

21/712D TE

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

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

**Re: Permeable paving as per BRE 365 for Brian Dunne, Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16.**

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

**Site Information Supplied as part of the layout provided By McCrae Consulting Engineers**

**Total permeable area to be drained = 485 m<sup>2</sup>**

**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 was set at 30% (0.3) to accommodate the use of granular fill material i.e. rounded gravel.

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

### Calculations For Permeable Paving

Average Soil Infiltration From Soakaways for houses A & B	$\frac{2.40^{-5}m/s + 1.62^{-5}m/sec}{2}$ $= 2.01^{-5}m/s$
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Site Information Supplied as part of the layout provided By McCrae Consulting Engineers  
Total permeable area = 485 m2

### Permeable Paving Design

<b>CLIENT:</b> Brian Dunne, Lyubrook, Whitechurch Rd, Rathfarnham, Dublin 16	
<b>ATCE JOB NO.:</b>	Traynor Env
<b>JOB DESCRIPTION:</b>	Proposed Development at Lyubrook, Whitechurch Rd, Rathfarnham, Dublin 16
<b>Paving Design:</b>	Overall

<b>Input Data</b>					
Impermeable Area to be drained	AI	m2	2.01E-05	m/s	
Permeable area to be drained	Ap	485	m2	3	
Ratio of 60min-2day M5 - r	r	0.4		0.300	

	IM10-5min	IM10-10min	IM10-15min	IM10-30min	IM10-60min
Design Rainfall-R (mm)	15.6	21.7	25.6	32.5	41.5
Storage depth (mm)	52	72	85	108	137

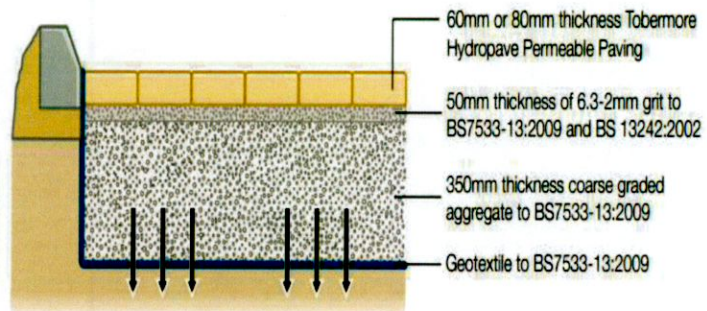


Figure 1: Site Layout Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16 showing Location of Tested Area



**Figure 2: Cross Section**

The Infiltration system allows the water to flow slowly through the crushed stone beneath the paving before being slowly released back into the ground through a geotextile.



**NB:**

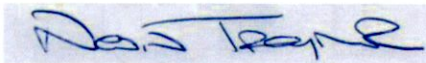
Please note for the purpose of the design, that the fill material used must have no less free volume than 30%.

**NB:**

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

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









Photographs From the Soakaway Test A

<p>Surface View Of Soakaway Test Hole No 1</p>	<p>Soakaway Test Hole Prior To Test</p>
	
<p>Soakaway Been Filled</p>	<p>Soil Removed from Soak Pit</p>
	
<p>Soakaway Under Test</p>	<p>Soakaway Complete</p>
	





Photographs From the Soakaway Test B

<p>Surface View Of Soakaway Test Hole No 1</p>	<p>Soakaway Test Hole Prior To Test</p>
	
