

Surface Water Drainage Report

Shelley House, Church Lane, Eastergate PO20 3UR

For

Lindsey Clare

Rev - **P1**

Reference **C1870**

Date **14th January 2022**

Revision	Date of Issue	Comments	Prepared By	Checked By
P	14.01.22	Initial Issue	LH	CS
P1	27.04.22	Updated to suit comments	CS	CS

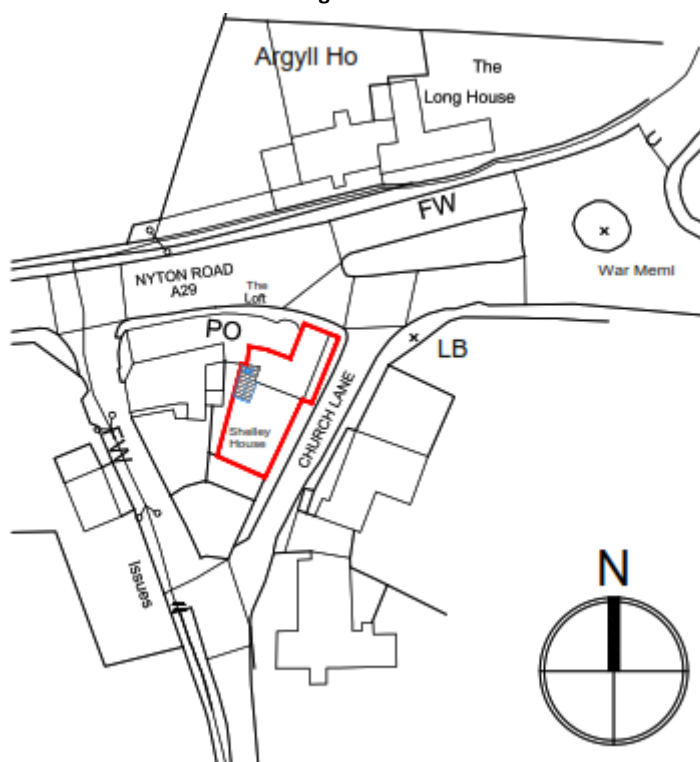
Contents

1	INTRODUCTION	3
2	SITE GEOLOGY	4
3	EXISTING DRAINAGE	5
4	PROPOSED DRAINAGE STRATEGY	5
5	MAINTENANCE	6
6	SUMMARY AND CONCLUSIONS	8
7	APPENDICES	9

1 Introduction

- 1.1.1 CGS Civils Ltd have been appointed by Lindsey Clare to undertake a drainage strategy report for a proposed development at Shelley House, Church Lane in Eastergate.
- 1.1.2 The purpose of this drainage strategy is to demonstrate how the development area can be satisfactorily drained without increasing flood risk onsite and elsewhere.
- 1.1.3 The existing site consists of single domestic property. The proposed development will consist of an extension to the rear of the property.
- 1.1.4 The proposed development is located as OS Grid Reference SU94340556 and has the post code PO20 3UR.
- 1.1.5 The total red line boundary is approximately 0.0201 Ha and the proposed development will result in a total of 0.003 Ha of impermeable area.
- 1.1.6 The proposed site plan can be found in **Appendix A**.

Fig 1. Site Location

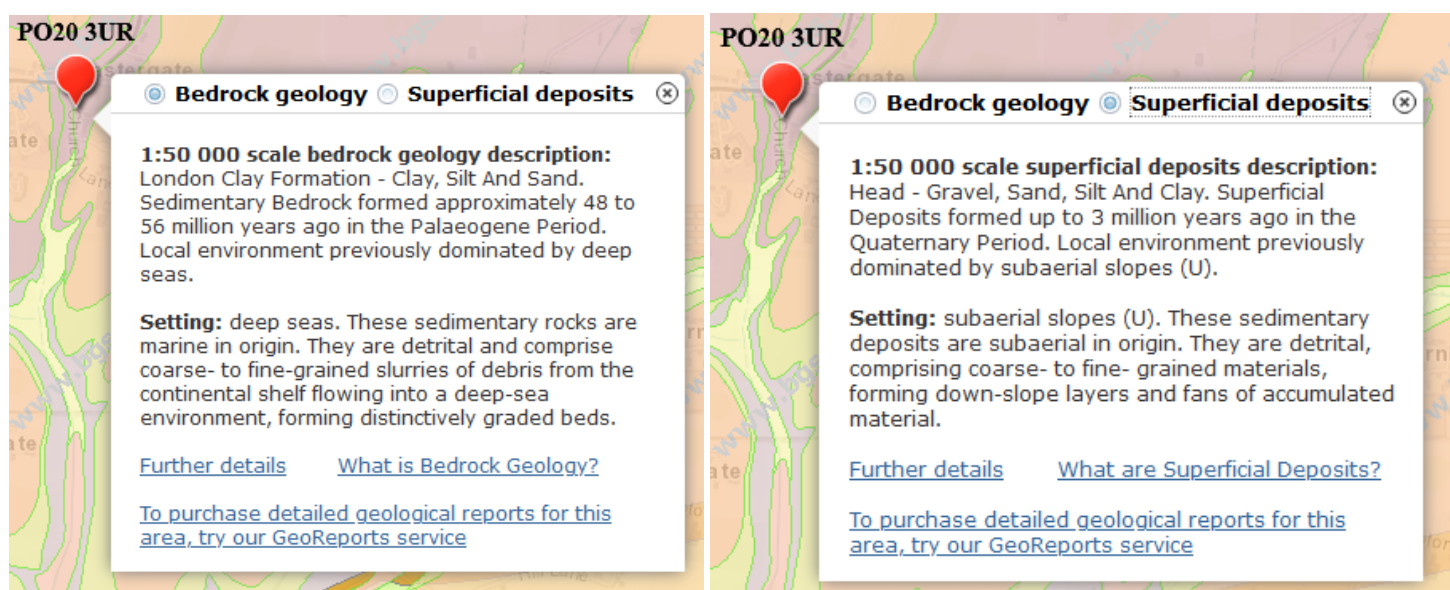


2 Site Geology

2.1 British Geological Survey information

- 2.1.1 The British Geological Survey confirms the bedrock geology to be made up of London Clay Formation which is primarily comprised of Clay, Silt and Sand. The BGS website confirms the superficial deposits on site to be made up of Head formation which is primarily comprised of Gravel, Sand, Silt and Clay.
- 2.1.2 The British Geological survey also holds records of historical boreholes near the site which give some insight into the ground geology.
- Borehole SU90NW54 (Located approx. 228m North West of the site) – Sand/Gravel

Fig 2. British Geological Survey



2.2 Geological Assessment

- 2.2.1 A soakaway test was carried out on site on 3rd December 2021 by CGS Civils. A series of infiltration tests to BRE 365 was undertaken on site and yielded a recorded infiltration rate of $1.03 \times 10^{-5} \text{ m/s}$.
- 2.2.2 In addition to the soakaway test, a hand augured borehole was excavated to a depth of 1.2m and monitored over a period of 24 hours and no groundwater was noted.

2.3 Hydrogeology Setting

- 2.3.1 The Environment Agency (EA) mapping service, as provided by Magic Map, indicates the aquifer designation for the bedrock and superficial drift geology and the groundwater vulnerability in the area. The mapping, as included in **Appendix F**, provides the following information for the site:
- 2.3.2 The site will not pose a risk to the groundwater on site as there will be no discharge of any hazardous materials to ground.

Geology Map	Site Description
Aquifer Designation (Bedrock)	N/A
Aquifer Designation (Superficial Drift)	Secondary A
Groundwater Vulnerability	Low
Groundwater Source Protection Zone	N/A

3 Existing Drainage

- 3.1.1 It is not currently known how the existing site discharges surface water runoff, however it is presumed that all surface water discharges to the local sewers. Due to the proposed development, a section of the existing drainage is to be diverted into the new proposed surface water soakaway.

4 Proposed Drainage Strategy

4.1 SuDS Hierarchy

- 4.1.1 All options for the destination of run-off generated on site have been assessed in line with the SuDS hierarchy as set out in Building Regulations Part H document and DEFRA's Draft National Standards for SuDS.

Discharge Destination	
Discharge to Ground	Yes – Recorded infiltration rate of 1.03×10^{-5} m/s
Discharge to Watercourse	N/A
Discharge to Surface Water Sewer	N/A
Discharge to Other Sewer	N/A

4.2 Surface Water Drainage

- 4.2.1 In order to follow the SuDS Hierarchy, the use of soakaways was investigated. Due to the ground geology, an infiltration test to BRE365 standards was undertaken on site. The tests resulted in an on-site infiltration rate of 1.03×10^{-5} m/s. This is considered to be a fair rate and the use of soakaways was deemed viable. It is therefore proposed that all roof areas are to be discharged to ground via a geocellular soakaway. The soakaway has been designed to cater for the 1 in 100-year +40% storm.
- 4.2.2 Hydraulic calculations have been carried out which can be found at Appendix C.

5 Maintenance

5.1 Introduction

- 5.1.1 During construction, the Contractor will be responsible for maintaining the drainage and SuDS (Sustainable Drainage Systems). Upon handover, the occupier will take on the responsibility of these duties as laid out in this report.
- 5.1.2 The maintenance schedule for the proposed development will be split down into two separate categories; SuDS features and regular private drainage.

