

**FLOOD RISK ASSESSMENT
FOR COMMERCIAL DEVELOPMENT AT
CHELWORTH LODGE INDUSTRIAL ESTATE, CRICKLADE**

FINAL REPORT

ECL1501/HEAL PLANNING

DATE MAY 2025

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1.0 INTRODUCTION

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of Glevums Transport Ltd in respect of a development that consists of the change of use of agricultural land for commercial purposes and associated operational development at Chelworth Lodge Industrial Estate, Cricklade.

An appeal against the refusal of application PL/2024/09385 is to be submitted by Heal Planning. Refusal reason 3 of that application stated:

‘The site is at risk of pluvial flooding and insufficient information has been provided to demonstrate Flood Risk and Drainage management can be employed to ensure the development occupies areas with the lowest risk of flooding and that flood risk to the users of the site and adjacent land would not be increased contrary to paragraph 174 of the National Planning Policy Framework, Core Policy 67 of the Wiltshire Core Strategy and Policy H8 of the Cricklade Neighbourhood Plan.’

The Case Officers Report for the application highlights that additional information is required in relation to the Sequential Test, how the impacts of runoff from the hardstanding would be mitigated, and how the pollution risk from vehicles would be managed.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is situated at Chelworth Lodge Industrial Estate, Cricklade, Wiltshire, SN6 6HP. The National Grid Reference of the site is 40768/19276.

The location of the site is shown on Figure 1.

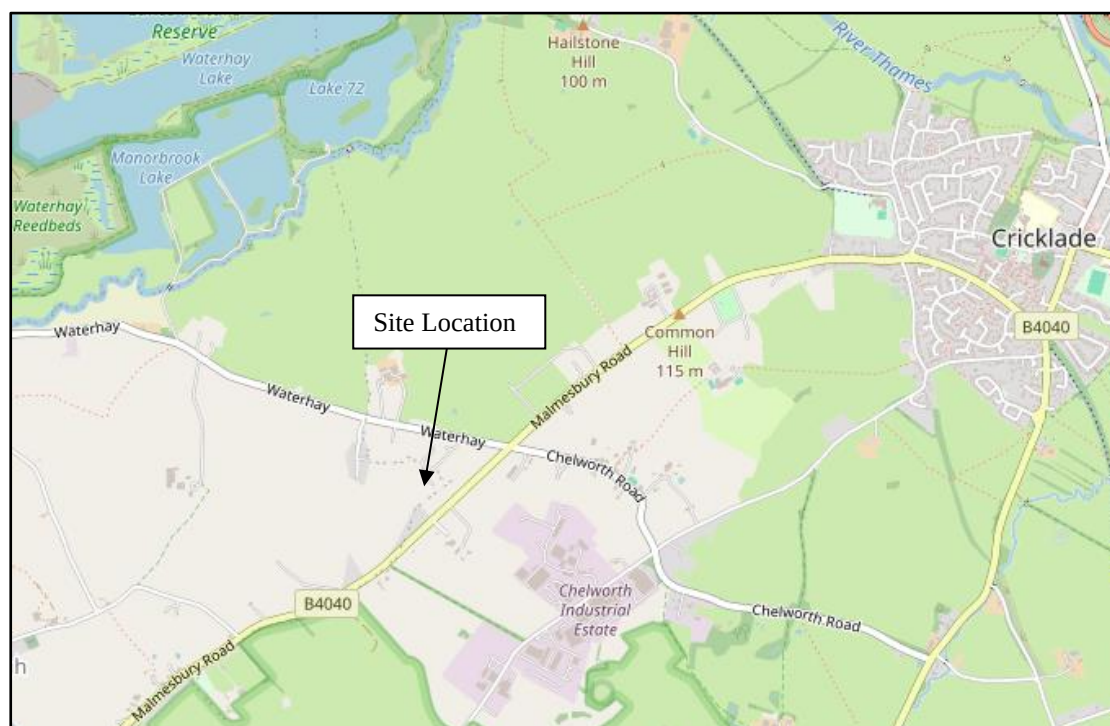


Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site forms part of an industrial estate on the southern side of Waterhay Road. The site is to the south of the existing industrial estate. A watercourse forms the northern boundary of the site and there is agricultural land to the east, south and west of the site. The site has an access from the existing industrial estate over the watercourse. The area of the development is 0.65 hectares.

Environment Agency LIDAR information shows that ground levels within the site fall in a northerly direction. Ground levels along the south western boundary of the site range between 84.8m OD in the south east to 83.6m OD in the north west. Ground levels in the north western part of the site are typically 83.6m OD. In the south eastern part of the site the areas closest to the watercourse are between 84.0m OD and 84.1m OD with ground levels typically above 84.4m OD elsewhere.

The online British Geological Survey maps indicate that the site is likely to be underlain by Oxford Clay Formation Mudstone – Mudstone. The superficial deposits are not recorded however the nearest recorded deposits, 300m south of the site, are sands and gravels.

2.3 Development

The development at the site is the retrospective planning permission for the change of use of agricultural land for commercial purposes, including the erection of a storage container, shipping container and portacabin. The Site Plan is provided within Attachment 1.

2.4 Local Development Documents

The Wiltshire Core Strategy Development Plan Document was adopted in 2015 and provides the overarching policy framework for Wiltshire for the period up to 2026. This Core Strategy is under review and the 'Local Plan review' will consider the period to 2036.

The Wiltshire Council Level 1 Strategic Flood Risk Assessment (SFRA) was prepared in May 2019.

The Wiltshire Local Flood Risk Management Strategy has been prepared by Wiltshire Council (as the Lead Local Flood Authority) to describe the approach to flooding and how it will work with other organisations.

2.5 Flood Zones

An extract from the Environment Agency Flood Map for Planning is shown in Figure 2. The site is partly located within Flood Zone 3, an area with a high probability of flooding.

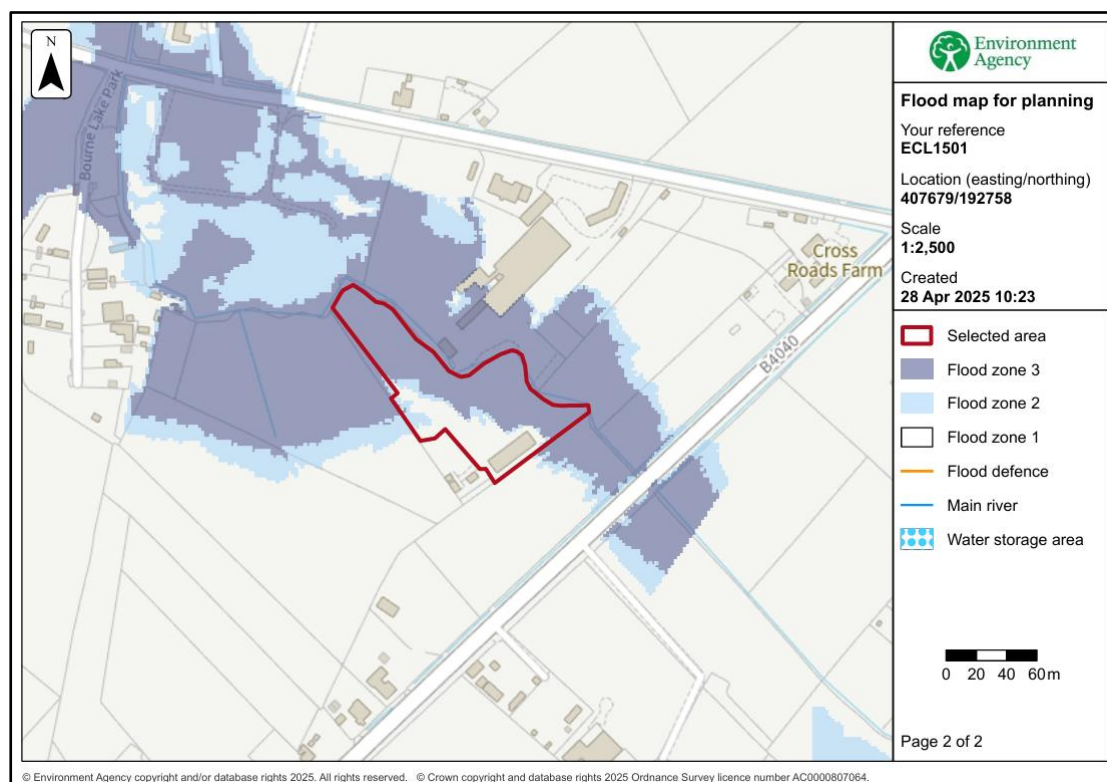


Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps provide an indication of the risk from the primary sources of flooding. The details provided with these maps are summarised in Table 1. The fluvial design flood to be considered within a Flood Risk Assessment is the 1% annual probability event. As such the depths of flooding identified is the maximum depth that occurs during a low chance (between 0.1% and 1% chance each year) event.

