LEONARDSLEE LAKES & GARDENS

HORSHAM, WEST SUSSEX

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

PURCELL UK

DOCUMENT REFERENCE:

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WATER | ENVIRONMENT

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Authorisation and Version Control

Water Environment was commissioned by Purcell UK to investigate the risks and assess the consequences of flooding on the site at Leonardslee Lakes & Gardens as well as to develop a Sustainable Drainage Strategy for the proposed development.

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ABBREVIATIONS

Acronym	Definition
AOD	Above Ordnance Datum
BGL	Below Ground Level
BGS	British Geological Survey
DEFRA	Department for Environment Food and Rural Affairs
DTM	Digital Terrain Model
EA	Environment Agency
FEH	Flood Estimation Handbook
FRA	Flood Risk Assessment
HDC	Horsham District Council
LiDAR	Light Detection and Ranging
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NPPF	National Planning Policy Framework
PFRA	Preliminary Flood Risk Assessment
PPG	Planning Practice Guidance
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems
SWMP	Surface Water Management Plan
WSCC	West Sussex County Council

1 INTRODUCTION

Brief

1.1 Water Environment has been commissioned by Purcell UK to prepare a Flood Risk Assessment (FRA) and Drainage Strategy in accordance with the National Planning Policy Framework (NPPF), to inform the proposed development at Leonardslee Lakes & Gardens, West Sussex, RH13 6PP, herein referred to as 'the Site'.

1.2 This FRA and drainage strategy has been prepared in support of the detailed planning application already submitted for the proposed development under reference DC/25/1146. This report seeks to address comments raised by the Lead Local Flood Authority (LLFA) on the submitted application.

Project Overview

1.3 The proposed development comprises a number of separate areas of development across the Leonardslee Lakes & Gardens estate. For the purposes of this report, the proposed development is divided across seven areas:

1. Extension to the visitor entrance building to house a new ticket sales area and café;
2. Landscaping changes to the forecourt of Leonardslee House.
3. Single storey winter garden conservatory to the Stable Block with terrace extension to the east and internal/ external reconfigurations and change of use from redundant staff offices and staff accommodation within the stable block to guest accommodation including extension to Honey Cottage;
4. Infilling roof to the former generator block courtyard, re-roofing of the Alpine House and internal/external reconfigurations and link extension;
5. Change of use to the partial first floor of the Red House to staff accommodation;
6. Small WC extension, reinstated chimney stack, and roof alterations to the Engine House; and,
7. Lightweight wedding pavilion to the lawn, south of Leonardslee House.

Scope of Study

1.4 The main objectives of this study are to:

- Assess the risk and implications of flooding on the Site including flooding from tidal, fluvial, groundwater, surface water and artificial sources;
- Prepare a flood risk assessment of the Site that is in accordance with the guidelines set out in the National Planning Policy Framework and associated Planning Practice Guidance;
- Consider potential future climate change over the lifetime of the proposed development in accordance with the latest guidance; and
- Prepare a SuDS strategy that shows how surface water runoff will be managed from the Site in accordance with the latest guidance.

2 SITE DESCRIPTION

Location

2.1 The Site is located to the east of the A281, south east of Horsham, West Sussex, as illustrated in Figure 2.1 below. The nearest postcode for the Site is RH13 6PP and the National Grid Reference for the approximate centre of the Site is 522125E, 125952N. The Site covers a total area of approximately 1.08 ha.

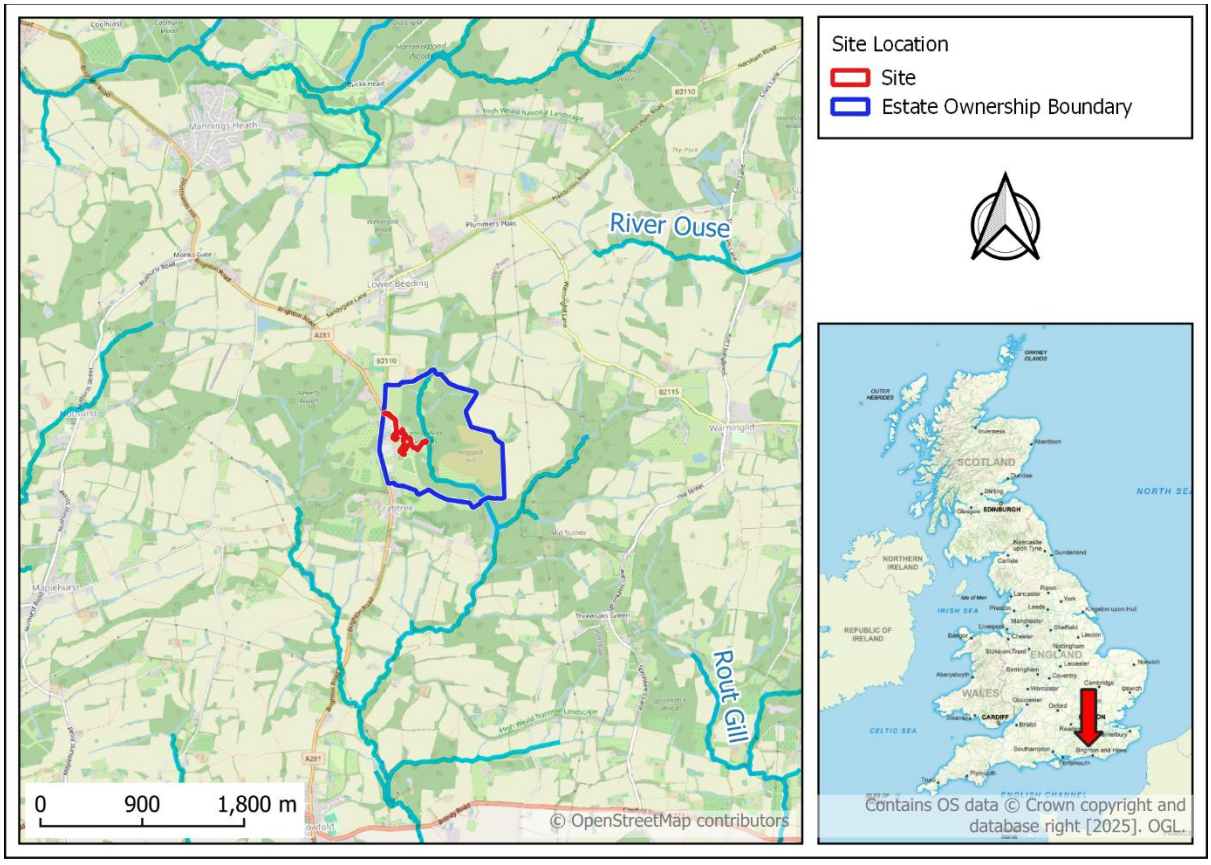


Figure 2.1: Site location and local watercourses

2.2 Horsham Borough Council (HBC) is the Local Planning Authority (LPA) for the Site and West Sussex County Council (WSCC) acts as the Lead Local Flood Authority (LLFA).

Existing Development

2.3 The existing site is currently occupied by a number of historic buildings, visitor amenities and historic gardens, and sits within the wider Leonardslee Lakes & Gardens estate. Within the estate, all gardens are Grade I listed and buildings are a mixture of Grade II listed, curtilage listed, and unlisted 20th Century buildings.. A plan of the existing site is included in Appendix A.

2.4 The Site is bound to the north, east, and south by the Leonardslee Lakes & Gardens estate. At the Site's western boundary is the A281.

2.5 Historic mapping shows that the site has been occupied by the present house and estate buildings since 1852 as a private residence. In recent years, the estate has operated as a public attraction, and was most recently re-opened to the public in 2019, for which the estate was developed to accommodate visitors through the construction of additional car parking and re-development of existing buildings.

Topography

2.6 A topographic survey of the site was undertaken by MK Surveys in March 2023 (ref: 32290), and is enclosed in Appendix A.

2.7 The topographic survey shows the Site to have a general fall from northwest to southeast in the area of the existing entrance building and forecourt. This area of the Site has a high point of approximately 100.2 mAOD at the site access road in the north, and a low point of approximately 90.0 mAOD at the south east corner of the forecourt to the front of the main house. The site falls more steeply east of the main house towards the lakes and engine house, which is the lowest part of the site at approximately 49.2 mAOD.

Geology

2.8 The British Geology Survey (BGS) Online Viewer notes the underlying bedrock of the Site as Upper Tunbridge Wells Sand, in a combination of Sandstone and Mudstone, as can be seen in Figure 2.2. No superficial deposits are noted on or within the near vicinity of the Site.

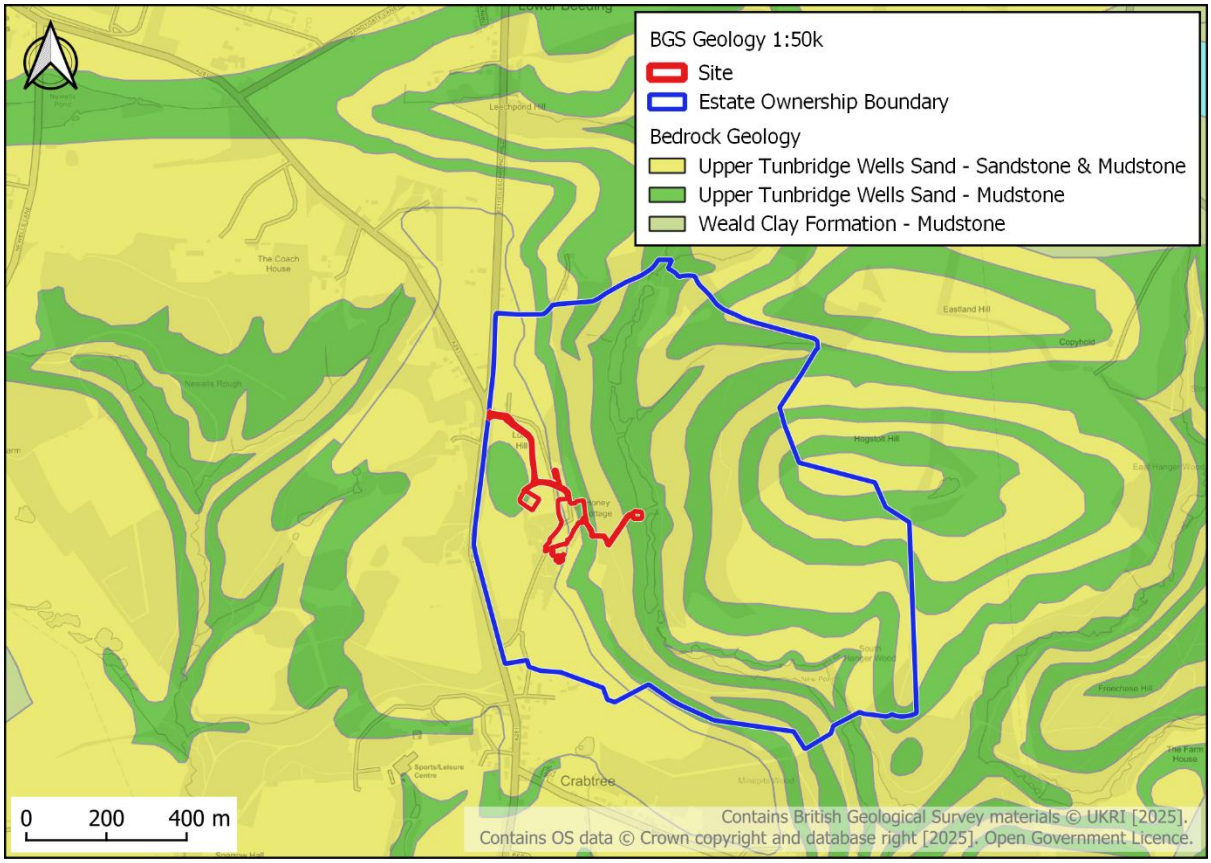


Figure 2.2: Extract of BGS Online Geology Viewer Map

2.9 One historical borehole record is located in the near vicinity of the Site on the BGS GeoIndex resource, approximately 350m to the west. This shows the area to be underlain by Tunbridge Wells Sandstone, described as sandy clay with occasional hard bands of sandstone, up to a depth of 65m. Water was struck at 43m below ground level (bgl). This record can be found in Appendix B.

2.10 No site-specific ground investigation has been undertaken at this time.

Hydrogeology

2.11 The Site is not located on a Source Protection Zone (SPZ).

2.12 The site is located on the boundary between Secondary A and unproductive aquifers. The groundwater vulnerability for the Site is noted as high in some areas, and unproductive in others. These areas likely correspond with the regions of sandstone and mudstone mapped by the BGS Online Viewer.

2.13 The groundwater levels beneath the Site are currently unknown, although the historical borehole record approximately 350m east of the Site notes groundwater levels to be approximately 43m bgl. The approximate ground level of the area of this borehole is 94 mAOD, meaning groundwater levels are believed to be at approximately 50 mAOD in the wider area.

Hydrology

2.14 A desk-study review of Ordnance Survey mapping shows no surface water bodies within the Site itself. This was confirmed by site walkover by Water Environment in November 2025.

2.15 Environment Agency mapping identifies the nearest Main Rivers to the Site as the Cowfold Stream and the River Ouse, 4.3km south and 4.4km north east of the Site respectively.

2.16 Immediately adjacent to the Engine House at the easternmost point of the site are a number of man-made lakes within the Leonardslee Lakes & Gardens estate. These lakes cascade from north to south, and ultimately discharge to the Cowfold Stream.

Existing Site Drainage

2.17 Southern Water are the statutory undertakers for wastewater in the area. However, a review of the Southern Water asset records confirms that there are no public sewers within the Site or in the immediate vicinity.

2.18 An underground utilities survey of the wider Leonardslee Lakes & Gardens estate was undertaken by MK Surveys in October 2017, and is contained in Appendix A. This survey showed the site to be served by a private combined network, taking both foul and surface water flows from the buildings and areas of hardstanding across the Site. These flows are conveyed through the subsurface pipe network to a settlement tank and reed beds to the southeast of the Site. Here the combined flows are treated and discharged overland to ultimately outfall to the man-made lakes at the base of the valley to the southeast of the site. An EA permit is in place for this discharge to surface water.

2.19 With regard to drainage, the Engine House is separate to all other buildings within the Site due to prevailing levels. The Engine House discharges only surface water, which is collected by rainwater pipes and channel drains, and outfalls overland into the man-made lakes immediately to the east.

Proposed Development

2.20 The proposed development comprises a number of separate areas of development across the Leonardslee Lakes & Gardens estate. For the purposes of this report, the proposed development is divided across seven areas, as set out in Figure 2.3. A plan of the proposed development is contained in Appendix C.

1. New Ticket Entrance Extension – an extension is proposed to the south elevation of this building creating a new area to house a ticket desk and a welcome café;

2. Leonardslee House Forecourt – it is proposed that the existing hard landscaping will be altered to a softer configuration with new interpretation boards to reduce parking to the front of the House, creating a soft division from garden visitors to the car park as per historic precedent;
3. Stable Block – a new winter garden extension is proposed to the Stable Block along with a lightweight terrace to the east. The Clocktower Café will be refurbished and back of house spaces consolidated with new WCs introduced. The existing staff accommodation will be refurbished into additional guest accommodation;
4. Former Generator Block – it is proposed that the existing open courtyard will be covered to create a new events space. The Alpine House will be refurbished and the Dolls House Museum will be moved to the Red House to create a limited number of WCs;
5. Red House – it is proposed that the current staff welfare to the ground floor side wing that has been moved to the Compound will house the Dolls House Exhibition to be closer to the play area. The offices at first floor level will be renovated into purpose built staff accommodation with individual living space and kitchens;
6. Engine House – a small extension is proposed to house an accessible WC. An extension to the existing terrace is also proposed for further seating capacity; and
7. Lightweight Wedding Pavilion – a new lightweight wedding pavilion is proposed on the lawn to the south of Leonardslee House to hold wedding ceremonies.

