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Environmental Services Report

For Proposed Residential Development comprising 8 dwellings

at:

Grangebrook Avenue, Rathfarnham, Dublin 16.

APPLICANT

BECKETT DEVELOPMENTS LTD.

Date:

July 2021

Job ref no. D1194

PREPARED BY. B. English NCEA Dip. Eng. M.I.E.I ON BEHALF OF TERRY & O'FLANAGAN LTD.

INTRODUCTION/ OUTLINE OF PROPOSED DEVELOPMENT

This Environmental Services report has been prepared in support of a planning application seeking approval for the construction of 8 no. dwellings on a total site area of circa. 0.22 Hectares (0.56 Ac.) (application red line area 0.27Ha.) including all associated services.

SITE LOCATION

The subject site is located on the eastern side of Grangebrook Avenue and is contained within the existing property know as 'Palymyra', Whitechurch Road, Rathfarnham. The application site currently comprises a grassed private garden. Access to the proposed houses will be directly off Gangebrook Avenue which each house having its own individual access.

EXISITNG SERVICES

Enclosed in Appendix A of this report is a copy of the existing drainage records as received from South Dublin County Council, Water Services Department.

IRISH WATER CONFIRMATION

Prior to preparing the proposed services layout plan and compiling this report, a pre application enquiry was submitted to Irish Water. Irish Water subsequently reverted back to confirm that the proposed development was acceptable and that sufficient foul sewer and water supply capacity is available to service the development as proposed. Enclosed in Appendix E of this report, is a copy of the confirmation letter from Irish Water.

FOUL SEWER

There is an existing foul sewer located in the grass verge to the west of the site on the opposite side of the road. It is proposed to provide individual connections to a new 150mm diameter collector foul sewer in the new footpath fronting the site with a single connection to the existing foul sewer/ manhole (ref. S014264407 on existing records).

All proposed dwellings will have individual 100mm diameter foul drain connections via individual inspection chambers located within each respective site, prior to connecting to new 150mm diameter collector foul sewer prior to discharging into the existing system.

It is estimated that the total foul discharge rate for the proposed development will be as outlined below:

8 No. new dwellings = 64 bed spaces @200l/day = 12,800 l/day
= 0.148 l/sec (DWF)

= 0.88 l/sec (6X DWF) Design Peak Flow

Enclosed with this submission are 6 copies of the proposed foul drainage layout plan (drawing no. D1194-24) showing all details in relation to the foul design and disposal.

All details relating to the proposed foul drains will be strictly in accordance with the Irish Water Code of practice for waste water and Irish Water standard details for wastewater and will be subject to a self-lay agreement with Irish Water which will be implemented prior to commencement of any works on site.

SURFACE WATER

There is an existing surface water sewer located immediately to the front of the site on its western side.

The applicant intends to provide either an underground Stormtech attenuation system or permeable paving system in the front driveway of each dwelling, with direct infiltration into the ground thereby ensuring there will be no surface water discharge from the site (however a high level overflow can also be connected to the existing drainage system if required by the Environmental Services Dept of SOUTH Dublin Co. Co.).

Enclosed with this submission are 6 copies of the proposed surface water drainage layout plan (drawing no. D1194-25) showing all details in relation to the surface water disposal.

A site investigation to determine the infiltration capacity of the existing soils for the purposes of infiltration is currently been carried out, following which and prior to construction, all design details will be reconfirmed. Should the infiltration tests prove unfavourable for infiltration, then a controlled limited flow will discharge to the existing surface water sewer via a hydrobrake flow control chamber.

Enclosed in Appendix B of this report are surface water attenuation Micro drainage design calculations and site specific Stormtech attenuation design provided by Resolute Engineering.

Enclosed in Appendix C are typical details of the permeable paving, proposed as an alternative for the front driveways.

We are satisfied that the proposed design will incorporate SUDS drainage systems in accordance with SUDS best practice and both the EEC Water Framework Directive 2000 and GDSDS insofar as surface water from the site will be strictly controlled by providing surface water attenuation and outflow from the site will be controlled and restricted.

Rainfall design data for the subject area as received from Met Éireann is enclosed in Appendix D of this report.

All details relating to the surface water design and attenuation details will be in accordance with the recommendations for site development works for housing areas and

in accordance with the requirements of South Dublin County Council Water Services Department.

WATERMAIN

There is an existing water main located to the front (west) of the site which currently serves the Grangebrook housing development

The applicant is proposing to connect the development via a single connection to the existing 150mm diameter watermain currently serving Grangebrook, located to the north of the site (refer to proposed watermain layout plan drawing no. D1194-26).

All houses will be provided with individual connections and boundary boxes located outside each respective property and a new hydrant will be provided to ensure all dwellings are located within 46m of a hydrant, as required.

All connections and construction details will be in accordance with the Irish Water Code of practice for waste and Irish Water standard details for water and will be subject to a self-lay agreement with Irish Water which will be implemented prior to commencement of any works on site.

UTILITIES

All utilities and services associated with the proposed development will be provided underground as required.

