



Drainage Design Report

Project:

157 Old Court Road,
Tallaght, Dublin 24

Client:

Robert Bourke Architects

Date of Report:

16th June 2022

Project Ref. No.:

22713

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Document Control

Producer:	Date:	Reviewer:	Date:	Revision Status:	Comment
E.Roche	26/06/2022	B.McGinn	26/06/2022	1st	Issued For Planning
E.Roche	26/06/2022	B.McGinn	26/06/2022	2nd	'RBA' revised to 'The Client'
E.Roche	07/07/2022	B.McGinn	07/07/2022	3rd	Client Name - Typo Amended

1.0 Introduction

1.1 Proposed Development Details

Mable Consulting Engineers have been appointed by the client to prepare a RFI response report to respond to the FI request received from South Dublin County Council on 14 April 2022 for the proposed construction of a new extension to 157 Old Court Road, Tallaght, Dublin 24, Planning reference number: SD22B/0061.

Mable consultants Mr Barry McGinn visited the site to aid in preparing this RFI response report.

This report was created in order to address Item 2, 3, 4 & 5 of the further information request.

The items state:-

2. There are no soil percolation test results, design calculations or dimensions submitted for the proposed soakaway. The applicant is requested to submit a report showing site specific soil percolation test results and design calculations for the proposed soakaway in accordance with BRE Digest 365 – Soakaway Design.
3. The applicant is requested to submit a revised drawing showing plan and cross-sectional views, dimensions, and location of proposed soakaway. Any proposed soakaway shall be located fully within the curtilage of the property and shall be:
 - (i) At least 5m from any building, public sewer, road boundary or structure.
 - (ii) Generally, not within 3m of the boundary of the adjoining property.
 - (iii) Not in such a position that the ground below foundations is likely to be adversely affected.
 - (iv) 10m from any sewage treatment percolation area and from any watercourse / floodplain.Should a soakaway prove not to be feasible, then the applicant shall submit the following:
 - (i) Soil percolation test results demonstrating a soakaway is not feasible
 - (ii) A revised surface water layout drainage drawing for the development showing the inclusion of alternative SuDS (Sustainable Drainage Systems) features.
4. The applicant is requested to include Water Butts as part of additional Sustainable Drainage Systems (SuDS) measures for the proposed development.
5. It is unclear where the foul water discharges from the proposed development. The applicant is requested to submit a drawing showing existing and proposed foul water drainage layouts up to and including the point of connection to the public foul water sewer. The drawing shall include the location of all Aj's, manholes, pipe size, material type and direction of flow. The drawing shall clearly show that the foul and surface water systems are discharging to separate pipe networks. Maps of the public watermains and Wastewater drainage networks may be obtained, if available, for required locations in by emailing: datarequests@water.ie.

1.2 Site Location

The site is located at rear of 157 Old Court Road, Tallaght, Dublin 24. The site is outlined in red in figure 1 below:



Figure 1 – Site Location – Site outlined in red

2.0 Existing Drainage

Existing Drainage drawings were attained from South Dublin County Council Drainage Division & Irish Water. A topographic survey of the existing drainage was undertaken along with a site visit to inspect the existing drainage lines. See Appendix 'A' & 'B' for the Existing drainage maps and topographic survey respectively.

The existing surface water and foul drainage systems outfall to a combined sewer at the rear of 156 Old Court Road which connects to an existing line in Old Court Road.

The location of existing manholes and existing sewer lines are shown in drawing 22713-100.

3.0 Foul Water Drainage Design

The proposed development foul water will discharge into a new manhole on the North-East side of the site which will be piped below the proposed extension to a second new manhole on the existing line constructed in the neighbouring property. The existing line is connected to the public 225mm Dia. foul sewer already present on Old Court Road. See Appendix 'C' for foul water drainage design calculations.

4.0 Surface Water Drainage Design

During the surface water drainage design process, 2 different solutions were assessed:

4.1 Discharge to Soakpit

Due to the poor soakage rate found by performing a soakage test in the area, this solution was found not to be suitable. See Appendix 'D' for soakage test results.

