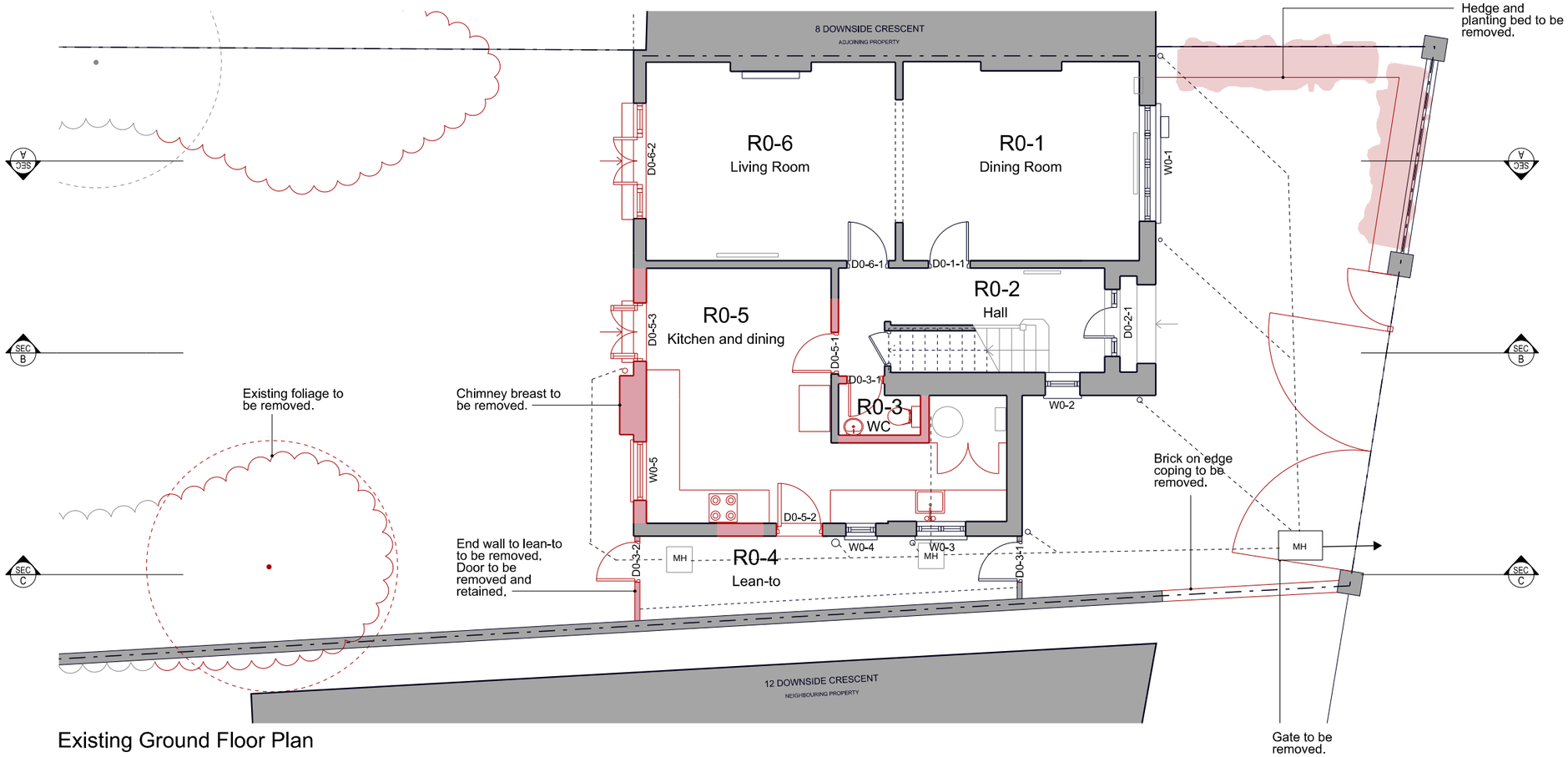


Existing Ground Floor Plan

0m 1m 2m 4m

N

Indicates building elements to be adjusted.

