GORDON WHITE
CONSULTING ENGINEERS

NEW HOUSE ADJACNET TO 11 GLENFIELD DRIVE

ENGINEERS REPORT TO ACCOMPANY ADDITIONAL INFORMATION SUBMISSION

Project Number: G1346

Date: 12th August '22

Revision: 1.0

Status: To Accompany Additional Information

Prepared By:

Gordon White BA BAI, CEng MIEI, FConsEI

Revision	Date	By	Description
1.0	29/08/22	GW	To Accompany Additional Information submission

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SECTION A Introduction

Gordon White Consulting Engineers has been commissioned by Derek Whyte Planning Consultants and Helen Geraghty to provide Civil Engineering input to the response to the additional information request for the above development, Planning Reg Ref SD22/0260

The development, as proposed, comprises a single in-fill house within the side garden of 11, Glenfield Drive, Clondalkin.

SECTION B Item 3 (iv)

Information Requested

iv) The applicant has not proposed any SuDS (Sustainable Drainage Systems) features for the proposed development. The applicant is requested to submit a drawing in plan and cross-sectional views clearly showing proposed Sustainable Drainage Systems (SuDS) features for the development. Sample SuDs devices include green roofs, water butts, tree pits, rain gardens, filter strips and permeable paving amongst others. The applicant is referred to the recently published SDCC SuDS Design Guide for further information and guidance.

Response

This is covered by the response to item 4(iii) and 4 (iv) below

SECTION C Item 4

Information Requested

The Applicant is requested to provide the following information in relation to drainage and water services infrastructure:

i) A drawing showing the surface water layout for proposed development.
ii) A report and drawing to show how surface water will be attenuated on site.
iii) A report and drawing to show what SuDS (Sustainable Drainage Systems) are proposed for the development. Examples of SuDS include Green Roofs, Rain garden, Swales, Permeable Paving, Grasscrete, Channel Rills, Planter Boxes and water butts. Guidance on SuDS can be found on South Dublin County Council Website at: sdcc-householders-guide-to-sustainable-drainage-suds-.pdf
iv) If a soakaway is proposed, then the Applicant is requested to submit a report to show percolation tests results for the site. Percolation tests and design of soakaway shall be in accordance with BRE Digest 365 Standards. Such a soakaway shall have an overflow connection to the public surface water sewer.
v) Submit a drawing in plan and cross-sectional view showing the distance between the boundary wall of proposed house and the outside diameter of existing watermain South of Site.
vi) Submit a drawing showing the watermain layout for proposed development.
vii) Submit a drawing in plan and cross sectional view showing the distance between the boundary wall of proposed house and the outside diameter of existing 225mm foul sewer South of Site.
viii) Submit a drawing showing the foul drain layout for proposed development.
ix) Obtain a letter of confirmation of feasibility from Irish Water for proposed development in relation to the water and wastewater infrastructure for the proposed dwelling.

Response

General

Drawing G1346-10 shows the layout of the existing foul and storm sewers serving the existing property The Existing house is at the head of both the existing foul and surface water drains, that is to say the existing foul and surface water drains on the existing property do not service any other dwellings other than the existing dwelling on the property.

Item i)

Drawing G1346-12 shows the existing and proposed surface water drainage.

It is proposed that as part of the new development the existing surface water drain along the gable of the existing house be removed. The existing down-pipe at the front corner of the house can either be eliminated (there is another downpipe from the front gutter at the centre of this semi-detached pair) or connected to the new surface water system within the proposed house

Items ii) & iii)

Surface water will be attenuated on site through the provision of a soak-pit in the rear garden to which the roof drainage will be discharged.

The primary SuDS system is the proposed soak-pit in the rear garden. This will take the drainage off the roof and allow it to soak into the ground. Excess water will be stored within this pit prior to discharge to ground. It is proposed to us an ecocell or similar proprietary system as this provides the maximum storage per unit area, reducing the impact on the garden. Secondary to this it is proposed that the new driveway be of permeable paving to provide a source control. The existing driveway is of concrete and falls towards the road, with any rainwater run-off discharging to the road gullies, so this proposal represents an improvement over the current situation in respect of this area. As it is not proposed to directly connect the new roof drainage to the public storm sewerage it is not considered that water butts on down-pipes would contribute to the sustainability of the drainage system, but these can be included for if required.