5.2 SuDS at Shelley House, Church Lane, Eastergate

- 5.2.1 As listed above, in section 5.1.2, the SuDS features used on site will be **Geocellular Soakaway**
- 5.2.2 The SuDS features have been designed for easy maintenance and comprise:
- Regular Day-to-Day care – litter collection, regular gardening to control vegetation growth and checking inlets where water enters the SuDS features
 - Occasional tasks – checking the SuDS features and removing any silt that builds up in the SuDS feature
 - Remedial work – repairing damage where necessary

5.3 SuDS Drainage Maintenance Specification

5.3.1 Soakaway

In order to maintain the functioning of the attenuation tanks, the following maintenance requirements should be adhered to:

Table 21.3 Operation and maintenance requirements for attenuation storage tanks		
Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae, or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from per-treatment structures and/or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents, and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

5.4 General Drainage Maintenance Specification

5.4.1 Inlet Structures and Inspection Chambers

- Inlet structures such as rainwater downpipes, road gullies and channel drains should be free from obstruction at all times to allow free flow through the SuDS
- Inspection Chambers and Rodding Eyes are used on bends or where pipes come together. They allow access and cleaning to the system if necessary.

Inlet Structures and Inspection Chambers	
Regular Maintenance	Frequency
Inlet Structures Inspect rainwater downpipes, channel drains and road gullies, removing obstructions and silt as necessary. Check that there is no physical damage. Trim vegetation 1m min surround to structures and keep area free from silt and debris	Monthly
Inspection Chambers and below ground control chambers. Remove cover and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in Autumn	Annually
Occasional Maintenance Check topsoil levels are 20mm above edges of chambers to avoid mower damage.	As necessary
Remedial Work Repair physical damage if necessary	As required

5.4.2 Below ground drainage pipes

- Below ground drainage pipes convey water to the SuDS system. They should always be free from obstruction to allow free flow.

Below Ground Drainage Pipes	
Regular Maintenance	Frequency
Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months then annually
Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
Remove sediment from pre-treatment inlet structures and inspection chambers.	Annually or as required
Maintain vegetation to designed limits within the vicinity of below ground drainage pipes and tanks.	Monthly or as required
Remedial Work	
Repair physical damage if necessary	As required
Monitoring	
Inspect all inlets, outlets and vents to ensure that they are in good conditions and operating as designed.	Annually
Survey inside of pipe runs for sediment build up and remove if necessary.	Every 5 years or as required

6 Summary and Conclusions

- 6.1.1 CGS Civils has been instructed by Lindsey Clare to produce a Drainage statement under National Planning Policy Framework (NPPF) to support the Planning Application for the development of a rear extension to an existing property at Shelley house in Eastergate.
- 6.1.2 The Surface Water will discharge to ground via infiltration through the use of a geocellular soakaway. The soakaway has been designed to a recorded infiltration rate of $1.03 \times 10^{-5} \text{m/s}$ and to cater for the 1 in 100+40% storm.
- 6.1.3 The report has demonstrated that the proposed drainage measures ensure that suitable means of surface water drainage can be achieved for the proposed development.

7 Appendices

7.1 Appendix A – Site Plan

SHELLEY HOUSE, CHURCH LANE, EASTERGATE
EXISTING & PROPOSED

NOTES:

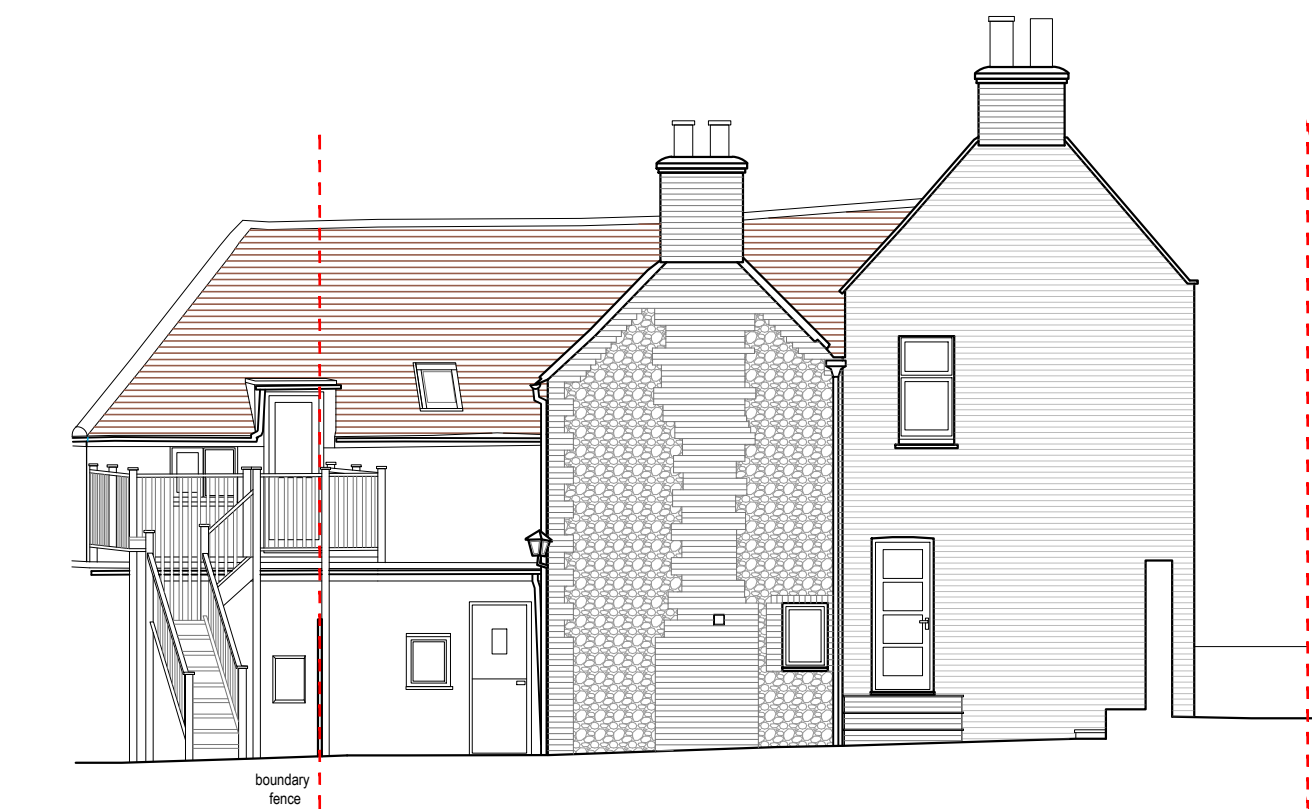
Dimensions to be checked on site before commencing work.
Any discrepancies shall be reported to the architect immediately.

Do not scale from these drawings except for planning purposes.

Use figured dimensions only.

Where applicable this drawing is to be read in conjunction with other consultants' drawings.

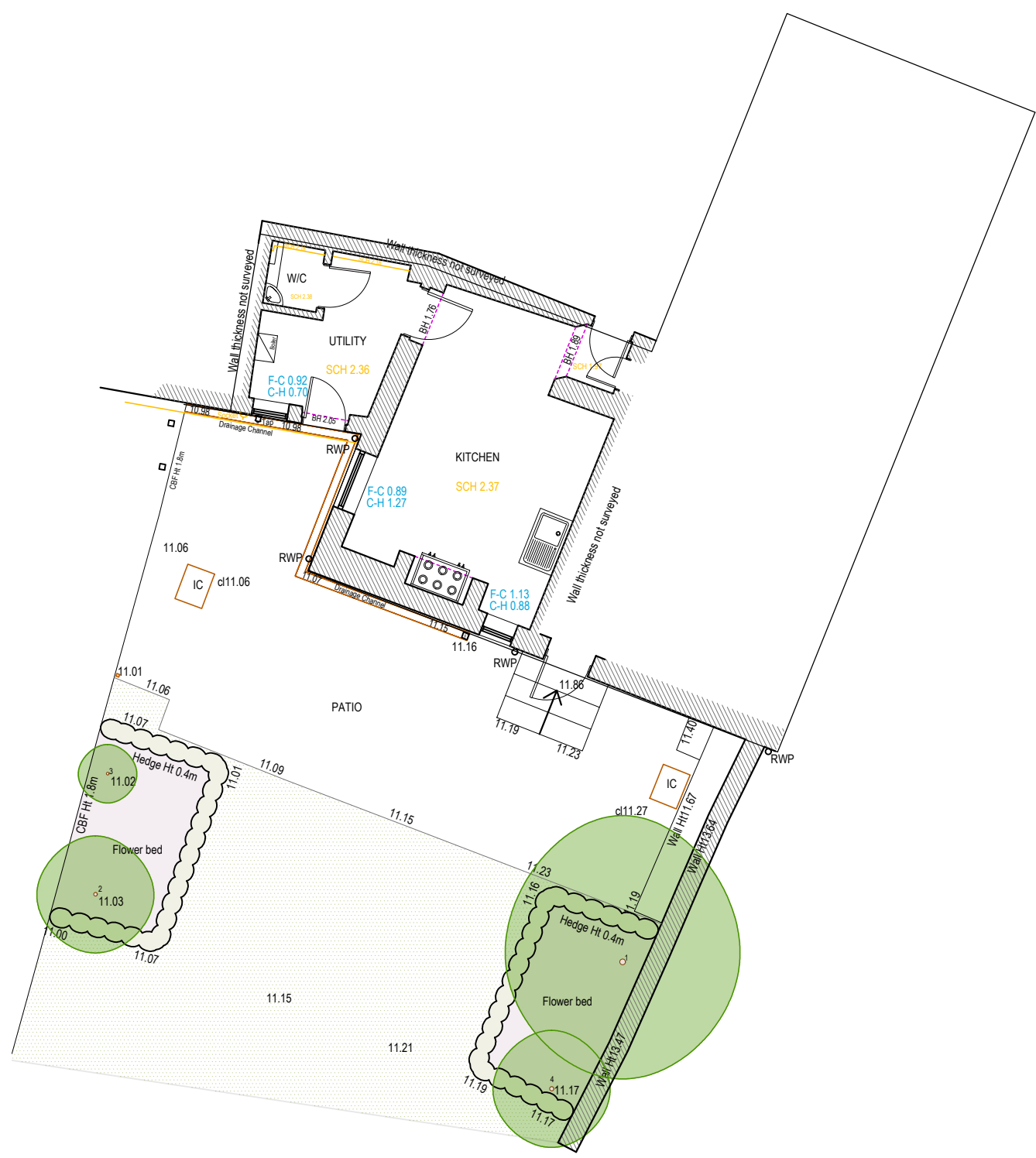
All drawings to be read in conjunction with specification and all other drawings including structural engineer and mechanical and electrical drawings / specification



