Central Lancashire Level 2 Strategic Flood Risk Assessment - Sites

South Ribble Combined

JBA consulting

Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S124/SRBC005

Final

February 2025

Prepared for:

Preston South Ribble Chorley
Central Lancashire

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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. 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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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19S124/SRBC005. 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 19S124/SRBC005

- Location: Land off Brownedge Rd/Railway Sidings
- Existing site use: Brownfield
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 2.7 hectares
- Proposed development impermeable area: 2.4 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
    - Assessment of all other sources of flood risk

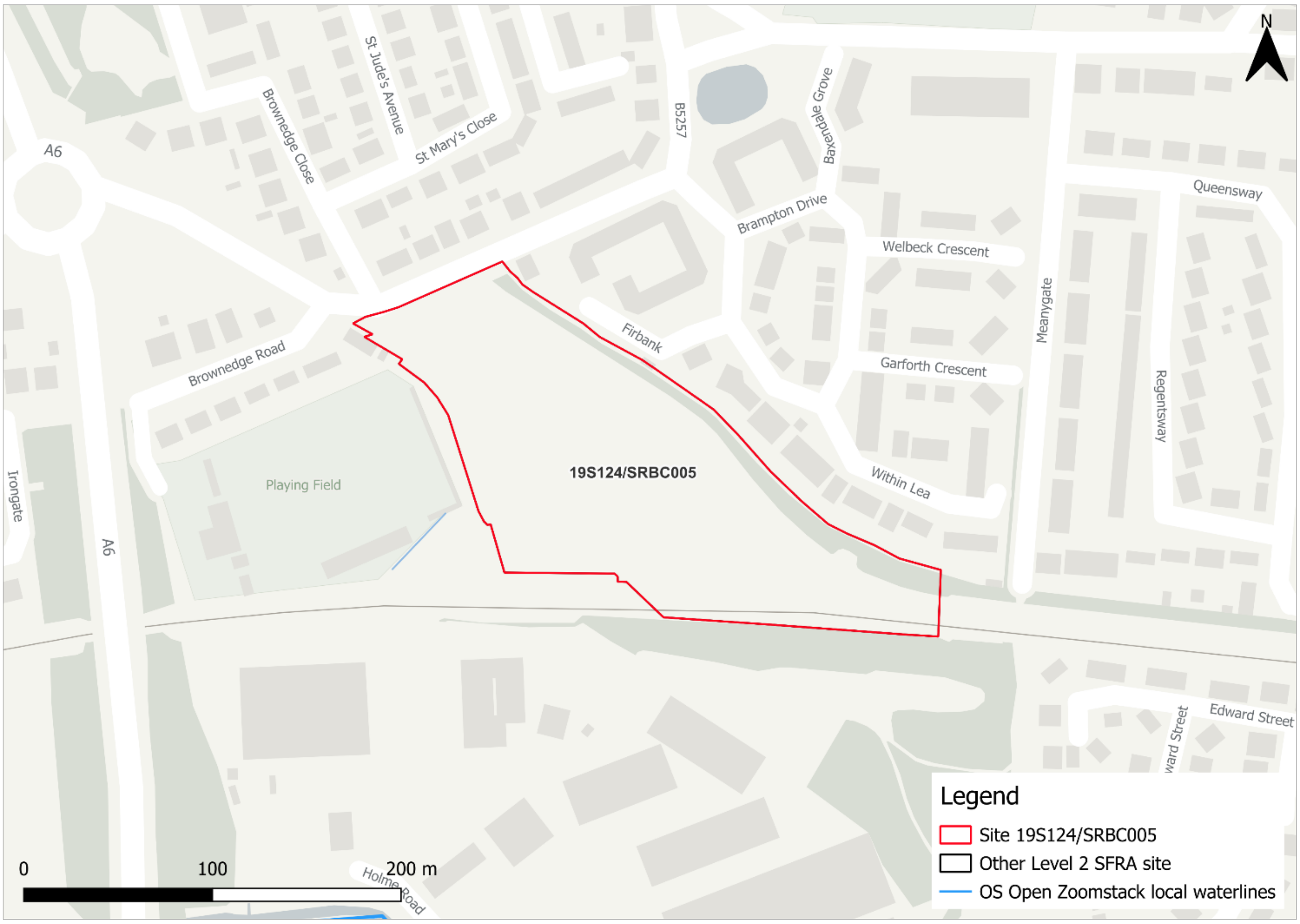

Figure 1-1: Existing site location boundary

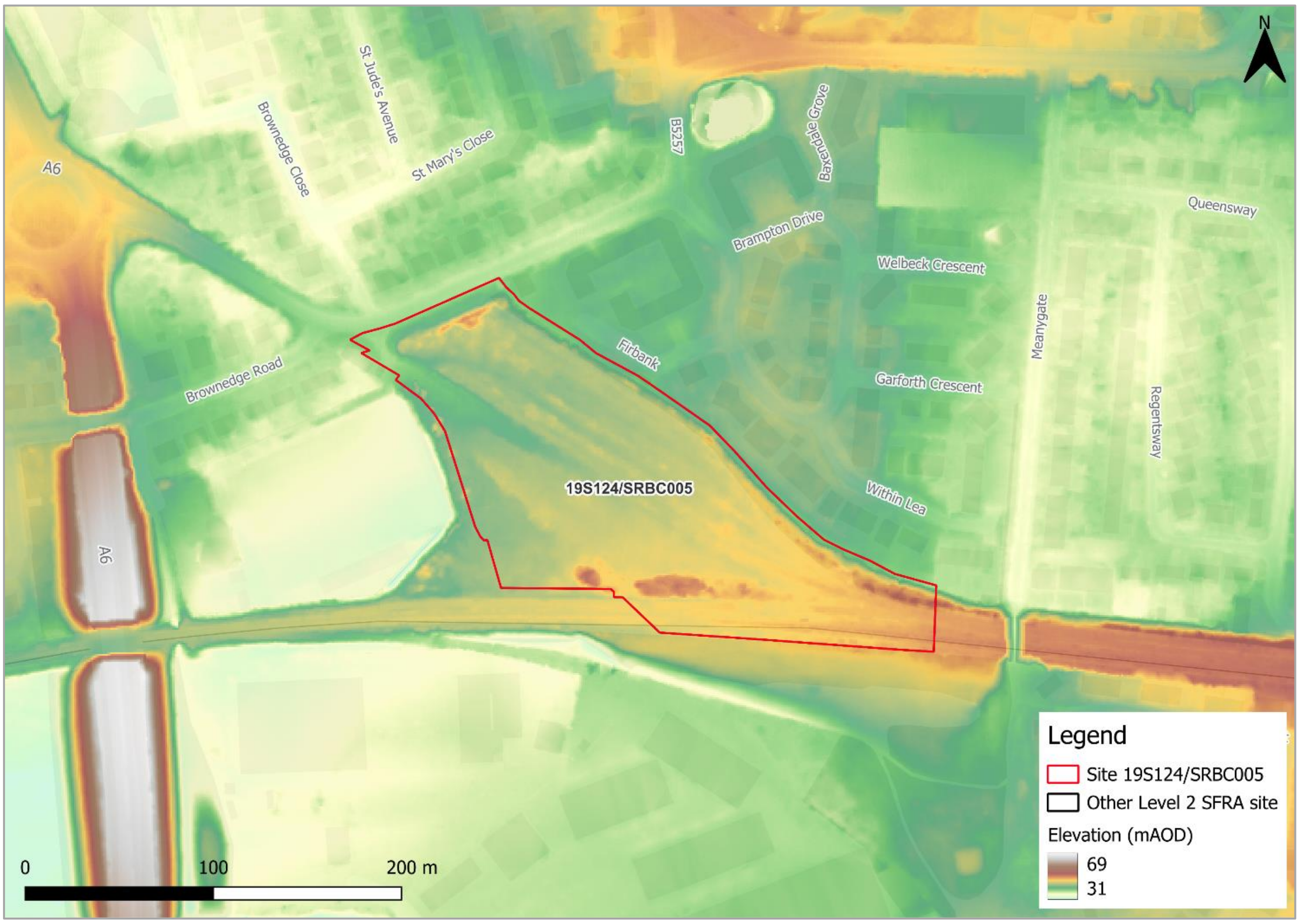

Figure 1-2: Topography

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 2.2) or the impacts of climate change.

This site is located fully within Flood Zone 1, indicating it is at low risk of flooding from rivers.

Table 2-1: Existing fluvial flood risk

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

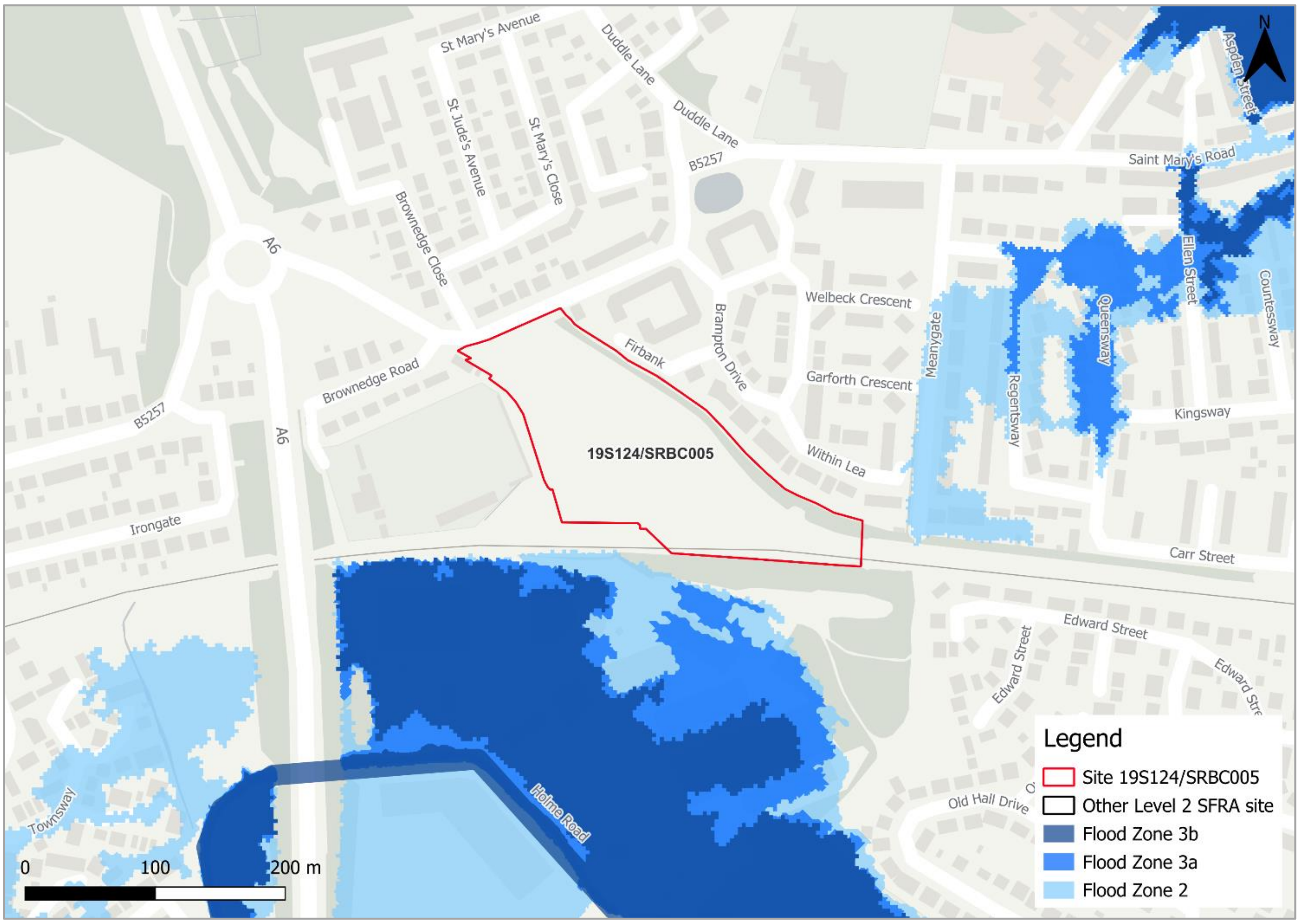

Figure 2-1: Existing risk from rivers to the site

2.2 Flood risk management

There are no engineered flood defences within the vicinity of the site, according to the EA’s spatial flood defences dataset.

2.2.1 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 19S124/SRBC005 is located within three catchments, namely Coastal Catchment 175, Lostock US Farington Weir and Darwen - conf Roddlesworth to tidal. Coastal Catchment 175 and Darwen - conf Roddlesworth to tidal are ranked as low sensitivity catchments. Lostock US Farington Weir 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[1].
- 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.

2.2.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. There are no applicable WwNP areas within the site boundary or its vicinity.

2.3 Residual risk

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

2.3.1 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

1 Lancashire SuDS Guidance

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 shown to be at risk of flooding from reservoirs.

2.4 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.

2.5 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 19S124/SRBC005 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 also not located within a FAA.

Safe access and escape routes could likely be achieved during a flood event via Brownedge Road.

2.6 Observations, mitigation options and site suitability - fluvial

- The proposed development 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).
- The site is modelled to be fully within Flood Zone 1.

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 flood risk to the site is predominantly very low. Approximately 4% of the site is within the low surface water risk zone as shown in Table 3-1.

In the low risk event, surface water ponding is limited to the topographic low spots in the northern half of the site and along the northeastern site boundary. Greatest flood depths in the low risk event are 0.3 to 0.6 m (Figure 3-1) with some areas of moderate hazard (Figure 3-2). There are flow paths evident along Brownedge Road (B5257), northeast of the site to significant depths. However, safe access and escape should be achievable, travelling northwest via Brownedge Road and onto the A6.

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

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
96%	4%	0%	0%

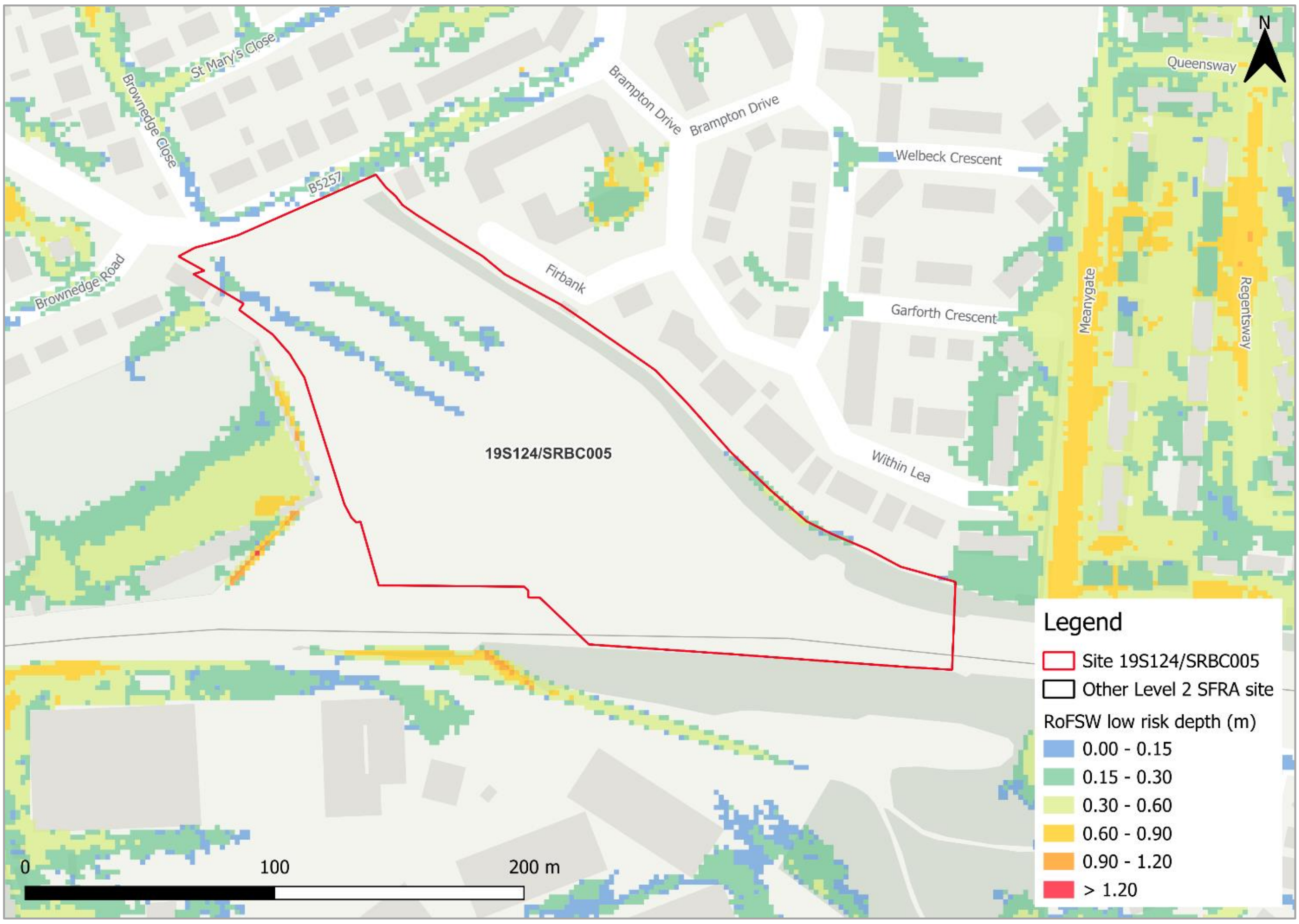

Figure 3-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

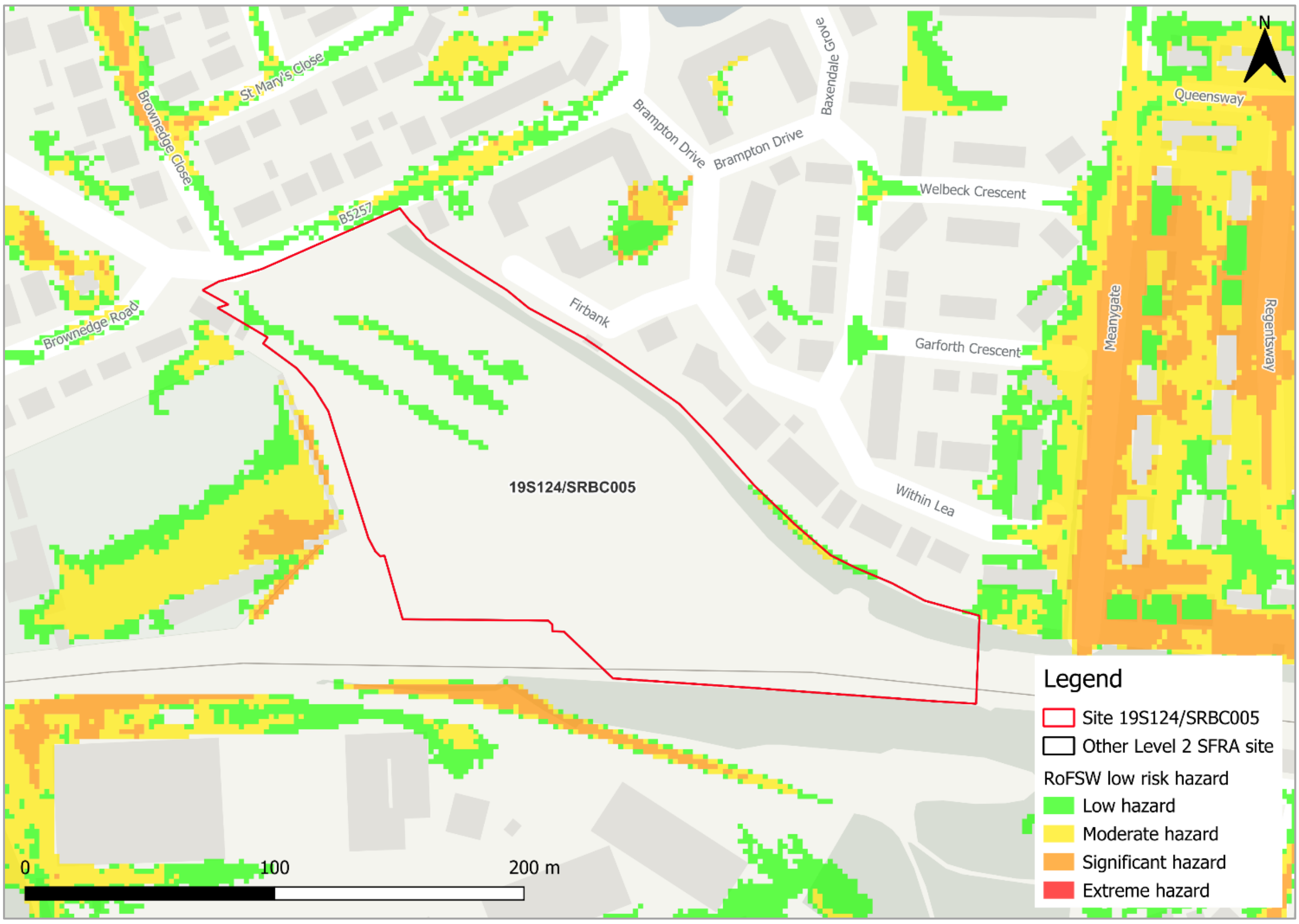

Figure 3-2: Low risk event surface water flood hazard[2] (Risk of Flooding from Surface Water map)

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. Site 19S124/SRBC005 is located within two management catchments; the Douglas and Ribble. With consideration of the EA's SFRA guidance, the latest climate change allowances have been modelled as shown in Table 3-2.

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

Table 3-2: Modelled climate change allowances for rainfall for the Douglas and Ribble management catchments

Return period	Central allowance 2070s for Douglas catchment	Upper end allowance 2070s for Douglas catchment	Central allowance for 2070s for Ribble catchment	Upper end allowance 2070s for Ribble catchment
3.3%	30%	40%	30%	40%
1%	35%	45%	35%	50%

Figure 3-3 shows the flood depths during the medium risk surface water event plus an allowance for climate change. Flooding is modelled to be marginally greater than the present day low risk event. With ponding in the northeastern corner of the site marginally increasing. Maximum flood depths remain 0.3 to 0.6 m (Figure 3-3) with some areas of moderate hazard (Figure 3-4). As in the present day low risk event, there are flow paths evident along Brownedge Road (B5257), northeast of the site to significant depths. However, safe access and escape should remain achievable, travelling northwest via Brownedge Road and onto the A6.

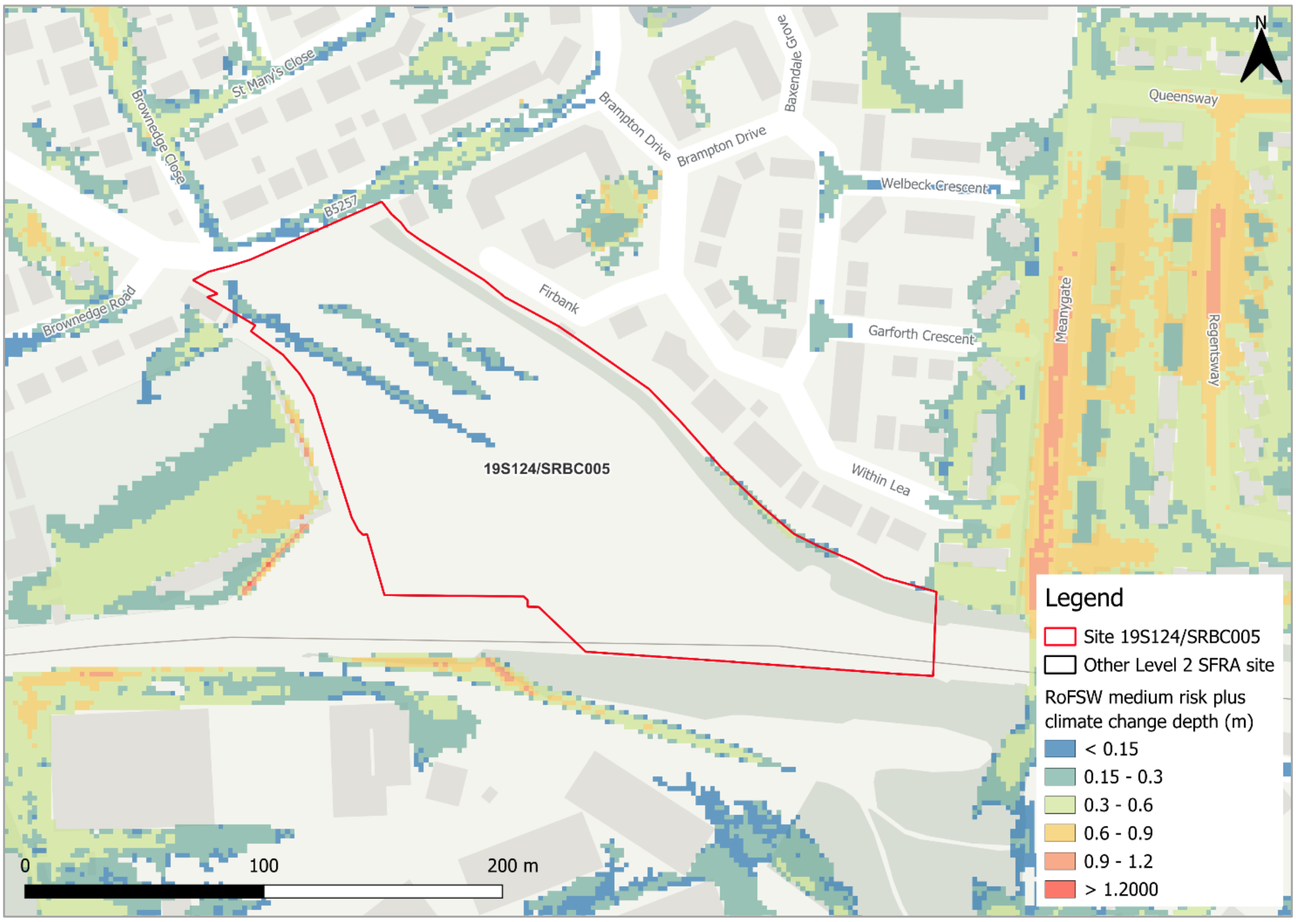

Figure 3-3: Medium risk event surface water flood depths plus upper end climate change allowance (based on Risk of Flooding from Surface Water map)

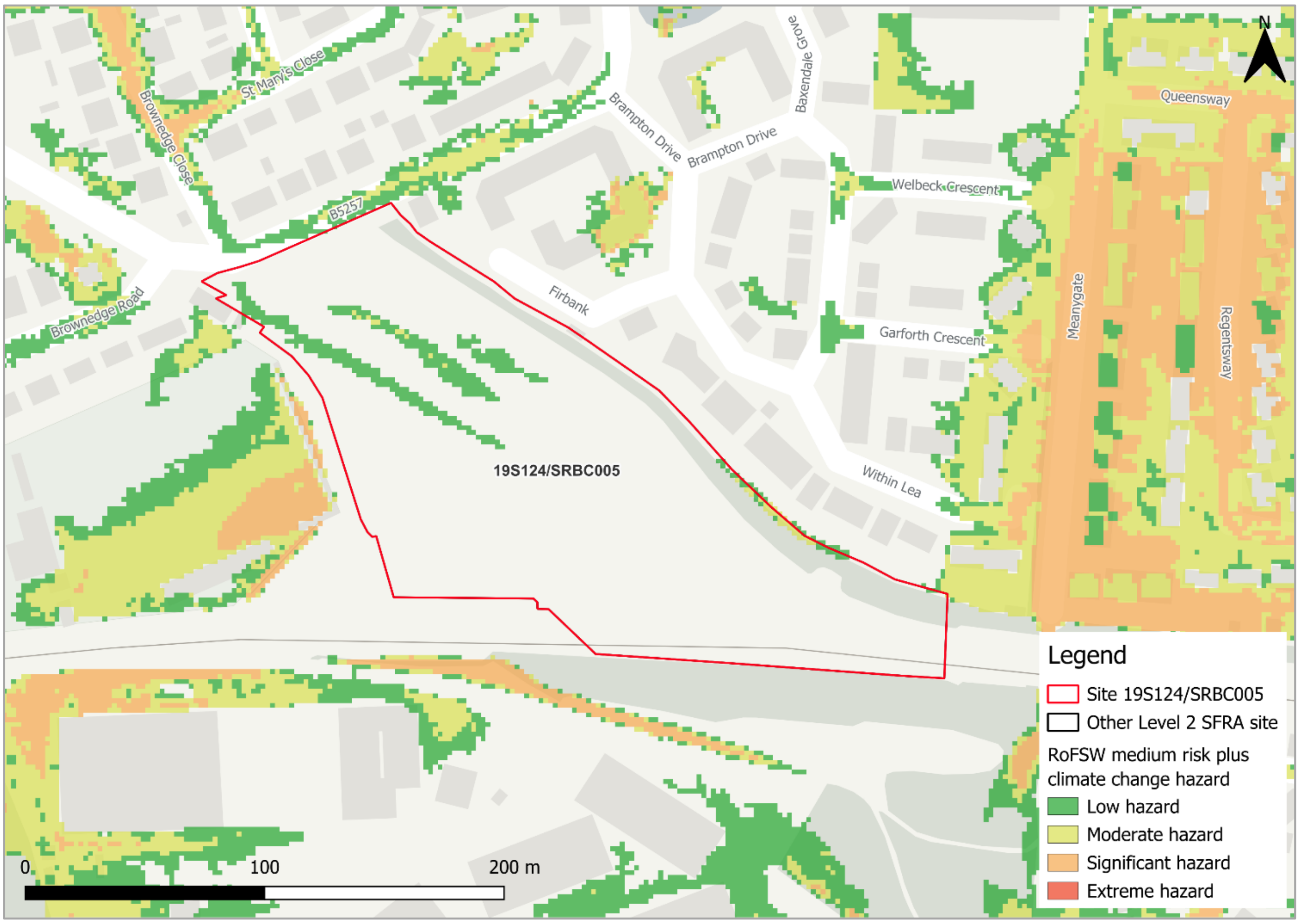

Figure 3-4: Medium risk event surface water flood hazards plus upper end climate change allowance (based on Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with only 4% of the site being at low surface water flood risk. In the low risk event, ponding is confined to the northern corner and northeastern boundary of 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 50% climate change Surface water risk is marginally larger in flood extent in comparison to the present day low risk event.
- 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 current rates and, where possible, betterment should be achieved.
- 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.

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[3]. Figure 4-1 shows the map for Site 19S124/SRBC005 and the surrounding areas and Table 4-1 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 4-1: JBA 5m Groundwater Flood Map

3 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[4], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall.

- The site is not required to pass the exception test since it is wholly within Flood Zone 1.

5.2 Recommendations, FRA requirements and further work

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

- This site could be allocated if development avoids the surface water ponding in the north of the site. These areas and other flow paths should be incorporated into the site design.
- A drainage strategy will be required for including investigation into the use of infiltration SuDS.
- 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.

4 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S110/165/169/SRB 007

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7 Background

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7.1 Site 19S110/165/169/SRB007

- Location: Land South of Chapel Lane, Longton, Preston, PR4 5EB
- Existing site use: Agricultural
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 16.4 hectares
- Proposed development impermeable area: 14 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

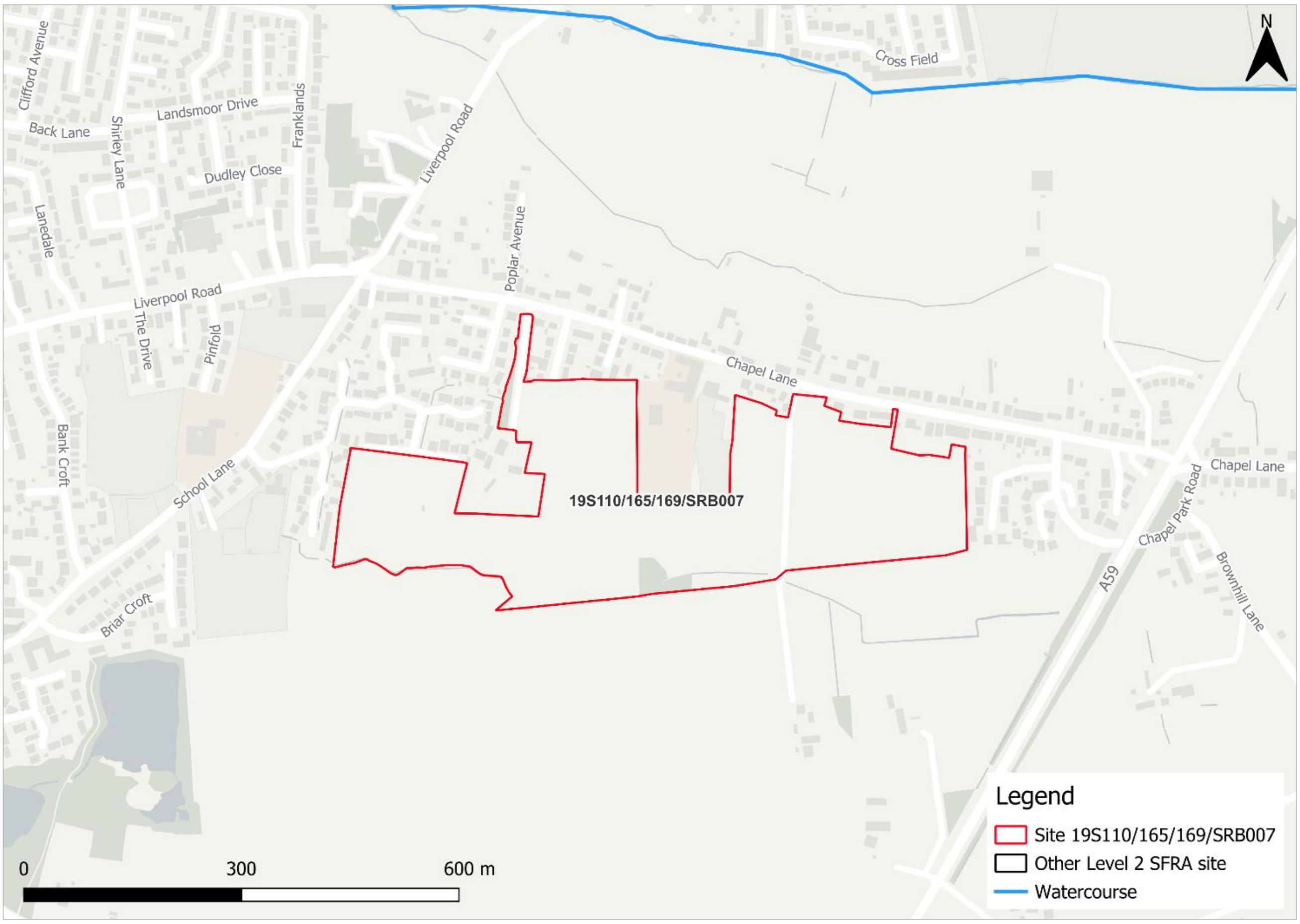

Figure 7-1: Existing site location boundary

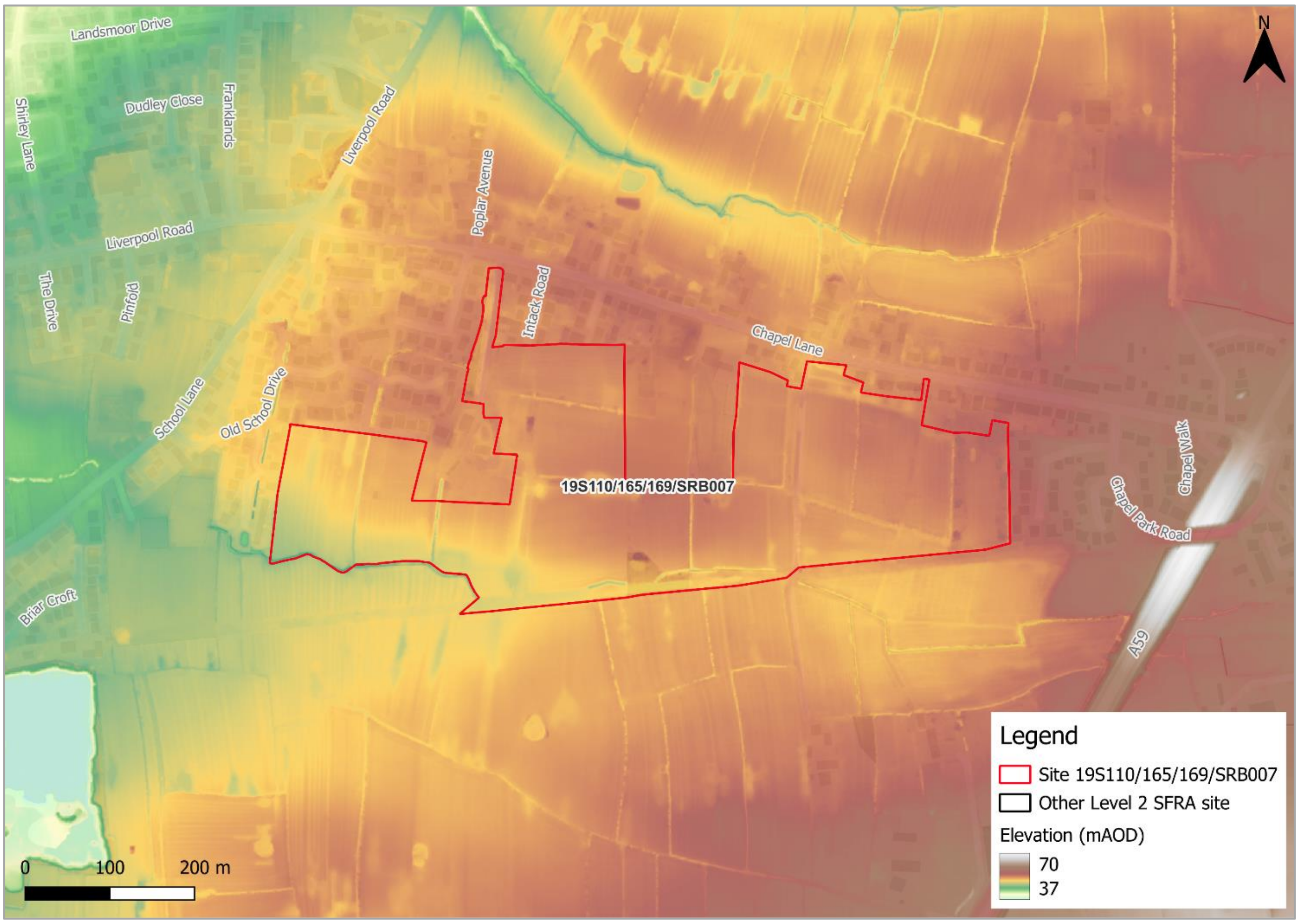

Figure 7-2: Topography

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, the percentage areas of the site within each fluvial flood zone are stated in Table 2-1 and can be viewed on Figure 8-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) 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.

Mapping and LiDAR (Figure 7-2) appear to show that the Hall Pool watercourse flows along the southern site boundary. Any FRA should consider modelling this watercourse to determine the level of fluvial flood risk it presents to the site.

Table 8-1: Existing fluvial flood risk

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

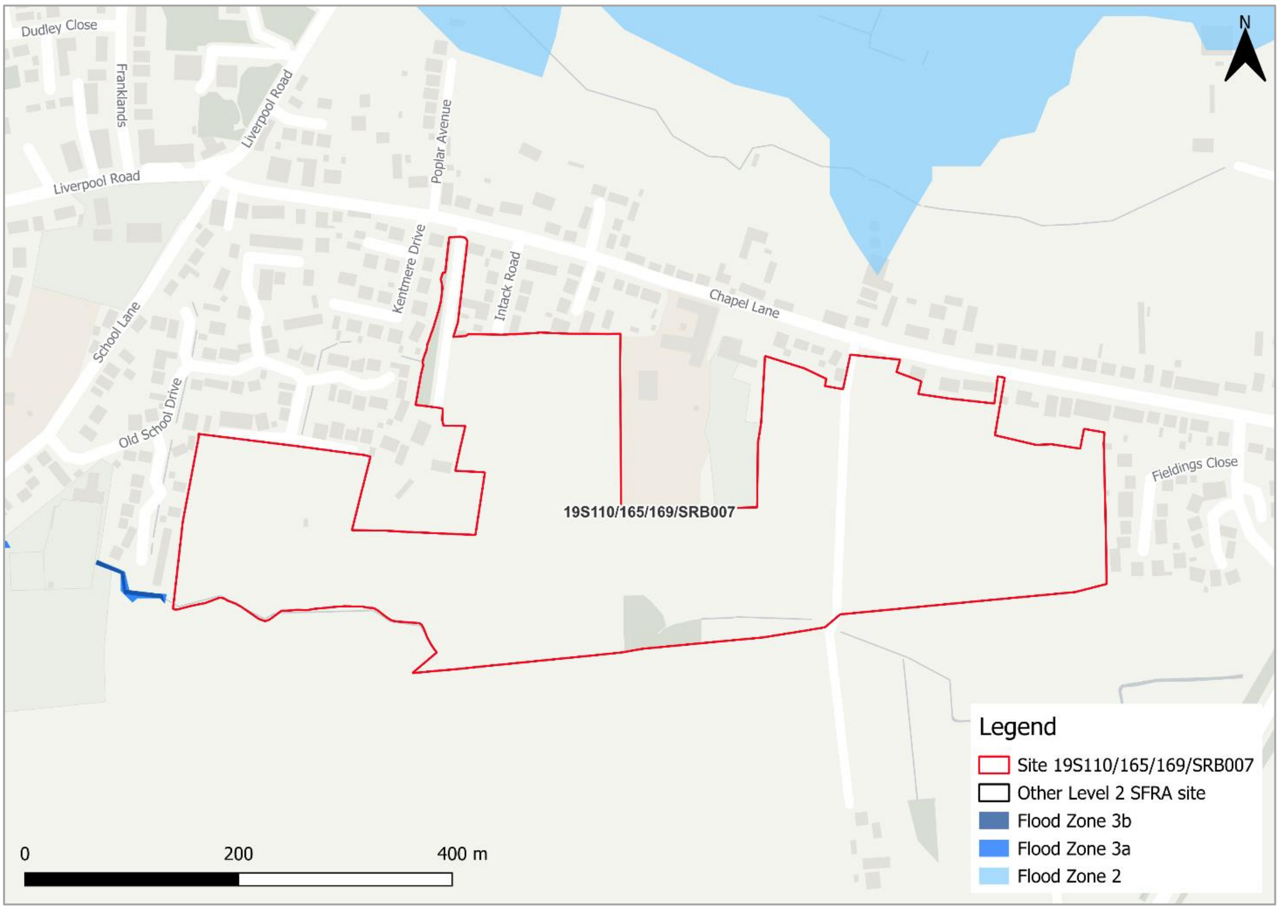

Figure 8-1: Existing risk from rivers to the site

8.2 Flood risk management

The site doesn't 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 19S110/165/169/SRB007 is located within two catchments, namely; Coastal Catchment 175, and Tarra Carr Gutter. The majority of the site is ranked within the higher sensitivity Tarra Carr Gutter catchment. Planning policy considerations for sites at higher 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.

