

Project Title

Land at Bowesden Lane, Shorne

Report Title

Drainage Statement

Document Reference:

5997-005-001

Prepared For

Roger Goodman & Paul Henry

Date

July 2026



Status	Details of Amendments	Date	Checked	Approved
For approval	First Issue	08/07/2026	TZ	SB

CONTENTS

CHAPTER	PAGE
EXECUTIVE SUMMARY	1
1.0 PLANNING POLICY CONTEXT	2
2.0 EXISTING SITE	3
3.0 PROPOSED DEVELOPMENT	7
4.0 CONCLUSIONS	12

APPENDICES

APPENDIX A – TOPOGRAPHICAL SURVEY

APPENDIX B – GREENFIELD RUNOFF CALCULATION

APPENDIX C – BGS RECORDS

APPENDIX D – PROPOSED SITE LAYOUT PLAN

APPENDIX E – PROPOSED IMPERMEABLE AREAS PLAN

APPENDIX F – PROPOSED DRAINAGE STRATEGY PLAN AND CALCULATIONS

EXECUTIVE SUMMARY

- I. This Drainage Statement has been produced in accordance with National and Local Planning Policy on behalf of Roger Goodman & Paul Henry to support a Planning Application for the construction of a single residential dwellings, SuDS system and landscaping on Land at Bowesden Lane, Shorne.
- II. The proposed development necessitates the construction of site-specific surface water drainage infrastructure. This infrastructure must comply with the requirements set forth by the National Planning Policy Framework (NPPF), which mandates the use of Sustainable Drainage Systems (SuDS) in all major developments where feasible.
- III. The Lead Local Flood Authority strongly advocates for the integration of SuDS within new developments. All new drainage systems will be designed in accordance with the following guidelines and standards:
 - Planning Practice Guidance (PPG)
 - Non-Statutory Technical Standards for Sustainable Drainage Systems
 - Building Regulations – Approved Document H (Drainage and Waste Disposal)
 - Local authority sustainable drainage guidance
 - Latest version of Design Construction Guidance
- IV. This report is to be read in conjunction with all planning, architectural and other reports that will accompany the planning application.
- V. From the information available this report confirms that a sustainable drainage system design can be achieved which will discharge surface water in accordance with National Planning Practice Guidance (NPPG) and the CIRIA SuDS hierarchy while providing storage for all storm return periods up to and including the 1:100-year rainfall event with an allowance for climate change.
- VI. The drainage proposals will need to be confirmed at detailed design stage subject to further site investigations and testing.
- VII. This report concludes that the site is not at risk of flooding from tidal or fluvial sources, overland flows, or groundwater.
- VIII. In terms of foul and surface water drainage the proposed development is suitable at this location.

1.0 PLANNING POLICY CONTEXT

- 1.1 The NPPF was originally issued by the Department for Communities and Local Government in March 2012 and deals specifically with development planning and flood risk using a sequential characterisation of risk based on planning zones and the EA flood mapping.
- 1.2 Gravesham Borough Council (GBC) have published Supplementary Planning Document dated May 2024 which includes guidance on Sustainable Drainage Systems (SuDS).
- 1.3 Kent County Council (KCC) have published guidance pertaining to Sustainable Drainage Systems (SuDS). This report outlines the key requirements for infiltration as specified in the GBC guidance. The below is also in line with guidance from KCC and the drainage design has been produced in accordance with both.
- 1.4 The KCC guidance stipulates the following criteria for infiltration:
- Climate change allowances are set to 45% for 1 in 30 year return period and 40% for 1 in 100 year return period.
 - Storage calculations to show 1 in 100 year return period plus climate change is safely contained on the site.
 - Suitable interception is provided for the first 5mm of rainfall
- 1.5 According to KCC SuDS guidance, post-development runoff rates for greenfield sites must be restricted to equivalent greenfield runoff rates. A staged approach or QBAR rural methodology should be utilised.
- 1.6 The following surface water strategy has been developed in accordance with local policy and SuDS requirements, ensuring compliance and effective management of surface water.
- 1.7 Adhering to these guidelines will ensure that the proposed development meets the necessary standards for sustainable drainage, promoting environmental sustainability and regulatory compliance.

2.0 EXISTING SITE

Site Location

- 2.1 The development site is located on Bowesden Lane, Shorne, Gravesend. The nearest postcode is DA12 3LA at Ordnance Survey grid reference TQ697700.
- 2.2 The site is access from Bowesden Lane. Bowesden Lane can be accessed from Peartree Lane, which joins the dual carriageway A226. A site location plan can be found below in Figure 2.1

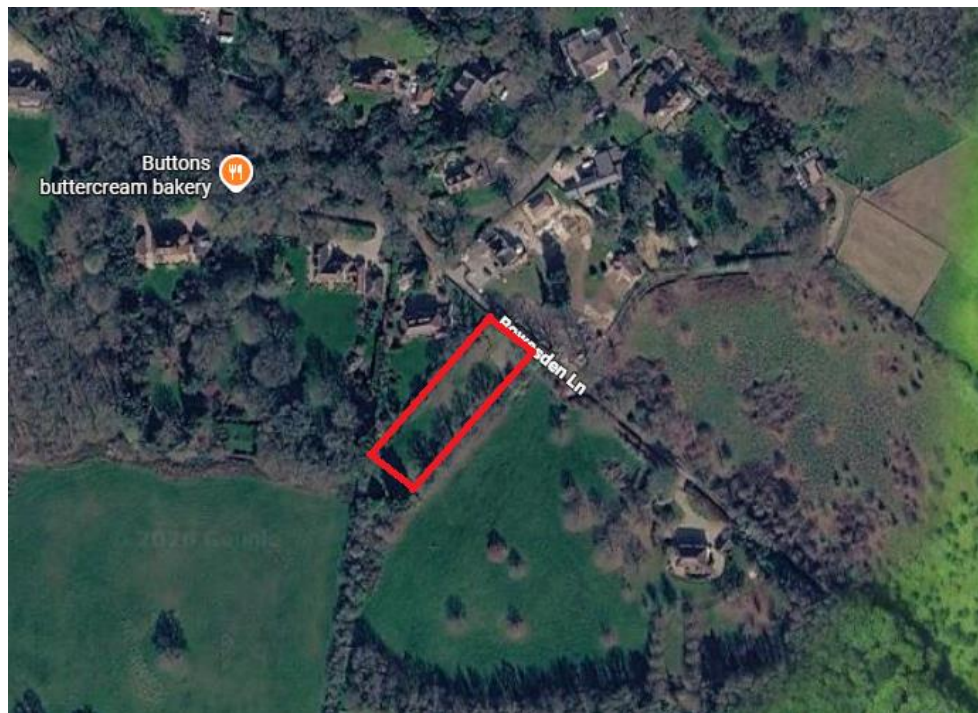


Figure 2.1: Site Location plan

Site Description

- 2.3 The overall development site is approximately 1,930m² in area.
- 2.4 The site currently comprises undeveloped greenfield land.
- 2.5 A topographical survey (Ref S26/10957/01) conducted by Hook Survey in May 2026 reveals that the site slopes from a high point in the south west of 76.68 and slopes north easterly down to the north east corner of the site to a level of 74.62. The site has a gradient of 1 in 41.
- 2.6 A copy of the topographical survey is in Appendix A at the rear of this report.

Existing Drainage

- 2.7 The nearest main river is the River Medway which is located approximately 2000 meters south east of the site.
- 2.8 The site currently has no positive surface or foul water drainage systems serving the site.
- 2.9 Southern Water serve the local area for both foul and surface water however there is no sewers for either within the vicinity of the proposed site.
- 2.10 Rainfall currently discharges in part to ground and in part overland as a greenfield runoff.
- 2.11 Pre-developed greenfield runoff rates have been established using the HR Wallingford tool.
- 2.12 The pre-developed greenfield runoff rates are as follows:
- 1:1 year 0.6 l/s/ha
 - Qbar 0.7 l/s/ha
 - 1:10 year 1.1 l/s/ha
 - 1:30 year 1.6 l/s/ha
 - 1:100 year 2.2 l/s/ha
 - 1:200 year 2.6 l/s/ha
- 2.13 A copy of the HR Wallingford Green Field Runoff Calculation can be found in Appendix B at the rear of this report.

Geology and Groundwater

Desk Based Study

- 2.14 At the time of writing this report no geotechnical or geo-environmental investigations have been commissioned for the proposed site therefore all information is based on already existing data from BGS.
- 2.15 Published geological records indicate that the ground conditions were likely to comprise of superficial Head-Clay, sand, silt and gravel overlying bedrock geology of Thanet Formation-Sand, silt and clay.

Hydrogeology

- 2.16 With reference to BGS data, the superficial deposits comprising Head-Clay, sand, silt and gravel were classified as a heterogeneous Aquifer. The bedrock Lambeth Clay was classified as a secondary aquifer.
- 2.17 According to information provided by the Environment Agency, the site was indicated to be located in Source Protection Zone 2 – subsurface activity.

Groundwater

- 2.18 No site specific groundwater testing has taken place however based on BGS records in the area the deepest of which being 15m below ground level there is no groundwater struck.
- 2.19 A Copy of BGS records can be found in Appendix C at the rear of this report

Soakage Testing

- 2.20 In the absence of site-specific infiltration testing, British Geological Survey (BGS) data has been reviewed to inform the drainage design. Site-specific soakage testing has not been completed; therefore, an assumed infiltration rate of 5×10^{-6} m/s has been adopted for permeable paving and soakaway calculations.
- 2.21 This assumption has been informed by a review of British Geological Survey (BGS) data, including historical borehole logs available via the BGS GeoIndex portal, located within the same bedrock and superficial geological deposits as the proposed development site. The adopted infiltration rate is considered representative of the prevailing ground conditions for the purposes of this preliminary drainage assessment.

- 2.22 Site-specific soakage testing will be undertaken in accordance with BRE Digest 365 prior to completion of the detailed drainage design. The infiltration drainage design will be reviewed and amended, if necessary, to reflect the results of the on-site testing.

3.0 PROPOSED DEVELOPMENT

Description

- 3.1 The development proposals are for the construction of 1 residential dwellings, SuDS system and landscaping on Land at Bowesden Lane, Shorne.
- 3.2 A copy of the site layout plan is in Appendix D at the rear of this report.

Impermeable Areas

- 3.3 The anticipated impermeable areas of the various elements of the whole development are summarised as follows. An allowance for 10% Urban Creep has been included within the impermeable areas stated:

- Roof Areas 350m²
- Permeable Paved Areas 223m²
- Areas Excluded From Drainage Calculations 277m²

Total 850m²

- 3.4 A copy of the impermeable areas plan is in Appendix E at the rear of this report.

Rainfall Climate Change Allowance

- 3.5 The latest climate change allowances (available online <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>), which supports the NPPF in making an allowance for climate change within drainage design. The allowances provide predictions of anticipated change for peak river flow by river basin district and peak rainfall intensity.
- 3.6 The table below shows the anticipated changes in extreme rainfall intensity. The anticipated increases in peak rainfall across the Medway Management Catchment for the 1% annual exceedance rainfall event are as follows:

Epoch	Central Allowance	Upper End Allowance
2050s	20%	45%
2070s	20%	40%

Table 3.1: Climate Change Allowances

- *Use '2050s' for development with a lifetime up to 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.
- 3.7 Based on the latest allowances and a life span of the development of 70 to 100 years, an increase of 45% has been applied to peak rainfall to this development.

Surface Water Drainage

- 3.8 CIRIA report C753 The SuDS Manual provides guidance on surface water drainage. The aim for surface water runoff is to match greenfield runoff rates and volumes where reasonably achievable.
- 3.9 For surface water discharge, the drainage hierarchy notes the following list of drainage options in order of preference:
1. Infiltration to ground
 2. Discharge to a watercourse
 3. Discharge to a surface water sewer
 4. Discharge to a foul water sewer
- 3.10 Based on the above and the assumed infiltration of 5×10^{-6} the surface water drainage strategy is proposed to drain to ground via infiltration.
- 3.11 The overall drainage strategy includes permeable paving and a create soakaway.
- 3.12 The proposed SuDS system will provide sufficient storage to accommodate a 1:100-year storm event including an additional 45% to account for the predicted effects of future climate change.
- 3.13 The system is drained through a combination of pipes, create soakaway, and permeable paving.
- 3.14 Catchpit manholes are to be provided prior to entering the create soakaways for water quality.
- 3.15 Kent County Council's SuDS guidance defines interception drainage as requiring that the first 5mm of rainfall is retained on site for the majority of rainfall events, rather than being discharged to sewer or watercourse.
- 3.16 To achieve the 5 mm rainfall interception requirement, the proposed surface water drainage strategy has been designed to capture the initial roof runoff using rainwater harvesting tanks for on-site non-potable water reuse. The rainwater harvesting tanks have been sized to provide a minimum storage volume equivalent to the first 5 mm of rainfall falling on the proposed roof areas. The required storage volumes have been calculated as follows:
- Main House: Roof area = $243 \text{ m}^2 \times 0.005 = 1.215 \text{ m}^3$ (1,215 litres)
 - Pool House: Roof area = $75 \text{ m}^2 \times 0.005 = 0.375 \text{ m}^3$ (375 litres)
- 3.17 It is proposed to install two rainwater harvesting tanks serving the Main House and one rainwater harvesting tank serving the Pool House. Collectively, these tanks provide sufficient interception storage for the initial 5 mm rainfall event, reducing runoff to the surface water drainage system

while enabling the harvested rainwater to be reused for non-potable purposes, such as landscape irrigation and external cleaning.

Foul Water Drainage

- 3.18 As the site is located within the area not served by the public foul sewers, foul water runoff is proposed to drain via gravity into the onsite cesspool from here it will be collected biweekly.
- 3.19 The foul drainage strategy has been designed in accordance with the Code of Practice Flows and Loads 4, which recommends a wastewater generation rate of 150 litres per person per day. Based on an anticipated occupancy of 9 persons, the estimated daily foul water flow is 1.35 m³/day (1,350 litres/day).
- 3.20 To provide a minimum storage period of 14 days between emptying operations, the required cesspool capacity has been calculated as follows:
- 9 persons × 150 litres/person/day × 14 days = 18,900 litres (18.9 m³).
- 3.21 Accordingly, a 19 m³ cesspool is proposed, providing adequate storage capacity for a minimum two-week period between tanker collections.
- 3.22 Copies of the proposed drainage strategy plan and calculations is located in Appendix F at the rear of this report.

Water Quality

- 3.23 The proposed development is residential. In accordance with CIRIA SuDS Manual 2015 (Report C753), the pollution hazard level for this type of development is very low to low.
- 3.24 The surface water scheme has been designed to include mitigation to ensure that surface water is suitably treated, and any pollution risk adequately managed prior to discharge.
- 3.25 Table 26.2 in Chapter 26 of CIRIA report C753 The SuDS Manual provides Pollution Hazard Indices for varying land types. Those of relevance to the development proposals are as follows:

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car park	Low	0.5	0.4	0.4

Table 3.3: Pollution Hazard Indices

3.26 Pollution Mitigation Indices for each SuDS component within the proposal are as follows:

Type of Mitigation	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7

Table 3.4: Pollution Mitigation Indices

3.27 The surface water drainage design combines the use of permeable paving and meets the target treatment level required for a site with Pollution Hazard Level of very low to low risk.

4.0 CONCLUSIONS

- 4.1 The development proposals are for the construction of a single residential dwellings, SuDS system and landscaping on Land at Bowesden Lane, Shorne.
- 4.2 A suitable SuDS drainage system is proposed which accords with the requirements of national and local policy.
- 4.3 Surface water will be discharged via infiltration to ground.
- 4.4 Preliminary calculations confirm that surface water runoff generated by the proposed development can be attenuated on site for all rainfall events up to the 1:100 year event including an allowance for climate change.
- 4.5 Foul drainage will discharge by gravity to a cesspool located at the north of the site which will be emptied via tanker biweekly.
- 4.6 The site is classified as having a surface water flood risk is classified as 'Very Low' to 'Low'
- 4.7 Water quality improvements will be provided at a greater level than the requirements as part of the SuDS system proposed.

