AJH Associates 21 Deanfield Court, Clitheroe	Oak hill housing plot 5			
			Revision	
	Job No:	3440	Page:	C/01
Section: SUDS drainage scheme attenuation tank size	Prepared By:	TH	Date:	30/11/2018

GENERAL DATA		
site location:	England and Wales	
60 min rainfall depth of 5 year return period 'R' *[mm]* =	20	
M5-60 to M5-2d rainfall ratio 'r' =	0.50	
proposed discharge rate 'v_1' *[litre/s]* =	3.50	
proposed discharge rate 'v_2' *[litre/s]* =	10.00	
allowance for climate change:	40%	

SUMMARY OF CALCULATIONS		
required storage volume for discharge rate 'v_1' =	30.62	m^3
required storage volume for discharge rate 'v_2' =	21.58	m^3

AREA DATA		impermeability *[%]*	effective area *[m^2]*
impermeable area 'A_1' *[m^2]* =	349	100.00	349
landscaping and/or green roof area 'A_2' *[m^2]* =	768	80.00	614.4
other partially permeable area 'A_3' *[m^2]* =	184	20.00	36.8
AREA DRAINED TO ATTENUATION TANK =			1000.2 m^2

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_1

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D			M20-D			M30-D			outflow from attenuation tank *[m^3]*	required storage *[m^3]*
			Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*		
5	0.39	7.80	1.21	13.18	13.18	1.39	15.16	15.16	1.46	15.97	15.97	1.05	14.92
10	0.54	10.80	1.22	18.49	18.50	1.41	21.39	21.40	1.50	22.62	22.62	2.10	20.52
15	0.65	13.00	1.23	22.42	22.43	1.43	25.99	25.99	1.51	27.52	27.52	3.15	24.37
30	0.82	16.40	1.24	28.47	28.48	1.44	33.13	33.13	1.53	35.16	35.17	6.30	28.87
60	1.00	20.00	1.24	34.72	34.73	1.45	40.60	40.61	1.54	43.21	43.22	12.60	**30.62**
120	1.19	23.80	1.24	41.32	41.33	1.44	48.06	48.07	1.54	51.17	51.18	25.20	25.98
240	1.38	27.60	1.23	47.51	47.52	1.43	55.24	55.25	1.52	58.85	58.86	50.40	8.46
360	1.51	30.20	1.22	51.56	51.57	1.42	60.00	60.02	1.51	63.94	63.96	75.60	0.00
600	1.68	33.60	1.21	56.88	56.89	1.41	66.12	66.13	1.50	70.40	70.41	126.00	0.00
1440	2.03	40.60	1.19	67.57	67.58	1.38	78.30	78.32	1.46	83.21	83.22	302.40	0.00

** Z2 is a growth factor from M5 rainfalls*

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_2

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D			M30-D			M50-D			outflow from attenuation tank *[m^3]*	required storage *[m^3]*
			Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*		
5	0.39	7.80	1.21	13.18	13.18	1.46	15.97	15.97	1.61	17.59	17.59	3.00	14.59
10	0.54	10.80	1.22	18.49	18.50	1.50	22.62	22.62	1.66	25.07	25.07	6.00	19.07
15	0.65	13.00	1.23	22.42	22.43	1.51	27.52	27.52	1.68	30.58	30.58	9.00	**21.58**
30	0.82	16.40	1.24	28.47	28.48	1.53	35.16	35.17	1.71	39.22	39.23	18.00	21.23
60	1.00	20.00	1.24	34.72	34.73	1.54	43.21	43.22	1.73	48.44	48.45	36.00	12.45
120	1.19	23.80	1.24	41.32	41.33	1.54	51.17	51.18	1.72	57.39	57.40	72.00	0.00
240	1.38	27.60	1.23	47.51	47.52	1.52	58.85	58.86	1.71	66.06	66.07	144.00	0.00
360	1.51	30.20	1.22	51.56	51.57	1.51	63.94	63.96	1.70	71.83	71.84	216.00	0.00
600	1.68	33.60	1.21	56.88	56.89	1.50	70.40	70.41	1.68	78.95	78.97	360.00	0.00
1440	2.03	40.60	1.19	67.57	67.58	1.46	83.21	83.22	1.64	93.01	93.03	864.00	0.00