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. Across the majority of the site there are significant opportunities for tree planting to reduce runoff. There are also several small areas across the site with potential for runoff attenuation features. 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 8-2.

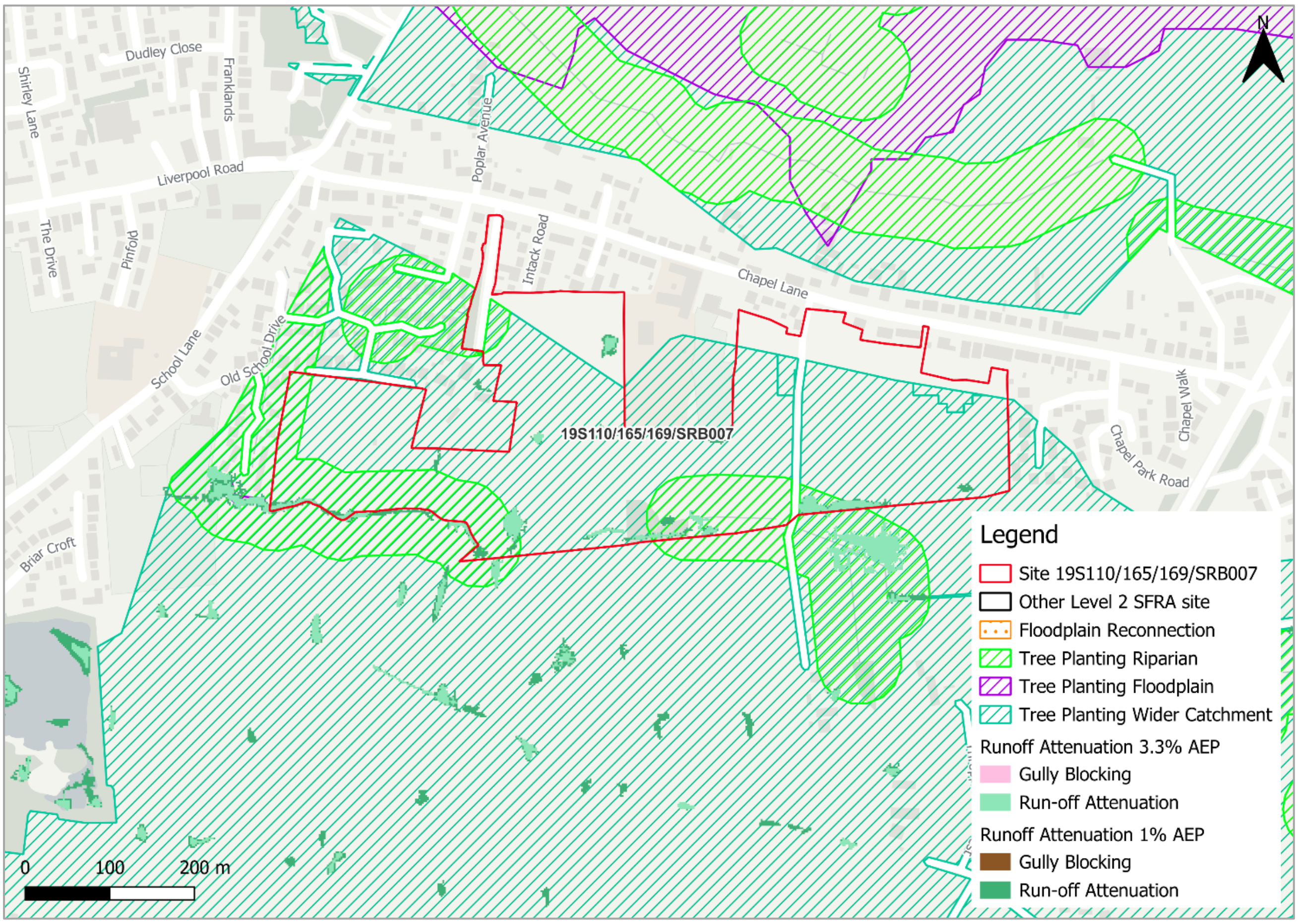

Figure 8-2: Natural Flood Management (NFM) potential mapping

8.3 Residual risk

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. 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.

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 incidents within the vicinity of the site.

8.5 Flood warning and access and escape routes

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

Based on available information, safe access and escape routes should be achievable via Chapel Lane to the north 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).
- The site is wholly within Flood Zone 1.

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. 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 7% is at low surface water risk, as shown in Table 3-1.

In the high and medium risk event, surface water risk is largely scattered areas of surface water ponding within topographic low spots. There are also several short flow paths along the southern boundary of the site, likely within the channel of the Hall Pool watercourse. In the low risk event, risk is greater along the surface water flow paths following the southern site boundary to the site. Risk also is greater with more scattered surface water ponding.

Greatest surface water flood depths in the medium risk event are between 0.9 and 1.2 m (Figure 3-1) with some areas of significant hazard (Figure 3-2). Safe access and escape routes should be possible via Chapel Lane to the north of the site 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 (%)
90	7	1	2

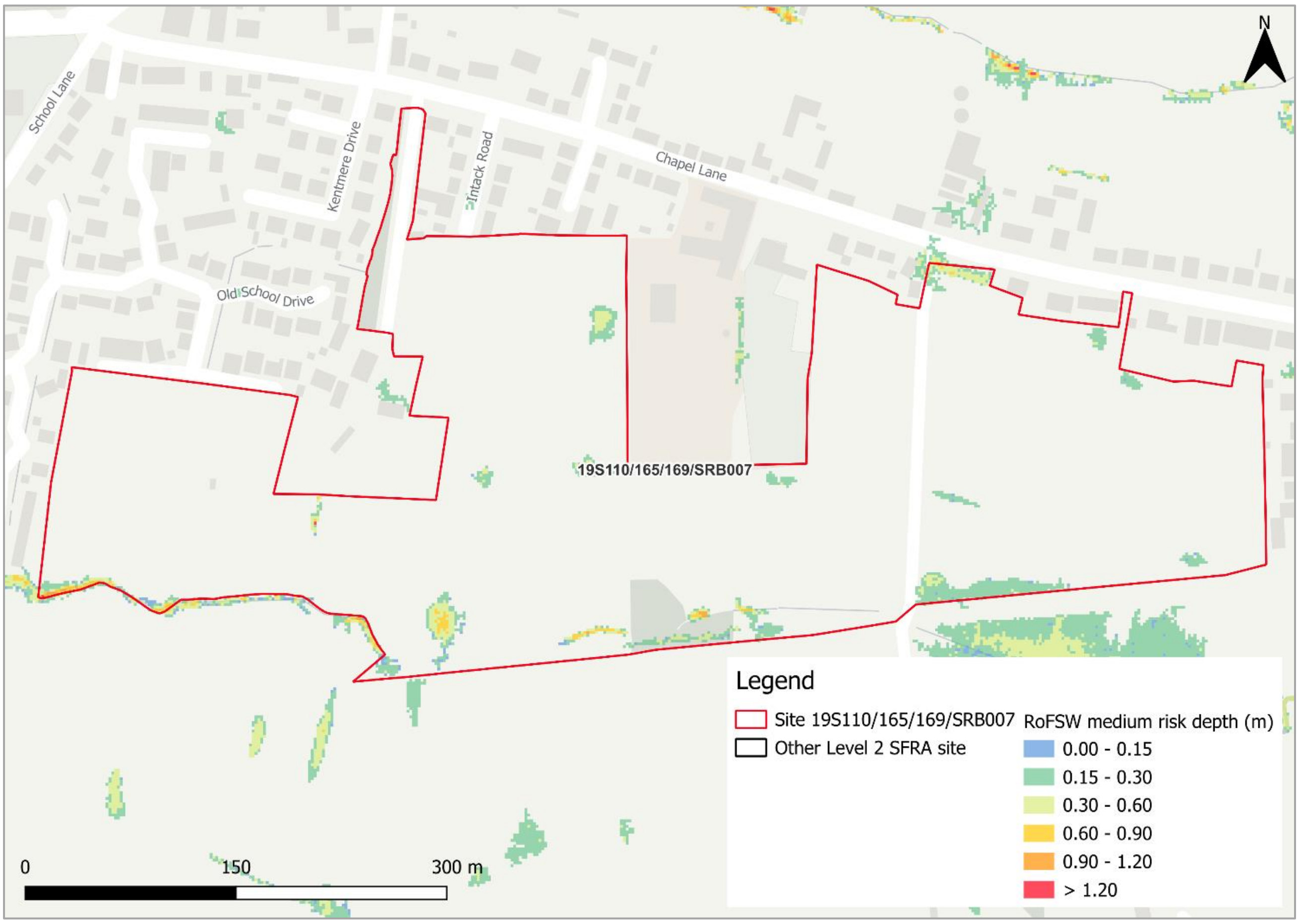

Figure 3-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

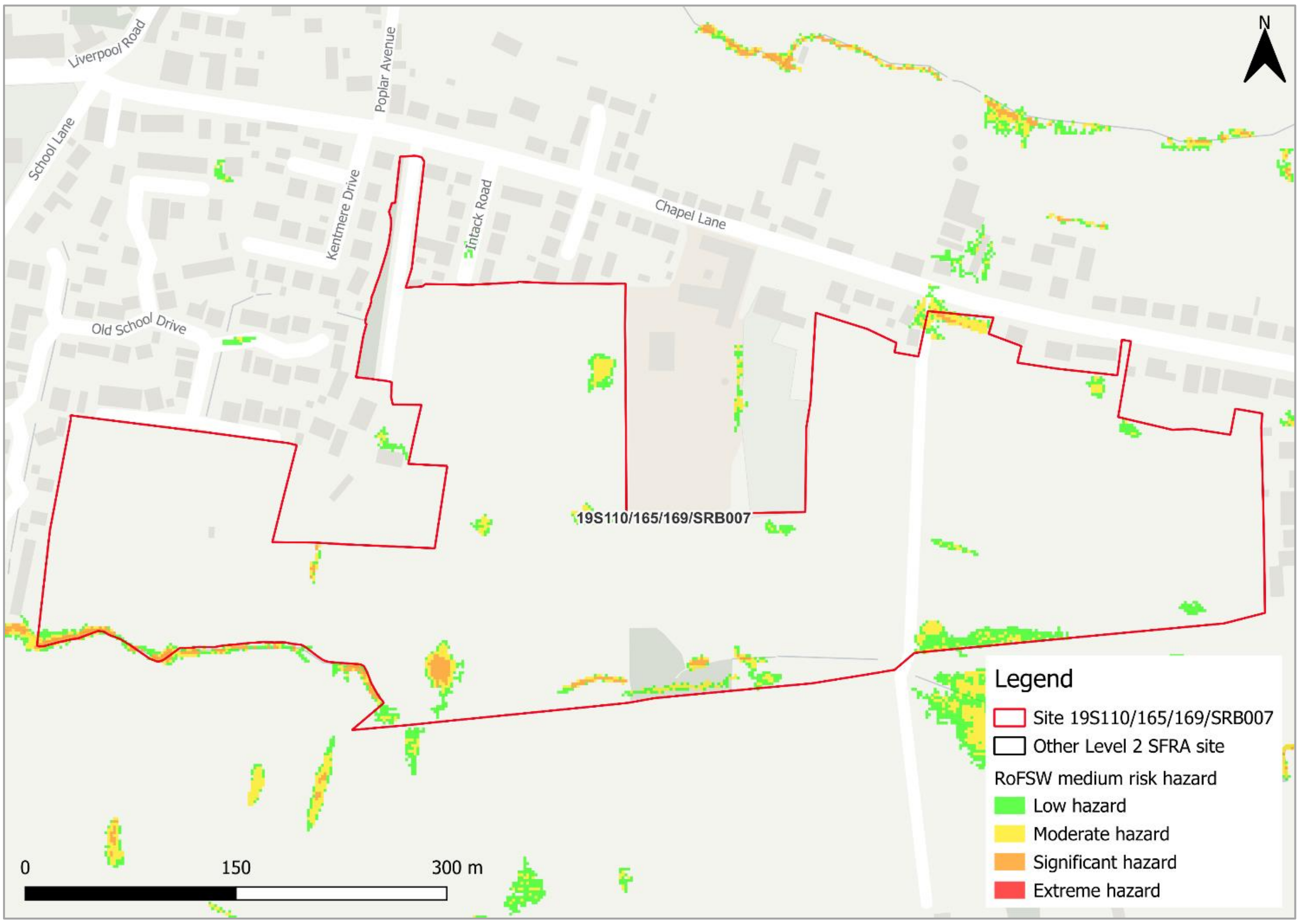

Figure 3-2: Medium risk event surface water flood hazard[5] (Risk of Flooding from Surface Water map)

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 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 medium risk surface water flood depths plus 45% climate change. Risk is modelled to be slightly greater than the present day medium surface water risk flood extent with additional surface water flow paths along the southern boundary of the site and

5 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

further scattered ponding, also greater in extent than the present day low risk event. Maximum flood depths are modelled to be between 0.9m and 1.2m, with some areas of significant hazard (Figure 3-4).

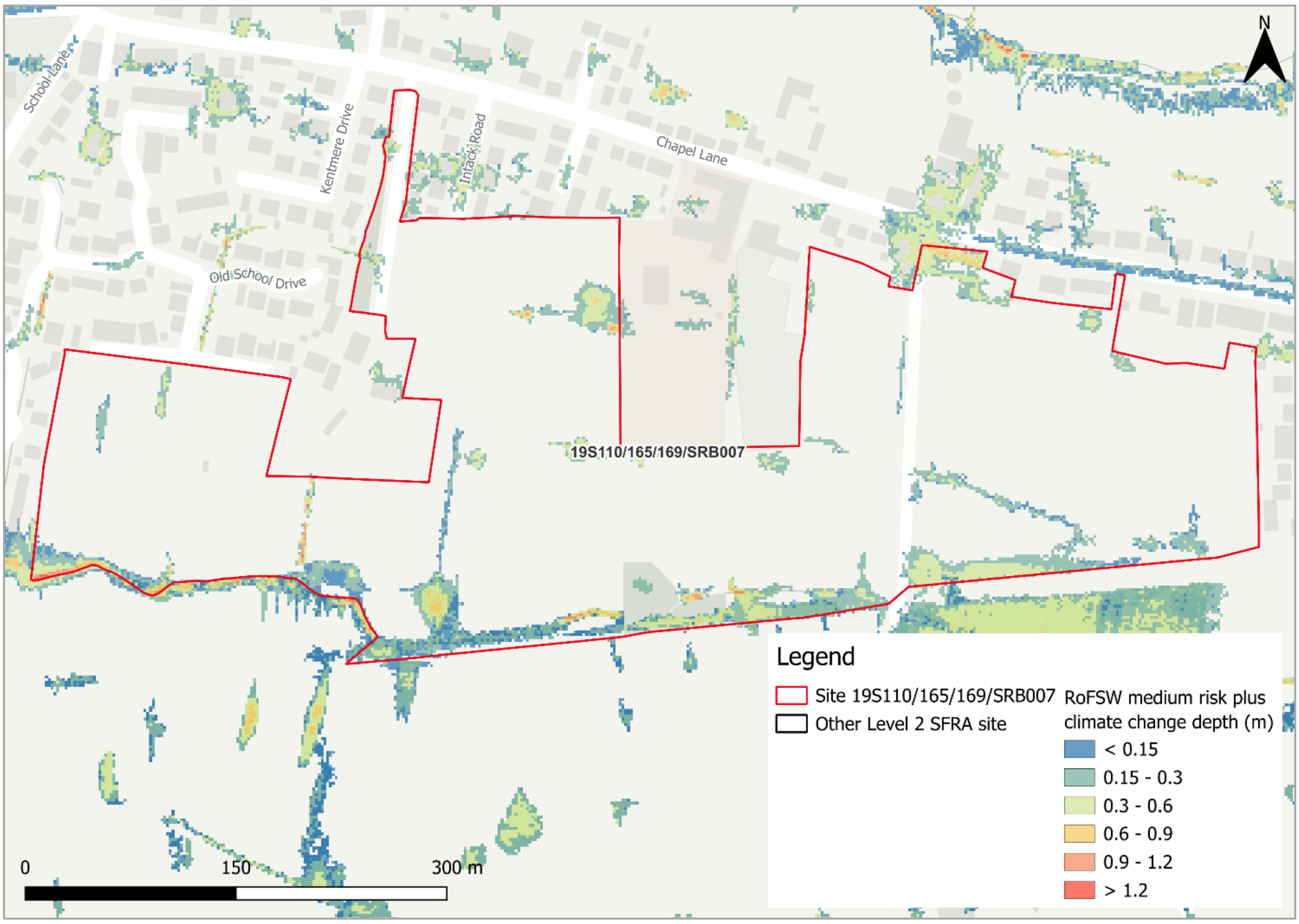

Figure 3-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

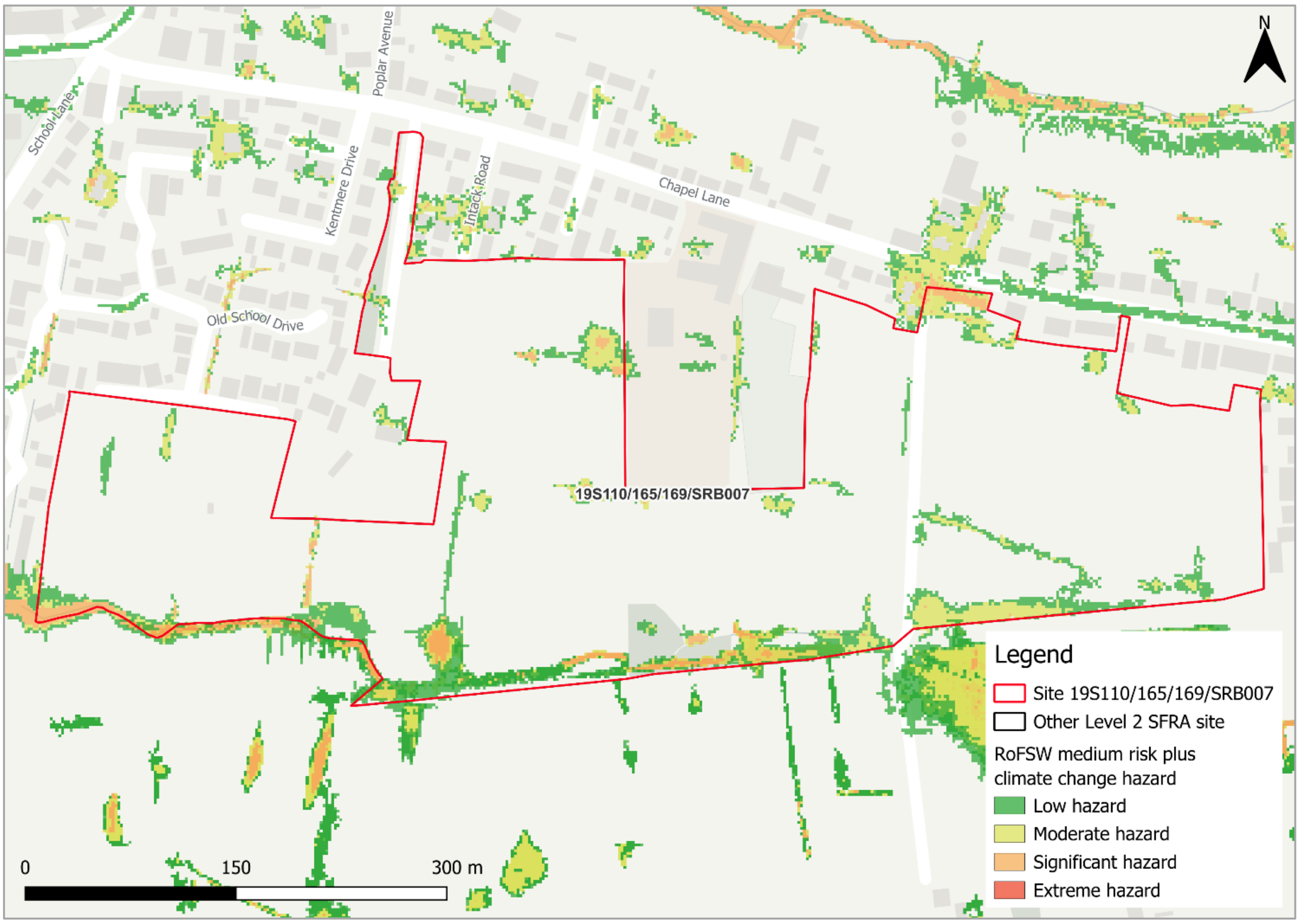

Figure 3-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

9.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with 90% of the site being at very low surface water flood risk. Surface water risk in the high and medium risk events is largely scattered areas of surface water ponding within topographic low spots. There are also several short flow paths along the southern boundary of the site. Safe access and escape routes should be achievable via Chapel 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 slightly greater than present day flood risk with additional surface water 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.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS across 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.

10 Flood 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[6]. Figure 4-1 show the map for Site 19S110/165/169/SRB007 and the surrounding areas and Table 4-1 explains the risk classifications.

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

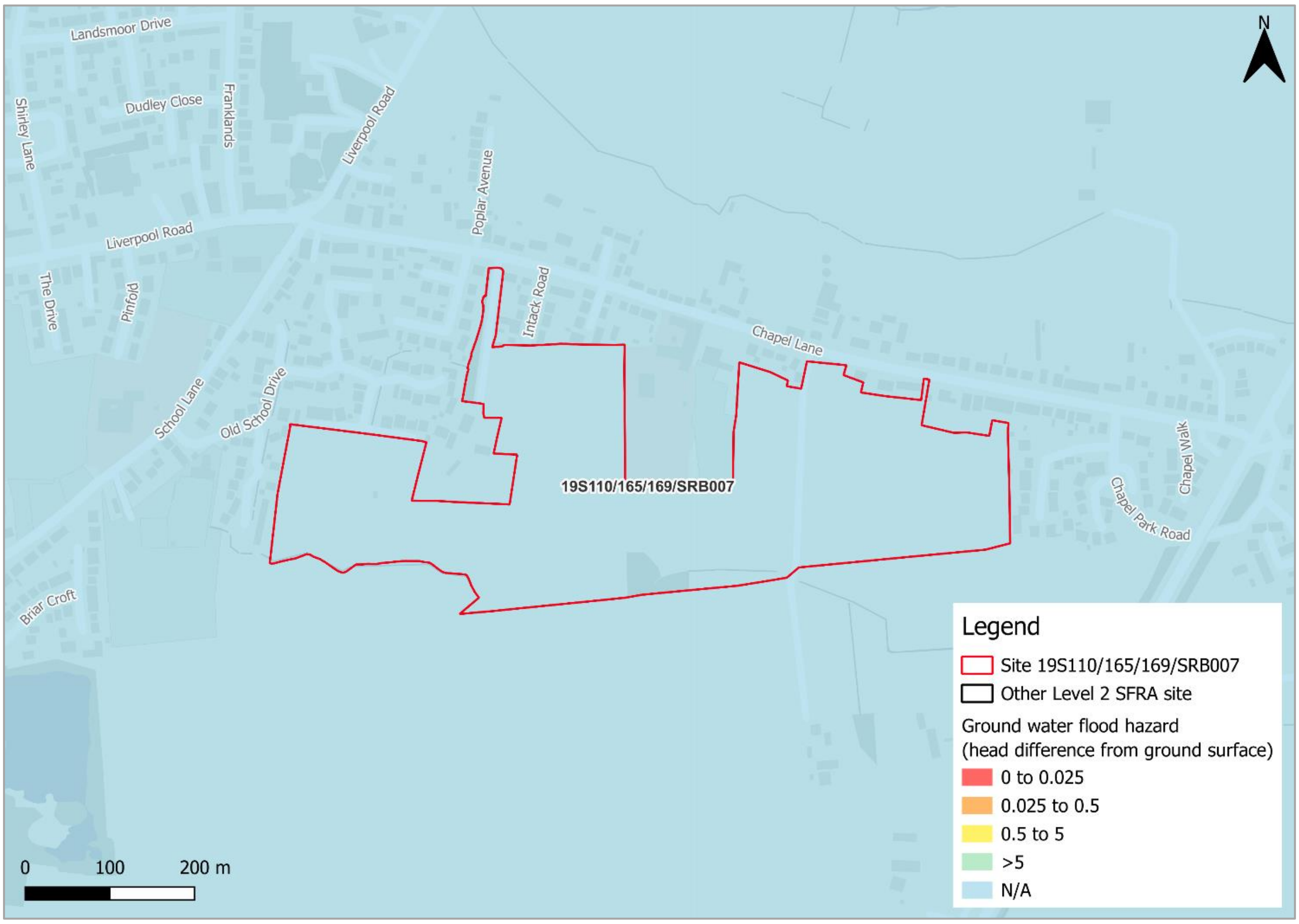

Figure 4-1: JBA 5m Groundwater Emergence Map

6 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.	

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[7] 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 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.
- Given the scattered nature of risk across the site, 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.
- Any FRA should consider modelling the Hall Pool watercourse to determine the level of fluvial flood risk it presents 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.

7 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S019

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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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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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

List of Figures

List of Tables

13 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19S019. 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.

13.1 Site 19S019

- Location: Land at Daub Hall Lane
- Existing site use: Open Space
- Existing site use vulnerability: Water Compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More Vulnerable
- Site area: 3.825 hectares
- Proposed development impermeable area: 3.251 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 13-1: Existing site location boundary

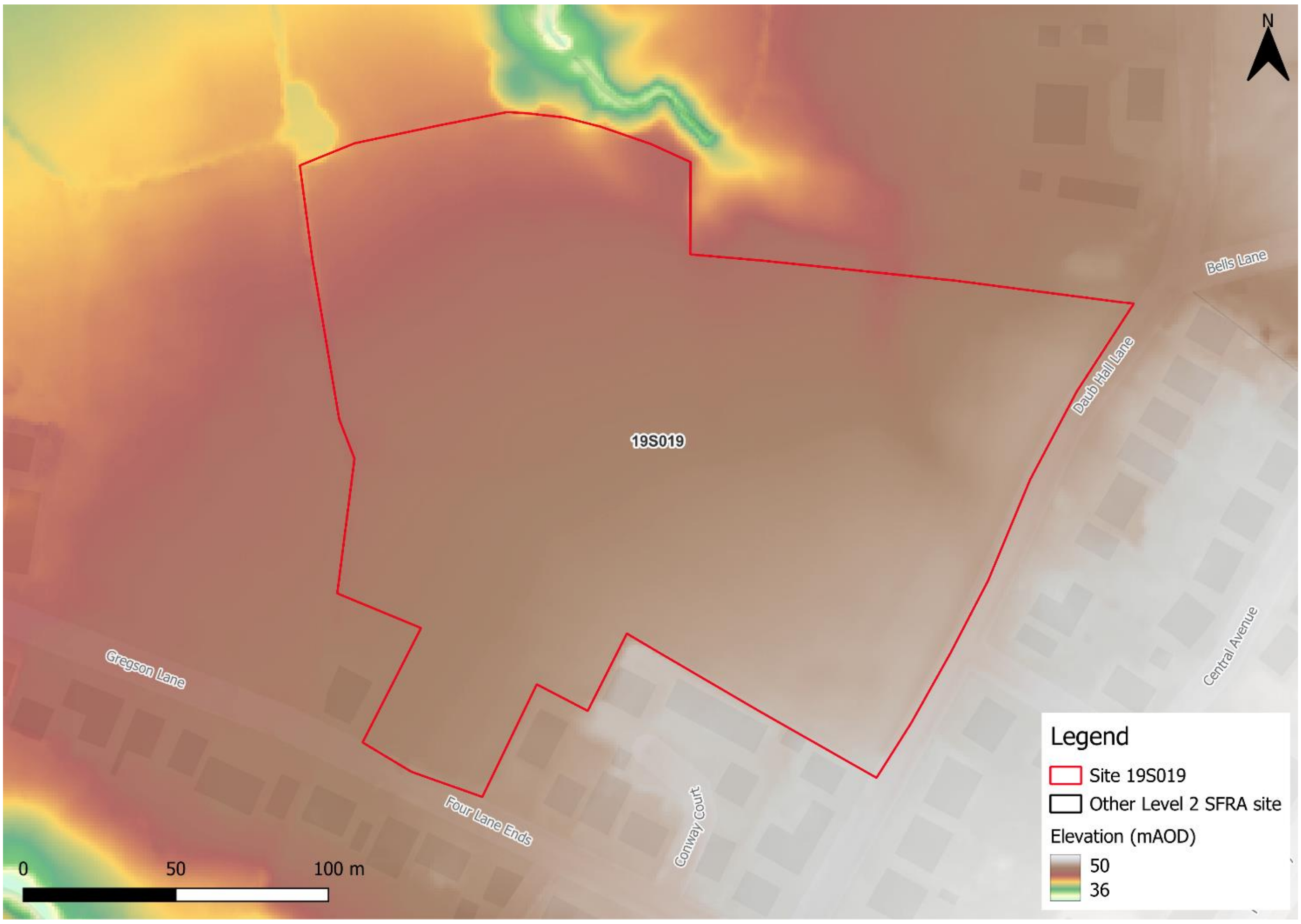

Figure 13-2: Topography

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 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) or the impacts of climate change.

The entire site is located within Flood Zone 1, indicating that 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

14.2.1 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 19S019 is located within one catchment, namely; Many Brooks. 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.

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. Within the majority of the site, there is opportunity for wider catchment tree planting which can intercept, slow, store and filter water. There is also potential for riparian tree planting, which can slow flows, reduce sediment delivery to the watercourse and reduce bankside erosion. There are also areas in the northwest corner where surface water runoff could be attenuated in the 3.3% and 1.0% 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 14-2.

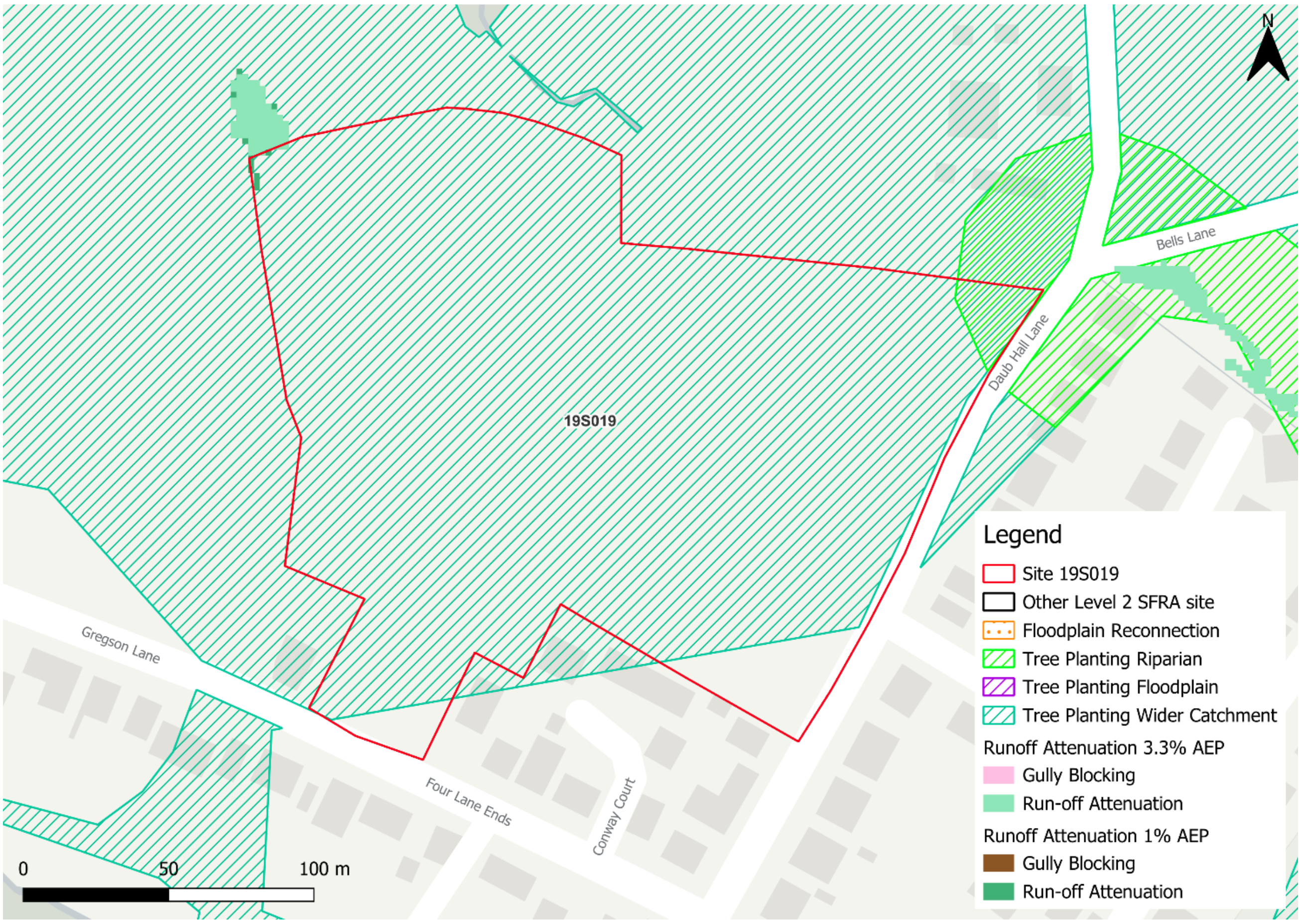

Figure 14-2: Natural Flood Management (NFM) potential mapping

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.

14.3.2 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.

14.4 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 19S019 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 a FWA. The site is not located within

Based on available information, safe access and escape routes could likely be achieved during a flood event via Four Lane Ends, Conway Court and Daub Hall Lane.

14.5 Observations, mitigation options and site suitability - fluvial

- The proposed development would 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 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 low risk of flooding to the site from rivers.
- Based on available information, access and escape routes are anticipated to be viable at the site via multiple routes.

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. 1% of the site is shown to be at medium risk from surface water, and a further 3% of the site is at low surface water flood risk as shown in Table 15-1.

In the high-risk event, surface water can be seen to pool along the perimeter of the northwest corner of the site where a topographic depression is located. In the medium risk event, this area of ponding expands in both depth and extent, whilst branches of surface water flow paths to the east and northeast of the site can be seen to extend into the site area.

Greatest surface water flood depths in the medium risk event are between 0.5 and 0.75 m (Figure 3-1) in the northwest and east of the site. In the northwest, these areas are coincident with hazard levels categorised as moderate (Figure 3-2).

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

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
96	3	1	0

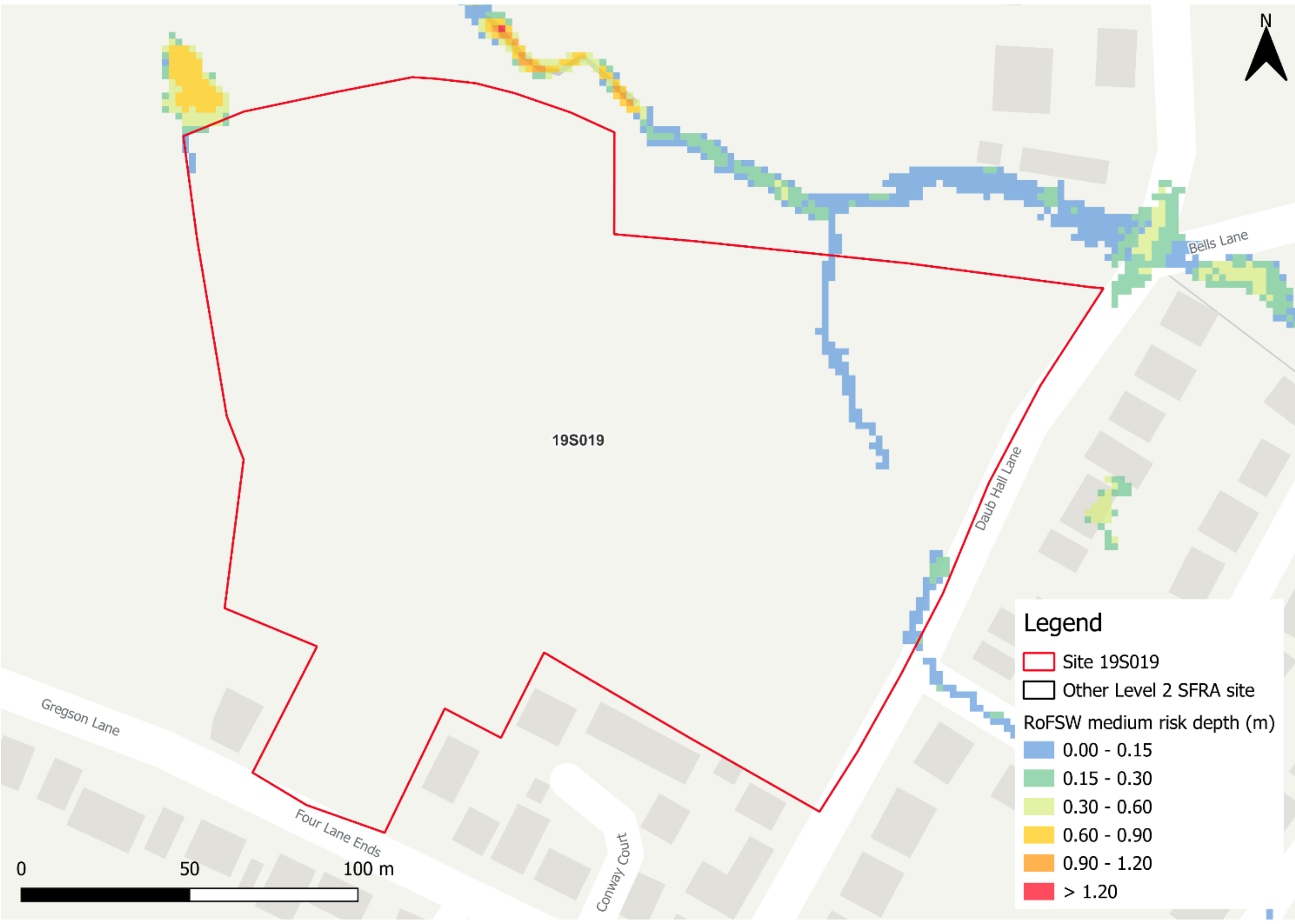

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Figure 15-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

Figure 15-2: Medium risk event surface water flood hazard[8] (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 Ribble management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3%	30%	40%
1%	35%	50%

Figure 3-3 shows the modelled surface water depths for the medium risk event +50% 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

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

risk event. Maximum flood depths are modelled to be approximately 0.70m in depth, with some areas of significant hazard Figure 3-4. Where possible, flow routes should be maintained in site layout and included in site design.

Although Four Ends Lane and areas of Daub Hall Lane are shown to be inundated during the medium risk surface water event plus climate change, safe access and escape routes should remain achievable to the south given the modelled shallow depths.

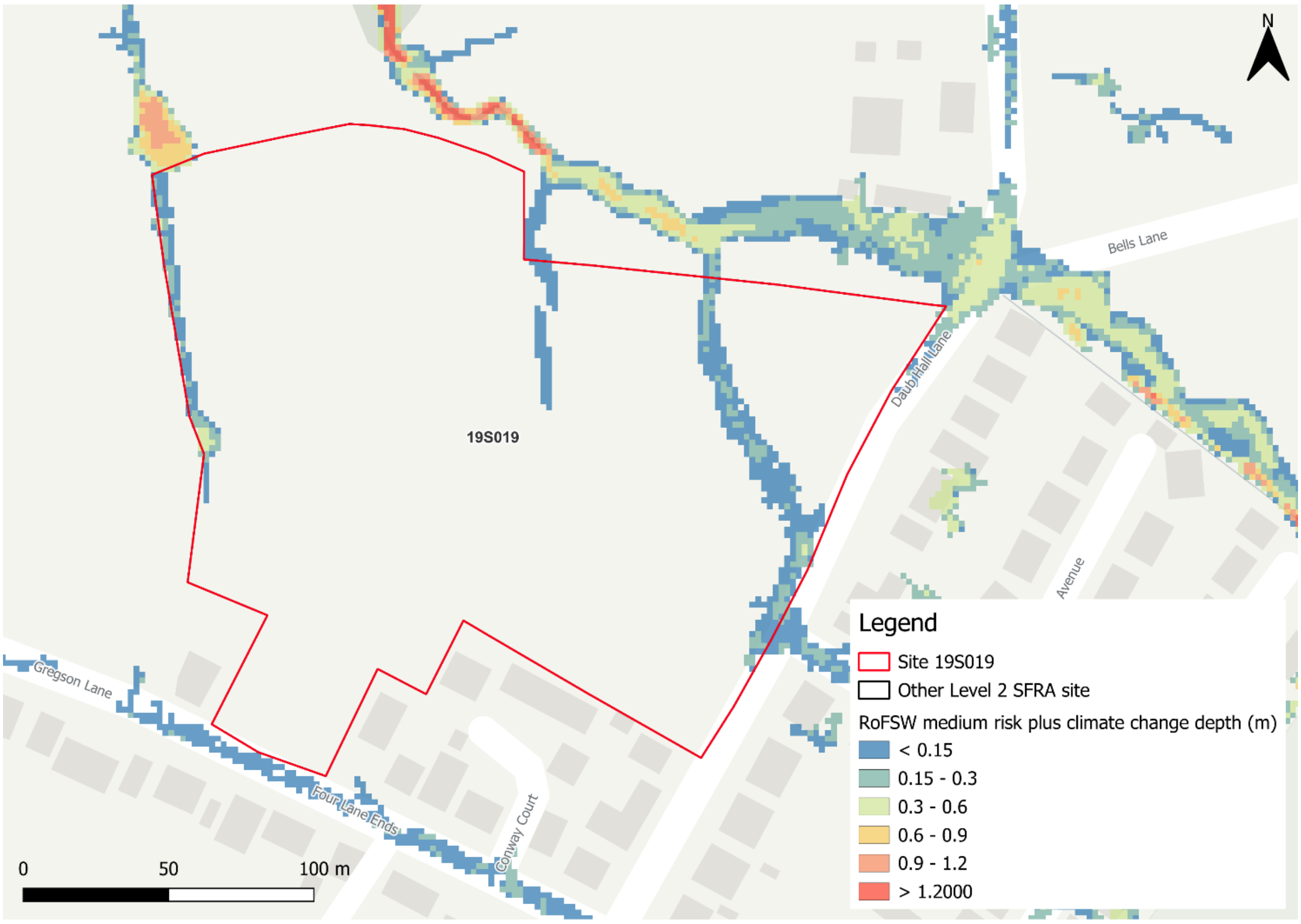

Figure 15-3: Medium risk event surface water flood depths plus 50% climate change (based on Risk of Flooding from Surface Water map)

Figure 15-4: Medium risk event surface water flood hazards plus 50% 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 96% of the site being at very low surface water flood risk. In the high-risk event, surface water is confined to a topographic depression in the northwest corner of the site, however in the medium and low risk events, surface water flow paths can also be seen to branch into the eastern areas of the site.
- In the present-day low risk event, surface water flow paths can be seen to branch into the centre of the site. In the medium risk plus climate change event, surface water flow paths can be seen along the western boundary of the site in addition.
- Safe access and escape routes should remain achievable southwards via Four Lane Ends and Daub Hall Lane 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.
- A drainage strategy would be required to ensure there is no increase in surface water flood risk elsewhere as a result of new development. Existing flow paths and topographic depressions should be maintained.