Appendix A – Topographical Survey

1720240mN

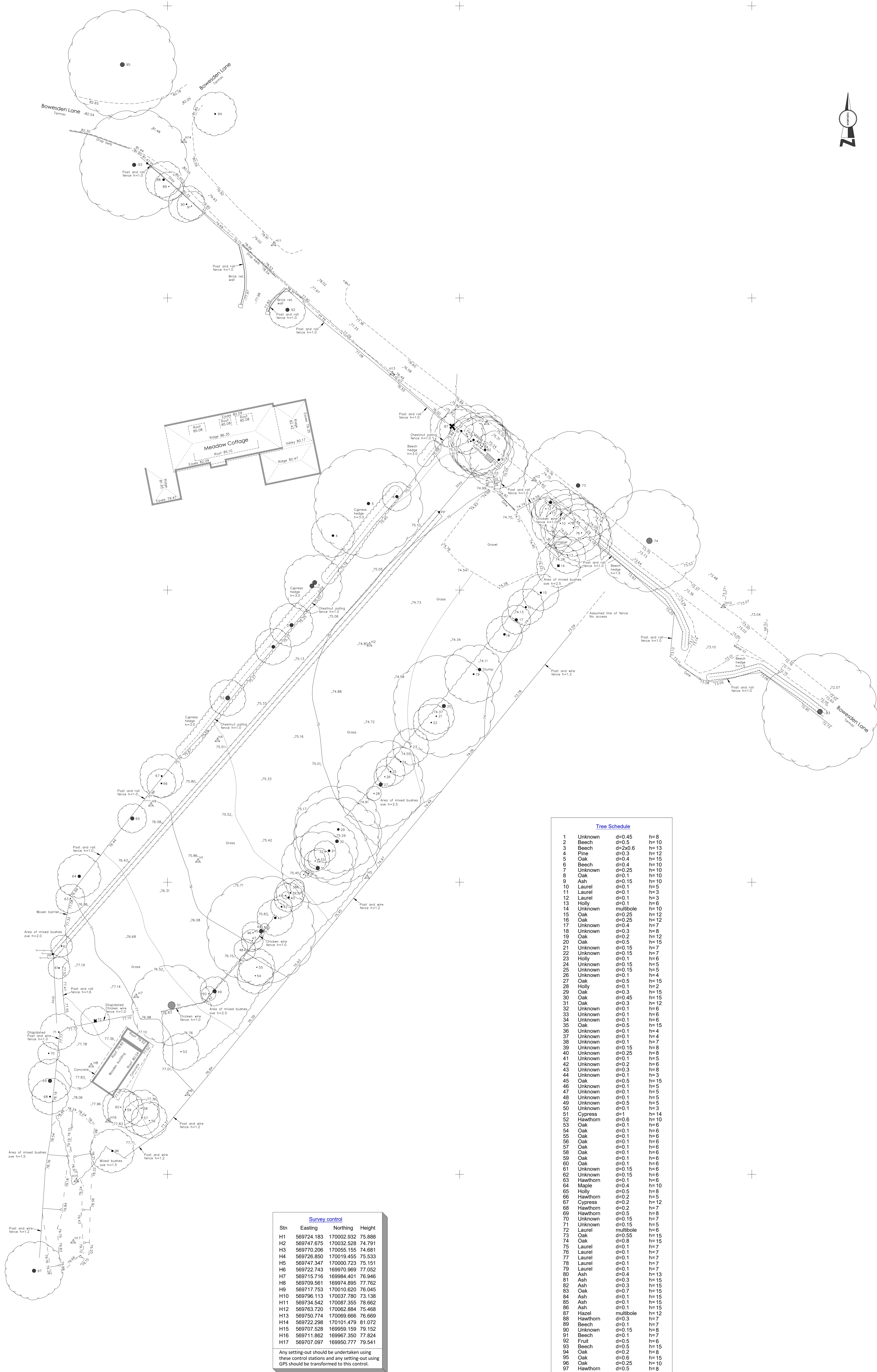
1720240mN

1720240mN

1720240mN

162920mN

162920mN



Survey control			
Stn	Easting	Northing	Height
H1	569724.193	170002.532	75.888
H2	569747.675	170032.528	74.791
H3	569770.206	170055.155	74.681
H4	569726.850	170019.455	75.533
H5	569747.347	170000.723	75.151
H6	569722.743	169970.969	77.052
H7	569715.716	169984.401	76.946
H8	569709.581	169974.895	77.762
H9	569717.753	170010.620	76.045
H10	569796.113	170037.780	73.138
H11	569734.542	170087.355	76.662
H12	569763.720	170062.884	75.468
H13	569750.774	170069.666	76.669
H14	569722.298	170101.479	81.072
H15	569707.528	169959.159	79.152
H16	569711.802	169987.350	77.824
H17	569707.097	169950.777	79.541
Any setting-out should be undertaken using these control stations and any setting-out using GPS should be transformed to this control.			

Tree Schedule			
1	Unknown	d=0.45	h=8
2	Beech	d=0.6	h=10
3	Beech	d=2x0.6	h=13
4	Pine	d=0.3	h=12
5	Oak	d=0.4	h=15
6	Beech	d=0.4	h=10
7	Unknown	d=0.25	h=10
8	Oak	d=0.1	h=10
9	Ash	d=0.15	h=10
10	Laurel	d=0.1	h=5
11	Laurel	d=0.1	h=3
12	Laurel	d=0.1	h=3
13	Holly	d=0.1	h=6
14	Unknown	multibole	h=10
15	Oak	d=0.25	h=12
16	Oak	d=0.25	h=12
17	Unknown	d=0.4	h=7
18	Unknown	d=0.3	h=8
19	Oak	d=0.2	h=12
20	Oak	d=0.5	h=15
21	Unknown	d=0.15	h=7
22	Unknown	d=0.15	h=7
23	Holly	d=0.1	h=6
24	Unknown	d=0.15	h=5
25	Unknown	d=0.15	h=5
26	Unknown	d=0.1	h=4
27	Oak	d=0.5	h=15
28	Holly	d=0.1	h=2
29	Oak	d=0.3	h=15
30	Oak	d=0.45	h=15
31	Oak	d=0.3	h=12
32	Unknown	d=0.1	h=6
33	Unknown	d=0.1	h=6
34	Unknown	d=0.1	h=6
35	Oak	d=0.5	h=15
36	Unknown	d=0.1	h=4
37	Unknown	d=0.1	h=4
38	Unknown	d=0.1	h=7
39	Unknown	d=0.15	h=8
40	Unknown	d=0.25	h=8
41	Unknown	d=0.1	h=5
42	Unknown	d=0.2	h=6
43	Unknown	d=0.3	h=8
44	Unknown	d=0.1	h=3
45	Oak	d=0.5	h=15
46	Unknown	d=0.1	h=5
47	Unknown	d=0.1	h=5
48	Unknown	d=0.1	h=5
49	Unknown	d=0.5	h=5
50	Unknown	d=0.1	h=3
51	Cypress	d=1	h=14
52	Hawthorn	d=0.6	h=10
53	Oak	d=0.1	h=6
54	Oak	d=0.1	h=6
55	Oak	d=0.1	h=6
56	Oak	d=0.1	h=6
57	Oak	d=0.1	h=6
58	Oak	d=0.1	h=6
59	Oak	d=0.1	h=6
60	Oak	d=0.1	h=6
61	Unknown	d=0.15	h=6
62	Unknown	d=0.15	h=6
63	Hawthorn	d=0.1	h=6
64	Maple	d=0.4	h=10
65	Holly	d=0.5	h=8
66	Hawthorn	d=0.2	h=5
67	Cypress	d=0.2	h=12
68	Hawthorn	d=0.2	h=7
69	Hawthorn	d=0.5	h=8
70	Unknown	d=0.15	h=7
71	Unknown	d=0.15	h=5
72	Laurel	multibole	h=6
73	Oak	d=0.55	h=15
74	Oak	d=0.8	h=15
75	Laurel	d=0.1	h=7
76	Laurel	d=0.1	h=7
77	Laurel	d=0.1	h=7
78	Laurel	d=0.1	h=7
79	Laurel	d=0.1	h=7
80	Ash	d=0.4	h=13
81	Ash	d=0.3	h=15
82	Ash	d=0.3	h=15
83	Oak	d=0.7	h=15
84	Ash	d=0.1	h=15
85	Ash	d=0.1	h=15
86	Ash	d=0.1	h=15
87	Hazel	multibole	h=12
88	Hawthorn	d=0.3	h=7
89	Beech	d=0.1	h=7
90	Unknown	d=0.15	h=8
91	Beech	d=0.1	h=7
92	Fruit	d=0.5	h=6
93	Beech	d=0.5	h=15
94	Oak	d=0.2	h=8
95	Oak	d=0.6	h=15
96	Oak	d=0.25	h=10
97	Hawthorn	d=0.5	h=8

Copyright 2026 Hook Survey Limited
The copyright of these Plans that remain valid with Hook Survey Limited who will grant an irrevocable licence for use by the Client once payment has been received in full. No third party may use the plans even if payment has been made to the Client but not received by the Company. Please see our terms and conditions of supply at www.hooksurvey.com for further details.

Topographical Survey Legend

Hedge: [Symbol] Telephone line: [Symbol]
Undergrowth: [Symbol] Power line: [Symbol]
Tree: [Symbol] Banking: [Symbol]
Bush: [Symbol] Contour line: [Symbol] 6.4
Building: [Symbol] Survey Station: [Symbol] H5
Glass Building: [Symbol] Gate: [Symbol]
Open Building: [Symbol] Level: [Symbol] 115.28
Ordnance Survey Benchmark: [Symbol] 115.28
Foul Drainage: [Symbol] 100m
Storm Drainage: [Symbol] 100m

Abbreviations

Animal Set	Sett
Air Valve	AV
Borehole	BH
Bus Stop	BS
Cover Level	CL
Earth Rod	ER
Electricity Pole	EP
Fire Hydrant	FH
Inspection Cover	IC
Invert Level	IL
Lump Post	LP
Manhole	MH
Marker	MK
Name Plate	RNP
Power Pole	PP
Rain water Pipe	RWP
Road Sign	RS
Rodding Eye	RE
Reinforced Steel Joint	RSJ
Soil Vent Pipe	SVP
Stop Valve	SV
Survey Station	STN
Telegraph Pole	TP
Tree Stump	Stump
Tree Hole	UHL
Unable To Lift	UTL
Vent Pipe	VP
Water Valve	WV

0 5 10 Metres
Scale

Notes
All trees are identified where possible. Species, spread, height and girth are indicative only.
Drainage has been surveyed where found, and traced where possible.
Eaves and ridge heights of surrounding buildings have been surveyed where possible.

HOOK SURVEY
Land & Building Surveyors
www.hooksurvey.com

Project: Doggetts, Bowesden Lane, Shorne, Gravesend DA12 3LA

Client: Esquire Developments

Drawing title: Topographical Survey

Job No.: 526/10957 Dwg No.: 526/10957/01 Revision: 1
Scale: 1:200 Date: May 2026 Drawn by: D.S.

Grid & Levels related to: Ordnance survey coordinate system using GPS related to the Leica Smartnet RTK network. Based around 3 survey stations with a scale factor of 1.000, only the fixed survey stations H1, H2 & H6 are true Ordnance Survey positions.

Head Office: Unit 1, Bybow Farm, Orchard Way, Dartford, Kent, DA2 7LR
Email: mail@hooksurvey.com
Tel: 01322 277221

Midlands Office: 42 Hanson Avenue, Shipston-on-Stour, Warwickshire, CV36 4HS
Email: midlands@hooksurvey.com
Tel: 01608 523118

www.hooksurvey.com

INSURANCE
Professional Indemnity
Public Liability

INSURANCE
Professional Indemnity
Public Liability

Appendix B – Greenfield Runoff Calculation

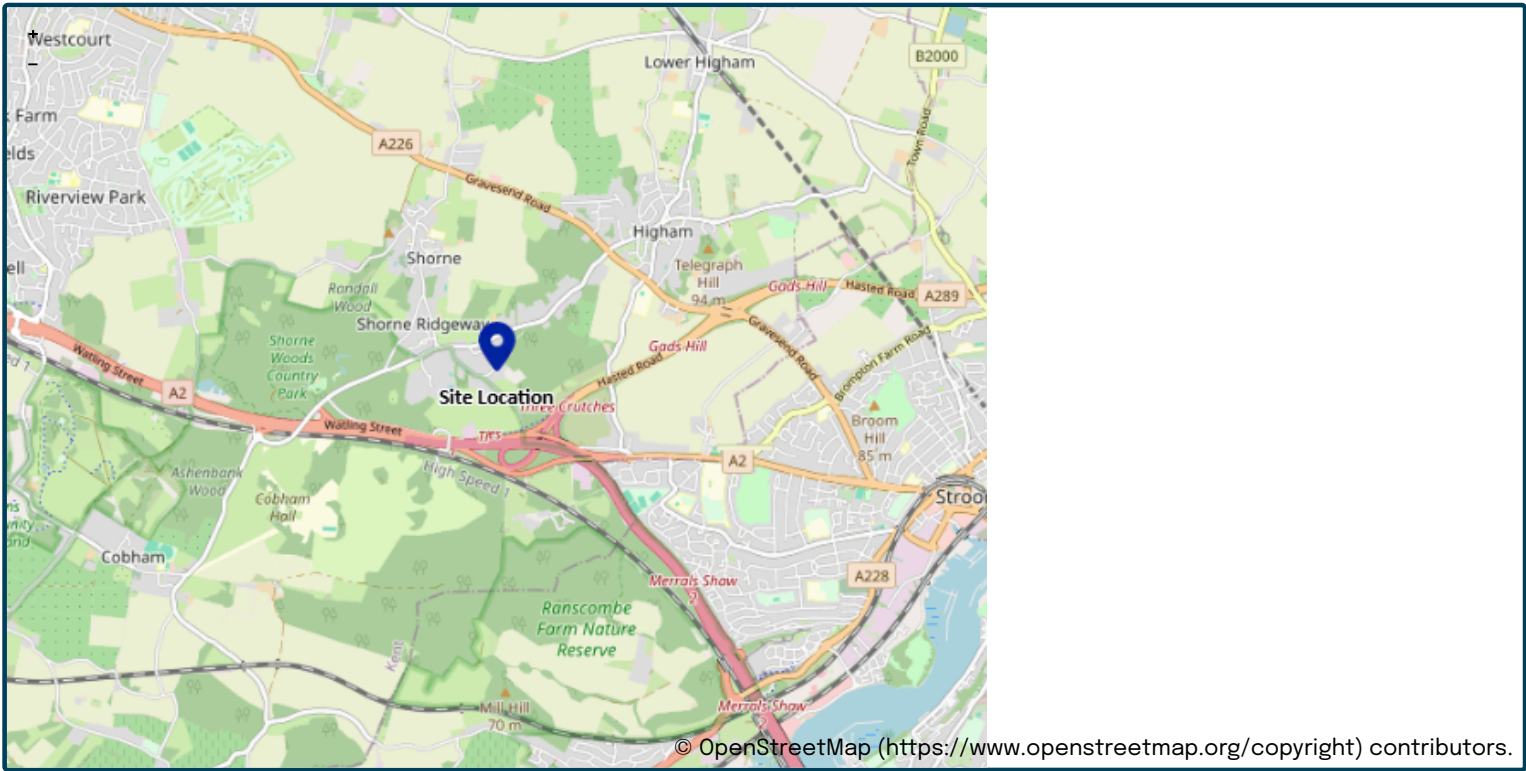
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	09/07/2026
Calculated by	
Reference	
Model version	2.2.3

