + (1{,}00 m * 3) * 2] * [49{,}07 m + (1{,}00 m * 3) * 2]}{2} * 1{,}00 m$$

$$V_{RBF} = \frac{3.469 m^2 + 4.223{,}87 m^2}{2} * 1{,}00 m = \underline{\underline{3.846{,}44 m^3}}$$

zzgl. 15 % des Filtervolumens:

$$V_{RBF} = \frac{2.965 m^2 + [65{,}90 m + (0{,}80 m * 3) * 2] * [44{,}27 m + (0{,}80 m * 3) * 2]}{2} * 0{,}80 m$$

$$V_{RBF} = \frac{2.965 m^2 + 3.469 m^2}{2} * 0{,}80 m = 2.573{,}60\ m^3 x\ 0{,}15 = \underline{\underline{386{,}04 m^3}}$$

$$V_{RBF} = 3.846{,}44\ m^3 + 386{,}04\ m^3 = \underline{\underline{4.232{,}48 m^3\ Gesamtspeichervolumen\ im\ RBF}}$$

4. Berechnung des hydraulischen Filterdurchsatz

Für den Bereich südlich von Magdeburg - Ottersleben wird eine jährliche Niederschlagsmenge von ca. 518,3 mm bzw. 518,3 l/m²*a angegeben. Diese Werte wurden auf der Internetseite www.wetteronline.de als klimatische Angaben der Wetterstation für die Region Magdeburg abgerufen und bilden die Grundlage zur Ermittlung des Filterdurchsatzes.

- Jahresniederschlagsmenge: ~ 518,3 mm/a = 518,3 l/m²*a
- befestigte Fläche auf dem Gebiet: 48,2291 ha

$$VQ_F = 48{,}2291ha * 0{,}5183m^3/m^2 * a = \underline{\underline{249.971m^3/a}}$$

5. Nachweis der hydraulischen Flächenbelastung

$$b_{spez\_F} = \frac{B_{AFS,F,zu}}{A_F} * \eta_{AFS\_F} = \frac{\frac{530kg}{ha*a}48{,}2291h}{3.469m^2} * 0{,}95 = \underline{\underline{7{,}000kg/(m^2 * a)}}$$

$$b_{spez\_F} = 7{,}000kg/(m^2 * a) \leq 7\ kg/(m^2 * a)$$

6. Berechnung der Einstaudauer

bei Vollfüllung des Retentionsraumes

$$t_E = 2 * \frac{h}{k_f} = 2 * \frac{1{,}00m}{1{,}0 * 10^{-4}m/s} = 20.000s = \underline{\underline{5{,}55h}}$$

4. Retentionsbodenfilter 2b vor Versickerungsbecken 2:

- A Einzugsgebietsgröße RW-Teilnetz 2b: ca. 263.587,00 m² = 26,3587 ha
- $A_{E,b,a}$ befestigte angeschlossene Fläche: ca. 247.772,00 m² = 24,7772 ha (ψ = 0,94)
- A_F Größe Filteroberfläche (geschätzt): im Regelfall 75 m²/ha befestigte angeschlossene Fläche
- b_{spez_F} zulässige mittl. Filteroberflächenbelastung: 4 kg/(m² x a) ≤ b_F ≤ b_{krit} = 7 kg/(m² x a)
- $B_{AFS,F,zu}$ (mittlere) jährliche AFS_{fein} -Zulauffracht zum Bodenfilter = 530 kg/(ha x a) im Trennsystem
- η_F Wirkungsgrad RBF im Trennsystem = 0,95
- jährliche Niederschlagsmenge für Magdeburg – Ottersleben: 518,3 mm bzw. 518,3 l/m²*

Der Retentionsbodenfilter bildet eine Reinigungsstufe zur Behandlung des Niederschlagswassers. Die Bemessung erfolgt anhand der DWA-M 178.

1. Bemessung der Bodenfilteroberfläche

A_F = 1.782 m² (gewählt); B x L = 100,00 m * 18,25 m

A_F = $B_{AFS,F,zu}$ / b_{spez_F} * η_F = 530 kg/(ha * a) x 24,7772 ha / 7 kg/(m² * a) * 0,95 = 1.782 m²

2. Berechnung des Drosselabflusses aus dem Filterbecken

$q_{Dr,RBF}$ = 0,05 l/(s*m²) im Trennsystem

mittlere Drosselabflussspende bezogen auf die Bodenfilteroberfläche unter Einhaltung der in der DWA-M 178 geforderten Korngrößenverteilung

$$Q_{Dr,RBF} = q_{Dr,RBF} * A_F = 0{,}05l/(s * m^2) * 1.782m^2 = \underline{\underline{89{,}11\ l/s}}$$

3. Festlegung der nutzbaren Tiefe u. Böschungsneigung im Retentionsraum

Tiefe h_{RBF} = 1,00 m (gewählt) – nutzbare Tiefe zw. Beckensohle RBF + OK Trenndamm RBF

Böschungsneigung Bn = 1 : 3

Das Porenvolumen sandiger Filtersubstrate kann pauschal zu 15 % des Speichervolumens herangezogen werden. Somit ergibt sich:

Retentionsvolumen: $V_{RBF} = \frac{A_F + A_O}{2} * h$ A_O = Fläche am Zulauf

$$V_{RBF} = \frac{A_F + [L + (h_{RBF} * n) * 2] * [B + (h_{RBF} * n) * 2]}{2} * h$$

$$V_{RBF} = \frac{1.825m^2 + [100{,}00m + (1{,}00m * 3) * 2] * [18{,}25m + (1{,}00m * 3) * 2]}{2} * 1{,}00m$$

$$V_{RBF} = \frac{1.825m^2 + 2.570{,}50m^2}{2} * 1{,}00m = \underline{\underline{2.197{,}85m^3}}$$ zzgl. 15 % des Filtervolumens:

$$V_{RBF} = \frac{1.293m^2 + [95{,}20m + (0{,}80m * 3) * 2] * [13{,}45m + (0{,}80m * 3) * 2}{2} * 0{,}80m$$

$$V_{RBF} = \frac{1.293m^2 + 1.825m^2}{2} * 0{,}80m = 1.247{,}20\ m^3 x\ 0{,}15 = \underline{\underline{187{,}08m^3}}$$

$$V_{RBF} = 2.197{,}85\ m^3 + 187{,}08\ m^3 = \underline{\underline{2.384{,}93m^3\ Gesamtspeichervolumen\ im\ RBF}}$$

4. Berechnung des hydraulischen Filterdurchsatz

Für den Bereich südlich von Magdeburg - Ottersleben wird eine jährliche Niederschlags-menge von ca. 518,3 mm bzw. 518,3 l/m²*a angegeben. Diese Werte wurden auf der Internetseite www.wetteronline.de als klimatische Angaben der Wetterstation für die Region Magdeburg abgerufen und bilden die Grundlage zur Ermittlung des Filterdurchsatzes.

- Jahresniederschlagsmenge: ~ 518,3 mm/a = 518,3 l/m²*a
- befestigte Fläche auf dem Gebiet: 24,7772 ha

$$VQ_F = 24{,}7772ha * 0{,}5183m^3/m^2 * a = \underline{\underline{128.420{,}23m^3/a}}$$

5. Nachweis der hydraulischen Flächenbelastung

$$b_{spez\_F} = \frac{B_{AFS,F,zu}}{A_F} * \eta_{AFS\_F} = \frac{\frac{530kg}{ha*a}24{,}7772h}{1.825m^2} * 0{,}95 = \underline{\underline{6{,}836kg/(m^2 * a)}}$$

$$b_{spez\_F} = 6{,}835kg/(m^2 * a) \leq 7\ kg/(m^2 * a)$$

6. Berechnung der Einstaudauer

bei Vollfüllung des Retentionsraumes

$$t_E = 2 * \frac{h}{k_f} = 2 * \frac{1{,}00m}{1{,}0 * 10^{-4}m/s} = 20.000s = \underline{\underline{5{,}55h}}$$

5. Retentionsbodenfilter 3 vor Versickerungsbecken 3:

- A Einzugsgebietsgröße RW-Teilnetz 3: ca. 976.080,00 m² = 97,6080 ha
- $A_{E,b,a}$ befestigte angeschlossene Fläche: ca. 917.515,00 m² = 91,7515 ha (ψ = 0,94)
- A_F Größe Filteroberfläche (geschätzt): im Regelfall 75 m²/ha befestigte angeschlossene Fläche
- b_{spez_F} zulässige mittl. Filteroberflächenbelastung: 4 kg/(m² x a) ≤ b_F ≤ b_{krit} = 7 kg/(m² x a)
- $B_{AFS,F,zu}$ (mittlere) jährliche AFS_{fein} -Zulauffracht zum Bodenfilter = 530 kg/(ha x a) im Trennsystem
- η_F Wirkungsgrad RBF im Trennsystem = 0,95
- jährliche Niederschlagsmenge für Magdeburg – Ottersleben: 518,3 mm bzw. 518,3 l/m²*

Der Retentionsbodenfilter bildet eine Reinigungsstufe zur Behandlung des Niederschlagswassers. Die Bemessung erfolgt anhand der DWA-M 178.

1. Bemessung der Bodenfilteroberfläche

A_F = 6.600 m² (gewählt); B x L = 103,00 m * 64,08 m

A_F = $B_{AFS,F,zu}$ / b_{spez_F} * η_F = 530 kg/(ha * a) x 91,7515 ha / 7 kg/(m² * a) * 0,95 = 6.600 m²

2. Berechnung des Drosselabflusses aus dem Filterbecken

$q_{Dr,RBF}$ = 0,05 l/(s*m²) im Trennsystem

mittlere Drosselabflussspende bezogen auf die Bodenfilteroberfläche unter Einhaltung der in der DWA-M 178 geforderten Korngrößenverteilung

$$Q_{Dr,RBF} = q_{Dr,RBF} * A_F = 0{,}05 l/(s * m^2) * 6.600 m^2 = \underline{\underline{330{,}00\ l/s}}$$

3. Festlegung der nutzbaren Tiefe u. Böschungsneigung im Retentionsraum

Tiefe h_{RBF} = 1,00 m (gewählt) – nutzbare Tiefe zw. Beckensohle RBF + OK Trenndamm RBF

Böschungsneigung Bn = 1 : 3

Das Porenvolumen sandiger Filtersubstrate kann pauschal zu 15 % des Speichervolumens herangezogen werden. Somit ergibt sich:

Retentionsvolumen: $V_{RBF} = \frac{A_F + A_O}{2} * h$ A_O = Fläche am Zulauf

$$V_{RBF} = \frac{A_F + [L + (h_{RBF} * n) * 2] * [B + (h_{RBF} * n) * 2]}{2} * h$$

$$V_{RBF} = \frac{6.600 m^2 + [103{,}00 m + (1{,}05 m * 3) * 2] * [64{,}08 m + (1{,}05 m * 3) * 2]}{2} * 1{,}00 m$$

$$V_{RBF} = \frac{6.600 m^2 + 7.692{,}53 m^2}{2} * 1{,}05 m = \underline{\underline{7.503{,}58 m^3}}$$ zzgl. 15 % des Filtervolumens:

$$V_{RBF} = \frac{5.857 m^2 + [98{,}20 m + (0{,}80 m * 3) * 2] * [59{,}28 m + (0{,}80 m * 3) * 2}{2} * 0{,}80 m$$

$$V_{RBF} = \frac{5.857 m^2 + 6.600 m^2}{2} * 0{,}80 m = 4.982{,}80\ m^3 x\ 0{,}15 = \underline{\underline{747{,}42 m^3}}$$

$$V_{RBF} = 7.503{,}58\ m^3 + 747{,}42\ m^3 = \underline{\underline{8.251{,}00 m^3\ Gesamtspeichervolumen\ im\ RBF}}$$

4. Berechnung des hydraulischen Filterdurchsatz

Für den Bereich südlich von Magdeburg - Ottersleben wird eine jährliche Niederschlagsmenge von ca. 518,3 mm bzw. 518,3 l/m²*a angegeben. Diese Werte wurden auf der Internetseite www.wetteronline.de als klimatische Angaben der Wetterstation für die Region Magdeburg abgerufen und bilden die Grundlage zur Ermittlung des Filterdurchsatzes.

- Jahresniederschlagsmenge: ~ 518,3 mm/a = 518,3 l/m²*a

- befestigte Fläche auf dem Gebiet: 91,7515 ha

$$VQ_F = 91{,}7515 ha * 0{,}5183 m^3/m^2 * a = \underline{\underline{475.548{,}02 m^3/a}}$$

5. Nachweis der hydraulischen Flächenbelastung

$$b_{spez\_F} = \frac{B_{AFS,F,zu}}{A_F} * \eta_{AFS\_F} = \frac{\frac{530kg}{ha*a} 91{,}7515 ha}{6.600 m^2} * 0{,}95 = \underline{\underline{6{,}999 kg/(m^2 * a)}}$$

$$b_{spez\_F} = 6{,}999 kg/(m^2 * a) \leq 7\ kg/(m^2 * a)$$

6. Berechnung der Einstaudauer

bei Vollfüllung des Retentionsraumes

$$t_E = 2 * \frac{h}{k_f} = 2 * \frac{1{,}05m}{1{,}0 * 10^{-4} m/s} = 21.000 s = \underline{\underline{5{,}83h}}$$

Anhang A. Berechnungen

A.1: MicroDrainage Modell Nomenklatur

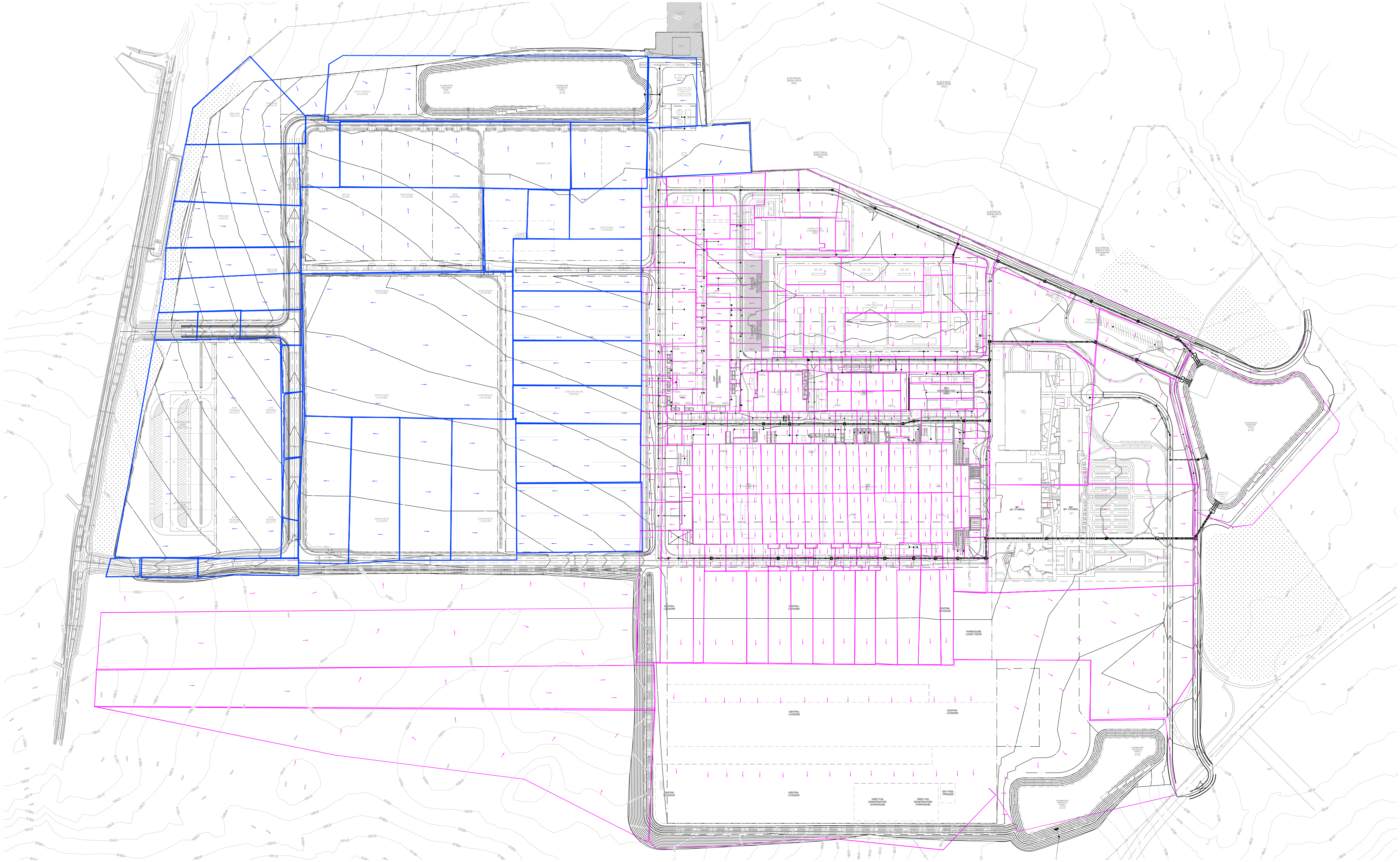
A.2: Berechnungen zur Netzdimensionierung für die Bereiche 1, 3 und 4

A.3: Berechnungen zur Netzdimensionierung für den Bereich 2

A.1: MicroDrainage Modell Nomenklatur

Term	Description
PN	Model allocated pipe number / Modell zugeordnete Rohrnummer
Length (m)	Length of pipe run in metres / Länge der Rohrleitung in Metern
Fall (m)	Difference in height between inlet and outlet of pipe in metres / Höhenunterschied zwischen Einlass und Auslass der Leitung in Metern
Slope (1:X)	Gradient of pipe / Gefälle
I.Area (ha)	Area of inflow into the network directly to the pipe measured in hectares / Fläche des Zuflusses in das Netz direkt zur Leitung, gemessen in Hektar
T.E. (mins)	Time of entry of rainfall from subcatchment into the drainage network measured in minutes / Zeit des Eintritts der Niederschläge aus dem Teileinzugsgebiet in das Entwässerungsnetz, gemessen in Minuten
Base Flow (l/s)	Flow-rate artificially added to the pipe in litres per second. / Durchflussmenge, die der Leitung künstlich zugeführt wird, in Litern pro Sekunde. Not applicable for this project. / Für dieses Projekt nicht anwendbar.
K (mm)	Pipe roughness measured in millimetres / Rohrrauhigkeit gemessen in Millimetern
HYD SECT	Symbolic cross-section of pipe or conduit. Typical examples are: Symbolischer Querschnitt eines Rohrs oder einer Leitung. Typische Beispiele sind: - o – for a pipe / Rohr - |_| - for a ditch / Graben - 1000[] – for a 1-metre-high culvert / für einen 1 Meter hohen Kastendurchlass
DIA (mm)	Diameter of a pipe or width of a ditch or culvert in millimetres / Durchmesser eines Rohrs oder Breite eines Grabens oder Durchlasses in Millimetern
Section Type	Text description of pipe or conduit type / Textbeschreibung des Rohr- oder Kanaltyps
Auto Design	Indication if MicroDrainage was able to auto design sewer network based on design rules. Green padlock symbol allows auto design and the red padlock prevents auto design. Zeigt an, ob MicroDrainage in der Lage war, das Kanalnetz auf der Grundlage der Entwurfsregeln automatisch zu entwerfen. Das grüne Vorhängeschloss-Symbol

	erlaubt die automatische Planung und das rote Vorhängeschloss verhindert die automatische Planung.
Rain (mm/hr)	Maximum design rainfall intensity in millimetres per hour. (1 l/s/ha = 0.36 mm/hr) / Maximale Bemessungsregenstärke in Millimetern pro Stunde. (1 l/s/ha = 0,36 mm/hr)
T.C. (mins)	Time of concentration in minutes / Zeit der Konzentration in Minuten.
US/IL (m)	Upstream invert level of the pipe in metres from datum level. / Stromaufwärts gelegene Sohle der Rohrleitung in Metern ab Bezugsebene.
Σ I.Area (ha)	Total area of inflow upstream of the pipe in hectares / Gesamtfläche des Zuflusses flussaufwärts der Leitung in Hektar
Σ Base Flow (l/s)	Total flow-rate artificially added to model upstream of the pipe in litres per second. / Gesamtdurchflussmenge, die dem Modell stromaufwärts der Leitung künstlich hinzugefügt wird, in Litern pro Sekunde. Not applicable for this project. / Für dieses Projekt nicht anwendbar.
Foul (l/s)	Foul flow-rate artificially added to the pipe in litres per second. / künstlich in die Leitung eingeleitete Abwassermenge in Litern pro Sekunde. Not applicable for this project. / Für dieses Projekt nicht anwendbar.
Add Flow (l/s)	Flow-rate artificially added to the pipe in litres per second. / Durchflussmenge, die der Leitung künstlich zugeführt wird, in Litern pro Sekunde. Not applicable for this project. / Für dieses Projekt nicht anwendbar.
Vel (m/s)	Velocity of flow within pipe in metres per second. / Fließgeschwindigkeit im Rohr in Metern pro Sekunde.
Cap (l/s)	Calculated capacity of the pipe in litres per second / Berechnete Kapazität des Rohrs in Litern pro Sekunde
Flow (l/s)	Calculated flow-rate required to be conveyed by pipe in ltres per second / Berechnete Durchflussmenge, die durch das Rohr befördert werden muss, in Liter pro Sekunde



LEGEND

PHASE 1 STORMDRAIN SYSTEM DRAINAGE AREA

PHASE 3 STORMDRAIN SYSTEM DRAINAGE AREA

FLOW ARROW PHASE 1

FLOW ARROW PHASE 3

NOTES:

1. SUB-CATCHMENT PLAN IS BASED ON CURRENT SP02 DESIGN.
2. SUB-CATCHMENT PLANS SUBJECT TO CHANGE BASED ON RESULTS OF PROGRAMMING AND FINAL GRADING DESIGN (SPO8).

N.T.S.

INTEL MAGDEBURG

ADA Lovelace Chaussee, 39116 Magdeburg, Germany

STORM DRAINAGE REPORT - SUBCATCHMENT PLAN

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27/Nov/23 7:52:32 AM

Jacobs Engineering Limited		Page 1
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Date 9/6/2023 4:06 PM File PHASE1_V17.MDX	Designed by Craig Lashford Checked by Chris Newton	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Rational Method

Design Criteria for Phase 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

IDF File	IDF	Add Flow / Climate Change (%)	10
Maximum Rainfall (mm/hr)	200	Minimum Backdrop Height (m)	0.200
Maximum Time of Concentration (mins)	30	Maximum Backdrop Height (m)	1.500
Foul Sewage (l/s/ha)	0.000	Min Design Depth for Optimisation (m)	1.200
		Min Vel for Auto Design only (m/s)	1.00
PIMP (%)	100	Min Slope for Optimisation (1:X)	750

Designed with Level Soffits

Network Design Table for Phase 1

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S637.000	21.002	0.087	240.6	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	
S637.001	29.717	0.124	240.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S637.002	41.262	0.055	750.0	1.064	0.00	0.0	0.600	o	900	Pipe/Conduit	
S637.003	39.555	0.483	81.9	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S637.004	11.168	0.081	137.7	0.510	0.00	0.0	0.600	o	900	Pipe/Conduit	
S637.005	54.072	0.236	228.7	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S637.006	46.526	0.209	222.6	0.673	0.00	0.0	0.600	o	1000	Pipe/Conduit	
S637.007	42.571	0.215	198.2	0.613	0.00	0.0	0.600	o	1000	Pipe/Conduit	
S637.008	99.889	0.133	750.0	0.277	0.00	0.0	0.600	o	1400	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S637.000	200.00	5.35	94.073	0.000	0.0	0.0	0.0	1.01	71.3	0.0
S637.001	200.00	5.84	93.986	0.000	0.0	0.0	0.0	1.01	71.3	0.0
S637.002	200.00	6.44	93.262	1.064	0.0	0.0	59.1	1.14	722.8	650.2
S637.003	200.00	6.63	93.207	1.064	0.0	0.0	59.1	3.46	2203.2	650.2
S637.004	200.00	6.70	92.724	1.574	0.0	0.0	87.4	2.67	1697.5	961.7
S637.005	200.00	7.14	92.643	1.574	0.0	0.0	87.4	2.07	1315.4	961.7
S637.006	200.00	7.49	92.307	2.248	0.0	0.0	124.8	2.24	1757.1	1373.1
S637.007	200.00	7.78	92.098	2.861	0.0	0.0	158.9	2.37	1863.0	1747.8
S637.008	200.00	8.90	91.483	3.138	0.0	0.0	174.3	1.49	2299.3	1916.9

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S638.000	35.665	0.148	240.6	0.086	5.00	0.0	0.600	o	300	Pipe/Conduit	
S638.001	21.672	0.047	462.4	0.164	0.00	0.0	0.600	o	500	Pipe/Conduit	
S638.002	43.859	0.076	578.3	0.123	0.00	0.0	0.600	o	600	Pipe/Conduit	
S638.003	20.422	0.027	750.0	0.430	0.00	0.0	0.600	o	800	Pipe/Conduit	
S638.004	23.985	0.032	750.0	0.043	0.00	0.0	0.600	o	800	Pipe/Conduit	
S638.005	54.473	0.079	691.8	0.058	0.00	0.0	0.600	o	800	Pipe/Conduit	
S638.006	55.021	0.077	716.8	0.112	0.00	0.0	0.600	o	900	Pipe/Conduit	
S638.007	16.488	0.077	214.4	0.116	0.00	0.0	0.600	o	900	Pipe/Conduit	
S638.008	24.483	0.096	254.2	0.044	0.00	0.0	0.600	o	900	Pipe/Conduit	
S638.009	77.897	0.104	750.0	0.431	0.00	0.0	0.600	o	1100	Pipe/Conduit	
S637.009	61.758	0.082	750.0	0.528	0.00	0.0	0.600	o	1600	Pipe/Conduit	
S639.000	22.553	0.092	245.4	0.197	5.00	0.0	0.600	o	400	Pipe/Conduit	
S639.001	30.574	0.179	171.1	0.125	0.00	0.0	0.600	o	500	Pipe/Conduit	
S639.002	17.055	0.031	553.8	0.150	0.00	0.0	0.600	o	600	Pipe/Conduit	
S639.003	13.134	0.018	750.0	0.261	0.00	0.0	0.600	o	800	Pipe/Conduit	
S639.004	30.659	0.041	750.0	0.231	0.00	0.0	0.600	o	900	Pipe/Conduit	
S639.005	18.963	0.025	750.0	0.270	0.00	0.0	0.600	o	1000	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S638.000	200.00	5.59	93.521	0.086	0.0	0.0	4.8	1.01	71.3	52.3
S638.001	200.00	5.95	93.173	0.249	0.0	0.0	13.8	1.00	197.1	152.3
S638.002	200.00	6.68	93.026	0.373	0.0	0.0	20.7	1.01	284.3	227.7
S638.003	200.00	7.00	92.750	0.803	0.0	0.0	44.6	1.06	530.7	490.7
S638.004	200.00	7.38	92.723	0.846	0.0	0.0	47.0	1.06	530.7	516.8
S638.005	200.00	8.20	92.691	0.904	0.0	0.0	50.2	1.10	552.8	552.1
S638.006	200.00	8.99	92.512	1.016	0.0	0.0	56.4	1.16	739.6	620.4
S638.007	200.00	9.12	92.435	1.131	0.0	0.0	62.8	2.14	1358.8	691.2
S638.008	200.00	9.33	92.358	1.175	0.0	0.0	65.3	1.96	1247.2	718.0
S638.009	200.00	10.34	92.062	1.606	0.0	0.0	89.2	1.29	1223.1	981.4
S637.009	200.00	10.97	91.150	5.272	0.0	0.0	292.8	1.62	3259.9	3221.1
S639.000	200.00	5.31	93.248	0.197	0.0	0.0	10.9	1.20	150.8	120.3
S639.001	200.00	5.62	93.056	0.322	0.0	0.0	17.9	1.66	325.5	196.8
S639.002	200.00	5.90	92.777	0.472	0.0	0.0	26.2	1.03	290.6	288.7
S639.003	200.00	6.10	92.546	0.734	0.0	0.0	40.7	1.06	530.7	448.1
S639.004	200.00	6.55	92.429	0.964	0.0	0.0	53.6	1.14	722.8	589.1
S639.005	200.00	6.81	92.288	1.234	0.0	0.0	68.5	1.21	952.8	753.9

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S639.006	30.489	0.041	750.0	0.234	0.00	0.0	0.600	o	1000	Pipe/Conduit	
S639.007	11.589	0.015	750.0	0.286	0.00	0.0	0.600	o	1100	Pipe/Conduit	
S639.008	30.392	0.041	750.0	0.232	0.00	0.0	0.600	o	1100	Pipe/Conduit	
S639.009	30.319	0.040	750.0	0.185	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S639.010	41.440	0.055	750.0	0.133	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S639.011	28.987	0.039	750.0	0.180	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S637.010	38.242	0.051	750.0	0.000	0.00	0.0	0.600	o	2000	Pipe/Conduit	
S637.011	75.000	0.100	750.0	0.631	0.00	0.0	0.600	o	2000	Pipe/Conduit	
S637.012	66.367	0.088	754.2	1.491	0.00	0.0	0.600	2100 []	2100	2100 Culvert	
S637.013	92.084	0.123	748.7	1.036	0.00	0.0	0.600	2100 []	2100	2100 Culvert	
S637.014	91.631	0.122	750.0	2.551	0.00	0.0	0.600	2100 []	2400	2100 Culvert	
S637.015	85.686	0.114	750.0	0.000	0.00	0.0	0.600	2100 []	2400	2100 Culvert	
S640.000	43.000	0.074	577.5	0.416	5.00	0.0	0.600	o	600	Pipe/Conduit	
S640.001	43.000	0.275	156.5	0.498	0.00	0.0	0.600	o	700	Pipe/Conduit	
S640.002	86.000	0.115	750.0	0.455	0.00	0.0	0.600	o	1000	Pipe/Conduit	
S640.003	127.157	0.170	750.0	1.619	0.00	0.0	0.600	o	1300	Pipe/Conduit	
S640.004	166.844	0.222	750.0	0.000	0.00	0.0	0.600	o	1300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S639.006	200.00	7.23	92.263	1.468	0.0	0.0	81.5	1.21	952.8	896.6
S639.007	200.00	7.38	92.122	1.754	0.0	0.0	97.4	1.29	1223.1	1071.3
S639.008	200.00	7.78	92.106	1.986	0.0	0.0	110.3	1.29	1223.1	1213.3
S639.009	200.00	8.15	91.966	2.171	0.0	0.0	120.6	1.36	1536.1	1326.3
S639.010	200.00	8.66	91.926	2.304	0.0	0.0	128.0	1.36	1536.1	1407.8
S639.011	200.00	9.01	91.870	2.484	0.0	0.0	138.0	1.36	1536.1	1517.5
S637.010	200.00	11.31	90.667	7.756	0.0	0.0	430.8	1.86	5838.8	4738.6
S637.011	200.00	11.99	90.616	8.388	0.0	0.0	465.8	1.86	5838.8	5124.3
S637.012	200.00	12.55	90.516	9.878	0.0	0.0	548.6	1.95	8084.5	6035.0
S637.013	200.00	13.34	90.428	10.915	0.0	0.0	606.2	1.96	8114.5	6668.2
S637.014	200.00	14.09	90.305	13.465	0.0	0.0	747.9	2.03	9621.6	8226.5
S637.015	200.00	14.80	90.183	13.465	0.0	0.0	747.9	2.03	9621.6	8226.5
S640.000	200.00	5.71	93.922	0.416	0.0	0.0	23.1	1.01	284.5	254.3
S640.001	200.00	6.05	93.747	0.915	0.0	0.0	50.8	2.14	823.9	558.9
S640.002	200.00	7.23	93.172	1.370	0.0	0.0	76.1	1.21	952.8	836.9
S640.003	200.00	8.71	92.758	2.989	0.0	0.0	166.0	1.43	1894.1	1826.2
S640.004	200.00	10.66	92.588	2.989	0.0	0.0	166.0	1.43	1894.1	1826.2

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S641.000	118.311	0.602	196.6	0.395	5.00	0.0	0.600	o	500	Pipe/Conduit	
S641.001	82.000	0.109	750.0	0.586	0.00	0.0	0.600	o	900	Pipe/Conduit	
S641.002	92.339	0.123	750.0	0.780	0.00	0.0	0.600	o	1100	Pipe/Conduit	
S642.000	120.192	0.602	199.5	0.274	5.00	0.0	0.600	o	400	Pipe/Conduit	
S642.001	84.765	0.201	422.0	0.273	0.00	0.0	0.600	o	700	Pipe/Conduit	
S642.002	91.544	0.122	750.0	0.982	0.00	0.0	0.600	o	1000	Pipe/Conduit	
S642.003	63.002	0.084	750.0	0.411	0.00	0.0	0.600	o	1100	Pipe/Conduit	
S641.003	48.466	0.065	750.0	0.203	0.00	0.0	0.600	o	1500	Pipe/Conduit	
S640.005	39.333	0.052	750.0	0.602	0.00	0.0	0.600	o	2000	Pipe/Conduit	
S637.016	85.686	0.415	206.7	0.508	0.00	0.0	0.600	2100 []	2100	2100 Culvert	
S643.000	63.755	0.265	240.6	0.035	5.00	0.0	0.600	o	300	Pipe/Conduit	
S643.001	43.308	2.525	17.2	0.097	0.00	0.0	0.600	o	300	Pipe/Conduit	
S637.017	100.003	0.133	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S637.018	101.200	0.135	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S641.000	200.00	6.28	92.850	0.395	0.0	0.0	21.9	1.55	303.5	241.3
S641.001	200.00	7.48	91.848	0.981	0.0	0.0	54.5	1.14	722.8	599.4
S641.002	200.00	8.67	91.539	1.761	0.0	0.0	97.8	1.29	1223.1	1075.9
S642.000	200.00	6.50	93.589	0.274	0.0	0.0	15.2	1.33	167.5	167.1
S642.001	200.00	7.59	92.687	0.547	0.0	0.0	30.4	1.30	499.8	333.9
S642.002	200.00	8.85	92.186	1.528	0.0	0.0	84.9	1.21	952.8	933.8
S642.003	200.00	9.66	91.964	1.939	0.0	0.0	107.7	1.29	1223.1	1184.6
S641.003	200.00	10.18	91.016	3.903	0.0	0.0	216.8	1.56	2753.9	2384.6
S640.005	200.00	11.02	90.451	7.494	0.0	0.0	416.2	1.86	5838.8	4578.4
S637.016	200.00	15.18	90.069	21.468	0.0	0.0	1192.3	3.73	15490.4	13115.4
S643.000	200.00	6.05	94.145	0.035	0.0	0.0	1.9	1.01	71.3	21.4
S643.001	200.00	6.24	93.880	0.132	0.0	0.0	7.3	3.81	269.6	80.8
S637.017	200.00	15.94	89.654	21.600	0.0	0.0	1199.7	2.20	14227.8	13196.2
S637.018	200.00	16.71	89.521	21.600	0.0	0.0	1199.7	2.20	14227.8	13196.2

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S637.019	98.656	0.132	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S637.020	48.495	0.065	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S644.000	89.983	0.513	175.6	0.230	5.00	0.0	0.600	o	400	Pipe/Conduit	
S644.001	58.149	0.109	531.9	0.254	0.00	0.0	0.600	o	600	Pipe/Conduit	
S637.021	55.285	0.074	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S637.022	49.623	0.066	750.0	1.744	0.00	0.0	0.600	2100 []	3600	2100 Culvert	
S637.023	0.500#	0.001	750.0	0.000	0.00	0.0	0.600	2100 []	3600	2100 Culvert	
S645.000	96.835	1.200	80.7	5.417	5.00	0.0	0.600	o	1100	Pipe/Conduit	
S645.001	37.392	0.294	127.0	0.000	0.00	0.0	0.600	o	1200	Pipe/Conduit	
S645.002	61.097	0.081	750.0	0.000	0.00	0.0	0.600	o	1800	Pipe/Conduit	
S645.003	51.978	0.069	750.0	0.000	0.00	0.0	0.600	o	1800	Pipe/Conduit	
S645.004	42.628	0.122	350.0	4.178	0.00	0.0	0.600	o	1800	Pipe/Conduit	
S646.000	48.825	0.140	350.0	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	
S645.005	25.127	0.134	187.5	0.152	0.00	0.0	0.600	2100 []	2100	2100 Culvert	
S645.006	0.500#	0.083	6.0	0.000	0.00	0.0	0.600	2100 []	2100	2100 Culvert	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S637.019	200.00	17.45	89.386	21.600	0.0	0.0	1199.7	2.20	14227.8	13196.2
S637.020	200.00	17.82	89.255	21.600	0.0	0.0	1199.7	2.20	14227.8	13196.2
S644.000	200.00	6.06	91.857	0.230	0.0	0.0	12.8	1.42	178.6	140.6
S644.001	200.00	6.98	91.145	0.485	0.0	0.0	26.9	1.05	296.6	296.0
S637.021	200.00	18.24	89.190	22.084	0.0	0.0	1226.6	2.20	14227.8	13492.3
S637.022	200.00	18.61	89.116	23.829	0.0	0.0	1323.5	2.24	15826.3	14558.0
S637.023	200.00	18.61	89.050	23.829	0.0	0.0	1323.5	2.24	15826.3	14558.0
S645.000	200.00	5.41	92.718	5.417	0.0	0.0	300.9	3.95	3753.2	3309.4
S645.001	200.00	5.60	91.418	5.417	0.0	0.0	300.9	3.32	3753.7	3309.4
S645.002	200.00	6.18	90.523	5.417	0.0	0.0	300.9	1.74	4434.5	3309.4
S645.003	200.00	6.68	90.442	5.417	0.0	0.0	300.9	1.74	4434.5	3309.4
S645.004	200.00	6.96	90.373	9.595	0.0	0.0	532.9	2.56	6506.5	5861.8
S646.000	200.00	5.97	91.782	0.000	0.0	0.0	0.0	0.83	59.0	0.0
S645.005	200.00	7.06	89.943	9.747	0.0	0.0	541.3	3.92	16266.8	5954.7
S645.006	200.00	7.06	89.809	9.747	0.0	0.0	541.3	21.98	91215.2	5954.7

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S647.000	83.664	0.118	706.7	0.593	5.00	0.0	0.600	o	700	Pipe/Conduit	
S647.001	18.402	0.188	98.1	1.129	0.00	0.0	0.600	o	800	Pipe/Conduit	
S647.002	19.535	0.026	750.0	0.000	0.00	0.0	0.600	o	1100	Pipe/Conduit	
S647.003	42.496	0.057	750.0	1.558	0.00	0.0	0.600	o	1400	Pipe/Conduit	
S647.004	4.892	0.007	750.0	0.849	0.00	0.0	0.600	1000 []	1900	1000 Culvert	
S647.005	17.052	0.023	750.0	0.000	0.00	0.0	0.600	1000 []	1900	1000 Culvert	
S647.006	31.244	0.042	750.0	0.485	0.00	0.0	0.600	1000 []	2200	1000 Culvert	
S647.007	20.109	0.027	750.0	1.920	0.00	0.0	0.600	1000 []	2800	1000 Culvert	
S647.008	29.257	0.039	750.0	0.404	0.00	0.0	0.600	1000 []	2800	1000 Culvert	
S647.009	21.752	0.229	95.0	1.147	0.00	0.0	0.600	1000 []	3000	1000 Culvert	
S647.010	14.716	0.020	750.0	0.386	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.011	14.596	0.019	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.012	22.077	0.329	67.0	1.290	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.013	30.309	0.040	750.0	0.020	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.014	1.083	0.001	750.0	0.964	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.015	11.426	0.115	99.2	0.306	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.016	39.860	0.253	157.5	0.298	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.017	14.686	0.020	750.0	1.251	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.018	9.783	0.013	750.0	0.020	0.00	0.0	0.600	2100 []	3000	2100 Culvert	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S647.000	200.00	6.39	94.431	0.593	0.0	0.0	32.9	1.00	385.1	362.1
S647.001	200.00	6.50	94.212	1.721	0.0	0.0	95.6	2.94	1478.5	1051.7
S647.002	200.00	6.75	93.725	1.721	0.0	0.0	95.6	1.29	1223.1	1051.7
S647.003	200.00	7.22	93.399	3.279	0.0	0.0	182.1	1.49	2299.3	2003.4
S647.004	200.00	7.28	93.342	4.129	0.0	0.0	229.3	1.47	2677.0	2522.3
S647.005	200.00	7.47	93.335	4.129	0.0	0.0	229.3	1.47	2677.0	2522.3
S647.006	200.00	7.82	93.313	4.614	0.0	0.0	256.3	1.51	3207.7	2818.9
S647.007	200.00	8.03	93.271	6.534	0.0	0.0	362.9	1.57	4283.1	3992.1
S647.008	200.00	8.34	93.244	6.939	0.0	0.0	385.4	1.57	4283.1	4239.1
S647.009	200.00	8.42	93.205	8.086	0.0	0.0	449.1	4.49	13118.7	4939.8
S647.010	200.00	8.54	91.976	8.472	0.0	0.0	470.5	2.14	12725.5	5175.8
S647.011	200.00	8.65	91.957	8.472	0.0	0.0	470.5	2.14	12725.5	5175.8
S647.012	200.00	8.70	91.937	9.762	0.0	0.0	542.2	7.19	42752.0	5963.8
S647.013	200.00	8.94	91.608	9.781	0.0	0.0	543.3	2.14	12725.5	5975.8
S647.014	200.00	8.95	91.567	10.746	0.0	0.0	596.8	2.14	12725.5	6564.9
S647.015	200.00	8.98	91.566	11.051	0.0	0.0	613.8	5.90	35133.0	6751.7
S647.016	200.00	9.12	91.451	11.349	0.0	0.0	630.3	4.68	27863.7	6933.6
S647.017	200.00	9.23	91.197	12.600	0.0	0.0	699.8	2.14	12725.5	7697.9
S647.018	200.00	9.31	91.178	12.620	0.0	0.0	700.9	2.14	12725.5	7710.0

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S647.019	26.212	0.035	750.0	1.209	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.020	24.788	0.033	750.0	0.297	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.021	6.374	0.008	750.0	1.060	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.022	28.071	0.037	750.0	0.175	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.023	37.964	0.051	750.0	1.545	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.024	14.091	0.019	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.025	18.532	0.021	882.5	1.332	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.026	24.232	0.032	750.0	0.054	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.027	14.360	0.019	750.0	1.175	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.028	9.238	0.012	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.029	20.199	0.027	750.0	1.045	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.030	6.857	0.009	750.0	0.304	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.031	48.917	0.065	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.032	35.684	0.055	651.1	0.431	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S647.033	92.826	0.125	743.7	0.168	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S647.034	92.298	0.123	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S647.035	50.923	0.068	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S647.036	49.677	0.066	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S647.037	75.030	0.100	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S647.038	25.479	0.034	750.0	8.336	0.00	0.0	0.600	2100 []	4200	2100 Culvert	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S647.019	200.00	9.51	91.165	13.829	0.0	0.0	768.0	2.14	12725.5	8448.5
S647.020	200.00	9.71	91.130	14.125	0.0	0.0	784.5	2.14	12725.5	8629.7
S647.021	200.00	9.76	91.097	15.185	0.0	0.0	843.4	2.14	12725.5	9277.3
S647.022	200.00	9.98	91.088	15.361	0.0	0.0	853.1	2.14	12725.5	9384.5
S647.023	200.00	10.27	91.051	16.906	0.0	0.0	938.9	2.14	12725.5	10328.3
S647.024	200.00	10.38	91.000	16.906	0.0	0.0	938.9	2.14	12725.5	10328.3
S647.025	200.00	10.54	90.981	18.238	0.0	0.0	1012.9	1.97	11725.7	11142.3
S647.026	200.00	10.73	90.960	18.292	0.0	0.0	1016.0	2.14	12725.5	11175.6
S647.027	200.00	10.84	90.928	19.467	0.0	0.0	1081.2	2.14	12725.5	11893.2
S647.028	200.00	10.91	90.909	19.467	0.0	0.0	1081.2	2.14	12725.5	11893.2
S647.029	200.00	11.07	90.897	20.512	0.0	0.0	1139.2	2.14	12725.5	12531.6
S647.030	200.00	11.12	90.870	20.816	0.0	0.0	1156.1	2.14	12725.5	12717.5
S647.031	200.00	11.50	90.861	20.816	0.0	0.0	1156.1	2.14	12725.5	12717.5
S647.032	200.00	11.76	90.795	21.247	0.0	0.0	1180.0	2.30	13663.1	12980.5
S647.033	200.00	12.46	90.741	21.415	0.0	0.0	1189.4	2.21	14288.2	13083.2
S647.034	200.00	13.16	90.616	21.415	0.0	0.0	1189.4	2.20	14227.8	13083.2
S647.035	200.00	13.55	90.493	21.415	0.0	0.0	1189.4	2.20	14227.8	13083.2
S647.036	200.00	13.92	90.425	21.415	0.0	0.0	1189.4	2.20	14227.8	13083.2
S647.037	200.00	14.49	90.359	21.415	0.0	0.0	1189.4	2.20	14227.8	13083.2
S647.038	200.00	14.68	90.259	29.751	0.0	0.0	1652.4	2.30	19055.6	18176.2

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S647.039	25.627	0.034	750.0	0.000	0.00	0.0	0.600	2100 []	4200	2100 Culvert	
S648.000	56.611	0.235	240.6	0.089	5.00	0.0	0.600	o	300	Pipe/Conduit	
S647.040	41.217	0.263	156.8	0.000	0.00	0.0	0.600	2100 []	2400	2100 Culvert	
S649.000	55.811	0.232	240.6	0.047	5.00	0.0	0.600	o	300	Pipe/Conduit	
S649.001	27.582	0.115	240.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S647.041	41.015	0.098	419.9	0.094	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S647.042	0.500#	0.000	0.0	0.000	0.00	0.0	0.600	2100 []	4000	2100 Culvert	
S650.000	187.025	0.249	750.0	8.664	5.00	0.0	0.600	|_|	1400	Ditch	
S650.001	0.500#	0.001	750.0	0.000	0.00	0.0	0.600	|_|	1400	Ditch	
S651.000	21.260	0.037	577.5	0.418	5.00	0.0	0.600	o	600	Pipe/Conduit	
S651.001	29.867	0.040	746.7	0.513	0.00	0.0	0.600	o	900	Pipe/Conduit	
S651.002	42.456	0.057	744.8	0.058	0.00	0.0	0.600	o	900	Pipe/Conduit	
S652.000	47.107	0.102	462.4	0.255	5.00	0.0	0.600	o	500	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S647.039	200.00	14.86	90.225	29.751	0.0	0.0	1652.4	2.30	19055.6	18176.2
S648.000	200.00	5.93	92.785	0.089	0.0	0.0	4.9	1.01	71.3	54.1
S647.040	200.00	15.02	90.190	29.840	0.0	0.0	1657.3	4.45	21118.4	18230.2
S649.000	200.00	5.92	91.774	0.047	0.0	0.0	2.6	1.01	71.3	28.9
S649.001	200.00	6.38	91.542	0.047	0.0	0.0	2.6	1.01	71.3	28.9
S647.041	200.00	15.25	89.727	29.981	0.0	0.0	1665.1	2.94	19041.8	18316.5
S647.042	200.00	15.26	89.305	29.981	0.0	0.0	1665.1	0.62	4879.7«	18316.5
S650.000	200.00	6.64	89.800	8.664	0.0	0.0	481.2	1.90	5320.7	5293.2
S650.001	200.00	6.64	89.551	8.664	0.0	0.0	481.2	1.90	5320.7	5293.2
S651.000	200.00	5.35	93.222	0.418	0.0	0.0	23.2	1.01	284.5	255.6
S651.001	200.00	5.79	92.885	0.932	0.0	0.0	51.8	1.14	724.5	569.3
S651.002	200.00	6.41	92.845	0.990	0.0	0.0	55.0	1.14	725.4	604.9
S652.000	200.00	5.78	93.018	0.255	0.0	0.0	14.2	1.00	197.1	156.0

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S652.001	22.877	0.040	577.5	0.128	0.00	0.0	0.600	o	600	Pipe/Conduit	
S651.003	39.051	0.052	751.0	0.075	0.00	0.0	0.600	o	1000	Pipe/Conduit	
S651.004	29.070	0.039	745.4	1.218	0.00	0.0	0.600	o	1250	Pipe/Conduit	
S651.005	24.801	0.033	751.5	0.066	0.00	0.0	0.600	o	1250	Pipe/Conduit	
S651.006	18.285	0.024	761.9	0.071	0.00	0.0	0.600	o	1300	Pipe/Conduit	
S651.007	14.181	0.019	746.4	0.081	0.00	0.0	0.600	o	1300	Pipe/Conduit	
S651.008	46.717	0.062	753.5	0.062	0.00	0.0	0.600	o	1300	Pipe/Conduit	
S651.009	31.355	0.042	746.5	0.076	0.00	0.0	0.600	o	1300	Pipe/Conduit	
S651.010	28.479	0.038	749.4	0.100	0.00	0.0	0.600	o	1400	Pipe/Conduit	
S651.011	19.018	0.025	760.7	0.681	0.00	0.0	0.600	o	1500	Pipe/Conduit	
S651.012	36.162	0.048	753.4	0.129	0.00	0.0	0.600	o	1500	Pipe/Conduit	
S651.013	22.037	0.029	759.9	0.129	0.00	0.0	0.600	o	1500	Pipe/Conduit	
S651.014	43.120	0.057	756.5	0.156	0.00	0.0	0.600	o	1500	Pipe/Conduit	
S651.015	64.869	0.086	754.3	0.773	0.00	0.0	0.600	o	1600	Pipe/Conduit	
S653.000	12.036	2.009	6.0	0.604	5.00	0.0	0.600	o	300	Pipe/Conduit	
S654.000	20.320	0.084	240.6	0.079	5.00	0.0	0.600	o	300	Pipe/Conduit	
S654.001	64.484	0.185	348.5	0.072	0.00	0.0	0.600	o	400	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S652.001	200.00	6.16	92.816	0.383	0.0	0.0	21.3	1.01	284.5	234.1
S651.003	200.00	6.95	92.376	1.448	0.0	0.0	80.4	1.21	952.2	884.7
S651.004	200.00	7.29	92.074	2.667	0.0	0.0	148.1	1.40	1714.6	1629.1
S651.005	200.00	7.59	92.035	2.733	0.0	0.0	151.8	1.39	1707.5	1669.6
S651.006	200.00	7.81	91.952	2.803	0.0	0.0	155.7	1.42	1879.1	1712.7
S651.007	200.00	7.97	91.928	2.885	0.0	0.0	160.2	1.43	1898.7	1762.4
S651.008	200.00	8.52	91.909	2.947	0.0	0.0	163.7	1.42	1889.6	1800.5
S651.009	200.00	8.88	91.847	3.023	0.0	0.0	167.9	1.43	1898.5	1847.0
S651.010	200.00	9.20	91.705	3.124	0.0	0.0	173.5	1.49	2300.1	1908.4
S651.011	200.00	9.41	91.567	3.804	0.0	0.0	211.3	1.55	2734.2	2324.2
S651.012	200.00	9.79	91.542	3.933	0.0	0.0	218.5	1.55	2747.6	2403.1
S651.013	200.00	10.03	91.494	4.063	0.0	0.0	225.6	1.55	2735.7	2482.0
S651.014	200.00	10.49	91.465	4.219	0.0	0.0	234.3	1.55	2741.9	2577.6
S651.015	200.00	11.16	91.308	4.992	0.0	0.0	277.3	1.62	3250.6	3050.1
S653.000	200.00	5.03	93.696	0.604	0.0	0.0	33.5	6.46	456.8	368.8
S654.000	200.00	5.34	94.867	0.079	0.0	0.0	4.4	1.01	71.3	48.5
S654.001	200.00	6.40	94.683	0.151	0.0	0.0	8.4	1.01	126.3	92.3

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S654.002	35.924	0.251	142.9	0.227	0.00	0.0	0.600	o	500	Pipe/Conduit	
S654.003	16.248	0.207	78.3	0.187	0.00	0.0	0.600	o	500	Pipe/Conduit	
S654.004	60.800	0.081	750.0	0.235	0.00	0.0	0.600	o	800	Pipe/Conduit	
S654.005	15.982	1.896	8.4	0.000	0.00	0.0	0.600	o	800	Pipe/Conduit	
S655.000	56.339	0.080	706.7	0.592	5.00	0.0	0.600	o	700	Pipe/Conduit	
S655.001	68.450	0.091	750.0	0.531	0.00	0.0	0.600	o	900	Pipe/Conduit	
S656.000	52.668	0.091	578.3	0.368	5.00	0.0	0.600	o	600	Pipe/Conduit	
S656.001	34.407	0.046	750.0	0.561	0.00	0.0	0.600	o	900	Pipe/Conduit	
S656.002	43.792	0.058	750.0	0.160	0.00	0.0	0.600	o	900	Pipe/Conduit	
S656.003	10.953	0.015	750.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit	
S655.002	33.840	0.045	752.0	0.354	0.00	0.0	0.600	o	1250	Pipe/Conduit	
S655.003	30.372	0.040	759.3	0.188	0.00	0.0	0.600	o	1250	Pipe/Conduit	
S655.004	25.058	0.033	759.3	0.354	0.00	0.0	0.600	o	1400	Pipe/Conduit	
S655.005	8.898	0.012	741.5	0.263	0.00	0.0	0.600	o	1400	Pipe/Conduit	
S655.006	25.042	0.033	750.0	0.931	0.00	0.0	0.600	1000 []	1900	1000 Culvert	
S655.007	15.483	0.021	750.0	0.051	0.00	0.0	0.600	1000 []	1900	1000 Culvert	
S655.008	13.149	0.018	750.0	0.250	0.00	0.0	0.600	1000 []	2200	1000 Culvert	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S654.002	200.00	6.73	94.398	0.378	0.0	0.0	21.0	1.82	356.4	231.2
S654.003	200.00	6.84	94.146	0.566	0.0	0.0	31.4	2.46	482.3	345.7
S654.004	200.00	7.80	93.639	0.800	0.0	0.0	44.5	1.06	530.7	489.0
S654.005	200.00	7.83	93.558	0.800	0.0	0.0	44.5	10.07	5059.3	489.0
S655.000	200.00	5.94	94.624	0.592	0.0	0.0	32.9	1.00	385.1	361.9
S655.001	200.00	6.94	94.345	1.124	0.0	0.0	62.4	1.14	722.8	686.6
S656.000	200.00	5.87	93.864	0.368	0.0	0.0	20.4	1.01	284.3	224.7
S656.001	200.00	6.38	93.472	0.929	0.0	0.0	51.6	1.14	722.8	567.4
S656.002	200.00	7.02	93.427	1.089	0.0	0.0	60.5	1.14	722.8	665.1
S656.003	200.00	7.18	93.368	1.089	0.0	0.0	60.5	1.14	722.8	665.1
S655.002	200.00	7.59	93.004	2.566	0.0	0.0	142.5	1.39	1707.0	1568.0
S655.003	200.00	7.95	92.959	2.754	0.0	0.0	153.0	1.38	1698.7	1682.5
S655.004	200.00	8.23	92.769	3.108	0.0	0.0	172.6	1.48	2285.0	1899.1
S655.005	200.00	8.33	92.736	3.372	0.0	0.0	187.3	1.50	2312.5	2059.8
S655.006	200.00	8.62	92.724	4.302	0.0	0.0	238.9	1.47	2677.0	2628.3
S655.007	200.00	8.79	92.690	4.353	0.0	0.0	241.8	1.47	2677.0	2659.5
S655.008	200.00	8.94	92.670	4.603	0.0	0.0	255.6	1.51	3207.7	2812.1

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S655.009	33.550	0.045	750.0	0.000	0.00	0.0	0.600	1000 []	2200	1000 Culvert	
S655.010	29.244	0.028	1029.3	0.865	0.00	0.0	0.600	1000 []	2800	1000 Culvert	
S655.011	31.305	0.042	750.0	0.262	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.012	11.966	0.016	750.0	0.270	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.013	48.159	0.064	750.0	1.111	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.014	17.702	0.024	750.0	0.266	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.015	14.170	0.019	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.016	28.689	0.037	773.8	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.017	30.421	0.041	750.0	1.240	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.018	30.968	0.041	750.0	0.546	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.019	18.058	0.024	750.0	0.508	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.020	34.984	0.017	2106.0	0.412	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.021	26.508	0.035	750.0	0.373	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.022	28.736	0.011	2584.3	0.573	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.023	28.227	0.038	750.0	0.734	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.024	36.372	0.042	865.9	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.025	23.681	0.032	750.0	0.956	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S655.026	25.777	0.034	750.0	0.141	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S654.006	55.665	0.074	750.0	0.129	0.00	0.0	0.600	2100 []	3000	2100 Culvert	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S655.009	200.00	9.31	92.652	4.603	0.0	0.0	255.6	1.51	3207.7	2812.1
S655.010	200.00	9.67	92.607	5.468	0.0	0.0	303.7	1.34	3651.1	3340.4
S655.011	200.00	9.91	91.579	5.730	0.0	0.0	318.2	2.14	12725.5	3500.7
S655.012	200.00	10.01	91.537	6.000	0.0	0.0	333.3	2.14	12725.5	3665.9
S655.013	200.00	10.38	91.521	7.111	0.0	0.0	395.0	2.14	12725.5	4344.5
S655.014	200.00	10.52	91.457	7.377	0.0	0.0	409.7	2.14	12725.5	4506.8
S655.015	200.00	10.63	91.433	7.377	0.0	0.0	409.7	2.14	12725.5	4506.8
S655.016	200.00	10.86	91.414	7.377	0.0	0.0	409.7	2.11	12526.9	4506.8
S655.017	200.00	11.09	91.377	8.617	0.0	0.0	478.6	2.14	12725.5	5264.6
S655.018	200.00	11.34	91.337	9.163	0.0	0.0	508.9	2.14	12725.5	5598.1
S655.019	200.00	11.48	91.296	9.671	0.0	0.0	537.1	2.14	12725.5	5908.3
S655.020	200.00	11.93	91.271	10.083	0.0	0.0	560.0	1.27	7564.3	6160.2
S655.021	200.00	12.14	91.255	10.457	0.0	0.0	580.8	2.14	12725.5	6388.3
S655.022	200.00	12.56	91.220	11.029	0.0	0.0	612.6	1.15	6821.4	6738.1
S655.023	200.00	12.78	91.208	11.763	0.0	0.0	653.3	2.14	12725.5	7186.5
S655.024	200.00	13.08	91.171	11.763	0.0	0.0	653.3	1.99	11837.8	7186.5
S655.025	200.00	13.27	91.129	12.719	0.0	0.0	706.4	2.14	12725.5	7770.7
S655.026	200.00	13.47	91.097	12.860	0.0	0.0	714.2	2.14	12725.5	7856.6
S654.006	200.00	13.90	90.462	13.789	0.0	0.0	765.9	2.14	12725.4	8424.5

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S653.001	64.009	0.085	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S651.016	35.597	0.047	757.4	0.187	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S651.017	42.266	0.056	750.0	0.239	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S651.018	43.160	0.058	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S651.019	37.391	0.050	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S651.020	44.201	0.059	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S651.021	49.073	0.065	750.0	0.000	0.00	0.0	0.600	2100 []	3000	2100 Culvert	
S651.022	49.073	0.065	750.0	2.397	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S651.023	64.235	0.086	750.0	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S651.024	55.588	0.176	315.4	0.000	0.00	0.0	0.600	2100 []	3300	2100 Culvert	
S651.025	21.521	0.029	750.0	1.284	0.00	0.0	0.600	2100 []	3600	2100 Culvert	
S651.026	0.500#	0.001	500.0	0.000	0.00	0.0	0.600	2100 []	3600	2100 Culvert	
S637.024	34.651	1.701	20.4	6.858	0.00	0.0	0.600	o	500	Pipe/Conduit	
S657.000	119.878	0.300	400.0	10.806	30.00	0.0	0.600	|_|	5000	Ditch	
S657.001	91.077	2.282	39.9	11.966	0.00	0.0	0.600	|_|	5000	Ditch	
S657.002	138.418	0.185	750.0	8.959	0.00	0.0	0.600	|_|	5000	Ditch	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S653.001	200.00	14.40	89.988	14.393	0.0	0.0	799.4	2.14	12725.5	8793.4
S651.016	200.00	14.68	89.902	19.572	0.0	0.0	1087.0	2.13	12662.9	11957.5
S651.017	200.00	15.01	89.855	19.812	0.0	0.0	1100.3	2.14	12725.5	12103.7
S651.018	200.00	15.35	89.799	19.812	0.0	0.0	1100.3	2.14	12725.5	12103.7
S651.019	200.00	15.64	89.742	19.812	0.0	0.0	1100.3	2.14	12725.5	12103.7
S651.020	200.00	15.98	89.692	19.812	0.0	0.0	1100.3	2.14	12725.5	12103.7
S651.021	200.00	16.36	89.633	19.812	0.0	0.0	1100.3	2.14	12725.5	12103.7
S651.022	200.00	16.74	89.567	22.209	0.0	0.0	1233.5	2.20	14227.8	13568.1
S651.023	200.00	17.22	89.502	22.209	0.0	0.0	1233.5	2.20	14227.8	13568.1
S651.024	200.00	17.50	89.416	22.209	0.0	0.0	1233.5	3.40	21984.5	13568.1
S651.025	200.00	17.66	89.240	23.492	0.0	0.0	1304.8	2.24	15826.3	14352.5
S651.026	200.00	17.66	89.211	23.492	0.0	0.0	1304.8	2.74	19403.5	14352.5
S637.024	200.00	18.73	89.159	102.571	0.0	0.0	5696.8	4.83	948.2«	62665.0
S657.000	190.30	30.00	101.342	10.806	0.0	0.0	571.1	3.17	15829.2	6281.9
S657.001	190.30	30.00	101.042	22.772	0.0	0.0	1203.4	6.68	14270.6	13237.7
S657.002	190.30	30.00	98.260	31.731	0.0	0.0	1676.9	2.72	20404.6	18445.6

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S657.003	144.723	0.193	750.0	11.622	0.00	0.0	0.600	|_|	6000	Ditch	
S657.004	120.039	0.160	750.0	0.000	0.00	0.0	0.600	|_|	6000	Ditch	
S657.005	124.926	0.167	750.0	0.000	0.00	0.0	0.600	|_|	6000	Ditch	
S657.006	104.224	2.407	43.3	0.000	0.00	0.0	0.600	|_|	6000	Ditch	
S657.007	135.865	5.821	23.3	0.000	0.00	0.0	0.600	|_|	6000	Ditch	
S657.008	101.278	2.272	44.6	0.000	0.00	0.0	0.600	|_|	6000	Ditch	
S657.009	146.374	0.479	305.6	0.000	0.00	0.0	0.600	|_|	6000	Ditch	
S657.010	30.000#	0.040	750.0	0.000	0.00	0.0	0.600	|_|	6000	Ditch	
S657.011	298.893	0.399	749.1	32.071	0.00	0.0	0.600	|_|	1500	Ditch	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S657.003	190.30	30.00	98.075	43.353	0.0	0.0	2291.1	2.83	25455.6	25201.6
S657.004	190.30	30.00	97.882	43.353	0.0	0.0	2291.1	2.83	25455.6	25201.6
S657.005	190.30	30.00	97.722	43.353	0.0	0.0	2291.1	2.83	25455.6	25201.6
S657.006	190.30	30.00	97.556	43.353	0.0	0.0	2291.1	11.81	106310.5	25201.6
S657.007	190.30	30.00	95.149	43.353	0.0	0.0	2291.1	16.09	144846.9	25201.6
S657.008	190.30	30.00	89.328	43.353	0.0	0.0	2291.1	11.64	104778.8	25201.6
S657.009	190.30	30.00	87.056	43.353	0.0	0.0	2291.1	4.44	39945.4	25201.6
S657.010	190.30	30.00	86.577	43.353	0.0	0.0	2291.1	2.83	25455.6	25201.6
S657.011	190.30	30.00	86.214	75.425	0.0	0.0	3985.9	1.83	3849.6«	43845.0

Manhole Schedules for Phase 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S316	95.573	1.500	Open Manhole	1200	S637.000	94.073	300				
S3	95.512	1.527	Open Manhole	1200	S637.001	93.986	300	S637.000	93.986	300	
S317	95.434	2.172	Open Manhole	1800	S637.002	93.262	900	S637.001	93.862	300	
S5	95.322	2.115	Open Manhole	1800	S637.003	93.207	900	S637.002	93.207	900	
S318	94.824	2.100	Open Manhole	1800	S637.004	92.724	900	S637.003	92.724	900	
S10	94.743	2.100	Open Manhole	1800	S637.005	92.643	900	S637.004	92.643	900	
S319	94.507	2.200	Junction		S637.006	92.307	1000	S637.005	92.407	900	
S320	94.298	2.200	Open Manhole	1900	S637.007	92.098	1000	S637.006	92.098	1000	
S375	94.083	2.600	Open Manhole	2300	S637.008	91.483	1400	S637.007	91.883	1000	
S32	95.021	1.500	Open Manhole	1200	S638.000	93.521	300				
S33	95.021	1.848	Open Manhole	1500	S638.001	93.173	500	S638.000	93.373	300	
S34	95.021	1.995	Open Manhole	1500	S638.002	93.026	600	S638.001	93.126	500	
S35	95.053	2.303	Open Manhole	1800	S638.003	92.750	800	S638.002	92.950	600	
S36	95.031	2.309	Open Manhole	1800	S638.004	92.723	800	S638.003	92.723	800	
S37	94.913	2.222	Open Manhole	1800	S638.005	92.691	800	S638.004	92.691	800	
S38	94.688	2.175	Open Manhole	1800	S638.006	92.512	900	S638.005	92.612	800	
S39	94.535	2.100	Open Manhole	1800	S638.007	92.435	900	S638.006	92.435	900	
S40	94.458	2.100	Open Manhole	1800	S638.008	92.358	900	S638.007	92.358	900	
S41	94.362	2.300	Open Manhole	2000	S638.009	92.062	1100	S638.008	92.262	900	
S376	94.703	3.554	Open Manhole	2500	S637.009	91.150	1600	S637.008	91.350	1400	
								S638.009	91.958	1100	309
S100	94.848	1.600	Open Manhole	1350	S639.000	93.248	400				
S438	94.756	1.700	Open Manhole	1500	S639.001	93.056	500	S639.000	93.156	400	
S439	94.577	1.800	Open Manhole	1500	S639.002	92.777	600	S639.001	92.877	500	
S440	94.573	2.027	Open Manhole	1800	S639.003	92.546	800	S639.002	92.746	600	
S441	94.535	2.106	Open Manhole	1800	S639.004	92.429	900	S639.003	92.529	800	
S442	94.510	2.222	Open Manhole	1900	S639.005	92.288	1000	S639.004	92.388	900	
S443	94.472	2.210	Open Manhole	1900	S639.006	92.263	1000	S639.005	92.263	1000	
S444	94.439	2.317	Open Manhole	2000	S639.007	92.122	1100	S639.006	92.222	1000	
S445	94.415	2.308	Open Manhole	2000	S639.008	92.106	1100	S639.007	92.106	1100	
S446	94.397	2.431	Open Manhole	2100	S639.009	91.966	1200	S639.008	92.066	1100	
S447	94.354	2.429	Open Manhole	2100	S639.010	91.926	1200	S639.009	91.926	1200	
S61	94.431	2.560	Open Manhole	2100	S639.011	91.870	1200	S639.010	91.870	1200	
S29	95.044	4.376	Open Manhole	2900	S637.010	90.667	2000	S637.009	91.067	1600	

Manhole Schedules for Phase 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
								S639.011	91.832	1200	364
S377	94.796	4.180	Open Manhole	2900	S637.011	90.616	2000	S637.010	90.616	2000	
S378	94.421	3.905	Open Manhole	3000	S637.012	90.516	2100	S637.011	90.516	2000	
S379	94.069	3.641	Open Manhole	3000	S637.013	90.428	2100	S637.012	90.428	2100	
S50	93.693	3.388	Open Manhole	3000	S637.014	90.305	2400	S637.013	90.305	2100	
S380	94.475	4.292	Open Manhole	3000	S637.015	90.183	2400	S637.014	90.183	2400	
S432	95.722	1.800	Open Manhole	1500	S640.000	93.922	600				
S433	95.688	1.941	Open Manhole	1500	S640.001	93.747	700	S640.000	93.847	600	
S434	95.372	2.200	Open Manhole	1900	S640.002	93.172	1000	S640.001	93.472	700	
S435	95.649	2.891	Open Manhole	2200	S640.003	92.758	1300	S640.002	93.058	1000	
S436	95.510	2.922	Open Manhole	2200	S640.004	92.588	1300	S640.003	92.588	1300	
S42	94.550	1.700	Open Manhole	1500	S641.000	92.850	500				
S51	93.948	2.100	Open Manhole	1800	S641.001	91.848	900	S641.000	92.248	500	
S51	93.853	2.314	Open Manhole	2000	S641.002	91.539	1100	S641.001	91.739	900	
S30	95.189	1.600	Open Manhole	1350	S642.000	93.589	400				
S31	94.587	1.900	Open Manhole	1500	S642.001	92.687	700	S642.000	92.987	400	
S32	94.386	2.200	Open Manhole	1900	S642.002	92.186	1000	S642.001	92.486	700	
S33	94.845	2.882	Open Manhole	2000	S642.003	91.964	1100	S642.002	92.064	1000	
S43	94.776	3.761	Open Manhole	2400	S641.003	91.016	1500	S641.002	91.416	1100	
								S642.003	91.880	1100	464
S27	95.252	4.801	Open Manhole	2900	S640.005	90.451	2000	S640.004	92.366	1300	1215
								S641.003	90.951	1500	
S22	95.204	5.135	Open Manhole	3000	S637.016	90.069	2100	S637.015	90.069	2400	
								S640.005	90.399	2000	330
S184	95.645	1.500	Junction		S643.000	94.145	300				
S381	95.627	1.747	Open Manhole	1200	S643.001	93.880	300	S643.000	93.880	300	
S464	95.845	6.191	Open Manhole	3000	S637.017	89.654	3300	S637.016	89.654	2100	
								S643.001	91.354	300	
S552	95.324	5.803	Open Manhole	3000	S637.018	89.521	3300	S637.017	89.521	3300	
S553	94.841	5.455	Open Manhole	3000	S637.019	89.386	3300	S637.018	89.386	3300	
S554	94.351	5.096	Open Manhole	3000	S637.020	89.255	3300	S637.019	89.255	3300	
S393	93.457	1.600	Open Manhole	1350	S644.000	91.857	400				
S394	92.945	1.800	Open Manhole	1500	S644.001	91.145	600	S644.000	91.345	400	
S555	94.286	5.096	Open Manhole	3000	S637.021	89.190	3300	S637.020	89.190	3300	

Manhole Schedules for Phase 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
								S644.001	91.035	600	445
S85	94.198	5.081	Open Manhole	3000	S637.022	89.116	3600	S637.021	89.116	3300	
S649	92.849	3.799	Open Manhole	3000	S637.023	89.050	3600	S637.022	89.050	3600	
S475	95.018	2.300	Open Manhole	2000	S645.000	92.718	1100				
S476	93.818	2.400	Open Manhole	2100	S645.001	91.418	1200	S645.000	91.518	1100	
S477	93.523	3.000	Open Manhole	2700	S645.002	90.523	1800	S645.001	91.123	1200	
S385	93.507	3.065	Open Manhole	2700	S645.003	90.442	1800	S645.002	90.442	1800	
S371	93.666	3.293	Open Manhole	2700	S645.004	90.373	1800	S645.003	90.373	1800	
S450	93.282	1.500	Open Manhole	1200	S646.000	91.782	300				
S608	93.262	3.320	Open Manhole	3000	S645.005	89.943	2100	S645.004	90.251	1800	109
								S646.000	91.643	300	
S451	93.018	3.210	Open Manhole	3000	S645.006	89.809	2100	S645.005	89.809	2100	
S3	96.331	1.900	Open Manhole	1500	S647.000	94.431	700				
S1	96.298	2.086	Open Manhole	1800	S647.001	94.212	800	S647.000	94.312	700	
S2	96.025	2.300	Open Manhole	2000	S647.002	93.725	1100	S647.001	94.025	800	
S42	96.219	2.821	Open Manhole	2300	S647.003	93.399	1400	S647.002	93.699	1100	
S6	96.156	2.814	Junction		S647.004	93.342	1900	S647.003	93.342	1400	
S3	96.108	2.772	Open Manhole	3000	S647.005	93.335	1900	S647.004	93.335	1900	
S8	96.278	2.966	Junction		S647.006	93.313	2200	S647.005	93.313	1900	
S10	96.300	3.029	Junction		S647.007	93.271	2800	S647.006	93.271	2200	
S12	96.134	2.889	Junction		S647.008	93.244	2800	S647.007	93.244	2800	
S12	96.426	3.221	Junction		S647.009	93.205	3000	S647.008	93.205	2800	
S14	96.258	4.282	Junction		S647.010	91.976	3000	S647.009	92.976	3000	
S15	96.108	4.152	Open Manhole	3000	S647.011	91.957	3000	S647.010	91.957	3000	
S17	96.254	4.317	Junction		S647.012	91.937	3000	S647.011	91.937	3000	
S17	96.414	4.806	Open Manhole	3000	S647.013	91.608	3000	S647.012	91.608	3000	
S7	96.108	4.540	Open Manhole	3000	S647.014	91.567	3000	S647.013	91.567	3000	
S30	96.118	4.552	Junction		S647.015	91.566	3000	S647.014	91.566	3000	
S30	96.232	4.782	Junction		S647.016	91.451	3000	S647.015	91.451	3000	
S35	96.254	5.057	Junction		S647.017	91.197	3000	S647.016	91.197	3000	
S8	96.108	4.930	Open Manhole	3000	S647.018	91.178	3000	S647.017	91.178	3000	
S38	96.187	5.022	Junction		S647.019	91.165	3000	S647.018	91.165	3000	
S38	96.359	5.229	Junction		S647.020	91.130	3000	S647.019	91.130	3000	
S40	96.142	5.045	Junction		S647.021	91.097	3000	S647.020	91.097	3000	

Manhole Schedules for Phase 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S40	96.087	4.998	Open Manhole	3000	S647.022	91.088	3000	S647.021	91.088	3000	
S46	96.379	5.328	Open Manhole	3000	S647.023	91.051	3000	S647.022	91.051	3000	
S10	96.103	5.103	Open Manhole	3000	S647.024	91.000	3000	S647.023	91.000	3000	
S51	96.218	5.237	Junction		S647.025	90.981	3000	S647.024	90.981	3000	
S51	96.407	5.446	Open Manhole	3000	S647.026	90.960	3000	S647.025	90.960	3000	
S11	96.201	5.273	Open Manhole	3000	S647.027	90.928	3000	S647.026	90.928	3000	
S56	96.120	5.211	Open Manhole	3000	S647.028	90.909	3000	S647.027	90.909	3000	
S100	96.213	5.317	Open Manhole	3000	S647.029	90.897	3000	S647.028	90.897	3000	
S62	96.157	5.287	Junction		S647.030	90.870	3000	S647.029	90.870	3000	
S13	96.089	5.229	Open Manhole	3000	S647.031	90.861	3000	S647.030	90.861	3000	
S86	96.111	5.315	Open Manhole	3000	S647.032	90.795	3000	S647.031	90.795	3000	
S565	96.310	5.570	Open Manhole	3000	S647.033	90.741	3300	S647.032	90.741	3000	
S441	95.300	4.684	Open Manhole	3000	S647.034	90.616	3300	S647.033	90.616	3300	
S465	94.745	4.253	Junction		S647.035	90.493	3300	S647.034	90.493	3300	
S569	94.413	3.988	Open Manhole	3000	S647.036	90.425	3300	S647.035	90.425	3300	
S469	94.102	3.743	Junction		S647.037	90.359	3300	S647.036	90.359	3300	
S645	93.660	3.401	Open Manhole	3000	S647.038	90.259	4200	S647.037	90.259	3300	
S473	94.151	3.926	Open Manhole	3000	S647.039	90.225	4200	S647.038	90.225	4200	
S477	94.285	1.500	Open Manhole	1200	S648.000	92.785	300				
S476	94.123	3.933	Open Manhole	3000	S647.040	90.190	2400	S647.039	90.190	4200	
								S648.000	92.550	300	659
S476	93.274	1.500	Open Manhole	1200	S649.000	91.774	300				
S480	93.238	1.696	Open Manhole	1200	S649.001	91.542	300	S649.000	91.542	300	
S476	93.257	3.529	Open Manhole	3000	S647.041	89.727	3300	S647.040	89.927	2400	200
								S649.001	91.427	300	
S484	92.638	3.333	Open Manhole	3000	S647.042	89.305	4000	S647.041	89.630	3300	325
S488	93.000	3.200	Junction		S650.000	89.800	1400				
S489	93.000	3.449	Junction		S650.001	89.551	1400	S650.000	89.551	1400	
S65	95.022	1.800	Junction		S651.000	93.222	600				
S54	95.128	2.243	Open Manhole	1800	S651.001	92.885	900	S651.000	93.185	600	
S101	95.407	2.562	Junction		S651.002	92.845	900	S651.001	92.845	900	
S390	94.718	1.700	Open Manhole	1500	S652.000	93.018	500				
S123	95.189	2.373	Open Manhole	1500	S652.001	92.816	600	S652.000	92.916	500	
S123	95.524	3.147	Junction		S651.003	92.376	1000	S651.002	92.788	900	312

Manhole Schedules for Phase 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
								S652.001	92.776	600	
S125	95.542	3.467	Junction		S651.004	92.074	1250	S651.003	92.324	1000	
S126	95.466	3.430	Junction		S651.005	92.035	1250	S651.004	92.035	1250	
S56	95.569	3.617	Junction		S651.006	91.952	1300	S651.005	92.002	1250	
S147	95.452	3.523	Junction		S651.007	91.928	1300	S651.006	91.928	1300	
S147	95.375	3.465	Junction		S651.008	91.909	1300	S651.007	91.909	1300	
S149	95.449	3.602	Junction		S651.009	91.847	1300	S651.008	91.847	1300	
S57	95.461	3.756	Open Manhole	2300	S651.010	91.705	1400	S651.009	91.805	1300	
S155	95.442	3.874	Junction		S651.011	91.567	1500	S651.010	91.667	1400	
S154	95.531	3.988	Junction		S651.012	91.542	1500	S651.011	91.542	1500	
S172	95.480	3.986	Junction		S651.013	91.494	1500	S651.012	91.494	1500	
S58	95.494	4.029	Open Manhole	2400	S651.014	91.465	1500	S651.013	91.465	1500	
S89	95.675	4.367	Junction		S651.015	91.308	1600	S651.014	91.408	1500	
S76	95.596	1.900	Open Manhole	1200	S653.000	93.696	300				
S70	96.367	1.500	Junction		S654.000	94.867	300				
S152	96.397	1.714	Open Manhole	1350	S654.001	94.683	400	S654.000	94.783	300	
S72	96.209	1.811	Junction		S654.002	94.398	500	S654.001	94.498	400	
S16	95.846	1.700	Open Manhole	1500	S654.003	94.146	500	S654.002	94.146	500	
S17	95.639	2.000	Open Manhole	1800	S654.004	93.639	800	S654.003	93.939	500	
S158	95.914	2.357	Open Manhole	1800	S654.005	93.558	800	S654.004	93.558	800	
S25	96.524	1.900	Open Manhole	1500	S655.000	94.624	700				
S26	96.602	2.258	Open Manhole	1800	S655.001	94.345	900	S655.000	94.545	700	
S190	95.664	1.800	Open Manhole	1500	S656.000	93.864	600				
S171	96.163	2.691	Open Manhole	1800	S656.001	93.472	900	S656.000	93.772	600	
S24	96.163	2.736	Open Manhole	1800	S656.002	93.427	900	S656.001	93.427	900	
S175	96.363	2.995	Open Manhole	1800	S656.003	93.368	900	S656.002	93.368	900	
S23	96.406	3.403	Open Manhole	2150	S655.002	93.004	1250	S655.001	94.253	900	900
								S656.003	93.354	900	
S26	95.952	2.994	Junction		S655.003	92.959	1250	S655.002	92.959	1250	
S24	95.933	3.164	Open Manhole	2300	S655.004	92.769	1400	S655.003	92.919	1250	
S29	95.858	3.122	Junction		S655.005	92.736	1400	S655.004	92.736	1400	
S27	95.830	3.106	Junction		S655.006	92.724	1900	S655.005	92.724	1400	
S25	95.831	3.141	Open Manhole	3000	S655.007	92.690	1900	S655.006	92.690	1900	
S32	95.872	3.202	Junction		S655.008	92.670	2200	S655.007	92.670	1900	

Manhole Schedules for Phase 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S38	95.825	3.173	Junction		S655.009	92.652	2200	S655.008	92.652	2200	
S40	95.828	3.220	Junction		S655.010	92.607	2800	S655.009	92.607	2200	
S163	95.826	4.247	Open Manhole	3000	S655.011	91.579	3000	S655.010	92.579	2800	
S51	95.832	4.294	Junction		S655.012	91.537	3000	S655.011	91.537	3000	
S53	95.853	4.332	Junction		S655.013	91.521	3000	S655.012	91.521	3000	
S27	95.824	4.367	Junction		S655.014	91.457	3000	S655.013	91.457	3000	
S128	95.872	4.439	Junction		S655.015	91.433	3000	S655.014	91.433	3000	
S129	95.812	4.397	Junction		S655.016	91.414	3000	S655.015	91.414	3000	
S130	95.828	4.450	Junction		S655.017	91.377	3000	S655.016	91.377	3000	
S147	95.815	4.478	Open Manhole	3000	S655.018	91.337	3000	S655.017	91.337	3000	
S149	95.825	4.529	Junction		S655.019	91.296	3000	S655.018	91.296	3000	
S149	95.875	4.604	Junction		S655.020	91.271	3000	S655.019	91.271	3000	
S29	95.827	4.572	Open Manhole	3000	S655.021	91.255	3000	S655.020	91.255	3000	
S30	95.889	4.669	Open Manhole	3000	S655.022	91.220	3000	S655.021	91.220	3000	
S174	95.733	4.525	Junction		S655.023	91.208	3000	S655.022	91.208	3000	
S32	95.734	4.563	Open Manhole	3000	S655.024	91.171	3000	S655.023	91.171	3000	
S181	95.795	4.667	Junction		S655.025	91.129	3000	S655.024	91.129	3000	
S34	96.031	4.934	Open Manhole	3000	S655.026	91.097	3000	S655.025	91.097	3000	
S23	96.128	5.666	Open Manhole	3000	S654.006	90.462	3000	S654.005	91.662	800	
								S655.026	91.063	3000	601
S74	95.699	5.712	Open Manhole	3000	S653.001	89.988	3000	S653.000	91.688	300	
								S654.006	90.388	3000	400
S75	95.048	5.146	Open Manhole	3000	S651.016	89.902	3000	S651.015	91.222	1600	920
								S653.001	89.902	3000	
S54	95.777	5.921	Open Manhole	3000	S651.017	89.855	3000	S651.016	89.855	3000	
S351	95.666	5.867	Open Manhole	3000	S651.018	89.799	3000	S651.017	89.799	3000	
S352	95.539	5.797	Open Manhole	3000	S651.019	89.742	3000	S651.018	89.742	3000	
S353	95.442	5.750	Open Manhole	3000	S651.020	89.692	3000	S651.019	89.692	3000	
S456	95.196	5.563	Open Manhole	3000	S651.021	89.633	3000	S651.020	89.633	3000	
S368	94.961	5.394	Open Manhole	3000	S651.022	89.567	3300	S651.021	89.567	3000	
S368	94.543	5.041	Open Manhole	3000	S651.023	89.502	3300	S651.022	89.502	3300	
S368	94.322	4.906	Open Manhole	3000	S651.024	89.416	3300	S651.023	89.416	3300	
S457	93.258	4.018	Open Manhole	3000	S651.025	89.240	3600	S651.024	89.240	3300	
S449	92.757	3.545	Open Manhole	3000	S651.026	89.211	3600	S651.025	89.211	3600	