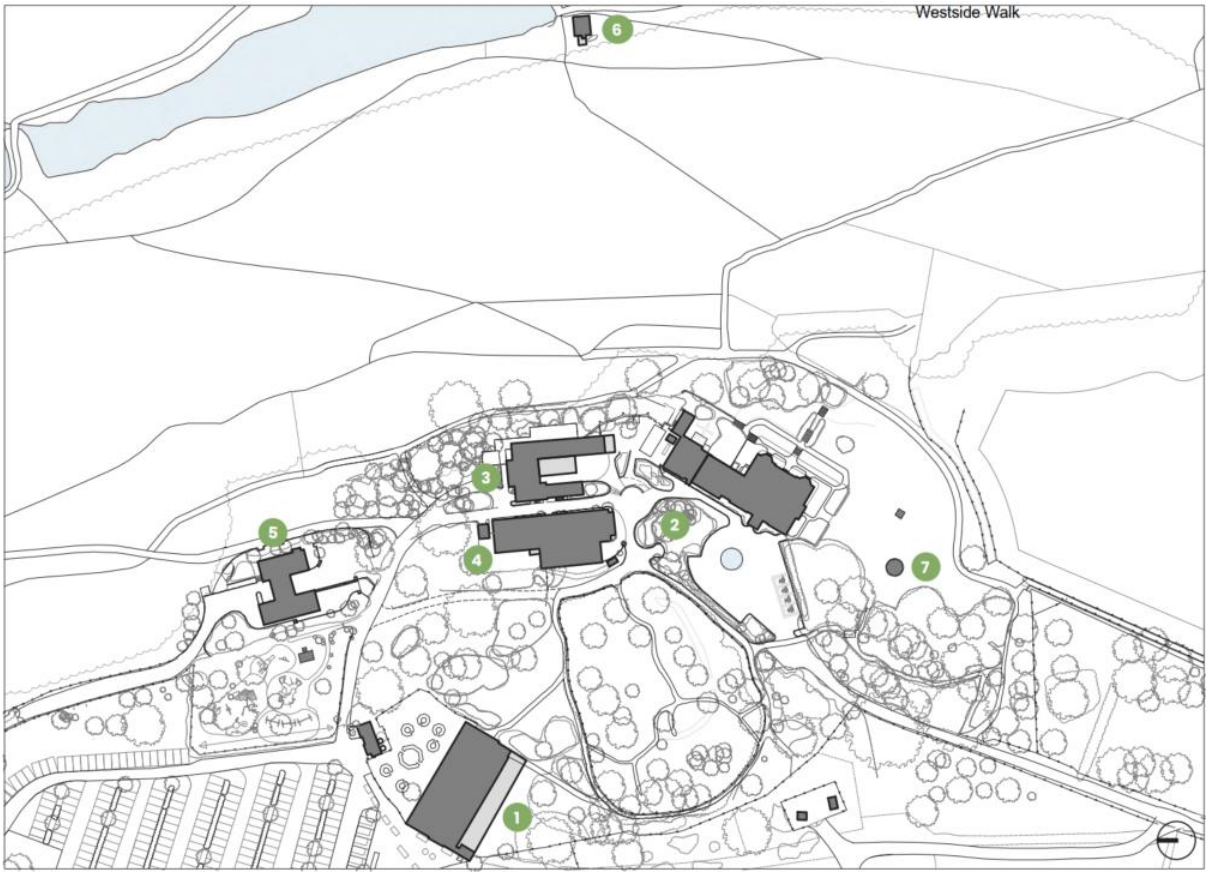


Figure 2.3: Proposed site plan (ref: Purcell UK Design and Access Statement, July 2025)

3 PLANNING POLICY

National Planning Policy Framework

3.1 The National Planning Policy Framework (NPPF) was revised in December 2024 and sets out the Governments' planning policies for England and how these are expected to be applied. In terms of flood risk, the updated NPPF states that:

> *"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere."*

3.2 In addition to the NPPF, online Planning Practice Guidance (PPG): Flood Risk and Coastal Change was published in March 2014 (and most recently revised in September 2025) to clarify planning aspects of flood risk management. The PPG clarifies which development types are considered appropriate within each flood zone and is a 'live' document with periodic reviews and updates.

3.3 According to Table 2 'Flood Risk Vulnerability Classification' of the Flood Risk and Coastal Change section of the PPG, the residential aspects of the proposed development (including the staff and guest accommodation) are considered to be 'More Vulnerable' in terms of flood risk. However, the retail, commercial and leisure aspects of the proposed development can be considered 'Less Vulnerable'. The vulnerability classifications of the proposed development remain the same as the existing site.

Sequential Test

3.4 The NPPF recommends that all plans should apply a sequential, risk-based approach to the location of development - taking into account the current and future impacts of climate change - so as to avoid, where possible flood risk to people and property. The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding.

3.5 The Site is entirely within Flood Zone 1 and the proposed development does not change the vulnerability of the site. The sequential test is therefore passed.

Exception Test

3.6 Table 3: Flood risk vulnerability and flood zone 'compatibility' of the PPG for Flood Risk and Coastal Change states that 'More Vulnerable' uses are compatible with Flood Zone 2 and Flood Zone 1. The Exception Test is therefore not required for this scheme.

Local Planning Policy

3.7 The Horsham District Planning Framework (HDPF) was adopted in November 2015 and sets out the Council's policies on development of the district up to 2031. The HDPF sets out the overall vision and planning strategy for development in the district. The main policy relevant to the development with regard to flood risk and surface water drainage comprises:

> ***Policy 38: Flooding***
>
> *1. Development proposals will follow a sequential approach to flood risk management, giving priority to development sites with the lowest risk of flooding and making required development safe without increasing flood risk elsewhere. Development proposals will;*

a. take a sequential approach to ensure most vulnerable uses are placed in the lowest risk areas.

b. avoid the functional floodplain (Flood zone 3b) except for water-compatible uses and essential infrastructure.

c. only be acceptable in Flood Zone 2 and 3 following completion of a sequential test and exceptions test if necessary.

d. require a site-specific Flood Risk Assessments for all developments over 1 hectare in Flood Zone 1 and all proposals in Flood Zone 2 and 3.

2. Comply with the tests and recommendations set out in the Horsham District Strategic Flood Risk Assessment (SFRA).

3. Where there is the potential to increase flood risk, proposals must incorporate the use of sustainable drainage systems (SuDS) where technically feasible, or incorporate water management measures which reduce the risk of flooding and ensure flood risk is not increased elsewhere.

4. Consider the vulnerability and importance of local ecological resources such as water quality and biodiversity when determining the suitability of SuDS. New development should undertake more detailed assessments to consider the most appropriate SuDS methods for each site. Consideration should also be given to amenity value and green infrastructure.

5. Utilise drainage techniques that mimic natural drainage patterns and manage surface water as close to its source as possible will be required where technically feasible.

6. Be in accordance with the objective of the Water Framework Directive, and accord with the findings of the Gatwick Sub Region Water Cycle Study in order to maintain water quality and water availability in rivers and wetlands and wastewater treatment requirements.

3.8 The proposed development was previously submitted for planning under planning reference DC/25/1146 without a flood risk assessment or drainage strategy. As the LLFA, WSCC provided comments on the proposals, stipulating requirements for the proposed drainage design. These have been appended to this report in Appendix D.

Strategic Flood Risk Assessment

3.9 A Level 1 Strategic Flood Risk Assessment (SFRA) was prepared by Aecom for HDC in September 2024. The following sources were identified within the study area:

- Fluvial
- Tidal
- Surface Water
- Groundwater
- Sewer
- Artificial Sources

3.10 Maps produced as part of the SFRA show the Site to be generally at low to very low risk of flooding from most identified sources, relevant extracts of which are contained in Appendix E. This is discussed further in the following chapters.

4 POTENTIAL FLOODING ON SITE

Flooding from Rivers and the Sea

4.1 The EA Flood Zone Map within the Flood Map for Planning shows the Site to be located entirely within Flood Zone 1, as can be seen in Figure 4.1. The EA defines Flood Zone 1 from rivers or the sea in Paragraph 078 (Table 1) of the PPG as follows:

> *Flood Zone 1 (Low Probability): Land having less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map - all land outside of Zones 2, 3a and 3b).*

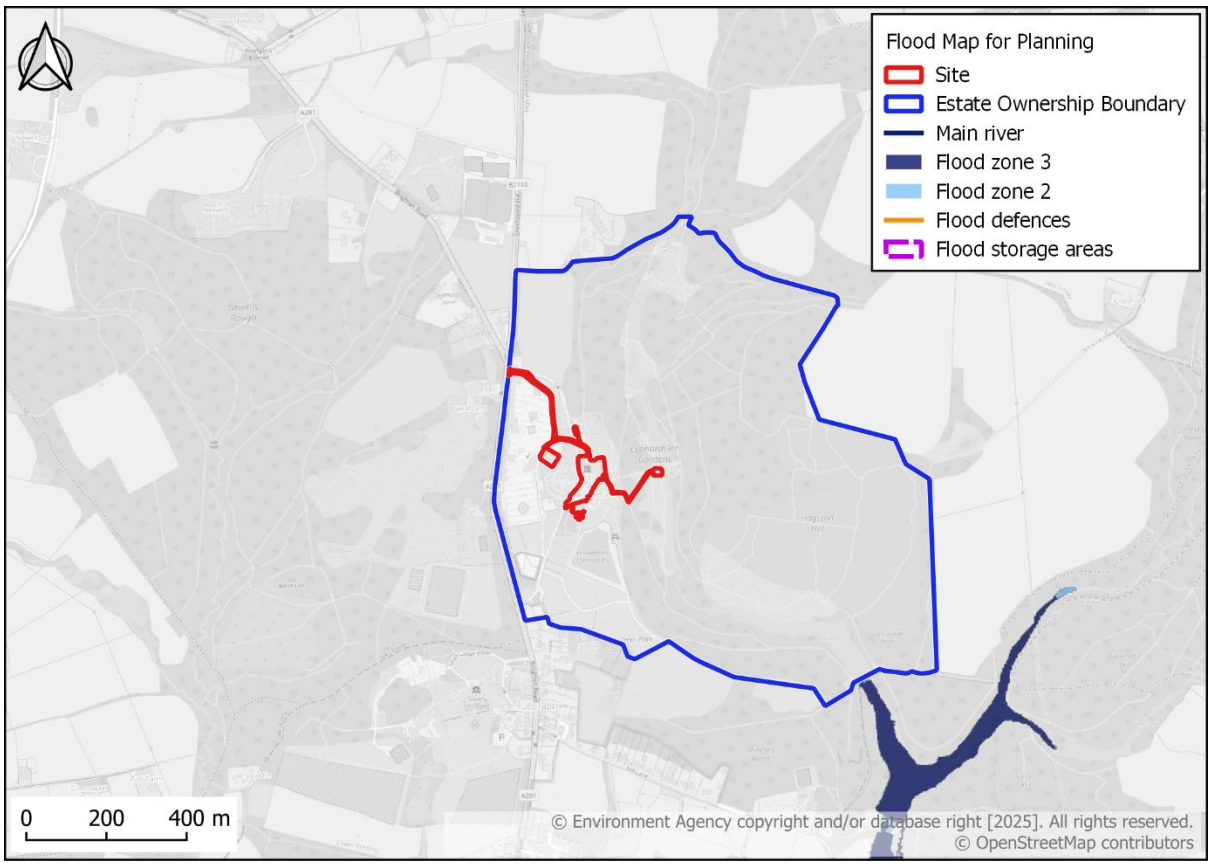


Figure 4.1: Extract of EA Flood Map for Planning

4.2 The risk of fluvial and tidal flooding is deemed **Low**.

Flooding from Surface Water

4.3 The EA classify surface water flood risk as follows:

- VERY LOW – the area has a chance of surface water flooding of less than 0.1%
- LOW – the area has a chance of surface water flooding of between 0.1% and 1%
- MEDIUM – the area has a chance of surface water flooding of between 1% and 3.3%
- HIGH - the area has a chance of surface water flooding of greater than 3.3%

4.4 The EA's Risk of Flooding from Surface Water (RoFSW) map is presented in Figure 4.2.

4.5 The Site is entirely at very low risk of surface water flooding.

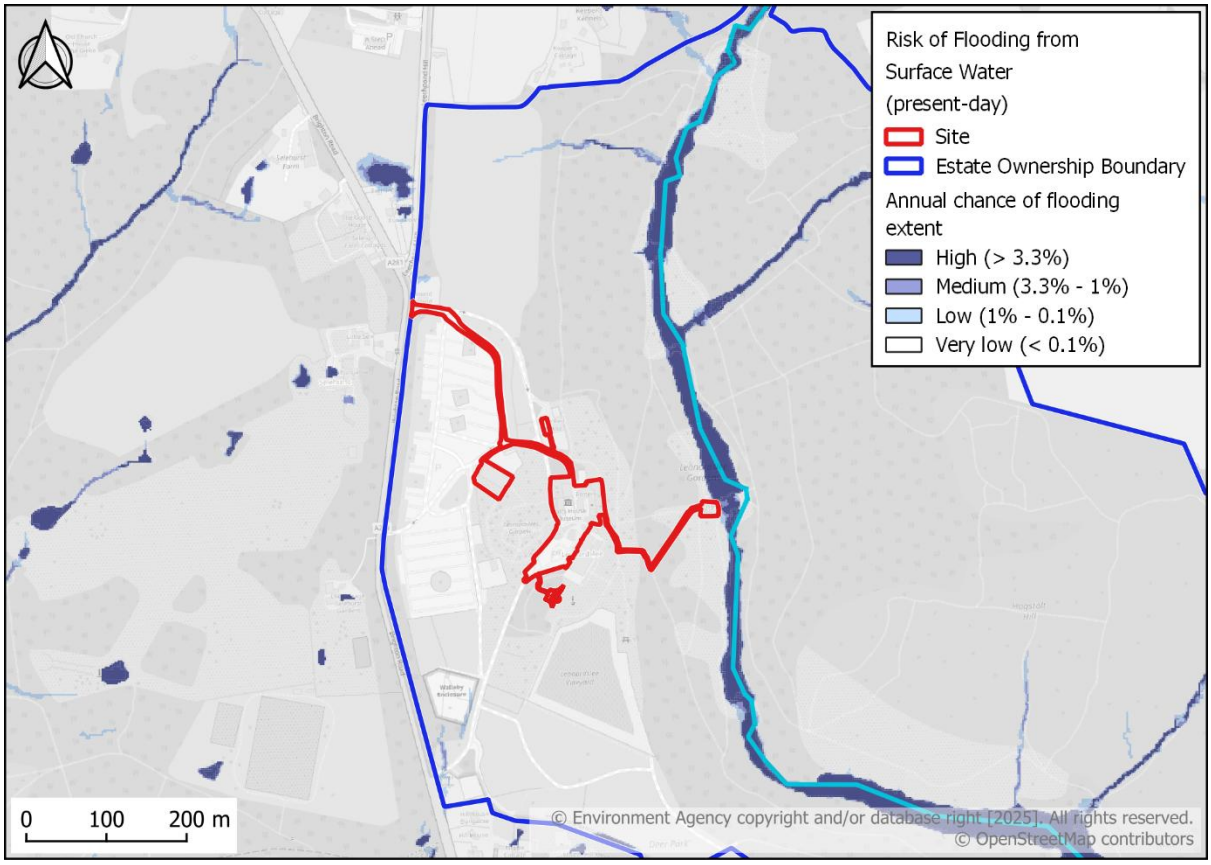


Figure 4.2: Risk of Surface Water Flooding Extent Map

4.6 Overall, the risk of surface water flooding is deemed **Very Low**.

4.7 Surface water will be managed on the Site by implementation of a SuDS strategy, reducing the risk of surface water flooding on and off the Site. The SuDS strategy is outlined in Section 5.

Flooding from Sewers

4.8 Sewer flooding generally results in localised short-term flooding caused by intense rainfall events overloading the capacity of sewers.

4.9 Mapping from the HDC SFRA shows the Site to be in a postcode area (RH13) where sewer flooding has been recorded between 41 and 120 times between 2014 and 2024. However, the Site does not contain any public sewers and is not served by the public sewer network

4.10 The risk of sewer flooding for the Site is therefore considered **Low**.

Flooding from Groundwater

4.11 Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata and is often localised in low-lying areas which are underlain by permeable aquifers. Following a prolonged period of rainfall, a rise in the water table may be observed and this can result in groundwater flooding at the surface. Groundwater responds slowly to variations in rainfall and therefore flooding may be seen for extended periods of time.

4.12 A review of the SFRA mapping shows the Site to be located in an area at negligible risk of groundwater flooding.

4.13 The bedrock geology of the Site is anticipated to be Upper Tunbridge Wells Sand and is expected to be of low permeability. Groundwater levels beneath the site are currently unknown, but nearby historical records suggest that they are significantly below ground level across the site.

4.14 The risk of groundwater flooding is deemed to be **Low**.

Flooding from Other Sources

4.15 Information available from the EA for risk of inundation from reservoirs indicates that the Site is not within the flood extents from artificial sources.

4.16 The easternmost point of the site is immediately adjacent to man-made lakes within the Leonardslee Lakes & Gardens estate, and is therefore in an area liable to flooding in the event of increased levels or blockage downstream. However, the likelihood of such an event is very low, as levels and overflows are closely managed by the estate management team.

4.17 The risk of flooding from artificial sources is **Low**.

Climate Change

4.18 The projected impacts of climate change are likely to increase intensity and frequency of extreme rainfall events, resulting in increased risk of flooding from rivers. Climate change allowances are therefore included as part of the assessment.

4.19 The EA has produced a range of climate change allowances to be applied to the peak river flow and rainfall intensity based upon the river basin management catchment. Management catchments are sub-catchments of river basin districts. The Site is located in the Adur and Ouse Management Catchment. Table 4.1 shows the anticipated changes to peak flow, which should be considered for the area.

4.20 The range of allowances is based upon a statistical analysis above the 50th percentile which is regarded as being the central category. The higher central is based upon the 70th percentile and the upper end is based on the 95th percentile.

Table 4.1: Peak River flow allowances by Adur and Ouse Management Catchment

Allowance category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper	40%	57%	107%
Higher	23%	28%	55%
Central	16%	18%	37%

4.21 Climate change allowances should be applied to the peak rainfall intensities. The EA has produced updated rainfall allowances for both 1% and 3.3% annual exceedance rainfall events for each Management Catchment. Table 4.2 and Table 4.3 show the anticipated change in extreme rainfall intensity in small and urban catchments. The upper end allowances for both the 1% and 3.3% annual exceedance probability events should be applied for Flood Risk Assessments to assess the range of impact.

Table 4.2: EA Peak Rainfall allowances by Adur and Ouse Management Catchment (3.3% annual exceedance probability)

Allowance category	Total potential change anticipated for the '2050s' (2040 to 2060)	Total potential change anticipated for the '2070s' (2061 to 2125)
Upper	35%	40%
Central	20%	20%

Table 4.3: EA Peak Rainfall allowances by Adur and Ouse Management Catchment (1.0% annual exceedance probability)

Allowance category	Total potential change anticipated for the '2050s' (2040 to 2060)	Total potential change anticipated for the '2070s' (2061 to 2125)
Upper	45%	45%
Central	20%	25%

5 SURFACE WATER MANAGEMENT

Policy

5.1 The surface water drainage system has been designed in accordance with the NPPF and the accompanying Guidance and Technical Standards for SuDS. It also complies with the requirements under Building Regulations Part H, and is compliant with the WSCC SuDS Design Guidance.