	Present Day		2050 Epoch	
	Risk of Flooding	Depth (Low chance)	Risk of Flooding	Depth (Low chance)
Rivers and the Sea	The chance of flooding each year) ranges from high (more than 3.3%) to no chance.	During low risk events depths are up to 0.3m.	The chance of flooding each year) ranges from high (more than 3.3%) to no chance.	During low risk events depths are up to 0.3m.
Surface Water	An isolated area of the site has a low chance (between 0.1% and 1%) / medium chance (between 1% and 3.3%)	During low risk events depths are up to 0.2m.	An isolated area of the site has a low chance (between 0.1% and 1%) / medium chance (between 1% and 3.3%)	During low risk events depths are up to 0.2m.
Reservoir	Outside of the area at risk.			

Table 1 – Environment Agency Long Term Flood Risk Maps

A request was made to the Environment Agency for available data that could inform this FRA. The response is provided in Attachment 2.

3.0 FLOOD RISK VULNERABILITY

3.1 The Sequential and Exception Test

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

3.2 Vulnerability Classification

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The develop is covered by the description of general industry and is classified as 'Less Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 3 and the development is 'Less Vulnerable' therefore it is not necessary to complete the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

3.3 Application of the Sequential Test

It is for the Local Planning Authority, using the evidence provided and taking advice from the Environment Agency as appropriate, to consider whether an application passes the Sequential Test.

Paragraph 033 of the PPG Flood Risk and Coastal Change states that when applying the Sequential Test a pragmatic approach on the availability of alternative sites should be taken. The specific example it gives is when considering planning applications for extensions to existing business premises it might be impractical to suggest that there are more suitable alternative locations for that development elsewhere.

The development form an extension to the business to the north of the site. The growth of the business is such that additional space is required. The location provides efficiency in a number of areas. Locating an extension to this business at an alternative site would be impractical

Paragraph 175 of the National Planning Policy Framework states that the Sequential Test does not need to be applied where the built development is not located in an area that is at risk of flooding. Whilst it is acknowledged that the access to the site is in an area at risk the structures that form the development are in Flood Zone 1.

Based upon the two points above the development is considered to pass the Sequential Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The watercourse that flows along the north eastern boundary of the site is an ordinary watercourse. There are no formal flood defences alongside this watercourse reducing the risk to the site.

The watercourse that flows along the north eastern boundary of the site is a tributary of the River Thames. The River Thames is an Environment Agency Main River and at its closest is 1000m north west of the site.

4.2 Sources of Flooding

A summary of the sources of flooding is provided in Table 2.

Source of Flooding	Level of Risk
Surface Water Flooding	Based upon the EA maps the risk is typically very low.
Fluvial Flooding	The risk is assessed in Section 4.3 and Section 4.5.
Tidal Flooding	The site is not at risk of tidal flooding.
Reservoir Flooding	Based upon the EA Long Term Maps the site is not at risk of reservoir flooding.
Groundwater Flooding	There is no evidence to suggest the site is at risk of groundwater flooding.

Table 2 – Sources of Flooding

4.3 Probability of Flooding

Fluvial flood levels provided by the Environment Agency for the watercourse on the north eastern boundary of the site are shown in Table 3 below.

Model Node	Annual Probability Event			
	5% (1 in 20)	2% (1 in 50)	1% (1 in 100)	0.1% (1 in 1000)
061 00 2014 BF1200	82.80	82.87	82.96	83.15
061 00 2014 BF1550	84.08	84.11	84.13	84.18

Table 3 – Fluvial Flood Levels (m AOD)

The modelled nodes given within Table 3 are approximately 50m downstream and 50m upstream of the site.

The modelled flood extents map provided by the Environment Agency show that the site is not at risk for all events up to and including the 0.1% annual probability (1 in 1000 chance each year) event.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded.

4.5 Climate Change and Residual Risk

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and flood levels in the watercourse alongside the site.

Fluvial flood levels including an allowance for climate change were provided by the Environment Agency.

Model Node	Annual Probability Event			
	1% AEP (15% CC)	1% AEP (25% CC)	1% AEP (35% CC)	1% AEP (70% CC)
061 00 2014 BF1313	83.37	83.39	83.40	83.64
061 00 2014 BF1411	83.62	83.64	83.65	83.74
061 00 2014 BF1476	83.83	83.84	83.85	83.91

Table 4 – Fluvial Flood Levels (m AOD)

The modelled nodes given within Table 3 are located along the northern boundary of the site.

The Environment Agency peak river flow map shows that for the Gloucestershire and the Vale Management Catchment the peak river flow central allowance is 26% and the higher allowance is 41% for the 2080's (100 year) timeframe.

The modelled flood extents map provided by the Environment Agency show that the site is not at risk for all events up to and including the 0.1% annual probability (1 in 1000 chance each year) event including 70% climate change.

The primary residual risk to the site would be an exceedance event.

Whilst it is noted that the modelling does not show the site to be at risk the recent flood map for planning indicates that the site is partly within Flood Zone 3. Whilst the reason for this discrepancy is not known, if we were to take a conservative approach we would conclude that part of the site closest to the watercourse on its north eastern boundary is at risk of flooding. Due to the nature of the modelling and the changes to the site that have occurred it is not possible to estimate the flood depth

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

It should be noted that the modelled flood levels and flood outline maps provided by the Environment Agency do not indicate that the site is at risk during the 1% annual probability (1 in 100 chance each year) event with climate change.

Based upon the Environment Agency Flood Map for Planning there is the potential that the parts of the site close to its north eastern boundary are at risk of flooding during the 1% annual probability (1 in 100 chance each year) event. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development it is anticipated that the potential flood depths in the areas at risk would increase. Due to the nature of the modelling and the changes to the site that have occurred it is not possible to estimate the flood depth.

The development changes the permeability of the site and therefore has the potential to increase the rate of surface water runoff from the site.

5.2 Mitigation Measures

The site has a low 'actual risk' of flooding. Considering the development is used for vehicle parking and storage there are no specific mitigation measures recommended.

The developer should ensure that the eventual users of the site are sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency operates a flood warning system for properties at risk of flooding to enable householders to protect life or take actions to manage the effect of flooding on property. Floodline Warnings Service is a national system run by the Environment Agency for broadcasting flooding warnings. The users of the site should register to receive flood warnings.

The proposed arrangement for the management of surface water within the site are provided in Section 6.

6.0 SURFACE WATER STRATEGY

6.1 Existing Drainage and Runoff Rates

Prior to development it is anticipated that the surface water would infiltrate into the ground or during an exceedance event flow overland to the watercourse on the north eastern boundary of the site.

Greenfield runoff rates have been estimated based upon a site area of 0.65ha. The rates within Table 5 have been estimated using the IH124 method within HR Wallingford's Greenfield Runoff Rate Estimation tool.

Event	1 in 1 Year	1 in 10 Year	1 in 30 Year	1 in 100 Year
Flow	1 l/s	1.9	2.7 l/s	3.8 l/s

Table 5 – Greenfield Runoff Rates

6.2 Proposed Approach to SuDS

The developed site comprises the following elements:

- structures, including the storage container, shipping container and portacabin, that are the subject of the current application;
- access routes through the site;
- parking areas for vehicles; and
- undeveloped areas.