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APPENDIX A

(Existing drainage and watermain records)

UISCE ÉIREANN : IRISH WATER

Legend

- Pump Stations
- Irish Water
- Private
- Irish Water
- Non IW
- Gravity - Combined
- Gravity - Foul
- Gravity - Overflow
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Overflow
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Syphon - Overflow
- Overflow
- Gravity - Combined
- Gravity - Foul
- Gravity - Overflow
- Gravity - Unknown
- Pumping - Combined
- Pumping - Foul
- Pumping - Overflow
- Pumping - Unknown
- Syphon - Combined
- Syphon - Foul
- Syphon - Overflow
- Overflow
- Surface Gravity Mains
- Surface Gravity Mains Private
- Surface Water Pressurised Mains
- Surface Water Pressurised Mains Private

APPENDIX B

(Stormtech design and details including surface water attenuation calculations)

Resolute Group

INPUTS

Project Name	Rathfarnham Site 1,4,5,6,8
Project Reference	JN210004
Date	04-Jan-21
Designer	LP
Liner	Permeable
Chamber Model	SC740
Required Storage Volume	18.5 m^3
Stone Porosity	43%
Excavation Batter	90 °
Stone Above Chambers	0.15 m
Stone Foundation Depth	0.15 m
Chamber Seperation	0.15 m
Spacing at Sides	0.42 m
Spacing at Ends	0.15 m
No. of Rows	2
No. of Chambers per Row	3
Manholes - 1500mm dia.	1
Isolator Rows	1

RESULTS

System Volume and Bed Size

Installed Storage Volume	18.5 m^3
Height per Chamber	0.762
Width per Chamber	1.295
Length per Chamber	2.169
Depth of System	1.062 m
Tank Overall Installed Width at Base	3.6 m
Tank Overall Installed Length at Base	7.2 m
Area of Dig at Base of System	26 m^2
Area of Dig at Top of System	26 m^2

System Components

Chambers	6
Endcaps	4
Amount of Stone Required (m3)	20 m^3
Amount of Stone Required (tonne)	33 m^3
Volume of excavation (not including top-fill)	27 m^3

Resolute Group

INPUTS

Project Name	Rathfarnham Site 2,7
Project Reference	JN210004
Date	08-Jan-21
Designer	LP
Liner	Permeable
Chamber Model	SC740
Required Storage Volume	22.2 m^3
Stone Porosity	40%
Excavation Batter	90 °
Stone Above Chambers	0.15 m
Stone Foundation Depth	0.15 m
Chamber Seperation	0.15 m
Spacing at Sides	0.3 m
Spacing at Ends	0.15 m
No. of Rows	3
No. of Chambers per Row	3
Manholes - 1500mm dia.	1
Isolator Rows	1

RESULTS

System Volume and Bed Size

Installed Storage Volume	24.1 m^3
Height per Chamber	0.762
Width per Chamber	1.295
Length per Chamber	2.169
Depth of System	1.062 m
Tank Overall Installed Width at Base	4.8 m
Tank Overall Installed Length at Base	7.2 m
Area of Dig at Base of System	34 m^2
Area of Dig at Top of System	34 m^2

System Components

Chambers	9
Endcaps	6
Amount of Stone Required (m3)	25 m^3
Amount of Stone Required (tonne)	42 m^3
Volume of excavation (not including top-fill)	37 m^3

Resolute Group

INPUTS

Project Name	Rathfarnham Site 3
Project Reference	JN210004
Date	08-Jan-21
Designer	LP
Liner	Permeable
Chamber Model	SC740
Required Storage Volume	17.8 m^3
Stone Porosity	43%
Excavation Batter	90 °
Stone Above Chambers	0.15 m
Stone Foundation Depth	0.15 m
Chamber Seperation	0.15 m
Spacing at Sides	0.62 m
Spacing at Ends	1.1 m
No. of Rows	2
No. of Chambers per Row	2
Manholes - 1500mm dia.	1
Isolator Rows	1

RESULTS

System Volume and Bed Size

Installed Storage Volume	17.9 m^3
Height per Chamber	0.762
Width per Chamber	1.295
Length per Chamber	2.169
Depth of System	1.062 m
Tank Overall Installed Width at Base	4.0 m
Tank Overall Installed Length at Base	6.9 m
Area of Dig at Base of System	28 m^2
Area of Dig at Top of System	28 m^2

System Components

Chambers	4
Endcaps	4
Amount of Stone Required (m3)	24 m^3
Amount of Stone Required (tonne)	40 m^3
Volume of excavation (not including top-fill)	29 m^3

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 2381 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Winter	0.294	0.294	0.0	5.2	O K
30 min Winter	0.400	0.400	0.1	7.0	O K
60 min Winter	0.508	0.508	0.1	8.9	O K
120 min Winter	0.625	0.625	0.1	11.0	O K
180 min Winter	0.697	0.697	0.1	12.2	O K
240 min Winter	0.750	0.750	0.1	13.1	O K
360 min Winter	0.825	0.825	0.1	14.5	O K
480 min Winter	0.877	0.877	0.1	15.4	O K
600 min Winter	0.916	0.916	0.1	16.1	O K
720 min Winter	0.947	0.947	0.1	16.6	O K
960 min Winter	0.990	0.990	0.1	17.3	O K
1440 min Winter	1.036	1.036	0.1	18.1	O K
2160 min Winter	1.055	1.055	0.1	18.5	O K
2880 min Winter	1.049	1.049	0.1	18.4	O K
4320 min Winter	1.026	1.026	0.1	18.0	O K
5760 min Winter	0.986	0.986	0.1	17.3	O K
7200 min Winter	0.942	0.942	0.1	16.5	O K
8640 min Winter	0.897	0.897	0.1	15.7	O K
10080 min Winter	0.853	0.853	0.1	14.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Winter	91.990	0.0	27
30 min Winter	62.658	0.0	41
60 min Winter	39.995	0.0	70
120 min Winter	24.904	0.0	128
180 min Winter	18.717	0.0	186
240 min Winter	15.262	0.0	246
360 min Winter	11.412	0.0	362
480 min Winter	9.274	0.0	480
600 min Winter	7.890	0.0	596
720 min Winter	6.913	0.0	712
960 min Winter	5.608	0.0	942
1440 min Winter	4.175	0.0	1392
2160 min Winter	3.107	0.0	2036
2880 min Winter	2.518	0.0	2340
4320 min Winter	1.870	0.0	3248
5760 min Winter	1.512	0.0	4200
7200 min Winter	1.283	0.0	5112
8640 min Winter	1.121	0.0	5976
10080 min Winter	1.000	0.0	6864