Drawing Status:
Planning

Revision	Date

BOW TIE CONSTRUCTION

Bow Tie Construction Ltd, Unit 86, Cressex Enterprise Centre, Lincoln Road, High Wycombe, Bucks, HP12 3RL, info@bowtieconstruction.co.uk

Project
10 Downside Crescent
Belsize Park
NW3 2AP

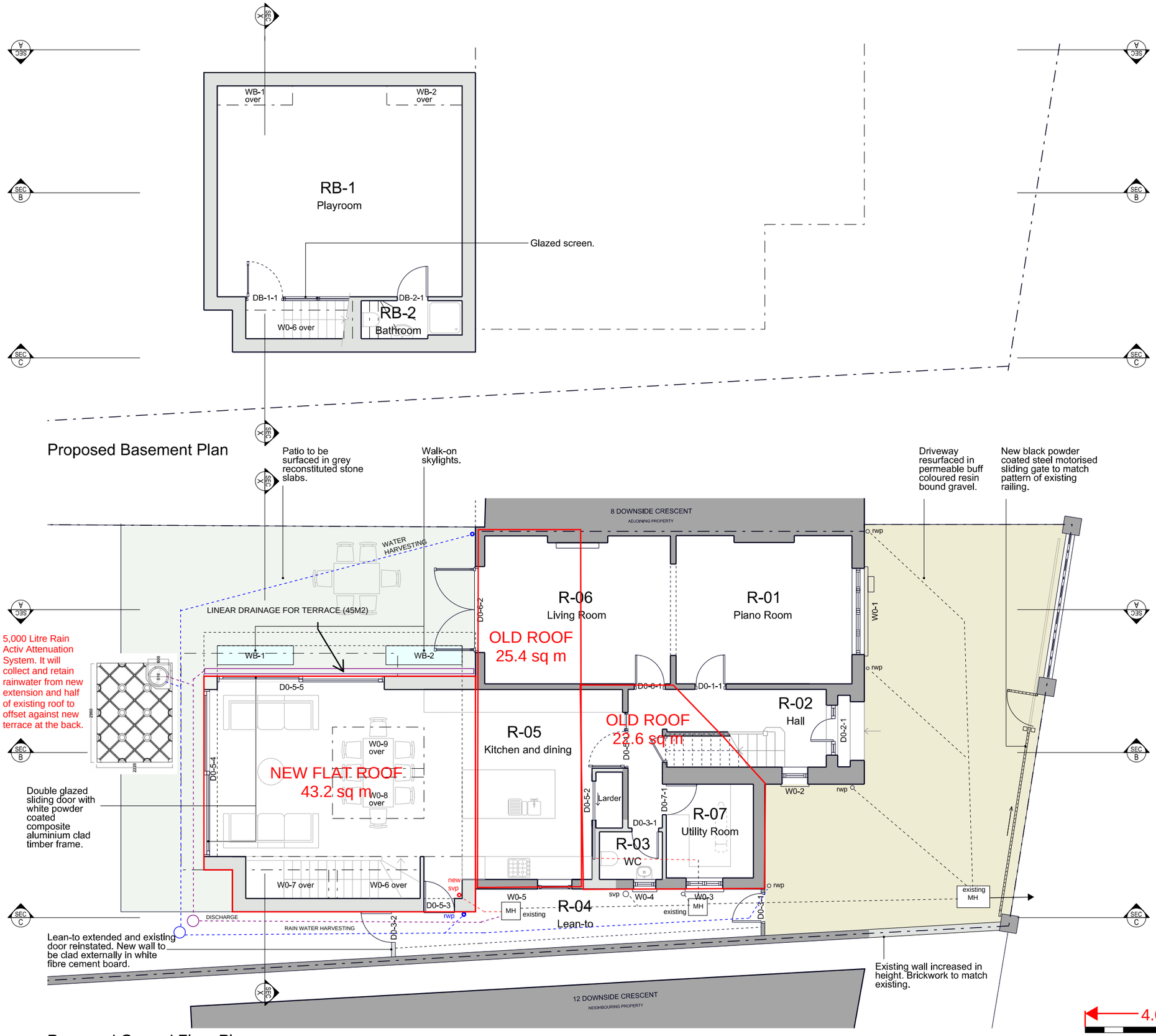
Drawing
Existing Ground Floor Plan

Scale
1:100 @ A3

Date
June 2016

Drg. no.
129 S 00

Revision
-



Proposed Basement Plan

Proposed Ground Floor Plan

Patio to be surfaced in grey reconstituted stone slabs.

Walk-on skylights.

Driveway resurfaced in permeable buff coloured resin bound gravel.

New black powder coated steel motorised sliding gate to match pattern of existing railing.

5,000 Litre Rain Activ Attenuation System. It will collect and retain rainwater from new extension and half of existing roof to offset against new terrace at the back.

Double glazed sliding door with white powder coated composite aluminium clad timber frame.

Lean-to extended and existing door reinstated. New wall to be clad externally in white fibre cement board.

Existing wall increased in height. Brickwork to match existing.

Drawings may be scaled for purposes of Planning.
Any discrepancies should be reported immediately to the designer.
If in doubt ask.

These drawings are based on survey plans provided by the client.
The designer accepts no liability for inaccuracies.
Check all dimensions on site before proceeding with the works.

Drawing Status:
Planning

Revision	Date

BOW TIE CONSTRUCTION

Bow Tie Construction Ltd, Unit 86, Cressex Enterprise Centre, Lincoln Road, High Wycombe, Bucks, HP12 3RL. Info@bowtieconstruction.co.uk

Project
10 Downside Crescent
Belsize Park
NW3 2AP

Drawing
