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**PROPOSED RESIDENTIAL DEVELOPMENT**  
**AT**  
**ROOKWOOD, STOCKING LANE, DUBLIN 14**

**ACCESS & SERVICES REPORT**  
**TO ACCOMPANY ADDITIONAL INFORMATION**

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**Project Number:** G1162  
**Date:** 08 November 2021  
**Revision:** 1.0  
**Status:** For Additional Information Submission

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**Prepared By:**

**Gordon White** BA BAI, CEng MIEI, RConsEI

Rev	Date	By	Revision
1.0	09/03/22	GW	Minor Amendments following Design Team Consultation



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## **SECTION A      INTRODUCTION**

At the request of Brenda Weir of Rookwood, Stocking Lane, Gordon White Consulting Engineers have carried out a review of the Request for Additional Information on Planning Register Reference SD21A/0202 and are providing the below report and the appended drawings in response to the following items in that request:

Item 4: Roads

Item 5: Water Services

The text of the items are shown in italics below with the response following

We have also updated the other services drawings submitted with the planning application to reflect changes in the layout of the proposed development arising from other areas of the request for additional information.



## **SECTION B      ITEM 4 OF THE REQUEST FOR ADDITIONAL INFORMATION**

### **B.1      Information Requested**

*4. The Roads Department has raised concerns in relation to traffic and pedestrian safety that are requested to be addressed. They are as follows:*

*(1) The applicant/developer is requested to submit accurate plans demonstrating with dimensions the vision lines of 49 metres shall be provided in each direction, at a point 2.4 metres back from the road edge at location of vehicular entrance. Said vision lines should be based on eye object height equal to 1.06 metres. Documentary evidence of consent for location of vision lines over third-party lands shall be submitted to the planning authority for written agreement prior to commencement of development.*

*(2) A 3.0m wide shared footpath/cycle track across the frontage of the site.*

*(3) The applicant is requested to submit revised layout showing the minimum width of internal pedestrian footpaths of 1.8m wide to aid mobility impaired users.*

*(4) The applicant is requested to submit revised layout showing fire tender can access and egress through roadways serving the two groups of houses.*

*(5) The provision of a ramp at the entrance to include the provision of a pedestrian crossing point on the proposed footpath/cycle track and a raised shared surface area within the development using a coloured SMA material.*

### **B.2      Response**

#### **(1) Sightlines**

- Sightlines are shown on drawing G1162-05 & G1162-06. 49m sightlines can be achieved per DMURS looking to the right on exit from the development. Sightlines looking left are marginally constrained by an existing 1.2m high stone pier on at the entrance to the adjacent property. The sightline distance from 2.4m back from the road edge past this pier to the centre of Stocking Lane is 46m, as opposed to the prescribed 49m, or the sightline setback to achieve 49m sight distance is 2.25m as opposed to the prescribed 2.4m
- In order to address this slight deficit, it is proposed to move or trim back the existing pier at the gateway to Rookwood Lodge by 200mm. As set out in the request for additional information documentary evidence of the consent of the affected third party will submitted to the Planning Authority prior to the commencement of development.
- We note the requirement, referred to elsewhere in this AI request, that a 3.0m wide strip be maintained across the frontage to the site as part of the County Council's objective that there be a footpath / cyclepath along Stocking Lane. In the event that the site to the South of the proposed development land is developed it would seem reasonable to assume that a similar constraint would be put on that development. In this event the marginal constraint on the sightlines created by the existing pier would be removed.

#### **(2) Footpath / Cyclepath**

- The Planning application drawings indicated a 3.0m allowance for a future footpath / cyclepath on the site frontage. This has been changed to indicate a 3.0m shared footpath / cyclepath here. The three meters is measured from the extent of the existing carriageway on Stocking Lane.



### (3) Footpaths

- The revised road layout shows internal public footpaths as 2.0m wide in general and a minimum of 1.8m wide where constrained.

### (4) Fire tender access.

- Access and turning for fire tenders has been provided within the common access road (Road 1) that accesses both sides of the proposed development and the existing period house. This is shown on drawing G1162-07 Rev H. This allows a fire tender to access and egress from the development. The proposed turning area is 30m from the existing house, 44m from the furthest house on Road 2 (The Mews) and 100m from the furthest house on Road 3.
- In order to reduce the distance from the furthest house on Road 3 a secondary fire tender turning area can be provided along the roadway. This is included on the revised road drawing G1162-10 rev F and is shown as a reinforced grass hammerhead for emergency vehicle turning and is a standard sized hammerhead Type (ii) per Figure 2.2 of the Recommendations for Site Development Works for Housing Areas.

