Site address: 50 Westney Road Job No.: 1636-02 Designer: JDP

Date : 10/07/2024

### **TP108** Rainfall Method

TP108 Storm depth =

2 yr ARI	(50% AEP)		mm
5 yr ARI	(20% AEP)		mm
10 yr ARI	(10% AEP)	130	mm
20 yr ARI	(5% AEP)		mm
50 yr ARI	(2% AEP)		mm
100 yr ARI	(1% AEP)	186	mm
	2 yr ARI 5 yr ARI 10 yr ARI 20 yr ARI 50 yr ARI 100 yr ARI	2 yr ARI (50% AEP) 5 yr ARI (20% AEP) 10 yr ARI (10% AEP) 20 yr ARI (5% AEP) 50 yr ARI (2% AEP) 100 yr ARI (1% AEP)	2 yr ARI       (50% AEP)         5 yr ARI       (20% AEP)         10 yr ARI       (10% AEP)         20 yr ARI       (5% AEP)         50 yr ARI       (2% AEP)         100 yr ARI       (1% AEP)         180       186

### Climate change adjusted percentage increase:

Annual Exceedence Probability	Percentage increase in 24-Hour Design Rainfall	Climate adjusted rainfall depth
(AEP)	Depth Due to Future Climate Change	(mm)
50%	15.1%	NA
20%	16.4%	NA
10%	17.0%	152.1
5%	31.2%	NA
2%	31.9%	NA
1%	32.7%	246.8

### Conversion of Depth to intensity (peak Intensity)

Table 2.1 Normalised 24 hr Design (TP108)

Storm Depth	Corresponding 10 min storm intensity (mm/hr)
152.1	112
246.8	191

Site address: 50 Westney Road Job No.: 1636-02 Designer: JDP Date : 20/12/2024



### **TP108** calculation - Proposed catchment:

		Pre Dev 50	Pre Dev 50	Post Dev 50
		Westney road 100	Westney road 100	Westney road 100
		Year - A only	Year - Total Excl A	Year - Total
Catchment number	>	Α	All except A	All
Impervious Area	ha	0.387	10.544	14.031
Pervious Area	ha	0.625	3.379	0.904
Total area	ha	1.012	13.923	14.936
% Impervious		0.383	0.757	0.939
Catchment Slope (S <sub>c</sub> )	m/m	0.02	0.02	0.02
Catchment Length (I)	km	0.12	0.50	0.50
Channelisation Factor (C)		0.8	1	0.8
Hydrological Soil Group		Group_C	Group_C	Group_C
SCS Curve Number (CN)		74	74	74
24-Hour Rainfall Depth (P <sub>24</sub> )	mm	246.8	246.8	246.8
Weighted Curve Number		96.55	96.55	96.55
Initial Abstraction (Ia) weighted	mm	3.087	1.214	0.303
t <sub>c</sub>	hours	0.17	0.30	0.24
t <sub>p</sub>	hours	0.11	0.20	0.16
Storage (S)	mm	9	9	9
c*=(P24-2Ia)/(P24-2Ia+2S)		0.930	0.931	0.931
q* (from Fig. 6.1)	Approx!!	0.164	0.136	0.147
Peak Flowrate (q <sub>p</sub> )	m3/s	0.409	4.673	5.411
Peak Flowrate (q <sub>p</sub> )	L/s	409.08	4673.34	5410.72
24 hour rainfall depth (Q $_{ m 24)}$	mm	235.0	236.8	237.7
24 hour runoff volume ( $V_{24}$ )	m <sup>3</sup>	2378	32974	35507

# **Channel Report**

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Thursday, Dec 19 2024

# Cross Section A - 100 Year - Pre

User-defined		Highlighted	
Invert Elev (m)	= 13.7310	Depth (m)	= 0.1676
Slope (%)	= 1.0000	Q (cms)	= 0.9340
N-Value	= 0.030	Area (sqm)	= 1.0516
		Velocity (m/s)	= 0.8882
Calculations		Wetted Perim (m)	= 7.4329
Compute by:	Known Q	Crit Depth, Yc (m)	= 0.1433
Known Q (cms)	= 0.9340	Top Width (m)	= 7.2857
		EGL (m)	= 0.2079