Manhole Schedules for Phase 1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S485	93.000	3.951	Open Manhole	3000	S637.024	89.159	500	S637.023	89.049	3600	
								S645.006	89.725	2100	2066
								S647.042	89.305	4000	1646
								S650.001	89.550	1400	1891
								S651.026	89.210	3600	1551
S	88.958	1.500	Open Manhole	0		OUTFALL		S637.024	87.458	500	
S446	102.342	1.000	Junction		S657.000	101.342	5000				
S447	101.469	0.427	Junction		S657.001	101.042	5000	S657.000	101.042	5000	
S448	100.960	2.700	Junction		S657.002	98.260	5000	S657.001	98.760	5000	
S449	104.362	6.287	Junction		S657.003	98.075	6000	S657.002	98.075	5000	
S450	104.534	6.652	Junction		S657.004	97.882	6000	S657.003	97.882	6000	
S451	102.894	5.172	Junction		S657.005	97.722	6000	S657.004	97.722	6000	
S452	100.259	2.703	Junction		S657.006	97.556	6000	S657.005	97.556	6000	
S453	97.849	2.700	Junction		S657.007	95.149	6000	S657.006	95.149	6000	
S454	92.028	2.700	Junction		S657.008	89.328	6000	S657.007	89.328	6000	
S455	89.756	2.700	Junction		S657.009	87.056	6000	S657.008	87.056	6000	
S456	89.277	2.700	Junction		S657.010	86.577	6000	S657.009	86.577	6000	
S439	92.135	5.921	Junction		S657.011	86.214	1500	S657.010	86.537	6000	423
S440	93.083	7.268	Open Manhole	10000		OUTFALL		S657.011	85.815	1500	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S316	673926.538	5772211.367	673926.538	5772211.367	Required	
S3	673944.789	5772221.759	673944.789	5772221.759	Required	
S317	673970.431	5772236.778	673970.431	5772236.778	Required	
S5	674006.195	5772257.357	674006.195	5772257.357	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S318	674040.514	5772277.026	674040.514	5772277.026	Required	
S10	674050.183	5772282.615	674050.183	5772282.615	Required	
S319	674097.013	5772309.646			No Entry	
S320	674137.306	5772332.909	674137.306	5772332.909	Required	
S375	674174.229	5772354.098	674174.229	5772354.098	Required	
S32	673909.783	5772139.507	673909.783	5772139.507	Required	
S33	673926.331	5772107.913	673926.331	5772107.913	Required	
S34	673945.009	5772118.906	673945.009	5772118.906	Required	
S35	673983.245	5772140.391	673983.245	5772140.391	Required	
S36	674000.725	5772150.951	674000.725	5772150.951	Required	
S37	674021.482	5772162.969	674021.482	5772162.969	Required	
S38	674068.822	5772189.916	674068.822	5772189.916	Required	
S39	674116.162	5772217.956	674116.162	5772217.956	Required	
S40	674130.365	5772226.332	674130.365	5772226.332	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S41	674151.486	5772238.713	674151.486	5772238.713	Required	
S376	674223.896	5772267.431	674223.896	5772267.431	Required	
S100	673989.650	5772060.937	673989.650	5772060.937	Required	
S438	674009.613	5772071.430	674009.613	5772071.430	Required	
S439	674036.153	5772086.609	674036.153	5772086.609	Required	
S440	674051.039	5772094.934	674051.039	5772094.934	Required	
S441	674062.301	5772101.691	674062.301	5772101.691	Required	
S442	674088.939	5772116.871	674088.939	5772116.871	Required	
S443	674105.293	5772126.468	674105.293	5772126.468	Required	
S444	674131.735	5772141.648	674131.735	5772141.648	Required	
S445	674141.724	5772147.524	674141.724	5772147.524	Required	
S446	674168.166	5772162.507	674168.166	5772162.507	Required	
S447	674194.412	5772177.687	674194.412	5772177.687	Required	
S61	674229.570	5772199.624	674229.570	5772199.624	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S29	674254.772	5772213.945	674254.772	5772213.945	Required	
S377	674273.896	5772180.829	674273.896	5772180.829	Required	
S378	674311.396	5772115.877	674311.396	5772115.877	Required	
S379	674344.121	5772058.139	674344.121	5772058.139	Required	
S50	674355.736	5771966.790	674355.736	5771966.790	Required	
S380	674366.536	5771875.798	674366.536	5771875.798	Required	
S432	674044.494	5771957.165	674044.494	5771957.165	Required	
S433	674065.994	5771919.926	674065.994	5771919.926	Required	
S434	674087.494	5771882.687	674087.494	5771882.687	Required	
S435	674130.494	5771808.209	674130.494	5771808.209	Required	
S436	674193.824	5771697.945	674193.824	5771697.945	Required	
S42	674166.801	5772075.288	674166.801	5772075.288	Required	
S51	674226.839	5771973.342	674226.839	5771973.342	Required	
S51	674267.839	5771902.328	674267.839	5771902.328	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S30	674111.198	5772047.635	674111.198	5772047.635	Required	
S31	674171.168	5771943.474	674171.168	5771943.474	Required	
S32	674213.846	5771870.237	674213.846	5771870.237	Required	
S33	674259.447	5771790.859	674259.447	5771790.859	Required	
S43	674314.009	5771822.360	674314.009	5771822.360	Required	
S27	674338.718	5771780.666	674338.718	5771780.666	Required	
S22	674376.744	5771790.722	674376.744	5771790.722	Required	
S184	674288.714	5771668.820			No Entry	
S381	674343.928	5771700.697	674343.928	5771700.697	Required	
S464	674386.952	5771705.646	674386.952	5771705.646	Required	
S552	674399.811	5771606.473	674399.811	5771606.473	Required	
S553	674410.290	5771505.817	674410.290	5771505.817	Required	
S554	674422.076	5771407.867	674422.076	5771407.867	Required	
S393	674474.162	5771455.884	674474.162	5771455.884	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S394	674485.529	5771366.621	674485.529	5771366.621	Required	
S555	674427.792	5771359.710	674427.792	5771359.710	Required	
S85	674434.308	5771304.811	674434.308	5771304.811	Required	
S649	674400.776	5771268.231	674400.776	5771268.231	Required	
S475	674246.970	5771416.218	674246.970	5771416.218	Required	
S476	674292.833	5771330.932	674292.833	5771330.932	Required	
S477	674297.202	5771293.797	674297.202	5771293.797	Required	
S385	674261.814	5771243.991	674261.814	5771243.991	Required	
S371	674216.544	5771218.451	674216.544	5771218.451	Required	
S450	674269.889	5771219.927	674269.889	5771219.927	Required	
S608	674238.929	5771182.174	674238.929	5771182.174	Required	
S451	674256.956	5771164.670	674256.956	5771164.670	Required	
S3	673619.216	5772032.849	673619.216	5772032.849	Required	
S1	673547.021	5771990.568	673547.021	5771990.568	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S2	673556.539	5771974.819	673556.539	5771974.819	Required	
S42	673566.337	5771957.919	673566.337	5771957.919	Required	
S6	673587.586	5771921.117			No Entry	
S3	673590.032	5771916.881	673590.032	5771916.881	Required	
S8	673598.558	5771902.113			No Entry	
S10	673614.447	5771875.211			No Entry	
S12	673624.759	5771857.947			No Entry	
S12	673639.388	5771832.609			No Entry	
S14	673649.900	5771813.567			No Entry	
S15	673657.051	5771800.705	673657.051	5771800.705	Required	
S17	673664.389	5771788.087			No Entry	
S17	673675.743	5771769.154			No Entry	
S7	673690.573	5771742.721	673690.573	5771742.721	Required	
S30	673691.142	5771741.799			No Entry	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S30	673696.839	5771731.895			No Entry	
S35	673716.763	5771697.372			No Entry	
S8	673724.111	5771684.657	673724.111	5771684.657	Required	
S38	673729.015	5771676.191			No Entry	
S38	673742.095	5771653.476			No Entry	
S40	673754.458	5771631.991			No Entry	
S40	673757.696	5771626.502	673757.696	5771626.502	Required	
S46	673771.170	5771601.876	673771.170	5771601.876	Required	
S10	673791.005	5771569.506	673791.005	5771569.506	Required	
S51	673797.735	5771557.125			No Entry	
S51	673807.147	5771541.162	673807.147	5771541.162	Required	
S11	673819.063	5771520.063	673819.063	5771520.063	Required	
S56	673826.301	5771507.660	673826.301	5771507.660	Required	
S100	673830.879	5771499.637	673830.879	5771499.637	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S62	673841.014	5771482.164			No Entry	
S13	673844.438	5771476.224	673844.438	5771476.224	Required	
S86	673868.564	5771433.670	673868.564	5771433.670	Required	
S565	673899.677	5771451.142	673899.677	5771451.142	Required	
S441	673948.309	5771372.075	673948.309	5771372.075	Required	
S465	673994.124	5771291.951			No Entry	
S569	674023.351	5771250.250	674023.351	5771250.250	Required	
S469	674048.588	5771207.461			No Entry	
S645	674085.738	5771142.274	674085.738	5771142.274	Required	
S473	674098.843	5771120.423	674098.843	5771120.423	Required	
S477	674063.487	5771070.507	674063.487	5771070.507	Required	
S476	674112.541	5771098.764	674112.541	5771098.764	Required	
S476	674218.845	5771163.729	674218.845	5771163.729	Required	
S480	674171.851	5771133.624	674171.851	5771133.624	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S476	674147.917	5771119.914	674147.917	5771119.914	Required	
S484	674177.534	5771091.541	674177.534	5771091.541	Required	
S488	673989.231	5771049.413			No Entry	
S489	674176.255	5771048.728			No Entry	
S65	673954.939	5772065.445			No Entry	
S54	673965.546	5772047.020	673965.546	5772047.020	Required	
S101	673980.462	5772021.145			No Entry	
S390	674062.807	5772019.661	674062.807	5772019.661	Required	
S123	674021.995	5771996.134	674021.995	5771996.134	Required	
S123	674002.196	5771984.674			No Entry	
S125	674020.798	5771950.337			No Entry	
S126	674035.765	5771925.416			No Entry	
S56	674047.885	5771903.779			No Entry	
S147	674057.273	5771888.088			No Entry	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S147	674064.426	5771875.842			No Entry	
S149	674087.943	5771835.477			No Entry	
S57	674103.424	5771808.209	674103.424	5771808.209	Required	
S155	674118.165	5771783.842			No Entry	
S154	674129.369	5771768.475			No Entry	
S172	674147.706	5771737.307			No Entry	
S58	674158.782	5771718.255	674158.782	5771718.255	Required	
S89	674180.577	5771681.048			No Entry	
S76	674147.830	5771603.244	674147.830	5771603.244	Required	
S70	673918.426	5771462.993			No Entry	
S152	673936.031	5771473.141	673936.031	5771473.141	Required	
S72	673991.841	5771505.441			No Entry	
S16	674022.960	5771523.390	674022.960	5771523.390	Required	
S17	674037.057	5771531.468	674037.057	5771531.468	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S158	674092.364	5771556.724	674092.364	5771556.724	Required	
S25	673667.832	5772061.321	673667.832	5772061.321	Required	
S26	673716.447	5772089.793	673716.447	5772089.793	Required	
S190	673898.425	5772195.135	673898.425	5772195.135	Required	
S171	673852.876	5772168.693	673852.876	5772168.693	Required	
S24	673823.035	5772151.566	673823.035	5772151.566	Required	
S175	673785.140	5772129.619	673785.140	5772129.619	Required	
S23	673775.669	5772124.118	673775.669	5772124.118	Required	
S26	673792.508	5772094.765			No Entry	
S24	673807.550	5772068.380	673807.550	5772068.380	Required	
S29	673820.403	5772046.869			No Entry	
S27	673824.751	5772039.106			No Entry	
S25	673837.261	5772017.413	673837.261	5772017.413	Required	
S32	673844.985	5772003.995			No Entry	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S38	673851.577	5771992.617			No Entry	
S40	673868.318	5771963.542			No Entry	
S163	673883.003	5771938.254	673883.003	5771938.254	Required	
S51	673898.662	5771911.147			No Entry	
S53	673904.619	5771900.769			No Entry	
S27	673928.699	5771859.063			No Entry	
S128	673937.541	5771843.728			No Entry	
S129	673945.262	5771831.846			No Entry	
S130	673958.976	5771806.647			No Entry	
S147	673974.624	5771780.559			No Entry	
S149	673989.623	5771753.465			No Entry	
S149	673998.665	5771737.834			No Entry	
S29	674016.176	5771707.547	674016.176	5771707.547	Required	
S30	674032.649	5771686.779	674032.649	5771686.779	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S174	674048.771	5771662.992			No Entry	
S32	674062.999	5771638.613	674062.999	5771638.613	Required	
S181	674081.202	5771607.125			No Entry	
S34	674093.078	5771586.636	674093.078	5771586.636	Required	
S23	674106.316	5771564.518	674106.316	5771564.518	Required	
S74	674154.145	5771592.998	674154.145	5771592.998	Required	
S75	674210.439	5771623.462	674210.439	5771623.462	Required	
S54	674241.008	5771641.702	674241.008	5771641.702	Required	
S351	674261.871	5771604.945	674261.871	5771604.945	Required	
S352	674283.454	5771567.569	674283.454	5771567.569	Required	
S353	674305.038	5771537.037	674305.038	5771537.037	Required	
S456	674340.665	5771510.875	674340.665	5771510.875	Required	
S368	674345.369	5771462.029	674345.369	5771462.029	Required	
S368	674350.074	5771413.182	674350.074	5771413.182	Required	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S368	674357.195	5771349.343	674357.195	5771349.343	Required	
S457	674361.831	5771293.949	674361.831	5771293.949	Required	
S449	674362.060	5771272.429	674362.060	5771272.429	Required	
S485	674348.355	5771134.605	674348.355	5771134.605	Required	
S	674354.215	5771100.453			No Entry	
S446	673447.242	5771982.639			No Entry	
S447	673343.430	5771922.691			No Entry	
S448	673276.171	5771861.281			No Entry	
S449	673157.737	5771789.635			No Entry	
S450	673031.992	5771717.990			No Entry	
S451	673099.251	5771618.564			No Entry	
S452	673166.510	5771513.290			No Entry	
S453	673224.996	5771427.023			No Entry	
S454	673287.144	5771306.206			No Entry	

Manhole Schedules for Phase 1

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S455	673320.759	5771210.669			No Entry	
S456	673451.680	5771145.209			No Entry	
S439	673686.323	5771007.220			No Entry	
S440	673568.956	5770732.334			No Entry	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S637.000	o	300	S316	95.573	94.073	1.200	Open Manhole	1200
S637.001	o	300	S3	95.512	93.986	1.227	Open Manhole	1200
S637.002	o	900	S317	95.434	93.262	1.272	Open Manhole	1800
S637.003	o	900	S5	95.322	93.207	1.215	Open Manhole	1800
S637.004	o	900	S318	94.824	92.724	1.200	Open Manhole	1800
S637.005	o	900	S10	94.743	92.643	1.200	Open Manhole	1800
S637.006	o	1000	S319	94.507	92.307	1.200	Junction	
S637.007	o	1000	S320	94.298	92.098	1.200	Open Manhole	1900
S637.008	o	1400	S375	94.083	91.483	1.200	Open Manhole	2300
S638.000	o	300	S32	95.021	93.521	1.200	Open Manhole	1200
S638.001	o	500	S33	95.021	93.173	1.348	Open Manhole	1500
S638.002	o	600	S34	95.021	93.026	1.395	Open Manhole	1500
S638.003	o	800	S35	95.053	92.750	1.503	Open Manhole	1800
S638.004	o	800	S36	95.031	92.723	1.509	Open Manhole	1800
S638.005	o	800	S37	94.913	92.691	1.422	Open Manhole	1800
S638.006	o	900	S38	94.688	92.512	1.275	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S637.000	21.002	240.6	S3	95.512	93.986	1.227	Open Manhole	1200
S637.001	29.717	240.6	S317	95.434	93.862	1.272	Open Manhole	1800
S637.002	41.262	750.0	S5	95.322	93.207	1.215	Open Manhole	1800
S637.003	39.555	81.9	S318	94.824	92.724	1.200	Open Manhole	1800
S637.004	11.168	137.7	S10	94.743	92.643	1.200	Open Manhole	1800
S637.005	54.072	228.7	S319	94.507	92.407	1.200	Junction	
S637.006	46.526	222.6	S320	94.298	92.098	1.200	Open Manhole	1900
S637.007	42.571	198.2	S375	94.083	91.883	1.200	Open Manhole	2300
S637.008	99.889	750.0	S376	94.703	91.350	1.954	Open Manhole	2500
S638.000	35.665	240.6	S33	95.021	93.373	1.348	Open Manhole	1500
S638.001	21.672	462.4	S34	95.021	93.126	1.395	Open Manhole	1500
S638.002	43.859	578.3	S35	95.053	92.950	1.503	Open Manhole	1800
S638.003	20.422	750.0	S36	95.031	92.723	1.509	Open Manhole	1800
S638.004	23.985	750.0	S37	94.913	92.691	1.422	Open Manhole	1800
S638.005	54.473	691.8	S38	94.688	92.612	1.275	Open Manhole	1800
S638.006	55.021	716.8	S39	94.535	92.435	1.200	Open Manhole	1800

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S638.007	o	900	S39	94.535	92.435	1.200	Open Manhole	1800
S638.008	o	900	S40	94.458	92.358	1.200	Open Manhole	1800
S638.009	o	1100	S41	94.362	92.062	1.200	Open Manhole	2000
S637.009	o	1600	S376	94.703	91.150	1.954	Open Manhole	2500
S639.000	o	400	S100	94.848	93.248	1.200	Open Manhole	1350
S639.001	o	500	S438	94.756	93.056	1.200	Open Manhole	1500
S639.002	o	600	S439	94.577	92.777	1.200	Open Manhole	1500
S639.003	o	800	S440	94.573	92.546	1.227	Open Manhole	1800
S639.004	o	900	S441	94.535	92.429	1.206	Open Manhole	1800
S639.005	o	1000	S442	94.510	92.288	1.222	Open Manhole	1900
S639.006	o	1000	S443	94.472	92.263	1.210	Open Manhole	1900
S639.007	o	1100	S444	94.439	92.122	1.217	Open Manhole	2000
S639.008	o	1100	S445	94.415	92.106	1.208	Open Manhole	2000
S639.009	o	1200	S446	94.397	91.966	1.231	Open Manhole	2100
S639.010	o	1200	S447	94.354	91.926	1.229	Open Manhole	2100
S639.011	o	1200	S61	94.431	91.870	1.360	Open Manhole	2100

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S638.007	16.488	214.4	S40	94.458	92.358	1.200	Open Manhole	1800
S638.008	24.483	254.2	S41	94.362	92.262	1.200	Open Manhole	2000
S638.009	77.897	750.0	S376	94.703	91.958	1.645	Open Manhole	2500
S637.009	61.758	750.0	S29	95.044	91.067	2.376	Open Manhole	2900
S639.000	22.553	245.4	S438	94.756	93.156	1.200	Open Manhole	1500
S639.001	30.574	171.1	S439	94.577	92.877	1.200	Open Manhole	1500
S639.002	17.055	553.8	S440	94.573	92.746	1.227	Open Manhole	1800
S639.003	13.134	750.0	S441	94.535	92.529	1.206	Open Manhole	1800
S639.004	30.659	750.0	S442	94.510	92.388	1.222	Open Manhole	1900
S639.005	18.963	750.0	S443	94.472	92.263	1.210	Open Manhole	1900
S639.006	30.489	750.0	S444	94.439	92.222	1.217	Open Manhole	2000
S639.007	11.589	750.0	S445	94.415	92.106	1.208	Open Manhole	2000
S639.008	30.392	750.0	S446	94.397	92.066	1.231	Open Manhole	2100
S639.009	30.319	750.0	S447	94.354	91.926	1.229	Open Manhole	2100
S639.010	41.440	750.0	S61	94.431	91.870	1.360	Open Manhole	2100
S639.011	28.987	750.0	S29	95.044	91.832	2.012	Open Manhole	2900

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S637.010	o	2000	S29	95.044	90.667	2.376	Open Manhole	2900
S637.011	o	2000	S377	94.796	90.616	2.180	Open Manhole	2900
S637.012	2100 []	2100	S378	94.421	90.516	1.905	Open Manhole	3000
S637.013	2100 []	2100	S379	94.069	90.428	1.641	Open Manhole	3000
S637.014	2100 []	2400	S50	93.693	90.305	1.388	Open Manhole	3000
S637.015	2100 []	2400	S380	94.475	90.183	2.292	Open Manhole	3000
S640.000	o	600	S432	95.722	93.922	1.200	Open Manhole	1500
S640.001	o	700	S433	95.688	93.747	1.241	Open Manhole	1500
S640.002	o	1000	S434	95.372	93.172	1.200	Open Manhole	1900
S640.003	o	1300	S435	95.649	92.758	1.591	Open Manhole	2200
S640.004	o	1300	S436	95.510	92.588	1.622	Open Manhole	2200
S641.000	o	500	S42	94.550	92.850	1.200	Open Manhole	1500
S641.001	o	900	S51	93.948	91.848	1.200	Open Manhole	1800
S641.002	o	1100	S51	93.853	91.539	1.214	Open Manhole	2000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S637.010	38.242	750.0	S377	94.796	90.616	2.180	Open Manhole	2900
S637.011	75.000	750.0	S378	94.421	90.516	1.905	Open Manhole	3000
S637.012	66.367	754.2	S379	94.069	90.428	1.641	Open Manhole	3000
S637.013	92.084	748.7	S50	93.693	90.305	1.388	Open Manhole	3000
S637.014	91.631	750.0	S380	94.475	90.183	2.292	Open Manhole	3000
S637.015	85.686	750.0	S22	95.204	90.069	3.135	Open Manhole	3000
S640.000	43.000	577.5	S433	95.688	93.847	1.241	Open Manhole	1500
S640.001	43.000	156.5	S434	95.372	93.472	1.200	Open Manhole	1900
S640.002	86.000	750.0	S435	95.649	93.058	1.591	Open Manhole	2200
S640.003	127.157	750.0	S436	95.510	92.588	1.622	Open Manhole	2200
S640.004	166.844	750.0	S27	95.252	92.366	1.586	Open Manhole	2900
S641.000	118.311	196.6	S51	93.948	92.248	1.200	Open Manhole	1800
S641.001	82.000	750.0	S51	93.853	91.739	1.214	Open Manhole	2000
S641.002	92.339	750.0	S43	94.776	91.416	2.261	Open Manhole	2400

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S642.000	o	400	S30	95.189	93.589	1.200	Open Manhole	1350
S642.001	o	700	S31	94.587	92.687	1.200	Open Manhole	1500
S642.002	o	1000	S32	94.386	92.186	1.200	Open Manhole	1900
S642.003	o	1100	S33	94.845	91.964	1.782	Open Manhole	2000
S641.003	o	1500	S43	94.776	91.016	2.261	Open Manhole	2400
S640.005	o	2000	S27	95.252	90.451	2.801	Open Manhole	2900
S637.016	2100 []	2100	S22	95.204	90.069	3.135	Open Manhole	3000
S643.000	o	300	S184	95.645	94.145	1.200	Junction	
S643.001	o	300	S381	95.627	93.880	1.447	Open Manhole	1200
S637.017	2100 []	3300	S464	95.845	89.654	4.191	Open Manhole	3000
S637.018	2100 []	3300	S552	95.324	89.521	3.803	Open Manhole	3000
S637.019	2100 []	3300	S553	94.841	89.386	3.455	Open Manhole	3000
S637.020	2100 []	3300	S554	94.351	89.255	3.096	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S642.000	120.192	199.5	S31	94.587	92.987	1.200	Open Manhole	1500
S642.001	84.765	422.0	S32	94.386	92.486	1.200	Open Manhole	1900
S642.002	91.544	750.0	S33	94.845	92.064	1.782	Open Manhole	2000
S642.003	63.002	750.0	S43	94.776	91.880	1.797	Open Manhole	2400
S641.003	48.466	750.0	S27	95.252	90.951	2.801	Open Manhole	2900
S640.005	39.333	750.0	S22	95.204	90.399	2.805	Open Manhole	3000
S637.016	85.686	206.7	S464	95.845	89.654	4.191	Open Manhole	3000
S643.000	63.755	240.6	S381	95.627	93.880	1.447	Open Manhole	1200
S643.001	43.308	17.2	S464	95.845	91.354	4.191	Open Manhole	3000
S637.017	100.003	750.0	S552	95.324	89.521	3.803	Open Manhole	3000
S637.018	101.200	750.0	S553	94.841	89.386	3.455	Open Manhole	3000
S637.019	98.656	750.0	S554	94.351	89.255	3.096	Open Manhole	3000
S637.020	48.495	750.0	S555	94.286	89.190	3.096	Open Manhole	3000

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S644.000	o	400	S393	93.457	91.857	1.200	Open Manhole	1350
S644.001	o	600	S394	92.945	91.145	1.200	Open Manhole	1500
S637.021	2100 []	3300	S555	94.286	89.190	3.096	Open Manhole	3000
S637.022	2100 []	3600	S85	94.198	89.116	3.081	Open Manhole	3000
S637.023	2100 []	3600	S649	92.849	89.050	1.799	Open Manhole	3000
S645.000	o	1100	S475	95.018	92.718	1.200	Open Manhole	2000
S645.001	o	1200	S476	93.818	91.418	1.200	Open Manhole	2100
S645.002	o	1800	S477	93.523	90.523	1.200	Open Manhole	2700
S645.003	o	1800	S385	93.507	90.442	1.265	Open Manhole	2700
S645.004	o	1800	S371	93.666	90.373	1.493	Open Manhole	2700
S646.000	o	300	S450	93.282	91.782	1.200	Open Manhole	1200
S645.005	2100 []	2100	S608	93.262	89.943	1.320	Open Manhole	3000
S645.006	2100 []	2100	S451	93.018	89.809	1.210	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S644.000	89.983	175.6	S394	92.945	91.345	1.200	Open Manhole	1500
S644.001	58.149	531.9	S555	94.286	91.035	2.650	Open Manhole	3000
S637.021	55.285	750.0	S85	94.198	89.116	3.081	Open Manhole	3000
S637.022	49.623	750.0	S649	92.849	89.050	1.799	Open Manhole	3000
S637.023	0.500#	750.0	S485	93.000	89.049	1.951	Open Manhole	3000
S645.000	96.835	80.7	S476	93.818	91.518	1.200	Open Manhole	2100
S645.001	37.392	127.0	S477	93.523	91.123	1.200	Open Manhole	2700
S645.002	61.097	750.0	S385	93.507	90.442	1.265	Open Manhole	2700
S645.003	51.978	750.0	S371	93.666	90.373	1.493	Open Manhole	2700
S645.004	42.628	350.0	S608	93.262	90.251	1.211	Open Manhole	3000
S646.000	48.825	350.0	S608	93.262	91.643	1.320	Open Manhole	3000
S645.005	25.127	187.5	S451	93.018	89.809	1.210	Open Manhole	3000
S645.006	0.500#	6.0	S485	93.000	89.725	1.275	Open Manhole	3000

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd	Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S647.000		o	700	S3	96.331	94.431	1.200	Open Manhole	1500
S647.001		o	800	S1	96.298	94.212	1.286	Open Manhole	1800
S647.002		o	1100	S2	96.025	93.725	1.200	Open Manhole	2000
S647.003		o	1400	S42	96.219	93.399	1.421	Open Manhole	2300
S647.004	1000	[]	1900	S6	96.156	93.342	1.814	Junction	
S647.005	1000	[]	1900	S3	96.108	93.335	1.772	Open Manhole	3000
S647.006	1000	[]	2200	S8	96.278	93.313	1.966	Junction	
S647.007	1000	[]	2800	S10	96.300	93.271	2.029	Junction	
S647.008	1000	[]	2800	S12	96.134	93.244	1.889	Junction	
S647.009	1000	[]	3000	S12	96.426	93.205	2.221	Junction	
S647.010	2100	[]	3000	S14	96.258	91.976	2.282	Junction	
S647.011	2100	[]	3000	S15	96.108	91.957	2.152	Open Manhole	3000
S647.012	2100	[]	3000	S17	96.254	91.937	2.317	Junction	
S647.013	2100	[]	3000	S17	96.414	91.608	2.806	Open Manhole	3000
S647.014	2100	[]	3000	S7	96.108	91.567	2.540	Open Manhole	3000
S647.015	2100	[]	3000	S30	96.118	91.566	2.552	Junction	
S647.016	2100	[]	3000	S30	96.232	91.451	2.782	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S647.000	83.664	706.7	S1	96.298	94.312	1.286	Open Manhole	1800
S647.001	18.402	98.1	S2	96.025	94.025	1.200	Open Manhole	2000
S647.002	19.535	750.0	S42	96.219	93.699	1.421	Open Manhole	2300
S647.003	42.496	750.0	S6	96.156	93.342	1.414	Junction	
S647.004	4.892	750.0	S3	96.108	93.335	1.772	Open Manhole	3000
S647.005	17.052	750.0	S8	96.278	93.313	1.966	Junction	
S647.006	31.244	750.0	S10	96.300	93.271	2.029	Junction	
S647.007	20.109	750.0	S12	96.134	93.244	1.889	Junction	
S647.008	29.257	750.0	S12	96.426	93.205	2.221	Junction	
S647.009	21.752	95.0	S14	96.258	92.976	2.282	Junction	
S647.010	14.716	750.0	S15	96.108	91.957	2.152	Open Manhole	3000
S647.011	14.596	750.0	S17	96.254	91.937	2.317	Junction	
S647.012	22.077	67.0	S17	96.414	91.608	2.806	Open Manhole	3000
S647.013	30.309	750.0	S7	96.108	91.567	2.540	Open Manhole	3000
S647.014	1.083	750.0	S30	96.118	91.566	2.552	Junction	
S647.015	11.426	99.2	S30	96.232	91.451	2.782	Junction	
S647.016	39.860	157.5	S35	96.254	91.197	3.057	Junction	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S647.017	2100 []	3000	S35	96.254	91.197	3.057	Junction	
S647.018	2100 []	3000	S8	96.108	91.178	2.930	Open Manhole	3000
S647.019	2100 []	3000	S38	96.187	91.165	3.022	Junction	
S647.020	2100 []	3000	S38	96.359	91.130	3.229	Junction	
S647.021	2100 []	3000	S40	96.142	91.097	3.045	Junction	
S647.022	2100 []	3000	S40	96.087	91.088	2.998	Open Manhole	3000
S647.023	2100 []	3000	S46	96.379	91.051	3.328	Open Manhole	3000
S647.024	2100 []	3000	S10	96.103	91.000	3.103	Open Manhole	3000
S647.025	2100 []	3000	S51	96.218	90.981	3.237	Junction	
S647.026	2100 []	3000	S51	96.407	90.960	3.446	Open Manhole	3000
S647.027	2100 []	3000	S11	96.201	90.928	3.273	Open Manhole	3000
S647.028	2100 []	3000	S56	96.120	90.909	3.211	Open Manhole	3000
S647.029	2100 []	3000	S100	96.213	90.897	3.317	Open Manhole	3000
S647.030	2100 []	3000	S62	96.157	90.870	3.287	Junction	
S647.031	2100 []	3000	S13	96.089	90.861	3.229	Open Manhole	3000
S647.032	2100 []	3000	S86	96.111	90.795	3.315	Open Manhole	3000
S647.033	2100 []	3300	S565	96.310	90.741	3.570	Open Manhole	3000
S647.034	2100 []	3300	S441	95.300	90.616	2.684	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S647.017	14.686	750.0	S8	96.108	91.178	2.930	Open Manhole	3000
S647.018	9.783	750.0	S38	96.187	91.165	3.022	Junction	
S647.019	26.212	750.0	S38	96.359	91.130	3.229	Junction	
S647.020	24.788	750.0	S40	96.142	91.097	3.045	Junction	
S647.021	6.374	750.0	S40	96.087	91.088	2.998	Open Manhole	3000
S647.022	28.071	750.0	S46	96.379	91.051	3.328	Open Manhole	3000
S647.023	37.964	750.0	S10	96.103	91.000	3.103	Open Manhole	3000
S647.024	14.091	750.0	S51	96.218	90.981	3.237	Junction	
S647.025	18.532	882.5	S51	96.407	90.960	3.446	Open Manhole	3000
S647.026	24.232	750.0	S11	96.201	90.928	3.273	Open Manhole	3000
S647.027	14.360	750.0	S56	96.120	90.909	3.211	Open Manhole	3000
S647.028	9.238	750.0	S100	96.213	90.897	3.317	Open Manhole	3000
S647.029	20.199	750.0	S62	96.157	90.870	3.287	Junction	
S647.030	6.857	750.0	S13	96.089	90.861	3.229	Open Manhole	3000
S647.031	48.917	750.0	S86	96.111	90.795	3.315	Open Manhole	3000
S647.032	35.684	651.1	S565	96.310	90.741	3.570	Open Manhole	3000
S647.033	92.826	743.7	S441	95.300	90.616	2.684	Open Manhole	3000
S647.034	92.298	750.0	S465	94.745	90.493	2.253	Junction	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S647.035	2100 []	3300	S465	94.745	90.493	2.253	Junction	
S647.036	2100 []	3300	S569	94.413	90.425	1.988	Open Manhole	3000
S647.037	2100 []	3300	S469	94.102	90.359	1.743	Junction	
S647.038	2100 []	4200	S645	93.660	90.259	1.401	Open Manhole	3000
S647.039	2100 []	4200	S473	94.151	90.225	1.926	Open Manhole	3000
S648.000	o	300	S477	94.285	92.785	1.200	Open Manhole	1200
S647.040	2100 []	2400	S476	94.123	90.190	1.933	Open Manhole	3000
S649.000	o	300	S476	93.274	91.774	1.200	Open Manhole	1200
S649.001	o	300	S480	93.238	91.542	1.396	Open Manhole	1200
S647.041	2100 []	3300	S476	93.257	89.727	1.529	Open Manhole	3000
S647.042	2100 []	4000	S484	92.638	89.305	1.333	Open Manhole	3000
S650.000	|_|	1400	S488	93.000	89.800	1.200	Junction	
S650.001	|_|	1400	S489	93.000	89.551	1.449	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S647.035	50.923	750.0	S569	94.413	90.425	1.988	Open Manhole	3000
S647.036	49.677	750.0	S469	94.102	90.359	1.743	Junction	
S647.037	75.030	750.0	S645	93.660	90.259	1.401	Open Manhole	3000
S647.038	25.479	750.0	S473	94.151	90.225	1.926	Open Manhole	3000
S647.039	25.627	750.0	S476	94.123	90.190	1.933	Open Manhole	3000
S648.000	56.611	240.6	S476	94.123	92.550	1.273	Open Manhole	3000
S647.040	41.217	156.8	S476	93.257	89.927	1.329	Open Manhole	3000
S649.000	55.811	240.6	S480	93.238	91.542	1.396	Open Manhole	1200
S649.001	27.582	240.6	S476	93.257	91.427	1.529	Open Manhole	3000
S647.041	41.015	419.9	S484	92.638	89.630	1.008	Open Manhole	3000
S647.042	0.500#	0.0	S485	93.000	89.305	1.695	Open Manhole	3000
S650.000	187.025	750.0	S489	93.000	89.551	1.449	Junction	
S650.001	0.500#	750.0	S485	93.000	89.550	1.450	Open Manhole	3000

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S651.000	o	600	S65	95.022	93.222	1.200	Junction	
S651.001	o	900	S54	95.128	92.885	1.343	Open Manhole	1800
S651.002	o	900	S101	95.407	92.845	1.662	Junction	
S652.000	o	500	S390	94.718	93.018	1.200	Open Manhole	1500
S652.001	o	600	S123	95.189	92.816	1.773	Open Manhole	1500
S651.003	o	1000	S123	95.524	92.376	2.147	Junction	
S651.004	o	1250	S125	95.542	92.074	2.217	Junction	
S651.005	o	1250	S126	95.466	92.035	2.180	Junction	
S651.006	o	1300	S56	95.569	91.952	2.317	Junction	
S651.007	o	1300	S147	95.452	91.928	2.223	Junction	
S651.008	o	1300	S147	95.375	91.909	2.165	Junction	
S651.009	o	1300	S149	95.449	91.847	2.302	Junction	
S651.010	o	1400	S57	95.461	91.705	2.356	Open Manhole	2300
S651.011	o	1500	S155	95.442	91.567	2.374	Junction	
S651.012	o	1500	S154	95.531	91.542	2.488	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S651.000	21.260	577.5	S54	95.128	93.185	1.343	Open Manhole	1800
S651.001	29.867	746.7	S101	95.407	92.845	1.662	Junction	
S651.002	42.456	744.8	S123	95.524	92.788	1.836	Junction	
S652.000	47.107	462.4	S123	95.189	92.916	1.773	Open Manhole	1500
S652.001	22.877	577.5	S123	95.524	92.776	2.147	Junction	
S651.003	39.051	751.0	S125	95.542	92.324	2.217	Junction	
S651.004	29.070	745.4	S126	95.466	92.035	2.180	Junction	
S651.005	24.801	751.5	S56	95.569	92.002	2.317	Junction	
S651.006	18.285	761.9	S147	95.452	91.928	2.223	Junction	
S651.007	14.181	746.4	S147	95.375	91.909	2.165	Junction	
S651.008	46.717	753.5	S149	95.449	91.847	2.302	Junction	
S651.009	31.355	746.5	S57	95.461	91.805	2.356	Open Manhole	2300
S651.010	28.479	749.4	S155	95.442	91.667	2.374	Junction	
S651.011	19.018	760.7	S154	95.531	91.542	2.488	Junction	
S651.012	36.162	753.4	S172	95.480	91.494	2.486	Junction	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S651.013	o	1500	S172	95.480	91.494	2.486	Junction	
S651.014	o	1500	S58	95.494	91.465	2.529	Open Manhole	2400
S651.015	o	1600	S89	95.675	91.308	2.767	Junction	
S653.000	o	300	S76	95.596	93.696	1.600	Open Manhole	1200
S654.000	o	300	S70	96.367	94.867	1.200	Junction	
S654.001	o	400	S152	96.397	94.683	1.314	Open Manhole	1350
S654.002	o	500	S72	96.209	94.398	1.311	Junction	
S654.003	o	500	S16	95.846	94.146	1.200	Open Manhole	1500
S654.004	o	800	S17	95.639	93.639	1.200	Open Manhole	1800
S654.005	o	800	S158	95.914	93.558	1.557	Open Manhole	1800
S655.000	o	700	S25	96.524	94.624	1.200	Open Manhole	1500
S655.001	o	900	S26	96.602	94.345	1.358	Open Manhole	1800
S656.000	o	600	S190	95.664	93.864	1.200	Open Manhole	1500
S656.001	o	900	S171	96.163	93.472	1.791	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S651.013	22.037	759.9	S58	95.494	91.465	2.529	Open Manhole	2400
S651.014	43.120	756.5	S89	95.675	91.408	2.767	Junction	
S651.015	64.869	754.3	S75	95.048	91.222	2.226	Open Manhole	3000
S653.000	12.036	6.0	S74	95.699	91.688	3.712	Open Manhole	3000
S654.000	20.320	240.6	S152	96.397	94.783	1.314	Open Manhole	1350
S654.001	64.484	348.5	S72	96.209	94.498	1.311	Junction	
S654.002	35.924	142.9	S16	95.846	94.146	1.200	Open Manhole	1500
S654.003	16.248	78.3	S17	95.639	93.939	1.200	Open Manhole	1800
S654.004	60.800	750.0	S158	95.914	93.558	1.557	Open Manhole	1800
S654.005	15.982	8.4	S23	96.128	91.662	3.666	Open Manhole	3000
S655.000	56.339	706.7	S26	96.602	94.545	1.358	Open Manhole	1800
S655.001	68.450	750.0	S23	96.406	94.253	1.253	Open Manhole	2150
S656.000	52.668	578.3	S171	96.163	93.772	1.791	Open Manhole	1800
S656.001	34.407	750.0	S24	96.163	93.427	1.836	Open Manhole	1800

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S656.002	o	900	S24	96.163	93.427	1.836	Open Manhole	1800
S656.003	o	900	S175	96.363	93.368	2.095	Open Manhole	1800
S655.002	o	1250	S23	96.406	93.004	2.153	Open Manhole	2150
S655.003	o	1250	S26	95.952	92.959	1.744	Junction	
S655.004	o	1400	S24	95.933	92.769	1.764	Open Manhole	2300
S655.005	o	1400	S29	95.858	92.736	1.722	Junction	
S655.006	1000 []	1900	S27	95.830	92.724	2.106	Junction	
S655.007	1000 []	1900	S25	95.831	92.690	2.141	Open Manhole	3000
S655.008	1000 []	2200	S32	95.872	92.670	2.202	Junction	
S655.009	1000 []	2200	S38	95.825	92.652	2.173	Junction	
S655.010	1000 []	2800	S40	95.828	92.607	2.220	Junction	
S655.011	2100 []	3000	S163	95.826	91.579	2.247	Open Manhole	3000
S655.012	2100 []	3000	S51	95.832	91.537	2.294	Junction	
S655.013	2100 []	3000	S53	95.853	91.521	2.332	Junction	
S655.014	2100 []	3000	S27	95.824	91.457	2.367	Junction	
S655.015	2100 []	3000	S128	95.872	91.433	2.439	Junction	
S655.016	2100 []	3000	S129	95.812	91.414	2.397	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S656.002	43.792	750.0	S175	96.363	93.368	2.095	Open Manhole	1800
S656.003	10.953	750.0	S23	96.406	93.354	2.153	Open Manhole	2150
S655.002	33.840	752.0	S26	95.952	92.959	1.744	Junction	
S655.003	30.372	759.3	S24	95.933	92.919	1.764	Open Manhole	2300
S655.004	25.058	759.3	S29	95.858	92.736	1.722	Junction	
S655.005	8.898	741.5	S27	95.830	92.724	1.706	Junction	
S655.006	25.042	750.0	S25	95.831	92.690	2.141	Open Manhole	3000
S655.007	15.483	750.0	S32	95.872	92.670	2.202	Junction	
S655.008	13.149	750.0	S38	95.825	92.652	2.173	Junction	
S655.009	33.550	750.0	S40	95.828	92.607	2.220	Junction	
S655.010	29.244	1029.3	S163	95.826	92.579	2.247	Open Manhole	3000
S655.011	31.305	750.0	S51	95.832	91.537	2.294	Junction	
S655.012	11.966	750.0	S53	95.853	91.521	2.332	Junction	
S655.013	48.159	750.0	S27	95.824	91.457	2.367	Junction	
S655.014	17.702	750.0	S128	95.872	91.433	2.439	Junction	
S655.015	14.170	750.0	S129	95.812	91.414	2.397	Junction	
S655.016	28.689	773.8	S130	95.828	91.377	2.450	Junction	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S655.017	2100 []	3000	S130	95.828	91.377	2.450	Junction	
S655.018	2100 []	3000	S147	95.815	91.337	2.478	Open Manhole	3000
S655.019	2100 []	3000	S149	95.825	91.296	2.529	Junction	
S655.020	2100 []	3000	S149	95.875	91.271	2.604	Junction	
S655.021	2100 []	3000	S29	95.827	91.255	2.572	Open Manhole	3000
S655.022	2100 []	3000	S30	95.889	91.220	2.669	Open Manhole	3000
S655.023	2100 []	3000	S174	95.733	91.208	2.525	Junction	
S655.024	2100 []	3000	S32	95.734	91.171	2.563	Open Manhole	3000
S655.025	2100 []	3000	S181	95.795	91.129	2.667	Junction	
S655.026	2100 []	3000	S34	96.031	91.097	2.934	Open Manhole	3000
S654.006	2100 []	3000	S23	96.128	90.462	3.666	Open Manhole	3000
S653.001	2100 []	3000	S74	95.699	89.988	3.712	Open Manhole	3000
S651.016	2100 []	3000	S75	95.048	89.902	3.146	Open Manhole	3000
S651.017	2100 []	3000	S54	95.777	89.855	3.921	Open Manhole	3000
S651.018	2100 []	3000	S351	95.666	89.799	3.867	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S655.017	30.421	750.0	S147	95.815	91.337	2.478	Open Manhole	3000
S655.018	30.968	750.0	S149	95.825	91.296	2.529	Junction	
S655.019	18.058	750.0	S149	95.875	91.271	2.604	Junction	
S655.020	34.984	2106.0	S29	95.827	91.255	2.572	Open Manhole	3000
S655.021	26.508	750.0	S30	95.889	91.220	2.669	Open Manhole	3000
S655.022	28.736	2584.3	S174	95.733	91.208	2.525	Junction	
S655.023	28.227	750.0	S32	95.734	91.171	2.563	Open Manhole	3000
S655.024	36.372	865.9	S181	95.795	91.129	2.667	Junction	
S655.025	23.681	750.0	S34	96.031	91.097	2.934	Open Manhole	3000
S655.026	25.777	750.0	S23	96.128	91.063	3.065	Open Manhole	3000
S654.006	55.665	750.0	S74	95.699	90.388	3.312	Open Manhole	3000
S653.001	64.009	750.0	S75	95.048	89.902	3.146	Open Manhole	3000
S651.016	35.597	757.4	S54	95.777	89.855	3.921	Open Manhole	3000
S651.017	42.266	750.0	S351	95.666	89.799	3.867	Open Manhole	3000
S651.018	43.160	750.0	S352	95.539	89.742	3.797	Open Manhole	3000

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S651.019	2100 []	3000	S352	95.539	89.742	3.797	Open Manhole	3000
S651.020	2100 []	3000	S353	95.442	89.692	3.750	Open Manhole	3000
S651.021	2100 []	3000	S456	95.196	89.633	3.563	Open Manhole	3000
S651.022	2100 []	3300	S368	94.961	89.567	3.394	Open Manhole	3000
S651.023	2100 []	3300	S368	94.543	89.502	3.041	Open Manhole	3000
S651.024	2100 []	3300	S368	94.322	89.416	2.906	Open Manhole	3000
S651.025	2100 []	3600	S457	93.258	89.240	2.018	Open Manhole	3000
S651.026	2100 []	3600	S449	92.757	89.211	1.545	Open Manhole	3000
S637.024	o	500	S485	93.000	89.159	3.341	Open Manhole	3000
S657.000	|_|	5000	S446	102.342	101.342	0.000	Junction	
S657.001	|_|	5000	S447	101.469	101.042	-0.573	Junction	
S657.002	|_|	5000	S448	100.960	98.260	1.200	Junction	
S657.003	|_|	6000	S449	104.362	98.075	4.787	Junction	
S657.004	|_|	6000	S450	104.534	97.882	5.152	Junction	
S657.005	|_|	6000	S451	102.894	97.722	3.672	Junction	
S657.006	|_|	6000	S452	100.259	97.556	1.203	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S651.019	37.391	750.0	S353	95.442	89.692	3.750	Open Manhole	3000
S651.020	44.201	750.0	S456	95.196	89.633	3.563	Open Manhole	3000
S651.021	49.073	750.0	S368	94.961	89.567	3.394	Open Manhole	3000
S651.022	49.073	750.0	S368	94.543	89.502	3.041	Open Manhole	3000
S651.023	64.235	750.0	S368	94.322	89.416	2.906	Open Manhole	3000
S651.024	55.588	315.4	S457	93.258	89.240	2.018	Open Manhole	3000
S651.025	21.521	750.0	S449	92.757	89.211	1.545	Open Manhole	3000
S651.026	0.500#	500.0	S485	93.000	89.210	1.790	Open Manhole	3000
S637.024	34.651	20.4	S	88.958	87.458	1.000	Open Manhole	0
S657.000	119.878	400.0	S447	101.469	101.042	-0.573	Junction	
S657.001	91.077	39.9	S448	100.960	98.760	1.200	Junction	
S657.002	138.418	750.0	S449	104.362	98.075	4.787	Junction	
S657.003	144.723	750.0	S450	104.534	97.882	5.152	Junction	
S657.004	120.039	750.0	S451	102.894	97.722	3.672	Junction	
S657.005	124.926	750.0	S452	100.259	97.556	1.203	Junction	
S657.006	104.224	43.3	S453	97.849	95.149	1.200	Junction	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S657.007	|_|	6000	S453	97.849	95.149	1.200	Junction	
S657.008	|_|	6000	S454	92.028	89.328	1.200	Junction	
S657.009	|_|	6000	S455	89.756	87.056	1.200	Junction	
S657.010	|_|	6000	S456	89.277	86.577	1.200	Junction	
S657.011	|_|	1500	S439	92.135	86.214	4.521	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S657.007	135.865	23.3	S454	92.028	89.328	1.200	Junction	
S657.008	101.278	44.6	S455	89.756	87.056	1.200	Junction	
S657.009	146.374	305.6	S456	89.277	86.577	1.200	Junction	
S657.010	30.000#	750.0	S439	92.135	86.537	4.098	Junction	
S657.011	298.893	749.1	S440	93.083	85.815	5.868	Open Manhole	10000

Free Flowing Outfall Details for Phase 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S637.024	S	88.958	87.458	0.000	0	0

Free Flowing Outfall Details for Phase 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S657.011	S440	93.083	85.815	0.000	10000	0

Simulation Criteria for Phase 1

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	2880
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	5

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

Rainfall Profile Details

Event Name Duration (mins) 65 Timestep (mins) 5 Profiles 6

Online Controls for Phase 1

Orifice Manhole: S485, DS/PN: S637.024, Volume (m^3): -46.0

Diameter (m) 0.001 Discharge Coefficient 0.600 Invert Level (m) 89.159

Hydroslide Manhole: S439, DS/PN: S657.011, Volume (m^3): 486.0

Design Head (m)	4.000	Invert Level (m)	86.214
Design Flow (l/s)	100.0	Maximum Head (m)	4.050
Range	VS	Minimum Pipe Diameter (mm)	300
Application	Stormwater	Minimum Manhole Diameter (mm)	2400
Model	DR 300 VS		

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	8.2	1.200	100.0	3.000	100.0	7.000	131.1
0.200	31.1	1.400	100.0	3.500	92.7	7.500	135.7
0.300	58.4	1.600	100.0	4.000	99.1	8.000	140.1
0.400	90.1	1.800	100.0	4.500	105.1	8.500	144.4
0.500	100.0	2.000	100.0	5.000	110.8	9.000	148.6
0.600	100.0	2.200	100.0	5.500	116.2	9.500	152.7
0.800	100.0	2.400	100.0	6.000	121.4		
1.000	100.0	2.600	100.0	6.500	126.3		

Storage Structures for Phase 1

Infiltration Basin Manhole: S485, DS/PN: S637.024

Invert Level (m) 89.049 Safety Factor 1.5
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.03600

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	37000.0	1.000	39073.9	2.000	41204.4	3.000	43391.4
0.500	38029.9	1.500	40132.1	2.500	42290.8	3.841	45274.4

Infiltration Basin Manhole: S439, DS/PN: S657.011

Invert Level (m) 86.214 Safety Factor 1.5
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.03600

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	12500.0	1.500	14347.1	4.000	17708.4	5.969	20604.5
0.500	13101.6	2.000	14991.1	5.000	19151.8		
1.000	13717.3	3.000	16321.5	5.242	19509.7		

Summary of Results for Measured Rainfall - (Phase 1)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S637.000	S316	94.073	-0.300	0.000	0.00			0.0	OK
S637.001	S3	93.986	-0.300	0.000	0.00			0.0	OK
S637.002	S317	93.811	-0.351	0.000	0.62			353.5	OK
S637.003	S5	93.511	-0.596	0.000	0.22			340.5	OK
S637.004	S318	93.236	-0.388	0.000	0.53			496.2	OK
S637.005	S10	93.111	-0.433	0.000	0.43			464.4	OK
S637.006	S319	92.913	-0.393	0.000	0.52			666.9	OK*
S637.007	S320	92.775	-0.323	0.000	0.67			860.6	OK
S637.008	S375	92.263	-0.619	0.000	0.50			970.4	OK
S638.000	S32	93.689	-0.132	0.000	0.56			36.7	OK
S638.001	S33	93.546	-0.126	0.000	0.61			93.6	OK
S638.002	S34	93.508	-0.118	0.000	0.50			122.3	OK
S638.003	S35	93.462	-0.088	0.000	0.92			250.0	OK
S638.004	S36	93.396	-0.126	0.000	0.82			251.9	OK
S638.005	S37	93.193	-0.298	0.000	0.62			290.0	OK
S638.006	S38	92.998	-0.414	0.000	0.53			325.1	OK
S638.007	S39	92.827	-0.508	0.000	0.41			350.0	OK
S638.008	S40	92.746	-0.512	0.000	0.41			358.0	OK
S638.009	S41	92.592	-0.570	0.000	0.43			447.7	OK
S637.009	S376	92.079	-0.670	0.000	0.64			1555.2	OK
S639.000	S100	93.500	-0.148	0.000	0.68			86.3	OK
S639.001	S438	93.425	-0.130	0.000	0.45			124.3	OK
S639.002	S439	93.377	0.000	0.000	1.00			166.3	OK
S639.003	S440	93.214	-0.132	0.000	1.04			245.0	OK
S639.004	S441	93.162	-0.166	0.000	0.63			303.2	OK
S639.005	S442	93.097	-0.191	0.000	0.86			367.8	OK
S639.006	S443	93.048	-0.214	0.000	0.70			429.0	OK
S639.007	S444	92.963	-0.259	0.000	0.98			502.3	OK
S639.008	S445	92.928	-0.278	0.000	0.76			585.1	OK
S639.009	S446	92.824	-0.342	0.000	0.69			645.6	OK
S639.010	S447	92.746	-0.379	0.000	0.61			686.9	OK
S639.011	S61	92.660	-0.410	0.000	0.80			724.7	OK
S637.010	S29	91.889	-0.778	0.000	0.63			2215.9	OK
S637.011	S377	91.803	-0.814	0.000	0.53			2240.0	OK
S637.012	S378	91.661	-0.956	0.000	0.42			2434.6	OK
S637.013	S379	91.574	-0.954	0.000	0.40			2528.7	OK
S637.014	S50	91.502	-0.903	0.000	0.40			2928.0	OK
S637.015	S380	91.436	-0.847	0.000	0.37			2716.1	OK
S640.000	S432	94.325	-0.197	0.000	0.71			172.8	OK
S640.001	S433	94.125	-0.322	0.000	0.50			345.5	OK

Summary of Results for Measured Rainfall - (Phase 1)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S640.002	S434	93.787	-0.386	0.000	0.54			442.5	OK
S640.003	S435	93.555	-0.503	0.000	0.56			927.6	OK
S640.004	S436	93.269	-0.619	0.000	0.54			921.6	OK
S641.000	S42	93.139	-0.211	0.000	0.54			156.5	OK
S641.001	S51	92.370	-0.379	0.000	0.49			309.8	OK
S641.002	S51	92.175	-0.464	0.000	0.53			556.1	OK
S642.000	S30	93.857	-0.132	0.000	0.65			105.4	OK
S642.001	S31	93.045	-0.342	0.000	0.40			182.7	OK
S642.002	S32	92.816	-0.370	0.000	0.56			465.4	OK
S642.003	S33	92.631	-0.432	0.000	0.62			616.5	OK
S641.003	S43	91.889	-0.627	0.000	0.64			1253.3	OK
S640.005	S27	91.586	-0.866	0.000	0.64			2267.7	OK
S637.016	S22	91.371	-0.798	0.000	0.47			4776.0	OK
S643.000	S184	94.241	-0.204	0.000	0.20			14.3	OK*
S643.001	S381	93.974	-0.205	0.000	0.21			51.8	OK
S637.017	S464	91.321	-0.433	0.000	0.41			4414.3	OK
S637.018	S552	91.286	-0.335	0.000	0.38			4040.3	OK
S637.019	S553	91.253	-0.233	0.000	0.36			3849.1	OK
S637.020	S554	91.223	-0.132	0.000	0.44			3866.8	OK
S644.000	S393	92.087	-0.170	0.000	0.55			93.8	OK
S644.001	S394	91.548	-0.197	0.000	0.64			168.6	OK
S637.021	S555	91.198	-0.092	0.000	0.43			3872.3	OK
S637.022	S85	91.174	-0.043	0.000	0.41			3950.1	OK
S637.023	S649	91.150	0.000	0.000	0.61			3962.6	OK
S645.000	S475	93.446	-0.371	0.000	0.73			2357.9	OK
S645.001	S476	92.656	0.038	0.000	0.99			2143.4	SURCHARGED
S645.002	S477	91.937	-0.387	0.000	0.59			1873.1	OK
S645.003	S385	91.819	-0.423	0.000	0.58			1764.2	OK
S645.004	S371	91.701	-0.472	0.000	0.73			3070.1	OK
S646.000	S450	91.782	-0.300	0.000	0.00			0.0	OK
S645.005	S608	90.862	-1.180	0.000	0.37			3196.5	OK
S645.006	S451	90.756	-1.153	0.000	0.42			3305.6	OK
S647.000	S3	94.938	-0.193	0.000	0.65			226.8	OK
S647.001	S1	94.797	-0.215	0.000	0.76			582.9	OK
S647.002	S2	94.587	-0.238	0.000	0.98			534.0	OK
S647.003	S42	94.389	-0.410	0.000	0.60			970.2	OK
S647.004	S6	94.255	-0.086	0.000	0.36			1212.9	OK*
S647.005	S3	94.104	-0.231	0.000	1.34			1294.5	OK
S647.006	S8	93.923	-0.390	0.000	0.48			1399.5	OK*
S647.007	S10	93.867	-0.404	0.000	0.62			1958.2	OK*
S647.008	S12	93.822	-0.423	0.000	0.55			2087.3	OK*
S647.009	S12	93.738	-0.467	0.000	0.41			2347.7	OK*
S647.010	S14	93.716	-0.360	0.000	0.29			2488.6	OK*
S647.011	S15	93.710	-0.347	0.000	0.78			2535.3	OK

Summary of Results for Measured Rainfall - (Phase 1)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S647.012	S17	93.694	-0.343	0.000	0.18			2844.2	OK*
S647.013	S17	93.685	-0.022	0.000	0.47			2866.1	OK
S647.014	S7	93.667	0.000	0.000	0.57			3091.8	OK
S647.015	S30	92.567	-1.098	0.000	0.20			3148.4	OK*
S647.016	S30	92.562	-0.988	0.000	0.20			3170.4	OK*
S647.017	S35	92.551	-0.747	0.000	0.39			3359.1	OK*
S647.018	S8	92.543	-0.734	0.000	0.81			3296.6	OK
S647.019	S38	92.524	-0.740	0.000	0.31			3517.8	OK*
S647.020	S38	92.513	-0.717	0.000	0.32			3467.7	OK*
S647.021	S40	92.501	-0.695	0.000	0.23			3649.6	OK*
S647.022	S40	92.497	-0.691	0.000	0.62			3508.7	OK
S647.023	S46	92.459	-0.691	0.000	0.52			3763.7	OK
S647.024	S10	92.395	-0.705	0.000	1.15			3790.0	OK
S647.025	S51	92.366	-0.715	0.000	0.49			3948.9	OK*
S647.026	S51	92.355	-0.706	0.000	0.82			4045.8	OK
S647.027	S11	92.317	-0.712	0.000	1.29			4218.9	OK
S647.028	S56	92.284	-0.725	0.000	1.01			4243.3	OK
S647.029	S100	92.135	-0.861	0.000	1.04			4377.6	OK
S647.030	S62	92.087	-0.883	0.000	0.28			4400.1	OK*
S647.031	S13	92.082	-0.878	0.000	0.56			4424.3	OK
S647.032	S86	91.952	-0.943	0.000	0.58			4441.8	OK
S647.033	S565	91.816	-1.024	0.000	0.41			4386.8	OK
S647.034	S441	91.683	-1.033	0.000	0.41			4294.5	OK
S647.035	S465	91.546	-1.047	0.000	0.29			4316.6	OK*
S647.036	S569	91.493	-1.031	0.000	0.49			4325.6	OK
S647.037	S469	91.353	-1.105	0.000	0.29			4311.0	OK*
S647.038	S645	91.279	-1.079	0.000	0.67			4933.4	OK
S647.039	S473	91.206	-1.119	0.000	0.67			4912.5	OK
S648.000	S477	92.954	-0.131	0.000	0.53			36.1	OK
S647.040	S476	91.028	-1.262	0.000	0.41			4888.4	OK
S649.000	S476	91.891	-0.183	0.000	0.29			19.3	OK
S649.001	S480	91.663	-0.179	0.000	0.28			17.8	OK
S647.041	S476	90.693	-1.134	0.000	0.44			4874.4	OK
S647.042	S484	90.189	-1.216	0.000	0.67			4859.8	OK
S650.000	S488	91.374	-1.626	0.000	0.36			3248.0	OK
S650.001	S489	90.595	-2.405	0.000	0.25			2886.7	OK
S651.000	S65	93.627	-0.194	0.000	0.75			182.9	OK*
S651.001	S54	93.497	-0.288	0.000	0.71			337.5	OK
S651.002	S101	93.327	-0.418	0.000	0.45			324.3	OK*
S652.000	S390	93.338	-0.180	0.000	0.60			106.0	OK
S652.001	S123	93.245	-0.171	0.000	0.68			134.2	OK
S651.003	S123	93.007	-0.369	0.000	0.46			442.0	OK*
S651.004	S125	92.911	-0.414	0.000	0.54			818.1	OK*
S651.005	S126	92.844	-0.441	0.000	0.58			804.2	OK*

Summary of Results for Measured Rainfall - (Phase 1)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S651.006	S56	92.779	-0.473	0.000	0.66			862.3	OK*
S651.007	S147	92.738	-0.490	0.000	0.70			889.3	OK*
S651.008	S147	92.708	-0.501	0.000	0.50			939.2	OK*
S651.009	S149	92.616	-0.531	0.000	0.55			959.2	OK*
S651.010	S57	92.556	-0.549	0.000	0.77			974.6	OK
S651.011	S155	92.458	-0.609	0.000	0.58			1124.0	OK*
S651.012	S154	92.432	-0.610	0.000	0.42			1136.4	OK*
S651.013	S172	92.381	-0.613	0.000	0.55			1145.3	OK*
S651.014	S58	92.345	-0.621	0.000	0.60			1141.8	OK
S651.015	S89	92.042	-0.866	0.000	0.40			1294.3	OK*
S653.000	S76	93.898	-0.098	0.000	0.79			278.9	OK
S654.000	S70	95.020	-0.147	0.000	0.49			34.9	OK*
S654.001	S152	94.895	-0.188	0.000	0.47			55.6	OK
S654.002	S72	94.631	-0.266	0.000	0.39			137.7	OK*
S654.003	S16	94.464	-0.183	0.000	0.64			202.9	OK
S654.004	S17	94.139	-0.300	0.000	0.56			255.9	OK
S654.005	S158	93.749	-0.609	0.000	0.10			253.9	OK
S655.000	S25	95.109	-0.216	0.000	0.72			239.3	OK
S655.001	S26	94.933	-0.311	0.000	0.56			348.7	OK
S656.000	S190	94.271	-0.193	0.000	0.59			148.4	OK
S656.001	S171	94.175	-0.197	0.000	0.58			307.5	OK
S656.002	S24	94.116	-0.211	0.000	0.55			317.7	OK
S656.003	S175	94.030	-0.239	0.000	0.98			339.6	OK
S655.002	S23	93.917	-0.337	0.000	0.72			802.4	OK
S655.003	S26	93.797	-0.412	0.000	0.58			888.2	OK*
S655.004	S24	93.727	-0.441	0.000	0.89			1000.9	OK
S655.005	S29	93.452	-0.684	0.000	0.43			1064.4	OK*
S655.006	S27	93.436	-0.288	0.000	0.60			1315.7	OK*
S655.007	S25	93.403	-0.287	0.000	1.50			1338.3	OK
S655.008	S32	93.173	-0.496	0.000	0.60			1396.5	OK*
S655.009	S38	93.150	-0.502	0.000	0.46			1401.7	OK*
S655.010	S40	93.067	-0.540	0.000	0.57			1611.3	OK*
S655.011	S163	92.399	-1.280	0.000	0.27			1663.1	OK
S655.012	S51	92.358	-1.279	0.000	0.16			1693.8	OK*
S655.013	S53	92.355	-1.267	0.000	0.15			1952.0	OK*
S655.014	S27	92.329	-1.228	0.000	0.21			1964.1	OK*
S655.015	S128	92.324	-1.209	0.000	0.22			1949.1	OK*
S655.016	S129	92.320	-1.195	0.000	0.17			1931.8	OK*
S655.017	S130	92.309	-1.168	0.000	0.18			2191.8	OK*
S655.018	S147	92.296	-1.141	0.000	0.37			2261.0	OK
S655.019	S149	92.244	-1.152	0.000	0.25			2345.5	OK*
S655.020	S149	92.238	-1.134	0.000	0.24			2379.7	OK*
S655.021	S29	92.218	-1.137	0.000	0.45			2395.1	OK
S655.022	S30	92.169	-1.150	0.000	0.57			2482.1	OK

Summary of Results for Measured Rainfall - (Phase 1)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S655.023	S174	92.108	-1.200	0.000	0.22			2594.8	OK*
S655.024	S32	92.088	-1.183	0.000	0.43			2635.7	OK
S655.025	S181	91.988	-1.241	0.000	0.26			2750.1	OK*
S655.026	S34	91.968	-1.229	0.000	0.54			2808.9	OK
S654.006	S23	91.673	-0.889	0.000	0.35			2897.8	OK
S653.001	S74	91.619	-0.469	0.000	0.33			2817.6	OK
S651.016	S75	91.590	-0.413	0.000	0.56			3886.7	OK
S651.017	S54	91.563	-0.393	0.000	0.50			3805.4	OK
S651.018	S351	91.529	-0.370	0.000	0.49			3705.4	OK
S651.019	S352	91.497	-0.345	0.000	0.51			3736.2	OK
S651.020	S353	91.470	-0.322	0.000	0.49			3768.0	OK
S651.021	S456	91.442	-0.291	0.000	0.47			3777.5	OK
S651.022	S368	91.414	-0.253	0.000	0.45			3953.7	OK
S651.023	S368	91.389	-0.213	0.000	0.41			3899.4	OK
S651.024	S368	91.360	-0.157	0.000	0.27			3863.1	OK
S651.025	S457	91.333	-0.007	0.000	0.74			3921.7	OK
S651.026	S449	91.311	0.000	0.000	0.60			3934.9	OK
S637.024	S485	90.189	0.530	0.000	0.00		2750	0.0	SURCHARGED
S657.000	S446	101.596	-0.746	0.000	0.15			1980.8	OK
S657.001	S447	101.268	-0.201	0.000	0.44			5077.9	FLOOD RISK*
S657.002	S448	99.136	-1.824	0.000	0.17			7444.6	OK
S657.003	S449	98.973	-5.390	0.000	0.07			10829.9	OK
S657.004	S450	98.778	-5.756	0.000	0.06			11044.3	OK
S657.005	S451	98.587	-4.307	0.000	0.09			11249.2	OK
S657.006	S452	97.884	-2.375	0.000	0.13			11271.8	OK
S657.007	S453	95.413	-2.436	0.000	0.08			11294.4	OK
S657.008	S454	89.650	-2.378	0.000	0.13			11264.1	OK
S657.009	S455	88.450	-1.306	0.000	0.18			11058.0	OK
S657.010	S456	88.446	-0.831	0.000	0.21			10449.6	OK
S657.011	S439	88.445	-3.690	0.000	0.01		1740	99.9	OK

STORM SEWER DESIGN by the Rational Method

Design Criteria for Phase 3 - Construction

Pipe Sizes STANDARD Manhole Sizes STANDARD

IDF File	M100-65*	Add Flow / Climate Change (%)	0
Maximum Rainfall (mm/hr)	200	Minimum Backdrop Height (m)	0.200
Maximum Time of Concentration (mins)	100	Maximum Backdrop Height (m)	1.500
Foul Sewage (l/s/ha)	0.000	Min Design Depth for Optimisation (m)	1.200
		Min Vel for Auto Design only (m/s)	1.00
PIMP (%)	100	Min Slope for Optimisation (1:X)	750

Designed with Level Soffits

Network Design Table for Phase 3 - Construction

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
C11.000	112.491	1.008	111.6	0.227	5.00	0.0		0.033	→_/→		Swale	
C11.001	164.596	1.870	88.0	0.443	0.00	0.0		0.033	→_/→		Swale	
C11.002	62.576	0.556	112.5	0.672	0.00	0.0		0.033	→_/→		Swale	
C11.003	120.643	1.157	104.3	0.246	0.00	0.0		0.033	→_/→		Swale	
C11.004	129.710	1.221	106.2	0.406	0.00	0.0		0.033	→_/→		Swale	
C11.005	96.705	0.970	99.7	0.449	0.00	0.0		0.033	→_/→		Swale	
C11.006	54.727	0.120	456.1	12.794	0.00	0.0		0.033	2100 []	4000	2100 Culvert	
C12.000	72.273	0.938	77.1	0.000	5.00	0.0		0.033	→_/→		Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
C11.000	200.00	7.28	105.277	0.227	0.0	0.0	0.0	0.82	197.2	125.8
C11.001	200.00	9.68	104.169	0.670	0.0	0.0	0.0	1.14	446.4	371.8
C11.002	200.00	10.47	102.099	1.341	0.0	0.0	0.0	1.31	982.7	745.0
C11.003	200.00	11.95	101.543	1.587	0.0	0.0	0.0	1.36	1020.9	881.4
C11.004	200.00	13.42	100.286	1.993	0.0	0.0	0.0	1.48	1417.6	1106.7
C11.005	200.00	14.47	99.065	2.442	0.0	0.0	0.0	1.52	1463.3	1356.2
C11.006	200.00	15.29	95.495	15.236	0.0	0.0	0.0	1.12	8819.0	8461.8
C12.000	200.00	6.22	101.919	0.000	0.0	0.0	0.0	0.99	237.3	0.0

Network Design Table for Phase 3 - Construction

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
C12.001	79.931	1.179	67.8	0.444	0.00	0.0		0.033	→_/→		Swale	
C12.002	94.435	1.449	65.2	0.470	0.00	0.0		0.033	→_/→		Swale	
C11.007	79.059	0.200	395.3	0.707	0.00	0.0		0.030	→_/→		Swale	
C11.008	55.665	0.228	244.1	1.894	0.00	0.0		0.033	→_/→		Swale	
C11.009	72.180	0.175	412.5	1.523	0.00	0.0		0.033	→_/→		Swale	
C11.010	23.061	0.215	107.3	2.246	0.00	0.0		0.033	2100 []	3000	2100 Culvert	
C11.011	73.830	0.215	343.4	0.000	0.00	0.0		0.033	o	2400	Pipe/Conduit	
C11.012	96.266	0.128	750.0	2.774	0.00	0.0		0.033	o	2400	Pipe/Conduit	
C11.013	80.340	1.864	43.1	2.667	0.00	0.0		0.033	2100 []	4000	2100 Culvert	
C11.014	147.694	1.438	102.7	1.014	0.00	0.0	0.600		2100 []	4000	2100 Culvert	
C11.015	196.477	0.719	273.3	0.000	0.00	0.0	0.600		2100 []	4000	2100 Culvert	
C11.016	25.000#	0.719	34.8	0.000	0.00	0.0	0.600		2100 []	4000	2100 Culvert	
C13.000	80.883	0.681	118.8	11.740	5.00	0.0	0.600		1000 []	2000	1000 Culvert	
C13.001	80.883	0.474	170.6	1.204	0.00	0.0	0.600		1000 []	2500	1000 Culvert	
C13.002	83.131	0.111	748.9	5.987	0.00	0.0	0.600		2100 []	3000	2100 Culvert	
C13.003	83.359	0.111	750.0	0.000	0.00	0.0	0.600		2100 []	3000	2100 Culvert	
C13.004	71.901	0.275	261.5	0.793	0.00	0.0	0.600		2100 []	3000	2100 Culvert	
C13.005	47.199	0.345	136.9	0.000	0.00	0.0	0.600		2100 []	3000	2100 Culvert	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
C12.001	200.00	7.48	100.981	0.444	0.0	0.0	0.0	1.05	253.0	246.6
C12.002	200.00	8.67	99.702	0.914	0.0	0.0	0.0	1.33	518.8	507.5
C11.007	200.00	15.94	95.375	16.856	0.0	0.0	0.0	2.03	26912.2	9362.0
C11.008	200.00	16.36	95.175	18.750	0.0	0.0	0.0	2.19	23458.6	10413.7
C11.009	200.00	17.14	94.947	20.273	0.0	0.0	0.0	1.54	12441.9	11259.6
C11.010	200.00	17.32	94.772	22.519	0.0	0.0	0.0	2.15	12790.4	12506.9
C11.011	200.00	18.38	93.364	22.519	0.0	0.0	0.0	1.16	5262.6«	12506.9
C11.012	200.00	20.42	92.693	25.292	0.0	0.0	0.0	0.79	3561.0«	14047.4
C11.013	200.00	20.79	92.235	27.959	0.0	0.0	0.0	3.65	28687.2	15528.6
C11.014	200.00	21.18	92.125	28.973	0.0	0.0	0.0	6.19	48746.8	16091.6
C11.015	200.00	22.05	90.004	28.973	0.0	0.0	0.0	3.79	29845.4	16091.6
C11.016	200.00	22.09	89.700	28.973	0.0	0.0	0.0	10.66	83855.3	16091.6
C13.000	200.00	5.36	93.129	11.740	0.0	0.0	0.0	3.75	7206.7	6520.6
C13.001	200.00	5.77	92.448	12.944	0.0	0.0	0.0	3.26	7881.9	7189.3
C13.002	200.00	6.42	90.974	18.931	0.0	0.0	0.0	2.14	12734.6	10514.2
C13.003	200.00	7.07	90.863	18.931	0.0	0.0	0.0	2.14	12725.5	10514.2
C13.004	200.00	7.40	90.752	19.724	0.0	0.0	0.0	3.63	21606.0	10954.6
C13.005	200.00	7.56	90.477	19.724	0.0	0.0	0.0	5.02	29888.2	10954.6

Network Design Table for Phase 3 - Construction

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
C13.006	22.204	0.030	750.0	0.000	0.00	0.0	0.600		2100 []	3000	2100 Culvert	
C13.007	25.000#	1.000	25.0	5.917	0.00	0.0	0.600		2100 []	3000	2100 Culvert	
C14.000	99.220	0.200	496.1	2.830	5.00	0.0		0.033	→_/→		Swale	
C14.001	99.220	0.200	496.1	2.761	0.00	0.0		0.033	→_/→		Swale	
C14.002	98.718	0.200	493.6	2.827	0.00	0.0		0.033	→_/→		Swale	
C14.003	98.951	0.384	257.7	3.547	0.00	0.0		0.033	→_/→		Swale	
C14.004	98.910	2.010	49.2	0.000	0.00	0.0		0.033	→_/→		Swale	
C14.005	99.453	2.566	38.8	0.000	0.00	0.0		0.033	→_/→		Swale	
C14.006	97.152	0.200	485.8	0.000	0.00	0.0		0.033	→_/→		Swale	
C14.007	100.291	0.200	501.5	3.371	0.00	0.0		0.033	→_/→		Swale	
C14.008	99.570	0.200	497.9	2.895	0.00	0.0		0.033	→_/→		Swale	
C14.009	96.614	0.512	188.7	1.881	0.00	0.0		0.033	→_/→		Swale	
C14.010	151.092	1.224	123.4	2.222	0.00	0.0		0.033	→_/→		Swale	
C14.011	42.148	0.150	281.0	2.457	0.00	0.0		0.033	2100 []	5000	2100 Culvert	
C14.012	116.017	0.575	201.8	2.589	0.00	0.0		0.033	→_/→		Swale	
C14.013	44.834	0.220	203.8	1.395	0.00	0.0		0.033	2100 []	5000	2100 Culvert	
C14.014	79.926	0.240	333.0	3.940	0.00	0.0		0.033	→_/→		Swale	
C14.015	47.084	0.290	162.4	0.000	0.00	0.0		0.033	2100 []	3000	2100 Culvert	
C14.016	25.000#	0.170	147.1	1.303	0.00	0.0		0.033	2100 []	5000	2100 Culvert	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
C13.006	200.00	7.73	88.236	19.724	0.0	0.0	0.0	2.14	12725.5	10954.6
C13.007	200.00	7.77	88.193	25.640	0.0	0.0	0.0	11.77	70046.2	14240.7
C14.000	200.00	6.71	100.839	2.830	0.0	0.0	0.0	0.97	2557.4	1571.8
C14.001	200.00	8.20	100.639	5.590	0.0	0.0	0.0	1.11	4345.9	3105.0
C14.002	200.00	9.54	100.439	8.418	0.0	0.0	0.0	1.23	6757.0	4675.3
C14.003	200.00	10.42	100.239	11.965	0.0	0.0	0.0	1.87	13535.0	6645.3
C14.004	200.00	10.89	100.055	11.965	0.0	0.0	0.0	3.49	13476.9	6645.3
C14.005	200.00	11.25	97.573	11.965	0.0	0.0	0.0	4.54	27250.7	6645.3
C14.006	200.00	12.52	95.007	11.965	0.0	0.0	0.0	1.28	7697.5	6645.3
C14.007	200.00	13.58	94.807	15.336	0.0	0.0	0.0	1.57	18226.1	8517.6
C14.008	200.00	14.77	94.607	18.231	0.0	0.0	0.0	1.40	11260.5	10125.6
C14.009	200.00	15.55	94.407	20.112	0.0	0.0	0.0	2.06	12350.2	11170.2
C14.010	200.00	16.54	93.895	22.334	0.0	0.0	0.0	2.54	15269.6	12404.1
C14.011	200.00	17.01	91.471	24.790	0.0	0.0	0.0	1.49	14564.7	13768.5
C14.012	200.00	17.74	91.321	27.379	0.0	0.0	0.0	2.66	38904.4	15206.4
C14.013	200.00	18.17	90.746	28.774	0.0	0.0	0.0	1.75	17102.3	15981.3
C14.014	200.00	18.81	90.526	32.714	0.0	0.0	0.0	2.07	30176.4	18169.3
C14.015	200.00	19.26	88.041	32.714	0.0	0.0	0.0	1.75	10396.0«	18169.3
C14.016	200.00	19.46	87.751	34.017	0.0	0.0	0.0	2.06	20132.6	18893.0

Network Design Table for Phase 3 - Construction

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
C11.017	232.707	0.067	3473.2	8.146	0.00	0.0	0.600		o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
C11.017	198.60	37.14	90.500	96.776	0.0	0.0	0.0	0.26	18.2«	53372.2

Manhole Schedules for Phase 3 - Construction

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
C34	105.477	0.200	Junction		C11.000	105.277					
C35	104.469	0.300	Junction		C11.001	104.169		C11.000	104.269		
C36	102.599	0.500	Junction		C11.002	102.099		C11.001	102.299		
C37	102.043	0.500	Junction		C11.003	101.543		C11.002	101.543		
C38	100.886	0.600	Junction		C11.004	100.286		C11.003	100.386		
C39	99.665	0.600	Junction		C11.005	99.065		C11.004	99.065		
C40	98.695	3.200	Junction		C11.006	95.495	4000	C11.005	98.095		1200
C8	102.119	0.200	Junction		C12.000	101.919					
C9	101.181	0.200	Junction		C12.001	100.981		C12.000	100.981		
C10	100.002	0.300	Junction		C12.002	99.702		C12.001	99.802		
C41	98.553	3.178	Junction		C11.007	95.375		C11.006	95.375	4000	
								C12.002	98.253		
C27	97.988	2.813	Junction		C11.008	95.175		C11.007	95.175		
C42	97.760	2.813	Junction		C11.009	94.947		C11.008	94.947		
C29	97.162	2.390	Junction		C11.010	94.772	3000	C11.009	94.772		
C15	96.665	3.301	Junction		C11.011	93.364	2400	C11.010	94.557	3000	793
C43	96.150	3.457	Junction		C11.012	92.693	2400	C11.011	93.149	2400	456
C14	95.394	3.159	Junction		C11.013	92.235	4000	C11.012	92.565	2400	730
C30	94.653	4.282	Open Manhole	3000	C11.014	92.125	4000	C11.013	90.371	4000	
C18	93.629	3.625	Open Manhole	3000	C11.015	90.004	4000	C11.014	90.687	4000	683
C19	92.925	3.640	Open Manhole	3000	C11.016	89.700	4000	C11.015	89.285	4000	
C27	95.329	2.200	Junction		C13.000	93.129	2000				
C38	94.648	2.200	Open Manhole	3000	C13.001	92.448	2500	C13.000	92.448	2000	
C28	94.174	3.200	Junction		C13.002	90.974	3000	C13.001	91.974	2500	
C39	94.069	3.206	Open Manhole	3000	C13.003	90.863	3000	C13.002	90.863	3000	
C33	93.956	3.204	Open Manhole	3000	C13.004	90.752	3000	C13.003	90.752	3000	
C34	93.677	3.200	Open Manhole	3000	C13.005	90.477	3000	C13.004	90.477	3000	
C27	93.399	5.163	Open Manhole	3000	C13.006	88.236	3000	C13.005	90.132	3000	1896
C30	92.621	4.428	Open Manhole	3000	C13.007	88.193	3000	C13.006	88.206	3000	13
C36	102.039	1.200	Junction		C14.000	100.839					
C37	102.184	1.545	Junction		C14.001	100.639		C14.000	100.639		
C37	102.331	1.892	Junction		C14.002	100.439		C14.001	100.439		
C37	102.474	2.235	Junction		C14.003	100.239		C14.002	100.239		
C37	102.090	2.235	Junction		C14.004	100.055		C14.003	99.855		