### (5) Pedestrian Crossing at Stocking Lane

- This has been added to the proposed layout. The proposed gullies at the entrance have been relocated to take this into account and the flow control chamber has been slightly relocated so that the access covers do not fall within this area.
- It is also proposed to relocate the existing speed ramp on Stocking Lane to a new location slightly up the hill and to the South of the proposed new entrance.



## **SECTION C            ITEM 5 OF THE REQUEST FOR ADDITIONAL INFORMATION**

### **C.1        Information Requested**

5. Water Services has raised concerns with surface water and have requested that the applicant provides a response to the following matters:

(1) The SAAR (Standard Annual Average Rainfall) value of 1046mm used for Qbar calculations is too high. The SAAR value should be approximately 840mm and not 1046mm.

(2) The developer is required to apply Qbar Rural as the maximum discharge rate for all storm events and not 30 year Qbar discharge rate. Water Services calculate Qbar rural to be approximately 1.5 Litres/Second but may accept 2 Litres/Second as a minimum discharge rate. Consultant engineer is to submit revised attenuation proposals based on applying the Qbar rural discharge rate as max discharge from site for all storm events. Water Services will then reassess attenuation volumes.

(3) Submit MET Eireann rainfall data for site.

(4) It is unclear how much attenuation in total is provided for the development. Submit a report and drawing showing how much surface water attenuation in m3 is provided for the development. Also submit a drawing showing where the surface water attenuation will be provided for the development.

(5) Include additional SuDS (Sustainable Drainage System Features) and submit details of same.

### **C.2        Response**

#### **(1) SAAR figure**

- We've checked with the Wallingford Irish SuDS website and the Flood Studies Maps and are satisfied that the SAAR of 1046mm is correct. We have, nonetheless, re-calculated the attenuation storage based on a SAAR of 840mm



(2) QBAR Figure and Attenuation Storage

- The Greater Dublin Strategic Drainage Study requires that either overflow storage for storms in excess of 30-year return period be provided or that the Qbar rural be applied to the 30-year return period, not that the Qbar rural be applied to return periods in excess of 30 years as would seem to be being requested here. Our design allows for “overflow” storage for storms in excess of 30-year return period by calculating the underground storage volume for a 100-year storm.
- We have looked at the implications of applying this request in full and limiting the flow to 1.5 l/s or 2.0 l/s for the 100-year storm and note that, whilst it would be possible, we feel that the quantum of storage required to balance would be excessive. To provide this volume would require the use of deeper storage modules over a larger area and would require either the removal of existing trees within the open space and / or the extension of the underground storage to below the existing driveway of the existing period structure. As a deeper storage module, and higher storage level, would be required the storage within the open space would not be able to serve the bottom of the proposed road at the junction with Stocking Lane and an additional storage area would be required there. We see the preceding as undesirable in the context of the development and not necessary to comply with the principles of the GSDS. We have tabulated below the storage required based on various calculations and propose, as a compromise, to provide 200m<sup>3</sup> of storage as this meets both the 30-year storage with no overflow and Qbar rural applied at 1.5 l/s (199m<sup>3</sup>) and 100-year storage with 100-year growth-factor applied to Qbar designs (186m<sup>3</sup>)

Original Calculation per Planning Application	
Return Period	Storage Required
30-year	107
100-year	176
Original Calculation with SAAR revised to 840mm	
Return Period	Storage Required
30-year	111
100-year	186
Outflow limited to 2.0 l/s and SAAR 840mm	
Return Period	Storage Required
30-year	191
100-year	317
Outflow limited to 1.5 l/s and SAAR 840mm	
Return Period	Storage Required
30-year	199
100-year	334

- Drawing G1162-12 rev F shows the proposed attenuation storage on the above basis in ping with the additional storage area required, using deeper storage chambers, if South Dublin County Council insist that the restricted Qbar rural be applied to the 100-year storm indicated with a purple outline.



(3) Met Eireann Data

- Met Eireann Data Sheet Appended to this report

(4) Proposed Attenuation

- The proposed attenuation storage volumes and locations are set out on Drawing G1162-12F

(5) Additional SuDS Measures

- The current proposal includes the following SuDS Measures
  - Use of water butts on downpipes to the rear of houses
  - Use of permeable brick paving for on-curtilage parking areas
  - Use of a swale to drain road run-off where possible
  - Use of permeable underground balancing storage to allow discharge to ground and groundwater recharge
  - Controlled discharge and balancing storage

**SECTION D      CONCLUSION**

The proposed development can be readily facilitated by existing available roads and services and developed in accordance with current guidelines.