Location

Site name	5997-005
Site location	



Site easting (British National Grid)	569846
Site northing (British National Grid)	169975

Site details

Total site area (ha)	1	ha
----------------------	--------------------------------	----

Greenfield runoff

Method

Method	FEH statistical (2025)
--------	------------------------

FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	614	mm
BFIHOST19scaled	0.767	
QMed-QBar conversion	1.136	1.136
QMed (l/s)	0.6	l/s
QBar (FEH statistical 2025) (l/s)	0.7	l/s

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	7	7
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

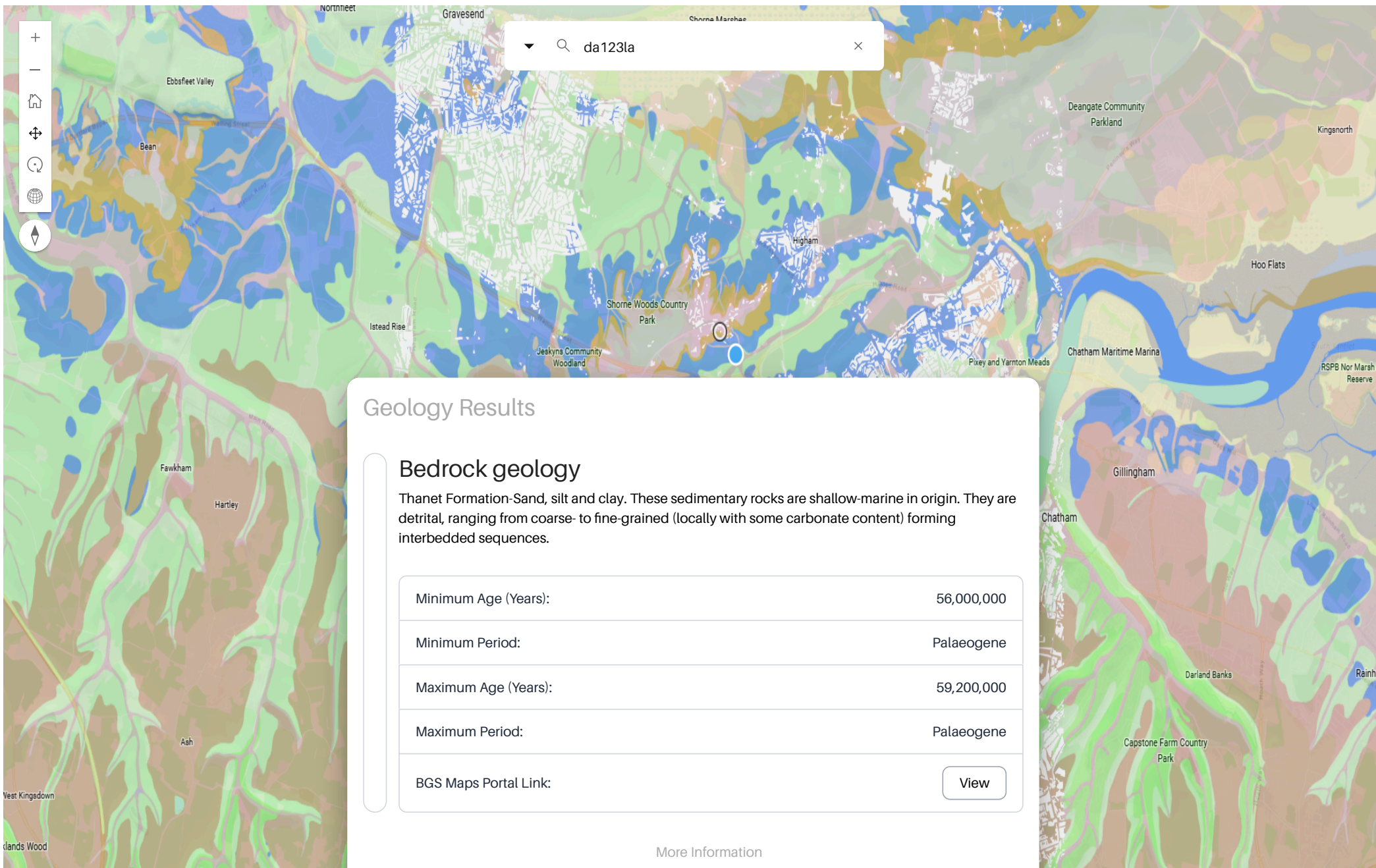
Method	FEH statistical (2025)
Flow rate 1 year (l/s)	0.6
Flow rate 2 year (l/s)	0.6
Flow rate 10 years (l/s)	1.1
Flow rate 30 years (l/s)	1.6
Flow rate 100 years (l/s)	2.2
Flow rate 200 years (l/s)	2.6

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent ‘zero’ figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix C – BGS Records



Geology Results

Bedrock geology

Thanet Formation-Sand, silt and clay. These sedimentary rocks are shallow-marine in origin. They are detrital, ranging from coarse- to fine-grained (locally with some carbonate content) forming interbedded sequences.

Minimum Age (Years):	56,000,000
Minimum Period:	Palaeogene
Maximum Age (Years):	59,200,000
Maximum Period:	Palaeogene
BGS Maps Portal Link:	View

[More Information](#)

The BGS Lexicon of Named Rock Units — Result Details

Thanet Formation

Computer
Code:[TAB](#)Preferred Map
Code:

TS

Status Code: Full

Age range: [Thanetian Age](#) (GT) — [Thanetian Age](#) (GT)Lithological
Description:

Typically composed of homogeneous, bioturbated, glauconitic silty fine-grained sand, with sandy silt, silt or sandy, silty clay especially in the lower part, forming a coarsening-upwards sequence. The deposits are generally pale yellow-brown in colour, typically with a 'peppering' of dark-coloured glauconite grains. Sparse white mica occurs throughout. Rare coarse gravel is present in places in London. Patchy calcareous, siliceous or ferruginous cement occurs locally. A thin gravel and cobble bed (the 'Bullhead Bed') is generally present at the base. It comprises unworn green-coated flints in a matrix of green, glauconite-rich clayey sand. Dispersed and degraded volcanic ash occurs at least locally in the Thanet Formation (Ellison and Lake, 1986; Knox, 1979). The Thanet Formation was deposited on an inner to outer marine shelf, above fair-weather wave base (Ellison et al., 1994). The heavy mineral content of the sands suggests a Scottish provenance, in contrast to that of the overlying Upnor Formation, but similar to that of most of the younger Palaeogene formations (Morton, 1982). Late Paleocene; early to mid-Thanetian (Blake, 1903; Ellison et al., 1994; King, in prep.).

Definition of
Lower
Boundary:

The base of the Thanet Formation is the base of the basal sandy, clayey flint gravel bed, which rests on the Chalk Group, often on an irregular, karstic surface modified by dissolution in groundwater.

Definition of
Upper
Boundary:

The Thanet Formation is overlain unconformably by the Upnor Formation in most areas but by the Reading Formation in parts of Essex. Generally, an upwards change from yellow-brown, glauconitic silty fine-grained sands of the Thanet Formation to greenish glauconitic medium- to coarse-grained, locally gravelly, variably clayey sand of the Upnor Formation. In the type section and in some other places, the grain-size contrast is less and the boundary correspondingly more difficult to identify.

Thickness:

In central London, the Thanet Formation is typically 10 to 15 m thick, diminishing westwards to where it is overstepped by the Lambeth Group in west London and Surrey. The formation is generally thicker in the eastern parts of the London Basin, and is greatest in North Kent, where it generally

ranges from about 20 m up to 30 m, increasing to as much as 37 m in the Canterbury district (Hester, 1965; Smart et al., 1966). In places significant parts of the Thanet Formation have been removed by erosion prior to deposition of the Lambeth Group (Curry, 1981). At Beacon Hill, west of Faversham, the thickness is about 24 m, whereas at Goodnestone it is little more than 18m (Holmes, 1981).

Geographical Limits: The Thanet Formation occurs in the central and eastern London Basin, as far north as southern Suffolk, where it passes laterally into the Ormesby Clay Member. To the west of London, it is overstepped by the Upnor Formation.

Parent Unit: Montrose Group (MONT)

Previous Name(s): Thanet Sands [Obsolete Name and Code: Use TAB] (-1856)
 Thanet Sand [Obsolete Name and Code: Use TAB] (TS)
 Thanet Beds [Obsolete Name and Code: Use TAB] (-2473)
 Thanet Sands Formation [Obsolete Name and Code: Use TAB] (-3708)

Alternative Name(s): *none recorded or not applicable*

Stratotypes:

Reference Section Loats Pit, Blackheath, London Borough of Lewisham [TQ 382 766] (Greater London Authority, 2009).

Reference Section Cray Valley Golf Course sand pit, London Borough of Bromley [TQ 489 692] (Greater London Authority, 2009).

Type Section Cliffs and foreshore east of Herne Bay, Kent [TR 203 687 to 215 693] (Curry, 1981; Daley, 1999; Ward, 1978) expose the upper part of the formation as Beds A to I of Ward (1978), probably with several metres overlap with the more proximal sequence at Pegwell Bay (Knox et al., 1994, p.49).

Type Section Cliffs near Little Cliffsend, Pegwell Bay, Kent [TR 3545 6440] (Curry, 1981; Daley, 1999; Ward, 1977) expose the lower part of the formation.

Reference Section Charlton Pit (or Gilbert's Pit), just south-west of Maryon Park, Charlton, London Borough of Greenwich [TQ 418 786] (Daley, 1999; Ellison et al., 1994; Whitaker, 1889).

Reference Section Bradwell Borehole 217 (TM00NW43) [TM 01769 09156], Essex, from 60.2 to about 82.3 m depth (Jolley, 1992, p. 211).

Reference Section Stanford-le-Hope Borehole (TQ68SE33) [TQ 6965 8241], Essex, from 29.04 to 57.05 m depth (Lake et al., 1986).

Reference Section Jubilee Line Extension Borehole 404T (TQ37NW2118) [TQ 33638 79604], Bermondsey, London, 41.1 to 53.05 m depth, (Ellison et al., 1994).

Reference(s):

Jolley, D W, 1992. Palynofloral association sequence stratigraphy of the Palaeocene Thanet Beds and equivalent sediments in eastern England. Review of Palaeobotany and Palynology, Vol.74, p.207-237.

Ward, D J. 1977. The Thanet Beds exposure at Pegwell Bay, Kent. Tertiary Research, Vol. 1, p. 69-76.

Ward, D J. 1978. The Lower London Tertiary (Palaeocene) succession of Herne Bay, Kent. Institute of Geological Sciences, Report 78/10.

Prestwich, J, 1852. On the structure of the strata between the London Clay and the Chalk, etc, part 111. The Thanet Sands. Quarterly Journal of the Geological Society, Vol.8, p.235-268.

Waters, C N, Smith, K, Hopson, P M, Wilson, D, Bridge, D M, Carney, J N, Cooper, A H, Crofts, R G, Ellison, R A, Mathers, S J, Moorlock, B S P, Scrivener, R C, McMillan, A A, Ambrose, K, Barclay, W J, and Barron, A J M. 2007. Stratigraphical Chart of the United Kingdom: Southern Britain. British Geological Survey, 1 poster.

Aldiss, D T. 2014. The stratigraphical framework for the Palaeogene successions of the London Basin, UK. British Geological Survey Open Report OR/14/008. 95 pp.

Curry, D. 1981. Thanetian. 255-265 in Stratotypes of Palaeogene stages. Pomerol, C (editor). Mémoire Hors Série du Bulletin d'Information des Géologues du Bassin du Paris, No. 2.

Daley, B. 1999. London Basin: eastern localities. 23-72 in British Tertiary Stratigraphy. Daley, B, and Balson, P (editors). Geological Conservation Review Series 15.

Ellison, R A, Knox R W O'B, Jolley, D W, and King, C. 1994. A revision of the lithostratigraphical classification of the early Palaeogene strata of the London Basin and East Anglia. Proceedings of the Geologists' Association, Vol. 105, 187-197.

Ellison, R A, and Lake, R D. 1986. Geology of the country around Braintree. Memoir of the British Geological Survey, Sheet 223 (England and Wales).

Haynes, J. 1956. Certain smaller British Paleocene foraminifera. Contributions from the Cushman Foundation for foraminiferal research, Vol. 7, 79-101.

Hester, S W. 1965. Stratigraphy and palaeogeography of the Woolwich and Reading Beds. Bulletin of the Geological Survey of Great Britain No. 23, 117-137.

King, C. in prep. A revised correlation of Palaeogene and Neogene deposits in the British Isles. Geological Society of London Special Report.

Knox, R W O, Hine, N M, and Ali, J R. 1994. New information on the age and sequence stratigraphy of the type Thanetian of southeast England. Newsletters on Stratigraphy, Vol. 30, 45-60.

Knox, R W O. 1979. Igneous grains associated with zeolites in the Thanet Beds of Pegwell Bay, Northeast Kent. Proceedings of the Geologists' Association, Vol. 90, 55-59.

Lake, R D, Ellison, R A, Henson, M R, and Conway, B W. 1986. Geology of the country around Southend and Foulness. Memoir of the British Geological Survey, Sheet 258 and 259 (England and Wales).

Morton, A C. 1982. The provenance and diagenesis of Palaeogene sandstones of southeast England as indicated by heavy mineral analysis. Proceedings of the Geologists' Association, Vol. 93, 263-274.

Siesser, W G, Ward, D J, and Lord, A R. 1987. Calcareous nannoplankton biozonation of the Thanetian Stage (Palaeocene) in the type area. Journal of Micropalaeontology, Vol. 6, 85-102.

Smart, J G O, Bisson, G and Worssam, B C. 1966. Geology of the Country around Canterbury and Folkestone. Memoir of the Geological Survey of Great Britain, Sheets 289, 305 and 306 (England and Wales).

Whitaker, W. 1872. The geology of the London Basin, Part I. The Chalk and the Eocene beds of the southern and western tracts. Memoir of the Geological Survey of England and Wales, Vol. IV.

Whitaker, W., 1889. The geology of London and part of the Thames Valley (Explanation of Sheets 1, 2 and 7). Memoir of the Geological Survey of the United Kingdom Vol. 1. Descriptive geology.

Blake, J H. 1903. The geology of the country around Reading. Memoir of the Geological Survey of England and Wales, Sheet 268 (England and Wales).

Gardner, J S. 1883. On the Lower Eocene section between Reculver and Herne Bay. Quarterly Journal of the Geological Society London, Vol. 39, 197-210.

Greater London Authority. 2009. London's Foundations - protecting the geodiversity of the capital. (City Hall, London: Greater London Authority.) ISBN 978 1 84781 250 6

Holmes, S C A. 1981. Geology of the country around Faversham. Memoir of the Geological Survey, Sheet 273 (England and Wales).

Whitaker, W. 1866. On the "Lower London Tertiaries" of Kent. Quarterly Journal of the Geological Society London, Vol.22, 404-435.

