Central Lancashire Level 2 Strategic Flood Risk Assessment - Sites

Chorley Combined

Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C100

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0036
Revision	P02
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This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Georgina Williams JBA Consulting carried out this work.

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Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C100. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

1.1 Site 19C100

- Location: Land at Bagganley Lane
- Existing site use: Mixed use; residential and agricultural
- Existing site use vulnerability: More vulnerable
- Proposed site use: Mixed use
- Proposed site use vulnerability: More vulnerable
- Site area: 13.3 hectares
- Proposed development impermeable area: 11.3 hectares (assumed 85% impermeable area)
- EA model: Black Brook 2011
- Watercourse: Black Brook
- Summary of requirements from scoping stage:
  - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
  - Subject to the exception test as more vulnerable development proposed in Flood Zone 3a
  - Assessment of modelled fluvial flood depths and hazards
  - Assessment of surface water flood depths and hazards
  - Assessment of all other sources of flood risk
  - Potential residual risk from blockage of M61 culvert along Black Brook

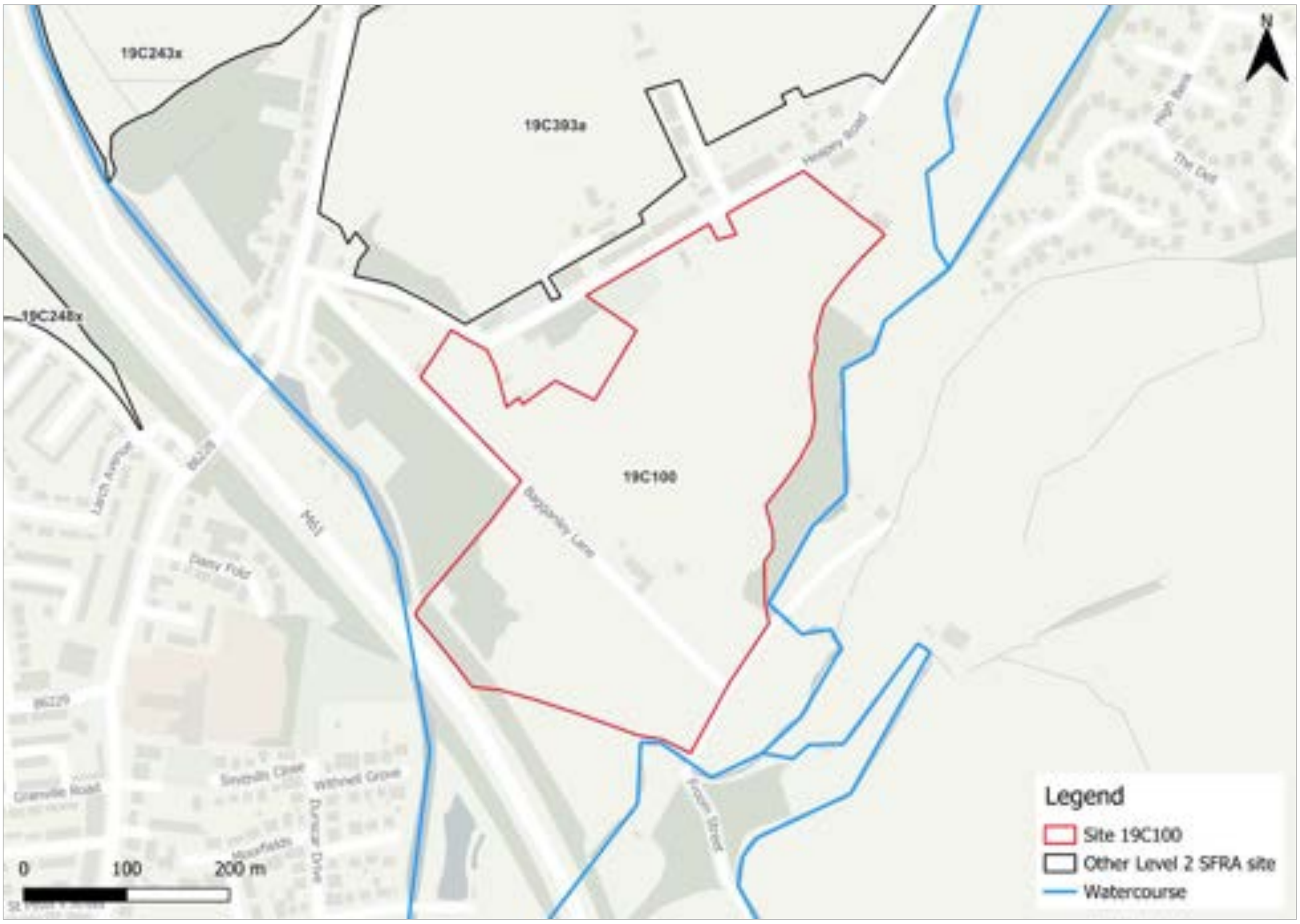

Figure 1-1: Existing site location boundary

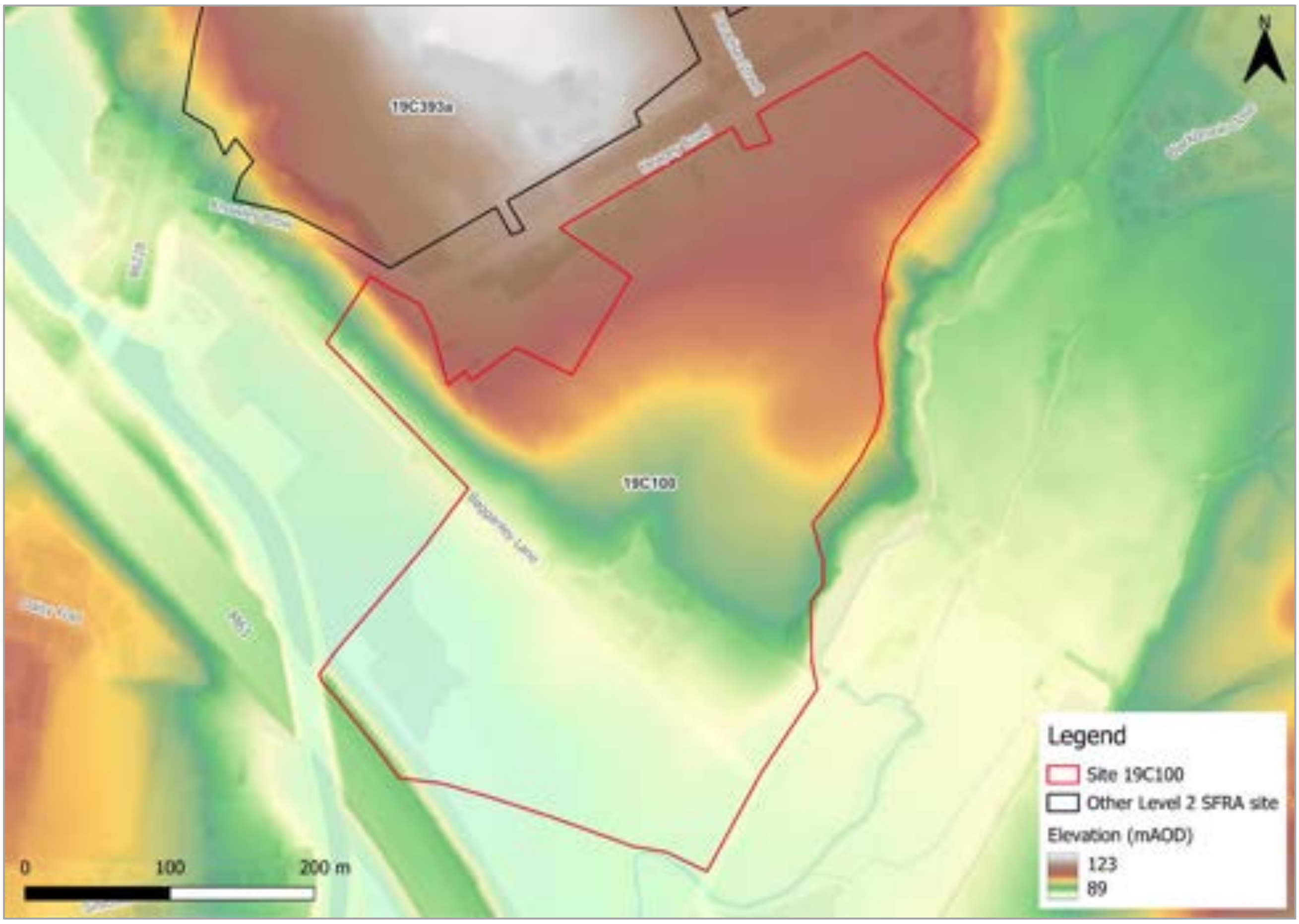

Figure 1-2: Topography

2 Flood risk from rivers

2.1 Existing risk

2.1.1 Flood Map for Planning and functional floodplain

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

Approximately 3% of the site is modelled to be within the functional floodplain. Flood Zone 3b is present within the south and southeast of the site. The functional floodplain in this location is conservatively based on the 2% AEP undefended event from the Black Brook 2011 model, in the absence of suitable modelled data. Both Flood Zone 3a and Flood Zone 2 are present within the southwest of the site. The remaining area of the site is modelled to be within Flood Zone 1.

Table 2-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
78	9	10	3

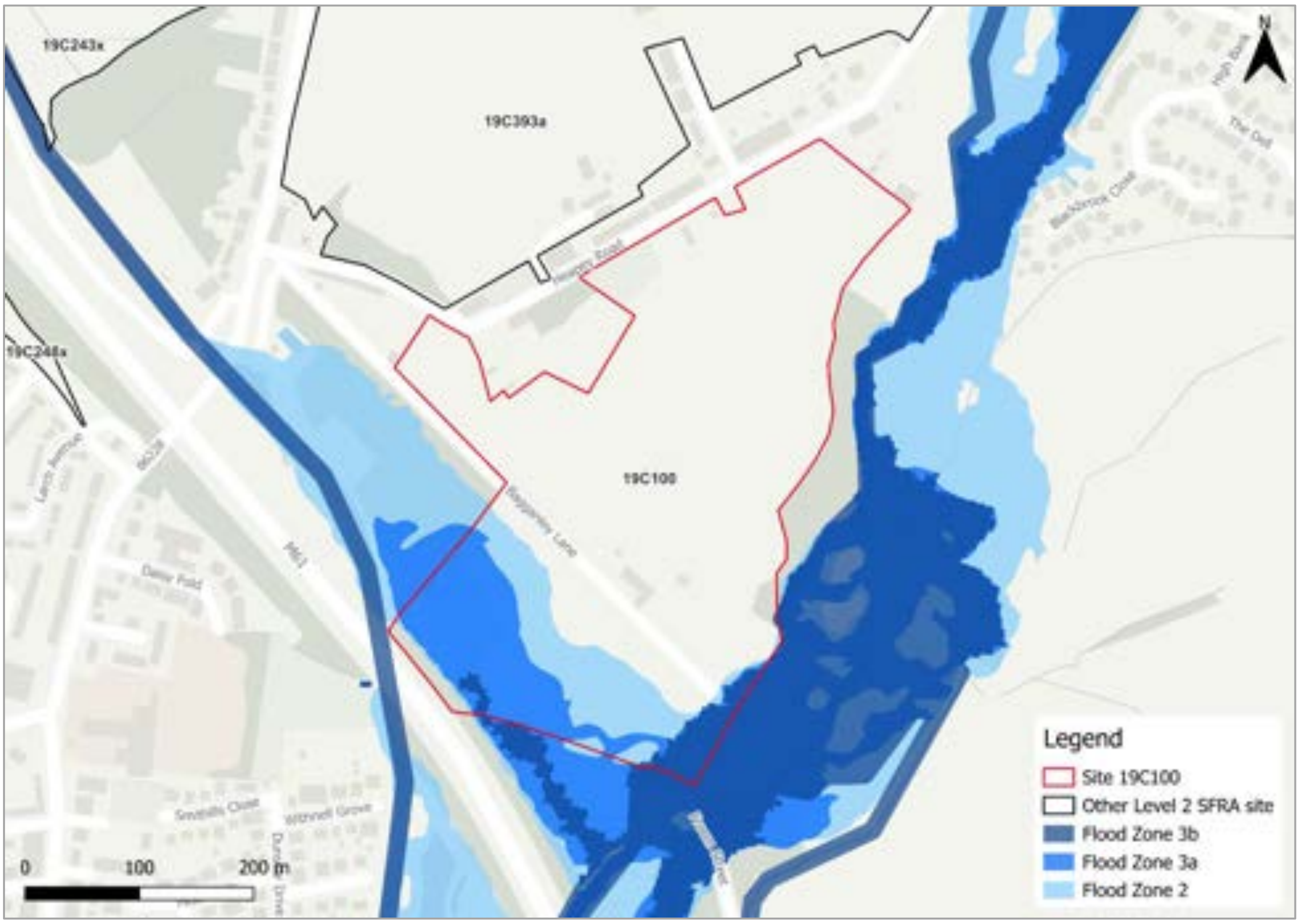

Figure 2-1: Existing risk from rivers to the site

2.1.2 Black Brook 2011 model outputs

Figure 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Modelled risk to the site is confined to the south and southeast of the site. Maximum flood depths within the site are largely modelled to be between 0.6 and 0.9 m. Figure 2-3 shows the modelled flood hazard ratings for the 1% AEP undefended event. Flood hazards within the site are largely categorised as 'Danger for some'. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event.

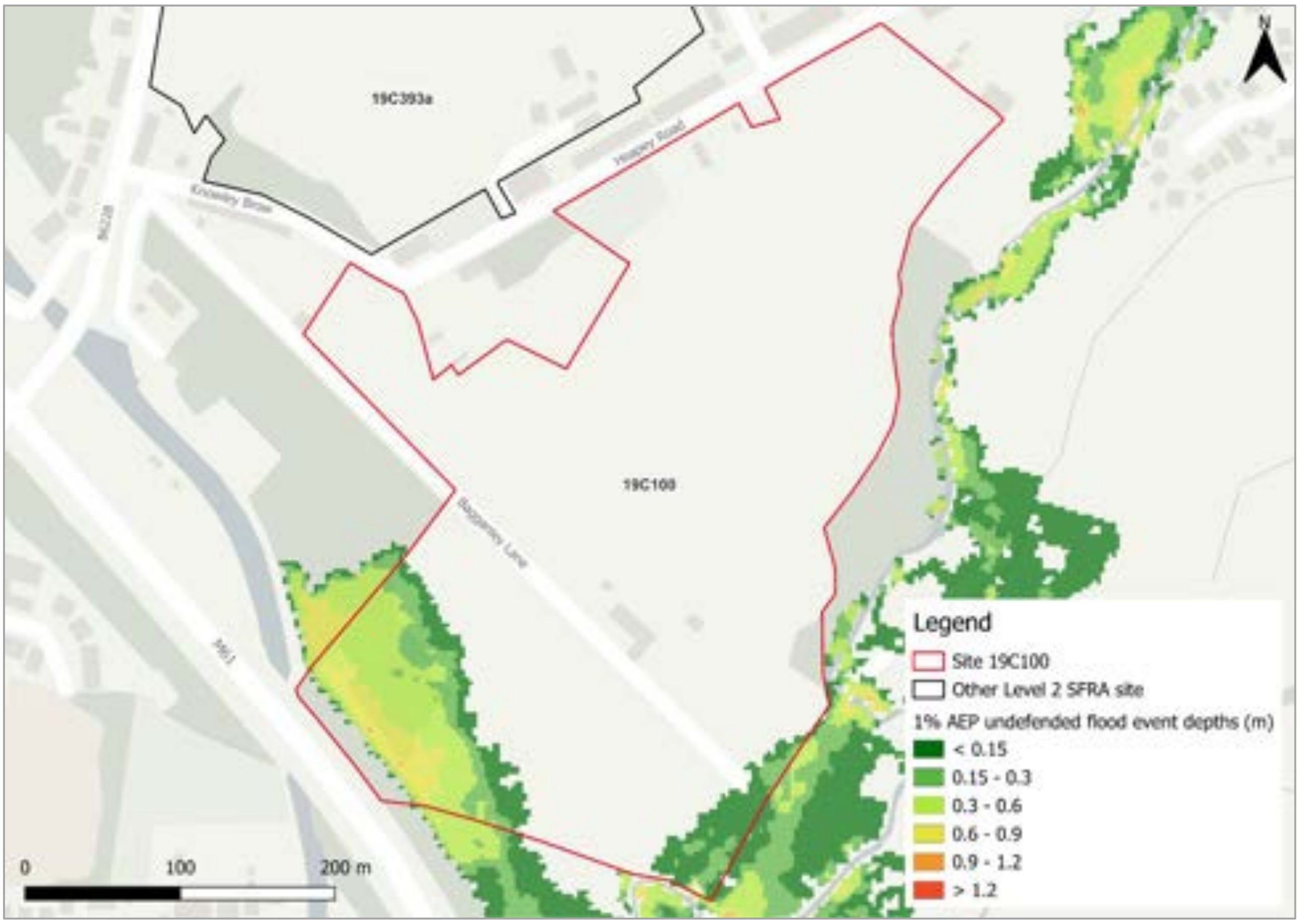

Figure 2-2: Flood depths for 1% AEP undefended flood event

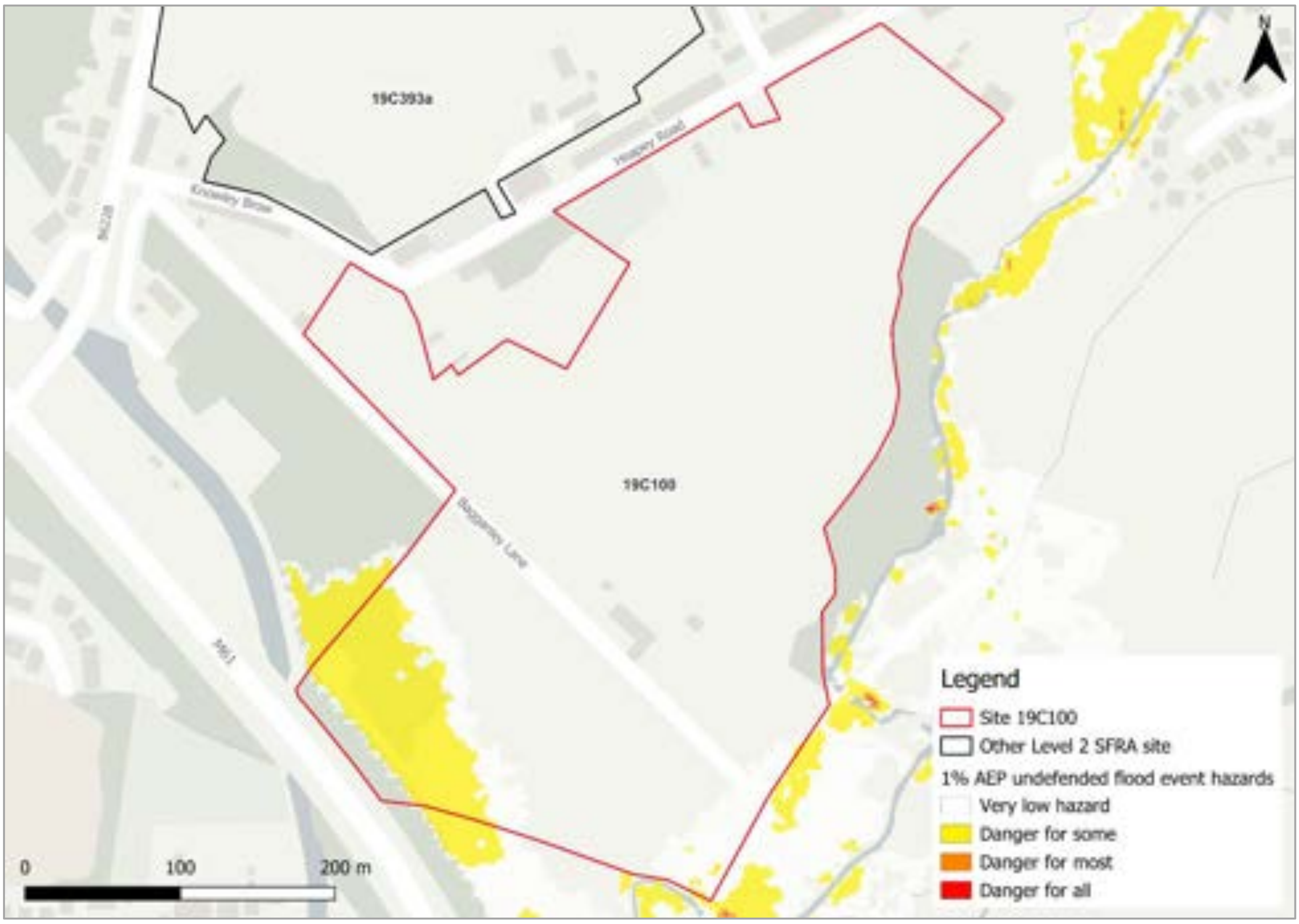

Figure 2-3: Flood hazard[1] for 1% AEP undefended flood event

2.2 Impacts from climate change

The impacts of climate change on flood risk from the Black Brook have been modelled without flood defence infrastructure in place. This allows for direct comparison with the existing risk of the Flood Map for Planning.

With consideration of the EA's SFRA guidance, the latest 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 Douglas Management Catchment

Return period	Central allowance 2080s	Higher central allowance 2080s
3.3% (functional floodplain)	35%	47%
1%	35%	47%

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.

In the climate change event, the site is modelled to be at risk within the south and west. Figure 2-4 shows the modelled flood depths during the 1% AEP undefended flood event +47% climate change allowance. Flood depths within the site are modelled to be > 1.2 m adjacent to the southwestern site boundary. Figure 2-5 shows the modelled flood hazard rating during the 1% AEP undefended flood event +47% climate change allowance. Flood hazard within the site is largely modelled to be categorised as 'Danger for some'.

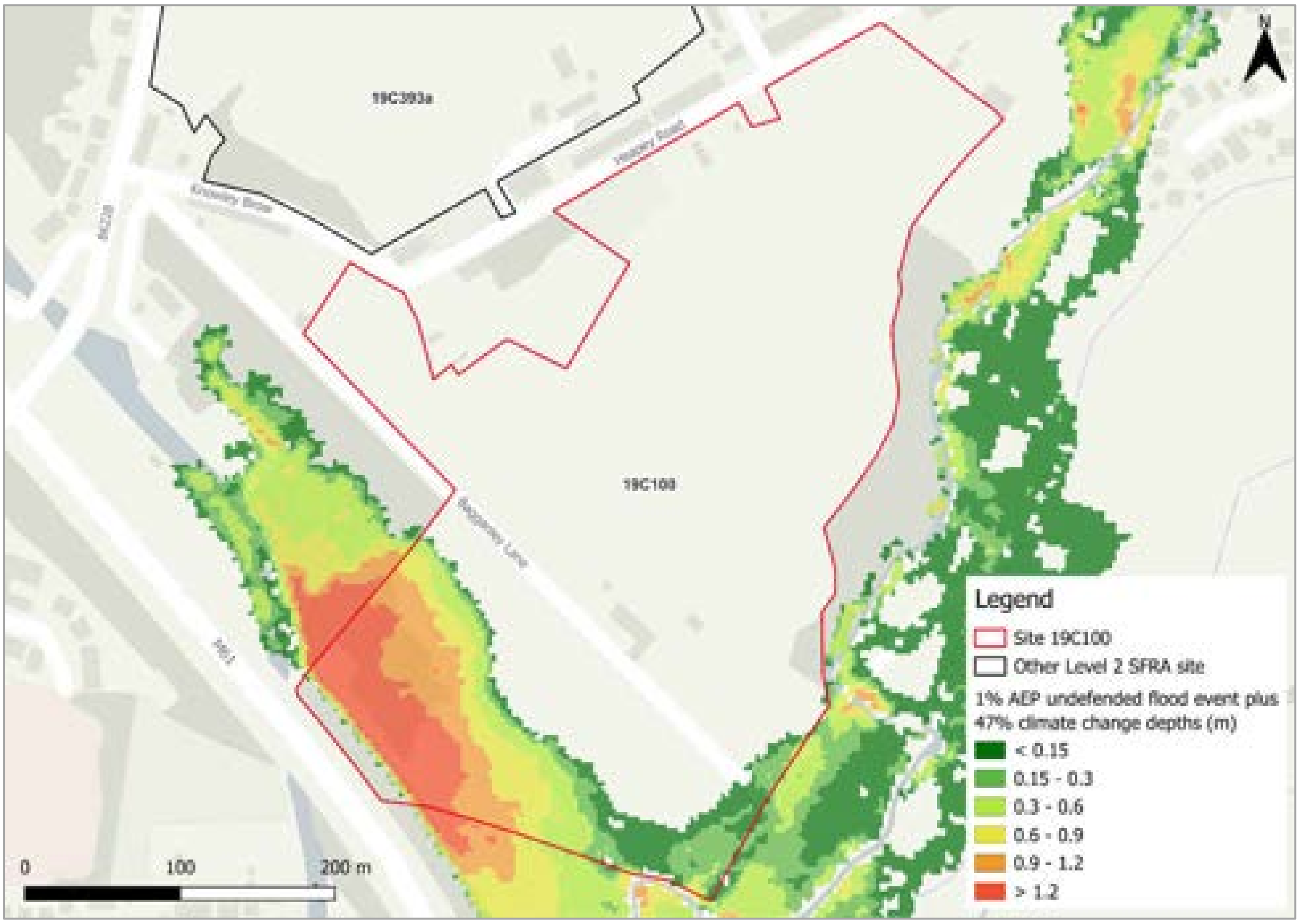

Figure 2-4: Flood depths for 1% AEP undefended flood event +47% (higher central climate change allowance)

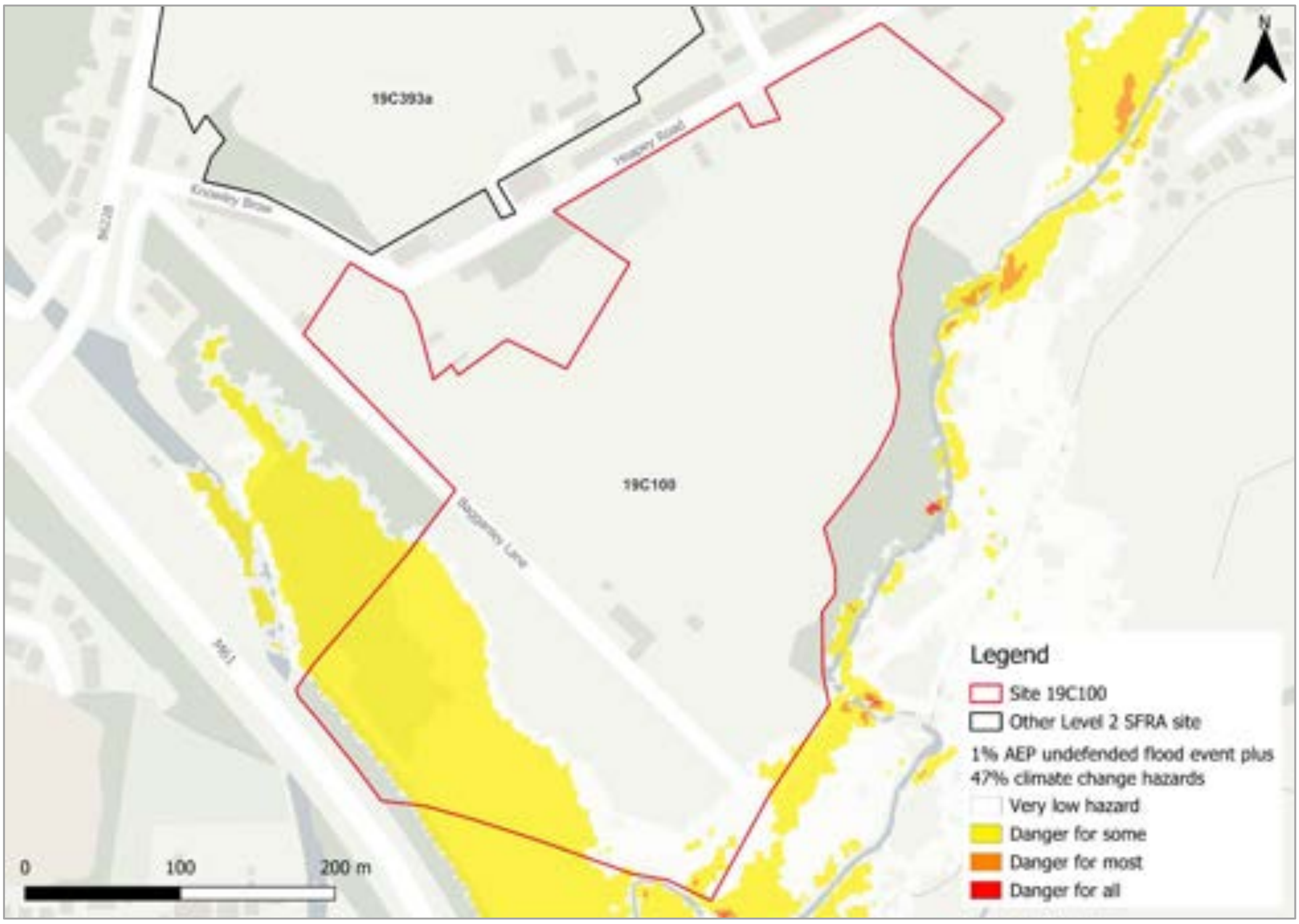

Figure 2-5: Flood hazard for 1% AEP undefended flood event +47% (higher central climate change allowance)

2.3 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

2.3.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C100 is located within two catchments, namely; Lostock US Farington Weir and Yarrow US Big Lodge Water. These are ranked as a medium and low sensitivity catchments respectively. Planning policy considerations for sites at low and medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[2].
- Developments should be incentivised to provide wider betterment by being requested to demonstrate in site-specific FRAs and Surface Water Drainage

2 Lancashire SuDS Guidance

Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.

- Developments are to aim to achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA

2.3.2 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. Both within and upstream of the site, there are significant opportunities for tree planting to reduce runoff. To the east of the site there is also potential to reconnect the channel to the floodplain along Black Brook, allowing flood water to be stored. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown on Figure 2-6.

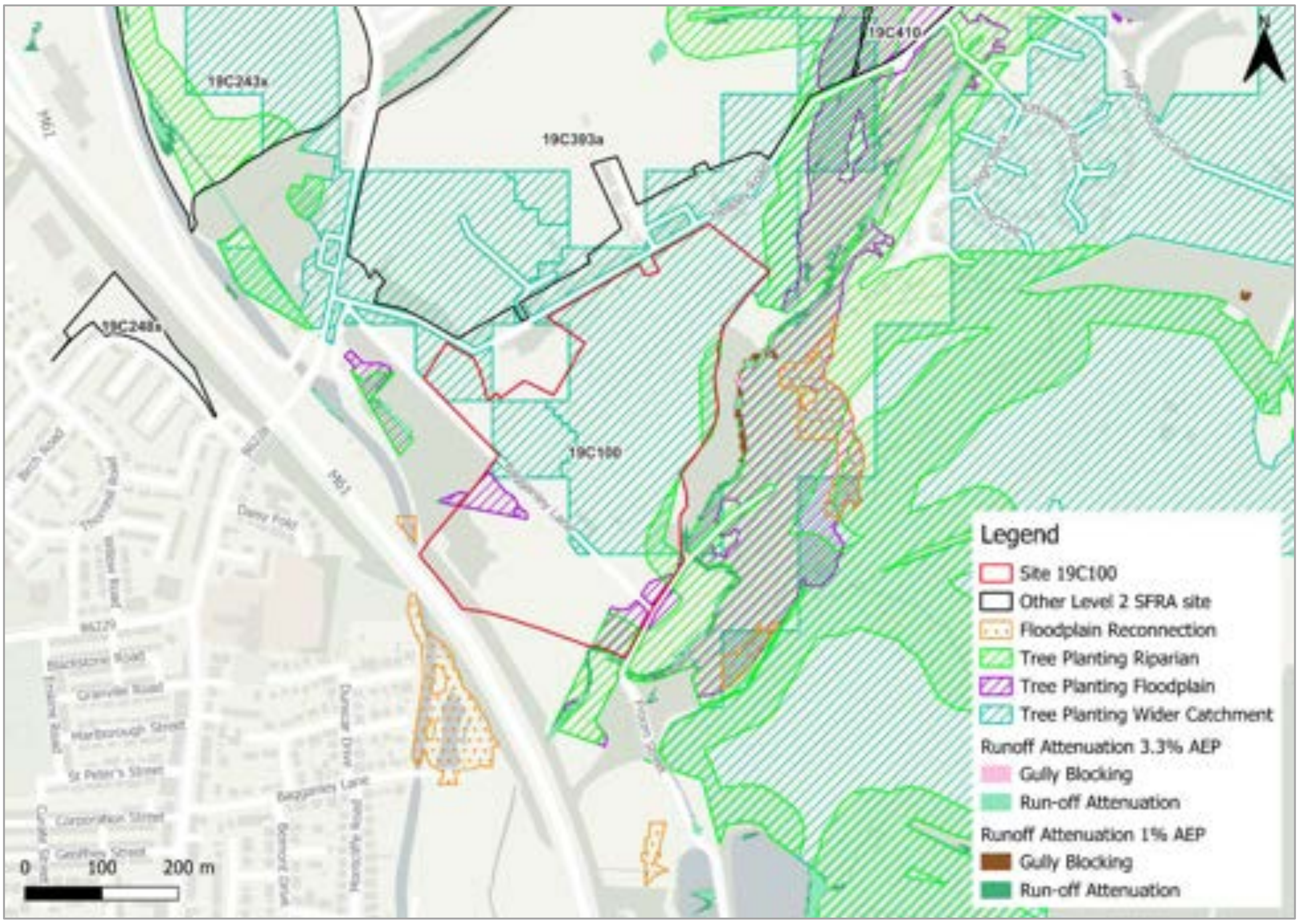

Figure 2-6: Natural Flood Management (NFM) potential mapping

2.4 Residual risk

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

Residual risk at this site comes from possible blockage of the culvert beneath the M61 which is downstream of the site. The impact of a blockage of this structure has been modelled as part of this Level 2 SFRA, based on the Black Brook 2011 model. Section 2.4.1 presents the blockage modelling outputs.

2.4.1 M61 culvert blockage

Figure 2-7 shows the culvert blockage modelled depths were there to be a 75% blockage the Black Brook culvert beneath the M61. The modelled event represents the 1% AEP undefended event plus 47% climate change allowance. There is greater modelled risk to the site if there were to be a blockage at the M61 in comparison to the baseline climate change event. Maximum flood depths across a large proportion of the area at risk are modelled to be > 1.2 m. Modelled flood hazard is largely categorised as 'Danger for some' with some areas of 'Danger for most' (Figure 2-8).

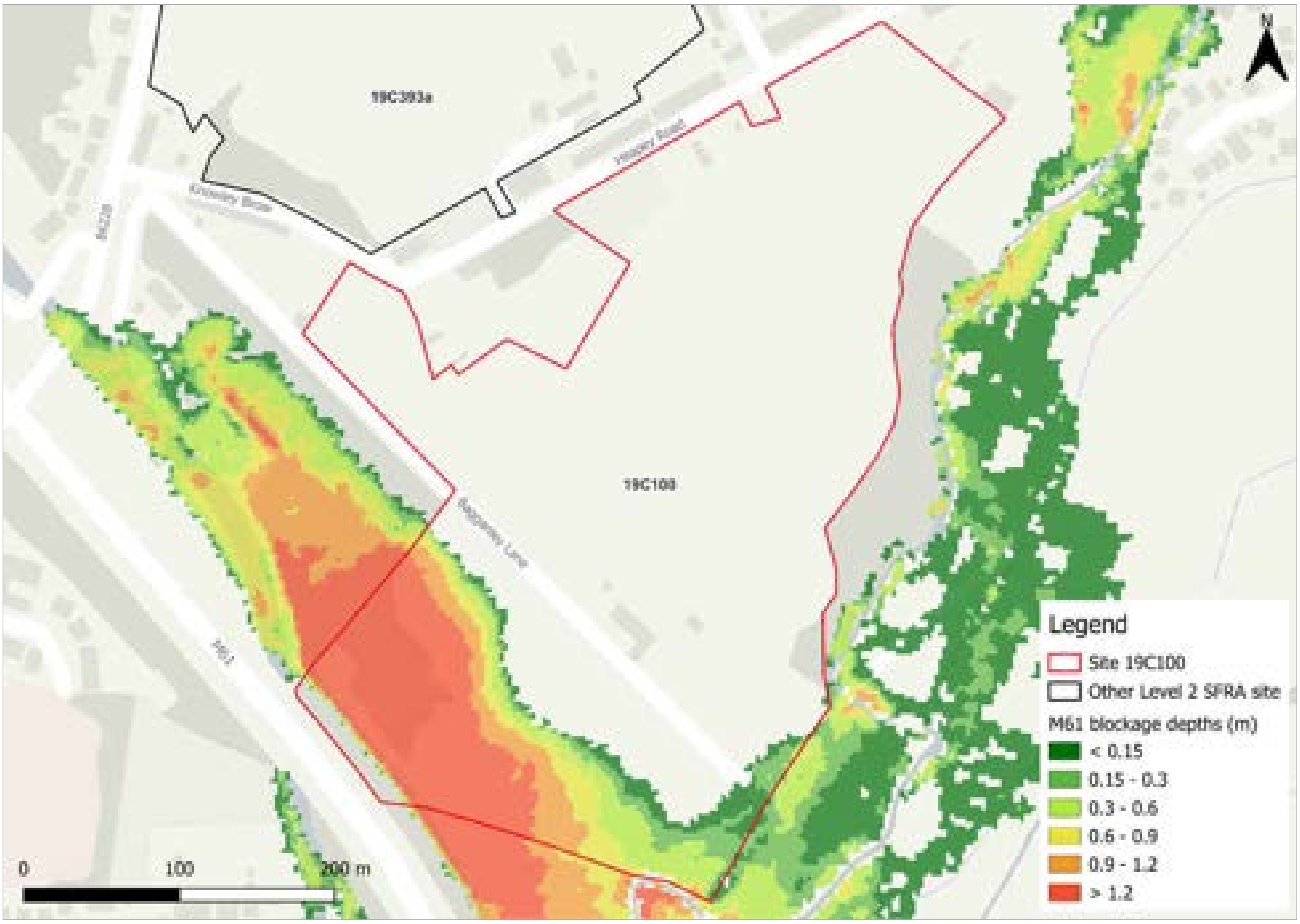

Figure 2-7: Flood depths (m) based on a potential M61 culvert blockage during a 1% AEP undefended flood event +47% (higher central climate change allowance)

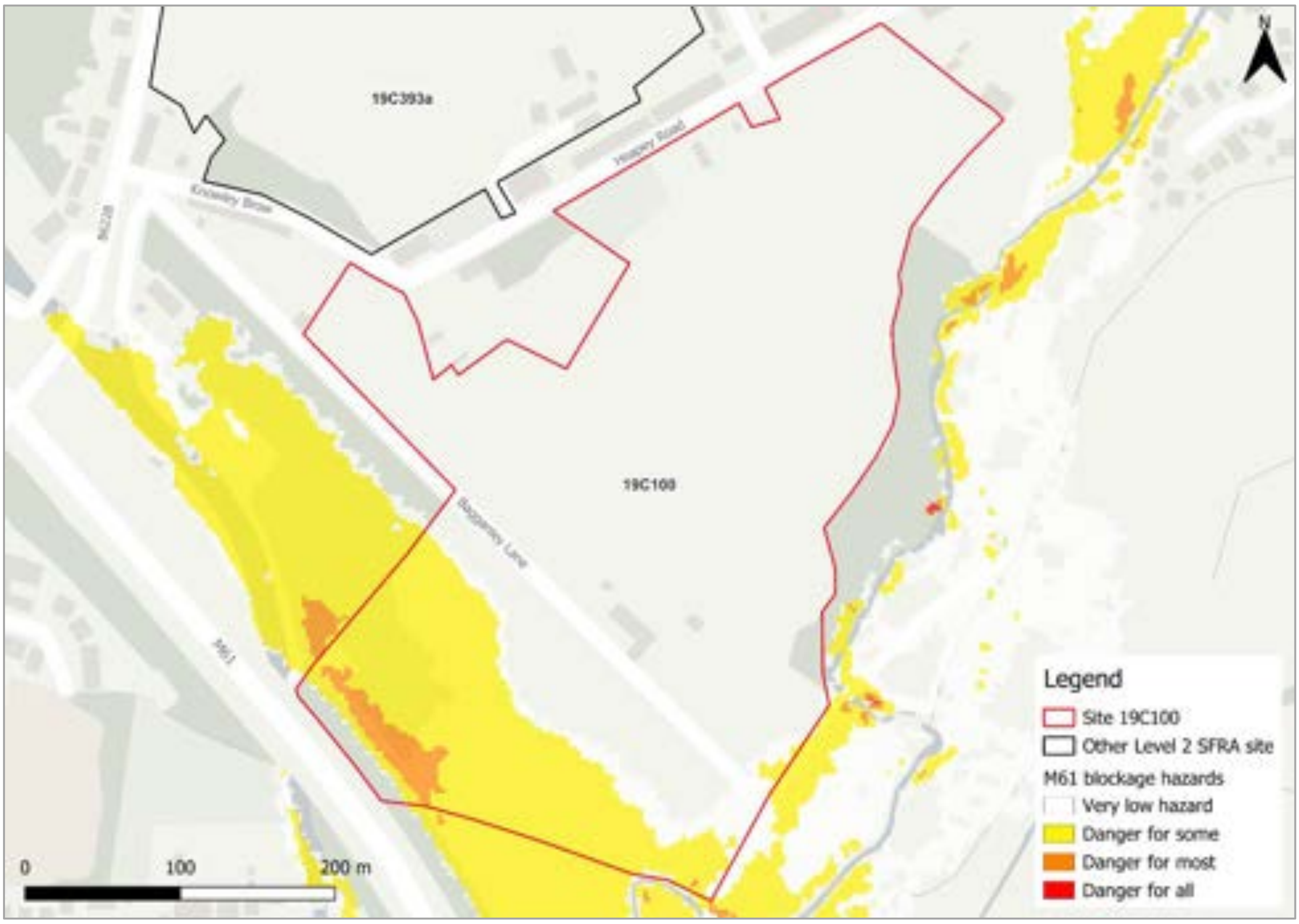

Figure 2-8: Flood hazards based on a potential M61 culvert blockage during a 1% AEP undefended flood event +47% (higher central climate change allowance)

2.4.2 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 2-9 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 from Anglezarke, Heapey No.1, Heapey No.2, Heapey No.3, High Bullough and Yarrow reservoirs, all of which are located within Lancashire. Three of these reservoirs are operated by United Utilities and three are operated by Wigan & District Angling Association.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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. At the FRA stage, United Utilities and Wigan & District Angling Association, should be contacted to ascertain whether the proposed development could affect the reservoir's risk designation, it's 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.

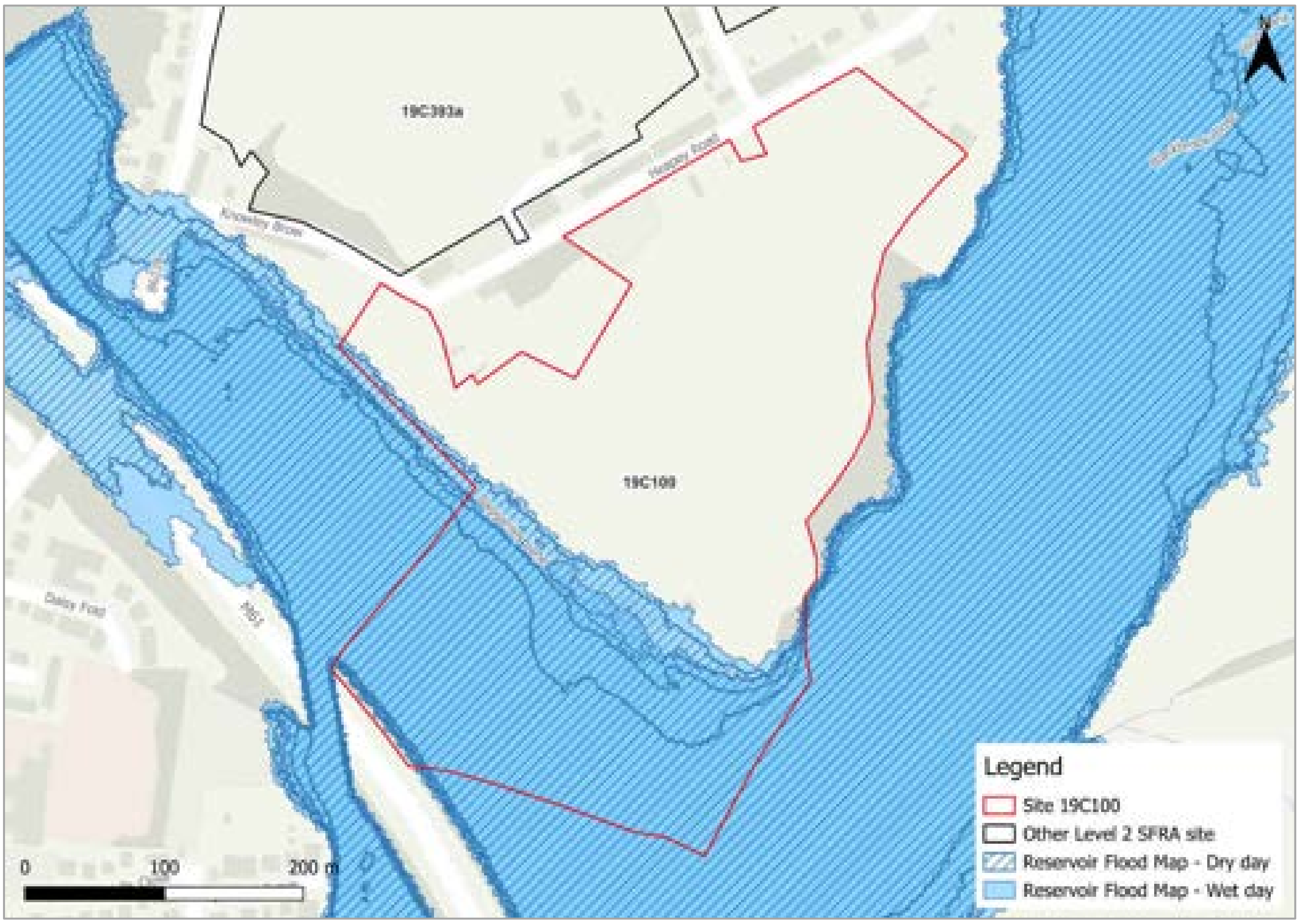

Figure 2-9: Flood risk from reservoirs

2.5 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

2.6 Flood warning and access and escape routes

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. Site 19C100 is located within one FWA, namely; 012FWFL59B - Black Brook at Chorley, Heapey Road to Cowling, as shown in Figure 2-10.

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 a FWA. The site is also located within a FAA, namely; 012WAFLY - River Lostock and River Yarrow.

Based on available information, safe access and escape routes could likely be achieved during a flood event from the west of the site via Bagganley Lane to the B6228.

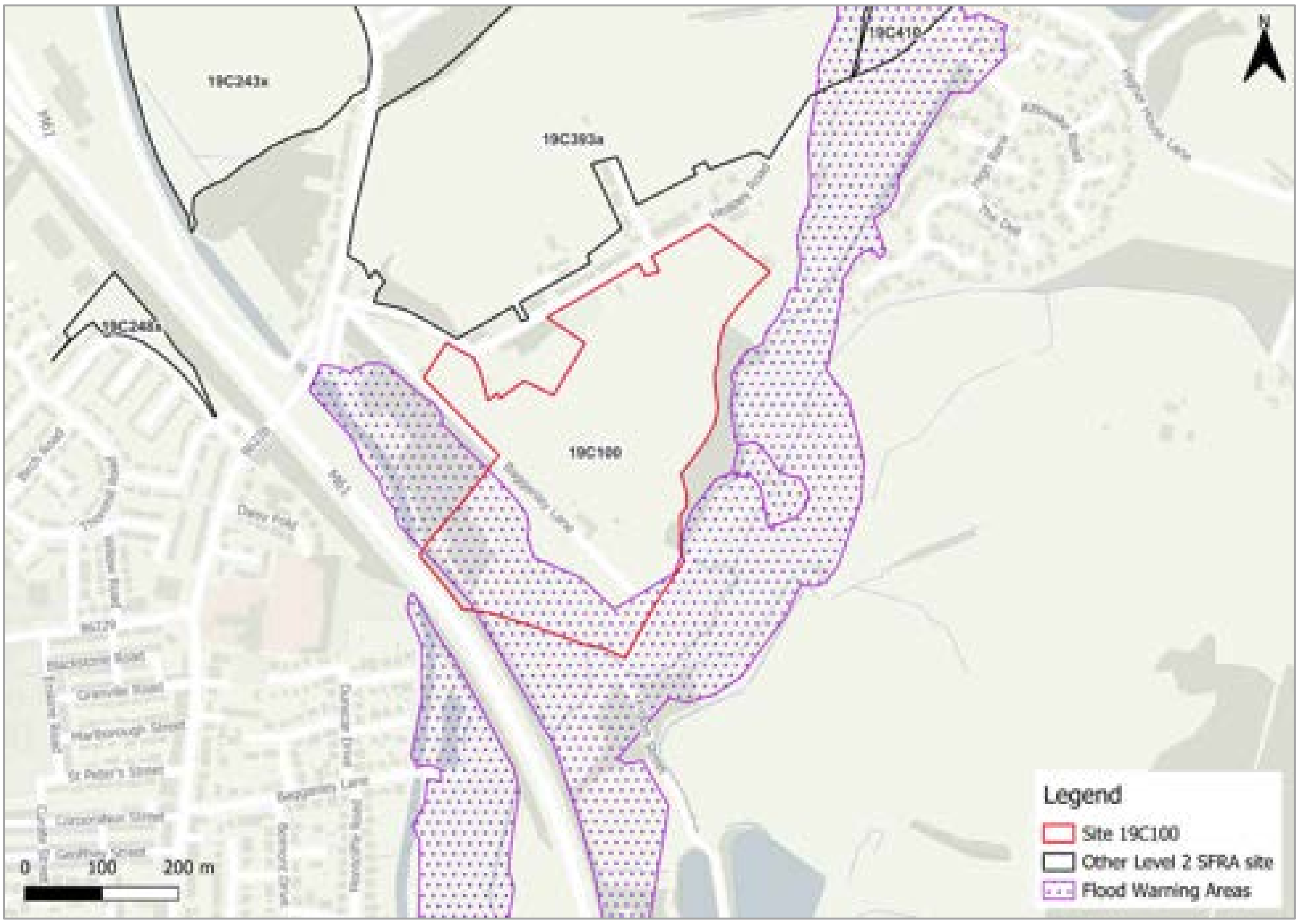

Figure 2-10: EA Flood Warning Areas

2.7 Observations, mitigation options and site suitability - fluvial

- The site is modelled to be within the functional floodplain in the south and southeast of the site. Development is not permitted within the functional floodplain. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value. However, the functional floodplain is conservatively based on the Black Brook 2011 2% AEP undefended event.
- Ordinary Watercourse Flood Defence Consent (OWFDC) may be required if development is planned within 8m of the riverbank. The LLFA can advise on whether this would be required. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
- The site is partially located in Flood Zone 3a, as indicated by the Black Brook 2011 model 1% AEP undefended event outputs. Greatest depths within the site boundary are modelled to be between 0.6 and 0.9 m.
- The impacts of climate change on flood risk from Black Brook have been modelled without flood defence infrastructure in place using climate change allowances for peak river flows for the Douglas Management Catchment. Based on this approach, fluvial risk is modelled to be greater in extent to the present day 1% undefended event outputs, covering the south of the site.
- More vulnerable development should be directed away from the area of the site within the modelled Flood Zone 3 plus climate change extent.
- The site is at residual risk from possible blockage of the culvert beneath the M61 which is downstream of the site. Modelled risk shows increased flood extent, depths and hazards during the blockage scenario.
- The LPA should use the information on residual risk in this Level 2 SFRA to state in the local plan strategic policies a preferred mitigation strategy for ensuring development will be safe throughout its lifetime in relation to urban form, risk management and where flood mitigation measures are likely to have wider sustainable design implications (para 042, FRCC-PPG).
- Given the residual risk to this site, the following should be considered:
  - Use of flood resistance and resilience measures,
  - Adequate flood warnings and alerts should remain in place, in consultation with the EA,
  - Provision of emergency escape routes including for vehicular access for emergency services. Judgements on whether the site can be regarded as safe will need to consider the feasibility and provision of evacuation from the site during a flood.
  - Provision of detailed emergency plans and signage for site users.
- Safe access and escape routes could likely be achieved during a flood event from the west of the site via Bagganley Lane to the B6228, based on available information.

- Given the potential reservoir risk to the site, developers should consider[3]:
    - Whether additional modelling is required to understand the flood risk from the reservoir, referring to the specification for the reservoir flood maps as a starting point
    - Whether the development may have an impact on the reservoir or reservoir owner
    - Referring to the Central Lancashire Level 1 SFRA for information on reservoir risk and recommendations for how to address it
    - Contacting the LPA for pre-application advice
    - Contacting the LPA to understand the need to consult with their emergency planning team and with the reservoir owner
- Were development of this site to proceed, given the proximity of this site to upstream sites 19C410 and 19C393a, and the fact that all sites are adjacent to Black Brook, 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.

3 Reservoir flood maps: when and how to use them | Environment Agency | 2021

3 Flood risk from surface water

3.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly low. Approximately 2% of the site is within the high-risk surface water flood zone. A further 1% is at medium surface water risk, and a further 8% is at low surface water risk, as shown in Table 3-1.

In the high and medium risk events, there is a short surface water flow path along the drainage ditch in the southwest of the site. In the low risk event, surface water risk to the site is greater in the southwestern area, with an additional surface water flow path in the centre of the site. Greatest flood depths in the high risk event are between 0.3 m and 0.6 m (Figure 3-1) with some areas of moderate hazard (Figure 3-2). Safe access and escape routes should be possible via Bagganley Lane in all events.

Table 3-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
89	8	1	2

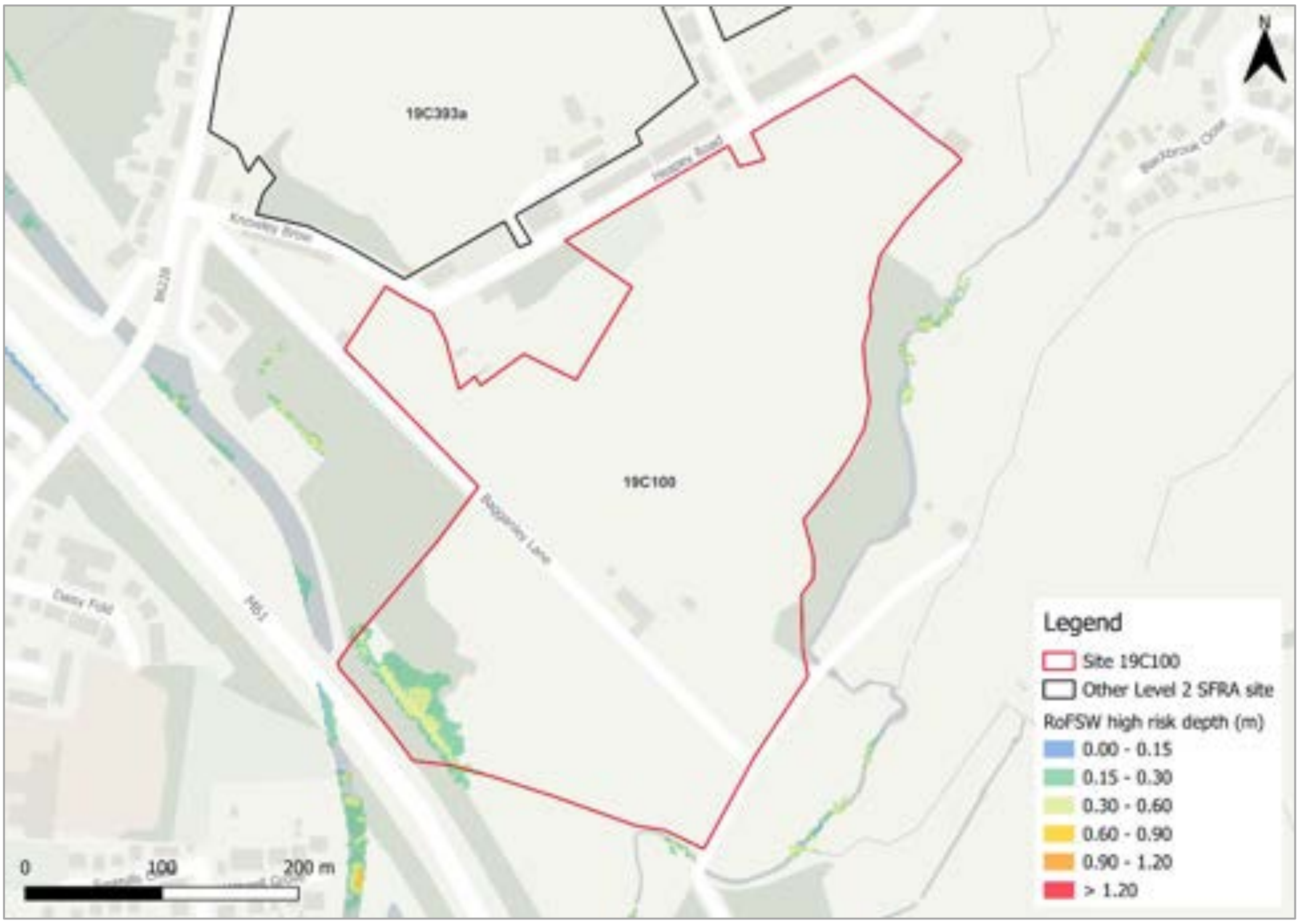

Figure 3-1: High risk event surface water flood depths (Risk of Flooding from Surface Water map)

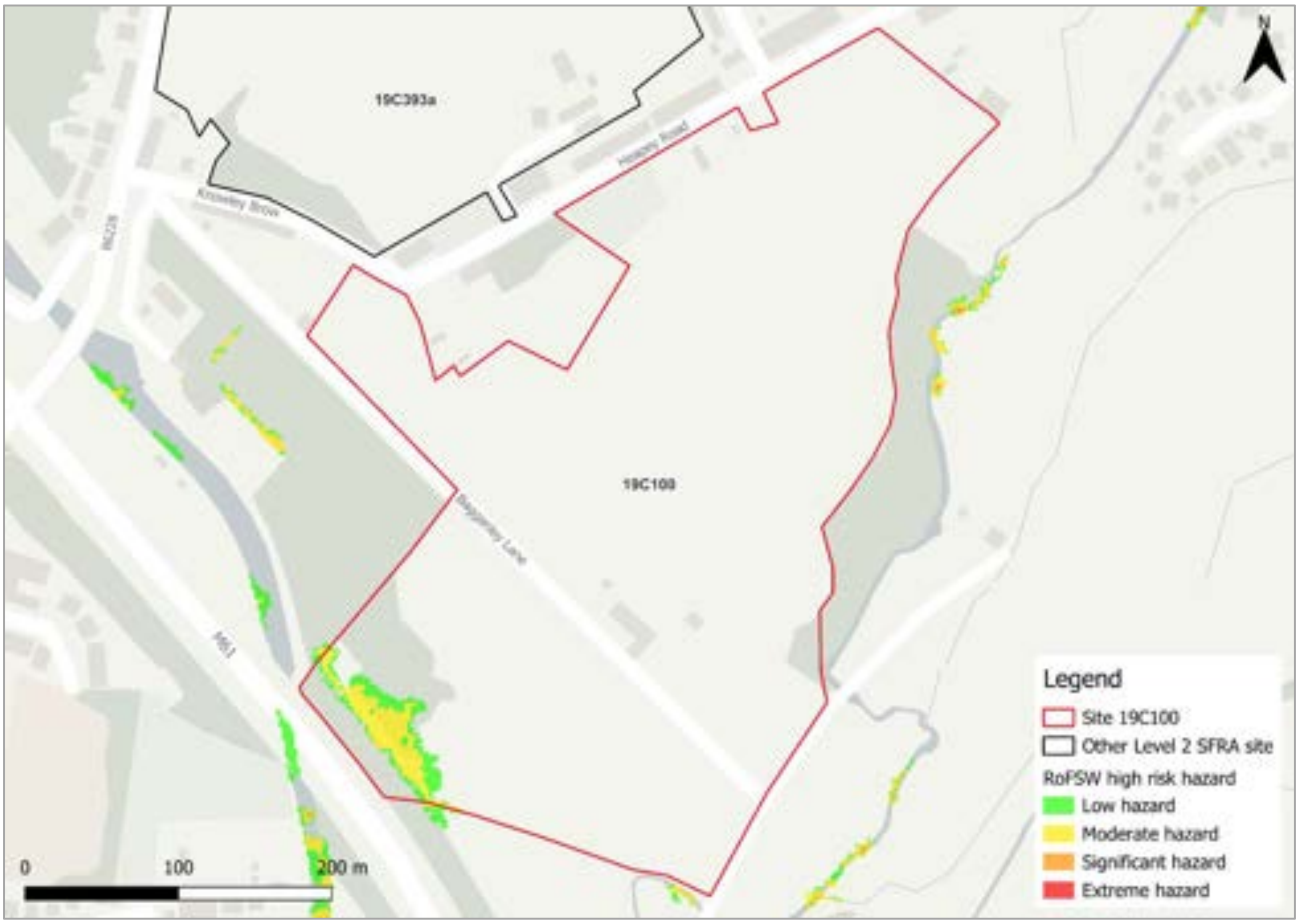

Figure 3-2: High risk event surface water flood hazard[4] (Risk of Flooding from Surface Water map)

3.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 3-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

4 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

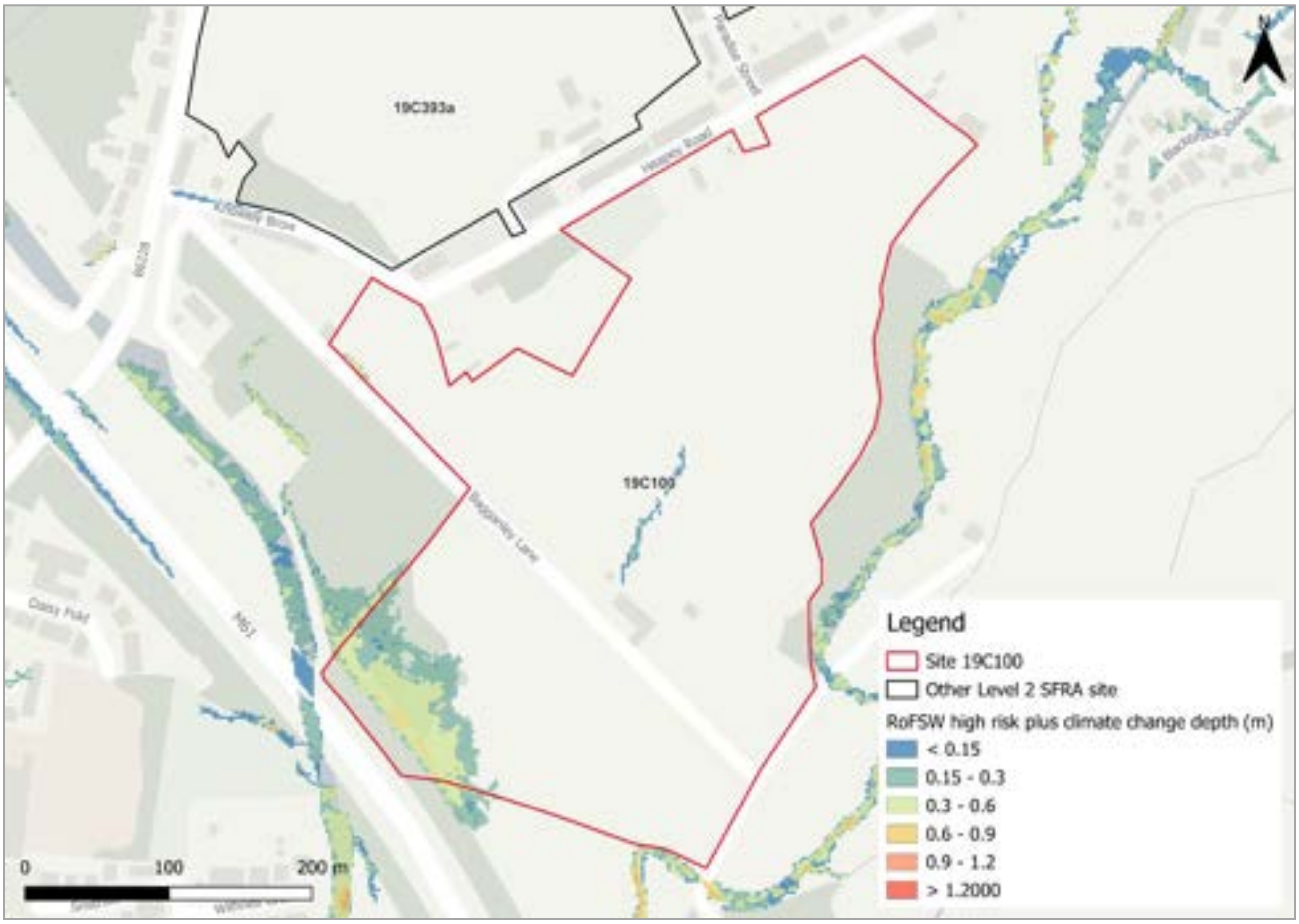

Figure 3-3: High risk event surface water flood depths plus 40% climate change (based on Risk of Flooding from Surface Water map)

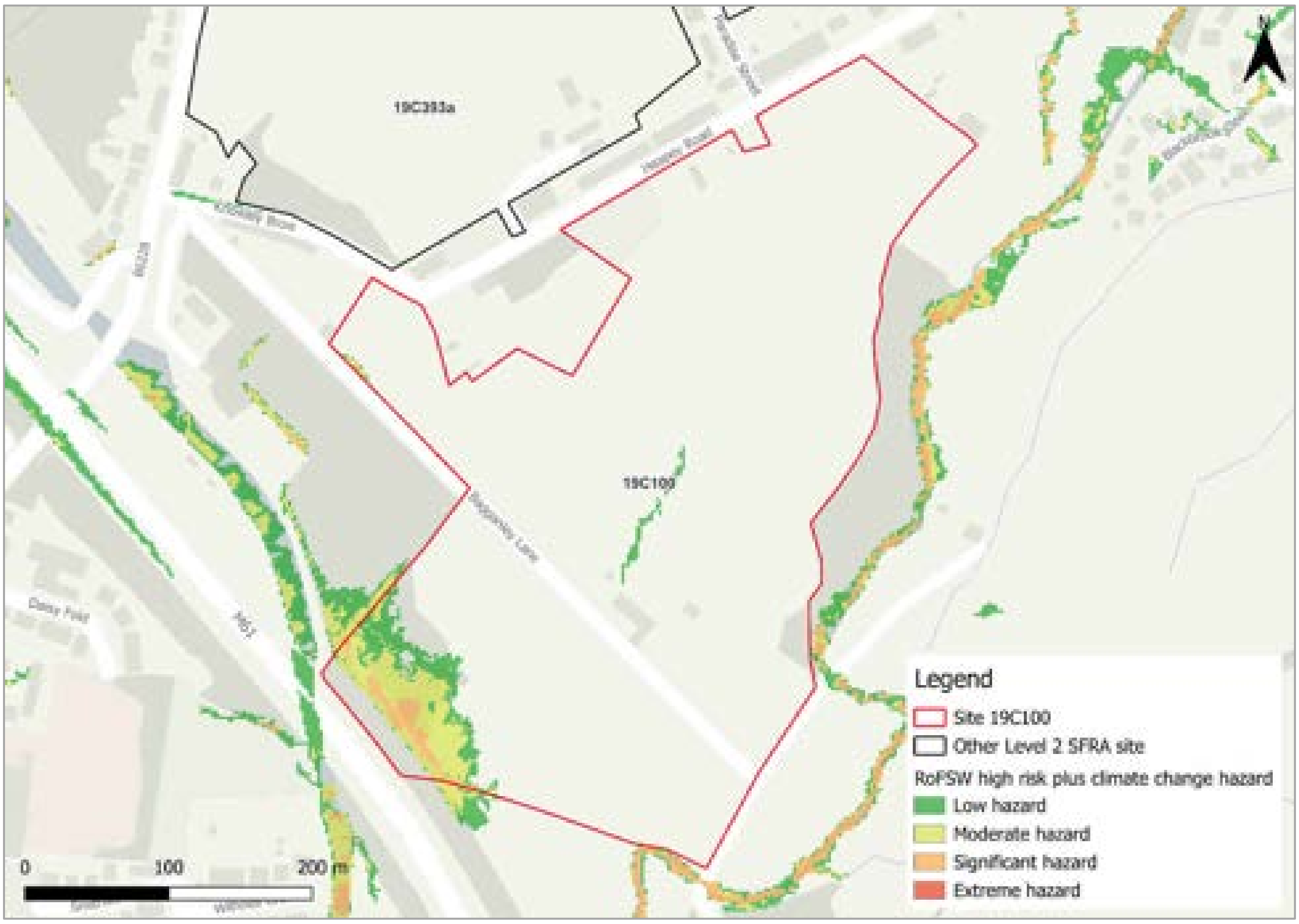

Figure 3-4: High risk event surface water flood hazards plus 40% climate change (based on Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with 89% of the site being at very low surface water flood risk. In all events, surface water risk is largely confined to the south of the site, with a short flow path within a drainage ditch through the centre of the site.
- Safe access and escape routes should be achievable via Bagganley Lane in all events.
- The effects of climate change on surface water have been modelled for this SFRA using the high risk surface water flood depths plus 40% climate change. Surface water risk is greater than present day flood risk with more defined surface water flow paths and a greater area of ponding within the south of the site. Any existing flow paths and topographic depressions should be maintained in site design.
- Were development plans to proceed, a full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.

- 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 or evidence.

4 Risk from groundwater

Risk from groundwater sources 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 Guide[5]. Figure 4-1 show the map for Site 19C100 and the surrounding areas and Table 4-1 explains the risk classifications.

Risk of groundwater emergence various across the site. Within the south of the site there is a risk groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots. Along the eastern boundary and in the north of the site, there is a risk of groundwater emergence to subsurface assets, but surface manifestation of groundwater is unlikely. The rest of the site is in an area where there is low to no risk of groundwater emergence. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions.

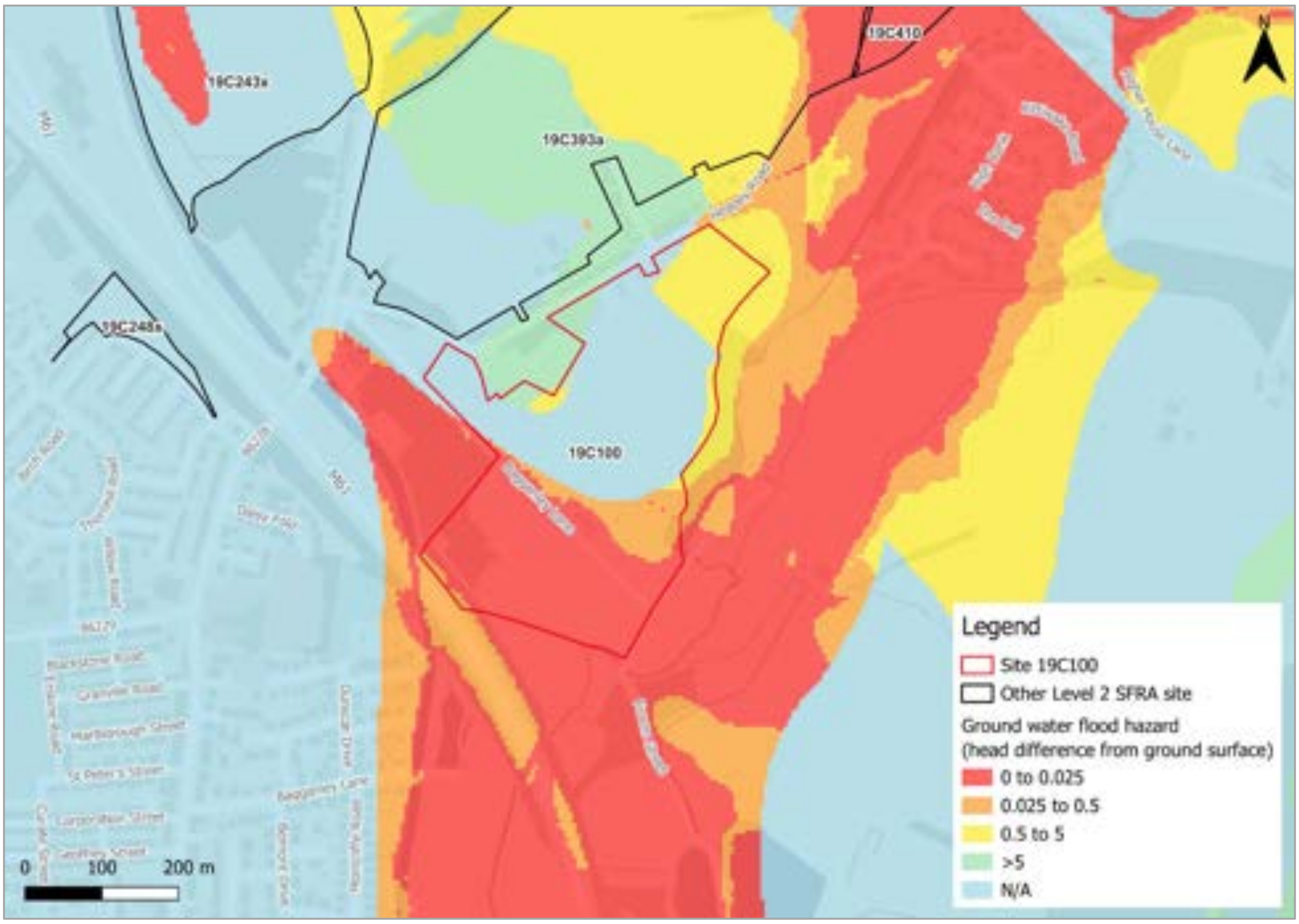

Figure 4-1: JBA 5m Groundwater Emergence Map

5 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 4-1: Groundwater Flood 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.	

5 Overall site assessment

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

To pass part b) of the exception test[6], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development and 100 years for residential development. This site should be able to pass the exception test if development avoids the area of the site within the functional floodplain and modelled to be at risk in the Flood Zone 3a plus climate change event.

5.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- There should be no development within the functional floodplain. There should be no development within 8m of Black Brook. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Ownership and maintenance details should be established for the culvert beneath the M61. It will be important to keep this structure free of blockage. Were this site to be developed, appropriate emergency and evacuation plans must be in place to deal with potential residual risk of infrastructure blockage and failure.
- Based on current information, this site could be allocated if more vulnerable development avoids the area within the functional floodplain and the area to the south of the site modelled to be at risk in the 1% AEP event + 47% climate change.
- A detailed drainage strategy will be required for any new development given the large area of this site being converted from open space to development.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Any FRA should undertake a condition assessment of the M61 culvert and further consider residual risk to the site.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

6 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C227x

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0035
Revision	P02
Prepared by	Kaylyn Carroll BSc Technical Assistant
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Contract

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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Kaylyn Carroll of JBA Consulting carried out this work.

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7 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C227x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

7.1 Site 19C227x

- Location: North of Bonds Lane
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 3.39 hectares
- Proposed development impermeable area: 2.89 hectares (assumed 85% impermeable area)
- Watercourse: Leeds and Liverpool Canal
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of present day and future surface water depths and hazards
    - Assessment of all other sources of flood risk
-

Figure 7-1: Existing site location boundary

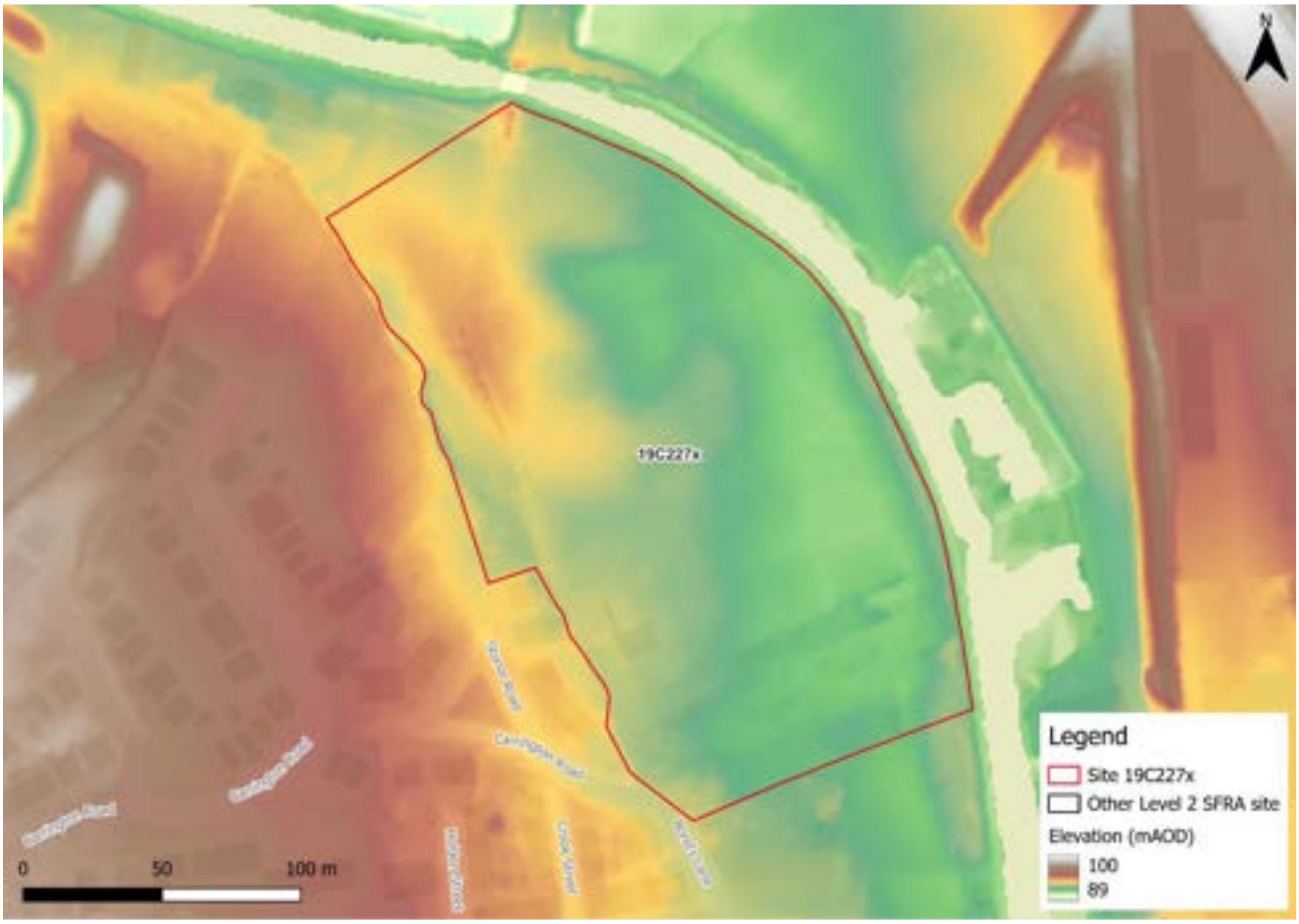

Figure 7-2: Topography

8 Flood risk from rivers

8.1 Existing risk

8.1.1 Flood Map for Planning and functional floodplain

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

The majority of the site is located within Flood Zone 1, indicating low risk from rivers. There is a very small area of the site located within the functional floodplain however this is conservatively based on an 8m buffer of the OS Open Rivers dataset. This is associated with the Leeds and Liverpool Canal rather than fluvial flood risk from a watercourse. The site boundary, in reality, will not enter the channel of the canal. Therefore, this site should be considered to be 100% in Flood Zone 1.

Table 8-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
99	0	0	1

Figure 8-1: Existing risk from rivers to the site

8.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

8.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C227x is located within one catchment, namely; Yarrow US Big Lodge Water. This is ranked as a low sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

8.2.2 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. Within the north of the site, there are opportunities for riparian tree planting, which can slow flows, reduce sediment delivery to the watercourse and reduce bankside erosion. These areas are shown on Figure 8-2.

Figure 8-2: Natural Flood Management (NFM) potential mapping

8.3 Residual risk

The Leeds and Liverpool Canal runs along the eastern boundary of the site. There is no known existing flood model of the canal therefore any residual risk from the canal is unknown at this stage. The canal is raised approximately 1m above the site in some locations. Therefore, the site is at potential residual flood risk from a breach of the canal system. This scenario must be investigated at the FRA stage including full consultation with the Canal & River Trust, the canal operator.

8.3.1 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.

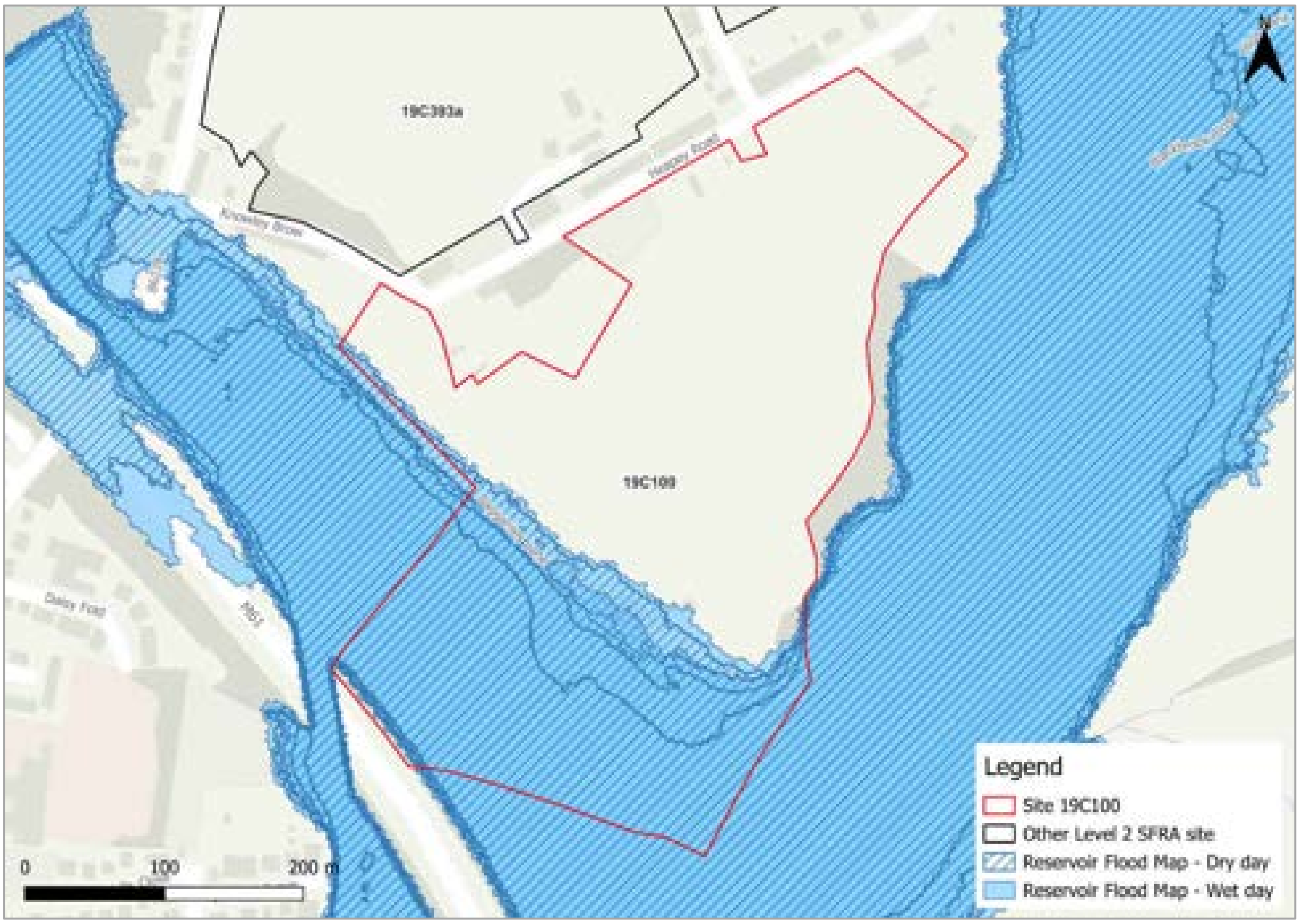

Figure 2-9 shows the RFM in a 'dry day' and 'wet day' scenario. A 'dry day' scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. 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 from Rivington Lower reservoir, located within the district of Chorley. Rivington Lower is operated by United Utilities.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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 United Utilities to ascertain whether the proposed development could affect the reservoir's risk designation, it's 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 8-3: Flood risk from reservoirs

8.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood events within the vicinity of the site.

8.5 Flood warning and access and escape routes

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. The site is not located within a Flood Warning Area.

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. The site is not located within a Flood Alert Area.

Based on available information, safe access and escape routes could likely be achieved during a flood event via Bond's Lane to the south of the site.

8.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- There is a small area of the site shown to be within the functional floodplain, however this is conservatively based on an 8m buffer of the OS Open Rivers dataset representing the Leeds and Liverpool Canal and the site boundary will not enter the canal channel.
- The site is entirely located within Flood Zone 1 and therefore at low flood risk from rivers.
- Given the potential reservoir risk to the site, developers should consider[7]:
    - Whether additional modelling is required to understand the flood risk from the reservoir, referring to the specification for the reservoir flood maps as a starting point
    - Whether the development may have an impact on the reservoir or reservoir owner
    - Referring to the Central Lancashire Level 1 SFRA for information on reservoir risk and recommendations for how to address it
    - Contacting the LPA for pre-application advice
    - Contacting the LPA to understand the need to consult with their emergency planning team and with the reservoir owner
- The residual risk of flooding to the site as a result of a breach or overtopping of the Leeds and Liverpool Canal should be fully investigated, given the proximity of the canal and the fact it is up to 1 metre higher in elevation than the site. Modelling may be required to inform on risk. Consultation will be required with the Canal & River Trust and breach modelling may be required to ascertain residual risk.
- Any development should be set back at least 8 metres from the canal embankment. However, this should be confirmed with the Canal & River Trust.

7 Reservoir flood maps: when and how to use them | Environment Agency | 2021

9 Flood risk from surface water

9.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. 5% of the site is within the high risk surface water flood risk. A further 5% is at medium surface water risk, and a further 12% of the site is at low surface water flood risk, as shown in Table 9-1.

In the high risk event, surface water is confined to topographic low spots across the site. These areas of ponding increase in both depth and extent in the medium risk event. In the low risk event, there is a significant area of surface water risk within the east of the site, with some additional areas of ponding within topographic low spots and additional surface water flow paths flowing through the south of the site.

Greatest surface water flood depths in the medium risk event are between 0.3 and 0.6 m (Figure 3-1) with areas of moderate hazard (Figure 3-2). Safe access and escape routes should be possible via Bond's Lane in all events. Bond's Lane is inundated in the low risk event however depths and hazards are low therefore safe access and escape should still be possible.

Table 9-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
78	12	5	5

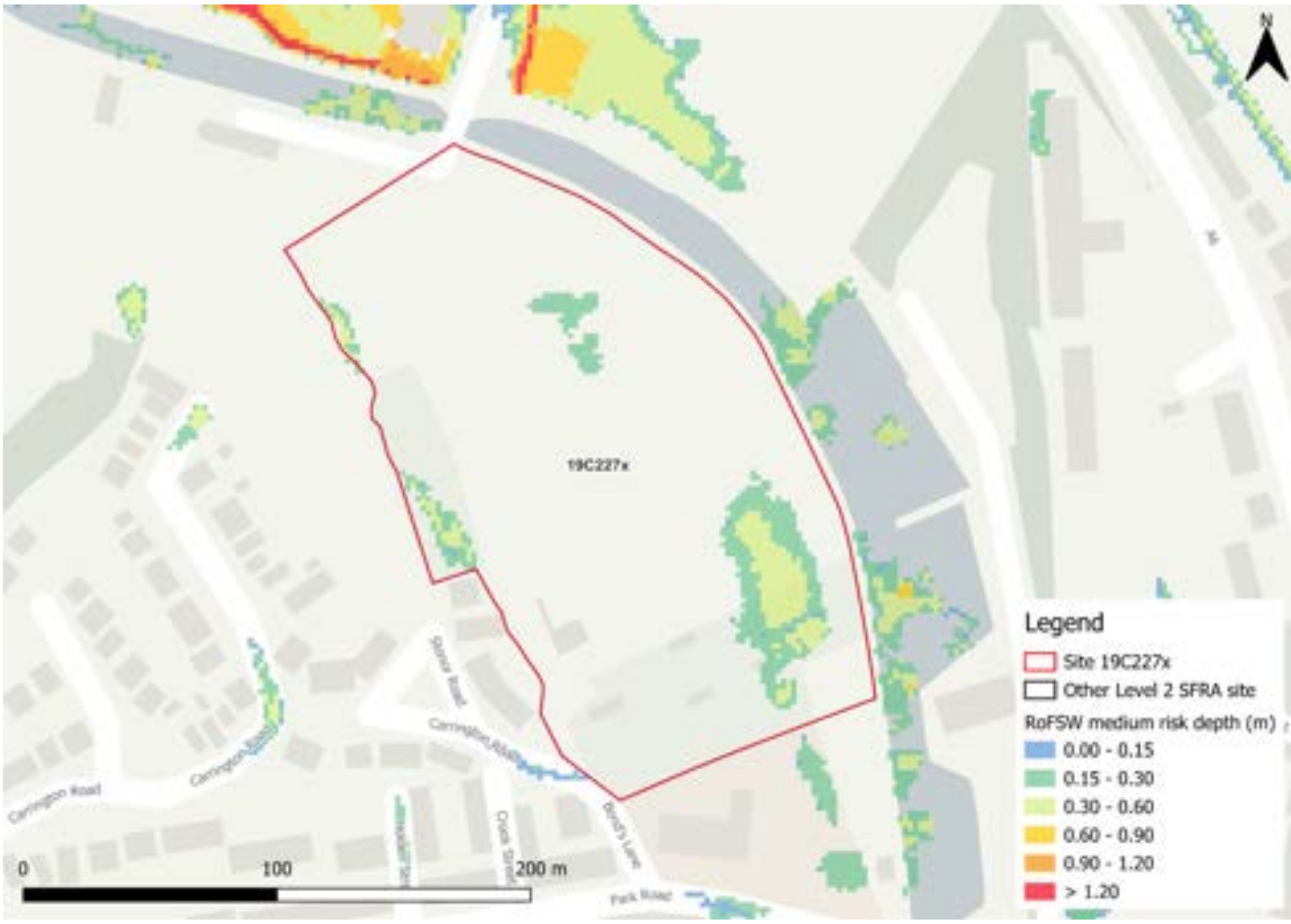

Figure 9-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

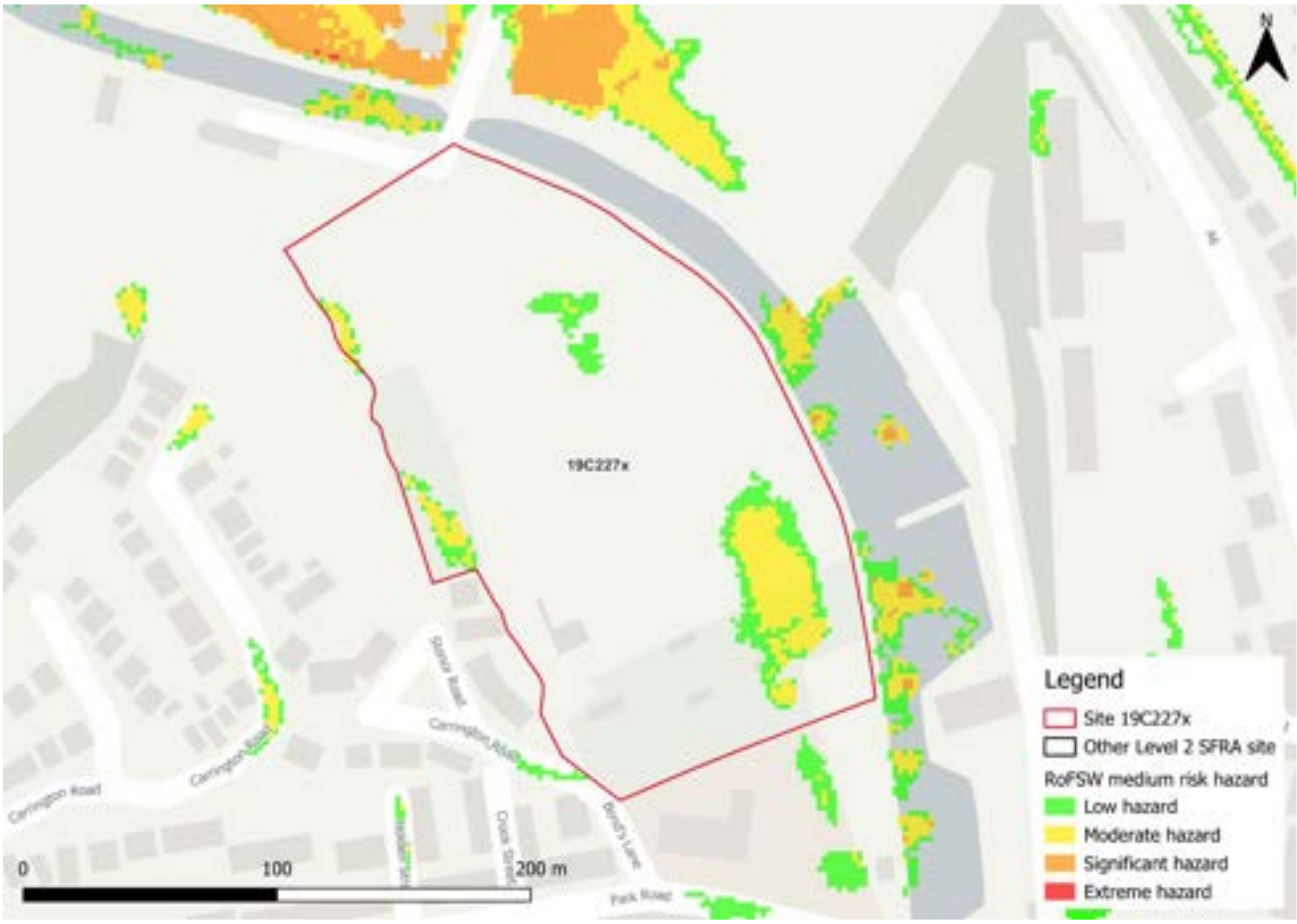

Figure 9-2: Medium risk event surface water flood hazard[8] (Risk of Flooding from Surface Water map)

9.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 9-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

8 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

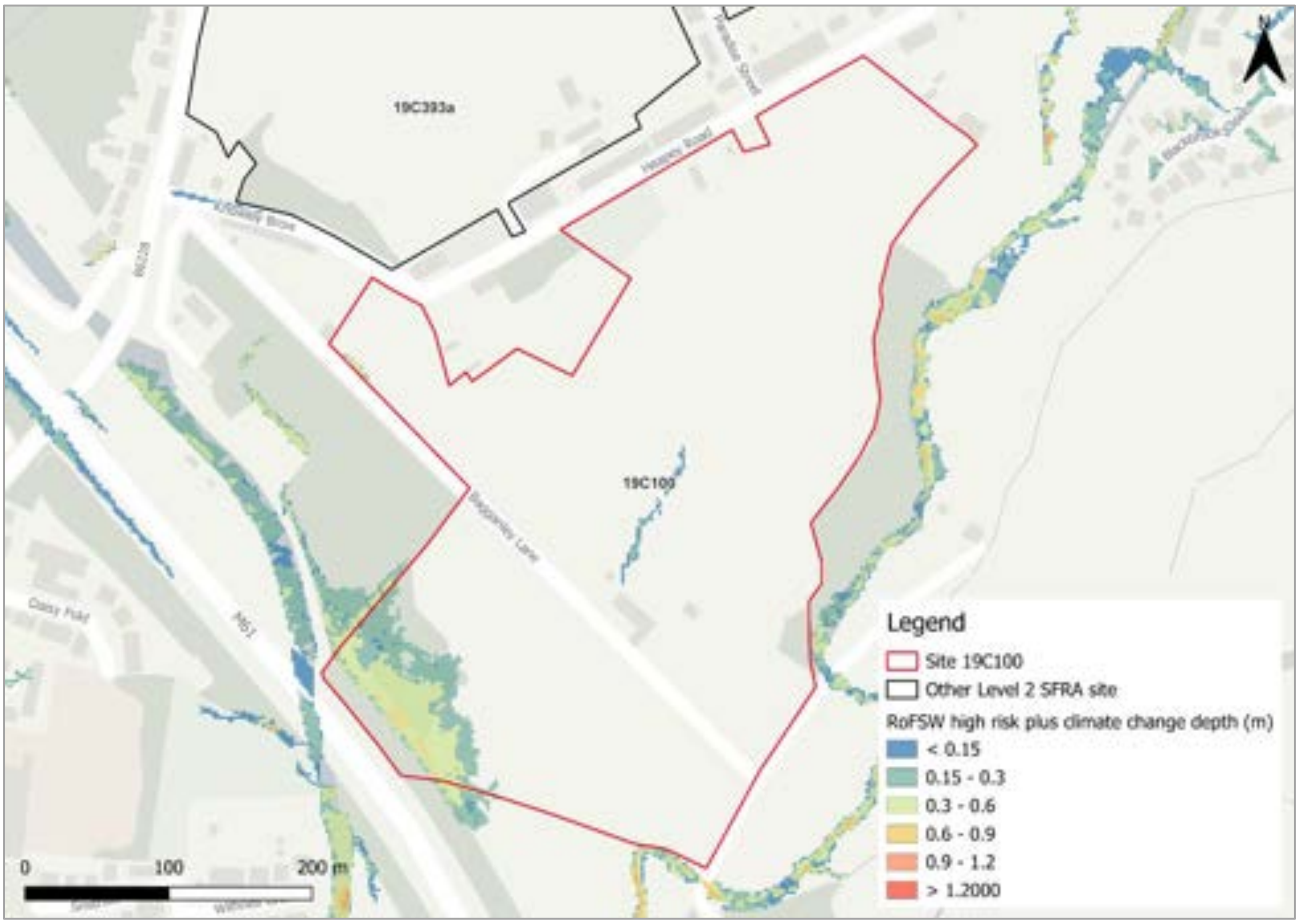

Figure 3-3 shows the modelled surface water depths for the medium risk event +45% climate change. Risk is modelled to be significantly greater than present day conditions, with the medium risk climate change event being similar in extent to the present day low risk event. Maximum flood depths are modelled to be between 0.6 and 0.9 m, with some areas of significant hazard (Figure 3-4).

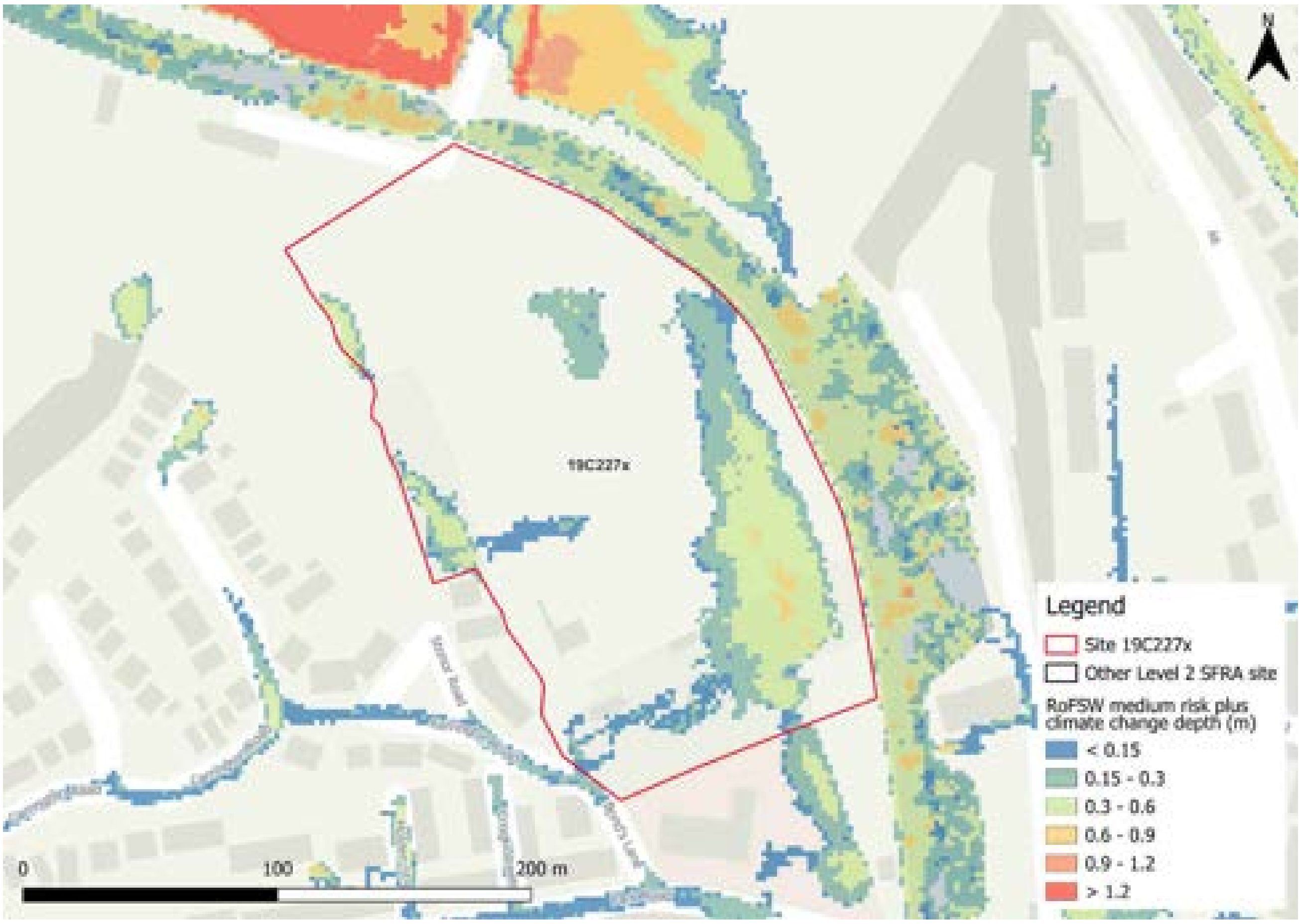

Figure 9-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

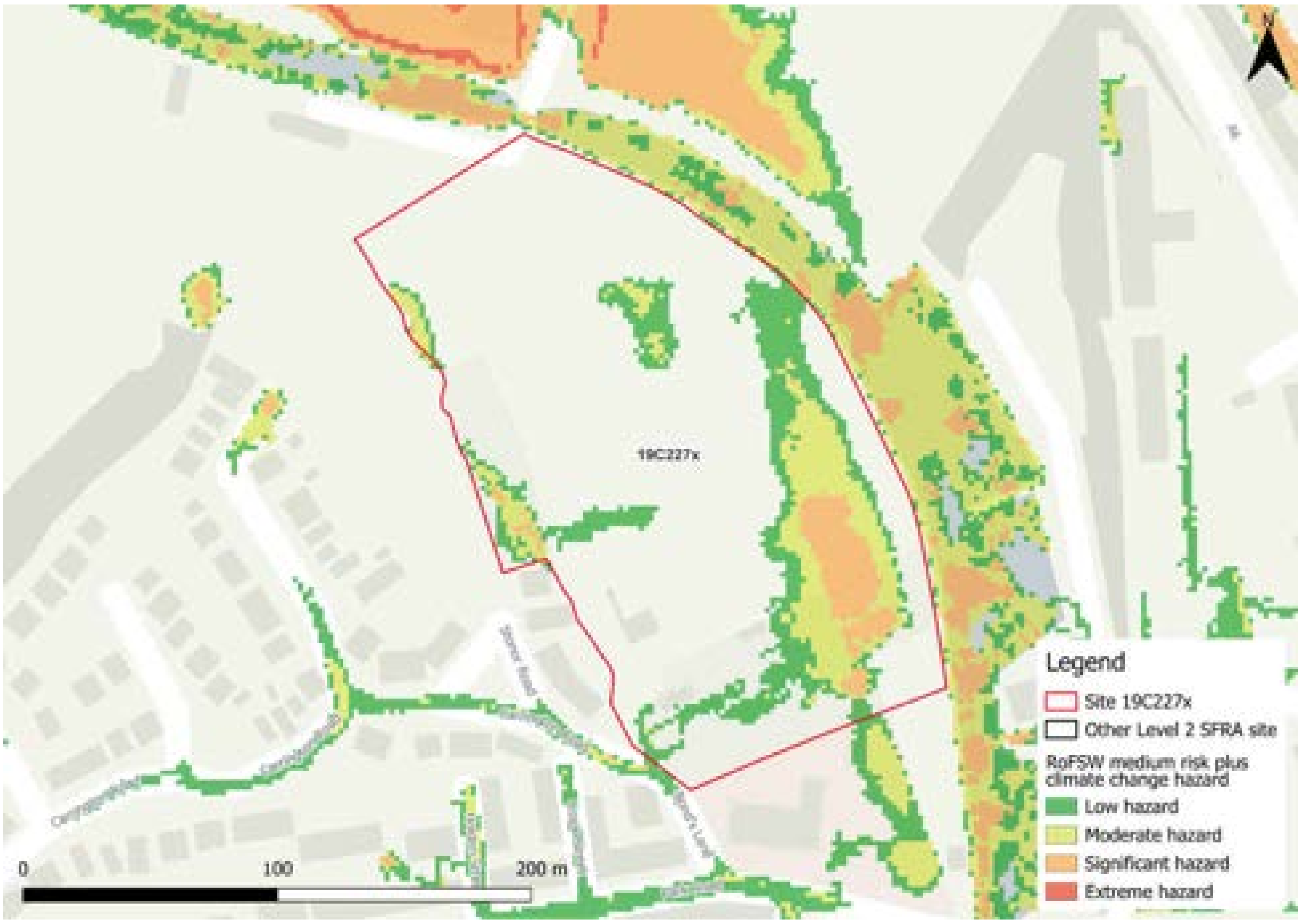

Figure 9-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

9.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with 78% of the site being at very low surface water flood risk. However, in the high and medium risk events, surface water is apparent though is confined to topographic low spots across the site.
- In the low risk event, there is a significant area of surface water risk within the east of the site, with some additional areas of ponding within topographic low spots and additional surface water flow paths flowing through the south of the site.
- Safe access and escape routes should be possible via Bond's Lane in all events. Bond's Lane is inundated in the low risk event however depths and hazards are low therefore safe access and escape should still be achievable.
- The effects of climate change on surface water have been modelled for this SFRA using the medium risk surface water flood depths plus 45% climate change. Surface water risk is greater than present day flood risk with a significant area of ponding within the east of the site. Any existing flow paths and topographic depressions should be maintained in the site design.
- The number of housing units may have to be reduced to accommodate the surface water risk on the site using appropriate SuDS.

- The Groundwater Flood Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Were development to proceed, a drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Site runoff should be maintained at greenfield rates and, where possible, betterment should be achieved.
- Note, 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 or evidence.

10 Risk from groundwater

Risk from groundwater sources 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 Guide[9]. Figure 4-1 shows the map for Site 19C227x and the surrounding areas and Table 10-1 explains the risk classifications.

The majority of the site is in an area where there is no risk of groundwater emergence. In a small area in the north of the site, groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots. Groundwater conditions may be suitable to infiltration SuDS across the majority of the site and where there is surface water ponding.

Figure 10-1: JBA 5m Groundwater Emergence Map

9 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 10-1: 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.	

11 Overall site assessment

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

This site is not required to pass part b) of the exception test[10] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

11.2 Recommendation summary, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Were this site to be allocated based on the information presented in this Level 2 SFRA, it should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1.
- There should be no inappropriate development within the functional floodplain. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- There is significant risk from surface water in the longer term. A detailed drainage strategy will be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development.
- Surface water should be retained onsite which may reduce units. This will require detailed surface water modelling based on layout plans and detailed design and full consultation with the LLFA on required runoff rates, likely to be greenfield or betterment. The use of infiltration SuDS should be investigated.
- Residual risk from the canal must be accounted for through consultation with the Canal & River Trust.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

10 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C233x

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0034-S3-P02.02-Level_2_SFRA_19C233x.docx
Revision	P02
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Authorised by	Krista Keating BSc MSc CEnv CSci MCIWEM C.WEM Associate Director

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JBA Project Code	2023s1344

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13.1 Site 29C223x

- Location: Land South of South Road, Bretherton
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 1.07 hectares
- Proposed development impermeable area: 0.91 hectares (assumed 85% impermeable area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk
-

Figure 13-1: Existing site location boundary

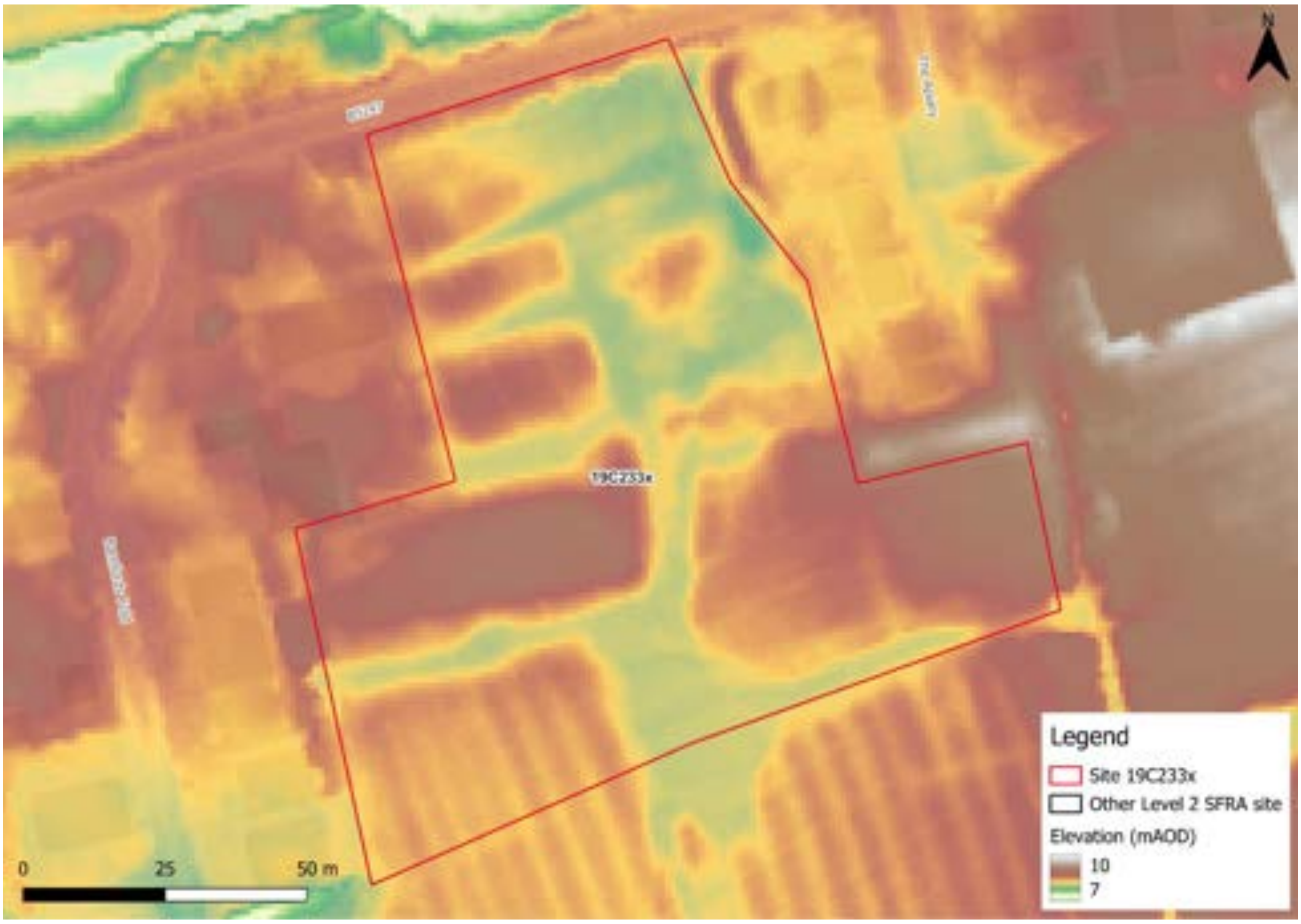

Figure 13-2: Topography

14 Flood risk from rivers

14.1 Existing risk

14.1.1 Flood Map for Planning and functional floodplain

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

The site is located wholly within Flood Zone 1 indicating the site is at low risk of flooding from rivers.

