

Date 06/05/26

Our Ref: MC0819 IB Lakers Cottage SA Design

**2 Lakers Cottage, North End Road, Yapton, West Sussex
Soakaway Design**

Meridian Civil Engineering Consultancy (MCEC) have been commissioned by Ian Nicholson to design a soakaway for the site at 2 Lakers Cottage, North End Road, Yapton, West Sussex.

In compliance with the SuDS hierarchy and given the sites suitable geology the proposals are proposed to be drained via soakaway.

This soakaway design is based on the infiltration rate derived from testing carried on 08/10/2025. Infiltration testing results with interpretation can be found in the Geotechnical Reports included in Appendix III. The lowest tested infiltration rate of 1.85E-5m/s has been used for design purposes.

A separate Geotechnical Report with winter groundwater monitoring is included in Appendix III and shows groundwater to be a minimum of 2.3m deep over the winter period.

It is proposed that there be a soakaway located in the rear garden of the development. It is understood the extension has a roof area of 36.748m². It is recommended that water butts are installed on the extension to provide water for re-use in garden areas.

A single soakaway 2.5mx2m in plan area and 0.8m in depth providing, a storage volume of 3.8m³ is proposed in the rear of the development. This is designed to be able to accommodate all events up to and including the 1 in 100 year +45%CC event. FEH22 rainfall data has been used to inform the soakaway design. The 0.8m deep soakaway can be sited 1m above the recorded groundwater level achieving 0.5m of cover over the tank.

Should the works on site impact the existing soakaway on site, meaning the runoff from the southern and eastern side of the existing roof will need to drain to the proposed soakaway. This would result in an additional 65m² draining to the proposed soakaway and would require a soakaway 2.5mx5m in plan area and 0.8m in depth, providing a storage volume of 9.5m³. The areas considered captured and managed as extra/over flow are hatched red on drawing MC0819 CIV01 the corresponding extra soakaway area is also hatched red.

Furthermore, it should be noted that the proposed soakaway is designed so that rainfall events up to the 3.3% AEP event shall half empty their runoff volume within a maximum of 24 hours as defined by National standards for sustainable drainage systems (SuDS).

In accordance with the planners comments a factor of safety of 2 has been applied. The Ciria SuDS manual states that a factor of safety of 2 should be applied where there is minor damage or inconvenience to external areas as a consequence of flooding.

It should be noted that the CV value has been set to 1 for all events and an allowance of 10% has been applied for urban creep. Calculations to for the soakaway designs are included in Appendix I.

Proposed drawings showing the location of the proposed soakaway have been included in Appendix II.

It is proposed that any new external hardstanding areas be constructed of permeable pavement and allowed to infiltrate.

Runoff from residential roofs only are to be directed to the soakaway. The CIRIA SuDS manual states runoff from residential roofs are very low risk pollution hazard and therefore no specific treatment would be necessary. A catchpit is proposed prior to the soakaway to reduce sediments entering the pit. In accordance with ADC guidance infiltration has only been indicated through the sides of the pit.

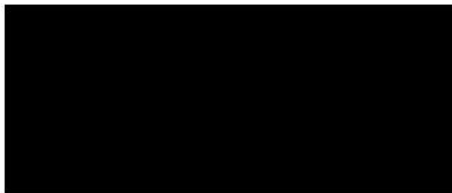
This design has been produced in accordance with the planners comments included in Appendix IV. We trust this outlines the design and proposal and should you have any questions, or require further information please contact us.

We trust this letter report shows that rainwater runoff can be drained adequately by infiltration and this report has been produced broadly in accordance with the National Planning Policy Framework (NPPF), Ciria SuDS Manual and National Standards for Sustainable Drainage Systems (SuDS).

We trust this is suitable for your current purposes but should you have any questions, or require any further information, please contact us.

Regards,

Mark Naumann BEng(Hons) CEng MICE
Director



Appendix I Soakaway Calculations

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.200
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0	Include Intermediate Ground	✓
Additional Flow (%)	45	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	✓
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	4.00	Minimum Backdrop Height (m)	0.200		

SW Standard Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
100	250	225	600	450	1350	900	1800
150	450	300	1200	675	1500		

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
0.600	250	3.000	450	99.000	1200

SW Junction Manhole Type

Max Width (mm)	Diameter (mm)
9999	100

>9999 Link+900 mm

SW Standard Link Type

Template	Freeform Carrier	Barrels	1	Follow Ground	x
Shape	Circular	Auto Increment (mm)	75		

Available Diameters (mm)

100	150
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Nodes

	Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
✓	1		4.00	6.529	250	0.229
✓	2	0.002	4.00	6.555	250	0.317
✓	3	0.002	4.00	6.791	450	0.658
✓	4			6.799	450	0.766
✓	SOAKAWAY			6.680		0.693
✓	5		4.00	6.791	250	0.599

Links

	Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
?	1.000	1	2	4.987	0.600	6.300	6.238	0.062	80.0	100	4.10	50.0
?	1.001	2	3	8.417	0.600	6.238	6.133	0.105	80.0	100	4.26	50.0
?	1.002	3	4	7.971	0.600	6.133	6.033	0.100	80.0	100	4.41	50.0
?	2.000	5	3	4.718	0.600	6.192	6.133	0.059	80.0	100	4.09	50.0
?	1.003	4	SOAKAWAY	3.686	0.600	6.033	5.987	0.046	80.0	100	4.49	50.0

	Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
	1.000	1	2	0.861	6.8	0.0	0.129	0.217	0.000	0.0	0	0.000
	1.001	2	3	0.861	6.8	0.5	0.217	0.558	0.002	0.0	18	0.485
	1.002	3	4	0.861	6.8	1.0	0.558	0.666	0.004	0.0	25	0.606
	2.000	5	3	0.861	6.8	0.0	0.499	0.558	0.000	0.0	0	0.000
	1.003	4	SOAKAWAY	0.861	6.8	1.0	0.666	0.593	0.004	0.0	25	0.606

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	4.987	80.0	100	SW_Standard	6.529	6.300	0.129	6.555	6.238	0.217
1.001	8.417	80.0	100	SW_Standard	6.555	6.238	0.217	6.791	6.133	0.558
1.002	7.971	80.0	100	SW_Standard	6.791	6.133	0.558	6.799	6.033	0.666
2.000	4.718	80.0	100	SW_Standard	6.791	6.192	0.499	6.791	6.133	0.558
1.003	3.686	80.0	100	SW_Standard	6.799	6.033	0.666	6.680	5.987	0.593

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	250	Manhole	SW_Standard	2	250	Manhole	SW_Standard
1.001	2	250	Manhole	SW_Standard	3	450	Manhole	SW_Standard
1.002	3	450	Manhole	SW_Standard	4	450	Manhole	SW_Standard
2.000	5	250	Manhole	SW_Standard	3	450	Manhole	SW_Standard
1.003	4	450	Manhole	SW_Standard	SOAKAWAY		Junction	

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	6.529	0.229	250		0	1.000	6.300
2	6.555	0.317	250		1	1.000	6.238
3	6.791	0.658	450		1	2.000	6.133
					2	1.001	6.133
					0	1.002	6.133

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
4	6.799	0.766	450	0 1 	1	1.002	6.033	100
					0	1.003	6.033	100
SOAKAWAY	6.680	0.693		1 	1	1.003	5.987	100
5	6.791	0.599	250	0 	0	2.000	6.192	100

Simulation Settings

Rainfall Methodology	FEH-22	Winter CV	1.000	Drain Down Time (mins)	1440	Check Discharge Rate(s)	x
Rainfall Events	Singular	Analysis Speed	Normal	Additional Storage (m ³ /ha)	0.0	Check Discharge Volume	x
Summer CV	1.000	Skip Steady State	x	Starting Level (m)			

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	10	0	100	45	10	0
30	45	10	0				

Node SOAKAWAY Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Pit Width (m)	2.500	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.06660	Invert Level (m)	5.380	Pit Length (m)	2.000	Number Required	1
Safety Factor	2.0	Time to half empty (mins)		Depth (m)	0.800		

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.200
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0	Include Intermediate Ground	✓
Additional Flow (%)	45	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	✓
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	4.00	Minimum Backdrop Height (m)	0.200		

SW Standard Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
100	250	225	600	450	1350	900	1800
150	450	300	1200	675	1500		

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
0.600	250	3.000	450	99.000	1200

SW Junction Manhole Type

Max Width (mm)	Diameter (mm)
9999	100

>9999 Link+900 mm

SW Standard Link Type

Template	Freeform Carrier	Barrels	1	Follow Ground	x
Shape	Circular	Auto Increment (mm)	75		

Available Diameters (mm)

100	150
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Nodes

	Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
✓	1	0.005	4.00	6.529	250	0.229
✓	2			6.555	250	0.317
✓	3			6.791	450	0.658
✓	4			6.799	450	0.766
✓	SOAKAWAY			6.680		0.693
✓	5	0.005	4.00	6.791	250	0.491

Links

	Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
?	1.000	1	2	4.987	0.600	6.300	6.238	0.062	80.0	100	4.10	50.0
?	1.001	2	3	8.417	0.600	6.238	6.133	0.105	80.0	100	4.26	50.0
?	1.002	3	4	7.971	0.600	6.133	6.033	0.100	80.0	100	4.41	50.0
?	2.000	5	3	4.718	0.600	6.300	6.241	0.059	80.0	100	4.09	50.0
?	1.003	4	SOAKAWAY	3.686	0.600	6.033	5.987	0.046	80.0	100	4.49	50.0

	Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
	1.000	1	2	0.861	6.8	1.3	0.129	0.217	0.005	0.0	30	0.668
	1.001	2	3	0.861	6.8	1.3	0.217	0.558	0.005	0.0	30	0.668
	1.002	3	4	0.861	6.8	2.6	0.558	0.666	0.010	0.0	43	0.807
	2.000	5	3	0.861	6.8	1.3	0.391	0.450	0.005	0.0	30	0.668
	1.003	4	SOAKAWAY	0.861	6.8	2.6	0.666	0.593	0.010	0.0	43	0.807

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	4.987	80.0	100	SW_Standard	6.529	6.300	0.129	6.555	6.238	0.217
1.001	8.417	80.0	100	SW_Standard	6.555	6.238	0.217	6.791	6.133	0.558
1.002	7.971	80.0	100	SW_Standard	6.791	6.133	0.558	6.799	6.033	0.666
2.000	4.718	80.0	100	SW_Standard	6.791	6.300	0.391	6.791	6.241	0.450
1.003	3.686	80.0	100	SW_Standard	6.799	6.033	0.666	6.680	5.987	0.593

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	250	Manhole	SW_Standard	2	250	Manhole	SW_Standard
1.001	2	250	Manhole	SW_Standard	3	450	Manhole	SW_Standard
1.002	3	450	Manhole	SW_Standard	4	450	Manhole	SW_Standard
2.000	5	250	Manhole	SW_Standard	3	450	Manhole	SW_Standard
1.003	4	450	Manhole	SW_Standard	SOAKAWAY		Junction	

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	6.529	0.229	250				
				0	1.000	6.300	100
2	6.555	0.317	250		1	1.000	6.238
				0	1.001	6.238	100
3	6.791	0.658	450		1	2.000	6.241
				2	1.001	6.133	100
				0	1.002	6.133	100

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
4	6.799	0.766	450	0 1	1	1.002	6.033	100
				0		1.003	6.033	100
SOAKAWAY	6.680	0.693		1	1	1.003	5.987	100
5	6.791	0.491	250	0				
				0	0	2.000	6.300	100

Simulation Settings

Rainfall Methodology	FEH-22	Winter CV	1.000	Drain Down Time (mins)	1440	Check Discharge Rate(s)	x
Rainfall Events	Singular	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0	Check Discharge Volume	x
Summer CV	1.000	Skip Steady State	x	Starting Level (m)			

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	10	0	100	45	10	0
30	45	10	0				

Node SOAKAWAY Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Pit Width (m)	2.500	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.06660	Invert Level (m)	5.380	Pit Length (m)	5.000	Number Required	1
Safety Factor	2.0	Time to half empty (mins)	1426	Depth (m)	0.800		

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Results for 10 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.352	0.052	3.2	0.0026	0.0000	OK
15 minute summer	2	10	6.286	0.048	3.2	0.0024	0.0000	OK
15 minute summer	3	10	6.220	0.087	6.4	0.0138	0.0000	OK
15 minute summer	4	10	6.116	0.083	6.4	0.0132	0.0000	OK
480 minute winter	SOAKAWAY	456	5.952	-0.035	0.6	6.7891	0.0000	OK
15 minute summer	5	10	6.352	0.052	3.2	0.0026	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	3.2	0.810	0.473	0.0197
15 minute summer	2	1.001	3	3.2	0.578	0.473	0.0461
15 minute summer	3	1.002	4	6.4	0.903	0.944	0.0564
15 minute summer	4	1.003	SOAKAWAY	6.3	0.947	0.939	0.0247
480 minute winter	SOAKAWAY	Infiltration		0.1			
15 minute summer	5	2.000	3	3.2	0.809	0.473	0.0187

Results for 30 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	6.364	0.064	4.2	0.0031	0.0000	OK
15 minute summer	2	11	6.339	0.101	4.2	0.0049	0.0000	FLOOD RISK
15 minute summer	3	11	6.299	0.166	8.0	0.0264	0.0000	SURCHARGED
15 minute summer	4	11	6.144	0.111	7.5	0.0177	0.0000	SURCHARGED
720 minute winter	SOAKAWAY	675	6.110	0.123	0.6	8.6677	0.0000	OK
15 minute summer	5	10	6.363	0.063	4.2	0.0031	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	4.2	0.859	0.623	0.0310
15 minute summer	2	1.001	3	4.0	0.584	0.587	0.0658
15 minute summer	3	1.002	4	7.5	0.955	1.105	0.0624
15 minute summer	4	1.003	SOAKAWAY	7.5	0.957	1.104	0.0278
720 minute winter	SOAKAWAY	Infiltration		0.1			
15 minute summer	5	2.000	3	4.2	0.860	0.621	0.0230

Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	6.448	0.148	5.3	0.0073	0.0000	FLOOD RISK
960 minute winter	2	855	6.444	0.206	0.3	0.0101	0.0000	FLOOD RISK
960 minute winter	3	855	6.444	0.311	0.6	0.0495	0.0000	SURCHARGED
960 minute winter	4	855	6.444	0.411	0.6	0.0654	0.0000	SURCHARGED
960 minute winter	SOAKAWAY	855	6.444	0.457	0.6	9.5059	0.0000	OK
960 minute winter	5	855	6.444	0.144	0.3	0.0071	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	5.0	0.861	0.746	0.0390
960 minute winter	2	1.001	3	0.3	0.329	0.044	0.0659
960 minute winter	3	1.002	4	0.6	0.527	0.089	0.0624
960 minute winter	4	1.003	SOAKAWAY	0.6	0.526	0.089	0.0288
960 minute winter	SOAKAWAY	Infiltration		0.1			
960 minute winter	5	2.000	3	0.3	0.428	0.044	0.0369

Appendix II Proposed Drainage Design Drawing



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Appendix III Geotechnical Reports



GEOTECHNICAL ASSESSMENT REPORT

**2 LAKERS COTTAGES
NORTH END ROAD
YAPTON
WEST SUSSEX**

PROJECT REFERENCE: P17321

REPORT REFERENCE: R16820

Report Beneficiary: Ian Nicholson and Jeanette Louise

Document Control			
Issue No.	Status	Issue Date	Notes
1	Final	8 th October 2025	
Report Section		Prepared By	Approved By
Factual Section		Tom Hughes BA MA	Rebecca Webb BSc FGS
Geotechnical Assessment		Adam Cormack HNC FGS	Steven McSwiney BA Mod. Geol. MSc FGS

Limitations

This report was prepared specifically for the Client's project and may not be appropriate to alternative schemes. The copyright for the report and licence for its use shall remain vested in Ashdown Site Investigation Limited (the Company) who disclaim all responsibility or liability (whether at common law or under the express or implied terms of the Contract between the Company and the Client) for any loss or damage of whatever nature in the event that this report is relied on by a third party, or is issued in circumstances or for projects for which it was not originally commissioned.

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EXECUTIVE SUMMARY

The following presents a summary of the main findings of the report. It is emphasised that no reliance should be placed on any individual point until the whole of the report has been read as other sections of the report may put into context the information contained herein.

It is proposed to construct a single storey extension to the existing house at 2 Lakers Cottages, North End Road, Yapton, West Sussex.

The site comprises a semi-detached two-storey house with a single storey extension to the rear and front and rear gardens. Two sheds and a fenced storage area are located on the southern side of the residence.

Reference to geological datasets indicates that the site is expected to be underlain by the River Terrace Deposits overlying the White Chalk Subgroup. The ground investigation confirmed the underlying soils to comprise a shallow thickness of made ground, overlying River Terrace Deposits.

The River Terrace Deposits are classed as a Secondary A Aquifer. The White Chalk Subgroup is classed as a Principal Aquifer. The site does not lie within a SPZ. Groundwater was recorded at a depth of 4.93m below ground level on completion of the standpipe installation. The results of the groundwater monitoring will be issued separately on completion of the monitoring period.

It is recommended that the design of precautions against shrinkage and heave for any new foundation system should assume a medium volume change potential for the fine-grained River Terrace Deposits.

A net allowable bearing capacity of 100kN/m² may be assumed for pad or strip foundations up to 1.00m in breadth that are constructed directly onto the undisturbed soils of the River Terrace Deposits of at least firm consistency.

A DS-1 Design Sulfate Class and an AC-1 ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground.

Ground floors should be suspended unless the conditions set out within this report can be met.

Infiltration testing within the River Terrace Deposits soils recorded infiltration rates ranging between 1.85x10⁻⁵m/sec and 3.46x10⁻⁵m/sec.

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Aggressivity To Concrete Assessment
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1. INTRODUCTION

It is proposed to construct a single storey extension to the existing house at 2 Lakers Cottages, North End Road, Yapton. A copy of the proposed development layout is presented in Appendix A.

Ashdown Site Investigation Ltd was requested to undertake a ground investigation and to provide advice to assist with the structural design and the design of soakaways.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q15485Rev1, dated 23rd July 2025. The instruction to proceed was received from the clients, Ian Nicholson and Jeanette Louise.

The specific objectives of the works were to:

- a) Establish the expected geology and hydrogeology at the site;
- b) Investigate the shallow ground and groundwater conditions in the area of the proposed development; and
- c) Provide advice/parameters to assist others in undertaking design of spread foundations and ground floors, and to assist with the preliminary design of the stormwater drainage system.

2. SITE CONTEXT

2.1 Site Details

The site is located at 2 Lakers Cottages, North End Road, Yapton, West Sussex, and is centred on the approximate Ordnance Survey national grid reference 498159, 104222. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively.

The site is located on the eastern side of North End Road in a wider area of residential houses/gardens and agricultural fields. The site is occupied by a semi-detached two-storey house with a single storey extension to the rear, and front and rear gardens. Two sheds and a fenced storage area are located on the southern side of the residence. At the time of the site works, the rear garden was in the process of being re-landscaped, with new turf/surfacing materials yet to have been placed.

2.2 Geological and Hydrogeological Setting

2.2.1 Expected Geology and Aquifer Designation

The stratigraphic succession that may be expected to underlie the site has been established by reference to British Geological Survey (BGS) mapping and the BGS Lexicon of Named Rock Units. The expected stratigraphy is presented in the following table.

