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Drainage Statement

Proposed Residential Development at

Abbots Leigh, Storrington

On behalf of

ECE Planing

October 2024

Document History and Status

Project Number 23909

Date	Version	Prepared By	Reviewed By	Approved By
18 October 2024	1.0	Nathan Thompson	Stuart Magowan IEng MICE	Steve Doughty Director

CONTENTS

1 Non Technical Summary

1.1 This Drainage Statement has been undertaken on behalf of ECE Planning in support of a Planning Application for the construction of 1 residential dwelling with associated driveway and landscaping on land at Abbots Leigh, Storrington, RH20 4AF.

1.2 The proposed development will incorporate a sustainable drainage system which will discharge surface water by infiltration to ground and provide storage for all storm return periods up to and including the 1:100 year rainfall event with an allowance for climate change.

1.3 Foul water will be discharged to a private cesspool which will be emptied regularly.

1.4 This report concludes that a suitable surface water and foul water drainage system can be designed to accommodate the anticipated flows from the proposed development.

2 Planning Policy Context

2.1 National Planning Policy Framework

2.1.1 With regard to planning and flood risk the National Planning Policy Framework states that *'when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment.*

Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

a) *within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*

b) *the development is appropriately flood resistant and resilient, such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*

c) *it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*

d) *any residual risk can be safely managed; and*

e) *safe access and escape routes are included where appropriate, as part of an agreed emergency plan.'*

2.1 Non Technical Standards for SuDS

2.1.1 The Non Technical Standards for SuDS dated March 2015 are intended to be used in conjunction with the National Planning Policy Framework.

2.1.2 **Non Statutory Standard S7** states that *'the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.'*

2.1.3 **Non Statutory Standard S8** states that *'the drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.'*

2.2 Local Planning Policy

2.2.1 The Horsham District Planning Framework (excluding South Downs national park) was adopted in November 2015.

2.2.2 The following policies are of specific relevance to this Drainage Statement:

Policy 24: Environmental Protection states:

'The high quality of the district's environment will be protected through the planning process and the provision of local guidance documents. Taking into account any relevant Planning Guidance Documents, developments will be expected to minimise exposure to and the emission of pollutants including noise, odour, air and light pollution and ensure that they:

1. Address land contamination by promoting the appropriate re-use of sites and requiring the delivery of appropriate remediation;

2. Are appropriate to their location, taking account of ground conditions and land instability;

3. Maintain or improve the environmental quality of any watercourses, groundwater and drinking water supplies, and prevents contaminated run-off to surface water sewers;

4. Minimise the air pollution and greenhouse gas emissions in order to protect human health and the environment;

5. Contribute to the implementation of local Air Quality Action Plans and do not conflict with its objectives;

6. Maintain or reduce the number of people exposed to poor air quality including odour. Consideration should be given to development that will result in new public exposure, particularly where vulnerable people (e.g. the elderly, care homes or schools) would be exposed to the areas of poor air quality; and

7. Ensure that the cumulative impact of all relevant committed developments is appropriately assessed.'

Policy 35: Climate Change states:

'Development must be designed so that it can adapt to the impacts of climate change, reducing vulnerability, particularly in terms of flood risk, water supply and changes to the district's landscape. Developments should adapt to climate change using the following measures:

1. Provision of appropriate flood storage capacity in new building development;

2. Use of green infrastructure and dual use SuDS to help absorb heat, reduce surface water runoff, provide flood storage capacity and assist habitat migration;

3. Use of measures which promote the conservation of water and/or grey water recycling; and

4. Use of site layout, design measures and construction techniques that provide resilience to climate change (opportunities for natural ventilation and solar gain).

If it is not possible to incorporate the adaption and mitigation measures proposed, an explanation should be provided as to why this is the case.

3 Existing Site

3.1 Site Location

3.1.1 The development site is located at Abbots Leigh, Storrington, RH20 4AF at Ordnance Survey reference TQ 10386 13804.

Image 1: Site Location

3.1.2 The site is bounded to the north by the CEMEX sand quarry, west and east by residential properties and the south by A283 Washington Road.

3.1.3 The closest watercourse is an unnamed tributary of the Stor River, which flows in a north westerly direction along the northern boundary of the CEMEX sand quarry and is approximately 600m north of the site.

3.1.4 A copy of the site location plan is located in Appendix 1 at the rear of this report.

3.2 Site Description

3.2.1 The site is approximately 0.29ha in area and is currently the garden of Abbots Leigh.

3.2.2 Existing ground levels are highest at the northern corner of the site at approximately 61.89m AOD. The site falls towards its southeastern corner to a level of approximately 58.75m AOD.

3.2.3 A copy of the existing site layout plan is located in Appendix 2 at the rear of this report.

3.3 Existing Drainage

3.3.1 The site currently has no positive surface water or foul water drainage infrastructure.

3.3.2 Rainfall currently discharges in part to ground and in part overland as a greenfield runoff to the southeastern corner of the site.

3.3.3 Pre-developed greenfield runoff rates have been established using the HR Wallingford tool for Greenfield runoff estimation based on the FEH Statistical method for rainfall estimation.

3.3.4 The Hydrology of Soil Type (HOST) has been confirmed by the National Soil Resources Institute at Cranfield University as soil type 3 which is classified as '*Free draining permeable soils on soft sandstone substrates with relatively high permeability and high storage capacity'.*

hrwallingford

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Nathan Thompson
Site name:	Abbots Leigh
Site location:	Washington Road

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.

