

# FLOOD RISK & DRAINAGE STATEMENT

Land at the rear of Sheeples House, Epsom Road, West Horsley, KT24 6AL



Prepared for: BlackOnyx Projects  
Ref: 005\_8230659\_SM\_FR\_Drainage\_Statement

## Document History

Issue	Date	Description	Prepared By	Checked By
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Hertfordshire | Oxfordshire | Cambridgeshire | Bristol  
 postbox@glanvillegroup.com | www.glanvillegroup.com



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## 1.0 Introduction

- 1.1 This Flood Risk & Drainage Statement has been prepared by Glanville Consultants on behalf of BlackOnyx Projects in relation to a proposed residential development on land at the rear of Sheeples House, Epsom Road, West Horsley, KT24 6AL.
- 1.2 The purpose of this document is to assess the existing level of flood risk to the site and its surroundings within the context of the development proposals and to demonstrate a suitable drainage strategy for the disposal of surface water run-off and foul water effluent from the development.
- 1.3 This assessment has been prepared in accordance with the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG) to the NPPF. Local policy concerning flood risk and drainage has been considered, in fulfilment of the guidance set out in the Guildford Borough Strategic Flood Risk Assessment, published in January 2016.
- 1.4 This assessment was undertaken with reference to information provided and/or published by the following bodies:
- Ordnance Survey;
  - British Geological Survey;
  - Surrey County Council;
  - Guildford Borough Council; and
  - Environment Agency.
- 1.5 This report concludes that the proposed development is not at risk of flooding and that the site can be developed safely without increasing flood risk elsewhere. The development proposals therefore comply with relevant planning policy concerning flood risk. The report also demonstrates that suitable arrangements for the disposal of surface water run-off and foul effluent from the proposed development can be provided.

## 2.0 Site Description and Development Proposals

### Site Description

- 2.1 The application site is located along A246 Epsom Road in East Horsley, Surrey, approximately 12.5km to the east of Guildford and 9.5km to the west of Leatherhead. The site is situated on the western edge of the village of East Horsely, to the north of Epsom Road, and currently comprises a detached dwelling, known as 'Sheepleas House', with associated garden space, a detached garage at the front, and a tennis court to the rear.
- 2.2 The site is irregular in shape and extends to approximately 0.66 Ha in area. The centre of the site is roughly located at National Grid Reference TQ 091 66 52774. The application site is bordered by agricultural land to the north and west, existing residential development to the east, and Epsom Road to the south, from which the site is currently accessed at the western end of the site frontage.

### Topography

- 2.3 A topographical survey was undertaken by Greenhatch Group in December 2023. Levels on-site generally fall away from Epsom Road, from a high point of roughly 91.41m Above Ordnance Datum (AOD) close to the vehicular access in the south of the site to a low point found in the north-western corner of the site, at approximately 85.68m AOD, some 6m below the level of Epsom Road.

### Geological Conditions

- 2.4 Geological maps published by the British Geological Survey (BGS) indicates the site is underlain by a variety of soils, with the southern part of the site consisting of the access road underlain by chalk of the Newhaven Chalk Formation before a band of Thanet Formation (sand) in the rear garden area of the property. The remaining area in the northern part of the site is underlain sands, silts and clay of the Lambeth Group. The BGS mapping indicates no superficial deposits on-site.
- 2.5 The BGS produces Infiltration SuDS GeoReports which include detailed subsurface data that can be used to inform the suitability of a site for infiltration SuDS. An Infiltration SuDS GeoReport for the site has been obtained, with the data and mapping reviewed in the following paragraphs. Extracts of this report are included in Appendix A, which includes copies of the geological mapping described in paragraph 2.4.
- 2.6 Section 2 of the SuDS GeoReport reviews the drainage potential of the soils underlying the site. This section includes mapping which suggests the southern part of the site, underlain by the Newhaven Chalk and Thanet Formation, is likely to be freely draining, while the area associated with the Lambeth Group is likely to permit moderate infiltration. The depth to groundwater is shown to be more than 5m below the ground surface throughout the year.
- 2.7 In addition to the BGS GeoReport, Soilscapes mapping provided by Cranfield University on behalf of DEFRA shows that the site falls on HOST class 7 soil, which is characterised as freely draining, slightly acid but base-rich soils.

## Hydrological and Hydrogeological Context

- 2.8 The closest watercourse designated as a main river by the Environment Agency (EA) is a tributary of the Ockham Mill Stream, located approximately 1.5km to the north of the site. The closest watercourse is an unnamed ordinary watercourse approximately 475m to the northwest of the site at West Horsely Place. No major artificial waterbodies or reservoirs are located in the vicinity of the site.
- 2.9 The EA defines Source Protection Zones (SPZs) for groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The SPZs mapping indicates that the site is not located within a SPZ zone.
- 2.10 The EA defines Drinking Water Safeguard Zones (SgZs) and Drinking Water Protected Areas (DWPAs) for water sources used for public drinking water supply. SgZs define areas where pollution control measures are needed to avoid deterioration in water quality. DWPAs are areas where water sources need to be protected to prevent pollution. The mapping shows the site is located within a Surface Water SgZ.
- 2.11 A Nitrate Vulnerable Zone (NVZ) is a conservative designation for areas of land that drain to nitrate polluted waters or waters which could become polluted by nitrates. The NVZs mapping indicates that the site is not located within a NVZ.
- 2.12 Groundwater vulnerability mapping published by the EA indicates the risk to possible groundwater sources from any potential pollutants on-site reaching the underlying aquifer. The mapping shows that the site is located within an area where there is a high likelihood of possible pollutants reaching groundwater.
- 2.13 The Bedrock Aquifer Designation Map published by the EA indicates that the site overlays a combination of a principal aquifer in the southern portion of the site, and a Secondary A aquifer in the north of the site. Principal Aquifers are layers of rock or drift deposits that have intergranular and/or fracture permeability that provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale, while Secondary A Aquifers comprise of permeable layers that can support local water supplies and may form an important source of base flow to rivers on a strategic scale.
- 2.14 None of the above points in relation to groundwater or surface water vulnerability are considered an issue that would prevent the site from being developed for residential purposes. Nonetheless, careful consideration will be given to the surface water drainage strategy for the site to provide suitable pollution control measures. The surface water drainage strategy is outlined in Section 4 of this report.

## Development Proposals

- 2.15 The development proposals are for the construction of five residential dwellings (including 2 x 3-bed units, 2 x 4-bed units and 1 x 5-bed unit). The existing property – Sheepleas House – is not included within the application red line and is to be retained. The proposals also include associated access, parking, and landscaping. The proposed site layout plan is provided at Appendix B.

## 3.0 Flood Risk Appraisal

3.1 Flood risk to the site is considered from all likely sources of flooding, as defined in the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG) to the NPPF. These include tidal, fluvial, surface water, artificial sources, groundwater, and sewer. The following paragraphs consider flood risk to the site from all these sources.

### Tidal/Coastal

3.2 Given that there are no tidally influenced watercourses on or within the vicinity of the site, tidal flooding is not an issue that would prevent the development of the site.

### Fluvial

3.3 The EA publishes flood zone mapping on GOV.UK website which shows the modelled extents of fluvial flooding. An extract from the EA mapping is included in Appendix C. The flood zone mapping indicates that the entirety of the site is located within Flood Zone 1, at the lowest risk of fluvial flooding (<1 in 1,000 year return period). The site is therefore considered to be at very low risk of fluvial flooding.

### Surface Water

3.4 The EA publishes a Flood Risk from Surface Water map on the GOV.UK website which indicates the predicted risk of surface water flooding if rainwater does not drain away through normal drainage systems or soak into the ground. The mapping indicates that the vast majority of the site, including the entire developed area, is at 'very low' risk of surface water flooding, with an annual probability of flooding less than 1:1,000.

3.5 An area of 'low' flood risk, defined as an area with an annual probability of flooding between 0.1% and 1%, is shown in the front garden of Sheepleas House. However, built development is not proposed in this area, which is isolated from other areas of surface water flood risk and not located on a wider overland flow path. As such, it is considered that the risk of flooding to the proposed development from surface water is very low.

### Artificial Sources

3.6 The EA publishes indicative mapping on its website which reveals the maximum extent of reservoir flooding in the unlikely event that a reservoir should fail. The mapping indicates that the site is not located within a reservoir flood risk area. The risk of flooding from this source is therefore considered to be negligible.

### Groundwater

3.7 As mentioned in Section 2, the SuDS GeoReport indicates the depth to groundwater from the surface throughout the year is likely to be greater than 5m. In addition, the GOV.UK long term flood risk checker indicates the site is located in an area where groundwater flooding is unlikely to occur. It is therefore considered that the risk of flooding from this source is very low.

### **Sewer**

- 3.8 Sewer records have been obtained from Thames Water as sewerage undertaker for the area surrounding the site. The records show the closest public sewer to be located at the junction of Epsom Road with Fearn Close and Longhurst Road some 175m to the east of the site. Given the distance from the site to the nearest sewers, it is considered that the risk of flooding from this source is very low.

### **Historical**

- 3.9 The Guildford Borough Council Level 1 Strategic Flood Risk Assessment (SFRA) dated January 2016 includes reports of historical flooding within the borough. No instances of historical flooding are recorded within the SFRA for the area surrounding the site, with the closest being reports of fluvial flooding at Kingston Avenue and Old Rectory Lane around 1.2 km north of the site which will have no impact on the development proposals.

### **Summary**

- 3.10 The entire site is located within Flood Zone 1, at the lowest risk of fluvial flooding. All other sources of flooding identified are considered to present a low to negligible risk to the proposed development.