1:50K maps on which the lithostratigraphical unit is found, and map code used:

[E270](#) [E256](#) [E269](#) [E162](#) [E285](#) [E206](#) [E207](#) [E222](#) [E240](#) [E241](#) [E257](#) [E258](#) [E259](#) [E271](#) [E272](#)
[E273](#) [E274](#)

- [Another Query ?](#)



Useful links

[About BGS](#)

[News and Events](#)

[Contact us](#)

[Press Office](#)

Policies & legal

[Privacy policy](#)

[Cookies policy](#)

[Terms of use](#)

[Freedom of information \(FOI\)](#)

[Intellectual Property Rights](#)



Legend



Only layers selected and visible at this map scale will be shown

Magic

Landscape

Geology and Soils

Groundwater Vulnerability Map (England)

 Local Information

 Soluble Rock Risk

 High

 Medium - High

 Medium

 Medium - Low

 Low

 Unproductive

Search result

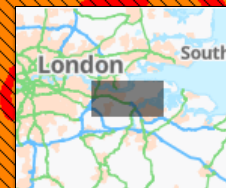


🔍 Zoom to

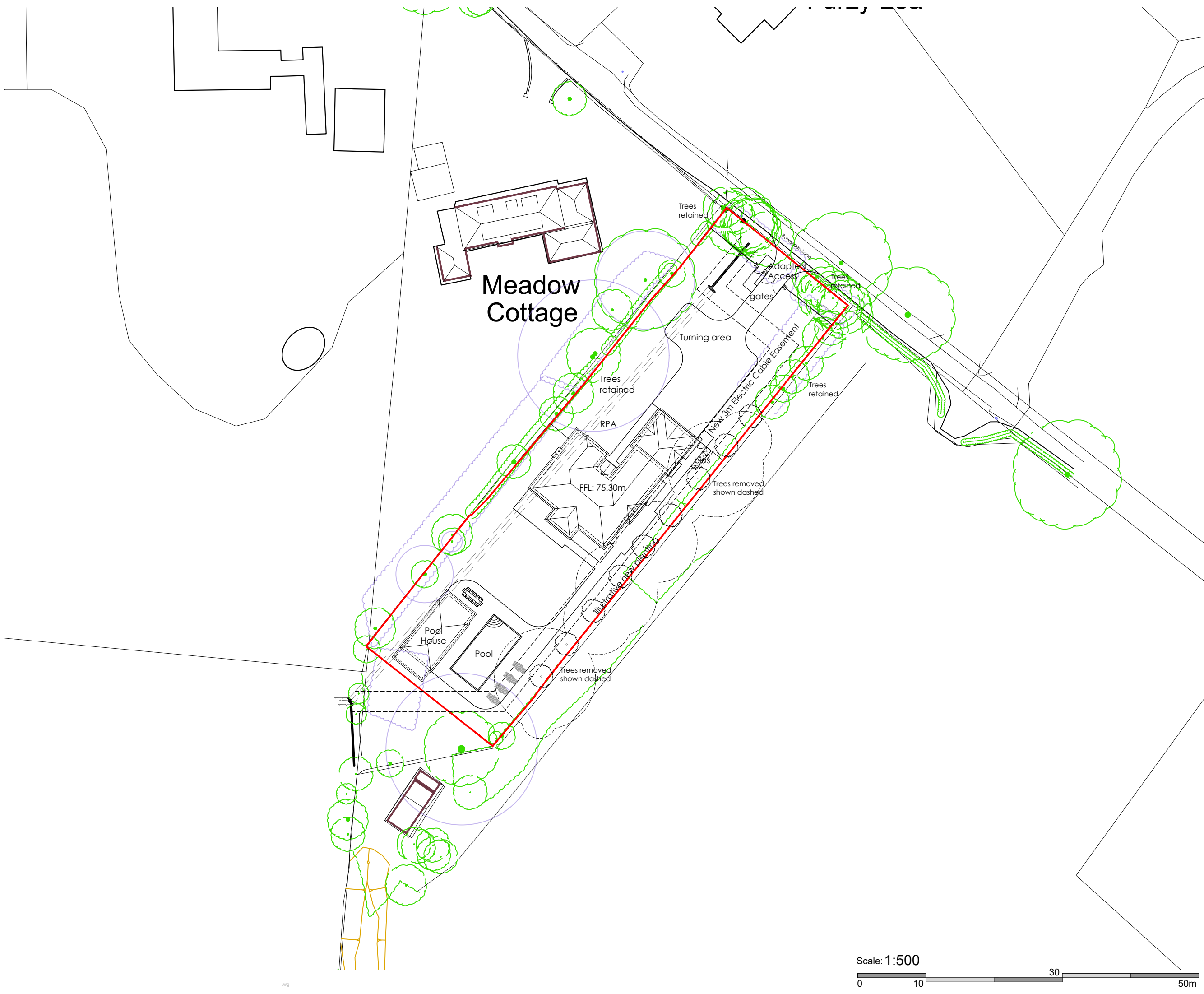
DA12 3LA

2 km

Coords: (570492,178241) | Grid Ref: TQ70497824 | Scale 1:59282



Appendix D – Proposed Site Layout Plan



This drawing and the design are the copyright of ON Architecture Ltd only. This drawing should not be copied or reproduced without written consent. All dimensions are to be checked on site prior to setting out and fabrication and ON Architecture Ltd should be notified of any discrepancy prior to proceeding further. For Construction & Fabrication Purposes - Do not scale from this drawing, use only the illustrated dimensions herein. Additional dimensions are to be requested and checked directly. Illustrated information from 3rd party consultants/specialists is shown as indicatively only. See other consultant / specialist drawings for full information and detail. All aspects of the architectural design concerning fire performance / fire safety (whether or not illustrated / annotated) are to be considered as 'For Approval' only, irrespective of the drawing status / suitability.

• P1	19/06/26	Updated layout following geolocation.		GA	PB
Rev	Date	Note		Amended	Checked
Revision Note & Date					



On Architecture
Logan House
St Andrews Close
Canterbury
CT1 2RP

onarchitecture.co.uk
info@onarchitecture.co.uk
01227 634334

Project Title
**Proposed Dwelling, Swimming Pool & Pool House
at Bowesden Lane, Shorne, Gravesend**

Client Details
Esquire Developments

Drawing Title
Proposed Site Layout with Swimming Pool

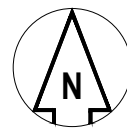
Scale	Date	Drawn	Checked
1:500 @ A3	June 26	PB	

Drawing Status
DRAFT

Project No.	Drawing No.	Status	Revision
26.051	10	D	P1

Appendix E – Proposed Impermeable Areas Plan

DO NOT SCALE OFF THIS DRAWING



GENERAL NOTES:

1. All dimensions to be checked on site. All details and dimensions relating to sub-Contractors work must be checked and agreed between the sub-Contractor or supplier and the general Contractor.
2. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and specification.
3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority. No liability is accepted by the Consultant and the main Contractor is responsible for obtaining and checking all information and taking due care and attention whilst undertaking the works.

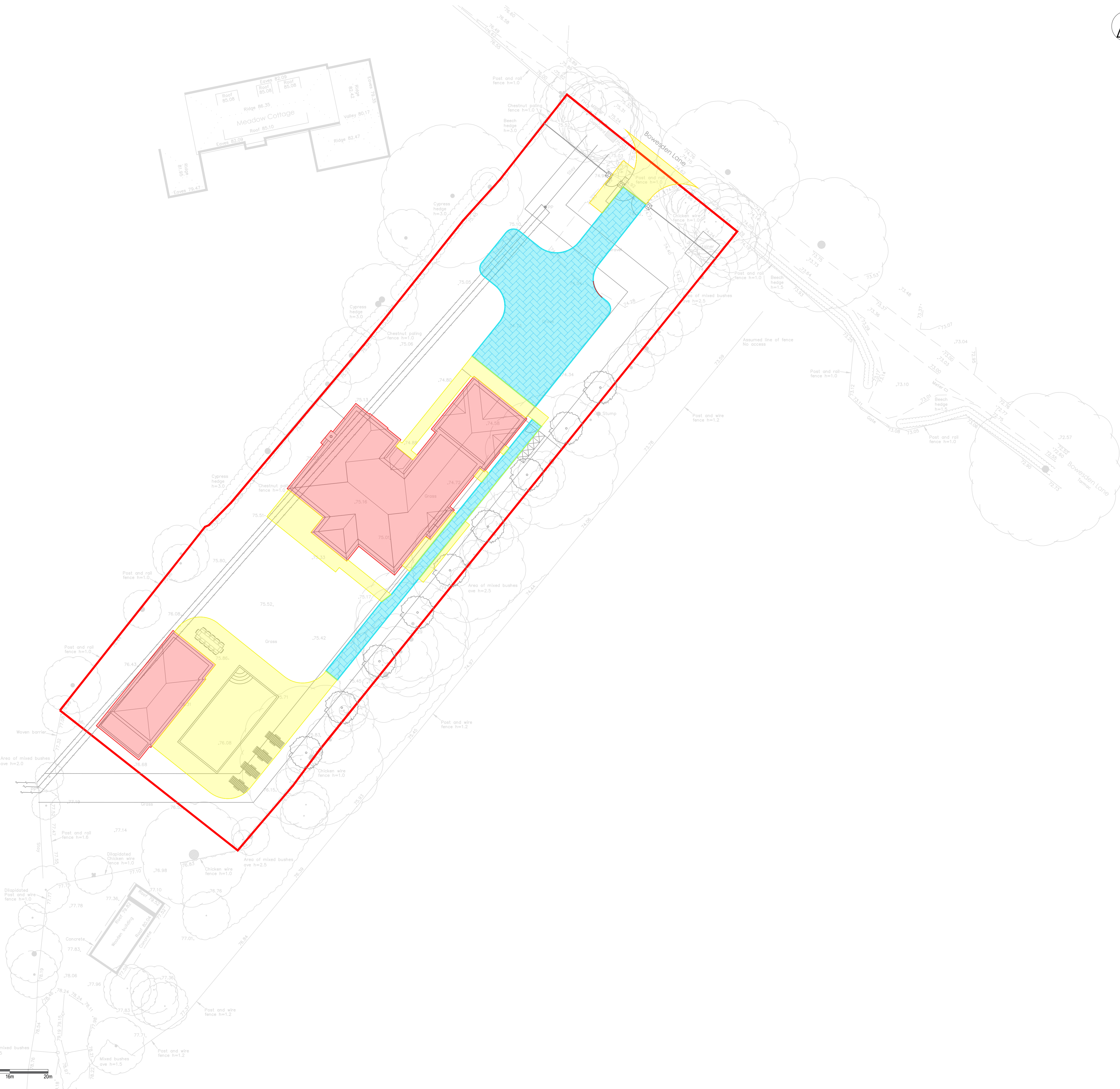
CDM 2015 RESIDUAL RISKS

1. All areas of live traffic and pedestrian movements shall be subject to appropriate traffic management barriers and signs.
2. Access points onto live public highway.
3. Unauthorised access to the site must be prevented at all times
4. Existing road drainage to be maintained.
5. Be aware of possible live drainage flows and foul effluent during construction. The Contractor shall assess and implement a safe working system and equipment (PPE) as necessary.

The above residual risks are for non-standard hazards. It is assumed that a competent contractor familiar with the construction of this type of work will be appointed who will be aware of the standard hazards.

IMPERMEABLE AREAS KEY

	Site Boundary
	Buildings plus 10% = 350m ²
	Excluded From Drainage Calculations = 277m ²
	Permeable Private Drives/Footpaths = 223m ²



Scale 1:200 @ A1 - 1:400 @ A3
4m 0 4m 8m 12m 16m 20m

A01	ISSUED FOR APPROVAL	NS	TZ	TZ	26/06/2026
Rev	Comment	By	Chkd	Appr	Date
Revision History					

Revision History

APPROVAL

ROGER GOODMAN & PAUL HENRY

robert west
proesgroup

1 Paris Garden
London
SE1 8ND
t: 0203 773 7880
www.robertwest.co.uk

Project
BOWESDEN LANE
SHORNE

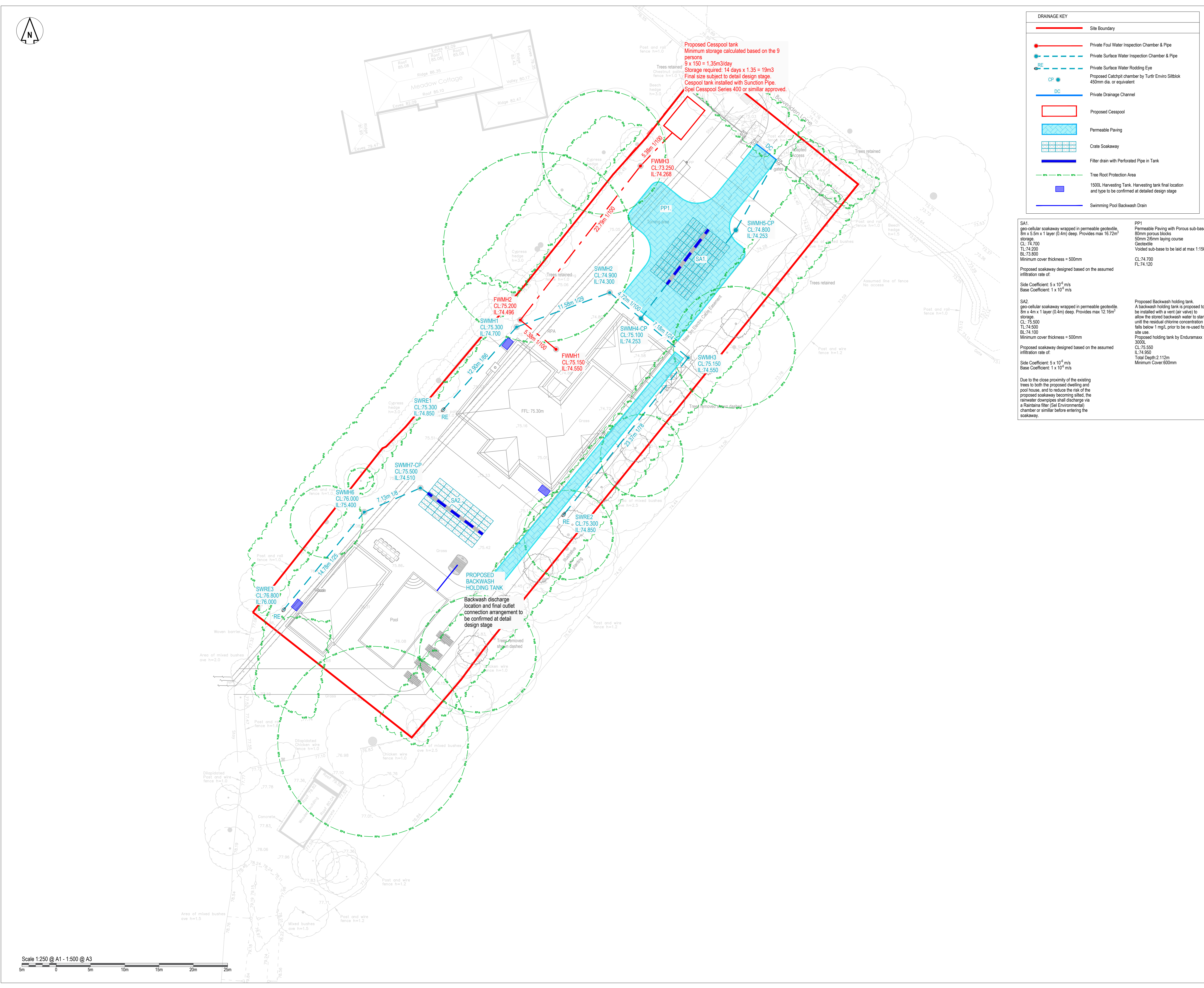
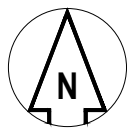
Drawing Title
PROPOSED IMPERMEABLE AREAS

RWCL Internal Register reference: 5997-005

Scales @ A1

102-A01

Appendix F – Proposed Drainage Strategy Plan and Calculations



DRAINAGE KEY	
	Site Boundary
	Private Foul Water Inspection Chamber & Pipe
	Private Surface Water Inspection Chamber & Pipe
	Private Surface Water Rodding Eye
	Proposed Catchpit chamber by Turfiri Enviro Siltblok 450mm dia. or equivalent
	Private Drainage Channel
	Proposed Cesspool
	Permeable Paving
	Crate Soakaway
	Filter drain with Perforated Pipe in Tank
	Tree Root Protection Area
	1500L Harvesting Tank. Harvesting tank final location and type to be confirmed at detailed design stage
	Swimming Pool Backwash Drain

SA1.
geo-cellular soakaway wrapped in permeable geotextile, 8m x 5.5m x 1 layer (0.4m) deep. Provides max 16.72m³ storage.
CL: 74.700
TL: 74.200
BL: 73.800
Minimum cover thickness = 500mm

Proposed soakaway designed based on the assumed infiltration rate of:
Side Coefficient: 5 x 10⁻⁴ m/s
Base Coefficient: 1 x 10⁻⁴ m/s

SA2.
geo-cellular soakaway wrapped in permeable geotextile, 8m x 4m x 1 layer (0.4m) deep. Provides max 12.16m³ storage.
CL: 75.500
TL: 74.500
BL: 74.100
Minimum cover thickness = 500mm

Proposed soakaway designed based on the assumed infiltration rate of:
Side Coefficient: 5 x 10⁻⁴ m/s
Base Coefficient: 1 x 10⁻⁴ m/s

Due to the close proximity of the existing trees to both the proposed dwelling and pool house, and to reduce the risk of the proposed soakaway becoming silted, the rainwater downpipes shall discharge via a Raintana filter (See Environmental) chamber or similar before entering the soakaway.

