

Flood Risk Assessment and Outline Surface Water Drainage Strategy

Little Warnham Lodge, Mayes Lane, Warnham

| Date | Prepared For | Reference |
|---------------|---------------------------|-----------|
| December 2025 | Robert and Vanessa Sharpe | 73515 |



Contract

GeoSon Limited were instructed by Robert and Vanessa Sharpe by an email dated 4th November 2025, to undertake a Site Specific Flood Risk Assessment and outline Surface Water Drainage Strategy to support a proposed planning application for development at Little Warnham Lodge, Mayes Lane, Warnham.

| | |
|----------------------|--|
| Project | Flood Risk Assessment and outline Surface Water Drainage Strategy for Planning |
| Prepared For | Robert and Vanessa Sharpe |
| Location | Little Warnham Lodge, Mayes Lane, Warnham RH12 3SG |
| Application | Construction of a dwelling and stables with associated driveway and parking area |
| Our Reference | 73515 |
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| Issued To | Robert Sharpe, Vanessa Sharpe and Clare Bartlett (Batcheller Monkhouse) |
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Purpose

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Introduction

Context

GeoSon Limited have been instructed by Robert and Vanessa Sharpe to undertake a Site Specific Flood Risk Assessment (FRA) and outline Surface Water Drainage Strategy to support a proposed planning application for development at Little Warnham Lodge, Mayes Lane, Warnham.

This assessment has been undertaken in accordance with the revised National Planning Policy Framework (NPPF) December 2024, the associated Planning Practice Guidance (PPG) and the CIRIA SuDS Manual c753. The level of flood risk to and from the site has been determined using third party information including Environment Agency flood data, national government mapping, LiDAR topography data and Local Authority documentation.

Study Objectives

In accordance with the National Planning Policy Framework (NPPF), a Flood Risk Assessment is required to accompany a planning application when a development site is:

- located within Flood Zone 2 or 3 (including minor development and change of use)
- more than 1 hectare (ha) in size
- less than 1 ha in flood zone 1 however includes a change of use in development type to a more vulnerable class (for example from commercial to residential) which could be affected by sources of flooding other than rivers and the sea
- located within an area which has been identified to have critical drainage problems by the Environment Agency

A Flood Risk Assessment is required to consider the proposed use of a site and assess the potential flood risk posed to the intended development from multiple sources of flooding including rivers, seas, surface water, groundwater, reservoir failure, sewer surcharge and any other artificial sources.

This FRA will assess the risk posed from all potential sources of flooding so that site users and third party land will be safe now and for the expected lifetime of the development, taking climate change into account.

Additionally, given that the proposed development will alter the impermeable coverage at the site, details of post development surface water drainage arrangements have been requested in line with current industry standards.

In accordance with the NPPF guidance and the CIRIA SuDS manual all surface water drainage strategies should follow the Drainage Hierarchy whereby discharge options are considered in the following order:

1. Stormwater reuse,
2. Discharge to ground,
3. Discharge to watercourse,
4. Discharge to surface water sewer,
5. Discharge to combined sewer.

This report details the preferred methods for managing post development surface water runoff generated by all newly introduced impermeable surfacing at the site. This includes how runoff can be managed now and for the lifetime of the development, so that future site users and third party land will not be at an increased risk of flooding as a result of the proposals.

Site Details

Site Description

The proposed application is located upon land to the north of Warnham Lodge Farm, Mayes Lane, Warnham RH12 3SG.

According to plans provided by the client, the application area measures approximately 3.6ha and is currently vacant. The landowners have confirmed that the site was previously used for livestock grazing.

The site is accessed via Mayes Lane which runs along the eastern boundary of the application area.

Having reviewed aerial imagery, the surrounding area is primarily characterised by agricultural land and residential dwellings. Hoopers Copse is located adjacent north west of the site.

| | |
|-----------------------------------|--|
| Site Address | Little Warnham Lodge, Mayes Lane, Warnham RH12 3SG |
| Site Area | Approximately 3.6ha |
| Current Use | Vacant land |
| Proposed Use | Residential Use |
| OS NGR | TQ 15398 35049 |
| County | West Sussex |
| Local Planning Authority | Horsham District Council |
| Lead Local Flood Authority | West Sussex County Council |

Table 1: Site Details

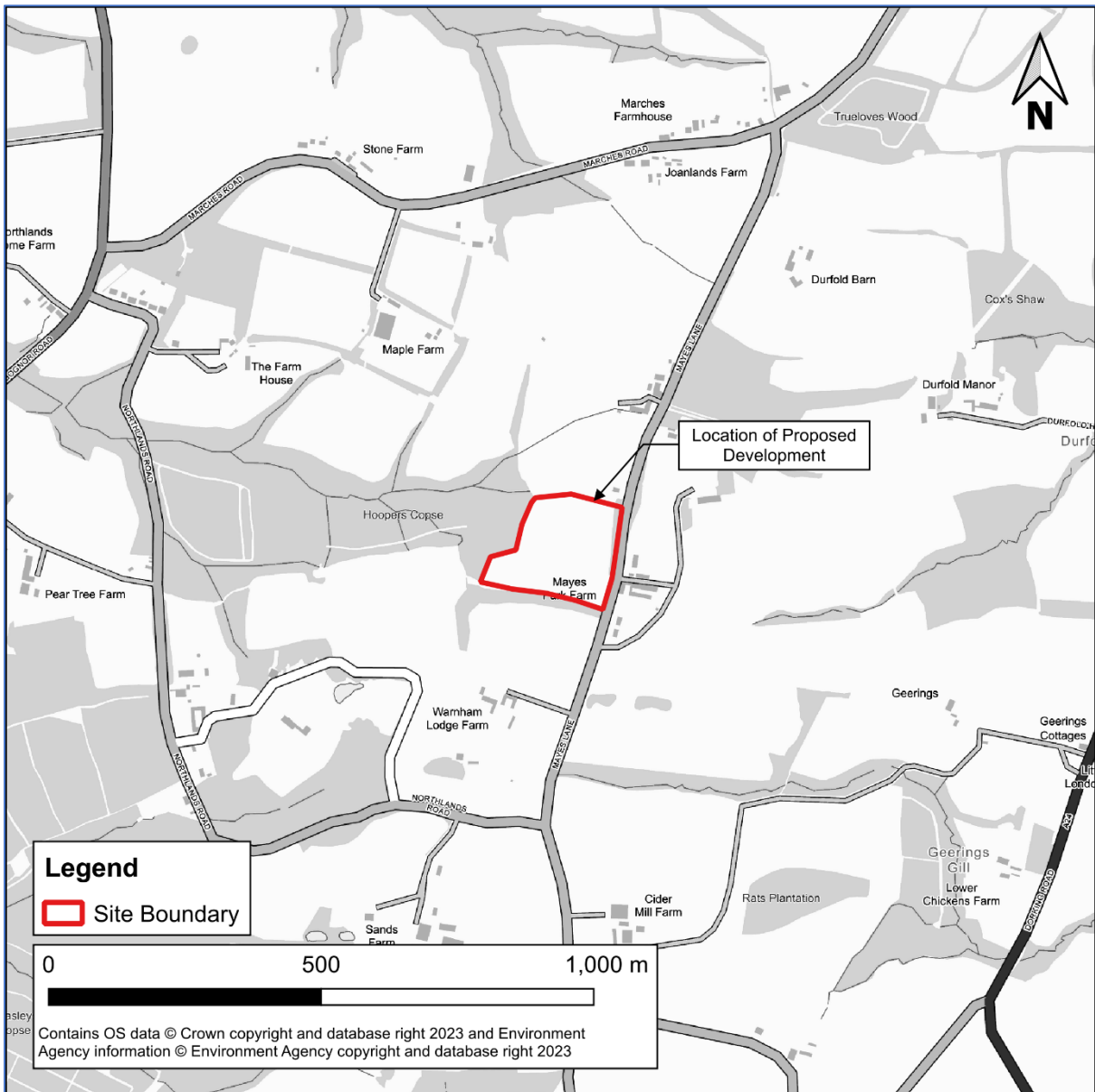


Figure 1: Site Location

Topography

Topographic LiDAR data has been obtained from the Environment Agency to assess the ground elevation profile across the site and within the wider area.

Light Detection and Ranging (LiDAR) is an airborne remote sensing technique, which accurately measures the height of the terrain and surface objects on the ground through the use of a laser, scanner and GPS receiver. The mapping technique measures the distance between the aircraft and the ground to generate precise, three-dimensional information of the terrain and surface objects. Hundreds of thousands of measurements per second are made of the ground, allowing highly detailed surface and terrain models to be generated at different spatial resolutions ranging between 25cm and 2.0 metres.

The LiDAR dataset can be supplied in two forms by the EA:

1. As a Digital Surface Model (DSM), which includes surface objects, such as vehicles, buildings and vegetation, as well as the terrain surface. Or;
2. As a Digital Terrain Model (DTM) produced by removing surface objects such as buildings from the Digital Surface Model through application of bespoke algorithms and manual filtering techniques.

For the purposes of this study the 1.0m resolution Digital Terrain Model has been used.

Environment Agency 1.0m LiDAR data indicates that the site is located on the side of a hill with the application area generally sloping in a westerly direction.

According to EA LiDAR data ground levels within the red outline boundary range from approximately 71.50mAOD, associated with land in the south west of the site, to approximately 86.75mAOD, associated with land along the north eastern boundary.

The section of Mayes Lane adjacent east of the site has an elevation of approximately 83.00mAOD to 84.50mAOD.

Figure 2 shows the elevation profile of the site and surrounding area using Environment Agency 1.0m LiDAR data.

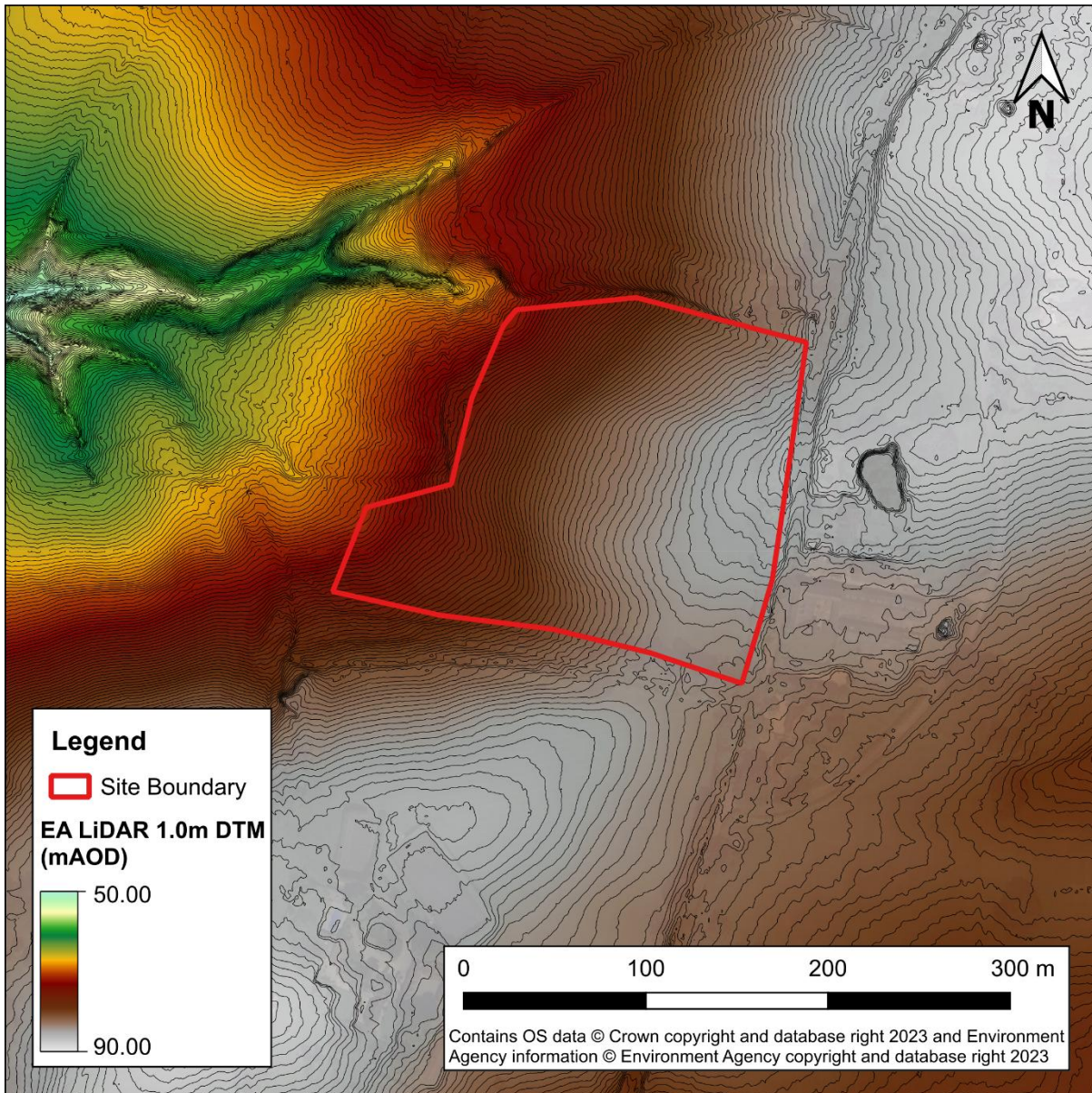


Figure 2: Topography of the Site and Surrounding Area

Geology and Hydrogeology

Review of online British Geological Survey (BGS) records indicates that the site is located directly upon Weald Clay Formation (Mudstone) bedrock. Weald Clay Formation was formed between the Hauterivian Age and the Barremian Age some 121.4 to 132.6 million years ago.

Weald Clay Formation is typically characterised by: *'dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone (e.g. Horsham Stone Member), shelly limestones (the so called "Paludina Limestones") and clay ironstones.'*

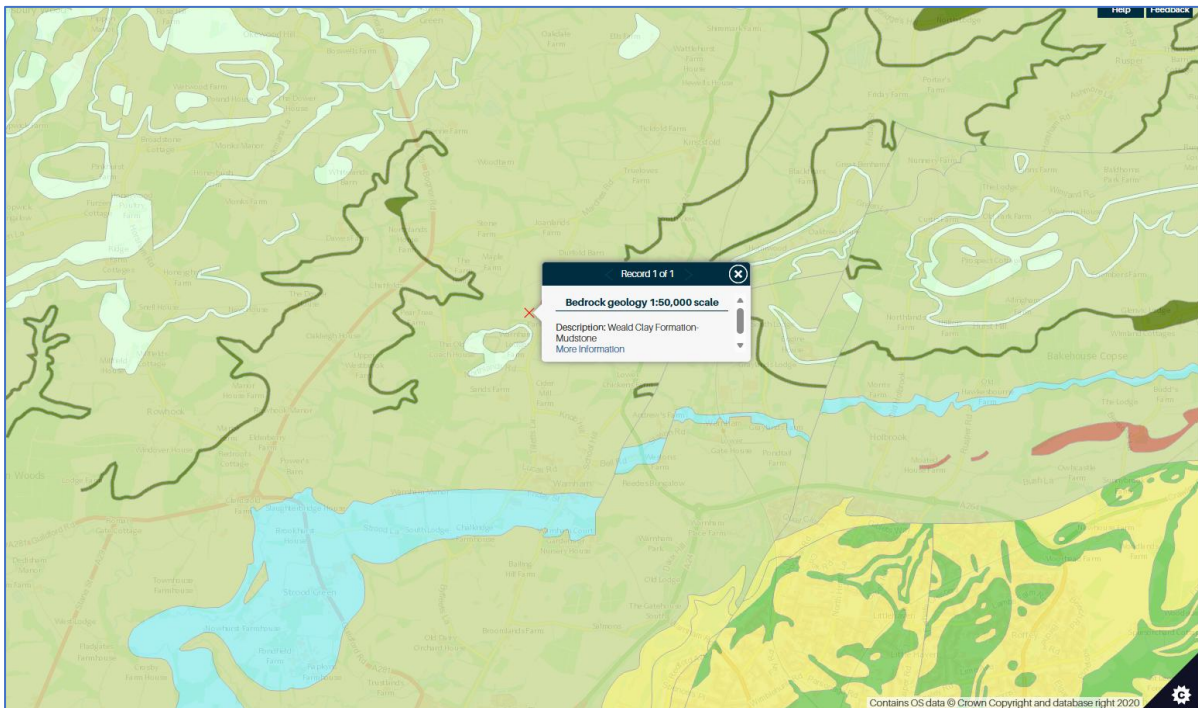


Figure 3: Bedrock Geology Map (Source: British Geological Survey)

According to BGS data the site is not underlain by superficial deposits.

Review of Landis Soilscales online viewer suggests that the site is located in an area where the soils are classified as 'slowly permeable seasonally wet slightly acid but base-rich loamy clayey soils with impeded drainage'.

DEFRA 'Magic Maps' indicate that the site is not located within a groundwater Source Protection Zone. The closest groundwater Source Protection Zone is situated 8.10km north west of the proposed site.

Nearby Watercourses

Aerial imagery indicates that there are no open drainage features at, or along the boundary of, the site. However, several watercourses have been identified within a 1.0km radius of the development. These include:

- Sladebottom Gill 20m north west;
- Durfold Gill 270m east;
- Boldings Brook 310m south; and,
- Stonefarm Gill 440m north of the site.

The features closest to the site are all classified as Ordinary Watercourses. Ordinary Watercourses within this area are managed by West Sussex County Council (Lead Local Flood Authority). The watercourses within a 1.0km radius of the site are shown in Figure 4 (below).

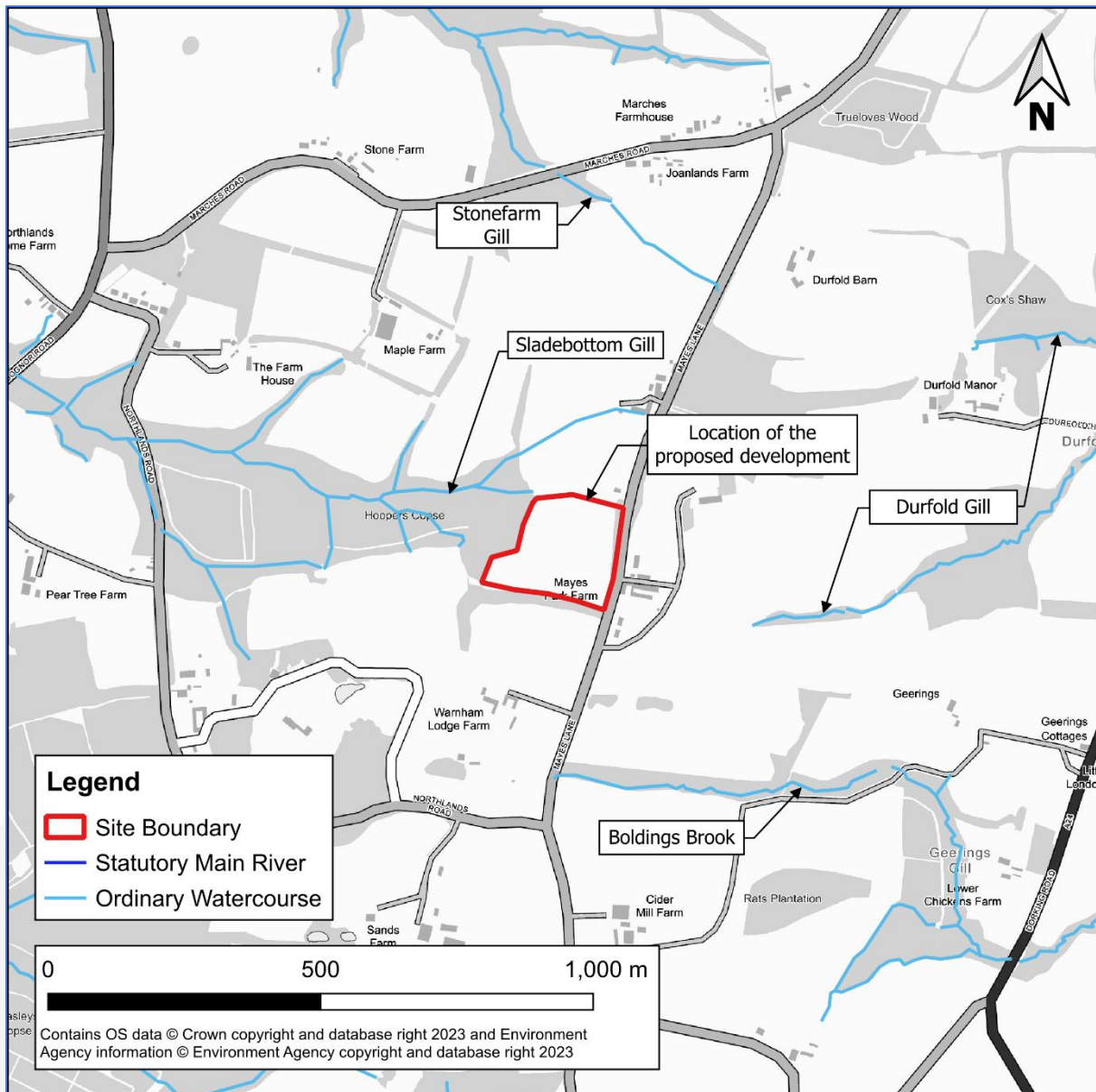


Figure 4: Watercourses Near the Site

Given the rural nature of the site and review of EA LiDAR data, it is considered likely that additional drainage features are located within vicinity of the application area which have not been captured on the OS mapping or aerial imagery.

In light of this, the applicant undertook a site walkover on the 16th November 2025 to investigate the drainage features located closest to the development. The following was reported:

Northern Boundary

On the northern boundary of the site, situated on the "Little Tanners" side of the boundary fence, is a gully. It is more pronounced in some areas than others, where the water clearly drains from the application site and the "Little Tanners" field and flows to the western end of the boundary. The gully depth ranges between 10cm and 30cm.

The gully crosses the "Little Tanners" boundary into Hoopers Copse and becomes a small stream.



Figure 5: Ditch to the North of the Site (Source: Robert Sharpe)

Western Boundary

OS mapping shows a watercourse within the section of Hoopers Copse, 60m west of the site boundary.

Whilst the applicant was able to find a number of water lines where rainwater had sought the lowest point no streams or ditches were identified in this area.

Eastern Boundary

On exiting the field from the gate on Mayes Lane (next to the public footpath) we sought to find a drainage ditch that ran immediately outside the site to be developed. There is a shallow ditch, but it is not very pronounced.

However, from the entrance to the site to be developed towards the gates at Warnham Lodge Farm (working in a southerly direction), there is quite a large drainage ditch which leads all the way to the drainage ditch Warnham Lodge Farm currently uses for it's excess water.



Figure 6: Ditch along Mayes Lane to the South of the Footpath (Source: Robert Sharpe)

Based on Environment Agency LiDAR data, the section of drainage ditch located along Mayes Lane to the south of the public footpath is conservatively estimated to have a cover and invert level of 83.00mAOD and 82.50mAOD, respectively.

Nearby Public Sewerage Infrastructure

The applicant lives in the property adjacent south of the site, Warnham Lodge Farm, and has confirmed that there are no main sewers beneath Mayes Lane or within vicinity to the application area.

It has been confirmed that the existing properties along Mayes Lane currently discharge surface water runoff into the surrounding ditches.

Warnham Lodge Farm currently discharges to the aforementioned drainage ditch which runs parallel to Mayes Lane and connects to Boldings Brook some 310m south of the application site.

Proposed Development

Development Proposals

The proposed planning application relates to construction of a new residential dwelling and garage/stables with associated driveway and parking.

According to plans provided by the applicant, post development, the newly introduced surfacing at the site will amount to approximately 2412m²; comprised of 653m² of roof area and 1759m² of patio/driveway.

The proposed site layout plan is shown in Figure 7 and Appendix B.



Figure 7: Proposed Site Layout Plan (Source: Simon Harvey Designs Ltd)

Development Vulnerability Classification

The National Planning Policy Framework classifies land use type in terms of vulnerability to flooding. Annex 3 of the NPPF details the flood risk vulnerability classification for each land use type (refer below).

Essential infrastructure

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood.
- Wind turbines.
- Solar farms.

Highly vulnerable

- Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)

More vulnerable

- Hospitals
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- **Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.**
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill* and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Less vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).

- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

Water-compatible development

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Table 2: Flood Risk Vulnerability Classification (Source: NPPF)

The site is currently occupied by grassland. Therefore, in terms of flood risk vulnerability it is considered "less vulnerable".

The proposals comprise construction of a new dwelling. As such, according to NPPF guidance the site as whole will become classified as "more vulnerable" post development.

In light of this, it is considered that the vulnerability of the site as a whole will increase as a result of the development.

Sequential and Exception Test Guidance

In accordance with the National Planning Policy Framework, and associated Planning Practice Guidance, the Sequential and Exception Tests should be undertaken to determine the most appropriate location for a development and used to inform the proposed design layout.

The Sequential Test is designed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account.

The Exception Test is undertaken when development in a flood risk area cannot be avoided. The Exception Test comprises of two elements which need to be satisfied before a development can be permitted. It needs to be demonstrated that:

1. A development will provide wider sustainability benefits to the community that outweigh flood risk; and
2. A development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

| Flood Zones | Flood Risk Vulnerability Classification | | | | |
|-------------|---|-------------------------|-------------------------|-----------------|------------------|
| | Essential infrastructure | Highly vulnerable | More vulnerable | Less vulnerable | Water compatible |
| Zone 1 | ✓ | ✓ | ✓ | ✓ | ✓ |
| Zone 2 | ✓ | Exception Test Required | ✓ | ✓ | ✓ |
| Zone 3a | Exception Test Required | X | Exception Test Required | ✓ | ✓ |
| Zone 3b | Exception Test Required | X | X | X | ✓ |

Table 3: Flood risk vulnerability and flood zone 'incompatibility' (Source: PPG)

Given the nature of the proposals the development is considered 'more vulnerable'.

According to Table 3 (above) 'more vulnerable' development is considered suitable within Flood Zone 1, 2 and 3a (subject to the Exception Test).

Assessment of Flood Risk

Flood risk is a combination of:

- the probability (likelihood or chance) of a flood event happening; and
- the potential consequences (impact) if an event were to occur.

In accordance with guidance set out in the Flood Risk and Coastal Change section of the PPG, areas at risk of flooding should be considered as those at risk of flooding from any source, now or in the future.

This study uses publicly available data (including EA flood maps and Local Authority documentation) to assess the potential flood risk posed to the intended development from multiple sources of flooding and the risk of flooding elsewhere, as a result of the proposals.

Where flood risks are identified this study outlines appropriate mitigation measures, compliant with NPPF and PPG, which would be suitable to incorporate within the proposed development to manage said flood risk(s).

Document Review

The following Local Authority documents have been reviewed as part of the Flood Risk Assessment element of this study:

- Horsham District Council Level 1 Strategic Flood Risk Assessment (2020)
- Horsham District Council Level 1 Strategic Flood Risk Assessment Update (2024)
- West Sussex Preliminary Flood Risk Assessment (2011)
- West Sussex County Council Local Flood Risk Management Strategy (2025)
- West Sussex County Council S19 Flood Investigations
- Horsham District Council Local Plan

Historical Flooding

Review of Horsham District Council's flood risk documentation along with the Environment Agency's Recorded Flood Outline and Historic Flood Map datasets indicates that the site and the immediate surrounding area have not been subject to historical flooding.

Horsham District Council's Strategic Flood Risk Assessment (2024) includes a map which shows the known locations of reported flood incidents throughout the catchment.

According to the SFRA map, the closest recorded flood incident to the site occurred in 2016 and relates to flooding within the vicinity of Church Street and Friday Street in the centre of Warnham (located some 1.65km south of the application area).

Flood Zones

The Environment Agency has created a set of Flood Zones which shows the risk of flooding from rivers and sea in England, for several return period events, ignoring the presence of defences. The Flood Zones are shown on the EA's Flood Map for Planning which forms the basis for assessing flood risk and development suitability under the National Planning Policy Framework.

| Flood Zone | Definition |
|--|--|
| Zone 1 Low Probability | Land having a less than a 1 in 1000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b) |
| Zone 2 Medium Probability | Land having between a 1 in 100 and 1 in 1000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1000 annual probability of tidal flooding. (Land shown in light blue on the Flood Map) |
| Zone 3a High Probability | Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of tidal flooding. (Land shown in dark blue on the Flood Map) |
| Zone 3b Functional Floodplain | <p>This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. The functional floodplain will normally comprise:</p> <ul style="list-style-type: none"> • land having a 1 in 30 or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 1 in 1000 annual probability of flooding). <p>Areas of functional floodplain should be identified by local planning authorities within Strategic Flood Risk Assessments, in agreement with the Environment Agency. (Note, Zone 3b is not separately distinguished from Zone 3a on the Flood Map).</p> |

Table 4: Flood Zone Definitions (Source: Planning Practice Guidance)

The Flood Map for Planning was updated on the 25th March 2025.

