Traynor Environmental Ltd.

Belturbet Business Park,
Creeny,
Belturbet,
Co. Cavan.

Tel: 049 9522236
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Web: www.traynorenvironmental.com

21/712A TE

Brian Dunne
c/o McCrae Consulting Engineers
Rear 6B Arbourfield Terrace,
Dundrum Business Park,
Dublin 14,
D14 F5C6

Re: Soakaway design as per BRE 365 for 263m² impermeable area for Brian Dunne, Lynbrook Whitechurch Rd, Rathfarnham, Dublin 16, House A & B

We have designed per BRE Digest 365 based on the total impermeable area as supplied and Met Eireann's Extreme Rainfall Return Periods for Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16.

Site Information Supplied as part of the layout provided By McCrae Consulting Engineers
Total Impermeable area to be drained = 485 m2
Total Permeable area to be drained total = 526m2 (House A = 263 m2 + House B = 263 m2)

Rainfall Information as Per Met Eireann (30 Year Rainfall Returns)

Storm dur.	*Rainfall*	*20% Allowance for Climate Change*
mins.	*mm.*	*mm.*
5	*13.0*	*15.6*
10	*18.1*	*21.72*
15	*21.3*	*25.56*
30	*27.1*	*32.52*
60	*34.6*	*41.52*

Void Ratio
The void ratio for the trench fill was set at 30% (0.3) to accommodate the use of granular fill material i.e. rounded gravel. The safety factor was taken as 1.

Soil infiltration rate
Tests carried out at 1.00m below ground level.
Average Calculated as per BRE365 = 2.01* 10^{-5} m/sec

The Base of the soakaway trial pit is set at 1.00 m Below the invert of the inlet drain According to BRE Digest 365 method

Traynor Environmental Ltd – BRE Digest 365 Calculations

Soakaway test A

Infiltration Rate	
Test Hole Dimension	
Length (l)	***1.10m***
Width (m)	***0.60m***
Depth (m)	***1.00m***
Drop Time (mins)	***130***

Soil Infiltration Rate, $f = V_{p75-25} / a_{p50} \times t_{p75-25}$

Where

V_{p75-25} = *the effective storage volume of water in the trial pit between 75% and 25% effective depth;*

a_{p50} = *the internal surface area of the trial pit up to 50% effective depth and including the base area;*

t_{p75-25} = *the time for the water level to fall from 75% to 25% effective depth*

$V_{p75-25} = 1.10 \times 0.60 \times (0.750 - 0.250) = 0.330m^3$

$na_{p50} = (1.10 \times 0.50 \times 2) + (0.6 \times 0.50 \times 2) = 1.70m^2$

$$f = \frac{0.330}{1.70 \times 130 \times 60} = 2.40^{-5} m/s$$

Soakaway test B

Infiltration Rate	
Test Hole Dimension	
Length (l)	***1.40m***
Width (m)	***0.60m***
Depth (m)	***1.00m***
Drop Time (mins)	***216***

Soil Infiltration Rate, $f = V_{p75-25} / a_{p50} \times t_{p75-25}$

Where

V_{p75-25} = *the effective storage volume of water in the trial pit between 75% and 25% effective depth;*

a_{p50} = *the internal surface area of the trial pit up to 50% effective depth and including the base area;*

t_{p75-25} = *the time for the water level to fall from 75% to 25% effective depth*

$V_{p75-25} = 1.40 \times 0.60 \times (0.75 - 0.25) = 0.42m^3$

$na_{p50} = (1.40 \times 0.50 \times 2) + (0.6 \times 0.5 \times 2) = 2.00m^2$

$$f = \frac{0.42}{2.00 \times 216 \times 60} = 1.62^{-5} m/s$$

Average Soil Infiltration	$\frac{2.40^{-5} m/s + 1.62^{-5} m/s}{2}$ = **$2.01^{-5} m/s$**

We have designed as per BRE Digest 365 based on the total impermeable area, total permeable area and Met Eireann's Extreme Rainfall Return

Permeable Paving Design

CLIENT:	Brian Dunne, Lynbrook ,Whitechurch Rd, Rathfarnham, Dublin 16, House A & B
ATCE JOB NO.:	Traynor Env
JOB DESCRIPTION:	Proposed Development at Lynbrook ,Whitechurch Rd, Rathfarnham, Dublin 16, House A & B
Paving Design	Overall

Input Data

Impermeable Area to be drained	**Ai**	526	m2		Soil permeability	2.01E-05	m/s
Permeable area to be drained	**Ap**	485	m2		Factor of Safety	3	
Ratio of 60min-2day M5 - r	**r**	0.4			Stone Void Ratio	0.300	

	M10-5min	M10-10min	M10-15min	M10-30min	M10-60min
Design Rainfall-R (mm)	15.6	21.7	25.6	32.5	41.5
Storage depth (mm)	108	151	177	225	287

Traynor Environmental Ltd.