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	17.000	Shortest Storm (mins)	15
Ratio R	0.300	Longest Storm (mins)	10080
Summer Storms	No	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.027

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.009	4	8	0.009	8	12	0.009

Model Details

Storage is Online Cover Level (m) 2.000

Cellular Storage Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01000 Porosity 0.60
Infiltration Coefficient Side (m/hr) 0.01000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	29.2	29.2	1.200	0.0	54.1
1.100	29.2	54.1			

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 2482 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Winter	0.293	0.293	0.1	6.1	O K
30 min Winter	0.398	0.398	0.1	8.3	O K
60 min Winter	0.505	0.505	0.1	10.5	O K
120 min Winter	0.622	0.622	0.1	13.0	O K
180 min Winter	0.694	0.694	0.1	14.5	O K
240 min Winter	0.747	0.747	0.1	15.6	O K
360 min Winter	0.822	0.822	0.1	17.2	O K
480 min Winter	0.875	0.875	0.1	18.3	O K
600 min Winter	0.914	0.914	0.1	19.1	O K
720 min Winter	0.945	0.945	0.1	19.7	O K
960 min Winter	0.989	0.989	0.1	20.6	O K
1440 min Winter	1.038	1.038	0.1	21.7	O K
2160 min Winter	1.060	1.060	0.1	22.1	O K
2880 min Winter	1.054	1.054	0.1	22.0	O K
4320 min Winter	1.033	1.033	0.1	21.6	O K
5760 min Winter	0.995	0.995	0.1	20.8	O K
7200 min Winter	0.952	0.952	0.1	19.9	O K
8640 min Winter	0.909	0.909	0.1	19.0	O K
10080 min Winter	0.865	0.865	0.1	18.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Winter	91.990	0.0	27
30 min Winter	62.658	0.0	41
60 min Winter	39.995	0.0	70
120 min Winter	24.904	0.0	128
180 min Winter	18.717	0.0	186
240 min Winter	15.262	0.0	246
360 min Winter	11.412	0.0	362
480 min Winter	9.274	0.0	480
600 min Winter	7.890	0.0	596
720 min Winter	6.913	0.0	712
960 min Winter	5.608	0.0	944
1440 min Winter	4.175	0.0	1398
2160 min Winter	3.107	0.0	2052
2880 min Winter	2.518	0.0	2572
4320 min Winter	1.870	0.0	3288
5760 min Winter	1.512	0.0	4216
7200 min Winter	1.283	0.0	5120
8640 min Winter	1.121	0.0	6048
10080 min Winter	1.000	0.0	6872

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	17.000	Shortest Storm (mins)	15
Ratio R	0.300	Longest Storm (mins)	10080
Summer Storms	No	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.032

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.011	4	8	0.011	8	12	0.011

Model Details

Storage is Online Cover Level (m) 2.000

Cellular Storage Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01000 Porosity 0.60
Infiltration Coefficient Side (m/hr) 0.01000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	34.8	34.8	1.200	0.0	61.2
1.100	34.8	61.2			

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 2370 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Winter	0.296	0.296	0.0	5.0	O K
30 min Winter	0.402	0.402	0.1	6.8	O K
60 min Winter	0.510	0.510	0.1	8.6	O K
120 min Winter	0.628	0.628	0.1	10.5	O K
180 min Winter	0.700	0.700	0.1	11.8	O K
240 min Winter	0.753	0.753	0.1	12.7	O K
360 min Winter	0.829	0.829	0.1	13.9	O K
480 min Winter	0.881	0.881	0.1	14.8	O K
600 min Winter	0.920	0.920	0.1	15.5	O K
720 min Winter	0.950	0.950	0.1	16.0	O K
960 min Winter	0.994	0.994	0.1	16.7	O K
1440 min Winter	1.040	1.040	0.1	17.5	O K
2160 min Winter	1.059	1.059	0.1	17.8	O K
2880 min Winter	1.053	1.053	0.1	17.7	O K
4320 min Winter	1.029	1.029	0.1	17.3	O K
5760 min Winter	0.989	0.989	0.1	16.6	O K
7200 min Winter	0.945	0.945	0.1	15.9	O K
8640 min Winter	0.900	0.900	0.1	15.1	O K
10080 min Winter	0.856	0.856	0.1	14.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Winter	91.990	0.0	27
30 min Winter	62.658	0.0	41
60 min Winter	39.995	0.0	70
120 min Winter	24.904	0.0	128
180 min Winter	18.717	0.0	186
240 min Winter	15.262	0.0	246
360 min Winter	11.412	0.0	362
480 min Winter	9.274	0.0	480
600 min Winter	7.890	0.0	596
720 min Winter	6.913	0.0	712
960 min Winter	5.608	0.0	942
1440 min Winter	4.175	0.0	1392
2160 min Winter	3.107	0.0	2036
2880 min Winter	2.518	0.0	2340
4320 min Winter	1.870	0.0	3248
5760 min Winter	1.512	0.0	4168
7200 min Winter	1.283	0.0	5112
8640 min Winter	1.121	0.0	5968
10080 min Winter	1.000	0.0	6864