Manhole Schedules for Phase 3 - Construction

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
C39	99.573	2.000	Junction		C14.005	97.573		C14.004	98.045		
C37	97.007	2.000	Junction		C14.006	95.007		C14.005	95.007		
C11	98.414	3.607	Junction		C14.007	94.807		C14.006	94.807		
C14	97.554	2.947	Junction		C14.008	94.607		C14.007	94.607		
C45	96.791	2.384	Junction		C14.009	94.407		C14.008	94.407		
C46	95.895	2.000	Junction		C14.010	93.895		C14.009	93.895		
C46	94.671	3.200	Open Manhole	10000	C14.011	91.471	5000	C14.010	92.671		1200
C47	94.677	3.356	Open Manhole	3000	C14.012	91.321		C14.011	91.321	5000	
C46	94.103	3.357	Open Manhole	10000	C14.013	90.746	5000	C14.012	90.746		
C15	93.877	3.351	Junction		C14.014	90.526		C14.013	90.526	5000	
C37	93.597	5.556	Open Manhole	10000	C14.015	88.041	3000	C14.014	90.286		3596
C22	93.220	5.469	Open Manhole	3000	C14.016	87.751	5000	C14.015	87.751	3000	
C42	92.000	4.807	Open Manhole	3000	C11.017	90.500	300	C11.016	88.981	4000	
								C13.007	87.193	3000	
								C14.016	87.581	5000	
C	92.000	1.567	Open Manhole	0		OUTFALL		C11.017	90.433	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
C34	673037.768	5772875.309			No Entry	
C35	673093.294	5772777.477			No Entry	
C36	673185.514	5772641.141			No Entry	
C37	673240.373	5772671.245			No Entry	
C38	673345.807	5772729.883			No Entry	

Manhole Schedules for Phase 3 - Construction

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
C39	673458.182	5772794.663			No Entry	
C40	673542.586	5772841.863			No Entry	
C8	673465.164	5773077.318			No Entry	
C9	673500.839	5773014.463			No Entry	
C10	673541.044	5772945.379			No Entry	
C41	673591.821	5772865.757			No Entry	
C27	673661.320	5772903.444			No Entry	
C42	673706.110	5772936.497			No Entry	
C29	673767.987	5772973.661			No Entry	
C15	673781.698	5772955.119			No Entry	
C43	673846.153	5772991.126			No Entry	
C14	673931.321	5773035.999			No Entry	
C30	673973.340	5772967.523	673973.340	5772967.523	Required	
C18	674047.975	5772840.075	674047.975	5772840.075	Required	

Manhole Schedules for Phase 3 - Construction

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
C19	674145.084	5772669.274	674145.084	5772669.274	Required	
C27	673863.525	5772571.494			No Entry	
C38	673934.013	5772611.160	673934.013	5772611.160	Required	
C28	674004.502	5772650.826			No Entry	
C39	674045.947	5772578.763	674045.947	5772578.763	Required	
C33	674086.290	5772505.817	674086.290	5772505.817	Required	
C34	674148.924	5772541.127	674148.924	5772541.127	Required	
C27	674189.860	5772564.621	674189.860	5772564.621	Required	
C30	674209.025	5772575.834	674209.025	5772575.834	Required	
C36	673241.794	5772521.480			No Entry	
C37	673291.318	5772435.503			No Entry	
C37	673340.842	5772349.527			No Entry	
C37	673390.249	5772264.062			No Entry	
C37	673439.690	5772178.348			No Entry	

Manhole Schedules for Phase 3 - Construction

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
C39	673489.178	5772092.709			No Entry	
C37	673540.332	5772007.420			No Entry	
C11	673624.745	5772055.513			No Entry	
C14	673711.885	5772105.161			No Entry	
C45	673798.042	5772155.072			No Entry	
C46	673882.031	5772202.823			No Entry	
C46	674012.950	5772278.250	674012.950	5772278.250	Required	
C47	674050.010	5772298.324	674050.010	5772298.324	Required	
C46	674150.846	5772355.701	674150.846	5772355.701	Required	
C15	674189.798	5772377.900			No Entry	
C37	674259.734	5772416.592	674259.734	5772416.592	Required	
C22	674300.790	5772439.642	674300.790	5772439.642	Required	
C42	674185.243	5772737.350	674185.243	5772737.350	Required	
C	674364.785	5772885.394			No Entry	

PIPELINE SCHEDULES for Phase 3 - Construction

Upstream Manhole

\# - Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
C11.000	→_/→		C34	105.477	105.277	0.000	Junction	
C11.001	→_/→		C35	104.469	104.169	0.000	Junction	
C11.002	→_/→		C36	102.599	102.099	0.000	Junction	
C11.003	→_/→		C37	102.043	101.543	0.000	Junction	
C11.004	→_/→		C38	100.886	100.286	0.000	Junction	
C11.005	→_/→		C39	99.665	99.065	0.000	Junction	
C11.006	2100 []	4000	C40	98.695	95.495	1.200	Junction	
C12.000	→_/→		C8	102.119	101.919	0.000	Junction	
C12.001	→_/→		C9	101.181	100.981	0.000	Junction	
C12.002	→_/→		C10	100.002	99.702	0.000	Junction	
C11.007	→_/→		C41	98.553	95.375	0.000	Junction	
C11.008	→_/→		C27	97.988	95.175	0.000	Junction	
C11.009	→_/→		C42	97.760	94.947	0.423	Junction	
C11.010	2100 []	3000	C29	97.162	94.772	0.390	Junction	
C11.011	o	2400	C15	96.665	93.364	0.901	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
C11.000	112.491	111.6	C35	104.469	104.269	0.000	Junction	
C11.001	164.596	88.0	C36	102.599	102.299	0.000	Junction	
C11.002	62.576	112.5	C37	102.043	101.543	0.000	Junction	
C11.003	120.643	104.3	C38	100.886	100.386	0.000	Junction	
C11.004	129.710	106.2	C39	99.665	99.065	0.000	Junction	
C11.005	96.705	99.7	C40	98.695	98.095	0.000	Junction	
C11.006	54.727	456.1	C41	98.553	95.375	1.178	Junction	
C12.000	72.273	77.1	C9	101.181	100.981	0.000	Junction	
C12.001	79.931	67.8	C10	100.002	99.802	0.000	Junction	
C12.002	94.435	65.2	C41	98.553	98.253	0.000	Junction	
C11.007	79.059	395.3	C27	97.988	95.175	-0.365	Junction	
C11.008	55.665	244.1	C42	97.760	94.947	0.000	Junction	
C11.009	72.180	412.5	C29	97.162	94.772	0.000	Junction	
C11.010	23.061	107.3	C15	96.665	94.557	0.108	Junction	
C11.011	73.830	343.4	C43	96.150	93.149	0.601	Junction	

PIPELINE SCHEDULES for Phase 3 - Construction

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
C11.012	o	2400	C43	96.150	92.693	1.057	Junction	
C11.013	2100 []	4000	C14	95.394	92.235	1.159	Junction	
C11.014	2100 []	4000	C30	94.653	92.125	0.528	Open Manhole	3000
C11.015	2100 []	4000	C18	93.629	90.004	1.625	Open Manhole	3000
C11.016	2100 []	4000	C19	92.925	89.700	1.225	Open Manhole	3000
C13.000	1000 []	2000	C27	95.329	93.129	1.200	Junction	
C13.001	1000 []	2500	C38	94.648	92.448	1.200	Open Manhole	3000
C13.002	2100 []	3000	C28	94.174	90.974	1.200	Junction	
C13.003	2100 []	3000	C39	94.069	90.863	1.206	Open Manhole	3000
C13.004	2100 []	3000	C33	93.956	90.752	1.204	Open Manhole	3000
C13.005	2100 []	3000	C34	93.677	90.477	1.200	Open Manhole	3000
C13.006	2100 []	3000	C27	93.399	88.236	3.163	Open Manhole	3000
C13.007	2100 []	3000	C30	92.621	88.193	2.428	Open Manhole	3000
C14.000	→_/→		C36	102.039	100.839	0.000	Junction	
C14.001	→_/→		C37	102.184	100.639	0.000	Junction	
C14.002	→_/→		C37	102.331	100.439	0.000	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
C11.012	96.266	750.0	C14	95.394	92.565	0.429	Junction	
C11.013	80.340	43.1	C30	94.653	90.371	2.282	Open Manhole	3000
C11.014	147.694	102.7	C18	93.629	90.687	0.942	Open Manhole	3000
C11.015	196.477	273.3	C19	92.925	89.285	1.640	Open Manhole	3000
C11.016	25.000#	34.8	C42	92.000	88.981	1.019	Open Manhole	3000
C13.000	80.883	118.8	C38	94.648	92.448	1.200	Open Manhole	3000
C13.001	80.883	170.6	C28	94.174	91.974	1.200	Junction	
C13.002	83.131	748.9	C39	94.069	90.863	1.206	Open Manhole	3000
C13.003	83.359	750.0	C33	93.956	90.752	1.204	Open Manhole	3000
C13.004	71.901	261.5	C34	93.677	90.477	1.200	Open Manhole	3000
C13.005	47.199	136.9	C27	93.399	90.132	1.267	Open Manhole	3000
C13.006	22.204	750.0	C30	92.621	88.206	2.415	Open Manhole	3000
C13.007	25.000#	25.0	C42	92.000	87.193	2.807	Open Manhole	3000
C14.000	99.220	496.1	C37	102.184	100.639	0.345	Junction	
C14.001	99.220	496.1	C37	102.331	100.439	0.347	Junction	
C14.002	98.718	493.6	C37	102.474	100.239	0.343	Junction	

PIPELINE SCHEDULES for Phase 3 - Construction

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
C14.003	→_/→		C37	102.474	100.239	0.000	Junction	
C14.004	→_/→		C37	102.090	100.055	0.507	Junction	
C14.005	→_/→		C39	99.573	97.573	0.000	Junction	
C14.006	→_/→		C37	97.007	95.007	0.000	Junction	
C14.007	→_/→		C11	98.414	94.807	0.660	Junction	
C14.008	→_/→		C14	97.554	94.607	0.563	Junction	
C14.009	→_/→		C45	96.791	94.407	0.384	Junction	
C14.010	→_/→		C46	95.895	93.895	0.000	Junction	
C14.011	2100 []	5000	C46	94.671	91.471	1.200	Open Manhole	10000
C14.012	→_/→		C47	94.677	91.321	0.000	Open Manhole	3000
C14.013	2100 []		C46	94.103	90.746	1.357	Open Manhole	10000
C14.014	→_/→		C15	93.877	90.526	0.000	Junction	
C14.015	2100 []	3000	C37	93.597	88.041	3.556	Open Manhole	10000
C14.016	2100 []	5000	C22	93.220	87.751	3.469	Open Manhole	3000
C11.017	o	300	C42	92.000	90.500	1.200	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
C14.003	98.951	257.7	C37	102.090	99.855	0.000	Junction	
C14.004	98.910	49.2	C39	99.573	98.045	0.000	Junction	
C14.005	99.453	38.8	C37	97.007	95.007	0.000	Junction	
C14.006	97.152	485.8	C11	98.414	94.807	1.607	Junction	
C14.007	100.291	501.5	C14	97.554	94.607	0.000	Junction	
C14.008	99.570	497.9	C45	96.791	94.407	0.000	Junction	
C14.009	96.614	188.7	C46	95.895	93.895	0.000	Junction	
C14.010	151.092	123.4	C46	94.671	92.671	0.000	Open Manhole	10000
C14.011	42.148	281.0	C47	94.677	91.321	1.356	Open Manhole	3000
C14.012	116.017	201.8	C46	94.103	90.746	0.001	Open Manhole	10000
C14.013	44.834	203.8	C15	93.877	90.526	1.351	Junction	
C14.014	79.926	333.0	C37	93.597	90.286	-0.040	Open Manhole	10000
C14.015	47.084	162.4	C22	93.220	87.751	3.469	Open Manhole	3000
C14.016	25.000#	147.1	C42	92.000	87.581	2.419	Open Manhole	3000
C11.017	232.707	3473.2	C	92.000	90.433	1.267	Open Manhole	0

Free Flowing Outfall Details for Phase 3 - Construction

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
C11.017	C	92.000	90.433	0.000	0	0

Simulation Criteria for Phase 3 - Construction

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	2880
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	5

Number of Input Hydrographs	0	Number of Storage Structures	26
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Rainfall Profile Details

Event Name Duration (mins) 65 Timestep (mins) 5 Profiles 6

Online Controls for Phase 3 - Construction

Orifice Manhole: C42, DS/PN: C11.017, Volume (m^3): 552.2

Diameter (m) 0.001 Discharge Coefficient 0.600 Invert Level (m) 90.500

Storage Structures for Phase 3 - Construction

Swale Pipe: C11.000

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	112.5
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	111.6
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	105.277	Cap Infiltration Depth (m)	0.000

Swale Pipe: C11.001

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	164.6
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	88.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	104.169	Cap Infiltration Depth (m)	0.000

Swale Pipe: C11.002

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	62.6
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	112.5
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	102.099	Cap Infiltration Depth (m)	0.000

Swale Pipe: C11.003

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	120.6
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	104.3
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	101.543	Cap Infiltration Depth (m)	0.000

Swale Pipe: C11.004

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	129.7
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	106.2
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	100.286	Cap Infiltration Depth (m)	0.000

Swale Pipe: C11.005

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	96.7
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	99.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	99.065	Cap Infiltration Depth (m)	0.000

Swale Pipe: C12.000

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	72.3
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	77.1
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	101.919	Cap Infiltration Depth (m)	0.000

Swale Pipe: C12.001

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	79.9
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	67.8
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	100.981	Cap Infiltration Depth (m)	0.000

Swale Pipe: C12.002

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	94.4
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	65.2
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	99.702	Cap Infiltration Depth (m)	0.000

Swale Pipe: C11.007

Manning's N	0.030	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	79.1
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	395.3
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	95.375	Cap Infiltration Depth (m)	0.000

Swale Pipe: C11.008

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	55.7
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	244.1
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	95.175	Cap Infiltration Depth (m)	0.000

Swale Pipe: C11.009

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	72.2
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	412.5
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	94.947	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.000

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	99.2
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	496.1
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	100.839	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.001

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	99.2
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	496.1
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	100.639	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.002

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	98.7
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	493.6
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	100.439	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.003

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	99.0
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	257.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	100.239	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.004

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	98.9
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	49.2
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	100.055	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.005

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	99.5
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	38.8
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	97.573	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.006

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	97.2
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	485.8
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	95.007	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.007

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	100.3
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	501.5
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	94.807	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.008

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	99.6
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	497.9
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	94.607	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.009

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	96.6
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	188.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	94.407	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.010

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	151.1
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	123.4
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	93.895	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.012

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	116.0
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	201.8
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	91.321	Cap Infiltration Depth (m)	0.000

Swale Pipe: C14.014

Manning's N	0.033	Base Width (m)	1.0
Infiltration Coefficient Base (m/hr)	0.01800	Length (m)	79.9
Infiltration Coefficient Side (m/hr)	0.03600	Side Slope (1:X)	1.0
Safety Factor	2.0	Slope (1:X)	333.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	90.526	Cap Infiltration Depth (m)	0.000

Infiltration Basin Manhole: C42, DS/PN: C11.017

Invert Level (m) 86.954 Safety Factor 1.5
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.03600

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	35000.0	2.000	39092.2	3.212	41682.2	5.000	45654.7
1.000	37017.8	3.000	41223.2	4.000	43410.7	6.000	47955.3

Summary of Results for Measured Rainfall - (Phase 3 - Construction)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
C11.000	C34	105.415	-0.062	0.000	0.47		10	93.4	FLOOD RISK*
C11.001	C35	104.382	-0.087	0.000	0.50		10	222.7	FLOOD RISK*
C11.002	C36	102.414	-0.185	0.000	0.40		15	391.1	FLOOD RISK*
C11.003	C37	101.867	-0.176	0.000	0.44		15	454.2	FLOOD RISK*
C11.004	C38	100.667	-0.219	0.000	0.39		15	547.2	FLOOD RISK*
C11.005	C39	99.440	-0.225	0.000	0.43		20	627.5	FLOOD RISK*
C11.006	C40	96.956	-0.639	0.000	0.44			4127.8	OK*
C12.000	C8	101.919	-0.200	0.000	0.00			0.0	OK
C12.001	C9	101.143	-0.038	0.000	0.55		10	139.8	FLOOD RISK*
C12.002	C10	99.947	-0.055	0.000	0.58		10	299.1	FLOOD RISK*
C11.007	C41	96.892	-1.662	0.000	0.23		25	4638.2	OK
C11.008	C27	96.721	-1.266	0.000	0.22		20	5111.0	OK
C11.009	C42	96.595	-1.165	0.000	0.44		25	5475.0	OK
C11.010	C29	95.823	-1.049	0.000	0.44			5922.6	OK*
C11.011	C15	95.764	0.000	0.000	1.08			5683.7	OK*
C11.012	C43	95.294	0.201	0.000	1.73			6150.2	SURCHARGED*
C11.013	C14	92.867	-1.468	0.000	0.21			6471.1	OK*
C11.014	C30	92.618	-1.607	0.000	0.19			6715.1	OK
C11.015	C18	90.678	-1.426	0.000	0.28			6812.3	OK
C11.016	C19	90.116	-1.684	0.000	0.28			6832.8	OK
C13.000	C27	93.910	-0.219	0.000	0.90			5060.2	OK*
C13.001	C38	93.270	-0.178	0.000	0.84			4971.0	OK
C13.002	C28	92.567	-0.507	0.000	0.48			6394.0	OK*
C13.003	C39	92.476	-0.487	0.000	0.67			6266.2	OK
C13.004	C33	91.775	-1.077	0.000	0.46			7048.7	OK
C13.005	C34	91.261	-1.315	0.000	0.45			7169.5	OK
C13.006	C27	89.632	-0.704	0.000	1.56			7151.2	OK
C13.007	C30	88.734	-1.559	0.000	0.39			8557.3	OK
C14.000	C36	101.962	-0.077	0.000	0.19		20	840.7	FLOOD RISK*
C14.001	C37	101.873	-0.311	0.000	0.25		15	1658.1	OK
C14.002	C37	101.703	-0.628	0.000	0.26		20	2494.1	OK
C14.003	C37	101.420	-1.054	0.000	0.25		20	3361.1	OK
C14.004	C37	100.825	-1.265	0.000	0.24		20	3250.5	OK
C14.005	C39	98.300	-1.274	0.000	0.12		15	3147.6	OK
C14.006	C37	96.514	-0.492	0.000	0.11		20	3251.5	OK
C14.007	C11	96.388	-2.025	0.000	0.20		25	3713.1	OK
C14.008	C14	96.146	-1.408	0.000	0.36		30	4018.7	OK
C14.009	C45	95.617	-1.173	0.000	0.34		30	4188.7	OK
C14.010	C46	95.018	-0.877	0.000	0.29		30	4395.8	OK
C14.011	C46	92.811	-0.760	0.000	0.36			4654.9	OK

Summary of Results for Measured Rainfall - (Phase 3 - Construction)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
C14.012	C47	92.771	-1.907	0.000	0.15		40	5028.8	OK
C14.013	C46	92.220	-0.626	0.000	0.34			5303.8	OK
C14.014	C15	92.184	-1.694	0.000	0.20		45	5808.2	OK
C14.015	C37	89.282	-0.859	0.000	0.60			5861.9	OK
C14.016	C22	88.604	-1.247	0.000	0.36			6038.9	OK
C11.017	C42	88.117	-2.683	0.000	0.00		2630	0.0	OK

Jacobs

15.0-B.06_Sonstiges – Auslegungsdetails für Ölabscheider

Projekt Intel Magdeburg
für
Intel Magdeburg GmbH, Deutschland
15 November 2023

Dipl.-Ing. Architekt
Timotheus Christopher
Kreidel
Projekt Manager
Mitglied-Nr.: 17563
Architektenkammer Berlin

15. NOV. 2023
im Auftrag von:
Jacobs GmbH

Name des Kunden:	Intel GmbH		
Projektname:	Projekt Intel Magdeburg		
Kundenreferenz:	Project Owl	Projekt Nr.:	D3641210
Dokument-Nr.:	0000	Projektleiter	Vincent Murphy
Revisions-Nr.:	0	Erstellt von:	Andrew Bothwell
Datum:	15 November 2023	Dateiname:	15.0-B.06_Sonstiges – Auslegungsdetails für Ölabscheider

Dokumentenhistorie und -status

Revision	Datum	Beschreibung	Autor	Geprüft	Bewertet	Genehmigt
0	15/11/23	Finale Version	VM	HS/ TK	FT-FUSS	VM

Verbreitung von Kopien

Revision	Ausgabe genehmigt	Ausstellungsdatum	Ausgestellt für	Kommentare

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INHALTSVERZEICHNIS

1. Details zur Ölabscheiderauslegung

1.1 Einleitung

Das Oberflächenwasser wird vom Intel-Gelände abgeleitet, indem das Regenwasser von versiegelten Flächen wie Dächern, internen Verkehrswegen und anderen befestigten Flächen aufgefangen wird und durch ein unterirdisches Rohrleitungsnetz abgeführt wird.

Das normale Regenwassersammelsystem sammelt das Oberflächenwasser aus Bereichen des Geländes, in denen keine Chemikalien verwendet, gelagert oder gehandhabt werden. Das Oberflächenwasser aus diesen Bereichen und den nicht überdachten Parkplätzen wird über eine Rohrsystem mit Gefälle in die Regenrückhaltebecken geleitet.

Das abgeschlossene Regenwassersammelsystem sammelt das Oberflächenwasser aus Bereichen des Geländes, in denen Chemikalien und Kraftstoffe angeliefert, verwendet, gelagert oder gehandhabt werden. Diese Bereiche sind vom normalen Regenwassersammelsystem getrennt. Regenwasser, das sich in diesen Bereichen sammelt, wird auf Schadstoffe untersucht, und nur dann in das normale Regenwassersystem eingeleitet, wenn es nicht kontaminiert ist; andernfalls wird es je nach Schadstoff auf geeignete Weise entsorgt.

Das gesammelte Oberflächenwasser in den Regenrückhaltebecken versickert und verdunstet.

Ölabscheider werden nur an den Standorten von elektrischen Transformatoren benötigt und installiert.

1.2 Richtlinien und Normen

Folgende Richtlinien und Normen kommen unter anderem bei der Auslegung von Ölabscheider zur Anwendung:

- DIN EN 858-1,
- DIN EN 858-2,
- DIN 1999-100
- DIN 1999-101

1.3 Intel Auslegungsrichtlinien

- Für das Auffangen des Regenwassers von mit Öl gefüllten elektrischen Transformatoren oder anderen hydrophoben Anwendungen, wie z. B. Kraftstoffentladestationen, müssen Ölabscheider vorgesehen werden.
- Die Auffangwannen müssen mit einem umlaufenden Graben versehen sein, der das Regenwasser auffängt und in die Kanalisation einleitet.
- Ölabscheider an Trafostationen sind auf der Grundlage des Ölvolumens des größten ölgefüllten Einzeltransformators zu bemessen.

- Ölabscheider für Tankstellen müssen ein Auffangvolumen von 950 Litern (250 Gallonen) und ein maximales Auffangvolumen von 2100 Litern (550 Gallonen) aufweisen. Das Produkt muss das Modell 660-SA von Old Castle oder ein gleichwertiges zugelassenes Produkt sein.

1.4 Ölabscheiderstandort und -anordnung

Für das Umspannwerk ist ein Ölabscheider erforderlich. Es werden 3 x 1,6 MVA-Transformatoren installiert:

- Jeder Transformator hat seine eigenes Auffangwanne, welche für110 % des erforderlichen Volumens ausmacht. Das Volumen ist ausreichend für die Regenniederschlagsmenge und das Öl.
- Jede Auffangwanne hat einen freien Auslauf zum Ölabscheider.
- Der Ablauf des Ölabscheiders wird an das unterirdische Regenwasserrohrleitungsnetz angeschlossen.

Basierend auf den aktuellen Planungsinformationen trifft folgendes zu:

- Jeder Transformator fasst 805 kg Öl.
- Öl Cargill FR3 mit einer Dichte von 0,92 g/cm3
- Resultierendes Fassungsvermögen von jeweils 875 Litern Öl.

Mit einem spezifischen Gewicht von 0,92 fällt dieses Öl nicht unter DIN EN 858-1 oder 2, da diese Norm nur für "Leichtflüssigkeiten" mit einem spezifischen Gewicht von 0,85 (+- 0,015) gilt. Bei dem vorgeschlagenen Öl handelt es sich um ein natürliches dielektrisches Esteröl, welches biologisch abbaubar ist und nicht als "Leichtflüssigkeit" eingestuft wird.

Jacobs Engineering hat das Auftreten dieses Öls in einer Ölabscheideranlage mit einem führenden Hersteller von Ölabscheidern erörtert. Dieser Hersteller hat in Zusammenarbeit mit National Grid (britischer Stromnetzbetreiber) umfangreiche Forschungen über die Verwendung von Ölen des Ester-Typs durchgeführt. In diesem Zusammenhang hat der Hersteller von Ölabscheidern eine Produktreihe (Produktname „Midel“) entwickelt, welche eine ausreichende Abscheidung bei Verwendung eines ähnlichen Öltyps gewährleistet.

Gemäß Herstellerangaben wird bis zu einem Durchfluss von bis zu 6 l/s Cargill FR3 das Öl ausreichend abgeschieden.

1.5 Planungsgrundlagen

Es wird davon ausgegangen, dass nur ein Transformator ausfällt. Deshalb muss der Ölabscheider für eine Fassungsvermögen von 875 Litern Öl oder mehr ausgelegt werden.

Der Ölabscheider muss ein "Abscheider mit vollem Rückhalt der Klasse 1" sein:

- Klasse 1 ist für die Einleitung in Regenwassersysteme erforderlich. Klasse 2 kann nur für die Einleitung in die Kanalisation verwendet werden und bietet nicht das gleiche Maß an Abscheidung.
- Der gesamte Abfluss aus den Transformatorauffangwannen wird durch den Ölabscheider geleitet.

- Die Einzelzellenversion ist für diese Anwendung geeignet:
    - Die Einzelzellenversion wird für Kraftstofflager- und -umschlagbereiche, Tankstellen, Nutzfahrzeug-/Werksbereiche und kontaminierte Industriebereiche eingesetzt.
    - Die Doppelzellenversionen wird für Hochrisiko-Kraftstofflagerbereiche, Tankstellen, Eisenbahnbetankungs- und -wartungsdepots sowie Brandübungsplätze eingesetzt.
- Die Fläche der Auffangwanne beträgt 110 m^2
- Der Höchstwert des Niederschlages beträgt 198 mm/Stunde (5,5 l/s), der Durchschnitt 49,49 mm/Stunde (1,4 l/s).

1.6 Produktauswahloptionen

Wie oben beschrieben, hängt die Auswahl des Produkts von der Art des verwendeten Öls ab.

Ein typischer Lieferant ist SPEL (mit Sitz in Großbritannien), welcher sein Produkt P006/2CSC/M als "Vollständige Abscheidung" der Klasse 1 zur Abscheidung von Ester-Dielektrikum-Flüssigkeiten empfiehlt.

Model	Series	Nominal Size (NS)	Catchment area (m^2)	Oil storage (litres)	Silt capacity (litres)	Overall length (mm)	Optimum Inlet dia.** (mm)
		Flow (l/s)				L	
P006 2C/SC/M	300	6	333	60	600	3200	160

Die 60 Liter Ölspeicherkapazität ist die sichere Menge an Öl, die im Abscheider gespeichert werden kann, bevor das Öl entleert werden muss. Das System sollte über ein Ölstandsüberwachungssystem verfügen, das bei 90 % dieser Kapazität einen Alarm auslöst, um den Kunden darauf hinzuweisen, dass er das Öl aus dem Abscheider entleeren muss.

Für den Fall, dass Öl ausläuft oder ein Transformator ausfällt, sollte das OWS über eine automatische Schließvorrichtung verfügen, bei der es sich um ein motorisiertes Ventil handelt, das durch einen separaten Alarm ausgelöst wird. Dieser Alarm schließt automatisch das automatische Ventil und sendet eine weitere Meldung an das Bedienfeld, um den Kunden darauf aufmerksam zu machen, dass die automatische Verschlussvorrichtung geschlossen ist. Das Volumen im geschlossenen Teil der Kammer muss größer sein als das maximale Ölvolumen in einem Transformator.

Im Zuge der Ausführungsplanung werden zusätzliche Lieferanten, unter anderen auch Lieferanten aus Deutschland, evaluiert und gegebenenfalls die Bestätigung der Abscheideleistung eingeholt.

Planung der Intel Anlage

Baustellenlogistik – Temporäre Flächenwasserentwässerungsstrategie

Dezember 2023

Intel Corporation

JACOBS

Name des Projekts

Projekt-Nr.:	D3641210
Titel des Dokuments:	Baustellenlogistik – Temporäres Flächenwasserentwässerungskonzept
Revision:	B
Datum:	Dezember 2023
Name des Kunden:	Intel Corporation
Projektleiter:	Vincent Murphy (Jacobs PM); Andrew Bothwell (Hauptdarsteller)
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Dokumentenhistorie und -status

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Inhalt

Glossar der Begriffe

Begriff	Definition
AEP	Jährliche Überschreitungswahrscheinlichkeit (d.h. 100% AEP ist eine Wiederkehrperiode von 1 in 1 Jahr).
Speicherung	Im Zusammenhang mit diesem Bericht ist unter Speicherung der Prozess der Wasserrückhaltung vor Ort zu verstehen, um die Abflussspitzen zu verringern und das Wasser langsam und kontrolliert in einen Oberflächenwasserkanal oder einen Wasserlauf abzuleiten.
BC	Kessel-Kühlanlage
Einzugsgebiet	Das Gebiet, das Oberflächenwasser in das Entwässerungsnetz einleitet
Chem Dock	Standorte zur Anlieferung von Chemikalien.
Klimawandel	Eine Veränderung der globalen Temperaturen und Niederschläge im Laufe der Zeit, die auf natürliche Schwankungen oder menschliche Aktivitäten zurückzuführen ist. Zu den Auswirkungen des Klimawandels gehören steigende Temperaturen, höhere Meeresspiegel und häufigere extreme Wetterereignisse wie Stürme und Hitzewellen.
CIRIA	Forschungs- und Informationsvereinigung der Bauindustrie (in engl. Construction Industry Research and Information Association) www.ciria.org
DWA	Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall
Fab	Fabrik
FFL	Höchster Hochwasserspiegel
Hochwasserrisiko	Das Ausmaß des Hochwasserrisikos ist das Produkt aus der Häufigkeit oder Wahrscheinlichkeit von Hochwasserereignissen und deren Folgen.
Standort auf der grünen Wiese	Ein landwirtschaftliches, forstwirtschaftliches oder sonstiges unbebautes Gebiet, das für die Entwicklung von Gewerbe, Industrie oder Wohngebieten vorgesehen ist.
Grundwasser	Wasser, das sich unterhalb der Bodenoberfläche in der Sättigungszone befindet.
Versiegelte Oberfläche	Eine künstliche, nicht poröse Oberfläche, die nach Regenfällen ein hohes Volumen an Oberflächenwasser abfließen lässt
Versickerung	Die Versickerung ist der Prozess, durch den Wasser von der Bodenoberfläche in den Boden eindringt. Die Versickerung wird durch die Schwerkraft und die Kapillarwirkung des Bodens gesteuert. Die damit verbundene Versickerungsrate variiert in Abhängigkeit von den Bodenverhältnissen
NHN	Normalhöhenull = NHN-Höhe über dem mittleren Meeresspiegel
PIMP	Prozentualer Versiegelungsgrad einer bestimmten Oberfläche oder Fläche

Begriff	Definition
Verschmutzung	Das Vorhandensein oder der Eintrag eines Stoffes, der schädliche oder giftige Wirkungen auf die Umwelt hat.
Abfluss	Der Wasserabfluss von (Boden)Oberflächen zum Entwässerungssystem.
SLY	Baustellenlogistikhof
SuDS	Nachhaltige (städtische) Entwässerungssysteme - Methoden der Bewirtschaftung und Kontrollstrukturen, die darauf ausgelegt sind, Oberflächenwasser auf nachhaltigere Weise abzuleiten als einige konventionelle Techniken, und die darauf abzielen, die natürlichen Entwässerungsmerkmale einer Entwicklungsfläches zu imitieren.
Niederschlagswasser	Regenwasser, das auf eine undurchlässige Oberfläche fällt. Im Zusammenhang mit der Erschließung bezieht sich das Oberflächenwasser auf das Regenwasser, das innerhalb der Erschließungsgrenze fällt oder in diese eindringt.
Vorfluter	Alle Flüsse, Bäche, Entwässerungsgräben (d. h. Gräben mit Ausläufen und Durchflusskapazität), Abflüsse, Einschnitte, Durchlässe und Deiche, die Wasser führen.
1% AEP	Das Ereignis, das verwendet wird, um die Auswirkungen von Niederschlägen zu simulieren, die im Durchschnitt nur einmal in 100 Jahren auftreten, oder ein Ereignis, das eine jährliche Überschreitungswahrscheinlichkeit (AEP- Annual Exceedance Probability) von 1 % in einem Jahr hat.

1. Einleitung

1.1 Hintergrund

Jacobs Engineering wurde mit der Erstellung eines Entwässerungsberichts beauftragt, um die Entwicklung einer neuen Produktionsstätte zu unterstützen.

Das vorgeschlagene Bauvorhaben umfasst die Fabrik, die dazugehörigen Funktionsgebäude, Nebengebäude, Bürogebäude, ein mehrstöckiges Parkhaus, oberirdische Parkplätze, Straßen und Betriebshöfe sowie ein neues Umspannwerk, das auf einer derzeit ungenutzten landwirtschaftlichen Fläche errichtet werden soll.

1.2 Ziel des Berichts

Dieser Bericht wurde erstellt, um die Grundlage des Entwurfs des temporären Oberflächenentwässerungssystems für die Logistikhöfe der Phase 1 zusammen mit unterstützenden Berechnungen und Details zu den angewandten Annahmen für die geplante Entwicklung zu präsentieren.

Dieser Bericht ergänzt den Bericht Oberflächenentwässerungskonzept für das Hauptprojekt der Phase 1 und erörtert nur den spezifischen Entwurf der Entwässerung der Logistikhöfe (SLYs). Alle Hintergrundinformationen über das Projekt und Informationen zum Oberflächenwasser sind im Oberflächenentwässerungskonzept zu finden.

Die in diesem Bericht verwendeten Annahmen und Daten sind zum Zeitpunkt der Erstellung des Berichts als korrekt bekannt. Jegliche Änderungen oder Ergänzungen dieser Daten werden wahrscheinlich die Planungsergebnisse des Berichts sowie den Ort und die Größe der erforderlichen Infrastruktur verändern.

1.3 Ist-Zustand des Standortes

Das bestehende, 391,4 ha große Gelände für die geplanten Arbeiten umfasst zunächst 253,2 ha der Phase 1 des Projekts. Von diesen 253,2 ha entfallen 151,9 ha auf den Baustellenlogistikhof (SLY). Das Gelände wird im Norden von der Landstraße L50, im Osten von der Autobahn A14, im Süden von der Bundesstraße B81, im Südwesten vom Seerennengraben und im Westen von landwirtschaftlichen Flächen begrenzt.

1.4 Geplante Gesamtentwicklung des Standorts

Einzelheiten zur Gesamtentwicklung des Geländes sind dem Baugenehmigungsbericht zu entnehmen.

2. Baustellenlogistikhof Entwässerungsplanung

2.1 Einleitung

Der Oberflächenwasserabfluss aus dem geplanten Baugebiet wird gemäß den im Oberflächenentwässerungskonzept aufgeführten Regelwerken und Richtlinien abgeleitet. Die allgemeine Entwurfsstrategie kann sich noch ändern.

2.2 Planungsvorschlag

Das gesamte Niederschlagswasser aus dem geplanten Baugebiet wird gemäß den Planungsrichtlinien der Stadt Magdeburg bis zu einem 1 % AEP (100-jährigen Regenereignis) gespeichert und gedrosselt abgeschlagen, ohne dass eine Einleitung in das Magdeburger Entwässerungsnetz zulässig ist. Der Anschluss an das städtische Netz kann ab Phase 2 erforderlich sein, ist aber nicht Teil dieses Berichts oder der Gesamtstrategie für die Oberflächenentwässerung und muss bei Bedarf mit der Stadt abgestimmt werden. Das resultierende Speichervolumen wird in neuen Rückhaltebecken bereitgestellt (Abbildung 2-1). In Abbildung 2-1 sind auch die den beiden Becken zugewiesenen Abflussflächen dargestellt. Für das SLY befindet sich das Rückhaltebecken 1 im Nordosten des Geländes, das die Abflüsse aus den nördlichen SLY-Gebieten aufnimmt, und das Rückhaltebecken 3 im Süden des Geländes, das die Abflüsse aus dem westlichen SLY aufnimmt.

Abbildung 2-1: Layout des Standorts mit identifizierten Rückhaltebecken.

Die Rückhaltebecken 1 und 3 wurden so dimensioniert, dass sie das gesamte Wasser aufnehmen können. Das Rückhaltebecken 1 hat keinen zulässigen Abfluss für Phase 1 und das gesamte Wasser wird infiltriert. Das

Rückhaltebecken 3 hat einen zulässigen Abfluss von 100 l/s in den Seerennengraben sowie Infiltration. Dies ist für den Betrieb der Phase 1 und während des Baus erforderlich. Auf diesen Ansatz wird in Abschnitt 2.5 näher eingegangen. Die Becken wurden so dimensioniert, dass sie das Wasservolumen aufnehmen können, das mit der langfristigen Speicherung verbunden ist, wobei die Versickerung dazu dient, sicherzustellen, dass das Becken bei einem Regenereignis von 100 % AEP innerhalb von 24 Stunden vollständig entleert ist. Das vorgeschlagene Oberflächenwasserkanalisationsnetz wurde so konzipiert, dass es den prognostizierten Abfluss innerhalb des SLY-Erschließungsgebiets aufnehmen kann. Die Rückhaltebecken werden auch die Regenwasserkäfunktion des Abflusses übernehmen. Eine zusätzliche Regenwasserbehandlung mit Bypass-Abscheidern der Klasse 1 ist gemäß DWA-M 153 für die befestigten Flächen und die Straßenflächen des Geländes nicht erforderlich.

Für das Rückhaltebecken 1 wird der Oberflächenwasserabfluss von 1 % AEP-Regenereignissen, der die zulässigen Parameter des Oberflächenwasserentwässerungssystems überschreitet, vor Ort zurückgehalten. Das Oberflächenwasser von Ereignissen, die die 1 % AEP-Regenereignisse übersteigen, wird in ein bestehendes, stillgelegtes Entwässerungsrohr eingeleitet, das den nördlichen Teil des Geländes durchquert, wodurch das Risiko einer Überschwemmung von Anlagen und Gebäuden verringert wird. Für das Rückhaltebecken 3 werden Abflussmengenüberschreitungen in den Seerennengraben geleitet. Die Überland Fließwege sind im Abschnitt 2.9 dargestellt.

Das Regenwasser des Parkhauses (Multi-Level Car Park - MLCP) wird durch eine eigene Kanalisationen und ein unterirdisches Rohrnetz gesammelt und abgeleitet. Dieses Wasser wird dann in das Haupt-Regenwasserkanalsystem des Geländes eingeleitet.

2.2.1 Nachhaltige Naturnahme Entwässerungssysteme

In Übereinstimmung mit den Empfehlungen der Stadt Magdeburg wird der Oberflächenwasserabfluss aus dem Baugebiet über ein SuDS-System (Sustainable Drainage Systems) gesteuert, um übermäßige Abflussmengen und -raten zu vermeiden. Zu dem für den SLY vorgeschlagenen SuDS-System gehören Mulden und Rückhaltebecken.

Die Behandlung des Regenwassersabflusses mit Hilfe von SuDS zielt darauf ab, ein wirksames System zur Abschwächung der nachteiligen Auswirkungen des städtischen Regenwasserabflusses auf die Umwelt zu schaffen, indem Abflussmenge, -volumen und -häufigkeit reduziert werden, die Schadstoffkonzentration im Regenwasser verringert wird und ein Beitrag zur Umweltverträglichkeit, Ästhetik und Verbesserung der Artenvielfalt geleistet wird. Darüber hinaus zielen SuDS-Maßnahmen darauf ab, die natürlichen Eigenschaften des Regenwasserabflusses nachzubilden, indem sie die Verschmutzung des Abflusses an der Quelle eindämmen.

Die für das Baugebiet vorgeschlagenen SuDS-Maßnahmen werden im Abschnitt 2.5.1 beschrieben.

2.3 Abflusswirksame Oberflächen & Abflussanalyse

2.3.1 Abflusswirksame Oberflächen

Wie in Abschnitt 2.2 erwähnt, wurden Berechnungen nur dort durchgeführt, wo dies als notwendig erachtet wurde, nämlich für das geplante Regenwasserkanalisationssystem. Abbildung 2-1 zeigt einen Einzugsgebietsplan, der die Ausdehnung der Gebiete zeigt, die in das geplante Kanalsystem entwässern.

Die mit dem geplanten Entwässerungssystem verbundenen Gebiete wurden aus den vorgeschlagenen Bebauungsplänen zusammengestellt.

Tabelle 2-1 zeigt, wie sich die gesamte undurchlässige Beitragsfläche nach Oberflächentyp aufteilt. Die beitragenden Bereiche sind Gegenstand der endgültigen Planung, ausgehend von der mit dem Auftaggeber vereinbarten Fläche. Eine Gesamtfläche von 151,9 ha wurde für die Berechnung des Rohrnetzes und der Beckengröße verwendet.

Die Oberflächen- und Grundwasserbewirtschaftung aus der Phase 1 ist nicht Teil dieser Studie und liegt in der Verantwortung des Bauauftragnehmers.

Tabelle 2-1: Zusammenfassung der angeschlossenen Flächen

Entwässerungsfläche	Fläche (ha)
Rückhaltebecken 1	3,5
Rückhaltebecken 3	1,3
Geplante bauzeitig befestigte Flächen, Straßen und Mulden	52,3
Geplante Bau-Dachflächen	SLY-Dachflächen unbekannt, abhängig von der endgültigen Anordnung des Bauauftragnehmers. Für diese Studie wurde ein Wert von Null angenommen.
Geplante Bauhöfe	94,8
Geplante Gesamtfläche des Standorts	151,9

2.4 Planungskriterien

Die Planungskriterien für die Oberflächenentwässerung beruhen auf IMDS 0224-L und den folgenden AHJ-Anforderungen. Dies wird im Oberflächenwasserkonzept abgehandelt. Spezifische Details für die SLY-Entwässerung, die an anderer Stelle nicht erwähnt werden, sind:

- Mannings n-Wert von 0,012 für kleine Sammelrohre mit einer Überdeckung von 1,2 m
- Mannings n-Wert von 0,012 für größere Hauptsammler mit einer Überdeckung von 0,5m
- Mannings n-Wert von 0,033 für die Mulden mit einer Überdeckung von 0,3 m, um Freibord darzustellen
- Minimale Fließgeschwindigkeit von 0,45 m/s

Anders als im Oberflächenwasserkonzept angegeben, wurde die minimale Fließgeschwindigkeit reduziert, um die Aushubtiefen des Beckens zu reduzieren. Dies wird zwar nicht empfohlen, aber die Gegenmaßnahmen um Ablagerungen und Abfall zu vermeiden besteht darin, den Wartungsaufwand zu erhöhen und Ablagerungen und Abfall zu entfernen.

2.5 Anforderungen an die hydraulische Auslegung

2.5.1 Rückhaltebecken

Anhand der zulässigen Abflussmengen wurde die maximale Regenwasserabflussmenge, die für das kritische 1 % AEP plus 10 % Klimawandel zurückgehalten werden muss, mit Hilfe von MicroDrainage berechnet und in Tabelle 2-2 untenstehend dargestellt.

Tabelle 2-2: Standort-Speichersvolumen

Gesamteinzugsgebiet (ha)	Gesamtundurchlässige Fläche für die Modellierung (ha)	Zulässiger Abfluss (l/s)	Erforderliches Rückhaltevolumen (m3)
151,9	134,8	100	57.963

Das Rückhaltespeichervolumen für das Einzugsgebiet wurde als das Volumen berechnet, das zwischen den folgenden drei vorgegebenen Wasserständen erforderlich ist, um die oben genannten Abflussbeschränkungen zu erreichen:

Rückhaltebecken 1

- Höchstwasserstand (TWL), **92 m NHN** , um die Mindestfreibordanforderung der Stadt Magdeburg von 500 mm zu gewährleisten
- Niedrigwasserstand (BWL), **88,5 m NHN,** entspricht dem Sohlenniveau des Auslassrohrs, um sicherzustellen, dass ein ausreichendes Gefälle vorhanden ist, um den Anschluss an die bestehenden Abflussrohre aus dem bestehenden Rückhaltebecken herzustellen

Rückhaltebecken 3

- Höchstwasserstand (TWL), **92,5 m NHN** , um die in der Stadt Magdeburg vorgeschriebene Mindestfreibordanforderung von 500 mm zu gewährleisten
- Niedrigwasserstand (BWL), **89,5 m NHN,** entspricht dem Sohlenniveau des Auslassrohrs, um sicherzustellen, dass ein ausreichendes Gefälle vorhanden ist, um eine Verbindung zu den bestehenden Abflussrohren des vorhandenen Rückhaltebeckens herzustellen

2.5.1.1 Infiltration

Die bestehenden Bohrlochstandorte sind im GEOLOGISCHEN BERICHT – ZUSATZ, Anhang – Rückhaltebecken und Gründungsoptionen für Nicht-FAB-Gebäude" (vom 22. November 2022) dargestellt. Die Daten aus diesen wurden verwendet, um die Planung der Teiche auszuführen. Da die Standortuntersuchung im Bereich des Rückhaltebeckens noch nicht abgeschlossen ist, wird der Wert verwendet, der für das Rückhaltebecken 2 im Oberflächenwasserkonzept verwendet wird. Die für den Standort verwendete Infiltrationsrate beträgt 0,1 m/h[1]. Diese wurde für die Beckenseiten angesetzt, aber für die Basis des Beckens um 50 % reduziert, um der Verschlammung/Sedimentation Rechnung zu tragen.

2.5.2 Kanalnetze

Zusätzlich zu den Kriterien die in Abschnitt 2.4 aufgeführt sind, wurde das Kanalnetz so ausgelegt, dass es bei einem AEP von 1 % plus 10% Aufschlag für Klimawandel kein Überstau eintritt, und um sicherzustellen, dass kein Abfluss außerhalb des Geländes stattfindet oder Gebäude überflutet werden, während ein Mindestfreibord von 300 mm bis zur FFL eingehalten wird. Die Rohre und Durchlässe wurden für den AEP von 10 % ohne Zuschlag dimensioniert und dürfen für das 24-Stunden-Ereignis von 4 % AEP (25 Jahre) kein Überschwemmungsrisiko aufweisen.

Das Kanalnetz umfasst 20,5 km Rohrleitungen und 5,5 km Mulden, um den Oberflächenabfluss ins Rückhaltebecken 1 zu leiten. Das größte Rohr im Kanalnetz hat einen Durchmesser von 2,2 m am Einlass des Rückhaltebeckens 1. Dimensionen und die Lage werden im Zeichnungssatz HUC-C0-1AA als Teil von SL-01 angezeigt. Weiterhin gibt es 14,8 km Rohrleitungen und 2,2 km Mulden, um den Oberflächenabfluss in das Rückhaltebecken 3 zu leiten.

2.6 Planungs-Ansatz

Das Becken und die Mulden sind zu begrünen und zu bepflanzen, um die Behandlung des Abflusses zu gewährleisten. Sie sind in der Phase der Detailplanung so zu profilieren, dass die Wartung erleichtert wird und das Becken mit Fahrzeugen befahren werden kann. Die seitlichen Böschungen dürfen maximal 1V:3H betragen (1 m vertikale Veränderung zu 3 m horizontale Veränderung). Die endgültige Abstufung der Böschungen ist im

[1] Der Wert basiert auf Informationen aus "GEOTECHNICAL REPORT – SUPPLEMENT, Addendum - Rückhaltebecken und Gründungsoptionen für Nicht-FAB-Gebäude" (vom 22. November 2022). Der nächstgelegene Punkt zu Teich 2 ist BS 71. Die Infiltrationsrate, die bei der Planung verwendet wurde, wurde von 7x10-5 m/s (0,252 m/h) auf 2,78x10-5 m/s (0,1 m/h) reduziert , um die Sicherheit aufgrund der Variabilität der Bodenbedingungen im Bereich des Teichs zu gewährleisten.

Rahmen der Detailplanung mit dem geotechnischen Team festzulegen. Der Einlauf ist durch eine Schürze aus Riffelblech und Steinen zur Ableitung der Strömungsenergie vor Erosion zu schützen.

Die endgültige Gestaltung der Landschaft und der Oberflächenbeschaffenheit ist mit der örtlichen Wasserbehörde im Rahmen der Detailplanung abzustimmen (HU1-JEG-SP-08 Paket).

2.7 Modellierung

Ein Kanalnetzmodell wurde mit der hydraulischen Simulationssoftware MicroDrainage von Innovyze entwickelt, unter Beachtung der Planungsgrundlagen aus Kapitel 2.4 und den unten folgenden Angaben. Eine detailliertere Aufstellung der Programmeingaben und resultierenden Ergebnisse des MicroDrainage-Modells ist in Anhang A zu finden.

2.7.1 Niederschlag

Die Niederschlagsdaten wurden aus dem KOSTRA-DWD-2020 gewonnen und mit lokalisierten Daten der Städtischen Werke Magdeburg GmbH & Co. KG (SWM) aktualisiert und mit der Euler-Typ-II-Methode entworfen. Die Konzentrationszeit für den Standort beträgt 32 Minuten und wurde für das Bemessungsereignis verwendet.

Die verwendete 10%ige AEP-Niederschlagsdauer betrug 65 Minuten, mit einer Spitzenniederschlagsintensität von 374,7 l/s/ha (134,9 mm/h) und einer durchschnittlichen Intensität von 93,3 l/s/ha (33,6 mm/h).

Die verwendete AEP-Niederschlagsdauer von 4 % betrug 1440 Minuten, mit einer Spitzenniederschlagsintensität von 397,8 l/s/ha (143,2 mm/h) und einer durchschnittlichen Intensität von 7,2 l/s/ha (2,6 mm/h).

Die verwendete Niederschlagsdauer von 1 % AEP betrug 65 Minuten, mit einer Spitzenniederschlagsintensität von 543,4 l/s/ha (198 mm/h) und einer durchschnittlichen Intensität von 137,5 l/s/ha (49,49 mm/h).

2.7.2 Abfluss

Für die Simulation wurden die folgenden Modellierungskriterien/Annahmen angewandt (Tabelle 2-3).

Tabelle 2-3: Eingabeparameter für die Berechnung

Globale Eintrittszeit (min)	5
Maximale Niederschlagsmenge (l/s/ha)	374,7
Maximale Konzentrationszeit (min)	30
PIMP (%) für SLY-Straßen und Arbeitsbereiche*	94
PIMP (%) für Naturflächen	30

*Es wurde von einer höheren Rate auf Schotterplätzen aufgrund der hohen Verdichtung durch die Nutzung und der unbekannten Nutzung/Anordnung durch den Auftragnehmer ausgegangen

2.7.3 Volumen des Rückhaltebeckens

Einzelheiten des Rückhaltebeckens sind in den Tabellen 2-4 und 2-5 aufgeführt.

Tabelle 2-4: Füllstände und Volumina des Rückhaltebeckens 1

Speichertypus	Wasserspeichervolumen (m3)	Aushubvolumen (m3)	Untere Ebene (m NHN)	Untere Grundrissfläche (ha)	Oberste Ebene (m NHN)	Obere Grundrissfläche (ha)
Rückhaltespeicher	38.598	142.478	88,5	3,5	91,5	4,1
Freibord bis Überlaufebene	-		91,5	4,1	92	4,2

Tabelle 2-5: Füllstände und Volumina des Rückhaltebeckens 3

Speichertypus	Wasserspeichervolumen (m3)	Aushubvolumen (m3)	Untere Ebene (m NHN)	Untere Grundrissfläche (ha)	Oberste Ebene (m NHN)	Obere Grundrissfläche (ha)
Dämpfungsspeicher	19.365	29.357	90,65	1,3	91,85	1,45
Freibord bis Überstauebene			91,85	1,45	92,5	15

2.7.4 Auslaufdetails

Das Rückhaltebecken 1 wurde so dimensioniert, dass es Wasser bis zu einem AEP-Szenario von 1 % ohne Abschläge aus dem Baugebiet während der Phase-1 Fabrikplanung aufnehmen kann. Für Überschreitungen des Regenereignisses wird der Standort an eine bestehende Leitung angeschlossen, die den Wasserabfluss in das Magdeburger Kanalnetz sicherstellt.

Das Rückhaltebecken 3 wurde so dimensioniert, dass es Wasser bis zu einem AEP-Szenario von 1 % mit einem Abschlag von 100 l/s außerhalb des Baugebietes bewältigen kann. Bei Überschreitungen wird Wasser in den Seerennengraben eingeleitet.

2.7.5 Dimensionierung des Entwässerungsnetzes

Bitte beachten Sie Anhang A3 für die Berechnungsergebnisse in Bezug auf die Bemessung und Dimensionierung der unterirdischen Rohre in den SLY-Entwässerungsbereichen, einschließlich der Parkplätze.

2.8 Wartung

2.8.1 Strassenabläufe und Rohrleitungen

Strassenabläufe, Rohrleitungen und Auffanggruben innerhalb der Planungsgrenzen sind nach Abschluss der Arbeiten und in Übereinstimmung mit DIN EN 752 Kapitel 10 und DIN EN 14654-1 von Intel Operations Personal zu warten. Es wird erwartet, dass die Wartungsarbeiten an Strassenabläufen, Rohrleitungen und Auffanggruben in ähnlicher Häufigkeit durchgeführt werden wie bei anderen Intel-eigenen Entwässerungsinfrastrukturen auf dem Industriegelände.

Das Intel Operations-Personal verpflichtet sich, das bestehende Netzwerk, das von den Arbeiten betroffen ist, regelmäßig zu überprüfen, um sicherzustellen, dass jede Verschlammung festgestellt und mit einem Vakuumtankwagen oder einer anderen Methode entfernt wird.

Während der Bauarbeiten sind die im Rahmen des SL-01-Pakets installierten und im SLY-Bereich verwendeten Strassenabläufe und Rohrleitungen vom Auftragnehmer zu warten.

2.8.2 Rückhaltebecken

Die Rückhaltebecken müssen nach Abschluss der Arbeiten von Intel Operations Personal gewartet werden. Die Instandhaltung wird im Oberflächenwasserkonzept behandelt.

Während der Bauarbeiten sind die Rückhaltebecken, die zur Steuerung des Oberflächenwasserflusses aus den SLYs verwendet werden, vom Auftragnehmer zu warten.

2.8.3 Mulden

In Anlehnung an DWA-A 138 – Tabelle E.2 (Tabelle 2-6) ist ein Wartungsplan zu erstellen. Die Wartungshäufigkeit sollte aufgrund der reduzierten Strömungsgeschwindigkeit während des Betriebs häufiger geprüft werden, um die geeigneten Wartungsfrequenz festzulegen.

Routinemäßige Wartungsarbeiten werden nur in Trockenperioden auf der Grundlage von Risikobewertungen durchgeführt.

Die Auffangeimer der Strassenabläufe als Eintrittspunkt ins Kanalnetz fangen den meisten Müll und Schmutz auf. Das beste Management besteht darin, eine müllfreie Kultur in der Belegschaft zu entwickeln und viele Mülleimer auf dem Gelände zu haben, damit kein Müll in das Kanalnetz gelangt.

Während des Baus sind die Mulden, die zur Steuerung des Oberflächenwasserflusses aus den SLYs verwendet werden, vom Auftragnehmer zu warten.

Tabelle 2-6: Betriebs- und Instandhaltungsanforderungen für Muldenanlagen (DWA-A 138 – Tabelle E.2)

Wartungsplan	Erforderliche Aktion	Typische Häufigkeit
Regelmäßige Inspektion und Wartung	Müll und Schmutz entfernen	Mindestens zweimal im Jahr
	Auf Anzeichen von Beschädigungen prüfen	Mindestens zweimal im Jahr
	Pflege sonstiger Vegetation und Entfernung störender Pflanzen	Mindestens zweimal im Jahr
	Zuläufe, Abflüsse und Überläufe auf Verstopfungen untersuchen und bei Bedarf reinigen.	Mindestens zweimal im Jahr
	Begutachtung von Uferböschungen, Bauwerken, Rohrleitungen usw. auf Anzeichen von physikalischen Schäden.	Mindestens zweimal im Jahr
	Kontrolle der Einlässe und der Oberfläche der Anlage auf Schlammansammlungen. Festlegen einer angemessenen Häufigkeit der Schlammentfernung.	Monatlich (für das erste Jahr), dann jährlich oder nach Bedarf
	Entfernen von Sediment aus Zuläufen, Auslässen, Vorbuchten und im Becken.	Mindestens zweimal im Jahr
	Infiltrationsfähigkeit prüfen	Nach Bedarf
Gelegentliche Wartung	Unterhaltspflege mit Mähen, Grünschnitt etc	Mindestens einmal jährlich, je nach Vegetationstyp
	Entfernung von Schmutz, Müll, Laub, Schutt und anderen groben Stoffen	Nach Bedarf
	Säuberung von Zuläufen	Nach Bedarf
Abhilfemaßnahmen	Ausbesserung von Erosions- oder anderen Schäden durch Neueinsaat oder Neusaat von Rasen	Nach Bedarf
	Wiederherstellung der Vegetationsdecke	Nach Bedarf
	Wiederherstellung der Durchlässigkeit	Nach Bedarf

2.9 Überschreitungsabflüsse

Das Rückhaltebecken 1 wird an ein bestehendes Entwässerungsrohr angeschlossen, das vom Standort aus nach Osten verläuft und im Falle von Überschreitungen die Abflüsse in Richtung Magdeburg weiterleitet (Abbildung 2-2). Bisher wurde das Oberflächenwasser aus dem Norden des Geländes zu einem bestehenden Netz und einer Einleitungsstelle im Osten in Richtung Magdeburg geleitet. Die volle Ausdehnung des Netzes und die Einleitungsstelle sind nicht bekannt, es wird jedoch davon ausgegangen, dass das Wasser nicht von diesem Standort abfließt. Die Stadt Magdeburg hat mitgeteilt, dass sie das bestehende Rohr an der nördlichen Grenze des Geländes (in Abbildung 2-2 gekennzeichneter Punkt) durchtrennen und mit einem Deckel versehen wird, so dass kein Wasser aus externen Bereichen über das Intel-Gelände abgeleitet wird.

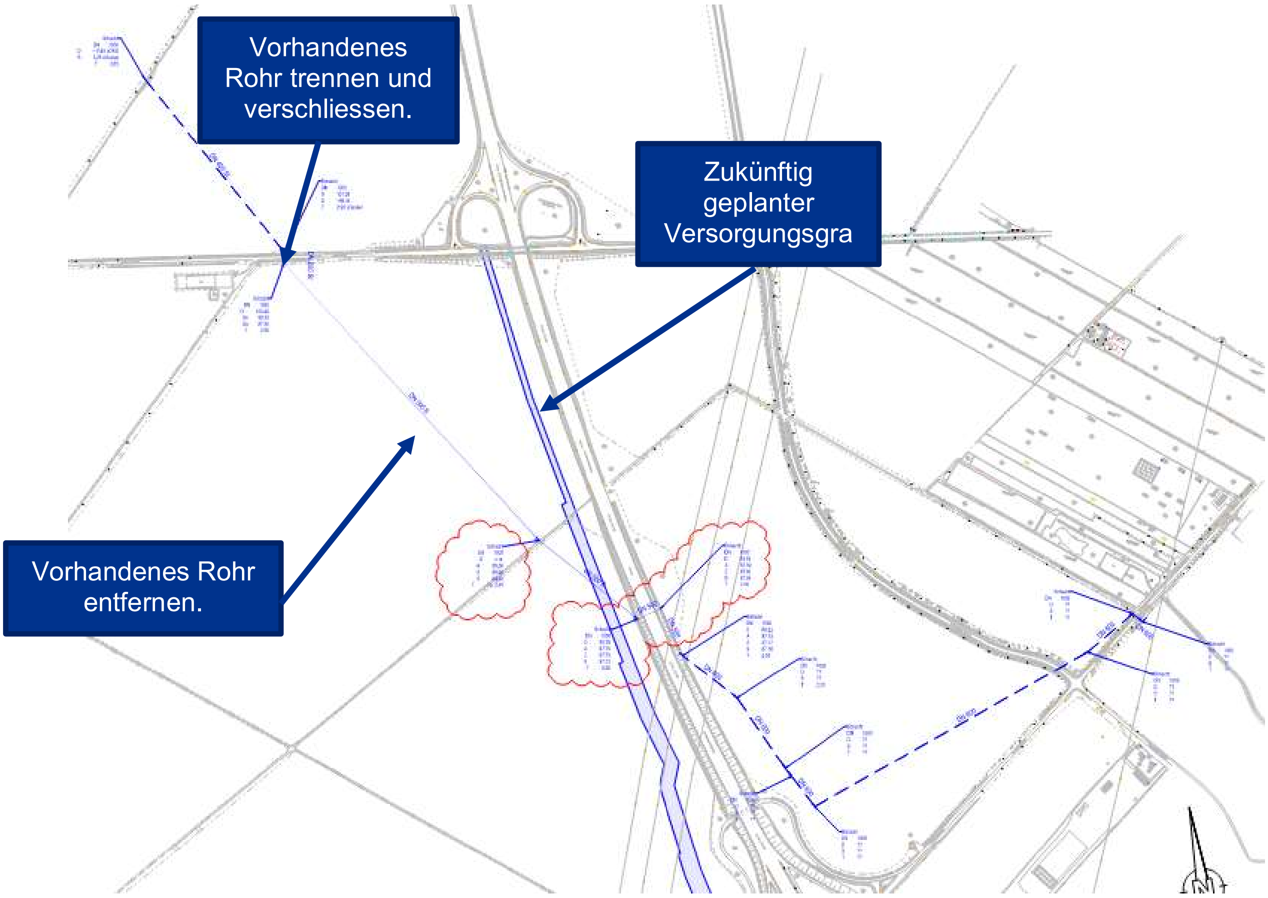

Abbildung 2-2: Bestehendes unterirdisches Entwässerungsnetz

Das Überschwemmungsrisiko ist minimal, es gibt keine Überschwemmungen oder Überschreitungen für das AEP-Auslegungsniederschlagsereignis von 0,33 %.

2.10 Schmutzfrachtüberwachung und Wasserqualität

Im folgenden Abschnitt wird das vorgeschlagene Konzept für die Schmutzfrachtüberwachung und der Wasserqualität erörtert.

Während der Bauzeit für Phase 1 ist der Auftragnehmer für die Behandlung von Abwässern und Schadstoffen aus seinen Arbeitsbereichen, einschließlich der Waschplätze für Lkw und Geräte, verantwortlich.

Anhang A. Berechnung des Entwurfsmodells

A.1: Nomenklatur des MicroDrainage-Modells

A.2: Dimensionierung des Kanalnetzes

A.3 Berechnungen zur Dimensionierung von Abwasserkanälen

A.1 Nomenklatur des MicroDrainage-Modells

Ausdruck	Beschreibung
PN	Dem Modell zugewiesene Rohrnummer
Länge (m)	Länge der Rohrstrecke in Metern
Sturz (m)	Höhenunterschied zwischen Ein- und Auslass des Rohres in Metern
Steigung (1:X)	Gefälle des Rohres
I.Fläche (ha)	Zuflussfläche in das Netz direkt an die Leitung gemessen in Hektar
T.E. (Minuten)	Zeitpunkt des Eintrags von Niederschlägen aus dem Teileinzugsgebiet in das Entwässerungsnetz in Minuten
Basisdurchfluss (l/s)	Künstlich dem Rohr zugeführte Durchflussmenge in Litern pro Sekunde. Gilt nicht für dieses Projekt.
HYD-SPEKTE	Symbolischer Querschnitt eines Rohrs oder einer Leitung. Typische Beispiele sind: - o – für ein Rohr - ooo – für eine Triple Pipe - 2_/ - für einen Graben mit 1:2 Seitenneigungen - 3\=/ - für eine Mulde mit 1:3 Seitenneigung
Durchmesser (mm)	Durchmesser eines Rohres oder Breite eines Grabens oder Dükers in Millimetern
Abschnittstyp	Textbeschreibung des Rohr- oder Leitungstyps
Automatisches Design	Angabe, ob MicroDrainage in der Lage war, das Kanalnetz auf der Grundlage von Entwurfsregeln automatisch zu entwerfen. Das grüne Vorhängeschloss-Symbol ermöglicht das automatische Design und das rote Vorhängeschloss verhindert das automatische Design.
Regen (mm/h)	Maximale Auslegungsniederschlagsintensität in Millimetern pro Stunde. (1 l/s/ha = 0,36 mm/h)
T.C. (Minuten)	Konzentrationszeit in Minuten.

US/IL (m)	Stromaufwärts liegendes Sohlenniveau des Rohres in Metern von der Bezugsebene.
Σ I.Fläche (ha)	Gesamtfläche des Zuflusses stromaufwärts der Leitung in Hektar
Σ Basisdurchfluss (l/s)	Die Gesamtdurchflussrate, die dem Modell vor dem Rohr künstlich hinzugefügt wurde, in Litern pro Sekunde. Gilt nicht für dieses Projekt.
Foul (l/s)	Schmutzdurchfluss, der dem Rohr künstlich zugeführt wird, in Litern pro Sekunde. Gilt nicht für dieses Projekt.
Durchfluss hinzufügen (l/s)	Künstlich dem Rohr zugeführte Durchflussmenge in Litern pro Sekunde. Gilt nicht für dieses Projekt.
Vel (m/s)	Strömungsgeschwindigkeit innerhalb des Rohres in Metern pro Sekunde.
Kappe (l/s)	Berechnete Kapazität des Rohres in Litern pro Sekunde
Durchfluss (l/s)	Berechnete Durchflussmenge, die per Rohr gefördert werden muss, in Litern pro Sekunde

A.2 Dimensionierung des Kanalnetzes

STORM SEWER DESIGN by the Rational Method

Design Criteria for Phase 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

IDF File	IDF	Add Flow / Climate Change (%)	10
Maximum Rainfall (mm/hr)	135	Minimum Backdrop Height (m)	0.200
Maximum Time of Concentration (mins)	30	Maximum Backdrop Height (m)	1.500
Foul Sewage (l/s/ha)	0.000	Min Design Depth for Optimisation (m)	1.200
		Min Vel for Auto Design only (m/s)	1.00
PIMP (%)	94	Min Slope for Optimisation (1:X)	750

Designed with Level Soffits

Network Design Table for Phase 1

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S638.000	307.560	2.308	133.3	0.000	5.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.001	402.886	3.007	134.0	1.783	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.002	273.987	0.600	456.4	3.681	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.003	25.472	4.258	6.0	3.085	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.004	173.866	0.232	749.4	2.192	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.005	89.881	0.195	461.5	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.006	138.418	0.300	461.5	0.848	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.007	89.975	0.195	461.5	1.155	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.008	50.146	0.119	420.5	1.747	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S639.000	496.554	1.166	425.9	3.035	5.00	0.0		0.012	ooo	600	Triple Pipe	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S638.000	120.45	7.74	103.873	0.000	0.0	0.0	0.0	1.87	9343.6	0.0
S638.001	103.28	11.35	101.565	1.783	0.0	0.0	51.1	1.86	9318.1	562.6
S638.002	85.87	15.87	98.558	5.464	0.0	0.0	130.3	1.01	5049.1	1433.2
S638.003	85.73	15.92	97.958	8.549	0.0	0.0	203.5	8.82	44098.0	2238.8
S638.004	75.44	19.59	93.700	10.741	0.0	0.0	225.0	0.79	3940.0	2475.1
S638.005	72.41	21.09	93.468	10.741	0.0	0.0	225.0	1.00	5020.9	2475.1
S638.006	68.41	23.38	93.273	11.588	0.0	0.0	225.0	1.00	5020.9	2475.1
S638.007	65.82	24.88	92.973	12.743	0.0	0.0	232.9	1.00	5020.9	2562.0
S638.008	64.43	25.67	92.778	14.491	0.0	0.0	259.3	1.05	5260.0	2852.1
S639.000	99.53	12.26	94.225	3.035	0.0	0.0	83.9	1.14	967.0	922.9

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S638.009	19.999	0.027	740.7	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S640.000	496.147	1.195	415.3	0.889	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.010	19.781	0.026	760.8	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S641.000	496.002	1.222	405.8	0.953	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.011	19.309	0.076	254.1	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S642.000	496.972	1.296	383.6	0.878	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.012	20.329	0.027	752.9	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S643.000	497.317	1.323	375.9	0.942	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.013	19.733	0.126	156.6	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S644.000	496.086	1.163	426.6	0.902	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.014	20.054	0.027	742.7	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S638.009	63.70	26.09	92.659	17.526	0.0	0.0	310.0	0.79	3963.1	3410.4
S640.000	99.93	12.16	94.227	0.889	0.0	0.0	24.7	1.15	326.4	271.4
S638.010	62.97	26.51	92.632	18.415	0.0	0.0	322.0	0.78	3910.4	3542.2
S641.000	100.28	12.08	94.228	0.953	0.0	0.0	26.5	1.17	330.2	292.0
S638.011	62.55	26.75	92.606	19.369	0.0	0.0	336.5	1.35	6766.9	3701.0
S642.000	101.03	11.90	94.226	0.878	0.0	0.0	24.6	1.20	339.6	271.0
S638.012	61.80	27.18	92.530	20.246	0.0	0.0	347.5	0.79	3930.8	3822.4
S643.000	101.29	11.83	94.226	0.942	0.0	0.0	26.5	1.21	343.1	291.4
S638.013	61.47	27.37	92.503	21.188	0.0	0.0	361.7	1.72	8618.9	3978.7
S644.000	99.54	12.26	94.227	0.902	0.0	0.0	24.9	1.14	322.1	274.4
S638.014	60.81	27.75	92.177	22.091	0.0	0.0	373.0	0.88	5895.0	4103.5

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S645.000	496.245	1.164	426.3	0.866	5.00	0.0		0.012	o	600	Pipe/Conduit	
S638.015	19.670	0.026	756.5	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S646.000	495.086	1.162	426.1	1.042	5.00	0.0		0.012	o	600	Pipe/Conduit	
S638.016	20.329	0.027	752.9	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S647.000	496.687	1.165	426.5	0.917	5.00	0.0		0.012	o	600	Pipe/Conduit	
S638.017	20.293	0.027	751.6	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S648.000	495.917	1.164	425.9	0.993	5.00	0.0		0.012	o	600	Pipe/Conduit	
S638.018	20.293	0.027	751.6	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S649.000	496.608	1.164	426.5	0.929	5.00	0.0		0.012	o	600	Pipe/Conduit	
S638.019	19.818	0.026	762.2	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S650.000	497.578	1.167	426.5	0.961	5.00	0.0		0.012	o	600	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S645.000	99.54	12.26	94.326	0.866	0.0	0.0	23.9	1.14	322.2	263.2
S638.015	60.15	28.13	92.150	22.957	0.0	0.0	383.5	0.87	5841.0	4218.3
S646.000	99.62	12.24	94.329	1.042	0.0	0.0	28.8	1.14	322.3	317.2
S638.016	59.48	28.52	92.124	23.999	0.0	0.0	396.4	0.87	5855.0	4360.2
S647.000	99.51	12.27	94.326	0.917	0.0	0.0	25.3	1.14	322.1	278.6
S638.017	58.80	28.91	92.097	24.915	0.0	0.0	406.9	0.87	5860.2	4475.4
S648.000	99.57	12.25	94.329	0.993	0.0	0.0	27.4	1.14	322.3	301.9
S638.018	58.13	29.29	92.070	25.908	0.0	0.0	418.2	0.87	5860.2	4600.2
S649.000	99.51	12.27	94.328	0.929	0.0	0.0	25.7	1.14	322.1	282.3
S638.019	57.46	29.68	92.043	26.837	0.0	0.0	428.2	0.87	5819.2	4710.7
S650.000	99.45	12.28	94.328	0.961	0.0	0.0	26.5	1.14	322.1	291.9

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S638.020	19.156	0.026	736.8	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S651.000	496.624	1.166	425.9	1.029	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.021	20.614	0.027	763.5	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S652.000	498.672	1.169	426.5	0.915	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.022	20.279	0.027	751.1	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S653.000	496.804	1.165	426.5	0.967	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.023	19.976	0.127	157.3	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S654.000	498.579	1.169	426.5	0.969	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.024	19.524	0.126	155.0	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S655.000	500.191	1.174	425.9	1.015	5.00	0.0	0.012		o	600	Pipe/Conduit	
S638.025	21.090	0.538	39.2	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S638.020	56.90	30.00	92.017	27.798	0.0	0.0	439.2	0.88	5918.9	4831.6
S651.000	99.53	12.26	94.330	1.029	0.0	0.0	28.4	1.14	322.3	312.9
S638.021	56.90	30.00	91.991	28.827	0.0	0.0	455.5	0.87	5814.4	5010.5
S652.000	99.39	12.30	94.326	0.915	0.0	0.0	25.2	1.14	322.1	277.7
S638.022	56.90	30.00	91.964	29.741	0.0	0.0	469.9	0.87	5862.2	5169.4
S653.000	99.50	12.27	94.329	0.967	0.0	0.0	26.7	1.14	322.1	294.0
S638.023	56.90	30.00	91.937	30.709	0.0	0.0	485.2	1.91	12810.1	5337.6
S654.000	99.39	12.29	94.327	0.969	0.0	0.0	26.7	1.14	322.1	294.2
S638.024	56.90	30.00	91.810	31.678	0.0	0.0	500.5	1.73	8664.9	5506.0
S655.000	99.32	12.31	94.323	1.015	0.0	0.0	28.0	1.14	322.3	308.0
S638.025	56.90	30.00	91.684	32.693	0.0	0.0	516.6	3.45	17227.2	5682.5

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S656.000	400.177	0.938	426.5	0.961	5.00	0.0		0.012	o	600	Pipe/Conduit	
S657.000	399.745	1.466	272.7	0.785	5.00	0.0		0.012	o	600	Pipe/Conduit	
S657.001	19.603	0.272	72.1	0.000	0.00	0.0		0.012	o	600	Pipe/Conduit	
S658.000	401.722	1.534	261.9	0.785	5.00	0.0		0.012	o	600	Pipe/Conduit	
S657.002	21.222	0.039	543.5	0.000	0.00	0.0		0.012	o	800	Pipe/Conduit	
S659.000	402.235	0.943	426.5	0.861	5.00	0.0		0.012	o	600	Pipe/Conduit	
S657.003	19.476	0.035	553.8	0.000	0.00	0.0		0.012	o	900	Pipe/Conduit	
S660.000	400.461	1.608	249.0	0.771	5.00	0.0		0.012	o	500	Pipe/Conduit	
S657.004	19.914	0.031	651.9	0.000	0.00	0.0		0.012	o	1000	Pipe/Conduit	
S661.000	401.986	1.416	283.9	0.766	5.00	0.0		0.012	o	600	Pipe/Conduit	
S657.005	20.387	0.027	750.0	0.000	0.00	0.0		0.012	o	1200	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S656.000	105.30	10.85	94.327	0.961	0.0	0.0	28.1	1.14	322.1	309.0
S657.000	110.47	9.68	94.430	0.785	0.0	0.0	24.1	1.42	402.8	264.9
S657.001	109.86	9.79	92.964	0.785	0.0	0.0	24.1	2.77	783.4	264.9
S658.000	110.83	9.61	94.225	0.785	0.0	0.0	24.2	1.45	411.0	265.7
S657.002	108.46	10.08	92.492	1.570	0.0	0.0	47.3	1.22	614.5	520.1
S659.000	105.17	10.88	94.323	0.861	0.0	0.0	25.1	1.14	322.1	276.6
S657.003	104.16	11.13	92.353	2.431	0.0	0.0	70.3	1.31	833.4	773.4
S660.000	108.57	10.06	94.326	0.771	0.0	0.0	23.2	1.32	259.2	255.6
S657.004	103.11	11.39	92.218	3.202	0.0	0.0	91.7	1.30	1017.3	1008.4
S661.000	109.84	9.80	94.425	0.766	0.0	0.0	23.4	1.40	394.8	257.0
S657.005	102.08	11.64	91.987	3.968	0.0	0.0	112.5	1.36	1542.2	1237.3

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S656.001	98.787	0.132	750.0	0.000	0.00	0.0		0.012	o	1200	Pipe/Conduit	
S638.026	219.384	0.563	389.7	2.712	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S662.000	398.983	1.405	283.9	0.766	5.00	0.0		0.012	o	600	Pipe/Conduit	
S662.001	17.989	0.063	283.9	0.000	0.00	0.0		0.012	o	600	Pipe/Conduit	
S663.000	399.745	0.937	426.5	0.866	5.00	0.0		0.012	o	600	Pipe/Conduit	
S662.002	21.975	0.240	91.4	0.000	0.00	0.0		0.012	o	600	Pipe/Conduit	
S664.000	398.447	1.511	263.7	0.782	5.00	0.0		0.012	o	600	Pipe/Conduit	
S662.003	19.372	0.034	565.1	0.000	0.00	0.0		0.012	o	900	Pipe/Conduit	
S665.000	400.590	1.543	259.7	0.771	5.00	0.0		0.012	o	600	Pipe/Conduit	
S662.004	19.744	0.030	665.2	0.000	0.00	0.0		0.012	o	1000	Pipe/Conduit	
S666.000	399.209	1.574	253.7	0.757	5.00	0.0		0.012	o	500	Pipe/Conduit	
S662.005	19.372	0.026	750.0	0.000	0.00	0.0		0.012	o	1200	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S656.001	97.13	12.85	91.960	4.928	0.0	0.0	132.9	1.36	1542.2	1462.3
S638.026	56.90	30.00	90.946	40.333	0.0	0.0	637.3	1.21	8138.7	7010.4
S662.000	110.02	9.76	94.429	0.766	0.0	0.0	23.4	1.40	394.8	257.5
S662.001	108.92	9.98	93.024	0.766	0.0	0.0	23.4	1.40	394.8	257.5
S663.000	105.32	10.85	94.330	0.866	0.0	0.0	25.3	1.14	322.1	278.5
S662.002	104.71	11.00	92.961	1.632	0.0	0.0	47.5	2.46	695.9	522.0
S664.000	110.95	9.58	94.231	0.782	0.0	0.0	24.1	1.45	409.6	265.1
S662.003	103.69	11.25	92.420	2.414	0.0	0.0	69.5	1.30	825.0	764.6
S665.000	111.00	9.57	94.228	0.771	0.0	0.0	23.8	1.46	412.8	261.4
S662.004	102.64	11.50	92.286	3.185	0.0	0.0	90.8	1.28	1007.1	998.5
S666.000	108.45	10.09	94.330	0.757	0.0	0.0	22.8	1.31	256.8	250.7
S662.005	101.67	11.74	92.056	3.941	0.0	0.0	111.3	1.36	1542.2	1224.1

Network Design Table for Phase 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S667.000	401.127	0.942	425.9	1.022	5.00	0.0		0.012	o	700	Pipe/Conduit	
S662.006	97.868	0.430	227.5	0.000	0.00	0.0		0.012	o	1200	Pipe/Conduit	
S638.027	19.673	0.126	156.1	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S668.000	500.792	3.569	140.3	0.948	5.00	0.0		0.012	o	500	Pipe/Conduit	
S638.028	19.187	0.126	152.3	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S669.000	502.145	3.691	136.1	0.995	5.00	0.0		0.012	o	500	Pipe/Conduit	
S638.029	52.980	0.106	499.8	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.030	20.000#	0.040	499.8	0.000	0.00	0.0		0.033	3 \=/	2000	1:3 Swale	
S638.031	130.817	0.399	327.9	2.589	0.00	0.0	0.600		o	500	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S667.000	107.60	10.29	94.328	1.022	0.0	0.0	30.5	1.26	486.2	335.9
S662.006	98.97	12.40	92.030	4.963	0.0	0.0	136.4	2.48	2800.5	1500.4
S638.027	56.90	30.00	90.383	45.297	0.0	0.0	715.7	1.73	8632.0	7873.1
S668.000	110.11	9.75	94.326	0.948	0.0	0.0	29.0	1.76	345.3	318.7
S638.028	56.90	30.00	90.257	46.244	0.0	0.0	730.7	1.75	8740.6	8037.8
S669.000	110.42	9.69	94.322	0.995	0.0	0.0	30.5	1.79	350.7	335.8
S638.029	56.90	30.00	89.831	47.240	0.0	0.0	746.4	1.12	8584.6	8210.8
S638.030	56.90	30.00	89.725	47.240	0.0	0.0	746.4	1.12	8584.6	8210.8
S638.031	56.90	30.00	89.685	49.829	0.0	0.0	787.3	1.19	234.5«	8660.8