(Sta, El, n)-(Sta, El, n)... (-0.0170, 15.4720)-(3.0850, 15.2420, 0.030)-(3.3920, 13.7310, 0.030)-(9.6040, 13.7530, 0.030)-(16.1570, 14.6710, 0.030)-(20.1820, 14.7390, 0.030)



# **Channel Report**

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Thursday, Dec 19 2024

# **Cross Section A - 100 Year - Post**

User-defined		Highlighted	
Invert Elev (m)	= 13.7310	Depth (m)	= 0.2438
Slope (%)	= 1.0000	Q (cms)	= 1.8340
N-Value	= 0.030	Area (sqm)	= 1.6281
		Velocity (m/s)	= 1.1265
Calculations		Wetted Perim (m)	= 8.0599
Compute by:	Known Q	Crit Depth, Yc (m)	= 0.2134
Known Q (cms)	= 1.8340	Top Width (m)	= 7.8451
		EGL (m)	= 0.3086

(Sta, El, n)-(Sta, El, n)... (-0.0170, 15.4720)-(3.0850, 15.2420, 0.030)-(3.3920, 13.7310, 0.030)-(9.6040, 13.7530, 0.030)-(16.1570, 14.6710, 0.030)-(20.1820, 14.7390, 0.030)



## **Cross Section B - 100 Year - Pre**

User-defined		Highlighted	
Invert Elev (m)	= 13.6910	Depth (m)	= 0.2774
Slope (%)	= 1.0000	Q (cms)	= 1.1434
N-Value	= 0.030	Area (sqm)	= 1.4650
		Velocity (m/s)	= 0.7805
Calculations		Wetted Perim (m)	= 12.6464
Compute by:	Known Q	Crit Depth, Yc (m)	= 0.2499
Known Q (cms)	= 1.1434	Top Width (m)	= 12.5704
		EGL (m)	= 0.3084

(Sta, El, n)-(Sta, El, n)... (0.0000, 14.0560)-(2.7980, 14.0170, 0.030)-(7.1650, 13.9020, 0.030)-(7.9510, 13.8930, 0.030)-(8.2240, 13.6910, 0.030)-(10.9270, 13.8370, 0.030)-(14.5300, 13.-(17.4680, 13.9830, 0.030)-(20.6970, 14.3380, 0.030)-(22.2470, 14.6350, 0.030)-(26.8430, 14.6390, 0.030)



Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Thursday, Dec 19 2024

## **Cross Section B - 100 Year - Post**

User-defined		Highlighted	
Invert Elev (m)	= 13.6880	Depth (m)	= 0.2499
Slope (%)	= 1.0000	Q (cms)	= 2.0430
N-Value	= 0.030	Area (sqm)	= 2.0654
		Velocity (m/s)	= 0.9891
Calculations		Wetted Perim (m)	= 12.6825
Compute by:	Known Q	Crit Depth, Yc (m)	= 0.2164
Known Q (cms)	= 2.0430	Top Width (m)	= 12.5983
		EGL (m)	= 0.2998

(Sta, El, n)-(Sta, El, n)... (0.0000, 14.0560)-(7.9420, 13.8960, 0.030)-(8.2300, 13.6910, 0.030)-(10.0000, 13.6880, 0.030)-(17.9970, 13.8100, 0.030)-(19.4440, 14.2110, 0.030)-(22.2470, -(29.7060, 14.6420, 0.030)



Sta (m)

Friday, Dec 20 2024

## Cross Section C - 100 Year - Pre

User-defined		Highlighted	
Invert Elev (m)	= 7.4180	Depth (m)	= 0.5517
Slope (%)	= 1.0000	Q (cms)	= 4.6730
N-Value	= 0.030	Area (sqm)	= 2.8130
		Velocity (m/s)	= 1.6612
Calculations		Wetted Perim (m)	= 7.9556
Compute by:	Known Q	Crit Depth, Yc (m)	= 0.5212
Known Q (cms)	= 4.6730	Top Width (m)	= 7.8343
		EGL (m)	= 0.6924