Site Details

Latitude:	50.91319° N
Longitude:	0.43163° W
Reference:	1129288714
Date:	Sep 17 2024 15:12

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha): 1

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Calculate from dominant HOST
HOST class:	3
BFI / BFIHOST:	0.704
Q_{MED} (l/s):	2.6
Q_{BAR} / Q_{MED} factor:	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm):	918	918
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	2.96	2.96
1 in 1 year (l/s):	2.51	2.51
1 in 30 years (l/s):	6.8	6.8
1 in 100 year (l/s):	9.43	9.43
1 in 200 years (l/s):	11.05	11.05

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at 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 www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of 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, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Image 2: Greenfield Runoff Calculation

3.3.5 The pre-developed greenfield runoff rates are as follows:

- Q_{bar} 2.96 l/s/ha
- 1:30 year 6.8 l/s/ha
- 1:100 year 9.43 l/s/ha

3.3.6 There are no nearby surface water or foul water public sewers.

3.3.7 A copy of the sewer records is located in Appendix 3 at the rear of this report.

3.4 Geology and Groundwater

3.4.1 British Geological Survey borehole information taken from approximately 200m east of the site suggest that the site is within an area underlain by a thick layer of sand and gravel to a depth of approximately 40m below ground level.

3.4.2 Groundwater was not encountered within the depth of the boreholes.

3.4.3 The online “Magic Map” available from Defra confirms that the site is not located above a groundwater source protection zone 1.

3.4.4 The online “Magic Map” available from Defra confirms that the site is located above a principal aquifer classified as having a medium to high vulnerability.

3.4.5 A copy of the geological borehole data is located in Appendix 4 at the rear of this report.

4 Development Proposals

4.1 Description

4.1.1 The development proposals are for the construction of 1 residential dwelling with an associated driveway and landscaping.

4.1.2 The areas of the various positively drained elements of the development are summarised as follows:

- Roof Areas 190m^2
- Driveway 92m^2

4.1.3 A copy of the proposed site layout plan together with a drained areas plan is located in Appendix 5 at the rear of this report.

4.2 Surface Water Drainage

4.2.1 CIRIA report C753 The SuDS Manual-v6 provides guidance on surface water drainage. The aim for surface water runoff is to match greenfield runoff rates and volumes where reasonably achievable.

4.2.2 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

4.2.3 The proposed surface water drainage strategy will be based on infiltration to ground with sufficient storage provided beneath the driveway area to accommodate a 1:100 year storm event including an additional 45% to account for the predicted effects of future climate change.

4.2.4 Approximately 40m² of the driveway is within root protections zones. These areas will be constructed using a permeable surfacing and run off rates will be unaffected from the greenfield run off rates.

4.2.5 The total positively drained area of the site will be approximately 282m^2 and the equivalent greenfield runoffs are as follows:

• Q_{bar} (approximate 1:2 year	at 2.96 l/s/ha	0.08 l/s
• 1:30 year	at 6.8 l/s/ha	0.19 l/s
• 1:100 year	at 9.43 l/s/ha	0.27 l/s

4.2.6 An infiltration rate of 1x10^{-5} m/s has been estimated based on HOST data and nearby BGS borehole data.

4.2.7 Preliminary calculations based on the estimated infiltration rate during the 1:100 year plus climate change event have been prepared in order to demonstrate that surface water drainage can be adequately accommodated within the site without any increased flood risk elsewhere.

4.2.8 A permeable hardstanding is proposed with a 30% voided subbase sized with sufficient storage to accommodate a 1:100 year storm event including an additional 45% to account for the predicted effects of future climate change.

4.2.9 The drainage proposals will be confirmed at detailed design stage subject to further site investigations and testing, confirmation of the on-site infiltration rate may change the requirements of the soakaway, although there is scope to increase the storage capacity by increasing the size of the soakaway or by implementing 95% voided crates should the infiltration rate be found to be lower than the estimated rate.

4.3 Foul Drainage

4.3.1 For foul water discharge, Building Regulations Approved Document H1 foul drainage hierarchy notes the following list of drainage options in order of preference:

1 Discharge to a public sewer

2 Discharge to a private sewer communicating with a public sewer

3 Discharge to a septic tank or wastewater treatment plant

4 Discharge to a cesspool

4.3.2 The site is not in a sewered area.

4.3.3 Sewage treatment plants may discharge to a watercourse, however there are no watercourses in the vicinity of the site that would be practical to discharge to.

4.3.4 Sewage treatment plants and septic tanks can discharge to ground if treated by a secondary treatment system such as a drainage mound.

4.3.5 Drainage mounds must be situated 15m from any building and as such there is insufficient space on the site to provide a drainage mound.

4.3.6 Therefore, the most viable strategy for foul water discharge is to a cesspool located beneath the garden to the west of the development.

4.3.7 The cesspool will be emptied regularly.

4.3.8 A copy of the preliminary drainage strategy plan together with calculations and is located in Appendix 6 at the rear of this report.

4.4 Water Quality

4.4.1 The proposed development is for residential use. In accordance with CIRIA SuDS Manual 2015 (Report C753), the pollution hazard level for this type of development is classified as between very low and low depending on the use / area of the site.