- Site runoff should be maintained at greenfield rates and, where possible, betterment should be achieved.
- 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.

16 Flood risk from groundwater

Flood 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[9]. Figure 4-1 show the map for Site 19S019 and the surrounding areas and

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

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.

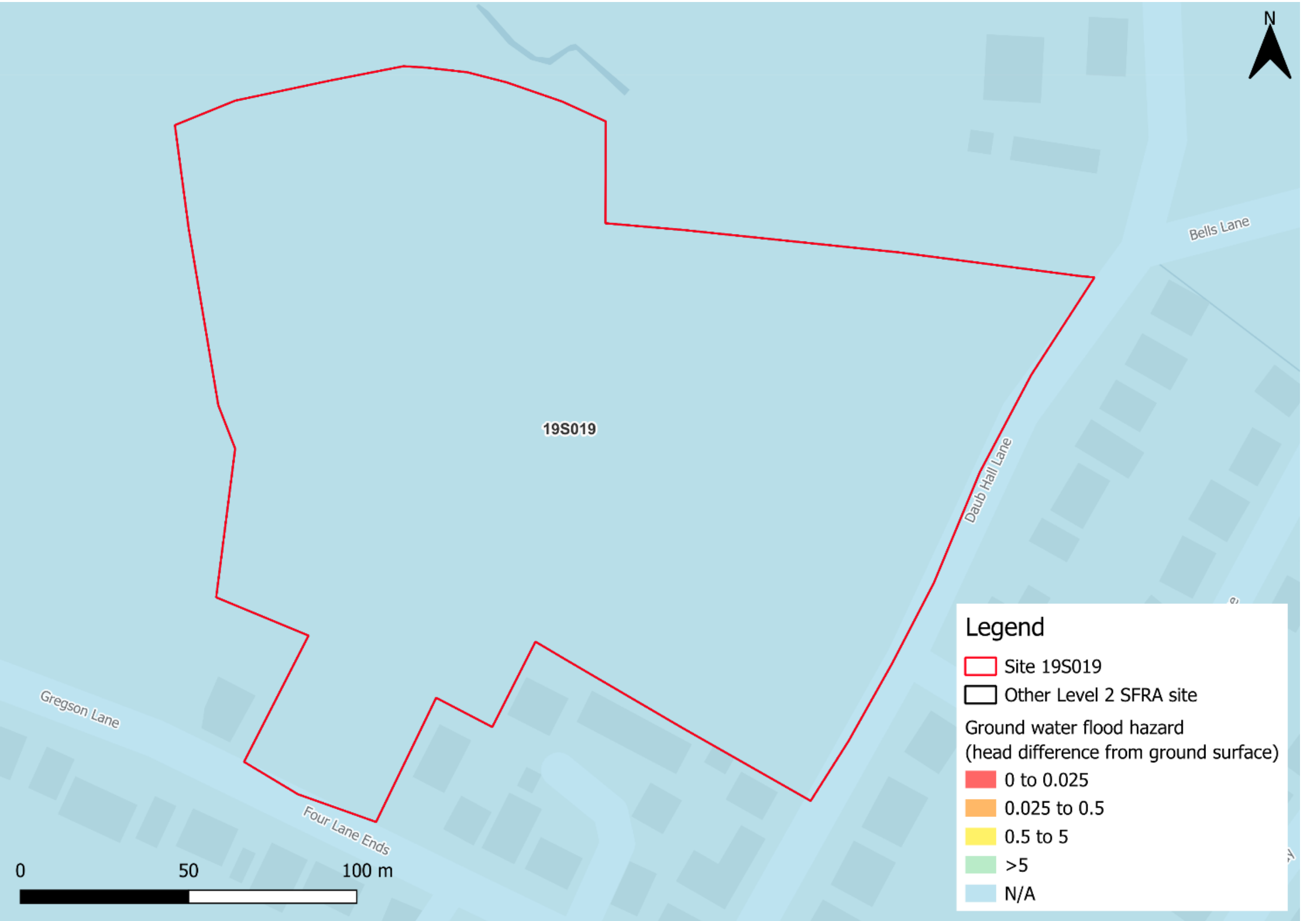

Figure 16-1: JBA 5m Groundwater Flood Map

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[10] as it is located within 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.

17.2 Recommendation summary, 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.
- However, there is risk from surface water in the longer term. A 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.
- Opportunities to implement NFM methods within site design should be explored.
- 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 19S052

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February 2025

Prepared for:

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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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19 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19S052. 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 19S052

- Location: Cuerden Strategic Site
- Existing site use: Agricultural land, open quarry
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Mixed Use
- Proposed site use vulnerability: More vulnerable
- Site area: 66.6 hectares
- Proposed development impermeable area: 56.6 hectares (assumed 85% impermeable area)
- Watercourse: River Lostock (unmodelled) to the north of the site
- 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
-

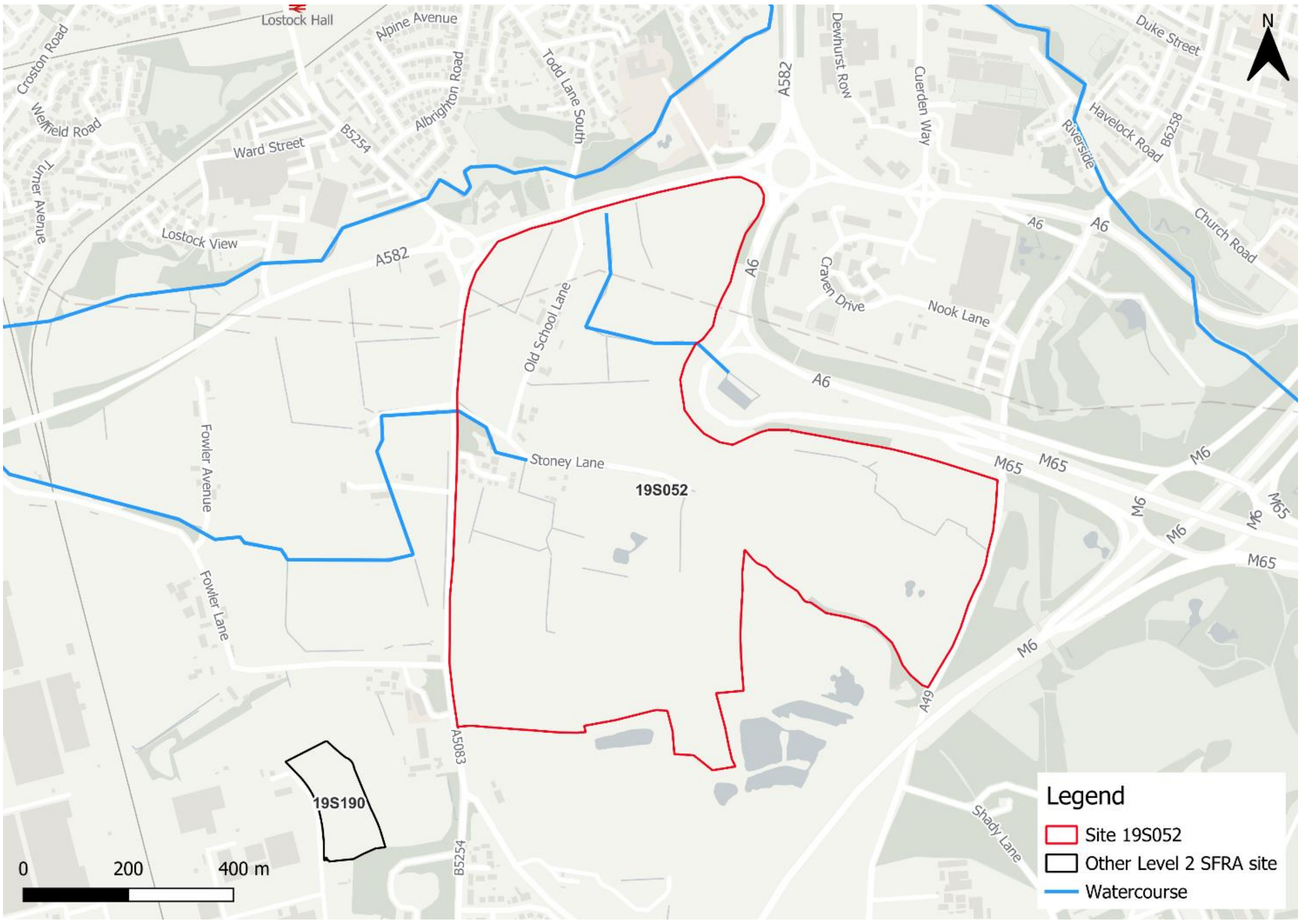

Figure 19-1: Existing site location boundary

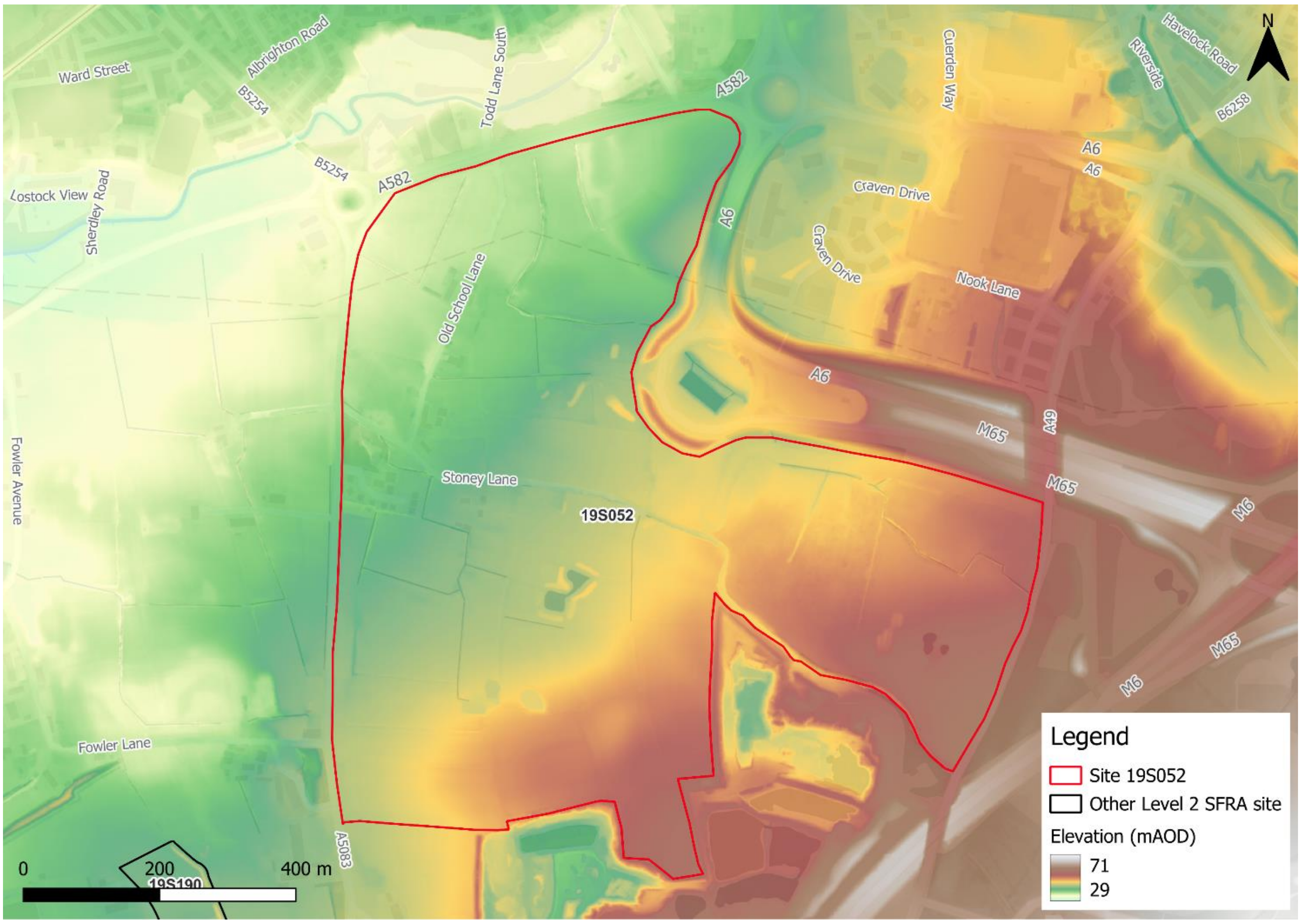

Figure 19-2: Topography

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 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 20.2) or the impacts of climate change.

The site is predominantly located within Flood Zone 1. The River Lostock to the north of the site is unmodelled. However, there may Functional floodplain is present along a drainage ditch within the north of the site and along an ordinary watercourse which is a tributary to the River Lostock. The area of functional floodplain onsite should be left free of development. It should be noted that functional floodplain within the site is conservatively based on an 8m buffer of the OS Open Rivers dataset.

There are several drainage ditches throughout the site which serve as field drains for the agricultural land. The functional floodplain does not cover these drainage ditches as they are not included within the OS Open Rivers dataset which is used in the functional floodplain delineation process. All drainage ditches should remain free of any development with 8m no development buffers applied.

Table 20-1: Existing fluvial flood risk

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

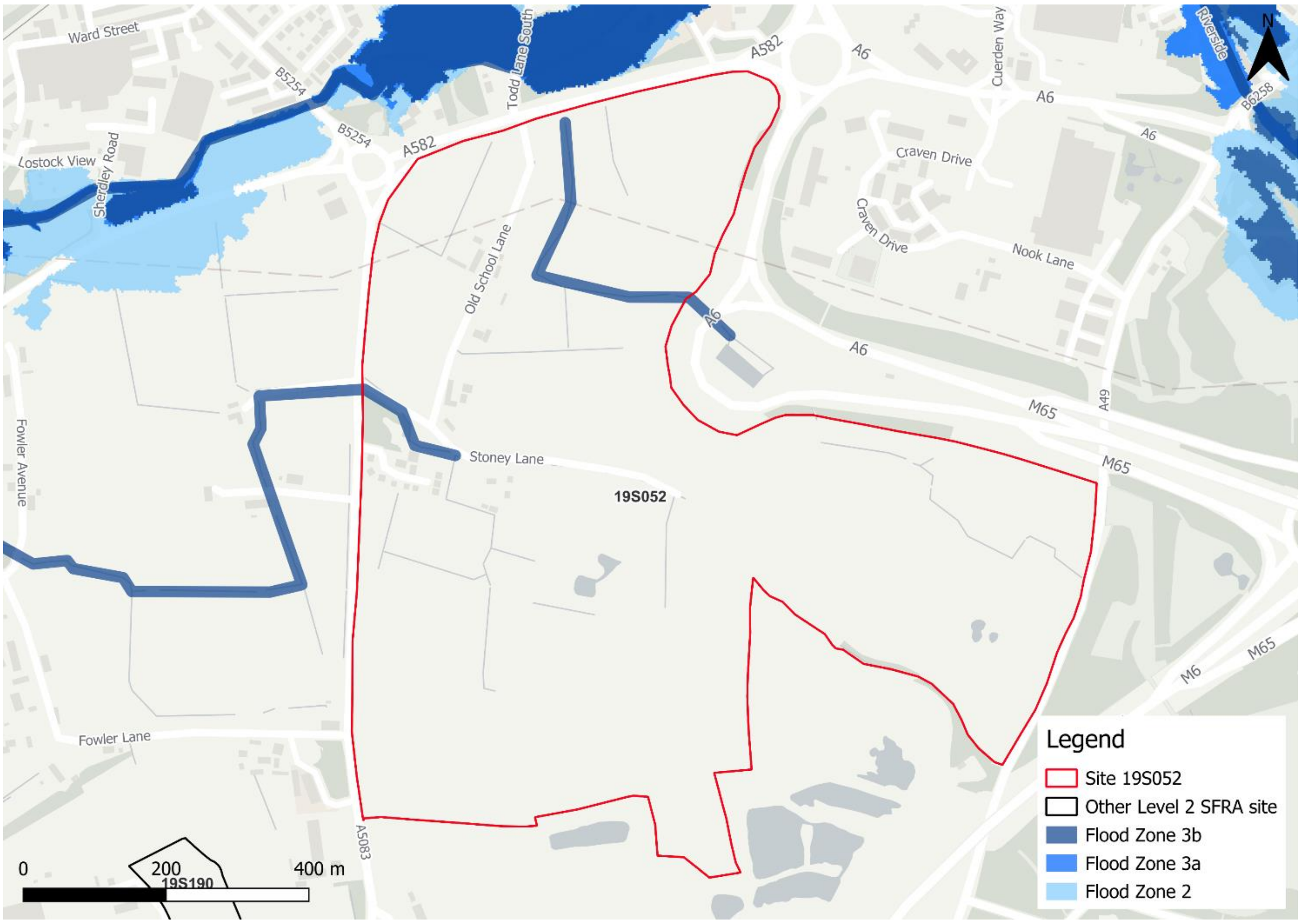

Figure 20-1: Existing risk from rivers to the site

20.2 Flood risk management

The site doesn't 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 19S052 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[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.

11 Lancashire SuDS Guidance

- 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. Both within and upstream 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 north and centre of the site provide opportunities for run-off attenuation to reduce peak surface flow volumes. These areas are shown on Figure 20-2. However, the WwNP dataset is indicative and further investigation into suitability of the site for tree planting should be carried out.

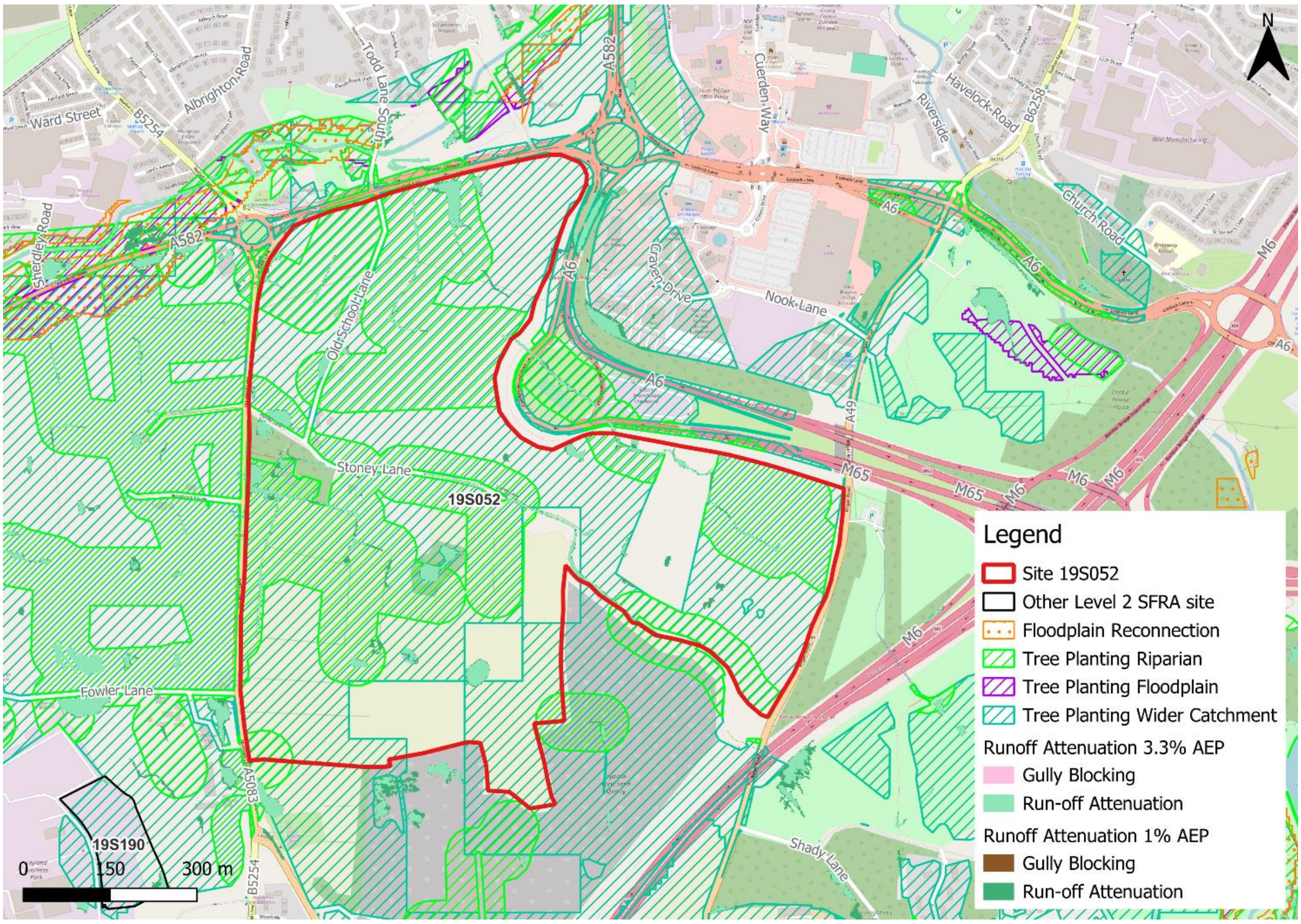

Figure 20-2: Natural Flood Management (NFM) potential mapping

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 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 multiple routes surrounding the site.

20.6 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 functional floodplain is conservatively based on an 8m buffer of the watercourse and does not therefore represent modelled flood risk to the site.
- Flood modelling may have to be carried out to ascertain the risk from the drainage ditches onsite and from the River Lostock to the north which is a main river.
- The onsite drainage ditches should be allowed to flow unobstructed and should be included in site design. No development should take place within 8 metres of any watercourse.

- Safe access and escape routes could likely be achieved via multiple routes surrounding the site, based on available information.

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 seen to be very low. Approximately 3% of the site is within the high risk surface water flood zone. A further 1% is at medium surface water risk, and 4% of the site is observed to be at low surface water risk, as shown in Table 21-1.

In the high and medium risk events, surface water is generally confined to scattered areas of ponding within topographic depressions combined with short, shallow flow paths along existing drainage ditches. In the low risk event, the flow paths within the site are greater in both extent and depth, connecting the areas of ponding within topographic low spots.

Greatest flood depths within the medium risk event are > 1.2 m (Figure 3-1), located within an area of ponding along the northern boundary of the site. These areas of high depths are coincident with hazards categorised as significant (Figure 3-2).

Safe access and escape routes should be possible via the A582 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 (%)
92	4	1	3

-

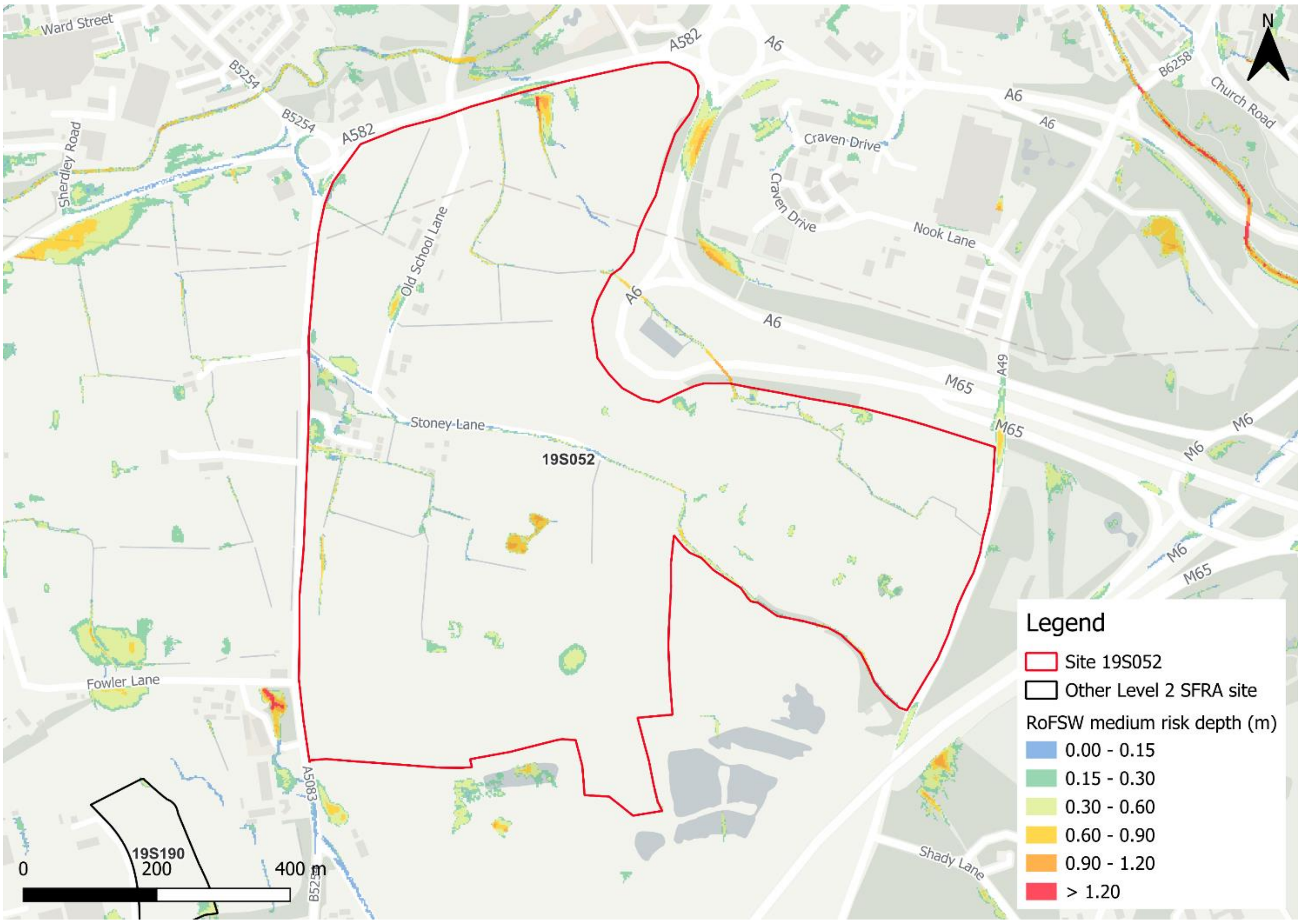

Figure 21-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

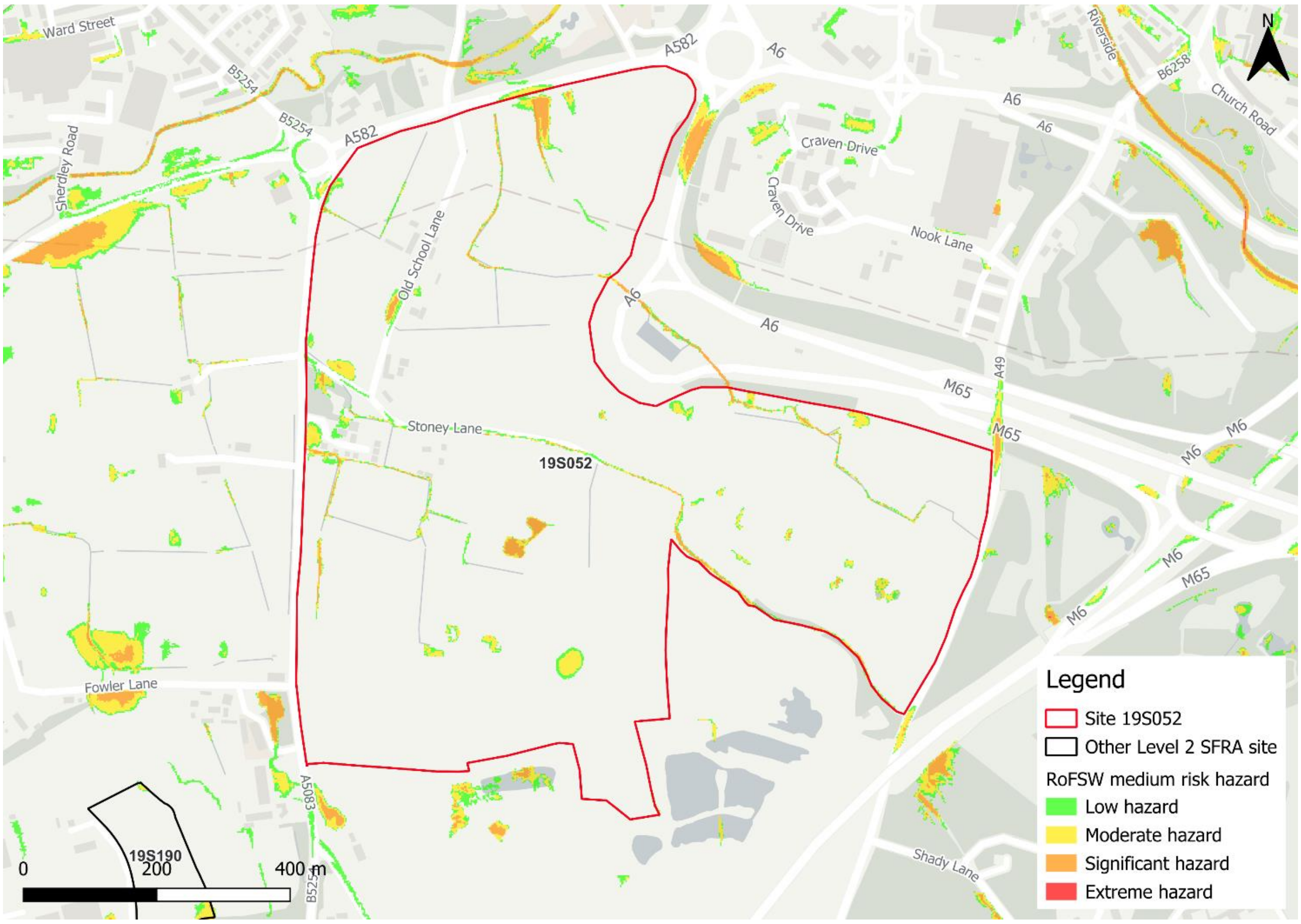

Figure 21-2: Medium risk event surface water flood hazard[12] (Risk of Flooding from Surface Water map)

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 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.

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

Maximum flood depths are modelled to be > 1.2 m, with some areas of significant hazard (Figure 21-4).

Given the sporadic nature of the risk from drainage ditches across a significantly large site, a detailed drainage strategy will be required for this this site.

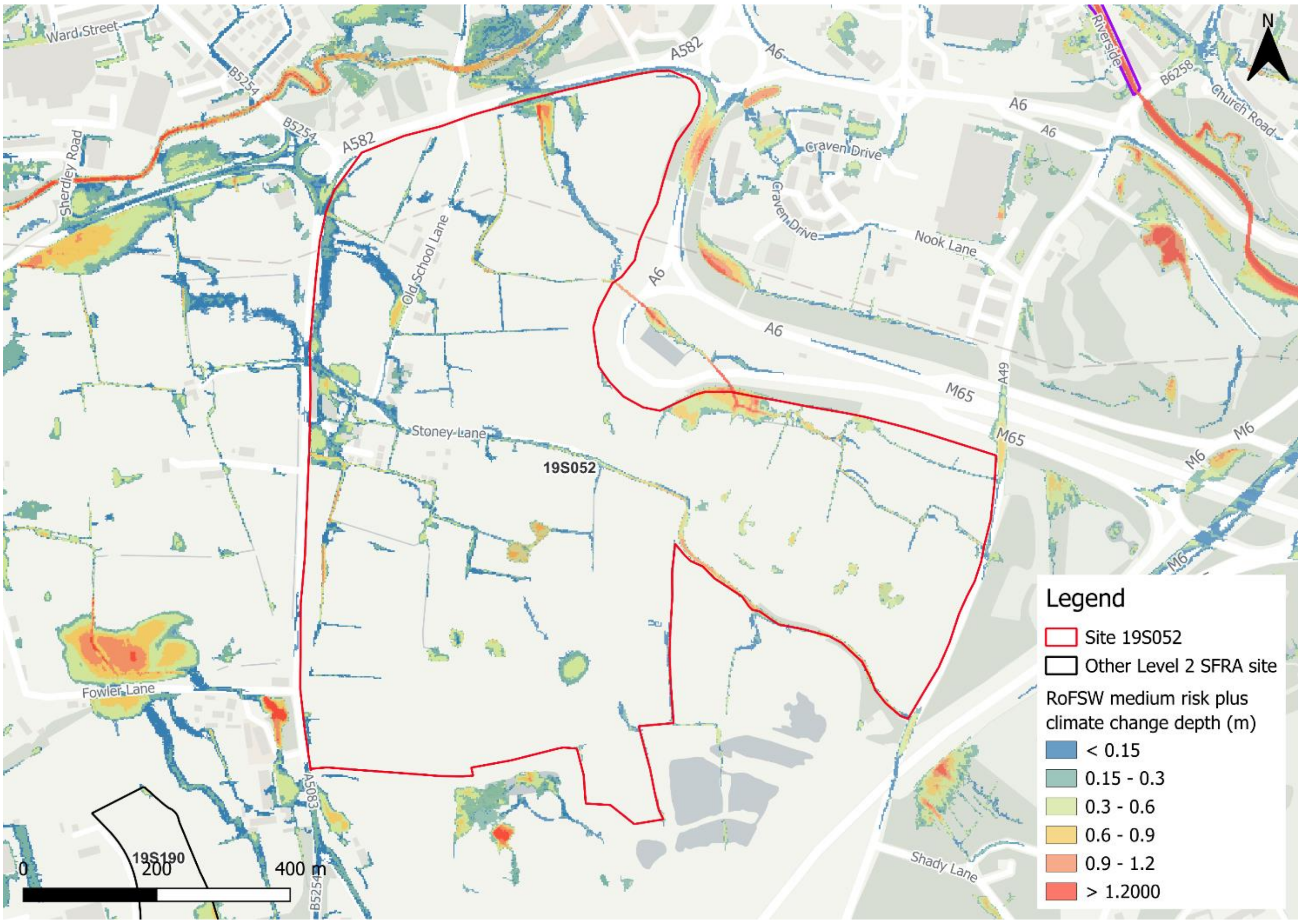

Figure 21-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

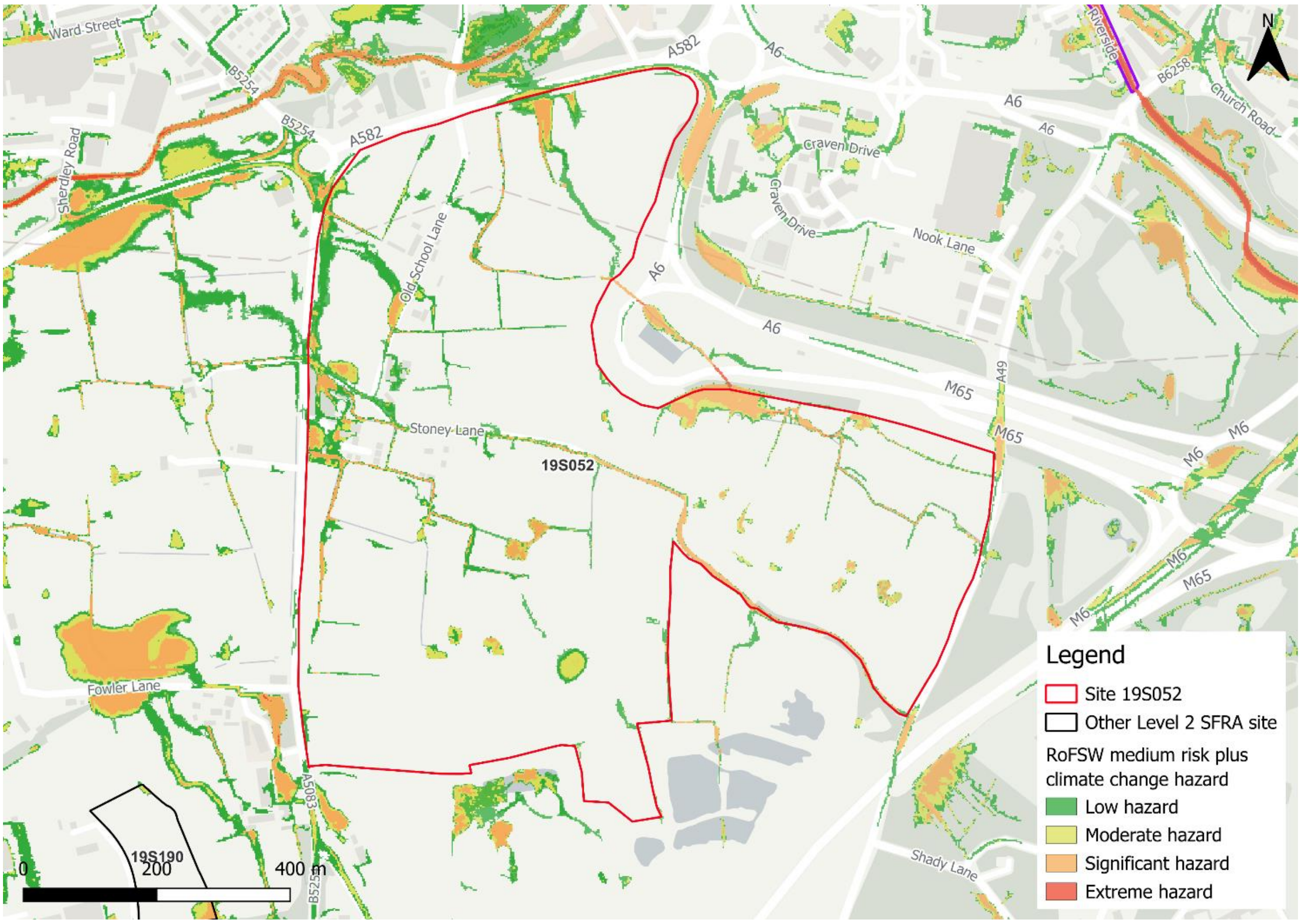

Figure 21-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

21.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 92% of the site being at very low risk. Surface water risk in the high and medium risk events is confined to ponding within topographic low spots across the site with some short flow paths within existing drainage ditches.
- The modelled medium risk climate change outputs indicate a similar extent risk to the present day low risk event, with a number of additional flow paths and areas of ponding emerging through the site. Any existing flow paths and topographic depressions should be maintained in site design.
- The sporadic nature of the risk and the number of drains and depressions means 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. This will require detailed 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.
- Safe access and escape routes should be achievable via the A582 in all events.

- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS in the majority of the site, with the exception of central areas which are indicated to have a greater risk of groundwater emergence. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- Details relating to existing highways drainage may need to be sought in order to ascertain the nature of flood risk in the north of the site.
- 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[13]. Figure 4-1 shows the map for Site 19S052 and the surrounding areas whilst Table 22-1 explains the risk classifications.

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

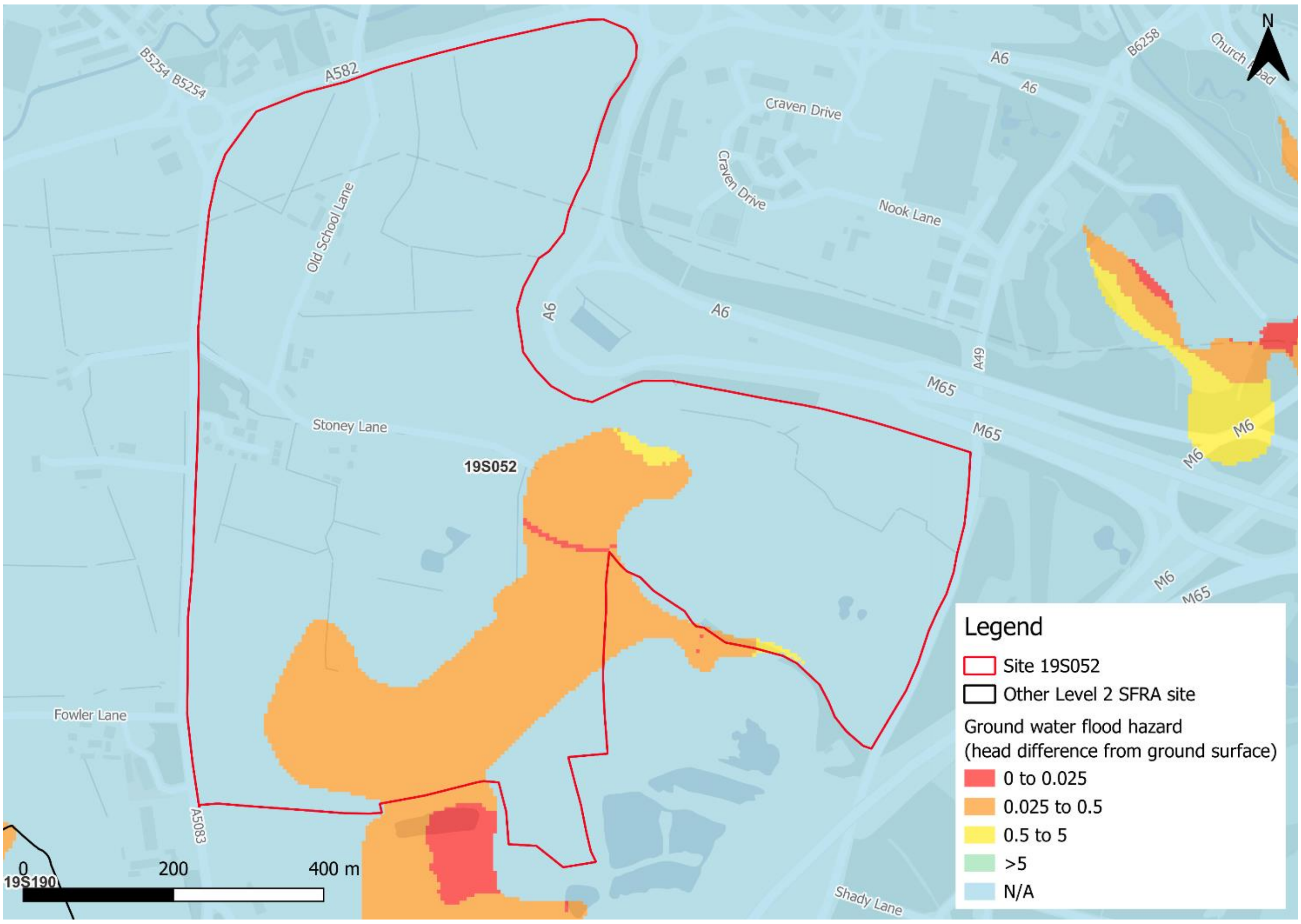

Figure 22-1: JBA 5m Groundwater Emergence Map

13 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[14] 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.