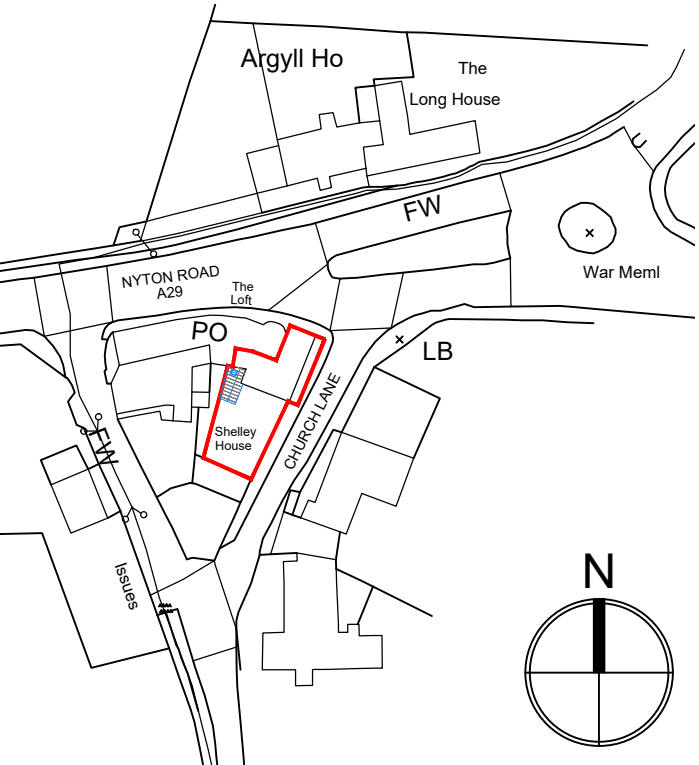
EXISTING SOUTH ELEVATION
(VIEW FROM THE BACK GARDEN)
1:100



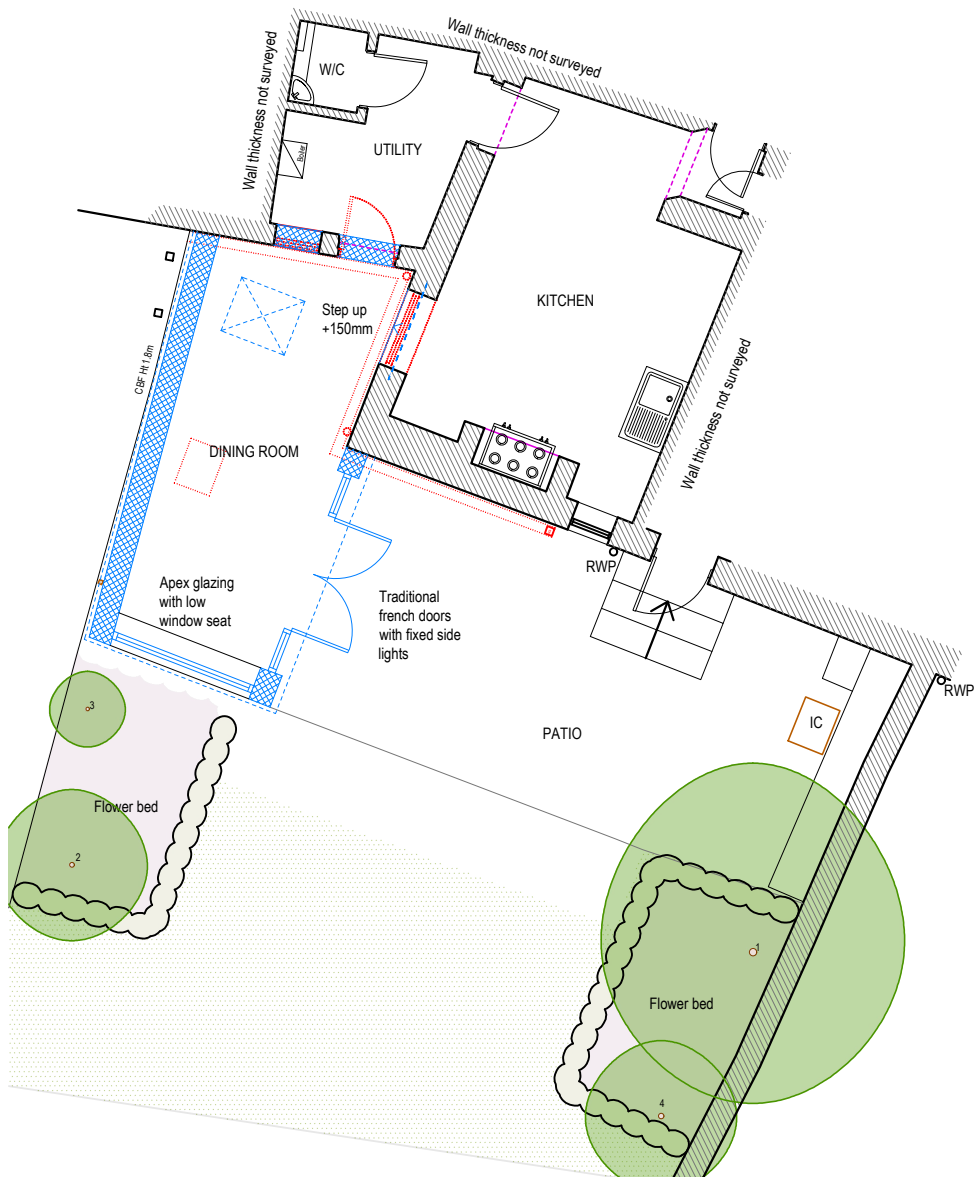
EXISTING EAST ELEVATION
(VIEW FROM CHURCH LANE)
1:100



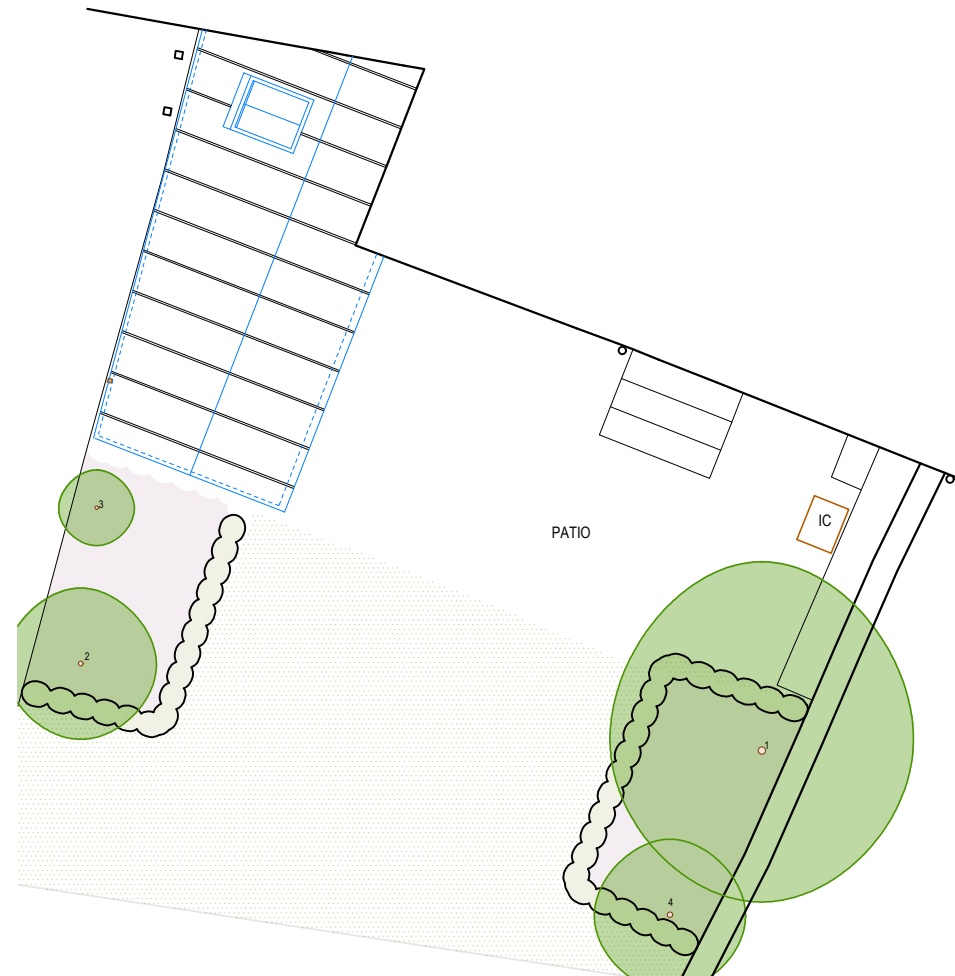
EXISTING GROUND FLOOR PLAN
1:100



LOCATION PLAN
1:1250
Ordnance Survey (c) Crown Copyright 2021.
All rights reserved. Licence number 100022432