** Z2 is a growth factor from M5 rainfalls*

AJH Associates 21 Deanfield Court, Clitheroe	Oak hill housing plot 6			
			Revision	
	Job No:	3440	Page:	C/01
Section: SUDS drainage scheme attenuation tank size	Prepared By:	TH	Date:	30/11/2018

GENERAL DATA		
site location:	England and Wales	
60 min rainfall depth of 5 year return period 'R' *[mm]* =	20	
M5-60 to M5-2d rainfall ratio 'r' =	0.50	
proposed discharge rate 'v_1' *[litre/s]* =	3.50	
proposed discharge rate 'v_2' *[litre/s]* =	10.00	
allowance for climate change:	40%	

SUMMARY OF CALCULATIONS		
required storage volume for discharge rate 'v_1' =	21.05	m^3
required storage volume for discharge rate 'v_2' =	14.78	m^3

AREA DATA		impermeability *[%]*	effective area *[m^2]*
impermeable area 'A_1' *[m^2]* =	349	100.00	349
landscaping and/or green roof area 'A_2' *[m^2]* =	485	80.00	388
other partially permeable area 'A_3' *[m^2]* =	204	20.00	40.8
AREA DRAINED TO ATTENUATION TANK =			777.8 m^2

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_1

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D			M20-D			M30-D			outflow from attenuation tank *[m^3]*	required storage *[m^3]*
			Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*		
5	0.39	7.80	1.21	13.18	10.25	1.39	15.16	11.79	1.46	15.97	12.42	1.05	11.37
10	0.54	10.80	1.22	18.49	14.39	1.41	21.39	16.64	1.50	22.62	17.59	2.10	15.49
15	0.65	13.00	1.23	22.42	17.44	1.43	25.99	20.21	1.51	27.52	21.40	3.15	18.25
30	0.82	16.40	1.24	28.47	22.14	1.44	33.13	25.77	1.53	35.16	27.35	6.30	**21.05**
60	1.00	20.00	1.24	34.72	27.01	1.45	40.60	31.58	1.54	43.21	33.61	12.60	21.01
120	1.19	23.80	1.24	41.32	32.14	1.44	48.06	37.38	1.54	51.17	39.80	25.20	14.60
240	1.38	27.60	1.23	47.51	36.95	1.43	55.24	42.97	1.52	58.85	45.77	50.40	0.00
360	1.51	30.20	1.22	51.56	40.10	1.42	60.00	46.67	1.51	63.94	49.74	75.60	0.00
600	1.68	33.60	1.21	56.88	44.24	1.41	66.12	51.43	1.50	70.40	54.75	126.00	0.00
1440	2.03	40.60	1.19	67.57	52.56	1.38	78.30	60.90	1.46	83.21	64.72	302.40	0.00

** Z2 is a growth factor from M5 rainfalls*

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_2

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D			M30-D			M50-D			outflow from attenuation tank *[m^3]*	required storage *[m^3]*
			Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*		
5	0.39	7.80	1.21	13.18	10.25	1.46	15.97	12.42	1.61	17.59	13.68	3.00	10.68
10	0.54	10.80	1.22	18.49	14.39	1.50	22.62	17.59	1.66	25.07	19.50	6.00	13.50
15	0.65	13.00	1.23	22.42	17.44	1.51	27.52	21.40	1.68	30.58	23.78	9.00	**14.78**
30	0.82	16.40	1.24	28.47	22.14	1.53	35.16	27.35	1.71	39.22	30.51	18.00	12.51
60	1.00	20.00	1.24	34.72	27.01	1.54	43.21	33.61	1.73	48.44	37.68	36.00	1.68
120	1.19	23.80	1.24	41.32	32.14	1.54	51.17	39.80	1.72	57.39	44.64	72.00	0.00
240	1.38	27.60	1.23	47.51	36.95	1.52	58.85	45.77	1.71	66.06	51.38	144.00	0.00
360	1.51	30.20	1.22	51.56	40.10	1.51	63.94	49.74	1.70	71.83	55.87	216.00	0.00
600	1.68	33.60	1.21	56.88	44.24	1.50	70.40	54.75	1.68	78.95	61.41	360.00	0.00
1440	2.03	40.60	1.19	67.57	52.56	1.46	83.21	64.72	1.64	93.01	72.35	864.00	0.00