Item iv)

The results of a soakaway test and soakaway calculations in accordance with BRE365 are included in Appendix B and a spec sheet for the Wavin Aquacell system is included in Appendix C. The location of the test hole is shown on Drawing G1346-12.

Drawing G1346-12 Shows the proposed soakaway dimensions and location and a typical section. The proposed soakaway is at least 5m from the nearest existing or proposed building, at least 3m from the boundary with another property and 1.5m from the boundary with the public footpath.

Items v) & vii)

A sectional view showing the relative locations and levels of the proposed house, the existing boundary wall and the existing watermain and foul sewer to the South of the site is included on Drawing G1364-11. Note we surveyed the location of the existing foul sewer at the manholes on either side of the section in question and found it to be somewhat further from the existing wall than shown on the Irish Water record drawings. This is because the foul sewer from Glenfield Close enders the side of the manhole on Glenfield Drive (ref SO06343106) at a location offset from the manhole cover. Thus whilst the Irish Water / SDCC map indicates it as passing below the existing boundary wall out survey indicates that it is outside the wall. At the other end (manhole ref SO06344104) the pipe is slightly closer to the boundary wall than the manhole cover, however the impact on this is much less as the offset is much less and it is much further from the proposed development.

We have verified the location of the hydrant on the watermain on Glenfield Close and on this basis assumed that the watermain location on the Irish Water / SDCC is correct. We have also assumed a standard depth of cover of 900mm for the watermain here. The watermain is not the critical service in respect to proximity to the proposed development.

The layout of the existing foul sewer & watermain per the above is shown on G1346-10

In order to prevent any additional load bearing on the foul sewer and to make allowance for any future requirement to excavate onto the sewer to maintain of repair it without undermining the foundations it is proposed to extend the rising wall and foundations down to a level outside a 45 degree zone of influence from the outside of the pipe plus a 300mm working space.

Item vi)

Drawing G1346-11 shows the proposed location of the new water connection to the proposed property

Item viii)

Drawing G1346-11 shows the proposed and existing foul drainage and sewerage serving the development. It is proposed that the new house be served by a new connection to the existing foul sewer on Glenfield Close.

Item ix)

We have received a confirmation of feasibility (reference number CDS22005806) from Irish Water and append same in Appendix D

SECTION D Conclusion

The proposed house can be readily accessed and serviced using existing roads and services

The proposed house can be built in such as way as to prevent any interference with the existing foul sewer and watermain in Glenfield Close

We trust that the above and the enclosed appendices provide sufficient information for South Dublin County Council to make a positive decision.

Appendix A: Drawing Schedule:

Drawing No	Rev	Title
G1346-10		Site Survey and Existing Services
G1346-11		Existing and Proposed Foul Drainage and Water Connection
G1325-12		Existing and Proposed Foul Sewerage
G1325-13		Existing and Proposed Storm Sewerage

Appendix B: BRE365 Test and Soak Pit Calculations

DKA Declan Kearns & Associates

- CIVIL, ENVIRONMENTAL, GEOTECHNICAL & STRUCTURAL ENGINEERS
- LAND SURVEYORS
- BUILDING ENERGY RATING
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Factual Report on
Soakaway Test
at

Proposed Development at side of
11 Glenfield Drive, Clondalkin, Dublin

on behalf of
Helen Gerathy

Date : 06/08/22

1. INTRODUCTION

It is understood that it will be necessary to dispose of the storm water from the proposed Development at 11 Glenfield Drive, Clondalkin, Dublin 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 photos) in order to ascertain subsoil conditions and the depth to groundwater. ST1 was excavated to 2.00m. 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.

The infiltration rate (f value) in the area of trial pit ST1 was determined to be 0.00029 m/min.

Signed :

Declan Kearns
for and on behalf of
Declan Kearns & Associates Ltd.