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	17.000	Shortest Storm (mins)	15
Ratio R	0.300	Longest Storm (mins)	10080
Summer Storms	No	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.026

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.009	4	8	0.009	8	12	0.009

Model Details

Storage is Online Cover Level (m) 2.000

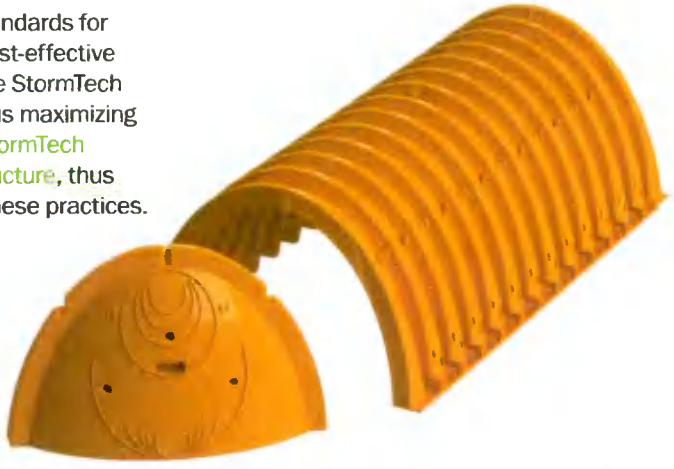
Cellular Storage Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01000 Porosity 0.60
Infiltration Coefficient Side (m/hr) 0.01000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	28.0	28.0	1.200	0.0	52.2
1.100	28.0	52.2			

STORMTECH SC-740 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



STORMTECH SC-740 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
85.4" x 51" x 30"
2,170 mm x 1,295 mm x 762 mm

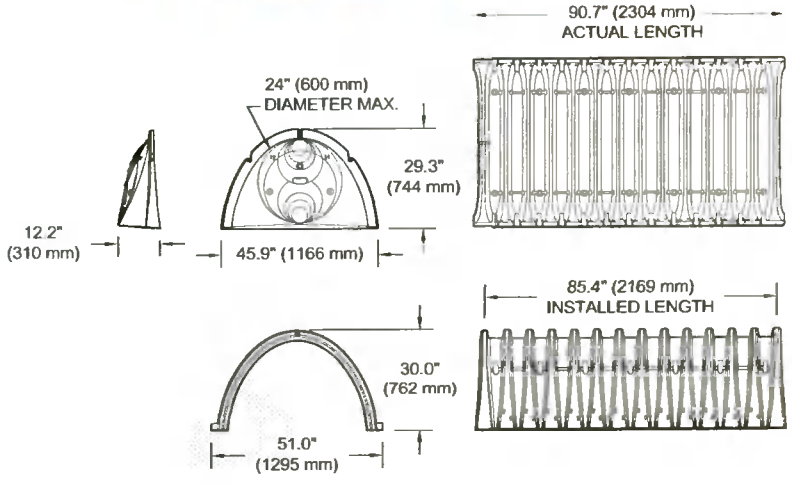
Chamber Storage
45.9 ft³ (1.30 m³)

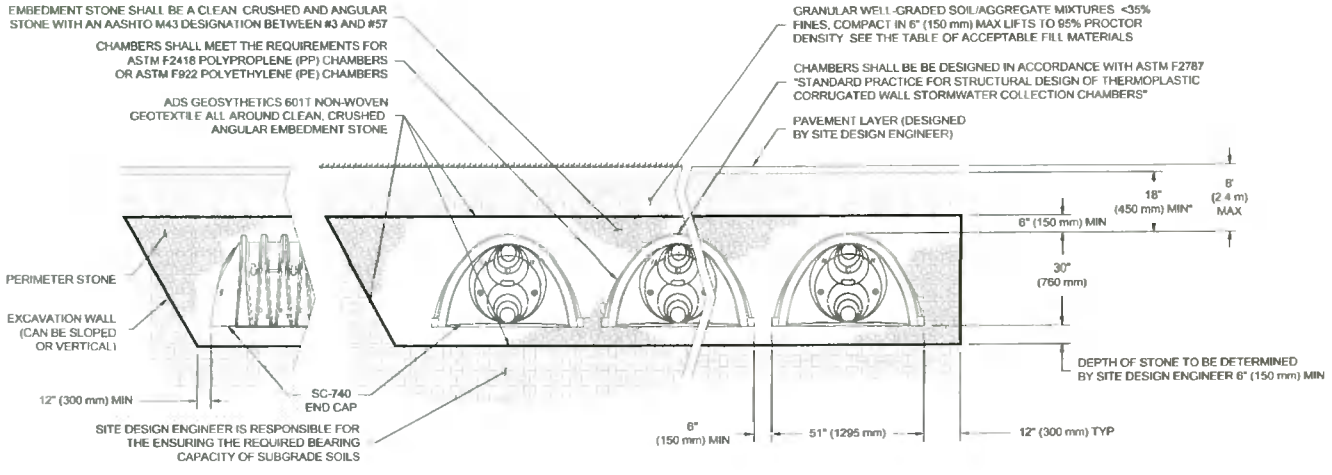
Min. Installed Storage*
74.9 ft³ (2.12 m³)

Weight
74.0 lbs (33.6 kg)

Shipping
30 chambers/pallet
60 end caps/pallet
12 pallets/truck

*Assumes 6" (150 mm) stone above, below and between chambers and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

StormTech

ADS

SC-740 CUMULATIVE STORAGE VOLUMES PER CHAMBER

Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under Chambers.