4.2 Discharge to Public Stormwater Sewer

The existing public sewers in the vicinity of the site were reviewed.

There is a separate surface water drainage line located in the footpath to the front of the site. This is suitable for a connection. It is proposed to connect to this drainage line.

The proposed construction of a new separate surface water outfall point will lower the surface water load on the existing combined public sewer.

A small increase in load will be applied to the existing surface water sewer due to the proposed new connection works. SUDS measures will be provided to manage the peak rate of surface water discharge into the surface water sewer.

The design of the attenuation storage capacity is based on Rainfall Data Issued by Met Eireann for the site location and for 30 years and 100 years return period, increased by 20% to consider the future variation caused by climate changes. A discharge rate of 0.41l/s was calculated. See Appendix 'E' for Surface water Qbar calculation sheet, Attenuation Storage Design Spreadsheet and Met Eireann Rainfall Data, Appendix 'F' for flow control device, and Appendix 'G' for Wavin Aquacell technical data sheet.

In addition to this design, Water Butts have been added to the planning drawings.

The final Site layout & Drainage Plan drawing 22713-100 shows the locations of all the mentioned equipment in this report. See Appendix 'H' for Existing Site Layout & Drainage Plan, Proposed Site Layout & Drainage Plan, and Proposed Drainage Details.

End Of Report.

Signed: *E. Roche*
Eoin Roche
Design Engineer

Date: 26/06/2022

Appendix A – Topographic Survey

Appendix B – Irish Water Web Map / Existing Drainage Map

Appendix C – Foul Water Drainage Calculations



Project:	157 OLD COURT ROAD, TALLAGHT, D24		
Project No.:	22213	Sheet No.:	1
Member / Location:	FOUL SEWER DESIGN		
Doc. Control:	Calculations By	Reviewed By	Date
Name:	ER		

Ref.	Calculations				Output															
	Sum of discharge																			
		DU (l/s)	DU	$\Sigma DU (l/s)$																
BSEN 75	SHOWER	0.4	1	0.4																
	KITCHEN SINK	0.5	1	0.5																
	DISHWASHER	0.5	1	0.5																
	WC (7.5L)	2.0	2	4.0																
	WASH BASIN	0.3	2	0.6																
	TOTAL : 6.0 L/S																			
	<u>WASTE WATER FLOW RATE</u>																			
	$Q_{ww} = K \sqrt{\Sigma DU} = 0.5 \sqrt{6.0} = 1.25 \text{ L/S}$																			
	$K = \text{SHORT TERM LET} = 0.5$																			
TECHNICAL GUIDANCE DOCUMENT 'H'	<table border="1"> <caption>Table 6 Recommended minimum gradients for foul drains</caption> <thead> <tr> <th>Peak flow (litres/sec)</th> <th>Pipe size (mm)</th> <th>Minimum gradient (1 in....)</th> <th>Number of dwellings served</th> </tr> </thead> <tbody> <tr> <td>< 2.5</td> <td>100</td> <td>1:60*</td> <td>1</td> </tr> <tr> <td rowspan="2">> 2.5</td> <td>100</td> <td>1:100*</td> <td>Up to 3</td> </tr> <tr> <td>150</td> <td>1:150†</td> <td>3 to 8</td> </tr> </tbody> </table> <p>Notes: * Minimum of 1 wc † Minimum of 5 wcs</p>				Peak flow (litres/sec)	Pipe size (mm)	Minimum gradient (1 in....)	Number of dwellings served	< 2.5	100	1:60*	1	> 2.5	100	1:100*	Up to 3	150	1:150†	3 to 8	
Peak flow (litres/sec)	Pipe size (mm)	Minimum gradient (1 in....)	Number of dwellings served																	
< 2.5	100	1:60*	1																	
> 2.5	100	1:100*	Up to 3																	
	150	1:150†	3 to 8																	
	$Q_{ww} = 1.25 \text{ L/S} < 2.5 \text{ L/S}$																			
	<u>\therefore USE 100 Ø uPVC @ 1:60</u>																			