## Appendix A

### Drawing schedule

Drawing No.	Rev	Drawing Title
G1162-05	J	Site Triangles and Main Access Road at 1:500
G1162-06	J	Site Triangles at 1:200
G1162-07	J	Swept Path (AutoTrack) Assessment of Access Road
G1162-10	G	Proposed Road Layout and Levels
G1162-11	G	Proposed Foul Drainage Layout Plan
G1162-12	G	Proposed Surface Water Drainage Layout Plan
G1162-13	G	Proposed Watermain Layout Plan
G1162-20	G	Proposed Road - Longitudinal and Typical Cross Sections
G1162-21	G	Proposed Foul Drainage Longitudinal Sections
G1162-22	G	Proposed Surface Water Drainage Longitudinal Sections



**Appendix B**  
**Met Eireann Data**

Met Eireann  
Return Period Rainfall Depths for sliding Durations  
Irish Grid: Easting: 313452, Northing: 226686,

DURATION	Interval 6months, 1year,	Years												
		2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,
5 mins	2.7, 3.9,	4.6, 5.6,	6.4,	6.9,	8.8,	11.0,	12.4,	14.5,	16.4,	17.9,	20.2,	22.0,	23.5,	N/A,
10 mins	3.7, 5.4,	6.4, 7.9,	8.9,	9.6,	12.3,	15.3,	17.3,	20.2,	22.9,	24.9,	28.1,	30.6,	32.7,	N/A,
15 mins	4.4, 6.4,	7.5, 9.2,	10.4,	11.3,	14.4,	18.0,	20.4,	23.8,	26.9,	29.3,	33.1,	36.0,	38.5,	N/A,
30 mins	5.8, 8.4,	9.8, 12.0,	13.5,	14.7,	18.5,	23.0,	26.0,	30.2,	34.0,	37.0,	41.7,	45.3,	48.3,	N/A,
1 hour	7.6, 11.0,	12.8, 15.6,	17.5,	18.9,	23.8,	29.4,	33.1,	38.4,	43.1,	46.8,	52.5,	57.0,	60.7,	N/A,
2 hours	10.1, 14.4,	16.7, 20.2,	22.6,	24.5,	30.6,	37.5,	42.2,	48.7,	54.6,	59.1,	66.2,	71.6,	76.2,	N/A,
3 hours	11.9, 16.8,	19.5, 23.5,	26.3,	28.4,	35.4,	43.3,	48.6,	56.0,	62.7,	67.8,	75.7,	81.9,	87.0,	N/A,
4 hours	13.3, 18.8,	21.8, 26.2,	29.3,	31.6,	39.3,	48.0,	53.8,	61.9,	69.1,	74.7,	83.4,	90.1,	95.7,	N/A,
6 hours	15.7, 22.0,	25.5, 30.6,	34.0,	36.7,	45.5,	55.4,	62.0,	71.2,	79.4,	85.7,	95.5,	103.1,	109.3,	N/A,
9 hours	18.5, 25.8,	29.7, 35.6,	39.6,	42.7,	52.7,	64.0,	71.4,	81.9,	91.1,	98.3,	109.3,	117.9,	124.9,	N/A,
12 hours	20.7, 28.9,	33.2, 39.7,	44.1,	47.5,	58.5,	70.9,	79.0,	90.4,	100.5,	108.3,	120.4,	129.7,	137.4,	N/A,
18 hours	24.4, 33.8,	38.8, 46.3,	51.3,	55.2,	67.7,	81.8,	91.1,	104.0,	115.5,	124.3,	137.8,	148.3,	157.0,	N/A,
24 hours	27.4, 37.8,	43.4, 51.6,	57.1,	61.4,	75.2,	90.6,	100.8,	114.9,	127.4,	137.0,	151.8,	163.2,	172.6,	205.4,
2 days	34.5, 46.4,	52.7, 61.8,	67.9,	72.6,	87.6,	104.1,	114.8,	129.6,	142.6,	152.5,	167.7,	179.3,	188.8,	221.8,
3 days	40.2, 53.4,	60.2, 70.1,	76.6,	81.7,	97.6,	115.1,	126.4,	141.8,	155.3,	165.6,	181.2,	193.1,	202.9,	236.5,
4 days	45.2, 59.4,	66.7, 77.3,	84.2,	89.6,	106.4,	124.7,	136.4,	152.5,	166.5,	177.1,	193.2,	205.4,	215.5,	249.8,
6 days	54.0, 70.0,	78.1, 89.8,	97.5,	103.3,	121.6,	141.4,	153.9,	171.1,	185.9,	197.1,	214.0,	226.9,	237.3,	273.0,
8 days	61.8, 79.3,	88.1, 100.8,	109.0,	115.3,	134.9,	155.8,	169.1,	187.2,	202.8,	214.5,	232.2,	245.6,	256.5,	293.4,
10 days	69.0, 87.8,	97.3, 110.8,	119.5,	126.1,	146.9,	168.9,	182.9,	201.8,	218.0,	230.2,	248.6,	262.4,	273.7,	311.8,
12 days	75.7, 95.8,	105.8, 120.0,	129.3,	136.2,	158.0,	181.1,	195.6,	215.2,	232.0,	244.7,	263.7,	278.0,	289.6,	328.7,
16 days	88.2, 110.4,	121.5, 137.1,	147.2,	154.7,	178.3,	203.1,	218.7,	239.7,	257.6,	271.0,	291.1,	306.2,	318.4,	359.5,
20 days	99.8, 124.0,	135.9, 152.7,	163.5,	171.7,	196.8,	223.2,	239.7,	261.9,	280.7,	294.9,	315.9,	331.7,	344.5,	387.3,
25 days	113.4, 139.8,	152.7, 170.9,	182.5,	191.3,	218.2,	246.4,	263.9,	287.4,	307.3,	322.2,	344.3,	360.9,	374.3,	419.0,