** Z2 is a growth factor from M5 rainfalls*

AJH Associates 21 Deanfield Court, Clitheroe	Oak hill housing plot 7			
			Revision	
	Job No:	3440	Page:	C/01
Section: SUDS drainage scheme attenuation tank size	Prepared By:	TH	Date:	30/11/2018

GENERAL DATA	
site location:	England and Wales
60 min rainfall depth of 5 year return period 'R' *[mm]* =	20
M5-60 to M5-2d rainfall ratio 'r' =	0.50
proposed discharge rate 'v_1' *[litre/s]* =	3.50
proposed discharge rate 'v_2' *[litre/s]* =	10.00
allowance for climate change:	40%

SUMMARY OF CALCULATIONS		
required storage volume for discharge rate 'v_1' =	21.05	m^3
required storage volume for discharge rate 'v_2' =	14.78	m^3

AREA DATA		impermeability *[%]*	effective area *[m^2]*
impermeable area 'A_1' *[m^2]* =	349	100.00	349
landscaping and/or green roof area 'A_2' *[m^2]* =	485	80.00	388
other partially permeable area 'A_3' *[m^2]* =	204	20.00	40.8
AREA DRAINED TO ATTENUATION TANK =			777.8 m^2

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_1

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D Z2	M10-D rainfalls *[mm]*	M10-D inflow *[m^3]*	M20-D Z2	M20-D rainfalls *[mm]*	M20-D inflow *[m^3]*	M30-D Z2	M30-D rainfalls *[mm]*	M30-D inflow *[m^3]*	outflow from attenuation tank *[m^3]*	required storage *[m^3]*
5	0.39	7.80	1.21	13.18	10.25	1.39	15.16	11.79	1.46	15.97	12.42	1.05	11.37
10	0.54	10.80	1.22	18.49	14.39	1.41	21.39	16.64	1.50	22.62	17.59	2.10	15.49
15	0.65	13.00	1.23	22.42	17.44	1.43	25.99	20.21	1.51	27.52	21.40	3.15	18.25
30	0.82	16.40	1.24	28.47	22.14	1.44	33.13	25.77	1.53	35.16	27.35	6.30	**21.05**
60	1.00	20.00	1.24	34.72	27.01	1.45	40.60	31.58	1.54	43.21	33.61	12.60	21.01
120	1.19	23.80	1.24	41.32	32.14	1.44	48.06	37.38	1.54	51.17	39.80	25.20	14.60
240	1.38	27.60	1.23	47.51	36.95	1.43	55.24	42.97	1.52	58.85	45.77	50.40	0.00
360	1.51	30.20	1.22	51.56	40.10	1.42	60.00	46.67	1.51	63.94	49.74	75.60	0.00
600	1.68	33.60	1.21	56.88	44.24	1.41	66.12	51.43	1.50	70.40	54.75	126.00	0.00
1440	2.03	40.60	1.19	67.57	52.56	1.38	78.30	60.90	1.46	83.21	64.72	302.40	0.00

** Z2 is a growth factor from M5 rainfalls*

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_2

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D Z2	M10-D rainfalls *[mm]*	M10-D inflow *[m^3]*	M30-D Z2	M30-D rainfalls *[mm]*	M30-D inflow *[m^3]*	M50-D Z2	M50-D rainfalls *[mm]*	M50-D inflow *[m^3]*	outflow from attenuation tank *[m^3]*	required storage *[m^3]*
5	0.39	7.80	1.21	13.18	10.25	1.46	15.97	12.42	1.61	17.59	13.68	3.00	10.68
10	0.54	10.80	1.22	18.49	14.39	1.50	22.62	17.59	1.66	25.07	19.50	6.00	13.50
15	0.65	13.00	1.23	22.42	17.44	1.51	27.52	21.40	1.68	30.58	23.78	9.00	**14.78**
30	0.82	16.40	1.24	28.47	22.14	1.53	35.16	27.35	1.71	39.22	30.51	18.00	12.51
60	1.00	20.00	1.24	34.72	27.01	1.54	43.21	33.61	1.73	48.44	37.68	36.00	1.68
120	1.19	23.80	1.24	41.32	32.14	1.54	51.17	39.80	1.72	57.39	44.64	72.00	0.00
240	1.38	27.60	1.23	47.51	36.95	1.52	58.85	45.77	1.71	66.06	51.38	144.00	0.00
360	1.51	30.20	1.22	51.56	40.10	1.51	63.94	49.74	1.70	71.83	55.87	216.00	0.00
600	1.68	33.60	1.21	56.88	44.24	1.50	70.40	54.75	1.68	78.95	61.41	360.00	0.00
1440	2.03	40.60	1.19	67.57	52.56	1.46	83.21	64.72	1.64	93.01	72.35	864.00	0.00