Figure 1: Site Layout Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16 showing Location of Tested Area

NB:

During the design process, a Silt Trap **must** be incorporated into any drains discharging into the soakaway system.

NB:

Any paved surface runoff or runoff from a car-parking area **must** pass through an oil interceptor/hydrocarbon retention geotextile before discharge to the soakaway if applicable.

NB:

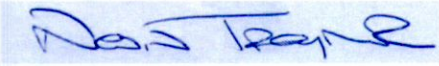
All elements of the soakaway **must** be maintained by suitably qualified professionals *i.e. Silt traps must be regularly cleaned.*

NB:

Please note that all relevant aspects of BRE365 **must** be taken into account in the design and installation of this soakaway system e.g. minimum separation distance of 5m from building foundations and from soil polishing filter for domestic wastewater.

Should you have any queries on this, do not hesitate to contact me.

Yours sincerely



Nevin Traynor

BSc. Env, H.Dip I.T, Cert SHWW, EPA/FAS Cert.

For **Traynor Environmental Ltd**

Encl – Appendices A - D

SOAKAWAY TESTING TO BRE DIGEST 365

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APPENDIX A – SITE PHOTOGRAPHS

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Photographs From the Soakaway Test A

Surface View Of Soakaway Test Hole No 1	Soakaway Test Hole Prior To Test
	
Soakaway Been Filled	**Soil Removed from Soak Pit**
	
Soakaway Under Test	**Soakaway Complete**
	

Traynor Environmental Ltd.

Photographs From the Soakaway Test B

Surface View Of Soakaway Test Hole No 1	Soakaway Test Hole Prior To Test
	
Soakaway Been Filled	**Soil Removed from Soak Pit**
	
Soakaway Under Test	**Soakaway Complete**
	

SOAKAWAY TESTING TO BRE DIGEST 365
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APPENDIX B – TRIAL PIT LOG

Trial Pit Number TP A	Traynor Environmental Ltd Unit 6, Belturbet Business Park Creeny Belturbet Co. Cavan	Sheet 1 of 2

Project	Client
Proposed Development Site at Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16	*Brian Dunne*

Method	Ground Level	Start Date
3 ton digger		*24.08.21*

Description	Legend	Reduced Level	Depth	Installation Backfill	Sample Test		Notes
Silt/Clay, Crumb Nature, Low Density Brown Colour			*0.00m - 0.30m*				
Clay intermixed with stone Blocky Nature, Medium Density Grey Colour			*0.30- 0.80m*				
Gravel intermixed with stone Crumb Nature, Medium Density Grey Colour			*0.80m- 1.10m*				
Winter Water Table			*1.10m- 1.40m*				
Groundwater Table			*1.40m- 2.10m*				

Trial Pit Completed at 2.1m BGL.

Remarks:
Bedrock None Encountered
Winter Water Table: 1.10mBGL
Groundwater Table:1.40m BGL
Average soakage characteristics of the subsoil.

Pit Dimensions
Depth: 3.10m
Length: 3.0m
Width: 1.60m
Orientation of Long Side: 000 Degrees

Photo

Trial Pit Number TP B	Traynor Environmental Ltd Unit 6, Belturbet Business Park Creeny Belturbet Co. Cavan	Sheet 2 of 2

Project	Client
Proposed Development Site at Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16	*Brian Dunne*

Method	Ground Level	Start Date
3 ton digger		*24.08.21*

Description	Legend	Reduced Level	Depth	Installation Backfill	Sample Test		Notes
Silt/Clay, Crumb Nature, Low Density Brown Colour			*0.00m - 0.30m*				
Clay intermixed with stone Blocky Nature, Medium Density Grey Colour			*0.30- 0.80m*				
Gravel intermixed with stone Crumb Nature, Medium Density Grey Colour			*0.80m- 1.10m*				
Winter Water Table			*1.10m- 1.30m*				
Groundwater Table			*1.30m- 2.10m*				

Trial Pit Completed at 2.1m BGL.

