Eaves Hall Lodges, West Bradford
Flood Risk Assessment & Outline Drainage Strategy

Job Number	Report Date	Client
FRA261101	**21st May 2026**	**Bowland Inns & Hotels**

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DOCUMENT QUALITY ASSURANCE

Site Address	Land off Moor Lane, West Bradford, Clitheroe, Lancashire, BB7 3JG.
Report Title	Flood Risk Assessment and Outline Drainage Strategy
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EXECUTIVE SUMMARY

Scope and Background

This Flood Risk Assessment (FRA) has been undertaken by LKC to support a planning application for a proposed leisure development at Eaves Hall, West Bradford. The development comprises the installation of 15 eco lodges and associated landscaping and access.

LKC has prepared this FRA in line with the NPPF and Technical Guidance where appropriate.

In considering the proposals the following key principles have therefore been applied:

- Identification of flood risks.
- Protection of users of the new development.
- No increased flood risk to third parties.

Consultations

The Environment Agency (EA) has been consulted to inform the preparation of this report.

Lancashire Council - Lead Local Flood Authority (LLFA) and United Utilities (UU) were also consulted concerning flood risk.

Flood Risk

The Environment Agency Flood Map for Planning indicates the site as being primarily located within Flood Zone 1 during the present day and future climate change scenarios. Areas of Flood Zone 2 and 3 are indicated in the western area of the site associated with the existing watercourse, however, a review of topographic levels indicates flooding appears to predominantly remain in channel due to raised embankments.

The site is considered to be at a negligible to low risk of flooding from all sources.

Drainage Strategy

To ensure there is no increase in downstream flood risk as a result of the proposed development it is proposed to restrict surface water runoff to the existing QBAR runoff rate during all events up to and including the 1 in 100 year plus 50% climate change event. It is proposed to provide attenuation for development in the form of an attenuation basin located in the southwestern corner of the site. The pond has been designed to provide the full balance of attenuation during all events up to and including the 1 in 100 year plus 50% climate change scenario and will discharge to the existing watercourse in the western area of the site, subject to agreement with the LLFA.

TABLE OF CONTENTS

Figures

Appendices

1. Introduction

1.1. Background

LK Consult Ltd (LKC) were commissioned by Bowland Inns & Hotels to carry out a Flood Risk Assessment (FRA) and Outline Drainage Strategy to support a planning application for the proposed development of 15 ecolodges at Eaves Hall, West Bradford.

This report provides an update to the previous FRA and Drainage Strategy (LKC ref. FRA201222, published October 2020) that was prepared to support the previously approved planning application (Ribble Valley Borough Council (RBVC) planning ref. 3/2020/0544). The proposed development assessed within this report remains as per that which was previously granted planning permission.

The report will address the vulnerability to flooding from all possible sources and will also consider the impact of the development on surface water runoff accounting for climate change and the potential to increase flood risk elsewhere. The Outline Drainage Strategy in Section 5 will provide an overview of the SuDS techniques which could be considered on the site. The issues of actual flood risk are discussed in Section 4.

Government policy with respect to development in flood risk areas is contained within the Ministry of Housing Communities and Local Government National Planning Policy Framework[i] (NPPF) and accompanying Planning Practice Guidance[ii] (PPG). The guidance on Climate Change allowances issued by the Environment Agency (EA) has also been considered.

LKC has prepared this FRA in line with the NPPF and the PPG where appropriate. The level of detail entered into any flood risk assessment is dependent upon the scale and potential impact of the proposed development, and the vulnerability classification of the proposed land-use.

1.2. Site Details

A summary of the general site details is presented in Table 1-1. Figure 1 indicates the site location and boundary.

Location	Land to the southwest of Moor Lane, West Bradford, Clitheroe, Lancashire, BB7 3JG. NGR: 373655, 444990.
Area	Approximately 1.85ha.
Current Site Use	<u>Site</u> The site comprises a grassed area to the majority of the site with mature trees along the watercourse in the western area of the site. Remaining areas of the site comprise a compacted gravel access track off Eaves Hall Lane with some adjacent mounds of stored material. Access to the site is provided via Eaves Hall Lane to the east which provides access/egress to West Bradford Road which leads to A59 to the south. <u>Surrounding Area/ Boundary Treatment</u> The site is located within an agricultural setting with the land use surrounding the site comprising: • A lodge and arable fields to the north; • Moor Lane to the east; • Eaves Hall to the southeast; • Arable land to the west and southwest.
Proposed Development	The proposed development comprises the installation of 15 eco lodges to be used as holiday lets. Ten of the lodges will be 1 bed and five of the lodges will be 2 bed. The development includes improved vehicular and pedestrian access, landscaping and onsite waste management. Access will continue to be provided as per the existing situation. Proposed development plans are provided in Appendix A.

Table 1-1: Summary of site details.

2. Site Setting

2.1. Vulnerability

As an initial phase in identifying whether a site is potentially at risk of flooding, LKC has consulted the EA's Flood Map for Planning. This mapping is based on a combination of local flood model outputs, recorded flood outlines and national flood model information to identify areas that are at risk of fluvial and/or tidal flooding for strategic planning purposes.

The Flood Map for Planning divides the floodplain into three categories of flood risk, and do not take flood defences into account. The PPG (Table 1: Flood Zones, Paragraph 78) defines the Flood Zones as:

- Flood Zone 1 – Very Low Risk, with annual probability of flooding from rivers and the sea of less than 0.1% (1 in 1000).
- Flood Zone 2 – Low Risk, with annual probability of flooding of 0.1 to 1.0% from rivers and 0.1 to 0.5% from the sea.
- Flood Zone 3 – Medium to High risk of flooding with an annual probability of flooding of 1.0% or greater from rivers, and 0.5% or greater from the sea.

The Flood Map for Planning indicates the site is located within Flood Zone 1 with Flood Zones 2 and 3 making up the western boundary of the site due to the present watercourse.

The proposed development comprises the installation of 15no. holiday eco lodges. Holiday accommodation is classified as 'More Vulnerable' development within Annex 3 of the NPPF.

2.2. The Sequential and Exception Tests

The Sequential Test aims to steer new development to areas at the lowest risk of flooding from all sources taking into account the impacts of climate change. The NPPF identifies that the Sequential Test should be applied to 'Major' and 'Non Major' development proposes in areas at risk of flooding with paragraphs 175, 176 and 189 setting out exemptions from the Test.

Paragraph 175 of the NPPF states that the Sequential Test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be located in an area that would be at risk of flooding from any source; both now and in the future.

Paragraph 27 of the updated Flood Risk and Coastal Change Planning Practice Guidance (published on 17th September 2025 states *"in applying paragraph 175 a proportionate approach should be taken. Where a site specific flood risk assessment demonstrates clearly that the proposed layout, design and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development (therefore addressing the risks identified e.g by Environment Agency flood risk mapping), without increasing flood risk elsewhere, then the Sequential Test need not be applied".*

This FRA demonstrates that the site is at a negligible to low risk of flooding from all sources therefore application of the Sequential Test is not considered to be required.

Table 2 of the PPG identifies that More Vulnerable development is acceptable within Flood Zone 1 without the requirement to apply the Exception Test.

2.3. Environmental Setting

LKC has undertaken a review of public domain information including British Geological Survey data, Environment Agency data, historical mapping and aerial photography to provide a summary of the environmental setting of the site. This is summarised in Table 2-1 below.

Summary of the Environmental Setting			
Geology	Superficial		Till, Devensian - Diamicton.
	Bedrock		Clitheroe Limestone Formation and Hodder Mudstone Formation (undifferentiated) - Mudstone
	BGS Boreholes		BH Ref: SD74NW14, 170m north: Top soil to 0.1m, grey boulder clay to 14.7m, grey and brown Mudstone to 18.0m, grey shale to 22.5m, grey Mudstone to 28.9m dark grey Shale to 29.7m, hard black sandy Shale to 35.5m, Quartz to 35.6m, hard black sandy Shale to 47.3m, Limestone and Mudstone layers to 65.0m. Water level at 40m and 58m.
Hydrogeology	Aquifer Designation	Superficial	Secondary Undifferentiated Aquifer.
		Bedrock	Secondary A Aquifer.
	Source Protection Zone (SPZ)		Site not within an SPZ.
Hydrology	All adjacent and internal surface water		A review of Ordnance Survey (OS) mapping indicates the following watercourses within the vicinity of the site: • Greg Sike, the ordinary watercourse in the western area of the site, flows in a south easterly direction before discharging into the River Ribble approximately 1.4km southeast of the site. • There is a watercourse running adjacent to Moor Lane that flows into Greg Sike. • A reservoir is located in the north eastern corner of the site.