## 4.0 Surface Water Drainage

### Sustainable Drainage

- 4.1 The PPG recommends that priority should be given to the use of sustainable drainage systems (SuDS) as they are designed to control surface water run-off where it falls and mimic natural drainage as closely as possible. SuDS also provide opportunities for the following:
- reduce the causes and impacts of flooding;
  - remove pollutants from urban run-off at source; and
  - combine water management with green space with benefits for amenity, recreation, and wildlife.
- 4.2 SuDS encompass a wide range of drainage techniques intended to minimise the rate of discharge, volume and environmental impact of run-off. Infiltration based techniques are high up in the hierarchy of techniques available due to the ability for close to source dispersion of surface water. These techniques are considered the closest solution to mimic the natural drainage of undeveloped sites.
- 4.3 The Building Regulations part H3 stipulates that rainwater from roofs and paved areas is carried away from surface to discharge to one of the following, listed in order of priority:
- a) an adequate soakaway or some other adequate infiltration system; or, where that is not practical;
  - b) a watercourse; or, where that is not practical
  - c) a sewer.

### Outfall and Constraints

- 4.4 As mentioned in Section 2, the site is underlain by a combination of Newhaven Chalk Formation before a band of Thanet Formation and Lambeth Group soils in the north of the site. These soil groups are described as freely draining and/or permitting moderate infiltration and, therefore, it is expected that infiltration drainage techniques for the disposal of surface water will be feasible on-site.
- 4.5 At the appropriate design stage, infiltration testing will be undertaken in the locations of the proposed soakaways and porous access road to ascertain accurate soil profiles and infiltration rates for detailed design purposes, and this requirement could be secured by a suitably worded planning condition.

### Surface Water Drainage Strategy

- 4.6 The proposed surface water drainage strategy strives to utilise sustainable drainage techniques in accordance with the guidance described in CIRIA document C753 'The SuDS Manual' (2015) to accommodate run-off from all rainfall events up to and including the 1 in 100 year event, with a 40% allowance for climate change. Run-off generated from the proposed development will discharge either via on-plot geocellular soakaways, permeable paving or an infiltration basin.
- 4.7 Run-off generated by the roof areas will discharge via on-plot soakaways consisting of geocellular crates, where spatial constraints allow – namely Plots 1 and 5. These systems will be sealed to only allow run-off from roofs to enter them, with catchpits provided upstream of the soakaways to remove any sediment contained within the surface water run-off. The proposed driveways will be constructed using permeable paving with a deepened porous sub-base and allowed to infiltrate under their own footprints.

- 4.8 The existing access road in the south of the site between Sheepleas House and the existing maintenance and store building is formed by an asphalt driveway which, from a drainage perspective, will remain unchanged as a result of the development and therefore drain as per the existing situation via the existing gulleys in the area. The proposed access road to be constructed through the site will also be formed using permeable paving, with larger infrequent storm events able to discharge via an infiltration basin in the west of the site. Plots 2-4 will also discharge surface water run-off via the permeable paving and the infiltration basin, as insufficient space for domestic soakaways which adhere to an appropriate stand-off distance can be achieved.
- 4.9 MicroDrainage calculations show the proposed infiltration features have been sized to accommodate the 1 in 100 year + 40% climate change allowance storm without flooding from surface water. A 10% allowance for urban creep has also been applied to the proposed dwelling areas. Copies of the calculations are included in Appendix D of this report, with a drawing illustrating the proposed surface water drainage strategy included in Appendix E.



## 5.0 Sustainable Drainage Pollution Control and Maintenance Measures

### Pollution Control

- 5.1 Pollution control measures are designed to minimise the transmittal of any pollutants collected by run-off flowing over hard paved areas to the underlying aquifer, with guidance provided on appropriate control measures included in CIRIA C753. The EA has also published a position statement detailing its approach to groundwater protection.
- 5.2 The EA's approach to groundwater protection states the discharge of clean roof water from residential development is acceptable provided rainwater downpipes are sealed against pollutants entering the system from other sources of surface water run-off. As such, it is considered appropriate to discharge surface water run-off from the roof areas on-site directly to domestic geocellular soakaways.
- 5.3 Table 26.2 of 'The SuDS Manual' indicates the minimum treatment indices for contributing pollution hazards for different land use classifications. The treatment indices for individual driveways and low-traffic roads, such as within the development, are shown in Table 1.
- 5.4 The pollution indices in Table 1 should be compared with the mitigation indices in Table 2 and the following formulae applied.

$$\text{Total SuDS Mitigation Index} \geq \text{Pollution Hazards Index (for each contaminant type)}$$

$$\text{Total SuDS Mitigation Index} = \text{1st Stage Mitigation Index} + 0.5 (\text{2nd Stage Mitigation Index})$$

Table 1: Pollution Hazard Indices for Different Land Use Classifications (Table 26.2, CIRIA C753)

Land Use	Pollution Hazard Level	Pollution Hazard Indices		
		Suspended Solids	Metals	Hydrocarbons
Individual property driveways, residential car parks, low traffic roads (e.g. cul-de-sacs, home zones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices)	Low	0.5	0.4	0.4

- 5.5 The proposed access road will drain via permeable paving, which is effective at removing pollutants, such as hydrocarbons, from surface water run-off. SuDS mitigation indices, taken from Table 26.4 of CIRIA C753, are shown in Table 2 to exceed the pollution hazard indices. The proposed surface water strategy is therefore considered to provide a suitable level of protection against pollution.

Table 2: SuDS Mitigation Indices (Table 26.4, CIRIA C753)

SuDS Component	Mitigation Indices		
	Suspended Solids	Metals	Hydrocarbons
Permeable paving	0.7	0.6	0.7
Infiltration Basin	0.6	0.5	0.6

### Maintenance and Responsibilities

- 5.6 All new surface water infrastructure will be designed and constructed in accordance with The Building Regulations and best practice, as appropriate.

- 5.7 The proposed surface water system will remain under private ownership. All surface water infrastructure serving a single property, such as the on-plot soakaways, will be owned and therefore maintained by the respective property owner. The proposed access road and open space area on-site will remain private, and the SuDS features will be maintained by a private management company.
- 5.8 Suitable adoption and maintenance regimes for the proposed drainage systems, incorporating advice from the component manufacturers and installers, will be developed by site management company and implemented prior to occupation of the development. A summary of typical items to be included is given in Table 3 below.

Table 3: SuDS Maintenance Schedule

Drainage Feature	Inspection and Maintenance	Frequency
Permeable pavements	Brushing and vacuuming of surface to remove detrimental materials such as debris, dirt and sediment	Annually
	Stabilise / mow adjacent verges and remove weeds from pavement surface	As required
	Ensure paving dewaterers after rain and between storms: check joints for sedimentation; mechanically clean or jet wash and sweep surface free from silt, etc; refill joints with sealing grit	As required
	Inspect and repair any rutting and cracked or broken blocks and replace lost jointing material	As required
	Rehabilitate surface and upper substructure	As required
Gullies	Inspect and remove any sediment / debris.	Annually
Geocellular soakaway*	Clean out catchpits and dispose of silt build-up	Regularly, as required – typically quarterly
	Ensure inlets and pre-treatment structures are clear and free of debris	Regularly, as required
	Inspection if infiltration decreases. Uncover, inspect, and remediate as appropriate, including cleaning and replacement of infiltration media and surface. Reinstate as required	Remedial work, as required
Infiltration basin	Inspect for signs of clogging and remove any litter / debris found.	Annually, or as required
	Inspect and clear inlets and outlets of any blockages.	
	Inspect banksides for evidence of physical damage and repair as appropriate.	
	Check sediment level and remove any excess.	
	Inspect infiltration surfaces for ponding, compaction and silt accumulation. Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of surface.	

\*refer to manufacturers' guidance for specific maintenance instructions

## 6.0 Foul Water Drainage

### Existing Foul Water Drainage

- 6.1 As mentioned in Section 4 of this report, the closest Thames Water foul water sewer is located at the junction of Epsom Road with Fearn Close and Longhurst Road, approximately 175m east of the site. A copy of the Thames Water records is included in Appendix F. It is understood that the existing property of Sheepleas House does not have a mains connection to the public sewerage network.

### Proposed Foul Water Drainage Strategy

- 6.2 The topography of the surrounding area is such that the existing Thames Water sewer at Fearn Close is at a higher overall elevation relative to the site and, as such, would require a pumped connection from the site to the sewer. It is also a considerable distance from the site.
- 6.3 Part H1 of the Building Regulations states foul water from developments should be conveyed to one of the following, listed in order of priority:
- a) a public sewer; or, where that is not reasonably practicable,
  - b) a private sewer communicating with a public sewer; or, where that is not reasonably practicable,
  - c) a septic tank with appropriate secondary treatment (or another wastewater treatment system); or, where that is not reasonably practicable,
  - d) a cesspool.
- 6.4 Given the considerable distance and requirement for a pumped connection, it is not considered reasonable or financially viable to connect to the public sewer. There is also no evidence of a private sewer communicating with a public sewer, so this option is not available.
- 6.5 The next hierarchically appropriate solution is either a septic tank or other wastewater treatment system. However, the lack of a watercourse nearby rules out this option as a possible outfall from the system. The alternative would be to allow treated effluent to discharge via infiltration to ground. However, a development of this size discharging effluent to ground would require a permit from the Environment Agency as the drainage system would not adhere to the general binding rules for small sewage discharges due to the volume of effluent discharged. Strict EA permitting rules mean a treatment system discharging to ground cannot not be accommodated within the site constraints, for example, infiltration systems must be a minimum of 50m from other soakage devices, which is not practicable within the site boundaries.
- 6.6 Foul water effluent generated by the proposed development will therefore be discharged to on-site cesspools. Cesspools are sealed tanks which do not allow effluent to discharge to the environment and are therefore emptied periodically for disposal by a licensed waste management contractor.
- 6.7 As per Building Regulations, the cesspools will be located 7m from habitable dwellings. To comply with stand-off and emptying distance requirements, Plots 1-3 and 5 will be provided with individual on-plot cesspools, whilst Plot 4 will discharge to a cesspool located within the public open space immediately to the west of the dwelling. The foul water drainage proposals are also illustrated in the drawing included in Appendix E.