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S638.000	3 \=/	2000	191	105.173	103.873	0.300	Junction	
S638.001	3 \=/	2000	192	102.865	101.565	0.300	Junction	
S638.002	3 \=/	2000	193	99.858	98.558	0.300	Junction	
S638.003	3 \=/	2000	194	99.543	97.958	0.586	Junction	
S638.004	3 \=/	2000	446	95.000	93.700	0.300	Junction	
S638.005	3 \=/	2000	447	95.000	93.468	0.532	Junction	
S638.006	3 \=/	2000	448	95.000	93.273	0.727	Junction	
S638.007	3 \=/	2000	449	95.000	92.973	1.027	Junction	
S638.008	3 \=/	2000	450	95.000	92.778	1.222	Junction	
S639.000	ooo	600	200	96.025	94.225	1.200	Open Manhole	2700
S638.009	3 \=/	2000	200	97.384	92.659	3.725	Junction	
S640.000	o	600	202	96.027	94.227	1.200	Open Manhole	1500
S638.010	3 \=/	2000	201	97.385	92.632	3.753	Junction	
S641.000	o	600	204	96.028	94.228	1.200	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S638.000	307.560	133.3	192	102.865	101.565	0.300	Junction	
S638.001	402.886	134.0	193	99.858	98.558	0.300	Junction	
S638.002	273.987	456.4	194	99.543	97.958	0.586	Junction	
S638.003	25.472	6.0	446	95.000	93.700	0.300	Junction	
S638.004	173.866	749.4	447	95.000	93.468	0.532	Junction	
S638.005	89.881	461.5	448	95.000	93.273	0.727	Junction	
S638.006	138.418	461.5	449	95.000	92.973	1.027	Junction	
S638.007	89.975	461.5	450	95.000	92.778	1.222	Junction	
S638.008	50.146	420.5	200	97.384	92.659	3.725	Junction	
S639.000	496.554	425.9	200	97.384	93.059	3.725	Junction	
S638.009	19.999	740.7	201	97.385	92.632	3.753	Junction	
S640.000	496.147	415.3	201	97.385	93.032	3.753	Junction	
S638.010	19.781	760.8	202	97.388	92.606	3.782	Junction	
S641.000	496.002	405.8	202	97.388	93.006	3.782	Junction	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S638.011	3 \=/	2000	202	97.388	92.606	3.782	Junction	
S642.000	o	600	206	96.026	94.226	1.200	Open Manhole	1500
S638.012	3 \=/	2000	200	97.388	92.530	3.858	Junction	
S643.000	o	600	208	96.026	94.226	1.200	Open Manhole	1500
S638.013	3 \=/	2000	201	97.390	92.503	3.887	Junction	
S644.000	o	600	210	96.027	94.227	1.200	Open Manhole	1500
S638.014	3 \=/	2000	201	97.386	92.177	4.009	Junction	
S645.000	o	600	212	96.026	94.326	1.100	Open Manhole	1500
S638.015	3 \=/	2000	202	97.384	92.150	4.034	Junction	
S646.000	o	600	214	96.029	94.329	1.100	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S638.011	19.309	254.1	200	97.388	92.530	3.858	Junction	
S642.000	496.972	383.6	200	97.388	92.930	3.858	Junction	
S638.012	20.329	752.9	201	97.390	92.503	3.887	Junction	
S643.000	497.317	375.9	201	97.390	92.903	3.887	Junction	
S638.013	19.733	156.6	201	97.386	92.377	4.009	Junction	
S644.000	496.086	426.6	201	97.386	93.064	3.722	Junction	
S638.014	20.054	742.7	202	97.384	92.150	4.034	Junction	
S645.000	496.245	426.3	202	97.384	93.162	3.622	Junction	
S638.015	19.670	756.5	200	97.384	92.124	4.060	Junction	
S646.000	495.086	426.1	200	97.384	93.167	3.617	Junction	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S638.016	3 \=/	2000	200	97.384	92.124	4.060	Junction	
S647.000	o	600	216	96.026	94.326	1.100	Open Manhole	1500
S638.017	3 \=/	2000	208	97.387	92.097	4.090	Junction	
S648.000	o	600	218	96.029	94.329	1.100	Open Manhole	1500
S638.018	3 \=/	2000	209	97.389	92.070	4.119	Junction	
S649.000	o	600	220	96.028	94.328	1.100	Open Manhole	1500
S638.019	3 \=/	2000	208	97.391	92.043	4.148	Junction	
S650.000	o	600	222	96.028	94.328	1.100	Open Manhole	1500
S638.020	3 \=/	2000	209	97.395	92.017	4.178	Junction	
S651.000	o	600	224	96.030	94.330	1.100	Open Manhole	1500
S638.021	3 \=/	2000	208	97.394	91.991	4.203	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S638.016	20.329	752.9	208	97.387	92.097	4.090	Junction	
S647.000	496.687	426.5	208	97.387	93.162	3.625	Junction	
S638.017	20.293	751.6	209	97.389	92.070	4.119	Junction	
S648.000	495.917	425.9	209	97.389	93.165	3.625	Junction	
S638.018	20.293	751.6	208	97.391	92.043	4.148	Junction	
S649.000	496.608	426.5	208	97.391	93.164	3.627	Junction	
S638.019	19.818	762.2	209	97.395	92.017	4.178	Junction	
S650.000	497.578	426.5	209	97.395	93.161	3.634	Junction	
S638.020	19.156	736.8	208	97.394	91.991	4.203	Junction	
S651.000	496.624	425.9	208	97.394	93.164	3.631	Junction	
S638.021	20.614	763.5	209	97.396	91.964	4.232	Junction	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S652.000	o	600	226	96.026	94.326	1.100	Open Manhole	1500
S638.022	3 \=/	2000	209	97.396	91.964	4.232	Junction	
S653.000	o	600	228	96.029	94.329	1.100	Open Manhole	1500
S638.023	3 \=/	2000	209	97.394	91.937	4.257	Junction	
S654.000	o	600	230	96.027	94.327	1.100	Open Manhole	1500
S638.024	3 \=/	2000	210	97.399	91.810	4.589	Junction	
S655.000	o	600	232	96.023	94.323	1.100	Open Manhole	1500
S638.025	3 \=/	2000	210	97.398	91.684	4.714	Junction	
S656.000	o	600	234	96.027	94.327	1.100	Open Manhole	1500
S657.000	o	600	235	96.030	94.430	1.000	Open Manhole	1500
S657.001	o	600	236	96.976	92.964	3.413	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S652.000	498.672	426.5	209	97.396	93.156	3.639	Junction	
S638.022	20.279	751.1	209	97.394	91.937	4.257	Junction	
S653.000	496.804	426.5	209	97.394	93.164	3.630	Junction	
S638.023	19.976	157.3	210	97.399	91.810	4.389	Junction	
S654.000	498.579	426.5	210	97.399	93.158	3.641	Junction	
S638.024	19.524	155.0	210	97.398	91.684	4.714	Junction	
S655.000	500.191	425.9	210	97.398	93.149	3.650	Junction	
S638.025	21.090	39.2	455	96.000	91.146	3.854	Junction	
S656.000	400.177	426.5	235	96.975	93.389	2.986	Open Manhole	2100
S657.000	399.745	272.7	236	96.976	92.964	3.413	Open Manhole	1500
S657.001	19.603	72.1	237	96.977	92.692	3.685	Open Manhole	1800

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S658.000	o	600	237	96.025	94.225	1.200	Open Manhole	1500
S657.002	o	800	237	96.977	92.492	3.685	Open Manhole	1800
S659.000	o	600	239	96.023	94.323	1.100	Open Manhole	1500
S657.003	o	900	237	96.975	92.353	3.722	Open Manhole	1800
S660.000	o	500	241	96.026	94.326	1.200	Open Manhole	1500
S657.004	o	1000	239	96.974	92.218	3.756	Open Manhole	1900
S661.000	o	600	243	96.025	94.425	1.000	Open Manhole	1500
S657.005	o	1200	239	96.977	91.987	3.790	Open Manhole	2100
S656.001	o	1200	235	96.975	91.960	3.815	Open Manhole	2100
S638.026	3 \=/	2000	455	96.000	90.946	3.854	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S658.000	401.722	261.9	237	96.977	92.692	3.685	Open Manhole	1800
S657.002	21.222	543.5	237	96.975	92.453	3.722	Open Manhole	1800
S659.000	402.235	426.5	237	96.975	93.379	2.995	Open Manhole	1800
S657.003	19.476	553.8	239	96.974	92.318	3.756	Open Manhole	1900
S660.000	400.461	249.0	239	96.974	92.718	3.756	Open Manhole	1900
S657.004	19.914	651.9	239	96.977	92.187	3.790	Open Manhole	2100
S661.000	401.986	283.9	239	96.977	93.010	3.368	Open Manhole	2100
S657.005	20.387	750.0	235	96.975	91.960	3.815	Open Manhole	2100
S656.001	98.787	750.0	455	96.000	91.828	2.972	Junction	
S638.026	219.384	389.7	218	94.000	90.383	2.417	Junction	

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S662.000	o	600	247	96.029	94.429	1.000	Open Manhole	1500
S662.001	o	600	248	96.974	93.024	3.350	Open Manhole	1500
S663.000	o	600	249	96.030	94.330	1.100	Open Manhole	1500
S662.002	o	600	249	96.976	92.961	3.416	Open Manhole	1500
S664.000	o	600	251	96.031	94.231	1.200	Open Manhole	1500
S662.003	o	900	250	96.974	92.420	3.654	Open Manhole	1800
S665.000	o	600	253	96.028	94.228	1.200	Open Manhole	1500
S662.004	o	1000	251	96.977	92.286	3.691	Open Manhole	1900
S666.000	o	500	255	96.030	94.330	1.200	Open Manhole	1500
S662.005	o	1200	252	96.975	92.056	3.719	Open Manhole	2100
S667.000	o	700	257	96.028	94.328	1.000	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S662.000	398.983	283.9	248	96.974	93.024	3.350	Open Manhole	1500
S662.001	17.989	283.9	249	96.976	92.961	3.416	Open Manhole	1500
S663.000	399.745	426.5	249	96.976	93.393	2.984	Open Manhole	1500
S662.002	21.975	91.4	250	96.974	92.720	3.654	Open Manhole	1800
S664.000	398.447	263.7	250	96.974	92.720	3.654	Open Manhole	1800
S662.003	19.372	565.1	251	96.977	92.386	3.691	Open Manhole	1900
S665.000	400.590	259.7	251	96.977	92.686	3.691	Open Manhole	1900
S662.004	19.744	665.2	252	96.975	92.256	3.719	Open Manhole	2100
S666.000	399.209	253.7	252	96.975	92.756	3.719	Open Manhole	2100
S662.005	19.372	750.0	253	96.978	92.030	3.748	Open Manhole	2100
S667.000	401.127	425.9	253	96.978	93.386	2.892	Open Manhole	2100

PIPELINE SCHEDULES for Phase 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S662.006	o	1200	253	96.978	92.030	3.748	Open Manhole	2100
S638.027	3 \=/	2000	218	94.000	90.383	2.617	Junction	
S668.000	o	500	260	96.026	94.326	1.200	Open Manhole	1500
S638.028	3 \=/	2000	219	94.000	90.257	2.743	Junction	
S669.000	o	500	262	96.022	94.322	1.200	Open Manhole	1500
S638.029	3 \=/	2000	219	94.000	89.831	2.869	Junction	
S638.030	3 \=/	2000	456	93.000	89.725	1.975	Junction	
S638.031	o	500	439	93.000	89.685	2.815	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S662.006	97.868	227.5	218	94.000	91.600	1.200	Junction	
S638.027	19.673	156.1	219	94.000	90.257	2.743	Junction	
S668.000	500.792	140.3	219	94.000	90.757	2.743	Junction	
S638.028	19.187	152.3	219	94.000	90.131	2.869	Junction	
S669.000	502.145	136.1	219	94.000	90.631	2.869	Junction	
S638.029	52.980	499.8	456	93.000	89.725	1.975	Junction	
S638.030	20.000#	499.8	439	93.000	89.685	2.015	Junction	
S638.031	130.817	327.9	440	93.083	89.286	3.297	Open Manhole	10000

Area Summary for Phase 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
638.000	-	-	30	0.000	0.000	0.000
638.001	-	-	30	5.944	1.783	1.783
638.002	-	-	30	12.269	3.681	3.681
638.003	-	-	30	10.282	3.085	3.085
638.004	-	-	30	7.308	2.192	2.192
638.005	-	-	30	0.000	0.000	0.000
638.006	-	-	30	2.825	0.848	0.848
638.007	-	-	30	3.850	1.155	1.155
638.008	-	-	94	1.859	1.747	1.747
639.000	-	-	94	3.229	3.035	3.035
638.009	-	-	94	0.000	0.000	0.000
640.000	-	-	94	0.946	0.889	0.889
638.010	-	-	94	0.000	0.000	0.000
641.000	-	-	94	1.014	0.953	0.953
638.011	-	-	94	0.000	0.000	0.000
642.000	-	-	94	0.934	0.878	0.878
638.012	-	-	94	0.000	0.000	0.000
643.000	-	-	94	1.002	0.942	0.942
638.013	-	-	94	0.000	0.000	0.000
644.000	-	-	94	0.960	0.902	0.902
638.014	-	-	94	0.000	0.000	0.000
645.000	-	-	94	0.921	0.866	0.866
638.015	-	-	94	0.000	0.000	0.000
646.000	-	-	94	1.109	1.042	1.042
638.016	-	-	94	0.000	0.000	0.000
647.000	-	-	94	0.975	0.917	0.917
638.017	-	-	94	0.000	0.000	0.000
648.000	-	-	94	1.056	0.993	0.993
638.018	-	-	94	0.000	0.000	0.000
649.000	-	-	94	0.988	0.929	0.929
638.019	-	-	94	0.000	0.000	0.000
650.000	-	-	94	1.022	0.961	0.961
638.020	-	-	94	0.000	0.000	0.000
651.000	-	-	94	1.095	1.029	1.029
638.021	-	-	94	0.000	0.000	0.000
652.000	-	-	94	0.973	0.915	0.915
638.022	-	-	94	0.000	0.000	0.000
653.000	-	-	94	1.029	0.967	0.967
638.023	-	-	94	0.000	0.000	0.000
654.000	-	-	94	1.031	0.969	0.969
638.024	-	-	94	0.000	0.000	0.000
655.000	-	-	94	1.080	1.015	1.015
638.025	-	-	94	0.000	0.000	0.000
656.000	-	-	94	1.022	0.961	0.961
657.000	-	-	94	0.835	0.785	0.785
657.001	-	-	94	0.000	0.000	0.000
658.000	-	-	94	0.835	0.785	0.785
657.002	-	-	94	0.000	0.000	0.000
659.000	-	-	94	0.916	0.861	0.861
657.003	-	-	94	0.000	0.000	0.000
660.000	-	-	94	0.820	0.771	0.771

Area Summary for Phase 1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
657.004	-	-	94	0.000	0.000	0.000
661.000	-	-	94	0.815	0.766	0.766
657.005	-	-	94	0.000	0.000	0.000
656.001	-	-	94	0.000	0.000	0.000
638.026	-	-	94	2.885	2.712	2.712
662.000	-	-	94	0.815	0.766	0.766
662.001	-	-	94	0.000	0.000	0.000
663.000	-	-	94	0.921	0.866	0.866
662.002	-	-	94	0.000	0.000	0.000
664.000	-	-	94	0.832	0.782	0.782
662.003	-	-	94	0.000	0.000	0.000
665.000	-	-	94	0.820	0.771	0.771
662.004	-	-	94	0.000	0.000	0.000
666.000	-	-	94	0.805	0.757	0.757
662.005	-	-	94	0.000	0.000	0.000
667.000	-	-	94	1.087	1.022	1.022
662.006	-	-	94	0.000	0.000	0.000
638.027	-	-	94	0.000	0.000	0.000
668.000	-	-	94	1.008	0.948	0.948
638.028	-	-	94	0.000	0.000	0.000
669.000	-	-	94	1.059	0.995	0.995
638.029	-	-	94	0.000	0.000	0.000
638.030	-	-	30	0.000	0.000	0.000
638.031	-	-	30	8.630	2.589	2.589
				Total	Total	Total
				87.806	49.829	49.829

Free Flowing Outfall Details for Phase 1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S638.031	440	93.083	89.286	0.000	10000	0

Simulation Criteria for Phase 1

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	2880
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	5

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Rainfall Profile Details

Simulation Criteria for Phase 1

Event Name Duration (mins) 65 Timestep (mins) 5 Profiles 1

Online Controls for Phase 1

Hydroslide Manhole: 439, DS/PN: S638.031, Volume (m³): 774.5

Design Head (m)	2.000	Invert Level (m)	89.685
Design Flow (l/s)	100.0	Maximum Head (m)	4.050
Range	VS	Minimum Pipe Diameter (mm)	300
Application	Stormwater	Minimum Manhole Diameter (mm)	2400
Model	DR 300 VS		

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	8.2	1.200	100.0	3.000	100.0	7.000	131.1
0.200	31.1	1.400	100.0	3.500	92.7	7.500	135.7
0.300	58.4	1.600	100.0	4.000	99.1	8.000	140.1
0.400	90.1	1.800	100.0	4.500	105.1	8.500	144.4
0.500	100.0	2.000	100.0	5.000	110.8	9.000	148.6
0.600	100.0	2.200	100.0	5.500	116.2	9.500	152.7
0.800	100.0	2.400	100.0	6.000	121.4		
1.000	100.0	2.600	100.0	6.500	126.3		

Storage Structures for Phase 1

Infiltration Basin Manhole: 439, DS/PN: S638.031

Invert Level (m) 89.585 Safety Factor 1.5
Infiltration Coefficient Base (m/hr) 0.05000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.10000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	13000.0	1.500	14882.4	3.000	16892.1	5.242	20133.1
0.500	13613.3	2.000	15538.2	4.000	18302.6	5.921	21170.7
1.000	14240.8	2.055	15611.2	5.000	19769.6		

STORM SEWER DESIGN by the Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

IDF File	IDF	Add Flow / Climate Change (%)	10
Maximum Rainfall (mm/hr)	134	Minimum Backdrop Height (m)	0.200
Maximum Time of Concentration (mins)	100	Maximum Backdrop Height (m)	1.500
Foul Sewage (l/s/ha)	0.000	Min Design Depth for Optimisation (m)	0.000
		Min Vel for Auto Design only (m/s)	0.45
PIMP (%)	94	Min Slope for Optimisation (1:X)	750

Designed with Level Soffits

Network Design Table for Storm

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.000	159.718	1.017	157.0	0.000	5.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.001	112.957	1.733	65.2	0.613	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.002	20.801	0.500	41.6	0.326	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.003	182.231	1.486	122.6	0.950	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.004	184.894	1.130	163.6	1.615	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.005	33.876	0.500	67.8	2.315	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S5.000	64.099	2.263	28.3	0.000	5.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S6.000	67.960	0.243	279.7	0.433	5.00	0.0	0.012	o	500	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4.000	126.62	6.55	103.500	0.000	0.0	0.0	0.0	1.72	8606.9	0.0
S4.001	122.98	7.25	102.250	0.613	0.0	0.0	20.9	2.67	13359.9	230.2
S4.002	122.45	7.35	100.517	0.939	0.0	0.0	31.9	3.34	16722.6	351.3
S4.003	114.40	8.91	100.017	1.889	0.0	0.0	60.0	1.95	9740.0	660.3
S4.004	105.76	10.74	98.531	3.504	0.0	0.0	102.9	1.69	8432.2	1132.1
S4.005	104.88	10.96	97.401	5.820	0.0	0.0	169.5	2.62	13103.9	1864.4
S5.000	133.24	5.26	100.980	0.000	0.0	0.0	0.0	4.05	20266.5	0.0
S6.000	129.91	5.91	103.150	0.433	0.0	0.0	15.6	1.25	244.6	172.0

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S7.000	32.553	0.043	750.0	0.044	5.00	0.0	0.012	o	300	Pipe/Conduit	
S6.001	24.511	0.033	750.0	0.307	0.00	0.0	0.012	o	700	Pipe/Conduit	
S6.002	26.225	0.174	150.7	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S8.000	69.223	0.288	240.4	0.418	5.00	0.0	0.012	o	500	Pipe/Conduit	
S9.000	29.885	0.040	747.1	0.054	5.00	0.0	0.012	o	300	Pipe/Conduit	
S6.003	50.317	0.498	101.0	0.374	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S10.000	67.127	0.090	750.0	0.352	5.00	0.0	0.012	o	500	Pipe/Conduit	
S11.000	30.516	0.041	744.3	0.048	5.00	0.0	0.012	o	300	Pipe/Conduit	
S6.004	49.291	0.165	298.7	0.362	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S12.000	67.565	0.090	750.0	0.311	5.00	0.0	0.012	o	500	Pipe/Conduit	
S13.000	30.376	0.041	750.0	0.044	5.00	0.0	0.012	o	300	Pipe/Conduit	
S6.005	50.949	0.189	269.6	0.356	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S7.000	129.43	6.00	102.750	0.044	0.0	0.0	1.6	0.54	38.3	17.5
S6.001	127.21	6.43	102.307	0.785	0.0	0.0	27.7	0.95	366.4	305.0
S6.002	125.93	6.68	101.974	0.785	0.0	0.0	27.7	1.76	8785.7	305.0
S8.000	130.17	5.86	102.745	0.418	0.0	0.0	15.1	1.34	263.8	166.3
S9.000	129.86	5.92	102.497	0.054	0.0	0.0	1.9	0.54	38.3	21.3
S6.003	123.91	7.07	101.757	1.631	0.0	0.0	56.1	2.15	10730.5	617.3
S10.000	127.01	6.47	102.372	0.352	0.0	0.0	12.4	0.76	149.4	136.4
S11.000	129.77	5.94	102.000	0.048	0.0	0.0	1.7	0.54	38.4	19.0
S6.004	120.52	7.73	101.259	2.392	0.0	0.0	80.1	1.25	6240.5	880.7
S12.000	126.96	6.48	102.013	0.311	0.0	0.0	11.0	0.76	149.4	120.7
S13.000	129.77	5.94	101.458	0.044	0.0	0.0	1.6	0.54	38.3	17.5
S6.005	117.18	8.38	100.717	3.104	0.0	0.0	101.0	1.31	6569.4	1111.0

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S14.000	30.702	0.041	748.8	0.050	5.00	0.0	0.012	o	300	Pipe/Conduit	
S15.000	66.313	0.500	132.6	0.255	5.00	0.0	0.012	o	400	Pipe/Conduit	
S6.006	49.382	0.113	437.0	0.357	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S16.000	65.755	0.088	750.0	0.221	5.00	0.0	0.012	o	500	Pipe/Conduit	
S17.000	30.575	0.041	750.0	0.053	5.00	0.0	0.012	o	300	Pipe/Conduit	
S6.007	11.745	0.016	734.1	0.361	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S6.008	30.302	0.040	757.6	0.000	0.00	0.0	0.012	o	1200	Pipe/Conduit	
S6.009	8.616	0.184	46.8	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S18.000	64.996	0.400	162.5	0.298	5.00	0.0	0.012	o	400	Pipe/Conduit	
S19.000	30.893	0.044	702.1	0.043	5.00	0.0	0.012	o	300	Pipe/Conduit	
S6.010	42.194	0.073	578.0	0.283	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S20.000	29.963	0.040	750.0	0.046	5.00	0.0	0.012	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S14.000	129.72	5.94	100.863	0.050	0.0	0.0	1.8	0.54	38.3	19.7
S15.000	130.94	5.71	101.732	0.255	0.0	0.0	9.3	1.56	195.9	101.9
S6.006	113.07	9.17	100.122	3.766	0.0	0.0	118.2	1.03	5159.6	1300.6
S16.000	127.17	6.44	101.389	0.221	0.0	0.0	7.8	0.76	149.4	85.8
S17.000	129.74	5.94	100.750	0.053	0.0	0.0	1.9	0.54	38.3	20.9
S6.007	111.80	9.42	100.009	4.400	0.0	0.0	136.6	0.80	3981.0	1502.7
S6.008	109.88	9.79	99.593	4.400	0.0	0.0	136.6	1.36	1534.5	1502.7
S6.009	109.64	9.84	99.553	4.400	0.0	0.0	136.6	3.15	15762.2	1502.7
S18.000	130.63	5.77	101.138	0.298	0.0	0.0	10.8	1.41	177.0	118.9
S19.000	129.85	5.92	100.177	0.043	0.0	0.0	1.6	0.56	39.5	17.2
S6.010	106.26	10.62	99.369	5.024	0.0	0.0	148.3	0.90	4486.4	1630.8
S20.000	129.84	5.92	99.513	0.046	0.0	0.0	1.7	0.54	38.3	18.3

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.011	41.986	0.056	749.8	0.335	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S5.001	13.230	0.020	661.5	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S5.002	23.822	0.025	952.9	0.157	0.00	0.0	0.033	oo	1500	Double Pipe	
S5.003	13.319	0.024	555.0	5.783	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S5.004	20.288	0.027	751.4	0.000	0.00	0.0	0.012	oo	1250	Double Pipe	
S5.005	38.833	0.500	77.7	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S5.006	20.455	0.027	757.6	0.000	0.00	0.0	0.012	oo	1250	Double Pipe	
S5.007	21.035	0.028	751.3	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.006	34.848	0.200	174.2	0.525	0.00	0.0	0.012	oo	2000	Double Pipe	
S21.000	87.612	1.398	62.7	0.000	5.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S21.001	136.733	3.541	38.6	0.307	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.007	22.385	0.033	678.3	0.285	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.008	87.280	0.118	739.7	0.040	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.009	60.159	0.077	781.3	2.700	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.010	52.700	0.071	742.3	1.340	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.011	43.729	0.062	705.3	0.955	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.012	17.255	0.023	750.2	1.188	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S6.011	102.61	11.51	98.773	5.405	0.0	0.0	154.0	0.79	3939.2	1694.2
S5.001	101.54	11.77	98.717	5.405	0.0	0.0	154.0	0.84	4193.7	1694.2
S5.002	98.35	12.55	97.997	5.562	0.0	0.0	154.0	0.51	1804.2	1694.2
S5.003	97.35	12.79	97.972	11.345	0.0	0.0	306.7	0.92	4578.6	3373.8
S5.004	96.36	13.03	97.498	11.345	0.0	0.0	306.7	1.40	3436.0	3373.8
S5.005	95.28	13.30	97.471	11.345	0.0	0.0	306.7	2.45	12239.0	3373.8
S5.006	94.28	13.54	96.721	11.345	0.0	0.0	306.7	1.39	3421.9	3373.8
S5.007	92.45	13.99	96.694	11.345	0.0	0.0	306.7	0.79	3935.2	3373.8
S4.006	91.85	14.13	96.500	17.689	0.0	0.0	451.2	3.98	24988.3	4963.1
S21.000	131.83	5.54	101.239	0.000	0.0	0.0	0.0	2.72	13624.9	0.0
S21.001	128.26	6.23	99.841	0.307	0.0	0.0	10.9	3.29	14142.6	120.4
S4.007	90.18	14.54	96.100	18.281	0.0	0.0	457.8	0.92	6168.6	5036.2
S4.008	84.95	16.20	96.067	18.322	0.0	0.0	457.8	0.88	5907.3	5036.2
S4.009	81.67	17.37	95.949	21.021	0.0	0.0	476.8	0.86	5747.8	5244.4
S4.010	78.87	18.37	94.600	22.362	0.0	0.0	489.8	0.88	5897.0	5387.4
S4.011	76.60	19.18	94.529	23.317	0.0	0.0	496.0	0.90	6049.4	5456.0
S4.012	75.68	19.51	93.750	24.505	0.0	0.0	515.0	0.87	5865.6	5665.0

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.013	42.549	0.608	70.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.014	58.043	0.142	408.8	0.867	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.015	39.259	0.048	817.9	2.104	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.016	130.606	0.633	206.3	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.017	108.222	0.475	227.8	1.289	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.018	17.554	1.241	14.1	0.881	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S4.019	20.000#	0.027	740.7	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.000	20.906	0.250	83.6	0.194	5.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.001	214.436	1.700	126.1	0.210	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.002	45.474	0.550	82.7	0.500	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.003	256.751	2.450	104.8	0.488	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.004	44.139	0.148	298.2	0.534	0.00	0.0	0.012	o	1000	Pipe/Conduit	
S22.005	33.039	0.050	660.8	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.006	14.117	0.100	141.2	0.193	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.007	87.864	0.900	97.6	0.087	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.008	11.713	0.016	750.0	0.491	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.009	89.812	0.120	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.010	23.204	0.031	748.5	0.346	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.011	1.964	0.003	750.0	0.163	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S22.012	19.362	0.026	744.7	0.000	0.00	0.0	0.012	o	1000	Pipe/Conduit	
S22.013	78.134	0.104	750.0	0.000	0.00	0.0	0.033	3 \=/	600	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4.013	74.91	19.78	93.500	24.505	0.0	0.0	515.0	2.58	12893.4	5665.0
S4.014	73.10	20.69	92.892	25.372	0.0	0.0	515.0	1.07	5335.0«	5665.5
S4.015	71.59	21.56	92.750	27.475	0.0	0.0	546.2	0.75	3771.5«	6008.6
S4.016	69.07	23.01	92.250	27.475	0.0	0.0	546.2	1.50	7509.0	6008.6
S4.017	66.87	24.27	91.250	28.764	0.0	0.0	546.2	1.43	7145.8	6008.6
S4.018	66.79	24.32	90.775	29.645	0.0	0.0	549.8	5.74	28678.7	6047.8
S4.019	66.05	24.74	89.534	29.645	0.0	0.0	549.8	0.79	3963.0«	6047.8
S22.000	133.84	5.15	100.750	0.194	0.0	0.0	7.2	2.36	11794.9	79.2
S22.001	124.24	7.01	100.500	0.403	0.0	0.0	13.9	1.92	9603.7	153.0
S22.002	122.54	7.34	98.800	0.903	0.0	0.0	30.7	2.31	10621.8	338.1
S22.003	112.06	9.37	98.250	1.391	0.0	0.0	43.3	2.11	10536.3	476.2
S22.004	110.08	9.75	95.600	1.925	0.0	0.0	58.8	1.91	1504.0	647.3
S22.005	107.13	10.41	95.452	1.925	0.0	0.0	58.8	0.84	4196.0	647.3
S22.006	106.60	10.54	94.800	2.118	0.0	0.0	62.7	1.82	9078.0	689.6
S22.007	103.85	11.21	94.700	2.205	0.0	0.0	63.6	2.18	10916.3	699.5
S22.008	102.83	11.46	93.800	2.696	0.0	0.0	77.0	0.79	3938.5	846.8
S22.009	95.04	13.36	93.784	2.696	0.0	0.0	77.0	0.79	3938.5	846.8
S22.010	93.03	13.85	93.000	3.042	0.0	0.0	78.6	0.79	3942.4	864.4
S22.011	92.86	13.89	92.800	3.204	0.0	0.0	82.6	0.79	3938.5	908.9
S22.012	91.76	14.15	92.597	3.204	0.0	0.0	82.6	1.21	951.8	908.9
S22.013	85.57	15.98	92.571	3.204	0.0	0.0	82.6	0.72	2575.5	908.9

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S22.014	19.098	0.025	763.9	0.000	0.00	0.0	0.012	o	1000	Pipe/Conduit	
S22.015	19.980	0.027	750.0	3.533	0.00	0.0	0.033	3 \=/	600	1:3 Swale	
S22.016	19.607	0.026	754.1	0.000	0.00	0.0	0.012	o	1300	Pipe/Conduit	
S22.017	42.174	0.056	750.0	0.000	0.00	0.0	0.033	3 \=/	600	1:3 Swale	
S22.018	19.994	0.027	750.0	0.000	0.00	0.0	0.012	o	1250	Pipe/Conduit	
S22.019	16.889	0.023	750.0	2.480	0.00	0.0	0.033	3 \=/	600	1:3 Swale	
S22.020	19.516	0.026	750.0	0.000	0.00	0.0	0.012	o	1400	Pipe/Conduit	
S22.021	16.243	0.022	750.0	0.000	0.00	0.0	0.033	3 \=/	600	1:3 Swale	
S22.022	19.427	0.026	750.0	0.000	0.00	0.0	0.012	o	1400	Pipe/Conduit	
S22.023	32.556	0.043	757.1	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S23.000	66.516	0.089	750.0	0.368	5.00	0.0	0.012	o	500	Pipe/Conduit	
S23.001	56.819	0.060	944.5	0.324	0.00	0.0	0.012	o	700	Pipe/Conduit	
S24.000	65.250	0.087	750.0	0.302	5.00	0.0	0.012	o	500	Pipe/Conduit	
S24.001	55.407	0.060	924.5	0.269	0.00	0.0	0.012	o	600	Pipe/Conduit	
S25.000	65.434	0.087	750.0	0.321	5.00	0.0	0.012	o	500	Pipe/Conduit	
S25.001	54.885	0.060	921.7	0.282	0.00	0.0	0.012	o	700	Pipe/Conduit	
S26.000	66.505	0.089	750.0	0.321	5.00	0.0	0.012	o	500	Pipe/Conduit	
S26.001	55.162	0.059	941.5	0.292	0.00	0.0	0.012	o	700	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S22.014	84.82	16.24	92.267	3.204	0.0	0.0	82.6	1.20	939.7	908.9
S22.015	83.52	16.71	92.242	6.738	0.0	0.0	156.3	0.72	2575.5	1719.1
S22.016	82.88	16.93	91.716	6.738	0.0	0.0	156.3	1.43	1904.0	1719.1
S22.017	80.13	17.92	91.690	6.738	0.0	0.0	156.3	0.72	2575.5	1719.1
S22.018	79.47	18.15	91.183	6.738	0.0	0.0	156.3	1.40	1719.6	1719.1
S22.019	78.36	18.55	91.157	9.218	0.0	0.0	200.6	0.72	2575.5	2206.5
S22.020	77.76	18.76	90.534	9.218	0.0	0.0	200.6	1.51	2326.4	2206.5
S22.021	76.70	19.14	90.508	9.218	0.0	0.0	200.6	0.72	2575.5	2206.5
S22.022	76.10	19.36	89.886	9.218	0.0	0.0	200.6	1.51	2326.4	2206.5
S22.023	74.22	20.05	89.861	9.218	0.0	0.0	200.6	0.78	3919.9	2206.5
S23.000	127.08	6.46	93.462	0.368	0.0	0.0	13.0	0.76	149.4	143.0
S23.001	121.32	7.57	93.174	0.693	0.0	0.0	23.3	0.85	326.5	256.7
S24.000	127.22	6.43	93.985	0.302	0.0	0.0	10.7	0.76	149.4	117.3
S24.001	121.06	7.62	93.798	0.571	0.0	0.0	19.2	0.77	218.8	211.0
S25.000	127.20	6.43	94.497	0.321	0.0	0.0	11.4	0.76	149.4	124.9
S25.001	121.71	7.50	94.209	0.603	0.0	0.0	20.4	0.86	330.5	224.4
S26.000	127.08	6.46	95.016	0.321	0.0	0.0	11.3	0.76	149.4	124.8
S26.001	121.50	7.54	94.727	0.614	0.0	0.0	20.7	0.85	327.0	227.8

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S27.000	65.903	0.088	750.0	0.326	5.00	0.0	0.012	o	500	Pipe/Conduit	
S27.001	54.679	0.147	372.7	0.288	0.00	0.0	0.012	o	600	Pipe/Conduit	
S28.000	65.521	0.087	750.0	0.332	5.00	0.0	0.012	o	500	Pipe/Conduit	
S28.001	55.648	0.060	921.0	0.290	0.00	0.0	0.012	o	700	Pipe/Conduit	
S29.000	66.765	0.089	750.0	0.304	5.00	0.0	0.012	o	500	Pipe/Conduit	
S29.001	54.586	0.059	924.6	0.263	0.00	0.0	0.012	o	600	Pipe/Conduit	
S30.000	65.852	0.088	748.3	0.293	5.00	0.0	0.012	o	600	Pipe/Conduit	
S30.001	55.162	0.060	926.1	0.250	0.00	0.0	0.012	o	600	Pipe/Conduit	
S31.000	66.248	0.088	752.8	0.318	5.00	0.0	0.012	o	500	Pipe/Conduit	
S31.001	54.997	0.073	753.4	0.271	0.00	0.0	0.012	o	600	Pipe/Conduit	
S32.000	66.043	0.088	750.5	0.337	5.00	0.0	0.012	o	500	Pipe/Conduit	
S32.001	55.092	0.126	435.9	0.290	0.00	0.0	0.012	o	600	Pipe/Conduit	
S33.000	65.325	0.087	750.9	0.369	5.00	0.0	0.012	o	500	Pipe/Conduit	
S33.001	54.826	0.059	923.2	0.319	0.00	0.0	0.012	o	700	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S27.000	127.15	6.44	95.537	0.326	0.0	0.0	11.5	0.76	149.4	126.7
S27.001	123.29	7.19	95.349	0.614	0.0	0.0	21.0	1.22	344.6	231.2
S28.000	127.19	6.44	96.063	0.332	0.0	0.0	11.7	0.76	149.4	128.9
S28.001	121.62	7.52	95.775	0.622	0.0	0.0	21.0	0.86	330.6	231.2
S29.000	127.05	6.46	96.615	0.304	0.0	0.0	10.7	0.76	149.4	117.8
S29.001	120.98	7.64	96.426	0.567	0.0	0.0	19.0	0.77	218.8	209.5
S30.000	128.01	6.28	96.000	0.293	0.0	0.0	10.4	0.86	243.2	114.7
S30.001	121.88	7.47	95.912	0.543	0.0	0.0	18.4	0.77	218.6	202.3
S31.000	127.10	6.45	97.500	0.318	0.0	0.0	11.2	0.76	149.1	123.4
S31.001	121.58	7.52	97.312	0.588	0.0	0.0	19.9	0.86	242.3	218.5
S32.000	127.13	6.45	98.000	0.337	0.0	0.0	11.9	0.76	149.3	131.1
S32.001	122.93	7.26	97.812	0.627	0.0	0.0	21.4	1.13	318.6	235.4
S33.000	127.21	6.43	98.000	0.369	0.0	0.0	13.1	0.76	149.3	143.6
S33.001	121.72	7.50	97.713	0.688	0.0	0.0	23.3	0.86	330.2	255.8

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S34.000	362.589	0.498	728.1	0.429	5.00	0.0	0.012	o	500	Pipe/Conduit	
S35.000	144.933	0.193	750.0	0.235	5.00	0.0	0.045	3 \=/	2000	1:3 Swale	
S35.001	140.105	0.187	750.0	0.285	0.00	0.0	0.045	3 \=/	2000	1:3 Swale	
S35.002	21.759	2.313	9.4	0.000	0.00	0.0	0.045	3 \=/	2000	1:3 Swale	
S34.001	10.460	0.013	804.6	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S33.002	8.614	0.014	615.3	0.123	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S36.000	363.846	2.349	154.9	0.313	5.00	0.0	0.012	o	400	Pipe/Conduit	
S33.003	19.966	0.026	767.9	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S37.000	363.021	2.184	166.2	0.340	5.00	0.0	0.012	o	400	Pipe/Conduit	
S33.004	20.811	0.028	743.3	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S38.000	363.240	2.033	178.7	0.327	5.00	0.0	0.012	o	400	Pipe/Conduit	
S32.002	18.885	0.026	726.3	0.114	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S34.000	97.21	12.83	100.195	0.429	0.0	0.0	11.6	0.77	151.6	127.3
S35.000	107.54	10.31	101.350	0.235	0.0	0.0	7.0	0.46	1168.7	77.2
S35.001	90.97	14.35	100.750	0.519	0.0	0.0	13.1	0.58	2888.2	144.3
S35.002	90.68	14.42	100.563	0.519	0.0	0.0	13.1	5.16	25788.8	144.3
S34.001	89.74	14.65	98.250	0.948	0.0	0.0	23.6	0.76	3802.5	259.9
S33.002	89.06	14.81	97.354	1.759	0.0	0.0	43.5	0.87	4348.3	478.6
S36.000	112.91	9.20	99.989	0.313	0.0	0.0	9.8	1.44	181.3	108.0
S33.003	87.62	15.24	97.040	2.072	0.0	0.0	50.4	0.78	3892.3	554.7
S37.000	112.18	9.34	99.798	0.340	0.0	0.0	10.6	1.39	175.0	116.6
S33.004	86.40	15.68	97.014	2.413	0.0	0.0	57.9	0.79	3956.3	636.7
S38.000	111.34	9.51	99.618	0.327	0.0	0.0	10.1	1.34	168.8	111.3
S32.002	85.30	16.07	96.986	3.480	0.0	0.0	82.4	0.80	4002.1	906.8

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S39.000	363.229	0.498	729.3	0.316	5.00	0.0	0.012	o	500	Pipe/Conduit	
S32.003	19.653	0.025	786.1	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S40.000	364.307	0.500	729.1	0.347	5.00	0.0	0.012	o	500	Pipe/Conduit	
S32.004	10.435	0.186	56.1	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S31.002	9.806	0.013	754.3	0.107	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S41.000	362.998	0.577	629.5	0.303	5.00	0.0	0.012	o	400	Pipe/Conduit	
S31.003	19.865	0.027	735.7	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S42.000	363.516	0.653	556.8	0.349	5.00	0.0	0.012	o	500	Pipe/Conduit	
S31.004	19.467	0.026	748.7	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S43.000	363.672	2.442	148.9	0.322	5.00	0.0	0.012	o	400	Pipe/Conduit	
S30.002	20.841	0.027	771.9	0.100	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S39.000	97.13	12.85	99.436	0.316	0.0	0.0	8.5	0.77	151.5	93.7
S32.003	84.10	16.50	96.750	3.796	0.0	0.0	88.7	0.77	3847.0	975.3
S40.000	97.04	12.87	99.243	0.347	0.0	0.0	9.3	0.77	151.5	102.8
S32.004	83.94	16.56	96.725	4.143	0.0	0.0	96.6	2.88	14400.3	1062.3
S31.002	83.35	16.77	96.539	4.839	0.0	0.0	112.0	0.79	3927.2	1232.0
S41.000	94.63	13.46	99.160	0.303	0.0	0.0	8.0	0.72	89.9	87.5
S31.003	82.19	17.18	96.526	5.141	0.0	0.0	117.3	0.80	3976.5	1290.8
S42.000	101.16	11.86	98.875	0.349	0.0	0.0	9.8	0.88	173.4	107.8
S31.004	81.03	17.59	96.499	5.490	0.0	0.0	123.5	0.79	3941.8	1359.0
S43.000	113.34	9.12	98.795	0.322	0.0	0.0	10.1	1.47	184.9	111.6
S30.002	79.78	18.04	95.452	6.456	0.0	0.0	143.0	0.78	3882.3	1573.3

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S44.000	363.009	0.774	469.1	0.319	5.00	0.0	0.012	o	400	Pipe/Conduit	
S30.003	24.536	0.032	766.8	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S45.000	363.796	0.887	410.0	0.324	5.00	0.0	0.012	o	400	Pipe/Conduit	
S29.002	15.676	0.021	746.5	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S46.000	363.058	0.881	412.1	0.321	5.00	0.0	0.012	o	400	Pipe/Conduit	
S29.003	19.259	0.026	740.7	0.100	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S47.000	363.487	1.363	266.7	0.333	5.00	0.0	0.012	o	400	Pipe/Conduit	
S29.004	20.851	0.059	353.4	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S48.000	363.798	1.005	362.2	0.330	5.00	0.0	0.012	o	400	Pipe/Conduit	
S28.002	19.860	0.127	156.4	0.111	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S49.000	363.231	1.051	345.6	0.317	5.00	0.0	0.012	o	400	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S44.000	99.37	12.30	98.598	0.319	0.0	0.0	8.8	0.83	104.2	96.7
S30.003	78.31	18.57	95.425	6.774	0.0	0.0	147.3	0.78	3895.2	1620.5
S45.000	101.26	11.84	98.404	0.324	0.0	0.0	9.1	0.89	111.4	100.3
S29.002	77.39	18.90	95.393	7.665	0.0	0.0	164.7	0.79	3947.8	1812.0
S46.000	101.25	11.84	98.213	0.321	0.0	0.0	9.0	0.88	111.1	99.1
S29.003	76.25	19.30	95.372	8.086	0.0	0.0	171.2	0.79	3963.1	1883.3
S47.000	106.70	10.51	98.037	0.333	0.0	0.0	9.9	1.10	138.1	108.5
S29.004	75.40	19.61	95.346	8.418	0.0	0.0	176.3	1.15	5737.5	1939.0
S48.000	102.95	11.43	97.841	0.330	0.0	0.0	9.4	0.94	118.6	103.8
S28.002	74.87	19.80	95.287	9.481	0.0	0.0	197.1	1.73	8625.3	2168.3
S49.000	103.60	11.27	97.651	0.317	0.0	0.0	9.1	0.97	121.4	100.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S28.003	20.126	0.132	152.5	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S50.000	362.449	1.111	326.2	0.327	5.00	0.0	0.012	o	400	Pipe/Conduit	
S28.004	10.037	0.366	27.4	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S27.002	10.795	0.012	899.6	0.101	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S51.000	363.279	1.159	313.5	0.333	5.00	0.0	0.012	o	400	Pipe/Conduit	
S27.003	19.535	0.041	476.5	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S52.000	364.152	1.227	296.9	0.317	5.00	0.0	0.012	o	400	Pipe/Conduit	
S27.004	21.125	0.080	264.1	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S53.000	362.163	1.315	275.3	0.316	5.00	0.0	0.012	o	400	Pipe/Conduit	
S26.002	19.077	0.075	254.4	0.106	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S54.000	362.533	1.541	235.2	0.303	5.00	0.0	0.012	o	400	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S28.003	74.33	19.99	95.000	9.798	0.0	0.0	202.2	1.75	8735.1	2224.7
S50.000	104.39	11.08	97.468	0.327	0.0	0.0	9.5	0.99	124.9	104.3
S28.004	74.25	20.03	94.868	10.125	0.0	0.0	208.8	4.12	20596.8	2296.5
S27.002	73.81	20.28	94.502	10.840	0.0	0.0	222.2	0.72	3596.2	2444.1
S51.000	104.82	10.97	97.276	0.333	0.0	0.0	9.7	1.01	127.4	106.5
S27.003	73.24	20.61	94.490	11.172	0.0	0.0	227.2	0.99	4941.4	2499.5
S52.000	105.42	10.82	97.105	0.317	0.0	0.0	9.3	1.04	130.9	102.0
S27.004	72.78	20.88	94.449	11.489	0.0	0.0	232.2	1.33	6637.6	2554.2
S53.000	106.43	10.58	96.926	0.316	0.0	0.0	9.3	1.08	136.0	102.7
S26.002	72.37	21.11	94.369	12.525	0.0	0.0	251.7	1.35	6763.0	2768.8
S54.000	108.14	10.16	96.735	0.303	0.0	0.0	9.1	1.17	147.1	100.0

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S26.003	17.590	0.027	651.5	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S55.000	363.468	1.403	259.0	0.330	5.00	0.0	0.012	o	400	Pipe/Conduit	
S26.004	10.667	0.014	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S25.002	12.133	0.014	866.6	0.100	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S56.000	362.864	1.630	222.6	0.342	5.00	0.0	0.012	o	400	Pipe/Conduit	
S25.003	18.976	0.025	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S57.000	363.706	1.698	214.2	0.317	5.00	0.0	0.012	o	400	Pipe/Conduit	
S25.004	19.691	0.026	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S58.000	363.370	1.881	193.2	0.320	5.00	0.0	0.012	o	400	Pipe/Conduit	
S24.002	19.420	0.026	746.9	0.097	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S59.000	363.371	2.351	154.6	0.322	5.00	0.0	0.012	o	400	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S26.003	71.76	21.46	94.294	12.828	0.0	0.0	255.6	0.85	4225.8	2812.1
S55.000	107.04	10.43	96.553	0.330	0.0	0.0	9.8	1.12	140.2	107.9
S26.004	71.37	21.68	94.267	13.158	0.0	0.0	260.8	0.79	3938.5	2868.7
S25.002	70.89	21.96	93.850	13.861	0.0	0.0	272.9	0.73	3663.9	3001.6
S56.000	108.70	10.03	96.366	0.342	0.0	0.0	10.3	1.20	151.2	113.6
S25.003	70.19	22.36	93.836	14.203	0.0	0.0	276.9	0.79	3938.5	3045.4
S57.000	109.10	9.94	96.334	0.317	0.0	0.0	9.6	1.23	154.1	105.6
S25.004	69.47	22.78	93.811	14.520	0.0	0.0	280.1	0.79	3938.5	3081.2
S58.000	110.40	9.69	96.321	0.320	0.0	0.0	9.8	1.29	162.3	107.8
S24.002	68.75	23.19	93.338	15.507	0.0	0.0	296.1	0.79	3946.6	3256.8
S59.000	112.96	9.19	96.556	0.322	0.0	0.0	10.1	1.44	181.5	111.3

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S24.003	19.323	0.028	690.1	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S60.000	363.053	2.677	135.6	0.534	5.00	0.0	0.012	o	400	Pipe/Conduit	
S23.002	15.651	0.021	745.3	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S23.003	20.977	0.028	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S61.000	68.114	0.598	113.9	0.000	5.00	0.0	0.045	3 \=/	600	1:3 Swale	
S61.001	31.587	0.278	113.6	0.000	0.00	0.0	0.045	o	300	Pipe/Conduit	
S61.002	64.347	0.564	114.1	0.000	0.00	0.0	0.045	3 \=/	600	1:3 Swale	
S61.003	27.723	0.246	112.7	0.000	0.00	0.0	0.045	3 \=/	600	1:3 Swale	
S61.004	67.309	0.588	114.5	0.000	0.00	0.0	0.045	3 \=/	600	1:3 Swale	
S61.005	25.808	0.227	113.7	0.000	0.00	0.0	0.045	3 \=/	600	1:3 Swale	
S61.006	44.777	0.393	113.9	0.000	0.00	0.0	0.045	3 \=/	600	1:3 Swale	
S23.004	31.905	0.043	750.0	0.000	0.00	0.0	0.012	oo	2000	Double Pipe	
S23.005	15.985	0.021	750.0	0.447	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S62.000	331.561	2.621	126.5	0.258	5.00	0.0	0.012	o	300	Pipe/Conduit	
S23.006	19.900	0.027	737.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S24.003	68.07	23.58	93.312	15.829	0.0	0.0	299.2	0.82	4105.8	3291.5
S60.000	114.35	8.93	96.628	0.534	0.0	0.0	17.0	1.54	193.7	186.5
S23.002	67.50	23.91	92.813	17.056	0.0	0.0	319.7	0.79	3950.9	3516.7
S23.003	66.73	24.35	92.792	17.056	0.0	0.0	319.7	0.79	3938.5	3516.7
S61.000	130.25	5.84	95.871	0.000	0.0	0.0	0.0	1.35	4846.5	0.0
S61.001	122.92	7.26	95.273	0.000	0.0	0.0	0.0	0.37	26.2	0.0
S61.002	118.81	8.06	94.995	0.000	0.0	0.0	0.0	1.35	4842.5	0.0
S61.003	117.05	8.40	94.431	0.000	0.0	0.0	0.0	1.35	4872.4	0.0
S61.004	112.74	9.24	94.185	0.000	0.0	0.0	0.0	1.34	4834.5	0.0
S61.005	111.09	9.56	93.597	0.000	0.0	0.0	0.0	1.35	4851.0	0.0
S61.006	108.35	10.11	93.370	0.000	0.0	0.0	0.0	1.35	4845.8	0.0
S23.004	66.24	24.63	92.700	17.056	0.0	0.0	319.7	1.92	12044.3	3516.7
S23.005	65.65	24.97	92.657	17.502	0.0	0.0	319.7	0.79	3938.5	3516.7
S62.000	112.96	9.19	96.257	0.258	0.0	0.0	8.1	1.32	93.1	88.9
S23.006	64.93	25.39	92.636	17.760	0.0	0.0	320.2	0.79	3973.0	3522.4

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S63.000	332.632	2.603	127.8	0.174	5.00	0.0	0.012	o	300	Pipe/Conduit	
S23.007	19.900	0.109	182.6	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S64.000	331.712	2.404	138.0	0.163	5.00	0.0	0.012	o	300	Pipe/Conduit	
S23.008	19.149	0.026	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S65.000	332.315	2.158	154.0	0.150	5.00	0.0	0.012	o	300	Pipe/Conduit	
S23.009	21.245	0.118	180.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S66.000	331.935	1.994	166.5	0.162	5.00	0.0	0.012	o	300	Pipe/Conduit	
S23.010	19.900	0.158	125.9	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S67.000	331.624	2.214	149.8	0.159	5.00	0.0	0.012	o	300	Pipe/Conduit	
S23.011	19.394	0.102	190.1	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S68.000	333.026	2.014	165.4	0.167	5.00	0.0	0.012	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S63.000	112.78	9.23	96.112	0.174	0.0	0.0	5.4	1.31	92.7	59.9
S23.007	64.57	25.59	92.609	17.934	0.0	0.0	321.6	1.60	7982.7	3537.1
S64.000	111.99	9.38	95.804	0.163	0.0	0.0	5.1	1.26	89.2	55.6
S23.008	63.86	26.00	92.500	18.097	0.0	0.0	321.6	0.79	3938.5	3537.1
S65.000	110.67	9.64	95.532	0.150	0.0	0.0	4.6	1.19	84.4	50.8
S23.009	63.48	26.22	92.474	18.247	0.0	0.0	321.7	1.61	8038.5	3538.2
S66.000	109.75	9.82	95.250	0.162	0.0	0.0	4.9	1.15	81.2	54.2
S23.010	63.18	26.39	92.000	18.409	0.0	0.0	323.0	1.92	9610.9	3552.7
S67.000	111.05	9.56	94.956	0.159	0.0	0.0	4.9	1.21	85.6	53.9
S23.011	62.82	26.60	91.842	18.567	0.0	0.0	323.9	1.56	7822.2	3563.0
S68.000	109.75	9.82	94.654	0.167	0.0	0.0	5.1	1.15	81.5	56.1

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S23.012	21.191	0.028	756.8	1.392	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S69.000	331.442	1.957	169.4	0.165	5.00	0.0	0.012	o	300	Pipe/Conduit	
S23.013	19.801	0.026	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S70.000	331.296	0.600	552.2	0.149	5.00	0.0	0.012	o	300	Pipe/Conduit	
S23.014	19.490	0.085	229.3	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S71.000	331.580	0.442	750.0	0.161	5.00	0.0	0.012	o	400	Pipe/Conduit	
S23.015	20.449	0.129	158.5	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S72.000	331.481	0.442	750.0	0.158	5.00	0.0	0.012	o	400	Pipe/Conduit	
S23.016	20.353	0.135	150.8	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S73.000	331.544	0.442	750.0	0.212	5.00	0.0	0.012	o	400	Pipe/Conduit	
S23.017	14.468	0.019	761.5	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S23.018	12.569	0.017	750.0	1.092	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S23.012	62.04	27.05	91.740	20.127	0.0	0.0	346.7	0.78	3920.7	3814.0
S69.000	109.57	9.85	94.357	0.165	0.0	0.0	5.0	1.14	80.5	55.4
S23.013	61.31	27.47	91.500	20.292	0.0	0.0	346.7	0.79	3938.5	3814.0
S70.000	93.41	13.75	94.053	0.149	0.0	0.0	3.9	0.63	44.6	42.4
S23.014	60.91	27.70	91.474	20.441	0.0	0.0	346.7	1.42	7123.0	3814.0
S71.000	94.74	13.43	93.757	0.161	0.0	0.0	4.2	0.66	82.4	46.5
S23.015	60.56	27.89	91.389	20.602	0.0	0.0	346.7	1.71	8566.8	3814.0
S72.000	94.75	13.43	93.483	0.158	0.0	0.0	4.2	0.66	82.4	45.7
S23.016	60.23	28.09	91.260	20.760	0.0	0.0	347.2	1.76	8784.4	3819.3
S73.000	94.74	13.43	93.104	0.212	0.0	0.0	5.6	0.66	82.4	61.5
S23.017	59.69	28.40	90.750	20.972	0.0	0.0	347.6	0.78	3908.7	3824.0
S23.018	59.23	28.66	90.731	22.064	0.0	0.0	362.9	0.79	3938.5«	3991.9

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S22.024	35.797	0.050	715.9	0.222	0.00	0.0	0.012	ooo	1300	Triple Pipe	
S22.025	147.211	0.196	751.1	0.000	0.00	0.0	0.012	ooo	1300	Triple Pipe	
S74.000	104.733	0.140	748.1	0.290	5.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S74.001	14.240	0.019	749.5	3.689	0.00	0.0	0.012	o	1200	Pipe/Conduit	
S74.002	99.876	0.133	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S74.003	21.797	0.029	750.0	2.396	0.00	0.0	0.012	o	1400	Pipe/Conduit	
S74.004	11.195	0.015	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S75.000	68.367	0.250	273.5	0.370	5.00	0.0	0.012	o	500	Pipe/Conduit	
S75.001	55.970	0.075	750.0	0.335	0.00	0.0	0.012	o	700	Pipe/Conduit	
S76.000	67.845	0.208	326.4	0.306	5.00	0.0	0.012	o	400	Pipe/Conduit	
S76.001	44.618	0.059	750.0	0.276	0.00	0.0	0.012	o	600	Pipe/Conduit	
S77.000	68.283	0.246	277.5	0.327	5.00	0.0	0.012	o	400	Pipe/Conduit	
S77.001	44.486	0.059	750.0	0.295	0.00	0.0	0.012	o	600	Pipe/Conduit	
S78.000	68.137	0.254	268.6	0.326	5.00	0.0	0.012	o	400	Pipe/Conduit	
S78.001	43.933	0.172	255.9	0.301	0.00	0.0	0.012	o	500	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S22.024	58.52	29.07	90.700	31.504	0.0	0.0	512.0	1.47	5862.3	5631.9
S22.025	56.17	30.77	90.650	31.504	0.0	0.0	512.0	1.44	5723.5	5631.9
S74.000	123.18	7.21	92.000	0.290	0.0	0.0	9.9	0.79	3943.5	109.1
S74.001	122.28	7.39	91.460	3.978	0.0	0.0	135.1	1.36	1542.8	1486.1
S74.002	111.38	9.50	91.441	3.978	0.0	0.0	135.1	0.79	3938.5	1486.1
S74.003	110.14	9.74	90.708	6.374	0.0	0.0	195.0	1.51	2326.4	2144.6
S74.004	108.92	9.98	90.679	6.374	0.0	0.0	195.0	0.79	3938.5	2144.6
S75.000	129.93	5.90	93.300	0.370	0.0	0.0	13.4	1.26	247.4	147.0
S75.001	124.88	6.88	92.850	0.705	0.0	0.0	24.4	0.95	366.4	268.9
S76.000	128.73	6.14	93.726	0.306	0.0	0.0	11.0	0.99	124.9	120.5
S76.001	124.26	7.00	93.319	0.583	0.0	0.0	20.1	0.86	242.9	221.2
S77.000	129.15	6.06	94.238	0.327	0.0	0.0	11.7	1.08	135.4	129.1
S77.001	124.70	6.92	93.792	0.622	0.0	0.0	21.5	0.86	242.9	237.0
S78.000	129.25	6.04	94.752	0.326	0.0	0.0	11.7	1.10	137.7	128.8
S78.001	126.35	6.60	94.398	0.627	0.0	0.0	22.0	1.30	255.7	242.0

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S79.000	67.991	0.276	246.4	0.329	5.00	0.0	0.012	o	400	Pipe/Conduit	
S79.001	44.604	0.222	201.0	0.294	0.00	0.0	0.012	o	500	Pipe/Conduit	
S80.000	68.512	0.303	226.4	0.337	5.00	0.0	0.012	o	400	Pipe/Conduit	
S80.001	44.786	0.360	124.4	0.306	0.00	0.0	0.012	o	500	Pipe/Conduit	
S81.000	67.970	0.319	212.9	0.304	5.00	0.0	0.012	o	400	Pipe/Conduit	
S81.001	44.847	0.231	193.9	0.274	0.00	0.0	0.012	o	500	Pipe/Conduit	
S82.000	67.991	0.376	181.0	0.290	5.00	0.0	0.012	o	400	Pipe/Conduit	
S82.001	45.161	0.247	182.6	0.264	0.00	0.0	0.012	o	500	Pipe/Conduit	
S83.000	68.394	0.417	164.0	0.310	5.00	0.0	0.012	o	400	Pipe/Conduit	
S83.001	44.495	0.274	162.4	0.285	0.00	0.0	0.012	o	500	Pipe/Conduit	
S84.000	68.052	0.091	750.0	0.334	5.00	0.0	0.012	o	500	Pipe/Conduit	
S84.001	45.285	0.461	98.2	0.307	0.00	0.0	0.012	o	500	Pipe/Conduit	
S85.000	68.119	0.530	128.5	0.365	5.00	0.0	0.012	o	400	Pipe/Conduit	
S85.001	44.885	0.344	130.6	0.353	0.00	0.0	0.012	o	500	Pipe/Conduit	
S86.000	19.851	0.148	134.1	0.000	5.00	0.0	0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S79.000	129.49	5.99	95.252	0.329	0.0	0.0	11.8	1.14	143.7	130.1
S79.001	126.88	6.50	94.876	0.623	0.0	0.0	22.0	1.47	288.5	241.5
S80.000	129.66	5.96	95.761	0.337	0.0	0.0	12.1	1.19	150.0	133.3
S80.001	127.60	6.36	95.358	0.642	0.0	0.0	22.7	1.87	366.8	250.2
S81.000	129.85	5.92	96.262	0.304	0.0	0.0	10.9	1.23	154.6	120.4
S81.001	127.27	6.42	95.842	0.577	0.0	0.0	20.4	1.50	293.8	224.4
S82.000	130.22	5.85	96.817	0.290	0.0	0.0	10.5	1.33	167.7	115.5
S82.001	127.70	6.34	96.342	0.555	0.0	0.0	19.7	1.54	302.7	216.3
S83.000	130.40	5.81	97.362	0.310	0.0	0.0	11.2	1.40	176.2	123.6
S83.001	128.06	6.27	96.845	0.595	0.0	0.0	21.2	1.63	320.9	232.8
S84.000	126.91	6.49	97.500	0.334	0.0	0.0	11.8	0.76	149.4	129.4
S84.001	125.05	6.85	97.409	0.641	0.0	0.0	22.3	2.10	412.7	244.9
S85.000	130.90	5.72	97.900	0.365	0.0	0.0	13.3	1.58	199.0	145.8
S85.001	128.78	6.13	97.270	0.718	0.0	0.0	25.7	1.82	358.0	282.5
S86.000	133.68	5.18	97.000	0.000	0.0	0.0	0.0	1.86	9313.2	0.0

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S85.002	56.581	0.080	707.3	0.123	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S84.002	49.981	0.067	746.0	0.107	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S83.002	50.189	0.077	651.8	0.104	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S82.002	49.836	0.066	750.0	0.097	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S81.002	50.189	0.067	750.0	0.098	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S80.002	49.702	0.066	753.1	0.118	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S79.002	49.550	0.067	739.6	0.103	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S78.002	51.619	0.069	750.0	0.108	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S77.002	49.066	0.067	732.3	0.104	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S76.002	11.979	0.016	748.7	0.097	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S75.002	5.975	0.008	746.9	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S85.002	122.78	7.29	96.426	0.841	0.0	0.0	28.7	0.81	4055.7	315.5
S84.002	117.34	8.34	96.346	1.590	0.0	0.0	51.8	0.79	3949.1	569.8
S83.002	112.23	9.33	96.071	2.289	0.0	0.0	71.3	0.84	4224.8	784.7
S82.002	107.21	10.39	95.594	2.940	0.0	0.0	87.5	0.79	3938.5	962.9
S81.002	102.85	11.45	95.111	3.615	0.0	0.0	103.3	0.79	3938.5	1135.8
S80.002	98.53	12.50	94.498	4.376	0.0	0.0	119.7	0.79	3930.5	1317.0
S79.002	94.26	13.55	94.154	5.102	0.0	0.0	133.6	0.79	3966.2	1469.2
S78.002	89.78	14.64	93.726	5.837	0.0	0.0	145.5	0.79	3938.5	1601.0
S77.002	86.44	15.66	93.332	6.564	0.0	0.0	157.6	0.80	3985.7	1733.2
S76.002	85.73	15.92	92.859	7.244	0.0	0.0	172.5	0.79	3941.9	1897.0
S75.002	85.38	16.04	92.475	7.949	0.0	0.0	188.5	0.79	3946.7	2073.1

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S75.003	86.031	0.110	782.1	0.000	0.00	0.0	0.012	oo	1100	Double Pipe	
S75.004	6.417	0.009	750.0	0.157	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S87.000	174.289	0.245	710.6	0.296	5.00	0.0	0.012	o	500	Pipe/Conduit	
S75.005	17.504	0.023	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S88.000	173.308	0.244	710.5	0.168	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.006	18.819	0.025	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S89.000	172.556	0.244	707.0	0.152	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.007	19.146	0.026	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S90.000	310.820	0.580	536.0	0.158	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.008	19.673	0.026	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S91.000	310.370	0.527	588.5	0.233	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.009	20.050	0.027	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S75.003	82.19	17.18	92.167	7.949	0.0	0.0	188.5	1.26	2395.0	2073.1
S75.004	81.81	17.32	92.057	8.106	0.0	0.0	188.5	0.79	3938.5	2073.1
S87.000	115.42	8.72	92.762	0.296	0.0	0.0	9.5	0.78	153.5	104.4
S75.005	80.78	17.69	92.017	8.402	0.0	0.0	188.5	0.79	3938.5	2073.1
S88.000	112.47	9.29	92.783	0.168	0.0	0.0	5.3	0.67	84.6	57.8
S75.006	79.66	18.09	91.939	8.570	0.0	0.0	189.6	0.79	3938.5	2085.4
S89.000	112.62	9.26	92.681	0.152	0.0	0.0	4.8	0.68	84.9	52.4
S75.007	78.53	18.49	91.837	8.722	0.0	0.0	190.2	0.79	3938.5	2092.3
S90.000	101.91	11.68	92.891	0.158	0.0	0.0	4.5	0.78	97.4	49.2
S75.008	77.36	18.91	91.711	8.880	0.0	0.0	190.8	0.79	3938.5	2098.5
S91.000	100.64	11.99	92.789	0.233	0.0	0.0	6.5	0.74	93.0	71.7
S75.009	76.17	19.33	91.662	9.113	0.0	0.0	192.8	0.79	3938.5	2120.5

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S92.000	310.427	0.527	589.3	0.243	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.010	20.702	0.028	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S93.000	310.547	0.528	588.6	0.221	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.011	19.835	0.026	750.0	1.431	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S94.000	310.316	0.536	579.3	0.243	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.012	20.289	0.027	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S95.000	311.040	0.528	588.7	0.247	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.013	19.441	0.026	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S96.000	310.427	0.428	725.5	0.239	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.014	19.682	0.026	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S97.000	310.059	0.478	649.2	0.218	5.00	0.0	0.012	o	400	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S92.000	100.62	12.00	92.681	0.243	0.0	0.0	6.8	0.74	92.9	74.5
S75.010	74.95	19.77	91.554	9.356	0.0	0.0	194.7	0.79	3938.5	2141.9
S93.000	100.62	11.99	92.567	0.221	0.0	0.0	6.2	0.74	93.0	67.9
S75.011	73.97	20.19	91.440	11.007	0.0	0.0	226.1	0.79	3938.5	2487.2
S94.000	100.87	11.93	92.450	0.243	0.0	0.0	6.8	0.75	93.7	75.0
S75.012	73.22	20.62	91.314	11.251	0.0	0.0	228.8	0.79	3938.5	2516.6
S95.000	100.58	12.01	92.331	0.247	0.0	0.0	6.9	0.74	93.0	76.0
S75.013	72.51	21.03	91.203	11.498	0.0	0.0	231.5	0.79	3938.5	2546.7
S96.000	97.48	12.76	92.214	0.239	0.0	0.0	6.5	0.67	83.8	71.1
S75.014	71.78	21.45	91.177	11.737	0.0	0.0	234.0	0.79	3938.5	2573.7
S97.000	99.23	12.33	92.137	0.218	0.0	0.0	6.0	0.70	88.5	66.1

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S75.015	20.110	0.027	750.0	0.000	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S98.000	303.458	0.588	515.9	0.270	5.00	0.0	0.012	o	400	Pipe/Conduit	
S75.016	13.610	0.018	750.0	1.131	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S75.017	10.606	0.014	750.0	3.108	0.00	0.0	0.033	3 \=/	2000	1:3 Swale	
S74.005	41.838	0.056	747.1	0.274	0.00	0.0	0.033	2100 []	3300	2100 Culvert	
S74.006	20.000#	0.027	750.0	0.000	0.00	0.0	0.033	3 \=/	600	1:3 Swale	
S4.020	140.782	0.188	748.8	5.458	0.00	0.0	0.012	o	2875	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S75.015	71.04	21.87	91.060	11.955	0.0	0.0	235.9	0.79	3938.5	2594.4
S98.000	103.07	11.40	92.120	0.270	0.0	0.0	7.7	0.79	99.3	84.9
S75.016	70.54	22.16	90.932	13.356	0.0	0.0	261.6	0.79	3938.5	2877.9
S75.017	70.15	22.38	90.913	16.463	0.0	0.0	320.7	0.79	3938.5	3528.0
S74.005	68.71	23.21	89.464	23.112	0.0	0.0	441.0	0.84	5433.3	4850.8
S74.006	67.98	23.63	89.408	23.112	0.0	0.0	441.0	0.80	4034.9«	4850.8
S4.020	55.27	31.73	87.932	89.718	0.0	0.0	1377.0	2.44	15862.6	15147.3

PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.000	3 \=/	2000	S103	105.250	103.500	0.750	Junction	
S4.001	3 \=/	2000	S104	103.750	102.250	0.500	Junction	
S4.002	3 \=/	2000	S105	102.250	100.517	0.733	Junction	
S4.003	3 \=/	2000	S2	101.750	100.017	0.733	Junction	
S4.004	3 \=/	2000	S3	100.250	98.531	0.719	Junction	
S4.005	3 \=/	2000	S4	98.500	97.401	0.099	Junction	
S5.000	3 \=/	2000	S1	102.000	100.980	0.020	Junction	
S6.000	o	500	S5	104.750	103.150	1.100	Open Manhole	1500
S7.000	o	300	S6	104.250	102.750	1.200	Open Manhole	1200
S6.001	o	700	S7	104.227	102.307	1.220	Open Manhole	1500
S6.002	3 \=/	2000	S7	103.750	101.974	0.776	Open Manhole	10000
S8.000	o	500	S9	104.299	102.745	1.054	Open Manhole	1500
S9.000	o	300	S10	103.997	102.497	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.000	159.718	157.0	S104	103.750	102.483	0.267	Junction	
S4.001	112.957	65.2	S105	102.250	100.517	0.733	Junction	
S4.002	20.801	41.6	S2	101.750	100.017	0.733	Junction	
S4.003	182.231	122.6	S3	100.250	98.531	0.719	Junction	
S4.004	184.894	163.6	S4	98.500	97.401	0.099	Junction	
S4.005	33.876	67.8	S2	98.500	96.901	0.599	Open Manhole	10000
S5.000	64.099	28.3	S5	100.750	98.717	1.033	Junction	
S6.000	67.960	279.7	S7	104.227	102.907	0.820	Open Manhole	1500
S7.000	32.553	750.0	S7	104.227	102.707	1.220	Open Manhole	1500
S6.001	24.511	750.0	S7	103.750	102.274	0.776	Open Manhole	10000
S6.002	26.225	150.7	S8	103.500	101.800	0.700	Junction	
S8.000	69.223	240.4	S8	103.500	102.457	0.543	Junction	
S9.000	29.885	747.1	S8	103.500	102.457	0.743	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.003	3 \=/	2000	S8	103.500	101.757	0.743	Junction	
S10.000	o	500	S12	104.000	102.372	1.128	Open Manhole	1500
S11.000	o	300	S13	103.500	102.000	1.200	Open Manhole	1200
S6.004	3 \=/	2000	S9	103.000	101.259	0.741	Junction	
S12.000	o	500	S15	103.500	102.013	0.987	Open Manhole	1500
S13.000	o	300	S16	102.958	101.458	1.200	Open Manhole	1200
S6.005	3 \=/	2000	S10	102.500	100.717	0.783	Junction	
S14.000	o	300	S18	102.363	100.863	1.200	Open Manhole	1200
S15.000	o	400	S19	103.228	101.732	1.096	Open Manhole	1350
S6.006	3 \=/	2000	S11	102.000	100.122	0.878	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S6.003	50.317	101.0	S9	103.000	101.259	0.741	Junction	
S10.000	67.127	750.0	S9	103.000	102.282	0.218	Junction	
S11.000	30.516	744.3	S9	103.000	101.959	0.741	Junction	
S6.004	49.291	298.7	S10	102.500	101.094	0.406	Junction	
S12.000	67.565	750.0	S10	102.500	101.923	0.077	Junction	
S13.000	30.376	750.0	S10	102.500	101.417	0.783	Junction	
S6.005	50.949	269.6	S11	102.000	100.528	0.472	Junction	
S14.000	30.702	748.8	S11	102.000	100.822	0.878	Junction	
S15.000	66.313	132.6	S11	102.000	101.232	0.368	Junction	
S6.006	49.382	437.0	S12	102.000	100.009	0.991	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S16.000	o	500	S21	102.694	101.389	0.805	Open Manhole	1500
S17.000	o	300	S22	102.250	100.750	1.200	Open Manhole	1200
S6.007	3 \=/	2000	S12	102.000	100.009	0.991	Junction	
S6.008	o	1200	S24	102.000	99.593	1.207	Junction	
S6.009	3 \=/	2000	S25	101.250	99.553	0.697	Junction	
S18.000	o	400	S24	102.638	101.138	1.100	Open Manhole	1350
S19.000	o	300	S25	101.677	100.177	1.200	Open Manhole	1200
S6.010	3 \=/	2000	S13	101.250	99.369	0.881	Junction	
S20.000	o	300	S29	101.013	99.513	1.200	Open Manhole	1200
S6.011	3 \=/	2000	S29	100.500	98.773	0.727	Junction	
S5.001	3 \=/	2000	S5	100.750	98.717	1.033	Junction	
S5.002	oo	1500	S1	100.750	97.997	1.253	Open Manhole	10000
S5.003	3 \=/	2000	S6	100.250	97.972	1.278	Open Manhole	10000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S16.000	65.755	750.0	S12	102.000	101.301	0.199	Junction	
S17.000	30.575	750.0	S12	102.000	100.709	0.991	Junction	
S6.007	11.745	734.1	S24	102.000	99.993	1.007	Junction	
S6.008	30.302	757.6	S25	101.250	99.553	0.497	Junction	
S6.009	8.616	46.8	S13	101.250	99.369	0.881	Junction	
S18.000	64.996	162.5	S13	101.250	100.738	0.112	Junction	
S19.000	30.893	702.1	S13	101.250	100.133	0.817	Junction	
S6.010	42.194	578.0	S29	100.500	99.296	0.204	Junction	
S20.000	29.963	750.0	S29	100.500	99.473	0.727	Junction	
S6.011	41.986	749.8	S5	100.750	98.717	1.033	Junction	
S5.001	13.230	661.5	S1	100.750	98.697	1.053	Open Manhole	10000
S5.002	23.822	952.9	S6	100.250	97.972	0.778	Open Manhole	10000
S5.003	13.319	555.0	S37	100.000	97.948	1.052	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.004	oo	1250	S37	100.000	97.498	1.252	Junction	
S5.005	3 \=/	2000	S37	99.750	97.471	1.279	Junction	
S5.006	oo	1250	S37	99.250	96.721	1.279	Junction	
S5.007	3 \=/	2000	S39	99.000	96.694	1.306	Junction	
S4.006	oo	2000	S2	98.500	96.500	0.000	Open Manhole	10000
S21.000	3 \=/	2000	S69	102.500	101.239	0.261	Junction	
S21.001	3 \=/	2000	S70	100.750	99.841	-0.091	Junction	
S4.007	3 \=/	2000	S8	98.500	96.100	1.200	Open Manhole	10000
S4.008	3 \=/	2000	S9	97.750	96.067	0.483	Junction	
S4.009	3 \=/	2000	S10	97.500	95.949	0.351	Junction	
S4.010	3 \=/	2000	S11	96.500	94.600	0.700	Junction	
S4.011	3 \=/	2000	S12	96.481	94.529	0.752	Junction	
S4.012	3 \=/	2000	S3	95.250	93.750	0.300	Junction	
S4.013	3 \=/	2000	S16	95.865	93.500	1.365	Junction	
S4.014	3 \=/	2000	S17	95.678	92.892	1.786	Junction	
S4.015	3 \=/	2000	S18	94.607	92.750	0.857	Junction	
S4.016	3 \=/	2000	S19	94.000	92.250	0.750	Junction	
S4.017	3 \=/	2000	S20	93.223	91.250	0.973	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.004	20.288	751.4	S37	99.750	97.471	1.029	Junction	
S5.005	38.833	77.7	S37	99.250	96.971	1.279	Junction	
S5.006	20.455	757.6	S39	99.000	96.694	1.056	Junction	
S5.007	21.035	751.3	S2	98.500	96.666	0.834	Open Manhole	10000
S4.006	34.848	174.2	S8	98.500	96.300	0.200	Open Manhole	10000
S21.000	87.612	62.7	S70	100.750	99.841	-0.091	Junction	
S21.001	136.733	38.6	S8	98.500	96.300	1.200	Open Manhole	10000
S4.007	22.385	678.3	S9	97.750	96.067	0.483	Junction	
S4.008	87.280	739.7	S10	97.500	95.949	0.351	Junction	
S4.009	60.159	781.3	S11	96.500	95.872	-0.572	Junction	
S4.010	52.700	742.3	S12	96.481	94.529	0.752	Junction	
S4.011	43.729	705.3	S3	95.250	94.467	-0.417	Junction	
S4.012	17.255	750.2	S16	95.865	93.727	0.938	Junction	
S4.013	42.549	70.0	S17	95.678	92.892	1.786	Junction	
S4.014	58.043	408.8	S18	94.607	92.750	0.857	Junction	
S4.015	39.259	817.9	S19	94.000	92.702	0.298	Junction	
S4.016	130.606	206.3	S20	93.223	91.617	0.606	Junction	
S4.017	108.222	227.8	S21	93.000	90.775	1.225	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.018	3 \=/	2000	S21	93.000	90.775	1.225	Junction	
S4.019	3 \=/	2000	S22	93.000	89.534	2.466	Junction	
S22.000	3 \=/	2000	S56	101.750	100.750	0.000	Junction	
S22.001	3 \=/	2000	S99	101.750	100.500	0.250	Junction	
S22.002	3 \=/	2000	S100	99.750	98.800	-0.050	Junction	
S22.003	3 \=/	2000	S101	99.250	98.250	0.000	Junction	
S22.004	o	1000	S26	97.750	95.600	1.150	Open Manhole	10000
S22.005	3 \=/	2000	S24	96.750	95.452	0.298	Junction	
S22.006	3 \=/	2000	S25	97.195	94.800	1.395	Junction	
S22.007	3 \=/	2000	S26	96.324	94.700	0.624	Junction	
S22.008	3 \=/	2000	S4	95.400	93.800	0.600	Junction	
S22.009	3 \=/	2000	S28	95.000	93.784	0.216	Junction	
S22.010	3 \=/	2000	S29	94.250	93.000	0.250	Junction	
S22.011	3 \=/	2000	S30	94.000	92.800	0.200	Junction	
S22.012	o	1000	S72	94.250	92.597	0.653	Junction	
S22.013	3 \=/	600	S73	93.750	92.571	0.179	Junction	
S22.014	o	1000	S74	93.750	92.267	0.483	Junction	
S22.015	3 \=/	600	S31	94.000	92.242	0.758	Junction	
S22.016	o	1300	S76	94.000	91.716	0.984	Junction	
S22.017	3 \=/	600	S76	94.000	91.690	1.310	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.018	17.554	14.1	S22	93.000	89.534	2.466	Junction	
S4.019	20.000#	740.7	S23	92.000	89.507	1.493	Junction	
S22.000	20.906	83.6	S99	101.750	100.500	0.250	Junction	
S22.001	214.436	126.1	S100	99.750	98.800	-0.050	Junction	
S22.002	45.474	82.7	S101	99.250	98.250	0.000	Junction	
S22.003	256.751	104.8	S26	97.750	95.800	0.950	Open Manhole	10000
S22.004	44.139	298.2	S24	96.750	95.452	0.298	Junction	
S22.005	33.039	660.8	S25	97.195	95.402	0.793	Junction	
S22.006	14.117	141.2	S26	96.324	94.700	0.624	Junction	
S22.007	87.864	97.6	S4	95.400	93.800	0.600	Junction	
S22.008	11.713	750.0	S28	95.000	93.784	0.216	Junction	
S22.009	89.812	750.0	S29	94.250	93.665	-0.415	Junction	
S22.010	23.204	748.5	S30	94.000	92.969	0.031	Junction	
S22.011	1.964	750.0	S72	94.250	92.797	0.453	Junction	
S22.012	19.362	744.7	S73	93.750	92.571	0.179	Junction	
S22.013	78.134	750.0	S74	93.750	92.467	0.283	Junction	
S22.014	19.098	763.9	S31	94.000	92.242	0.758	Junction	
S22.015	19.980	750.0	S76	94.000	92.216	0.784	Junction	
S22.016	19.607	754.1	S76	94.000	91.690	1.010	Junction	
S22.017	42.174	750.0	S78	93.800	91.633	1.167	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S22.018	o	1250	S78	93.800	91.183	1.367	Junction	
S22.019	3 \=/	600	S32	93.750	91.157	1.593	Junction	
S22.020	o	1400	S80	93.750	90.534	1.816	Junction	
S22.021	3 \=/	600	S80	93.600	90.508	2.092	Junction	
S22.022	o	1400	S82	93.600	89.886	2.314	Junction	
S22.023	3 \=/	2000	S82	93.500	89.861	2.639	Junction	
S23.000	o	500	S39	94.793	93.462	0.831	Open Manhole	1500
S23.001	o	700	S40	95.000	93.174	1.126	Open Manhole	1500
S24.000	o	500	S37	95.189	93.985	0.704	Open Manhole	1500
S24.001	o	600	S38	95.270	93.798	0.872	Open Manhole	1500
S25.000	o	500	S35	95.500	94.497	0.503	Open Manhole	1500
S25.001	o	700	S36	95.750	94.209	0.841	Open Manhole	1500
S26.000	o	500	S33	96.000	95.016	0.484	Open Manhole	1500
S26.001	o	700	S34	96.250	94.727	0.823	Open Manhole	1500
S27.000	o	500	S31	97.004	95.537	0.967	Open Manhole	1500
S27.001	o	600	S32	97.131	95.349	1.182	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S22.018	19.994	750.0	S32	93.750	91.157	1.343	Junction	
S22.019	16.889	750.0	S80	93.750	91.134	1.616	Junction	
S22.020	19.516	750.0	S80	93.600	90.508	1.692	Junction	
S22.021	16.243	750.0	S82	93.600	90.486	2.114	Junction	
S22.022	19.427	750.0	S82	93.500	89.861	2.239	Junction	
S22.023	32.556	757.1	S5	93.500	89.818	2.682	Open Manhole	10000
S23.000	66.516	750.0	S40	95.000	93.374	1.126	Open Manhole	1500
S23.001	56.819	944.5	S38	95.500	93.113	1.687	Open Manhole	10000
S24.000	65.250	750.0	S38	95.270	93.898	0.872	Open Manhole	1500
S24.001	55.407	924.5	S40	96.000	93.738	1.662	Open Manhole	10000
S25.000	65.434	750.0	S36	95.750	94.409	0.841	Open Manhole	1500
S25.001	54.885	921.7	S42	96.650	94.150	1.800	Open Manhole	10000
S26.000	66.505	750.0	S34	96.250	94.927	0.823	Open Manhole	1500
S26.001	55.162	941.5	S44	97.250	94.669	1.881	Open Manhole	10000
S27.000	65.903	750.0	S32	97.131	95.449	1.182	Open Manhole	1500
S27.001	54.679	372.7	S46	97.750	95.202	1.948	Open Manhole	10000

