

FLOOD RISK ASSESSMENT

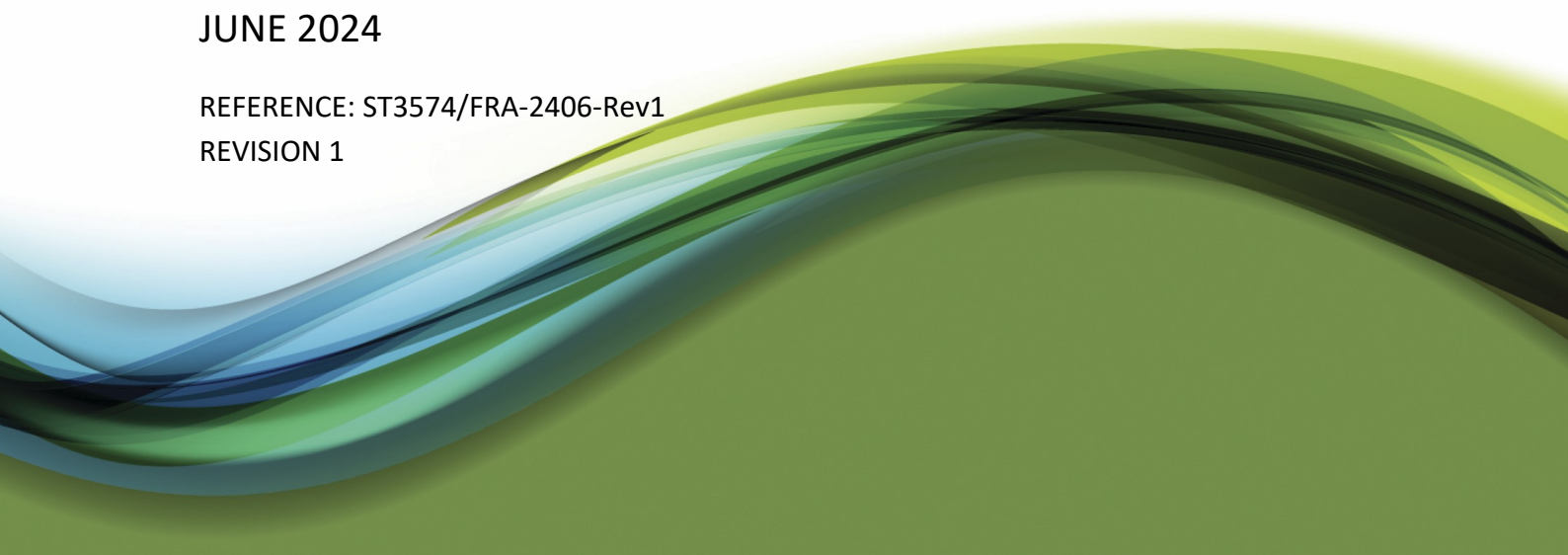
GRID REF: 518765E, 221028N

MILL BARN, WHITWELL,
HITCHIN, HERTFORDSHIRE, SG4 8AG

prepared for
TALMI/WALDEN VENTURES

JUNE 2024

REFERENCE: ST3574/FRA-2406-Rev1
REVISION 1



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<i>Revision</i>	<i>Author</i>	<i>Checked by</i>	<i>Issue Date</i>
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APPENDICES

- A Site Location Plan
- B Development Proposals
- C Topographical Survey
- D Greenfield Runoff Rate Calculation

1. Introduction

- 1.1.1 Stomor Ltd have been commissioned by Talmi/Walden Ventures Limited to prepare a Flood Risk Assessment (FRA) associated with proposed development at Mill Barn, Whitwell, Hitchin, Hertfordshire, SG4 8AG. A Site Location Plan is provided in **Appendix A**.
- 1.1.2 The application site currently comprises a barn surrounded by fenced off grassland with some trees, with a total area of 970m².
- 1.1.3 Development proposals comprise of the change of use of the existing barn to a dwelling with an extension to the south, as shown in **Appendix B**.

1.2. Policy Context

- 1.2.1. The FRA has been prepared in accordance with relevant national, regional, and local planning policy and guidance on flooding as follows:

- The National Planning Policy Framework (NPPF) published by Department for Communities and Local Government (DCLG), and the accompanying National Planning Practice Guidance (NPPG).
- Department for Environment, Food and Rural Affairs (DEFRA) and The Environment Agency (EA) published Guidance for Planning Applications: Assessing Flood Risk (March 2014, updated February 2017).
- The EA Flood Risk Standing Advice (FRSA) version 3.1 (April 2012, updated February 2022).
- North Hertfordshire Local Plan 2011-2031 (November 2022).
- North Hertfordshire District Council Strategic Flood Risk Assessment (SFRA) (July 2008).
- North Hertfordshire District Council Strategic Flood Risk Assessment Update (2016).

- 1.2.2. Furthermore, the FRA follows the methodology prescribed in Construction Industry Research and Information Association (CIRIA) document C624: Development and Flood Risk (2004), Guidance for the Construction Industry.

1.3. Flood Risk Vulnerability and the NPPF Sequential Test

- 1.3.1. The Indicative Floodplain Map obtained from the UK government website is provided in Figure 1.1. This shows that the application site is partly located within Flood Zones 1 and 2; land with a low to medium risk of flooding. There is also a very small part of the northeast corner of the site in Flood Zone 3; land assessed to have a high probability of flooding.