Table 14-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

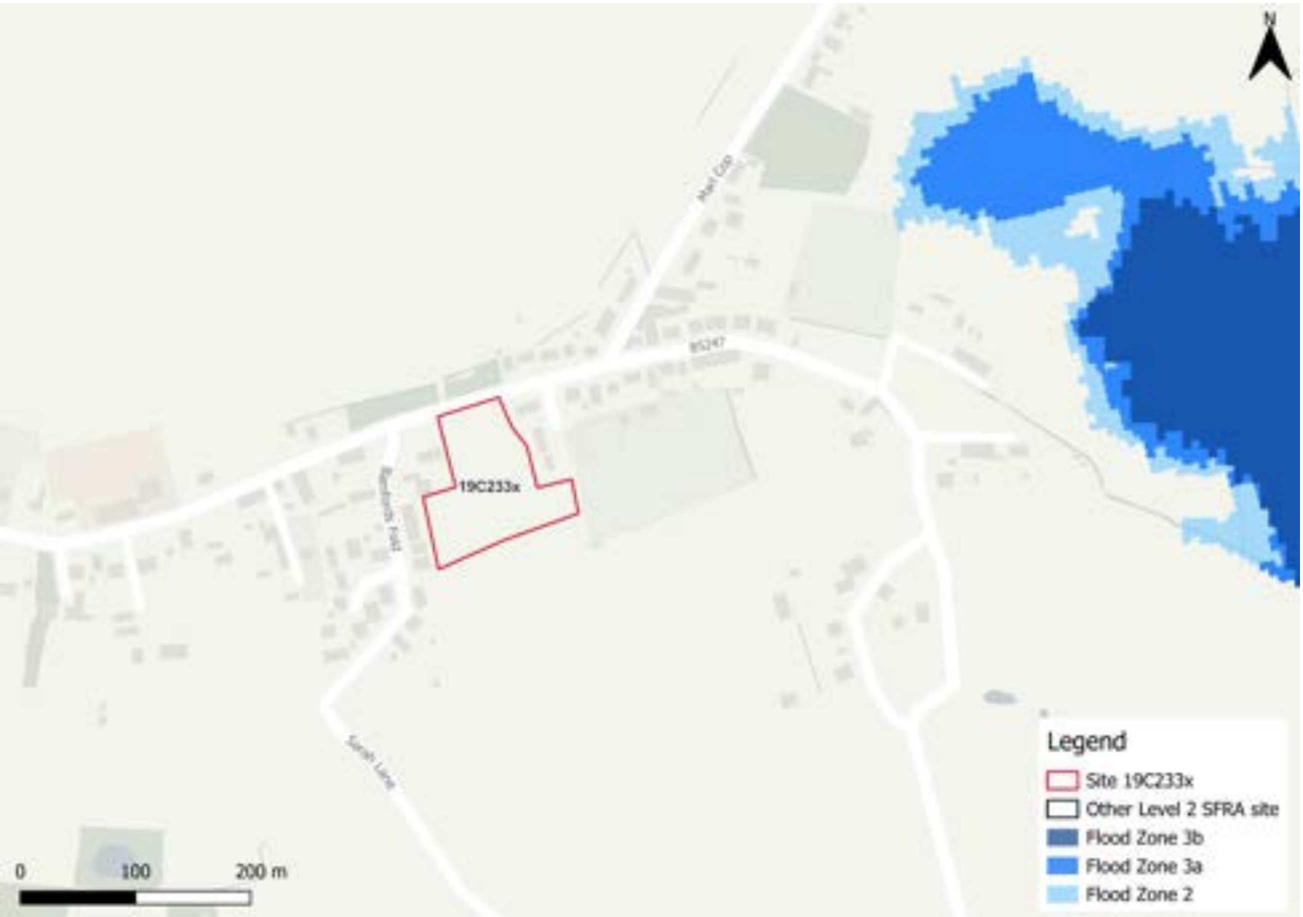

Figure 14-1: Existing risk from rivers to the site

14.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

14.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA, which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C233x is located within one catchment, namely, Coastal Catchment 175. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[11].
- Developments should be incentivised to provide wider betterment by demonstrating in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments should achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

14.2.2 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. Both within and upstream of the site there is potential for both riparian and wider catchment woodland planting to attenuate flows and reduce the volume of runoff downstream. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 14-2.

11 Lancashire SuDS Guidance

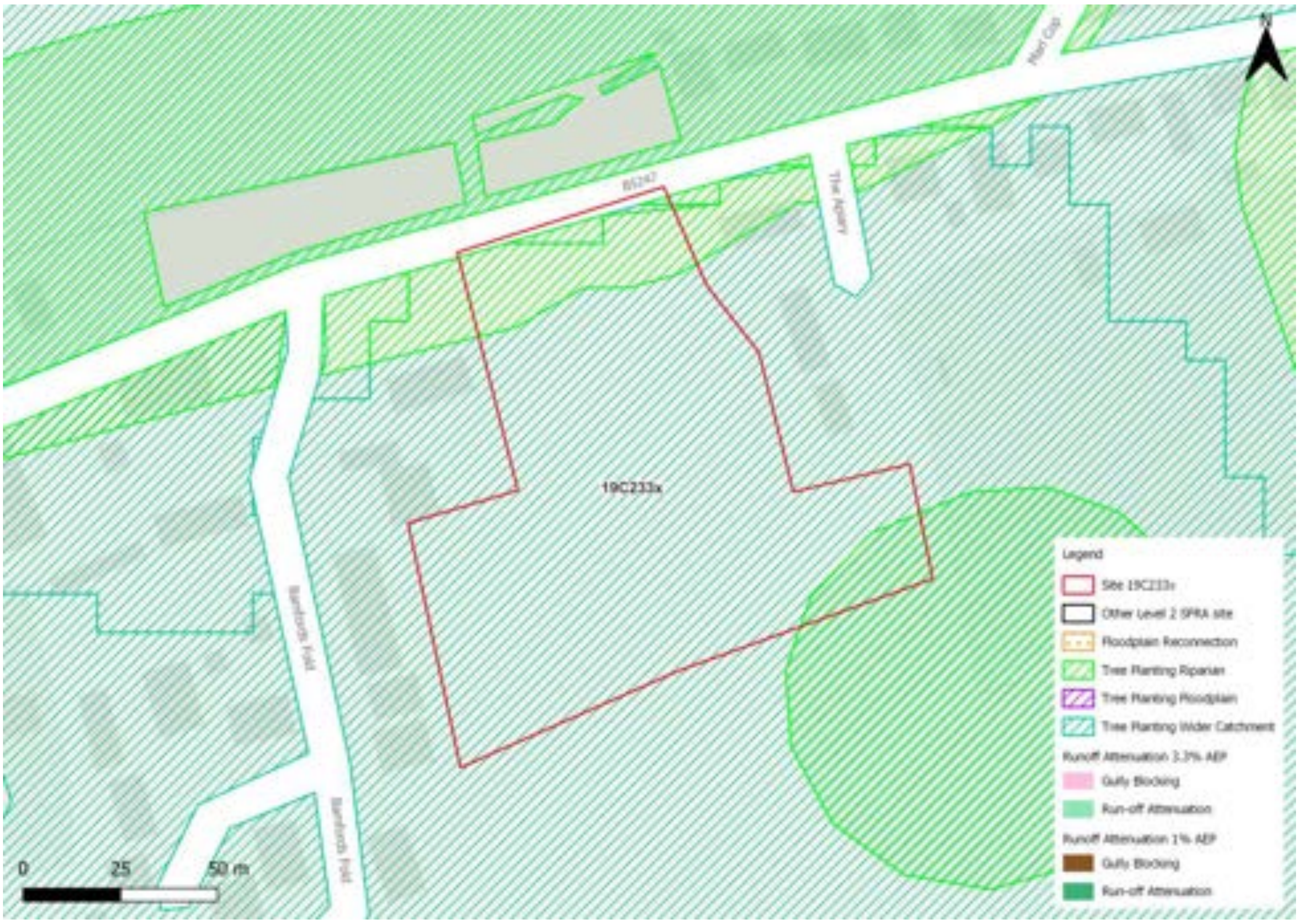

Figure 14-2: Natural Flood Management (NFM) potential mapping

14.3 Residual risk

14.3.1 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. 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 not modelled to be at risk from reservoir flooding.

14.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

14.5 Flood warning and access and escape routes

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. The 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. The site is not located within a FAA.

Based on available information, safe access and escape routes could likely be achieved during a flood event via the B5247.

14.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is wholly located within Flood Zone 1.

15 Flood risk from surface water

15.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 3% of the site is within the high risk surface water flood zone. A further 9% is at medium surface water risk and 15% of the site is observed to be at low surface water risk, as shown in Table 15-1.

Topography is varied throughout the site with clear undulations causing surface water to pond in the lower areas. In the high risk event, surface water is largely confined to an area of ponding in a topographic low spot within the south of the site. In the medium risk event, there is a greater extent of ponding within the south of the site, and some additional areas of ponding within the north. In the low risk event, surface water risk extends through the areas of lower elevation through the centre of the site.

Greatest flood depths within the medium risk event are between 0.3 and 0.6 m (Figure 3-1) with some areas of significant hazard (Figure 3-2). Safe access and escape routes should be possible via the B5247 in all events.

Table 15-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
73	15	9	3

Figure 15-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 15-2: Medium risk event surface water flood hazard[12] (Risk of Flooding from Surface Water map)

15.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 15-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

12 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

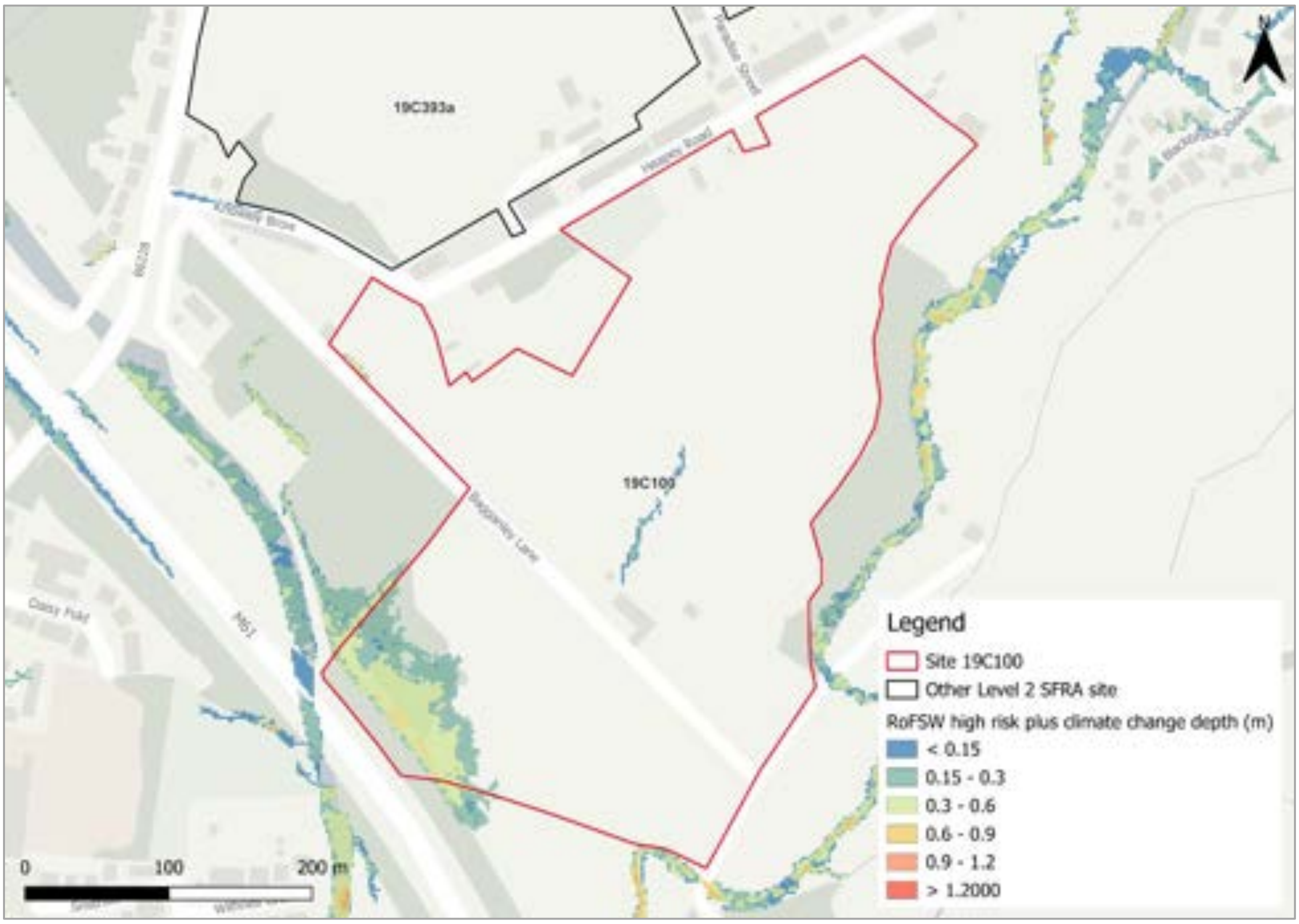

Figure 3-3 shows the medium risk surface water flood depths plus 45% climate change. Risk is modelled to be significantly greater than present day conditions, with the medium risk climate change event being similar in extent to the present day low risk event. Areas of ponding are confined to the areas of lower elevation through the centre of the site. Maximum flood depths are modelled to be between 0.6 and 0.9 m (Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

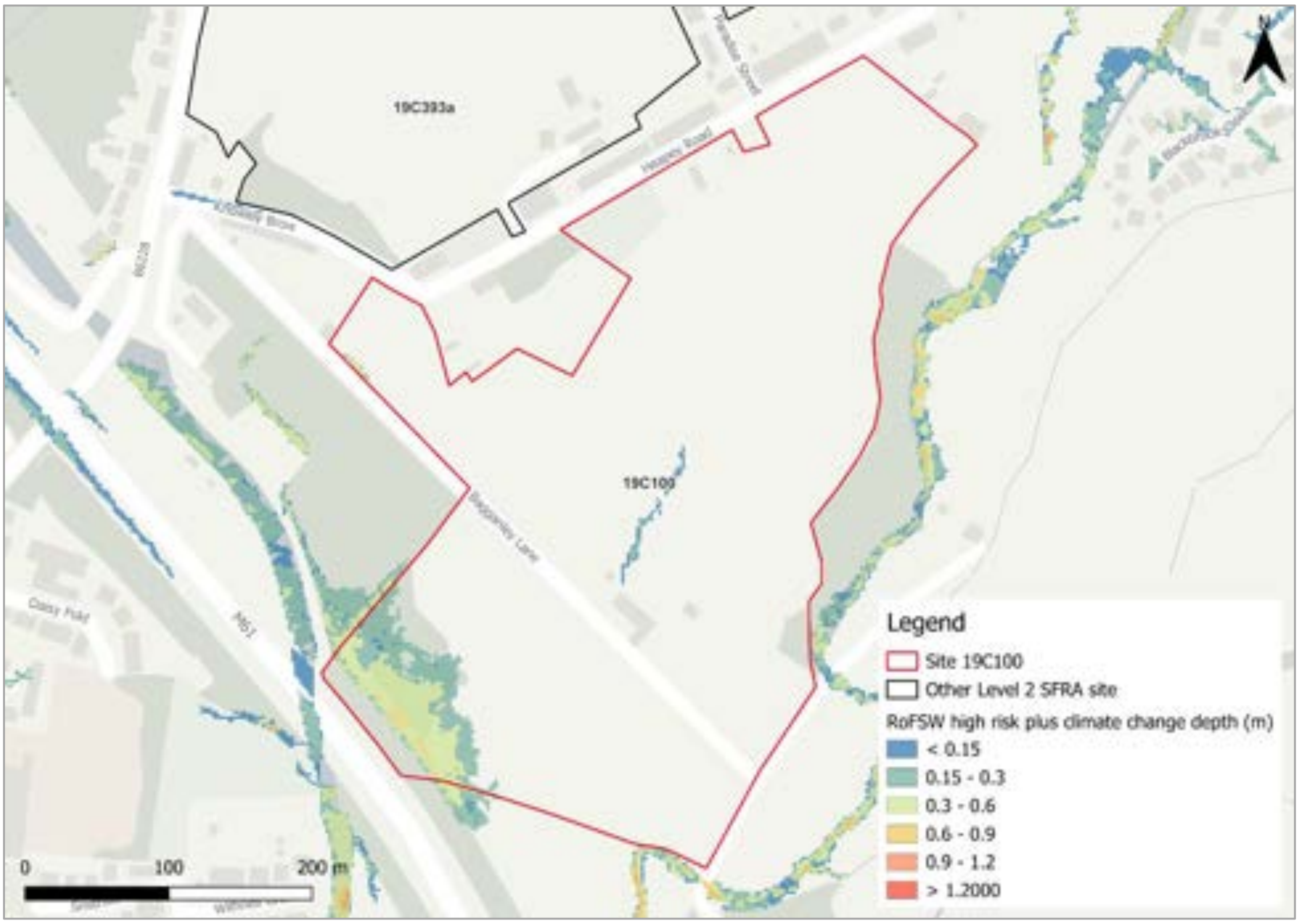

Figure 3-3), with some areas of significant hazard (Figure 3-4). Surface water is not modelled to encroach onto the access road to the north.

Figure 15-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 15-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

15.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with approximately 73% of the site being at very low risk. Surface water risk in the medium risk event is confined to two areas of ponding within topographic low spots in the north and south of the site.
- The modelled medium risk climate change outputs indicate a similar extent risk to the present day low risk event, with additional areas of ponding emerging through the site. It will be challenging to maintain existing flow paths and topographic depressions in site design given the sporadic nature of the risk across the whole of the site. Regrading of the land may be required though this will require modelling to ensure runoff is maintained at current greenfield rates and, where possible, betterment should be achieved.
- Safe access and escape routes should be achievable via the B5247 to the north of the site in all events.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Note, 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 or evidence.

16 Risk from groundwater

Risk from groundwater sources is assessed in this SFRA using JBA's 5m Groundwater Flood Map. This dataset is recommended for use by the EA in the SFRA Good Practice Guide[13]. Figure 4-1 show the map for Site 19C233x and the surrounding areas and Table 16-1 explains the risk classifications.

The entirety of the site is in an area where there is no groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS.

Figure 16-1: JBA 5m Groundwater Emergence Map

13 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 16-1: Groundwater Flood 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.	

17 Overall site assessment

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

This site is not required to pass part b) of the exception test[14] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

17.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on the evidence in this SFRA, it should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1.
- Surface water should be retained onsite which may reduce units. This will require detailed surface water modelling based on layout plans and detailed design and full consultation with the LLFA on required runoff rates, likely to be greenfield or betterment. The use of infiltration SuDS should be investigated.
- Regrading of the land may be required given the sporadic nature of the risk across the site.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

14 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C236x

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0033
Revision	P02
Prepared by	Laura Thompson BSc Analyst
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Contract

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This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Laura Thompson of JBA Consulting carried out this work.

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Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

Contents

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List of Tables

19 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C236x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

19.1 Site 19C236x

- Location: Charter Lane
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 3.4 hectares
- Proposed development impermeable area: 2.9 hectares (assumed 85% impermeable area)
- Watercourse: Clancutt Brook
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 19-1: Existing site location boundary

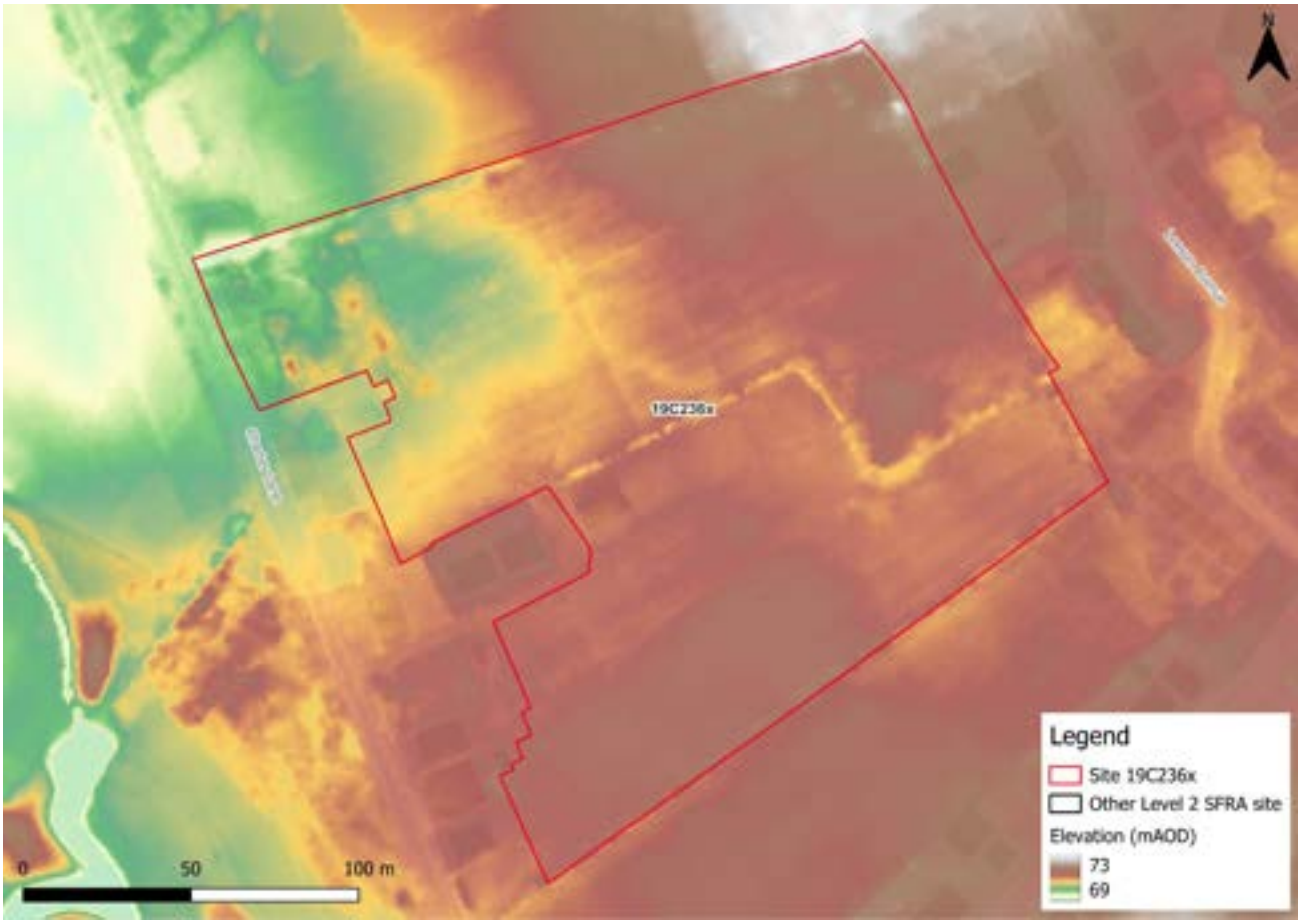

Figure 19-2: Topography

20 Flood risk from rivers

20.1 Existing risk

20.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk from flooding from rivers.

Table 20-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 20-1: Existing risk from rivers to the site

20.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

20.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C236x is located within one catchment, namely; Syd Brook. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[15].
- Developments should be incentivised to provide wider betterment by demonstrating in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments should achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

20.2.2 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. Within the north of the site, there is potential for tree planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. This area is shown in Figure 20-2.

15 Lancashire SuDS Guidance

Figure 20-2: Natural Flood Management (NFM) potential mapping

20.3 Residual risk

20.3.1 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. 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 not modelled to be at risk from reservoir flooding.

20.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

20.5 Flood warning and access and escape routes

The site is not located within a Flood Warning Area (FWA) or a Flood Alert Area (FAA).

Based on available information, safe access and escape routes could likely be achieved during a flood event via Charter Lane to the west of the site.

20.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site would see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is located wholly within Flood Zone 1.

21 Flood risk from surface water

21.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 1% of the site is within the high risk surface water flood zone. A further 1% is at medium surface water risk, and a further 11% is at low surface water risk, as shown in Table 21-1.

In the high and medium risk events, surface water risk is confined to an area of ponding within a topographic low spot towards the north west of the site. This is similar to the low risk event, however there are additional areas of ponding scattered across the site.

Greatest flood depths in the medium risk event are between 0.15 and 0.3 m (Figure 3-1) with some areas of moderate hazard (Figure 3-2). Safe access and escape should be achievable via Charter Lane to the west of the site in all events.

Table 21-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
87	11	1	1

- 

-

Figure 21-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 21-2: Medium risk event surface water flood hazard[16] (Risk of Flooding from Surface Water map)

21.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 21-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

16 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

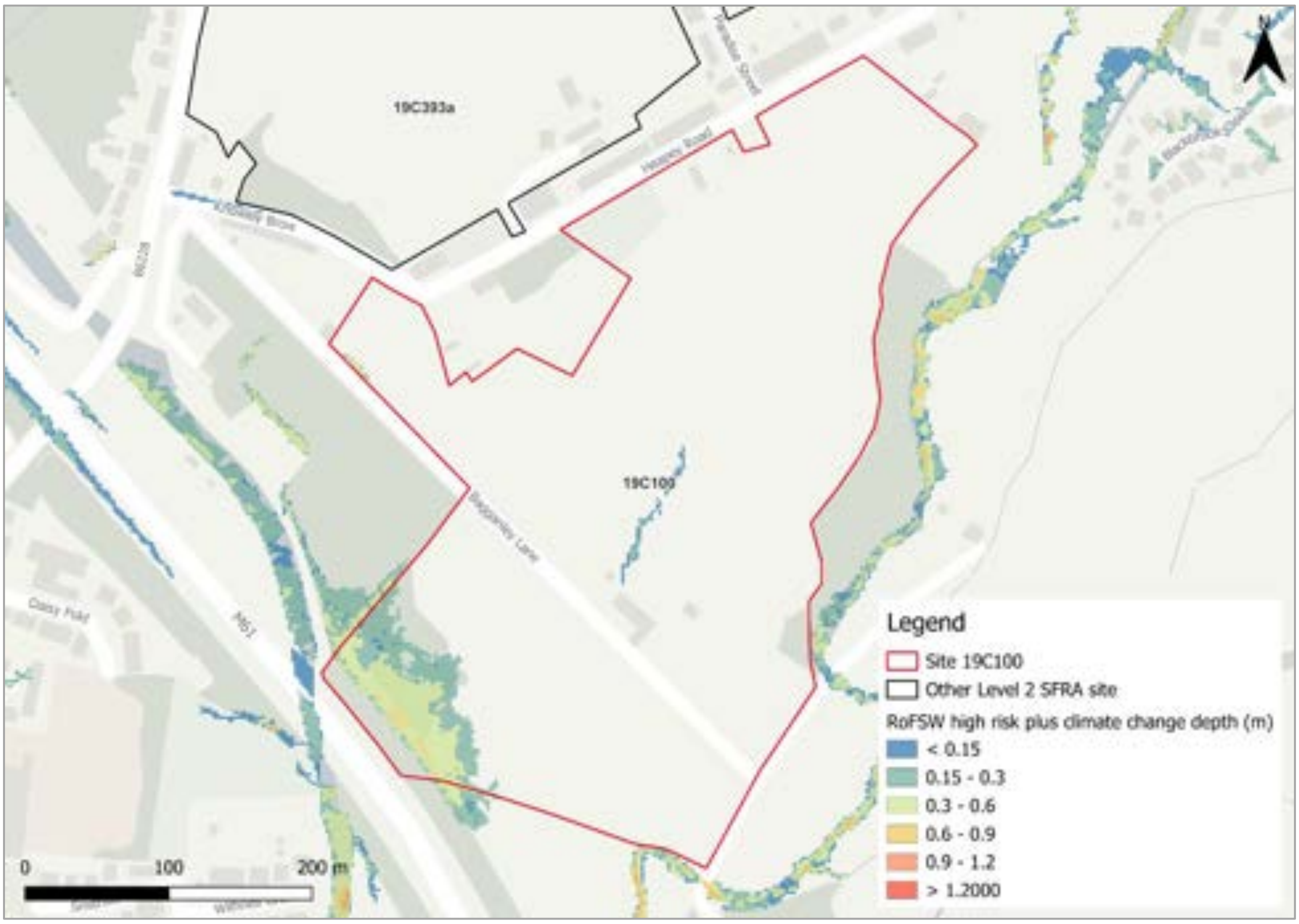

Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be greater than for present day conditions, with the medium risk climate change event showing a similar level of risk to the low risk present day event. Maximum depths are between 0.3 and 0.6 m with areas of hazard categorised as moderate (Figure 3-4). Safe access and escape routes should remain achievable via Charter Lane.

Figure 21-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 21-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

21.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 87% of the site being at very low risk. Surface water risk in the high and medium risk events is confined to an area of ponding within a topographic low spot in the north west of the site.
- The modelled medium risk surface water climate change outputs indicate a similar risk to the present day low risk event. Safe access and escape routes should remain achievable via Charter Lane in all events.
- Topographic depressions should be considered and included in site design and ideally left in place to flood naturally when required. Any regrading of land must include for like for like volumes to ensure risk is contained safely onsite for the lifetime of development.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Were development plans to proceed, a full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a

result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.

- Note, 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 or evidence.

22 Risk from groundwater

Risk from groundwater sources 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 Guide[17]. Figure 4-1 shows the map for Site 19C236x and the surrounding areas and Table 22-1 explains the risk classifications.

The entirety of the site is in an area where there is no groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS.

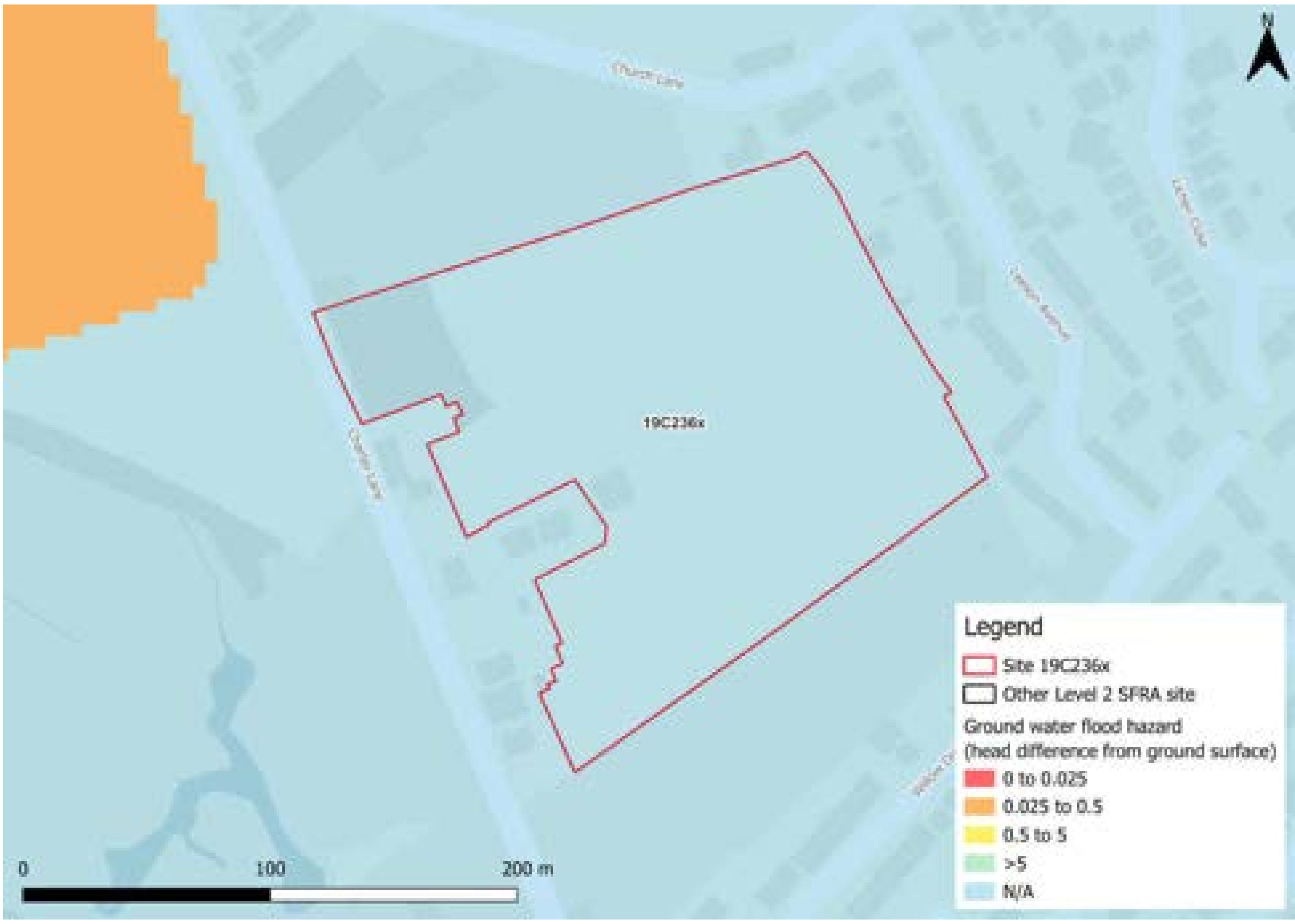

Figure 22-1: JBA 5m Groundwater Emergence Map

17 [Strategic flood risk assessment good practice guide. ADEPT. December 2021.]

Table 22-1: Groundwater Flood 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.	

23 Overall site assessment

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

This site is not required to pass part b) of the exception test[18] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

23.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

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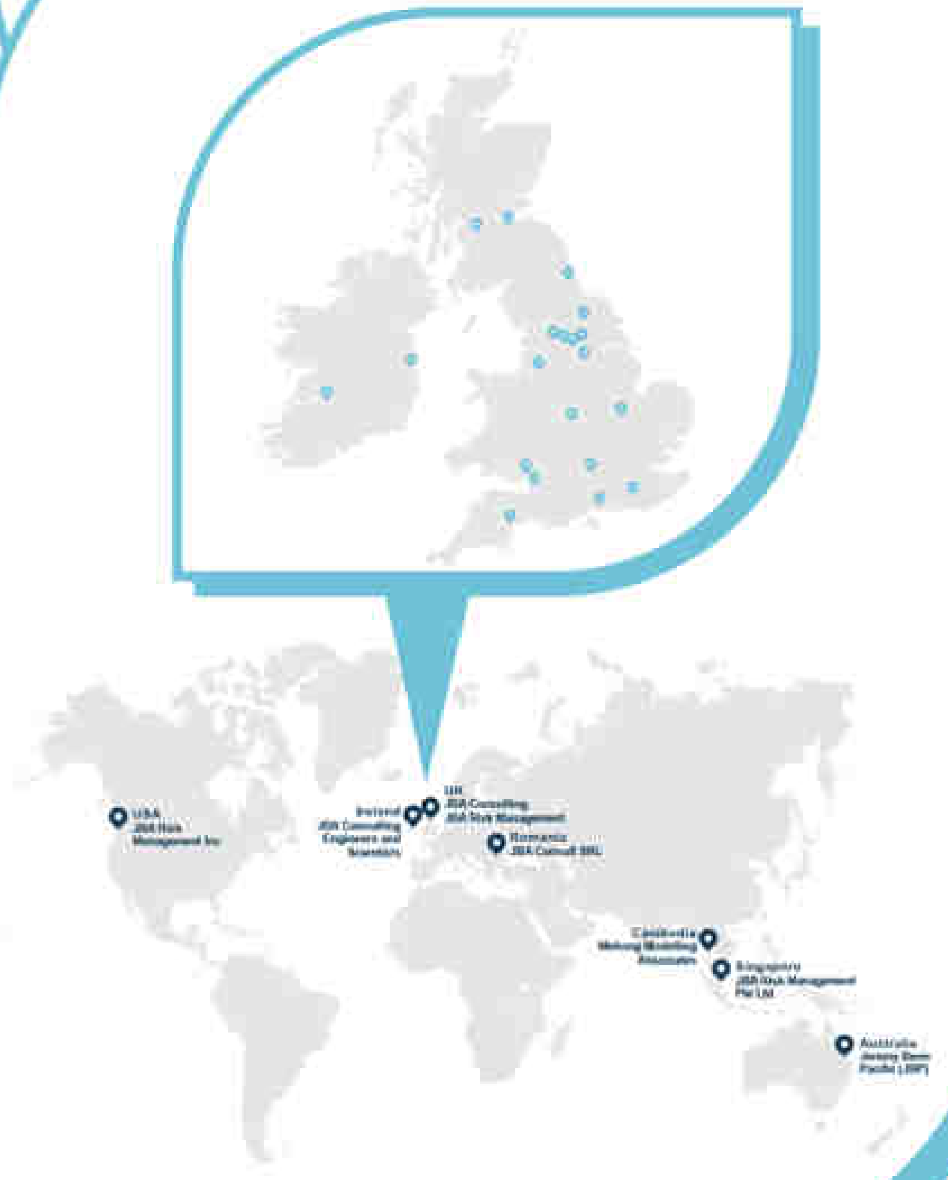

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C239x

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0032
Revision	P02
Prepared by	Laura Thompson BSc Analyst
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Contract

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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Laura Thompson of JBA Consulting carried out this work.

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Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based

on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. JBA specifically does not guarantee or warrant any estimates or projections contained in this Report.

Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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25 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C239x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

25.1 Site 19C239x

- Location: Cowling Farm
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mixed use
- Proposed site use vulnerability: More vulnerable
- Site area: 9.5 hectares
- Proposed development impermeable area: 8.1 hectares (assumed 85% impermeable area)
- Watercourse: Leeds and Liverpool Canal
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 25-1: Existing site location boundary

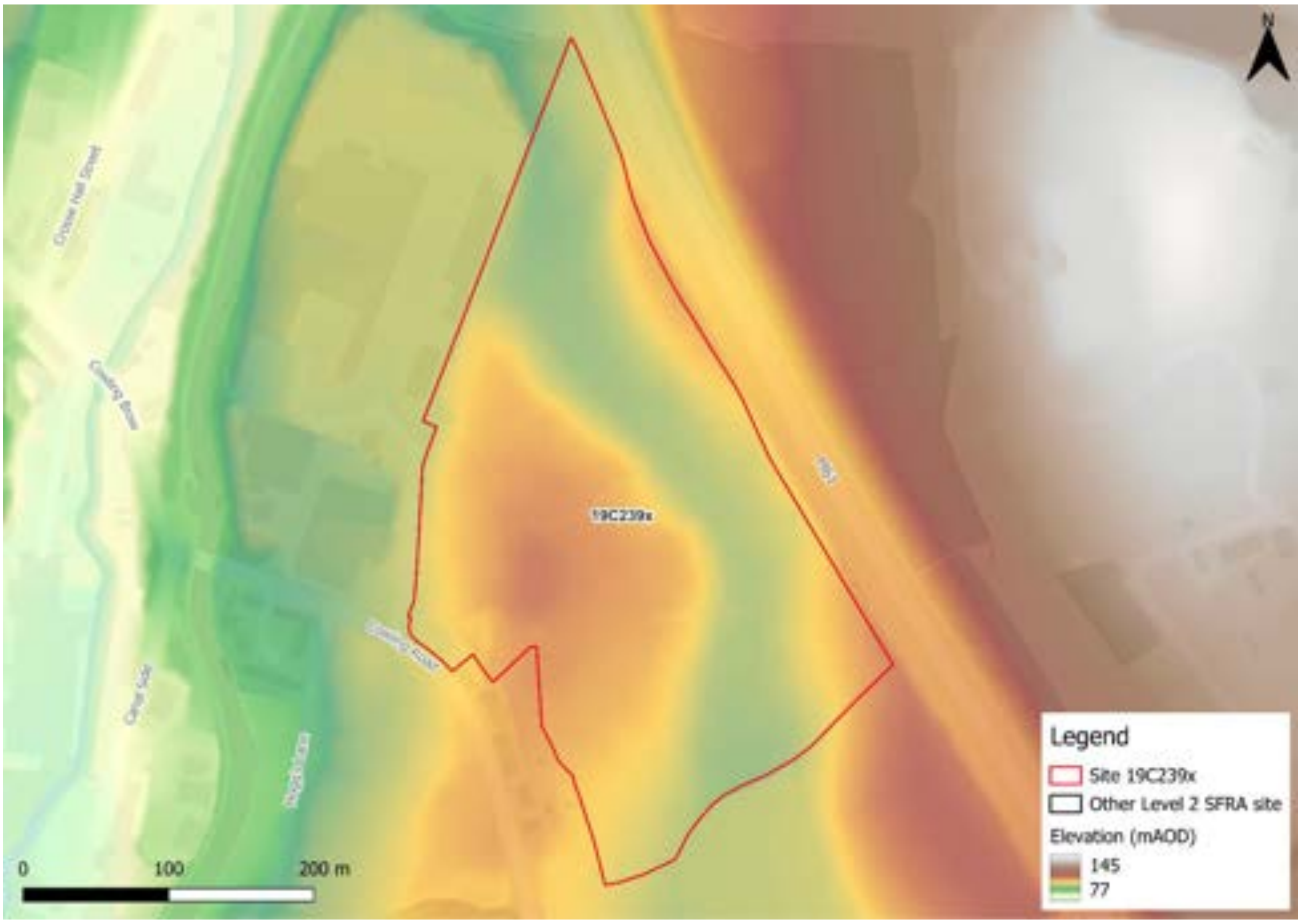

Figure 25-2: Topography

26 Flood risk from rivers

26.1 Existing risk

26.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk from flooding from rivers. The Leeds and Liverpool Canal is located to the west of the site.

Table 26-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 26-1: Existing risk from rivers to the site

26.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

26.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C239x is located within one catchment, namely; Yarrow US Big Lodge Water. This is ranked as a low sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

26.2.2 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. Both within and upstream of the site, there is potential for tree planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. There are also opportunities to implement runoff attenuation features to reduce runoff downstream. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 20-2.

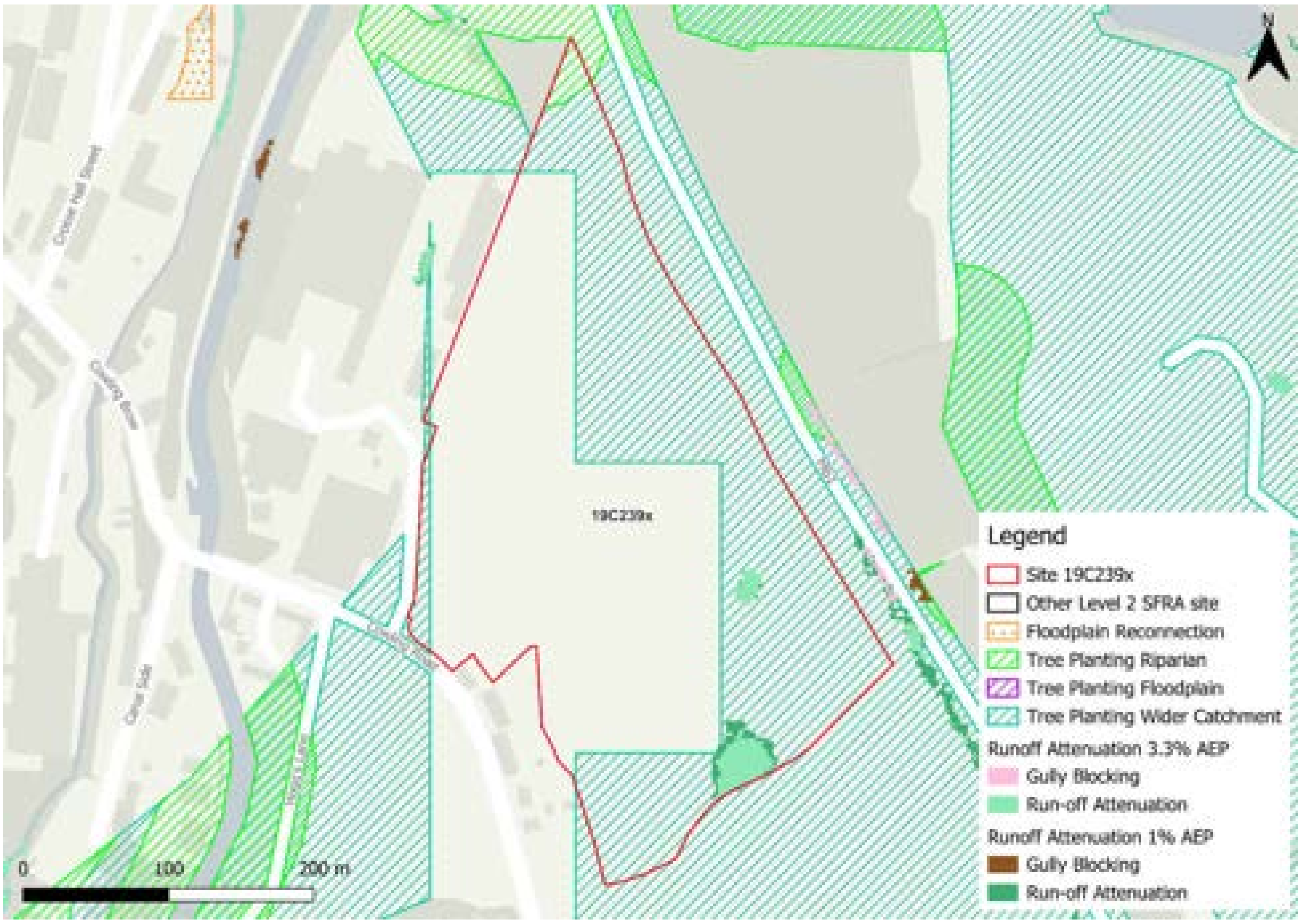

Figure 26-2: Natural Flood Management (NFM) potential mapping

26.3 Residual risk

26.3.1 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 26-3 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 from two reservoirs, namely Anglezarke and Yarrow, both of which are located within Chorley. Both reservoirs with the potential to impact the site are operated by United Utilities.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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 United Utilities to ascertain whether the proposed development could affect the reservoir's risk designation, it's 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.

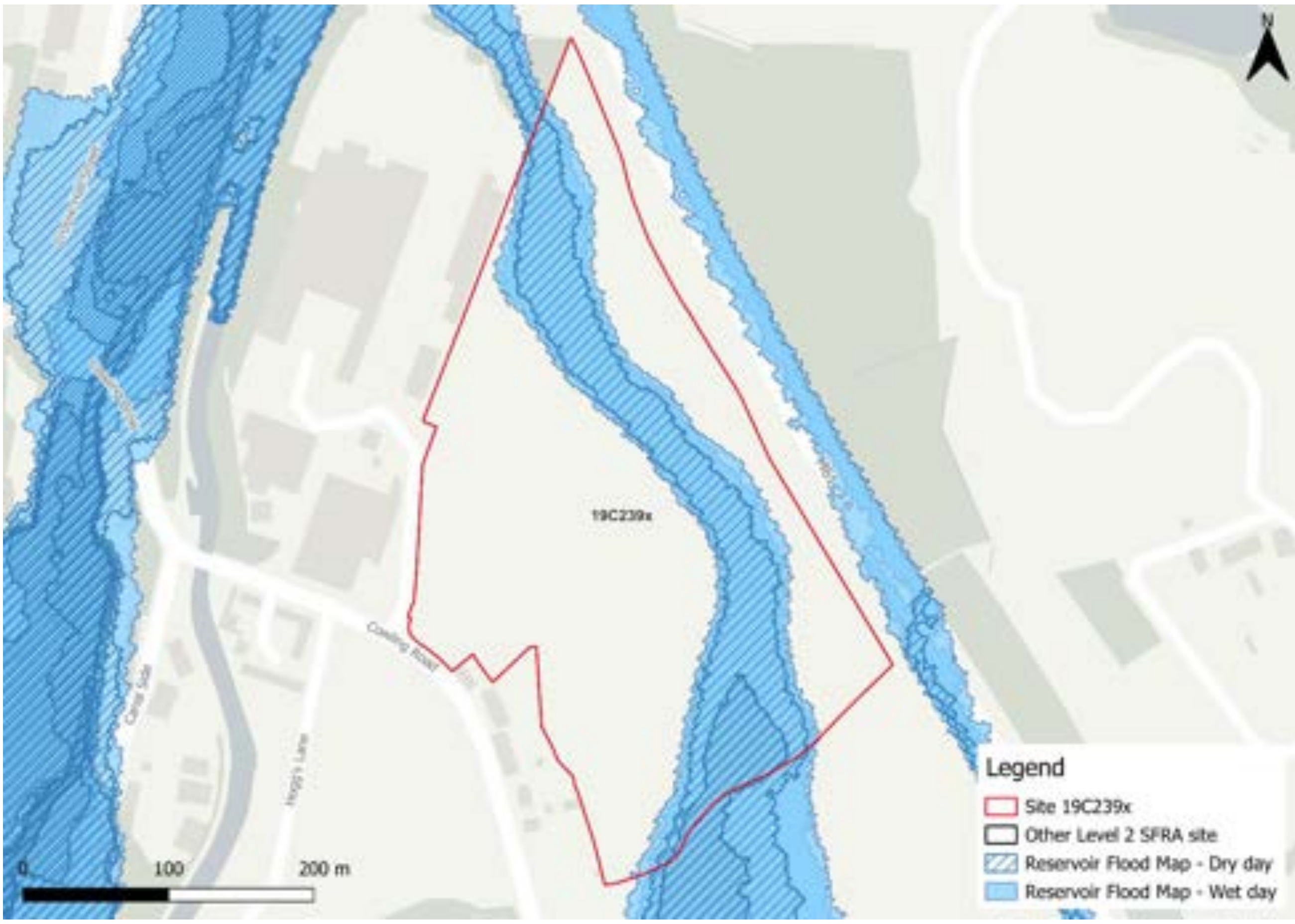

Figure 26-3: Flood risk from reservoirs

26.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

26.5 Flood warning and access and escape routes

The site is not located within a Flood Warning Area (FWA) or a Flood Alert Area (FAA).

Based on available information, safe access and escape routes could likely be achieved during a flood event via Moorland Gate to the west of the site and Cowling Road to the south of the site.

26.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.

- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is located wholly within Flood Zone 1.
- Given the potential reservoir risk to the site, developers should consider[19]:
    - Whether additional modelling is required to understand the flood risk from the reservoir, referring to the specification for the reservoir flood maps as a starting point
    - Whether the development may have an impact on the reservoir or reservoir owner
    - Referring to the Central Lancashire Level 1 SFRA for information on reservoir risk and recommendations for how to address it
    - Contacting the LPA for pre-application advice
    - Contacting the LPA to understand the need to consult with their emergency planning team and with the reservoir owner

19 Reservoir flood maps: when and how to use them | Environment Agency | 2021

27 Flood risk from surface water

27.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 2% of the site is within the high risk surface water flood zone. A further 1% is at medium surface water risk, and a further 2% is at low surface water risk, as shown in Table 21-1.

In the high and medium risk events, surface water risk is confined to two areas of ponding within topographic low spots towards the south of the site. This is similar to the low risk event, however there is an additional flow path emerging within the north of the site.

Greatest flood depths in the medium risk event are between 0.6 and 0.9 m (Figure 3-1) with some areas of significant hazard (Figure 3-2). Safe access and escape should be achievable via Moorland Gate to the west of the site and Cowling Road to the south of the site.

Table 27-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
95	2	1	2

-
-
-

Figure 27-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 27-2: Medium risk event surface water flood hazard[20] (Risk of Flooding from Surface Water map)

27.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 27-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

20 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

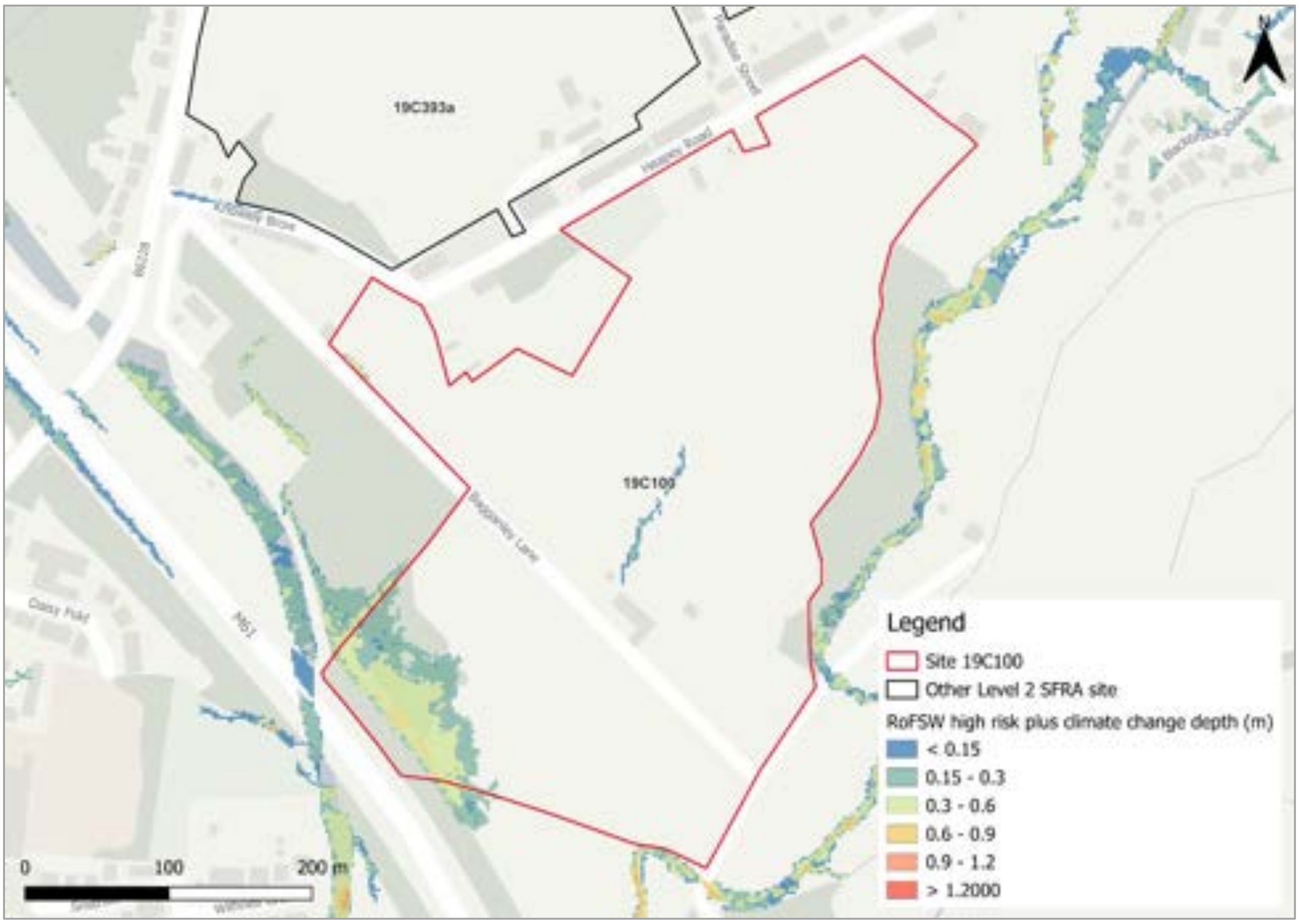

Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be greater than for present day conditions, with the medium risk climate change event showing a similar level of risk to the low risk present day event. Maximum depths are between 0.9 and 1.2 m with areas of hazard categorised as significant (Figure 3-4). Safe access and escape routes should remain achievable.

Figure 27-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 27-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

27.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 95% of the site being at very low risk. Surface water risk in the medium risk event is confined to two areas of ponding within topographic low spots in the south of the site.
- The modelled medium risk surface water climate change outputs indicate a similar risk to the present day low risk event. Safe access and escape routes should remain achievable in all events.
- Topographic depressions should be considered and included in site design and ideally left in place to flood naturally when required. Any regrading of land must include for like for like volumes to ensure risk is contained safely onsite for the lifetime of development. The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Were development plans to proceed, a full drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.

- Note, 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 or evidence.

28 Risk from groundwater

Risk from groundwater sources 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 Guide[21]. Figure 4-1 shows the map for Site 19C239x and the surrounding areas and Table 22-1 explains the risk classifications.

Within the east of the site, there is a risk of groundwater flooding to surface and subsurface assets. Within the north, there is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely. The remaining area of the site is in an area where there is no groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS in these areas.

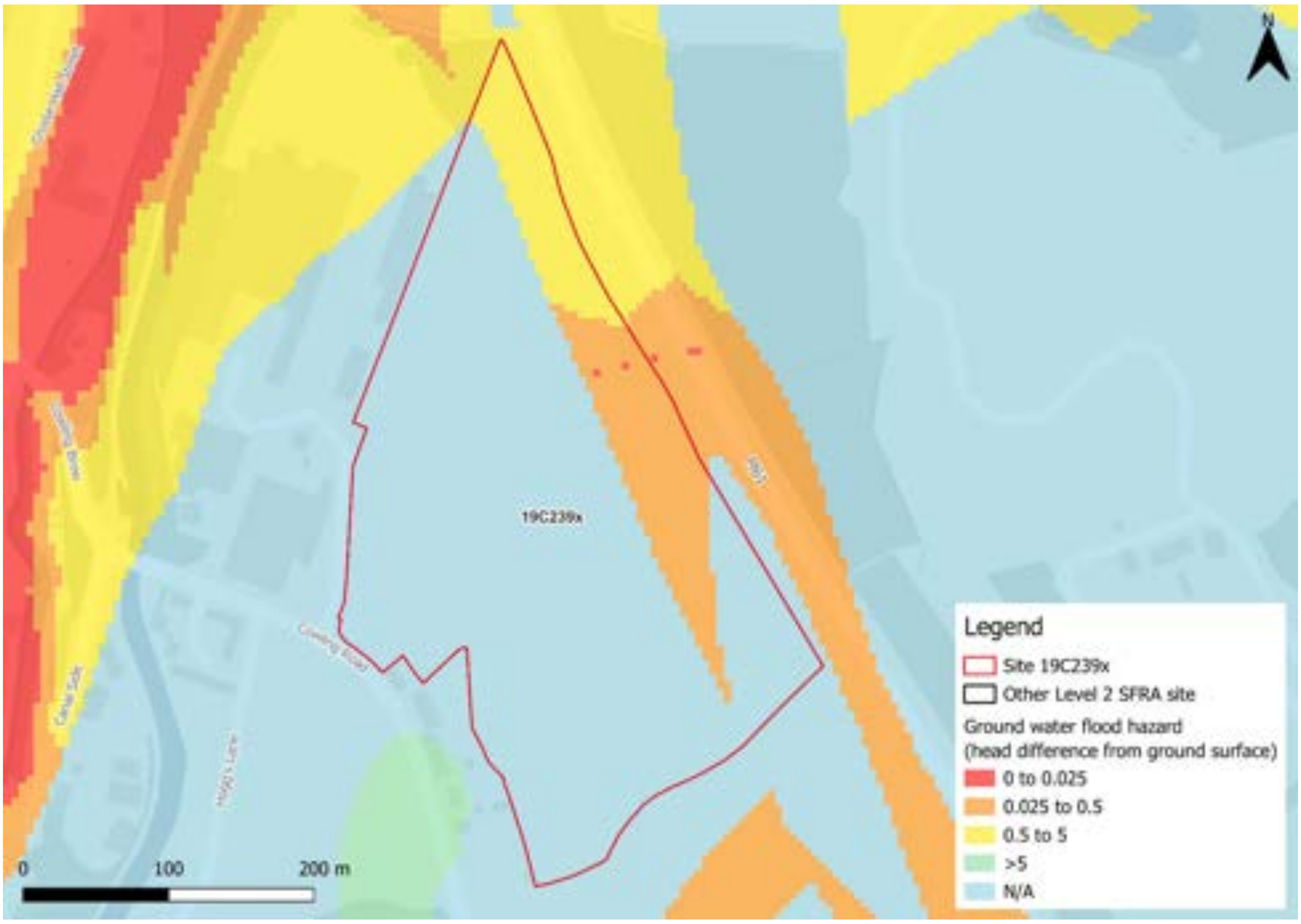

Figure 28-1: JBA 5m Groundwater Emergence Map

21 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 28-1: Groundwater Flood 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.	

29 Overall site assessment

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

This site is not required to pass part b) of the exception test[22] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

29.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

22 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C242x

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0031
Revision	P02
Prepared by	Laura Thompson BSc Analyst
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31.1 Site 19C242x

- Location: Woodlands, Southport Road
- Existing site use: Brownfield; education
- Existing site use vulnerability: More vulnerable
- Proposed site use: Mixed use
- Proposed site use vulnerability: More vulnerable
- Site area: 5.2 hectares
- Proposed development impermeable area: 4.4 hectares (assumed 85% impermeable area)
- Watercourse: River Chor
- Summary of requirements from scoping stage:
  - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
  - Assessment of surface water flood depths and hazards
  - Assessment of all other sources of flood risk

Figure 31-1: Existing site location boundary

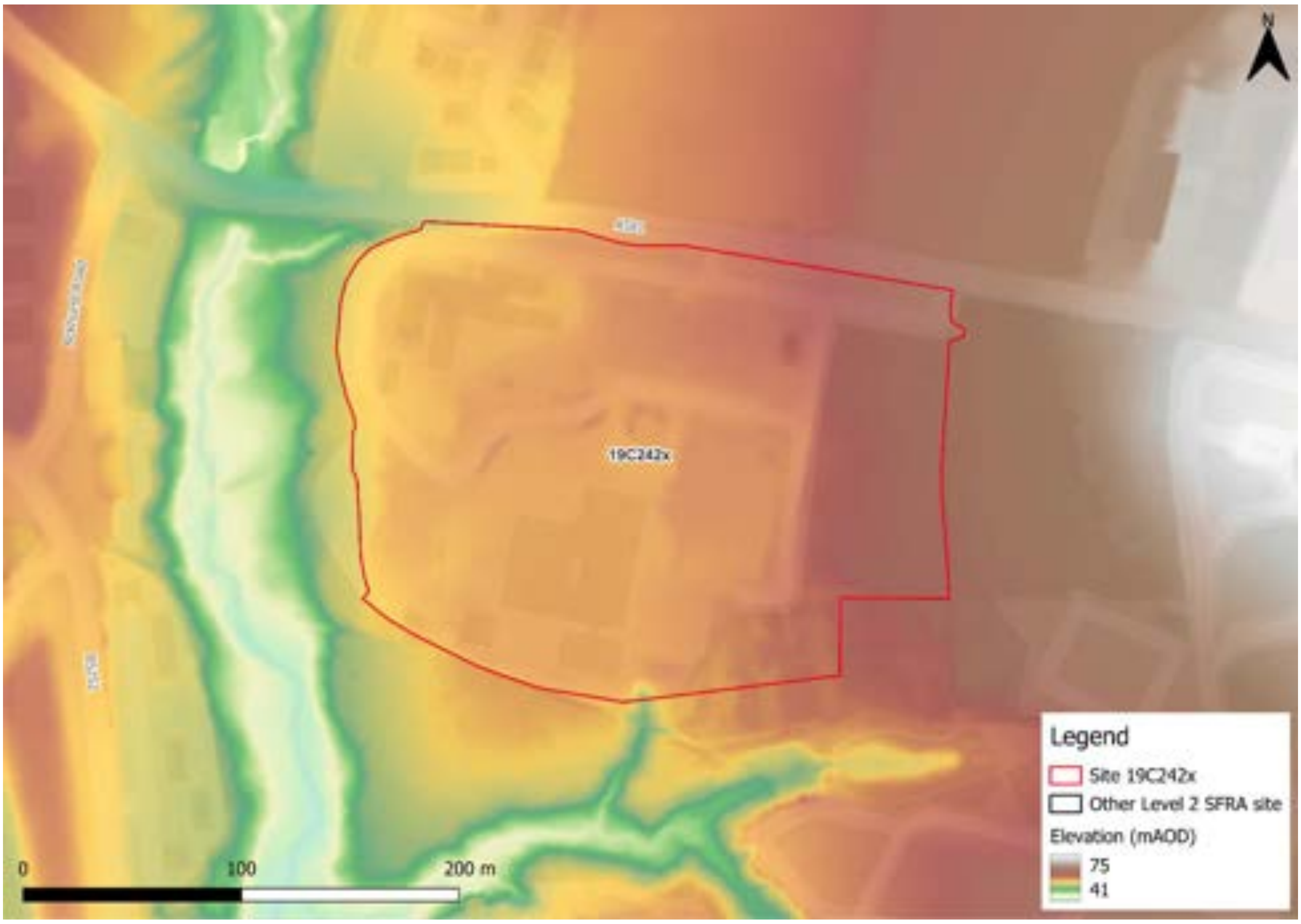

Figure 31-2: Topography

32 Flood risk from rivers

32.1 Existing risk

32.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk from flooding from rivers.

Table 32-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

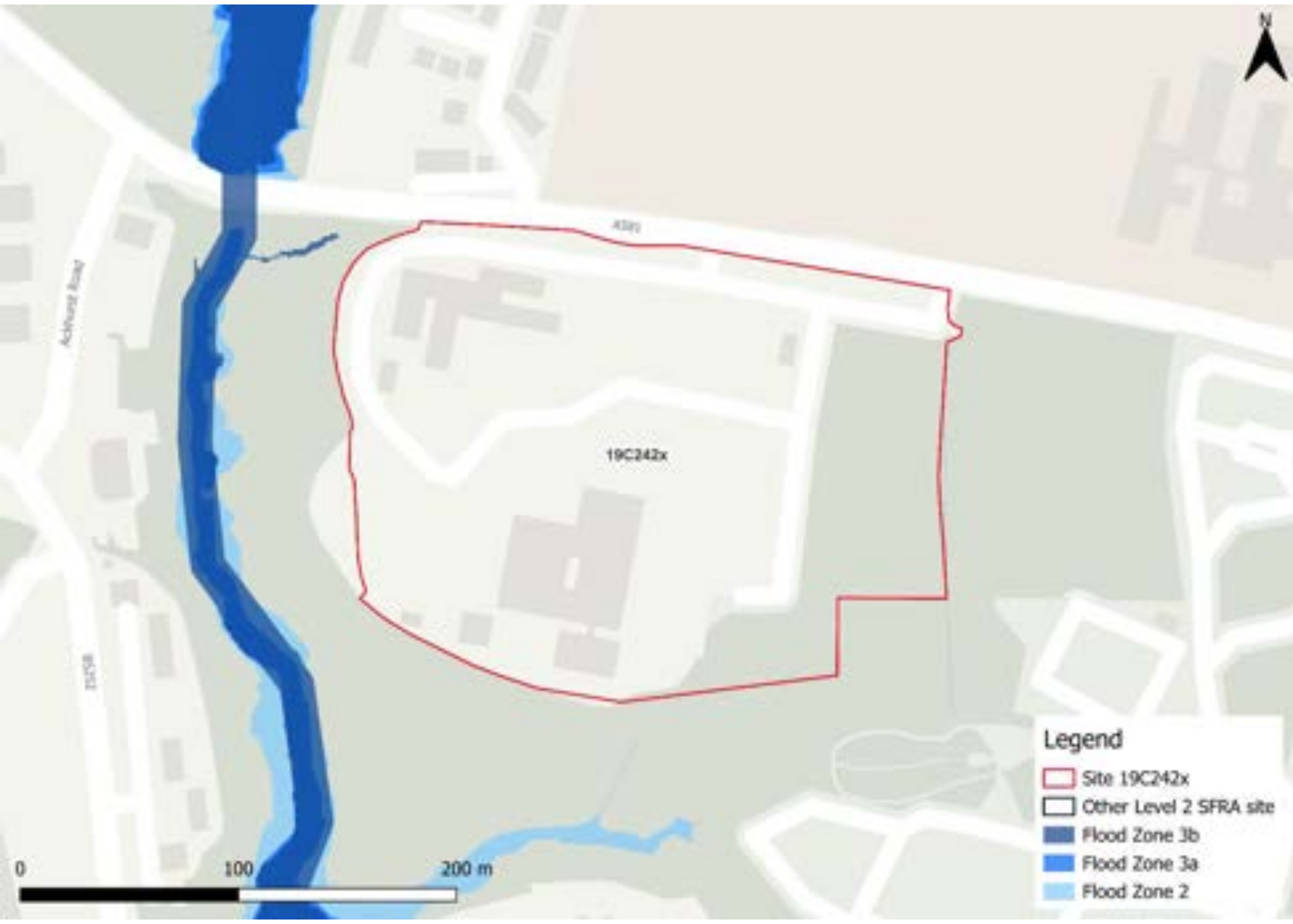

Figure 32-1: Existing risk from rivers to the site

32.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

32.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C242x is located within one catchment, namely; Yarrow DS Big Lodge Water. This is ranked as a low sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

32.2.2 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. Within and upstream of the site, there is potential for tree planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. These areas are shown on Figure 32-2.

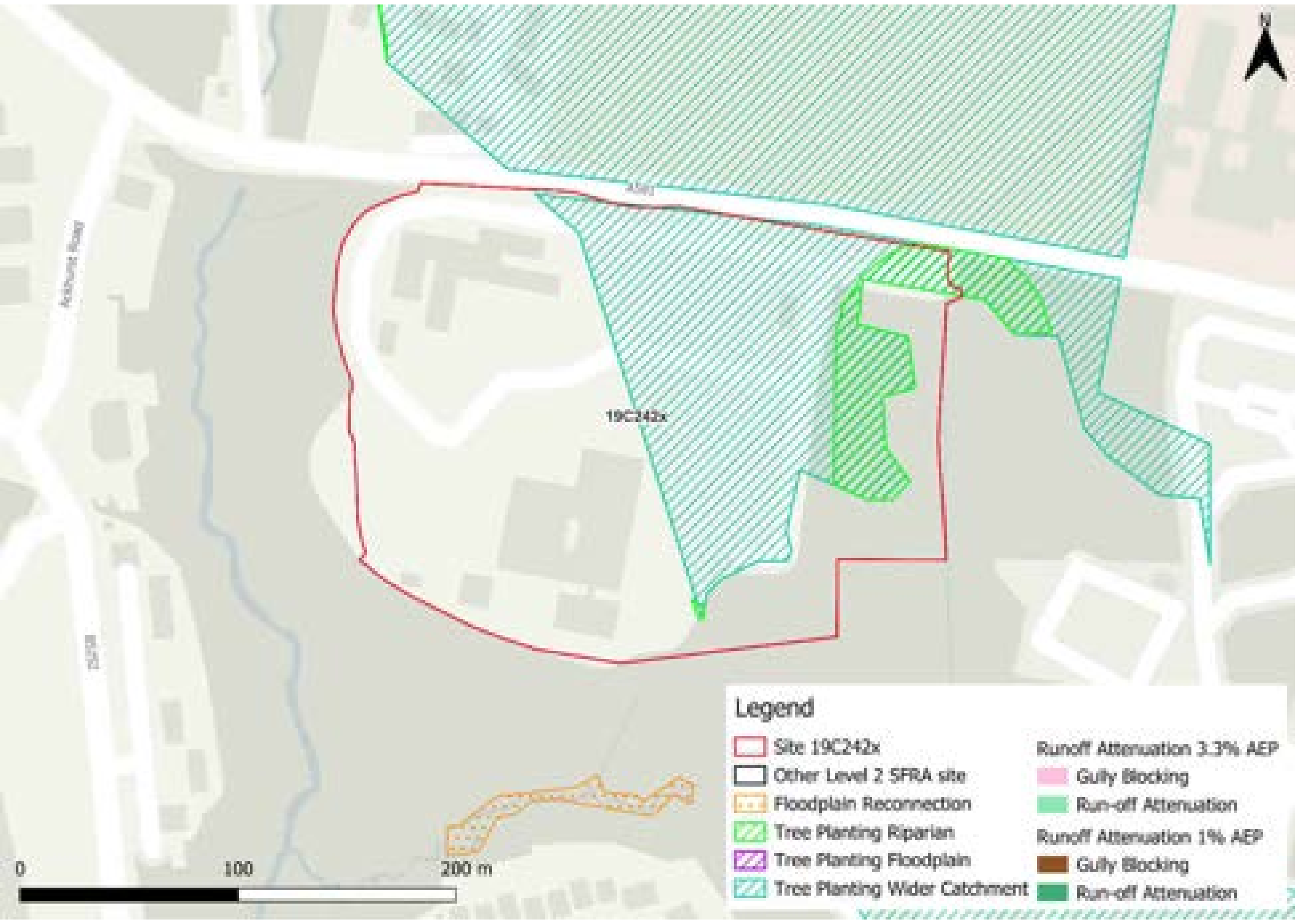

Figure 32-2: Natural Flood Management (NFM) potential mapping

32.3 Residual risk

32.3.1 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. 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 not modelled to be at risk from reservoir flooding.

32.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

32.5 Flood warning and access and escape routes

The site is not located within a Flood Warning Area (FWA) or a Flood Alert Area (FAA).

Based available information, safe access and escape routes could likely be achieved during a flood event via the A581 to the north of the site.

32.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is located wholly within Flood Zone 1.

33 Flood risk from surface water

33.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 1% of the site is within the high risk surface water flood zone. A further 2% is at low surface water risk, as shown in Table 21-1.

In the high and medium risk events, surface water risk is confined to an area of ponding within a topographic low spot in the centre of the site. In the low risk event, this area of ponding increases in extent, with some additional areas of surface water risk constrained by the existing development within the site.

Greatest flood depths in the low risk event are between 0.3 and 0.6 m (Figure 3-1) with some areas of moderate hazard (Figure 3-2). Safe access and escape routes should be achievable via the A581 to the north of the site.

Table 33-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
97	2	0	1

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-
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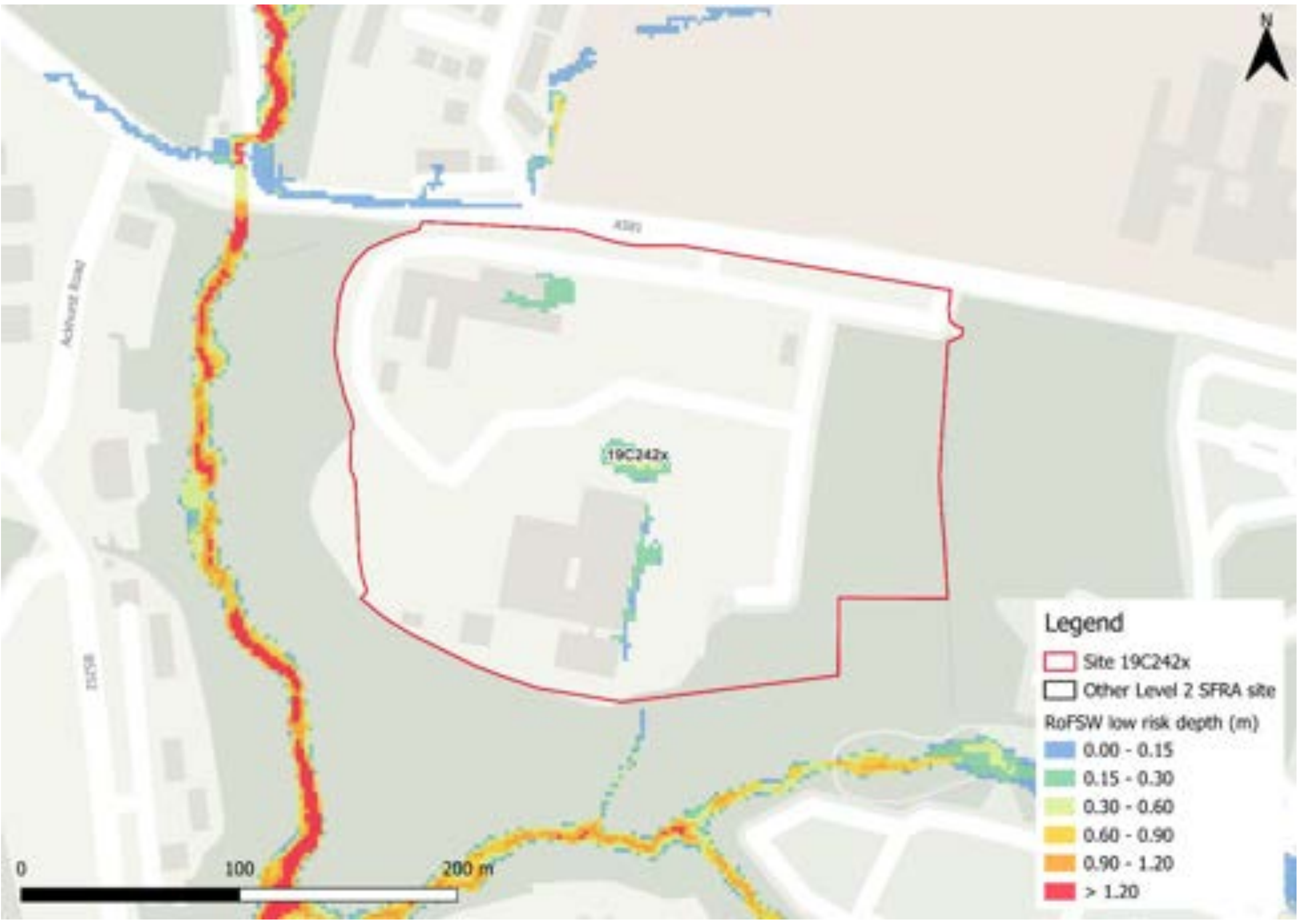
- 

Figure 33-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 33-2: Low risk event surface water flood hazard[23] (Risk of Flooding from Surface Water map)

33.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 33-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

23 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

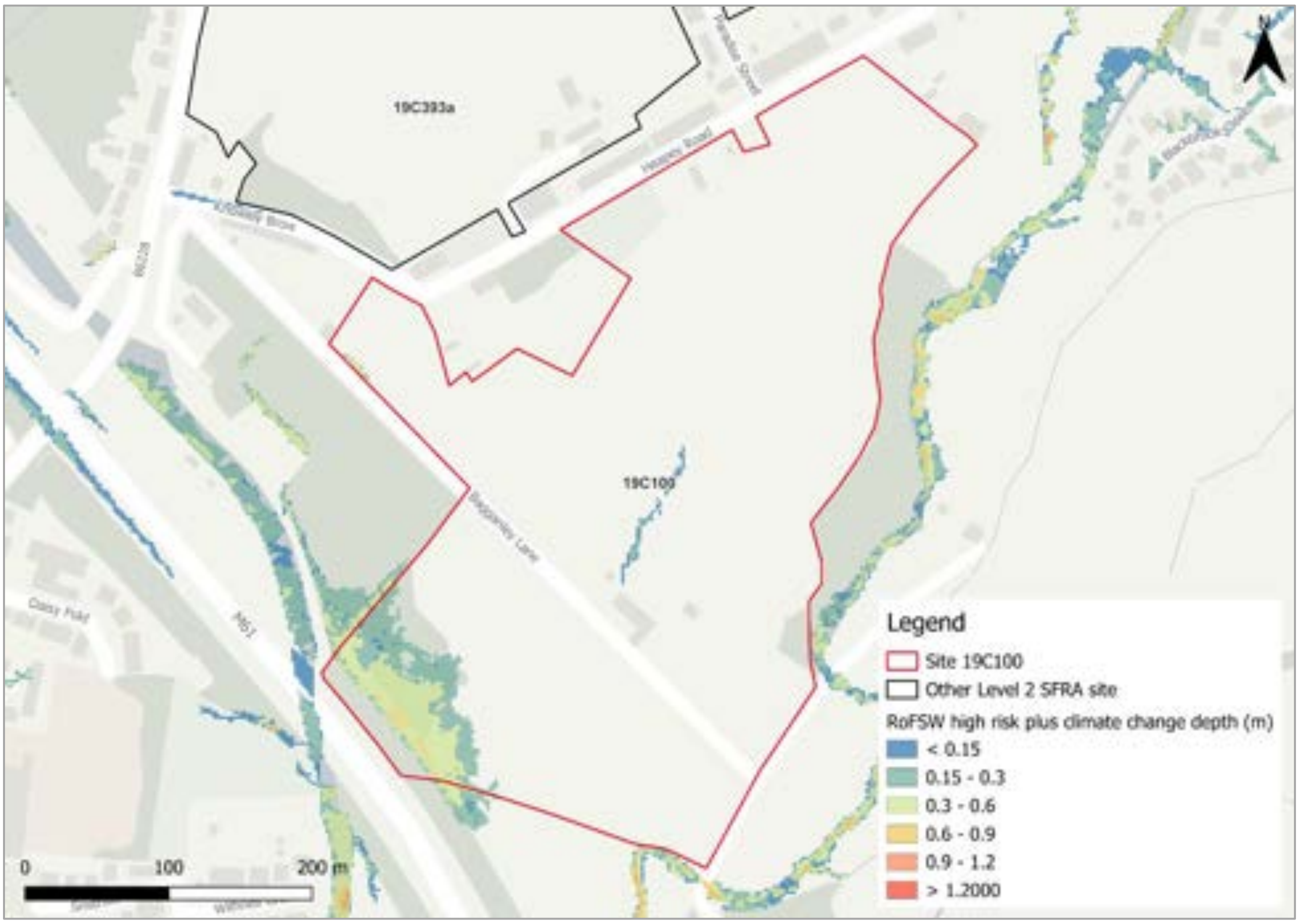


Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be greater than for present day conditions, with the medium risk climate change event showing a similar level of risk to the low risk present day event. Maximum depths are between 0.3 and 0.6 m with some areas of moderate hazard (Figure 3-4).

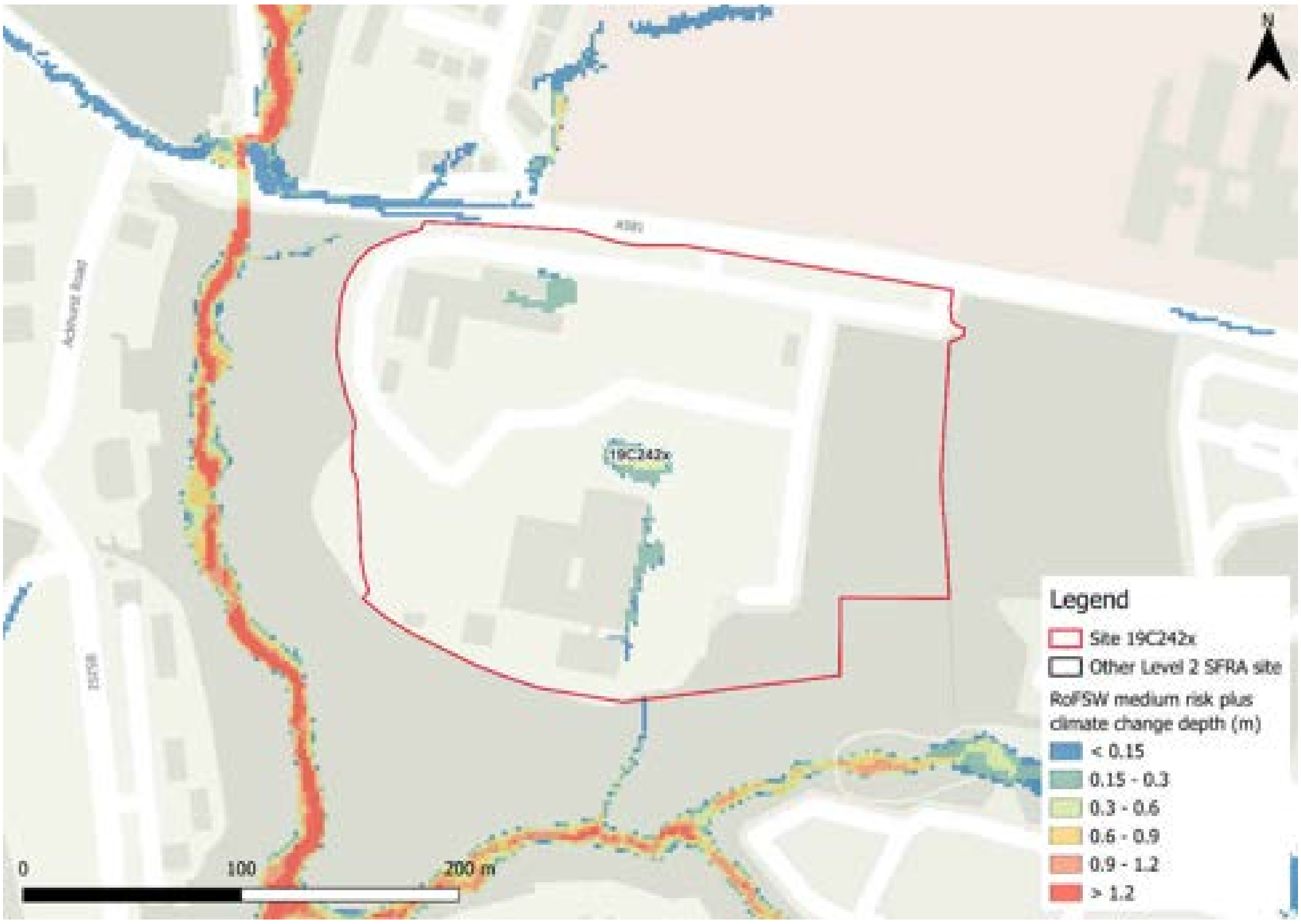


Figure 33-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 33-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

33.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 97% of the site being at very low risk. Surface water risk in the low risk event is confined to areas of ponding across the site, constrained by the existing development.
- The medium risk modelled climate change outputs indicate a similar extent risk to the present day low risk event. Safe access and escape routes should be achievable via the A581 to the north of the site in all events.
- Topographic depressions and flow paths should be considered and included in site design and ideally left in place to flood naturally when required. Any regrading of land must include for like for like volumes to ensure risk is contained safely onsite for the lifetime of development.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

accommodate the proposed residential development or whether further capacity will be required.

- It is assumed the existing onsite development will be demolished for new housing units. A detailed drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Note, 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 or evidence.

34 Risk from groundwater

Risk from groundwater sources 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 Guide[24]. Figure 4-1 shows the map for Site 19C242x and the surrounding areas and Table 22-1 explains the risk classifications.

The entirety of the site is in an area where there is no groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS across the majority of the site.

Figure 34-1: JBA 5m Groundwater Emergence Map

24 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 34-1: Groundwater Flood 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.	

35 Overall site assessment

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

This site is not required to pass part b) of the exception test[25] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

35.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

25 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C243x

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0030
Revision	P02
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Contract

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This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Kaylyn Carroll 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 19 August 2024 and 14 February 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.

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Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

Contents

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List of Tables

37 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C243x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

37.1 Site 19C243x

- Location: Great Knowley
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 9.12 hectares
- Proposed development impermeable area: 7.75 hectares (assumed 85% impermeable area)
- Watercourse: Leeds and Liverpool Canal
- Summary of requirements from scoping stage:
    - Level 1 recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of modelled fluvial flood depths and hazards
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 37-1: Existing site location boundary

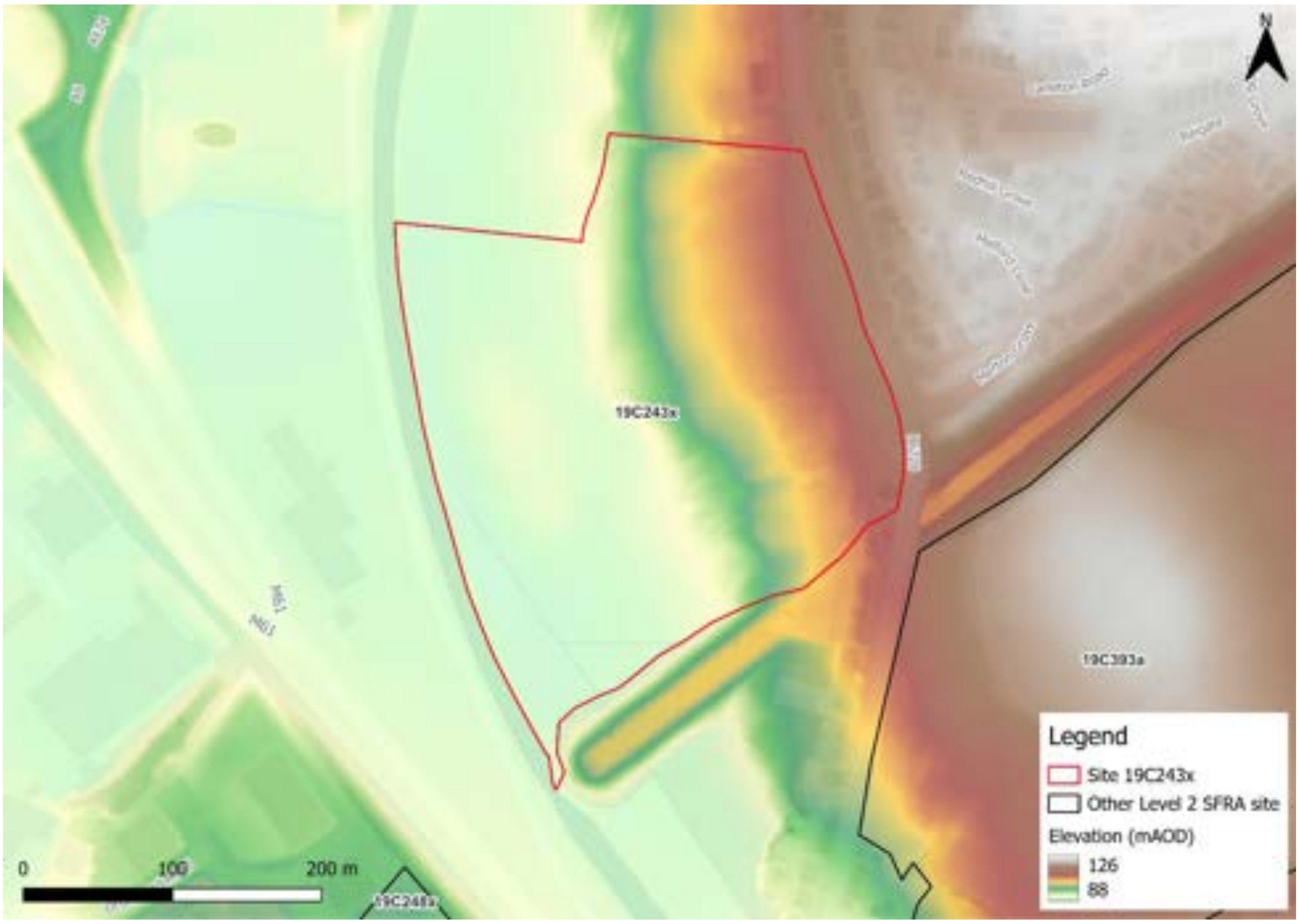

Figure 37-2: Topography

38 Flood risk from rivers

38.1 Existing risk

38.1.1 Flood Map for Planning and functional floodplain

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

The majority of the site is located within Flood Zone 1, indicating low risk from rivers. There is a very small area of the site within the functional floodplain however this is conservatively based on an 8m buffer of the OS Open Rivers dataset. This is associated with the Leeds and Liverpool Canal rather than fluvial flood risk from a watercourse. The site boundary, in reality, will not enter the channel of the canal. Therefore, this site should be considered to be 100% in Flood Zone 1.

Table 38-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
98	0	0	2

Figure 38-1: Existing risk from rivers to the site

38.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

38.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA, which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C243x is located within one catchment, namely; Lostock US Farrington Weir. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[26].
- Developments should be incentivised to provide wider betterment by demonstrating in site-specific FRAs and Surface Water Drainage Strategies what

26 Lancashire SuDS Guidance

measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments should achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

38.2.2 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. Within the west of the site there are opportunities for riparian tree planting, which can slow flows, reduce sediment delivery to the watercourse and reduce bankside erosion. The majority of the site has potential for wider catchment tree planting. These areas are shown on Figure 38-2.

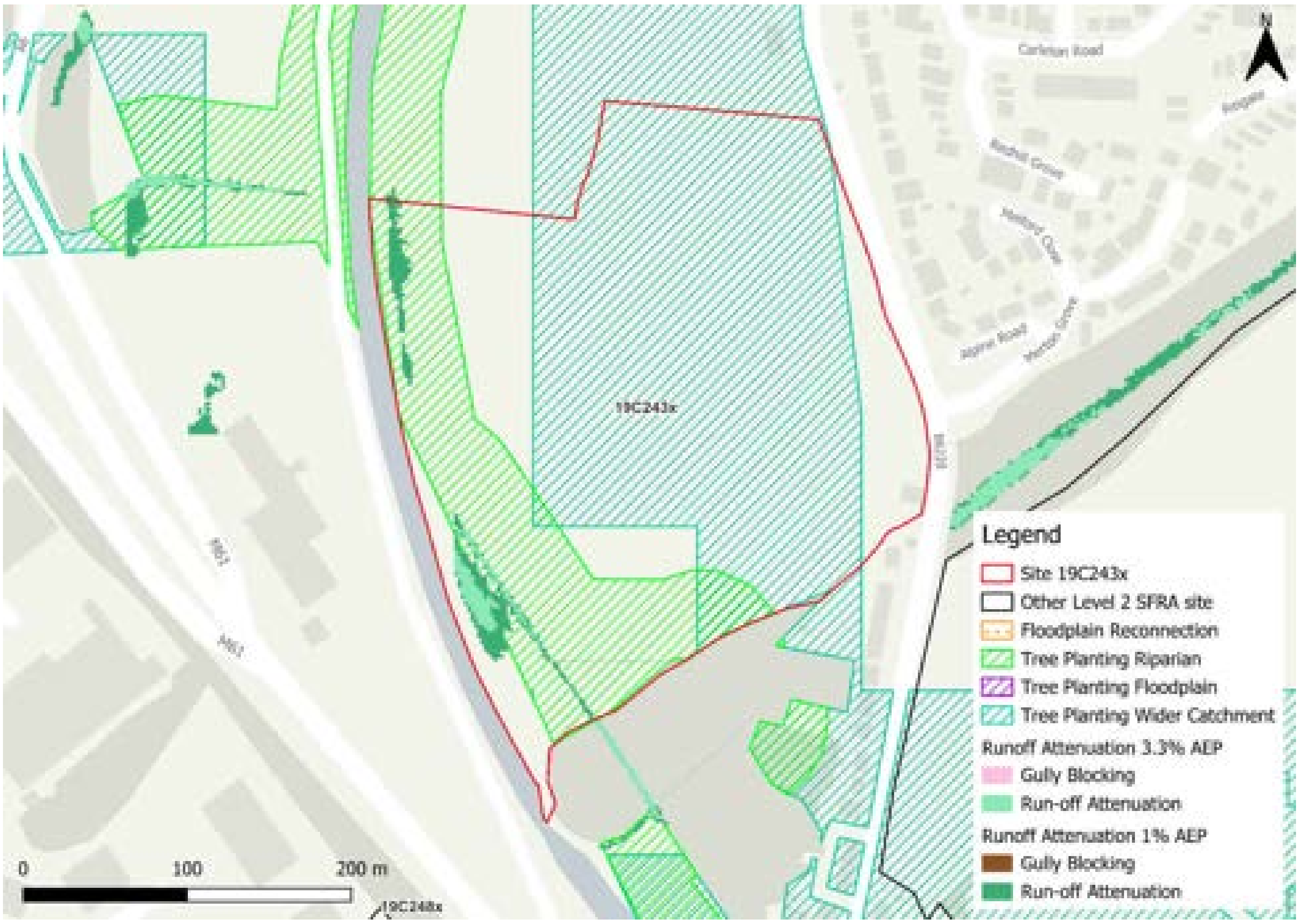

Figure 38-2: Natural Flood Management (NFM) potential mapping

38.3 Residual risk

The Leeds and Liverpool Canal runs along the eastern boundary of the site. There is no known existing flood model of the canal therefore any residual risk from the canal is unknown at this stage. The canal is raised approximately 0.5m above the site in some locations. Therefore, the site is at potential residual flood risk from a breach of the canal system. This scenario must be investigated at the FRA stage including full consultation with the Canal & River Trust, the canal operator.

38.3.1 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 38-3 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 from Anglezarke, Heapey No.1, Heapey No.2, Heapey No.3, High Bullough and Yarrow reservoirs, all of which are located within the district of Chorley. Three of these reservoirs are operated by United Utilities and three are operated by Wigan & District Angling Association.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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 both United Utilities and Wigan & District Angling Association to ascertain whether the proposed development could affect the reservoir's risk designation, it's 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.

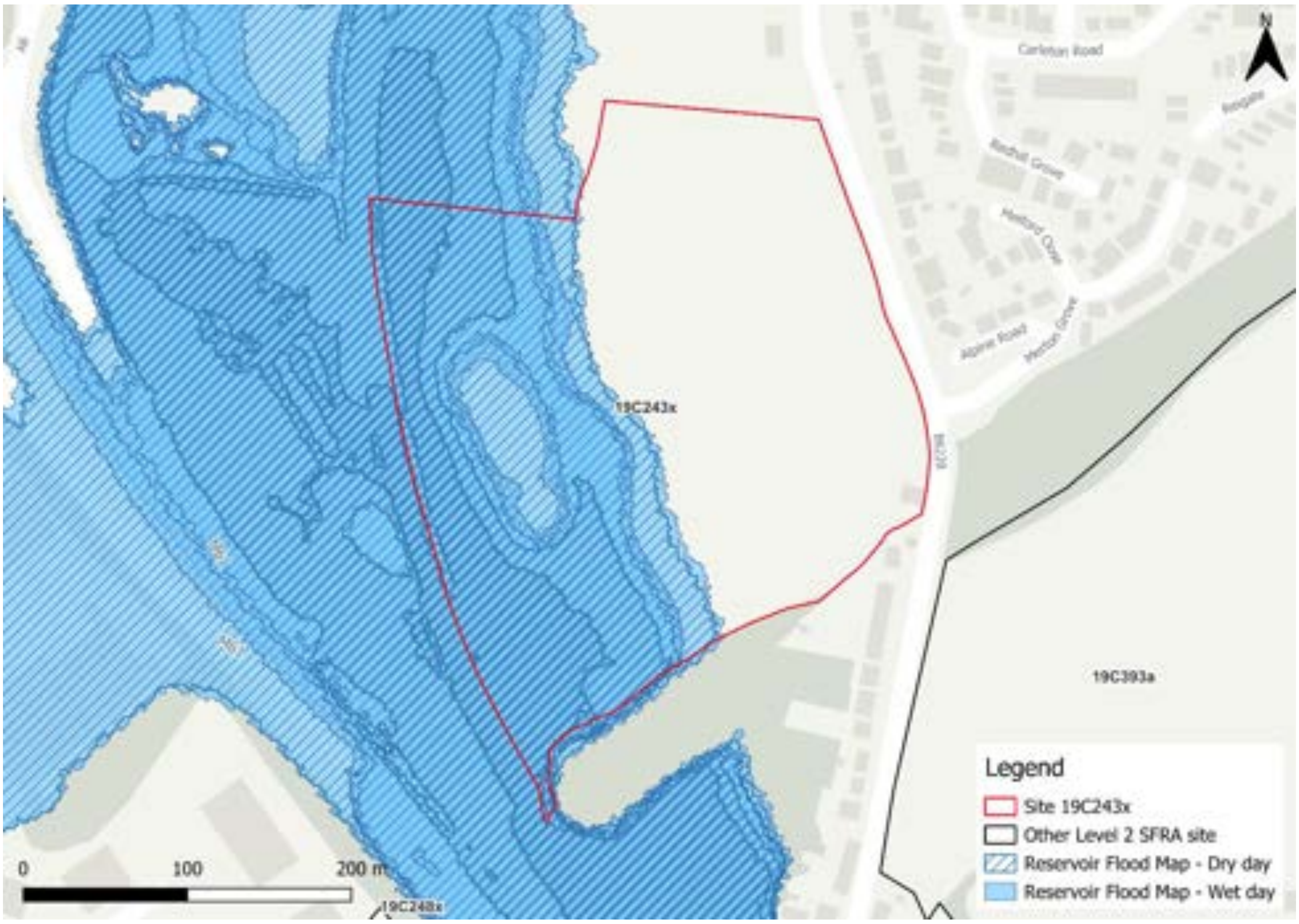

Figure 38-3: Flood risk from reservoirs

38.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood events within the vicinity of the site.

38.5 Flood warning and access and escape routes

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. The 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. The site is not located within a FAA.

Based on available information, safe access and escape routes could likely be achieved via the B6228.

38.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- There is a small area of the site shown to be within the functional floodplain, however this is conservatively based on an 8m buffer of the OS Open Rivers dataset representing the Leeds and Liverpool Canal and the site boundary will not enter the canal channel.
- The site is entirely located within Flood Zone 1 and therefore at low flood risk from rivers.
- Given the potential reservoir risk to the site, developers should consider[27]:
    - Whether additional modelling is required to understand the flood risk from the reservoir, referring to the specification for the reservoir flood maps as a starting point
    - Whether the development may have an impact on the reservoir or reservoir owner
    - Referring to the Central Lancashire Level 1 SFRA for information on reservoir risk and recommendations for how to address it
    - Contacting the LPA for pre-application advice
    - Contacting the LPA to understand the need to consult with their emergency planning team and with the reservoir owner
- The residual risk of flooding to the site as a result of a breach or overtopping of the Leeds and Liverpool Canal should be fully investigated. Modelling may be required to inform on risk. Consultation will be required with the Canal & River Trust and breach modelling may be required to ascertain residual risk.
- Any development should be set back at least 8 metres from the canal embankment. However, this should be confirmed with the Canal & River Trust.

27 Reservoir flood maps: when and how to use them | Environment Agency | 2021

39 Flood risk from surface water

39.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 1% of the site is within the high risk surface water flood zone. A further 3% is at medium surface water risk, and a further 9% is at low surface water risk, as shown in Table 3-1.

In the high risk event, surface water is confined to an area of ponding within a topographic low spot in the west of the site. There is surface water flow path located along an existing drainage ditch through the south of the site. In the medium risk event, the area of ponding within the west of the site extends into a flow path along the western boundary, likely due to the raised canal embankment. In the low risk event, there is a significant area of ponding within the west of the site, likely caused by the raised canal embankment.

Greatest surface water flood depths in the medium risk event are between 0.3 and 0.6 m (Figure 3-1) with some areas of moderate hazard (Figure 3-2). Safe access and escape routes should be possible via B6228 during all events.

Table 3-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
87	9	3	1

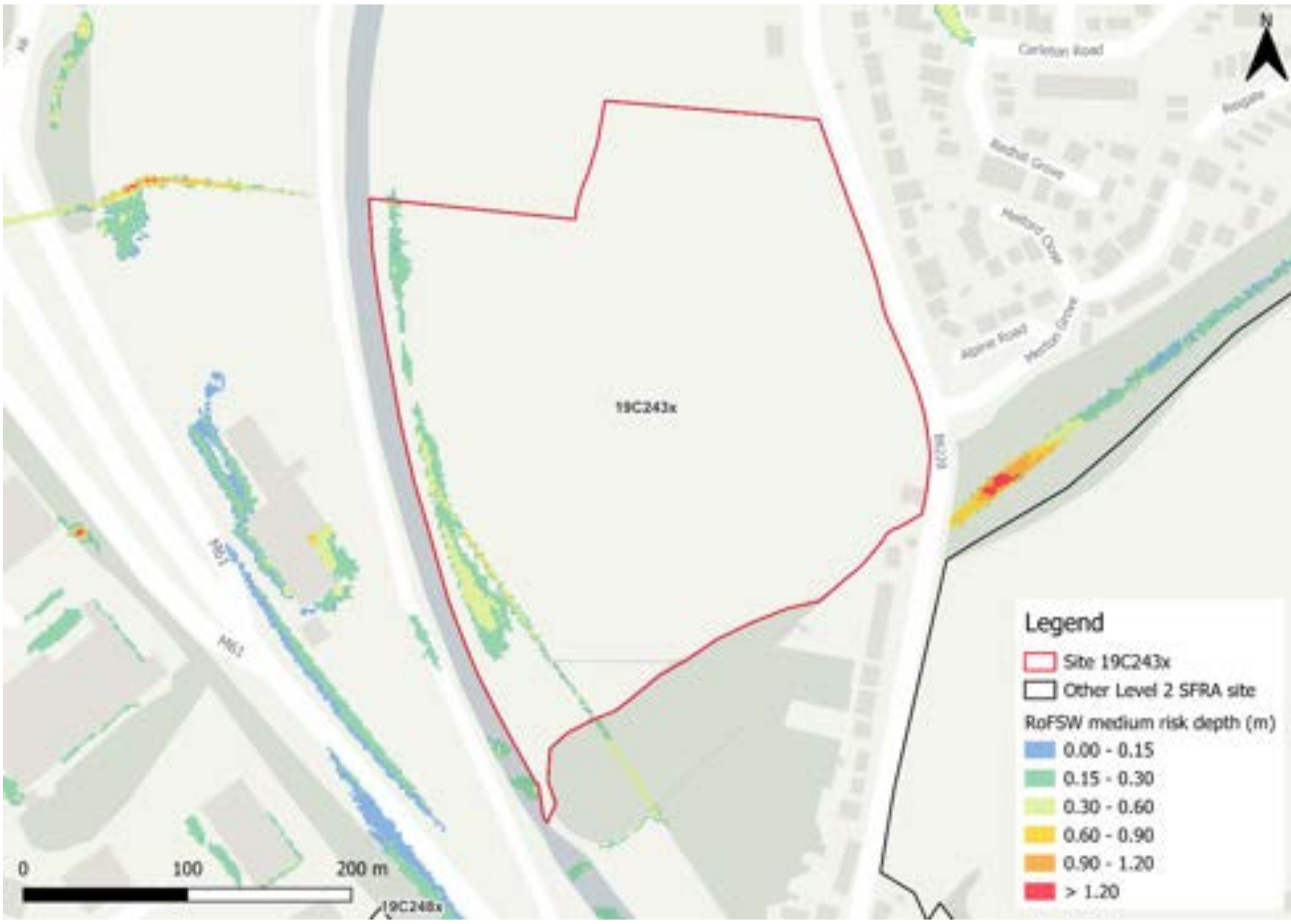

Figure 39-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 39-2: Medium risk event surface water flood hazard[28] (Risk of Flooding from Surface Water map)

39.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 3-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

28 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

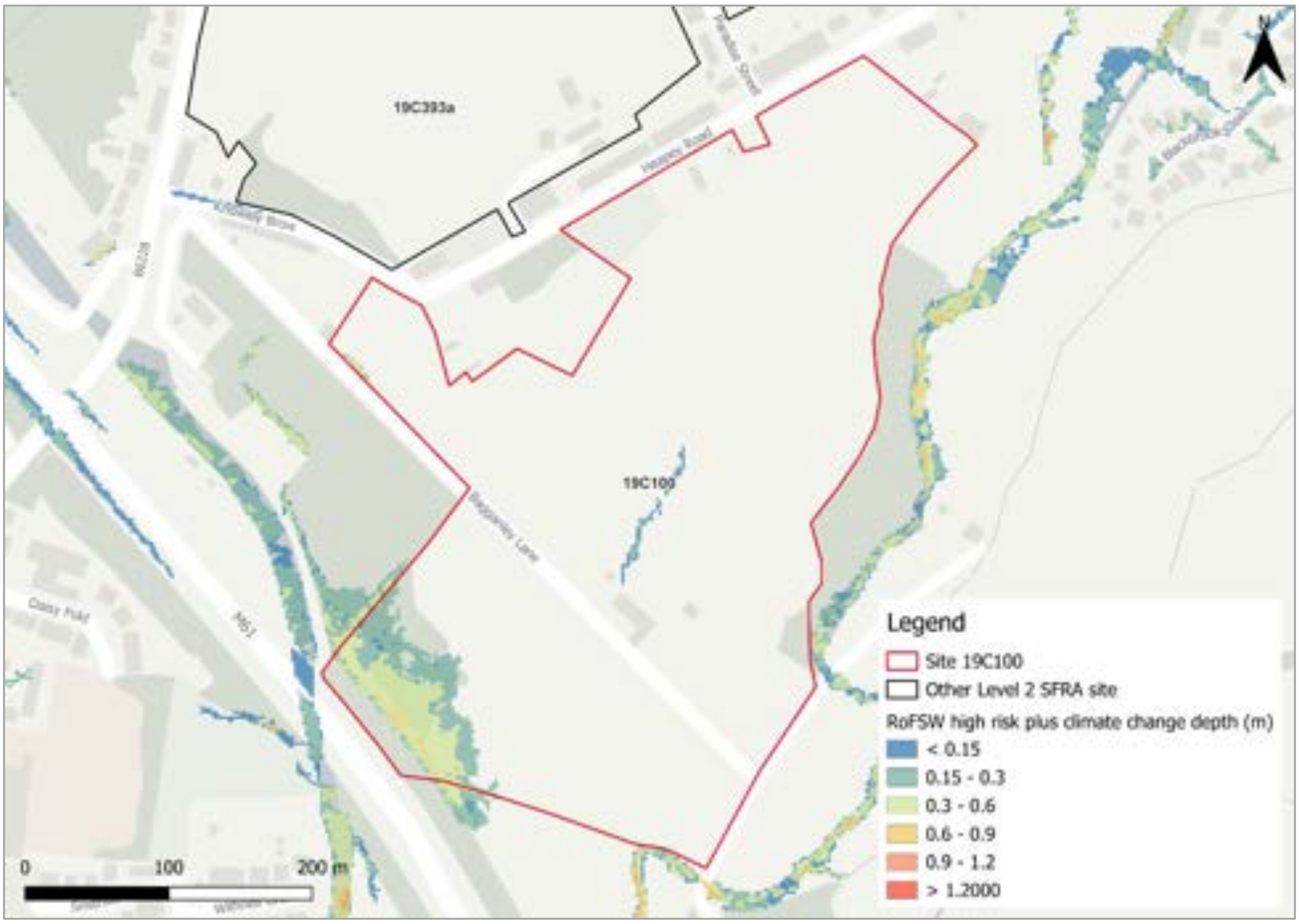

Figure 3-3 shows the modelled surface water depths for the high risk event +40% climate change. Risk is modelled to be significantly greater than present day conditions, with the medium risk climate change event being similar in extent to the present day low risk event. The risk is clearly caused by the raised canal embankment preventing the surface water from flowing westwards. Maximum flood depths are modelled to be between 0.9 and 1.2 m, with hazard categorised as significant (Figure 3-4).