Proposed Ground Floor and Basement Plans

Scale	Date
1:100 @ A3	June 2016

Drg. no.	Revision
129 P 00	-

Quotation for the supply of Rainwater Harvesting Equipment

Client :

Mr Rafael Delimata
Bowtie Construction

Site Reference :

Rain Activ for Downside Crescent

Prepared by:

Ian Woodcock

ianw@rainwaterharvesting.co.uk

01733 405104 / 07736 45 46 45

Our reference : IMW227478

Date of proposal : 11/07/2017

Your Proposal

Thank you for your enquiry and as requested please find the following information regarding our proposed controlled attenuation system.

SHALLOW DIG F-LINE TANK	
	5000
Weight Kg	250
Length	2960
Width	2220
Overall Height	1350 - 1750
Ground to Invert VS60 (635mm Shaft)	345 - 745
Minimum Attenuation Capacity	2700 litres
Invert to Outlet	656

EXCAVATION	
Length	3360
Width	2620
Overall height VS60	1450 - 1850

Overall height allows for 100mm compacted aggregate

The overall height difference above is because up to 400 mm can be cut off of the 635 mm shaft on site so as to achieve your exact invert level.

Please see Drainage Calculation Summary on page 7

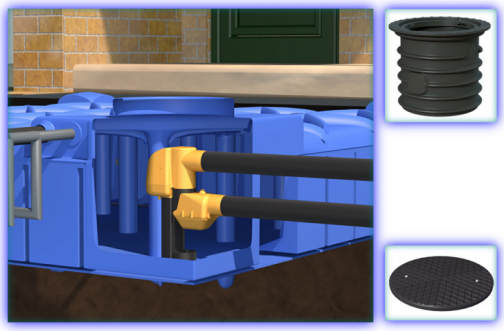
Rainwater Harvesting Limited is a private family owned company, our strong service ethos has been built on many years of experience and this is reflected in our ability to offer both simple to install systems and mix and match components to provide bespoke solutions reflecting clients needs. At our 100,000sq ft warehouse in Peterborough we hold over 3000 stock items, we are the largest stockholder of the Shallow Dig Rewatec tanks in the UK and we regularly despatch to site complete systems within 5-7 days of order, we also provide full technical support on all our products.