Appendix 1

Site Photographs

Figure 1. Testhole ST1

Figure 2. Arisings from ST1

Figure 3. View of Site

Appendix 2

Field Data Records & Calculations

DKA Declan Kearns & Associates

Soakaway Design f -value from field tests

Contract:	Proposed Development at side of 11 Glenfield Drive, Clondalkin, Dublin
Test No.	ST1
Client	Helen Gerathy
Date:	06/08/2022

Summary of Ground Conditions

From	To	Description	Ground water
0.00	0.30	TOPSOIL	
0.30	0.60	Brown sandy gravelly CLAY	Not met
0.60	2.00	Grey brown sandy gravelly CLAY	

Notes:

Field Data - Fill No. 3

Depth to Water (m)	Elapsed Time (min)
1.390	0
1.400	6
1.412	22
1.427	32
1.460	55
1.502	85
1.537	110
1.582	143

Field Test

Depth of Pit (D)	2.00	m
Width of Pit (B)	0.35	m
Length of Pit (L)	1.20	m
Initial depth to Water (25%) =	1.438	m
Final depth to water (75%) =	1.534	m
Elapsed time (mins)=	68.20	
Top of permeable soil	0.60	m
Base of permeable soil	2.00	m
Base area=	0.42	m2
*Av. side area of permeable stratum over test period=	1.5934	m2
Total Exposed area =	2.0134	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0.00029 m/min or 4.8939E-06 m/sec

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 306403, Northing: 234191,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.3,	3.4,	4.1,	5.0,	5.7,	6.2,	8.0,	10.0,	11.4,	13.4,	15.2,	16.6,	18.8,	20.6,	22.0,	N/A ,
10 mins	3.2,	4.8,	5.7,	7.0,	7.9,	8.7,	11.1,	14.0,	15.9,	18.7,	21.2,	23.1,	26.2,	28.7,	30.7,	N/A ,
15 mins	3.8,	5.6,	6.7,	8.2,	9.3,	10.2,	13.1,	16.4,	18.7,	22.0,	24.9,	27.2,	30.9,	33.7,	36.1,	N/A ,
30 mins	5.0,	7.4,	8.6,	10.6,	12.0,	13.0,	16.6,	20.7,	23.4,	27.3,	30.9,	33.7,	38.0,	41.4,	44.2,	N/A ,
1 hours	6.6,	9.6,	11.2,	13.7,	15.3,	16.7,	21.0,	26.0,	29.3,	34.1,	38.3,	41.6,	46.8,	50.8,	54.2,	N/A ,
2 hours	8.8,	12.5,	14.5,	17.6,	19.7,	21.3,	26.6,	32.7,	36.7,	42.4,	47.5,	51.5,	57.6,	62.4,	66.3,	N/A ,
3 hours	10.3,	14.6,	16.9,	20.4,	22.8,	24.6,	30.6,	37.4,	41.9,	48.2,	53.9,	58.3,	65.0,	70.3,	74.7,	N/A ,
4 hours	11.6,	16.3,	18.9,	22.7,	25.2,	27.2,	33.7,	41.1,	46.0,	52.8,	58.9,	63.6,	70.9,	76.5,	81.2,	N/A ,
6 hours	13.7,	19.1,	22.0,	26.3,	29.2,	31.4,	38.8,	47.0,	52.4,	60.1,	66.8,	72.0,	80.1,	86.3,	91.4,	N/A ,
9 hours	16.1,	22.3,	25.6,	30.5,	33.7,	36.3,	44.5,	53.8,	59.8,	68.3,	75.8,	81.5,	90.4,	97.3,	102.9,	N/A ,
12 hours	18.1,	24.9,	28.5,	33.8,	37.4,	40.2,	49.1,	59.1,	65.7,	74.8,	82.8,	89.1,	98.6,	105.9,	112.0,	N/A ,
18 hours	21.3,	29.1,	33.2,	39.2,	43.2,	46.4,	56.4,	67.6,	74.9,	85.0,	94.0,	100.8,	111.3,	119.4,	126.0,	N/A ,
24 hours	23.9,	32.4,	36.9,	43.5,	47.9,	51.3,	62.3,	74.4,	82.2,	93.1,	102.7,	110.1,	121.3,	130.0,	137.1,	161.7,
2 days	29.8,	39.5,	44.5,	51.7,	56.5,	60.2,	71.9,	84.6,	92.8,	104.1,	113.9,	121.4,	132.7,	141.4,	148.5,	172.8,
3 days	34.6,	45.2,	50.6,	58.4,	63.5,	67.4,	79.7,	93.1,	101.6,	113.3,	123.4,	131.0,	142.6,	151.4,	158.7,	183.2,
4 days	38.8,	50.1,	55.9,	64.1,	69.5,	73.6,	86.6,	100.5,	109.3,	121.3,	131.7,	139.6,	151.4,	160.4,	167.8,	192.7,
6 days	46.1,	58.8,	65.1,	74.2,	80.0,	84.5,	98.4,	113.3,	122.6,	135.3,	146.2,	154.5,	166.8,	176.1,	183.7,	209.4,
8 days	52.6,	66.4,	73.2,	82.9,	89.2,	94.0,	108.7,	124.4,	134.2,	147.5,	158.9,	167.5,	180.3,	189.9,	197.7,	224.1,
10 days	58.6,	73.3,	80.6,	90.9,	97.5,	102.5,	118.1,	134.5,	144.7,	158.5,	170.3,	179.2,	192.4,	202.3,	210.3,	237.4,
12 days	64.2,	79.8,	87.4,	98.3,	105.3,	110.5,	126.7,	143.8,	154.4,	168.7,	180.9,	190.0,	203.5,	213.7,	222.0,	249.6,
16 days	74.5,	91.7,	100.1,	111.9,	119.4,	125.1,	142.5,	160.7,	172.0,	187.2,	200.0,	209.6,	223.8,	234.5,	243.1,	271.8,
20 days	84.1,	102.6,	111.7,	124.3,	132.4,	138.4,	156.9,	176.1,	188.0,	203.9,	217.3,	227.3,	242.1,	253.2,	262.2,	291.9,
25 days	95.3,	115.4,	125.2,	138.7,	147.3,	153.8,	173.4,	193.8,	206.3,	223.1,	237.1,	247.6,	263.1,	274.7,	284.0,	314.8,