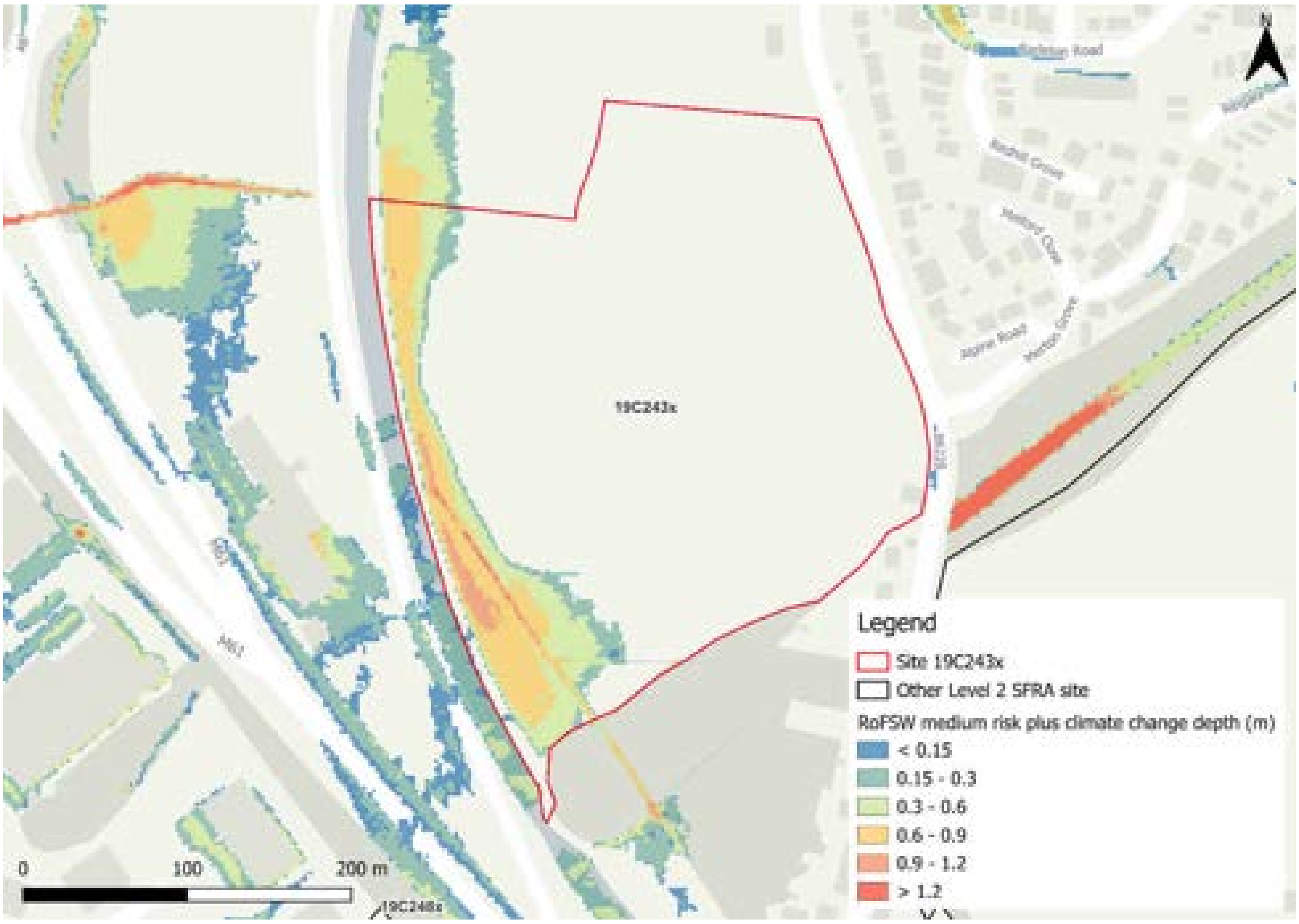

Figure 39-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

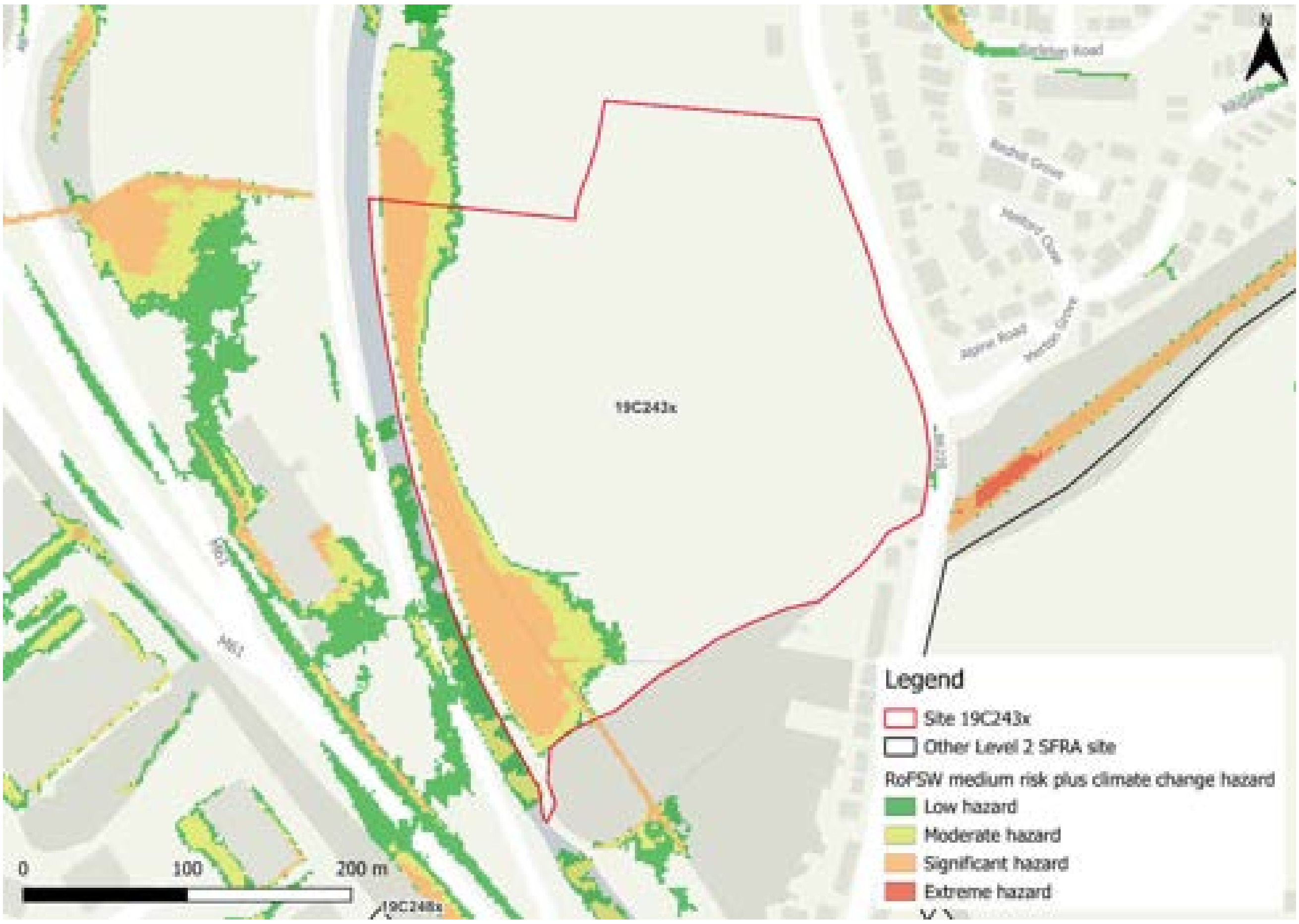

Figure 39-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

39.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is very low, with 87% of the site being at a very low risk. Surface water risk in the high and medium risk events is confined to the western boundary of the site, ponding within topographic low spots and within an existing drainage ditch.
- In the low risk event, there is a significant area of ponding within the west of the site. Safe access and escape routes should be achievable via B6228 in all events.
- The medium risk modelled climate change outputs indicate a similar extent risk to the present day low risk event, with a number of flow paths emerging through the site. Any existing flow paths and topographic depressions should be maintained in site design.
- The risk is clearly caused by the raised canal embankment preventing the surface water from flowing westwards. Development should be setback from this area alongside the embankment which should be used for SuDS.
- The Groundwater Flood Map (Figure 40-1) indicates that ground conditions may be suitable for infiltration SuDS across the majority of the site. This should be

further explored through appropriate ground survey as part of the FRA and drainage strategy.

- Were development to proceed, a drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and consultation with the LLFA.
- Site runoff should be maintained at greenfield rates and, where possible, betterment should be achieved.
- Note, the RoFSW map is not suitable for identifying whether an individual property will flood and is therefore indicative. The RoFSW map is no 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 or evidence.

40 Risk from groundwater

Risk from groundwater sources 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 Guide[29]. Figure 40-1 shows the map for Site 19C243x and the surrounding areas and Table 40-1 explains the risk classifications.

The risk of groundwater emergence varies across the site. Within the west of the site, there is a risk groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots. The remaining area of the site is within an area where there is no groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS across the majority of the site. Ground investigations will be required within the west of the site through the site-specific FRA to ascertain groundwater levels and conditions. Given the proximity of this high risk area to the surface water flood risk area, this area should be included within any SuDS design.

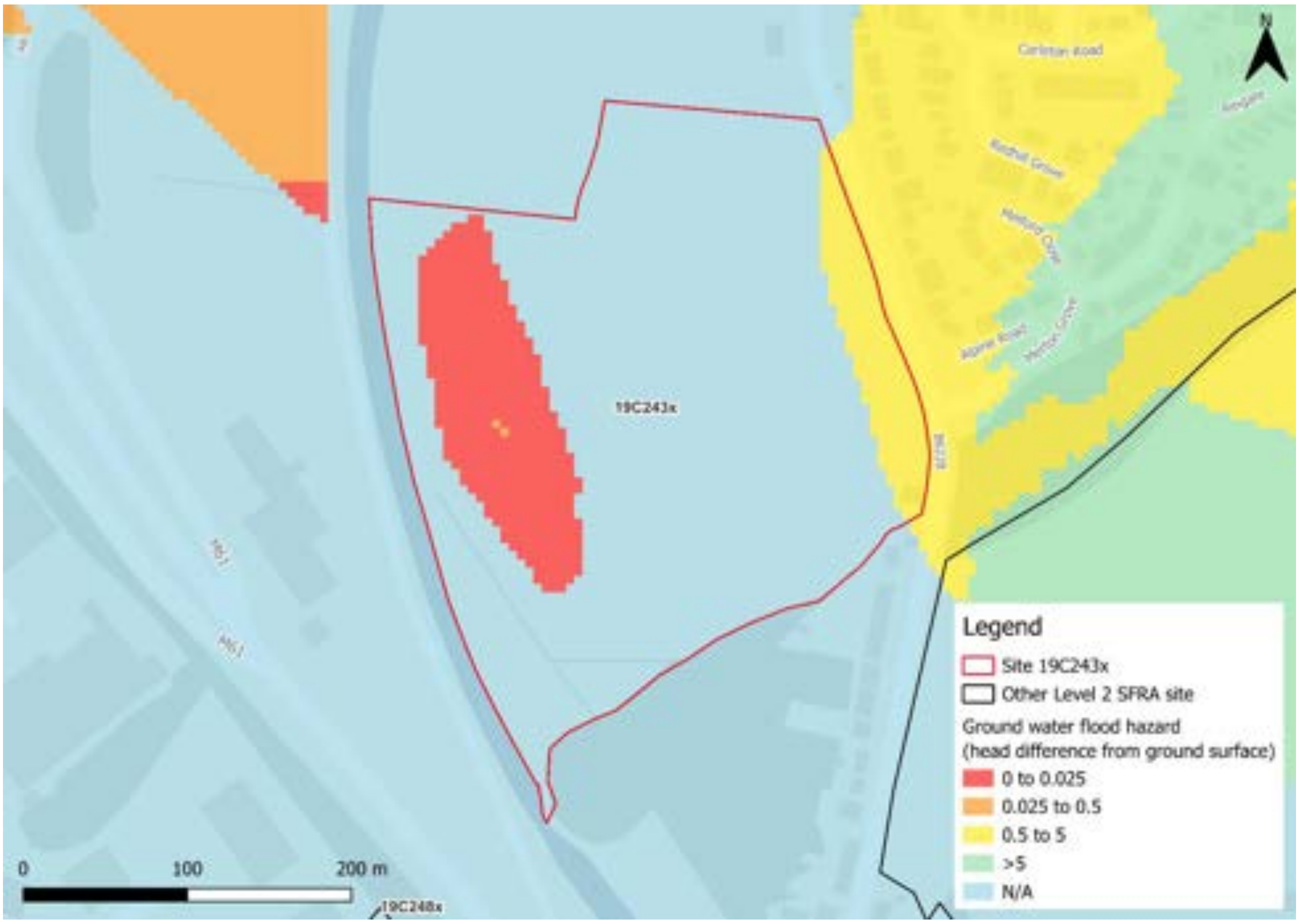

Figure 40-1: JBA 5m Groundwater Emergence Map

29 [Strategic flood risk assessment good practice guide. ADEPT. December 2021.]

Table 40-1: Groundwater Flood 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.	

41 Overall site assessment

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

This site is not required to pass part b) of the exception test[30] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

41.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on the evidence in this SFRA, it should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1.
- There should be no inappropriate development within the functional floodplain. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- There is significant risk from surface water in the longer term. A detailed drainage strategy will be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development.
- Surface water should be retained onsite in the western area of the site where appropriate SuDS should be put in place. This may require surface water modelling based on layout plans and detailed design and full consultation with the LLFA on required runoff rates, likely to be greenfield or betterment. The use of infiltration SuDS should be investigated.
- Residual risk from the canal must be accounted for through consultation with the Canal & River Trust.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C245x

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	13 December
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0029
Revision	P02
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JBA Project Code	2023s1344

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Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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43 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C245x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

43.1 Site 19C245x

- Location: Land East of M61
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 6.9 hectares
- Proposed development impermeable area: 5.9 hectares (assumed 85% impermeable area)
- Watercourse: Leeds and Liverpool Canal
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 43-1: Existing site location boundary

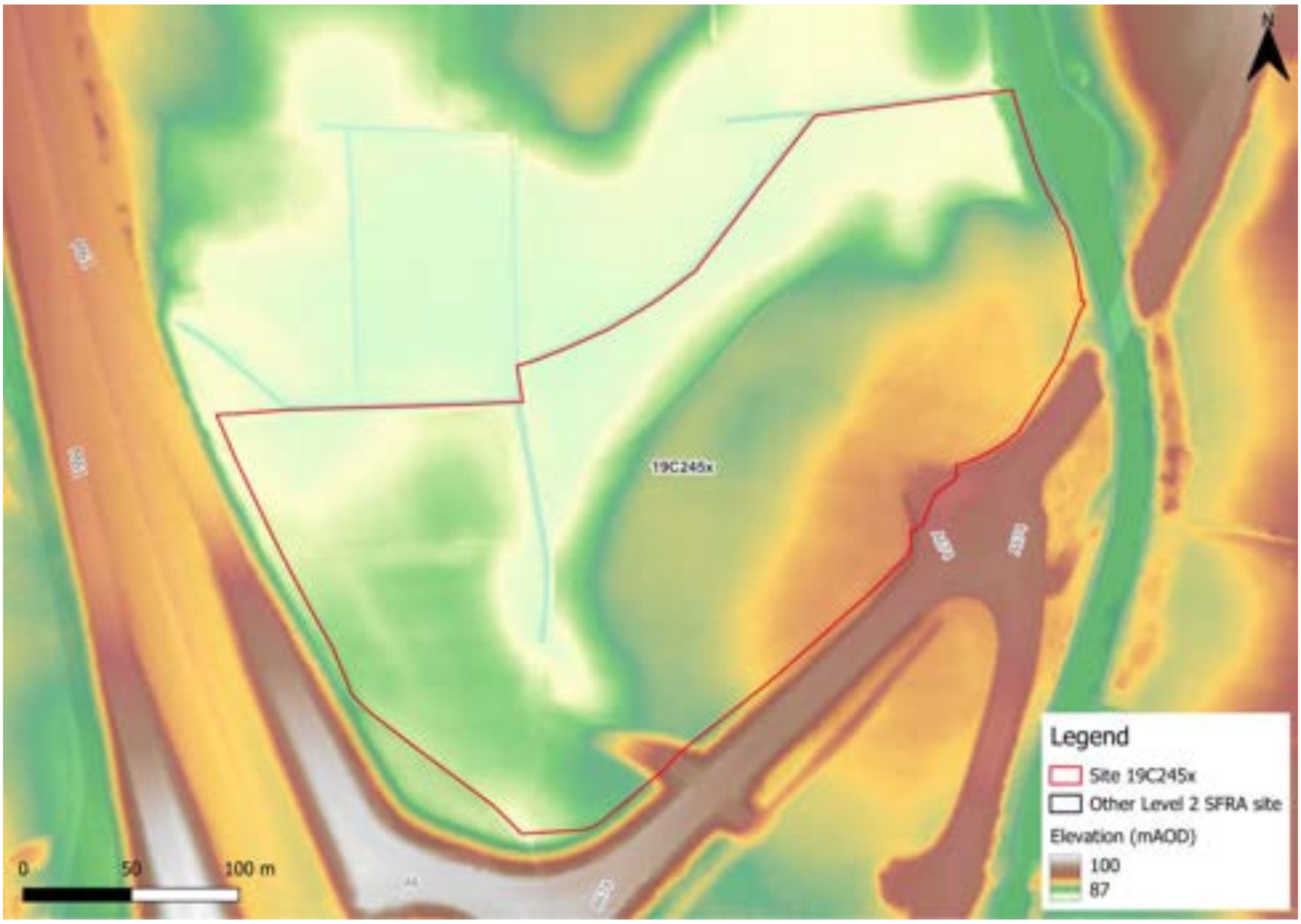

Figure 43-2: Topography

44 Flood risk from rivers

44.1 Existing risk

44.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk from flooding from rivers. The Leeds and Liverpool Canal runs adjacent to the western boundary of the site.

Table 44-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 44-1: Existing risk from rivers to the site

44.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

44.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C245x is located within one catchment, namely; Lostock US Farington Weir. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[31].
- Developments should be incentivised to provide wider betterment by demonstrating in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments should achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

44.2.2 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. Both within and upstream of the site, there is potential for tree planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. There are also opportunities to implement runoff attenuation features to reduce runoff downstream. These areas are shown on Figure 44-2.

31 Lancashire SuDS Guidance

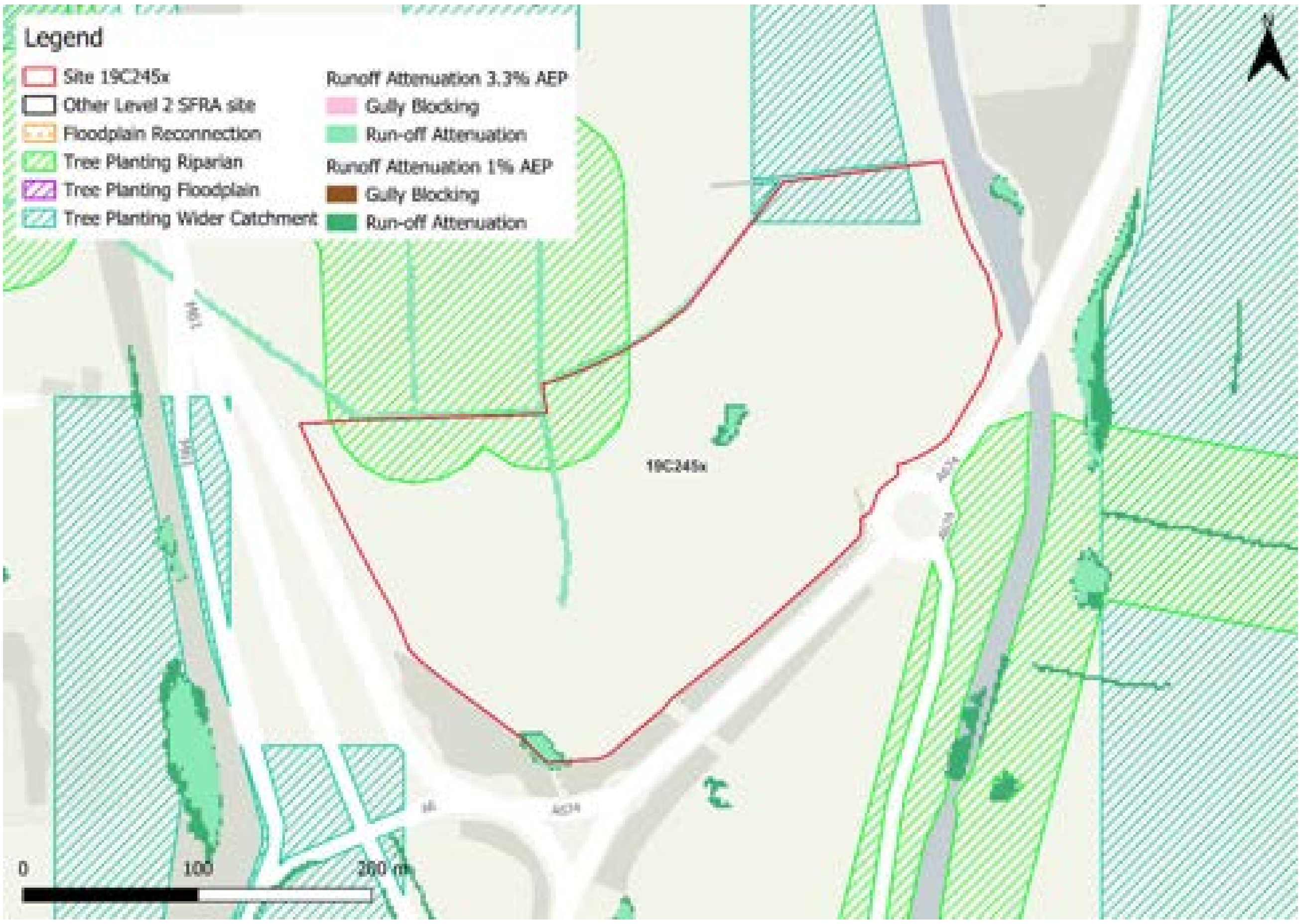

Figure 44-2: Natural Flood Management (NFM) potential mapping

44.3 Residual risk

44.3.1 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 44-3 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 from five reservoirs, all of which are located within Chorley. Three of these reservoirs are operated by United Utilities and two are operated by Wigan & District Angling Association.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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 United Utilities to ascertain whether the proposed development could affect the reservoir's risk designation, it's 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.

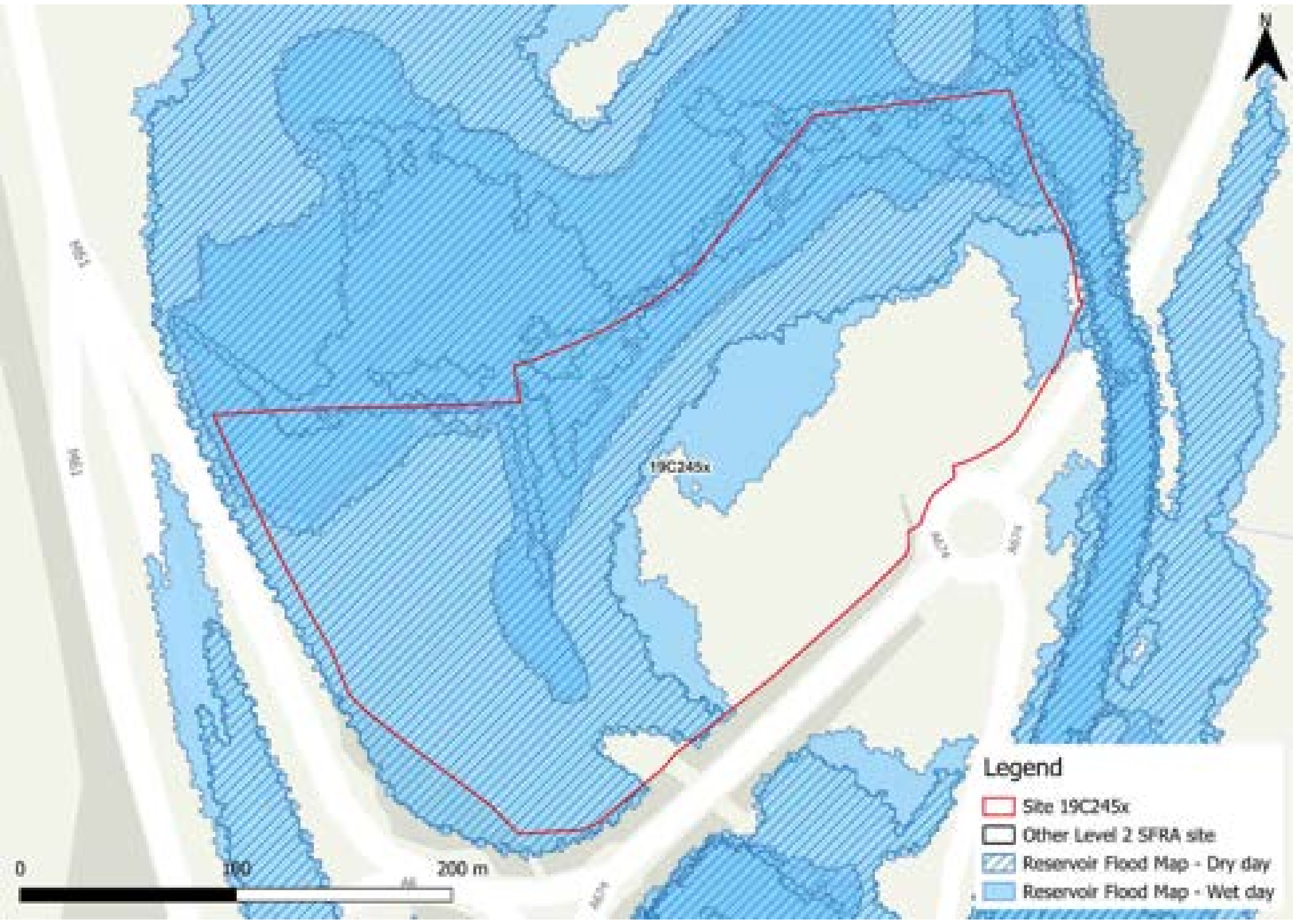

Figure 44-3: Flood risk from reservoirs

44.3.2 Flood risk from canals

The Leeds and Liverpool Canal runs adjacent to the eastern boundary of the site. There is no known existing flood model of the canal therefore any residual risk from the canal is unknown at this stage. However, the canal is raised approximately 1.5 m above the site. Therefore, the site is at potential residual risk from a breach of the canal system. This scenario must be investigated at the FRA stage including full consultation with the Canal & River Trust.

Canal & River Trust historic overtopping incidents data indicates that there have been some recorded incidents of the Leeds and Liverpool Canal overtopping within the vicinity of the site, occurring in 2011 and 2014.

44.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

44.5 Flood warning and access and escape routes

The site is not located within a Flood Warning Area (FWA) or a Flood Alert Area (FAA).

Based on available information, safe access and escape routes could likely be achieved during a flood event via the A674 to the south of the site.

44.6 Observations, mitigation options and site suitability - fluvial

- The site is located wholly within Flood Zone 1.
- The potential residual risk of flooding to the site as a result of a breach or overtopping of the Leeds Liverpool Canal should be fully investigated. Modelling may be required to inform on risk. Consultation will be required with the Canal & River Trust.
- Given the potential reservoir risk to the site, developers should consider[32]:
  - Whether additional modelling is required to understand the flood risk from the reservoir, referring to the specification for the reservoir flood maps as a starting point
  - Whether the development may have an impact on the reservoir or reservoir owner
  - Referring to the Central Lancashire Level 1 SFRA for information on reservoir risk and recommendations for how to address it
  - Contacting the LPA for pre-application advice
  - Contacting the LPA to understand the need to consult with their emergency planning team and with the reservoir owner
-

32 Reservoir flood maps: when and how to use them | Environment Agency | 2021

45 Flood risk from surface water

45.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 2% of the site is within the high risk surface water flood zone. A further 1% is at medium surface water risk, and a further 6% is at low surface water risk, as shown in Table 21-1.

In the high and medium risk events, surface water risk is confined to areas of ponding within the centre and south of the site and along a drainage ditch through the west and along the northern boundary of the site. In the low risk event, the areas of ponding within the site become larger in extent, and an area along the northern boundary of the site is inundated.

Greatest flood depths in the medium risk event are between 0.6 and 0.9 m (Figure 3-1), located within the drainage ditch in the site, with some areas of significant hazard (Figure 3-2). Safe access and escape routes should be possible via the A674 to the south of the site in all events.

Table 45-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
91	6	1	2

-
-

Figure 45-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 45-2: Medium risk event surface water flood hazard[33] (Risk of Flooding from Surface Water map)

45.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 45-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

33 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

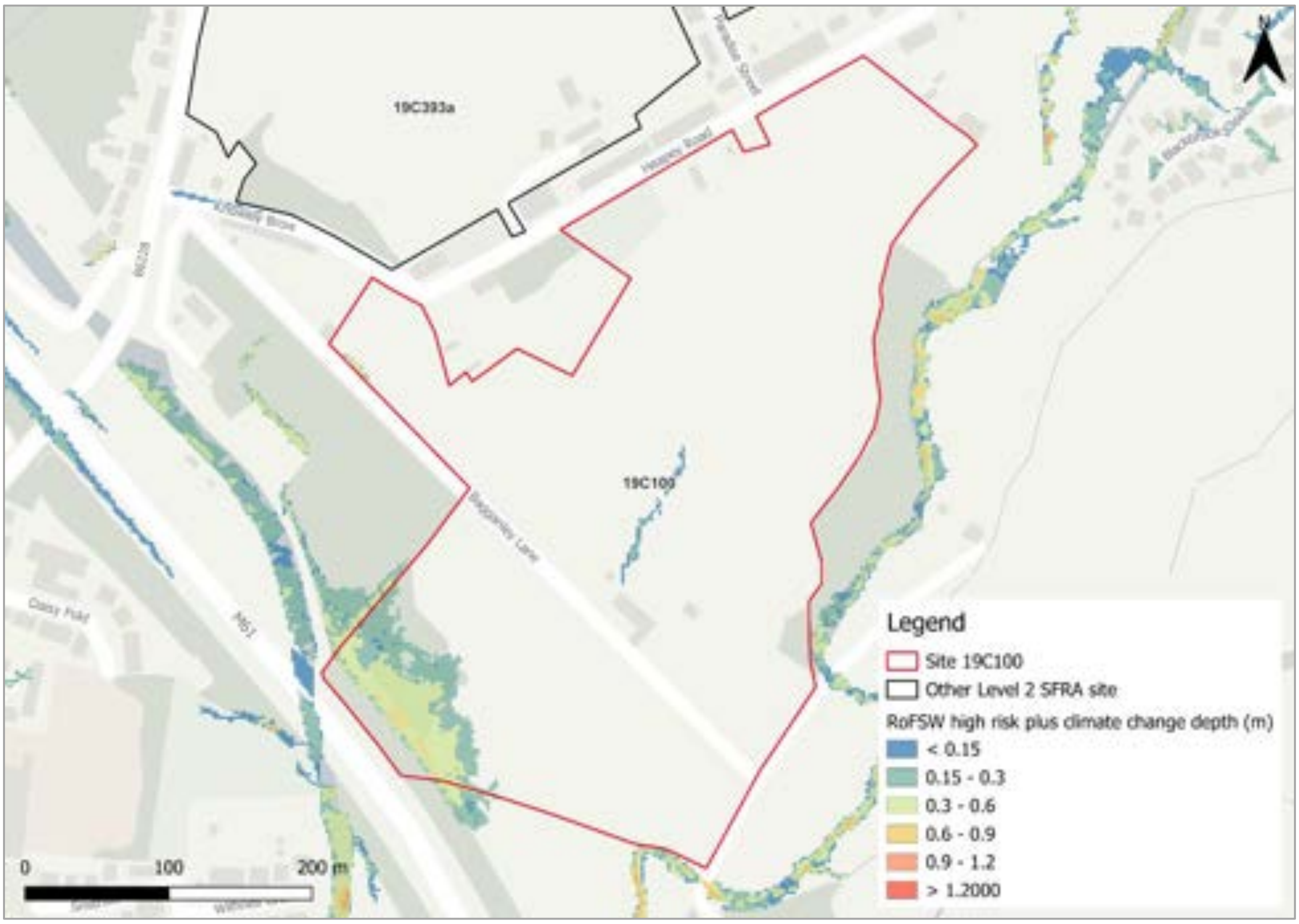

Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be greater than for present day conditions, with the medium risk climate change event showing a similar level of risk to the low risk present day event. Maximum depths are between 0.9 and 1.2 m, located within the drainage ditch in the site, with some areas of significant hazard (Figure 3-4). Safe access and escape routes should remain achievable via the A674 to the south of the site.

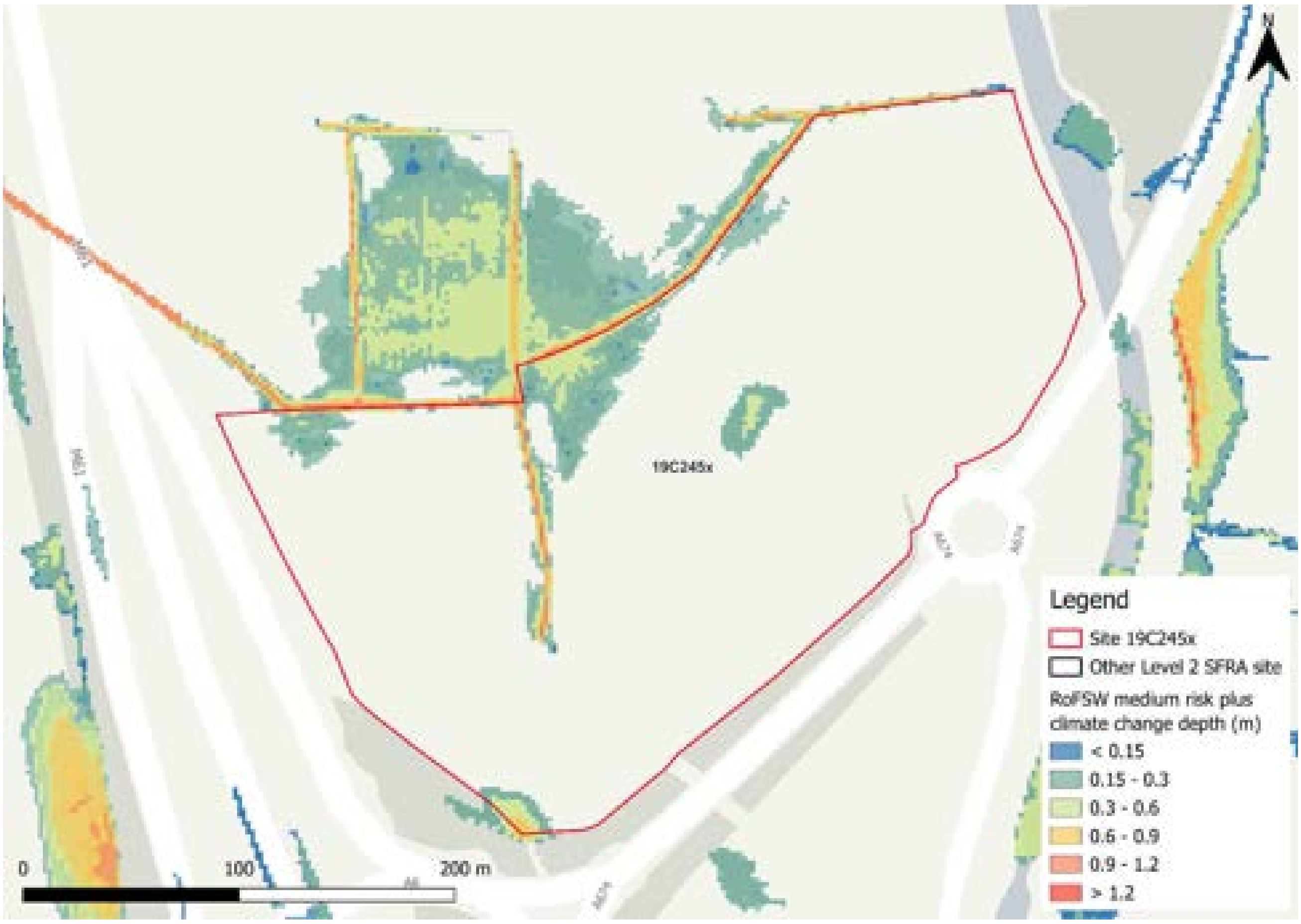

Figure 45-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 45-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

45.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 91% of the site being at very low risk. Surface water risk in the high and medium risk events is confined to small areas of ponding across the site and along the existing drainage ditch.
- The modelled medium risk surface water climate change outputs indicate a similar risk to the present day low risk event.
- Safe access and escape routes should be achievable via the A674 in all events.
- The drainage ditch should be kept in place and remain unobstructed. The ditch should be maintained and included within the landscaping design of the development.
- Topographic depressions should be considered and included in site design and ideally left in place to flood naturally when required. Any regrading of land must include for like for like volumes to ensure risk is contained safely onsite for the lifetime of development.
- Were development plans to proceed, a full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a

result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.

- Note, 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 or evidence.

46 Risk from groundwater

Risk from groundwater sources 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 Guide[34]. Figure 4-1 shows the map for Site 19C245x and the surrounding areas and Table 22-1 explains the risk classifications.

Across the majority of the site, there is a risk of groundwater flooding to both surface and subsurface assets. There are some small areas within the north east and south of the site where there is no groundwater risk. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions.

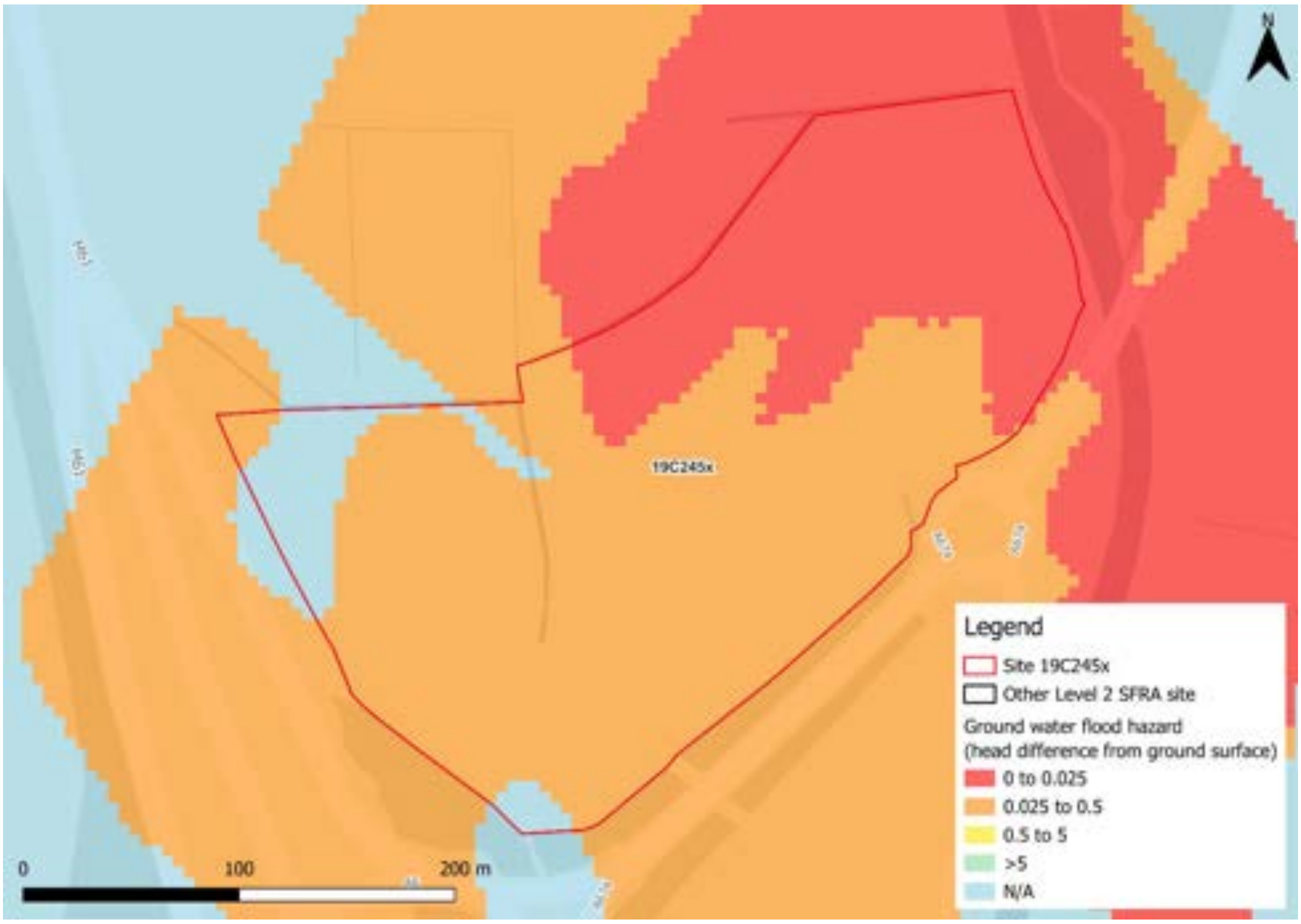

Figure 46-1: JBA 5m Groundwater Emergence Map

34 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 46-1: Groundwater Flood 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.	

47 Overall site assessment

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

This site is not required to pass part b) of the exception test[35] as it is proposed for less vulnerable uses. However, it must still be proven that the development can be safe for its lifetime, which is 75 years for non-residential development.

47.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Potential residual risk from the Leeds and Liverpool Canal must be considered.
- Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions.
- Any FRA should undertake a condition assessment of the canal embankment adjacent to the site and investigate the impact of a potential breach of the canal.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

35 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C247x

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0028
Revision	P02
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49.1 Site 19C247x

- Location: Cabbage Hall Fields
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 0.6 hectares
- Proposed development impermeable area: 0.5 hectares (assumed 85% impermeable area)
- Watercourse: River Chor
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk
    -

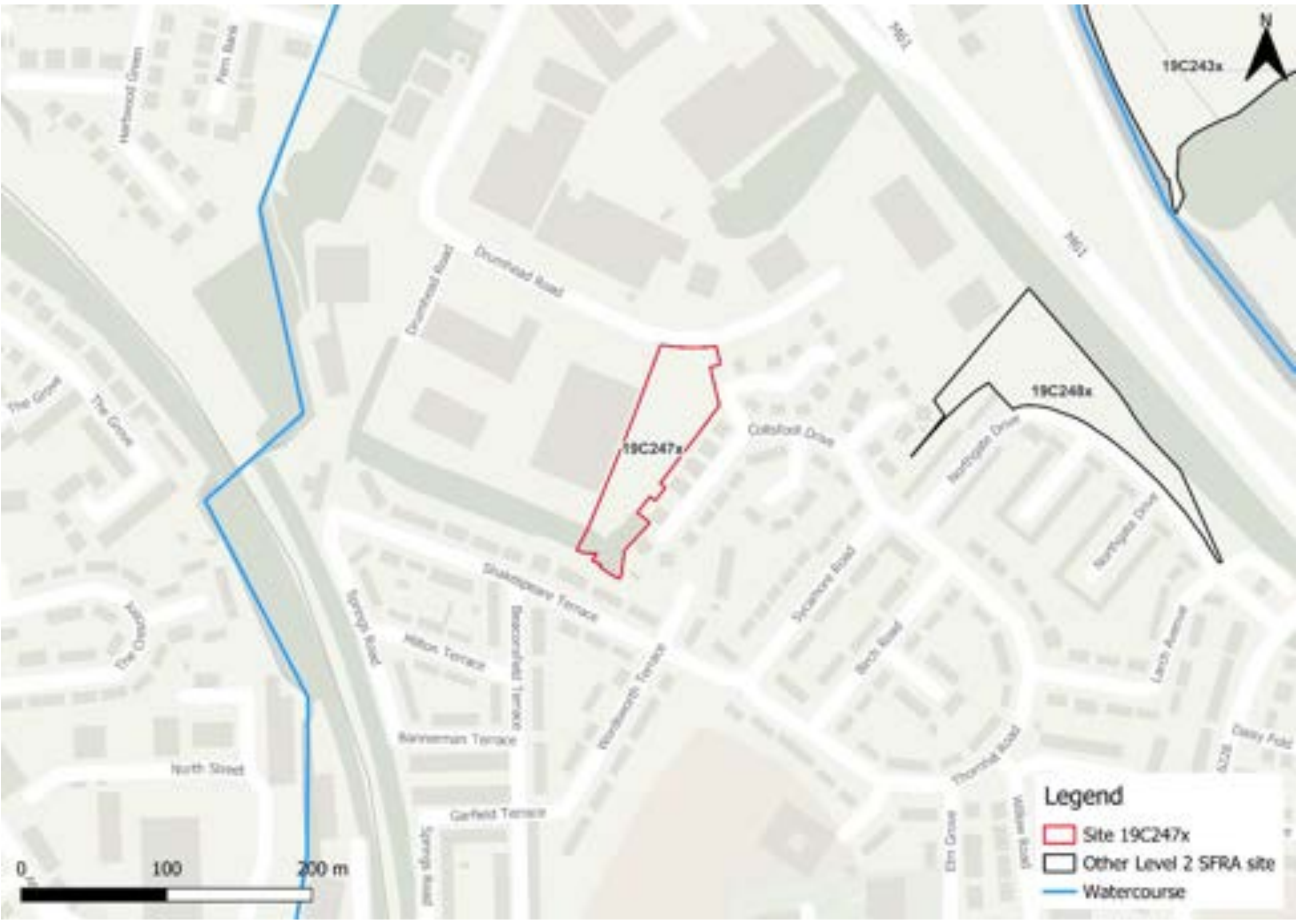

Figure 49-1: Existing site location boundary

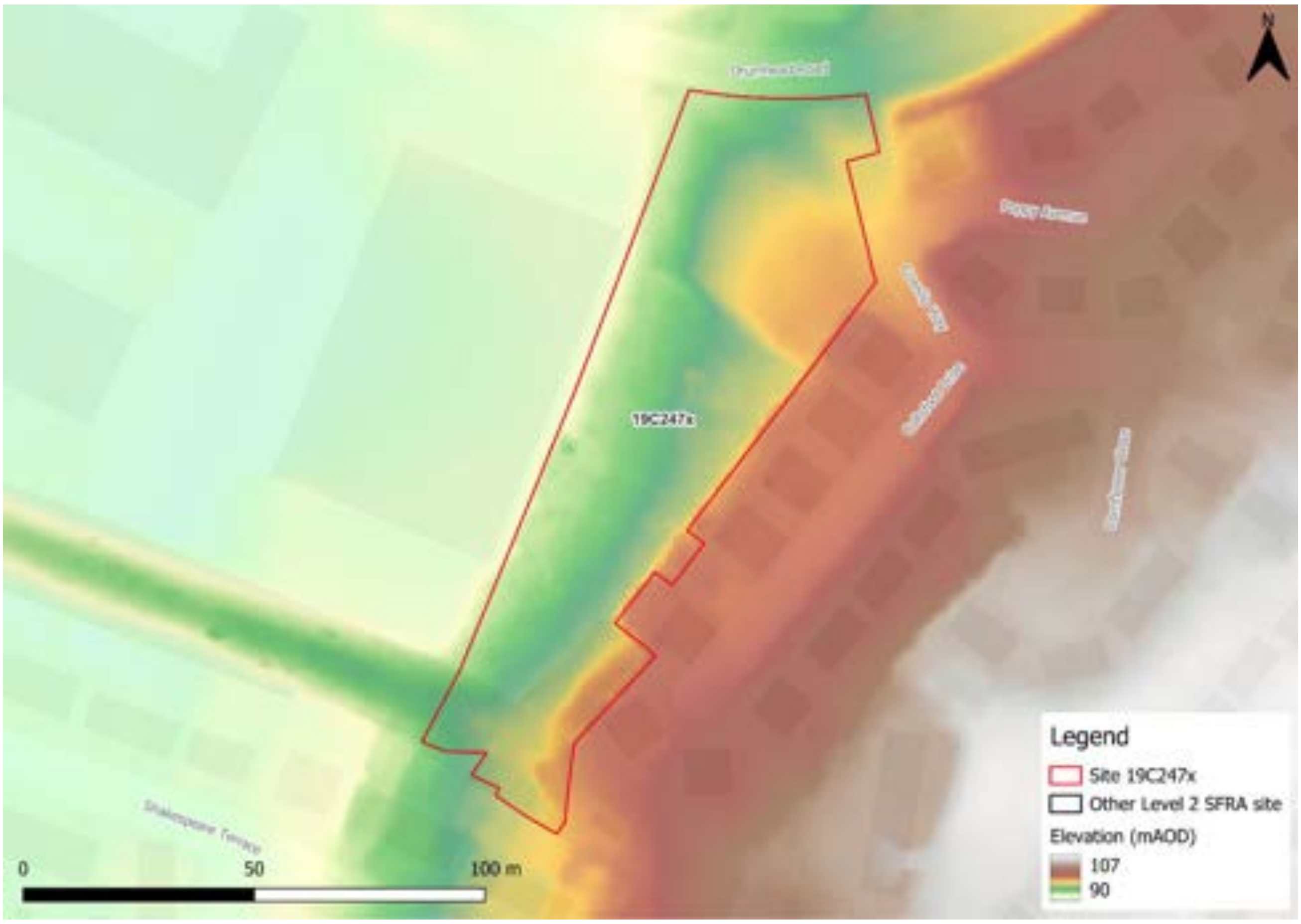

Figure 49-2: Topography

50 Flood risk from rivers

50.1 Existing risk

50.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk from flooding from rivers.

Table 50-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 50-1: Existing risk from rivers to the site

50.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

50.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C247x is located within one catchment, namely; Yarrow DS Big Lodge Water. This is ranked as a low sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

50.2.2 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. There are no opportunities for NFM applicable to this site.

50.3 Residual risk

50.3.1 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 50-2 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 western boundary and some of the access and escape routes of the site are potentially at risk from Anglezarke Reservoir, located in Chorley and operated by United Utilities.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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 United Utilities to ascertain whether the proposed development could affect the reservoir's risk designation, it's 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.

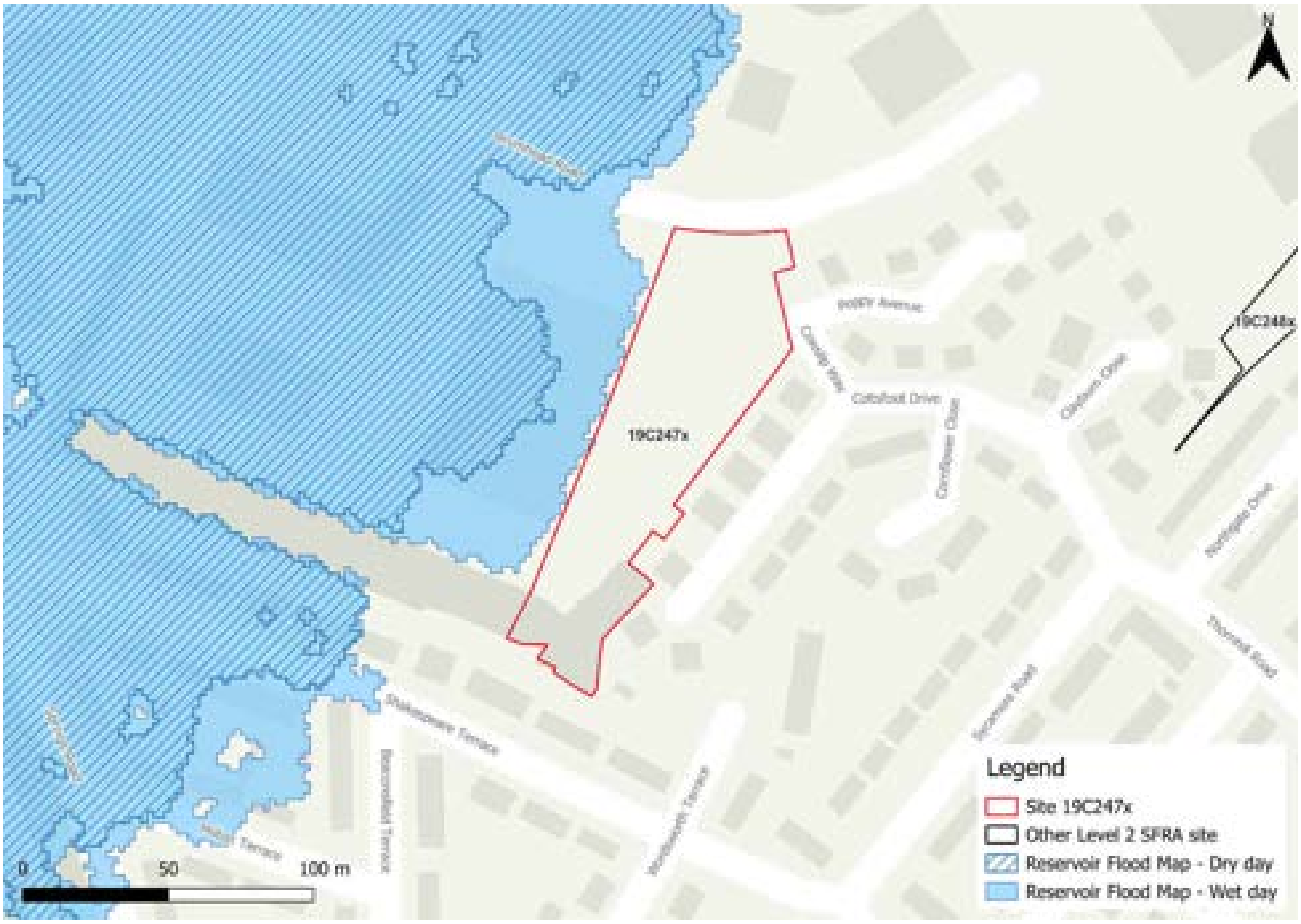

Figure 50-2: Flood risk from reservoirs

50.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

50.5 Flood warning and access and escape routes

The site is not located within a Flood Warning Area (FWA) or a Flood Alert Area (FAA).

Based on the FMfP, safe access and escape routes could likely be achieved during a flood event via Drumhead Road to the north and Cowslip Way to the east.

50.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site would see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the site-specific FRA must show that the development can be designed to be safe for its lifetime and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is located wholly within Flood Zone 1.

51 Flood risk from surface water

51.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Only 1% of the site is at low surface water risk, as shown in Table 21-1.

In the low risk event, surface water risk is confined to a short flow path adjacent to the northern and northeastern site boundaries.

Greatest flood depths in the low risk event are less than 0.15 m (Figure 3-1) with hazard categorised as low (Figure 3-2). The access and escape routes to the site are inundated in the low risk event, however depths and hazards are low therefore safe access and escape routes should be achievable via both Drumhead Road and Cowslip Way.

Table 51-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
99	1	0	0

Figure 51-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

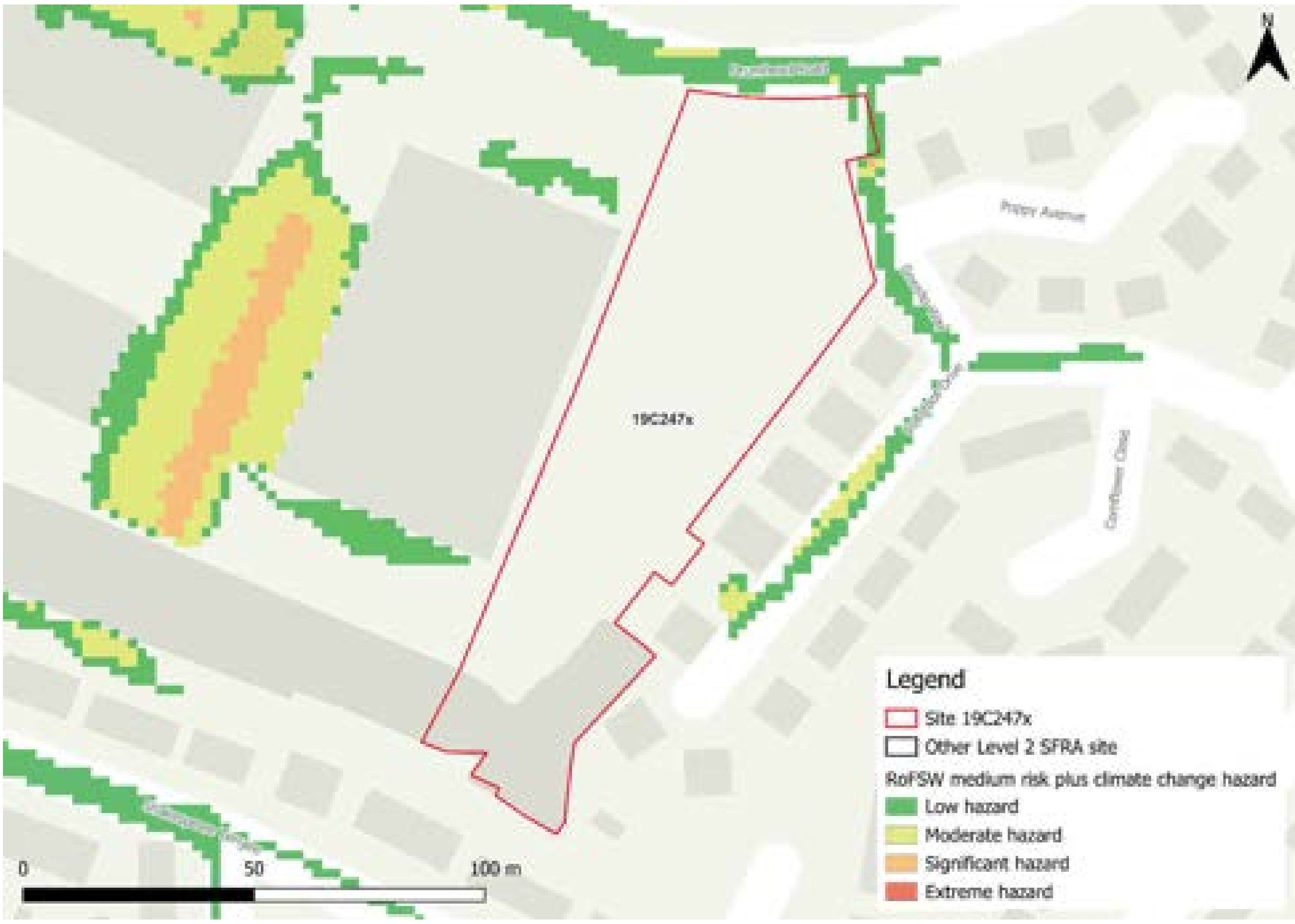

Figure 51-2: Low risk event surface water flood hazard[36] (Risk of Flooding from Surface Water map)

51.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 51-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

36 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

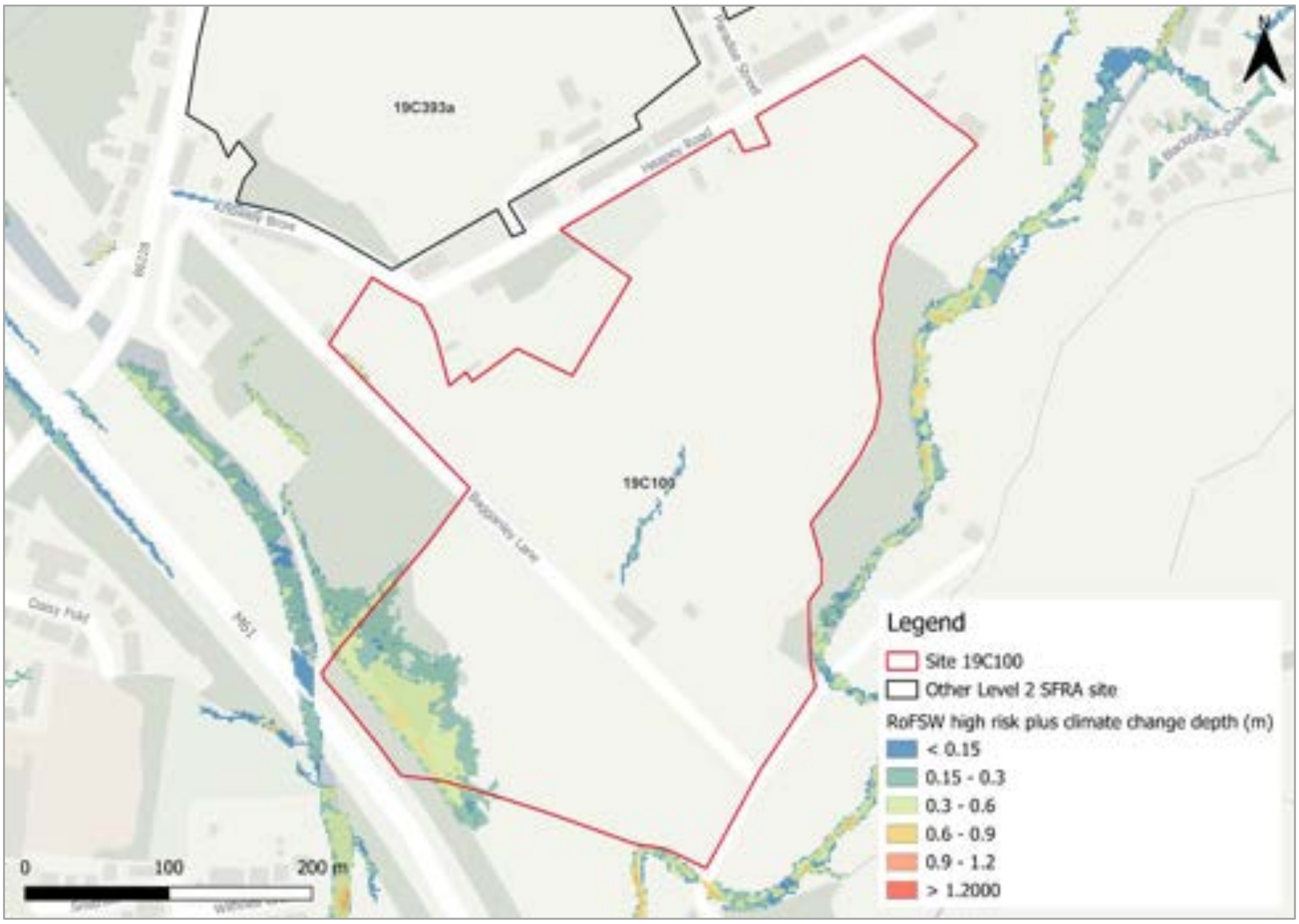

Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be greater than for present day conditions, with the medium risk climate change event showing a similar level of risk to the low risk present day event. Maximum depths are less than 0.15 m with hazard categorised as low (Figure 3-4). Safe access and escape routes should remain achievable via the north and northeast of the site.

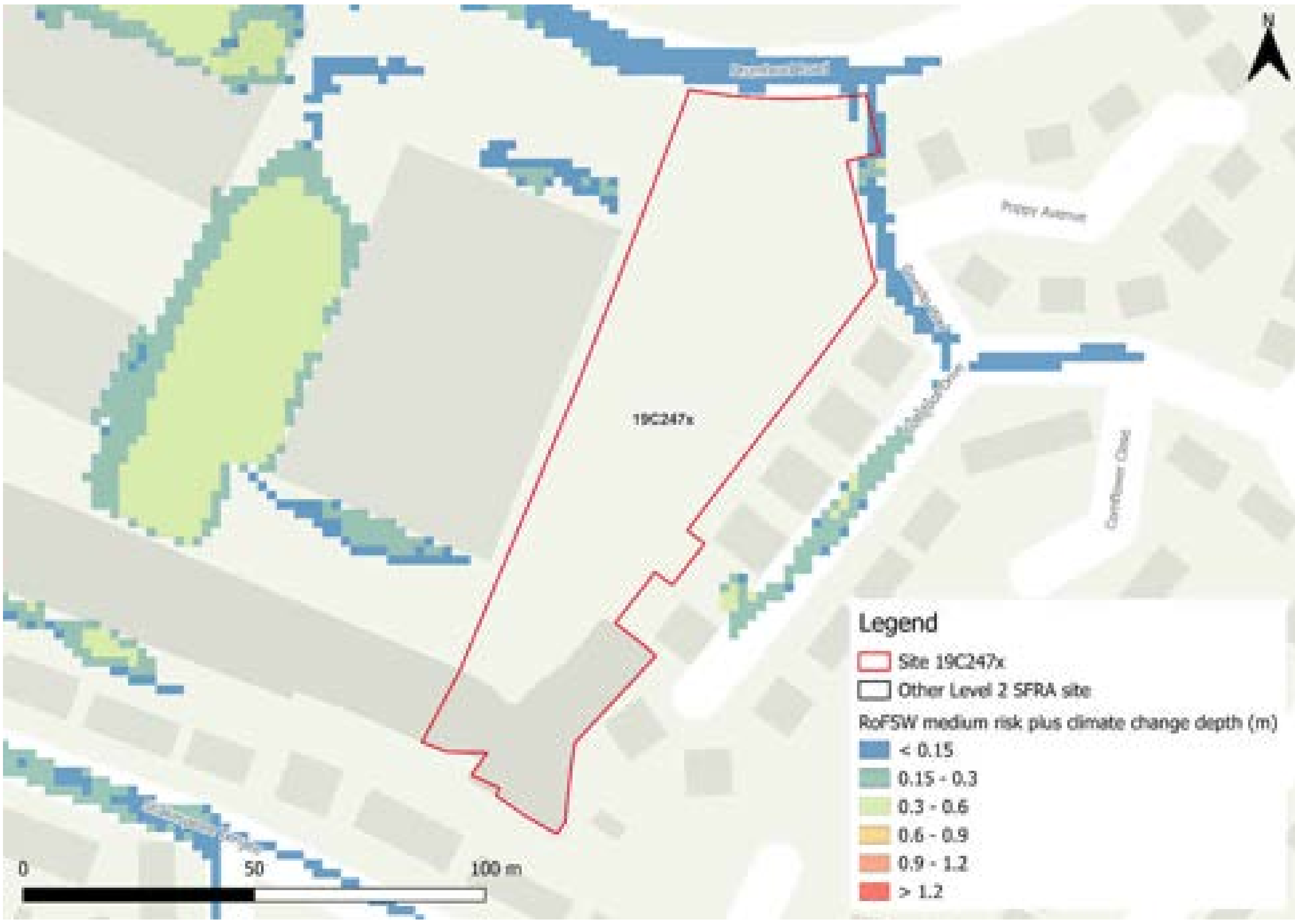

Figure 51-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

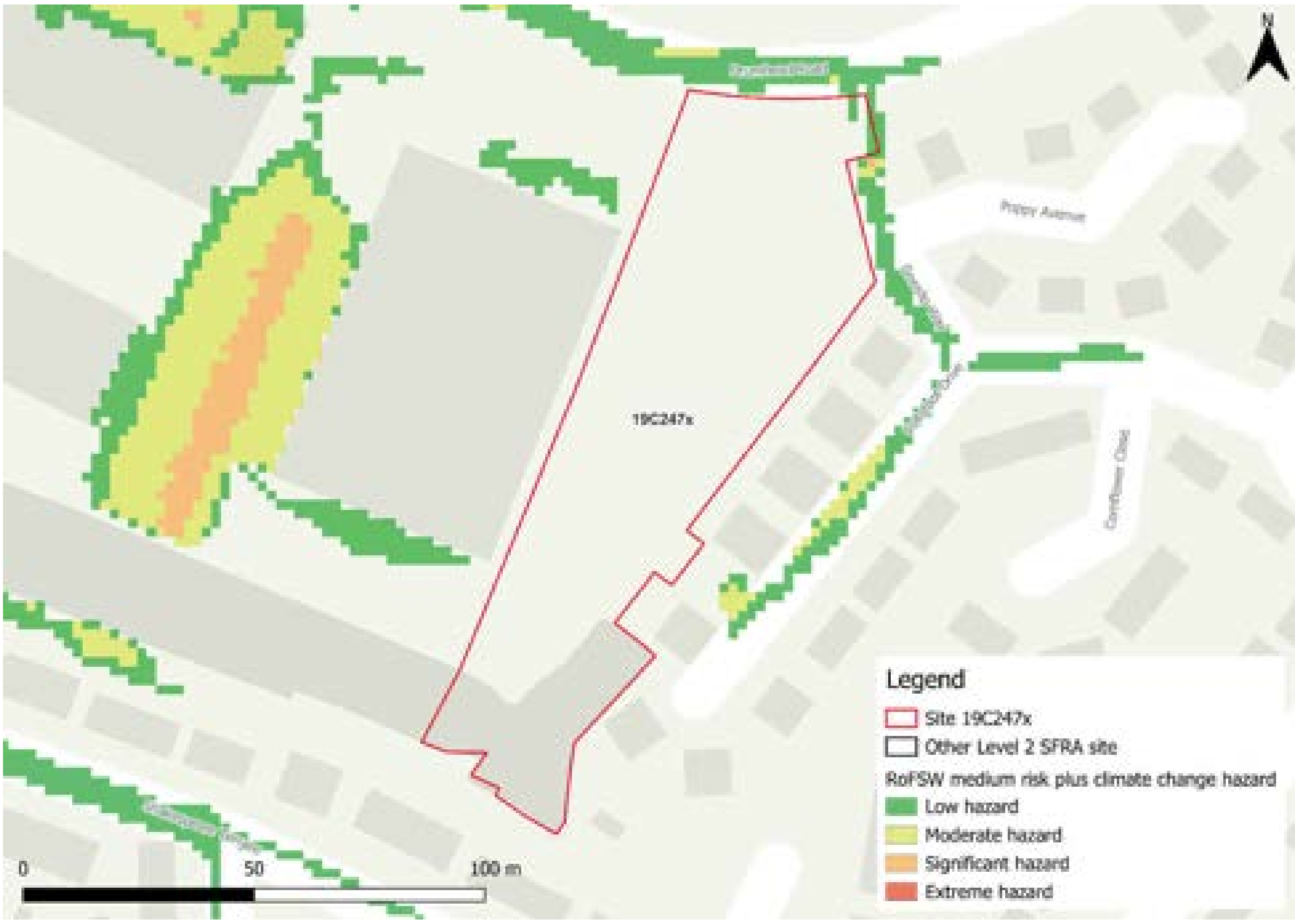

Figure 51-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

51.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 99% of the site being at very low risk. Surface water risk in the low risk event is confined to a flow path along the northern and northeastern boundaries of the site.
- The medium risk modelled climate change outputs indicate a greater risk to the site than present day conditions, however risk still remains very low.
- Safe access and escape routes are achievable via Drumhead Road and Cowslip lane.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Note, 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 or evidence.

52 Risk from groundwater

Risk from groundwater sources 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 Guide[37]. Figure 4-1 shows the map for Site 19C247x and the surrounding areas and Table 22-1 explains the risk classifications.

The entirety of the site is in an area where there is no groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS.

Figure 52-1: JBA 5m Groundwater Emergence Map

37 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 52-1: Groundwater Flood 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.	

53 Overall site assessment

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

This site is not required to pass part b) of the exception test[38] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

53.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

38 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C248x

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0027
Revision	P02
Prepared by	Laura Thompson BSc Analyst
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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Laura Thompson of JBA Consulting carried out this work.

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Jeremy Benn Associates Limited ("JBA") has prepared this Report for the sole use of the Central Lancashire Local Plan Team and its appointed agents in accordance with the Agreement under which our services were performed.

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Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

Contents

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List of Tables

55 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C248x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

55.1 Site 19C248x

- Location: Land adjacent to Northgate Drive
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 0.75 hectares
- Proposed development impermeable area: 0.64 hectares (assumed 85% impermeable area)
- Watercourse: Leeds and Liverpool Canal
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

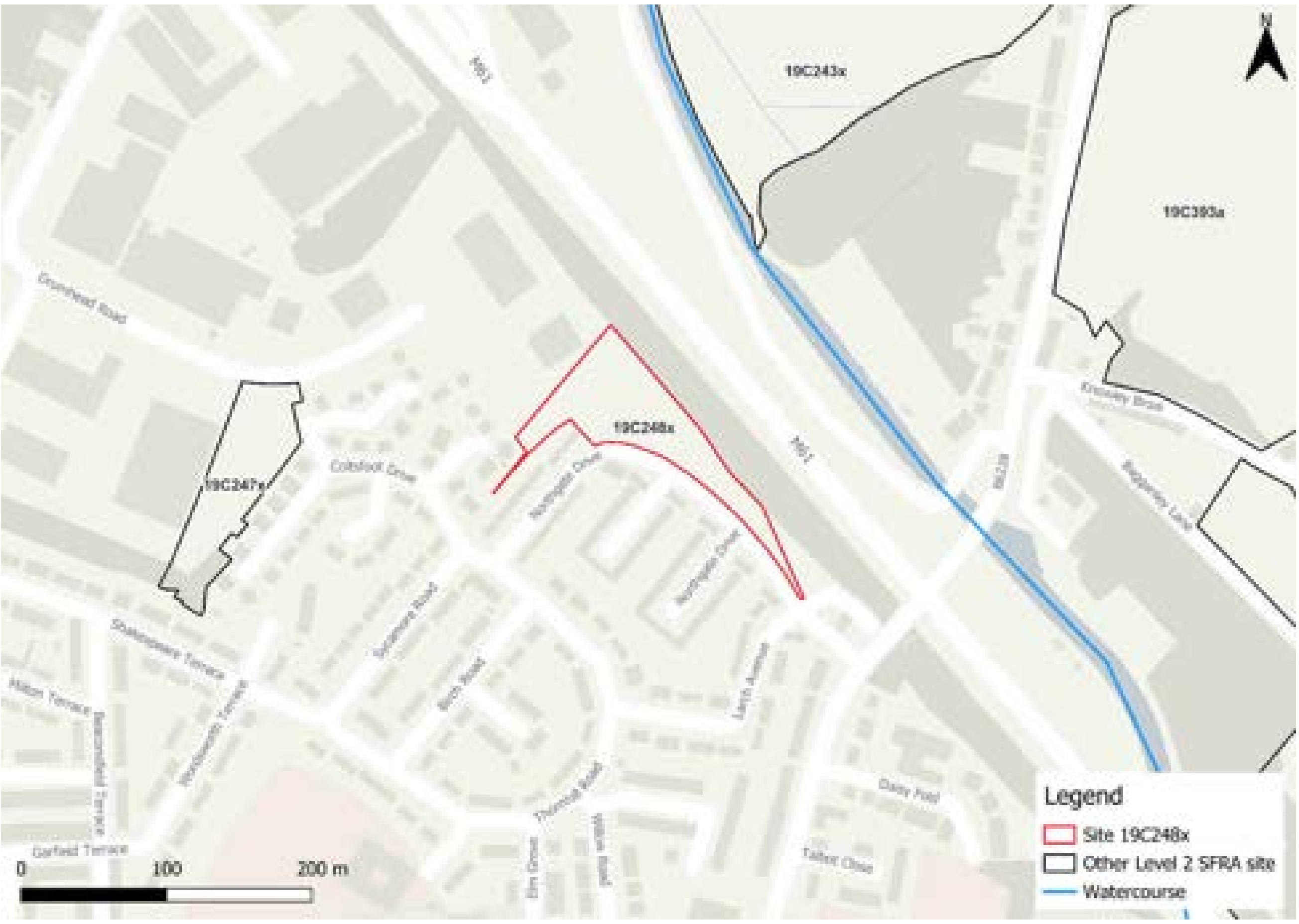

Figure 55-1: Existing site location boundary

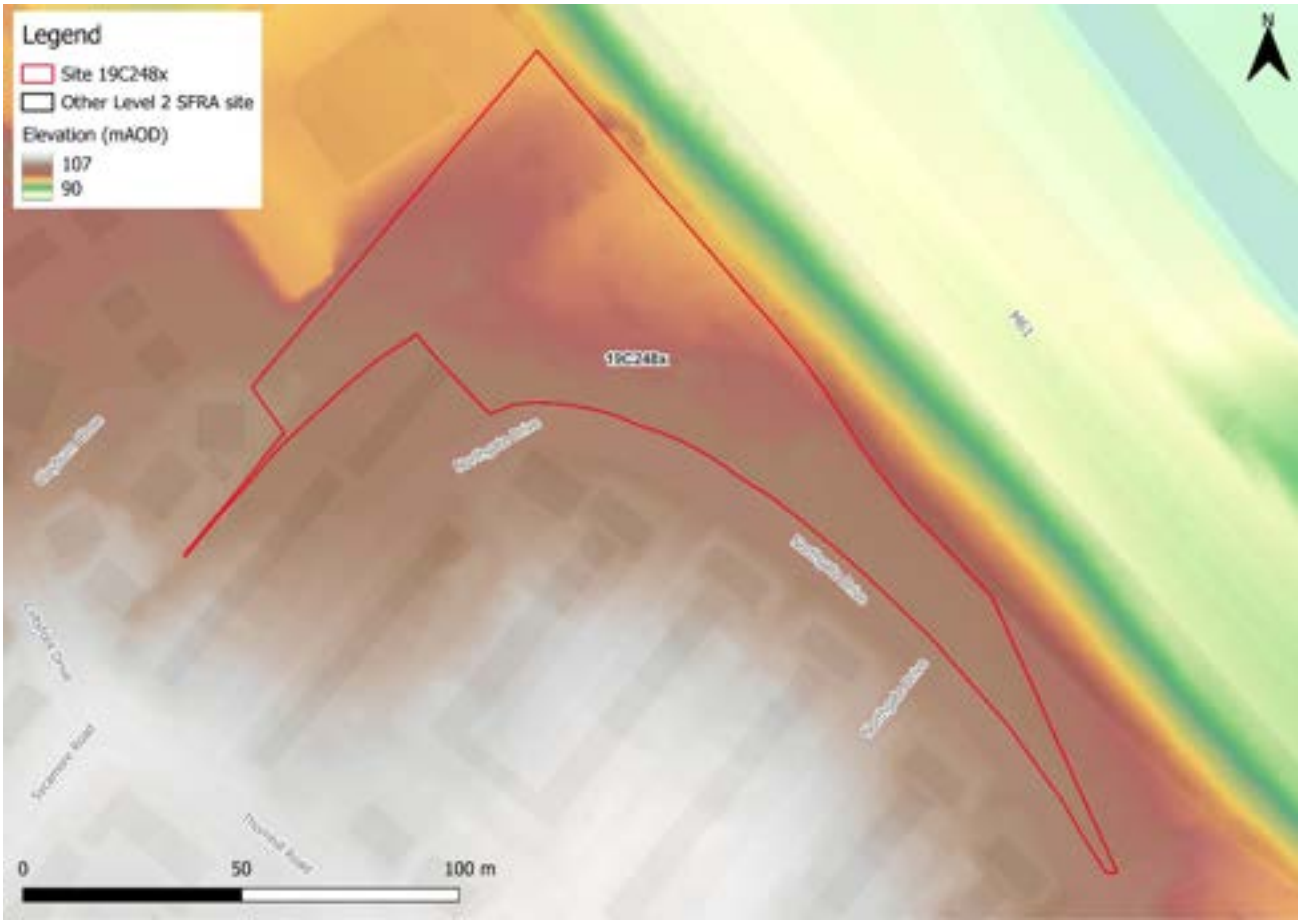

Figure 55-2: Topography

56 Flood risk from rivers

56.1 Existing risk

56.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk from flooding from rivers. The Leeds and Liverpool Canal is located to the east of the site.

Table 56-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 56-1: Existing risk from rivers to the site

56.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

56.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C248x is located within one catchment, namely; Lostock US Farington Weir. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[39].
- Developments should be incentivised to provide wider betterment by demonstrating in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments should achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

56.2.2 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. There are no opportunities for NFM applicable to this site.

56.3 Residual risk

56.3.1 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. 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 not modelled to be at risk from reservoir flooding.

39 Lancashire SuDS Guidance

56.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

56.5 Flood warning and access and escape routes

The site is not located within a Flood Warning Area (FWA) or a Flood Alert Area (FAA).

Based on available information, safe access and escape routes could likely be achieved during a flood event via Northgate Drive to the south of the site.

56.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is located wholly within Flood Zone 1.

57 Flood risk from surface water

57.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Only 2% of the site is at low surface water risk, as shown in Table 21-1.

In the low risk event, surface water risk is confined to a short flow path extending from the southern boundary of the site.

Greatest flood depths in the low risk event are less than 0.15 m (Figure 3-1) with hazard categorised as low (Figure 3-2). Northgate Drive is inundated in the low risk surface water event, however depths and hazards are low via the south east of the site therefore safe access and escape routes should be achievable via this route.

Table 57-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
98	2	0	0

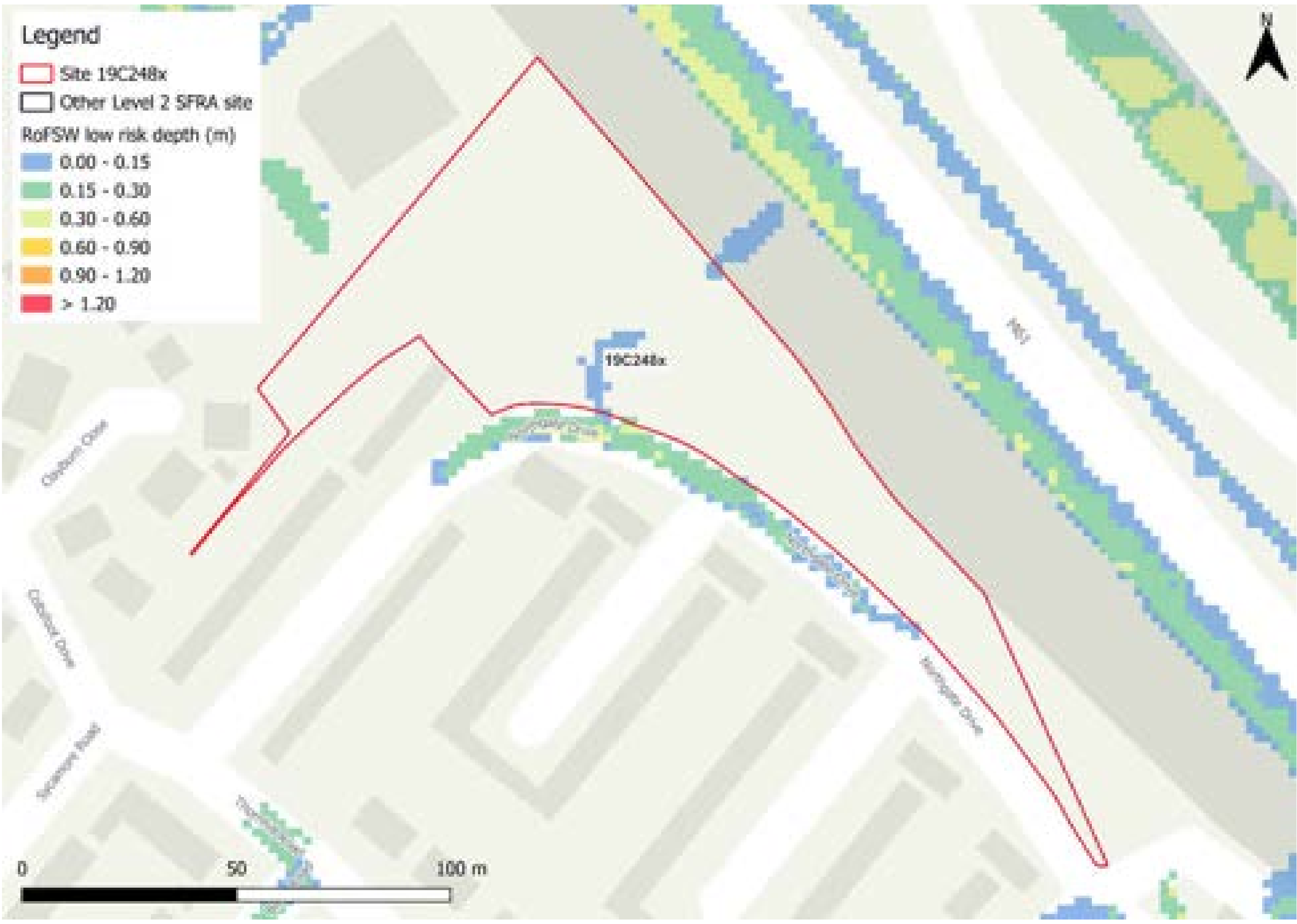

Figure 57-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 57-2: Low risk event surface water flood hazard[40] (Risk of Flooding from Surface Water map)

57.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 57-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

40 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

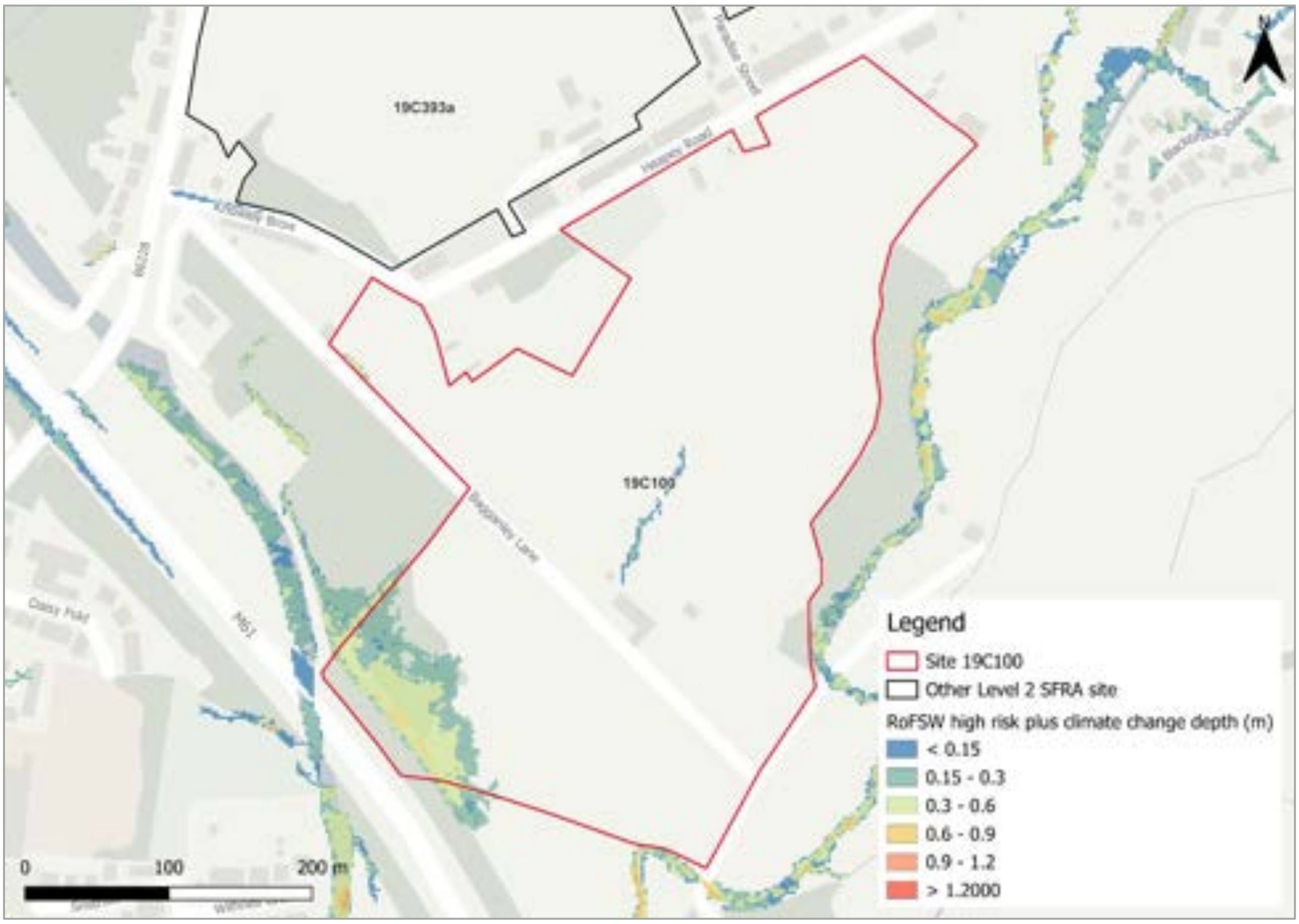

Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be greater than for present day conditions, with the flow path in the present day low risk event extending through the centre of the site. There is also an additional area of ponding within a topographic low spot in the west of the site. Maximum depths are less than 0.15 m with hazard categorised as low (Figure 3-4). Safe access and escape routes should remain achievable via Northgate Drive to the south east of the site.

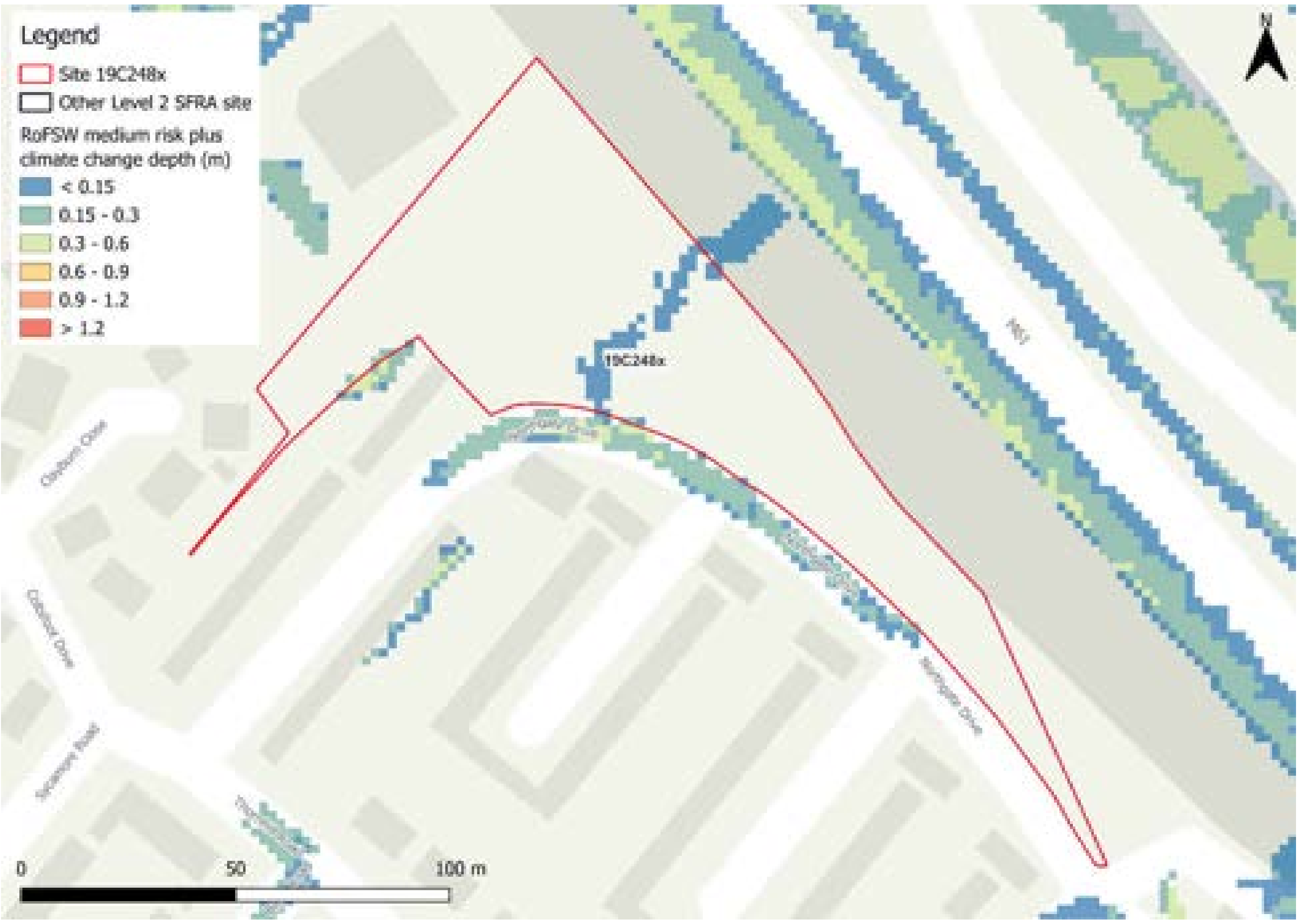

Figure 57-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 57-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

57.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 98% of the site being at very low risk. Surface water risk in the low risk event is confined to a short surface water flow path within the centre of the site.
- The short flow path extends through the centre of the site in the medium risk surface water event plus climate change, although depths are low. Safe access and escape routes should be achievable via Northgate Drive to the south east of the site, given the low modelled depths and hazards.
- Topographic depressions and flow paths should be considered and included in site design and ideally left in place to flood naturally when required. Any regrading of land must include for like for like volumes to ensure risk is contained safely onsite for the lifetime of development. Development should be directed away from the southwestern corner of the site where there is significant ponding. This area should remain as open greenspace.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.

- Were development plans to proceed, a full drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Note, 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 or evidence.

58 Risk from groundwater

Risk from groundwater sources 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 Guide[41]. Figure 4-1 shows the map for Site 19C248x and the surrounding areas and Table 22-1 explains the risk classifications.

The entirety of the site is in an area where there is no risk of groundwater emergence. Groundwater conditions may therefore be suited to infiltration SuDS.

Figure 58-1: JBA 5m Groundwater Emergence Map

41 [Strategic flood risk assessment good practice guide. ADEPT. December 2021.]

Table 58-1: Groundwater Flood 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.	

59 Overall site assessment

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

This site is not required to pass part b) of the exception test[42] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

59.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

42 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C251x

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0026
Revision	P02
Prepared by	Laura Thompson BSc Analyst
Reviewed by	Mike Williamson BSc MSc CGeog FRGS EADA Principal Analyst
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Acknowledgements

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61 Background

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61.1 Site 19C251x

- Location: Land to the East of Wigan Road (remaining allocation)
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 16 hectares
- Proposed development impermeable area: 13.6 hectares (assumed 85% impermeable area)
- Watercourse: River Lostock
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 61-1: Existing site location boundary

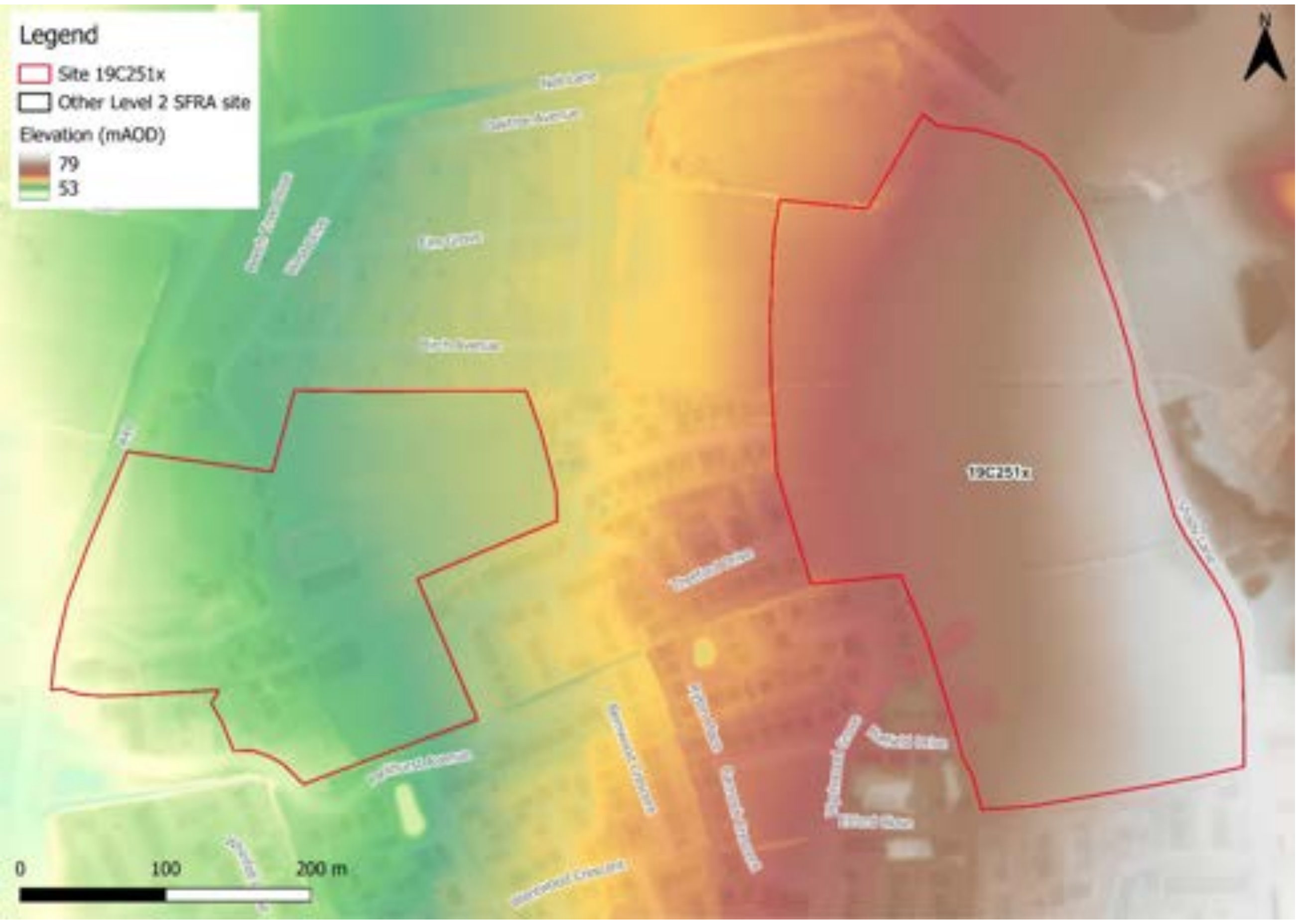

Figure 61-2: Topography

62 Flood risk from rivers

62.1 Existing risk

62.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk from flooding from rivers.

Table 62-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

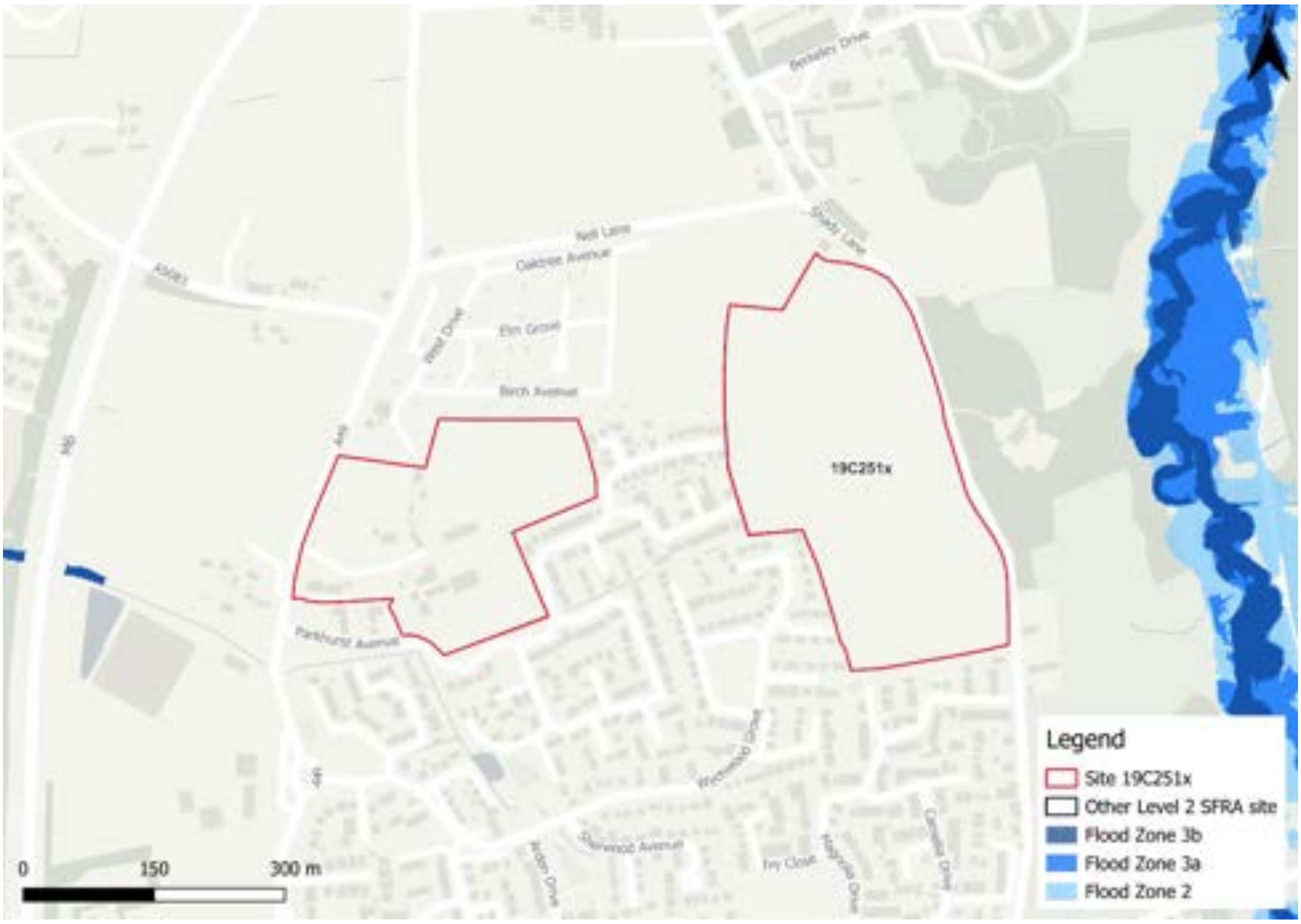

Figure 62-1: Existing risk from rivers to the site

62.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

62.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C251x is located within two catchments, namely; Lostock DS Farington Weir and Lostock US Farington Weir. The majority of the site is within a catchment ranked as high sensitivity. Planning policy considerations for sites at high sensitivity to the cumulative impacts of development that apply to this site include:

- National and local flood risk planning policy must be stringently applied within these areas, with flood risk from all sources given the appropriate priority, particularly when applying the Sequential and Exception Tests.
- Both greenfield and brownfield developments to achieve 20% betterment over pre-development greenfield runoff peak flows and volumes in their post development state.
- For larger sites and strategic developments (e.g. new settlements and urban extensions):
    - The LLFA, Environment Agency, and LPA should be consulted at pre-application stage.
    - The FRA should examine the cumulative impacts of proposed peak surface water runoff rates and volumes from across the site on the peak flows, duration of flooding and timing of flood peaks in receiving watercourses. This should include the impact of other developments within the WFD catchment, if appropriate, as advised by the LPA/LLFA.
    - A Surface Water Drainage Masterplan should be developed and implement appropriate drainage sub-catchments for the management of surface water, with specific runoff rate and volume requirements set for each sub-catchment, in line with the SuDS management train.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

62.2.2 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. Within both parcels of the site, there is significant potential for woodland planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. There are also opportunities to implement runoff attenuation features to reduce runoff downstream. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 62-2.

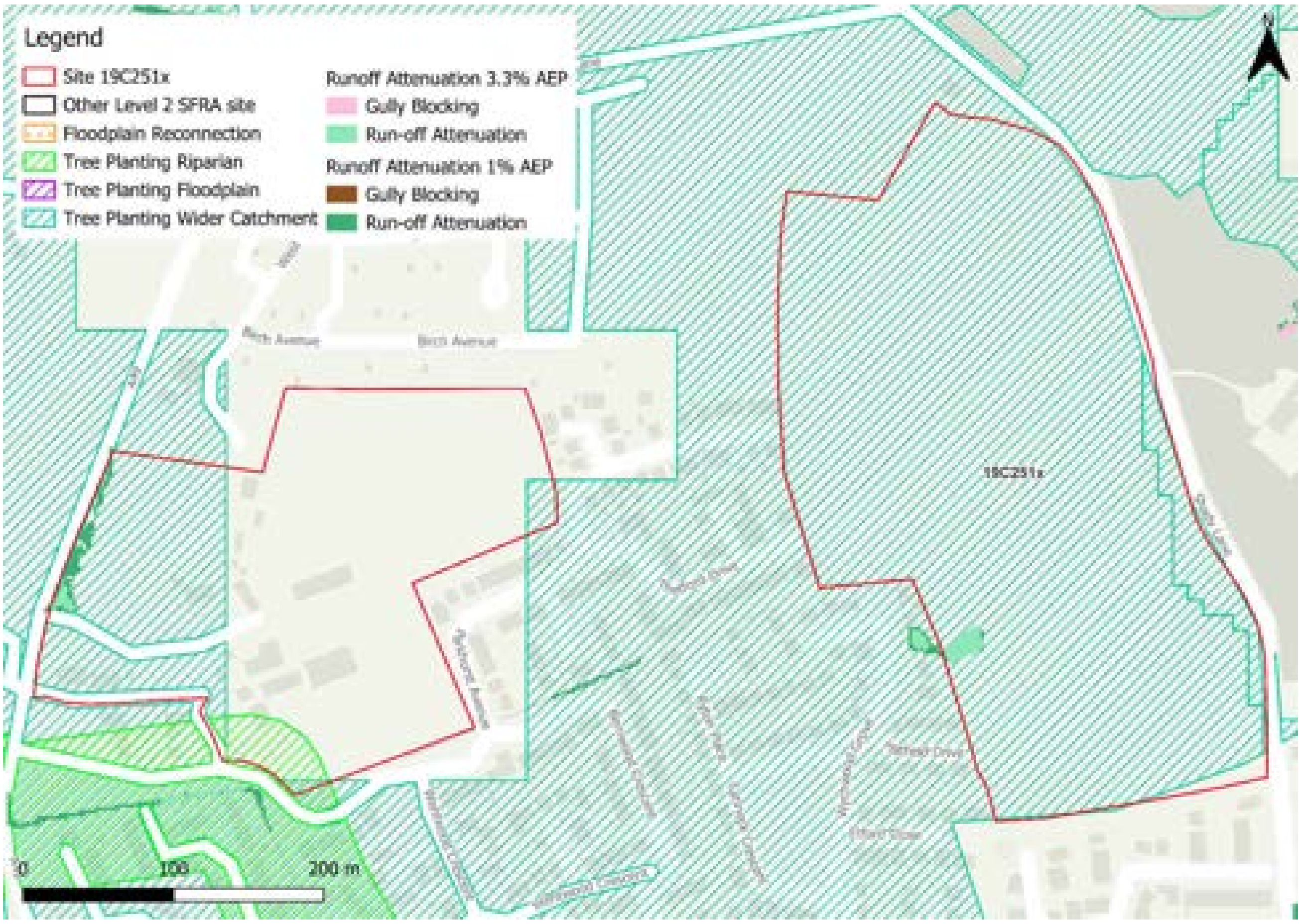

Figure 62-2: Natural Flood Management (NFM) potential mapping

62.3 Residual risk

62.3.1 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. 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 not modelled to be at risk from reservoir flooding.

62.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

62.5 Flood warning and access and escape routes

The site is not located within a Flood Warning Area (FWA) or a Flood Alert Area (FAA).

Based on available information, safe access and escape routes could likely be achieved during a flood event via the A49 from the western parcel of the site and via Shady Lane from the eastern parcel of the site.

62.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is located wholly within Flood Zone 1.

63 Flood risk from surface water

63.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 1% of the site is within the high risk surface water flood zone. A further 1% is at medium surface water risk, and a further 1% is at low surface water risk, as shown in Table 21-1.

In the high risk event, surface water risk is confined to an area of ponding within a topographic low spot along the western boundaries of both site parcels. In the medium and low risk events, the area of ponding within the western site parcel emerges into a flow path extending along the western boundary.

Greatest flood depths in the medium risk event are between 0.6 and 0.9 m (Figure 3-1) with some areas of significant hazard (Figure 3-2). Safe access and escape from the eastern site parcel should be achievable via Shady Lane to the east. The A49 to the west of the western site parcel becomes inundated in both the medium and low risk surface water events, however depths and hazards are low and therefore safe access and escape routes should be possible via this route.