<p>Soakaway Been Filled</p>	<p>Soil Removed from Soak Pit</p>
	
<p>Soakaway Under Test</p>	<p>Soakaway Complete</p>
	

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



<b>Trial Pit Number TP A</b>	<b>Traynor Environmental Ltd Unit 6, Belturbet Business Park Creeny Belturbet Co. Cavan</b>			<b>Sheet 1 of 3</b>		
<b>Project</b> <i>Proposed Development Site at Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16</i>			<b>Client</b> <i>Brian Dunne</i>			
<b>Method</b> 3 ton digger		<b>Ground Level</b>		<b>Start Date</b> 24.08.21		
<b>Description</b>	<b>Legend</b>	<b>Reduced Level</b>	<b>Depth</b>	<b>Installation Backfill</b>	<b>Sample Test</b>	<b>Notes</b>
<i>Silt/Clay, Crumb Nature, Low Density Brown Colour</i>			<i>0.00m - 0.30m</i>			
<i>Clay intermixed with stone Blocky Nature, Medium Density Grey Colour</i>			<i>0.30- 0.80m</i>			
<i>Gravel intermixed with stone Crumb Nature, Medium Density Grey Colour</i>			<i>0.80m- 1.10m</i>			
<i>Winter Water Table</i>			<i>1.10m- 1.40m</i>			
<i>Groundwater Table</i>			<i>1.40m- 2.10m</i>			
Trial Pit Completed at 2.1m BGL.						
<b>Remarks:</b> <i>Bedrock None Encountered Winter Water Table: 1.10mBGL Groundwater Table:1.40m BGL Average soakage characteristics of the subsoil.</i>		<b>Pit Dimensions</b> Depth: 3.10m Length: 3.0m Width: 1.60m Orientation of Long Side: 000 Degrees		<b>Photo</b> 		

<b>Trial Pit Number TP B</b>	<b>Traynor Environmental Ltd Unit 6, Belturbet Business Park Creeny Belturbet Co. Cavan</b>			<b>Sheet 2 of 3</b>		
<b>Project</b> <i>Proposed Development Site at Lynbrook, Whitechurch Rd, Rathfarnham, Dublin 16</i>			<b>Client</b> <i>Brian Dunne</i>			
<b>Method</b> 3 ton digger		<b>Ground Level</b>		<b>Start Date</b> 24.08.21		
<b>Description</b>	<b>Legend</b>	<b>Reduced Level</b>	<b>Depth</b>	<b>Installation Backfill</b>	<b>Sample Test</b>	<b>Notes</b>
<i>Silt/Clay, Crumb Nature, Low Density Brown Colour</i>			<i>0.00m - 0.30m</i>			
<i>Clay intermixed with stone Blocky Nature, Medium Density Grey Colour</i>			<i>0.30- 0.80m</i>			
<i>Gravel intermixed with stone Crumb Nature, Medium Density Grey Colour</i>			<i>0.80m- 1.10m</i>			
<i>Winter Water Table</i>			<i>1.10m- 1.30m</i>			
<i>Groundwater Table</i>			<i>1.30m- 2.10m</i>			
Trial Pit Completed at 2.1m BGL.						
<b>Remarks:</b> <i>Bedrock None Encountered Winter Water Table: 1.10mBGL Groundwater Table:1.30m BGL Average soakage characteristics of the subsoil.</i>		<b>Pit Dimensions</b> Depth: 3.10m Length: 3.0m Width: 1.60m Orientation of Long Side: 000 Degrees		<b>Photo</b> 		



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,**

DURATION	Interval 6months, 1year, 5 mins 10 mins 15 mins 30 mins 1 hours 2 hours 3 hours 4 hours 6 hours 9 hours 12 hours 18 hours 24 hours 2 days 3 days 4 days 6 days 8 days 10 days 12 days 16 days 20 days 25 days	Years												
		2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,
5 mins	2.7,	4.7,	5.8,	6.6,	7.2,	9.1,	11.4,	13.0,	15.2,	17.2,	18.7,	23.1,	24.7,	N/A
10 mins	3.8,	6.6,	8.1,	9.2,	10.0,	12.7,	15.9,	18.1,	21.2,	23.9,	26.1,	29.5,	34.4,	N/A
15 mins	4.5,	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
30 mins	5.9,	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
1 hours	7.8,	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
2 hours	10.2,	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
3 hours	12.0,	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
4 hours	13.5,	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
6 hours	15.8,	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
9 hours	18.6,	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
12 hours	20.8,	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
18 hours	24.5,	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
24 hours	27.4,	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
2 days	34.6,	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
3 days	40.4,	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
4 days	45.4,	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
6 days	54.4,	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
8 days	62.3,	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
10 days	69.6,	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
12 days	76.5,	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
16 days	89.2,	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
20 days	101.0,	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
25 days	114.9,	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
500,														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/datsproducts/Estimation-of-Point-Rainfall-Frequencies\\_IN61.pdf](http://www.met.ie/climate/datsproducts/Estimation-of-Point-Rainfall-Frequencies_IN61.pdf)



