



Huntingdonshire Level 2 Strategic Flood Risk Assessment Site Summary

Site CfS23:24309

Final Report

Prepared for
Huntingdonshire District
Council

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Prepared by	Kira Khangura Technical Assistant
Reviewed by	Mike Williamson BSc MSc CGeog FRGS EADA Principal Analyst
Authorised by	Paul Eccleston BA CertWEM CEnv MCIWEM C.WEM Technical Director

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Contract

JBA Project Manager	Mike Williamson
Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2022s1322

This report describes work commissioned by Huntingdonshire District Council by an instruction via email dated 21 July 2025. The Client's representative for the contract was Frances Schulz of Huntingdonshire District Council. Kira Khangura of JBA Consulting carried out this work.

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The methodology adopted and the sources of information used by JBA in providing its services are outlined in this Report. The work described in this Report was undertaken between 21 July 2025 and 6 November 2025 and is based on the conditions encountered and the information available during the said period. The scope of this Report and the services are accordingly factually limited by these circumstances.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate.

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for Local Plan Site CfS23:24309. The content of this report assumes the reader has already consulted the 'HDC Level 1 SFRA' (2024) and read the 'HDC Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

1.1 Site CfS23:24309

- Location: Land North West of Needingworth, South of Station Road
- Existing site use: Agricultural
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Residential
- Proposed site use vulnerability: More vulnerable
- Site area (ha): 24
- Watercourse: Heath Drain main river and unnamed ordinary watercourses
- Environment Agency (EA) model: Lower Ouse - Non Main Rivers 2015 (St Ives)
- Summary of requirements from Level 2 SFRA scoping stage:
 - Subject to the Exception Test as more vulnerable development proposed in Flood Zone 3a
 - Assessment of fluvial flood depths, velocities and hazards
 - Assessment of surface water flood extent, depths and hazards
 - Assessment of all other sources of flood risk

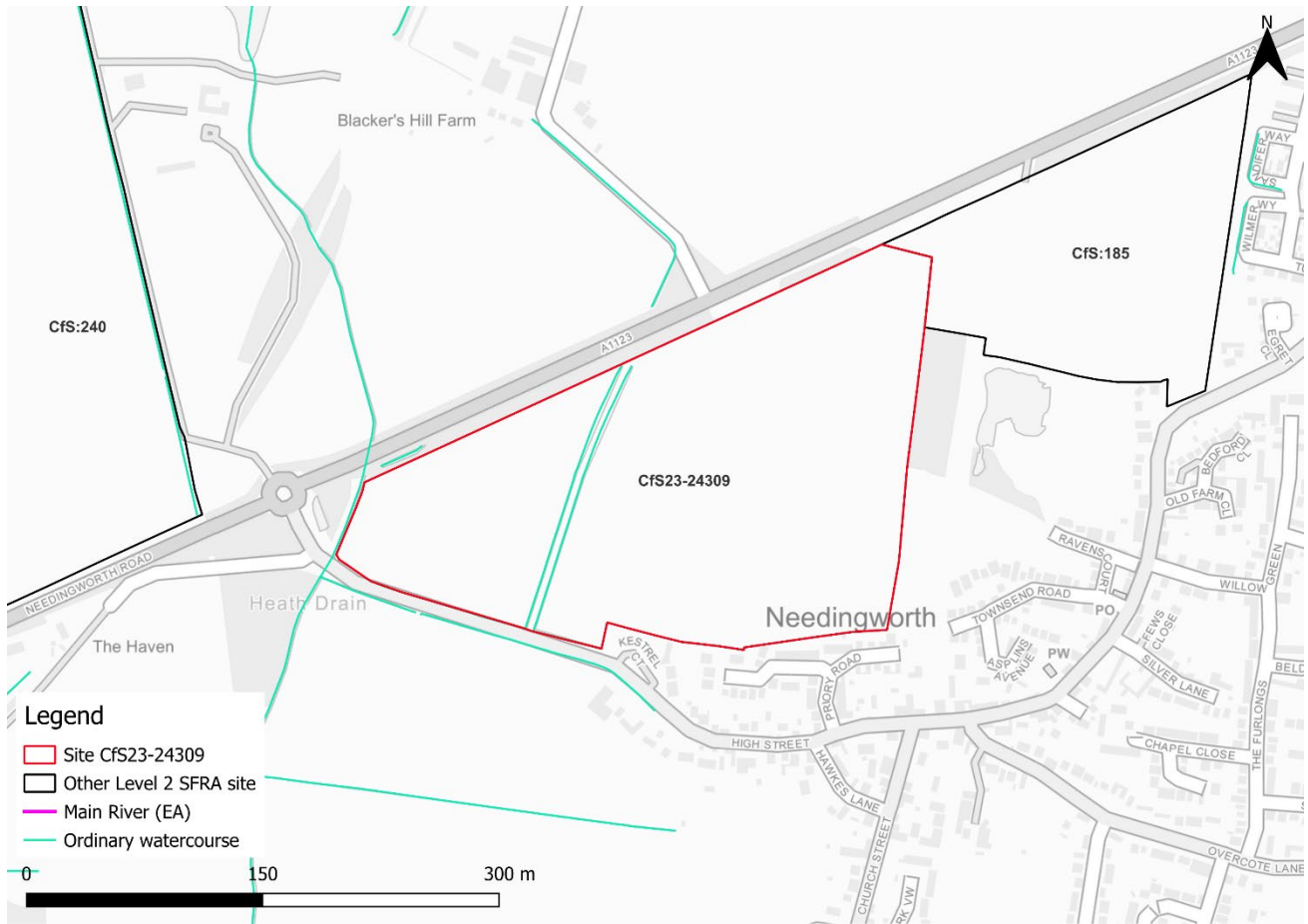


Figure 1-1: Existing site location boundary



Figure 1-2: Aerial photography

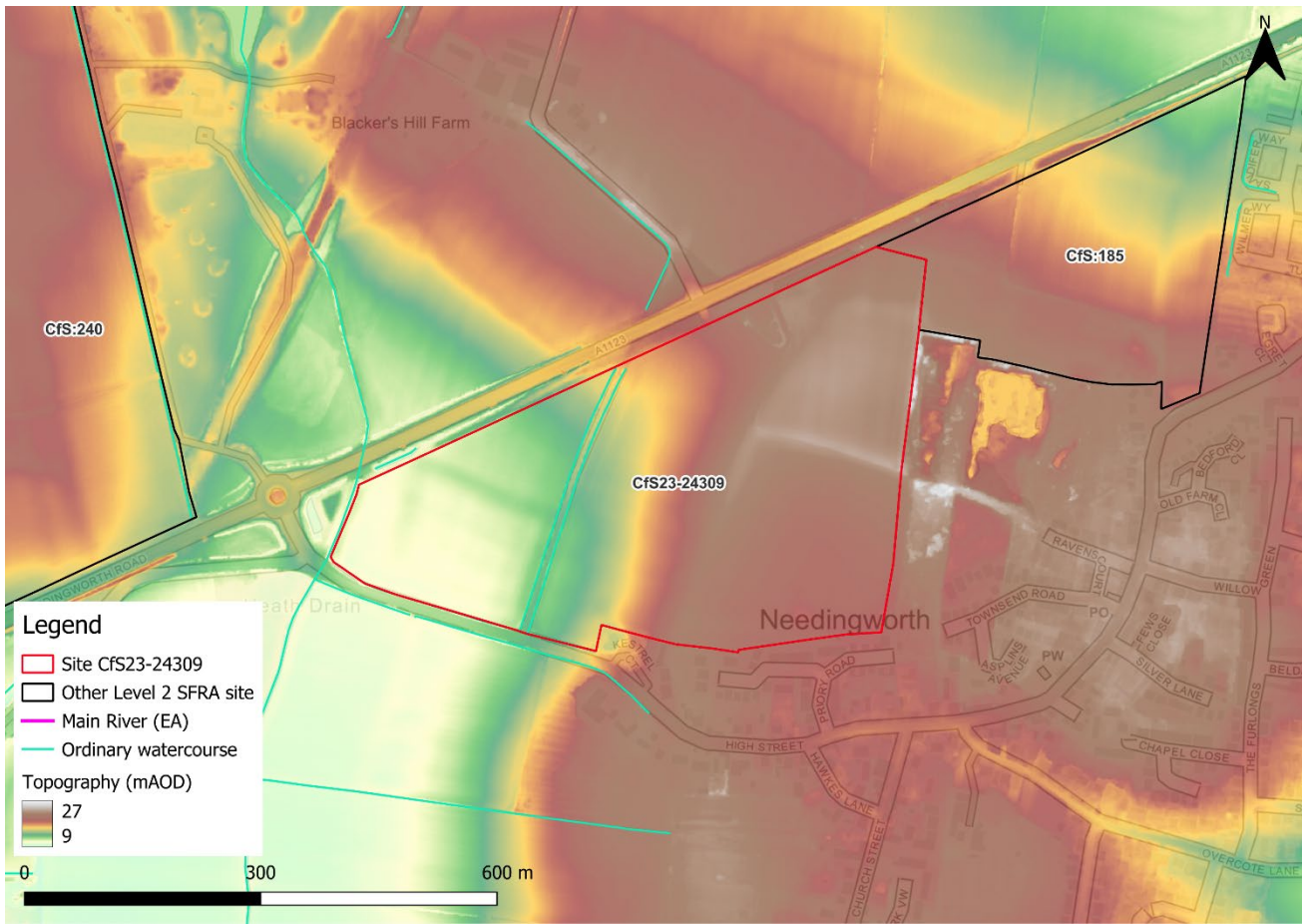


Figure 1-3: Topography

2 Flood risk from rivers and sea

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

Based on the EA's Flood Map for Planning (accessed July 2025) and Flood Zone 3b (functional floodplain), as updated in this Level 2 SFRA, the percentage areas of the site within each flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. This version of the Flood Map for Planning does not consider flood defence infrastructure (Section 2.2) or the impacts of climate change (Section 2.3).

The majority of the site is within Flood Zone 1, indicating that this area is at low risk of flooding from rivers and the sea. In the southwestern corner, 9% of the site is within Flood Zone 2 and 3% is within Flood Zone 3a. The source of the risk is fluvial from the Heath Drain watercourse and the ordinary watercourse tributaries. The flood zones of the Flood Map for Planning are different to the equivalent modelled events. It is likely that the flood zones in this location are based on the EA's New National Model for which flood depths and hazards are unavailable.

Table 2-1: Existing flood risk based on percentage area of site at risk

Flood Zone 1 (% area)	Flood Zone 2 (% area)	Flood Zone 3a (% area)	Flood Zone 3b (% area)
88	9	3	0

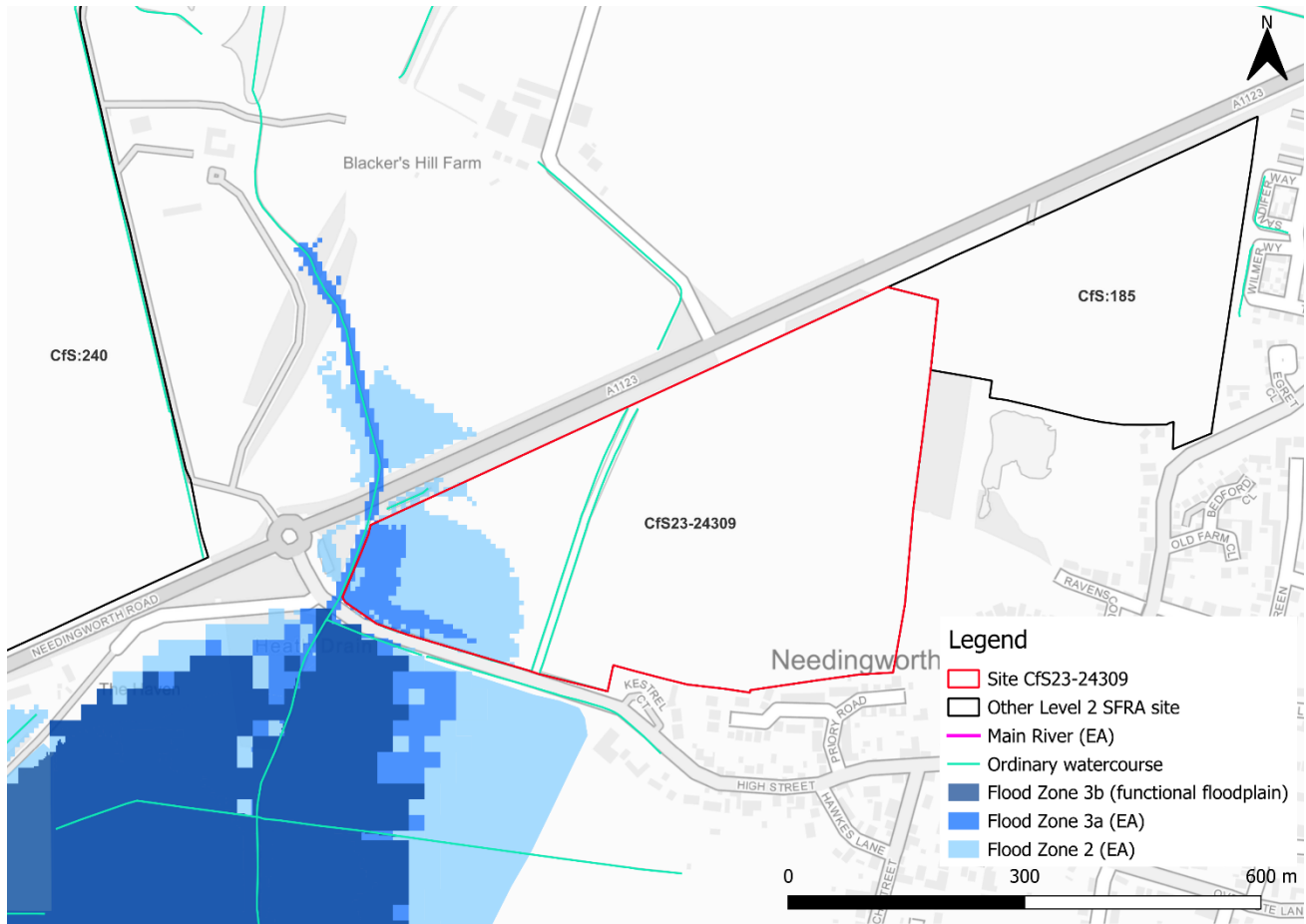


Figure 2-1: Existing risk

2.1.2 Fluvial undefended model outputs (Non Main Rivers, St Ives)

Figure 2-2, Figure 2-3 and Figure 2-4 show the modelled flood depths, velocities and hazards for the 1% AEP undefended event respectively.