23.2 Recommendations, FRA requirements and further work

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

- Modelling should be carried out for the present day and for the impacts of climate change of the River Lostock to ascertain the potential fluvial flood risk to the north of the site. However, it should be possible to allocate the site assuming all drainage ditches and ponds can be included in site design.
- There should be no development within 8m of any watercourse. The areas adjacent to the existing watercourses and ditches within the site should be converted to blue / green corridors 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 and the sporadic nature of the risk. 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 to not exceed greenfield rates or betterment on current rates. The use of infiltration SuDS should be investigated.
- Groundwater conditions within the south of the site should be investigated further.
- 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 19S190

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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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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25 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19S190. 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 19S190

- Location: Land Adjacent to Leyland Business Park, Farington
- Existing site use: Brownfield
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Employment
- Proposed site use vulnerability: Less vulnerable
- Site area: 2.2 hectares
- Proposed development impermeable area: 1.9 hectares (assumed 85% impermeable area)
- EA model: 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 25-1: Existing site location boundary

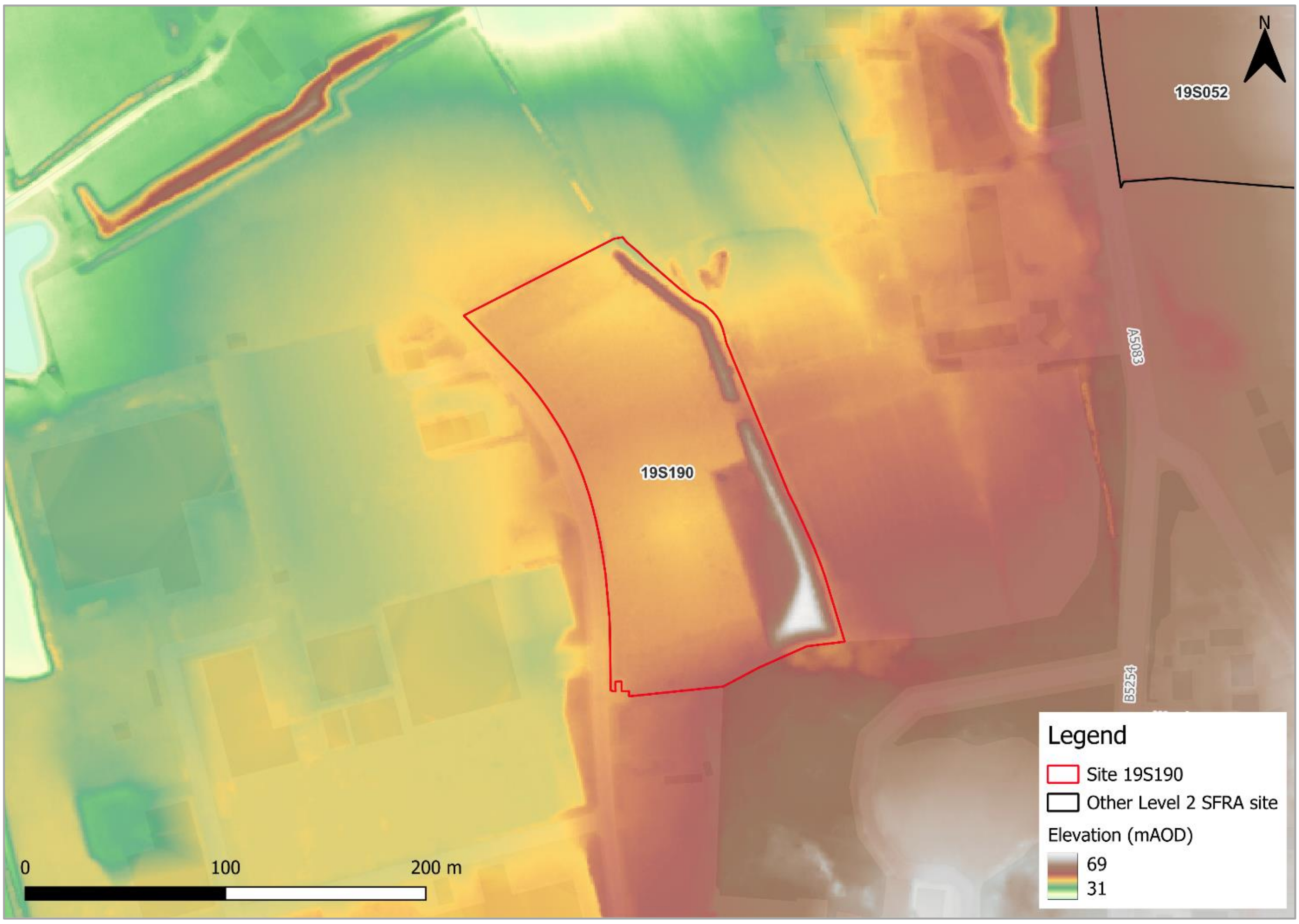

Figure 25-2: Topography

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 26-1 The Flood Map for Planning does not consider flood defence infrastructure (Section 26.2) or the impacts of climate change.

This site is located fully within Flood Zone 1, indicating it is at low risk of flooding from rivers.

Table 26-1: Existing fluvial flood risk

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

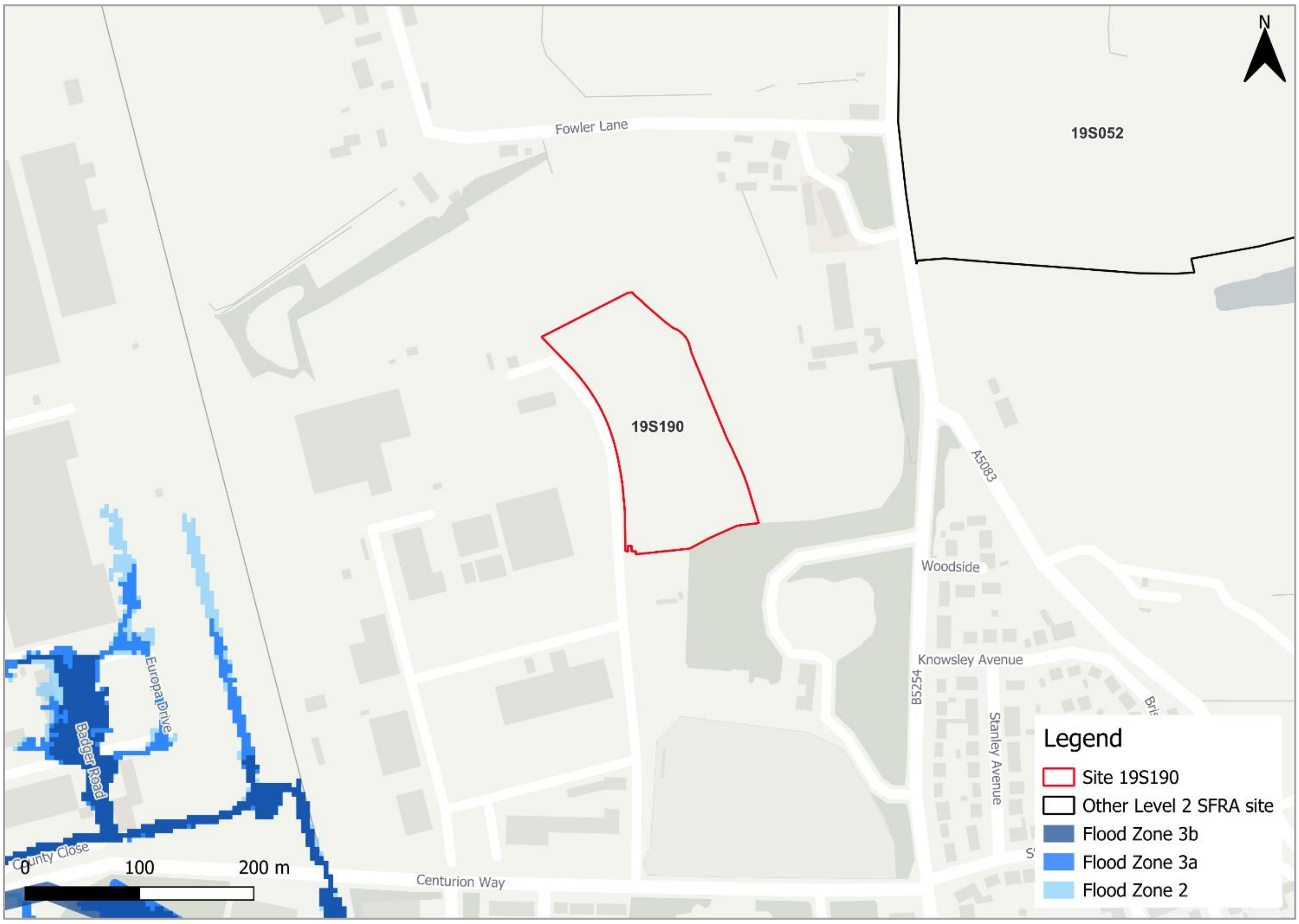

Figure 26-1: Existing risk from rivers to the site

26.2 Flood risk management

There are no engineered flood defences within the vicinity of the site, 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 19S190 is located within one catchment, namely, Lostock US Farington Weir. Lostock US Farington Weir is ranked as low sensitivity catchments. Planning policy considerations for sites at medium sensitivity to the cumulative impacts of development. The full list of planning policy suggestions for all sites 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. The majority of the site is located within an area with potential for wider catchment tree planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. There are also opportunities within the southeastern site corner 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 26-2.

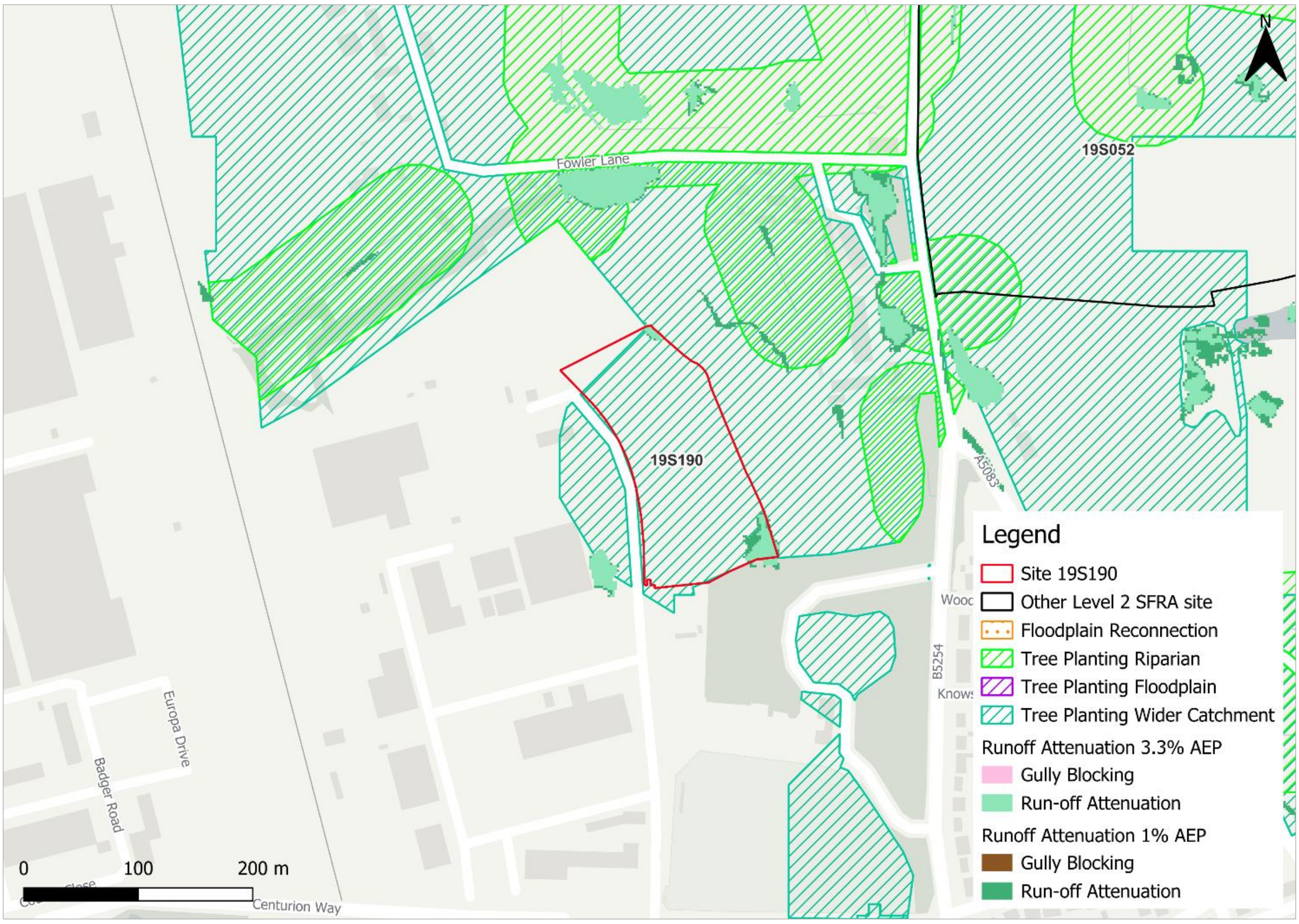

Figure 26-2: NFM potential mapping

26.3 Residual risk

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

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. 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 of flooding 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 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 19S190 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 also not located within a FAA.

Safe access and escape routes could likely be achieved during a flood event via the unnamed road through Leyland Business Park leading to Centurion Way.

26.6 Observations, mitigation options and site suitability - fluvial

- The site is modelled to be fully within Flood Zone 1.

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 flood risk to the site is predominantly very low. Approximately 3% of the site is within the high risk zone, 1% is within the medium risk zone and 2% in the low surface water risk zone as shown in Table 3-1.

In the high risk event, surface water ponding is limited to the topographic low spots in the northeastern and southeastern corners of the site. In the medium and low risk events, ponding expands at the southeastern corner of the site. Greatest flood depths in the medium risk event are 0.3 to 0.6 m (Figure 3-1) with some areas of significant hazard (Figure 3-2). Safe access and escape should be achievable via the unnamed road west 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 (%)
94%	2%	1%	3%

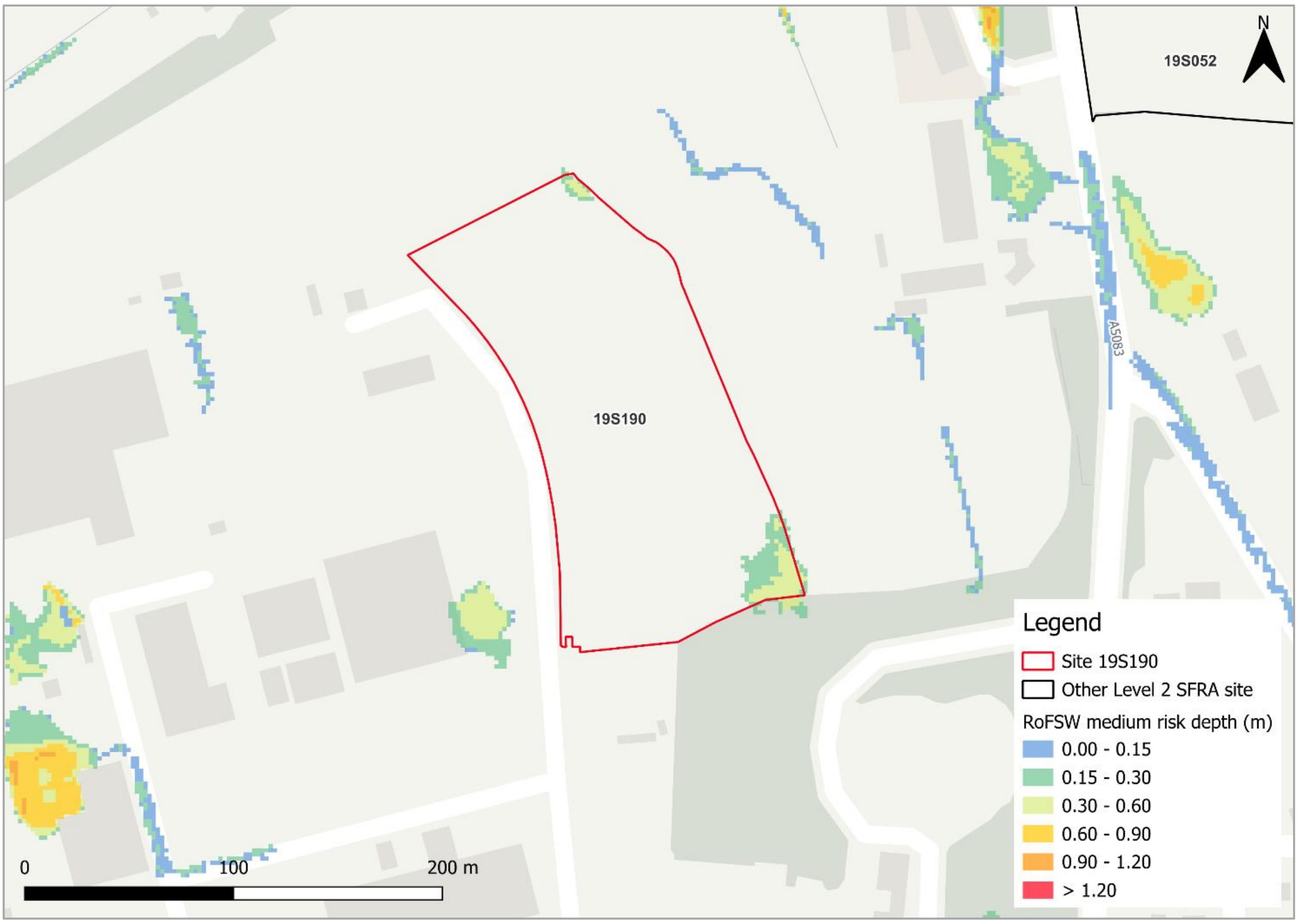

Figure 27-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

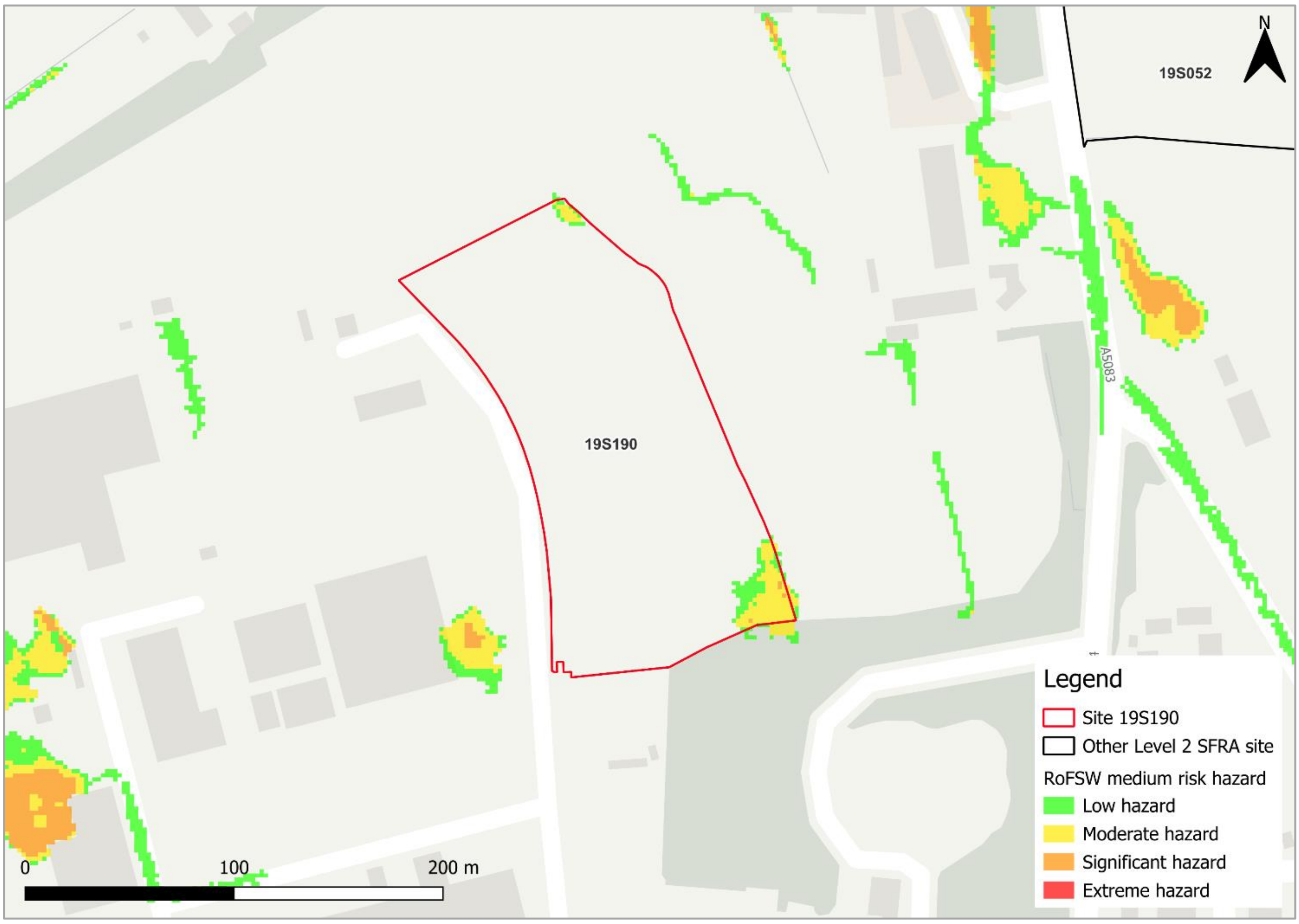

Figure 27-2: Medium risk event surface water flood hazard[15] (Risk of Flooding from Surface Water map)

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. Site 19S190 is located within the Douglas management catchment. 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 and Ribble management catchments

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

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

Figure 3-3 shows the flood depths during the medium risk surface water event plus 45% allowance for climate change. Flooding is modelled to be greater than the present day low risk event. With ponding in the southeastern corner of the site expanding. Maximum depths increase to between 0.6 to 0.9m (Figure 3-3) with some areas of significant hazard (Figure 3-4). There is ponding evident along the unnamed road west of the site to shallow depths. However, safe access and escape should remain achievable, travelling via this road and onto Centurion Way.

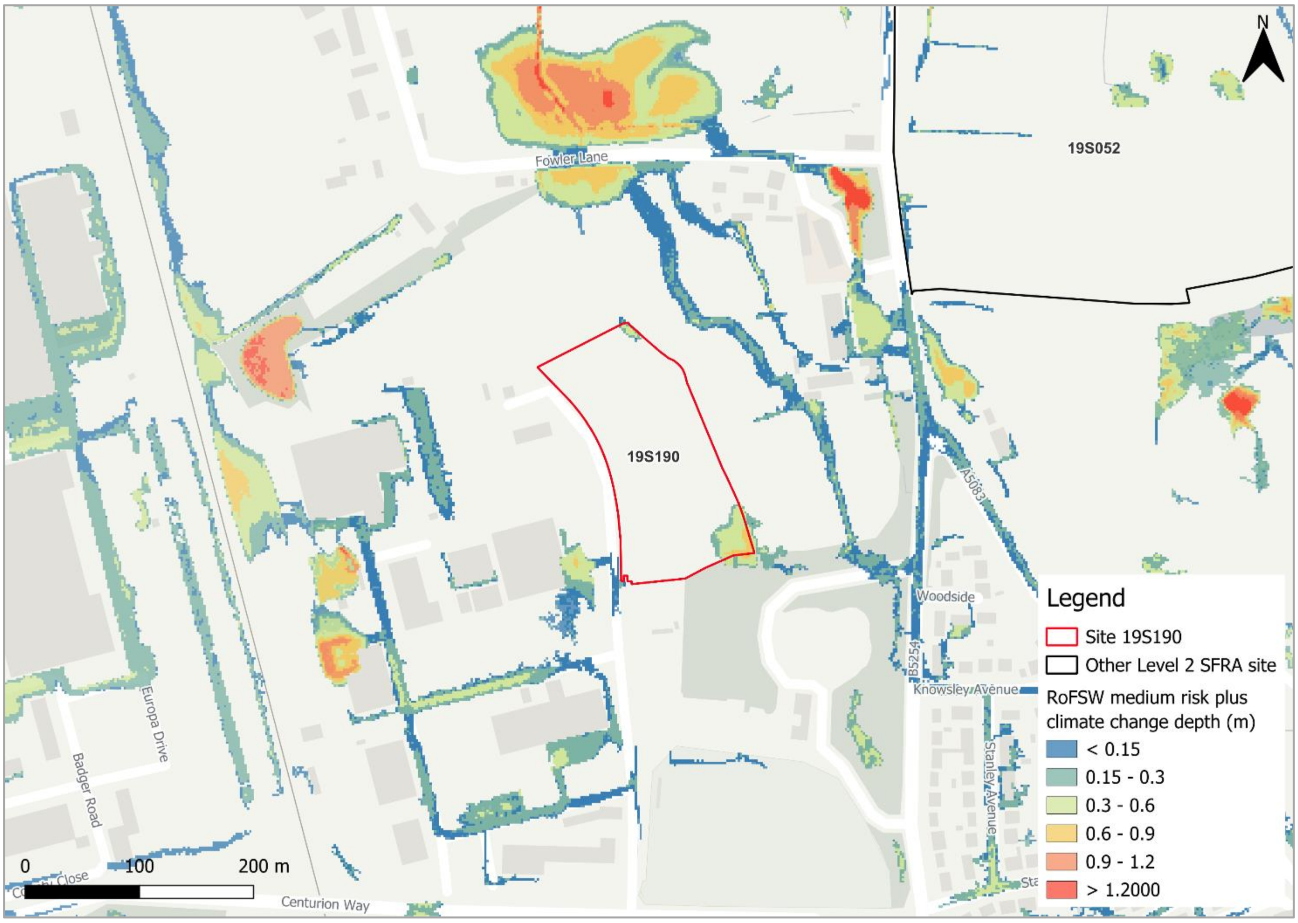

Figure 27-3: Medium risk event surface water flood depths plus 45% climate change allowance (based on Risk of Flooding from Surface Water map)

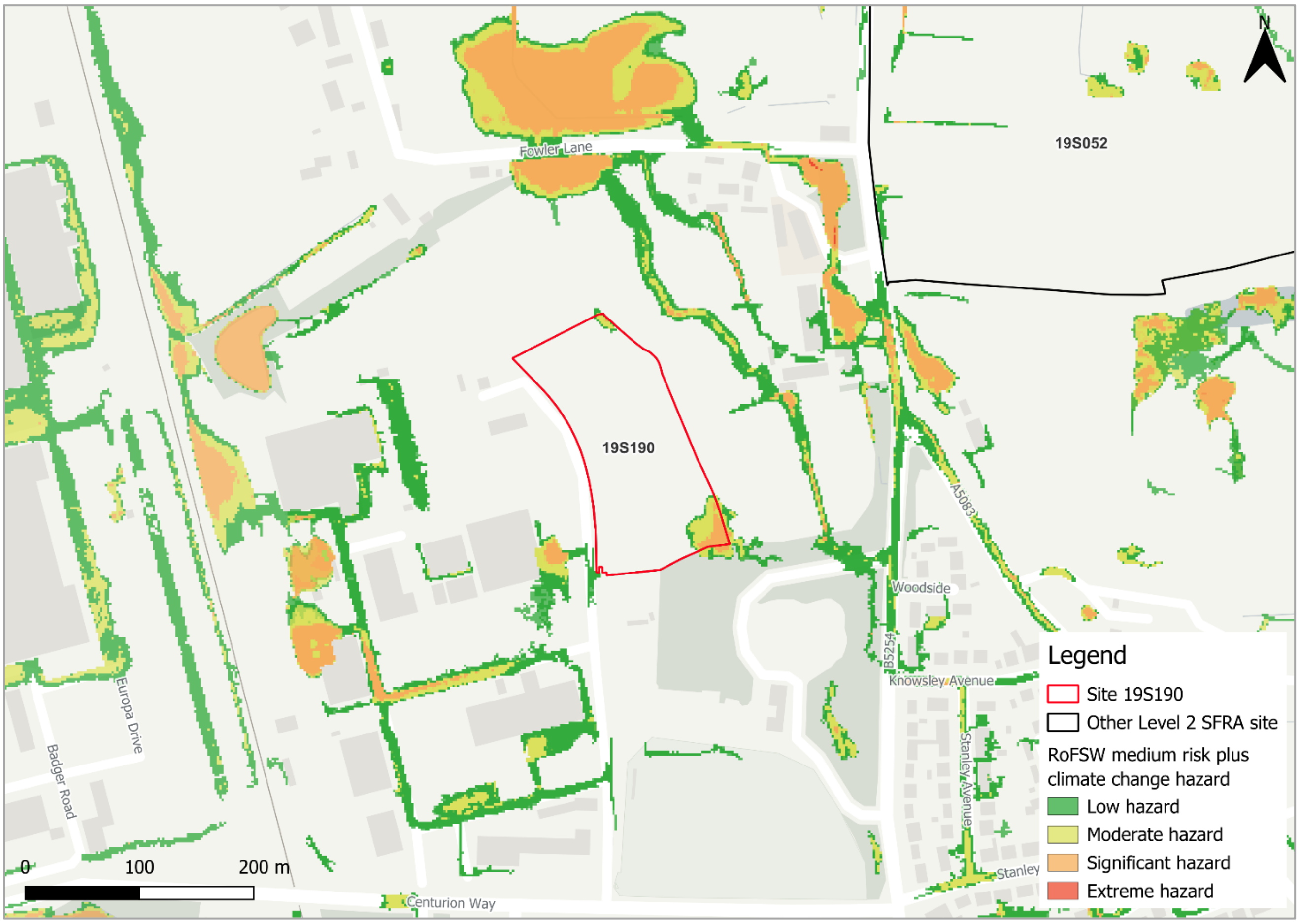

Figure 27-4: Medium risk event surface water flood hazards plus 45% climate change allowance (based on Risk of Flooding from Surface Water map)

27.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, 3% of the site within the high risk zone, 1% is within the medium risk zone and 2% in the low. In the low risk event, ponding is confined to the northeastern and southeastern corner of the site. Some ponding encroaches onto the road through the business park.
- 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 marginally increases in extent in comparison to the present day low risk event.
- 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.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS within the majority of the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.

- 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.

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[16]. Figure 4-1 shows the map for Site 19S190 and the surrounding areas and Table 4-1 explains the risk classifications.

The majority of the site is in an area where there is no risk of groundwater emergence. In the northwestern corner of the site, there is a risk of groundwater flooding to surface and subsurface assets and a possibility of groundwater emerging at the surface locally. Therefore, groundwater conditions may be suited to infiltration SuDS within the majority of the site, excluding the northwestern corner. This should be investigated further at the FRA stage.

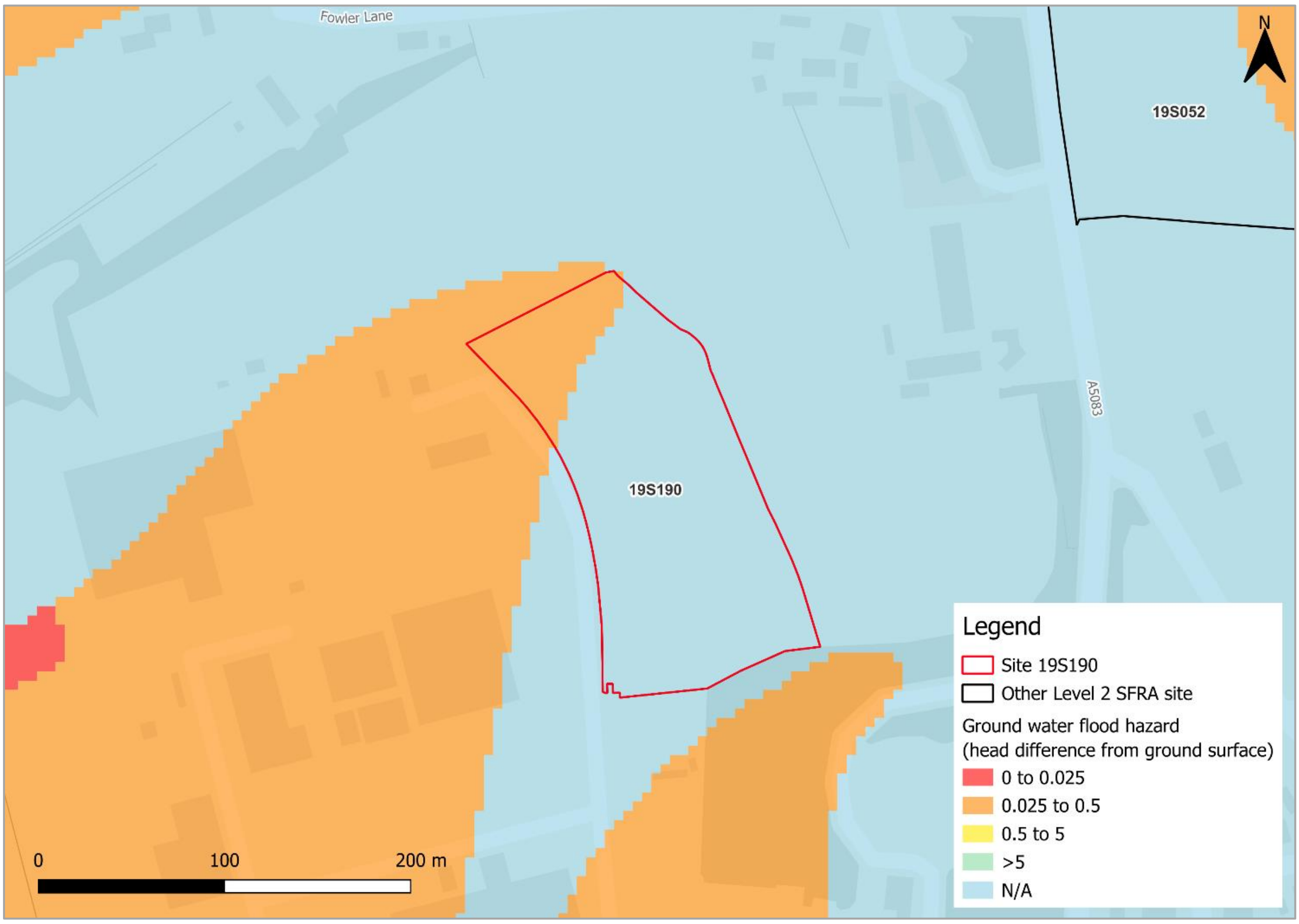

Figure 28-1: JBA 5m Groundwater Flood Map

16 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?

To pass part b) of the exception test[17], it must be proven that the development can be safe for its lifetime, which is 75 years for non-residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall.

- The site is not required to pass the exception test since it is wholly within Flood Zone 1.

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 for this site to be allocated, given the low fluvial and predominantly very low surface water flood risk to the site.
- 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 development or whether further capacity will be required.
- A drainage strategy will be required for any new development. The use of infiltration SuDS should be investigated.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- Any FRA must further consider surface water flood risk, including a drainage strategy.
- 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.

17 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S220

Final

February 2025

Prepared for:

Preston
South Ribble
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Central Lancashire

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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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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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Acknowledgements

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

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31 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19S220. 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.

31.1 Site 19S220

- Location: Land at Orchard Gardens
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 0.84 hectares
- Proposed development impermeable area: 0.59 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

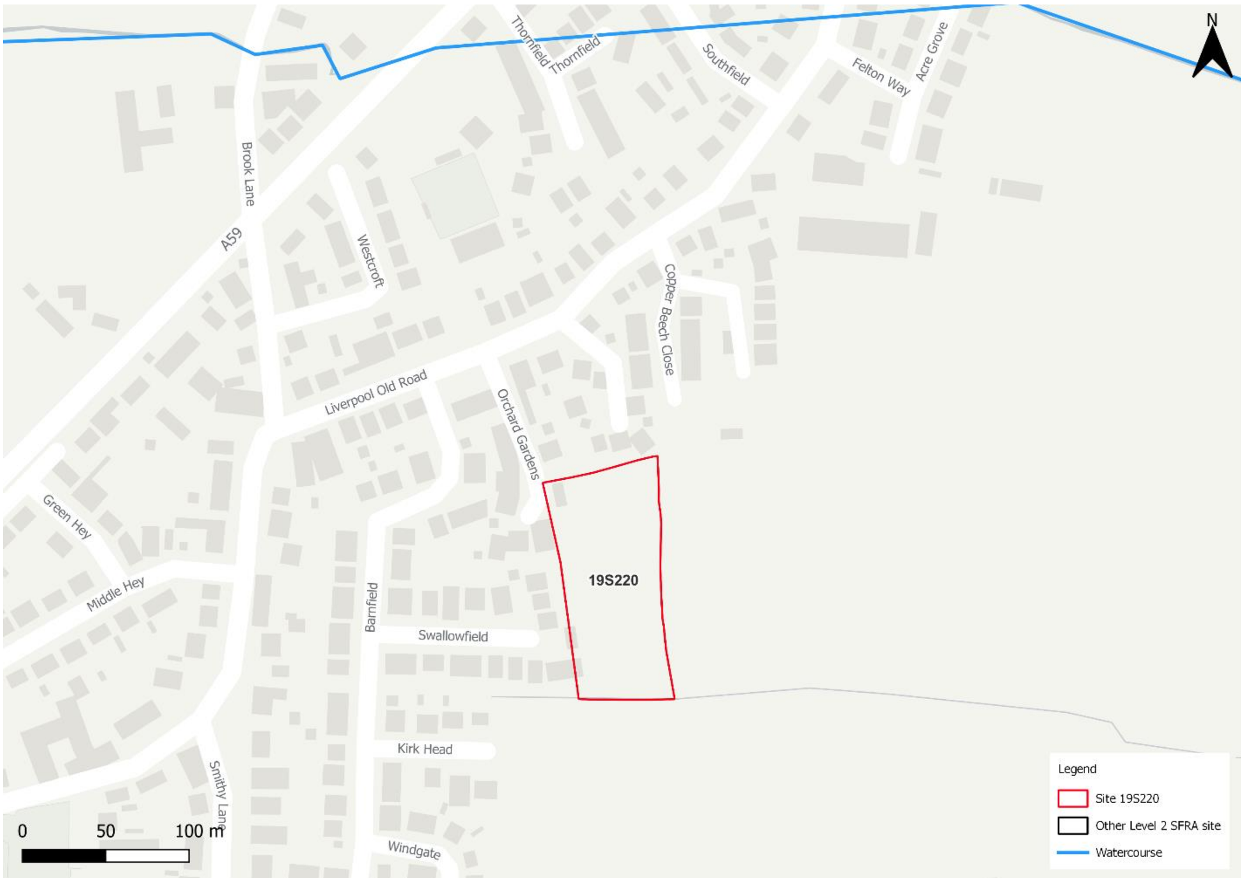

Figure 31-1: Existing site location boundary

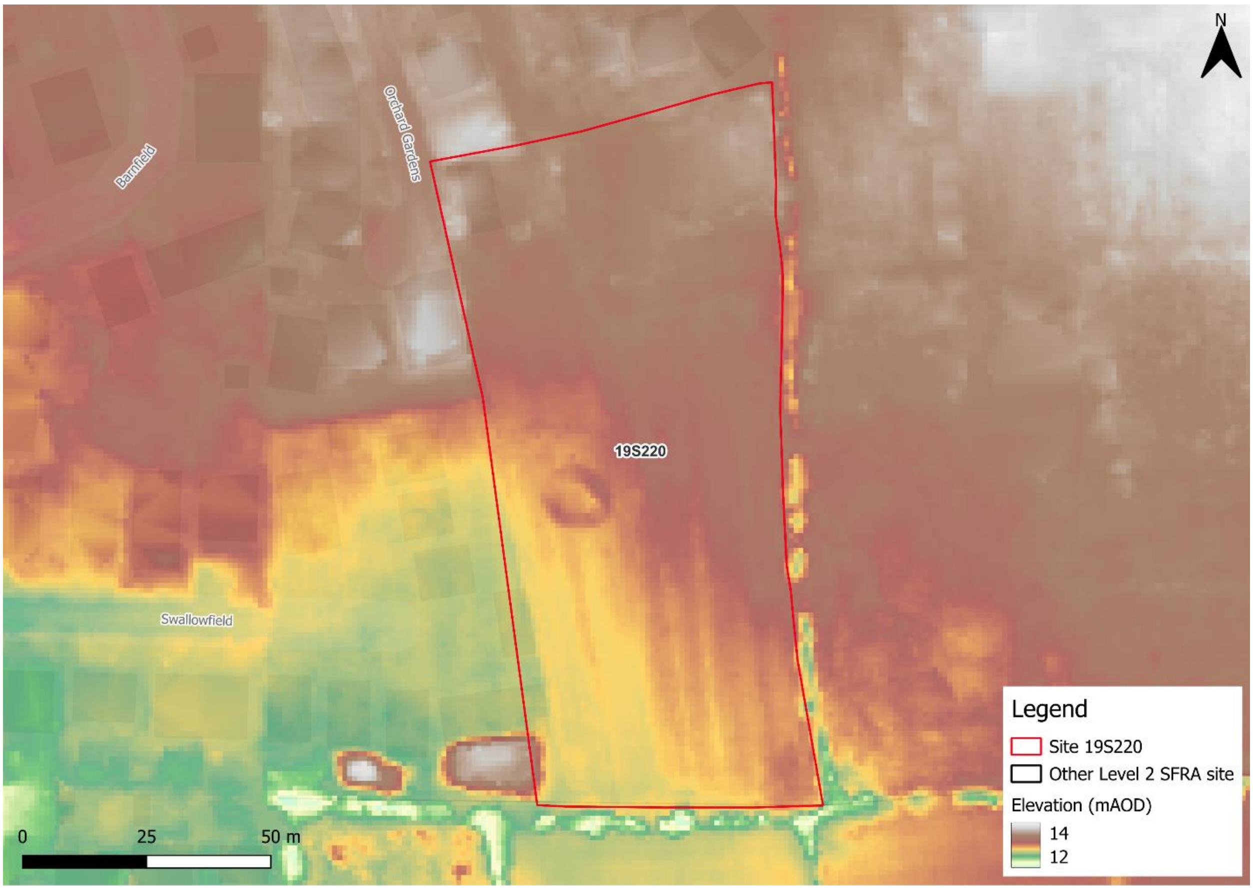

Figure 31-2: Topography

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 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) 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.