The updated Flood Map for Planning continues to show Flood Zones 1, 2 and 3 for the present day (ignoring the benefits of defences).

However, the Environment Agency's mapping tool now also displays the following information:

- Rivers and sea with defences for the present day and climate change scenarios
- Rivers and sea without defences for the present day and climate change scenarios
- Surface water flood extents for the present day

Fluvial (River) To the Site

According to the Environment Agency's Flood Map for Planning (refer to Figure 8) the site and the surrounding area are located entirely within Flood Zone 1 (Low Probability), defined as land which has less than a 1 in 1000 annual probability of fluvial flooding.

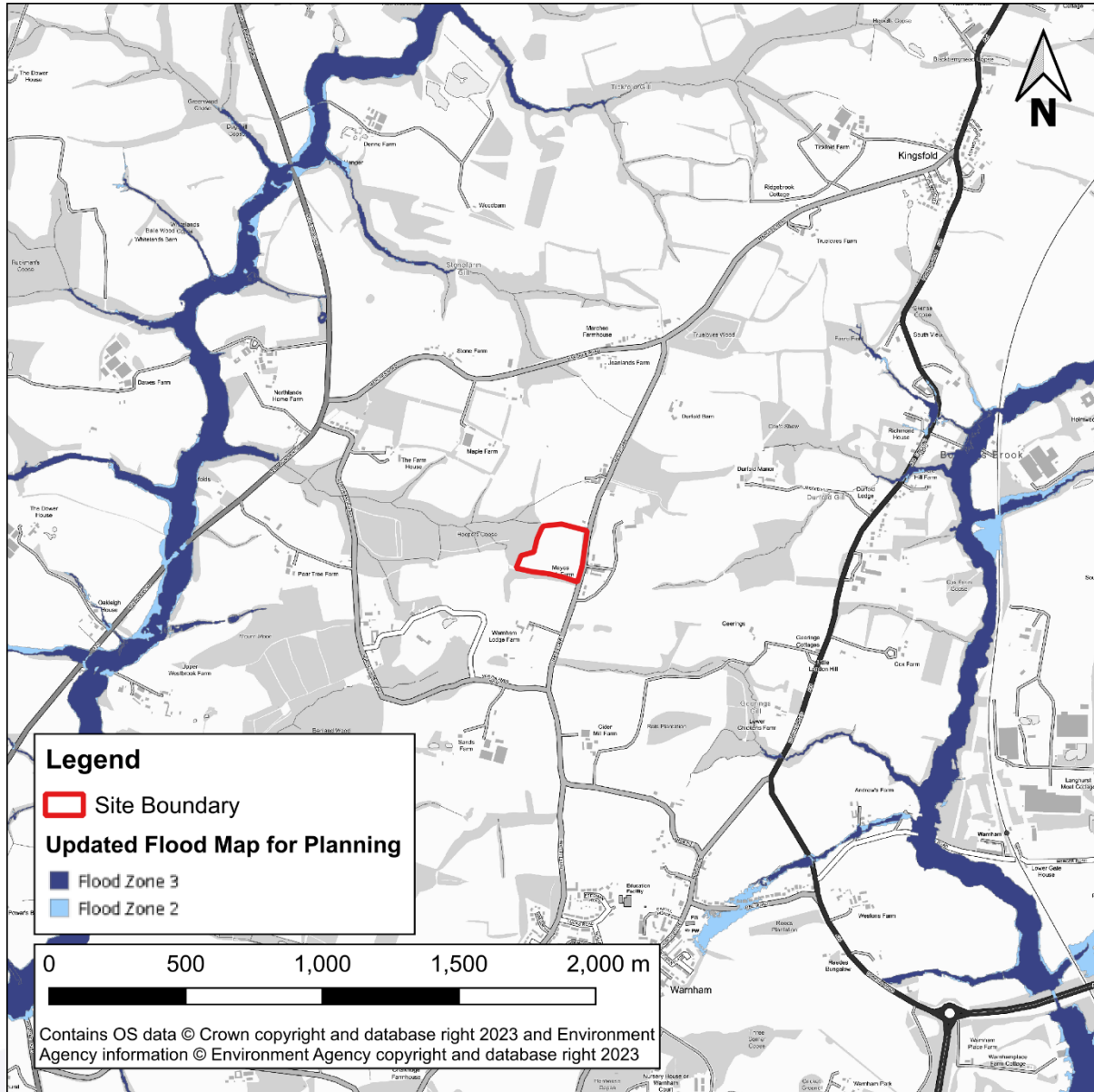


Figure 8: Environment Agency Flood Map for Planning (Source: EA)

Having reviewed the fluvial flood risk in the wider area, the nearest Flood Zone 2 and 3 extents are located some 900m away from the development footprint upon land elevated significantly lower than the site.

In light of the above, the risk posed to the site from fluvial / tidal flooding is considered to be very low.

Furthermore, based on the location of the surrounding watercourses in relation to the site, and the associated elevation difference, any increase in water levels due to climate change are considered unlikely to affect the proposed development.

From the Site

Given that the site is located entirely within Flood Zone 1, thus outside of any fluvial flood zone extent, the proposed development is not considered to have an impact on the existing floodplain functionality and will not increase the risk of fluvial flooding elsewhere.

Pluvial (Surface Water)

Pluvial flooding occurs as a result of excess overland flow and stormwater ponding. Surface water flooding can happen when water does not have time to soak into the underlying ground or cannot infiltrate at all, for instance because the ground is already fully saturated.

This mechanism of flooding can also arise when the volume of precipitation exceeds the capacity of the drainage system meaning that water is unable to drain away through the sewer network and instead flows overland.

Overland flow will follow the local topography and can therefore pose a risk to both the development and surrounding third party land.

The risk posed to the site from surface water flooding has been assessed using the new National Flood Risk Assessment (NaFRA) 'Risk of Flooding from Surface Water' dataset. The updated Risk of Flooding from Surface Water maps were published on the 28th January 2025 by the Environment Agency and were subsequently integrated into the Flood Map for Planning on 25th March 2025.

The revised mapping is considered to represent a significant improvement on previous iterations of the surface water flood maps, both in terms of method and representation of the risk of flooding.

The NaFRA dataset was created by combining the best available flood models (including locally produced detailed model information and national flood modelling) to generate the probability of flood risk for each 2m grid square of land, with the aim of using the best available flood risk information in any one location.

Considerable improvements have been made when compared to the previous iterations of the RoFSW dataset including a more accurate representation of buildings within the model terrain to better capture the influence of built footprints on flow routes, the correction of misinterpretations in earlier surface water maps that wrongly suggested some buildings would remain dry, and a focus toward assessing flood risk to land rather than individual properties.

The new RoFSW dataset includes details of the annual chance of flooding to a specific depth. The dataset presents the likelihood (categorised as High, Medium or Low) of flooding to reach the following depth increments at a set location in any given year:

- 0.2m
- 0.3m
- 0.6m
- 0.9m
- 1.2m

Risk is displayed as one of the following likelihood categories:

| | |
|-----------------|--|
| High | An area which has more than 3.3% chance of flooding each year |
| Medium | An area which has between 1% and 3.3% chance of flooding each year |
| Low | An area which has between 0.1% and 1% chance of flooding each year |
| Very Low | An area which has less than a 0.1% chance of flooding each year |

The 2025 RoFSW dataset includes modelled outputs for both the present day and climate change scenarios. The newly introduced climate change map shows the predicted impacts of climate change on future flood risk for the 2050's epoch (2040 – 2060) where the central allowances have been used to support short and medium-term decisions informed by the highest flood likelihood projections.

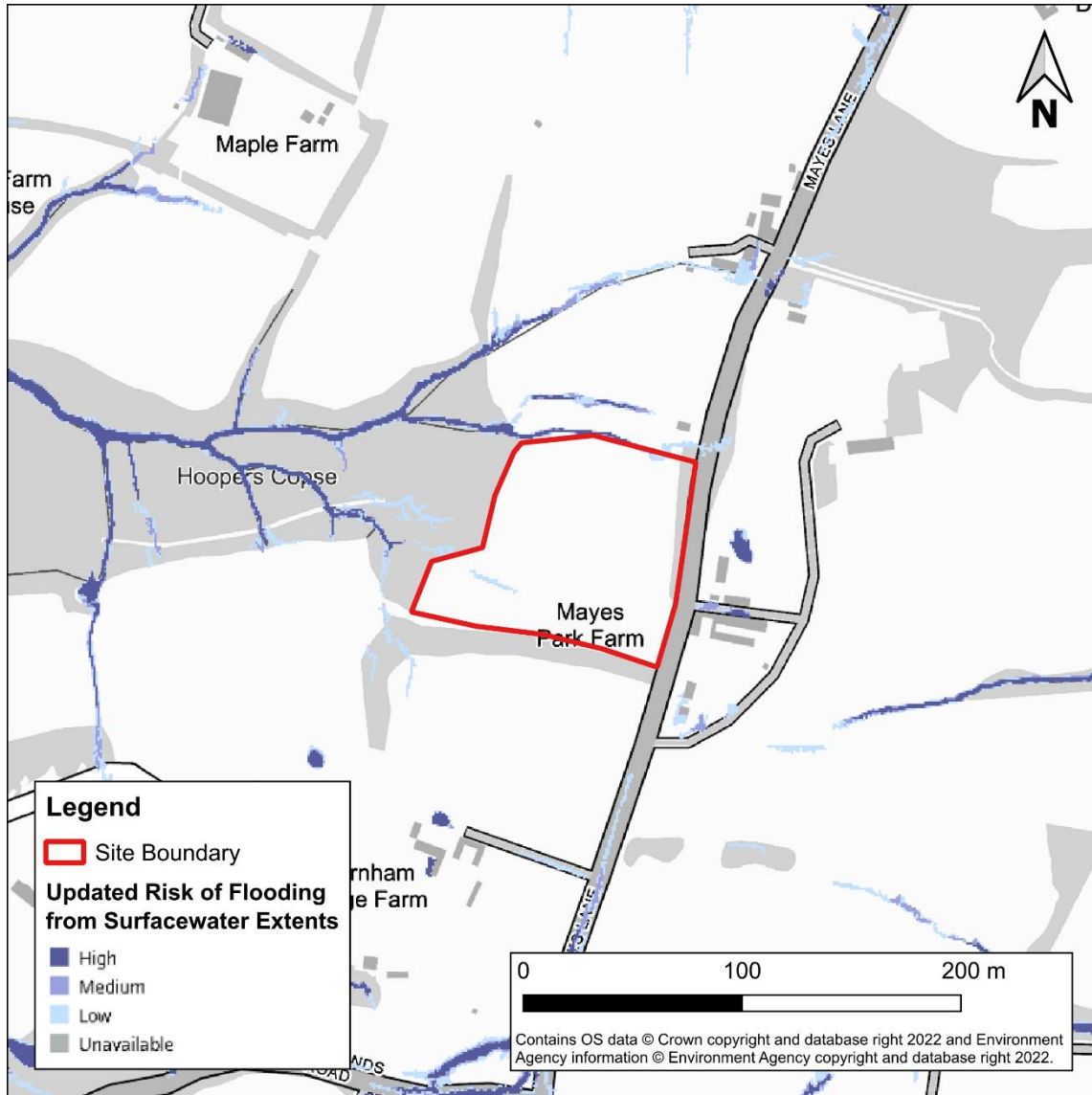


Figure 9: Risk of Flooding from Surface Water Map (Source: Environment Agency)

The EA's Risk of Flooding from Surface Water data (Figure 9) shows that the entire site is located within an area modelled to be at "Very Low" risk of flooding, with the exception of a small swathe of land in the south western corner which has been modelled at "Low" risk.

Land adjacent north of the application area has been modelled at "High" risk of surface water flooding.

However, having reviewed aerial imagery, EA LiDAR data and the information provided by the applicant from the site walkover, it appears that the linear strip of modelled "High" risk, adjacent north of the site, correlates with the position of an existing gully.

Considering that the area identified at risk is associated with an existing feature, the modelled risk in this location should be regarded as in-channel flows.

From the Site

Increases in impermeable surfacing can alter the runoff regime at a site and can lead to increased surface water runoff rates and volumes when compared to the pre-developed situation.

Any additional surface water runoff can increase flood risk to third party land, create new flow paths and can lead to pollution of downstream waterways. Considering this, post development surface water runoff will need to be managed appropriately.

Refer to the Outline Surface Water Drainage section for more information on the potential options available to manage post development surface water runoff at the site.

Groundwater

Groundwater flooding occurs when the water table rises up from the underlying rocks and emerges at the ground surface or within subsurface infrastructure (such as basements). Low lying areas that are underlain by permeable bedrock, superficial geology and aquifers are particularly susceptible to this form of flooding, especially during the winter months and after periods of heavy, sustained precipitation.

Unlike other mechanisms of flooding, groundwater flooding takes longer to dissipate as the water table needs to lower before any emerged flood water can soak back into the ground. As a result of this, whilst groundwater flooding does not pose a significant risk to life, flood waters can last for many months and can cause considerable damage to property.

Horsham District Council Level 1 Strategic Flood Risk Assessment (2024) uses the 2019 GeoSmart Groundwater Flood Risk dataset to assess the risk of groundwater emergence across the catchment area.

The GeoSmart Groundwater Flood Risk dataset does not show the risk of groundwater flooding, rather it identifies areas where geological conditions could enable groundwater flooding to occur.

The dataset shows that the majority of Horsham District Council is situated within Class 4 (Negligible Risk). This means that there is a less than 1% annual probability of groundwater flooding within each 5m grid square.

The site is shown to be located within a Class 4 area (refer to map extract in Figure 10). As such the site is considered to be at 'negligible' risk of groundwater flooding. No further information has been provided to suggest that the site is susceptible to groundwater emergence.

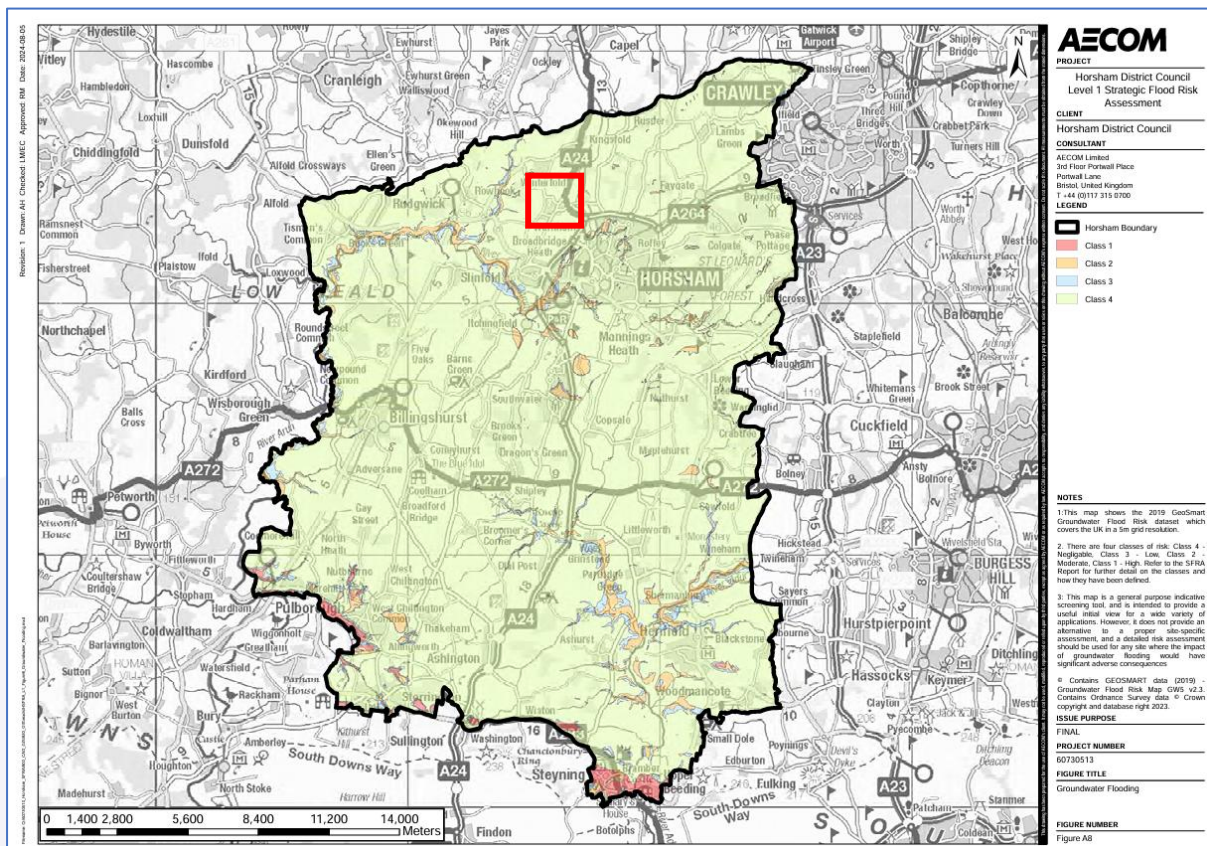


Figure 10: GeoSmart Groundwater Flood Risk Map (Source: HDC SFRA 2024)

Sewer Surcharge

Sewer flooding occurs when the volume of water entering a drainage system is greater than the capacity of the sewer network. It is often experienced during periods of heavy rainfall, when a large amount of precipitation falls within a short period of time, and overloads the sewer system capacity causing a surcharge and localised short-term flooding.

Sewer flooding can also occur when the sewerage system is unable to discharge as intended. This is frequently caused by problems such as high water levels within the receiving watercourse, blockages, siltation and structural defects.

Historical incidents of sewer flooding are detailed by water companies in a DG5 register which records incidents of internal and external flooding relating to public foul, combined or surface water sewers and displays which properties suffered flooding. For confidentiality reasons, this data is supplied on a postcode basis.

Horsham District Council Strategic Flood Risk Assessment (2024) includes details of the number of properties within a postcode region which experienced sewer flood incidents in the 10-year period between 2014-2024. This information was provided by Southern Water on a three to four digit postcode basis.

Review of Horsham District Council's Sewer Flooding Incidents Map indicates that there have been between 41 to 120 reported incidents of sewer flooding within the postcode area where the site is located.

Despite this, considering the site's current use it can be confidently assumed that the application area is at very low risk of sewer surcharge.

Reservoir

Reservoirs are artificially created lakes, typically formed by building a dam across an existing watercourse to hold water back. Whilst unlikely, flooding from reservoirs can occur as a result of water exceeding the reservoir capacity or structural failure of the dam or bank.

All large reservoirs are regulated under the Reservoirs Act 1975 and undergo regular maintenance to minimise the possibility of reservoir failure. This legislation is enforced by the Environment Agency and requires reservoirs to be routinely inspected and maintained to an appropriate standard. As an enforcement authority the Environment Agency is responsible for some 2,000 reservoirs in England and Wales.

The Environment Agency have produced a flood map which shows where water may go in the unlikely event of a dam or reservoir failure. Two flooding scenarios are shown on the reservoir flood maps:

- A 'dry-day' scenario which shows the predicted flood extents if a dam or reservoir failed when rivers are at normal levels
- A 'wet-day' scenario which shows how much greater the flood extent might be if a downstream river is already experiencing an extreme flood event

Review of the Environment Agency's Risk of Flooding from Reservoirs map indicates that the site is not located within the 'maximum extent of flooding from reservoirs'.

As such, the development is not considered to be susceptible to reservoir failure.

Other Sources

No other artificial infrastructure has been identified within the surrounding area which could pose a risk of flooding to the development.

Flood Risk Management

Finished Floor Levels

The NPPF requires new residential Finished Floor Levels to be set at least 300mm above the modelled 1 in 100 year plus allowance for climate change flood level.

The development is located entirely within Flood Zone 1 and is identified to be at 'Very Low' risk of flooding from surface water.

Despite this, it is recommended that the Finished Floor Level of the dwelling is designed in line with Building Regulations and is raised:

- At least 150mm above the surrounding external ground levels, and
- At least 300mm above any design water levels in the post development surface water drainage system. This includes all pipework, manholes and above ground SuDS storage features.

The architect has confirmed that the Finished Floor Level of the dwelling will be elevated 150mm above the surrounding ground levels, set at approximately 84.00mAOD or above.

Surface Water Flood Risk Mitigation

Whilst the entire site is located within an area modelled to be at 'Very Low' and 'Low' risk of surface water flooding, in line with Building Regulations, it is recommended that Finished Floor Level of the dwelling should be set at least 150mm above the surrounding ground level.

To further protect the development against the risk of surface water flooding, it is recommended that:

- Development within any localised topographic depressions is avoided.
- External landscaping is designed to slope away from the dwelling and outbuilding.
- Linear drains are installed in front of all building entry points / thresholds.
- Non-return valves are fitted on drains and pipes.
- Any chambers are fitted with double seal screw down cover and frame.
- Any cracks and holes in the external walls, including service and drainage entry points are sealed with mortar/sealant and made watertight.
- Any openings, such as air bricks, are designed to be at least 300mm above the surrounding external ground levels.
- Covers are available for airbricks, pet flaps and appliance vents.

These measures will help mitigate against overland flows being directed towards the buildings during storm events and will reduce the risk of stormwater ponding at threshold entry points and stormwater ingress.

Groundwater Flood Risk Mitigation

Whilst there is no evidence to suggest that the site has historically been impacted by groundwater flooding, it is recommended that the floor of the new residential dwelling is made of either solid construction materials or the ground beneath the suspended floor is sealed.

The inclusion of basements and subterranean rooms at the site is not recommended. However, should the applicant decide to incorporate subterranean rooms within the proposals at a later date they should be appropriately waterproofed.

These mitigation measures will protect against the unlikely occurrence of groundwater ingress should water table levels fluctuate in the future.

Flood Warnings and Alerts

The site is not located within an EA Flood Warning or Alert area.

However, future residents of the development should be advised to monitor weather forecasts by signing up to the Met Office weather warnings.

Safe Access and Egress

The NPPF requires all new residential developments in areas at risk of flooding to demonstrate a route of safe escape for residents and site users which can be maintained for the lifetime of the development.

Whilst the proposed application is for construction of a residential dwelling, the development is located entirely within Flood Zone 1. As such, a route of safe escape is not required.

Despite this, given that the house will be raised at least 150mm above the surrounding external ground levels, it is considered that safe refuge can be provided within the dwelling itself should an extreme event occur.

Outline Surface Water Drainage Strategy

Planning and Relevant Guidance

Given that the proposed development will alter the impermeable surfacing at the site and will impact the existing runoff regime, details of post development surface water management will be required to accompany the planning proposals.

The aim of this Surface Water Drainage Strategy is to assess how surface water runoff generated by the proposed development can be managed now and for the lifetime of the development so that future site users and third party land will not be at an increased risk of flooding as a result of the proposals.

This outline Surface Water Drainage Strategy has been designed in accordance with national and local guidance including:

- National Planning Policy Framework
- West Sussex County Council’s Guide for Master Planning Sustainable Drainage into Developments
- Planning Practice Guidance on Flood Risk and Coastal Change (Updated August 2022)
- National Standards for Sustainable Drainage Systems (SuDS) (July 2025)
- Sustainable Drainage Systems: Non-Statutory Technical Standards
- CIRIA SuDS Manual (c753)
- Sewerage Sector Guidance – Design and Construction Standards
- ICE SuDS Route Maps

Peak Rainfall Intensity Allowance

In May 2022 the Environment Agency issued revised peak rainfall intensity allowances for Management Catchments in England. The update introduced a regional variation in rainfall uplifts to account for Climate Change based on Management Catchment and development lifetime.

The Environment Agency published the Peak Rainfall Allowance Map which shows anticipated changes in peak rainfall intensity over time based on drainage catchment.

According to the EA’s Peak Rainfall Allowance Map the site is located within the Arun and Western Streams Management Catchment. Peak rainfall allowances for this catchment are as follows:

| 3.3% Annual Exceedance Rainfall Event | | |
|---------------------------------------|-------------------|---------------------|
| Epoch | Central Allowance | Upper End Allowance |
| 2050s | 20% | 35% |
| 2070s | 25% | 40% |
| 1% Annual Exceedance Rainfall Event | | |
| Epoch | Central Allowance | Upper End Allowance |
| 2050s | 20% | 45% |
| 2070s | 25% | 45% |

Table 5: Arun and Western Streams Management Catchment Peak Rainfall Allowances

The specific Climate Change allowance required to be applied within the attenuation storage calculations to account for future change in peak rainfall intensity is dependent on the design lifetime of the proposed development.

In accordance with the development lifetime guidance, residential developments should be considered to have a minimum lifetime of 100 years. Developments with a lifetime beyond 2100 should use the Upper End Allowance for the 2070s epoch for both the 1% and 3.3% annual exceedance probability events.

As such, this drainage strategy has been designed to accommodate all surface water runoff during the 1% annual exceedance probability Upper End Allowance (45%) Climate Change event.

Urban Creep

Urban creep is the conversion of permeable surfaces to impermeable over time. Typical examples include paving of front gardens to provide parking or extensions to existing buildings.

An allowance for urban creep is required to be considered within the drainage design for residential developments only to account for the incremental change of use from permeable to impermeable surfacing over the lifetime of a development.

Where applicable, the following allowances must be applied to the impermeable area within the site curtilage to account for urban creep:

| Residential Development Density (Dwellings per Hectare) | Urban Creep Allowance (%) |
|---|---------------------------|
| ≤ 25 | 10 |
| 30 | 8 |
| 35 | 6 |
| 45 | 4 |
| ≥ 50 | 2 |
| Flats and Apartments | 0 |

Table 6: Urban Creep Allowances

Note: Where the inclusion of the urban creep allowance would increase the total impermeable area to greater than 100% of the site area, the drainage system should be sized to accommodate runoff generated by 100% of the site area.

Given the nature of the proposed development and the site's intended use, a 10% allowance for urban creep has been accounted for within the design calculations.

Drainage Hierarchy

In accordance with NPPF guidance and the CIRIA SuDS manual all surface water drainage strategies should follow the Drainage Hierarchy whereby discharge options are considered in the following order:

1. Stormwater reuse,
2. Discharge to ground,
3. Discharge to watercourse,
4. Discharge to surface water sewer,
5. Discharge to combined sewer.

The following sections detail how the drainage hierarchy has been followed and each of the discharge locations considered as part of this drainage strategy.

Stormwater Reuse (Optional)

Review of the design layout indicates that gardens will be created as well as a stable block. Therefore, it is considered likely that there will be a demand for non-potable water supply post development.

Rainwater butts offer a simple mechanism for water re-use. They typically take the form of an above ground storage tank which collects roof runoff from building downpipes. Any stored water within the rainwater butt can subsequently be drawn off at a later time for non-potable uses such as wash-down purposes or irrigation use. In accordance with CIRIA SuDS Manual water re-use SuDS provide an *'indirect amenity value by supporting the resilience of developments and their landscape to changes in climate and water resource availability'*.

Rainwater butts are simple to incorporate within residential developments and can easily be added onto building downpipes at any stage of a development, with the tank overflow connected to the site's wider drainage system.

In practise, water re-use SuDS provide little in the way of attenuation storage therefore are not accounted for within the formal attenuation storage calculations. However, they do increase the lag time for storm water to enter a drainage system.

In light of the above, it is considered that there would a benefit from incorporating rainwater butts into the scheme as a form of water re-use SuDS to reduce post development water demand.

Infiltration to Ground

Review of British Geological Survey (BGS) records indicates that the site is located directly upon Weald Clay Formation bedrock.

Additionally, Landis Soilscales online viewer suggests that the site is located upon soils which are classified as *'slowly permeable seasonally wet slightly acid but base-rich loamy clayey soils with impeded drainage'*.

In light of the this, it is considered that a scheme based on infiltration to ground is unlikely to be feasible at the site. As such infiltration to ground has not been considered further.

Discharge to Watercourse

Given the rural nature of the application site and the fact that it is likely that some of the nearby water features have not been captured by OS mapping or aerial imagery, the applicant undertook a site walkover on the 16th November 2025 to investigate the closest watercourses to the site.

A drainage ditch was found to run in a southerly direction along Mayes Lane adjacent east of the application boundary. The applicant confirmed that whilst a ditch is located along the eastern boundary of the site the feature becomes more pronounced from 5.0m south east (on the opposite side of the footpath) onwards.

EA LiDAR data was used to ascertain approximate ground levels surrounding the ditch so that a top of bank and bed level could be estimated. Based on Environment Agency information the top of bank and bed level of the section of ditch some 10m south of the site is considered to be approximately 83.00mAOD and 82.50mAOD, respectively.

All levels will need to be confirmed by a topographic survey undertaken at detailed design stage.

Providing that the drainage ditch invert level is 82.50mAOD or less a gravity connection could be achieved to this feature from a shallow SuDS system at the site.

Furthermore, whilst the section of drainage ditch on the opposite side of the footpath is located outside of the red outline application boundary, this land is within the applicant's current ownership. Therefore, discharge to this drainage ditch can be achieved without the need to obtain third party land owner permission.