Table 2-1: Summary of the Environmental Setting.

2.4. Site Topography

A review of the topographic survey information included within the Existing Site Plan (Appendix B) indicates ground levels across the site. The levels are summarised below:

- The site falls northwest to southeast from 134.5m AOD to approximately 121.3m AOD.
- The plot proposed for a car park falls towards the road from 123.9m AOD to 123.4m AOD.
- The watercourse embankments are higher than the bed by around 2.0m in the north and to over 3m further downstream.
- The access joins Eaves Hall Lane at around 121.5m AOD.

2.5. Site Reconnaissance

A site walkover was previously undertaken by LKC in October 2020 as part of the preparation of the previous report (Reference: FRA201222-R0). The relevant site features identified are summarised below:

- Site access is off Moor Lane which ramps up to the site via a compacted gravel track which then becomes flat and then falls slightly towards the southwest.
- Site is comprised of a grassed area with an area of construction rubble adjacent to the access.
- Site falls towards the south and west falling towards Greg Sike. Undulations are present across the site. Mounds of stored material / construction waste observed by the access track.
- The watercourse noted to be at lower than the site levels by approximately 2m in the north to over 3m in the south of the site. It flows to the southeast.
- Mature trees noted growing along the watercourse.
- A reservoir with aquatic vegetation adjacent to the north of the site noted to be approximately 2m above the site levels, retained by the walls, and overgrown vegetation.
- A field boundary ditch runs across the fields to the north of the site intercepting overland flows before discharging into Greg Sike to the southwest.
- Highway drainage noted to be draining into the ditch along Moor Lane and a number of gullies were observed. The overflow water from the lodge is likely to overflow into that ditch.
- A deep concrete manhole / tank observed adjacent to the lodge.
- The area proposed for the car park noted to be falling gently towards the south.
- Piped crossing noted beneath the access to the site.
- Shallow excavations on site confirmed silty clay topsoil and clay strata below.

3. Consultation

Information from all relevant consultees is summarised in Table 3-1 below.

Source	Details	
Environment Agency (EA)	Modelled Flood Levels	The EA Flood Map for Planning indicates the site is located within Flood Zone 3. Consultation has been undertaken with the EA to request site specific modelled flood level data. Within their response (dated 23rd March 2026), included as Appendix C), the EA have provided an extract of from the Flood Map for Planning. The EA have advised that the flood zones in this location are informed by their new national modelling (published in March 2025), however, they are unable to provide flood level or depth data. The EA do not hold any detailed modelling for the site.
	Records of Flooding	The site is shown to have not been impacted by any historic, recorded flood events.
	Records of Flood Warning Service	The site is shown not to be located within a flood warning area.
	Surface Water Flooding	A review of the EA Risk of Flooding from Surface Water (RoFSW) dataset indicates the site has a low to high chance of surface water flooding during the present-day and future climate change scenario. Access via Eaves Hall Lane to the east of the site is shown to have a high chance of surface water flooding.
	Flooding from reservoirs	A review of the EA Long Term Reservoir Flood map indicates the site is not located within an area that is shown to be impacted by flooding in the event of reservoir failure.
United Utilities (UU)	Consultation has been undertaken with United Utilities to obtain public sewer records which are included as Appendix D. Public sewer records indicate the following public sewers within the vicinity of the site: • A 150mm diameter combined sewer is located to the east of the site in the fields adjacent to Moor Lane. The sewer flows in a southerly direction beneath Moor Lane. Node 7000 to the east of the site is shown to have a Cover Level (CL):124.92m AOD an Invert Level (IL): 123.78m AOD with a depth of 1.14m. Node 7902 to the south east of the site is shown to have a CL:122.90m AOD an IL: 121.20m AOD with a depth of 1.70m. • There are no surface water sewers shown within the vicinity of the site.	
Local Flood Risk Management Strategy (LFRMS[iii])	The LFRMS identifies groundwater flooding as typically occurring in low-lying areas underlain by permeable soils and geology, which is characteristic of much of the West Lancashire Plain and the Fylde Peninsula. However, this mechanism is not considered relevant to the site due to its local topography and underlying geological conditions. Fluvial flooding from the River Ribble is identified as a potential source of flood risk at a wider catchment scale. An assessment of how this risk may affect the site is provided in Section 4. The LFRMS also identifies sewer flooding as arising from a combination of tidal and fluvial influences, as well as from exceedance of sewer capacity, particularly within more densely urbanised areas. However, no site-specific information relating to historical or current sewer flooding has been identified for the site.	

Table 3-1: Summary consultee information.

4. Assessment of Flood Risk

4.1. Sources of Flooding

The risk of flooding from the following flood sources has been considered:

Fluvial Flooding

The Flood Zone mapping indicates Greg Sike, within the western area of the site, is shown to be in Flood Zones 2 and 3 while the remainder of the site is shown to be Flood Zone 1.

Consultation has been undertaken with the Environment Agency to obtain site-specific detailed flood modelling information, and their response is provided in Appendix B. Within their response, the EA have provided extracts from the Flood Map for Planning which have been derived from the new national modelling published in March 2025. The EA have advised that they do not hold any detailed modelling for this location.

Based on a review of the Flood Map for Planning, the extent of Flood Zones 2 and 3 appear to be contained within the channel of the existing watercourse and do not appear to ingress into the wider site. Topographic survey information indicates the watercourse embankments are approximately 2.0m higher than the bed in the north of the site, increasing to over 3.0m further downstream. A review of the EA climate change extents for the period 2070 to 2125 indicates there is no increase in flood risk within the site due to the impacts of climate change.

Based on the above, the overall risk of fluvial flooding is considered to be low.

Tidal Flooding

The study area is remote from the sea and tidally influenced water bodies. Therefore, the flood risk associated with this source is considered negligible.

Surface Water Flooding

A review of the Environment Agency (EA) Long Term Surface Water Flood Map indicates that the majority of the site is shown to have a very low chance of surface water flooding.

The watercourse and existing reservoir are shown as having a high probability of surface water flooding during both the present-day and 2050s climate change scenarios. Modelled flood depths within these water features are shown to reach up to 0.9m; however, this flooding appears to remain confined within Greg Sike and reservoir, without spilling onto the site. Greg Sike is located approximately 2m below the surrounding bank levels, which is likely to further reduce the risk of surface water flooding extending onto the site.

This bund would provide containment of surface water flooding within the reservoir. While no detailed information is available regarding the reservoir's depth or operating water level, the presence of the bund would limit the potential for floodwater to affect the site.

An area of low probability surface water flooding is identified during the present-day scenario within a localised topographic low point in the central part of the site. Corresponding depth data indicates that flooding in this area would be shallow, with depths generally less than 0.2m.

The 2050s climate change scenario indicates a similar overall extent of surface water flooding to the present-day scenario, with a slight increase in the area of high-probability flooding identified within Greg Sike .

Moor Lane to the east of the site is shown to have a high chance of surface water flooding during the present day scenario and a low to high chance during the climate change scenario. A review of the relative depth data for this risk indicates that the flooding is relatively shallow, up to 0.3m during the present and climate change scenarios. Surface water flooding in Moor Lane appears to be contained

within the highway and does not ingress into the site. .On the basis of the above assessment, the overall risk of surface water flooding to the site is considered to be low.

Groundwater Flooding

According to the Lancashire LFRMS, as described in Section 3 above, groundwater flooding is typically concentrated in low-lying areas underlain by permeable geology, which is characteristic of much of the West Lancashire Plain and the Fylde Peninsula.

However, a review of BGS borehole records (BH Ref: SD74NW14) indicates groundwater is recorded at 40m below the surface. The superficial till is more than 14m thick, the cohesive nature of the boulder clay would make it unlikely for groundwater flooding to occur.

Based on the above, the overall risk of groundwater flooding is considered to be low.

Sewer Flooding

United Utilities sewer records show combined sewers beneath the adjacent highway. There are no records of sewer flooding at the site location.

In the event of sewer flooding within Moor Lane to the east of the site it is likely that flows will be contained within the highway and follow the southerly gradient away from the site. The site is raised above the highway therefore it is unlikely the sewer surcharge would encroach on the site.

Based on the above, the overall risk of sewer flooding is considered to be low.