4.4.2 The surface water scheme will include mitigation to ensure that surface water is suitably treated and any pollution risk adequately managed prior to discharge.

4.4.3 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-traffic roads	Low	0.5	0.4	0.4

Table 1: Pollution Hazard Indices

4.4.4 The use of permeable paving will treat surface water collected from the driveway, and the voided subbase acting as a filter drain will treat surface water collected from the roof areas.

SuDS Type	**Total suspended solids (TSS)**	**Metals**	**Hydrocarbons**
Voided subbase acting as a filter drain	0.4	0.4	0.4
Permeable pavement	0.7	0.6	0.7

Table 2: Pollution Mitigation Indices

4.4.5 An outline drainage maintenance schedule is located in Appendix 7 at the rear of this report.

5 Conclusions

5.1 A suitable SuDS drainage system is proposed which accords with the requirements of national and local policy.

5.2 The proposed surface water drainage strategy is based on infiltration to ground.

5.3 The geology of the area is sand/sandstone and an infiltration rate of $1x10^{-5}$ has been estimated at the preliminary design stage.

5.4 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.

5.5 Water quality improvement will be provided to mitigate against any risk to any receiving waterbody.

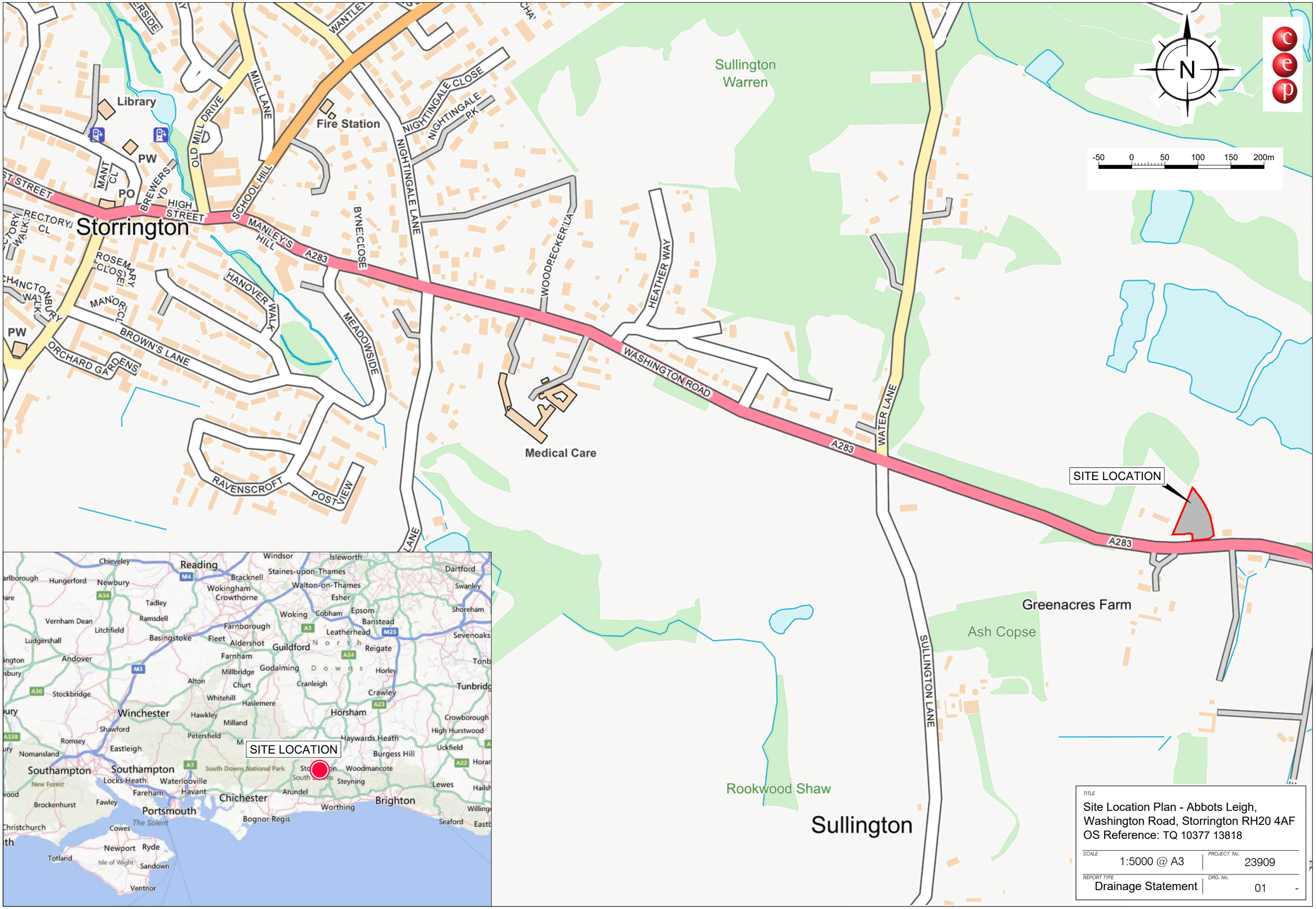
5.6 Foul water will be discharged to a new cesspool located beneath the garden to the west of the property – the cesspool will be emptied regularly.

5.7 A suitable surface water and foul water drainage system can be designed to accommodate the anticipated flows from the proposed development and in terms of drainage the development proposals are suitable at this location.