5.2 In order to avoid increasing flood risk elsewhere, the surface water runoff from the Site should not increase post-development. In addition, national and local policy require the use of Sustainable Drainage Systems (SuDS) wherever practical to reduce runoff to as close to greenfield as possible. In the case of low discharge rates, the HDC Surface Water Drainage Statement Form states that pipes with flows of less than 2l/s are prone to blockage. Flows of less than 2L/s have therefore been avoided in the proposed design.

5.3 Surface water should be managed in line with the SuDS hierarchy under paragraph 56 of the PPG. In addition, the SCC SuDS Design Guidance states that runoff should be discharged in line with the following drainage hierarchy:

1) at source reductions and reuse;
2) infiltration to ground;
3) attenuated discharge to a surface water body;
4) to a public surface water sewer,
5) to highway drain, or other private drainage system; or
6) to a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewage undertaker.

Existing Site Runoff

5.4 The greenfield runoff rates for the Site were calculated using the FEH statistical (2025) method and are summarised in Table 5.1.

Table 5.1: Greenfield runoff rates

Return period (years)	Greenfield Rate (L/s/ha)
Qbar	5.2
1	4.5
30	12.1
100	16.7

5.5 The Site is currently occupied by existing historical development. It is therefore considered a brownfield site, and is also assumed to make an unrestricted discharge to the Thames Water sewer network with no attenuation or flow controls. The brownfield runoff rates for the Site were calculated for the 6 hour rainfall event and are summarised in Table 5.2.

Table 5.2: Brownfield runoff rates

Return period (years)	Brownfield Rate (L/s/ha)
2	48.4
30	96.3
100	120.0

Permeable and Impermeable Areas

5.6 The Site is approximately 1.079 ha in size. The existing and proposed permeable and impermeable areas are presented in Table 5.3. The proposed development will yield an overall decrease in impermeable area of 0.02 ha.

Table 5.3: Existing and Proposed Permeable and Impermeable Areas

	Permeable Area (ha)	Impermeable Area (ha)
Existing	0.286	0.794
Proposed	0.305	0.774

5.7 As noted previously, the proposed development is split into seven separate areas within the red line boundary of the Site. Existing and proposed impermeable areas for each area are summarised in Table 5.4. Existing and proposed impermeable areas plans are enclosed in Appendix F.

Table 5.4: Impermeable Area Summary

Area	Existing Impermeable Area (ha)	Proposed Impermeable Area (ha)
1	0.086	0.109
2	0.234	0.188
3	0.081	0.081
4	0.067	0.068
5	0.015	0.015
6	0.006	0.006
7	0.000	0.003

Proposed Site Runoff

5.8 In accordance with the relevant policies of the HDPF and comments from WSCC, surface water runoff from the proposed development should be restricted to as close as possible to greenfield 1 in 1 year runoff rate.

5.9 However, as noted in the HDC Surface Water Drainage Statement Form, a minimum trickle rate of 2 L/s is recommended for any proposed pipes to minimise the risk of blockages and to promote the reliability and longevity of the network. Where new connections to the existing drainage network are proposed, flows have been restricted to 2L/s.

Sustainable Drainage Principles

5.10 The aim of SuDS is to emulate natural drainage processes such that watercourses and storage areas receive the hydrological profiles under which they evolved, and that water quality in local ecosystems is protected or improved. The best practice guide states that SuDS will:

- Reduce the impact of additional urbanisation on the frequency and size of floods;
- Protect or enhance river and groundwater quality;
- Be sympathetic to the needs of the local environment and community; and
- Encourage natural groundwater recharge.

5.11 Table 5.4 shows the hierarchy of SuDS techniques. The SuDS techniques that are proposed to manage surface water for the development will be discussed in relation to this hierarchy.

Table 5.5: SuDS Hierarchy

	SUDS Technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife
Most Sustainable	**Green Roofs, Bioretention Areas, Tree Pits**	✓	✓	✓
	Basins and Ponds 1. Constructed wetlands 2. Balancing ponds 3. Detention basins 4. Retention ponds	✓	✓	✓
	Filter Strips and Swales	✓	✓	✓
	Infiltration Devices 5. Soakaways 6. Infiltration trenches and basins	✓	✓	✓
	Permeable Surfaces and Filter Drains 7. Gravelled areas 8. Solid paving blocks 9. Porous paviors	✓	✓	
Least Sustainable	**Tanked Systems** 10. Over-sized pipes/tanks 11. Box storage systems	✓		

5.12 Due to the constraints of the existing Site, including the listed nature of the buildings and gardens, bioretention areas, basins and ponds, and swales are unable to be incorporated into the proposed surface water drainage strategy.

5.13 Infiltration is considered unlikely for the proposed development due to the anticipated geology on site. Sandstone and mudstone bedrock are unlikely to yield suitable infiltration rates for discharge of surface water from the proposed development.

5.14 Permeable resin-bound gravel surfacing is proposed to all pedestrian areas within Area 2 of the proposed development. Filter drains are also proposed to drain the proposed wedding pavilion in Area 7 of the proposed development.

5.15 In order to achieve the required reduced runoff rates from the proposed development, it is necessary to use tanked attenuation features with flow controls.

Table 5.6: Summary of proposed SuDS with reference to the SuDS Hierarchy

SUDS Technique	Practicable	Proposed	Notes
Green roofs, Bioretention areas, Tree pits	×	×	Green roofs, bioretention areas and tree pits cannot be used due to the listed nature of the gardens and buildings.
Basins and ponds	×	×	There is insufficient space available on the site.
Filter strips and swales	×	×	There is insufficient space available on the site.
Infiltration devices	×	×	Anticipated bedrock geology is likely inappropriate for infiltration.
Permeable surfaces and filter drains	✓	✓	Permeable paving proposed in Area 2.
Tanked systems	✓	✓	Tanked system to be wrapped in an impermeable membrane to drain to existing drainage network within the Site.

Proposed Surface Water Drainage System

5.16 Infiltration is considered unlikely for the proposed development due to the anticipated bedrock geology of the Site. The Site is adjacent to the man-made lakes within the wider Leonardslee estate, which ultimately discharge to the Cowfold Stream approximately 400m south of the estate boundary. Surface water runoff from the proposed development is therefore proposed to be discharge to these man-made lakes, via the existing drainage network on site and via a new outfall.

5.17 The following SuDS features have been considered within the proposed surface water drainage strategy:

- Permeable Paving
- Attenuation Tank

5.18 As the proposed development is split across several different areas, the proposed surface water drainage for each area is described separately in the following sections.

5.19 For full details of the proposed drainage strategy, please refer to plans and calculations contained within Appendix F.

5.20 The proposed surface water drainage system can effectively control all runoff generated within the Site and maintain a maximum discharge rate of 2 L/s for each separate network for storm events up to and including the 1 in 100 year return period with 45% climate change. Flood risk is not increased for the Site or for neighbouring sites .

Area 1 – New Ticket Entrance Extension

5.21 Surface water runoff from the roof of the proposed extension to the entrance building is collected via traditional rainwater pipes and conveyed to the subsurface pipe network. Here, flows are attenuated in a 9.4m^3 geocellular tank to the south of the proposed extension. Flows exit the tank via a flow control manhole, which utilises a vortex flow control to discharge at no more than

2L/s. From here, surface water flows are discharged to the existing private drainage network on site via a new manhole.

5.22 Once within the existing drainage network, flows are combined with foul water from the wider estate and conveyed to the settlement tank and reed beds to the south of the site. Here, flows are treated prior to outfall to the man-made lakes within the Leonardslee estate.

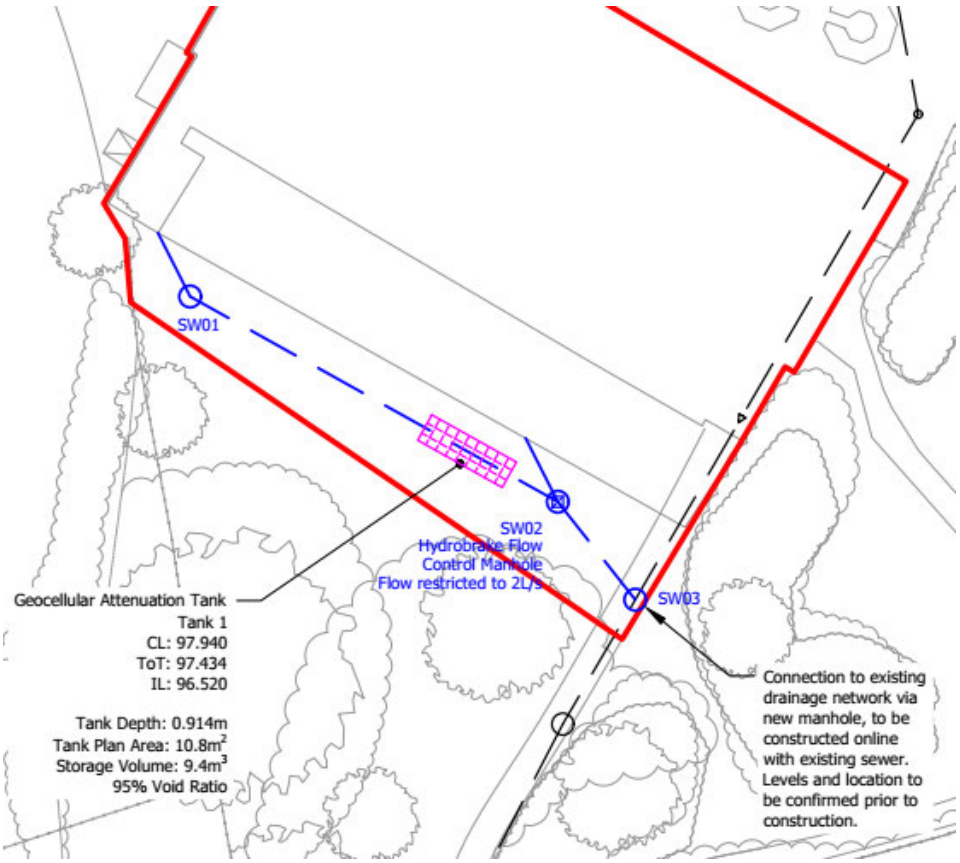


Figure 5.1: Area 1 Proposed Surface Water Drainage Strategy

Area 2 – Leonardslee House Forecourt

5.23 Drainage of Area 2 is divided into two separate networks; one draining the proposed car park and western footpath, and one draining the eastern footpath area.

5.24 Surface water runoff from the western footpath is collected using permeable resin-bound gravel surfacing, with flows attenuated within the 300mm deep paving subbase using an orifice flow control. The subbase storage provides 12.3m^3 of attenuation volume. Runoff from the proposed car park is collected via a series of channel drains and gullies. Flows from both areas are combined in an 81.3m^3 geocellular attenuation tank beneath the car park area. Flows exit the tank via a vortex flow control manhole at no more than 2L/s and are discharged to the existing private drainage network in the north east corner of the car park.

5.25 Surface water runoff from the eastern area of footpath is collected using permeable resin-bound gravel surfacing and attenuated within the 300mm deep paving subbase. The subbase provides 50.0m3 of attenuation storage. In addition to runoff from the paving area, this network also receives flows from the Stable Block extension in Area 3 via a diffuser box within the paving subbase. Flows exiting the paving subbase are restricted to 2L/s by a vortex flow control manhole, and discharge to the existing private drainage network via an existing manhole.

5.26 Once within the existing drainage network, flows are combined with foul water from the wider estate and conveyed to the settlement tank and reed beds to the south of the site. Here, flows are treated prior to outfall to the man-made lakes within the Leonardslee estate.

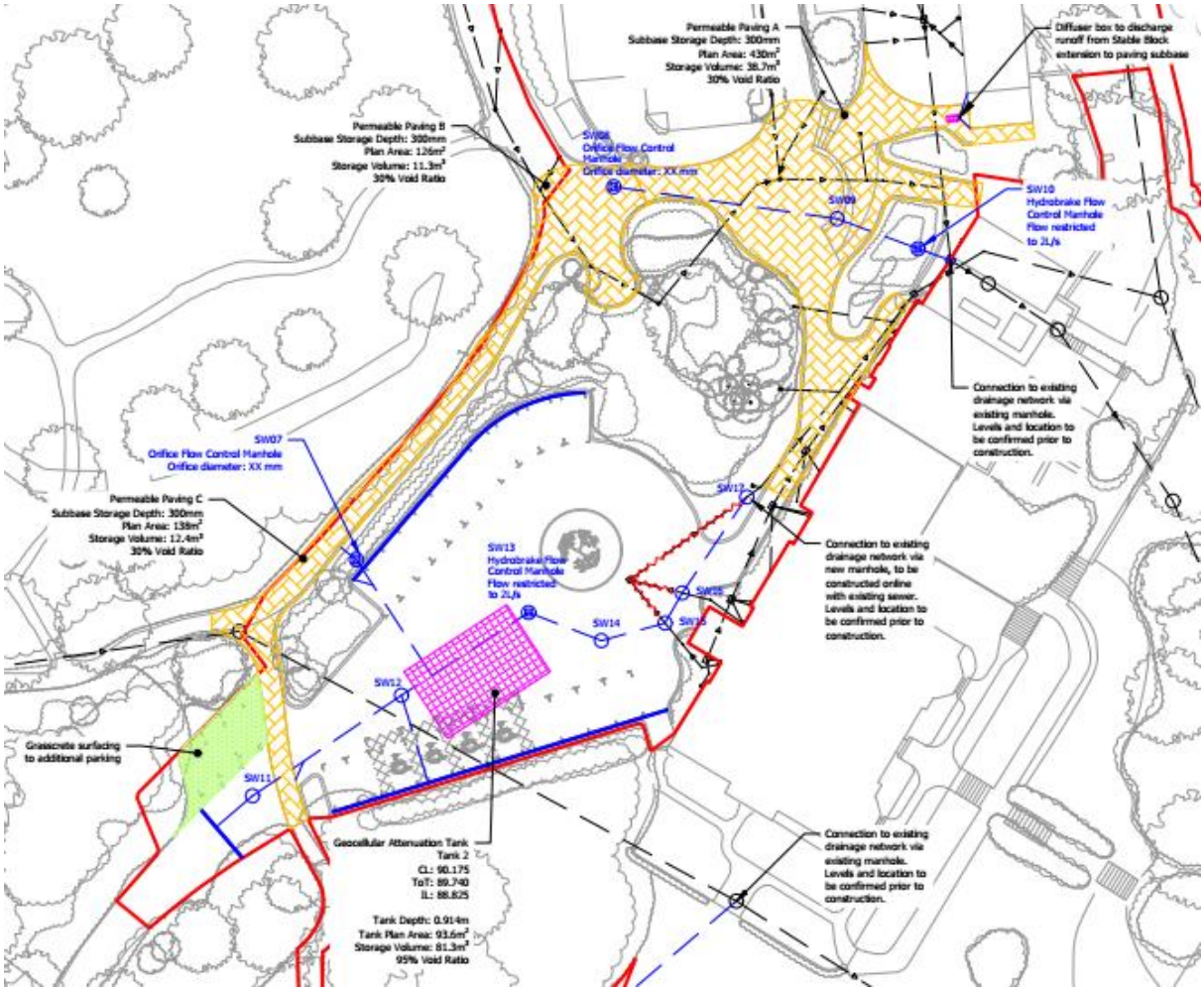


Figure 5.2: Area 2 Proposed Surface Water Drainage Strategy

Area 3 – Stable Block

5.27 As noted above, surface water runoff from the extension to the eastern wing of the stable block is discharged to the footpath subbase via a diffuser box, and will ultimately outfall to the existing drainage network on site.

5.28 No other areas of work within Area 3 increase the impermeable area of the site.

5.29 The winter garden extension takes up area within the existing courtyard and therefore does not increase the impermeable area of the site. As such, surface water runoff from the extension is proposed to discharge to the existing drainage as per the current scenario.

5.30 The new terrace to the east of the Stable Block is proposed to be constructed of wooden/composite decking. This will allow any surface water to fall through gaps in the decking and onto the soft landscaping beneath, as per the current situation. As such, no formal drainage is proposed for this area.

Area 4 – Former Generator Block

5.31 The proposed development of Area 4 does not increase the building footprint of the Former Generator Block, with the exception of a small link extension on the western elevation. This extension contributes just 6.5m^2 of impermeable area and results in approximately 0.7L/s of surface water runoff during the most severe 1 in 100 year storm event with a 45% allowance for climate change.

5.32 As the runoff from the proposed increase in impermeable area is less than the minimum trickle rate of 2L/s, no additional drainage is proposed for this area. Instead, the proposed extension will be connected to the existing drainage at above ground level.

Area 5 – Red House

5.33 The proposed development of Area 5 is entirely internal, and does not result in any increase in impermeable area here. As such, no changes to the existing surface water drainage of Area 5 are proposed.

Area 6 – Engine House

5.34 The existing Engine House currently has no formal below ground drainage. It is therefore proposed to provide a drainage network serving the existing Engine House, as well as the proposed extension.

5.35 Surface water runoff from the area will be collected by rainwater pipes and channel drain, and conveyed to the subsurface pipe network. Flows are restricted to 2L/s using a vortex flow control manhole, and attenuated within the pipe network. The runoff is then discharged to the nearby man-made lake to the east of the site at the restricted rate via a new outfall headwall.