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\\_ITN61.pdf](http://www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_ITN61.pdf)



## Appendix C

### Surface water attenuation calculations

Project No.:

G1162

Project

Lands at Rookwood

SAAR from SDCC Fl, rainfall from Met Eireann

G1162-12 Rev G

Drawing Ref.

## DESIGN FOR ROOF, LANDSCAPE AND CARPARK AREAS



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Date:

Revision:

Date:

Rev. by:

GW

12.11.2020

B

09.03.2022

GW

### DESIGN SUMMARY SHEET

DESIGN DEVELOPED AREA

0.68 Ha

ATTENUATED DISCHARGE; 30-YEAR RETURN PERIOD STORM

5.26 l/s

ATTENUATION BALANCING STORAGE REQUIRED; 30-YEAR STORM

111 m<sup>3</sup>

ATTENUATED DISCHARGE; 100-YEAR RETURN PERIOD STORM

6.45 l/s


ATTENUATION STORAGE REQUIRED; 100-YEAR STORM

186 m<sup>3</sup>

ADDITIONAL STORAGE FOR 100-YEAR OVER 30-YEAR STORM

75 m<sup>3</sup>

Project No.: G1162      Project Lands at Rookwood  
 Drawing Ref. G1162-12 Rev G

	<b>GORDON WHITE</b>		<b>Design by:</b>	GW
	<b>Consulting Engineers</b>		<b>Date:</b>	12/11/2020
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**ASSESSMENT OF GREENFIELD RUN-OFF**

**STEP 1**

**Contribution Areas**

Road/ Car Parking	0.173 Hectares	Impermeable Area 0.249
Paths	0.055 Hectares	
Roof Areas	0.076 Hectares	
Public Open Space/ Verges	0.180 Hectares	
Private Open Space	0.200 Hectares	
<b>Total</b>	<b>0.6833 Hectares</b>	
Area =		<b>0.0068 km<sup>2</sup></b>

**STEP 2**

Standard Annual Average Rainfall  
 SAAR = 840 mm

Data taken from UKSuds website for Stocking Lane  
<https://uksuds.worldssecure.com/drainage-calculator/tools/greenfield-runoff-rate-estimation>

**STEP 3**

Percentage of Each Soil Type

G1 % =	0
G2 % =	100
G3 % =	0
G4 % =	0
G5 % =	0

**STEP 4**

SOIL = Soil Index =  $(0.15S1 + 0.30S2 + 0.40S3 + 0.45S4 + 0.50S5)/(S_{sum}) = 0.30$