Table 63-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
97	1	1	1

•

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Figure 63-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

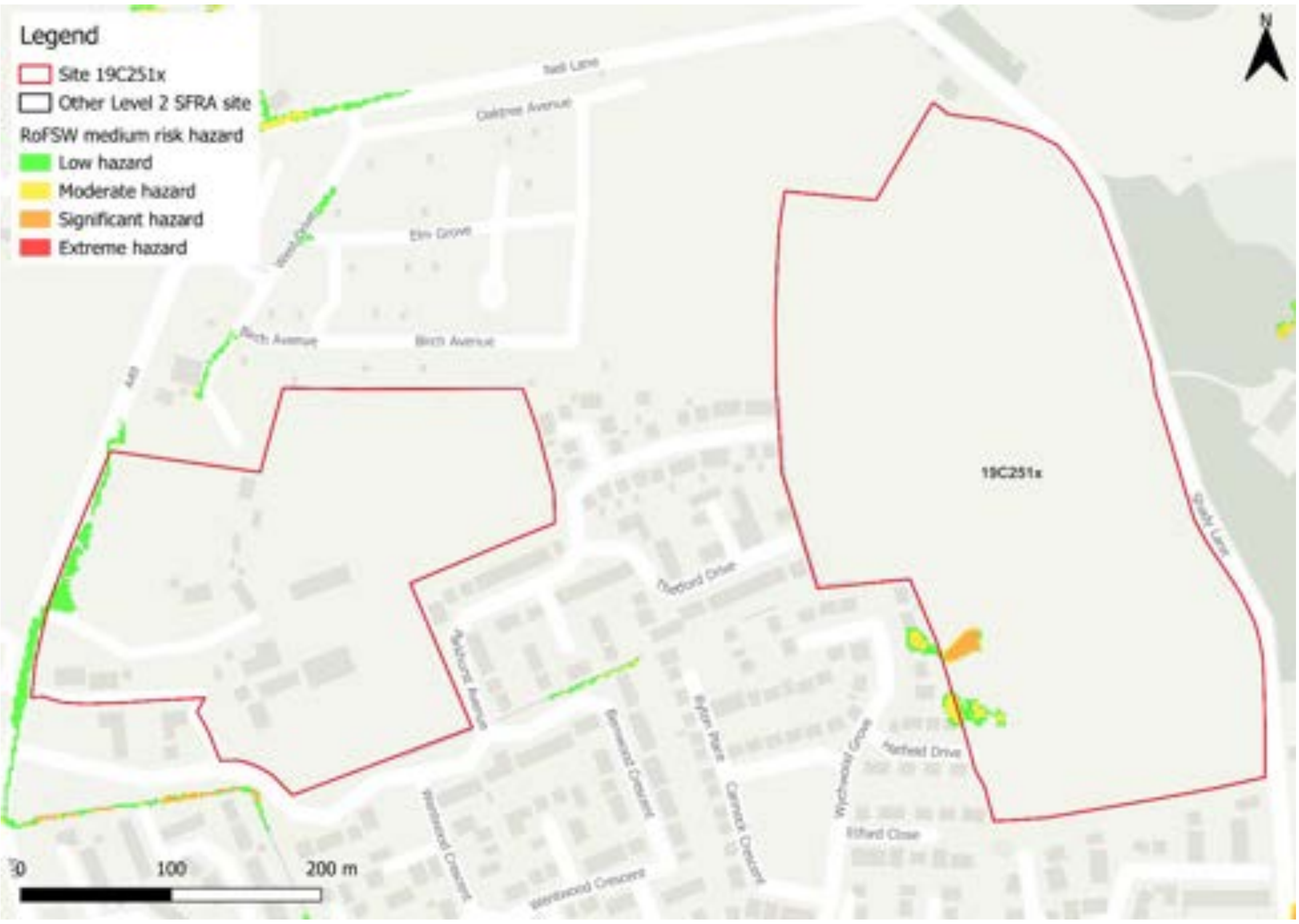

Figure 63-2: Medium risk event surface water flood hazard[43] (Risk of Flooding from Surface Water map)

63.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 63-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

43 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

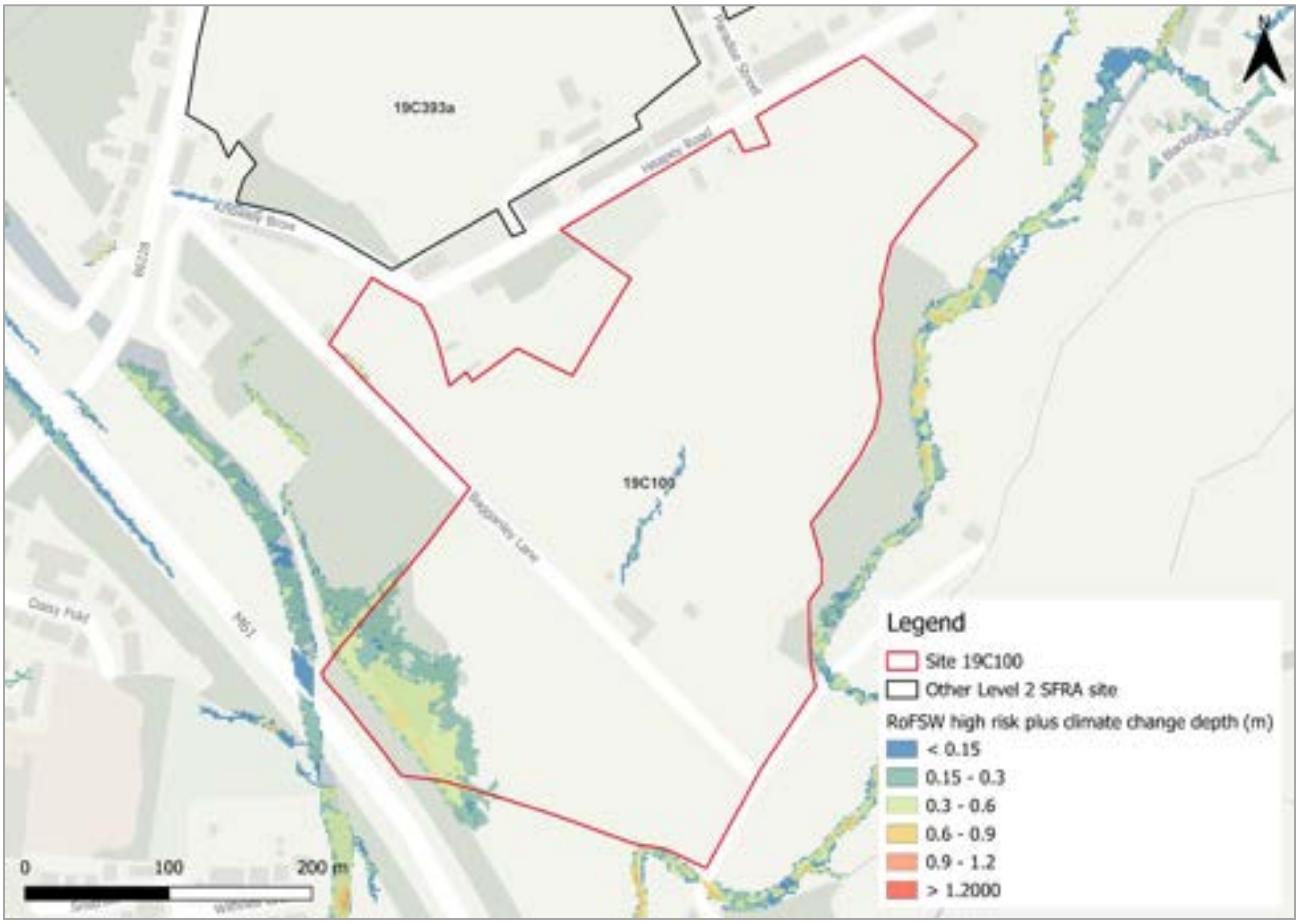

Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be greater than for present day conditions, with some additional flow paths through both parcels of the site. Maximum depths are between 0.6 and 0.9 m with some areas of significant hazard (Figure 3-4). Safe access and escape routes from the eastern parcel of the site should remain achievable via Shady Lane to the east. It may be challenging to achieve safe access and escape routes from the western site parcel, as the A49 becomes inundated with depths up to 0.6 m in the medium risk surface water event plus climate change.

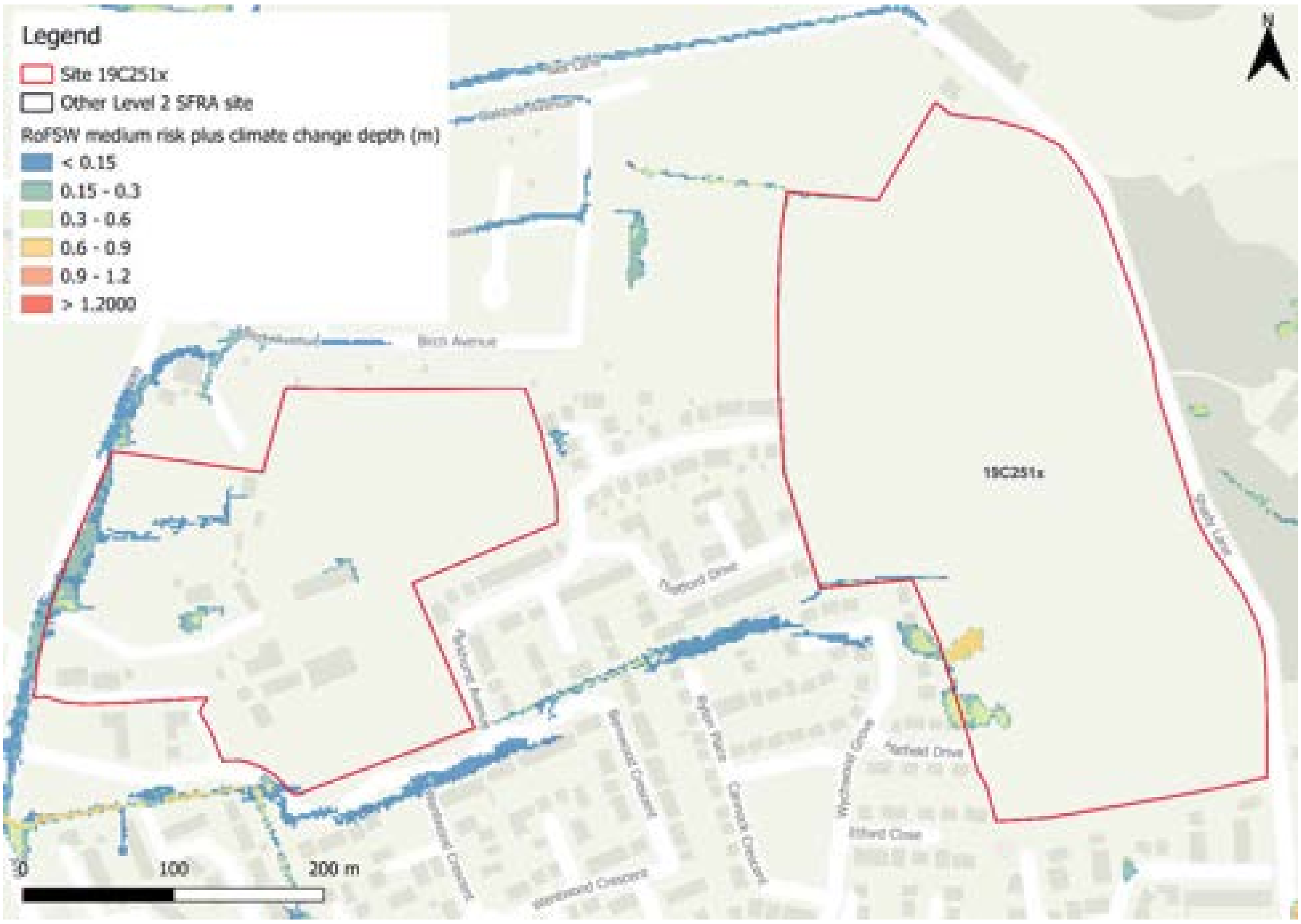

Figure 63-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 63-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

63.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 97% of the site being at very low risk. Surface water risk in the medium risk event is confined to areas of ponding along the western boundary of each site parcel. A flow path emerges along the western boundary of the western site parcel in the medium and low risk surface water events.
- The medium risk modelled climate change outputs indicate a greater risk to the site than the present day surface water flood events. Additional flow paths are modelled to develop within each site parcel.
- Topographic depressions and flow paths should be considered and included in site design and ideally left in place to flood naturally when required. Any regrading of land must include for like for like volumes to ensure risk is contained safely onsite for the lifetime of development.
- Safe access and escape routes may be challenging to achieve from the western parcel of the site in the medium risk surface water event plus climate change. Consideration should be given to the safe access and escape of site users in this event, including for appropriate evacuation procedures and flood response

infrastructure are in place to manage the risk associated with the climate change enhanced flood event.

- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS across the eastern site parcel. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Were development plans to proceed, a full drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Note, 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 or evidence.

64 Risk from groundwater

Risk from groundwater sources 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 Guide[44]. Figure 4-1 shows the map for Site 19C251x and the surrounding areas and Table 22-1 explains the risk classifications.

Within the western site parcel, there is a risk of groundwater emergence to both surface and subsurface assets in the centre and north east of the parcel. The entirety of the eastern site parcel is in an area where there is no risk of groundwater emergence. Groundwater conditions may therefore be suited to infiltration SuDS in this area.

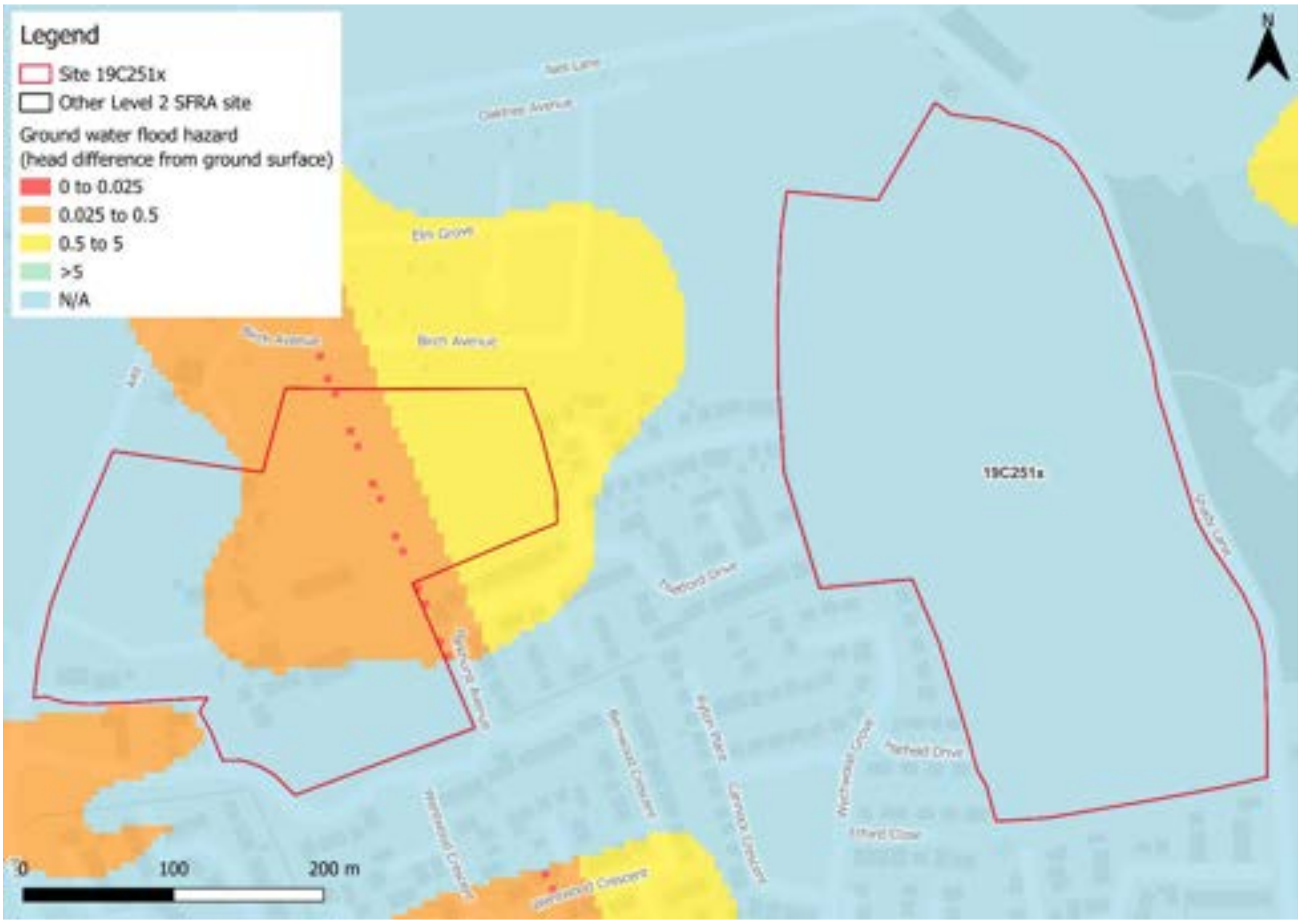

Figure 64-1: JBA 5m Groundwater Emergence Map

44 [Strategic flood risk assessment good practice guide. ADEPT. December 2021.]

Table 64-1: Groundwater Flood 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.	

65 Overall site assessment

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

This site is not required to pass part b) of the exception test[45] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

65.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Were this site to be developed, appropriate emergency and evacuation plans must be in place for the western site parcel to deal with the future surface water flood risk.
- Any FRA must consider the inclusion of detailed emergency plans and the provision of safe access and escape routes in the future surface water flood event, based on detailed climate change modelling.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

45 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C253x

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0025
Revision	P02
Prepared by	Laura Thompson BSc Analyst
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Contract

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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Laura Thompson of JBA Consulting carried out this work.

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Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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Contents

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67 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C253x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

67.1 Site 19C253x

- Location: Westwood Road
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 1.3 hectares
- Proposed development impermeable area: 1.1 hectares (assumed 85% impermeable area)
- Watercourse: Carr Brook
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 67-1: Existing site location boundary

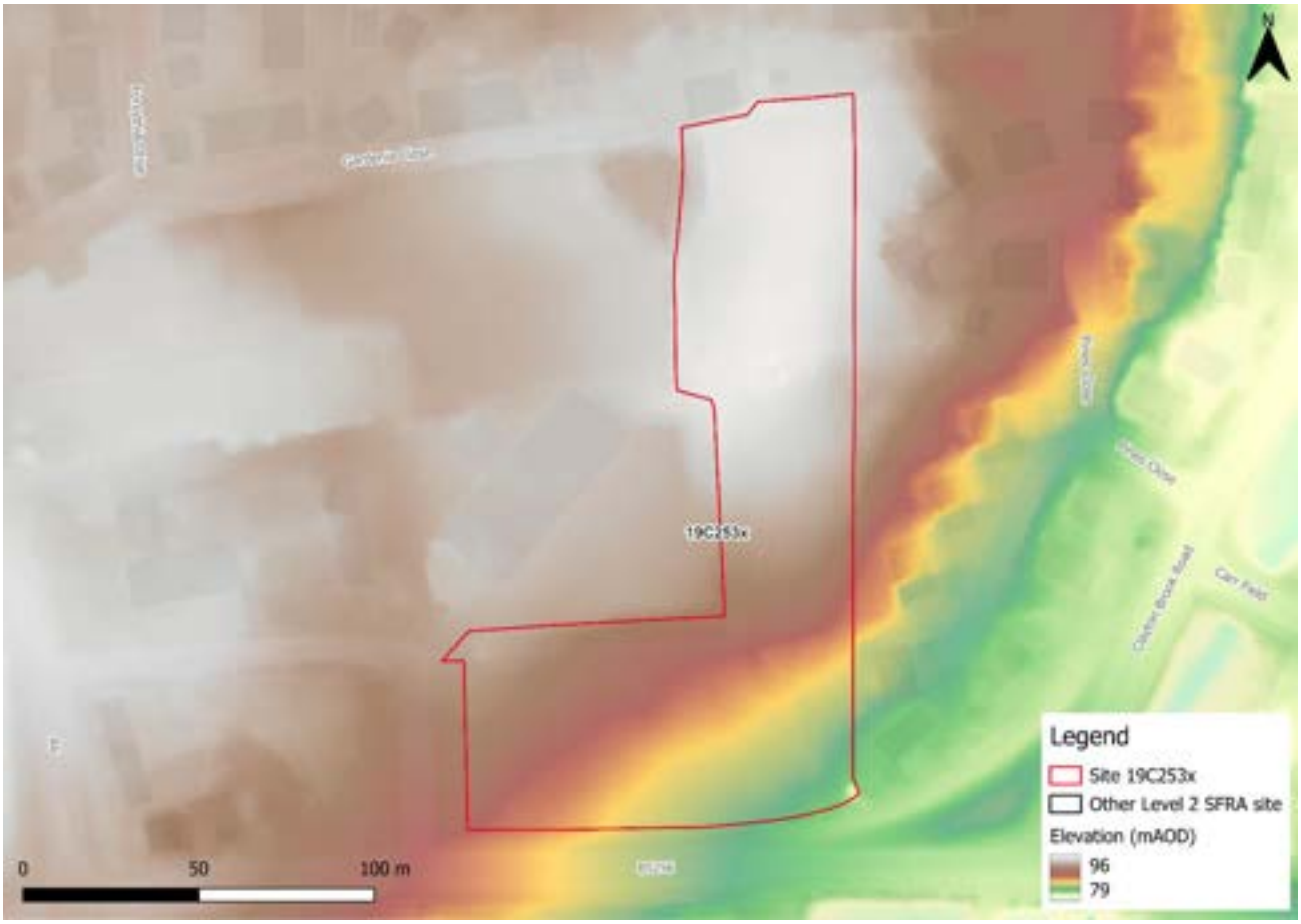

Figure 67-2: Topography

68 Flood risk from rivers

68.1 Existing risk

68.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk from flooding from rivers.

Table 68-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 68-1: Existing risk from rivers to the site

68.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

68.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C253x is located within one catchment, namely; Lostock US Farington Weir. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[46].
- Developments should be incentivised to provide wider betterment by demonstrating in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments should achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

68.2.2 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. Upstream of the site, there is significant potential for woodland planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 62-2.

46 Lancashire SuDS Guidance

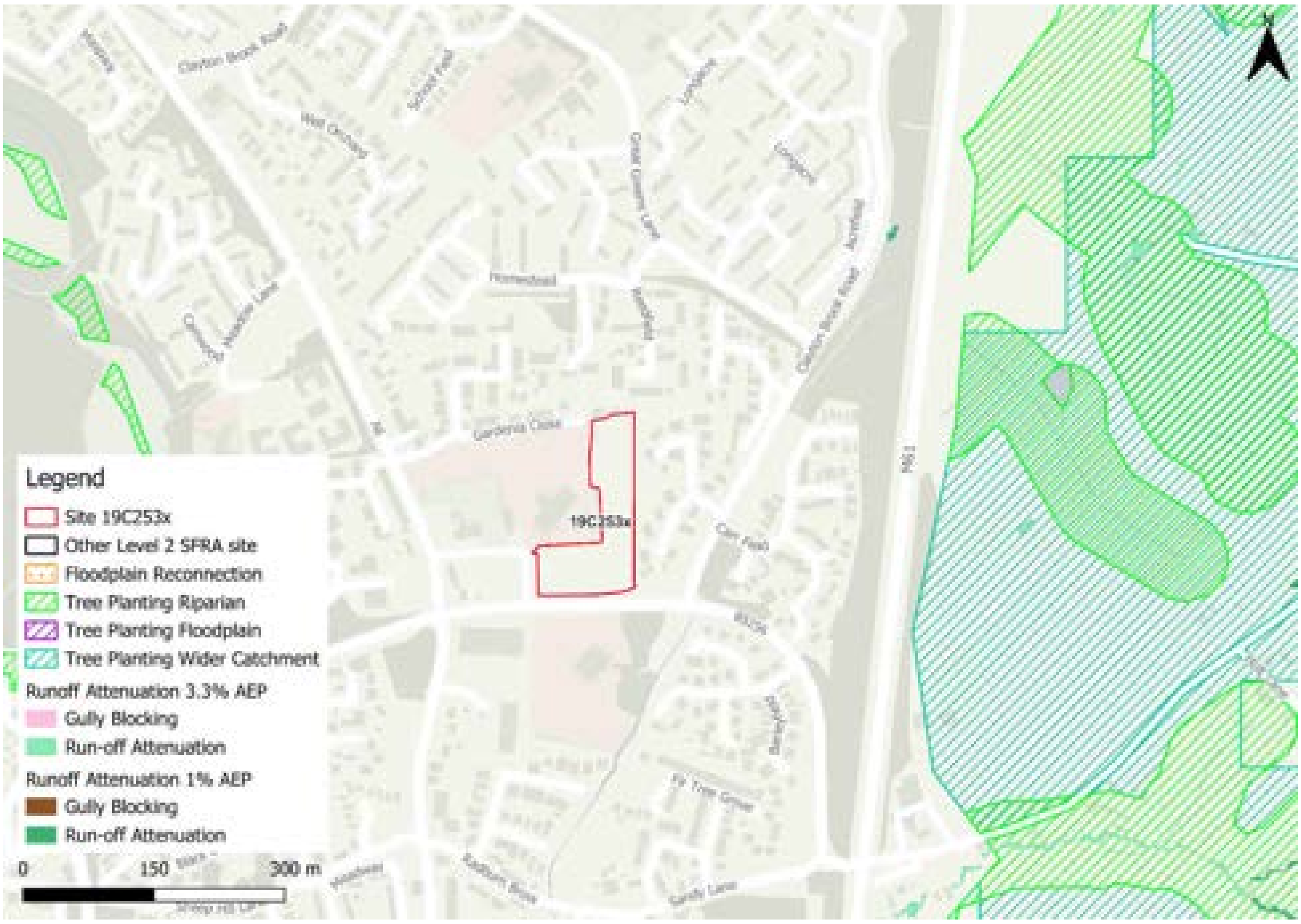

Figure 68-2: Natural Flood Management (NFM) potential mapping

68.3 Residual risk

68.3.1 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. 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 not modelled to be at risk from reservoir flooding.

68.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

68.5 Flood warning and access and escape routes

The site is not located within a Flood Warning Area (FWA) or a Flood Alert Area (FAA).

Based on available information, safe access and escape routes could likely be achieved during a flood event via the B5256 to the south of the site.

68.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is located wholly within Flood Zone 1.

69 Flood risk from surface water

69.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Only 1% of the site is at low surface water risk, as shown in Table 21-1.

In the low risk event, surface water risk is confined to a very small area of ponding along the north western boundary of the site.

Greatest flood depths in the low risk event are between 0.15 and 0.3 m (Figure 3-1) with hazard categorised as low (Figure 3-2). The B5256 is inundated in the low risk surface water event, however depths and hazards are low therefore safe access and escape routes should be achievable via this route.

Table 69-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
99	1	0	0

Figure 69-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

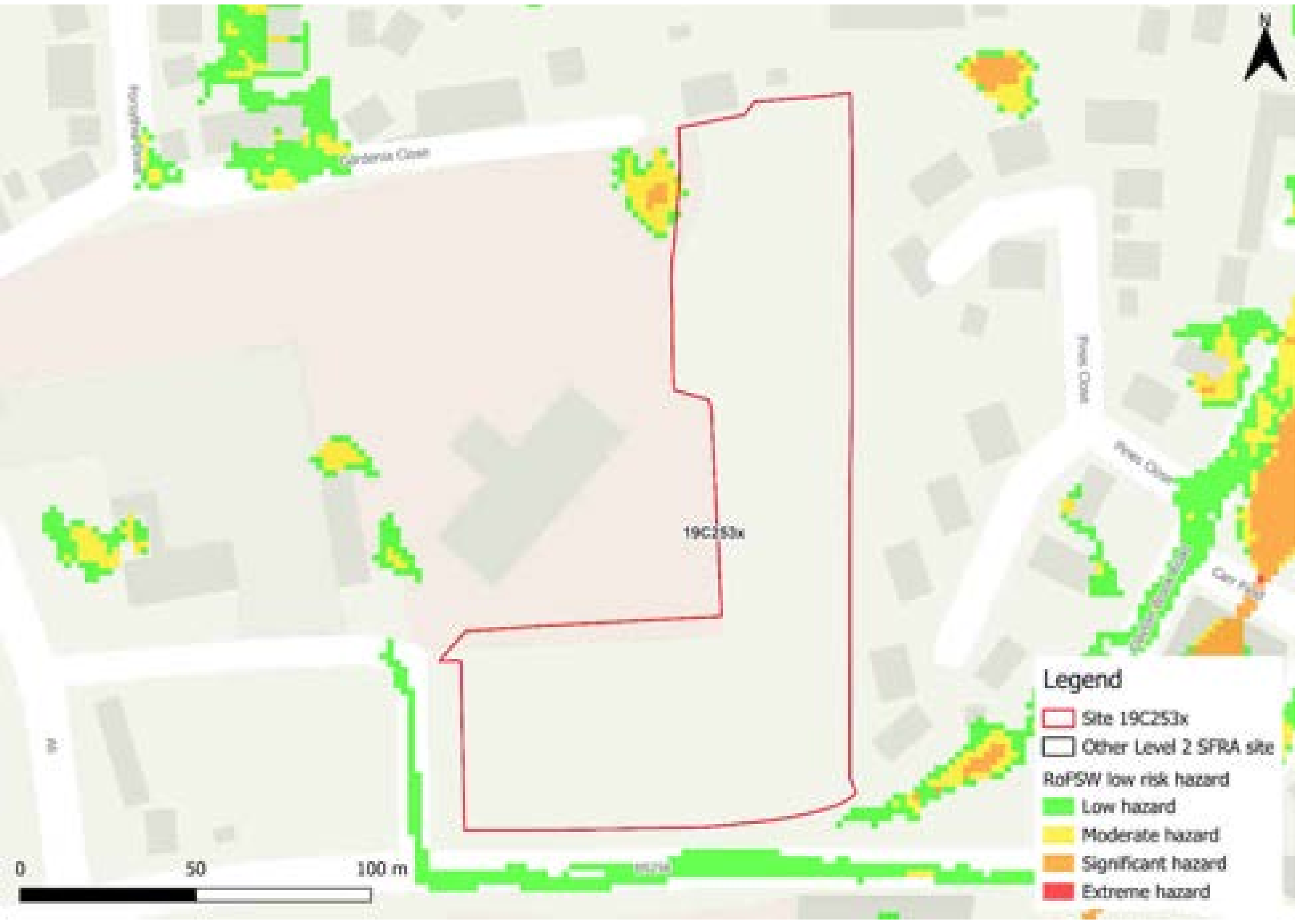

Figure 69-2: Low risk event surface water flood hazard[47] (Risk of Flooding from Surface Water map)

69.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 69-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

47 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

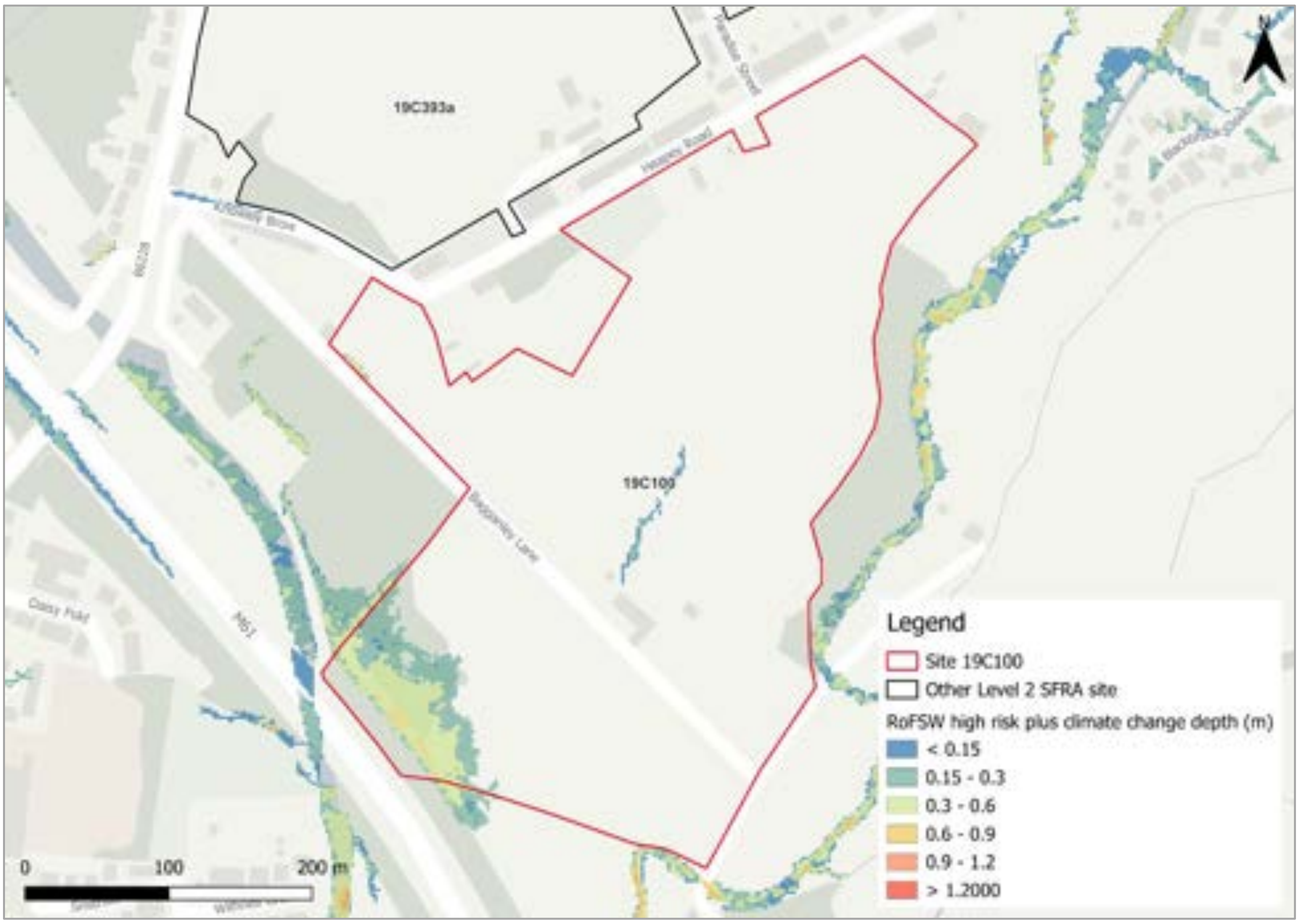

Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be greater than for present day conditions, with the medium risk climate change event showing a similar level of risk to the low risk present day event. Maximum depths are between 0.15 and 0.3 m with hazard categorised as low (Figure 3-4). Safe access and escape routes should be achievable via the B5256 to the south of the site.

Figure 69-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 69-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

69.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 99% of the site being at very low risk. Surface water risk in the low risk event is confined to the north western boundary of the site.
- The medium risk modelled climate change outputs indicate a similar extent risk to the present day low risk event. Safe access and escape routes should be achievable via the B5256 to the south of the site.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Were development plans to proceed, a full drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Note, 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 or evidence.

70 Risk from groundwater

Risk from groundwater sources 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 Guide[48]. Figure 4-1 shows the map for Site 19C253x and the surrounding areas and Table 22-1 explains the risk classifications.

The entirety of the site is in an area where there is no risk of groundwater emergence. Groundwater conditions may therefore be suited to infiltration SuDS.

Figure 70-1: JBA 5m Groundwater Emergence Map

48 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 70-1: Groundwater Flood 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.	

71 Overall site assessment

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

This site is not required to pass part b) of the exception test[49] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

71.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

49 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C255x

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0024
Revision	P02
Prepared by	Dominic Richardson BSc Analyst
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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Dominic Richardson of JBA Consulting carried out this work.

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Acknowledgements

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73 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C255x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

73.1 Site 19C255x

- Location: Mountain Road
- Existing site use: Open space
- Existing site use vulnerability: Water compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More Vulnerable
- Site area: 0.634 hectares
- Proposed development impermeable area: 0.539 hectares (assumed 85% impermeable area)
- Summary of requirements from scoping stage:
- Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
- Assessment of surface water flood depths and hazards
- Modelling of latest Environment Agency (EA) climate change allowances for peak rainfall intensities

Figure 73-1: Existing site location boundary

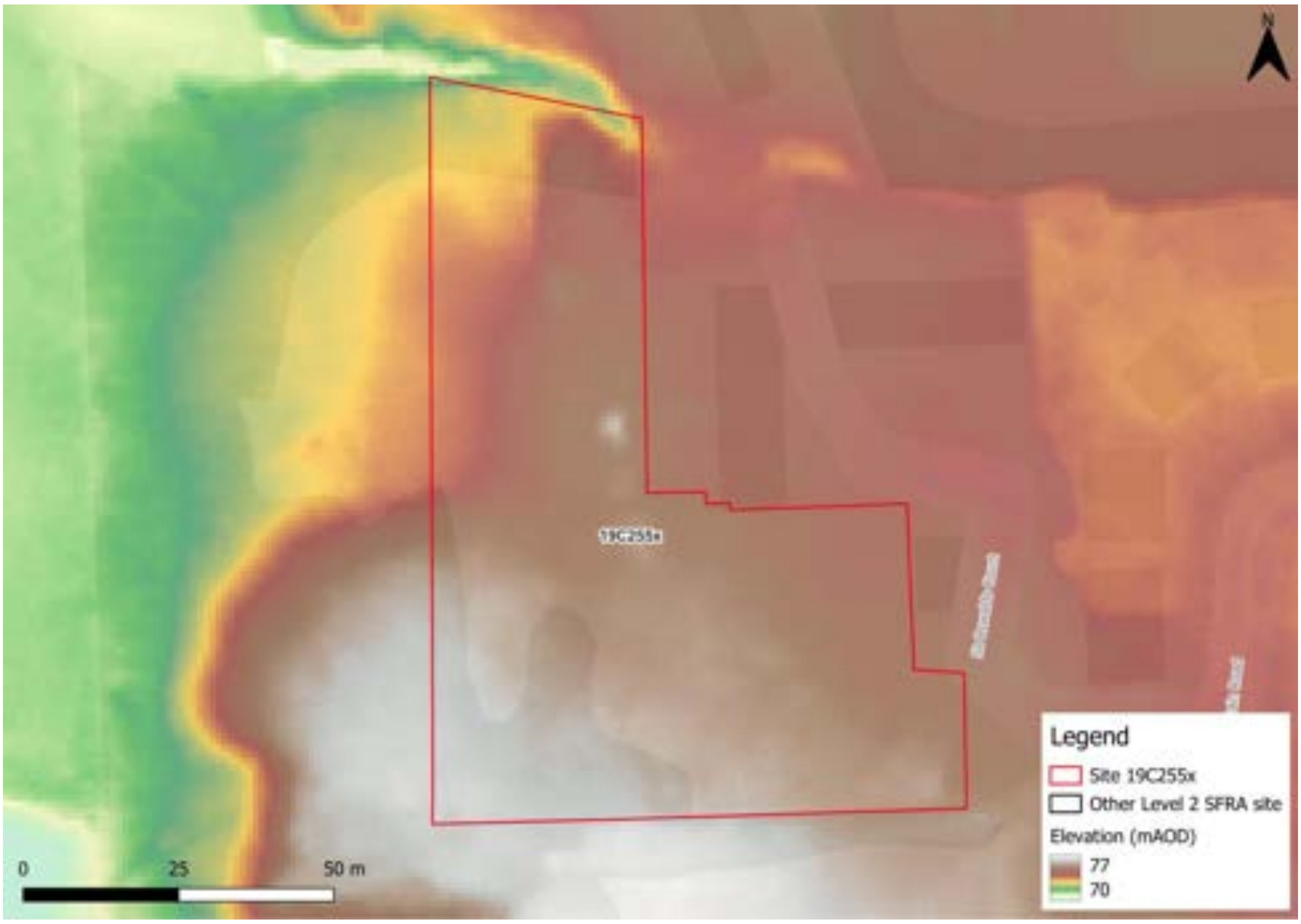

Figure 73-2: Topography

74 Flood risk from rivers

74.1 Existing risk

74.1.1 Flood Map for Planning and functional floodplain

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

The entire site can be seen to lie within Flood Zone 1 indicating a low risk of flooding from rivers, as seen in Figure 2-1.

Table 74-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

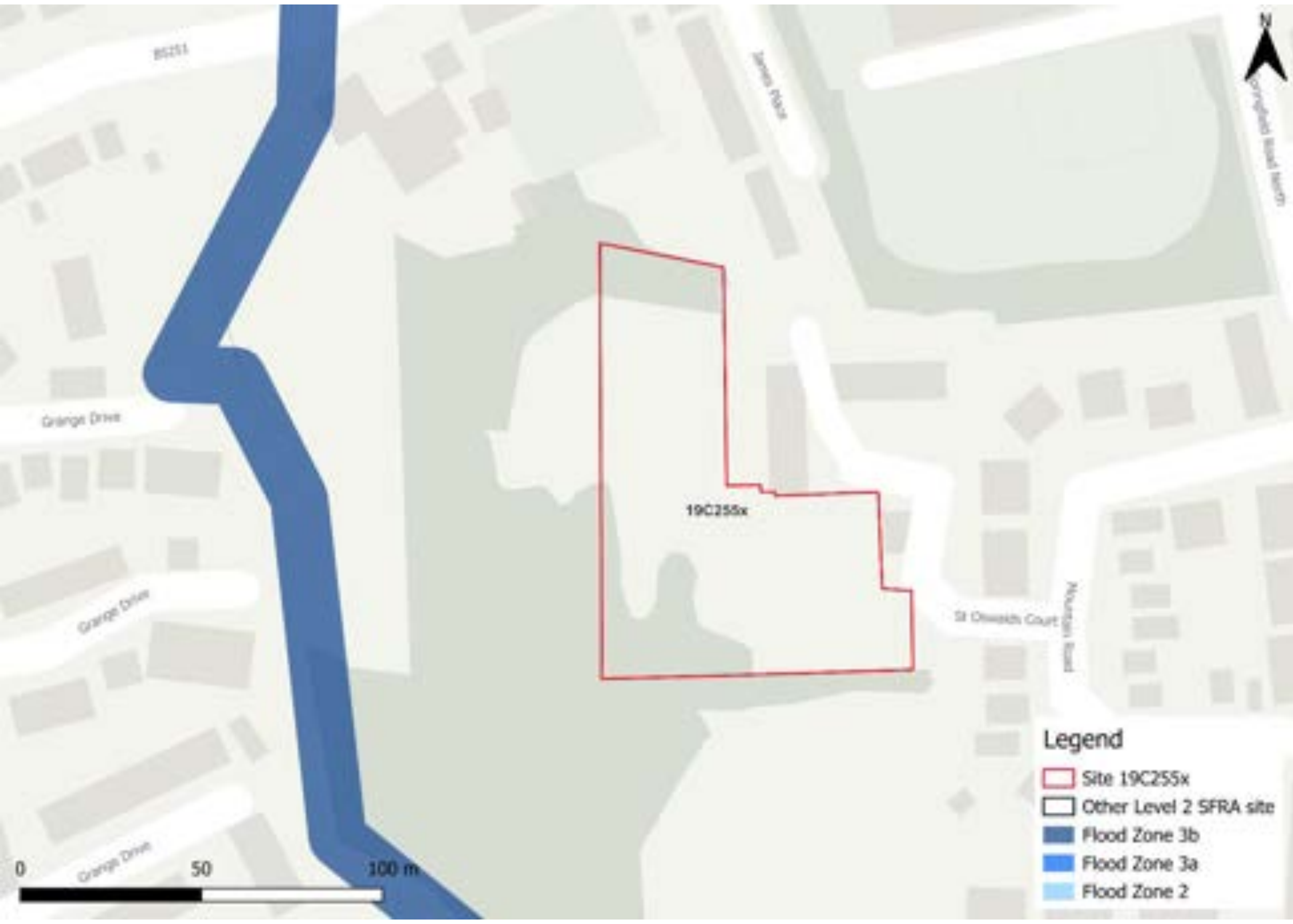

Figure 74-1: Existing risk from rivers to the site

74.2 Flood risk management

the site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset. The Site is noted to be situated on natural high ground within the context of the local area.

74.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development, Site 19C277x is located within one catchment, namely, Yarrow DS Big Lodge Water. The site is ranked as being within a 'Low' sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

74.2.2 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. Within the central and western areas of the site, there are opportunities for tree planting in the wider catchment which can intercept, slow, store and filter water. There are also shown to be opportunities for riparian tree planting which can slow flows, reduce sediment delivery to the watercourse and reduce bankside erosion. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 74-2. However, the WwNP dataset is indicative and further investigation into suitability of the site for tree planting should be carried out.

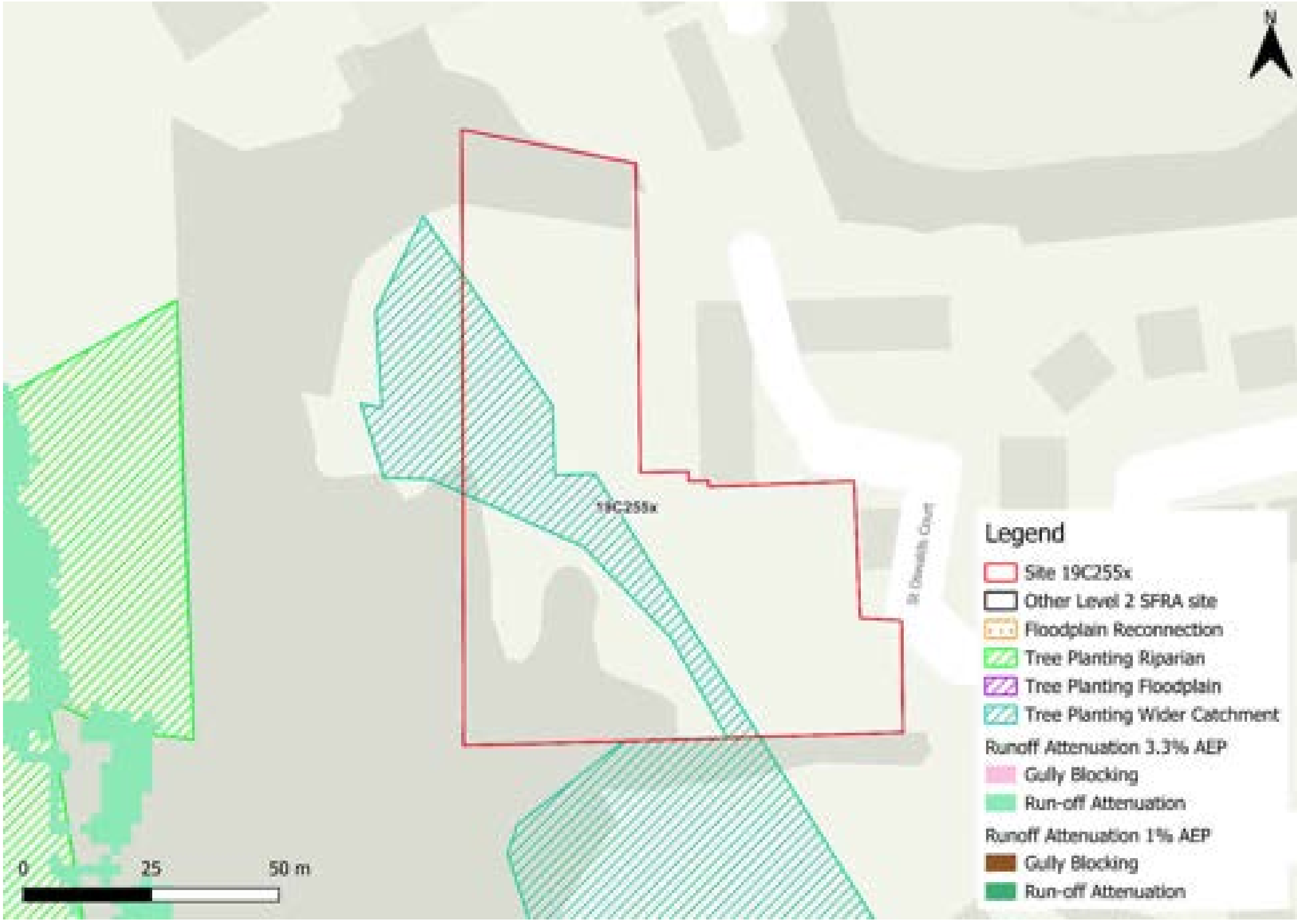

Figure 74-2: Natural Flood Management (NFM) potential mapping

74.3 Residual risk

74.3.1 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. 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 not modelled to be at risk from reservoir flooding.

74.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

74.5 Flood warning and access and escape routes

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. Site 19C255x is not located within an 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. The site is not located within a FAA.

Safe access and escape routes could likely be achieved during a flood event via St Oswalds Court.

74.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The entire site is located within Flood Zone 1 indicating that it is at low risk of flooding from rivers. There are therefore no constraints to development at the site with respect to flood risk from rivers.
- Safe access and escape routes could likely be achieved via St Oswalds Court, based on available information.

75 Flood risk from surface water

75.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water flood risk to the site is predominantly very low. Approximately 1% of the site is within the low-risk surface water flood zone, as shown in Table 75-1.

In the high and medium risk events, floodwaters are not shown to occur within the site boundary. In the low-risk event, a surface water flow path can be seen to flow westwards along the northern boundary of the site.

Greatest depths within the site can be seen of 0.30 m to 0.60 m within this flow path, as shown in Figure 3-1. This area is coincident with hazards categorised as significant, as seen in Figure 3-2. Based on available information, safe access and escape routes should be possible via St Oswalds Court in all events.

Table 75-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
99	1	0	0

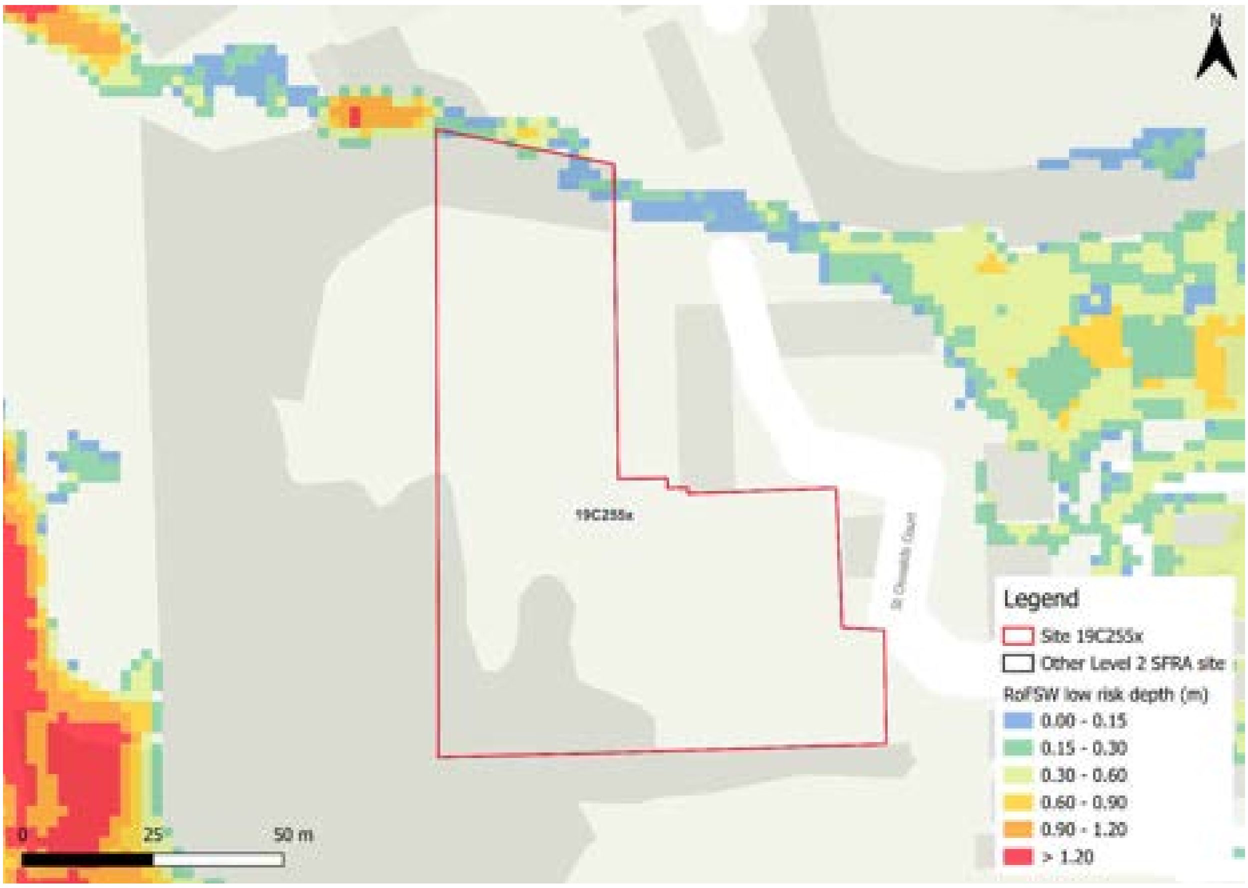

Figure 75-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

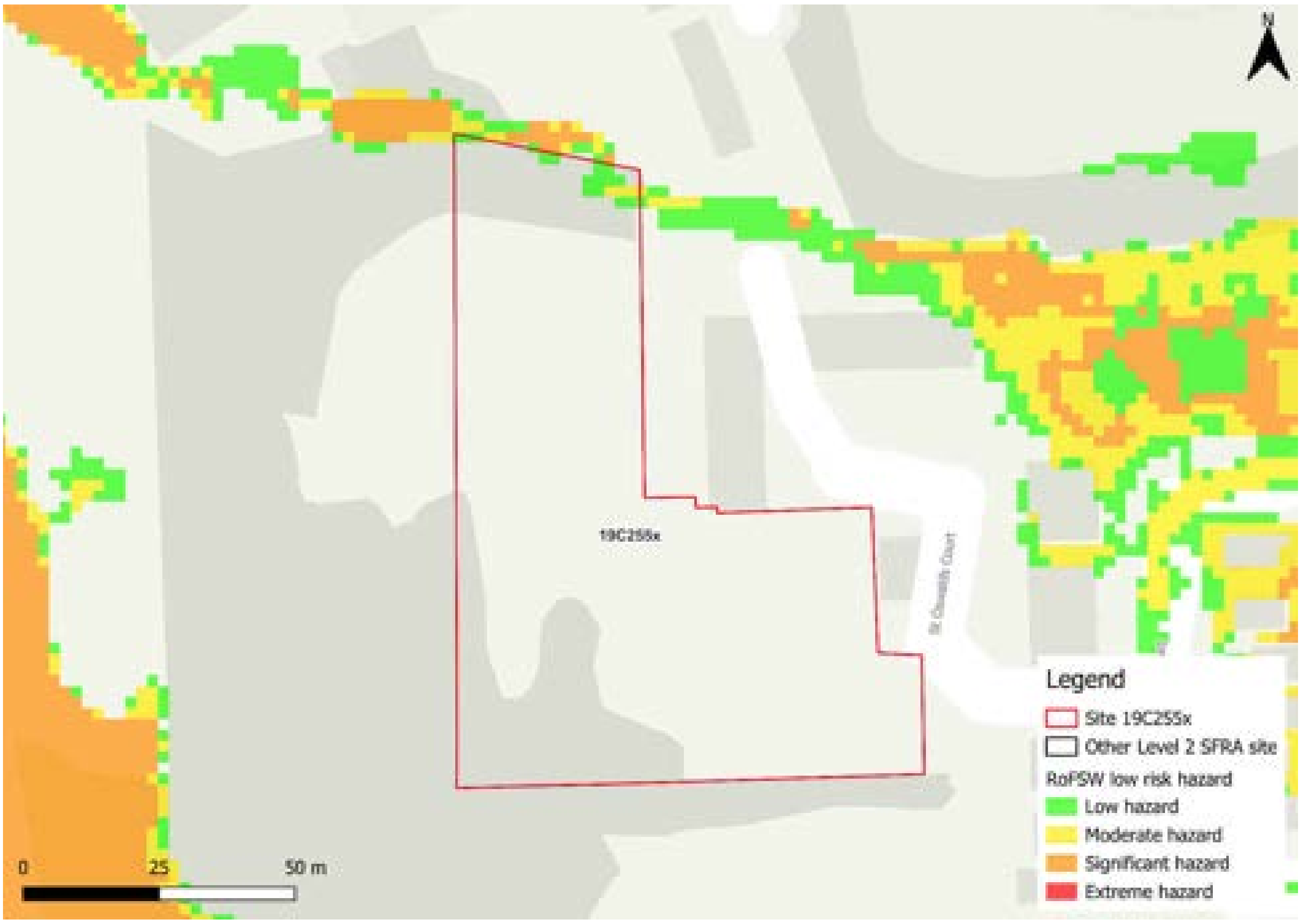

Figure 75-2: Low risk event surface water flood hazard[50] (Risk of Flooding from Surface Water map)

75.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 75-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar

50 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

to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

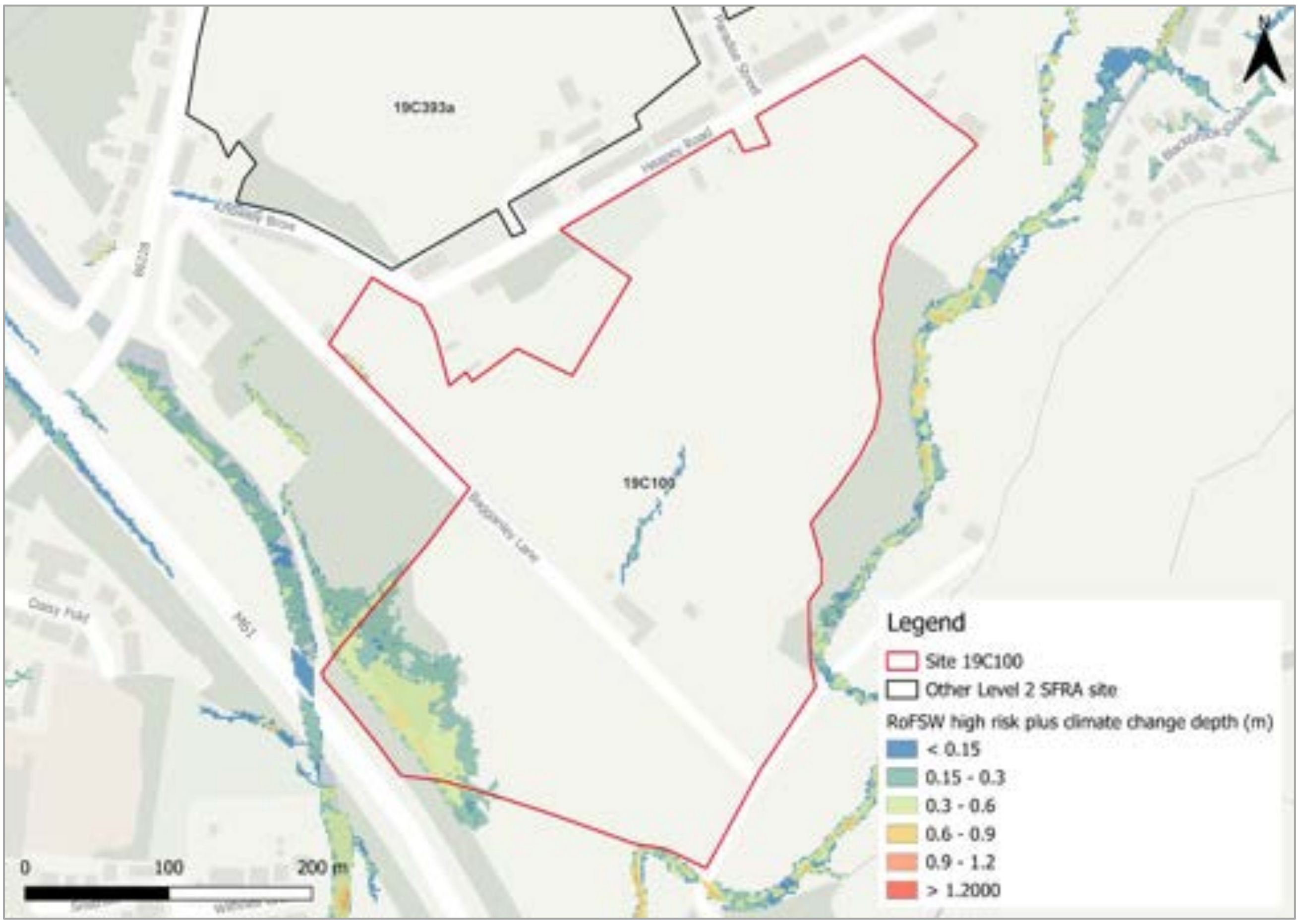

Figure 3-3 shows the medium surface water flood depths plus 45% climate change. Risk is modelled to be slightly greater than that of the present-day low risk, however, is broadly similar in extents.

Maximum flood depths are modelled to be approximately 0.3m in depth, with some areas of significant hazard Figure 3-4. Based on available information, the access and escape route at St Oswalds Court is anticipated to remain viable in all events.

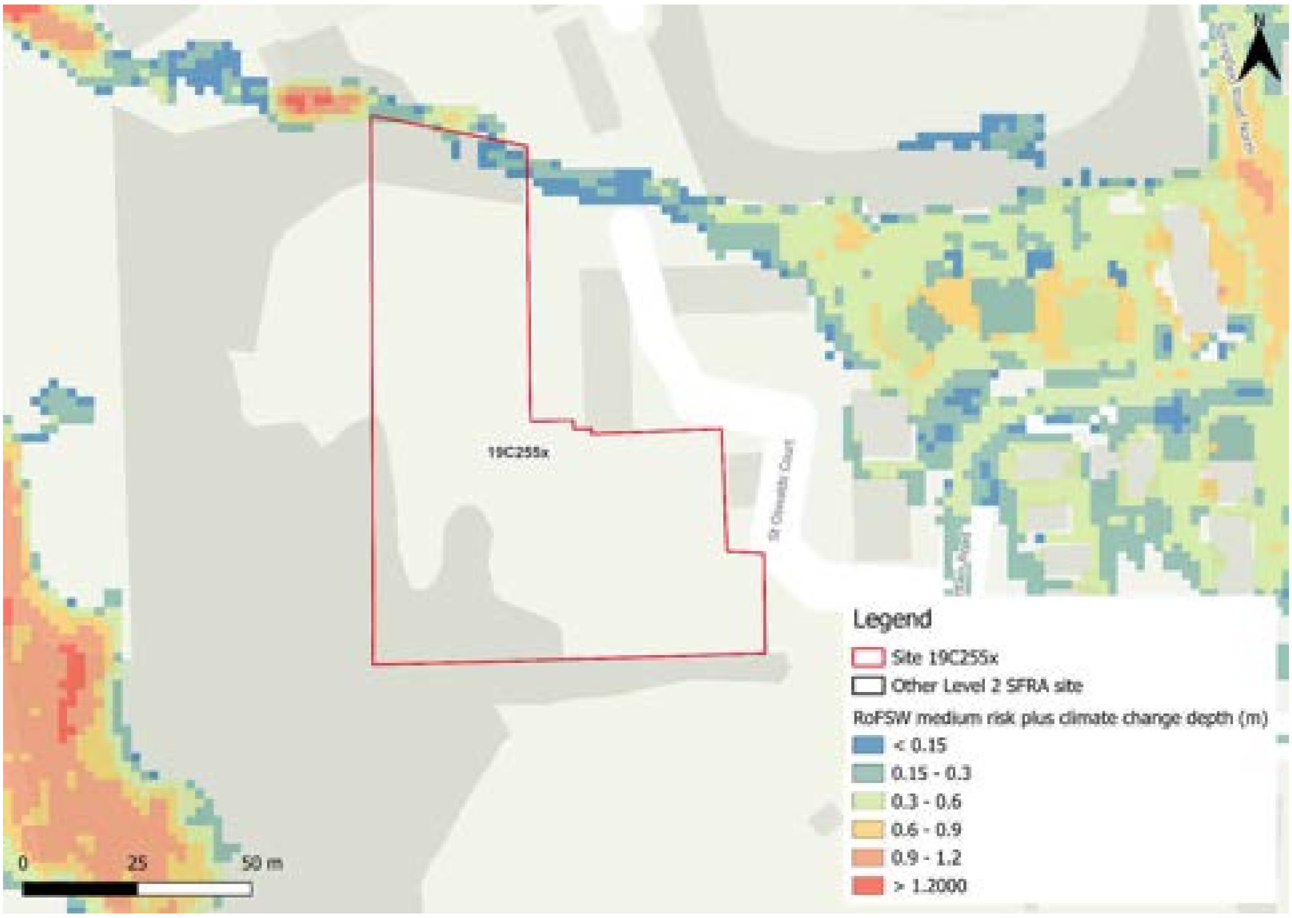

Figure 75-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

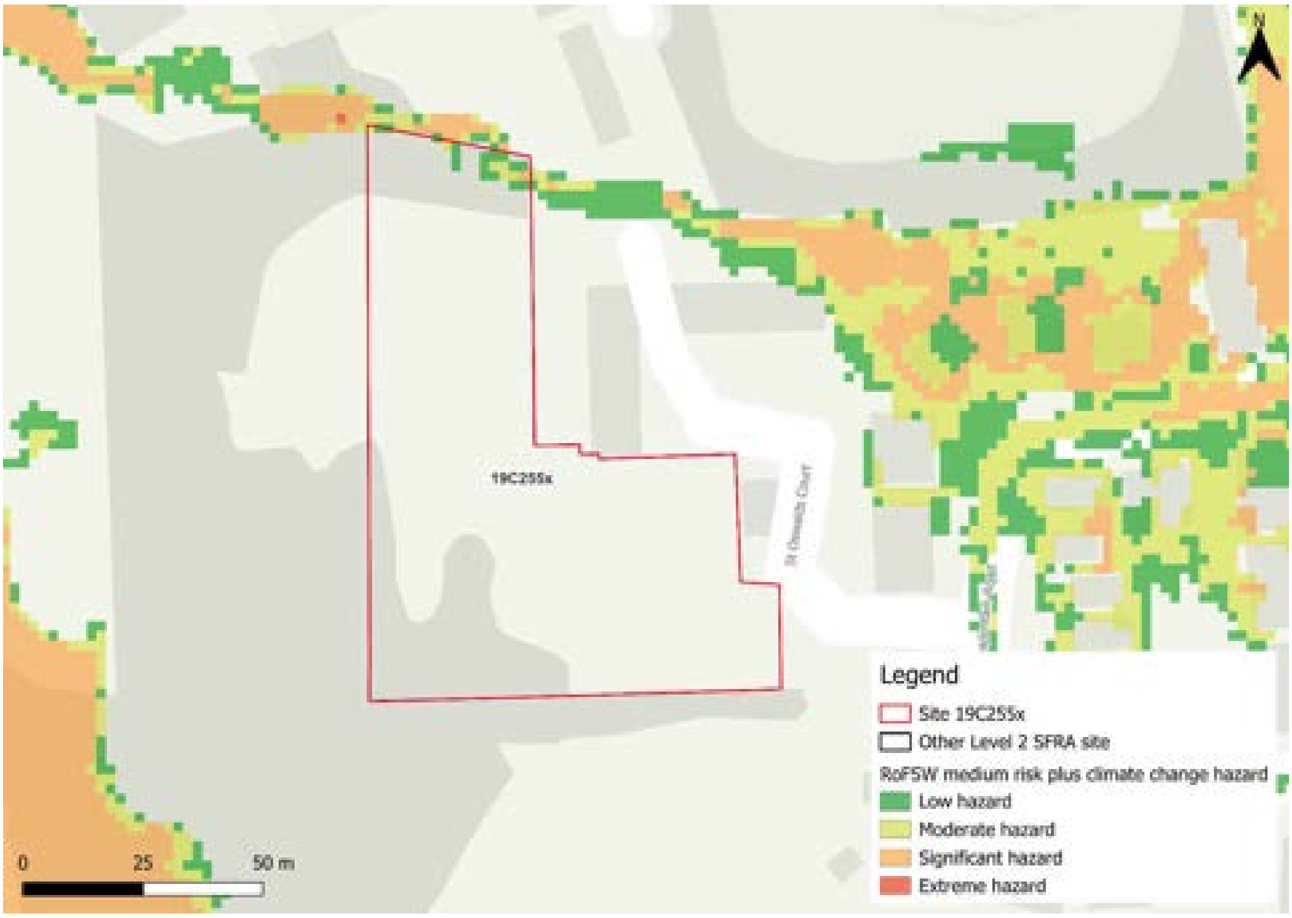

Figure 75-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

75.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site from surface water flooding is predominantly very low with 99% of the site being at very low surface water flood risk. Surface water flood risk in the low-risk event is confined to the surface water flow route that occurs adjacent to the northern boundary of the site.
- The modelled medium risk climate change outputs indicate a similar extent risk to the present-day low risk event, with marginally increased depths and extents emerging in the north of the site. Any existing flow paths and topographic depression should be maintained in site design.
- The Groundwater Flood Map (Figure 4-1) indicates that the ground conditions may be suitable for infiltration SuDS. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Based on available information, safe access and escape routes should be achievable via St Oswalds Lane in all events.
- Note, 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 or evidence.

76 Risk from Groundwater

Flood risk from groundwater sources 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 Guide[51]. Figure 4-1 show the map for Site 19C255x and the surrounding areas whilst

51 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 4-1 explains the risk classifications.

The entire site is shown to be in an area at negligible risk of groundwater emergence. Groundwater conditions may therefore be suited to infiltration SuDS across the site.

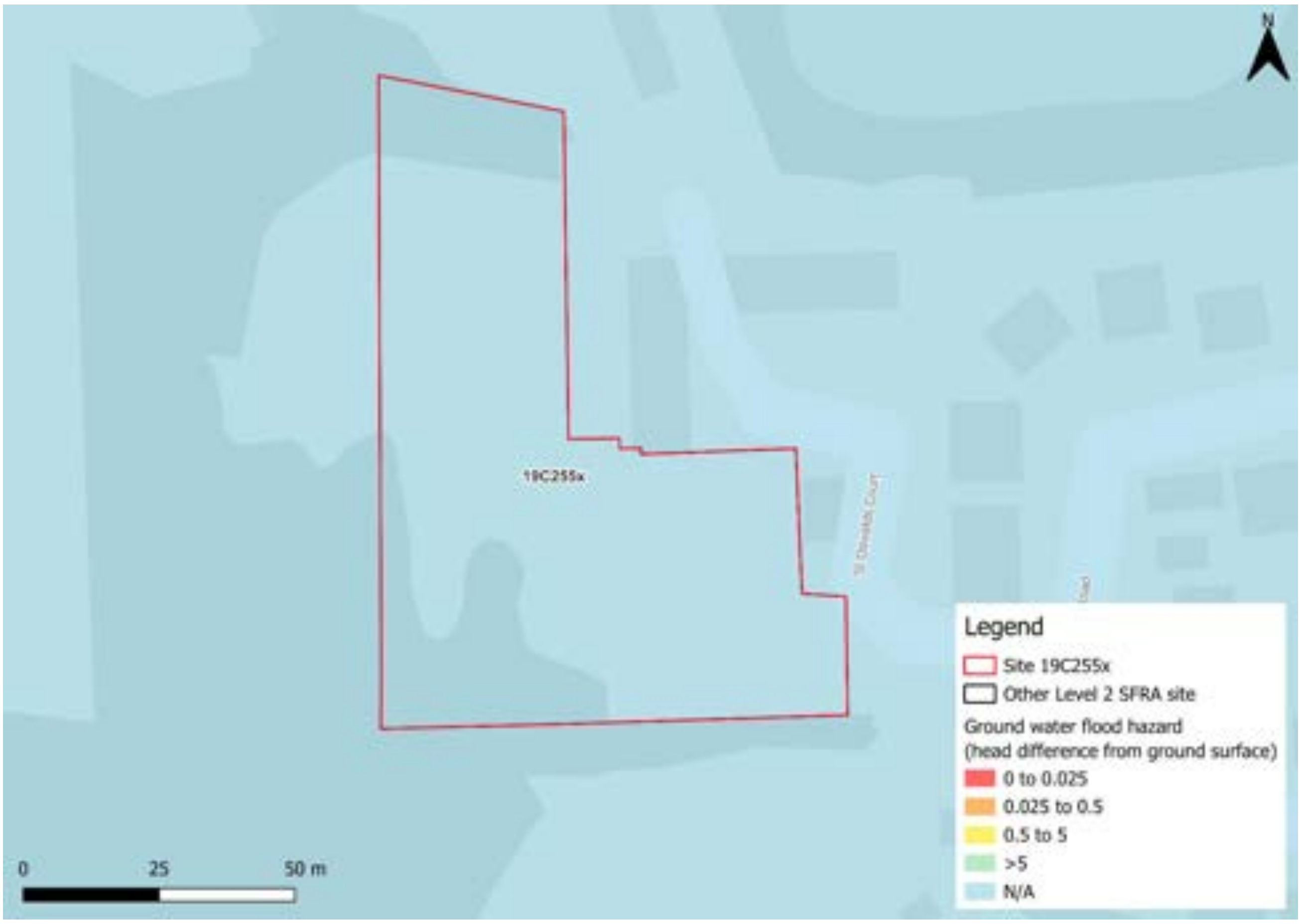

Figure 76-1: JBA 5m Groundwater Flood Map

Table 76-1: Groundwater Flood 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.	

77 Overall site assessment

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

The site is not required to pass part b) of the exception test[52], as it is located within Flood Zone 1. However, it must still be proven that development can be safe for its lifetime, which is 100 years for residential development.

77.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable uses. A limited area within the north of the site is shown to be at flood risk in the low-risk climate change event, however this area should be able to be avoided in development layout plans.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

52 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C257x

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0023-S3-P03
Revision	P03
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79 Background

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79.1 Site 19C257x

- Location: Coppull Enterprise Centre, Mill Lane
- Existing site use: Commercial, shops
- Existing site use vulnerability: Less Vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More Vulnerable
- Site area: 1.497 hectares
- Proposed development impermeable area: 1.272 hectares (assumed 85% impermeable area)
- Summary of requirements from scoping stage:
- Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
- Assessment of surface water flood depths and hazards
- Modelling of latest Environment Agency (EA) climate change allowances for peak rainfall intensities

Figure 79-1: Existing site location boundary

Figure 79-2: Topography

80 Flood risk from rivers

80.1 Existing risk

80.1.1 Flood Map for Planning and functional floodplain

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

The entire site is modelled to be within Flood Zone 1, indicating a low risk of flooding from Rivers.

Table 80-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 80-1: Existing risk from rivers to the site

80.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

80.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19257x is located within one catchment, namely; Yarrow DS Big Lodge Water. This is ranked as a low sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

80.2.2 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. To the northwest and southwest of the site there are opportunities for wider catchment and riparian tree planting respectively which can intercept, slow, store and filter water around the site. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 80-2.

Figure 80-2: Natural Flood Management (NFM) potential mapping

80.3 Residual risk

80.3.1 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. 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 not modelled to be at risk from reservoir flooding.

80.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

80.5 Flood warning and access and escape routes

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. Site 19C257x 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. The site is not located within a FAA.

Based on available information, safe access and escape routes are available via Mill Lane.

80.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is entirely within Flood Zone 1 indicating a low fluvial flood risk. There are therefore no constraints to development at the site with respect to flood risk from rivers.
- Safe access and escape routes could likely be achieved via Mill Street, based on available information.

81 Flood risk from surface water

81.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 1% of the site is observed to be within the medium risk surface water flood zone. A further 1% is observed to be within the low-risk surface water flood zone, as shown in Table 81-1.

In the high-risk event, surface water is not observed within the site area. In the medium risk event, an area of surface water pooling can be seen in an area of topographic depression to the south of the site where it is constrained by an existing building. In the low-risk event, this area of ponding can be seen to expand in extent and forms part of a surface water flow route along Mill Lane.

Greatest flood depths within the medium risk event are seen between 0.30 m and 0.60 m (Figure 3-1) in the area of pooling within the south of the site. These areas of higher depths are coincident with hazards categorised as significant (Figure 3-2).

Parts of Mill Lane are shown to be inundated with floodwater in the medium and low risk events, however safe access and escape is anticipated to remain viable as hazard levels are predominantly low.

Table 81-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
98	1	1	0

Figure 81-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 81-2: Medium risk event surface water flood hazard[53] (Risk of Flooding from Surface Water map)

53 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

81.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 81-2: Modelled climate change allowances for rainfall for the Douglas Management Catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

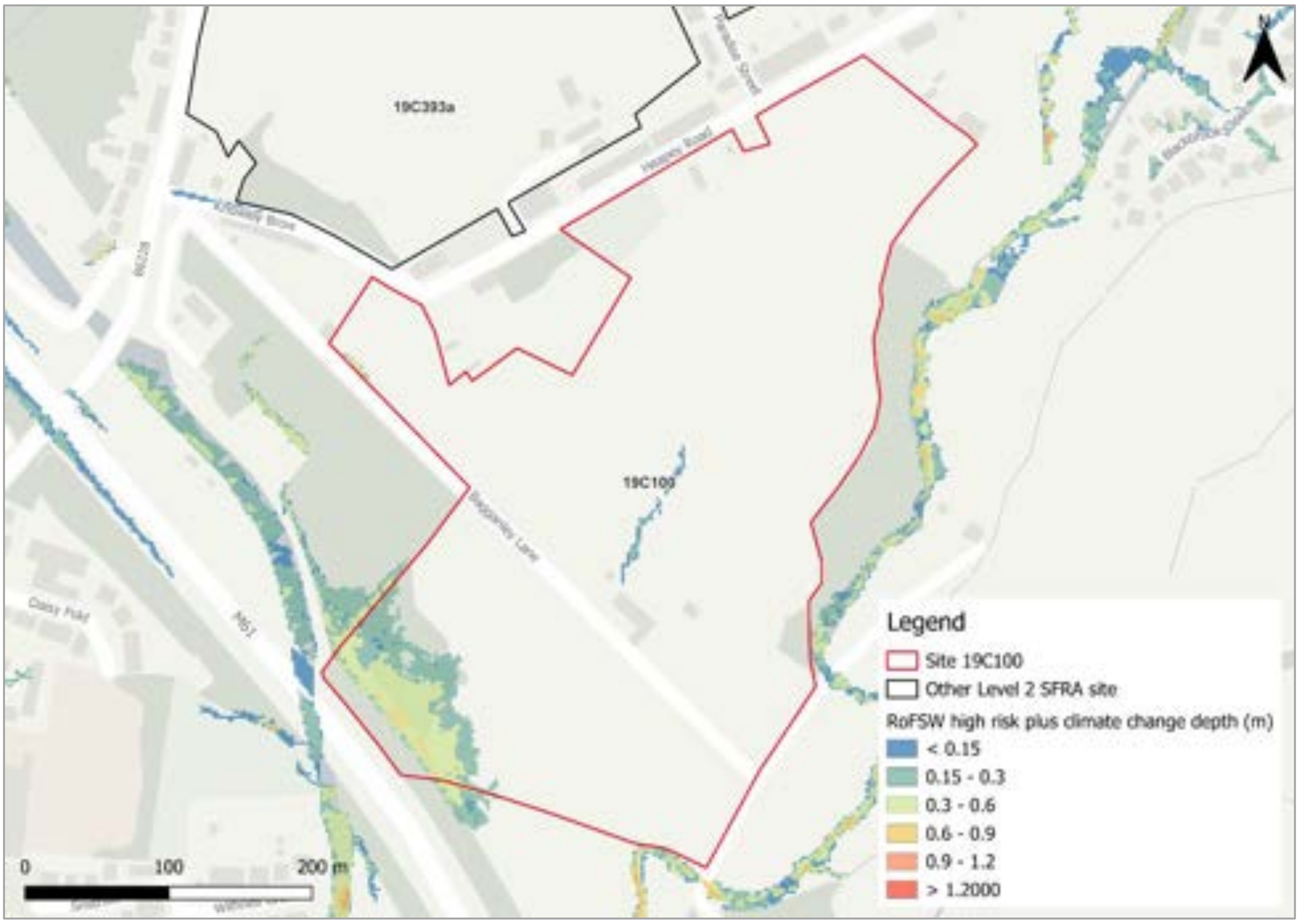

Figure 3-3 shows the medium risk surface water flood depths plus 45% climate change. Risk is modelled to be significantly greater in extent than present day conditions with the medium risk climate change event being similar in extent to the present-day low risk event.

Flooding observed both in the south of the site as well as in the northeast, where surface water pooling is observed to occur in an area confined by the existing building.

Maximum flood depths are modelled to be >1.2m, with some areas of significant hazard in both the south and northeast of the site (Figure 3-4).

Although Mill Lane is shown to be partially inundated during the medium risk climate change event, hazard levels are generally seen to be low and access and escape routes are anticipated to remain viable.

Figure 81-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

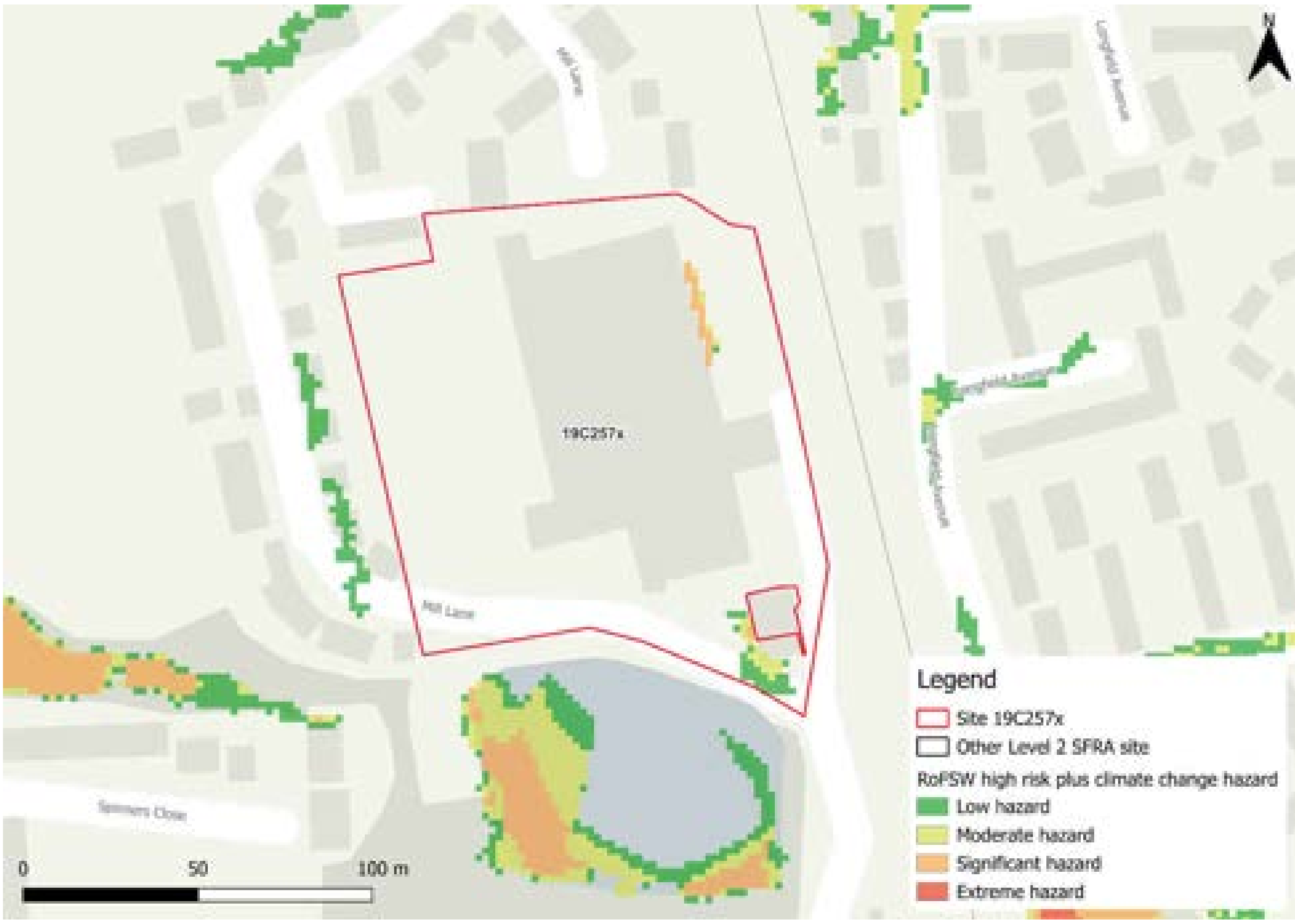

Figure 81-4: High risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

81.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with 98% of the site being at very low surface water flood risk. Surface water risk in the low event is predominantly seen in an area of topographic depression in the southeast corner of the site. Safe access and escape route is expected to be achievable via Mill Lane, however the route is shown to partially inundate with floodwaters of low hazard.
- The effects of climate change on surface water have been modelled for this SFRA using high-risk surface water flood depths plus 45% climate change. Surface water risk is observed as greater than present day flood risk with an additional area of floodwater in the northeast of the site confined by the existing building.
- The Groundwater Flood Map (Figure 4-1) indicates that the ground conditions at this site may be suitable for infiltration SuDS. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the existing system could accommodate the proposed residential development or whether further capacity

would be required. Consideration should be given to maintaining safe access and escape routes from the site during a flood event.

- The Council highways department should be consulted, along with United Utilities and the LLFA regarding existing highway drainage networks, surface water sewers and LLFA assets, and whether increased capacities may be required to enable sustainable development in the long term.
- Note, 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 or evidence.

82 Risk from groundwater

Flood risk from groundwater sources 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 Guide[54]. Figure 4-1 show the map for Site 19C257x and the surrounding areas and

54 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 4-1 explains the risk classifications.

The mapping indicates that the site is at minimal risk from groundwater emergence. Therefore, groundwater conditions may be suited to infiltration SuDS.

Figure 82-1: JBA 5m Groundwater Flood Map

Table 82-1: Groundwater Flood 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.	

83 Overall site assessment

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

The site is not required to pass part b) of the exception test[55] as it is located within Flood Zone 1. However, it must still be proven that development can be safe for its lifetime, which is 100 years for residential development.

83.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable uses. Limited areas of the site are shown to be at flood risk in the low-risk present day event and medium risk climate change event, however these areas should be able to be avoided in development layout plans.
- A drainage strategy will be required to manage surface water flood risk, including the areas of surface water shown in the mapping contained within this document. Site runoff should be maintained at greenfield rates and, where possible, betterment should be achieved.
- Access and escape routes are anticipated to remain viable at Mill Lane, however the route is shown to partially inundate with surface water during flood events. The FRA should detail measures to ensure safe access and escape routes are viable in the event of a flood.
- The use of infiltration SuDS should be considered in the drainage strategy, and ground investigation at the site should be undertaken to better inform opportunities for this.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.
-

55 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C264x

Final

February 2025

Prepared for:

Preston
South Ribble
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Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0022
Revision	P02
Prepared by	Kaylyn Carroll BSc Assistant Analyst
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Contract

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This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Kaylyn Carroll 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 19 August 2024 and 14 February 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.

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Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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Contents

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85 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C264x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

85.1 Site 19C264x

- Location: Pear Tree Lane
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 4.63 hectares
- Proposed development impermeable area: 3.94 hectares (assumed 85% impermeable area)
- Watercourse: Chapel Brook (unmodelled)
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 85-1: Existing site location boundary

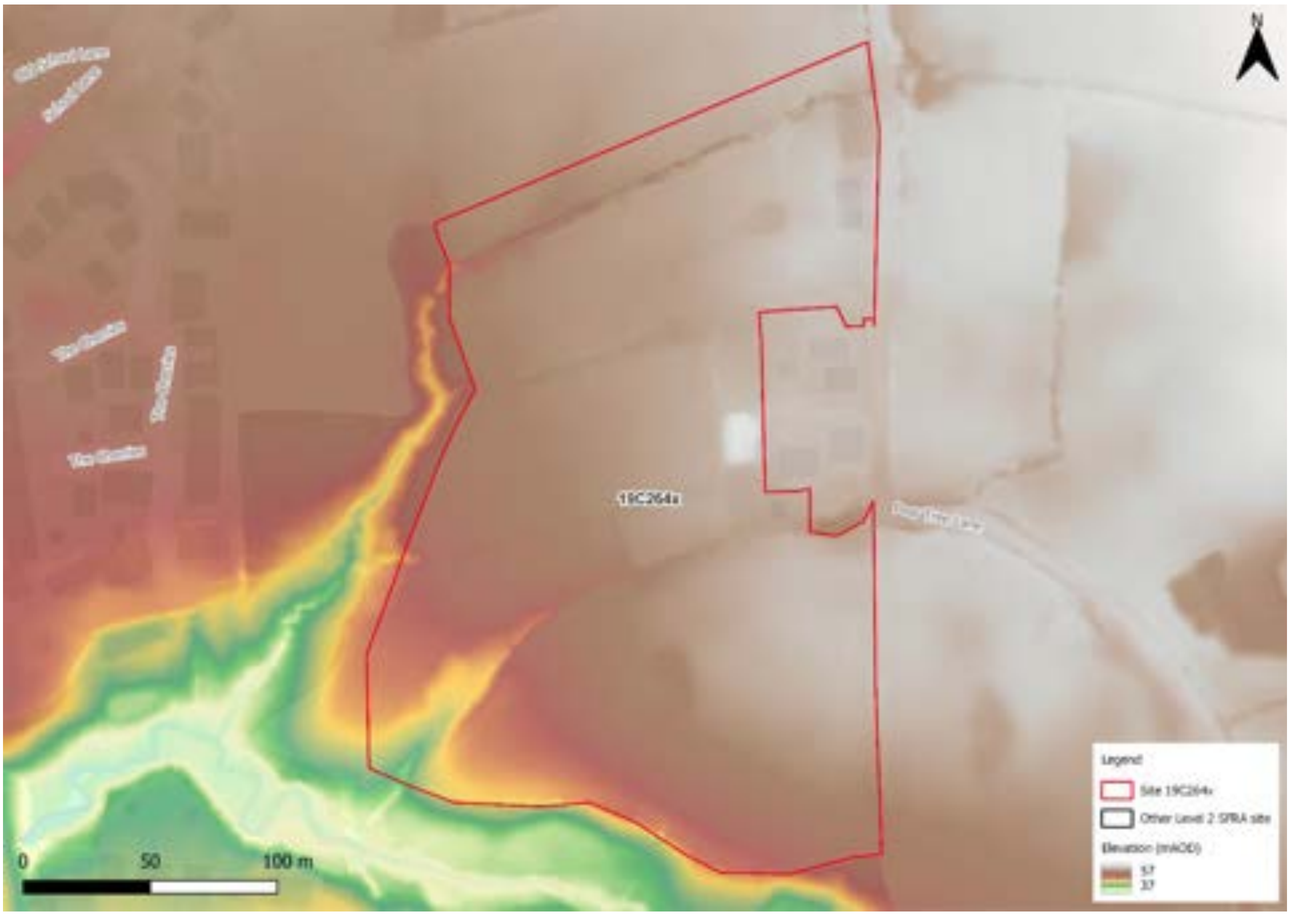

Figure 85-2: Topography

86 Flood risk from rivers

86.1 Existing risk

86.1.1 Flood Map for Planning and functional floodplain

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

The site is located wholly within Flood Zone 1 indicating that the site is at low risk of flooding from rivers. Rushton Brook is a small, unmodelled watercourse present through the north of the site. Risk from this watercourse and from Chapel Brook should be quantified. Additional modelling may be required at the FRA stage.

Table 86-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 86-1: Existing risk from rivers to the site

86.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

86.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C264x is located within one catchment, namely, Yarrow Culbeck Brook to tidal. This is ranked as a high sensitivity catchment. Planning considerations for sites at high sensitivity to the cumulative impacts of development that apply to this site include:

- National and local flood risk planning policy must be stringently applied within these areas, with flood risk from all sources given the appropriate priority, particularly when applying the Sequential and Exception Tests.
- Both greenfield and brownfield developments to achieve 20% betterment over pre-development greenfield runoff peak flows and volumes in their post development state.
- For larger sites and strategic developments (e.g. new settlements and urban extensions):
    - The LLFA, Environment Agency, and LPA should be consulted at pre-application stage.
    - The FRA should examine the cumulative impacts of proposed peak surface water runoff rates and volumes from across the site on the peak flows, duration of flooding and timing of flood peaks in receiving watercourses. This should include the impact of other developments within the WFD catchment, if appropriate, as advised by the LPA/LLFA.
    - A Surface Water Drainage Masterplan should be developed and implement appropriate drainage sub-catchments for the management of surface water, with specific runoff rate and volume requirements set for each sub-catchment, in line with the SuDS management train.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

86.2.2 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. Both within and upstream of the site there is potential for both riparian and wider catchment woodland planting to attenuate flows and reduce the volume of runoff downstream. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 86-2.

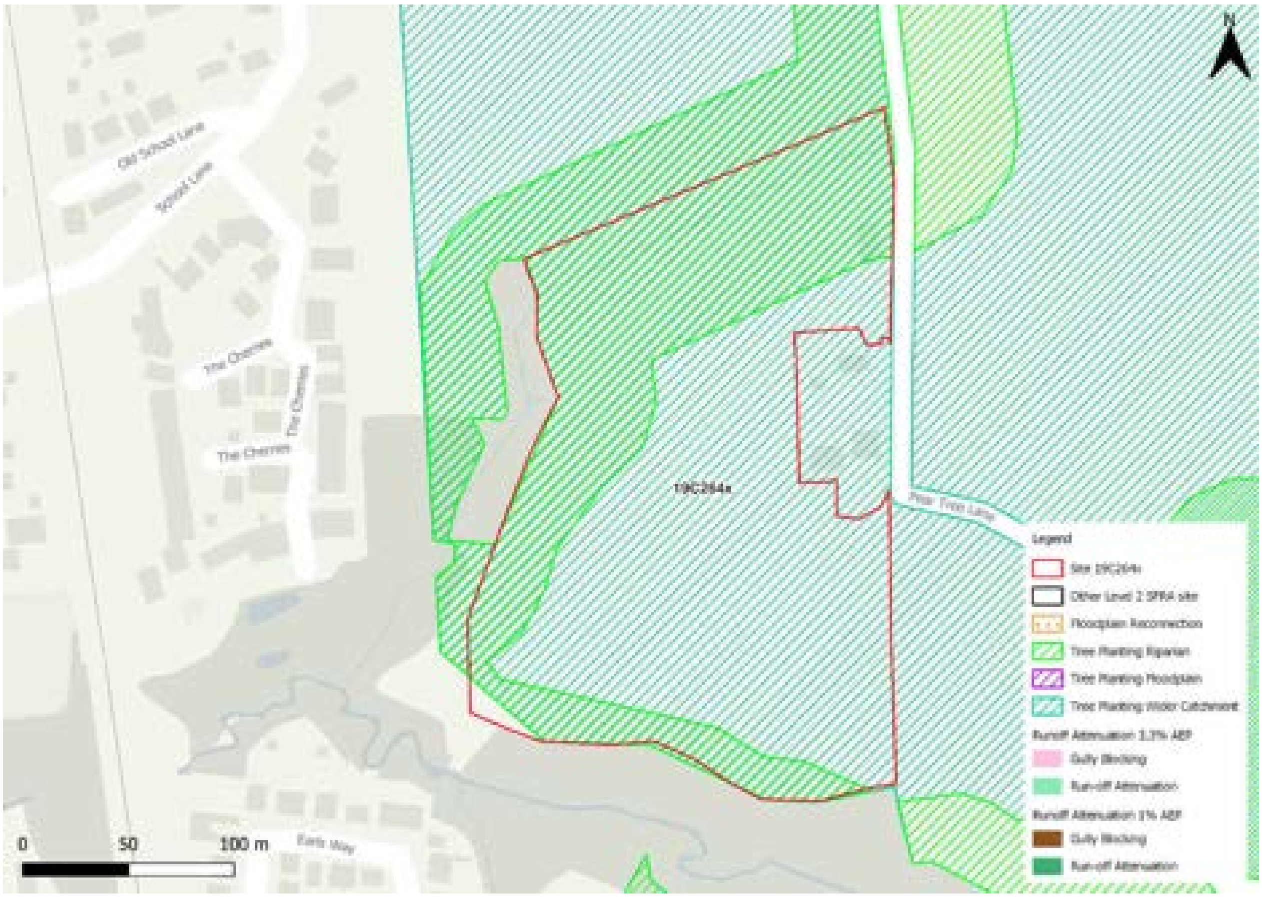

Figure 86-2: Natural Flood Management (NFM) potential mapping

86.3 Residual risk

86.3.1 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.

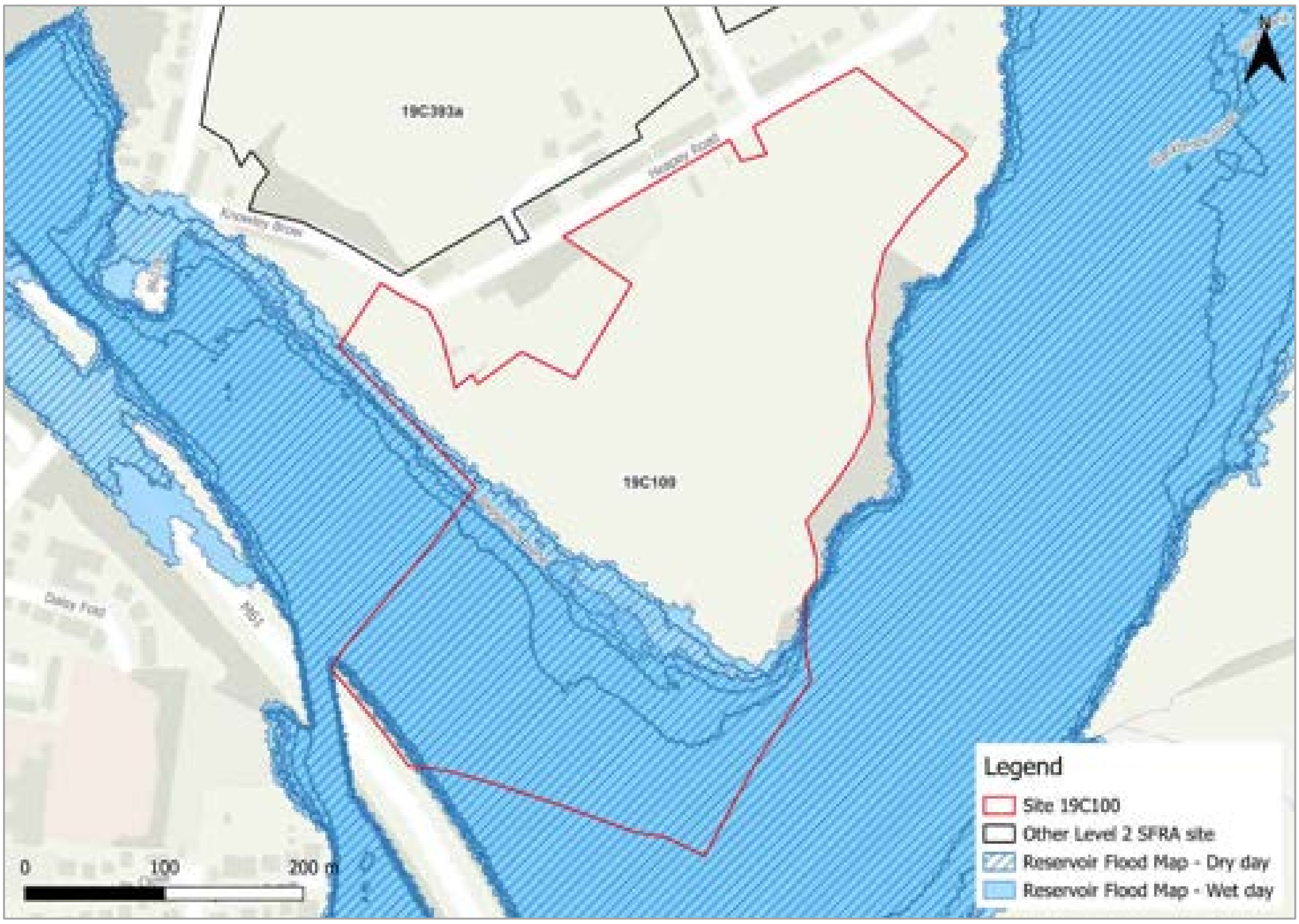

Figure 2-9 shows the RFM in a 'dry day' and 'wet day' scenario. A 'dry day' scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. 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 from one reservoir located within Chorley, namely Anglezarke reservoir, operated by United Utilities.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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 United Utilities to ascertain whether the proposed development could affect the reservoir's risk designation, it's 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.

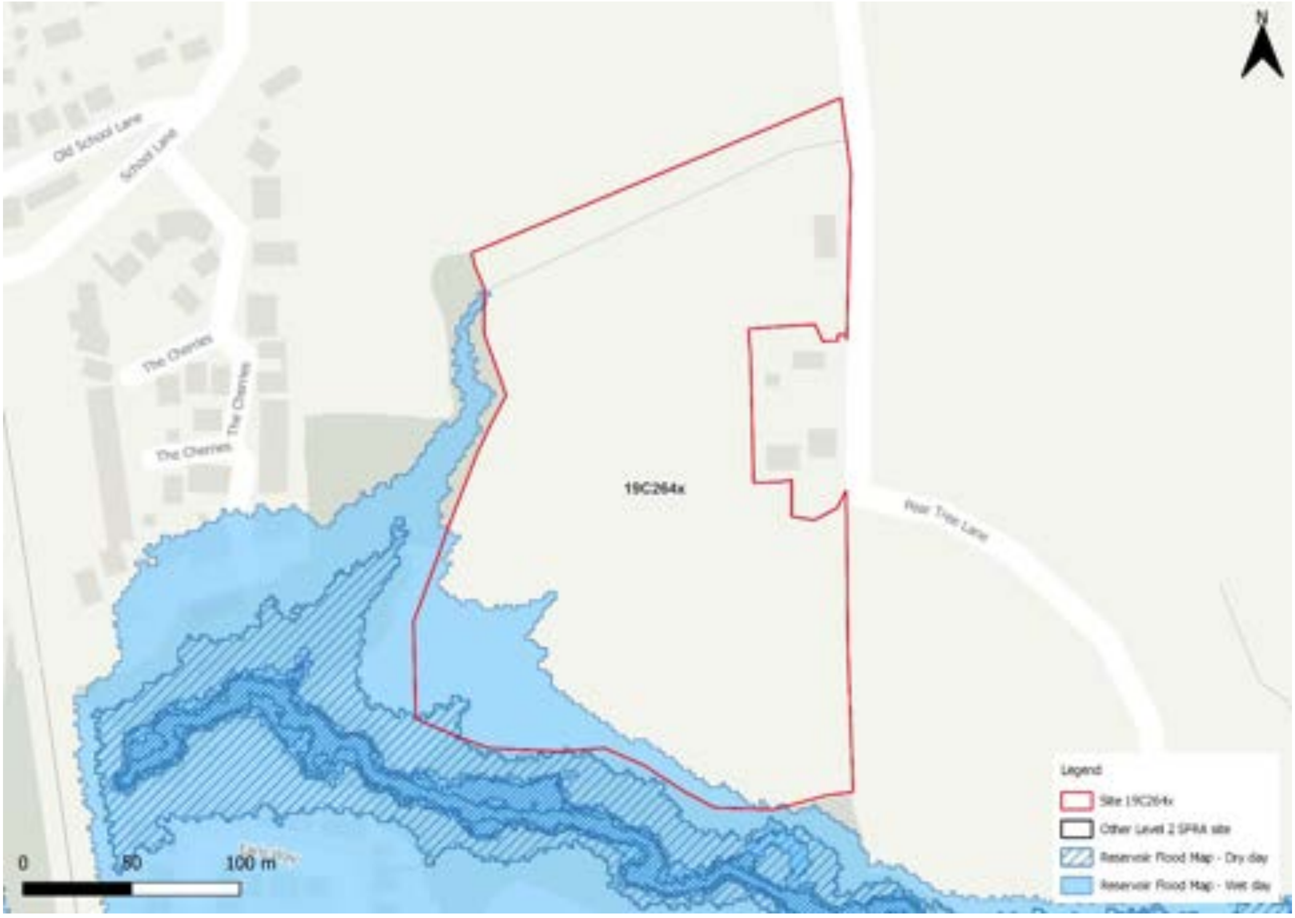

Figure 86-3: Flood risk from reservoirs

86.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

86.5 Flood warning and access and escape routes

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. The 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. The site is not located within a FAA.

Based on available information, safe access and escape routes could likely be achieved during a flood event via Pear Tree Lane.

86.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is wholly located within Flood Zone 1. Rushton's Brook is a small, unmodelled watercourse which flows adjacent to the northern boundary of the site. Any FRA should quantify the risk to the site from this watercourse and Chapel Brook to the south.
- Given the potential reservoir risk to the site, developers should consider[56]:
    - Whether additional modelling is required to understand the flood risk from the reservoir, referring to the specification for the reservoir flood maps as a starting point
    - Whether the development may have an impact on the reservoir or reservoir owner
    - Referring to the Central Lancashire Level 1 SFRA for information on reservoir risk and recommendations for how to address it
    - Contacting the LPA for pre-application advice
    - Contacting the LPA to understand the need to consult with their emergency planning team and with the reservoir owner
- The Council should consult United Utilities to ascertain whether the proposed development could affect the reservoir's risk designation, it's design category or how it is operated
-

56 Reservoir flood maps: when and how to use them | Environment Agency | 2021

87 Flood risk from surface water

87.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly seen to be very low. Approximately 1% of the site is within the high risk surface water flood zone. A further 1% is at medium surface water risk, and 3% of the site is observed to be at low surface water risk, as shown in Table 87-1.

In the high and medium risk events, surface water risk is confined to a flow path through the north of the site, coincident with the Rushton's Brook watercourse. There is a deep area of ponding along the eastern boundary of the site, however this is largely confined to outside of the boundary. Access should be directed to the north of the site, avoiding this significant risk area. In the low risk event, an additional flow path emerges through the south of the site, extending from the area of ponding along the eastern boundary of the site in the high and medium risk events.

Greatest flood depths within the medium risk event are between 0.6 and 0.9 m (Figure 3-1) with some areas of significant hazard (Figure 3-2), however these are confined to the Rushton's Brook watercourse. Safe access and escape routes should be possible via Pear Tree Lane in all events.

Table 87-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
95	3	1	1

Figure 87-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 87-2: Medium risk event surface water flood hazard[57] (Risk of Flooding from Surface Water map)

87.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 87-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

57 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

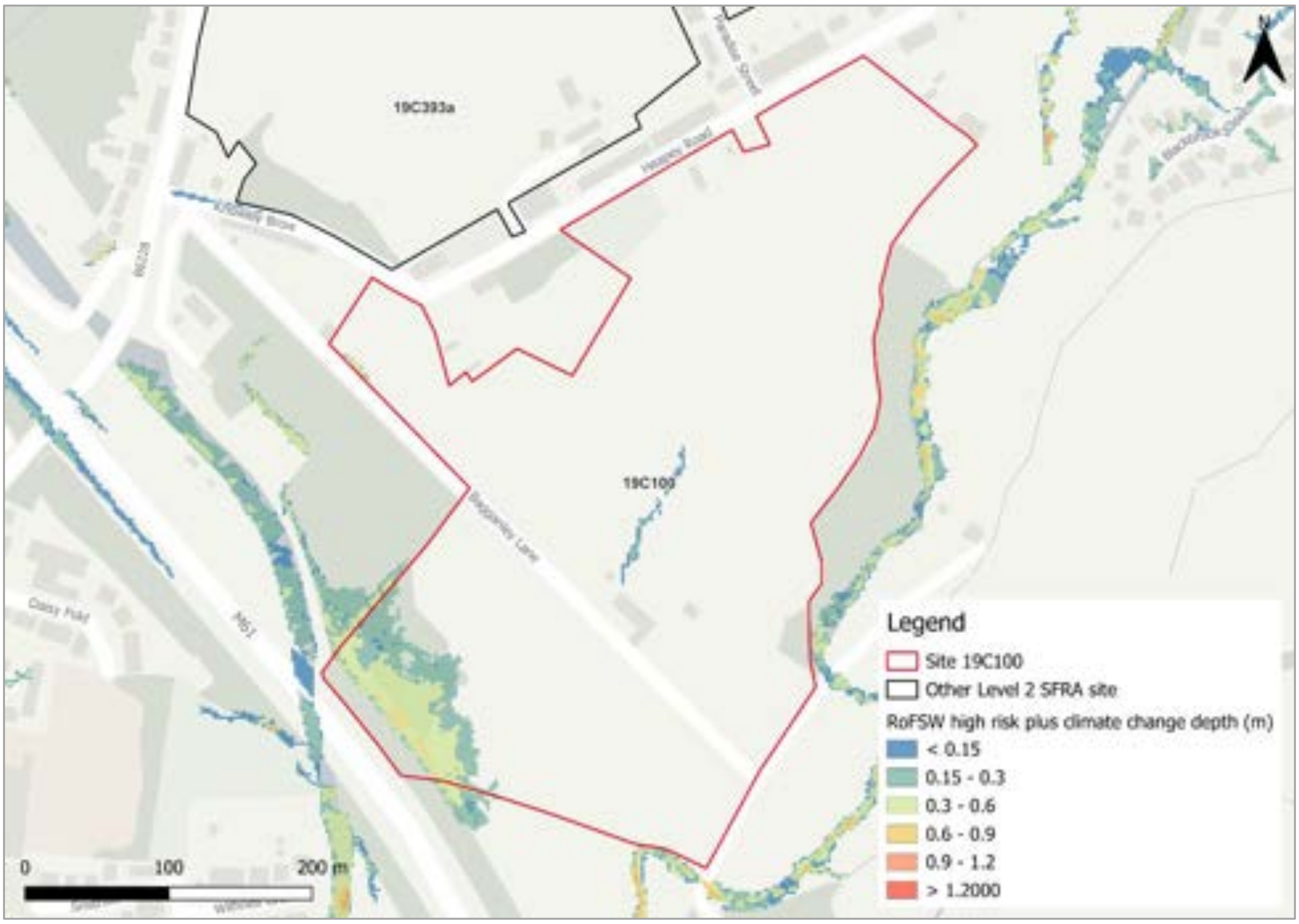

Figure 3-3 shows the medium risk surface water flood depths plus 45% climate change. Risk is modelled to be greater than present day conditions, with the medium risk climate change event being similar in extent to the present day low risk event. There are some additional areas of ponding within topographic low spots in the north of the site. A clear shallow flow route is modelled to develop through the south of the site, draining into Chapel Brook. Maximum flood depths outside of the Rushton's Brook watercourse are modelled to be between 0.3 and 0.6 m (Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

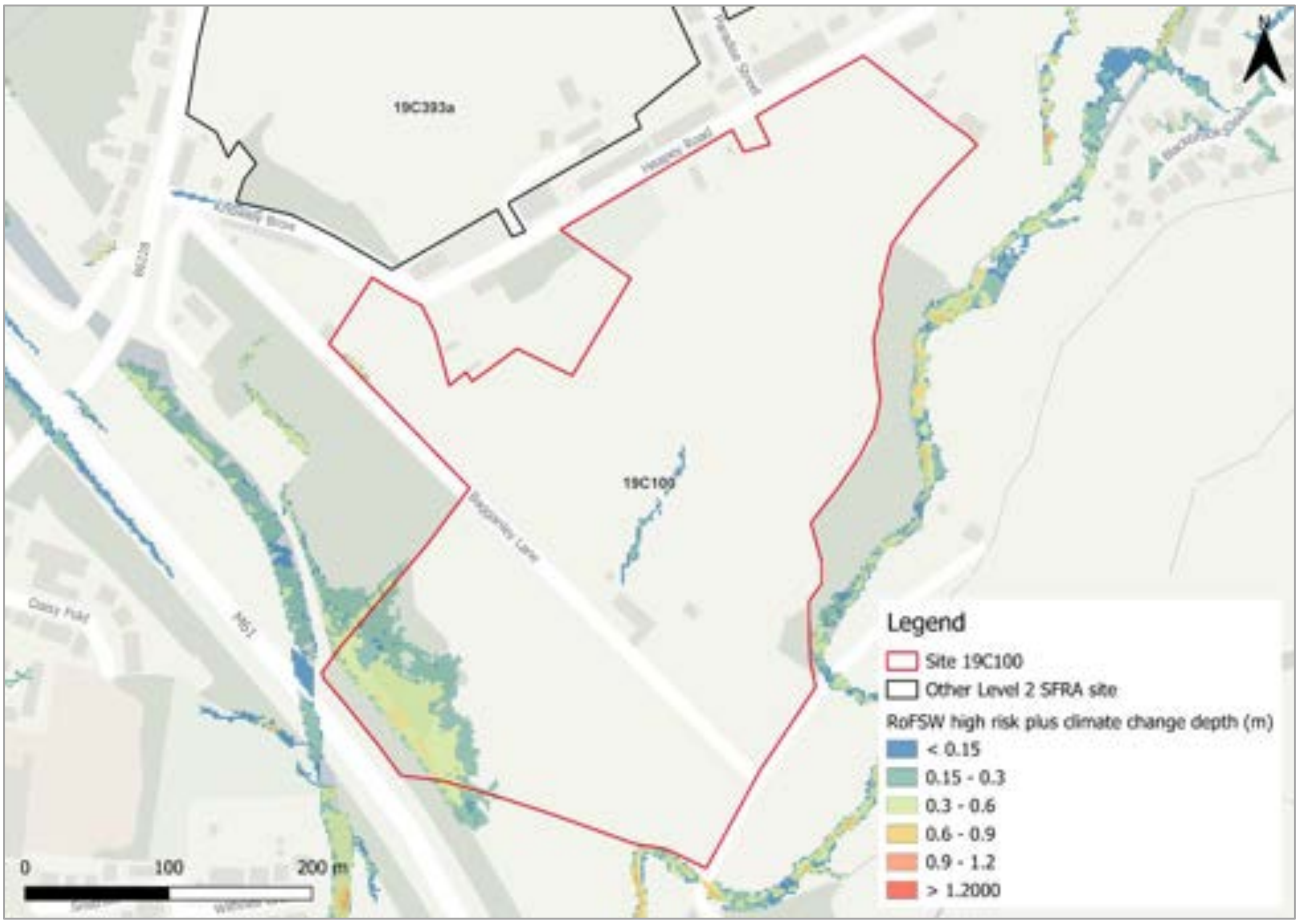

Figure 3-3) with some areas of significant hazard (Figure 3-4). If feasible, both flow paths should be retained and included in site layout and design as features. Availability of safe access and escape routes may become an issue with deep ponding to the access road in the east in two locations.