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Superficial	River Terrace Deposits	Secondary A Aquifer
Bedrock	White Chalk Subgroup (Undifferentiated)	Principal Aquifer

The River Terrace Deposits in this area were formerly denoted as the Brickearth and comprise brown sandy (fine) silt or clay largely originating from the solution weathering of the previously existing chalk. The material will have been reworked by water flow to produce some lateral variability in the grain size of the soil (sand and gravel) and can be expected to contain a variable content of flint.

The White Chalk Subgroup comprises chalk with flints. The Subgroup contains discrete marl seams, nodular chalk and flint seams throughout. The formation is of Maastrichtian to Cenomanian age (66 to 100.5 million years old; Late Cretaceous). The subgroup is recorded by the BGS to range in thickness up to 515m in the Hampshire/Sussex Area.

2.2.2 Natural Ground Subsidence

The chalk can be expected to have a deeply convoluted upper surface as a result of solution weathering and erosion. The presence of natural cavities in the chalk is very rare and solution features, if present, can be expected to be infilled with Quaternary Superficial Deposits. The infill material may be significantly weaker than the surrounding chalk. Solution features can comprise pipes extending to several metres deep into the chalk or conical depressions and basin shaped structures.

The British Geological Survey GeoSure 5km hex grid indicates the generalised area of the site has a low susceptibility from soluble rocks.

Further assessment of the natural ground hazards can be undertaken, if required, to provide more detailed comment specific to the site.

2.2.3 *Mining and Ground Workings*

Historically, chalk deposits were often mined locally. Most commonly historical mines characteristically comprise a narrow shaft with a number of chambers radiating from the base. These structures are colloquially known as "deneholes", "chalk-wells" or "chalkangles".

The depth of the features reflects the depth to the underlying chalk bedrock. The shaft width was commonly in the order of 2m to 3m, widening out into galleries at depth. The chalk was extracted for soil improvement and was usually applied directly to fields though sometimes the chalk was processed, typically by burning in kilns where the chalk was used to produce quicklime (calcium oxide).

Once they had reached their limits the mines were commonly capped. Various capping techniques were used; examples include the use of upturned trees or brick arching. Records pertaining to the distribution of these localised mines are incomplete, usually being limited to features marked as shafts or the occurrence of circular depressions on historic Ordnance Survey maps. In the field they are most likely to be visible as shallow depressions, if at all.

The British Geological Survey GeoIndex Onshore viewer does not record any mines or quarries within 1km of the site. A search of the Chelsea Speleological Society records revealed no records within 1km of the site. The risk posed to the development is considered to be negligible to very low.

Further assessment of the mining hazards can be undertaken, if required, to provide more detailed comment specific to the site.

2.2.4 *Groundwater Source Protection Zones (SPZ)*

The Environment Agency defines SPZs as those areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. SPZs are primarily a policy tool used to control activities close to water supplies intended for human consumption.

The site does not lie within a SPZ.

3. SITE WORKS

3.1 Introduction

The intrusive site works comprised two dynamic sampler boreholes and a single hand dug pit, together with accompanying in-situ geotechnical testing. The intrusive work was carried out on 9th September 2025. The exploratory hole locations are shown on Figure 2.

Descriptions of the strata encountered and comments on groundwater conditions are shown in the exploratory hole records given in Appendix B, which also includes explanatory notes to assist in their interpretation.

3.2 Exploratory Holes

The following table summarises the intrusive works undertaken at the site.

Table 2. Summary of Intrusive Works Undertaken

Designation	Depth (m bgl)	Method
WS01	3.00	Dynamic Sampler
WS02	5.00	Dynamic Sampler
TP01	0.98	Hand Dug Pit

3.3 Sampling

Samples of soil were taken from the exploratory holes at the depths shown in the exploratory hole records. The types of samples taken are indicated on the exploratory hole records. Details on the sample types are provided in the explanatory notes.

3.4 In Situ Strength Testing

The types and depths of in situ testing, together with the test results, are either given on the exploratory hole records or are summarised separately in Appendix B. Further details on the in situ testing methods are provided in the explanatory notes.

3.5 In Situ Infiltration Testing

In situ infiltration testing was undertaken in a single trial pit in general accordance with the test methodology given by BRE guidance¹. The results of the testing along with the infiltration rate calculations are included in Appendix D.

3.6 Installation

A groundwater monitoring standpipe was installed within borehole WS02 to a depth of 5.00m below ground level. A description of the installation is shown on the exploratory hole record.

¹ Section 3.2.3 of Building Research Establishment (BRE) Digest 365, 2016.

A groundwater data logger was installed within the standpipe on 9th September 2025. The data logger was programmed to collect readings at hourly intervals and is scheduled to remain installed for a 6-month period of winter groundwater monitoring.

3.7 Laboratory Testing

Laboratory testing was scheduled by Ashdown Site Investigation Ltd.

Geotechnical testing was undertaken by Ashdown Site Investigation Ltd. Chemical testing was undertaken by a laboratory with recognised (UKAS and MCERTS) accreditation for quality control.

Results from the laboratory tests are provided in Appendix C.

4. GROUND CONDITIONS

4.1 Stratigraphy

4.1.1 *Surface Covering*

Both boreholes WS01 and WS02 were excavated through a surface cover of topsoil. Trial pit TP01 was excavated through a 100mm thick layer of sub-base material, which comprised sandy gravel of crystalline rock.

4.1.2 *Made Ground*

Made ground, generally comprising slightly gravelly silty clay, was recorded to depths of between 0.50m and 0.75m below ground level. The gravel fraction comprised variable quantities of flint and brick, with concrete and chalk also noted at times.

4.1.3 *River Terrace Deposits*

Underlying the made ground, the investigation progressed into undisturbed clay deposits with varying gravel, sand and silt content. At shallower depths these deposits were variably firm or stiff, locally very stiff. Within borehole WS02, the deepest of the exploratory holes undertaken, the soils were recorded as very stiff below a depth of 3.20m below ground level. The gravel fraction comprised subangular to subrounded fine to coarse flint, with chalk gravel also noted within borehole WS02 below 3.10m depth.

These deposits continued to the deepest depth of the ground investigation works at 5.00m below ground level and are considered to represent the River Terrace Deposits indicated to underlie the site on BGS geological maps.

4.2 Stability

Each of the exploratory holes was recorded to remain stable during the course of drilling/excavation.

4.3 Groundwater Conditions

Groundwater was recorded within borehole WS02 at 4.93m depth, after installation of the groundwater monitoring standpipe. Groundwater was not encountered in the other exploratory holes during the short period they remained open during the intrusive works.

Groundwater monitoring is currently on-going over the winter period and results of the groundwater monitoring will be issued under separate cover.

5. GEOTECHNICAL ASSESSMENT

The geotechnical assessment has been prepared in connection with the development proposals shown on the drawings included in Appendix A.

In summary, the proposed development is to comprise the construction of a single storey side extension to the existing dwelling.

At the time of writing, no details were available concerning the specific loads likely to be applied to the foundations.

5.1 Foundations

5.1.1 Soil Shrinkage/Heave Potential

The fine-grained soils of the River Terrace Deposits have been classified as clays, and with modified plasticity indices in the range of 15% to 23%, the soils may be expected to exhibit a low to medium volume change potential.

It is recommended that the design of precautions against shrinkage and heave for any new foundation system (spread footings and ground beams etc.) should assume a medium volume change potential for the fine-grained River Terrace Deposits and take into account current guidance such as that given by the Building Research Establishment (BRE)² or the National House Builders Council (NHBC)³.

Whilst this report has been prepared to provide advice to assist designers in undertaking detailed design, the report itself does not represent a detailed design statement. Detailed foundation design, including assessment of foundation type, minimum founding depths for spread foundations, and requirements for placement of void formers et cetera, should take into account the findings of this report and the presence of trees (previous, present and proposed). In connection with the latter, it is recommended that an arboricultural survey of the site that identifies the species and maturity of the existing or recently felled trees in the area of the proposed new building should be provided to engineers responsible for the foundation design. Information on proposed planting schemes that may affect foundation design should also be provided.

5.1.2 Spread Foundations

5.1.2.1 Foundation Depths for Spread Foundations

Foundations should be constructed to bear below soils that are likely to be affected by significant soil volume changes caused by seasonal changes in moisture content to avoid damage to foundations that could otherwise arise. In addition, all made ground and any soils disturbed by the construction or removal of any previously existing foundations or services should be regarded as being variable in nature and state of compaction and, as such, unsuitable as a founding medium for shallow footings. New footings should be constructed so as to bear below made ground/disturbed natural soils and soil subject to seasonal soil volume changes, whichever is the deeper, and onto undisturbed, competent, natural deposits.

² www.bre.co.uk : BRE Digests 240, 241 and 242, Low rise buildings on shrinkable clay soils, parts 1, 2 and 3; and BRE Digest 298, The influence of trees on house foundations in clay soils and BRE Digest 412, Desiccation in clay soils.

³ <http://www.nhbc.co.uk/> : NHBC Standards, Chapter 4.2.

Summary guidance on suitable minimum foundation depths to protect against the effects of seasonal soil volume changes is presented in the table below but designers undertaking detailed design of foundations should follow the detailed guidance such as that provided within Chapter 4.2 of the NHBC Standards.

Table 3. Indicative Minimum Foundation Depths

Tree Type	Water Demand of Tree	Tree Distance to Tree Height Ratio (D/H)									
		0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.80	1.00	1.25
		Minimum Foundation Depth Required in Medium Volume Change Potential Soils (m)									
Broad Leaf	High	†			2.50	2.35	2.20	2.00	1.70	1.35	0.90*
	Moderate	2.00	1.85	1.70	1.60	1.45	1.30	1.15	0.90*	0.90*	0.90*
	Low	1.50	1.40	1.30	1.15	1.05	0.90*	0.90*	0.90*	0.90*	0.90*
Coniferous	High	†			2.30	1.95	1.60	1.25	0.90*	0.90*	0.90*
	Moderate	2.00	1.70	1.40	1.10	0.90*	0.90*	0.90*	0.90*	0.90*	0.90*

* Minimum foundation depth required to protect against soil volume changes.

† Foundations deeper than 2.50m require specialist design to protect against soil volume changes.

Where specialist foundation design is required (foundation depths exceeding the maximum permitted by the guidance) then piled foundations are likely to be needed, though commercial considerations may also dictate that piled foundations may be more economic even in comparison with conventional spread foundations constructed to depths less than the maximum permitted by guidance. Further works including deep boreholes would be required if structural engineers or quantity surveyors decide that piled foundations should be adopted.

Details on the water demand and mature height of common trees is given within Table 3 of Chapter 4.2 of the NHBC standards which should be referred to when assessing minimum foundation depths required for the proposed development. A summary is provided in the table below.

Table 4. Indicative Summary of Water Demand and Mature Height of Common Trees

Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
	Tree	Height (m)	Tree	Height (m)	Tree	Height (m)
Broad Leaf	Elm	18 – 24*	Acacia	18	Birch	14
	Oak	16 – 24*	Alder	18	Elder	10
	Poplar	15 – 28*	Apple	10	Fig	8
	Willow	16 – 24*	Ash	11 – 23*	Hazel	8
	Eucalyptus	18	Laurel	10	Holly	12
	Hawthorn	10	Beech	20	Honey Locust	14
			Blackthorn	8	Hornbeam	17
			Cherry	8 – 17*	Laburnum	12
			Chestnut	20 – 24*	Magnolia	9
			Lime	22	Mulberry	9

Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
			Maple	8 – 18*	Tulip Tree	20
			Pear	12		
			Plane	26		
			Plum	10		
			Sycamore	22		
			Tree of Heaven	20		
			Walnut	18		
			Whitebeam	12		
Coniferous	Cypress	18 – 20*	Cedar	20		
			Douglas Fir	20		
			Larch	20		
			Monkey Puzzle	18		
			Pine	20		
			Spruce	18		
			Wellingtonia	30		
			Yew	12		

* Dependent on particular species.

5.1.2.2 Bearing Capacity for Spread Foundations

For design purposes, a net allowable bearing capacity of 100kN/m² may be assumed for spread (pad or strip) foundations up to 1.00m across bearing within the River Terrace Deposits of at least firm consistency. The quoted bearing capacity is expected to limit settlement to less than 25mm.

Care must be taken to ensure that new foundations do not undermine or impose additional loading (vertical or lateral) on existing foundations. Similarly, the construction of new foundations should be undertaken carefully and monitored in those situations where temporary works could affect existing foundations.

5.2 Ground Floors

In view of the presence of soils of medium volume change potential underlying the site, it is recommended that ground floors should be suspended.

Current guidance⁴ suggests that ground bearing floor slabs may, however, be considered where:

- 1) All made ground is removed from beneath the building footprint;
- 2) The depth of foundations required to protect against seasonal soil volume changes close to trees is less than 1.5m; and
- 3) Further works demonstrate that close to the time of construction, no significant soil desiccation is present.

⁴ <http://www.nhbc.co.uk/> : NHBC Standards, Chapter 4.2.

Where the above criteria cannot be met ground floors should be suspended.

If ground bearing floors are adopted it is recommended that the potential for differential movement, both between the floor slab and walls and across the floor slab itself, should be anticipated. Such floors should be fully debonded from walls. Formations should be adequately proof rolled and any excessively soft materials excavated and replaced with a suitable, well graded granular fill. The depth of any fill should be limited to a maximum of 600mm unless placed to an engineering specification designed to limit internal settlement of the fill materials to a tolerance to be advised by the designer.

5.3 Groundwater

Groundwater was only recorded within the deeper borehole, WS02 at a depth of 4.93m below ground level during the site works.

It should be noted that the water level within the standpipe may not have equilibrated with the groundwater table at the time the reading was recorded and that groundwater levels at the site should be expected to fluctuate seasonally. Ongoing winter groundwater monitoring is currently being undertaken on site with the results due to be issued under separate cover in Spring 2026.

The potential for perched groundwater to be present above the groundwater table, for example within the made ground etc, should not be overlooked. It is also possible that heavy precipitation during construction could lead to the ingress of perched groundwater or surface water run-off into excavations. In such circumstances it would be expected that water entering excavations would be adequately managed by either pumping from sumps or natural drainage, or a combination of the two.

5.4 Stability of Excavations

All made ground exposed in excavations should be assumed to be unstable, even in the short term. Whilst fine-grained natural soils may remain stable for a short period of time if not subjected to surcharge loads (such as may be imposed by existing foundations, traffic or storage of materials), the stability of these deposits if left unsupported should be assumed to have the potential to deteriorate. Where stable excavations are required, excavations should either be suitably supported or, where space permits, side slopes could be battered back to a safe angle of repose.

All excavations requiring human entry must be shored or battered as necessary to conform to current best practice, as accepted by the Health and Safety Executive (HSE)⁵. Current legislation requires that where personnel access is required into any excavation a competent person must inspect excavation supports or battering of slopes at the start of the working shift and at other specified times. No work should take place until the excavation is safe. Excavations should also be inspected after any event that may have affected their stability, such as a significant weather event, changes in surcharge loadings imposed by temporary storage of materials or changes in site traffic plans or alteration of support systems. Inspections should be formally recorded and any faults that are found should be corrected immediately.

Particular attention must be paid to ensuring the stability of the existing property and nearby structures, services and neighbouring sites as well as the road frontage.

⁵ Relevant guidance is given on the HSE website, www.hse.gov.uk

5.5 Aggressivity to Concrete

The aggressivity of the soils to concrete has been assessed in accordance with guidance published by the BRE⁶. The results of the chemical laboratory testing together with a summary of the characteristic values are included in Appendix D.

In consideration of the soils encountered beneath the site it is considered that 'natural ground conditions' may be assumed for the purpose of assessing the aggressivity of the chemical environment for concrete classification (ACEC class). Given the occurrence of groundwater seepages at depth and, in the absence of long-term monitoring data, 'mobile groundwater' conditions should be conservatively assumed.

The following table summarises the characteristic values indicated from the chemical analysis of the soils present beneath the site.

Table 5. Assessment of the Chemical Analysis of the Soil

	Characteristic Value	Design Sulfate Class	ACEC Classification
pH	7.7	-	-
Water Soluble Sulphate (mg/l as SO ₄) *	<100	DS-1	AC-1

Notes: * Characteristic value rounded to nearest 100.

In accordance with the guidance, a DS-1 Design Sulfate Class and an AC-1 ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground.

5.6 Stormwater Infiltration Systems

In-situ infiltration testing⁷ was carried out in trial pit TP01. From the test results calculations were made to determine the infiltration rate that could be expected for infiltration systems constructed into the underlying River Terrace Deposits.

For each test the soil infiltration rate (f) was calculated by dividing the volume of water lost between 75% and 25% of the initial test depth by the sum of the average surface area of the sides of the trial pit in contact with the water during the test monitoring period, and its base area. This figure was then divided by the test duration (time taken for the water level to fall between 75% and 25% of the initial test depth) to give the soil infiltration rate in metres per second.

The following infiltration rates were derived from the tests:

⁶ BRE Special Digest 1:2005 Concrete in Aggressive Ground.

⁷ Conducted in general accordance with the requirements of BRE 365, Soakaway Design.

Table 6. Calculated Infiltration Rates

Exploratory Hole	Top of Response Zone (m bgl)	Bottom of Response Zone (m bgl)	Stratum	Infiltration Rate (f) (m/sec)
TP01 – Test 1	0.61	0.98	Made Ground and River Terrace Deposits	3.46×10^{-5}
TP01 – Test2	0.58	0.98	Made Ground and River Terrace Deposits	1.97×10^{-5}
TP01 Test 3	0.61	0.98	Made Ground and River Terrace Deposits	1.85×10^{-5}

The value 'f' is equivalent to the soil infiltration coefficient 'q' quoted in the Construction Industry Research and Information Association (CIRIA) Report 156.

The results from the infiltration tests should be provided to engineers responsible for the design of the drainage system.