We would welcome the opportunity of supplying your system and I can easily be contacted either by phone or email as shown on the previous page

Components and Prices – Supply Only

Product Code **: RWH-5099FL-RA**

5,000 Litre Rain Activ Attenuation System



Components

Product Code	Description	Qty
RWFT5000	F-LINE 5000L TANK	1
RWDS0062	F-LINE TANK 635mm EXTENSION SHAFT - VS60	1
RWDS0066	F-LINE TANK WALK ON LID	1
RWH-RV01	RAINVANTAGE FILTER KIT INC SIPHON & OVERFLOW	1
RWH-RA02	**RAIN ACTIV SUDS COMPONENT PRE FITTED ALLOWING FOR A MINIMUM OF 2700 LITRES WORTH OF ATTENUATION AND A CONTROLLED DISCHARGE RATE OF 1.1 LITRES PER SECOND**	1
RWH-RA01	MICRO DRAINAGE CALCULATIONS	

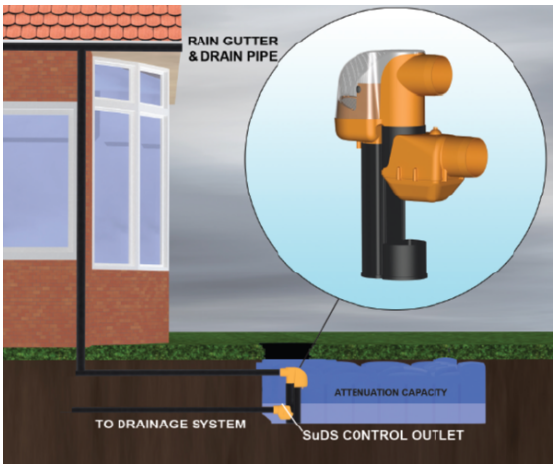
Price : £2,520.00 (£3,024.00 Inc. VAT)

UK delivery is included in the price (Highlands and islands extra)

Rain Activ SuDS Solution

Rain Activ is a totally new concept within the storm attenuation market. Utilising shallow dig underground water tanks as well as a filtration and controlled discharge module.

Rain Activ collects water from the roof and removes debris via a self-cleaning filter. Once inside the tank, the clean water is attenuated and discharged slowly at a calculated rate through an orifice.