The construction of the access routes and parking areas within the site has included the placement of a 0.5m deep sub-base of hardcore material and a 0.15m deep layer of granular (road planings / Type 1) material. Although these materials are permeable their ability to infiltrate would be affected by the traffic within the site. The access routes are considered to be compacted and therefore the level of infiltration in these areas is considered to be low. In comparison the parking areas have a much lower level of use and therefore a higher level of infiltration will occur in these areas.

The drainage areas, based upon the layout shown in Attachment 1, are provided in Table 6. The access has a total length of 140m and is 8m wide.

Drainage Area	Surface	Area
Roofs	Impermeable	400m ²
Access	Permeable (compacted)	1,120m ²
Parking Areas	Permeable (uncompacted)	4,580m ²
Undeveloped	Permeable	400m ²

Table 6 – Drainage Areas

The SuDS Manual states that where not collected for re-use, surface water runoff should be as discharged as high up the hierarchy of discharge solutions as is practicable:

- into the ground;
- to a surface water body;
- to a surface water sewer, highway drain or another drainage system; and
- to a combined sewer.

It is proposed that surface water within the parking areas and undeveloped areas will infiltrate. The runoff from the roof of the structures and the access routes will enter a filter drain. The drain will discharge to a basin at the north western part of the site. The basin will facilitate infiltration but will also have a controlled outlet to the adjacent watercourse should adequate infiltration rates not be achieved.

The site is comparable to a commercial yard which has a medium pollution hazard level. The proposed SuDS provides two components (filter drain & basin) that are in series. When a simple index approach is considered the Total SuDS Mitigation Index exceeds or is equal to the Pollution Hazard Indices.

6.3 Surface Water Management Scheme

The key components of the drainage arrangement and the proposed SuDS system are:

- the access routes within the site are to be formally identified so that access routes and parking areas are distinguished from each other;
- a filter drain (linear trench filled with permeable aggregate with a perforated pipe in the base) constructed alongside the access routes;
- roof runoff from the structures will be discharged to the filter drain;
- access routes will be graded so that runoff is discharged to the adjacent filter drain;
- at the north western end of the site the filter drain pipe will discharge to a basin that will facilitate infiltration and provide attenuation;
- discharge from the basin will be controlled by a 50mm orifice; and
- surface water will be discharged to the adjacent watercourse.

The site layout with the arrangement modelled is shown in Figure 3.

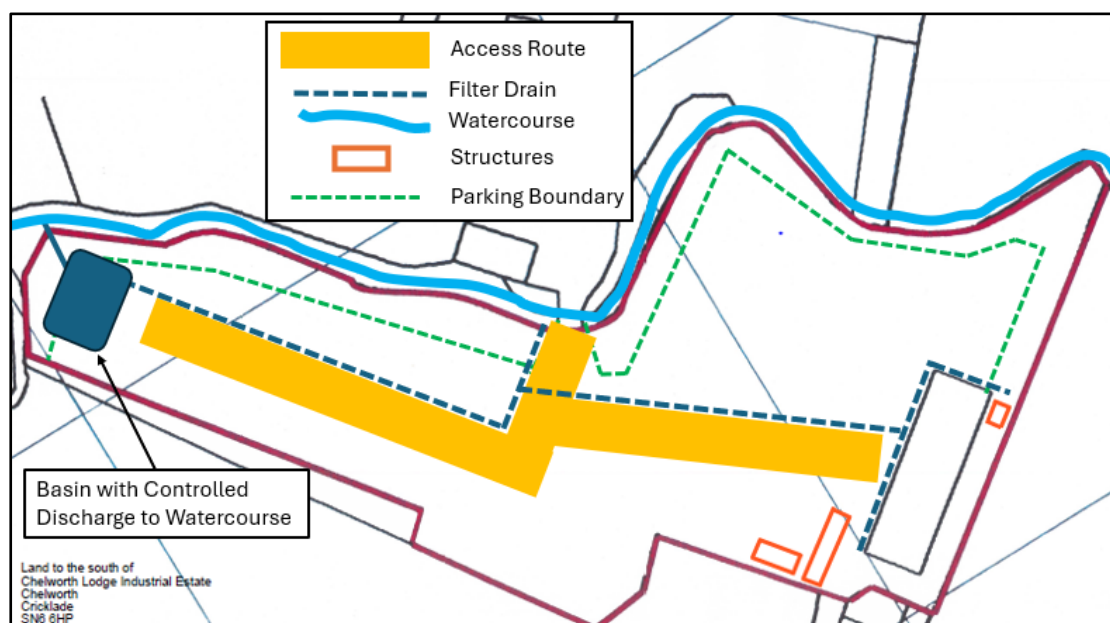


Figure 3 – Preliminary Site Layout

Using HR Wallingford's tool for Surface Water Storage Volume Estimation the total storage volume has been calculated. Within the calculation:

- FEH rainfall has been used;
- the contributing area is based upon access routes and the roof areas;
- it has been assumed that no infiltration occurs;
- a rectangular basin with 1 in 3 side slopes;
- a climate change allowance of 40% has been used; and
- flow rate is controlled by a 50mm orifice to limit the blockage risk.

Based upon the calculation it is proposed that 83m³ of storage is provided within the basin. The calculation is shown in Attachment 3. A basin with a footprint that is 16m by 9m and 1m deep will provide adequate storage.

The basin will facilitate infiltration. Should ground conditions not provide adequate infiltration the water will be attenuated.

The maximum discharge rate from the basin during the 1% annual probability (1 in 100 chance each year) event with 40% climate change is 5.2l/s.

Should there be an exceedance event, ground levels fall in a north easterly direction and therefore any overland flows would discharge to the watercourse on the boundary of the site.

7.0 CONCLUSIONS

As a result of the assessment, the following conclusions have been reached.

- The development at the site is the retrospective planning permission for the change of use of agricultural land for commercial purposes, including the erection of a storage container, shipping container and portacabin at Chelworth Lodge Industrial Estate.
- Part of the development site is in Flood Zone 3. The storage container, shipping container and portacabin are located in Flood Zone 1 and not at risk of flooding from the watercourse on the north eastern boundary of the site.
- Based upon the EA Flood Map for Planning the part of the site closest to its north eastern boundary is at risk of flooding.
- There are no specific recommendations associated with the development to reduce the risk of flooding to the development.
- The development passes the Sequential Test and is therefore suitable for the location.
- A preliminary drainage scheme has been developed that manages the surface water runoff from the site mitigating the risks of pollution and flooding.

This document demonstrates that an appropriate scheme for surface water management can be developed for the site. It is recommended that as a Condition of an approval there is a requirement to:

- formalises the areas designated as access routes within the site;
- undertakes a topographic survey of the site;
- completes infiltration testing of the site; and
- prepares a detailed design for the management of surface water.

ATTACHMENT 1

PROPOSED SITE PLAN



Land to the south of
Chelworth Lodge Industrial Estate
Chelworth
Cricklade
SN6 6HP

Drg No: PR01
Proposed Site Plan
Scale 1:500



ATTACHMENT 2

ENVIRONMENT AGENCY FLOOD RISK ASSESSMENT DATA

Product 4 (Detailed Flood Risk) for SN6 6HB

Our Ref: THM402889

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies. This is:

- i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq metres; and all domestic extensions", and
- ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;

Statutory (Sealed) Main River (where available within map extents);

A table showing:

- i) Model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
- ii) Flood defence locations unique identifiers and attributes; (supplied separately)
- iii) Historic flood events outlines unique identifiers and attributes; and
- iv) Local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please request our guidance which sets out the requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance regarding Flood Risk Assessments can be found on our website at:

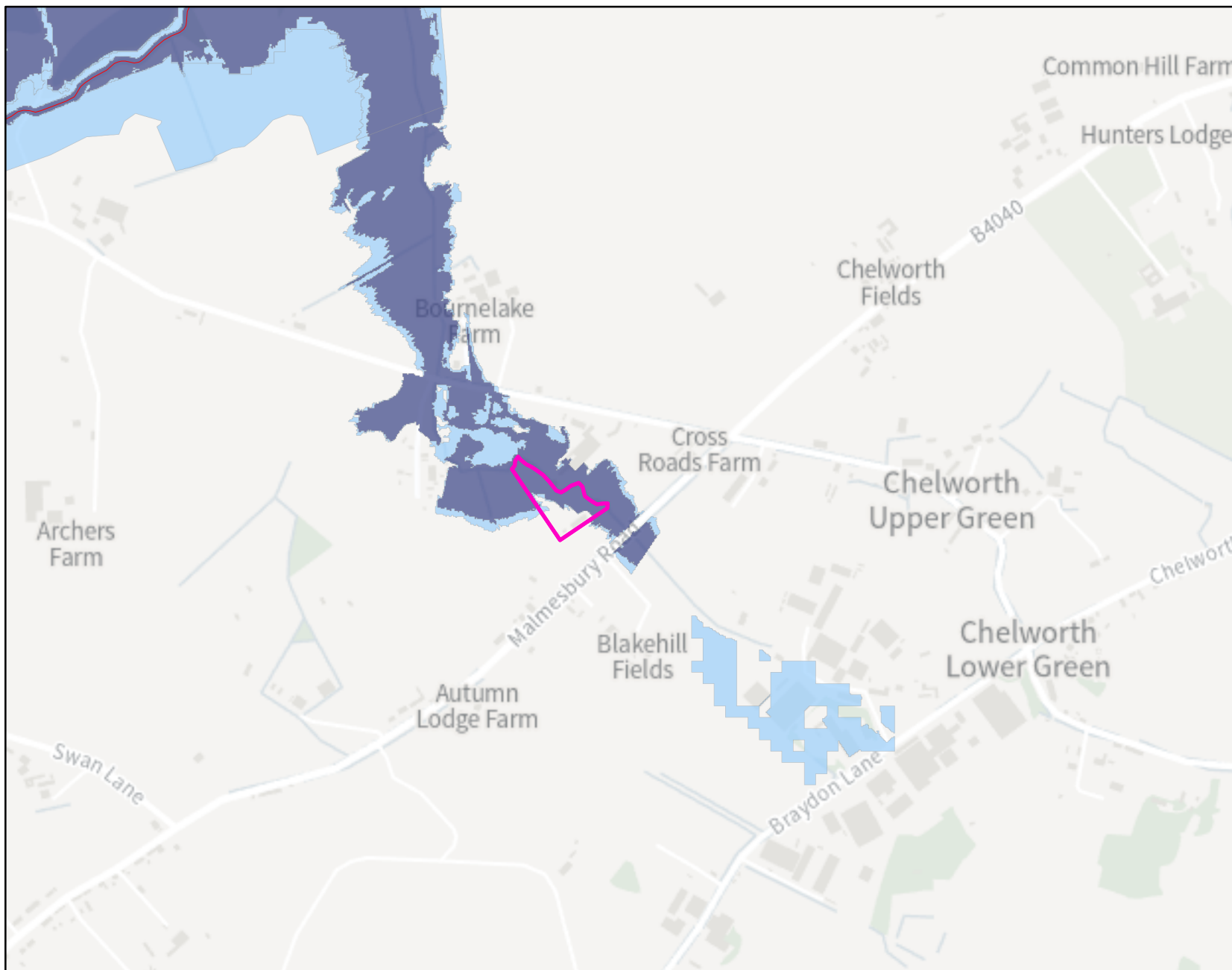
<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at:

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Detailed flood map for planning centred on SN6 6HB

Created on 25/03/2025 REF: THM402889



Environment
Agency

Kilometres

0 0.25 0.5

Legend

- Statutory Main Rivers
- Site
- Flood Zone 3
- Flood Zone 2

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Defence information

Defence Location: No defences and NOT on Main River

Description: This location is not on Main River and we do not hold defence information for this area. There may be an ordinary watercourse nearby which could affect the site. Please contact your local authority for further details.

Model information

THM402889

Model: **Thames (MRL to St Johns) 2014**

Description: The information provided is taken from the Thames (MRL to St Johns Lock) Flood Mapping Study completed in January 2014. The study was carried out using 1D-2D modelling software (ISIS-Tuflow). Model re-run to include new climate change allowances in July 2017. Please note, this model has not modelled the Fairford defences as these were installed after the completion of this modelling.

Model design runs and Mapped Outputs:

- 1 in 5 / 20%
- 1 in 20 / 5% AEP
- 1 in 50 / 2% AEP
- 1 in 100 / 1% AEP
- 1 in 100+15% / 1% AEP with 15% AEP climate change allowance
- 1 in 100+25% / 1% AEP with 20% AEP climate change allowance
- 1 in 100+35% / 1% AEP with 25% AEP climate change allowance
- 1 in 100+35% / 1% AEP with 35% AEP climate change allowance
- 1 in 100+70% / 1% AEP with 70% AEP climate change allowance
- 1 in 1000 / 0.1% AEP

Model accuracy:

Levels $\pm$ 250mm

Modelled in-channel flood flows and levels

THM402889

The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below:

Node label	Model	Easting	Northing	Flood Levels (mAOD)										
				20% AEP	5% AEP	3.3% AEP	1% AEP	1% AEP (+10% increase in flows)	1% AEP (+15% increase in flows)	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_00_2014_BF1200	Thames (MRL to St Johns) 2014	407538	192812	82.80	82.87	0.00	82.96	0.00	83.03	83.05	83.07	83.10	83.18	83.15
061_00_2014_BF1313	Thames (MRL to St Johns) 2014	407632	192820	0.00	0.00	0.00	0.00	0.00	83.37	0.00	83.39	83.40	83.46	0.00
061_00_2014_BF1411	Thames (MRL to St Johns) 2014	407700	192781	0.00	0.00	0.00	0.00	0.00	83.62	0.00	83.64	83.65	83.74	0.00
061_00_2014_BF1476	Thames (MRL to St Johns) 2014	407747	192751	0.00	0.00	0.00	0.00	0.00	83.83	0.00	83.84	83.85	83.91	0.00
061_00_2014_BF1550	Thames (MRL to St Johns) 2014	407799	192705	84.08	84.11	0.00	84.13	0.00	84.15	84.15	84.16	84.16	84.19	84.18

Node label	Model	Easting	Northing	Flood Flows (m3/s)										
				20% AEP	5% AEP	3.3% AEP	1% AEP	1% AEP (+10% increase in flows)	1% AEP (+15% increase in flows)	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
061_00_2014_BF1200	Thames (MRL to St Johns) 2014	407538	192812	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.72	0.76	0.98	0.00
061_00_2014_BF1313	Thames (MRL to St Johns) 2014	407632	192820	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.72	0.76	0.98	0.00
061_00_2014_BF1411	Thames (MRL to St Johns) 2014	407700	192781	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.72	0.76	0.98	0.00
061_00_2014_BF1476	Thames (MRL to St Johns) 2014	407747	192751	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.72	0.76	0.98	0.00
061_00_2014_BF1550	Thames (MRL to St Johns) 2014	407799	192705	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.36	0.36	0.48	0.00

Note:
Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>.