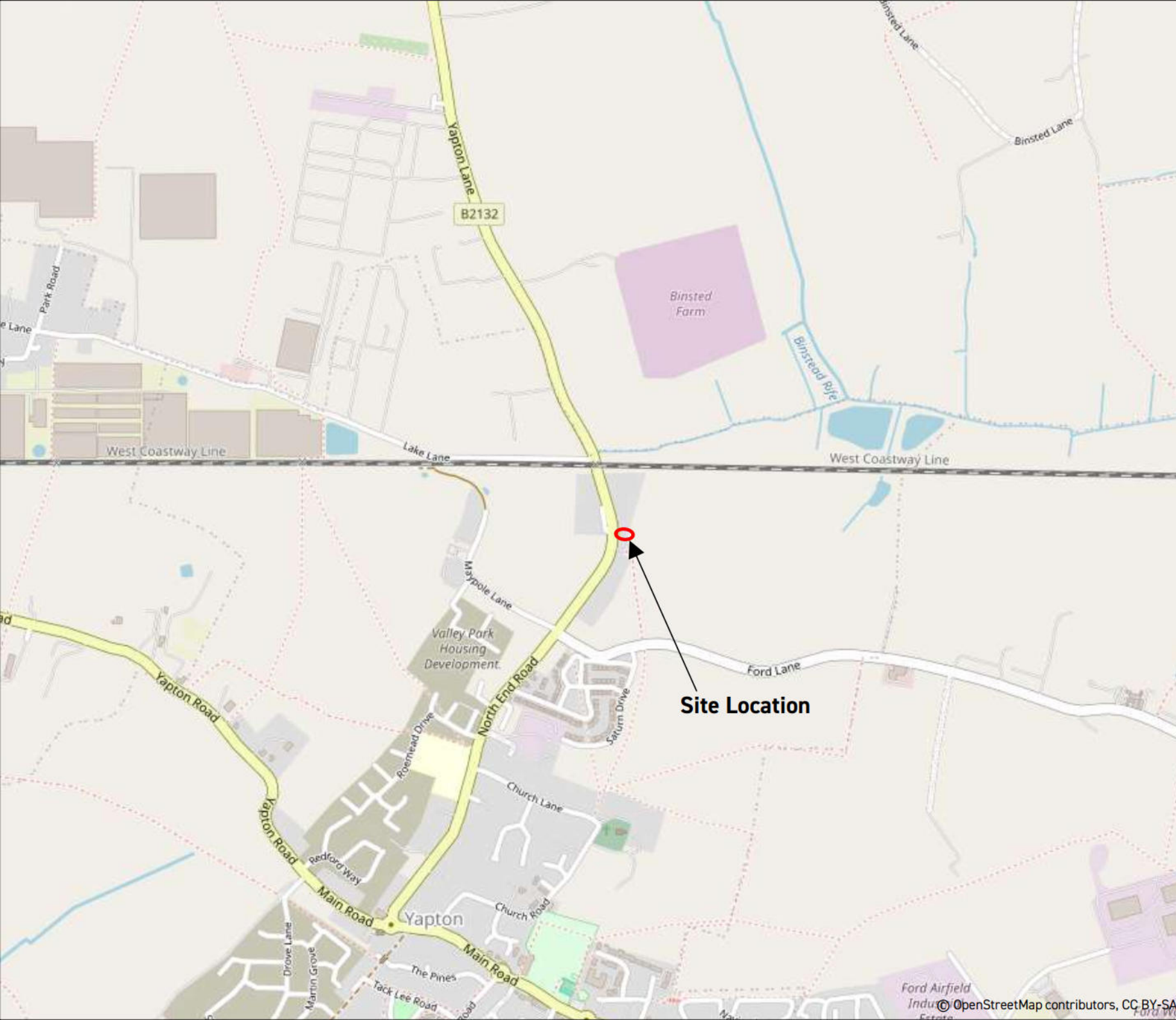
To comply with building regulations⁸, point discharging infiltration systems (conventional ring or trench soakaways) are required to be constructed a minimum of 5.0m away from proposed or existing buildings.

The infiltration testing conducted is intended to provide calculated soil infiltration rates to assist in the preliminary design of infiltration systems at the site. However, it should be noted that Regulators/Local Authorities may require further testing to be undertaken at a later stage in accordance with the BRE365 guidance. This guidance states the testing should be carried out at the locations and depths of the proposed soakaways, which will not be known until preliminary drainage design has been undertaken. The guidance also states that "designers should note that the results of tests may be affected by seasonal factors. In the winter and spring, the soil moisture and groundwater level will be higher than in the summer. Testing under a worst-case basis should be undertaken"; often local authorities may insist that soakage testing to support detailed design of the drainage system is undertaken within defined periods of the year which can vary from authority to authority.

⁸ The Building Regulations 2010; Part H; Drainage and Waste Disposal

FIGURES

- Figure 1 Site Location Plan
- Figure 2 Site Plan



Head Office

Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
East Sussex
BN6 8SG
contact@ashdownsi.co.uk

Site

2 Lakers Cottages
North End Road
Yapton
West Sussex

Project Ref

P17321

Figure No

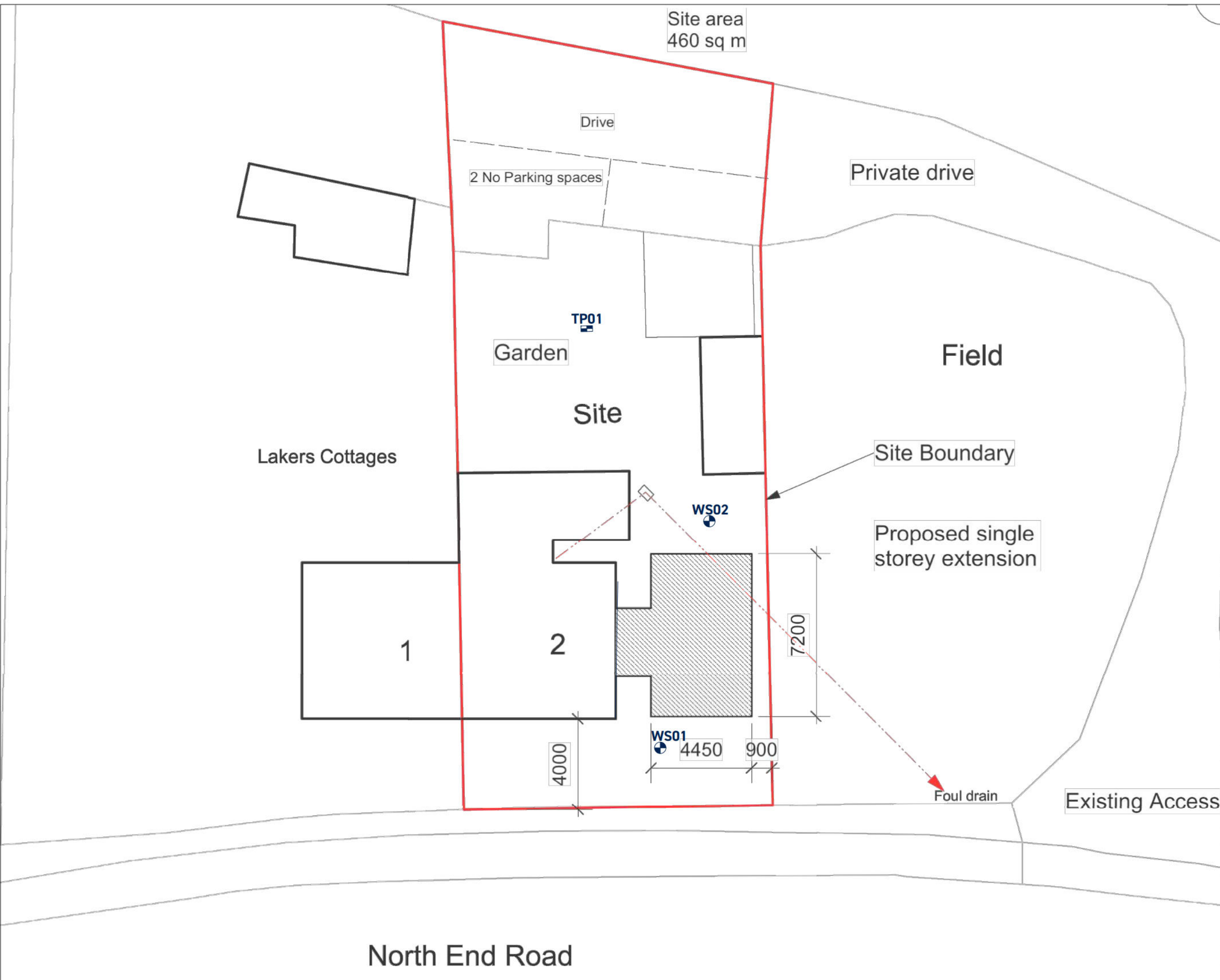
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Drawing Title

Site Location Plan

Scale

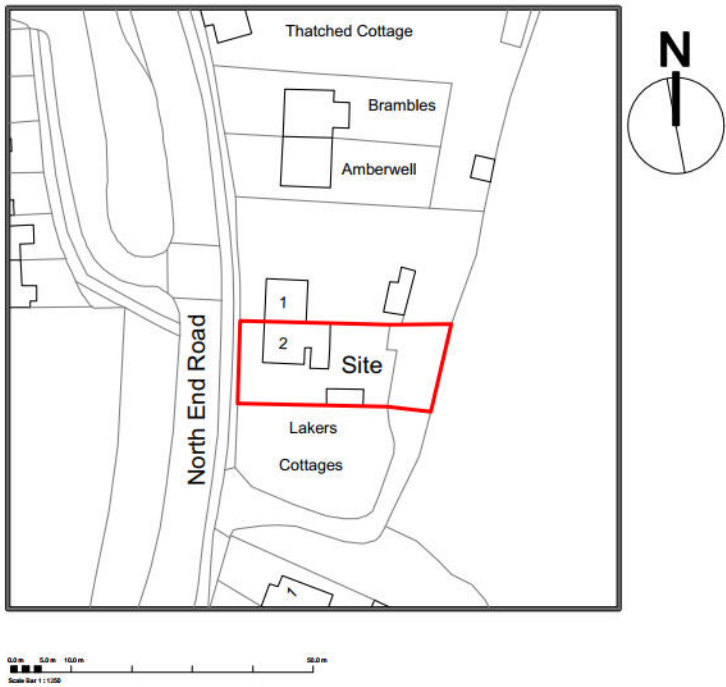
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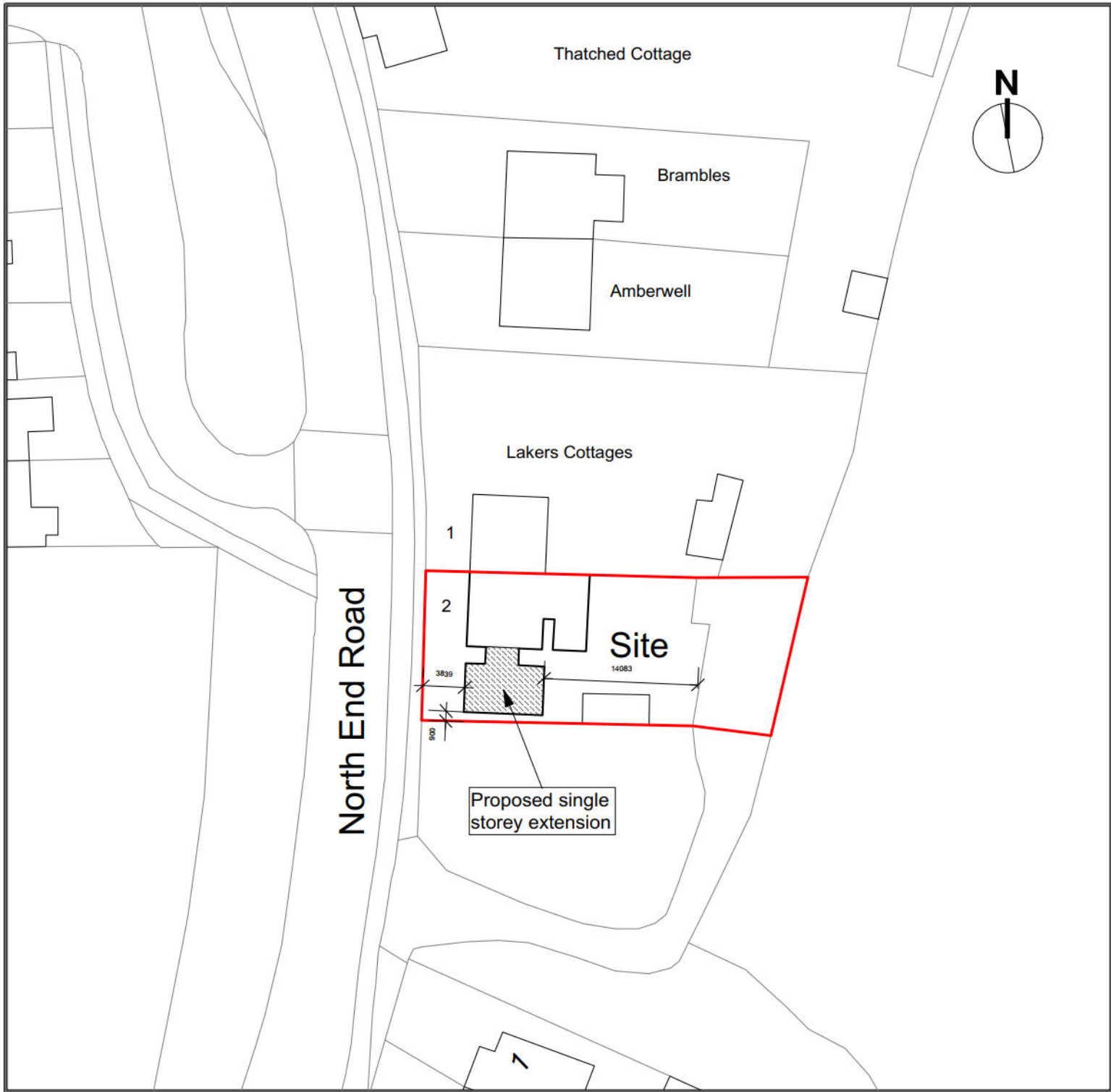
ASHDOWN SITE INVESTIGATION	
Head Office	
Unit 3 The Old Grain Store Ditchling Common Business Park Ditchling East Sussex BN6 8SG contact@ashdownsi.co.uk	
Site	
2 Lakers Cottages North End Road Yapton West Sussex	
Project Ref	
P17321	
Figure No	
2	
Drawing Title	
Site Plan	
Scale	
Not To Scale	