Depth of Water in System Inches (mm)		Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
42 (1067)		45.90 (1.300)	74.90 (2.121)
41 (1041)		45.90 (1.300)	73.77 (2.089)
40 (1016)	Stone	45.90 (1.300)	72.64 (2.057)
39 (991)	Cover	45.90 (1.300)	71.52 (2.025)
38 (965)		45.90 (1.300)	70.39 (1.993)
37 (940)		45.90 (1.300)	69.26 (1.961)
36 (914)		45.90 (1.300)	68.14 (1.929)
35 (889)		45.85 (1.298)	66.98 (1.897)
34 (864)		45.69 (1.294)	65.75 (1.862)
33 (838)		45.41 (1.286)	64.46 (1.825)
32 (813)		44.81 (1.269)	62.97 (1.783)
31 (787)		44.01 (1.246)	61.36 (1.737)
30 (762)		43.06 (1.219)	59.66 (1.689)
29 (737)		41.98 (1.189)	57.89 (1.639)
28 (711)		40.80 (1.155)	56.05 (1.587)
27 (686)		39.54 (1.120)	54.17 (1.534)
26 (660)		38.18 (1.081)	52.23 (1.479)
25 (635)		36.74 (1.040)	50.23 (1.422)
24 (610)		35.22 (0.977)	48.19 (1.365)
23 (584)		33.64 (0.953)	46.11 (1.306)
22 (559)		31.99 (0.906)	44.00 (1.246)
21 (533)		30.29 (0.858)	1.85 (1.185)
20 (508)		28.54 (0.808)	39.67 (1.123)
19 (483)		26.74 (0.757)	37.47 (1.061)
18 (457)		24.89 (0.705)	35.23 (0.997)
17 (432)		23.00 (0.651)	32.96 (0.939)
16 (406)		21.06 (0.596)	30.68 (0.869)
15 (381)		19.09 (0.541)	28.36 (0.803)
14 (356)		17.08 (0.484)	26.03 (0.737)
13 (330)		15.04 (0.426)	23.68 (0.670)
12 (305)		12.97 (0.367)	21.31 (0.608)
11 (279)		10.87 (0.309)	18.92 (0.535)
10 (254)		8.74 (0.247)	16.51 (0.468)
9 (229)		6.58 (0.186)	14.09 (0.399)
8 (203)		4.41 (0.125)	11.66 (0.330)
7 (178)		2.21 (0.063)	9.21 (0.264)
6 (152)		0 (0)	6.76 (0.191)
5 (127)		0 (0)	5.63 (0.160)
4 (102)	Stone Foundation	0 (0)	4.51 (0.128)
3 (76)		0 (0)	3.38 (0.096)
2 (51)		0 (0)	2.25 (0.064)
1 (25)		0 (0)	1.13 (0.032)

Note: Add 1.13 ft³ (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)		
		6 (150)	12 (300)	18 (450)
SC-740 Chamber	45.9 (1.3)	74.9 (2.1)	81.7 (2.3)	88.4 (2.5)

Note: Assumes 6" (150 mm) stone above chambers, 6" (150 mm) row spacing and 40% stone porosity.

AMOUNT OF STONE PER CHAMBER

ENGLISH TONS (yds³)	Stone Foundation Depth		
	6"	12"	16"
SC-740	3.8 (2.8)	4.6 (3.3)	5.5 (3.9)
METRIC KILOGRAMS (m³)	150 mm	300 mm	450 mm
SC-740	3,450 (2.1)	4,170 (2.5)	4,490 (3.0)

Note: Assumes 6" (150 mm) of stone above and between chambers.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth		
	6 (150)	12 (300)	18 (450)
SC-740	5.5 (4.2)	6.2 (4.7)	6.8 (5.2)

Note: Assumes 6" (150 mm) of row separation and 18" (450 mm) of cover. The volume of excavation will vary as depth of cover increases.

Working on a project?
Visit us at www.stormtech.com
and utilize the StormTech Design Tool

For more information on the StormTech SC-740 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

THE MOST ADVANCED NAME IN WATER MANAGEMENT SOLUTIONS™

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

StormTech

An ADS company

Isolator® Row O&M Manual

THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS™

ADS

THE ISOLATOR® ROW

INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-160LP, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

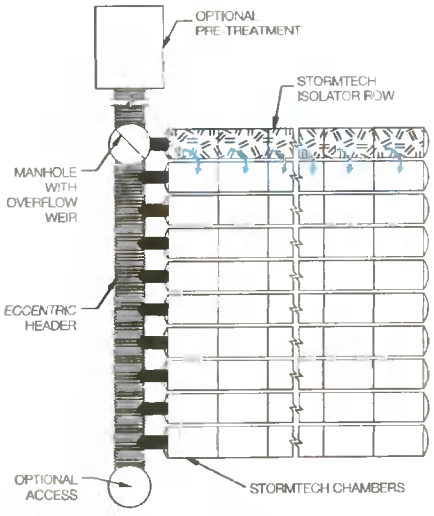
The Isolator Row is typically designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.

Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

StormTech Isolator Row with Overflow Spillway (not to scale)



ISOLATOR ROW INSPECTION/MAINTENANCE

INSPECTION

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

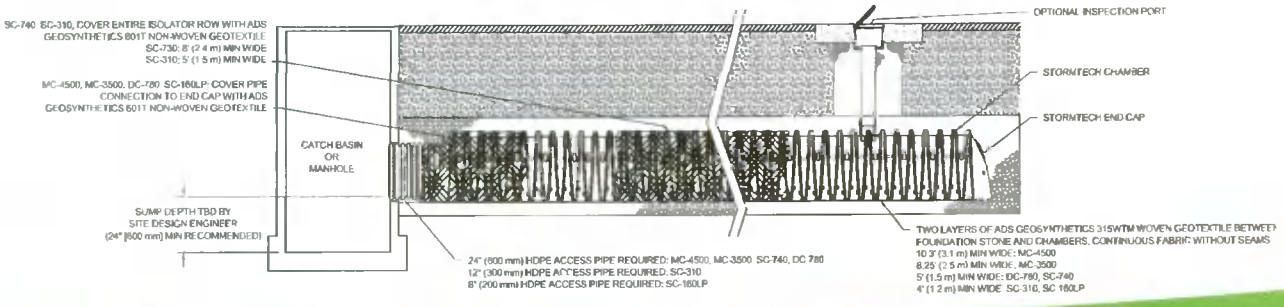
MAINTENANCE

The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

StormTech Isolator Row (not to scale)

Note: Non-woven fabric is only required over the inlet pipe connection into the end cap for DC-780, MC-3500 and MC-4500 chamber models and is not required over the entire Isolator Row.



ISOLATOR ROW STEP BY STEP MAINTENANCE PROCEDURES

STEP 1
Inspect Isolator Row for sediment.

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
   iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

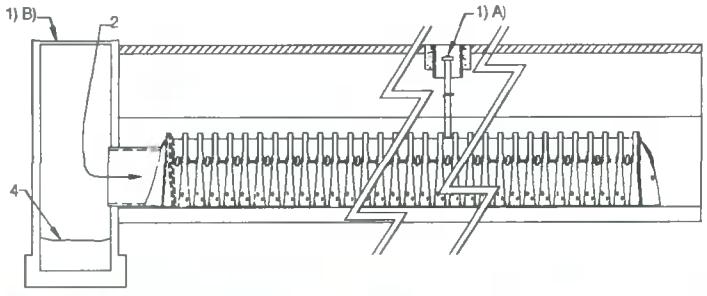
B) All Isolator Rows
   i. Remove cover from manhole at upstream end of Isolator Row
   ii. Using a flashlight, inspect down Isolator Row through outlet pipe
      1. Mirrors on poles or cameras may be used to avoid a confined space entry
      2. Follow OSHA regulations for confined space entry if entering manhole
   iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

STEP 2
Clean out Isolator Row using the JetVac process.

A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

STEP 3
Replace all caps, lids and covers, record observations and actions.

STEP 4
Inspect & clean catch basins and manholes upstream of the StormTech system.



SAMPLE MAINTENANCE LOG

Date	Stadia Rod Readings		Sediment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

StormTech
A division of ADS

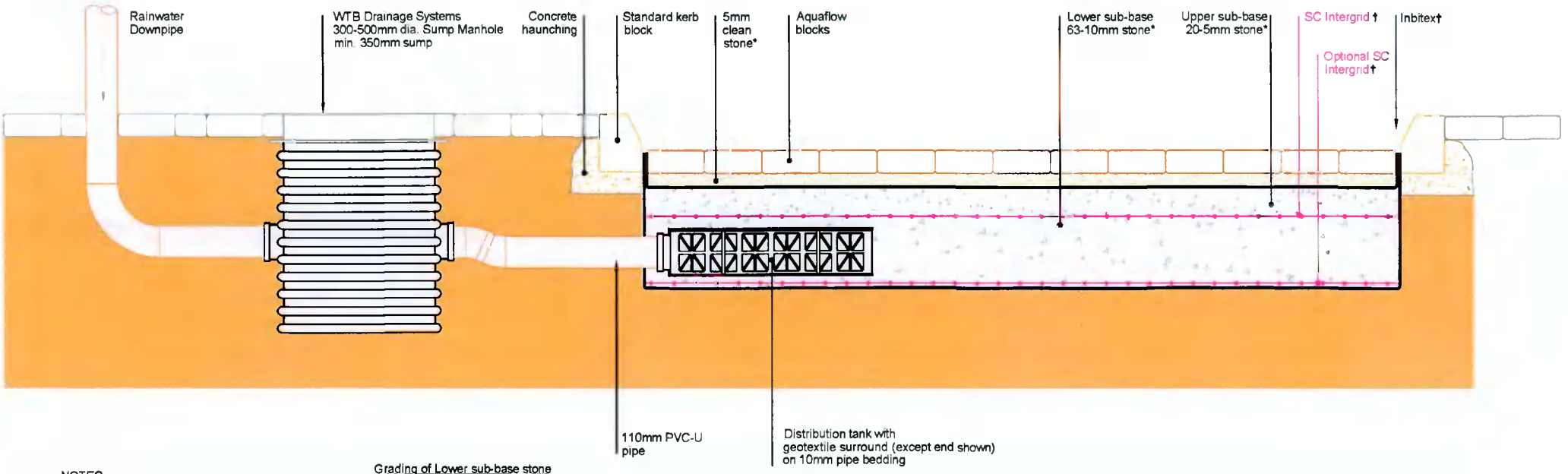
Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

APPENDIX C

(Alternative surface water disposal option) Permeable paving details - Roadstone Aquaform/ or alternative approved system