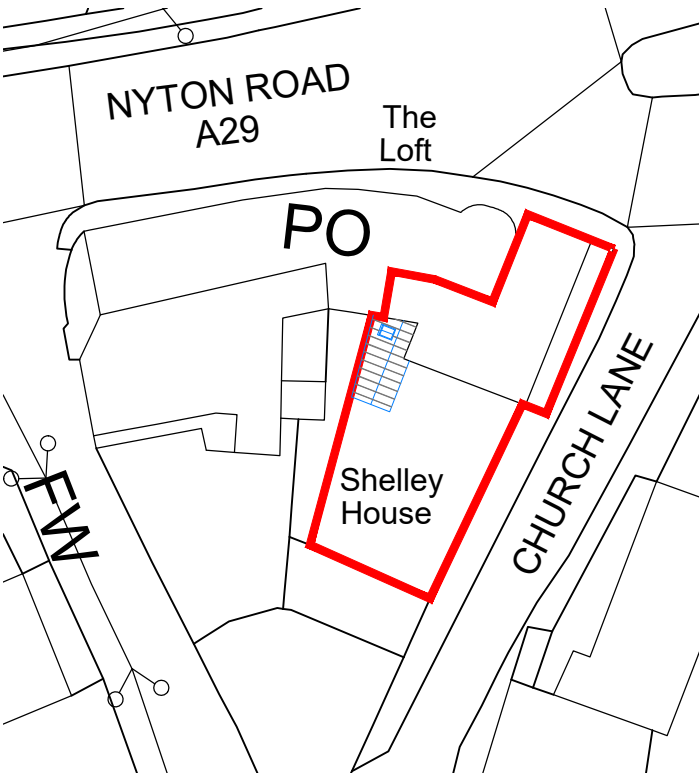
PROPOSED GROUND FLOOR PLAN
1:100



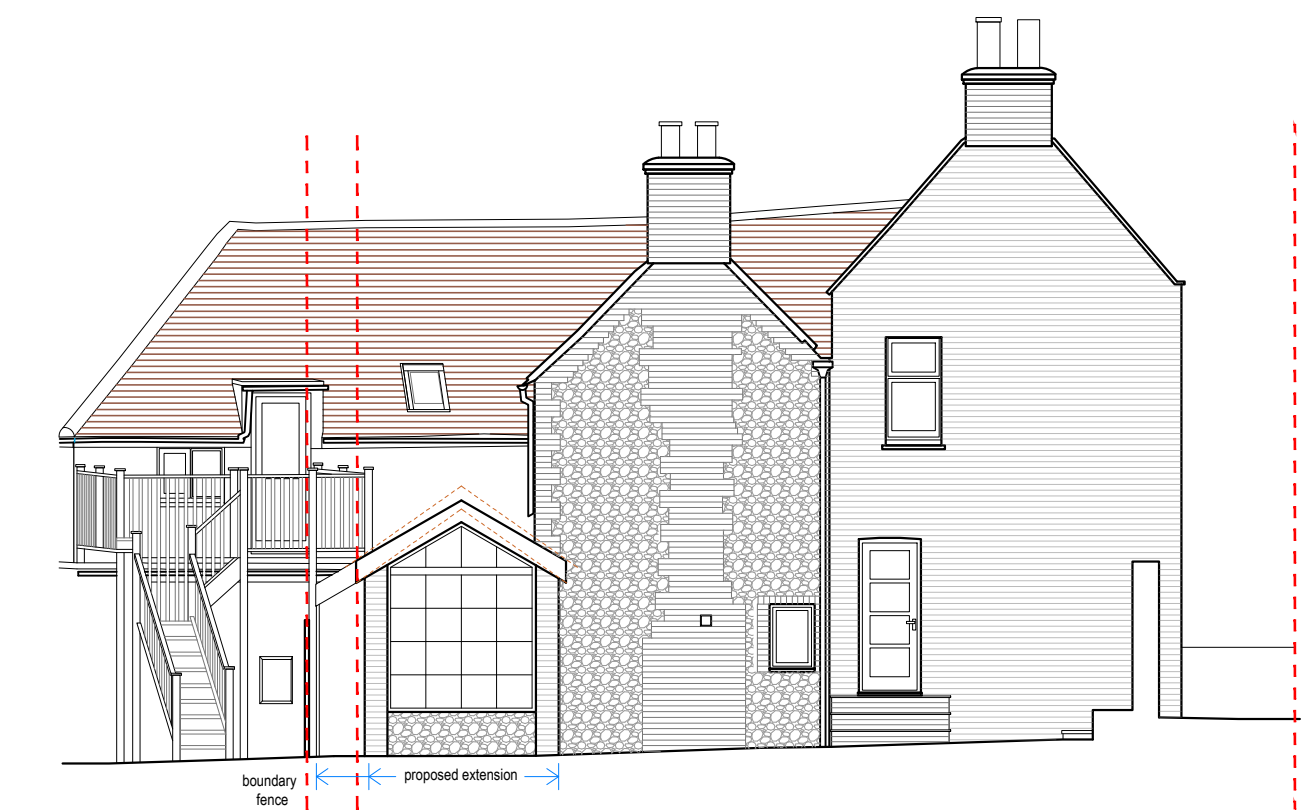
PROPOSED ROOF PLAN
1:100



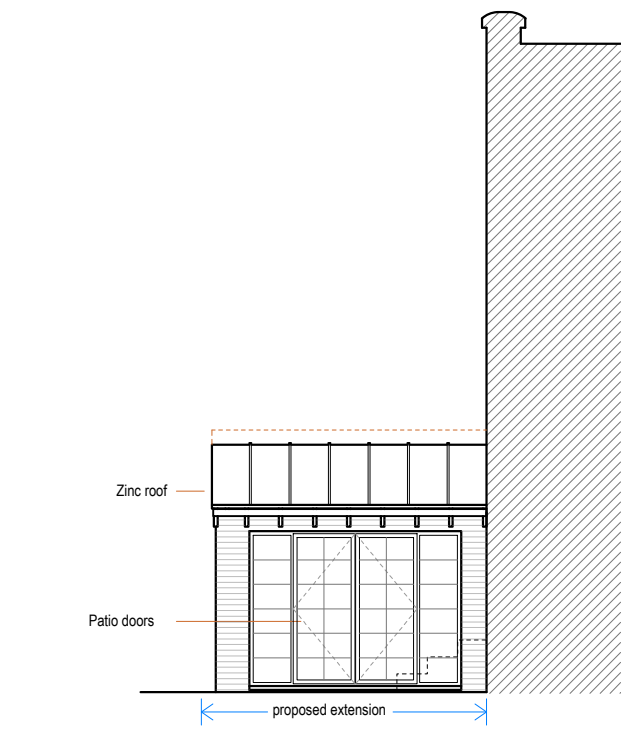
PRECEDENTS



BLOCK PLAN
1:500



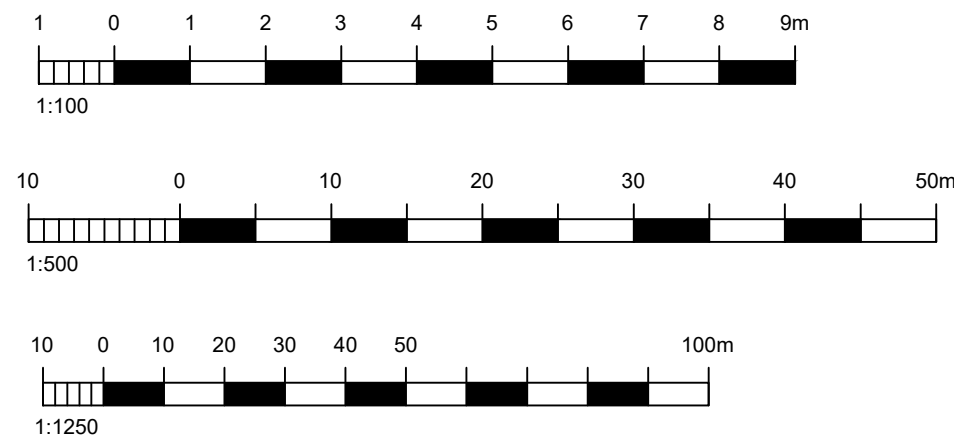
PROPOSED SOUTH ELEVATION
(VIEW FROM THE BACK GARDEN)
1:100