APPENDIX A

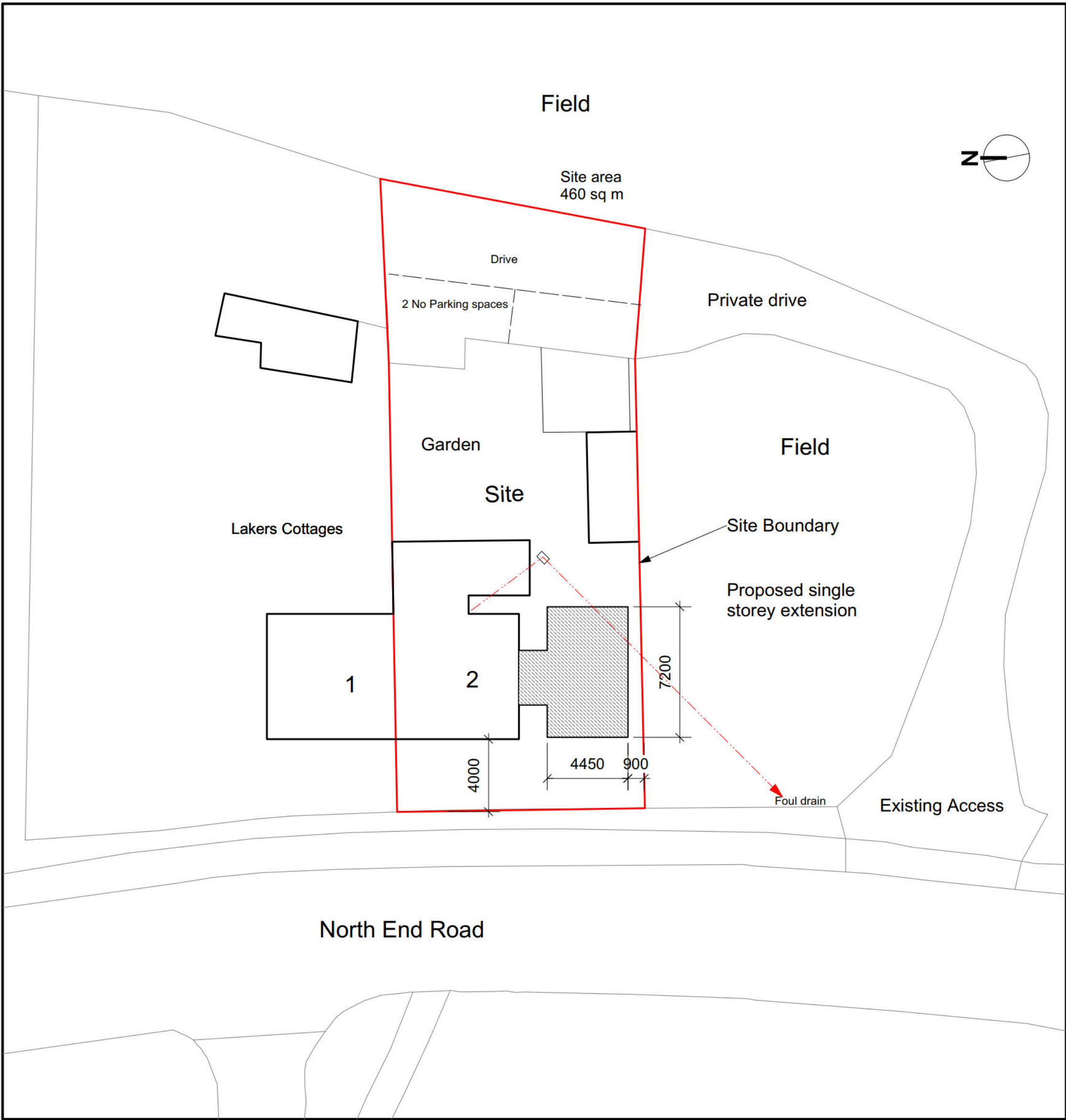
Proposed Development Layout



Location Plan
Scale 1 : 1250



Block Plan
Scale 1 : 500

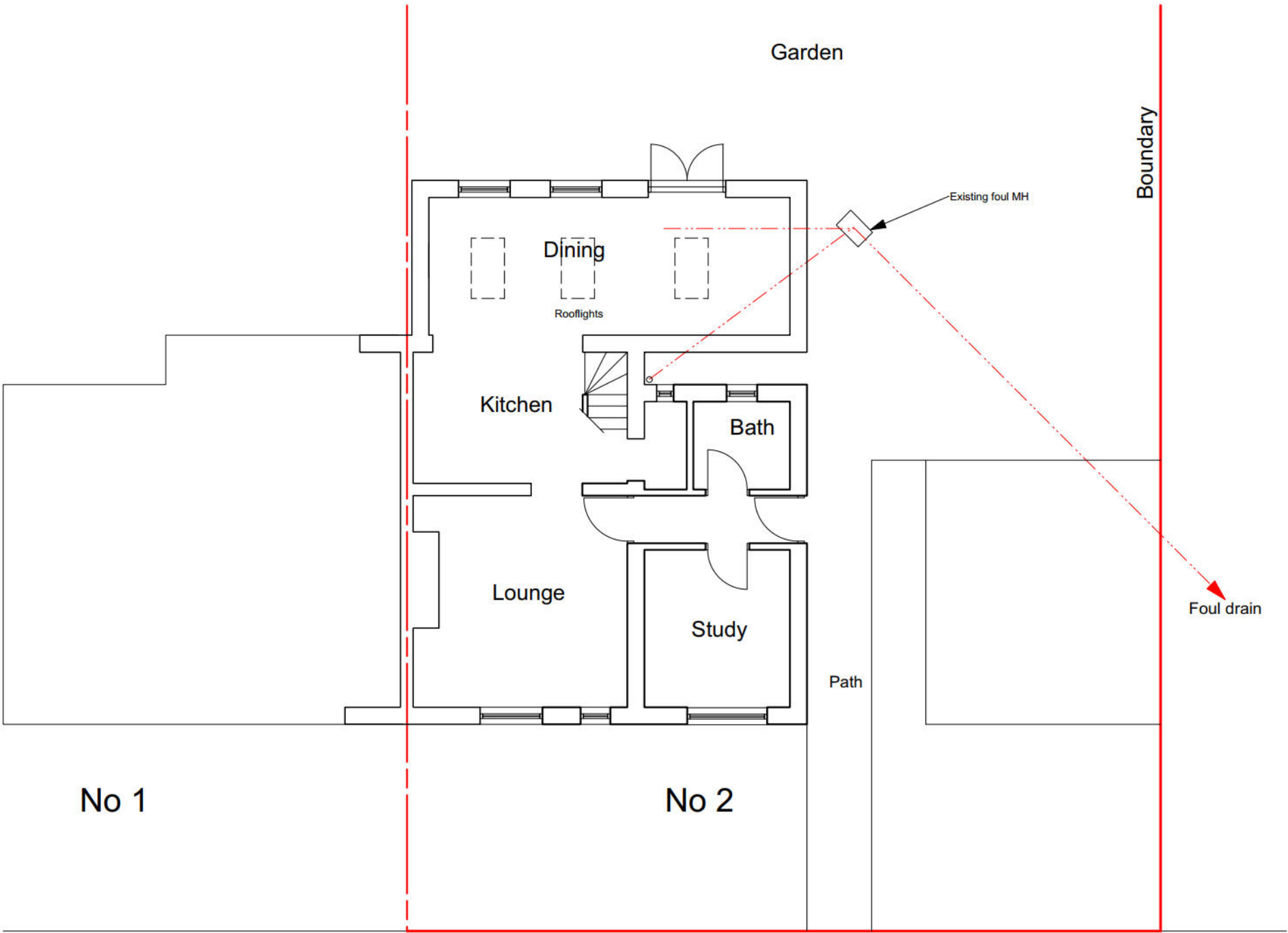


0.0 m 5.0 m 10.0 m 30.0 m
Scale Bar 1 : 200

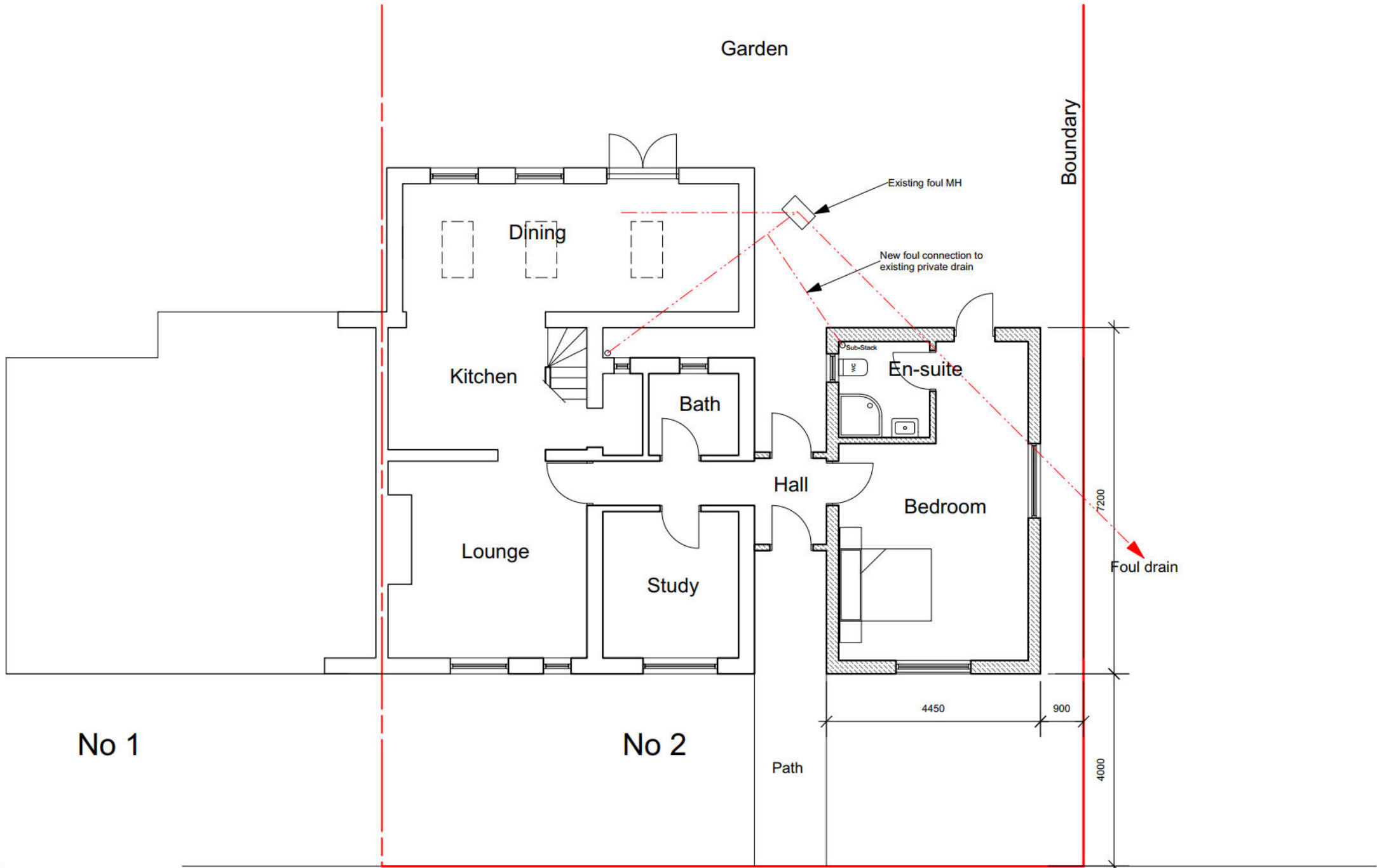
Site Plan
Scale 1 : 200

IVON BLUMER ARCHITECTS LTD

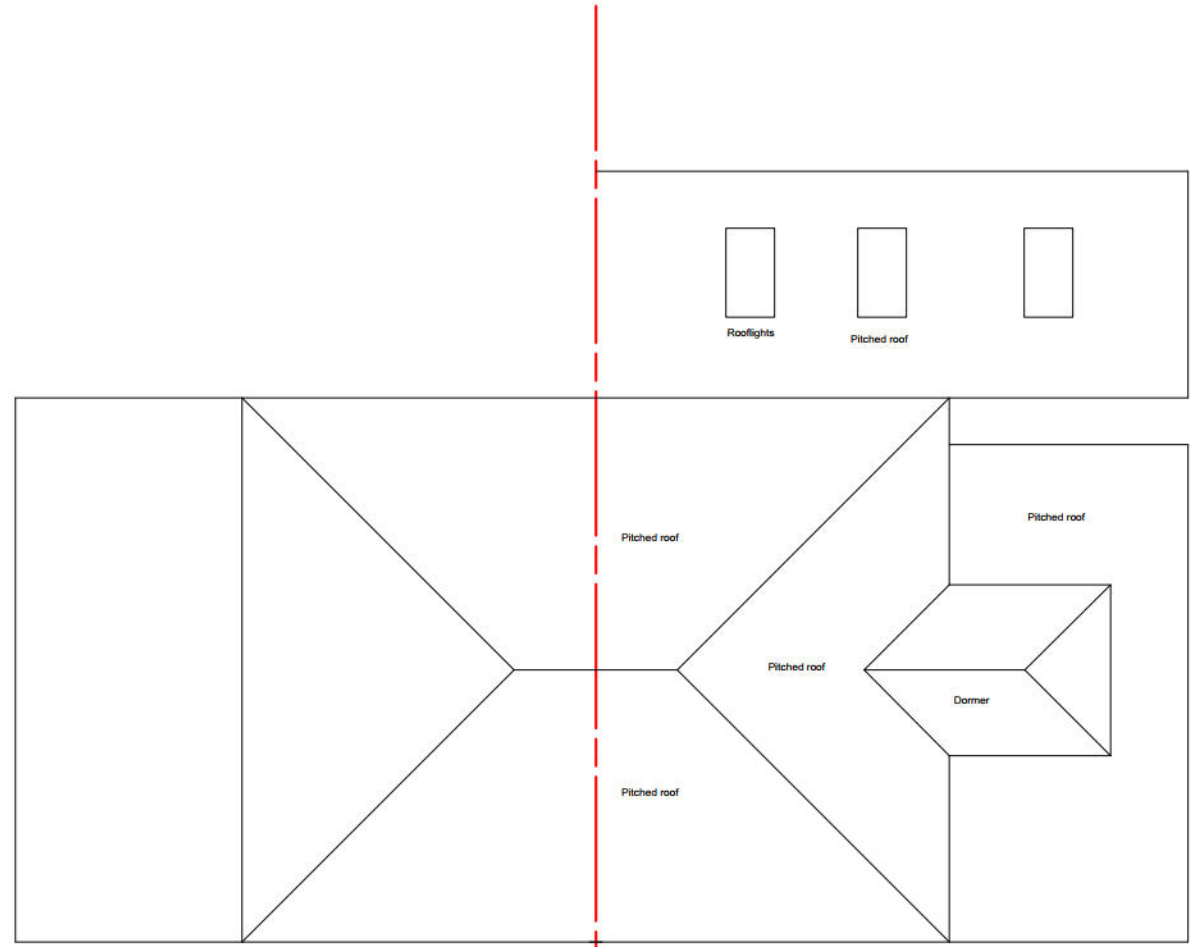
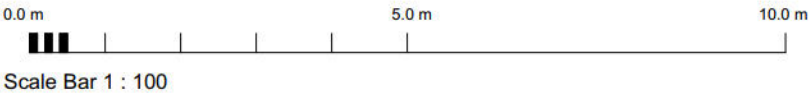
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TITLE	Site Plans & Roof Plan	DRG NO	IBA/609/01
SCALE	As Noted	REVISIONS	