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

Project No.:	**G1346**	**Project**	11 Glenfield Drive
		Drawing Ref.	G1346-12

GORDON WHITE		**Design by:**	
Consulting Engineers		**Date:**	
1st Floor, 8 Riverwalk	tel. (01) 479 6396	**Revision:**	-
Lake Drive	mob. 086 230 6216	**Date:**	-
Citywest Business Campus	E-mail:	**Rev. by:**	-
Dublin 24	mail@gwce.ie	**Checked by**	-

DESIGN SUMMARY SHEET - SOAKAWAY DESIGN TO BRE 365

TOTAL CONTRIBUTING EQUIVALENT IMPERMEABLE AREA	130 m2
INFLOW FOR CRITICAL STORM	8.91 m3
INFILTRATION RATE	4.9E-06 m/s
TIME TO PERCOLATE 50% TO GROUND	24 hours
PROPOSED SOAKAWAY LENGTH	3.5 m
SOAKAWAY WIDTH FOR CRITICAL STORM DURATION	1.2 m
EFFECTIVE DEPTH (MIN SOAKAWAY DEPTH BELOW INLET INVERT)	1.50 m
DEPTH OF INLET PIPE BELOW GROUND ASSUMED FOR DESIGN	0.50 m
ESTIMATED STONE VOLUME REQUIRED	N/A

SIZING SUMMARY:

Storm Duration	Storage Required (m3)	Soakaway Length (m)	Soakaway Width (m)	
5	1.14	3.5	0.23	
10	1.59	3.5	0.31	
15	1.87	3.5	0.37	
30	2.37	3.5	0.47	
60	3.00	3.5	0.58	
120 (2hr)	3.80	3.5	0.72	
240 (4hr)	4.82	3.5	0.87	
360 (6hr)	5.55	3.5	0.97	
720 (12hr)	7.02	3.5	1.11	
1440 (24hr)	8.91	3.5	1.19	<= CRITICAL STORM
2880 (2day)	10.28	3.5	0.93	

Project No.:	G1346	**Project**	New House at 11 Glenfield Drive
	G1346	**Drawing Ref.**	G1346-12

GORDON WHITE		**Design by:**	0.00
Consulting Engineers		**Date:**	00/01/1900
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Citywest Business Campus	mob. 086 230 6216	**Date:**	-
Dublin 24	E-mail:	**Rev. by:**	-
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SOAKAWAY DESIGN TO BRE 365 FOR 10-YR RETURN PERIOD