**STEP 5**

$Q_{BAR} = 1000 \times \{0.00108 \times A^{0.89} (SAAR)^{1.17} (SOIL)^{2.17}\}$  (l/s)

<b>Q<sub>BAR</sub></b>	<b>0.0025 m<sup>3</sup>/s</b>	<b>2.47 l/s</b>
------------------------	-------------------------------	-----------------

**STEP 6**

Calculate Maximum Allowable Discharges:

<b>Growth Factors:</b>	
1 Year	0.85
30 Year	2.13
100 Year	2.61

<b>Return Period</b>	<b>1yr</b>	<b>30 year</b>	<b>100 year</b>
<b>Calculated Max Allowable Discharge (l/s)</b>	<b>2.10</b>	<b>5.26</b>	<b>6.45</b>

Project No.: G1162 Project Lands at Rookwood  
Drawing Ref. G1162-12 Rev G

	GORDON WHITE		Design by:	GW
	Consulting Engineers		Date:	12/11/2020
	1 <sup>st</sup> Floor, 8 RIVERWALK		Revision:	B
	Citywest Business Campus		Date:	09/03/2022
	Dublin 24		Rev. by:	GW

**SURFACE WATER ATTENUATION DESIGN FOR A 30-YEAR RETURN PERIOD STORM**

AREA: 0.68 Ha

Notes: Rainfall Data used was issued By Met Eireann for for Stocking Lane

Design Outflow = Greenfield Outflow

Greenfield Flow

5.26 l/s

Area of Attenuation Infiltration Rate

295.00 m<sup>2</sup>  
0.0000013 m/s

Duration Minutes	Rainfall mm	Plus 10% for climate change mm	Rainfall				Runoff (m <sup>3</sup> )		Public Open Space/ Verges	Private Open Space	Total Inflow m <sup>3</sup>	Allowable Outflow m <sup>3</sup>	Inflow - Outflow m <sup>3</sup>	Percolation to Ground m <sup>3</sup>	Storage Required m <sup>3</sup>	Duration (hrs)
			m <sup>3</sup> /ha	Road/ Car Parking	Paths	Roof Areas	Roof Areas	Public Open Space								
5	12.40	13.64	136.40	21.24	6.73	9.85	3.22	3.59	44.62	1.58	43.04	0.12	42.92	0.08		
10	17.30	19.03	190.30	29.63	9.39	13.74	4.49	5.00	62.25	3.16	59.09	0.23	58.86	0.17		
15	20.40	22.44	224.40	34.94	11.07	16.20	5.29	5.90	73.40	4.74	68.66	0.35	68.32	0.25		
30	26.00	28.60	286.00	44.53	14.11	20.65	7.52	8.57	93.55	9.48	84.08	0.70	83.38	0.5		
60	33.10	36.41	364.10	56.69	17.96	28.29	8.59	9.57	119.10	18.95	100.15	1.39	98.76	1		
120	42.20	46.42	464.20	72.28	22.89	39.52	10.95	12.20	151.84	37.91	113.94	2.78	111.16	2		
240	53.80	59.18	591.80	92.14	29.19	42.73	13.96	15.56	193.58	75.81	117.77	5.56	112.21	4		
360	62.00	68.20	682.00	106.19	33.64	49.24	16.09	17.93	223.09	113.72	109.37	8.35	101.02	6		
720	79.00	86.90	869.00	135.30	42.86	62.74	20.51	22.85	284.26	227.43	56.82	16.69	40.13	12		
1440	100.80	110.88	1108.80	172.64	54.69	80.06	26.16	29.15	362.70	454.86	-92.17	33.39	-125.56	24		
2880	114.80	126.28	1262.80	196.62	62.28	91.17	29.80	33.20	413.07	909.73	-496.66	66.78	-563.43	48		

Critical Storm Duration (hrs)

**Contribution Areas**

Road/ Car Parking	0.173 Hectares	90 % Runoff Coefficient
Paths	0.055 Hectares	90 % Runoff Coefficient
Roof Areas	0.076 Hectares	95 % Runoff Coefficient
Public Open Space/Verges	0.180 Hectares	13 % Runoff Coefficient
Private Open Space	0.200 Hectares	13 % Runoff Coefficient
<b>Total</b>	<b>0.683 Hectares</b>	<b>0.28 [E<sub>G</sub> Imp. Area (H<sub>a</sub>)</b>