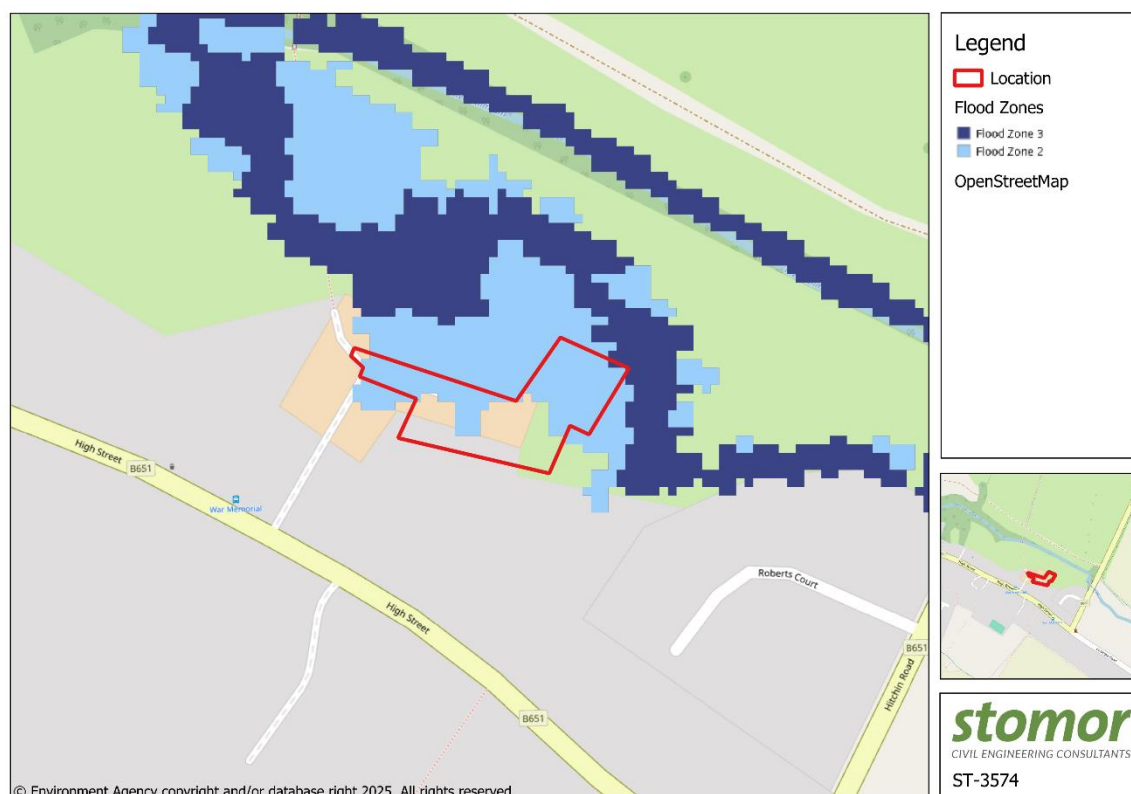


Figure 1.1 – UK Government Flood Map for Planning

1.3.2. The difference between Flood Zones 1, 2 and 3 are described in Table 1: Flood Zones from the Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government Flood Risk and Coastal Change guidance (updated August 2022), reproduced below:

Zone 1 Low Probability	Land assessed as having a less than 0.1% annual probability of river or sea flooding.
Zone 2 Medium Probability	Land assessed as having between a 1% and 0.1% annual probability of river flooding, or land having between a 0.5% and 0.1% annual probability of sea flooding.
Zone 3a High Probability	Land assessed as having a 1% or greater annual probability of river flooding, land having a 0.5% or greater annual probability of flooding from the sea.
Zone 3b The Functional Floodplain	Land where water from rivers or the sea has to flow or be stored in times of flood. Normally comprises land having a 3.3% or greater annual probability of flooding, or land designed to flood (such as a flood attenuation scheme).

1.3.3. The Flood Risk and Coastal Change Category (ID 7) of the NPPG and associated documents identifies that a Flood Risk Assessment is required areas at risk of flooding.

- 1.3.4. The Flood Risk and Coastal Change Category of the NPPG and associated documents identify that site-specific flood risk assessments should identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.
- 1.3.5. The development would have a NPPF flood risk vulnerability classification of More Vulnerable. In accordance with the 2024 NPPG guidance, the sequential test should be followed in areas at risk from any sources of flooding including access routes and areas of land raising. The site is shown to be at risk from fluvial flooding. Therefore, the sequential test may be required. The sequential approach has been applied on site by constructing the extension in Flood Zone 1 with a minor area of the barn conversion in Flood Zone 2.

2. Site Location & Surrounding Area

- 2.1.1. The application site comprises approximately 970m² of greenfield land.
- 2.1.2. The site is located to the east of Whitwell, with proposed access from the High Street. The site boundary is defined by residential properties to the north, east, south, and west. There is a culvert to the south, however, the material and pipe size were not confirmed by the topographical survey, a copy of which is provided in **Appendix C**.
- 2.1.3. Inspection of the topographical survey shows that the site is generally flat, with surveyed ground levels ranging from approximately 86.43mAOD – 86.72mAOD. Beyond the extent of the topographical survey, northeast of the site, 1m DTM LiDAR data was used to review levels, and this shows levels ranging between 85.98mAOD – 86.50mAOD.
- 2.1.4. According to the Department for Environment Food & Rural Affairs (DEFRA) Asset Management Map there is an open channel on the southern side of the development site. However, the topographical survey identifies this feature as a culvert and this is shown as a designated EA Main River. The Client, however, believes that water discharging into the culvert was diverted in the 1970s and the culvert is no longer operational.
- 2.1.5. The River Mimram is located 65m north of the site and is designated as an EA Main River.
- 2.1.6. Inspection of EA Catchment Data identifies that the site is located within the Lee Upper Operational Catchment, within the Thames River Basin District.
- 2.1.7. Inspection of the EA's Groundwater Source Protection Zone data shows that the site lies within Zone III - Groundwater Source Protection (Total Catchment). Therefore, there may be restrictions on the area discharging via infiltration methods.
- 2.1.8. EA maps identify that the site is within a Principal aquifer for the Bedrock Designation and Secondary (A) aquifer for the Superficial Drift Designation. Inspection of the Groundwater Vulnerability Map identifies that the site is within a Medium-High groundwater vulnerability area with soluble rock risk.

3. Site Background

- 3.1.1. The site currently comprises a barn with fenced off grassland and with a number of trees.
- 3.1.2. A Level 1 Strategic Flood Risk Assessment (SFRA) for the area was prepared by WSP, on behalf of North Hertfordshire District Council, in July 2008. There was an update produced by North Hertfordshire District Council to the SFRA in 2016. The SFRA is used as a desk-based study to map all forms of flood risk to provide an evidence base to locate new development primarily within low-risk areas. The information allows the planning authority to identify the level of detail required for site-specific Flood Risk Assessments.
- 3.1.3. Inspection of the British Geological Survey (BGS) website identifies that the site overlies bedrock composed of Holywell Nodular Chalk Formation and New Pit Chalk Formation (chalk) with superficial deposits of Alluvium (clay, silt, sand and gravel). In addition, inspection of the Soilscales website indicates that the site lies in a region with freely draining soil. Ground conditions and the underlying groundwater table should be confirmed by a geotechnical investigation.

4. Existing Drainage

4.1. Surface Water Drainage

4.1.1. The site is contained by fencing and a wall with little information relating to how the existing bard is drained. Therefore, it is assumed surface water landing within the site boundary currently percolates into the ground. The building to the north of the site appears to discharge into a combined drainage system discharging towards the northwestern corner of the property.

4.1.2. Greenfield runoff rates have been calculated based upon the IH124 Method, for a development area of 0.097 ha. Geotechnical information from the WRAP map of the Wallingford Procedure indicates that the underlying soil conditions would reflect Winter Rain Acceptance Potential (WRAP) Soil Class 1, which gives flow rates as follows:

Greenfield Runoff (l/s)		
1 in 1 year	Q1	0.85 l/s
1 in 30 years	Q30	2.3 l/s
1 in 100 years	Q100	3.19 l/s

4.1.3. The greenfield runoff calculation sheets are provided in **Appendix D**.

4.2. Foul Drainage

4.2.1. Although the site is greenfield, there is existing combined sewer infrastructure within the overall property boundary identified on the topographical survey. It is unclear where this combined system currently discharges, although the outfall is directed towards the north west corner of the property, possibly discharging to a treatment plant.