Mapping and LiDAR (Figure 31-2) appear to show a ditch running along the southern site boundary. Any FRA should consider the level of flood risk this poses to the site.

Table 32-1: Existing fluvial flood risk

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

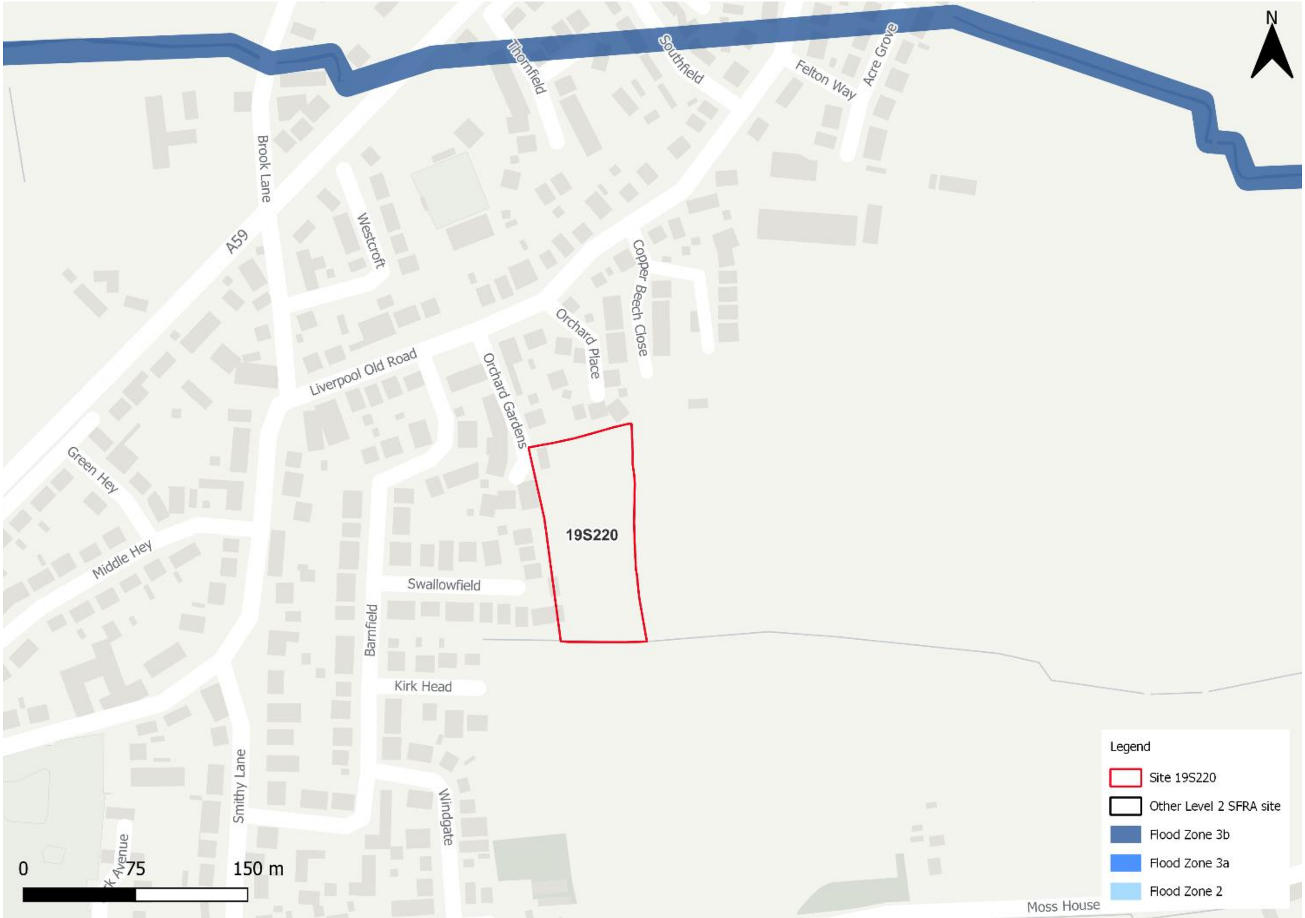

Figure 32-1: Existing risk from rivers to the site

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, which aimed to identify the catchments sensitive to the cumulative impact of development. Site 19S220 is located within one catchment, namely Coastal Catchment 175. 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..

The full list of planning policy suggestions 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. Across the site there are opportunities for wider catchment tree planting and riparian tree planting 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 32-2.

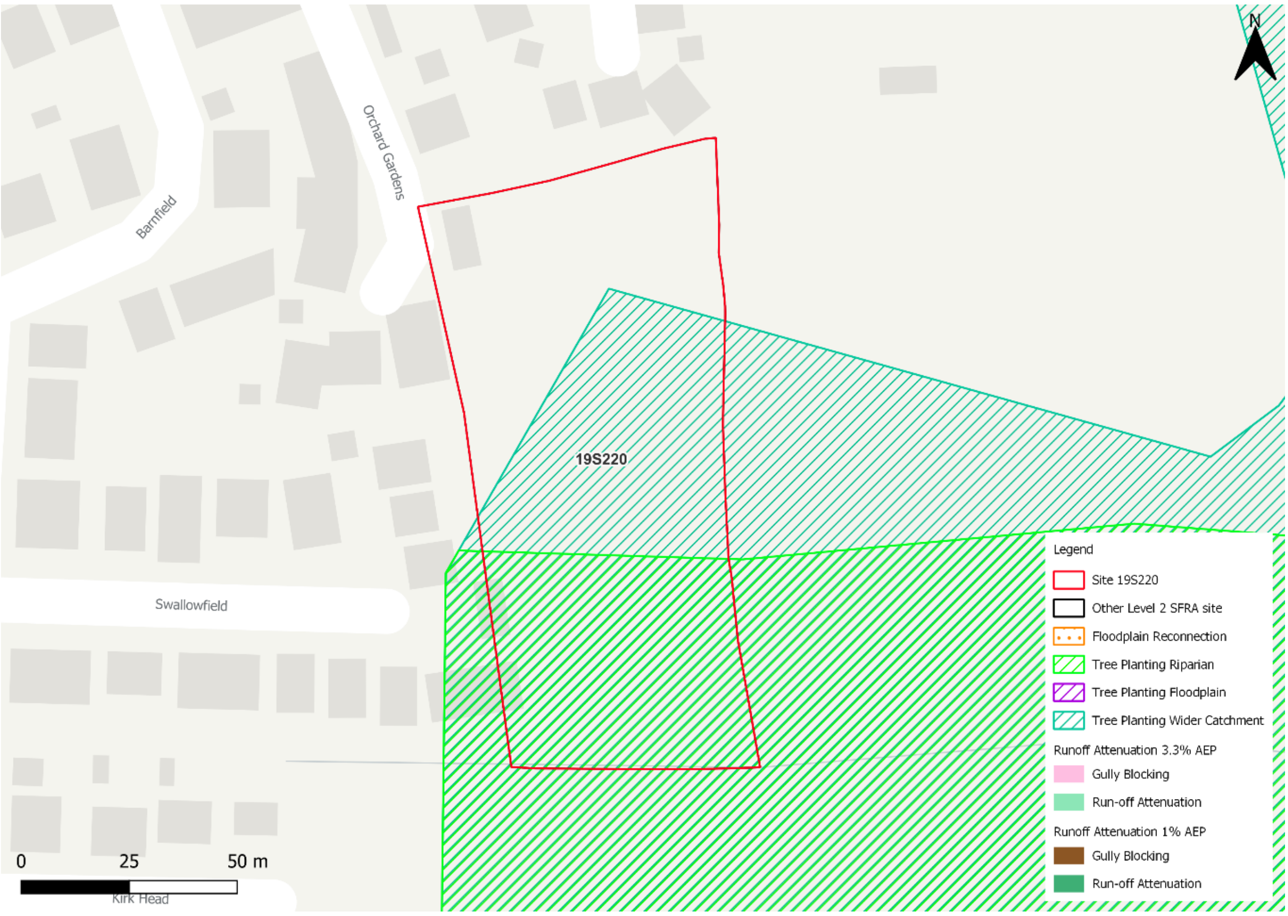

Figure 32-2: Natural Flood Management (NFM) potential mapping

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 events within the vicinity of the site.

32.5 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 a 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 Orchard Gardens.

32.6 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 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% of the site is within the low risk surface water flood zone, as shown in Table 33-1.

In the high and medium risk events, surface water risk covers a small area within the southeastern corner of the site. In the low risk event, additional surface water risk emerges along the southern and eastern boundaries of the site.

Greatest flood depths in the medium risk event are between 0.15 and 0.3 m (Figure 3-1) with some small areas of moderate hazard (Figure 3-2). Safe access and escape routes should be possible via and Orchard Gardens in the high and medium risk events. In the low risk event, the route via Orchard Gardens becomes inundated however depths are low therefore safe access and escape should be possible.

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

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

Figure 33-2: Medium risk event surface water flood hazard[18] (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 medium risk surface water flood depths plus 45% climate change. Risk is modelled to be greater than the present day medium risk event, similar in extent to the present day low risk event. The key areas of risk are located along the eastern and

18 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

southern site boundaries. Maximum flood depths are modelled to be between 0.3 and 0.6 m (Figure 33-3), with some area of moderate hazard (Figure 3-4). Safe access and escape routes could likely be achievable via Orchard Gardens, however the onward route is inundated with low depths.

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

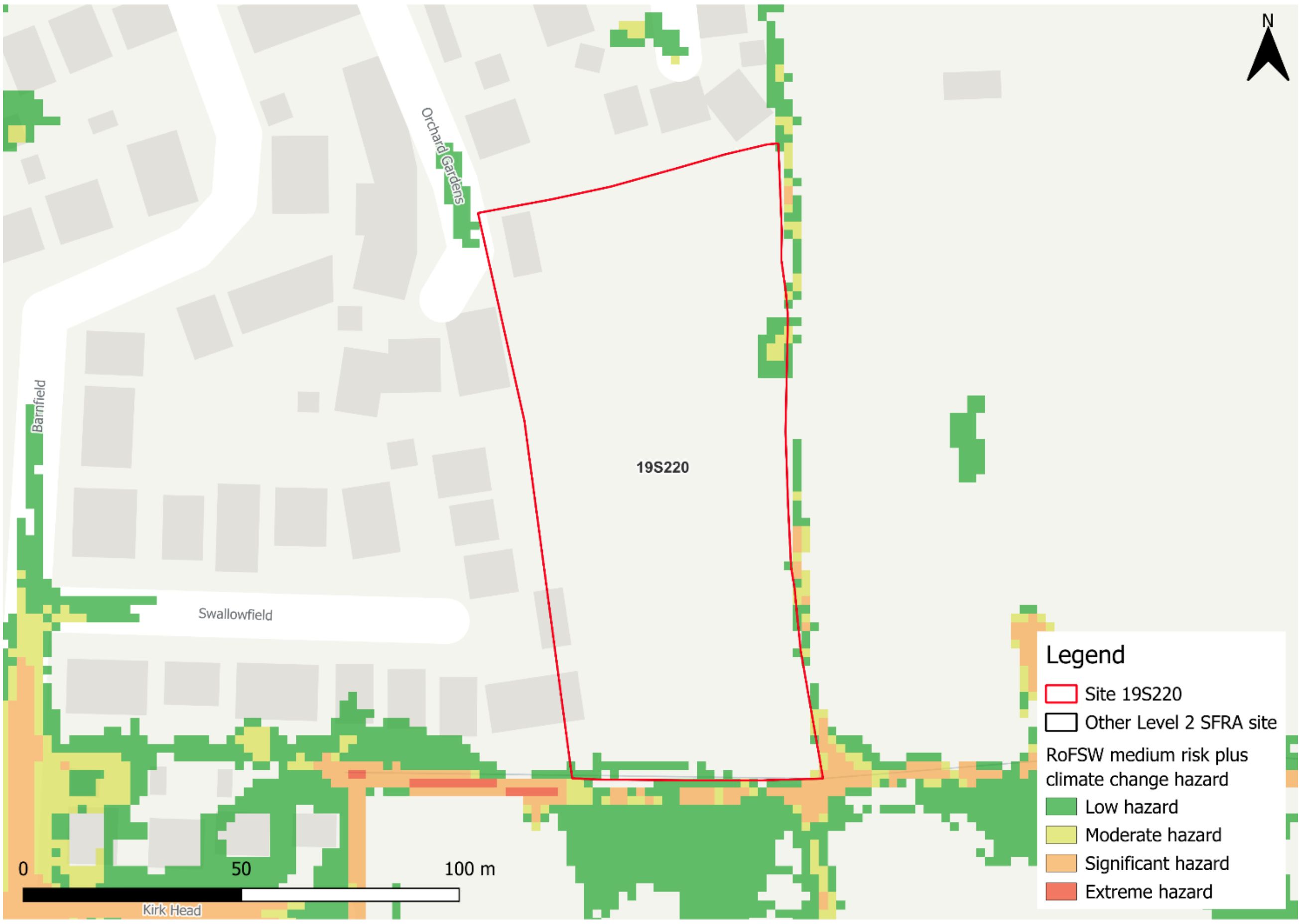

Figure 33-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

33.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with 97% of the site being at very low surface water flood risk. Surface water risk in the medium risk event is confined to the southeastern corner of the site. Safe access and escape routes should be achievable via Orchard Gardens 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 slightly greater than present day flood risk, showing a similar level of risk to the present day low risk event. Any existing flow paths should be maintained in site design.
- 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 across 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.
-

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[19]. Figure 4-1 show the map for Site 19S220 and the surrounding areas and Table 34-1 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 34-1: JBA 5m Groundwater Emergence Map

19 [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[20] 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 consider the existing ditch along the southern boundary of the site to determine the level of flood risk it presents.
- 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.

20 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S366

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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Reviewed by	Mike Williamson BSc MSc CGeog FRGS EADA Principal Analyst
Authorised by	Krista Keating BSc MSc CEnv CSci MCIWEM C.WEM Associate Director

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Address	Phoenix House, Lakeside Drive, Centre Park, Warrington, WA1 1RX
JBA Project Code	2023s1344

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Acknowledgements

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37 Background

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37.1 Site 19S366

- Location: Land south of Bannister Lane, Farington moss, Leyland, PR26 6RU
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 1.71 hectares
- Proposed development impermeable area: 1.46 hectares (assumed 85% impermeable area)
- Watercourse: River Lostock (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
-

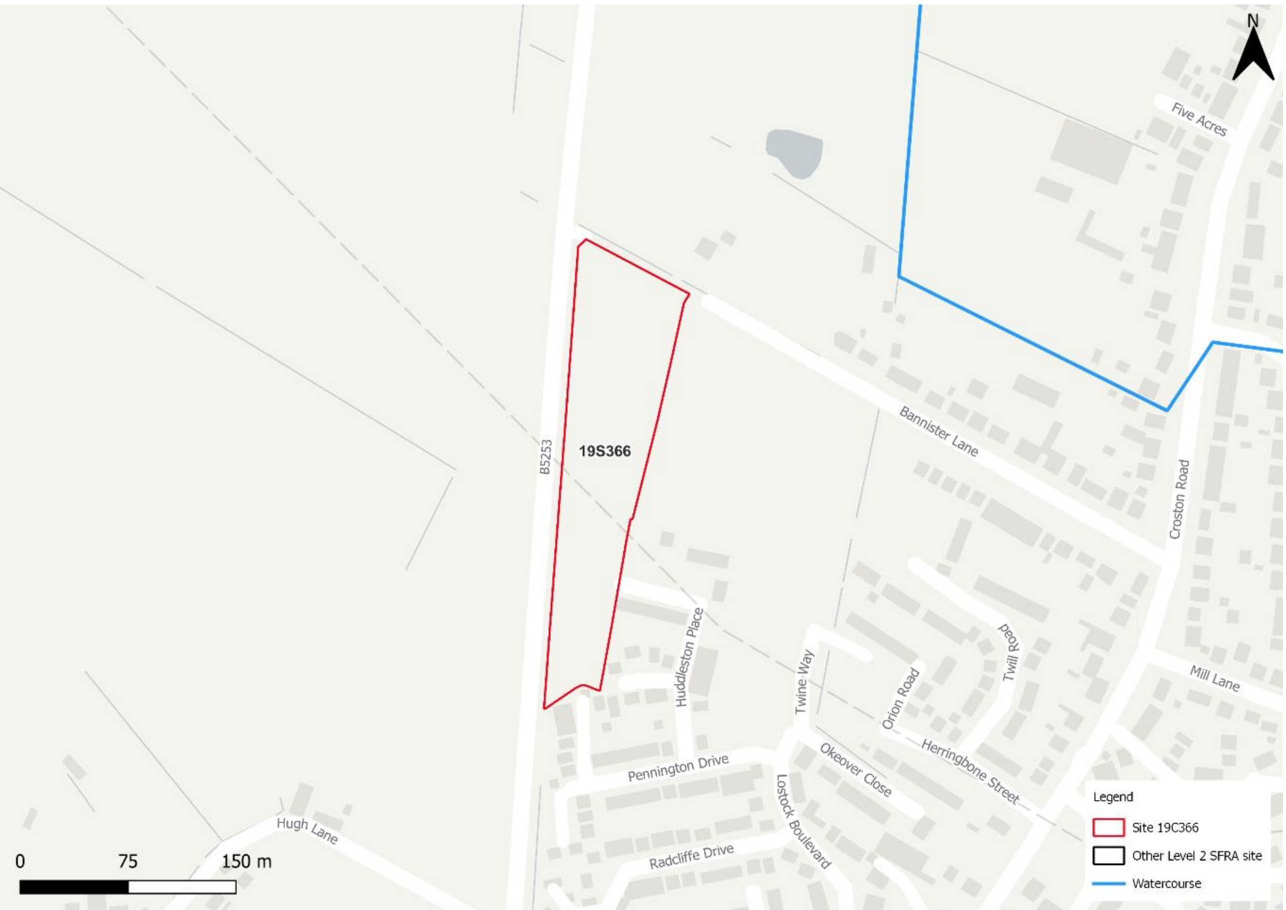

Figure 37-1: Existing site location boundary

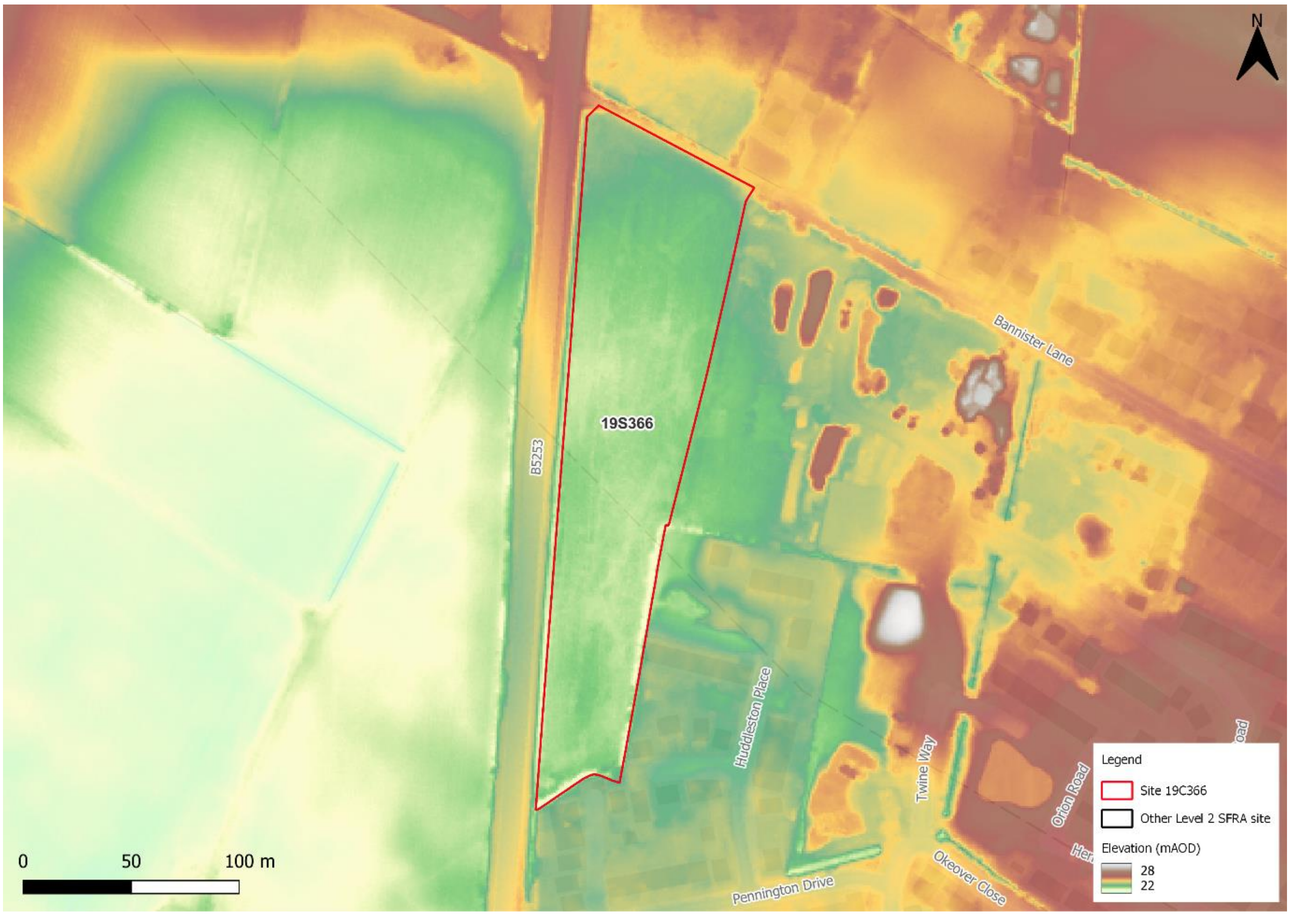

Figure 37-2: Topography

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 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) or the impacts of climate change.

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

Table 38-1: Existing fluvial flood risk

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

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 (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 19S366 is located within one catchment, namely, Lostock DS Farington Weir. 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.

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. 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 38-2.

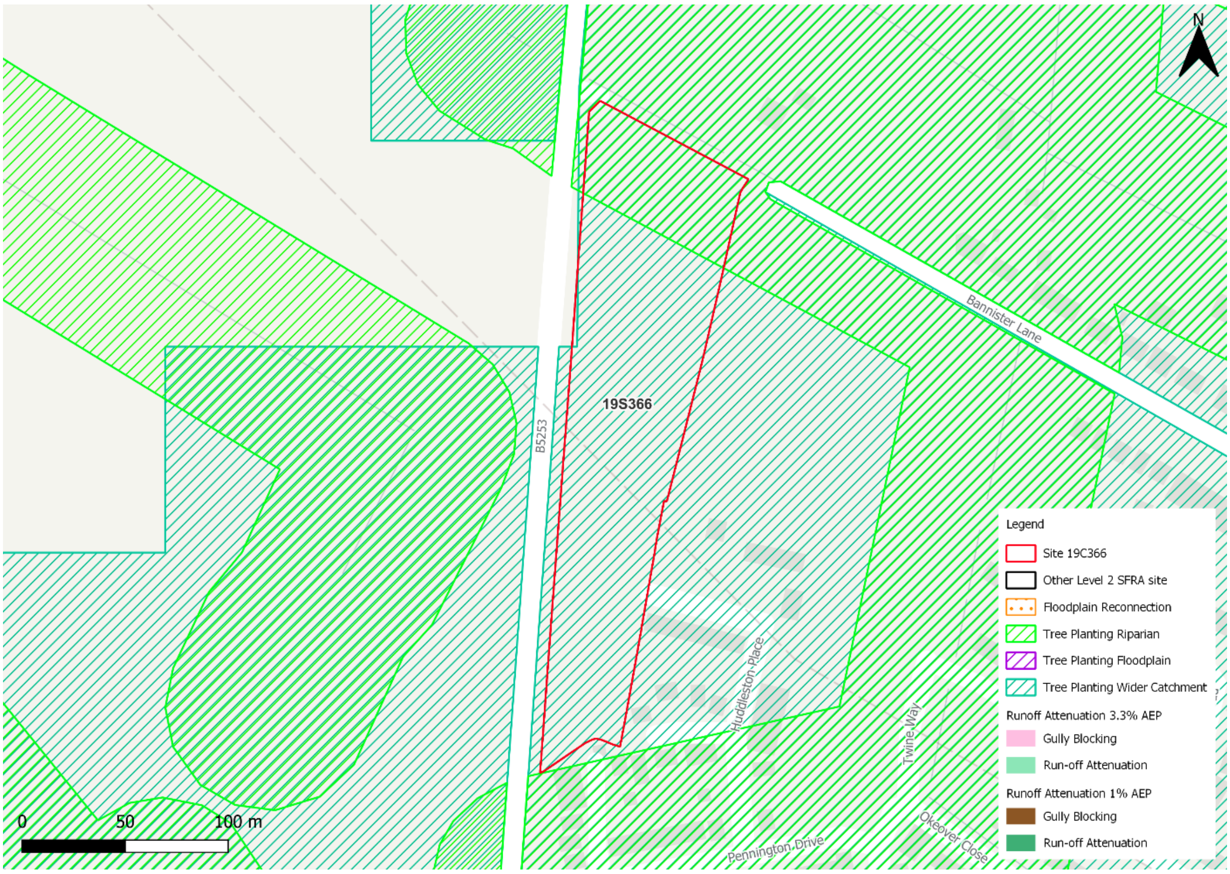

Figure 38-2: Natural Flood Management (NFM) potential mapping

38.3 Residual risk

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. 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.

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 incidents 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 during a flood event via Bannister Lane.

38.6 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.

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 significant. Approximately 7% of the site is within the high risk surface water flood zone. A further 33% of the site is at medium risk and a further 48% of the site is at low risk.

In the high risk event, surface water risk is present across the site as scattered areas of ponding within topographic low spots. In the medium risk, modelled surface water risk is present across the majority of the south of the site. Almost the entire site is inundated in the low risk event.

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 routes should be possible via Bannister Lane in all events, however accessing this route from the south of the site may prove challenging.

Table 39-1: Existing surface water flood risk based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
11	48	33	7

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

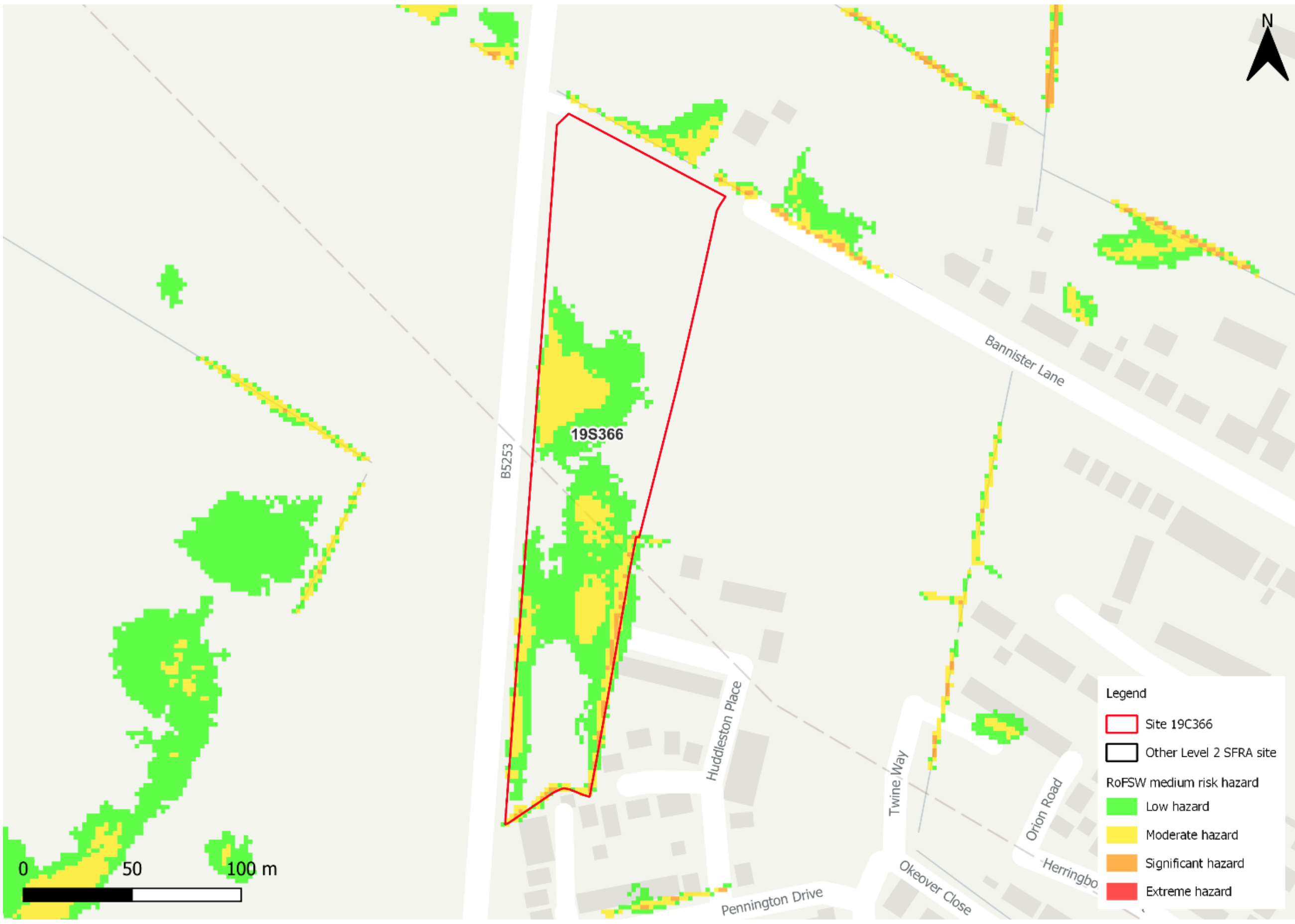

Figure 39-2: Medium risk event surface water flood hazard[21] (Risk of Flooding from Surface Water map)

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 39-2: 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 modelled surface water depths for the medium risk event +45% climate change. Risk is modelled to be significantly greater than present day conditions, with almost the entire site modelled to be at risk of surface water flooding. Maximum flood

21 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

depths are modelled to be between 0.6 and 0.9 m (Figure 3-3), with large areas of significant hazard (Figure 3-4). Based on long term flood risk, this site would ideally remain as greenspace for flood storage.

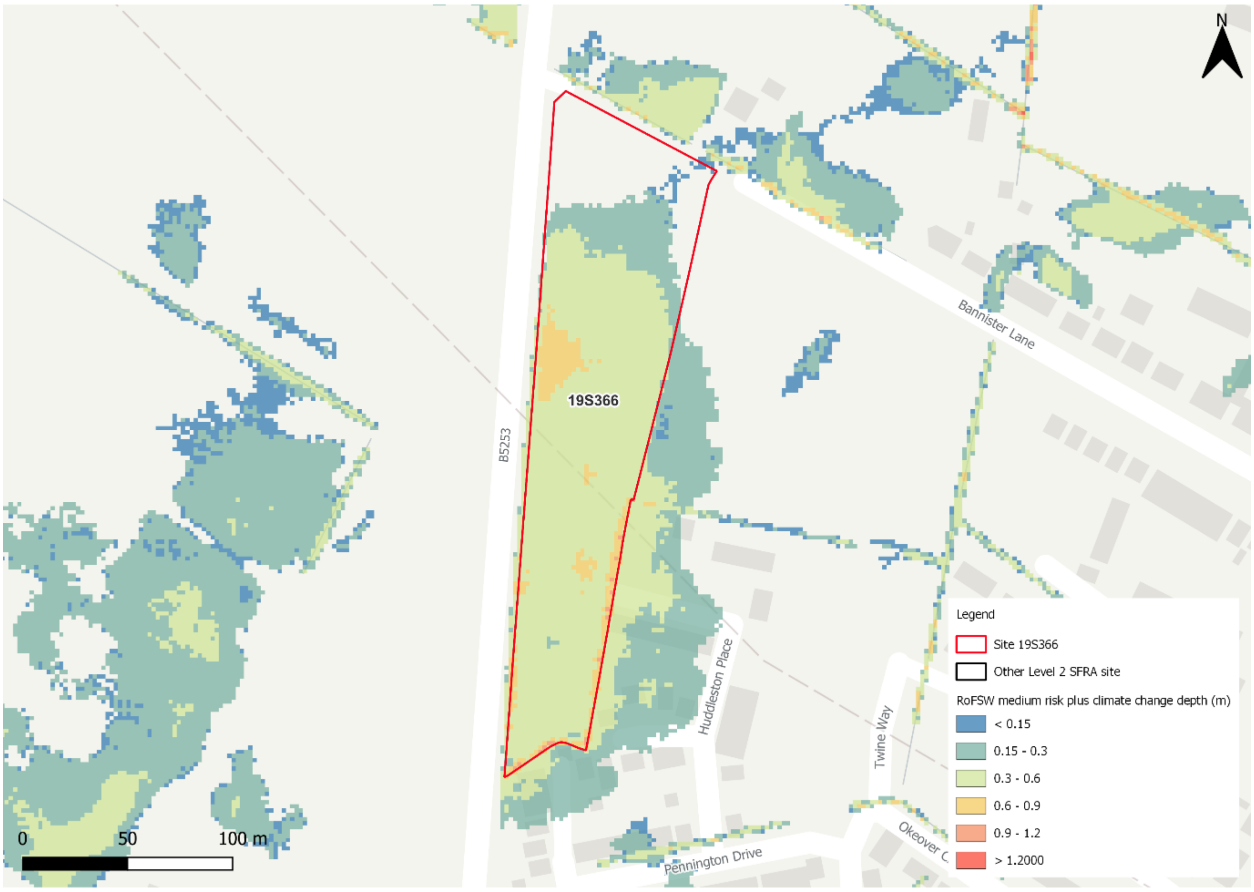

Figure 39-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

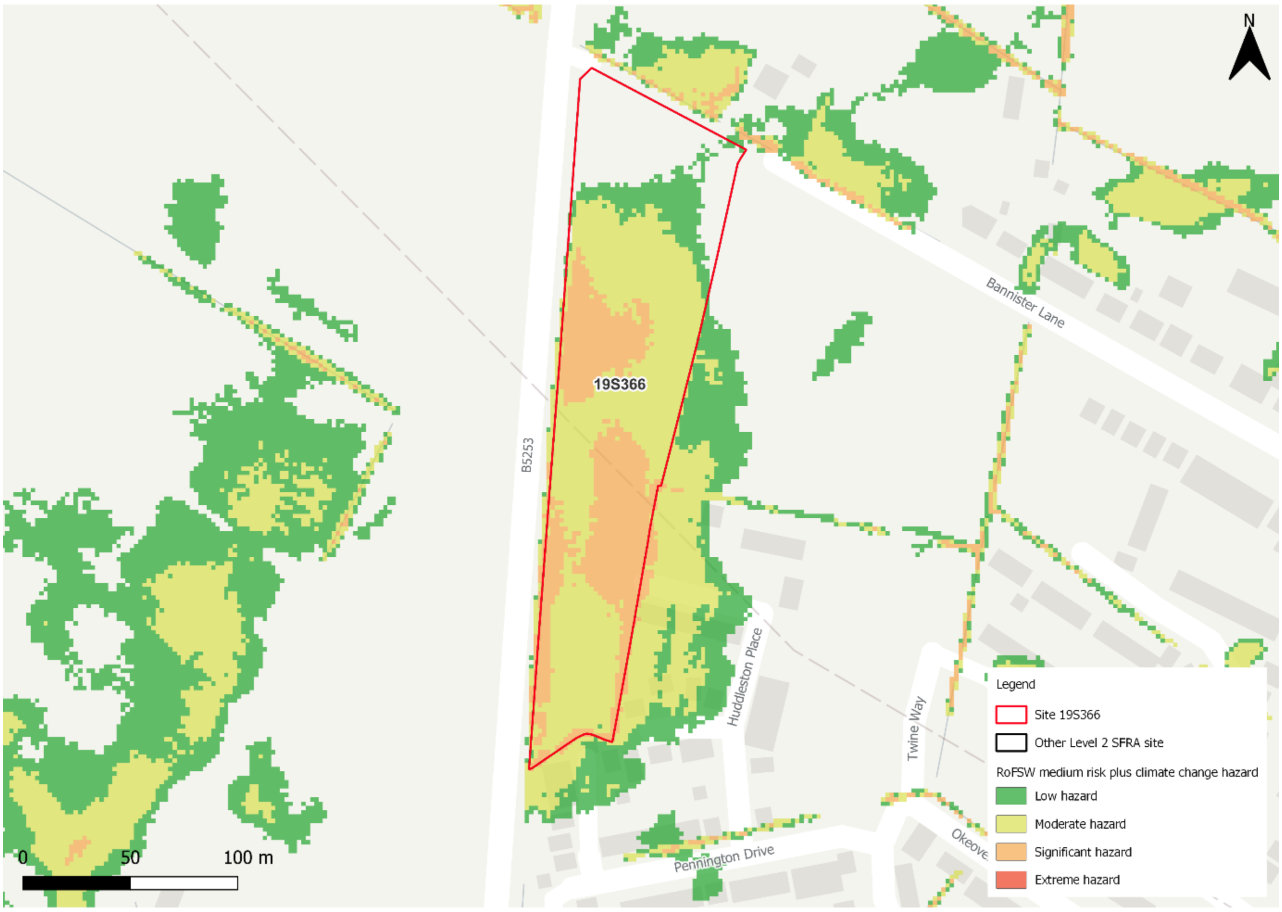

Figure 39-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

39.3 Observations, mitigation options and site suitability - surface water

- Present day surface water risk to the site is widespread though depths are shallow and could likely be mitigated. Over a third of the site is modelled to be at risk from surface water flooding in the medium risk event, covering a large area within the south of the site. Almost the entire site is inundated in the low risk surface water event.
- The medium risk modelled climate change outputs indicate a similar extent of risk to the present day low risk event, with almost the entire site modelled to be at risk.
- Safe access and escape routes are likely to be achievable via Bannister Lane to the north of the site. Additional access and escape routes via the B5253 would need to be considered for housing units towards the south of the site, given the modelled surface water depths and hazards in the north of the site.
- The Groundwater Emergence Map (Figure 4-1) indicates that ground conditions may be suitable for infiltration SuDS across the site. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.

- This site should not be developed for more vulnerable uses, given the significant future risk.
- 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.

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[22]. Figure 4-1 show the map for the site and the surrounding areas and Table 40-1 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.

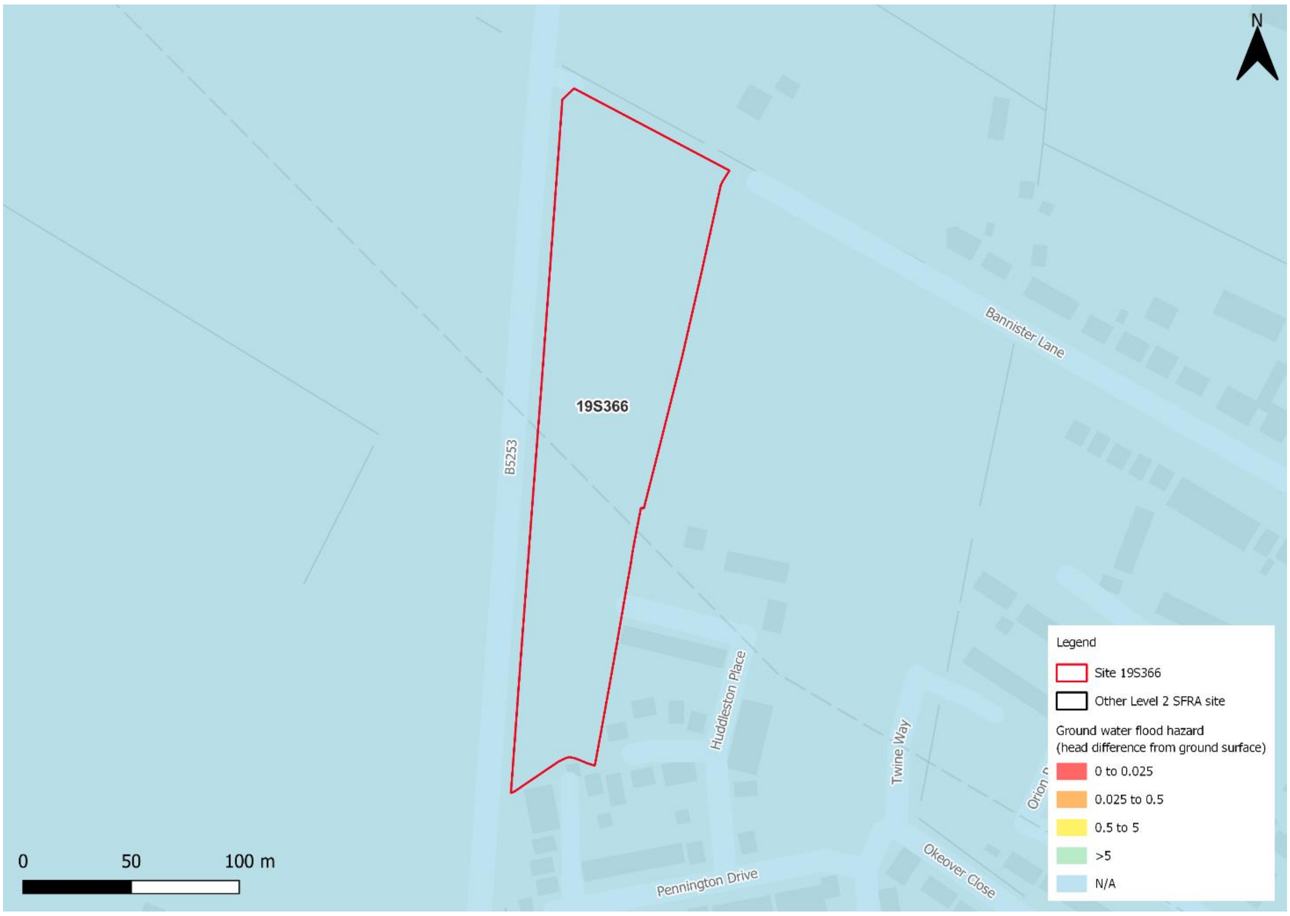

Figure 40-1: JBA 5m Groundwater Emergence Map

22 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[23], 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 current information, and the significant level of surface water risk, this site would ideally be left free of development and converted to open greenspace. This would allow the conveyance and storing of surface water and would provide amenity 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.