- 6.8 Cesspools serving and located within the curtilage of a single property will be owned and maintained by the property owner. The cesspool serving Plot 4 will be owned and maintained by the property owner, with the right of access and maintenance schedule written into the property deeds, if necessary.



## 7.0 Summary and Conclusions

### Summary

- 7.1 This Flood Risk & Drainage Statement has been prepared by Glanville Consultants on behalf of BlackOnyx Projects in relation to a proposed residential development on land at the rear of Sheepleas House, Epsom Road, West Horsley, KT24 6AL.
- 7.2 This report has been prepared in accordance with the requirement of National Planning Policy Framework, Planning Practice Guidance, and with reference to the relevant Strategic Flood Risk Assessment and National and Local Drainage Standards.
- 7.3 The entire site is in Flood Zone 1, and therefore is considered to be at very low risk of fluvial flooding. All other sources of potential flooding identified are considered to present a low to negligible risk to the proposed development.
- 7.4 Geological mapping suggests infiltration drainage techniques should be feasible on-site and, as such, run-off from the proposed development will discharge via a combination of on-plot soakaways consisting of geocellular crates, permeable paving with deepened porous sub-base and an infiltration basin.
- 7.5 The proposed SuDS features have been sized to accommodate all flows up to the 1 in 100 year +40 % climate change storm event without flooding from surface water. Appropriate pollution control and maintenance measures have also been proposed within this report.
- 7.6 Foul water will drain to private cesspools located on-site. Alternative means of disposal have been ruled out as it is not considered reasonable or financially viable to connect to the public sewer due to the considerable distance to the outfall, and other means of on-site disposal are unsuitable due to site constraints.

### Conclusions

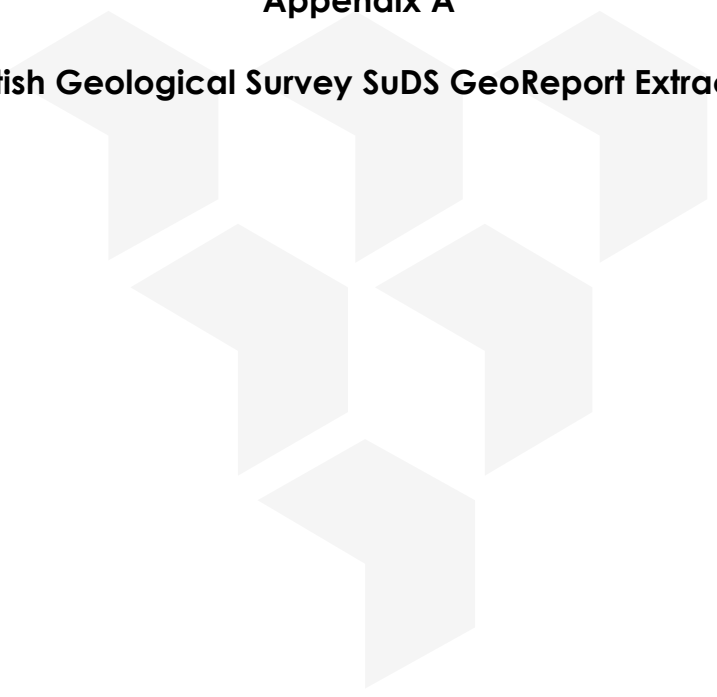
- 7.7 In conclusion, this report has demonstrated that the proposed development:
- is in accordance with the National Planning Policy Framework;
  - will not be at an unacceptable risk from surface water flooding or other sources;
  - will not increase flood risk elsewhere;
  - will employ a surface water drainage strategy based on the principles of sustainable drainage;
  - will employ a suitable foul water drainage strategy.
- 7.8 The proposals are therefore considered to fully comply with national, regional and local planning policy.

## Appendices

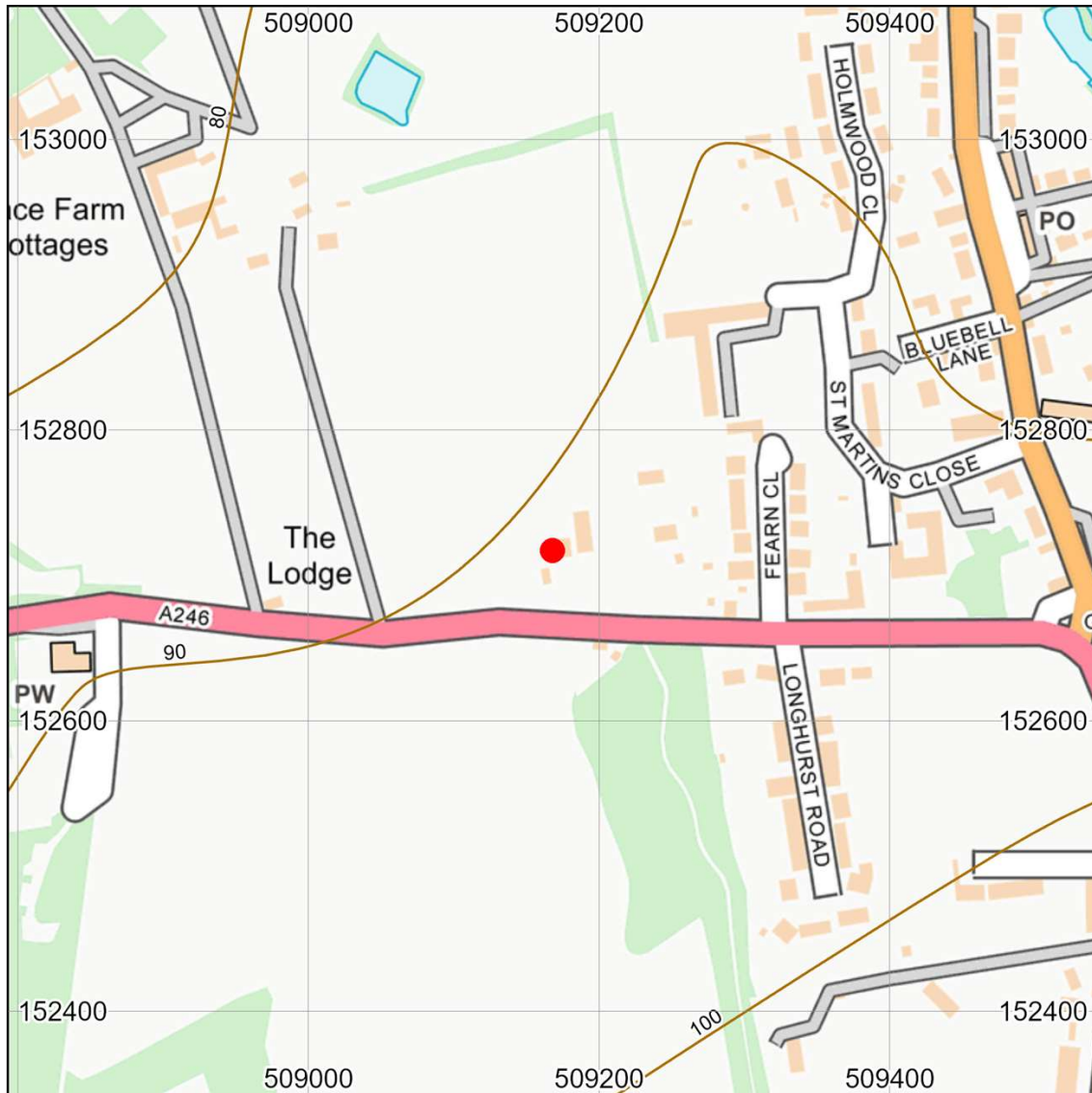




**Appendix A**  
**British Geological Survey SuDS GeoReport Extracts**



## Search location



Contains OS data © Crown Copyright and database right 2024. OS OpenMap Local: Scale: 1:5 000 (1cm = 50 m)

Search location indicated in red

Point centred at: 509168,152717

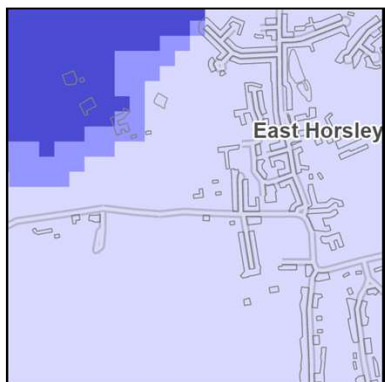



## Section 2. Drainage potential










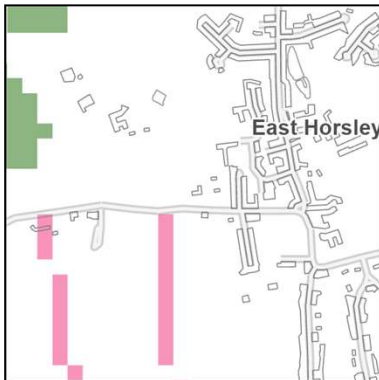
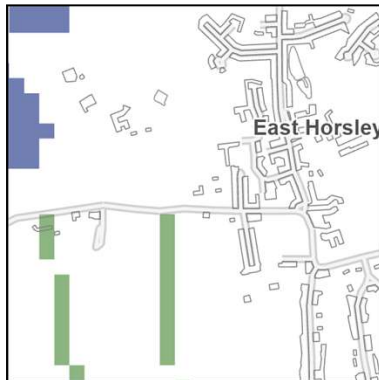
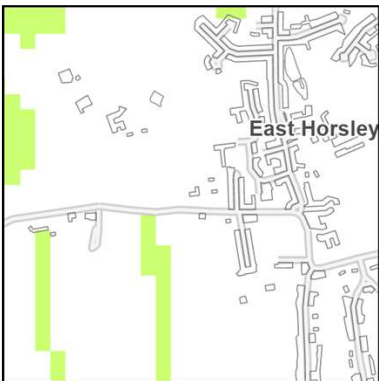