Greenfield flow =

5.26 GDS Formula

42.20 mm = 40.05 l/s

Rainfall for Critical Duration, 30 year storm =

5.26 => runoff coefficient for greenfield area = 40.05

13.1%

Project No.: G1162 Project Lands at Rookwood  
 Drawing Ref. G1162-12 Rev G

		GORDON WHITE	
		Design by: GW	Date: 12/11/2020
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Date:			Date: 09/03/2022

**SURFACE WATER ATTENUATION DESIGN FOR A 100-YEAR RETURN PERIOD STORM**

AREA: **0.68 Ha**  
 Rainfall Data used was issued by Met Eireann for **Stocking Lane**  
 Design Outflow = Greenfield Outflow  
 Greenfield Flow **6.45 l/s**  
 Area of Attenuation **295.00 m<sup>2</sup>**  
 Infiltration Rate **0.0000013 m/s**

Duration Minutes	Rainfall mm	Plus 10% for climate change mm	Rainfall m3/ha	Runoff (m3)				Total Inflow m3	Allowable Outflow m3	Percolation to Ground m3	Storage Required m3	Duration (hrs)
				Road/ Car Parking	Paths	Roof Areas	Public Open Spaces/ Verges					
5	17.90	19.69	196.90	30.66	9.71	14.22	6.43	68.18	1.94	66.25	66.13	0.08
10	24.90	27.39	273.90	42.65	13.51	19.78	8.95	94.85	3.87	90.98	90.75	0.17
15	29.30	32.23	322.30	50.18	15.90	23.27	10.53	111.61	5.81	105.80	105.45	0.25
30	37.00	40.70	407.00	63.37	20.07	29.39	13.30	140.94	11.61	129.33	128.63	0.5
60	46.80	51.48	514.80	80.15	25.39	37.17	16.82	178.27	23.22	155.04	153.65	1
120	59.10	65.01	650.10	101.22	32.06	46.94	21.24	225.12	46.45	178.67	175.89	2
240	74.70	82.17	821.70	127.94	40.53	59.33	26.84	284.54	92.89	191.65	186.08	4
360	85.70	94.27	942.70	146.78	46.49	68.06	30.80	326.44	139.34	187.10	178.76	6
720	105.30	119.13	1191.30	185.49	58.75	86.01	38.92	412.53	278.68	133.85	117.15	12
1440	137.00	150.70	1507.00	234.64	74.33	108.81	49.23	521.85	557.37	-35.51	-68.90	24
2880	152.50	167.75	1677.50	261.19	82.73	121.12	54.80	580.90	1114.74	-533.84	-600.62	48

Contribution Areas		Roof Areas	Public Open Spaces/ Verges	Private Open Space	Total	% Runoff Coefficient
Road/ Car Parking	0.17 Hectares	14.22	6.43	7.17	27.82	90 %
Paths	0.05 Hectares	19.78	8.95	9.97	38.70	95 %
Roof Areas	0.08 Hectares	15.90	10.53	11.73	38.16	18.2 %
Public Open Space/ Verges	0.18 Hectares	29.39	13.30	14.81	57.50	18.2 %
Private Open Space	0.20 Hectares	37.17	16.82	18.74	72.73	18.2 %
<b>Total</b>	<b>0.68 Hectares</b>	<b>121.12</b>	<b>54.80</b>	<b>61.06</b>	<b>236.98</b>	<b>0.30</b> [Eq. Imp. A.1.1. (H.)]

Greenfield flow =	6.45 GSDS Formula
Rainfall for Critical Duration, 100 year storm =	74.70 mm = 35.45 l/s
=> runoff coefficient for greenfield area =	6.45 / 35.45 = 18.2%




Project No.: G1162

Project

Lands at Rookwood  
SAAR & Qbar rural from SDCC, rainfall from Met Eireann  
G1162-12 Rev G

Drawing Ref.

## DESIGN FOR ROOF, LANDSCAPE AND CARPARK AREAS

	<b>GORDON WHITE</b> Consulting Engineers 1 <sup>st</sup> Floor, 8 Riverwalk Citywest Business Campus Dublin 24		<b>Design by:</b> Date: <b>Revision:</b> Date: <b>Rev. by:</b>	GW 12/11/2020 C 09/03/2022 GW
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### DESIGN SUMMARY SHEET