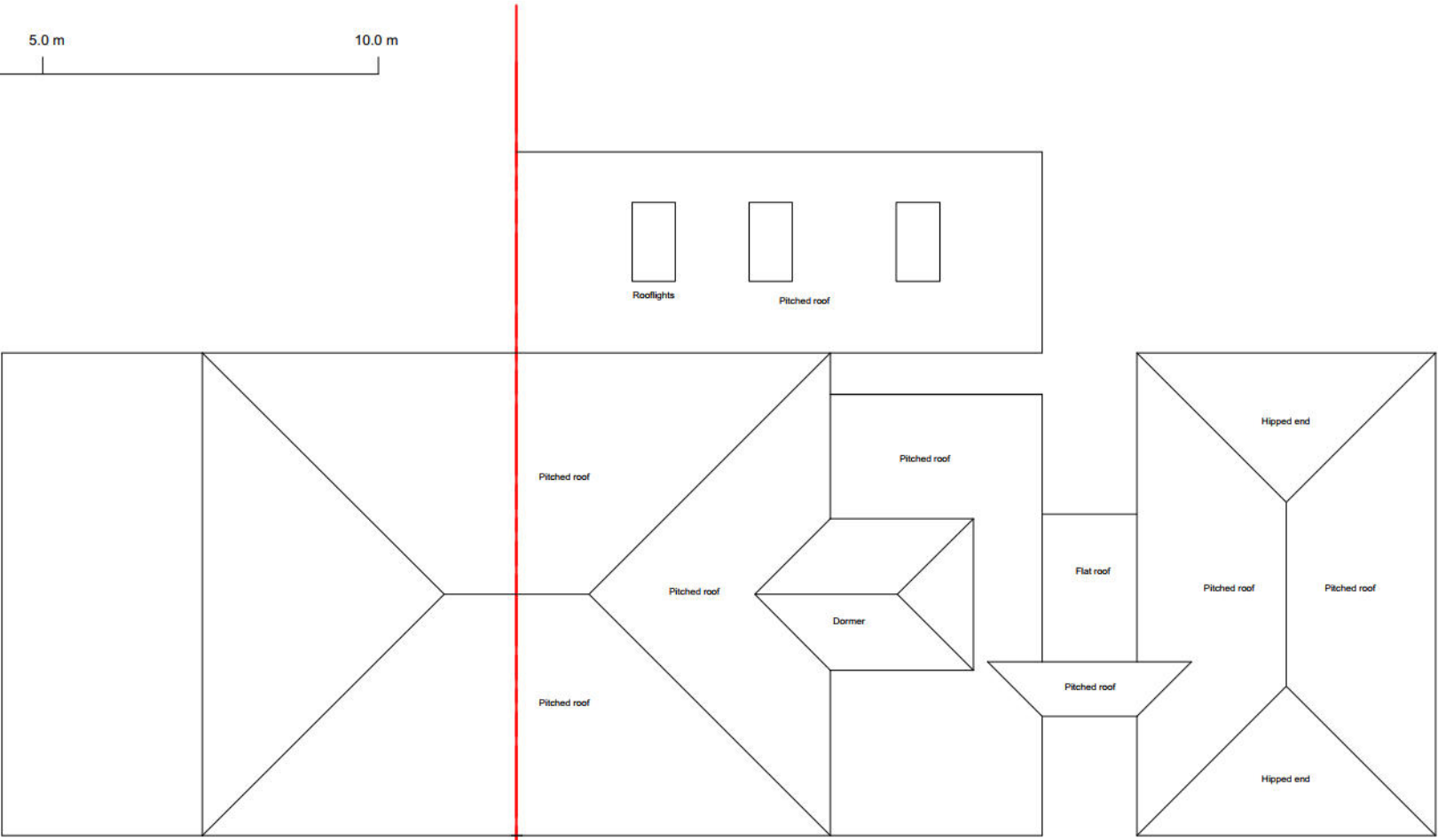
Existing Ground Floor Plan



Proposed Ground Floor Plan

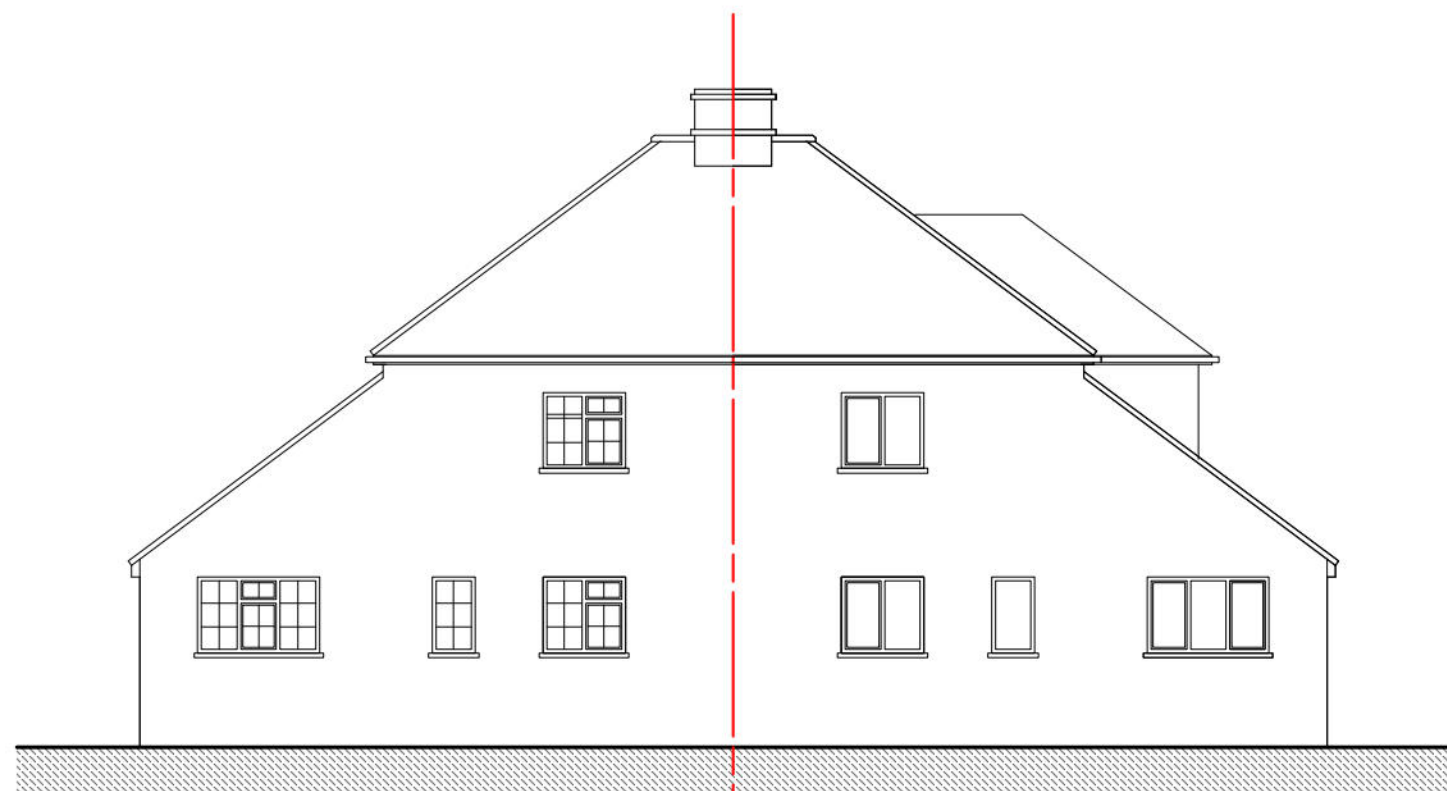


Existing Roof Plan

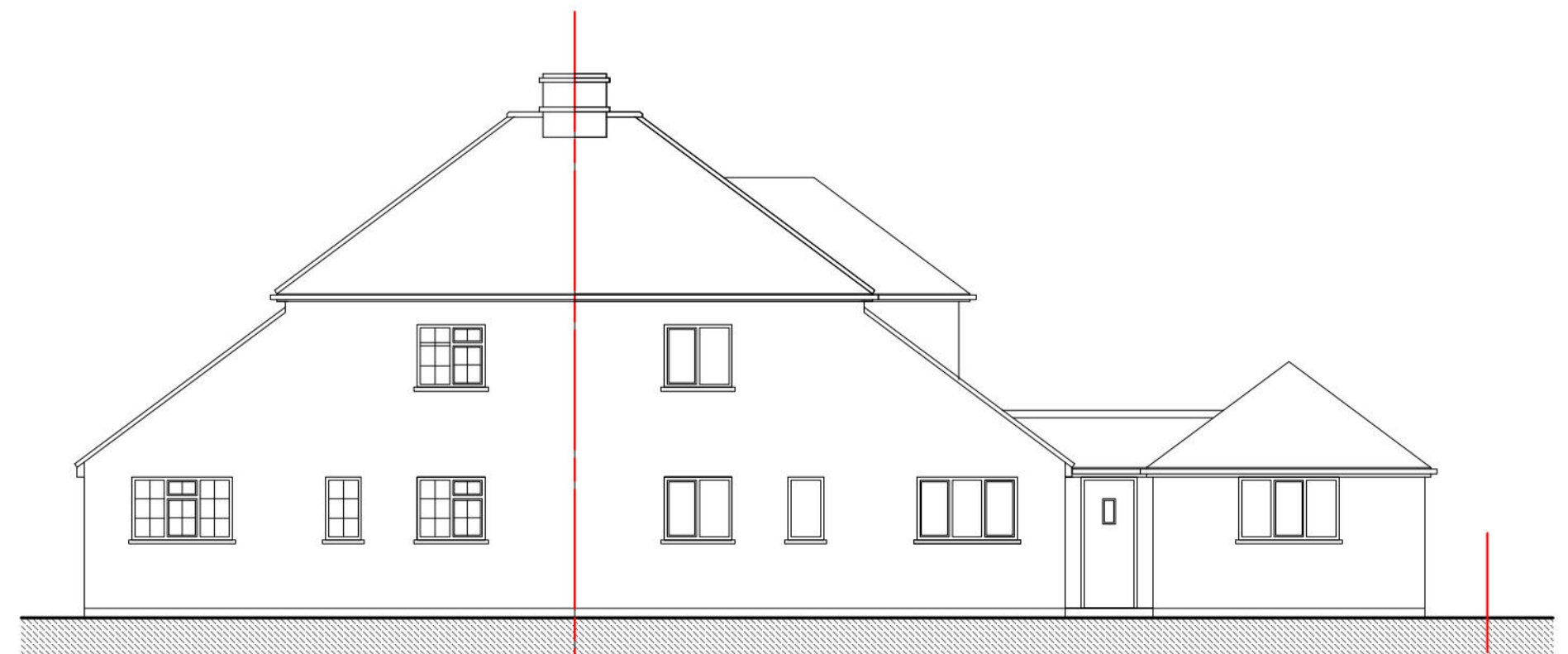


Proposed Roof Plan

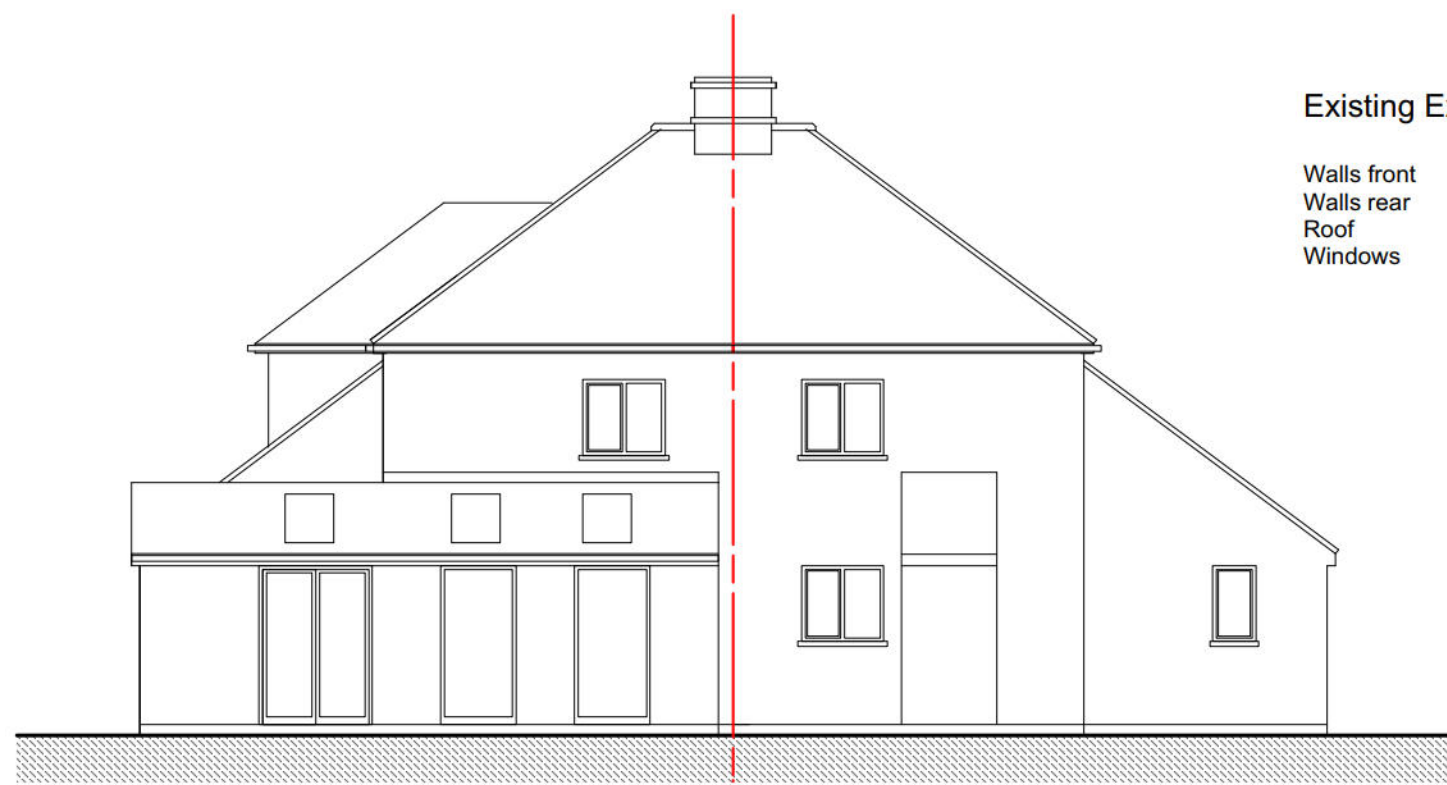
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PROJECT	2 Lakers Cottage	DATE	24/02/25
TITLE	Existing Plans and Elevations	DRG NO	IBA/609/02
SCALE	1 : 100	REVISIONS	



No 1 No 2
Existing West Elevation



No 1 No 2 Proposed Extension
Proposed West Elevation

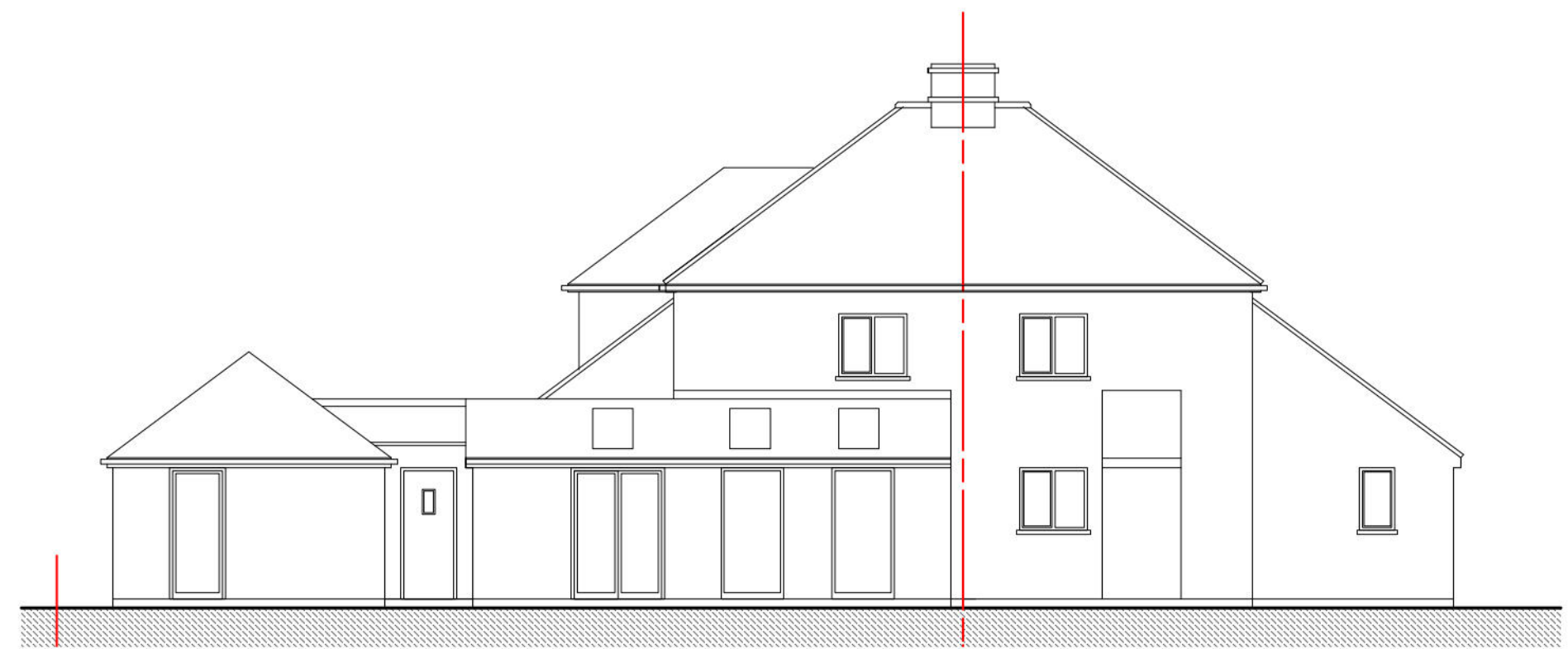


No 2 No 1
Existing East Elevation

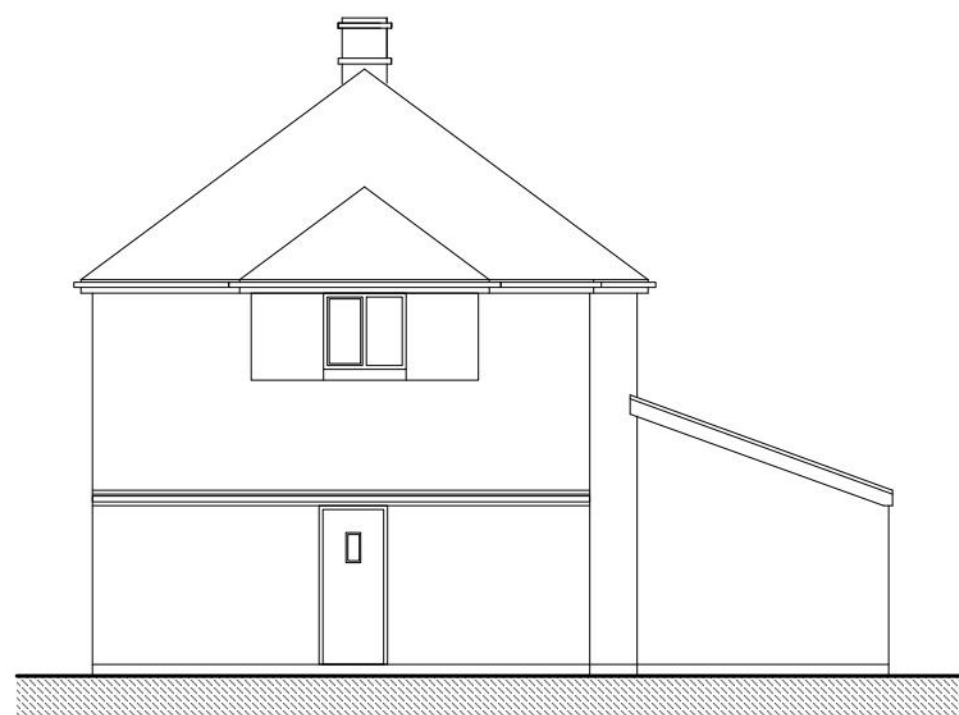
Existing External Finishes

Walls front
Walls rear
Roof
Windows

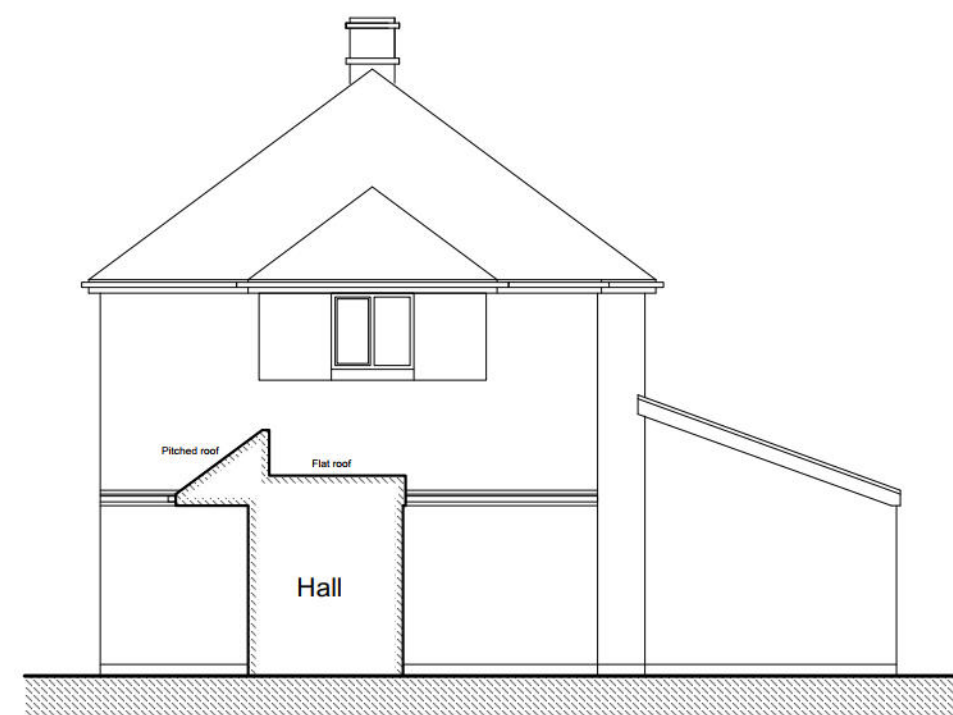
Cream painted render
Brick & Brick/flint
Plain red clay tiles & Slate
White Upvc



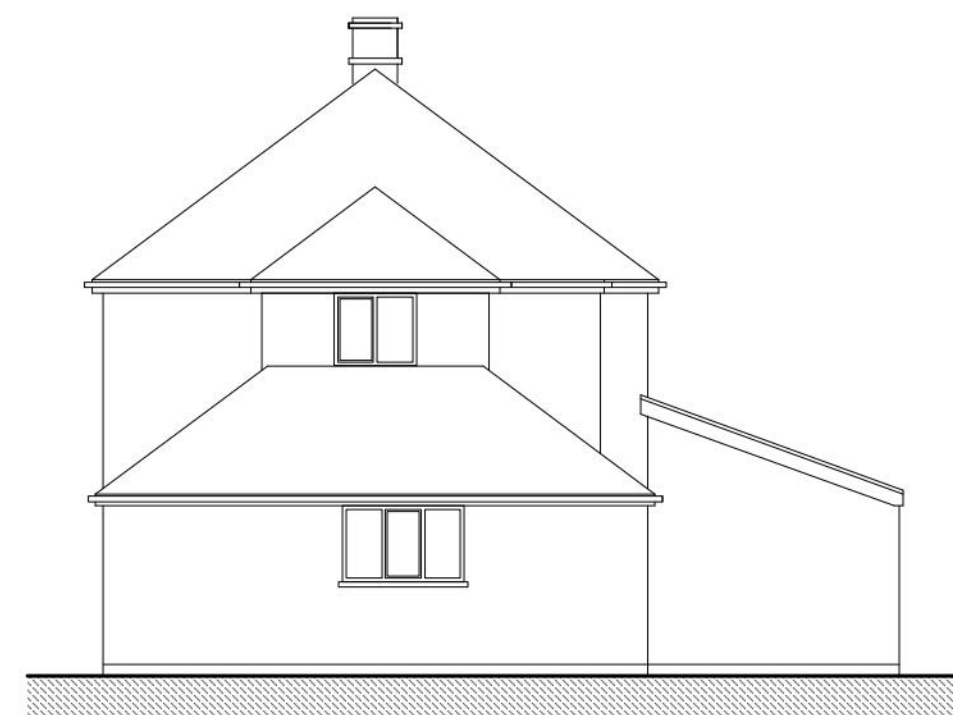
Proposed Extension No 2 No 1
Proposed East Elevation



Existing South Elevation



Proposed Extension
Proposed South Elevation

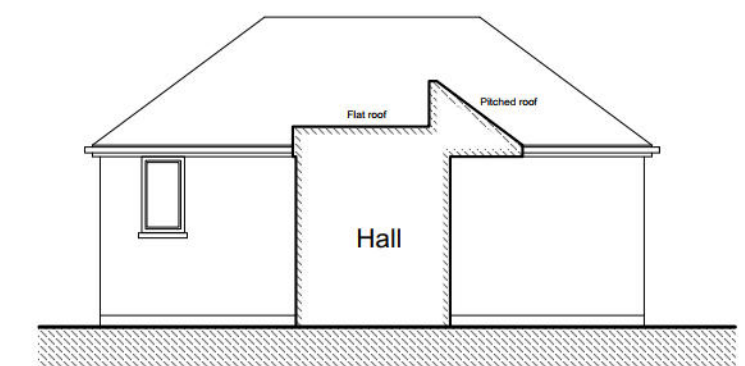


Proposed Extension
Proposed South Elevation

Proposed External Finishes New Bedroom Extension

Walls
Roof
Windows

Cream Eternit Cedral cladding
Plain red clay tiles to match existing
White Upvc



Proposed Extension
Proposed North Elevation

IVON BLUMER ARCHITECTS LTD

PROJECT	2 Lakers Cottage	DATE	24/02/25
TITLE	Elevations	DRG NO	IBA/609/03
SCALE	1 :100	REVISIONS	



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APPENDIX B

Explanatory Notes

Exploratory Hole Records

DPSH-B Dynamic Probe Records

EXPLANATORY NOTES

Symbols and abbreviations on Exploratory Hole Records

Samples

U	'Undisturbed' Sample: - 100mm diameter by 450mm long. The number of blows to drive in the sampling tube is shown after the test index letter in the SPT column.
L	Liner sample cut to length indicated.
D	Disturbed Sample
B	Bulk Disturbed Sample
W	Water Sample
ES	Environmental Suite (on older records may be referenced J T)

In Situ Testing

SPT	Standard penetration test (SPT): Using the split spoon sampler.
SPT(C)	Standard Penetration Test (SPT): Using a solid cone instead of the sampler – conducted usually in coarse grained soils or weak rocks.
HV	Shear Vane Test: Undrained shear strength (cohesion).
PP	Hand penetrometer Test: Undrained shear strength (cohesion).
P	Perth Penetrometer Test: Number of blows for 300mm penetration shown under remarks section.

Excavation Method

CP	Cable Percussion Borehole
RC/RO	Rotary Cored Borehole/Rotary Open Hole Borehole
WLS	Dynamic Sampler Borehole using windowless sampler tubes
WS	Dynamic Sampler Borehole using window sampler tubes
TP	Trial Pit excavated using mechanic excavator
HP	Trial Pit excavated using hand tools
HA	Hand Auger borehole

Soil Description

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1) and Part 2 Principles of classification (BS EN 14688-2) as well as the BS5930 code of Practice for Ground Investigations.

Rock Description

Description and classification of rocks has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of rock, Part 1 Identification and classification (BS EN ISO 14689-1) as well as the BS5930 code of Practice for Ground Investigations. TCR – Total Core Recovery, SCR – Solid Core Recovery, RQD – Rock Quality Designation, NI – Non Intact, If – indicative fracture spacing (min/ave/max), FI – Fracture Index.

Chalk Description

Chalk description is based on BS EN ISO 14688, BS EN ISO 14689 and BS5930. The classification of chalk generally follows the guidance offered by the Construction Industry Research and Information Association (CIRIA) C574, 'Engineering in Chalk'. This is based on assessment of chalk density, discontinuity and aperture spacing, and the proportion of intact chalk to silt of chalk.

In Situ Strength Testing (where undertaken)

Standard penetration testing (SPT) carried out in accordance with BS EN ISO 22476-3:2005.

Continuous dynamic probe testing conducted using a super heavy DPSH-B (As defined by BS EN ISO 22476-2:2005) probing geometry. The DPSH-B configuration is similar to that of the standard penetration test (SPT); the main differences being that the tip comprises a 90° cone, the driving rods are lighter than those used for SPT testing and the blow counts are recorded over 100mm increments rather than 300mm, as is the case for the SPT.

Perth penetrometer tests carried out in accordance with Australian Standard AS 1289:6.3.3-1997, Method of Testing Soils for Engineering Purposes; no equivalent European or British Standard having been published to date.

Undrained shear strength determinations made in-situ using a Geonor hand shear vane or a hand penetrometer.

Testing to determine the in-situ California Bearing Ratio (CBR) of soils conducted at shallow depths using a hand-held Transport Research Laboratory (TRL) cone penetrometer.