Modelling of the 1% AEP undefended event shows risk is confined to the southwestern corner of the site, with shallow depths predominately at either less than 0.15 metres or between 0.15-0.3m. Flood velocity is confined to the same southwestern corner and is less than 0.3m³/s. Hazard is categorised as 'Danger for some' in a small area along the boundary in the southwestern corner. The centre and east of the site is not modelled to be at risk in the 1% AEP undefended event.

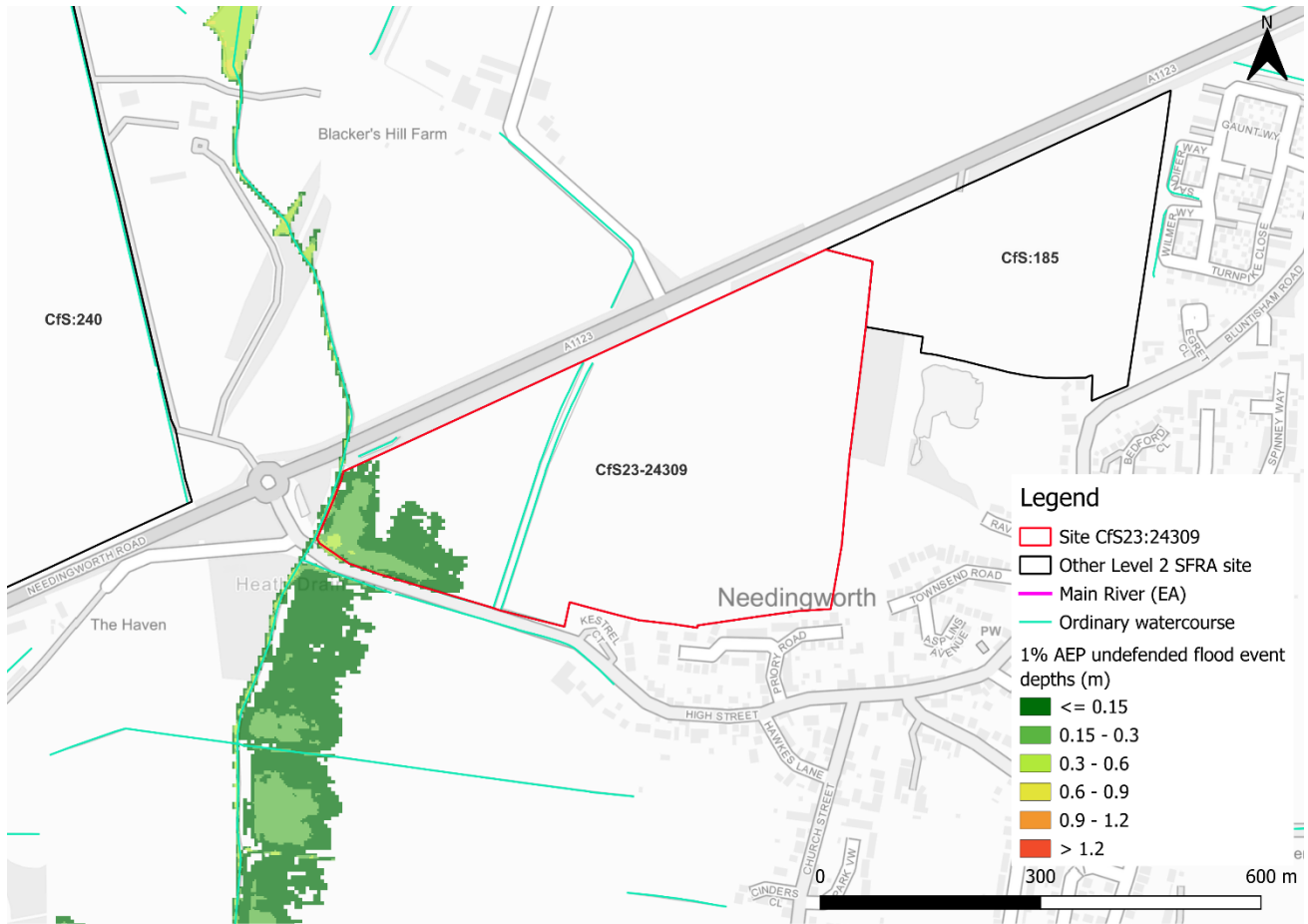


Figure 2-2: Flood depths for 1% AEP undefended flood event

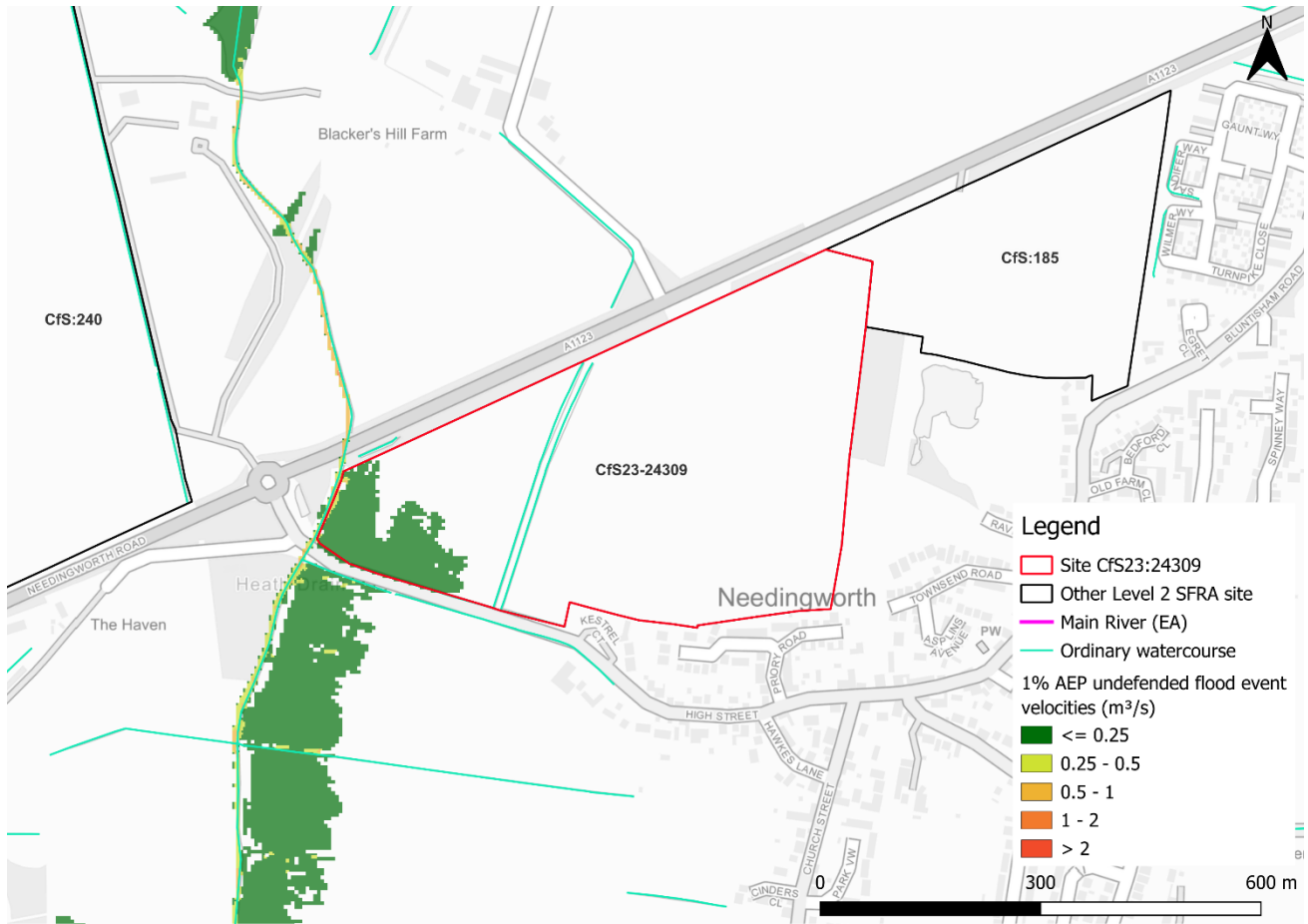


Figure 2-3: Flood velocities for 1% AEP undefended flood event

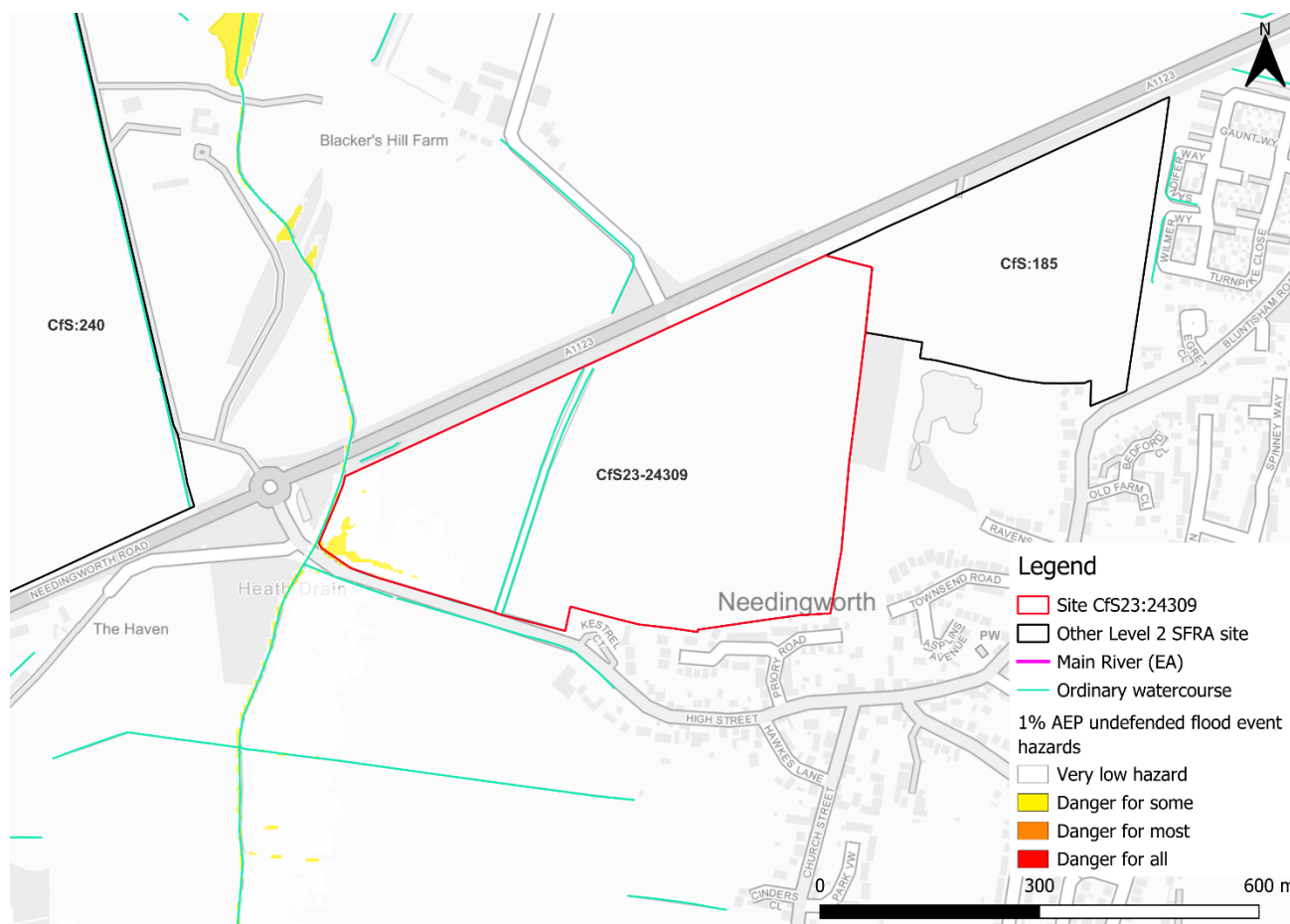


Figure 2-4: Flood hazard¹ for 1% AEP undefended flood event

2.2 Flood risk management

2.2.1 Flood defences

There are no engineered flood defences within the vicinity of the site that are likely to impact fluvial flood risk.

2.2.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. These areas are shown in 2-2. Note, the WwNP mapping is broadscale and indicative, therefore further investigation will be required for any land shown to have potential for WwNP. In the west of the site, there is potential for woodland tree planting to intercept, slow, store and filter water. Along the unnamed watercourse, there is potential for riparian tree planting to attenuate flooding.

¹ Fluvial hazard ratings based on Table 4 of the SUPPLEMENTARY NOTE ON FLOOD HAZARD RATINGS AND THRESHOLDS FOR DEVELOPMENT PLANNING AND CONTROL PURPOSE – Clarification of the Table 13.1 of FD2320/TR2 and Figure 3.2 of FD2321/TR1. May 2008.