5. Proposed Development

- 5.1.1. Development proposals comprise of the change of use of the existing barn to a dwelling with an extension to the south.

6. Potential Sources of Flooding

6.1. Flooding from Rivers or Sea

- 6.1.1. The EA Indicative Floodplain Map (Figure 1.1) identifies that the site is located partly within Flood Zones 1 and 2; land with a low to medium probability of flooding. There is also a very small part of the northeast corner of the site in Flood Zone 3; land assessed to have a high probability of flooding.
- 6.1.2. Historical fluvial flooding has been recorded within Whitwell. According to the 2008 SFRA, historical fluvial flooding has occurred in 1947 due to heavy rainfall and snow melt affecting the River Mimram and 1996 from out of bank flows from the River Mimram. It is unclear whether the site was affected by these events. There was flooding in 2014 in the village, however, this appeared to affect the area associated with the west of Whitwell.
- 6.1.3. The EA have provided 2D node levels from the hydraulic model Mimram, produced by Mott MacDonald in 2019.
- 6.1.4. The site is classified as 'More Vulnerable' and is located in Flood Zone 2, therefore, the 'central allowance' applies. The site is located within the 'Upper Lee Management Catchment peak river flow allowances' which equates to an increase of 10% of flows during the 2080s.
- 6.1.5. During the present day 1% AEP, the majority of the site is shown to remain dry and outside the extent of flooding, as shown in Figure 7.1. The very north of the site is shown to flood to depths of 0.13m however, no development is taking place in this area.

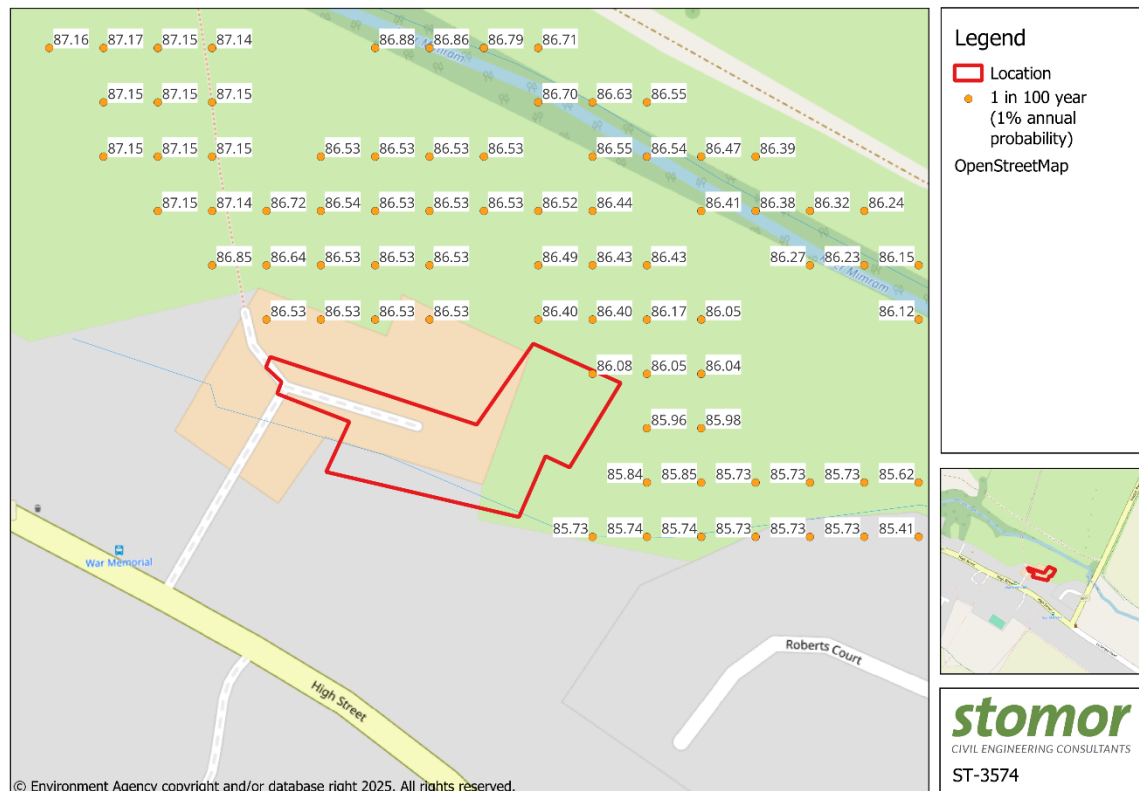


Figure 7.1 – 1% AEP 2D Node Map

6.1.6. The majority of the site is shown to remain dry during the 1% AEP + 10% climate change event. The 2D model levels do extend to the centre of the site access, with a level of 86.33mAOD. However, when compared to the topographical survey, the lowest point in this area has a level of 86.29mAOD. On this basis, minor flooding up to 40mm could occur in this specific location during the 1% AEP + 10% climate change event. The area to the northeast is shown to flood to 86.40mAOD and LiDAR data shows levels in this area of 86.30mAOD, consequently, there is a possibility of 100mm of flooding however, no development is taking place in this area. The access road has a lower level of 86.27mAOD therefore, when compared to the flood level of 86.36mAOD, it could flood to depths of 90mm. The majority of site levels are above 86.33mAOD and the site is defended by higher ground surrounding the site boundary.