Remarks:
Bedrock None Encountered
Winter Water Table: 1.10mBGL
Groundwater Table:1.30m BGL
Average soakage characteristics of the subsoil.

Pit Dimensions
Depth: 3.10m
Length: 3.0m
Width: 1.60m
Orientation of Long Side: 000 Degrees

Photo

SOAKAWAY TESTING TO BRE DIGEST 365

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APPENDIX B – MET EIREANN RAINFALL RETURN PERIODS

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 314707, Northing: 225697,

	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,	9.1,	11.4,	13.0,	15.2,	17.2,	18.7,	21.2,	23.1,	24.7,	N/A ,
10 mins	3.8,	5.6,	6.6,	8.1,	9.2,	10.0,	12.7,	15.9,	18.1,	21.2,	23.9,	26.1,	29.5,	32.2,	34.4,	N/A ,
15 mins	4.5,	6.6,	7.8,	9.5,	10.8,	11.8,	15.0,	18.7,	21.3,	24.9,	28.2,	30.7,	34.7,	37.9,	40.5,	N/A ,
30 mins	5.9,	8.6,	10.1,	12.4,	13.9,	15.2,	19.2,	24.0,	27.1,	31.6,	35.7,	38.9,	43.8,	47.7,	51.0,	N/A ,
1 hours	7.8,	11.2,	13.1,	16.0,	18.0,	19.6,	24.7,	30.6,	34.6,	40.2,	45.2,	49.2,	55.3,	60.1,	64.1,	N/A ,
2 hours	10.2,	14.7,	17.1,	20.8,	23.3,	25.3,	31.7,	39.1,	44.1,	51.1,	57.4,	62.2,	69.8,	75.7,	80.7,	N/A ,
3 hours	12.0,	17.2,	20.0,	24.2,	27.1,	29.3,	36.7,	45.2,	50.8,	58.8,	65.9,	71.4,	80.0,	86.7,	92.3,	N/A ,
4 hours	13.5,	19.2,	22.3,	27.0,	30.1,	32.6,	40.8,	50.0,	56.2,	64.9,	72.7,	78.8,	88.1,	95.4,	101.5,	N/A ,
6 hours	15.8,	22.4,	26.0,	31.4,	35.0,	37.9,	47.2,	57.8,	64.8,	74.7,	83.5,	90.4,	101.0,	109.3,	116.1,	N/A ,
9 hours	18.6,	26.2,	30.3,	36.5,	40.7,	44.0,	54.6,	66.7,	74.7,	86.0,	96.0,	103.8,	115.8,	125.1,	132.8,	N/A ,
12 hours	20.8,	29.3,	33.9,	40.7,	45.3,	48.9,	60.6,	73.9,	82.7,	95.0,	105.9,	114.4,	127.5,	137.7,	146.1,	N/A ,
18 hours	24.5,	34.3,	39.5,	47.4,	52.7,	56.8,	70.2,	85.3,	95.3,	109.3,	121.7,	131.4,	146.2,	157.7,	167.2,	N/A ,
24 hours	27.4,	38.3,	44.1,	52.8,	58.6,	63.1,	77.9,	94.5,	105.4,	120.8,	134.4,	144.9,	161.0,	173.6,	183.9,	220.2,
2 days	34.6,	47.1,	53.6,	63.3,	69.7,	74.7,	90.7,	108.5,	120.1,	136.1,	150.2,	161.1,	177.6,	190.4,	200.9,	237.3,
3 days	40.4,	54.1,	61.3,	71.8,	78.8,	84.1,	101.2,	120.0,	132.1,	148.9,	163.6,	174.8,	191.9,	205.0,	215.7,	252.8,
4 days	45.4,	60.3,	68.0,	79.2,	86.6,	92.3,	110.3,	130.0,	142.6,	160.1,	175.3,	186.9,	204.5,	217.9,	228.9,	266.7,
6 days	54.4,	71.2,	79.7,	92.1,	100.3,	106.5,	126.1,	147.3,	160.9,	179.5,	195.7,	207.9,	226.4,	240.5,	252.0,	291.4,
8 days	62.3,	80.7,	90.0,	103.4,	112.2,	118.9,	139.9,	162.5,	176.9,	196.5,	213.4,	226.2,	245.6,	260.3,	272.2,	313.0,
10 days	69.6,	89.4,	99.4,	113.8,	123.1,	130.2,	152.4,	176.2,	191.3,	211.8,	229.4,	242.8,	262.9,	278.1,	290.5,	332.5,
12 days	76.5,	97.6,	108.2,	123.3,	133.2,	140.6,	163.9,	188.8,	204.6,	225.9,	244.2,	258.1,	278.8,	294.5,	307.3,	350.5,
16 days	89.2,	112.6,	124.3,	141.0,	151.7,	159.8,	185.1,	211.9,	228.8,	251.6,	271.1,	285.8,	307.8,	324.4,	337.8,	383.1,
20 days	101.0,	126.6,	139.2,	157.1,	168.7,	177.4,	204.4,	233.0,	250.9,	275.0,	295.5,	311.0,	334.0,	351.3,	365.4,	412.6,
25 days	114.9,	142.8,	156.5,	176.0,	188.4,	197.8,	226.8,	257.2,	276.2,	301.8,	323.5,	339.8,	364.1,	382.3,	397.0,	446.4,