23 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S215

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

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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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Contents

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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 19S215. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the 'Central Lancashire Level 1 SFRA' and read the 'Central Lancashire Level 2 SFRA Main Report' and is therefore familiar with the terminology used in this report.

43.1 Site 19S215

- Location: South of Factory Lane and East of the West Coast Main Line, PR1 9TE
- Existing site use: Mixed use (open green space and housing)
- Existing site use vulnerability: More vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 2.6 hectares
- Proposed development impermeable area: 2.2 hectares (assumed 85% impermeable area)
- EA model: Penwortham Lane 2006
- Watercourse: Penwortham Lane watercourse
- 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

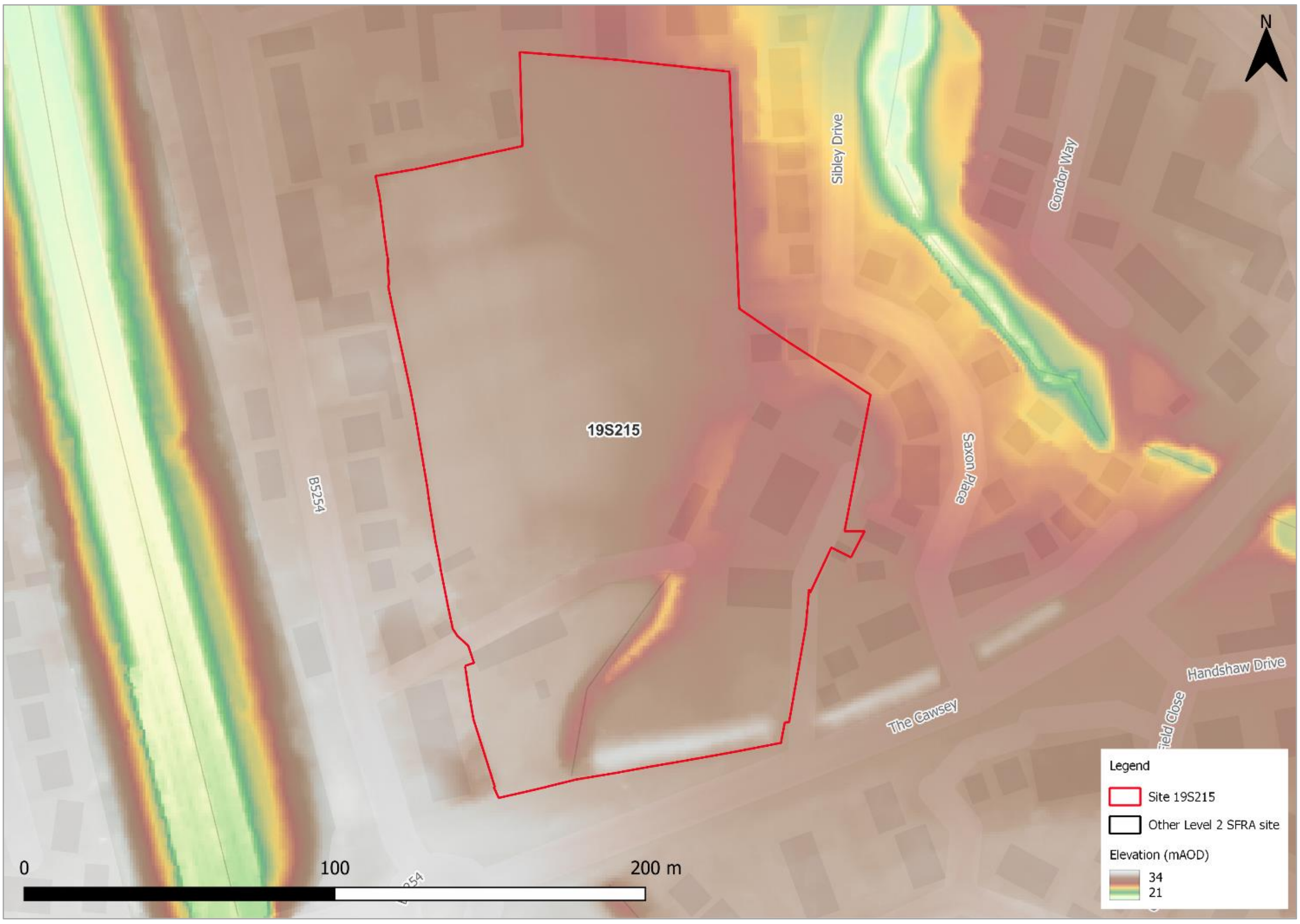

Figure 43-2: Topography

44 Flood risk from rivers

44.1 Existing risk

44.1.1 Flood Map for Planning and functional floodplain

Based on the 2006 Penwortham Lane modelled flood outlines, the EA's Flood Map for Planning and Flood Zone 3b (functional floodplain) as updated in the Central Lancashire Level 1 SFRA, the percentage areas of the site within each fluvial flood zone are stated in Table 2-1 and can be viewed on Figure 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0).

The site is located wholly within Flood Zone 1 indicating it is at low risk of flooding from rivers. However, there appears to be a ditch within the south site, as identified in the OS mapping and picked up in LiDAR imagery (Figure 43-2). This ditch should be investigated further at the Flood Risk Assessment (FRA) stage.

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 19S215 is located within one catchment, namely; Coastal Catchment 175. This is ranked as a low sensitivity catchment. Planning policy considerations for sites at low sensitivity to the cumulative impacts of development that apply to this site 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. Within the eastern side of the site, there are opportunities for wider catchment and riparian tree planting to reduce runoff downstream. Upstream of the site, alongside the Penwortham Lane watercourse, 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 44-2.

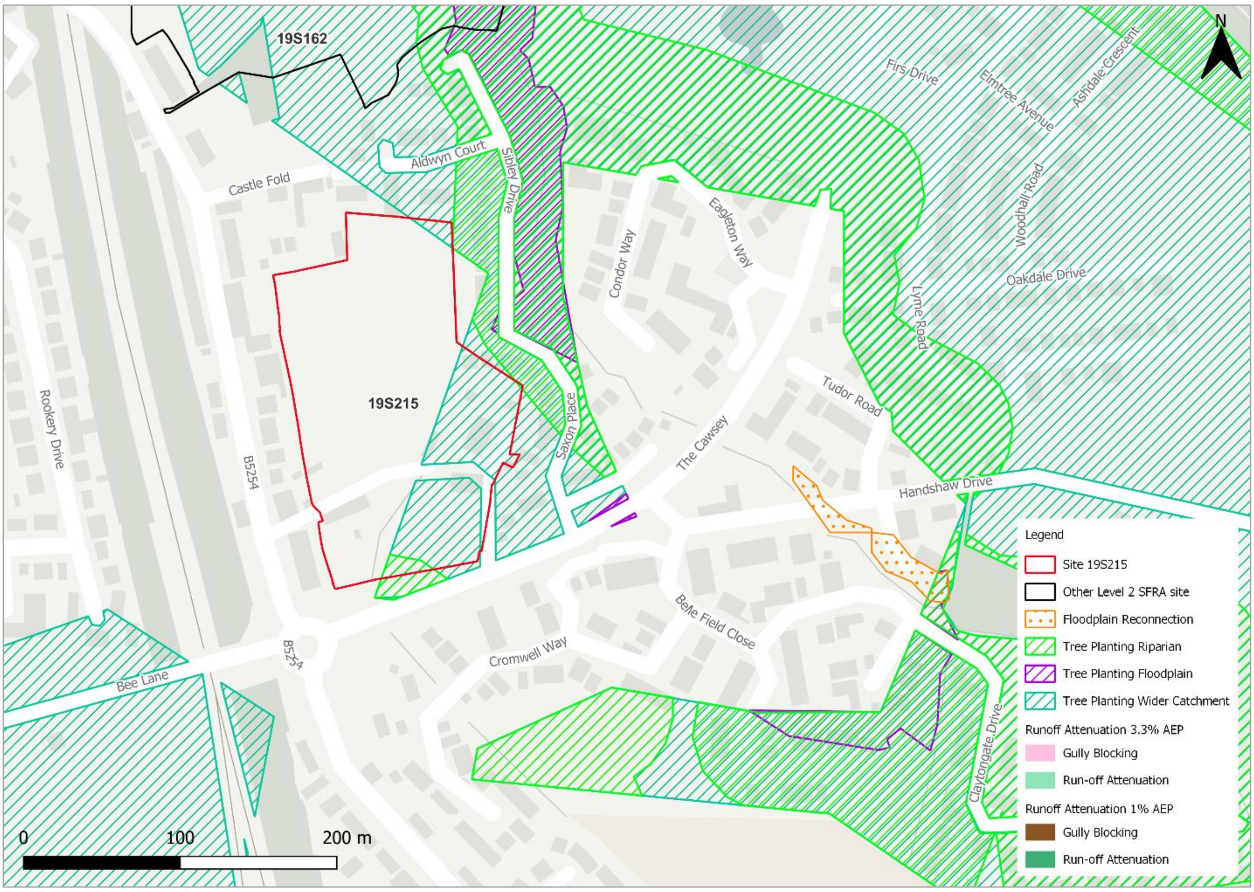

Figure 44-2: Natural Flood Management (NFM) potential mapping

44.3 Residual risk

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

There is potential residual risk to the site from a possible blockage of the unnamed ditch within the site which is culverted beneath The Cawsey (Figure 44-3). The impact of a blockage of this structure has not been modelled as part of this Level 2 SFRA, as there is no existing flood model for the watercourse. It is recommended that the site-specific FRA considers the impact of a blockage of this culvert on residual flood risk to the site.

Figure 44-3: Potential culvert blockage location

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. 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

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

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

Safe access and escape routes should be achievable via the unnamed road off the B5254 to the west of the site, Old Lane Farm Barn to the east of the site and the Cawsey to the south of the site.

44.6 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 within Flood Zone 1.
- Risk from the onsite ditch should be quantified at the FRA stage.

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 flood risk to the site is predominantly very low. Approximately 2% of the site is within the high risk surface water zone. A further 1% is at medium surface water risk and a further 1% is at low surface water risk as shown in Table 45-1.

In the high risk event, surface water risk is confined to the southern half of the site, within and adjacent to the ditch. In the medium and low risk events ponding increases slightly in area and depth. Greatest flood depths in the medium risk event are >1.2 m (Figure 3-1) with some areas of significant hazard (Figure 45-2). In all events, safe access and escape should be achievable via the unnamed road off the B5254 to the west of the site, Old Lane Farm Barn to the east of the site and the Cawsey to the south of the site, travelling westwards.

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

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
96%	1%	1%	2%

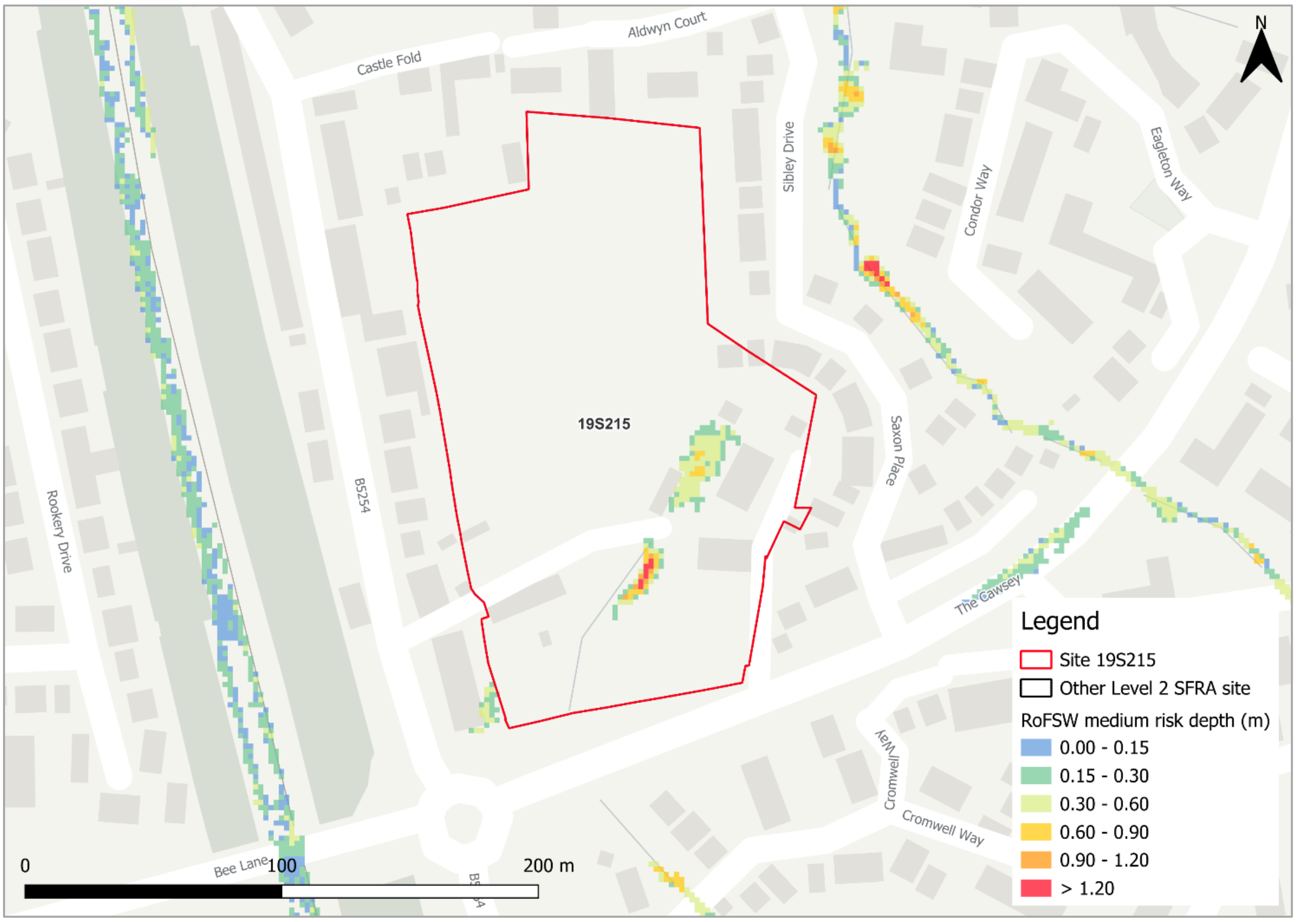

Figure 45-1: Medium risk event surface water flood depths (Risk of Flooding from Surface

Water map)

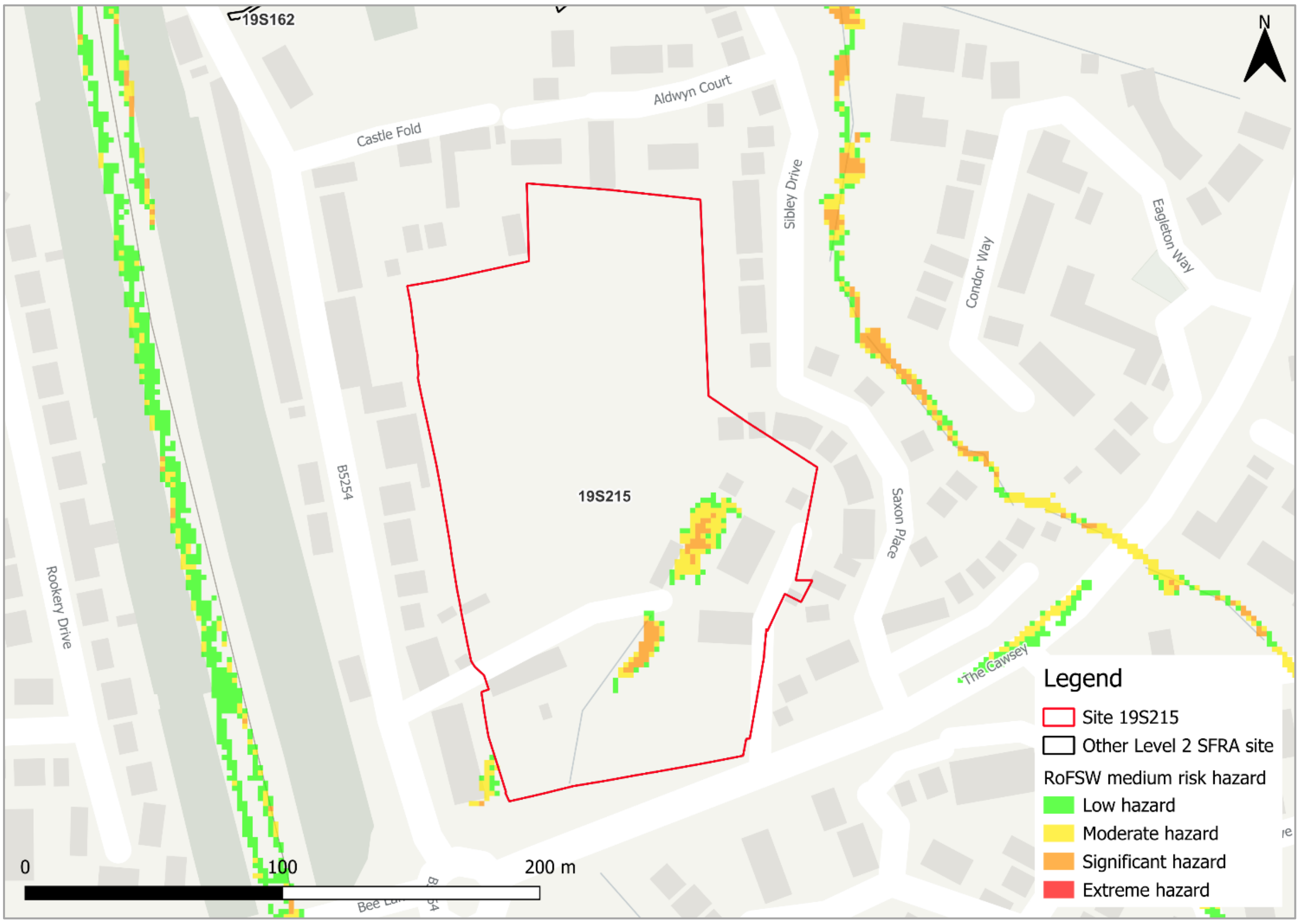

Figure 45-2: Medium risk event surface water flood hazard[24] (Risk of Flooding from Surface Water map)

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 flood depths during the medium risk surface water flood event plus an allowance for climate change. The areas of ponding in the south of the site expand slightly

24 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

in area and depth. There is also a new small area of ponding along the western site boundary. Maximum flood depths remain >1.2 m and flood hazard remains significant (Figure 3-4). A surface water flow path also forms to the east of the site along The Cawsey with a flood hazard rating of low to significant. Risk is clearly constrained by the current buildings onsite.

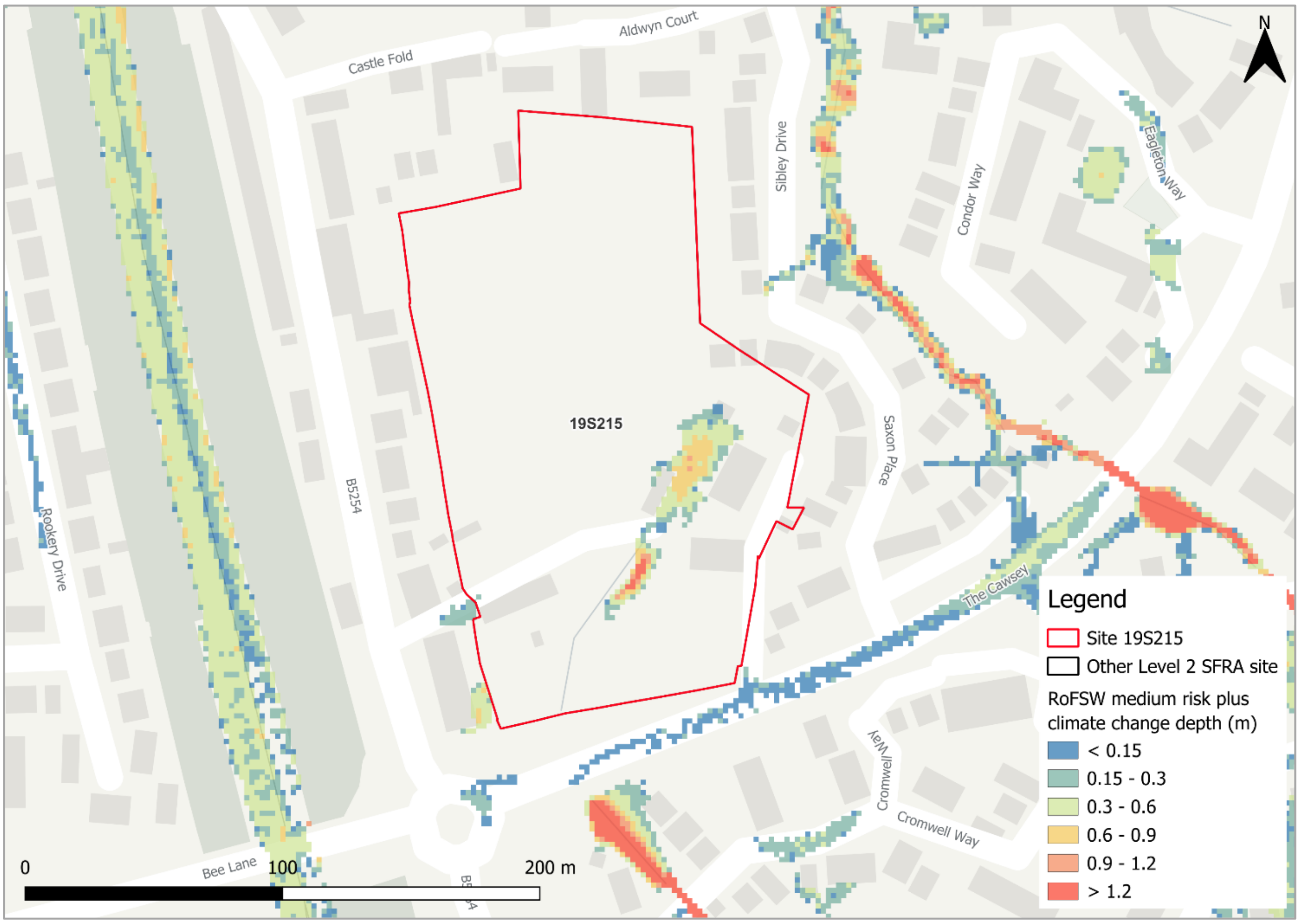

Figure 45-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

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 only 2% of the site being at high, 1% at medium and 1% at low surface water flood risk. Surface water risk in the high risk event is confined to the southern half of the site, within and adjacent to the ditch. In the medium and low risk events existing ponding expands.
- The medium risk event plus climate change modelling shows risk a new area of ponding along the western boundary and flow path along The Cawsey, east of the site. Safe access and escape routes should be achievable via the B5254, west of the site in alle events.
- The Groundwater Flood 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.
- 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.
- 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.

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[25]. Figure 4-1 show the map for Site 19S215 and the surrounding areas and

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

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 46-1: JBA 5m Groundwater Flood Map

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?

To pass part b) of the exception test[26], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development, taking account of the vulnerability of its users, without increasing risk elsewhere, and, where possible, will reduce flood risk overall.

- The site is not required to pass the exception test as it is located wholly within Flood Zone 1.

47.2 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 for this site to be allocated, given the low fluvial and predominantly very low surface water flood risk to the site.
- Modelling of the ditch through the site should be undertaken through a site-specific FRA, including for climate change.
- The impact of a blockage of the culvert beneath The Cawsey on residual flood risk to the site should be considered.
- A detailed drainage strategy will be required including investigation into the use of infiltration SuDS.
- Opportunities for NFM features to reduce flood risk to the site and surrounding areas should be explored at the site-specific FRA stage.
- 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 19S221/039/304

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

www.jbaconsulting.com

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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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49 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19S221/039/304. 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.

49.1 Site 19S221/039/304

- Location: Land at End of Northern Avenue
- Existing site use: Greenfield, several residential units
- Existing site use vulnerability: More vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 3.49 hectares
- Proposed development impermeable area: 2.97 hectares (assumed 85% impermeable area)
- Watercourse: Unnamed tributary of River Douglas (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 modelled fluvial flood depths and hazards
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

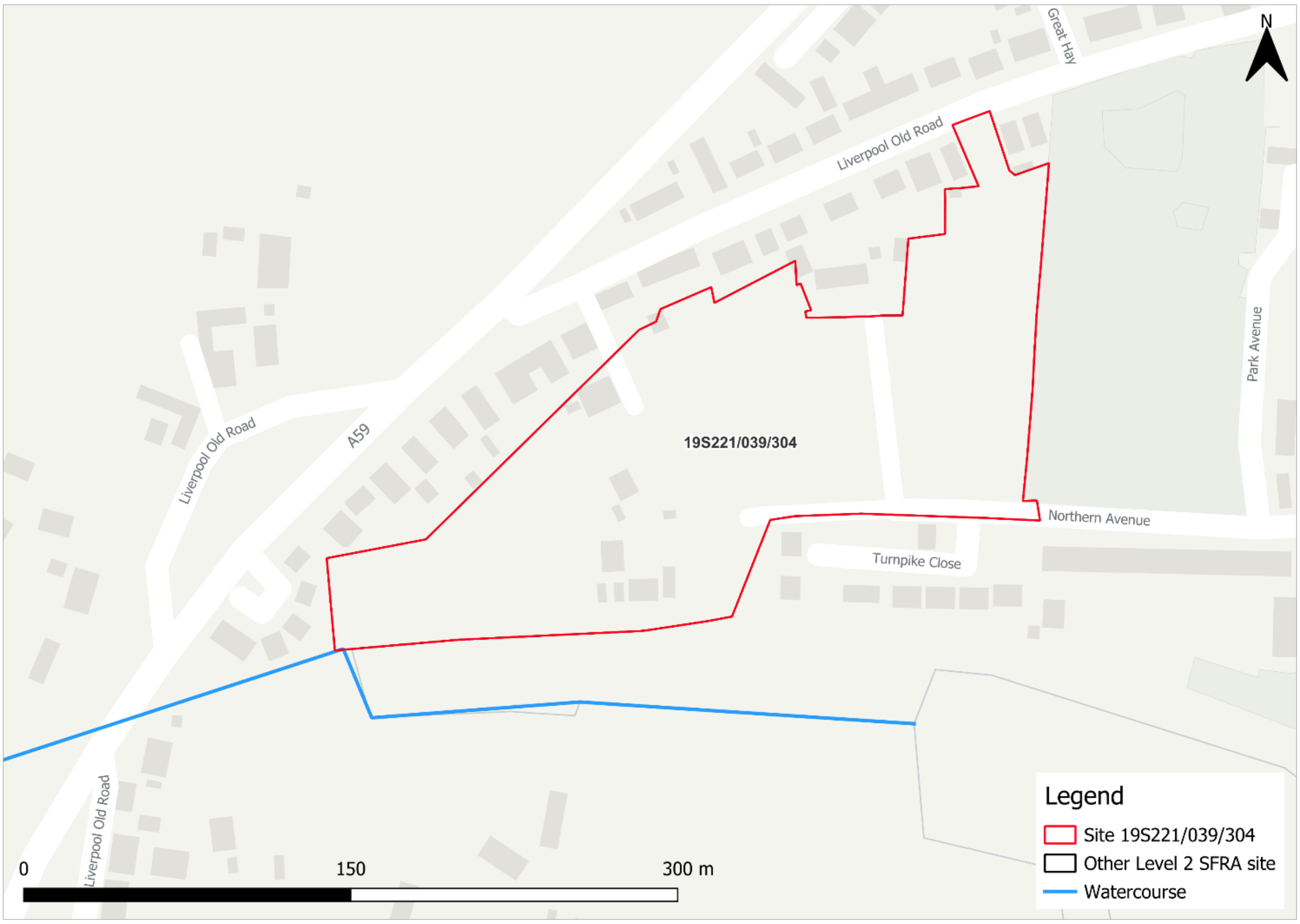

Figure 49-1: Existing site location boundary

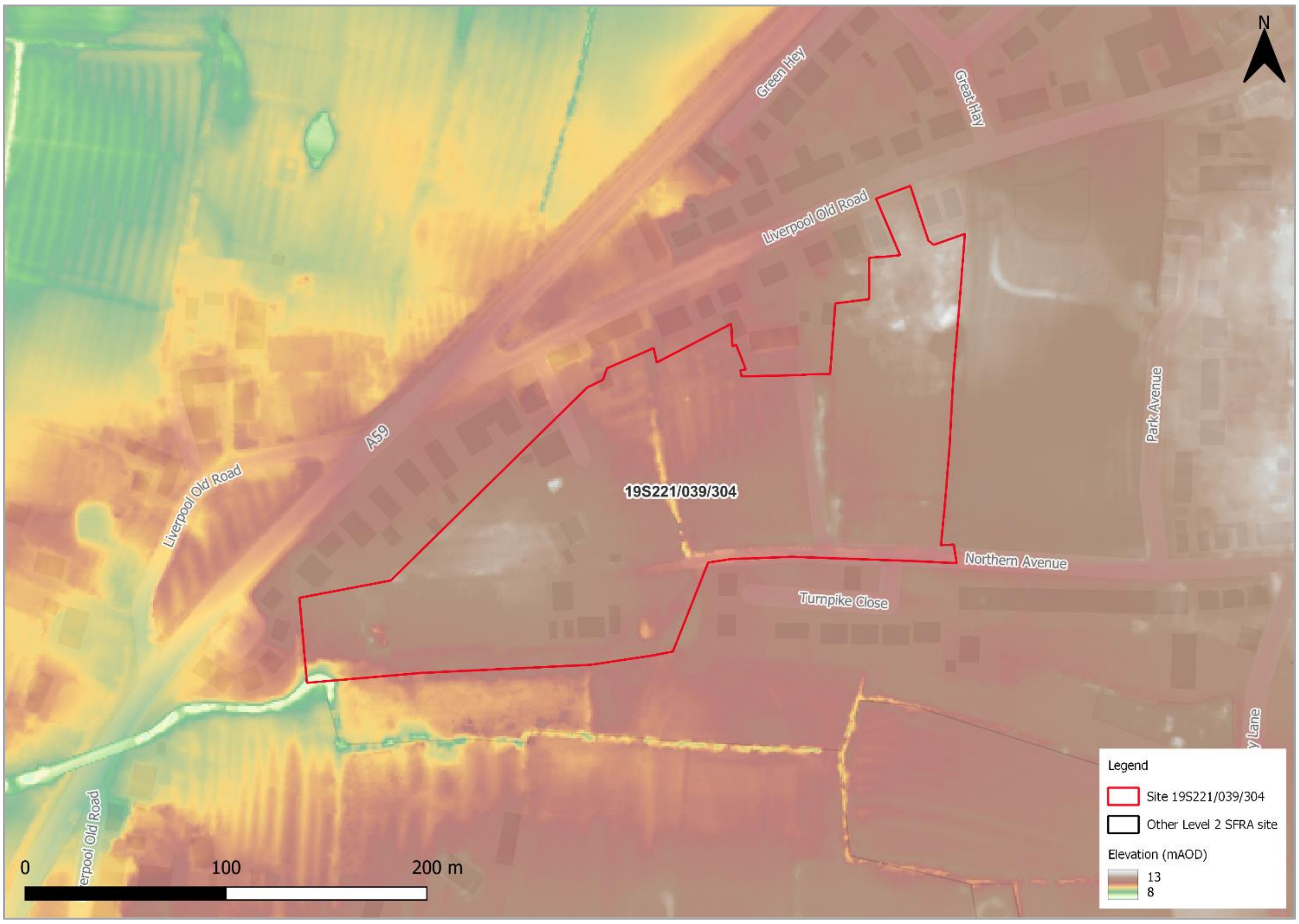

Figure 49-2: Topography

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 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) or the impacts of climate change (Section 50.2).

The majority of the site is located within Flood Zone 1. There is a very small area of the site on the southern corner boundary that is within the functional floodplain of the unnamed watercourse. However, this is conservatively based on an 8m buffer of the OS Open Rivers dataset.

Table 50-1: Existing fluvial flood risk

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

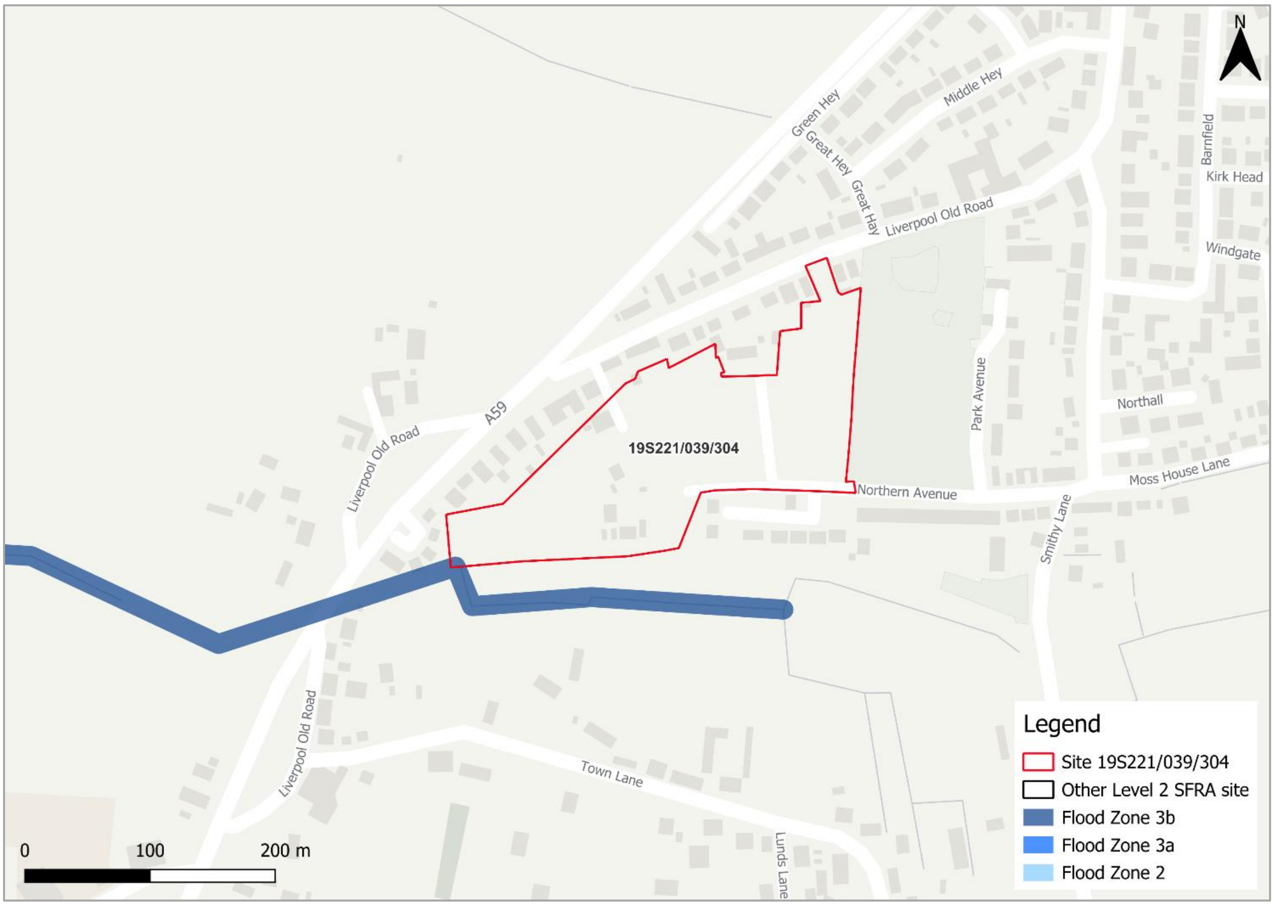

Figure 50-1: Existing risk from rivers to the site

50.2 Impacts from climate change

The impacts of climate change on flood risk from the unnamed tributary of the River Douglas have not been modelled for this SFRA due to the unavailability of modelling for this watercourse.

The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to robustly inform on flood risk to the site. Therefore, any updates to this Level 2 SFRA and/or any FRA should produce a model of the unnamed watercourse and include for the most up to date climate change allowances.

50.3 Flood risk management

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

50.3.1 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 19S221/039/304 is located within one catchment, namely; Coastal Catchment 175. This is ranked as a low sensitivity catchment. Planning policy considerations for all sites that apply to this site include:

- Developments should seek betterment of existing flood risks both within the site and in surrounding areas. As a minimum, developments must meet national and local standards for Flood Risk Assessments and Surface Water Drainage Strategies. By looking at flood risks beyond the site boundary, developers should be encouraged to implement sustainable solutions which manage flood risk.
- In urban and suburban locations, SuDS should be integrated into the site design, to manage the existing surface water flow paths on the site and to help mitigate the flood risks to downstream communities.
- Any development within the fluvial floodplain (i.e. Flood Zones 3b, 3a and 2) should provide suitable flood compensation storage, in consultation with the Environment Agency, to avoid a net loss in floodplain storage.

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

50.3.2 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 riparian tree planting, which can slow flows, reduce sediment delivery to the watercourse and reduce bankside erosion. The site is also identified to have potential for wider catchment tree planting, which can intercept, slow, store and filter water. These areas are shown in Figure 50-2. However, the WwNP dataset is indicative and further investigation into suitability of the site for tree planting should be carried out.

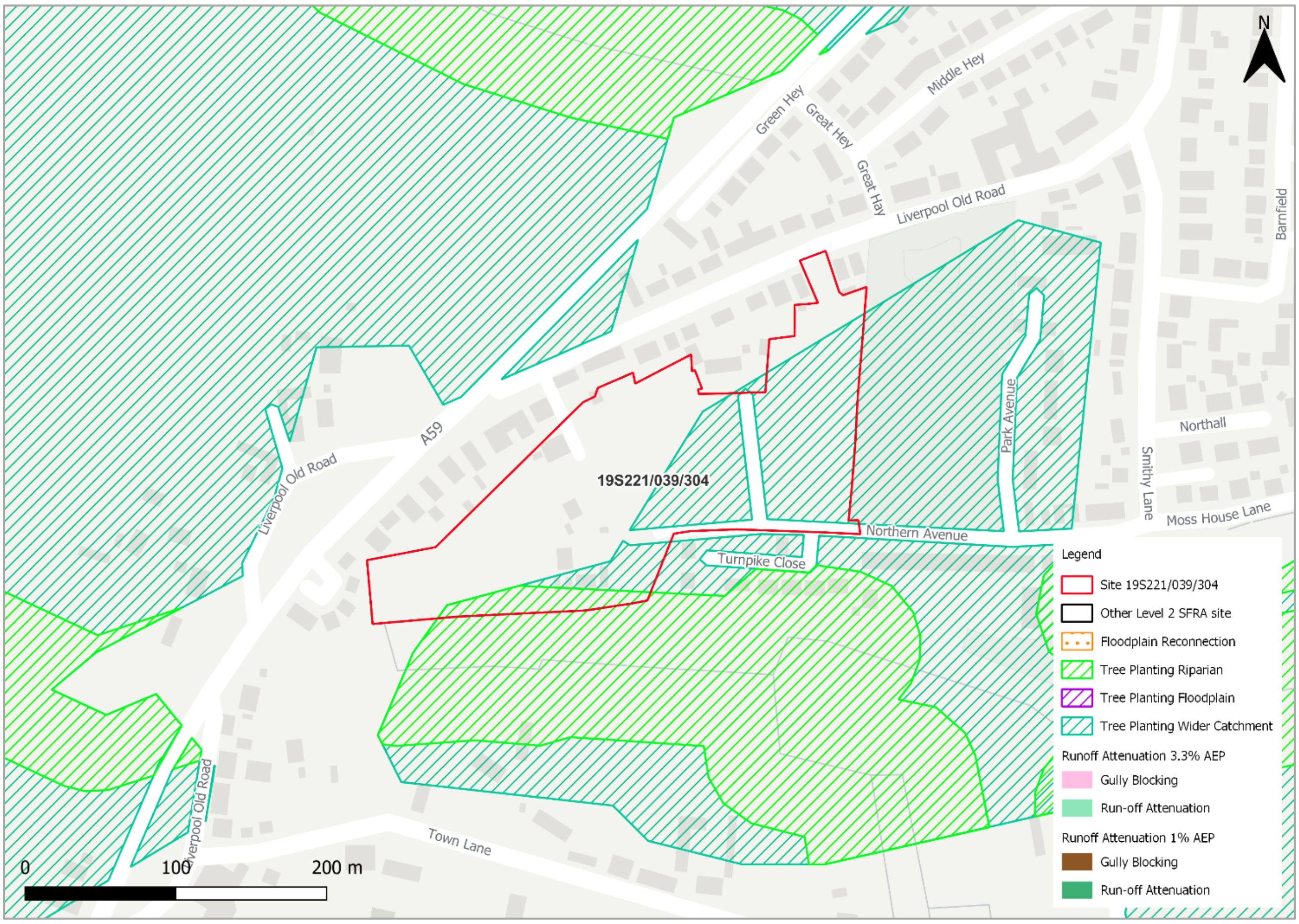

Figure 50-2: Natural Flood Management (NFM) potential mapping

50.4 Residual risk

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

There is potential residual risk to the site from possible blockage of the unnamed watercourse which is culverted beneath the A59, downstream of the site (Figure 50-3). The impact of culvert blockage has not been modelled as part of this Level 2 SFRA, due to the absence of a flood model for the watercourse. 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.