** Z2 is a growth factor from M5 rainfalls*

AJH Associates 21 Deanfield Court, Clitheroe	Oak hill housing plot 8			
			Revision	
	Job No:	3440	Page:	C/01
Section: SUDS drainage scheme attenuation tank size	Prepared By:	TH	Date:	30/11/2018

GENERAL DATA	
site location:	England and Wales
60 min rainfall depth of 5 year return period 'R' *[mm]* =	20
M5-60 to M5-2d rainfall ratio 'r' =	0.50
proposed discharge rate 'v_1' *[litre/s]* =	3.50
proposed discharge rate 'v_2' *[litre/s]* =	10.00
allowance for climate change:	40%

SUMMARY OF CALCULATIONS		
required storage volume for discharge rate 'v_1' =	83.13	m^3
required storage volume for discharge rate 'v_2' =	66.55	m^3

AREA DATA		impermeability *[%]*	effective area *[m^2]*
impermeable area 'A_1' *[m^2]* =	349	100.00	349
landscaping and/or green roof area 'A_2' *[m^2]* =	2112	80.00	1689.6
other partially permeable area 'A_3' *[m^2]* =	392	20.00	78.4
AREA DRAINED TO ATTENUATION TANK =			2117 m^2

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_1

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D			M20-D			M30-D			outflow from attenuation tank *[m^3]*	required storage *[m^3]*
			Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*		
5	0.39	7.80	1.21	13.18	27.90	1.39	15.16	32.09	1.46	15.97	33.80	1.05	32.75
10	0.54	10.80	1.22	18.49	39.15	1.41	21.39	45.29	1.50	22.62	47.88	2.10	45.78
15	0.65	13.00	1.23	22.42	47.47	1.43	25.99	55.02	1.51	27.52	58.26	3.15	55.11
30	0.82	16.40	1.24	28.47	60.27	1.44	33.13	70.13	1.53	35.16	74.43	6.30	68.13
60	1.00	20.00	1.24	34.72	73.50	1.45	40.60	85.95	1.54	43.21	91.48	12.60	78.88
120	1.19	23.80	1.24	41.32	87.47	1.44	48.06	101.74	1.54	51.17	108.33	25.20	**83.13**
240	1.38	27.60	1.23	47.51	100.58	1.43	55.24	116.94	1.52	58.85	124.58	50.40	74.18
360	1.51	30.20	1.22	51.56	109.14	1.42	60.00	127.03	1.51	63.94	135.37	75.60	59.77
600	1.68	33.60	1.21	56.88	120.42	1.41	66.12	139.97	1.50	70.40	149.03	126.00	23.03
1440	2.03	40.60	1.19	67.57	143.05	1.38	78.30	165.77	1.46	83.21	176.15	302.40	0.00