The following pages contain maps that will help you assess the drainage potential of the ground by considering the:












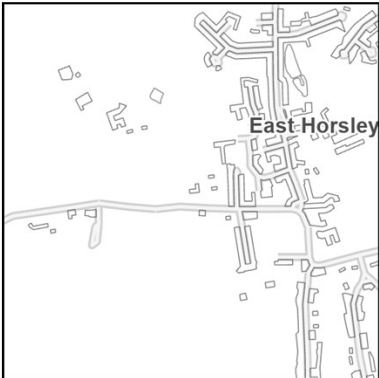

- depth to water table
- permeability of the superficial deposits
- thickness of the superficial deposits
- permeability of the bedrock
- presence of floodplains

Superficial deposits are not present everywhere and therefore some areas of the *superficial deposit permeability* map may not be coloured. Where this is the case, the *bedrock permeability* map shows the likely permeability of the ground. Superficial deposits in some places are very thin and hence in these places you may wish to consider both the permeability of the superficial deposits and the permeability of the bedrock. The *superficial thickness* map will tell you whether the superficial deposits are thin (< 3 m thick) or thick (>3 m). Where they are over 3 m thick, the permeability of the bedrock may not be relevant.

For more information read 'Explanation of terms' at the end of this report.

Depth to groundwater table	
 <p>Contains OS data © Crown Copyright and database right 2024</p>	 Groundwater is likely to be <b>more than 5 m</b> below the ground surface throughout the year.
	 Groundwater is likely to be between <b>3 and 5 m</b> below the ground surface for at least part of the year.
	 Groundwater is likely to be <b>less than 3 m</b> below the ground surface for at least part of the year.

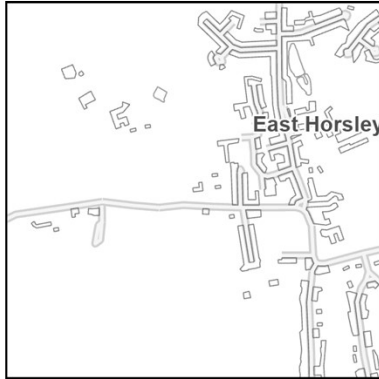
<h3>Superficial deposit permeability</h3>			
 <p>Contains OS data © Crown Copyright and database right 2024</p>	 Superficial deposits are likely to be <b>free-draining</b> .		
	 The superficial deposit permeability is <b>spatially variable</b> , but likely to permit moderate infiltration.		
	 Superficial deposits are likely to be <b>poorly draining</b> .		
<p>These maps show the permeability range that is summarised above.</p> <ul style="list-style-type: none"> <li> Very Low</li> <li> Low</li> <li> Moderate</li> <li> High</li> <li> Very High</li> </ul>	<h4>Minimum</h4>  <p>Contains OS data © Crown Copyright and database right 2024</p>	<h4>Maximum</h4>  <p>Contains OS data © Crown Copyright and database right 2024</p>	
	<h3>Superficial deposit thickness</h3>		
	 <p>Contains OS data © Crown Copyright and database right 2024</p>	 The thickness of superficial deposits is <b>&lt; 3 m</b> and hence the permeability of the ground may be dependent on both the superficial deposits (where present) and underlying bedrock (see below).	
 The thickness of superficial deposits is <b>&gt; 3 m</b> and hence the permeability of the superficial deposits is likely to determine the permeability of the ground.			

<h3>Bedrock permeability</h3>	
 <p>Contains OS data © Crown Copyright and database right 2024</p>	<p> Bedrock deposits are likely to be <b>free-draining</b>.</p>
	<p> The bedrock permeability is <b>spatially variable</b>, but likely to permit moderate infiltration.</p>
	<p> Bedrock deposits are likely to be <b>poorly draining</b>.</p>
<p>These maps show the permeability range that is summarised above.</p> <p><b>Key</b></p> <ul style="list-style-type: none"> <li> Very Low</li> <li> Low</li> <li> Moderate</li> <li> High</li> <li> Very High</li> </ul>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>Minimum</b></p>  <p>Contains OS data © Crown Copyright and database right 2024</p> </div> <div style="text-align: center;"> <p><b>Maximum</b></p>  <p>Contains OS data © Crown Copyright and database right 2024</p> </div> </div>
<h3>Geological indicators of flooding</h3>	
 <p>Contains OS data © Crown Copyright and database right 2024</p>	<p> Superficial floodplain deposits or low-lying coastal areas have been identified. Groundwater levels may rise in response to high river or tide levels, potentially causing inundation of subsurface infiltration SuDS.</p>

## Section 5. Geological Maps

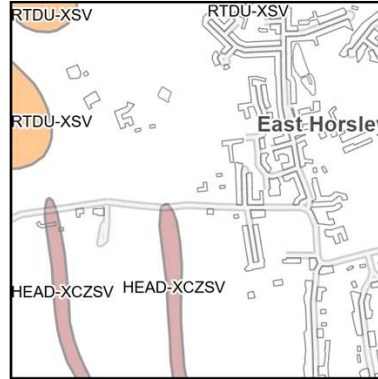
The following maps show the artificial, superficial and bedrock geology within the area of interest.

### Artificial deposits



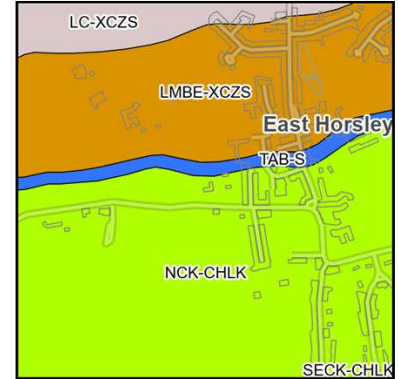
Contains OS data © Crown Copyright and database right 2024

### Superficial deposits

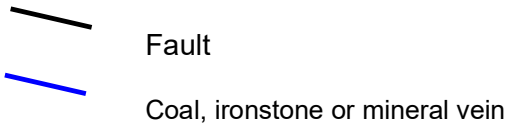


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### Bedrock



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Note: Faults and Coals, ironstone & mineral veins are shown for illustration and to aid interpretation of the map. Not all such features are shown and their absence on the map face does not necessarily mean that none are present






Key to Artificial deposits:

**No deposits recorded by BGS in the search area**

Key to Superficial deposits:

Map colour	Computer Code	Rock name	Rock type
	HEAD-XCZSV	HEAD	CLAY, SILT, SAND AND GRAVEL
	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL

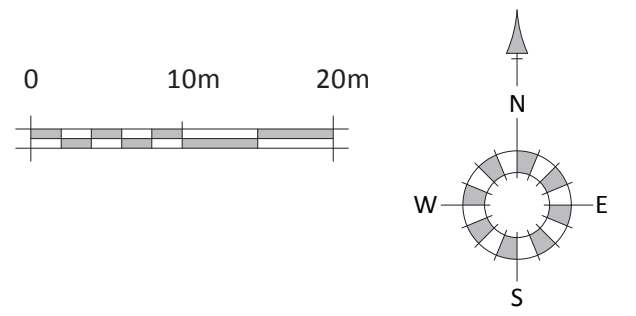
Key to Bedrock geology:

Map colour	Computer Code	Rock name	Rock type
	LC-XCZS	LONDON CLAY FORMATION	CLAY, SILT AND SAND
	LMBE-XCZS	LAMBETH GROUP	CLAY, SILT AND SAND
	TAB-S	THANET FORMATION	SAND
	NCK-CHLK	NEWHAVEN CHALK FORMATION	CHALK
	SECK-CHLK	SEAFORD CHALK FORMATION	CHALK

**Appendix B**  
**Proposed Site Layout**







Coloured Site Layout  
Sheepleas House, West Horsley

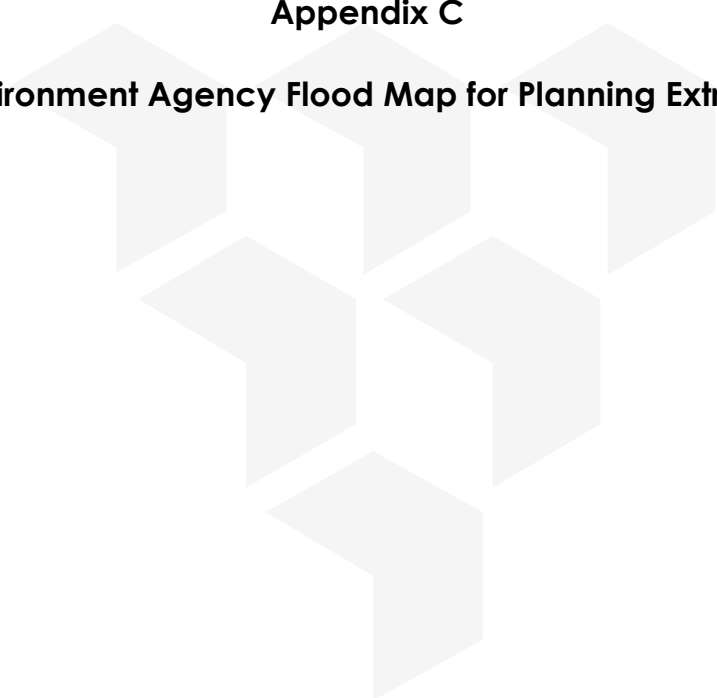
**23125 / C101A**

Scale 1:500 @ A2 March 2024

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**Appendix C**  
**Environment Agency Flood Map for Planning Extracts**