Appendix D – Soakage Test



Declan Kearns & Associates Ltd. t/a
Soakaway Tests
Tullywest
Kildare
Co. Kildare
Ireland

- SOAKAWAY TESTS
- SOAKAWAY DESIGN
- DRAINAGE DESIGN
- PERCOLATION TESTS
- SITE CHARACTERISATION TESTS

Phone: 01 539 4447
Phone: 045 520642
Mob: 086 2111590
Email: info@soakawaytests.ie
Visit: www.soakawaytests.ie

**Factual Report on
Soakaway Test
at**

**Proposed Development at
157 Oldcourt Road, Dublin 24**

Date : 21/05/22

1. INTRODUCTION

It is understood that it will be necessary to dispose of the storm water from the proposed Development at 157 Oldcourt Road, Dublin 24 by means of a soakaway system on site.

An investigation has been carried out to assess the suitability of the sub-soils for this purpose and to determine soakaway requirements.

2. FIELDWORK

One trial pit was excavated (see Appendix 1 for testhole photos) in order to ascertain subsoil conditions and the depth to groundwater. ST1 was excavated to a depth of 1.80m. Groundwater was not encountered after 48 hours.

The soakaway trial pit details are located in Appendix 2.

3. TESTING

To determine the soil infiltration rate, water was poured into the pit and records made of the fall in water level against time. Testing was continued until a constant rate of fall was established.

From the rate of fall in water level and measurement of the average internal surface area of the test pit over the test zone, the soil infiltration rate "f" was calculated.

The field data and calculations are located in Appendix 2.

There was no soakage in the test hole during the test after 3 hours. As the site is not suitable for a soakaway system, an attenuation system should be designed by the project engineers.

Signed :



Declan Kearns
Consultant Civil / Geotechnical Engineer
for and on behalf of
Declan Kearns & Associates Ltd. t/a
Soakaway Tests

Appendix 1
Site Photographs

Soakaway Test for 157 Oldcourt Road, Dublin 24



Figure 1. Testhole ST1



Figure 2. View of Arisings

Soakaway Test for 157 Oldcourt Road, Dublin 24

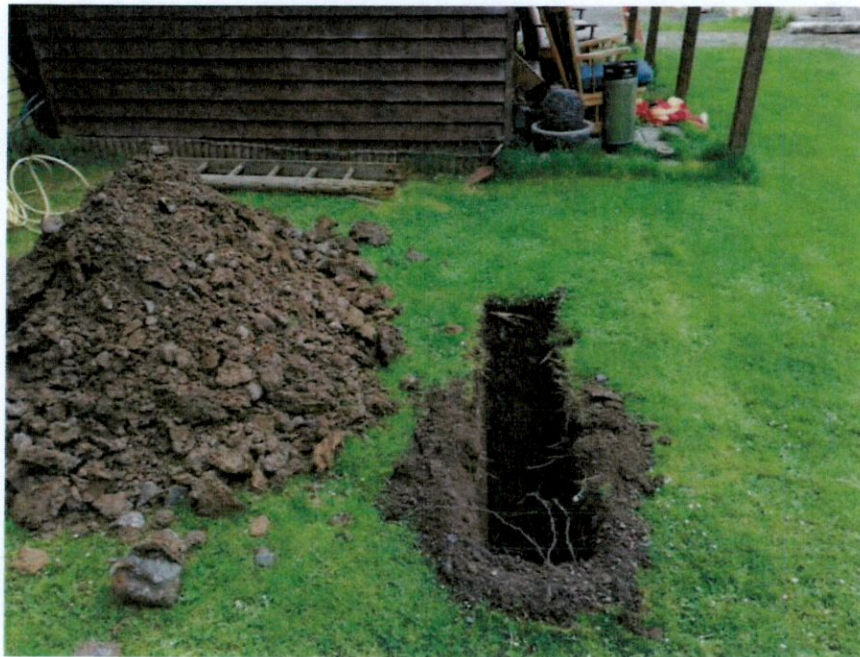


Figure 3. View of Site

Appendix 2

Field Data Records & Calculations

Appendix E – Surface Water Calculation Sheet & Met Eireann Rainfall Data

INPUT	Calculations By:	ER
OUTPUT	Checked By:	BMG

SITE DETAILS

Location	157 Old Court Road, Old Court, Dublin 24		
Site Area	0.041 Ha	410 m ²	0.00041 km ²