Notes: Rainfall Data used was Issued By Met Eireann for Rowlagh

Contribution Areas				
Garden	90m2	0.01 Hectares	15	% Runoff Coefficient
Roofs	60m2	0.01 Hectares	95	% Runoff Coefficient
Paving	70m2	0.01 Hectares	85	% Runoff Coefficient
Roads		0.00 Hectares		% Runoff Coefficient
Total	220m2	0.02 Hectares	0.01	Eq Imp Area (Ha)

Duration (minutes)	Rainfall* (mm) 1:10 yr return period	10% Climate change increase (per GDSDS)	Rainfall Total	Rainfall (m3/ha)	Roofs Flow (m3)	Greenfield Flow (m3)	Roads Flow (m3)	Paving Flow	Allowance for Rainwater Harvesting (m3)	Total Inflow (m3)
5*	8.00	0.80	8.80	88.00	0.50	0.12	0.00	0.52	0.00	1.14
10*	11.10	1.11	12.21	122.10	0.70	0.16	0.00	0.73	0.00	1.59
15	13.10	1.31	14.41	144.10	0.82	0.19	0.00	0.86	0.00	1.87
30	16.60	1.66	18.26	182.60	1.04	0.25	0.00	1.09	0.00	2.37
60	21.00	2.10	23.10	231.00	1.32	0.31	0.00	1.37	0.00	3.00
120 (2hr)	26.60	2.66	29.26	292.60	1.67	0.40	0.00	1.74	0.00	3.80
240 (4hr)	33.70	3.37	37.07	370.70	2.11	0.50	0.00	2.21	0.00	4.82
360 (6hr)	38.80	3.88	42.68	426.80	2.43	0.58	0.00	2.54	0.00	5.55
720 (12hr)	49.10	4.91	54.01	540.10	3.08	0.73	0.00	3.21	0.00	7.02
1440 (24hr)	62.30	6.23	68.53	685.30	3.91	0.93	0.00	4.08	0.00	8.91
2880 (2day)	71.90	7.19	79.09	790.90	4.51	1.07	0.00	4.71	0.00	10.28

*Rainfall Data available here:

http://www.met.ie/climate/products03.asp

Use 1 in 10 year return period as per BRE 365

Project No.: G1346 **Project** 11 Glenfield Drive
Drawing Ref. G1346-12

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Citywest Business Campus	E-mail:	**Rev. by:**	-
Dublin 24	mail@gwce.ie	**Checked by:**	-

SOAKAWAY DESIGN TO BRE 365 FOR 10-YR RETURN PERIOD STORM DURATION 720MINS

Volume Equation: **Inflow - Outflow = Storage**

Inflow for Critical Storm:

Inflow (from 10 year calculation)	7.021	m3

Outflow for Critical Storm:

Proposed soakaway Length (L)	3.5	m		
Proposed soakaway effective depth (De)	1.5	m		
Proposed Soakaway Width (W)	W	m		
Internal surface Area 1 to 50% depth (As50-1)	5.25	m2		50% storage depth (excl base area)
Internal surface Area 2 to 50% depth (As50-2)	1.5 W	m2		50% storage depth (excl base area)
As50	5.25 + 1.5 W	m2		
Soil Percolation Rate (F)	4.89E-06	m/s		
Storm Duration (D)	720	min =	43200	seconds

Outflow = As50 x F x D = 5.25 + 1.50 W x 4.89E-06 x 43200
= 1.11 + 0.32 W

Soakaway Storage Volume:

Proposed soakaway width (L)	3.5	m
Proposed soakaway effective depth (De)	1.5	m
Proposed Soakaway width (W)	W	m
Voids Ratio	0.95	
Storage Volume =	4.99 W	m3

Volume Equation:

Inflow	-	OUTFLOW	=	Storage
7.021	-	1.11 + 0.32 W	=	4.99 W

=====> 5.91 = 5.30 W

Required Soakaway Width (W) = **1.11 m**

Time to empty half of storage volume (T50):

Using value for L:

Surface Area A1 + A2	6.92	m2
Storage (s)	5.56	m3
Percolation Rate (F)	5.E-06	m/s

$$T50 = \frac{S \times 0.5}{(A1 + A2) \times F} = 22.79 \text{ hours}$$

Time to empty half of stored volume 22.8 hours or 1367.3 minutes

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Drawing Ref. G1346-12

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Citywest Business Campus	E-mail:	**Rev. by:**	-
Dublin 24	mail@gwce.ie	**Checked by:**	-