# Flood map for planning

Your reference  
**8230659\_FMfP**

Location (easting/northing)  
**509158/152763**

Created  
**14 Mar 2024 14:31**

**Your selected location is in flood zone 1, an area with a low probability of flooding.**

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

## Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>





### Flood map for planning

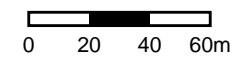
Your reference  
**8230659\_FMfP**

Location (easting/northing)  
**509158/152763**

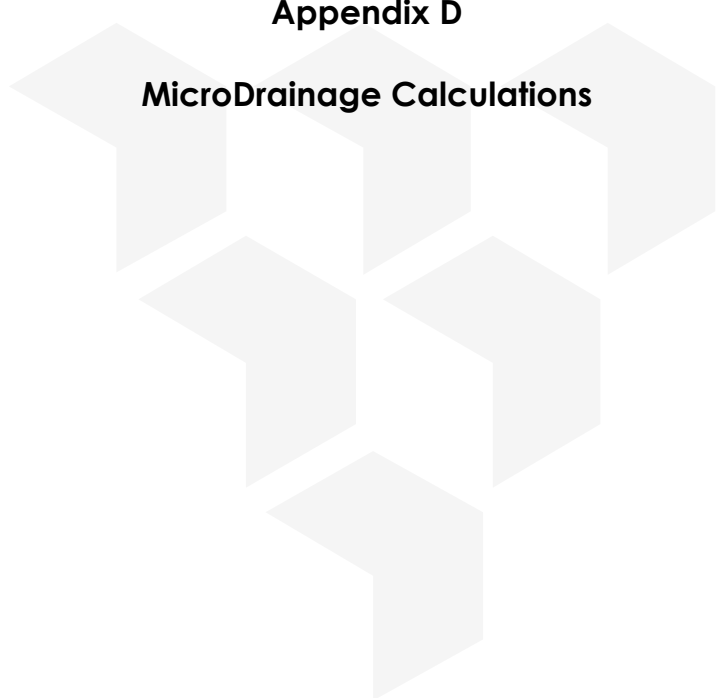
Scale  
**1:2500**


Created  
**14 Mar 2024 14:31**

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area



**Appendix D**  
**MicroDrainage Calculations**




Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Plot 1 Soakaway Sizing	
Date 14/03/2024 16:35 File 8230659 - PLOT1&2 SOAKA...	Designed by S McNair Checked by J Birch	
Micro Drainage	Source Control 2020.1.3	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 946 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	98.913	0.463	0.1	6.6	O K
30 min Summer	99.060	0.610	0.1	8.7	O K
60 min Summer	99.211	0.761	0.1	10.8	O K
120 min Summer	99.356	0.906	0.1	12.9	O K
180 min Summer	99.429	0.979	0.2	13.9	O K
240 min Summer	99.471	1.021	0.2	14.5	O K
360 min Summer	99.520	1.070	0.2	15.2	O K
480 min Summer	99.542	1.092	0.2	15.6	O K
600 min Summer	99.548	1.098	0.2	15.7	O K
720 min Summer	99.545	1.095	0.2	15.6	O K
960 min Summer	99.534	1.084	0.2	15.4	O K
1440 min Summer	99.501	1.051	0.2	15.0	O K
2160 min Summer	99.443	0.993	0.2	14.2	O K
2880 min Summer	99.386	0.936	0.1	13.3	O K
4320 min Summer	99.284	0.834	0.1	11.9	O K
5760 min Summer	99.196	0.746	0.1	10.6	O K
7200 min Summer	99.117	0.667	0.1	9.5	O K
8640 min Summer	99.046	0.596	0.1	8.5	O K
10080 min Summer	98.984	0.534	0.1	7.6	O K
15 min Winter	98.913	0.463	0.1	6.6	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	135.323	0.0	23
30 min Summer	89.751	0.0	37
60 min Summer	56.713	0.0	66
120 min Summer	34.581	0.0	126
180 min Summer	25.514	0.0	186
240 min Summer	20.423	0.0	244
360 min Summer	14.927	0.0	364
480 min Summer	11.937	0.0	482
600 min Summer	10.029	0.0	600
720 min Summer	8.694	0.0	692
960 min Summer	6.934	0.0	802
1440 min Summer	5.033	0.0	1054
2160 min Summer	3.646	0.0	1468
2880 min Summer	2.897	0.0	1876
4320 min Summer	2.092	0.0	2688
5760 min Summer	1.659	0.0	3512
7200 min Summer	1.385	0.0	4320
8640 min Summer	1.194	0.0	5096
10080 min Summer	1.055	0.0	5848
15 min Winter	135.323	0.0	22

Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Plot 1 Soakaway Sizing	
Date 14/03/2024 16:35 File 8230659 - PLOT1&2 SOAKA...	Designed by S McNair Checked by J Birch	
Micro Drainage	Source Control 2020.1.3	

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
30 min Winter	99.060	0.610	0.1	8.7	O K
60 min Winter	99.212	0.762	0.1	10.9	O K
120 min Winter	99.357	0.907	0.1	12.9	O K
180 min Winter	99.431	0.981	0.2	14.0	O K
240 min Winter	99.474	1.024	0.2	14.6	O K
360 min Winter	99.525	1.075	0.2	15.3	O K
480 min Winter	99.549	1.099	0.2	15.7	O K
600 min Winter	99.558	1.108	0.2	15.8	O K
720 min Winter	99.558	1.108	0.2	15.8	O K
960 min Winter	99.541	1.091	0.2	15.5	O K
1440 min Winter	99.502	1.052	0.2	15.0	O K
2160 min Winter	99.427	0.977	0.2	13.9	O K
2880 min Winter	99.351	0.901	0.1	12.8	O K
4320 min Winter	99.214	0.764	0.1	10.9	O K
5760 min Winter	99.095	0.645	0.1	9.2	O K
7200 min Winter	98.993	0.543	0.1	7.7	O K
8640 min Winter	98.904	0.454	0.1	6.5	O K
10080 min Winter	98.828	0.378	0.1	5.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
30 min Winter	89.751	0.0	37
60 min Winter	56.713	0.0	66
120 min Winter	34.581	0.0	124
180 min Winter	25.514	0.0	182
240 min Winter	20.423	0.0	240
360 min Winter	14.927	0.0	356
480 min Winter	11.937	0.0	468
600 min Winter	10.029	0.0	580
720 min Winter	8.694	0.0	688
960 min Winter	6.934	0.0	886
1440 min Winter	5.033	0.0	1100
2160 min Winter	3.646	0.0	1564
2880 min Winter	2.897	0.0	2020
4320 min Winter	2.092	0.0	2896
5760 min Winter	1.659	0.0	3696
7200 min Winter	1.385	0.0	4536
8640 min Winter	1.194	0.0	5280
10080 min Winter	1.055	0.0	6056

Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Plot 1 Soakaway Sizing	
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Date 14/03/2024 16:35 File 8230659 - PLOT1&2 SOAKA...	Designed by S McNair Checked by J Birch	
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Micro Drainage	Source Control 2020.1.3
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Rainfall Details


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.900
Region	England and Wales	Cv (Winter)	0.900
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.377	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.022

Time (mins)	Area	Time (mins)	Area
From:	To: (ha)	From:	To: (ha)
0	4 0.011	4	8 0.011



Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Plot 1 Soakaway Sizing	
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Date 14/03/2024 16:35 File 8230659 - PLOT1&2 SOAKA...	Designed by S McNair Checked by J Birch	
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Micro Drainage	Source Control 2020.1.3
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Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 98.450 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.03600 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.03600

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	15.0	15.0	1.300	0.0	34.2
1.200	15.0	34.2			


Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Plot 5 Soakaway Sizing	
Date 14/03/2024 14:19 File 8230659 - PLOT 5 SOAKAW...	Designed by S McNair Checked by J Birch	
Micro Drainage	Source Control 2020.1.3	

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 894 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	99.176	0.326	0.2	11.6	O K
30 min Summer	99.280	0.430	0.2	15.3	O K
60 min Summer	99.386	0.536	0.3	19.1	O K
120 min Summer	99.487	0.637	0.3	22.7	O K
180 min Summer	99.538	0.688	0.3	24.5	O K
240 min Summer	99.566	0.716	0.3	25.5	O K
360 min Summer	99.599	0.749	0.3	26.7	O K
480 min Summer	99.612	0.762	0.3	27.2	O K
600 min Summer	99.615	0.765	0.3	27.2	O K
720 min Summer	99.610	0.760	0.3	27.1	O K
960 min Summer	99.597	0.747	0.3	26.6	O K
1440 min Summer	99.566	0.716	0.3	25.5	O K
2160 min Summer	99.518	0.668	0.3	23.8	O K
2880 min Summer	99.474	0.624	0.3	22.2	O K
4320 min Summer	99.392	0.542	0.3	19.3	O K
5760 min Summer	99.319	0.469	0.2	16.7	O K
7200 min Summer	99.254	0.404	0.2	14.4	O K
8640 min Summer	99.195	0.345	0.2	12.3	O K
10080 min Summer	99.144	0.294	0.2	10.5	O K
15 min Winter	99.176	0.326	0.2	11.6	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	135.323	0.0	26
30 min Summer	89.751	0.0	41
60 min Summer	56.713	0.0	70
120 min Summer	34.581	0.0	130
180 min Summer	25.514	0.0	188
240 min Summer	20.423	0.0	246
360 min Summer	14.927	0.0	364
480 min Summer	11.937	0.0	484
600 min Summer	10.029	0.0	602
720 min Summer	8.694	0.0	706
960 min Summer	6.934	0.0	812
1440 min Summer	5.033	0.0	1060
2160 min Summer	3.646	0.0	1472
2880 min Summer	2.897	0.0	1880
4320 min Summer	2.092	0.0	2688
5760 min Summer	1.659	0.0	3472
7200 min Summer	1.385	0.0	4256
8640 min Summer	1.194	0.0	5016
10080 min Summer	1.055	0.0	5752
15 min Winter	135.323	0.0	26

Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Plot 5 Soakaway Sizing	
Date 14/03/2024 14:19 File 8230659 - PLOT 5 SOAKAW...	Designed by S McNair Checked by J Birch	
Micro Drainage		Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
30 min Winter	99.280	0.430	0.2	15.3	O K
60 min Winter	99.387	0.537	0.3	19.1	O K
120 min Winter	99.489	0.639	0.3	22.7	O K
180 min Winter	99.540	0.690	0.3	24.6	O K
240 min Winter	99.569	0.719	0.3	25.6	O K
360 min Winter	99.603	0.753	0.3	26.8	O K
480 min Winter	99.617	0.767	0.3	27.3	O K
<b>600 min Winter</b>	<b>99.622</b>	<b>0.772</b>	<b>0.3</b>	<b>27.5</b>	<b>O K</b>
720 min Winter	99.619	0.769	0.3	27.4	O K
960 min Winter	99.602	0.752	0.3	26.8	O K
1440 min Winter	99.565	0.715	0.3	25.5	O K
2160 min Winter	99.503	0.653	0.3	23.3	O K
2880 min Winter	99.441	0.591	0.3	21.0	O K
4320 min Winter	99.326	0.476	0.2	16.9	O K
5760 min Winter	99.225	0.375	0.2	13.4	O K
7200 min Winter	99.139	0.289	0.2	10.3	O K
8640 min Winter	99.066	0.216	0.2	7.7	O K
10080 min Winter	99.005	0.155	0.2	5.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
30 min Winter	89.751	0.0	40
60 min Winter	56.713	0.0	70
120 min Winter	34.581	0.0	126
180 min Winter	25.514	0.0	184
240 min Winter	20.423	0.0	242
360 min Winter	14.927	0.0	358
480 min Winter	11.937	0.0	472
<b>600 min Winter</b>	<b>10.029</b>	<b>0.0</b>	<b>582</b>
720 min Winter	8.694	0.0	692
960 min Winter	6.934	0.0	892
1440 min Winter	5.033	0.0	1110
2160 min Winter	3.646	0.0	1568
2880 min Winter	2.897	0.0	2020
4320 min Winter	2.092	0.0	2864
5760 min Winter	1.659	0.0	3688
7200 min Winter	1.385	0.0	4464
8640 min Winter	1.194	0.0	5192
10080 min Winter	1.055	0.0	5856

Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Plot 5 Soakaway Sizing	
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Date 14/03/2024 14:19 File 8230659 - PLOT 5 SOAKAW...	Designed by S McNair Checked by J Birch	
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Micro Drainage	Source Control 2020.1.3
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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.900
Region	England and Wales	Cv (Winter)	0.900
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.377	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.039

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0	4 0.013	4	8 0.013	8	12 0.013

Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Plot 5 Soakaway Sizing	
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Date 14/03/2024 14:19 File 8230659 - PLOT 5 SOAKAW...	Designed by S McNair Checked by J Birch	
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Micro Drainage	Source Control 2020.1.3
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Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 98.850 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.03600 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.03600

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	37.5	37.5	0.900	0.0	57.5
0.800	37.5	57.5			

Cascade Summary of Results for 8230659 - Permeable Paving.SRCX


**Upstream Structures**                      **Outflow To**                      **Overflow To**

(None) 8230659 - Infiltration Basin.SRCX                      (None)

Half Drain Time : 0 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	98.216	0.266	0.1	32.7	32.8	1.1		O K
30 min Summer	98.232	0.282	0.1	35.6	35.7	1.2		O K
60 min Summer	98.226	0.276	0.1	34.5	34.6	1.1		O K
120 min Summer	98.190	0.240	0.1	27.6	27.7	0.9		O K
180 min Summer	98.144	0.194	0.1	22.2	22.3	0.6		O K
240 min Summer	98.124	0.174	0.1	18.7	18.7	0.4		O K
360 min Summer	98.094	0.144	0.1	14.3	14.3	0.3		O K
480 min Summer	98.077	0.127	0.1	11.7	11.7	0.2		O K
600 min Summer	98.069	0.119	0.1	10.0	10.1	0.2		O K
720 min Summer	98.062	0.112	0.1	8.7	8.8	0.2		O K
960 min Summer	98.052	0.102	0.1	7.0	7.1	0.2		O K
1440 min Summer	98.035	0.085	0.0	5.1	5.1	0.1		O K
2160 min Summer	98.023	0.073	0.0	3.7	3.8	0.1		O K
2880 min Summer	98.015	0.065	0.0	3.0	3.0	0.1		O K
4320 min Summer	98.004	0.054	0.0	2.1	2.1	0.0		O K
5760 min Summer	97.999	0.049	0.0	1.7	1.7	0.0		O K
7200 min Summer	97.995	0.045	0.0	1.5	1.5	0.0		O K


Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	135.323	0.0	31.0	16
30 min Summer	89.751	0.0	41.4	24
60 min Summer	56.713	0.0	52.4	38
120 min Summer	34.581	0.0	64.1	68
180 min Summer	25.514	0.0	71.0	98
240 min Summer	20.423	0.0	75.8	128
360 min Summer	14.927	0.0	83.1	188
480 min Summer	11.937	0.0	88.6	250
600 min Summer	10.029	0.0	93.1	306
720 min Summer	8.694	0.0	96.8	374
960 min Summer	6.934	0.0	102.9	490
1440 min Summer	5.033	0.0	112.0	734
2160 min Summer	3.646	0.0	121.6	1092
2880 min Summer	2.897	0.0	128.7	1468
4320 min Summer	2.092	0.0	139.2	2132
5760 min Summer	1.659	0.0	146.9	2864
7200 min Summer	1.385	0.0	152.9	3632

Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Access Road Permeable Paving	
Date 14/03/2024 16:28 File 8230659 - Cascade PP + ...	Designed by S McNair Checked by J Birch	
Micro Drainage		Source Control 2020.1.3

Cascade Summary of Results for 8230659 - Permeable Paving.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m <sup>3</sup> )	Status
8640 min Summer	97.991	0.041	0.0	1.2	1.2	0.0	O K
10080 min Summer	97.989	0.039	0.0	1.1	1.1	0.0	O K
15 min Winter	98.216	0.266	0.1	32.8	32.9	1.0	O K
30 min Winter	98.231	0.281	0.1	35.4	35.5	1.2	O K
60 min Winter	98.206	0.256	0.1	30.8	31.0	1.0	O K
120 min Winter	98.139	0.189	0.1	21.3	21.4	0.5	O K
180 min Winter	98.107	0.157	0.1	16.1	16.2	0.4	O K
240 min Winter	98.086	0.136	0.1	13.1	13.2	0.3	O K
360 min Winter	98.067	0.117	0.1	9.7	9.7	0.2	O K
480 min Winter	98.057	0.107	0.1	7.8	7.8	0.2	O K
600 min Winter	98.048	0.098	0.0	6.6	6.6	0.1	O K
720 min Winter	98.040	0.090	0.0	5.7	5.7	0.1	O K
960 min Winter	98.030	0.080	0.0	4.6	4.6	0.1	O K
1440 min Winter	98.019	0.069	0.0	3.3	3.3	0.1	O K
2160 min Winter	98.007	0.057	0.0	2.4	2.4	0.1	O K
2880 min Winter	98.002	0.052	0.0	1.9	2.0	0.0	O K
4320 min Winter	97.993	0.043	0.0	1.4	1.4	0.0	O K
5760 min Winter	97.989	0.039	0.0	1.1	1.1	0.0	O K
7200 min Winter	97.985	0.035	0.0	0.9	0.9	0.0	O K
8640 min Winter	97.983	0.033	0.0	0.8	0.8	0.0	O K
10080 min Winter	97.980	0.030	0.0	0.7	0.7	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Discharge Volume (m <sup>3</sup> )	Time-Peak (mins)
8640 min Summer	1.194	0.0	158.0	4320
10080 min Summer	1.055	0.0	162.5	4968
15 min Winter	135.323	0.0	31.0	16
30 min Winter	89.751	0.0	41.3	24
60 min Winter	56.713	0.0	52.4	38
120 min Winter	34.581	0.0	64.1	68
180 min Winter	25.514	0.0	71.0	100
240 min Winter	20.423	0.0	75.8	128
360 min Winter	14.927	0.0	83.1	186
480 min Winter	11.937	0.0	88.6	244
600 min Winter	10.029	0.0	93.1	312
720 min Winter	8.694	0.0	96.8	374
960 min Winter	6.934	0.0	102.9	490
1440 min Winter	5.033	0.0	112.0	746
2160 min Winter	3.646	0.0	121.6	1104
2880 min Winter	2.897	0.0	128.7	1500
4320 min Winter	2.092	0.0	139.2	2216
5760 min Winter	1.659	0.0	146.9	2864
7200 min Winter	1.385	0.0	152.9	3536
8640 min Winter	1.194	0.0	158.0	4360
10080 min Winter	1.055	0.0	162.5	5328

Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Access Road Permeable Paving	
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Date 14/03/2024 16:28 File 8230659 - Cascade PP + ...	Designed by S McNair Checked by J Birch	
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Micro Drainage	Source Control 2020.1.3
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Cascade Rainfall Details for 8230659 - Permeable Paving.SRCX


Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.900
Region	England and Wales	Cv (Winter)	0.900
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.377	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.104

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From:	To:	From:	To:	From:	To:	From:	To:
	(ha)		(ha)		(ha)		(ha)
0	4 0.026	4	8 0.026	8	12 0.026	12	16 0.026



Glanville Consultants		Page 4
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Access Road Permeable Paving	
Date 14/03/2024 16:28 File 8230659 - Cascade PP + ...	Designed by S McNair Checked by J Birch	
Micro Drainage	Source Control 2020.1.3	

Cascade Model Details for 8230659 - Permeable Paving.SRCX


Storage is Online Cover Level (m) 100.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.03600	Width (m)	2.4
Membrane Percolation (mm/hr)	1000	Length (m)	53.5
Max Percolation (l/s)	35.7	Slope (1:X)	41.2
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	97.950	Cap Volume Depth (m)	0.400

Pipe Outflow Control

Diameter (m)	0.225	Entry Loss Coefficient	0.500
Slope (1:X)	195.1	Coefficient of Contraction	0.600
Length (m)	9.755	Upstream Invert Level (m)	97.950
Roughness k (mm)	0.600		


Glanville Consultants		Page 1
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Western Infiltration Basin	
Date 14/03/2024 16:29 File 8230659 - Cascade PP + ...	Designed by S McNair Checked by J Birch	
Micro Drainage		Source Control 2020.1.3

Cascade Summary of Results for 8230659 - Infiltration Basin.SRCX

**Upstream Structures**                      **Outflow To**    **Overflow To**  
 8230659 - Permeable Paving.SRCX                      (None)                      (None)  
 Half Drain Time : 649 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	98.372	0.472	0.7	30.1	O K
30 min Summer	98.480	0.580	0.8	39.9	O K
60 min Summer	98.578	0.678	0.9	49.8	O K
120 min Summer	98.660	0.760	1.0	58.9	O K
180 min Summer	98.697	0.797	1.0	63.3	O K
240 min Summer	98.716	0.816	1.0	65.5	O K
360 min Summer	98.733	0.833	1.1	67.7	O K
480 min Summer	98.737	0.837	1.1	68.2	O K
600 min Summer	98.737	0.837	1.1	68.1	O K
720 min Summer	98.735	0.835	1.1	68.0	O K
960 min Summer	98.729	0.829	1.1	67.2	O K
1440 min Summer	98.710	0.810	1.0	64.9	O K
2160 min Summer	98.673	0.773	1.0	60.5	O K
2880 min Summer	98.635	0.735	0.9	56.1	O K
4320 min Summer	98.567	0.667	0.9	48.7	O K
5760 min Summer	98.508	0.608	0.8	42.7	O K
7200 min Summer	98.457	0.557	0.8	37.8	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	135.323	0.0	30
30 min Summer	89.751	0.0	45
60 min Summer	56.713	0.0	74
120 min Summer	34.581	0.0	130
180 min Summer	25.514	0.0	188
240 min Summer	20.423	0.0	246
360 min Summer	14.927	0.0	362
480 min Summer	11.937	0.0	462
600 min Summer	10.029	0.0	514
720 min Summer	8.694	0.0	574
960 min Summer	6.934	0.0	702
1440 min Summer	5.033	0.0	976
2160 min Summer	3.646	0.0	1388
2880 min Summer	2.897	0.0	1796
4320 min Summer	2.092	0.0	2600
5760 min Summer	1.659	0.0	3352
7200 min Summer	1.385	0.0	4120

Glanville Consultants		Page 2
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Western Infiltration Basin	
Date 14/03/2024 16:29 File 8230659 - Cascade PP + ...	Designed by S McNair Checked by J Birch	
Micro Drainage	Source Control 2020.1.3	

Cascade Summary of Results for 8230659 - Infiltration Basin.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
8640 min Summer	98.412	0.512	0.7	33.7	O K
10080 min Summer	98.372	0.472	0.7	30.2	O K
15 min Winter	98.372	0.472	0.7	30.1	O K
30 min Winter	98.480	0.580	0.8	39.9	O K
60 min Winter	98.578	0.678	0.9	49.9	O K
120 min Winter	98.661	0.761	1.0	59.1	O K
180 min Winter	98.699	0.799	1.0	63.5	O K
240 min Winter	98.718	0.818	1.0	65.8	O K
360 min Winter	98.737	0.837	1.1	68.2	O K
480 min Winter	98.742	0.842	1.1	68.8	O K
600 min Winter	98.739	0.839	1.1	68.5	O K
720 min Winter	98.735	0.835	1.1	68.0	O K
960 min Winter	98.727	0.827	1.0	66.9	O K
1440 min Winter	98.699	0.799	1.0	63.5	O K
2160 min Winter	98.648	0.748	1.0	57.6	O K
2880 min Winter	98.597	0.697	0.9	51.9	O K
4320 min Winter	98.506	0.606	0.8	42.5	O K
5760 min Winter	98.430	0.530	0.7	35.3	O K
7200 min Winter	98.365	0.465	0.7	29.6	O K
8640 min Winter	98.310	0.410	0.6	25.1	O K
10080 min Winter	98.262	0.362	0.6	21.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
8640 min Summer	1.194	0.0	4848
10080 min Summer	1.055	0.0	5640
15 min Winter	135.323	0.0	30
30 min Winter	89.751	0.0	44
60 min Winter	56.713	0.0	72
120 min Winter	34.581	0.0	128
180 min Winter	25.514	0.0	186
240 min Winter	20.423	0.0	242
360 min Winter	14.927	0.0	354
480 min Winter	11.937	0.0	464
600 min Winter	10.029	0.0	564
720 min Winter	8.694	0.0	586
960 min Winter	6.934	0.0	738
1440 min Winter	5.033	0.0	1042
2160 min Winter	3.646	0.0	1488
2880 min Winter	2.897	0.0	1916
4320 min Winter	2.092	0.0	2732
5760 min Winter	1.659	0.0	3520
7200 min Winter	1.385	0.0	4288
8640 min Winter	1.194	0.0	5024
10080 min Winter	1.055	0.0	5768

Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Western Infiltration Basin	
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Date 14/03/2024 16:29 File 8230659 - Cascade PP + ...	Designed by S McNair Checked by J Birch	
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Micro Drainage	Source Control 2020.1.3
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Cascade Rainfall Details for 8230659 - Infiltration Basin.SRCX

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.900
Region	England and Wales	Cv (Winter)	0.900
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.377	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.000

<b>Time (mins)</b>		<b>Area</b>
<b>From:</b>	<b>To:</b>	<b>(ha)</b>
0	4	0.000

Glanville Consultants		Page 4
Cornerstone Court 62 Foxhall Road Didcot OX11 7AD	Sheepleas House Epsom Road, West Horsley Western Infiltration Basin	
Date 14/03/2024 16:29 File 8230659 - Cascade PP + ...	Designed by S McNair Checked by J Birch	
Micro Drainage	Source Control 2020.1.3	

Cascade Model Details for 8230659 - Infiltration Basin.SRCX

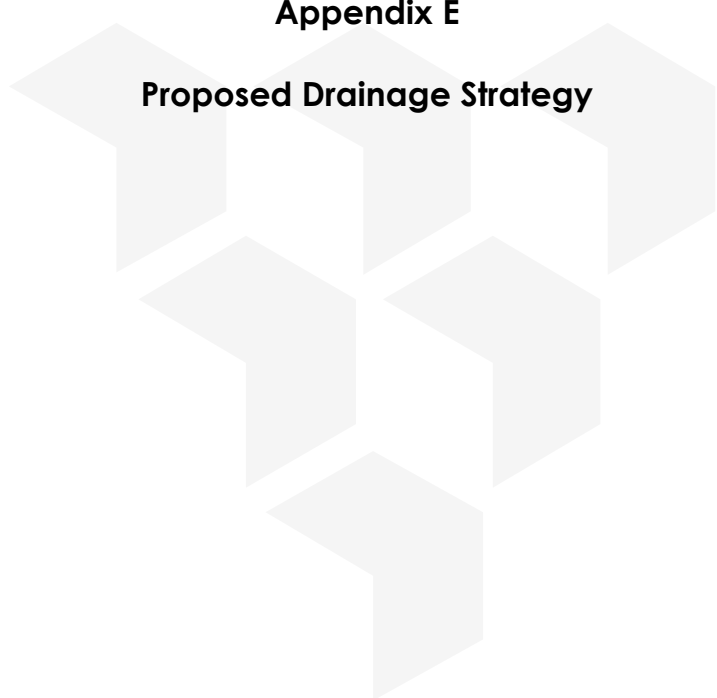
Storage is Online Cover Level (m) 98.900

Infiltration Basin Structure

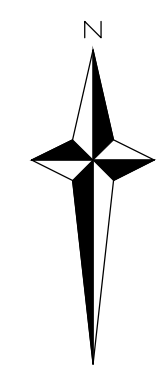
Invert Level (m) 97.900 Safety Factor 2.0  
 Infiltration Coefficient Base (m/hr) 0.03600 Porosity 1.00  
 Infiltration Coefficient Side (m/hr) 0.03600

Depth (m)	Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )
0.000	45.0	1.000	144.6

**Appendix E**  
**Proposed Drainage Strategy**







NOTES

1. This document is to be read in conjunction with the Flood Risk & Drainage Statement and all relevant documents and specifications.
2. Dimensions are for planning purposes only and are not approved for construction from.
3. Site Layout taken from OSP Architects drawing no: 23125 / C101, dated March 2024.
4. All drainage to be installed in accordance with Building Regulations Part H and BS8582.
5. Cesspools sizing and location shown for planning purposes only and to be confirmed at detailed design stage.
6. RWP locations TBC by Architects at detailed design stage.
7. All chambers and sewer runs subject to detailed design and confirmation of foul water penetration and RWP locations.
8. All levels, including FFLs, subject to external works design (+/- C. 300mm).