6 List of Appendices, Images and Tables

Appendix 1

Site Location Plan



TITLE

Site Location Plan - Abbots Leigh, Washington Road, Storrington RH20 4AF
OS Reference: TQ 10377 13818

SCALE	PROJECT. No.
1:5000 @ A3	23909
REPORT TYPE	DRG. No.
Drainage Statement	01 -

Appendix 2

Existing Site Layout Plan

UNABLE TO SURVEY FULLY DUE TO DENSE FOLIAGE

SHED

FLOWERBED

GRASS

ASPHALT

OVERHEAD CABLE

STAY WIRE

WASHINGTON ROAD

N

-2.5m 0 2.5m 5.0m 7.5m 10m

TITLE
Existing Site Layout Plan

SCALE	PROJECT. No.
1:250 @ A3	23909

REPORT TYPE	DRG. No.
Drainage Statement	02 -

Appendix 3

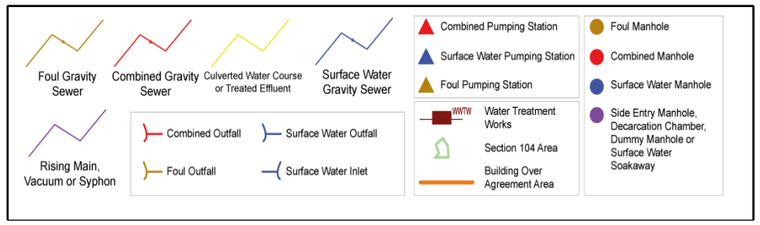
Sewer Records

(c) Crown copyright and database rights 2024 Ordnance Survey 100031673 | Date: 17/09/24 | Scale: 1:1250 | Map Centre: 510333,113795 | Data updated: 22/08/24 | Our Ref: 1571449 - 1 | Wastewater Plan A3 Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2024 Ordnance Survey 100031673 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