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S28.000	o	500	S29	96.861	96.063	0.299	Open Manhole	1500
S28.001	o	700	S30	97.250	95.775	0.775	Open Manhole	1500
S29.000	o	500	S27	97.549	96.615	0.435	Open Manhole	1500
S29.001	o	600	S28	97.698	96.426	0.673	Open Manhole	1500
S30.000	o	600	S25	97.751	96.000	1.151	Open Manhole	1500
S30.001	o	600	S26	98.563	95.912	2.051	Open Manhole	1500
S31.000	o	500	S23	98.250	97.500	0.250	Open Manhole	1500
S31.001	o	600	S24	98.555	97.312	0.643	Open Manhole	1500
S32.000	o	500	S21	98.750	98.000	0.250	Open Manhole	1500
S32.001	o	600	S22	99.030	97.812	0.618	Open Manhole	1500
S33.000	o	500	S19	99.111	98.000	0.611	Open Manhole	1500
S33.001	o	700	S20	99.515	97.713	1.102	Open Manhole	1500
S34.000	o	500	S81	101.750	100.195	1.055	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S28.000	65.521	750.0	S30	97.250	95.975	0.775	Open Manhole	1500
S28.001	55.648	921.0	S48	98.500	95.715	2.085	Open Manhole	10000
S29.000	66.765	750.0	S28	97.698	96.526	0.673	Open Manhole	1500
S29.001	54.586	924.6	S55	99.000	96.367	2.033	Open Manhole	10000
S30.000	65.852	748.3	S26	98.563	95.912	2.051	Open Manhole	1500
S30.001	55.162	926.1	S57	99.500	95.852	3.048	Open Manhole	10000
S31.000	66.248	752.8	S24	98.555	97.412	0.643	Open Manhole	1500
S31.001	54.997	753.4	S59	100.250	97.239	2.411	Open Manhole	10000
S32.000	66.043	750.5	S22	99.030	97.912	0.618	Open Manhole	1500
S32.001	55.092	435.9	S61	100.750	97.686	2.464	Open Manhole	10000
S33.000	65.325	750.9	S20	99.515	97.913	1.102	Open Manhole	1500
S33.001	54.826	923.2	S63	101.750	97.654	3.396	Open Manhole	10000
S34.000	362.589	728.1	S63	101.750	99.697	1.553	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S35.000	3 \=/	2000	S104	102.000	101.350	-0.350	Junction	
S35.001	3 \=/	2000	S105	101.750	100.750	0.000	Junction	
S35.002	3 \=/	2000	S106	101.750	100.563	0.187	Junction	
S34.001	3 \=/	2000	S63	101.750	98.250	2.500	Junction	
S33.002	3 \=/	2000	S63	101.750	97.354	3.396	Open Manhole	10000
S36.000	o	400	S85	101.697	99.989	1.307	Open Manhole	1350
S33.003	3 \=/	2000	S89	101.250	97.040	3.210	Junction	
S37.000	o	400	S88	101.500	99.798	1.302	Open Manhole	1350
S33.004	3 \=/	2000	S89	101.000	97.014	2.986	Junction	
S38.000	o	400	S91	101.336	99.618	1.318	Open Manhole	1350
S32.002	3 \=/	2000	S61	100.750	96.986	2.764	Open Manhole	10000
S39.000	o	500	S94	101.111	99.436	1.175	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S35.000	144.933	750.0	S105	101.750	101.157	-0.407	Junction	
S35.001	140.105	750.0	S106	101.750	100.563	0.187	Junction	
S35.002	21.759	9.4	S63	101.750	98.250	2.500	Junction	
S34.001	10.460	804.6	S63	101.750	98.237	2.513	Open Manhole	10000
S33.002	8.614	615.3	S89	101.250	97.340	2.910	Junction	
S36.000	363.846	154.9	S89	101.250	97.640	3.210	Junction	
S33.003	19.966	767.9	S89	101.000	97.014	2.986	Junction	
S37.000	363.021	166.2	S89	101.000	97.614	2.986	Junction	
S33.004	20.811	743.3	S61	100.750	96.986	2.764	Open Manhole	10000
S38.000	363.240	178.7	S61	100.750	97.586	2.764	Open Manhole	10000
S32.002	18.885	726.3	S91	100.500	96.960	2.540	Junction	
S39.000	363.229	729.3	S91	100.500	98.938	1.062	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S32.003	3 \=/	2000	S91	100.500	96.750	2.750	Junction	
S40.000	o	500	S97	100.894	99.243	1.150	Open Manhole	1500
S32.004	3 \=/	2000	S91	100.250	96.725	2.525	Junction	
S31.002	3 \=/	2000	S59	100.250	96.539	2.711	Open Manhole	10000
S41.000	o	400	S101	100.728	99.160	1.168	Open Manhole	1350
S31.003	3 \=/	2000	S94	100.100	96.526	2.574	Junction	
S42.000	o	500	S104	100.466	98.875	1.091	Open Manhole	1500
S31.004	3 \=/	2000	S94	99.900	96.499	2.401	Junction	
S43.000	o	400	S107	100.335	98.795	1.140	Open Manhole	1350
S30.002	3 \=/	2000	S57	99.500	95.452	3.048	Open Manhole	10000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S32.003	19.653	786.1	S91	100.250	96.725	2.525	Junction	
S40.000	364.307	729.1	S91	100.250	98.744	1.006	Junction	
S32.004	10.435	56.1	S59	100.250	96.539	2.711	Open Manhole	10000
S31.002	9.806	754.3	S94	100.100	96.526	2.574	Junction	
S41.000	362.998	629.5	S94	100.100	98.583	1.117	Junction	
S31.003	19.865	735.7	S94	99.900	96.499	2.401	Junction	
S42.000	363.516	556.8	S94	99.900	98.222	1.178	Junction	
S31.004	19.467	748.7	S57	99.500	96.473	2.027	Open Manhole	10000
S43.000	363.672	148.9	S57	99.500	96.352	2.748	Open Manhole	10000
S30.002	20.841	771.9	S92	99.250	95.425	2.825	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S44.000	o	400	S110	100.198	98.598	1.200	Open Manhole	1350
S30.003	3 \=/	2000	S92	99.250	95.425	2.825	Junction	
S45.000	o	400	S113	99.947	98.404	1.143	Open Manhole	1350
S29.002	3 \=/	2000	S55	99.000	95.393	2.607	Open Manhole	10000
S46.000	o	400	S116	99.562	98.213	0.949	Open Manhole	1350
S29.003	3 \=/	2000	S53	99.000	95.372	2.628	Junction	
S47.000	o	400	S119	99.575	98.037	1.139	Open Manhole	1350
S29.004	3 \=/	2000	S49	98.700	95.346	2.354	Junction	
S48.000	o	400	S122	99.440	97.841	1.200	Open Manhole	1350
S28.002	3 \=/	2000	S48	98.500	95.287	2.213	Open Manhole	10000
S49.000	o	400	S125	99.243	97.651	1.192	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S44.000	363.009	469.1	S92	99.250	97.824	1.026	Junction	
S30.003	24.536	766.8	S55	99.000	95.393	2.607	Open Manhole	10000
S45.000	363.796	410.0	S55	99.000	97.517	1.083	Open Manhole	10000
S29.002	15.676	746.5	S53	99.000	95.372	2.628	Junction	
S46.000	363.058	412.1	S53	99.000	97.332	1.268	Junction	
S29.003	19.259	740.7	S49	98.700	95.346	2.354	Junction	
S47.000	363.487	266.7	S49	98.700	96.674	1.626	Junction	
S29.004	20.851	353.4	S48	98.500	95.287	2.213	Open Manhole	10000
S48.000	363.798	362.2	S48	98.500	96.836	1.264	Open Manhole	10000
S28.002	19.860	156.4	S97	98.250	95.160	2.090	Junction	
S49.000	363.231	345.6	S97	98.250	96.600	1.250	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S28.003	3 \=/	2000	S97	98.250	95.000	2.250	Junction	
S50.000	o	400	S128	98.841	97.468	0.973	Open Manhole	1350
S28.004	3 \=/	2000	S98	98.000	94.868	2.132	Junction	
S27.002	3 \=/	2000	S46	97.750	94.502	2.248	Open Manhole	10000
S51.000	o	400	S132	98.799	97.276	1.123	Open Manhole	1350
S27.003	3 \=/	2000	S100	97.750	94.490	2.260	Junction	
S52.000	o	400	S135	98.705	97.105	1.200	Open Manhole	1350
S27.004	3 \=/	2000	S100	97.500	94.449	2.051	Junction	
S53.000	o	400	S138	98.275	96.926	0.949	Open Manhole	1350
S26.002	3 \=/	2000	S44	97.250	94.369	1.881	Open Manhole	10000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S28.003	20.126	152.5	S98	98.000	94.868	2.132	Junction	
S50.000	362.449	326.2	S98	98.000	96.356	1.244	Junction	
S28.004	10.037	27.4	S46	97.750	94.502	2.248	Open Manhole	10000
S27.002	10.795	899.6	S100	97.750	94.490	2.260	Junction	
S51.000	363.279	313.5	S100	97.750	96.117	1.233	Junction	
S27.003	19.535	476.5	S100	97.500	94.449	2.051	Junction	
S52.000	364.152	296.9	S100	97.500	95.879	1.221	Junction	
S27.004	21.125	264.1	S44	97.250	94.369	1.881	Open Manhole	10000
S53.000	362.163	275.3	S44	97.250	95.611	1.239	Open Manhole	10000
S26.002	19.077	254.4	S103	97.000	94.294	1.706	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S54.000	o	400	S141	98.270	96.735	1.135	Open Manhole	1350
S26.003	3 \=/	2000	S103	97.000	94.294	1.706	Junction	
S55.000	o	400	S144	98.121	96.553	1.168	Open Manhole	1350
S26.004	3 \=/	2000	S104	96.750	94.267	1.483	Junction	
S25.002	3 \=/	2000	S42	96.650	93.850	1.800	Open Manhole	10000
S56.000	o	400	S148	98.000	96.366	1.234	Open Manhole	1350
S25.003	3 \=/	2000	S106	96.500	93.836	1.664	Junction	
S57.000	o	400	S151	97.956	96.334	1.222	Open Manhole	1350
S25.004	3 \=/	2000	S106	96.250	93.811	1.439	Junction	
S58.000	o	400	S154	98.000	96.321	1.279	Open Manhole	1350
S24.002	3 \=/	2000	S40	96.000	93.338	1.662	Open Manhole	10000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S54.000	362.533	235.2	S103	97.000	95.194	1.406	Junction	
S26.003	17.590	651.5	S104	96.750	94.267	1.483	Junction	
S55.000	363.468	259.0	S104	96.750	95.150	1.200	Junction	
S26.004	10.667	750.0	S42	96.650	94.253	1.397	Open Manhole	10000
S25.002	12.133	866.6	S106	96.500	93.836	1.664	Junction	
S56.000	362.864	222.6	S106	96.500	94.736	1.364	Junction	
S25.003	18.976	750.0	S106	96.250	93.811	1.439	Junction	
S57.000	363.706	214.2	S106	96.250	94.636	1.214	Junction	
S25.004	19.691	750.0	S40	96.000	93.784	1.216	Open Manhole	10000
S58.000	363.370	193.2	S40	96.000	94.441	1.159	Open Manhole	10000
S24.002	19.420	746.9	S109	95.800	93.312	1.488	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S59.000	o	400	S157	98.000	96.556	1.044	Open Manhole	1350
S24.003	3 \=/	2000	S109	95.800	93.312	1.488	Junction	
S60.000	o	400	S160	98.228	96.628	1.200	Open Manhole	1350
S23.002	3 \=/	2000	S38	95.500	92.813	1.687	Open Manhole	10000
S23.003	3 \=/	2000	S39	95.500	92.792	1.708	Junction	
S61.000	3 \=/	600	S163	97.750	95.871	0.879	Junction	
S61.001	o	300	S164	97.500	95.273	1.727	Junction	
S61.002	3 \=/	600	S165	97.500	94.995	1.505	Junction	
S61.003	3 \=/	600	S166	96.750	94.431	1.319	Junction	
S61.004	3 \=/	600	S167	96.750	94.185	1.565	Junction	
S61.005	3 \=/	600	S168	96.000	93.597	1.403	Junction	
S61.006	3 \=/	600	S169	96.000	93.370	1.630	Junction	
S23.004	oo	2000	S18	95.750	92.700	1.050	Open Manhole	10000
S23.005	3 \=/	2000	S33	95.500	92.657	1.843	Open Manhole	10000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S59.000	363.371	154.6	S109	95.800	94.205	1.195	Junction	
S24.003	19.323	690.1	S38	95.500	93.284	1.216	Open Manhole	10000
S60.000	363.053	135.6	S38	95.500	93.951	1.149	Open Manhole	10000
S23.002	15.651	745.3	S39	95.500	92.792	1.708	Junction	
S23.003	20.977	750.0	S18	95.750	92.764	1.986	Open Manhole	10000
S61.000	68.114	113.9	S164	97.500	95.273	1.227	Junction	
S61.001	31.587	113.6	S165	97.500	94.995	2.005	Junction	
S61.002	64.347	114.1	S166	96.750	94.431	1.319	Junction	
S61.003	27.723	112.7	S167	96.750	94.185	1.565	Junction	
S61.004	67.309	114.5	S168	96.000	93.597	1.403	Junction	
S61.005	25.808	113.7	S169	96.000	93.370	1.630	Junction	
S61.006	44.777	113.9	S18	95.750	92.977	1.773	Open Manhole	10000
S23.004	31.905	750.0	S33	95.500	92.657	0.843	Open Manhole	10000
S23.005	15.985	750.0	S105	95.000	92.636	1.364	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S62.000	o	300	S105	97.857	96.257	1.300	Open Manhole	1200
S23.006	3 \=/	2000	S105	95.000	92.636	1.364	Junction	
S63.000	o	300	S109	97.612	96.112	1.200	Open Manhole	1200
S23.007	3 \=/	2000	S105	94.750	92.609	1.141	Junction	
S64.000	o	300	S113	97.251	95.804	1.147	Open Manhole	1200
S23.008	3 \=/	2000	S107	94.750	92.500	1.250	Junction	
S65.000	o	300	S117	96.953	95.532	1.121	Open Manhole	1200
S23.009	3 \=/	2000	S105	94.750	92.474	1.276	Junction	
S66.000	o	300	S121	96.750	95.250	1.200	Open Manhole	1200
S23.010	3 \=/	2000	S109	94.500	92.000	1.500	Junction	
S67.000	o	300	S125	96.456	94.956	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S62.000	331.561	126.5	S105	95.000	93.636	1.064	Junction	
S23.006	19.900	737.0	S105	94.750	92.609	1.141	Junction	
S63.000	332.632	127.8	S105	94.750	93.509	0.941	Junction	
S23.007	19.900	182.6	S107	94.750	92.500	1.250	Junction	
S64.000	331.712	138.0	S107	94.750	93.400	1.050	Junction	
S23.008	19.149	750.0	S105	94.750	92.474	1.276	Junction	
S65.000	332.315	154.0	S105	94.750	93.374	1.076	Junction	
S23.009	21.245	180.0	S109	94.500	92.356	1.144	Junction	
S66.000	331.935	166.5	S109	94.500	93.256	0.944	Junction	
S23.010	19.900	125.9	S110	94.250	91.842	1.408	Junction	
S67.000	331.624	149.8	S110	94.250	92.742	1.208	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S23.011	3 \=/	2000	S110	94.250	91.842	1.408	Junction	
S68.000	o	300	S129	96.154	94.654	1.200	Open Manhole	1200
S23.012	3 \=/	2000	S34	94.250	91.740	1.510	Junction	
S69.000	o	300	S133	95.655	94.357	0.998	Open Manhole	1200
S23.013	3 \=/	2000	S112	94.000	91.500	1.500	Junction	
S70.000	o	300	S137	95.115	94.053	0.762	Open Manhole	1200
S23.014	3 \=/	2000	S113	94.000	91.474	1.526	Junction	
S71.000	o	400	S141	95.239	93.757	1.082	Open Manhole	1350
S23.015	3 \=/	2000	S112	93.750	91.389	1.361	Junction	
S72.000	o	400	S145	94.983	93.483	1.100	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S23.011	19.394	190.1	S34	94.250	91.740	1.510	Junction	
S68.000	333.026	165.4	S34	94.250	92.640	1.310	Junction	
S23.012	21.191	756.8	S112	94.000	91.712	1.288	Junction	
S69.000	331.442	169.4	S112	94.000	92.400	1.300	Junction	
S23.013	19.801	750.0	S113	94.000	91.474	1.526	Junction	
S70.000	331.296	552.2	S113	94.000	93.453	0.247	Junction	
S23.014	19.490	229.3	S112	93.750	91.389	1.361	Junction	
S71.000	331.580	750.0	S112	93.750	93.315	0.035	Junction	
S23.015	20.449	158.5	S115	93.750	91.260	1.490	Junction	
S72.000	331.481	750.0	S115	93.750	93.041	0.309	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S23.016	3 \=/	2000	S115	93.750	91.260	1.490	Junction	
S73.000	o	400	S149	94.702	93.104	1.198	Open Manhole	1350
S23.017	3 \=/	2000	S116	93.500	90.750	1.750	Junction	
S23.018	3 \=/	2000	S35	93.500	90.731	1.769	Junction	
S22.024	ooo	1300	S5	93.500	90.700	1.500	Open Manhole	10000
S22.025	ooo	1300	S33	92.000	90.650	0.050	Open Manhole	4800
S74.000	3 \=/	2000	S39	93.500	92.000	0.500	Junction	
S74.001	o	1200	S40	93.500	91.460	0.840	Junction	
S74.002	3 \=/	2000	S196	93.250	91.441	0.809	Junction	
S74.003	o	1400	S41	93.500	90.708	1.392	Junction	
S74.004	3 \=/	2000	S198	93.500	90.679	1.821	Junction	
S75.000	o	500	S61	94.882	93.300	1.082	Open Manhole	1500
S75.001	o	700	S62	94.751	92.850	1.201	Open Manhole	1500
S76.000	o	400	S59	95.156	93.726	1.030	Open Manhole	1350
S76.001	o	600	S60	94.858	93.319	0.939	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S23.016	20.353	150.8	S116	93.500	91.125	1.375	Junction	
S73.000	331.544	750.0	S116	93.500	92.662	0.438	Junction	
S23.017	14.468	761.5	S35	93.500	90.731	1.769	Junction	
S23.018	12.569	750.0	S5	93.500	90.714	1.786	Open Manhole	10000
S22.024	35.797	715.9	S33	92.000	90.650	0.050	Open Manhole	4800
S22.025	147.211	751.1	S23	92.000	90.454	0.246	Junction	
S74.000	104.733	748.1	S40	93.500	91.860	0.640	Junction	
S74.001	14.240	749.5	S196	93.250	91.441	0.609	Junction	
S74.002	99.876	750.0	S41	93.500	91.308	1.192	Junction	
S74.003	21.797	750.0	S198	93.500	90.679	1.421	Junction	
S74.004	11.195	750.0	S6	93.500	90.664	1.836	Open Manhole	10000
S75.000	68.367	273.5	S62	94.751	93.050	1.201	Open Manhole	1500
S75.001	55.970	750.0	S48	95.000	92.775	1.525	Open Manhole	10000
S76.000	67.845	326.4	S60	94.858	93.519	0.939	Open Manhole	1500
S76.001	44.618	750.0	S50	95.000	93.259	1.141	Open Manhole	10000

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S77.000	o	400	S57	95.321	94.238	0.683	Open Manhole	1350
S77.001	o	600	S58	95.239	93.792	0.847	Open Manhole	1500
S78.000	o	400	S55	95.904	94.752	0.752	Open Manhole	1350
S78.001	o	500	S56	95.646	94.398	0.748	Open Manhole	1500
S79.000	o	400	S53	96.291	95.252	0.639	Open Manhole	1350
S79.001	o	500	S54	96.003	94.876	0.627	Open Manhole	1500
S80.000	o	400	S51	96.746	95.761	0.585	Open Manhole	1350
S80.001	o	500	S52	96.532	95.358	0.673	Open Manhole	1500
S81.000	o	400	S49	97.415	96.262	0.753	Open Manhole	1350
S81.001	o	500	S50	97.291	95.842	0.949	Open Manhole	1500
S82.000	o	400	S47	97.690	96.817	0.473	Open Manhole	1350
S82.001	o	500	S48	97.269	96.342	0.428	Open Manhole	1500
S83.000	o	400	S45	98.000	97.362	0.238	Open Manhole	1350
S83.001	o	500	S46	97.967	96.845	0.622	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S77.000	68.283	277.5	S58	95.239	93.992	0.847	Open Manhole	1500
S77.001	44.486	750.0	S52	95.500	93.732	1.168	Open Manhole	10000
S78.000	68.137	268.6	S56	95.646	94.498	0.748	Open Manhole	1500
S78.001	43.933	255.9	S54	95.750	94.226	1.024	Open Manhole	10000
S79.000	67.991	246.4	S54	96.003	94.976	0.627	Open Manhole	1500
S79.001	44.604	201.0	S56	96.250	94.654	1.096	Open Manhole	10000
S80.000	68.512	226.4	S52	96.532	95.458	0.673	Open Manhole	1500
S80.001	44.786	124.4	S58	96.500	94.998	1.002	Open Manhole	10000
S81.000	67.970	212.9	S50	97.291	95.942	0.949	Open Manhole	1500
S81.001	44.847	193.9	S60	97.000	95.611	0.889	Open Manhole	10000
S82.000	67.991	181.0	S48	97.269	96.442	0.428	Open Manhole	1500
S82.001	45.161	182.6	S62	97.500	96.094	0.906	Open Manhole	10000
S83.000	68.394	164.0	S46	97.967	96.945	0.622	Open Manhole	1500
S83.001	44.495	162.4	S64	97.750	96.571	0.679	Open Manhole	10000

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S84.000	o	500	S43	98.430	97.500	0.430	Open Manhole	1500
S84.001	o	500	S44	98.450	97.409	0.541	Open Manhole	1500
S85.000	o	400	S41	98.750	97.900	0.450	Open Manhole	1350
S85.001	o	500	S42	98.250	97.270	0.480	Open Manhole	1500
S86.000	3 \=/	2000	S68	99.250	97.000	1.250	Junction	
S85.002	3 \=/	2000	S68	98.750	96.426	1.324	Open Manhole	10000
S84.002	3 \=/	2000	S66	98.250	96.346	0.904	Open Manhole	10000
S83.002	3 \=/	2000	S64	97.750	96.071	0.679	Open Manhole	10000
S82.002	3 \=/	2000	S62	97.500	95.594	0.906	Open Manhole	10000
S81.002	3 \=/	2000	S60	97.000	95.111	0.889	Open Manhole	10000
S80.002	3 \=/	2000	S58	96.500	94.498	1.002	Open Manhole	10000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S84.000	68.052	750.0	S44	98.450	97.409	0.541	Open Manhole	1500
S84.001	45.285	98.2	S66	98.250	96.948	0.802	Open Manhole	10000
S85.000	68.119	128.5	S42	98.250	97.370	0.480	Open Manhole	1500
S85.001	44.885	130.6	S68	98.750	96.926	1.324	Open Manhole	10000
S86.000	19.851	134.1	S68	98.750	96.852	0.898	Open Manhole	10000
S85.002	56.581	707.3	S66	98.250	96.346	0.904	Open Manhole	10000
S84.002	49.981	746.0	S64	97.750	96.279	0.471	Open Manhole	10000
S83.002	50.189	651.8	S62	97.500	95.994	0.506	Open Manhole	10000
S82.002	49.836	750.0	S60	97.000	95.528	0.472	Open Manhole	10000
S81.002	50.189	750.0	S58	96.500	95.044	0.456	Open Manhole	10000
S80.002	49.702	753.1	S56	96.250	94.432	0.818	Open Manhole	10000

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S79.002	3 \=/	2000	S56	96.250	94.154	1.096	Open Manhole	10000
S78.002	3 \=/	2000	S54	95.750	93.726	1.024	Open Manhole	10000
S77.002	3 \=/	2000	S52	95.500	93.332	1.168	Open Manhole	10000
S76.002	3 \=/	2000	S50	95.000	92.859	1.141	Open Manhole	10000
S75.002	3 \=/	2000	S48	95.000	92.475	1.525	Open Manhole	10000
S75.003	oo	1100	S63	95.000	92.167	1.733	Open Manhole	10000
S75.004	3 \=/	2000	S47	94.000	92.057	0.943	Open Manhole	10000
S87.000	o	500	S203	94.460	92.762	1.197	Open Manhole	1500
S75.005	3 \=/	2000	S203	94.000	92.017	0.983	Junction	
S88.000	o	400	S206	94.376	92.783	1.193	Open Manhole	1350
S75.006	3 \=/	2000	S203	94.000	91.939	1.061	Junction	
S89.000	o	400	S209	94.281	92.681	1.200	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S79.002	49.550	739.6	S54	95.750	94.087	0.663	Open Manhole	10000
S78.002	51.619	750.0	S52	95.500	93.658	0.842	Open Manhole	10000
S77.002	49.066	732.3	S50	95.000	93.265	0.735	Open Manhole	10000
S76.002	11.979	748.7	S48	95.000	92.843	1.157	Open Manhole	10000
S75.002	5.975	746.9	S63	95.000	92.467	1.533	Open Manhole	10000
S75.003	86.031	782.1	S47	94.000	92.057	0.843	Open Manhole	10000
S75.004	6.417	750.0	S203	94.000	92.049	0.951	Junction	
S87.000	174.289	710.6	S203	94.000	92.517	0.983	Junction	
S75.005	17.504	750.0	S203	94.000	91.994	1.006	Junction	
S88.000	173.308	710.5	S203	94.000	92.539	1.061	Junction	
S75.006	18.819	750.0	S204	94.250	91.914	1.336	Junction	
S89.000	172.556	707.0	S204	94.250	92.437	1.413	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S75.007	3 \=/	2000	S204	94.250	91.837	1.413	Junction	
S90.000	o	400	S212	94.472	92.891	1.181	Open Manhole	1350
S75.008	3 \=/	2000	S203	94.250	91.711	1.539	Junction	
S91.000	o	400	S216	94.295	92.789	1.105	Open Manhole	1350
S75.009	3 \=/	2000	S207	94.250	91.662	1.588	Junction	
S92.000	o	400	S220	94.267	92.681	1.187	Open Manhole	1350
S75.010	3 \=/	2000	S207	94.250	91.554	1.696	Junction	
S93.000	o	400	S224	94.099	92.567	1.132	Open Manhole	1350
S75.011	3 \=/	2000	S48	94.000	91.440	1.560	Junction	
S94.000	o	400	S228	93.953	92.450	1.103	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S75.007	19.146	750.0	S203	94.250	91.811	1.439	Junction	
S90.000	310.820	536.0	S203	94.250	92.311	1.539	Junction	
S75.008	19.673	750.0	S207	94.250	91.685	1.565	Junction	
S91.000	310.370	588.5	S207	94.250	92.262	1.588	Junction	
S75.009	20.050	750.0	S207	94.250	91.635	1.615	Junction	
S92.000	310.427	589.3	S207	94.250	92.154	1.696	Junction	
S75.010	20.702	750.0	S48	94.000	91.526	1.474	Junction	
S93.000	310.547	588.6	S48	94.000	92.040	1.560	Junction	
S75.011	19.835	750.0	S210	94.000	91.413	1.587	Junction	
S94.000	310.316	579.3	S210	94.000	91.914	1.686	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S75.012	3 \=/	2000	S210	94.000	91.314	1.686	Junction	
S95.000	o	400	S232	93.805	92.331	1.074	Open Manhole	1350
S75.013	3 \=/	2000	S211	94.000	91.203	1.797	Junction	
S96.000	o	400	S236	93.694	92.214	1.079	Open Manhole	1350
S75.014	3 \=/	2000	S210	93.750	91.177	1.573	Junction	
S97.000	o	400	S240	93.565	92.137	1.028	Open Manhole	1350
S75.015	3 \=/	2000	S211	93.500	91.060	1.440	Junction	
S98.000	o	400	S244	93.425	92.120	0.905	Open Manhole	1350
S75.016	3 \=/	2000	S49	93.500	90.932	1.568	Junction	
S75.017	3 \=/	2000	S50	93.500	90.913	1.587	Junction	
S74.005	2100 []	3300	S6	93.500	89.464	2.036	Open Manhole	10000
S74.006	3 \=/	600	S93	93.000	89.408	2.392	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S75.012	20.289	750.0	S211	94.000	91.287	1.713	Junction	
S95.000	311.040	588.7	S211	94.000	91.803	1.797	Junction	
S75.013	19.441	750.0	S210	93.750	91.177	1.573	Junction	
S96.000	310.427	725.5	S210	93.750	91.787	1.563	Junction	
S75.014	19.682	750.0	S211	93.500	91.151	1.349	Junction	
S97.000	310.059	649.2	S211	93.500	91.660	1.440	Junction	
S75.015	20.110	750.0	S49	93.500	91.033	1.467	Junction	
S98.000	303.458	515.9	S49	93.500	91.532	1.568	Junction	
S75.016	13.610	750.0	S50	93.500	90.913	1.587	Junction	
S75.017	10.606	750.0	S6	93.500	90.899	1.601	Open Manhole	10000
S74.005	41.838	747.1	S93	93.000	89.408	1.592	Open Manhole	3000
S74.006	20.000#	750.0	S23	92.000	89.381	1.419	Junction	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.020	o	2875	S23	92.000	87.932	1.193	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.020	140.782	748.8	S	92.000	87.744	1.381	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
4.000	-	-	94	0.000	0.000	0.000
4.001	-	-	94	0.652	0.613	0.613
4.002	-	-	94	0.347	0.326	0.326
4.003	-	-	94	1.011	0.950	0.950
4.004	-	-	94	1.718	1.615	1.615
4.005	-	-	94	2.463	2.315	2.315
5.000	-	-	94	0.000	0.000	0.000
6.000	-	-	94	0.461	0.433	0.433
7.000	-	-	94	0.047	0.044	0.044
6.001	-	-	94	0.327	0.307	0.307
6.002	-	-	94	0.000	0.000	0.000
8.000	-	-	94	0.445	0.418	0.418
9.000	-	-	94	0.057	0.054	0.054
6.003	-	-	94	0.398	0.374	0.374
10.000	-	-	94	0.374	0.352	0.352
11.000	-	-	94	0.051	0.048	0.048
6.004	-	-	94	0.385	0.362	0.362
12.000	-	-	94	0.331	0.311	0.311
13.000	-	-	94	0.047	0.044	0.044
6.005	-	-	94	0.379	0.356	0.356
14.000	-	-	94	0.053	0.050	0.050
15.000	-	-	94	0.271	0.255	0.255
6.006	-	-	94	0.380	0.357	0.357
16.000	-	-	94	0.235	0.221	0.221
17.000	-	-	94	0.056	0.053	0.053
6.007	-	-	94	0.384	0.361	0.361
6.008	-	-	94	0.000	0.000	0.000
6.009	-	-	94	0.000	0.000	0.000
18.000	-	-	94	0.317	0.298	0.298
19.000	-	-	94	0.046	0.043	0.043
6.010	-	-	94	0.301	0.283	0.283
20.000	-	-	94	0.049	0.046	0.046
6.011	-	-	94	0.356	0.335	0.335
5.001	-	-	94	0.000	0.000	0.000
5.002	-	-	94	0.167	0.157	0.157
5.003	-	-	94	6.152	5.783	5.783
5.004	-	-	94	0.000	0.000	0.000
5.005	-	-	94	0.000	0.000	0.000
5.006	-	-	94	0.000	0.000	0.000
5.007	-	-	94	0.000	0.000	0.000
4.006	-	-	94	0.558	0.525	0.525
21.000	-	-	94	0.000	0.000	0.000
21.001	-	-	94	0.327	0.307	0.307
4.007	-	-	94	0.303	0.285	0.285
4.008	-	-	94	0.043	0.040	0.040
4.009	-	-	94	2.872	2.700	2.700
4.010	-	-	94	1.426	1.340	1.340
4.011	-	-	94	1.016	0.955	0.955
4.012	-	-	94	1.264	1.188	1.188
4.013	-	-	94	0.000	0.000	0.000
4.014	-	-	94	0.922	0.867	0.867

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
4.015	-	-	94	2.238	2.104	2.104
4.016	-	-	94	0.000	0.000	0.000
4.017	-	-	94	1.371	1.289	1.289
4.018	-	-	94	0.937	0.881	0.881
4.019	-	-	94	0.000	0.000	0.000
22.000	-	-	94	0.206	0.194	0.194
22.001	-	-	94	0.223	0.210	0.210
22.002	-	-	94	0.532	0.500	0.500
22.003	-	-	94	0.519	0.488	0.488
22.004	-	-	94	0.568	0.534	0.534
22.005	-	-	94	0.000	0.000	0.000
22.006	-	-	94	0.205	0.193	0.193
22.007	-	-	94	0.093	0.087	0.087
22.008	-	-	94	0.522	0.491	0.491
22.009	-	-	94	0.000	0.000	0.000
22.010	-	-	94	0.368	0.346	0.346
22.011	-	-	94	0.173	0.163	0.163
22.012	-	-	94	0.000	0.000	0.000
22.013	-	-	94	0.000	0.000	0.000
22.014	-	-	94	0.000	0.000	0.000
22.015	-	-	94	3.759	3.533	3.533
22.016	-	-	94	0.000	0.000	0.000
22.017	-	-	94	0.000	0.000	0.000
22.018	-	-	94	0.000	0.000	0.000
22.019	-	-	94	2.638	2.480	2.480
22.020	-	-	94	0.000	0.000	0.000
22.021	-	-	94	0.000	0.000	0.000
22.022	-	-	94	0.000	0.000	0.000
22.023	-	-	94	0.000	0.000	0.000
23.000	-	-	94	0.392	0.368	0.368
23.001	-	-	94	0.345	0.324	0.324
24.000	-	-	94	0.321	0.302	0.302
24.001	-	-	94	0.286	0.269	0.269
25.000	-	-	94	0.342	0.321	0.321
25.001	-	-	94	0.300	0.282	0.282
26.000	-	-	94	0.342	0.321	0.321
26.001	-	-	94	0.311	0.292	0.292
27.000	-	-	94	0.347	0.326	0.326
27.001	-	-	94	0.306	0.288	0.288
28.000	-	-	94	0.353	0.332	0.332
28.001	-	-	94	0.309	0.290	0.290
29.000	-	-	94	0.323	0.304	0.304
29.001	-	-	94	0.280	0.263	0.263
30.000	-	-	94	0.312	0.293	0.293
30.001	-	-	94	0.266	0.250	0.250
31.000	-	-	94	0.338	0.318	0.318
31.001	-	-	94	0.288	0.271	0.271
32.000	-	-	94	0.359	0.337	0.337
32.001	-	-	94	0.308	0.290	0.290
33.000	-	-	94	0.393	0.369	0.369
33.001	-	-	94	0.339	0.319	0.319

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
34.000	-	-	94	0.456	0.429	0.429
35.000	User	-	94	0.250	0.235	0.235
35.001	User	-	94	0.303	0.285	0.285
35.002	-	-	94	0.000	0.000	0.000
34.001	-	-	94	0.000	0.000	0.000
33.002	-	-	94	0.131	0.123	0.123
36.000	-	-	94	0.333	0.313	0.313
33.003	-	-	94	0.000	0.000	0.000
37.000	-	-	94	0.362	0.340	0.340
33.004	-	-	94	0.000	0.000	0.000
38.000	-	-	94	0.348	0.327	0.327
32.002	-	-	94	0.121	0.114	0.114
39.000	-	-	94	0.336	0.316	0.316
32.003	-	-	94	0.000	0.000	0.000
40.000	-	-	94	0.369	0.347	0.347
32.004	-	-	94	0.000	0.000	0.000
31.002	-	-	94	0.114	0.107	0.107
41.000	-	-	94	0.322	0.303	0.303
31.003	-	-	94	0.000	0.000	0.000
42.000	-	-	94	0.371	0.349	0.349
31.004	-	-	94	0.000	0.000	0.000
43.000	-	-	94	0.343	0.322	0.322
30.002	-	-	94	0.106	0.100	0.100
44.000	-	-	94	0.339	0.319	0.319
30.003	-	-	94	0.000	0.000	0.000
45.000	-	-	94	0.345	0.324	0.324
29.002	-	-	94	0.000	0.000	0.000
46.000	-	-	94	0.341	0.321	0.321
29.003	-	-	94	0.106	0.100	0.100
47.000	-	-	94	0.354	0.333	0.333
29.004	-	-	94	0.000	0.000	0.000
48.000	-	-	94	0.351	0.330	0.330
28.002	-	-	94	0.118	0.111	0.111
49.000	-	-	94	0.337	0.317	0.317
28.003	-	-	94	0.000	0.000	0.000
50.000	-	-	94	0.348	0.327	0.327
28.004	-	-	94	0.000	0.000	0.000
27.002	-	-	94	0.107	0.101	0.101
51.000	-	-	94	0.354	0.333	0.333
27.003	-	-	94	0.000	0.000	0.000
52.000	-	-	94	0.337	0.317	0.317
27.004	-	-	94	0.000	0.000	0.000
53.000	-	-	94	0.336	0.316	0.316
26.002	-	-	94	0.113	0.106	0.106
54.000	-	-	94	0.322	0.303	0.303
26.003	-	-	94	0.000	0.000	0.000
55.000	-	-	94	0.351	0.330	0.330
26.004	-	-	94	0.000	0.000	0.000
25.002	-	-	94	0.106	0.100	0.100
56.000	-	-	94	0.364	0.342	0.342
25.003	-	-	94	0.000	0.000	0.000

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
57.000	-	-	94	0.337	0.317	0.317
25.004	-	-	94	0.000	0.000	0.000
58.000	-	-	94	0.340	0.320	0.320
24.002	-	-	94	0.103	0.097	0.097
59.000	-	-	94	0.343	0.322	0.322
24.003	-	-	94	0.000	0.000	0.000
60.000	-	-	94	0.568	0.534	0.534
23.002	-	-	94	0.000	0.000	0.000
23.003	-	-	94	0.000	0.000	0.000
61.000	-	-	94	0.000	0.000	0.000
61.001	-	-	94	0.000	0.000	0.000
61.002	-	-	94	0.000	0.000	0.000
61.003	-	-	94	0.000	0.000	0.000
61.004	-	-	94	0.000	0.000	0.000
61.005	-	-	94	0.000	0.000	0.000
61.006	-	-	94	0.000	0.000	0.000
23.004	-	-	94	0.000	0.000	0.000
23.005	-	-	94	0.475	0.447	0.447
62.000	-	-	94	0.274	0.258	0.258
23.006	-	-	94	0.000	0.000	0.000
63.000	-	-	94	0.185	0.174	0.174
23.007	-	-	94	0.000	0.000	0.000
64.000	-	-	94	0.173	0.163	0.163
23.008	-	-	94	0.000	0.000	0.000
65.000	-	-	94	0.160	0.150	0.150
23.009	-	-	94	0.000	0.000	0.000
66.000	-	-	94	0.172	0.162	0.162
23.010	-	-	94	0.000	0.000	0.000
67.000	-	-	94	0.169	0.159	0.159
23.011	-	-	94	0.000	0.000	0.000
68.000	-	-	94	0.178	0.167	0.167
23.012	-	-	94	1.481	1.392	1.392
69.000	-	-	94	0.176	0.165	0.165
23.013	-	-	94	0.000	0.000	0.000
70.000	-	-	94	0.158	0.149	0.149
23.014	-	-	94	0.000	0.000	0.000
71.000	-	-	94	0.171	0.161	0.161
23.015	-	-	94	0.000	0.000	0.000
72.000	-	-	94	0.168	0.158	0.158
23.016	-	-	94	0.000	0.000	0.000
73.000	-	-	94	0.226	0.212	0.212
23.017	-	-	94	0.000	0.000	0.000
23.018	-	-	94	1.162	1.092	1.092
22.024	-	-	94	0.236	0.222	0.222
22.025	-	-	94	0.000	0.000	0.000
74.000	User	-	94	0.308	0.290	0.290
74.001	-	-	94	3.924	3.689	3.689
74.002	-	-	94	0.000	0.000	0.000
74.003	-	-	94	2.549	2.396	2.396
74.004	-	-	94	0.000	0.000	0.000
75.000	-	-	94	0.394	0.370	0.370

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
75.001	-	-	94	0.356	0.335	0.335
76.000	-	-	94	0.326	0.306	0.306
76.001	-	-	94	0.294	0.276	0.276
77.000	-	-	94	0.348	0.327	0.327
77.001	-	-	94	0.314	0.295	0.295
78.000	-	-	94	0.347	0.326	0.326
78.001	-	-	94	0.320	0.301	0.301
79.000	-	-	94	0.350	0.329	0.329
79.001	-	-	94	0.313	0.294	0.294
80.000	-	-	94	0.358	0.337	0.337
80.001	-	-	94	0.325	0.306	0.306
81.000	-	-	94	0.323	0.304	0.304
81.001	-	-	94	0.291	0.274	0.274
82.000	-	-	94	0.309	0.290	0.290
82.001	-	-	94	0.281	0.264	0.264
83.000	-	-	94	0.330	0.310	0.310
83.001	-	-	94	0.303	0.285	0.285
84.000	-	-	94	0.355	0.334	0.334
84.001	-	-	94	0.327	0.307	0.307
85.000	-	-	94	0.388	0.365	0.365
85.001	-	-	94	0.376	0.353	0.353
86.000	-	-	94	0.000	0.000	0.000
85.002	-	-	94	0.131	0.123	0.123
84.002	-	-	94	0.114	0.107	0.107
83.002	-	-	94	0.111	0.104	0.104
82.002	-	-	94	0.103	0.097	0.097
81.002	-	-	94	0.104	0.098	0.098
80.002	-	-	94	0.126	0.118	0.118
79.002	-	-	94	0.110	0.103	0.103
78.002	-	-	94	0.115	0.108	0.108
77.002	-	-	94	0.111	0.104	0.104
76.002	-	-	94	0.103	0.097	0.097
75.002	-	-	94	0.000	0.000	0.000
75.003	-	-	94	0.000	0.000	0.000
75.004	-	-	94	0.167	0.157	0.157
87.000	-	-	94	0.315	0.296	0.296
75.005	-	-	94	0.000	0.000	0.000
88.000	-	-	94	0.179	0.168	0.168
75.006	-	-	94	0.000	0.000	0.000
89.000	-	-	94	0.162	0.152	0.152
75.007	-	-	94	0.000	0.000	0.000
90.000	-	-	94	0.168	0.158	0.158
75.008	-	-	94	0.000	0.000	0.000
91.000	-	-	94	0.248	0.233	0.233
75.009	-	-	94	0.000	0.000	0.000
92.000	-	-	94	0.258	0.243	0.243
75.010	-	-	94	0.000	0.000	0.000
93.000	-	-	94	0.235	0.221	0.221
75.011	-	-	94	1.522	1.431	1.431
94.000	-	-	94	0.259	0.243	0.243
75.012	-	-	94	0.000	0.000	0.000

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
95.000	-	-	94	0.263	0.247	0.247
75.013	-	-	94	0.000	0.000	0.000
96.000	-	-	94	0.254	0.239	0.239
75.014	-	-	94	0.000	0.000	0.000
97.000	-	-	94	0.232	0.218	0.218
75.015	-	-	94	0.000	0.000	0.000
98.000	-	-	94	0.287	0.270	0.270
75.016	-	-	94	1.203	1.131	1.131
75.017	-	-	94	3.306	3.108	3.108
74.005	-	-	94	0.292	0.274	0.274
74.006	-	-	94	0.000	0.000	0.000
4.020	-	-	94	5.806	5.458	5.458
				Total	Total	Total
				95.445	89.718	89.718

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S4.020	S	92.000	87.744	89.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	2880
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	5

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Rainfall Profile Details

Event Name Duration (mins) 65 Timestep (mins) 5 Profiles 1

Online Controls for Storm

Orifice Manhole: S23, DS/PN: S4.020, Volume (m^3): 2192.0

Diameter (m) 0.001 Discharge Coefficient 0.600 Invert Level (m) 89.381

Storage Structures for Storm

Infiltration Basin Manhole: S23, DS/PN: S4.020

Invert Level (m) 89.500 Safety Factor 1.5
Infiltration Coefficient Base (m/hr) 0.05000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.10000

Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**	**Depth (m)**	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	35000.0	2.000	39092.2	3.501	42312.1	5.000	45654.7
1.000	37017.8	3.000	41223.2	4.000	43410.7	6.000	47955.3

A.3 Berechnungen zur Dimensionierung von Abwasserkanälen

APPENDIX A
Marshalling Yard

- Exhibit 1: Drainage Map
- Rational Method
- Inlet Capacity
- Exhibit 2: StormCAD Model Exhibit
- Storm Drain Sizing - StormCAD Results
- Culvert Sizing - HY-8 Results

N.T.S.

INTEL PROJECT OWL - SITE LOGISTICS SL-01
MAGDEBURG, GERMANY

EXHIBIT 1: DRAINAGE MAP - MARSHALLING YARD & NORTHWEST LAYDOWN YARD

Jacobs

2020 S.W. 4th Avenue
Portland, Oregon 97201

RATIONAL METHOD

SWM
Magdeburg

Niederschlagshöhen für Magdeburg

Starkniederschlagsstatistik NDT-SWM-2019 *

Stand: 13. Juni 2019

Auswertung gemessener Niederschläge im Stadtgebiet von 1992 bis 2018

T [a]	0,5	1	2	5	10	20	30	50	100
D [min]	N [mm]								
5	5,0	6,4	7,8	9,7	11,1	12,5	13,4	14,6	16,3
10	8,1	10,4	12,7	15,8	18,1	20,5	21,8	23,5	25,9
15	9,9	12,7	15,5	19,2	22,1	24,9	26,5	28,6	31,4
20	11,1	14,2	17,4	21,6	24,8	27,9	29,8	32,1	35,3
30	12,7	16,4	20,0	24,8	28,5	32,1	34,2	36,9	40,6
45	14,3	18,4	22,5	27,9	32,0	36,1	38,5	41,6	45,6
60	15,5	19,9	24,3	30,1	34,5	38,9	41.5	44,7	49,1
90	17,0	21,8	26,6	33,0	37,8	42,7	45.5	49,1	53,9
120	18,0	23,2	28,3	35,0	40,1	45,3	48,3	52,0	57,1
180	19,5	25,0	30,5	37,8	43,3	48,8	52,0	56,0	61,5
240	20,5	26,2	32,0	39,6	45,4	51,2	54,6	58,8	64,6
360	21,8	27,9	34,1	42,2	48,3	54,4	58,0	62,5	68,7
720	24,0	30,7	37,4	46,2	52,9	59,6	63,5	68,5	75,2

Für die Bemessung entwässerungstechnischer Anlagen im öffentlichen Bereich in Magdeburg sind die oben aufgeführten Werte verbindlich anzuwenden.

Für die Bemessung privater GEA werden die oben aufgeführten Werte empfohlen.

Für Nachweise mit T > 20 a können die Werte aus KOSTRA-DWD-2010R plus dem dort ausgewiesenen Toleranzbetrag verwendet werden.

Gültigkeit NDT-SWM-2019: bis Dez. 2022 längstens Revision KOSTRA-DWD-2010R durch DWD

(*) In den bemessungsrelevanten Dauerstufen und Wiederkehrzeiten sind die Werte aus KOSTRA-DWD-2010R kleiner.

Regenspende: $r_{D,T} = \frac{N_{D,T}}{D} \cdot 166{,}7$

$r_{D,T}$ *in* $\frac{L}{s \cdot ha}$, *D in min und* $N_{D,T}$ *in mm*

SWM
Magdeburg

NIEDERSCHLAGSSPENDEN FÜR MAGDEBURG

STARKNIEDERSCHLAGSSTATISTIK NDT-SWM-2019 *

Stand: 18. Juni 2019

Auswertung gemessener Niederschläge im Stadtgebiet von 1992 bis 2018

T [a]	0,5	1	2	5	10	20	30	50	100
D [min]	Regenspende r [L/(s ha)]								
5	166,7	213,4	260,1	323,4	370,1	416,8	451,3	486,8	543,4
10	135.0	173,4	211,7	263,4	301,7	341,7	363,8	391,7	431,8
15	110.0	141,1	172,3	213,4	245,6	276,7	294,8	317,8	349.0
20	92,5	118,4	145.0	180.0	206,7	232,5	248,2	267,6	294,2
30	70,6	91,1	111,1	137,8	158,4	178,4	190,3	205.0	225,6
45	53.0	68,2	83,4	103,4	118,5	133,7	142,7	154,1	168,9
60	43,1	55,3	67,5	83,6	95,9	108,1	115,2	124,2	136,4
90	31,5	40,4	49,3	61,1	70.0	79,1	84,3	90,9	99,8
120	25.0	32,2	39,3	48,6	55,7	62,9	67.0	72,2	79,3
180	18,1	23,2	28,2	35.0	40,1	45,2	48,1	51,9	57.0
240	14,2	18,2	22,2	27,5	31,5	35,6	37,9	40,8	44,9
360	10,1	12,9	15,8	19,5	22,4	25,2	26,9	28,9	31,8
720	5,6	7,1	8,7	10,7	12,2	13,8	14,7	15,9	17,4

Für die Bemessung entwässerungstechnischer Anlagen im öffentlichen Bereich in Magdeburg sind die oben aufgeführten Werte verbindlich anzuwenden.

Für die Bemessung privater GEA werden die oben aufgeführten Werte empfohlen.

Für Nachweise mit T > 20 a können die Werte aus KOSTRA-DWD-2010R plus dem dort ausgewiesenen Toleranzbetrag verwendet werden.

Gültigkeit NDT-SWM-2019: bis Dez. 2022 längstens Revision KOSTRA-DWD-2010R durch DWD

(*) In den bemessungsrelevanten Dauerstufen und Wiederkehrzeiten sind die Werte aus KOSTRA-DWD-2010R kleiner.

hide/unhide columns G&H for elevations

Peak Flow Calculations Using The Rational Method

(Tc calculations per Papadakis and Kazan, 1987)

Project:	Intel OWL Site - Magdeburg, Germany
Proj #:	D3641200
Date:	12/19/23
By:	Jacobs

Rainfall Depth-Duration-Frequency (D-D-F), (inch)

Desired Fequency	5 min	10 min	15 min	30 min	60 min
10-Yr	0.437	0.713	0.870	1.122	1.358
100-Yr	0.642	1.020	1.236	1.598	1.833
Rainfall Intensity-Duration-Frequency (I-D-F), (inch/hr)					
10-Yr	5.24	4.28	3.48	2.24	1.36
100-Yr	7.70	6.12	4.94	3.20	1.93

Attach source and supporting data

AF for Cw per Cw_{100-Yr}

Freq.	Typical	Applicable
2-Yr	0.80	—
5-Yr	0.80	—
10-Yr	0.80	—
25-Yr	0.88	—
50-Yr	0.96	—
100-Yr	1.00	—

AF=Frequency Adjustment Factor

Jacobs

Drainage Area ID:

K_b=m LOG A + b $Tc=11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$

10-Yr / 100-Yr: Cw for each frequency is adjusted as a function of the 100-year value per the table above

Peak flow at Drainage Inlets excluding any upstream flow by

Concent. Point	Contributing Sub-basins	Total Area (ac)	100-year Cw	Flow Path (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	10-Yr Cw — (Tc,minim allowed= 5.0)	10-Yr i (in/hr)	10-Yr Tc (min)	Q 10-Yr (cfs)	100-Yr Cw — (Tc,minim allowed= 5.0)	100-Yr i (in/hr)	100-Yr Tc (min)	Q 100-Yr (cfs)	Inlet ID	10-Yr Flow (cfs)	100-Yr Flow (cfs)	10-YR Flow (l/s)	
—	M-1	1.910	0.65	437	—	—	0.0139	A	-0.00625	0.04	0.0362	0	0.65	5.24	5.1	6.5	0.65	7.70	5.0	9.6	CB-46	6.5	9.6	184.4	on-grade
—	M-2	1.310	0.65	417	—	—	0.0139	A	-0.00625	0.04	0.0393	0	0.65	5.24	5.0	4.5	0.65	7.70	5.0	6.6	CB-48	4.5	6.6	251.0	on-grade
—	M-3	1.200	0.65	374	—	—	0.0144	A	-0.00625	0.04	0.0395	0	0.65	5.24	5.0	4.1	0.65	7.70	5.0	6.0	CB-50	4.1	6.0	302.5	on-grade
—	M-4	1.020	0.65	310	—	—	0.0141	A	-0.00625	0.04	0.0399	0	0.65	5.24	5.0	3.5	0.65	7.70	5.0	5.1	CB-52	3.5	5.1	328.4	on-grade
—	M-5	1.200	0.65	274	—	—	0.0150	A	-0.00625	0.04	0.0395	0	0.65	5.24	5.0	4.1	0.65	7.70	5.0	6.0	CB-54	4.1	6.0	367.6	sag
—	M-6	0.250	0.65	144	—	—	0.0084	A	-0.00625	0.04	0.0436	0	0.65	5.24	5.0	0.9	0.65	7.70	5.0	1.3	CB-56	0.9	1.3	24.1	sag

INLET CAPACITY

Jacobs

CATCH BASIN / TRENCH DRAIN DESIGN FOR 10-YR EVENT

Project: Intel OWL Site - Magdeburg, Germany
Description: Inlet Capacities for Marshaling Yard SD system
Prepared by: Jacobs Engineering **Date:** **Date: ####**

INTENT: Verify adequacy of catch basin size per following equations, capacities are as noted below.

Curb open catch basin:
For length of curb opening: $Q = Cw\,(L\,(F_{CL}) + 1.8W)\,d^{1.5}$
Where: $Cw =$ 2.3
$W =$ 1.42 ft
$F_{CL} =$ No Clogging Factor assumed for curb-open catch basin/scuppers

Combined Curb open and grate catch basin:
For length of curb upstream of grate: $Q = Cw\,(L\,(F_{CL}) + 1.8W)\,d^{1.5}$
Where: $Cw =$ 2.3
$W =$ 1.42 ft
$F_{CL} =$ No Clogging Factor assumed for curb-open catch basin/scuppers
For the grated portion of the catch basin: $Q = CwPd^{1.5}(F_{CL})$
$Cw =$ 3.0
$P =$ Perimeter of the Grate, diregarding bars and side against curb, ft
$F_{CL} =$ No Clogging Factor assumed for curb-open catch basin/scuppers

Grate Catch Basin Operating as Weir:
$Q = CwPd^{1.5}$
$Cw =$ 3.0
$P =$ Perimeter of the Grate, diregarding bars and side against curb, ft

Grate Catch Basin Operating as an Orifice
Q=CoAg(2gd)0.5
$Co=$ 0.67
$Ag=$ Clear Opening Area (ft^2)
$g=$ 32.16 ft/s^2

Catch Basin ID	Concentration Point	Flow Q_{10} (cfs)	Flow Q_{10} (l/s)	Catch Basin Type	Grate Type	Clear Opening Area, A (ft^2)	Grate Length (ft)	Grate Width (ft)	Perimeter (ft)	Flow Depth, d (ft)	Catch Basin Capacity (Weir Flow) (cfs)	Catch Basin Capacity (Weir Flow) (l/s)	Catch Basin Capacity (Orifice Flow) (cfs)	Catch Basin Capacity (Orifice Flow) (l/s)
CB-54	—	12.98	367.63	600mm x 600mm	Neenah 4852 - 27" (685mm) Square	1.9	1.9	2.0	5.58	0.85	13.12	371.47	9.41	266.54
CB-56	—	0.85	24.13	600mm x 600mm	Neenah 4852 - 27" (685mm) Square	1.9	1.9	2.0	5.58	0.50	5.92	167.59	7.22	204.42

Worksheet for CB-46_On Grade_10-yr

Project Description	
Solve For	Efficiency

Input Data	
Discharge	184.40 L/s
Slope	0.0100 m/m
Gutter Width	0.60 m
Gutter Cross Slope	0.0150 m/m
Road Cross Slope	0.0150 m/m
Roughness Coefficient	0.015
Grate Width	0.60 m
Grate Length	0.6 m
Grate Type	P-50 mm (P-1 -7/8")
Clogging	0.0 %

Options	
Grate Flow Option	Exclude None

Results	
Efficiency	32.43 %
Intercepted Flow	59.81 L/s
Bypass Flow	124.59 L/s
Spread	5.2 m
Depth	0.08 m
Flow Area	0.2 m²
Gutter Depression	0.0 cm
Total Depression	0.0 cm
Velocity	0.92 m/s
Splash Over Velocity	2.46 m/s
Frontal Flow Factor	1.000
Side Flow Factor	0.062
Grate Flow Ratio	0.280
Active Grate Length	0.6 m

Worksheet for CB-48_On Grade_10-yr

Project Description

Solve For	Efficiency

Input Data

Discharge	251.00 L/s
Slope	0.0065 m/m
Gutter Width	0.60 m
Gutter Cross Slope	0.0120 m/m
Road Cross Slope	0.0120 m/m
Roughness Coefficient	0.015
Grate Width	0.60 m
Grate Length	0.6 m
Grate Type	P-50 mm (P-1 -7/8")
Clogging	0.0 %

Options

Grate Flow Option	Exclude None

Results

Efficiency	25.62 %
Intercepted Flow	64.30 L/s
Bypass Flow	186.70 L/s
Spread	7.3 m
Depth	0.09 m
Flow Area	0.3 m²
Gutter Depression	0.0 cm
Total Depression	0.0 cm
Velocity	0.80 m/s
Splash Over Velocity	2.46 m/s
Frontal Flow Factor	1.000
Side Flow Factor	0.063
Grate Flow Ratio	0.206
Active Grate Length	0.6 m

Worksheet for CB-50_On Grade_10-yr

Project Description

Solve For	Efficiency

Input Data

Discharge	302.50 L/s
Slope	0.0065 m/m
Gutter Width	0.60 m
Gutter Cross Slope	0.0120 m/m
Road Cross Slope	0.0120 m/m
Roughness Coefficient	0.015
Grate Width	0.60 m
Grate Length	0.6 m
Grate Type	P-50 mm (P-1 -7/8")
Clogging	0.0 %

Options

Grate Flow Option	Exclude None

Results

Efficiency	24.01 %
Intercepted Flow	72.64 L/s
Bypass Flow	229.86 L/s
Spread	7.8 m
Depth	0.09 m
Flow Area	0.4 m²
Gutter Depression	0.0 cm
Total Depression	0.0 cm
Velocity	0.83 m/s
Splash Over Velocity	2.46 m/s
Frontal Flow Factor	1.000
Side Flow Factor	0.058
Grate Flow Ratio	0.193
Active Grate Length	0.6 m

Worksheet for CB-52_On Grade_10-yr

Project Description

Solve For	Efficiency

Input Data

Discharge	328.40 L/s
Slope	0.0065 m/m
Gutter Width	0.60 m
Gutter Cross Slope	0.0120 m/m
Road Cross Slope	0.0120 m/m
Roughness Coefficient	0.015
Grate Width	0.60 m
Grate Length	0.6 m
Grate Type	P-50 mm (P-1 -7/8")
Clogging	0.0 %

Options

Grate Flow Option	Exclude None

Results

Efficiency	23.34 %
Intercepted Flow	76.64 L/s
Bypass Flow	251.76 L/s
Spread	8.0 m
Depth	0.10 m
Flow Area	0.4 m²
Gutter Depression	0.0 cm
Total Depression	0.0 cm
Velocity	0.85 m/s
Splash Over Velocity	2.46 m/s
Frontal Flow Factor	1.000
Side Flow Factor	0.056
Grate Flow Ratio	0.187
Active Grate Length	0.6 m

hide/unhide columns G&H for elevations

Peak Flow Calculations Using The Rational Method

(Tc calculations per Papadakis and Kazan, 1987)

Jacobs

Project:	Intel OWL Site - Magdeburg, Germany
Proj #:	D3641200
Date:	12/19/23
By:	Jacobs

Rainfall Depth-Duration-Frequency (D-D-F), (inch)					
Desired Fequency	Time				
	5 min	10 min	15 min	30 min	60 min
25-Yr	0.510	0.833	1.012	1.305	1.583
100-Yr	0.642	1.020	1.236	1.598	1.933
Rainfall Intensity-Duration-Frequency (I-D-F), (inch/hr)					
25-Yr	6.12	5.00	4.05	2.61	1.58
100-Yr	7.70	6.12	4.94	3.20	1.93

Attach source and supporting data

AF for Cw per Cw_{100-Yr}		
Freq.	Typical	Applicable
2-Yr	0.80	—
5-Yr	0.80	—
10-Yr	0.80	—
25-Yr	0.88	—
50-Yr	0.96	—
100-Yr	1.00	—

AF=Frequency Adjustment Factor

Drainage Area ID:

K_b=m LOG A + b; $Tc=11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$

Cw for each frequency is adjusted as a function of the 100-year value per the table above

Peak flow at Drainage Inlets excluding any upstream flow by

Concent. Point	Contributing Sub-basins	Total Area (ac)	100-year Cw	Flow Path (ft)	Approx High pt (ft)	Approx Low pt (ft)	Average Slope ft/ft	K_b Class A-->D	m	b	K_b	Initial/lot Tc (min)	25-Yr (Tc,minim allowed= 5.0) Cw —	25-Yr i (in/hr)	25-Yr Tc (min)	Q 25-Yr (cfs)	100-Yr (Tc,minim allowed= 5.0) Cw —	100-Yr i (in/hr)	100-Yr Tc (min)	Q 100-Yr (cfs)	Inlet ID	25-Yr Flow (cfs)	100-Yr Flow (cfs)	25-yr Flow (l/s)	
—	NWY-1	31.000	0.40	2430	—	—	0.0090	B	-0.01375	0.08	0.0595	0	0.40	3.68	19.7	45.4	0.40	4.71	17.9	58.4	—	—	—	—	
—	NWY-2	0.550	0.40	302	—	—	0.0192	B	-0.01375	0.08	0.0836	0	0.40	6.12	5.4	1.3	0.40	7.70	5.0	1.7	—	—	—	—	
—	NWY-2+NWY-3	1.080	0.40	617	—	—	0.0107	B	-0.01375	0.08	0.0795	0	0.40	5.22	9.6	2.3	0.40	6.75	8.7	2.9	—	—	—	—	
—	M-1	1.910	0.65	437	—	—	0.0139	A	-0.00625	0.04	0.0382	0	0.65	6.12	5.0	7.6	0.65	7.70	5.0	9.6	CB-46	7.6	9.6	215.1	on-grade
—	M-2	1.310	0.65	417	—	—	0.0139	A	-0.00625	0.04	0.0393	0	0.65	6.12	5.0	5.2	0.65	7.70	5.0	6.6	CB-48	5.2	6.6	292.9	on-grade
—	M-3	1.200	0.65	374	—	—	0.0144	A	-0.00625	0.04	0.0395	0	0.65	6.12	5.0	4.8	0.65	7.70	5.0	6.0	CB-50	4.8	6.0	353.0	on-grade
—	M-4	1.020	0.65	310	—	—	0.0141	A	-0.00625	0.04	0.0399	0	0.65	6.12	5.0	4.1	0.65	7.70	5.0	5.1	CB-52	4.1	5.1	383.1	on-grade
—	M-5	1.200	0.65	274	—	—	0.0150	A	-0.00625	0.04	0.0395	0	0.65	6.12	5.0	4.8	0.65	7.70	5.0	6.0	CB-54	4.8	6.0	428.8	
—	M-5	0.250	0.65	144	—	—	0.0084	A	-0.00625	0.04	0.0438	0	0.65	6.12	5.0	1.0	0.65	7.70	5.0	1.3	CB-56	1.0	1.3	28.2	
—	M-7	4.740	0.50	820	—	—	0.0158	B	-0.01375	0.08	0.0707	0	0.50	5.22	9.2	12.4	0.50	6.75	8.4	16.0	—	—	—	350.4	
—	M1-M7	11.630	0.65	1148.85	—	—	0.0158	B	-0.01375	0.08	0.0853	0	0.65	5.00	10.7	37.8	0.65	6.43	9.7	48.6	CULVERT	37.8	48.6	1069.5	
—	SW06A	0.914	0.65	528	—	—	0.0195	A	-0.00625	0.04	0.0402	0	0.65	6.12	5.0	3.6	0.65	7.70	5.0	4.6	—	—	—	102.9	

STORM DRAIN SIZING - STORMCAD RESULTS

N.T.S.

INTEL PROJECT OWL - SITE LOGISTICS SL-01
MAGDEBURG, GERMANY

EXHIBIT 2: STORMCAD MODEL EXHIBIT

Jacobs
2020 S.W. 4th Avenue
Portland, Oregon 97201

19/Dec/23 10:22:56 AM

Scenario: Base
Current Time Step: 0.000 h
FlexTable: Catch Basin Table

Label	Elevation (Rim) (m)	Elevation (Invert) (m)	Flow (Known) (L/s)	Flow (Additional Carryover) (L/s)	Flow (L/s)	Headloss Coefficient (Standard)	Headloss (m)	Hydraulic Grade Line (In) (m)	Hydraulic Grade Line (Out) (m)
CB-1	98.99	97.60	143.00	0.00	0.00	0.500	0.03	98.45	98.41
CB-2	98.60	97.10	0.00	143.00	0.00	0.500	0.05	98.10	98.05
CB-3	98.13	96.70	0.00	130.00	0.00	0.500	0.11	97.67	97.55
CB-5	98.54	97.05	143.00	0.00	0.00	0.500	0.03	98.13	98.09
CB-6	98.17	96.65	0.00	143.00	0.00	0.500	0.05	97.78	97.73
CB-7	97.73	96.33	0.00	130.00	0.00	0.500	0.11	97.35	97.23
CB-8	98.09	96.70	143.00	0.00	0.00	0.500	0.03	97.70	97.66
CB-9	97.75	96.25	0.00	143.00	0.00	0.500	0.05	97.35	97.30
CB-10	97.33	95.90	0.00	130.00	0.00	0.500	0.11	96.92	96.80
CB-11	97.64	96.10	143.00	0.00	0.00	0.500	0.03	97.33	97.29
CB-12	97.32	95.75	0.00	143.00	0.00	0.500	0.05	96.98	96.93
CB-13	96.93	95.50	0.00	130.00	0.00	0.500	0.11	96.55	96.43
CB-14	97.19	95.45	143.00	0.00	0.00	0.500	0.03	97.00	96.96
CB-15	96.90	95.25	0.00	143.00	0.00	0.500	0.05	96.65	96.60
CB-16	96.53	95.10	0.00	130.00	0.00	0.500	0.11	96.22	96.10
CB-17	96.74	95.10	0.00	143.00	0.00	0.500	0.03	96.60	96.56
CB-18	96.47	94.85	0.00	143.00	0.00	0.500	0.05	96.25	96.20
CB-19	96.13	94.70	0.00	130.00	0.00	0.500	0.11	95.82	95.70
CB-20	96.29	94.85	143.00	0.00	0.00	0.500	0.03	95.84	95.80
CB-21	96.05	94.45	0.00	143.00	0.00	0.500	0.05	95.49	95.44
CB-22	95.73	94.10	0.00	130.00	0.00	0.500	0.11	95.06	94.94
CB-23	95.84	94.50	143.00	0.00	0.00	0.500	0.03	95.59	95.55
CB-24	95.62	94.10	0.00	143.00	0.00	0.500	0.05	95.24	95.19
CB-25	95.33	93.80	0.00	130.00	0.00	0.500	0.11	94.81	94.69
CB-26	95.39	94.00	143.00	0.00	0.00	0.500	0.03	95.35	95.31
CB-27	95.20	93.70	0.00	143.00	0.00	0.500	0.05	95.00	94.95
CB-28	94.94	93.50	0.00	130.00	0.00	0.500	0.11	94.57	94.45
CB-29	94.96	93.45	143.00	0.00	0.00	0.500	0.03	94.98	94.94
CB-30	94.78	93.20	0.00	143.00	0.00	0.500	0.05	94.63	94.58
CB-31	94.54	93.05	0.00	130.00	0.00	0.500	0.11	94.20	94.08
CB-32	94.70	93.20	143.00	0.00	0.00	0.500	0.01	94.66	94.64
CB-33	94.59	93.05	0.00	143.00	0.00	0.500	0.05	94.55	94.49
CB-34	94.44	92.80	0.00	130.00	0.00	0.500	0.06	94.11	94.06
CB-35	99.39	98.00	125.00	0.00	0.00	0.500	0.03	98.45	98.42
CB-36	98.91	97.50	125.00	0.00	0.00	0.500	0.06	97.81	97.76
CB-37	98.44	97.00	125.00	0.00	0.00	0.500	0.06	97.31	97.26
CB-38	97.96	96.50	125.00	0.00	0.00	0.500	0.06	96.81	96.76
CB-39	97.49	96.00	125.00	0.00	0.00	0.500	0.06	96.31	96.26
CB-40	97.01	95.50	125.00	0.00	0.00	0.500	0.05	95.82	95.77
CB-41	96.54	95.00	125.00	0.00	0.00	0.500	0.03	95.42	95.39
CB-42	96.06	94.50	125.00	0.00	0.00	0.500	0.03	95.00	94.97
CB-43	95.59	94.00	125.00	0.00	0.00	0.500	0.03	94.58	94.55
CB-44	95.15	93.50	125.00	0.00	0.00	0.500	0.03	94.21	94.18
CB-45	94.87	93.50	125.00	0.00	0.00	0.500	0.03	94.24	94.22
CB-46	104.15	102.75	215.10	0.00	0.00	0.500	0.07	103.67	103.60
CB-48	103.83	102.35	292.90	0.00	0.00	0.500	0.07	102.78	102.72
CB-50	103.50	102.00	353.00	0.00	0.00	0.500	0.08	102.47	102.39
CB-52	103.17	101.65	383.10	0.00	0.00	0.500	0.09	102.15	102.06
CB-54	102.75	101.00	428.80	0.00	0.00	0.500	0.06	101.73	101.67
CB-56	104.10	102.60	28.20	0.00	0.00	0.500	0.01	102.80	102.80

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Scenario: Base
Current Time Step: 0.000 h
FlexTable: Conduit Table

Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (m)	Slope (m/m)	Pipe Section Type	Diameter (mm)	Manning's n	Flow (L/s)	Headloss (m)	Hydraulic Grade Line (In) (m)	Hydraulic Grade Line (Out) (m)
CO-2	CB-1	97.60	CB-2	97.20	66.2	0.006	Circle	400.0	0.013	143.00	0.31	98.41	98.10
CO-3	CB-2	97.10	CB-3	96.70	66.2	0.006	Circle	500.0	0.013	286.00	0.38	98.05	97.67
CO-4	CB-3	96.70	O-1	96.45	49.8	0.005	Circle	500.0	0.013	416.00	0.60	97.55	96.95
CO-4	CB-5	97.05	CB-6	96.75	66.2	0.005	Circle	400.0	0.013	143.00	0.31	98.09	97.78
CO-5	CB-6	96.65	CB-7	96.33	66.2	0.005	Circle	500.0	0.013	286.00	0.38	97.73	97.35
CO-6	CB-7	96.33	O-2	96.13	49.8	0.004	Circle	500.0	0.013	416.00	0.60	97.23	96.63
CO-7	CB-8	96.70	CB-9	96.35	66.2	0.005	Circle	400.0	0.013	143.00	0.31	97.66	97.35
CO-8	CB-9	96.25	CB-10	95.90	66.2	0.005	Circle	500.0	0.013	286.00	0.38	97.30	96.92
CO-9	CB-10	95.90	O-3	95.70	49.8	0.004	Circle	500.0	0.013	416.00	0.60	96.80	96.20
CO-10	CB-11	96.10	CB-12	95.85	66.2	0.004	Circle	400.0	0.013	143.00	0.31	97.29	96.98
CO-11	CB-12	95.75	CB-13	95.50	66.2	0.004	Circle	500.0	0.013	286.00	0.38	96.93	96.55
CO-12	CB-13	95.50	O-4	95.33	49.8	0.003	Circle	500.0	0.013	416.00	0.60	96.43	95.83
CO-13	CB-14	95.45	CB-15	95.35	66.2	0.002	Circle	400.0	0.013	143.00	0.31	96.96	96.65
CO-14	CB-15	95.25	CB-16	95.10	66.2	0.002	Circle	500.0	0.013	286.00	0.38	96.60	96.22
CO-15	CB-18	95.10	O-5	95.00	49.8	0.002	Circle	500.0	0.013	416.00	0.60	96.10	95.50
CO-16	CB-17	95.10	CB-18	94.95	66.2	0.002	Circle	400.0	0.013	143.00	0.31	96.56	96.25
CO-17	CB-18	94.85	CB-19	94.70	66.2	0.002	Circle	500.0	0.013	286.00	0.38	96.20	95.82
CO-18	CB-19	94.70	O-6	94.60	49.8	0.002	Circle	500.0	0.013	416.00	0.60	95.70	95.10
CO-19	CB-20	94.85	CB-21	94.55	66.2	0.005	Circle	400.0	0.013	143.00	0.31	95.80	95.49
CO-20	CB-21	94.45	CB-22	94.10	66.2	0.005	Circle	500.0	0.013	286.00	0.38	95.44	95.06
CO-21	CB-22	94.10	O-7	93.84	49.8	0.005	Circle	500.0	0.013	416.00	0.60	94.94	94.34
CO-22	CB-23	94.50	CB-24	94.20	86.2	0.005	Circle	400.0	0.013	143.00	0.31	95.55	95.24
CO-23	CB-24	94.10	CB-25	93.80	66.2	0.005	Circle	500.0	0.013	286.00	0.38	95.19	94.81
CO-24	CB-25	93.80	O-8	93.59	49.8	0.004	Circle	500.0	0.013	416.00	0.60	94.69	94.09
CO-25	CB-26	94.00	CB-27	93.80	66.2	0.003	Circle	400.0	0.013	143.00	0.31	95.31	95.00
CO-26	CB-27	93.70	CB-28	93.50	66.2	0.003	Circle	500.0	0.013	286.00	0.38	94.95	94.57
CO-27	CB-28	93.50	O-9	93.35	49.8	0.003	Circle	500.0	0.013	416.00	0.60	94.45	93.85
CO-28	CB-29	93.45	CB-30	93.30	66.2	0.002	Circle	400.0	0.013	143.00	0.31	94.94	94.63
CO-29	CB-30	93.20	CB-31	93.05	66.2	0.002	Circle	500.0	0.013	286.00	0.38	94.58	94.20
CO-30	CB-31	93.05	O-10	92.96	49.8	0.002	Circle	500.0	0.013	416.00	0.60	94.08	93.48
CO-31	CB-32	93.20	CB-33	93.05	66.2	0.002	Circle	500.0	0.013	143.00	0.09	94.64	94.55
CO-32	CB-33	93.05	CB-34	92.90	86.2	0.002	Circle	500.0	0.013	286.00	0.38	94.49	94.11
CO-33	CB-34	92.80	O-22	92.70	50.0	0.002	Circle	600.0	0.013	416.00	0.23	94.06	93.83
CO-34	CB-35	98.00	O-11	97.85	48.0	0.003	Circle	400.0	0.013	125.00	0.17	98.42	98.25
CO-35	CB-36	97.50	O-12	96.92	48.0	0.012	Circle	400.0	0.013	125.00	0.43	97.76	97.33
CO-36	CB-37	97.00	O-13	96.47	48.0	0.011	Circle	400.0	0.013	125.00	0.39	97.26	96.87
CO-37	CB-38	96.50	O-14	96.02	48.0	0.010	Circle	400.0	0.013	125.00	0.31	96.76	96.45
CO-38	CB-39	96.00	O-15	95.57	48.0	0.009	Circle	400.0	0.013	125.00	0.22	96.26	96.04
CO-39	CB-40	95.50	O-16	95.12	48.0	0.008	Circle	400.0	0.013	125.00	0.13	95.77	95.64
CO-40	CB-41	95.00	O-17	94.67	48.0	0.007	Circle	400.0	0.013	125.00	0.17	95.39	95.22
CO-41	CB-42	94.50	O-18	94.22	48.0	0.006	Circle	400.0	0.013	125.00	0.17	94.97	94.80
CO-42	CB-43	94.00	O-19	93.77	48.0	0.005	Circle	400.0	0.013	125.00	0.17	94.55	94.38
CO-43	CB-44	93.50	O-20	93.35	48.0	0.003	Circle	400.0	0.013	125.00	0.17	94.18	94.01
CO-44	CB-45	93.50	O-21	93.12	51.8	0.007	Circle	400.0	0.013	125.00	0.19	94.22	94.03
CO-55	CB-46	102.75	O-23	102.40	74.8	0.005	Circle	400.0	0.013	215.10	0.80	103.60	102.80
CO-56	CB-48	102.35	O-24	101.99	74.8	0.005	Circle	600.0	0.013	292.90	0.13	102.72	102.59
CO-57	CB-50	102.00	O-25	101.55	74.8	0.006	Circle	600.0	0.013	353.00	0.24	102.39	102.15
CO-58	CB-52	101.65	O-26	101.13	74.8	0.007	Circle	600.0	0.013	383.10	0.33	102.06	101.73
CO-59	CB-56	102.60	O-28	102.40	14.2	0.014	Circle	400.0	0.013	28.20	0.00	102.80	102.80
CO-60	CB-54	101.00	O-27	100.70	75.4	0.004	Circle	600.0	0.013	428.80	0.37	101.67	101.30

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Scenario: Base
Current Time Step: 0.000 h
FlexTable: Outfall Table

Label	Elevation (Ground) (m)	Elevation (Invert) (m)	Flow (L/s)	Hydraulic Grade (m)
[illegible]	99.38	96.45	416.00	96.95
O-2	98.92	96.13	416.00	96.63
O-3	98.45	95.70	416.00	96.20
O-4	97.96	95.33	416.00	95.83
O-5	97.48	95.00	416.00	95.50
O-6	97.00	94.60	416.00	95.10
O-7	96.54	93.84	416.00	94.34
O-8	96.07	93.59	416.00	94.09
O-9	95.59	93.35	416.00	93.85
O-10	95.13	92.96	416.00	93.48
O-11	101.54	97.85	125.00	98.25
O-12	100.90	96.92	125.00	97.33
O-13	100.27	96.47	125.00	96.87
O-14	99.65	96.02	125.00	96.45
O-15	99.03	95.57	125.00	96.04
O-16	98.42	95.12	125.00	95.64
O-17	97.84	94.67	125.00	95.22
O-18	97.24	94.22	125.00	94.80
O-19	96.64	93.77	125.00	94.38
O-20	96.05	93.35	125.00	94.01
O-21	95.53	93.12	125.00	94.03
O-22	94.70	92.70	416.00	93.83
O-23	103.40	102.40	215.10	102.80
O-24	102.99	101.99	292.90	102.59
O-25	102.55	101.55	353.00	102.15
O-26	102.13	101.13	383.10	101.73
O-27	101.70	100.70	428.80	101.30
O-28	104.25	102.40	28.20	102.80

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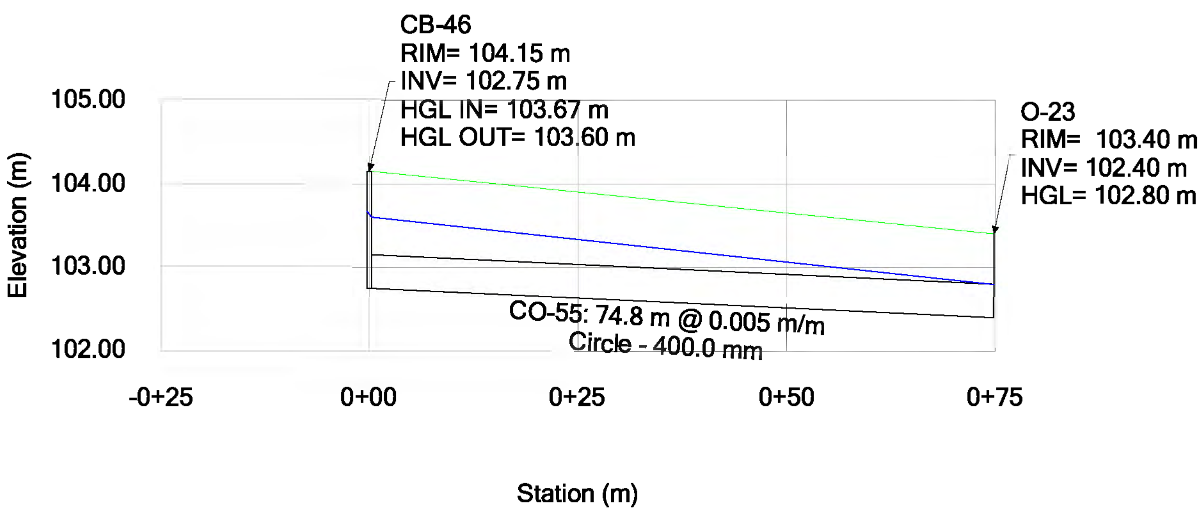
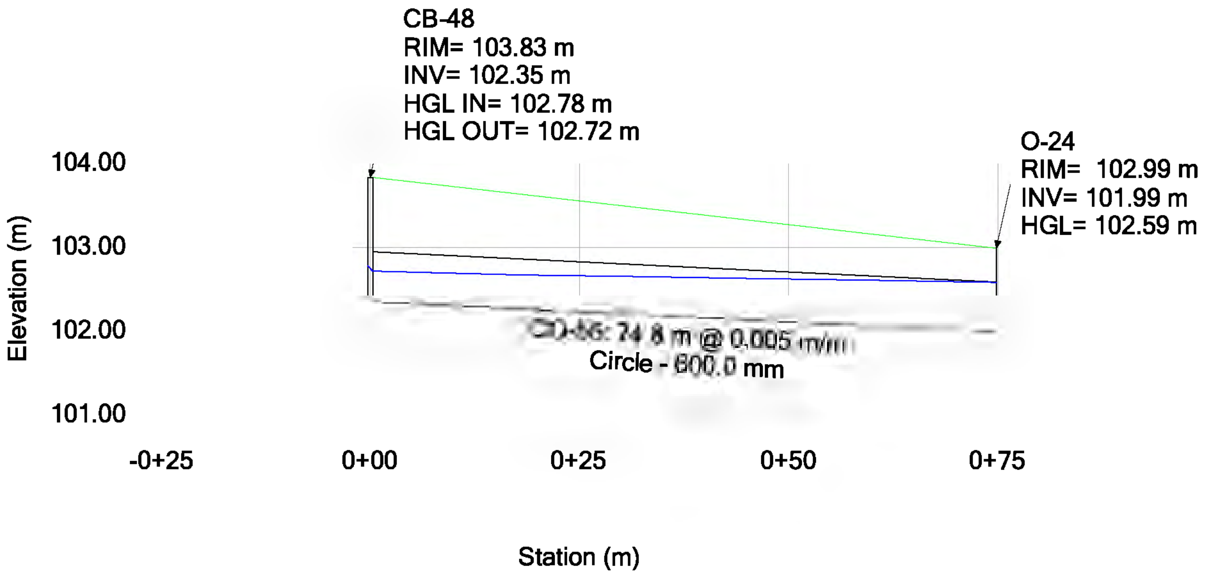
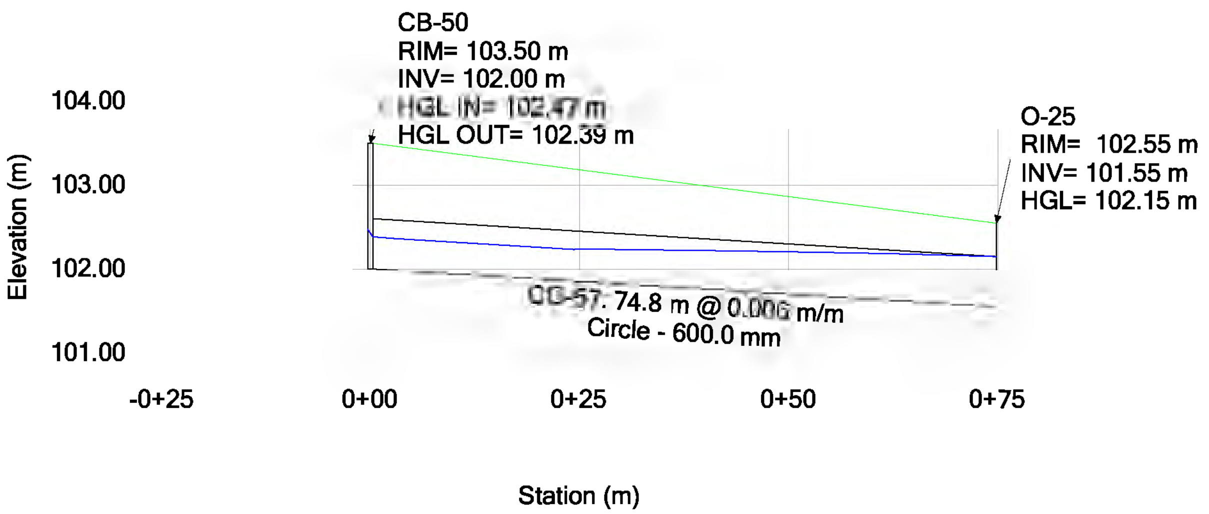
Profile Report
Engineering Profile - Profile - 23 (Owl_Parking_Lot_Marsh_Yard_ SD_System.stsw)