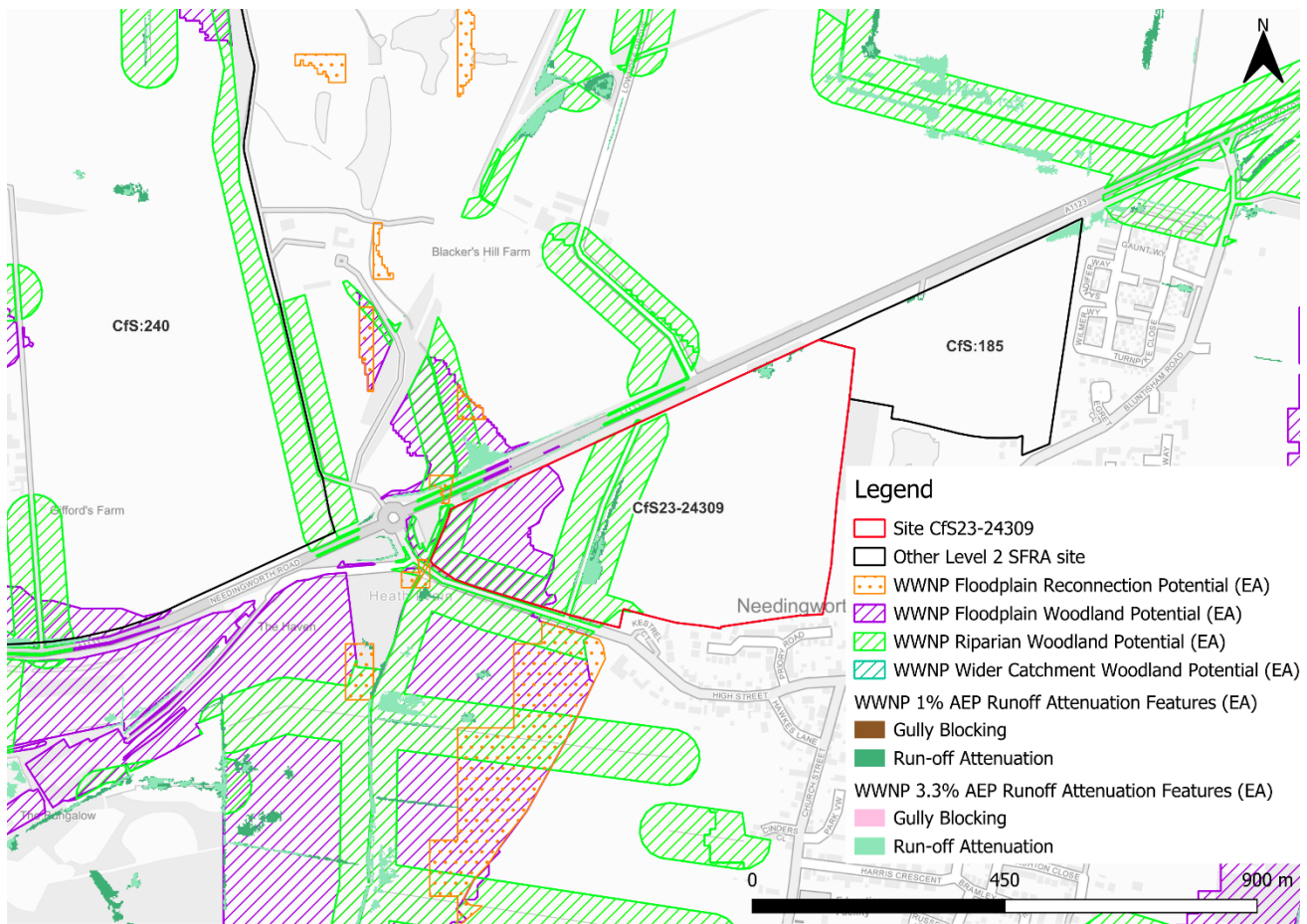


Figure 2-5: Natural Flood Management (NFM) potential mapping

2.3 Impacts from climate change

2.3.1 Fluvial

The EA's SFRA guidance states that SFRAs should assess the central allowance for less, more, highly vulnerable, and water compatible development. The higher central allowance should be assessed for essential infrastructure.

The impacts of climate change on flood risk from Heath Drain have been modelled with and without flood defence infrastructure in place, where applicable.

With consideration of the EA's SFRA guidance, the latest central and higher central climate change allowances have been modelled as shown in Table 2-2.

Table 2-2: Modelled climate change allowances for peak river flows for the Upper and Bedford Ouse management catchment

Return period (AEP event)	Central allowance 2080s (% increase)	Higher central allowance 2080s (% increase)
2% used as proxy for 3.3% which is not available	19	30
1%	19	30
0.1%	19	30

Figure 2-6, Figure 2-7 and Figure 2-8, show the modelled flood depths, velocities and hazards for the 1% AEP undefended event plus the central climate change allowance (+19%) respectively. Risk is modelled to increase slightly in extent for the modelled flood depths, velocities and hazards.

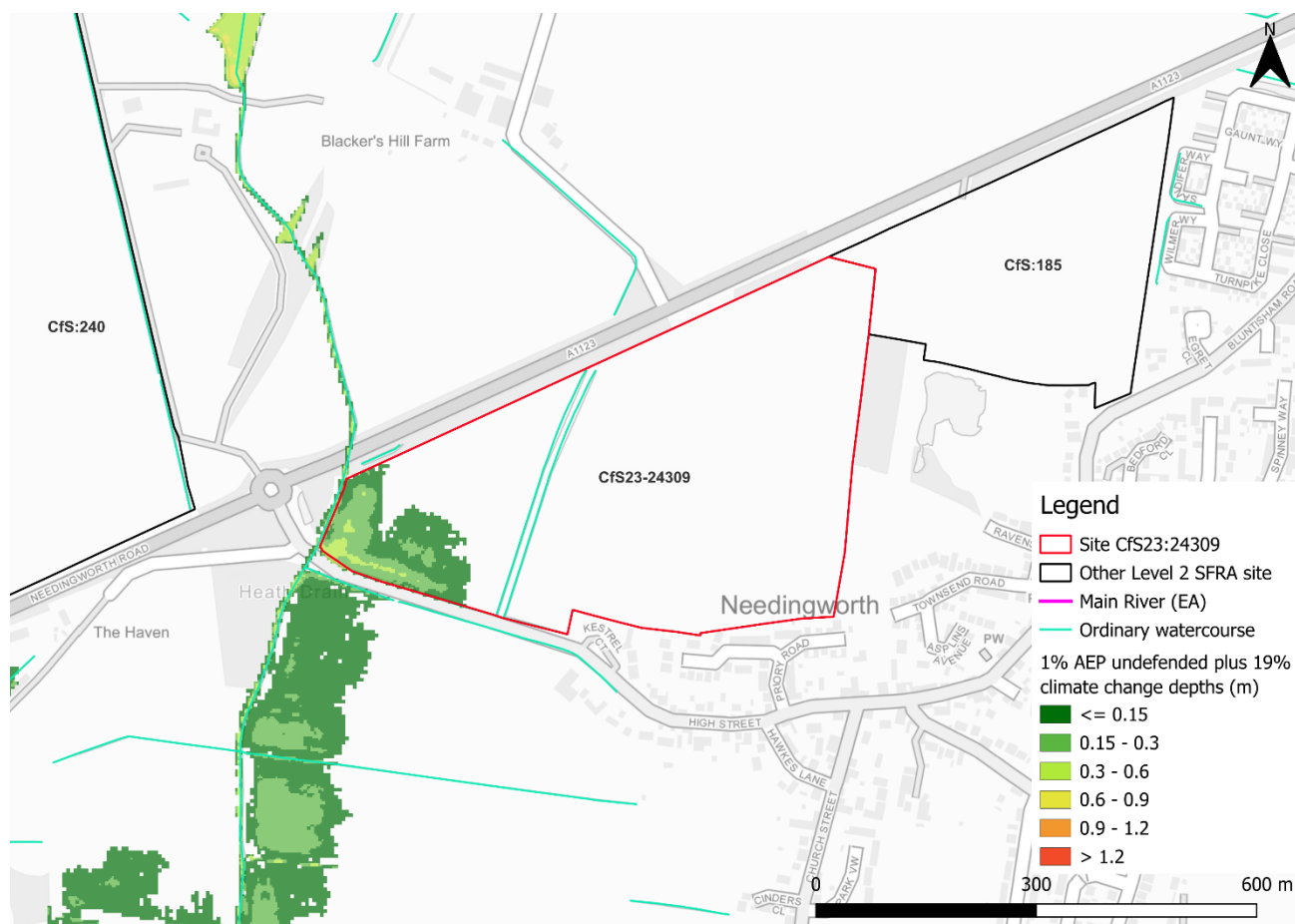


Figure 2-6: Flood depths for 1% AEP undefended flood event +19% (central climate change allowance)

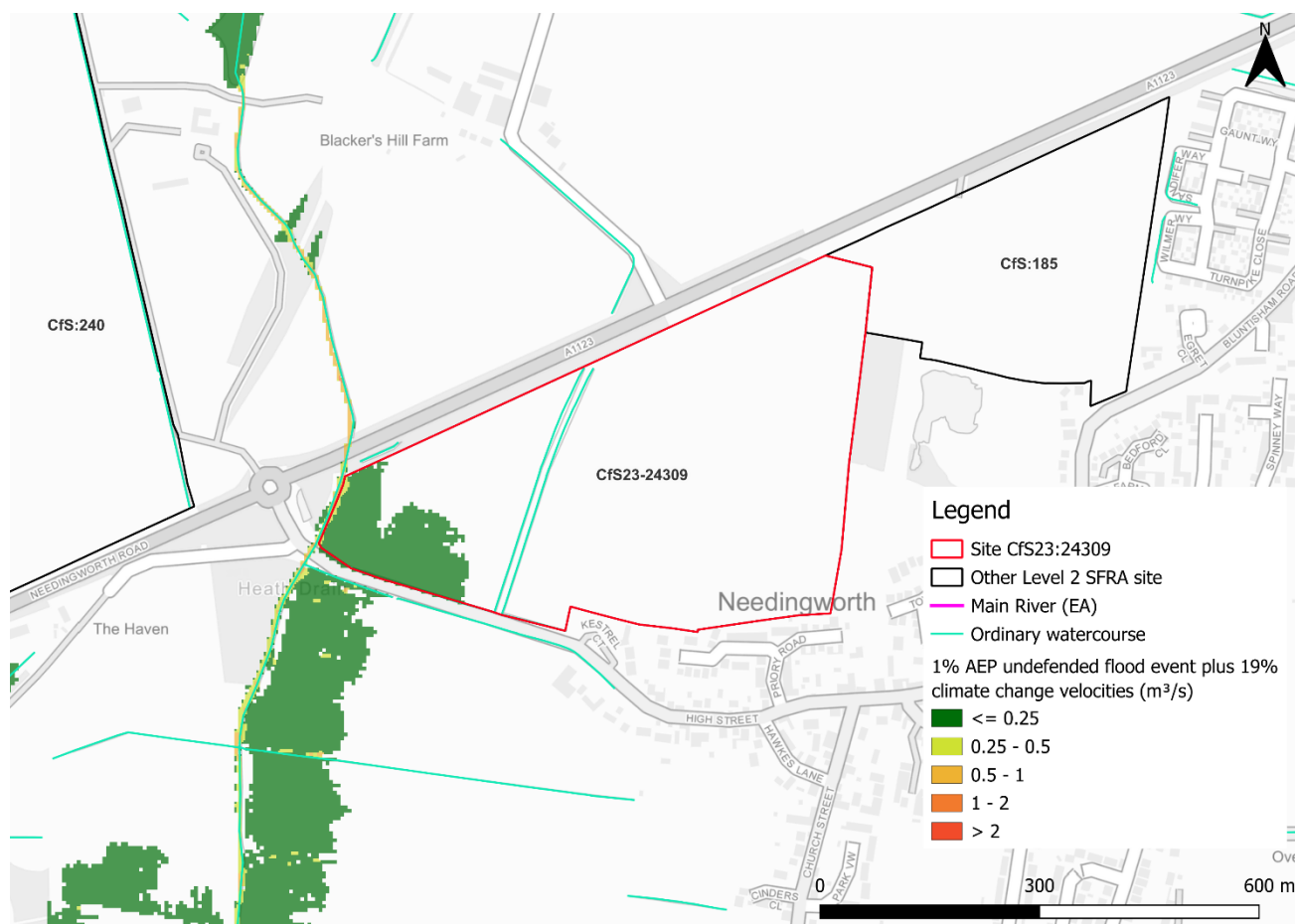


Figure 2-7: Flood velocities for 1% AEP undefended flood event +19% (central climate change allowance)

