



**Advance**  
Consulting Engineers Ltd

# TREMAINE MANOR, PELYNT CORNWALL

## Drainage Strategy Statement

for

COTTAGE ORNE LIMITED

June 2023

# DOCUMENT CONTROL SHEET

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## Project Summary

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Client:	DS Developments	
Project:	Tremaine Manor, Pelynt Cornwall	
Title:	Drainage Strategy Statement	
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Date:	01/06/2023	

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Revision	Status	Author	Checked	Approved	Issue Date	Revision Details
A	First Issue	Matt Eagle	Chris Williams	Chris Williams	15/05/2023	For planning submission
B	Second Issue	Matt Eagle	Chris Williams	Chris Williams	01/06/2023	Appendix A updated



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## 1. DRAINAGE DESIGN SUMMARY

This statement sets out the design philosophy and provides calculations for drainage strategy for the proposed development at Tremaine Manor, Pelynt, Cornwall. A summary of the strategy is as follows:

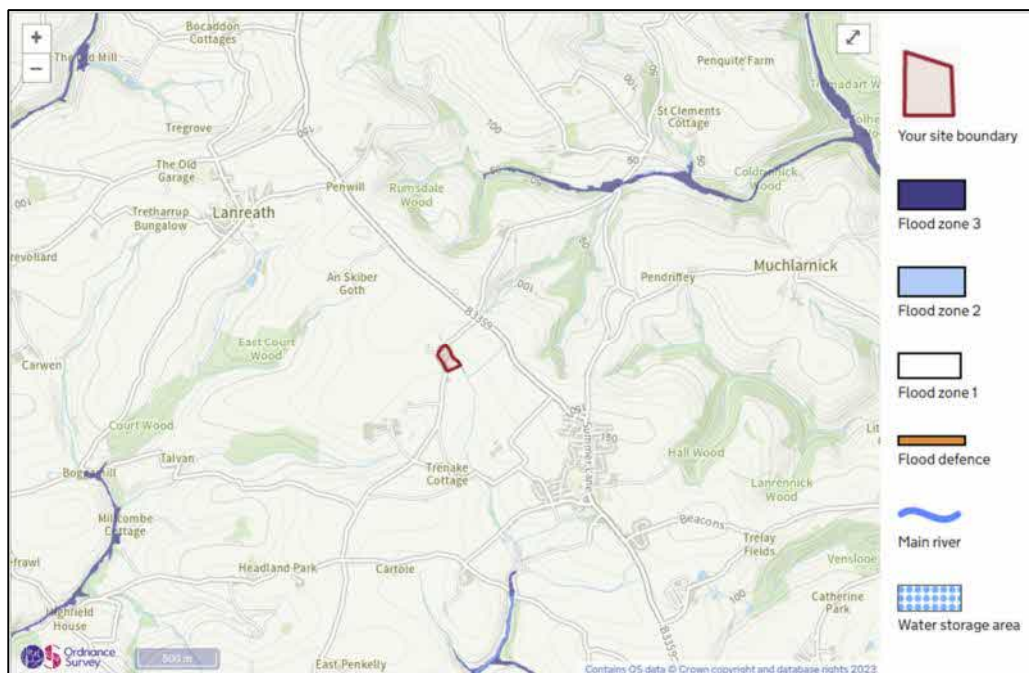
- The site is located within flood zone 1 and it is considered that the site is at low risk of flooding from any of the typically considered sources.
- Infiltration testing has been undertaken on site and confirms that “soakaways may be considered as a means of drainage at the site”.
- The first option is an infiltration scheme, with conservative soil infiltration rates assumed for initial design purposes and the intention that site specific ground investigation will confirm actual rates prior to detailed design.
- The second / back-up option presented is an attenuation scheme, with controlled discharge to watercourse and attenuation provided within open SuDS feature – pond or basin.
- All infiltration systems have been designed for storm events up to and including the critical 1 in 100-year event + 50% climate change allowance.
- Foul water will be treated on-site via package treatment plant, with effluent discharged to watercourse.
- This is a managed site and proposed drainage will be maintained by on-site grounds persons.
- Drainage strategy options are provided on Advance drawing C23060\_C020.

## 2. FLOOD RISK

### 2.1 Flood Zone: Overview

- 2.1.1 The NPPF approach to flood risk uses a system of flood zone designations to provide a primary tool for risk-based planning decisions.
- 2.1.2 According to the Government’s online published Flood Map for Planning the application site lies wholly within Zone 1 - Low Probability, refer to below.
- 2.1.3 The Government’s online mapping shows medium and low risk of surface water flooding at the eastern site boundary, which is associated with the existing watercourse running north to south along that boundary. Topographic survey shows that the levels of the watercourse are approximately 2m below that of the existing and proposed structures, with the flood map indicating flooding is retained in tight proximity to the watercourse; it is therefore concluded that this surface water flooding poses low risk to the development.
- 2.1.4 The Government’s online mapping shows the application site to lie within an area designated to be at “Very low risk” in terms of flood risk from rivers or the sea and from artificial sources (reservoirs).

Figure 2.1 – GOV.UK mapping – Flood zones



### 3. LOCAL AUTHORITY REQUIREMENTS

#### 3.1 Drainage design hierarchy

The LLFA and Building Regulations set out a hierarchy of drainage methods to ensure that developments maximise the use of sustainable drainage techniques. The hierarchy favours infiltration methods of disposal over other methods, such as watercourse and sewers, as detailed below -

1. utilise infiltration techniques
2. attenuate rainwater in ponds or open water features for gradual release
3. attenuate rainwater by storing in tanks or sealed water features for gradual release
4. discharge rainwater direct to a watercourse
5. discharge rainwater to a surface water sewer/drain
6. discharge rainwater to a combined sewer.

### 4. GROUND CONDITIONS AND EXISTING DRAINAGE

#### 4.1 Infiltration testing

Infiltration testing to BRE 365, was carried out by Advance Consulting Engineers Ltd in April 2023, with the report noting “The results of soakaway testing indicate that soakaways may be considered as a means of drainage at the site. Infiltration testing undertaken within The Paddock area, trial pits SA01 &



SA02, received 3 cycles of testing, in accordance with Building Research Establishment (BRE) report BR365. The lowest values for infiltration for each of the pits was calculated as:  $2.9 \times 10^{-5}$  m/s for SA01 and  $2.4 \times 10^{-4}$  m/s for SA02. The Parking area trial pit – SA03 - was undertaken for assessment of shallow drainage. This pit also received 3 cycles of testing; the lowest infiltration value was calculated as  $1.7 \times 10^{-5}$  m/s at between 0.7m & 1.0m BGL.”.

No groundwater was encountered during site investigation.

Results of the testing are provided in table 2.0 below and the Advance letter report is included in Appendix A.

Table 2.0 – Infiltration test results

Trial pit	Depth (m)	Dims (m)	Test 1	Test 2	Test 3	Design Rate
SA01	1.70	1.3 x 0.6	$3.917 \times 10^{-5}$	$2.881 \times 10^{-5}$	$3.293 \times 10^{-5}$	$2.881 \times 10^{-5}$
SA02	1.20	1.3 x 0.6	$4.065 \times 10^{-4}$	$3.049 \times 10^{-4}$	$2.439 \times 10^{-4}$	$2.439 \times 10^{-4}$
SA03	1.00	0.6 x 0.6	$2.176 \times 10^{-5}$	$1.792 \times 10^{-5}$	$1.684 \times 10^{-5}$	$1.684 \times 10^{-5}$

#### 4.2 South West Water (SWW)

Review of SWW record mapping indicates no public foul or surface water sewers within proximity to the site.

#### 4.3 Watercourses

Mapping and topographic survey shows that there is an existing watercourse to the eastern site boundary.



## 5. DRAINAGE STRATEGY

### 5.1 Description of surface water drainage system

5.2 The results of the Advance geotechnical investigation confirms that ground conditions support the use of an infiltration strategy; from which, soil infiltration rate from suitably corresponding test locations have been applied to detailed design of proposed infiltration systems.

5.3 For the proposed permanent buildings, the detailed design drains all proposed roof into private drainage gravity networks discharging to soakaways located at suitable offsets (5m min.) from proposed structures (Soakaways 1 & 2).

5.4 For the proposed site access and car park area, this is currently laid to permeable gravel surfacing and the extended car park provision will be surfaced in the same material, providing infiltration to ground and treatment of runoff.

5.5 All infiltration systems have been designed for storm events up to and including the critical 1 in 100 year event + 50% climate change allowance..

5.6 Surface water calculations are provided in Appendix B.

### 5.7 Description of foul water drainage system

With there being no public foul sewers within proximity to the site, foul water will be treated on-site via package treatment plant, with effluent discharging to watercourse via a new outfall. Subject to confirmation of design flow rate, and Environment Agency consent to discharge may be required.

### 5.8 Exceedance Flood Routing

Excess flows will be routed away from buildings and towards soft landscaping or low points within the car parking areas. Site levels naturally route any exceedance surface flows towards the proposed extensive garden areas to the eastern side of the site, with any residual runoff naturally draining to the watercourse at the site boundary.

Exceedance routing is provided on the drainage strategy plan, Advance drawing C23060\_C020.

### 5.9 Drainage management and maintenance

The drainage maintenance being undertaken by the owners/occupiers and/or a designated management company.

The drainage maintenance plan and any relevant manufacturer guidance for specific bespoke drainage items will be provided to the occupiers as part of the O&M manual at handover.

Recommended drainage maintenance details are provided on Advance drawing C23060\_C025.