ALLOWABLE DISCHARGE FROM SITE

Equation: $Q_{bar} = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$

Q _{bar} :	Mean Annual Peak Flow From Site	(m ³ /s)
AREA:	Area of Site	km ²
SAAR:	Standard Annual Average Rainfall (Station)	7 Dublin Airport SAAR: 666.6 mm
SOIL:	Soil Index	4 SOIL: 0.47

1	0.1	Very Low	Sandy, Well Drained
2	0.3	Low	Intermediate Soil (Silty)
3	0.37	Moderate	Intermediate Soil (Sandy)
4	0.47	High	Clayey, Poorly Drained
5	0.53	Very High	Steep, Rocky area

Rainfall Intesities
Climate Change % 20%

If site is <50Ha, calculate Q-Bar for 50Ha and linearly interpolate for Site Area

Q_{bar} 50 Ha - STANDARD			
Area	Ha/km ²	50	0.5
Q _{bar}	=	0.0456	m ³ /s
Q _{bar}	=	45.59	l/s
Q _{bar}	=	0.91	l/s/ha
Q_{bar} 50 Ha - Restricted			
Area	Ha/km ²	0.041	0.00041
Q _{bar}	=	0.0004	m ³ /s
Q _{bar}	=	0.41	l/s
Q _{bar} (Allowable)	=	2.00	l/s/ha

Qbar Note:

If Qbar is less than 0.4l/s it will be inputted as a lower outflow is not practical & can cause maintenance issues and blockages of the outfall pipe.

Qbar Used	=	0.41 l/s
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Attenuation Design Inputs (Contribution Areas)

Location	Area (m ²)	Area (Ha)	% Impervious
Roof & Terrace	160	0.016	100%
Footpath, Access, Road & Carparking	140	0.014	90%
GreenField	110	0.011	15%
Total Area	0	0.041	% Impervious

30 Year Storm + 20%

Duration (minutes)	Met Ereann Rainfall (mm)	Rainfall (mm) + 20%	Rainfall + 20% (m3/ha)	Proposed Total Outflow (m3)	Proposed Un-Attenuated Outflow Rate (l/s)	Attenuated Outflow (m3)	Storage (m3)
5	10.6	12.72	127.20	3.85	12.826	0.123	3.73
10	14.7	17.64	176.40	5.34	8.894	0.245	5.09
15	17.3	20.76	207.60	6.28	6.978	0.368	5.91
30	23.3	27.96	279.60	8.46	4.699	0.735	7.72
60	31.4	37.68	376.80	11.40	3.166	1.471	9.93
120	42.4	50.88	508.80	15.39	2.138	2.941	12.45
180	50.4	60.48	604.80	18.30	1.694	4.412	13.88
240	57.1	68.52	685.20	20.73	1.439	5.882	14.85
360	68	81.60	816.00	24.68	1.143	8.823	15.86
540	80.9	97.08	970.80	29.37	0.906	13.235	16.13
720	91.6	109.92	1099.20	33.25	0.770	17.647	15.60
1080	109	130.80	1308.00	39.57	0.611	26.470	13.10
1440	123.3	147.96	1479.60	44.76	0.518	35.293	9.46