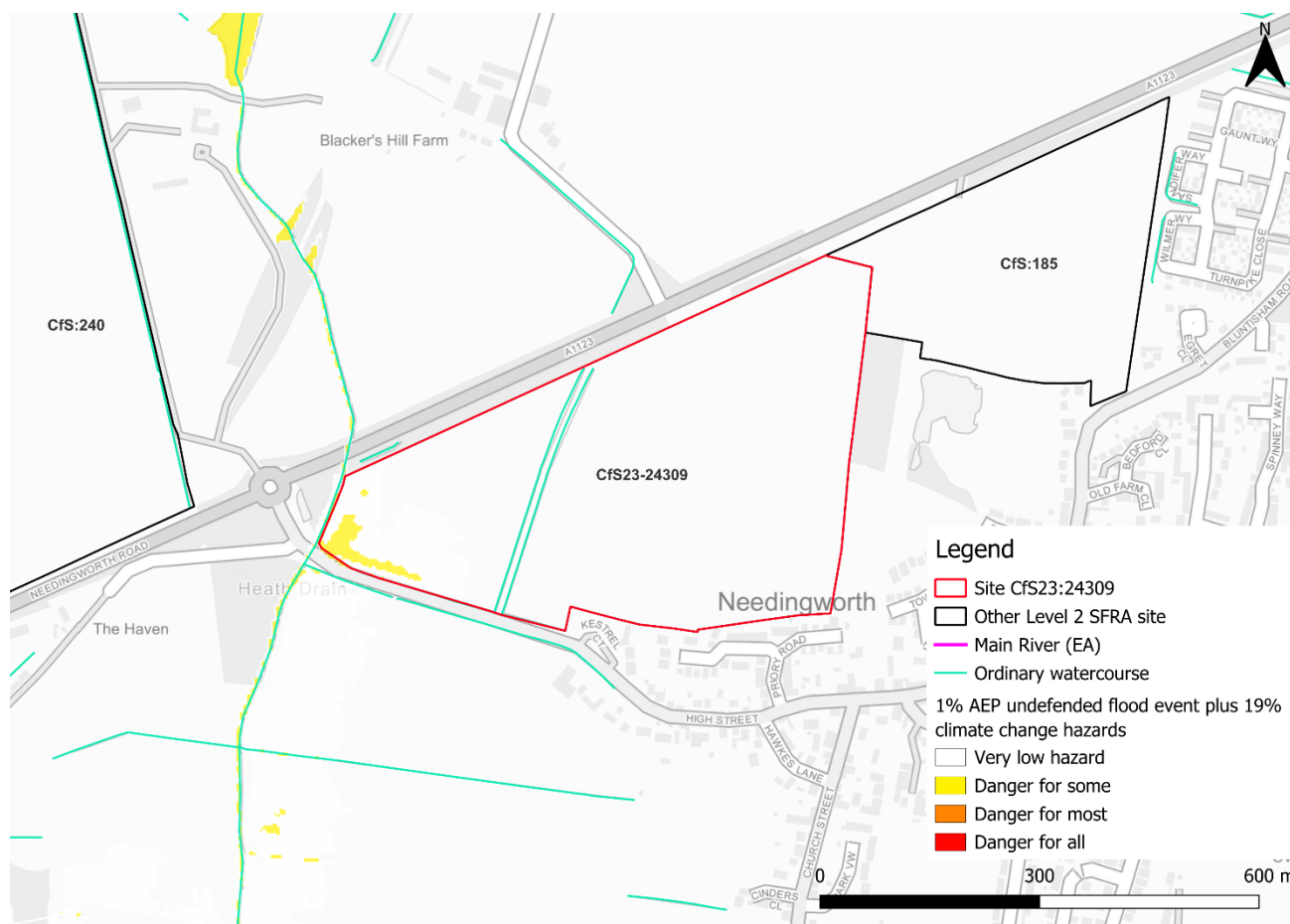


Figure 2-8: Flood hazard¹ for 1% AEP undefended flood event +19% (central climate change allowance)

Figure 2-9 shows the EA's Flood Map for Planning plus climate change. The extent of flooding in the Flood Map for Planning plus climate change is greater than the modelled climate change event, occupying a larger area in the southwestern corner of the site.

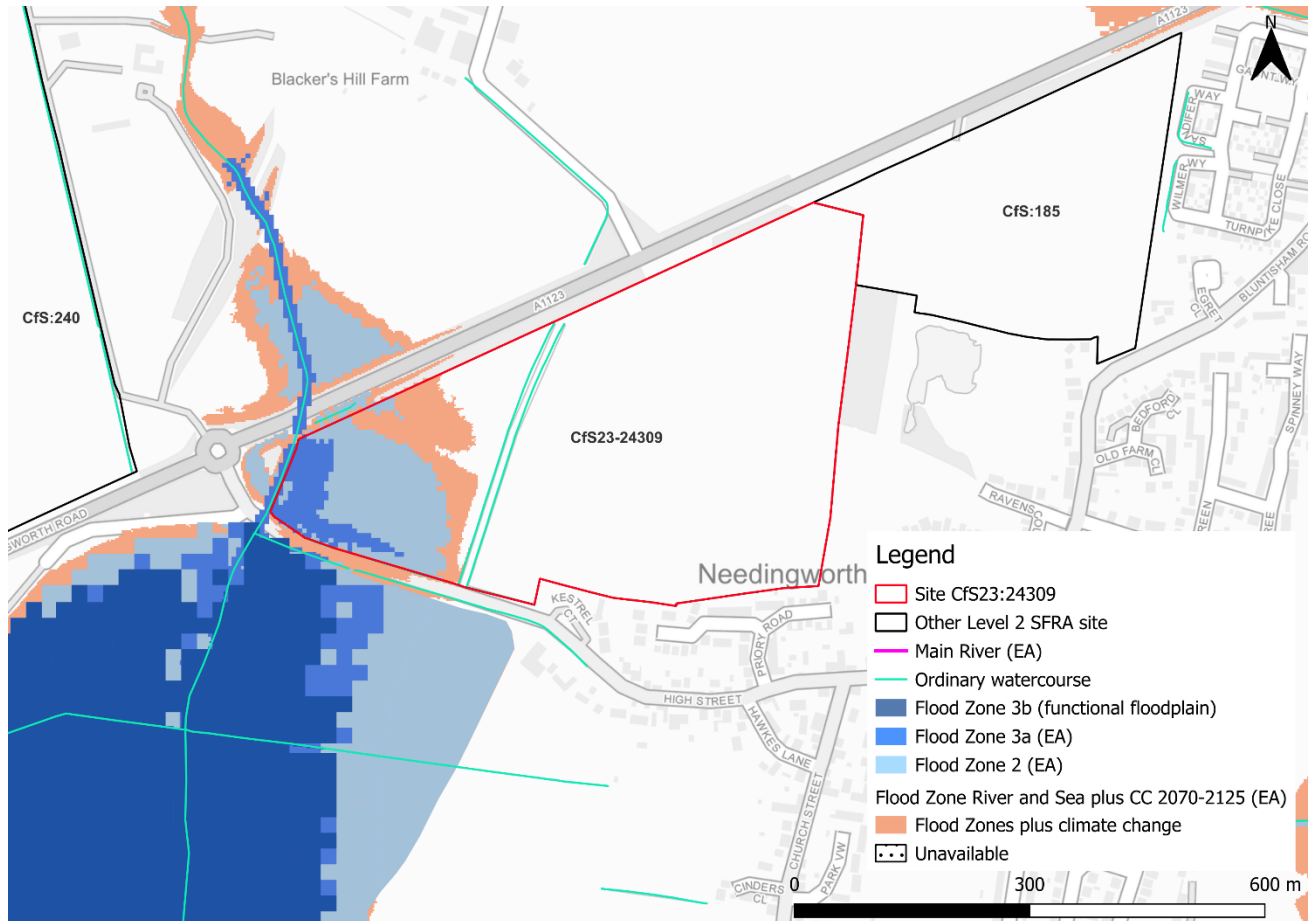


Figure 2-9: Flood Map for Planning - Climate Change 2070-2125 outputs

2.3.2 Tidal

The EA's Flood Map for Planning shows the site is not at risk from tidal climate change.

2.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered and mapped in Figure 2-10 which shows historical flooding in close proximity to the site. There have been two historic floods in Easter 1998 and March 1947. Both flood events have unknown sources.

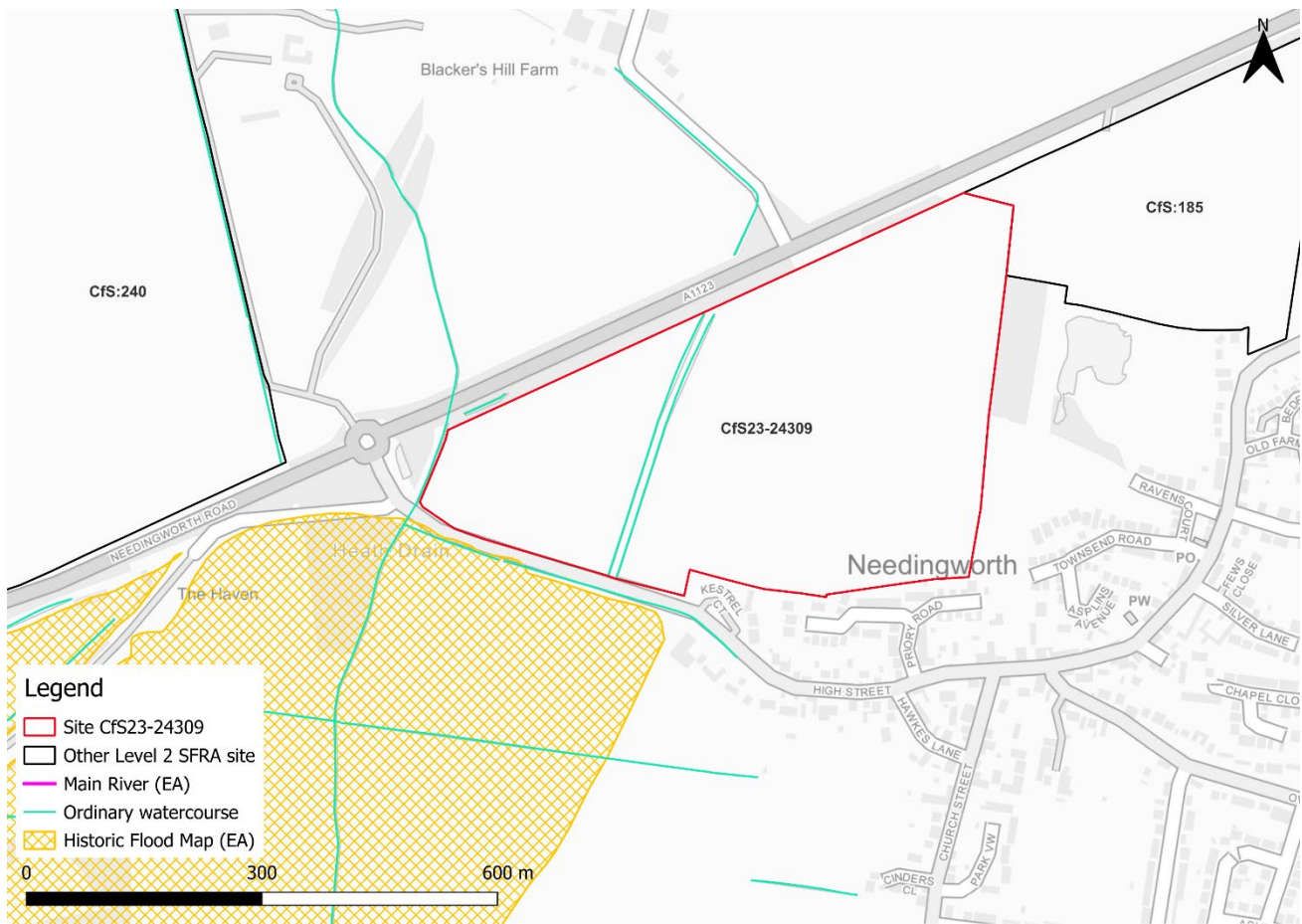


Figure 2-10: Recorded historic flood events onsite and around the site

2.5 Emergency planning

2.5.1 Flood warning

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. This site is not located within a FWA.

Flood alerts may be issued before a flood warning for properties located within a Flood Alert Area (FAA) to provide advance notice of the possibility of flooding. A flood alert may be issued when there is less confidence that flooding will occur in an FWA. As shown in Figure 2-11, the west of the site is located within a FAA, namely the River Great Ouse in Cambridgeshire from Brampton to Earith FAA.