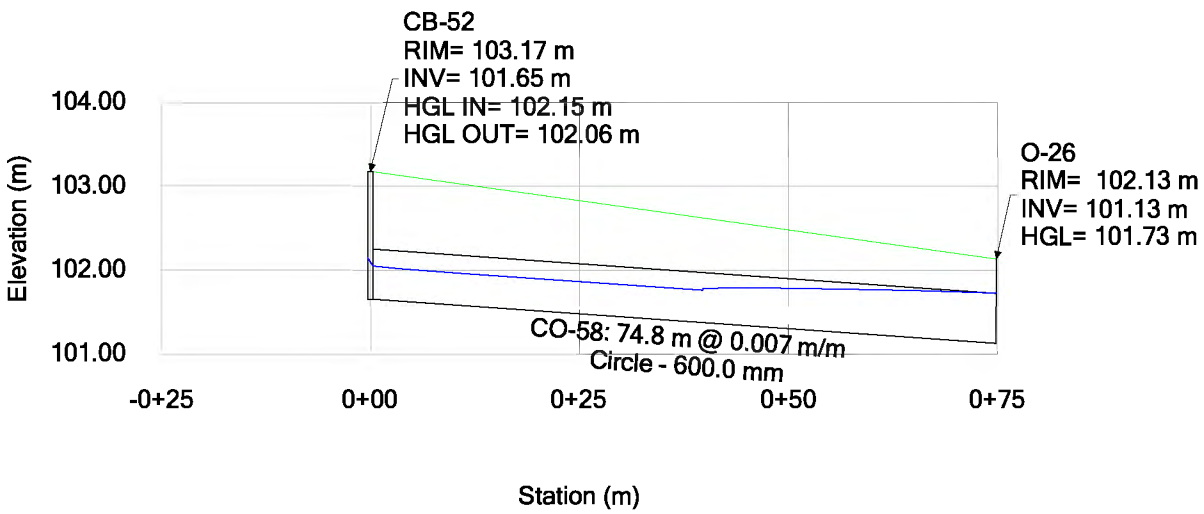
Profile Report
Engineering Profile - Profile - 24 (Owl_Parking_Lot_Marsh_Yard_ SD_System.stsw)



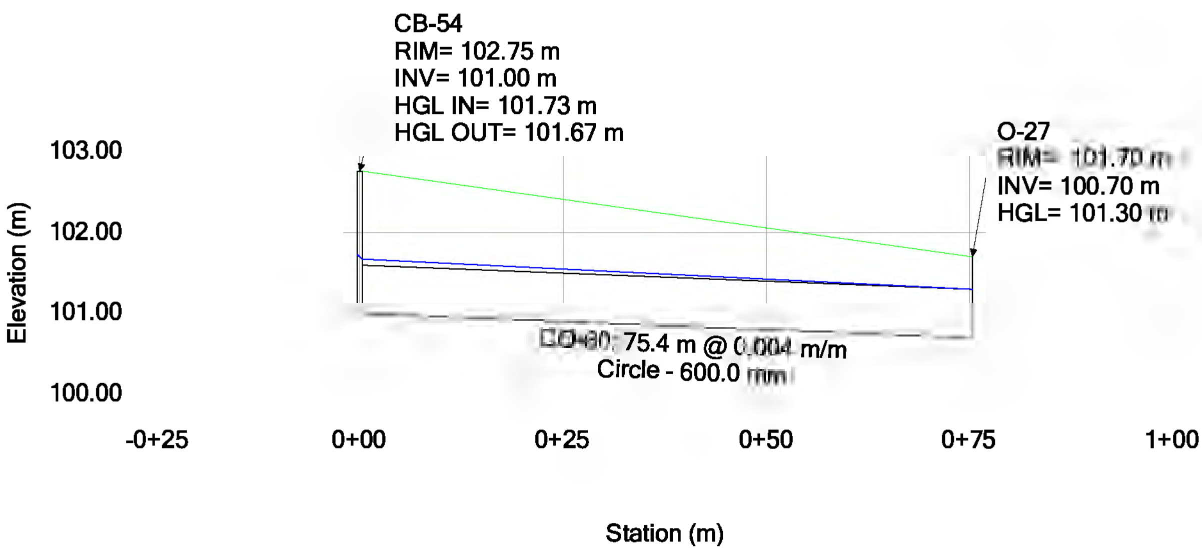
Profile Report
Engineering Profile - Profile - 25 (Owl_Parking_Lot_Marsh_Yard_ SD_System.stsw)



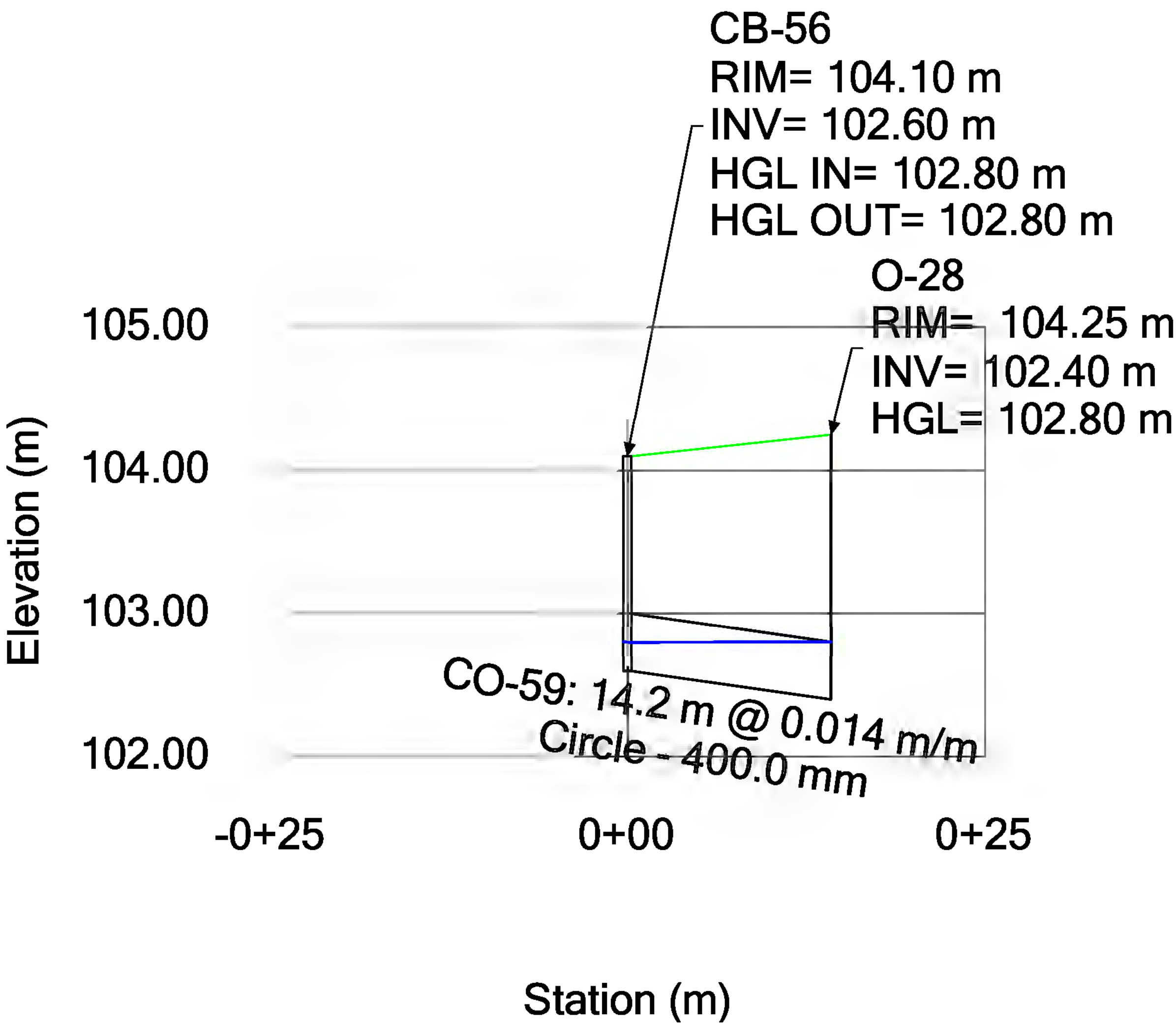
Profile Report
Engineering Profile - Profile - 26 (Owl_Parking_Lot_Marsh_Yard_ SD_System.stsw)



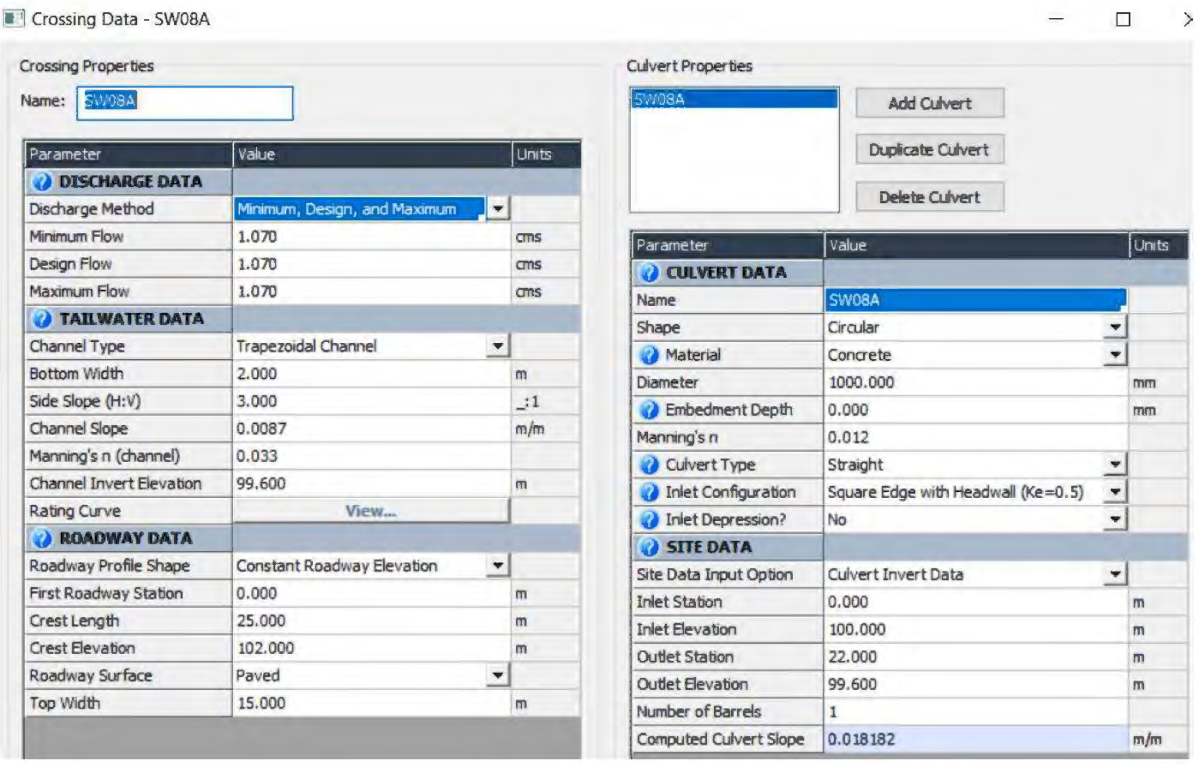
Profile Report
Engineering Profile - Profile - 27 (Owl_Parking_Lot_Marsh_Yard_ SD_System.stsw)



Profile Report
Engineering Profile - Profile - 28 (Owl_Parking_Lot_Marsh_Yard_ SD_System.stsw)



HY-8 RESULTS


Crossing Data - SW08A

Crossing Properties

Name: SW08A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	1.070	cms
Design Flow	1.070	cms
Maximum Flow	1.070	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0087	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	99.600	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	102.000	m
Roadway Surface	Paved	
Top Width	15.000	m

Culvert Properties

SW08A

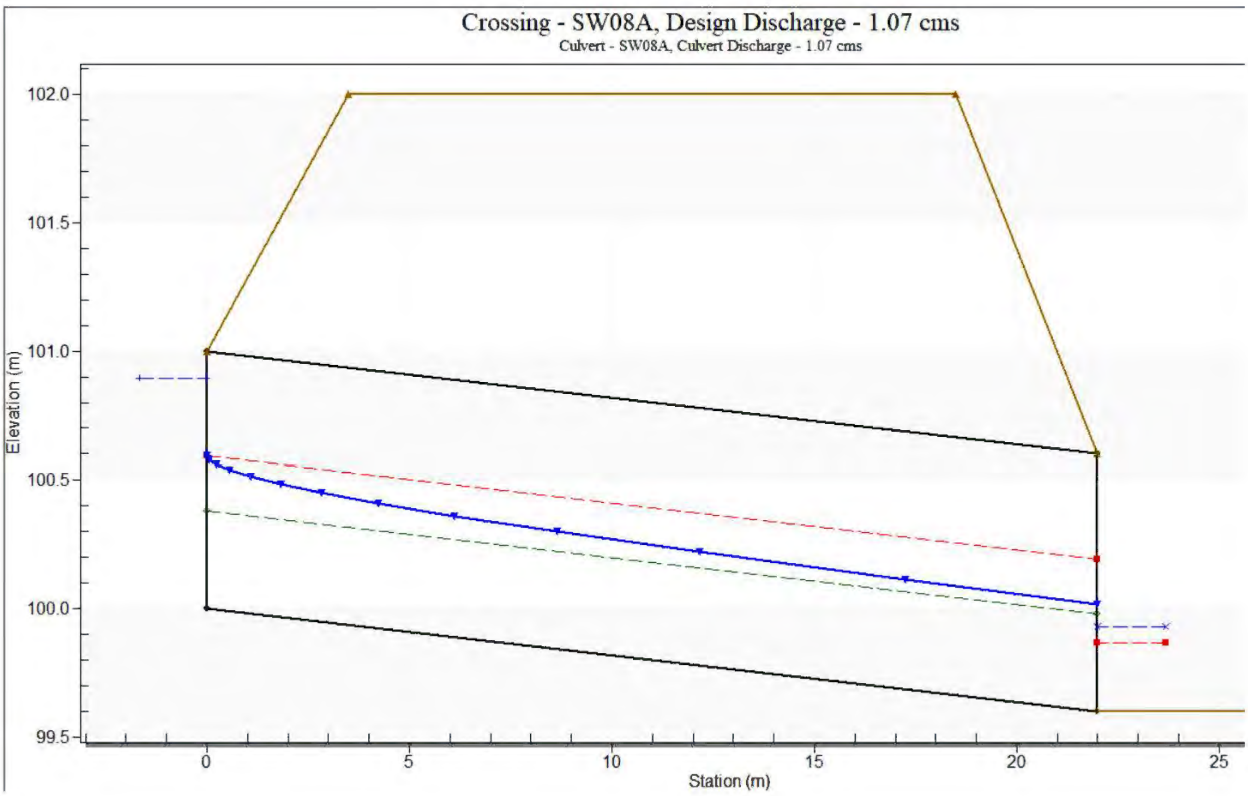
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW08A	
Shape	Circular	
Material	Concrete	
Diameter	1000.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	100.000	m
Outlet Station	22.000	m
Outlet Elevation	99.600	m
Number of Barrels	1	
Computed Culvert Slope	0.018182	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1.07	1.07	100.90	**0.90**	0.37	1-S2n	0.38	0.59	0.42	0.33	3.45	1.09



APPENDIX B
Construction Parking Lot

- Exhibit 2: StormCAD Model Exhibit
- Storm Drain Sizing - StormCAD Results

INTEL PROJECT OWL - SITE LOGISTICS SL-01
MAGDEBURG, GERMANY

EXHIBIT 2: STORMCAD MODEL EXHIBIT

Jacobs

2020 S.W. 4th Avenue
Portland, Oregon 97201

19/Dec/23 1:36:34 PM

STORM DRAIN SIZING - STORMCAD RESULTS

Scenario: Base
Current Time Step: 0.000 h
FlexTable: Catch Basin Table

Label	Elevation (Rim) (m)	Elevation (Invert) (m)	Flow (Known) (L/s)	Flow (Additional Carryover) (L/s)	Flow (L/s)	Headloss Coefficient (Standard)	Headloss (m)	Hydraulic Grade Line (In) (m)	Hydraulic Grade Line (Out) (m)
CB-1	98.99	97.60	143.00	0.00	0.00	0.500	0.03	98.45	98.41
CB-2	98.60	97.10	0.00	143.00	0.00	0.500	0.05	98.10	98.05
CB-3	98.13	96.70	0.00	130.00	0.00	0.500	0.11	97.67	97.55
CB-5	98.54	97.05	143.00	0.00	0.00	0.500	0.03	98.13	98.09
CB-6	98.17	96.65	0.00	143.00	0.00	0.500	0.05	97.78	97.73
CB-7	97.73	96.33	0.00	130.00	0.00	0.500	0.11	97.35	97.23
CB-8	98.09	96.70	143.00	0.00	0.00	0.500	0.03	97.70	97.66
CB-9	97.75	96.25	0.00	143.00	0.00	0.500	0.05	97.35	97.30
CB-10	97.33	95.90	0.00	130.00	0.00	0.500	0.11	96.92	96.80
CB-11	97.64	96.10	143.00	0.00	0.00	0.500	0.03	97.33	97.29
CB-12	97.32	95.75	0.00	143.00	0.00	0.500	0.05	96.98	96.93
CB-13	96.93	95.50	0.00	130.00	0.00	0.500	0.11	96.55	96.43
CB-14	97.19	95.45	143.00	0.00	0.00	0.500	0.03	97.00	96.96
CB-15	96.90	95.25	0.00	143.00	0.00	0.500	0.05	96.65	96.60
CB-16	96.53	95.10	0.00	130.00	0.00	0.500	0.11	96.22	96.10
CB-17	96.74	95.10	0.00	143.00	0.00	0.500	0.03	96.60	96.56
CB-18	96.47	94.85	0.00	143.00	0.00	0.500	0.05	96.25	96.20
CB-19	96.13	94.70	0.00	130.00	0.00	0.500	0.11	95.82	95.70
CB-20	96.29	94.85	143.00	0.00	0.00	0.500	0.03	95.84	95.80
CB-21	96.05	94.45	0.00	143.00	0.00	0.500	0.05	95.49	95.44
CB-22	95.73	94.10	0.00	130.00	0.00	0.500	0.11	95.06	94.94
CB-23	95.84	94.50	143.00	0.00	0.00	0.500	0.03	95.59	95.55
CB-24	95.62	94.10	0.00	143.00	0.00	0.500	0.05	95.24	95.19
CB-25	95.33	93.80	0.00	130.00	0.00	0.500	0.11	94.81	94.69
CB-26	95.39	94.00	143.00	0.00	0.00	0.500	0.03	95.35	95.31
CB-27	95.20	93.70	0.00	143.00	0.00	0.500	0.05	95.00	94.95
CB-28	94.94	93.50	0.00	130.00	0.00	0.500	0.11	94.57	94.45
CB-29	94.96	93.45	143.00	0.00	0.00	0.500	0.03	94.98	94.94
CB-30	94.78	93.20	0.00	143.00	0.00	0.500	0.05	94.63	94.58
CB-31	94.54	93.05	0.00	130.00	0.00	0.500	0.11	94.20	94.08
CB-32	94.70	93.20	143.00	0.00	0.00	0.500	0.01	94.66	94.64
CB-33	94.59	93.05	0.00	143.00	0.00	0.500	0.05	94.55	94.49
CB-34	94.44	92.80	0.00	130.00	0.00	0.500	0.06	94.11	94.06
CB-35	99.39	98.00	125.00	0.00	0.00	0.500	0.03	98.45	98.42
CB-36	98.91	97.50	125.00	0.00	0.00	0.500	0.06	97.81	97.76
CB-37	98.44	97.00	125.00	0.00	0.00	0.500	0.06	97.31	97.26
CB-38	97.96	96.50	125.00	0.00	0.00	0.500	0.06	96.81	96.76
CB-39	97.49	96.00	125.00	0.00	0.00	0.500	0.06	96.31	96.26
CB-40	97.01	95.50	125.00	0.00	0.00	0.500	0.05	95.82	95.77
CB-41	96.54	95.00	125.00	0.00	0.00	0.500	0.03	95.42	95.39
CB-42	96.06	94.50	125.00	0.00	0.00	0.500	0.03	95.00	94.97
CB-43	95.59	94.00	125.00	0.00	0.00	0.500	0.03	94.58	94.55
CB-44	95.15	93.50	125.00	0.00	0.00	0.500	0.03	94.21	94.18
CB-45	94.87	93.50	125.00	0.00	0.00	0.500	0.03	94.24	94.22
CB-46	104.15	102.75	215.10	0.00	0.00	0.500	0.07	103.67	103.60
CB-48	103.83	102.35	292.90	0.00	0.00	0.500	0.07	102.78	102.72
CB-50	103.50	102.00	353.00	0.00	0.00	0.500	0.08	102.47	102.39
CB-52	103.17	101.65	383.10	0.00	0.00	0.500	0.09	102.15	102.06
CB-54	102.75	101.00	428.80	0.00	0.00	0.500	0.06	101.73	101.67
CB-56	104.10	102.60	28.20	0.00	0.00	0.500	0.01	102.80	102.80

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Scenario: Base
Current Time Step: 0.000 h
FlexTable: Conduit Table

Label	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (m)	Slope (m/m)	Pipe Section Type	Diameter (mm)	Manning's n	Flow (L/s)	Headloss (m)	Hydraulic Grade Line (In) (m)	Hydraulic Grade Line (Out) (m)
CO-2	CB-1	97.60	CB-2	97.20	66.2	0.006	Circle	400.0	0.013	143.00	0.31	98.41	98.10
CO-3	CB-2	97.10	CB-3	96.70	66.2	0.006	Circle	500.0	0.013	286.00	0.38	98.05	97.67
CO-4	CB-3	96.70	O-1	96.45	49.8	0.005	Circle	500.0	0.013	416.00	0.60	97.55	96.95
CO-4	CB-5	97.05	CB-6	96.75	66.2	0.005	Circle	400.0	0.013	143.00	0.31	98.09	97.78
CO-5	CB-6	96.65	CB-7	96.33	66.2	0.005	Circle	500.0	0.013	286.00	0.38	97.73	97.35
CO-6	CB-7	96.33	O-2	96.13	49.8	0.004	Circle	500.0	0.013	416.00	0.60	97.23	96.63
CO-7	CB-8	96.70	CB-9	96.35	66.2	0.005	Circle	400.0	0.013	143.00	0.31	97.66	97.35
CO-8	CB-9	96.25	CB-10	95.90	66.2	0.005	Circle	500.0	0.013	286.00	0.38	97.30	96.92
CO-9	CB-10	95.90	O-3	95.70	49.8	0.004	Circle	500.0	0.013	416.00	0.60	96.80	96.20
CO-10	CB-11	96.10	CB-12	95.85	66.2	0.004	Circle	400.0	0.013	143.00	0.31	97.29	96.98
CO-11	CB-12	95.75	CB-13	95.50	66.2	0.004	Circle	500.0	0.013	286.00	0.38	96.93	96.55
CO-12	CB-13	95.50	O-4	95.33	49.8	0.003	Circle	500.0	0.013	416.00	0.60	96.43	95.83
CO-13	CB-14	95.45	CB-15	95.35	66.2	0.002	Circle	400.0	0.013	143.00	0.31	96.96	96.65
CO-14	CB-15	95.25	CB-16	95.10	66.2	0.002	Circle	500.0	0.013	286.00	0.38	96.60	96.22
CO-15	CB-18	95.10	O-5	95.00	49.8	0.002	Circle	500.0	0.013	416.00	0.60	96.10	95.50
CO-16	CB-17	95.10	CB-18	94.95	66.2	0.002	Circle	400.0	0.013	143.00	0.31	96.56	96.25
CO-17	CB-18	94.85	CB-19	94.70	66.2	0.002	Circle	500.0	0.013	286.00	0.38	96.20	95.82
CO-18	CB-19	94.70	O-6	94.60	49.8	0.002	Circle	500.0	0.013	416.00	0.60	95.70	95.10
CO-19	CB-20	94.85	CB-21	94.55	66.2	0.005	Circle	400.0	0.013	143.00	0.31	95.80	95.49
CO-20	CB-21	94.45	CB-22	94.10	66.2	0.005	Circle	500.0	0.013	286.00	0.38	95.44	95.06
CO-21	CB-22	94.10	O-7	93.84	49.8	0.005	Circle	500.0	0.013	416.00	0.60	94.94	94.34
CO-22	CB-23	94.50	CB-24	94.20	86.2	0.005	Circle	400.0	0.013	143.00	0.31	95.55	95.24
CO-23	CB-24	94.10	CB-25	93.80	66.2	0.005	Circle	500.0	0.013	286.00	0.38	95.19	94.81
CO-24	CB-25	93.80	O-8	93.59	49.8	0.004	Circle	500.0	0.013	416.00	0.60	94.69	94.09
CO-25	CB-26	94.00	CB-27	93.80	66.2	0.003	Circle	400.0	0.013	143.00	0.31	95.31	95.00
CO-26	CB-27	93.70	CB-28	93.50	66.2	0.003	Circle	500.0	0.013	286.00	0.38	94.95	94.57
CO-27	CB-28	93.50	O-9	93.35	49.8	0.003	Circle	500.0	0.013	416.00	0.60	94.45	93.85
CO-28	CB-29	93.45	CB-30	93.30	66.2	0.002	Circle	400.0	0.013	143.00	0.31	94.94	94.63
CO-29	CB-30	93.20	CB-31	93.05	66.2	0.002	Circle	500.0	0.013	286.00	0.38	94.58	94.20
CO-30	CB-31	93.05	O-10	92.96	49.8	0.002	Circle	500.0	0.013	416.00	0.60	94.08	93.48
CO-31	CB-32	93.20	CB-33	93.05	66.2	0.002	Circle	500.0	0.013	143.00	0.09	94.64	94.55
CO-32	CB-33	93.05	CB-34	92.90	86.2	0.002	Circle	500.0	0.013	286.00	0.38	94.49	94.11
CO-33	CB-34	92.80	O-22	92.70	50.0	0.002	Circle	600.0	0.013	416.00	0.23	94.06	93.83
CO-34	CB-35	98.00	O-11	97.85	48.0	0.003	Circle	400.0	0.013	125.00	0.17	98.42	98.25
CO-35	CB-36	97.50	O-12	96.92	48.0	0.012	Circle	400.0	0.013	125.00	0.43	97.76	97.33
CO-36	CB-37	97.00	O-13	96.47	48.0	0.011	Circle	400.0	0.013	125.00	0.39	97.26	96.87
CO-37	CB-38	96.50	O-14	96.02	48.0	0.010	Circle	400.0	0.013	125.00	0.31	96.76	96.45
CO-38	CB-39	96.00	O-15	95.57	48.0	0.009	Circle	400.0	0.013	125.00	0.22	96.26	96.04
CO-39	CB-40	95.50	O-16	95.12	48.0	0.008	Circle	400.0	0.013	125.00	0.13	95.77	95.64
CO-40	CB-41	95.00	O-17	94.67	48.0	0.007	Circle	400.0	0.013	125.00	0.17	95.39	95.22
CO-41	CB-42	94.50	O-18	94.22	48.0	0.006	Circle	400.0	0.013	125.00	0.17	94.97	94.80
CO-42	CB-43	94.00	O-19	93.77	48.0	0.005	Circle	400.0	0.013	125.00	0.17	94.55	94.38
CO-43	CB-44	93.50	O-20	93.35	48.0	0.003	Circle	400.0	0.013	125.00	0.17	94.18	94.01
CO-44	CB-45	93.50	O-21	93.12	51.8	0.007	Circle	400.0	0.013	125.00	0.19	94.22	94.03
CO-55	CB-46	102.75	O-23	102.40	74.8	0.005	Circle	400.0	0.013	215.10	0.80	103.60	102.80
CO-56	CB-48	102.35	O-24	101.99	74.8	0.005	Circle	600.0	0.013	292.90	0.13	102.72	102.59
CO-57	CB-50	102.00	O-25	101.55	74.8	0.006	Circle	600.0	0.013	353.00	0.24	102.39	102.15
CO-58	CB-52	101.65	O-26	101.13	74.8	0.007	Circle	600.0	0.013	383.10	0.33	102.06	101.73
CO-59	CB-56	102.60	O-28	102.40	14.2	0.014	Circle	400.0	0.013	28.20	0.00	102.80	102.60
CO-60	CB-54	101.00	O-27	100.70	75.4	0.004	Circle	600.0	0.013	428.80	0.37	101.67	101.30

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Scenario: Base
Current Time Step: 0.000 h
FlexTable: Outfall Table

Label	Elevation (Ground) (m)	Elevation (Invert) (m)	Flow (L/s)	Hydraulic Grade (m)
O-1	99.38	96.45	416.00	96.95
O-2	98.92	96.13	416.00	96.63
O-3	98.45	95.70	416.00	96.20
O-4	97.96	95.33	416.00	95.83
O-5	97.48	95.00	416.00	95.50
O-6	97.00	94.60	416.00	95.10
O-7	96.54	93.84	416.00	94.34
O-8	96.07	93.59	416.00	94.09
O-9	95.59	93.35	416.00	93.85
O-10	95.13	92.96	416.00	93.48
O-11	101.54	97.85	125.00	98.25
O-12	100.90	96.92	125.00	97.33
O-13	100.27	96.47	125.00	96.87
O-14	99.65	96.02	125.00	96.45
O-15	99.03	95.57	125.00	96.04
O-16	98.42	95.12	125.00	95.64
O-17	97.84	94.67	125.00	95.22
O-18	97.24	94.22	125.00	94.80
O-19	96.64	93.77	125.00	94.38
O-20	96.05	93.35	125.00	94.01
O-21	95.53	93.12	125.00	94.03
O-22	94.70	92.70	416.00	93.83
O-23	103.40	102.40	215.10	102.80
O-24	102.99	101.99	292.90	102.59
O-25	102.55	101.55	353.00	102.15
O-26	102.13	101.13	383.10	101.73
O-27	101.70	100.70	428.80	101.30
O-28	104.25	102.40	28.20	102.80

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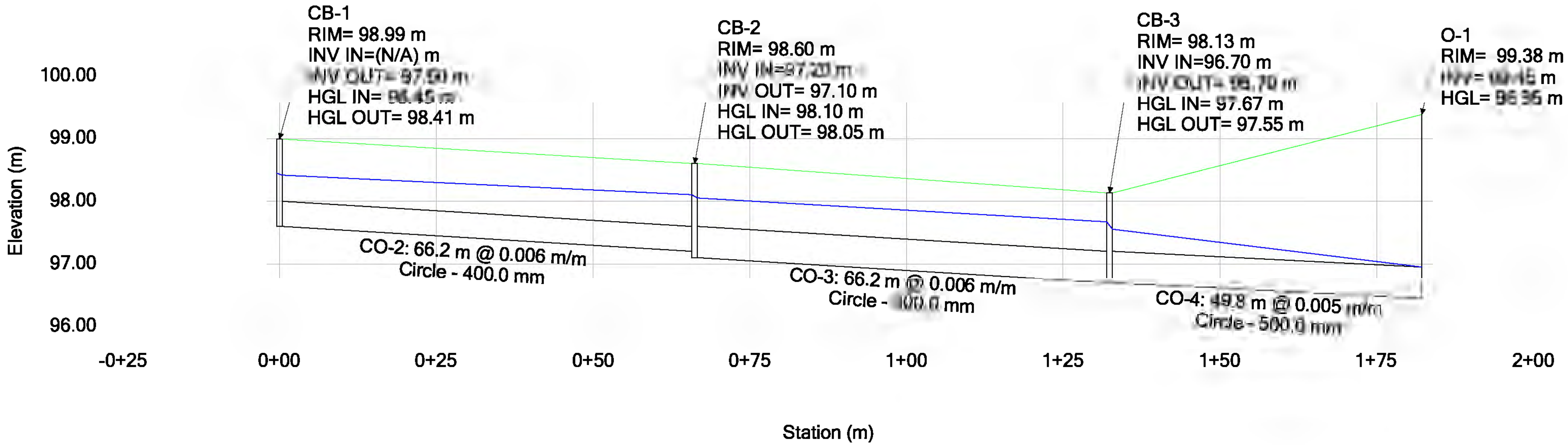
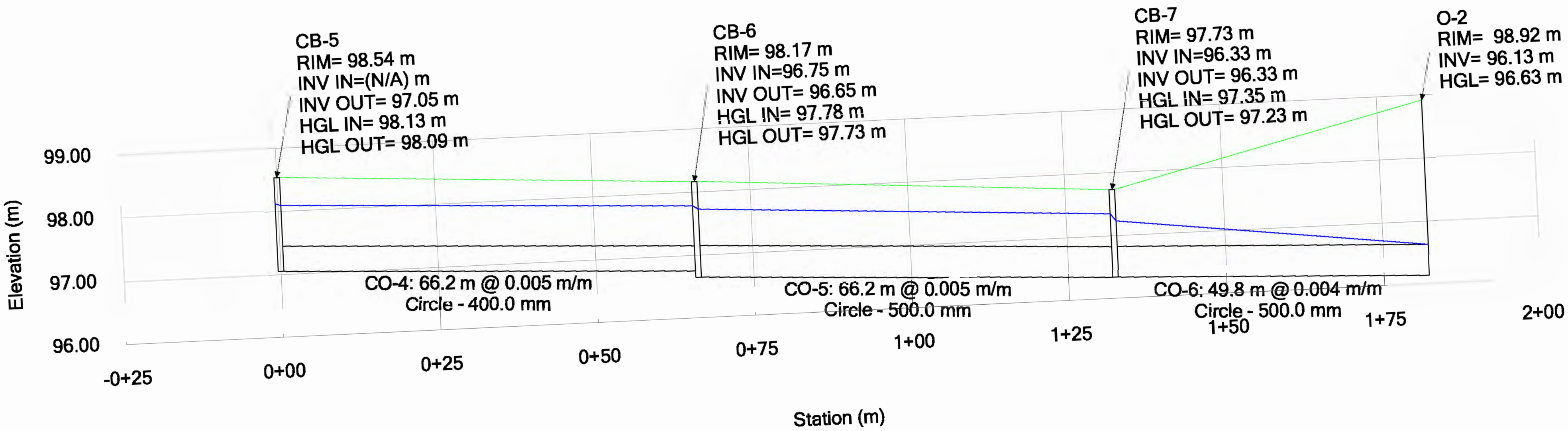
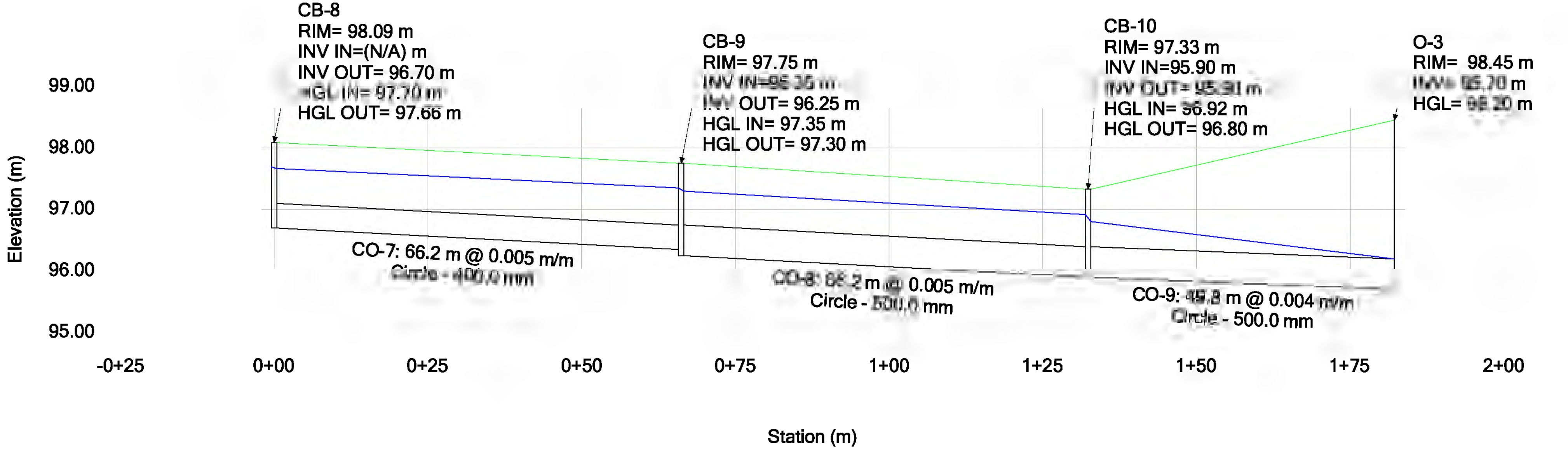
Profile Report
Engineering Profile - Profile - 1 (Owl_Parking Lot SD System.stsw)



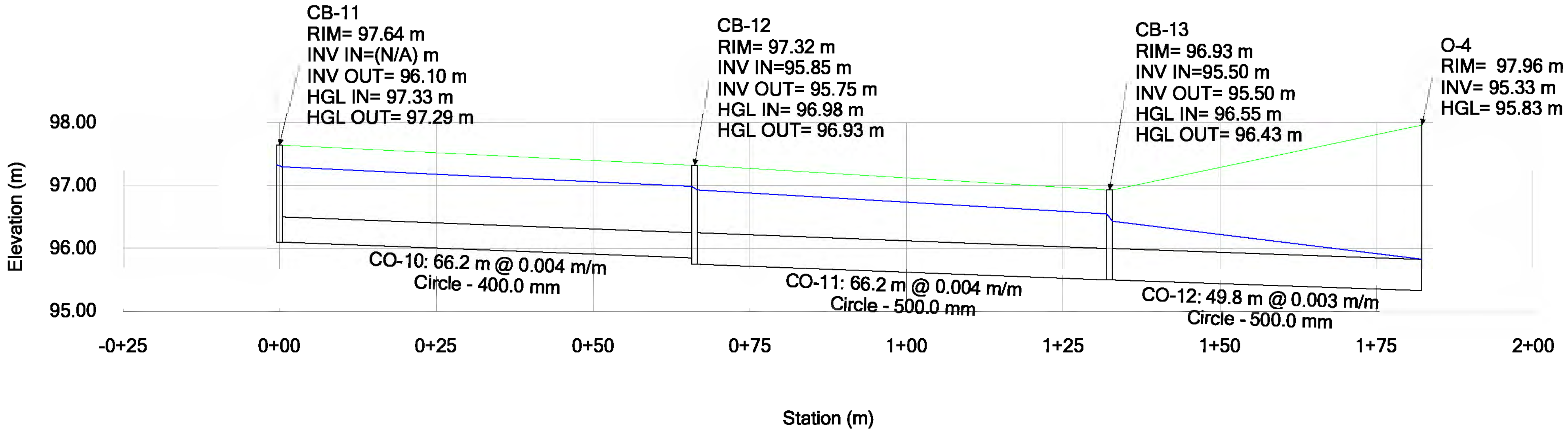
Profile Report
Engineering Profile - Profile - 2 (Owl_Parking Lot SD System.stsw)



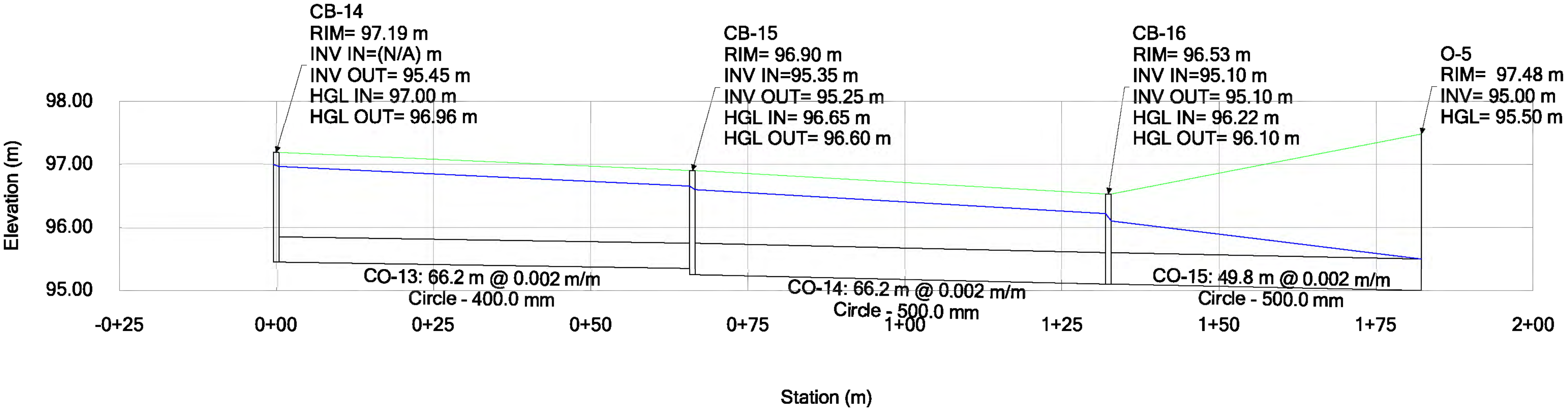
Profile Report
Engineering Profile - Profile - 3 (Owl_Parking Lot SD System.stsw)



Profile Report
Engineering Profile - Profile - 4 (Owl_Parking Lot SD System.stsw)

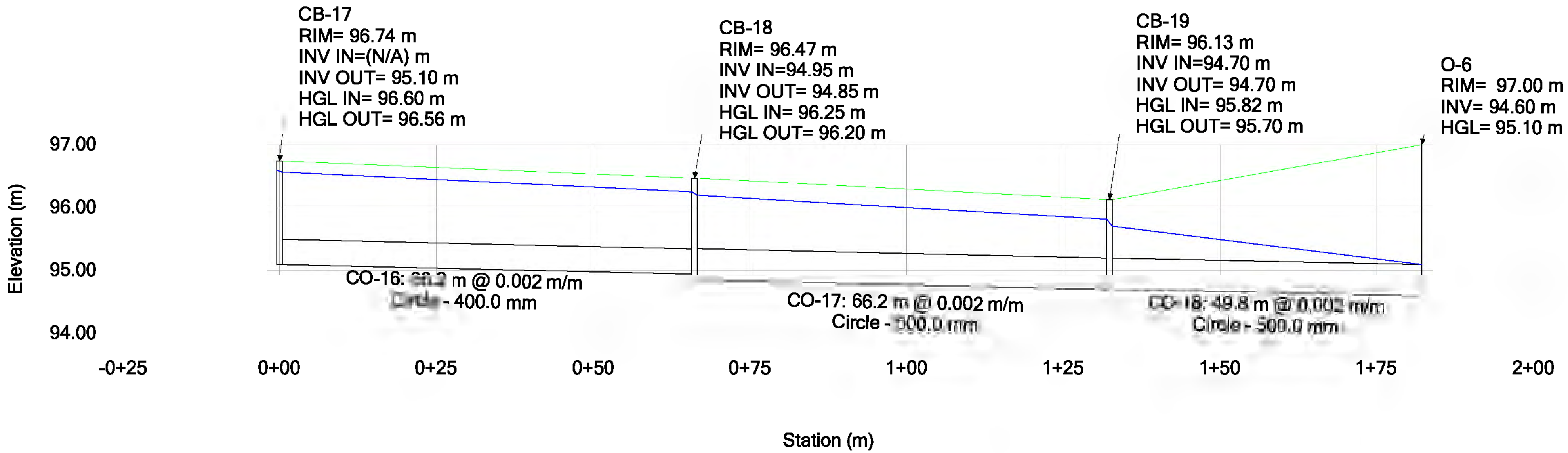


Profile Report
Engineering Profile - Profile - 5 (Owl_Parking Lot SD System.stsw)

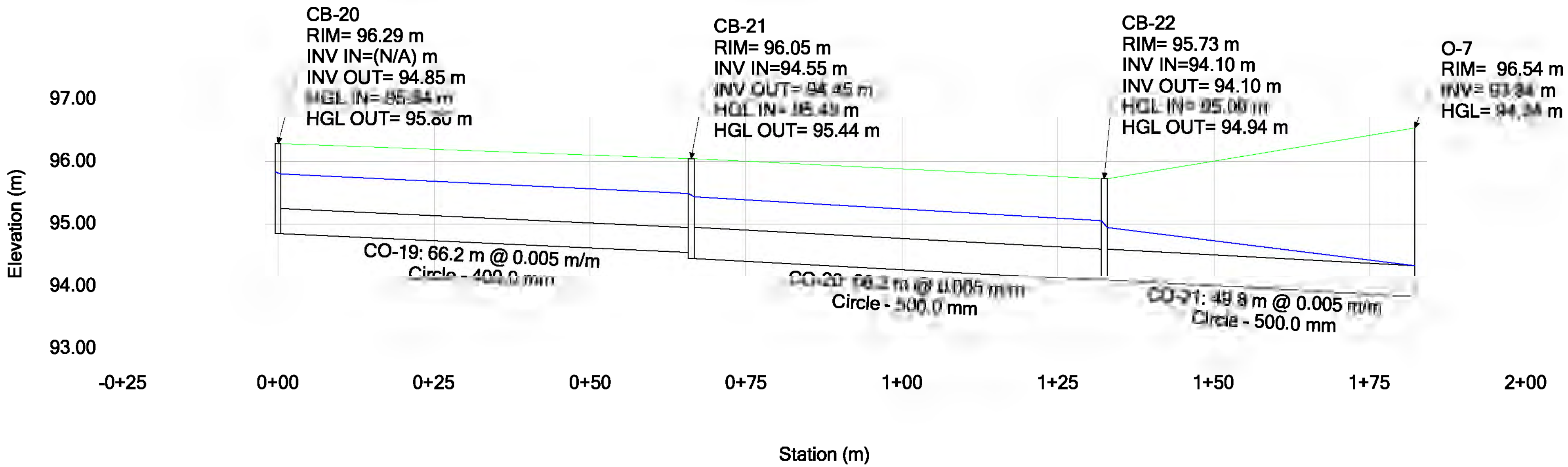


Profile Report

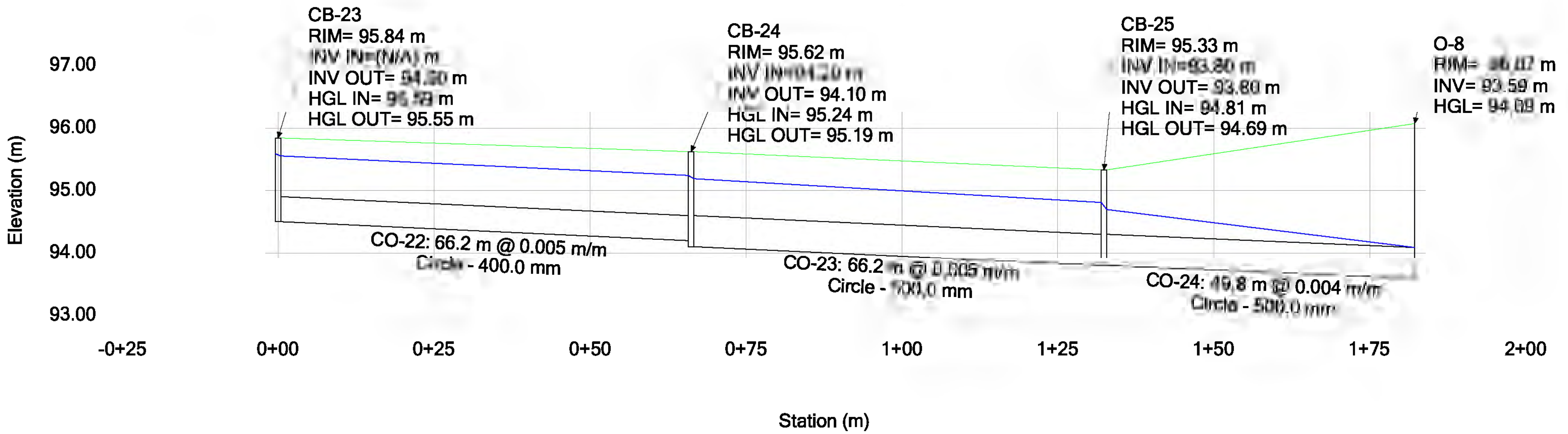
Engineering Profile - Profile - 6 (Owl_Parking Lot SD System.stsw)



Profile Report
Engineering Profile - Profile - 7 (Owl_Parking Lot SD System.stsw)

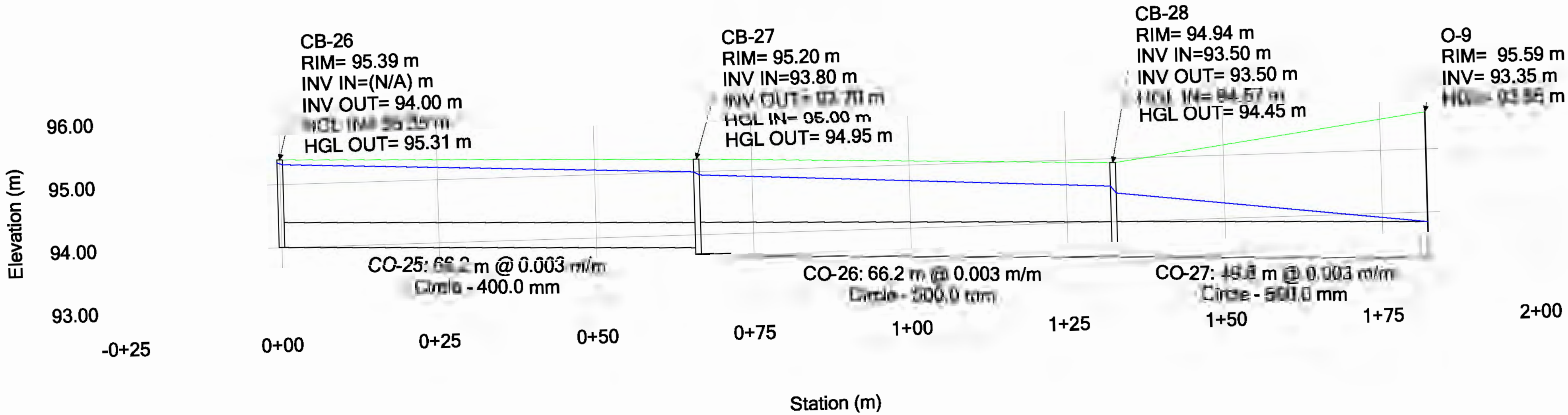


Profile Report
Engineering Profile - Profile - 8 (Owl_Parking Lot SD System.stsw)



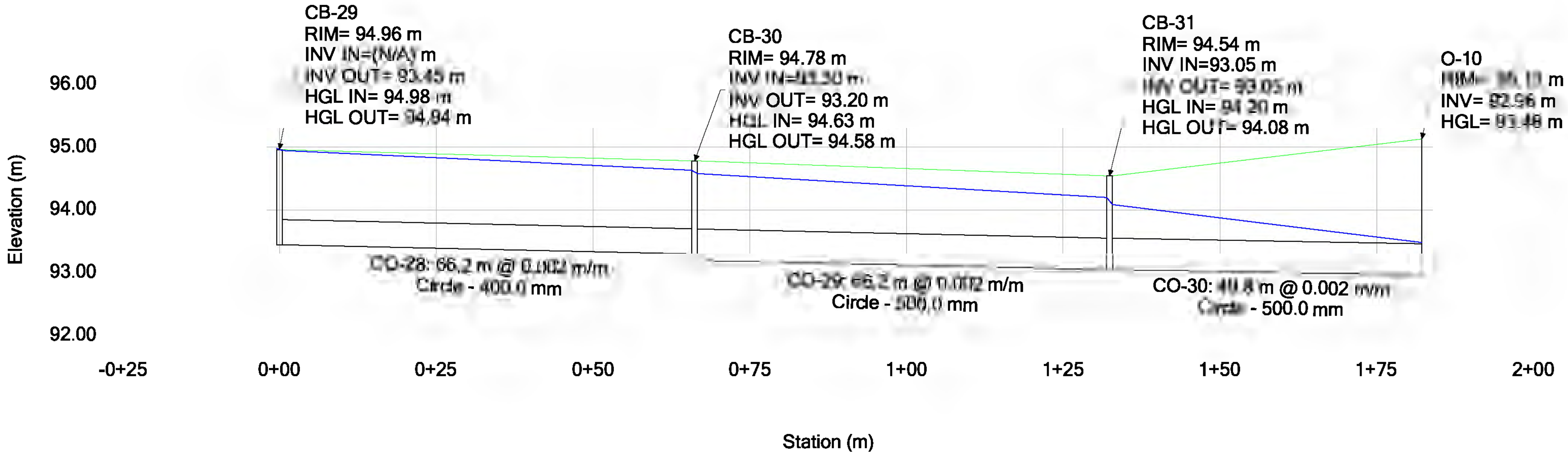
Profile Report

Engineering Profile - Profile - 9 (Owl_Parking Lot SD System.stsw)

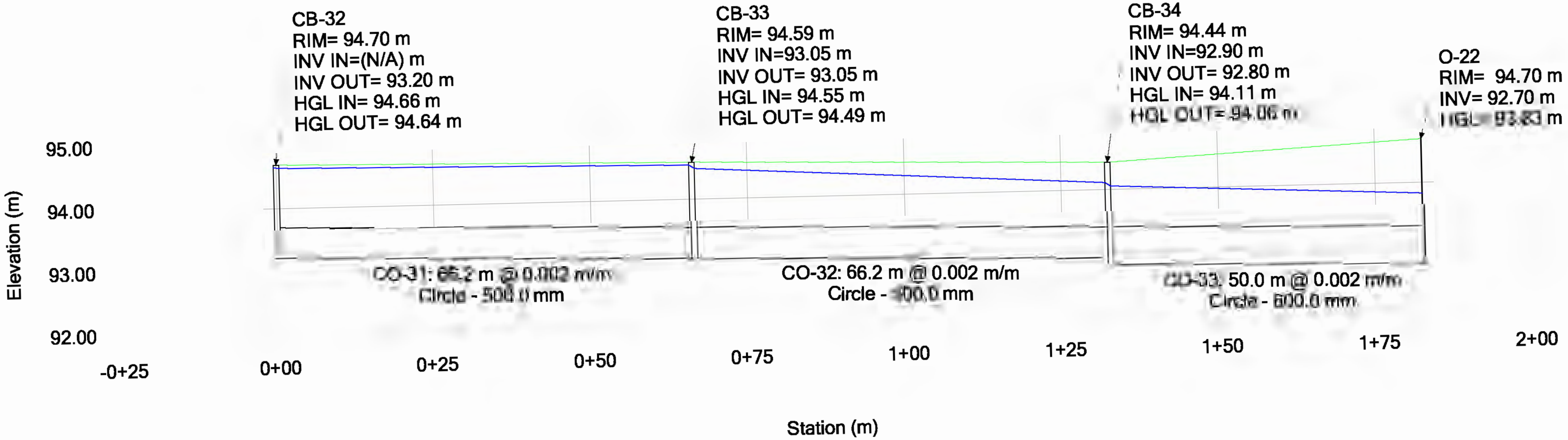


Profile Report

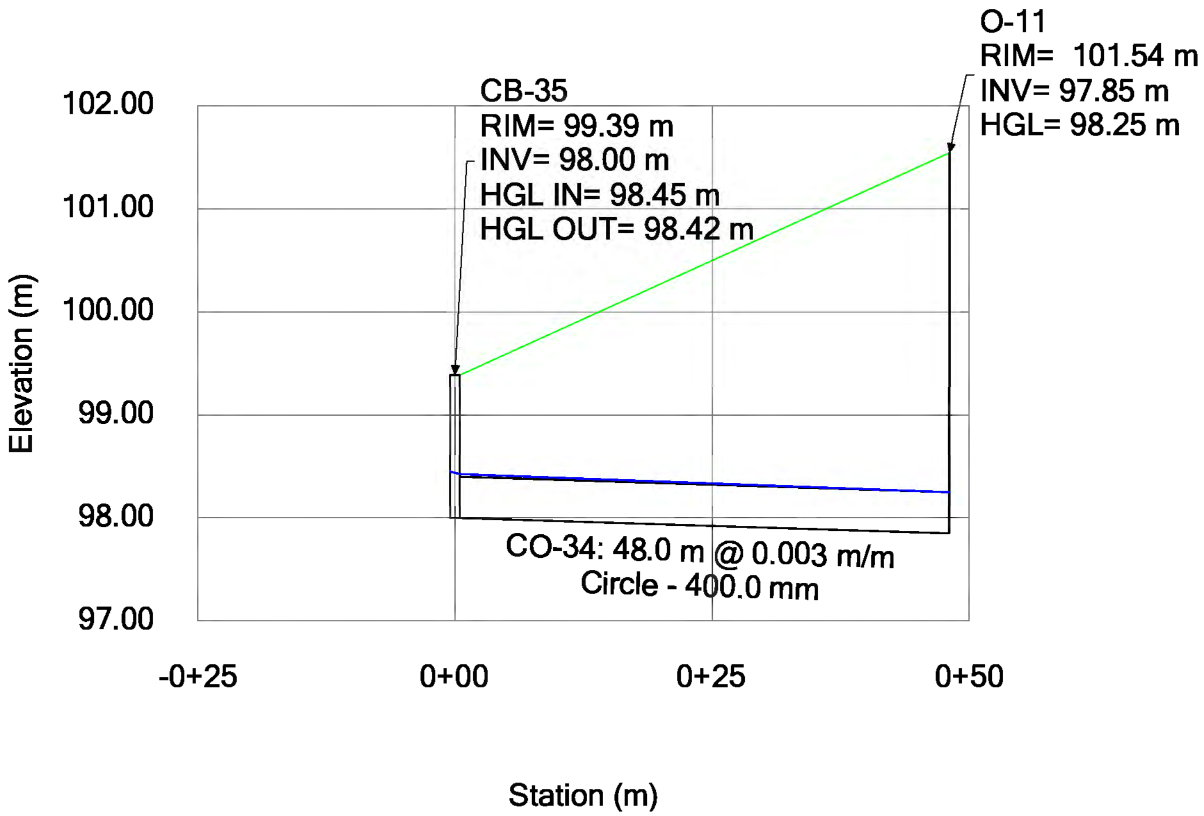
Engineering Profile - Profile - 10 (Owl_Parking Lot SD System.stsw)



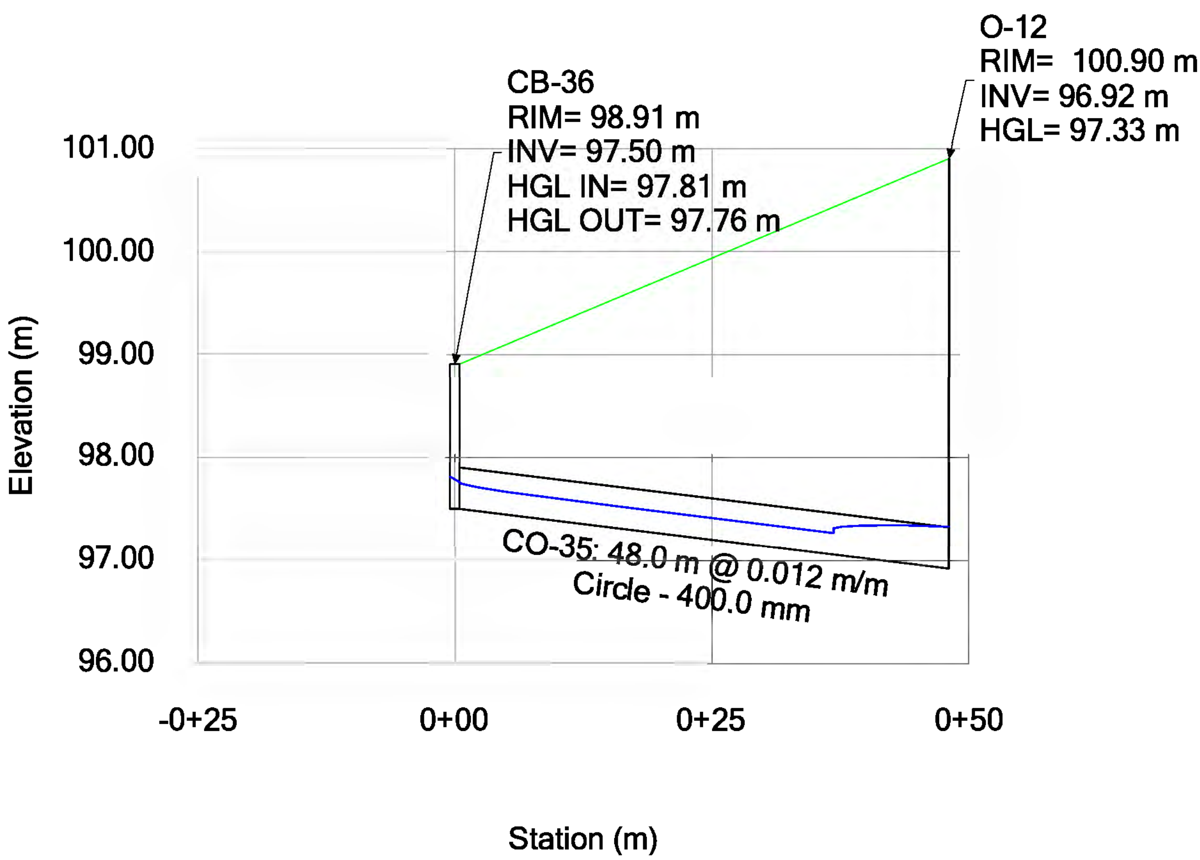
Profile Report
Engineering Profile - Profile - 11 (Owl_Parking Lot SD System.stsw)



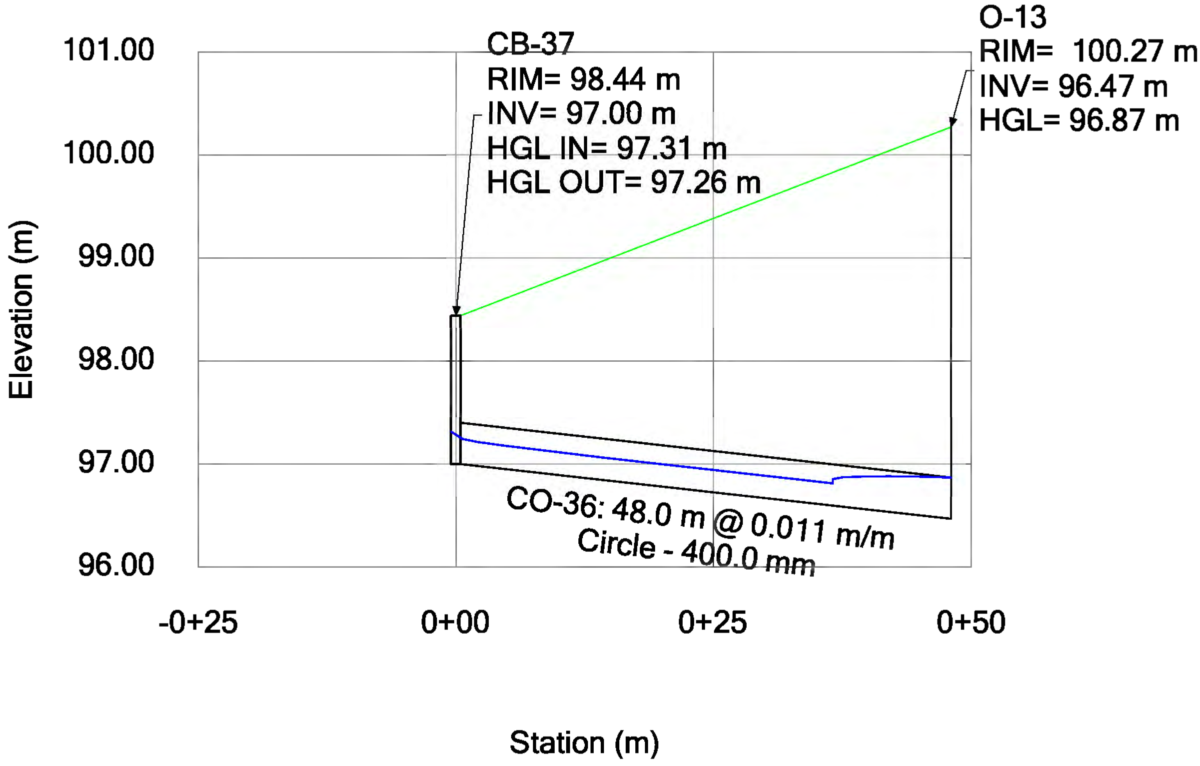
Profile Report
Engineering Profile - Profile - 12 (Owl_Parking Lot SD System.stsw)



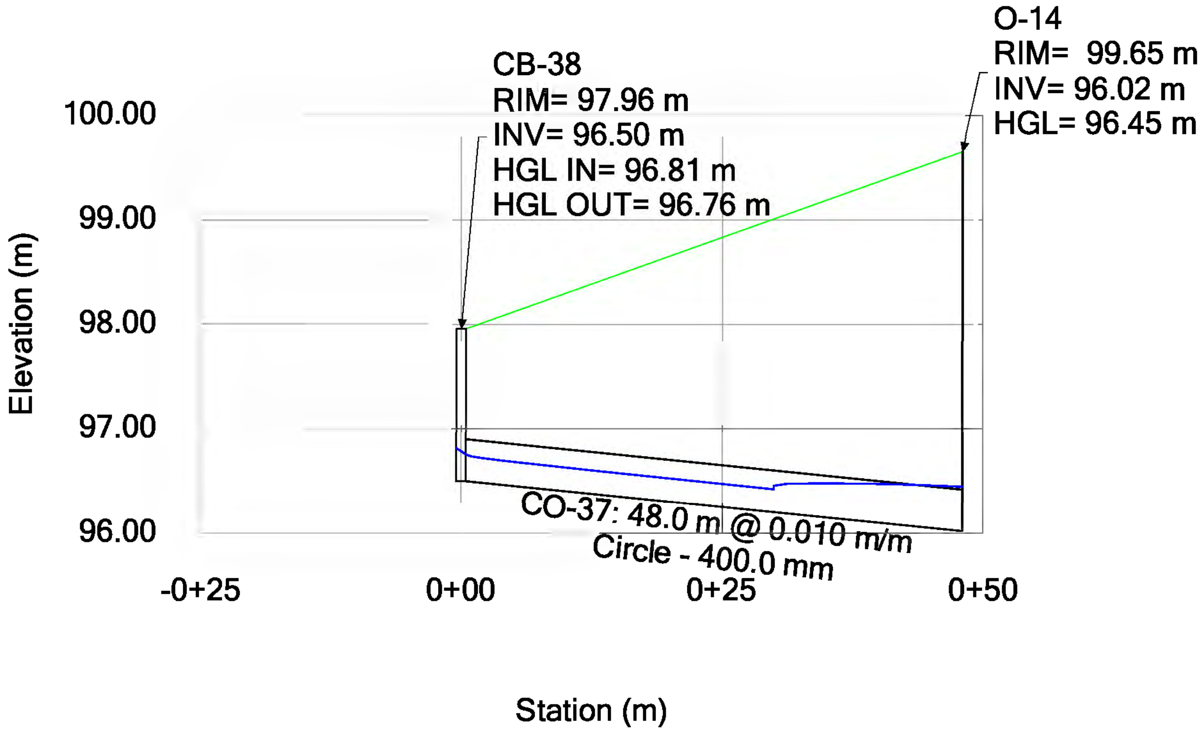
Profile Report
Engineering Profile - Profile - 13 (Owl_Parking Lot SD System.stsw)



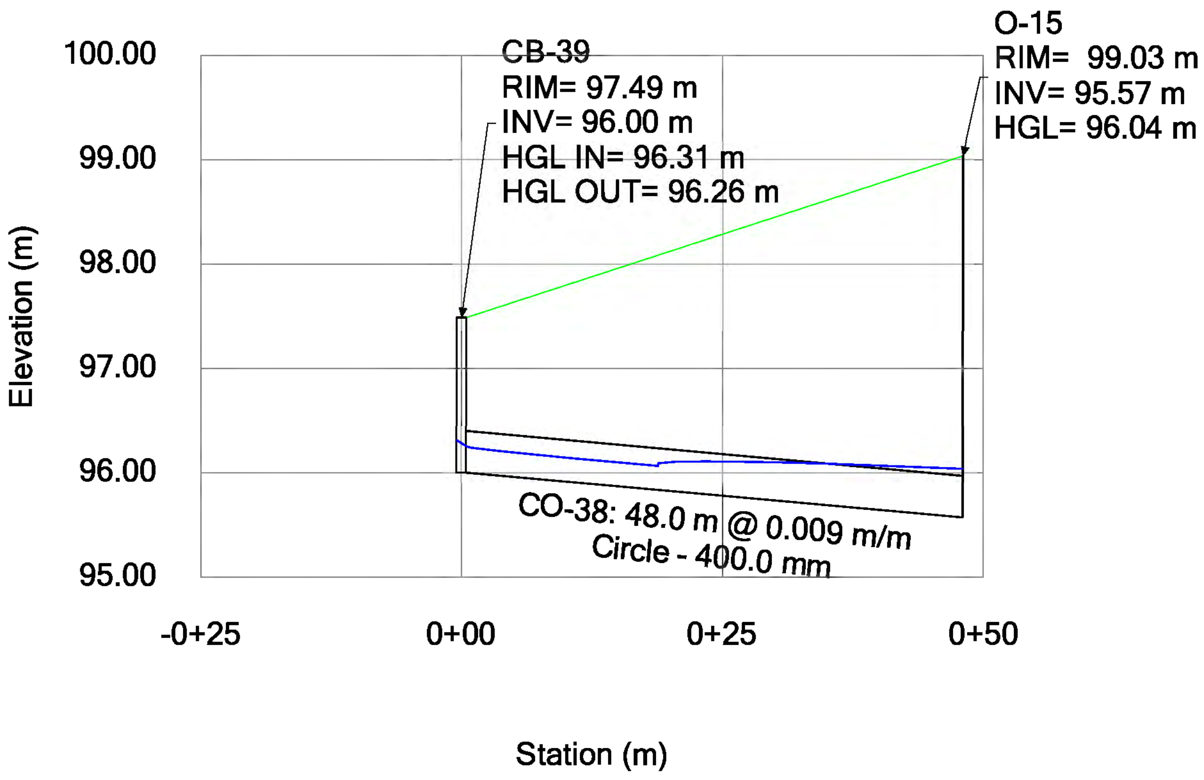
Profile Report
Engineering Profile - Profile - 14 (Owl_Parking Lot SD System.stsw)



Profile Report
Engineering Profile - Profile - 15 (Owl_Parking Lot SD System.stsw)

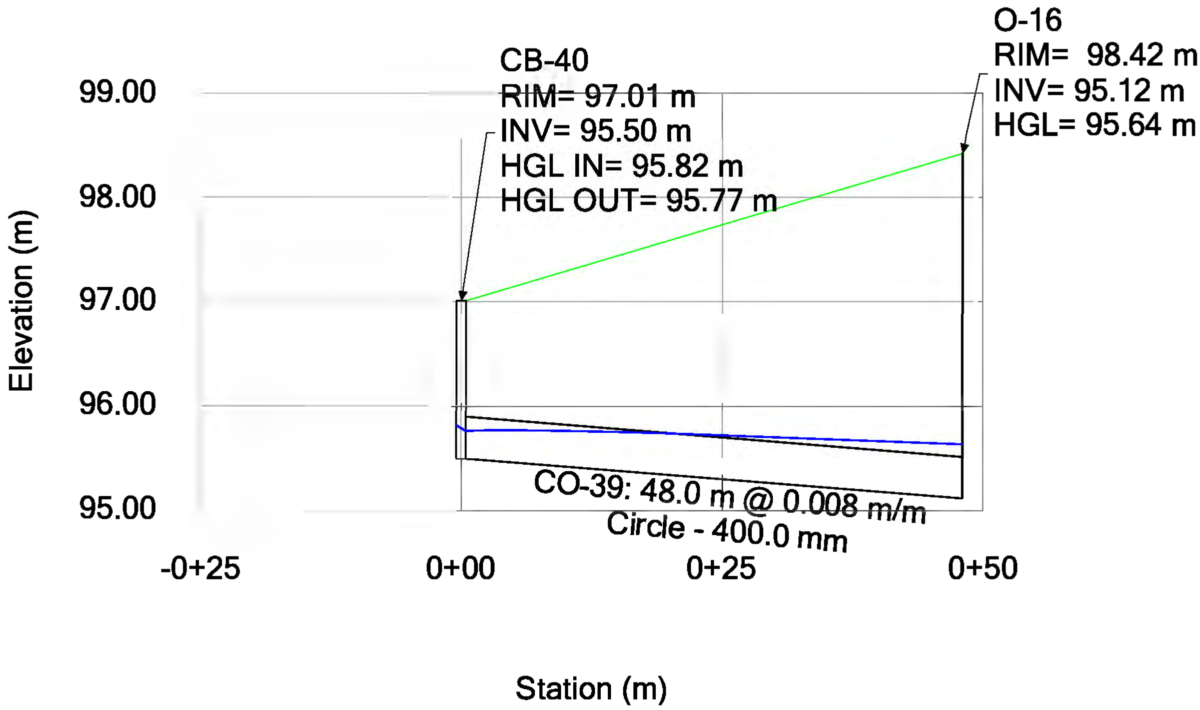


Profile Report
Engineering Profile - Profile - 16 (Owl_Parking Lot SD System.stsw)

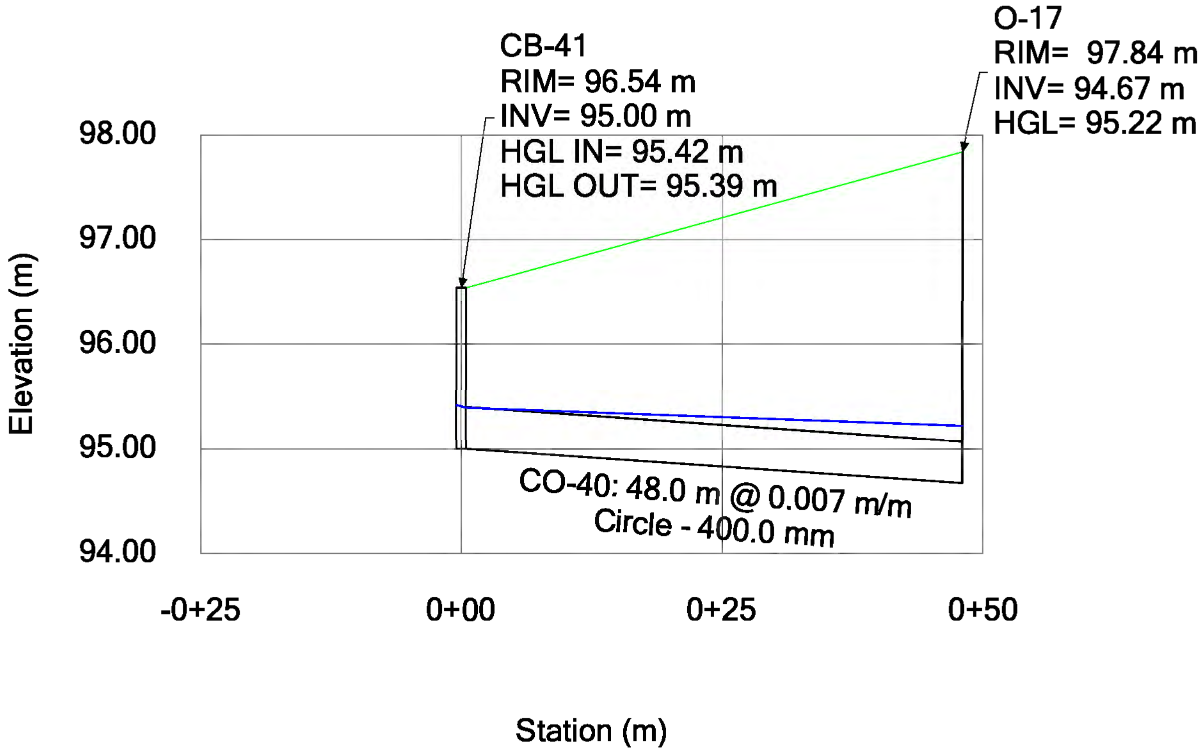


Profile Report

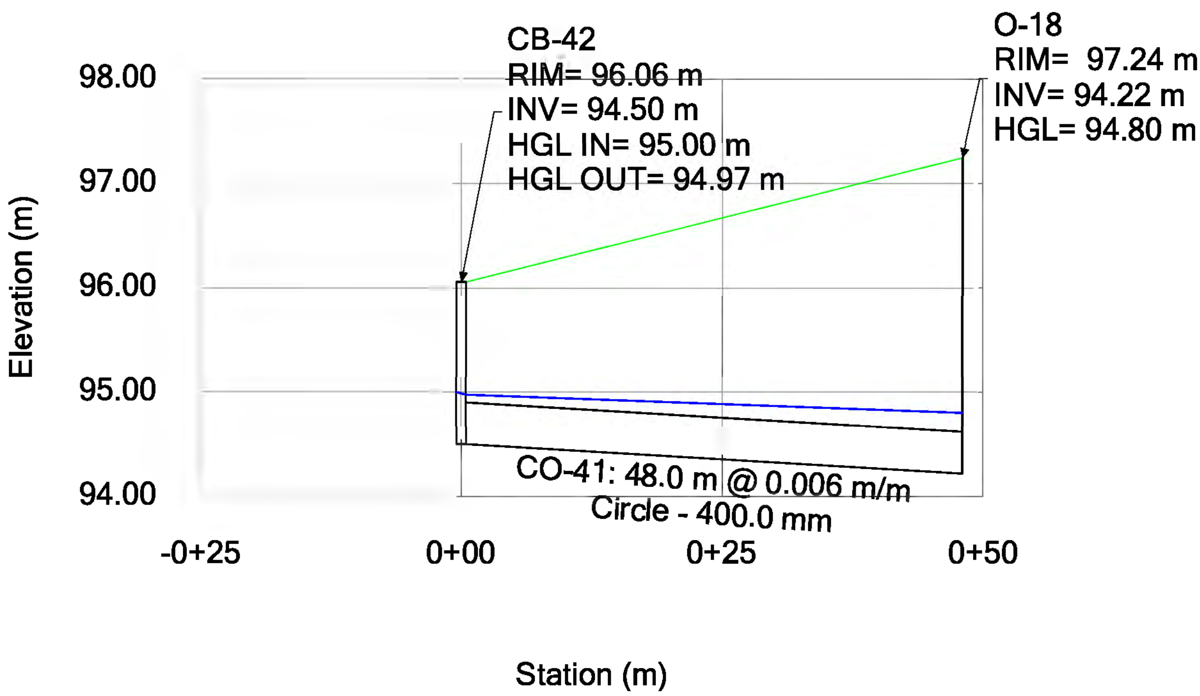
Engineering Profile - Profile - 17 (Owl_Parking Lot SD System.stsw)



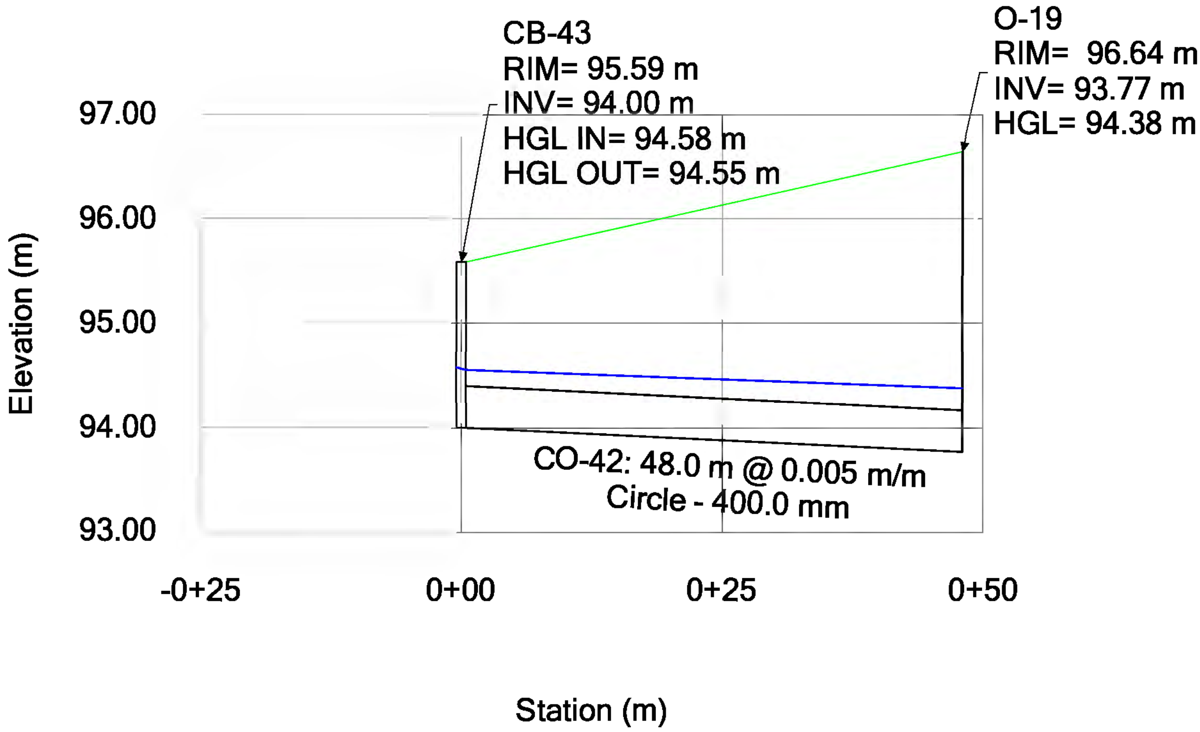
Profile Report
Engineering Profile - Profile - 18 (Owl_Parking Lot SD System.stsw)



Profile Report
Engineering Profile - Profile - 19 (Owl_Parking Lot SD System.stsw)

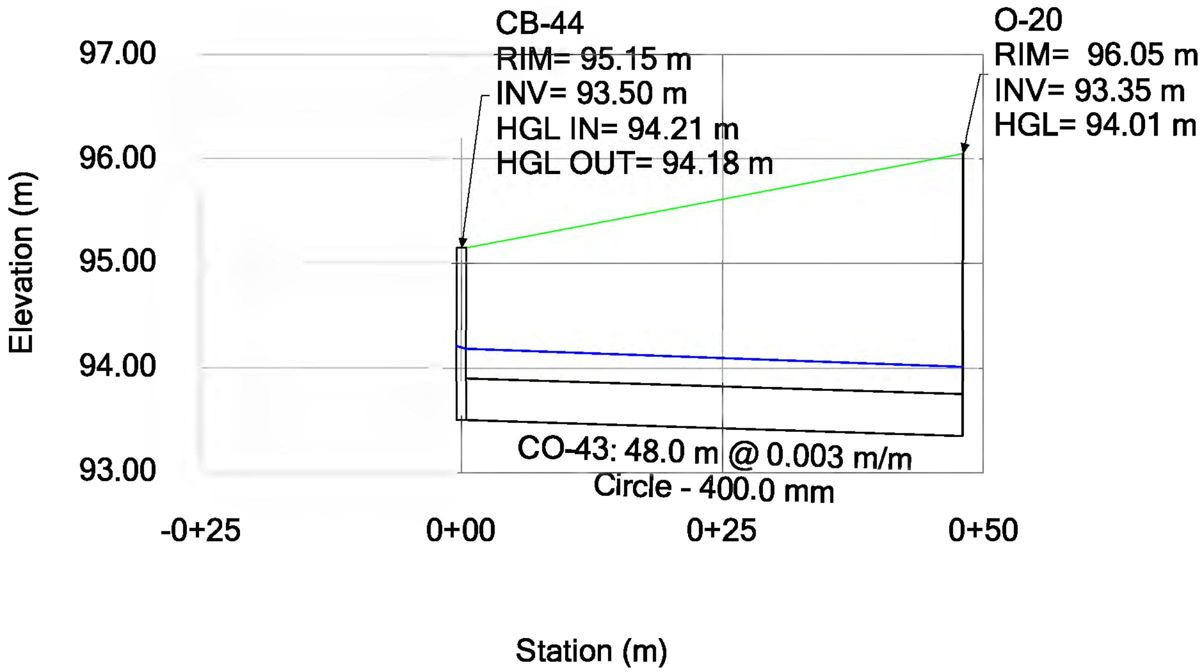


Profile Report
Engineering Profile - Profile - 20 (Owl_Parking Lot SD System.stsw)

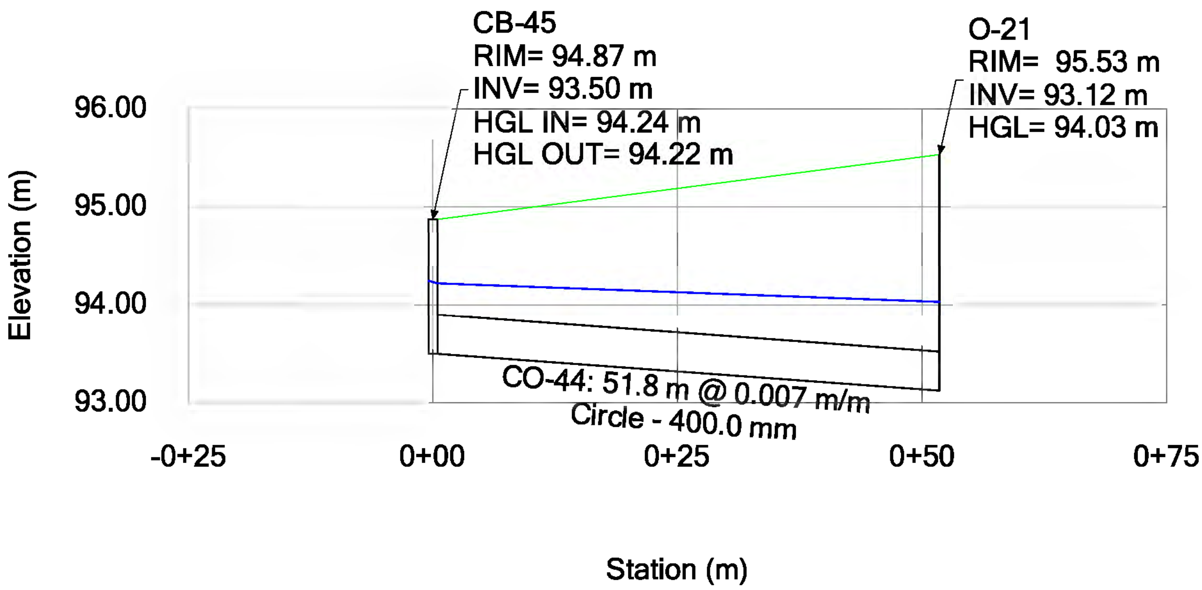


Profile Report

Engineering Profile - Profile - 21 (Owl_Parking Lot SD System.stsw)



Profile Report
Engineering Profile - Profile - 22 (Owl_Parking Lot SD System.stsw)



APPENDIX C
CULVERTS SIZING

- Exhibit 3: Culvert Location Exhibit
- HY-8 Results and Erosion Protection

N.T.S.