Considering the above, it is initially proposed to discharge all post development runoff at a controlled rate to the section of drainage ditch located along Mayes Lane.

However, following completion of the topographic survey should sufficient fall not be available for a gravity discharge to the ditch along Mayes Lane, a potential connection could be made to a watercourse located to the north of the site. If taken forward, further investigation would be required to ascertain a point of connection to this feature.

Post development discharge of surface water flows into an ordinary watercourse will be subject to receipt of Ordinary Watercourse Consent from West Sussex County Council.

Discharge to the water feature to the north of the site would also be subject to the applicant obtaining third party land owner permission to run infrastructure across third party land and construct a new outfall.

Discharge to Sewer

There are no main sewers beneath Mayes Lane or within vicinity to the application area.

It has been confirmed that the existing properties along Mayes Lane currently discharge surface water runoff into the surrounding ditches.

Therefore, a connection to the main sewer network has not been explored further within this drainage strategy.

Existing Runoff Rates

The FEH Statistical Method has been used to estimate the greenfield runoff rate for several return period events including QBAR.

Greenfield runoff rates have been calculated based on a site area of 35930m² and a development area of 2412m².

Copies of the calculation sheets are included in Appendix C.

| Storm Event | Greenfield Runoff Rate (l/s) | |
|---------------|------------------------------|------------------|
| | Whole Site | Development Area |
| QBAR | 34.4 | 2.3 |
| 1 in 1 year | 29.2 | 2.0 |
| 1 in 30 year | 79.1 | 5.3 |
| 1 in 100 year | 109.7 | 7.3 |

Table 7: Greenfield Runoff Rates

Post Development Surfacing

The proposed development will introduce approximately 2412m² of new surfacing to the site; comprised of 653m² of roof area, 229m² of patio/terrace and 1530m² of driveway.

The architect has confirmed that as part of the development land levels within proximity to the buildings will be altered to accommodate the proposals.

Whilst the development is at the early stages of the design process (and levels are subject to change) the architect has confirmed that the current intention is for each element of the build to be set at the following elevation.

- House - 84.00mAOD
- Terrace to west of house - 83.85mAOD
- Garage - 84.25mAOD
- Stables - 84.40mAOD (assumed terrace adjacent to stables will also be set at this level)
- Parking area - 84.00mAOD
- Turning circle - 83.85mAOD
- Access road - 83.85mAOD (based on EA LiDAR data the access road will follow the contour of the land. Therefore, for the purposes of this study it is assumed that the road will be set at a similar level to the turning circle)

Post development surfacing and elevations are shown in Figure 11. Final post development levels will be confirmed at detailed design stage.

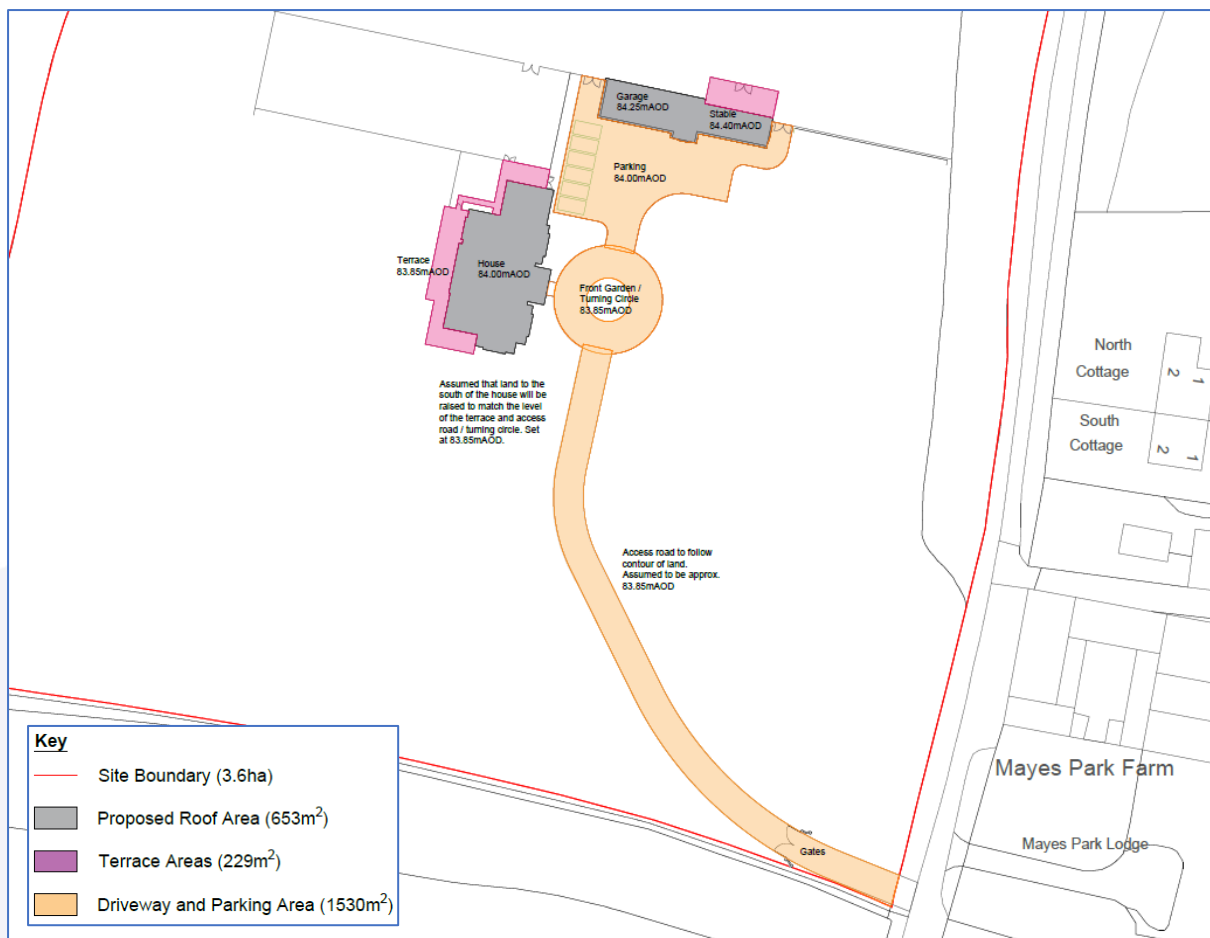


Figure 11: Post Development Surfacing and Elevations

SuDS Scheme

It is proposed to manage post development surface water runoff from the site via a treatment train comprised of three shallow ponds/detention basins, a swale and permeable paving sub-base.

The proposed SuDS system has been designed to provide sufficient storage to accommodate all runoff generated by impermeable areas during the 1 in 100 year plus (45%) Climate Change event.

Surface water runoff generated by the stables, garage and stable terrace area will be directed towards Pond 1.

Surface water runoff from the house and the dwelling terrace will be directed towards Pond 2.

Based on the current site level information, surface level drainage infrastructure such as channel drains and rills will be required to convey water around the site.

From Pond 2 water will be directed towards Pond 3 via a swale which will run along the west of the driveway.

The driveway and parking area will be underlain by unlined gravel sub-base with a depth of 250mm. The unlined (lined with permeable membrane) sub-base will allow infiltration where possible and will enable the interception standard to be met. Given the length of the driveway, it is recommended that an underdrain is installed within the sub-base to promote full drainage of the system into Pond 3.

From Pond 3 water will be discharged at a controlled rate of 2.3 l/s into the drainage ditch along Mayes Lane. Equivalent to the existing greenfield QBAR rate for the development area (subject to receipt of Ordinary Watercourse Consent from West Sussex County Council).

All preliminary surface water drainage calculations have been undertaken using Innoyze InfoDrainage software.

A summary of the design parameters for each SuDS feature is shown in Table 8, below. The InfoDrainage calculation sheets are included in Appendix E.

| | Pond 1 | Pond 2 | Swale | Driveway Sub-Base | Pond 3 |
|---|-----------------------------|--|----------------------------------|-------------------------------------|--|
| Contribution Area | Garage, stables and terrace | House, terrace and discharge from Pond 1 | Discharge from Pond 2 | Driveway and parking area | Discharge from driveway sub-base and swale |
| Dimension of Proposed SuDS feature | 170m ² x 0.6m | 190m ² x 0.6m | 60m long x 3.3m wide x 0.5m deep | 1418m ² x 0.25m sub-base | 300m ² x 0.6m |
| Discharge Rate (l/s) | 1.5 | - | 3.0 | 2.0 | 2.3 |
| Total Volume Provided SuDS (m³) | 27.442 | 28.730 | 21.600 | 106.785 | 50.023 |

Table 8: Summary of Proposed SuDS System

Design Exceedance

The SuDS system has been designed to accommodate surface water runoff generated by 2412m² of impermeable surfacing (plus urban creep) during the 1 in 100yr plus (45%) Climate Change event. As such, the SuDS system also has capacity to accommodate all runoff generated by the 1 in 30yr plus (40%) Climate Change rainfall event with no exceedance.

Despite this it is recommended that the profile of the site is designed to direct any exceedance surface water flows towards the formal drainage system.

In addition, it is advised that raised thresholds are put in place in line with building regulations, linear drains are installed at entrance points and all landscaping is designed to slope away from doorways. These measures will mitigate against water ingress.

Water Quality

In accordance with The Simple Index Approach, detailed in the CIRIA SuDS Manual, residential roof runoff is considered to have a 'very low' pollution hazard level (refer to Table 9). Nevertheless, it is recommended that sediment traps are included on any new drainage.

Runoff from private driveways is considered to have a 'low' pollution hazard level.

| Land Use | Pollution Hazard Level | Total Suspended Solids (TSS) | Metals | Hydrocarbons |
|-------------------------------|------------------------|------------------------------|--------|--------------|
| Residential Roofs | Very Low | 0.2 | 0.2 | 0.05 |
| Individual Property Driveways | Low | 0.5 | 0.4 | 0.4 |

Table 9: Pollution Hazard Indices for Different Land Use Classifications

It is proposed to manage all surface water runoff generated by the site via a combination of shallow ponds/detention basins, a swale and permeable paving sub-base. Indicative SuDS mitigation indices for all proposed SuDS features are as follows:

| Type of SuDS Component | Mitigation Indices | | |
|------------------------|------------------------------|--------|--------------|
| | Total Suspended Solids (TSS) | Metals | Hydrocarbons |
| Detention Basin | 0.5 | 0.5 | 0.6 |
| Attenuation Pond | 0.7 | 0.7 | 0.5 |
| Swale | 0.5 | 0.6 | 0.6 |
| Permeable Pavement | 0.7 | 0.6 | 0.7 |

Table 10: Indicative SuDS Mitigation Indices for Discharges to Surface Waters

As demonstrated in Table 10 the proposed SuDS features will provide adequate treatment for surface water runoff and are shown to have a higher mitigation index than the pollution hazard index for the development.

Scheme Dependencies

Post development discharge to the drainage ditch along Mayes Lane will be subject to:

- The topographic survey showing that there is sufficient fall at the site to allow a gravity connection into the receiving ditch
- Confirmation of the post development site levels
- Receipt of Ordinary Watercourse Consent from West Sussex County Council

Alternative SuDS Solutions

The SuDS scheme outlined within this report is the preferred solution to manage post development runoff from the site. However, it is noted that the scheme is based on several assumptions including that a gravity connection can be achieved to the drainage ditch located along Mayes Lane.

At detailed design stage, should for any reason discharge to the ditch along Mayes Lane be found not to be possible an alternative discharge location may be provided by the watercourse to the north of the site.

Connection to the watercourse to the north of the site would be subject to further investigation as well as obtaining third party land owner permission to run infrastructure across third party land.

In the instance that discharge to the watercourse to the north of the site needs to be taken forward (or a pumped system to the ditch along Mayes Lane is approved), a single pond or tank which an attenuation capacity of approximately 190m³ would provide sufficient storage to accommodate runoff from the development during the design storm event whilst limiting discharge to the existing QBAR rate (2.3l/s).

Adoption and Maintenance

It is foreseen that all SuDS components will be maintained privately by the future site owner(s) / operators or an appropriate management company.

All SuDS components should be maintained in line with the guidance provided in The SuDS Manual (C753). The following operation and maintenance requirements are recommended for the SuDS elements proposed in this strategy.

Given the requirement for shallow falls within the system (to enable the movement of water across the site), regular maintenance and clearance of all debris and silt will be key to make sure that the system operates at full capacity at all times.

| Drainage Infrastructure | Required Action | Typical Frequency |
|-------------------------------------|--|---|
| Conveyance Pipes | Inspect and remove silt/debris. Jet where appropriate. | To be inspected annually and as required. |
| Chambers and Catchpits | Inspect and remove silt/debris. Jet where appropriate. Replace damaged covers. | To be inspected annually and following a large storm event. |
| Flow Control and Associated Chamber | Inspect for blockages and clear where required. Remediate any faults. | To be inspected annually and following a large storm event. |

Table 11: Suggested Maintenance Requirements for Drainage Infrastructure

TABLE 20.15 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, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment |
| Occasional maintenance | Stabilise and mow contributing and adjacent areas | As required |
| | Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying | As required – once per year on less frequently used pavements |
| Remedial Actions | Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving | As required |
| | Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material | As required |
| | Rehabilitation of surface and upper substructure by remedial sweeping | Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging) |
| 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, 48 h after large storms in first six months |
| | Inspect silt accumulation rates and establish appropriate brushing frequencies | Annually |
| | Monitor inspection chambers | Annually |

Table 12: Maintenance Requirements for Pervious Pavements (Source: CIRIA SuDS Manual)

TABLE 23.1 Operation and maintenance requirements for ponds and wetlands

| Maintenance schedule | Required action | Typical frequency |
|----------------------|---|--|
| Regular maintenance | Remove litter and debris | Monthly (or as required) |
| | Cut the grass – public areas | Monthly (during growing season) |
| | Cut the meadow grass | Half yearly (spring, before nesting season, and autumn) |
| | Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years) | Monthly (at start, then as required) |
| | Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage and/or physical damage | Monthly |
| | Inspect water body for signs of poor water quality | Monthly (May – October) |
| | Inspect silt accumulation rates in any forebay and in main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build-up has occurred, to inform management and disposal options | Half yearly |
| | Check any mechanical devices, eg penstocks | Half yearly |
| | Hand cut submerged and emergent aquatic plants (at minimum of 0.1 m above pond base; include max 25% of pond surface) | Annually |
| | Remove 25% of bank vegetation from water's edge to a minimum of 1 m above water level | Annually |
| | Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract) | Annually |
| | Remove sediment from any forebay. | Every 1–5 years, or as required |
| | Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays. | Every 5 years, or as required |
| | Occasional maintenance | Remove sediment from the main body of big ponds when pool volume is reduced by 20% |
| Remedial actions | Repair erosion or other damage | As required |
| | Replant, where necessary | As required |
| | Aerate pond when signs of eutrophication are detected | As required |
| | Realign rip-rap or repair other damage | As required |
| | Repair / rehabilitate inlets, outlets and overflows. | As required |

Table 13: Maintenance Requirements for Ponds (Source: CIRIA SuDS Manual)

TABLE 22.1 Operation and maintenance requirements for detention basins

| Maintenance schedule | Required action | Typical frequency |
|------------------------|--|---|
| Regular maintenance | Remove litter and debris | Monthly |
| | Cut grass – for spillways and access routes | Monthly (during growing season), or as required |
| | Cut grass – meadow grass in and around basin | Half yearly (spring – before nesting season, and autumn) |
| | Manage other vegetation and remove nuisance plants | Monthly (at start, then as required) |
| | Inspect inlets, outlets and overflows for blockages, and clear if required. | Monthly |
| | Inspect banksides, structures, pipework etc for evidence of physical damage | Monthly |
| | Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies. | Monthly (for first year), then annually or as required |
| | Check any penstocks and other mechanical devices | Annually |
| | Tidy all dead growth before start of growing season | Annually |
| | Remove sediment from inlets, outlet and forebay | Annually (or as required) |
| | Manage wetland plants in outlet pool – where provided | Annually (as set out in Chapter 23) |
| Occasional maintenance | Reseed areas of poor vegetation growth | As required |
| | Prune and trim any trees and remove cuttings | Every 2 years, or as required |
| | Remove sediment from inlets, outlets, forebay and main basin when required | Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided) |
| Remedial actions | Repair erosion or other damage by reseeding or re-turfing | As required |
| | Realignment of rip-rap | As required |
| | Repair/rehabilitation of inlets, outlets and overflows | As required |
| | Relevel uneven surfaces and reinstate design levels | As required |

Table 14: Maintenance Requirements for Detention Basin (Source: CIRIA SuDS Manual)

TABLE 17.1 Operation and maintenance requirements for swales

| Maintenance schedule | Required action | Typical frequency |
|------------------------|--|---|
| Regular maintenance | Remove litter and debris | Monthly, or as required |
| | Cut grass – to retain grass height within specified design range | Monthly (during growing season), or as required |
| | Manage other vegetation and remove nuisance plants | Monthly at start, then as required |
| | Inspect inlets, outlets and overflows for blockages, and clear if required | Monthly |
| | Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours | Monthly, or when required |
| | Inspect vegetation coverage | Monthly for 6 months, quarterly for 2 years, then half yearly |
| | Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies | Half yearly |
| Occasional maintenance | Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required | As required or if bare soil is exposed over 10% or more of the swale treatment area |
| Remedial actions | Repair erosion or other damage by re-turfing or reseeded | As required |
| | Relevel uneven surfaces and reinstate design levels | As required |
| | Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface | As required |
| | Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip | As required |
| | Remove and dispose of oils or petrol residues using safe standard practices | As required |

Table 15: Maintenance Requirements for Swales (Source: CIRIA SuDS Manual)

Conclusions and Recommendations

Conclusions

GeoSon Limited have been instructed by Robert and Vanessa Sharpe to undertake a Site Specific Flood Risk Assessment (FRA) and outline Surface Water Drainage Strategy to support a proposed planning application for development at Little Warnham Lodge, Mayes Lane, Warnham.

The proposed application is located upon land to the north of Warnham Lodge Farm, Mayes Lane, Warnham RH12 3SG. The site measures approximately 3.6ha and is currently vacant. The landowners have confirmed that the application area was formerly used for livestock grazing.

The proposed planning application relates to construction of a new residential dwelling and garage/stables with associated driveway and parking.

According to plans provided by the applicant, post development, the newly introduced surfacing at the site will amount to approximately 2412m²; comprised of 653m² of roof area and 1759m² of patio/driveway.

Flood Risk Assessment Summary

Review of Horsham District Council's flood risk documentation along with the Environment Agency's Recorded Flood Outline and Historic Flood Map datasets indicate that the site and the immediate surrounding area have not been subject to historical flooding.

According to the Environment Agency's Flood Map for Planning the site and the surrounding area are located entirely within Flood Zone 1 (Low Probability), defined as land which has less than a 1 in 1000 annual probability of fluvial flooding.

The EA's Risk of Flooding from Surface Water data shows that the entire site is located within an area modelled to be at "Very Low" risk of flooding from surface water, with the exception of a small swathe of land in the south western corner which has been modelled at "Low" risk.

Horsham District Council Level 1 Strategic Flood Risk Assessment (2024) uses the 2019 GeoSmart Groundwater Flood Risk dataset to assess the risk of groundwater emergence across the catchment area. The site is shown to be located within a Class 4 area. As such, the site is considered to be at 'negligible' risk of groundwater flooding.

No further information has been provided to suggest that the site is susceptible to groundwater emergence.

No information has been provided to suggest that the site has historically been subject to sewer surcharge flooding.

Review of the Environment Agency's Risk of Flooding from Reservoirs map indicates that the site is not located within the 'maximum extent of flooding from reservoirs'. As such, the development is not considered to be susceptible to reservoir failure.

No other artificial infrastructure has been identified within the surrounding area which could pose a risk of flooding to the development.

Considering the flood risks identified at the site, the following mitigation measures are recommended:

- It is recommended that the Finished Floor Level of the dwelling is designed in line with Building Regulations and is raised:
 - At least 150mm above the surrounding external ground levels, and
 - At least 300mm above any design water levels in the post development surface water drainage system.
- The architect has confirmed that the Finished Floor Level of the dwelling will be elevated 150mm above the surrounding ground levels, set at approximately 84.00mAOD or above.
- To offer additional protection against surface water ingress, flood risk mitigation measures have been suggested for the development on Page 28.
- External landscaping should be designed to slope away from all buildings.
- Linear drains should be installed in front of all building entry points / thresholds.
- It is recommended that the floor of the new residential unit is made of either solid construction materials or the ground beneath the suspended floor is sealed.
- Future owners/occupants should be advised to monitor weather forecasts by signing up to the Met Office weather warnings.
- In the event of an extreme flood incident, it is considered that safe refuge can be provided within the new dwelling itself.

Outline Surface Water Drainage Strategy Summary

Given that the proposed development will alter the impermeable surfacing at the site and will impact the existing runoff regime, details of post development surface water management will be required to accompany the planning proposals.

This Surface Water Drainage Strategy outlines how surface water runoff generated from all newly introduced impermeable surfaces can be managed so as not to increase the risk of flooding to third party land.

According to plans provided by the applicant, the proposed development will introduce approximately 2412m² of new surfacing to the site; comprised of 653m² of roof area, 229m² of patio/terrace and 1530m² of driveway.

The architect has confirmed that as part of the development land levels within proximity to the buildings will be altered to accommodate the proposals. Post development surfacing and elevations are shown in Figure 11. Final post development levels will be confirmed at detailed design stage.

It is proposed to manage post development surface water runoff from the site via a treatment train comprised of three shallow ponds/detention basins, a swale and permeable paving sub-base.

The proposed SuDS system has been designed to provide sufficient storage to accommodate all runoff generated by impermeable areas during the 1 in 100 year plus (45%) Climate Change event.

Discharge from the SuDS system will be limited to a maximum rate of 2.3 l/s for all events including the 1 in 100 year plus (45%) Climate Change scenario. This discharge rate is equivalent to the existing greenfield QBAR rate for the development area.

A summary of the design parameters for each SuDS feature is shown below:

| | Pond 1 | Pond 2 | Swale | Driveway Sub-Base | Pond 3 |
|--|-----------------------------|--|----------------------------------|-------------------------------------|--|
| Contribution Area | Garage, stables and terrace | House, terrace and discharge from Pond 1 | Discharge from Pond 2 | Driveway and parking area | Discharge from driveway sub-base and swale |
| Dimension of Proposed SuDS feature | 170m ² x 0.6m | 190m ² x 0.6m | 60m long x 3.3m wide x 0.5m deep | 1418m ² x 0.25m sub-base | 300m ² x 0.6m |
| Discharge Rate (l/s) | 1.5 | - | 3.0 | 2.0 | 2.3 |
| Total Volume Provided SuDS (m ³) | 27.442 | 28.730 | 21.600 | 106.785 | 50.023 |

The SuDS system has been designed to accommodate surface water runoff generated by 2412m² of impermeable surfacing (plus urban creep) during the 1 in 100yr plus (45%) Climate Change event. As such, the SuDS system also has capacity to accommodate all runoff generated by the 1 in 30yr plus (40%) Climate Change rainfall event with no exceedance.

Given the requirement for shallow falls within the system (to enable the movement of water across the site), regular maintenance and clearance of all debris and silt will be key to make sure that the system operates at full capacity at all times.

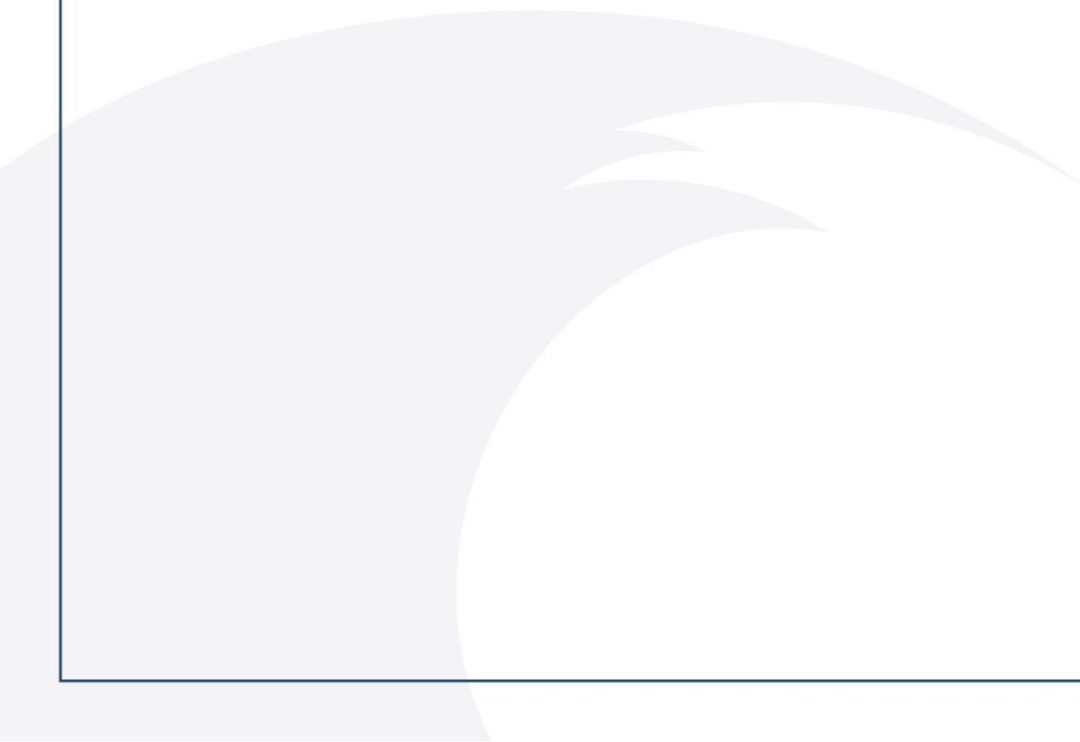
The proposed SuDS features will provide adequate treatment for surface water runoff and are shown to have a higher mitigation index than the pollution hazard index for the development.

The current SuDS scheme is based on several assumptions and is subject to the dependencies listed on Page 38.

Appendix

- A. Existing Plans
- B. Proposed Development Plans
- C. Greenfield Runoff Calculations
- D. SuDS Layout Plan and Schematic
- E. SuDS Design Calculations

Appendix A

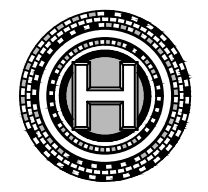


This drawing is to be read in conjunction with all other relevant drawings and specifications. Do not scale from this drawing (Unless for planning purposes). Use figured dimensions only. All levels and dimensions to be checked on site prior to commencement of works on site. All dimensional discrepancies are to be brought to the immediate attention of the originator. Responsibility cannot be accepted for alteration and/or deviation from this design without prior knowledge. Copyright reserved. This drawing may only be used under licence for the client and location specified in the title block. It may not be copied or disclosed to any other third party without prior written consent. It is the responsibility of the Client to check Legal Boundaries are correctly indicated and that relevant Party Wall Notices (usually served via a Surveyor) where required have been served to adjoining neighbours prior to any commencement of works. No responsibility will be held by Simon Harvey Designs Ltd for any failure in the above.



A - Planning Issue. - 02.12.2025

Revision



SIMON HARVEY DESIGNS LTD
 2 Greenfield Way,
 Storrington,
 West Sussex,
 RH20 4PY
 t: 07833 178649
 e: office@simonharveydesigns.com

Client: Mr & Mrs Sharpe

Project: New Build Dwellinghouse at;

Address: Land north of Warnham Lodge,
 Mayes Lane,
 Warnham,
 West Sussex.
 RH12 3SG

Drawing Title: LOCATION PLAN

Drawing Number: 157_01

Date: November 2025 Scale: 1:1250 @A3

PLANNING

Appendix B



This drawing is to be read in conjunction with all other relevant drawings and specifications.
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This drawing is to be read in conjunction
 with Landscape Architect's Design for all
 soft and hard-landscaping features.