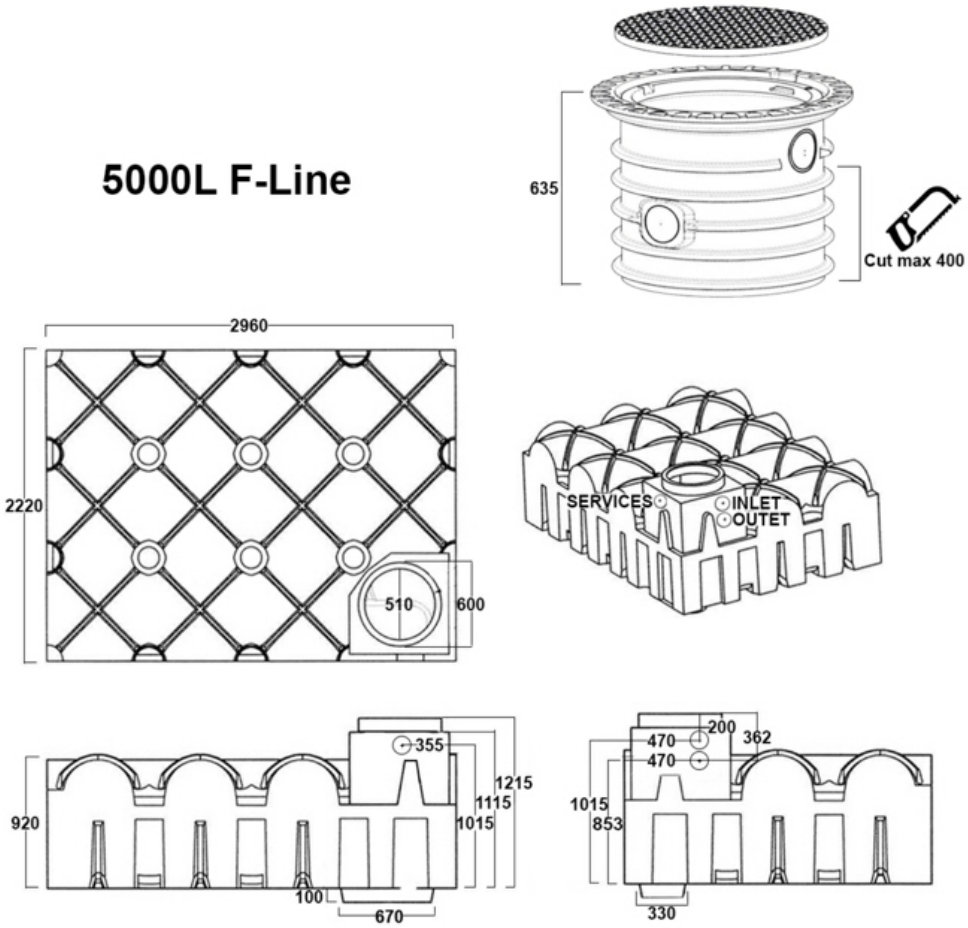
- Ultra-low discharge SuDS system.
- Peak discharge rates as low as 0.05 L/sec per property.
- Primary solution reduces secondary SuDS infrastructure and costs.
- Each system individually calibrated to site requirement.
- Can be used in combination with Rainwater Harvesting.

Rain Activ is ideal for sites where low rates of storm water discharge are required. With peak discharge rates as low as 0.05 L/sec, the system provides a solution for applications where flow is typically not sufficient for vortex flow control systems.

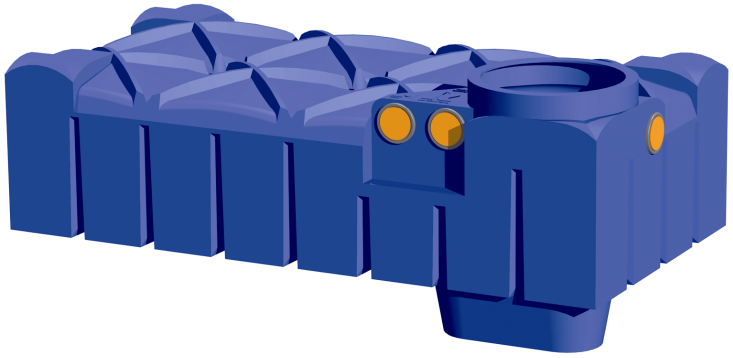
By collecting and slowing the water at source, the scale and cost of secondary SuDS infrastructure such as balancing ponds and geocellular storage can be heavily reduced. For many developments this can increase the available land for development.

Where applicable, Rain Activ can be used in conjunction with Rainwater Harvesting by simply adding a pump and management system.

5000L F-Line


635
Cut max 400
2960
2220
510
600
SERVICES
INLET
OUTET
355
1215
1115
1015
920
100
670
200
362
470
470
1015
853
330

F-Line Flat Tank shallow dig underground tank



Why buy this tank?

