

## **CIVIL ENGINEERING REPORT**

**FOR**

**LOUISE KELLY AND NIALL HEAVIN  
6, KNOCKLYON COTTAGES,  
KNOCKLYON ROAD, DUBLIN 16**

**ADDITION INFORMATION REQUEST  
SOUTH DUBLIN COUNTY COUNCIL  
DECISION ORDER NUMBER: 1588  
REGISTER REFERENCE: SD22B/0469**

**Prepared by:** Wojciech Prus  
Chartered Engineer, MSc Eng CEng MIEI  
European Engineer, Eur Ing

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## APPENDIX A - INFILTRATION TEST BRE DIGEST 365

# 1. Introduction

WP Consulting Engineers Ltd. were requested to prepare a civil engineering part of planning application for Louise Kelly and Niall Heavin, 6, Knocklyon Cottages, Knocklyon Road, Dublin 16

This report addresses the following items:

- Surface Water
- Watermain
- Foul Water

This report should be read in conjunction with all other planning documents including WP Consulting Engineers Ltd. drawing and details and Appendix A – Infiltration Test BRE 365 Digest 365.

**2. Met Eireann Return Period Rainfall Depth Data**  
**Irish Grid: Easting: 312646, Northing: 227437**

Met Eireann  
Return Period Rainfall Depths for sliding Durations  
Irish Grid: Easting: 312646, Northing: 227437,

DURATION	Interval 6months, 1year,	Years													
		2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.6, 3.8,	4.5,	5.6,	6.3,	6.9,	8.7,	10.9,	12.4,	14.5,	16.4,	17.9,	20.2,	22.1,	23.6,	N/A ,
10 mins	3.6, 5.4,	6.3,	7.8,	8.8,	9.6,	12.2,	15.2,	17.3,	20.2,	22.9,	25.0,	28.2,	30.8,	32.9,	N/A ,
15 mins	4.3, 6.3,	7.4,	9.1,	10.3,	11.2,	14.3,	17.9,	20.3,	23.8,	26.9,	29.4,	33.2,	36.2,	38.7,	N/A ,
30 mins	5.7, 8.3,	9.7,	11.8,	13.3,	14.5,	18.3,	22.8,	25.8,	30.0,	33.9,	36.8,	41.5,	45.1,	48.2,	N/A ,
1 hours	7.5, 10.8,	12.6,	15.4,	17.2,	18.7,	23.5,	29.0,	32.7,	37.9,	42.6,	46.3,	51.9,	56.3,	60.0,	N/A ,
2 hours	10.0, 14.2,	16.5,	19.9,	22.3,	24.1,	30.1,	36.9,	41.5,	47.9,	53.6,	58.1,	65.0,	70.3,	74.8,	N/A ,
3 hours	11.8, 16.6,	19.3,	23.2,	25.9,	28.0,	34.8,	42.5,	47.7,	54.9,	61.3,	66.3,	74.1,	80.1,	85.0,	N/A ,
4 hours	13.2, 18.6,	21.5,	25.9,	28.8,	31.1,	38.6,	47.0,	52.6,	60.5,	67.5,	72.9,	81.3,	87.8,	93.2,	N/A ,
6 hours	15.6, 21.8,	25.1,	30.1,	33.5,	36.1,	44.6,	54.2,	60.5,	69.4,	77.2,	83.3,	92.7,	100.0,	106.0,	N/A ,
9 hours	18.4, 25.6,	29.4,	35.1,	38.9,	41.9,	51.5,	62.4,	69.5,	79.5,	88.4,	95.2,	105.7,	113.8,	120.6,	N/A ,
12 hours	20.7, 28.6,	32.8,	39.1,	43.3,	46.6,	57.1,	69.0,	76.8,	87.6,	97.3,	104.7,	116.0,	124.8,	132.1,	N/A ,
18 hours	24.4, 33.5,	38.3,	45.5,	50.3,	54.0,	66.1,	79.5,	88.3,	100.5,	111.3,	119.6,	132.4,	142.2,	150.3,	N/A ,
24 hours	27.4, 37.5,	42.8,	50.7,	56.0,	60.1,	73.2,	87.9,	97.4,	110.8,	122.5,	131.5,	145.3,	155.9,	164.7,	195.2,
2 days	34.3, 45.9,	51.9,	60.7,	66.6,	71.0,	85.3,	101.0,	111.1,	125.1,	137.3,	146.6,	160.7,	171.6,	180.5,	211.2,
3 days	40.0, 52.7,	59.3,	68.8,	75.1,	79.9,	95.1,	111.7,	122.3,	136.9,	149.6,	159.2,	173.9,	185.0,	194.2,	225.5,
4 days	44.9, 58.7,	65.7,	75.8,	82.5,	87.6,	103.6,	121.0,	132.1,	147.2,	160.4,	170.4,	185.4,	196.9,	206.3,	238.2,
6 days	53.6, 69.0,	76.8,	88.0,	95.3,	100.9,	118.3,	137.1,	149.0,	165.1,	179.1,	189.6,	205.5,	217.6,	227.4,	260.7,
8 days	61.2, 78.1,	86.6,	98.7,	106.6,	112.5,	131.2,	151.1,	163.7,	180.7,	195.4,	206.4,	223.0,	235.6,	245.7,	280.3,
10 days	68.3, 86.4,	95.5,	108.4,	116.8,	123.1,	142.8,	163.8,	176.9,	194.8,	210.1,	221.6,	238.8,	251.8,	262.3,	297.9,
12 days	74.9, 94.2,	103.8,	117.4,	126.2,	132.9,	153.6,	175.4,	189.2,	207.7,	223.6,	235.5,	253.3,	266.7,	277.6,	314.2,
16 days	87.1, 108.5,	119.0,	134.0,	143.6,	150.8,	173.2,	196.8,	211.5,	231.3,	248.2,	260.8,	279.7,	293.8,	305.3,	343.7,
20 days	98.4, 121.6,	133.1,	149.2,	159.5,	167.2,	191.1,	216.2,	231.7,	252.7,	270.4,	283.7,	303.5,	318.3,	330.3,	370.4,
25 days	111.6, 137.0,	149.4,	166.8,	177.9,	186.2,	211.8,	238.5,	255.0,	277.2,	296.0,	310.0,	330.8,	346.3,	358.9,	400.8,

## 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](http://www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf)

### 3. Surface Water

Proposed on-site storm water management system was designed for 100 year return period plus 20% increase in rainfall depth for climate change.