FORMPAVE STORMWATER SOURCE CONTROL SYSTEM

Downpipe drainage into Infiltration System - Section



NOTES

† Supplied by WTB Geotextiles or UGS

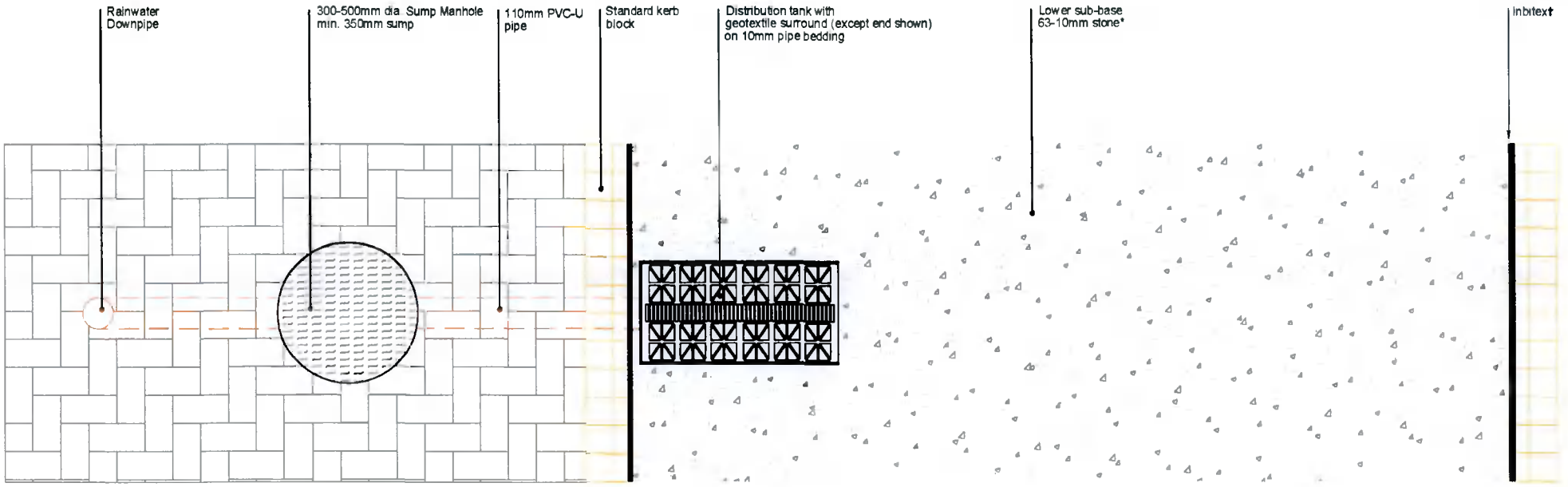
* Specification for sub-base and laying course.- the crushed stone must possess well defined edges and have a minimum 10% fines value of 150kN when tested in accordance with BS812 Part iii.

Grading of Lower sub-base stone

SIEVE SIZE	% PASSING
100mm	100
63mm	90-100
37.5mm	60-80
20mm	15-30
10mm	0-5

FORMPAVE STORMWATER SOURCE CONTROL SYSTEM

Downpipe drainage into Infiltration System - Plan



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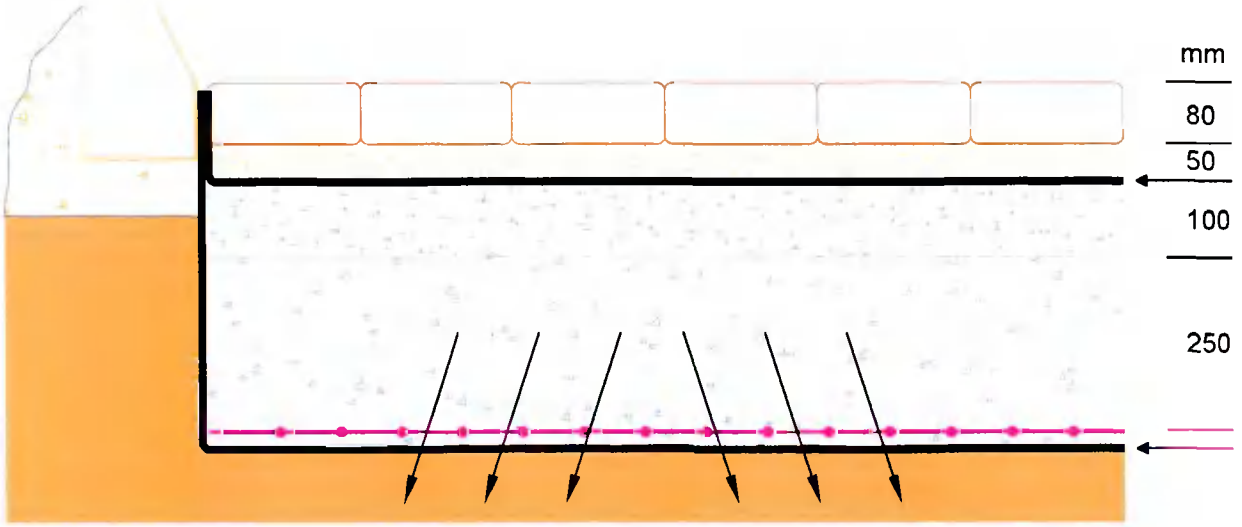
Grading of Lower sub-base stone

SIEVE SIZE	% PASSING
100mm	100
63mm	90-100
37.5mm	60-80
20mm	15-30
10mm	0-5

FORMPAVE STORMWATER SOURCE CONTROL SYSTEM

Typical Infiltration System with a CBR between 2 - 5%
Parking Areas subject to trafficking by Cars and Vans only



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* Specification for sub-base and laying course:-
the crushed stone must possess well defined edges
and have a minimum 10% fines value of 150kN
when tested in accordance with BS812 Part iii.