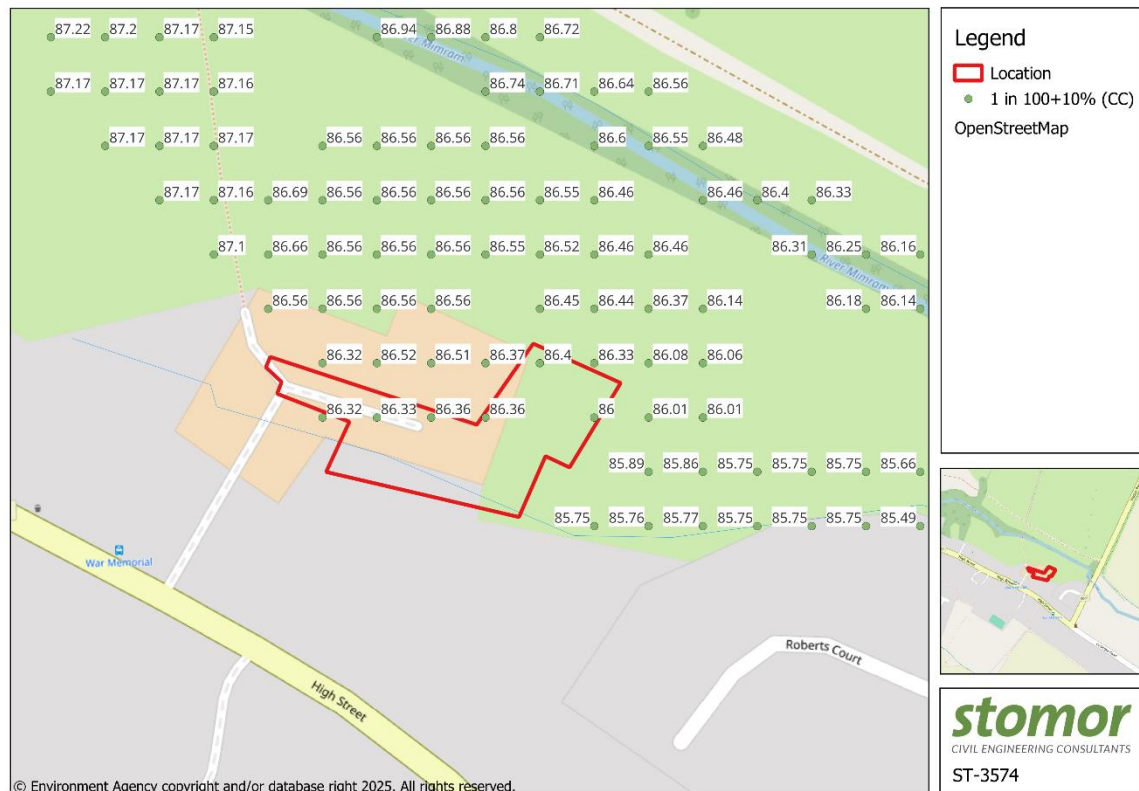


Figure 7.2 – 1% AEP + 10% Climate Change 2D Node Map

6.1.7. Floodplain compensation is not required as the area for development is shown to remain dry during the 1% AEP plus climate change event (Figure 7.2).

6.1.8. The site access could potentially flood to a depth of 90mm during the 1% AEP + 10% climate change event. According to the FD2320 Table 13.1 safe access/egress is achievable at this depth for all up to a velocity of 1.50m/s.

6.1.9. In line with the EA standing advice, Finished Floor Levels (FFL) should be set 300mm above the 1% AEP + climate change level. The nearest 2D node to the site has a level of 86.36mAOD, therefore, FFLs should be raised to a minimum of 86.63mAOD to meet EA standing advice requirements.

6.1.10. Flood resistance/resilience measures are not required, as the finished floor level of the building will be 300mm above the 1% AEP + 10% climate change level.

6.1.11. The site is located within the River Mimram in Hertfordshire flood warning area. Residents should sign up to receive flood warnings on the following website or by calling Floodline on: 0345 988 1188.

- <https://www.fws.environment-agency.gov.uk/app/olr/register>

6.1.12. Based upon the above information, it is considered that the site is at low risk of flooding from fluvial sources.

6.2. Flooding from Land (Surface Water)

6.2.1. Flooding from land occurs when intense rainfall is unable to soak into the ground or enter drainage systems. Local topography and built form can have a strong influence on the direction and depth of flow.

6.2.2. The EA indicative surface water flood map, including an allowance for climate change (Figure 7.3), identifies that the majority of the site is at a very low risk from surface water flooding. There is an area of high risk to the west along the access road. High risk means that this area has a chance of flooding during the 3.33% AEP. This appears from the topographical survey to be due to a low point on site.

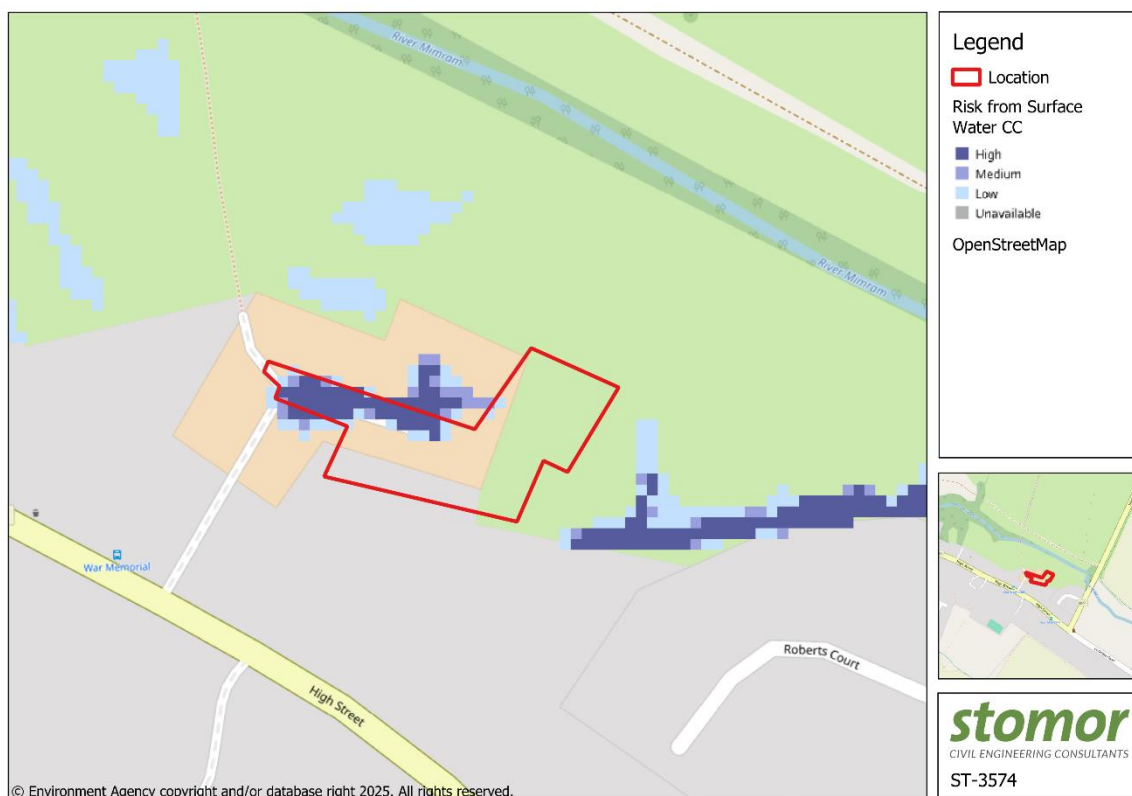


Figure 7.3 – EA Surface Water Flood Map (including climate change)

6.2.3. Overland flow routes will be taken into consideration in the design levels for the proposed development to direct overland flows away from buildings, towards the proposed SuDS features in the lower part of the site.

6.2.4. There is a low risk of surface water flooding to a depth of 0.2m during the climate change event along the access road, however the majority of the site is shown not to flood.