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

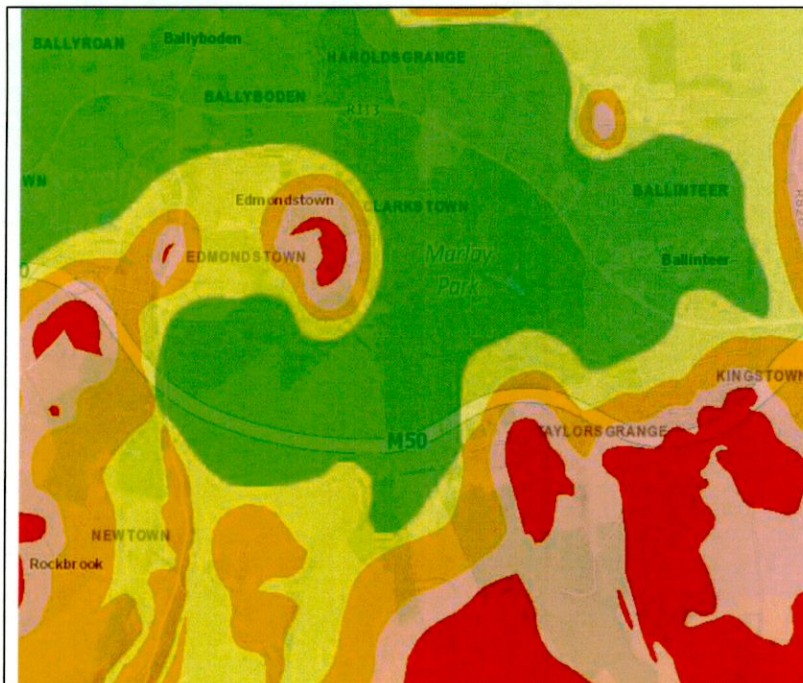
### Maps Used

#### Groundwater/Aquifer Map



*From the GSI Groundwater  
Aquifer Map Site is  
classified as P1- Poor  
Aquifer - Bedrock which is  
Generally Unproductive  
except for Local Zones*

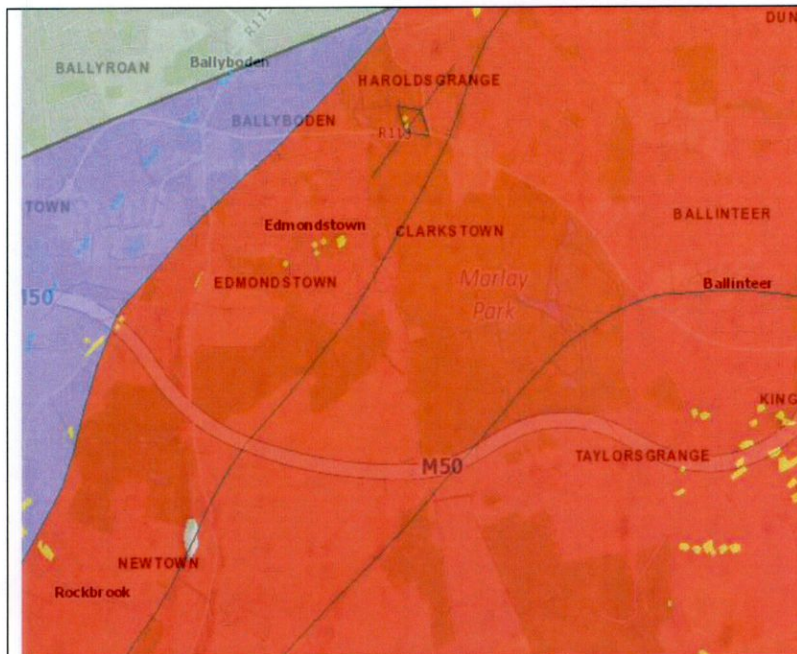
#### Vulnerability Map



*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**

**COMPLETED BY**

**TRAYNOR ENVIRONMENTAL LTD**

**APPENDIX D – INSURANCE**



**Griffiths & Armour Europe DAC**

Alexandra House      ☎ +353 (0)1 654 1400  
The Sweepstakes      ☎ +353 (0)1 634 0001  
Bellebridge            ☎ info@griffithsandarmour.com  
Dublin 4                ☎ griffithsandarmour.com

**Griffiths &  
Armour**

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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.