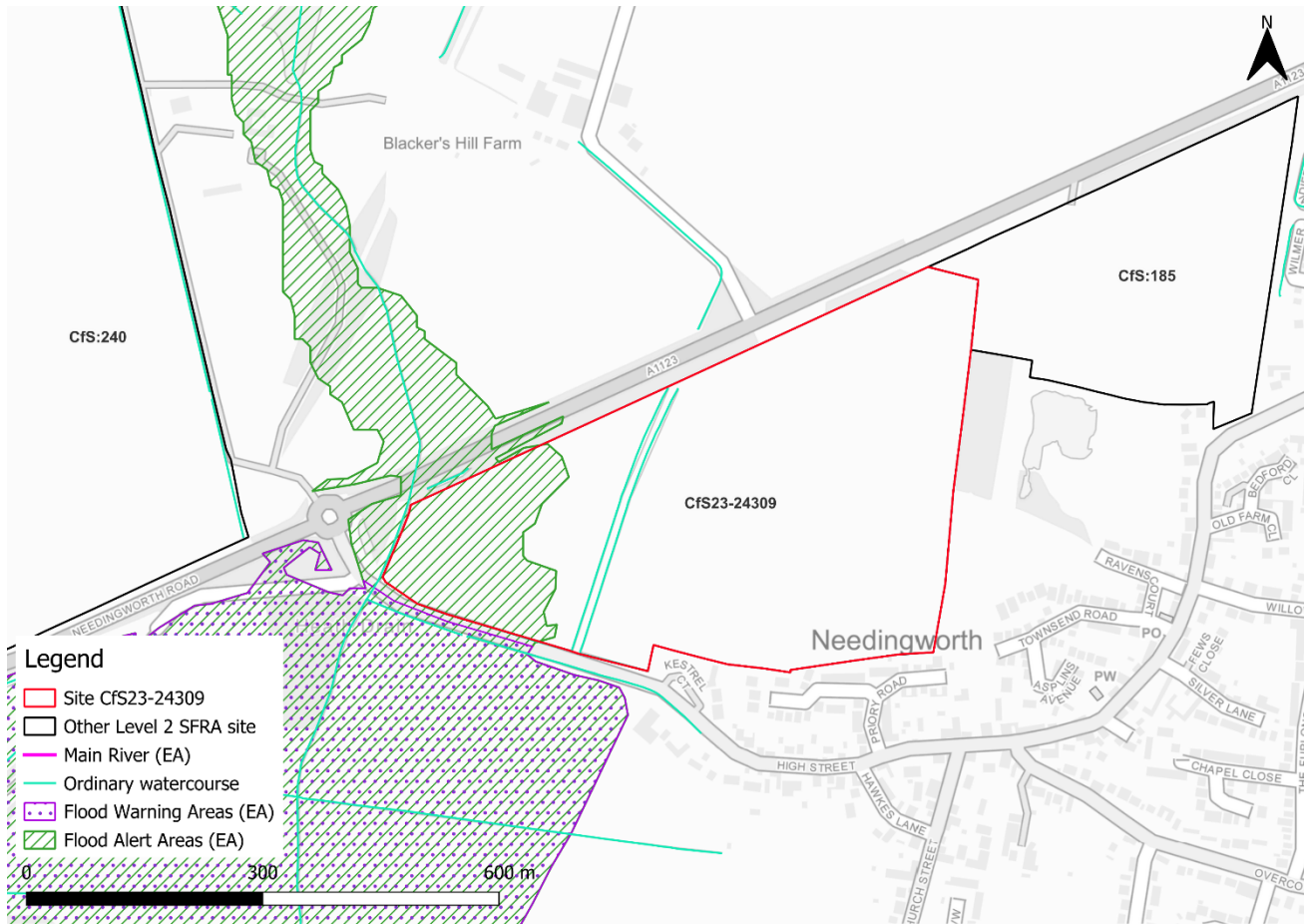


Figure 2-11: EA Flood Warning Areas and Flood Alert Areas

2.5.2 Access and escape routes

Based on available information, safe access and escape routes could likely be achieved during a flood event via the A1123 on the northern boundary, as shown by the orange circle in Figure 2-12. However, the flood alert should remain in place to ensure site users can be safe and evacuate the site during the 0.1% AEP fluvial event plus climate change.

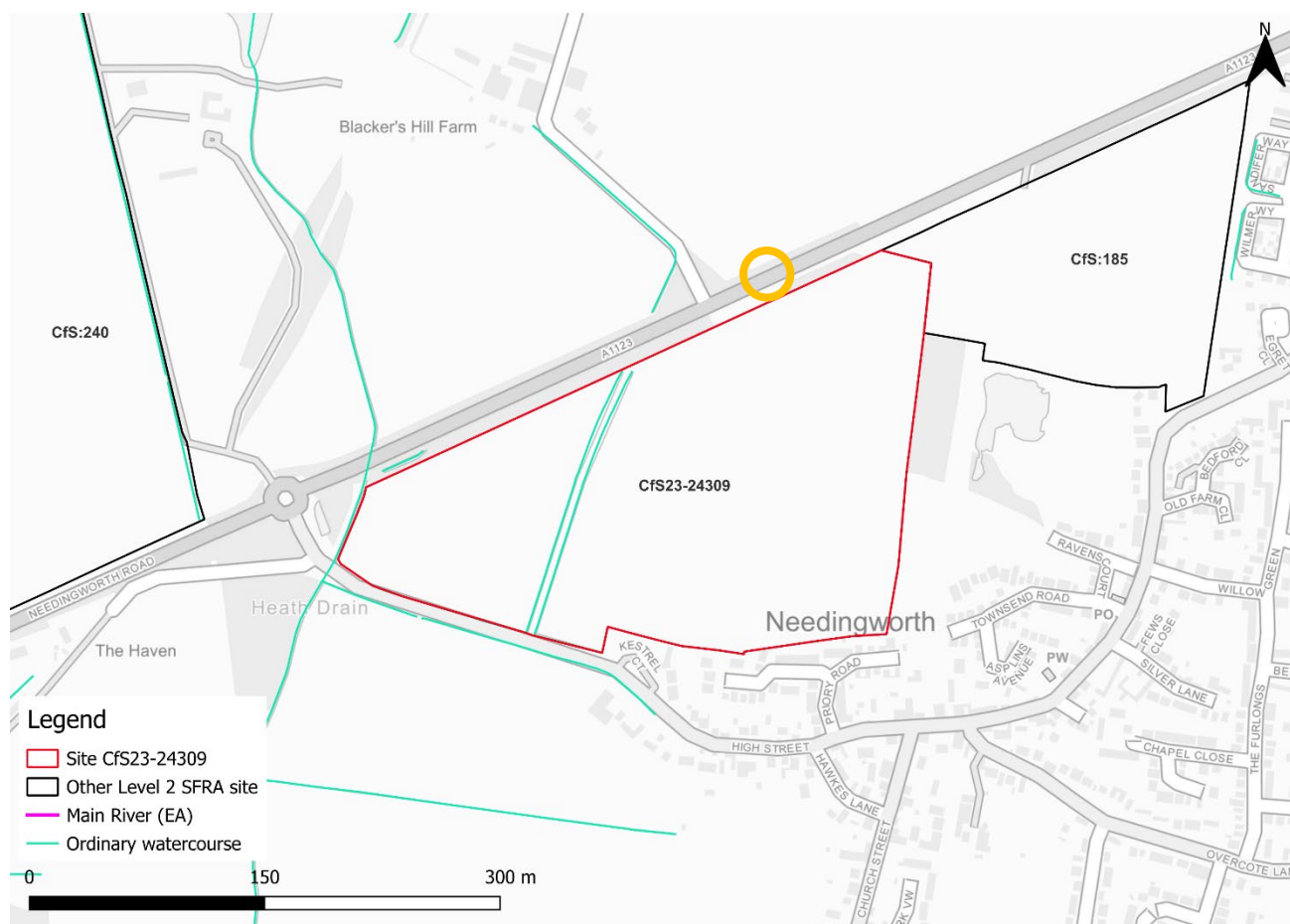


Figure 2-12: Potential access and escape routes

2.6 Observations, mitigation options, site suitability, sequential approach to development management - fluvial and tidal

- Observations:
 - The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
 - The site is partially located within fluvial Flood Zone 3a and therefore must be subject to the exception test.
 - Based on current information, it should be possible to develop the majority of the site, ideally outside of the risk areas and to the east of the onsite ordinary watercourse.
 - Local detailed modelling of Heath Drain shows low flood depths and hazards within the 1% AEP event extent. This risk increases slightly with climate change. However, the modelled risk is significantly different from the flood zones of the Flood Map for Planning. The flood zones are therefore likely to be based on the EA's New national Model. Depth and hazard information is not available for the New National Model.
 - The risk areas should ideally not be developed for more vulnerable purposes and be left as open green space.

- The extent of fluvial risk from the unmodelled ordinary watercourse is currently unknown. Using the 0.1% AEP surface water event as a proxy, risk is modelled to remain largely confined to the areas immediately surrounding the watercourse through the centre of the site.
- Defences:
 - There are no engineered flood defences within the vicinity of the site that are likely to impact fluvial flood risk.
- Mitigation:
 - The risk areas, once confirmed, should ideally not be developed for more vulnerable purposes and be left as open green space. Ideally any development would be directed to the east of the ordinary watercourse.
 - The site-specific FRA should confirm the risk to the site, including modelled flood depths and hazards, accounting for climate change.
 - The site-specific FRA should investigate potential risk from the ordinary watercourse to understand potential fluvial risk and look to include the channel and risk areas within a blue green corridor.
 - Were development of this site to proceed, given the proximity of this site to neighbouring sites CfS:185 and CfS:240, it would be prudent to formulate a strategy to develop these sites in tandem and for consultation between each developer to take place to ensure a joined-up approach for sustainable development is in place.
 - The ordinary watercourses should be included within the site design and layout. Infilling of drainage ditches should be avoided.
- Access and escape:
 - Safe access and escape routes must be available at times of flood and appear to be available from the north of the site, via the A1123. An FWA is in place however which should provide advanced warning for site users to evacuate ahead of a flood event in the short term.
 - EA flood warnings and alerts should continue to be in place to ensure early evacuation of site users before an extreme flood event occurs.

3 Flood risk from surface water

3.1 Existing risk

The NaFRA2 Risk of Flooding from Surface Water (RoFSW) mapping received a significant update and was published January 2025, including for surface water flood extents and depths. However, at the time of writing, the EA has confirmed that the depth information available is not structured in a way that is suitable for planning purposes. Therefore, this Level 2 SFRA considers the third generation RoFSW depth and hazard mapping in addition to the NaFRA2 extents, as agreed with the EA. Surface water depth and hazard should be modelled at the site-specific FRA stage.

3.1.1 Risk of Flooding from Surface Water - NaFRA2 extents

Based on the EA's national scale RoFSW map, as updated in January 2025, surface water risk to the site is predominantly very low. Approximately 7% of the site is at high surface water risk. A further 3% is at medium risk and a further 6% is at low surface water risk, as shown in Table 3-1. Surface water risk is in the southwest of the site, coincident with the area of modelled fluvial risk. There is additional surface water risk along the ordinary watercourse, as well as in various topographic low spots at the northeastern corner, southeastern corner and along the eastern boundary of the site.

Table 3-1: Existing surface water flood risk based on percentage area at risk using the NaFRA2 RoFSW map

Very low risk (% area)	Low risk (% area)	Medium risk (% area)	High risk (% area)
84	6	3	7

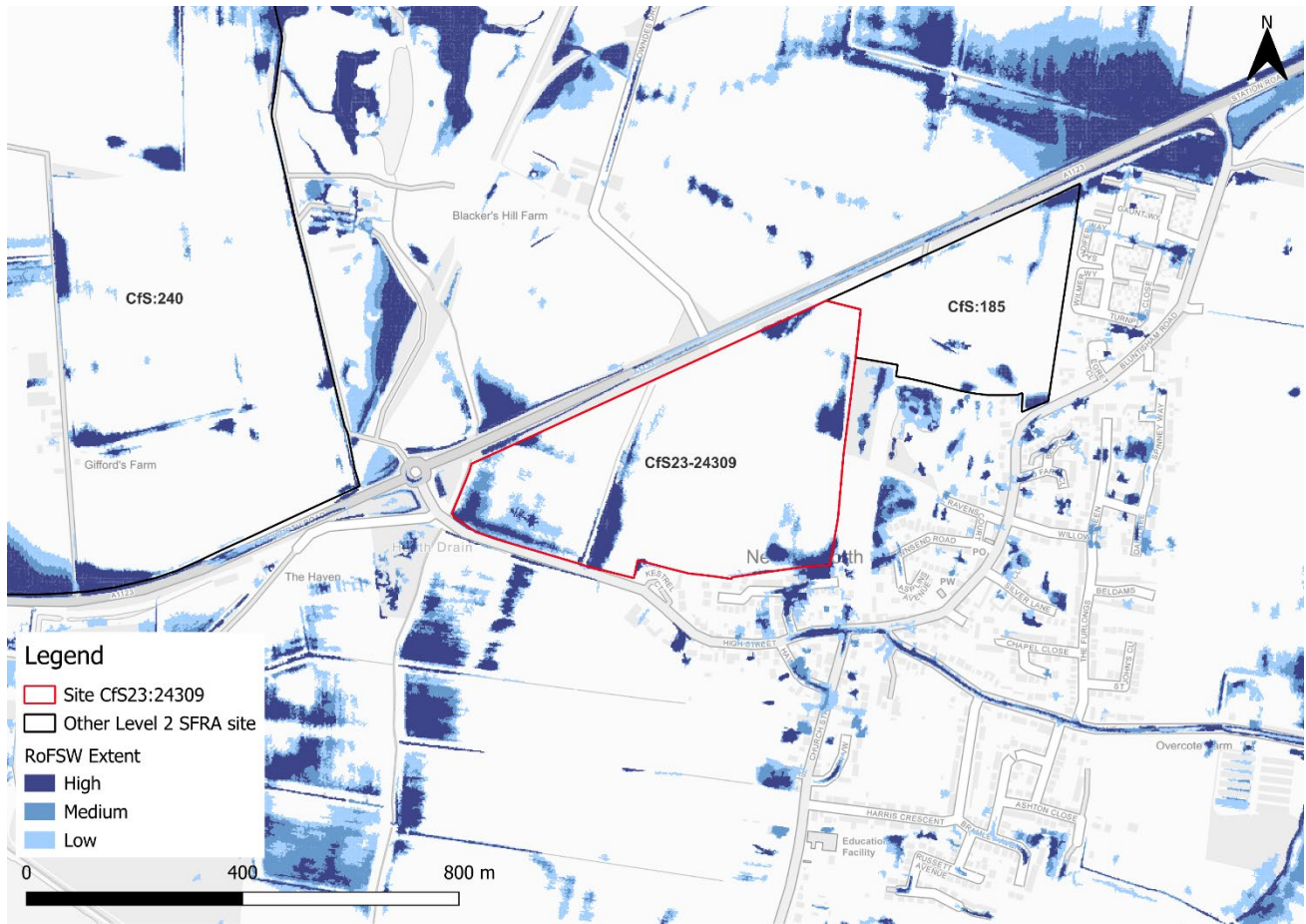


Figure 3-1: Surface water flood extents (NaFRA2 - Risk of Flooding from Surface Water map)

3.1.2 Risk of Flooding from Surface Water - third generation depths and hazard

Based on the EA's national scale third generation RoFSW map, greatest flood depths within the site in the medium risk event are between 0.6 and 0.9m. Smaller flood depths are evident along the ordinary watercourse and in topographic low spots in the east of the site. Hazard is predominantly categorised as significant

There are differences in the extent of surface water flooding between the NaFRA2 RoFSW map and the third-generation depths and hazard mapping, with the NaFRA2 extents appearing smaller in the southwest of the site and slightly larger in the east of the site. This reinforces the requirement for detailed assessment of surface water at the FRA stage to establish surface water flood risk conditions.