PROPOSED EAST ELEVATION
(VIEW FROM PATIO)
1:100



PROPOSED EAST ELEVATION
(VIEW FROM CHURCH LANE)
1:100



REV	DATE	AMENDMENT	DRAWN

hd
architects

Helyer Davies Architects Ltd
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Emsworth, PO10 7BT
01243 370 715
www.hdarchitects.co.uk mail@hdarchitects.co.uk

PROJECT
Shelley house
Church Lane
Eastergate

DRAWING
PROPOSED
Plans
Elevations
Location & Block Plans

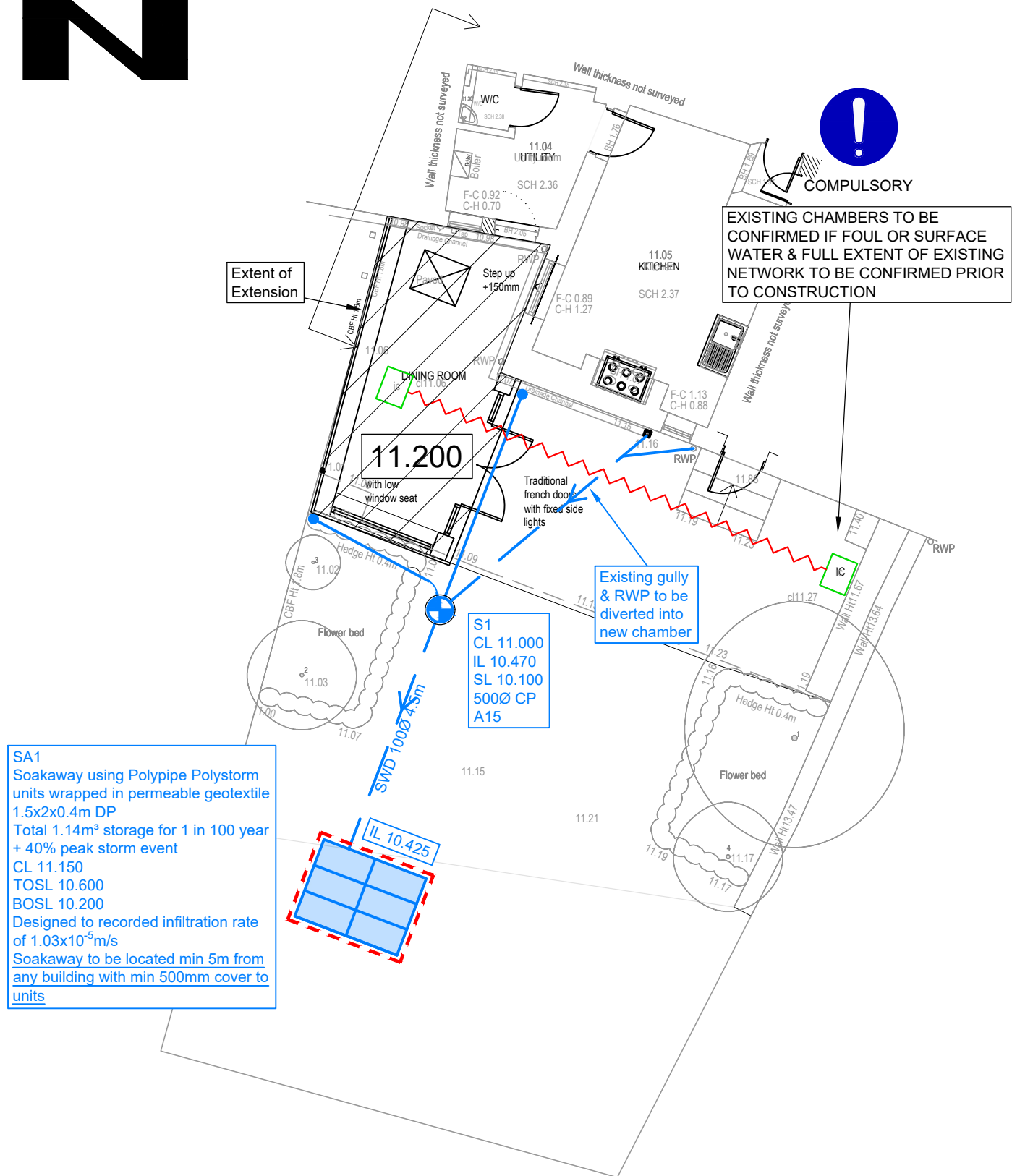
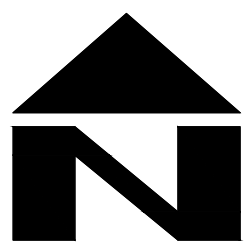
SCALE
as noted @ A1

DATE	JULY 2021	DRAWN	NW
DRAWING NUMBER	17144-01	REVISION	B

7.2 **Appendix B – Drainage Layout**

DESIGN SUBJECT TO THE APPROVAL OF:
PLANNING AUTHORITY
BUILDING CONTROL

DESIGN SUBJECT TO THE CONFIRMATION OF:
RWP POSITIONS
LOCATION AND DEPTH OF EXISTING UTILITIES



DRAINAGE LEGEND (1:100)

EXISTING FEATURES

- Ex SWD Existing surface water sewer/drain and manhole
- Existing foul/surface water sewer/drain and manhole to be abandoned

PROPOSED FEATURES

- SWD Storm water sewer/drain
- Rainwater pipe
- Storm water catchpit chamber (5000)

00.000

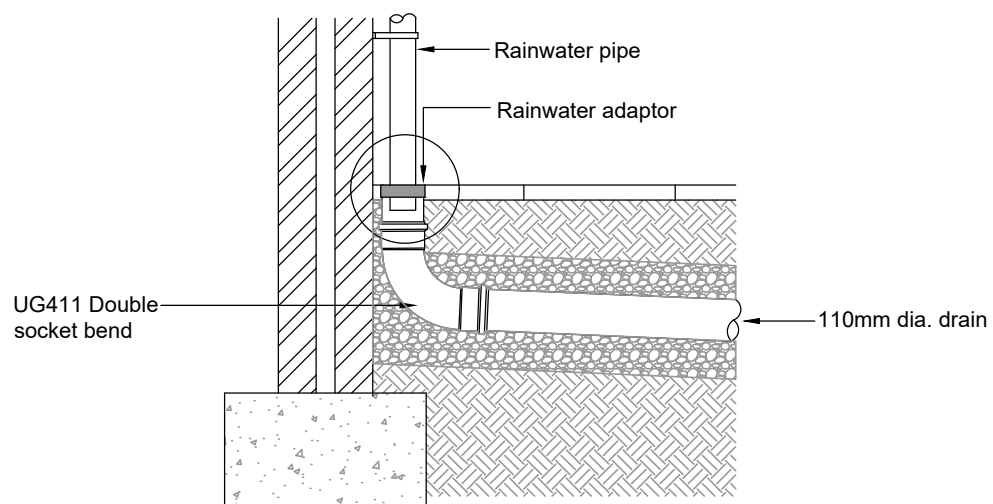
1000 4.5m 1:100

Z BED

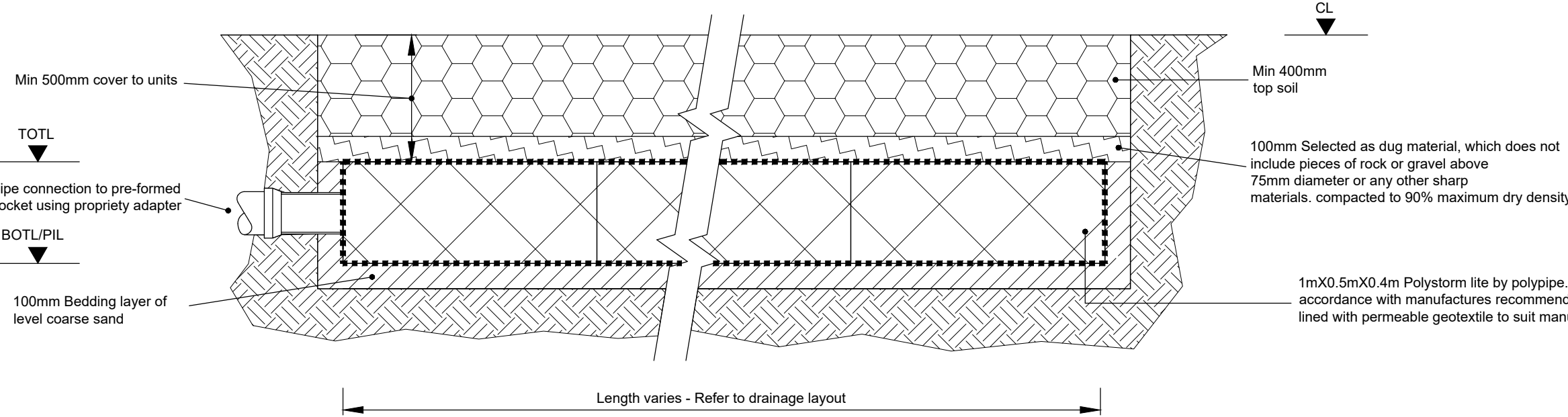
PIPE INFO - DIAMETER, LENGTH, GRADIENT, BEDDING TYPE