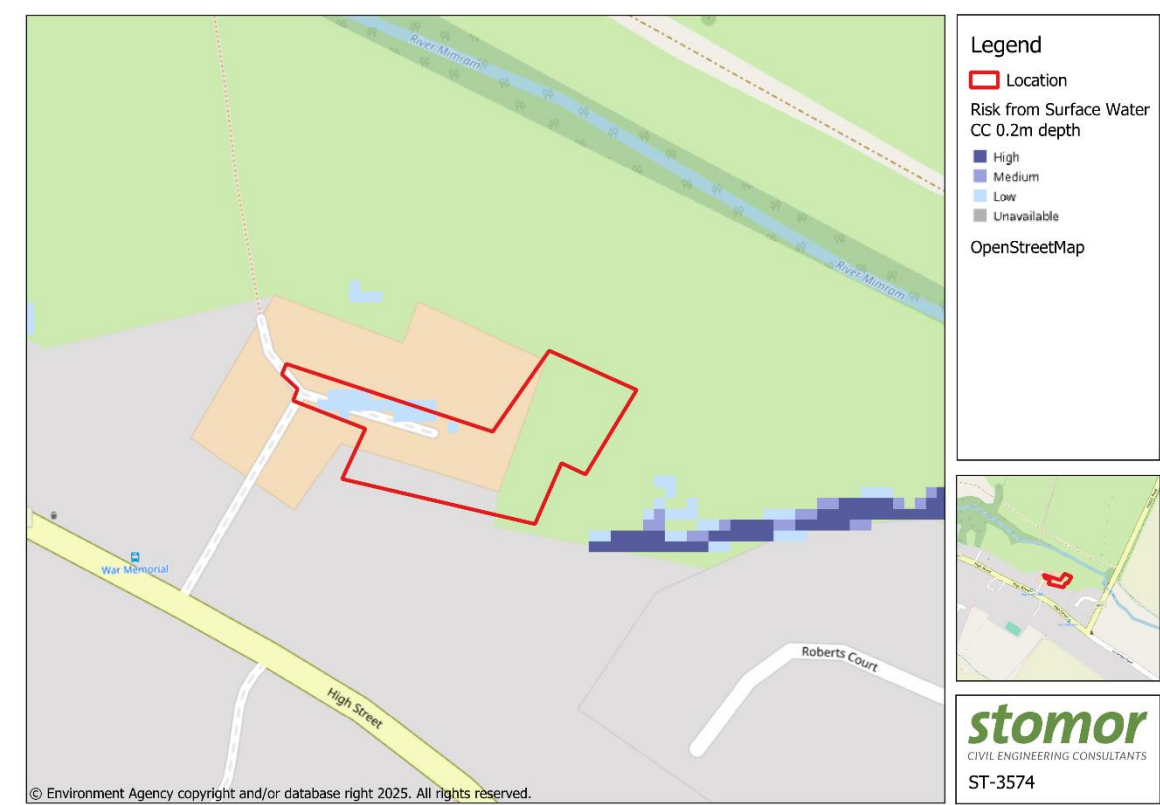


Figure 7.4 – EA Surface Water Flood Map Risk at 0.2m Depth

6.2.5. Assuming a flood depth of 200mm, safe access can be achieved for all up to a velocity of 1m/s (Figure 7.5). There is danger for some up to a velocity of 3m/s suggesting that the general public and emergency services can still safely access the site.

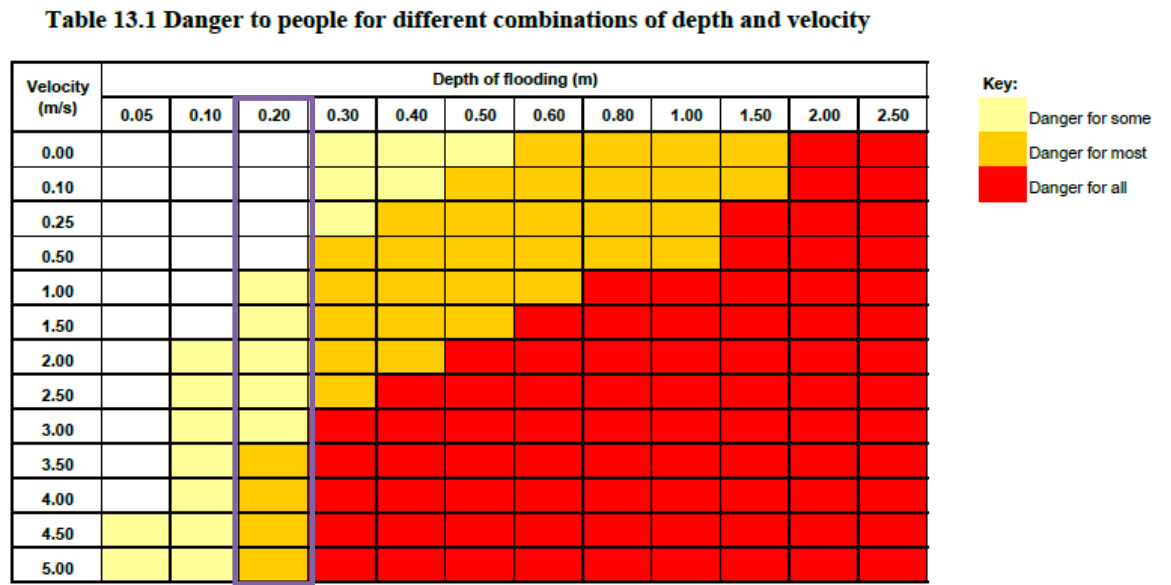


Figure 7.5 – DEFRA/EA R&D Technical Report FD2320/TR2 Table 13.1

6.3. Flooding from Groundwater

- 6.3.1. Groundwater flooding occurs when water levels in the ground rise above surface elevations. Groundwater flooding events are most likely to occur in low lying areas underlain by permeable rocks (aquifers).
- 6.3.2. The SFRA does not identify historical groundwater flooding.
- 6.3.3. The Hertfordshire County Council Flood Risk Management Viewer identifies that the 1km grid area that the site lies within is at a lower than 25% annual susceptibility of groundwater flooding.
- 6.3.4. Overland flow routes will be taken into account in the design of levels for the proposed development to direct overland flows away from buildings.

6.4. Flooding from Sewers

- 6.4.1. The 2008 SFRA identifies that there is no evidence of historic sewer flooding along the High Street in Whitwell.
- 6.4.2. The development layout will be designed with consideration of flood routing, to ensure that new buildings and occupants of the site will not be subject to detrimental impacts in the event of flooding from infrastructure failure within or upstream of the site.

6.5. Flooding from Reservoirs, Canals and Other Artificial Sources

- 6.5.1. Inspection of the EA flood maps (Figure 7.6) confirm the site is not at risk of flooding from reservoirs.
- 6.5.2. The Canal and Rivers Trust show there are no canals within 10 miles of the site.