SUDS is a fundamental change in the overall approach to drainage design with the primary aim of replicating the natural processes. This involves incorporating source control techniques which endeavour to mimic the natural movement of storm water from a development, reducing flood risk downstream, enhancing water quality and provide an improved environment.

In aiming to achieve this, it was intended that the following systems would be adopted as part of the scheme:

- Soakaway – total impermeable surface drained to proposed sokaway = 104M<sup>2</sup>
- Rain water butt – for garden use

For details, please refer to drawing C01 – PROPOSED SITE LAYOUT PLAN AND DETAILS

All proposed works will be carried out in accordance with Greater Dublin Regional Code of Practice for Drainage Works. Sokaway to be constructed in accordance with current Building Regulations and BRE DIGEST 365 requirements.

### 4. Surface Water Network Levels

NAME	COVER LEVEL	ENTRY INVERT LEVEL	INVERT LEVEL	DISTANCE	FALL	PIPE INTERNAL DIAMETER	DEPTH
M (X)	m	m	m	m	1: x	mm	m

S1	68.400		67.700				0.700
S2	68.200	67.558	66.900	6.4	45	150	1.300
S3	68.200	67.558	66.900	9.0	ZERO	150	1.300

## 5. Surface Water Network Hydraulic Calculations

Rainfall Intensity roof = 75 mm/hr  
 Rainfall Intensity paved = 50 mm/hr  
 Self cleansing Velocity = 0.8-3 m/s  
 Roof Vol. run-off coefficient = 0.9  
 Paved Vol. run-off coefficient = 0.9  
 Pipe Roughness  $K_s$  = 0.6 mm

Pipe No.	Impermeable Area ( $A_p$ )		Gradient	Diameter	Actual Rate of Flow	Accumulative Rate of Flow	Discharge Velocity	Capacity Full bore flow	Full Bore Velocity	Proportional flow	Discharge Velocity	Proportional Depth
	Roof ( $A_{p1}$ )	Paved ( $A_{p2}$ )			Q	$Q_t$	v	$Q_p$	$v_p$	Q/ $Q_p$		
	$m^2$	$m^2$	1 in	mm	l/s	l/s	m/s	l/s	m/s	OK?	OK?	OK?
S1-S2	104.0		45	150	1.95	1.95	0.88	26.53	1.50	OK	OK	OK

## 6. Proposed Soakaway Hydraulic Calculations

Impermeable surface drained to proposed soakaway:	104	m <sup>2</sup>
Run-off Co-efficient:	0.90	
Soil infiltration rate:	0.00001466	m / sec
Proposed soakaway size [ L x W x ED ]:	10.400    1.800    1.000	m
Storage volume provided in stone with 30% air voids:	5.62	m <sup>3</sup>
as50 - internal surface area to 50% effective depth:	12.2	m <sup>2</sup>
Outflow infiltrating into the soil during rainfall:	0.00017885    x D	m <sup>3</sup>

D = rainfall duration	Rainfall 100 year storm + 20% increase in depth (climate change) Return Period Rainfall Depths for sliding Durations Irish Grid: Easting: 312646, Northing: 227437	Inflow from impermeable surface	Outflow infiltrating into the soil during rainfall	Required storage volume
min.	mm	m <sup>3</sup>	m <sup>3</sup>	m <sup>3</sup>
5	21.480	2.0	0.1	1.96
10	30.000	2.8	0.1	2.70
15	35.280	3.3	0.2	3.14
30	44.160	4.1	0.3	3.81
60	55.560	5.2	0.6	4.56
120	69.720	6.5	1.3	5.24
180	79.560	7.4	1.9	5.52
<b>240</b>	<b>87.480</b>	<b>8.2</b>	<b>2.6</b>	<b>5.61</b>
360	99.960	9.4	3.9	5.49
540	114.240	10.7	5.8	4.90
720	125.640	11.8	7.7	4.03
1,080	143.520	13.4	11.6	1.84
1,440	157.800	14.8	15.5	- 0.68
2,880	175.920	16.5	30.9	- 14.44
4,320	191.040	17.9	46.4	- 28.48
5,760	204.480	19.1	61.8	- 42.67
8,640	227.520	21.3	92.7	- 71.42
11,520	247.680	23.2	123.6	- 100.44
14,400	265.920	24.9	154.5	- 129.64
17,280	282.600	26.5	185.4	- 158.98
23,040	312.960	29.3	247.2	- 217.95
28,800	340.440	31.9	309.1	- 277.19
36,000	372.000	34.8	386.3	- 351.50

From table above, required storage volume is:

**5.61 m<sup>3</sup>**

From table above, critical rainfall duration is:

**4 hour**

Checking on time of emptying half storage volume:

The soakaway should discharge from full to half-volume within 24 hours in readiness for subsequent storm inflow:

**T = 4.36 hours**

## **7. Foul Water and Watermains**

It is proposed to re-use existing foul water and watermains connections.