ABBREVIATIONS

- MH - MANHOLE
- IC - INSPECTION CHAMBER
- AC - ACCESS CHAMBER
- CP - CATCHPIT
- BC - BRAKE CHAMBER
- RE - RODDING EYE
- IL - INVERT LEVEL
- SL - SUMP LEVEL
- CL - COVER LEVEL



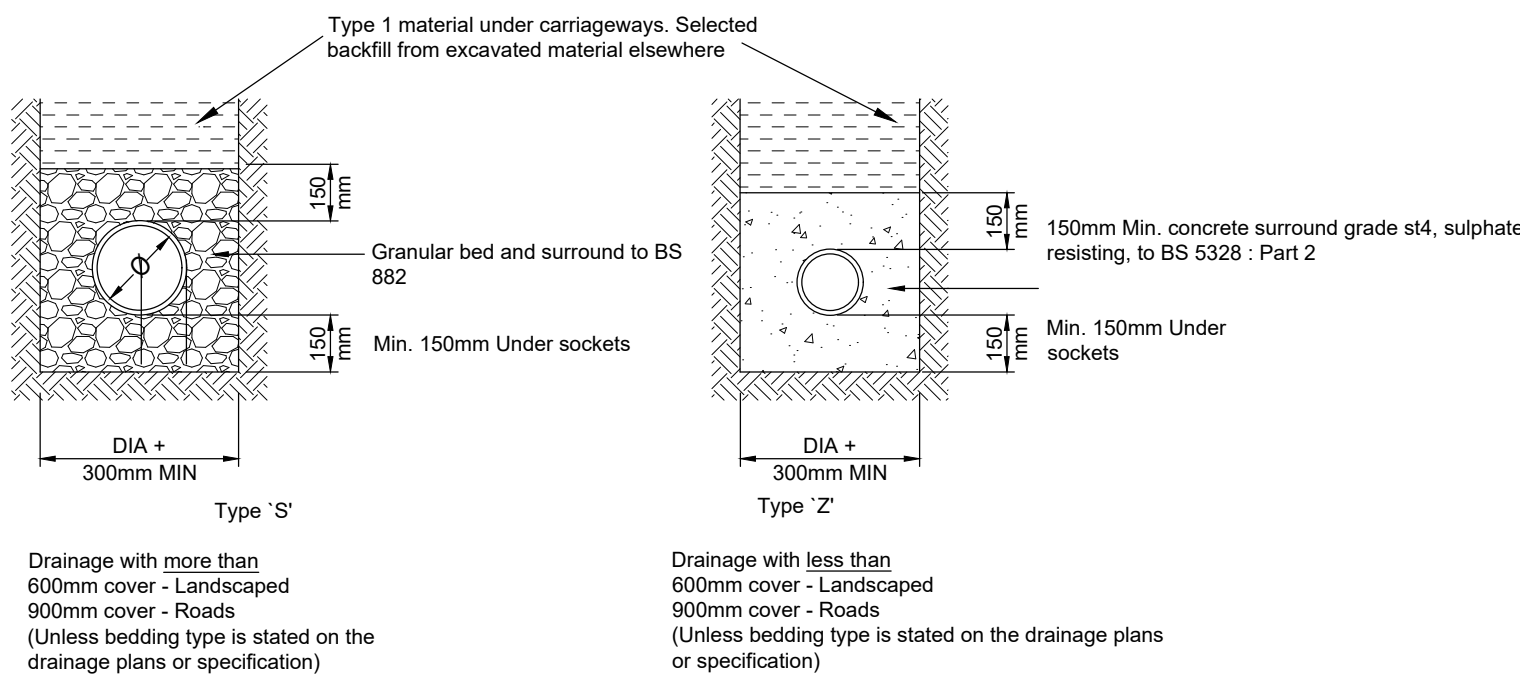
Rainwater pipe connection



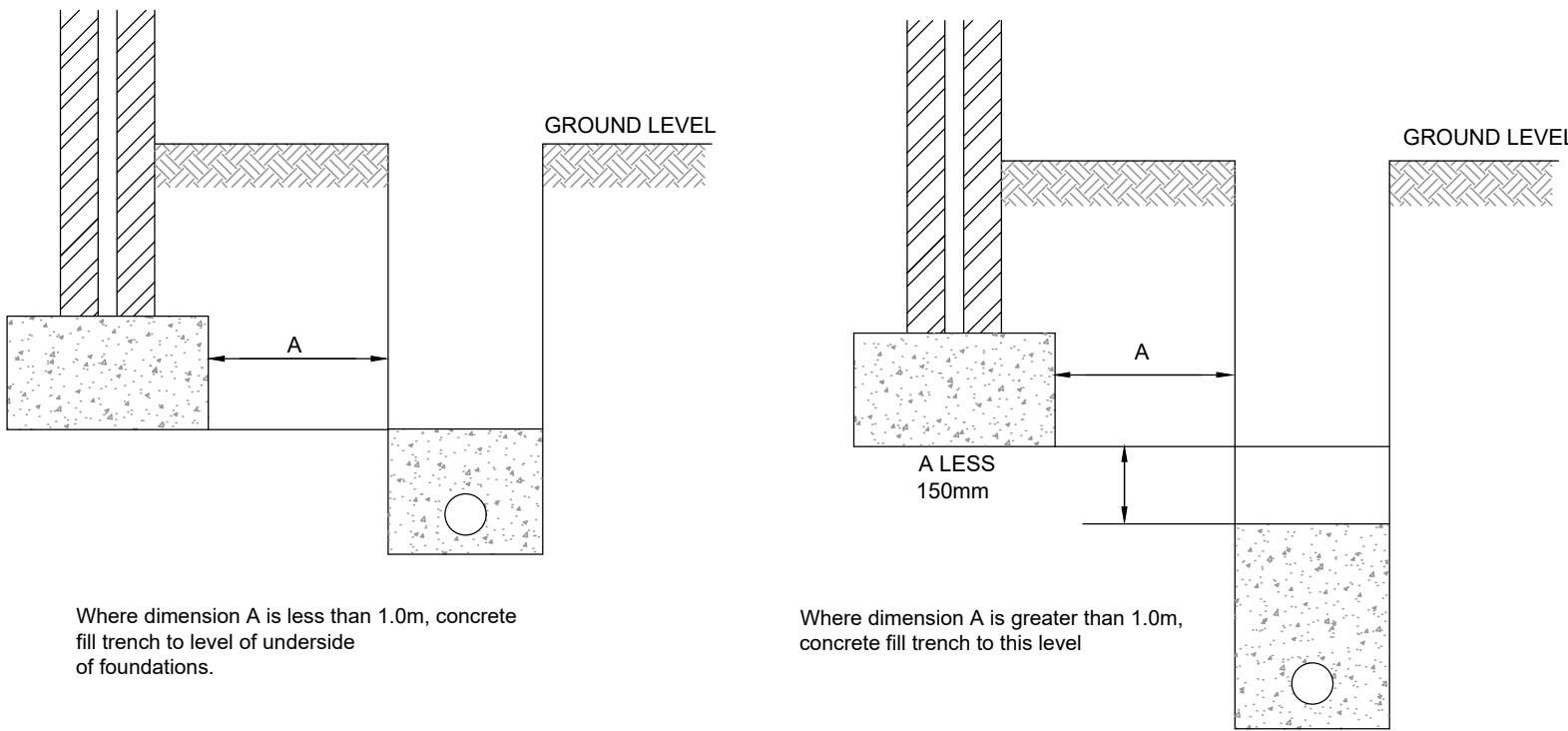
Trench soakaway using Polystorm Lite Geomodular units
Landscaped areas only

0.4m deep

All storage tank drainage works shall be carried out in accordance with the specifications, method statements and recommendations of Polypipe



Pipe bedding details in private
Areas



Pipes near buildings

Pipes near buildings

CONSTRUCTION DETAILS 1:20

STANDARD DRAINAGE NOTES

- DO NOT SCALE FROM THIS DRAWING. REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.
- ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.
- ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
- BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.
- ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT. THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.
- COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.
- ALL UN-REFERENCED PIPES ARE ASSUMED TO BE 100mm DIA.
- ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS65 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 AND BS5911:PART 1.
- ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.
- ALL ADOPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.
- ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.
- THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.
- STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.
- IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.
- NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.
- ALL EXISTING MANHOLE COVERS, GULLIES, ETC. ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT.
- UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEY OF DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION.
- MANHOLE AND CHAMBER COVER GRADES:

- 'A15' IN ALL LANDSCAPED AREAS AND ON FOOTPATHS
- 'B125' IN ALL DRIVEWAYS
- 'C250' IN PRIVATE PARKING AREAS
- 'D400' IN CARRIAGEWAY/ACCESS ROAD

Prefixed to drawing numbers shall signify the following:-			
P = PRELIMINARY	Shall not be used for contract or construction purposes		
T = TENDER	Shall not be used for construction purposes		
C = CONSTRUCTION	These are the only drawings that shall be used for construction purposes		
R = RECORD	Record of actual completed work		