SOAKAWAY DESIGN TO BRE 365 FOR 10-YR RETURN PERIOD STORM DURATION 720MINS

Volume Equation: **Inflow - Outflow = Storage**

Inflow for Critical Storm:

Inflow (from 10 year calculation)	8.909	m3

Outflow for Critical Storm:

Proposed soakaway Length (L)	3.5	m		
Proposed soakaway effective depth (De)	1.5	m		
Proposed Soakaway Width (W)	W	m		
Internal surface Area 1 to 50% depth (As50-1)	5.25	m2		50% storage depth (excl base area)
Internal surface Area 2 to 50% depth (As50-2)	1.5 W	m2		50% storage depth (excl base area)
As50	5.25 + 1.5 W	m2		
Soil Percollation Rate (F)	4.89E-06	m/s		
Storm Duration (D)	1440	min =	86400	seconds

Outflow = As50 x F x D = 5.25 + 1.50 W x 4.89E-06 x 86400
= 2.22 + 0.63 W

Soakaway Storage Volume:

Proposed soakaway width (L)	3.5	m
Proposed soakaway effective depth (De)	1.5	m
Proposed Soakaway width (W)	W	m
Voids Ratio	0.95	
Storage Volume =	4.99 W	m3

Volume Equation:

Inflow	-	OUTFLOW			=	Storage
8.909	-	2.22	+	0.63 W	=	4.99 W

=====> 6.69 = 5.62 W

Required Soakaway Width (W) = **1.19 m**

Time to empty half of storage volume (T50):

Using value for L:

Surface Area A1 + A2	7.03	m2
Storage (s)	5.93	m3
Percolation Rate (F)	5.E-06	m/s

$$T50 = \frac{S \times 0.5}{(A1 + A2) \times F} = 23.94 \text{ hours}$$

Time to empty half of stored volume 23.9 hours or 1436.4 minutes

Project No.: G1346 **Project** 11 Glenfield Drive
Drawing Ref. G1346-12

GORDON WHITE		**Design by:**	0.00
Consulting Engineers		**Date:**	00/01/1900
1st Floor, 8 Riverwalk	tel. (01) 479 6396	**Revision:**	-
Lake Drive	mob. 086 230 6216	**Date:**	-
Citywest Business Campus	E-mail:	**Rev. by:**	-
Dublin 24	mail@gwce.ie	**Checked by:**	-

SOAKAWAY DESIGN TO BRE 365 FOR 10-YR RETURN PERIOD STORM DURATION 720MINS

Volume Equation: **Inflow - Outflow = Storage**

Inflow for Critical Storm:

Inflow (from 10 year calculation)	10.282	m3

Outflow for Critical Storm:

Proposed soakaway Length (L)	3.5	m		
Proposed soakaway effective depth (De)	1.5	m		
Proposed Soakaway Width (W)	W	m		
Internal surface Area 1 to 50% depth (As50-1)	5.25	m2		50% storage depth (excl base area)
Internal surface Area 2 to 50% depth (As50-2)	1.5 W	m2		50% storage depth (excl base area)
As50	5.25 +	1.5 W	m2	
Soil Percollation Rate (F)	4.89E-06	m/s		
Storm Duration (D)	2880	min =	172800	seconds

Outflow = As50 x F x D = 5.25 + 1.50 W x 4.89E-06 x 172800
= 4.44 + 1.27 W

Soakaway Storage Volume:

Proposed soakaway width (L)	3.5	m
Proposed soakaway effective depth (De)	1.5	m
Proposed Soakaway width (W)	W	m
Voids Ratio	0.95	
Storage Volume =	4.99 W	m3

Volume Equation:

Inflow	-	OUTFLOW			=	Storage
10.282	-	4.44	+	1.27 W	=	4.99 W

=====> 5.84 = 6.26 W

Required Soakaway Width (W) = **0.93 m**

Time to empty half of storage volume (T50):

Using value for L:		
Surface Area A1 + A2	6.65	m2
Storage (s)	4.66	m3
Percolation Rate (F)	5.E-06	m/s

$$T50 = \frac{S \times 0.5}{(A1 + A2) \times F} = 19.87 \text{ hours}$$

Time to empty half of stored volume 19.9 hours or 1192.4 minutes

APPENDIX C: WAVIN AQUACELL DETAILS

AquaCell Eco

Application

AquaCell Eco is manufactured from specially reformulated, recycled material and has been specifically designed for shallow, non-trafficked, landscaped applications. AquaCell Eco is **NOT** suitable for locations subject to high water tables.