Modelled floodplain flood levels

THM402889

The modelled flood levels for the closest most appropriate model grid cells for your site are provided below:

2D grid cell reference	Model	Easting	Northing	flood levels (mAOD)										
				20% AEP	5% AEP	3.3 AEP	1% AEP	1% AEP (+10% increase in flows)	1% AEP (+15% increase in flows)	1% AEP (+20% increase in flows)	1% AEP (+25% increase in flows)	1% AEP (+35% increase in flows)	1% AEP (+70% increase in flows)	0.1% AEP
floodplain 1	Thames (MRL to St Johns) 2014	407,545	192,817	No Data	No Data		No Data		No Data	No Data	No Data	No Data	83.20	No Data
floodplain 2	Thames (MRL to St Johns) 2014	407,782	192,738	83.97	83.99		84.00		84.03	84.03	84.04	84.04	84.07	84.06

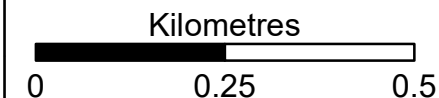
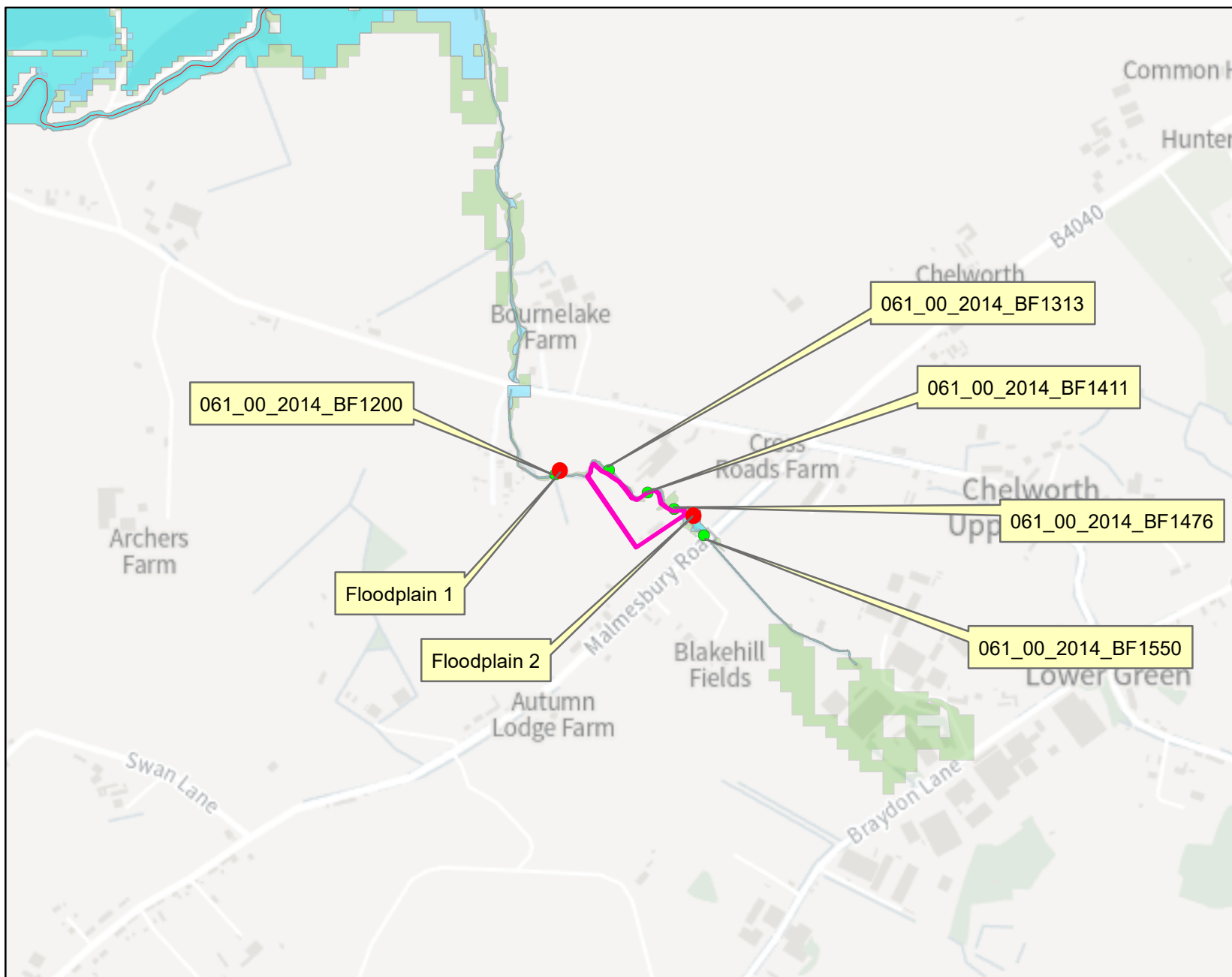
This flood model has represented the floodplain as a grid.
The flood water levels have been calculated for each grid cell.

Note:
Due to changes in guidance on the allowances for climate change, the percentage increase in river flows above should no longer to be used for development design purposes. The data included in this Product can be used for interpolation of levels as part of an intermediate level assessment.

For further advice on the new allowances please visit
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Detailed FRA map centred on SN6 6HB

Created on 25/03/2025 REF: THM402889



Legend

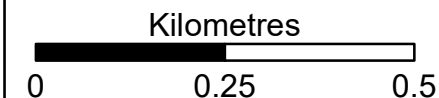
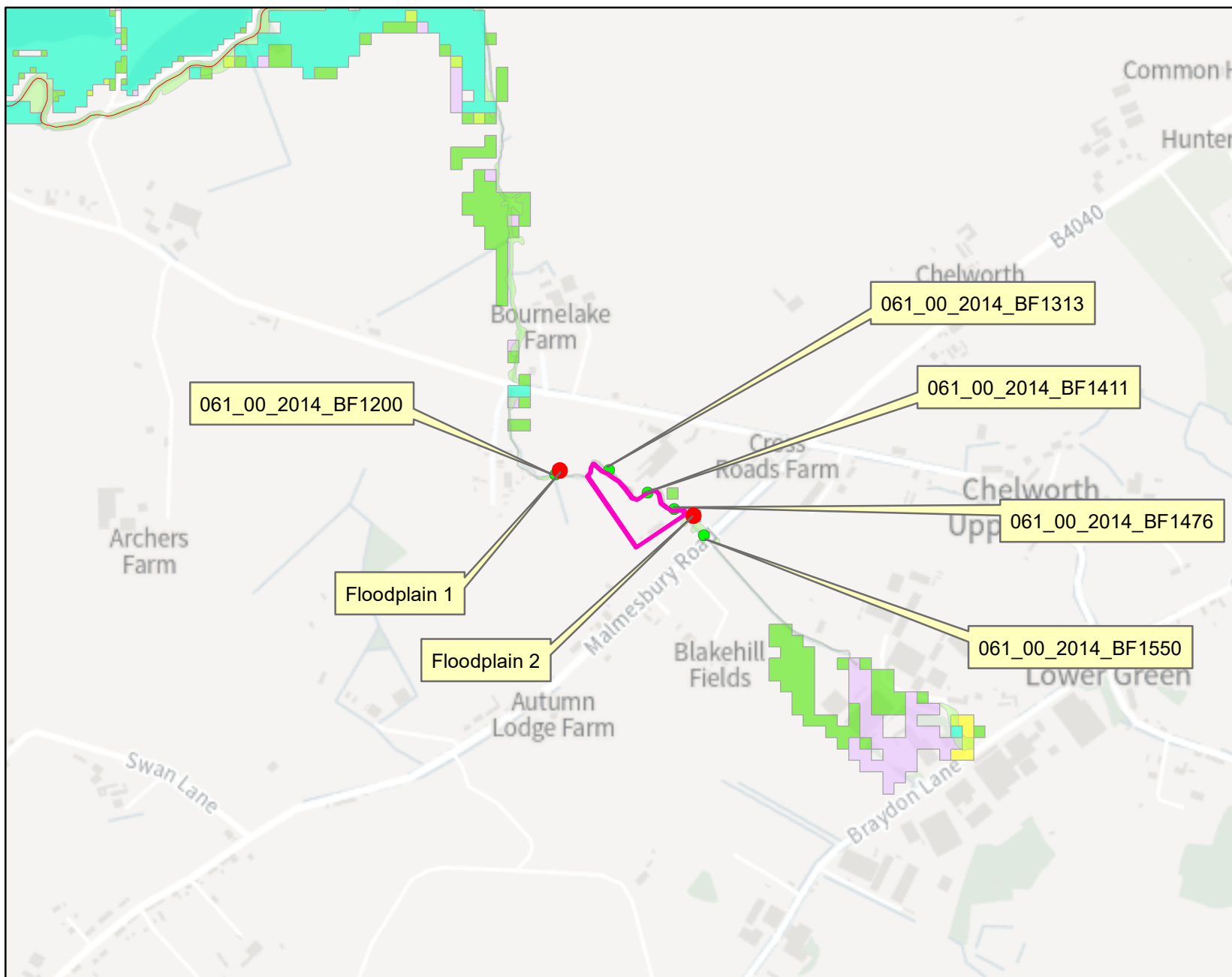
- Statutory Main Rivers
- Site
- Nodes
- 20% AEP Flood Outline
- 5% AEP Flood Outline
- 1% AEP Flood Outline
- 0.1% AEP Flood Outline

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occurring in any given year

Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Detailed FRA map centred on SN6 6HB

Created on 25/03/2025 REF: THM402889



Legend

- Statutory Main Rivers
- Site
- Nodes
- 1%+15% AEP Flood Outline
- 1%+20% AEP Flood Outline
- 1%+25% AEP Flood Outline
- 1%+35% AEP Flood Outline
- 1%+70% AEP Flood Outline

AEP = Annual Exceedance Probability
The probability of a flood of a particular magnitude, or greater, occurring in any given year

Where available climate change extents have been calculated with an additional flow added to an AEP event. An example of how this is written is 1%+20% AEP.