Advance Consulting Engineers Ltd



# Appendix A Proposed Site Plan







## Appendix B Drainage Strategy Calculations



% Search

&

Point data at 219388,55996 ✎

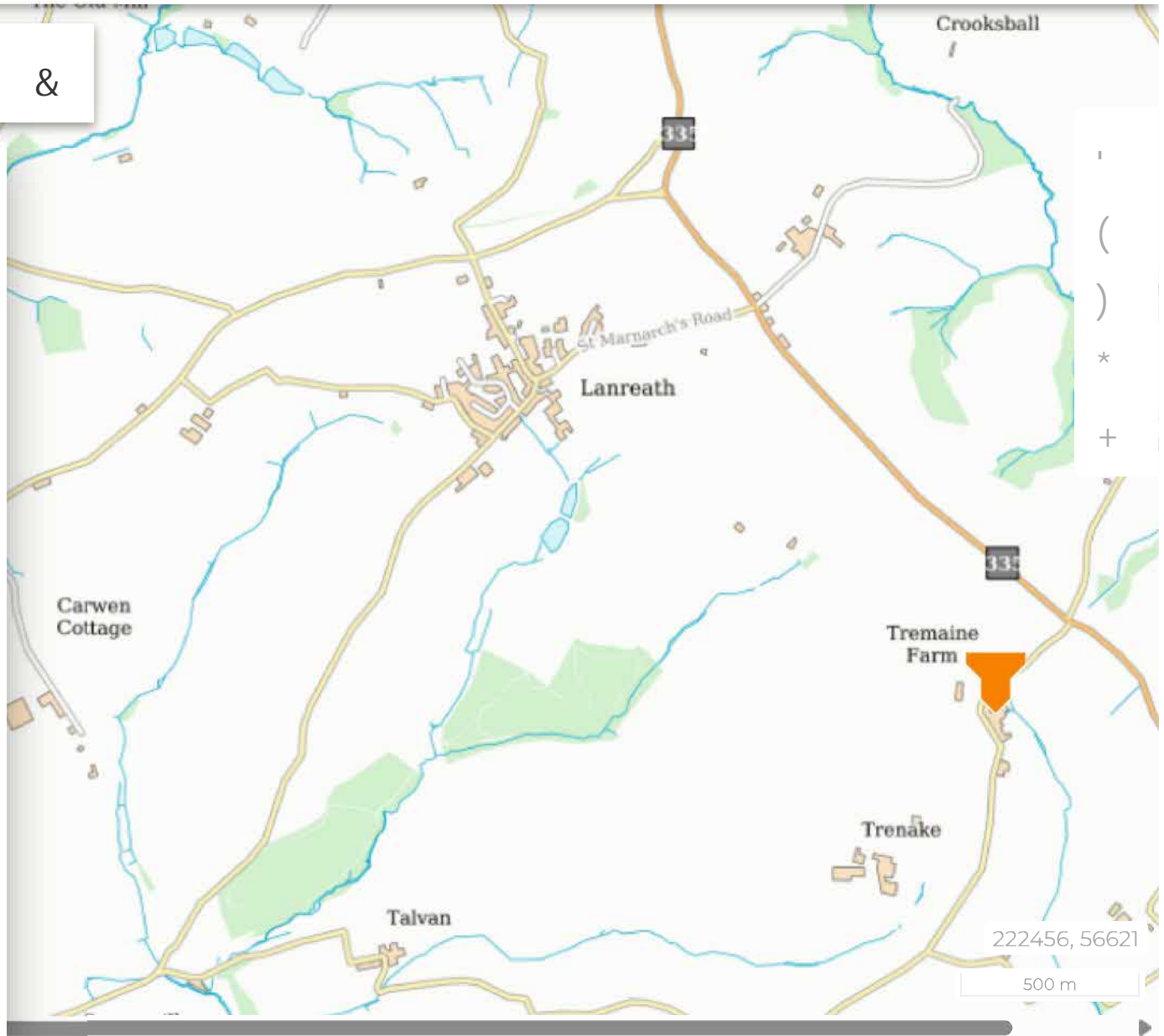
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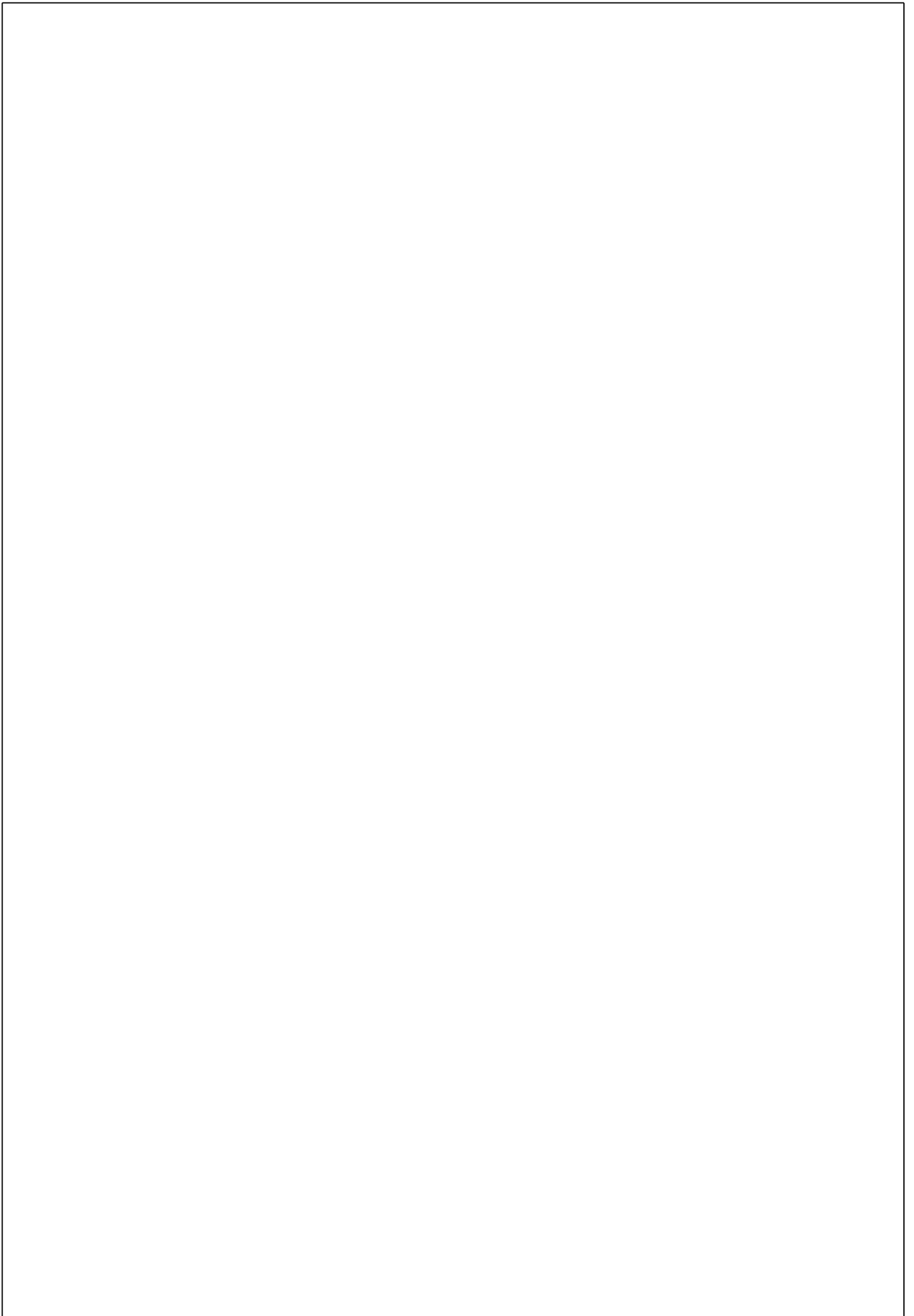
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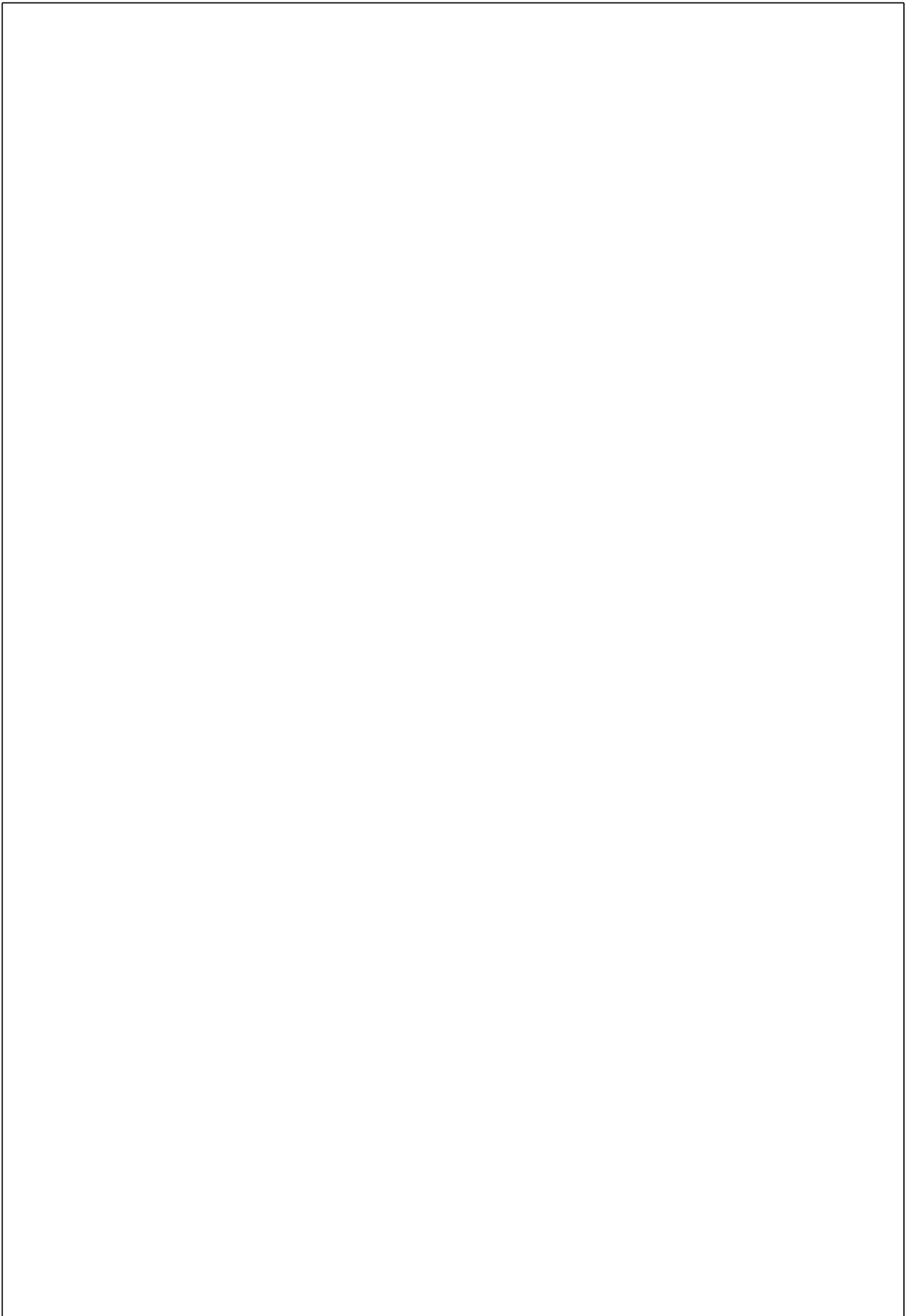
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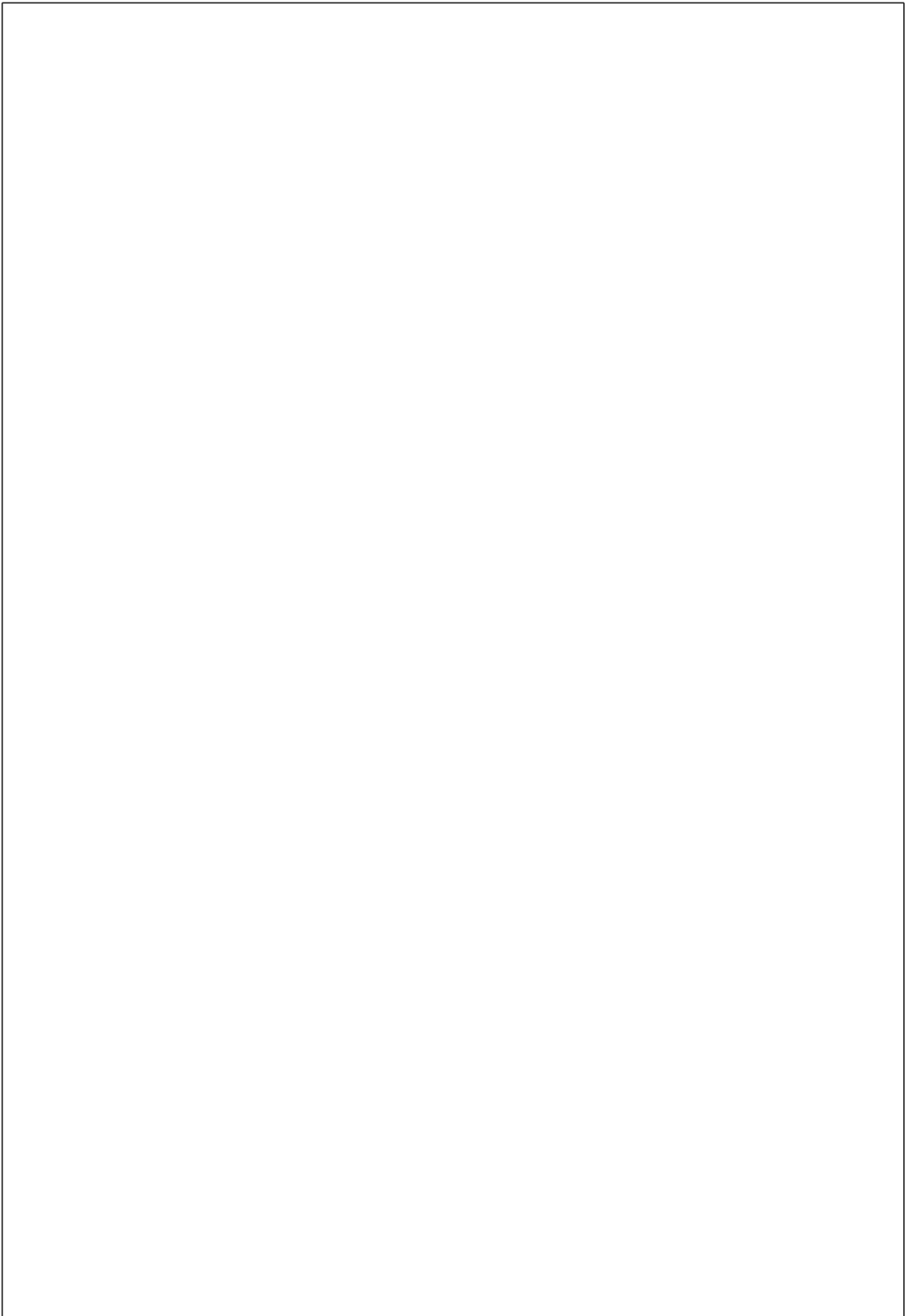
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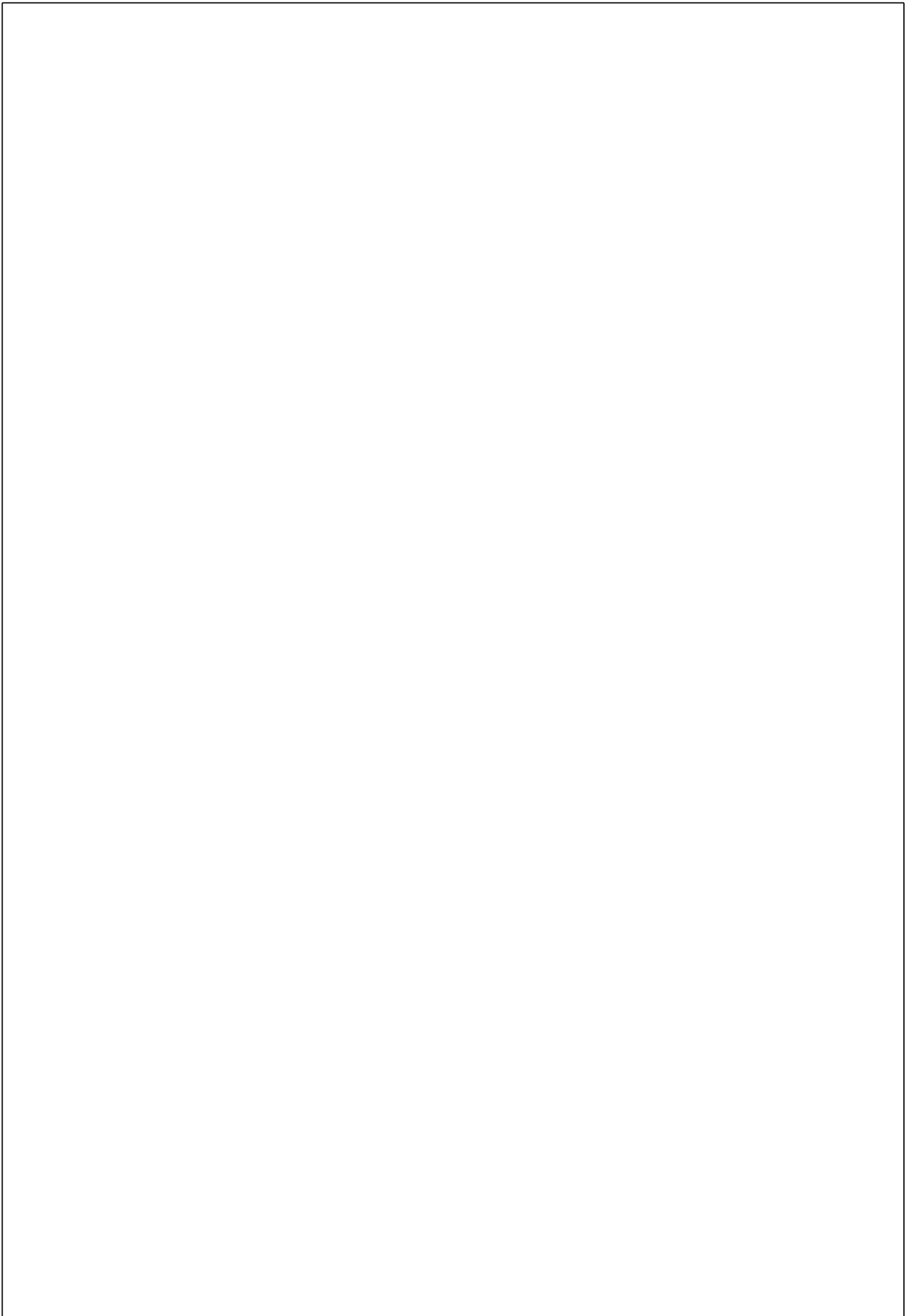
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PROPWET	0.45
SAAR6190	1229 mm