AquaCell Eco is typically suitable for installations to a maximum depth of 2.68 metres, to the base of the units from ground level, with a minimum cover depth of 0.3 metres, (CIRIA's recommendation, is to allow a cover depth of 0.5 metres in applications where a ride on mower may be used).

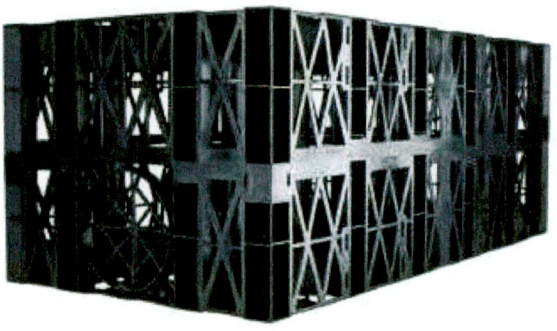
Any installation using AquaCell Eco must **NOT** be subjected to additional loading at any time. Trafficking by construction plant on site, including mechanical equipment, must be avoided.

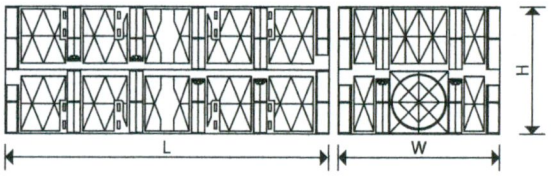
If trafficking of the buried tank by construction plant or, other vehicles is unavoidable, the installation should be constructed using AquaCell Core-R units (see page 9).

The width of an AquaCell Eco installation should not exceed 12 metres to allow for mechanical backfilling without loading. There is no limit to the length of the installation.

Features and benefits

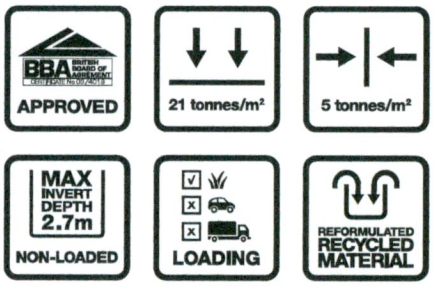
- Manufactured from specially reformulated, recycled material
- Suitable for both soakaway and attenuation applications
- Proven vertical loading capacity of: 21.3 tonnes/m² (213kN/m²)
- Proven lateral loading capacity of: 5.2 tonnes/m² (52kN/m²)
- Integral "hand holds" for ease of carrying/handling
- BBA approved – Certificate No 03/4018





Material: Reformulated polypropylene

Nominal size (mm)	Part number	Dimensions (mm)		
		W	H	L
160	6LB025	500	400	1000



Maximum installation depths – to base of units (m)[1]

Typical soil type	Soil weight kN/m³	Angle of internal friction φ (degrees)[2, 3]	Landscaped areas
Over-consolidated stiff clay	20	24	1.53
Silty sandy clay	19	26	1.68
Loose sand and gravel	18	30	2.08
Medium dense sand and gravel	19	34	2.35
Dense sand and gravel	20	38	2.68

(1) These values relate to installations where the groundwater is a minimum of one metre below the base of the excavation.
(2) AquaCell Eco units should not be used where groundwater is present.
(3) 0.5m cover is required where a ride-on mower may be used.

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

APPENDIX D: IRISH WATER CONFIRMATION OF FEASABILITY

CONFIRMATION OF FEASIBILITY

Gordon White
GWCE Ltd
1st Floor
8 Riverwalk Lake Drive
Citywest Campus
Dublin 24
D24V50F

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

16 August 2022

Our Ref: CDS22005806 Pre-Connection Enquiry
11 Glenfield Drive, Clondalkin, Dublin 22, South Dublin

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Single Domestic of 1 unit(s) at 11 Glenfield Drive, Clondalkin, Dublin 22, South Dublin, (the **Development)**.