- The F-Line is a high quality, rotationally moulded, one piece rainwater tank that can be installed without the need for concrete, thereby minimising installation costs and supported by our long term 25 year tank guarantee.
- Minimal installation depth
- Easy and quick to install
- Small excavation pit and little earth excavation preserves your garden
- Ideal for installation in new or existing properties
- Can be installed in ground water up to tank shoulder
- Easy to install

The F-line flat tank can be installed into much higher water tables than a standard round tank. If you don't know what your water table will be like in the winter, you're safer to install a flat tank. The F-Line tanks are flat and the installation depth is up to 60% less than other rainwater tanks. The excavation can be up to 70% less, meaning little earth excavation, easy handling and less cost for you! The small excavation pit is easily filled in and your garden will look just like it did before.

Drainage Calculation Summary

The calculations below have been based on the following criteria:

1:100 Year Storm Event

40% Climate Change

Geographical Location; Downside Crescent. NW3 2AP

Total impermeable area = 100 sqm

We have run the Micro Drainage Calculations (see pages 1 – 4 below) and designed a system as follows;

- 5000L tank with a 22mm orifice, providing 2700 litres of attenuation and a peak discharge of 1.1 l/s

- The highest stress put on the system was during the 1:100 year (+40%), 30 minute winter storm.

- Various other events were trailed; (38 in total) all at or below a peak discharge of 1.1 l/s

The reason we can use a very small orifice (between 5-28mm) without risk of blockage is because;

- High quality pre filtration, removing any particles larger than 1000 micron. *(So nothing larger than 1mm can enter the tank.)*
- The filter is self cleaning but does require an annual check for any major debris. As detailed in the maintenance guide.
- The orifice and filter have been developed for simple auditing. (Remove the manhole and look directly below to check for blockage.)

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	0.407	0.407	1.0	0.0	1.0	2.1	O K
30 min Summer	0.461	0.461	1.1	0.0	1.1	2.4	O K
60 min Summer	0.469	0.469	1.1	0.0	1.1	2.4	O K
120 min Summer	0.419	0.419	1.0	0.0	1.0	2.2	O K
180 min Summer	0.363	0.363	0.9	0.0	0.9	1.9	O K
240 min Summer	0.315	0.315	0.9	0.0	0.9	1.6	O K
360 min Summer	0.245	0.245	0.8	0.0	0.8	1.3	O K
480 min Summer	0.197	0.197	0.7	0.0	0.7	1.0	O K
600 min Summer	0.162	0.162	0.6	0.0	0.6	0.8	O K
720 min Summer	0.136	0.136	0.6	0.0	0.6	0.7	O K
960 min Summer	0.102	0.102	0.5	0.0	0.5	0.5	O K
1440 min Summer	0.065	0.065	0.4	0.0	0.4	0.3	O K
2160 min Summer	0.041	0.041	0.3	0.0	0.3	0.2	O K
2880 min Summer	0.031	0.031	0.2	0.0	0.2	0.2	O K
4320 min Summer	0.025	0.025	0.2	0.0	0.2	0.1	O K
5760 min Summer	0.021	0.021	0.1	0.0	0.1	0.1	O K
7200 min Summer	0.019	0.019	0.1	0.0	0.1	0.1	O K
8640 min Summer	0.017	0.017	0.1	0.0	0.1	0.1	O K
10080 min Summer	0.016	0.016	0.1	0.0	0.1	0.1	O K
15 min Winter	0.462	0.462	1.1	0.0	1.1	2.4	O K
30 min Winter	0.522	0.522	1.1	0.0	1.1	2.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	144.378	0.0	2.7	0.0	16
30 min Summer	93.951	0.0	3.5	0.0	25
60 min Summer	58.167	0.0	4.4	0.0	42
120 min Summer	34.775	0.0	5.2	0.0	76
180 min Summer	25.397	0.0	5.7	0.0	108
240 min Summer	20.203	0.0	6.1	0.0	140
360 min Summer	14.615	0.0	6.6	0.0	202
480 min Summer	11.610	0.0	7.0	0.0	262
600 min Summer	9.705	0.0	7.3	0.0	320
720 min Summer	8.379	0.0	7.5	0.0	382
960 min Summer	6.641	0.0	8.0	0.0	500
1440 min Summer	4.779	0.0	8.6	0.0	736
2160 min Summer	3.434	0.0	9.3	0.0	1100
2880 min Summer	2.713	0.0	9.8	0.0	1448
4320 min Summer	1.945	0.0	10.5	0.0	2180
5760 min Summer	1.534	0.0	11.0	0.0	2880
7200 min Summer	1.276	0.0	11.5	0.0	3632
8640 min Summer	1.097	0.0	11.8	0.0	4328
10080 min Summer	0.965	0.0	12.2	0.0	5024
15 min Winter	144.378	0.0	3.0	0.0	16
30 min Winter	93.951	0.0	3.9	0.0	26