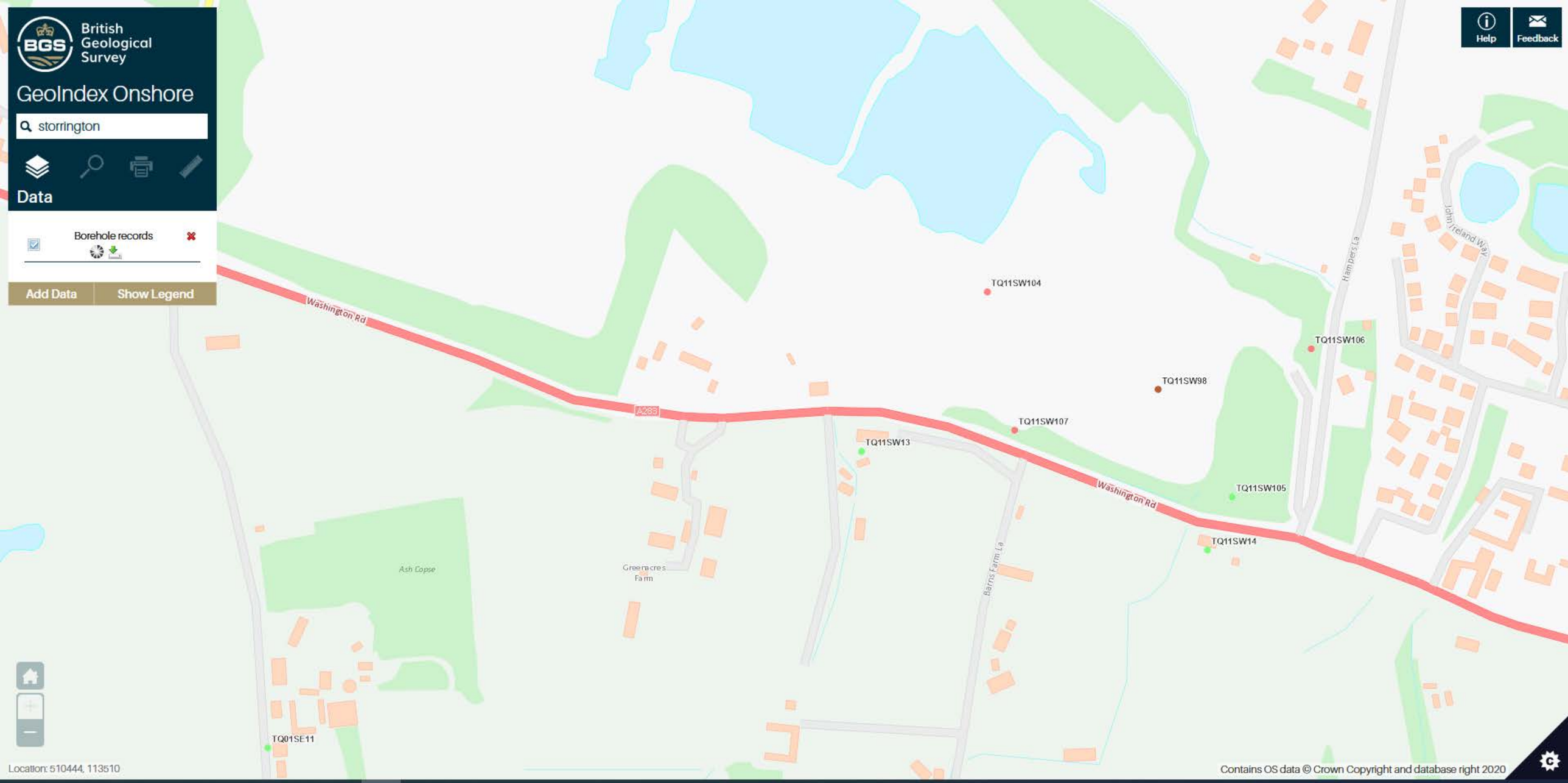
mat@civil.co.uk

Abbots Leigh

WATER for LIFE from Southern Water

Appendix 4

Geological Borehole Data


British Geological Survey
GeoIndex Onshore
storrington
Data
Borehole records
Add Data
Show Legend
Help
Feedback
Washington Rd
A283
TQ11SW104
TQ11SW106
TQ11SW98
TQ11SW107
TQ11SW13
TQ11SW105
TQ11SW14
TQ01SE11
Ash Copse
Greenacres Farm
Barns Farm La
Hampers La
John Ireland Way
Location: 510444, 113510
Contains OS data © Crown Copyright and database right 2020
11:59
30/08/2024

Borehole (4) located in woodland above Sand pit off of Storrington road.

WR38: Borehole record form

Borehole record

Nicholls Boreholes

British Geological Survey

Environment Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for Britania Crest, Recycling LTD.

Location Washington Sand Pit, Haupers lane, Storrington, RH20 4AF

NGR (ten digits) TQ10584 13767 Please attach site plan

Ground level (if known) _____ metres Above Ordnance Datum

Drilling company Nicholls Bore holes

Date drilling commenced 15/11/2016 (DD/MM/YYYY) Completed 15/11/2016 (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) 41 metres (m). Please tick if this is above D or below D ground level.
(point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter 152 mm from 0 to 41 m/depth
_____ mm from _____ to _____ m/depth
_____ mm from _____ to _____ m/depth
_____ mm from _____ to _____ m/depth

Casing material and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.
Solid uPVC diameter 50 mm from 0 to 17 m/depth
Slotted uPVC diameter 50 mm from 17 to 41 m/depth
_____ diameter _____ mm from _____ to _____ m/depth
_____ diameter _____ mm from _____ to _____ m/depth

Grouting details 2 bags of Nitolit Seal at bottom 32 bags of Shingle and 4 bags of Nitolit 5m seal to surface.

Water struck at 1. _____ m (depth below datum - mbd) 2. _____ m (mbd)
3. _____ m (mbd) 4. _____ m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum (if different from borehole datum) _____ m. Please tick if this is above D or below D ground level.

Pump suction depth _____ mbd

Water level (start of test) _____ mbd

Water level (end of test) _____ mbd

Type of test (for example, bailer, step, constant rate)
_____

Pumping rate _____ m^3/hour D or litres/second D. Please tick as appropriate.

for _____ days, _____ hours, _____ mins

Recovery to _____ mbd in _____ days, _____ hours, _____ mins
(from end of pumping)

Date(s) of measurements Pump started _____ (DD/MM/YYYY)
Pump stopped _____ (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box D

WR38: Borehole record form

D Strata log

Geological classification (BGS only)	Description of strata	Thickness m	Depth (to base of strata) m
	• Top Soil	1	1
	• Red, Yellow & white Sand with bands of Sand Stone.	40	41
	(continue on separate page if necessary)		
	Other comments (for example, gas encountered, saline water intercepted)		

E Completing this form

How long did it take you to fill in this form? _____

For Official use only

Date received (DD/MM/YYYY)	File	Consent number	BGS reference number
Accession number	Wellmaster number	SOBI number	NGR
LIC NO	Purpose		EA reference number
Copy number	Entered by		

Bore hole (1) located in the bottom of the pit.

WR38: Borehole record form

Borehole record

Nicholls Boreholes

British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

Water Resources Act 1991 (as amended by the Water Act 2003)

A Site details

Borehole drilled for Britania crest recycling LTD.

Location Washington Sand pit, Manfers lane, Storrington, RH20 4AF

NGR (ten digits) TQ10562 13879 Please attach site plan

Ground level (if known) _____ metres Above Ordnance Datum

Drilling company Nicholls Boreholes

Date drilling commenced 8/11/2016 (DD/MM/YYYY) Completed 9/11/2016 (DD/MM/YYYY)

B Construction details

Borehole datum (if not ground level) _____ metres (m). Please tick if this is above D or below D ground level.
(point from which all measurements of depth are taken, for example, flange, edge of chamber)

Borehole drilled diameter 152 mm from 0 to 41 m/depth

_____ mm from _____ to _____ m/depth

_____ mm from _____ to _____ m/depth

_____ mm from _____ to _____ m/depth

2m of Solid liner 50mm above around level.

Casing material Solid uPVC diameter 50 mm from 0 to 3 m/depth
and type (for example, if plain steel, plastic slotted). Please record permanent casing details, not temporary casing.