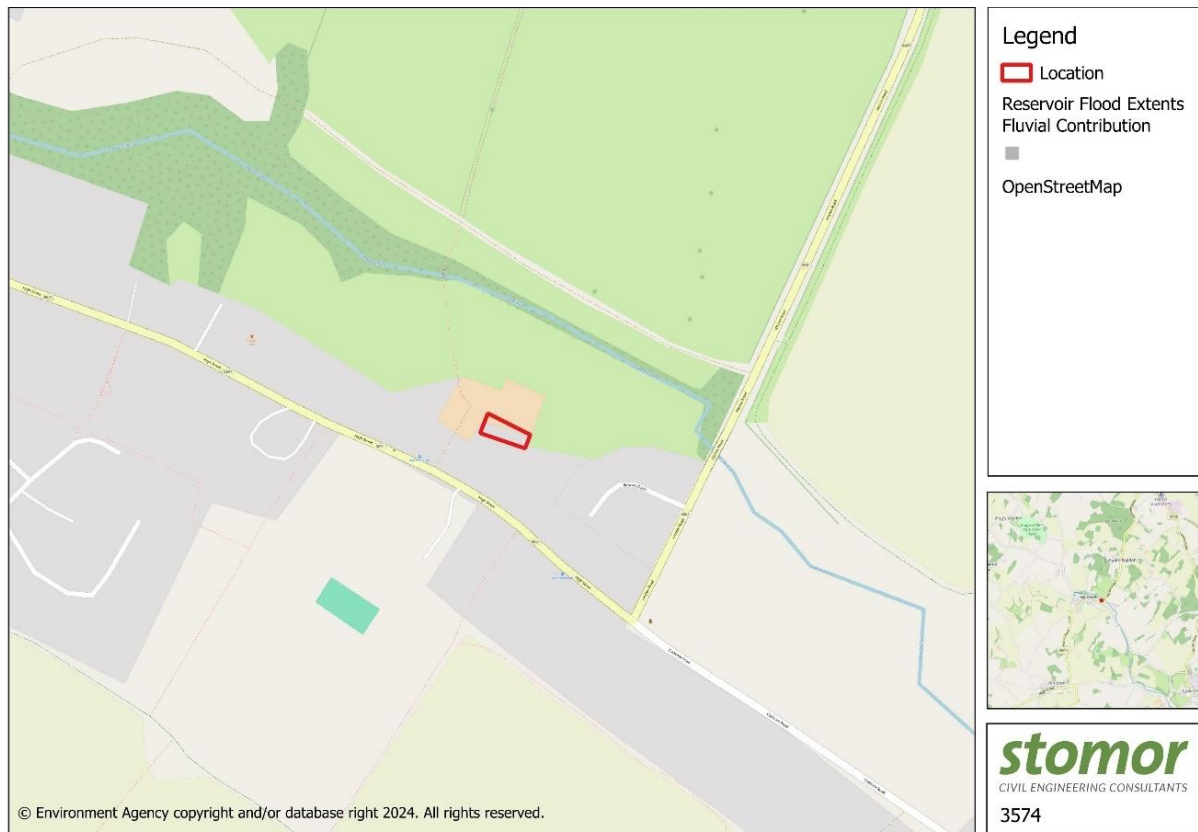


Figure 7.6 – Reservoirs Flood Extents with Fluvial Contribution

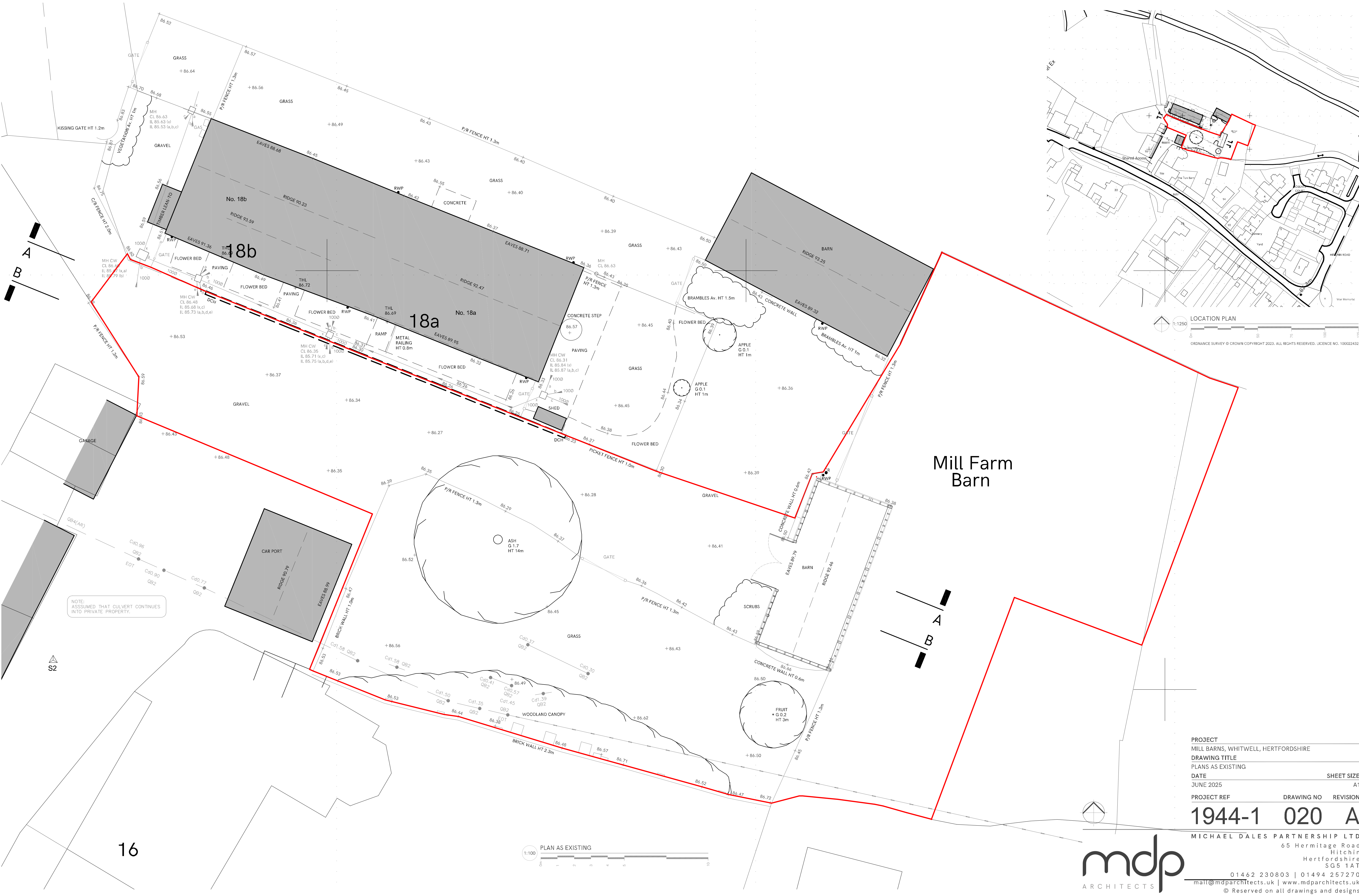
6.5.3. No other non-natural or artificial sources of flooding, where water is retained above natural ground level, operational and redundant industrial processes including mining, quarrying and sand and gravel extraction, would appear to be located in the vicinity of the site which may cause increased floodwater depths or velocities.