Flooding from Artificial sources

The EA Long Term Flood Maps indicate the site is located within an area that is not at risk of flooding in the event of reservoir failure.

The reservoir located to the directly to the north of the site is connected to ditches flowing to the southeast away from the site. The ditches at the perimeters of the site are generally free draining and are considered to be low risk.

There are no canals within the vicinity of the site, therefore the overall risk associated with canal flooding is considered to be low.

Based on the above the overall risk of flooding from artificial sources is considered to be low.

4.2. Summary of Flood Risk

A summary of the risk of flooding from all sources is provided in Table 4-1.

Source of Flooding	Risk Assessment Level
Fluvial	Low
Tidal	Negligible
Surface Water	Low
Groundwater	Low
Sewers	Low
Artificial Sources	Low

Table 4-1: Summary of Existing Risk Level.

5. Mitigation Measures

5.1. Proposed Site Levels and Development Level

The proposed development comprises the installation of eco-lodge holiday homes with associated access works. In accordance with Table 2 of the Planning Practice Guidance (PPG) to the National Planning Policy Framework (NPPF), the development is classified as 'More Vulnerable' to flooding.

Environment Agency fluvial flood model outputs do not provide site-specific information on flood levels or depths affecting the site. However, the Environment Agency surface-water flood mapping indicates that shallow flooding, with depths of up to approximately 0.6m, may occur in small, localised areas during extreme rainfall events. These areas of potential ponding are confined to existing on-site water features and do not extend into the developable footprint.

As a precautionary measure, the finished floor levels (FFLs) of the lodges should be set at above surrounding ground levels. A freeboard of 0.6m is recommended to provide resilience against potential overland flow resulting from surface-water flooding or a drainage exceedance.

On this basis, no additional flood mitigation measures are considered necessary.

5.2. Safe access and Egress

Access to the site is provided via Moor Lane to the east which provides access/egress to West Bradford Road which leads to A59 to the south.

Eaves Hall Lane is shown to be low to high chance of surface water flooding up to a depth of 0.3m during the present day and 2050s climate change scenario. However, surface water flooding would be anticipated to be relatively shallow and of short duration.

6 Surface Water Management

6.1 Overview

The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface run-off from development sites through the use of Sustainable Drainage Systems (SuDS), this being complementary to the control of development within the floodplain.

The site is located within the administrative boundary of RVBC. The RVBC Core Strategy 2008 – 2028 'A Local Plan for Ribble Valley', sets out the planning policy and guidance for development within the district. Policy DME6: *'Water Management'* states that all proposed development should consider the use of SuDS techniques for the management of surface water.

The anticipated design life of development is in excess of 100 years. The EA climate change guidance for peak rainfall intensity (published in May 2022) identifies that development with a lifespan beyond 2100 should consider the upper end climate change allowance. According to the EA Peak Rainfall Allowances map, the site is located within the Ribble Management Catchment in which the upper end allowance equates to a 50% increase in peak rainfall intensity.

SuDS will not alleviate flooding in an area prone to flooding; however, properly designed SuDS have the potential to prevent the surface water runoff from new development worsening the flood risk. The effective disposal of surface water from any new development is a material planning consideration in determining if the proposals for the development and use of land are acceptable.

The accepted principles are that surface water arising from a developed area should, as far as practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

The Planning Practice guidance identifies that surface water runoff should be disposed of in the following order of preference:

1. Into the ground (infiltration);
2. To a surface water body;
3. To a surface water sewer, highway drain, or another drainage system; or
4. To a combined sewer.

Suitability of different SuDS will be governed by prevailing site conditions, such as the type and scale of development, topography, ground conditions (soil permeability, ground stability, depth to water table), local hydrogeology and risk of groundwater contamination (presence of sensitive aquifers and source protection zones) etc.

6.2 Sustainable Drainage Hierarchy

6.2.1 Infiltration

A summary of the British Geological Survey superficial and bedrock aquifer descriptions and classifications is shown in Table 6-1 below:

Classification	Description	Aquifer Classification	Recorded Water Table Depth	Soakaway Potential
Till, Devensian Deposits	Silty, sl. gravelly clay, boulder clay	Secondary (undifferentiated)	N/A	Limited
Clitheroe Limestone and Hodder Mudstone Formation Bedrock	Mudstone	Secondary A	40m & 58mbgl	Poor

Table 6-1: Geological and Hydrogeological Setting according to BGS Borehole Log (reference: SD74NW14)

Shallow excavations taken onsite during the previous site walkover undertaken in 2020 indicated the presence of silty clay topsoil and clay strata below the site.

Based on the nature of the published geology and site observations, the use of infiltration for the disposal of surface water runoff is unlikely to be feasible due to the presence of cohesive strata.

Infiltration testing in accordance with BRE365 Digest guidance may be required at the detailed design stage to confirm the potential for the use of infiltration. For the purposes of this assessment, a connection to an alternative receptor has been considered to demonstrate that a feasible drainage solution can be achieved in lieu of infiltration.

6.2.2 Watercourses

Greg Sike, located in the western area of the site, is deemed to be the most suitable point of connection for surface water runoff generated by the proposed development.

6.2.3 To a surface water sewer, highway drain or another drainage system

Public sewer records provided by UU indicate there are no surface water sewers within the vicinity of the site; therefore, discharge to the surface water sewer network has not been considered further.

6.2.4 To a combined sewer

Public sewer records provided by UU indicate the presence of public combined sewers located beneath Eaves Hall Lane to the east of the site.

Based on the presence of an onsite watercourse and considering the drainage hierarchy, a connection to the combined sewer network has not been considered further.

6.3 Surface Water Runoff Rates

6.3.1 Greenfield runoff rates

Greenfield runoff rates have been calculated using the FEH Statistical Method (2025) based on a contributing catchment area of 0.165 ha which includes the individual lodges with the surrounding decking and the area designated as parking and bin store. This does not include the existing crushed stone road through the southern area of the site which is anticipated to continue to drain as per the existing situation. Proposed footpaths, which are likely to comprise permeable surfacing, have also been excluded. Greenfield runoff rate calculations are included as Appendix E and are summarised in Table 6-1 below:

Return period	Greenfield Runoff Rate (l/s)
QBAR	2.2
1 in 1 year	2.1
1 in 30 year	4.0
1 in 100 year	4.9

Table 6-2: Summary of the greenfield runoff rates.

Based on the above, it is proposed to restrict surface water runoff rates during all events up to and including the 1 in 100 year plus 50% climate change scenario to a rate of 2.2l/s which represents the greenfield QBAR rate.

6.4 Surface Water Attenuation Requirements

An initial Quick Storage Estimate (QSE) has been undertaken using Causeway Flow modelling software to determine the attenuation volume required to achieve the proposed discharge rate of 2.2 l/s. Based on a proposed contributing hardstanding area of 0.165ha (see Appendix F), the QSE indicates that between 119-201m^3 of attenuation will be required for the 1 in 100 year plus 50% climate change event.

6.5 Consideration of SuDS

The NPPF requires applications that could affect drainage on or around a site to incorporate Sustainable Drainage Systems to control surface water runoff. An options appraisal of potential SuDS features commensurate to the scale and nature of the proposed development has been undertaken to determine potential SuDS features that could be utilised to provide the required surface water attenuation volume. Table 6-3 provides a summary of the SuDS options appraisal with consideration of CIRIA C753 (The SUDS Manual)[iv] for the proposed development.