Dynamic (Windowless) Sampler

WS01
Sheet 1 of 1

Hole Type WLS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name 2 Lakers Cottages, Yapton	Project No. P17321	Start Date 2025-09-09	End Date 2025-09-09	

Client	Consultant	Contractor
--------	------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
		0.30	D			(0.50)		Topsoil over, MADE GROUND: Dark brown slightly gravelly silty clay. Gravel is subangular to subrounded fine to coarse flint and brick.
		0.50 0.55	HV D	>120 (kPa)		0.50		Stiff, locally very stiff, light orange brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint. [River Terrace Deposits]
		0.75 0.80	D PP	160 (kPa)				with occasional roots between 0.60m and 0.90m depth. (0.60 - 0.90m)
		1.20 1.30	PP D	125 (kPa)		(1.40)		
		1.50 1.70	PP D	200 (kPa)				
		1.90 2.00	PP HV	140 (kPa) 90 (kPa)		1.90		Stiff light orange brown slightly gravelly slightly sandy silty CLAY. Gravel is subangular to subrounded fine to coarse flint. [River Terrace Deposits]
		2.20 2.50	D PP			(1.10)		with a band of subangular to subrounded fine to coarse gravel of flint at 2.30m depth. (2.30m)
		2.80 3.00	D HV			3.00		with a band of subangular to subrounded fine to coarse gravel of flint at 2.90m depth. (2.90m)
								End of Borehole at 3.00m

Remarks Borehole dry on completion.	Method, Plant, Stability, Dimensions 0.00 - 3.00m Borehole stable on completion.	Logger AW
--	--	--------------



Dynamic (Windowless) Sampler

WS02
Sheet 1 of 1

Hole Type WLS	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name 2 Lakers Cottages, Yapton	Project No. P17321	Start Date 2025-09-09	End Date 2025-09-09	

Client	Consultant	Contractor
--------	------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata	
		Depth (m)	Type/ Ref	Results			Legend	Description
						(0.20)		Topsoil over,
						0.20		MADE GROUND: Brown slightly gravelly sandy clay. Gravel is subangular to subrounded fine to coarse flint, concrete and brick.
						(0.30)		MADE GROUND: Dark brown slightly gravelly silty clay. Gravel is subangular to sbounded fine to coarse flint and brick.
		0.50	D			0.50		Firm, locally stiff, light orange brown slightly gravelly slightly sandy silty CLAY. Gravel is subangular to subrounded fine to medium flint. [River Terrace Deposits]
		0.70	PP	125 (kPa)				
		1.00	PP	100 (kPa)				
		1.10	D					
		1.30	PP	125 (kPa)		(1.70)		
		1.80	PP	50 (kPa)				
		1.90	D					
		2.00	HV	100 (kPa)				
		2.10	PP	125 (kPa)		2.20		Firm, locally stiff, light orange brown slightly gravelly sandy silty CLAY. Gravel is subangular to subrounded fine to medium flint. [River Terrace Deposits]
								with dark brown speckling at 1.80m depth. (2.20m)
		2.80	D			(1.00)		
		3.20	D			3.20		with gravel of subangular to subrounded fine to medium chalk below 3.10m depth. (3.10 - 3.20m)
		3.30	PP	>225 (kPa)				Very stiff light brown gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse chalk and occasional flint. [River Terrace Deposits]
		3.70	PP	>225 (kPa)				
		3.80	D					
		4.00	HV	>120 (kPa)		(1.80)		
		4.50	D					
						5.00		End of Borehole at 5.00m

Remarks Borehole dry on completion of drilling. Groundwater at 4.95m depth on completion of standpipe installation. Standpipe installed to 5.00m depth; 5.00m to 3.00m slotted pipe with gravel surround; 3.00m to ground level plain pipe with bentonite seal; completed with end cap and security cover concreted flush with ground surface.	Method, Plant, Stability, Dimensions 0.00 - 5.00m Borehole stable on completion.	Logger AW
---	--	--------------



Hand Pit

TP01
Sheet 1 of 1

Hole Type HP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name 2 Lakers Cottages, Yapton	Project No. P17321	Start Date 2025-09-09	End Date 2025-09-09	

Client	Consultant	Contractor
--------	------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.10) 0.10		MADE GROUND: Red brown and grey sandy subangular to subrounded fine to coarse gravel of crystalline rock.	
						(0.45)		MADE GROUND: Dark brown slightly gravelly silty clay. Gravel is subangular to subrounded fine to coarse brick, flint and chalk.	
		0.60	D			0.55 (0.20)		MADE GROUND: Brown slightly gravelly silty clay. Gravel is subangular to subrounded fine to coarse flint, brick and chalk.	0.5
		0.85	D			0.75 (0.23)		Light brown slightly gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint.	
						0.98		[River Terrace Deposits]	1.0
								End of Trial Pit at 0.98m	
									1.5
									2.0
									2.5
									3.0
									3.5
									4.0
									4.5
									5.0

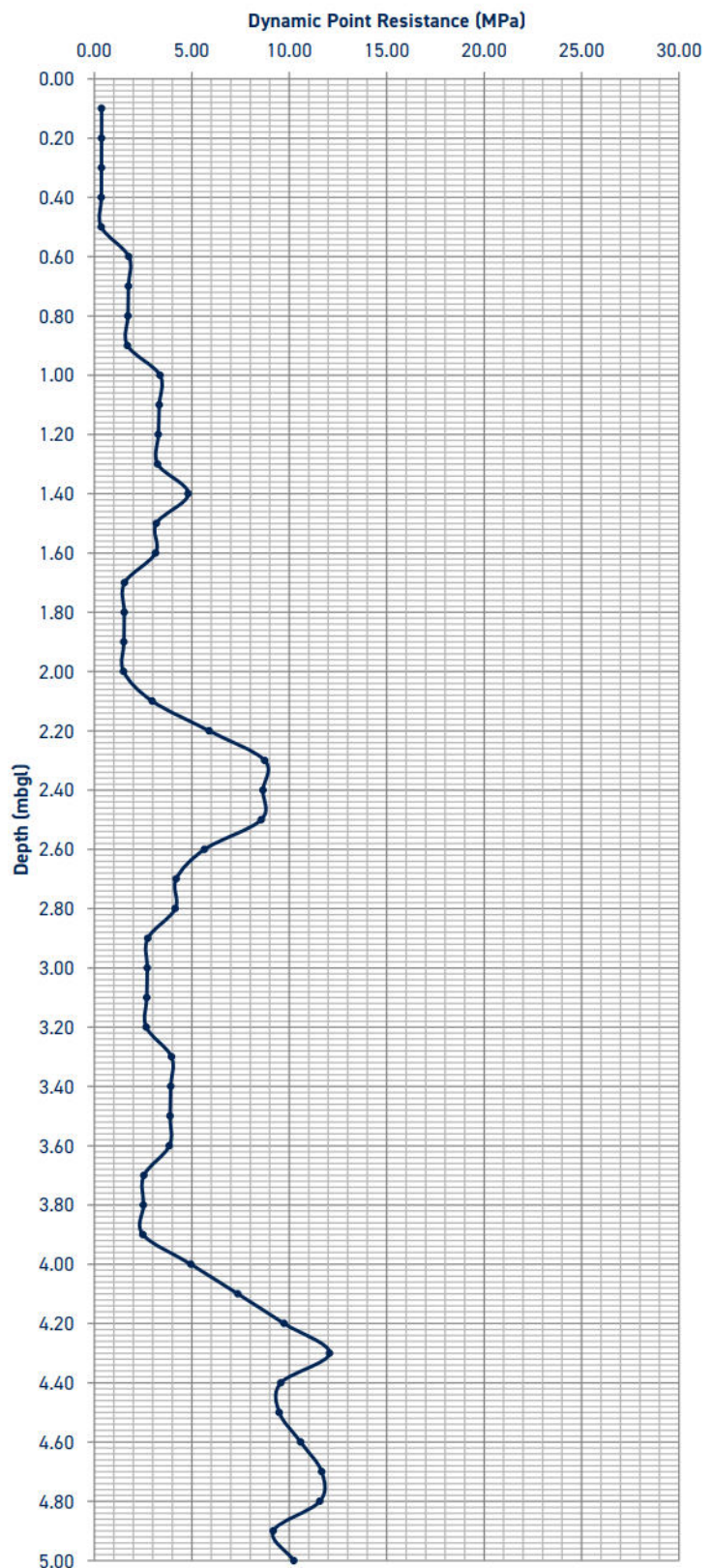
Remarks Trial pit dry on completion.	Method, Plant, Stability, Dimensions 0.00 - 0.98m Trial pit stable on completion. L = 0.99m W = 0.31m	Logger AW
---	---	--------------

Site: 2 Lakers Cottages, North End Road, Yapton, West Sussex

Project Ref: P17321

Test Location Reference **WS01**

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	0.2	0.50	0.39	0.38
0.20	0.2	0.50	0.39	0.37
0.30	0.2	0.50	0.39	0.37
0.40	0.2	0.50	0.39	0.36
0.50	0.2	0.50	0.39	0.36
0.60	1	0.10	1.94	1.77
0.70	1	0.10	1.94	1.75
0.80	1	0.10	1.94	1.73
0.90	1	0.10	1.94	1.70
1.00	2	0.05	3.89	3.37
1.10	2	0.05	3.89	3.33
1.20	2	0.05	3.89	3.29
1.30	2	0.05	3.89	3.25
1.40	3	0.03	5.83	4.82
1.50	2	0.05	3.89	3.18
1.60	2	0.05	3.89	3.14
1.70	1	0.10	1.94	1.55
1.80	1	0.10	1.94	1.54
1.90	1	0.10	1.94	1.52
2.00	1	0.10	1.94	1.50
2.10	2	0.05	3.89	2.98
2.20	4	0.03	7.77	5.89
2.30	6	0.02	11.66	8.74
2.40	6	0.02	11.66	8.65
2.50	6	0.02	11.66	8.56
2.60	4	0.03	7.77	5.65
2.70	3	0.03	5.83	4.20
2.80	3	0.03	5.83	4.16
2.90	2	0.05	3.89	2.74
3.00	2	0.05	3.89	2.72
3.10	2	0.05	3.89	2.69
3.20	2	0.05	3.89	2.67
3.30	3	0.03	5.83	3.96
3.40	3	0.03	5.83	3.92
3.50	3	0.03	5.83	3.89
3.60	3	0.03	5.83	3.85
3.70	2	0.05	3.89	2.54
3.80	2	0.05	3.89	2.52
3.90	2	0.05	3.89	2.50
4.00	4	0.03	7.77	4.95
4.10	6	0.02	11.66	7.37
4.20	8	0.01	15.55	9.74
4.30	10	0.01	19.44	12.07
4.40	8	0.01	15.55	9.57
4.50	8	0.01	15.55	9.49
4.60	9	0.01	17.49	10.59
4.70	10	0.01	19.44	11.67
4.80	10	0.01	19.44	11.57
4.90	8	0.01	15.55	9.18
5.00	9	0.01	17.49	10.24



Notes:

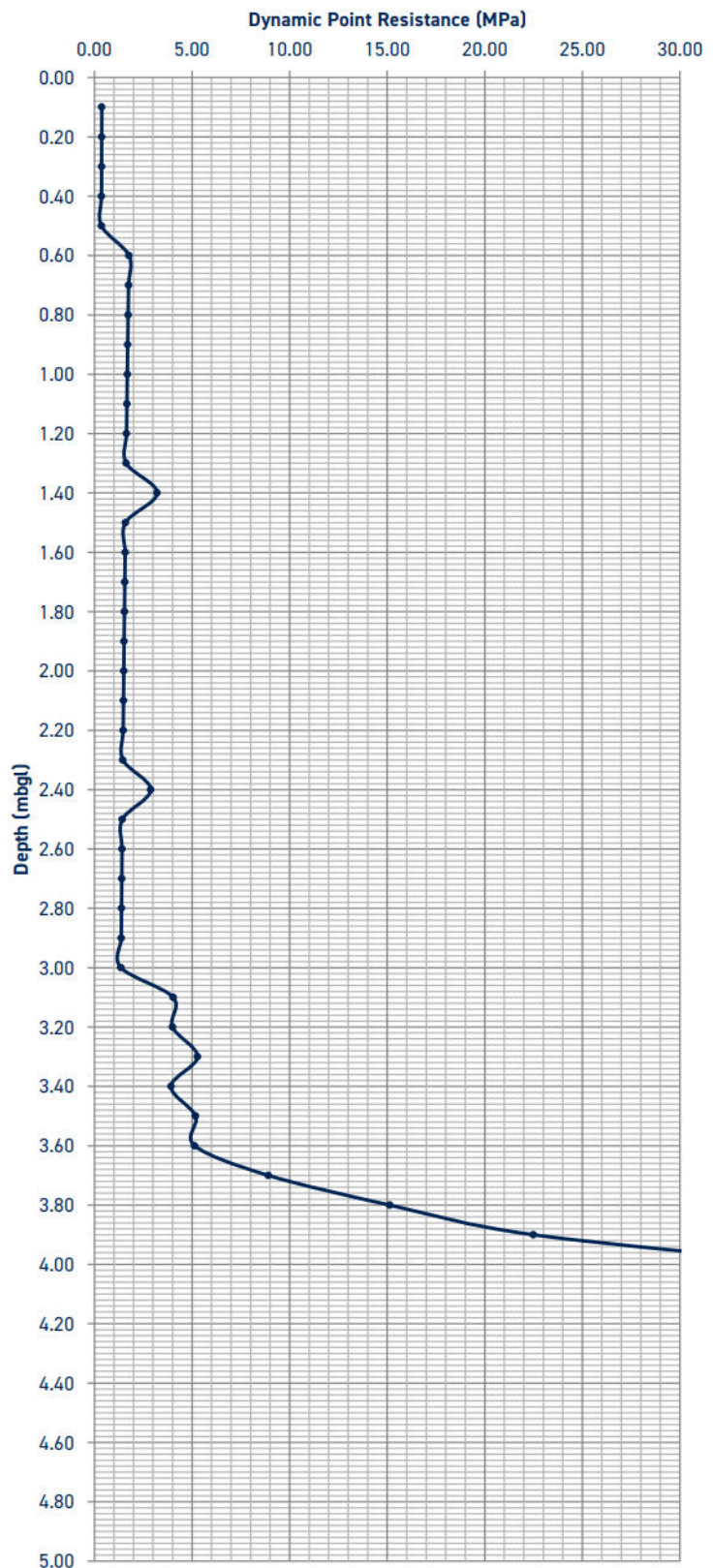
Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.78
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

Site: 2 Lakers Cottages, North End Road, Yapton, West Sussex

Project Ref: P17321

Test Location Reference: WS02

Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	0.2	0.50	0.39	0.38
0.20	0.2	0.50	0.39	0.37
0.30	0.2	0.50	0.39	0.37
0.40	0.2	0.50	0.39	0.36
0.50	0.2	0.50	0.39	0.36
0.60	1	0.10	1.94	1.77
0.70	1	0.10	1.94	1.75
0.80	1	0.10	1.94	1.73
0.90	1	0.10	1.94	1.70
1.00	1	0.10	1.94	1.68
1.10	1	0.10	1.94	1.66
1.20	1	0.10	1.94	1.64
1.30	1	0.10	1.94	1.63
1.40	2	0.05	3.89	3.21
1.50	1	0.10	1.94	1.59
1.60	1	0.10	1.94	1.57
1.70	1	0.10	1.94	1.55
1.80	1	0.10	1.94	1.54
1.90	1	0.10	1.94	1.52
2.00	1	0.10	1.94	1.50
2.10	1	0.10	1.94	1.49
2.20	1	0.10	1.94	1.47
2.30	1	0.10	1.94	1.46
2.40	2	0.05	3.89	2.88
2.50	1	0.10	1.94	1.43
2.60	1	0.10	1.94	1.41
2.70	1	0.10	1.94	1.40
2.80	1	0.10	1.94	1.39
2.90	1	0.10	1.94	1.37
3.00	1	0.10	1.94	1.36
3.10	3	0.03	5.83	4.04
3.20	3	0.03	5.83	4.00
3.30	4	0.03	7.77	5.28
3.40	3	0.03	5.83	3.92
3.50	4	0.03	7.77	5.18
3.60	4	0.03	7.77	5.14
3.70	7	0.01	13.60	8.91
3.80	12	0.01	23.32	15.13
3.90	18	0.01	34.98	22.49
4.00	30	0.00	58.31	37.16
4.10				
4.20				
4.30				
4.40				
4.50				
4.60				
4.70				
4.80				
4.90				
5.00				



Notes:
No further progress below 4.00m depth - hammer bouncing.

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.78
Anvil Mass	1 kg
Rod Mass	8.79 kg/m

APPENDIX C

Geotechnical Laboratory Test Results

Project Ref: P17321

[illegible]

Sheet No. 1

* Consistency index based on natural moisture content and not the equivalent moisture content.

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Unit 3 The Grain Store
Ditchling Common Business Park
Ditchling Common
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BN6 8SG

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 25-08083

Site Reference: 2 Lakers Cottages, North End Road, Yapton, West Sussex

Project / Job Ref: P17321 3026

Order No: 12407

Sample Receipt Date: 11/09/2025

Sample Scheduled Date: 11/09/2025

Report Issue Number: 1

Reporting Date: 19/09/2025

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Soil Analysis Certificate						
DETS Report No: 25-08083	~Date Sampled	09/09/25	09/09/25			
Ashdown Site Investigations Ltd	~Time Sampled	None Supplied	None Supplied			
~Site Reference: 2 Lakers Cottages, North End Road, Yapton, West Sussex	~TP / BH No	WS01	WS02			
~Project / Job Ref: P17321_3026	~Additional Refs	None Supplied	None Supplied			
~Order No: 12407	~Depth (m)	1.30	2.80			
Reporting Date: 19/09/2025	DETS Sample No	789451	789452			

Determinand	Unit	RL	Accreditation				
pH	pH Units	N/a	MCERTS	7.8	7.7		
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	15	< 10		
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.02	< 0.01		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
 Analysis carried out on the dried sample is corrected for the stone content

Soil Analysis Certificate - Sample Descriptions

DETS Report No: 25-08083	
Ashdown Site Investigations Ltd	
~Site Reference: 2 Lakers Cottages, North End Road, Yapton, West Sussex	
~Project / Job Ref: P17321_3026	
~Order No: 12407	
Reporting Date: 19/09/2025	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
789451	WS01	None Supplied	1.30	13.1	Light brown clay
789452	WS02	None Supplied	2.80	9.1	Light brown clayey sand with stones

Moisture content is part of procedure E003 & is not an accredited test

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 25-08083
Ashdown Site Investigations Ltd
~Site Reference: 2 Lakers Cottages, North End Road, Yapton, West Sussex
~Project / Job Ref: P17321_3026
~Order No: 12407
Reporting Date: 19/09/2025

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of FOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

List of HWOL Acronyms and Operators
DETS Report No: 25-08083
Ashdown Site Investigations Ltd
~Site Reference: 2 Lakers Cottages, North End Road, Yapton, West Sussex
~Project / Job Ref: P17321_3026
~Order No: 12407
Reporting Date: 19/09/2025

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total
~	Sample details provided by customer and can affect the validity of results

Det - Acronym

Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN

Certificate Key

Symbol	Description
F	Filtered sample
UF	Unfiltered sample
D	Dried sample
AR	As received sample
RL	Reporting limit
~	Sample details provided by customer and can affect the validity of results
M/S	Missing Sample
*	The Dutch 10 PAH compounds consist of Naphthalene, Anthracene, Phenanthrene, Fluoranthene, Benz(a)anthracene, Chrysene, Benzo(k)fluoranthene, Benzo(a)pyrene, Benzo(g,h,i)perylene, and Indeno(1,2,3-cd)pyrene
**	Total EPA-16 PAHs consist of the following polycyclic aromatic hydrocarbons: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, and Benzo(ghi)perylene.
***	Total WAC-17 PAHs consist of the following polycyclic aromatic hydrocarbons: Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, Benzo(ghi)perylene and Coronene.
^	No sampling date provided; unable to confirm if samples are within acceptable holding times
\$	Samples exceeded their recommended holding times
M	MCERTS accredited test
U	UKAS accredited test

APPENDIX D

Aggressivity To Concrete Assessment

Trial Pit In Situ Infiltration Test Results

Site: 2 Lakers Cottages, North End Road, Yapton, West Sussex

Project Ref: P17321

Chemical Laboratory Test Results

[illegible]

Notes: Chemical testing was undertaken by an external laboratory with recognised (UKAS and MCERTS) accreditation for quality control. Testing scheduled in line with the BRE Special Digest 1:2005 Concrete in Aggressive Ground Suites A-D and as such some determinands were not required to be tested.