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	0.521	0.521	1.1	0.0	1.1	2.7	O K
120 min Winter	0.440	0.440	1.0	0.0	1.0	2.3	O K
180 min Winter	0.361	0.361	0.9	0.0	0.9	1.9	O K
240 min Winter	0.297	0.297	0.9	0.0	0.9	1.5	O K
360 min Winter	0.210	0.210	0.7	0.0	0.7	1.1	O K
480 min Winter	0.156	0.156	0.6	0.0	0.6	0.8	O K
600 min Winter	0.121	0.121	0.5	0.0	0.5	0.6	O K
720 min Winter	0.097	0.097	0.5	0.0	0.5	0.5	O K
960 min Winter	0.068	0.068	0.4	0.0	0.4	0.4	O K
1440 min Winter	0.042	0.042	0.3	0.0	0.3	0.2	O K
2160 min Winter	0.029	0.029	0.2	0.0	0.2	0.2	O K
2880 min Winter	0.025	0.025	0.2	0.0	0.2	0.1	O K
4320 min Winter	0.020	0.020	0.1	0.0	0.1	0.1	O K
5760 min Winter	0.018	0.018	0.1	0.0	0.1	0.1	O K
7200 min Winter	0.015	0.015	0.1	0.0	0.1	0.1	O K
8640 min Winter	0.014	0.014	0.1	0.0	0.1	0.1	O K
10080 min Winter	0.013	0.013	0.1	0.0	0.1	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	58.167	0.0	4.9	0.0	44
120 min Winter	34.775	0.0	5.8	0.0	80
180 min Winter	25.397	0.0	6.4	0.0	114
240 min Winter	20.203	0.0	6.8	0.0	146
360 min Winter	14.615	0.0	7.4	0.0	208
480 min Winter	11.610	0.0	7.8	0.0	268
600 min Winter	9.705	0.0	8.1	0.0	326
720 min Winter	8.379	0.0	8.4	0.0	384
960 min Winter	6.641	0.0	8.9	0.0	502
1440 min Winter	4.779	0.0	9.6	0.0	736
2160 min Winter	3.434	0.0	10.4	0.0	1100
2880 min Winter	2.713	0.0	10.9	0.0	1468
4320 min Winter	1.945	0.0	11.8	0.0	2140
5760 min Winter	1.534	0.0	12.4	0.0	2920
7200 min Winter	1.276	0.0	12.9	0.0	3552
8640 min Winter	1.097	0.0	13.3	0.0	4296
10080 min Winter	0.965	0.0	13.6	0.0	5080

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.500	Shortest Storm (mins)	15
Ratio R	0.420	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.010

Time (mins) From:	To:	Area (ha)
0	4	0.010

Model Details

Storage is Online Cover Level (m) 2.000

Tank or Pond Structure

Invert Level (m) 0.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	5.2	0.755	5.2	0.756	0.0

Orifice Outflow Control

Diameter (m) 0.022 Discharge Coefficient 0.950 Invert Level (m) 0.000

Orifice Overflow Control

Diameter (m) 0.100 Discharge Coefficient 0.600 Invert Level (m) 0.754