A - Planning Issue. Boot room porch amended.
 Revision - 02.12.2025

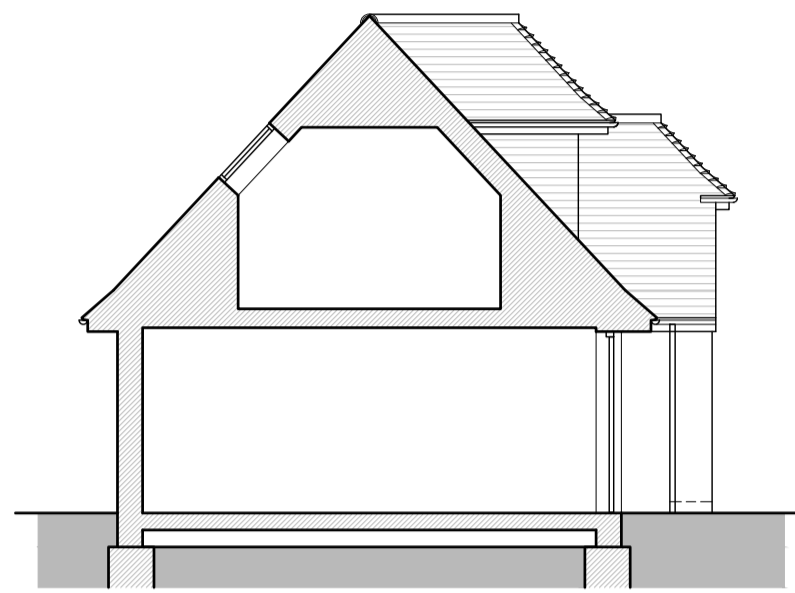
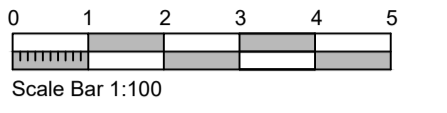
Revision

| | |
|---|---|
|  | SIMON HARVEY DESIGNS LTD 2 Greenfield Way, Storrington, West Sussex, RH20 4PY t: 07833 178649 e: office@simonharveydesigns.com |
| | Client: Mr & Mrs Sharpe Project: New Build Dwelling at; Address: Land north of Warnham Lodge Mayes Lane, Warnham, West Sussex. RH12 3SG |

PLANNING

Drawing Title: PROPOSED SITE BLOCK PLAN
 Drawing Number: 157_02
 Date: November 2025 Scale: 1:500 @A1

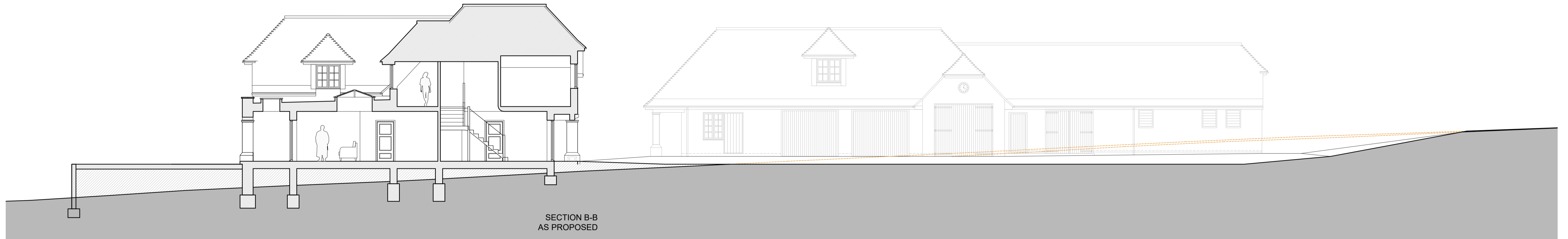
This drawing is to be read in conjunction with all other relevant drawings and specifications.
 Do not scale from this drawing (unless for planning purposes). Use figured dimensions only.
 All work and dimensions to be checked on site prior to commencement of work.
 All dimensional discrepancies are to be brought to the immediate attention of the originator. Responsibility cannot be accepted for alteration or deviation from this design without prior knowledge.
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OUTBUILDING
PROPOSED SECTION



SECTION A-A
AS PROPOSED



SECTION B-B
AS PROPOSED

A - Planning Issue. - 02.12.2025

Revision



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Client: Mr & Mrs Sharpe

Project: New Build Dwelling at;

Address: Land north of Warnham Lodge
 Mayes Lane,
 Warnham,
 West Sussex.
 RH12 3SG

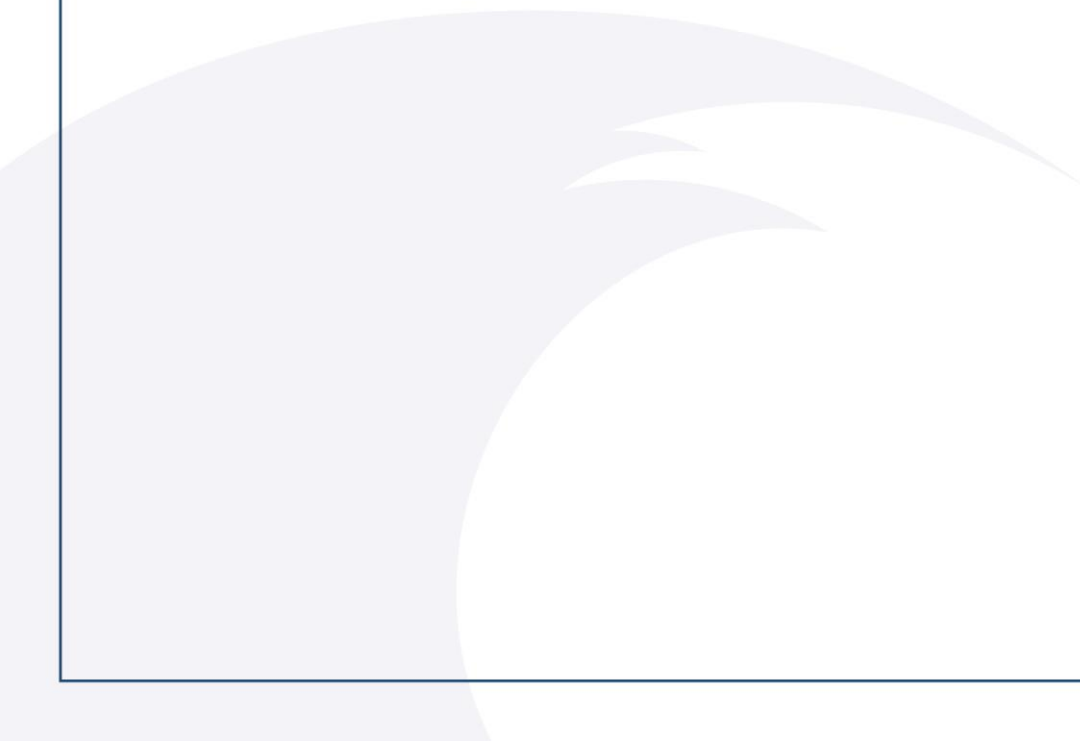
Drawing Title: PROPOSED SECTIONS

Drawing Number: 157_08

Date: November 2025 Scale:1:100 @A1

PLANNING

Appendix C



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 | <input type="text" value="11/12/2025"/> |
| Calculated by | <input type="text"/> |
| Reference | <input type="text"/> |
| Model version | <input type="text" value="2.2.2"/> |

Location

| | |
|---------------|---|
| Site name | <input type="text" value="Little Warnham Lodge"/> |
| Site location | <input type="text"/> |



| | |
|---------------------------------------|-------------------------------------|
| Site easting (British National Grid) | <input type="text" value="515448"/> |
| Site northing (British National Grid) | <input type="text" value="135011"/> |

Site details

| | | |
|----------------------|------------------------------------|----|
| Total site area (ha) | <input type="text" value="3.593"/> | ha |
|----------------------|------------------------------------|----|

Greenfield runoff

Method

Method

FEH statistical (2025)

| | <u>My value</u> | <u>Map value</u> |
|-----------------------------------|------------------------------------|------------------------------------|
| SAAR9120 (mm) | <input type="text" value="861"/> | <input type="text" value="mm"/> |
| BFIHOST19scaled | <input type="text" value="0.236"/> | |
| QMed-QBar conversion | <input type="text" value="1.136"/> | <input type="text" value="1.136"/> |
| QMed (l/s) | <input type="text" value="30.3"/> | <input type="text" value="l/s"/> |
| QBar (FEH statistical 2025) (l/s) | <input type="text" value="34.4"/> | <input type="text" value="l/s"/> |

Growth curve factors

| | <u>My value</u> | <u>Map value</u> |
|------------------------|-----------------------------------|--------------------------------|
| Hydrological region | <input type="text" value="7"/> | <input type="text" value="7"/> |
| 1 year growth factor | <input type="text" value="0.85"/> | |
| 2 year growth factor | <input type="text" value="0.88"/> | |
| 10 year growth factor | <input type="text" value="1.62"/> | |
| 30 year growth factor | <input type="text" value="2.3"/> | |
| 100 year growth factor | <input type="text" value="3.19"/> | |
| 200 year growth factor | <input type="text" value="3.74"/> | |

Results

| | | |
|---------------------------|---|----------------------------------|
| Method | <input type="text" value="FEH statistical (2025)"/> | |
| Flow rate 1 year (l/s) | <input type="text" value="29.2"/> | <input type="text" value="l/s"/> |
| Flow rate 2 year (l/s) | <input type="text" value="30.3"/> | <input type="text" value="l/s"/> |
| Flow rate 10 years (l/s) | <input type="text" value="55.7"/> | <input type="text" value="l/s"/> |
| Flow rate 30 years (l/s) | <input type="text" value="79.1"/> | <input type="text" value="l/s"/> |
| Flow rate 100 years (l/s) | <input type="text" value="109.7"/> | <input type="text" value="l/s"/> |
| Flow rate 200 years (l/s) | <input type="text" value="128.6"/> | <input type="text" value="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/) (<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) (<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.

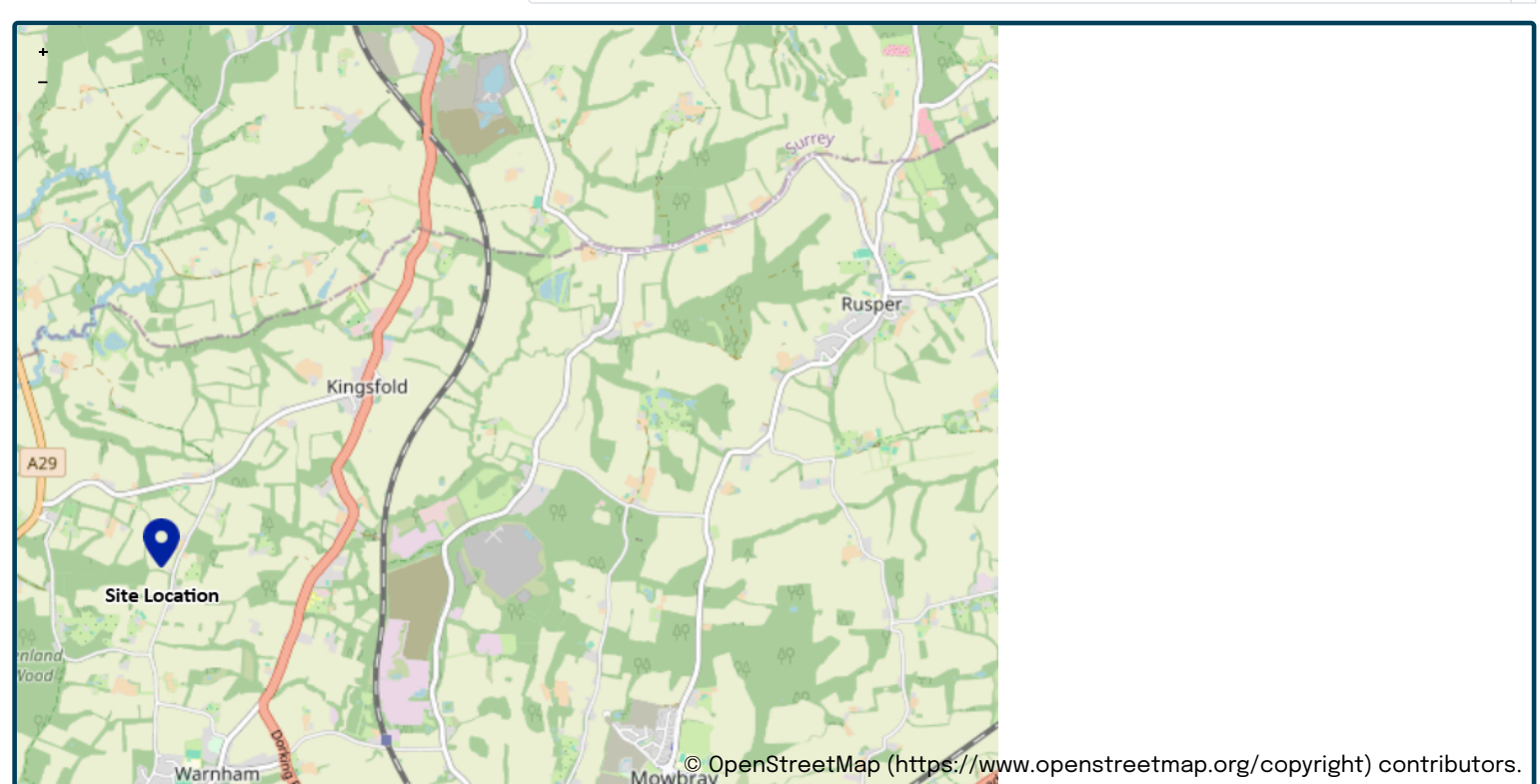
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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 | <input type="text" value="11/12/2025"/> |
| Calculated by | <input type="text"/> |
| Reference | <input type="text"/> |
| Model version | <input type="text" value="2.2.2"/> |

Location

| | |
|---------------|---|
| Site name | <input type="text" value="Little Warnham Lodge"/> |
| Site location | <input type="text"/> |



| | |
|---------------------------------------|-------------------------------------|
| Site easting (British National Grid) | <input type="text" value="515448"/> |
| Site northing (British National Grid) | <input type="text" value="135011"/> |

Site details

| | | |
|----------------------|-----------------------------------|----|
| Total site area (ha) | <input type="text" value="0.24"/> | ha |
|----------------------|-----------------------------------|----|

Greenfield runoff

Method

Method

FEH statistical (2025)

| | <u>My value</u> | <u>Map value</u> |
|-----------------------------------|------------------------------------|------------------------------------|
| SAAR9120 (mm) | <input type="text" value="861"/> | <input type="text" value="mm"/> |
| BFIHOST19scaled | <input type="text" value="0.236"/> | |
| QMed-QBar conversion | <input type="text" value="1.136"/> | <input type="text" value="1.136"/> |
| QMed (l/s) | <input type="text" value="2"/> | <input type="text" value="l/s"/> |
| QBar (FEH statistical 2025) (l/s) | <input type="text" value="2.3"/> | <input type="text" value="l/s"/> |

Growth curve factors

| | <u>My value</u> | <u>Map value</u> |
|------------------------|-----------------------------------|--------------------------------|
| Hydrological region | <input type="text" value="7"/> | <input type="text" value="7"/> |
| 1 year growth factor | <input type="text" value="0.85"/> | |
| 2 year growth factor | <input type="text" value="0.88"/> | |
| 10 year growth factor | <input type="text" value="1.62"/> | |
| 30 year growth factor | <input type="text" value="2.3"/> | |
| 100 year growth factor | <input type="text" value="3.19"/> | |
| 200 year growth factor | <input type="text" value="3.74"/> | |

Results

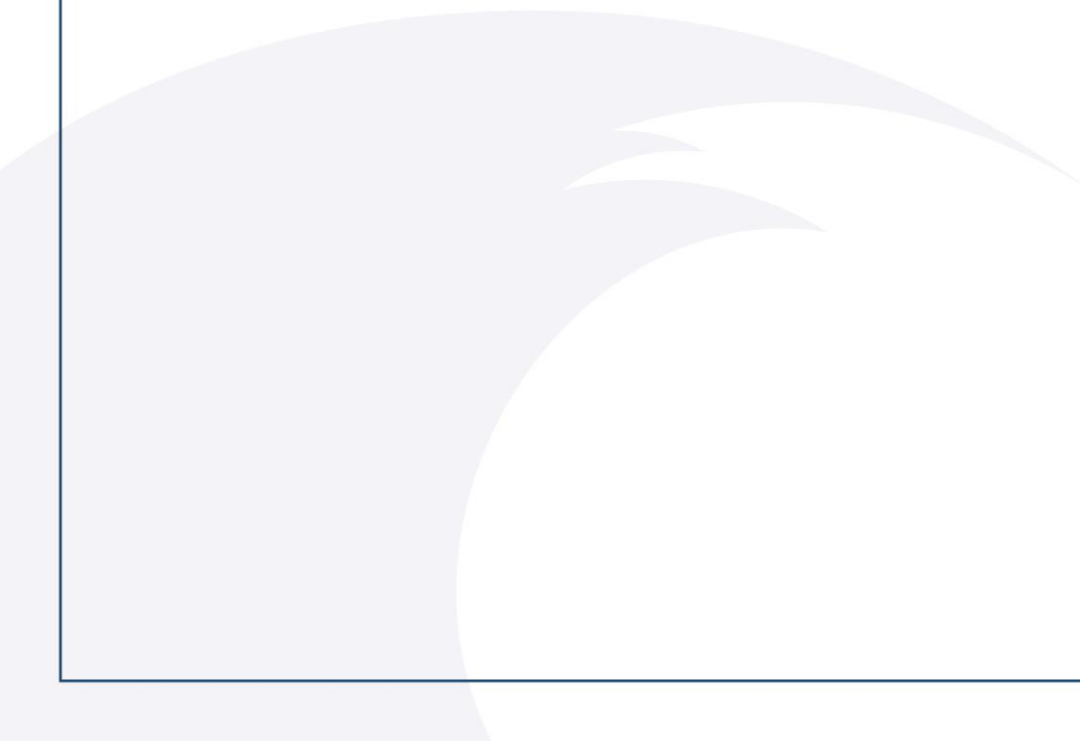
| | | |
|---------------------------|---|----------------------------------|
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| Flow rate 2 year (l/s) | <input type="text" value="2.0"/> | <input type="text" value="l/s"/> |
| Flow rate 10 years (l/s) | <input type="text" value="3.7"/> | <input type="text" value="l/s"/> |
| Flow rate 30 years (l/s) | <input type="text" value="5.3"/> | <input type="text" value="l/s"/> |
| Flow rate 100 years (l/s) | <input type="text" value="7.3"/> | <input type="text" value="l/s"/> |
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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

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Appendix D



- Key**
- Site Boundary (3.6ha)
 - Proposed Roof Area (653m²)
 - Terrace Areas (229m²)
 - Driveway (1530m²)
 - ▨ Permeable Sub-Base (1418m²)
 - Ponds / Detention Basins
 - Swale
 - Linear Drains
 - Proposed Surface Water Infrastructure
 - Proposed Surface Water Manhole
 - Proposed Flow Controls
 - Proposed Outfall
 - Existing Drainage Ditch
 - ➔ Potential Overland Flow Route

- Notes**
1. All dimensions in this drawing are in millimetres unless stated otherwise.
 2. All levels are in metres Above Ordnance Datum (mAOD).
 3. The proposed drainage layout is based on the drawing reference LITTLE WARNHAM LODGE PLANNING_revA provided by Simon Harvey Designs Ltd.
 4. A combination of Environment Agency LiDAR data and information from the architect (Simon Harvey Designs Ltd) has been used to determine approximate post development ground levels across the site. Final levels should be confirmed by a topographic survey undertaken to mAOD prior to construction, at detailed design stage.
 5. The invert level of the drainage ditch along Mayes Lane has been estimated based on EA LiDAR data and the photographs provided by the applicant. The top of bank and bed level of the drainage ditch along Mayes Lane should be confirmed by the topographic survey at detailed design stage.
 6. The topographic survey findings will be used to determine the final SuDS invert levels and sizing.
 7. At this stage, based on the information available, a shallow SuDS system has been designed to increase the likelihood of a post development gravity connection being possible.
 8. Preliminary calculations indicate that a combination of three shallow ponds/detention basins, a swale and permeable paving sub-base will provide sufficient storage to accommodate all runoff generated by 2412m² of impermeable areas during the 1 in 100 year plus (45%) Climate Change event.
 9. Discharge from the SuDS system to the drainage ditch along Mayes Lane will be restricted to a maximum rate of 2.3 l/s. Equivalent to the existing greenfield OBAR rate for the development area (subject to receipt of Ordinary Watercourse Consent from West Sussex County Council).
 10. Based on the current levels water from the house and the stables will need to be conveyed towards the ponds via surface level drainage infrastructure such as channel drains and rills. TBC at detailed design stage.
 11. Given the requirement for shallow falls within the system to enable water to move across the site, regular maintenance and clearance of all debris and silt will be vital to make sure that the system operates at full capacity during a storm event.
 12. In the instance that it is not possible to connect to the drainage ditch along Mayes Lane an alternative post development discharge location may be provided by the watercourse to the north east of the site which runs through Hoopers Copse. If taken forward, further investigation would be required to ascertain a point of connection to this feature. Discharge to the water feature to the north of the site would also be subject to the applicant obtaining third party land owner permission to run infrastructure across third party land and construction of an outfall.
 13. Any new connection of post development flows to the surrounding watercourses will be subject to Ordinary Watercourse Consent.
 14. No deep rooted vegetation should be planted within proximity of the proposed below ground drainage components.
 15. It is currently unknown whether there are any additional utilities beneath the site.
 16. At this stage, detailed modelling of the drainage system has not been undertaken therefore the proposed SuDS scheme should be taken as indicative.
 17. This drawing is for planning purposes only. Not for construction. Do not scale from this drawing.

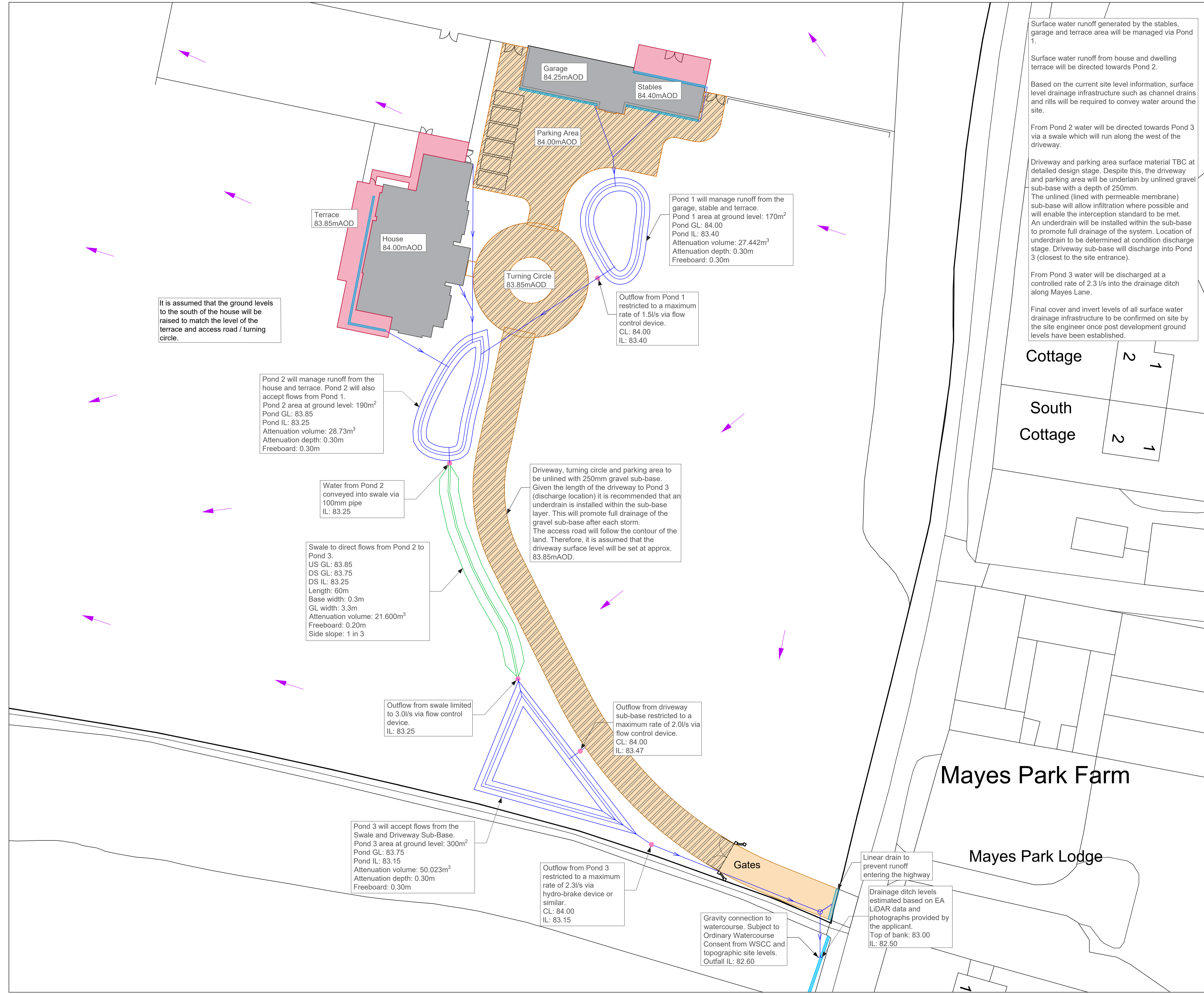
Client
 Robert and Vanessa Sharpe

Title
 Drainage Layout Plan

Location
 Little Warnham Lodge, Mayes Lane, Warnham

| | |
|-----------------------------|-------------------|
| Drawing Number: 73515-01 | Revision: v1.0 |
| Date: 11/12/2025 | Scale: 1:300 |
| Designed By: TS | Checked By: JN |
| Approved By: TS | |

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It is assumed that the ground levels to the south of the house will be raised to match the level of the terrace and access road / turning circle.

Surface water runoff generated by the stables, garage and terrace area will be managed via Pond 1.

Surface water runoff from house and dwelling terrace will be directed towards Pond 2.

Based on the current site level information, surface level drainage infrastructure such as channel drains and rills will be required to convey water around the site.

From Pond 2 water will be directed towards Pond 3 via a swale which will run along the west of the driveway.

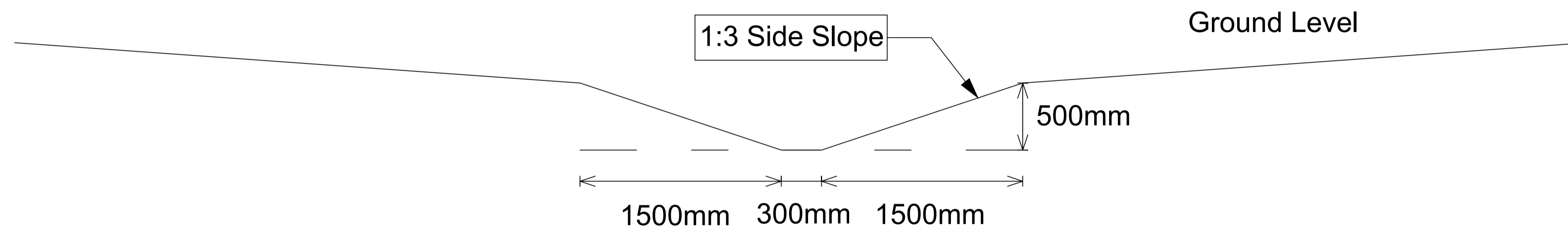
Driveway and parking area surface material TBC at detailed design stage. Despite this, the driveway and parking area will be underlain by unlined gravel sub-base with a depth of 250mm. The unlined (lined with permeable membrane) sub-base will allow infiltration where possible and will enable the interception standard to be met. An underdrain will be installed within the sub-base to promote full drainage of the system. Location of underdrain to be determined at condition discharge stage. Driveway sub-base will discharge into Pond 3 (closest to the site entrance).

From Pond 3 water will be discharged at a controlled rate of 2.3 l/s into the drainage ditch along Mayes Lane.

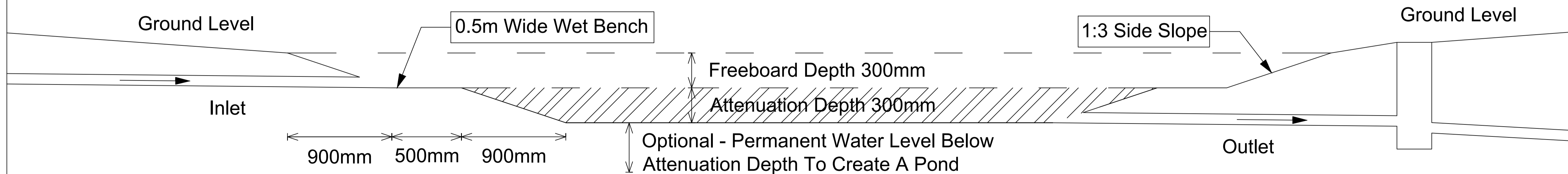
Final cover and invert levels of all surface water drainage infrastructure to be confirmed on site by the site engineer once post development ground levels have been established.

Swale and Pond / Detention Basin Schematic

Swale



Pond / Detention Basin



Notes

1. All dimensions in this drawing are in millimetres unless stated otherwise.
2. All levels are in metres Above Ordnance Datum (mAOD).
3. This drawing is for planning purposes only. Not for construction.
4. Do not scale from this drawing.