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

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SOAKAWAY TESTING TO BRE DIGEST 365
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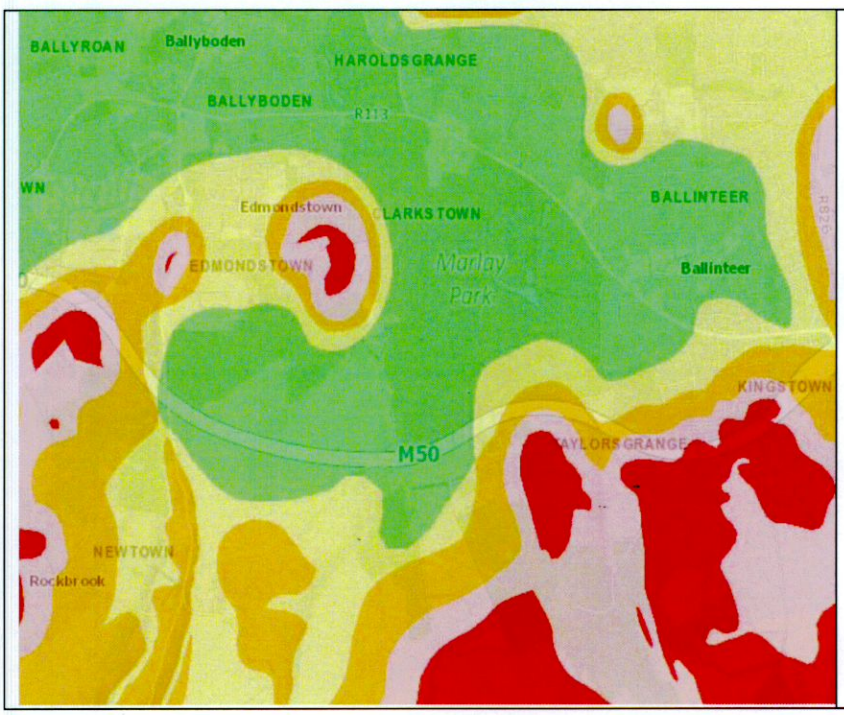
APPENDIX C – MAPS USED AS PART OF THE DESK STUDY