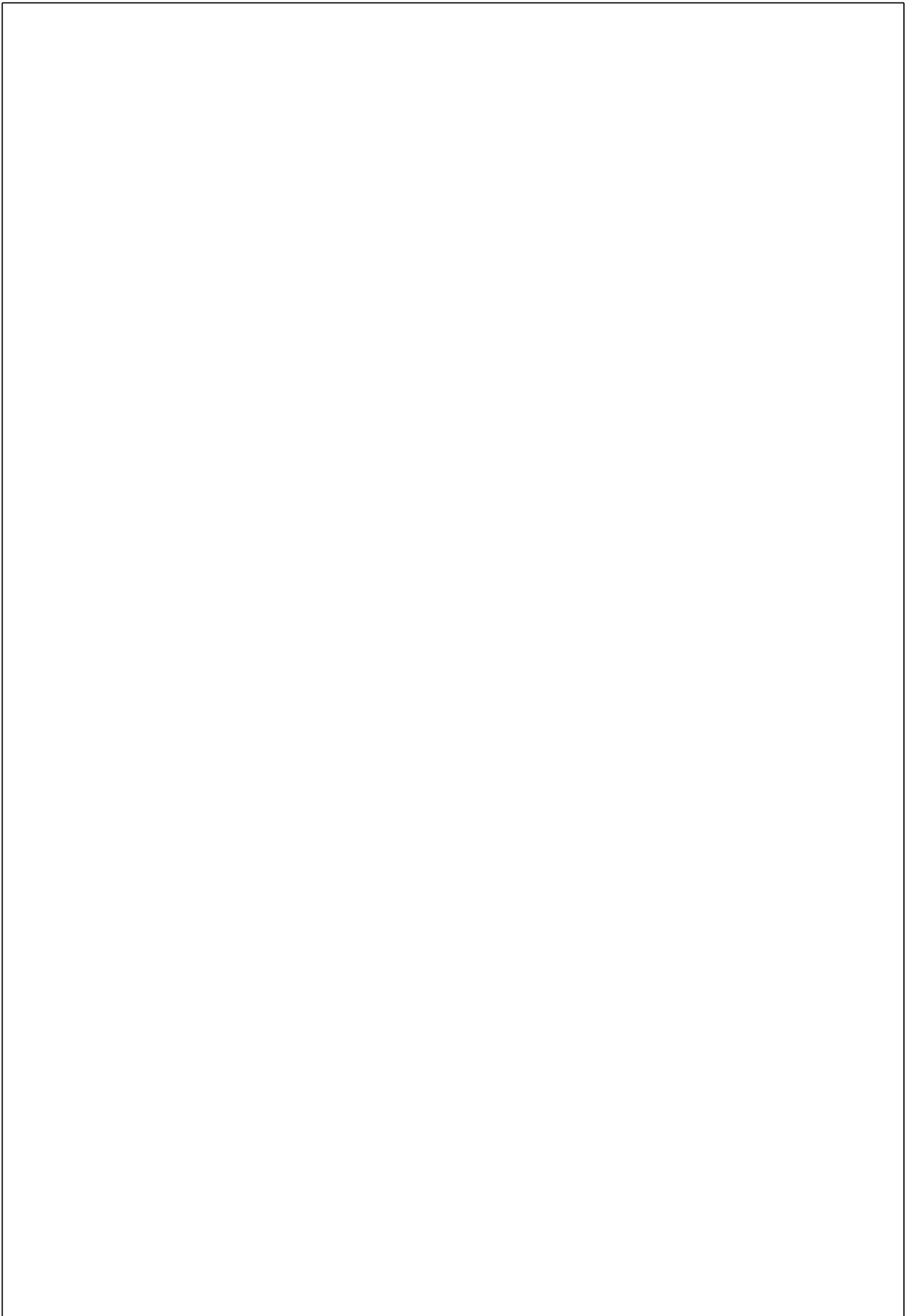




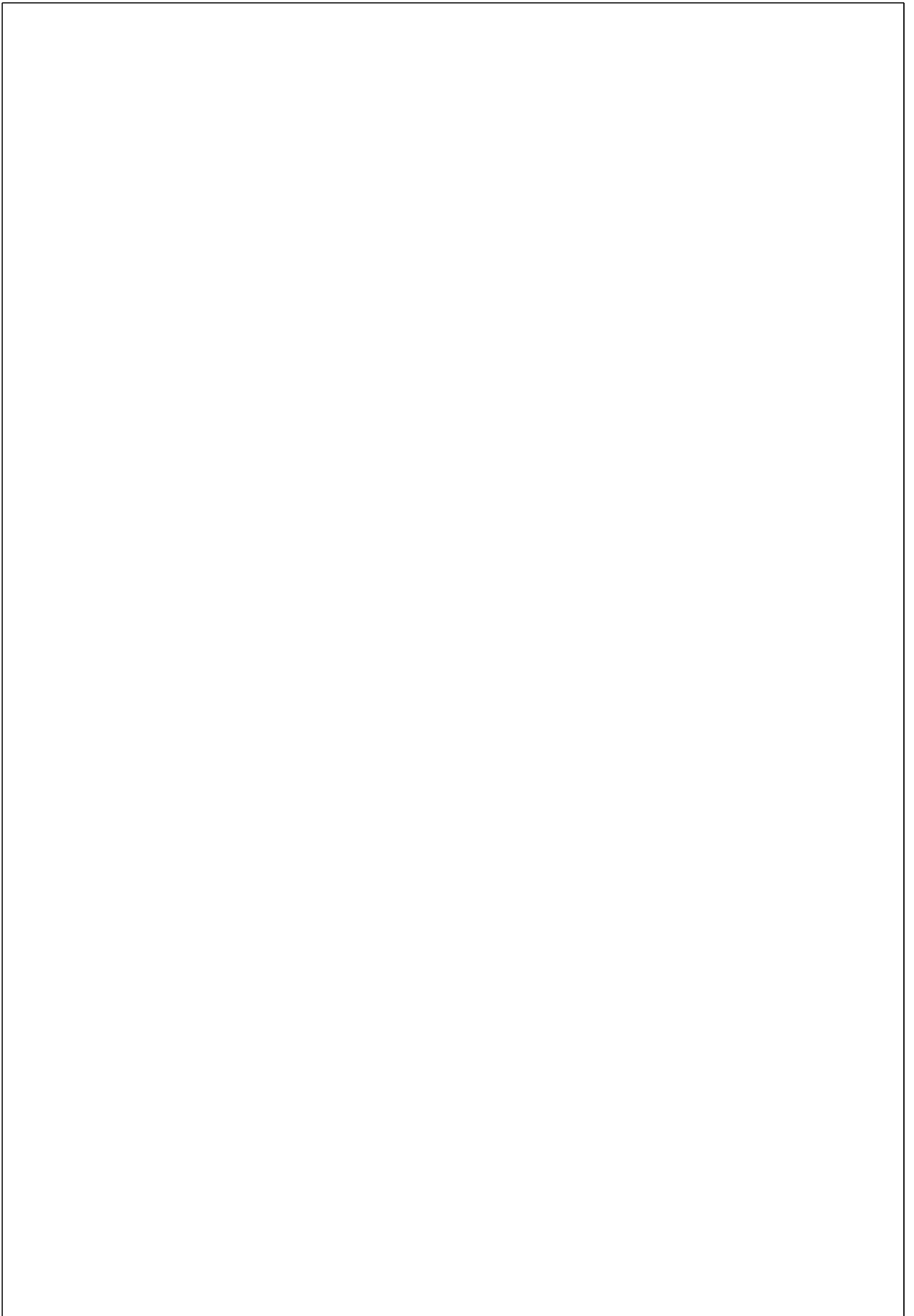














# Appendix C C23060\_R001 - Tremaine Green - Soil infiltration letter report

Advance Ref: R001-C22030-Tremaine-230427

Twelvetrees House,  
Twelvetrees Business Park,  
Dobwalls,  
Liskeard,  
Cornwall,  
PL14 6LN

For the attention of Febe-Campbell Collins  
Cottage Orne Limited  
BY EMAIL ONLY

27 April 2023

Dear Febe

**RE: Tremaine Green, Pelynt Cornwall – Soil Infiltration testing**

Following our site works on 25<sup>th</sup> April 2023 we report on our findings as below.