7. Summary and Recommendations

- 7.1.1. Stomor Ltd. has been commissioned by Talmi/Walden Ventures Limited to prepare a Flood Risk Assessment (FRA) to support proposed residential development on part of the site at Mill Barn, Whitwell, Hitchin, SG4 8AG.
- 7.1.2. The application site is predominantly greenfield, with a total area of 970m².
- 7.1.3. Development proposals comprise the conversion and extension of the existing barn to provide of 1No. two-bedroom residential dwelling.
- 7.1.4. The sequential approach has been applied on site by constructing the extension in Flood Zone 1 with a minor area of the barn conversion in Flood Zone 2.
- 7.1.5. The River Mimram is located 65m north of the site and is designated as an EA Main River, with a culvert within the site boundary which is also classed as Main River.
- 7.1.6. As the proposed building is technically within 8m of a Main River, a Flood Risk Activity Permit may be required.
- 7.1.7. It has been identified that the proposed development will be at low risk of flooding from fluvial sources due to ground levels surrounding the site, which would act as a defence to any flood flows. Finished floor levels should be set to a minimum of 86.63mAOD, which is 300mm above the nearest 1% AEP + climate change level, in accordance with NPPF guidance, with safe access and egress routes to the property.
- 7.1.8. Residents should sign up to receive flood warnings.
- 7.1.9. The site is considered to be at low risk of flooding from groundwater flooding and low risk of reservoir flooding, based upon HCC flood risk mapping. The majority of the site is also at low risk from surface water flooding. However, geotechnical investigations are recommended to identify groundwater levels and review site-specific risk of potential groundwater flooding.



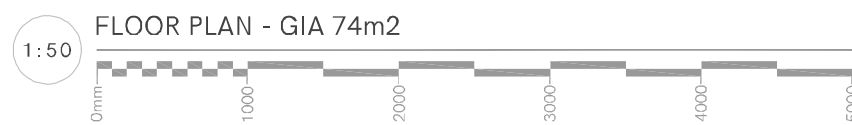
NOTES
Refer to figured dimensions only- do not scale from this drawing.
All dimensions are to be checked on site and any discrepancies raised with the Architect.



PROJECT
MILL BARN, WHITWELL, HERTFORDSHIRE
DRAWING TITLE
PLANS AS EXISTING
DATE
JUNE 2025
PROJECT REF
1944-1
DRAWING NO
020
REVISION
A
SHEET SIZE
A1
MICHAEL DALES PARTNERSHIP LTD
65 Hermitage Road
Hitchin
Hertfordshire
SG5 1AT
01462 230803 | 01494 257270
mail@mdparchitects.uk | www.mdparchitects.uk
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PROJECT	
MILL BARNS, WHITWELL, HERTFORDSHIRE	
DRAWING TITLE	
PLANS AS PROPOSED	
DATE	SHEET SIZE
JUNE 2025	A

PROJECT REF	DRAWING NO	REVISIO
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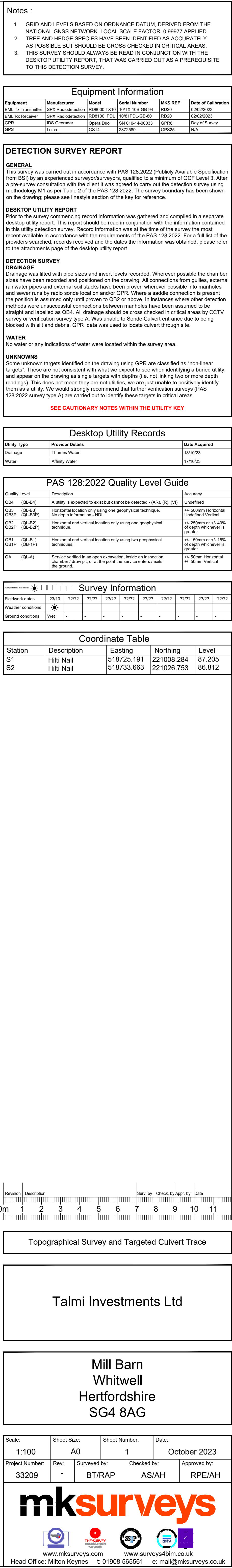
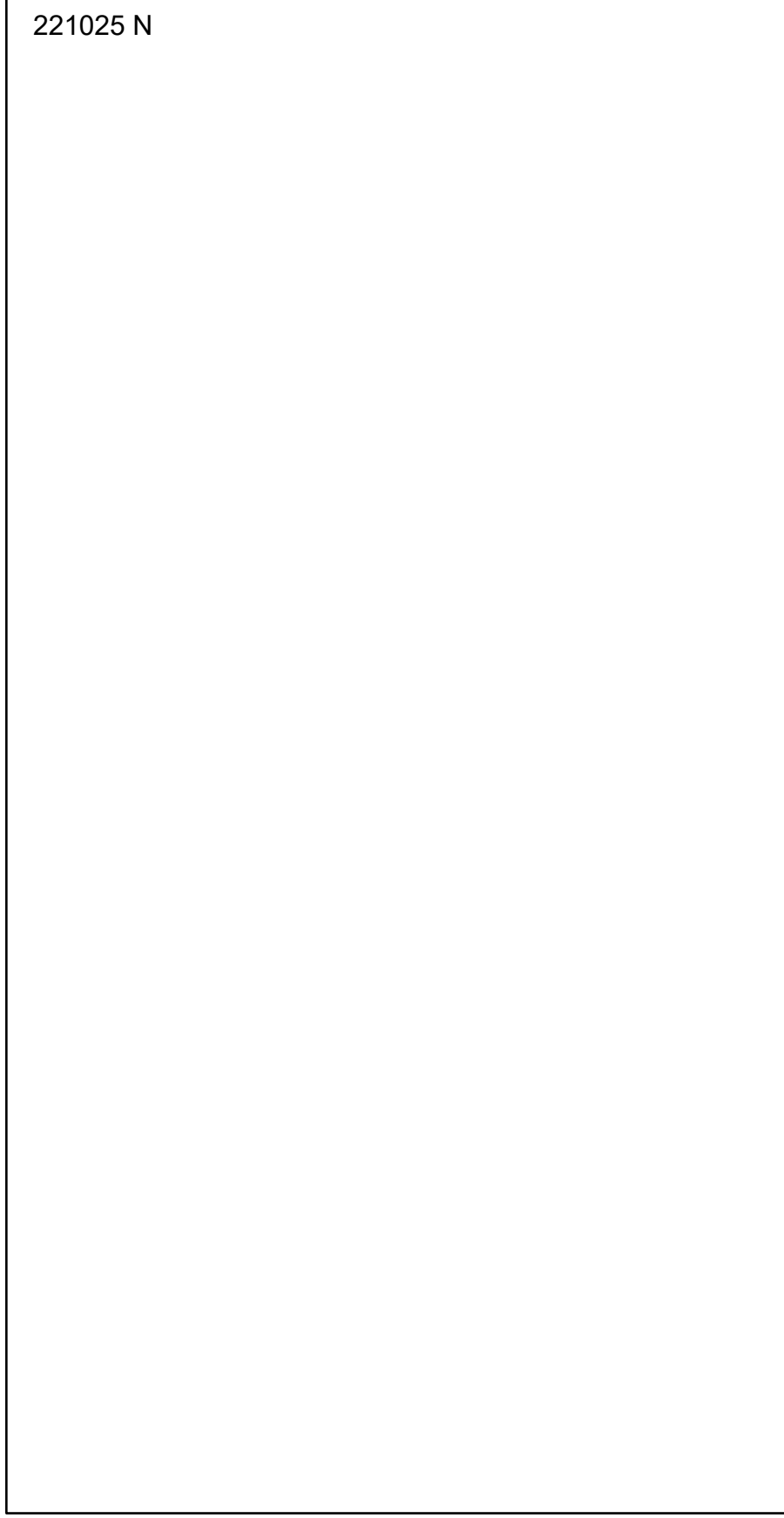
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MICHAEL DALES PARTNERSHIP LT
65 Hermitage Roa
Hitchi
Hertfordshir
SG5 1A