P1	27.04.22	INVERT LEVEL ADDED TO SOAKAWAY	CS	CS	CS
P-	14.01.22	PRELIMINARY ISSUE	LH	CS	CS

REV	DATE	DESCRIPTION	BY	CHK	APP
-----	------	-------------	----	-----	-----

cgs civils Consulting Civil Engineers					
CLIENT LINDSEY CLARE					
ARCHITECT HELIER DAVIES ARCHITECTS LTD					
JOB TITLE SHELLEY HOUSE EASTERGATE					
DRAWING TITLE SURFACE WATER DRAINAGE LAYOUT					
DRAWN	LH	ENGINEER	C SLADE	CHECKED	CS
DATE	JANUARY 2022	SCALE @ A1	1:100	APPROVED	CS
JOB No.	C1870	STATUS	P	DRAWING No.	100
				REV.	P1

PRELIMINARY

7.3 **Appendix C – Surface Water Calculations**

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.350
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.003	5.00	11.000	450	665.252	36.395	0.530
SA1			11.000	100	663.584	32.022	0.575

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	S1	SA1	4.500	0.600	10.470	10.425	0.045	100.0	100	5.10	50.0

Name	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	0.769	6.0	0.4	0.430	0.475	0.003	0.0	18	0.432

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	4.500	100.0	100	Circular	11.000	10.470	0.430	11.000	10.425	0.475

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	450	Manhole	Adoptable	SA1	100	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	665.252	36.395	11.000	0.530	450		0	1.000	10.470	100
SA1	663.584	32.022	11.000	0.575	100		1	1.000	10.425	100

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m ³ /ha)	20.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Normal		

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 %)
1	0	0	0
10	40	0	0
30	0	0	0
100	40	0	0

Node SA1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.03708	Invert Level (m)	10.200	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.03708	Time to half empty (mins)	419	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.000	Number Required	1
Porosity	0.95	Pit Length (m)	1.500		

Results for 1 year Critical Storm Duration. Lowest mass balance: 95.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	10.488	0.018	0.4	0.0049	0.0000	OK
360 minute summer	SA1	216	10.299	-0.126	0.1	0.2828	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	S1	1.000	SA1	0.4	0.429	0.066	0.0042
360 minute summer	SA1	Infiltration		0.0			

Results for 10 year +40% CC Critical Storm Duration. Lowest mass balance: 95.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	10.500	0.030	1.1	0.0081	0.0000	OK
120 minute summer	SA1	108	10.485	0.060	0.5	0.8123	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	S1	1.000	SA1	1.1	0.562	0.176	0.0085
120 minute summer	SA1	Infiltration		0.0			

Results for 30 year Critical Storm Duration. Lowest mass balance: 95.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	10.498	0.028	1.0	0.0077	0.0000	OK
720 minute summer	SA1	450	10.451	0.026	0.1	0.7155	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	S1	1.000	SA1	1.0	0.547	0.160	0.0079
720 minute summer	SA1	Infiltration		0.0			

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.57%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	S1	184	10.783	0.313	0.6	0.0852	0.0000	FLOOD RISK
180 minute summer	SA1	184	10.783	0.358	0.6	1.1443	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
180 minute summer	S1	1.000	SA1	0.6	0.454	0.102	0.0352
180 minute summer	SA1	Infiltration		0.0			

7.4 **Appendix D – Borehole Logs**

For Institute use only
GEOLOGICAL
CLASSIFICATION

NATURE OF STRATA

If measurements start below
ground surface, state how far.

THICKNESS

Su 70 NW/54

DEPTH

Feet Inches Metres Feet Inches Metres

90 = 12.0

Topsoil
(Assumed 2 ft. 0 in.)

Brickwork

1-1

Head
Ground

6.9

Rebates
20.00 in
6.5

? head 6.9 ✓

6.5 1/2

6.5 1/2

Topsoil

compact brown silty fine sand
becoming gravelly near bottom

firm becoming soft/firm with

depth light brown/grey
calcareous clay and silt

(chalk putty) containing rounded
fragments and scattered flint

light brown slightly silty
fine sand

Ditto containing emp. flint gravel

Stiff grey silty clay.

Data Bank

0.4

1.1

1.5

1.8

3.3

3.2

6.5

.5

7.0

.6

25

7.6

7.5 **Appendix E – Soakage Test Results**

Ref: C1870

Lindsey Potter

12th January 2022**Re: Shelley House, Eastergate – Soakaway Testing – Infiltration Test Result Summary**

Dear Lindsey

The following investigation was carried out at the above location in accordance with our quotation.

1. Site Works

The purpose of the investigation was to supply soakaway test data in general accordance with BRE document 365 (Soakaway Design) at one location which would be the approximate intended location for a possible infiltration device to serve an extension to an existing property.

The appended drawing illustrates the position of the test pit. The BRE365 pit was excavated to a depth of 0.9m in line with the approximate depth of the proposed soakaway.

In addition to the soakaway test, a hand augured borehole was excavated to a depth of 1.2m and monitored over a period of 24 hours. The hole remained dry throughout.

The testing commenced on 17th December 2021 with three tests being undertaken in accordance with BRE 365.

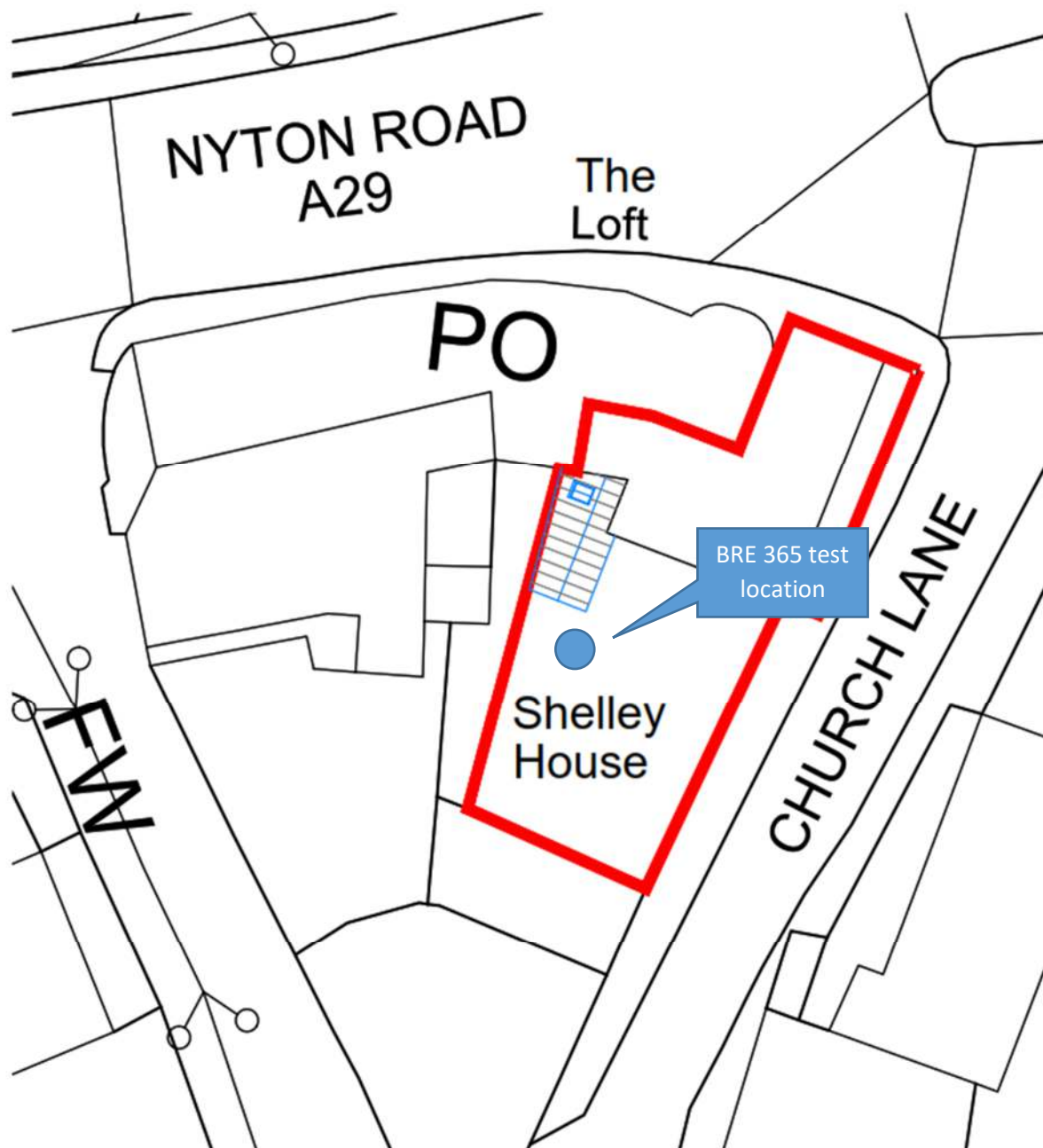
2. BRE 365 Soakaway Test Findings

Testing of the sub soils which was noted as chalk produced a BRE 365 design infiltration rate of **1.03x10⁻⁵m/s**. This rate was the slowest taken from all three tests. This is considered a moderate rate and will likely be suitable for most infiltration devices.