MAX

100 Year Storm + 20%

Duration (minutes)	Met Ereann Rainfall (mm)	Rainfall (mm) + 20%	Rainfall + 20% (m3/ha)	Proposed Total Outflow (m3)	Proposed Un-Attenuated Outflow Rate (l/s)	Attenuated Outflow (m3)	Storage (m3)
5	14.7	17.64	176.40	5.34	17.787	0.123	5.21
10	20.5	24.60	246.00	7.44	12.403	0.245	7.20
15	24.1	28.92	289.20	8.75	9.720	0.368	8.38
30	32.4	38.88	388.80	11.76	6.534	0.735	11.03
60	43.7	52.44	524.40	15.86	4.406	1.471	14.39
120	58.8	70.56	705.60	21.34	2.965	2.941	18.40
180	70.1	84.12	841.20	25.45	2.356	4.412	21.03
240	79.3	95.16	951.60	28.79	1.999	5.882	22.90
360	94.4	113.28	1132.80	34.27	1.586	8.823	25.44
540	112.4	134.88	1348.80	40.80	1.259	13.235	27.57
720	127.2	152.64	1526.40	46.17	1.069	17.647	28.53
1080	151.4	181.68	1816.80	54.96	0.848	26.470	28.49
1440	171.3	205.56	2055.60	62.18	0.720	35.293	26.89

MAX

Appendix F – Flow Control Device

Technical Specification

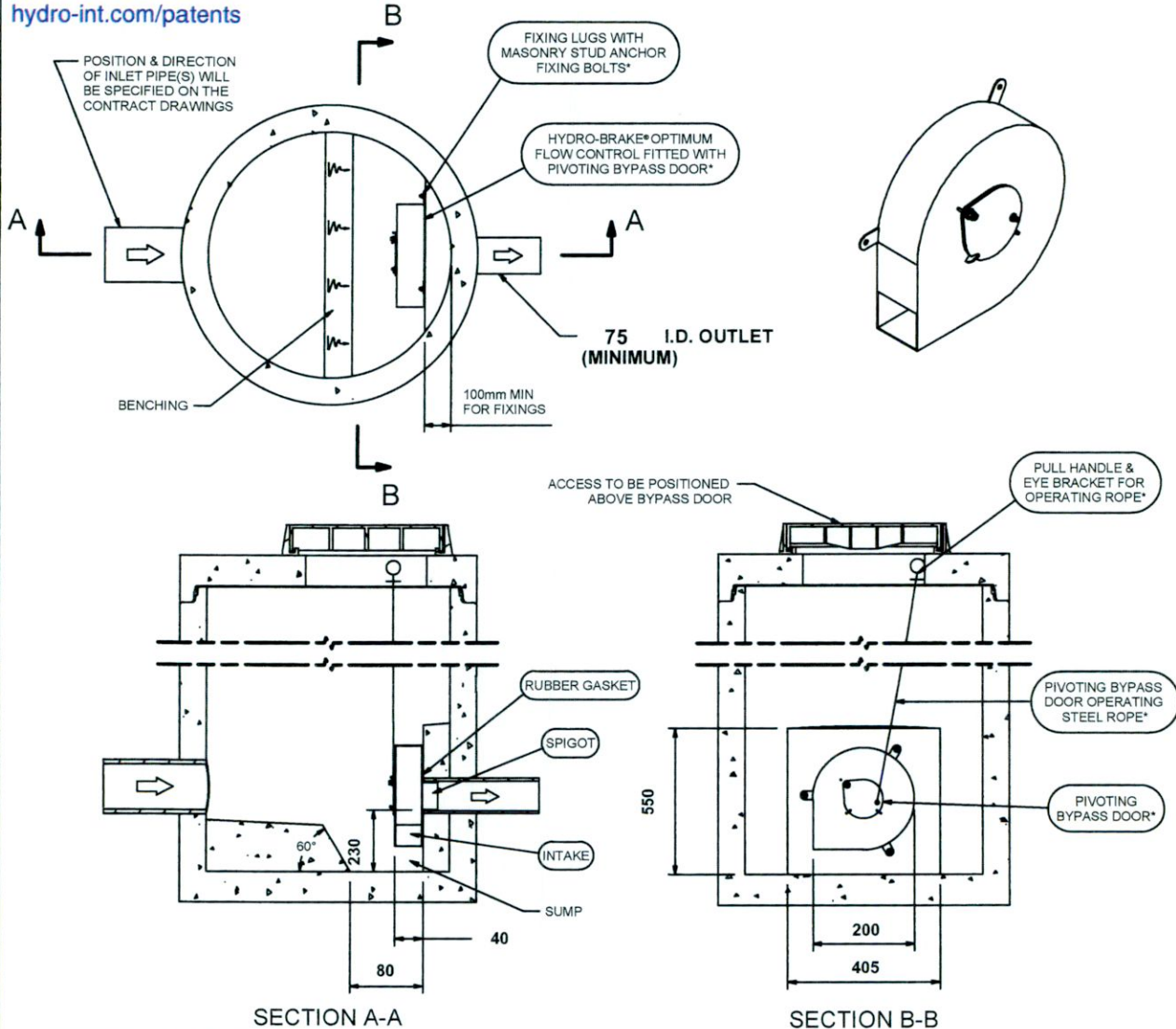
Control Point	Head (m)	Flow (l/s)
Primary Design	0.600	0.400
Flush-Flo™	0.143	0.343
Kick-Flo®	0.287	0.292
Mean Flow		0.323