** Z2 is a growth factor from M5 rainfalls*

REQUIRED STORAGE VOLUME PER RAINFALL DURATION FOR DISCHARGE RATE v_2

rainfall duration *[min]*	rainfall factor Z1	M5-D rainfalls *[mm]*	M10-D			M30-D			M50-D			outflow from attenuation tank *[m^3]*	required storage *[m^3]*
			Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*	Z2	rainfalls *[mm]*	inflow *[m^3]*		
5	0.39	7.80	1.21	13.18	27.90	1.46	15.97	33.80	1.61	17.59	37.23	3.00	34.23
10	0.54	10.80	1.22	18.49	39.15	1.50	22.62	47.88	1.66	25.07	53.07	6.00	47.07
15	0.65	13.00	1.23	22.42	47.47	1.51	27.52	58.26	1.68	30.58	64.73	9.00	55.73
30	0.82	16.40	1.24	28.47	60.27	1.53	35.16	74.43	1.71	39.22	83.04	18.00	65.04
60	1.00	20.00	1.24	34.72	73.50	1.54	43.21	91.48	1.73	48.44	102.55	36.00	**66.55**
120	1.19	23.80	1.24	41.32	87.47	1.54	51.17	108.33	1.72	57.39	121.50	72.00	49.50
240	1.38	27.60	1.23	47.51	100.58	1.52	58.85	124.58	1.71	66.06	139.85	144.00	0.00
360	1.51	30.20	1.22	51.56	109.14	1.51	63.94	135.37	1.70	71.83	152.05	216.00	0.00
600	1.68	33.60	1.21	56.88	120.42	1.50	70.40	149.03	1.68	78.95	167.14	360.00	0.00
1440	2.03	40.60	1.19	67.57	143.05	1.46	83.21	176.15	1.64	93.01	196.91	864.00	0.00

** Z2 is a growth factor from M5 rainfalls*

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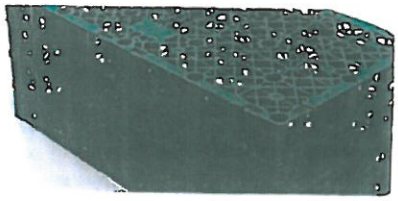


Polystorm Lite

Polystorm Lite has been specifically designed for non-trafficked applications such as landscaped areas, pedestrian or public open spaces. The modular structure receives rainwater collected from the roofs or surface drains ready to release within a set drainage limit, or is wrapped in a permeable geotextile for infiltration.

Although Polystorm Lite is designed for non-trafficked applications for surface water rentention (http://www.polypipe.com/civils-and-infrastructure/water-management-solutions/surface-water-retention?s=6&c=700), surface water attenuation (http://www.polypipe.com/civils-and-infrastructure/water-management-solutions/surface-water-attenuation?s=6&c=700) or surface water infiltration (http://www.polypipe.com/civils-and-infrastructure/water-management-solutions/surface-water-infiltration-soakaway) as a soakaway solution. It has a compressive strength if up to 20 tonnes/m², meaning it is able to support general maintenance vehicles such as grass cutters.

Features & Benefits

- Compressive strength of 20 tonnes/m²
- Ideal for retention, attenuation or soakaway applications with a suitable geomembrane or geotextile
- Designed for landscaped, pedestrian or other non-loaded applications
- BBA approved
- Visual and maintenance access can be achieved when used in conjunction with Polystorm Access & Inspect
- Can be used as part of an intelligently engineered hybrid system with Polystorm, Polystorm-R and Polystorm Xtra
- Integrated inlet and outlet
- 3D flow throughout the structure
- 95% void ratio
- 100% recyclable
- 50 years creep limited life expectancy

(https://www.polypipe.com) (https://www.p

TECHNICAL SPECIFICATION OVERVIEW

Element	Value
Product code	PSM2*
Length	1m
Width	0.5m
Depth	0.4m
Total volume	0.2m³
Unit weight	7kg
Unit storage volume	0.19m³ (190 litres)
Void ratio	95%
Vertical compressive strength	Maximum 200kN/m² **
Lateral compressive strength	Maximum 40kN/m² **
Short-term vertical deflection	43kN/m² per mm
Short-term lateral deflection	6.4kN/m² per mm
Maximum burial depths: Non-trafficked	2.5m***

* Each unit includes 4 Clips and 2 Shear Connectors.

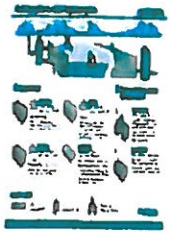
** Compressive strength at yield, maximum recommended value for design purposes.

*** Based on ground conditions being dense sand and gravel with no groundwater present, using the calculation methodology detailed within CIRIA C680 (2008). Where ground conditions differ, please consult our water management solutions Technical Department on +44 (0) 1509 615100.

Downloads

View all (https://www.polypipe.com/literature-search)

An 8 step guide to a total Polystorm system



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