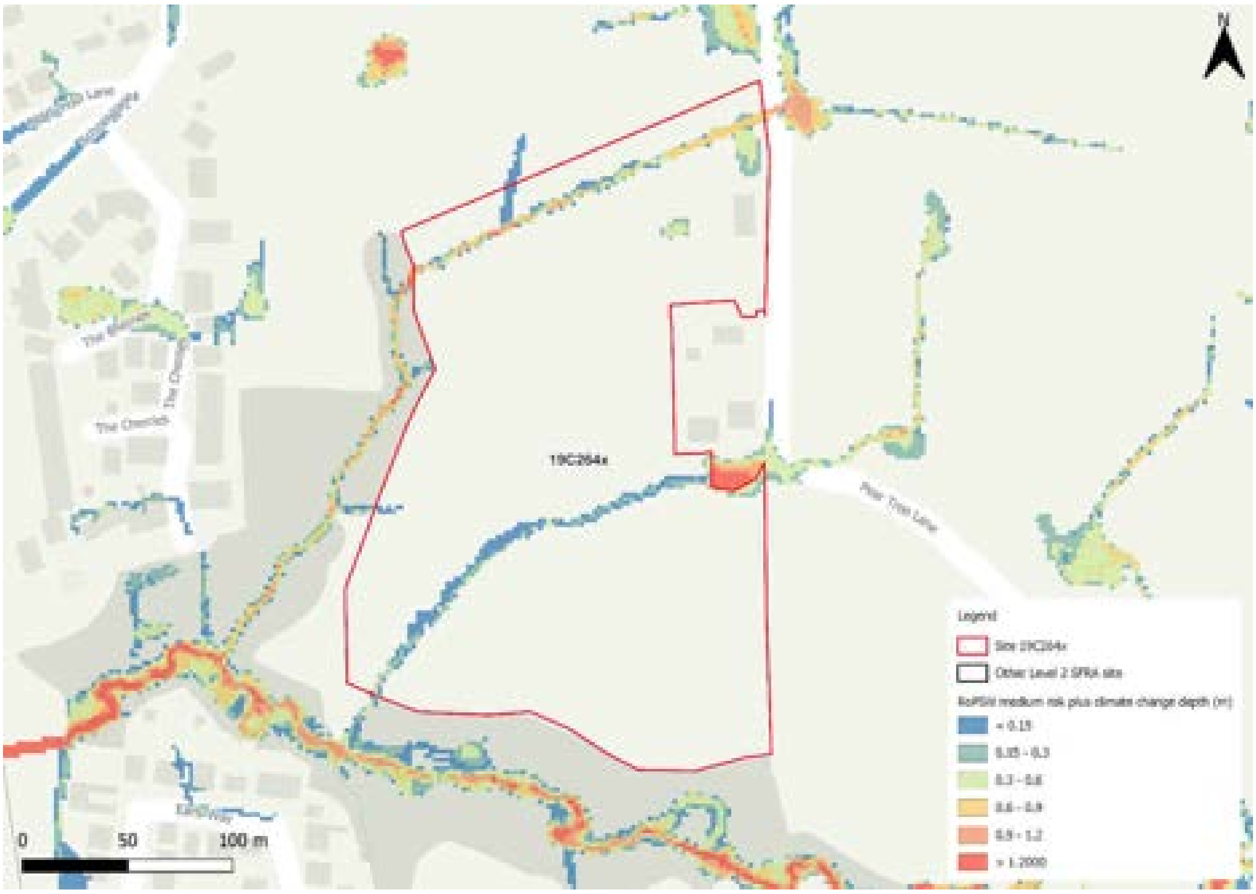

Figure 87-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

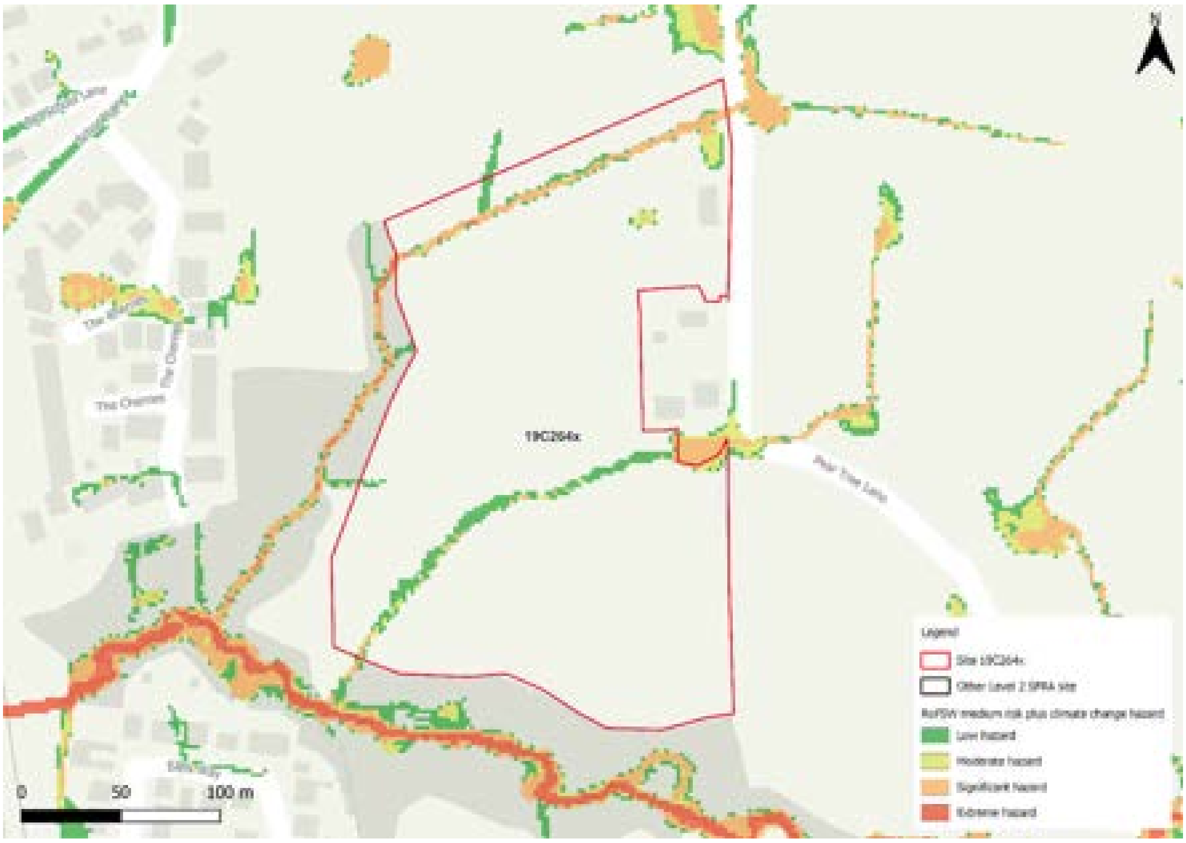

Figure 87-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

87.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 95% of the site being at very low risk. Surface water risk in the high and medium risk events is largely confined to the channel of the existing watercourse on site.
- The modelled medium risk climate change outputs indicate a similar extent of risk to the present day low risk event, with additional areas of ponding emerging through the site. Existing flow paths and topographic depressions should be maintained in site design.
- Safe access and escape routes should be achievable via Pear Tree Lane in all events. However, with climate change access from this road may become limited given the ponding in two locations. This risk should be investigated further through the drainage strategy.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Site runoff should be maintained at greenfield rates and, where possible, betterment should be achieved.
- A full drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Note, 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 or evidence.

88 Risk from groundwater

Risk from groundwater sources 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 Guide[58]. Figure 4-1 shows the map for the site and the surrounding areas and Table 88-1 explains the risk classifications.

The entirety of the site is in an area where there is no groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS.

Figure 88-1: JBA 5m Groundwater Emergence Map

58 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 88-1: Groundwater Flood 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.	

89 Overall site assessment

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

This site is not required to pass part b) of the exception test[59] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

89.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on the evidence in this SFRA, it should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Fluvial risk to the site from Rushton's Brook and Chapel Brook should be quantified as part of a site-specific FRA and should account for the latest climate change allowances.
- A drainage strategy should include for the surface water flow paths and account for limited access to the road on the eastern boundary.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

59 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C275x

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0020-S3-P02-Level_2_SFRA_19C275x
Revision	P02
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JBA Project Code	2023s1344

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Acknowledgements

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91 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C275x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

91.1 Site 19C275x

- Location: Rear of New Street
- Existing site use: Greenfield, open space
- Existing site use vulnerability: Water Compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More Vulnerable
- Site area: 0.251 hectares
- Proposed development impermeable area: 0.213 hectares (assumed 85% impermeable area)
- Summary of requirements from scoping stage:
- Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
- Assessment of surface water flood depths and hazards
- Modelling of latest Environment Agency (EA) climate change allowances for peak rainfall intensities

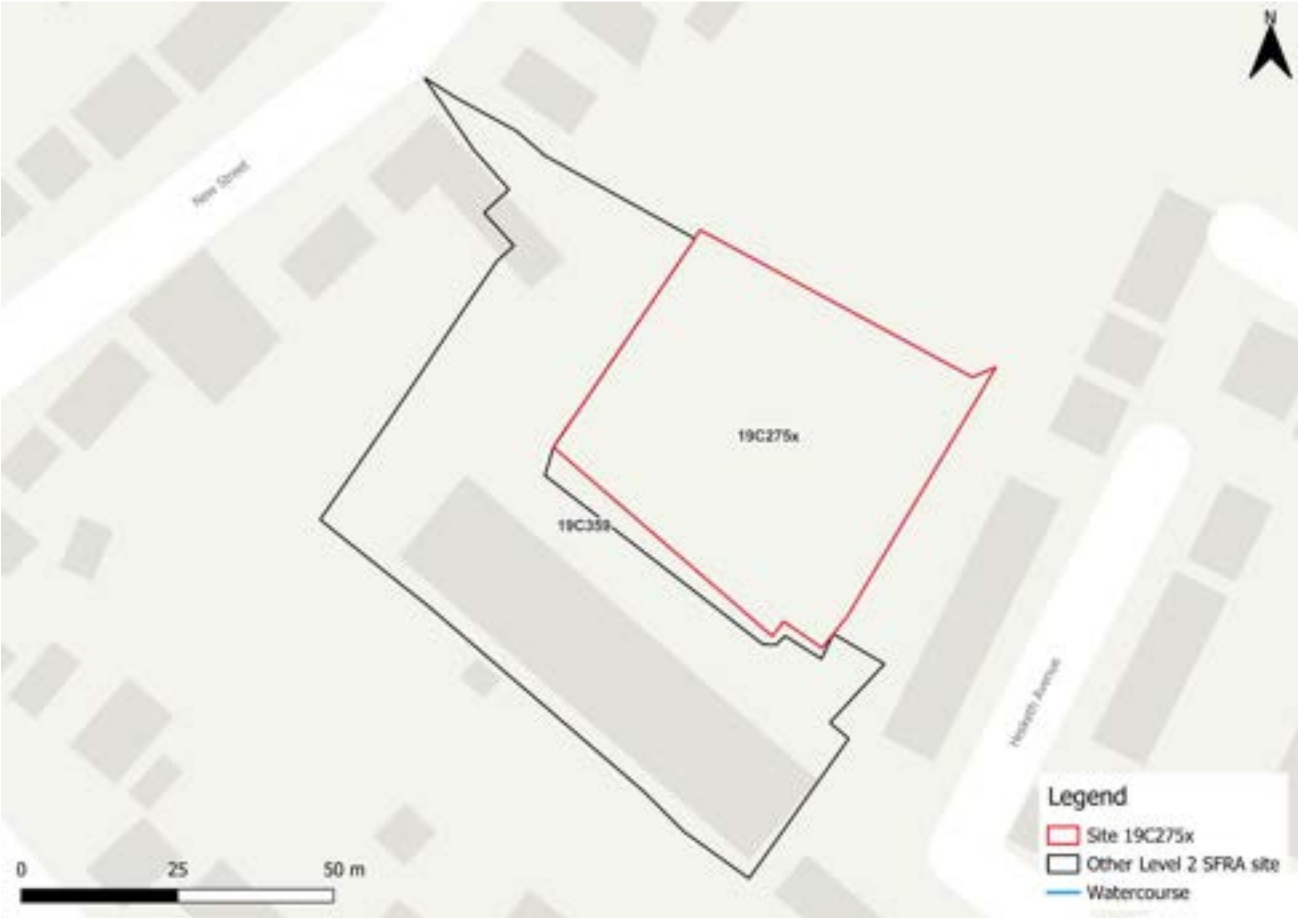

Figure 91-1: Existing site location boundary

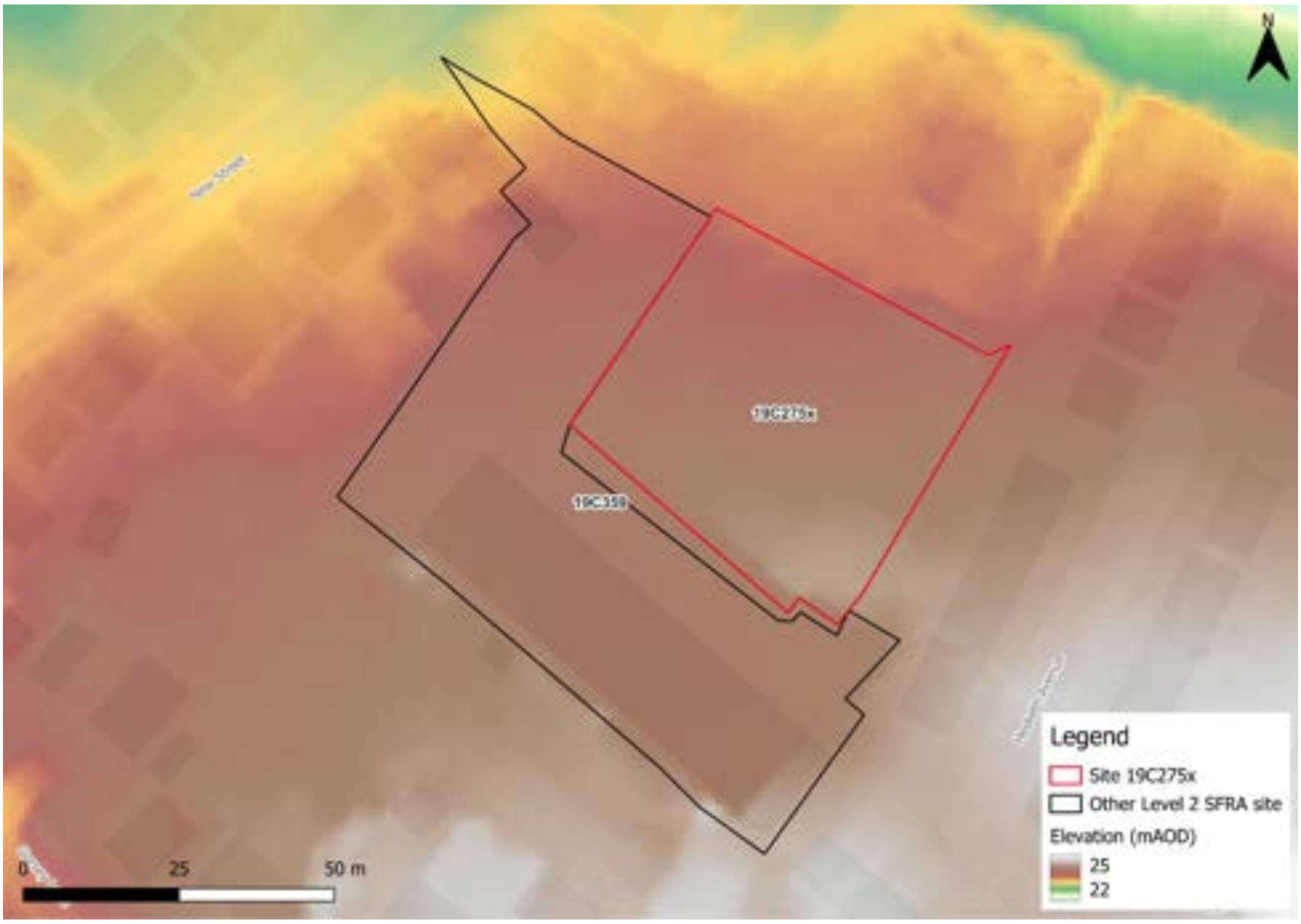

Figure 91-2: Topography

92 Flood risk from rivers

92.1 Existing risk

92.1.1 Flood Map for Planning and functional floodplain

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

The entire site is located within Flood Zone 1, indicating the site is at low risk of flooding from rivers.

Table 92-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

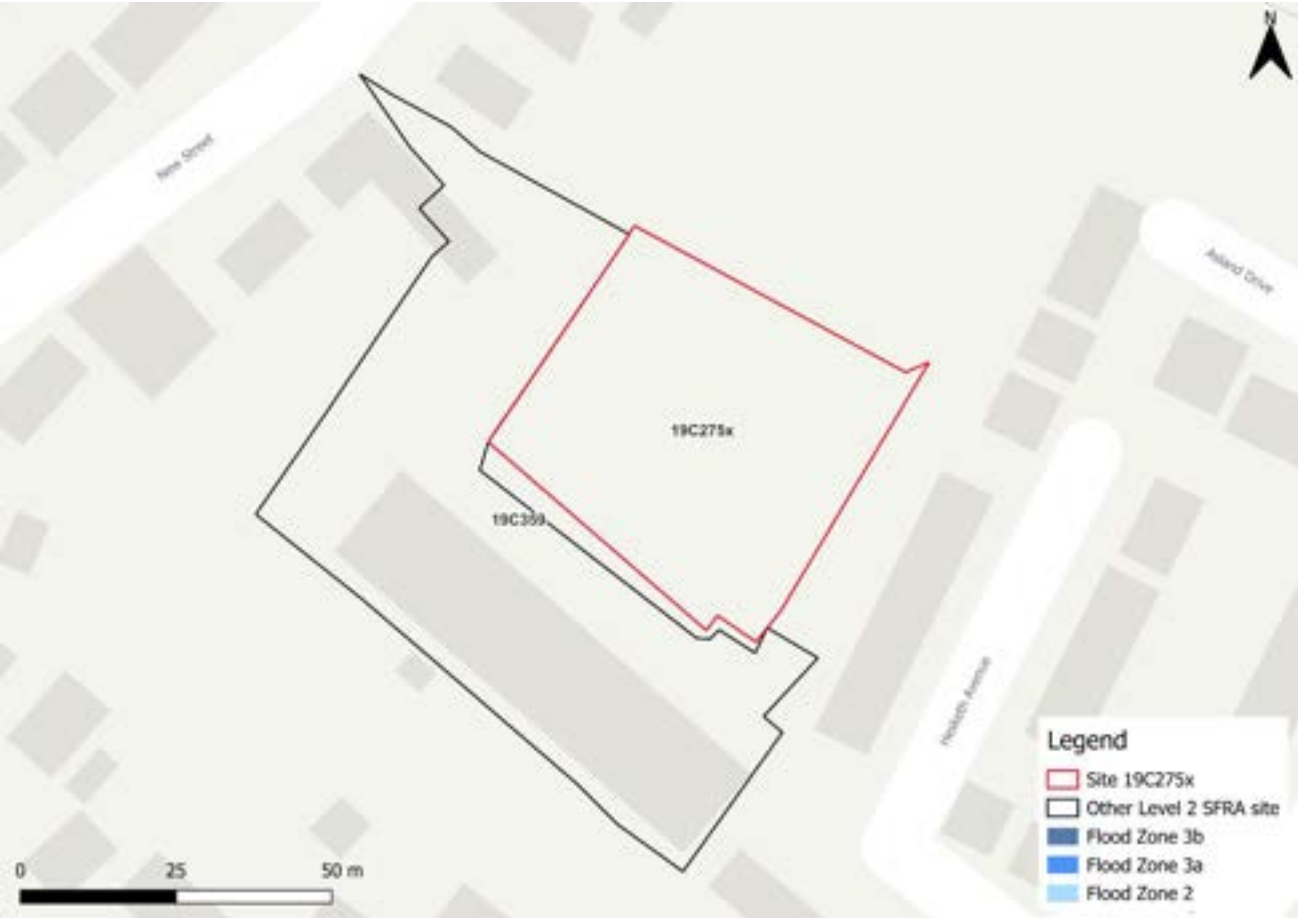

Figure 92-1: Existing risk from rivers to the site

92.2 Flood risk management

There are no engineered flood defences within the vicinity of the site that are likely to impact fluvial flood risk. It is noted however that the site lies on a location of naturally higher ground within the local area.

92.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development, Site 19C275x is located within one catchment, namely, Douglas - Lower. The site is ranked as being within a 'Low' sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

92.2.2 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. Within the eastern corner of the site, there are opportunities for tree planting in the wider catchment which can intercept, slow, store and filter water. Outside of the site to the northeast, there is potential for riparian tree planting, which can slow flows, reduce sediment delivery to watercourses and reduce bankside erosion. To the north of the site, there are opportunities for run-off attenuation to reduce peak surface flow volumes. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 92-2, however the WwNP dataset is indicative and further investigation into suitability of the site for tree planting should be carried out.

Figure 92-2: Natural Flood Management (NFM) potential mapping

92.3 Residual risk

92.3.1 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. 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 not modelled to be at risk from reservoir flooding.

92.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

92.5 Flood warning and access and escape routes

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. The 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. The site is not located within a FAA.

Based on available information, safe access and escape routes could likely be achieved during a flood event via multiple routes surrounding the site.

92.6 Observations, mitigation options and site suitability - fluvial

- The proposed development site is anticipated to see a change in the risk classification from water compatible development to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA m show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG)
- The entire site is modelled to be within Flood Zone 1, indicating a low fluvial flood risk. There are therefore no constraints to development at the site with respect to fluvial flood risk.
- Safe access and escape routes could likely be achieved via multiple routes surrounding the site, based on available information.

93 Flood risk from surface water

93.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 1% of the site is within the low-risk surface water flood zone whilst the rest of the site is designated as very low risk, as shown in Table 93-1.

In the low and medium risk events, surface floodwater is not shown within the site. In the low-risk event, a surface water flow path can be seen to impinge on localised areas of the northern boundary of the site.

Greatest flood depths within the low-risk event are shallow up to 0.15 m (Figure 3-1), located in the northeast corner of the site. This area is coincident with hazards categorised as low (Figure 3-2).

Based on available information, safe access and escape routes are likely to still be possible from New Street and Hesketh Avenue, however parts of these routes are shown to be inundated with shallow floodwaters of low hazard level.

Table 93-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
99	1	0	0

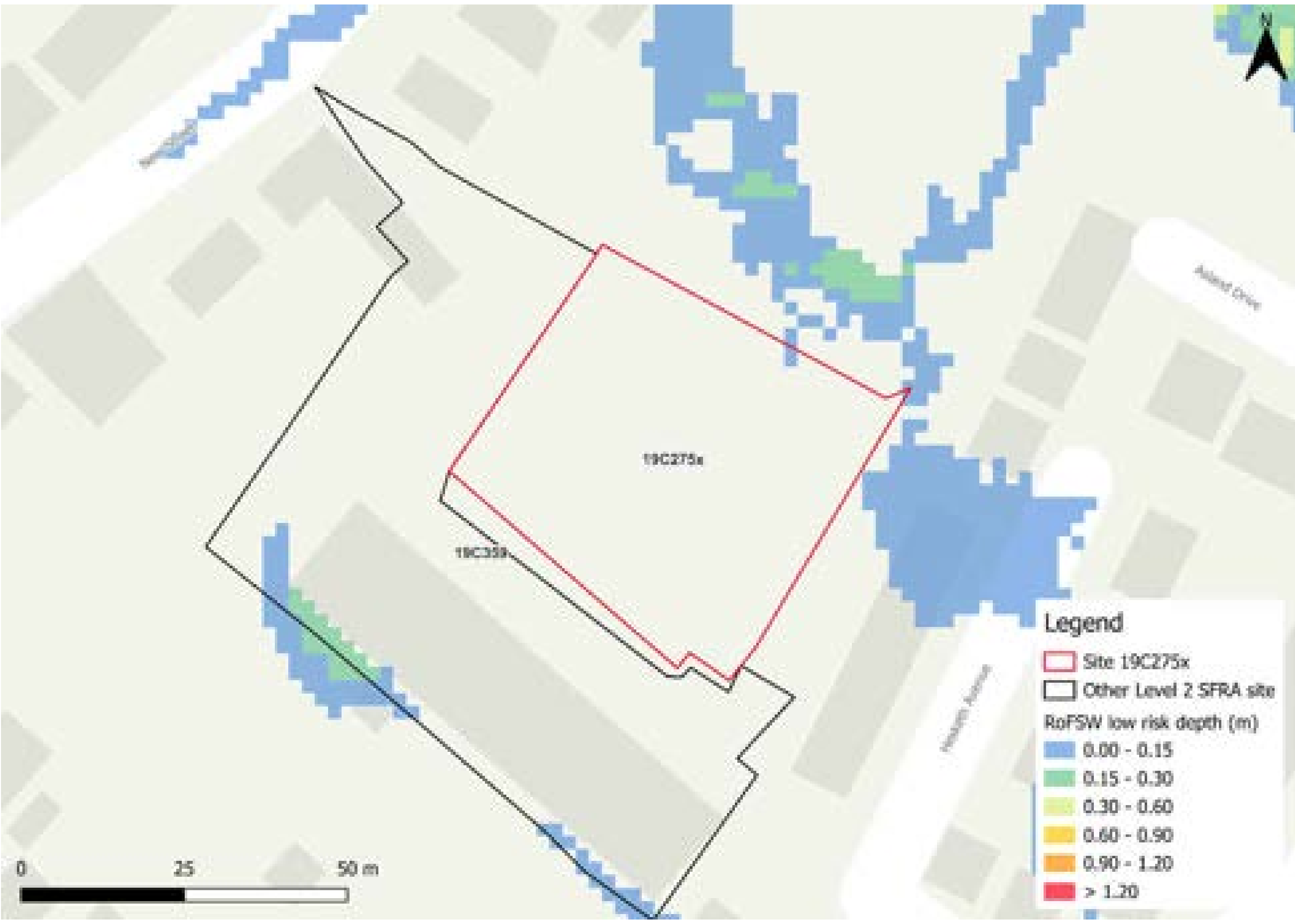

Figure 93-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

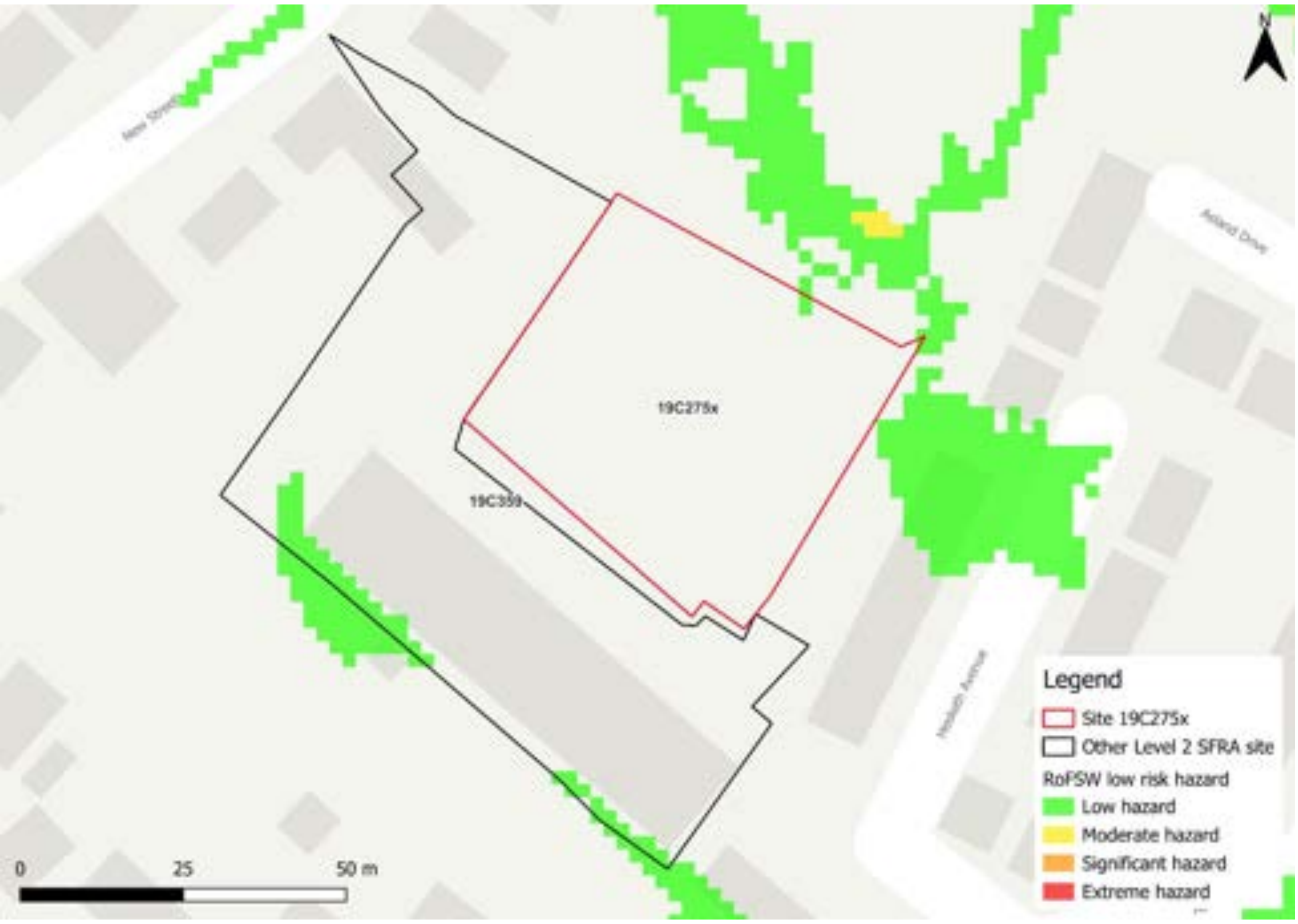

Figure 93-2: Low risk event surface water flood hazard[60] (Risk of Flooding from Surface Water map)

93.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 93-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

60 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

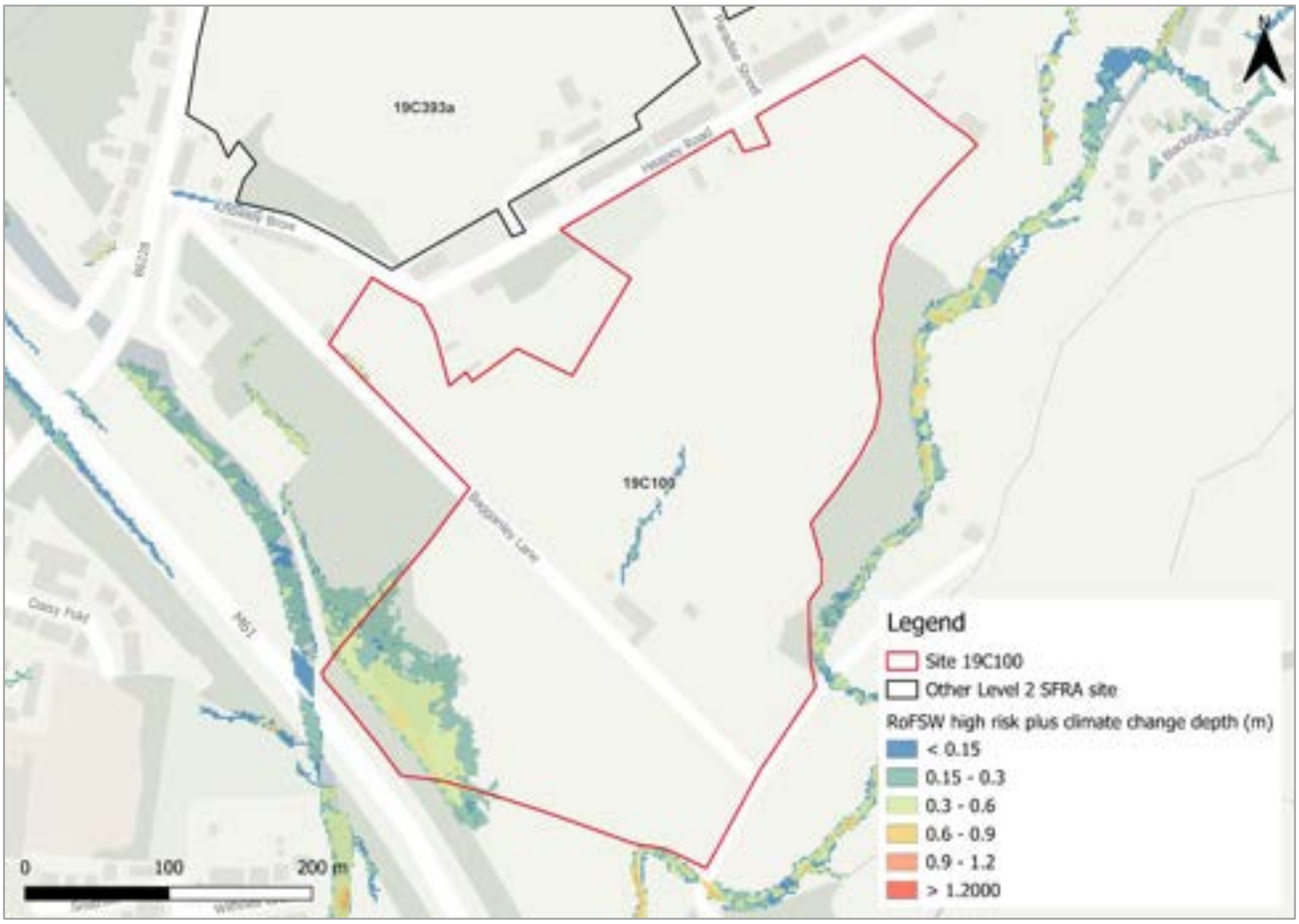

Figure 3-3 shows the medium-risk surface water flood depths plus 45% climate change. Risk is modelled to be significantly greater than present-day high-risk event, however, is similar within the site area to the low-risk present day event.

Maximum flood depths are modelled to be 0.00 m to 0.15 m, and these areas are coincident with hazards categorised as low.

Based on available information, safe access and escape routes are likely to still be possible from New Street and Hesketh Avenue, however parts of these routes are shown to be inundated with shallow floodwaters of low hazard level.

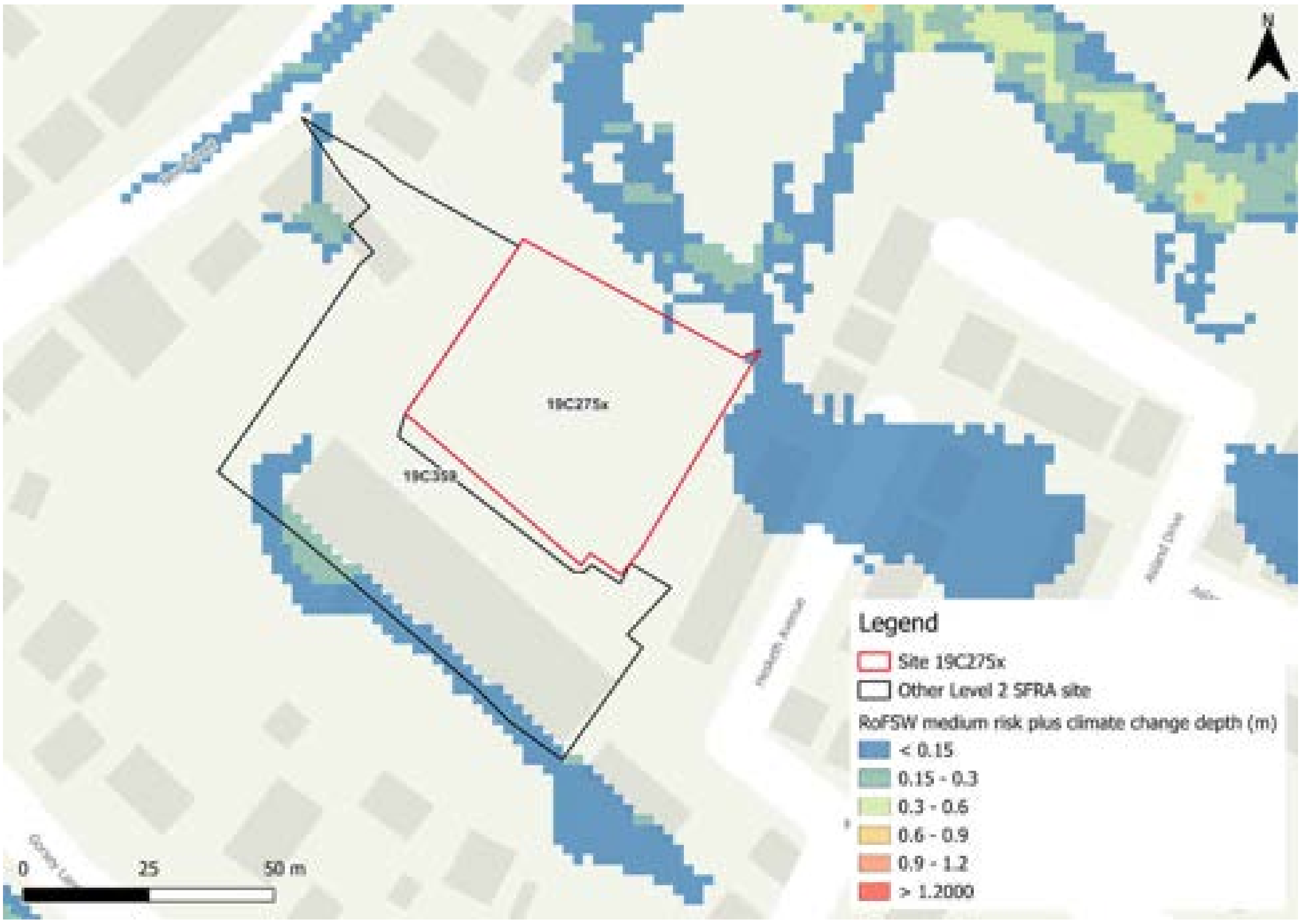

Figure 93-3: High risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 93-4: High risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

93.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with 99% of the site being at very low risk. Surface water risk in the low risk event is confined to limited areas that marginally impinge on the northwestern corner of the site.
- The effects of climate change on surface water have been modelled for this SFRA using high-risk surface water flood depths plus 40% climate change. In this event, surface water risk is seen to occur in a limited area on the northeastern corner of the site in a similar manner to the present-day low risk event.
- Based on available information, safe access and escape routes are viable in all events via Hesketh Avenue and New Street. However, these are noted to inundate with shallow floodwater of low hazard rating, and this should be accounted for in the site FRA.
- The Groundwater Flood Map (Figure 4-1) indicates that the ground conditions at this site may be suitable for infiltration SuDS. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- The Council highways department should be consulted, along with United Utilities and the LLFA regarding existing highway drainage networks, surface water

sewers and LLFA assets, and whether increased capacities may be required to enable sustainable development in the long term.

- 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 or evidence.

94 Risk from groundwater emergence

Flood risk from groundwater sources 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 Guide[61]. Figure 4-1 show the map for Site 19C275x and the surrounding areas and Table 94-1 explains the risk classifications.

As seen in Figure 4-1, the site is in an area where there is no groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS across the site.

Figure 94-1: JBA 5m Groundwater Emergence Map

61 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 94-1: Groundwater Flood 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.	

95 Overall site assessment

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

The site is not required to pass part b) of the exception test[62] as it is located within Flood Zone 1. However, it must still be proven that development can be safe for its lifetime, which is 100 years for residential development.

95.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be possible to allocate this site.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

62 Para 178 National Planning Policy Framework 2024

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97.1 Site 19C277x

- Location: West of M61 - Land North of Hill Top Farm
- Existing site use: Greenfield, Open Space
- Existing site use vulnerability: Water Compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More Vulnerable
- Site area: 4.816 hectares
- Proposed development impermeable area: 4.094 hectares (assumed 85% impermeable area)
- Summary of requirements from scoping stage:
- Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
- Assessment of surface water flood depths and hazards
- Modelling of latest Environment Agency (EA) climate change allowances for peak rainfall intensities

Figure 97-1: Existing site location boundary

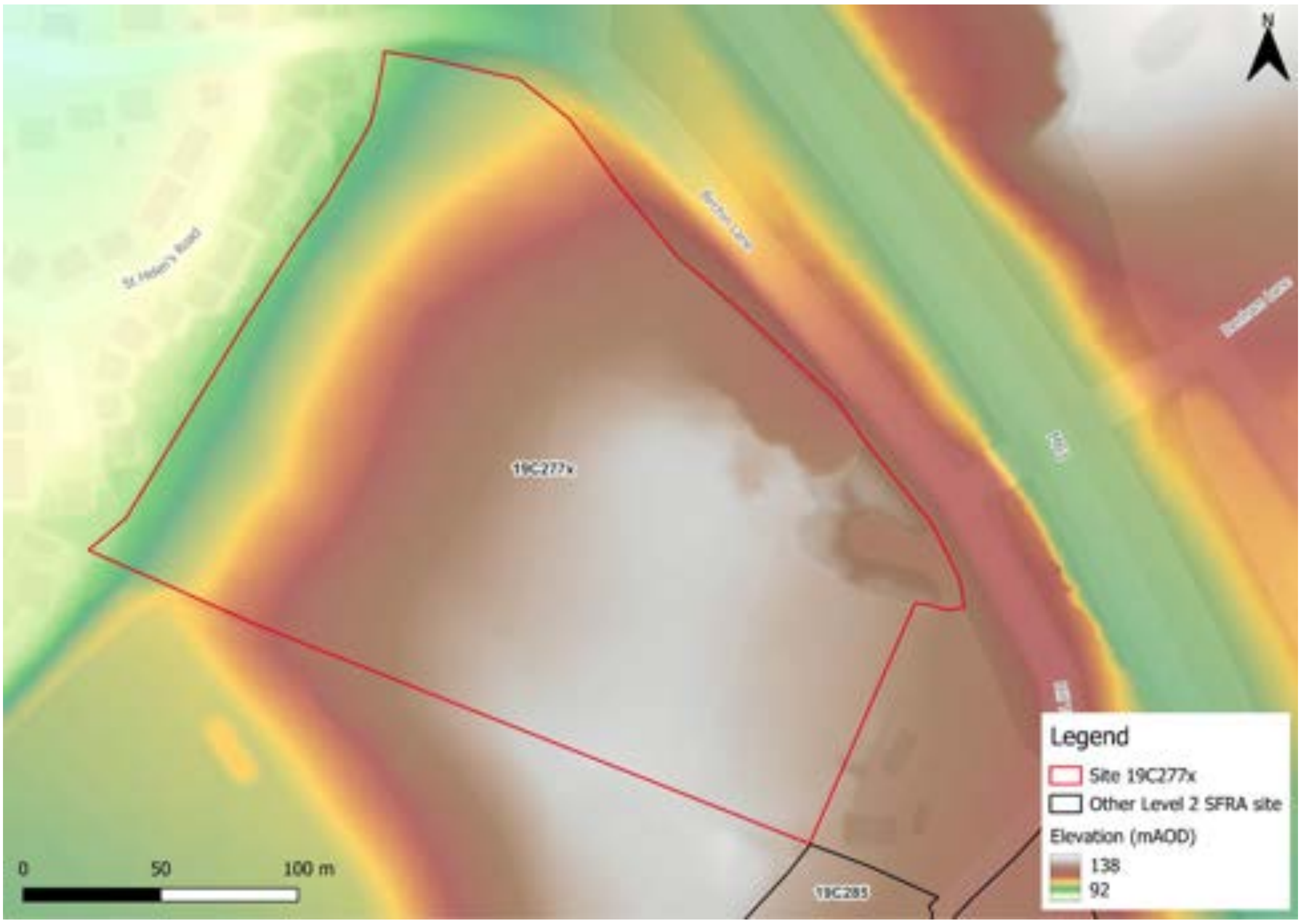


Figure 97-2: Topography

98 Flood risk from rivers

98.1 Existing risk

98.1.1 Flood Map for Planning and functional floodplain

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

The entire site can be seen to lie within Flood Zone 1 indicating a low risk of flooding from rivers, as seen in Figure 97-1.

Table 98-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 98-1: Existing risk from rivers to the site

98.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

98.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development, Site 19C277x is located within one catchment, namely, Lostock US Farington Weir. The site is ranked as being within a 'Medium' sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance.
- Developments should be incentivised to provide wider betterment by demonstrating in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments should achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

98.2.2 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. Within the West and Northwest of the site, there are opportunities for tree planting in the wider catchment which can intercept, slow, store and filter water. In addition, to the southwest of the site, there is opportunity for run-off attenuation to reduce peak surface flow volumes in the 3.3% and 1% AEP events. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 98-2. However, the WwNP dataset is indicative and further investigation into suitability of the site for tree planting should be carried out.

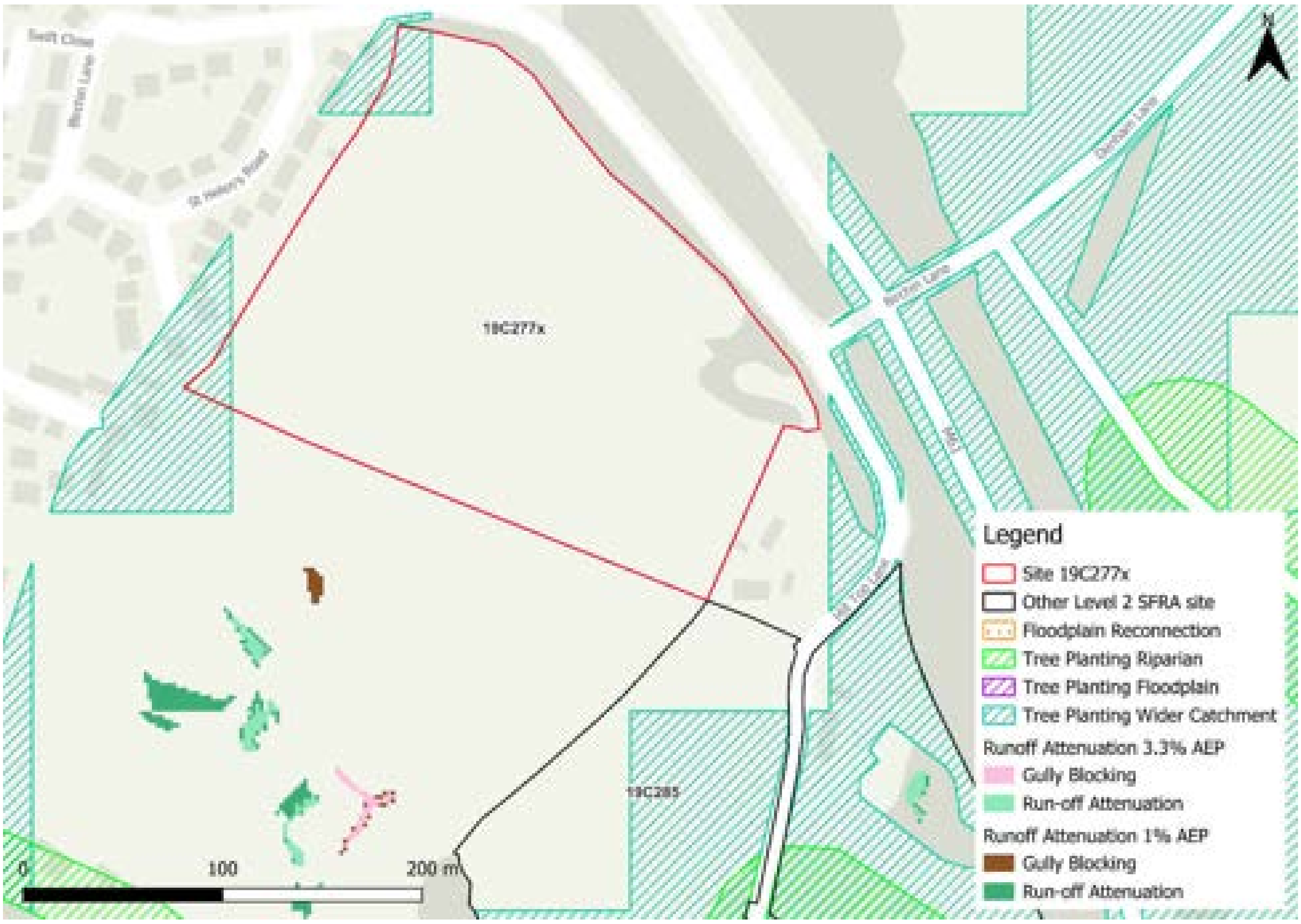


Figure 98-2: Natural Flood Management (NFM) potential mapping

98.3 Residual risk

98.3.1 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. 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 not modelled to be at risk from reservoir flooding.

98.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

98.5 Flood warning and access and escape routes

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. Site 19C277x 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. The site is not located within a FAA.

Safe access and escape routes would be achieved through Birchin Lane and Hill Top Lane in all events.

98.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The entire site is located within Flood Zone 1 indicating that it is at low risk of flooding from rivers. There are therefore no constraints to development at the site with respect to flood risk from rivers.
- The site is not located within a flood warning zone and Safe access and escape routes could likely be achieved via multiple routes surrounding the site, based on available information.

99 Flood risk from surface water

99.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water flood risk to the site is predominantly very low. Approximately 1% of the site is within the low-risk surface water flood zone, as shown in Table 99-1.

In the high and medium risk events, floodwaters are not shown to occur within the site boundary. In the low-risk event, surface water can be seen to pool in the western corner of the site.

Greatest flood depths in the low-risk event are seen in excess of 1.2m at this location of surface water ponding, as seen in Figure 3-1. This area of high depth is coincident with hazards categorised as significant, as seen in Figure 3-2.

Table 99-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
99	1	0	0

-

In the low-risk event, surface water risk is confined to an area of topographic depression within the west of the site. Greatest floodwater depths in the low-risk event range from in excess of 1.20 m to 0.15 - 0.30 m in depth at this location. Hazard levels are shown in Figure 3-2 to be of significant hazard in this area.

Based on available information, safe access and escape routes remain viable at Birchin and Hill Top Lane in all events.

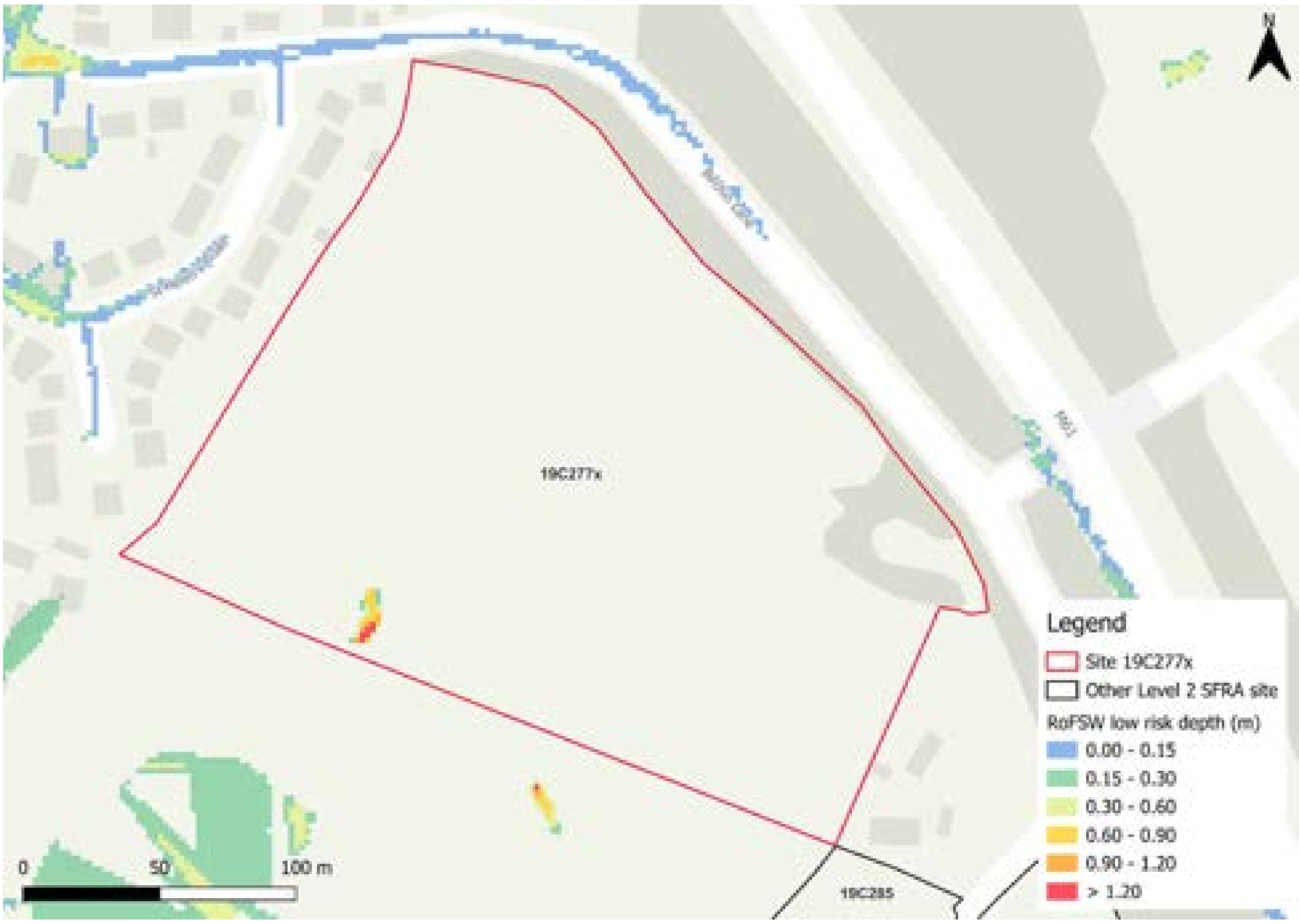
- 

Figure 99-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

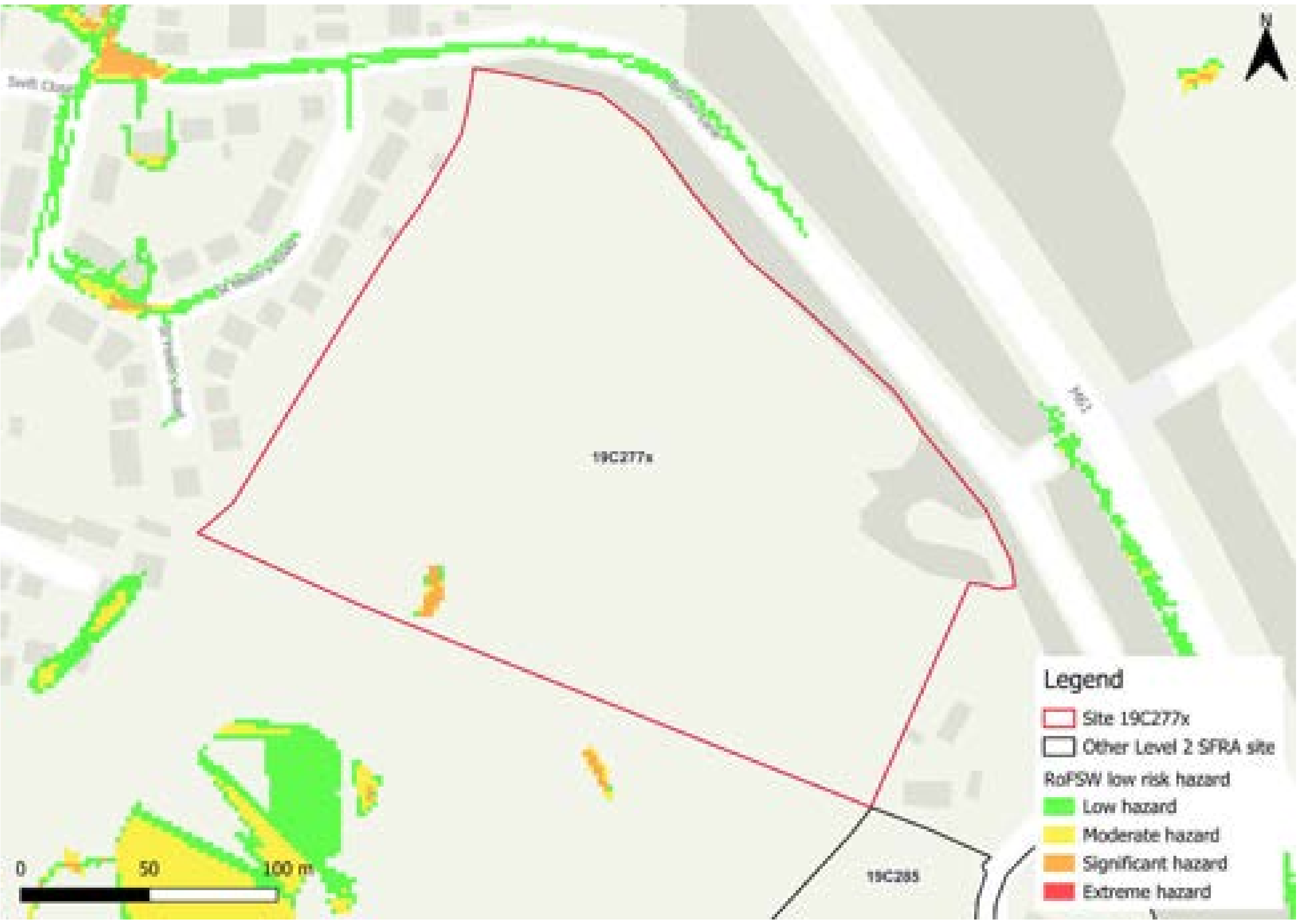


Figure 99-2: Low risk event surface water flood hazard[63] (Risk of Flooding from Surface Water map)

99.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 99-2.

Table 99-2: Modelled climate change allowances for rainfall for the Douglas Management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

63 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

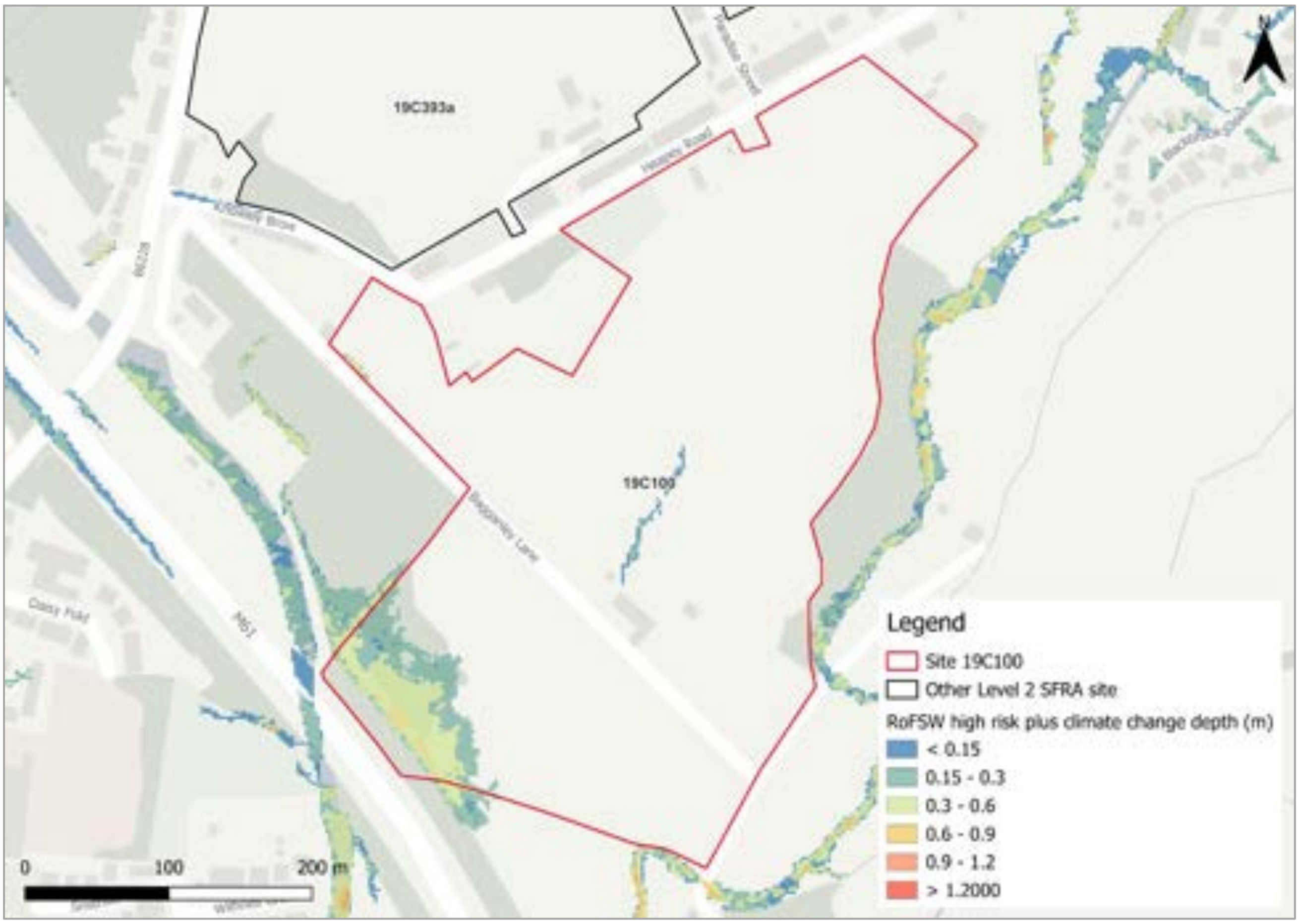


Figure 3-3 shows the medium-risk surface water flood depths plus 50% climate change. Risk is modelled to be similar to present day conditions, with the medium risk climate change event being similar in extent to the present-day low risk event.

Maximum flood depths are modelled to be > 1.2 m in the topographic depression where surface water ponding occurs, with this area indicated to be of significant hazard (Figure 3-4). Risk is shown to be constrained by the area of topographic depression at the site.

Figure 99-3: Medium risk event surface water flood depths plus 50% climate change (based on Risk of Flooding from Surface Water map). As the upper end allowance for the 2070s of 45% for the management catchment was not available at this location, an uplift of 50% was used as a conservative measure.

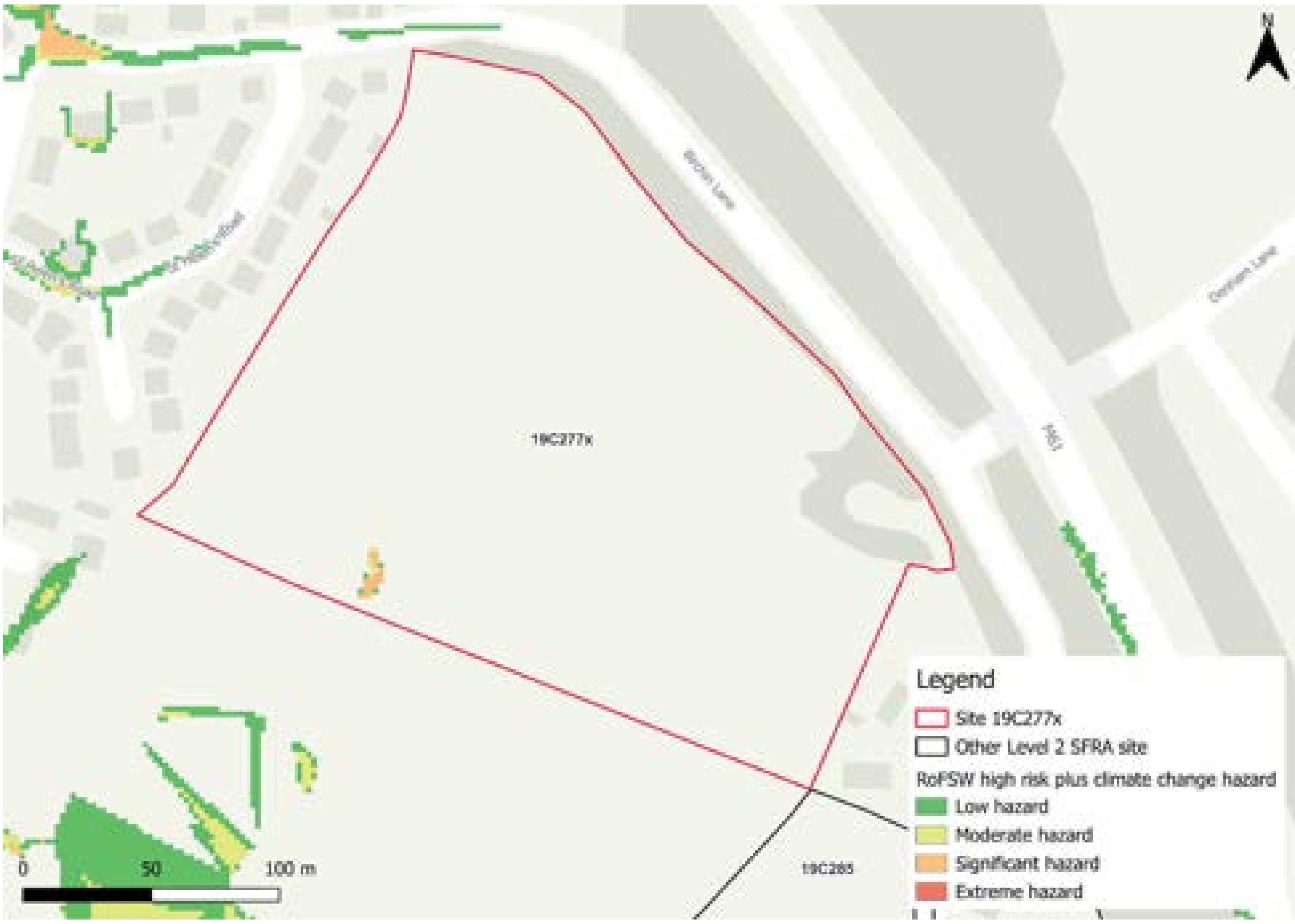


Figure 99-4: High risk event surface water flood hazards plus 40% climate change (based on Risk of Flooding from Surface Water map). As the upper end allowance for the 2070s of 45% for the management catchment was not available at this location, an uplift of 50% was used as a conservative measure.

99.3 Observations, mitigation options and site suitability - Surface Water

- Current risk to the site is predominantly very low, with 99% of the site being at very low surface water flood risk. Surface water risk in the low-risk event is confined to one small area of ponding within a topographic low point in the western corner of the site.
- The modelled medium risk climate change outputs indicate a similar extent in risk to the low-risk present day event, with an expanded area of ponding emerging at the location of topographic depression.
- The Groundwater Emergence Map (Figure 4-1) indicates that the majority of the site is at risk from groundwater emergence and conditions may only be suitable for infiltration SuDS in parts of the northwest of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Any drainage plan should look to assess possible benefits that may be had from designing solutions that that work in conjunction with the adjacent site at 19C285.
- Based on available information, safe access and escape routes should be achievable via multiple routes in all events.

- The Council highways department should be consulted, along with United Utilities and the LLFA regarding existing highway drainage networks, surface water sewers and LLFA assets, and whether increased capacities may be required to enable sustainable development in the long term.
- 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 or evidence.

100 Risk from groundwater

Risk to the site from 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 Guide[64]. Figure 4-1 shows the map for Site 19C277x and the surrounding areas whilst

64 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 4-1 explains the risk classifications.

The majority of the site is within an area where there is a risk of groundwater emergence to both surface and subsurface assets. Locations along the central and southern areas of the site can be seen where groundwater may emerge at significant rates and may have the capacity to flow overland and/or pond within any topographic low spots. Ground investigation will be required through the site-specific FRA to ascertain groundwater levels and conditions.

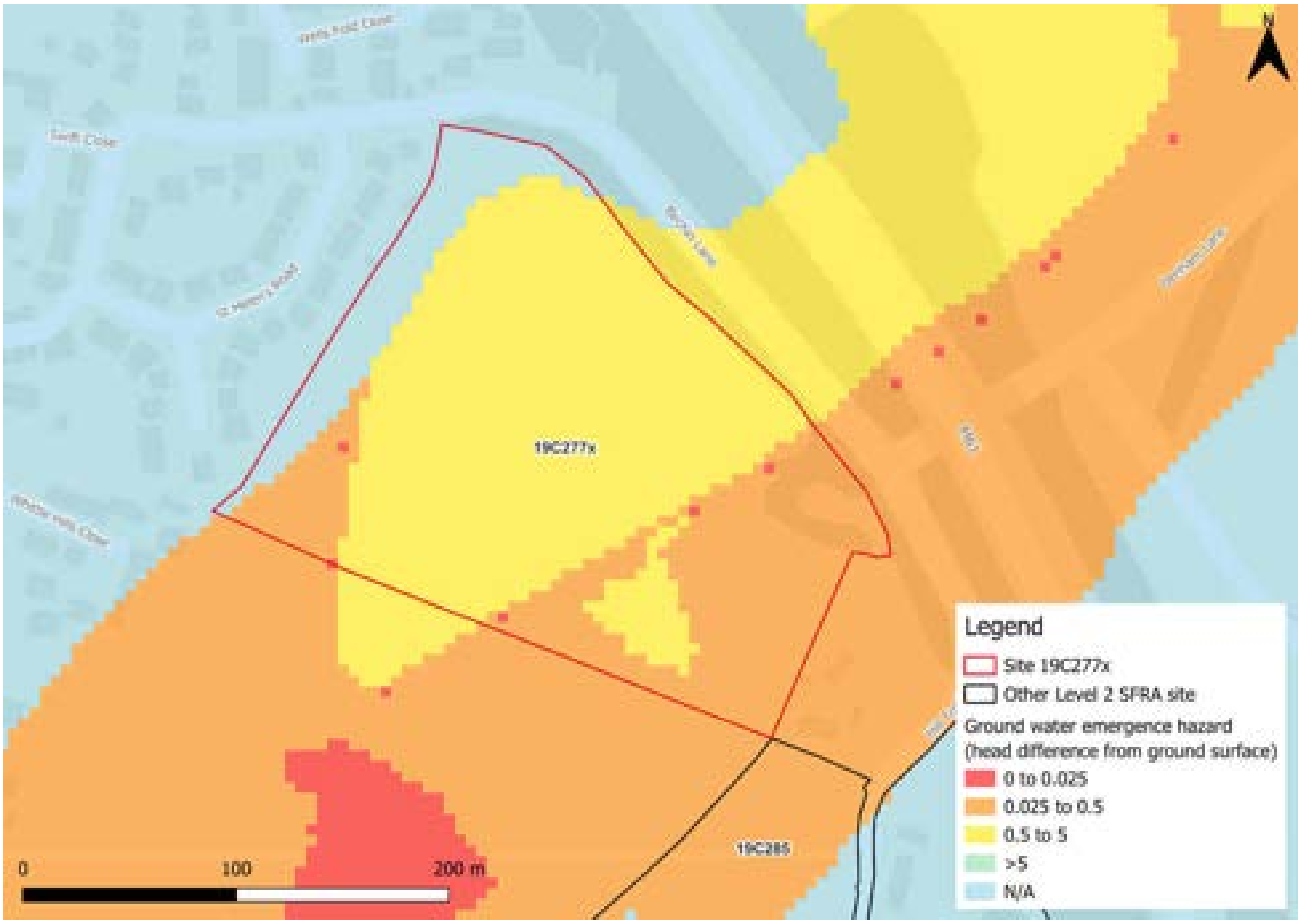


Figure 100-1: JBA 5m Groundwater Emergence Map

Table 100-1: Groundwater Flood 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.	

101 Overall site assessment

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

The site is not required to pass part b) of the exception test[65], as it is located within Flood Zone 1. However, it must still be proven that development can be safe for its lifetime, which is 100 years for residential development.

101.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- It should be appropriate to develop this site for more vulnerable uses. A limited area of the site is shown to be at flood risk in the low-risk climate change event, however this area should be able to be avoided in development layout plans.
- A drainage strategy will be required to manage surface water flood risk. Site runoff should be maintained at greenfield rates and, where possible, betterment should be achieved.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Ground investigation will be required through the site-specific FRA to ascertain groundwater levels and conditions, with the majority of the site shown to be at risk from groundwater emergence. Infiltration based SuDS may be viable in the northwest area of the site.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

65 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C283x

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0018-S3-P02-Level_2_SFRA_19C283x
Revision	P02
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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Dominic Richardson of JBA Consulting carried out this work.

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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. Information obtained by JBA has not been independently verified by JBA, unless otherwise stated in the Report.

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 August 2024 and February 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.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

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Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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Copyright

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103 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C283x. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

103.1 Site 19C283x

- Location: Land at Drinkwater Farm, Windsor Drive
- Existing site use: Open space with car parking
- Existing site use vulnerability: Less Vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More Vulnerable
- Site area: 0.434 hectares
- Proposed development impermeable area: 0.369 hectares (assumed 85% impermeable area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
- Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
- Assessment of surface water flood depths and hazards
- Modelling of latest Environment Agency (EA) climate change allowances for peak rainfall intensities

Figure 103-1: Existing site location boundary

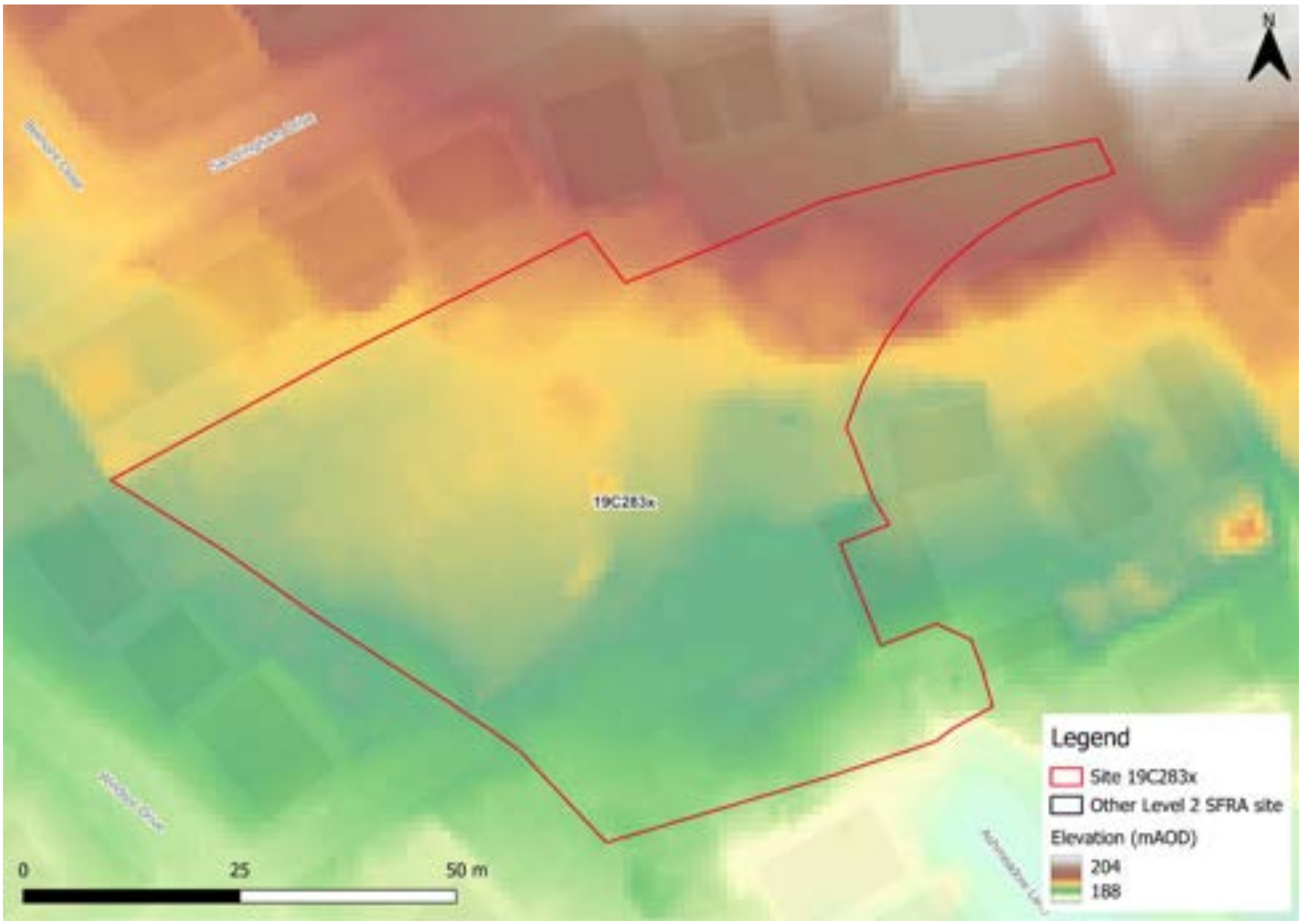

Figure 103-2: Topography

104 Flood risk from rivers

104.1 Existing risk

104.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk of flooding from rivers.

Table 104-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 104-1: Existing risk from rivers to the site

104.2 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

104.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C283x is located within one catchment, namely; Yarrow US Big Lodge Water. This is ranked as a medium sensitivity catchment. Planning policy considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance
- Developments should be incentivised to provide wider betterment by being requested to demonstrate in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

104.2.2 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. To the northeast of the site, there are opportunities for tree planting in the wider catchment which can intercept, slow, store and filter water. These areas are seen in Figure 104-2.

Figure 104-2: Natural Flood Management (NFM) potential mapping

104.3 Residual risk

104.3.1 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. 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 not modelled to be at risk from reservoir flooding.

104.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

104.5 Flood warning and access and escape routes

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. Site 19C283x 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. The site is not located within a FAA.

Based on available information, safe access and escape routes could likely be achieved during a flood event via multiple routes surrounding the site.

104.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The Site is located entirely within Flood Zone 1, indicating that the site is at low risk of flooding from rivers.
- Safe access and escape routes could likely be achieved via multiple routes surrounding the site, based on available information.

105 Flood risk from surface water

105.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, the flood risk from surface water is indicated to be very low to the entire site, as shown in Table 105-1.

As the entire site is at very low flood risk, there is no associated hazard rating shown within the site, as shown on Figure 3-2

Based on available information, safe access and escape routes should be available from Sandringham Drive, although this is shown to inundate with a low to moderate hazard level in some areas.

Table 105-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
100	0	0	0

Figure 105-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 105-2: Low risk event surface water flood hazard[66] (Risk of Flooding from Surface Water map)

66 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

105.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 105-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	45%

As the upper end allowance of 45% for the site area was not available within modelling, a 50% uplift was assessed as a conservative measure of flood risk. Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

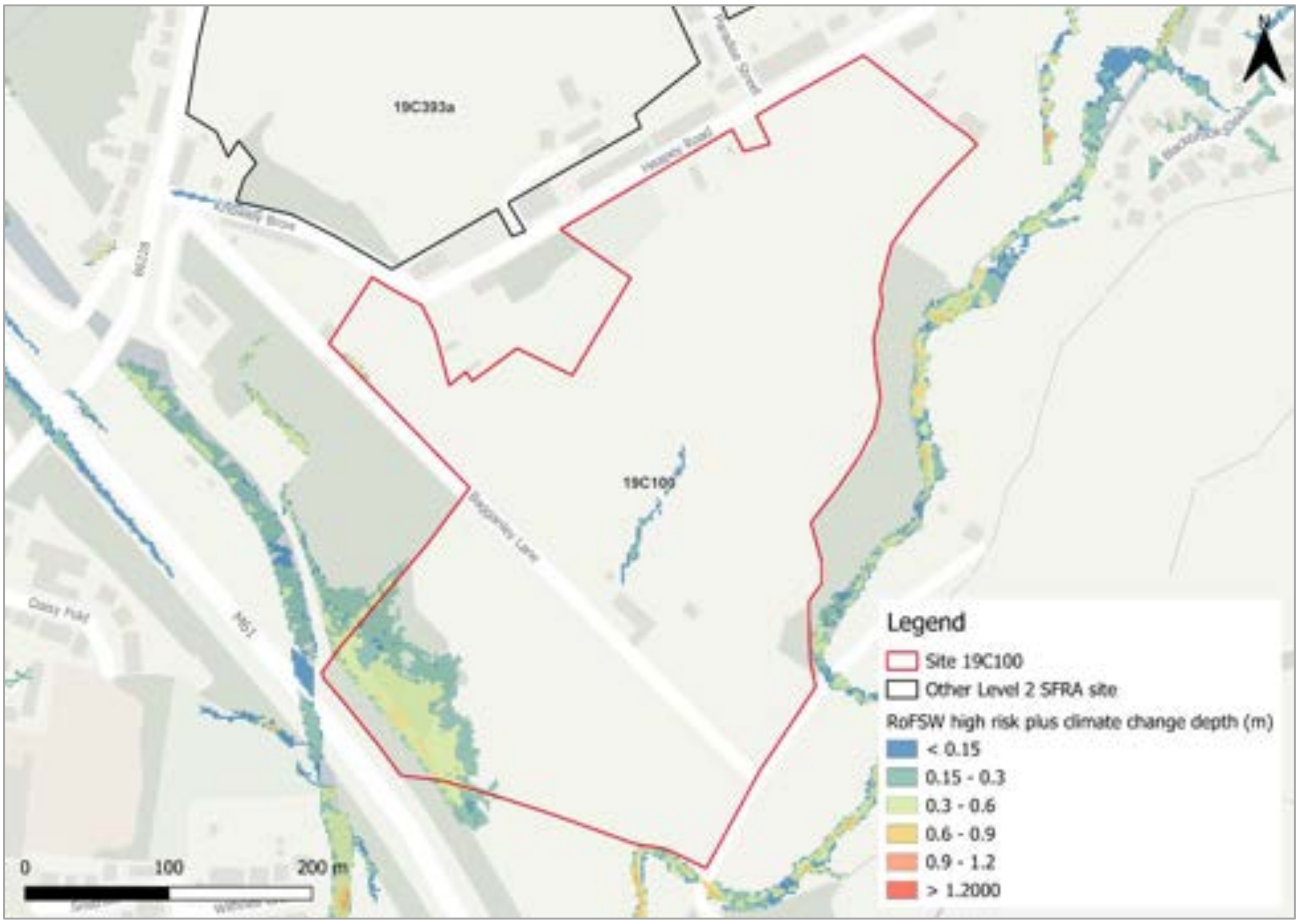

Figure 3-3 shows this modelled flood risk for the medium risk +50% climate change event. Risk is modelled to be greater in extent with the floodwater flow path from Ashmeadow Lane extending into the southeast corner of the site. This limited area of surface water is coincident with a 'low' hazard rating, as shown in Figure 3-4.

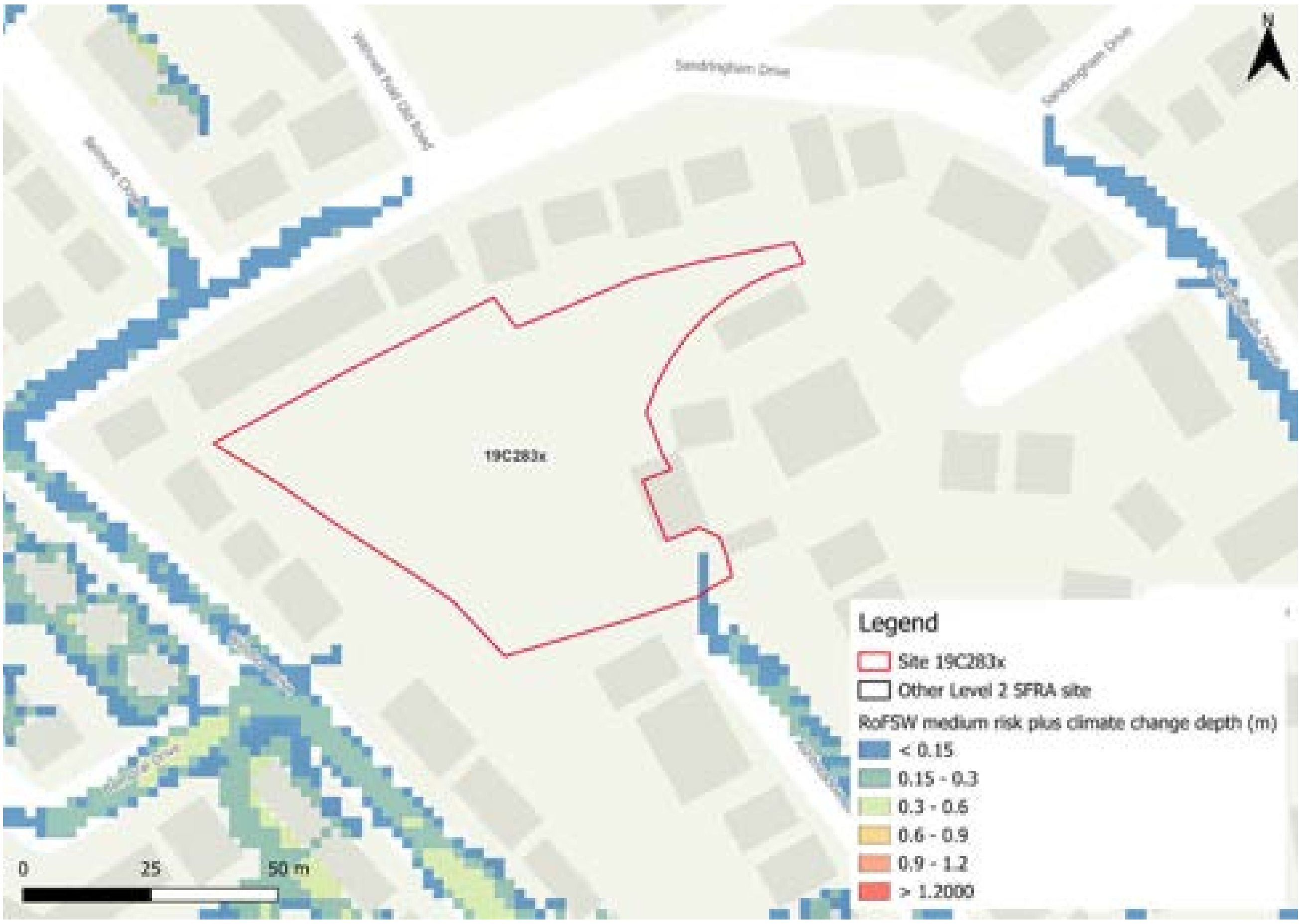

Figure 105-3: Medium risk event surface water flood depths plus 50% climate change (based on Risk of Flooding from Surface Water map). The Douglas catchment's rainfall uplift of 45% was not available in the settlement 19C283x area, and therefore the 50% climate change value was taken forward as a conservative measure.

Figure 105-4: Medium risk event surface water flood hazards plus 50% climate change (based on Risk of Flooding from Surface Water map). The Douglas catchment's rainfall uplift of 45% was not available in the settlement 19C283x area, and therefore the 50% climate change value was taken forward as a conservative measure.

105.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site from surface water flooding is minimal, with the entire site indicated to be at very low risk of flooding in the present-day scenario. Safe access and escape routes are achievable via Ashmeadow Lane and Windsor Drive although these routes are shown to partially inundate with a low hazard rating in a low-risk present-day flood extent.
- The medium risk modelled climate change outputs indicate increased extents in areas around the site, with one instance of surface floodwater extending into the southeast corner of the site.
- Details relating to existing highways drainage may need to be sought in order to ascertain the nature of flood risk to access and escape routes.
- Note, 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 or evidence.
-

106 Risk from groundwater

Risk from groundwater sources 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 Guide[67]. Figure 4-1 show the map for Site 19C283x and the surrounding areas and Table 106-1 explains the risk classifications.

The entirety of the site is in an area where there is no groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS.

Figure 106-1: JBA 5m Groundwater Flood Map

67 [Strategic flood risk assessment good practice guide. ADEPT. December 2021.]

Table 106-1: Groundwater Flood 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.	

107 Overall site assessment

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

This site is not required to pass part b) of the exception test[68] as it is located in Flood Zone 1. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

107.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on current information, it should be possible to allocate this site given that it is at low risk of flooding from all sources of flood risk.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

68 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C285

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0017-S3-P02-Level_2_SFRA_19C285
Revision	P02
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Authorised by	Krista Keating BSc MSc CEnv CSci MCIWEM C.WEM Associate Director

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JBA Project Code	2023s1344

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Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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109 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C285. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

109.1 Site 19C285

- Location: Hill Top Farm
- Existing site use: Housing and open space
- Existing site use vulnerability: More Vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More Vulnerable
- Site area: 4.613 hectares
- Proposed development impermeable area: 3.921 hectares (assumed 85% impermeable area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
- Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
- Assessment of surface water flood depths and hazards
- Modelling of latest Environment Agency (EA) climate change allowances for peak rainfall intensities

Figure 109-1: Existing site location boundary

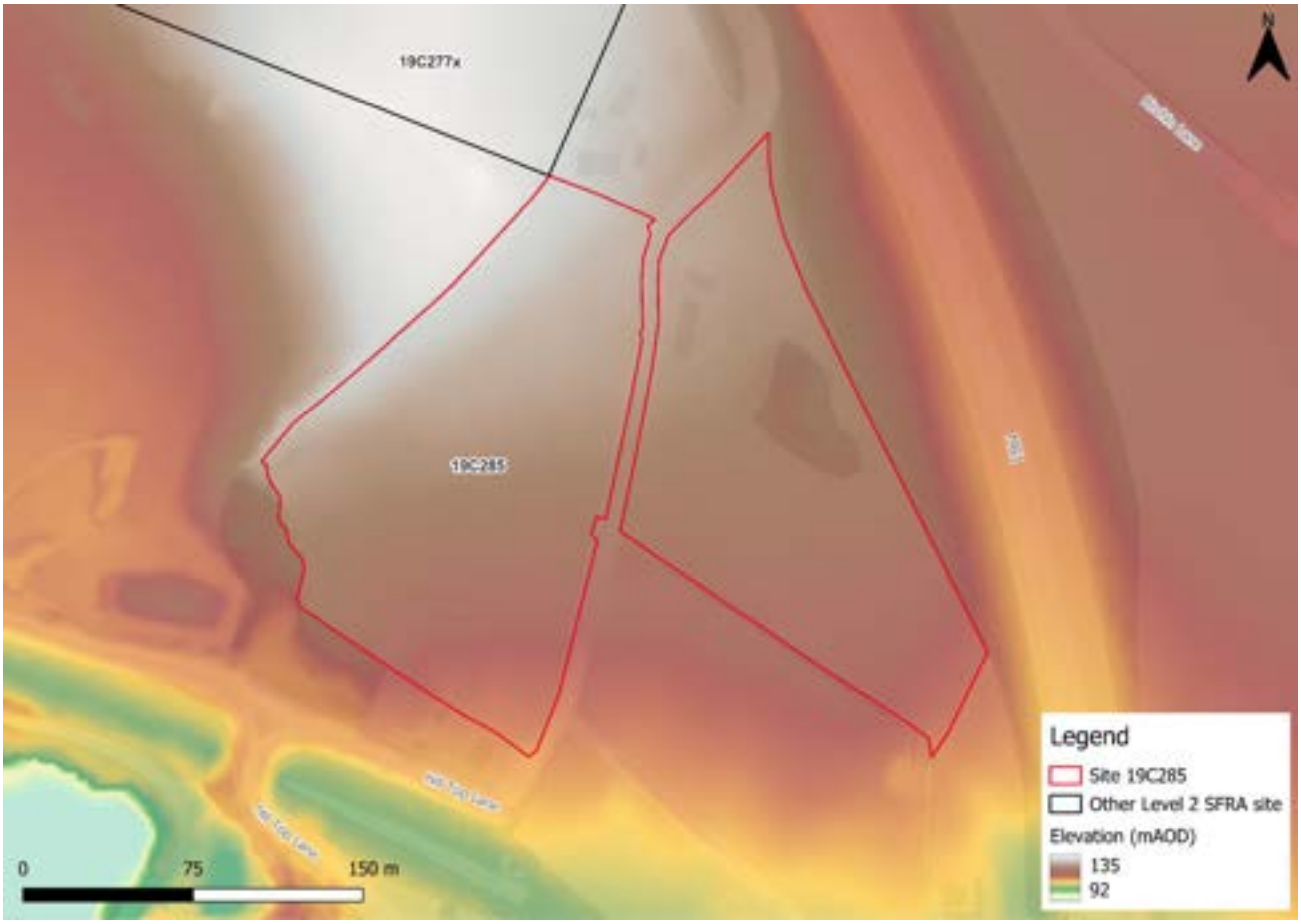

Figure 109-2: Topography

110 Flood risk from rivers

110.1 Existing risk

110.1.1 Flood Map for Planning and functional floodplain

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

The entire site is located in Flood Zone 1 indicating that it is at low risk of flooding from rivers.

Table 110-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 110-1: Existing risk from rivers to the site

110.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset. It is however noted that the site is located within an area of naturally higher ground level.

110.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA, which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C285 is located within one catchment, namely, Lostock US Farington Weir. This is ranked as a medium sensitivity catchment. Planning policy considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance
- Developments should be incentivised to provide wider betterment by being requested to demonstrate in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

110.2.2 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. Within the site as well as both up and downstream of the site, there are opportunities for tree planting in the wider catchment which can intercept, slow, store and filter water. There is also potential for riparian tree planting, which can slow flows, reduce sediment delivery to watercourses and reduce bankside erosion. In addition, areas within the eastern spur of the site are shown to be suitable for Run-off attenuation to reduce peak surface flow volumes in the 3.3% AEP event. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 110-2. However, the WwNP dataset is indicative and further investigation into suitability of the site for tree planting should be carried out.

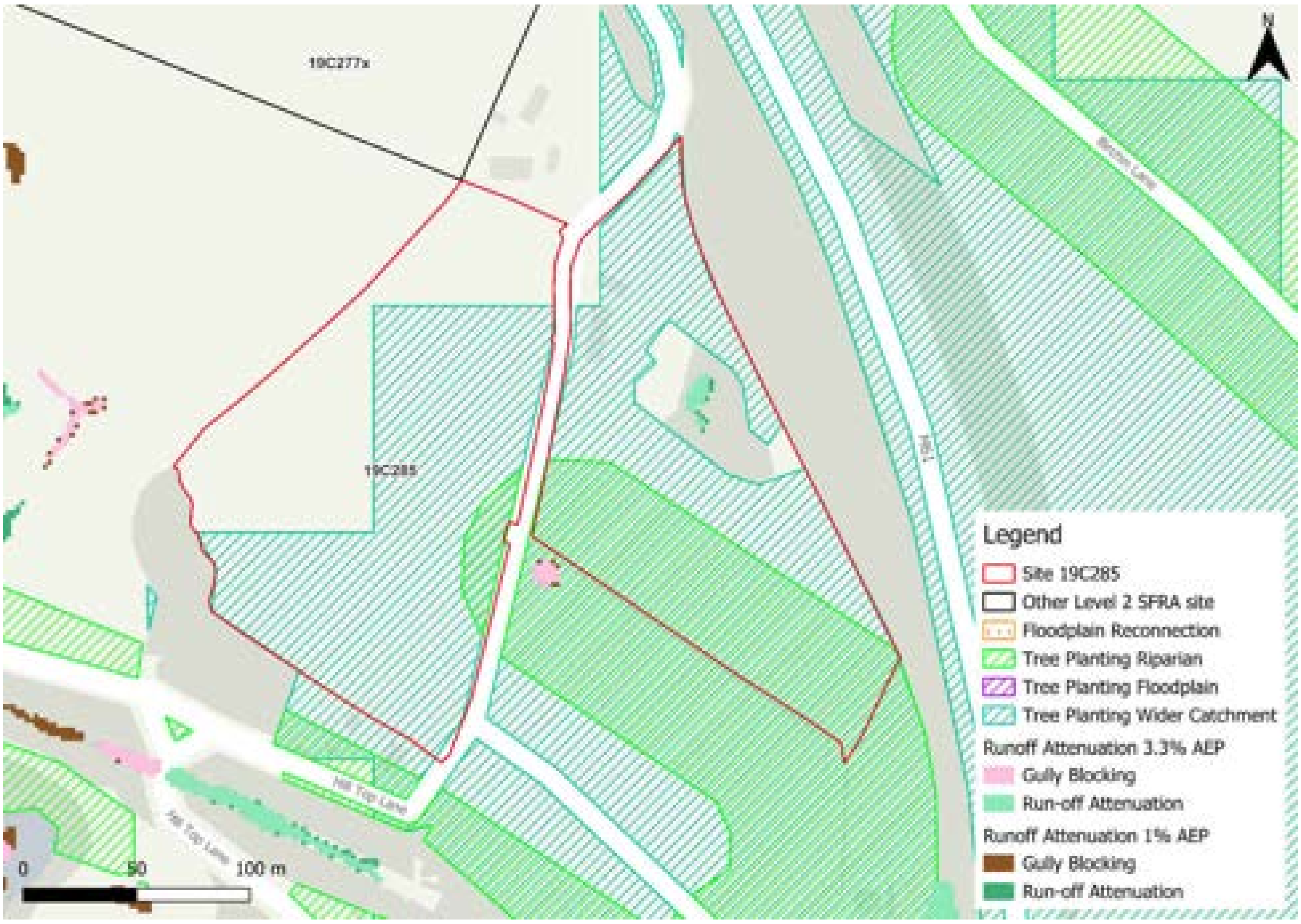

Figure 110-2: Natural Flood Management (NFM) potential mapping

110.3 Residual risk

110.3.1 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. 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 not modelled to be at risk from reservoir flooding.

110.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

110.5 Flood warning and access and escape routes

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. Site 19C285 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. The site is not located within a FAA.

Based on available information, safe access and escape routes could likely be achieved during a flood event via multiple routes surrounding the site.

110.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see no change in risk classification, maintaining the 'More Vulnerable' status, according to the NPPF.
- The site is located entirely within Flood Zone 1 which indicates a very low risk of flooding from rivers. This provides no constraints to future development.
- Safe access and escape routes could likely be achieved via multiple routes surrounding the site, based on available information.

111 Flood risk from surface water

111.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water flood risk to the site is predominantly very low, with 97% of the site at very low surface water flood risk. Approximately 1% of the site is within the high-risk surface water flood zone. A further 1% is at medium surface water risk and another 1% is observed to be at low surface water risk, as shown in Table 111-1.

In the high, medium and low risk events, surface water is confined to ponding in a topographic depression in the eastern spur of the site. In the low-risk event, the ponding is observed to expand in size and is greater in depth.

Greatest flood depths within the high-risk event are between 0.6 m and 0.9 m (Figure 3-1), located within the area of ponding in the east of the site. This area is coincident with hazards categorised as moderate (Figure 3-2).

Safe access and escape route should be possible via Hill Top Lane which runs to the south and through the centre of the site.

Table 111-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
97	1	1	1

•


Figure 111-1: High risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 111-2: High risk event surface water flood hazard[69] (Risk of Flooding from Surface Water map)

69 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

111.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 111-2: Modelled climate change allowances for rainfall for the Douglas Management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

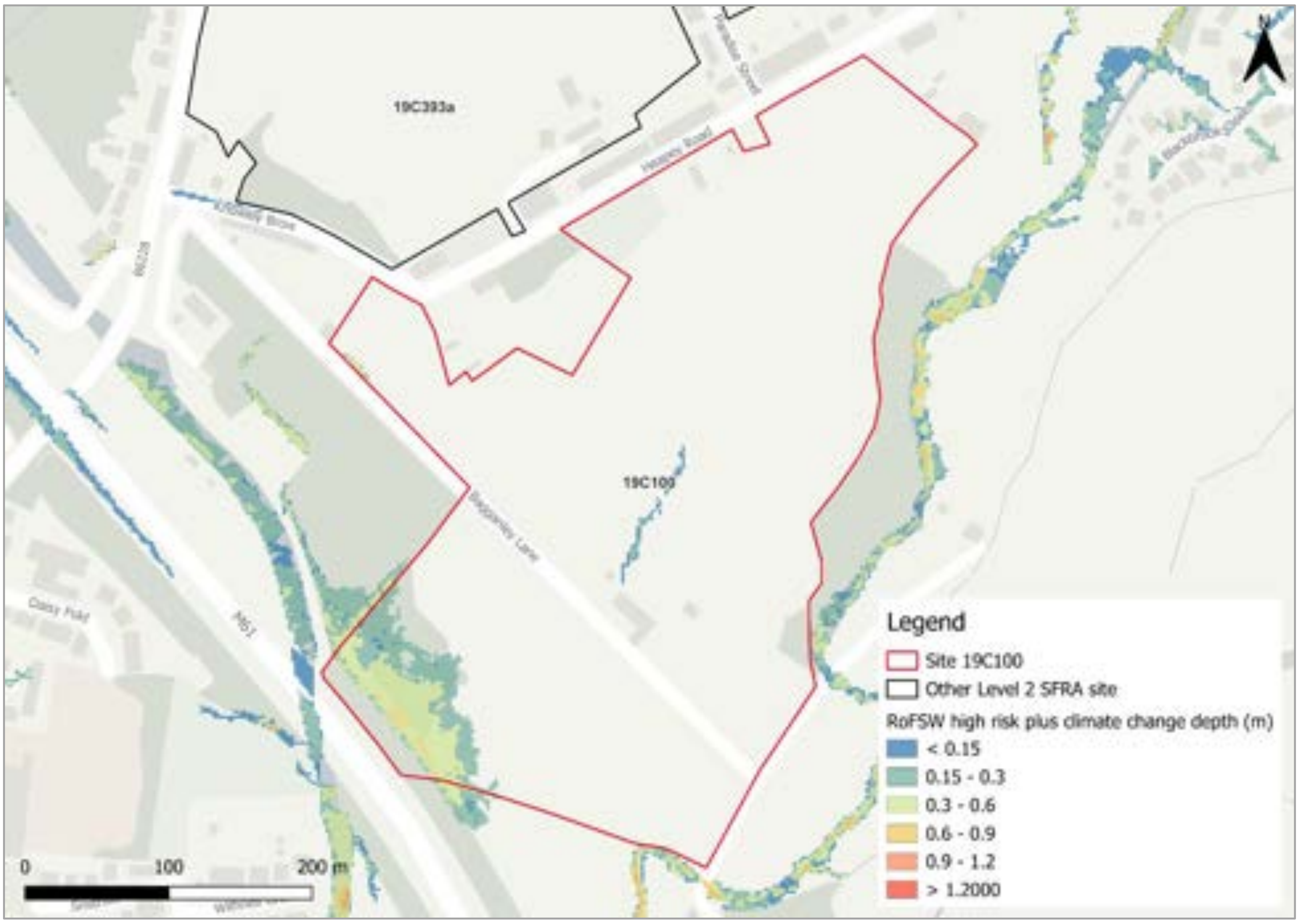

Figure 3-3 shows the medium risk surface water flood depths plus 45% climate change. Risk is modelled to be greater than present day conditions, with the high-risk climate change event being similar in extent to the present-day medium risk event.

Maximum flood depths are modelled to be approximately 0.8 m, these depths are coincident with an area of significant flood hazard (Figure 3-4).

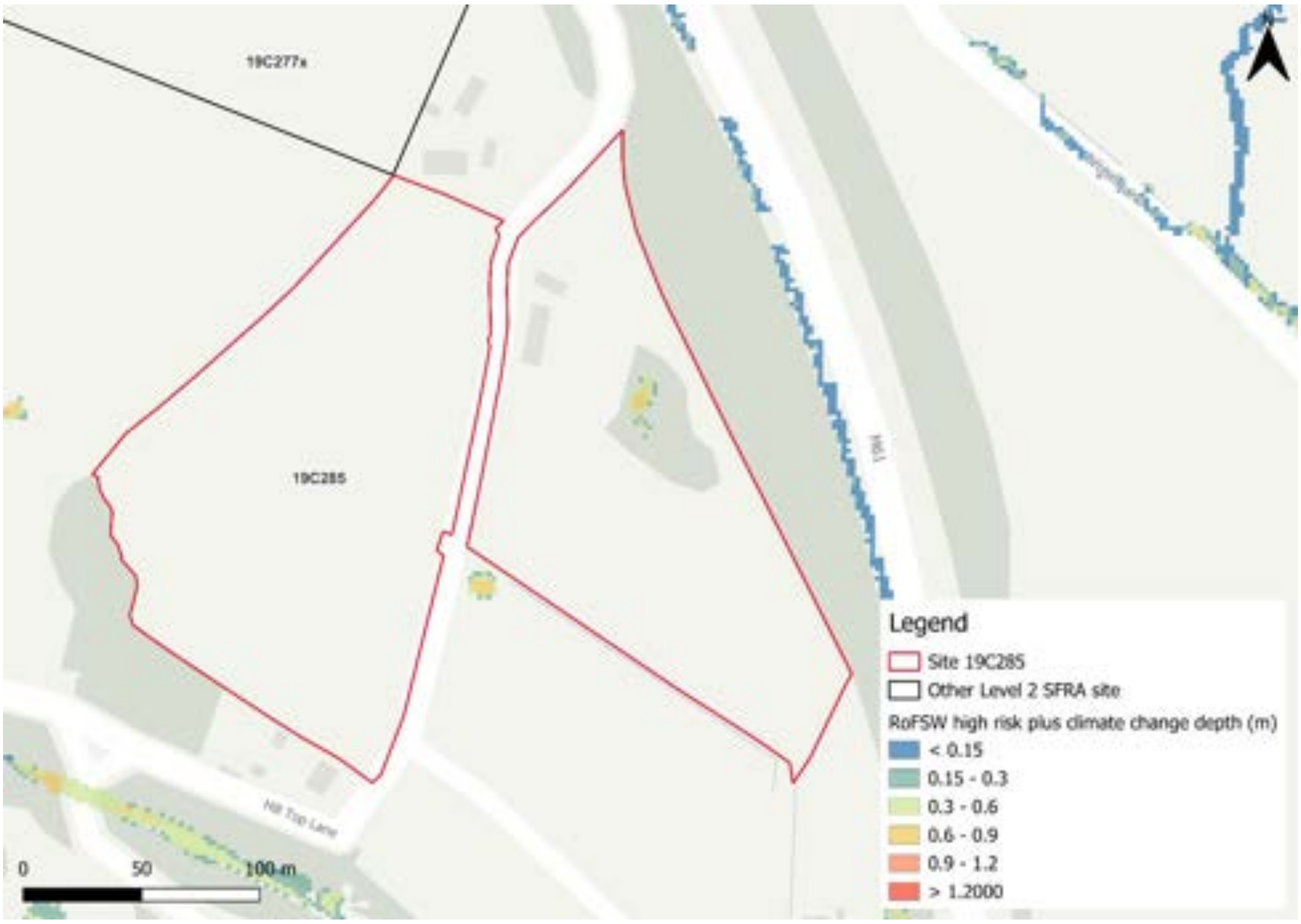

Figure 111-3: High risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

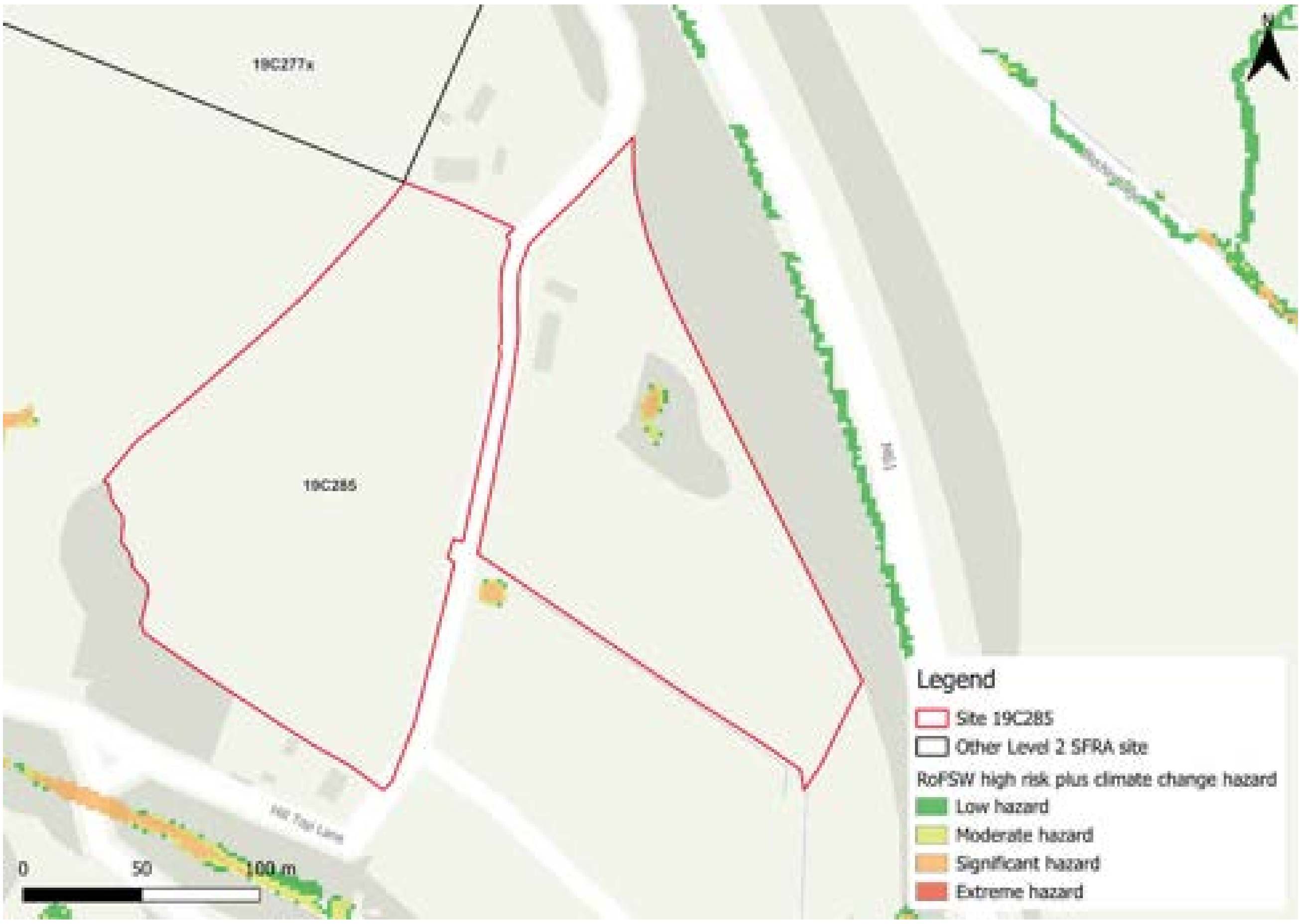

Figure 111-4: High risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

111.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low with approximately 97% of the site being at very low risk. Surface water risk in the high and medium risk events is confined to ponding within a topographic low spot located in the east of the site.
- The modelled high risk climate change outputs indicate a similar extent risk to the present-day medium risk event, with flooding confined to the same topographic low point in the site but expanding in area and increasing in depth. Any existing topographic depressions should be maintained in site design.
- The Groundwater Emergence Map (Figure 4-1) indicates that the ground conditions may be suitable for infiltration SuDS in the majority of the eastern section of the site as well as some areas of the west of the site. The northwestern area of the site is however indicated to have a greater risk of groundwater emergence. This should be further explored through an appropriate ground survey as part of the FRA and drainage strategy.
- Safe access and escape routes should be achievable via Hill Top Lane in all events.