(Sta, El, n)-(Sta, El, n)... (0.0330, 12.7620)-(10.4170, 12.6760, 0.030)-(20.1180, 10.0470, 0.030)-(25.6170, 8.4670, 0.030)-(28.8450, 7.4440, 0.030)-(31.1730, 7.4180, 0.030)-(33.6770, 7.4180, 0.03



## Cross Section C - 100 Year - Post

User-defined		Highlighted	
Invert Elev (m)	= 7.4180	Depth (m)	= 0.5913
Slope (%)	= 1.0000	Q (cms)	= 5.4100
N-Value	= 0.030	Area (sqm)	= 3.1306
		Velocity (m/s)	= 1.7281
Calculations		Wetted Perim (m)	= 8.3270
Compute by:	Known Q	Crit Depth, Yc (m)	= 0.5608
Known Q (cms)	= 5.4100	Top Width (m)	= 8.1962
		EGL (m)	= 0.7436

(Sta, El, n)-(Sta, El, n)... (0.0330, 12.7620)-(10.4170, 12.6760, 0.030)-(20.1180, 10.0470, 0.030)-(25.6170, 8.4670, 0.030)-(28.8450, 7.4440, 0.030)-(31.1730, 7.4180, 0.030)-(33.6770, 7.4180, 0.03



Monday, Dec 16 2024

# **OLFP Diversion - 100 Year - Post**

### Trapezoidal

Trapezoidal		Highlighted	
Bottom Width (m)	= 1.0000	Depth (m)	= 0.5547
Side Slopes (z:1)	= 3.0000, 3.0000	Q (cms)	= 1.6540
Total Depth (m)	= 0.6000	Area (sqm)	= 1.4779
Invert Elev (m)	= 10.0000	Velocity (m/s)	= 1.1191
Slope (%)	= 0.5000	Wetted Perim (m)	= 4.5085
N-Value	= 0.030	Crit Depth, Yc (m)	= 0.4359
		Top Width (m)	= 4.3284
Calculations		EGL (m)	= 0.6186
Compute by:	Known Q		
Known Q (cms)	= 1.6540		



Reach (m)



# **STORMWATER**

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Date	Thursday, 29 August 2024
Client	Envelope Engineering
Project name	Carpark
Project address	50 Westney Road, Mangere

Area to flowrate calculator		
Impervious area	20,000	m²
Treatment rainfall	10	mm/h
Coefficient of area	0.95	
Treatment flow	52.78	l/sec

Filter selection		
Product used	Full size Atlan Filter (3l/sec)	
Flow per cartridge	3.0	l/sec
Cartridges required	17.59259259	
No. of cartridges selected	18	

Treatment rainfall/coefficient flow notes	
Use 10mm/h for Auckland and 0.95 coefficient for 100% impervious areas	
Use 5mm/h for Christchurch and 1.00 coefficient for 100% impervious areas	
Use 10mm/h for everywhere else and 1.00 coefficient for 100% impervious areas	

### **Cartridge selection notes**

Wherever possible use the full size Atlan Filter. It has a high hydraulic drop of 850mm making it ideal for sites with reasonable fall. It backwashes at the end of every cycle and has a guaranteed media life of 5 years (conditions apply).

For sites with less fall where long media life if still required use the half size Atlan Filter. Hydraulic drop is 550mm and it still back washes at the end of every cycle and has the same media life guarantee of the full size SPELFilter.

For very flat sites use the Flowfilter. The hydraulic drop required is only 250mm and it can be used as a bubble up sump. Up to 3 of the 400 series cartridges can be fitted in a single sump and wherever more treatment flow is required use the 1500 series cartridges. Note the Flowfilter does not backwash at the end of every cycle which reduces media life and thus should be used only where the Atlan Filter cannot work.