We attended site at the location of the Parking area to the north and the Paddock areas to the southeast of Tremaine Manor, Pelynt, Looe Cornwall and undertook excavation of 3no trial pits to between 0.1m & 1.7m Below Ground Level; (BGL). All of the pits were used for assessment of soakaway drainage.

Ground conditions were as follows, Paddock Area: TOPSOIL to between 0.45m & 0.6m BGL, underlain by brown silty sandy GRAVEL of tabular slate to 1.6m BGL over grey brown silty fine SAND to 1.7m BGL (SA01). Brown grey clayey sandy GRAVEL of slate to 0.8m overlying intact SLATE (Upper Devonian Slate) to refusal at 1.2m (SA02). Parking Area: Surface dressed stone underlain by MADE GROUND of type 1 sub-base over a geotextile to 0.25m BGL. Underlain by tallow brown gravelly CLAY to 0.7m BGL, overlying Yellow brown clayey sandy GRAVEL to 1.0m BGL. Trial pit logs are appended to this letter.

Groundwater was encountered in trial pit SA03 as seepage at 1.0m BGL, likely related to the nearby watercourse.

The results of soakaway testing indicate that soakaways may be considered as a means of drainage at the site. Infiltration testing undertaken within The Paddock area, trial pits SA01 & SA02, received 3 cycles of testing, in accordance with Building Research Establishment (BRE) report BR365. The lowest values for infiltration for each of the pits was calculated as:  **$2.9 \times 10^{-5}$  m/s for SA01** and  **$2.4 \times 10^{-4}$  m/s for SA02**. The Parking area trial pit – SA03 - was undertaken for assessment of shallow drainage. This pit also received 3 cycles of testing; the lowest infiltration value was calculated as  **$1.7 \times 10^{-5}$  m/s** at between 0.7m & 1.0m BGL. Consideration of the slight groundwater seepage should be considered in the design in this area by considering shallow drainage techniques or potential lined drainage.

We trust that the above meets with your needs, but should you have any queries or need any further advice, please do contact us.

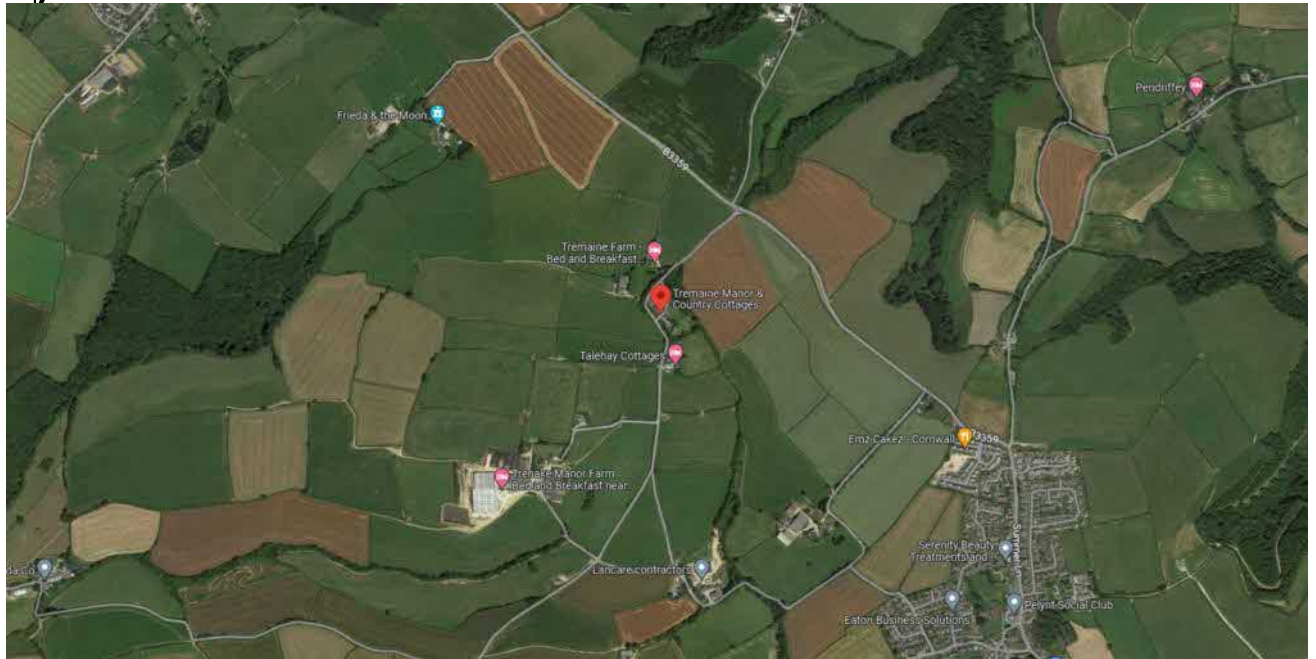
Yours sincerely



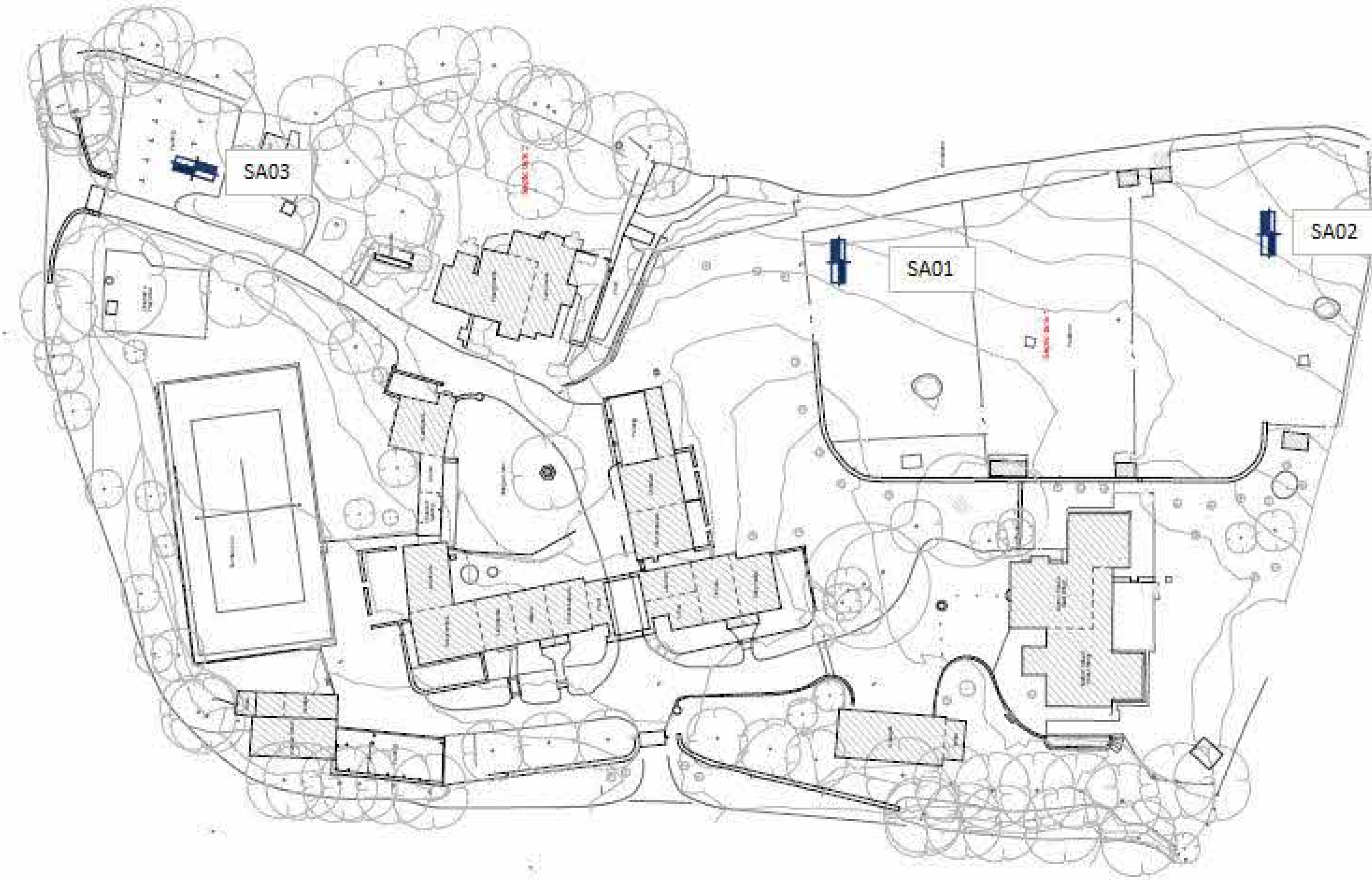
**Chris Williams**

**Director**






REVISION NOTES			
REV	DRAWN BY	DATE	APPROVED BY
	IC		CW
		<p>Head Office Twelvewoods House Twelvewoods Business Park Dobwalls Cornwall PL14 6LN Tel: 01752 361774 email: admin@advance-consulting.co.uk web: advance-consulting.co.uk</p>	
CLIENT			
Cottage Orne Limited			
PROJECT			
TREMINE MANOR, PELYNT			
DRAWING TITLE			
Site Location Plan			
PROJECT NO.	C23060	SCALE @ A4	NTS
DRAWING STATUS			
Reporting			
DRAWING NO. C23060-ADV-RP-GI-3000-SL1			REVISION