PP1
Permeable Paving with Porous sub-base
80mm porous blocks
50mm 26mm laying course
Geotextile
Voided sub-base to be laid at max 1:150
CL: 74.700
FL: 74.120

Proposed backwash holding tank.
A backwash holding tank is proposed to be installed with a vent (air valve) to allow the stored backwash water to stand until the residual chlorine concentration falls below 1 mg/L prior to be re-used for site use.
Proposed holding tank by Enduramaxx 3000L
CL: 75.550
IL: 74.950
Total Depth: 2.112m
Minimum Cover: 500mm

DO NOT SCALE OFF THIS DRAWING

- GENERAL NOTES:
- All dimensions to be checked on site. All details and dimensions relating to sub-Contractors work must be checked and agreed between the sub-Contractor or supplier and the general Contractor.
 - This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and specification.
 - The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
 - Any information given regarding existing underground services is given in good faith after consultation with the relevant authority. No liability is accepted by the Consultant and the main Contractor is responsible for obtaining and checking all information and taking due care and attention whilst undertaking the works.

- CDM 2015 RESIDUAL RISKS
- All areas of live traffic and pedestrian movements shall be subject to appropriate traffic management barriers and signs.
 - Access points onto live public highway.
 - Unauthorised access to the site must be prevented at all times.
 - Existing road drainage to be maintained.
 - Be aware of possible live drainage flows and foul effluent during construction. The Contractor shall assess and implement a safe working system and equipment (PPE) as necessary.
- The above residual risks are for non-standard hazards. It is assumed that a competent contractor familiar with the construction of this type of work will be appointed who will be aware of the standard hazards.

- DRAINAGE NOTES:
- All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidance (published by Water UK) & BS EN 752.
 - Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with the Client and Robert West.
 - For location and setting out of building drainage points refer to architects drawings.
 - All pipe runs near buildings to comply with the Building Regulations 2015 part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
 - Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
 - Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
 - Where a pipe, under a vehicular area other than a carriageway has a depth of cover if less than 0.8m the pipe shall be protected with a concrete slab set above it.
 - In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided. compressible boards (fibresboard or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints). the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section. a board thickness of 18mm for pipes up to 450mm nominal diameter and 36mm for pipes over 450mm nominal diameter.
 - All private building drainage shall be constructed in strict accordance with BS EN 752. Foul drainage beneath the floor slab shall be laid, shall be laid no flatter than 1:40. Unless otherwise specified below ground building drainage external to the building shall be 100mm diameter and shall be laid at a minimum gradient of (<1/4 = 1 in 40>1/4 = 1 in 80) for foul drains and 1 in 80 for surface water drains.
 - All building drains shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
 - All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All pipes, bends and junction materials for adoptable drainage shall be UPVC compliant with Clause E2.21 of Design and Construction Guidance for Foul and Surface Water Water Sewers, Sector Guidance Appendix C, June 2022. These should conform to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All back inlet gullies to be roddable or connected to inspection chambers.
 - All gully connections other than at manholes to be 'Y' junctions.
 - All road gully connections to be 150mm diameter.
 - All stub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
 - No low point shall be without a method of drainage.
 - All connections to be soffit to soffit unless otherwise noted.
 - All concrete and concrete products to be in accordance with BRE 363 for sulphates.
 - The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
 - Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
 - The precise depth and location and size of existing pipes, watercourses or manholes where corrections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
 - Any existing drains to be abandoned in accordance with the Building Regulations by either grubbing, infilling or sealing.
 - Should ground water be encountered on site during construction, the Client shall be informed to determine if additional measures are required.
 - The drainage system shall be fully cleansed on completion of the project using methods that ensure pollution off site does not occur.
 - Any existing land drains severed during construction shall be reinstated.

A01 ISSUED FOR APPROVAL		NS	TZ	TZ	08/07/2026
Rev	Comment	By	Chkd	Appr	Date

Revision History

APPROVAL

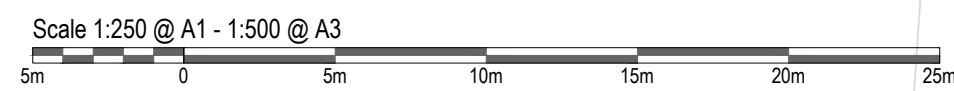
ROGER GOODMAN & PAUL HENRY

proesgroup
1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

Project
BOWESDEN LANE
SHORNE

Drawing Title
PROPOSED DRAINAGE LAYOUT

RWCL Internal Register reference: 5997-005
Scales @ A1
101-A01



© Robert West Consulting 2019. All rights reserved

Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
PP1	0.020	5.00	74.900	450	0.570
SA1	0.027		74.800	450	1.400
SA2	0.008		75.500	450	1.000

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	PP1	SA1	10.000	0.600	74.330	73.400	0.930	10.8	100	5.07	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	2.370	18.6	3.6	0.470	1.300	0.020	0.0	30	1.843

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	10.000	10.8	100	Circular	74.900	74.330	0.470	74.800	73.400	1.300

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	PP1	450	Manhole	Adoptable	SA1	450	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
PP1	74.900	0.570	450				
				0	1.000	74.330	100
SA1	74.800	1.400	450		1	1.000	73.400
							100
SA2	75.500	1.000	450				

Simulation Settings

Rainfall Methodology	FEH-13	Analysis Speed	Normal	Additional Storage (m ³ /ha)	0.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	10080
30	120	240	480	720	1440	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
10	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Node PP1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.01800	Invert Level (m)	74.330	Slope (1:X)	150.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.450
Safety Factor	1.5	Width (m)	20.000	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node SA1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00360	Invert Level (m)	73.400	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.01800	Time to half empty (mins)	2944	Inf Depth (m)	
Safety Factor	1.5	Pit Width (m)	8.000	Number Required	1
Porosity	0.95	Pit Length (m)	5.500		

Node SA2 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00360	Invert Level (m)	74.500	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.01800	Time to half empty (mins)	2714	Inf Depth (m)	
Safety Factor	1.5	Pit Width (m)	4.000	Number Required	1
Porosity	0.95	Pit Length (m)	8.000		

Results for 2 year Critical Storm Duration. Lowest mass balance: 97.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	PP1	11	74.356	0.026	3.5	0.3151	0.0000	OK
10080 minute winter	SA1	6240	73.688	0.288	0.2	12.0644	0.0000	OK
1440 minute winter	SA2	930	74.559	0.059	0.1	1.8044	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	
15 minute summer	PP1	1.000	SA1	2.8	1.486	0.149	0.0351	
15 minute summer	PP1	Infiltration		0.3				
10080 minute winter	SA1	Infiltration		0.1				
1440 minute winter	SA2	Infiltration		0.0				

Results for 10 year Critical Storm Duration. Lowest mass balance: 97.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	PP1	12	74.368	0.038	7.1	0.6616	0.0000	OK
600 minute winter	SA1	570	74.348	0.948	1.4	16.8916	0.0000	OK
480 minute winter	SA2	456	74.612	0.112	0.3	3.4326	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	PP1	1.000	SA1	5.7	1.519	0.308	0.0528	
15 minute summer	PP1	Infiltration		0.4				
600 minute winter	SA1	Infiltration		0.1				
480 minute winter	SA2	Infiltration		0.0				

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 97.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	PP1	495	74.530	0.200	3.5	10.0137	0.0000	SURCHARGED
720 minute summer	SA1	495	74.530	1.130	3.4	16.9206	0.0000	OK
960 minute winter	SA2	915	74.720	0.220	0.3	6.7325	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
720 minute summer	PP1	1.000	SA1	-2.0	0.443	-0.107	0.0782
720 minute summer	PP1	Infiltration		0.7			
720 minute summer	SA1	Infiltration		0.1			
960 minute winter	SA2	Infiltration		0.0			

Results for 100 year Critical Storm Duration. Lowest mass balance: 97.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	PP1	495	74.530	0.200	3.5	10.0137	0.0000	SURCHARGED
720 minute summer	SA1	495	74.530	1.130	3.4	16.9206	0.0000	OK
960 minute winter	SA2	915	74.720	0.220	0.3	6.7325	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
720 minute summer	PP1	1.000	SA1	-2.0	0.443	-0.107	0.0782
720 minute summer	PP1	Infiltration		0.7			
720 minute summer	SA1	Infiltration		0.1			
960 minute winter	SA2	Infiltration		0.0			

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 97.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	PP1	570	74.776	0.446	3.4	24.8397	0.0000	FLOOD RISK
720 minute winter	SA1	570	74.777	1.377	2.4	16.9598	0.0000	OK
1440 minute summer	SA2	1350	74.834	0.334	0.5	10.2036	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
720 minute winter	PP1	1.000	SA1	-1.9	0.548	-0.102	0.0782
720 minute winter	PP1	Infiltration		0.7			
720 minute winter	SA1	Infiltration		0.1			
1440 minute summer	SA2	Infiltration		0.0			

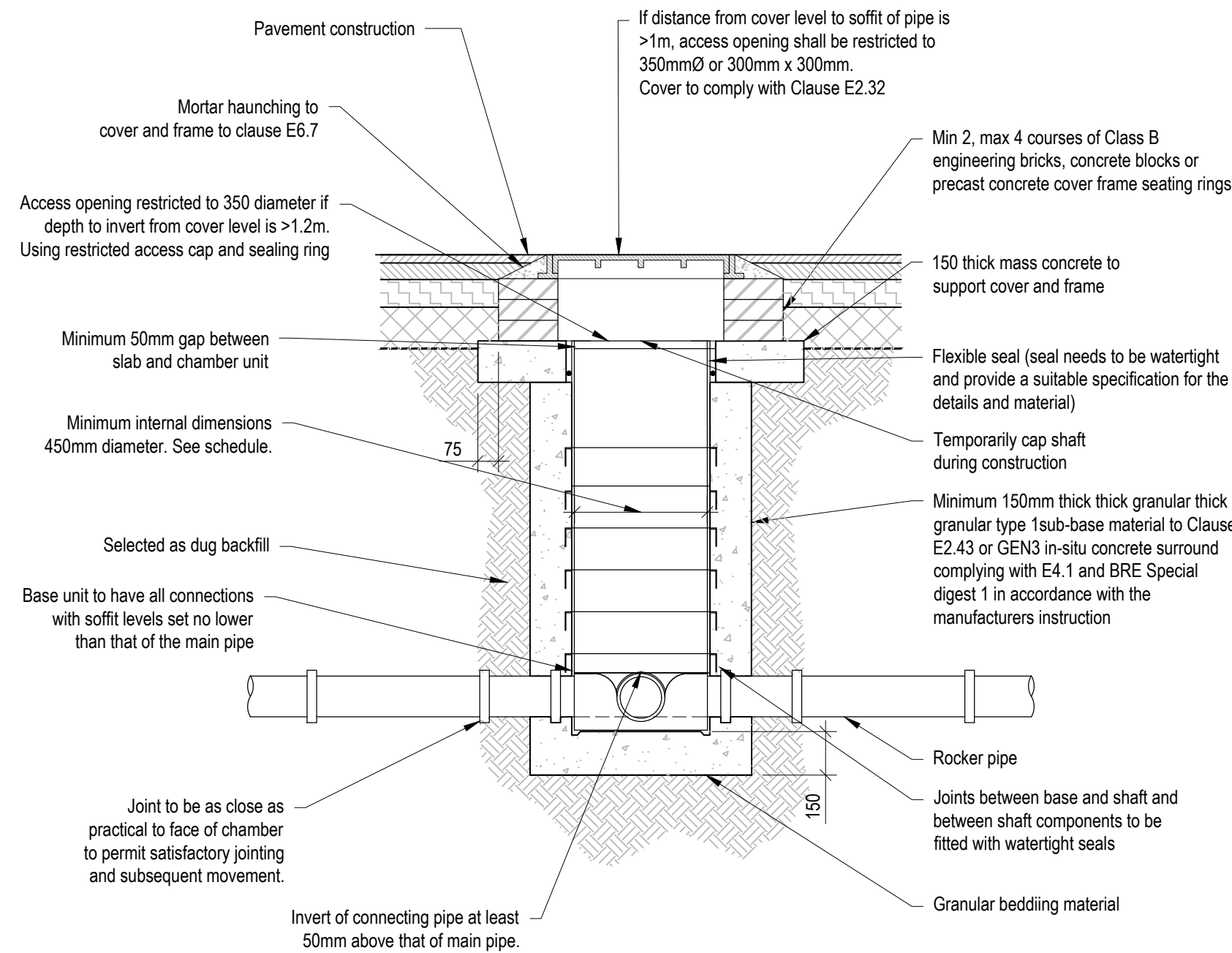
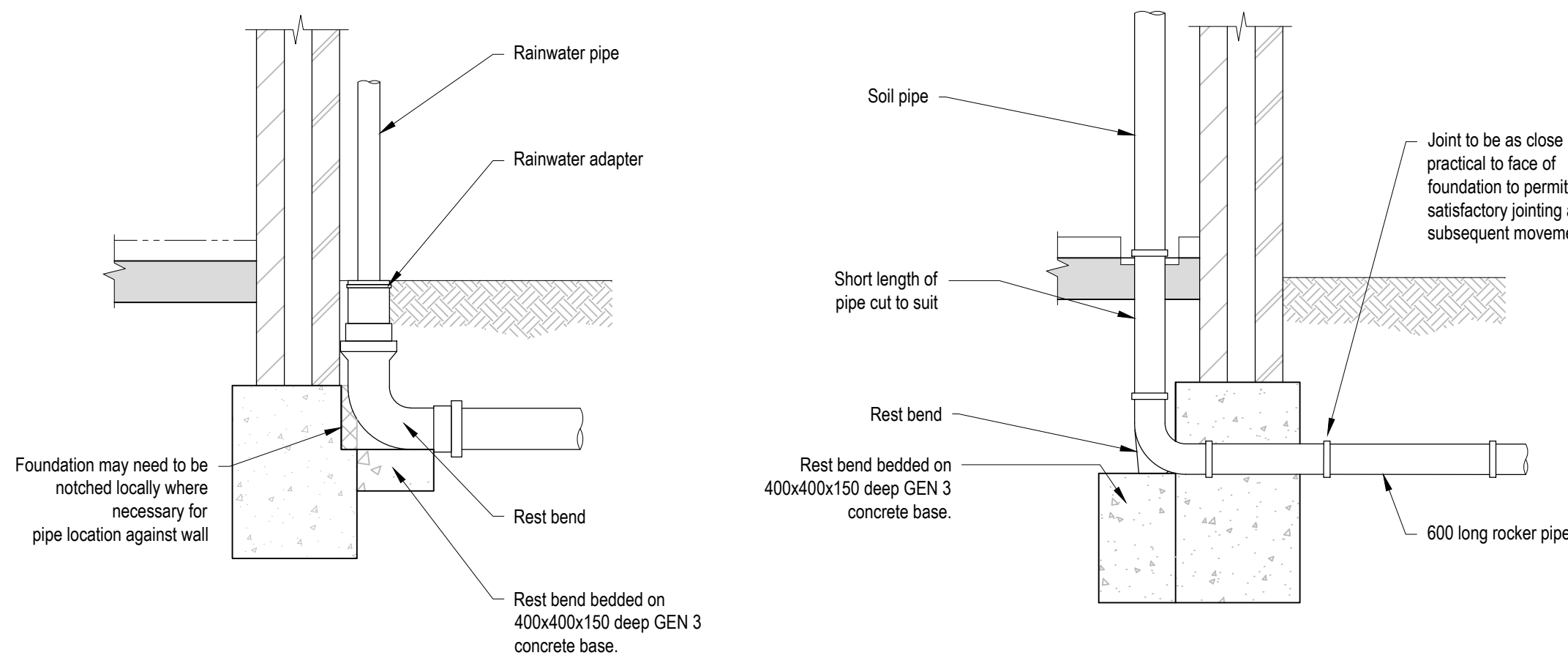