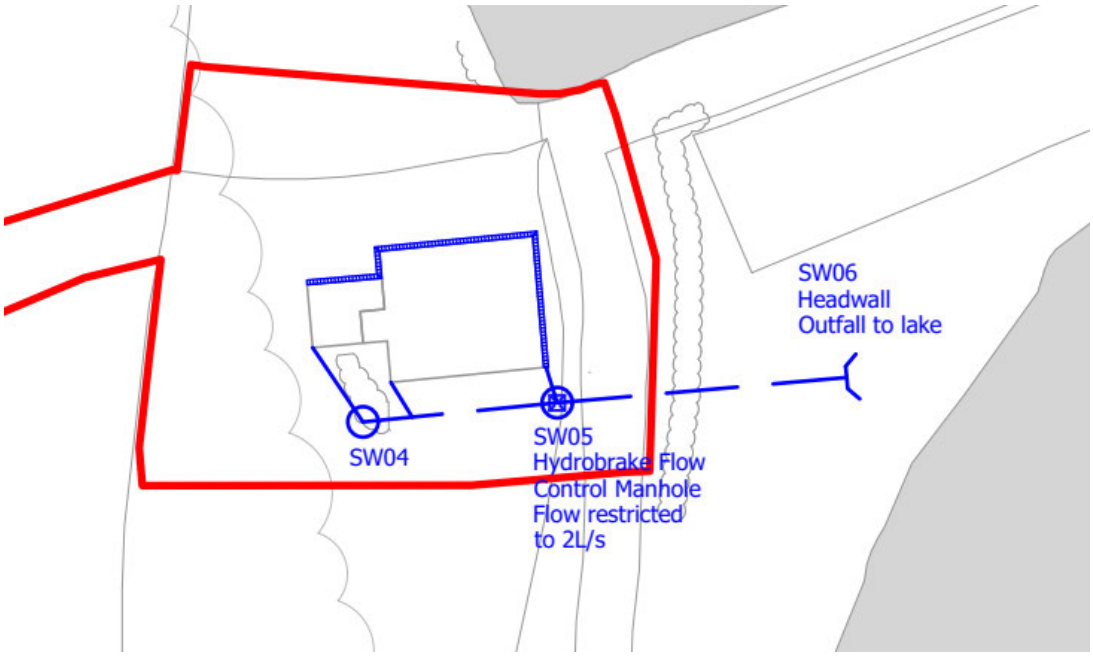


Figure 5.3: Area 6 Proposed Surface Water Drainage Strategy

Area 7 – Lightweight Wedding Pavilion

5.36 Surface water runoff from the proposed Wedding Pavilion in Area 7 is collected by a filter drain encircling the pavilion. From here, flows are conveyed to a vortex flow control manhole, which restricts discharge to 2 L/s, with attenuation provided within the pipe network. Runoff is then discharged to the existing private drainage network on site.

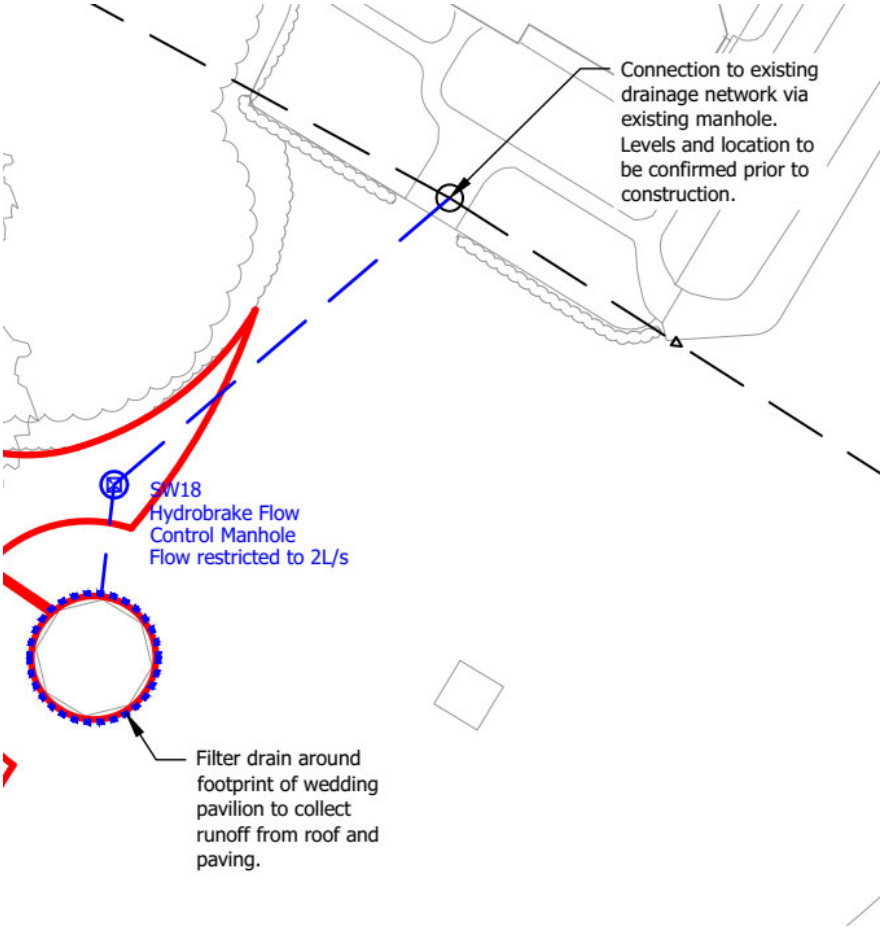


Figure 5.4: Area 6 Proposed Surface Water Drainage Strategy

Drainage Exceedance

5.37 The SuDS strategy outlined above is designed to contain the 100 year return period rainfall including a 45% allowance for climate change. It is highly unlikely that this system would fail and cause flooding elsewhere. Furthermore, where multiple SuDS features are employed, such as rain gardens and permeable paving, the impact of failure of any one element is substantially reduced.

5.38 There is a very low chance of system exceedance in more severe events or successive extreme events, which is outside the scope of the design. In this case, water would follow the existing surface water flooding routes. Due to the storage provided on the site, the total overland volumes in these scenarios would be reduced relative to existing. Consequently, the severity of flooding in these events would be reduced by the proposed development.

5.39 Exceedance flow routes have been mapped approximately on drawing 25087-SWD-DP-04, enclosed in Appendix F.

Effect on Flood Risk Elsewhere

5.40 Due to the implementation of a suitable SuDS strategy and an overall reduction in impermeable area, the overall site discharge of surface water will reduce as a result of the proposed development.

5.41 There will be no increased pressure on the public surface water sewer network as a result of the proposed SuDS strategy as there is no proposed connection to the public network.

5.42 The overall effect of the proposed SuDS strategy on flood risk at the Site and in the local area will be to reduce the risk of flooding.

SuDS Management and Maintenance

5.43 Management and maintenance of the drainage network will be the responsibility of the freeholder and / or management company for the site. Management and maintenance agreements and plans will be arranged prior to completion of development.

5.44 The SuDS Manual provides details for maintaining SuDS. Guidance on maintenance requirements for attenuation tanks and permeable paving are presented in Tables 5.7 and 5.8.

5.45 The CIRIA guidelines are generic and provide advice only. Management and maintenance of the drainage should be carried out in accordance with the guidance and specification provided by the supplier of each SuDS component.

Table 5.7: Operation and maintenance requirements for attenuation storage tanks

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

Table 5.8: Operation and maintenance requirements for pervious pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds	As required
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked of broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost joining material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

6 FOUL WATER MANAGEMENT

Existing Foul Water Drainage

6.1 As noted in Section 2, the Site is served by a private combined drainage network, taking both foul and surface water flows from the buildings and areas of hardstanding within the wider Leonardslee estate. This combined network discharges to a settlement tank and reed bed treatment system to the south of the Site. Once treated, effluent is discharged overland to the man-made lakes to the east of the site. An environmental permit is in place for this discharge.

6.2 The drainage treatment system was designed by Moody Sewage Ltd and the design report can be found in Appendix G.

6.3 The design of the existing drainage network was based on a total foul water flow rate of 62.8m^3 per day.

Proposed Foul Water Drainage

6.4 The proposed foul water drainage strategy is split into two areas, due to prevailing levels of the site; the Main Site (comprising Areas 1 to 5 and Area 7) and the Engine House. The proposed strategy for each area is summarised below:

Main Site

6.5 Foul water flows from the main area of the proposed development are proposed to connect to the existing foul water drainage network where possible.

6.6 The proposed development includes the addition of a number of WCs and the change of use of some buildings. This will likely lead to a change in foul water flows received by the existing treatment system. A summary of the anticipated changes to the foul water flows is provided in Table 6.1, with flow rates based on British Water – Flows and Loads 4.

Table 6.1: Anticipated change to foul water daily rates for the Main Site

Visitor Type	Flow (L/person/day)	Daily Change from Existing	Change in Daily Flow (m^3)
General (assumed one use of WC per visit)	10	+75	+0.75
Cafe	12	+10	+0.12
Staff	50	-15	-0.75
Residential Guests	250	+4	+1.00
Total			+1.12

6.7 Table 6.1 shows that the proposed development of the Main Site is expected to increase the average daily foul water flow by approximately 1.12 m^3. It is anticipated that this increase in foul flows can be accommodated by the existing treatment system. However, this will be confirmed at the detailed design stage, and any required changes to the treatment system will be specified then.

Engine House

6.8 The Engine House has no existing foul water drainage. It is therefore proposed to provide a package treatment plant to treat foul water flows from the proposed WC extension and flows from the café facilities within the existing Engine House.

6.9 The package treatment plant has been reviewed and designed by Dirk Daude Wastewater Consultancy Services. The design report can be found in Appendix G.

6.10 Treated effluent from the package treatment plant is proposed to be discharged to the man-made lakes immediately east of the Engine House. This can be achieved by connection to the proposed surface water drainage network downstream of the flow control. This outfall complies with the current EA General Binding Rules for Small Sewage Discharges, as discussed in the Dirk Daude report (ref: PC1121) enclosed in Appendix G.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Water Environment has produced this Flood Risk Assessment and Drainage Strategy to support the detailed planning application for the proposed development at Leonardslee Lakes & Gardens, Horsham, West Sussex.

7.2 The proposed development comprises a number of separate areas of development across the Leonardslee Lakes & Gardens estate, including:

- Extension to the visitor entrance building to house a new ticket sales area and café;
- Landscaping changes to the forecourt of Leonardslee House.
- Single storey winter garden conservatory to the Stable Block with terrace extension to the east and internal/ external reconfigurations and change of use from redundant staff offices and staff accommodation within the stable block to guest accommodation including extension to Honey Cottage;
- Infilling roof to the former generator block courtyard, re-roofing of the Alpine House and in-ternal/external reconfigurations and link extension;
- Change of use to the partial first floor of the Red House to staff accommodation;
- Small WC extension, reinstated chimney stack, and roof alterations to the Engine House; and,
- Lightweight wedding pavilion to the lawn, south of Leonardslee House.

7.3 The existing site is currently occupied by a number of historic buildings, visitor amenities and historic gardens, and sits within the wider Leonardslee Lakes & Gardens estate. Within the estate, all gardens are Grade I listed and buildings are a mixture of Grade II listed, curtilage listed, and unlisted 20th Century buildings. The Site is therefore considered brownfield land.

7.4 The proposed development is entirely within Flood Zone 1. The Site is therefore considered to pass the sequential test and the exception test.

7.5 The Environment Agency Risk of Surface Water Flood maps show the existing Site to be entirely very low risk of surface water flooding.

7.6 The British Geological Survey Online Viewer notes the Site to be underlain by a bedrock of Upper Tunbridge Wells Sand – Sandstone and Mudstone. Ground investigations will be required to confirm the geology of the Site.

7.7 The Strategic Flood Risk Assessment identifies the Site to be located in an area with negligible risk of groundwater flooding.

7.8 The Strategic Flood Risk Assessment shows the Site to be located in an area that has previously experienced sewer flooding. However, as the Site does not contain any public sewers, it is deemed to be at low risk of sewer flooding.

7.9 Surface water runoff from the proposed development can be efficiently managed on site for all storm events up to and including the 1 in 100 year return period, with allowances for climate change. The proposed surface water discharge will be limited to 2 L/s at each point of connection to the existing drainage network within the Site.

7.10 The surface water drainage strategy for the proposed development incorporates sustainable drainage systems including permeable paving and below ground attenuation tanks. The proposed

strategy reduces site runoff and provides betterment, and will also alleviate flood risks downstream of the Site.

7.11 Based upon the available information, the guidance provided and if measures presented within this Flood Risk Assessment are followed, Water Environment considers the risks to be adequately mitigated.

7.12 This report has been prepared to address comments from the LLFA on the proposed development. A summary of the responses to these comments is provided in Table 7.1.

Table 7.1: Response to LLFA Comments

LLFA Comment	Water Environment Response
Site-specific assessment of flood risk	Please see Section 4
Surface water flow routes	Please see Sections 4 and 5
Existing and proposed permeable and impermeable areas	Please see Section 5 and Appendix F
Surface water management strategy	Please see Section 5 and Appendix F
Methods of foul and surface water disposal	Please see Sections 5 and 6, and Appendices F and G
Southern Water sewer connections	No connections to the Southern Water network are proposed
Rainwater harvesting	No rainwater harvesting is proposed
Proposed flows and volumes	Please see Section 5 and Appendix F
Infiltration	No infiltration is proposed due to the anticipated geology of the Site. Please refer to Section 2.
Pollution prevention	Please see Section 5
Exceedance flow routes	Please see Section 5
Foul water flow calculations	Please see Section 6 and Appendix G
Maintenance and Management Plans	Please see Section 5

APPENDIX A: EXISTING SITE INFORMATION

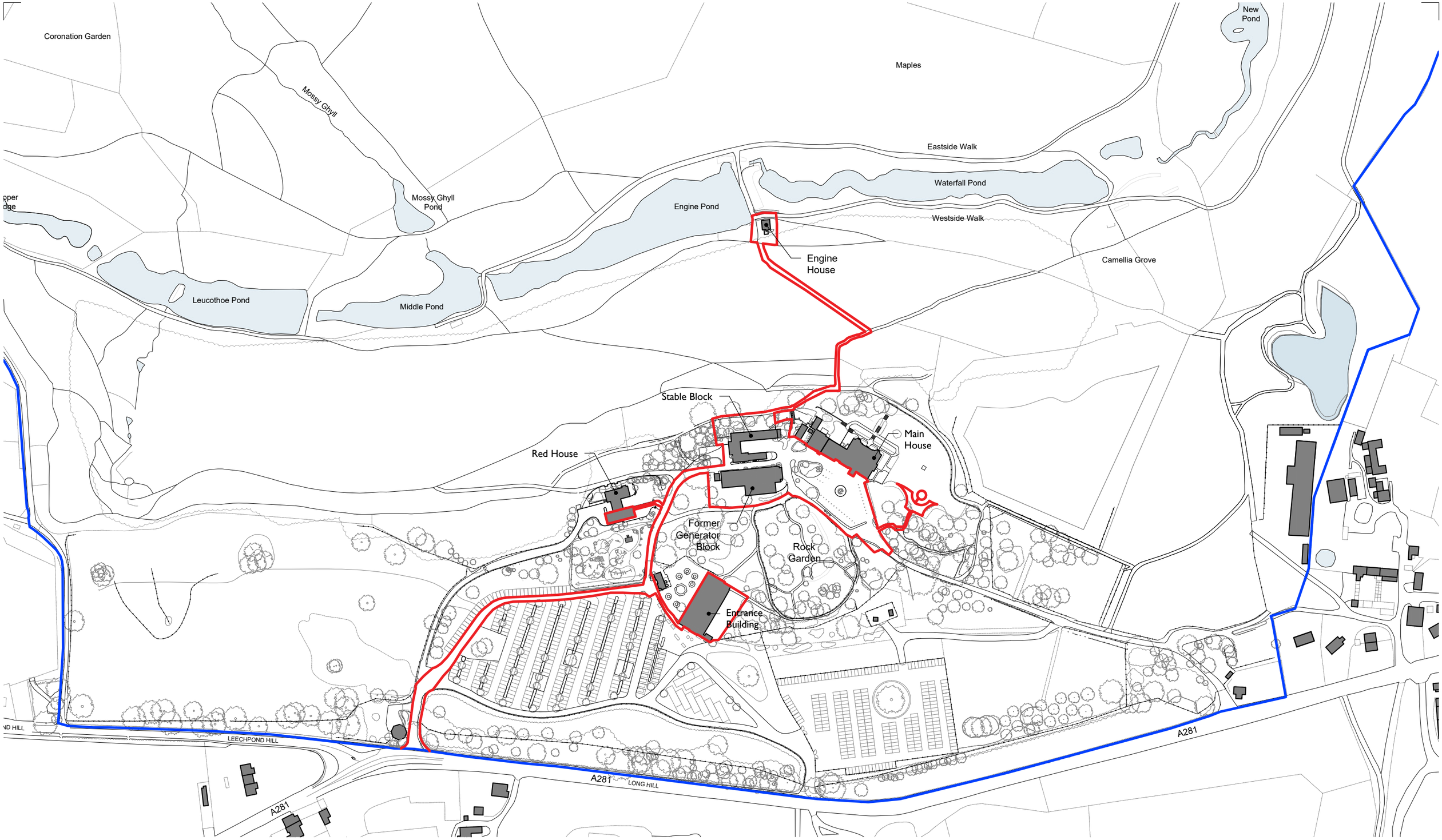
A.1 Existing Site Plan (242769-PUR-00-XX-DR-A-1001 P05) – Purcell UK

A.2 Topographic Survey (32290) – MK Surveys, March 2023

A.3 Underground Utilities Survey (24451) – MK Surveys, October 2017

A.4 Greenfield Runoff Rate Calculation

A.5 Brownfield Runoff Rate Calculation



1
1001

Existing Site Plan
Scale - 1:2500 @ A3

0 25 m 50 m 100 m 200 m

N

Notes:

Drawings are based on survey data however any discrepancies. should be notified to Purcell in writing.