DESIGN DEVELOPMENT AREA

0.68 Ha


ATTENUATED DISCHARGE; 30-YEAR RETURN PERIOD STORM

1.50 l/s

ATTENUATION BALANCING STORAGE REQUIRED; 30-YEAR STORM

199 m<sup>3</sup>

Project No.: G1162      Project Lands at Rookwood  
 Drawing Ref. G1162-12 Rev G

	<b>GORDON WHITE</b>		<b>Design by:</b>	GW
	Consulting Engineers		<b>Date:</b>	12/11/2020
	1 <sup>st</sup> Floor, 8 Riverwalk	tel. (01) 479 6396	<b>Revision:</b>	C
	Citywest Business Campus	mob. 086 230 6216	<b>Date:</b>	09/03/2022
	Dublin 24	E-mail: <a href="mailto:enquiries@gw.ie">enquiries@gw.ie</a>	<b>Rev. by:</b>	GW

**ASSESSMENT OF GREENFIELD RUN-OFF**

**STEP 1**

Contribution Areas		Impermeable Area
Road/ Car Parking	0.173 Hectares	0.249
Paths	0.055 Hectares	
Roof Areas	0.076 Hectares	
Public Open Space/ Verges	0.180 Hectares	
Private Open Space	0.200 Hectares	
<b>Total</b>	<b>0.6833 Hectares</b>	
Area =		<b>0.0068 km<sup>2</sup></b>

**STEP 2**

Standard Annual Average Rainfall  
 SAAR = 840 mm

Data taken from UKSuds website - Nees Road, Newbridge  
<https://uksuds.worldssecure-systems.com/drainage-calculation-tools/greenfield-runoff-rate-estimation>

**STEP 3**

Percentage of Each Soil Type

G1 % =	0
G2 % =	100
G3 % =	0
G4 % =	0
G5 % =	0

**STEP 4**

SOIL = Soil Index =  $(0.15S1 + 0.30S2 + 0.40S3 + 0.45S4 + 0.50S5) / (S_{sum}) = 0.30$

**STEP 5**

$Q_{BAR} = 1000 \times \{0.00108 \times A^{0.89} (SAAR)^{1.17} (SOIL)^{2.17}\}$  (l/s)

$Q_{BAR}$	0.0025 m <sup>3</sup> /s	2.47 l/s	
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**STEP 6**

Calculate Maximum Allowable Discharges:

Growth Factors:	
1 Year	0.85
30 Year	2.13
100 Year	2.61

Return Period	1yr	30 year	100 year
Calculated Max Allowable Discharge (l/s)	2.10	5.26	6.45
Additional Information Max Allowable Discharge		1.50	1.50

	<b>Gordon White Consulting Engineers</b>		<b>Design by:</b> GW
	1 <sup>st</sup> Floor, 8 Riverwalk		<b>Date:</b> 12/11/2020
	Citywest Business Campus		<b>Revision:</b> C
	Dublin 24		<b>Date:</b> 09/03/2022
	E-mail: <a href="mailto:info@white.ie">info@white.ie</a>		<b>Rev. by:</b> GW

**SURFACE WATER ATTENUATION DESIGN FOR A 30-YEAR RETURN PERIOD STORM**

AREA: 0.68 Ha  
 Notes: Rainfall Data used was issued By Met Eireann for Naas Road, Newbridge  
 Design Outflow = Allowable Outflow based on that prescribed in the SDCC FI Request

Area of Attenuation Infiltration Rate  
 295.00 m<sup>2</sup>  
 0.0000013 m/s

Greenfield Flow  
 1.50 l/s

Duration Minutes	Rainfall	Plus 10% for climate change	Rainfall	Runoff (m <sup>3</sup> )				Total Inflow m <sup>3</sup>	Percolation to Ground m <sup>3</sup>	Storage Required m <sup>3</sup>	Duration (hrs)			
	mm	mm	m <sup>3</sup> /ha	Road/Car Parking	Paths	Roof Areas	Public Open Spaces/ Verges					Private Open Spaces	Allowable Outflow m <sup>3</sup>	Inflow - Outflow m <sup>3</sup>
5	12.40	13.64	136.40	21.24	6.73	9.85	2.94	3.27	44.03	0.45	43.58	0.12	43.46	0.08
10	17.30	19.03	190.30	29.63	9.39	13.74	4.10	4.57	61.42	0.90	60.52	0.23	60.29	0.17
15	20.40	22.44	224.40	34.94	11.07	16.20	4.84	5.39	72.43	1.35	71.08	0.35	70.73	0.25
30	26.00	28.60	286.00	44.53	14.11	20.65	6.16	6.87	92.31	2.70	89.61	0.70	88.92	0.5
60	33.10	36.41	364.10	56.69	17.96	26.29	7.85	8.74	117.52	5.40	112.12	1.39	110.73	1
120	42.20	46.42	464.20	72.28	22.89	33.52	10.00	11.14	149.83	10.80	139.03	2.78	136.25	2
240	53.80	59.18	591.80	92.14	29.19	42.73	12.75	14.21	191.02	21.60	169.42	5.56	163.85	4
360	62.00	68.20	682.00	106.19	33.64	49.24	14.70	16.37	220.13	32.40	187.73	8.35	179.39	6
720	79.90	86.90	869.00	135.30	42.86	62.74	18.72	20.86	280.49	64.80	215.69	16.69	199.00	12
1440	100.80	110.88	1108.80	172.64	54.69	80.06	23.89	26.62	357.89	129.60	228.29	33.39	194.91	24
2880	114.80	126.28	1262.80	196.62	62.28	91.17	27.21	30.32	407.60	259.20	148.40	66.78	81.62	48
										Critical Storm Duration (hrs)		12		