Client

Robert and Vanessa Sharpe

Title

Swale and Pond / Detention Basin Schematic

Location

Little Warrham Lodge

| | |
|-----------------------------|--------------------|
| Drawing Number: 73515-02 | Revision: v.1.0 |
| Date: 11/12/2025 | Scale: |
| Designed By: TS | Checked By: JN |
| Approved By: TS | |

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Appendix E



| | | | |
|---|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Inflows Storm Phase: Phase | Company Address: Geoson Limited | | |



Garage, Stables and Terrace

Type : Catchment Area

| | |
|-----------|-------|
| Area (ha) | 0.031 |
|-----------|-------|

Dynamic Sizing

| Runoff Method | Time of Concentration |
|------------------------------|-----------------------|
| Summer Volumetric Runoff | 0.750 |
| Winter Volumetric Runoff | 0.840 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |



House Roof and Terrace

Type : Catchment Area

| | |
|-----------|-------|
| Area (ha) | 0.066 |
|-----------|-------|

Dynamic Sizing

| Runoff Method | Time of Concentration |
|------------------------------|-----------------------|
| Summer Volumetric Runoff | 0.750 |
| Winter Volumetric Runoff | 0.840 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |



Road, Parking and Turning Circle

Type : Catchment Area

| | |
|-----------|-------|
| Area (ha) | 0.153 |
|-----------|-------|

Dynamic Sizing

| Runoff Method | Time of Concentration |
|------------------------------|-----------------------|
| Summer Volumetric Runoff | 0.750 |
| Winter Volumetric Runoff | 0.750 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |

| | | | |
|---|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Pond 1

Type : Pond

Dimensions

| | |
|----------------------|--------|
| Exceedance Level (m) | 84.000 |
| Depth (m) | 0.600 |
| Base Level (m) | 83.400 |
| Freeboard (mm) | 300 |
| Initial Depth (m) | 0.000 |
| Porosity (%) | 100 |
| Average Slope (1:X) | 4.117 |
| Total Volume (m³) | 27.442 |

| Depth (m) | Area (m²) | Volume (m³) |
|-----------|-----------|-------------|
| 0.000 | 75.00 | 0.000 |
| 0.300 | 109.00 | 27.442 |
| 0.301 | 130.00 | 27.561 |
| 0.600 | 170.00 | 72.277 |

Inlets

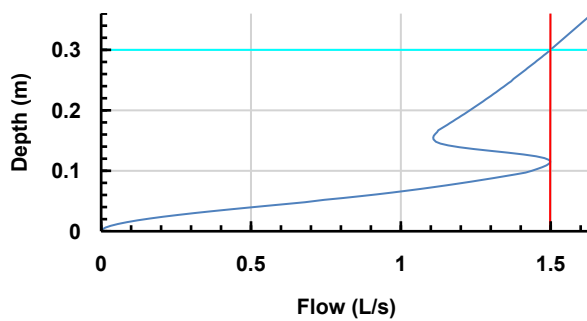
Inlet

| | |
|--------------------|-----------------------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | Garage, Stables and Terrace |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Outlets

Outlet

| | |
|---------------------|--|
| Outgoing Connection | Pipe |
| Outlet Type | Hydro-Brake® |
| Invert Level (m) | 83.400 |
| Design Depth (m) | 0.300 |
| Design Flow (L/s) | 1.5 |
| Objective | Minimise Upstream Storage Requirements |
| Application | Surface Water Only |
| Sump Available | <input type="checkbox"/> |
| Unit Reference | CHE-0068-1500-0300-1500 |



| | | | |
|---|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Advanced

| | |
|-----------------|-------------|
| Perimeter | Circular |
| Length (m) | 14.000 |
| Friction Scheme | Manning's n |
| n | 0.05 |



Pond 2

Type : Pond

Dimensions

| | |
|----------------------|--------|
| Exceedance Level (m) | 83.850 |
| Depth (m) | 0.600 |
| Base Level (m) | 83.250 |
| Freeboard (mm) | 300 |
| Initial Depth (m) | 0.000 |
| Porosity (%) | 100 |
| Average Slope (1:X) | 4.764 |
| Total Volume (m³) | 28.730 |

| Depth (m) | Area (m²) | Volume (m³) |
|-----------|-----------|-------------|
| 0.000 | 76.00 | 0.000 |
| 0.300 | 117.00 | 28.730 |
| 0.301 | 142.00 | 28.859 |
| 0.600 | 190.00 | 78.319 |

Inlets

Inlet

| | |
|--------------------|------------------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | House Roof and Terrace |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Inlet (1)

| | |
|--------------------|----------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | Pipe |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Outlets

Outlet

| | |
|--------------------------|----------|
| Outgoing Connection | No Delay |
| Outlet Type | Orifice |
| Diameter (m) | 0.100 |
| Coefficient of Discharge | 0.600 |
| Invert Level (m) | 83.250 |

Advanced

| | |
|-----------------|-------------|
| Perimeter | Circular |
| Length (m) | 18.000 |
| Friction Scheme | Manning's n |
| n | 0.05 |

| | | | |
|---|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Pond 3

Type : Pond

Dimensions

| | |
|----------------------|--------|
| Exceedance Level (m) | 83.750 |
| Depth (m) | 0.600 |
| Base Level (m) | 83.150 |
| Freeboard (mm) | 300 |
| Initial Depth (m) | 0.000 |
| Porosity (%) | 100 |
| Average Slope (1:X) | 5.161 |
| Total Volume (m³) | 50.023 |

| Depth (m) | Area (m²) | Volume (m³) |
|-----------|-----------|-------------|
| 0.000 | 140.00 | 0.000 |
| 0.300 | 195.00 | 50.023 |
| 0.301 | 230.00 | 50.235 |
| 0.600 | 300.00 | 129.239 |

Inlets

Inlet

| | |
|--------------------|----------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | No Delay (1) |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Inlet (1)

| | |
|--------------------|----------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | No Delay (2) |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

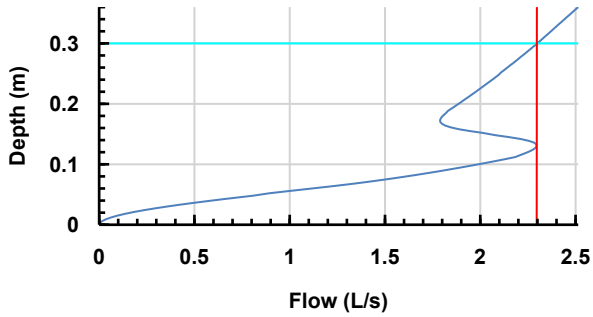
| | | | |
|---|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Outlets

Outlet

| | |
|---------------------|--|
| Outgoing Connection | (None) |
| Outlet Type | Hydro-Brake® |
| Invert Level (m) | 83.150 |
| Design Depth (m) | 0.300 |
| Design Flow (L/s) | 2.3 |
| Objective | Minimise Upstream Storage Requirements |
| Application | Surface Water Only |
| Sump Available | <input type="checkbox"/> |
| Unit Reference | CHE-0082-2300-0300-2300 |



Advanced

| | |
|-----------------|-------------|
| Perimeter | Circular |
| Length (m) | 25.000 |
| Friction Scheme | Manning's n |
| n | 0.05 |

| | | | |
|---|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Porous Paving

Type : Porous Paving

Dimensions

| | |
|-----------------------------|---------|
| Exceedance Level (m) | 83.850 |
| Depth (m) | 0.380 |
| Base Level (m) | 83.470 |
| Paving Layer Depth (mm) | 130 |
| Membrane Percolation (m/hr) | 1.0 |
| Porosity (%) | 30 |
| Length (m) | 140.000 |
| Long. Slope (1:X) | 1000.00 |
| Width (m) | 10.100 |
| Total Volume (m³) | 106.785 |

Under Drain

| | |
|-----------------------|-------------|
| Height Above Base (m) | 0.050 |
| Diameter (mm) | 100 |
| No. of Barrels | 1 |
| Release Height (m) | 0.100 |
| Friction Scheme | Manning's n |
| n | 0.015 |

Inlets

Inlet

| | |
|--------------------|----------------------------------|
| Inlet Type | Lateral Inflow |
| Incoming Item(s) | Road, Parking and Turning Circle |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Outlets

Outlet

| | |
|--------------------------|--------------|
| Outgoing Connection | No Delay (2) |
| Outlet Type | Orifice |
| Diameter (m) | 0.044 |
| Coefficient of Discharge | 0.600 |
| Invert Level (m) | 83.470 |

Advanced

| | |
|---------------------|-------|
| Conductivity (m/hr) | 100.0 |
|---------------------|-------|

| | | | |
|---|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Swale

Type : Swale

Swale

| | |
|------------------------|-------------|
| Exceedance Level (m) | 83.750 |
| Depth (m) | 0.500 |
| Base Level (m) | 83.250 |
| Top Width (m) | 3.300 |
| Side Slope (1:X) | 3.00 |
| Base Width (m) | 0.300 |
| Freeboard (mm) | 200 |
| Length (m) | 60.000 |
| Long. Slope (1:X) | 10000.00 |
| Filtration Rate (m/hr) | 0.0 |
| Friction Scheme | Manning's n |
| n | 0.15 |
| Total Volume (m³) | 21.600 |

Inlets

Inlet

| | |
|--------------------|----------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | No Delay |
| Bypass Destination | (None) |
| Inlet Destination | Ponding Area |
| Capacity Type | No Restriction |

Outlets

Outlet

| | |
|--------------------------|--------------|
| Outgoing Connection | No Delay (1) |
| Outlet Type | Orifice |
| Diameter (m) | 0.052 |
| Coefficient of Discharge | 0.600 |
| Invert Level (m) | 83.250 |

Advanced

Swale

| | |
|--------------|-----|
| Porosity (%) | 100 |
|--------------|-----|

| | | | |
|---|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Title: Rainfall Analysis Criteria | Company Address: Geoson Limited | | |



| | |
|---------------------------------|--------------------------|
| Runoff Type | Dynamic |
| Output Interval (mins) | 5 |
| Time Step | Default |
| Urban Creep | Apply Global Value |
| Urban Creep Global Value (%) | 0 |
| Junction Flood Risk Margin (mm) | 300 |
| Perform No Discharge Analysis | <input type="checkbox"/> |

Rainfall

| | |
|------------------|-------------------------------------|
| FEH | Type: FEH |
| Site Location | GB 514800 135250 TQ 14800 35250 |
| Rainfall Version | 2022 |
| Summer | <input checked="" type="checkbox"/> |
| Winter | <input checked="" type="checkbox"/> |

Return Period

| Return Period (years) | Increase Rainfall (%) |
|-----------------------|-----------------------|
| 30.0 | 40.000 |

Storm Durations

| Duration (mins) | Run Time (mins) |
|-----------------|-----------------|
| 15 | 30 |
| 30 | 60 |
| 60 | 120 |
| 120 | 240 |
| 180 | 360 |
| 240 | 480 |
| 360 | 720 |
| 480 | 960 |
| 600 | 1200 |
| 720 | 1440 |
| 960 | 1920 |
| 1440 | 2880 |
| 2160 | 4320 |
| 2880 | 5760 |
| 4320 | 8640 |
| 5760 | 11520 |
| 7200 | 14400 |
| 8640 | 17280 |
| 10080 | 20160 |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Porous Paving: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residual Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 30 years: +40 %: 15 mins: Summer | 83.684 | 83.539 | 0.074 | 0.069 | 72.6 | 31.210 | 0.000 | 0.000 | | 0.9 | 1.039 | | 70.774 | OK |
| FEH: 30 years: +40 %: 15 mins: Winter | 83.684 | 83.539 | 0.074 | 0.069 | 68.3 | 31.219 | 0.000 | 0.000 | | 0.9 | 1.039 | | 70.765 | OK |
| FEH: 30 years: +40 %: 30 mins: Summer | 83.705 | 83.562 | 0.095 | 0.092 | 49.3 | 41.336 | 0.000 | 0.000 | | 1.1 | 2.724 | | 61.291 | OK |
| FEH: 30 years: +40 %: 30 mins: Winter | 83.705 | 83.562 | 0.095 | 0.092 | 46.3 | 41.322 | 0.000 | 0.000 | | 1.1 | 2.724 | | 61.303 | OK |
| FEH: 30 years: +40 %: 60 mins: Summer | 83.721 | 83.592 | 0.111 | 0.122 | 43.4 | 51.469 | 0.000 | 0.000 | | 1.3 | 6.761 | | 51.801 | OK |
| FEH: 30 years: +40 %: 60 mins: Winter | 83.722 | 83.592 | 0.112 | 0.122 | 34.9 | 51.479 | 0.000 | 0.000 | | 1.3 | 6.759 | | 51.792 | OK |
| FEH: 30 years: +40 %: 120 mins: Summer | 83.729 | 83.619 | 0.119 | 0.149 | 30.9 | 59.430 | 0.000 | 0.000 | | 1.4 | 15.503 | 65 | 44.346 | OK |
| FEH: 30 years: +40 %: 120 mins: Winter | 83.730 | 83.619 | 0.120 | 0.149 | 22.2 | 59.633 | 0.000 | 0.000 | | 1.4 | 15.494 | 75 | 44.156 | OK |
| FEH: 30 years: +40 %: 180 mins: Summer | 83.733 | 83.632 | 0.123 | 0.162 | 24.1 | 63.300 | 0.000 | 0.000 | | 1.5 | 24.296 | 110 | 40.723 | OK |
| FEH: 30 years: +40 %: 180 mins: Winter | 83.733 | 83.631 | 0.123 | 0.161 | 16.6 | 63.557 | 0.000 | 0.000 | | 1.5 | 24.267 | 115 | 40.482 | OK |
| FEH: 30 years: +40 %: 240 mins: Summer | 83.735 | 83.641 | 0.125 | 0.171 | 20.0 | 65.256 | 0.000 | 0.000 | | 1.6 | 32.995 | 130 | 38.891 | OK |
| FEH: 30 years: +40 %: 240 mins: Winter | 83.734 | 83.640 | 0.124 | 0.170 | 13.4 | 65.667 | 0.000 | 0.000 | | 1.6 | 32.981 | 135 | 38.506 | OK |
| FEH: 30 years: +40 %: 360 mins: Summer | 83.736 | 83.650 | 0.126 | 0.180 | 15.0 | 66.767 | 0.000 | 0.000 | | 1.6 | 49.199 | 185 | 37.475 | OK |
| FEH: 30 years: +40 %: 360 mins: Winter | 83.734 | 83.650 | 0.124 | 0.180 | 9.8 | 67.074 | 0.000 | 0.000 | | 1.6 | 49.208 | 160 | 37.188 | OK |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



| | | | | | | | | | | | | | | |
|--|--------|--------|-------|-------|------|--------|-------|-------|--|-----|---------|-----|--------|----|
| FEH: 30 years: +40 %: 480 mins: Summer | 83.736 | 83.652 | 0.126 | 0.182 | 12.2 | 67.582 | 0.000 | 0.000 | | 1.6 | 62.094 | 235 | 36.712 | OK |
| FEH: 30 years: +40 %: 480 mins: Winter | 83.732 | 83.653 | 0.122 | 0.183 | 7.9 | 67.454 | 0.000 | 0.000 | | 1.6 | 62.117 | 220 | 36.832 | OK |
| FEH: 30 years: +40 %: 600 mins: Summer | 83.735 | 83.653 | 0.125 | 0.183 | 10.2 | 68.044 | 0.000 | 0.000 | | 1.6 | 69.971 | 270 | 36.280 | OK |
| FEH: 30 years: +40 %: 600 mins: Winter | 83.730 | 83.654 | 0.120 | 0.184 | 6.6 | 67.557 | 0.000 | 0.000 | | 1.6 | 69.997 | 245 | 36.736 | OK |
| FEH: 30 years: +40 %: 720 mins: Summer | 83.734 | 83.654 | 0.124 | 0.184 | 8.9 | 68.307 | 0.000 | 0.000 | | 1.6 | 75.294 | 295 | 36.033 | OK |
| FEH: 30 years: +40 %: 720 mins: Winter | 83.727 | 83.654 | 0.117 | 0.184 | 5.7 | 67.286 | 0.000 | 0.000 | | 1.6 | 75.268 | 260 | 36.990 | OK |
| FEH: 30 years: +40 %: 960 mins: Summer | 83.731 | 83.655 | 0.121 | 0.185 | 7.1 | 68.293 | 0.000 | 0.000 | | 1.6 | 83.113 | 325 | 36.047 | OK |
| FEH: 30 years: +40 %: 960 mins: Winter | 83.721 | 83.654 | 0.111 | 0.184 | 4.6 | 66.153 | 0.000 | 0.000 | | 1.6 | 83.099 | 285 | 38.051 | OK |
| FEH: 30 years: +40 %: 1440 mins: Summer | 83.724 | 83.657 | 0.114 | 0.187 | 5.2 | 67.295 | 0.000 | 0.000 | | 1.6 | 94.413 | 310 | 36.981 | OK |
| FEH: 30 years: +40 %: 1440 mins: Winter | 83.710 | 83.651 | 0.100 | 0.181 | 3.3 | 62.932 | 0.000 | 0.000 | | 1.6 | 94.482 | 245 | 41.067 | OK |
| FEH: 30 years: +40 %: 2160 mins: Summer | 83.713 | 83.653 | 0.103 | 0.183 | 3.8 | 64.233 | 0.000 | 0.000 | | 1.6 | 106.566 | 265 | 39.848 | OK |
| FEH: 30 years: +40 %: 2160 mins: Winter | 83.700 | 83.639 | 0.090 | 0.169 | 2.4 | 57.208 | 0.000 | 0.000 | | 1.6 | 106.464 | 175 | 46.427 | OK |
| FEH: 30 years: +40 %: 2880 mins: Summer | 83.705 | 83.647 | 0.095 | 0.177 | 3.0 | 60.622 | 0.000 | 0.000 | | 1.6 | 116.202 | 230 | 43.230 | OK |
| FEH: 30 years: +40 %: 2880 mins: Winter | 83.695 | 83.626 | 0.085 | 0.156 | 2.0 | 51.977 | 0.000 | 0.000 | | 1.5 | 116.148 | | 51.325 | OK |
| FEH: 30 years: +40 %: 4320 mins: Summer | 83.698 | 83.632 | 0.088 | 0.162 | 2.3 | 53.934 | 0.000 | 0.000 | | 1.5 | 132.213 | 70 | 49.493 | OK |
| FEH: 30 years: +40 %: 4320 mins: Winter | 83.690 | 83.599 | 0.080 | 0.129 | 1.5 | 44.644 | 0.000 | 0.000 | | 1.3 | 132.480 | | 58.193 | OK |
| FEH: 30 years: +40 %: 5760 mins: Summer | 83.694 | 83.617 | 0.084 | 0.147 | 1.8 | 48.946 | 0.000 | 0.000 | | 1.4 | 146.610 | | 54.164 | OK |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