Due to the scales used any measurements from this drawing should include an appropriate level of tolerance.
Where appropriate site dimensions should be taken to verify accuracy of measurement.

All dimensions are in millimetres unless noted otherwise.

Purcell shall be notified in writing of any discrepancies.

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KEY

- Ownership Boundary
- Application Site Boundary

REV	DATE	BY	CHK	DESCRIPTION
P05	12.12.25	JS	JC	Planning Issue

CLIENT
Leonardslee Gardens
PROJECT
Leonardslee Lakes and Gardens

JOB NUMBER
242769
TITLE
Existing Site Location Plan

SIZE SCALE
A3L 1:2500@A3
REV SUITABILITY/REASON FOR ISSUE
P05 Planning Issue
DRAWING NUMBER
242769-PUR-00-XX-DR-A-1001

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2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.

Coordinate Table

Station	Description	Easting	Northing	Level
J1	HILTI NAIL	522010.019	126191.067	100.097
J2	HILTI NAIL	522001.624	126107.619	99.607
J3	HILTI NAIL	521979.803	126005.252	96.597
J4	HILTI NAIL	521996.597	125885.085	93.901
J5	ROAD NAIL	522066.021	125786.606	87.213
J6	ROAD NAIL	522116.987	125750.844	87.484
J7	ROAD NAIL	522139.477	125801.201	89.085
J8	ROAD NAIL	522112.172	125811.636	89.140
J9	ROAD NAIL	522076.283	125813.986	88.811
J10	ROAD NAIL	522095.570	125856.895	90.211
J11	ROAD NAIL	522120.118	125902.081	91.136
J12	ROAD NAIL	522146.184	125940.313	90.921
J13	ROAD NAIL	522133.418	125972.329	92.350
J14	ROAD NAIL	522134.849	126008.546	93.118
J15	ROAD NAIL	522123.278	126047.739	94.488
J16	ROAD NAIL	522096.427	126155.837	96.168
J30	ROAD NAIL	522103.735	125968.701	94.768
J31	ROAD NAIL	522059.071	125954.333	97.119
J32	ROAD NAIL	522054.831	125939.824	96.365
J50	ROAD NAIL	522039.119	125677.238	82.047

TOPOGRAPHICAL KEY

GENERAL ABBREVIATIONS

SURVEY STATION	5	AIR CONDITIONING UNIT	ACU
		AIR VALVE	AV
BANKING	TOP / BOTTOM	BACK DROP	BD
		BASE LEVEL	BL
		BELISHA BEACON	BB
HEDGE SPREADS		BOLLARD	BO
		BUILDING LIGHT	BUILL
WOODLAND CANOPY		BRICK	BK
		BUS STOP	BS
ARROW ON STEPS / RAMPS INDICATES DIRECTION UP/HARDS		CABLE RISER	CR
		CABLE TV COVER	CATV
		CATCH PIT GROUND	CPG
		CATCH PIT	CP
TREES	SPREAD & GIRTH SHOWN TO SCALE	CONTROL BOX	CB
		COVER LEVEL	CL
		CROSSING CONTROL BUTTON	CCB
		DAMP PROOF COURSE	DPC
		DRAINAGE CHANNEL	DCH
		DRAIN	DR
		ELECTRICITY POLE	EP
		EARTH ROD	ER
GATE		FIRE HYDRANT	FH
		FLOOR LEVEL	FL
KERB CHANNEL		FOUL SEWER	FS
		FOUL WATER	FW
ROAD LINKERBED		GAS RISER	GR
		GAS VALVE	GV
FOOTPATH		GULLY	GY
		HARD BED	HB
CHANGE IN SURFACE		INSPECTION COVER	IC
		KERB	K
		KERB OUTLET	KO
FENCE		LAMP POST	LP
		MANHOLE	MH
WALL		MARKER POST	MK
		METER	MT
OVERHEAD ELECTRIC		NO PIPES VISIBLE	NPV
		ORDNANCE SURVEY BENCH MARK	OSBM
OVERHEAD TELECOM		P-TRAP	PT
		POST	PO
FOUL SEWER		POST BOX	P BOX
		RODDING EYE	RE
SURFACE SEWER		ROAD SIGN	RS
		RAIN WATER PIPE	RWP
P-TRAP		RAILWAY RAIL	RW
		SOFT BED	SB
BACK DROP (EXTERNAL)		STOP COCK	SC
		STREET NAME PLATE	SNP
BACK DROP (INTERNAL)		STOP VALVE	SV
		SIGN	SIGN
BUILDING		SOIL VENT PIPE	SVP
		SURFACE WATER	SW
OPEN SIDED BUILDING		TACTILE PAVING	TAC
		TELECOM POLE	TP
OVERHANG / CANOPY		TELECOM INSPECTION COVER	TEL
		TELEPHONE CALL BOX	TCB
GLASSHOUSE		TOP OF BANK	TOB
		TOP OF WALL	TOW
CONTOUR	25.00	TRAFFIC LIGHT	TL
		TRAFFIC LIGHT COVER	TLC
SPOT LEVEL	+ 127.13	THRESHOLD LEVEL	THL
SONAR LEVEL	127.13	UTILITY TO LOCATE	UTL
BORE HOLE	BH	UNABLE TO RAISE	UTR
TRIAL HOLE	TH	UNABLE TO SURVEY	UTS
		VENT PIPE	VP
		WATER LEVEL	WL
		WATER METER	WM
		WASH OUT	WO
		WATER TANK	WT
		WATER TAP	WT

FENCE ABBREVIATIONS

BARBED WIRE FENCE	B/W	IRON RAILINGS	IR
CLOSE BOARDED FENCE	CBF	HORIZ LAP FENCE	LL
CONCRETE PANEL FENCE	CPL	POST AND RAIL FENCE	P/R
CORRUGATED IRON FENCE	CIS	POST AND WIRE FENCE	P/W
CHAIN LINK FENCE	CL	WIRE MESH FENCE	W/M
CHESTNUT PALING	CNP		

Sheet Layout: (Not to Scale)

Revision	Description	Surv by	Check by	Appr by	Date

0m 5 10 15 20 25 30 35 40 45 50 55

Topographical Survey

Client:

Leonardslee Gardens

Leonardslee Gardens
Lower Beeding
West Sussex

Scale:	Sheet Size:	Sheet Number:	Date:
1:500	A0	1	March 2023

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
32290	-	JM	AS	CP

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		DRAIN	D
		ELECTRICITY POLE	EP
		EARTH ROD	ER
GATE		FIRE HYDRANT	FH
		FLOOR LEVEL	FL
KERB CHANNEL		FOUL MANHOLE	FM
		FOUL WATER	FW
ROAD UNKERBED		GAS RISER	GR
		GAS VALVE	GV
FOOTPATH		GULLY	GY
		HARD BED	HB
CHANGE IN SURFACE		INSPECTION COVER	IC
		KERB LOWERED	K
FENCE		KERB OUTLET	KO
		LAMP POST	LP
WALL		MANHOLE	MH
		MARKER POST	MK
OVERHEAD ELECTRIC		METER	MT
		NO PIPES VISIBLE	NPV
OVERHEAD TELECOM		ORDNANCE SURVEY BENCH MARK	OSBM
		P-TRAP	PT
FOUL SEWER		POST	PO
		POST BOX	P BOX
SURFACE SEWER		RODDING EYE	RE
		ROAD SIGN	RSI
P-TRAP		RAIN WATER PIPE	RWP
		RETAINING WALL	RW
BACK DROP (EXTERNAL)		SOFT BED	SB
		STOP COCK	SC
BACK DROP (INTERNAL)		STREET NAME PLATE	SNP
		STOP VALVE	SV
BUILDING		SIGN	SIG
		SOIL VENT PIPE	SVP
OPEN SIDED BUILDING		SURFACE WATER	SW
		TACTILE PAVING	TAC
OVERHANG / CANOPY		TELECOM POLE	TP
		TELECOM INSPECTION COVER	TEL
GLASSHOUSE		TELEPHONE CALL BOX	TCB
		TELEPHONE	T
		TOP OF WALL	TOW
		TRAFFIC LIGHT	TL
CONTOUR	25.00	TRAFFIC LIGHT COVER	TLC
		THRESHOLD LEVEL	THL
SPOT LEVEL	+ 127.13	UNABLE TO LOCATE	UTL
SONAR LEVEL	+ 127.13	UNABLE TO RAISE	UTR
BORE HOLE	BH	UNABLE TO SURVEY	UTS
TRIAL HOLE	TH	VENT PIPE	VP
		WATER LEVEL	WL
		WATER METER	WM
		WASH OUT	WO
		WATER TROUGH	WT
		WATER TAP	WT

FENCE ABBREVIATIONS

BARBED WIRE FENCE	B/W	IRON RAILINGS	IR
CLOSE BOARDED FENCE	CBF	POST AND CHAIN LINK FENCE	LIL
CONCRETE PANEL FENCE	CPL	POST AND RAIL FENCE	PR
CORRUGATED IRON FENCE	CIS	POST AND WIRE FENCE	PW
CHAIN LINK FENCE	CL	WIRE MESH FENCE	WM
CHESTNUT PALING	CNP		

Sheet Layout: (Not to Scale)

1

2

Revision	Description	Rvn. by	Check by	Appr. by	Date

0m 5 10 15 20 25 30 35 40 45 50 55

Topographical Survey

Client:

Leonardslee Gardens

Leonardslee Gardens
Lower Beeding
West Sussex

Scale:	Sheet Size:	Sheet Number:	Date:
1:500	A0	2	March 2023

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
32290	-	JM	AS	CP

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Head Office: Milton Keynes t: 01908 565561 e: mail@mksurveys.co.uk

KEY

TOPOGRAPHICAL KEY

SURVEY STATION 5
BANKING (TOP / BOTTOM)
HEDGE SPREADS
WOODLAND CANOPY
ARROW ON STEPS / RAMPS INDICATES DIRECTION UPWARDS
TREES — SPREAD & GIRTH SHOWN TO SCALE
GATE
KERB CHANNEL
ROAD UNKERBED
FENCE
WALL
BUILDING
OPEN SIDED BUILDING
OVERHANG / CANOPY
GLASSHOUSE
CONTOUR 25.50
SPOT LEVEL + 127.13 SONAR LEVEL 127.13
BORE HOLE BH
TRIAL HOLE TH
FOOTPATH
CHANGE IN SURFACE

GENERAL

Av.	AVERAGE
(ACP)	ASSUMED CONNECTION POINT
COW	CABLE ON WALL
CW	COMBINED WATER
DIS	DISUSED
DK	DROP KERB
EML	ELECTROMAGNETIC LOCATOR
EOT	END OF TRACE
FO	FIBRE OPTIC
FP	FOOTPATH
FW	FOUL WATER
GP	GATE POST
GPR	GROUND PENETRATING RADAR
HB	HARD BED
H/P	HIGH PRESSURE
HV	HIGH VOLTAGE
KV	KILO VOLT
I/P	INTERMEDIATE PRESSURE
L/P	LOW PRESSURE
LV	LOW VOLTAGE
M/P	MEDIUM PRESSURE
NDI	NO DEPTH INFORMATION
NFI	NO FURTHER INFORMATION
NDV	NO DUCTS VISIBLE
NPV	NO PIPES VISIBLE
OSBM	ORDNANCE SURVEY BENCHMARK
POW	PIPE ON WALL
P.BOX	POST BOX
RED	REDUNDANT SERVICE
RW	RETAINING WALL
SB	SOFT BED
SNP	STREET NAME PLATE
SW	SURFACE WATER
TAC	TACTILE PAVING
TOW	TOP OF WALL
TW	TRADE EFFLUENT WATER
UTL	UNABLE TO LOCATE
UTR	UNABLE TO RAISE
UTS	UNABLE TO SURVEY

APPARATUS

ACU	AIR CONDITIONING UNIT
AV	AIR VALVE
BB	BELISHA BEACON
BO	BOLLARD
BOL	BOLLARD LIGHT
BS	BUS STOP
CATV	CABLE TELEVISION
CB	CONTROL BOX
CCB	CROSSING CONTROL BUTTON
CP	CATCH PIT
CR	CABLE RISER
DCH	DRAINAGE CHANNEL
EB	ELECTRIC CONTROL BOX
EP	ELECTRIC POLE
ER	EARTH ROD
FD	FILTER DRAIN
FFP	FUEL TANK FILL POINT
FH	FIRE HYDRANT
GR	GAS RISER
GV	GAS VALVE
GY	GULLY
IC	INSPECTION COVER
INT	INTERCEPTOR
IT	INLET
KO	KERB OUTLET
LD	LOOP DETECTOR
LH	LAMP HOLE
LP	LAMP POST
MH	MANHOLE
MK	MARKER POST / PLATE
MT	METER
MW	MONITORING WELL
OL	OUTLET
OU	OUTFALL
PO	POST
PTG	PIPE TO GROUND
PTS	PIPE TO SURFACE
PU	PUMP
RE	RODDING EYE
RS	ROAD SIGN
RM	RISING MAIN
RWP	RAIN WATER PIPE
SC	STOP COCK
SP	SOIL PIPE
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SV	STOP / SLUICE VALVE
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TCB	TELEPHONE CALL BOX
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TL	TRAFFIC LIGHT
TLC	TRAFFIC LIGHT COVER
TM	TICKET MACHINE
TP	TELECOM POLE
VP	VENT PIPE
WM	WATER METER
WO	WASH OUT
WR	WATER RISER
WT	WATER TAP
WW	WET WELL

DEPTHS

d	ELECTRONICALLY DERIVED
Pd	PASSIVELY DERIVED
Bd	BASE DEPTH
Cd	DEPTH TO CROWN
Id	DEPTH TO INVERT
Sd	DEPTH TO SOFFIT

PIPE MATERIALS

AC	ASBESTOS CEMENT
ALK	ALKATHENE
BK	BRICK
CI	CAST IRON
CO	CONCRETE
DI	DUCTILE IRON
HDPE	HIGH DENSITY PE
MDPE	MEDIUM DENSITY PE
PE	POLYETHYLENE
PF	PITCH FIBRE
PP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
PVC-U	ULTRA RIB (PVC)
SI	SPUN IRON
ST	STEEL
VC	VITRIFIED CLAY

FENCES

B/W	BARBED WIRE FENCE
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L/L	LARCH LAP FENCE
P/R	POST AND RAIL FENCE
P/W	POST AND WIRE FENCE
W/M	WIRE MESH FENCE

LEVELS

BD	BACKDROP LEVEL
BL	BASE LEVEL
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CWL	CROWN LEVEL
DPC	DAMP PROOF COURSE
FL	FLOOR LEVEL
IL	INVERT LEVEL
PT	P TRAP LEVEL
RL	ROOF LEVEL
SOF	SOFFIT LEVEL
THL	THRESHOLD LEVEL
WL	WATER LEVEL

LINESTYLE

INTERNAL METER (MT)
POT ENDED SERVICE
SEWER CAPPED RUN
SURVEY ABANDONED
INTERNAL VALVE
UNKNOWN UNDERGROUND ANOMALY
UNDERGROUND CHAMBERS
POST PROCESSING AREA (FROZEN LAYER)
ABOVE GROUND (AG)
ASSUMED ROUTE (AR)
EMPTY DUCTS (E)
OVERHEAD (OH)
BACK DROP
P TRAP
UTILITY CROSSOVER
SURVEY BOUNDARY
VERBAL INFORMATION (VI)
RECORD INFORMATION (R)
REDUNDANT SERVICE
RISING MAIN

CCTV SECTION 4 AND 5 FAULTS ARE SHOWN IN RED

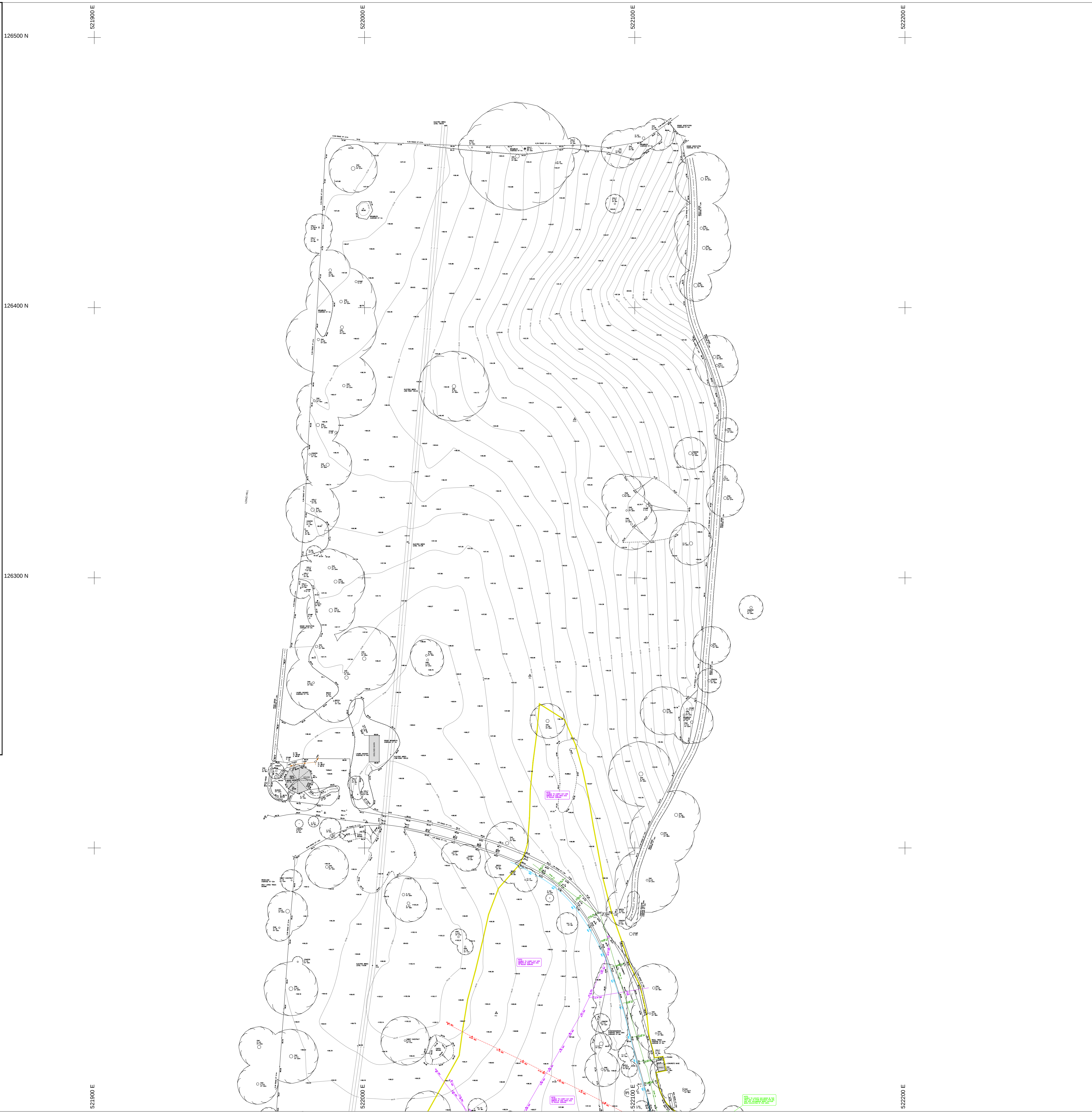
SERVICE TYPE

CATV / DATA
ELECTRICITY (HV)
ELECTRICITY (LV)
FUEL
GAS
HEATING
OVERHEAD ELECTRIC
OVERHEAD TELECOM
TRADE EFFLUENT
COMBINED SEWER
FOUL SEWER
SURFACE SEWER
UNIDENTIFIED SEWER
TELECOM
UNKNOWN SERVICE
WATER