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet



hydro-int.com/patents



IMPORTANT: ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
 ALL CIVIL AND INSTALLATION WORK BY OTHERS
 * WHERE SUPPLIED
 HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW
 CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0032-4000-0600-4000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
 International®

DATE	5/13/2021 9:09 AM
SITE	Dublin
DESIGNER	T B
REF	Prussia Apartment

SHE-0032-4000-0600-4000
 Hydro-Brake® Optimum

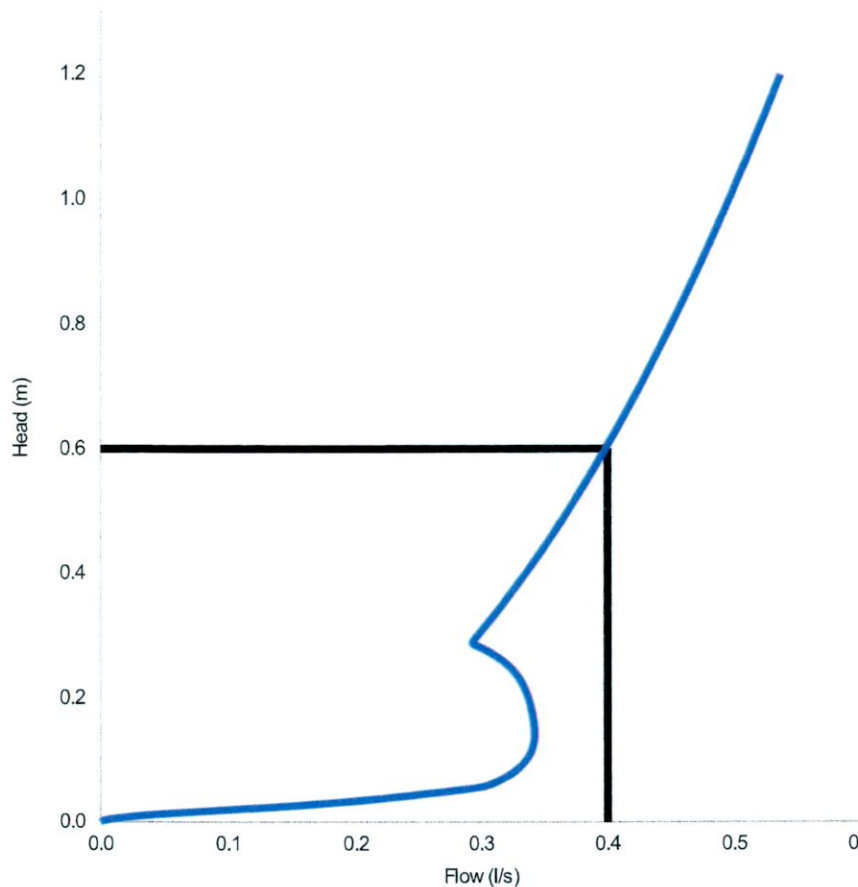
Technical Specification

Control Point	Head (m)	Flow (l/s)
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Flush-Flo	0.143	0.343
Kick-Flo®	0.287	0.292
Mean Flow		0.323