INTEL PROJECT OWL - SITE LOGISTICS SL-01
MAGDEBURG, GERMANY

EXHIBIT 3: CULVERT LOCATION EXHIBIT

Jacobs

2020 S.W. 4th Avenue
Portland, Oregon 97201

HY-8 RESULTS and EROSION PROTECTION

Crossing Data - SW01A

Crossing Properties

Name: SW01A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	2.502	cms
Design Flow	2.502	cms
Maximum Flow	2.502	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0033	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	92.345	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	94.810	m
Roadway Surface	Paved	
Top Width	70.000	m

Culvert Properties

SW01A

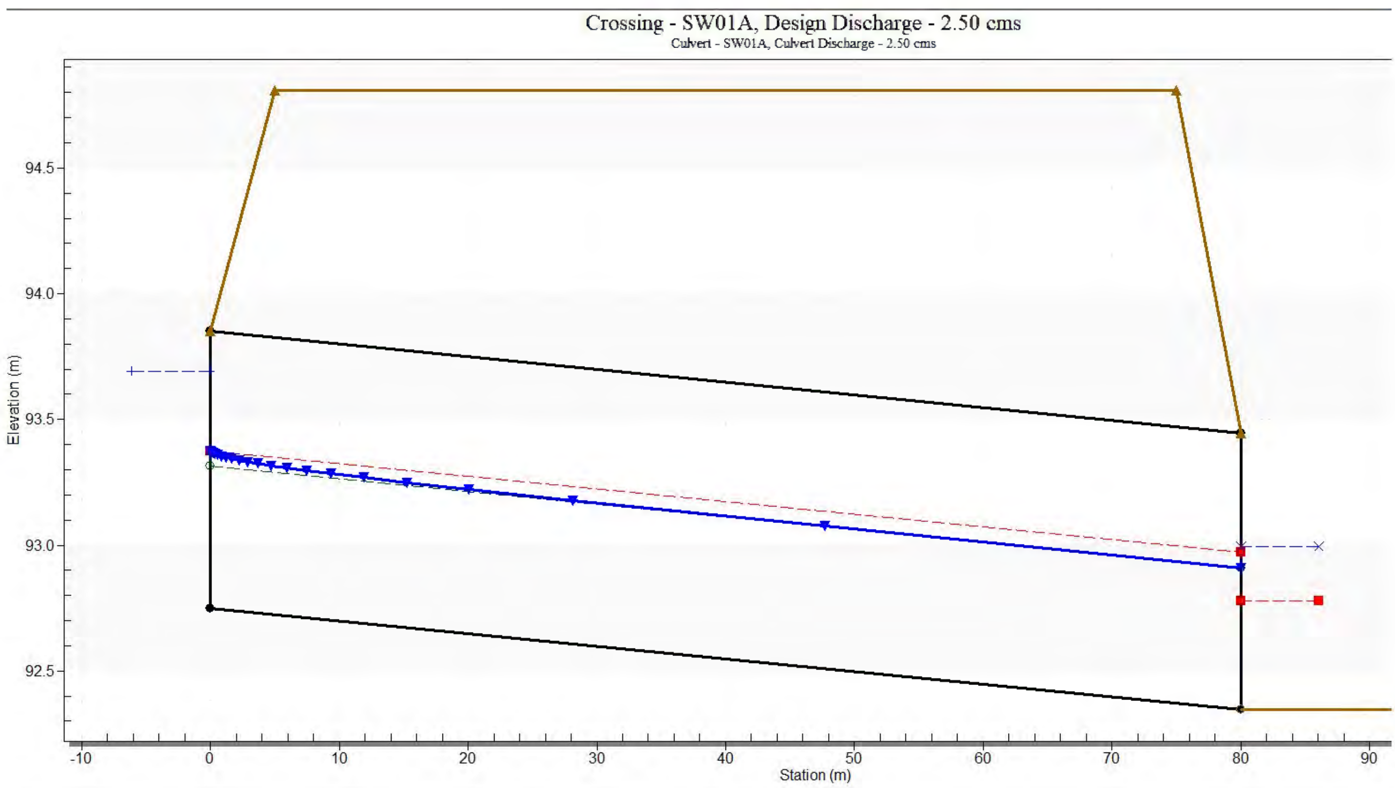
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW01A	
Shape	Circular	
Material	Concrete	
Diameter	1100.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	92.750	m
Outlet Station	80.000	m
Outlet Elevation	92.345	m
Number of Barrels	2	
Computed Culvert Slope	0.005062	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2.50	2.50	93.69	**0.94**	0.49	1-S2n	0.57	0.63	0.57	0.65	2.54	0.98



Crossing Data - SW01B

Crossing Properties

Name: SW01B

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	6.156	cms
Design Flow	6.156	cms
Maximum Flow	6.156	cms
TAILWATER DATA		
Channel Type	Enter Constant Tailwater Elevation	
Channel Invert Elevation	91.000	m
Constant Tailwater Elevation	92.100	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	93.550	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW01B

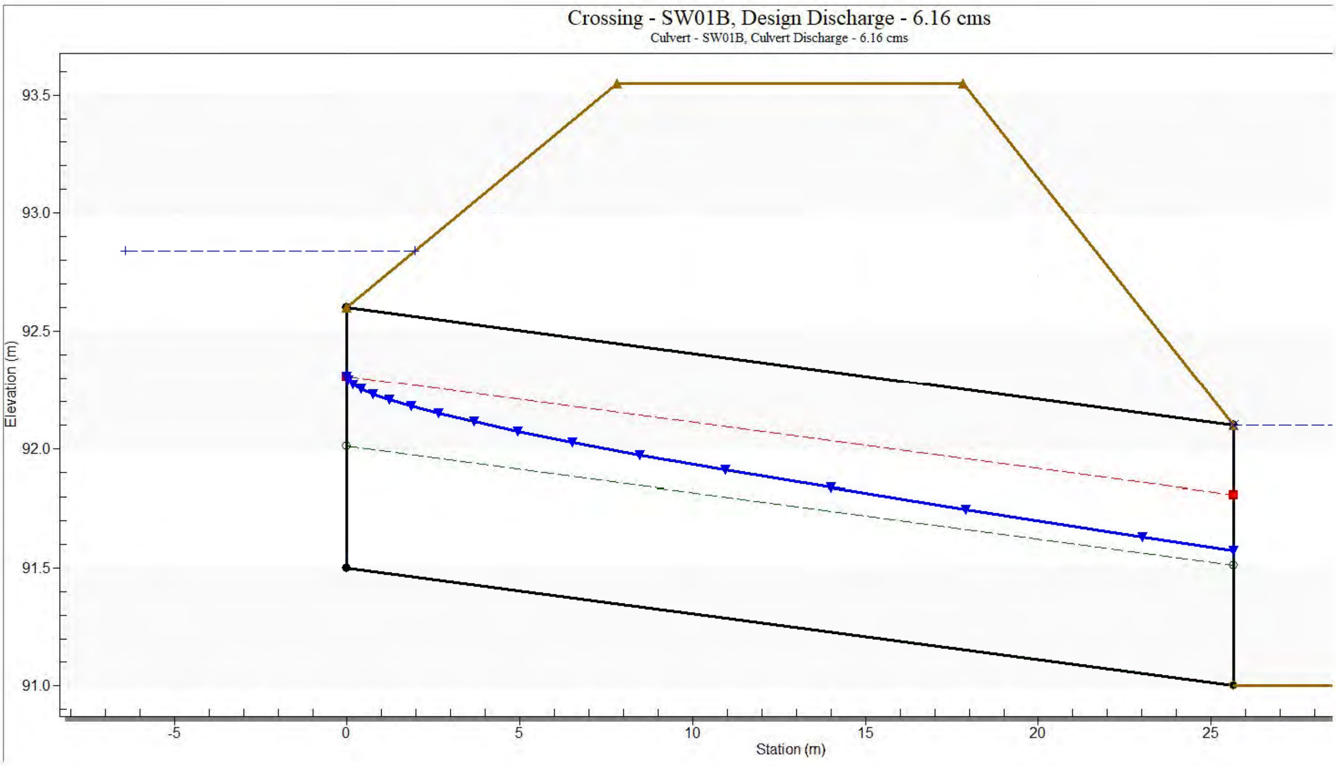
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW01B	
Shape	Circular	
Material	Concrete	
Diameter	1100.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	91.500	m
Outlet Station	25.650	m
Outlet Elevation	91.000	m
Number of Barrels	3	
Computed Culvert Slope	0.019493	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
6.16	6.16	92.84	**1.34**	1.05	5-S2n	0.51	0.81	0.57	1.10	4.10	0.00



Rock Chute Design Data

(Version WI-July-2010, Based on Design of Rock Chutes by Robinson, Rice, Kadavy, ASAE, 1998)

Project: Owl - SL-01 Culvert SW01B **County:** Germany
Designer: Jacobs **Checked by:** Jacobs
Date: December 19, 2023 **Date:** 12/19/23

Input Geometry:

Upstream Channel	Chute	Downstream Channel
Bw = 13.0 ft.	Bw = 27.0 ft.	Bw = 27.0 ft.
Side slopes = 1.0 (m:1)	Factor of safety = 1.50 (F_s) 1.2 Min	Side slopes = 3.0 (m:1)
Velocity n-value = 0.012	Side slopes = 3.0 (m:1) 2.0:1 max.	Velocity n-value = 0.033
Bed slope = 0.0195 ft./ft.	Bed slope (3:1) = 0.333 ft./ft 3.0:1 max.	Bed slope = 0.0010 ft./ft.
Note: n value = a) velocity n from waterway program	Freeboard = 0.5 ft.	
or b) computed mannings n for channel	Outlet apron depth, d = 1.0 ft.	Base flow = 0.0 cfs

Design Storm Data (Table 2, FOTG, WI-NRCS Grade Stabilization Structure No. 410):

Apron elev. --- Inlet = 91.0 ft. ------- Outlet 79.8 ft. --- (H_{drop} = 10.2 ft.)

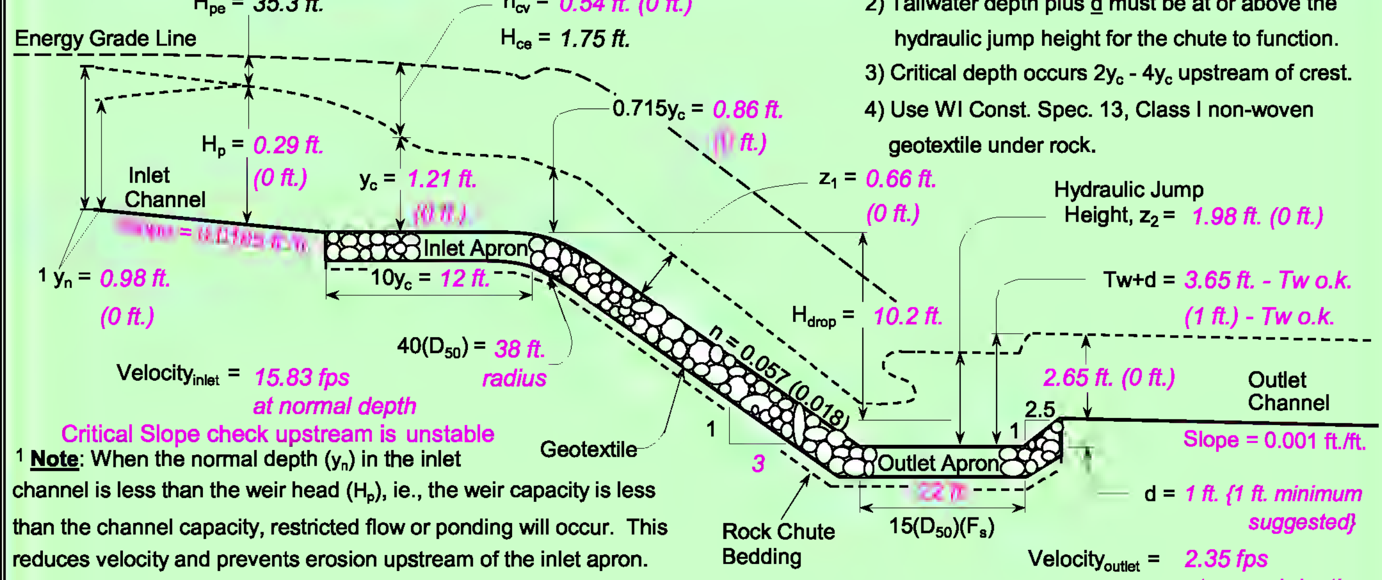
Q_{high} = Runoff from design storm capacity from Table 2, FOTG Standard 410
Q_5 = Runofff from a 5-year,24-hour storm.

***Note**: The total required capacity is routed through the chute (principal spillway) or in combination with an auxiliary spillway.*
***Input tailwater (Tw)**:*

Q_{high} = 218.0 cfs High flow storm through chute → Tw (ft.) = Program
Q_5 = 0.0 cfs Low flow storm through chute → Tw (ft.) = Program

Profile and Cross Section (Output):

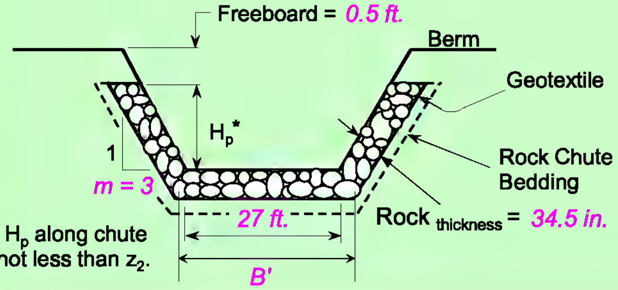
Notes:
1) Output given as ***High Flow (Low Flow)*** values.
2) Tailwater depth plus d must be at or above the hydraulic jump height for the chute to function.
3) Critical depth occurs $2y_c$ - $4y_c$ upstream of crest.
4) Use WI Const. Spec. 13, Class I non-woven geotextile under rock.



[1] **Note**: When the normal depth (y_n) in the inlet channel is less than the weir head (H_p), ie., the weir capacity is less than the channel capacity, restricted flow or ponding will occur. This reduces velocity and prevents erosion upstream of the inlet apron.

Profile Along Centerline of Chute

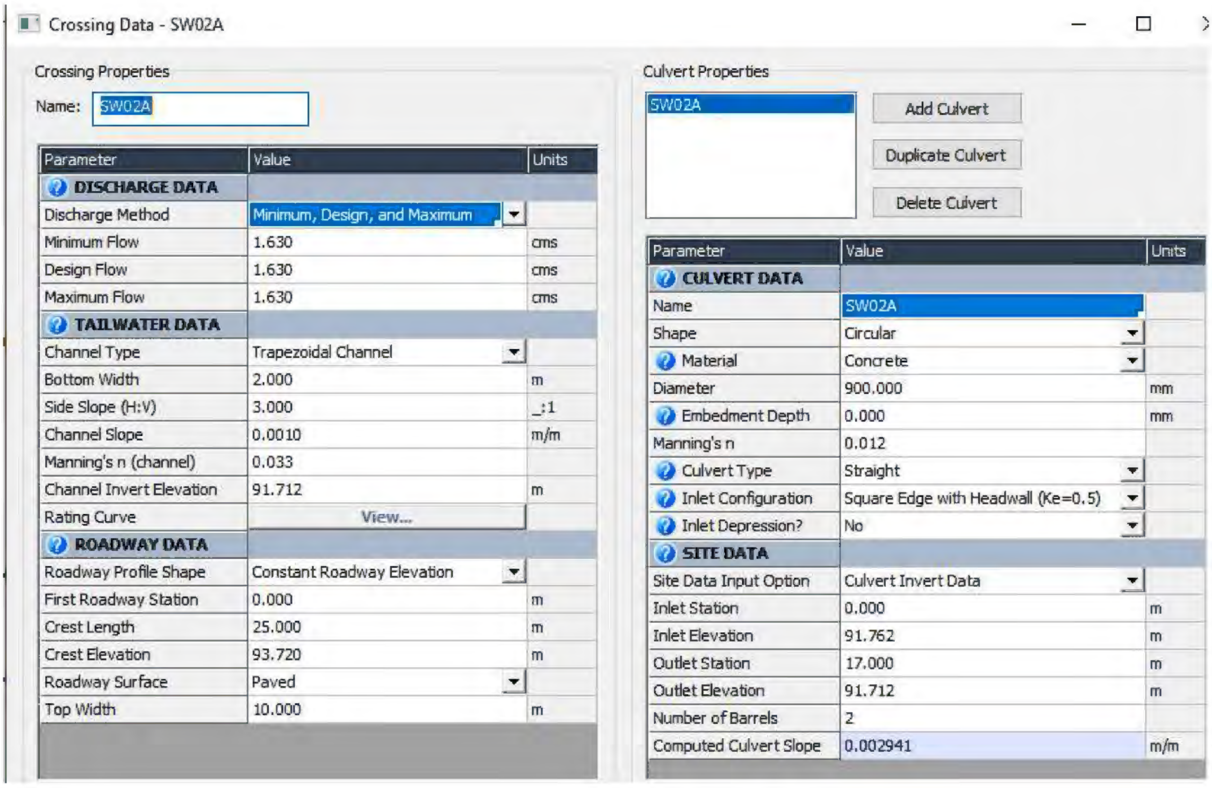
Typical Cross Section



* Use H_p along chute but not less than z_2.

	7.53 cfs/ft.	Equivalent unit discharge
F_s =	1.50	Factor of safety (multiplier)
z_1 =	0.66 ft.	Normal depth in chute
n-value =	0.057	Manning's roughness coefficient
$D_{50}(F_s)$ =	17.3 in.	Minimum Design D50*
$2(D_{50})(F_s)$ =	34.5 in.	Rock chute thickness
Tw + d =	3.65 ft.	Tailwater above outlet apron
z_2 =	1.98 ft.	Hydraulic jump height
****** The outlet***	***will***	***function adequately***

High Flow Storm Information



Crossing Data - SW02A

Crossing Properties

Name: SW02A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	1.630	cms
Design Flow	1.630	cms
Maximum Flow	1.630	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0010	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	91.712	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	93.720	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW02A

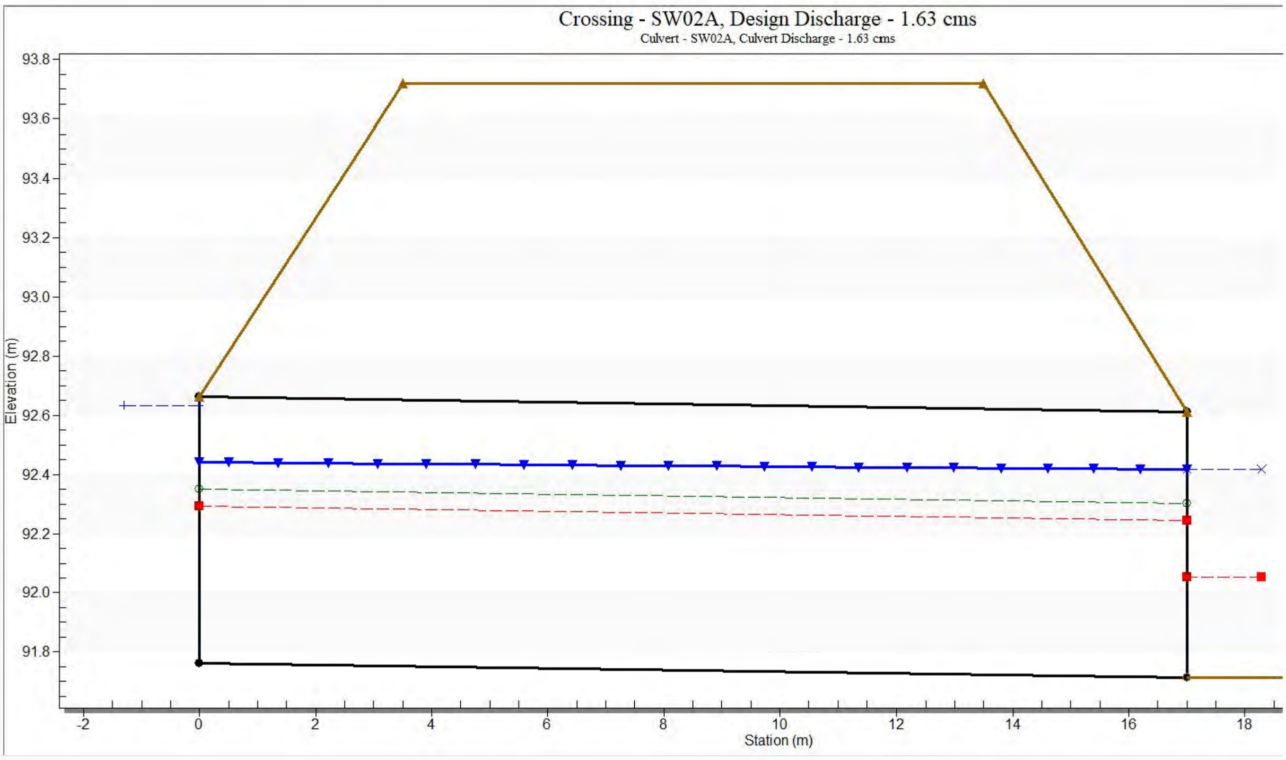
Add Culvert

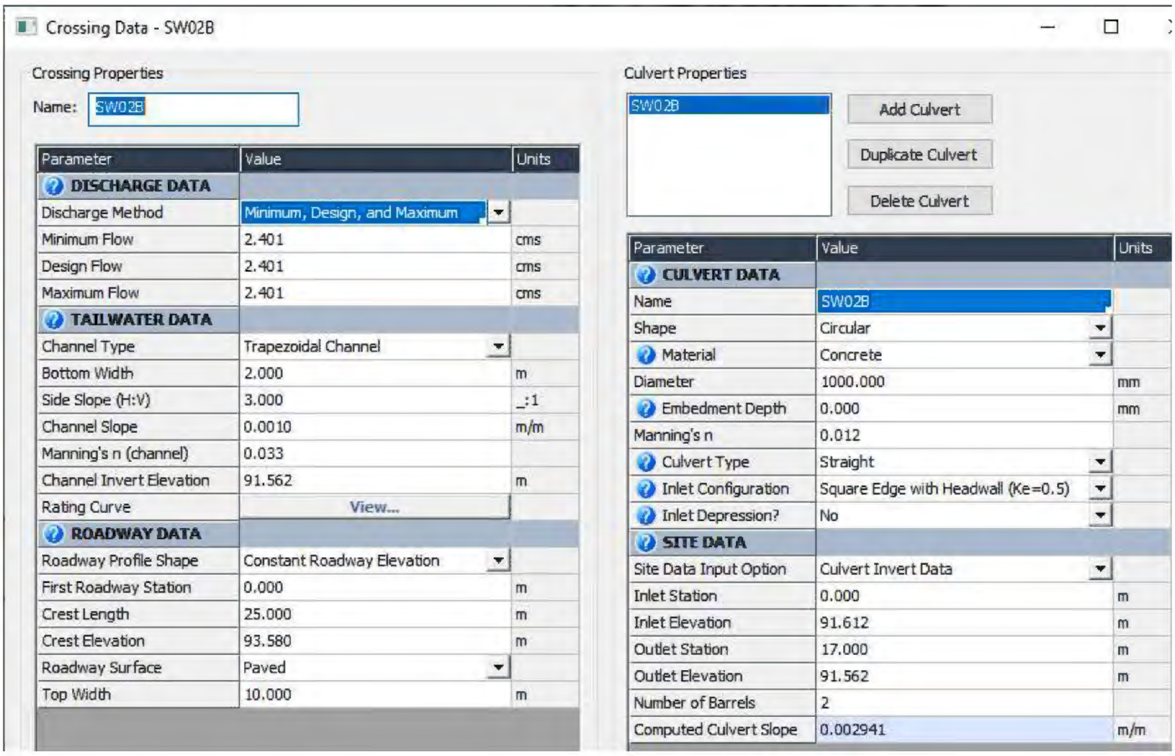
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW02A	
Shape	Circular	
Material	Concrete	
Diameter	900.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	91.762	m
Outlet Station	17.000	m
Outlet Elevation	91.712	m
Number of Barrels	2	
Computed Culvert Slope	0.002941	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1.63	1.63	92.63	0.81	**0.87**	3-M1t	0.59	0.53	0.70	0.70	1.52	0.56





Crossing Data - SW02B

Crossing Properties

Name: SW02B

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	2.401	cms
Design Flow	2.401	cms
Maximum Flow	2.401	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0010	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	91.562	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	93.580	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW02B

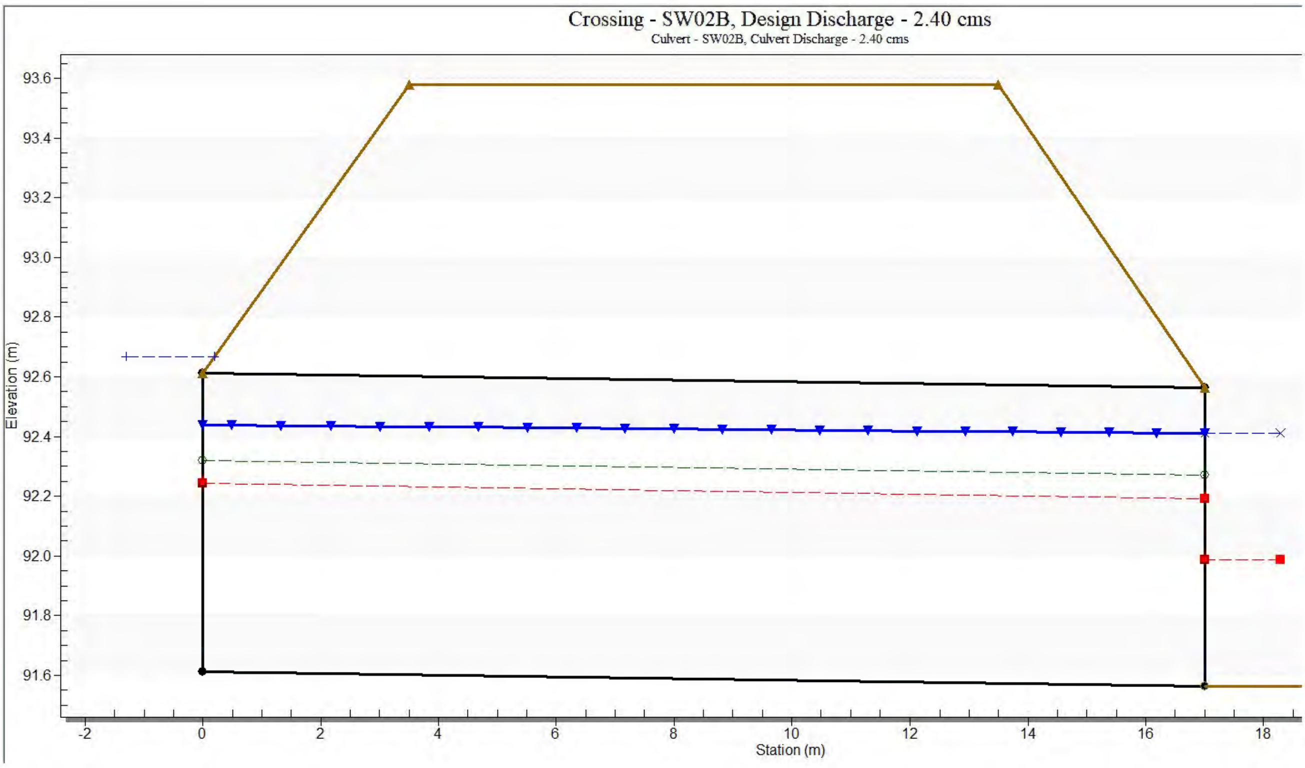
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW02B	
Shape	Circular	
Material	Concrete	
Diameter	1000.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	91.612	m
Outlet Station	17.000	m
Outlet Elevation	91.562	m
Number of Barrels	2	
Computed Culvert Slope	0.002941	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2.40	2.40	92.67	0.97	**1.06**	7-M1t	0.71	0.63	0.85	0.85	1.69	0.62



Crossing Data - SW03A

Crossing Properties

Name: SW03A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	4.144	cms
Design Flow	4.144	cms
Maximum Flow	4.144	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0087	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	92.850	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	95.517	m
Roadway Surface	Paved	
Top Width	18.000	m

Culvert Properties

SW03A

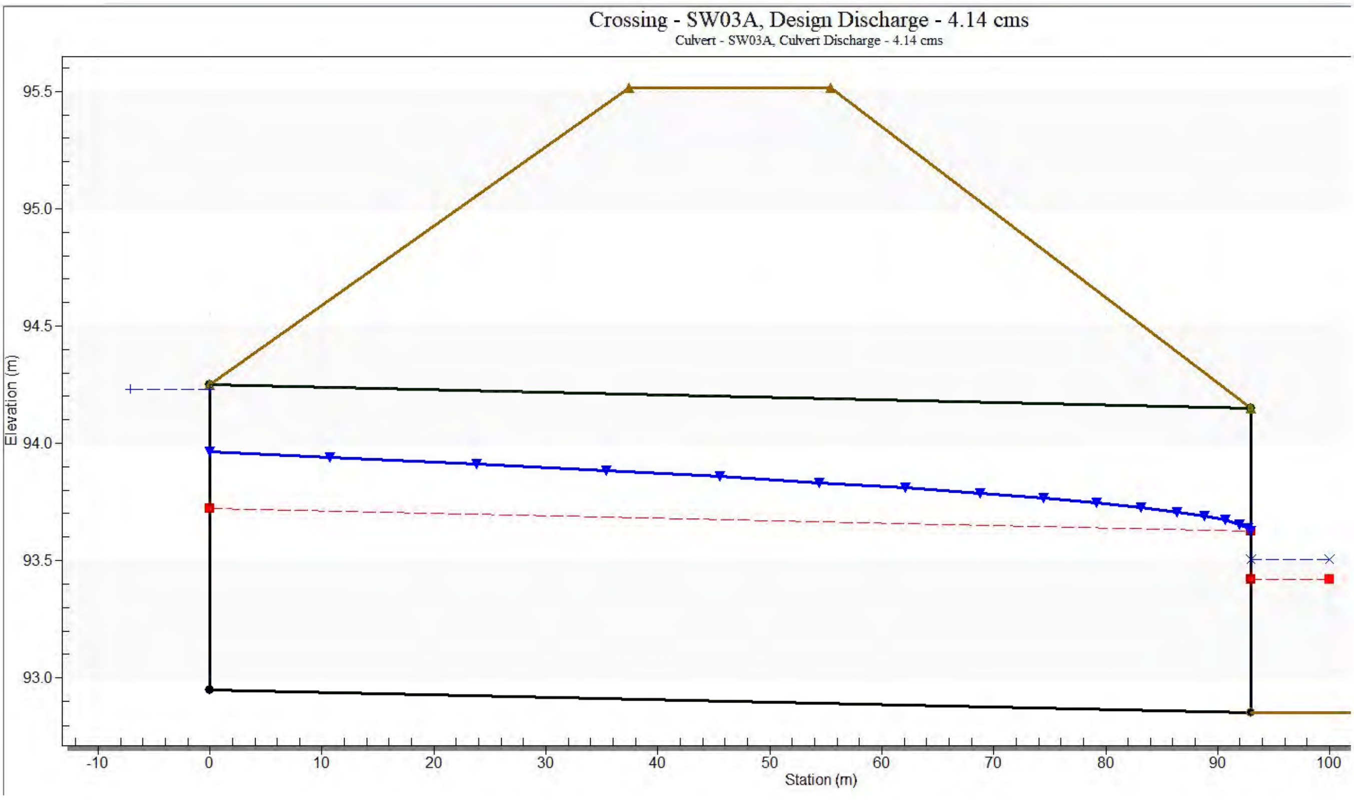
Add Culvert

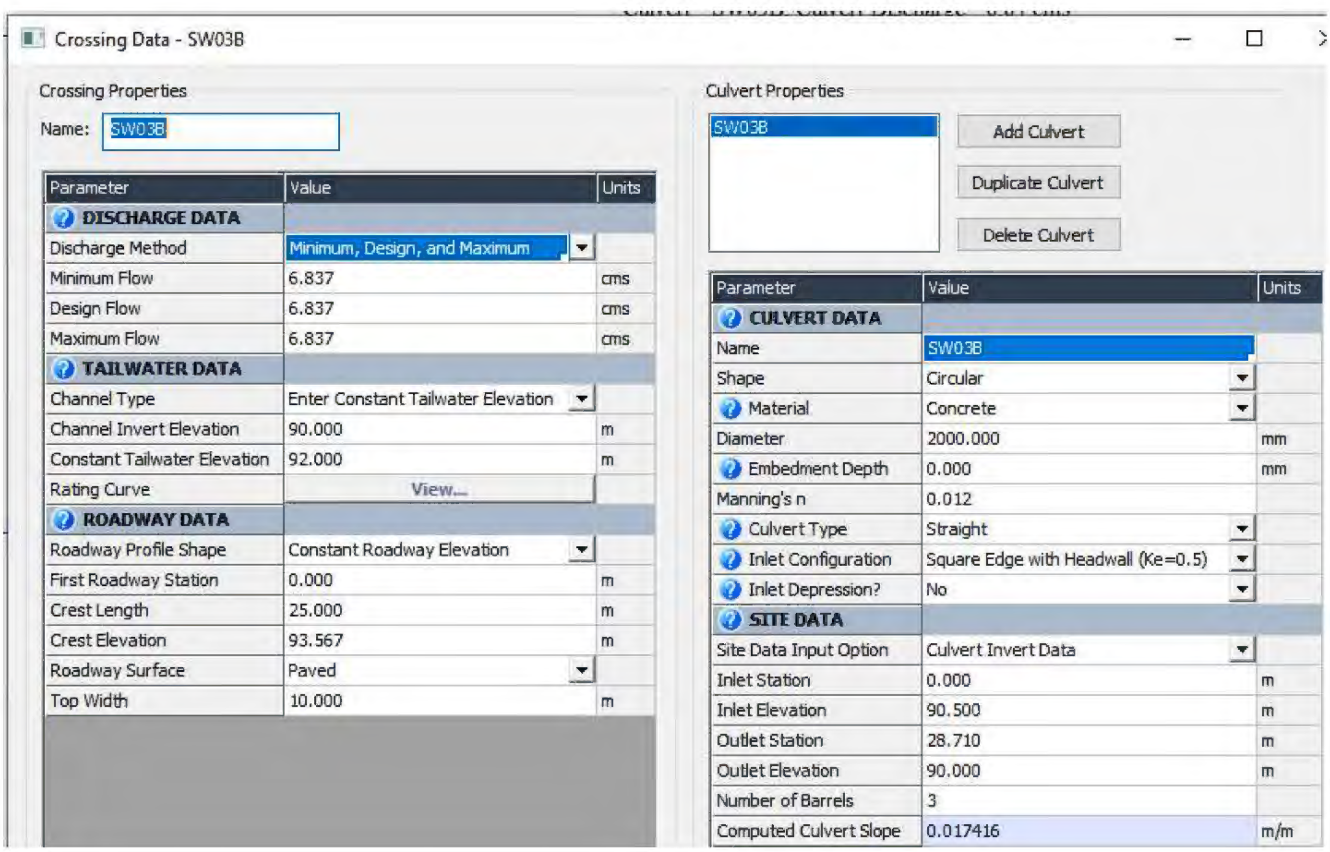
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW03A	
Shape	Circular	
Material	Concrete	
Diameter	1300.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	92.950	m
Outlet Station	92.950	m
Outlet Elevation	92.850	m
Number of Barrels	2	
Computed Culvert Slope	0.001076	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
4.14	4.14	94.23	1.18	**1.28**	2-M2c	1.30	0.77	0.77	0.66	2.52	1.59





Crossing Data - SW03B

Crossing Properties

Name: SW03B

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	6.837	cms
Design Flow	6.837	cms
Maximum Flow	6.837	cms
TAILWATER DATA		
Channel Type	Enter Constant Tailwater Elevation	
Channel Invert Elevation	90.000	m
Constant Tailwater Elevation	92.000	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	93.567	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW03B

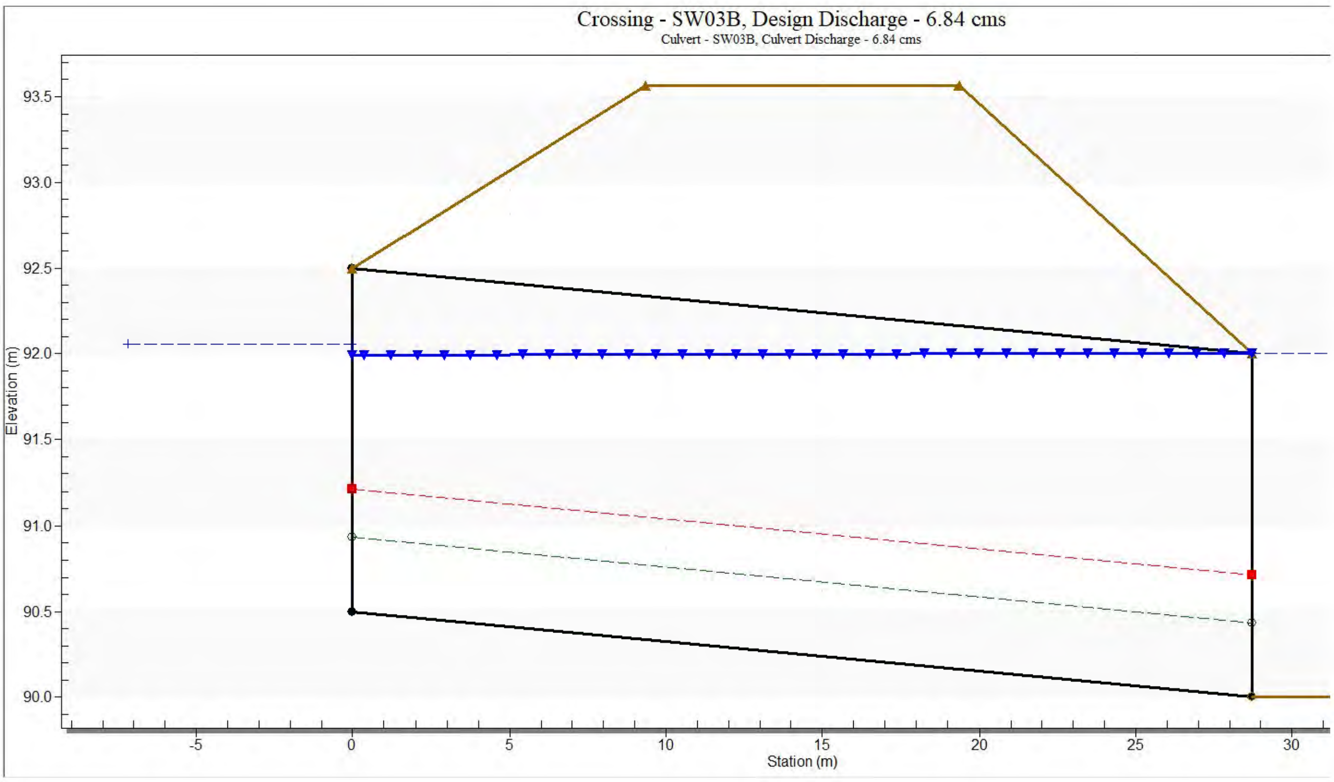
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW03B	
Shape	Circular	
Material	Concrete	
Diameter	2000.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	90.500	m
Outlet Station	28.710	m
Outlet Elevation	90.000	m
Number of Barrels	3	
Computed Culvert Slope	0.017416	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
6.84	6.84	92.05	0.97	**1.55**	1-S1f	0.44	0.71	2.00	2.00	0.73	0.00



Rock Chute Design Data

(Version WI-July-2010, Based on Design of Rock Chutes by Robinson, Rice, Kadavy, ASAE, 1998)

Project: *Owl - SL-01 Culvert SW03B* **County:** *Germany*
Designer: *Jacobs* **Checked by:** Jacobs
Date: *December 19, 2023* **Date:** 12/19/23

Input Geometry:

Upstream Channel	Chute	Downstream Channel
Bw = *22.0* ft.	Bw = *36.5* ft.	Bw = *36.5* ft.
Side slopes = *1.0* (m:1)	Factor of safety = *1.50* (F_s) ***1.2 Min***	Side slopes = *3.0* (m:1)
Velocity n-value = *0.012*	Side slopes = *3.0* (m:1) ***2.0:1 max.***	Velocity n-value = *0.033*
Bed slope = *0.0174* ft./ft.	Bed slope (3:1) = *0.333* ft./ft ***3.0:1 max.***	Bed slope = *0.0010* ft./ft.
Note: n value = a) velocity n from waterway program	Freeboard = *0.5* ft.	
or b) computed mannings n for channel	Outlet apron depth, d = *1.0* ft.	Base flow = *0.0* cfs

Design Storm Data (Table 2, FOTG, WI-NRCS Grade Stabilization Structure No. 410):

Apron elev. --- Inlet = *90.0* ft. ------- Outlet *79.8* ft. --- (H_{drop} = *9.2 ft.*)

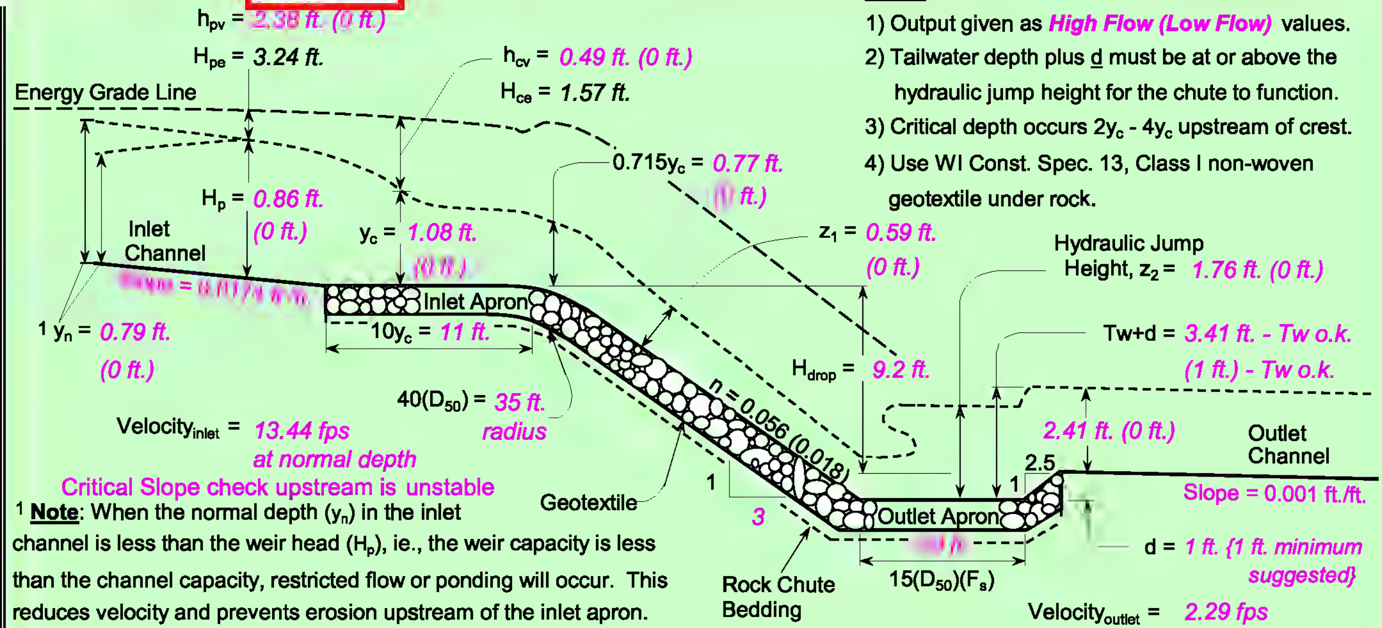
Q_{high} = *Runoff from design storm capacity from Table 2, FOTG Standard 410*
Q_5 = *Runofff from a 5-year,24-hour storm.*

***Note**: The total required capacity is routed through the chute (principal spillway) or in combination with an auxiliary spillway.*
***Input tailwater (Tw)**:*

Q_{high} = *242.0* cfs High flow storm through chute → Tw (ft.) = *Program*
Q_5 = *0.0* cfs Low flow storm through chute → Tw (ft.) = *Program*

Profile and Cross Section (Output):

Starting Station = *0+00.0*

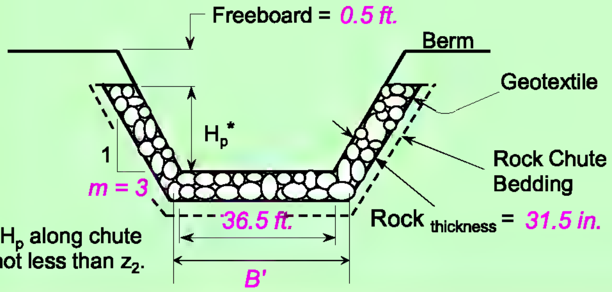


Notes:
1) Output given as ***High Flow (Low Flow)*** values.
2) Tailwater depth plus d must be at or above the hydraulic jump height for the chute to function.
3) Critical depth occurs 2y_c - 4y_c upstream of crest.
4) Use WI Const. Spec. 13, Class I non-woven geotextile under rock.

[1] **Note**: When the normal depth (y_n) in the inlet channel is less than the weir head (H_p), ie., the weir capacity is less than the channel capacity, restricted flow or ponding will occur. This reduces velocity and prevents erosion upstream of the inlet apron.

Profile Along Centerline of Chute

Typical Cross Section



* Use H_p along chute but not less than z_2.

	6.33 cfs/ft.	Equivalent unit discharge
F_S =	*1.50*	Factor of safety (multiplier)
z_1 =	*0.59 ft.*	Normal depth in chute
n-value =	*0.056*	Manning's roughness coefficient
$D_{50}(F_s)$ =	*15.8 in.*	Minimum Design D50*
$2(D_{50})(F_s)$ =	*31.5 in.*	Rock chute thickness
Tw + d =	*3.41 ft.*	Tailwater above outlet apron
z_2 =	*1.76 ft.*	Hydraulic jump height
****** The outlet***	***will***	***function adequately***

High Flow Storm Information

Crossing Data - SW03C

Crossing Properties

Name: SW03C

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.410	cms
Design Flow	0.410	cms
Maximum Flow	0.410	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0185	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	100.350	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	101.960	m
Roadway Surface	Paved	
Top Width	3.000	m

Culvert Properties

SW03C

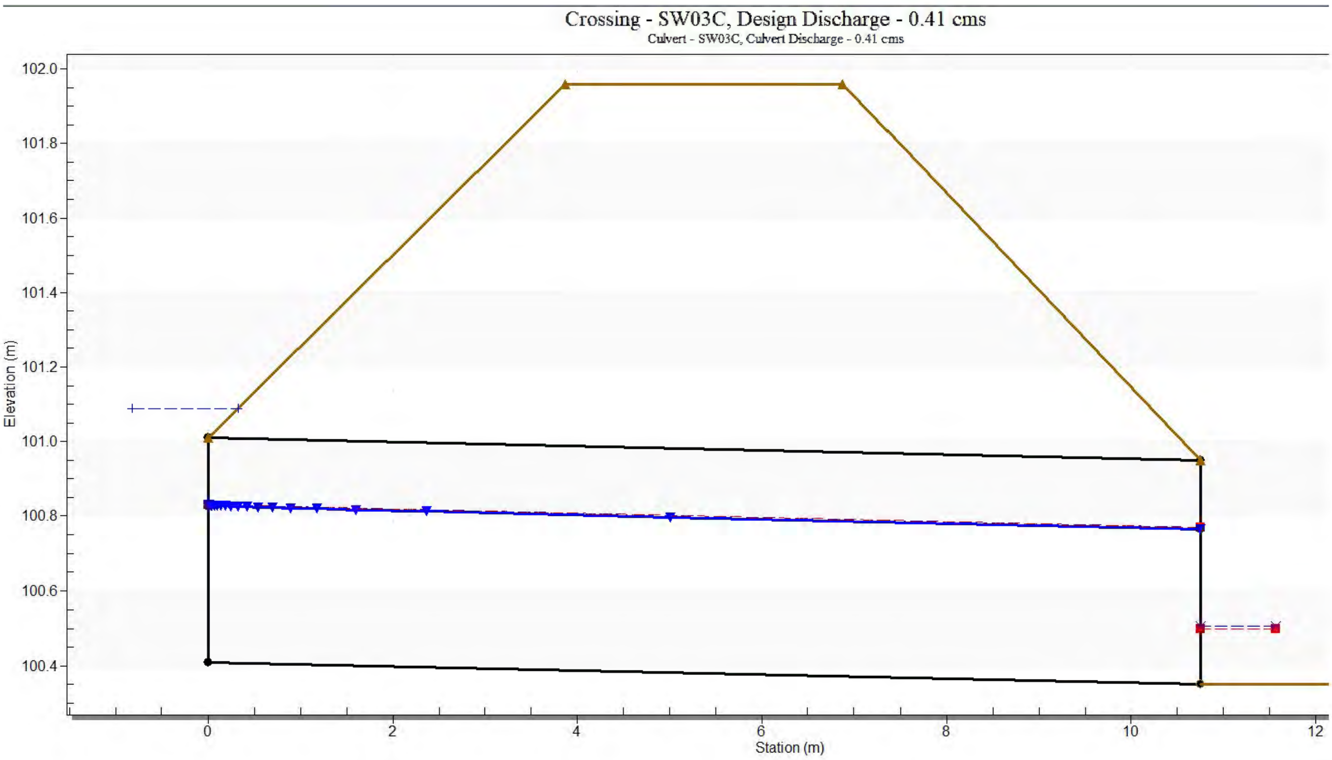
Add Culvert

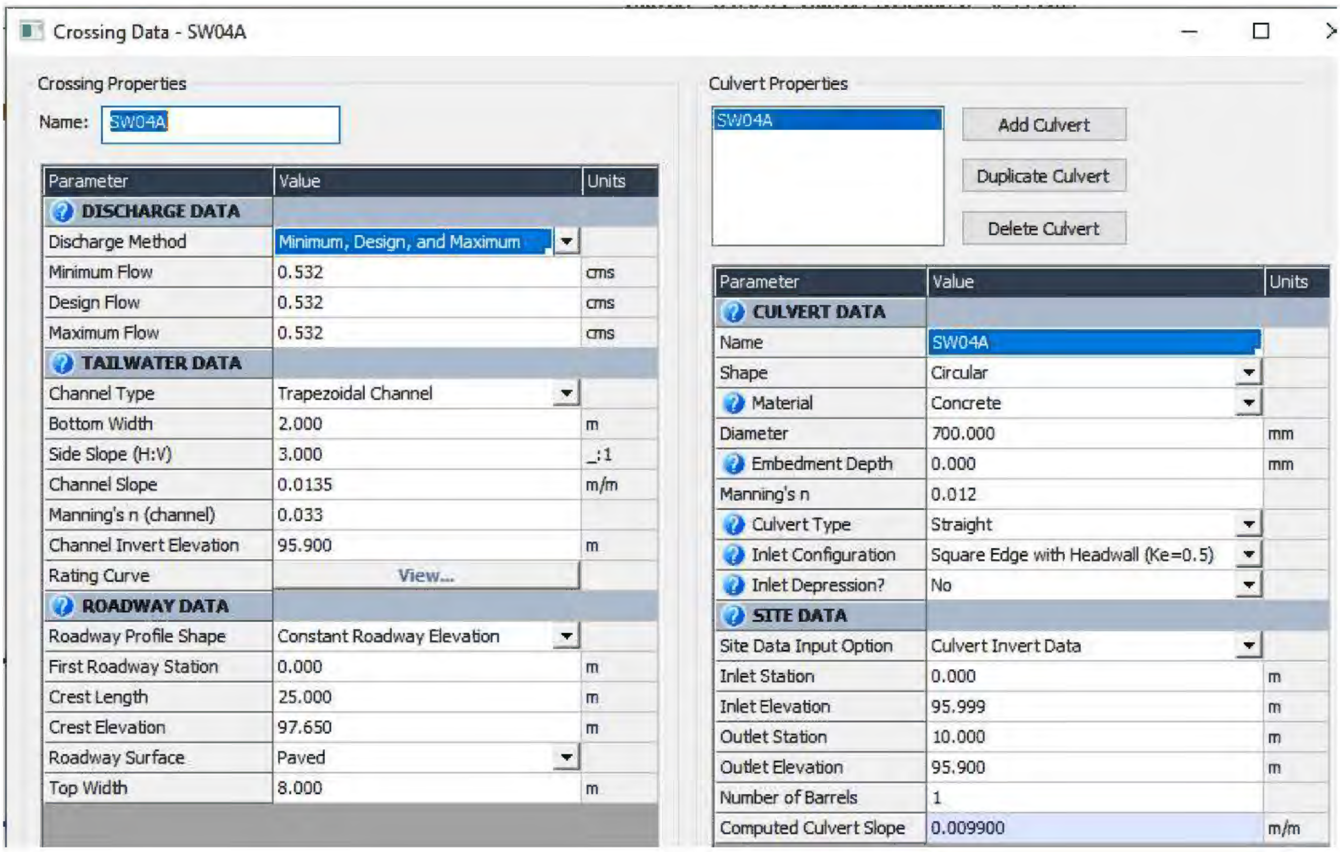
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW03C	
Shape	Circular	
Material	Concrete	
Diameter	600.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	100.410	m
Outlet Station	10.750	m
Outlet Elevation	100.350	m
Number of Barrels	1	
Computed Culvert Slope	0.005581	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.41	0.41	101.09	**0.68**	0.56	5-S2n	0.41	0.42	0.41	0.16	1.97	1.06





Crossing Data - SW04A

Crossing Properties

Name: SW04A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.532	cms
Design Flow	0.532	cms
Maximum Flow	0.532	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0135	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	95.900	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	97.650	m
Roadway Surface	Paved	
Top Width	8.000	m

Culvert Properties

SW04A

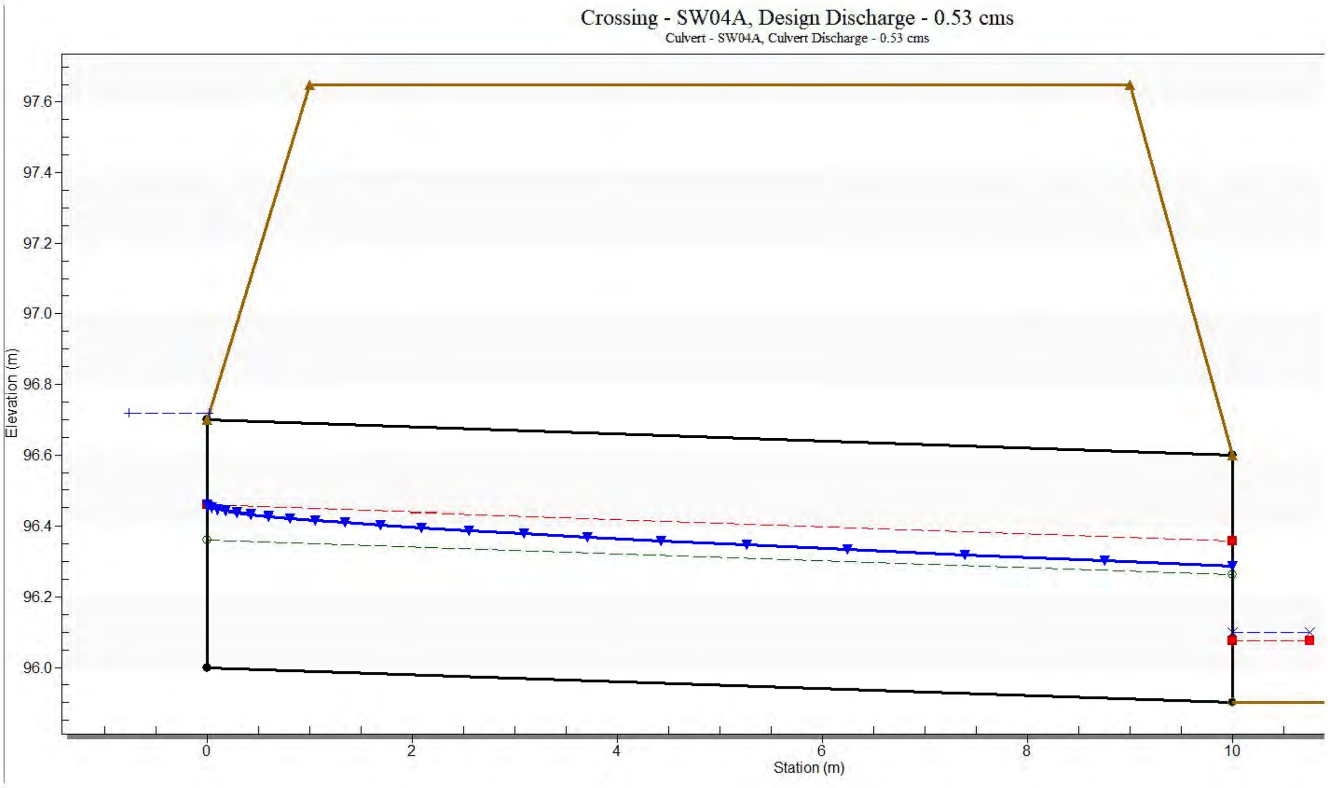
Add Culvert

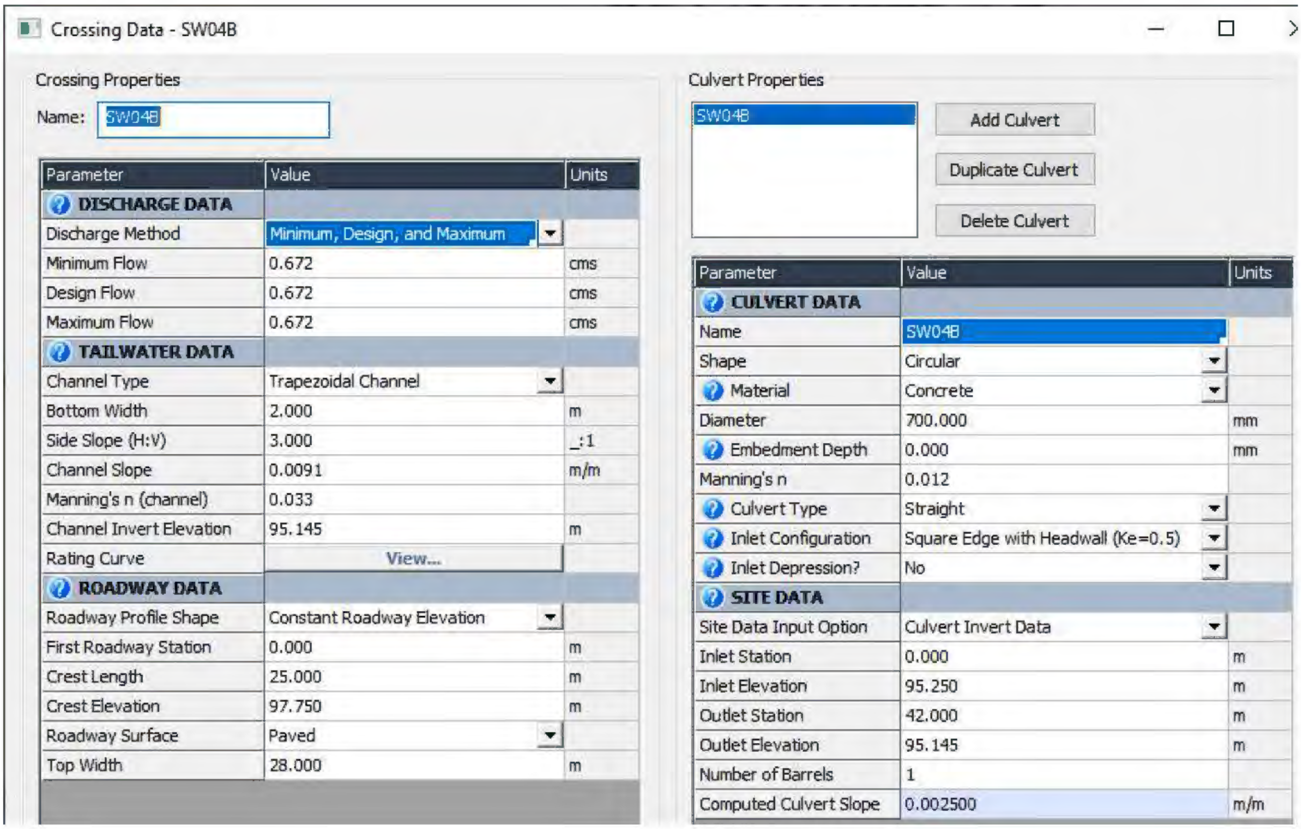
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW04A	
Shape	Circular	
Material	Concrete	
Diameter	700.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	95.999	m
Outlet Station	10.000	m
Outlet Elevation	95.900	m
Number of Barrels	1	
Computed Culvert Slope	0.009900	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.53	0.53	96.72	**0.72**	0.53	5-S2n	0.36	0.46	0.39	0.20	2.43	1.03





Crossing Data - SW04B

Crossing Properties

Name: SW04B

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.672	cms
Design Flow	0.672	cms
Maximum Flow	0.672	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0091	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	95.145	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	97.750	m
Roadway Surface	Paved	
Top Width	28.000	m

Culvert Properties

SW04B

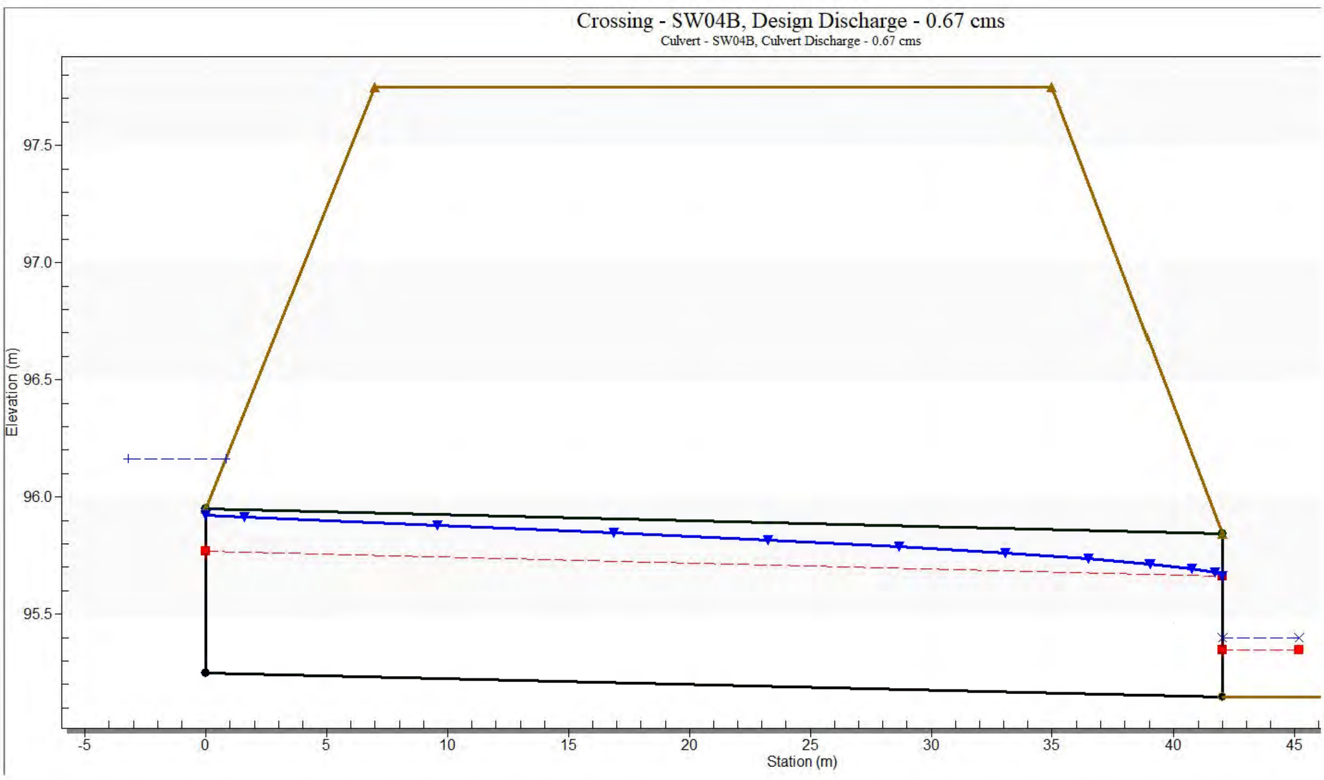
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW04B	
Shape	Circular	
Material	Concrete	
Diameter	700.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	95.250	m
Outlet Station	42.000	m
Outlet Elevation	95.145	m
Number of Barrels	1	
Computed Culvert Slope	0.002500	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.67	0.67	96.16	0.87	**0.91**	7-M2c	0.70	0.52	0.52	0.25	2.21	0.97



Crossing Data - SW04C

Crossing Properties

Name: SW04C

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.961	cms
Design Flow	0.961	cms
Maximum Flow	0.961	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0040	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	92.500	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	94.340	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW04C

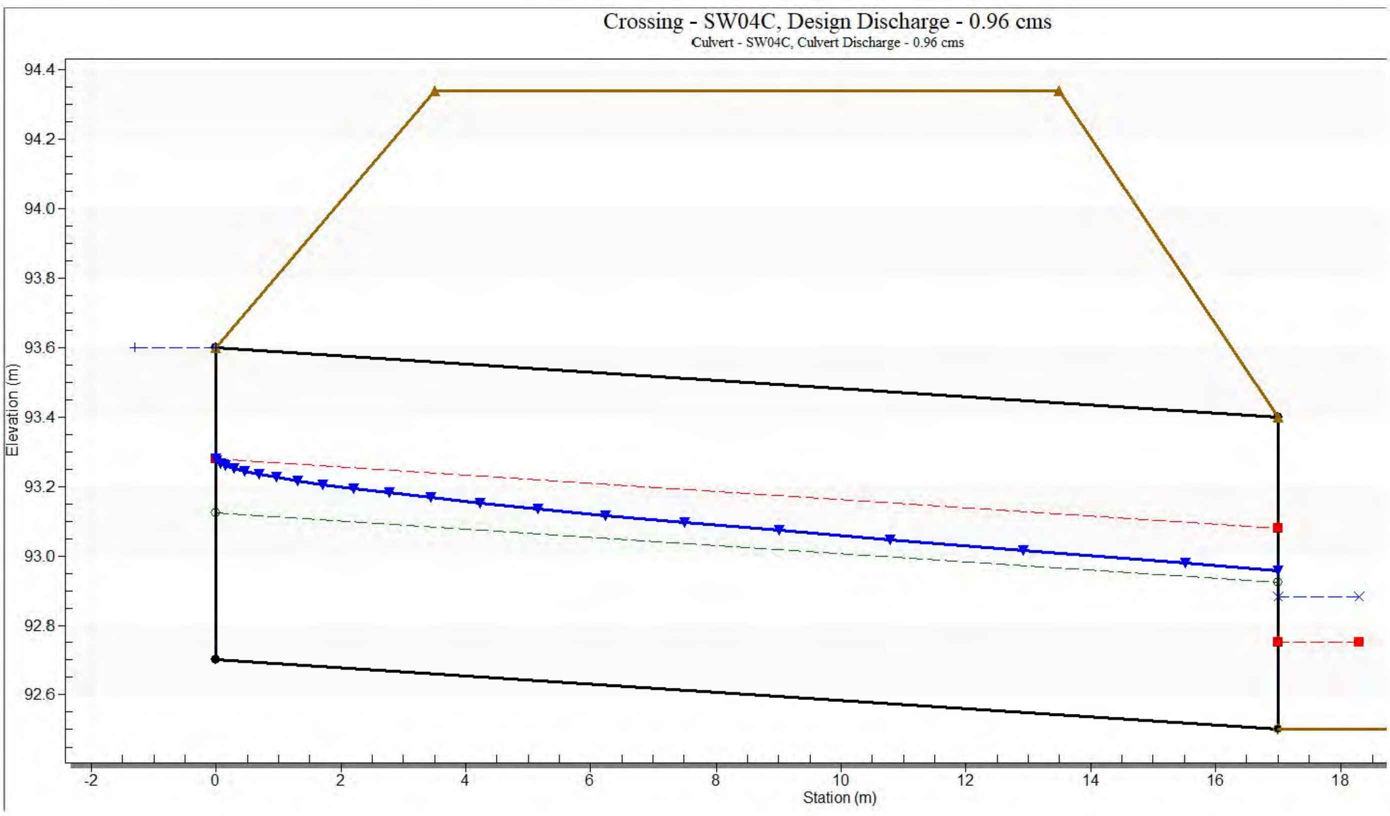
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW04C	
Shape	Circular	
Material	Concrete	
Diameter	900.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	92.700	m
Outlet Station	17.000	m
Outlet Elevation	92.500	m
Number of Barrels	1	
Computed Culvert Slope	0.011765	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.96	0.96	93.60	**0.90**	0.59	1-S2n	0.42	0.58	0.46	0.38	2.95	0.80



Crossing Data - SW04D

Crossing Properties

Name: SW04D

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.961	cms
Design Flow	0.961	cms
Maximum Flow	0.961	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0020	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	92.140	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	93.970	m
Roadway Surface	Paved	
Top Width	10.000	m

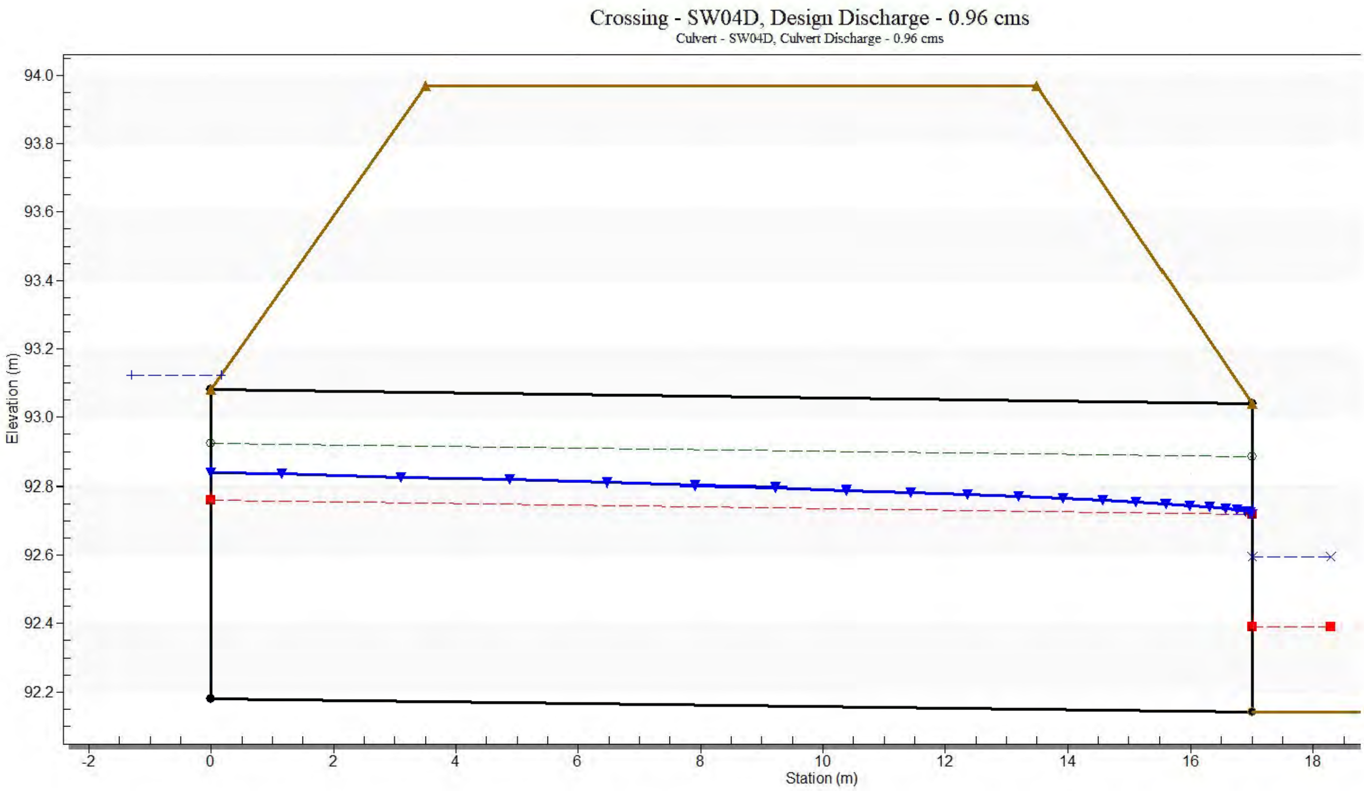
Culvert Properties

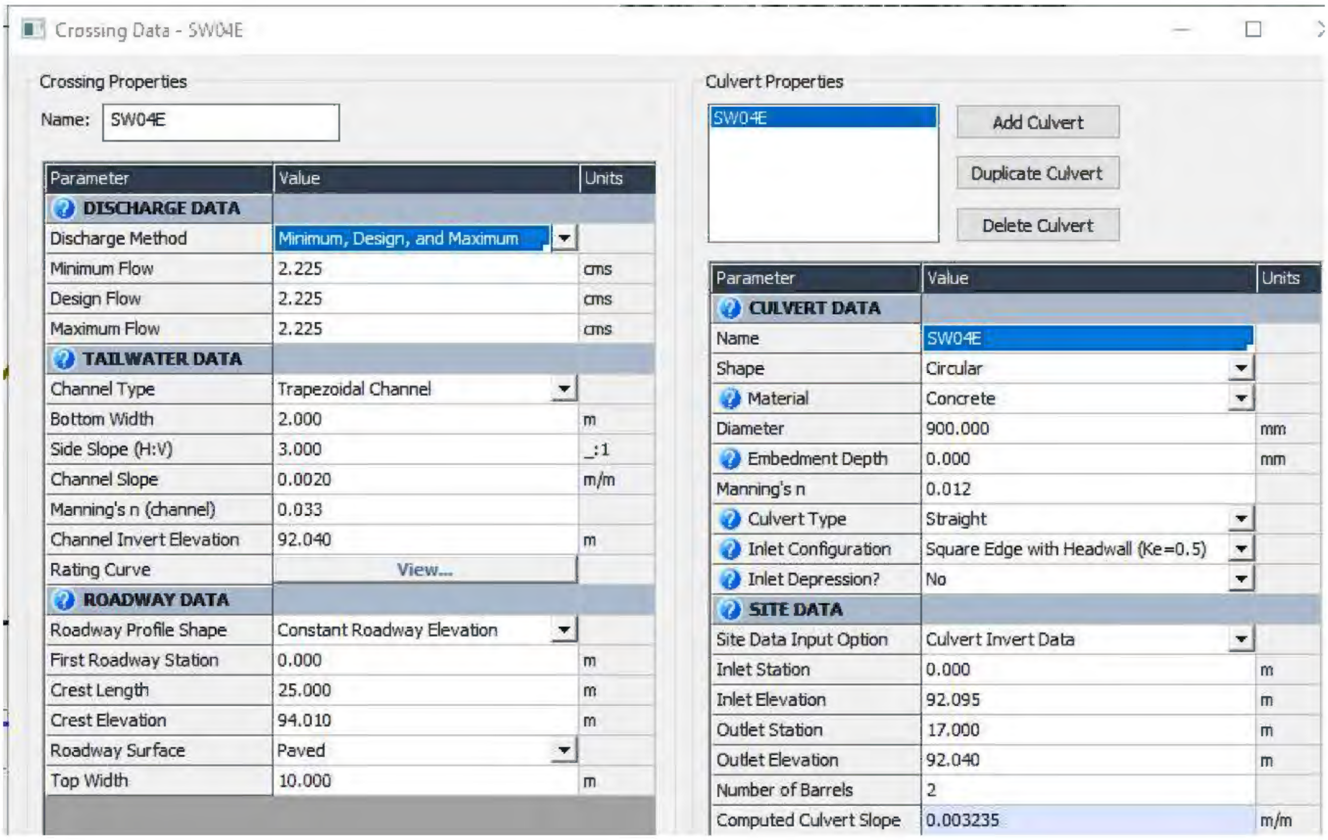
SW04D

Add Culvert | Duplicate Culvert | Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW04D	
Shape	Circular	
Material	Concrete	
Diameter	900.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	92.180	m
Outlet Station	17.000	m
Outlet Elevation	92.140	m
Number of Barrels	1	
Computed Culvert Slope	0.002353	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)