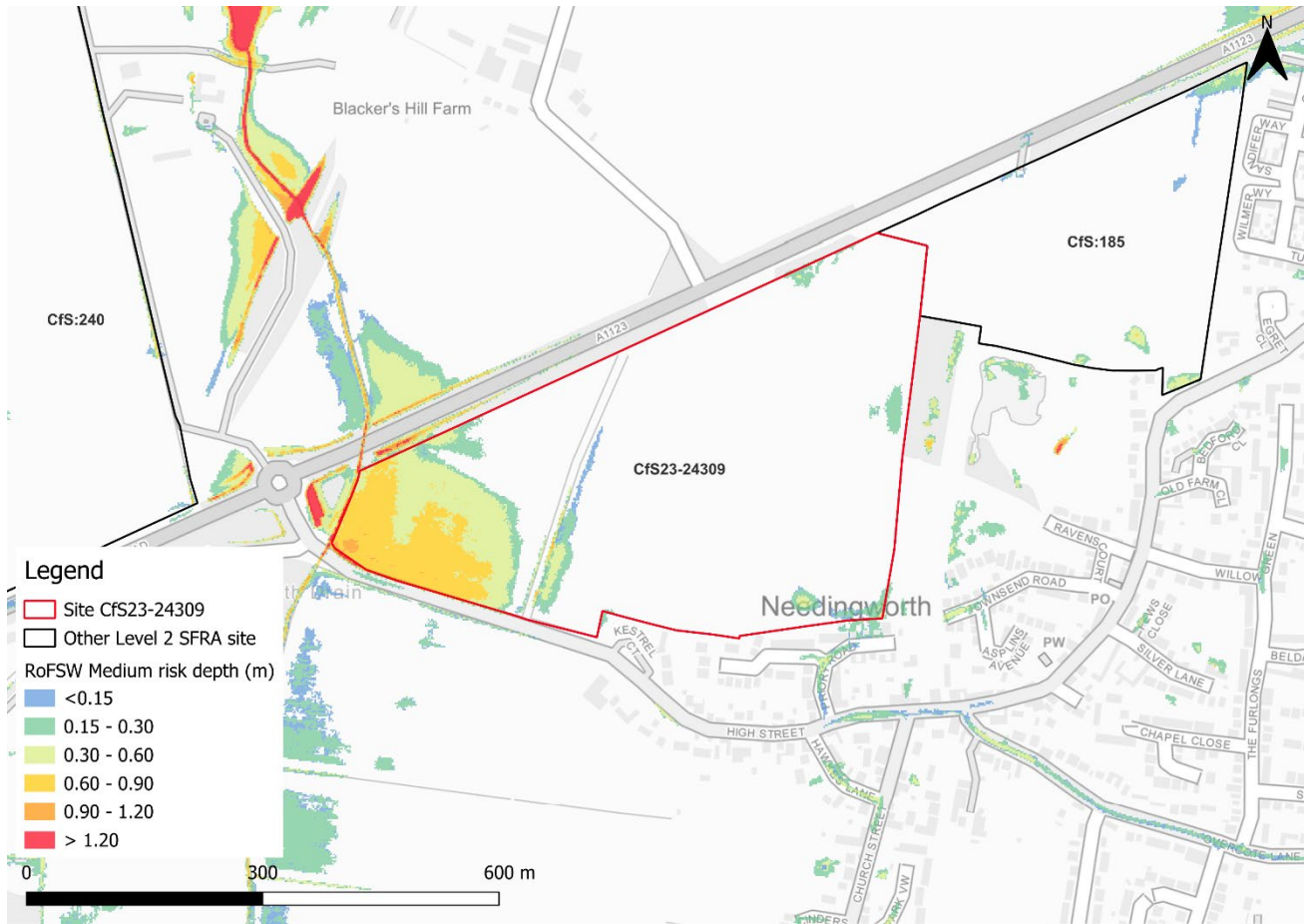


Figure 3-2: Medium risk event surface water flood depths (Third generation - Risk of Flooding from Surface Water map)

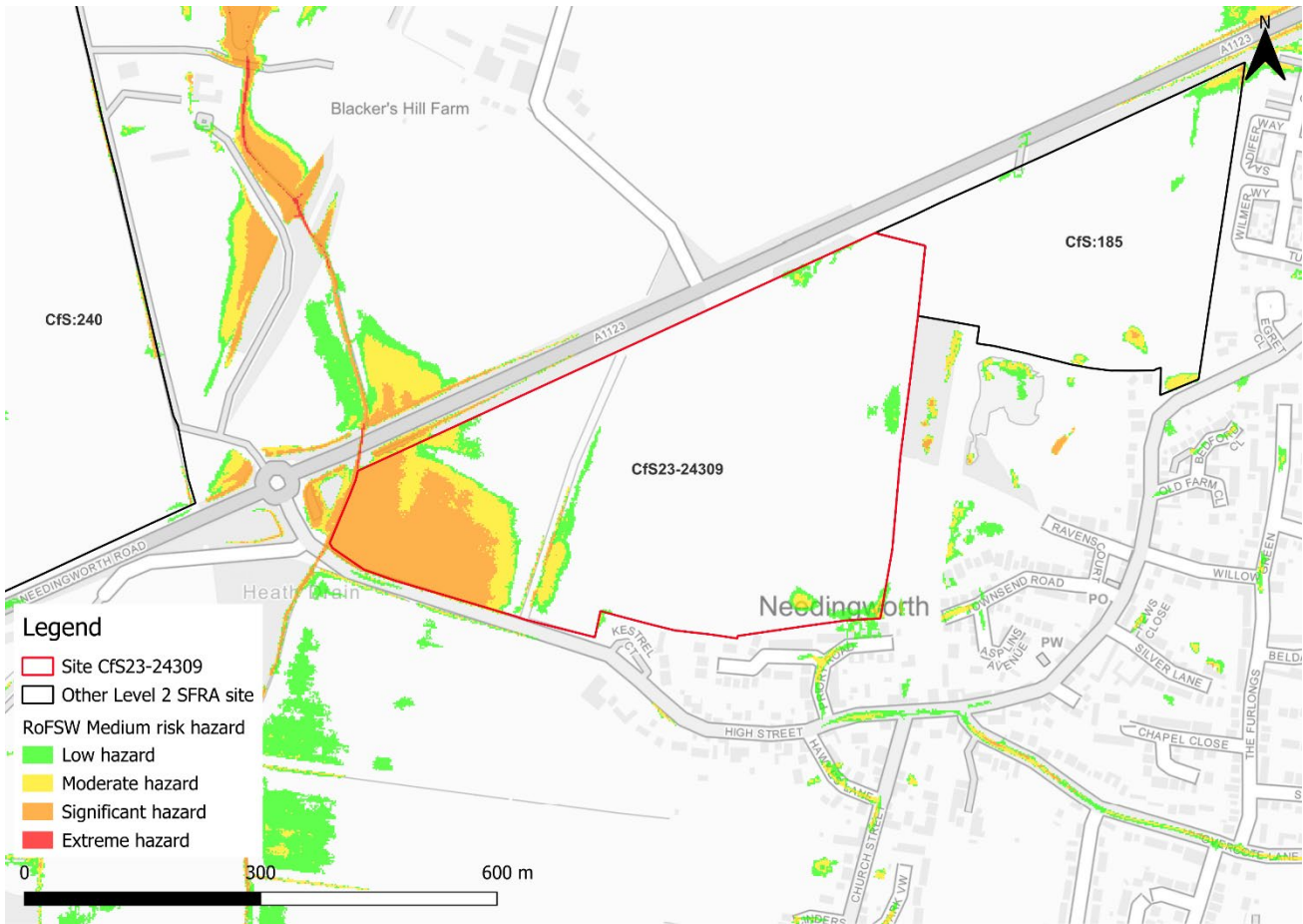


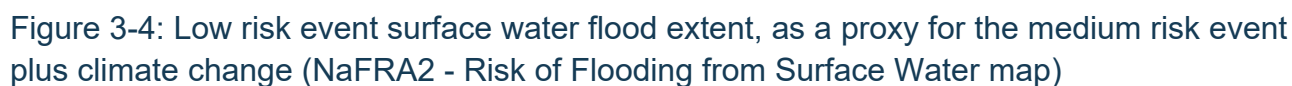
Figure 3-3: Medium risk event surface water flood hazard² (Third generation - Risk of Flooding from Surface Water map)

3.2 Impacts from climate change

The NaFRA2 RoFSW mapping now includes one modelled climate change scenario, the 2050s central allowance for the high, medium and low risk events. However, the upper end allowance on peak rainfall for the 2070s should be assessed in SFRA. Therefore, at the time of writing, the available national surface water climate change mapping is unsuitable for consideration in development planning. This Level 2 SFRA considers the low risk surface water event as a conservative proxy for the medium risk event plus climate change, as agreed with the EA. The impact of climate change on surface water flood risk should be fully accounted for at the site-specific FRA stage.

Using the low risk event as a proxy, the medium risk surface water event is likely to increase in extent when accounting for climate change (Figure 3-4). This is most notable within the southwest of the site. Additionally, the third generation surface water map indicate maximum flood depths are likely to increase to between 0.90 to 1.20m in this area (Figure 3-5), with a greater extent of area classified as significant hazard.

2 Based on Section 7.5 Hazard rating. What is the Risk of Flooding from Surface Water map? Report version 2.0. April 2019. Environment Agency



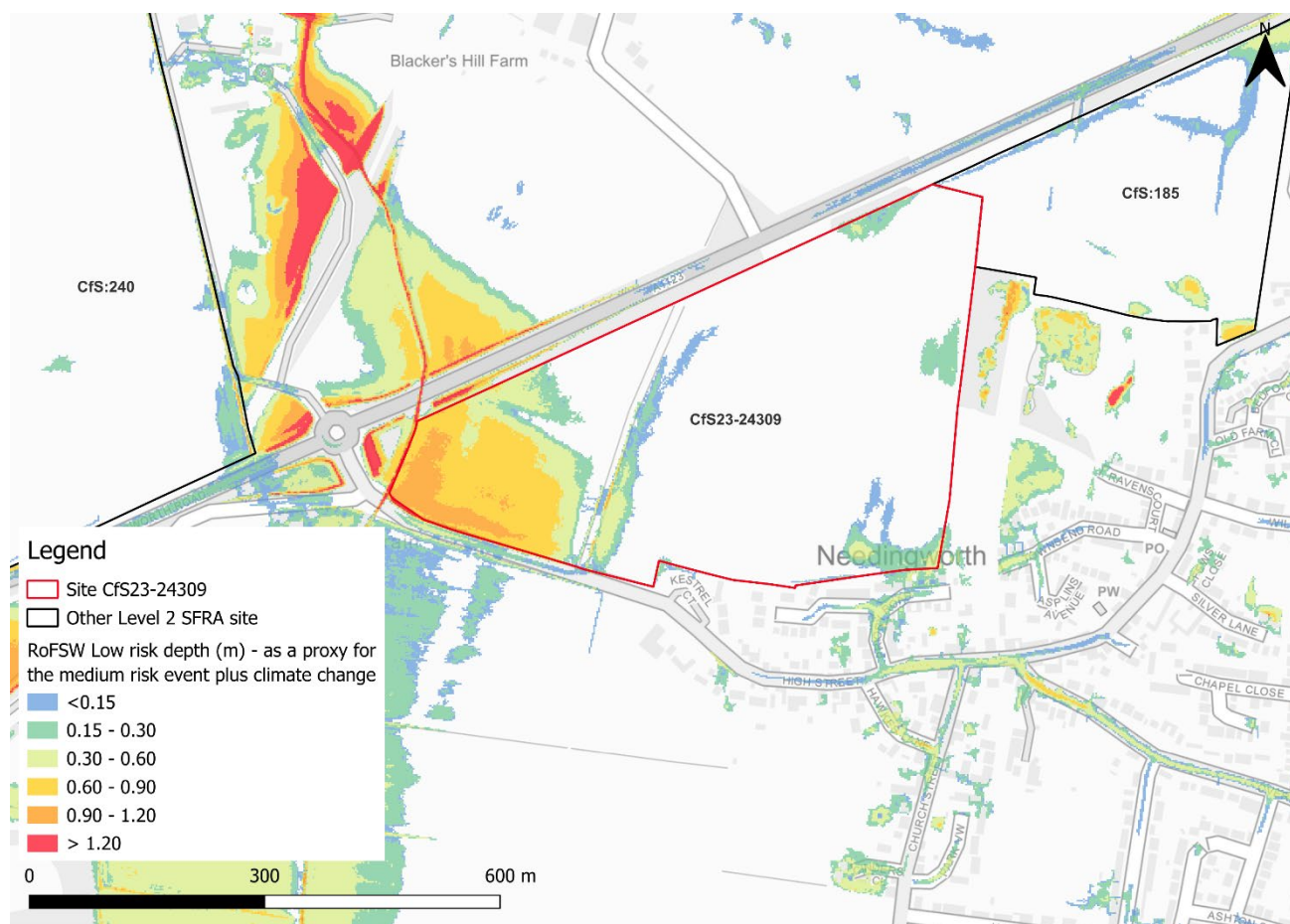


Figure 3-5: Low risk event surface water flood depths, as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