SuDS Option	Description	Benefits	Comments	Appropriate to Development
Infiltration				
Soakaways	Soakaways provide stormwater attenuation, stormwater treatment and groundwater recharge. Runoff is treated by physical filtration to remove solids, by absorption into the soil and removal and by biochemical reactions involving micro-organisms growing on the soil.	Water quantity: Attenuation, treatment, and recharge. Water quality: Filtration and biochemical treatment.	Likely to be unsuitable based on underlying ground conditions.	X
Infiltration Basin	Infiltration basin reduces the volume of runoff from a drainage area, can be very effective at pollutant removal via filtering through the soils, contributes to groundwater recharge and baseflow augmentation. Runoff is treated by physical filtration to remove solids, by absorption into the soil and removal and by biochemical reactions involving micro-organisms growing on the soil.	Water quantity: Reduces runoff volume. Water quality: Effective pollutant removal. Biodiversity & Amenity: Potential if space allows.	Likely to be unsuitable based on underlying ground conditions.	X
Infiltration Trench	An Infiltration trench can create temporary subsurface storage of stormwater runoff, thereby enhancing the natural capacity of the ground to store and drain water. Infiltration trenches allow water to dissipate into the surrounding soils from the bottom and sides of the trench where runoff is treated by physical filtration, adsorption and biochemical reactions involving micro-organisms growing in the soil. Infiltration trenches are easy to integrate into a site. They are ideal for use around playing fields, recreational areas, or public open space.	Water quantity: Subsurface storage. Water quality: Filtration and biochemical treatment. Amenity: Can be integrated into open spaces.	Likely to be unsuitable based on underlying ground conditions.	X
Infiltration Rain Gardens	Attractive features that can help to improve open space. Can be planned as landscaping features. Flexible layout to fit into landscape. Runoff can be treated by physical filtration to remove solids, by absorption and removal by biochemical reactions involving micro-organisms growing on the soil. They can reduce rate of run off and provide some volume reduction.	Amenity: Attractive and flexible. Water quality: Filtration and microbial treatment. Water quantity: Some reduction. Biodiversity: Supports planting.	Likely to be unsuitable based on underlying ground conditions.	X

Table 6-3: Summary of the SuDS options appraisal

Filtration				
Filter Drain / Trench	Filter trenches create temporary subsurface storage of stormwater runoff and provide stormwater treatment. These trenches can be used to filter and convey stormwater to downstream SuDS components.	Water quantity: Subsurface storage and conveyance. Water quality: Filtration.	May be suitable to provide surface water treatment prior to discharge.	*
Filter Strip	A filter strip offers no storage and is used solely to remove pollutants from surface water. The vegetation traps organic and mineral particles that are then incorporated into the soil, while the vegetation takes up any nutrients. A filter strip features medium amenity potential. Local wild grass and flower species can be introduced for visual interest and to provide a wildlife habitat.	Water quality: Pollutant removal via vegetation. Amenity & Biodiversity: Moderate potential.	May be suitable to provide surface water treatment prior to discharge.	*
Retention & Detention				
Detention Basin	Detention basins provide flow control through attenuation of stormwater runoff for a wide range of rainfall events. Basins treat runoff in a variety of ways: settlement of solids in still or slow-moving water, adsorption by the soil, biological activity. Basins offer many opportunities for the landscape designer. Basins should not be built on but can be used for sports and recreation. Basins can be part of public open space.	Water quantity: Flow control. Water quality: Sediment removal. Amenity & Biodiversity: High potential.	Suitable for above ground storage and biodiversity provision.	✓
Attenuation Ponds	Ponds will attenuate the surface water flow prior to discharging to the public surface water sewers. The storage volume afforded by these features should not include any permanent water in the pond. Ponds treat runoff in a variety of ways: settlement of solids in still water (having plants in the water enhances calm conditions and promotes settlement), adsorption by aquatic vegetation, biological activity. Permanently wet ponds can be used to store water for reuse and offer excellent opportunities for the provision of wildlife habitats. Ponds can be part of public open space.	Water quantity: Attenuation. Water quality: Sediment and pollutant removal. Amenity & Biodiversity: High.	May be suitable for above ground storage and biodiversity provision.	*
Geo-cellular Storage Systems	Geo-cellular systems can be used to control and manage rainwater surface water runoff either as a soakaway or as a storage tank. Geo-cellular storage systems provide high storage volume capacity High void ratios (up to 96%). Capable of managing high flow events.	Water quantity: High-capacity storage. Suitable for high flow events. Can be used as soakaway or tank.	Suitable for underground storage. High void ratio and compact footprint.	✓
Oversized Pipes	Oversized pipes can reduce rate of run off and provide some volume reduction.	Water quantity: Reduces runoff rate and provides volume reduction.	May be suitable for high-capacity underground storage.	*
Tanks	Storage tanks can be used to control and manage rainwater surface water runoff providing high storage volume capacity. Tanks are capable of managing high flow events.	Water quantity: High-volume control. Suitable for high flow events.	Suitable for high-capacity underground storage.	✓

Table 6-3: Summary of the SuDS options appraisal (continued)

Swales & Conveyance Channels				
Swales	Swales are effective at removing polluting suspended solids through filtration and sedimentation. The vegetation traps organic and mineral particles that are then incorporated into the soil, while the vegetation takes up any nutrients. Swales are often integrated into the surrounding land use. Local wild grass and flower species can be introduced for visual interest and to provide a wildlife habitat. Swales are usually designed as conveyance systems but can also be designed with check dams to increase attenuation and, where applicable, infiltration.	Water quality: Filtration and sedimentation. Amenity & Biodiversity: High. Water quantity: Some attenuation.	Suitable for above ground storage and biodiversity provision.	✓
Channels & Rills	Effective in water & pollution treatment. Can act as pre-treatment to remove silt before water is conveyed into further SuDS features. Can be visually appealing in urban landscapes. Amenity value for the local community and biodiversity value (design dependant).	Water quality: Pre-treatment. Amenity & Biodiversity: High (design dependent). Water quantity: Some attenuation.	May be suitable for above ground storage and biodiversity provision.	*
Control Structures				
Flow Control Devices	Control the peak flow. Complex controls can reduce upstream storage requirements.	Water quantity: Peak flow control.	Suitable for managing peak flows and reducing upstream storage needs.	✓
Inlets, Outlets and Other Control Structures	Inlets, outlets and other control structures are key elements of well-designed SuDS. Inlet and outlet features allow water to flow into and out of features and also limit the rate at which water flows along and out of the system. There are many different approaches and products available, and they can be easily designed to add interest to the urban landscape. Can provide accurate flow control from one SuDS feature to another.	Water quantity: Peak flow control. Water quality Amenity	Suitable for managing peak flows and reducing upstream storage needs.	✓

Table 6-3: Summary of the SuDS options appraisal (continued)

Source Control				
Green Roofs	Green roof installations can help to reduce surface water runoff from roof areas depending on the system specified. Good removal capability of atmospherically deposited urban pollutants. Ecological, aesthetic and amenity benefits.	Water quality: Pollutant removal. Water quantity: Reduces runoff. Amenity & Biodiversity: High.	Unsuitable due to construction design limitations for the proposed lodges and pitched roofs.	X
Blue Roofs	Blue roofs are designed to attenuate and manage stormwater on a flat roof in urban areas where options for ground-based attenuation systems are limited, and in particular, where construction is being carried out within flood sensitive areas. Amenity value for the local community	Water quantity: Attenuation on roofs. Amenity & Biodiversity: Moderate.	Unsuitable due to construction design limitations for the proposed lodges and pitched roofs.	X
Rainwater Harvesting	In the process, a volume of water is kept out of the storm-water management system, thereby helping to reduce flooding risks. When required, the water is pumped to the point of use, thus displacing what would otherwise be a demand for mains-water. Reduces demand on mains water.	Water quantity: Reduces demand on drainage and mains water.	May be suitable depending on demand for non-potable water, however, the attenuation benefits provided by rainwater harvesting are considered to be limited and are only realised when tanks are empty. Rainwater harvesting has been excluded for the purposes of the outline drainage strategy, however, further consideration may be required at the detailed design stage.	*
Permeable Pavements (with storage)	Reduced peak flows to watercourses, reducing the risk of flooding downstream. Reduced effects of pollution in runoff on the environment.	Water quality: Pollutant reduction. Water quantity: Attenuation and volume reduction.	Suitable for parking areas. Provides both surface and subsurface storage. However, due to the slope across the site, permeable paving would be subject to the detailed design stage to confirm finished ground levels of the parking area and determine feasibility of surface water infiltration.	*
Wetlands				
Wetlands	Wetlands provide both stormwater attenuation and treatment. Wetlands detain flows for an extended period to allow sediments to settle, and to remove contaminates by facilitating adhesion to vegetation and aerobic decomposition. They also provide significant ecological benefits.	Water quality: High treatment potential. Water quantity: Attenuation and volume reduction.	Unsuitable due to space and maintenance requirements.	X

Table 6-3: Summary of the SuDS options appraisal (continued)

Notes

✓ Suitable for use given the nature and scale of the development.

* Possibly suitable for use – not included in the client and architect design proposal at present.

6.6 Surface Water Drainage Strategy

It is proposed to restrict surface water runoff generated by the proposed development to a rate of 2.2 /s, during all events up to and including the 1 in 100 year plus 50% climate change scenario.