- Note, 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 or evidence.
-

112 Flood risk from groundwater

Risk from groundwater sources 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 Guide[70]. Figure 4-1 shows the map for this site and the surrounding areas and Table 112-1 explains the risk classifications.

Areas in the western section of the site are indicated to be in an area where there is a risk of groundwater flooding to both surface and subsurface assets. In these areas, as well as along the northern border of the eastern section of the site, groundwater may emerge at significant rates with the capacity to flow overland and/or pond within any topographic low spots. However, the majority of the eastern section of the site and parts of the western area are indicated to be at no risk of groundwater emergence. In these areas groundwater conditions may be suited to infiltration SuDS. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions.

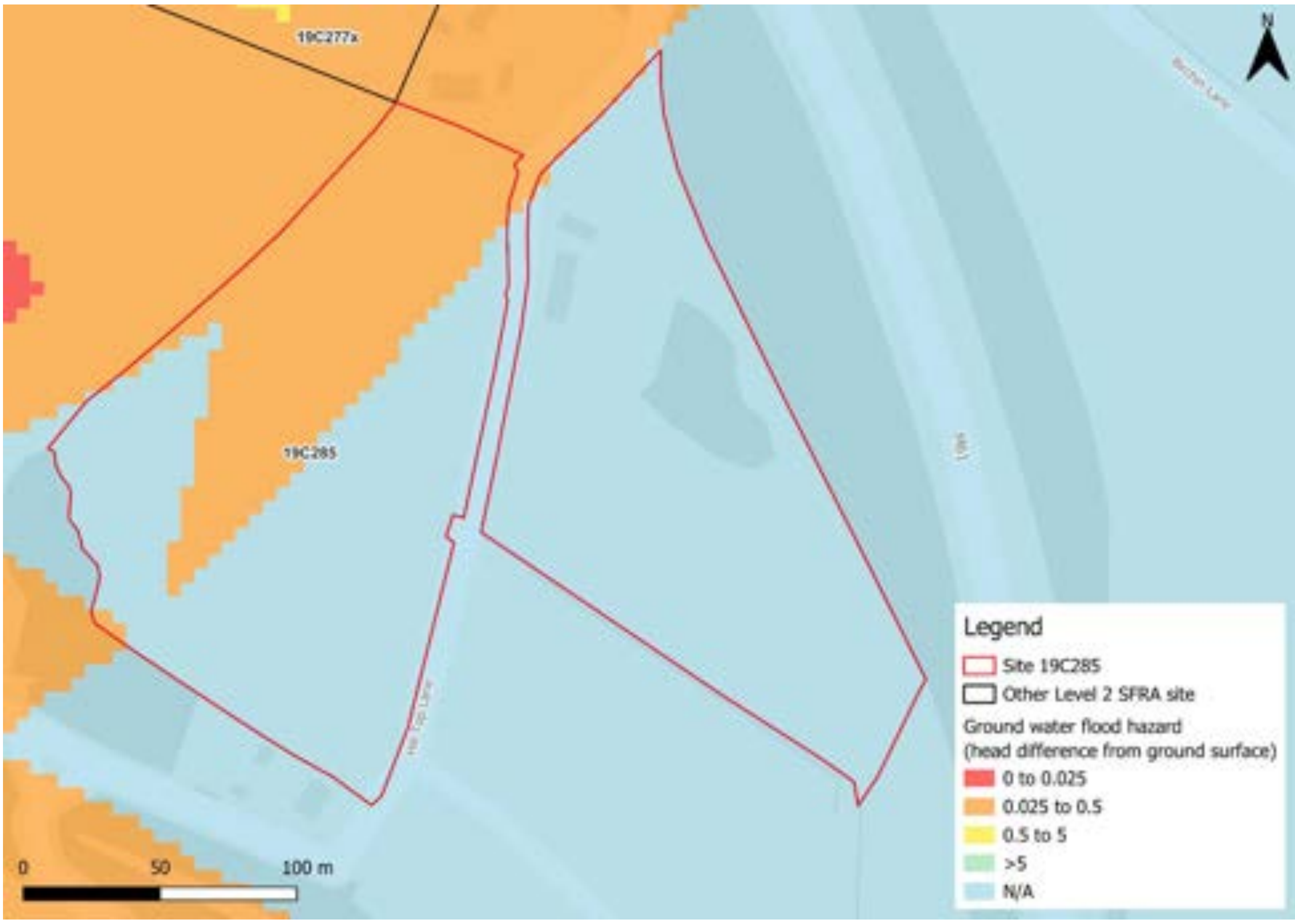

Figure 112-1: JBA 5m Groundwater Flood Map

70 [Strategic flood risk assessment good practice guide. ADEPT. December 2021.]

Table 112-1: Groundwater Flood 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.	

113 Overall site assessment

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

The site is not required to pass part b) of the exception test[71], as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

113.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on current information, this site could be allocated if development avoids a topographic low point at risk of surface water ponding in the east of the site.
- Ground conditions particularly in the northwest of the site should be investigated further to inform development design and determine suitability for infiltration SuDS.
- Development plans are recommended to avoid placing basements or other significant sub-surface structures in areas to the west of the site where shallow groundwater depths are indicated to occur. In addition, infiltration-based SuDS may not be viable in shallow groundwater depth areas.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

71 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C350

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0016
Revision	P02
Prepared by	Laura Thompson BSc Analyst
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Contract

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This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Laura Thompson of JBA Consulting carried out this work.

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115 Background

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115.1 Site 19C350

- Location: Former Gasworks, Bengal Street
- Existing site use: Brownfield; industrial
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 0.8 hectares
- Proposed development impermeable area: 0.7 hectares (assumed 85% impermeable area)
- Watercourse: River Chor (unmodelled)
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 115-1: Existing site location boundary

Figure 115-2: Topography

116 Flood risk from rivers

116.1 Existing risk

116.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely located within Flood Zone 1 indicating it is at low risk of flooding from rivers.

Table 116-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

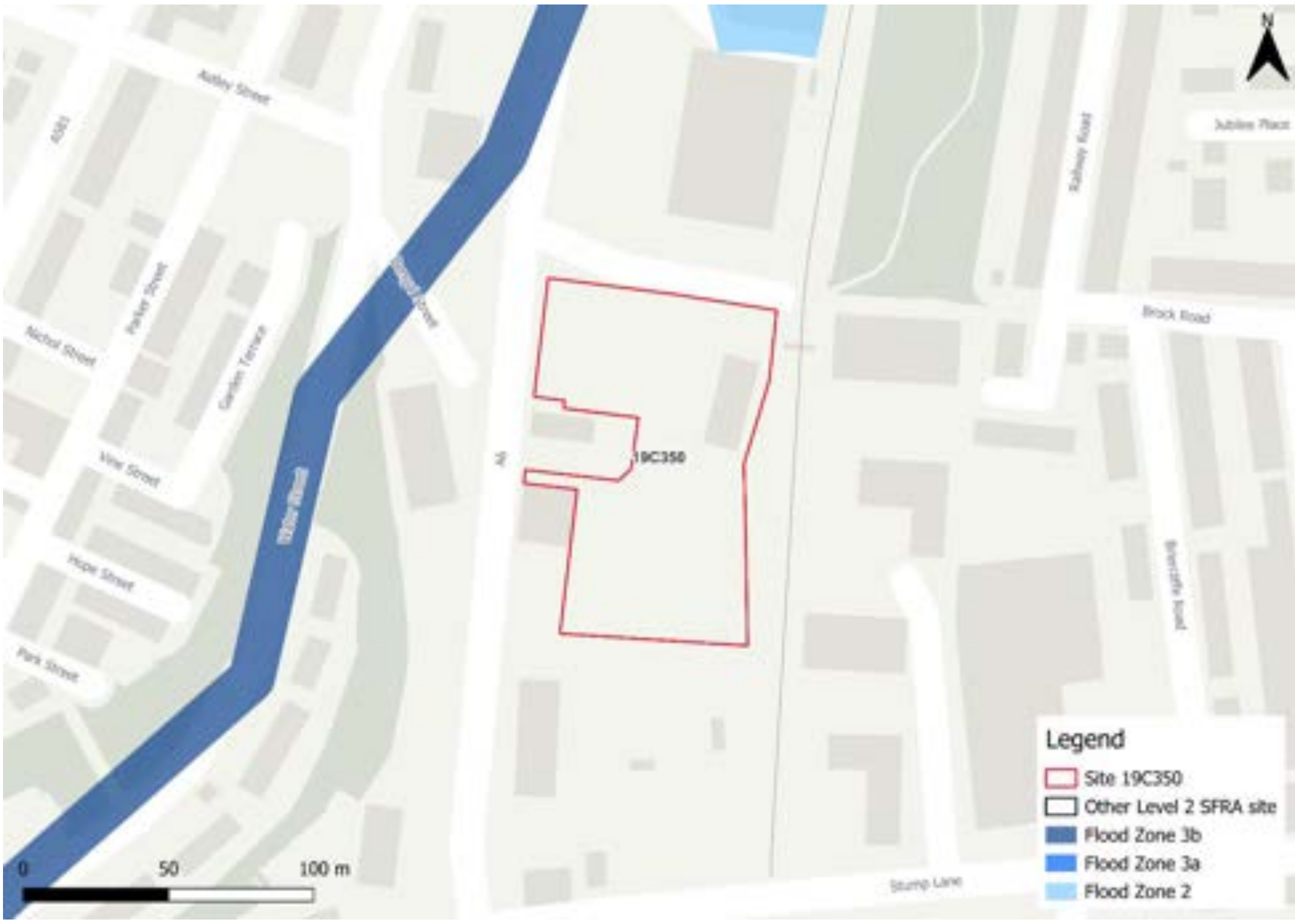

Figure 116-1: Existing risk from rivers to the site

116.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

116.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C350 is located within one catchment, namely; Yarrow DS Big Lodge Water. This is ranked as a low sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

116.2.2 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. There are no opportunities for NFM applicable to this site.

116.3 Residual risk

116.3.1 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.

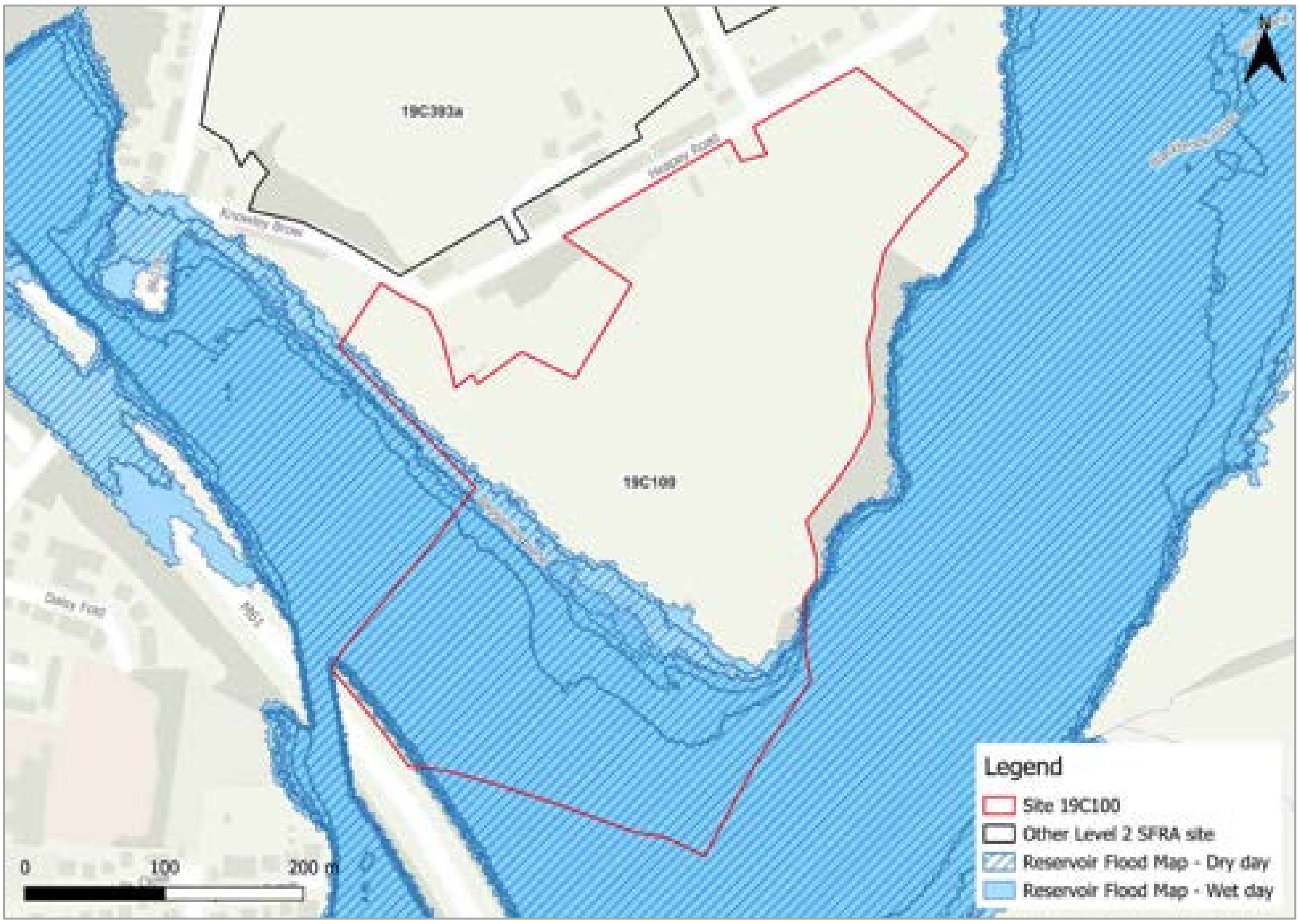

Figure 2-9 shows the RFM in a 'dry day' and 'wet day' scenario. A 'dry day' scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. 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 western boundary of the site is potentially at risk from Anglezarke reservoir, located within Chorley district and operated by United Utilities.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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 United Utilities to ascertain whether the proposed development could affect the reservoirs risk designation, it's 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 116-2: Flood risk from reservoirs

116.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

116.5 Flood warning and access and escape routes

The site is not located within a Flood Warning Area (FWA) or a Flood Alert Area (FAA).

Based on available information, safe access and escape routes could likely be achieved during a flood event via the existing access road to the north of the site.

116.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is located wholly within Flood Zone 1.

- Given the potential reservoir risk to the site, developers should consider[72]:
  - Whether additional modelling is required to understand the flood risk from the reservoir, referring to the specification for the reservoir flood maps as a starting point
  - Whether the development may have an impact on the reservoir or reservoir owner
  - Referring to the Central Lancashire Level 1 SFRA for information on reservoir risk and recommendations for how to address it
  - Contacting the LPA for pre-application advice
  - Contacting the LPA to understand the need to consult with their emergency planning team and with the reservoir owner
- The Council should consult United Utilities to ascertain whether the proposed development could affect the reservoirs risk designation, it's design category or how it is operated.

72 Reservoir flood maps: when and how to use them | Environment Agency | 2021

117 Flood risk from surface water

117.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 12% of the site is at medium surface water risk, and a further 19% is at low surface water risk, as shown in Table 21-1.

In the medium risk event, surface water risk is confined to two short flow paths within the north of the site. These flow paths become more significant in the low risk event. Surface water risk is constrained by the existing development within the site.

Greatest flood depths in the medium risk event are between 0.3 and 0.6 m (Figure 3-1) with areas of significant hazard (Figure 3-2). Safe access and escape routes via the existing access road to the north of the site may be challenging to achieve, given the depths along the road in the medium and low risk events. However, routes should be achievable via the A6 to the west of the site.

Table 117-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
69	19	12	0

-
-

- 

Figure 117-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 117-2: Medium risk event surface water flood hazard[73] (Risk of Flooding from Surface Water map)

117.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 117-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

73 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

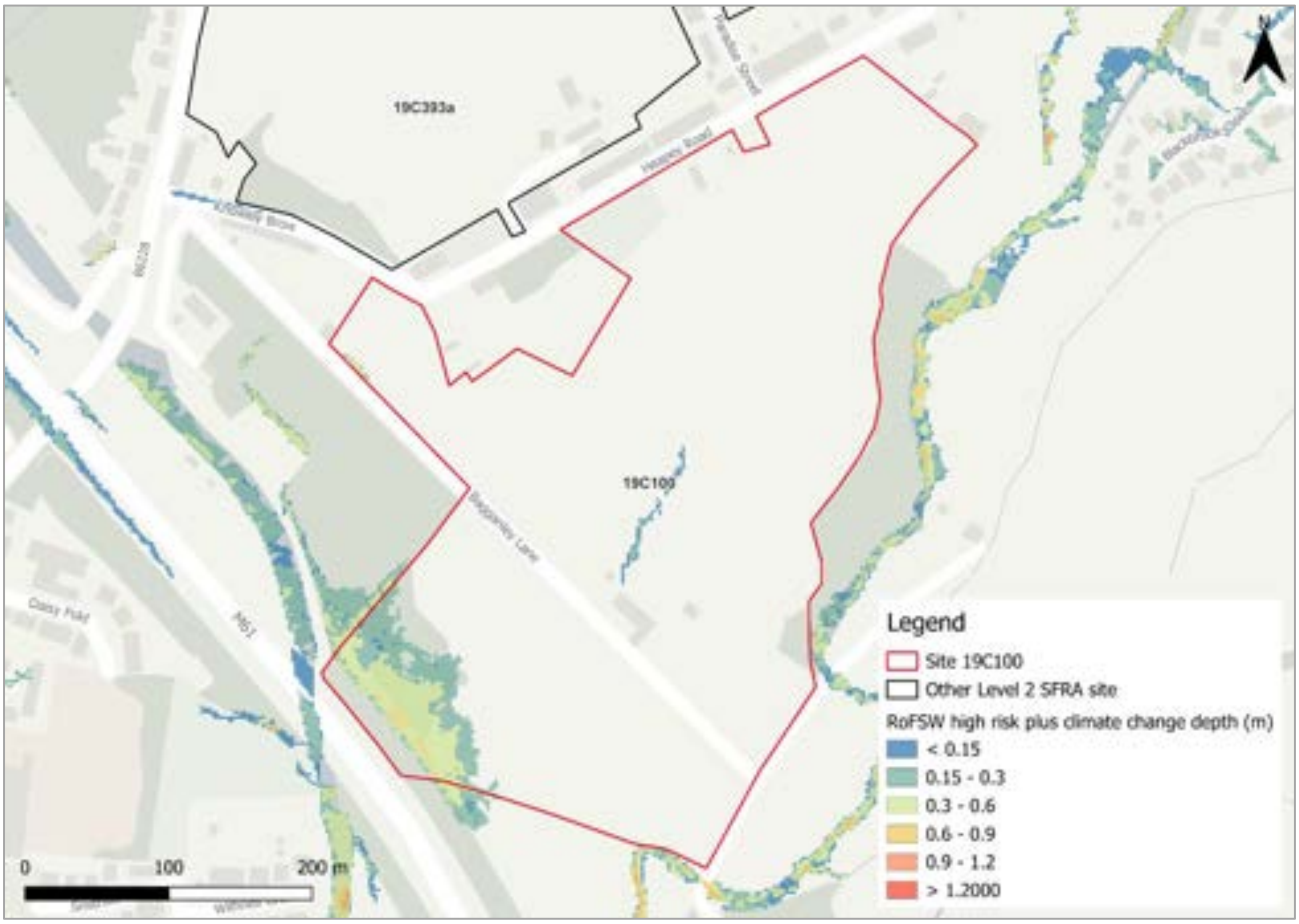

Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be significantly greater than for present day conditions, with the medium risk climate change event showing a similar level of risk to the low risk present day event. Maximum depths are between 0.6 and 0.9 m with some areas of significant hazard (Figure 3-4). Offsite impacts and flooding to surrounding roads are significant and should be mitigated in a wider drainage strategy for the area. The northern area of the site should be left free of development based on current information.

Figure 117-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 117-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

117.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 69% of the site being at very low risk. Surface water risk in the medium and low risk events is confined to the north of the site. Surface water risk is constrained by the existing development within the site.
- Risk to surrounding roads and infrastructure is significant and should be investigated through a wider drainage strategy for the area.
- The medium risk modelled climate change outputs indicate a similar extent risk to the present day low risk event. Safe access and escape routes should be achievable via the A6 to the west of the site in all events.
- Topographic flow routes and depressions should be considered and included in site design and ideally left in place to flood naturally when required. Any regrading of land must include for like for like volumes to ensure risk is contained safely onsite for the lifetime of development.
- Ideally, development would avoid the flow path in the northern half of the site at risk in the medium risk event. This is subject to detailed modelling through a detailed drainage strategy.

- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could accommodate the proposed residential development or whether further capacity will be required.
- It is assumed the existing onsite development will be demolished for new housing units. A drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Note, 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 or evidence.

118 Risk from groundwater

Risk from groundwater sources 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 Guide[74]. Figure 4-1 shows the map for Site 19C350 and the surrounding areas and Table 22-1 explains the risk classifications.

The majority of the site is in an area where there is no groundwater risk. Within the northwest of the site, there is a risk of flooding to subsurface assets but surface manifestation of groundwater is unlikely. Groundwater conditions may therefore be suited to infiltration SuDS across the majority of the site.

Figure 118-1: JBA 5m Groundwater Emergence Map

74 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 118-1: Groundwater Flood 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.	

119 Overall site assessment

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

This site is not required to pass part b) of the exception test[75] as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

119.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on current information, it should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1. Ideally development would avoid the area at modelled surface water risk in the medium risk event.
- A wider drainage strategy for the area should look to reduce risk on and offsite. Surface water should be retained onsite which may reduce units. Surrounding access routes drainage capacities should also be assessed. This will require detailed surface water modelling based on layout plans and detailed design and full consultation with the LLFA on required runoff rates, likely to be greenfield or betterment. The use of infiltration SuDS should be investigated.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

75 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C359

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0015
Revision	P02
Prepared by	Dominic Richardson BSc Analyst
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Contract

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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Dominic Richardson of JBA Consulting carried out this work.

Purpose and Disclaimer

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Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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121 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C359. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

121.1 Site 19C359

- Location: East of New Street
- Existing site use: Buildings Used for Shops
- Existing site use vulnerability: Less Vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More Vulnerable
- Site area: 0.392 hectares
- Proposed development impermeable area: 0.333 hectares (assumed 85% impermeable area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
- Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
- Assess present day and future surface water depths and hazards.
- Modelling of latest Environment Agency (EA) climate change allowances for peak rainfall intensities.

Figure 121-1: Existing site location boundary

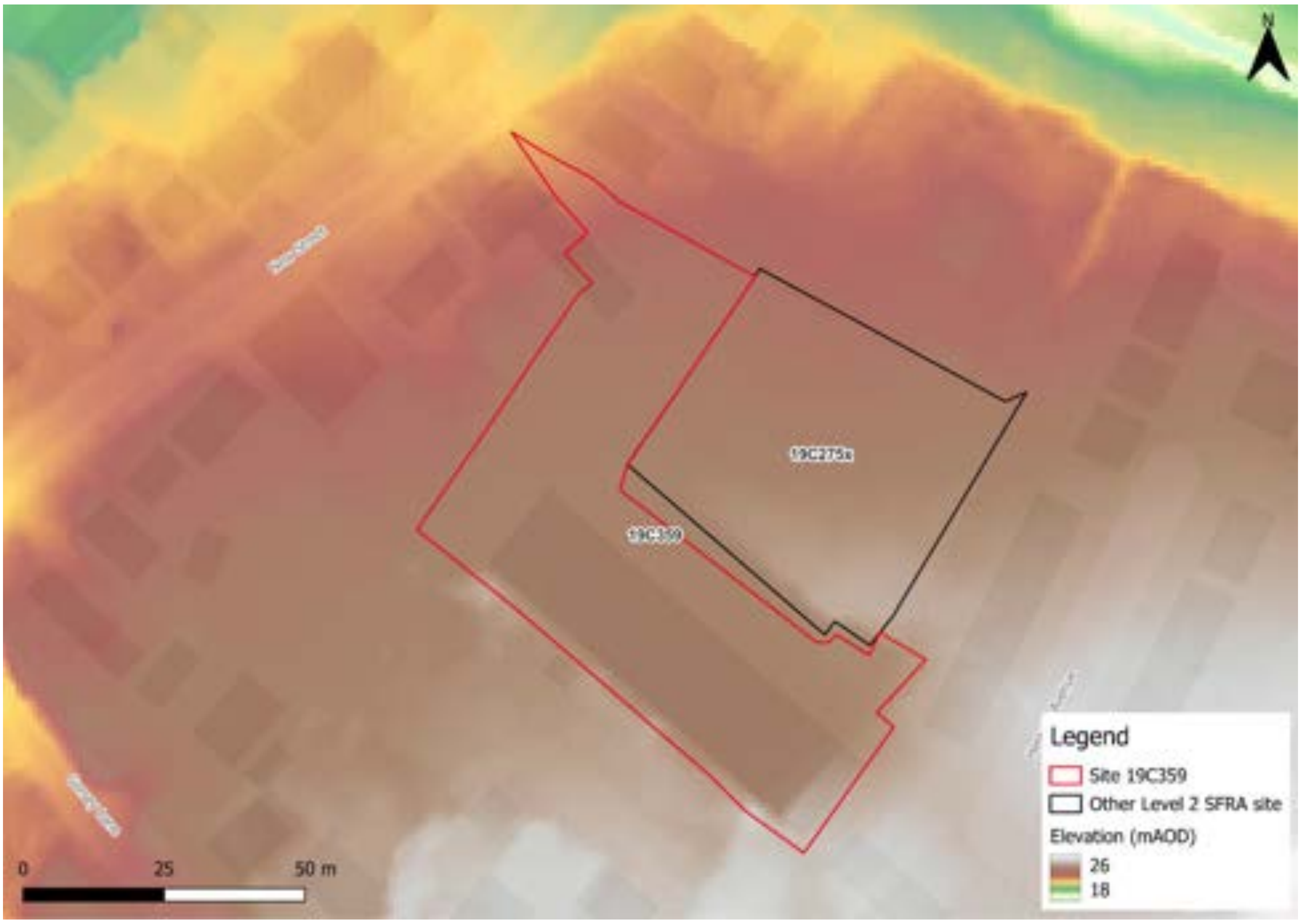

Figure 121-2: Topography

122 Flood risk from rivers

122.1 Existing risk

122.1.1 Flood Map for Planning and functional floodplain

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

The entire site is modelled to be in Flood Zone 1 and is therefore at low risk of flooding from rivers.

Table 122-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 122-1: Existing risk from rivers to the site

122.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to EA's spatial flood defences dataset. It is noted that the site is situated on an area of naturally higher ground within the local topography.

122.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C359 is located within one catchment, namely; Douglas - Lower. This is ranked as a low sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

122.2.2 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. There are no opportunities shown to be present in site 19C359's area, as can be seen in Figure 122-2.

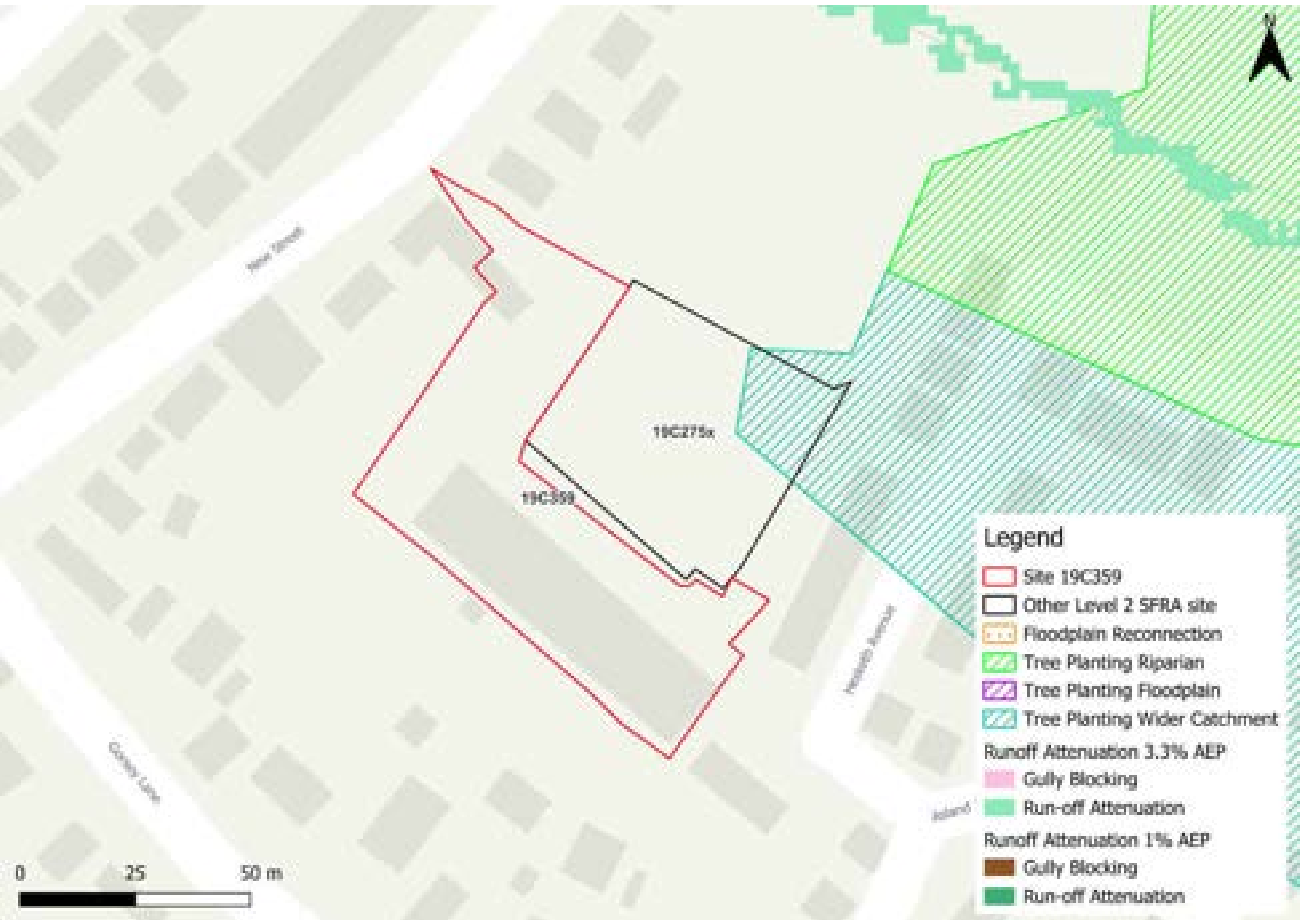

Figure 122-2: Natural Flood Management (NFM) potential mapping

122.3 Residual risk

122.3.1 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. 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 not modelled to be at risk from reservoir flooding.

122.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

122.5 Flood warning and access and escape routes

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. Site 19C359 is not located within an FWA.

Safe access and escape routes should be achievable during a flood event via New Street and Hesketh Avenue.

122.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The entire site is modelled to be within Flood Zone 1 indicating low fluvial flood risk. There are therefore no constraints to development at the site due to fluvial flood risk.
- Safe access and escape routes could likely be achieved via multiple routes surrounding the site, based on available information.
- The site is not located within a flood warning zone and Safe access and escape routes could likely be achieved via multiple routes surrounding the site, based on available information.

123 Flood risk from surface water

123.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 4% of the site is within a low-risk zone whilst no part of the site is indicated to be within a medium or high-risk zone, as shown in Table 123-1.

In the high and medium risk events, no areas of surface water flooding are observed within the site. In the low-risk event, surface water pooling is modelled to occur in the topographic low spots along the southern site boundary. Greatest surface water flood depths are between 0.15m and 0.30m (Figure 3-1) whilst hazard levels are shown to be low (Figure 3-2) in this event.

Safe access and escape routes can be found in the area adjoining Hesketh Avenue and should also be possible at New Street. Although surface water pooling is observed to occur on parts of these routes, hazard levels are shown to be low (Figure 3-2).

Table 123-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
96	4	0	0

Figure 123-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

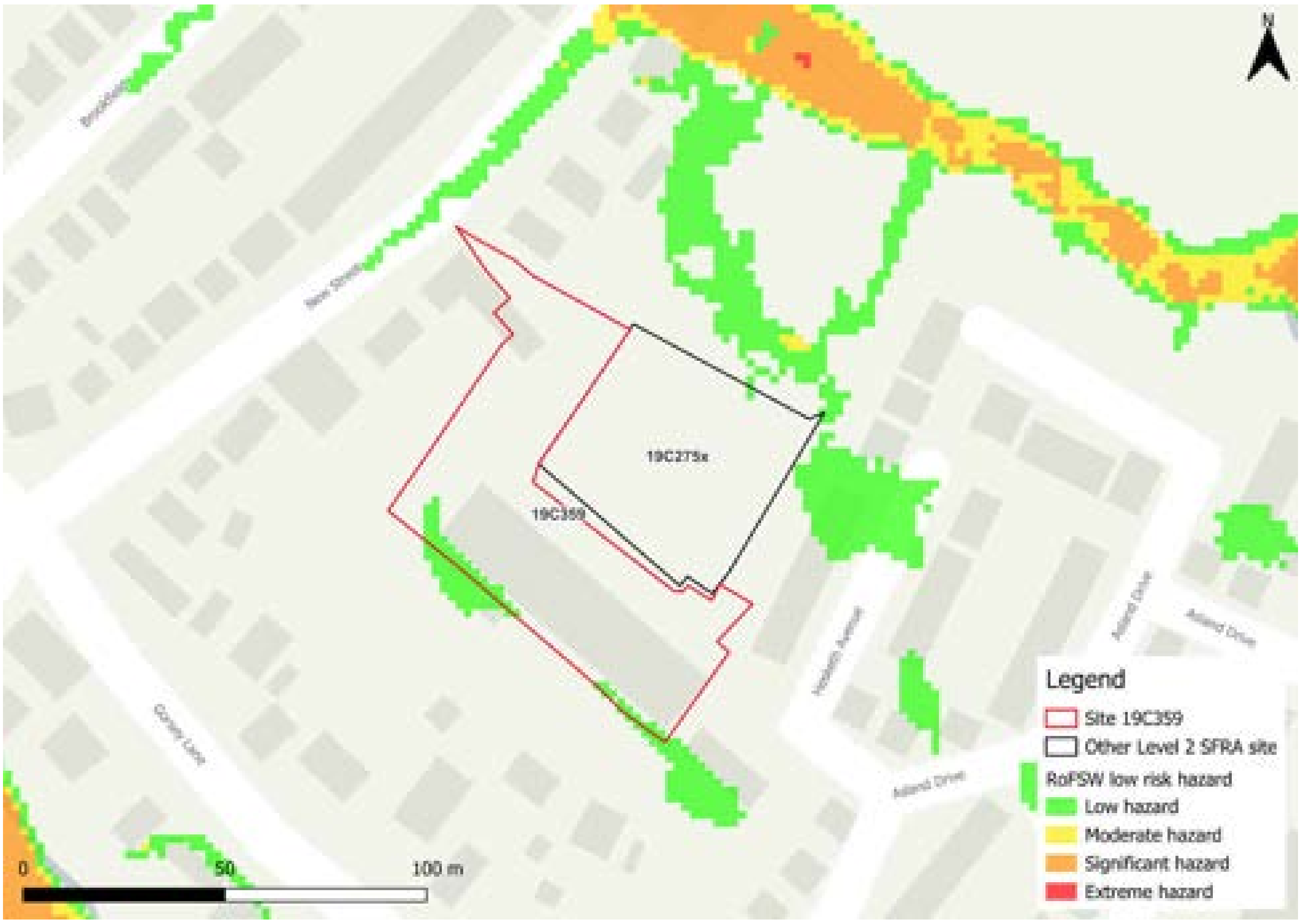

Figure 123-2: Low risk event surface water flood hazard[76] (Risk of Flooding from Surface Water map)

123.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 123-2: Modelled climate change allowances for rainfall for the Douglas Management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

76 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

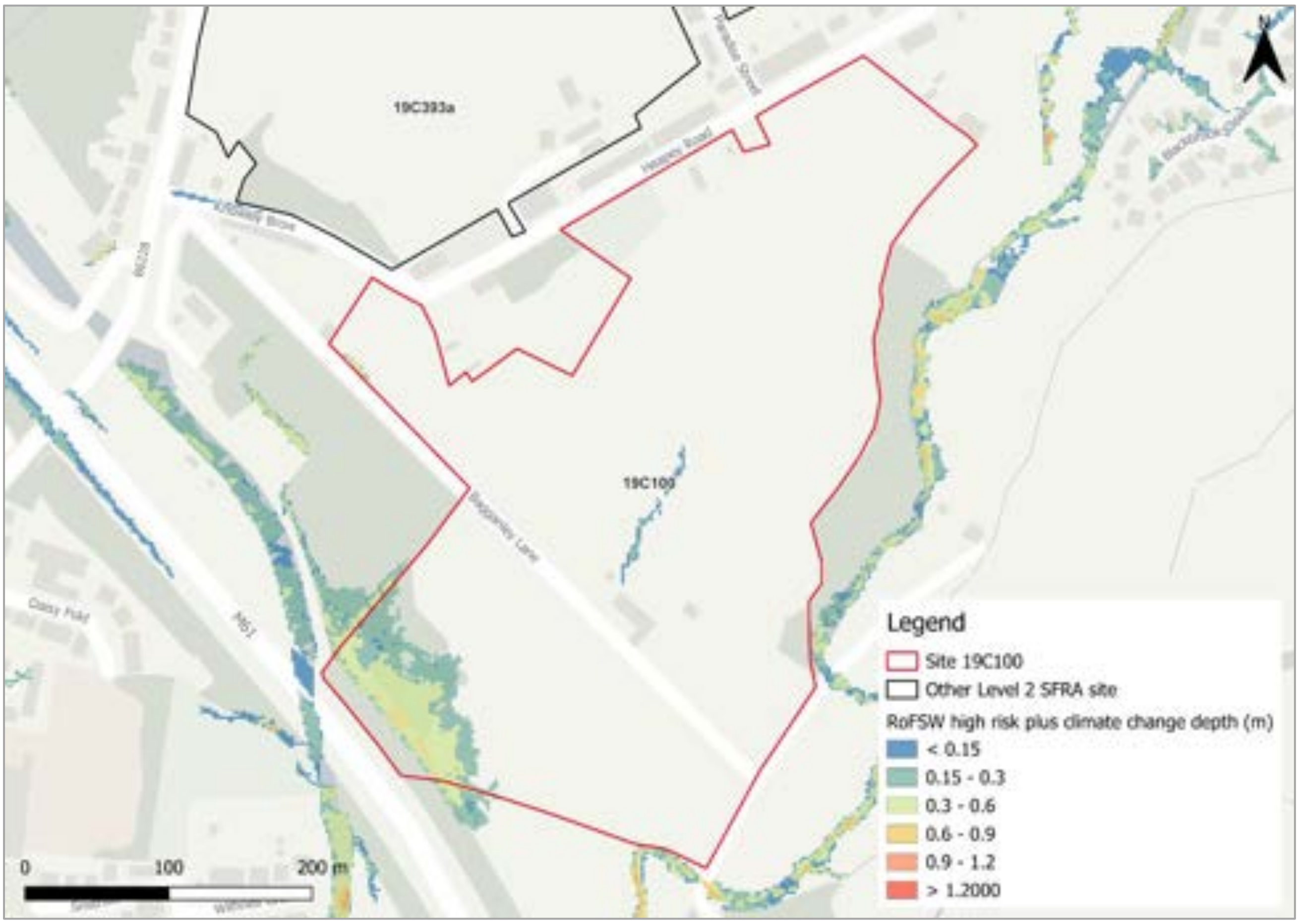

Figure 3-3 shows the medium-risk surface water flood depths plus 45% climate change. The areas of ponding expand in size in comparison to the present-day event, particularly along the southern border of the site. Maximum flood depths are modelled to remain shallow between 0.15m and 0.30m (Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

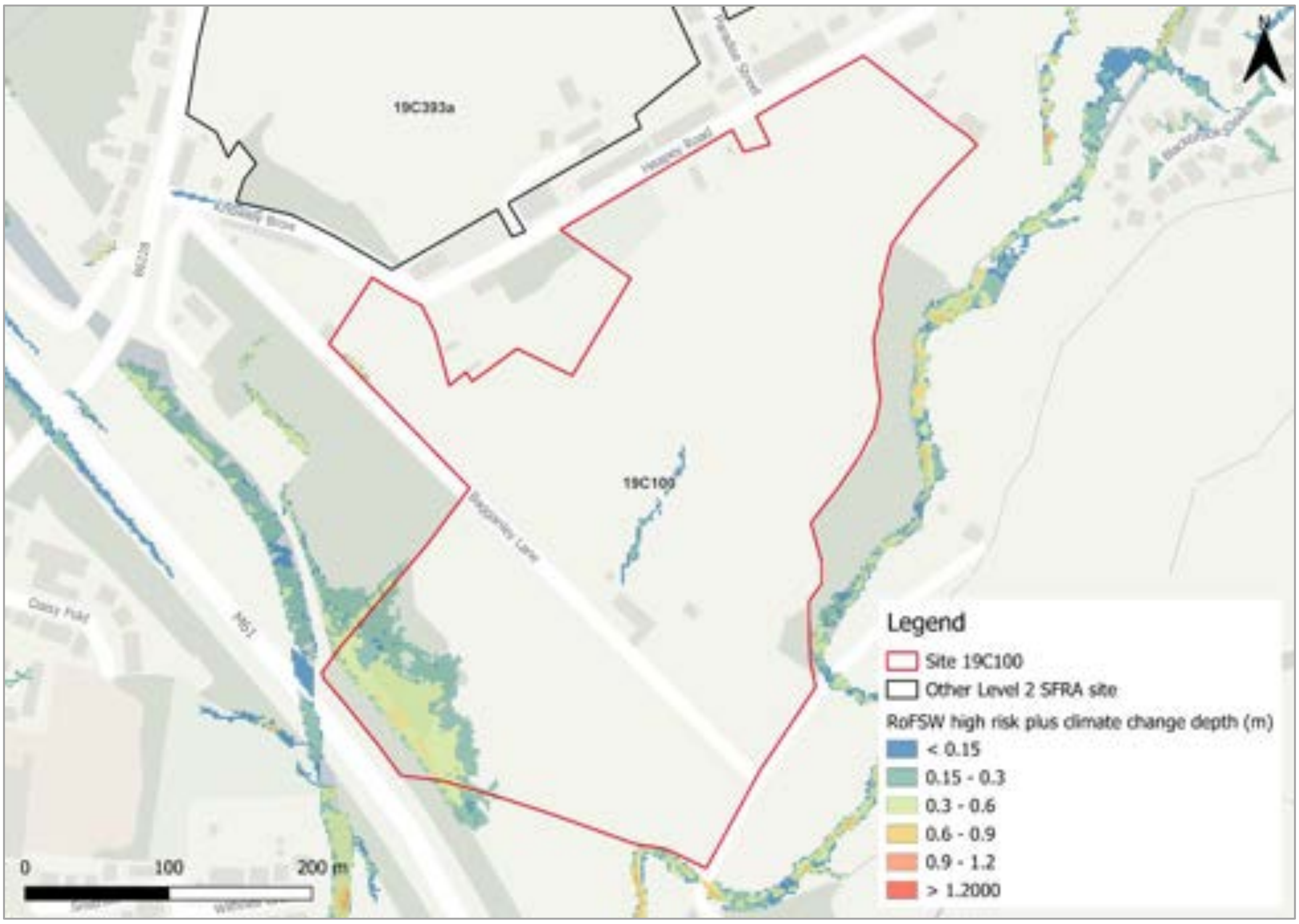

Figure 3-3). Flood hazard largely remains low with the site (Figure 3-4).

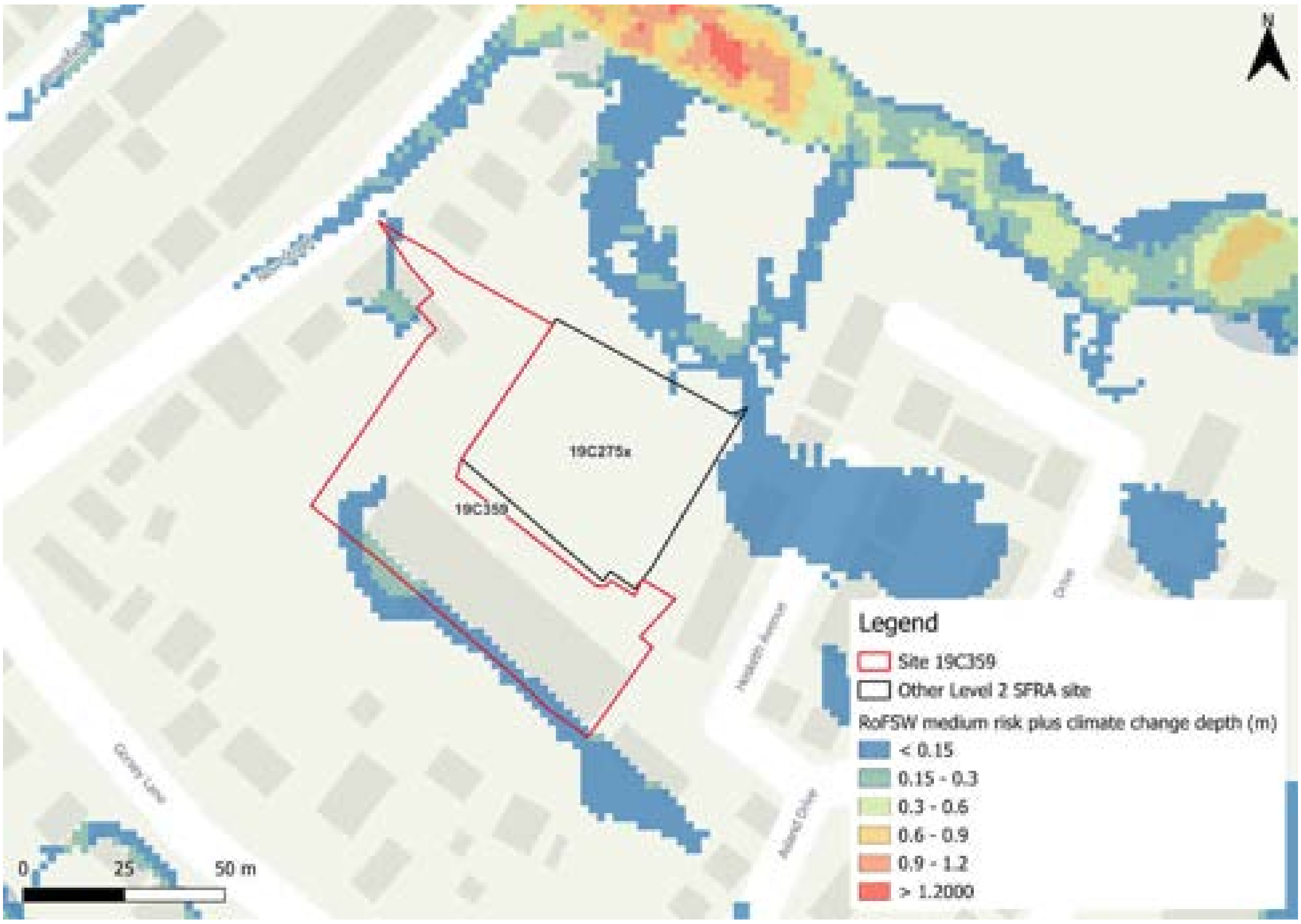

Figure 123-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

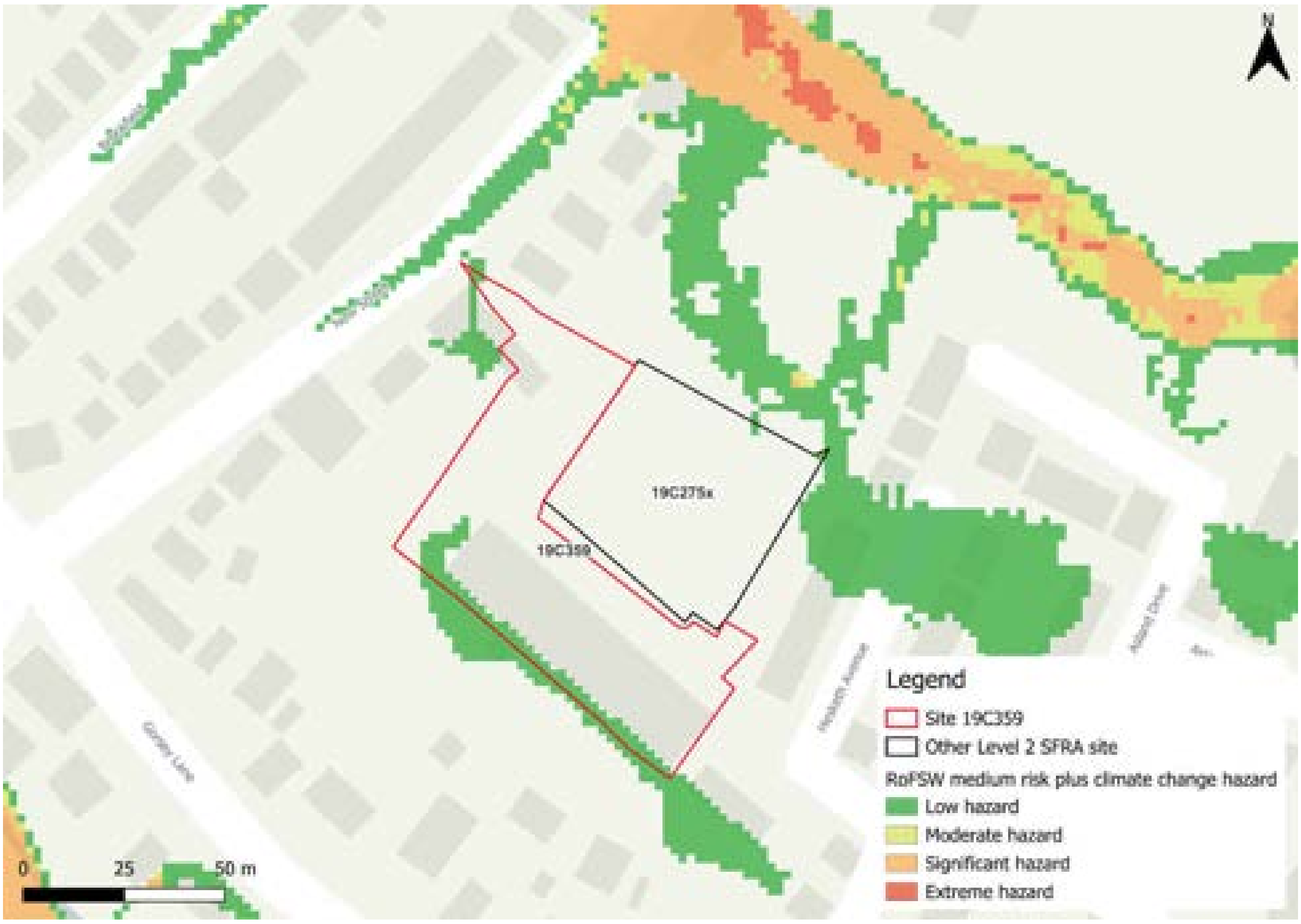

Figure 123-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

123.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with only 96% of the site being at very low surface water flood risk. Surface water risk in the present day low-risk event is confined to the southern boundary. Safe access and escape routes are achievable via the area adjoining Hesketh Avenue and should also be possible at New Street although this access route is shown to partially inundate with a low floodwater hazard.
- The effects of climate change on surface water have been modelled for this SFRA using medium-risk surface water flood depths plus 45% climate change. Surface water flood risk is slightly greater than that of the present-day for the low-risk event although the impact on the site is broadly similar to that of the low-risk present day event. Any existing flow paths should be maintained in the site design.
- The Groundwater Emergence Map (Figure 4-1) indicates that the ground conditions at this site may be suitable for infiltration SuDS. This should be further explored through an appropriate ground survey as part of the FRA and drainage strategy.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could accommodate the proposed residential development or whether further capacity will be required. It is anticipated that surface floodwater risk within the site will be resolved through a proposed drainage design that accompanies any future development plans.
- 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 or evidence.

124 Risk from groundwater

Risk from groundwater sources 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 Guide[77]. Figure 4-1 show the map for Site 19C359 and the surrounding areas and Table 124-1 explains the risk classifications.

Risk of groundwater emergence is shown to be consistent across the site as no risk of groundwater emergence is indicated at any location. Groundwater conditions may therefore be suited to infiltration SuDS across the site.

Figure 124-1: JBA 5m Groundwater Flood Map

77 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 124-1: Groundwater Flood 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.	

125 Overall site assessment

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

This site is not required to pass part b) of the exception test as it is not located within Flood Zone 3a. However, it must still be proven that development can be safe for its lifetime, which is 100 years for residential development and 75 years for non-residential development.

125.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on current information, this site could be allocated if development avoids areas at risk of surface water particularly along the southern boundary.
- A drainage strategy will be required for any new development. The use of infiltration SuDS should be investigated as part of this.
- The site is noted to be in close proximity to site 19C275x, and a coordinated approach should be considered when providing surface water management strategies at the site to maximise opportunities for shared benefits.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.
- The Council highways department should be consulted, along with United Utilities and the LLFA regarding existing highway drainage networks, surface water sewers and LLFA assets, and whether increased capacities may be required to enable sustainable development in the long term.

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C393a

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0014
Revision	P02
Prepared by	Freya Nation BSc Analyst
Reviewed by	Mike Williamson BSc MSc CGeog FRGS EADA Principal Analyst
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127.1 Site 19C393a

- Location: Little Knowley Farm
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 24.5 hectares
- Proposed development impermeable area: 20.8 hectares (assumed 85% impermeable area)
- EA model: Black Brook 2011
- Watercourse: Black Brook
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of modelled fluvial flood depths and hazards
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

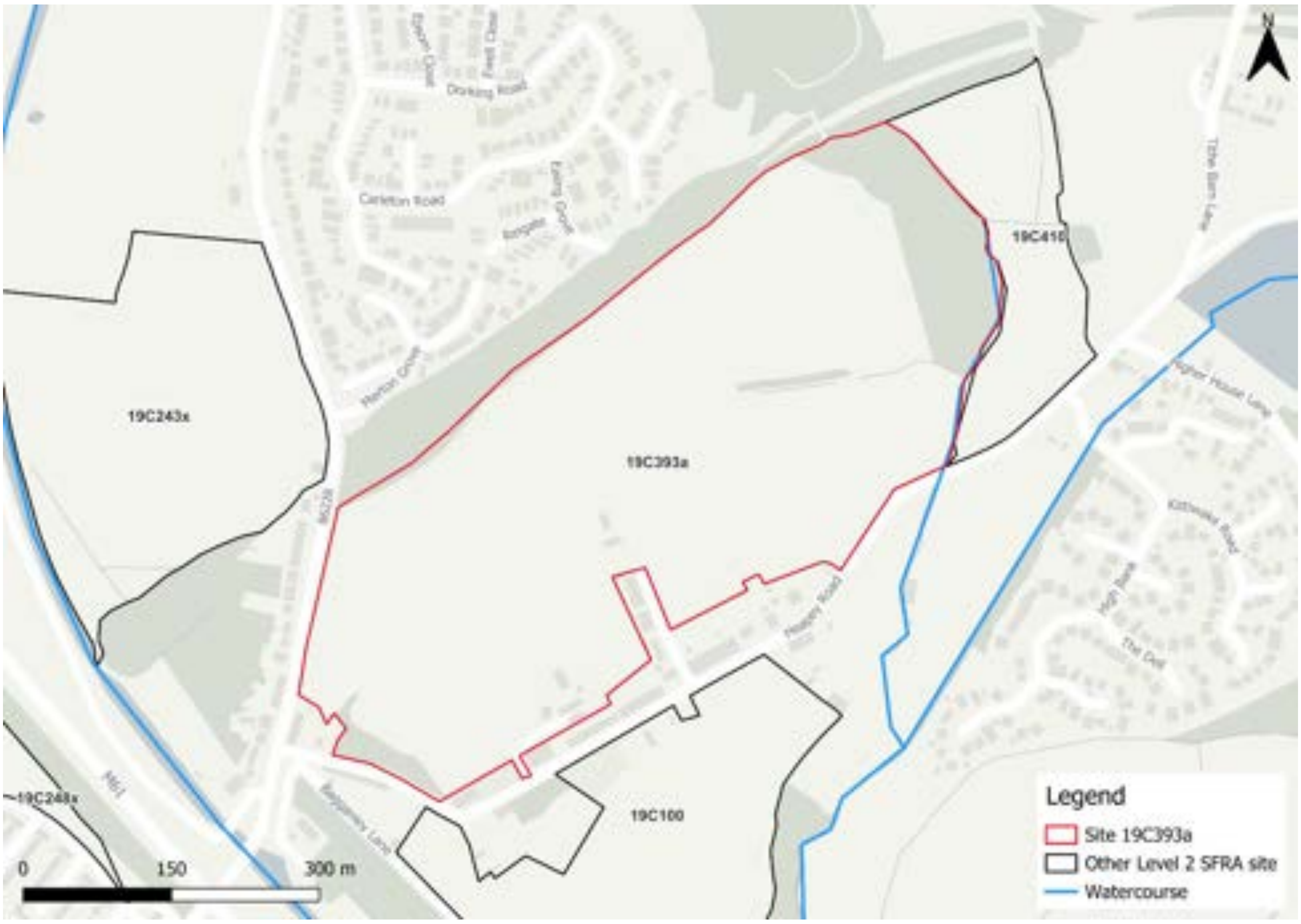

Figure 127-1: Existing site location boundary

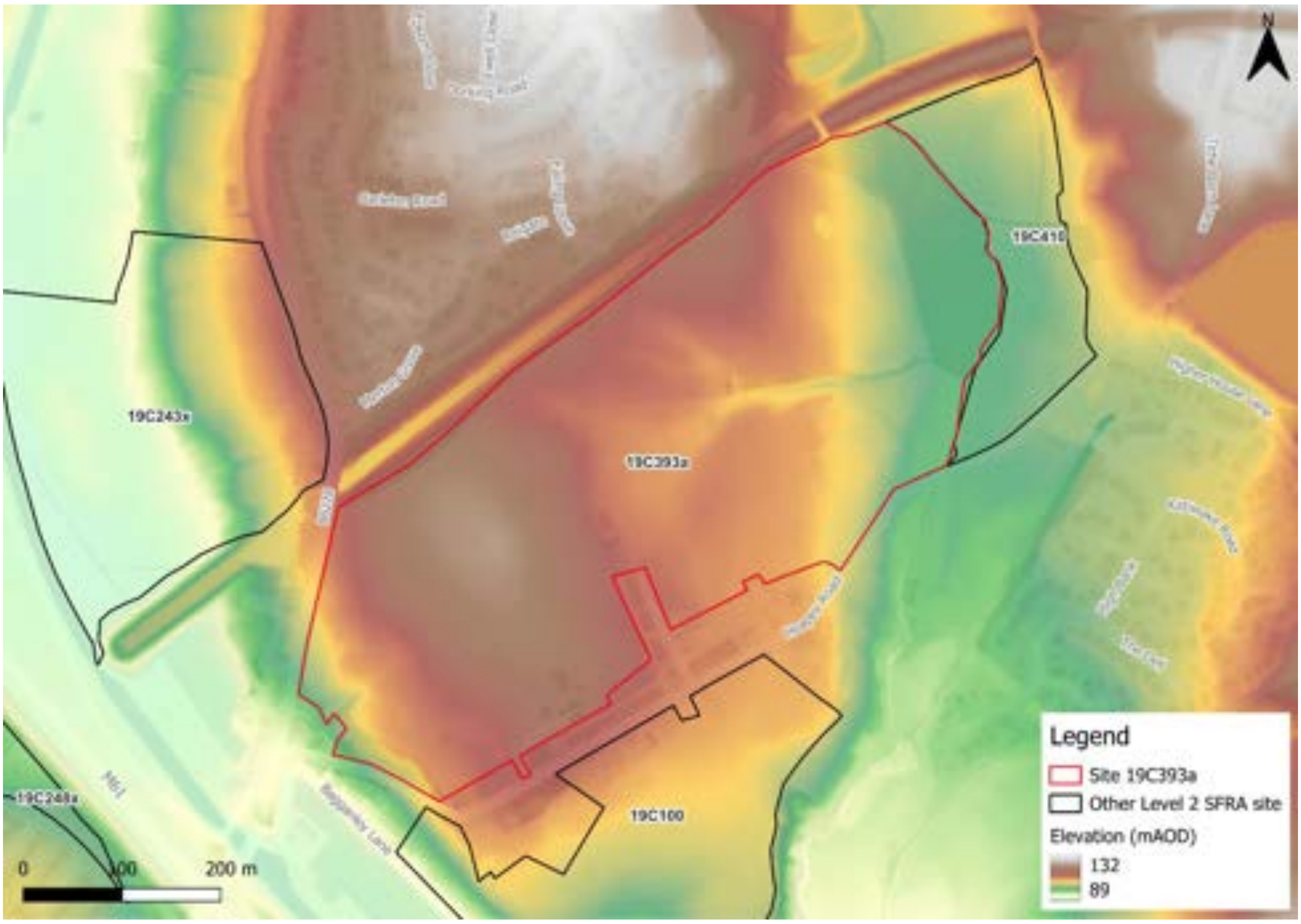

Figure 127-2: Topography

128 Flood risk from rivers

128.1 Existing risk

128.1.1 Flood Map for Planning and functional floodplain

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

Functional floodplain is present along a reach of Black Brook which flows along the eastern boundary of the site. This reach of Black Brook is not explicitly represented in the 2011 model and instead has been represented as a hydrologic inflow into the main Black Brook channel. The functional floodplain in this location is based on an 8m buffer either side of the OS Open Rivers Watercourse Link dataset. It is recognised that this is an approximation. There should be no development within the functional floodplain. Policy relating to Flood Zone 3b applies to the watercourse with an 8m buffer either side, and not the mapping where they are different. The site is also located partially within Flood Zone 2 along the eastern boundary of the site.

Table 128-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
95	4	0	1

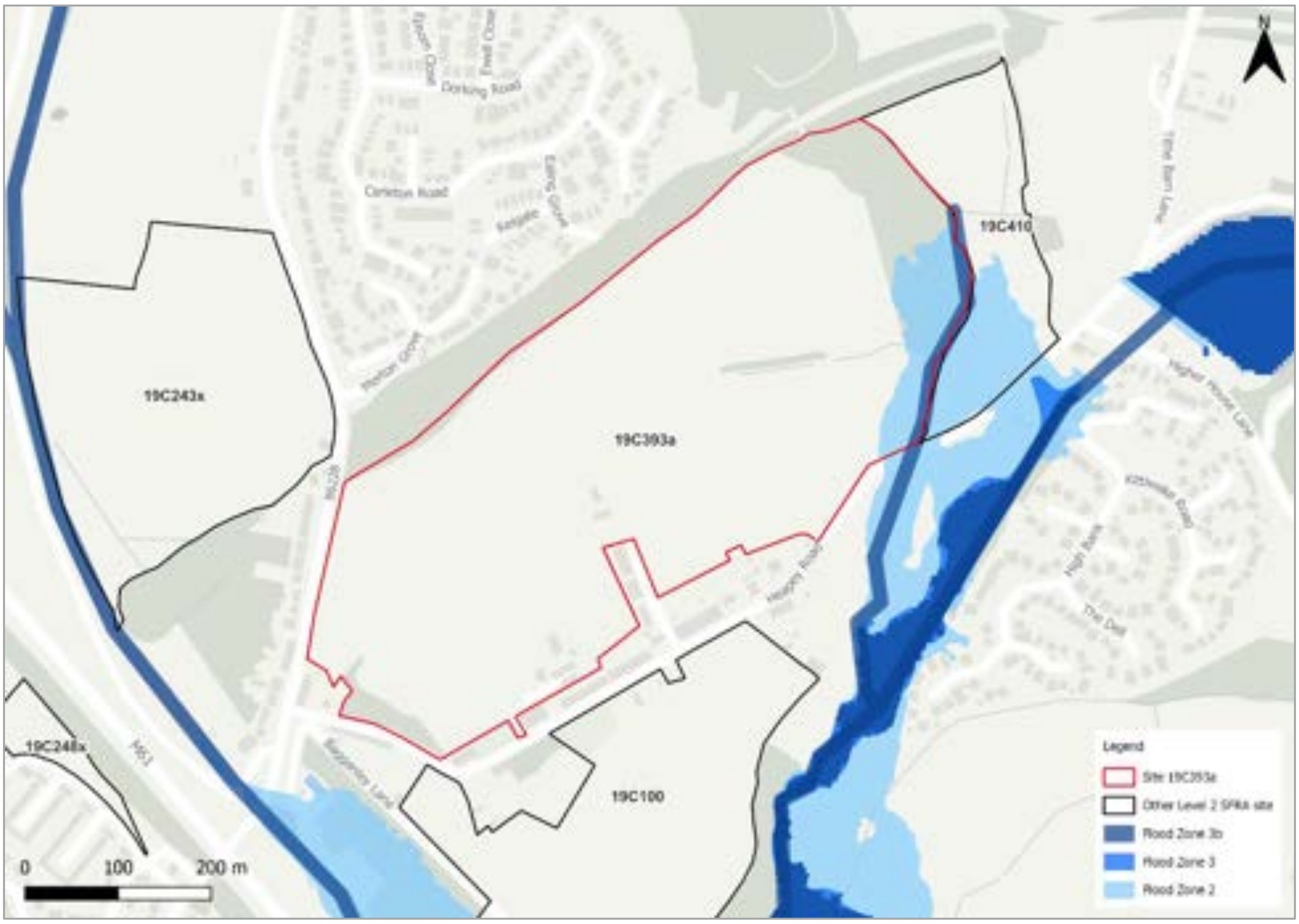

Figure 128-1: Existing risk from rivers to the site

128.1.2 Black Brook 2011 model outputs

Figure 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. There is no modelled flood risk to the site in the 1% AEP undefended event. However, the reach of Black Brook adjacent to the site is not explicitly represented in the model and instead has been represented as a hydrologic inflow into the main channel. Modelling this reach of the Black Brook should be considered as part of a site-specific FRA, as well as/instead of a Level 2 SFRA update.

Figure 128-2: Flood depths for 1% AEP undefended flood event

128.2 Impacts from climate change

The impacts of climate change on flood risk from the Black Brook have been modelled without flood defence infrastructure in place. This allows for direct comparison with the existing risk of the Flood Map for Planning.

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

Table 128-2: Modelled climate change allowances for peak river flows for the Douglas Management Catchment

Return period	Central allowance 2080s	Higher central allowance 2080s
3.3% (functional floodplain)	35%	47%
1%	35%	47%

In the climate change event, the site is modelled to be at risk along the eastern boundary of the site. Figure 128-3 shows the modelled flood depths for the 1% AEP undefended event plus 47% climate change allowance. Greatest depths within the site are modelled to be between 0.9 and 1.2 m. Figure 2-5 shows the modelled flood hazard rating during the 1%

AEP undefended flood event +47% climate change allowance. Flood hazard within the site is largely modelled to be categorised as 'Danger for some'.

However, the reach of Black Brook adjacent to the site is not explicitly represented in the model, and instead has been represented as a hydrologic inflow into the main channel. Modelling this reach of the Black Brook should be considered as part of a site-specific FRA, as well as/instead of a Level 2 SFRA update.

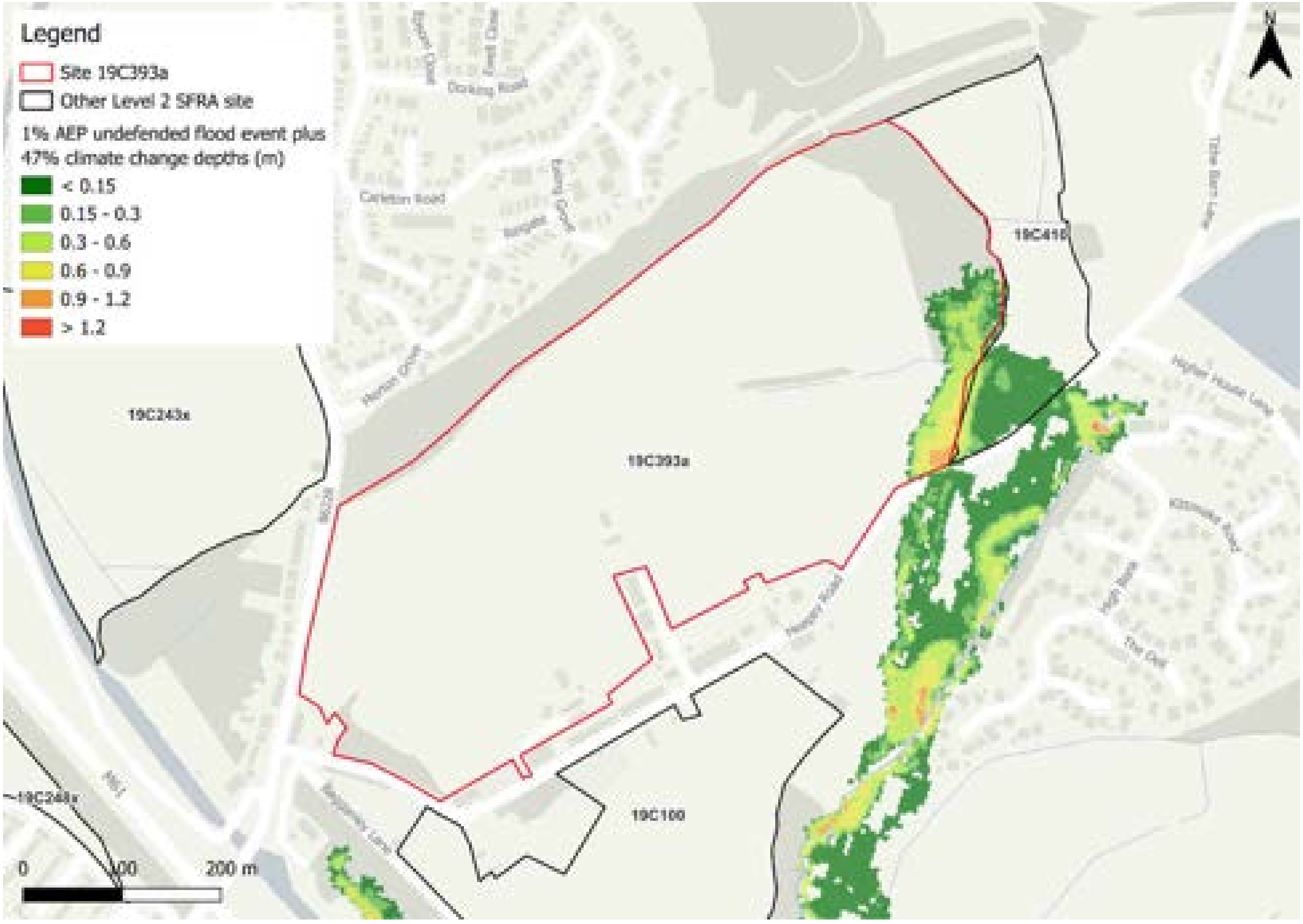

Figure 128-3: Flood depths for 1% AEP undefended flood event +47% (higher central climate change allowance)

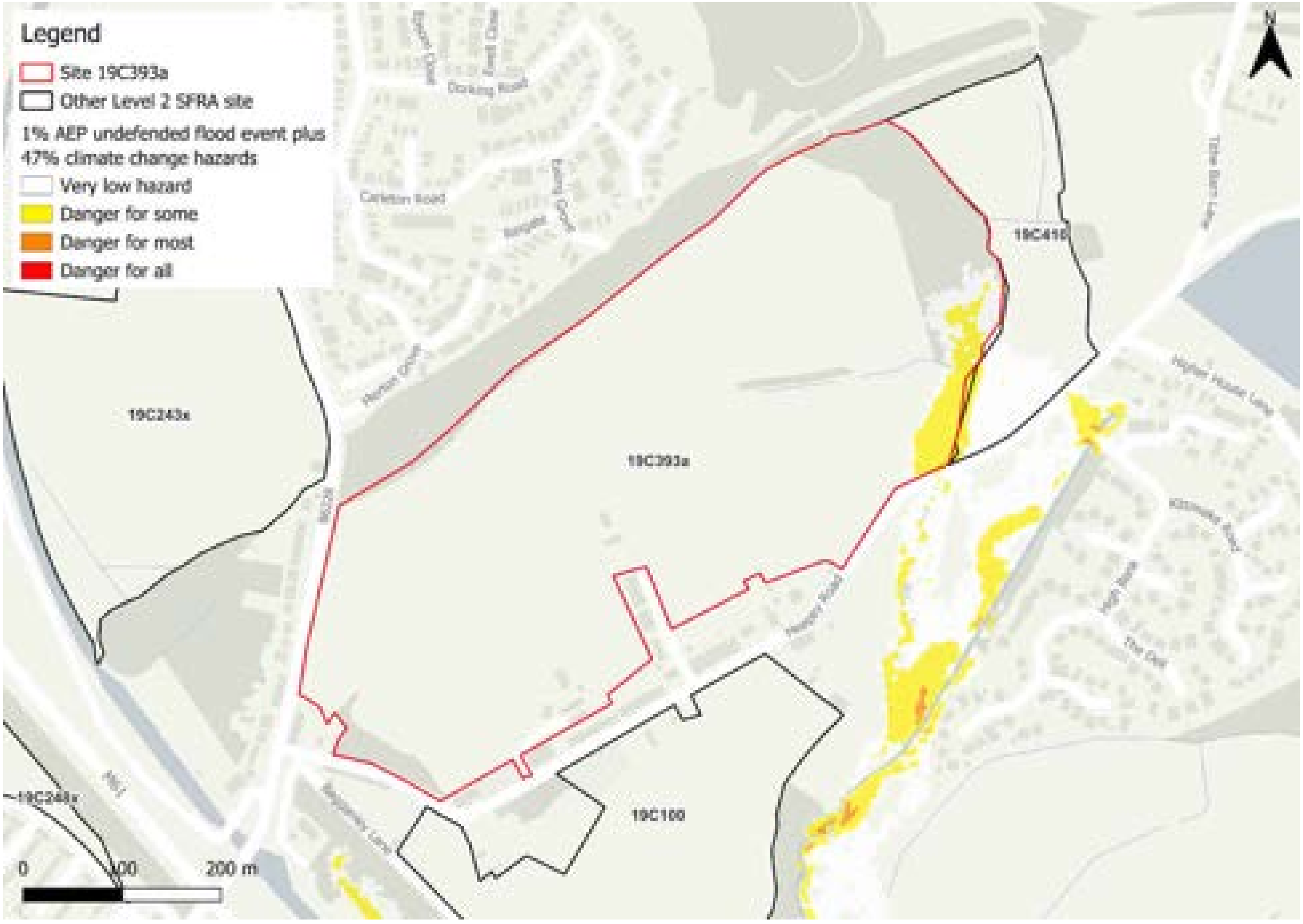

Figure 128-4: Flood hazard[78] for 1% AEP undefended flood event +47% (higher central climate change allowance)

128.3 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

128.3.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C393a is located within two catchments, namely; Lostock US Farington Weir and Yarrow US Big Lodge Water. Lostock US Farington Weir is ranked as a medium sensitivity catchment and Yarrow US Big Lodge Water is ranked as a low sensitivity catchment. Planning policy considerations for sites at medium and low sensitivity to the cumulative impacts of development that apply to this site include:

78 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.

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[79].
- Developments should be incentivised to provide wider betterment by being requested to demonstrate in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments are to aim to achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

128.3.2 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. Within the site there are opportunities for floodplain, riparian and wider catchment tree planting. Tree planting can intercept, slow, store and filter water, reducing runoff downstream. There is also the potential for runoff attenuation features to reduce the volume of flooding downstream. These areas are shown in Figure 128-5.

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79 Lancashire SuDS Guidance

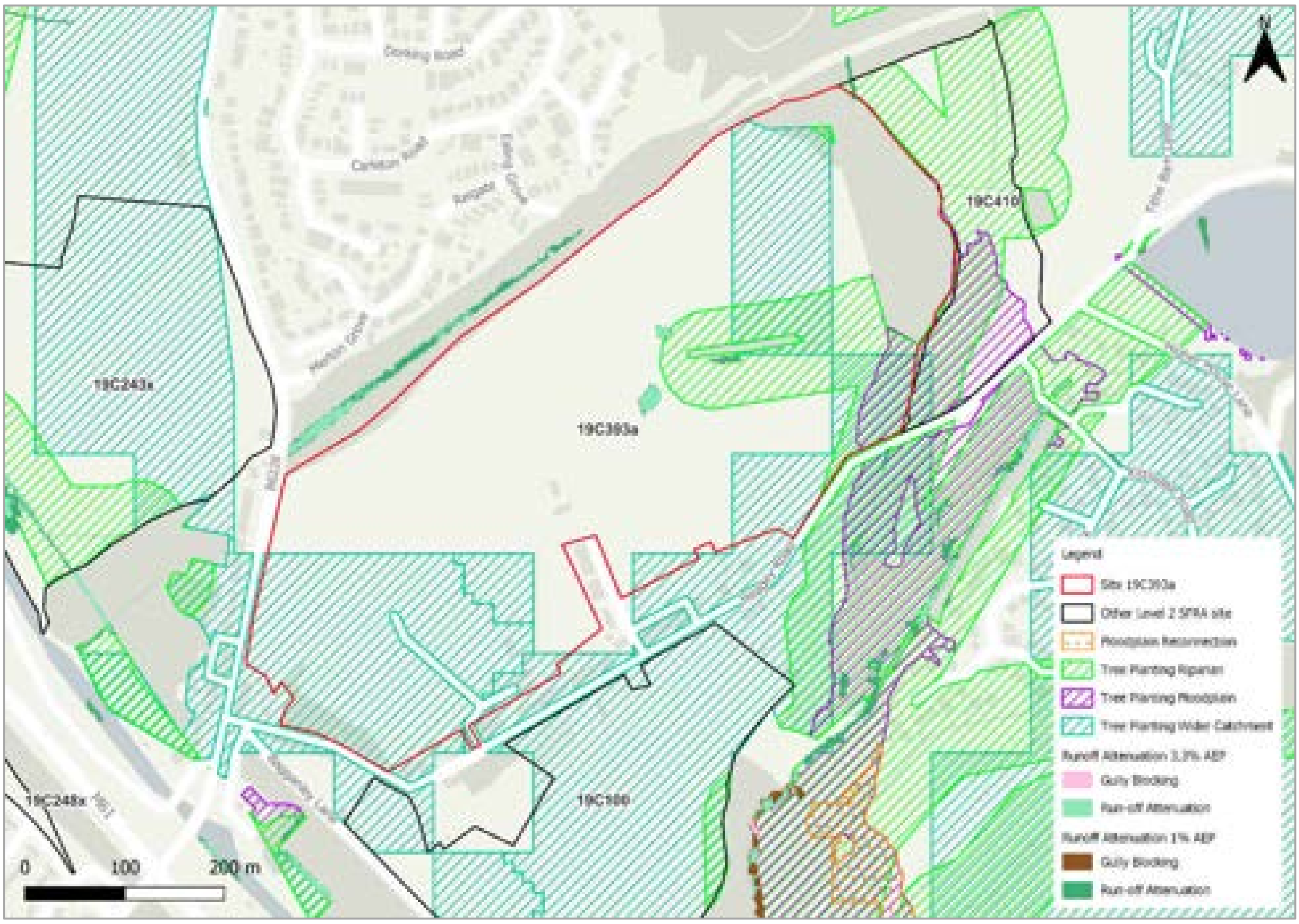

Figure 128-5: Natural Flood Management (NFM) potential mapping

128.4 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 bridge openings.

Residual risk at this site comes from possible blockage of the structure beneath Heapey Road at the southeastern corner of the site (Figure 2-7). This section of the watercourse is not included in the 2011 Black Brook model, therefore the impact of a blockage at this location could not be assessed. It is recommended that the site-specific FRA should consider the impact of a blockage of this culverts on residual flood risk to the site.

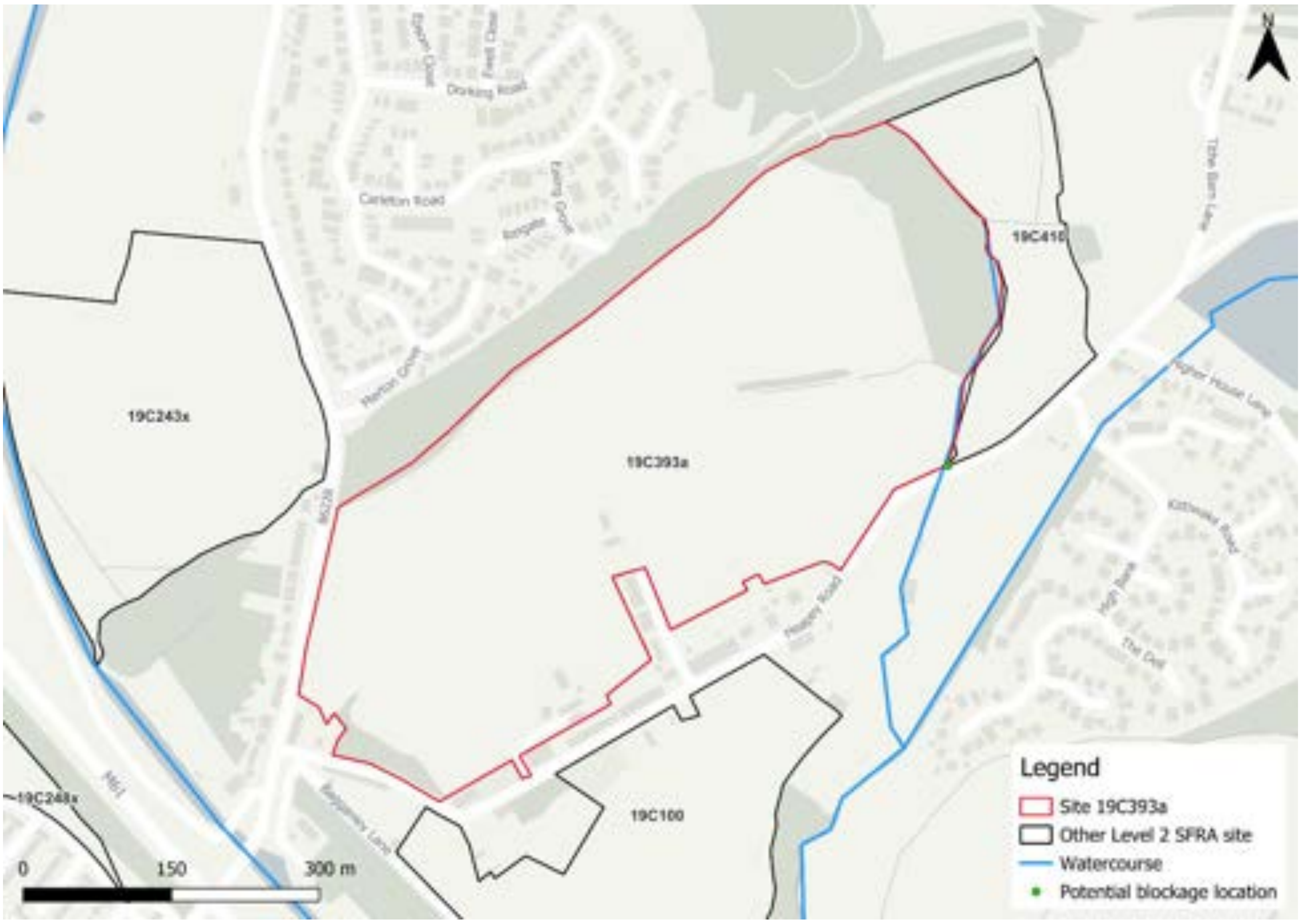

Figure 128-6: Potential blockage location

128.4.1 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.

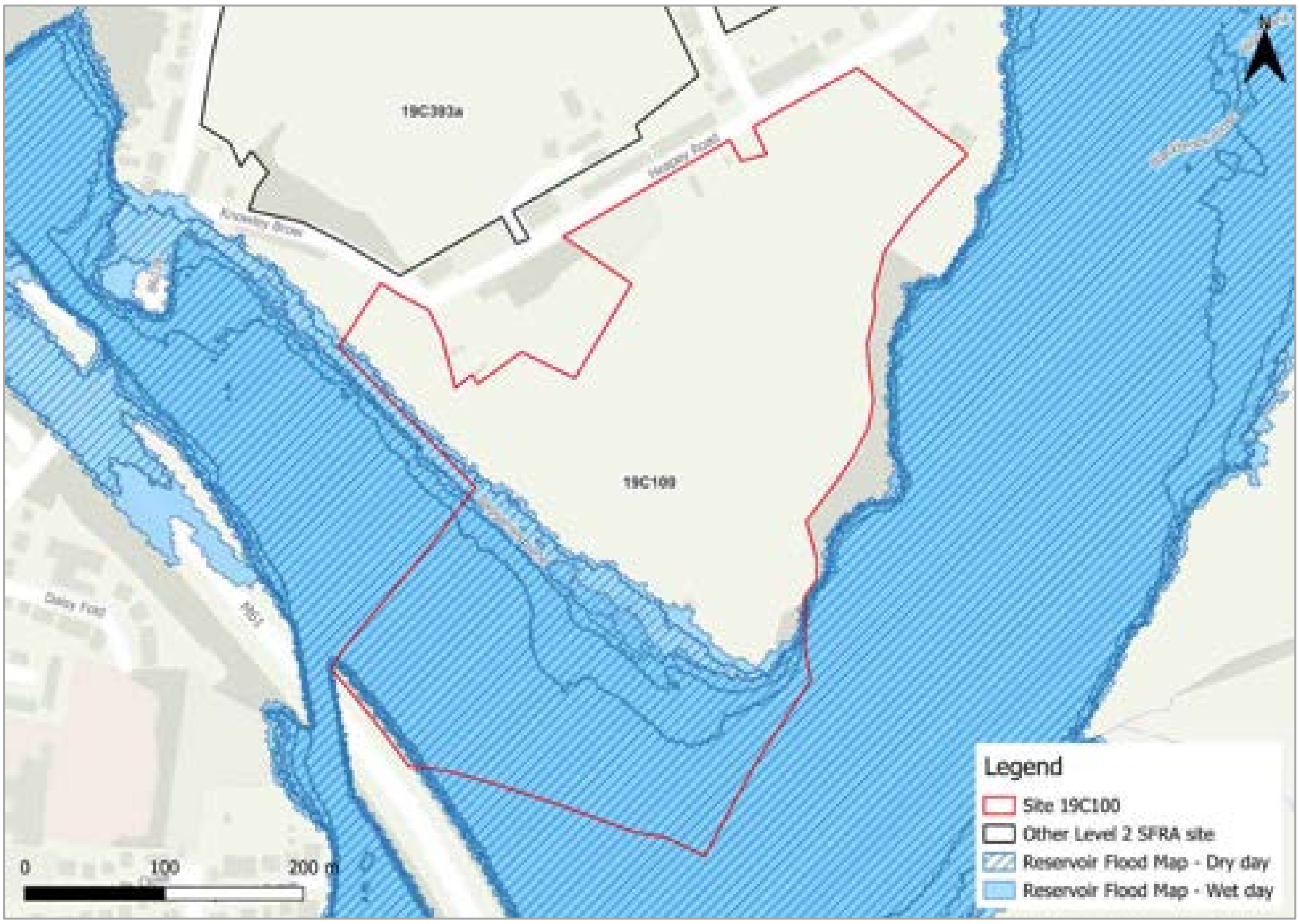

Figure 2-9 shows the RFM in a 'dry day' and 'wet day' scenario. A 'dry day' scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. 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 from Anglezarke, Heapey No.1, Heapey No.2, Heapey No.3, High Bullough and Yarrow reservoirs, all of which are located within Lancashire. Three of these reservoirs are operated by United Utilities and three are operated by Wigan & District Angling Association.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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. At the FRA stage, United Utilities and Wigan & District Angling Association, should be contacted to ascertain whether the proposed development could affect the reservoir's risk designation, it's 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.

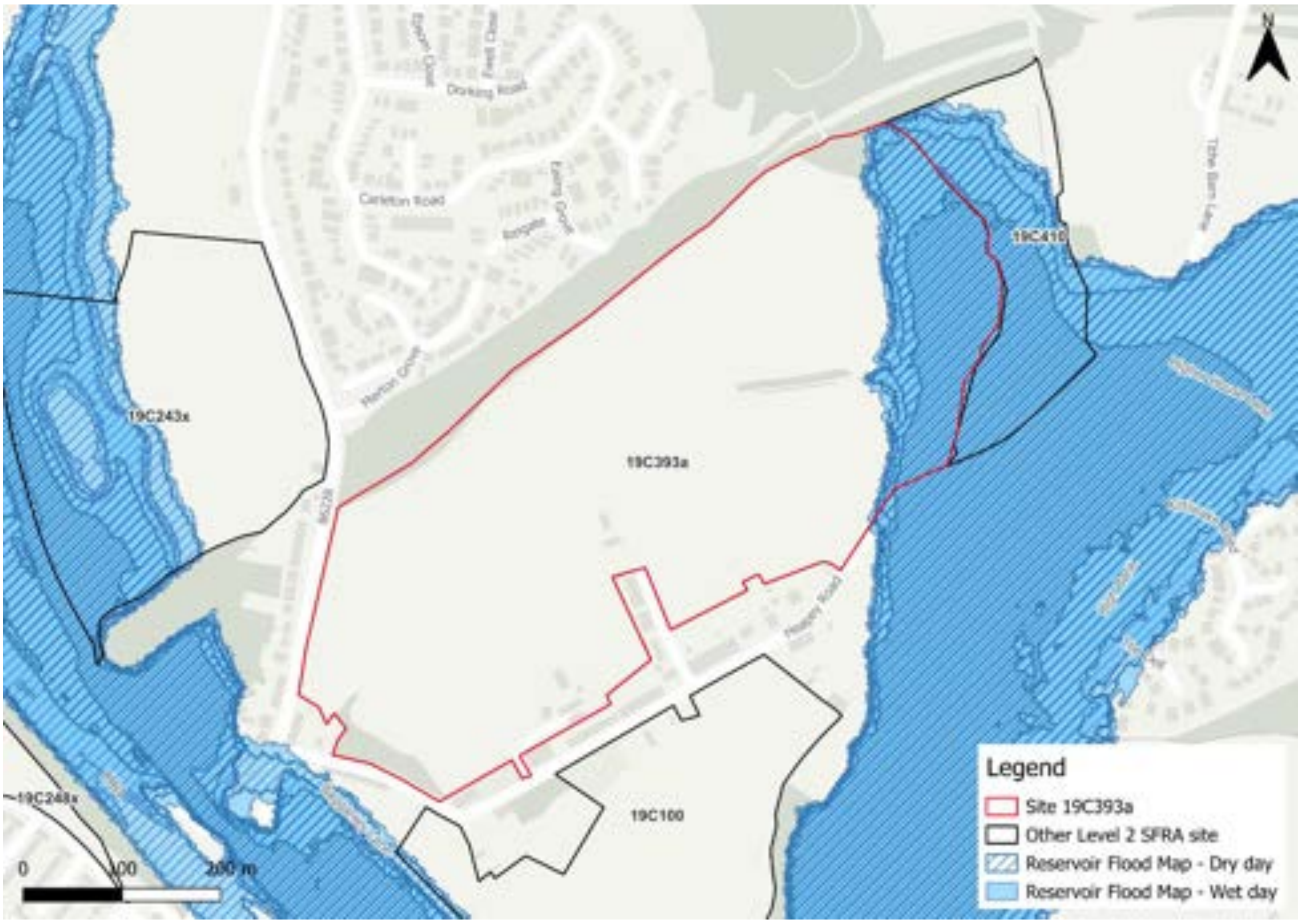

Figure 128-7: Flood risk from reservoirs

128.5 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

128.6 Flood warning and access and escape routes

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. Site 19393a is located within FWA, namely; 012FWFL59B - Black Brook at Chorley, Heapey Road to Cowling.

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 a FWA. The site is also located within a FAA, namely; 012WAFLY - River Lostock and River Yarrow.

Based on available information, safe access and escape routes could likely be achieved during a flood event via multiple locations surrounding the site.

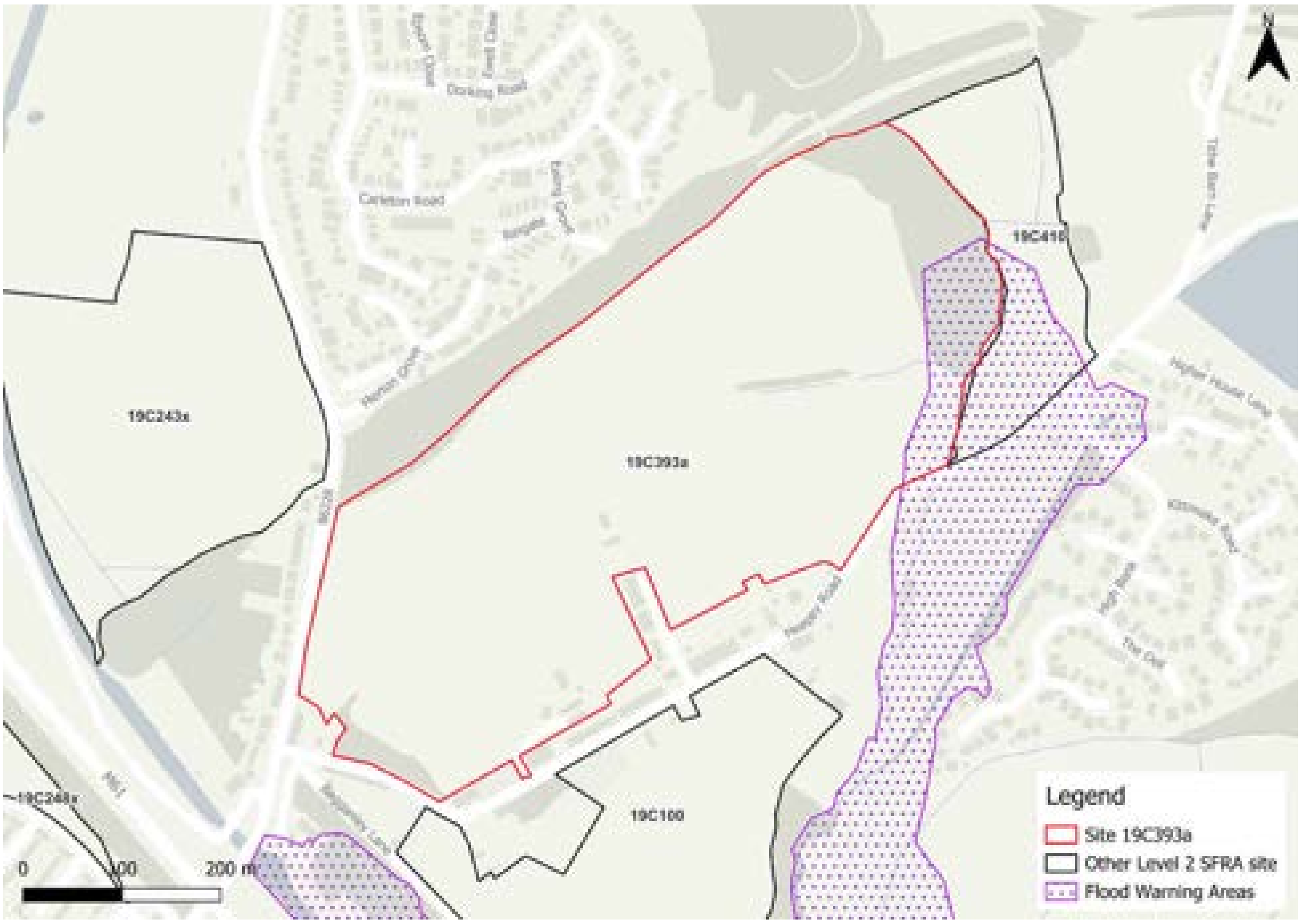

Figure 128-8: EA Flood Warning Areas

128.7 Observations, mitigation options and site suitability - fluvial

- The site is modelled to be within the functional floodplain along a reach of Black Brook. Development is not permitted within the functional floodplain. However, the functional floodplain in this area is conservatively based on an 8m buffer either side of the OS Open Rivers Watercourse link dataset.
- The reach of the Black Brook which flows adjacent to the site is not explicitly modelled in the 2011 Black Brook model. Detailed modelling of this reach should be considered as part of a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- Ordinary Watercourse Flood Defence Consent (OWFDC) may be required if development is planned within 8m of the riverbank. The LLFA can advise on whether this would be required. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
- The impacts of climate change on flood risk from the Black Brook have been modelled without flood defence infrastructure in place using climate change allowances for peak river flows for the Douglas Management Catchment. Based on this approach, fluvial risk is modelled to be significantly greater in extent to the present day 1% undefended event outputs, covering the eastern boundary of the site.

- More vulnerable development should be directed away from the area of the site within Flood Zone 3a plus climate change. However, as mentioned previously, the reach of the Black Brook which flows adjacent to the site is not explicitly modelled in the 2011 Black Brook model.
- The site is at potential residual risk from a possible blockage of the culvert beneath Heapey Road downstream of the site. It is recommended that the site-specific FRA should consider the impact of a blockage of this culvert on residual flood risk to the site.
- Safe access and escape should be possible via multiple locations around the site, based on available information.
- Given the potential reservoir risk to the site, developers should consider[80]:
    - Whether additional modelling is required to understand the flood risk from the reservoir, referring to the specification for the reservoir flood maps as a starting point
    - Whether the development may have an impact on the reservoir or reservoir owner
    - Referring to the Central Lancashire Level 1 SFRA for information on reservoir risk and recommendations for how to address it
    - Contacting the LPA for pre-application advice
    - Contacting the LPA to understand the need to consult with their emergency planning team and with the reservoir owner
- Were development of this site to proceed, given the proximity of this site to neighbouring site 19C410, and the fact that Black Brook borders both sites, 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.

80 Reservoir flood maps: when and how to use them | Environment Agency | 2021

129 Flood risk from surface water

129.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map surface water flood risk to the site is predominantly very low. Approximately 1% of the site is within the high risk surface water zone. A further 1% is at medium surface water risk and a further 3% is at low surface water risk, as shown in Table 129-1.

In the high risk event, surface water risk is confined to two small areas of ponding within topographic low spots in the centre of the site. In the medium risk event, the two areas of ponding are greater in extent and there is an additional surface water flow path in the ditch within the east of the site. In the low risk event, the flow path along the ditch within the eastern half of the site develops and joins the larger flow path along Black Brook. Greatest flood depths in the medium risk event are between 0.6 m and 0.9 m (Figure 3-1), with some areas of hazard categorised as significant (Figure 3-2).

Table 129-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
95	3	1	1

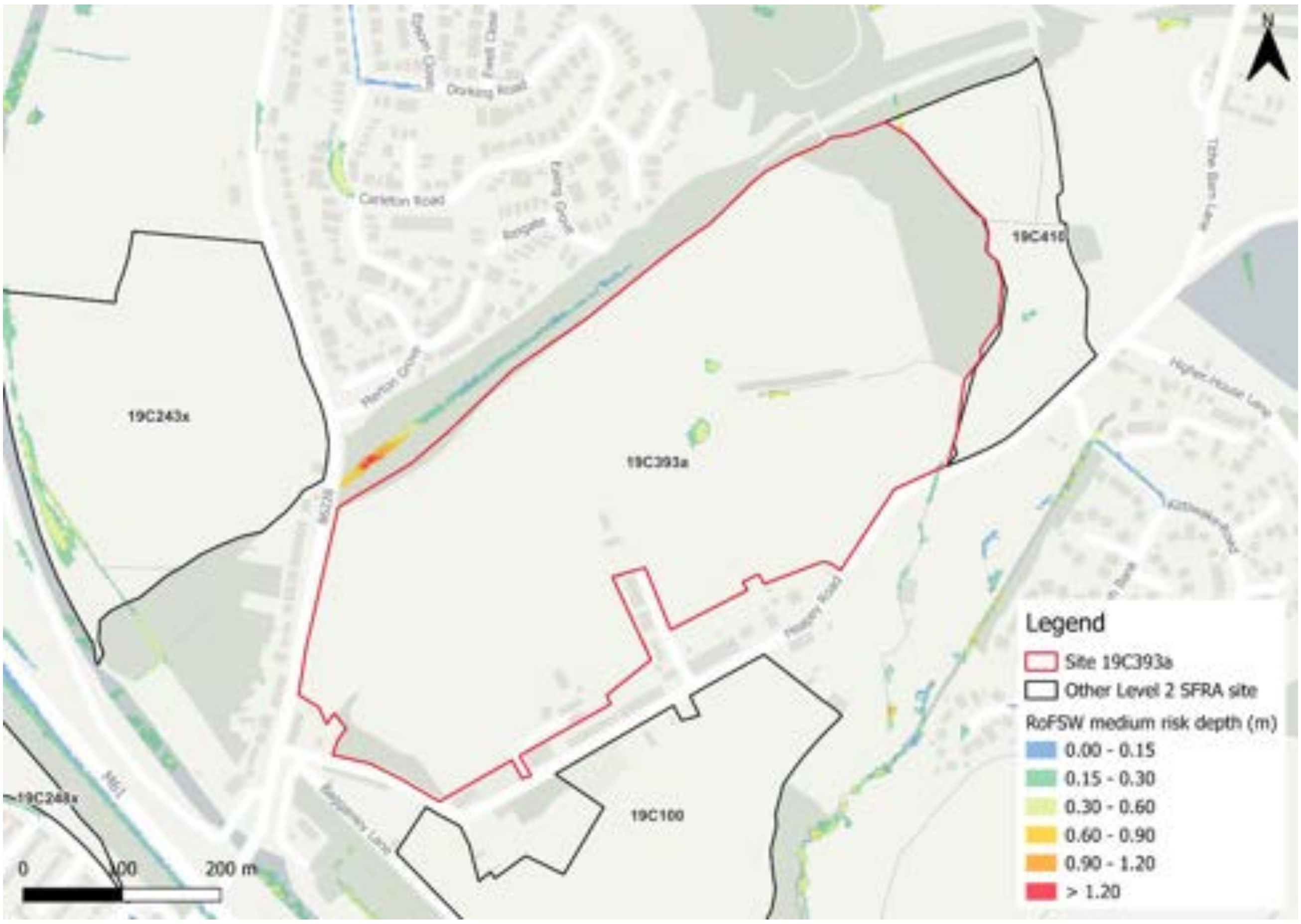

Figure 129-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

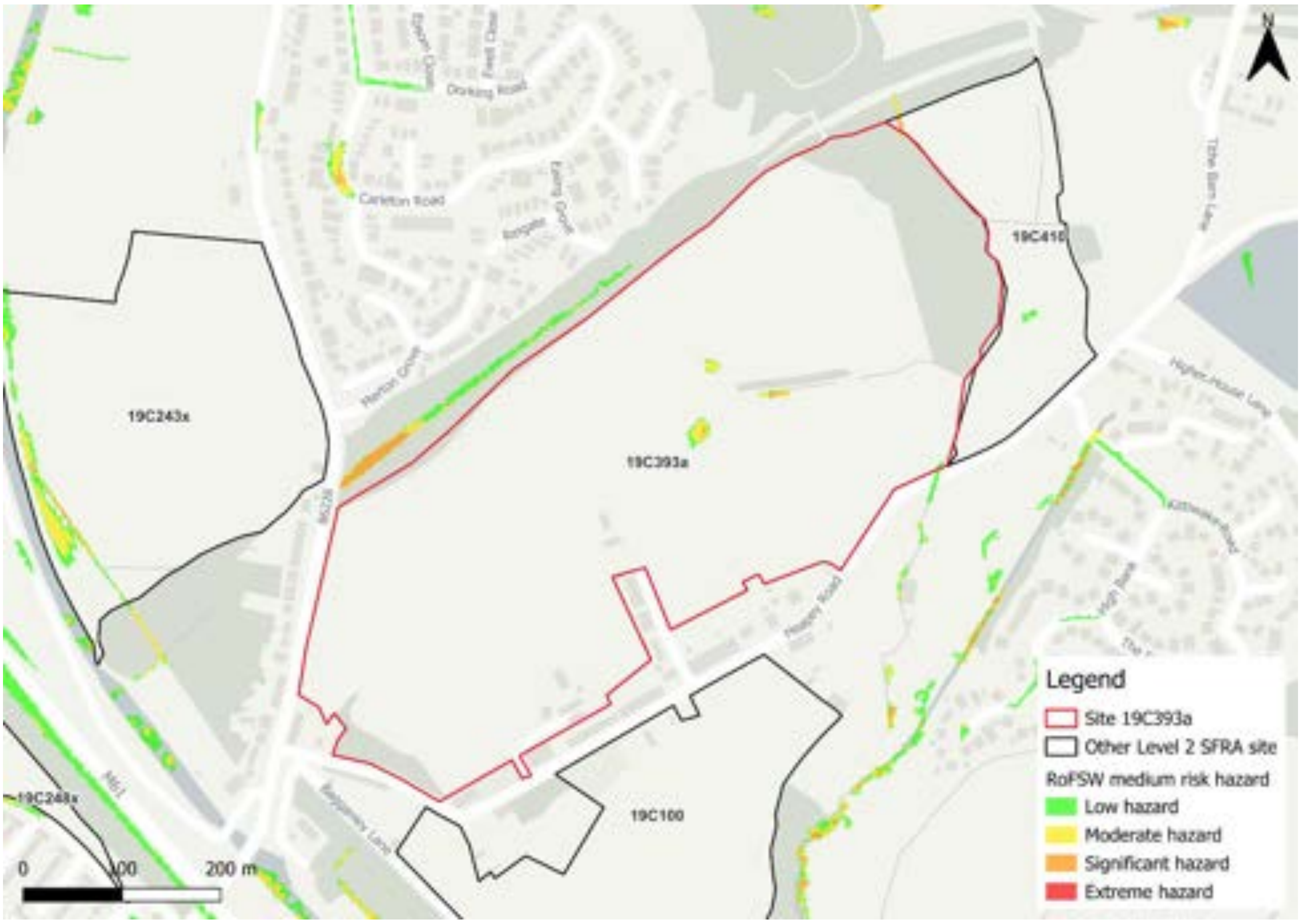

Figure 129-2: Medium risk event surface water flood hazard[81] (Risk of Flooding from Surface Water map)

129.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 129-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

81 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

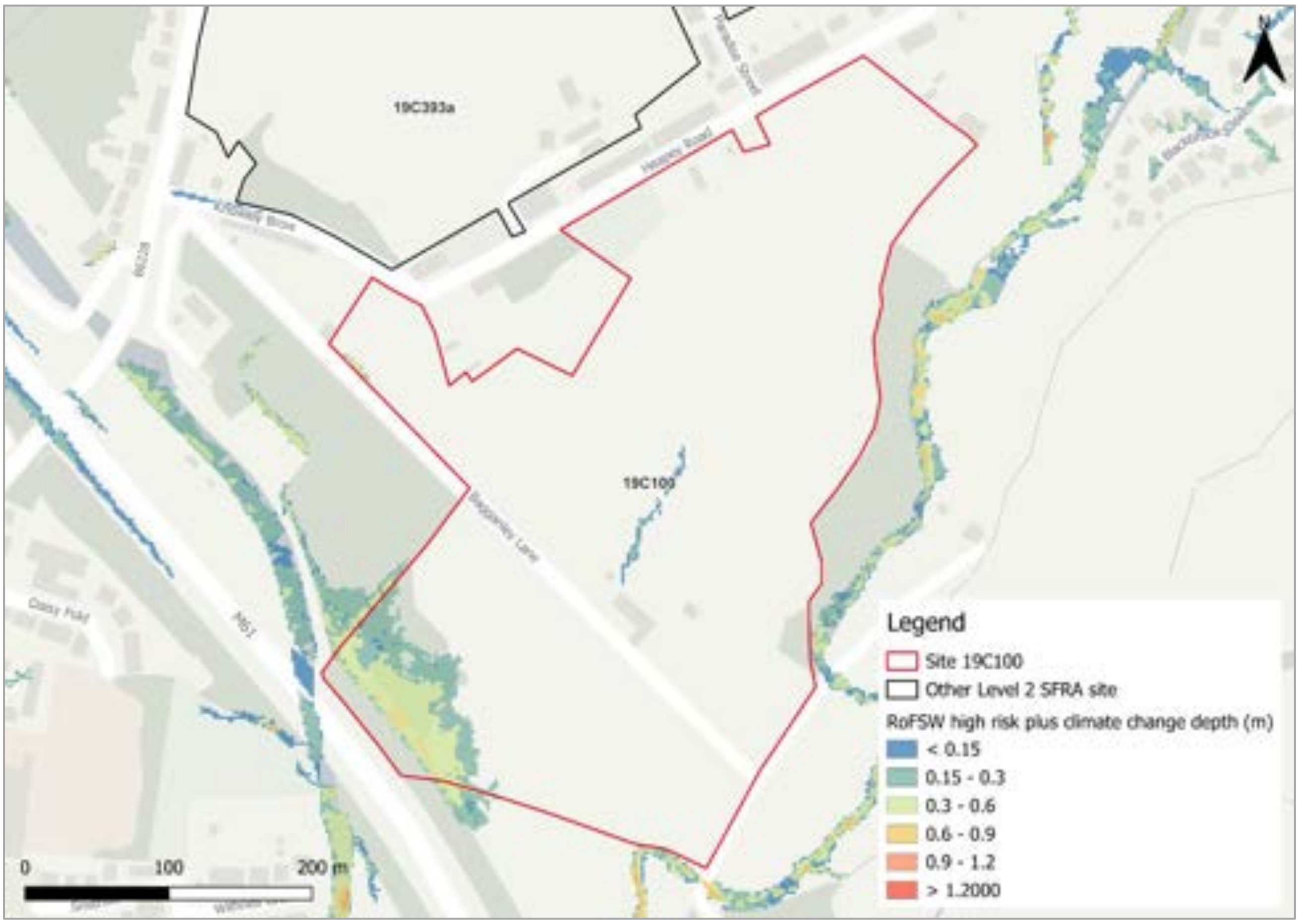

Figure 3-3 shows the flood depths during the medium risk surface water flood event plus an allowance for climate change. Risk is modelled to be greater in extent than the present day medium risk surface water event, similar to the present day low risk event. The two areas of ponding within the centre of the site extend to join the flow path along the drainage ditch within the east of the site. Maximum flood depths are modelled to be between 0.9 m and 1.2 m and with areas of hazard categorised as significant (Figure 3-4). Safe access and escape should remain achievable via multiple locations around the site.