| | | | | | | | | | | | | | |
|---|--------|--------|-------|-------|-----|--------|-------|-------|--|-----|---------|--------|----|
| FEH: 30 years: +40 %: 5760 mins: Winter | 83.687 | 83.573 | 0.077 | 0.103 | 1.2 | 40.563 | 0.000 | 0.000 | | 1.1 | 146.835 | 62.015 | OK |
| FEH: 30 years: +40 %: 7200 mins: Summer | 83.692 | 83.602 | 0.082 | 0.132 | 1.6 | 45.515 | 0.000 | 0.000 | | 1.3 | 159.640 | 57.377 | OK |
| FEH: 30 years: +40 %: 7200 mins: Winter | 83.685 | 83.553 | 0.075 | 0.083 | 1.0 | 38.213 | 0.000 | 0.000 | | 1.0 | 159.373 | 64.215 | OK |
| FEH: 30 years: +40 %: 8640 mins: Summer | 83.690 | 83.590 | 0.080 | 0.120 | 1.4 | 43.282 | 0.000 | 0.000 | | 1.3 | 172.226 | 59.468 | OK |
| FEH: 30 years: +40 %: 8640 mins: Winter | 83.684 | 83.541 | 0.074 | 0.071 | 0.9 | 36.484 | 0.000 | 0.000 | | 0.9 | 171.940 | 65.835 | OK |
| FEH: 30 years: +40 %: 10080 mins: Summer | 83.688 | 83.579 | 0.078 | 0.109 | 1.3 | 41.497 | 0.000 | 0.000 | | 1.2 | 184.483 | 61.140 | OK |
| FEH: 30 years: +40 %: 10080 mins: Winter | 83.683 | 83.533 | 0.073 | 0.063 | 0.8 | 35.148 | 0.000 | 0.000 | | 0.8 | 184.794 | 67.085 | OK |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Pond 1: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residant Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 30 years: +40 %: 15 mins: Summer | 83.477 | 83.477 | 0.077 | 0.077 | 14.7 | 6.062 | 0.000 | 0.000 | | 0.7 | 0.778 | | 77.908 | OK |
| FEH: 30 years: +40 %: 15 mins: Winter | 83.485 | 83.485 | 0.085 | 0.085 | 15.5 | 6.764 | 0.000 | 0.000 | | 0.8 | 0.907 | | 75.353 | OK |
| FEH: 30 years: +40 %: 30 mins: Summer | 83.496 | 83.496 | 0.096 | 0.096 | 10.0 | 7.676 | 0.000 | 0.000 | | 1.0 | 2.235 | | 72.026 | OK |
| FEH: 30 years: +40 %: 30 mins: Winter | 83.507 | 83.507 | 0.107 | 0.107 | 10.5 | 8.661 | 0.000 | 0.000 | | 1.0 | 2.433 | | 68.438 | OK |
| FEH: 30 years: +40 %: 60 mins: Summer | 83.513 | 83.513 | 0.113 | 0.113 | 8.8 | 9.138 | 0.000 | 0.000 | | 1.0 | 4.897 | | 66.700 | OK |
| FEH: 30 years: +40 %: 60 mins: Winter | 83.528 | 83.528 | 0.128 | 0.128 | 7.9 | 10.453 | 0.000 | 0.000 | | 1.0 | 5.190 | | 61.909 | OK |
| FEH: 30 years: +40 %: 120 mins: Summer | 83.520 | 83.521 | 0.120 | 0.121 | 6.3 | 9.798 | 0.000 | 0.000 | | 1.0 | 8.857 | | 64.294 | OK |
| FEH: 30 years: +40 %: 120 mins: Winter | 83.536 | 83.536 | 0.136 | 0.136 | 5.1 | 11.132 | 0.000 | 0.000 | | 1.0 | 9.676 | | 59.434 | OK |
| FEH: 30 years: +40 %: 180 mins: Summer | 83.523 | 83.523 | 0.123 | 0.123 | 4.9 | 9.993 | 0.000 | 0.000 | | 1.0 | 11.467 | | 63.584 | OK |
| FEH: 30 years: +40 %: 180 mins: Winter | 83.536 | 83.536 | 0.136 | 0.136 | 3.8 | 11.208 | 0.000 | 0.000 | | 0.9 | 12.755 | | 59.157 | OK |
| FEH: 30 years: +40 %: 240 mins: Summer | 83.523 | 83.523 | 0.123 | 0.123 | 4.1 | 9.983 | 0.000 | 0.000 | | 0.9 | 13.266 | | 63.620 | OK |
| FEH: 30 years: +40 %: 240 mins: Winter | 83.534 | 83.535 | 0.134 | 0.135 | 3.1 | 11.045 | 0.000 | 0.000 | | 0.9 | 14.855 | | 59.752 | OK |
| FEH: 30 years: +40 %: 360 mins: Summer | 83.519 | 83.519 | 0.119 | 0.119 | 3.0 | 9.655 | 0.000 | 0.000 | | 0.9 | 15.619 | | 64.816 | OK |
| FEH: 30 years: +40 %: 360 mins: Winter | 83.527 | 83.527 | 0.127 | 0.127 | 2.2 | 10.396 | 0.000 | 0.000 | | 0.9 | 17.558 | | 62.115 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|--|--------|--------|-------|-------|-----|-------|-------|-------|-----|--------|--------|----|
| FEH: 30 years: +40 %: 480 mins: Summer | 83.513 | 83.513 | 0.113 | 0.113 | 2.5 | 9.173 | 0.000 | 0.000 | 0.9 | 17.086 | 66.572 | OK |
| FEH: 30 years: +40 %: 480 mins: Winter | 83.518 | 83.518 | 0.118 | 0.118 | 1.8 | 9.606 | 0.000 | 0.000 | 0.9 | 19.196 | 64.994 | OK |
| FEH: 30 years: +40 %: 600 mins: Summer | 83.507 | 83.507 | 0.107 | 0.107 | 2.1 | 8.666 | 0.000 | 0.000 | 0.9 | 18.139 | 68.419 | OK |
| FEH: 30 years: +40 %: 600 mins: Winter | 83.510 | 83.510 | 0.110 | 0.110 | 1.5 | 8.841 | 0.000 | 0.000 | 0.9 | 20.375 | 67.782 | OK |
| FEH: 30 years: +40 %: 720 mins: Summer | 83.502 | 83.502 | 0.102 | 0.102 | 1.8 | 8.187 | 0.000 | 0.000 | 0.9 | 19.003 | 70.164 | OK |
| FEH: 30 years: +40 %: 720 mins: Winter | 83.501 | 83.501 | 0.101 | 0.101 | 1.3 | 8.138 | 0.000 | 0.000 | 0.9 | 21.385 | 70.343 | OK |
| FEH: 30 years: +40 %: 960 mins: Summer | 83.492 | 83.492 | 0.092 | 0.092 | 1.4 | 7.362 | 0.000 | 0.000 | 0.9 | 20.402 | 73.171 | OK |
| FEH: 30 years: +40 %: 960 mins: Winter | 83.487 | 83.487 | 0.087 | 0.087 | 1.0 | 6.959 | 0.000 | 0.000 | 0.8 | 22.908 | 74.640 | OK |
| FEH: 30 years: +40 %: 1440 mins: Summer | 83.481 | 83.481 | 0.081 | 0.081 | 1.0 | 6.426 | 0.000 | 0.000 | 0.8 | 22.506 | 76.582 | OK |
| FEH: 30 years: +40 %: 1440 mins: Winter | 83.474 | 83.474 | 0.074 | 0.074 | 0.8 | 5.858 | 0.000 | 0.000 | 0.7 | 25.204 | 78.653 | OK |
| FEH: 30 years: +40 %: 2160 mins: Summer | 83.471 | 83.471 | 0.071 | 0.071 | 0.8 | 5.586 | 0.000 | 0.000 | 0.6 | 24.883 | 79.643 | OK |
| FEH: 30 years: +40 %: 2160 mins: Winter | 83.464 | 83.464 | 0.064 | 0.064 | 0.6 | 4.974 | 0.000 | 0.000 | 0.5 | 27.948 | 81.873 | OK |
| FEH: 30 years: +40 %: 2880 mins: Summer | 83.464 | 83.464 | 0.064 | 0.064 | 0.6 | 5.044 | 0.000 | 0.000 | 0.5 | 26.753 | 81.618 | OK |
| FEH: 30 years: +40 %: 2880 mins: Winter | 83.457 | 83.457 | 0.057 | 0.057 | 0.4 | 4.426 | 0.000 | 0.000 | 0.4 | 30.052 | 83.871 | OK |
| FEH: 30 years: +40 %: 4320 mins: Summer | 83.456 | 83.456 | 0.056 | 0.056 | 0.5 | 4.375 | 0.000 | 0.000 | 0.4 | 29.928 | 84.056 | OK |
| FEH: 30 years: +40 %: 4320 mins: Winter | 83.449 | 83.449 | 0.049 | 0.049 | 0.3 | 3.807 | 0.000 | 0.000 | 0.3 | 33.642 | 86.128 | OK |
| FEH: 30 years: +40 %: 5760 mins: Summer | 83.451 | 83.451 | 0.051 | 0.051 | 0.4 | 3.949 | 0.000 | 0.000 | 0.3 | 32.629 | 85.610 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|---|--------|--------|-------|-------|-----|-------|-------|-------|-----|--------|--------|----|
| FEH: 30 years: +40 %: 5760 mins: Winter | 83.444 | 83.444 | 0.044 | 0.044 | 0.3 | 3.418 | 0.000 | 0.000 | 0.3 | 36.667 | 87.543 | OK |
| FEH: 30 years: +40 %: 7200 mins: Summer | 83.447 | 83.448 | 0.047 | 0.048 | 0.3 | 3.680 | 0.000 | 0.000 | 0.3 | 35.299 | 86.590 | OK |
| FEH: 30 years: +40 %: 7200 mins: Winter | 83.441 | 83.441 | 0.041 | 0.041 | 0.2 | 3.146 | 0.000 | 0.000 | 0.2 | 39.511 | 88.535 | OK |
| FEH: 30 years: +40 %: 8640 mins: Summer | 83.445 | 83.445 | 0.045 | 0.045 | 0.3 | 3.497 | 0.000 | 0.000 | 0.3 | 37.648 | 87.255 | OK |
| FEH: 30 years: +40 %: 8640 mins: Winter | 83.439 | 83.439 | 0.039 | 0.039 | 0.2 | 2.981 | 0.000 | 0.000 | 0.2 | 42.526 | 89.137 | OK |
| FEH: 30 years: +40 %: 10080 mins: Summer | 83.443 | 83.443 | 0.043 | 0.043 | 0.3 | 3.318 | 0.000 | 0.000 | 0.3 | 39.858 | 87.909 | OK |
| FEH: 30 years: +40 %: 10080 mins: Winter | 83.437 | 83.437 | 0.037 | 0.037 | 0.2 | 2.850 | 0.000 | 0.000 | 0.2 | 44.700 | 89.615 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Pond 2: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residant Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 30 years: +40 %: 15 mins: Summer | 83.390 | 83.390 | 0.140 | 0.140 | 31.3 | 11.871 | 0.000 | 0.000 | | 3.2 | 3.464 | | 58.680 | OK |
| FEH: 30 years: +40 %: 15 mins: Winter | 83.405 | 83.405 | 0.155 | 0.155 | 33.1 | 13.272 | 0.000 | 0.000 | | 3.7 | 4.035 | | 53.804 | OK |
| FEH: 30 years: +40 %: 30 mins: Summer | 83.423 | 83.422 | 0.173 | 0.172 | 21.8 | 14.948 | 0.000 | 0.000 | | 3.9 | 7.983 | 5 | 47.971 | OK |
| FEH: 30 years: +40 %: 30 mins: Winter | 83.439 | 83.438 | 0.189 | 0.188 | 23.0 | 16.665 | 0.000 | 0.000 | | 4.3 | 9.122 | 20 | 41.993 | OK |
| FEH: 30 years: +40 %: 60 mins: Summer | 83.443 | 83.442 | 0.193 | 0.192 | 19.4 | 16.938 | 0.000 | 0.000 | | 4.2 | 14.820 | 40 | 41.045 | OK |
| FEH: 30 years: +40 %: 60 mins: Winter | 83.460 | 83.460 | 0.210 | 0.210 | 17.6 | 18.821 | 0.000 | 0.000 | | 4.7 | 16.489 | | 34.491 | OK |
| FEH: 30 years: +40 %: 120 mins: Summer | 83.451 | 83.451 | 0.201 | 0.201 | 14.1 | 17.859 | 0.000 | 0.000 | | 4.3 | 25.238 | 90 | 37.836 | OK |
| FEH: 30 years: +40 %: 120 mins: Winter | 83.467 | 83.468 | 0.217 | 0.218 | 11.6 | 19.560 | 0.000 | 0.000 | | 4.5 | 27.851 | 120 | 31.916 | OK |
| FEH: 30 years: +40 %: 180 mins: Summer | 83.453 | 83.453 | 0.203 | 0.203 | 11.2 | 18.080 | 0.000 | 0.000 | | 4.2 | 33.024 | 115 | 37.068 | OK |
| FEH: 30 years: +40 %: 180 mins: Winter | 83.467 | 83.467 | 0.217 | 0.217 | 8.9 | 19.570 | 0.000 | 0.000 | | 4.3 | 36.359 | 140 | 31.881 | OK |
| FEH: 30 years: +40 %: 240 mins: Summer | 83.453 | 83.453 | 0.203 | 0.203 | 9.5 | 18.050 | 0.000 | 0.000 | | 4.0 | 37.982 | 130 | 37.174 | OK |
| FEH: 30 years: +40 %: 240 mins: Winter | 83.466 | 83.466 | 0.216 | 0.216 | 7.4 | 19.430 | 0.000 | 0.000 | | 3.9 | 41.988 | 155 | 32.369 | OK |
| FEH: 30 years: +40 %: 360 mins: Summer | 83.450 | 83.450 | 0.200 | 0.200 | 7.3 | 17.779 | 0.000 | 0.000 | | 3.7 | 43.900 | 145 | 38.117 | OK |
| FEH: 30 years: +40 %: 360 mins: Winter | 83.462 | 83.462 | 0.212 | 0.212 | 5.7 | 18.980 | 0.000 | 0.000 | | 3.5 | 48.917 | 175 | 33.935 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|--|--------|--------|-------|-------|-----|--------|-------|-------|--|-----|---------|-----|--------|----|
| FEH: 30 years: +40 %: 480 mins: Summer | 83.447 | 83.446 | 0.197 | 0.196 | 6.1 | 17.406 | 0.000 | 0.000 | | 3.3 | 48.865 | 150 | 39.414 | OK |
| FEH: 30 years: +40 %: 480 mins: Winter | 83.455 | 83.455 | 0.205 | 0.205 | 4.7 | 18.330 | 0.000 | 0.000 | | 3.1 | 54.560 | 185 | 36.199 | OK |
| FEH: 30 years: +40 %: 600 mins: Summer | 83.443 | 83.442 | 0.193 | 0.192 | 5.3 | 16.987 | 0.000 | 0.000 | | 3.2 | 53.791 | 130 | 40.872 | OK |
| FEH: 30 years: +40 %: 600 mins: Winter | 83.449 | 83.449 | 0.199 | 0.199 | 4.0 | 17.628 | 0.000 | 0.000 | | 2.8 | 60.152 | 200 | 38.644 | OK |
| FEH: 30 years: +40 %: 720 mins: Summer | 83.438 | 83.438 | 0.188 | 0.188 | 4.6 | 16.551 | 0.000 | 0.000 | | 2.9 | 57.566 | 120 | 42.390 | OK |
| FEH: 30 years: +40 %: 720 mins: Winter | 83.442 | 83.442 | 0.192 | 0.192 | 3.6 | 16.938 | 0.000 | 0.000 | | 2.7 | 64.702 | 185 | 41.044 | OK |
| FEH: 30 years: +40 %: 960 mins: Summer | 83.430 | 83.430 | 0.180 | 0.180 | 3.8 | 15.677 | 0.000 | 0.000 | | 2.6 | 62.772 | 85 | 45.433 | OK |
| FEH: 30 years: +40 %: 960 mins: Winter | 83.429 | 83.429 | 0.179 | 0.179 | 2.9 | 15.611 | 0.000 | 0.000 | | 2.4 | 70.553 | 125 | 45.663 | OK |
| FEH: 30 years: +40 %: 1440 mins: Summer | 83.412 | 83.412 | 0.162 | 0.162 | 2.9 | 13.986 | 0.000 | 0.000 | | 2.2 | 69.921 | | 51.319 | OK |
| FEH: 30 years: +40 %: 1440 mins: Winter | 83.404 | 83.404 | 0.154 | 0.154 | 2.2 | 13.217 | 0.000 | 0.000 | | 2.0 | 78.421 | | 53.996 | OK |
| FEH: 30 years: +40 %: 2160 mins: Summer | 83.392 | 83.392 | 0.142 | 0.142 | 2.2 | 12.082 | 0.000 | 0.000 | | 1.8 | 77.528 | | 57.947 | OK |
| FEH: 30 years: +40 %: 2160 mins: Winter | 83.380 | 83.379 | 0.130 | 0.129 | 1.7 | 10.880 | 0.000 | 0.000 | | 1.6 | 87.136 | | 62.129 | OK |
| FEH: 30 years: +40 %: 2880 mins: Summer | 83.379 | 83.379 | 0.129 | 0.129 | 1.8 | 10.835 | 0.000 | 0.000 | | 1.7 | 83.355 | | 62.286 | OK |
| FEH: 30 years: +40 %: 2880 mins: Winter | 83.365 | 83.365 | 0.115 | 0.115 | 1.4 | 9.596 | 0.000 | 0.000 | | 1.4 | 93.719 | | 66.598 | OK |
| FEH: 30 years: +40 %: 4320 mins: Summer | 83.363 | 83.363 | 0.113 | 0.113 | 1.4 | 9.410 | 0.000 | 0.000 | | 1.3 | 93.208 | | 67.247 | OK |
| FEH: 30 years: +40 %: 4320 mins: Winter | 83.350 | 83.350 | 0.100 | 0.100 | 1.0 | 8.199 | 0.000 | 0.000 | | 1.1 | 104.523 | | 71.460 | OK |
| FEH: 30 years: +40 %: 5760 mins: Summer | 83.354 | 83.354 | 0.104 | 0.104 | 1.1 | 8.582 | 0.000 | 0.000 | | 1.1 | 101.909 | | 70.130 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|---|--------|--------|-------|-------|-----|-------|-------|-------|--|-----|---------|--|--------|----|
| FEH: 30 years: +40 %: 5760 mins: Winter | 83.342 | 83.342 | 0.092 | 0.092 | 0.8 | 7.526 | 0.000 | 0.000 | | 0.9 | 114.134 | | 73.803 | OK |
| FEH: 30 years: +40 %: 7200 mins: Summer | 83.348 | 83.348 | 0.098 | 0.098 | 1.0 | 8.016 | 0.000 | 0.000 | | 1.0 | 110.042 | | 72.097 | OK |
| FEH: 30 years: +40 %: 7200 mins: Winter | 83.337 | 83.337 | 0.087 | 0.087 | 0.7 | 7.072 | 0.000 | 0.000 | | 0.8 | 123.375 | | 75.383 | OK |
| FEH: 30 years: +40 %: 8640 mins: Summer | 83.344 | 83.344 | 0.094 | 0.094 | 0.9 | 7.654 | 0.000 | 0.000 | | 0.9 | 116.998 | | 73.359 | OK |
| FEH: 30 years: +40 %: 8640 mins: Winter | 83.333 | 83.333 | 0.083 | 0.083 | 0.6 | 6.720 | 0.000 | 0.000 | | 0.7 | 131.733 | | 76.608 | OK |
| FEH: 30 years: +40 %: 10080 mins: Summer | 83.341 | 83.341 | 0.091 | 0.091 | 0.8 | 7.384 | 0.000 | 0.000 | | 0.9 | 124.647 | | 74.298 | OK |
| FEH: 30 years: +40 %: 10080 mins: Winter | 83.330 | 83.330 | 0.080 | 0.080 | 0.6 | 6.473 | 0.000 | 0.000 | | 0.7 | 139.288 | | 77.470 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Pond 3: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residual Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 30 years: +40 %: 15 mins: Summer | 83.163 | 83.152 | 0.013 | 0.002 | 1.7 | 1.172 | 0.000 | 0.000 | | 0.0 | 0.000 | | 97.657 | OK |
| FEH: 30 years: +40 %: 15 mins: Winter | 83.164 | 83.152 | 0.014 | 0.002 | 1.9 | 1.261 | 0.000 | 0.000 | | 0.0 | 0.000 | | 97.480 | OK |
| FEH: 30 years: +40 %: 30 mins: Summer | 83.185 | 83.185 | 0.035 | 0.035 | 2.8 | 4.999 | 0.000 | 0.000 | | 0.5 | 0.302 | | 90.007 | OK |
| FEH: 30 years: +40 %: 30 mins: Winter | 83.187 | 83.187 | 0.037 | 0.037 | 2.9 | 5.253 | 0.000 | 0.000 | | 0.5 | 0.336 | | 89.499 | OK |
| FEH: 30 years: +40 %: 60 mins: Summer | 83.229 | 83.229 | 0.079 | 0.079 | 3.3 | 11.644 | 0.000 | 0.000 | | 1.6 | 3.643 | | 76.723 | OK |
| FEH: 30 years: +40 %: 60 mins: Winter | 83.232 | 83.232 | 0.082 | 0.082 | 3.4 | 12.064 | 0.000 | 0.000 | | 1.7 | 3.849 | | 75.882 | OK |
| FEH: 30 years: +40 %: 120 mins: Summer | 83.280 | 83.281 | 0.130 | 0.131 | 3.6 | 19.728 | 0.000 | 0.000 | | 2.3 | 15.905 | | 60.562 | OK |
| FEH: 30 years: +40 %: 120 mins: Winter | 83.286 | 83.286 | 0.136 | 0.136 | 3.7 | 20.685 | 0.000 | 0.000 | | 2.3 | 16.403 | | 58.649 | OK |
| FEH: 30 years: +40 %: 180 mins: Summer | 83.318 | 83.318 | 0.168 | 0.168 | 3.7 | 25.933 | 0.000 | 0.000 | | 2.3 | 27.503 | | 48.158 | OK |
| FEH: 30 years: +40 %: 180 mins: Winter | 83.331 | 83.331 | 0.181 | 0.181 | 3.8 | 28.157 | 0.000 | 0.000 | | 2.3 | 27.452 | | 43.712 | OK |
| FEH: 30 years: +40 %: 240 mins: Summer | 83.341 | 83.341 | 0.191 | 0.191 | 3.7 | 29.892 | 0.000 | 0.000 | | 2.3 | 37.553 | | 40.242 | OK |
| FEH: 30 years: +40 %: 240 mins: Winter | 83.355 | 83.354 | 0.205 | 0.204 | 3.9 | 32.294 | 0.000 | 0.000 | | 2.3 | 38.174 | | 35.441 | OK |
| FEH: 30 years: +40 %: 360 mins: Summer | 83.356 | 83.355 | 0.206 | 0.205 | 3.7 | 32.440 | 0.000 | 0.000 | | 2.3 | 59.435 | | 35.148 | OK |
| FEH: 30 years: +40 %: 360 mins: Winter | 83.369 | 83.369 | 0.219 | 0.219 | 3.9 | 34.818 | 0.000 | 0.000 | | 2.3 | 61.199 | | 30.395 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|--|--------|--------|-------|-------|-----|--------|-------|-------|--|-----|---------|--------|--------|----|
| FEH: 30 years: +40 %: 480 mins: Summer | 83.364 | 83.364 | 0.214 | 0.214 | 3.7 | 33.906 | 0.000 | 0.000 | | 2.3 | 81.355 | 32.219 | OK | |
| FEH: 30 years: +40 %: 480 mins: Winter | 83.377 | 83.377 | 0.227 | 0.227 | 3.8 | 36.218 | 0.000 | 0.000 | | 2.3 | 84.117 | 27.598 | OK | |
| FEH: 30 years: +40 %: 600 mins: Summer | 83.369 | 83.369 | 0.219 | 0.219 | 3.7 | 34.810 | 0.000 | 0.000 | | 2.3 | 104.755 | 400 | 30.411 | OK |
| FEH: 30 years: +40 %: 600 mins: Winter | 83.382 | 83.382 | 0.232 | 0.232 | 3.8 | 37.092 | 0.000 | 0.000 | | 2.3 | 106.979 | 430 | 25.849 | OK |
| FEH: 30 years: +40 %: 720 mins: Summer | 83.372 | 83.372 | 0.222 | 0.222 | 3.7 | 35.362 | 0.000 | 0.000 | | 2.3 | 124.273 | 420 | 29.308 | OK |
| FEH: 30 years: +40 %: 720 mins: Winter | 83.385 | 83.385 | 0.235 | 0.235 | 3.7 | 37.624 | 0.000 | 0.000 | | 2.3 | 129.698 | 445 | 24.785 | OK |
| FEH: 30 years: +40 %: 960 mins: Summer | 83.373 | 83.373 | 0.223 | 0.223 | 3.6 | 35.533 | 0.000 | 0.000 | | 2.3 | 141.973 | 415 | 28.966 | OK |
| FEH: 30 years: +40 %: 960 mins: Winter | 83.385 | 83.385 | 0.235 | 0.235 | 3.6 | 37.736 | 0.000 | 0.000 | | 2.3 | 149.603 | 450 | 24.562 | OK |
| FEH: 30 years: +40 %: 1440 mins: Summer | 83.369 | 83.369 | 0.219 | 0.219 | 3.5 | 34.753 | 0.000 | 0.000 | | 2.3 | 162.152 | 485 | 30.525 | OK |
| FEH: 30 years: +40 %: 1440 mins: Winter | 83.377 | 83.377 | 0.227 | 0.227 | 3.3 | 36.237 | 0.000 | 0.000 | | 2.3 | 170.659 | 475 | 27.559 | OK |
| FEH: 30 years: +40 %: 2160 mins: Summer | 83.361 | 83.362 | 0.211 | 0.212 | 3.3 | 33.497 | 0.000 | 0.000 | | 2.3 | 182.647 | 500 | 33.037 | OK |
| FEH: 30 years: +40 %: 2160 mins: Winter | 83.363 | 83.363 | 0.213 | 0.213 | 3.0 | 33.678 | 0.000 | 0.000 | | 2.3 | 192.141 | 460 | 32.674 | OK |
| FEH: 30 years: +40 %: 2880 mins: Summer | 83.353 | 83.353 | 0.203 | 0.203 | 3.1 | 32.033 | 0.000 | 0.000 | | 2.3 | 198.490 | 425 | 35.962 | OK |
| FEH: 30 years: +40 %: 2880 mins: Winter | 83.342 | 83.341 | 0.192 | 0.191 | 2.7 | 29.939 | 0.000 | 0.000 | | 2.3 | 208.825 | 305 | 40.148 | OK |
| FEH: 30 years: +40 %: 4320 mins: Summer | 83.324 | 83.324 | 0.174 | 0.174 | 2.7 | 26.938 | 0.000 | 0.000 | | 2.3 | 224.923 | 185 | 46.148 | OK |
| FEH: 30 years: +40 %: 4320 mins: Winter | 83.266 | 83.265 | 0.116 | 0.115 | 2.3 | 17.249 | 0.000 | 0.000 | | 2.2 | 236.413 | | 65.518 | OK |
| FEH: 30 years: +40 %: 5760 mins: Summer | 83.275 | 83.275 | 0.125 | 0.125 | 2.5 | 18.856 | 0.000 | 0.000 | | 2.3 | 248.367 | | 62.306 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|---|--------|--------|-------|-------|-----|--------|-------|-------|--|-----|---------|--------|----|
| FEH: 30 years: +40 %: 5760 mins: Winter | 83.247 | 83.247 | 0.097 | 0.097 | 2.0 | 14.331 | 0.000 | 0.000 | | 1.9 | 260.576 | 71.351 | OK |
| FEH: 30 years: +40 %: 7200 mins: Summer | 83.261 | 83.261 | 0.111 | 0.111 | 2.3 | 16.514 | 0.000 | 0.000 | | 2.2 | 269.672 | 66.987 | OK |
| FEH: 30 years: +40 %: 7200 mins: Winter | 83.235 | 83.234 | 0.085 | 0.084 | 1.7 | 12.353 | 0.000 | 0.000 | | 1.7 | 282.718 | 75.305 | OK |
| FEH: 30 years: +40 %: 8640 mins: Summer | 83.253 | 83.253 | 0.103 | 0.103 | 2.1 | 15.179 | 0.000 | 0.000 | | 2.0 | 289.499 | 69.656 | OK |
| FEH: 30 years: +40 %: 8640 mins: Winter | 83.226 | 83.226 | 0.076 | 0.076 | 1.5 | 11.073 | 0.000 | 0.000 | | 1.5 | 304.353 | 77.865 | OK |
| FEH: 30 years: +40 %: 10080 mins: Summer | 83.246 | 83.245 | 0.096 | 0.095 | 2.0 | 14.083 | 0.000 | 0.000 | | 1.9 | 309.379 | 71.848 | OK |
| FEH: 30 years: +40 %: 10080 mins: Winter | 83.221 | 83.221 | 0.071 | 0.071 | 1.4 | 10.261 | 0.000 | 0.000 | | 1.4 | 324.577 | 79.488 | OK |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Swale: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residant Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|--|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 30 years: +40 %: 15 mins: Summer | 83.373 | 83.300 | 0.117 | 0.050 | 3.2 | 3.274 | 0.000 | 0.000 | 0.1 | 0.8 | 0.157 | | 84.845 | OK |
| FEH: 30 years: +40 %: 15 mins: Winter | 83.382 | 83.312 | 0.126 | 0.062 | 3.7 | 3.771 | 0.000 | 0.000 | 0.1 | 1.1 | 0.240 | | 82.543 | OK |
| FEH: 30 years: +40 %: 30 mins: Summer | 83.395 | 83.375 | 0.139 | 0.125 | 3.9 | 5.353 | 0.000 | 0.000 | 0.1 | 1.8 | 2.608 | | 75.216 | OK |
| FEH: 30 years: +40 %: 30 mins: Winter | 83.404 | 83.389 | 0.148 | 0.139 | 4.3 | 6.204 | 0.000 | 0.000 | 0.1 | 1.9 | 2.891 | | 71.277 | OK |
| FEH: 30 years: +40 %: 60 mins: Summer | 83.414 | 83.404 | 0.158 | 0.154 | 4.2 | 7.192 | 0.000 | 0.000 | 0.1 | 2.0 | 8.552 | | 66.706 | OK |
| FEH: 30 years: +40 %: 60 mins: Winter | 83.426 | 83.419 | 0.170 | 0.169 | 4.7 | 8.215 | 0.000 | 0.000 | 0.1 | 2.1 | 9.186 | | 61.966 | OK |
| FEH: 30 years: +40 %: 120 mins: Summer | 83.430 | 83.423 | 0.174 | 0.173 | 4.3 | 8.525 | 0.000 | 0.000 | 0.0 | 2.2 | 20.151 | | 60.534 | OK |
| FEH: 30 years: +40 %: 120 mins: Winter | 83.444 | 83.439 | 0.188 | 0.189 | 4.5 | 9.764 | 0.000 | 0.000 | 0.0 | 2.3 | 21.618 | | 54.794 | OK |
| FEH: 30 years: +40 %: 180 mins: Summer | 83.434 | 83.428 | 0.178 | 0.178 | 4.2 | 8.862 | 0.000 | 0.000 | 0.0 | 2.2 | 29.168 | | 58.971 | OK |
| FEH: 30 years: +40 %: 180 mins: Winter | 83.449 | 83.444 | 0.193 | 0.194 | 4.3 | 10.183 | 0.000 | 0.000 | 0.0 | 2.3 | 31.366 | | 52.859 | OK |
| FEH: 30 years: +40 %: 240 mins: Summer | 83.435 | 83.429 | 0.179 | 0.179 | 4.0 | 8.988 | 0.000 | 0.000 | 0.0 | 2.2 | 34.478 | | 58.391 | OK |
| FEH: 30 years: +40 %: 240 mins: Winter | 83.449 | 83.444 | 0.193 | 0.194 | 3.9 | 10.222 | 0.000 | 0.000 | 0.0 | 2.3 | 37.513 | | 52.675 | OK |
| FEH: 30 years: +40 %: 360 mins: Summer | 83.435 | 83.429 | 0.179 | 0.179 | 3.7 | 8.998 | 0.000 | 0.000 | 0.0 | 2.2 | 40.561 | | 58.340 | OK |
| FEH: 30 years: +40 %: 360 mins: Winter | 83.447 | 83.442 | 0.191 | 0.192 | 3.5 | 10.057 | 0.000 | 0.000 | 0.0 | 2.3 | 44.769 | | 53.438 | OK |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



| | | | | | | | | | | | | | |
|--|--------|--------|-------|-------|-----|-------|-------|-------|-----|-----|---------|--------|----|
| FEH: 30 years: +40 %: 480 mins: Summer | 83.433 | 83.427 | 0.177 | 0.177 | 3.3 | 8.812 | 0.000 | 0.000 | 0.0 | 2.2 | 46.303 | 59.203 | OK |
| FEH: 30 years: +40 %: 480 mins: Winter | 83.442 | 83.437 | 0.186 | 0.187 | 3.1 | 9.611 | 0.000 | 0.000 | 0.0 | 2.3 | 51.258 | 55.504 | OK |
| FEH: 30 years: +40 %: 600 mins: Summer | 83.430 | 83.423 | 0.174 | 0.173 | 3.1 | 8.537 | 0.000 | 0.000 | 0.0 | 2.2 | 52.479 | 60.479 | OK |
| FEH: 30 years: +40 %: 600 mins: Winter | 83.436 | 83.431 | 0.180 | 0.181 | 2.9 | 9.090 | 0.000 | 0.000 | 0.0 | 2.2 | 58.356 | 57.918 | OK |
| FEH: 30 years: +40 %: 720 mins: Summer | 83.426 | 83.419 | 0.170 | 0.169 | 2.9 | 8.228 | 0.000 | 0.000 | 0.0 | 2.1 | 56.698 | 61.906 | OK |
| FEH: 30 years: +40 %: 720 mins: Winter | 83.430 | 83.424 | 0.174 | 0.174 | 2.7 | 8.595 | 0.000 | 0.000 | 0.0 | 2.2 | 63.680 | 60.210 | OK |
| FEH: 30 years: +40 %: 960 mins: Summer | 83.419 | 83.410 | 0.163 | 0.160 | 2.6 | 7.591 | 0.000 | 0.000 | 0.0 | 2.1 | 62.162 | 64.857 | OK |
| FEH: 30 years: +40 %: 960 mins: Winter | 83.419 | 83.412 | 0.163 | 0.162 | 2.4 | 7.669 | 0.000 | 0.000 | 0.0 | 2.0 | 69.937 | 64.495 | OK |
| FEH: 30 years: +40 %: 1440 mins: Summer | 83.403 | 83.392 | 0.147 | 0.142 | 2.2 | 6.355 | 0.000 | 0.000 | 0.0 | 1.9 | 69.567 | 70.578 | OK |
| FEH: 30 years: +40 %: 1440 mins: Winter | 83.397 | 83.390 | 0.141 | 0.140 | 2.0 | 6.057 | 0.000 | 0.000 | 0.0 | 1.8 | 77.999 | 71.959 | OK |
| FEH: 30 years: +40 %: 2160 mins: Summer | 83.385 | 83.369 | 0.129 | 0.119 | 1.8 | 4.991 | 0.000 | 0.000 | 0.0 | 1.7 | 77.228 | 76.893 | OK |
| FEH: 30 years: +40 %: 2160 mins: Winter | 83.375 | 83.372 | 0.119 | 0.122 | 1.6 | 4.741 | 0.000 | 0.000 | 0.0 | 1.5 | 86.807 | 78.051 | OK |
| FEH: 30 years: +40 %: 2880 mins: Summer | 83.373 | 83.360 | 0.117 | 0.110 | 1.7 | 4.106 | 0.000 | 0.000 | 0.0 | 1.5 | 83.173 | 80.992 | OK |
| FEH: 30 years: +40 %: 2880 mins: Winter | 83.361 | 83.350 | 0.105 | 0.100 | 1.4 | 3.570 | 0.000 | 0.000 | 0.0 | 1.3 | 93.532 | 83.470 | OK |
| FEH: 30 years: +40 %: 4320 mins: Summer | 83.360 | 83.331 | 0.104 | 0.081 | 1.3 | 3.185 | 0.000 | 0.000 | 0.0 | 1.3 | 93.431 | 85.254 | OK |
| FEH: 30 years: +40 %: 4320 mins: Winter | 83.348 | 83.307 | 0.092 | 0.057 | 1.1 | 2.573 | 0.000 | 0.000 | 0.0 | 1.0 | 104.531 | 88.090 | OK |
| FEH: 30 years: +40 %: 5760 mins: Summer | 83.351 | 83.312 | 0.095 | 0.062 | 1.1 | 2.723 | 0.000 | 0.000 | 0.0 | 1.1 | 102.312 | 87.392 | OK |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 30yr +40% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



| | | | | | | | | | | | | | |
|---|--------|--------|-------|-------|-----|-------|-------|-------|-----|-----|---------|--------|----|
| FEH: 30 years: +40 %: 5760 mins: Winter | 83.341 | 83.299 | 0.085 | 0.049 | 0.9 | 2.247 | 0.000 | 0.000 | 0.0 | 0.8 | 114.274 | 89.596 | OK |
| FEH: 30 years: +40 %: 7200 mins: Summer | 83.346 | 83.304 | 0.090 | 0.054 | 1.0 | 2.474 | 0.000 | 0.000 | 0.0 | 1.0 | 110.559 | 88.545 | OK |
| FEH: 30 years: +40 %: 7200 mins: Winter | 83.336 | 83.294 | 0.080 | 0.044 | 0.8 | 2.048 | 0.000 | 0.000 | 0.0 | 0.7 | 123.865 | 90.518 | OK |
| FEH: 30 years: +40 %: 8640 mins: Summer | 83.342 | 83.300 | 0.086 | 0.050 | 1.0 | 2.302 | 0.000 | 0.000 | 0.0 | 0.9 | 117.781 | 89.344 | OK |
| FEH: 30 years: +40 %: 8640 mins: Winter | 83.332 | 83.291 | 0.076 | 0.041 | 0.7 | 1.899 | 0.000 | 0.000 | 0.0 | 0.6 | 132.936 | 91.206 | OK |
| FEH: 30 years: +40 %: 10080 mins: Summer | 83.340 | 83.297 | 0.084 | 0.047 | 0.9 | 2.183 | 0.000 | 0.000 | 0.0 | 0.8 | 125.402 | 89.895 | OK |
| FEH: 30 years: +40 %: 10080 mins: Winter | 83.329 | 83.289 | 0.073 | 0.039 | 0.7 | 1.797 | 0.000 | 0.000 | 0.0 | 0.6 | 140.301 | 91.680 | OK |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Inflows Storm Phase: Phase | Company Address: Geoson Limited | | |



Garage, Stables and Terrace

Type : Catchment Area

| | |
|-----------|-------|
| Area (ha) | 0.031 |
|-----------|-------|

Dynamic Sizing

| Runoff Method | Time of Concentration |
|------------------------------|-----------------------|
| Summer Volumetric Runoff | 0.750 |
| Winter Volumetric Runoff | 0.840 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |



House Roof and Terrace

Type : Catchment Area

| | |
|-----------|-------|
| Area (ha) | 0.066 |
|-----------|-------|

Dynamic Sizing

| Runoff Method | Time of Concentration |
|------------------------------|-----------------------|
| Summer Volumetric Runoff | 0.750 |
| Winter Volumetric Runoff | 0.840 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |



Road, Parking and Turning Circle

Type : Catchment Area

| | |
|-----------|-------|
| Area (ha) | 0.153 |
|-----------|-------|

Dynamic Sizing

| Runoff Method | Time of Concentration |
|------------------------------|-----------------------|
| Summer Volumetric Runoff | 0.750 |
| Winter Volumetric Runoff | 0.750 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Pond 1

Type : Pond

Dimensions

| | |
|----------------------|--------|
| Exceedance Level (m) | 84.000 |
| Depth (m) | 0.600 |
| Base Level (m) | 83.400 |
| Freeboard (mm) | 300 |
| Initial Depth (m) | 0.000 |
| Porosity (%) | 100 |
| Average Slope (1:X) | 4.117 |
| Total Volume (m³) | 27.442 |

| Depth (m) | Area (m²) | Volume (m³) |
|-----------|-----------|-------------|
| 0.000 | 75.00 | 0.000 |
| 0.300 | 109.00 | 27.442 |
| 0.301 | 130.00 | 27.561 |
| 0.600 | 170.00 | 72.277 |

Inlets

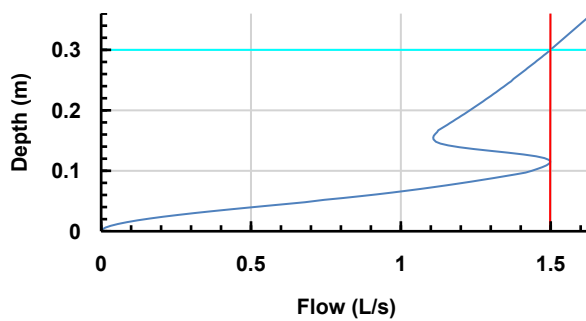
Inlet

| | |
|--------------------|-----------------------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | Garage, Stables and Terrace |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Outlets

Outlet

| | |
|---------------------|--|
| Outgoing Connection | Pipe |
| Outlet Type | Hydro-Brake® |
| Invert Level (m) | 83.400 |
| Design Depth (m) | 0.300 |
| Design Flow (L/s) | 1.5 |
| Objective | Minimise Upstream Storage Requirements |
| Application | Surface Water Only |
| Sump Available | <input type="checkbox"/> |
| Unit Reference | CHE-0068-1500-0300-1500 |



| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Advanced

| | |
|-----------------|-------------|
| Perimeter | Circular |
| Length (m) | 14.000 |
| Friction Scheme | Manning's n |
| n | 0.05 |



Pond 2

Type : Pond

Dimensions

| | |
|----------------------|--------|
| Exceedance Level (m) | 83.850 |
| Depth (m) | 0.600 |
| Base Level (m) | 83.250 |
| Freeboard (mm) | 300 |
| Initial Depth (m) | 0.000 |
| Porosity (%) | 100 |
| Average Slope (1:X) | 4.764 |
| Total Volume (m³) | 28.730 |

| Depth (m) | Area (m²) | Volume (m³) |
|-----------|-----------|-------------|
| 0.000 | 76.00 | 0.000 |
| 0.300 | 117.00 | 28.730 |
| 0.301 | 142.00 | 28.859 |
| 0.600 | 190.00 | 78.319 |

Inlets

Inlet

| | |
|--------------------|------------------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | House Roof and Terrace |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Inlet (1)

| | |
|--------------------|----------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | Pipe |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Outlets

Outlet

| | |
|--------------------------|----------|
| Outgoing Connection | No Delay |
| Outlet Type | Orifice |
| Diameter (m) | 0.100 |
| Coefficient of Discharge | 0.600 |
| Invert Level (m) | 83.250 |

Advanced

| | |
|-----------------|-------------|
| Perimeter | Circular |
| Length (m) | 18.000 |
| Friction Scheme | Manning's n |
| n | 0.05 |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Pond 3

Type : Pond

Dimensions

| | |
|----------------------|--------|
| Exceedance Level (m) | 83.750 |
| Depth (m) | 0.600 |
| Base Level (m) | 83.150 |
| Freeboard (mm) | 300 |
| Initial Depth (m) | 0.000 |
| Porosity (%) | 100 |
| Average Slope (1:X) | 5.161 |
| Total Volume (m³) | 50.023 |

| Depth (m) | Area (m²) | Volume (m³) |
|-----------|-----------|-------------|
| 0.000 | 140.00 | 0.000 |
| 0.300 | 195.00 | 50.023 |
| 0.301 | 230.00 | 50.235 |
| 0.600 | 300.00 | 129.239 |

Inlets

Inlet

| | |
|--------------------|----------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | No Delay (1) |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Inlet (1)

| | |
|--------------------|----------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | No Delay (2) |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

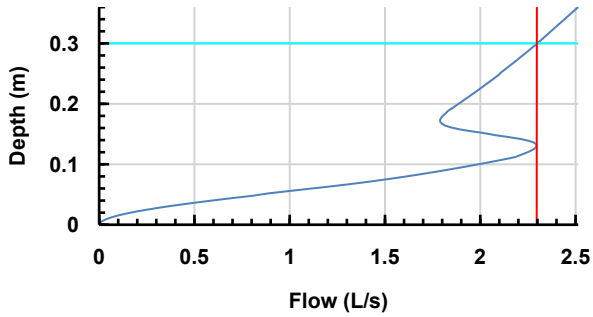
| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Outlets

Outlet

| | |
|---------------------|--|
| Outgoing Connection | (None) |
| Outlet Type | Hydro-Brake® |
| Invert Level (m) | 83.150 |
| Design Depth (m) | 0.300 |
| Design Flow (L/s) | 2.3 |
| Objective | Minimise Upstream Storage Requirements |
| Application | Surface Water Only |
| Sump Available | <input type="checkbox"/> |
| Unit Reference | CHE-0082-2300-0300-2300 |



Advanced

| | |
|-----------------|-------------|
| Perimeter | Circular |
| Length (m) | 25.000 |
| Friction Scheme | Manning's n |
| n | 0.05 |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Porous Paving

Type : Porous Paving

Dimensions

| | |
|-----------------------------|---------|
| Exceedance Level (m) | 83.850 |
| Depth (m) | 0.380 |
| Base Level (m) | 83.470 |
| Paving Layer Depth (mm) | 130 |
| Membrane Percolation (m/hr) | 1.0 |
| Porosity (%) | 30 |
| Length (m) | 140.000 |
| Long. Slope (1:X) | 1000.00 |
| Width (m) | 10.100 |
| Total Volume (m³) | 106.785 |

Under Drain

| | |
|-----------------------|-------------|
| Height Above Base (m) | 0.050 |
| Diameter (mm) | 100 |
| No. of Barrels | 1 |
| Release Height (m) | 0.100 |
| Friction Scheme | Manning's n |
| n | 0.015 |

Inlets

Inlet

| | |
|--------------------|----------------------------------|
| Inlet Type | Lateral Inflow |
| Incoming Item(s) | Road, Parking and Turning Circle |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

Outlets

Outlet

| | |
|--------------------------|--------------|
| Outgoing Connection | No Delay (2) |
| Outlet Type | Orifice |
| Diameter (m) | 0.044 |
| Coefficient of Discharge | 0.600 |
| Invert Level (m) | 83.470 |

Advanced

| | |
|---------------------|-------|
| Conductivity (m/hr) | 100.0 |
|---------------------|-------|

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Storm Phase: Phase | Company Address: Geoson Limited | | |



Swale

Type : Swale

Swale

| | |
|------------------------|-------------|
| Exceedance Level (m) | 83.750 |
| Depth (m) | 0.500 |
| Base Level (m) | 83.250 |
| Top Width (m) | 3.300 |
| Side Slope (1:X) | 3.00 |
| Base Width (m) | 0.300 |
| Freeboard (mm) | 200 |
| Length (m) | 60.000 |
| Long. Slope (1:X) | 10000.00 |
| Filtration Rate (m/hr) | 0.0 |
| Friction Scheme | Manning's n |
| n | 0.15 |
| Total Volume (m³) | 21.600 |

Inlets

Inlet

| | |
|--------------------|----------------|
| Inlet Type | Point Inflow |
| Incoming Item(s) | No Delay |
| Bypass Destination | (None) |
| Inlet Destination | Ponding Area |
| Capacity Type | No Restriction |

Outlets

Outlet

| | |
|--------------------------|--------------|
| Outgoing Connection | No Delay (1) |
| Outlet Type | Orifice |
| Diameter (m) | 0.052 |
| Coefficient of Discharge | 0.600 |
| Invert Level (m) | 83.250 |

Advanced

Swale

| | |
|--------------|-----|
| Porosity (%) | 100 |
|--------------|-----|

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Title: Rainfall Analysis Criteria | Company Address: Geoson Limited | | |



| | |
|---------------------------------|--------------------------|
| Runoff Type | Dynamic |
| Output Interval (mins) | 5 |
| Time Step | Default |
| Urban Creep | Apply Global Value |
| Urban Creep Global Value (%) | 0 |
| Junction Flood Risk Margin (mm) | 300 |
| Perform No Discharge Analysis | <input type="checkbox"/> |

Rainfall

| | |
|------------------|-------------------------------------|
| FEH | Type: FEH |
| Site Location | GB 514800 135250 TQ 14800 35250 |
| Rainfall Version | 2022 |
| Summer | <input checked="" type="checkbox"/> |
| Winter | <input checked="" type="checkbox"/> |

Return Period

| Return Period (years) | Increase Rainfall (%) |
|-----------------------|-----------------------|
| 100.0 | 45.000 |

Storm Durations

| Duration (mins) | Run Time (mins) |
|-----------------|-----------------|
| 15 | 30 |
| 30 | 60 |
| 60 | 120 |
| 120 | 240 |
| 180 | 360 |
| 240 | 480 |
| 360 | 720 |
| 480 | 960 |
| 600 | 1200 |
| 720 | 1440 |
| 960 | 1920 |
| 1440 | 2880 |
| 2160 | 4320 |
| 2880 | 5760 |
| 4320 | 8640 |
| 5760 | 11520 |
| 7200 | 14400 |
| 8640 | 17280 |
| 10080 | 20160 |