To achieve the required discharge rate, it is proposed to provide attenuation in the form of an attenuation basin, as shown on the Conceptual Surface Water Drainage Strategy included as Appendix G.

Storage will be provided within an attenuation basin which have been indicatively sized using Causeway Flow modelling software (see Appendix H). It is proposed that the storage basin will measure an area of 234m^2 x 1.3m deep (1.0m of storage and a 0.3m freeboard) with a slope of 1:3 which will provide approximately 127.68m^3 of attenuation. Causeway flow calculations indicate the proposed storage basin provides the required storage volume to ensure there is no flooding on site during all events up to and including the 1 in 100 year plus 50% climate change event.

Surface water runoff is proposed to discharge into Greg Sike in the western area of the site via a Hydrobrake or similar flow control, subject to agreement with the LLFA. Land drainage consent will be required for any proposed outfall into Greg Sike.

Additional surface water storage could be provided in the form of permeable paving within the proposed parking area. The proposed site layout (included as Appendix A) identifies the proposed development will include 22no. car parking spaces that will measure an area of approximately 320m^2. Based on an assumed sub-base depth of 0.3m and a 30% porosity, permeable paving could potentially provide 22.5m^3 of attenuation. Permeable paving should be considered further during the detailed design phase.

Assuming that the conceptual surface water drainage strategy outlined above is acceptable to the Local Authority, a more detailed design can be presented and agreed with the appropriate regulatory bodies during the detailed design phase.

6.7 SuDS Maintenance

Maintenance of proposed SuDS features will be required to ensure these remain operational over the lifetime of the proposed development. An indicative maintenance plan for the proposed SuDS and associated features is provided in Table 6-4 below. The SuDS maintenance and inspections responsibility rests with the owners or could be arranged through appointment of a site management company.

Maintenance Schedule	Required Action	Typical Frequency
SuDS Pond		
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

Maintenance Schedule	Required Action	Typical Frequency
	Inspect water body for signs of poor water quality	Monthly (May – October)
	Inspect silt accumulation rates and establish appropriate removal frequences; undertake contamination testing once some build up has occurred to inform management and disposal options	Half yearly
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; including max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from waters edge to a minimum of 1m above water level	Annually
	Tidy all dead growth (scrub clearance) before start of growing season	Annually
	Remove sediment and planting from one quadrant of the main body of the pond	Every 5 years or as required
Occasional maintenance	Remove sediment from main body of pond when pool volume is reduced by 20%	Required rarely, e.g. every 25 – 50 years
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 6-4: Summary of maintenance requirements

7. Summary

This report has been undertaken to assess the risk of flooding in relation to the proposed installation of 15 Eco Lodges with associated landscaping and access works at Eaves Hall.

The EA Flood Map for Planning indicates that the site is located within Flood Zone 3. Consultation with the EA provided no site-specific modelled flood level nor depth data and confirmed that the development area is not impacted by the Flood Zone. Therefore for the purpose of this assessment, it is concluded that the site is located within Flood Zone 1.

The site is therefore considered to be at an overall low risk of fluvial flooding.

EA Long Term Surface Water Flood Mapping indicates that the site has a low to high chance of surface water flooding during both present-day and future climate change scenarios. the surface water flooding is predominantly contained within the onsite water features and does not encroach onto the wider developable area. localised flooding in the centre of the site is shown to have a depth of less than 0.2m. Therefore, the overall risk of surface water flooding to the development is considered to be low.

It is recommended that the finished floor levels (FFLs) of the lodges should be set above surrounding ground levels to provide resilience against potential overland flow resulting from surface-water flooding or a drainage exceedance.

Figures

Figure 1 – Site Location and Boundary Plan

Client: Bowland Inns & Hotels				Title: Site Location & Boundary Plan	LK GROUP
Site: Eaves Hall, West Bradford				Scale (see scale bar): 1:25,000 & 1:2,500 @ A4	Figure: 1
Job No.: FRA261101	Drawn By: AY	Checked By: DP	Drawn: May 2026		Revision:

Appendix A – Site Information

KEY

- grass
- wildflower meadow
- vegetation
- eco lodge decking
- gravel or bark path
- gravel road
- water
- existing tree
- proposed tree
- overhead cable
- hedgerow or other vegetation
- assumed tree root protection area

note
some areas are assumed due to dense vegetation and limited access

lodge
fence
additonal vegetation to reduce views into the site
5m root protection area assumed
5 no. 2 bed eco lodges
wild flower meadow
dense vegetation
access off highway
access control
10 no. 1 bed eco lodges
existing road crushed stone
existing trees and dense vegetation
drop off and luggage loading bay
waste/bin store
sewage treatment septic tank
car park 20 spaces
2 no. disabled spaces
brook
bike storage and bike wash
wall
fence
bollard (lockable)
pedestrian route only

Three Rivers (caravan site)
Easington House
FB
Peveril
Moor Lane
Cranbrook
BM 116.52m
Markhor
Highfield
112.7m
Tennis Court
Eaves Hall
Bowling Green
Little Beck

Proposed Site Plan
Scale: 1:500

N

0m 10m 20m scale

A - Issued for planning july 2018

stanton andrews
architects

44 york street
clitheroe
BB7 2DL

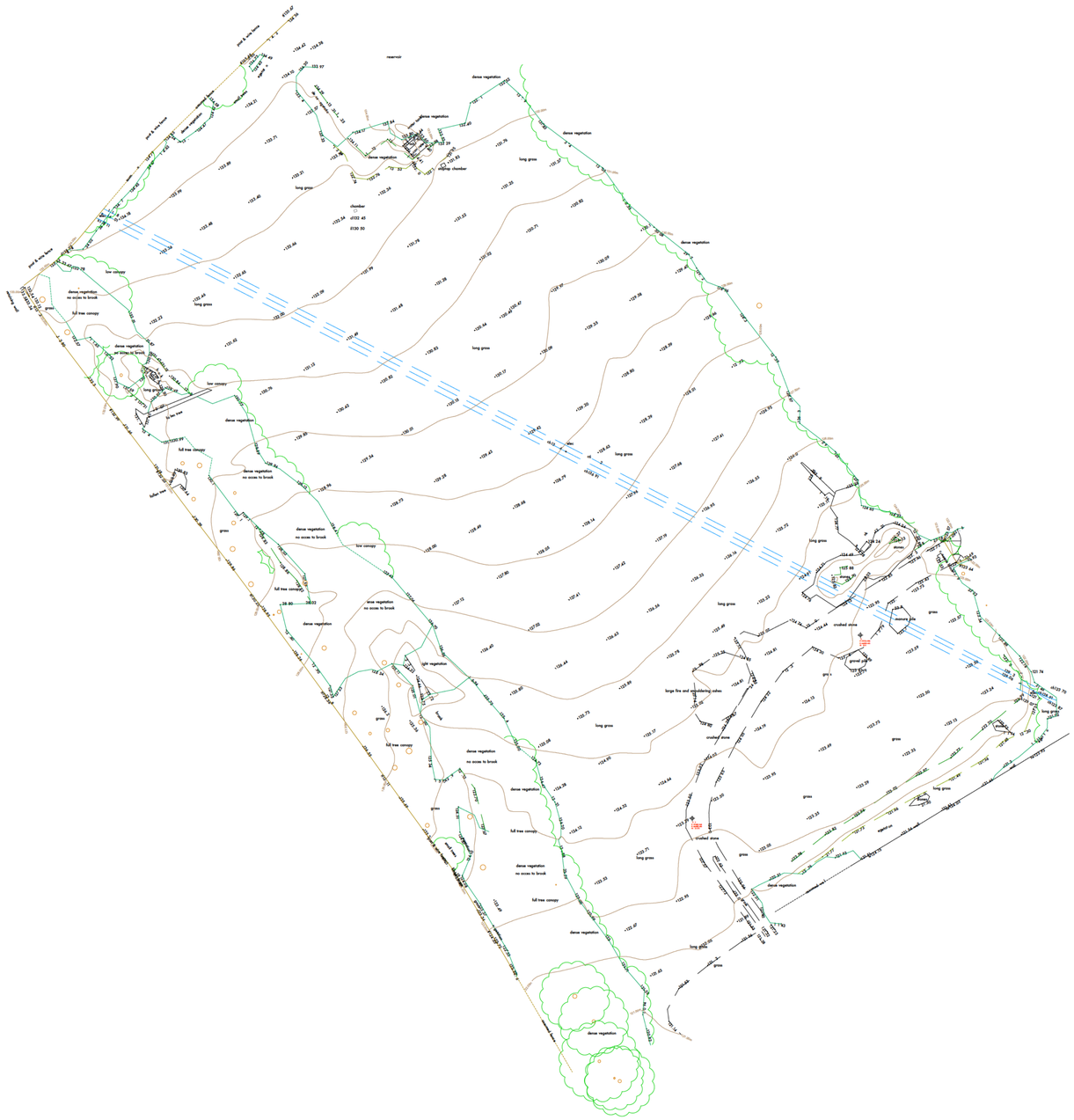
t 01200 444490
e mail@stantonandrews.co.uk
w stantonandrews.co.uk