Casing material Slotted uPVC diameter 50 mm from 3 to 27 m/depth

Casing material Solid uPVC diameter 50 mm from 27 to 30 m/depth

Casing material _____ diameter _____ mm from _____ to _____ m/depth

Grouting details 16 bags of shingle, 2 MIXOLT

Water struck at 1. _____ m (depth below datum - mbd) 2. _____ m (mbd)

3. _____ m (mbd) 4. _____ m (mbd)

C Test pumping summary (Please supply full details on form WR39)

Test pumping datum _____ m. Please tick if this is above D or below D ground level.
(if different from borehole datum)

Pump suction depth _____ mbd

Water level (start of test) _____ mbd

Water level (end of test) _____ mbd

Type of test (for example, bailer, step, constant rate)

_____

Pumping rate _____ m^3/hour D or litres/second D. Please tick as appropriate.

for _____ days, _____ hours, _____ mins

Recovery to _____ mbd in _____ days, _____ hours, _____ mins
(from end of pumping)

Date(s) of measurements Pump started _____ (DD/MM/YYYY)

Pump stopped _____ (DD/MM/YYYY)

Please supply chemical analysis if available. If you have included this please tick this box D

WR38: Borehole record form

D Strata log

Geological classification (BGS only)	Description of strata	Thickness m	Depth (to base of strata) m
	• Red, Yellow, orange and white Sand with bands of Sand Stone.	35	35
	• Grey Sandy clay.	6	41
	(continue on separate page if necessary)		
	Other comments (for example, gas encountered, saline water intercepted)		

E Completing this form

How long did it take you to fill in this form? _____

For Official use only

Date received (DD/MM/YYYY)	File	Consent number	BGS reference number
Accession number	Wellmaster number	SOBI number	NGR
LIC NO	Purpose		EA reference number
Copy number	Entered by		

Appendix 5

Proposed Site Layout and Drained Areas Plan

ADJOINING PROPERTIES

WASHINGTON ROAD

Key

- Roof Areas (190m²)
- Driveway (92m²)
- Driveway no dig construction (41m²)

N

-2.5m 0 2.5m 5.0m 7.5m 10m

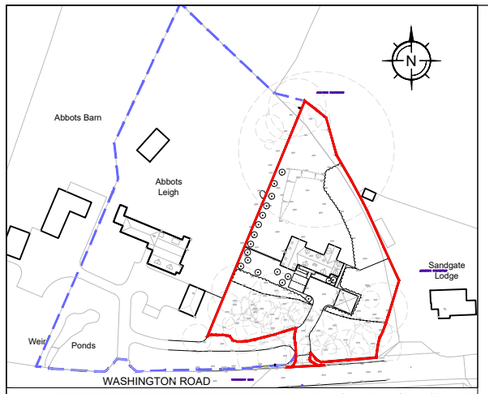
TITLE
Proposed Site and Drained Areas Plan

SCALE	PROJECT. No.
1:250 @ A3	23909
REPORT TYPE	DRG. No.
Drainage Statement	03 -

Appendix 6

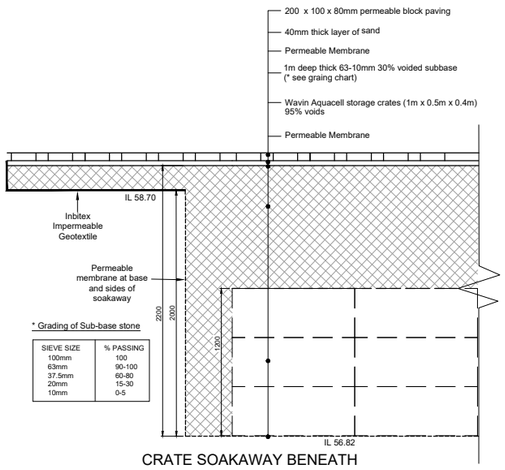
Drainage Strategy Plan and

Calculations



Entire Site Overview

Scale 1:1000



CRATE SOAKAWAY BENEATH
PERMEABLE BLOCK PAVING AND TYPE 3
VOIDED STONE SUBBASE DETAIL
(scale 1:25)

Key

- Permeable paving with 30% voided subbase (lined)
- permeable paving with 30% voided soakaway
- 95% Void storage crate
- No dig construction permeable paving
- Proposed foul pipe
- Foul inspection chamber
- Surface water pipe
- CP — Proposed catchpit
- RWP — Rain Water pipe
- re — Rodding eye
- dt — Distribution Tank

Klargester silage cesspool 59,000L

Klargester Silage
Cesspool 59,000L
2.82mØ x 11.991m long

CL 60.800
Inlet invert 59.300
IL 56.390

Desludging points 600Ø

inlet 150Ø

315Ø PPIC
CL 60.340
IL 59.820

315Ø PPIC
CL 60.320
IL 59.920

100Ø 8m @1:80
100Ø 11.9m @1:104
100Ø 3.3m @1:80
100Ø 13.2m @1:24.4
100Ø 11.5m @1:104.4
100Ø 2.8m @1:80
150Ø 3.7m @1:80
100Ø 6.6m @1:103.8
100Ø 14.8m @1:80
100Ø 4.6m @1:104
100Ø 7.1m @1:80
100Ø 2.5m @1:104
100Ø 3.7m @1:104
100Ø 9.1m @1:56.3
100Ø 3.2m @1:104
100Ø 3m @1:80

500Ø CP
CL 60.370
IL 59.670

re
CL 60.370
IL 59.701

re
CL 60.370
IL 59.784

3150Ø CP
CL 60.370
IL 59.970

Assumed FFL 60.52

500Ø CP
CL 60.350
IL 59.496

500Ø CP
CL 60.350
IL 59.473

500Ø CP
CL 60.370
IL 59.670

450Ø PPIC
CL 60.450
IL 59.328

315Ø PPIC
CL 60.450
IL 59.364

500Ø CP
CL 60.370
IL 59.560

dt
CL 60.350
IL 59.452

315Ø PPIC
CL 60.350
IL 59.549

315Ø PPIC
CL 60.370
IL 59.675

500Ø CP
CL 60.350
IL 59.509

315Ø PPIC
CL 60.370
IL 59.638

dt
CL 60.320
IL 59.449

No dig construction permeable paving within root protection zones, 41m² total area

Permeable paving with lined 0.2m deep type 3 voided stone subbase providing 30% voids, 64m² level base at 58.7m AOD

95% Void crate soakaway 3 units deep (1.2m), 22.5m² level base at 56.82m AOD beneath permeable block paving with 880mm deep type 3 voided stone subbase with 30% voids, 28m²

RWP

Scale 1:100

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.