LEGEND

 \*SOAKAWAY PIT

REVISIONS

REV	REVISION NOTES	DATE	APPROVED BY	DATE
A	FIRST ISSUE			

REV	REVISION NOTES	DATE	APPROVED BY	DATE

 **Advance**  
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CLIENT  
Cottage Orne Limited

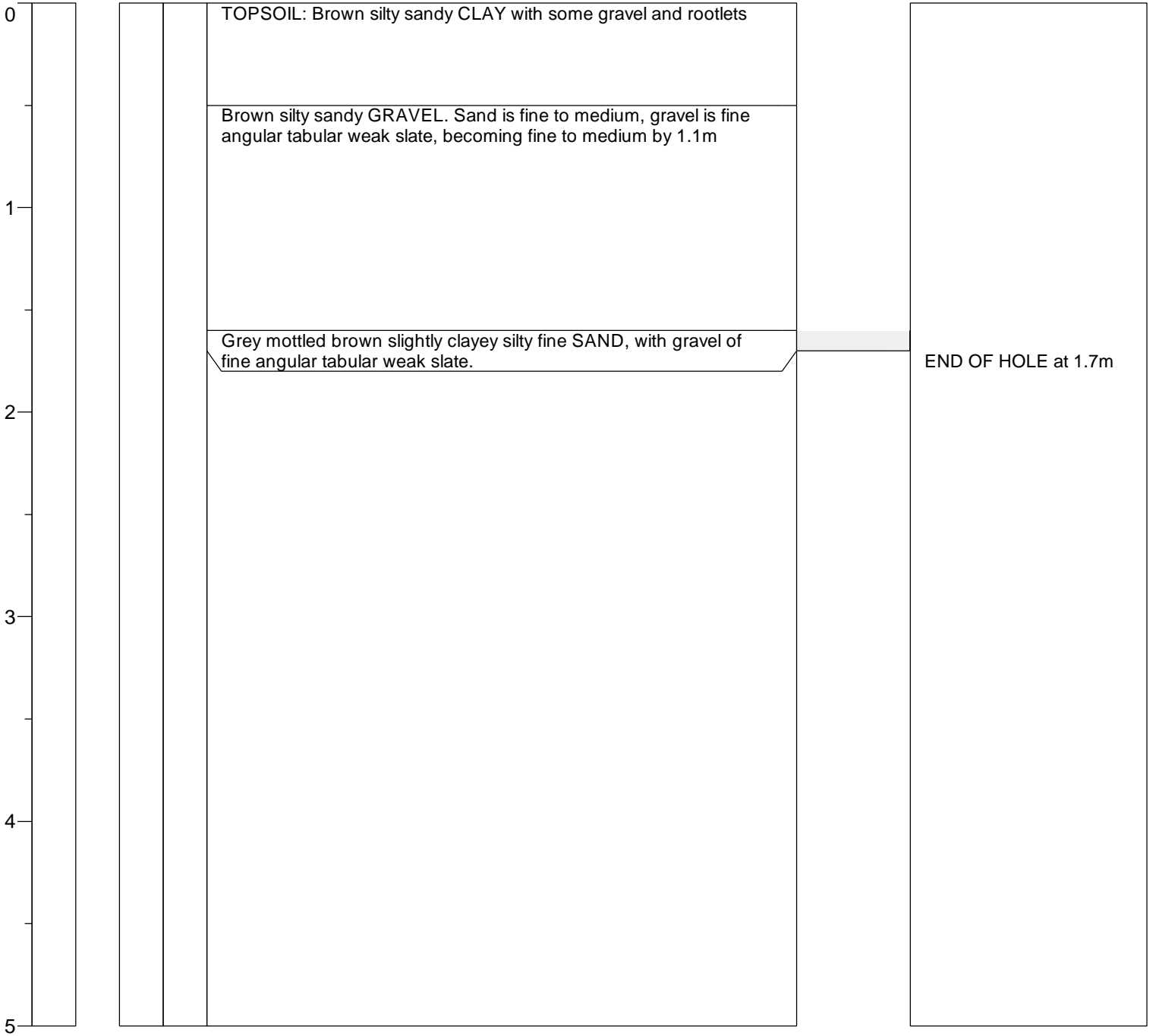
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TREMINE MANOR, PELYNT

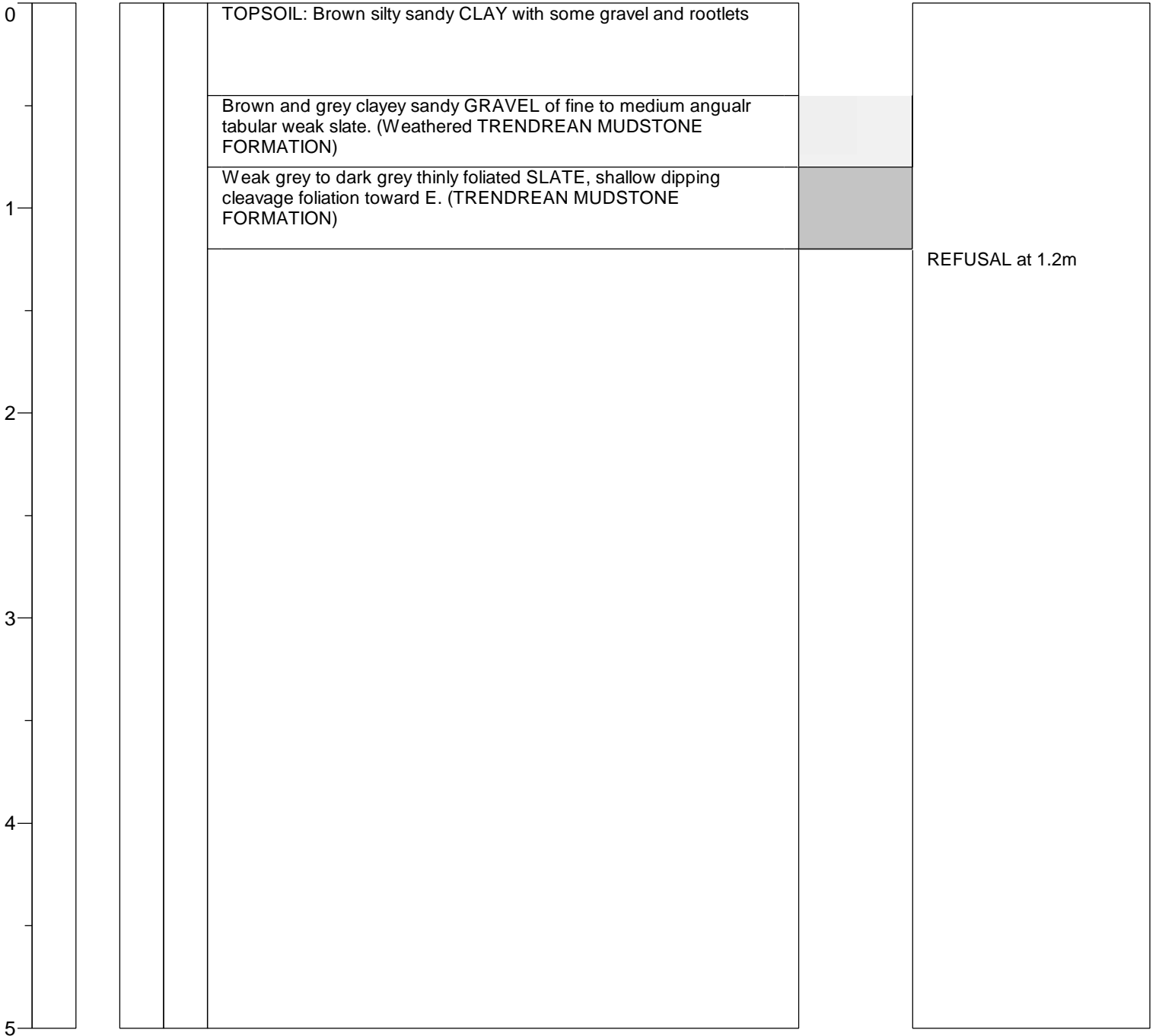
DRAWING TITLE  
GROUND INVESTIGATION PLAN

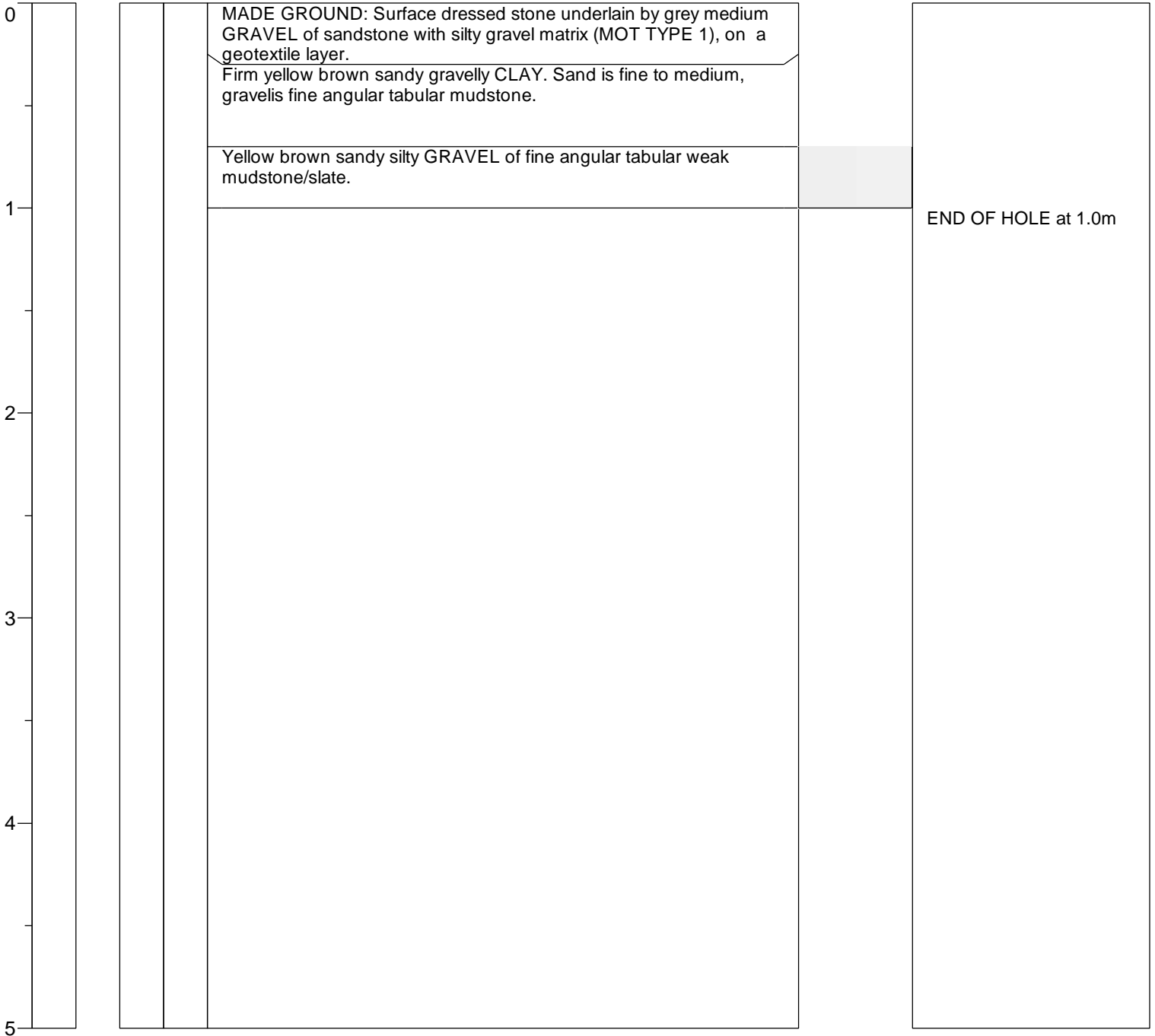
PROJECT NO. C23060 SCALE @ A3 NTS

DRAWING STATUS FOR INFORMATION

DRAWING NO. C23060-3000-GI02 REVISION A









Site Name: TREMAINE GREEN, PELYNT  
 Project No: C23060  
 Date of Test: 25/04/2023