Eaves Hall Lodges

Proposed Site Plan

drg.no. 1813/ PL01 rev. A
drawn. gw date. july18 sca e. 1:500 @ A1

Appendix B – Topographic Survey



N

0m 10m 20m scale

A - Issued for planning july 2018

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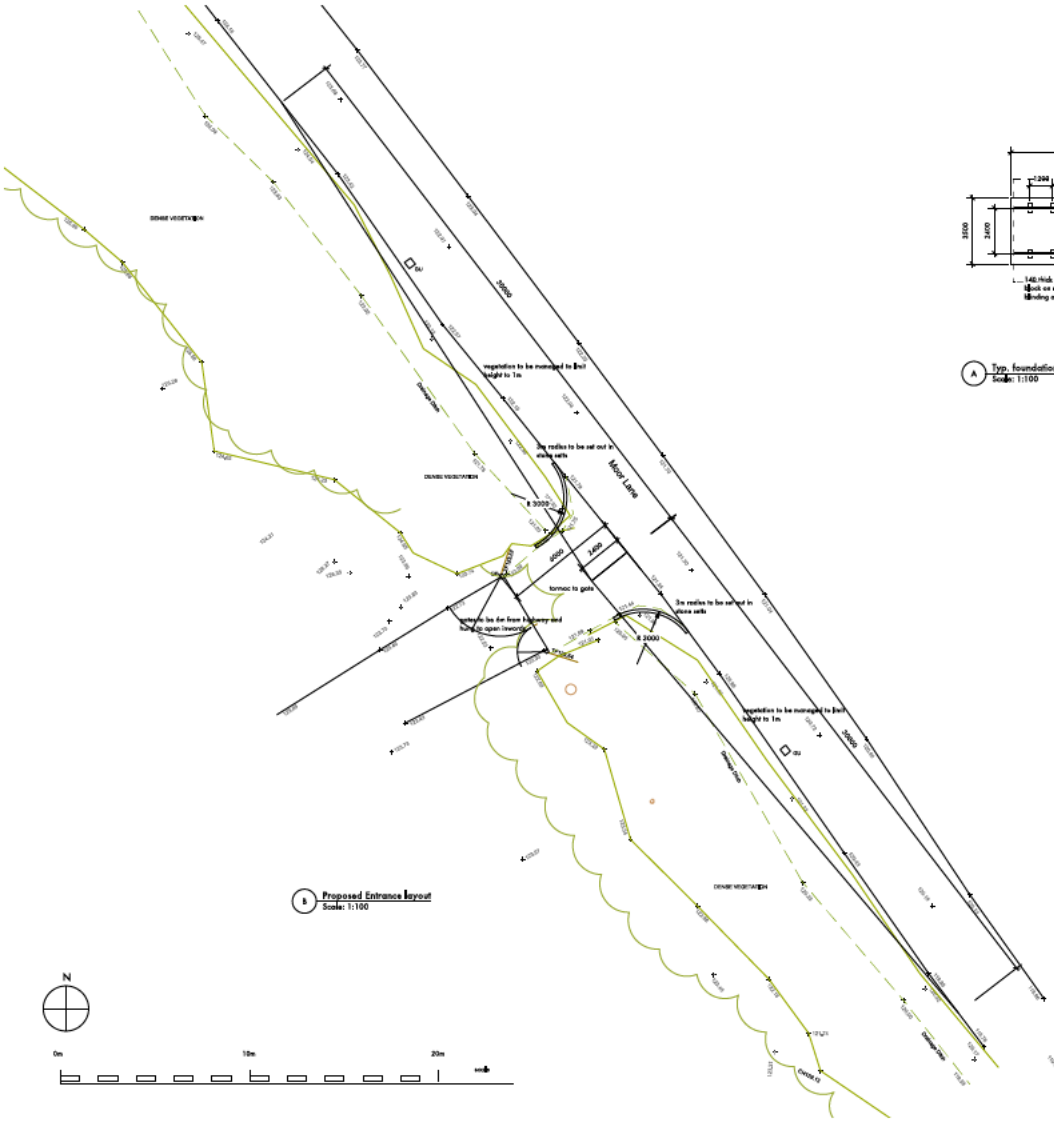
w stantonandrews.co.uk

Eaves Hall Lodges

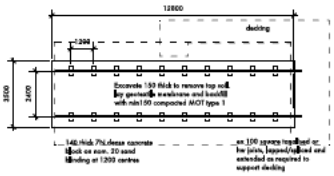
Existing Site Plan

drg.no. 1813/ EX01 rev. A

drawn. gw date. july18 sca e. 1:500 @ A1



B Proposed Entrance layout
Scale: 1:100



A Typ. foundation plan
Scale: 1:100

N

0m 10m 20m
scale

A - issued for planning sept 2020

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Eaves Hall Lodges

Details

dwg no. 1813/ PL04 rev A

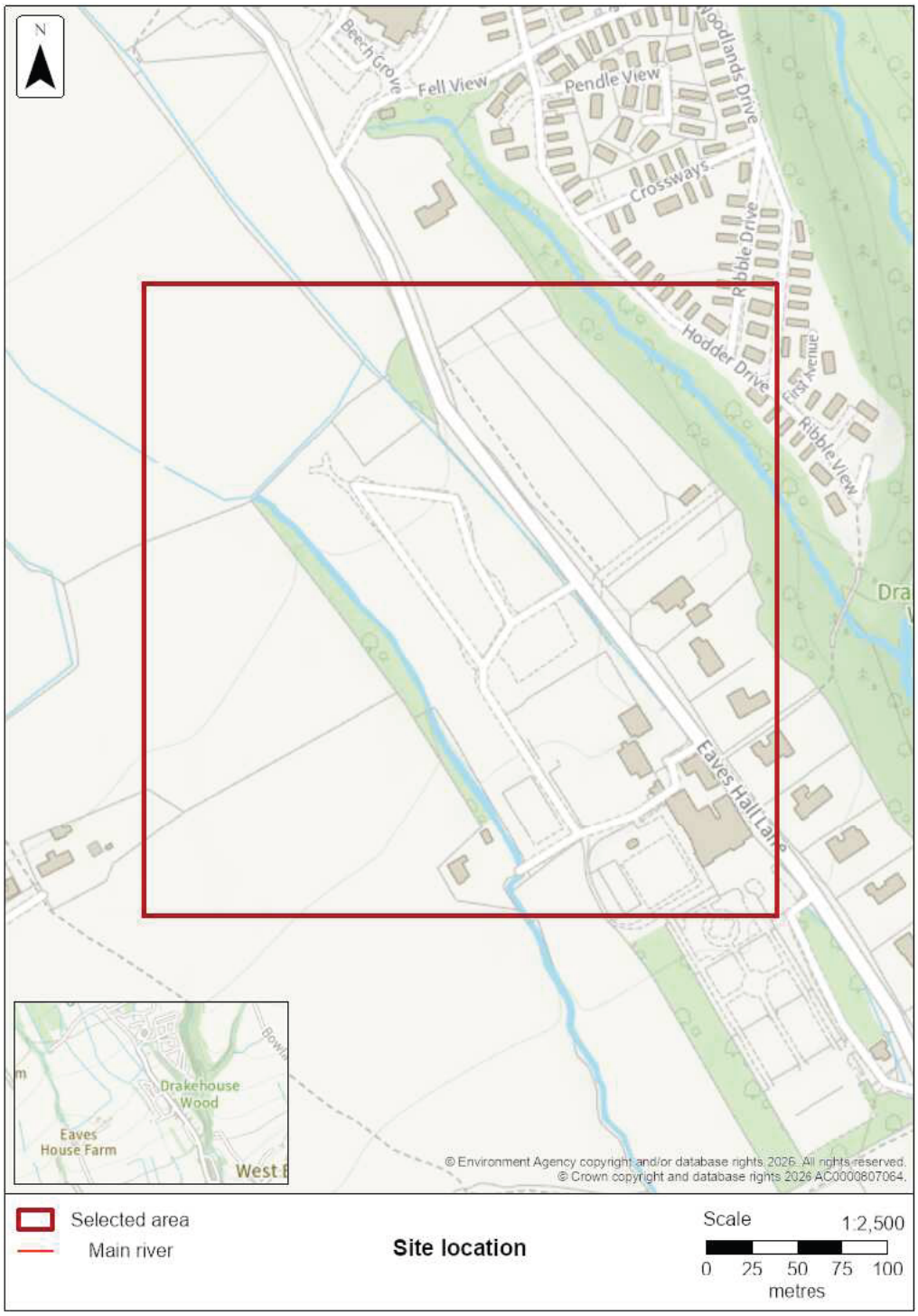
drawn rs date sept 20 scale 1:100 @ A1

Appendix C – Environment Agency Data

Flood risk assessment data

Location of site: 373683 / 444948 (shown as easting and northing coordinates)
Document created on: 23 March 2026
This information was previously known as a product 4.
Customer reference number: KFCCAMDT79RX