CAUTIONARY NOTES

1. EML techniques have been used in the detection of underground utilities as outlined in Table 2 of PAS 128:2014, the results are not infallible and trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
2. GPR techniques has been used in the detection of non-metallic utilities as outlined in Table 2 of PAS 128:2014. The interpretation of these results is not infallible and success will depend on a number of factors including soil type, ground water levels and surface conditions, hence trial excavations must be carried out in order to confirm identification, position and in particular depth of the utility.
3. Depths derived via EML are taken to the centre of the conductor (cable, metallic pipe) and those derived via GPR are usually to the crown of the utility unless otherwise indicated.
4. Where cables cannot be detected individually an average depth has been obtained and trial excavations are recommended to confirm number and depths of cables banded together.
5. 'Pot-ended' cables are often difficult to detect and although we have made all reasonable efforts to locate or transpose this information from records, we cannot guarantee that all 'pot-ended' cables have been located.
6. Fibre optic cables are often difficult to detect, and commonly access chambers can be locked and thereby made inaccessible by the utility provider. All reasonable efforts have been made to locate these ducts using GPR. Cables not located have been transposed from records.
7. Within close proximity of electric substations and similar structures results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
8. Underneath overhead power lines results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
9. Drainage information has been obtained without man entry into the chamber.
10. Wherever possible we have attempted to locate the route of the sewer. Issues such as blockages, surcharging, flooding, sedimentation, sewer collapse, root ingress, excessive depth, obstructions or heavy traffic flow may have affected our ability to obtain meaningful results. In these cases recommendations have been made for further survey or maintenance work.
11. Pipe / duct sizes have been recorded from surface inspection or taken from record information. Pipe sizes have been recorded in millimetres and depths in metres, except in instances where sizes are indicated in imperial units on the record information.
12. Water and Gas utilities to individual properties are often of a size that cannot be detected using EML or GPR investigation, whenever possible the route has been added from surface evidence (pipe risers, valves, etc), but this should be viewed as a guide only.
13. All utilities detected by MK Surveys should be considered live unless confirmed otherwise by client or service provider.
14. MK Surveys cannot confirm when utilities are redundant unless there is visual or record evidence to indicate this. In addition MK Surveys cannot guarantee being able to detect all redundant utilities.
15. Wherever available the results of our investigations have been cross referenced with record information. If a utility shown on the records cannot be detected on site, the information has been added to the drawing and indicated as QB4 (R). However it should be noted that the completeness and accuracy of the records cannot be guaranteed.
16. The utility information has been obtained from non-intrusive survey techniques; it always remains possible that there are additional utilities within the survey boundary that we have not been able to detect. We recommend that care is taken on site and that all utility records are used in conjunction with this survey.
17. The responsibility for avoiding damage to assets and utilities on site shall be that of the persons proposing to excavate within the surveyed area, who shall be liable to the asset owner and any third party who may be affected in any way for any loss or damage.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.



Notes :

1. GRID AND LEVELS BASED ON ORDNANCE DATUM, DERIVED FROM THE NATIONAL GNSS NETWORK. LOCAL SCALE FACTOR (0.99978) APPLIED.
2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.
3. THIS SURVEY SHOULD ALWAYS BE READ IN CONJUNCTION WITH THE DESKTOP UTILITY REPORT, THAT WAS CARRIED OUT AS A PREREQUISITE TO THIS DETECTION SURVEY.
4. TOPOGRAPHICAL SURVEY EXTENDED FEBRUARY 2018 AND ADDED TO EXISTING TOPOGRAPHICAL AND UTILITY SURVEY CARRIED OUT IN 2017. NO UPDATE OR VERIFICATION CARRIED OUT ON PREVIOUS SURVEY AREA.

DETECTION SURVEY REPORT

GENERAL
This survey was carried out in accordance with PAS 128:2014 (Publicly Available Specification from BSI). After a pre-survey consultation with the client it was agreed to carry out the detection survey using methodology M1 as per Table 2 of the PAS 128:2014. The survey boundary has been shown on the drawing; please see linestyle section of the key for reference.

DESKTOP UTILITY REPORT
Prior to the survey commencing record information was gathered and compiled in a separate desktop utility report. This report should be read in conjunction with the information contained in this utility detection survey. Record information was at the time of the survey less than 90 days old in accordance with the requirements of the PAS 128:2014. For a full list of the providers searched, records received and the dates the information was obtained, please refer to the attachments page of the desktop utility report.

DETECTION SURVEY
DRAINAGE
All drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external rainwater pipes and external soil stacks have been proven wherever possible into manholes and sewer runs by radio sonde location and/or GPR. Where a saddle connection is present the position is assumed only until proven otherwise. In instances where other detection methods were unsuccessful connections between manholes have been assumed to be straight and labelled as QB4. All drainage should be cross checked in critical areas by CCTV survey or verification survey type A.

WATER
Water mains to the east of the toilets have been located by GPR methods wherever possible to quality level QB2. It was not possible to locate water supplies to the greenhouse, main house and outbuildings in the south east of the survey area. Recommend caution when excavating. Assumed route for incoming water supply shown in the north of the survey area (quality level QB4.)

GAS
Unable to locate route of gas mains in MH10 due to poor readings for EML and GPR. Unable to locate gas supply to toilets. Main building in south is supplied by oil tanks.

ELECTRICITY
Electricity cables were located wherever possible by EML and GPR methods to quality level QB1. The quality level is QB2 in areas where electricity cables were located by EML techniques only. Recommend trial excavations in critical areas in order to confirm position and depth,.

TELECOM
Telecom ducts have been traced using EML and GPR to quality level QB1. In areas where EML only was successful, the quality level is QB2. Due to laws protecting British Telecom apparatus all ducts have been located using remote detection techniques only and compared with record information. Chamber sizes have been recorded using GPR techniques wherever possible. For further information regarding BT apparatus please contact Openreach directly. Positions of overhead cables have been checked and added to the drawing.

CATV
No evidence for any CATV ducts within the survey area. Record information confirms this.

UNKNOWNS
Unknown underground linear anomalies are possible buried services. Recommend trial excavations in order to identify any services present and confirm position and depth.

SEE CAUTIONARY NOTES WITHIN THE UTILITY KEY

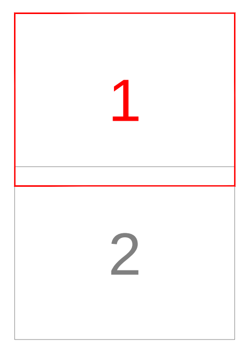
PAS 128:2014 Quality Level Guide

Quality Level	Description	Accuracy
QB4	A utility is expected to exist but cannot be detected - (AR), (R), (VI)	Undefined
QB3 QB3P	Horizontal location only using one geophysical technique. No depth information - NDI.	+/- 500mm Horizontal Undefined Vertical
QB2 QB2P	Horizontal and vertical location only using one geophysical technique.	+/- 250mm or +/- 40% of depth whichever is greater
QB1 QB1P	Horizontal and vertical location only using two geophysical techniques.	+/- 150mm or +/- 15% of depth whichever is greater
QA	Service verified in an open excavation, inside an inspection chamber / draw pit, or at the point the service enters / exits the ground.	+/- 50mm Horizontal +/- 25mm Vertical

Desktop Utility Records

Utility Type	Provider Details	Date Acquired
Drainage	Southern Water	26/09/17
Water	Southern Water	26/09/17
Gas	Southern Gas Networks	09/10/17
Electricity	UK Power Networks	09/10/17
Telecom	Openreach	08/10/17
CATV	Virgin Media (Not Affected)	13/09/17
Tunnels and Pipelines	LinesearchbeforeUdig	08/10/17

Sheet Layout: (Not to Scale)



Revision	Description	Surv. by	Appr. by	Date
1	Survey extended to North and West field boundaries, and southern fields added to survey.	RG / SW	CP / NS	01/03/18

0m 5 10 15 20 25 30 35 40 45 50 55

Coordinate Table

Station	Description	Easting	Northing	Level
S1	ROAD NAIL	522131.083	125892.987	90.588
S2	ROAD NAIL	522172.181	125924.769	89.214
S3	ROAD NAIL	522158.755	126021.469	90.799
S4	ROAD NAIL	522123.257	126045.080	94.389
S5	PEG	522061.470	126047.870	98.328
S6	PEG	522093.401	126012.990	97.757
S7	ROAD NAIL	522109.264	125967.538	94.530
S8	ROAD NAIL	522135.591	125974.320	92.340
S20	ROAD NAIL	522176.105	125951.074	89.008
S30	ROAD NAIL	522164.398	125994.420	90.080
S40	ROAD NAIL	522104.862	126110.207	95.331
S41	ROAD NAIL	522085.556	126175.337	97.077
S100	ROAD NAIL	522145.304	125940.997	90.950
R1	PEG	522061.204	126263.789	97.105
R2	PEG	522000.767	126209.565	99.242
R3	PEG	522048.770	126138.929	99.186
R4	PEG	522013.693	126067.403	98.005
R5	PEG	522008.920	125990.511	96.750
R6	PEG	522070.682	125984.201	97.959
R10	PEG	522077.787	126358.752	93.583
SW1	PEG	522044.438	125907.745	95.129
SW2	PEG	522030.839	125757.187	85.804
SW3	PEG	522014.927	125682.585	81.809
SW4	ROAD NAIL	522039.368	125669.096	81.785

mksurveys

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Tel 01384 404203 West Midlands westmidlands@mksurveys.co.uk
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Paul Thompkins

Leonardslee Gardens
Lower Beeding
West Sussex

Topographical & Utility Survey

Scale	Sheet Size:	Sheet Number:	Date:
1:500	A0	1	October 2017

Project Number:	Rev:	Surveyed By:	Approved By:
24451	1	SW / AC	AJ / CP / GL

KEY

TOPOGRAPHICAL KEY

SURVEY STATION	5	FENCE	
BANKING	TOP / BOTTOM	WALL	
HEDGE SPREADS		BUILDING	
WOODLAND CANOPY		OPEN SIDED BUILDING	
ARROW ON STEPS / RAMPS INDICATES DIRECTION UPWARDS		OVERHANG / CANOPY	
TREES	SPREAD & GIRTH SHOWN TO SCALE	GLASSHOUSE	
GATE		CONTOUR	25.50
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		TRIAL HOLE	TH
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		CHANGE IN SURFACE	

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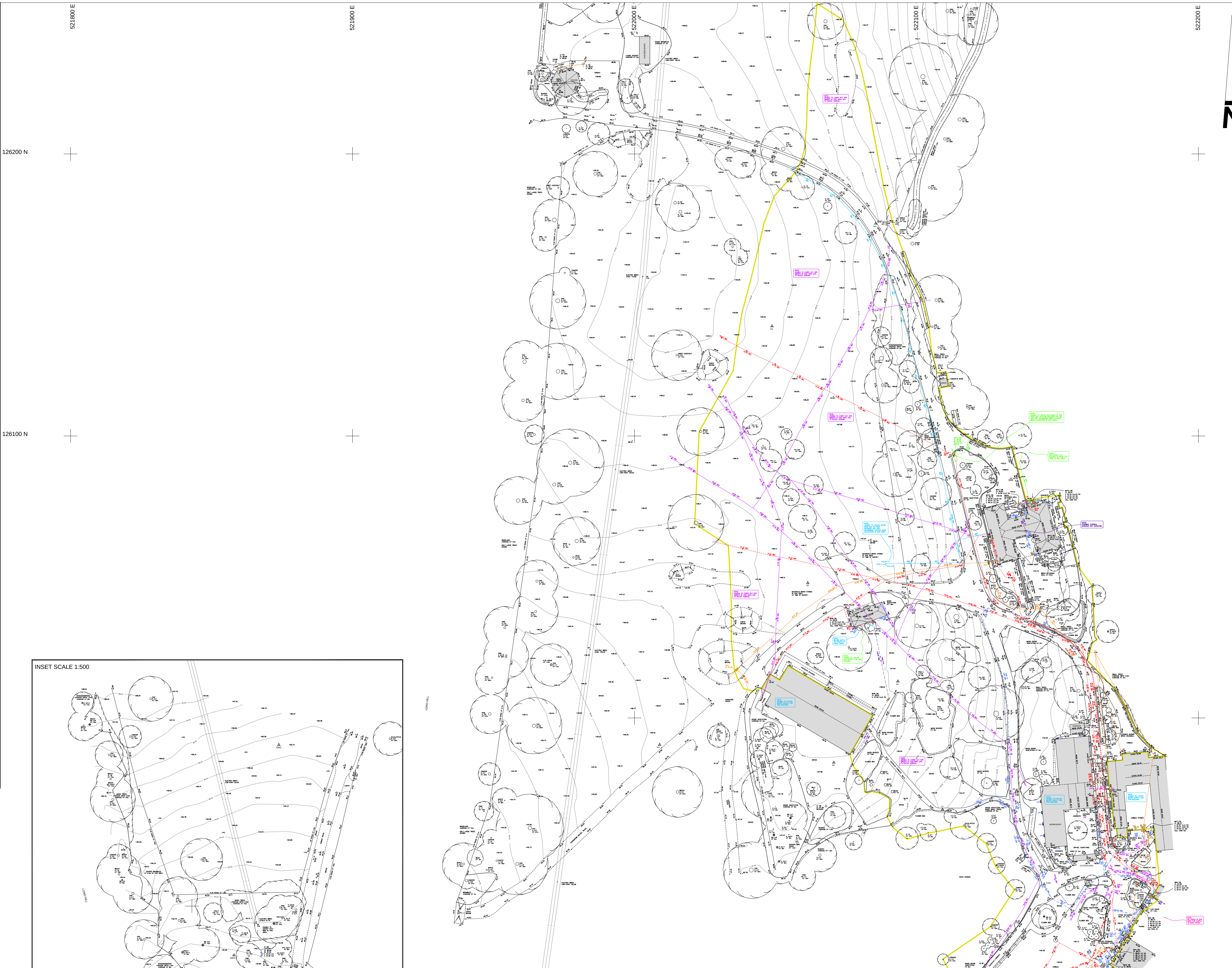
4. Where cables cannot be detected individually an average depth has been obtained and trial excavations are recommended to confirm number and depths of cables banded together.
5. 'Pot-ended' cables are often difficult to detect and although we have made all reasonable efforts to locate or transpose this information from records, we cannot guarantee that all 'pot-ended' cables have been located.
6. Fibre optic cables are often difficult to detect, and commonly access chambers can be locked and thereby made inaccessible by the utility provider. All reasonable efforts have been made to locate these ducts using GPR. Cables not located have been transposed from records.
7. Within close proximity of electric substations and similar structures results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
8. Underneath overhead power lines results using EML may become distorted. All reasonable efforts have been made to verify our results using GPR wherever conditions permitted.
9. Drainage information has been obtained without man entry into the chamber.
10. Wherever possible we have attempted to locate the route of the sewer. Issues such as blockages, surcharging, flooding, sedimentation, sewer collapse, root ingress, excessive depth, obstructions or heavy traffic flow may have affected our ability to obtain meaningful results. In these cases recommendations have been made for further survey or maintenance work.
11. Pipe / duct sizes have been recorded from surface inspection or taken from record information. Pipe sizes have been recorded in millimetres and depths in metres, except in instances where sizes are indicated in imperial units on the record information.
12. Water and Gas utilities to individual properties are often of a size that cannot be detected using EML or GPR investigation, whenever possible the route has been added from surface evidence (pipe risers, valves, etc), but this should be viewed as a guide only.
13. All utilities detected by MK Surveys should be considered live unless confirmed otherwise by client or service provider.
14. MK Surveys cannot confirm when utilities are redundant unless there is visual or record evidence to indicate this. In addition MK Surveys cannot guarantee being able to detect all redundant utilities.
15. Wherever available the results of our investigations have been cross referenced with record information. If a utility shown on the records cannot be detected on site, the information has been added to the drawing and indicated as QB4 (R). However it should be noted that the completeness and accuracy of the records cannot be guaranteed.
16. The utility information has been obtained from non-intrusive survey techniques; it always remains possible that there are additional utilities within the survey boundary that we have not been able to detect. We recommend that care is taken on site and that all utility records are used in conjunction with this survey.
17. The responsibility for avoiding damage to assets and utilities on site shall be that of the persons proposing to excavate within the surveyed area, who shall be liable to the asset owner and any third party who may be affected in any way for any loss or damage.