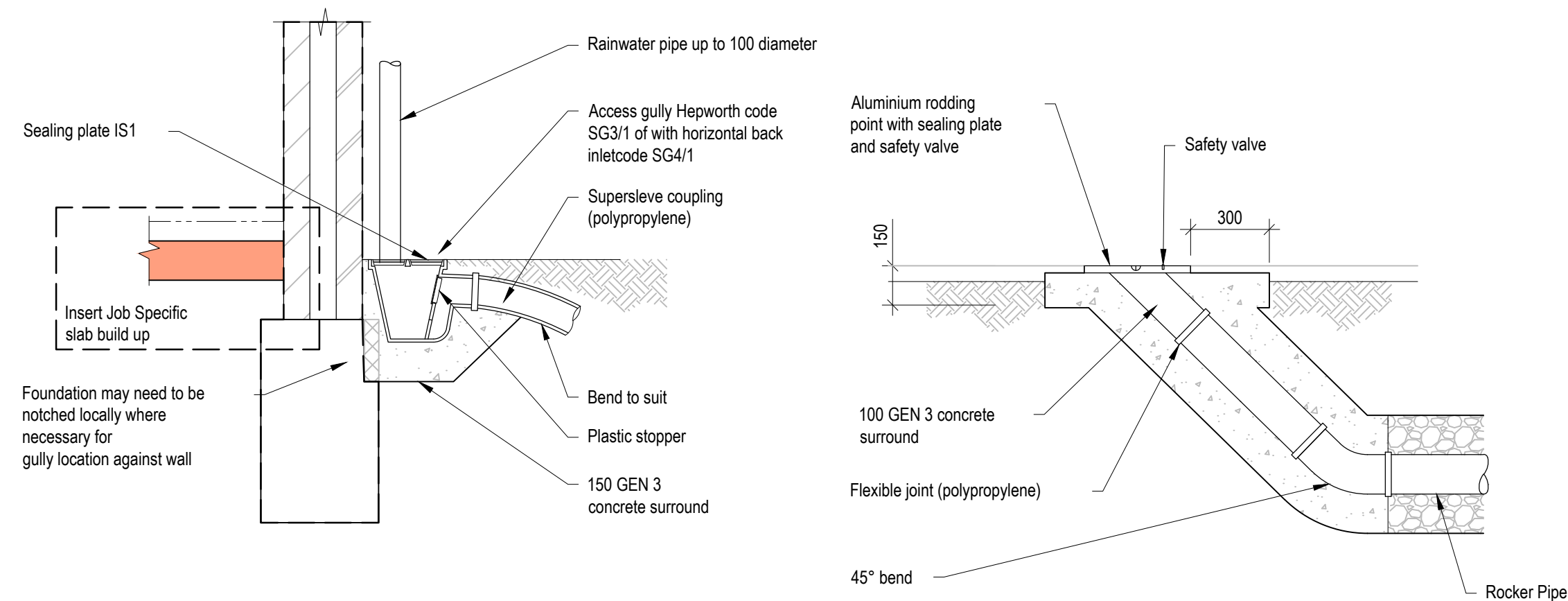
FIG B 37 - TYPE D - TYPICAL PLASTIC INSPECTION CHAMBER

- MINIMUM 450mm DIAMETER CHAMBERS IN :-
- DOMESTIC DRIVEWAYS (B125) UP TO - 3.0m DEEP
 - AREAS SUBJECT TO VEHICLE LOADING (D400) UP TO 3.0m DEEP



RAINWATER DOWN PIPE TO DRAIN
(SURFACE WATER SYSTEM)

TYPICAL SOIL VENT PIPE/STUB
STACK/WC DETAIL



RAINWATER ACCESS GULLY CONNECTION

RODDING EYE

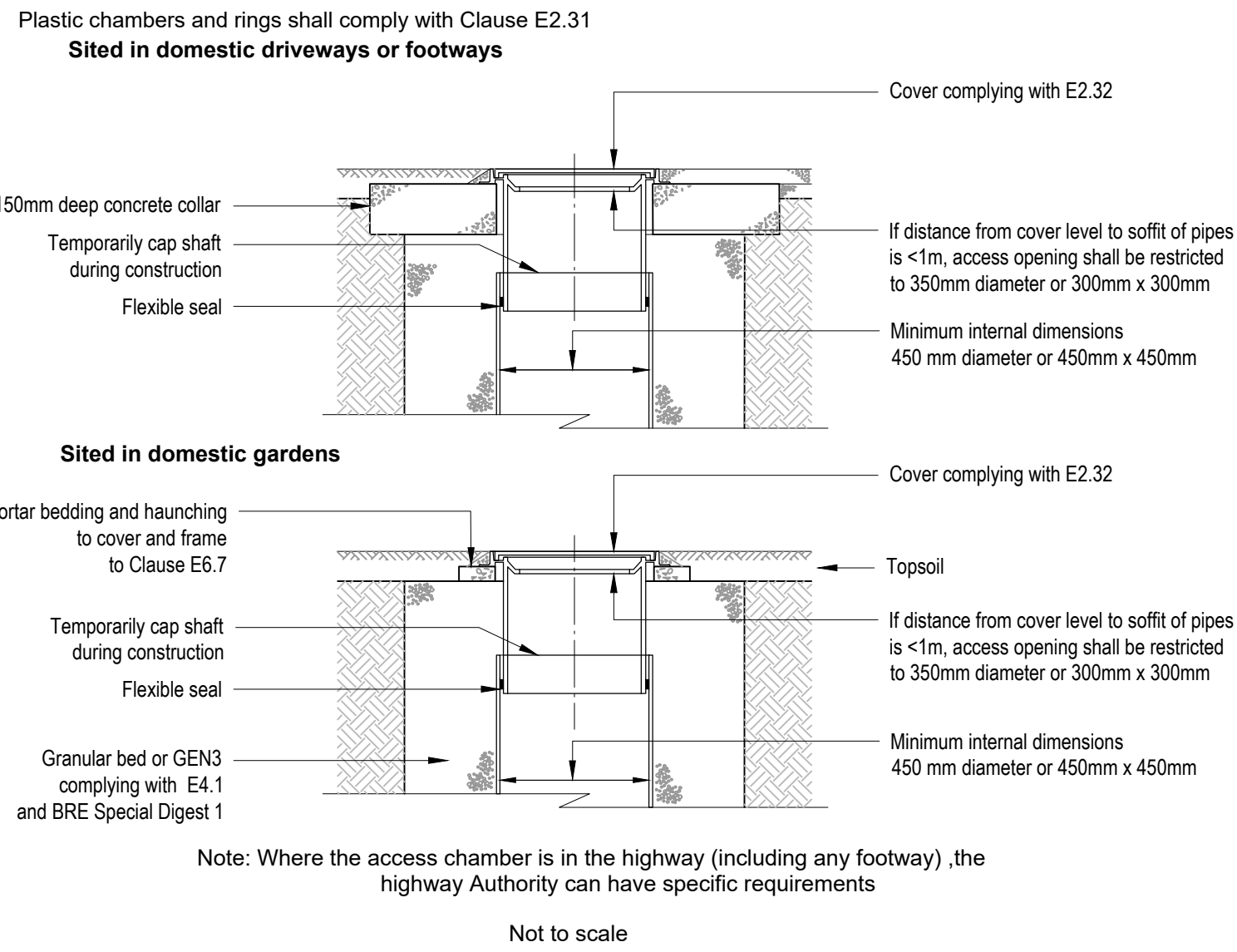
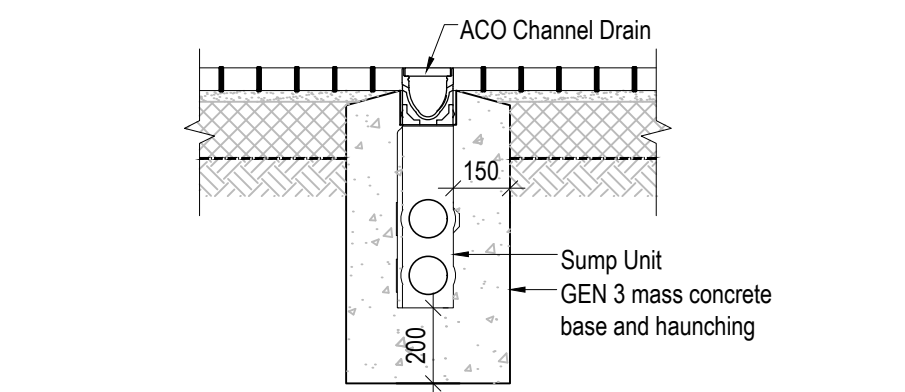
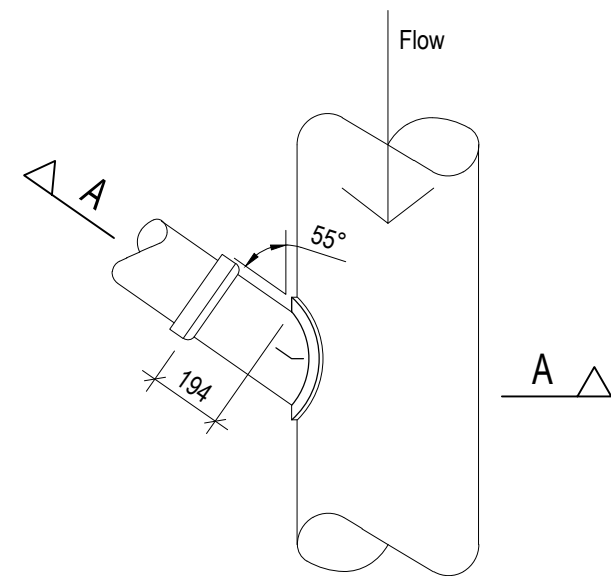


FIGURE B 38 - TYPE D - TYPICAL INSPECTION CHAMBER DETAIL

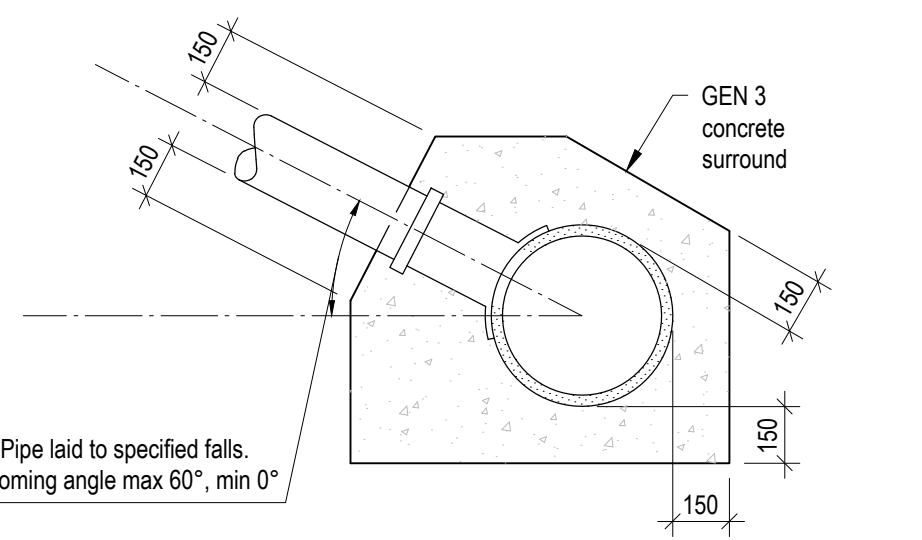
Flexible material construction alternative top details for use in areas of light vehicle loading or landscaped areas



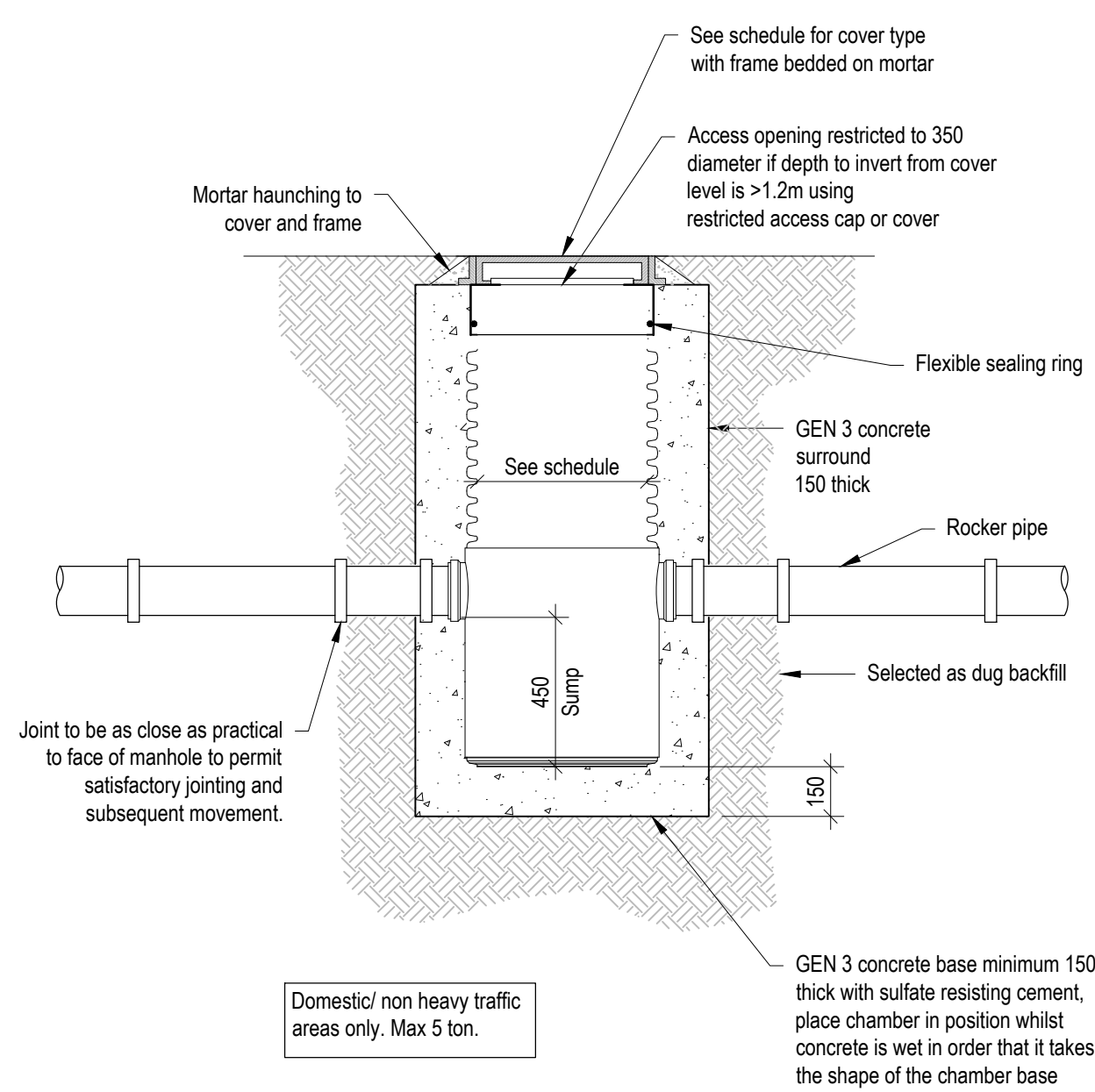
SUMP UNIT CHANNEL/SLOT DRAIN DETAIL
(ACO M100D UNIVERSAL SUMP)