DRAINAGE NOTES:

1. All adoptable pipes, bends and junctions shall be vitrified clay in accordance with the current version of BS EN 295-1, with flexible joints and kitemark certified.

2. All Adoptable sewers shall be in strict accordance with the SSG Appendix C - Design and Construction Guidance. Unless otherwise stated adoptable sewers shall be 150mm diameter and shall be laid in a class S bedding. Where the depth to soffit is less than 1.2m under a public highway or 0.9m elsewhere the pipe shall be laid with a class Z bedding.

3. All private building drainage shall be constructed in strict in accordance with the current version of BS EN 752:2017. Unless otherwise specified building drainage shall be 100mm diameter and shall be laid at a minimum gradient of 1 in 40 for foul drains and 1 in 80 for surface water drains. All building drains shall be laid in class B bedding unless otherwise specified.

4. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN 3 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 GEN 3 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 GEN 3 concrete.

5. Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN 3 concrete encasement (150mm thick). In all other cases the pipes shall be bedded and surrounded with 100mm thick granular material.

6. In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided. Compressible boards (fibreboard 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.

7. All svps shall have rodding access plates fitted at their bases (ground floor level).

8. Where existing pipes are to be abandoned they shall be dug out together with any abandoned manholes.

9. Any discrepancy between the drawing and site should be reported immediately to the Engineer.

10. All manhole and chamber sizes are given as a minimum to meet the SSG Appendix C-Design and Construction Guidance

REV	DATE	INT	DESCRIPTION	CHK
A	16.10.24	NT	Storage detail added	SD

Issue Status: FOR APPROVAL

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CLIENT: ECE PLANNING

PROJECT: Aboots Leigh, Storrington

TITLE: Proposed Drainage Strategy Plan

DRAWN: N Thompson	DATE: Oct 2024	PROJECT NO.: 23909	
ENGINEER: S Magowan	CHECKED: SD	DRG. No.: 04	REV.: A
SCALE: As Shown @ A1			

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	0.75
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.400
CV	0.900	Preferred Cover Depth (m)	0.600
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)	150.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.008	5.00	60.370	500	585.735	62.638	0.700
2	0.003	5.00	60.370	500	581.376	52.019	0.810
3	0.003	5.00	60.350	500	587.358	49.125	0.854
4	0.004	5.00	60.370	500	603.767	53.097	0.700
5	0.005	5.00	60.370	500	600.329	44.722	0.861
6	0.005	5.00	60.350	500	596.728	45.565	0.877
7	0.009		59.020	1200	598.482	42.032	2.200
DummyNode			60.000	500	593.288	46.842	0.700

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	11.479	0.600	59.670	59.560	0.110	104.4	100	5.25	59.5
1.001	2	3	6.645	0.600	59.560	59.496	0.064	103.8	100	5.40	58.8
2.000	4	5	9.053	0.600	59.670	59.509	0.161	56.2	100	5.15	60.0
2.001	5	6	3.698	0.600	59.509	59.473	0.036	102.7	100	5.23	59.6
1.002	3	DummyNode	6.354	0.600	59.496	59.300	0.196	32.4	100	5.48	58.5
2.002	6	DummyNode	3.669	0.600	59.473	59.300	0.173	21.2	100	5.26	59.5
1.003	DummyNode	7	7.079	0.600	59.300	56.820	2.480	2.9	100	5.50	58.4

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	0.752	5.9	1.5	0.600	0.710	0.008	0.0	35	0.631
1.001	0.754	5.9	2.1	0.710	0.754	0.011	0.0	41	0.689
2.000	1.029	8.1	0.8	0.600	0.761	0.004	0.0	21	0.642
2.001	0.758	6.0	1.7	0.761	0.777	0.009	0.0	37	0.658
1.002	1.359	10.7	2.7	0.754	0.600	0.014	0.0	34	1.129
2.002	1.684	13.2	2.7	0.777	0.600	0.014	0.0	31	1.327
1.003	4.612	36.2	5.3	0.600	2.100	0.028	0.0	26	3.321

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.900	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	0.900	Additional Storage (m³/ha)	0.0		

Storm Durations

15	60	180	360	600	960	2160	4320
30	120	240	480	720	1440	2880	

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

Node 7 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Safety Factor	2.0	Invert Level (m)	56.820
Side Inf Coefficient (m/hr)	0.03600	Porosity	0.95	Time to half empty (mins)	1846

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	22.5	28.0	1.200	22.5	28.0	1.201	0.0	28.0

Node 7 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Safety Factor	2.0	Invert Level (m)	58.020
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	350