ALWAYS EXERCISE CAUTION WHEN EXCAVATING.



INSET SCALE 1:500

Notes :

1. GRID AND LEVELS BASED ON ORDNANCE DATUM, DERIVED FROM THE NATIONAL GNSS NETWORK. LOCAL SCALE FACTOR (0.99978) APPLIED.
2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.
3. THIS SURVEY SHOULD ALWAYS BE READ IN CONJUNCTION WITH THE DESKTOP UTILITY REPORT, THAT WAS CARRIED OUT AS A PREREQUISITE TO THIS DETECTION SURVEY.
4. TOPOGRAPHICAL SURVEY EXTENDED FEBRUARY 2018 AND ADDED TO EXISTING TOPOGRAPHICAL AND UTILITY SURVEY CARRIED OUT IN 2017. NO UPDATE OR VERIFICATION CARRIED OUT ON PREVIOUS SURVEY AREA.

DETECTION SURVEY REPORT

GENERAL
This survey was carried out in accordance with PAS 128:2014 (Publicly Available Specification from BSI). After a pre-survey consultation with the client it was agreed to carry out the detection survey using methodology M1 as per Table 2 of the PAS 128:2014. The survey boundary has been shown on the drawing; please see linestyle section of the key for reference.

DESKTOP UTILITY REPORT
Prior to the survey commencing record information was gathered and compiled in a separate desktop utility report. This report should be read in conjunction with the information contained in this utility detection survey. Record information was at the time of the survey less than 90 days old in accordance with the requirements of the PAS 128:2014. For a full list of the providers searched, records received and the dates the information was obtained, please refer to the attachments page of the desktop utility report.

DETECTION SURVEY

DRAINAGE
All drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber sizes have been recorded and positioned on the drawing. All connections from gullies, external rainwater pipes and external soil stacks have been proven wherever possible into manholes and sewer runs by radio sonde location and/or GPR. Where a saddle connection is present the position is assumed only until proven otherwise. In instances where other detection methods were unsuccessful connections between manholes have been assumed to be straight and labelled as QB4. All drainage should be cross checked in critical areas by CCTV survey or verification survey type A.

WATER
Water mains to the east of the toilets have been located by GPR methods wherever possible to quality level QB2. It was not possible to locate water supplies to the greenhouse, main house and outbuildings in the south east of the survey area. Recommend caution when excavating. Assumed route for incoming water supply shown in the north of the survey area (quality level QB4.)

GAS
Unable to locate route of gas mains in MH10 due to poor readings for EML and GPR. Unable to locate gas supply to toilets. Main building in south is supplied by oil tanks.

ELECTRICITY
Electricity cables were located wherever possible by EML and GPR methods to quality level QB1. The quality level is QB2 in areas where electricity cables were located by EML techniques only. Recommend trial excavations in critical areas in order to confirm position and depth,.

TELECOM
Telecom ducts have been traced using EML and GPR to quality level QB1. In areas where EML only was successful, the quality level is QB2. Due to laws protecting British Telecom apparatus all ducts have been located using remote detection techniques only and compared with record information. Chamber sizes have been recorded using GPR techniques wherever possible. For further information regarding BT apparatus please contact Openreach directly. Positions of overhead cables have been checked and added to the drawing.

CATV
No evidence for any CATV ducts within the survey area. Record information confirms this.

UNKNOWNS
Unknown underground linear anomalies are possible buried services. Recommend trial excavations in order to identify any services present and confirm position and depth.

SEE CAUTIONARY NOTES WITHIN THE UTILITY KEY

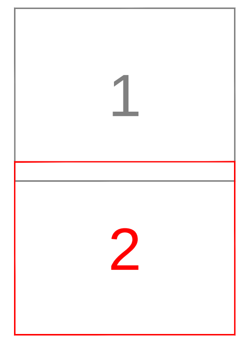
PAS 128:2014 Quality Level Guide

Quality Level	Description	Accuracy
QB4	A utility is expected to exist but cannot be detected - (AR), (R), (VI)	Undefined
QB3 QB3P	Horizontal location only using one geophysical technique. No depth information - NDI.	+/- 500mm Horizontal Undefined Vertical
QB2 QB2P	Horizontal and vertical location only using one geophysical technique.	+/- 250mm or +/- 40% of depth whichever is greater
QB1 QB1P	Horizontal and vertical location only using two geophysical techniques.	+/- 150mm or +/- 15% of depth whichever is greater
QA	Service verified in an open excavation, inside an inspection chamber / draw pit, or at the point the service enters / exits the ground.	+/- 50mm Horizontal +/- 25mm Vertical

Desktop Utility Records

Utility Type	Provider Details	Date Acquired
Drainage	Southern Water	26/09/17
Water	Southern Water	26/09/17
Gas	Southern Gas Networks	09/10/17
Electricity	UK Power Networks	09/10/17
Telecom	Openreach	08/10/17
CATV	Virgin Media (Not Affected)	13/09/17
Tunnels and Pipelines	LinesearchbeforeUdig	08/10/17

Sheet Layout: (Not to Scale)



Coordinate Table

Station	Description	Easting	Northing	Level
S1	ROAD NAIL	522131.083	125892.987	90.588
S2	ROAD NAIL	522172.181	125924.769	89.214
S3	ROAD NAIL	522158.755	126021.469	90.799
S4	ROAD NAIL	522123.257	126045.080	94.389
S5	PEG	522061.470	126047.870	98.328
S6	PEG	522093.401	126012.990	97.757
S7	ROAD NAIL	522109.264	125967.538	94.530
S8	ROAD NAIL	522135.591	125974.320	92.340
S20	ROAD NAIL	522176.105	125951.074	89.008
S30	ROAD NAIL	522164.398	125994.420	90.080
S40	ROAD NAIL	522104.862	126110.207	95.331
S41	ROAD NAIL	522085.556	126175.337	97.077
S100	ROAD NAIL	522145.304	125940.997	90.950
R1	PEG	522061.204	126263.789	97.105
R2	PEG	522000.767	126209.565	99.242
R3	PEG	522048.770	126138.929	99.186
R4	PEG	522013.693	126067.403	98.005
R5	PEG	522008.920	125990.511	96.750
R6	PEG	522070.682	125984.201	97.959
R10	PEG	522077.787	126358.752	93.583
SW1	PEG	522044.438	125907.745	95.129
SW2	PEG	522030.839	125757.187	85.804
SW3	PEG	522014.927	125682.585	81.809
SW4	ROAD NAIL	522039.368	125669.096	81.785

Revision	Description	Surv. by	Appr. by	Date
1	Survey extended to North and West field boundaries, and southern fields added to survey.	RG / SW	CP / NS	01/03/2018

0m 5 10 15 20 25 30 35 40 45 50 55

mksurveys

Tel 01908 565561 — Milton Keynes — enquiries@mksurveys.co.uk
Tel 01865 594979 — Oxford — oxford@mksurveys.co.uk
Tel 0116 2849127 — East Midlands — eastmidlands@mksurveys.co.uk
Tel 01384 404203 — West Midlands — westmidlands@mksurveys.co.uk
Tel 01403 243162 — Horsham — horsham@mksurveys.co.uk

www.mksurveys.com www.surveys4bim.co.uk

Paul Thompkins

Leonardslee Gardens
Lower Beeding
West Sussex

Topographical & Utility Survey

Scale	Sheet Size:	Sheet Number:	Date:
1:500	A0	2	October 2017
Project Number: 24451	Rev: 1	Surveyed By: SW / AC	Approved By: AJ / CP / GL

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

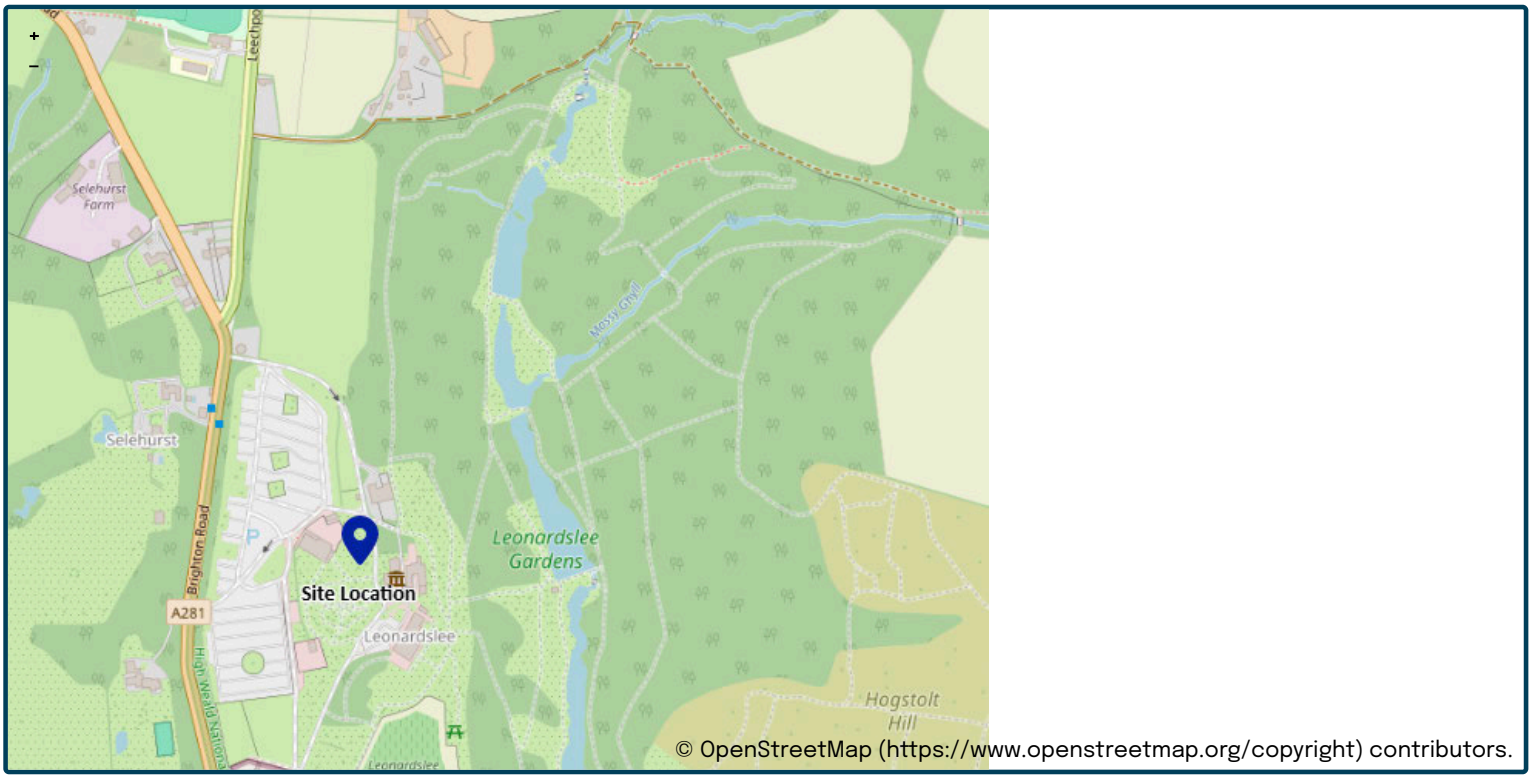
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	20/11/2025
Calculated by	Jonathan Adams
Reference	25087 Greenfield Runoff
Model version	2.2.2

Location

Site name	Leonardslee Lakes & Gardens
Site location	Horsham, West Sussex



Site easting (British National Grid)	522119
Site northing (British National Grid)	125960

Site details

Total site area (ha)	1 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	843 mm		
BFIHOST19scaled	0.467		
QMed-QBar conversion	1.136		1.136
QMed (l/s)	4.6 l/s		
QBar (FEH statistical 2025) (l/s)	5.2 l/s		

Growth curve factors

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

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	4.5 l/s
Flow rate 2 year (l/s)	4.6 l/s
Flow rate 10 years (l/s)	8.5 l/s
Flow rate 30 years (l/s)	12.1 l/s
Flow rate 100 years (l/s)	16.7 l/s
Flow rate 200 years (l/s)	19.6 l/s

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

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
1	1.000	5.00	10.000	1350	1.575
2			10.000	1350	2.475

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	53.561	0.600	8.425	7.525	0.900	59.5	375	5.38	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	2.352	259.8	180.7	1.200	2.100	1.000	0.0	231	2.534

Simulation Settings

Rainfall Methodology	FEH-22	Winter CV	1.000	Drain Down Time (mins)	240	Check Discharge Rate(s)	x
Rainfall Events	Singular	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0	Check Discharge Volume	✓
Summer CV	1.000	Skip Steady State	x	Starting Level (m)		100 year 360 minute (m³)	

Storm Durations

360

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

Flow+ v15.0 Copyright © 1988-2026 Causeway Technologies Ltd

Pre-development Discharge Volume

Site Makeup	Greenfield	Soil Index	1	Return Period (years)	100	Betterment (%)	0
Greenfield Method	FSR/FEH	SPR	0.10	Climate Change (%)	0	PR	
Positively Drained Area (ha)		CWI		Storm Duration (mins)	360	Runoff Volume (m^3)	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	1	184	8.536	0.111	48.5	0.1595	0.0000	OK
360 minute summer	2	184	7.633	0.108	48.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	1	1.000	2	48.4	1.801	0.186	1.4379	268.4

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Results for 10 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	1	184	8.569	0.144	77.8	0.2062	0.0000	OK
360 minute summer	2	184	7.664	0.139	77.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	1	1.000	2	77.5	2.044	0.298	2.0327	429.9

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Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	1	184	8.588	0.163	96.6	0.2332	0.0000	OK
360 minute summer	2	184	7.681	0.156	96.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	1	1.000	2	96.3	2.159	0.371	2.3880	534.2

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Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	1	184	8.611	0.186	120.3	0.2658	0.0000	OK
360 minute summer	2	184	7.701	0.176	120.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	1	1.000	2	120.0	2.279	0.462	2.8197	665.5

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APPENDIX B: SITE GEOLOGY

B.1 BGS borehole 20039220 (TQ22NW19)

British Geological Survey

BGS ID: 20039220 : BGS Reference: TQ22NW19
British National Grid (27700) : 521791,126136

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 E MICHAEL PRIDEAUX

Location SELHURST, BRIGHTON ROAD, LOWER BEEDING, WEST SUSSEX, RH13 6RR.

NGR (ten digits) TQ21791 26136 Please attach site plan

Ground level (if known) _____ metres Above Ordnance Datum

Drilling company NICHOLLS BOREHOLES

Date drilling commenced 27-09-2016 (DD/MM/YYYY) Completed 03-10-2016 (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 200 mm from 0 to 65 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.