SADDLE CONNECTION - PLAN
VIEW

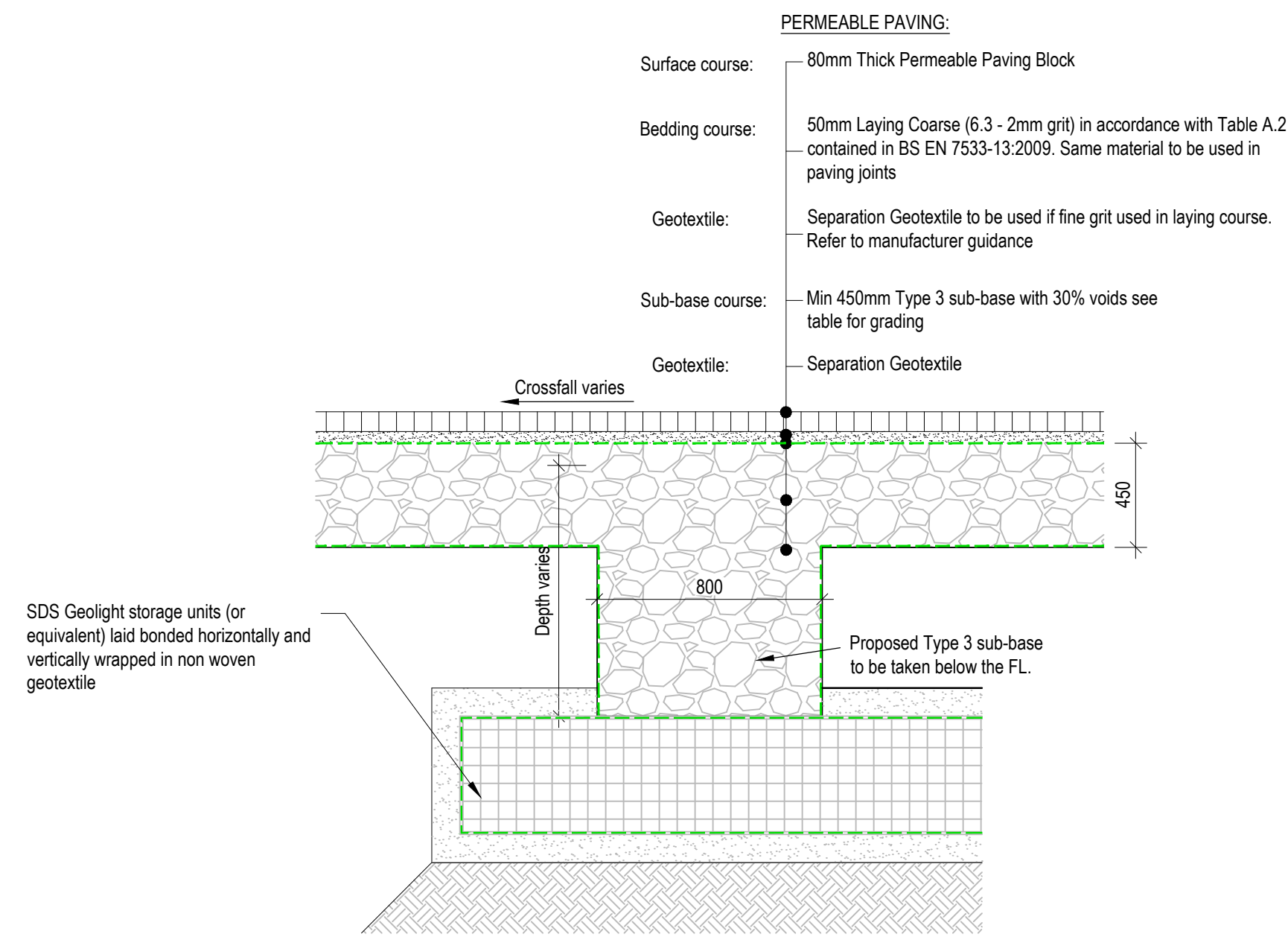


SADDLE CONNECTION SECTION A-A
SCALE 1:20

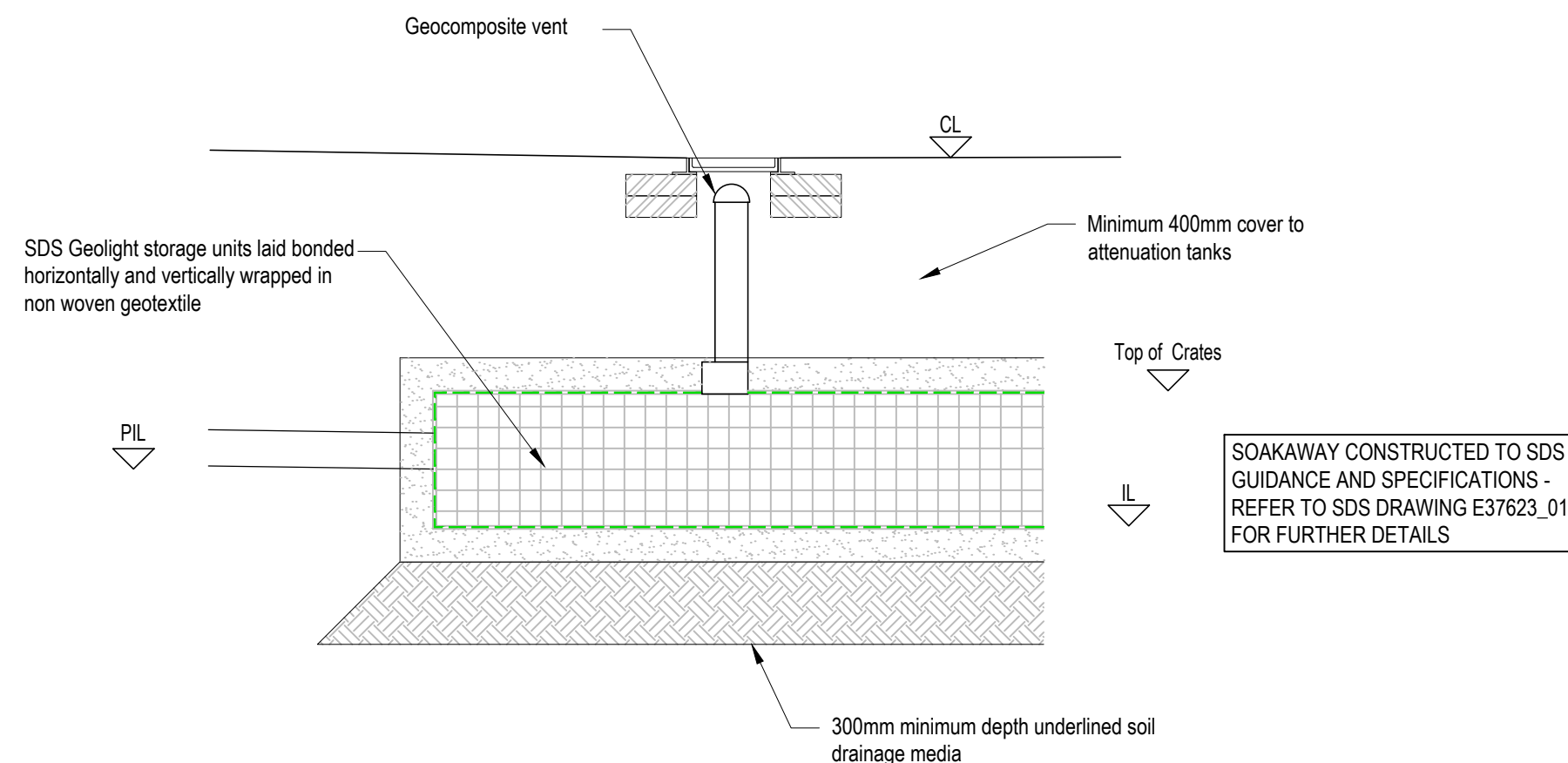


TYPICAL PLASTIC INSPECTION CHAMBER - CATCHPIT

Scale: 1:20



PERMEABLE PAVING WITH SOAKAWAY DETAIL



SDS CRATE SOAKAWAY DETAIL

DO NOT SCALE OFF THIS DRAWING

GENERAL NOTES:

1. All dimensions to be checked on site. All details and dimensions relating to sub-Contractors work must be checked and agreed between the sub-Contractor or supplier and the general Contractor.
2. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and specification.
3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority. No liability is accepted by the Consultant and the main Contractor is responsible for obtaining and checking all information and taking due care and attention whilst undertaking the works.

CDM 2015 RESIDUAL RISKS

1. All areas of live traffic and pedestrian movements shall be subject to appropriate traffic management barriers and signs.
2. Access points onto live public highway.
3. Unauthorised access to the site must be prevented at all times
4. Existing road drainage to be maintained.
5. Be aware of possible live drainage flows and foul effluent during construction.

The Contractor shall assess and implement a safe working system and equipment (PPE) as necessary.

The above residual risks are for non-standard hazards. It is assumed that a competent contractor familiar with the construction of this type of work will be appointed who will be aware of the standard hazards.

Revision History					
Rev	Comment	By	Chkd	Appr	Date
Current Revision					
A01	ISSUED FOR APPROVAL	NS	TZ	SB	10.07.2026

APPROVAL

ESQUIRE DEVELOPMENTS

1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

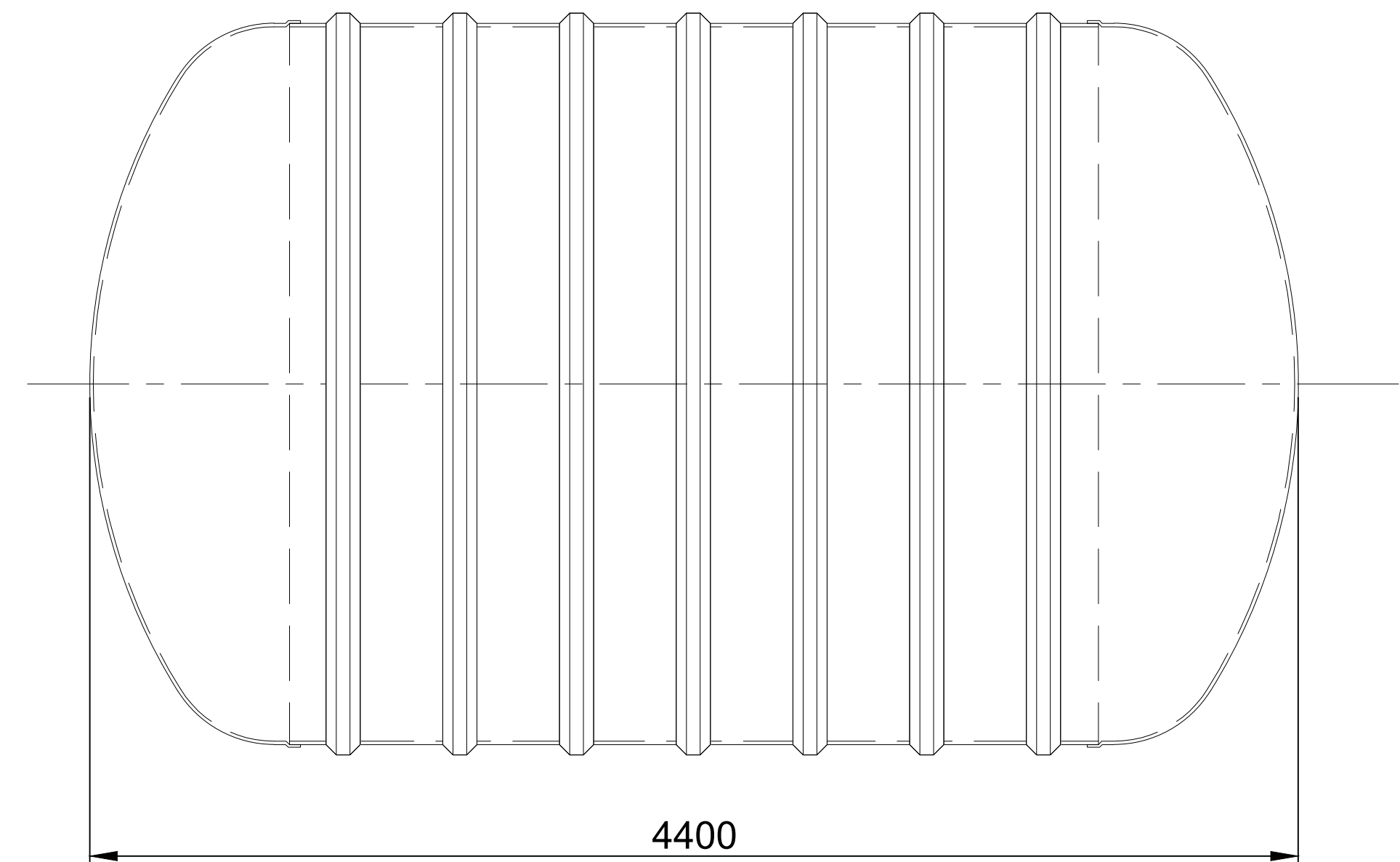
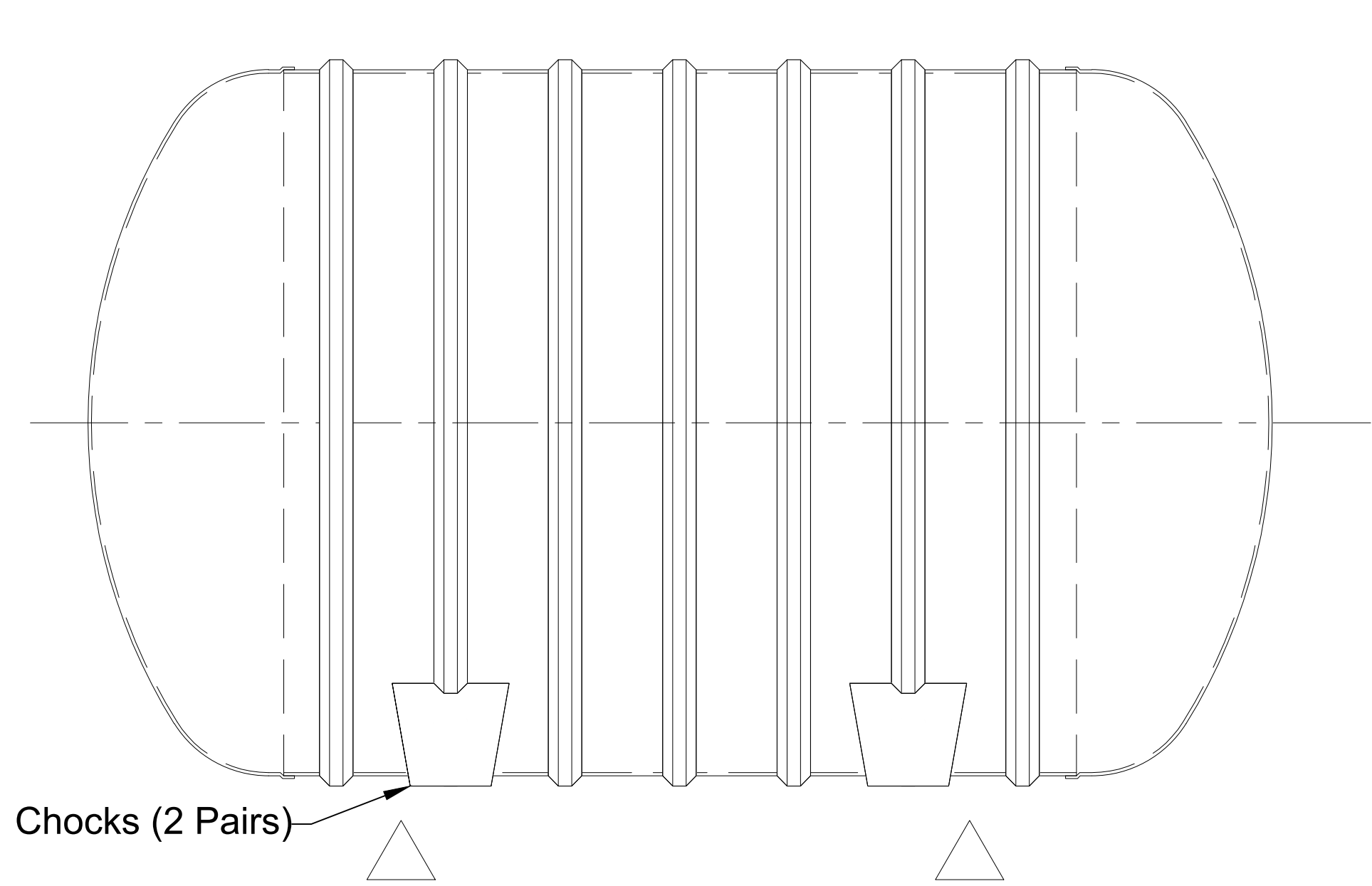
Project
BOWSDEN LANE
SHORNE