| | | | |
|--|------------------------------------|-------------|--------------|
| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Porous Paving: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residual Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 100 years: +45 %: 15 mins: Summer | 83.705 | 83.563 | 0.095 | 0.093 | 95.1 | 40.849 | 0.000 | 0.000 | | 1.1 | 1.299 | | 61.747 | OK |
| FEH: 100 years: +45 %: 15 mins: Winter | 83.705 | 83.563 | 0.095 | 0.093 | 89.4 | 40.877 | 0.000 | 0.000 | | 1.1 | 1.301 | | 61.720 | OK |
| FEH: 100 years: +45 %: 30 mins: Summer | 83.731 | 83.600 | 0.121 | 0.130 | 64.9 | 54.458 | 0.000 | 0.000 | | 1.3 | 3.427 | 10 | 49.002 | OK |
| FEH: 100 years: +45 %: 30 mins: Winter | 83.731 | 83.600 | 0.121 | 0.130 | 60.9 | 54.471 | 0.000 | 0.000 | | 1.3 | 3.430 | 10 | 48.990 | OK |
| FEH: 100 years: +45 %: 60 mins: Summer | 83.755 | 83.635 | 0.145 | 0.165 | 57.8 | 68.799 | 0.000 | 0.000 | | 1.5 | 8.222 | | 35.573 | OK |
| FEH: 100 years: +45 %: 60 mins: Winter | 83.756 | 83.635 | 0.146 | 0.165 | 46.5 | 68.806 | 0.000 | 0.000 | | 1.5 | 8.233 | | 35.566 | OK |
| FEH: 100 years: +45 %: 120 mins: Summer | 83.767 | 83.661 | 0.157 | 0.191 | 40.3 | 78.171 | 0.000 | 0.000 | | 1.7 | 18.021 | | 26.796 | OK |
| FEH: 100 years: +45 %: 120 mins: Winter | 83.768 | 83.661 | 0.158 | 0.191 | 29.0 | 78.329 | 0.000 | 0.000 | | 1.7 | 18.061 | | 26.648 | OK |
| FEH: 100 years: +45 %: 180 mins: Summer | 83.773 | 83.675 | 0.163 | 0.205 | 31.2 | 82.848 | 0.000 | 0.000 | | 1.7 | 28.011 | | 22.417 | OK |
| FEH: 100 years: +45 %: 180 mins: Winter | 83.774 | 83.675 | 0.164 | 0.205 | 21.5 | 83.079 | 0.000 | 0.000 | | 1.7 | 28.092 | | 22.200 | OK |
| FEH: 100 years: +45 %: 240 mins: Summer | 83.776 | 83.684 | 0.166 | 0.214 | 25.8 | 85.463 | 0.000 | 0.000 | | 1.8 | 37.922 | | 19.968 | OK |
| FEH: 100 years: +45 %: 240 mins: Winter | 83.776 | 83.684 | 0.166 | 0.214 | 17.3 | 85.788 | 0.000 | 0.000 | | 1.8 | 38.047 | | 19.664 | OK |
| FEH: 100 years: +45 %: 360 mins: Summer | 83.780 | 83.693 | 0.170 | 0.223 | 19.3 | 87.433 | 0.000 | 0.000 | | 1.8 | 57.042 | 365 | 18.122 | OK |
| FEH: 100 years: +45 %: 360 mins: Winter | 83.778 | 83.694 | 0.168 | 0.224 | 12.7 | 87.928 | 0.000 | 0.000 | | 1.8 | 57.262 | 350 | 17.660 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|---|--------|--------|-------|-------|------|--------|-------|-------|--|-----|---------|-----|--------|----|
| FEH: 100 years: +45 %: 480 mins: Summer | 83.782 | 83.695 | 0.172 | 0.225 | 15.7 | 88.525 | 0.000 | 0.000 | | 1.8 | 74.908 | 425 | 17.100 | OK |
| FEH: 100 years: +45 %: 480 mins: Winter | 83.778 | 83.697 | 0.168 | 0.227 | 10.2 | 88.227 | 0.000 | 0.000 | | 1.8 | 75.201 | 410 | 17.379 | OK |
| FEH: 100 years: +45 %: 600 mins: Summer | 83.782 | 83.697 | 0.172 | 0.227 | 13.3 | 89.292 | 0.000 | 0.000 | | 1.8 | 90.447 | 465 | 16.382 | OK |
| FEH: 100 years: +45 %: 600 mins: Winter | 83.777 | 83.698 | 0.167 | 0.228 | 8.6 | 88.637 | 0.000 | 0.000 | | 1.8 | 90.746 | 445 | 16.995 | OK |
| FEH: 100 years: +45 %: 720 mins: Summer | 83.782 | 83.699 | 0.172 | 0.229 | 11.5 | 89.836 | 0.000 | 0.000 | | 1.8 | 101.460 | 500 | 15.872 | OK |
| FEH: 100 years: +45 %: 720 mins: Winter | 83.775 | 83.699 | 0.165 | 0.229 | 7.4 | 88.644 | 0.000 | 0.000 | | 1.8 | 101.621 | 465 | 16.989 | OK |
| FEH: 100 years: +45 %: 960 mins: Summer | 83.780 | 83.702 | 0.170 | 0.232 | 9.2 | 90.277 | 0.000 | 0.000 | | 1.9 | 113.741 | 545 | 15.460 | OK |
| FEH: 100 years: +45 %: 960 mins: Winter | 83.771 | 83.700 | 0.161 | 0.230 | 6.0 | 87.738 | 0.000 | 0.000 | | 1.8 | 113.797 | 490 | 17.837 | OK |
| FEH: 100 years: +45 %: 1440 mins: Summer | 83.775 | 83.703 | 0.165 | 0.233 | 6.8 | 89.473 | 0.000 | 0.000 | | 1.9 | 129.975 | 610 | 16.212 | OK |
| FEH: 100 years: +45 %: 1440 mins: Winter | 83.760 | 83.695 | 0.150 | 0.225 | 4.4 | 84.233 | 0.000 | 0.000 | | 1.8 | 130.066 | 530 | 21.119 | OK |
| FEH: 100 years: +45 %: 2160 mins: Summer | 83.762 | 83.697 | 0.152 | 0.227 | 5.0 | 85.093 | 0.000 | 0.000 | | 1.8 | 145.957 | 590 | 20.314 | OK |
| FEH: 100 years: +45 %: 2160 mins: Winter | 83.740 | 83.680 | 0.130 | 0.210 | 3.2 | 76.359 | 0.000 | 0.000 | | 1.8 | 145.974 | 490 | 28.493 | OK |
| FEH: 100 years: +45 %: 2880 mins: Summer | 83.748 | 83.686 | 0.138 | 0.216 | 4.0 | 79.608 | 0.000 | 0.000 | | 1.8 | 158.155 | 540 | 25.451 | OK |
| FEH: 100 years: +45 %: 2880 mins: Winter | 83.720 | 83.665 | 0.110 | 0.195 | 2.6 | 68.390 | 0.000 | 0.000 | | 1.7 | 157.936 | 425 | 35.956 | OK |
| FEH: 100 years: +45 %: 4320 mins: Summer | 83.721 | 83.666 | 0.111 | 0.196 | 2.9 | 68.879 | 0.000 | 0.000 | | 1.7 | 176.501 | 430 | 35.497 | OK |
| FEH: 100 years: +45 %: 4320 mins: Winter | 83.695 | 83.636 | 0.085 | 0.166 | 1.9 | 55.146 | 0.000 | 0.000 | | 1.5 | 176.117 | 175 | 48.358 | OK |
| FEH: 100 years: +45 %: 5760 mins: Summer | 83.702 | 83.648 | 0.092 | 0.178 | 2.4 | 60.525 | 0.000 | 0.000 | | 1.6 | 191.849 | 330 | 43.320 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|--|--------|--------|-------|-------|-----|--------|-------|-------|--|-----|---------|-----|--------|----|
| FEH: 100 years: +45 %: 5760 mins: Winter | 83.691 | 83.611 | 0.081 | 0.141 | 1.5 | 46.955 | 0.000 | 0.000 | | 1.4 | 191.529 | | 56.029 | OK |
| FEH: 100 years: +45 %: 7200 mins: Summer | 83.696 | 83.634 | 0.086 | 0.164 | 2.0 | 54.414 | 0.000 | 0.000 | | 1.5 | 205.851 | 115 | 49.044 | OK |
| FEH: 100 years: +45 %: 7200 mins: Winter | 83.689 | 83.587 | 0.079 | 0.117 | 1.3 | 42.633 | 0.000 | 0.000 | | 1.2 | 205.881 | | 60.076 | OK |
| FEH: 100 years: +45 %: 8640 mins: Summer | 83.694 | 83.622 | 0.084 | 0.152 | 1.8 | 50.066 | 0.000 | 0.000 | | 1.5 | 218.859 | | 53.115 | OK |
| FEH: 100 years: +45 %: 8640 mins: Winter | 83.687 | 83.569 | 0.077 | 0.099 | 1.1 | 40.049 | 0.000 | 0.000 | | 1.1 | 218.592 | | 62.495 | OK |
| FEH: 100 years: +45 %: 10080 mins: Summer | 83.692 | 83.611 | 0.082 | 0.141 | 1.6 | 47.115 | 0.000 | 0.000 | | 1.4 | 231.406 | | 55.879 | OK |
| FEH: 100 years: +45 %: 10080 mins: Winter | 83.685 | 83.556 | 0.075 | 0.086 | 1.0 | 38.450 | 0.000 | 0.000 | | 1.0 | 231.099 | | 63.993 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Pond 1: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residant Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 100 years: +45 %: 15 mins: Summer | 83.498 | 83.498 | 0.098 | 0.098 | 19.3 | 7.886 | 0.000 | 0.000 | | 0.9 | 1.094 | | 71.262 | OK |
| FEH: 100 years: +45 %: 15 mins: Winter | 83.510 | 83.510 | 0.110 | 0.110 | 20.3 | 8.895 | 0.000 | 0.000 | | 1.0 | 1.101 | | 67.584 | OK |
| FEH: 100 years: +45 %: 30 mins: Summer | 83.527 | 83.527 | 0.127 | 0.127 | 13.1 | 10.373 | 0.000 | 0.000 | | 1.1 | 2.463 | | 62.199 | OK |
| FEH: 100 years: +45 %: 30 mins: Winter | 83.543 | 83.542 | 0.143 | 0.142 | 13.8 | 11.770 | 0.000 | 0.000 | | 1.1 | 2.411 | | 57.107 | OK |
| FEH: 100 years: +45 %: 60 mins: Summer | 83.554 | 83.554 | 0.154 | 0.154 | 11.7 | 12.805 | 0.000 | 0.000 | | 1.1 | 5.242 | | 53.336 | OK |
| FEH: 100 years: +45 %: 60 mins: Winter | 83.573 | 83.573 | 0.173 | 0.173 | 10.6 | 14.596 | 0.000 | 0.000 | | 1.1 | 5.280 | 15 | 46.812 | OK |
| FEH: 100 years: +45 %: 120 mins: Summer | 83.562 | 83.562 | 0.162 | 0.162 | 8.2 | 13.523 | 0.000 | 0.000 | | 1.0 | 10.272 | | 50.720 | OK |
| FEH: 100 years: +45 %: 120 mins: Winter | 83.583 | 83.583 | 0.183 | 0.183 | 6.6 | 15.506 | 0.000 | 0.000 | | 1.1 | 10.623 | 30 | 43.495 | OK |
| FEH: 100 years: +45 %: 180 mins: Summer | 83.563 | 83.563 | 0.163 | 0.163 | 6.3 | 13.657 | 0.000 | 0.000 | | 1.0 | 14.190 | | 50.231 | OK |
| FEH: 100 years: +45 %: 180 mins: Winter | 83.583 | 83.582 | 0.183 | 0.182 | 4.9 | 15.455 | 0.000 | 0.000 | | 1.0 | 14.906 | 55 | 43.681 | OK |
| FEH: 100 years: +45 %: 240 mins: Summer | 83.563 | 83.563 | 0.163 | 0.163 | 5.2 | 13.624 | 0.000 | 0.000 | | 1.0 | 16.802 | | 50.354 | OK |
| FEH: 100 years: +45 %: 240 mins: Winter | 83.580 | 83.581 | 0.180 | 0.181 | 3.9 | 15.269 | 0.000 | 0.000 | | 1.0 | 17.974 | 60 | 44.358 | OK |
| FEH: 100 years: +45 %: 360 mins: Summer | 83.559 | 83.559 | 0.159 | 0.159 | 3.9 | 13.229 | 0.000 | 0.000 | | 0.9 | 20.023 | | 51.791 | OK |
| FEH: 100 years: +45 %: 360 mins: Winter | 83.573 | 83.573 | 0.173 | 0.173 | 2.9 | 14.569 | 0.000 | 0.000 | | 1.0 | 21.682 | 50 | 46.909 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|---|--------|--------|-------|-------|-----|--------|-------|-------|-----|--------|--------|----|
| FEH: 100 years: +45 %: 480 mins: Summer | 83.553 | 83.553 | 0.153 | 0.153 | 3.2 | 12.698 | 0.000 | 0.000 | 0.9 | 22.020 | 53.727 | OK |
| FEH: 100 years: +45 %: 480 mins: Winter | 83.564 | 83.564 | 0.164 | 0.164 | 2.3 | 13.715 | 0.000 | 0.000 | 0.9 | 24.025 | 50.022 | OK |
| FEH: 100 years: +45 %: 600 mins: Summer | 83.546 | 83.546 | 0.146 | 0.146 | 2.7 | 12.116 | 0.000 | 0.000 | 0.9 | 23.453 | 55.847 | OK |
| FEH: 100 years: +45 %: 600 mins: Winter | 83.554 | 83.554 | 0.154 | 0.154 | 1.9 | 12.845 | 0.000 | 0.000 | 0.9 | 25.964 | 53.191 | OK |
| FEH: 100 years: +45 %: 720 mins: Summer | 83.540 | 83.540 | 0.140 | 0.140 | 2.3 | 11.551 | 0.000 | 0.000 | 0.9 | 24.668 | 57.906 | OK |
| FEH: 100 years: +45 %: 720 mins: Winter | 83.545 | 83.545 | 0.145 | 0.145 | 1.7 | 12.021 | 0.000 | 0.000 | 0.9 | 27.552 | 56.194 | OK |
| FEH: 100 years: +45 %: 960 mins: Summer | 83.528 | 83.528 | 0.128 | 0.128 | 1.9 | 10.469 | 0.000 | 0.000 | 0.9 | 26.678 | 61.851 | OK |
| FEH: 100 years: +45 %: 960 mins: Winter | 83.528 | 83.528 | 0.128 | 0.128 | 1.4 | 10.495 | 0.000 | 0.000 | 0.9 | 29.906 | 61.753 | OK |
| FEH: 100 years: +45 %: 1440 mins: Summer | 83.508 | 83.508 | 0.108 | 0.108 | 1.4 | 8.679 | 0.000 | 0.000 | 0.9 | 29.757 | 68.374 | OK |
| FEH: 100 years: +45 %: 1440 mins: Winter | 83.501 | 83.501 | 0.101 | 0.101 | 1.0 | 8.107 | 0.000 | 0.000 | 0.8 | 33.336 | 70.457 | OK |
| FEH: 100 years: +45 %: 2160 mins: Summer | 83.485 | 83.485 | 0.085 | 0.085 | 1.0 | 6.784 | 0.000 | 0.000 | 0.8 | 32.879 | 75.279 | OK |
| FEH: 100 years: +45 %: 2160 mins: Winter | 83.475 | 83.475 | 0.075 | 0.075 | 0.7 | 5.938 | 0.000 | 0.000 | 0.7 | 36.895 | 78.363 | OK |
| FEH: 100 years: +45 %: 2880 mins: Summer | 83.476 | 83.476 | 0.076 | 0.076 | 0.8 | 6.030 | 0.000 | 0.000 | 0.7 | 35.275 | 78.027 | OK |
| FEH: 100 years: +45 %: 2880 mins: Winter | 83.467 | 83.467 | 0.067 | 0.067 | 0.6 | 5.232 | 0.000 | 0.000 | 0.6 | 39.427 | 80.933 | OK |
| FEH: 100 years: +45 %: 4320 mins: Summer | 83.465 | 83.465 | 0.065 | 0.065 | 0.6 | 5.109 | 0.000 | 0.000 | 0.5 | 38.837 | 81.381 | OK |
| FEH: 100 years: +45 %: 4320 mins: Winter | 83.456 | 83.456 | 0.056 | 0.056 | 0.4 | 4.392 | 0.000 | 0.000 | 0.4 | 43.680 | 83.995 | OK |
| FEH: 100 years: +45 %: 5760 mins: Summer | 83.459 | 83.459 | 0.059 | 0.059 | 0.5 | 4.593 | 0.000 | 0.000 | 0.5 | 41.905 | 83.264 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|--|--------|--------|-------|-------|-----|-------|-------|-------|--|-----|--------|--|--------|----|
| FEH: 100 years: +45 %: 5760 mins: Winter | 83.451 | 83.451 | 0.051 | 0.051 | 0.4 | 3.929 | 0.000 | 0.000 | | 0.3 | 46.885 | | 85.682 | OK |
| FEH: 100 years: +45 %: 7200 mins: Summer | 83.455 | 83.454 | 0.055 | 0.054 | 0.4 | 4.235 | 0.000 | 0.000 | | 0.4 | 44.719 | | 84.566 | OK |
| FEH: 100 years: +45 %: 7200 mins: Winter | 83.446 | 83.446 | 0.046 | 0.046 | 0.3 | 3.580 | 0.000 | 0.000 | | 0.3 | 49.717 | | 86.955 | OK |
| FEH: 100 years: +45 %: 8640 mins: Summer | 83.451 | 83.451 | 0.051 | 0.051 | 0.4 | 3.969 | 0.000 | 0.000 | | 0.3 | 46.888 | | 85.538 | OK |
| FEH: 100 years: +45 %: 8640 mins: Winter | 83.444 | 83.444 | 0.044 | 0.044 | 0.3 | 3.362 | 0.000 | 0.000 | | 0.3 | 52.900 | | 87.747 | OK |
| FEH: 100 years: +45 %: 10080 mins: Summer | 83.448 | 83.448 | 0.048 | 0.048 | 0.3 | 3.744 | 0.000 | 0.000 | | 0.3 | 49.883 | | 86.357 | OK |
| FEH: 100 years: +45 %: 10080 mins: Winter | 83.441 | 83.441 | 0.041 | 0.041 | 0.2 | 3.150 | 0.000 | 0.000 | | 0.2 | 55.583 | | 88.522 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Pond 2: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residual Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 100 years: +45 %: 15 mins: Summer | 83.427 | 83.426 | 0.177 | 0.176 | 41.2 | 15.433 | 0.000 | 0.000 | | 4.5 | 4.913 | 5 | 46.283 | OK |
| FEH: 100 years: +45 %: 15 mins: Winter | 83.445 | 83.444 | 0.195 | 0.194 | 43.4 | 17.221 | 0.000 | 0.000 | | 4.9 | 5.575 | | 40.058 | OK |
| FEH: 100 years: +45 %: 30 mins: Summer | 83.465 | 83.465 | 0.215 | 0.215 | 28.8 | 19.374 | 0.000 | 0.000 | | 5.1 | 10.829 | | 32.565 | OK |
| FEH: 100 years: +45 %: 30 mins: Winter | 83.488 | 83.486 | 0.238 | 0.236 | 30.0 | 21.630 | 0.000 | 0.000 | | 5.7 | 12.141 | | 24.713 | OK |
| FEH: 100 years: +45 %: 60 mins: Summer | 83.490 | 83.491 | 0.240 | 0.241 | 25.5 | 22.041 | 0.000 | 0.000 | | 5.7 | 19.181 | | 23.283 | OK |
| FEH: 100 years: +45 %: 60 mins: Winter | 83.513 | 83.514 | 0.263 | 0.264 | 23.0 | 24.595 | 0.000 | 0.000 | | 6.1 | 21.235 | | 14.391 | OK |
| FEH: 100 years: +45 %: 120 mins: Summer | 83.497 | 83.497 | 0.247 | 0.247 | 18.1 | 22.688 | 0.000 | 0.000 | | 5.6 | 31.231 | | 21.030 | OK |
| FEH: 100 years: +45 %: 120 mins: Winter | 83.516 | 83.516 | 0.266 | 0.266 | 14.8 | 24.852 | 0.000 | 0.000 | | 5.7 | 34.150 | | 13.497 | OK |
| FEH: 100 years: +45 %: 180 mins: Summer | 83.496 | 83.496 | 0.246 | 0.246 | 14.3 | 22.647 | 0.000 | 0.000 | | 5.2 | 40.205 | 230 | 21.173 | OK |
| FEH: 100 years: +45 %: 180 mins: Winter | 83.514 | 83.514 | 0.264 | 0.264 | 11.2 | 24.550 | 0.000 | 0.000 | | 5.3 | 43.834 | | 14.549 | OK |
| FEH: 100 years: +45 %: 240 mins: Summer | 83.495 | 83.494 | 0.245 | 0.244 | 11.9 | 22.443 | 0.000 | 0.000 | | 5.0 | 46.327 | 265 | 21.881 | OK |
| FEH: 100 years: +45 %: 240 mins: Winter | 83.510 | 83.511 | 0.260 | 0.261 | 9.2 | 24.228 | 0.000 | 0.000 | | 4.8 | 50.772 | | 15.669 | OK |
| FEH: 100 years: +45 %: 360 mins: Summer | 83.490 | 83.490 | 0.240 | 0.240 | 9.2 | 21.934 | 0.000 | 0.000 | | 4.5 | 53.894 | 340 | 23.652 | OK |
| FEH: 100 years: +45 %: 360 mins: Winter | 83.505 | 83.504 | 0.255 | 0.254 | 7.0 | 23.566 | 0.000 | 0.000 | | 4.2 | 59.551 | | 17.975 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|---|--------|--------|-------|-------|-----|--------|-------|-------|-----|---------|-----|--------|----|
| FEH: 100 years: +45 %: 480 mins: Summer | 83.485 | 83.485 | 0.235 | 0.235 | 7.6 | 21.459 | 0.000 | 0.000 | 4.1 | 59.538 | 425 | 25.309 | OK |
| FEH: 100 years: +45 %: 480 mins: Winter | 83.498 | 83.498 | 0.248 | 0.248 | 5.7 | 22.840 | 0.000 | 0.000 | 3.7 | 66.018 | 575 | 20.502 | OK |
| FEH: 100 years: +45 %: 600 mins: Summer | 83.481 | 83.481 | 0.231 | 0.231 | 6.6 | 20.964 | 0.000 | 0.000 | 3.8 | 64.860 | 505 | 27.032 | OK |
| FEH: 100 years: +45 %: 600 mins: Winter | 83.491 | 83.491 | 0.241 | 0.241 | 5.0 | 22.067 | 0.000 | 0.000 | 3.4 | 72.200 | 630 | 23.189 | OK |
| FEH: 100 years: +45 %: 720 mins: Summer | 83.476 | 83.476 | 0.226 | 0.226 | 5.8 | 20.469 | 0.000 | 0.000 | 3.6 | 70.539 | 570 | 28.754 | OK |
| FEH: 100 years: +45 %: 720 mins: Winter | 83.484 | 83.484 | 0.234 | 0.234 | 4.4 | 21.349 | 0.000 | 0.000 | 3.2 | 78.739 | 670 | 25.692 | OK |
| FEH: 100 years: +45 %: 960 mins: Summer | 83.467 | 83.467 | 0.217 | 0.217 | 4.8 | 19.476 | 0.000 | 0.000 | 3.2 | 81.184 | 650 | 32.211 | OK |
| FEH: 100 years: +45 %: 960 mins: Winter | 83.472 | 83.472 | 0.222 | 0.222 | 3.7 | 20.083 | 0.000 | 0.000 | 2.8 | 90.988 | 720 | 30.095 | OK |
| FEH: 100 years: +45 %: 1440 mins: Summer | 83.451 | 83.451 | 0.201 | 0.201 | 3.8 | 17.860 | 0.000 | 0.000 | 2.8 | 92.283 | 745 | 37.836 | OK |
| FEH: 100 years: +45 %: 1440 mins: Winter | 83.456 | 83.456 | 0.206 | 0.206 | 2.9 | 18.370 | 0.000 | 0.000 | 2.4 | 103.505 | 730 | 36.060 | OK |
| FEH: 100 years: +45 %: 2160 mins: Summer | 83.434 | 83.434 | 0.184 | 0.184 | 2.9 | 16.141 | 0.000 | 0.000 | 2.4 | 102.462 | 715 | 43.817 | OK |
| FEH: 100 years: +45 %: 2160 mins: Winter | 83.442 | 83.442 | 0.192 | 0.192 | 2.2 | 16.982 | 0.000 | 0.000 | 2.0 | 115.025 | 615 | 40.890 | OK |
| FEH: 100 years: +45 %: 2880 mins: Summer | 83.425 | 83.425 | 0.175 | 0.175 | 2.4 | 15.246 | 0.000 | 0.000 | 2.0 | 109.786 | 385 | 46.932 | OK |
| FEH: 100 years: +45 %: 2880 mins: Winter | 83.431 | 83.431 | 0.181 | 0.181 | 1.8 | 15.807 | 0.000 | 0.000 | 1.6 | 123.251 | 415 | 44.979 | OK |
| FEH: 100 years: +45 %: 4320 mins: Summer | 83.408 | 83.408 | 0.158 | 0.158 | 1.8 | 13.630 | 0.000 | 0.000 | 1.6 | 121.192 | | 52.556 | OK |
| FEH: 100 years: +45 %: 4320 mins: Winter | 83.398 | 83.397 | 0.148 | 0.147 | 1.3 | 12.588 | 0.000 | 0.000 | 1.3 | 135.948 | | 56.185 | OK |
| FEH: 100 years: +45 %: 5760 mins: Summer | 83.388 | 83.388 | 0.138 | 0.138 | 1.5 | 11.687 | 0.000 | 0.000 | 1.4 | 130.730 | | 59.321 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|--|--------|--------|-------|-------|-----|-------|-------|-------|--|-----|---------|--------|----|
| FEH: 100 years: +45 %: 5760 mins: Winter | 83.354 | 83.354 | 0.104 | 0.104 | 1.1 | 8.521 | 0.000 | 0.000 | | 1.1 | 146.338 | 70.342 | OK |
| FEH: 100 years: +45 %: 7200 mins: Summer | 83.365 | 83.365 | 0.115 | 0.115 | 1.3 | 9.552 | 0.000 | 0.000 | | 1.3 | 138.972 | 66.751 | OK |
| FEH: 100 years: +45 %: 7200 mins: Winter | 83.346 | 83.346 | 0.096 | 0.096 | 0.9 | 7.841 | 0.000 | 0.000 | | 1.0 | 155.633 | 72.706 | OK |
| FEH: 100 years: +45 %: 8640 mins: Summer | 83.354 | 83.354 | 0.104 | 0.104 | 1.1 | 8.588 | 0.000 | 0.000 | | 1.2 | 146.323 | 70.108 | OK |
| FEH: 100 years: +45 %: 8640 mins: Winter | 83.341 | 83.341 | 0.091 | 0.091 | 0.8 | 7.417 | 0.000 | 0.000 | | 0.9 | 164.830 | 74.184 | OK |
| FEH: 100 years: +45 %: 10080 mins: Summer | 83.349 | 83.349 | 0.099 | 0.099 | 1.0 | 8.132 | 0.000 | 0.000 | | 1.1 | 154.920 | 71.696 | OK |
| FEH: 100 years: +45 %: 10080 mins: Winter | 83.337 | 83.337 | 0.087 | 0.087 | 0.7 | 7.094 | 0.000 | 0.000 | | 0.8 | 173.484 | 75.309 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Pond 3: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residant Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 100 years: +45 %: 15 mins: Summer | 83.167 | 83.155 | 0.017 | 0.005 | 2.4 | 1.631 | 0.000 | 0.000 | | 0.0 | 0.000 | | 96.739 | OK |
| FEH: 100 years: +45 %: 15 mins: Winter | 83.168 | 83.155 | 0.018 | 0.005 | 2.5 | 1.716 | 0.000 | 0.000 | | 0.0 | 0.001 | | 96.571 | OK |
| FEH: 100 years: +45 %: 30 mins: Summer | 83.193 | 83.193 | 0.043 | 0.043 | 3.4 | 6.192 | 0.000 | 0.000 | | 0.7 | 0.483 | | 87.622 | OK |
| FEH: 100 years: +45 %: 30 mins: Winter | 83.195 | 83.195 | 0.045 | 0.045 | 3.5 | 6.406 | 0.000 | 0.000 | | 0.7 | 0.522 | | 87.193 | OK |
| FEH: 100 years: +45 %: 60 mins: Summer | 83.242 | 83.242 | 0.092 | 0.092 | 3.8 | 13.670 | 0.000 | 0.000 | | 1.9 | 4.593 | | 72.673 | OK |
| FEH: 100 years: +45 %: 60 mins: Winter | 83.245 | 83.245 | 0.095 | 0.095 | 3.9 | 14.109 | 0.000 | 0.000 | | 1.9 | 4.805 | | 71.794 | OK |
| FEH: 100 years: +45 %: 120 mins: Summer | 83.305 | 83.306 | 0.155 | 0.156 | 4.1 | 23.921 | 0.000 | 0.000 | | 2.3 | 17.193 | | 52.179 | OK |
| FEH: 100 years: +45 %: 120 mins: Winter | 83.314 | 83.314 | 0.164 | 0.164 | 4.2 | 25.242 | 0.000 | 0.000 | | 2.3 | 17.351 | | 49.539 | OK |
| FEH: 100 years: +45 %: 180 mins: Summer | 83.360 | 83.360 | 0.210 | 0.210 | 4.2 | 33.223 | 0.000 | 0.000 | | 2.3 | 27.723 | | 33.584 | OK |
| FEH: 100 years: +45 %: 180 mins: Winter | 83.370 | 83.369 | 0.220 | 0.219 | 4.3 | 35.010 | 0.000 | 0.000 | | 2.3 | 28.196 | | 30.013 | OK |
| FEH: 100 years: +45 %: 240 mins: Summer | 83.387 | 83.386 | 0.237 | 0.236 | 4.2 | 38.004 | 0.000 | 0.000 | | 2.3 | 39.443 | | 24.026 | OK |
| FEH: 100 years: +45 %: 240 mins: Winter | 83.398 | 83.398 | 0.248 | 0.248 | 4.3 | 40.210 | 0.000 | 0.000 | | 2.3 | 40.386 | | 19.616 | OK |
| FEH: 100 years: +45 %: 360 mins: Summer | 83.403 | 83.403 | 0.253 | 0.253 | 4.2 | 40.954 | 0.000 | 0.000 | | 2.3 | 64.303 | | 18.129 | OK |
| FEH: 100 years: +45 %: 360 mins: Winter | 83.416 | 83.416 | 0.266 | 0.266 | 4.3 | 43.439 | 0.000 | 0.000 | | 2.3 | 66.272 | | 13.161 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|---|--------|--------|-------|-------|-----|--------|-------|-------|--|-----|---------|--------|--------|----|
| FEH: 100 years: +45 %: 480 mins: Summer | 83.412 | 83.411 | 0.262 | 0.261 | 4.2 | 42.634 | 0.000 | 0.000 | | 2.3 | 89.447 | 14.771 | OK | |
| FEH: 100 years: +45 %: 480 mins: Winter | 83.425 | 83.425 | 0.275 | 0.275 | 4.2 | 45.152 | 0.000 | 0.000 | | 2.3 | 92.470 | 9.737 | OK | |
| FEH: 100 years: +45 %: 600 mins: Summer | 83.418 | 83.418 | 0.268 | 0.268 | 4.2 | 43.813 | 0.000 | 0.000 | | 2.3 | 114.281 | 12.414 | OK | |
| FEH: 100 years: +45 %: 600 mins: Winter | 83.431 | 83.431 | 0.281 | 0.281 | 4.1 | 46.343 | 0.000 | 0.000 | | 2.3 | 118.444 | 7.356 | OK | |
| FEH: 100 years: +45 %: 720 mins: Summer | 83.422 | 83.422 | 0.272 | 0.272 | 4.1 | 44.679 | 0.000 | 0.000 | | 2.3 | 138.191 | 10.683 | OK | |
| FEH: 100 years: +45 %: 720 mins: Winter | 83.436 | 83.436 | 0.286 | 0.286 | 4.1 | 47.218 | 0.000 | 0.000 | | 2.3 | 143.438 | 5.607 | OK | |
| FEH: 100 years: +45 %: 960 mins: Summer | 83.427 | 83.427 | 0.277 | 0.277 | 4.0 | 45.553 | 0.000 | 0.000 | | 2.3 | 184.704 | 730 | 8.934 | OK |
| FEH: 100 years: +45 %: 960 mins: Winter | 83.440 | 83.443 | 0.290 | 0.293 | 3.9 | 48.138 | 0.000 | 0.000 | | 2.3 | 192.148 | 765 | 3.769 | OK |
| FEH: 100 years: +45 %: 1440 mins: Summer | 83.427 | 83.426 | 0.277 | 0.276 | 3.8 | 45.423 | 0.000 | 0.000 | | 2.3 | 219.471 | 785 | 9.196 | OK |
| FEH: 100 years: +45 %: 1440 mins: Winter | 83.439 | 83.438 | 0.289 | 0.288 | 3.6 | 47.734 | 0.000 | 0.000 | | 2.3 | 230.714 | 765 | 4.575 | OK |
| FEH: 100 years: +45 %: 2160 mins: Summer | 83.421 | 83.421 | 0.271 | 0.271 | 3.6 | 44.464 | 0.000 | 0.000 | | 2.3 | 246.717 | 875 | 11.112 | OK |
| FEH: 100 years: +45 %: 2160 mins: Winter | 83.429 | 83.429 | 0.279 | 0.279 | 3.3 | 45.896 | 0.000 | 0.000 | | 2.3 | 259.301 | 840 | 8.249 | OK |
| FEH: 100 years: +45 %: 2880 mins: Summer | 83.415 | 83.415 | 0.265 | 0.265 | 3.4 | 43.274 | 0.000 | 0.000 | | 2.3 | 266.745 | 900 | 13.491 | OK |
| FEH: 100 years: +45 %: 2880 mins: Winter | 83.417 | 83.417 | 0.267 | 0.267 | 3.0 | 43.657 | 0.000 | 0.000 | | 2.3 | 279.922 | 825 | 12.727 | OK |
| FEH: 100 years: +45 %: 4320 mins: Summer | 83.398 | 83.398 | 0.248 | 0.248 | 3.0 | 40.041 | 0.000 | 0.000 | | 2.3 | 296.985 | 735 | 19.954 | OK |
| FEH: 100 years: +45 %: 4320 mins: Winter | 83.383 | 83.383 | 0.233 | 0.233 | 2.7 | 37.306 | 0.000 | 0.000 | | 2.3 | 311.291 | 590 | 25.421 | OK |
| FEH: 100 years: +45 %: 5760 mins: Summer | 83.377 | 83.377 | 0.227 | 0.227 | 2.8 | 36.213 | 0.000 | 0.000 | | 2.3 | 322.224 | 595 | 27.607 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|--|--------|--------|-------|-------|-----|--------|-------|-------|--|-----|---------|-----|--------|----|
| FEH: 100 years: +45 %: 5760 mins: Winter | 83.284 | 83.284 | 0.134 | 0.134 | 2.4 | 20.228 | 0.000 | 0.000 | | 2.3 | 337.345 | | 59.562 | OK |
| FEH: 100 years: +45 %: 7200 mins: Summer | 83.352 | 83.352 | 0.202 | 0.202 | 2.7 | 31.801 | 0.000 | 0.000 | | 2.3 | 344.817 | 440 | 36.427 | OK |
| FEH: 100 years: +45 %: 7200 mins: Winter | 83.258 | 83.258 | 0.108 | 0.108 | 2.2 | 16.068 | 0.000 | 0.000 | | 2.1 | 361.343 | | 67.879 | OK |
| FEH: 100 years: +45 %: 8640 mins: Summer | 83.286 | 83.285 | 0.136 | 0.135 | 2.5 | 20.458 | 0.000 | 0.000 | | 2.3 | 365.539 | | 59.103 | OK |
| FEH: 100 years: +45 %: 8640 mins: Winter | 83.246 | 83.245 | 0.096 | 0.095 | 1.9 | 14.087 | 0.000 | 0.000 | | 1.9 | 383.480 | | 71.840 | OK |
| FEH: 100 years: +45 %: 10080 mins: Summer | 83.270 | 83.270 | 0.120 | 0.120 | 2.3 | 17.922 | 0.000 | 0.000 | | 2.2 | 386.893 | | 64.172 | OK |
| FEH: 100 years: +45 %: 10080 mins: Winter | 83.236 | 83.236 | 0.086 | 0.086 | 1.7 | 12.610 | 0.000 | 0.000 | | 1.7 | 404.931 | | 74.792 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



Summary Results for Swale: Rank By: Max. Avg. Depth

| Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Residant Volume (m³) | Max. Flooded Volume (m³) | Total Lost Volume (m³) | Max. Velocity (m/s) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Percentage Available (%) | Status |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|---------------------------|--------------------------|------------------------|---------------------|--------------------|-----------------------------|-----------------------------|--------------------------|--------|
| FEH: 100 years: +45 %: 15 mins: Summer | 83.394 | 83.331 | 0.138 | 0.081 | 4.4 | 4.506 | 0.000 | 0.000 | 0.1 | 1.3 | 0.367 | | 79.141 | OK |
| FEH: 100 years: +45 %: 15 mins: Winter | 83.402 | 83.345 | 0.146 | 0.095 | 4.9 | 5.071 | 0.000 | 0.000 | 0.1 | 1.5 | 0.463 | | 76.525 | OK |
| FEH: 100 years: +45 %: 30 mins: Summer | 83.418 | 83.409 | 0.162 | 0.159 | 5.1 | 7.521 | 0.000 | 0.000 | 0.1 | 2.1 | 3.276 | | 65.181 | OK |
| FEH: 100 years: +45 %: 30 mins: Winter | 83.431 | 83.423 | 0.175 | 0.173 | 5.6 | 8.566 | 0.000 | 0.000 | 0.1 | 2.2 | 3.539 | | 60.341 | OK |
| FEH: 100 years: +45 %: 60 mins: Summer | 83.447 | 83.442 | 0.191 | 0.192 | 5.6 | 10.040 | 0.000 | 0.000 | 0.1 | 2.3 | 10.074 | | 53.518 | OK |
| FEH: 100 years: +45 %: 60 mins: Winter | 83.462 | 83.458 | 0.206 | 0.208 | 6.1 | 11.439 | 0.000 | 0.000 | 0.1 | 2.4 | 10.720 | 25 | 47.041 | OK |
| FEH: 100 years: +45 %: 120 mins: Summer | 83.465 | 83.461 | 0.209 | 0.211 | 5.6 | 11.706 | 0.000 | 0.000 | 0.0 | 2.4 | 23.123 | 30 | 45.803 | OK |
| FEH: 100 years: +45 %: 120 mins: Winter | 83.482 | 83.479 | 0.226 | 0.229 | 5.7 | 13.381 | 0.000 | 0.000 | 0.0 | 2.5 | 24.562 | 70 | 38.051 | OK |
| FEH: 100 years: +45 %: 180 mins: Summer | 83.469 | 83.466 | 0.213 | 0.216 | 5.2 | 12.136 | 0.000 | 0.000 | 0.0 | 2.5 | 32.964 | 45 | 43.817 | OK |
| FEH: 100 years: +45 %: 180 mins: Winter | 83.488 | 83.485 | 0.232 | 0.235 | 5.2 | 13.989 | 0.000 | 0.000 | 0.0 | 2.6 | 35.140 | 90 | 35.235 | OK |
| FEH: 100 years: +45 %: 240 mins: Summer | 83.470 | 83.467 | 0.214 | 0.217 | 5.0 | 12.255 | 0.000 | 0.000 | 0.0 | 2.5 | 39.552 | 70 | 43.265 | OK |
| FEH: 100 years: +45 %: 240 mins: Winter | 83.488 | 83.485 | 0.232 | 0.235 | 4.8 | 14.006 | 0.000 | 0.000 | 0.0 | 2.6 | 42.574 | 120 | 35.156 | OK |
| FEH: 100 years: +45 %: 360 mins: Summer | 83.470 | 83.467 | 0.214 | 0.217 | 4.5 | 12.225 | 0.000 | 0.000 | 0.0 | 2.5 | 47.212 | 115 | 43.403 | OK |
| FEH: 100 years: +45 %: 360 mins: Winter | 83.486 | 83.483 | 0.230 | 0.233 | 4.1 | 13.795 | 0.000 | 0.000 | 0.0 | 2.6 | 51.654 | 165 | 36.134 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|---|--------|--------|-------|-------|-----|--------|-------|-------|-----|-----|---------|-----|--------|----|
| FEH: 100 years: +45 %: 480 mins: Summer | 83.468 | 83.465 | 0.212 | 0.215 | 4.1 | 12.015 | 0.000 | 0.000 | 0.0 | 2.5 | 53.308 | 125 | 44.375 | OK |
| FEH: 100 years: +45 %: 480 mins: Winter | 83.482 | 83.480 | 0.226 | 0.230 | 3.7 | 13.414 | 0.000 | 0.000 | 0.0 | 2.5 | 58.640 | 190 | 37.898 | OK |
| FEH: 100 years: +45 %: 600 mins: Summer | 83.465 | 83.462 | 0.209 | 0.212 | 3.8 | 11.719 | 0.000 | 0.000 | 0.0 | 2.4 | 59.564 | 105 | 45.747 | OK |
| FEH: 100 years: +45 %: 600 mins: Winter | 83.477 | 83.475 | 0.221 | 0.225 | 3.4 | 12.971 | 0.000 | 0.000 | 0.0 | 2.4 | 65.910 | 215 | 39.949 | OK |
| FEH: 100 years: +45 %: 720 mins: Summer | 83.462 | 83.458 | 0.206 | 0.208 | 3.6 | 11.409 | 0.000 | 0.000 | 0.0 | 2.4 | 66.783 | 80 | 47.182 | OK |
| FEH: 100 years: +45 %: 720 mins: Winter | 83.473 | 83.471 | 0.217 | 0.221 | 3.1 | 12.541 | 0.000 | 0.000 | 0.0 | 2.4 | 74.089 | 240 | 41.941 | OK |
| FEH: 100 years: +45 %: 960 mins: Summer | 83.455 | 83.452 | 0.199 | 0.202 | 3.2 | 10.788 | 0.000 | 0.000 | 0.0 | 2.3 | 80.071 | | 50.056 | OK |
| FEH: 100 years: +45 %: 960 mins: Winter | 83.464 | 83.463 | 0.208 | 0.213 | 2.8 | 11.756 | 0.000 | 0.000 | 0.0 | 2.2 | 89.817 | 270 | 45.576 | OK |
| FEH: 100 years: +45 %: 1440 mins: Summer | 83.443 | 83.441 | 0.187 | 0.191 | 2.8 | 9.816 | 0.000 | 0.000 | 0.0 | 2.1 | 91.777 | | 54.556 | OK |
| FEH: 100 years: +45 %: 1440 mins: Winter | 83.452 | 83.452 | 0.196 | 0.202 | 2.4 | 10.696 | 0.000 | 0.000 | 0.0 | 2.0 | 102.993 | | 50.483 | OK |
| FEH: 100 years: +45 %: 2160 mins: Summer | 83.431 | 83.430 | 0.175 | 0.180 | 2.4 | 8.828 | 0.000 | 0.000 | 0.0 | 1.9 | 102.024 | | 59.132 | OK |
| FEH: 100 years: +45 %: 2160 mins: Winter | 83.441 | 83.441 | 0.185 | 0.191 | 2.0 | 9.718 | 0.000 | 0.000 | 0.0 | 1.7 | 114.582 | | 55.011 | OK |
| FEH: 100 years: +45 %: 2880 mins: Summer | 83.424 | 83.424 | 0.168 | 0.174 | 2.0 | 8.312 | 0.000 | 0.000 | 0.0 | 1.7 | 109.508 | | 61.519 | OK |
| FEH: 100 years: +45 %: 2880 mins: Winter | 83.430 | 83.429 | 0.174 | 0.179 | 1.6 | 8.750 | 0.000 | 0.000 | 0.0 | 1.5 | 122.880 | | 59.493 | OK |
| FEH: 100 years: +45 %: 4320 mins: Summer | 83.408 | 83.407 | 0.152 | 0.157 | 1.6 | 7.047 | 0.000 | 0.000 | 0.0 | 1.5 | 121.223 | | 67.377 | OK |
| FEH: 100 years: +45 %: 4320 mins: Winter | 83.397 | 83.395 | 0.141 | 0.145 | 1.3 | 6.227 | 0.000 | 0.000 | 0.0 | 1.2 | 135.912 | | 71.170 | OK |
| FEH: 100 years: +45 %: 5760 mins: Summer | 83.387 | 83.386 | 0.131 | 0.136 | 1.4 | 5.602 | 0.000 | 0.000 | 0.0 | 1.3 | 131.064 | | 74.063 | OK |

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| Project: SuDS Scheme - Little Warnham Lodge 1 in 100yr +45% CC Event | Date: 11/12/2025 | | |
| | Designed by: TS | Checked by: | Approved By: |
| Report Details: Type: Stormwater Controls Summary Storm Phase: Phase | Company Address: Geoson Limited | | |



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|--|--------|--------|-------|-------|-----|-------|-------|-------|-----|-----|---------|--------|----|
| FEH: 100 years: +45 %: 5760 mins: Winter | 83.351 | 83.312 | 0.095 | 0.062 | 1.1 | 2.691 | 0.000 | 0.000 | 0.0 | 1.1 | 146.403 | 87.540 | OK |
| FEH: 100 years: +45 %: 7200 mins: Summer | 83.364 | 83.361 | 0.108 | 0.111 | 1.3 | 4.119 | 0.000 | 0.000 | 0.0 | 1.2 | 139.624 | 80.931 | OK |
| FEH: 100 years: +45 %: 7200 mins: Winter | 83.345 | 83.302 | 0.089 | 0.052 | 1.0 | 2.390 | 0.000 | 0.000 | 0.0 | 0.9 | 155.971 | 88.934 | OK |
| FEH: 100 years: +45 %: 8640 mins: Summer | 83.351 | 83.312 | 0.095 | 0.062 | 1.2 | 2.721 | 0.000 | 0.000 | 0.0 | 1.1 | 147.244 | 87.401 | OK |
| FEH: 100 years: +45 %: 8640 mins: Winter | 83.340 | 83.298 | 0.084 | 0.048 | 0.9 | 2.198 | 0.000 | 0.000 | 0.0 | 0.8 | 165.381 | 89.825 | OK |
| FEH: 100 years: +45 %: 10080 mins: Summer | 83.348 | 83.306 | 0.092 | 0.056 | 1.1 | 2.536 | 0.000 | 0.000 | 0.0 | 1.0 | 155.998 | 88.260 | OK |
| FEH: 100 years: +45 %: 10080 mins: Winter | 83.336 | 83.295 | 0.080 | 0.045 | 0.8 | 2.057 | 0.000 | 0.000 | 0.0 | 0.7 | 174.327 | 90.477 | OK |