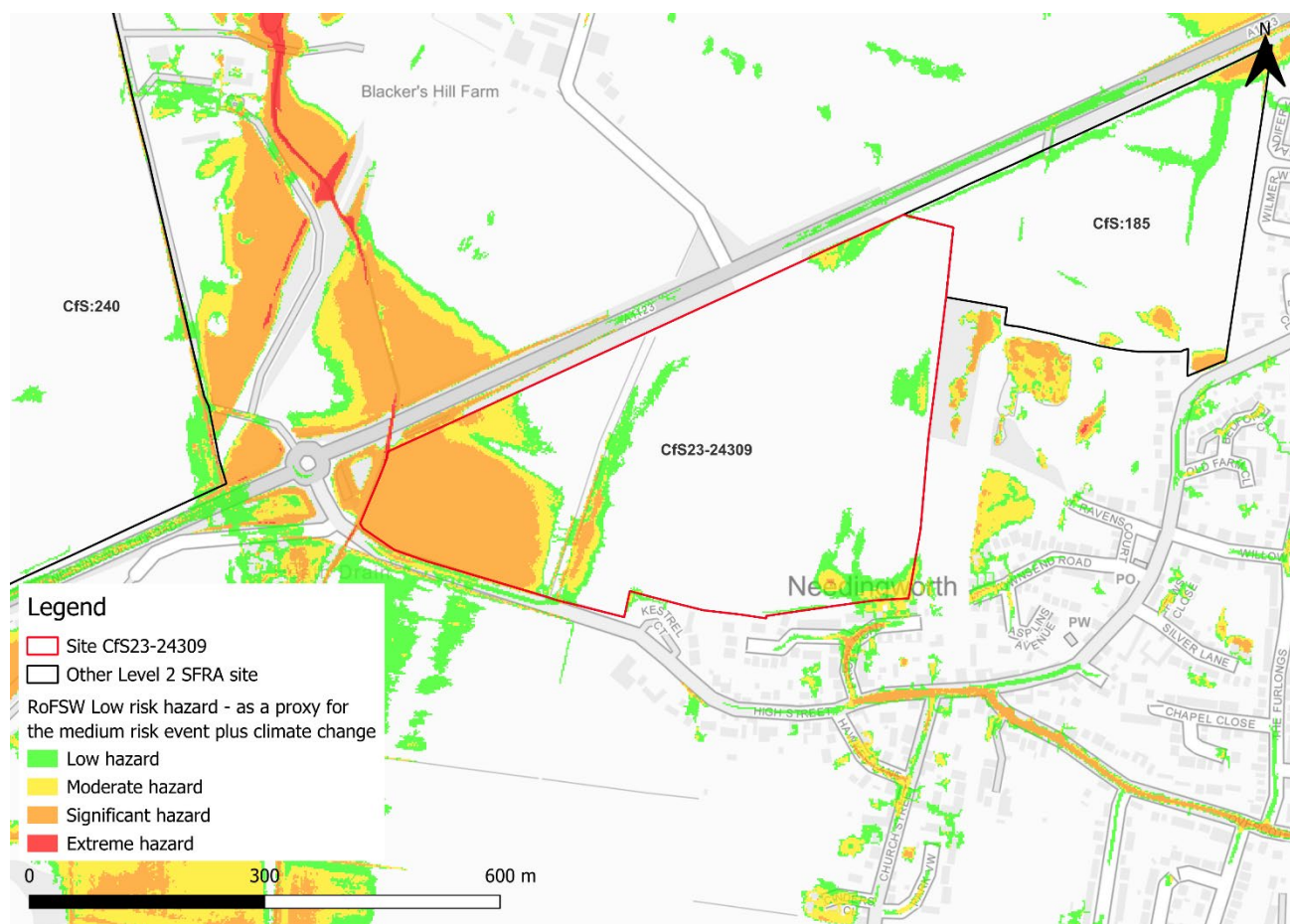


Figure 3-6: Low risk event surface water flood hazard, as a proxy for the medium risk event plus climate change (Third generation - Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options, site suitability, sequential approach to development management - surface water

- Current risk to the site is predominantly very low, with 84% of the site being at very low surface water flood risk. Surface water risk in all events is largely present in the southwest of the site, coincident with the area at risk of fluvial flooding. There is an additional surface water path along the ordinary watercourse as well as spots of surface water risk in the east of the site.
- The effects of climate change on surface water have not been modelled for this SFRA, however the low risk surface water event has been used as a proxy for the medium risk event plus climate change. Risk is modelled to be larger in extent than the present day medium risk event, most notably in the southwest of the site.
- Surface water flood depths, hazards, including for the impact of climate change should be considered further through the site-specific FRA and drainage strategy. Any surface water modelling at the FRA stage should consider flood depths and hazards.
- There are differences between the NaFRA2 RoFSW map and the third-generation depths and hazard mapping. This reinforces the requirement for

detailed assessment of surface water at the FRA stage to establish surface water flood risk conditions.

- Topographic low spots and flow paths should be incorporated into site design and layout. The ordinary watercourse and its risk area should be included within a blue green corridor.
- The RoFSW map is not suitable for identifying whether an individual property will flood and is therefore indicative. The RoFSW map is not appropriate to act as the sole evidence for any specific planning or regulatory decision or assessment of risk in relation to flooding at any scale without further supporting studies, modelling, or evidence.
- The LLFA agree with the recommendations, any proposed site layout should carefully consider areas of hazardous flood risk.

4 Cumulative impacts assessment and high risk catchments

4.1 Level 1 cumulative impacts assessment

A cumulative impact assessment was completed through the Huntingdonshire Level 1 SFRA (2024), which aimed to identify catchments sensitive to the cumulative impact of new development. This site is located within one catchment, namely, the Marley Gap Brook catchment. This catchment is ranked as a high sensitivity catchment. Planning considerations for sites at high sensitivity to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA. Cumulative impacts of development should also be considered as part of a site-specific FRA.

5 Groundwater, geology, soils, SuDS suitability

Risk of groundwater emergence is assessed in this SFRA using JBA's 5m Groundwater Emergence Map. This dataset is recommended for use by the EA in the SFRA Good Practice Guide³. Figure 5-1 shows the map covering this site and the surrounding areas. Table 5-1 explains the risk classifications.

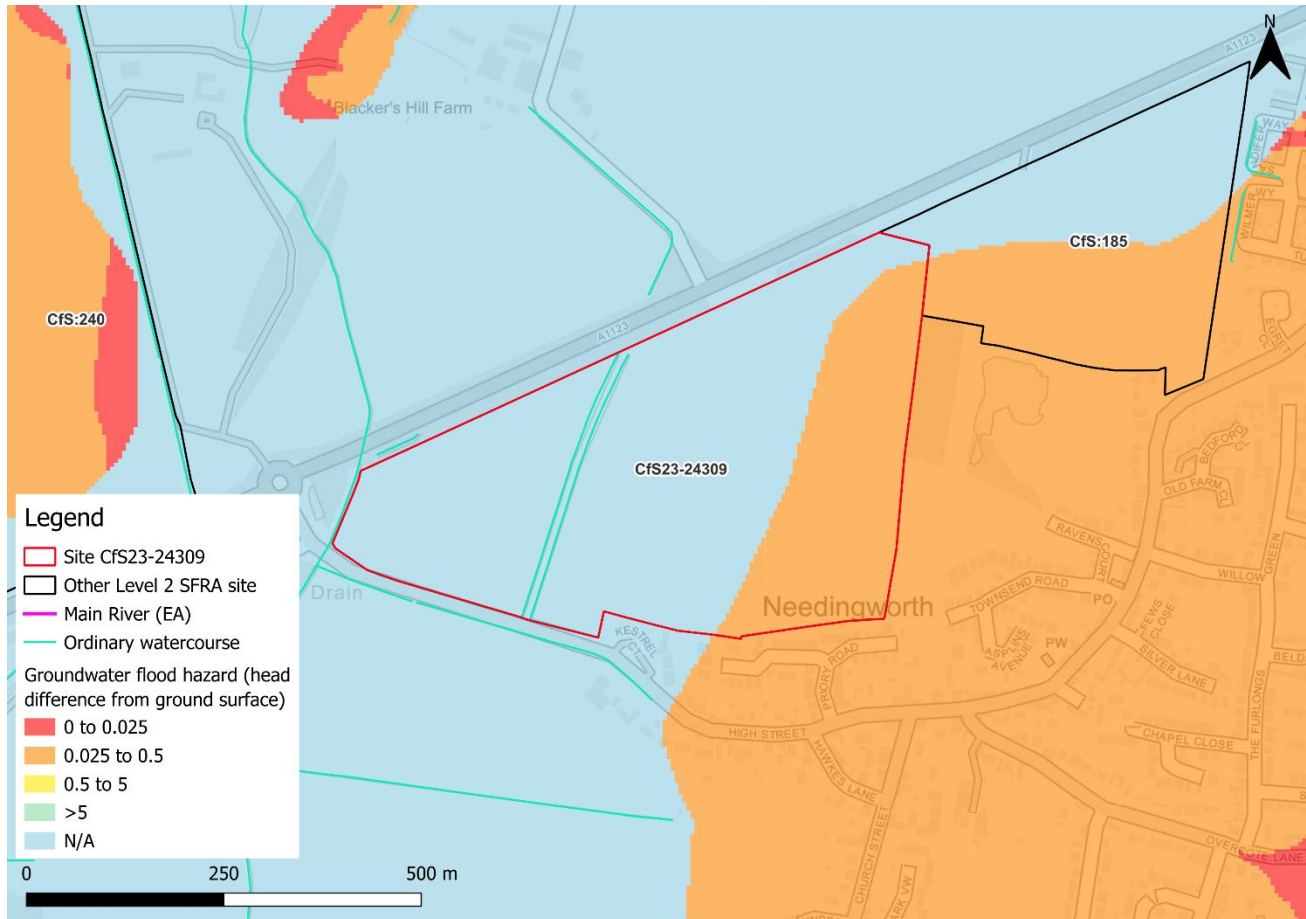


Figure 5-1: JBA 5m Groundwater Emergence Map

The west of the site is classified as no risk. Infiltration SuDS should therefore be suitable in this area. The eastern area of the site is shown to have groundwater levels between 0.025m and 0.5m below the ground surface in the 100 year return period flood event, infiltration SuDS are therefore unlikely to be appropriate in this area. The site-specific FRA should further investigate groundwater levels through percolation testing in both wet and dry weather conditions across the site. The underlying bedrock within the site is a combination of mudstone, siltstone and sandstone (Figure 5-2). Mudstone and siltstone generally have low permeability.

³ [Strategic flood risk assessment good practice guide. ADEPT. December 2021.](#)

Table 5-1: Groundwater Hazard Classification

Groundwater head difference (m)*	Class label
0 to 0.025	Groundwater levels are either at very near (within 0.025m of) the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
0.025 to 0.5	Groundwater levels are between 0.025m and 0.5m below the ground surface in the 100-year return period flood event. Within this zone there is a risk of groundwater flooding to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
0.5 to 5	Groundwater levels are between 0.5m and 5m below the ground surface in the 100-year return period flood event There is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely.
>5	Groundwater levels are at least 5m below the ground surface in the 100-year return period flood event. Flooding from groundwater is not likely.
N/A	No risk. This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.
*Difference is defined as ground surface in mAOD minus modelled groundwater table in mAOD.	



Figure 5-2: Soils and geology

6 Residual risk

Although a site may be afforded some protection from defences and / or drainage infrastructure, there is always a residual risk of flooding from asset failure i.e. breaching / overtopping of flood defences, blockages of culverts or drainage assets.

Residual risk at this site comes from the potential blockage of the structure beneath High Street

6.1 Potential blockage

A blockage of the bridges/culverts over Heath Drain at the southwest of the site (High Street and A1123) may cause flooding to the site, depending on the severity of the blockage and the magnitude of the flood event. There is also a potential blockage of the culvert underneath High Street along the ordinary watercourse. Such a scenario should be investigated at the FRA stage. Culvert course and condition surveys may be required, including for consultation with the culvert owner.