**Contribution Areas**

Road/Car Parking	0.173 Hectares	90 % Runoff Coefficient
Paths	0.055 Hectares	90 % Runoff Coefficient
Roof Areas	0.076 Hectares	95 % Runoff Coefficient
Public Open Space/Verges	0.180 Hectares	12 % Runoff Coefficient
Private Open Space	0.200 Hectares	12 % Runoff Coefficient
<b>Total</b>	<b>0.683 Hectares</b>	<b>0.27 [E.g. Imp. Areas (Hz)]</b>

**Greenfield flow =**

<b>Rainfall for Critical Duration, 30 year storm =</b>	<b>1.50 GSDS Formula</b>	<b>12.50 l/s</b>
=> runoff coefficient for greenfield area =	<b>1.50</b>	<b>12.0%</b>
	<b>12.50</b>	



## Appendix D

### Surface water storage calculations

**Project:** G1162 - Rookwood



Chamber Model -  
Units -

SC-740  
Metric [Click Here for Imperial](#)

Number of chambers -  
Voids in the stone (porosity) -

82  
40 %

Base of Stone Elevation -  
Amount of Stone Above Chambers -

85.44 m  
200 mm

Include Perimeter Stone in Calculations

Amount of Stone Below Chambers -  
Area of system -

225 mm  
285 sq.meters

Min. Area - 257.522 sq.meters

**StormTech SC-740 Cumulative Storage Volumes**

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Total Chamber (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch & St (cubic meters)	Cumulative Chamber (cubic meters)	Elevation (meters)
1194	0.00	0.00	2.90	2.90	200.124	86.63
1168	0.00	0.00	2.90	2.90	197.228	86.61
1143	0.00	0.00	2.90	2.90	194.332	86.58
1118	0.00	0.00	2.90	2.90	191.436	86.56
1092	0.00	0.00	2.90	2.90	188.541	86.53
1067	0.00	0.00	2.90	2.90	185.645	86.51
1041	0.00	0.00	2.90	2.90	182.749	86.48
1016	0.00	0.00	2.90	2.90	179.853	86.46
991	0.00	0.13	2.84	2.97	176.957	86.43
965	0.00	0.38	2.74	3.12	173.985	86.41
940	0.01	0.65	2.63	3.29	170.862	86.38
914	0.02	1.40	2.33	3.74	167.573	86.35
889	0.02	1.86	2.15	4.01	163.836	86.33
864	0.03	2.21	2.01	4.22	159.823	86.30
838	0.03	2.50	1.90	4.39	155.603	86.28
813	0.03	2.74	1.80	4.54	151.210	86.25
787	0.04	2.94	1.72	4.66	146.669	86.23
762	0.04	3.15	1.64	4.78	142.010	86.20
737	0.04	3.38	1.55	4.92	137.226	86.18
711	0.04	3.54	1.48	5.02	132.305	86.15
686	0.04	3.67	1.43	5.10	127.285	86.13
660	0.05	3.81	1.37	5.18	122.184	86.10
635	0.05	3.95	1.32	5.26	117.000	86.08
610	0.05	4.07	1.27	5.34	111.737	86.05
584	0.05	4.19	1.22	5.41	106.399	86.02
559	0.05	4.31	1.17	5.48	100.991	86.00
533	0.05	4.40	1.14	5.53	95.511	85.97
508	0.05	4.49	1.10	5.59	89.978	85.95