Historic flood data

THM402889

Our records show that the area of your site has been affected by flooding.
Information on the floods that have affected your site is provided in the table below:

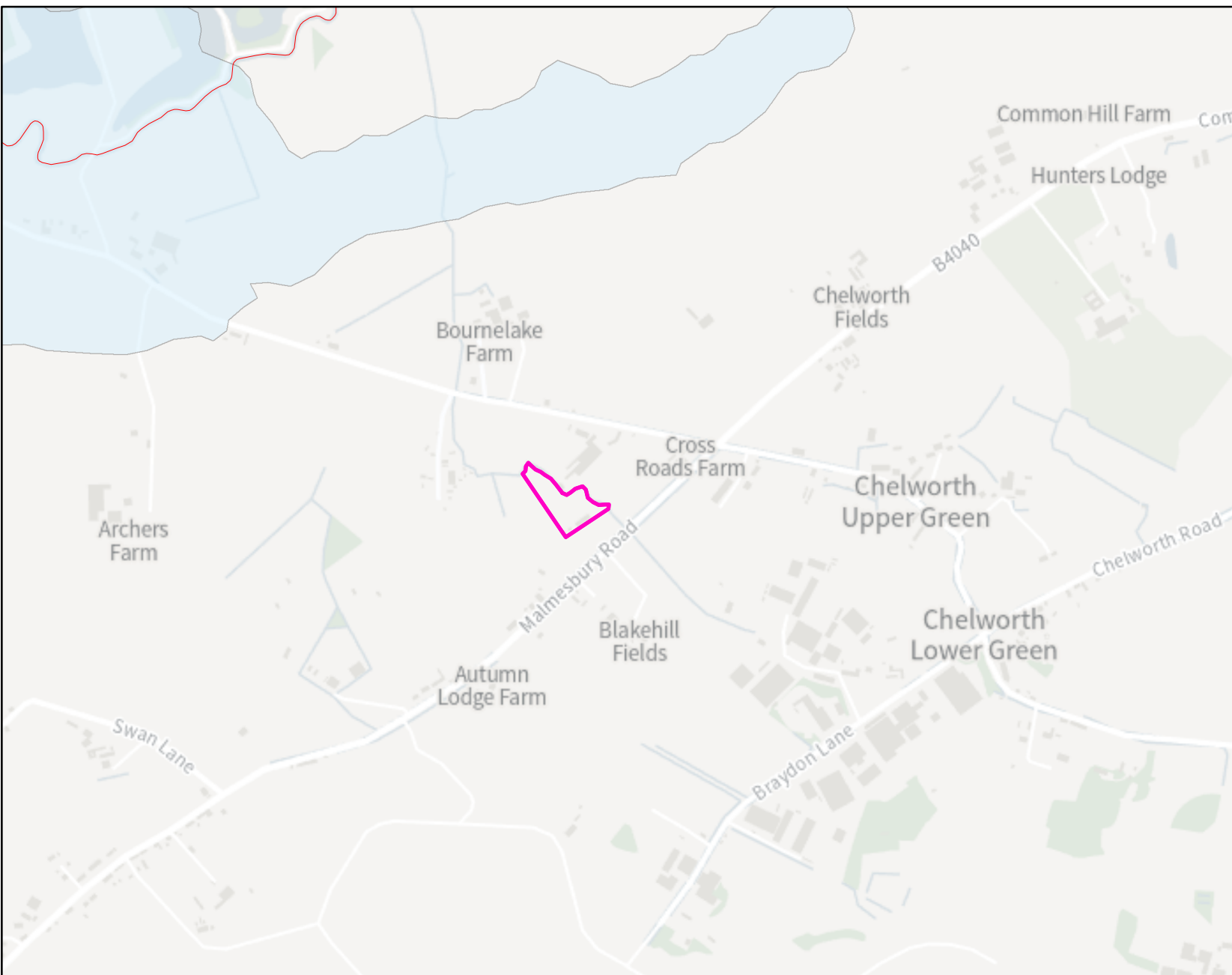
Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
No Historic Information					

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

Start and End Dates shown above may represent a wider range where the exact dates are not available.

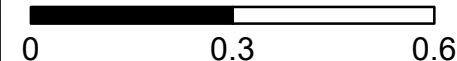
Detailed flood map for planning centred on SN6 6HB

Created on 25/03/2025 REF: THM402889



Environment
Agency

Kilometres



Legend

- Statutory Main Rivers
- Site
- 1992

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Hazard Mapping

Hazard Mapping methodology:

To calculate flood hazard with the debris factor we have used the supplementary note to Flood Risk to People Methodology (see below).

The following calculation is used:

$$HR = d \times (v+0.5) + DF$$

Where HR = flood hazard rating

d = depth of flooding (m)

v = velocity of floodwaters (m/sec)

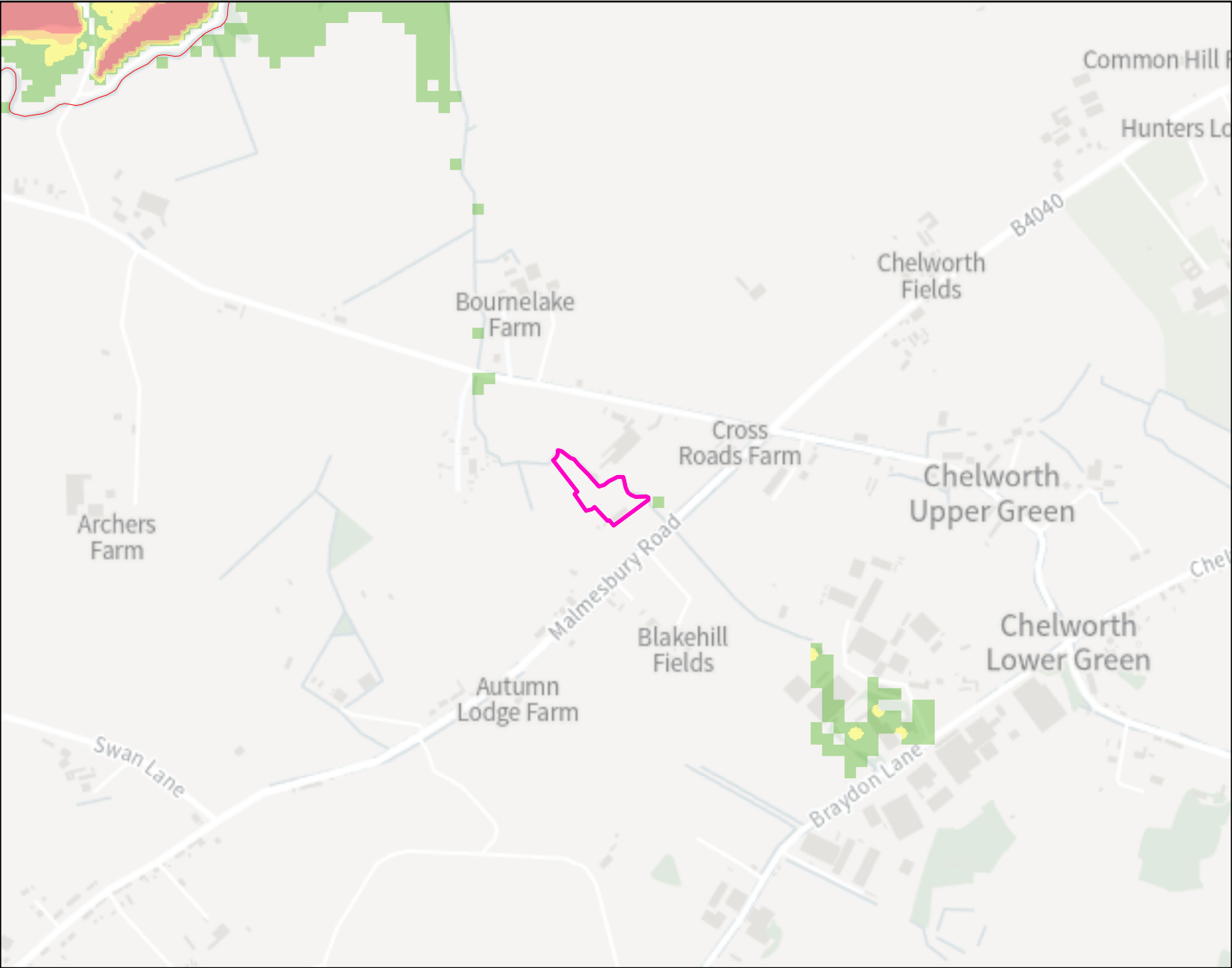
DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