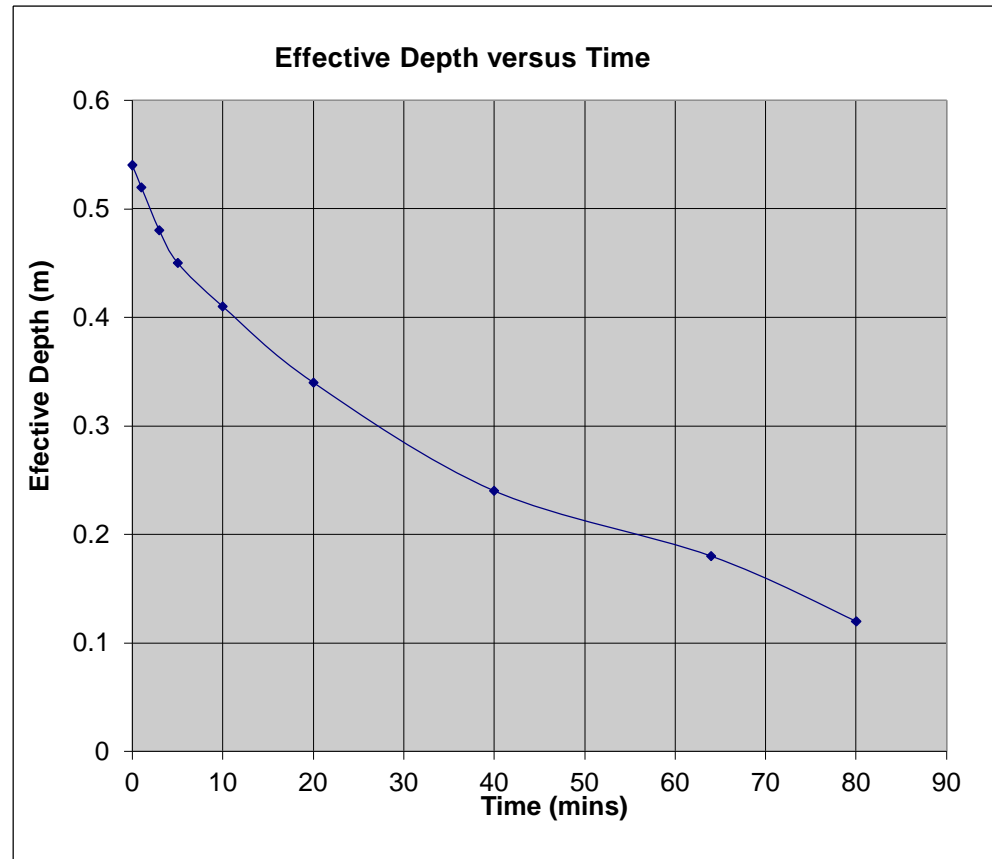
BRE 365: Soakway Testing

**Soil Infiltration Rate**

Location SA01  
 Cycle 1

**Pit dimensions** top bottom  
 Length 1.30 0.80 m  
 Width 0.60 0.60 m  
 Depth 1.70 1.70 m

Time	Depth		Effective
Minutes	cm	m	Depth
0	116	1.16	0.54
1	118	1.18	0.52
3	122	1.22	0.48
5	125	1.25	0.45
10	129	1.29	0.41
20	136	1.36	0.34
40	146	1.46	0.24
64	152	1.52	0.18
80	158	1.58	0.12



NOTES:

**Effective depth** 0.54 m  
 75% effective depth 0.405 m  
 25% effective depth 0.135 m

**Effective volume** 0.340 m<sup>3</sup>  
 75% effective volume 0.255 m<sup>3</sup>  
 25% effective volume 0.085 m<sup>3</sup>  
 Vp75-25 0.170 m<sup>3</sup>

**Internal surface area** 2.2620 m<sup>2</sup>  
 ap50 1.1310 m<sup>2</sup>

**Time for water level to fall from 75% to 25% effective depth**  
 T 75% effective depth 11  
 T25% effective depth 75  
 T75-25 3840

**Soil Infiltration Rate** 3.917E-05 m/s  
 equivalent to 141.0 mm/hr

Site Name: TREMAINE GREEN, PELYNT  
 Project No: C23060  
 Date of Test: 25/04/2023

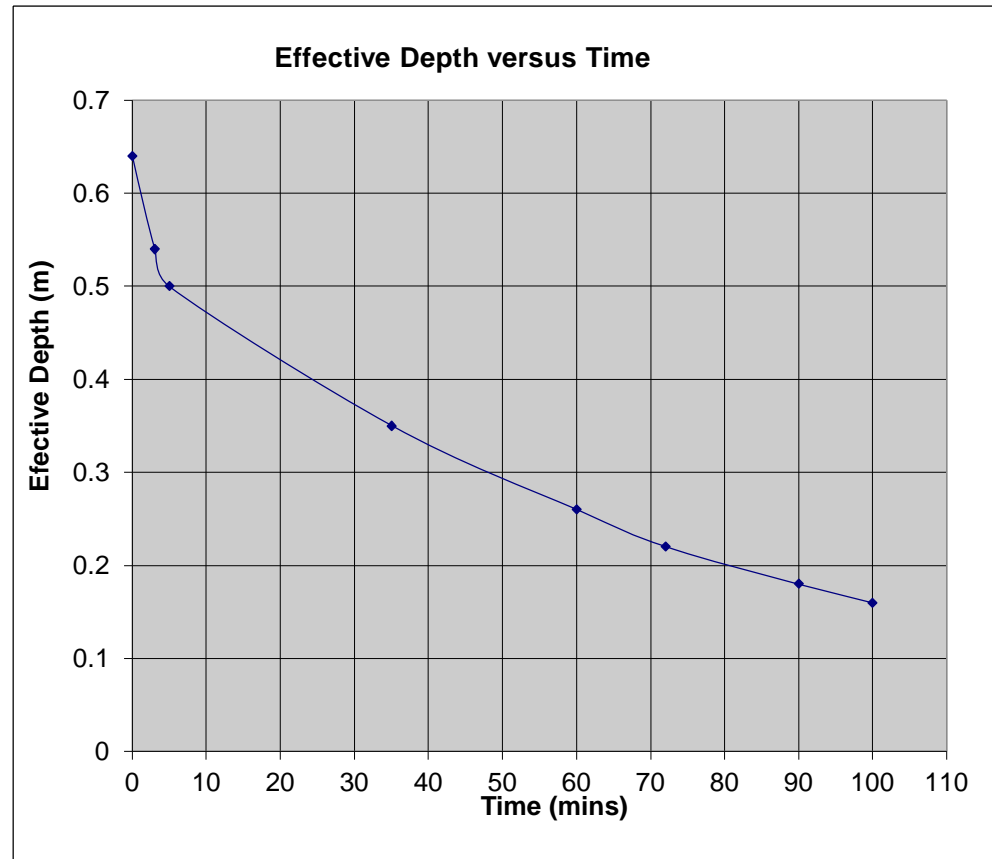
BRE 365: Soakway Testing

**Soil Infiltration Rate**

Location SA01  
 Cycle 2

**Pit dimensions** top bottom  
 Length 1.30 0.80 m  
 Width 0.60 0.60 m  
 Depth 1.70 1.70 m

Time Minutes	Depth cm	m	Effective Depth
0	106	1.06	0.64
3	116	1.16	0.54
5	120	1.2	0.5
35	135	1.35	0.35
60	144	1.44	0.26
72	148	1.48	0.22
90	152	1.52	0.18
100	154	1.54	0.16



NOTES:

**Effective depth** 0.64 m  
 75% effective depth 0.48 m  
 25% effective depth 0.16 m

**Effective volume** 0.403 m<sup>3</sup>  
 75% effective volume 0.302 m<sup>3</sup>  
 25% effective volume 0.101 m<sup>3</sup>  
 Vp75-25 0.202 m<sup>3</sup>

**Internal surface area** 2.5920 m<sup>2</sup>  
 ap50 1.2960 m<sup>2</sup>

**Time for water level to fall from 75% to 25% effective depth**  
 T 75% effective depth 10  
 T25% effective depth 100  
 T75-25 5400

**Soil Infiltration Rate** 2.881E-05 m/s  
 equivalent to 103.7 mm/hr

Site Name: TREMAINE GREEN, PELYNT  
 Project No: C23060  
 Date of Test: 25/04/2023

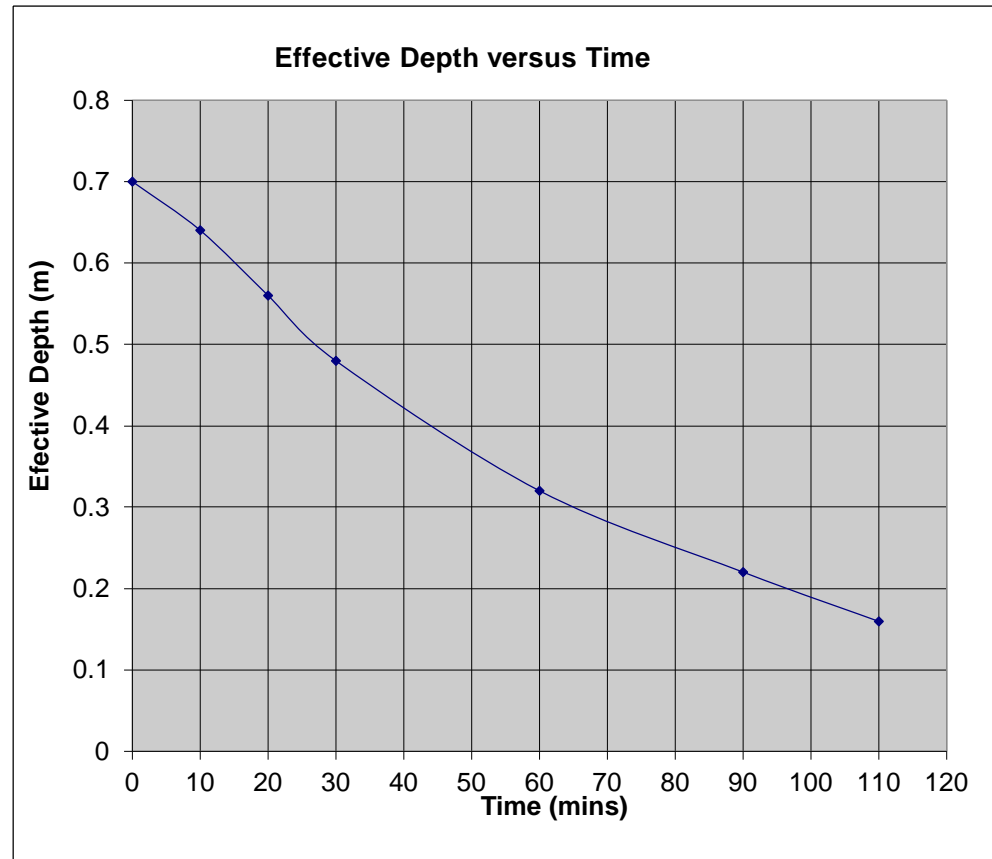
BRE 365: Soakway Testing

**Soil Infiltration Rate**

Location SA01  
 Cycle 3

**Pit dimensions** top bottom  
 Length 1.30 0.80 m  
 Width 0.60 0.60 m  
 Depth 1.70 1.70 m

Time	Depth	Effective
Minutes	cm	Depth
0	100	0.7
10	106	0.64
20	114	0.56
30	122	0.48
60	138	0.32
90	148	0.22
110	154	0.16



NOTES:

**Effective depth** 0.7 m  
 75% effective depth 0.525 m  
 25% effective depth 0.175 m

**Effective volume** 0.441 m<sup>3</sup>  
 75% effective volume 0.331 m<sup>3</sup>  
 25% effective volume 0.110 m<sup>3</sup>  
 Vp75-25 0.221 m<sup>3</sup>

**Internal surface area** 2.7900 m<sup>2</sup>  
 ap50 1.3950 m<sup>2</sup>

**Time for water level to fall from 75% to 25% effective depth**  
 T 75% effective depth 25  
 T25% effective depth 105  
 T75-25 4800

**Soil Infiltration Rate** 3.293E-05 m/s  
 equivalent to 118.5 mm/hr

Site Name: TREMAINE GREEN, PELYNT  
 Project No: C23060  
 Date of Test: 25/04/2023