Based upon the details provided we can advise the following regarding connecting to the networks;

• **Water Connection**	-	Feasible without infrastructure upgrade by Irish Water
• **Wastewater Connection**	-	Feasible without infrastructure upgrade by Irish Water. - The proposed Development indicates that Irish Water assets are present in close proximity to the site boundary. The Developer has to demonstrate that proposed structures and works will not inhibit access for maintenance or endanger structural or functional integrity of the assets during and after the works. Drawings (showing clearance distances, changing to ground levels) and Method Statements should be included in the

Detailed Design of the Development. For design submissions and queries related to diversion/build near or over, please contact IW Diversion Team via email address diversions@water.ie

- Separate storm and foul water connection services have to be provided for the Development. The surface and storm water from the site must be discharged only into an existing storm water network that does not discharge to an IW combined/foul sewer. The connection arrangement should be agreed with the Local Authority Drainage Division

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

Where can you find more information?

- **Section A -** What is important to know?
- **Section B -** Details of Irish Water's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit **www.water.ie/connections**, **email** **newconnections@water.ie** or contact 1800 278 278.

Yours sincerely,

Yvonne Harris

Yvonne Harris
Head of Customer Operations

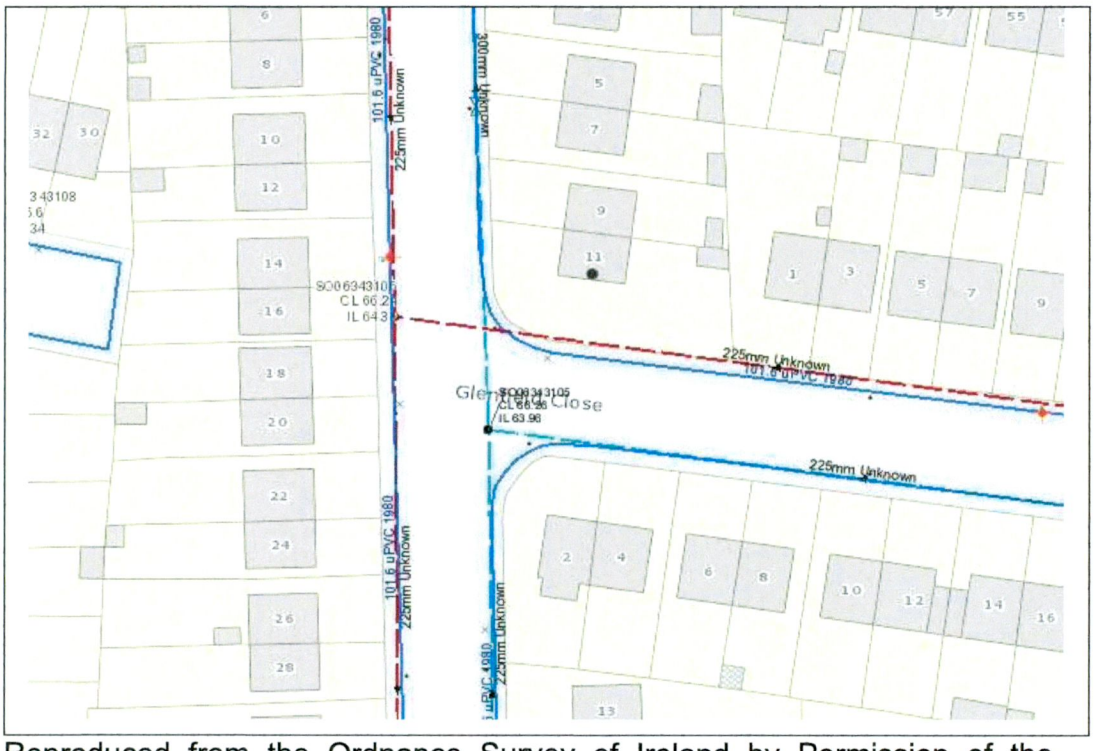
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application and be granted and sign a connection agreement with Irish Water.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. *Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works
Fire flow Requirements	• The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • **What to do?** - Contact the relevant Local Fire Authority
Plan for disposal of storm water	• The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • **What to do?** - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Irish Water's network(s)?	• Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• 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,*** available at www.water.ie/connections
Trade Effluent Licensing	• Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). • More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Irish Water's Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email datarequests@water.ie



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Note: The information provided on the included maps as to the position of Irish Water's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water's network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water's underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.