The resultant hazard rating is then classified according to:

Flood Hazard	Colour	Hazard to People Classification
Less than 0.75	Green	Very low hazard - Caution
0.75 to 1.25	Yellow	Danger for some - includes children, the elderly and the infirm
1.25 to 2.0	Orange	Danger for most - includes the general public
More than 2.0	Red	Danger for all - includes the emergency services

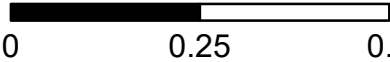
REF: HR Wallingford and Environment Agency (May 2008) Supplementary note of flood hazard ratings and thresholds for development planning and control purpose – Clarification of the Table 113.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1

35%cc Hazaqrd map centred on SN6 6HB
Created on 17/03/2025 REF: THM402889



Environment
Agency

Kilometres



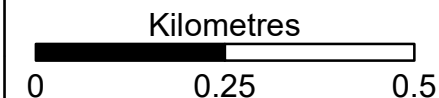
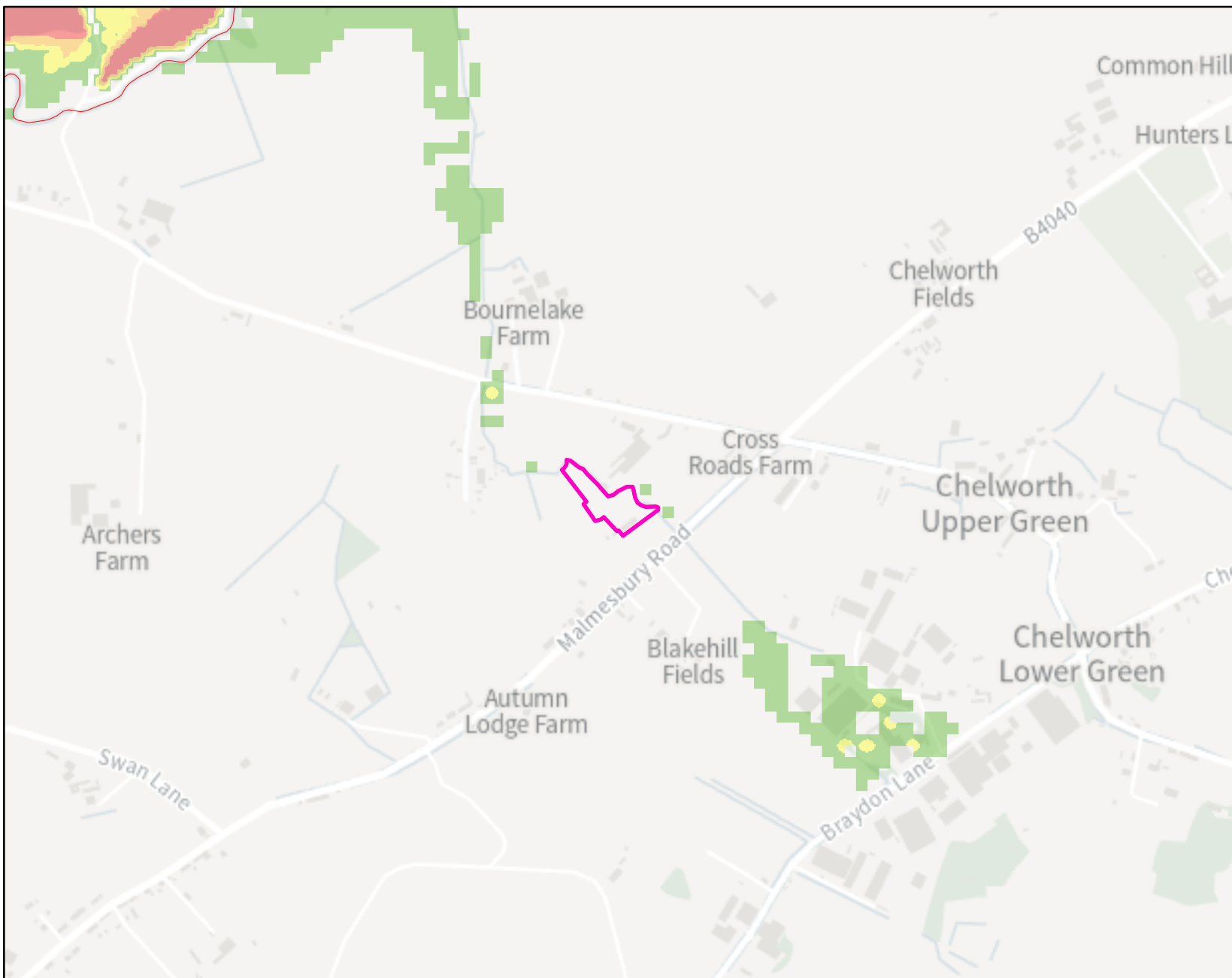
Legend

- Statutory Main Rivers
- Site
- Very low hazard – Caution
- Danger for some – includes children, the elderly a
- Danger for most – includes the general public
- Danger for all – includes the emergency services

For hazard and debris factor we used HR Wallingford and Environment Agency (May 2008) supplementary note on flood hazard ratings and thresholds for development planning and control purpose. The following calculation is used:
 $HR = d \times (v + 0.5) + DF$
HR = flood hazard rating
d = depth of flooding (m)
v = velocity of floodwaters (m/sec)
DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

70%cc Hazaqrd map centred on SN6 6HB

Created on 17/03/2025 REF: THM402889



Legend

- Statutory Main Rivers
- Site
- Very low hazard – Caution
- Danger for some – includes children, the elderly a
- Danger for most – includes the general public
- Danger for all – includes the emergency services

For hazard and debris factor we used HR Wallingford and Environment Agency (May 2008) supplementary note on flood hazard ratings and thresholds for development planning and control purpose. The following calculation is used:

$$HR = d \times (v + 0.5) + DF$$

HR = flood hazard rating
d = depth of flooding (m)
v = velocity of floodwaters (m/sec)
DF = debris factor calculated (0, 0.5, 1 depending on probability that debris will lead to a hazard)

ATTACHMENT 3

GREENFIELD RUNOFF AND STORAGE VOLUME CALCULATIONS

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.