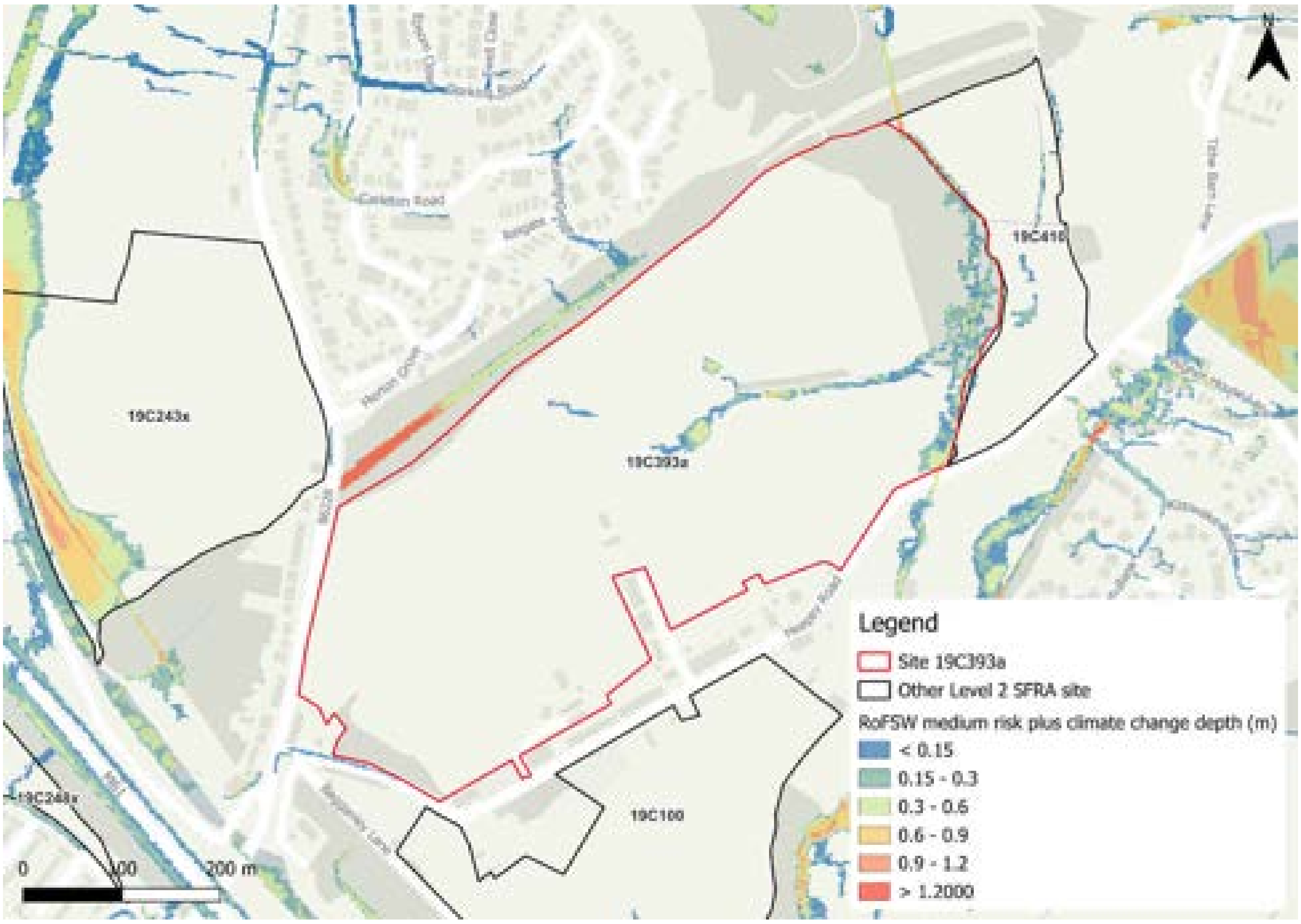

Figure 129-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

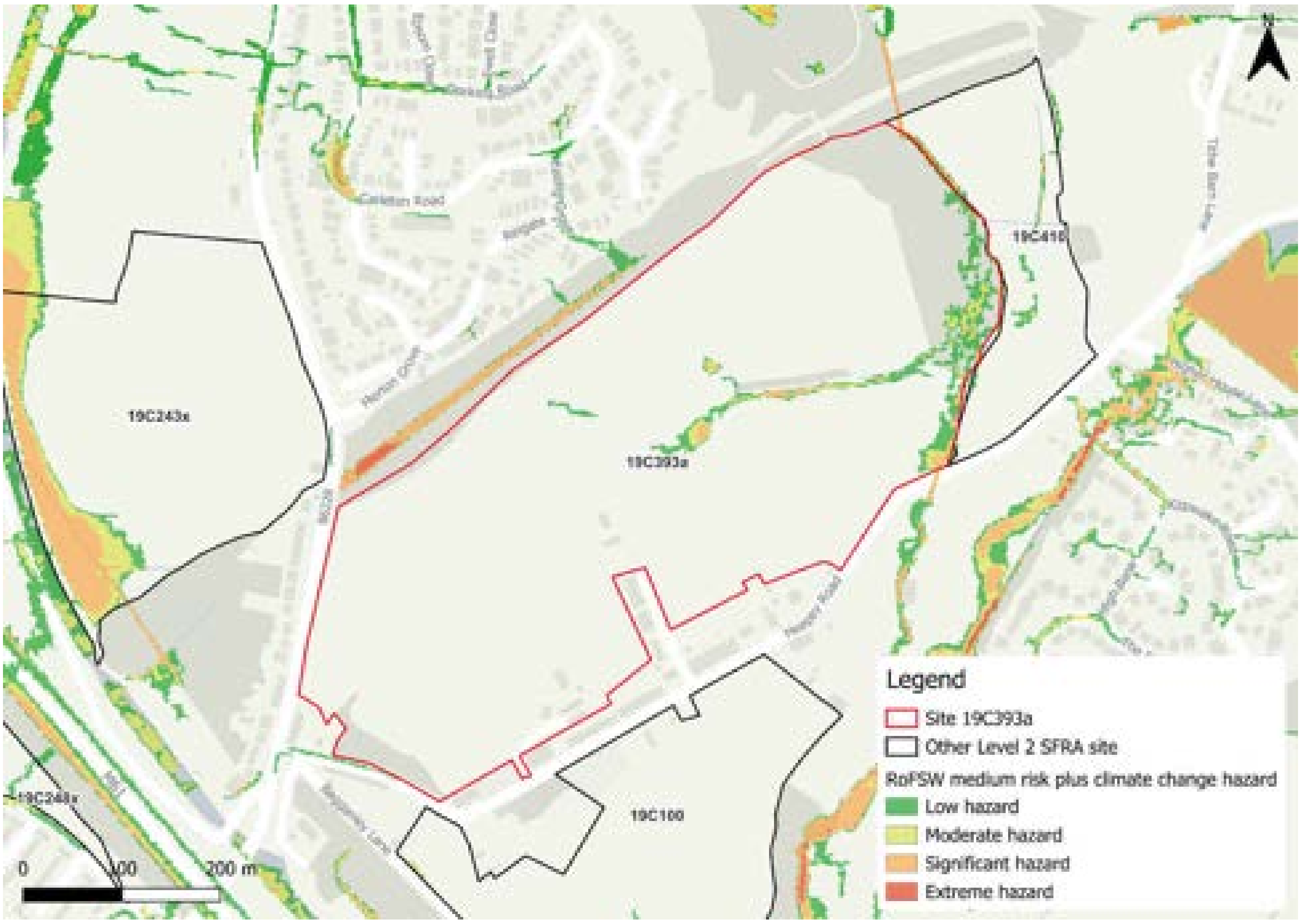

Figure 129-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

129.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 95% of the site being at very low risk. Surface water risk in the high risk event is confined to two areas of ponding within the centre of the site, which become greater in extent in the medium risk event. In the low risk event, a flow path along the drainage ditch within the east of the site develops and extends to the large flow path along Black Brook.
- Safe access and escape routes should be achievable via multiple locations around the site in all events.
- The effects of climate change on surface water have been modelled for this SFRA using the medium risk surface water flood depths plus 45% climate change. Surface water risk is greater than present day flood risk with more defined surface water flow paths and areas of ponding across the site. Any existing flow paths and topographic depressions should be maintained in site design.
- Were development plans to proceed, a full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a

result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.

- 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 or evidence.

130 Risk from groundwater

Risk from groundwater sources 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 Guide[82]. Figure 4-1 shows the map for Site 19C393a and the surrounding areas and Table 130-1 explains the risk classifications.

Risk of groundwater emergence varies across the site. Within the east of the site, there is a risk groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots. Through the centre of the risk, there is a risk of groundwater emergence to subsurface assets. Groundwater emergence is unlikely across the rest of the site. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions.

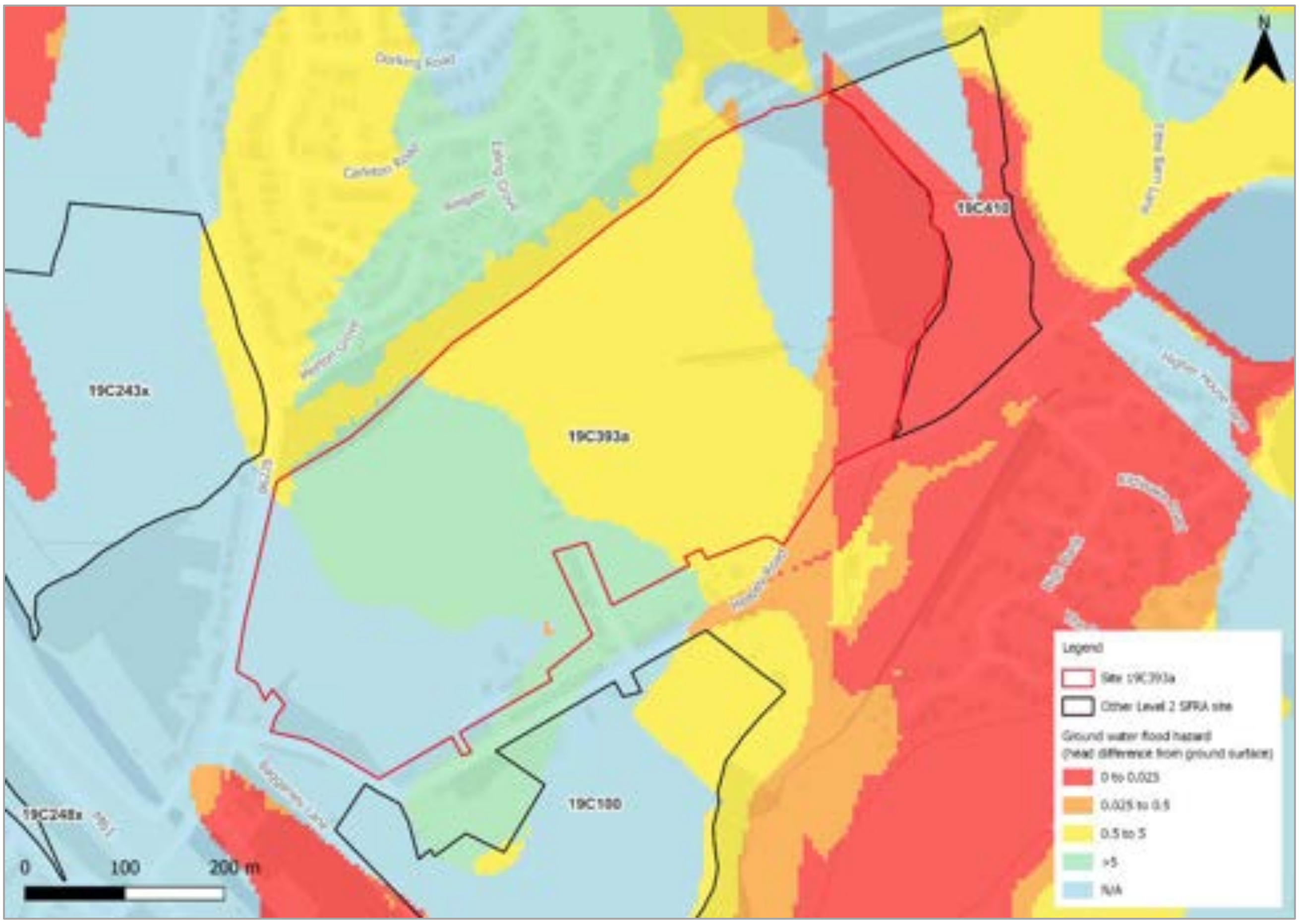

Figure 130-1: JBA 5m Groundwater Emergence Map

82 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 130-1: Groundwater Flood 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.	

131 Overall site assessment

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

The site is modelled to be at risk in the 1% AEP plus climate change event and is therefore required to pass part b) of the exception test[83]. It must be proven that the development can be safe for its lifetime, which is 100 years for residential development. This site should be able to pass the exception test if development avoids the area of the site modelled to be at risk in the 1% AEP undefended event plus higher central climate change allowance.

131.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to NPFF.
- Given the change in use and therefore vulnerability of the site. The FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRC-PPG).
- There should be no development within the functional floodplain. There should be no development within 8m of Black Brook. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Updated present day and climate change modelling of the reach of Black Brook adjacent to the site should be used to update this Level 2 SFRA at the earliest opportunity to provide a robust strategic assessment of flood risk to this site and surrounding areas. It would also be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- Residual risk to the site from a possible blockage of the culvert beneath Heapey Lane should be considered as part of a site-specific FRA.
- Based on current information, this site could be allocated if more vulnerable development avoids the area within the functional floodplain and the area to the south of the site modelled to be at risk in the 1% AEP event + 47% climate change following detailed modelling of the reach of Black Brook adjacent to the site.
- A detailed drainage strategy will be required for any new development given the large area of this site being converted from open space to development.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.

83 Para 178 National Planning Policy Framework 2024

- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C394a

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0013
Revision	P02
Prepared by	Freya Nation BSc Analyst
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Contract

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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Freya Nation of JBA Consulting carried out this work.

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Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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133 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C394a. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

133.1 Site 19C394a

- Location: Camelot Theme Park
- Existing site use: Mixed use (defunct theme park, hotel, green space)
- Existing site use vulnerability: More vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 26.9 hectares
- Proposed development impermeable area: 22.9 hectares (assumed 85% impermeable area)
- EA model: N/A
- Watercourse: Unnamed watercourse (tributary of Syd Brook)
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of modelled fluvial flood depths and hazards
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 133-1: Existing site location boundary

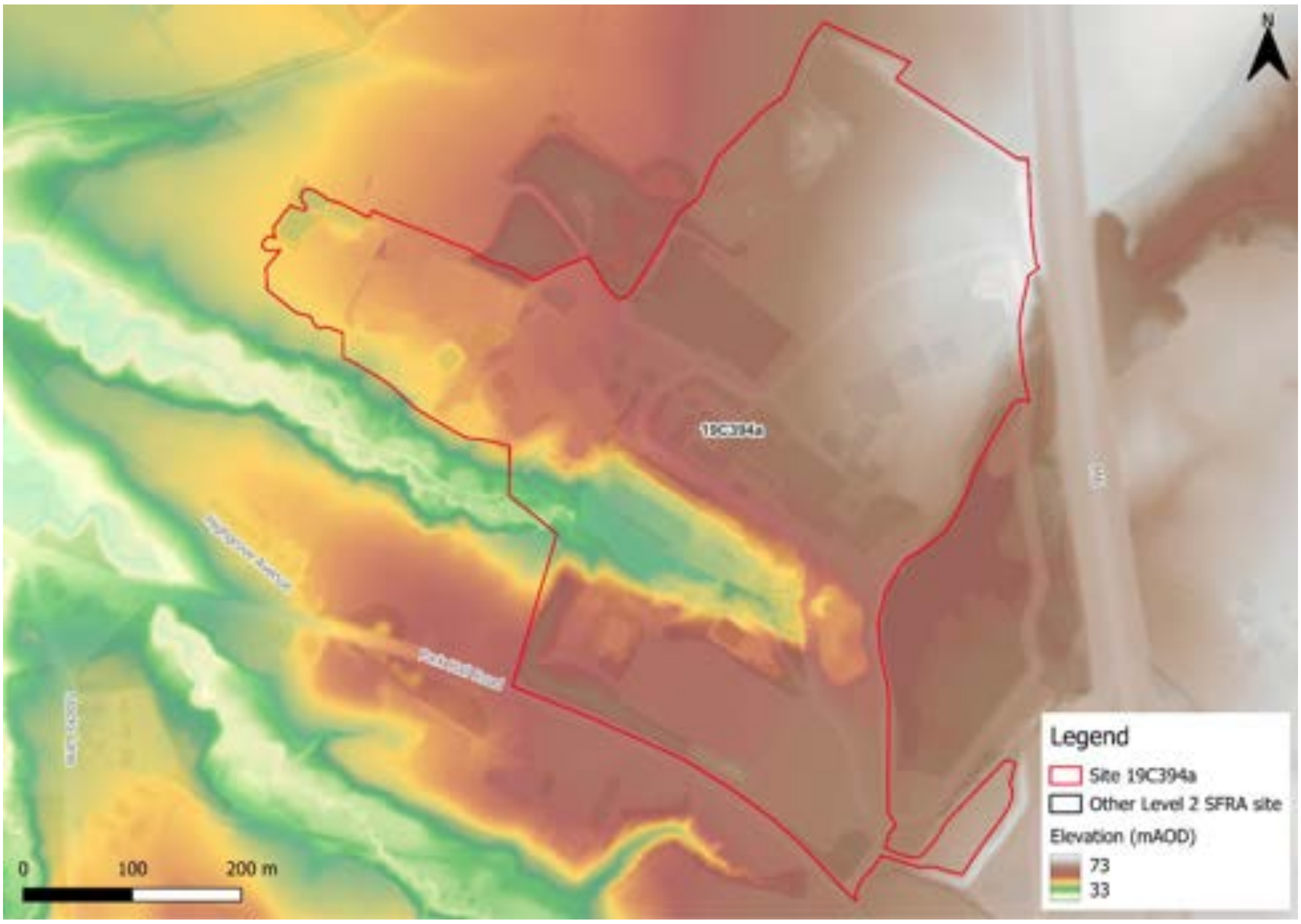

Figure 133-2: Topography

134 Flood risk from rivers

134.1 Existing risk

134.1.1 Flood Map for Planning and functional floodplain

Based on the EA's Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the Central Lancashire Level 1 SFRA (2025), the percentage areas of the site within each fluvial flood zone are stated in Table 2-1 and can be viewed on Figure 134-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.3) or the impacts of climate change (Section 2.2).

Approximately 2% of the site is within Flood Zone 3b which is the channel of an unnamed tributary of Syd Brook flowing through the site. The functional floodplain in this location is conservatively based on an 8m buffer either side of the OS Open Rivers dataset. The remaining area of the site is within Flood Zone 1.

Modelling of the unnamed watercourse may be required to fully ascertain the risk from this watercourse to the site.

There is also an ornamental pond know as 'The Dam' on the eastern boundary of the site.

Table 134-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
98	0	0	2

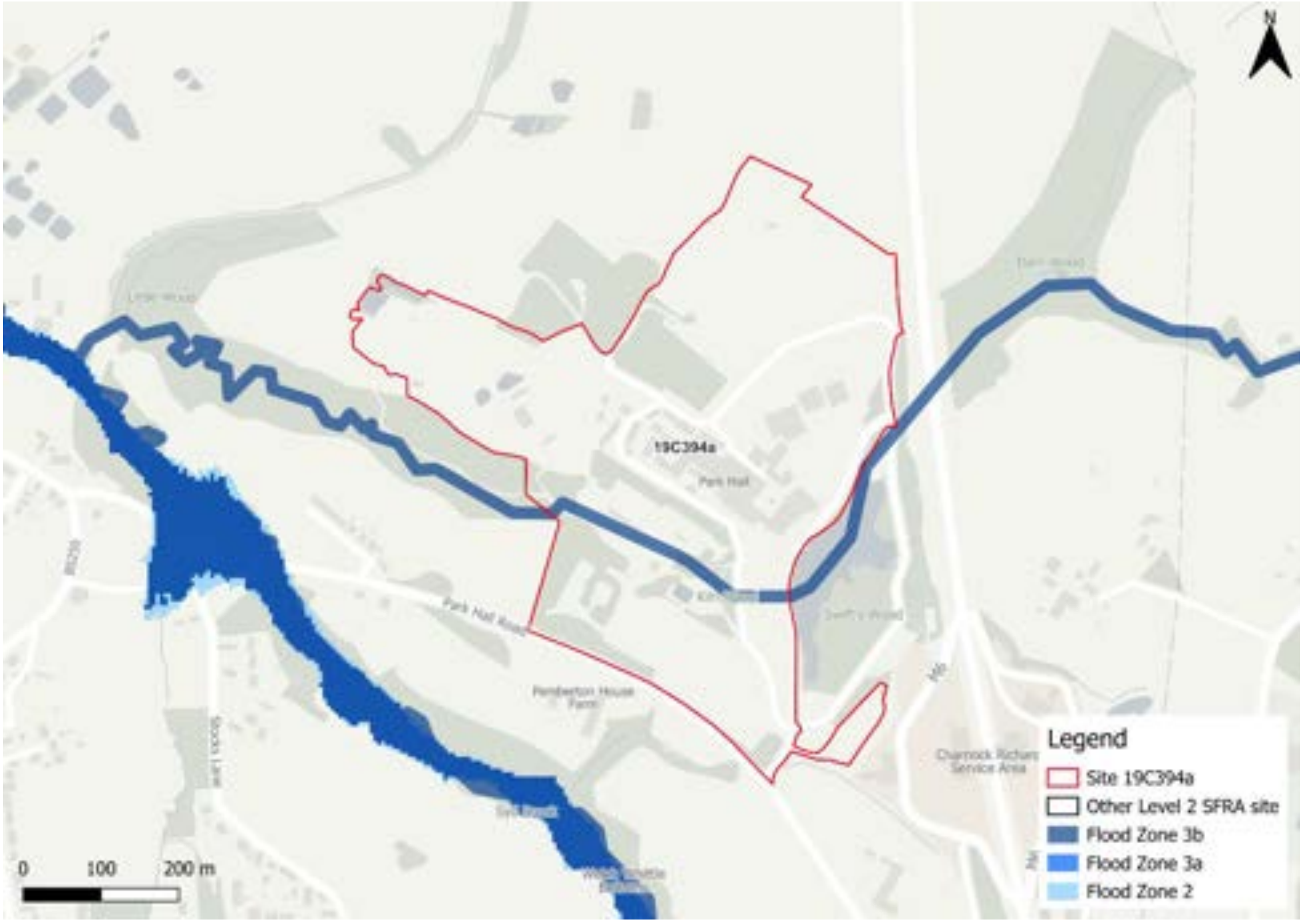

Figure 134-1: Existing risk from rivers to the site

134.2 Impacts from climate change

The impacts of climate change on flood risk from the unnamed watercourse have not been modelled for this SFRA due to a model not being available.

The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to robustly inform on fluvial flood risk to the site. Therefore, any updates to this Level 2 SFRA and/or any FRA should assess and model the unnamed watercourse.

134.3 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

134.3.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C394a is located within two catchments, namely; Syd Brook and Yarrow DS Big Lodge Water. The majority of the site is located within a medium sensitivity catchment. Planning policy considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[84].
- Developments should be incentivised to provide wider betterment by demonstrating in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments should achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

134.3.2 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. There are opportunities for riparian and wider catchment tree planting, which can intercept, slow, store and filter water around the site. Upstream of the site there is also potential for runoff attenuation features to reduce the rate of flooding downstream. These areas are show in Figure 134-2.

84 Lancashire SuDS Guidance

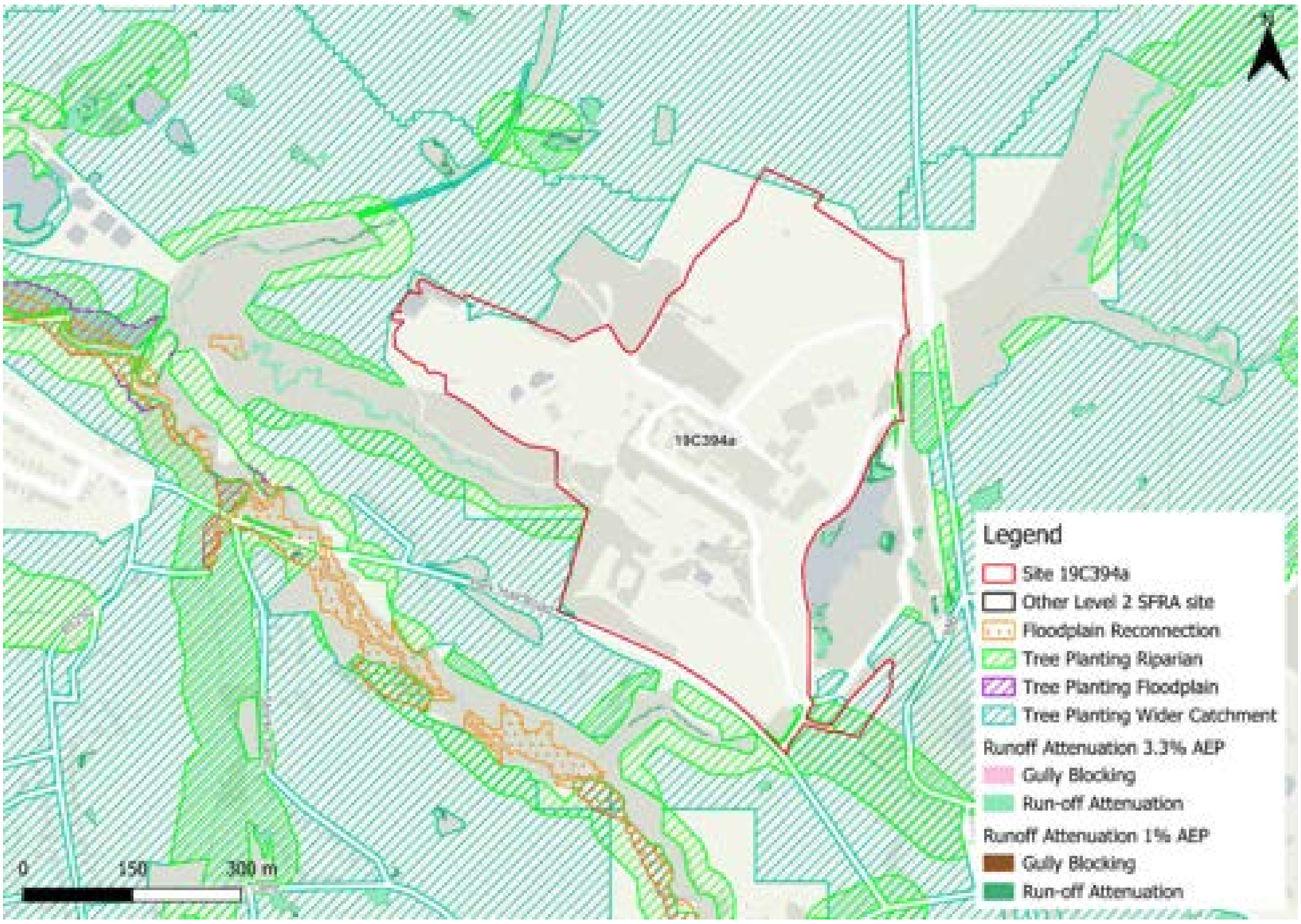

Figure 134-2: Natural Flood Management (NFM) potential mapping

134.4 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 bridge openings.

The site is potentially at residual risk from potential blockages of the culverted sections of the unnamed watercourse (Figure 134-3). The impacts of culvert blockages have not been modelled as part of this Level 2 SFRA given the absence of an existing flood model for the watercourse. It is recommended that the impact of a blockage of these culverts should be assessed in order to inform on residual flood risk to the site. Options for culvert removal should be assessed and inclusion of an open watercourse in site design. There should be no development over any existing culverts or watercourses.

Figure 134-3: Potential blockage locations

134.4.1 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. 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 not modelled to be at risk from reservoir flooding.

134.5 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

134.6 Flood warning and access and escape routes

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. The 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 a FWA. The site is not located within a FAA.

Based on available information, safe access and escape routes are available from multiple locations.

134.7 Observations, mitigation options and site suitability - fluvial

- The unnamed watercourse flowing through the site is unmodelled and culverted in several locations. The watercourse is therefore not included in the Flood Map for Planning and modelled depth and hazard information is not available. A fully robust assessment of fluvial flood risk to this site cannot therefore be carried out.
- The functional floodplain is conservatively based on an 8m buffer of the watercourse and does not therefore represent modelled flood risk to the site.
- A flood model of the unnamed watercourse should be built to fully ascertain risk from this watercourse.
- The unnamed watercourse should be allowed to flow unobstructed and should be included in site design. No development should take place within 8 metres of the watercourse, including the culverted sections.
- Deculverting should be investigated to open up the watercourse as there is a residual risk associated with potential blockages of the culverts.
- Potential risk from the ornamental pond should be investigated.

135 Flood risk from surface water

135.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water flood risk to the site is predominantly very low. Approximately 1% of the site is within the high risk surface water zone. A further 1% is at medium surface water risk and a further 3% is at low surface water risk as shown in Table 135-1.

In the high and medium risk events, surface water risk is scattered across the site. Ponding is shown in topographic low spots within the site and is constrained by the existing development. In the low risk event, two distinct flow paths are present through the centre of the site. One of these is coincident with the unnamed watercourse through the site.

Greatest flood depths in the medium risk event are >1.2 m (Figure 3-1) with some areas of significant hazard (Figure 3-2), however these are confined to the existing channel within the site. Maximum depths outside of the channel are between 0.9 and 1.2 m with areas of hazard classified as significant. Safe access and escape should be achievable via Park Hall Road to the south of the site in all events given the modelled shallow depths of flooding along the road.

Table 135-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
95	3	1	1

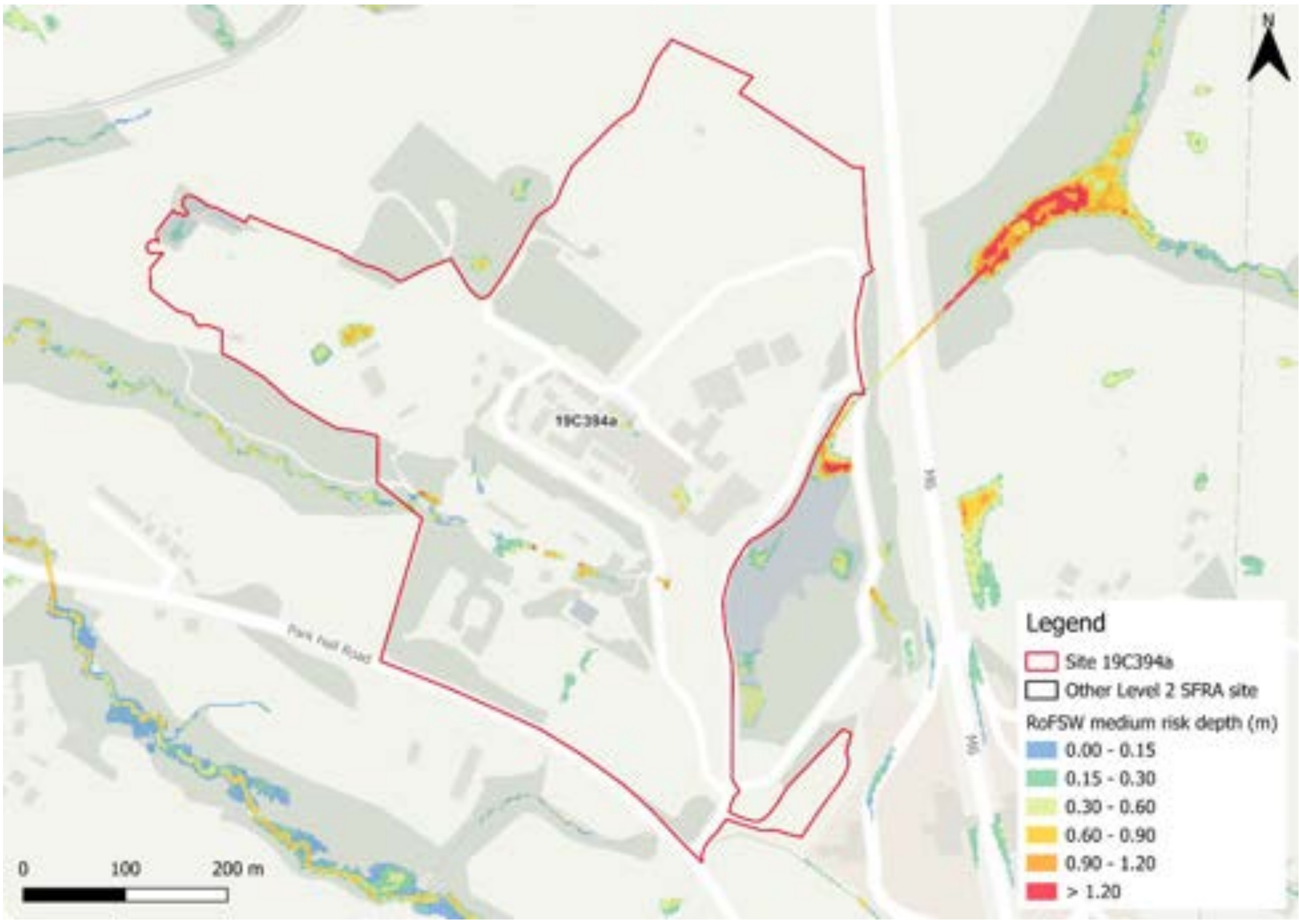

Figure 135-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

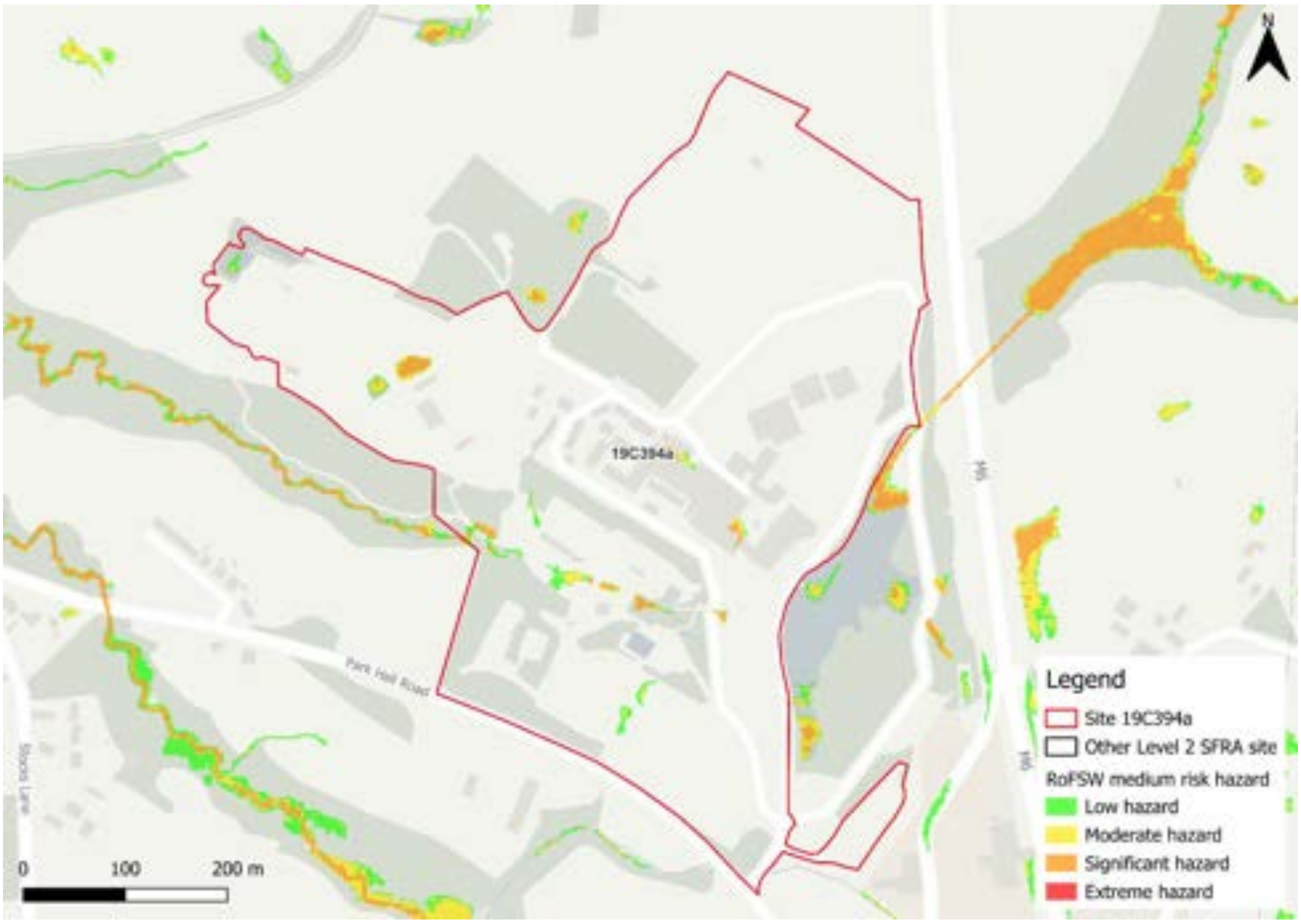

Figure 135-2: Medium risk event surface water flood hazard[85] (Risk of Flooding from Surface Water map)

135.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 135-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

85 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

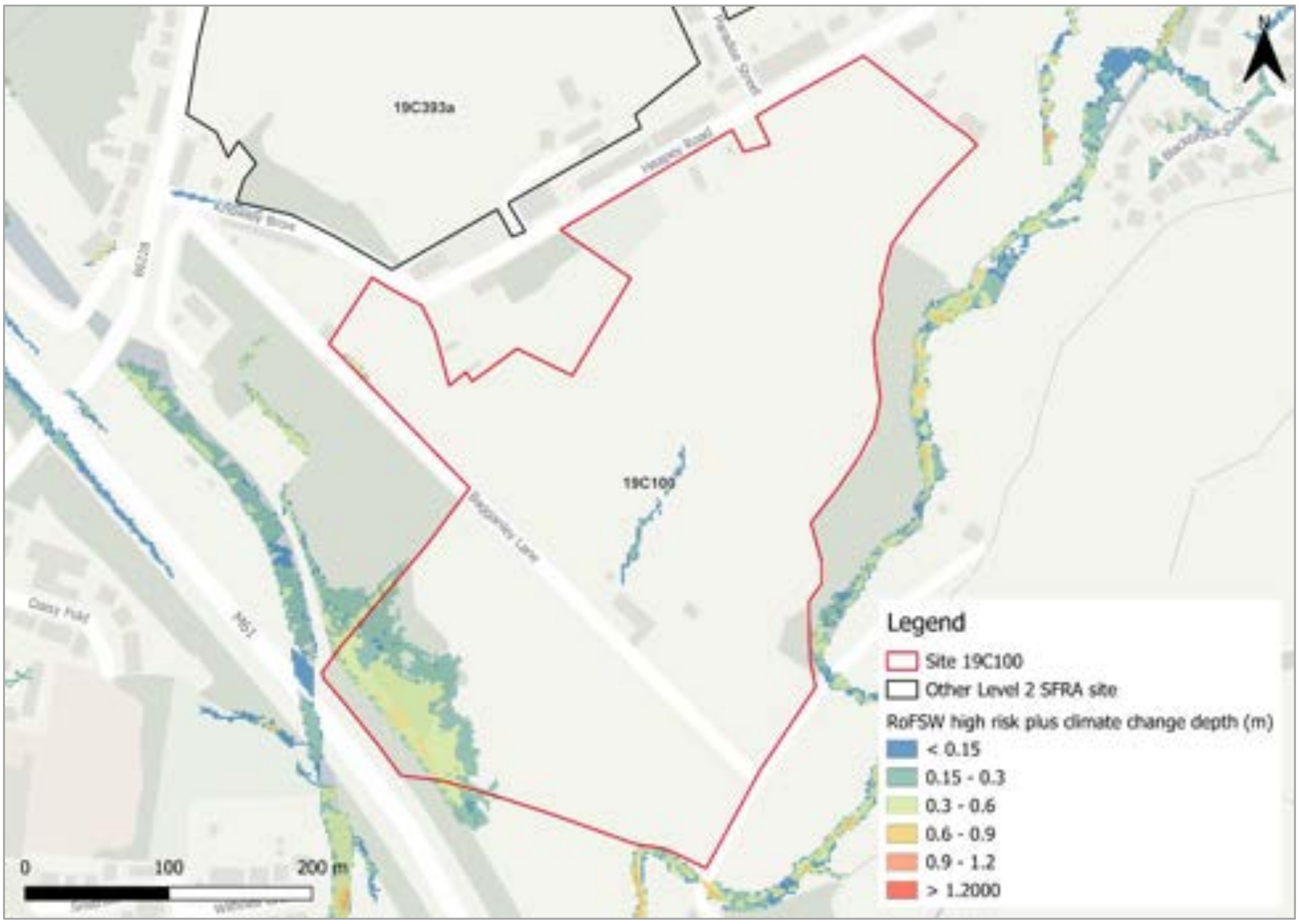

Figure 3-3 shows the modelled surface water flood depths for the medium risk event +45% climate change. Risk is modelled to be greater than for present day conditions, with the medium risk climate change event showing a similar level of risk to the low risk present day event. Greatest flood depths within the site are located within the existing channel. Maximum flood depths outside of the channel are between 0.9 and 1.2 m (Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

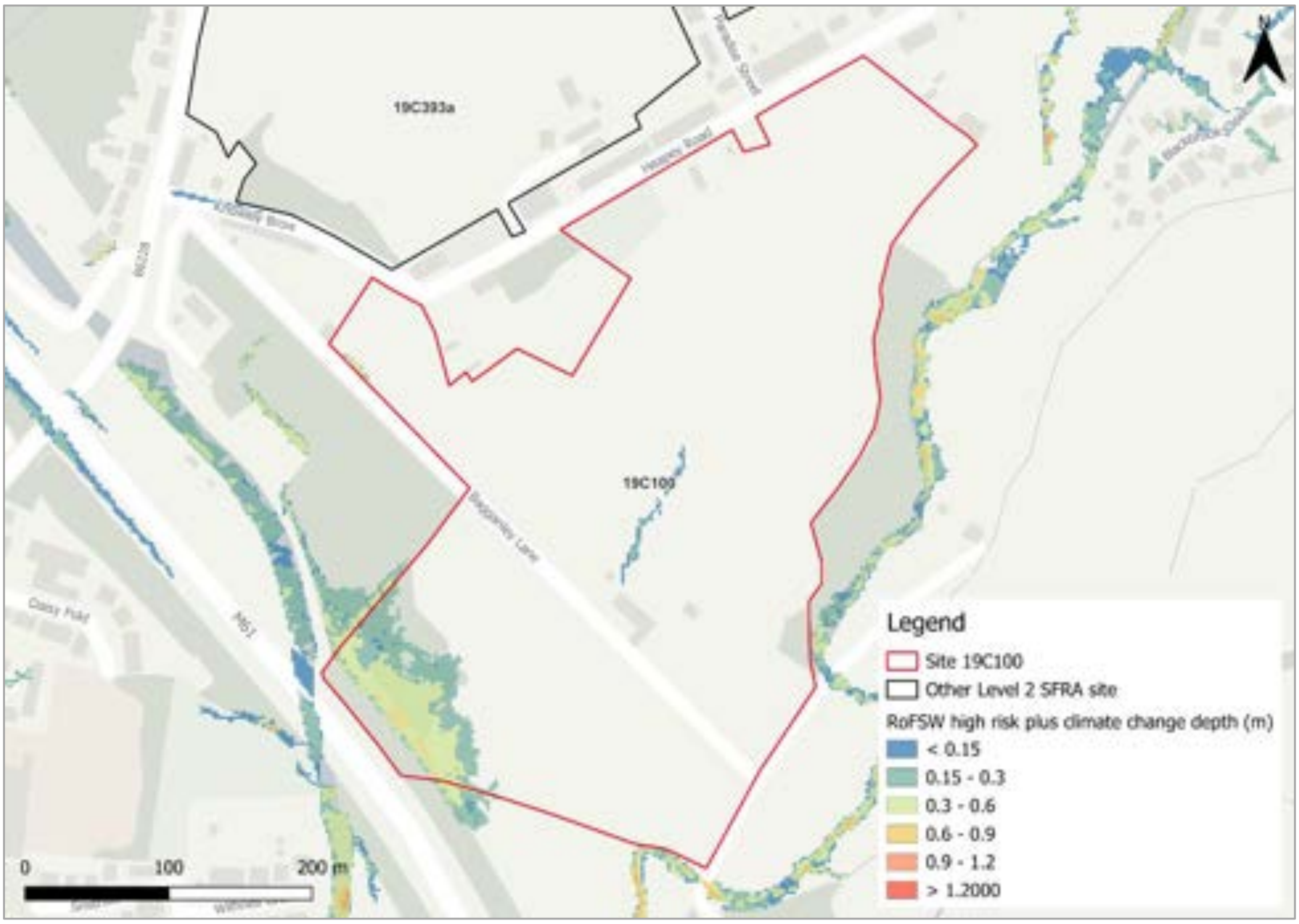

Figure 3-3) with areas of hazard categorised as significant (Figure 3-4).

Although Park Hall Road is inundated during the medium surface water risk plus climate change event, safe access and escape routes should remain achievable given the modelled shallow depths.

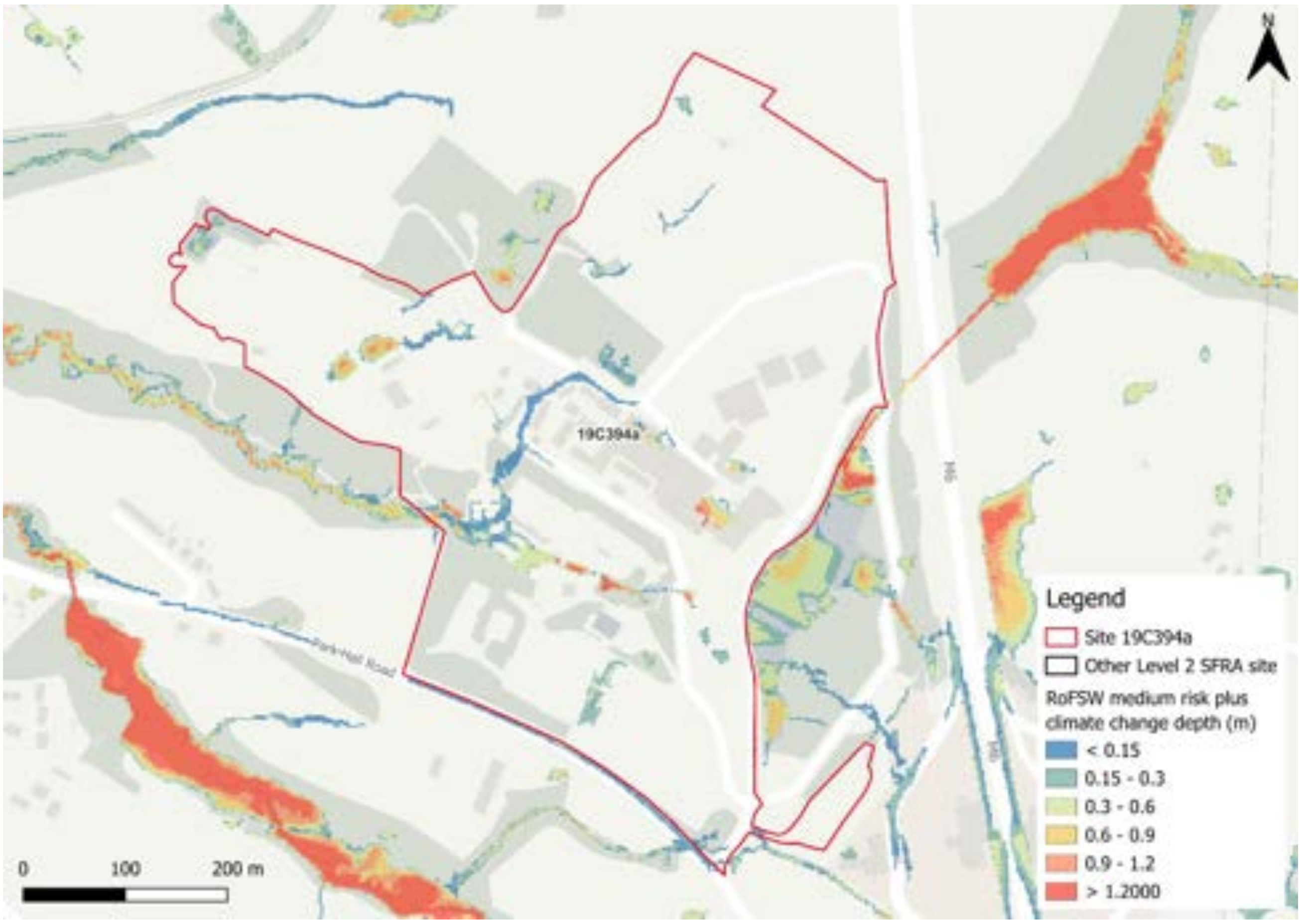

Figure 135-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

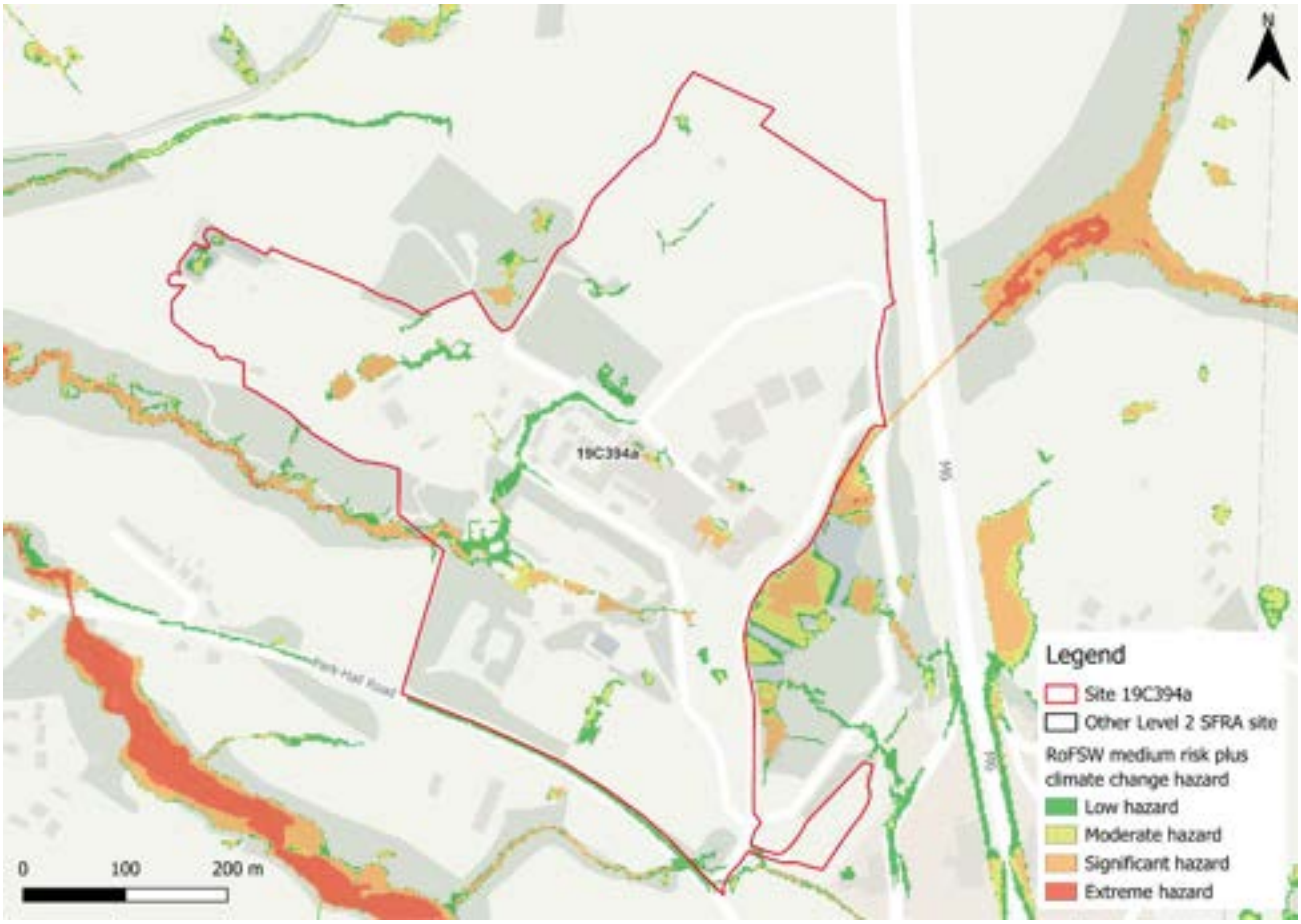

Figure 135-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

135.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 95% of the site being at very low risk. Surface water risk in the medium risk event is scattered across the site, largely ponding within topographic low spots and is constrained by existing development.
- In the low risk event and medium risk surface water event plus climate change, existing areas of ponding increase in extent and two flow paths form through the centre of the site. Any existing topographic depressions and flow paths should be maintained in site design.
- Safe access and escape routes should remain achievable via Park Hall Road in all events.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS across large areas of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could

accommodate the proposed residential development or whether further capacity will be required.

- It is assumed the existing onsite developments will be demolished for new housing units. A drainage strategy would therefore be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and consultation with the LLFA.
- Site runoff should be maintained at current rates and, where possible, betterment should be achieved.
- Note, 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 or evidence.

136 Risk from groundwater

Risk from groundwater sources 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 Guide[86]. Figure 4-1 shows the map for Site 19C394a and the surrounding areas and Table 136-1 explains the risk classifications.

Within the northeast of the site, there is a risk of groundwater emergence to surface and subsurface assets. The south and centre of the site comprises areas where there is a risk of emergence to subsurface assets, but surface manifestation of groundwater is unlikely. Across the rest of the site, there is no risk of groundwater emergence. Therefore, groundwater conditions may be suited to infiltration SuDS across the majority of the site.

Figure 136-1: JBA 5m Groundwater Emergence Map

86 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 136-1: Groundwater Flood 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.	

137 Overall site assessment

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

This site is not required to pass part b) of the exception test[87], as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

The areas of flood risk within this site cannot be developed until the required information detailed in this SFRA on existing and future flood risk from Syd Brook is fully ascertained. This is because, at this stage, it cannot be proven that the site can remain safe for its lifetime. The site can only be allocated if all development can be directed to areas of low flood risk.

Were additional, more detailed modelled information on flood risk become available through an update to the SFRA or through a site-specific FRA, that show the risk area to be lower than currently shown, more of the site could then be developed. Conversely, were the risk to be greater, any development must account for this. Flood risk elsewhere should not be increased as a result of development.

137.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Updated flood modelling for the present day and with the impacts of climate change of the unnamed tributary of Syd Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide a robust strategic assessment of flood risk to this site and surrounding areas in order to allocate the site.
- Were this site to be allocated based on the information presented in this Level 2 SFRA, the LPA must make it clear that this site cannot be developed until the required information detailed in this report on existing and future flood risk from the unnamed tributary of Syd Brook is fully ascertained.
- There should be no development within the functional floodplain. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- A detailed drainage strategy will be required for any new development, given the large area of the site likely to be cleared to make way for new development. This may require surface water modelling based on layout plans and detailed design and full consultation with the LLFA on required runoff rates, likely to be to not exceed current rates or betterment on current rates. The use of infiltration SuDS should be investigated.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.

87 Para 178 National Planning Policy Framework 2024

- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C399a

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0012
Revision	P02
Prepared by	Dominic Richardson BSc Analyst
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Contract

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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Dominic Richardson 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 19 August 2024 and 14 February 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.

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Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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Contents

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139 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C399a. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

139.1 Site 19C399a

- Location: Orchard Heys Farm
- Existing site use: Brownfield, farm buildings
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 0.6 hectares
- Proposed development impermeable area: 0.5 hectares
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 139-1: Existing site location boundary

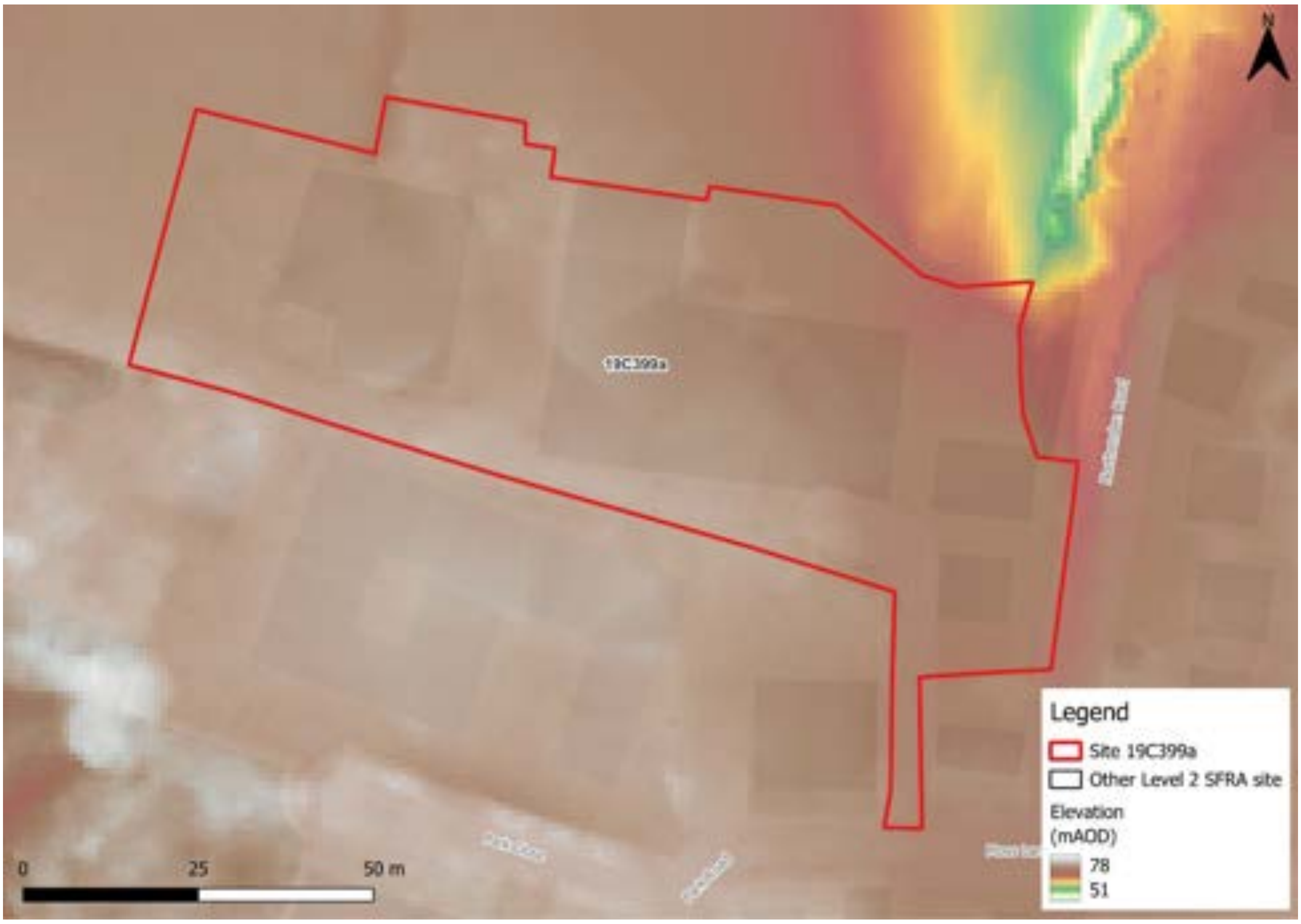

Figure 139-2: Topography

140 Flood risk from rivers

140.1 Existing risk

140.1.1 Flood Map for Planning and functional floodplain

Based on the EA's Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the Central Lancashire Level 1 SFRA (2025), the percentage areas of the site within each fluvial flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 140.2) or the impacts of climate change.

The entire site is shown to be located within Flood Zone 1 and therefore at low risk of flooding from rivers.

Table 140-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 140-1: Existing risk from rivers to the site

140.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA’s spatial flood defences dataset.

140.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C399a is located within one catchment, namely; Yarrow DS Big Lodge Water. This is ranked as a low sensitivity catchment. Planning considerations that apply to all sites in relation to the cumulative impacts of development can be found in Appendix G of the Level 1 SFRA.

140.2.2 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. Both within and upstream of the site, there is significant potential for wider catchment tree planting. Tree planting can intercept, slow, store and filter water reducing run-off downstream. This area is shown on Figure 140-2.

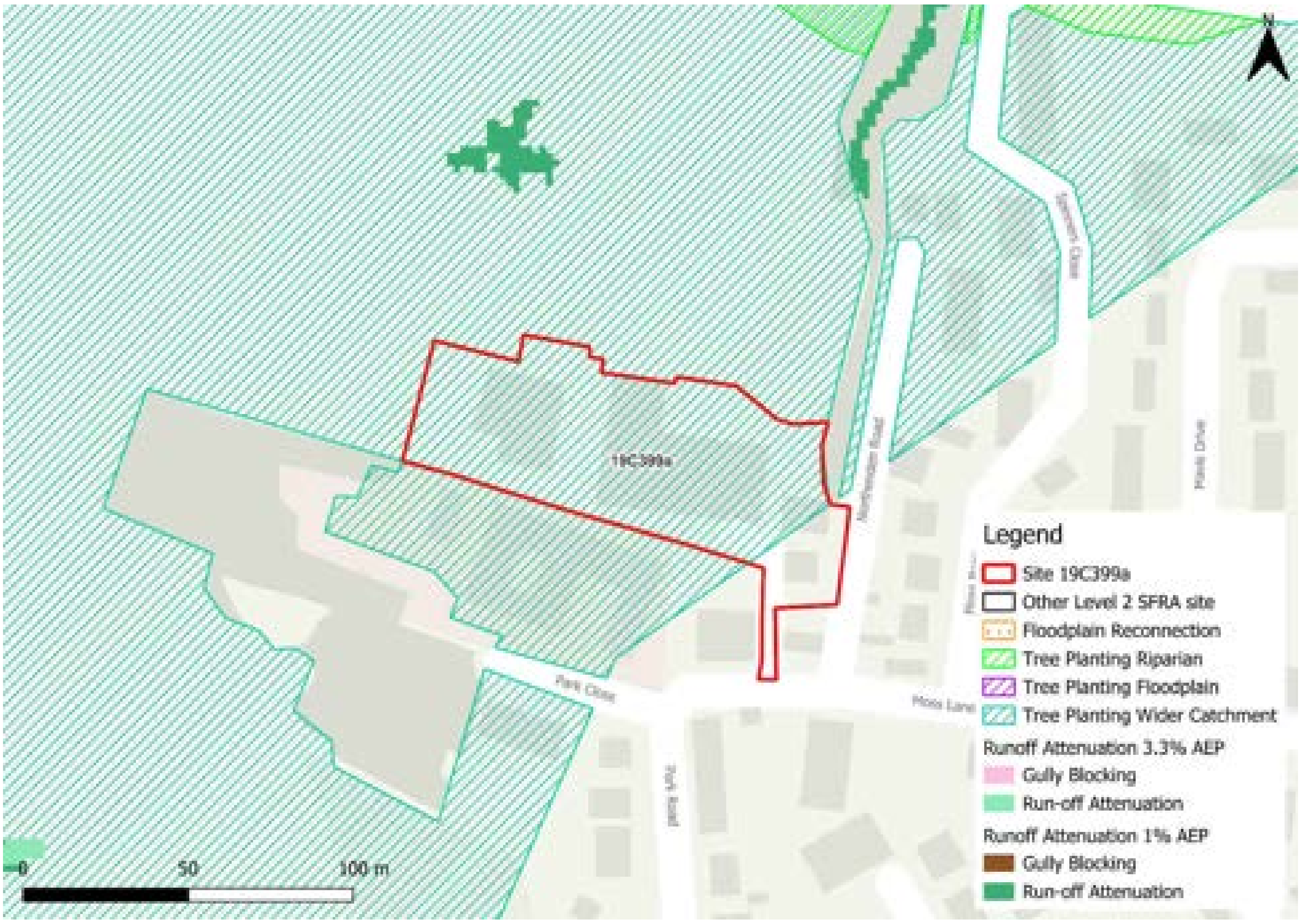

Figure 140-2: Natural Flood Management (NFM) potential mapping

140.3 Residual risk

140.3.1 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. 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 not modelled to be at risk from reservoir flooding.

140.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

140.5 Flood warning and access and escape routes

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. Site 19C399a 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. The site is not located within a FAA.

Based on available information, safe access and escape routes would likely be achievable during a flood event via Moss Lane to the south of the site.

140.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from less vulnerable to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is wholly located within Flood Zone 1.

141 Flood risk from surface water

141.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 4% of the site is within the high risk surface water flood zone. A further 2% is at medium surface water risk, and 6% of the site is observed to be at low surface water risk, as seen in Table 141-1.

In the high and medium risk events, surface water risk is confined to the hardstanding access road within the southeast of the site. In the low risk event, surface water flow paths within the east of the site are increase in both extent and depth, with the flow routes connecting to the flow path along Northenden Road. Surface water risk is clearly constrained by the existing development within the site.

Greatest flood depths within the medium risk event are between 0.3 and 0.6 m (Figure 3-1), with areas of hazard categorised as moderate (Figure 3-2). Safe access and escape routes are likely to be achievable via Moss Lane to the south of the site in the high and medium risk events. In the low risk event, this route becomes inundated up to depths of 0.6 m and therefore safe access and escape may be difficult to achieve and should be considered further as part of a site-specific FRA.

Table 141-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
88	6	2	4

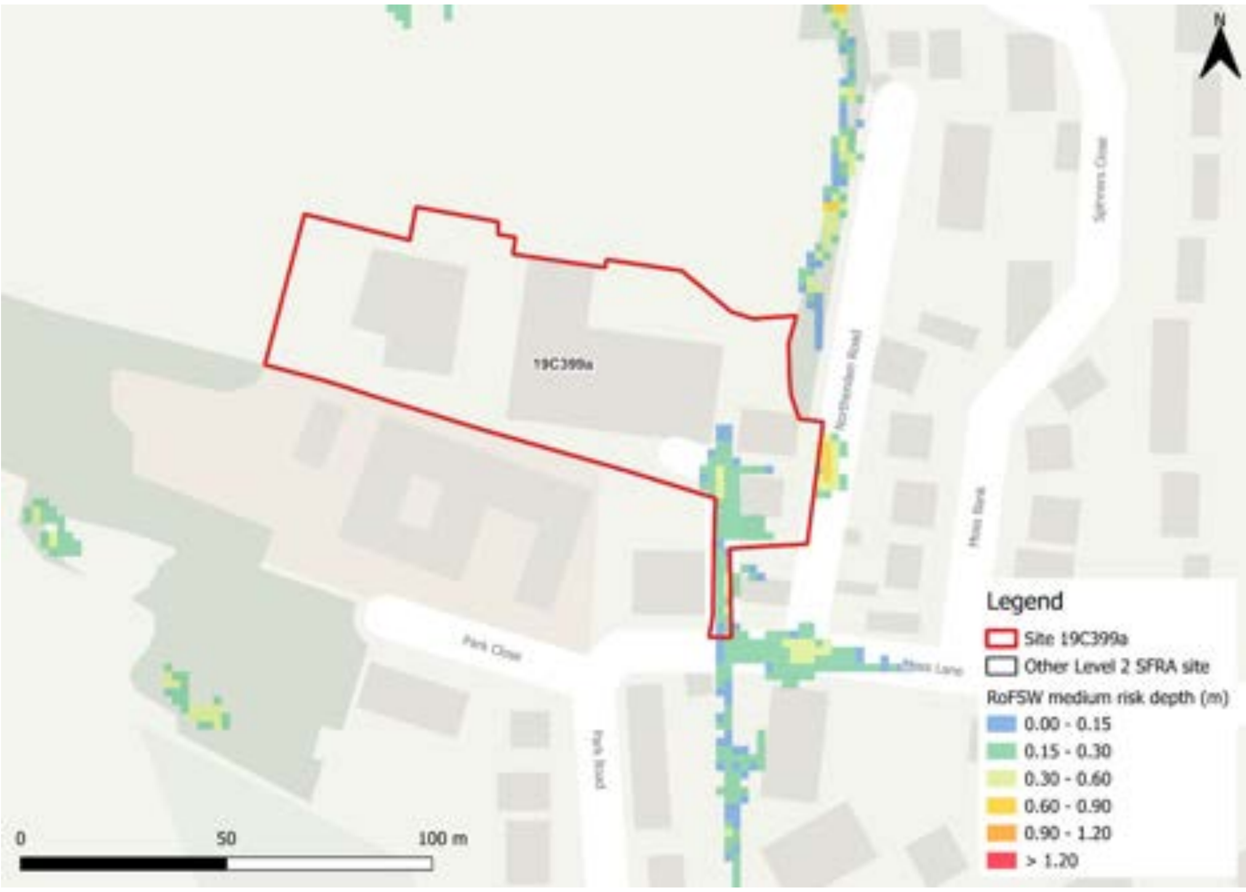

Figure 141-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

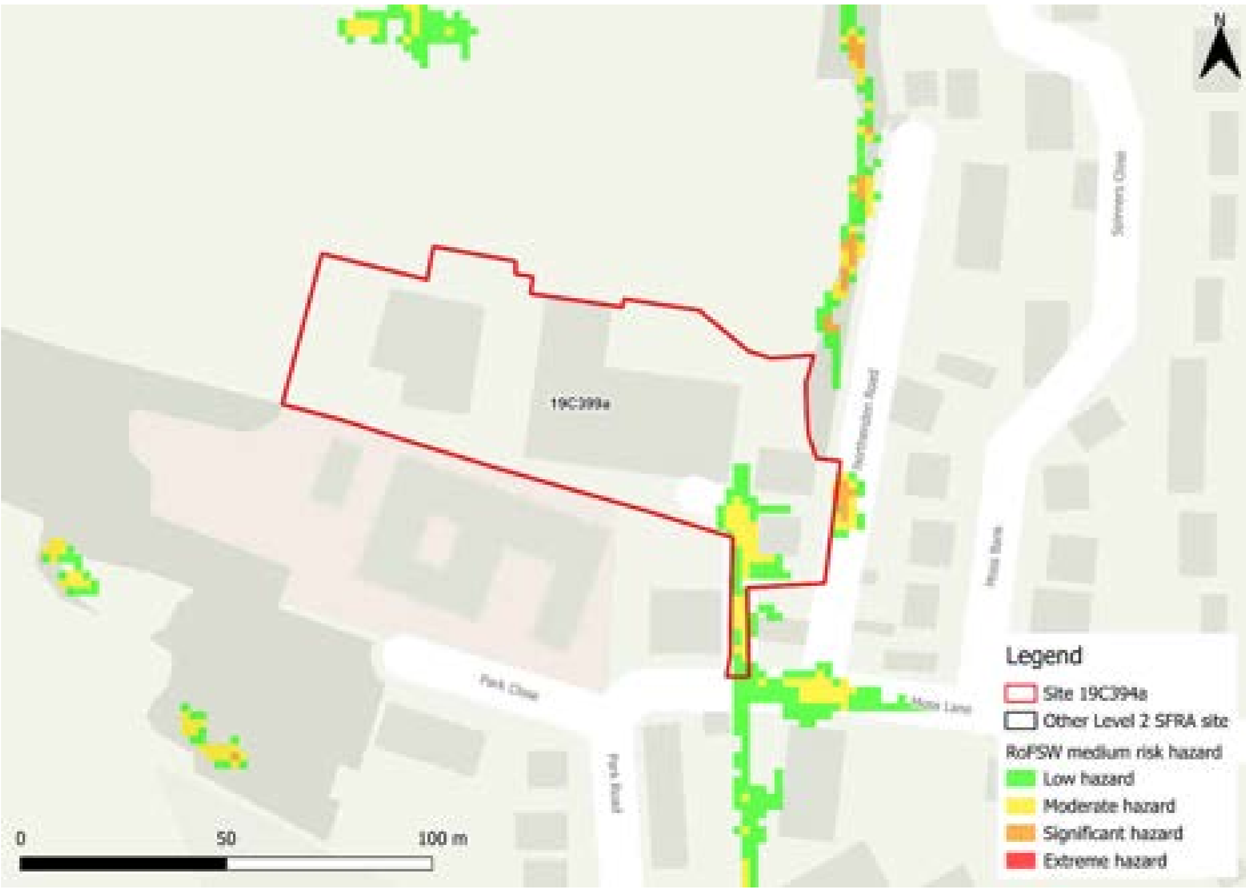

Figure 141-2: Medium risk event surface water flood hazard[88] (Risk of Flooding from Surface Water map)

141.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 141-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through

88 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

the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

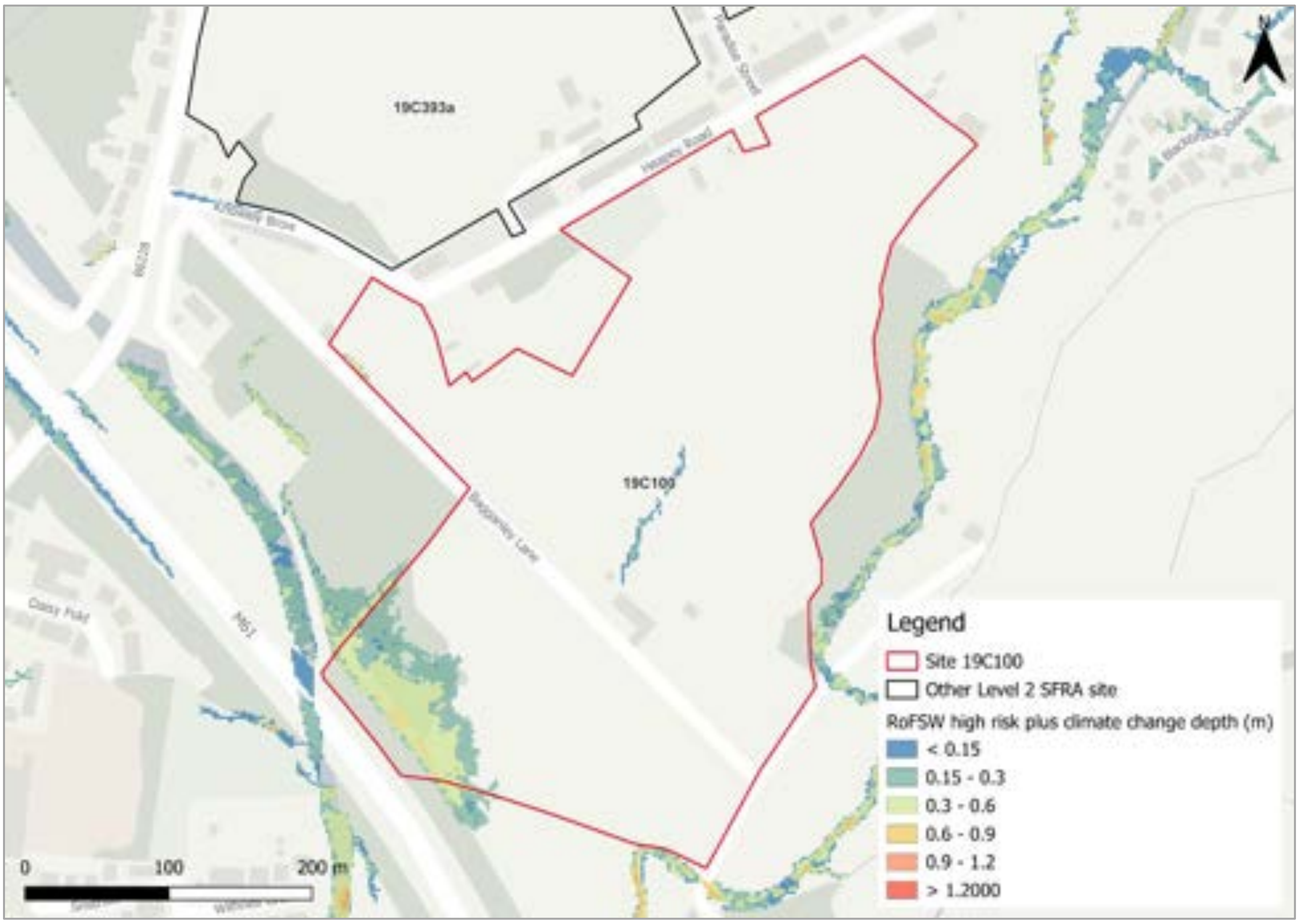

Figure 3-3 shows the modelled surface water depths for the medium risk event +45% climate change. Risk is modelled to be significantly greater than present day conditions, with the medium risk climate change event being similar in extent to the present day low risk event. Maximum flood depths are modelled to be between 0.3 and 0.6 m (Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

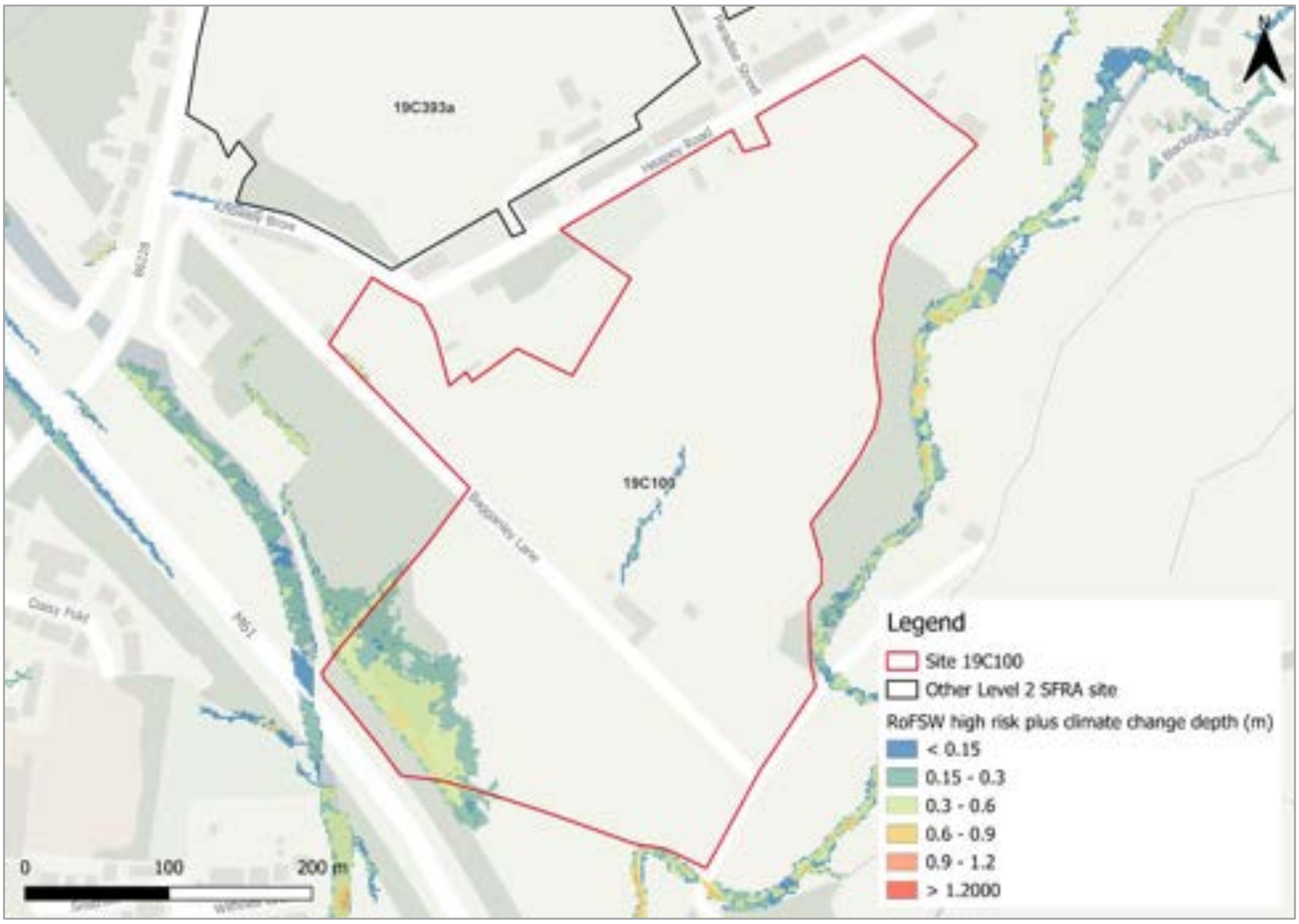

Figure 3-3) with some areas of significant hazard (Figure 3-4). There is a major flow path flowing from south of the site northwards through the east of the site. Options for mitigation should be explored offsite as well as onsite to limit the impacts of this flow route. Safe access and escape routes may be challenging to achieve in this event.

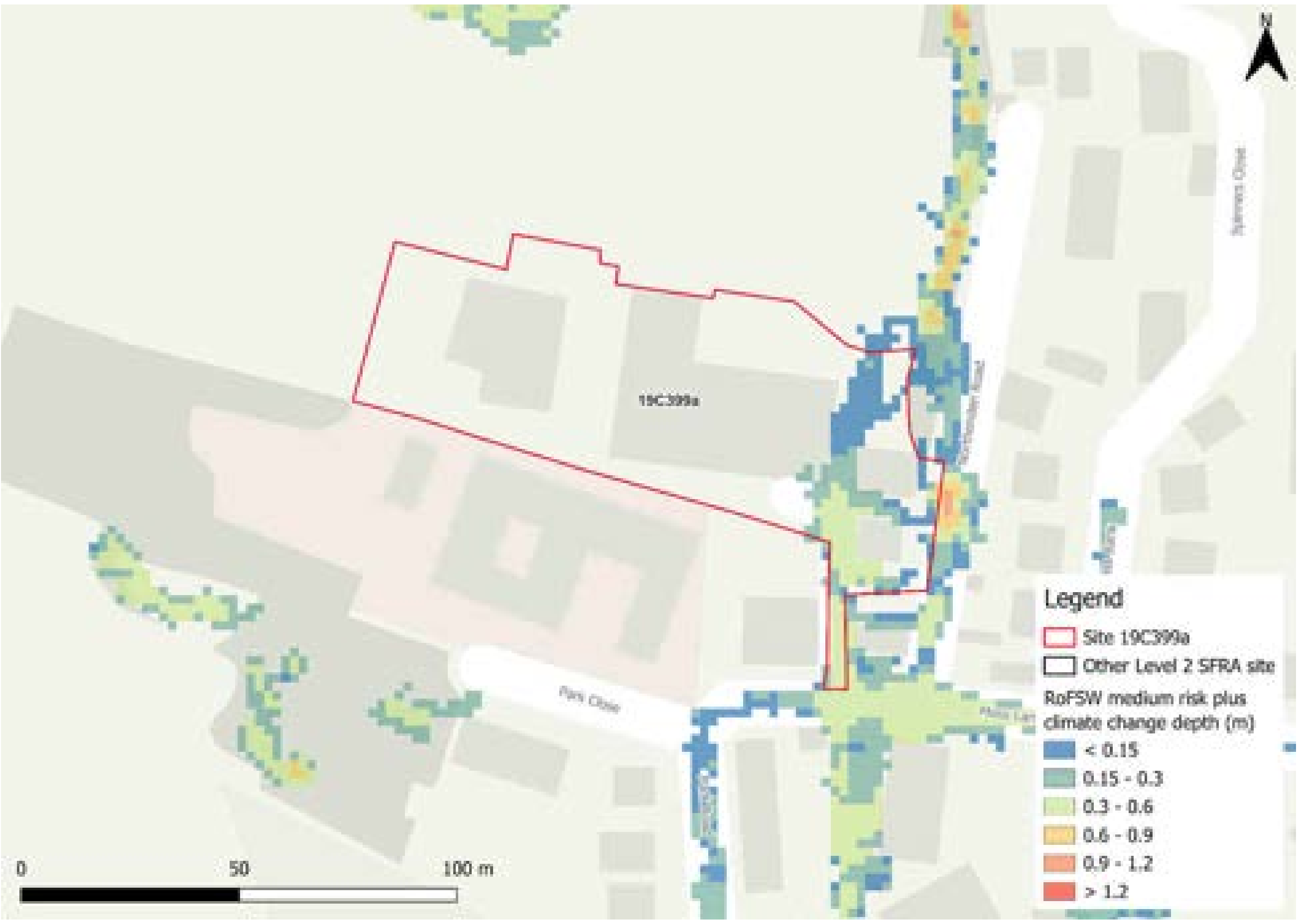

Figure 141-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 141-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

141.3 Observations, mitigation options and site suitability - Surface Water

- Current risk to the site is predominantly very low, with approximately 88% of the site being at very low risk. Surface water risk in the high and medium risk events is confined to hardstanding access road within the south east of the site.
- The modelled medium risk climate change outputs indicate a similar extent of risk to the present day low risk event, with additional areas of ponding emerging through the site.
- Safe access and escape routes should be explored further as part of a site-specific FRA to ascertain whether they can be achieved during the extreme surface water events.
- The Groundwater Emergence Map (Figure 4-1) indicates that the ground conditions at this site may be suitable for infiltration SuDS. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could accommodate the proposed residential development or whether further capacity will be required.

- Were development to proceed, a drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA. The flow route in the east should be mitigated offsite and onsite.
- Note, 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 or evidence.

142 Risk from groundwater

Flood risk from groundwater sources 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 Guide[89]. Figure 4-1 shows the map for Site 19C399a and the surrounding areas and Table 142-1 explains the risk classifications.

The entirety of the site is in an area where there is no risk of groundwater emergence. Groundwater conditions may therefore be suited to infiltration SuDS across the site.

Figure 142-1: JBA 5m Groundwater Emergence Map

89 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 142-1: Groundwater Flood 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.	

143 Overall site assessment

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

This site is not required to pass part b) of the exception test[90], as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

143.2 Recommendation summary, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on the evidence in this SFRA, it should be appropriate to develop this site for more vulnerable purposes given its location in Flood Zone 1 and the majority of the site being at very low surface water flood risk.
- Surface water should be retained onsite which may reduce units. This will require detailed surface water modelling based on layout plans and detailed design and full consultation with the LLFA on required runoff rates, likely to be greenfield or betterment. The use of infiltration SuDS should be investigated.
- Safe access and escape routes are likely to be challenging to achieve during the medium risk surface water flood event when allowing for climate change. Therefore, any FRA for this site would need to be accompanied with a detailed drainage strategy informed by further pluvial modelling as well as identifying access and escape routes that are safe in all observed events.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

90 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C410

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0011
Revision	P02
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Contract

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This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Kaylyn Caroll 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 19 August 2024 and 14 February 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.

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Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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145 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C410. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

145.1 Site 19C410

- Location: Tithebarn Lane
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 3.70 hectares
- Proposed development impermeable area: 3.15 hectares (assumed 85% impermeable area)
- EA model: Black Brook 2011
- Watercourse: Black Brook
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of modelled fluvial flood depths and hazards
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 145-1: Existing site location boundary

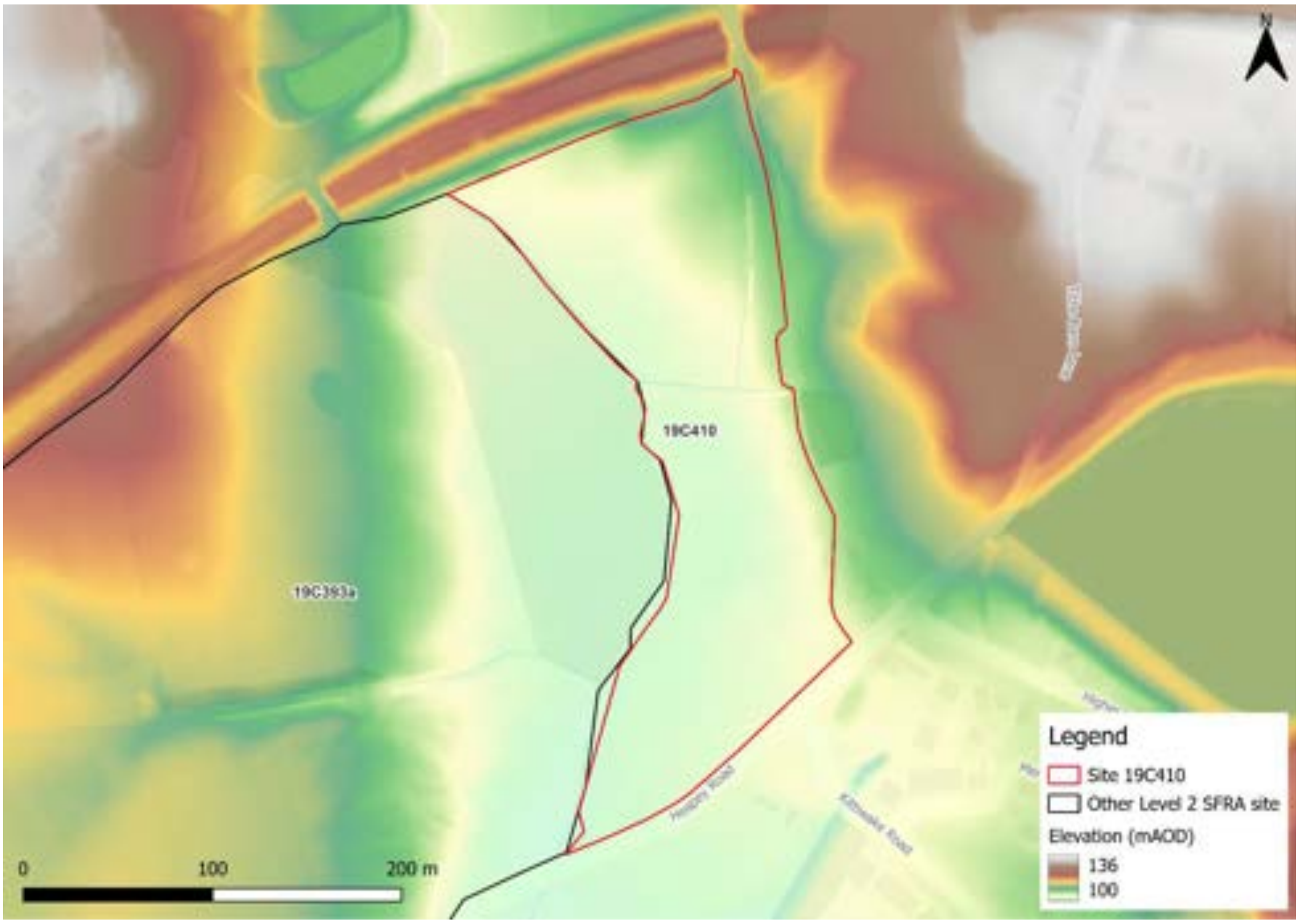

Figure 145-2: Topography

146 Flood risk from rivers

146.1 Existing risk

146.1.1 Flood Map for Planning and functional floodplain

Based on the EA's Flood Map for Planning and Flood Zone 3b (functional floodplain), as updated in the Central Lancashire Level 1 SFRA (2025), the percentage areas of the site within each fluvial flood zone are stated in Table 2-1 and can be viewed on Figure 146-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.3) or the impacts of climate change (Section 2.2).

Functional floodplain is present along a reach Black Brook which runs along the western boundary of the site. This reach of Black Brook is not explicitly represented in the 2011 model, and instead has been represented as a hydrologic inflow into the main Black Brook channel. The functional floodplain in this location is based on an 8m buffer either side of the OS Open Rivers Watercourse Link dataset. It is recognised that this is an approximation. There should be no development within the functional floodplain. Policy relating to Flood Zone 3b applies to the watercourse with an 8m buffer either side, and not the mapping where they are different. Flood Zone 2 is present within the south of the site.

Table 146-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
66	31	0	3

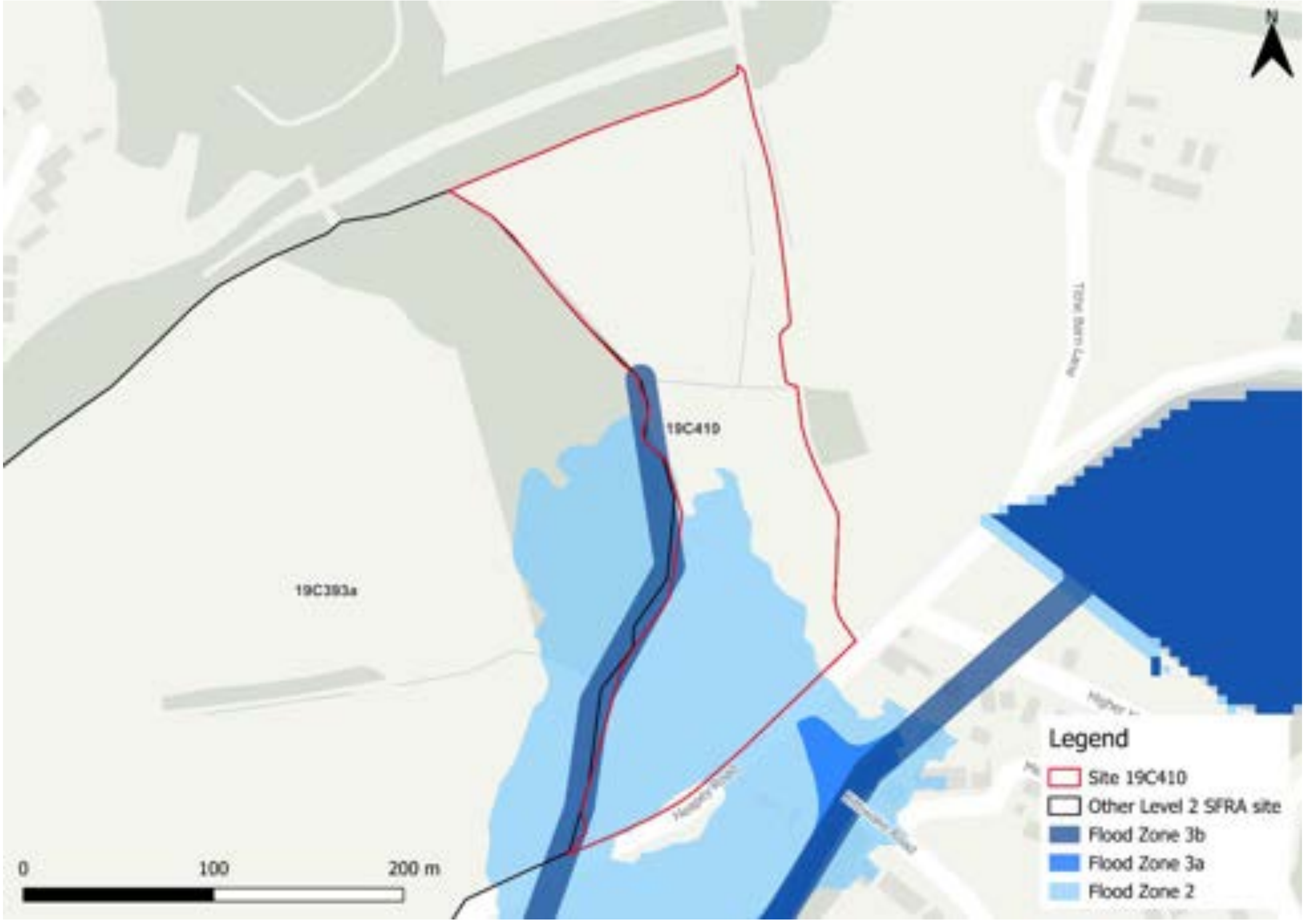

Figure 146-1: Existing risk from rivers to the site

146.1.2 Black Brook 2011 model outputs

Figure 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. There is no modelled flood risk to the site in the 1% AEP undefended event. However, the reach of Black Brook adjacent to the site is not explicitly represented in the model, and instead has been represented as a hydrologic inflow into the main channel. Modelling this reach of the Black Brook should be considered as part of a site-specific FRA, as well as/instead of a Level 2 SFRA update.

Figure 146-2: Flood depths for 1% AEP undefended flood event

146.2 Impacts from climate change

The impacts of climate change on flood risk from the Black Brook have been modelled without flood defence infrastructure in place. This allows for direct comparison with the existing risk of the Flood Map for Planning.

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

Table 146-2: Modelled climate change allowances for peak river flows for the Douglas Management Catchment

Return period	Central allowance 2080s	Higher central allowance 2080s
3.3% (functional floodplain)	35%	47%
1%	35%	47%

In the climate change event, the site is modelled to be at risk across the south of the site. Figure 2-4 shows the modelled flood depths during the 1% AEP undefended flood event +47% climate change allowance. Flood depths within the site are modelled to be between 0.6 and 0.9 m. Figure 2-5 shows the modelled flood hazard rating during the 1% AEP undefended flood event +47% climate change allowance. Flood hazard within the site is largely modelled to be 'Very low hazard' with some areas categorised as 'Danger for some'.

However, the reach of Black Brook adjacent to the site is not explicitly represented in the model, and instead has been represented as a hydrologic inflow into the main channel. Modelling this reach of the Black Brook should be considered as part of a site-specific FRA, as well as/instead of a Level 2 SFRA update.

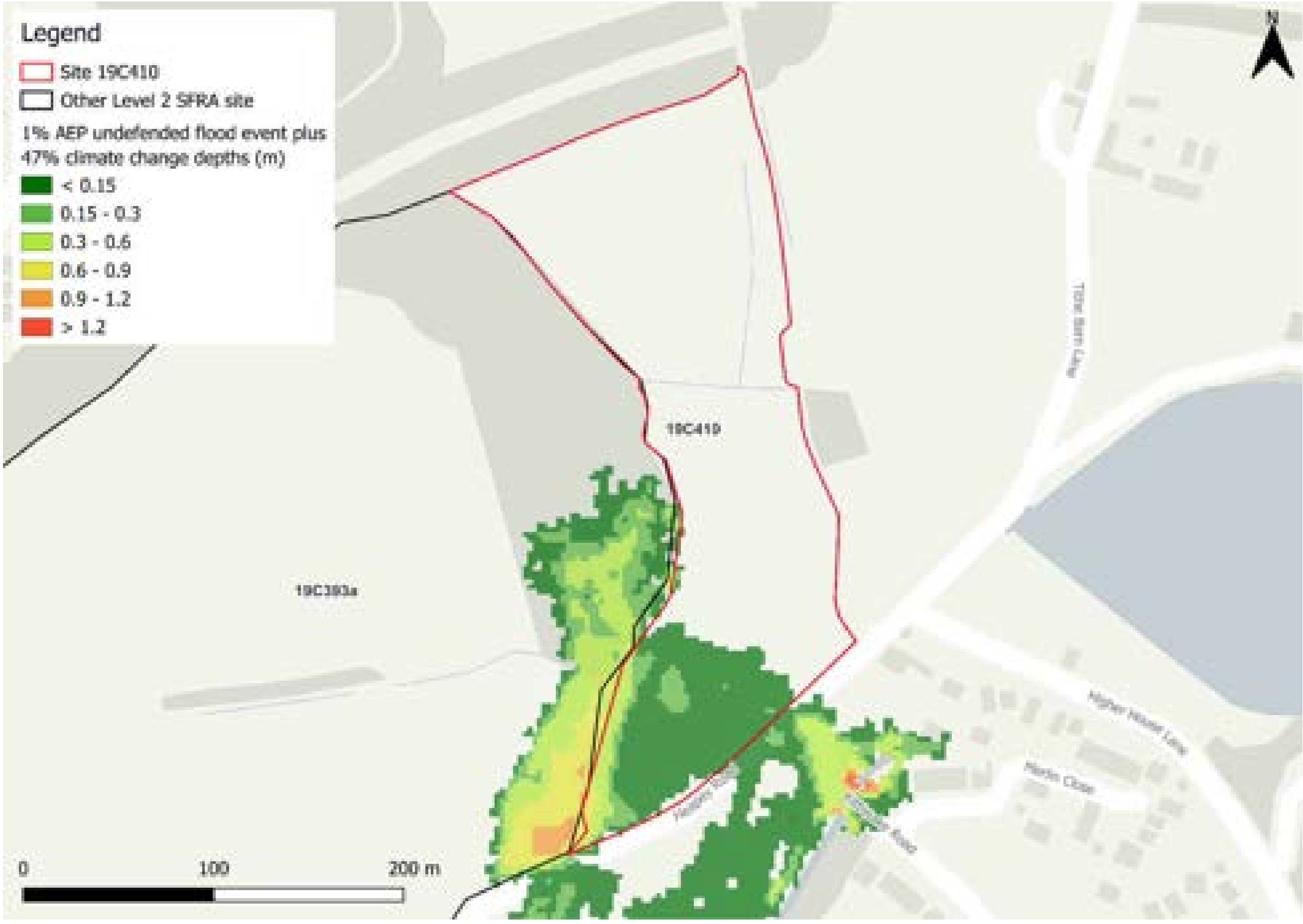

Figure 146-3: Flood depths for 1% AEP undefended flood event + 47% (higher central climate change allowance)

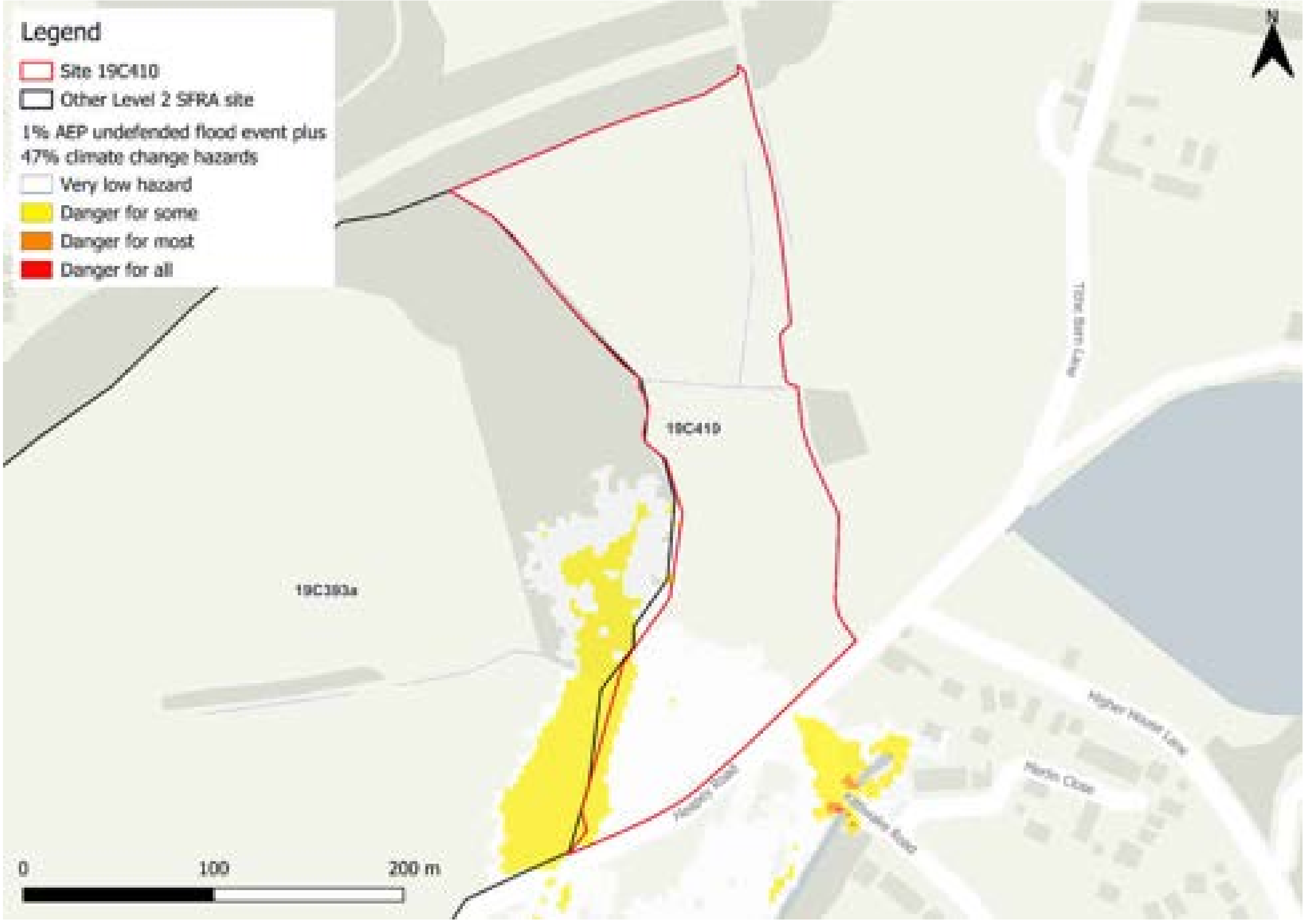

Figure 146-4: Flood hazard[91] for 1% AEP undefended flood event +47% (higher central climate change allowance)

146.3 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

146.3.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C410 is located within one catchment, namely; Yarrow US Big Lodge Water. This is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

91 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.

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[92].
- Developments should be incentivised to provide wider betterment by being requested to demonstrate in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments are to aim to achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

146.3.2 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. Within the northern and southwestern areas of the site there is potential for riparian tree planting, which can slow flows, reduce sediment delivery to the watercourse and reduce bankside erosion. Within the south of the site there is potential for floodplain tree planting, which can slow floodwaters and reduce flood peak height. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 146-5.