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

> **We recommend that you work with a flood risk consultant to get your flood risk assessment.**

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- modelled data
- climate change modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- past floods
- flood defences and attributes

We do not have past flooding data for this location.

Please note that:

- flooding may have occurred that we do not have records for
- flooding can come from a range of different sources
- we can only supply flood risk data relating to flooding from rivers or the sea

You can contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

Surface water and other sources of flooding

When using the surface water map on the check your long term flood risk service the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- reservoir flood risk
- groundwater flood risk - you could use the British Geological Survey groundwater flooding data, groundwater: current status and flood risk and the guide on mining and groundwater constraints for development - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Lancashire County.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occuring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

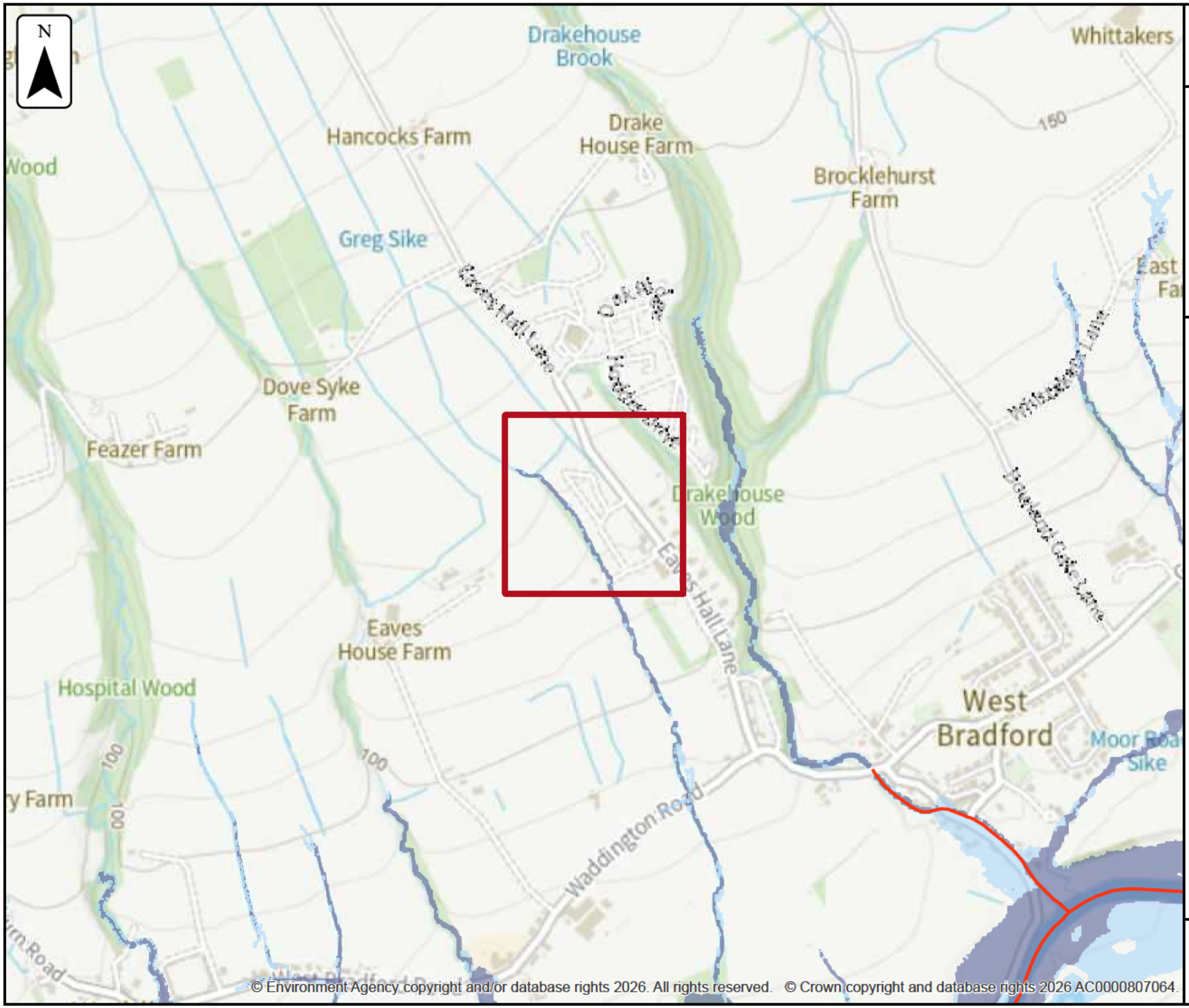
- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change



Environment Agency

Flood map for planning

Location (easting/northing)
373683/444948

Scale
1:10,000

Created
23 Mar 2026

- Selected area
- Main river
- Flood Zone 3
- Flood Zone 2

0 100 200 300 400 500
metres

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change

No data available

We do not have any height or depth data at this location for the following models:

Model name: West Bradford 2011
Scenario(s): No defences exist climate change modelled fluvial, No defences exist modelled fluvial

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Lancashire County.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

Find out more about flood risk activity permits

Help and advice

Contact the Cumbria and Lancashire Environment Agency team at inforequests.cmblnc@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for

Appendix D – United Utilities Sewer Records

United Utilities
Water for the North West

How to contact us:

United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

LKGroup

Unit 29
Eton Hill Road,
Radcliffe,
m26 2zs

FAO:

Your Ref: FRA261101 Eaves hall
Our Ref: UUPS-ORD-723036
Date: 14/04/2026

Dear Sirs

Location: FRA261101 Eaves hall

I acknowledge with thanks your request dated 09/04/2026 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. http://www.unitedutilities.com/work-near-asset.aspx .

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please contact us .