Drawing Title
TYPICAL DRAINAGE DETAILS
SHEET 1

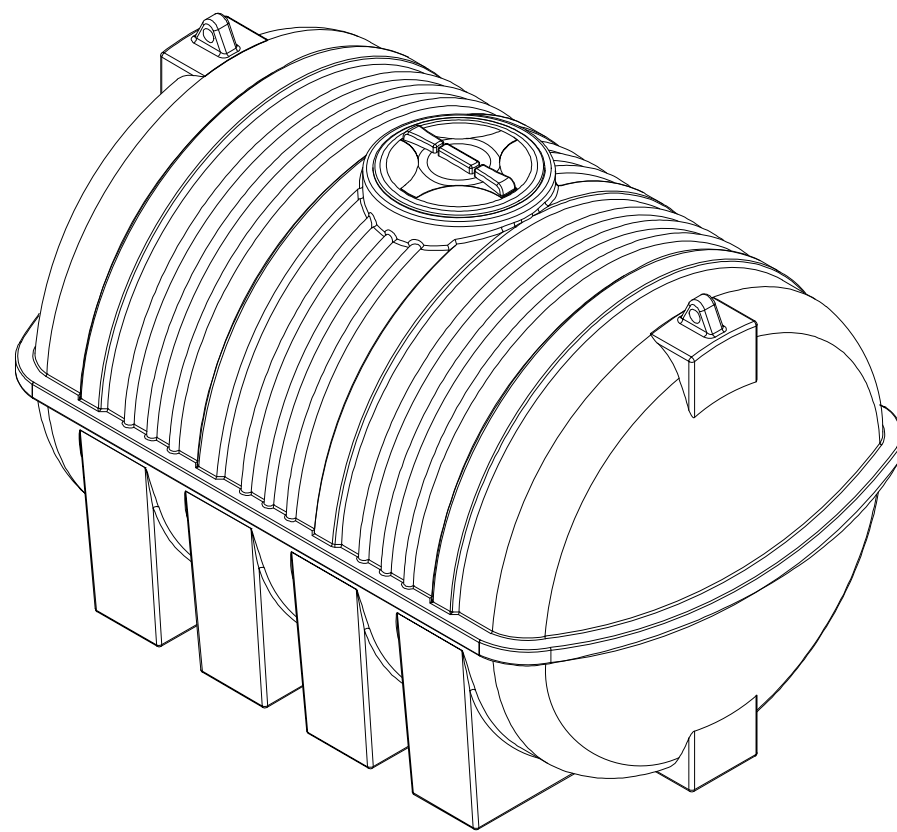
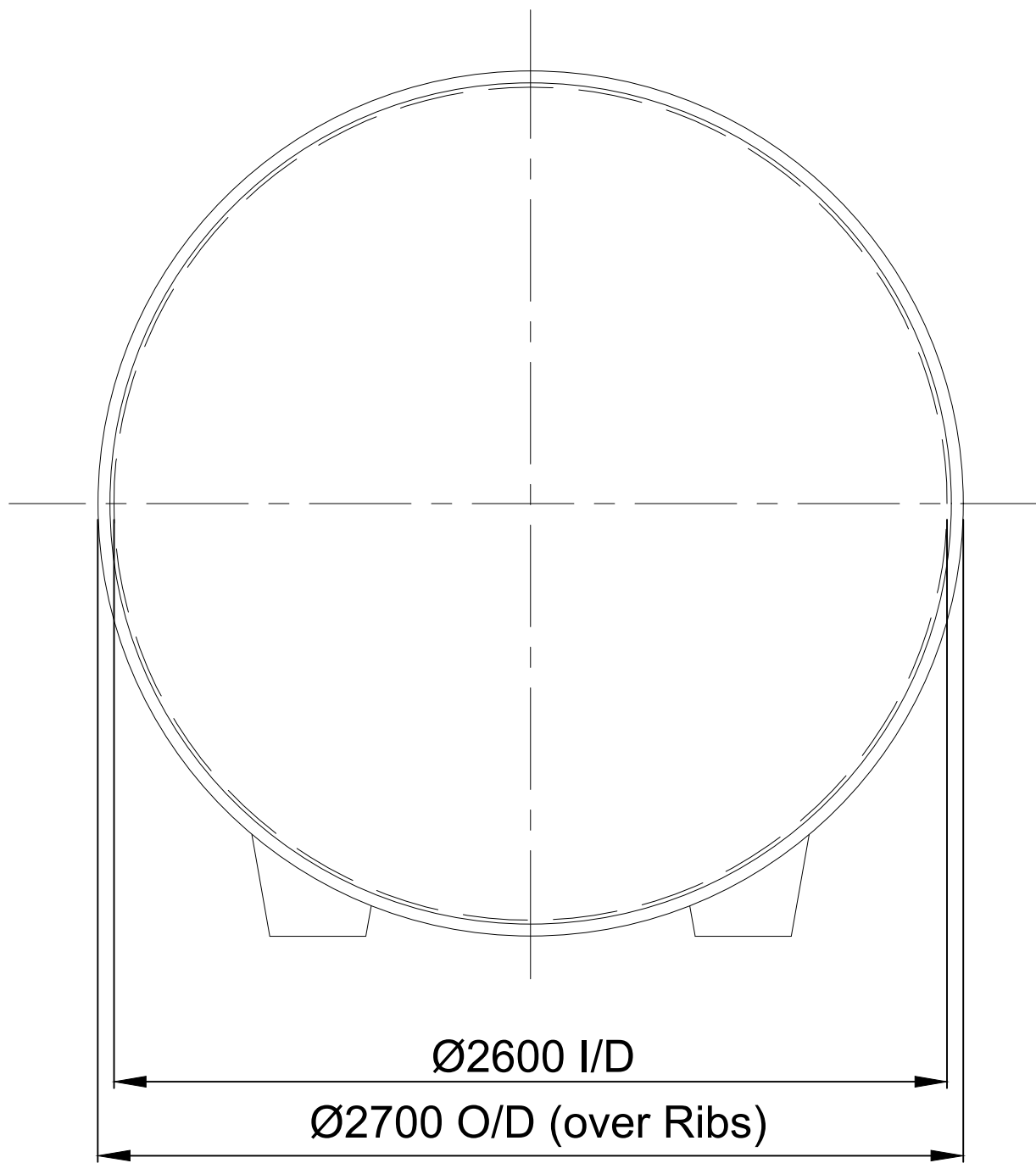
RWCL Internal Register reference: 5997-003 Scales @ A1

© Robert West Consulting 2019. All rights reserved.

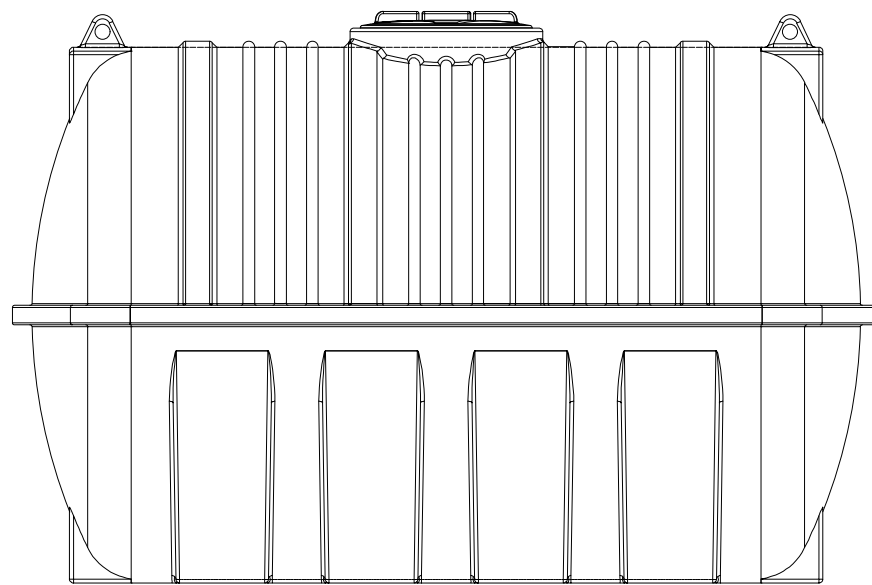
103-A01



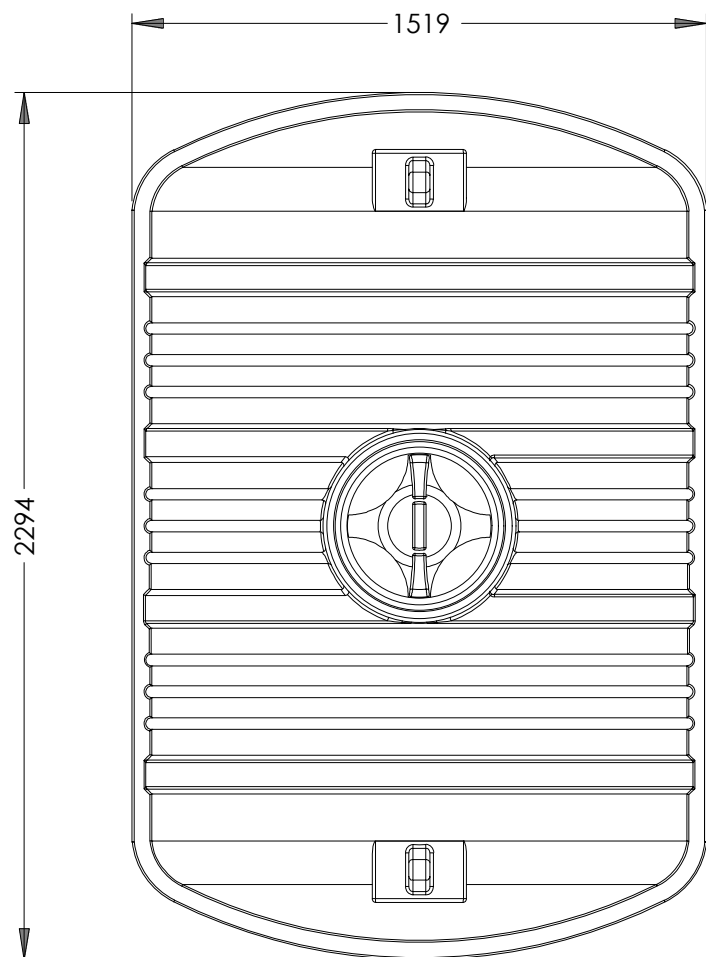
SPEL SERIES 400 CESSPOOL



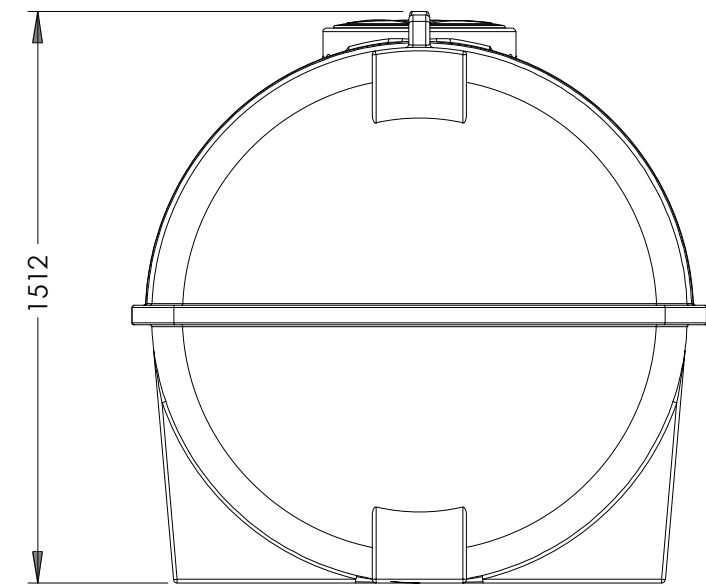
LEFT ISO VIEW



LEFT VIEW



PLAN VIEW



FRONT VIEW

DO NOT SCALE OFF THIS DRAWING

GENERAL NOTES:

1. All dimensions to be checked on site. All details and dimensions relating to sub-Contractors work must be checked and agreed between the sub-Contractor or supplier and the general Contractor.
2. This drawing is to be read in conjunction with all relevant Architect's and Engineer's drawings and specification.
3. The main Contractor is responsible for ensuring the stability of the structure whilst the works are in progress.
4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority. No liability is accepted by the Consultant and the main Contractor is responsible for obtaining and checking all information and taking due care and attention whilst undertaking the works.

CDM 2015 RESIDUAL RISKS

1. All areas of live traffic and pedestrian movements shall be subject to appropriate traffic management barriers and signs.
 2. Access points onto live public highway.
 3. Unauthorised access to the site must be prevented at all times.
 4. Existing road drainage to be maintained.
 5. Be aware of possible live drainage flows and foul effluent during construction.
- The Contractor shall assess and implement a safe working system and equipment (PPE) as necessary.

The above residual risks are for non-standard hazards. It is assumed that a competent contractor familiar with the construction of this type of work will be appointed who will be aware of the standard hazards.

Revision History					
Rev	Comment	By	Chkd	Appr	Date
Current Revision					
A01	ISSUED FOR APPROVAL	NS	TZ	SB	10.07.2026

APPROVAL

ESQUIRE DEVELOPMENTS

robert west
proesgroup
1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

Project
BOWESDEN LANE
SHORNE

Drawing Title
TYPICAL DRAINAGE DETAILS
SHEET 2

RWCL Internal Register reference: 5997-003

Scales @ A1

104 -A01

Scale 1:20 @ A1 - 1:40 @ A3
400mm 0 400mm 800mm 1200mm 1600mm 2000mm

ENDURAMAXX 3000L POOL BACKWASH
STATIC TANK