01462 230803 | 01494 25727
mail@mdparchitects.uk | www.mdparchitects.uk
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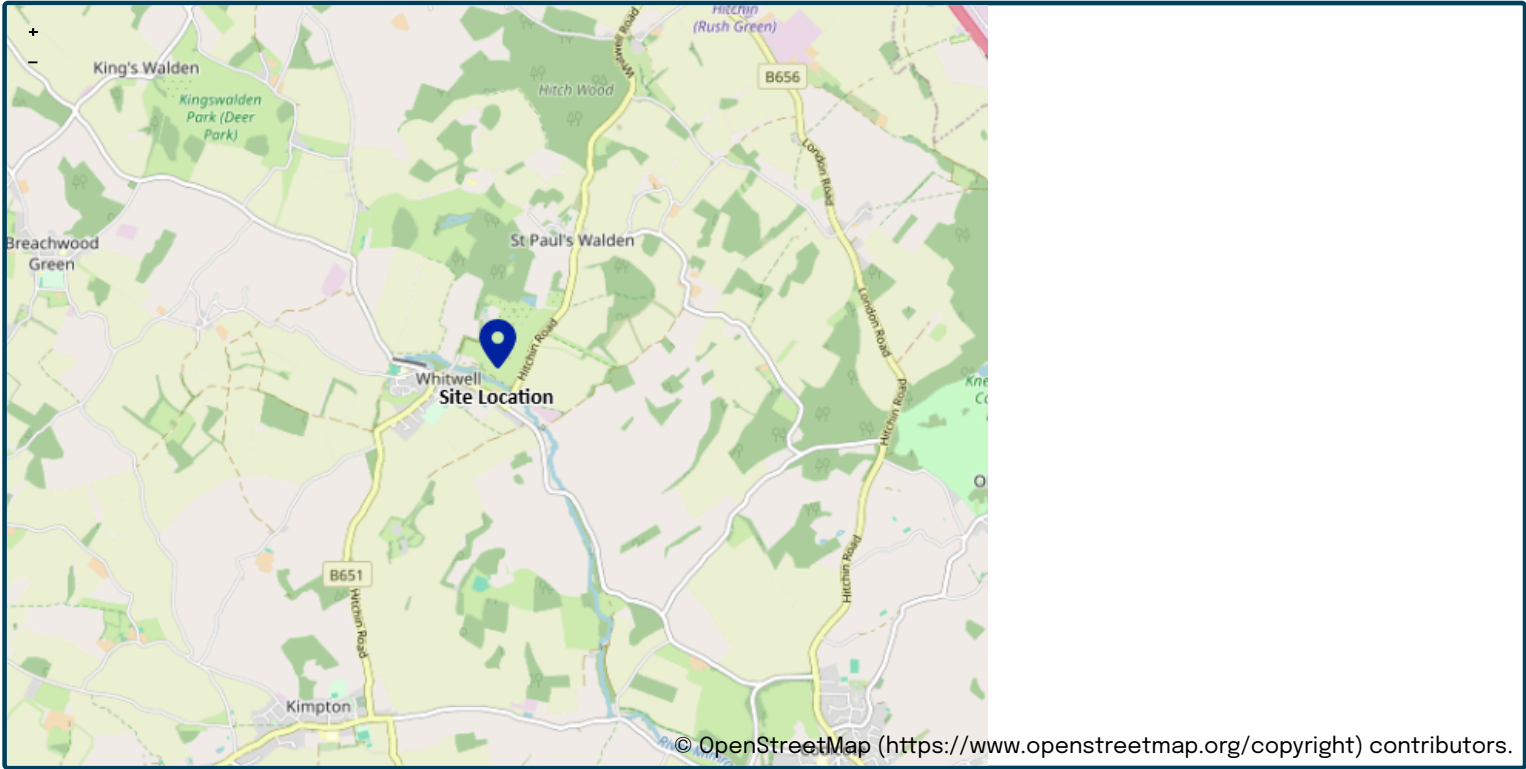
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	15/08/2025
Calculated by	FG
Reference	ST-3574
Model version	2.1.2

Location

Site name	ST-3574
Site location	Mill Barn



Site easting (British National Grid)	518767
Site northing (British National Grid)	221048

Site details

Total site area (ha)	0.097	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)	651	mm	651
How should SPR be derived?	WRAP soil type		
WRAP soil type	1		1
SPR	0.1		
QBar (IH124) (l/s)	0.01	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)	0.01	l/s
Flow rate 2 year (l/s)	0.01	l/s
Flow rate 10 years (l/s)	0.02	l/s
Flow rate 30 years (l/s)	0.03	l/s
Flow rate 100 years (l/s)	0.05	l/s
Flow rate 200 years (l/s)	0.1	l/s

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

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.1.2) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<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.



Suite 2 First Floor
Portmill House
Portmill Lane
Hitchin
Hertfordshire SG5 1DJ

01462 615433
info@stomor.com
www.stomor.com