Crossing Data - SW04E

Crossing Properties

Name: SW04E

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	2.225	cms
Design Flow	2.225	cms
Maximum Flow	2.225	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0020	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	92.040	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	94.010	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW04E

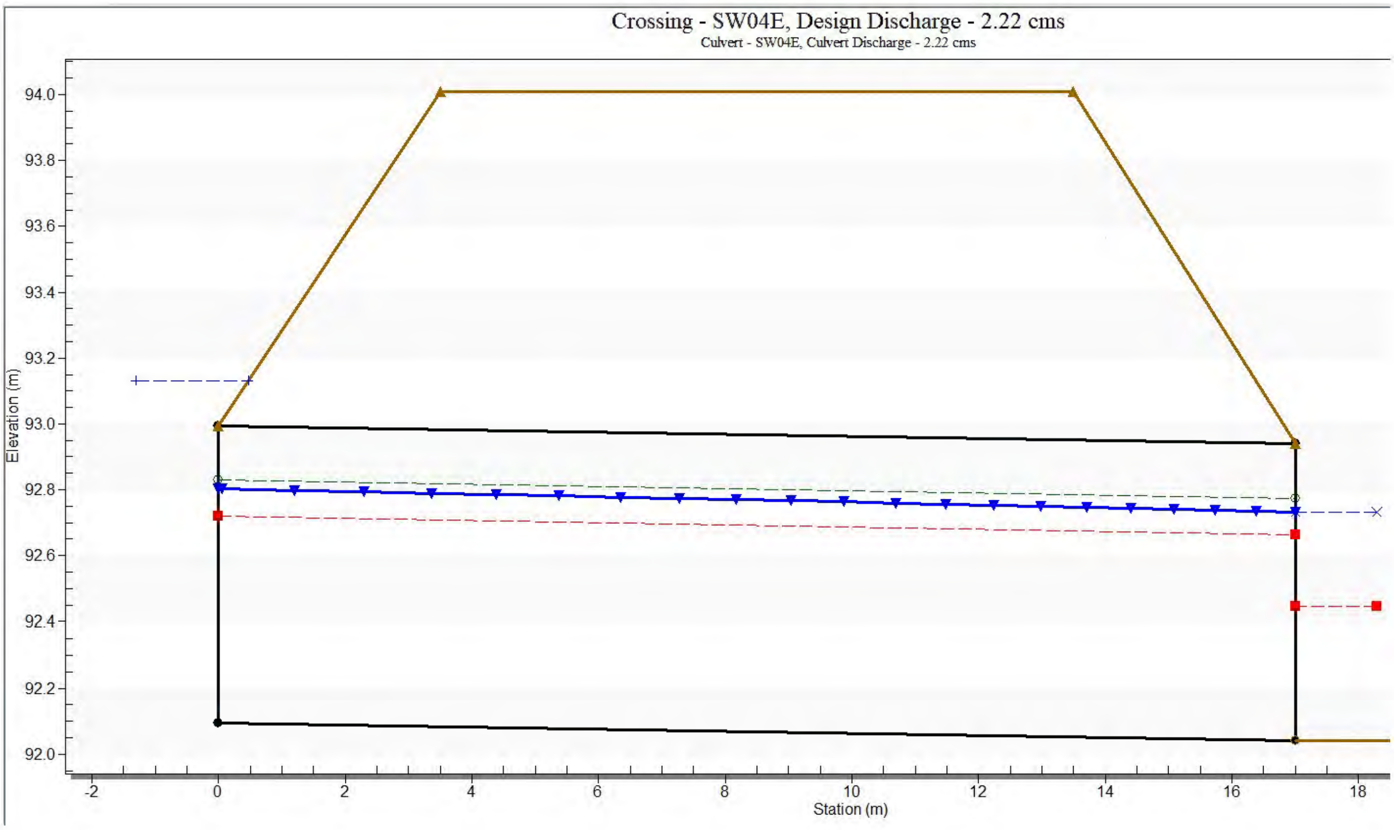
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW04E	
Shape	Circular	
Material	Concrete	
Diameter	900.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	92.095	m
Outlet Station	17.000	m
Outlet Elevation	92.040	m
Number of Barrels	2	
Computed Culvert Slope	0.003235	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2.22	2.22	93.13	1.01	**1.04**	3-M2t	0.73	0.62	0.69	0.69	2.12	0.79



Crossing Data - SW04F

Crossing Properties

Name: SW04F

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	2.225	cms
Design Flow	2.225	cms
Maximum Flow	2.225	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0021	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	91.910	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	93.850	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW04F

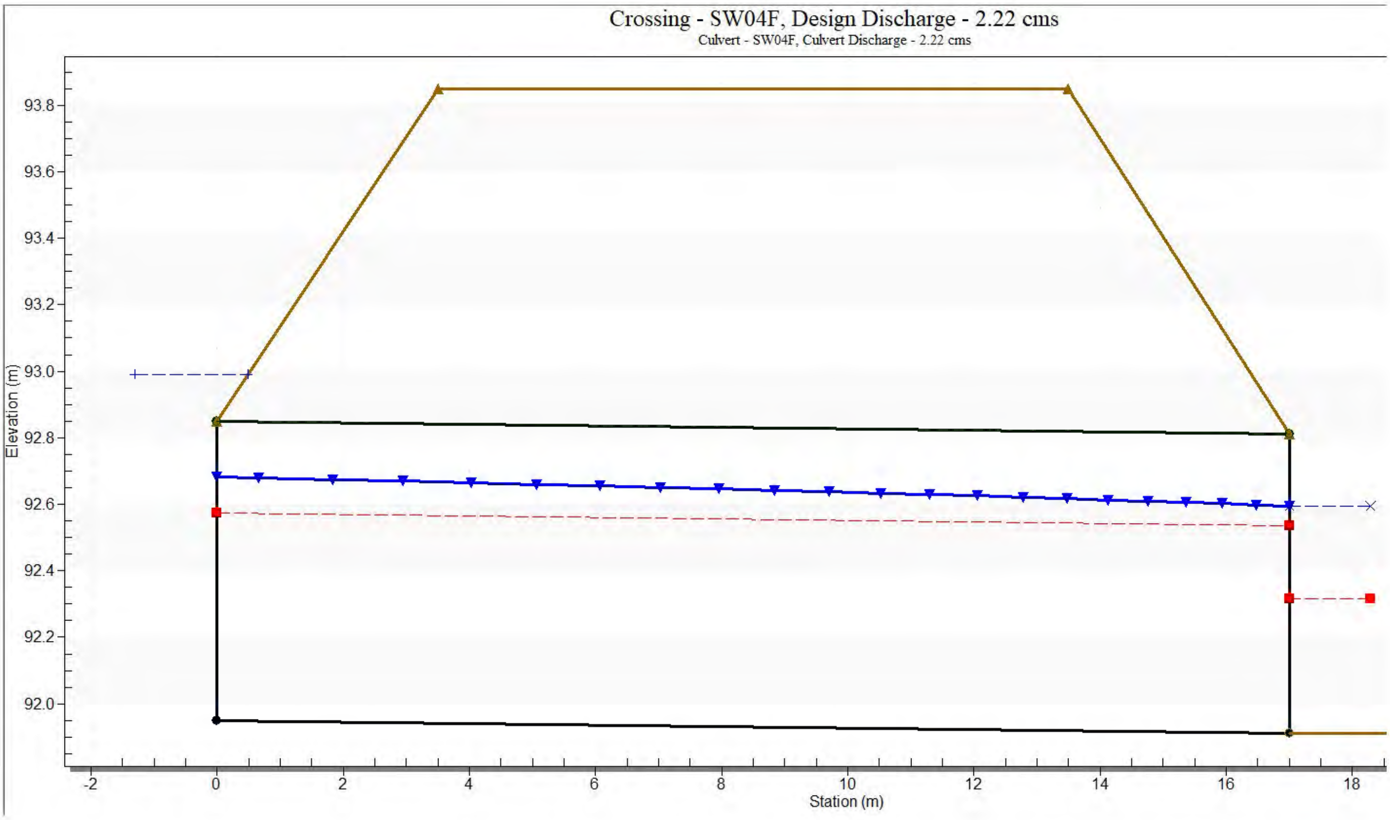
Add Culvert

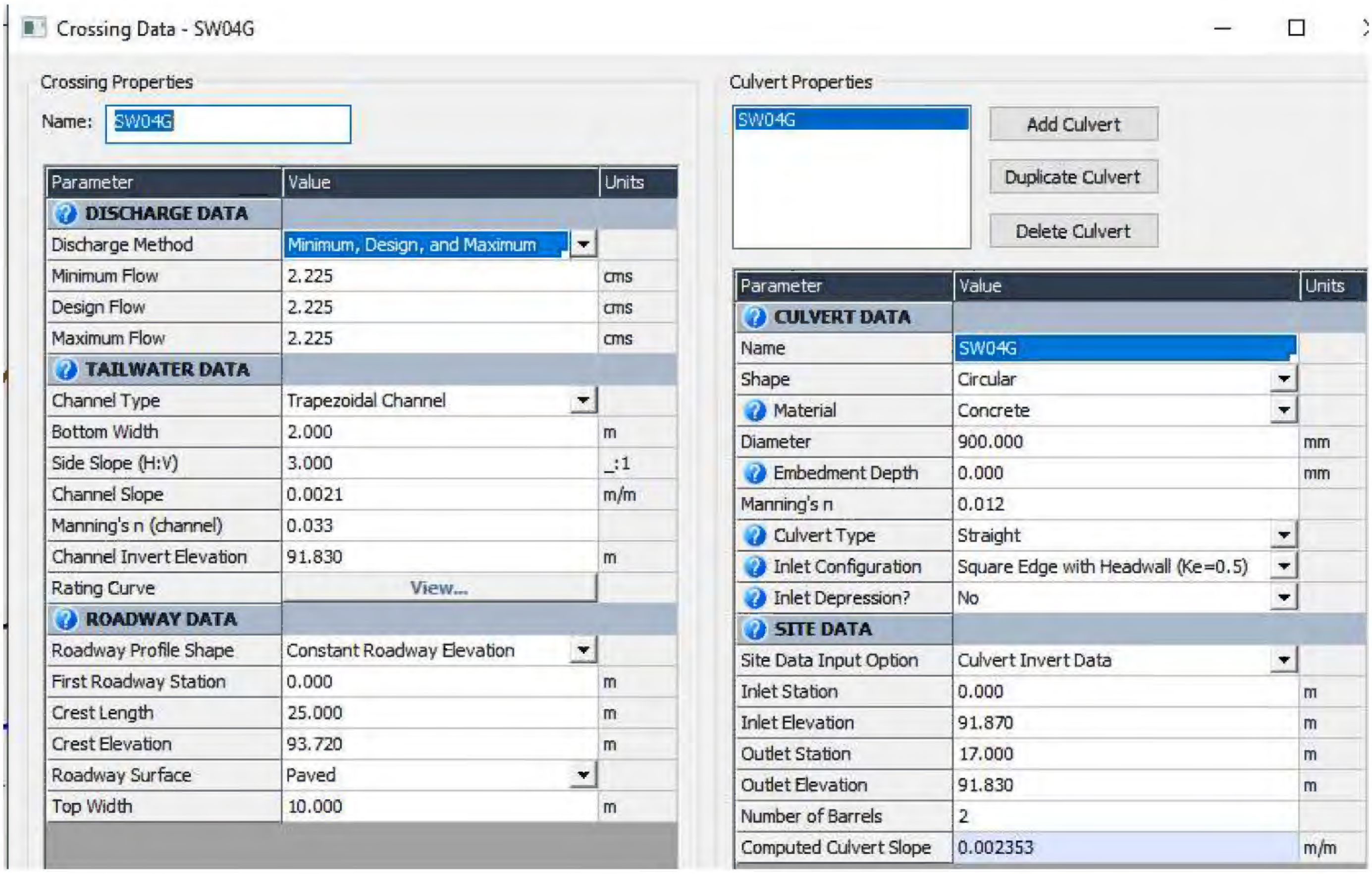
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW04F	
Shape	Circular	
Material	Concrete	
Diameter	900.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	91.949	m
Outlet Station	17.000	m
Outlet Elevation	91.910	m
Number of Barrels	2	
Computed Culvert Slope	0.002294	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2.22	2.22	92.99	1.01	**1.04**	3-M2t	0.90	0.62	0.68	0.68	2.14	0.80





Crossing Data - SW04G

Crossing Properties

Name: SW04G

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	2.225	cms
Design Flow	2.225	cms
Maximum Flow	2.225	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0021	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	91.830	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	93.720	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW04G

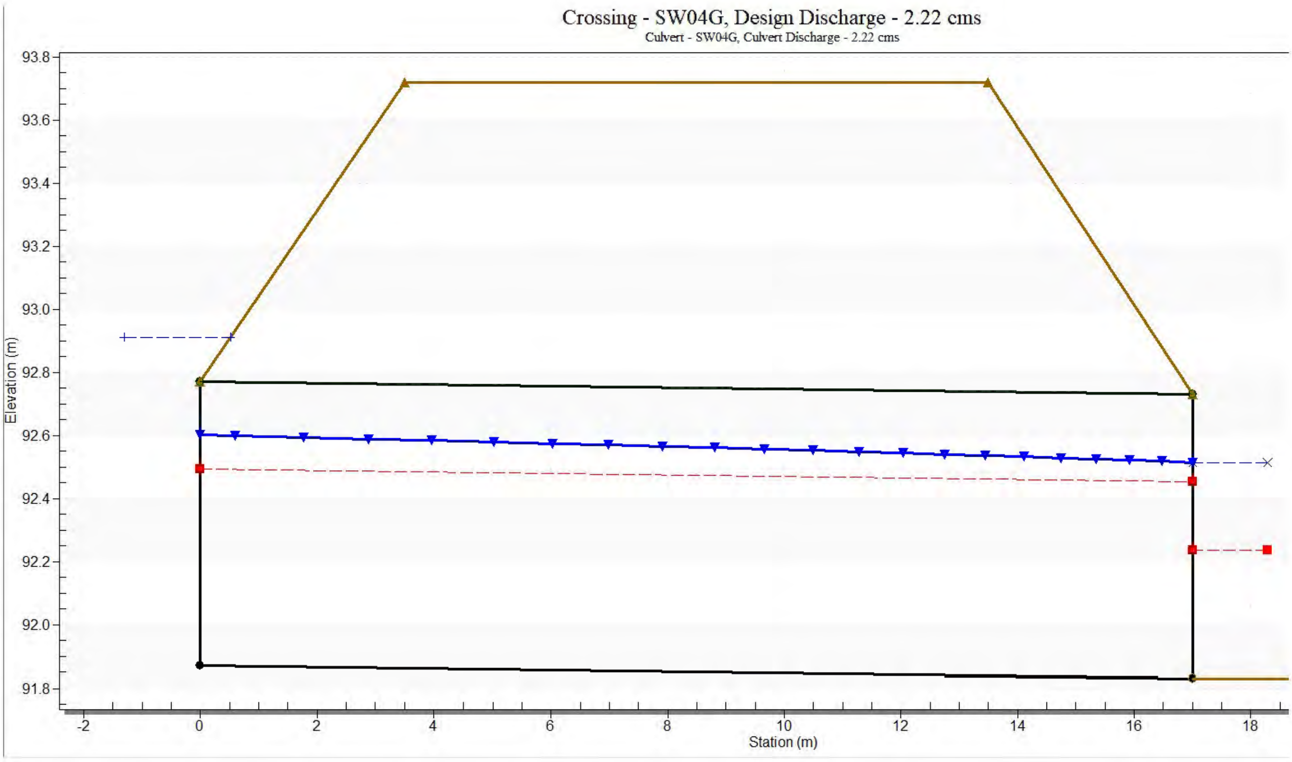
Add Culvert

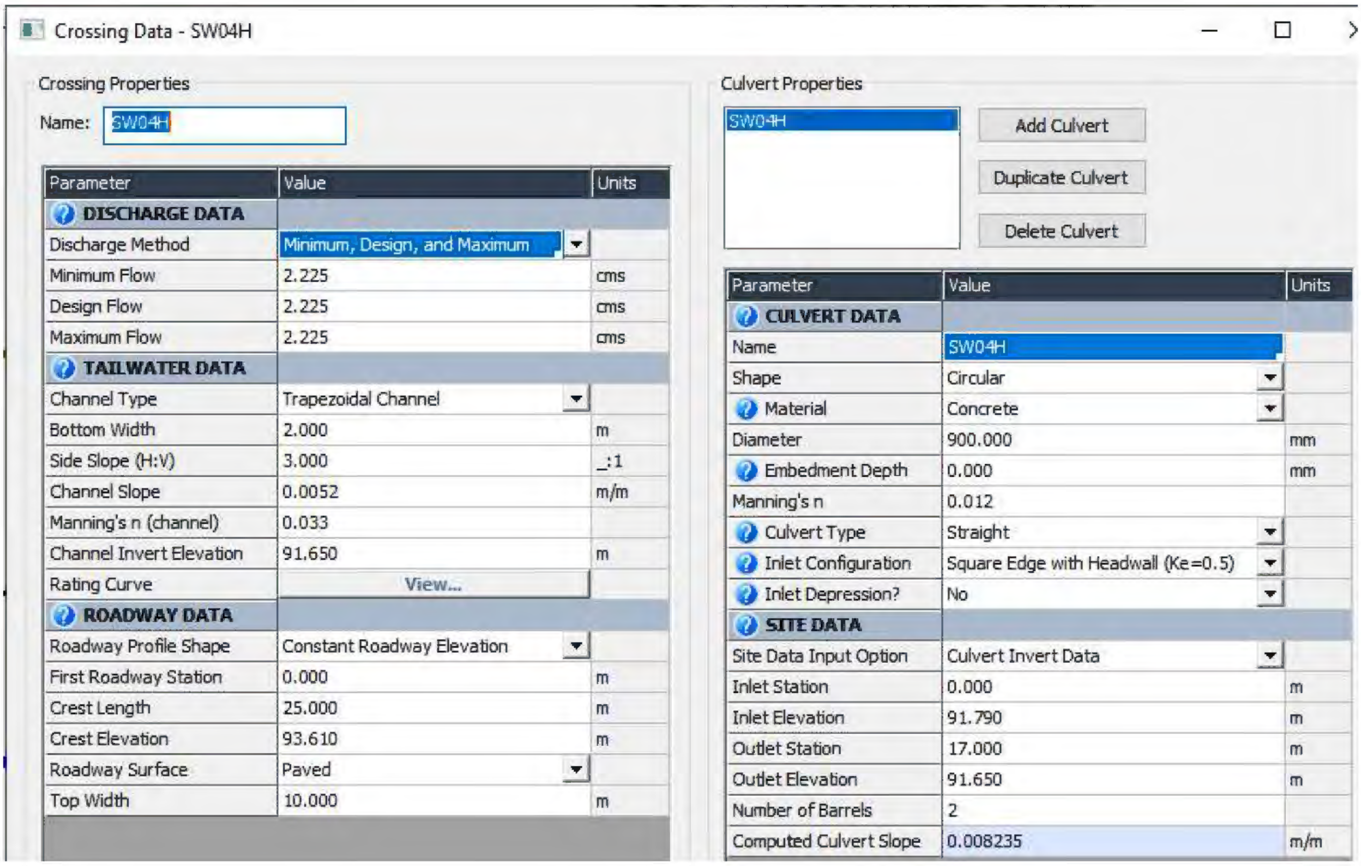
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW04G	
Shape	Circular	
Material	Concrete	
Diameter	900.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	91.870	m
Outlet Station	17.000	m
Outlet Elevation	91.830	m
Number of Barrels	2	
Computed Culvert Slope	0.002353	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2.22	2.22	92.91	1.01	**1.04**	3-M2t	0.90	0.62	0.68	0.68	2.14	0.80




Crossing Data - SW04H

Crossing Properties

Name: SW04H

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	2.225	cms
Design Flow	2.225	cms
Maximum Flow	2.225	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0052	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	91.650	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	93.610	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW04H

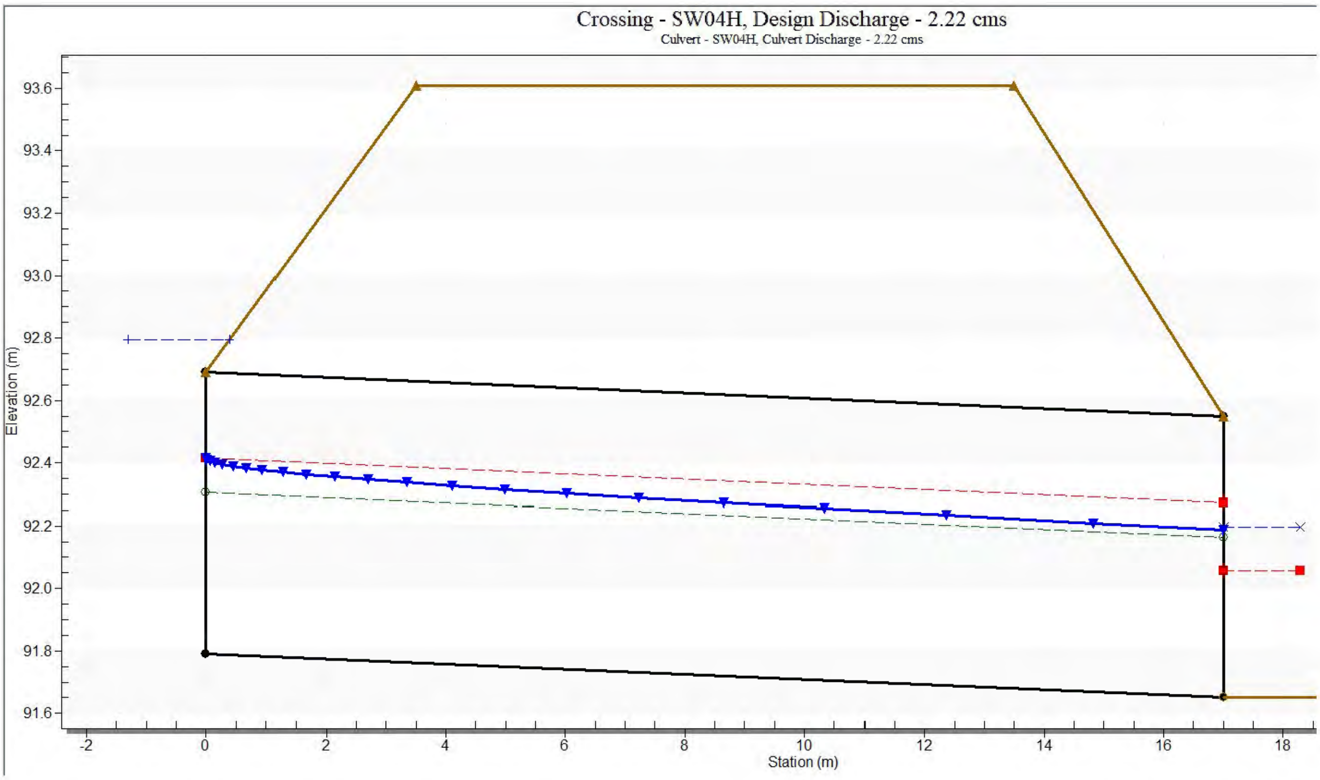
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW04H	
Shape	Circular	
Material	Concrete	
Diameter	900.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	91.790	m
Outlet Station	17.000	m
Outlet Elevation	91.650	m
Number of Barrels	2	
Computed Culvert Slope	0.008235	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
2.22	2.22	92.79	**1.00**	0.77	5-S2n	0.51	0.62	0.54	0.55	2.80	1.12



Crossing Data - SW05A

Crossing Properties

Name: SW05A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.134	cms
Design Flow	0.134	cms
Maximum Flow	0.134	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0160	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	98.500	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	100.210	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW05A

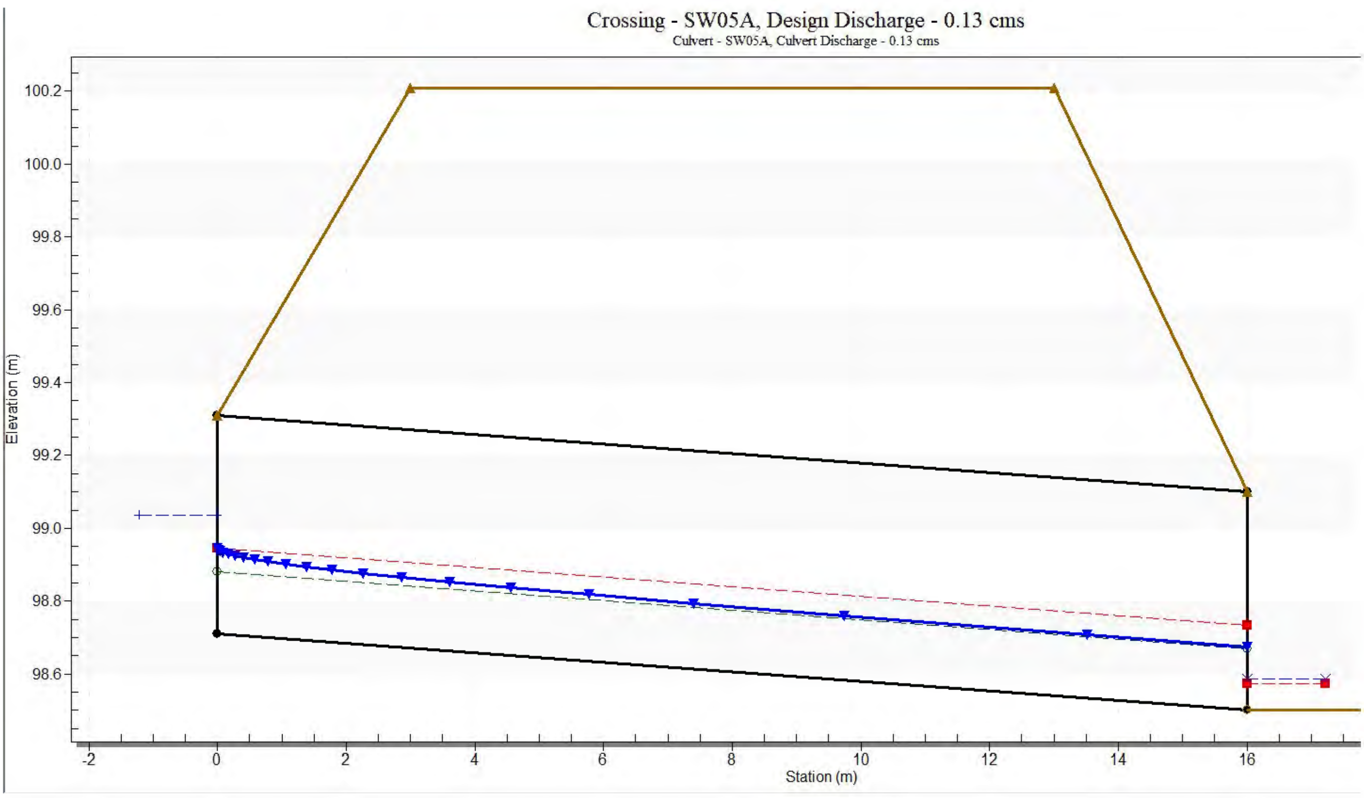
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW05A	
Shape	Circular	
Material	Concrete	
Diameter	600.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	98.710	m
Outlet Station	16.000	m
Outlet Elevation	98.500	m
Number of Barrels	1	
Computed Culvert Slope	0.013125	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.13	0.13	99.04	**0.33**	0.05	1-S2n	0.17	0.23	0.17	0.09	1.97	0.69



Crossing Data - SW05B

Crossing Properties

Name: SW05B

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.134	cms
Design Flow	0.134	cms
Maximum Flow	0.134	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0190	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	97.630	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	99.350	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW05B

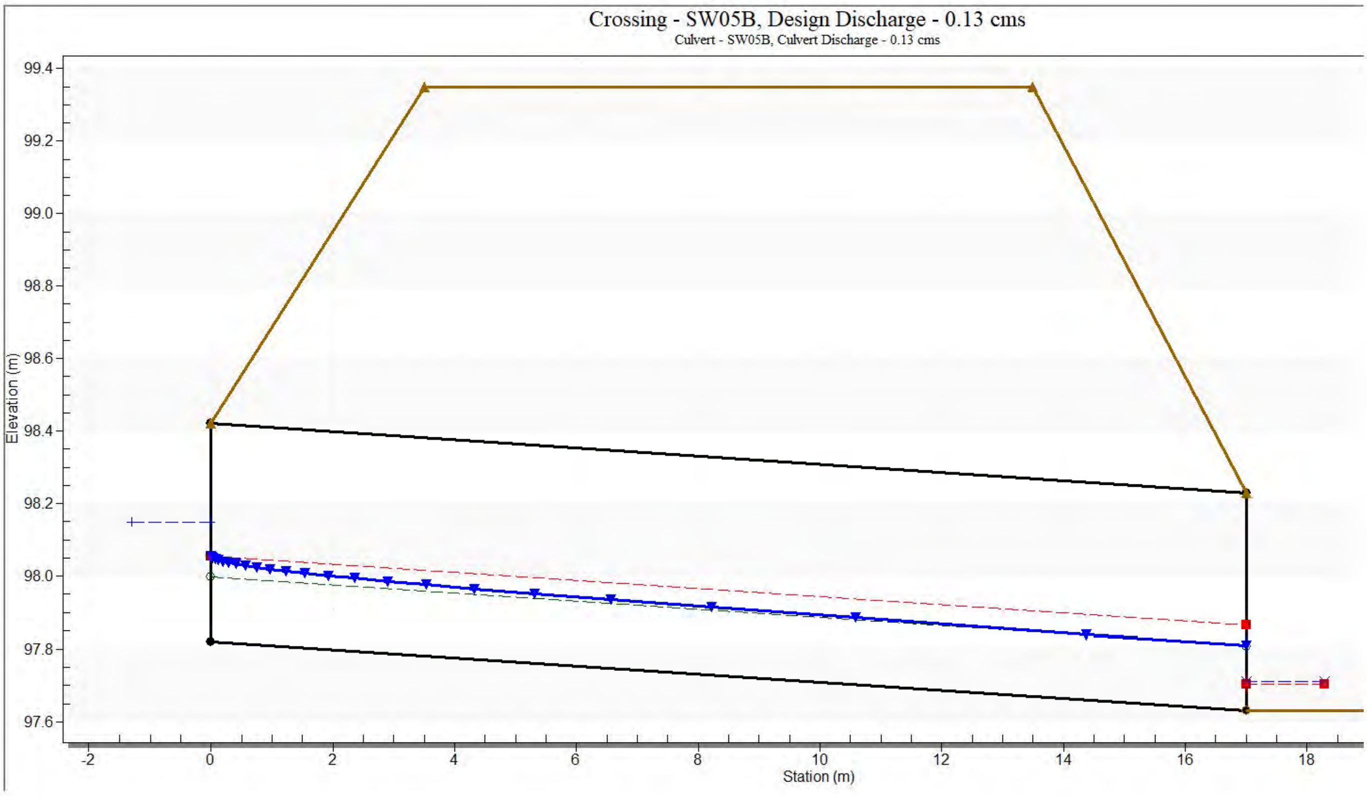
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW05B	
Shape	Circular	
Material	Concrete	
Diameter	600.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	97.820	m
Outlet Station	17.000	m
Outlet Elevation	97.630	m
Number of Barrels	1	
Computed Culvert Slope	0.011176	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.13	0.13	98.15	**0.33**	0.07	1-S2n	0.18	0.23	0.18	0.08	1.88	0.73



Crossing Data - SW05C

Crossing Properties

Name: SW05C

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.682	cms
Design Flow	5.682	cms
Maximum Flow	5.682	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0090	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	95.792	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	97.765	m
Roadway Surface	Paved	
Top Width	12.000	m

Culvert Properties

SW05C

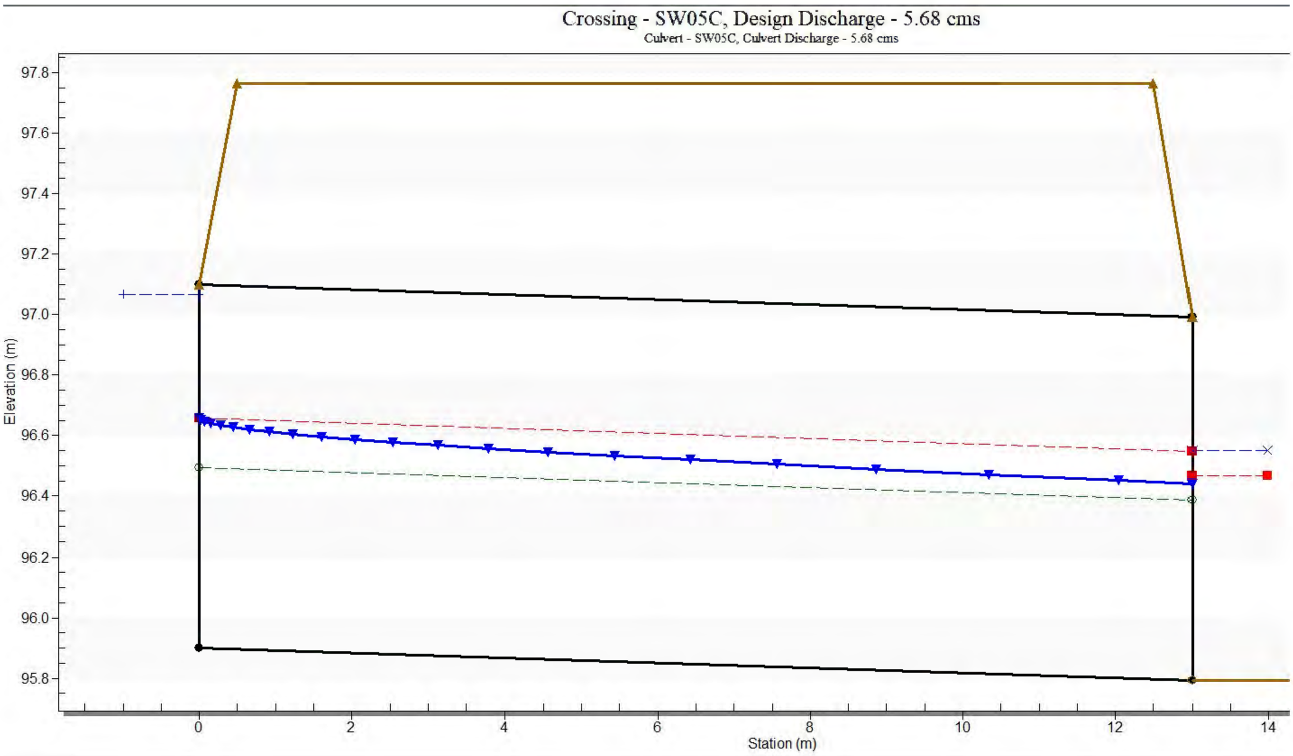
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW05C	
Shape	Circular	
Material	Concrete	
Diameter	1200.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	95.900	m
Outlet Station	13.000	m
Outlet Elevation	95.792	m
Number of Barrels	3	
Computed Culvert Slope	0.008308	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.68	5.68	97.07	**1.17**	0.89	1-S2n	0.59	0.76	0.65	0.76	3.03	1.75



Crossing Data - SW06A

Crossing Properties

Name: SW06A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	5.582	cms
Design Flow	5.582	cms
Maximum Flow	5.582	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0190	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	96.430	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	98.644	m
Roadway Surface	Paved	
Top Width	15.500	m

Culvert Properties

SW06A

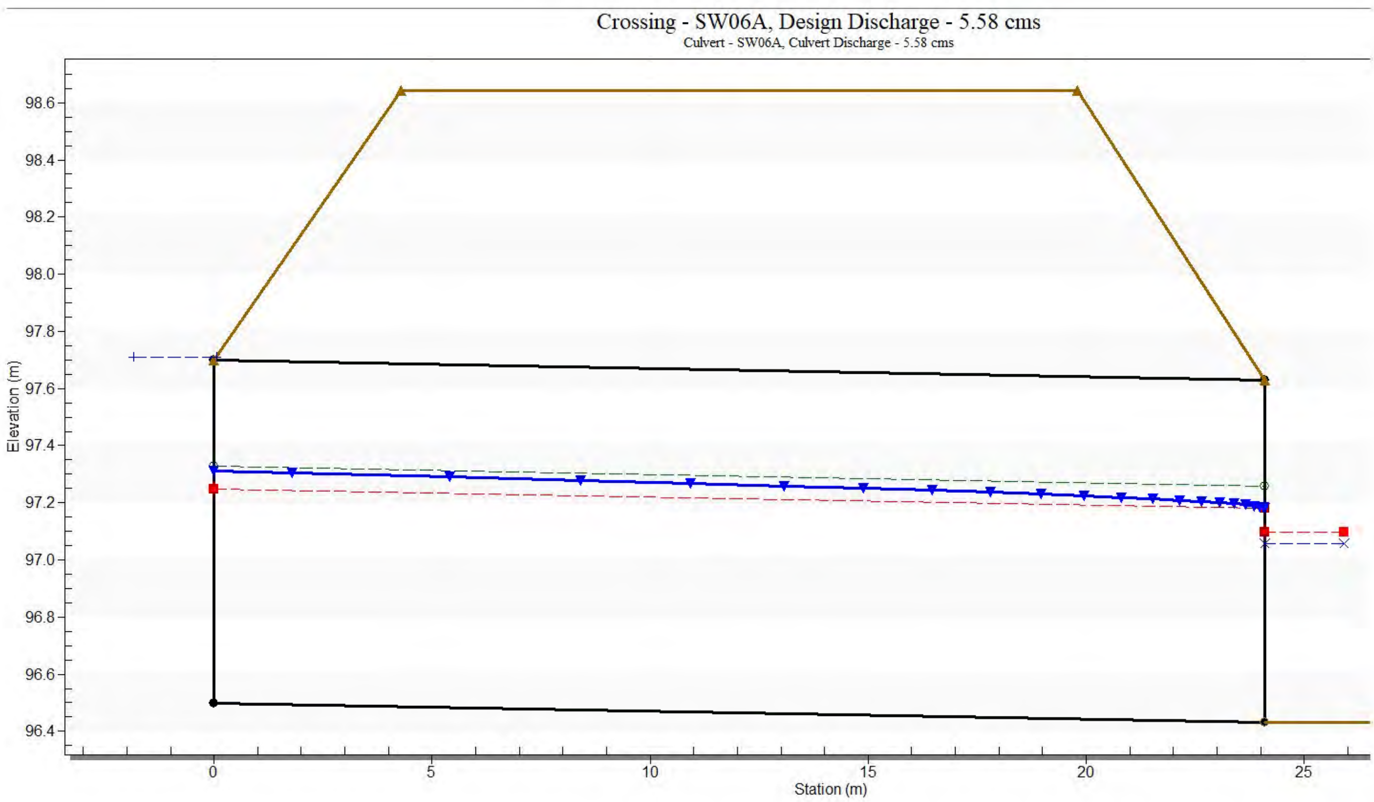
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW06A	
Shape	Circular	
Material	Concrete	
Diameter	1200.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	96.499	m
Outlet Station	24.090	m
Outlet Elevation	96.430	m
Number of Barrels	3	
Computed Culvert Slope	0.002864	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
5.58	5.58	97.71	1.16	**1.21**	7-M2c	0.83	0.75	0.75	0.63	2.50	2.30



Crossing Data - SW06B

Crossing Properties

Name: SW06B

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.100	cms
Design Flow	0.100	cms
Maximum Flow	0.100	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0117	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	102.200	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	104.070	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW06B

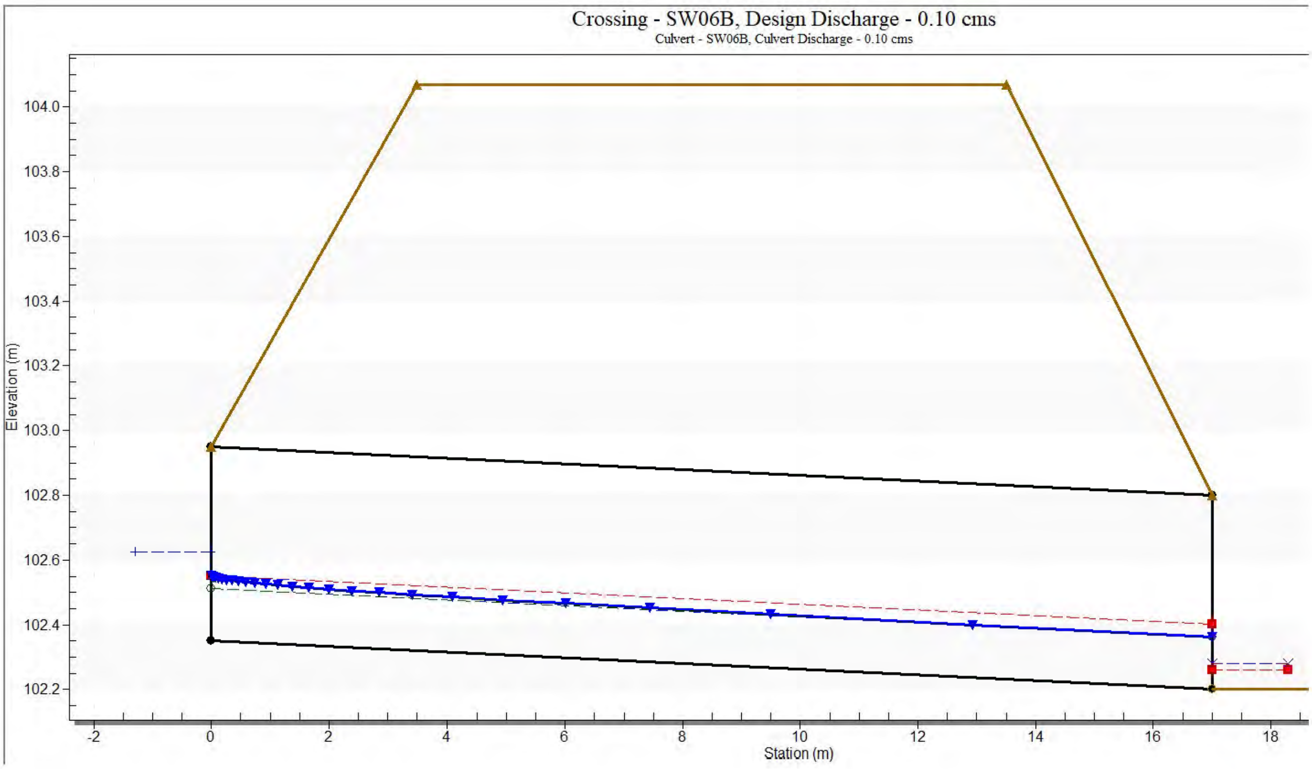
Add Culvert

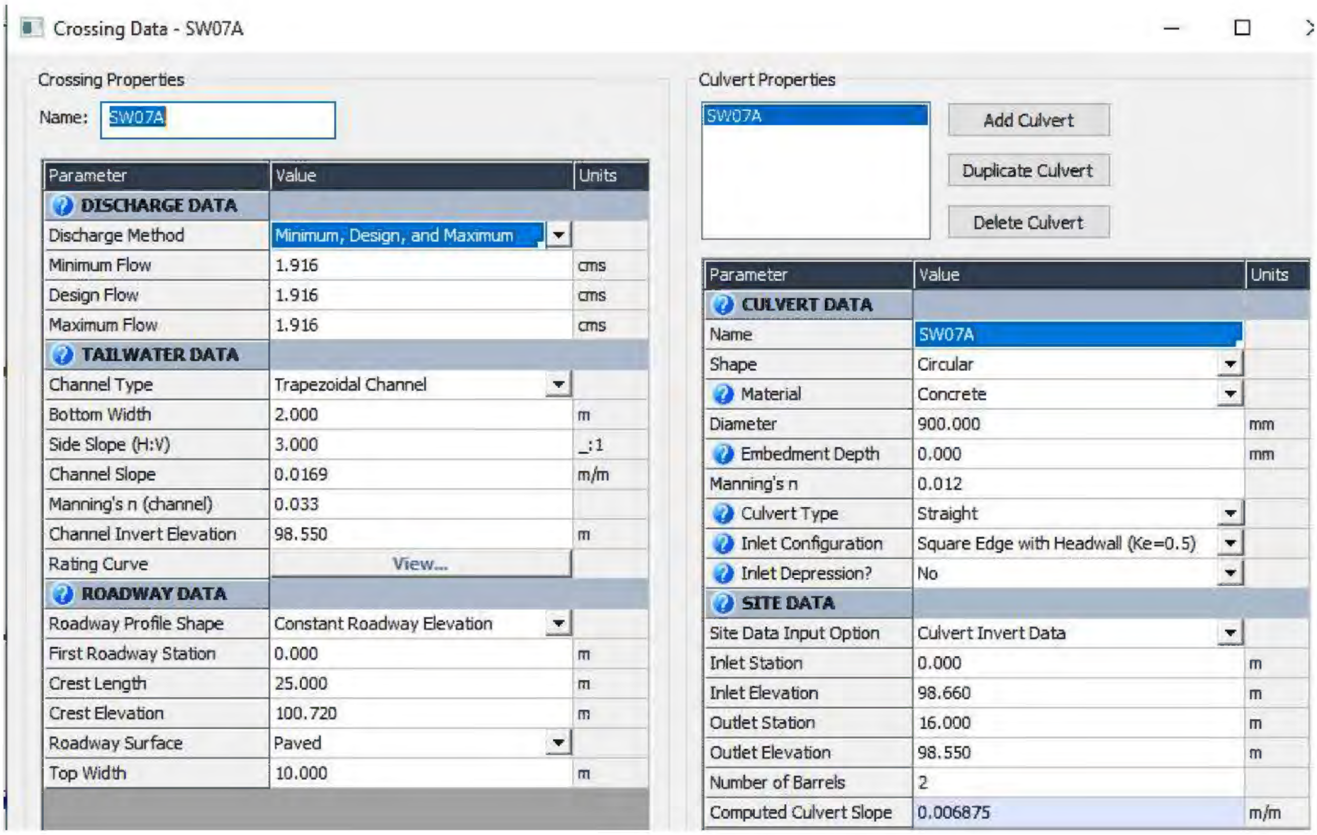
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW06B	
Shape	Circular	
Material	Concrete	
Diameter	600.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	102.350	m
Outlet Station	17.000	m
Outlet Elevation	102.200	m
Number of Barrels	1	
Computed Culvert Slope	0.008824	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.10	0.10	102.63	**0.28**	0.06	1-S2n	0.16	0.20	0.16	0.08	1.60	0.56





Crossing Data - SW07A

Crossing Properties

Name: SW07A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	1.916	cms
Design Flow	1.916	cms
Maximum Flow	1.916	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0169	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	98.550	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	100.720	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW07A

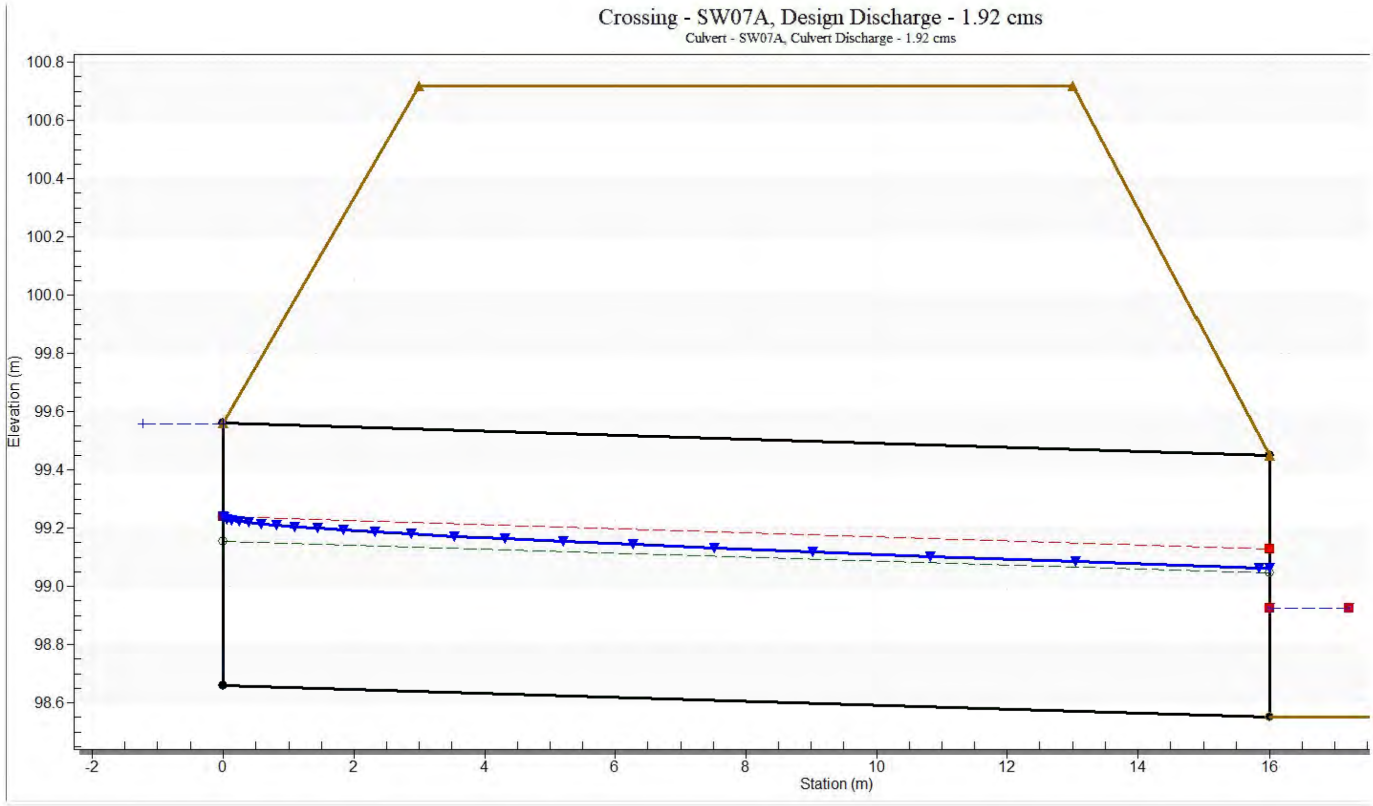
Add Culvert

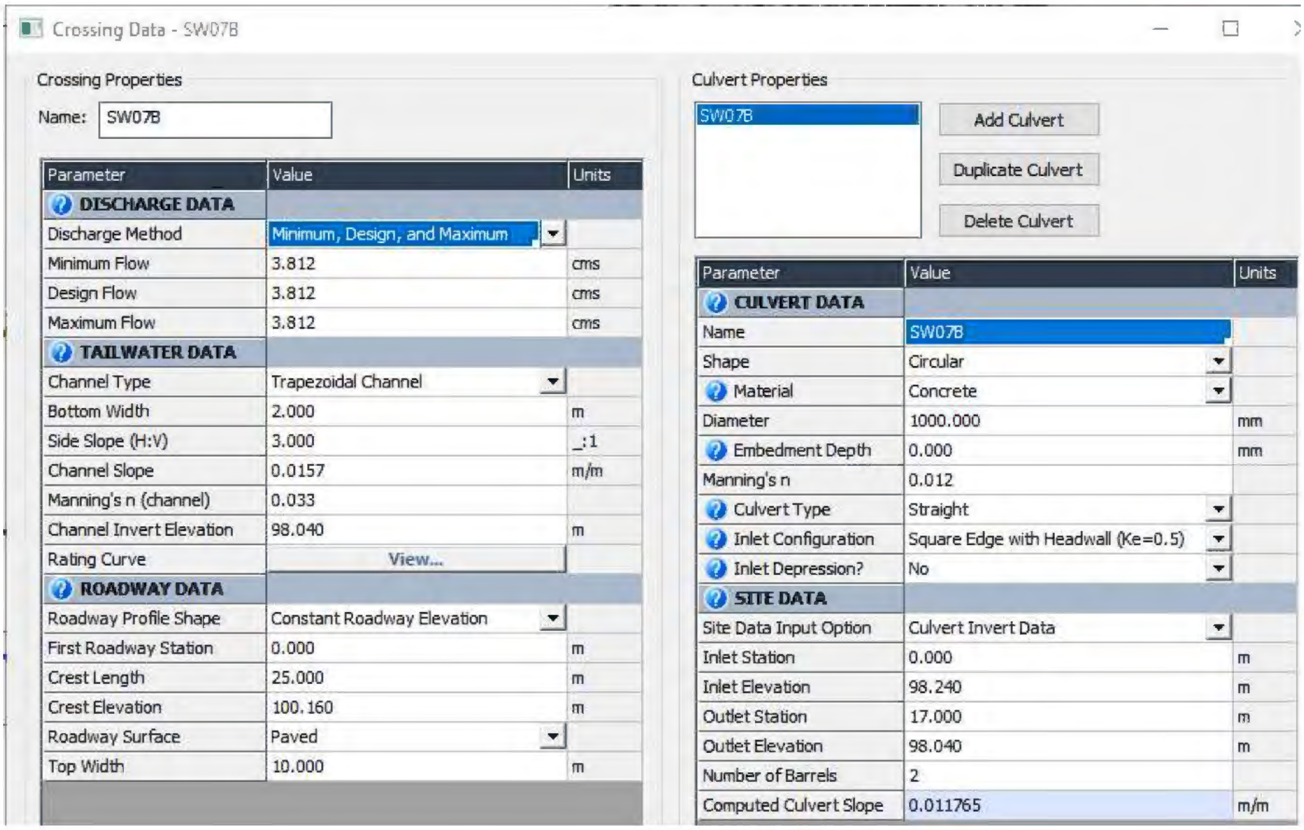
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW07A	
Shape	Circular	
Material	Concrete	
Diameter	900.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	98.660	m
Outlet Station	16.000	m
Outlet Elevation	98.550	m
Number of Barrels	2	
Computed Culvert Slope	0.006875	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1.92	1.92	99.56	**0.90**	0.68	1-S2n	0.50	0.58	0.51	0.37	2.57	1.64





Crossing Data - SW07B

Crossing Properties

Name: SW07B

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	3.812	cms
Design Flow	3.812	cms
Maximum Flow	3.812	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0157	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	98.040	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	100.160	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW07B

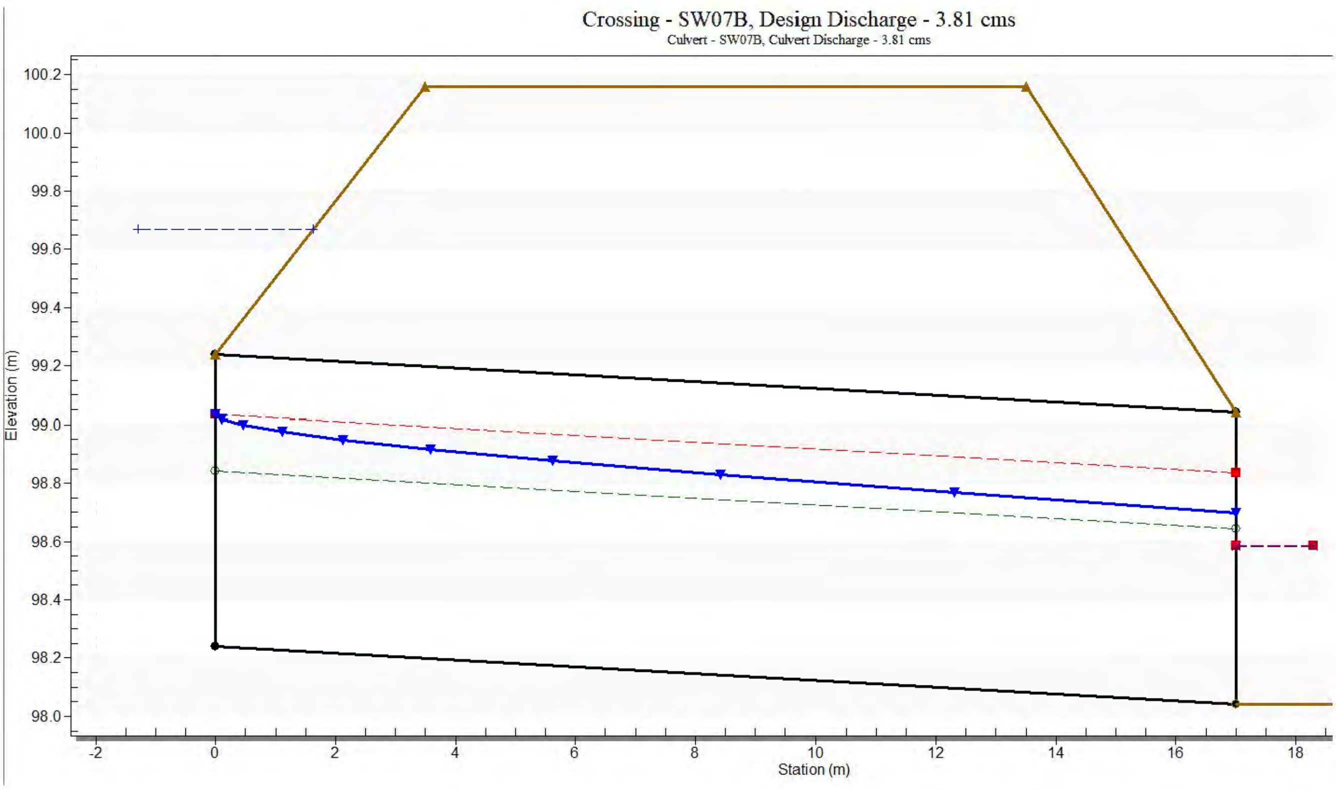
Add Culvert

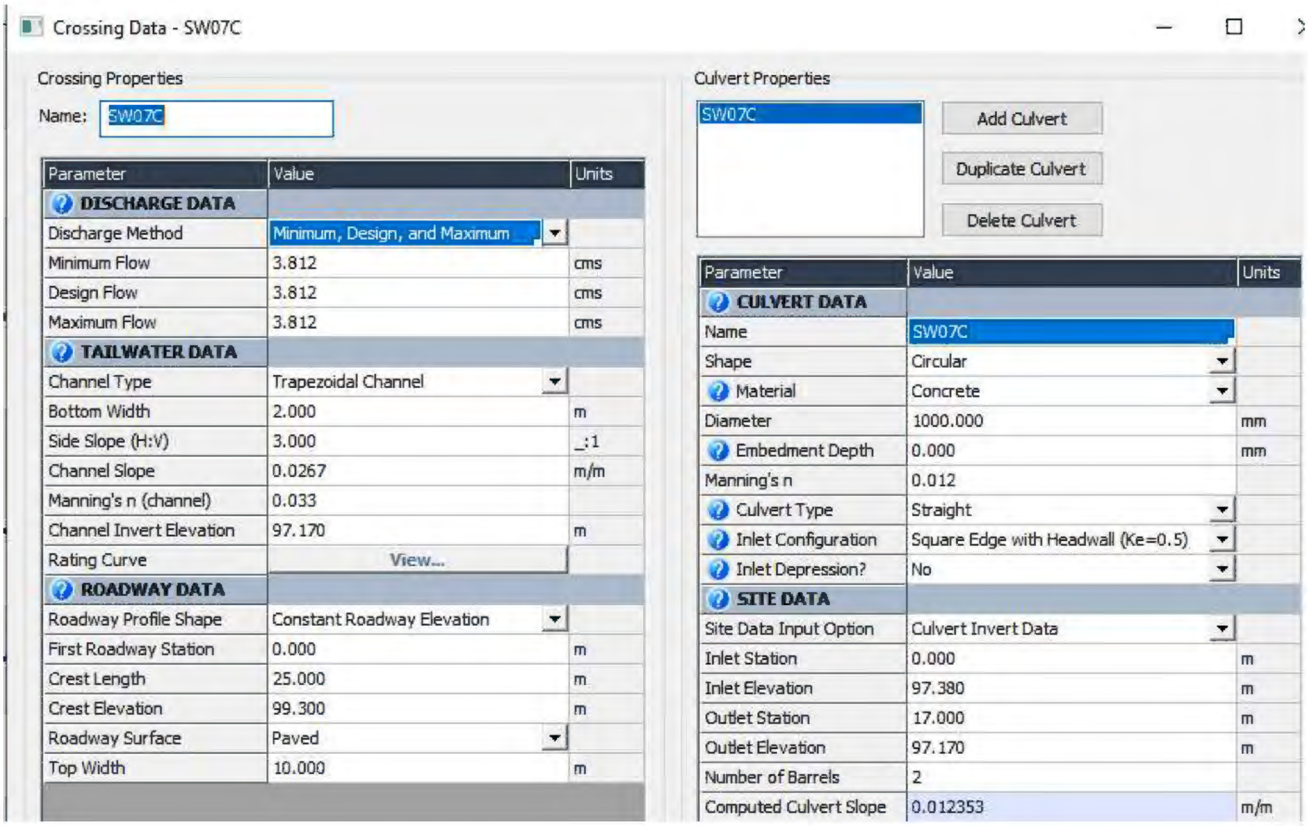
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW07B	
Shape	Circular	
Material	Concrete	
Diameter	1000.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	98.240	m
Outlet Station	17.000	m
Outlet Elevation	98.040	m
Number of Barrels	2	
Computed Culvert Slope	0.011765	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
3.81	3.81	99.67	**1.43**	1.24	5-S2n	0.60	0.79	0.66	0.54	3.47	1.93





Crossing Data - SW07C

Crossing Properties

Name: SW07C

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	3.812	cms
Design Flow	3.812	cms
Maximum Flow	3.812	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	2.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0267	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	97.170	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	99.300	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW07C

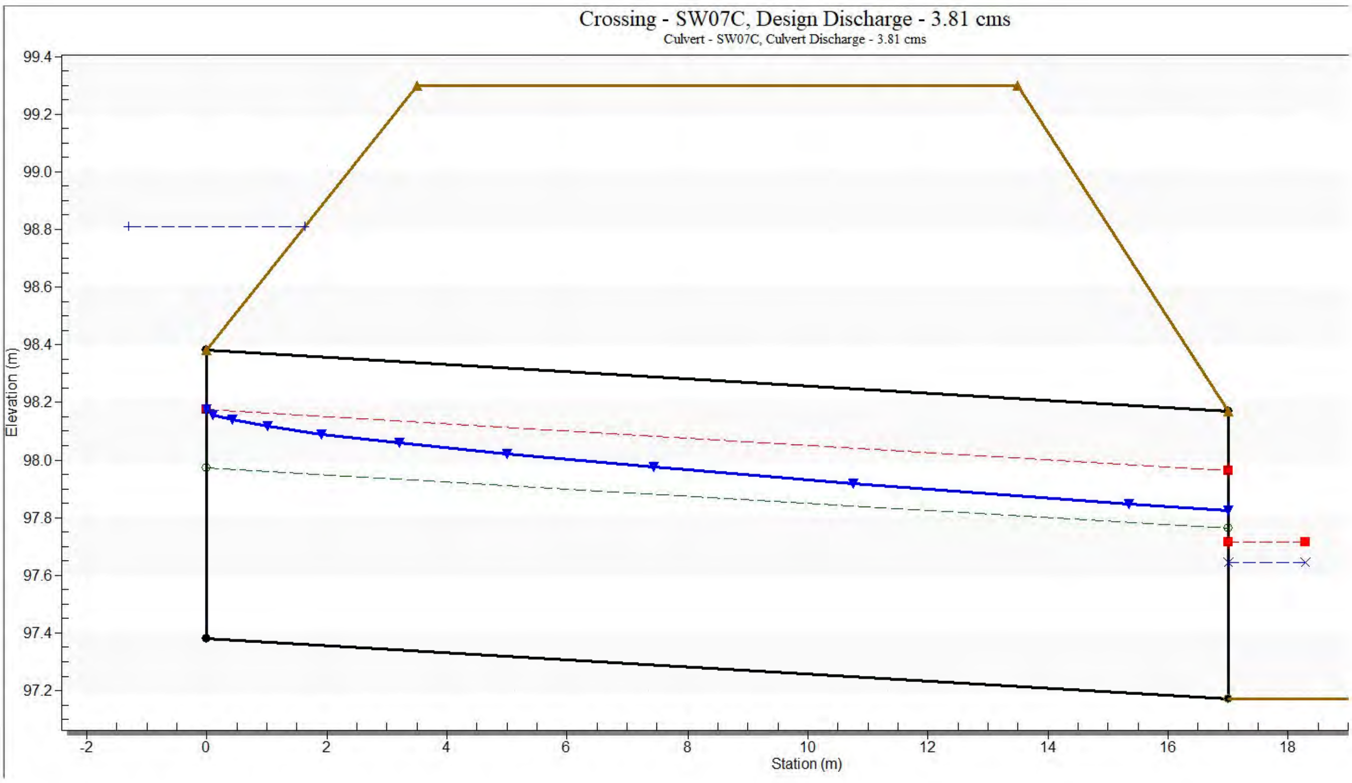
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW07C	
Shape	Circular	
Material	Concrete	
Diameter	1000.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	97.380	m
Outlet Station	17.000	m
Outlet Elevation	97.170	m
Number of Barrels	2	
Computed Culvert Slope	0.012353	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
3.81	3.81	98.81	**1.43**	1.23	5-S2n	0.59	0.79	0.65	0.48	3.51	2.34



Crossing Data - SW09A

Crossing Properties

Name: SW09A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.037	cms
Design Flow	0.037	cms
Maximum Flow	0.037	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	1.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0027	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	95.050	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	97.611	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW-09A

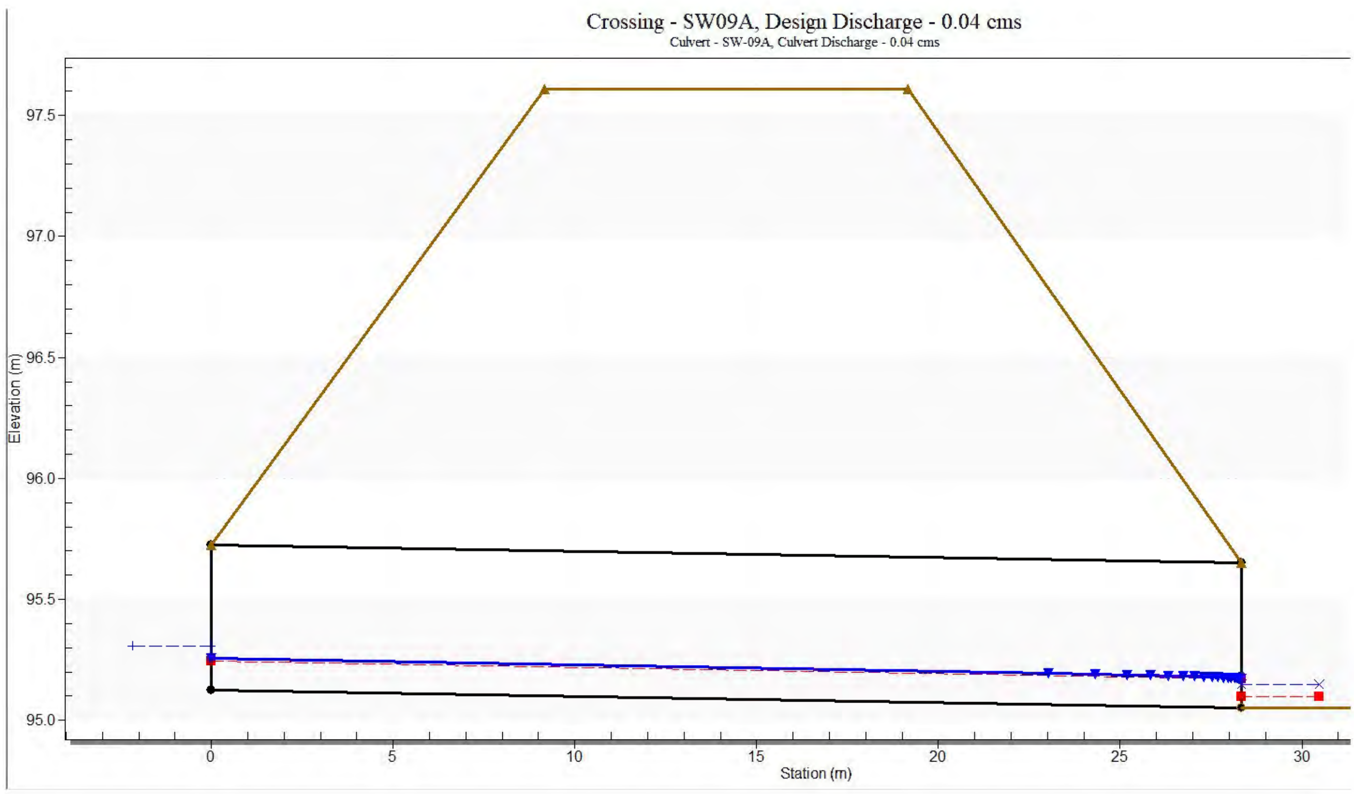
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW-09A	
Shape	Circular	
Material	Concrete	
Diameter	600.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	95.126	m
Outlet Station	28.330	m
Outlet Elevation	95.050	m
Number of Barrels	1	
Computed Culvert Slope	0.002683	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.04	0.04	95.31	0.16	**0.18**	2-M2c	0.13	0.12	0.12	0.10	0.91	0.29



Crossing Data - SW09B

Crossing Properties

Name: SW09B

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.065	cms
Design Flow	0.065	cms
Maximum Flow	0.065	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	1.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0027	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	94.803	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	96.824	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW09B

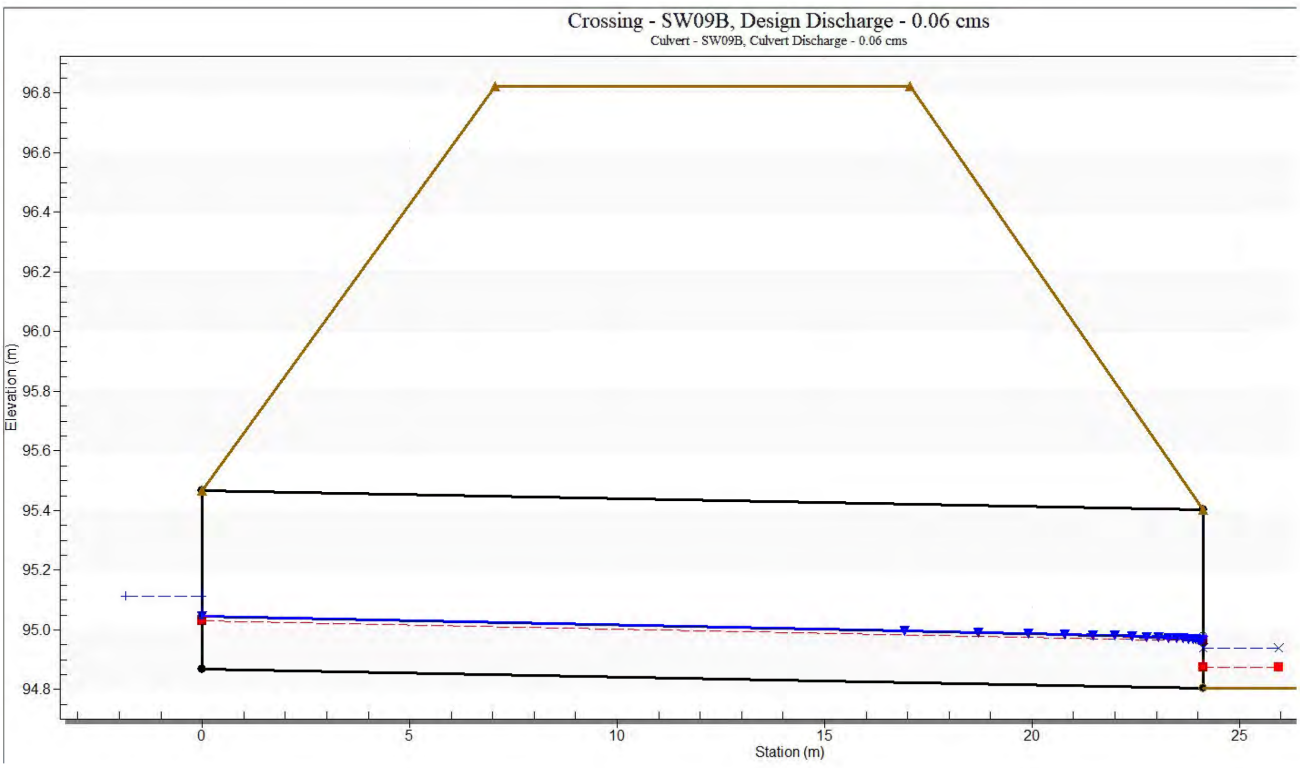
Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW09B	
Shape	Circular	
Material	Concrete	
Diameter	600.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	94.868	m
Outlet Station	24.120	m
Outlet Elevation	94.803	m
Number of Barrels	1	
Computed Culvert Slope	0.002695	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.06	0.06	95.11	0.22	**0.24**	2-M2c	0.18	0.16	0.16	0.13	1.06	0.34



Crossing Data - SW09C

Crossing Properties

Name: SW09C

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	0.643	cms
Design Flow	0.643	cms
Maximum Flow	0.643	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	1.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0100	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	94.554	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	96.099	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW09C

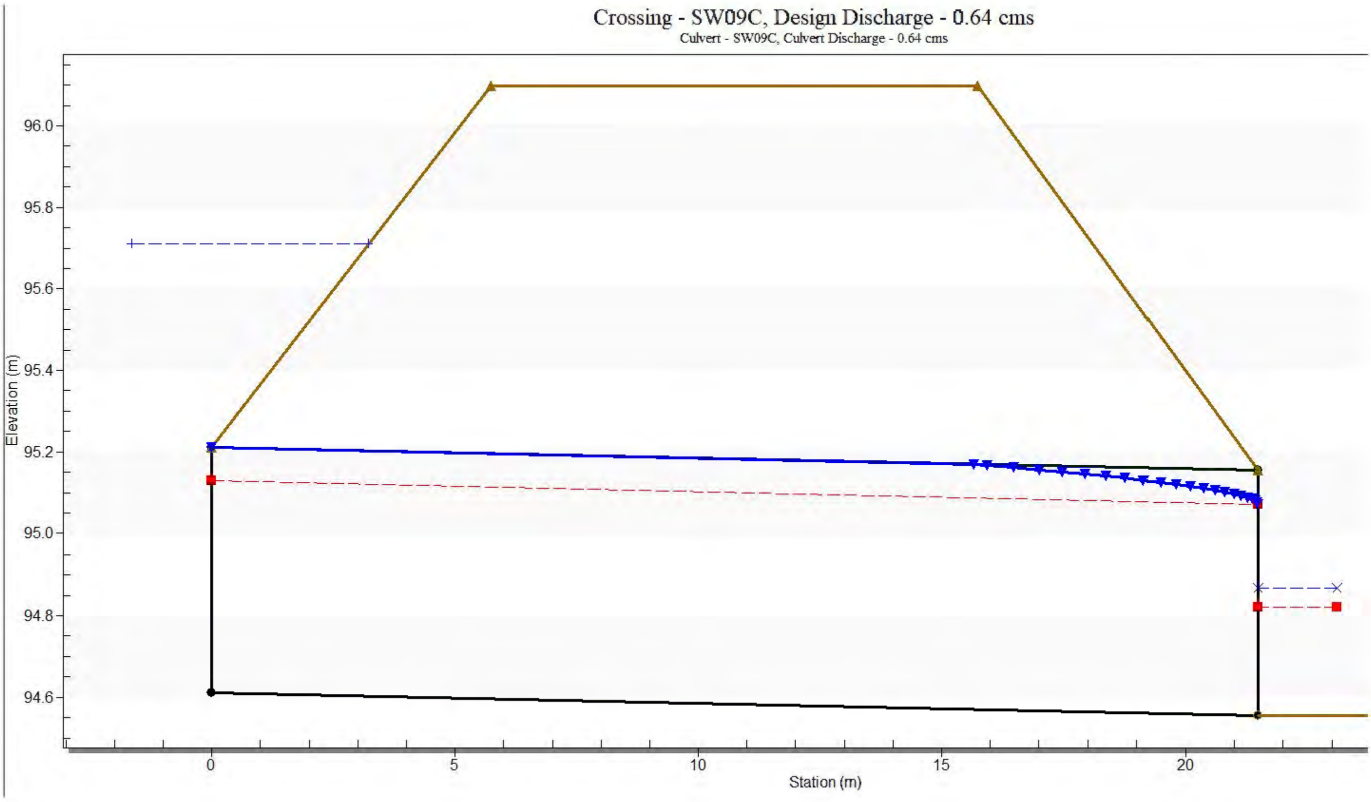
Add Culvert

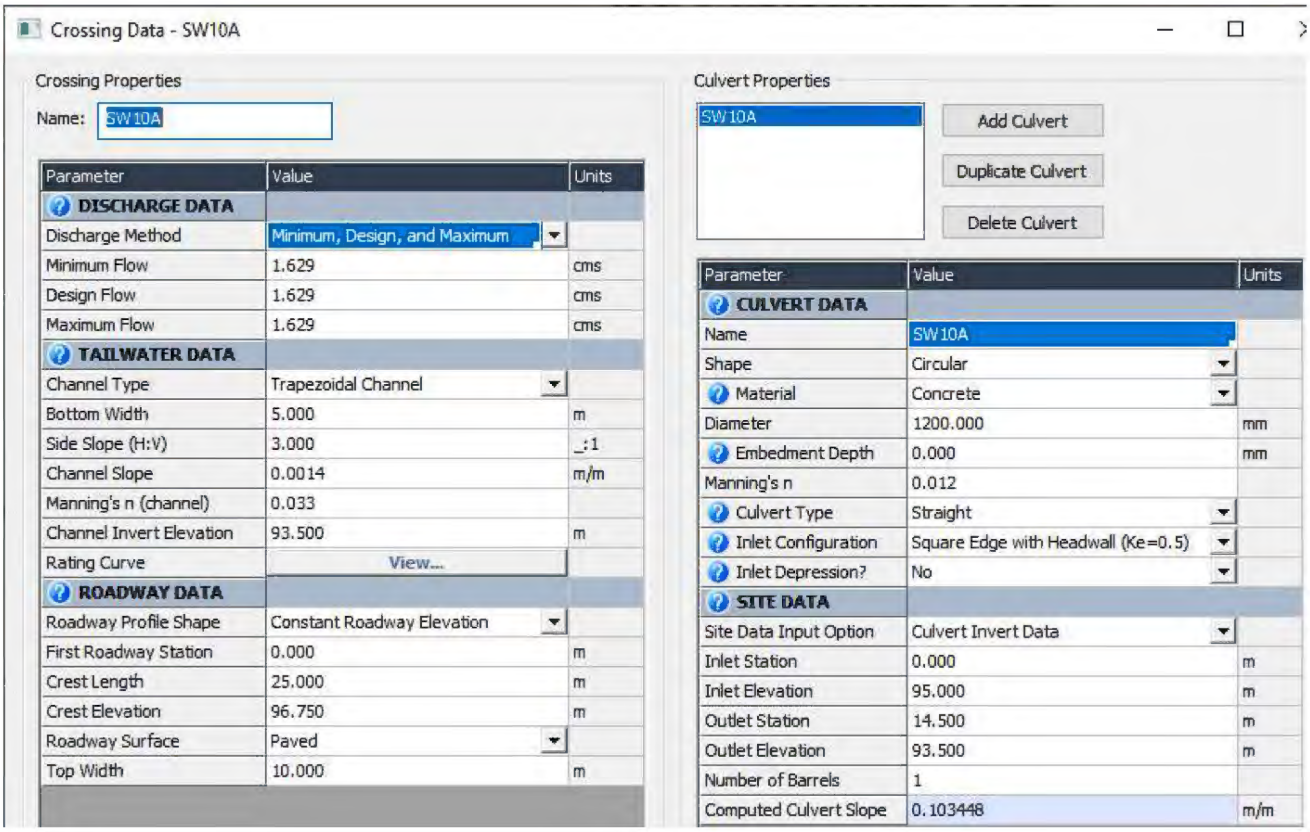
Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW09C	
Shape	Circular	
Material	Concrete	
Diameter	600.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	94.612	m
Outlet Station	21.480	m
Outlet Elevation	94.554	m
Number of Barrels	1	
Computed Culvert Slope	0.002700	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
0.64	0.64	95.71	1.07	**1.10**	7-M2c	0.60	0.52	0.52	0.31	2.48	1.05





Crossing Data - SW10A

Crossing Properties

Name: SW10A

Parameter	Value	Units
DISCHARGE DATA		
Discharge Method	Minimum, Design, and Maximum	
Minimum Flow	1.629	cms
Design Flow	1.629	cms
Maximum Flow	1.629	cms
TAILWATER DATA		
Channel Type	Trapezoidal Channel	
Bottom Width	5.000	m
Side Slope (H:V)	3.000	_:1
Channel Slope	0.0014	m/m
Manning's n (channel)	0.033	
Channel Invert Elevation	93.500	m
Rating Curve	View...	
ROADWAY DATA		
Roadway Profile Shape	Constant Roadway Elevation	
First Roadway Station	0.000	m
Crest Length	25.000	m
Crest Elevation	96.750	m
Roadway Surface	Paved	
Top Width	10.000	m

Culvert Properties

SW10A

Add Culvert

Duplicate Culvert

Delete Culvert

Parameter	Value	Units
CULVERT DATA		
Name	SW10A	
Shape	Circular	
Material	Concrete	
Diameter	1200.000	mm
Embedment Depth	0.000	mm
Manning's n	0.012	
Culvert Type	Straight	
Inlet Configuration	Square Edge with Headwall (Ke=0.5)	
Inlet Depression?	No	
SITE DATA		
Site Data Input Option	Culvert Invert Data	
Inlet Station	0.000	m
Inlet Elevation	95.000	m
Outlet Station	14.500	m
Outlet Elevation	93.500	m
Number of Barrels	1	
Computed Culvert Slope	0.103448	m/m

Total Discharge (cms)	Culvert Discharge (cms)	Headwater Elevation (m)	Inlet Control Depth(m)	Outlet Control Depth(m)	Flow Type	Normal Depth (m)	Critical Depth (m)	Outlet Depth (m)	Tailwater Depth (m)	Outlet Velocity (m/s)	Tailwater Velocity (m/s)
1.63	1.63	96.00	**1.00**	0.0*	1-S2n	0.28	0.70	0.35	0.45	5.89	0.58