Maps Used

Groundwater/Aquifer Map

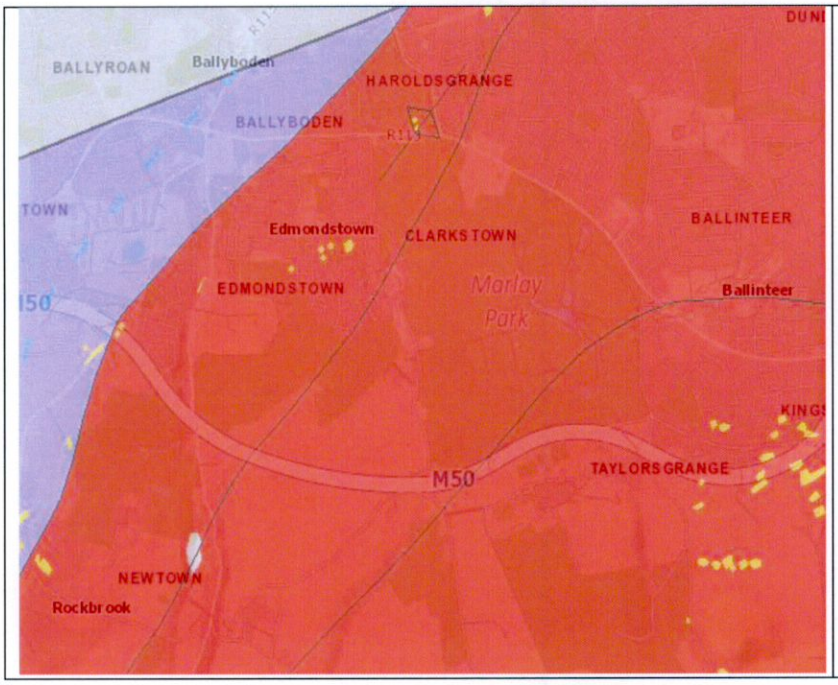
From the GSI Groundwater Aquifer Map Site is classified as Pl– Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones

Vulnerability Map



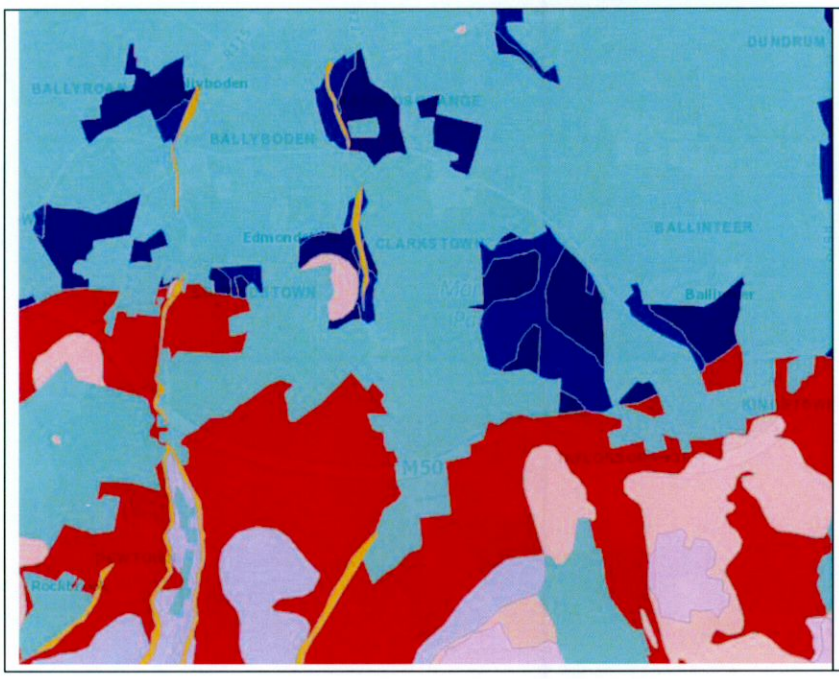
From the GSI Vulnerability Map Site is classified as Low

Bedrock Map



From the GSI Bedrock Map the Site is classified as GII- Granites & other Igneous Intrusive rocks

Teagasc Subsoil Map



From the GSI Teagasc Subsoil Map Site is classified as Fine loamy drift with siliceous stones

SOAKAWAY TESTING TO BRE DIGEST 365

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APPENDIX D – INSURANCE

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info@griffithsandarmour.com
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PROFESSIONAL INDEMNITY INSURANCE

We confirm the following details relating to our client's Professional Indemnity Insurance:

Insured:	Traynor Environmental Ltd
Address:	Belturbet Business Park Creeny Belturbet Co. Cavan H14AY94
Lead Insurer(s):	Axis Specialty Europe SE
Period of Insurance:	12 July 2021 to 11 July 2022
Policy Number:	20/1/04786
Limit of Indemnity:	€1,500,000 any one claim and unlimited in the period of insurance

Signed:

Graeme Tinney
Chief Executive Officer
Griffiths & Armour Europe DAC

Date: **22 June 2021**

The policy is subject to the insuring agreements, exceptions, exclusions, limitations, conditions and declarations contained therein. The above is accurate at the date of signature. No obligation is imposed herein on the signatory to advise of any alteration.