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	28.0	28.0	0.880	28.0	28.0	0.881	0.0	28.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.67%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	12	59.922	0.252	7.0	0.0493	0.0000	SURCHARGED
15 minute summer	2	12	59.790	0.230	8.5	0.0452	0.0000	SURCHARGED
15 minute summer	3	12	59.636	0.140	10.4	0.0274	0.0000	SURCHARGED
15 minute summer	4	10	59.716	0.046	3.5	0.0090	0.0000	OK
15 minute summer	5	11	59.666	0.157	7.8	0.0307	0.0000	SURCHARGED
15 minute summer	6	11	59.585	0.112	11.6	0.0220	0.0000	SURCHARGED
600 minute summer	7	600	58.815	1.995	4.2	34.6006	0.0000	OK
15 minute summer	DummyNode	12	59.355	0.055	21.4	0.0107	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	6.0	0.769	1.018	0.0898
15 minute summer	2	1.001	3	8.1	1.030	1.360	0.0520
15 minute summer	3	1.002	DummyNode	10.2	1.689	0.953	0.0387
15 minute summer	4	2.000	5	3.5	0.530	0.429	0.0512
15 minute summer	5	2.001	6	7.4	0.940	1.234	0.0289
15 minute summer	6	2.002	DummyNode	11.4	1.833	0.859	0.0223
600 minute summer	7	Infiltration		0.1			
600 minute summer	7	Infiltration		0.1			
15 minute summer	DummyNode	1.003	7	21.3	3.330	0.587	0.0431

Appendix 7

Outline Drainage Maintenance Schedule

Drainage Maintenance Schedule

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Project	**Abbots Leigh, Storrington**
Project Number	**23909**
By	Nathan Thompson
Date	26 September 2024

1 Schedule of Maintenance

1.1 Once appointed the Contractor will prepare a site specific method statement for the control of silt and other pollutants during construction. CIRIA Report C532, Control of water pollution from construction sites, provides further guidance on this.

1.2 The Contractor will maintain the proposed drainage system during construction and until the handing over of the site.

1.3 Upon completion the Principal Contractor will collate the data sheets, operation and maintenance details of all materials used in the construction of the site drainage system.

1.4 These details will issued to the homeowner for their records.

1.5 The following maintenance schedule details the typical tasks to be undertaken at different intervals.

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Manage vegetation and remove nuisance plants – aesthetics	As required
	Litter and debris removal – catchpits	Monthly or as required
	Cleaning of gutters and any filters on downpipes	3 Monthly
	Remove sediment and debris from silt trap chambers, channel drains and inlet chambers	6 monthly
	Visual inspection of permeable paving for defects and settlement	Annually
	Sweeping / brushing of permeable paving	Every 2 years
	Surface and foul water pipework – jetting / rodding	Every 2 years or as required
	Have cesspool emptied by a registered waste handler	Monthly or when alarm indicates
Corrective Maintenance	Remove debris / blockages to silt traps	As required
	Repairs to access chambers / manhole covers	As required
	Replace any broken permeable blocks / surface, remedial works to any depressions or rutting	As required

Maintenance Schedule	Required Action	Frequency
	Inspect inlet and outlet from downpipes for blockages or standing water and clear	As required
	Reconstruct storage structures if performance deteriorates or failure occurs	As required
	Where there is a build-up of silt at inlets of 50mm or more above the design level remove silt and spread on site. Undertake when ground is damp in autumn or early spring and transplant turf / overseed to original design levels	As required
Monitoring	Inspect silt traps and note the rate sediment has accumulated	Monthly in the first year and then annually
	Inspect storage structures to ensure they are fully emptying	Annually

Indicative Schedule of Maintenance for the Proposed Drainage System

Component	Inspection Frequency					
	1 Month	3 Months	6 Months	1 Year	After leaf fall in Autumn	2 Years
Gullies and Gutters		✓			✓	
Catchpits	✓				✓	
Surface and Foul Water Pipework						✓
Permeable Paving				✓		
Storage Facilities				✓		
Existing Watercourse	✓					

Inspection Frequency Summary

2 Design Life

2.1 The design life of the development is likely to exceed the design life of the components within the SuDS network. During the routine drainage inspections it may be determined that some components have reached the end of their functional life cycle.

2.2 Where possible repairs should be the first option considered however if repairs are unviable it will be necessary for the property owner / Management Company to replace the faulty component.

3 Emergency Plan

3.1 Potential flood and maintenance indicators:

- Manholes or inspections chambers overflowing
- Gullies overflowing or ponding
- Channel drains overflowing or ponding

- Other visual indicators of the drainage system not performing as it should

3.2 Should any of the items above occur then immediate action as outlined below should be undertaken:

- Inspect for blockages in the problem area
- Should the problem not be identified via an initial inspection:
    - For unadopted onsite drainage the Management Company should appoint a suitable drainage engineer to inspect and survey the system and jet any blockages
    - For adopted onsite drainage the relevant statutory undertaker should be alerted
    - Where it is suspected that there is a problem with the downstream drainage network the Owner or relevant statutory undertaker of that system should be alerted

3.3 Spillages

3.3.1 If a serious spillage in volume or toxicity occurs on site then the spillage should be isolated with soil, turf or specialist fabric and all downstream outlets should be bunged / blocked.

3.3.2 Once the spillage is contained the Environment Agency should be contacted immediately on 0370 850 6506.