Yours Faithfully,

Karen McCormack
Property Searches Manager

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP

United Utilities

Water for the North West

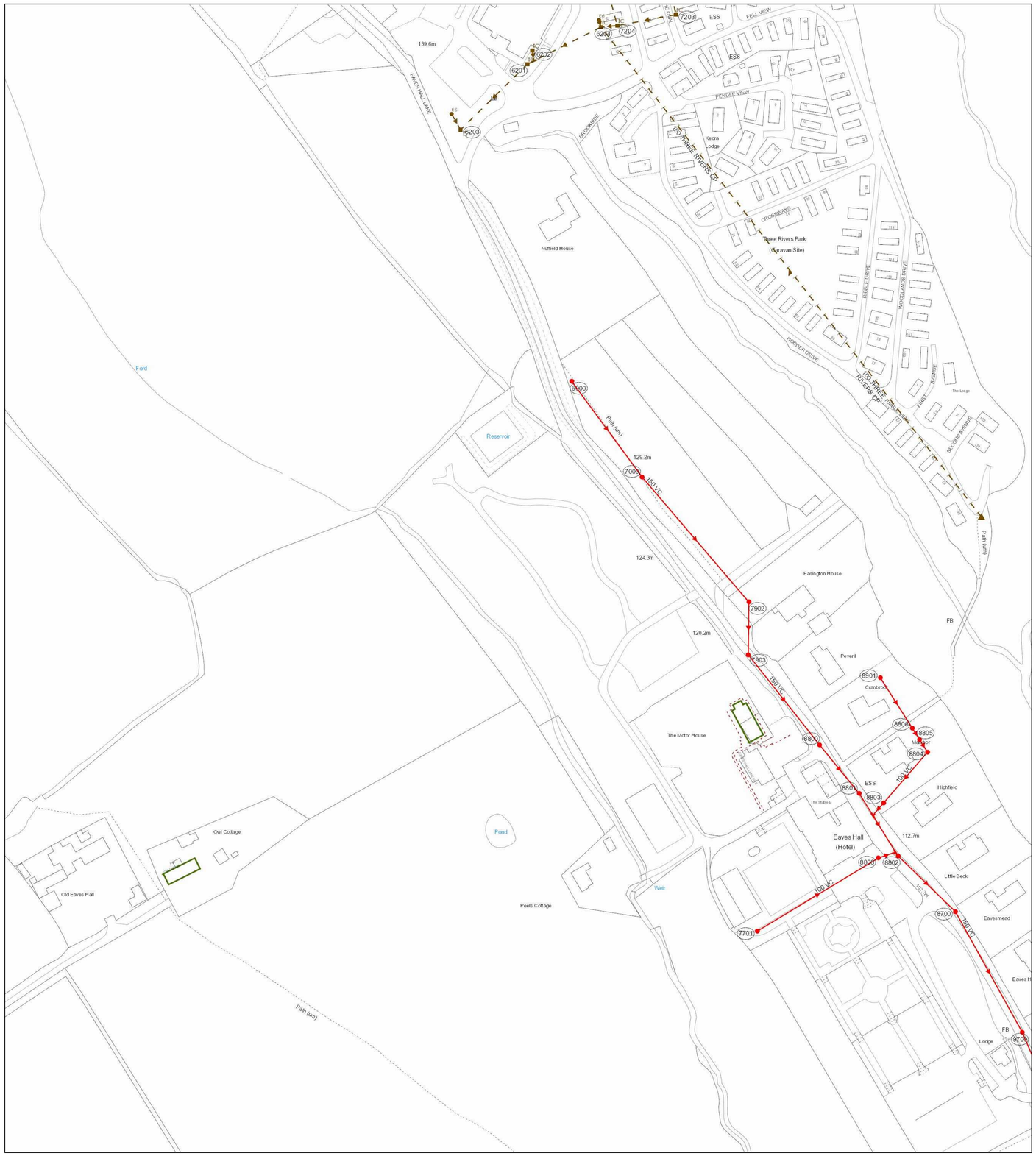
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
7903	119.42	CO	118.16	150			VC	63.83246	
6000	130.02	CO	0	150			VC	65.7807	
8806		CO		100			VC	7.519563	
8700	108.01	CO	106.26	150			VC	76.52863	1 in 13
8901		CO		100			VC	33.18849	
8805		CO		100			VC	8.140581	
7902	122.9	CO	121.2	150			VC	29.28107	1 in 10
7000	124.92	CO	123.78	150			VC	91.15663	1 in 36
9700	101.56	CO	100.13	150			VC	45.81284	1 in 9
8800	116.4	CO	115.17	150			VC	34.67971	1 in 14
8804		CO		100			VC	37.32597	
8803		CO		100			VC	9.012091	
8802	112.46	CO	110.96	150			VC	44.41794	1 in 9
8801	114.16	CO	112.67	150			VC	40.73576	1 in 24
7701		CO		100			VC	78.33047	
8808		CO		100			VC	10.1758	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:

red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- DNM Network Monitoring Point
- Change of Characteristic

MANHOLE FUNCTION

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
PE	Polyethylene
RP	Reinforced Plastic Matrix
CO	Concrete
CSB	Concrete Segment Bolted
CSU	Concrete Segment Unbolted
CC	Concrete Box Culverted
PSC	Plastic / Steel Composite
GRC	Glass Reinforecd Plastic
DI	Ductile Iron
PVC	Polyvinyl Chloride
CI	Cast Iron
SI	Spun Iron
ST	Steel
VC	Vitrified Clay
PP	Polypropylene
PF	Pitch Fibre
MAC	Masonry, Coursed
MAR	Masonry, Random
U	Unspecified

Address or Site Reference:

FRA261101 Eaves hall,

Scale: 1:1250 **Date:** 14/04/2026

Sheet: 1 of 1

Printed by: Property Searches

SEWER RECORDS

United Utilities
Water for the North West

Appendix E – IoH124 Greenfield Runoff Calculations

Greenfield runoff rate estimation tool

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

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

Project details

Date	15/04/2026
Calculated by	
Reference	
Model version	2.2.3

Location

Site name	Eaves Hall
Site location	

Site easting (British National Grid)	373769
Site northing (British National Grid)	444994

Site details

Total site area (ha)	1.85 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	1361 mm		
BFIHOST19scaled	0.369		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	24.7 l/s		
QBar (FEH statistical 2025) (l/s)	26.5 l/s		

Growth curve factors

	My value		Map value
Hydrological region	10		10
1 year growth factor	0.87		
2 year growth factor	0.93		
10 year growth factor	1.38		
30 year growth factor	1.7		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	23.1 l/s
Flow rate 2 year (l/s)	24.7 l/s
Flow rate 10 years (l/s)	36.6 l/s
Flow rate 30 years (l/s)	45.1 l/s
Flow rate 100 years (l/s)	55.2 l/s
Flow rate 200 years (l/s)	62.9 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

Appendix F – Site Composition

Drawing based on Proposed Site Plans
provided by Stanton Andrews Architects

KEY:

- Site Boundary (Area = 1.85 ha)
- Existing Road (Area = 0.03 ha)
- Impermeable Area (Area = 0.20 ha)
- Permeable Landscaping (Area = 1.43 ha)

Do not scale from this drawing and work from marked dimensions only. All dimensions and features should be confirmed on site by the Contractor. Where this drawing includes information provided to LK Consult Ltd by others, LK Consult Ltd gives no warranty, representation or assurance as to the accuracy of such information. Subject to detailed design.

LK GROUP

Client: Bowland Inns & Hotels

Site: Eaves Hall Lodges, West Bradford

Title: Site Composition

Job No.:	Scale (See Scale Bar):	App:	Revision:
FRA261101	NTS	F	

Drawn By:	Checked By:	Drawn:
AY	CC	May 2026

Appendix G – Drainage Strategy

KEY:

SuDS Pond Feature

Indicative route of swales

NOTES:

1. This drawing represents a conceptual SuDS layout and aims to demonstrate a suitable surface water drainage strategy for the proposed development. Detailed drainage design will be required at the detailed design stage.

2. Location, dimensions and storage volumes provided by proposed SuDS features to be confirmed at the detailed design stage taking into account proposed site levels.

3. Final site discharge rate to be limited to 2.2 l/s during all events up to and including the 1 in 100 year plus 50% climate change event.

4. Surface water runoff to discharge into the ordinary watercourse located to the west of the site subject to agreement with the LLFA and UU. It is recommended that the invert level of the receiving watercourse is confirmed prior to undertaking detailed drainage design. In the event a gravity connection is not feasible then a pumped outfall may be required.

LK CONSULT

Client: Bowland Inns and Hotels

Site: Eaves Hall Lodges, West Bradford

Title: Conceptual SuDS Layout

Job No.:	Scale (See Scale Bar):	App:	Revision:
FRA261101	NTS	G	0

Drawn By:	Checked By:	Drawn:
AY	DP	May 2026

Appendix H – Causeway Flow Network Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)		Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Depth/Area 1	0.165	122.000	44.584	72.978	1.300

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	50	0	0

Node Depth/Area 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	120.700	Product Number	CTL-SHE-0071-2200-1000-2200
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.2	Min Node Diameter (mm)	1200

Node Depth/Area 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	120.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	645

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	70.0	70.0	1.000	187.3	193.6	1.300	233.5	242.3

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	Depth/Area 1	600	121.695	0.995	11.9	127.6767	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
720 minute winter	Depth/Area 1	Hydro-Brake®	2.2	204.4

Appendix I – References

[i] Ministry of Housing, Communities and Local Government, December 2024, “National Planning Policy Framework”.
[ii] Ministry of Housing Communities and Local Government. “Planning Practice Guidance” Ministry of Housing, Communities and Local Government, February 2024, “Planning practice guidance”.
[iii] Blackburn-with-Darwen Council, Blackpool Council and Lancashire County Council, November 2021 “Lancashire Local Flood Risk Management Strategy 2021 – 2027”
[iv] CIRIA, December 2015, “The SUDS Manual”, C753.

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