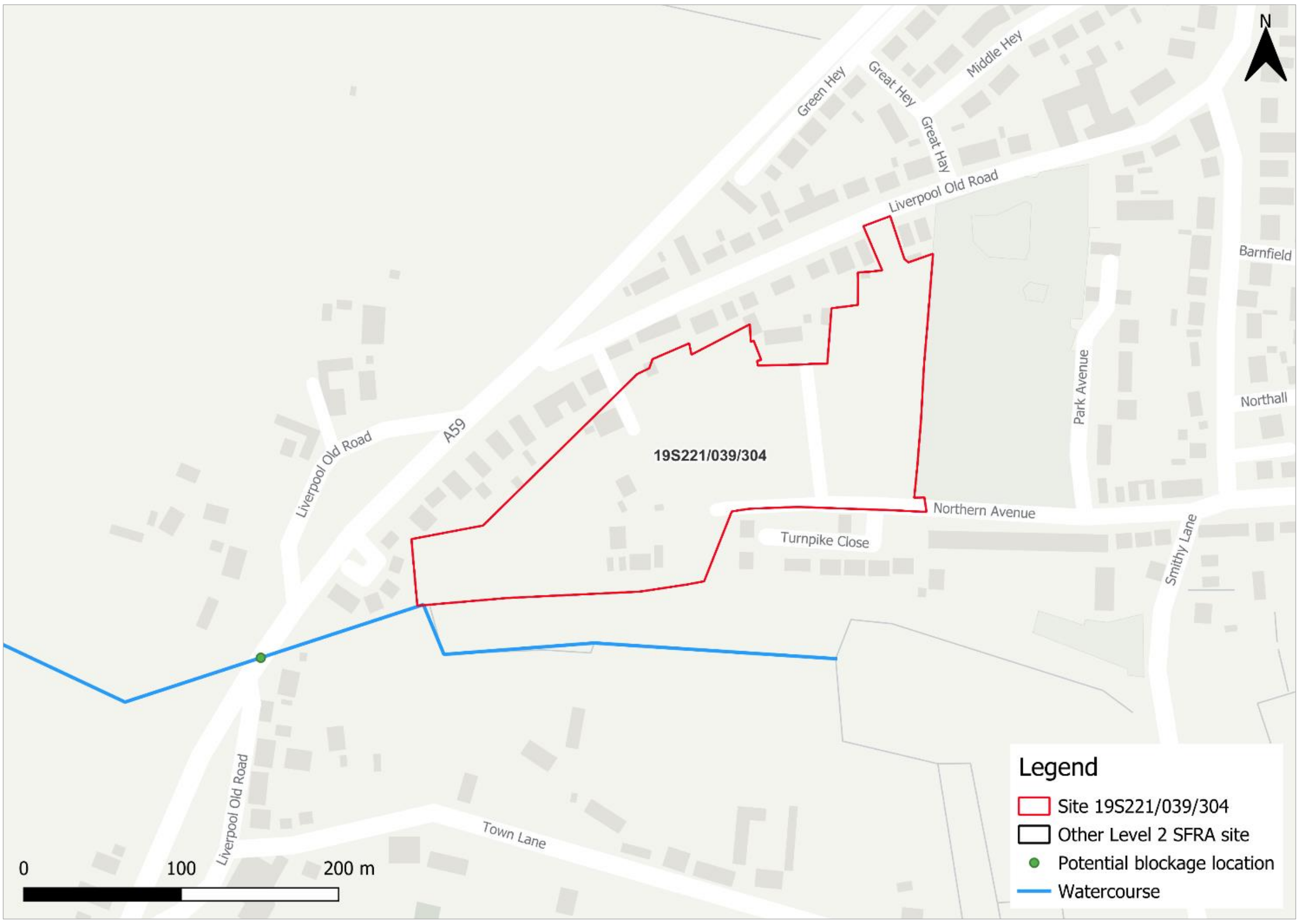

Figure 50-3: Potential blockage locations

50.4.1 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 of reservoir flooding.

50.5 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.

50.6 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 19S221/039/304 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 also not located within a FAA.

Based on available information, safe access and escape routes should be achievable via multiple locations around the site.

50.7 Observations, mitigation options and site suitability - fluvial

- The unnamed watercourse is unmodelled and 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 from this watercourse 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 could be included in site design through a blue / green corridor.
- There could be residual risk from possible blockage of the culvert downstream of the site. It is recommended that the site-specific FRA considers the impact of blockage of this culvert on residual flood risk to the site.
- Safe access and escape routes should be achievable via multiple locations around the site, based on available information.

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 flood risk within the site is predominantly very low. Approximately 2% of the site is within the high risk surface water zone. A further 1% is at medium risk and 3% is at low surface water flood risk, as shown in Table 51-1.

In the high risk event, surface water risk is mostly confined to the road of Northern Avenue along the southeastern edge of the site.

Greatest flood depths in the medium risk event are between 0.9 and 1.2m (Figure 3-1) with some areas of significant hazard (Figure 3-2). Safe access and escape routes should be achievable travelling southwest via Liverpool Old Road to the north of the site in all events, given the shallow depths of flooding to the road.

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

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
94	3	1	2

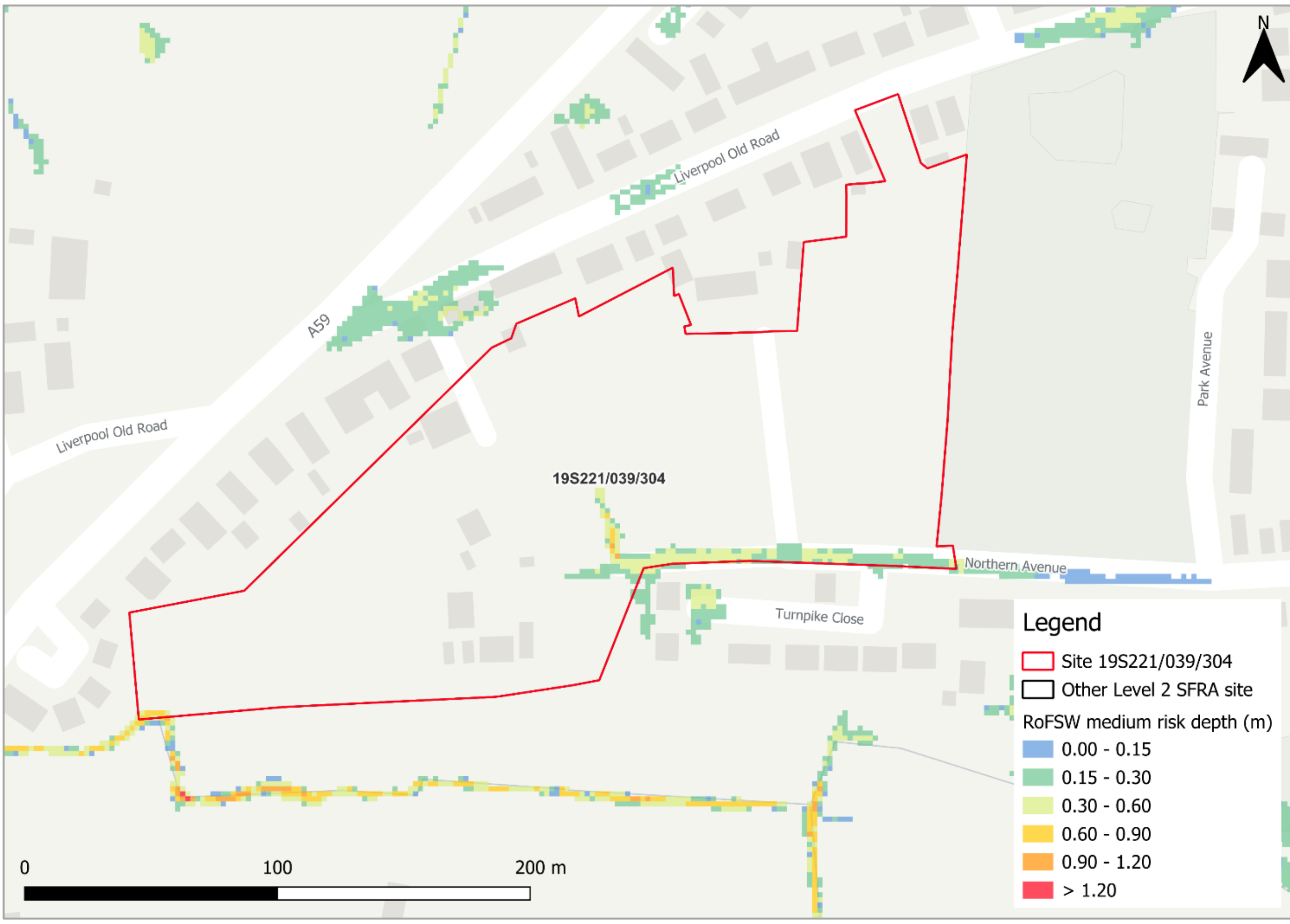

Figure 51-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

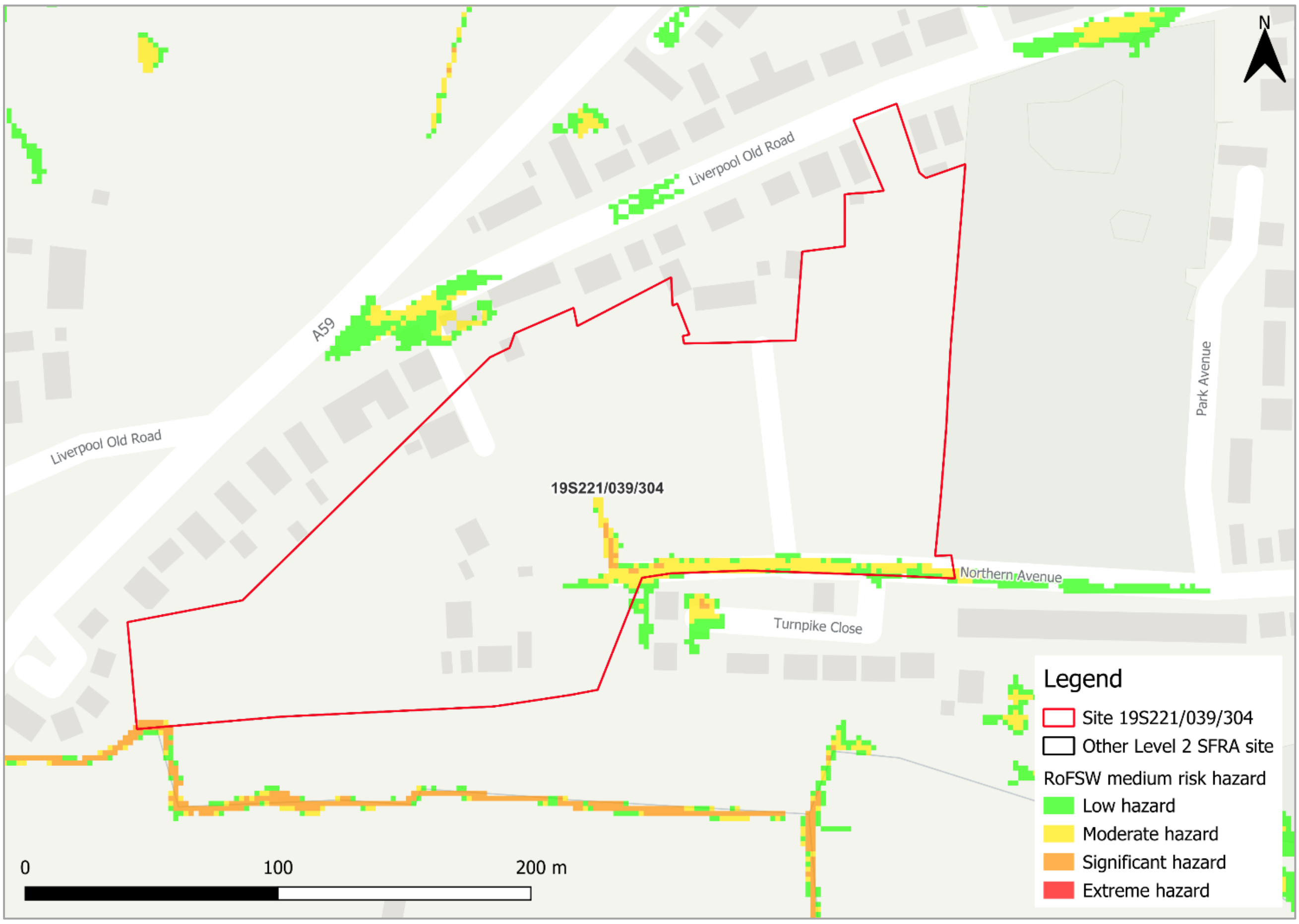

Figure 51-2: Medium risk event surface water flood hazard[27] (Risk of Flooding from Surface Water map)

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 flood depths during the medium risk surface water event plus a 45% allowance for climate change. Additional areas of ponding form within the site, along the northern and eastern site boundaries. The maximum depth of flooding on Northern Avenue

27 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 modelled to remain between 0.9 and 1.2m with maximum flood hazard onsite remaining significant (Figure 3-4). Flooding is modelled to increase on parts of Liverpool Old Road though flood hazard is largely low. Safe access and escape may be achievable travelling southwest via Liverpool Old Road to the north of the site.

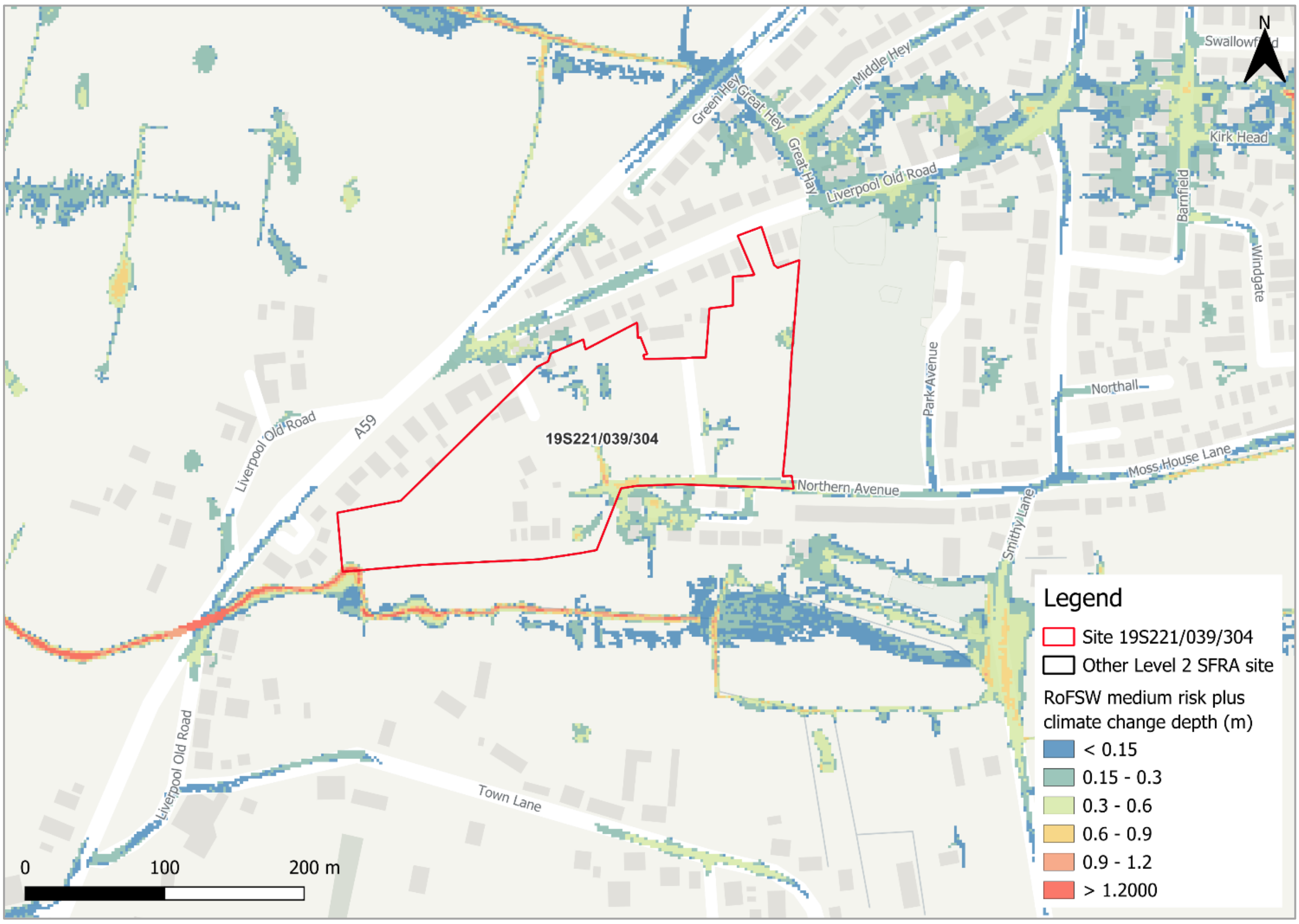

Figure 51-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

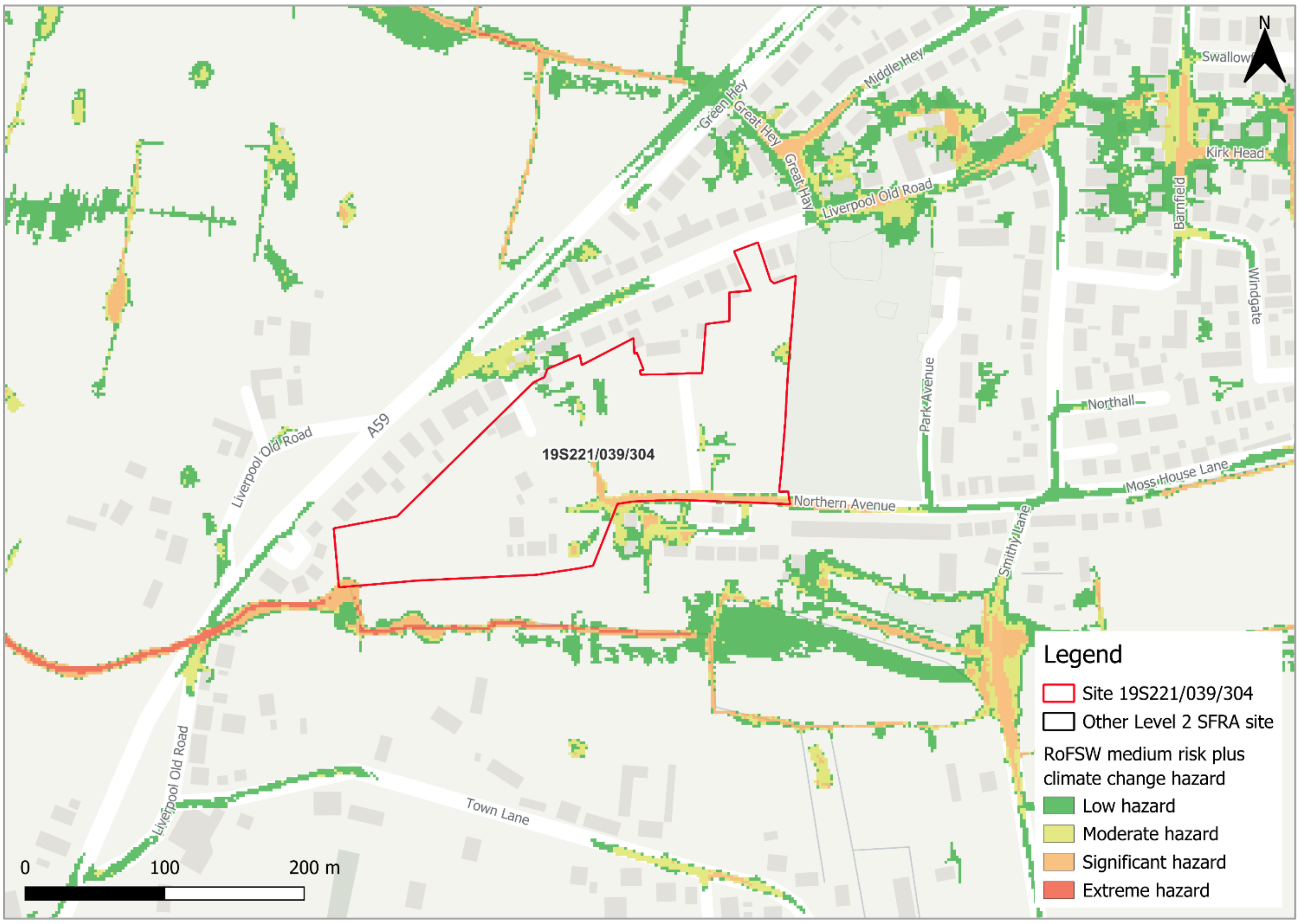

Figure 51-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

51.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with only 2% of the site being at high, 1% at medium and 3% at low surface water flood risk. Surface water risk in the high risk event is largely confined to Northern Avenue. In the medium risk event ponding slightly increases, in the low risk event additional areas of ponding form.
- The medium risk event plus climate change modelling shows increased ponding within the site in comparison to the present day medium risk event.
- 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.
- Were development plans 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.

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[28]. Figure 4-1 shows the map for Site 19S221/039/304 and the surrounding areas and Table 52-1 explains the risk classifications.

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

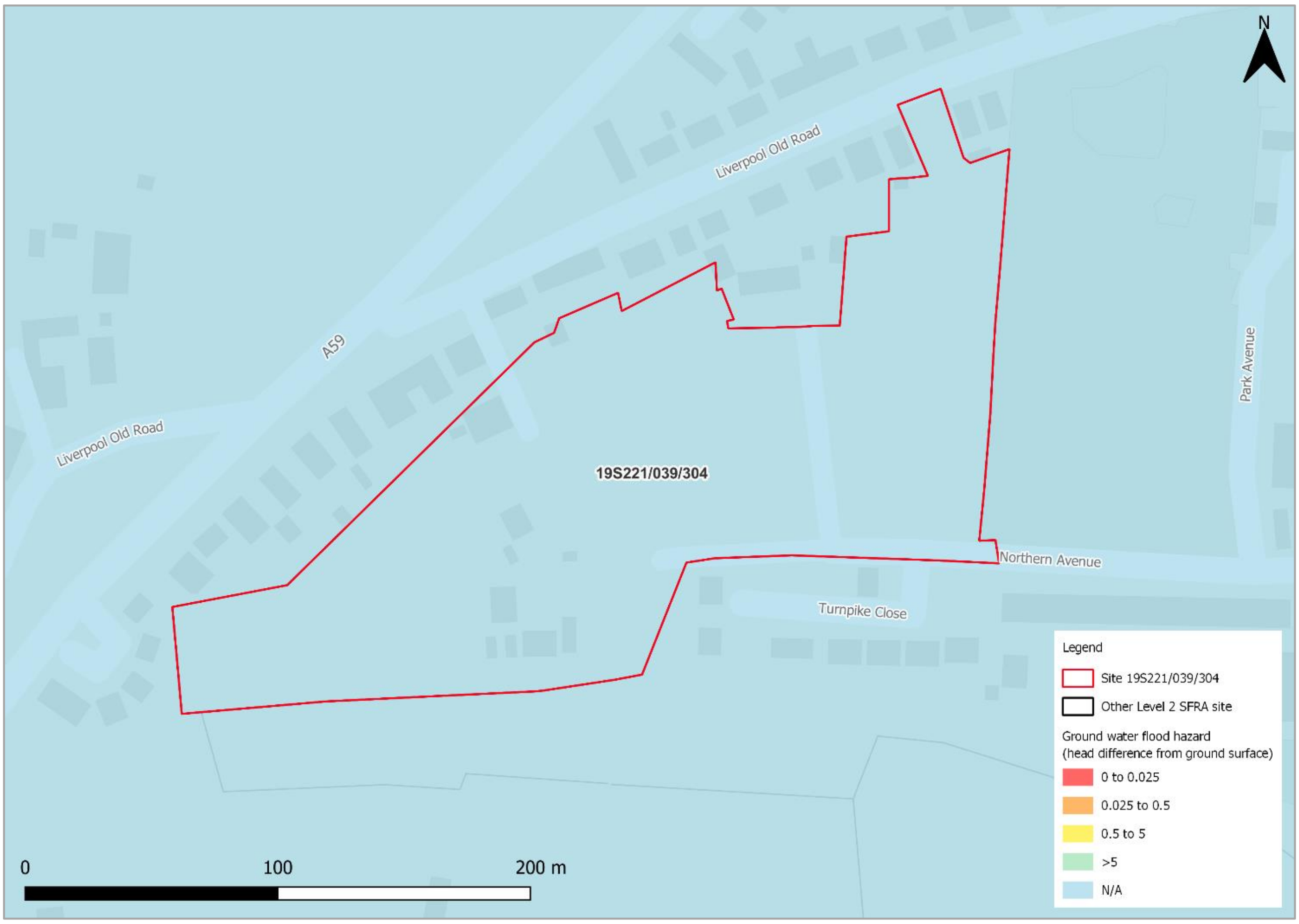

Figure 52-1: JBA 5m Groundwater Flood Map

28 [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[29], 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 the unmodelled watercourse 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.

53.2 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 inappropriate development within the functional floodplain. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Flood modelling for the present day and for the impacts of climate change of the unnamed watercourse should be carried out to ascertain the fluvial flood risk to the site. This should include for residual risk modelling of the offsite culvert.
- 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.
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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S122/331x

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

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Reviewed by	Mike Williamson BSc MSc CGeog FRGS EADA Principal Analyst
Authorised by	Krista Keating BSc MSc CEnv CSci MCIWEM C.WEM Associate Director

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55.1 Site 19S122/331x

- Location: Land at Liverpool Road
- Existing site use: Agricultural
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 5.7 hectares
- Proposed development impermeable area: 4.9 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 55-1: Existing site location boundary

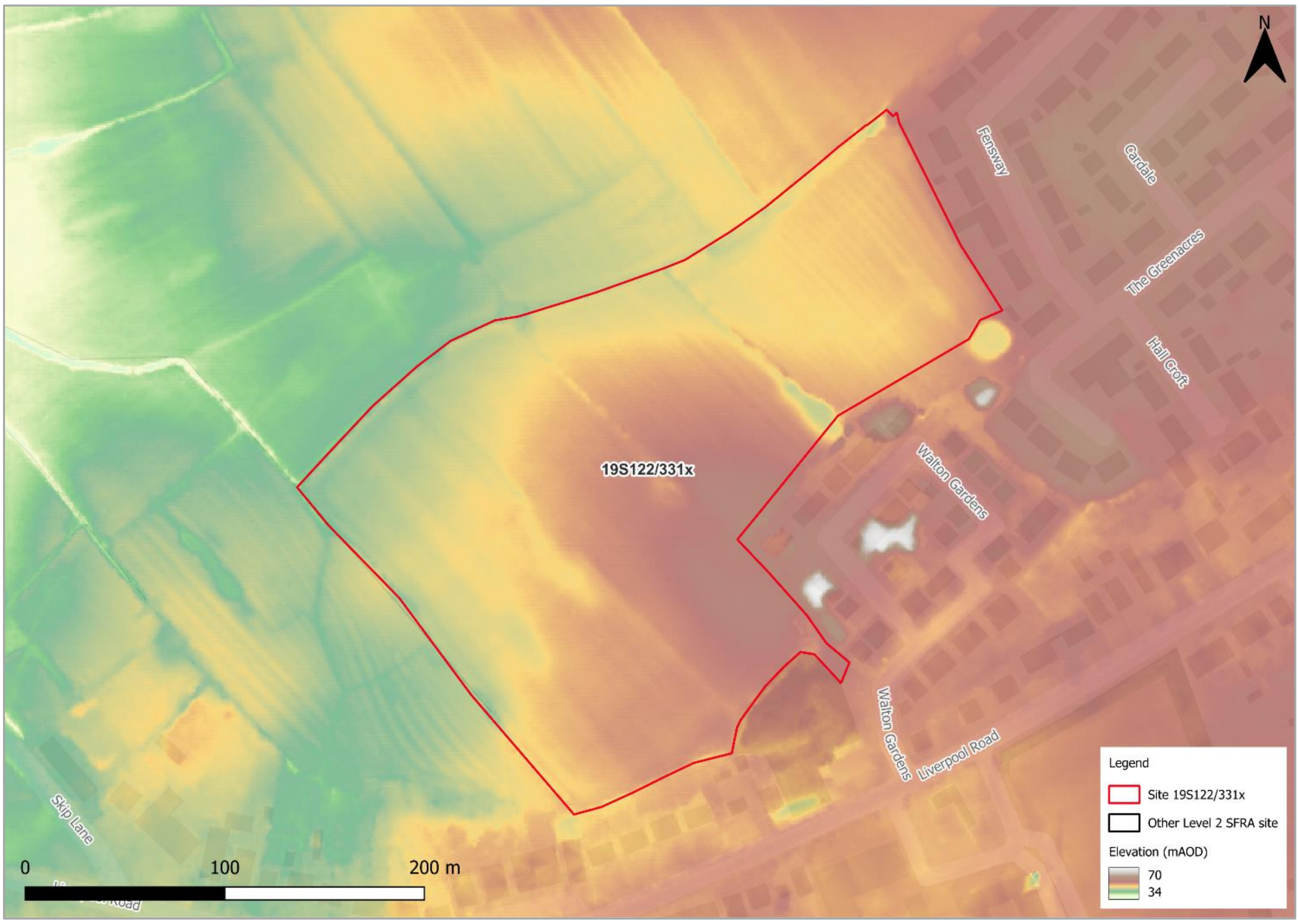

Figure 55-2: Topography

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, the percentage areas of the site within each fluvial flood zone are stated in Table 2-1 and can be viewed on Figure 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) or the impacts of climate change.

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

Mapping and LiDAR (Figure 55-2) appear to show a ditch running along the southwestern site boundary. Any FRA should consider the level of flood risk this poses to 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 doesn't 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 19S122/331x is located within one catchment, namely; Coastal Catchment 175. This is ranked as a low sensitivity catchment. Planning policy considerations for all developments are considered 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. Across the majority of the site there are significant opportunities for wider catchment tree planting to reduce runoff downstream. There is also potential for riparian tree planting in the west of the site, 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 56-2.

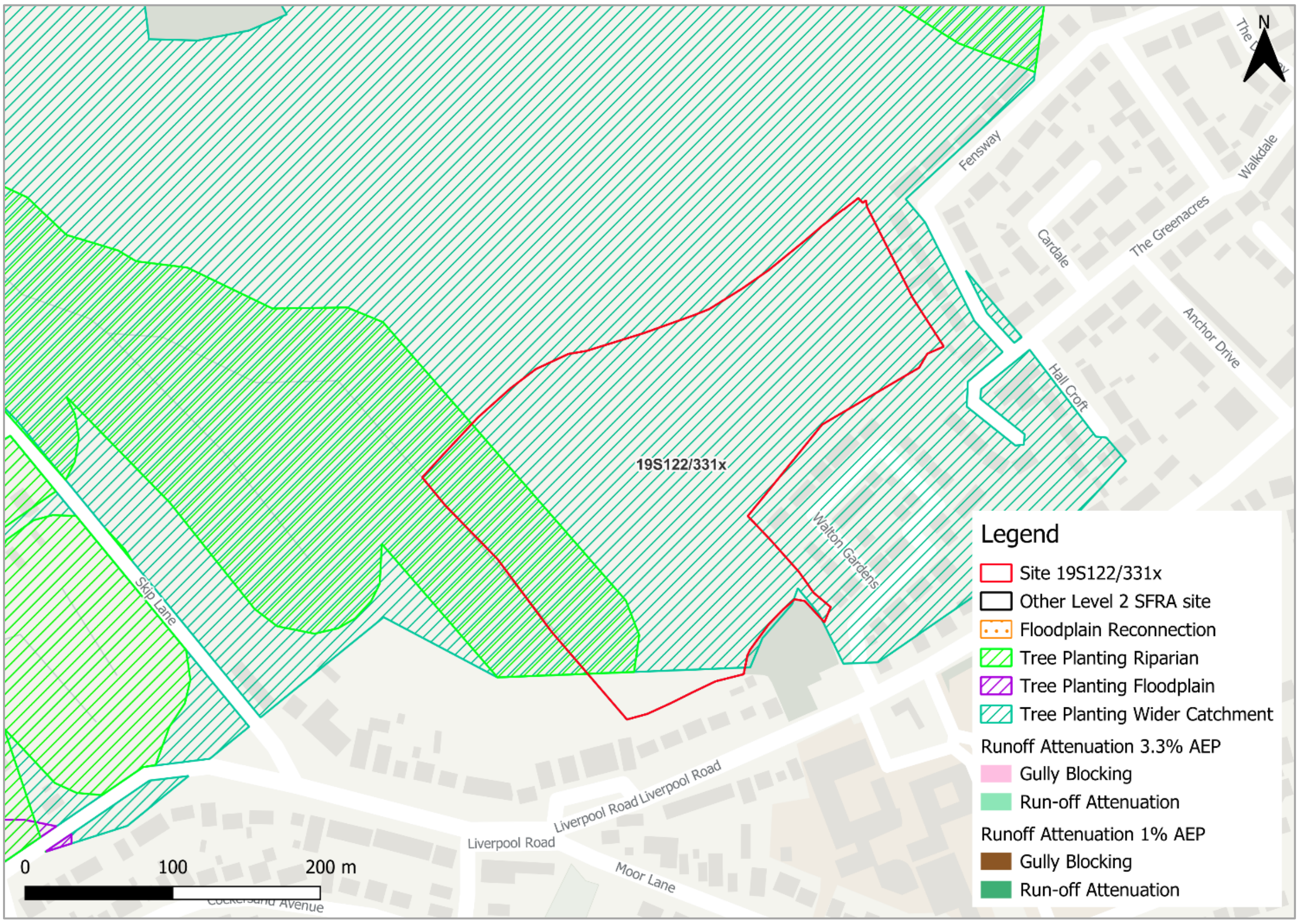

Figure 56-2: Natural Flood Management (NFM) potential mapping

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.

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

There are no Flood Warning Areas (FWA) or Flood Alert Areas (FAA) within the vicinity of the site.

Based on available information, safe access and escape routes should be achievable via Liverpool Road to the south of the site.

56.6 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).
- The site is 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. 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 3-1.

In the high and medium risk events, surface water risk is confined to surface water ponding within topographic low spots in the northeast of the site. In the low risk event, risk is greater with more scattered surface water ponding across the site and a flow path along the northwestern boundary of the site. A small flow path also forms through the eastern part of the site.

Greatest surface water flood depths in the low risk event are between 0.6 and 0.9m (Figure 57-1) with some areas of significant hazard (Figure 57-2). Safe access and escape routes should be possible via Liverpool Road during all events, given the low flood depths on the road.

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

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

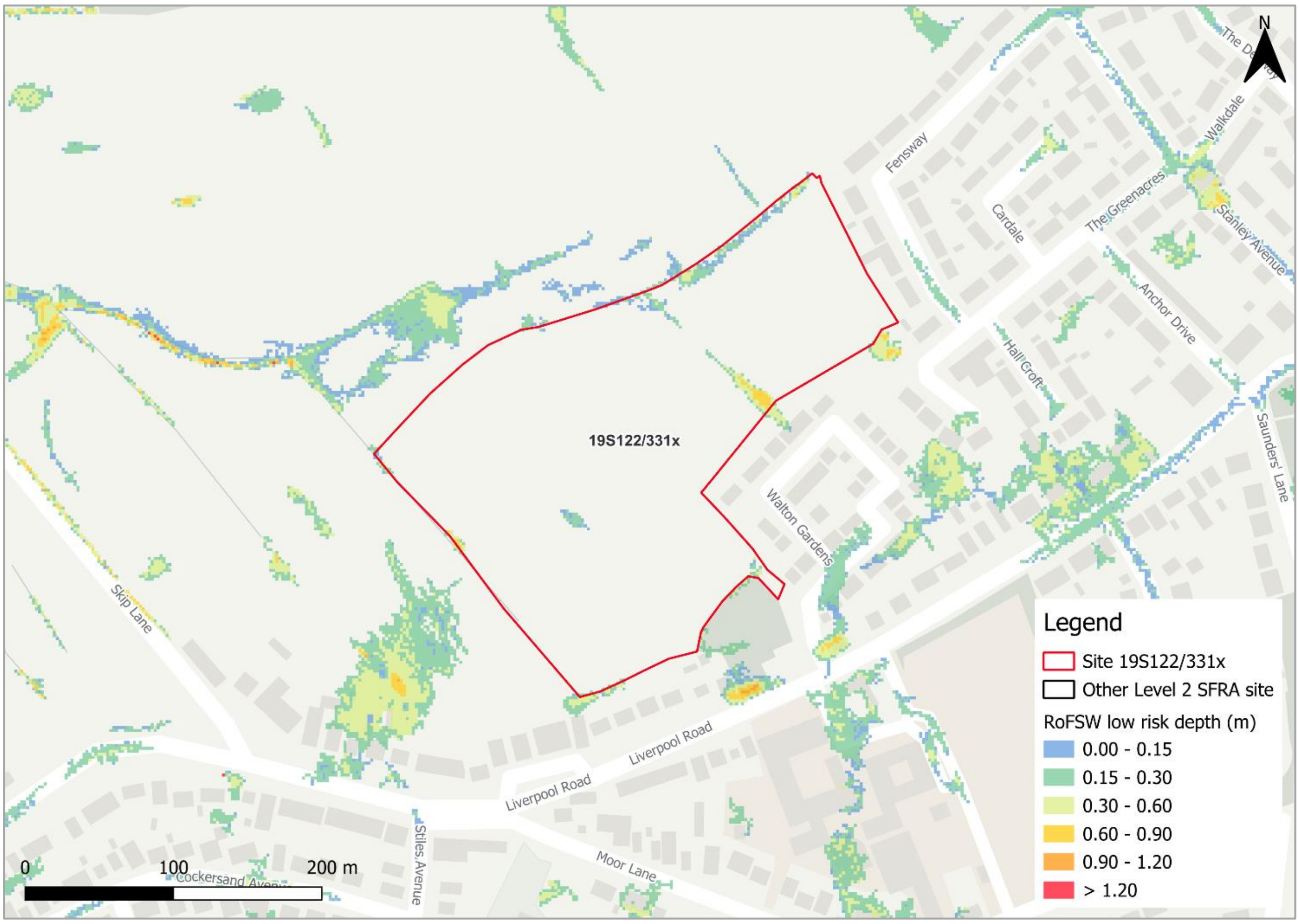

Figure 57-1: Low risk event surface water flood depths (Risk of Flooding from Surface Water map)

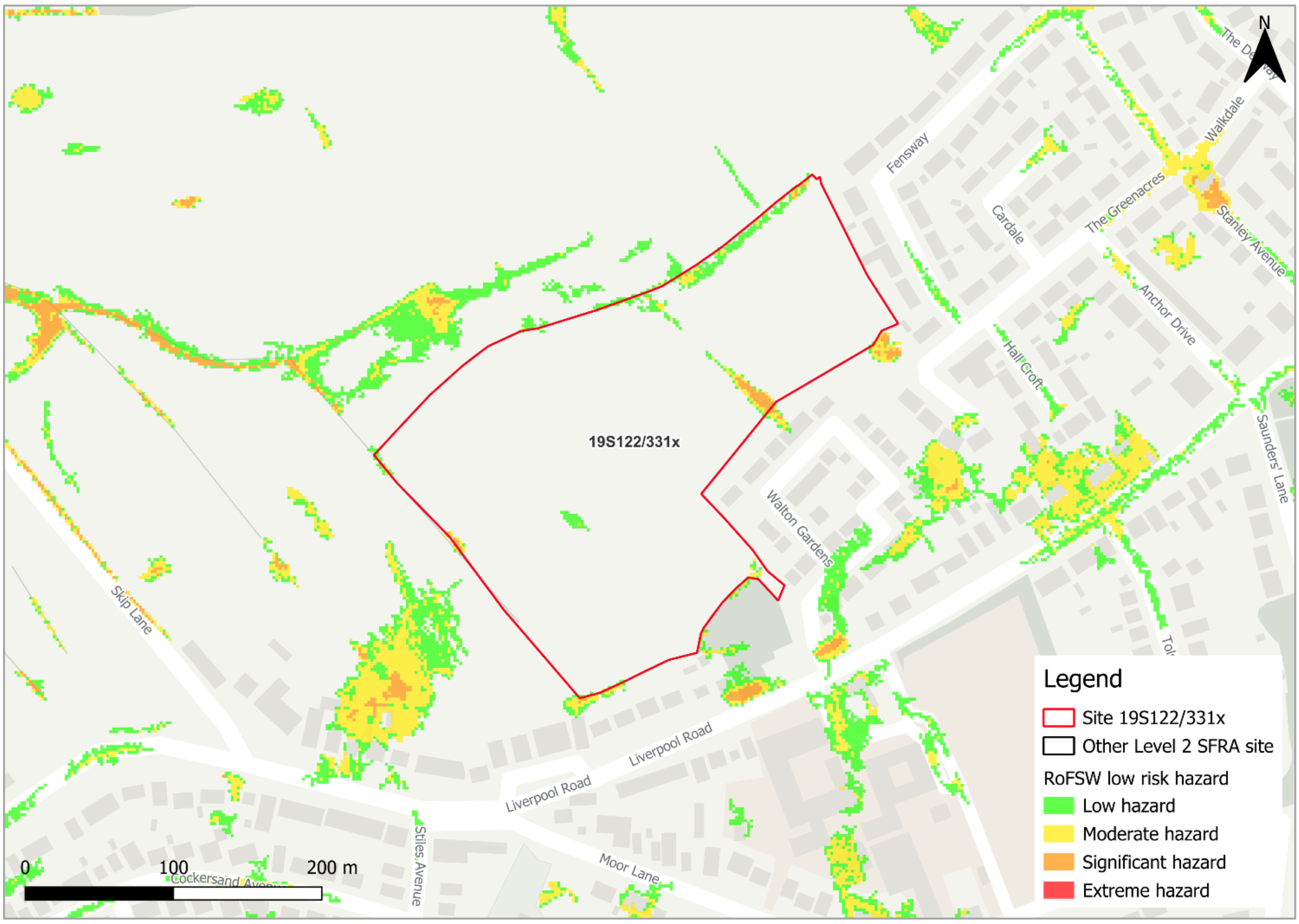

Figure 57-2: Low risk event surface water flood hazard[30] (Risk of Flooding from Surface Water map)

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 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 57-3 shows the medium risk surface water flood depths plus 45% climate change. Risk is modelled to be slightly greater than the present day low risk surface water flood event with flow paths at the northern and western boundaries of the of the site slightly

30 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

increasing in length and further scattered ponding forming at the centre of the site, both constrained within topographic low spots. Maximum flood depths are modelled to be between 0.6 and 0.9 m, with some areas of significant hazard (Figure 57-4). Safe access and escape routes should remain possible via Liverpool Road.