BRE 365: Soakway Testing

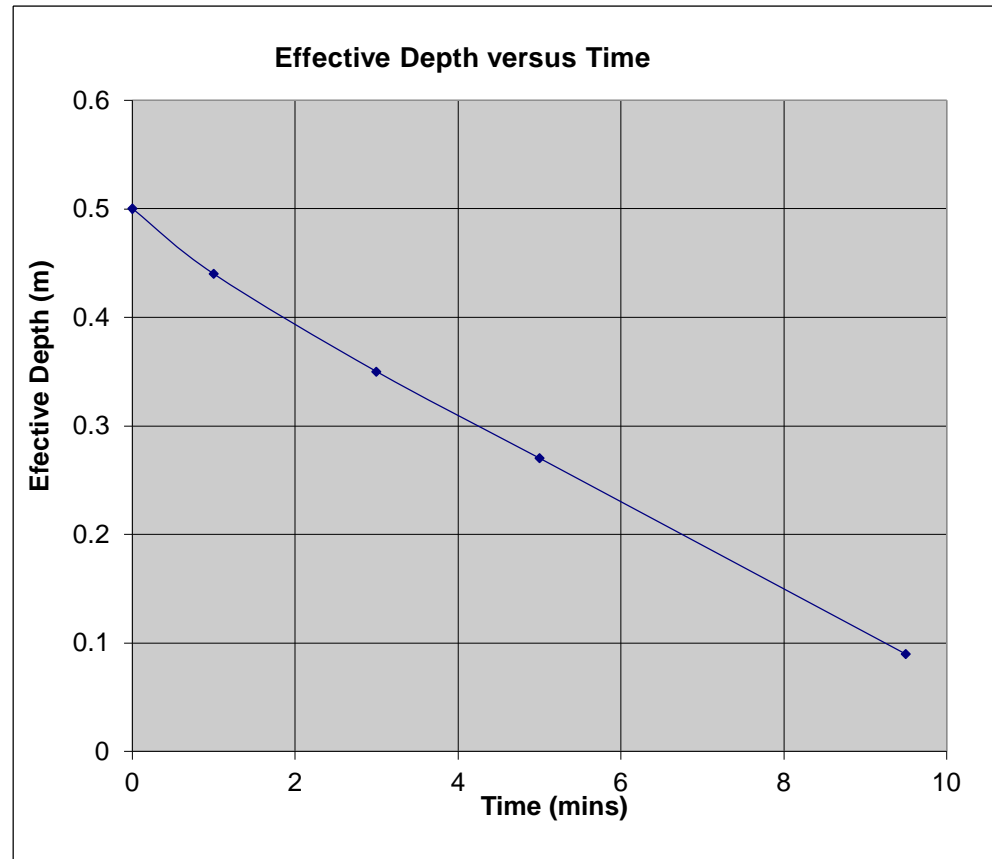
**Soil Infiltration Rate**

Location SA02  
 Cycle 1

**Pit dimensions**

	top	bottom
Length	1.30	1.10 m
Width	0.60	0.60 m
Depth	1.20	1.20 m

Time	Depth	Effective
Minutes	cm	Depth
0	70	0.5
1	76	0.44
3	85	0.35
5	93	0.27
9.5	111	0.09



NOTES:

**Effective depth** 0.5 m  
 75% effective depth 0.375 m  
 25% effective depth 0.125 m

**Effective volume** 0.360 m<sup>3</sup>  
 75% effective volume 0.270 m<sup>3</sup>  
 25% effective volume 0.090 m<sup>3</sup>  
 Vp75-25 0.180 m<sup>3</sup>

**Internal surface area** 2.4600 m<sup>2</sup>  
 ap50 1.2300 m<sup>2</sup>

**Time for water level to fall from 75% to 25% effective depth**  
 T 75% effective depth 2.5  
 T25% effective depth 8.5  
 T75-25 360

**Soil Infiltration Rate** 4.065E-04 m/s  
 equivalent to 1463.4 mm/hr

Site Name: TREMAINE GREEN, PELYNT  
 Project No: C23060  
 Date of Test: 25/04/2023

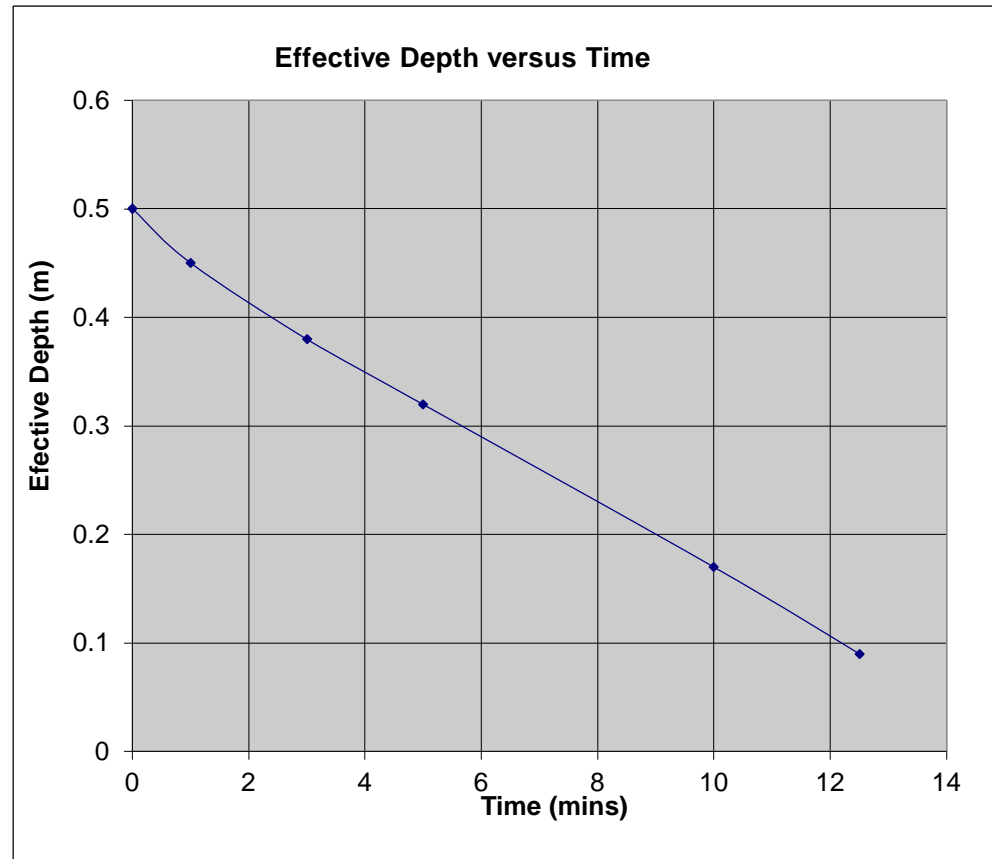
BRE 365: Soakway Testing

**Soil Infiltration Rate**

Location SA02  
 Cycle 2

**Pit dimensions** top bottom  
 Length 1.30 1.10 m  
 Width 0.60 0.60 m  
 Depth 1.20 1.20 m

Time	Depth		Effective
Minutes	cm	m	Depth
0	70	0.7	0.5
1	75	0.75	0.45
3	82	0.82	0.38
5	88	0.88	0.32
10	103	1.03	0.17
12.5	111	1.11	0.09



NOTES:

**Effective depth** 0.5 m  
 75% effective depth 0.375 m  
 25% effective depth 0.125 m

**Effective volume** 0.360 m<sup>3</sup>  
 75% effective volume 0.270 m<sup>3</sup>  
 25% effective volume 0.090 m<sup>3</sup>  
 Vp75-25 0.180 m<sup>3</sup>

**Internal surface area** 2.4600 m<sup>2</sup>  
 ap50 1.2300 m<sup>2</sup>

**Time for water level to fall from 75% to 25% effective depth**  
 T 75% effective depth 3.2  
 T25% effective depth 11.2  
 T75-25 480

**Soil Infiltration Rate** 3.049E-04 m/s  
 equivalent to 1097.6 mm/hr

Site Name: TREMAINE GREEN, PELYNT  
 Project No: C23060  
 Date of Test: 25/04/2023

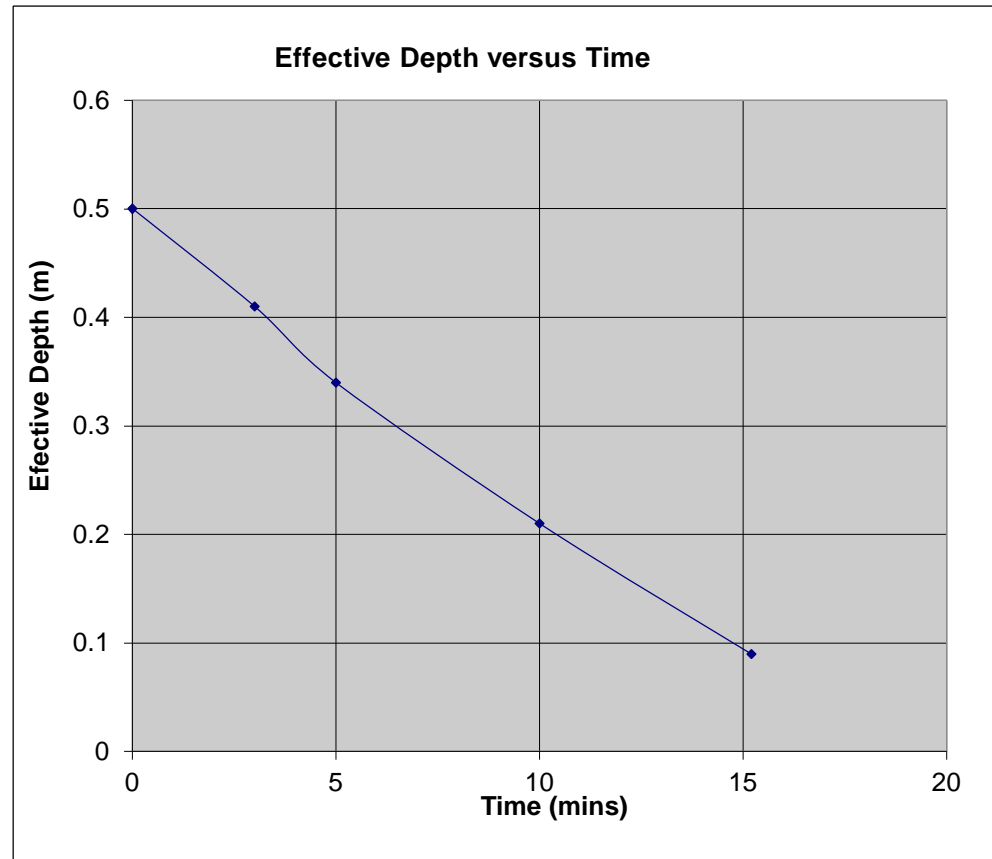
BRE 365: Soakway Testing

**Soil Infiltration Rate**

Location SA02  
 Cycle 2

**Pit dimensions** top bottom  
 Length 1.30 1.10 m  
 Width 0.60 0.60 m  
 Depth 1.20 1.20 m

Time	Depth		Effective
Minutes	cm	m	Depth
0	70	0.7	0.5
3	79	0.79	0.41
5	86	0.86	0.34
10	99	0.99	0.21
15.2	111	1.11	0.09



NOTES:

<b>Effective depth</b>	0.5 m
75% effective depth	0.375 m
25% effective depth	0.125 m
<b>Effective volume</b>	0.360 m <sup>3</sup>
75% effective volume	0.270 m <sup>3</sup>
25% effective volume	0.090 m <sup>3</sup>
Vp75-25	0.180 m <sup>3</sup>

<b>Internal surface area</b>	2.4600 m <sup>2</sup>
ap50	1.2300 m <sup>2</sup>

<b>Time for water level to fall from 75% to 25% effective depth</b>	
T 75% effective depth	4.5
T25% effective depth	14.5
T75-25	600

<b>Soil Infiltration Rate</b>	2.439E-04 m/s
equivalent to	878.0 mm/hr

Site Name: TREMAINE GREEN, PELYNT  
 Project No: C23060  
 Date of Test: 25/04/2023