KEY:

- Application Boundary
- Surface Water Sewer
- Drainage Channel
- Headwall
- Distribution Box
- Infiltration Basin
- Permeable Paving with deepened porous sub-base (min. 300mm)
- Geocellular Crates
- Cesspool
- No-dig construction area
- Existing hardstanding to be retained



Plot 5 Soakaway  
 Dims: 5m x 7.5m x 0.8m  
 Total Volume: 28.5m<sup>3</sup>  
 Half drain time for 1% AEP+40%CC storm: 894 min  
 Infiltration Rate: 1 x 10<sup>-5</sup> m/s - TBC

Insufficient space within Plot 2-4 gardens for domestic soakaways and cesspools while maintaining appropriate stand-off distance from dwellings and RPAs. Plot 4 to discharge foul effluent to cesspool located in public space to west of dwelling.

Infiltration Basin  
 Depth: 1m  
 Min. Freeboard for 1% AEP+40%CC storm: 150mm  
 Max. Volume: 68.8m<sup>3</sup>  
 Plan Area: 173m<sup>2</sup>  
 Side Slopes: 1:3  
 Half drain time for 1% AEP+40%CC storm: 649 min  
 Infiltration Rate: 1 x 10<sup>-5</sup> m/s - TBC

Proposed access road to be constructed using permeable paving with deepened sub-base to allow infiltration where feasible, and convey flows downstream to infiltration basin during less frequent storms.

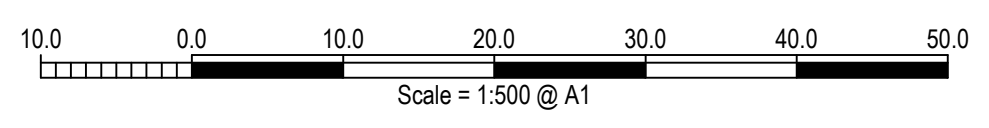
Root protection areas require no-dig construction within hatched area - work to be strictly in accordance with arboricultural method statement.

Existing asphalt surfacing to remain unchanged and therefore drain via existing system serving catchment.

Cesspools located a min. of 7m from any habitable room, as per Building Regulations Part H2. Sizing, location and installation subject to specialist design at detailed design stage.

Plot 1 Soakaway  
 Dims: 5m x 3m x 1.8m  
 Total Volume: 17.1m<sup>3</sup>  
 Half drain time for 1% AEP+40%CC storm: 946 min  
 Infiltration Rate: 1 x 10<sup>-5</sup> m/s - TBC

Existing Sheeples House unchanged as part of development and therefore to drain as per existing situation.



P1	Issued to Client.	15.03.2024	SM	JB
Rev	Description	Date	By	Chkd

Client:	BlackOynx Projects Limited		
Project:	Sheeples House, Epsom Road, West Horsely, KT24 6AL		
Title:	Proposed Drainage Strategy		
Engineer:	S McNair	Date:	March 2024
Director:	J Birch	Scale:	1:200 @ A1
Status:	PLANNING		
Drawing No.	8230659 - SK01	Rev	P1

## **Appendix F**

### **Thames Water Sewer Records**







SearchFlow Limited  
42  
Kings Hill Avenue  
Kings Hill  
West Malling  
ME19 4AJKent

Search address supplied	Sheeples House, Epsom Road, West Horsley, LEATHERHEAD, KT24 6AL
Your reference	B4081.8.fw
Our reference	DWS/DWS Standard/2023_4917940
Received date	29 November 2023
Search date	13 December 2023

### Keeping you up-to-date

#### Notification of Price Changes

From 1st April 2023 Thames Water Property Searches will be increasing the prices of its CON29DW, CommercialDW Drainage & Water Enquiries and Asset Location Searches. Historically costs would rise in line with RPI but as this currently sits at 14.2%, we are capping it at 10%.

Customers will be emailed with the new prices by January 1st 2023.

Any orders received with a higher payment prior to the 1st April 2023 will be non-refundable. For further details on the price increase please visit our website at [www.thameswater-propertysearches.co.uk](http://www.thameswater-propertysearches.co.uk)



Thames Water Utilities Ltd  
Property Searches,  
PO Box 3189, Slough SL1 4WW



[searches@thameswater.co.uk](mailto:searches@thameswater.co.uk)  
[www.thameswater-propertysearches.co.uk](http://www.thameswater-propertysearches.co.uk)



0800 009 4540



Question	Summary Answer
<b>Maps</b>	
1.1 Where relevant, please include a copy of an extract from the public sewer map.	Map Provided
1.2 Where relevant, please include a copy of an extract from the map of waterworks.	Map Provided
<b>Drainage</b>	
2.1 Does foul water from the property drain to a public sewer?	Not Connected
2.2 Does surface water from the property drain to a public sewer?	Not Connected
2.3 Is a surface water drainage charge payable?	No Charge
2.4 Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	No
2.4.1 Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?	No
2.5 Does the public sewer map indicate any public sewer within 30.48 metres(100 feet) of any buildings within the property?	No
2.5.1 Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the 50metres of any buildings within the property?	No
2.6 Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
2.7 Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	No
2.8 Is the building which is or forms part of the property, at risk of internal flooding due to overloaded public sewers?	Not At Risk
2.9 Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	6.425 Kilometres
<b>Water</b>	
3.1 Is the property connected to mains water supply?	Connected
3.2 Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	No
3.3 Is any water main or service pipe serving or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No
3.4 Is the property at risk of receiving low water pressure or flow?	No
3.5 What is the classification of the water supply for the property?	Hard
3.6 Please include details of the location of any water meter serving the property.	See Details
<b>Charging</b>	
4.1.1 Who are the sewerage undertakers for the area?	Thames Water
4.1.2 Who are the water undertakers for the area?	Affinity Water
4.2 Who bills the property for sewerage services?	Not Billed
4.3 Who bills the property for water services?	Affinity Water
4.4 What is the current basis for charging for sewerage and/or water services at the property?	Metered
4.5 Will the basis for charging for sewerage and water services at the property change as a consequence of a change of occupation?	No



0 5 10 20 30 40  
Meters

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified before any works are undertaken. Crown copyright Reserved

**Scale:** 1:1009  
**Width:** 200m  
**Printed By:** ASuji  
**Print Date:** 13/12/2023  
**Map Centre:** 509177,152719  
**Grid Reference:** TQ0952NW

**Comments:**



The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified before any works are undertaken. Crown copyright Reserved











**Scale:** 1:2523  
**Width:** 500m  
**Printed By:** ASuji  
**Print Date:** 13/12/2023  
**Map Centre:** 509177,152719  
**Grid Reference:** TQ0952NW

**Comments:**



# Con29DW Residential Drainage and Water Search - Sewer Key







## Public Sewer Types (Operated and maintained by Thames Water)

-  **Foul Sewer:** A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
-  **Surface Water Sewer:** A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
-  **Combined Sewer:** A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
-  **Trunk Sewer:** A strategic sewer which collects either foul or surface water flow from a number of subsidiary catchments and transfers this flow to a pumping station, river outfall or treatment works.
-  **Storm Overflow Sewer:** A sewer designed to convey excess rainfall to rivers or watercourses so that the flow does not exceed the capacity of normal sewers (which could cause flooding).
-  **Sludge Sewer:** A sewer designed to convey sludge from one treatment works to another.
-  **Vent Pipe:** A section of sewer pipe connected between the top of a sewer and vent column, used to prevent the accumulation of gas in a sewer and thus allowing the system to operate properly.
-  **Rising Main:** A pipe carrying pumped flow under pressure from a low point to a high point on the sewerage network. The direction of the fleck indicates the direction of flow within the pipe.
-  **Vacuum:** A foul sewer designed to remove foul sewage under pressure (vacuum sewers cannot accept direct new connections).
-  **Thames Water Proposed Sewer**




### Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plan are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

## Other Sewer Types (Not Operated or Maintained by Thames Water)

-  **Foul Sewer:** Any foul sewer that is not owned by Thames Water.
-  **Gulley:** A sewer designed to convey surface water from large roads, motorways, etc. to watercourses or to public surface water sewers. These sewers are generally maintained by the relevant highway authority.
-  **Culverted Watercourse:** A watercourse running through a culvert or pipe which is the responsibility of the property owner or the Environment Agency.
-  **Decommissioned Sewer:** A disused sewer. Usually filled with cement mixture or removed from the ground.
-  Content of this drainage network is currently unknown.
-  Ownership of this drainage network is currently unknown.

## Other Symbols

-  **Undefined Ends:** These symbols represent the point at which a pipe continues but no records of its position are currently held by Thames Water. These symbols are rare but may be found on any of the public sewer types.
-  **Public / Private Pumping Station:** Foul or Surface Water pumping station.
-  **Casement:** Ducts may contain high voltage cables. Please check with Thames Water.

5) 'na' or '0' on a manhole indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters.

Text next to a manhole indicates the manhole reference number and should not be taken as a measurement.

If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.