92 Lancashire SuDS Guidance

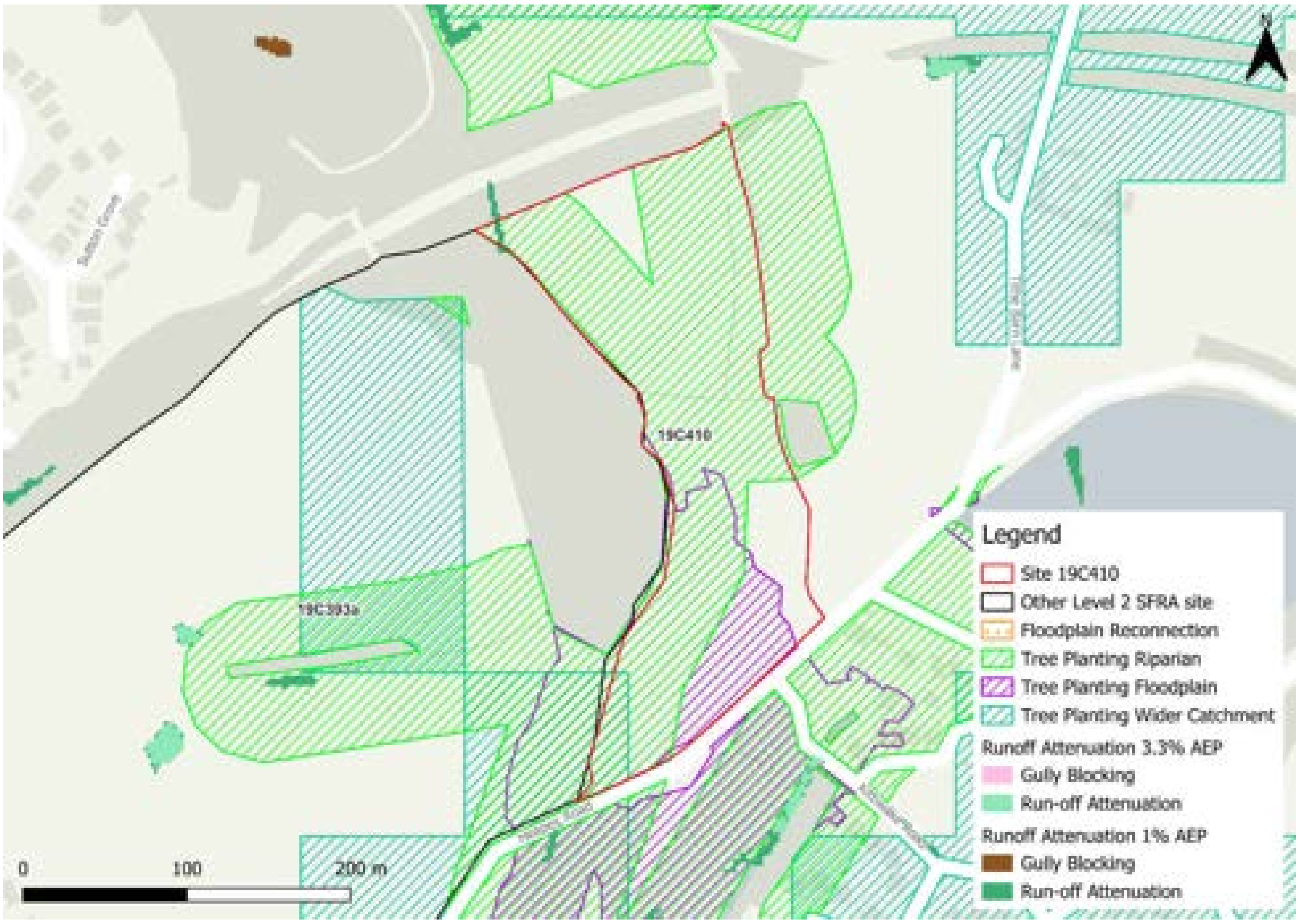

Figure 146-5: Natural Flood Management (NFM) potential mapping

146.4 Residual risk

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

Residual risk at this site comes from possible blockage of the structure beneath Heapey Road at the southern corner of the site (Figure 146-6). This section of the watercourse is not included in the 2011 Black Brook model, therefore the impact of a blockage at this location could not be assessed. It is recommended that the site-specific FRA should consider the impact of a blockage of this culverts on residual flood risk to the site.

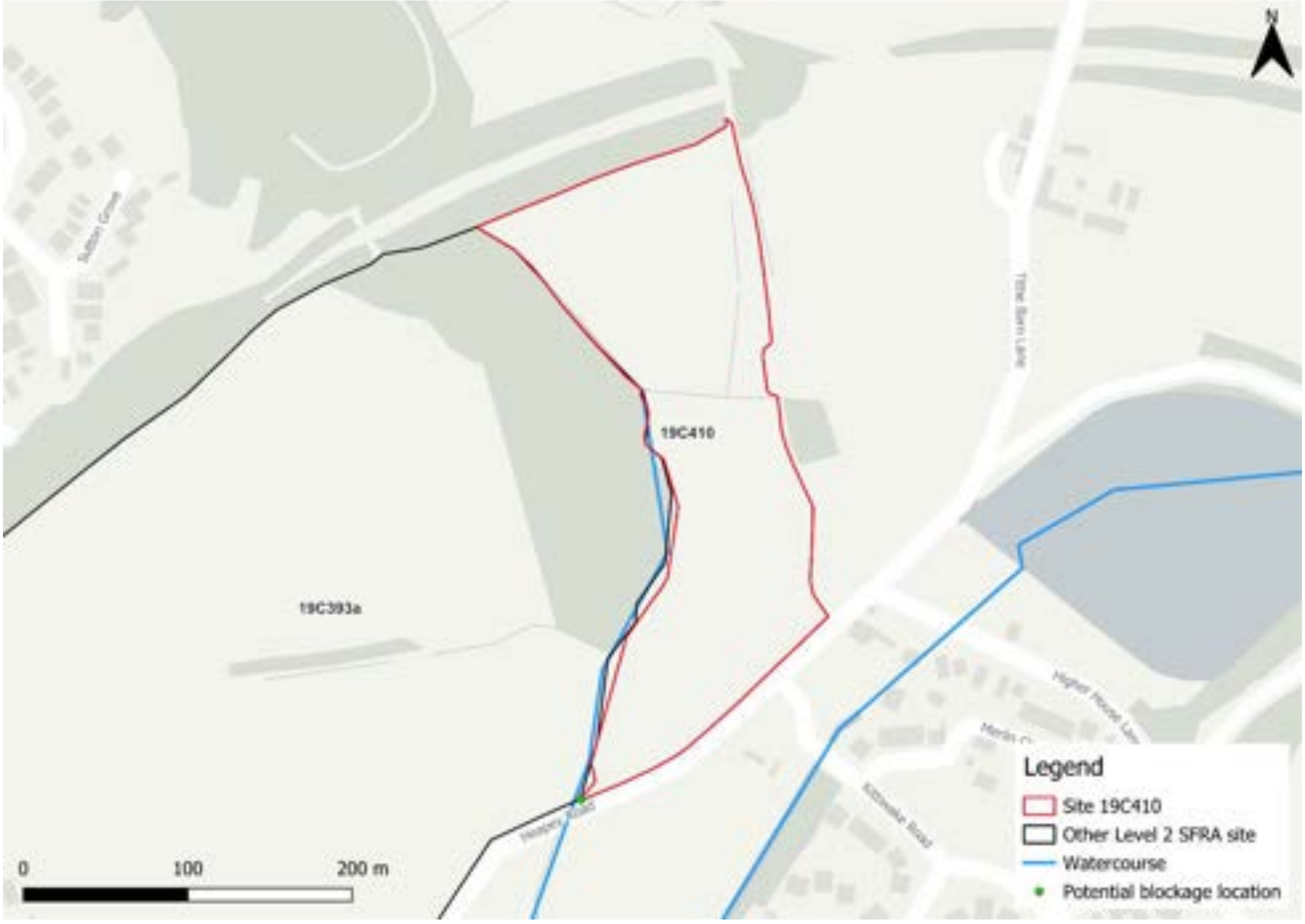

Figure 146-6: Potential blockage location

146.4.1 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 146-7 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 from Anglezarke, Heapey No.1, Heapey No.2, Heapey No.3, High Bullough and Yarrow reservoirs, all of which are located within Lancashire. Three of these reservoirs are operated by United Utilities and three are operated by Wigan & District Angling Association.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, 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. At the FRA stage, United Utilities and Wigan & District Angling Association, should be contacted to ascertain whether the proposed development could affect the reservoir's risk designation, it's 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.

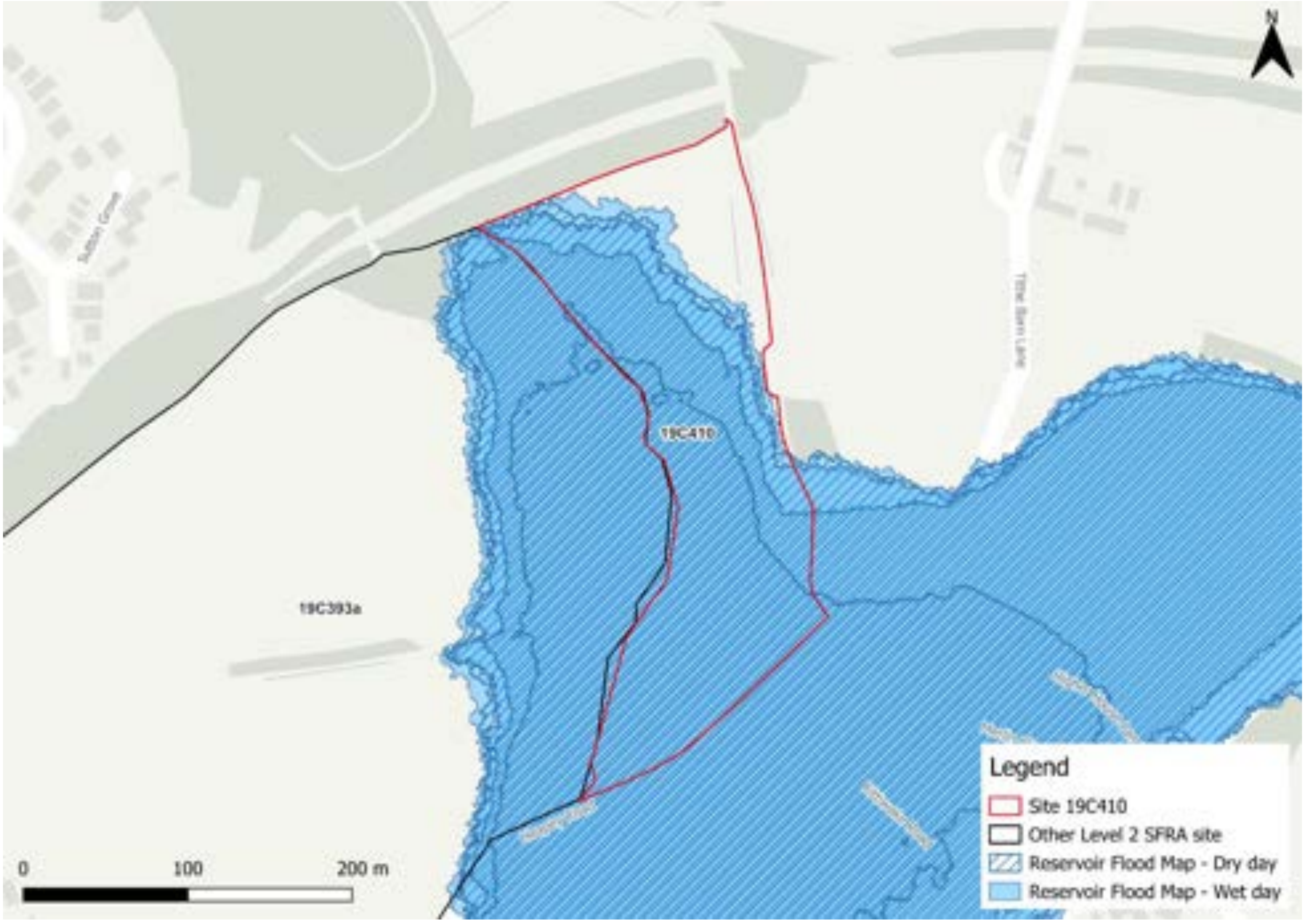

Figure 146-7: Flood risk from reservoirs

146.5 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

146.6 Flood warning and access and escape routes

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. Site 19C410 is located within one FWA, namely; 012FWFL59B - Black Brook at Chorley, Heapey Road to Cowling.

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. The site is also located within a FAA, namely; 012WAFLY - River Lostock and River Yarrow.

Based on available information, safe access and escape routes could likely be achieved during a flood event via Heapey Road to Tithe Barn Lane.

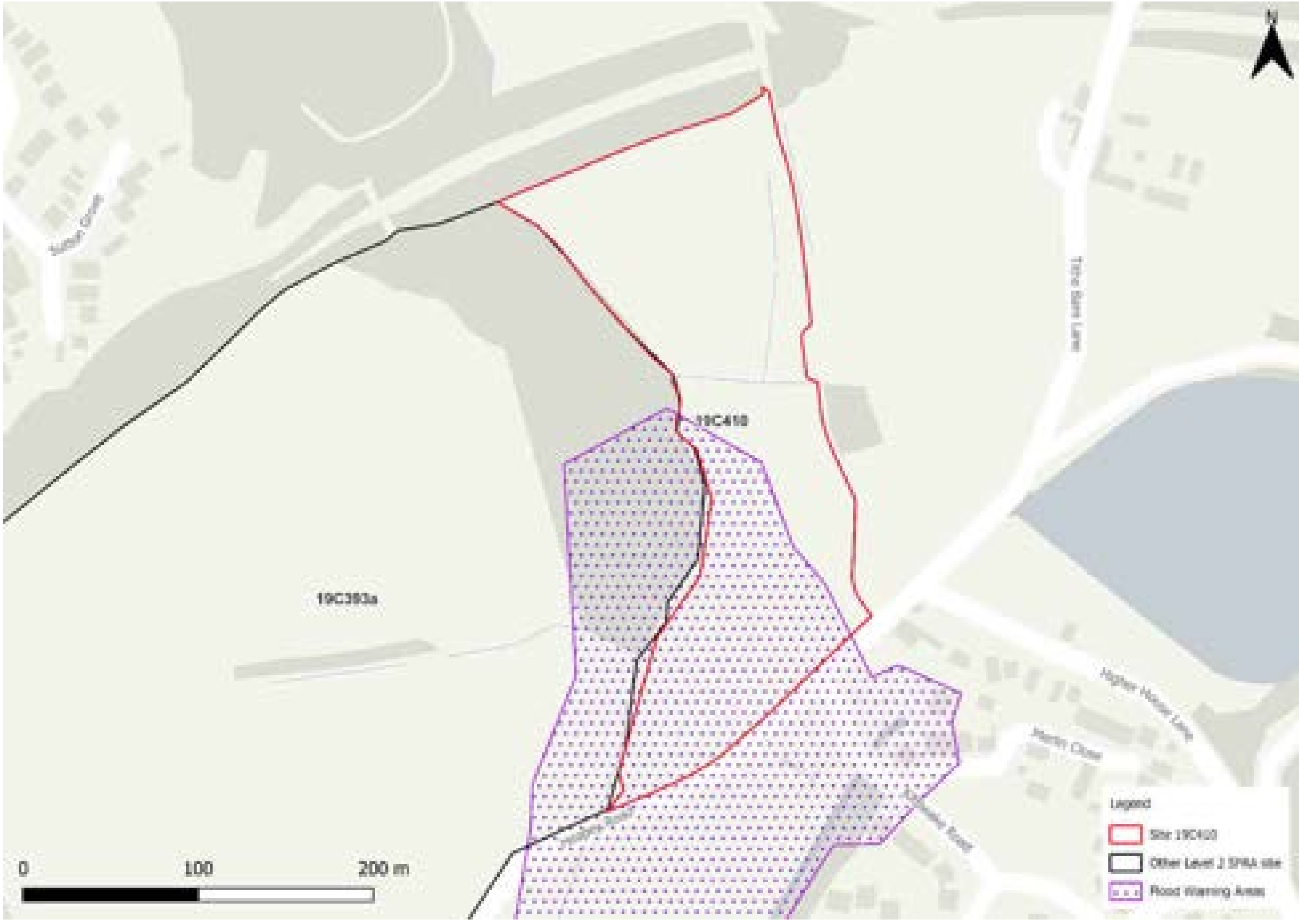

Figure 146-8: EA Flood Warning Areas

146.7 Observations, mitigation options and site suitability - fluvial

- The site is modelled to be within the functional floodplain along a reach of Black Brook. Development is not permitted within the functional floodplain. However, the functional floodplain in this area is conservatively based on an 8m buffer either side of the OS Open Rivers Watercourse link dataset.
- The reach of the Black Brook which flows adjacent to the site is not explicitly modelled in the 2011 Black Brook model. Detailed modelling of this reach should be considered as part of a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- Ordinary Watercourse Flood Defence Consent (OWFDC) may be required if development is planned within 8m of the riverbank. The LLFA can advise on whether this would be required. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
- The impacts of climate change on flood risk from the Black Brook have been modelled without flood defence infrastructure in place using climate change allowances for peak river flows for the Douglas Management Catchment. Based on this approach, fluvial risk is modelled to be significantly greater in extent to the present day 1% undefended event outputs, covering the southern area of the site.

- More vulnerable development should be directed away from the area of the site within Flood Zone 3a plus climate change. However, as mentioned previously, the reach of the Black Brook which flows adjacent to the site is not explicitly modelled in the 2011 Black Brook model.
- The site is at potential residual risk from a possible blockage of the culvert beneath Heapey Road downstream of the site. It is recommended that the site-specific FRA should consider the impact of a blockage of this culvert on residual flood risk to the site.
- Safe access and escape should be possible via Heapey Road to Tithe Barn Lane to the southeast of the site, based on available information.
- Given the potential reservoir risk to the site, developers should consider[93]:
  - Whether additional modelling is required to understand the flood risk from the reservoir, referring to the specification for the reservoir flood maps as a starting point
  - Whether the development may have an impact on the reservoir or reservoir owner
  - Referring to the Central Lancashire Level 1 SFRA for information on reservoir risk and recommendations for how to address it
  - Contacting the LPA for pre-application advice
  - Contacting the LPA to understand the need to consult with their emergency planning team and with the reservoir owner
- Were development of this site to proceed, given the proximity of this site to neighbouring site 19C393a, and the fact that Black Brook borders both sites, 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.

93 Reservoir flood maps: when and how to use them | Environment Agency | 2021

147 Flood risk from surface water

147.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 1% of the site is within the medium risk surface water flood zone. A further 3% is at low surface water risk, shown as in Table 4-1.

In the medium risk event, surface water risk is confined to an area of ponding within a topographic low spot in the centre of the site, and a short flow path within the north, coincident with the Black Brook channel. In the low risk event, the surface water flow path with the north of the site extends along the section of Black Brook adjacent to the western boundary of the site. There is a greater extent of ponding within the centre of the site and an additional surface water flow path along a drainage ditch within the north of the site.

Greatest surface water flood depths in the medium risk event are between 0.6 m and 0.9 m (Figure 3-1) with some areas of significant hazard (Figure 3-2), however these depths and hazards are located within the section of open channel along Black Brook. Maximum flood depths outside of the open channel section are modelled to be between 0.15 m and 0.3 m with hazard categorised as low. Safe access and escape routes should be possible via Heapey Road to Tithe Barn Lane in all events.

Table 147-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
96	3	1	0

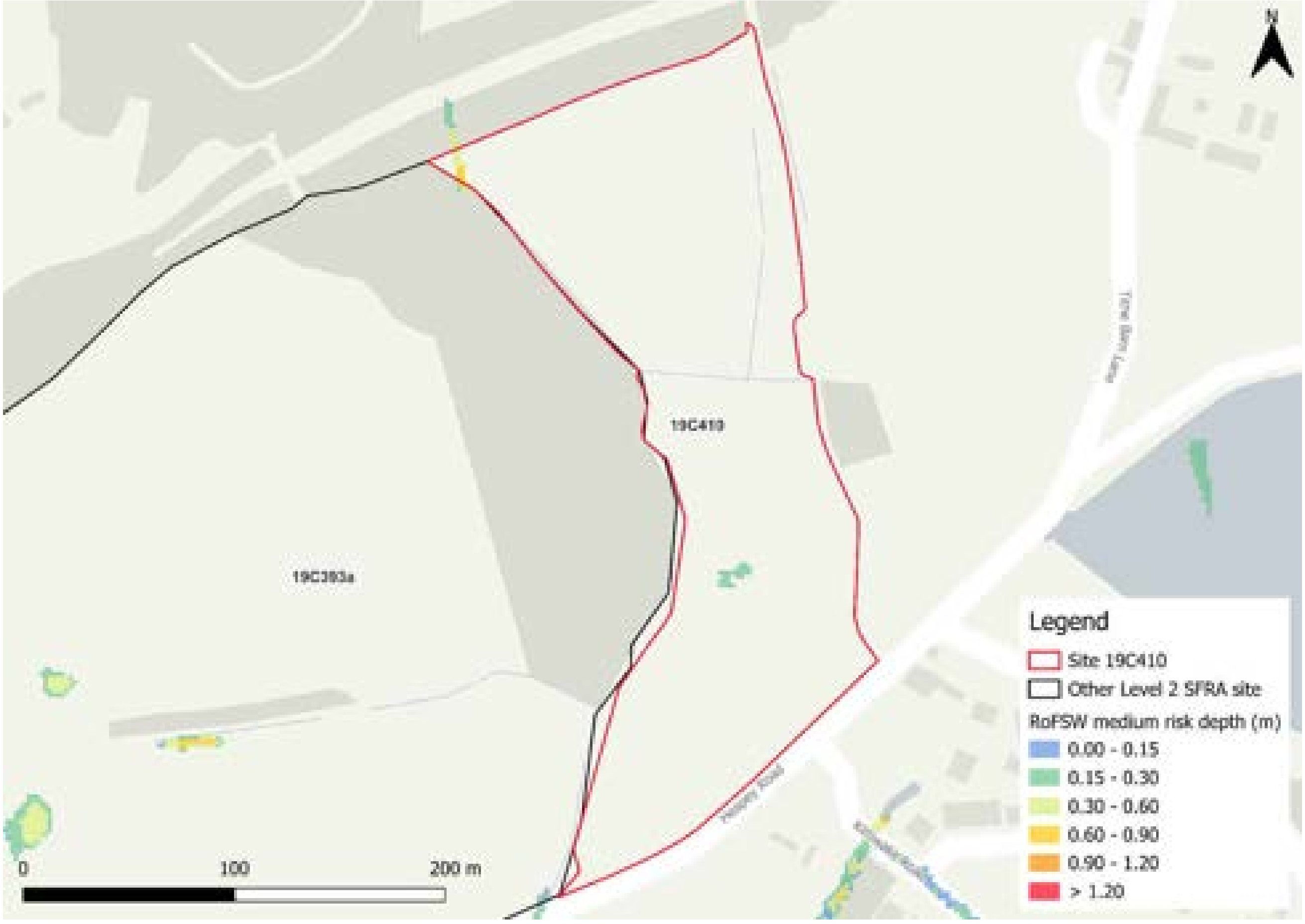

Figure 147-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 147-2: Medium risk event surface water flood hazard[94] (Risk of Flooding from Surface Water map)

147.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 147-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

94 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

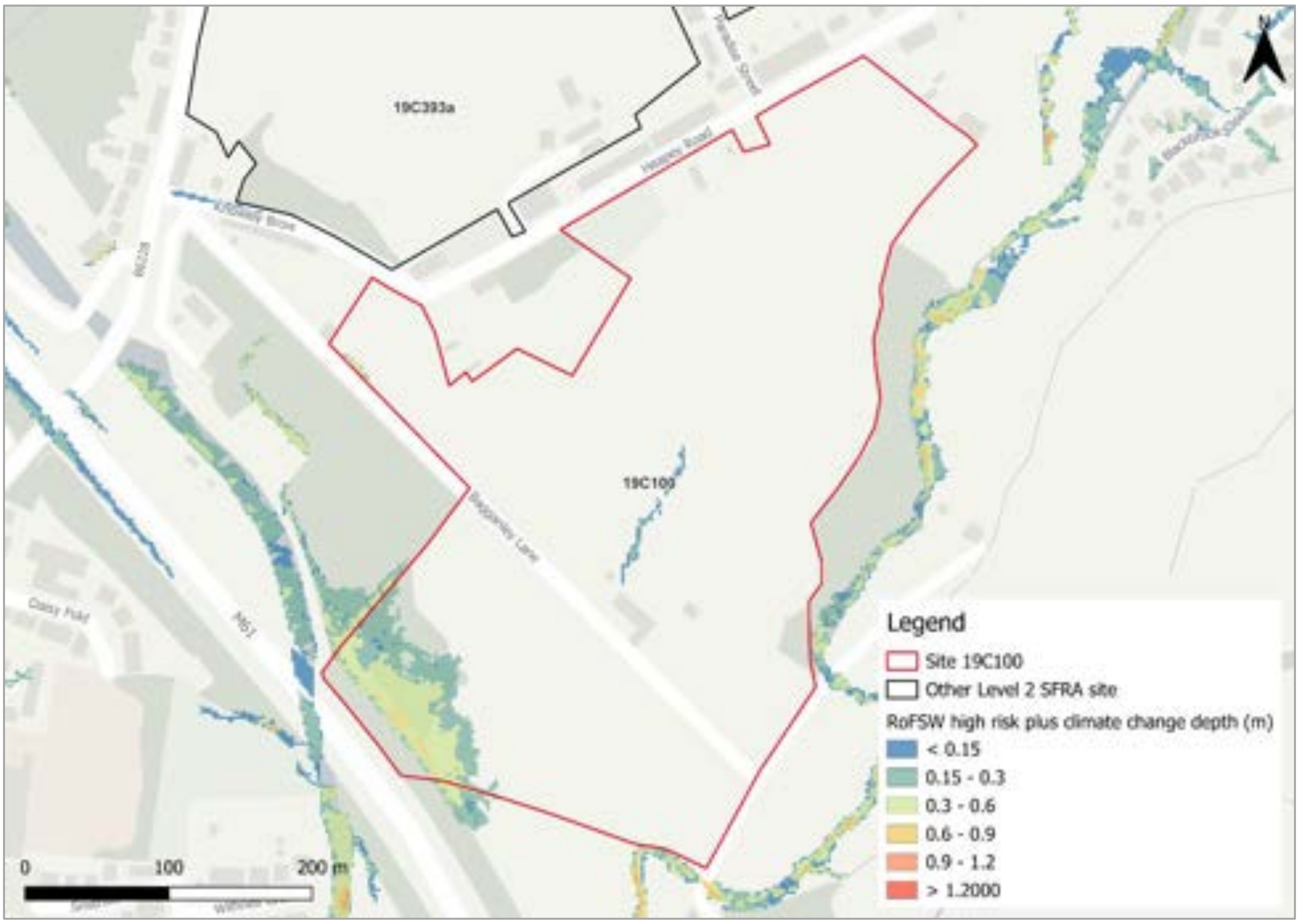

Figure 3-3 shows the medium risk surface water flood depths plus 45% climate change. Risk is modelled to be greater in extent than the present day medium risk surface water event, similar to the present day low risk event. Greatest flood depths are modelled to be between 0.9 and 1.2 m, with some areas of significant hazard (Figure 3-4), however these depths and hazards are located within the section of open channel along Black Brook. Greatest flood depths across the rest of the site are modelled to be between 0.6 m and 0.9 m with some areas of significant hazard.

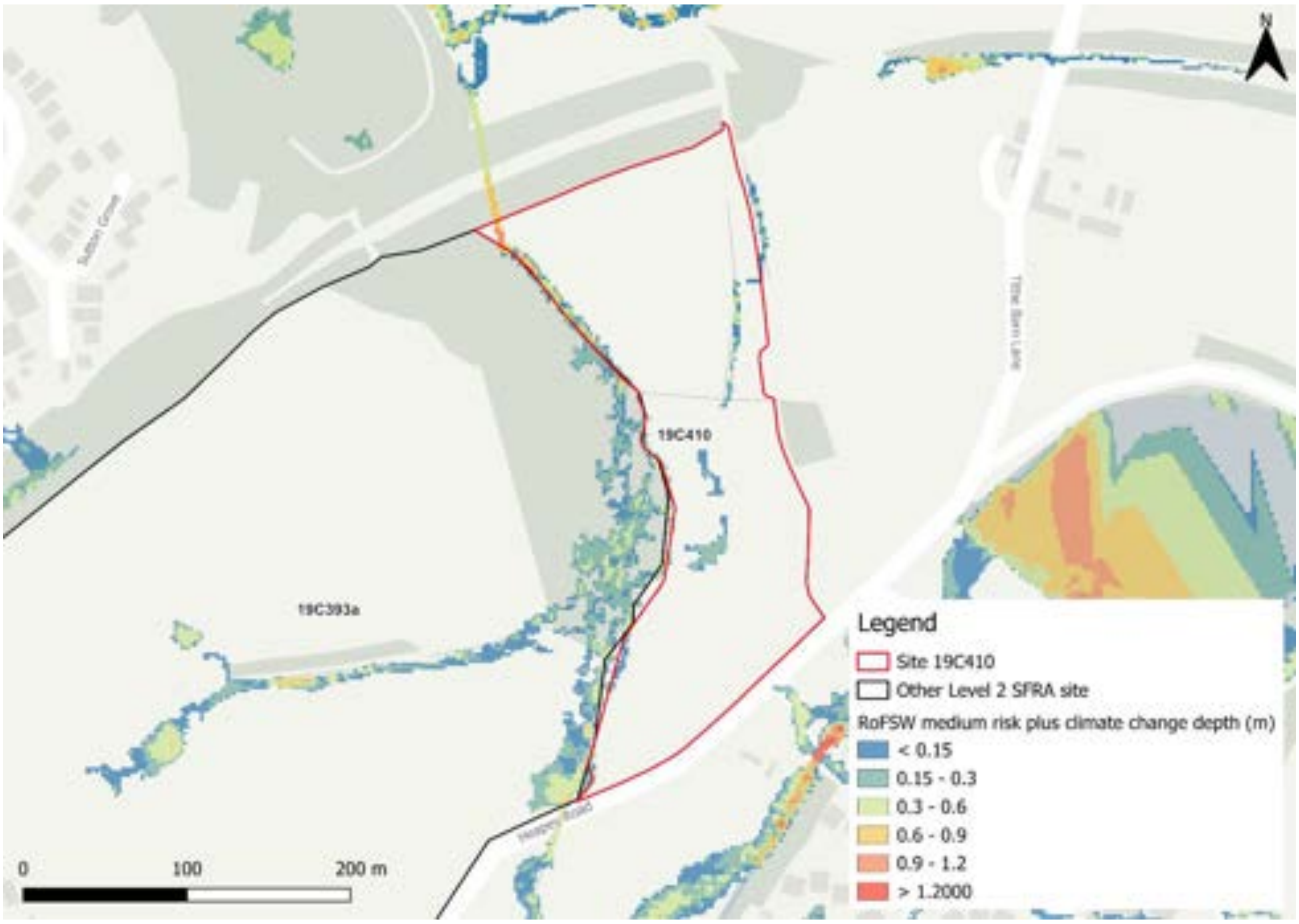

Figure 147-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 147-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

147.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with 96% of the site being at very low surface water flood risk. Surface water risk in the medium event is confined to an area of ponding within the centre of the site and a short flow path within the north. Safe access and escape routes should be achievable via Heapey Road to Tithe Barn Lane in all events.
- The effects of climate change on surface water have been modelled for this SFRA using the medium risk surface water flood depths plus 45% climate change. Surface water risk is greater than present day flood risk with additional surface water flow paths and areas of ponding across the site. Any existing flow paths and topographic depressions should be maintained in site design.
- Where development plans to proceed, a full detailed drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere because of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- 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 or evidence.

148 Risk from groundwater

Risk from groundwater sources 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 Guide[95]. Figure 4-1 shows the map for Site 19C410 and the surrounding areas and Table 148-1 explains the risk classifications.

Risk of groundwater emergence varies across the site. Across the majority of the site, there is a risk groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots. The north of the site is within an area where there is no risk of groundwater emergence. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions.

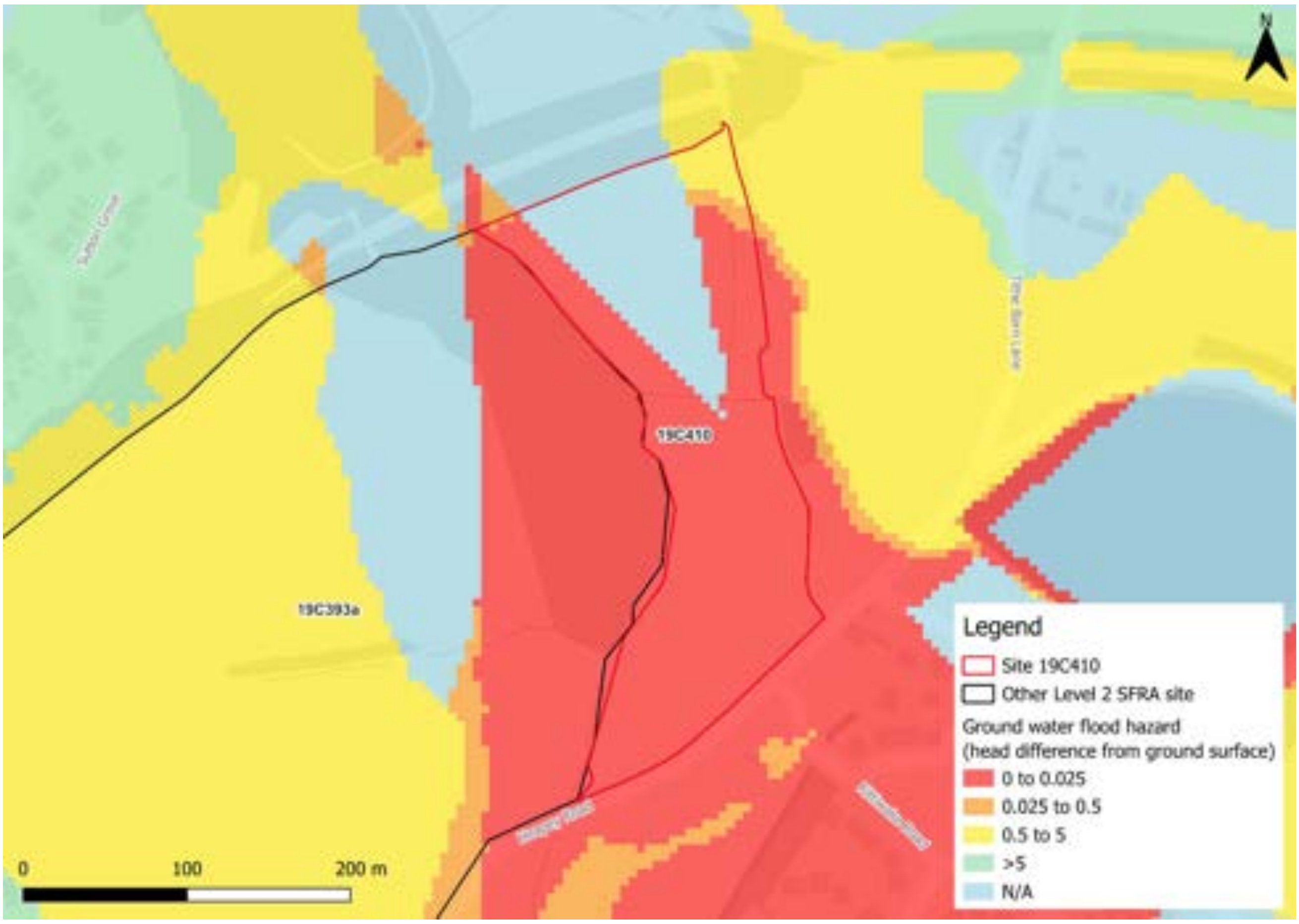

Figure 148-1: JBA 5m Groundwater Emergence Map

95 [Strategic flood risk assessment good practice guide. ADEPT. December 2021.]

Table 148-1: Groundwater Flood 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.	

149 Overall site assessment

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

The site is modelled to be at risk in the 1% AEP plus climate change event and is therefore required to pass part b) of the exception test[96]. It must be proven that the development can be safe for its lifetime, which is 100 years for residential development. This site should be able to pass the exception test if development avoids the area of the site modelled to be at risk in the 1% AEP undefended event plus higher central climate change allowance.

149.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- The proposed development of the site would see a change in the risk classification from less vulnerable to more vulnerable, according to NPFF.
- Given the change in use and therefore vulnerability of the site. The FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRC-PPG).
- There should be no development within the functional floodplain. There should be no development within 8m of Black Brook. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Updated present day and climate change modelling of the reach of Black Brook adjacent to the site should be used to update this Level 2 SFRA at the earliest opportunity to provide a robust strategic assessment of flood risk to this site and surrounding areas. It would also be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- Residual risk to the site from a possible blockage of the culvert beneath Heapey Lane should be considered as part of a site-specific FRA.
- Based on current information, this site could be allocated if more vulnerable development avoids the area within the functional floodplain and the area to the south of the site modelled to be at risk in the 1% AEP event + 47% climate change following detailed modelling of the reach of Black Brook adjacent to the site.
- A detailed drainage strategy will be required for any new development given the large area of this site being converted from open space to development.
- Groundwater conditions must be investigated further through the site-specific FRA.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.

96 Para 178 National Planning Policy Framework 2024

- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C411

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0010
Revision	P02
Prepared by	Georgina Williams BSc MSc Assistant Analyst
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Contract

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This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Georgina Williams of JBA Consulting carried out this work.

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Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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Contents

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List of Tables

151 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C411. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

151.1 Site 19C411

- Location: Land south west of The Green and Langton Brow
- Existing site use: Mixed use; residential and commercial
- Existing site use vulnerability: More vulnerable
- Proposed site use: Mixed use
- Proposed site use vulnerability: More vulnerable
- Site area: 2.4 hectares
- Proposed development impermeable area: 2 hectares (assumed 85% impermeable area)
- EA model: N/A
- Watercourse: Syd Brook
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of modelled fluvial flood depths and hazards
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk
    -

Figure 151-1: Existing site location boundary

Figure 151-2: Topography

152 Flood risk from rivers

152.1 Existing risk

152.1.1 Flood Map for Planning and functional floodplain

Based on the EA's Flood Map for Planning and Flood Zone 3b (functional floodplain), as updated in the Central Lancashire Level 1 SFRA (2025), the percentage areas of the site within each fluvial flood zone are stated in Table 2-1 and can be viewed on Figure 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 152.3) or the impacts of climate change (Section 2.2).

Functional floodplain is largely present in the southeast of the site and is present along the entire southern boundary of the site, adjacent to Syd Brook. The area of functional floodplain onsite should be left free of development. It should be noted that functional floodplain along Syd Brook has been conservatively based on Flood Zone 3 of the Flood Map for Planning. Undertaking updated modelling of the Syd Brook should be considered at the FRA stage. 25% of the site is located within Flood Zone 2 and the remaining 43% is within Flood Zone 1.

Table 152-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
43	25	0	32

Figure 152-1: Existing risk from rivers to the site

152.2 Impacts from climate change

The impact of climate change on flood risk from Syd Brook has not been modelled for this SFRA, as a model covering Syd Brook was not made available for consideration. Therefore, in the absence of modelled climate change information, Flood Zone 2 of the Flood Map for Planning (based on the 0.1% AEP undefended event) can be used as a conservative proxy for Flood Zone 3 plus climate change. Based on this approach, fluvial risk is modelled to increase with further flooding to the centre and southern half of the site (Figure 2-1).

The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to inform the exception test. The EA should be consulted on the data source of the Flood Map for Planning in this location. If the Flood Map for Planning is based on a detailed model of Syd Brook, any updates to this Level 2 SFRA and/or any FRA should make use of this model and include for the most up to date climate change allowances.

152.3 Flood risk management

The site doesn't benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

152.3.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C411 is located within one catchment, namely; Syd Brook. This is ranked as a medium sensitivity catchment. Planning policy considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[97].
- Developments should be incentivised to provide wider betterment by being requested to demonstrate in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments are to aim to achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

152.3.2 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. In the southern area of the site, there are significant opportunities for woodland planting to reduce runoff downstream. Upstream of the site, along Syd Brook, there is also potential to reconnect the channel to the floodplain, allowing flood water to be stored during a flood event. A Flood Risk Activity Permit (FRAP) may be required for NFM activities or works within the floodplain when planning permission is not required. These areas are shown in Figure 152-2.

97 Lancashire SuDS Guidance

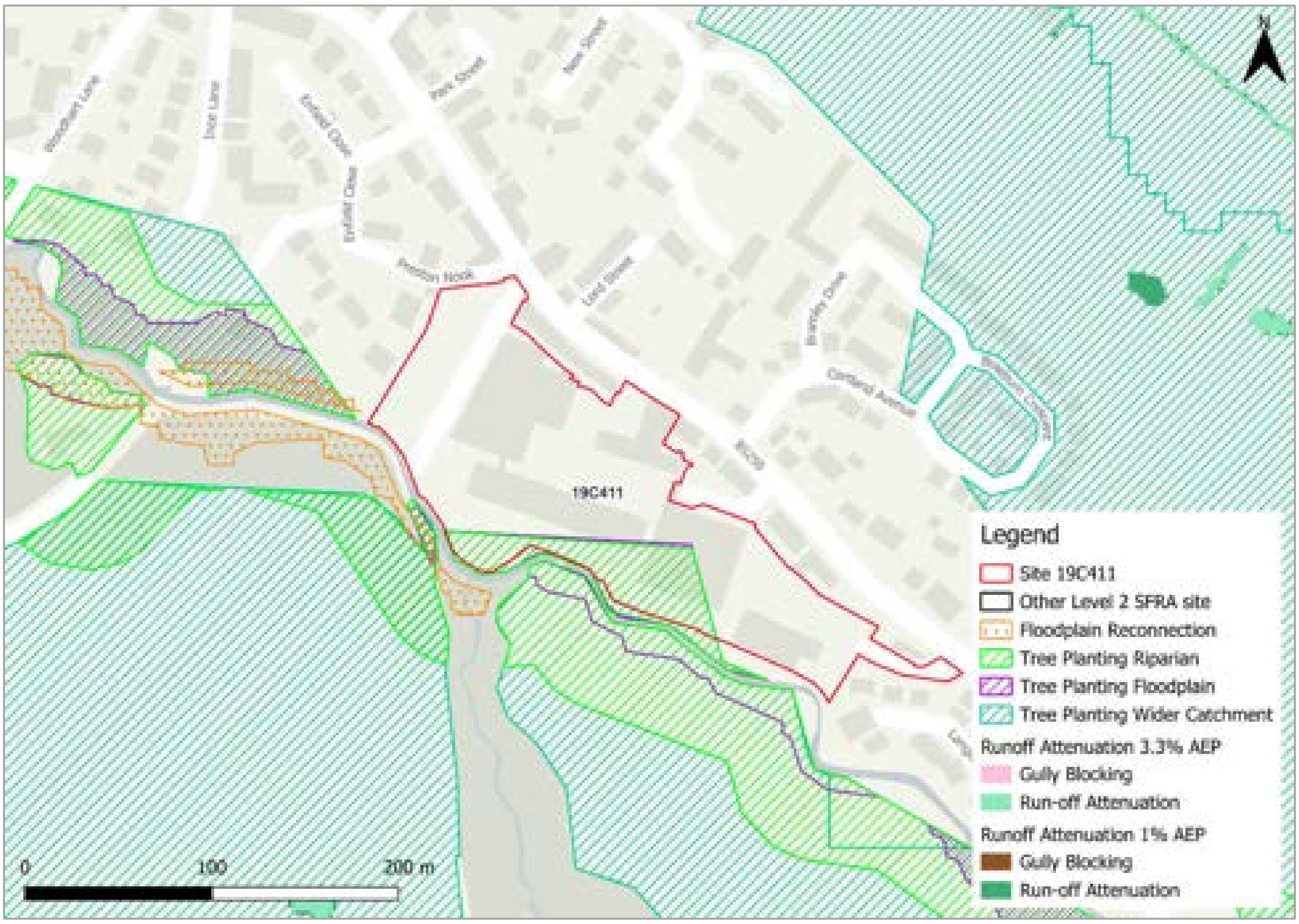

Figure 152-2: Natural Flood Management (NFM) potential mapping

152.4 Residual risk

152.4.1 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. 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 not modelled to be at risk from reservoir flooding.

152.5 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. Historic risk to the site is shown in The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the which shows that an area along to the southeast of the site has been subject to flooding in the past. The RFO dataset references that the historic event occurred in December 2015 during the Boxing Day Floods due to channel capacity exceedance of Syd Brook which runs adjacent to the southern boundary of the site.

Figure 152-3: Recorded historic flood events onsite and around the site

152.6 Flood warning and access and escape routes

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. Site 19C411 is located within one FWA, namely; 012FWFL65 - Syd Brook at Eccleston, as shown in 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. Site 19C100 is located within one FWA, namely; 012FWFL59B - Black Brook at Chorley, Heapey Road to Cowling, as shown in Figure 2-10.

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 a FWA. The site is also located within a FAA, namely; 012WAFLY - River Lostock and River Yarrow.

Based on available information, safe access and escape routes could likely be achieved during a flood event from the west of the site via Bagganley Lane to the B6228.

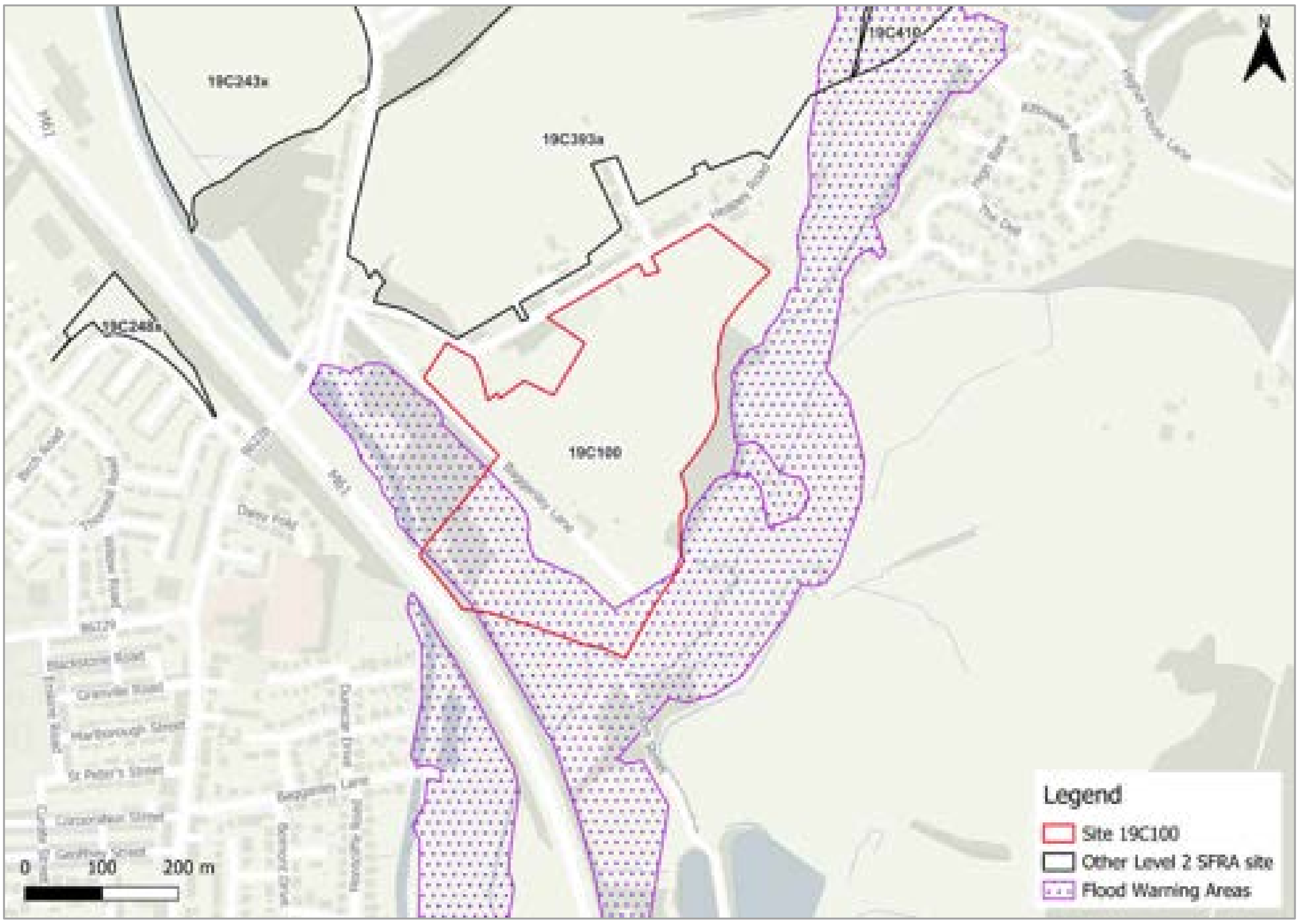

Figure 2-10.

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 a FWA. The site is also located within a FAA, namely; 012WAFLY - River Lostock and River Yarrow.

Based on available information, safe access and escape routes could likely be achieved during a flood event via the B5250 to the north of the site.

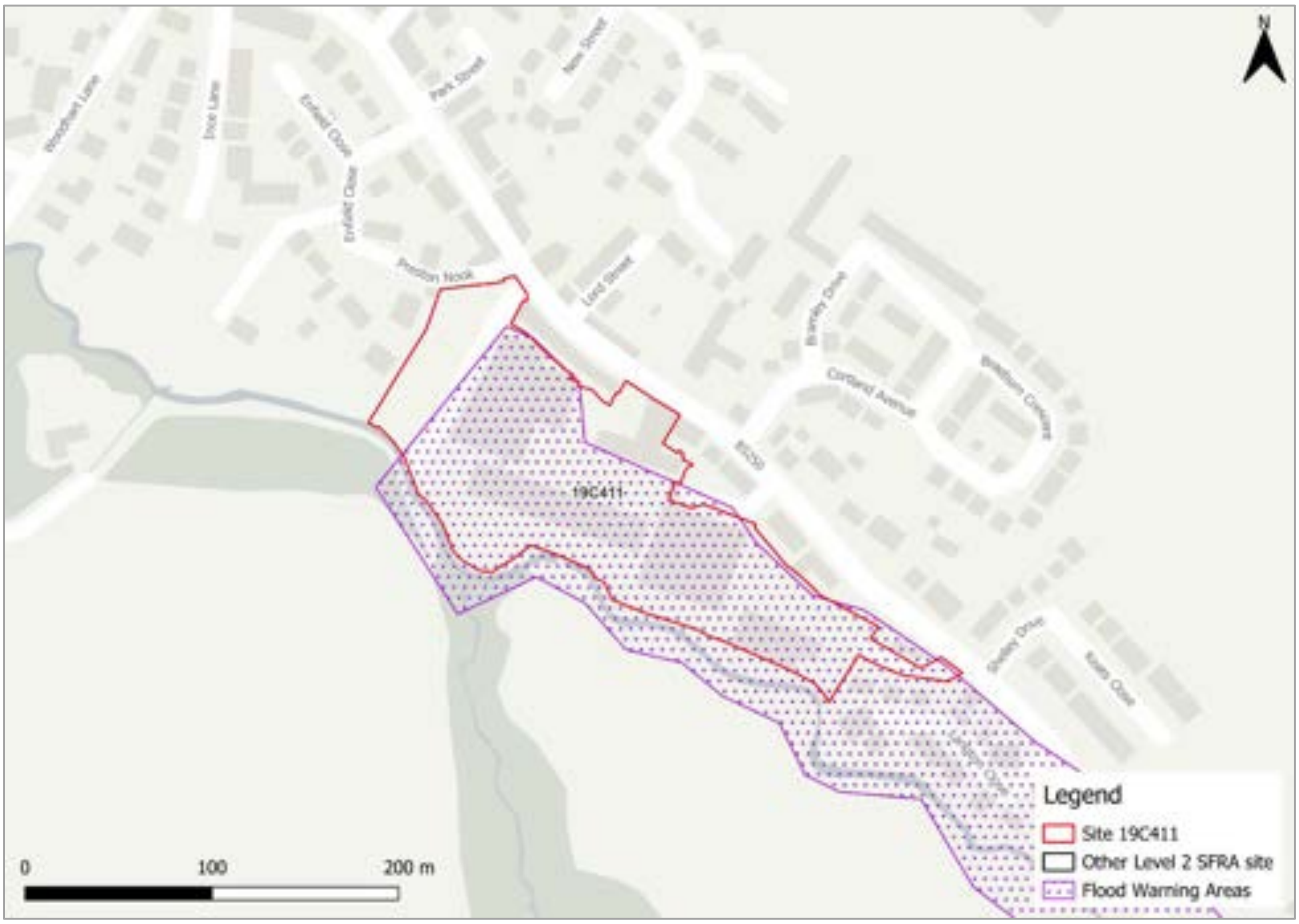

Figure 152-4: EA Flood Warning Areas

152.7 Observations, mitigation options and site suitability - fluvial

- The site is modelled to be within the functional floodplain in the east and along the southern boundary of the site, adjacent to Syd Brook. Development is not permitted within the functional floodplain. However, the functional floodplain in this area is conservatively based on Flood Zone 3.
- A flood risk activity permit may be required from the EA if development is planned within 8m of the bank of Syd Brook, which is a main river. EA advice would normally recommend for no development within 8m of a main river, to enable access for maintenance activities. The EA can advise on whether a permit will be required. If feasible, this area would be used as a green / blue corridor which can provide ecological, social and amenity value.
- Flood Zone 2 has been used as a proxy to provide a conservative estimate of Flood Zone 3 plus climate change. Flood depths and hazards were not available

at the time of writing, therefore a fully robust assessment of fluvial flood risk to this site cannot be carried out.

- Any update to the Level 2 SFRA and/or any FRA should include for detailed modelling of Syd Brook including for climate change. At this stage, it cannot be proven that this site can be safe for its lifetime.
- Safe access and escape routes are available via the B5250 located north of the site, based on available information.

153 Flood risk from surface water

153.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 1% of the site is within the medium risk surface water flood zone. A further 13% is at low surface water risk, as shown in Table 153-1.

In the medium risk event, surface water risk is largely confined to a small, shallow area of ponding in a topographic low spot towards the south of the site. In the low risk event, there are a number of surface water flow paths developing through the site, largely confined to the hardstanding roads and are constrained by the existing development within the site.

Greatest flood depths in the medium risk event range between 0.3 and 0.6 m (

Figure 153-1) with some areas of moderate hazard (Figure 153-2). Safe access and escape routes should be possible via the B5250 to the north of the site in all events.

Table 153-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
86	13	1	0

Figure 153-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 153-2: Medium risk event surface water flood hazard[98] (Risk of Flooding from Surface Water map)

153.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 153-2.

Table 153-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 153-3 shows the medium risk surface water flood depths plus 45% climate change. There are a number of additional surface water flow paths within the medium risk event constrained by the existing development within the site, similar to the present day low risk

98 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

event. Maximum flood depths are modelled to be 0.6m and 0.9m, with some areas of significant hazard (Figure 153-4).

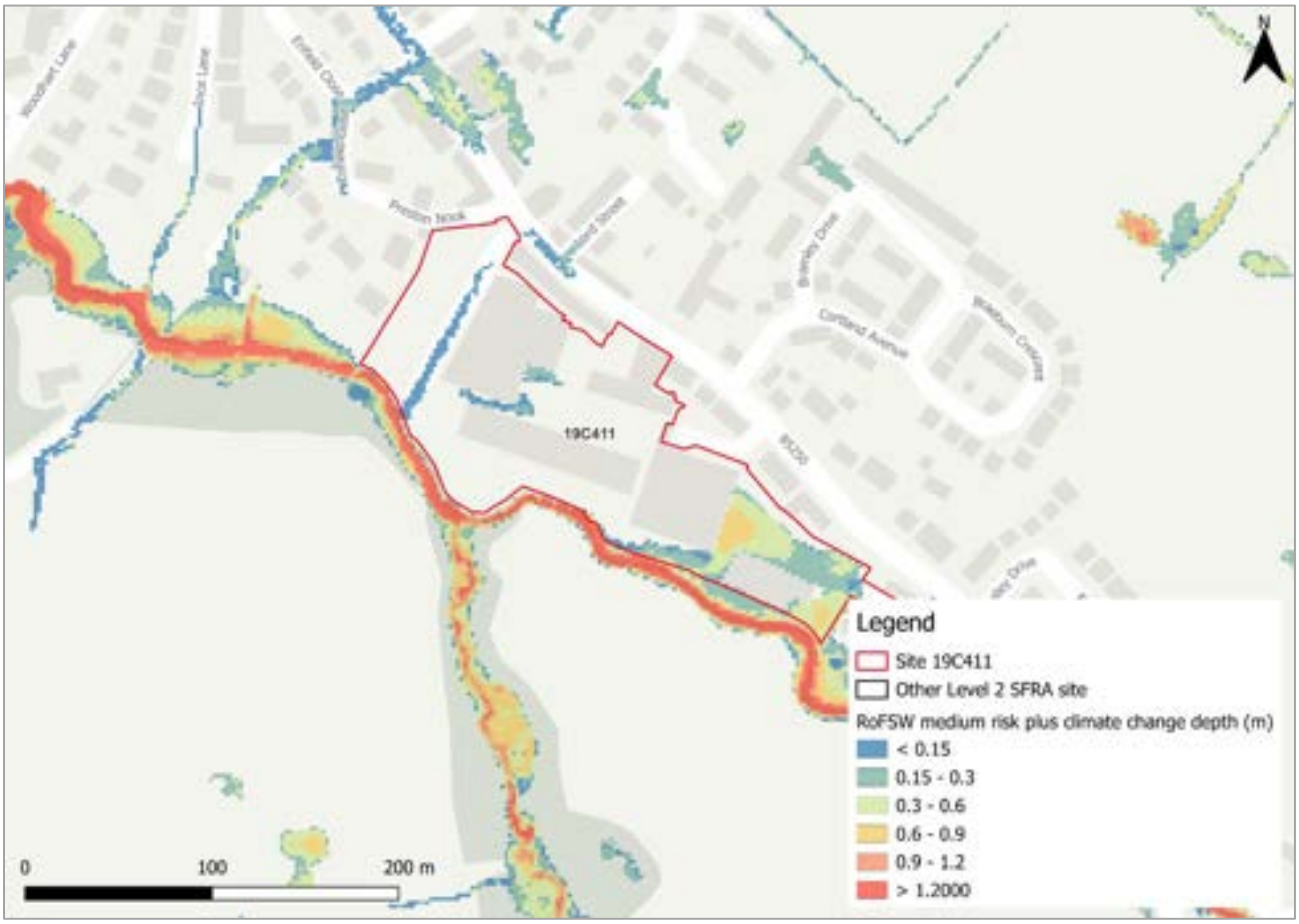

Figure 153-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 153-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

153.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with 86% of the site being at very low surface water flood risk. In the medium risk event, surface water risk is confined to an area of ponding within a topographic low spot and is constrained by the existing development within the site.
- The effects of climate change on surface water have been modelled for this SFRA using the medium risk surface water flood depths plus 45% climate change. There are additional surface water flow paths and areas of ponding due to existing development constraints within the medium risk plus climate change event in comparison to the present day medium risk event. Any existing flow paths and topographic depressions should be maintained in site design.
- Safe access and escape routes should be achievable via the B5250 in all events.
- The Groundwater Emergence Map (Figure 154-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Were development to proceed, a drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new

development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.

- Site runoff should be maintained at current rates and, where possible, betterment should be achieved.
- Assessment of the current drainage system in place should be carried out to ascertain any current capacity issues and whether the current system could accommodate new development or whether further capacity will be required.
- 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 or evidence.

154 Risk from groundwater

Risk from groundwater sources 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 Guide[99]. Figure 154-1 shows the map for Site 19C411 and the surrounding areas and Table 154-1 explains the risk classifications.

Within the southwest of the site there is a risk groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots. In this area there is a risk of flooding to both surface and subsurface assets. The rest of the site is in an area where there is no risk of groundwater emergence. Groundwater conditions may therefore be suited to infiltration SuDS in these areas.

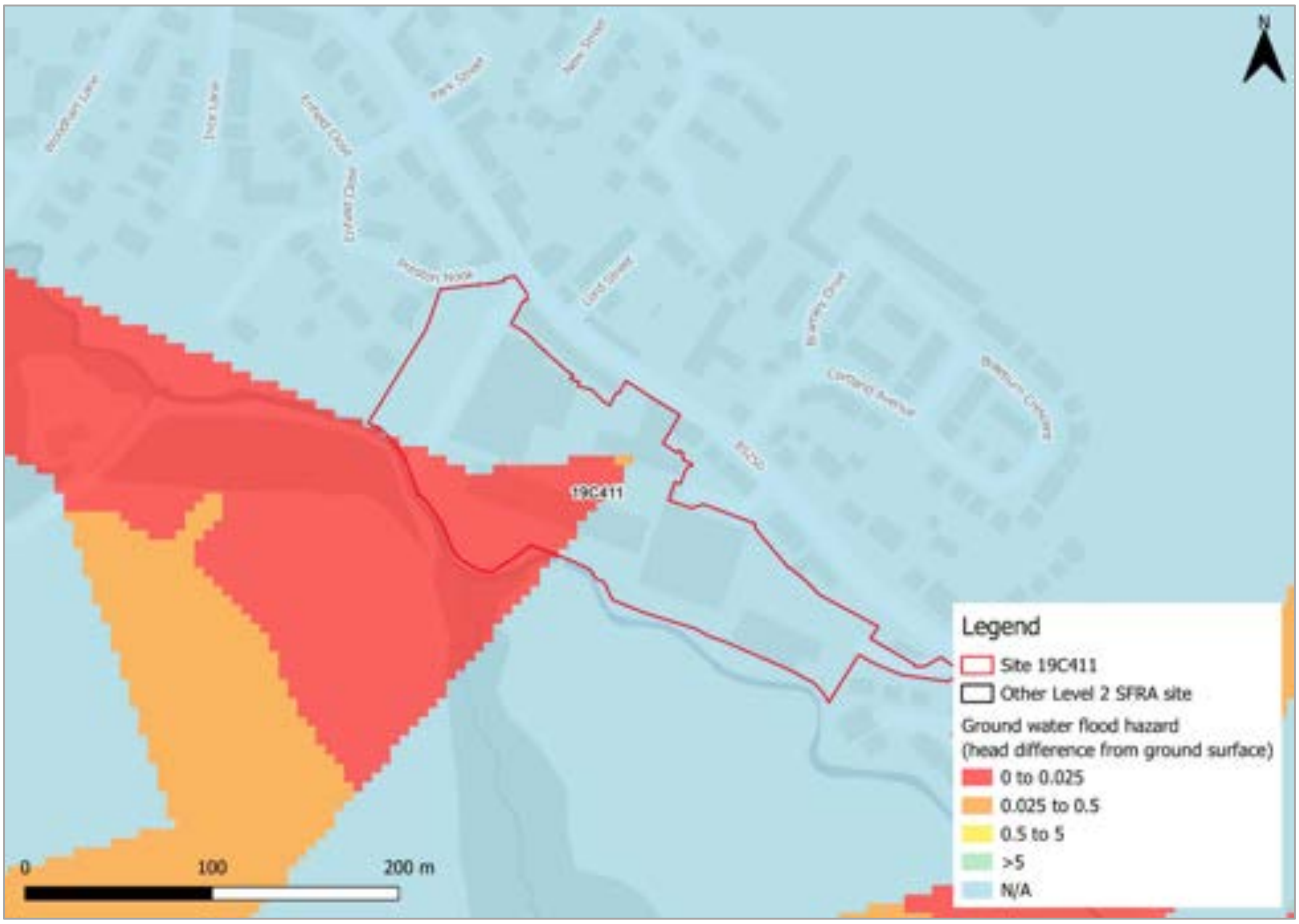

Figure 154-1: JBA 5m Groundwater Emergence Map

99 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 154-1: 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.	

155 Overall site assessment

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

To pass part b) of the exception test[100], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development. Given the absence of modelled climate change data and the use of proxies to inform future fluvial flood risk to the site, it cannot be proven that this site can remain safe for its lifetime and therefore the exception test cannot be passed.

The areas of flood risk within this site cannot be developed until the required information detailed in this SFRA on existing and future flood risk from Syd Brook is fully ascertained. This is because, at this stage, it cannot be proven that the site can remain safe for its lifetime. The site can only be allocated if all development can be directed to areas of low flood risk.

Were additional, more detailed modelled information on flood risk become available through an update to the SFRA or through a site-specific FRA, that show the risk area to be lower than currently shown, more of the site could then be developed. Conversely, were the risk to be greater, any development must account for this. Flood risk elsewhere should not be increased as a result of development.

155.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Updated present day and climate change modelling of Syd Brook should be used to update this Level 2 SFRA at the earliest opportunity to provide a robust strategic assessment of flood risk to this site and surrounding areas.
- It would be acceptable to use updated modelling to suitably assess risk through a site-specific FRA, as well as/instead of a Level 2 SFRA update.
- There should be no development within the functional floodplain. There should also be no development within 8m of Syd Brook. The EA recommend for an 8m no development buffer for all main rivers to enable access for maintenance activities. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- A detailed drainage strategy will be required for any new development. The use of infiltration SuDS should be investigated.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.

100 Para 178 National Planning Policy Framework 2024

- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C427

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0009
Revision	P02
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Contract

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JBA Project Code	2023s1344

This report describes work commissioned by Preston City Council, on behalf of the Central Lancashire Local Plan Team, by an instruction dated 19 August 2024. The Client's representative for the contract was Carolyn Williams of Preston City Council. Kaylyn Carroll of JBA Consulting carried out this work.

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Acknowledgements

We would like to thank the Environment Agency for their assistance with this work

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157 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19C427. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' (2025) and read the 'Central Lancashire Level 2 SFRA Main Report' (2025) and is therefore familiar with the terminology used in this report.

157.1 Site 19C427

- Location: Land at Millbrook Close/ Victoria Street
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 1.07 hectares
- Proposed development impermeable area: 0.91 hectares (assumed 85% impermeable area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
  - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
  - Assessment of surface water flood depths and hazards
  - Assessment of all other sources of flood risk

Figure 157-1: Existing site location boundary

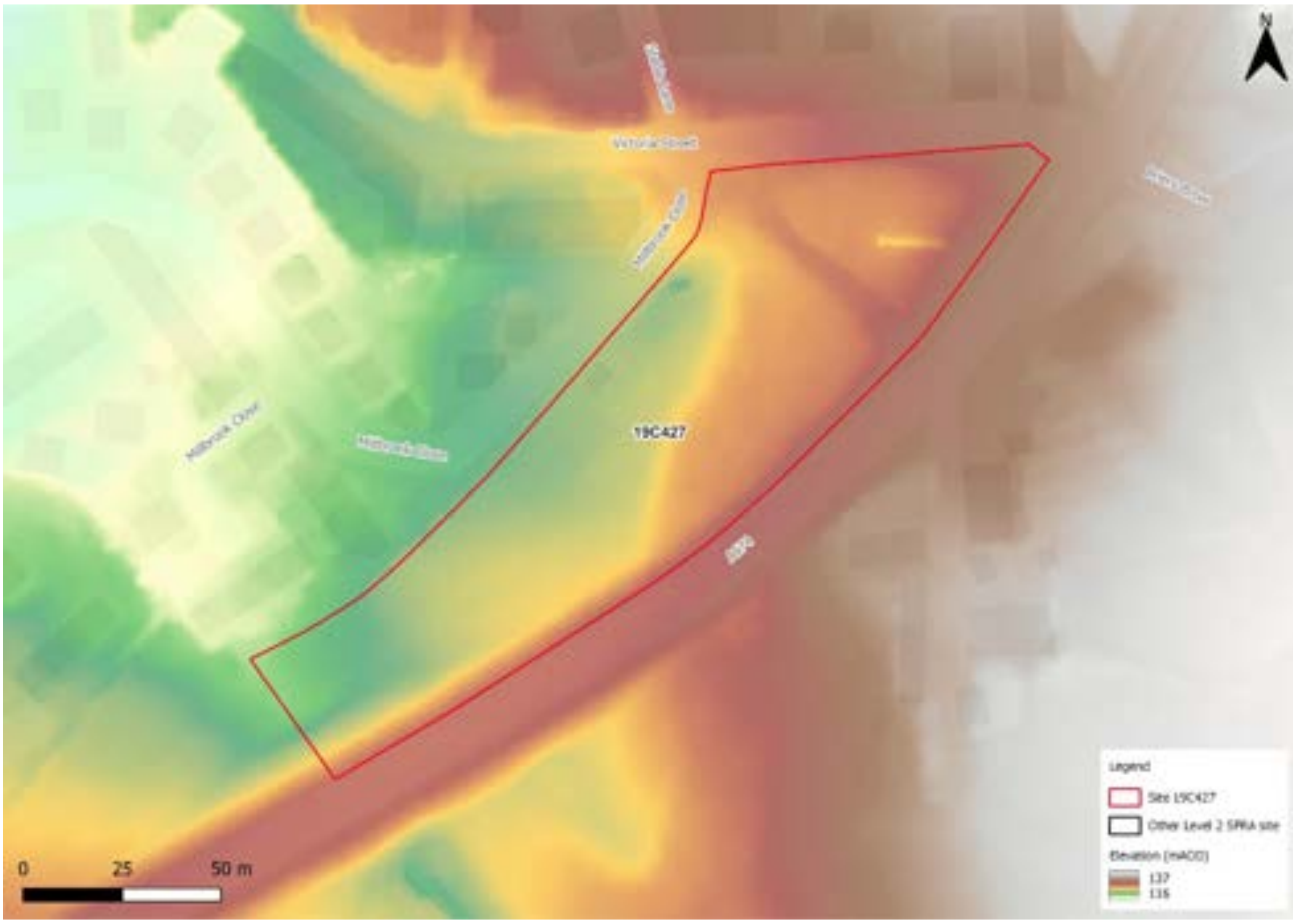

Figure 157-2: Topography

158 Flood risk from rivers

158.1 Existing risk

158.1.1 Flood Map for Planning and functional floodplain

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

The site is entirely within Flood Zone 1 indicating it is at low risk of flooding from rivers.

Table 158-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

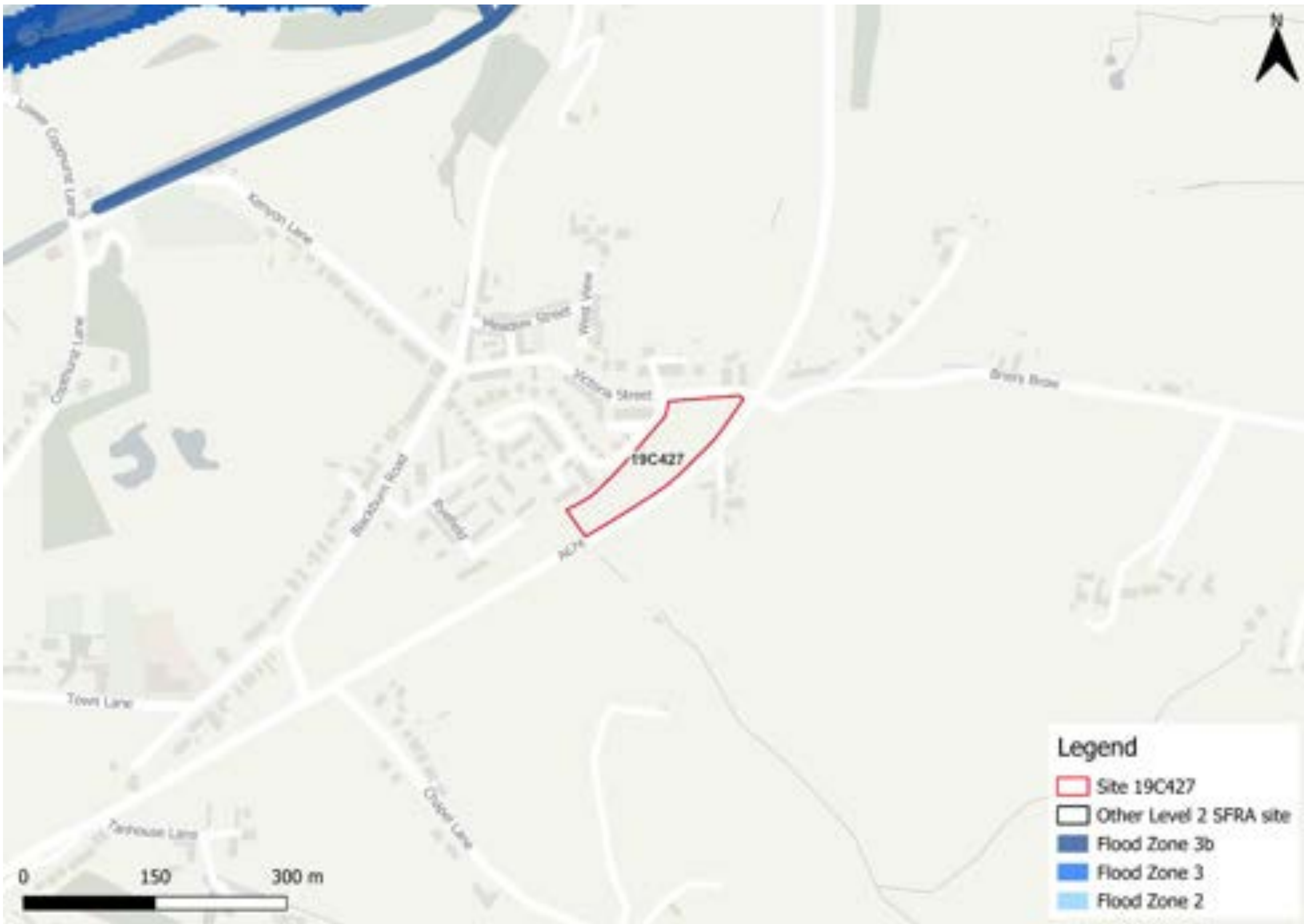

Figure 158-1: Existing risk from rivers to the site

158.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

158.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C427 is located within one catchment, namely, Lostock US Farrington Weir. The site is ranked as a medium sensitivity catchment. Planning considerations for sites at medium sensitivity to the cumulative impacts of development that apply to this site include:

- Incorporate SuDS and provide details of adoption, ongoing maintenance, and management, in line with the Lancashire SuDS Guidance[101].
- Developments should be incentivised to provide wider betterment by demonstrating in site-specific FRAs and Surface Water Drainage Strategies what measures can be put in place to contribute to a reduction in flood risk downstream.
- Developments should achieve greenfield runoff rates and volumes in their post-development state.
- Surface Water Management Plans should be developed as required.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

158.2.2 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. There are not any applicable areas that could benefit this site.

158.3 Residual risk

158.3.1 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. 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 not modelled to be at risk from reservoir flooding.

101 Lancashire SuDS Guidance

158.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

158.5 Flood warning and access and escape routes

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. The 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. The site is not located within a FAA.

Based on available information. safe access and escape routes could likely be achieved via the A674 to the southeast of the site.

158.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is located wholly within Flood Zone 1 indicating it is at low risk of flooding from rivers.

159 Flood risk from surface water

159.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 5% of the site is within the high risk surface water flood zone. A further 2% of the site is at medium surface water flood risk and a further 2% of the site is at low surface water risk, as shown in Table 3-1.

In the high risk event, surface water risk is confined to an area of ponding within a topographic low spot in the north of the site. In the medium risk event, this area of ponding increases in extent, with an additional area of ponding along the western boundary. In the low risk event, these areas of ponding develop into two short flow paths.

Greatest surface water flood depths in the medium risk event are > 1.2 m (Figure 3-1) with some areas of extreme hazard (Figure 3-2). Safe access and escape routes should be possible via the A624 in all events.

Table 159-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
91	2	2	5

-
-

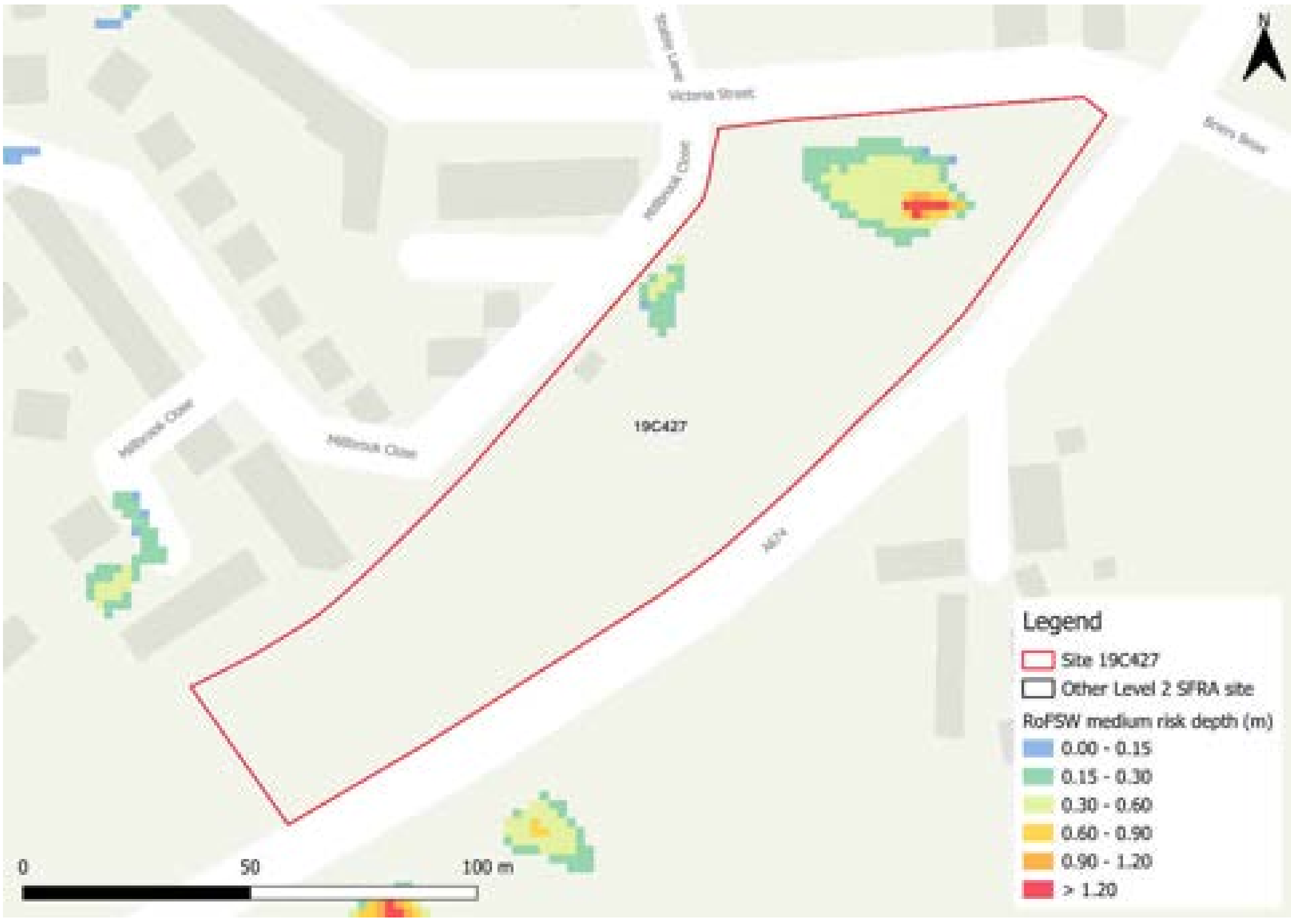

Figure 159-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

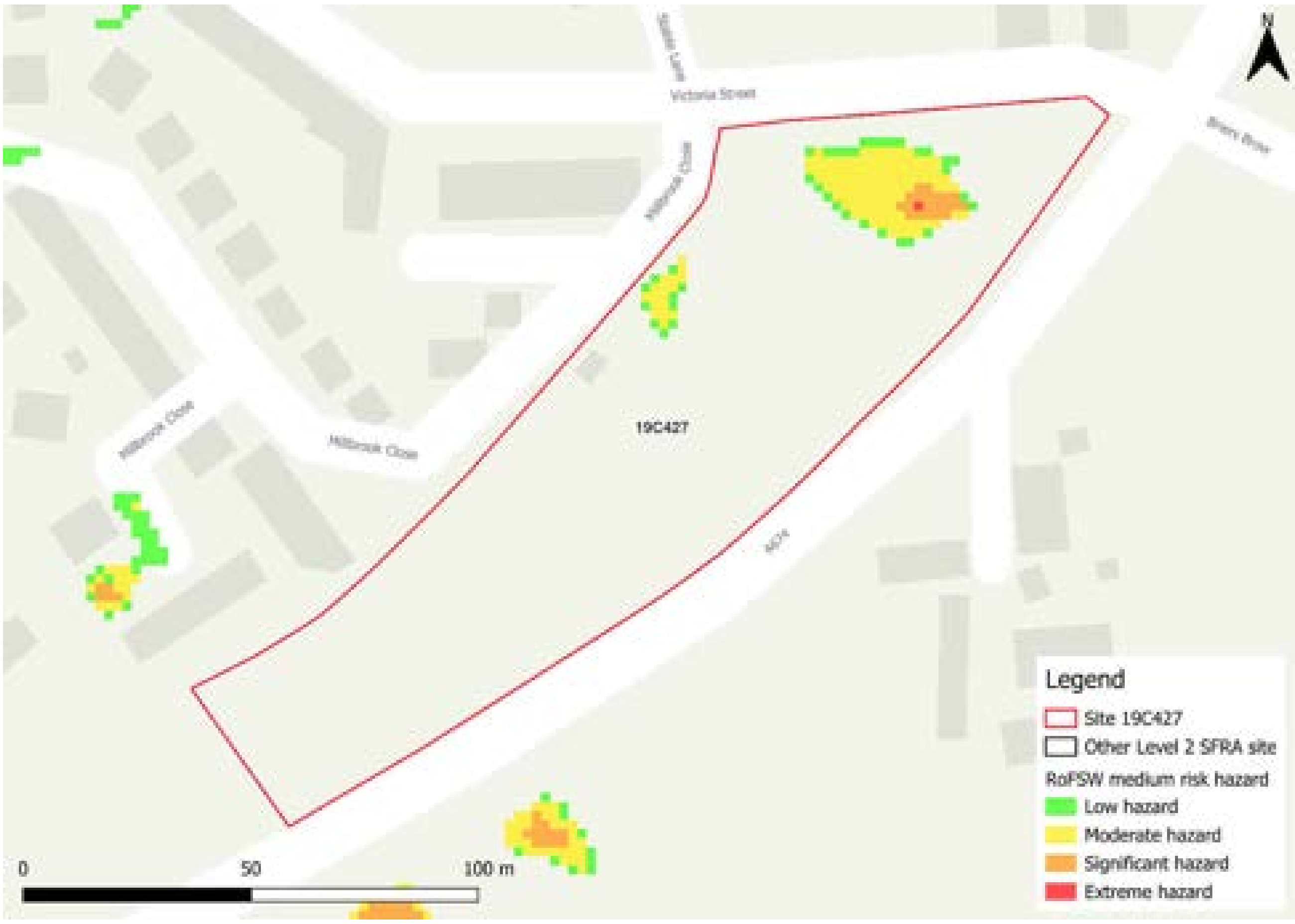

Figure 159-2: Medium risk event surface water flood hazard[102] (Risk of Flooding from Surface Water map)

159.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 159-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

102 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

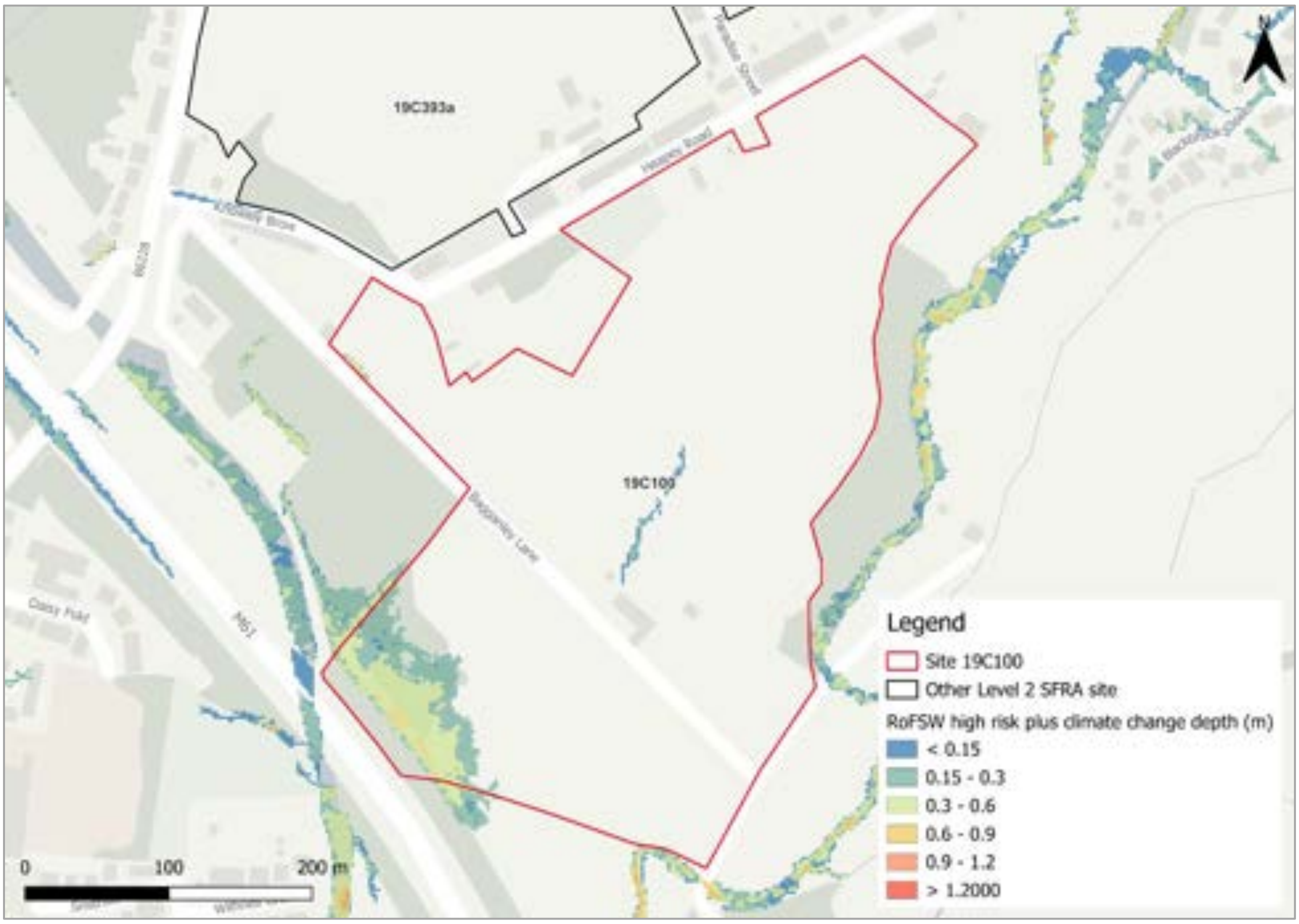

Figure 3-3 shows the medium risk surface water flood depths plus 45% climate change. Risk is modelled to be significantly greater than present day conditions, with the medium risk climate change event being similar in extent to the present day low risk event, with flow paths extending from the areas of ponding within the north and west. Maximum flood depths are modelled to be > 1.2 m, with some areas of extreme hazard (Figure 3-3). However, the flow routes are mainly shallow.

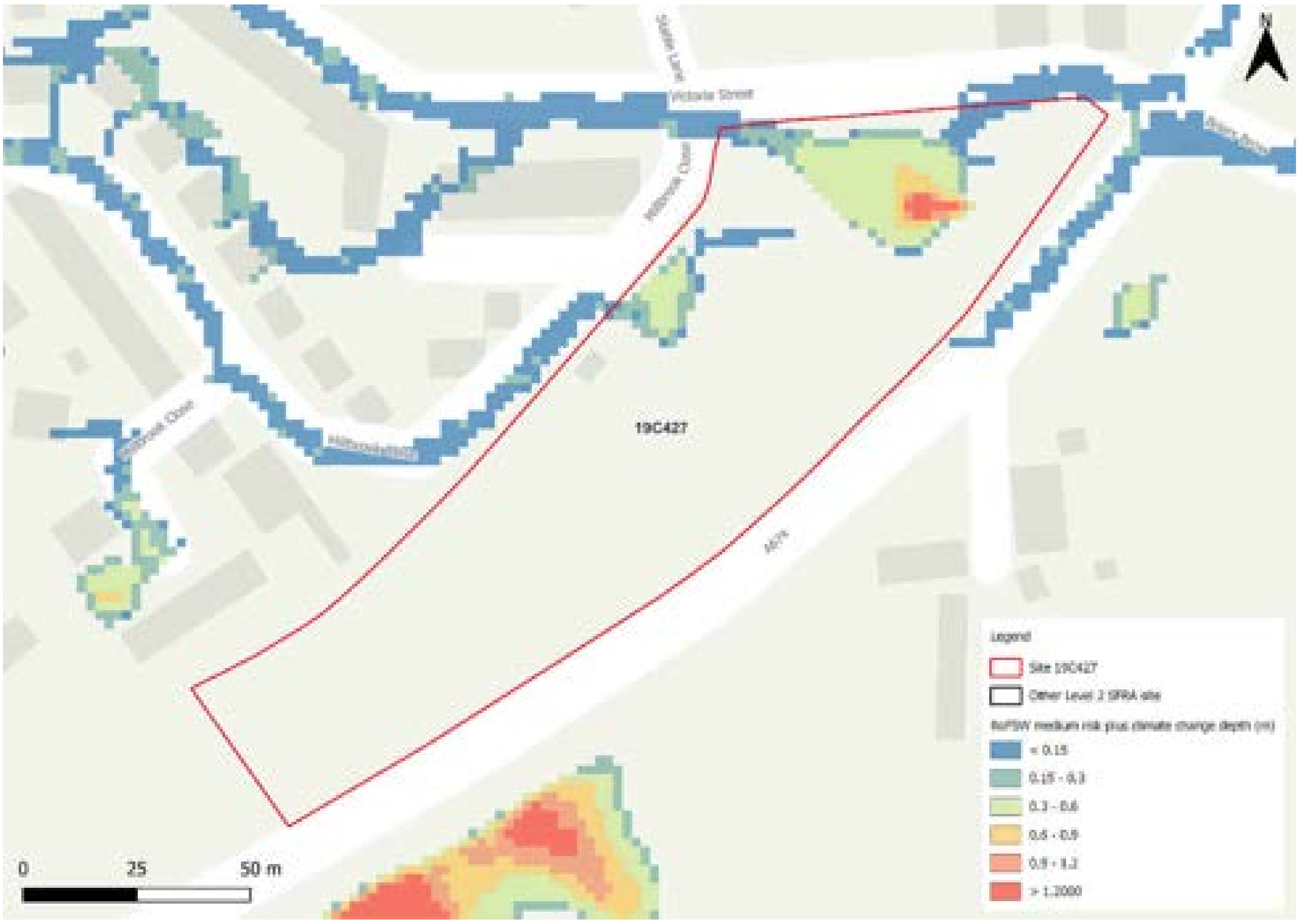

Figure 159-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 159-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

159.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 91% of the site being at very low risk. Surface water risk in the medium risk event is confined to two areas of ponding within topographic low spots. Safe access and escape routes should be achievable via the A624 in all events.
- The medium risk modelled climate change outputs indicate a similar extent risk to the present day low risk event, with a greater extent of flooding within the areas of ponding, which extend into two distinct flow paths.
- Topographic depressions and flow paths should be considered and included in site design and ideally left in place to flood naturally when required. Any regrading of land must include for like for like volumes to ensure risk is contained safely onsite for the lifetime of development. Development should be directed away from the areas of ponding within the north of the site where there is significant ponding. These areas should remain as open greenspace.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.

- Were development to proceed, a drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Site runoff should be maintained at current rates (likely to be greenfield) and, where possible, betterment should be achieved.
- Note, 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 or evidence.

160 Risk from groundwater

Risk from groundwater sources 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 Guide[103]. Figure 4-1 show the map for Site 19C427 and the surrounding areas and Table 160-1 explains the risk classifications.

The risk of groundwater emergence varies across the site. In the north of the site there is the risk that groundwater may emerge at a significant rate and has the capacity to flow overland and/or pond within any topographic low spots. The remaining area of the site is within an area of no risk of groundwater emergence. Ground investigations will be required through the site-specific FRA to ascertain groundwater levels and conditions within the north of the site. Groundwater conditions may therefore be suited to infiltration SuDS across the site.

Figure 160-1: JBA 5m Groundwater Emergence Map

103 [Strategic flood risk assessment good practice guide. ADEPT. December 2021.]

Table 160-1: Groundwater Flood 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.	

161 Overall site assessment

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

This site is not required to pass part b) of the exception test[104], as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development

161.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on current information, it should be possible to allocate this site given its location within Flood Zone 1. However, there is risk from surface water in the north of the site. A detailed drainage strategy will be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development.
- Ideally, development would avoid the significant area of ponding within the north of the site.
- Surface water should be retained onsite which may reduce units. This will require detailed surface water modelling based on layout plans and detailed design and full consultation with the LLFA on required runoff rates, likely to be greenfield or betterment. The use of infiltration SuDS should be investigated.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

104 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19C434

Final

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Prepared for:

Preston South Ribble Chorley Central Lancashire

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Document Status

Issue date	14 February 2025
Issued to	Carolyn Williams
BIM reference	LOU-JBA-XX-XX-RP-Z-0008
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Acknowledgements

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163 Background

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163.1 Site 19C434

- Location: Land to the rear of 62-66 Moor Road
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 0.09 hectares
- Proposed development impermeable area: 0.08 hectares (assumed 85% impermeable area)
- Watercourse: N/A
- Summary of requirements from scoping stage:
    - Level 1 SFRA recommendation was for withdrawal from allocation or more detailed assessment through Level 2 SFRA
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 163-1: Existing site location boundary

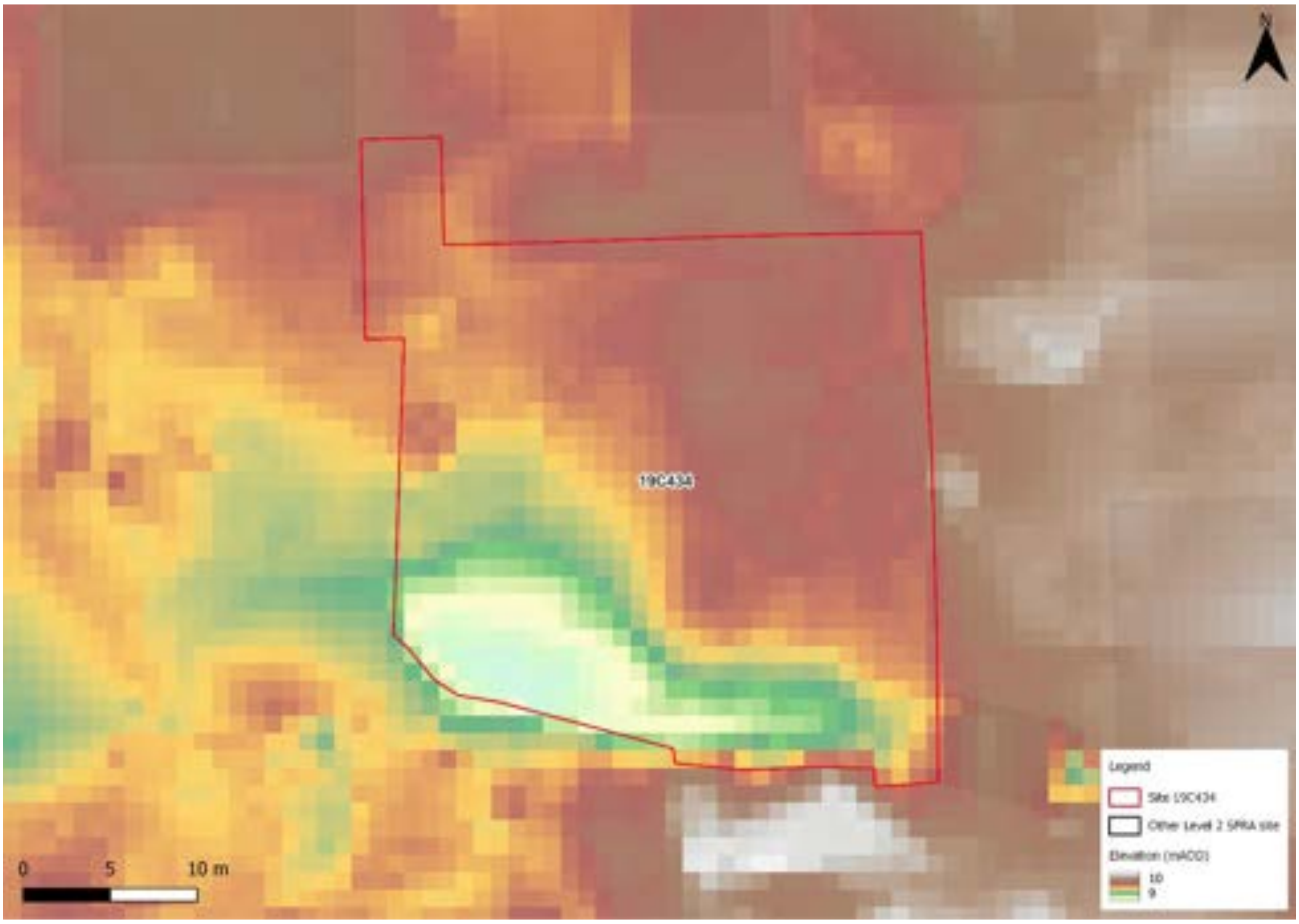

Figure 163-2: Topography

164 Flood risk from rivers

164.1 Existing risk

164.1.1 Flood Map for Planning and functional floodplain

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

The site is wholly located within Flood Zone 1 indicating it is at low risk from flooding from rivers.

Table 164-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
100	0	0	0

Figure 164-1: Existing risk from rivers to the site

164.2 Flood risk management

The site does not benefit from any formal engineered flood defences, according to the EA's spatial flood defences dataset.

164.2.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19C434 is located within one catchment, namely; Lostock DS Farrington Weir. This is ranked as a high sensitivity catchment. Planning considerations for sites at high sensitivity to the cumulative impacts of development that apply to this site include:

- National and local flood risk planning policy must be stringently applied within these areas, with flood risk from all sources given the appropriate priority, particularly when applying the Sequential and Exception Tests.
- Both greenfield and brownfield developments to achieve 20% betterment over pre-development greenfield runoff peak flows and volumes in their post development state.
- For larger sites and strategic developments (e.g. new settlements and urban extensions):
    - The LLFA, Environment Agency, and LPA should be consulted at pre-application stage.
    - The FRA should examine the cumulative impacts of proposed peak surface water runoff rates and volumes from across the site on the peak flows, duration of flooding and timing of flood peaks in receiving watercourses. This should include the impact of other developments within the WFD catchment, if appropriate, as advised by the LPA/LLFA.
    - A Surface Water Drainage Masterplan should be developed and implement appropriate drainage sub-catchments for the management of surface water, with specific runoff rate and volume requirements set for each sub-catchment, in line with the SuDS management train.

The full list of planning policy suggestions can be found in Appendix G of the Level 1 SFRA.

164.2.2 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. There are not any applicable areas that could benefit this site.

164.3 Residual risk

164.3.1 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. 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 not modelled to be at risk from reservoir flooding.

164.4 Historic flood incidents

The EA's Historic Flood Map (HFM) and Recorded Flood Outlines (RFO) datasets have been considered. There are no recorded historic flood incidents within the vicinity of the site.

164.5 Flood warning and access and escape routes

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. The 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. The site is not located within a FAA.

Based on available information, safe access and escape routes could likely be achieved via multiple points surrounding the site.

164.6 Observations, mitigation options and site suitability - fluvial

- The proposed development of the site is anticipated to see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- The site is wholly located within Flood Zone 1.

165 Flood risk from surface water

165.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly very low. Approximately 14% of the site is within the medium risk surface water flood zone and a further 5% of the site is at low surface water flood risk.

In both the medium and low risk events, surface water risk is confined to an area of ponding within a topographic low spot within the southwest of the site.

Greatest surface water flood depths in the medium risk event are between 0.3 and 0.6 m (Figure 3-1) with some areas of moderate hazard (Figure 3-2). Safe access and escape routes should be possible via multiple points surrounding the site in all events.

Table 165-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
81	5	14	0

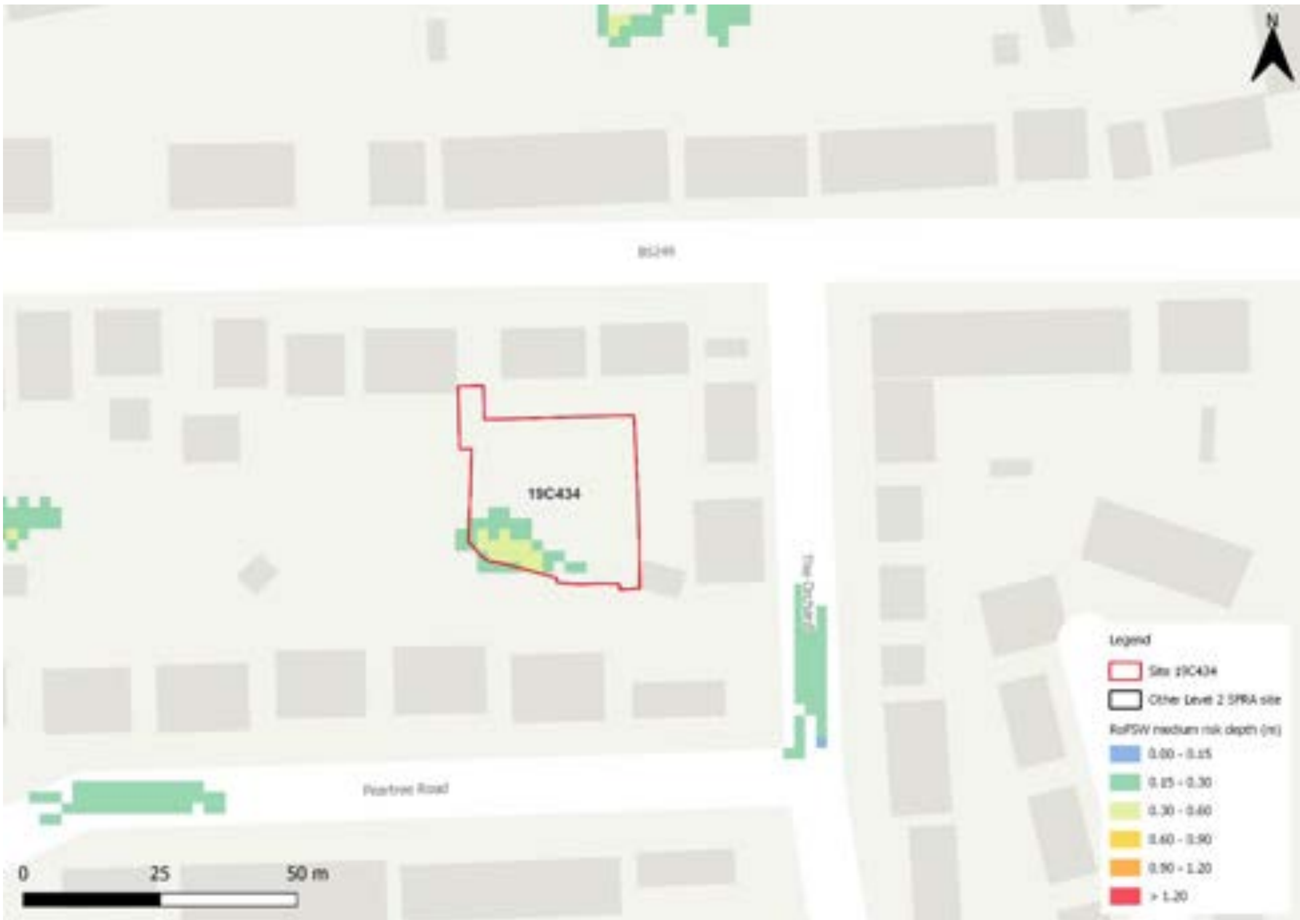

Figure 165-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 165-2: Medium risk event surface water flood hazard[105] (Risk of Flooding from Surface Water map)

165.2 Impacts from climate change

The impact of climate change on surface water flood risk has been modelled. This allows for direct comparison with the RoFSW map. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

Table 165-2: Modelled climate change allowances for rainfall for the Douglas management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater in extent than the present day high risk surface water event, similar to the present day medium risk event. The area of ponding within the southwest of the site

105 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

is greater in extent and depth, and an additional surface water flow path emerges through the centre of the site. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

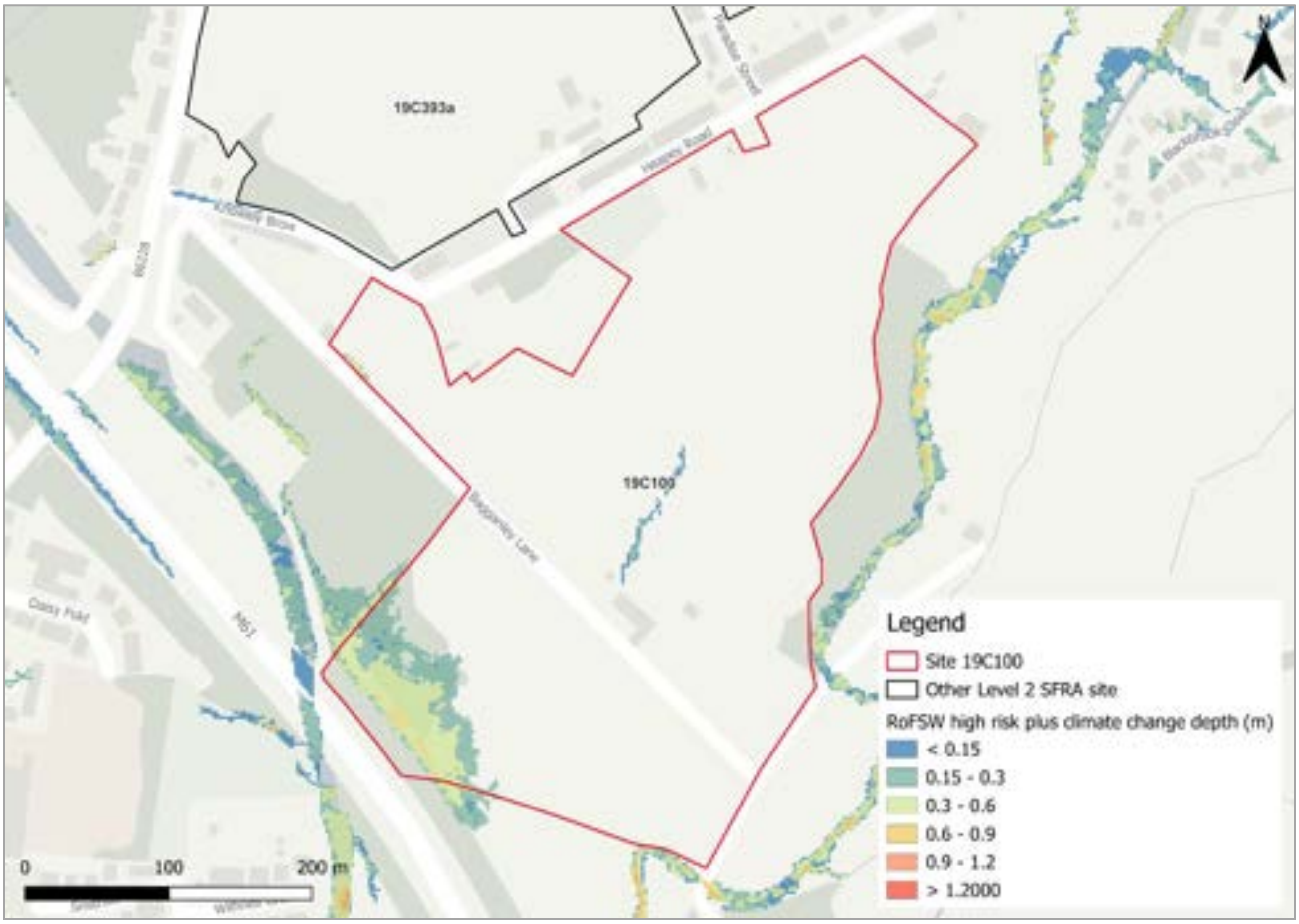

Figure 3-3 shows the modelled surface water depths for the medium risk event +45% climate change. Risk is modelled to be significantly greater than present day conditions, with the medium risk climate change event being similar in extent to the present day low risk event. There is a greater extent of flooding within the southwest of the site. Maximum flood depths are modelled to be between 0.3 and 0.6 m, with some areas of significant hazard (Figure 165-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map).

Figure 165-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

Figure 165-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

165.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 81% of the site being at a very low risk. Surface water risk in the medium risk event is confined to an area of ponding within a topographic low spot in the southwest of the site. Safe access and escape routes should be achievable via multiple points surrounding the site in all events.
- The medium risk modelled climate change outputs indicate a similar extent of risk to the present day low risk event, with a greater extent of flooding within the southwestern corner.
- Topographic depressions should be considered and included in site design and ideally left in place to flood naturally when required. Any regrading of land must include for like for like volumes to ensure risk is contained safely onsite for the lifetime of development. Development should be directed away from the southwestern corner of the site where there is significant ponding. This area should remain as open greenspace.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site. This should be

further explored through appropriate ground survey as part of the FRA and drainage strategy.

- Were development to proceed, a drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. This will require surface water modelling based on layout plans and detailed design and full consultation with the LLFA.
- Site runoff should be maintained at current rates (likely to be greenfield) and, where possible, betterment should be achieved.
- Note, 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 or evidence.

166 Risk from groundwater

Risk from groundwater sources 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 Guide[106]. Figure 4-1 show the map for Site 19C434 and the surrounding areas and Table 166-1 explains the risk classifications.

The entirety of the site is in an area where there is no risk of groundwater emergence. Groundwater conditions may therefore be suited to infiltration SuDS across the site.

Figure 166-1: JBA 5m Groundwater Emergence Map

106 Strategic flood risk assessment good practice guide. ADEPT. December 2021.

Table 166-1: Groundwater Flood 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.	

167 Overall site assessment

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

This site is not required to pass part b) of the exception test[107], as it is not located within Flood Zone 3a. However, it must still be proven that the development can be safe for its lifetime, which is 100 years for residential development.

167.2 Recommendations, FRA requirements and further work

Based on the evidence presented in the Level 1 SFRA (2025) and this Level 2 SFRA:

- Based on current information, it should be possible to allocate this site given its location within Flood Zone 1. However, there is significant risk from surface water in the southwest of the site. A detailed drainage strategy will be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development.
- Ideally, development would avoid the significant area of ponding within the southwest of the site.
- Surface water should be retained onsite which may reduce units. This will require detailed surface water modelling based on layout plans and detailed design and full consultation with the LLFA on required runoff rates, likely to be greenfield or betterment. The use of infiltration SuDS should be investigated.
- Any FRA should be carried out in line with the NPPF; FRCC-PPG; EA guidance; Central Lancashire Local Plan and LLFA policies; and national and local SuDS policy and guidelines.
- Throughout the FRA process, consultation should be carried out with the following, where applicable, the LPA; LLFA; emergency planning officers; EA; UU; the highways authorities; and the emergency services.

107 Para 178 National Planning Policy Framework 2024

168 Licencing

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