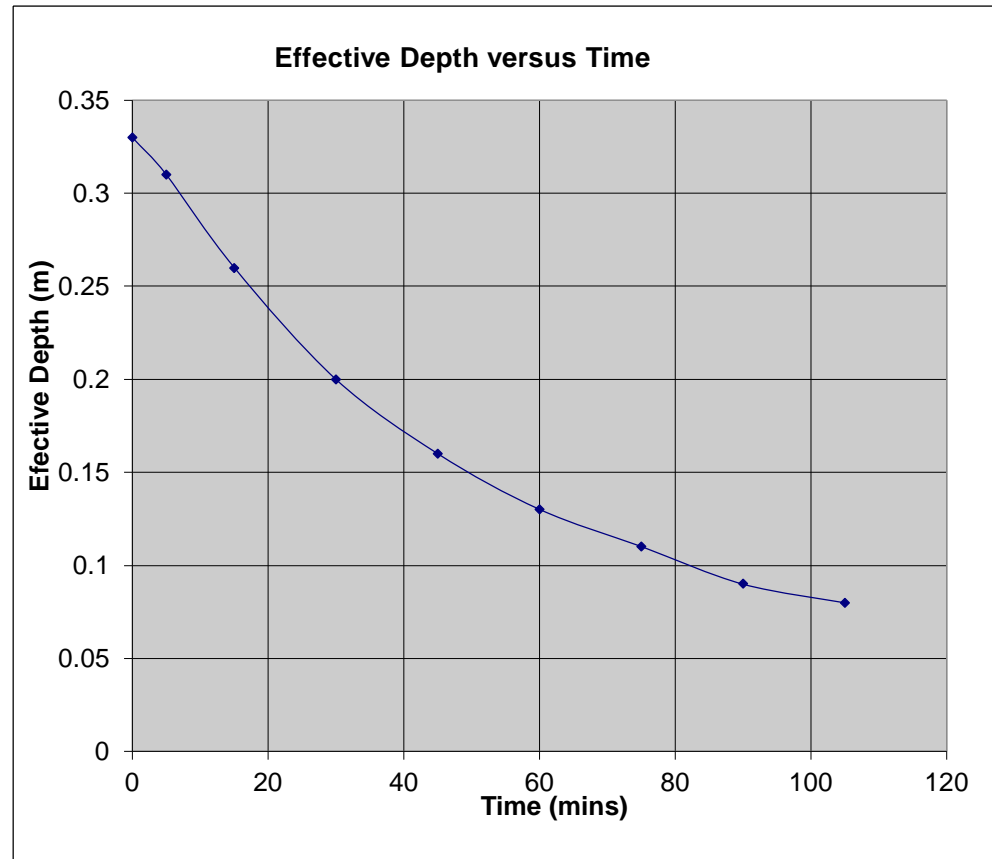
BRE 365: Soakway Testing

**Soil Infiltration Rate**

Location SA03  
 Cycle 1

**Pit dimensions** top bottom  
 Length m 0.60 0.60 m  
 Width 0.60 0.60 m  
 Depth 1.00 1.00 m

Time	Depth		Effective
Minutes	cm	m	Depth
0	67	0.67	0.33
5	69	0.69	0.31
15	74	0.74	0.26
30	80	0.8	0.2
45	84	0.84	0.16
60	87	0.87	0.13
75	89	0.89	0.11
90	91	0.91	0.09
105	92	0.92	0.08



NOTES:

**Effective depth** 0.33 m  
 75% effective depth 0.2475 m  
 25% effective depth 0.0825 m

**Effective volume** 0.119 m3  
 75% effective volume 0.089 m3  
 25% effective volume 0.030 m3  
 Vp75-25 0.059 m3

**Internal surface area** 1.1520 m2  
 ap50 0.5760 m2

**Time for water level to fall from 75% to 25% effective depth**  
 T 75% effective depth 20  
 T25% effective depth 99  
 T75-25 4740

**Soil Infiltration Rate** 2.176E-05 m/s  
 equivalent to 78.3 mm/hr

Site Name: TREMAINE GREEN, PELYNT  
 Project No: C23060  
 Date of Test: 25/04/2023

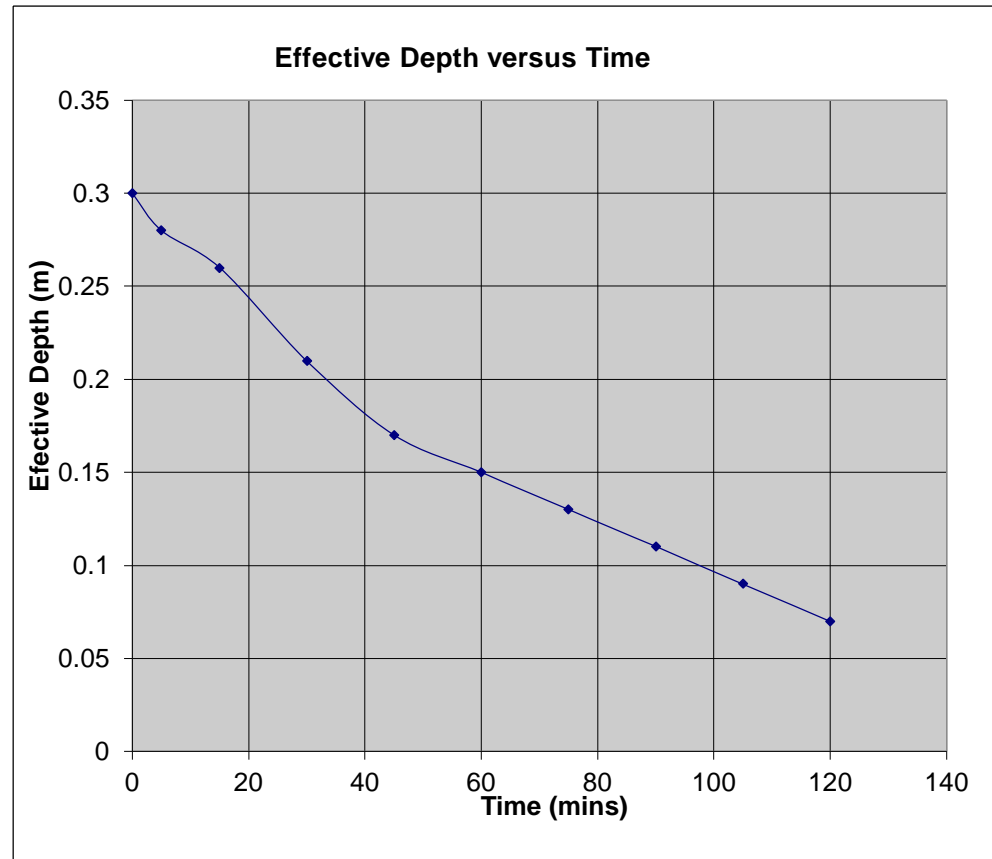
BRE 365: Soakway Testing

**Soil Infiltration Rate**

Location SA03  
 Cycle 2

Pit dimensions	top		bottom	
	Length	Width	Length	Width
Length	0.60	0.60	0.60	0.60
Width	0.60	0.60	0.60	0.60
Depth	1.00	1.00	1.00	1.00

Time	Depth		Effective
Minutes	cm	m	Depth
0	70	0.7	0.3
5	72	0.72	0.28
15	74	0.74	0.26
30	79	0.79	0.21
45	83	0.83	0.17
60	85	0.85	0.15
75	87	0.87	0.13
90	89	0.89	0.11
105	91	0.91	0.09
120	93	0.93	0.07



NOTES:

**Effective depth** 0.3 m  
 75% effective depth 0.225 m  
 25% effective depth 0.075 m

**Effective volume** 0.108 m3  
 75% effective volume 0.081 m3  
 25% effective volume 0.027 m3  
 Vp75-25 0.054 m3

**Internal surface area** 1.0800 m2  
 ap50 0.5400 m2

**Time for water level to fall from 75% to 25% effective depth**  
 T 75% effective depth 26  
 T25% effective depth 119  
 T75-25 5580

**Soil Infiltration Rate** 1.792E-05 m/s  
 equivalent to 64.5 mm/hr



Site Name: TREMAINE GREEN, PELYNT  
 Project No: C23060  
 Date of Test: 25/04/2023

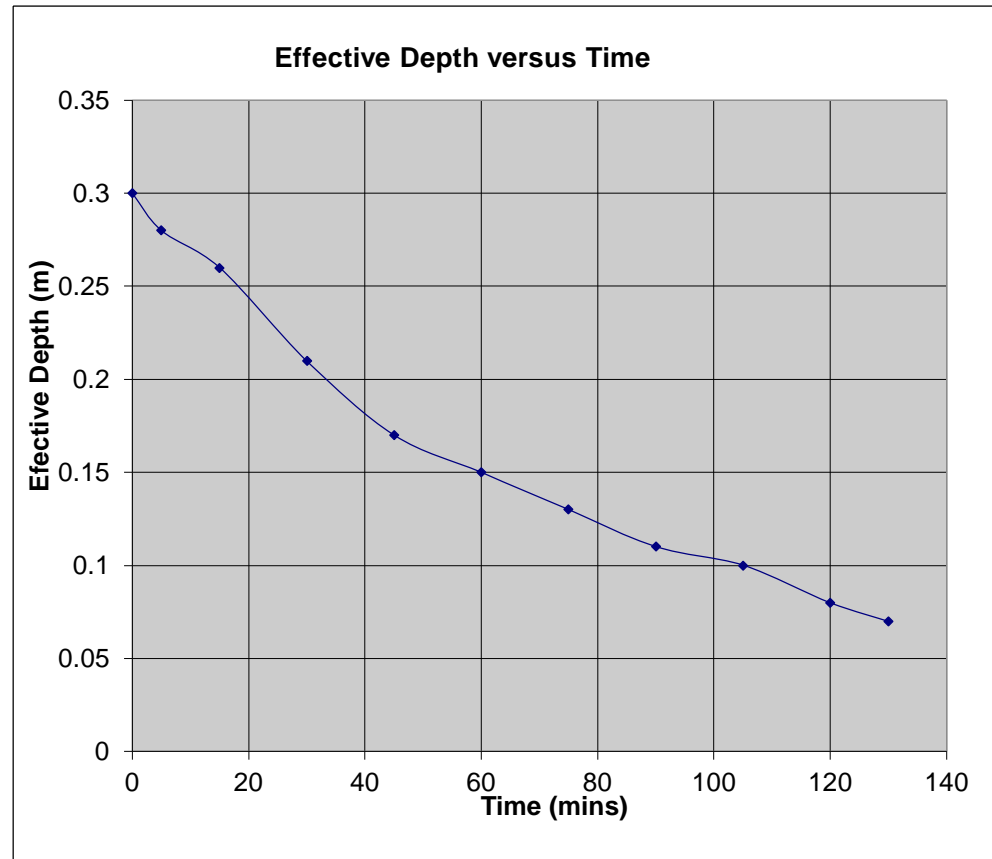
BRE 365: Soakway Testing

**Soil Infiltration Rate**

Location SA03  
 Cycle 3

**Pit dimensions** top bottom  
 Length 0.60 0.60 m  
 Width 0.60 0.60 m  
 Depth 1.00 1.00 m

Time	Depth		Effective
Minutes	cm	m	Depth
0	70	0.7	0.3
5	72	0.72	0.28
15	74	0.74	0.26
30	79	0.79	0.21
45	83	0.83	0.17
60	85	0.85	0.15
75	87	0.87	0.13
90	89	0.89	0.11
105	90	0.9	0.1
120	92	0.92	0.08
130	93	0.93	0.07



NOTES:

**Effective depth** 0.3 m  
 75% effective depth 0.225 m  
 25% effective depth 0.075 m

**Effective volume** 0.108 m<sup>3</sup>  
 75% effective volume 0.081 m<sup>3</sup>  
 25% effective volume 0.027 m<sup>3</sup>  
 Vp75-25 0.054 m<sup>3</sup>

**Internal surface area** 1.0800 m<sup>2</sup>  
 ap50 0.5400 m<sup>2</sup>

**Time for water level to fall from 75% to 25% effective depth**  
 T 75% effective depth 26  
 T25% effective depth 125  
 T75-25 5940

**Soil Infiltration Rate** 1.684E-05 m/s  
 equivalent to 60.6 mm/hr