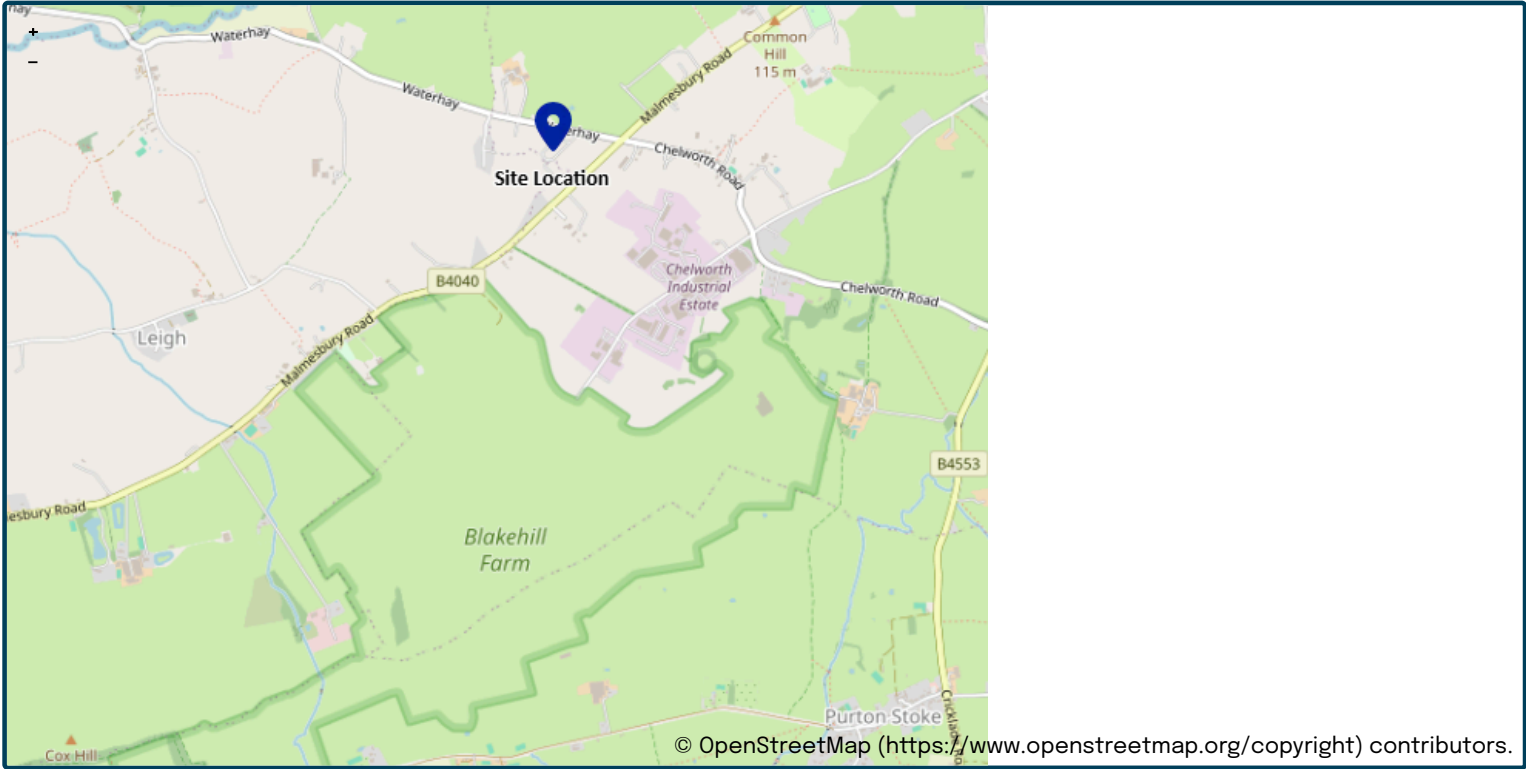
Project details

Date	30/04/2025
Calculated by	Ellingham Consulting
Reference	ECL1501
Model version	2.0.0

Location

Site name	Chelworth Lodge
Site location	Crickalde

Enter the postcode where your site is located and click the "Find Postcode" button. You can also click on the map to set the site coordinates. Setting a location will automatically set related hydrological characteristics.



Site easting	407705
Site northing	192740

Site details

Total site area (ha)	0.65	ha
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Greenfield runoff

Method

Method	IH124
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IH124

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	699	mm	699
How should SPR be derived?	WRAP soil type		
WRAP soil type	2		2
SPR	0.3		
QBar (IH124) (l/s)	1.2	l/s	

Growth curve factors

	<u>My value</u>		<u>Map value</u>
Hydrological region	6		6
1 year growth factor	0.85		
2 year growth factor	0.88		
10 year growth factor	1.62		
30 year growth factor	2.3		
100 year growth factor	3.19		
200 year growth factor	3.74		

Results

Method	IH124	
Flow rate 1 year (l/s)	1	l/s
Flow rate 2 year (l/s)	1	l/s
Flow rate 10 years (l/s)	1.9	l/s
Flow rate 30 years (l/s)	2.7	l/s
Flow rate 100 years (l/s)	3.8	l/s
Flow rate 200 years (l/s)	4.4	l/s

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.0) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>).

The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<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 storage volume requirements that are needed 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). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	01/05/2025
Calculated by	Ellingham Consulting
Reference	Chelworth Lodge
Model version	2.0.0

Location

Site name	Chelworth Lodge
Site location	Cricklade



Site easting	407699
Site northing	192741

Site areas

Total site area (ha)	0.65	ha
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Roof area

Total roof area (ha)	0.04	ha
Contributing roof area (ha)	0.04	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	0.57	ha
Contributing paved area (ha)	0.112	ha
Non-contributing paved area (ha)	0.458	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0.04	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	0.04	ha

Total area

Total contributing area (ha)	0.152	ha
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Contributing areas with urban creep allowance

Urban creep allowance factor	+0% (no creep)
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Storage design parameters

Storage base shape	Rectangular / square	
Storage base length to width ratio	3:1	
Storage design depth (mm)	1000	mm
Storage side slope (1 in x)	1 in 3	
Storage voids ratio (%)	100% (all voids)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site

Greenfield

Specify the method

Default 3l/s/ha

Default 3l/s/ha

Total area for greenfield runoff calculation (ha)

0.65

ha

☒

0.65

Flow rate (default) (l/s)

2

l/s

Final discharge rate

Runoff calculation method

Default 3l/s/ha

Design flow rate (l/s)

2

l/s

Blockage risk

Specify the method

Orifice diameter

Minimum orifice diameter to prevent blockage (mm)

50

mm

My value

Calculated value

Design orifice diameter (mm)

50

mm

☐

50

Flow rate of orifice (l/s)

5.2

l/s

Rainfall and runoff

Rainfall input type

FEH22 CSV file

FEH_Point_Rainfall_FEH22_AM_407718_192726.csv

Distance from FEH location to site (km)

0

km

Climate change allowance factor

140%

Specify the runoff method from grass / vegetated areas

Fixed percentage - based on rainfall event depth and SPR

My value

Map value

How should SPR be derived?

WRAP soil type

WRAP soil type

2

☒

2

SPR

0.3

Model results

- **Maximum discharge flow rate:** 5.2 (l/s)
- **Outflow orifice diameter:** 50 (mm)
- **Storage base length:** 9.76 (m)
- **Storage base width:** 3.25 (m)
- **Storage base area:** 31.74 (m²)
- **Storage total volume:** 82.7 (m³)
- **Storage total water volume:** 82.7 (m³)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m ³)	Max storage volume (m ³)
1	180	3	0.35	16.7	16.7
2	180	3.3	0.43	21.8	21.8
10	180	4.3	0.69	44	44
30	180	4.7	0.84	60.8	60.8
<u>100</u>	<u>180</u>	<u>5.2</u>	<u>1</u>	<u>82.7</u>	<u>82.7</u>
200	240	5.4	1.1	97.9	97.9

Disclaimer

This report was produced using the surface water storage volume design tool (2.0.0) 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 surface water storage volumes for the whole site based on a limiting discharge rate from the site. 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.

HR Wallingford are not responsible for any rainfall data shared that is subject to licensing terms imposed by UK Centre for Ecology & Hydrology's Flood Estimation Handbook web service (<https://fehweb.ceh.ac.uk/Home/Terms> (<https://fehweb.ceh.ac.uk/Home/Terms>)).