Assessment of the Chemical Analysis of the Soil

Ground Condition	Natural Ground Conditions
Groundwater Condition	Mobile Groundwater Conditions
Pyrite Soil Condition	Soils present beneath the site are not expected to contain pyrite

	Characteristic Value	Design Sulfate Class	ACEC Classification
pH	7.7	-	-
Water Soluble Sulphate (mg/l as SO ₄) *	<100	DS-1	AC-1
Total Potential Sulphate (TPS % SO ₄)	N/A - Non Pyrite Soil Present	-	-
Magnesium (mg/l) *	N/A - Natural Ground Conditions	-	-
Water Soluble Sulphate including mineral acids (mg/l as SO ₄) *	N/A - Natural Ground Conditions	-	-

Notes: * Characteristic value rounded to nearest 100.

The aggressivity of the soils to concrete has been assessed in accordance with guidance published by the BRE Special Digest 1:2005 Concrete in Aggressive Ground.

Site: 2 Lakers Cottages, North End Road, Yapton, West Sussex

Project Ref: P17321

Test Location Reference	TP01
Test Number	1

Width of Pit	0.31 m	W
Length of Pit	0.99 m	L
Depth of Pit	0.98 m	D
Pit type	Open	

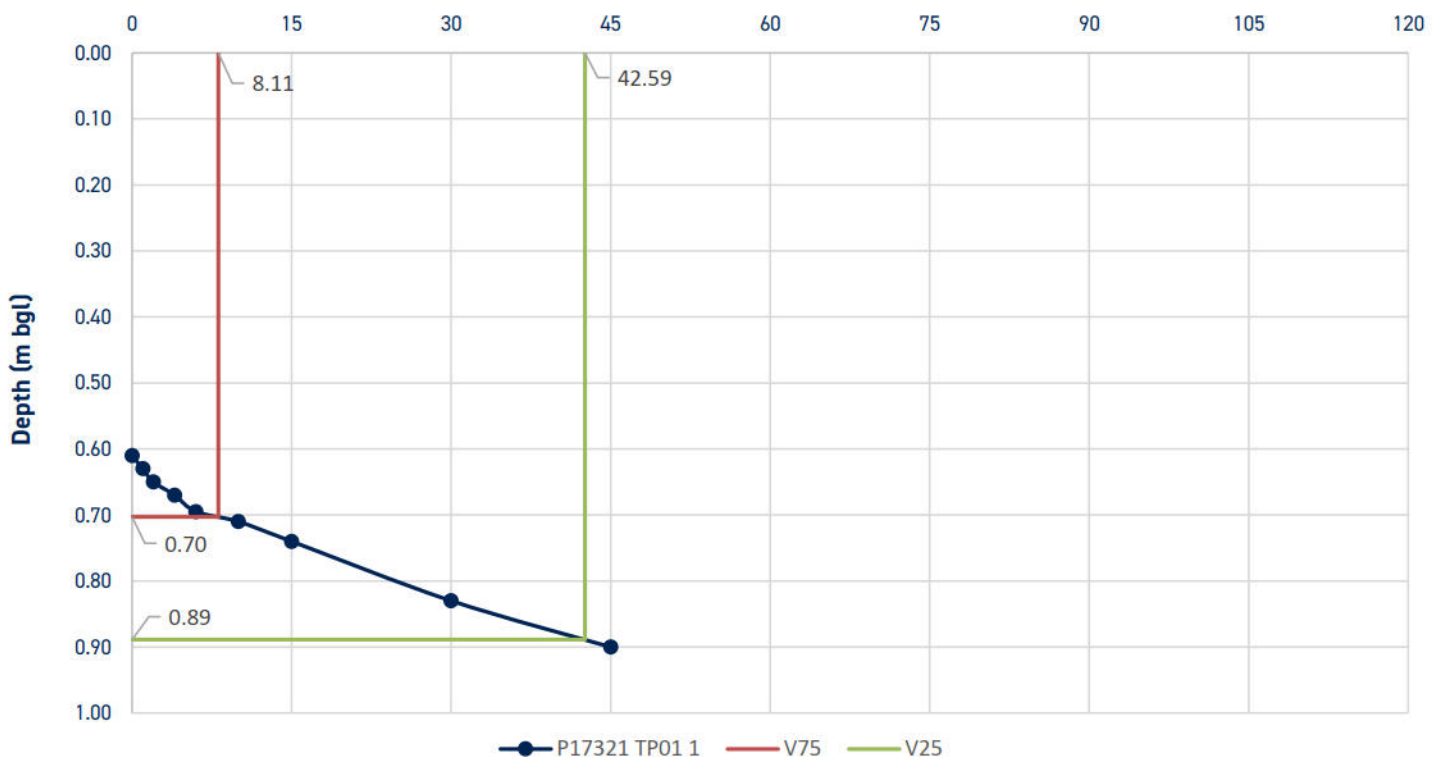
Volume of water introduced into pit	0.112 m ³	
Initial head of water	0.37 m	h_0
Water level at start of test	0.61 m	
Water level at end of test	0.90 m	
Volume of water discharged from pit	0.088 m ³	
Duration of test	45 min	
Average soaked surface area	0.89 m ²	
Time for water level to fall to 75% of initial head	8.11 min	t_{p75}
Time for water level to fall to 25% of initial head	42.59 min	t_{p25}
Depth to water at 75% of initial head	0.70 m	d_{75}
Depth to water at 25% of initial head	0.89 m	d_{25}
Time for the water level to fall from 75% to 25% of initial head	34.48 min	t_{p75-25}
Effective storage volume of water in the soakage trial pit between 75% and 25% of initial head	0.056 m ³	V_{p75-25}
Internal surface area of the soakage trial pit up to 50% of initial head and including the base area	0.78 m ²	a_{s50}

Infiltration rate

3.46E-05 m/sec f

Calculation method: BRE 365

Elapsed Time (min)



Site: 2 Lakers Cottages, North End Road, Yapton, West Sussex

Project Ref: P17321

Test Location Reference	TP01
Test Number	2

Width of Pit	0.31 m	W
Length of Pit	0.99 m	L
Depth of Pit	0.98 m	D
Pit type	Open	

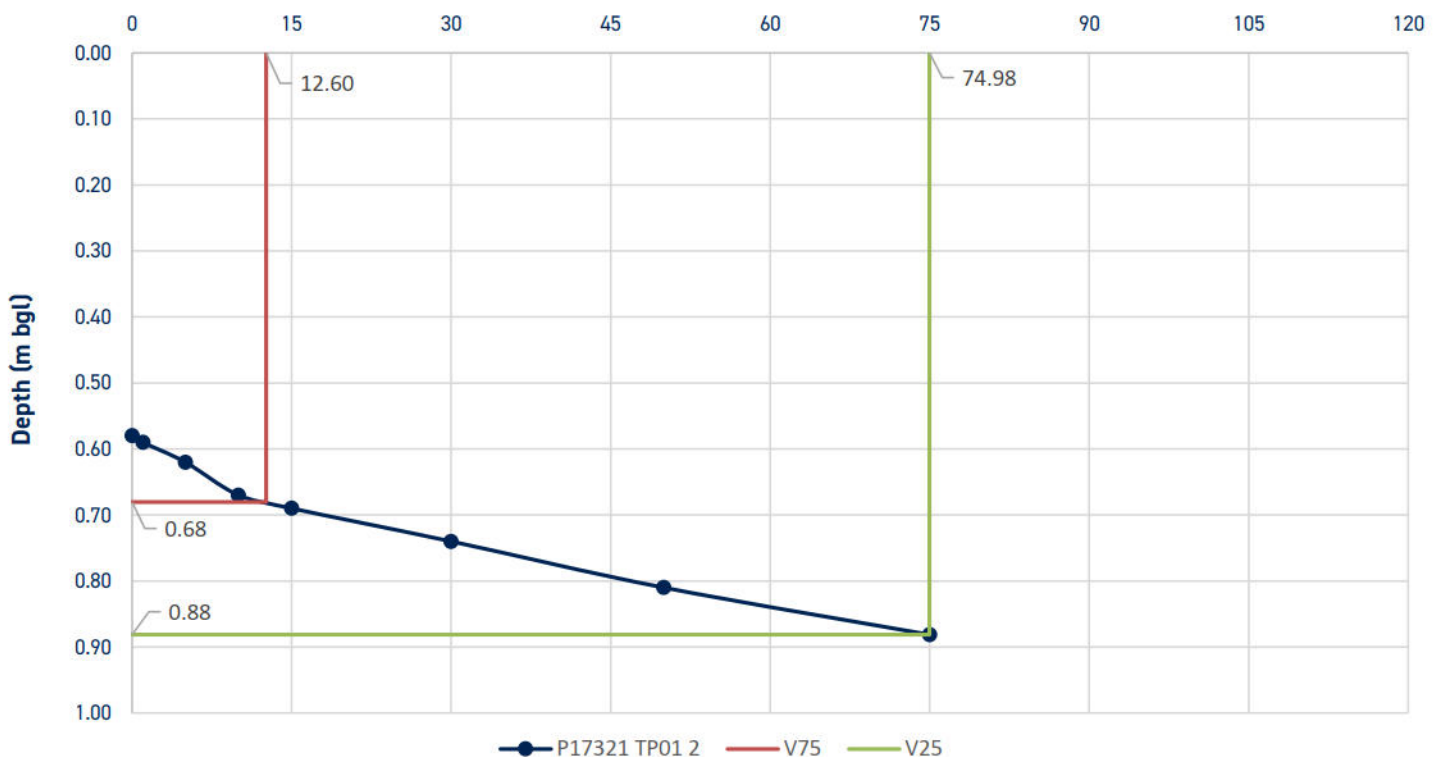
Volume of water introduced into pit	0.121 m ³	
Initial head of water	0.40 m	h_o
Water level at start of test	0.58 m	
Water level at end of test	0.88 m	
Volume of water discharged from pit	0.091 m ³	
Duration of test	75 min	
Average soaked surface area	0.95 m ²	
Time for water level to fall to 75% of initial head	12.60 min	t_{p75}
Time for water level to fall to 25% of initial head	74.98 min	t_{p25}
Depth to water at 75% of initial head	0.68 m	d_{75}
Depth to water at 25% of initial head	0.88 m	d_{25}
Time for the water level to fall from 75% to 25% of initial head	62.38 min	t_{p75-25}
Effective storage volume of water in the soakage trial pit between 75% and 25% of initial head	0.061 m ³	V_{p75-25}
Internal surface area of the soakage trial pit up to 50% of initial head and including the base area	0.82 m ²	a_{s50}

Infiltration rate

1.97E-05 m/sec f

Calculation method: BRE 365

Elapsed Time (min)



Site: 2 Lakers Cottages, North End Road, Yapton, West Sussex

Project Ref: P17321

Test Location Reference	TP01
Test Number	3

Width of Pit	0.31 m	W
Length of Pit	0.99 m	L
Depth of Pit	0.98 m	D
Pit type	Open	

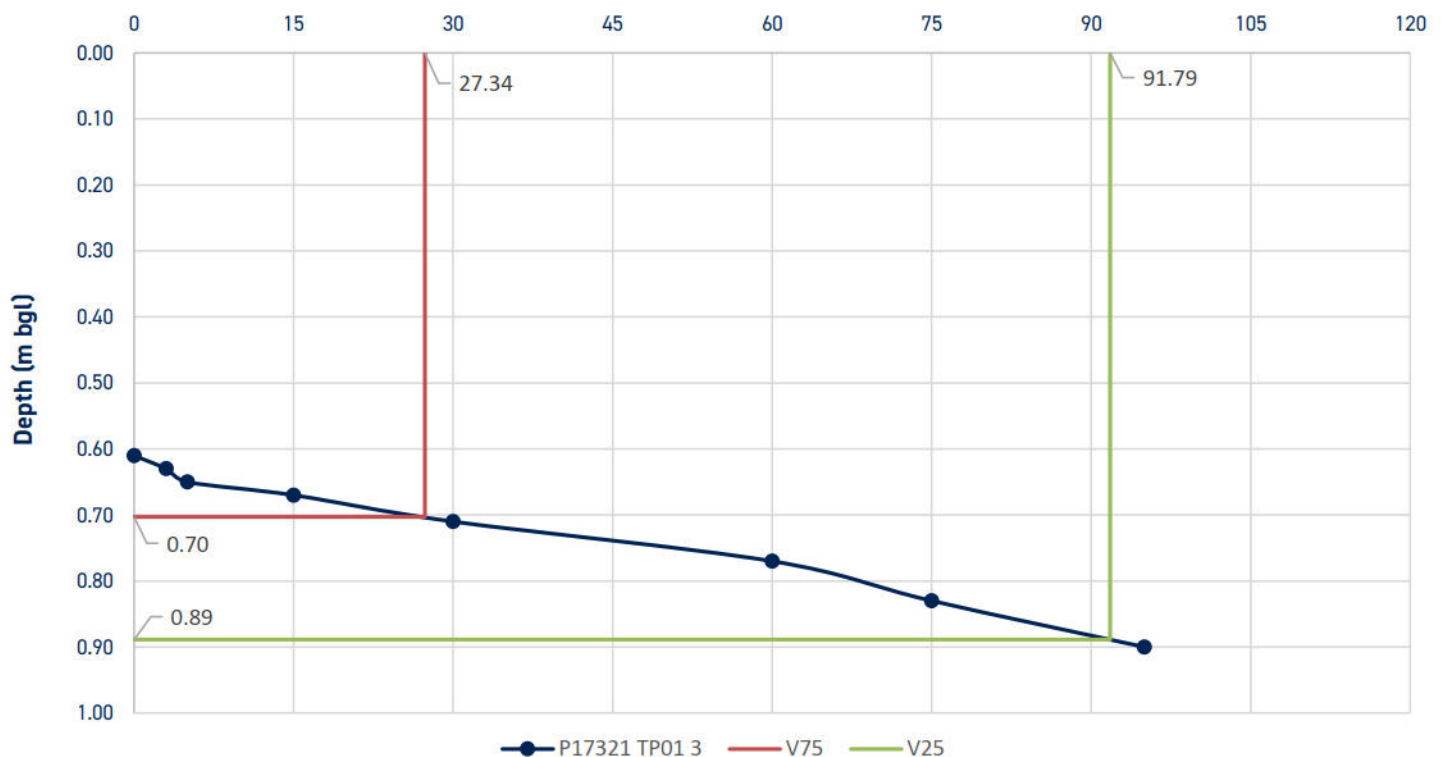
Volume of water introduced into pit	0.112 m ³	
Initial head of water	0.37 m	h_0
Water level at start of test	0.61 m	
Water level at end of test	0.90 m	
Volume of water discharged from pit	0.088 m ³	
Duration of test	95 min	
Average soaked surface area	0.89 m ²	
Time for water level to fall to 75% of initial head	27.34 min	t_{p75}
Time for water level to fall to 25% of initial head	91.79 min	t_{p25}
Depth to water at 75% of initial head	0.70 m	d_{75}
Depth to water at 25% of initial head	0.89 m	d_{25}
Time for the water level to fall from 75% to 25% of initial head	64.44 min	t_{p75-25}
Effective storage volume of water in the soakage trial pit between 75% and 25% of initial head	0.056 m ³	V_{p75-25}
Internal surface area of the soakage trial pit up to 50% of initial head and including the base area	0.78 m ²	a_{s50}

Infiltration rate

1.85E-05 m/sec f

Calculation method: BRE 365

Elapsed Time (min)



Appendix IV Planners Comments

Engineers Comments Regarding Surface Water Drainage

Application Reference:	Y/13/25/HH	Reviewer Reference:	ADC/SB
Planning Officer:	Aishwarya Reddy	Date of Review:	25/04/2025
Site Name:	2 Lakers Cottages North End Road Yapton BN18 0DL		
Application Description:	Single storey side extension.		
Assessment Number:	1 of 1		

Policy and Guidance Information

Arun District Council Surface Water Drainage Guidance - <https://www.arun.gov.uk/surfacewater>

Land Drainage Consent – <https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/flooding/flood-risk-management/ordinary-watercourse-land-drainage-consent/> and <https://www.arun.gov.uk/land-drainage-consent/>

Arun District Council surface water pre-commencement conditions - <https://www.arun.gov.uk/planning-pre-commencement-conditions>

The SuDs Manual [C753] by CIRIA

Sustainable drainage systems: non-statutory technical standards' <https://assets.publishing.service.gov.uk/media/5a815646ed915d74e6231b43/sustainable-drainage-technical-standards.pdf>

Response	Objection
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Critical Items for Surface Water Drainage Design Conditions

The failure to adequately address the following items will result in an objection to a surface water drainage design.

If any of these items are inadequately addressed by the submission, then their correction may result in a redesign of the surface water drainage scheme. A redesign is likely to have site wide implications such as the potential for storage structures to increase in volume or plan area.

Items are further elaborated upon in the attached comment tracker where necessary.

Further comments which are unlikely to impact the design methodology will be provided in the comment tracker, these relate to the detailed design. Unless clearly stated, it is considered that these additional comments are unlikely to result in a redesign of the system. These can be addressed following a second consultation to prevent unnecessary refusals.