Grading of Lower sub-base stone

SIEVE SIZE	% PASSING
100mm	100
63mm	90-100
37.5mm	60-80
20mm	15-30
10mm	0-5

APPENDIX D

Rainfall return period tables

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 314464, Northing: 226372,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.7,	4.0,	4.7,	5.8,	6.6,	7.2,	9.2,	11.5,	13.1,	15.3,	17.4,	19.0,	21.5,	23.4,	25.1,	N/A ,
10 mins	3.8,	5.6,	6.6,	8.1,	9.2,	10.0,	12.8,	16.1,	18.2,	21.4,	24.2,	26.4,	29.9,	32.6,	34.9,	N/A ,
15 mins	4.5,	6.6,	7.8,	9.6,	10.8,	11.8,	15.1,	18.9,	21.5,	25.1,	28.5,	31.1,	35.2,	38.4,	41.1,	N/A ,
30 mins	5.9,	8.6,	10.1,	12.3,	13.9,	15.1,	19.2,	24.0,	27.1,	31.7,	35.8,	39.0,	44.0,	47.9,	51.2,	N/A ,
1 hours	7.7,	11.2,	13.0,	15.9,	17.9,	19.4,	24.5,	30.4,	34.3,	39.9,	44.9,	48.9,	54.9,	59.7,	63.7,	N/A ,
2 hours	10.1,	14.5,	16.9,	20.5,	23.0,	24.9,	31.3,	38.6,	43.4,	50.3,	56.4,	61.2,	68.6,	74.4,	79.3,	N/A ,
3 hours	11.9,	17.0,	19.7,	23.8,	26.7,	28.9,	36.1,	44.3,	49.8,	57.6,	64.5,	69.9,	78.2,	84.7,	90.1,	N/A ,
4 hours	13.3,	18.9,	21.9,	26.5,	29.6,	32.0,	39.9,	48.9,	54.9,	63.4,	70.9,	76.7,	85.8,	92.8,	98.7,	N/A ,
6 hours	15.6,	22.1,	25.5,	30.8,	34.3,	37.0,	46.0,	56.3,	63.0,	72.5,	81.0,	87.6,	97.7,	105.6,	112.1,	N/A ,
9 hours	18.3,	25.8,	29.7,	35.7,	39.7,	42.9,	53.1,	64.7,	72.3,	83.0,	92.5,	99.9,	111.3,	120.1,	127.5,	N/A ,
12 hours	20.5,	28.7,	33.1,	39.7,	44.1,	47.5,	58.7,	71.4,	79.7,	91.4,	101.7,	109.7,	122.1,	131.7,	139.6,	N/A ,
18 hours	24.1,	33.5,	38.6,	46.1,	51.1,	55.0,	67.7,	82.0,	91.4,	104.6,	116.2,	125.2,	139.1,	149.8,	158.6,	N/A ,
24 hours	27.0,	37.4,	43.0,	51.2,	56.7,	61.0,	74.9,	90.5,	100.8,	115.1,	127.8,	137.5,	152.5,	164.1,	173.7,	207.2,
2 days	33.9,	45.9,	52.1,	61.3,	67.4,	72.1,	87.2,	103.9,	114.7,	129.8,	142.9,	153.0,	168.4,	180.2,	189.9,	223.5,
3 days	39.6,	52.7,	59.5,	69.5,	76.1,	81.1,	97.2,	114.9,	126.3,	141.9,	155.6,	166.1,	181.9,	194.1,	204.0,	238.3,
4 days	44.5,	58.7,	66.0,	76.6,	83.6,	89.0,	106.0,	124.4,	136.3,	152.6,	166.8,	177.6,	193.9,	206.4,	216.6,	251.5,
6 days	53.2,	69.2,	77.3,	89.0,	96.7,	102.6,	121.1,	141.0,	153.7,	171.1,	186.2,	197.6,	214.8,	227.8,	238.5,	274.9,
8 days	60.9,	78.4,	87.2,	99.9,	108.2,	114.5,	134.3,	155.5,	168.9,	187.3,	203.0,	215.0,	232.9,	246.6,	257.7,	295.3,
10 days	67.9,	86.8,	96.3,	109.8,	118.6,	125.3,	146.2,	168.5,	182.6,	201.8,	218.3,	230.7,	249.4,	263.5,	275.0,	313.8,
12 days	74.5,	94.6,	104.7,	119.0,	128.3,	135.3,	157.3,	180.6,	195.3,	215.2,	232.3,	245.2,	264.5,	279.1,	290.9,	330.9,
16 days	86.8,	109.1,	120.2,	135.9,	146.1,	153.7,	177.5,	202.6,	218.4,	239.7,	257.9,	271.6,	292.0,	307.4,	319.8,	361.8,
20 days	98.3,	122.5,	134.5,	151.4,	162.3,	170.5,	195.9,	222.7,	239.4,	261.9,	281.1,	295.4,	316.9,	333.0,	346.0,	389.7,
25 days	111.7,	138.1,	151.1,	169.5,	181.2,	190.0,	217.2,	245.8,	263.6,	287.4,	307.7,	322.8,	345.4,	362.3,	375.9,	421.7,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

APPENDIX E

Irish Water confirmation of available capacity

Brian O' Flanagan

Terry & O'Flanagan
Unit F1
Centrepoint Bus Park
Oak Road
Dublin 12
D12P308

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

28 July 2020

Re: CDS20004764 pre-connection enquiry - Subject to contract | Contract denied

Connection for Housing Development of 8 units at Grangebrook Avenue, Rathfarnham, Dublin 16

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Grangebrook Avenue, Rathfarnham, Dublin 16 (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	OUTCOME OF PRE-CONNECTION ENQUIRY THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Deirdre Ryan from the design team on 022 54620 or email deiryan@water.ie. For further information, visit **www.water.ie/connections.**

Yours sincerely,

Maria O'Dwyer

Connections and Developer Services