3. BRE 365 Soakaway Test Results

Test Pit No	Infiltration Rate (1-3 Tests)			Depth of Test	Soil Type
SAT1	2.62x10 ⁻⁵ m/s	1.53x10 ⁻⁵ m/s	1.03x10⁻⁵m/s	0.9m	Loam over clays with chalk and flint

Appendix A – Soakaway Test Location Plan





Consulting Civil Engineers

Appendix C – Soakaway Test Results



Consulting Civil Engineers

Job: Shelley House, Eastergate - Test 1

Infiltration Calculator

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

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

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

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	0.9
Trial pit length	=	1

a_{p50} =

1.32 m/squared

t_{p75-25} =

3900 seconds

V_{p75-25} =

0.135 m/cubed

F =

2.62E-05

Job: Shelley House, Eastergate - Test 2

Infiltration Calculator

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

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

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

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	0.9
Trial pit length	=	1

a_{p50} = 1.32 m/squared

t_{p75-25} = 6700 seconds

V_{p75-25} = 0.135 m/cubed

F =

1.53E-05



Job: Shelley House, Eastsergate - Test 3

Infiltration Calculator

$$f = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} = Effective storage volume between 75% and 25% effective depth

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

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

f = Infiltration rate

Trial pit width	=	0.3
Trial pit depth	=	0.9
Trial pit length	=	1

a_{p50} =

1.32 m/squared

t_{p75-25} =

9900 seconds

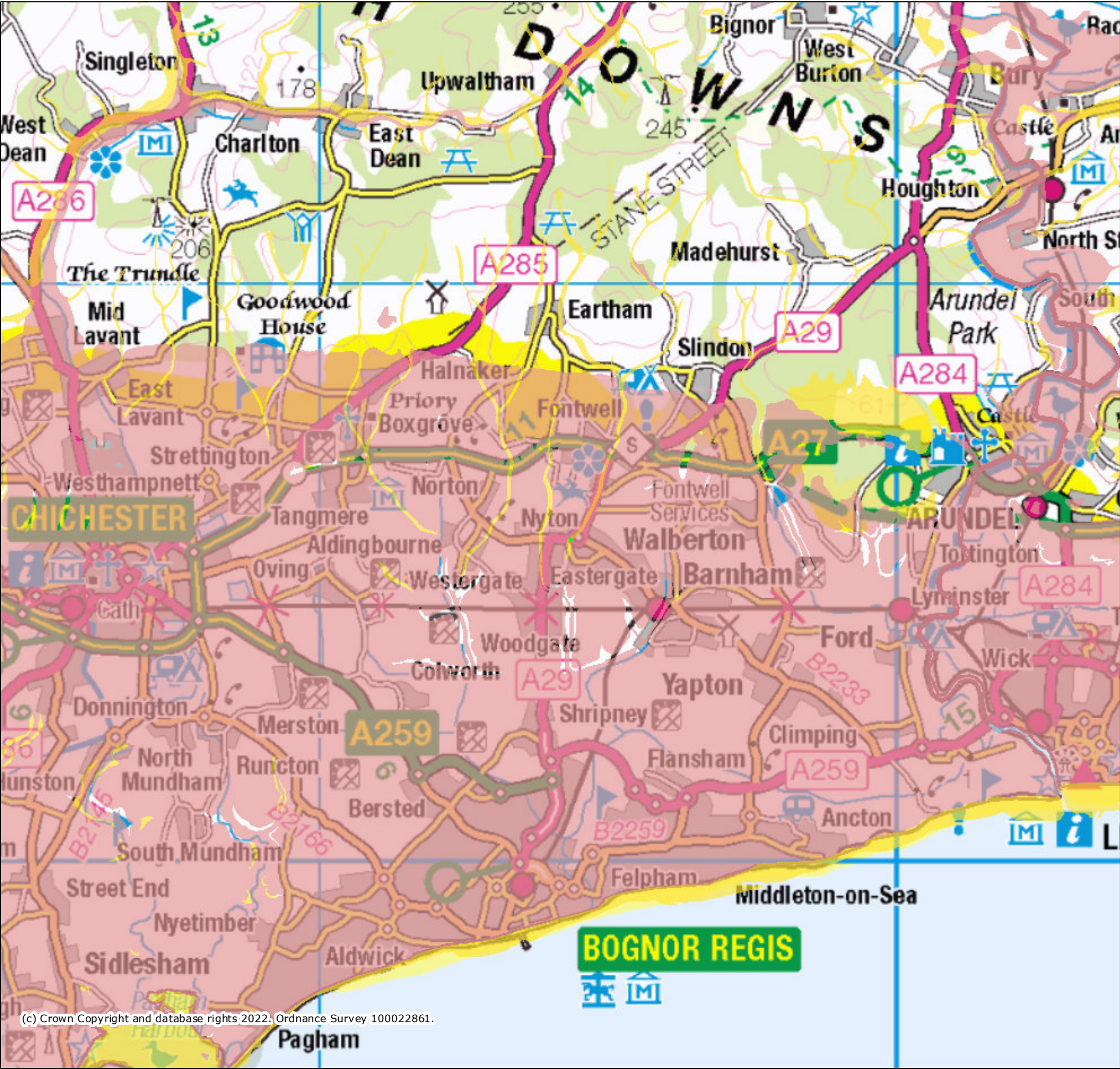
V_{p75-25} =

0.135 m/cubed

F =

1.03E-05

7.6 **Appendix F – Magic Map from Environment Agency**



Legend

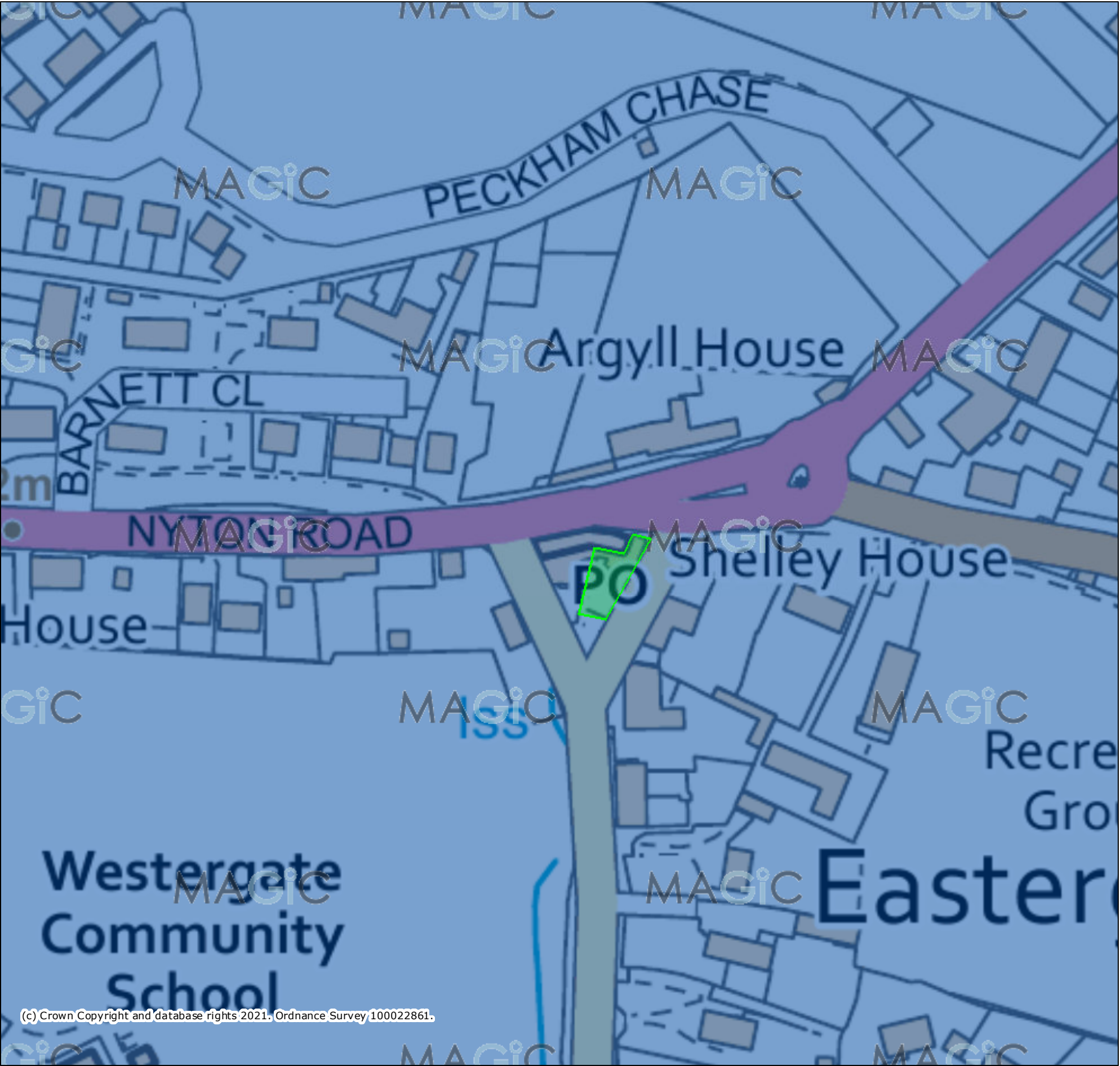
Aquifer Designation Map (Superficial Drift) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unknown (lakes+landslip)
- Unproductive

Projection = OSGB36
xmin = 481700
ymin = 92830
xmax = 506700
ymax = 118500



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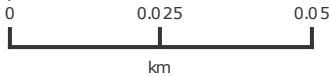
Legend

Groundwater Vulnerability Map (England)

- Local Information
- Soluble Rock Risk
- High
- Medium - High
- Medium
- Medium - Low
- Low
- Unproductive

Projection = OSGB36

xmin = 494100
ymin = 105400
xmax = 494500
ymax = 105800



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