PT/329/0412

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Head (m)	Flow (l/s)
0.000	0.000
0.021	0.105
0.041	0.237
0.062	0.309
0.083	0.327
0.103	0.337
0.124	0.342
0.145	0.342
0.166	0.342
0.186	0.339
0.207	0.336
0.228	0.331
0.248	0.324
0.269	0.310
0.290	0.293
0.310	0.302
0.331	0.310
0.352	0.318
0.372	0.325
0.393	0.333
0.414	0.340
0.434	0.347
0.455	0.354
0.476	0.361
0.497	0.368
0.517	0.374
0.538	0.380
0.559	0.386
0.579	0.393
0.600	0.398

DESIGN ADVICE

The head/flow characteristics of this SHE-0032-4000-0600-4000 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.



The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.



DATE	13/05/2021 09:09
Site	Dublin
DESIGNER	T B
Ref	Prussia Apartment

SHE-0032-4000-0600-4000
Hydro-Brake Optimum®

Appendix G – Wavin Aquacell Technical Data Sheet

AquaCell Plus-R

Product description

AquaCell Plus-R has been designed primarily for use in applications where inspectability is required, and is suitable for use in all applications from landscaped areas to heavily trafficked areas.



Technical specification

Product code / SAP code	6LB250 / 4064832	Void ratio	95%
Colour	Black	Material	Recycled PP
Dimensions	1m x 0.5m x 0.4m	Vertical loading	70.2 tonnes/m ² (702 kN/m ²)
Weight	12.7kg	Lateral loading	15.1 tonnes/m ² (151 kN/m ²)
Storage volume	190 litres		

Maximum installation depths

Typical soil type	Maximum depth of installation – to base of units (m) ¹				
	Soil weight kN/m ³	Angle of internal friction ϕ (degrees) ^{2,3}	Landscaped areas	Vehicle mass <9 tonnes ^{4,5}	Vehicle mass <44 tonnes
Over consolidated stiff clay	20	24	4.67	4.42	4.17
Silty sandy clay	19	26	5.03	4.78	4.53
Loose sand and gravel	18	30	5.86	5.61	5.36
Medium dense sand and gravel	19	34	6.87	6.62	6.37
Dense sand and gravel	20	38	7.82	7.57	7.30

Minimum cover depths

	Landscaped areas	Car parks with vehicle mass <3 tonnes ⁵	Car parks with vehicle mass <9 tonnes	Car parks with vehicle mass <12 tonnes	Low speed roads with vehicle mass <60 tonnes
Minimum cover depth (m)	0.30	0.50	0.69	0.81	1.30

- Without groundwater present below base of units – AquaCell Plus-R may be used where groundwater is present, contact Wavin for technical advice.
- Loosening of dense sand or softening of clay by water can occur during installation. The designer should allow for any such likely effects when choosing an appropriate value of ϕ .
- The design is very sensitive to small changes in the assumed value of ϕ , therefore, it should be confirmed by a chartered geotechnical engineer. In clay soils, it may be possible to utilise cohesion in some cases.
- Applicable for car parks or other areas trafficked only by cars or occasional refuse collection trucks or similar vehicles (typically one per week).
- This category should be used when considering landscaped areas that may be trafficked by ride on mowers.

Assumptions made:

- Ground surface is horizontal
- Shear planes or other weaknesses are not present within the structure of the soil

Appendix H – Existing Site Layout & Drainage Plan, Proposed Site Layout & Drainage Plan, and Proposed Drainage Details