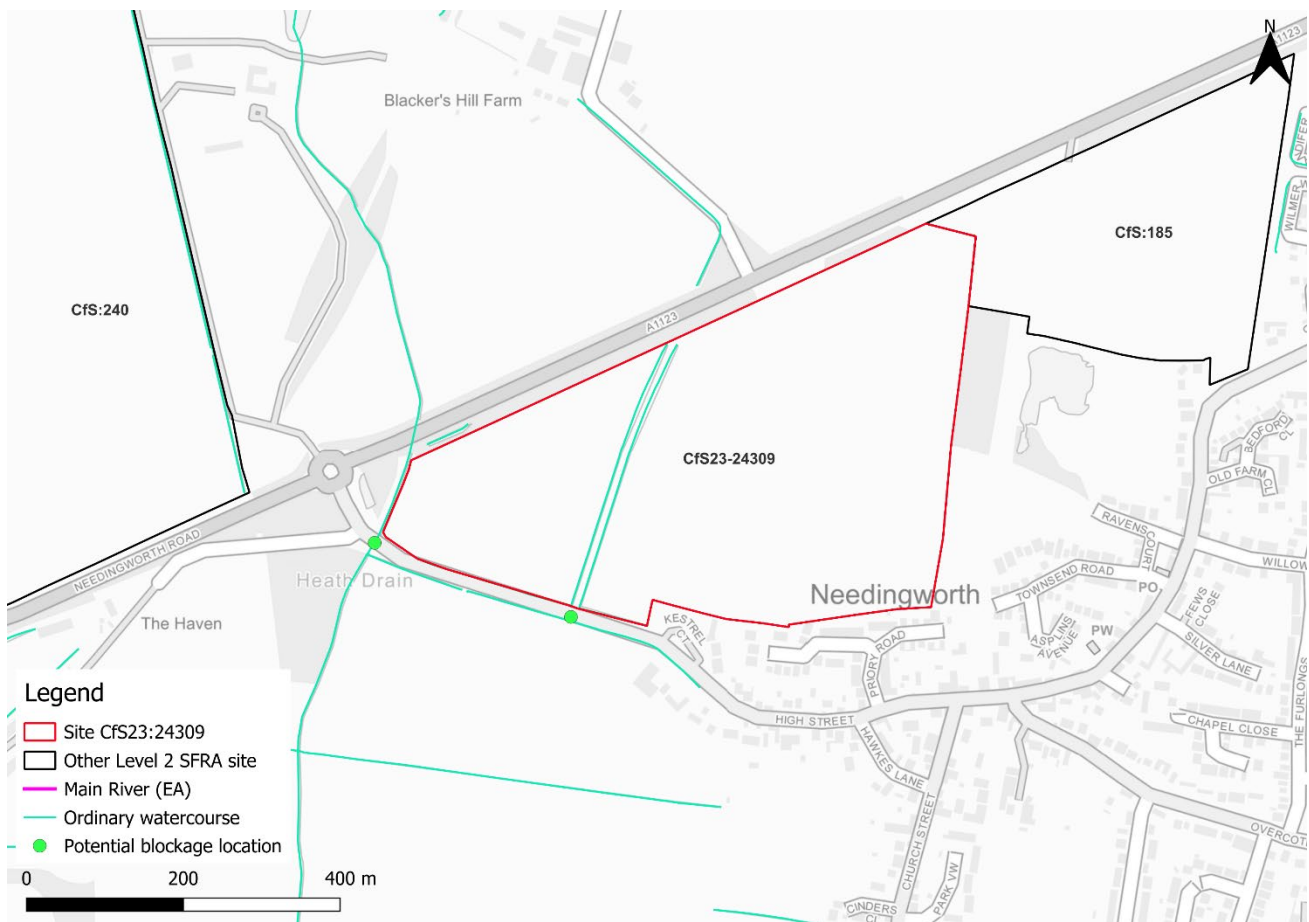


Figure 6-1: Potential blockage locations

6.2 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. Figure 6-2 shows the RFM in a 'dry day' and 'wet day' scenario. A 'dry day' scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A 'wet day' scenario assumes a worst-case scenario where a reservoir releases water held on a 'wet day' when local rivers have already overflowed their banks.

The site is potentially at risk in a 'wet day' scenario from Grafham Water reservoir, located in the Cambridgeshire LLFA. The reservoir is owned by Anglian Water Services Ltd.

The EA's SFRA guidance states that where a proposed development site is shown to be at potential risk from reservoir failure, then an assessment into whether the reservoir design or maintenance schedule needs improving should be carried out. Expert advice may be required from an all-reservoirs panel engineer. The Council should consult Anglian Water Services Ltd to ascertain whether the proposed development could affect the reservoir's risk designation, its design category or how it is operated. The Council, as category 1 responders, can access more detailed information about reservoir risk and reservoir owners using the [Resilience Direct](#) system.

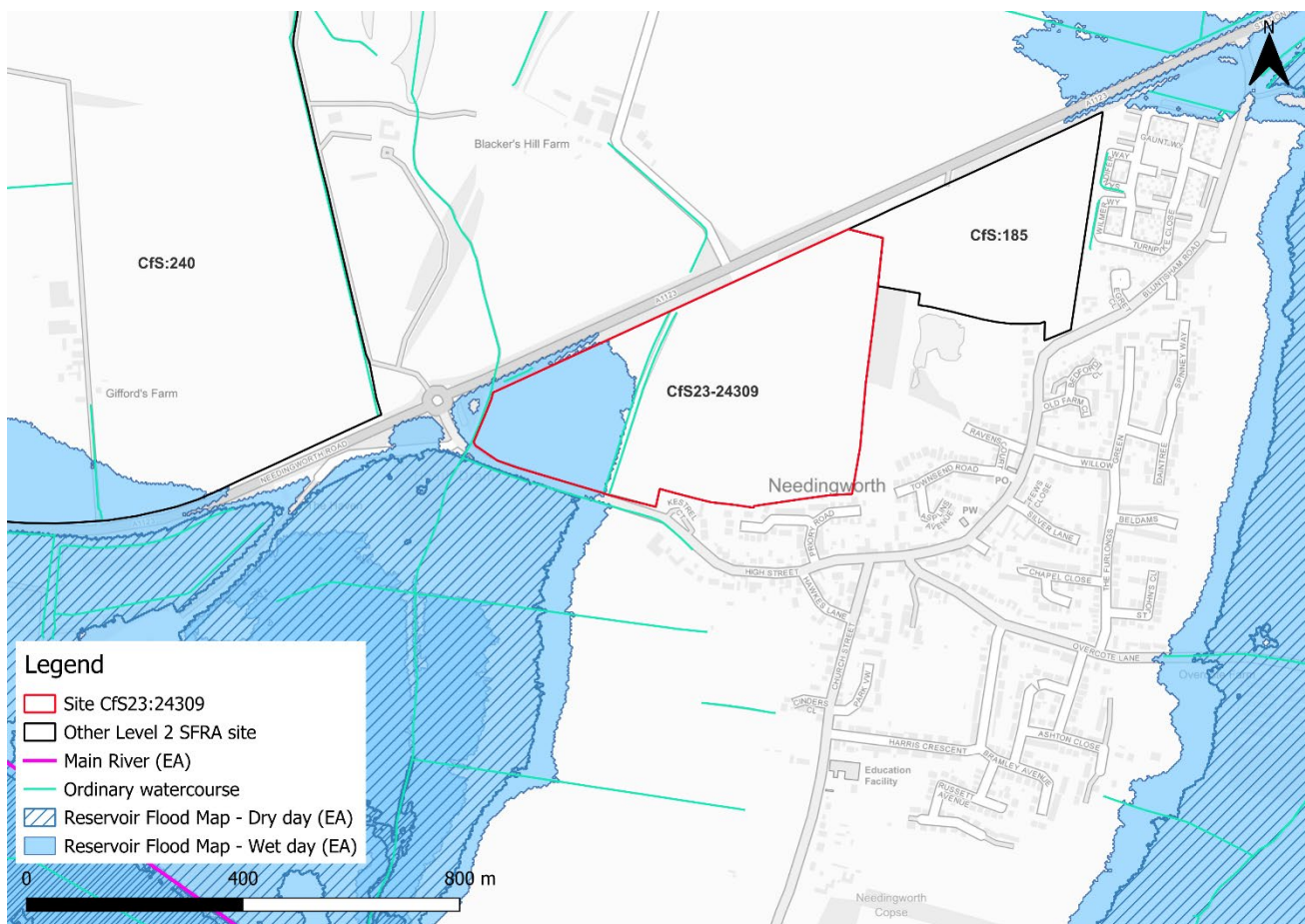


Figure 6-2: EA Reservoir Flood Map

7 Overall site assessment

7.1 Can part b) of the exception test be passed?

This site is required to pass part b) of the exception test as it is proposed for more vulnerable development and is located within Flood Zone 3a. Based on the information presented in this Level 2 SFRA, the exception test could be passed and the site allocated, assuming the risk area is left as open greenspace and development is directed to the east of the onsite ordinary watercourse. However, the test should be reapplied at the application stage as some flood risk information has not been available for consideration in this Level 2 SFRA, as outlined below. The test should also be reapplied if more recent information about existing or potential flood risk becomes available at application stage.

7.2 Recommendations summary

Based on the evidence presented in the Level 1 SFRA (2024) and this Level 2 SFRA:

- Based on current information, it should be appropriate to develop this site for more vulnerable purposes given it is located predominantly within Flood Zone 1 and with surface water risk largely confined to the channels of the ordinary watercourses. However, this assumes the risk area can remain as open greenspace and development takes place to the east of the ordinary watercourse.
- Risk must be confirmed at the FRA stage through updated detailed modelling of the Heath Drain.
- Risk from the onsite ordinary watercourse should be investigated at the FRA stage. Modelling may be required. The ordinary watercourse should be included within a blue green corridor.
- A detailed drainage strategy will be required for any new development, given the large area of the site and the fact it is currently greenfield.
- There is potential residual risk to the site from a blockage of the bridges over Heath Drain at the southwest of the site (High Street and A1123). There is also potential risk to the site from a blockage of the culvert under High Street.
- Groundwater conditions must be investigated further through the site-specific FRA. The potential use of infiltration SuDS should be investigated.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Safe access and escape routes should be considered further to ensure safe evacuation of site users during the low risk surface water flood event.
- The reservoir owner should be consulted on any development.
- EA flood warnings and alerts should continue to be in place to ensure early evacuation of site users before an extreme flood event occurs.
- Were development of this site to proceed, given the proximity of this site to neighbouring sites CfS:185 and CfS:240, it would be prudent to formulate a

strategy to develop these sites in tandem and for consultation between each developer to take place to ensure a joined-up approach for sustainable development is in place.

7.3 Site-specific FRA requirements and further work

At the planning application stage, the following should be considered:

- Confirmation of fluvial risk to the site. Modelling will be required. Residual risk should be investigated.
- Investigation into risk from the onsite ordinary watercourse including for potential residual risk.
- Investigation into groundwater conditions and the production of a detailed drainage strategy.
- Further consideration of surface water flood risk, including a drainage strategy. Discharge rates should remain at greenfield rates at a minimum in consultation with the LLFA.
- FRA should be carried out in line with the latest versions of the NPPF; FRCC-PPG; EA online guidance; the HDC Local Plan, and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with, where applicable, the local planning authority; the lead local flood authority; emergency planning officers; the Environment Agency; Anglian Water; the highways authorities; and the emergency services.

8 Licencing

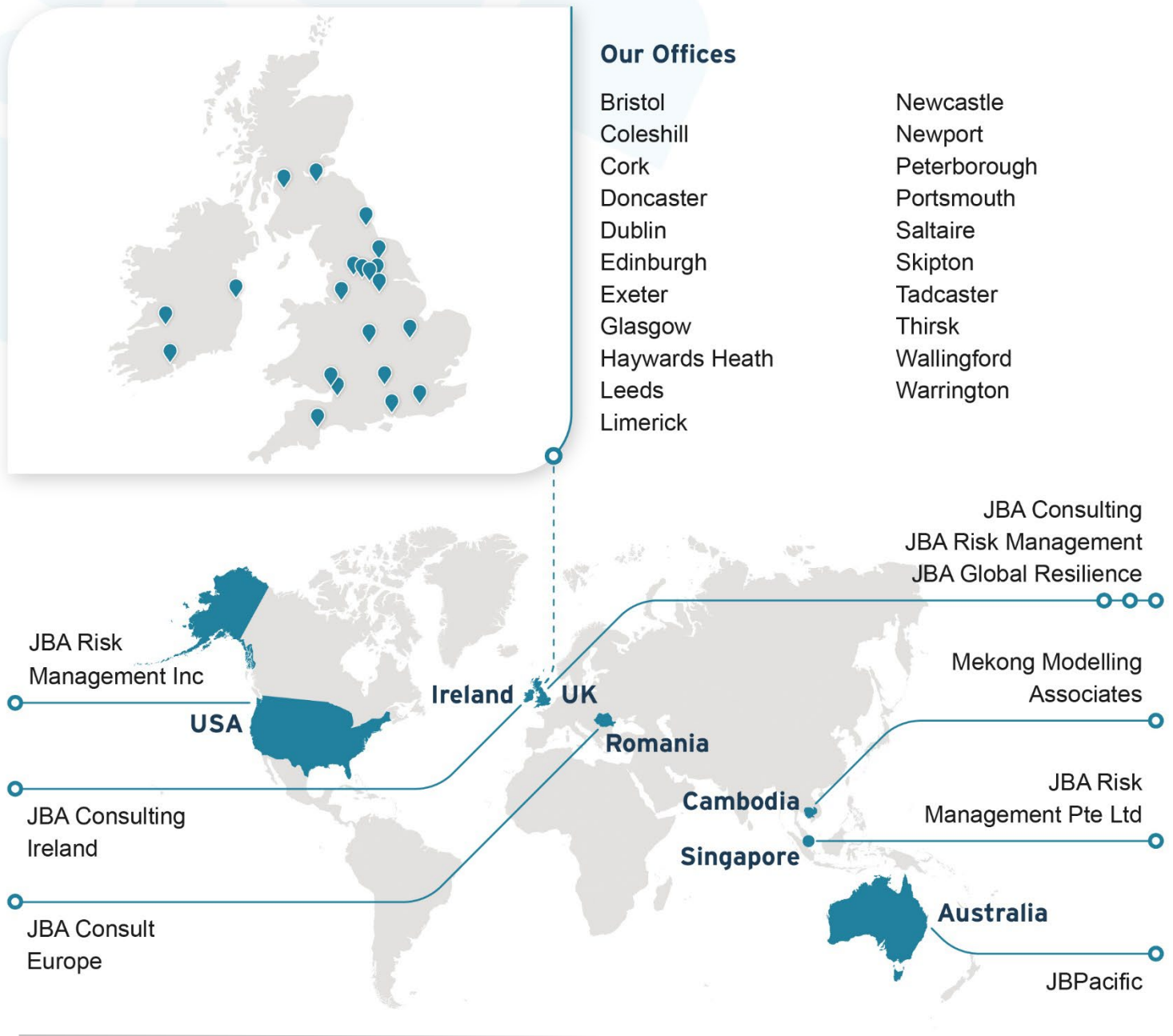
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Registered Office

1 Broughton Park
Old Lane North
Broughton
SKIPTON
North Yorkshire
BD23 3FD
United Kingdom

+44(0) 1756 799919
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