Critical Item	Reason	Status
Winter groundwater monitoring data.	Adequate winter groundwater monitoring data must be supplied to evidence that infiltration designs have sufficient freeboard from the base of structures and the peak groundwater level.	Not supplied

	The same data is necessary to ensure that the potential for buoyancy has been adequately considered in attenuation designs.	
Winter infiltration testing data.	Adequate winter infiltration testing must be supplied to justify the proposed discharge method and design infiltration rates. Infiltration tests must be completed strictly in accordance with BRE DG 365, CIRIA R156 or a similar approved method. Testing depths must account for peak groundwater levels and correspond with the location and depth of proposed infiltration features. Designs must be based upon the <u>slowest</u> infiltration rate evidenced closest to a proposed infiltration feature. Average design rates will not be accepted. The results of incomplete tests should not be extrapolated to obtain design values for infiltration rates.	Not supplied
The hierarchy for sustainable drainage.	The proposed discharge method must accord with the SuDS hierarchy as given below. Evidence must be supplied to justify the proposed discharge method. 1. Rainwater reuse where possible. 2. Complete discharge into the ground (infiltration). 3. Hybrid infiltration and restricted discharge to an appropriate water body or surface water sewer. 4. Restricted discharge to an appropriate water body. 5. Restricted discharge to a surface water sewer. 6. Restricted discharge to a combined sewer. A water body may be defined as a river, watercourse, ditch, culverted watercourse, reservoir, wetland or the sea. Engineers cannot support any proposed connection of surface water to the foul sewer.	Compliant – but unproven

Calculations	Calculations for pre-development run off rates must be based upon the positively drained area only. Proposed discharge rates must not increase flood risk on site or elsewhere. Discharge rates must be restricted to QBAR or 2 l/s/ha, depending on whichever is higher.	Not supplied
	Designs must be based on the most recently available rainfall data at the time of conditions being applied. <u>FSR rainfall data will not be accepted.</u> FEH rainfall data is based upon more recent records and continues to be updated.	Not supplied
	Designs must use the correct climate change allowances at the time of determination of the outline or full planning application. CV values for all events must be set to 1. This includes summer, winter, design, and simulation events. The correct allowance for urban creep must be applied. Additional storage must be set to zero unless it can be evidenced where this is provided. Infiltration half-drain times must be less than 24 hours. Infiltration design rates must be applied to the sides of soakaways, or to the base of infiltration blankets. Design rates must not be applied to both the base and sides of infiltration structures. A surcharged outfall must be modelled.	Not supplied
Natural catchments design.	The submission must define the natural drainage characteristics within, and hydraulically linked to, the site and demonstrate that the drainage proposals will integrate with and not compromise the function of the natural and existing drainage systems. The condition, performance (including capacity where appropriate) and ownership of any existing site surface water drainage infrastructure must be accurately reported.	Not supplied

	Appropriate easements to watercourses and other services must be shown on all plans. Where there are areas of flood risk from any source on the site, it must be shown how a sustainable surface water drainage design can be accommodated on the site without conflicting with those areas of flood risk. Designs must replicate the natural drainage catchments of the site. All surface water drainage designs must therefore drain via gravity to corresponding points of discharge. The use of pumps for surface water drainage is not sustainable and will not be supported.	
Plans	Plan areas, depths and levels of drainage infrastructure must accurately correspond with the supporting calculations.	Not supplied
Water quality benefits.	An assessment of water quality is necessary to evidence that the proposed design provides adequate treatment of surface water.	Not supplied
Trees and planting	There should be no conflict between surface water drainage infrastructure and existing or proposed trees or planting. The design must consider the potential growth of proposed trees and adequate mitigation must be provided to protect drainage infrastructure where conflict cannot be avoided.	Not supplied

Additional comments to the planning officer

The NPPF states that when determining any planning application, local planning authorities should ensure that flood risk is not increased elsewhere (paragraph 181, 182 and 187e). The PPG guides local planning authorities to refer to 'Sustainable drainage systems: non-statutory technical standards' and detailed industry guidance like The SuDS Manual [C753] by CIRIA to guide decisions about the design, maintenance, and operation of sustainable drainage systems for non-major development.

This consultation has been primarily informed by The SuDS Manual.

The following documents have been submitted to support the application with reference to surface water drainage:

- Lidsey Catchment Area Drainage Statement. Referred to as the **drainage statement**.

Insufficient information regarding surface water drainage has been submitted to evidence that flood risk will not be increased as due to the proposed development.

The drainage statement states that the existing dwelling is assumed to drain via soakaways and that the proposed extensions will be drained via infiltration. To achieve an infiltration design, winter groundwater levels must be monitored to ensure that 1m of unsaturated ground is allowed for between the base of the soakaway or infiltration structure and the peak groundwater level. Ground conditions and infiltration potential are very variable in Yapton. Infiltration can be possible, but in parts, groundwater can be high or infiltration rates so low as to make infiltration unviable.

If infiltration is not viable, then alternative sustainable means of draining the site are summarised as follows:

1. Infiltration – not investigated.
2. To a watercourse – none available.
3. To a surface water sewer – none available.
4. To a highway drainage system – Permission cannot be assumed. Generally, applications to connect surface water to highway drainage are strongly resisted.
5. To a combined sewer – none available.

Surface water must not be discharged into the foul sewer. The foul sewer is not a recognised disposal location in the SuDS Manual, Approved Document H, or the NPPG **[Flood risk and coastal change para 056]**. It is important to recognise that the foul and combined sewer networks are defined by the public sewer records held by Southern Water Services Ltd.

The public sewer in the Lidsey Wastewater Treatment Catchment Area has a history of flooding and any surface water added to this system should be assumed to increase flood risk.

As this is already a developed site which is apparently drained with soakaways, there is a risk that there may not be sufficient space to accommodate additional infiltration structures without conflicting with, or compromising, the function of the existing drainage of the site. The existing drainage features must be investigated to ensure that flood risk is not increased by the proposed extension construction and/or its drainage.

In the absence of any evidence of a viable surface water drainage design, we cannot assess if flood risk will be increased by the proposed development. Therefore, this application does not accord with the NPPF as set out above.

Overcoming our objection

As this is not a holding objection or a request for further information, requested conditions are not listed. If you are minded to approve this application, please reconsult engineers for a list of suggested conditions to ensure that the development is adequately drained and does not increase flood risk elsewhere.

The imposition of conditions at this stage rather than overcoming the objection could result in a circumstance where the condition cannot be discharged. In the event of attaching a condition that cannot be discharged, permission may be invalid.

If the planning officer is minded to allow the applicant additional time to submit further documents to support this application, then the following evidence may overcome the objection. Please do not

submit further documents without prior discussion with the planning officer as to whether it will be possible for these to be assessed or influence their determination.

1. Provide evidence of a sustainable surface water disposal location. Including but not limited to:

- Winter groundwater monitoring and winter infiltration testing,

If infiltration is not viable then present evidence of this in addition to:

- Permission in principle to connect surface water from the site to an alternative disposal location. Please note, evidence of permission to connect surface water to the Southern Water public foul sewer will not be acceptable.

2. Evidence that a sustainable surface water drainage design can be accommodated within the proposed site layout. This will require a drainage statement, supporting calculations and a preliminary drainage layout as a minimum.

A reduced **site-specific** version of our full surface water drainage design checklist is provided below. This has been edited to remove elements that are not applicable to this site, either due to the scale of the proposal or the method of disposal. The checklist is provided to assist the applicant and designer in preparing a revised design to meet our requirements. It is applicable to 2 Lakers Cottages only.

- Items highlighted as must be provided prior to determination to overcome our objection.
- Additional comments or notes are provided by the reviewer **in bold**.
- If an item has been submitted this is checked: ☒
- All other items are assumed to be handled via a condition applied to the permission if given.

The full unedited surface water design checklist is available on our website at <https://www.arun.gov.uk/surfacewater/>. **If the design is amended following receipt of our consultation the designer may need to refer to the full checklist to ensure that the revised design meets our requirements.**

2 Lakers Cottages Road Designer Checklist

Ground Investigation Results

Groundwater monitoring

- ☐ Plan showing location of monitoring points provided.
- ☐ Depths of holes detailed.
- ☐ Dates of observations and depth to groundwater recorded.
- ☐ Evidence of the strata within borehole or monitoring pits provided.

Requested to aid speed of assessment

- ☐ Plan showing the peak groundwater levels at each monitoring point in mAOD.
- ☐ Peak groundwater levels recorded in metres below ground level and mAOD.

Infiltration testing

- ☐ Completed strictly in accordance with BRE DG 365, CIRIA R156 or a similar approved method.
- ☐ Plan showing location of trial pits provided.
- ☐ Pit dimensions provided.
- ☐ Depths of testing provided.
- ☐ Dates, times and readings of each test recorded.
- ☐ Calculations for the infiltration rate for each test provided.
- ☐ Evidence of the strata within trial pits provided.
- ☐ Test locations, and depths correspond with the expected location and depths of proposed infiltration features.

Requested to aid speed of assessment

- ☐ Depths of testing provided in m below ground level and mAOD.

Surface Water Drainage Statement

Disposal method (Select as appropriate)

- ☒ Rainwater reuse is proposed where possible.
- ☒ Infiltration is proposed and maximised wherever possible. **Unproven**
- ☐ Restricted discharge to a public or private highway drainage network is proposed where a full infiltration design is not possible and there are no nearby water bodies or surface water sewers.

Disposal method justification

- ☐ Infiltration has been adequately investigated, in winter, at appropriate and varying depths where appropriate, above peak recorded winter groundwater levels at the given location.
- ☐ Offsite nearby downstream water bodies are investigated (location, mapping, network, flow direction, ownership/responsibility, depth, and condition).
- ☐ Public and private downstream highway drainage networks are investigated (location, mapping, network, flow direction, ownership/responsibility, depth, capacity, and condition).
- ☐ Any relevant permissions or legal agreements from asset or landowners that are needed are identified and evidence of consents provided.

Investigate in priority order if infiltration is not viable.

Requested to aid speed of assessment

☐ Any previous relevant correspondence or pre-application advice from the Local Planning Authority [LPA] or the Lead Local Flood Authority [LLFA] regarding the surface water drainage design is included with the statement. **Assumed N/A**

Existing Site

Essential

- ☐ It is clear what the natural drainage characteristics of the site are.
- ☐ Existing site drainage features are investigated – condition, performance, and ownership.
- ☒ Existing and future flood risk from any source is detailed.

It is suggested that the above is achieved with the following, which may be combined where appropriate:

- ☐ An existing topographical plan. **Need not be extensive, cover levels at proposed features will be required.**
- ☒ Flood maps (fluvial, tidal, pluvial, groundwater, sewer, and reservoir) are supplied (or Flood Risk Assessment referred to).
- ☐ Confirmation and surveys of any existing drainage infrastructure on the site.
- ☒ Full details of any known flooding on the site.

Proposed Design

Essential

☐ Statement confirming the proposed design criteria including fixed design calculation inputs for the SuDS system. Examples include:

- Climate change allowances,
- Urban creep allowance,
- CV values,
- Rainfall data,
- MADD factor or additional storage.

- ☐ The design is gravity based with no use of pumps.
- ☐ Where there is existing drainage infrastructure on the site it is clearly explained or illustrated what is being retained, upgraded, or removed.
- ☐ Details of necessary off-site works and consents are provided. **If applicable.**
- ☐ If the surface water drainage is designed to flood in the 1% Annual Exceedance Probability [AEP] + Climate Change Allowance [CCA] event, then the flood volume is contained safely on site without flooding any part of a building or utility plant susceptible to water or affecting safe access or egress.

☒ The design provides and evidences interception drainage and is able to capture and retain on site the first 5mm of the majority of all rainfall events. **Water butts assumed to achieve this.**

☐ Water quality and treatment is adequately assessed – with an assessment appropriate for the scale and proposed use of the site.

☐ There are no clashes with other infrastructure.

☐ Self-cleansing velocities are achieved where pipes are proposed.

☐ 1m freeboard is provided between peak groundwater levels and the base of any infiltration feature.

If infiltration is not viable:

- ☐ The proposed discharge rate is explained and justified (for attenuation designs).
- ☐ Where there is a risk that the base of an attenuation feature may penetrate peak groundwater levels, additional mitigation measures to prevent groundwater ingress are incorporated into the design and construction method statement.

☐ Where there is a risk that the base of an attenuation feature may penetrate peak groundwater levels the effects of buoyancy have been considered in the design.

☐ The justification and criteria for tree root avoidance and mitigation measures is clear.

☐ A construction method statement for the SuDS system, appropriate to the scale of the development, is submitted. **Only applicable for high groundwater if found due to scale of development.**

☐ A maintenance plan for the SuDS system, appropriate to the scale of the development, is submitted.

Preferred

☐ Ground raising is avoided where possible.

Impermeable Area/Catchment Plan

Comment: **Can be incorporated within the drainage layout.**

Essential

☐ An impermeable area plan is provided showing all positively drained areas including open surface water storage plan areas.

Preferred

☐ Impermeable areas are shown in m² on the impermeable areas plan(s).

☐ Demarcated impermeable areas correspond with the distribution of those areas in the supporting calculations.

Surface Water Drainage Calculations

General

☒ The most recently applicable, or previously agreed FEH rainfall data is used.

☒ CV values for all events are set to 1. This includes summer, winter, design, and simulation events.

☒ The correct climate change allowances, appropriate for the full lifetime of the development, have been applied to all calculations.

☒ A 10% allowance for urban creep is applied to all residential roof areas.

☐ 100% Annual Exceedance Probability [AEP] + Climate Change Allowance [CCA] (1 in 1 year) event calculations provided.

☒ 10% AEP + CCA (1 in 10 year) event calculations provided showing that the incoming pipe to any infiltration feature is above this level.

☒ 3.33% AEP + CCA (1 in 30 year) event calculations provided showing that the full surface water volume is contained within the designed system without flooding.

☒ 1% AEP + CCA (1 in 100 year) event calculations provided showing that the full surface water volume is contained safely on site, without flooding any part of a building or utility plant susceptible to water or affecting safe access or egress.

Infiltration

☒ Half drain times do not exceed 24 hours for the 10% AEP + CCA and 1% AEP + CCA events.

☒ If half drain times exceed 24 hours for the 1% AEP + CCA event, then advice and agreement from the LPA has been sought and submitted.

☒ The most precautionary design infiltration rate is used.

- ☐ Design infiltration rates are applied to the sides of soakaways only.
- ☐ Design infiltration rates are applied to the base of permeable paving, infiltration blankets or basins only.
- ☐ Where the design infiltration rate is applied to the base an appropriate factor of safety is applied.

Attenuation and Restricted Discharge – if infiltration is not viable

- ☐ Greenfield run off rates are based upon the positively drained area of the site only.
- ☐ Discharge rates are restricted to QBAR or 2 l/s/ha, depending on whichever is higher, for all storms up to the 1% AEP + CCA event.
- ☐ Half drain times and available capacity in the drainage system for subsequent storms are considered.
- ☐ A surcharged outfall to a watercourse or sewer has been modelled. The surcharge level is the 1% AEP + CCA flood event for the receiving watercourse, or to the top of the bank if appropriate hydraulic modelling is not available.

Requested to aid assessment

- ☐ FEH22 point descriptors for the site are provided.

Drainage Plans and Specifications

Comment: Where only some of the detail is required prior to determination, these are highlighted in **bold**, if all items are required nothing is highlighted except the checkbox.

Essential

Plans are provided showing:

- ☐ The proposed design within the proposed site layout.
- ☐ Existing and proposed site levels.
- ☐ Long and cross sections for the proposed drainage system including final finished floor levels.
- ☐ Exceedance flow management routes.
- ☐ Details of connections to sewers.

These plans must be of sufficient detail that a reviewer can be confident that the design can be constructed without flood risk being increased on site or elsewhere.

Specifications are required for all materials used in the design. We suggest that this is best achieved and illustrated with site specific construction detail drawings. The combination of construction details, with plans and sections, ensure that the proposed standard of construction will facilitate adoption and maintenance by an appropriate body and have structural integrity.

The following checklist is designed to demonstrate the level of detail required:

Easements

- ☐ Any appropriate easements as stipulated by any public or private utility provider shown on all plans.
- ☐ Infiltration features (aside from permeable paving that does not take any extra impermeable catchment such as a roof) are shown at least 5m from buildings or structures.
- ☐ Existing and proposed trees and their root protection zones are shown on any drainage layout.

Detail

- ☐ It can be clearly determined what a pipe's diameter, pipe materials, **gradients**, flow directions and invert levels are from the plans.

- ☐ It can be clearly determined what an inspection chamber or manhole's **cover level, invert level,** cover loading grade and sump depth (where applicable) are from the plans.
- ☐ All infiltration or attenuation features (including permeable paving) are clearly labelled with their dimensions, invert/base levels and cover levels.
- ☐ Control structures are labelled with discharge rates, hydraulic head, invert and cover levels and ideally model number. **If infiltration is not viable.**
- ☐ Measures to protect drainage from tree root damage are clearly shown on any drainage layout.
- ☐ If the 1% AEP + CCA event floods, then the extent and depth of the flooding is shown on a site plan. This plan includes proposed external ground levels and finished floor levels of buildings.
- ☐ Potential flow routes off site are shown. The plan also includes proposed external ground levels, finished floor levels of buildings and designed slopes on all impermeable surfaces such as highways or car parks.
- ☐ Construction detail drawings are site specific.
- ☐ Construction detail drawings are provided for all components including but not limited to:
 - ☐ Infiltration structures
 - ☐ Attenuation structures
 - ☐ Manholes/inspection chambers
 - ☐ Catchpits/silt traps
 - ☐ Flow control devices
 - ☐ Permeable paving
 - ☐ Channel drains
 - ☐ Gullies
 - ☐ Pipe bed and surround
 - ☐ Pipe to pipe connections
 - ☐ Filter strips or drains
 - ☐ Tree pits and measures to protect drainage from root incursion
 - ☐ Water treatment features
 - ☐ Water butts or alternative methods of water reuse – also to be shown on plans.

The following items are requested to aid assessment or confidence in construction:

- ☐ Where features have a non-uniform plan area, a plan showing the coordinates of the perimeter is provided.
- ☐ All drainage infrastructure is labelled to correspond with the supporting calculations.

Other

- ☐ Open feature planting specification is provided (to be assessed by others).

This checklist is designed to aid an applicant with their submission. The list is not exhaustive, and our engineers may request additional information to enable them to review a proposal to their satisfaction.

The checklist may also request information that an applicant does not feel is relevant to their submission. In this case the applicant can provide an explanation as to why they have omitted certain information in their drainage statement. However, the appraising engineer reserves the right to request this information if they believe it is necessary for their review.

[REDACTED]

Drainage Engineers response

[REDACTED]

Arun District Council, Civic Centre, Maltravers Rd
Littlehampton, West Sussex, BN17 5LF
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From: Sarah Burrow <Sarah.Burrow@arun.gov.uk>

Sent: 06 May 2025 12:39

To: Planning.Responses <Planning.Responses@arun.gov.uk>

Cc: Paul Cann <Paul.Cann@arun.gov.uk>; Aishwarya Reddy <Aishwarya.Reddy@arun.gov.uk>

Subject: RE: Internal Staff Planning Consultation on: Y/13/25/HH

Hi Aishwarya,

Find the consultation – an objection – attached. Apologies for the delay in response.

Kind regards

Sarah Burrow

Flood Risk and Drainage Engineer, Coastal Engineers and Flood Prevention

T: 01903 737815

E: sarah.burrow@arun.gov.uk

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From: Planning.Responses <Planning.Responses@arun.gov.uk>

Sent: 25 April 2025 11:34

To: Land Drainage <Land.Drainage@arun.gov.uk>

Subject: Internal Staff Planning Consultation on: Y/13/25/HH

To: **Engineers (Drainage)**

NOTIFICATION FROM ARUN DISTRICT COUNCIL

CONFIDENTIAL LINK TO INTERNAL DOCUMENTS

Application No: Y/13/25/HH
Registered: 4th March 2025
Site Address: 2 Lakers Cottages North End Road Yapton BN18 0DL
Grid Reference: 498154 104227
Description of Works: Single storey side extension.

PLEASE BE AWARE THAT THIS EMAIL IS FOR INTERNAL STAFF ONLY AND GIVES ACCESS TO REDACTED AND NON REDACTED DOCUMENTS. INFORMATION FROM THESE LINKS SHOULD NOT BE FORWARDED OUTSIDE THE ORGANISATION AS IT IS NOT IN THE PUBLIC DOMAIN

The internal documents for this application can be viewed here:

[Click here to view all the documents.](#)

Yours sincerely

Aishwarya Reddy

Planning Case Officer- Arun District Council

Telephone: 01903 737649

aishwarya.reddy@arun.gov.uk

PLCON_DMSINTERNAL (ODB) 2024