Casing material SOLID UPVC diameter 113 mm from 0 to 41 m/depth

Casing material SLOTTED UPVC diameter 113 mm from 41 to 62 m/depth

Casing material SOLID UPVC diameter 113 mm from 62 to 65 m/depth

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

Grouting details 61 BAGS SHINGLE, 14 BAGS MIKOLIT SEAL TO SURFACE

Water struck at 1. 43m 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

Contact BGS: ngdc@bgs.ac.uk

WR38: Borehole record form

D Strata log

Geological classification (BGS only)	Description of strata	Thickness m	Depth (to base of strata) m
	TUNBRIDGE WELLS SANDSTONE - E SANDY CLAY WITH OCCASSIONAL HARD BANDS OF SANDSTONE	65	65
	(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? _____

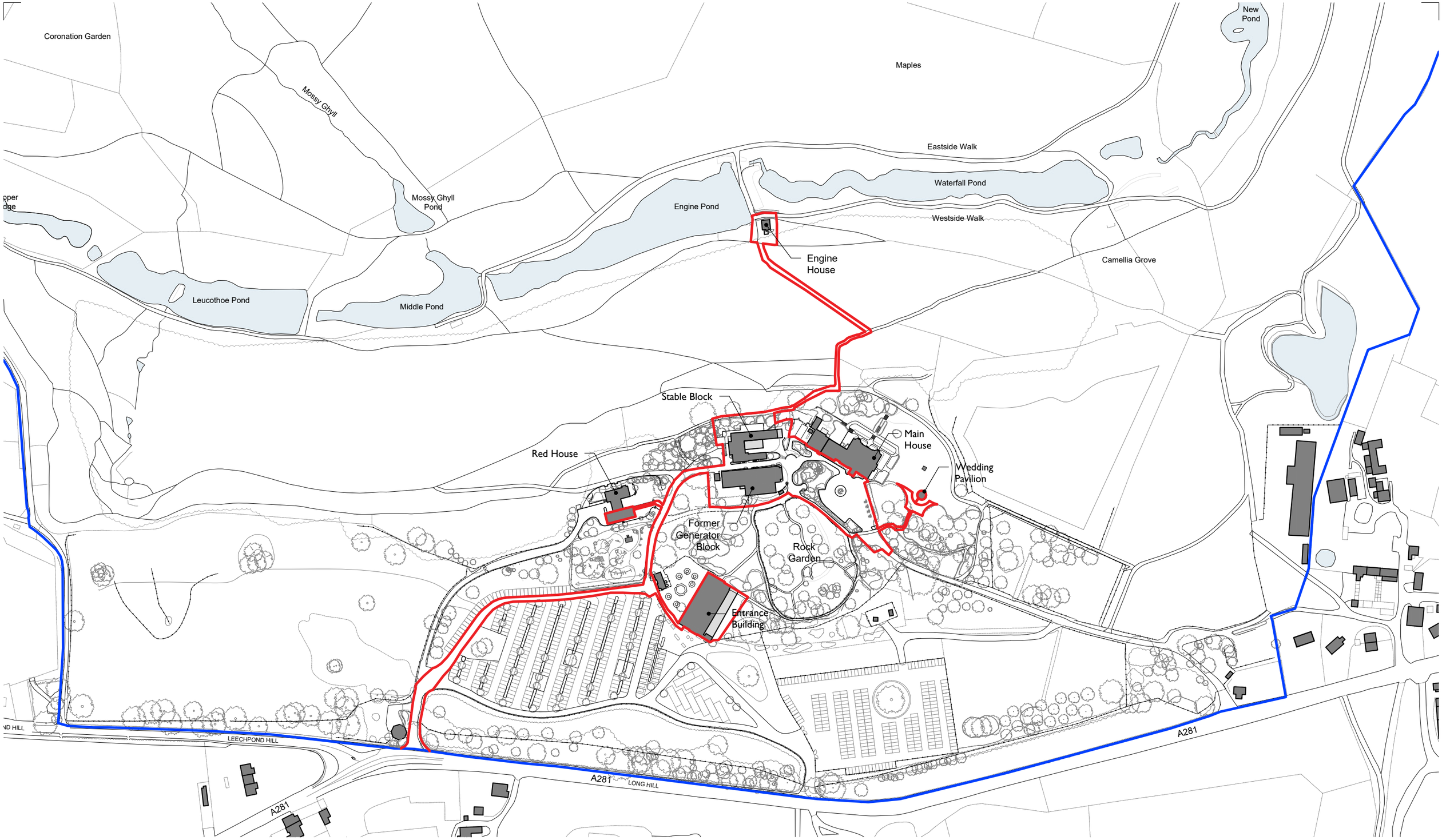
For Official use only

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		

Contact BGS: ngdc@bgs.ac.uk

APPENDIX C: PROPOSED DEVELOPMENT

C.1 Proposed Site Plan (242769-PUR-00-XX-DR-A-2001 P05) – Purcell UK



1 / 2001 Proposed Site Plan
Scale - 1:2500 @ A3

0 25 m 50 m 100 m 200 m

N

Notes:

Drawings are based on survey data however any discrepancies. should be notified to Purcell in writing.

Due to the scales used any measurements from this drawing should include an appropriate level of tolerance.
Where appropriate site dimensions should be taken to verify accuracy of measurement.

All dimensions are in millimetres unless noted otherwise.

Purcell shall be notified in writing of any discrepancies.

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KEY

- Ownership Boundary
- Application Site Boundary

REV	DATE	BY	CHK	DESCRIPTION
P05	12.12.25	JS	JC	Planning Issue

CLIENT
Leonardslee Gardens
PROJECT
Leonardslee Lakes and Gardens

JOB NUMBER
242769
TITLE
Proposed Site Location Plan

SIZE SCALE
A3L 1:2500@A3
REV SUITABILITY/REASON FOR ISSUE
P05 Planning Issue
DRAWING NUMBER
242769-PUR-00-XX-DR-A-2001

PURCELL

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APPENDIX D: LLFA COMMENTS

D.1 LLFA Comments (DC/25/1146)

TO:	Horsham District Council – Planning Dept
LOCATION:	Leonardslee Gardens Brighton Road Lower Beeding West Sussex
DESCRIPTION:	Extension to the visitor entrance building to house a new ticket sales area and café; Infilling roof to the former generator block courtyard, re-roofing of the Alpine House and internal/ external reconfigurations and link extension; Single storey winter garden conservatory to the Stable Block; Terrace extension to the east and internal/ external reconfiguration. Change of use from redundant staff offices and staff accommodation within the stable block to guest accommodation including extension to Honey Cottage; Change of use to the partial first floor of the Red House to staff accommodation; Small WC extension, reinstated chimney stack, and roof alterations to the Engine House; Lightweight wedding pavilion to the lawn, south of Leonardslee House; Landscaping changes including to the forecourt of Leonardslee House.
REFERENCE:	DC/25/1146
RECOMMENDATION:	More Information

SUMMARY OF COMMENTS & RECOMMENDATION:

The following documents have been reviewed:

- Existing Landscape Site Plan. Drawing No: 242769-PUR-00-XX-DR-A-1020. Rev P04. Dated: 07.07.25. PURCELL.
- Proposed Landscape Site Plan. Drawing No: 242769-PUR-00-XX-DR-A-2020. Rev P04. Dated: 07.07.25. PURCELL.
- Proposed Roof Plan, Engine House. Drawing No: 242769-PUR-02-RF-DR-A-2002. Rev P03. Dated: 07.07.25. PURCELL.
- Demolition Roof Plan, Engine House. Drawing No: 242769-PUR-02-RF-DR-A-1502. Rev P03. Dated: 07.07.25. PURCELL.
- Existing North & West Elevations, Engine House. Drawing No: 242769-PUR-02-ZZ-DR-A-1011. Rev P03. Dated: 07.07.25. PURCELL.
- Demolition North & East Elevations, Engine House. Drawing No: 242769-PUR-02-ZZ-DR-A-1511. Rev P03. Dated: 07.07.25. PURCELL.
- Existing South & East Elevations, Engine House. Drawing No: 242769-PUR-02-ZZ-DR-A-1012. Rev P03. Dated: 07.07.25. PURCELL.
- Demolition South & East Elevations, Engine House. Drawing No: 242769-PUR-02-ZZ-DR-A-1512. Rev P03. Dated: 07.07.25. PURCELL.
- Existing Sections AA & BB, Engine House. Drawing No: 242769-PUR-02-ZZ-DR-A-1021. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed Sections AA & BB, Engine House. Drawing No: 242769-PUR-02-ZZ-DR-A-2021. Rev P03. Dated: 07.07.25. PURCELL.
- Existing Roof Plan, The Glasshouse - Retail Block. Drawing No: 242769-PUR-08-00-DR-A-1002. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed Roof Plan, The Glasshouse - Retail Block. Drawing No: 242769-PUR-08-00-DR-A-2002. Rev P03. Dated: 07.07.25. PURCELL.
- Existing Elevations, The Glasshouse - Retail Block. Drawing No: 242769-PUR-08-ZZ-DR-A-1011. Rev P03. Dated: 07.07.25. PURCELL.

- Proposed Elevations, The Glasshouse - Retail Block. Drawing No: 242769-PUR-08-ZZ-DR-A-2011. Rev P03. Dated: 07.07.25. PURCELL.
- Existing North & East Elevations, Former Generator Block. Drawing No: 242769-PUR-05-ZZ-DR-A-1011. Rev P03. Dated: 07.07.25. PURCELL.
- Demolition North & East Elevations, Former Generator Block. Drawing No: 242769-PUR-05-ZZ-DR-A-1511. Rev P03. Dated: 07.07.25. PURCELL.
- Existing South & West Elevations, Scale - 1:200 @ A3 Former Generator Block. Drawing No: 242769-PUR-05-ZZ-DR-A-1012. Rev P03. Dated: 07.07.25. PURCELL.
- Existing South & West Elevations, Scale - 1:200 @ A3 Former Generator Block. Drawing No: 242769-PUR-05-ZZ-DR-A-1512. Rev P03. Dated: 07.07.25. PURCELL.
- Existing Ground Floor Plan, Former Generator Block. Drawing No: 242769-PUR-05-00-DR-A-1001. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed Roof Plan, Former Generator Block. Drawing No: 242769-PUR-05-RF-DR-A-2002. Rev P03. Dated: 07.07.25. PURCELL.
- Existing Roof Plan, Red House. Drawing No: 242769-PUR-06-RF-DR-A-1003. Rev P03. Dated: 07.07.25. PURCELL.
- Existing Ground Floor Plan, Red House. Drawing No: 242769-PUR-06-00-DR-A-1001. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed Ground Floor Plan, Red House. Drawing No: 242769-PUR-06-00-DR-A-2001. Rev P03. Dated: 07.07.25. PURCELL.
- Existing Roof Plan, Stable Block. Drawing No: 242769-PUR-01-RF-DR-A-1003. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed Roof Plan, Stable Block. Drawing No: 242769-PUR-01-RF-DR-A-2003. Rev P03. Dated: 07.07.25. PURCELL.
- Existing Ground Floor Plan, Stable Block. Drawing No: 242769-PUR-01-00-DR-A-1001. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed Ground Floor Plan, Stable Block. Drawing No: 242769-PUR-01-00-DR-A-2001. Rev P03. Dated: 07.07.25. PURCELL.
- Demolition Roof Plan, Stable Block. Drawing No: 242769-PUR-01-RF-DR-A-1503. Rev P03. Dated: 07.07.25. PURCELL.
- Existing South & West Elevations, Stable Block. Drawing No: Rev P03. Dated: 242769-PUR-01-ZZ-DR-A-1012. 07.07.25. PURCELL.
- Proposed South & West Elevation, Stable Block. Drawing No: 242769-PUR-01-ZZ-DR-A-2012. Rev P03. Dated: 07.07.25. PURCELL.
- Existing North & East Elevations, Stable Block. Drawing No: 242769-PUR-01-ZZ-DR-A-1011. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed North & East Elevations, Stable Block. Drawing No: 242769-PUR-01-ZZ-DR-A-2011. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed Base and Roof Plans, Wedding Pavilion. Drawing No: 242769-PUR-04-00-DR-A-2001. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed Elevation & Section, Wedding Pavilion. Drawing No: 242769-PUR-04-ZZ-DR-A-2011. Rev P03. Dated: 07.07.25. PURCELL.
- Existing Site Plan, Wedding Pavilion. Drawing No: 242769-PUR-04-SL-DR-A-1000. Rev P03. Dated: 07.07.25. PURCELL.
- Proposed Site Plan, Wedding Pavilion. Drawing No: 242769-PUR-04-SL-DR-A-2000. Rev P03. Dated: 07.07.25. PURCELL.
- Lead Local Flood Authority Letter, Dated 30th September 2025.

We have reviewed the evidence provided by the applicant in support of this planning application DC/25/1146.

Horsham District Council require **more information** to support the proposals to determine that the site drainage meets the requirements of the NPPF and PPG, National standards for sustainable drainage systems (June 2025), and the Horsham District Planning Framework (2015) – Policy 38.

Until the following information in the Main Comments section below is received, we are unable to determine the suitability of the proposed scheme regarding surface water and foul water drainage and flood risk.

MAIN COMMENTS:

The following information would still be required within a Drainage Strategy:

- The applicant must provide a site-specific assessment of flood risk, even where a full flood risk assessment is not required.
- The applicant must demonstrate an understanding of how surface water currently flows across the site under 'normal' conditions and during rainfall events, providing an assessment of the current and proposed drainage patterns entering the site, within the site and leaving the site.
- The applicant should provide a measurement of the total site area, all pre-development permeable and impermeable areas within the red line boundary, all post-development permeable and impermeable areas within the red line boundary, with supporting catchment plans and calculations.
- A fully designed surface water management strategy should include:
    - The aim to achieve and better greenfield runoff rates and adherence to the drainage hierarchy.
    - Rationale for SuDS selected in line with the Horsham District Planning Framework (2015) – Policy 38, and industry best practice such as The SuDS Manual (C753).
- The method of foul and surface water disposal must be confirmed in line with the drainage hierarchy (Building Regulations Part H).
- If connections to Southern Water Utilities are proposed as part of the development/ redevelopment, supporting plans and assumed points of connection must be provided as well as expected flow rates. Connection to the public sewerage network is advised, wherever it is reasonable to do so.
- Where rainwater harvesting (RWH) is proposed, the appropriate sized storage unit for this system must be provided on site.
- Whilst the use of RWH is welcomed and encouraged, the operational volume within the storage unit cannot be considered a component of the total stormwater attenuation on site because there is no guarantee of water use within the property or the availability of the storage unit (system failure). Therefore, evidence is required to show the overall surface water drainage system has sufficient capacity to provide the necessary stormwater attenuation, without reliance on the RWH system.
- The following flow and volume rates must be provided:
    - existing runoff rates during a 100% Annual Exceedance Probability (AEP), 3.33% AEP, 1% AEP storm events
    - post development discharge rates during a 100% AEP, 3.33% AEP, 1% AEP and 1% AEP + 45% for Climate Change storm events
    - greenfield runoff rate (QBAR)

- water storage capacity volumes of the proposed drainage features, to attenuate the 1% AEP + climate change storm event (see details below).

- The runoff from the proposed development should, where possible, be restricted to the greenfield 1 in 1 year runoff rate (100% AEP) during all events up to and including the 1 in 100-year rainfall event (1% AEP) + 45% allowance for climate change. Where this is not possible, the runoff from the proposed development should restrict flows to as close as reasonably practical to the greenfield runoff rate for the site.
- Brownfield sites (previously developed sites) should where possible revert the drainage back to its natural state. Any proposals which are considered as redevelopment on brownfield sites, must provide surface water discharge rates equal to, or as close as feasibly possible to, the 1 in 1-year greenfield runoff rate calculated for the full development site area (subtracting any areas of large open space that will not be draining via the proposed SuDS). Should this be unattainable, the discharge rate is expected to provide a minimum of 50% betterment than the current scenario (brownfield 1 in 1-year runoff rate). Discharge rates cannot exceed/ be higher than the 50% betterment scenario.
- A 50% betterment scenario will only be considered acceptable, when lower discharge rates are proven to be unattainable. Calculations must be provided and demonstrated clearly with supporting evidence, to justify the proposed discharge rate. Corresponding storage volumes associated with those rates must also be provided.
- The surface water drainage strategy must demonstrate that the proposed SuDS attenuate all runoff from <u>all</u> impermeable areas (with an additional area equivalent to +10% of the area of any residential development, factored into the sum of the total impermeable areas on site, allowing for urban creep) for the 1 in 100-year rainfall event (1% AEP) + 45% allowance for climate change (upper end). Attenuation should be provided on site to ensure that:
    - The 100% AEP storm event does not generate excessive surcharging in the drainage system.
    - The 3.33% AEP storm event is safely contained underground with no flooding.
    - The 1% AEP + climate change storm event is safely contained within the site without risk to persons or property.
- Where infiltration discharge methods are proposed (soakaways/swales etc…), the applicant must provide infiltration testing in accordance with BRE365, at the location and depth of the proposed devices.
- Where infiltration testing has not been undertaken, provide an infiltration assessment, supported by a desk-based assessment of soil types, geology and suitability for infiltration potential (See the Horsham District Council Local Plan evidence base), together with an alternative option for surface water disposal.
- The applicant must provide evidence of measures to prevent pollution of the receiving groundwater and/or surface water.
- The applicant must provide plans which indicate the expected exceedance routes for storm events greater than the 1% AEP + climate change storm event. The Drainage Strategy must demonstrate that the surface water runoff from these events can be controlled, to confirm there is no adverse flood risk to the development or elsewhere. Evidence of appropriate management and mitigation of exceedance flows are expected within the Drainage Strategy, to demonstrate that the proposed conveyance systems have considered the risks associated to nature, people and property during the event of failure and/or exceedance.

- Supporting foul flow calculations, in line with Sewerage Sector Guidance and/or Building Regulations Part H, is to be provided. It should be noted that any proposed foul water system and foul water treatment unit should be in line with current legislation and best practice for the management of domestic waste, with any method for disposal justified and appropriate permits sought.
- Maintenance and Management Plans must be provided for both the proposed Foul and Surface Water Drainage Strategy, including access requirements, maintenance frequency and responsibility, and proprietary device manuals, for all drainage features and SuDS devices.

Further evidence in addition to that requested above may be required once the additional information is submitted.

Advisory notes:

- In addition to Planning Permission, the applicant may additionally require a permit to discharge treated foul water to a water body or to ground from the Environment Agency, where non-mains foul drainage is proposed.
- In addition to Planning Permission, the applicant may additionally require Ordinary Watercourse Consent (OWC) from the Lead Local Flood Authority at West Sussex County Council, to consent to any works adjacent to or within an ordinary watercourse.
- On the Horsham District Council website, there are several useful documents available to the public, which the applicant may wish to use as guides for their application. To navigate to this page you can follow this link: https://www.horsham.gov.uk/planning/local-plan/local-plan-examination/Examination-Library

  Alternatively, here is how to navigate to that page on the HDC Website:
  Home > Planning and development > Local Plan > Local Plan examination > Examination Library > Evidence Base Documents > Climate Change and Water

ANY RECOMMENDED CONDITIONS:
NA

NAME:	A. Furness
DEPARTMENT:	Horsham District Council - Drainage
DATE:	15/10/2025

APPENDIX E: SFRA EXTRACTS

E.1 60730513 Figure A1

E.2 60730513 Figure A2

E.3 60730513 Figure A3

E.4 60730513 Figure A4

E.5 60730513 Figure A5

E.6 60730513 Figure A6

E.7 60730513 Figure A6-B

E.8 60730513 Figure A6-D

E.9 60730513 Figure A7

E.10 60730513 Figure A7-B

E.11 60730513 Figure A7-D

E.12 60730513 Figure A8

E.13 60730513 Figure A9

E.14 60730513 Figure A9-B

E.15 60730513 Figure A9-D

E.16 60730513 Figure A10

E.17 60730513 Figure A10-B

E.18 60730513 Figure A10-D

E.19 60730513 Figure A11

E.20 60730513 Figure A12

E.21 60730513 Figure A12-B

E.22 60730513 Figure A12-D