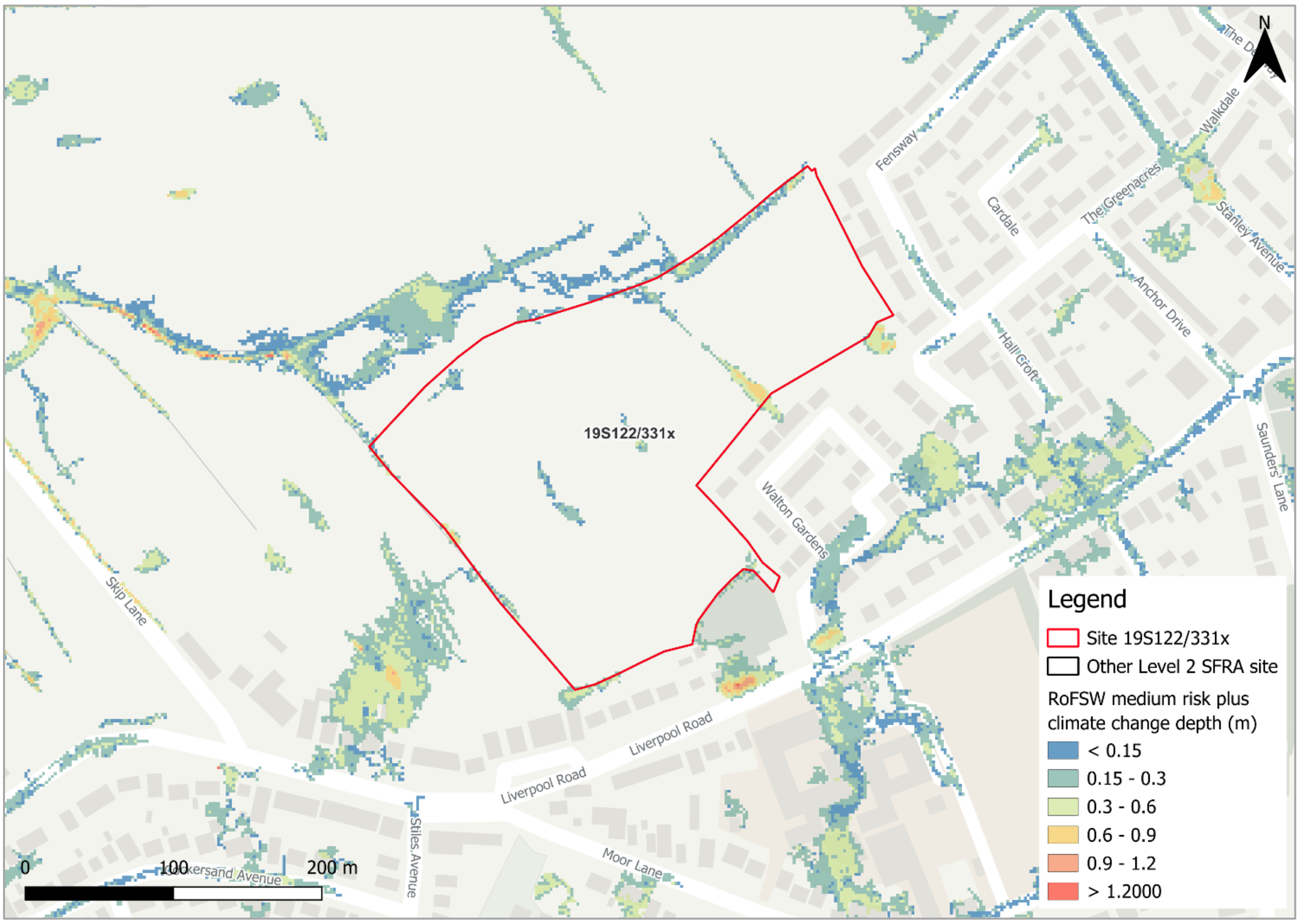

Figure 57-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

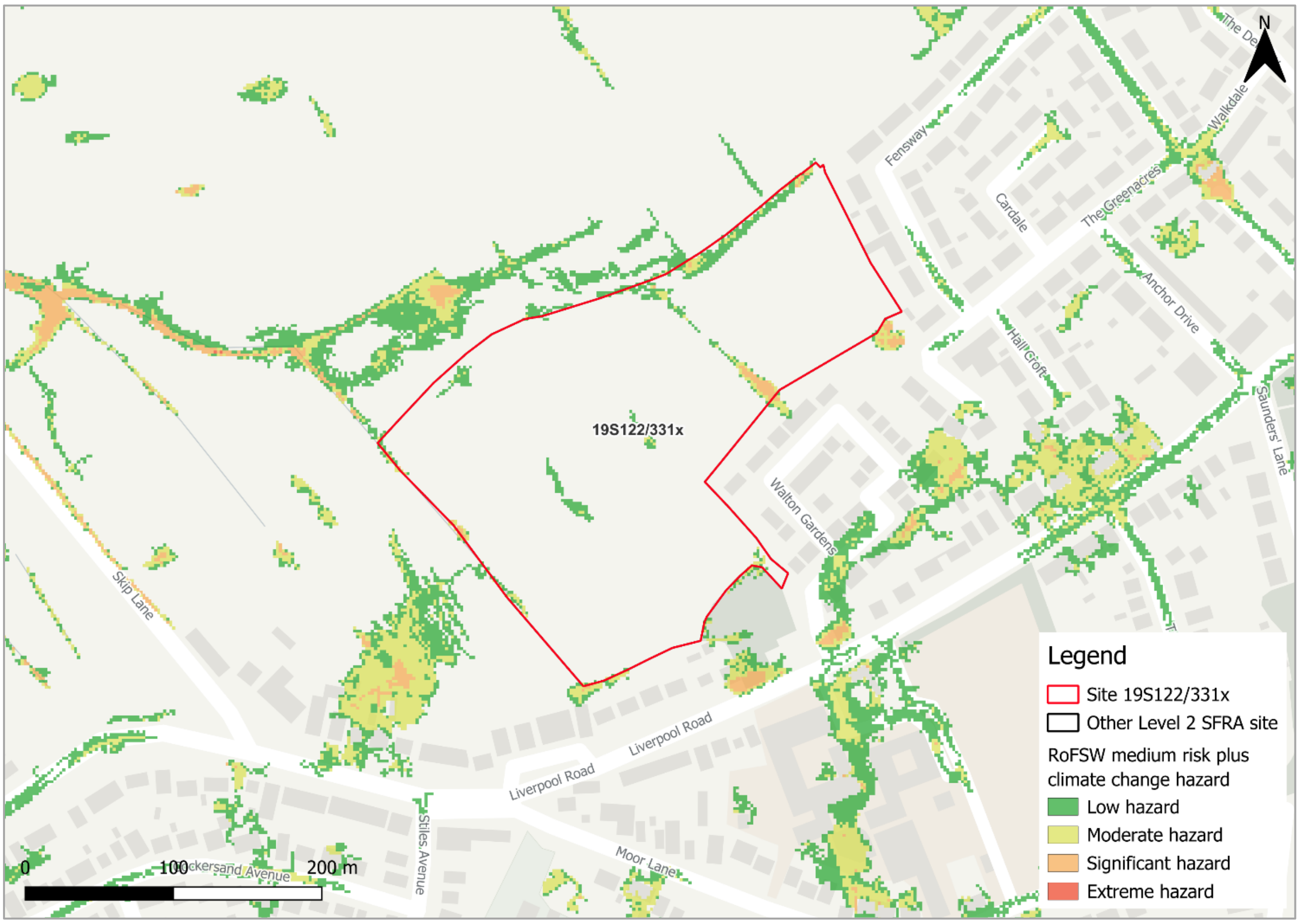

Figure 57-4: Medium risk event surface water flood hazards plus 40% climate change (based on Risk of Flooding from Surface Water map)

57.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with 97% of the site being at very low surface water flood risk. Surface water risk in the high and medium risk events is confined to two areas of surface water ponding within topographic low spots in the north east of the site. Safe access and escape routes should be achievable via Liverpool Road in all events.
- The effects of climate change on surface water have been modelled for this SFRA using the medium risk surface water event plus 45% climate change. Surface water risk is slightly greater than in the present day low risk event with additional areas of scattered surface water ponding across the site. Any existing flow paths should be maintained in site design.
- 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 58-1) indicates that ground conditions may be suitable for infiltration SuDS across 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 Flood 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[31]. Figure 58-1 show the map for Site 19S122/331x and the surrounding areas and Table 4-1 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

31 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.

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[32] 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.
- Given the scattered nature of risk across the site, 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.
- Any FRA should consider the existing ditch along the southwestern boundary of the site to determine the level of fluvial flood risk it presents.
- 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.

32 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S191/326

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

www.jbaconsulting.com

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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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61 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19S191/326. 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.

61.1 Site 19S191/326

- Location: Kellet Lane
- Existing site use: Agriculture
- Existing site use vulnerability: More vulnerable (based on existing residential properties within the site boundary)
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 2.67 hectares
- Proposed development impermeable area: 2.27 hectares (assumed 85% impermeable area)
- Watercourse: Fowler 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 modelled fluvial flood depths and hazards
    - Assessment of surface water flood depths and hazards
    - Assessment of all other sources of flood risk

Figure 61-1: Existing site location boundary

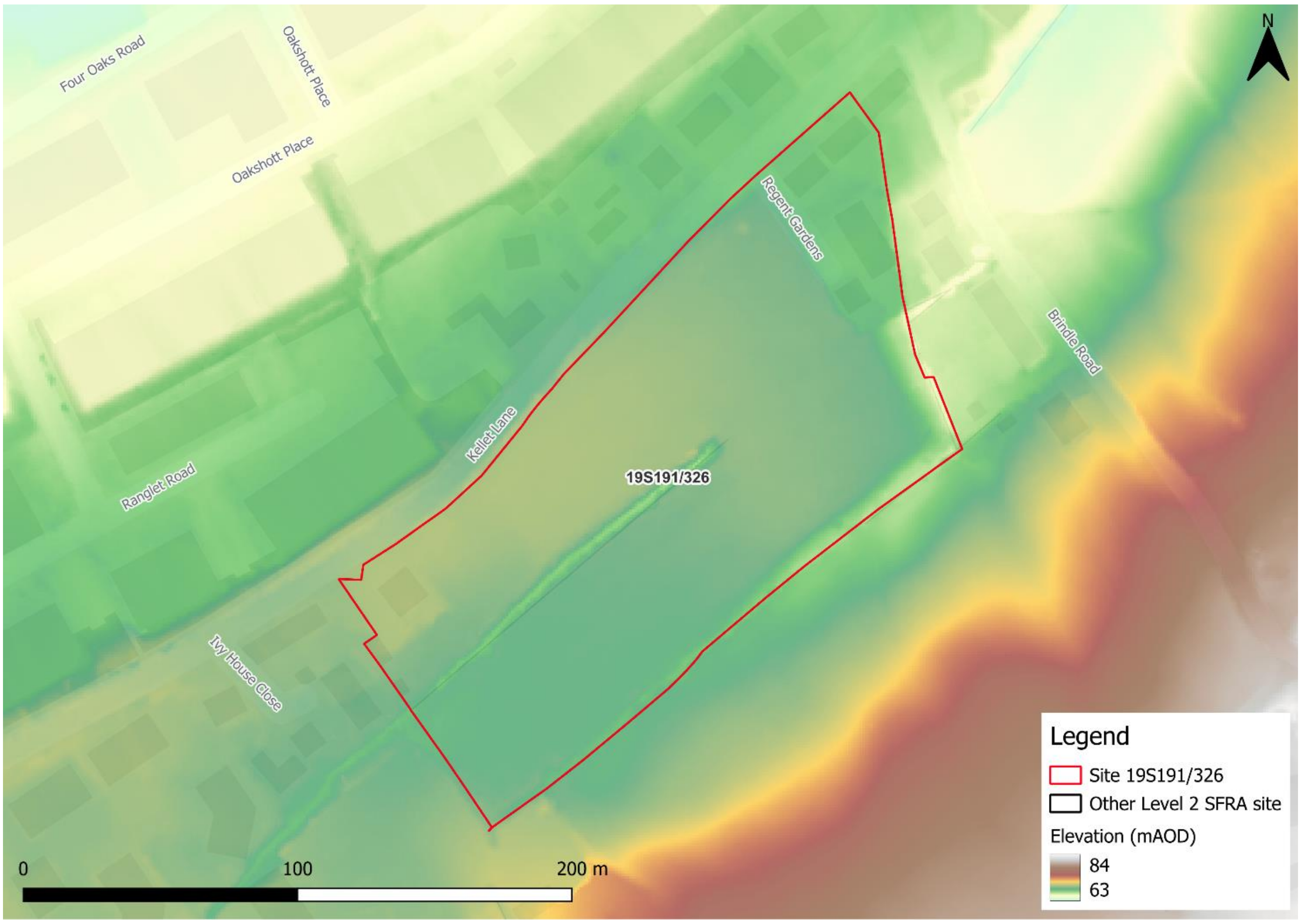

Figure 61-2: Topography

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 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) or the impacts of climate change.

The majority of the site is located within Flood Zone 1. There is a very small area of the site along the eastern boundary that is within the functional floodplain of Fowler Brook. However, this is conservatively based on an 8m buffer of the OS Open Rivers dataset.

OS mapping and LIDAR imagery (Figure 61-2) indicate an existing drainage ditch through the centre of the site that connects to Fowler Brook in the northeast of the site. This watercourse is not modelled and therefore is not included in the Flood Map for Planning. The watercourse appears to originate upstream of the site to the west, before flowing eastwards where it is culverted through the eastern half of the site.

The functional floodplain does not extend through the site as this watercourse is not included within the OS Open Rivers dataset which is used in the functional floodplain delineation process. The onsite watercourse and culvert should remain free of development with an 8m no development buffer recommended.

Table 62-1: Existing fluvial flood risk

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

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

62.2 Impacts from climate change

The impacts of climate change on flood risk from the drainage ditch and Fowler Brook have not been modelled for this SFRA due to the unavailability of suitable models for these watercourses.

The impacts of climate change must be modelled using the EA's latest allowances for peak river flows to robustly inform on flood risk to the site. Therefore, any updates to this Level 2 SFRA and/or any FRA should produce a model of the ditch and Fowler Brook and include for the most up to date climate change allowances.

62.3 Flood risk management

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

62.3.1 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 19S191/326 is located within one catchment, namely, Many Brooks. 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[33].
- 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.

62.3.2 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 is the potential for woodland planting to slow floodwaters, reduce flood peak height and reduce sediment delivery to the watercourse. There are also opportunities for runoff attenuation features to temporarily store water and attenuate flooding during high flows. These areas are shown in Figure 62-2. However, the WwNP dataset is indicative and further investigation into suitability of the site for tree planting should be carried out.

33 Lancashire SuDS Guidance

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

62.4 Residual risk

62.4.1 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.

62.5 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.

62.6 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 an FWA. The site is not located within a FAA.

Based on available information, safe access and escape routes could likely be achieved via Kellet Lane to the north of the site.

62.7 Observations, mitigation options and site suitability - fluvial

- Fowler Brook and the onsite ditch are unmodelled and culverted under half of the site. Neither watercourse is therefore included in the Flood Map for Planning and modelled depth and hazard information is not available. A fully robust assessment of fluvial flood risk from Fowler Brook and the ditch 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 Fowler Brook and the ditch should be built to fully ascertain risk from these watercourses.
- The onsite ditch should be allowed to flow unobstructed and should be included in site design as a blue / green corridor. No development should take place within 8 metres of the watercourse.
- Options for culvert removal should be explored to reduce any residual risk from culvert blockages or exceedance.
- The potential residual risk to the site from a blockage of the culvert should be assessed.
- Safe access and escape routes should be achievable via Kellet Lane to the north of the site.
-

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 6% of the site is within the high risk surface water flood zone. A further 4% is at medium surface water risk, and a further 12% is at low surface water risk, as shown in Table 4-1.

In the high and medium risk events, surface water risk is confined to a flow path along the drainage ditch through the centre of the site and an additional flow path along the southern site boundary. There is an additional area of ponding within a topographic low spot along the western boundary of the site. In the low risk event, there is a significant surface water flow path within the south of the site between the two drainage ditches.

Greatest flood depths in the medium risk event are between 0.9m and 1.2m (Figure 63-1), however these are located within the existing drainage ditch through the centre of the site. Maximum flood depths outside of the drainage ditch are between 0.3 and 0.6 m, with areas of hazard categorised as moderate (Figure 63-2). Safe access and escape routes should be possible via Kellet Lane to the north of the site 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 (%)
78	12	4	6

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[34] (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 3-2: Modelled climate change allowances for rainfall for the Ribble management catchment

Return period	Central allowance 2070s	Upper end allowance 2070s
3.3% (high risk)	30%	40%
1% (medium risk)	35%	50%

Figure 63-3 shows the modelled surface water depths for the medium risk event +50% 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

34 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

risk event. Greatest flood depths outside of the drainage ditch are modelled to be between 0.6 and 0.9 m, with areas of significant hazard (Figure 63-4).

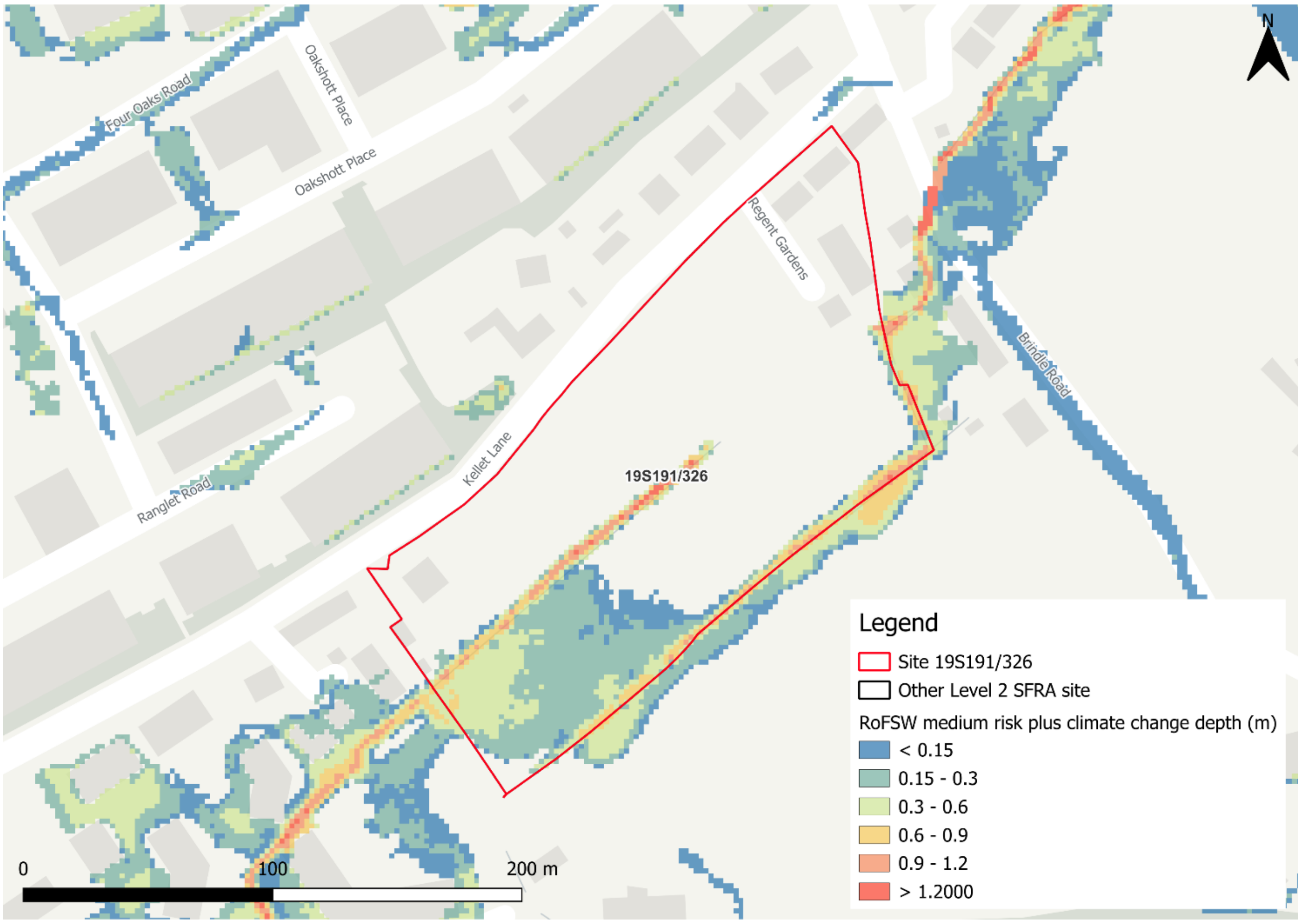

Figure 63-3: Medium risk event surface water flood depths plus 50% climate change (based on Risk of Flooding from Surface Water map)

Figure 63-4: Medium risk event surface water flood hazards plus 50% 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 78% of the site being at a very low risk. Surface water risk in the high and medium risk events is largely confined to the drainage ditch through the centre of the site and an additional flow path along the southern site boundary which flows into Fowler Brook to the northwest. Safe access and escape routes should be achievable via Kellet Lane in all events.
- The medium risk modelled climate change outputs indicate a similar extent risk to the present day low risk event, with a significant flow path emerging within the south of the site, between the existing drainage channels. Any existing flow paths and topographic depressions should be maintained in site design. Development should be directed away from the southern area of the site where there is significant ponding. This area should remain as open greenspace.
- The Groundwater Emergence Map (Figure 64-1) 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.

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[35]. Figure 64-1 shows the map for Site 19S191/326 and the surrounding areas and Table 4-1 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 suitable to infiltration SuDS across the site.

Figure 64-1: JBA 5m Groundwater Emergence Map

35 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.	

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[36], 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:

- Flood modelling for the present day and for the impacts of climate change of Fowler Brook and the onsite ditch should be carried out to ascertain the fluvial flood risk to the site. This should include for residual risk modelling of the culvert.
- There should be no development within 8m either side of the ditch. This should be used as a blue / green corridor to provide ecological, amenity and social value.
- Culvert removal should be investigated to reduce the residual risk of culvert blockage or exceedance.
- 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.
- 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.

36 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S249

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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Document Status

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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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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

List of Figures

List of Tables

67 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19S249. 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 19S249

- Location: Land off Church Lane, Farington
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 8.18 hectares
- Proposed development impermeable area: 6.96 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 67-1: Existing site location boundary

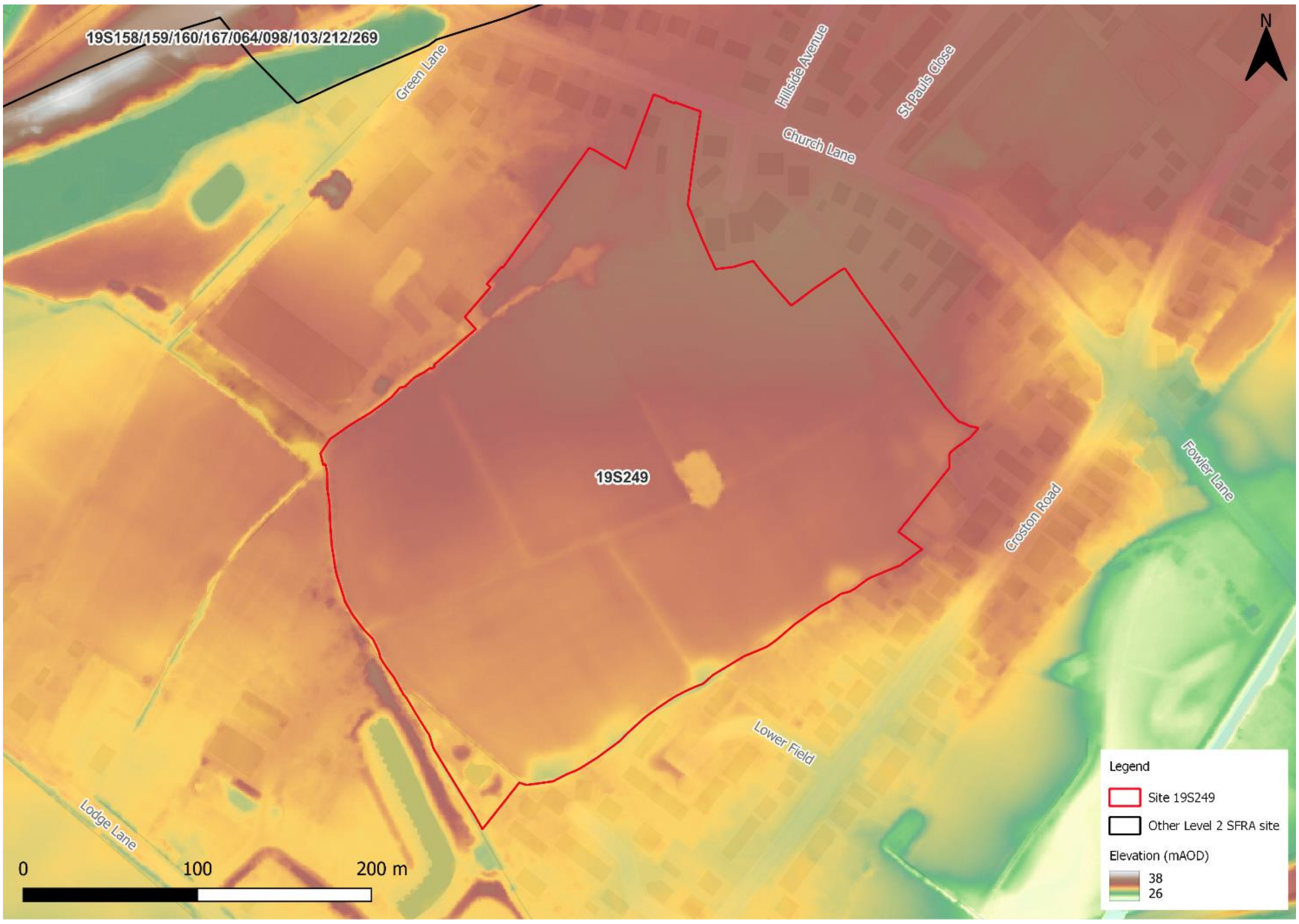

Figure 67-2: Topography

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 68-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) or the impacts of climate change.

The site is located entirely within Flood Zone 1 indicating that the site is at low risk of 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

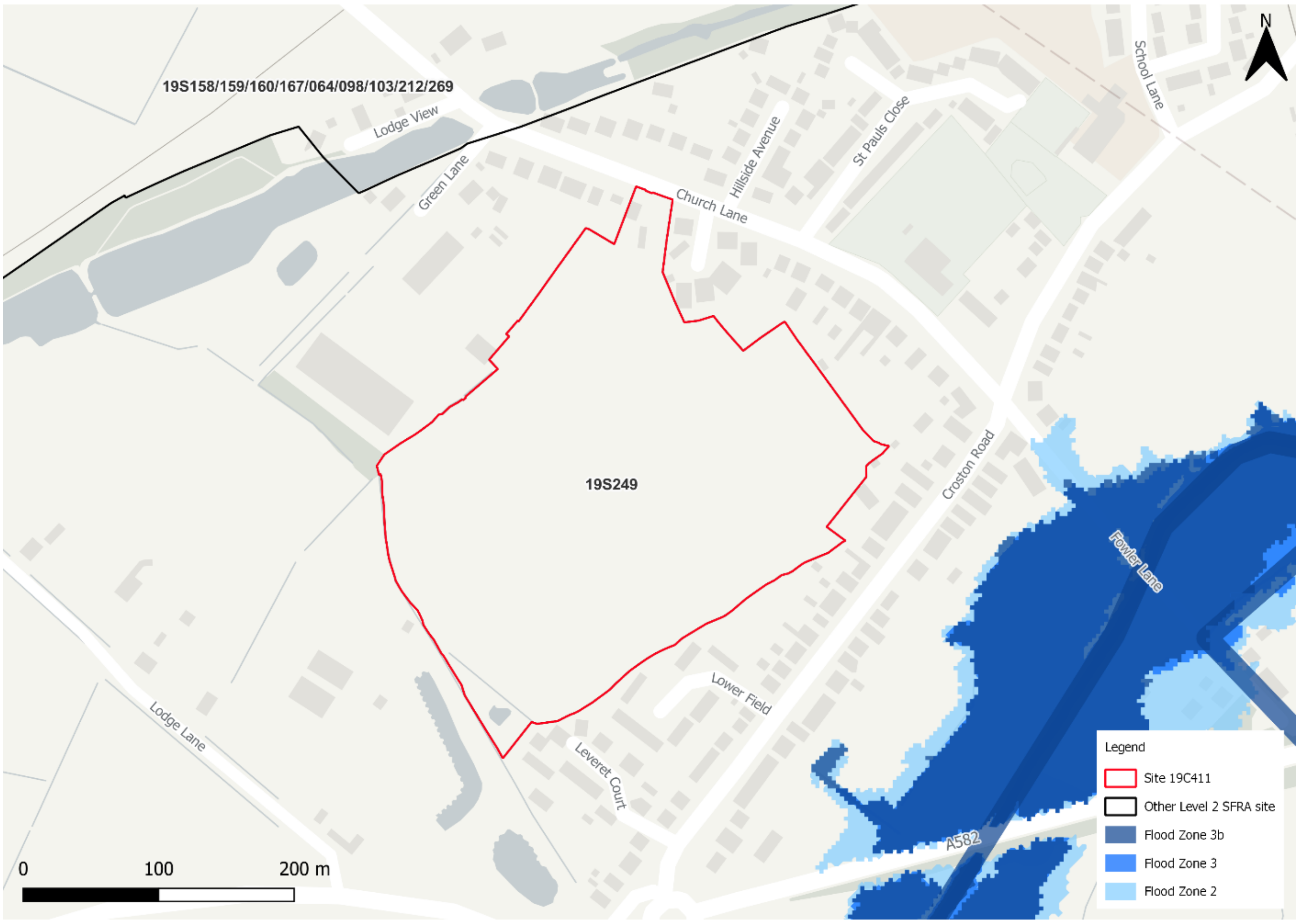

Figure 68-1: Existing risk from rivers

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 19S249 is located within two catchments, namely, Lostock US Farington Weir and Lostock DS Farington Weir. The majority of the site is located within a high 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[37].
- 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. 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. There is also potential for runoff attenuation features within the site to temporarily store water and attenuate flooding during high flows. 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 68-2.

37 Lancashire SuDS Guidance

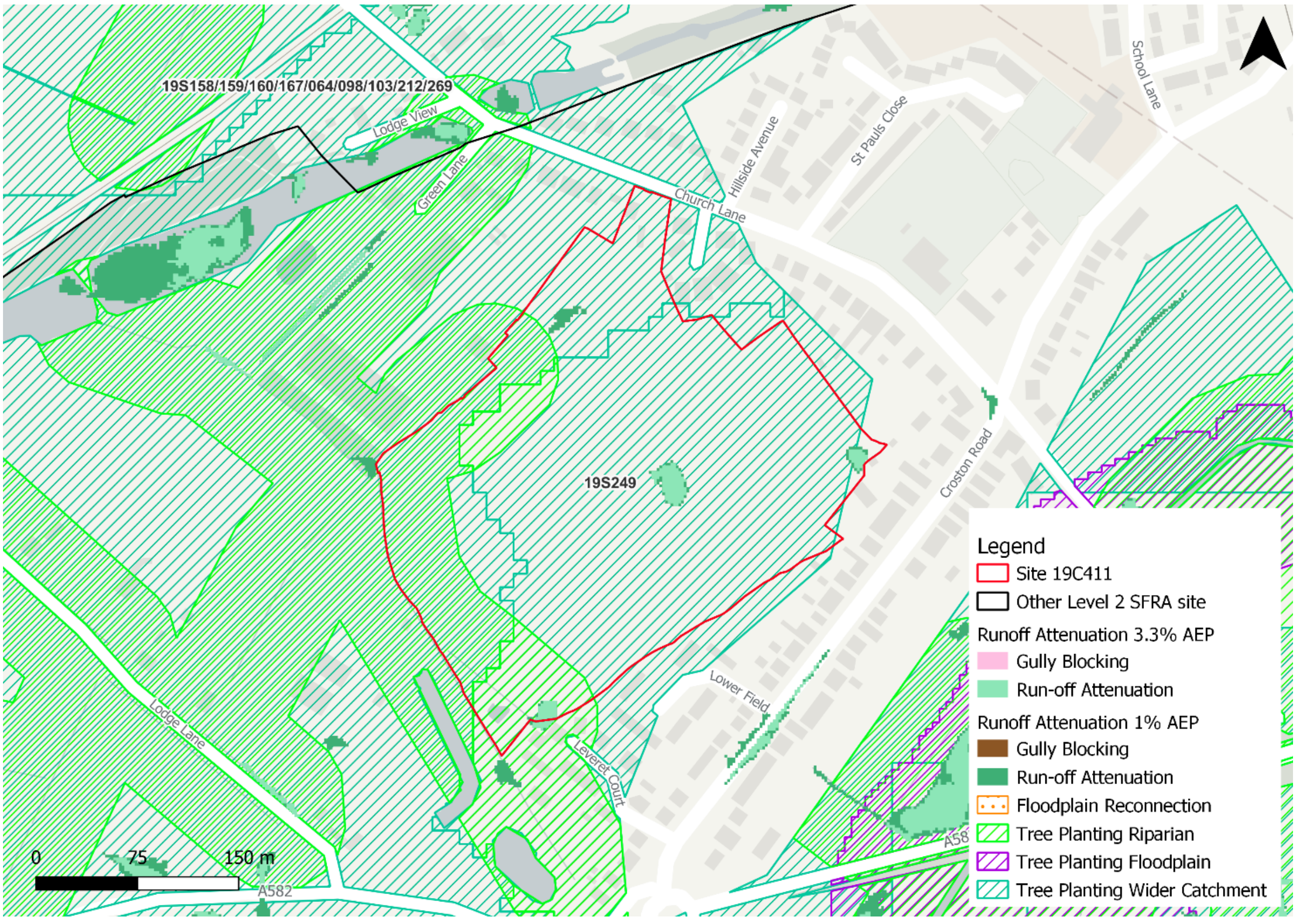

Figure 68-2: Natural Flood Management (NFM) potential mapping

68.2.3 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.

68.3 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.

68.4 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 Church Lane.

68.5 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.

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. Approximately 3% of the site is within the high risk surface water flood zone. A further 1% is at low surface water risk, as shown in Table 69-1.

In all events, surface water risk is scattered across the site within topographic low spots. There is an existing pond within the centre of the site that is currently modelled to attenuate surface water in all events.

Greatest flood depths within the medium risk event are between 0.9 and 1.2 m (Figure 3-1) with some areas of significant hazard (Figure 3-2). Safe access and escape routes should be possible via Church Lane during all events.

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

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
96	1	0	3

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

Figure 69-2: Medium risk event surface water flood hazard[38] (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 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 slightly greater in extent than the present day low risk

38 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 between 0.9 and 1.2 m, with some areas of significant hazard (Figure 3-4).

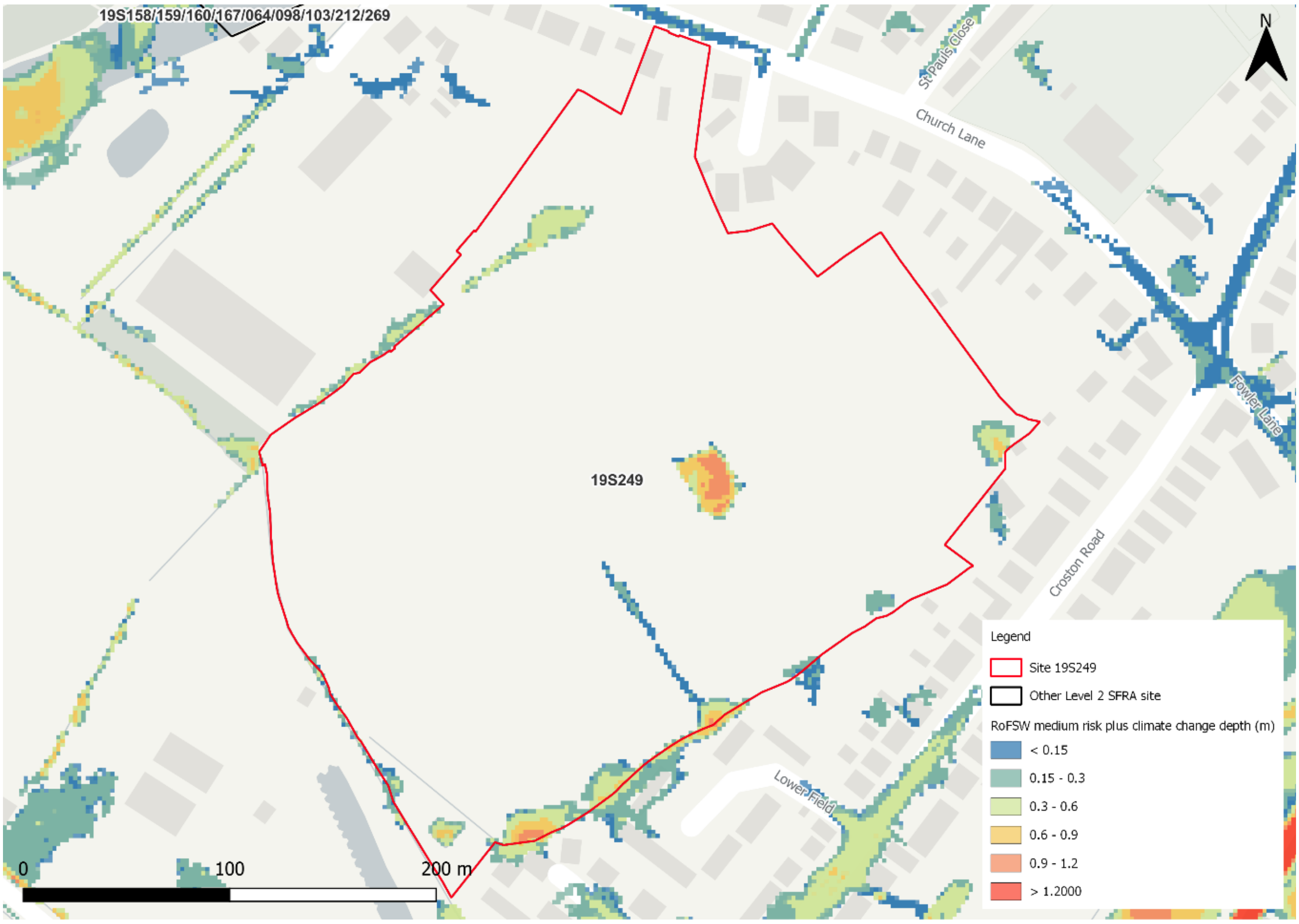

Figure 69-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

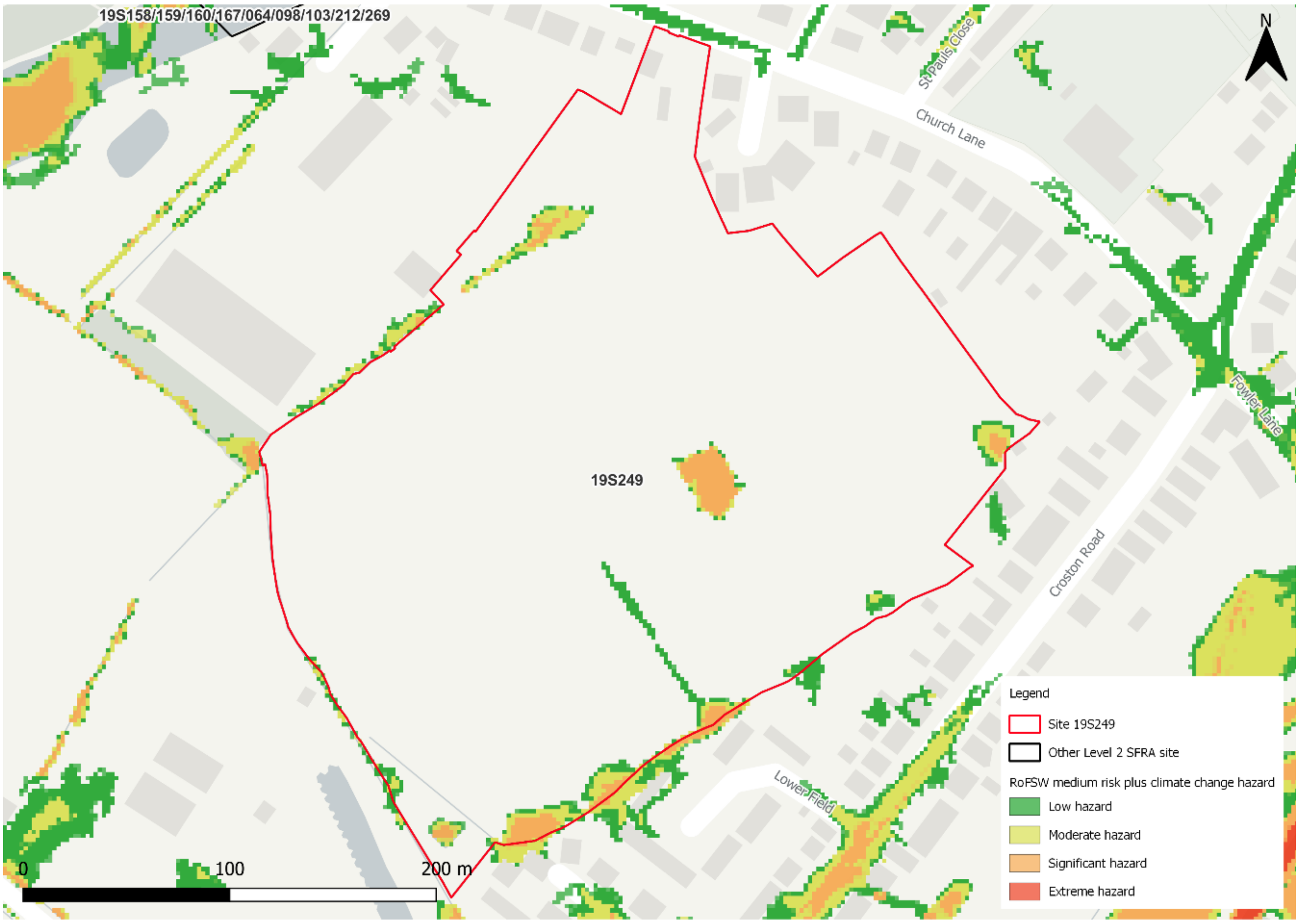

Figure 69-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

69.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 96% of the site being at very low risk. Surface water risk in all events is scattered across the site in areas of topographic depressions.
- The modelled medium risk climate change outputs indicate a slightly greater extent of risk than the present day low risk event, with some additional areas of ponding emerging through the site.
- Safe access and escape routes should be achievable via Church Lane to the north of the site in all events.
- Topographic depressions and the existing pond within the site 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. This should be further explored through appropriate ground survey as part of the FRA and drainage strategy.
- 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. Runoff rates should not exceed 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.

70 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[39]. Figure 4-1 shows the map for the site and the surrounding areas and 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.

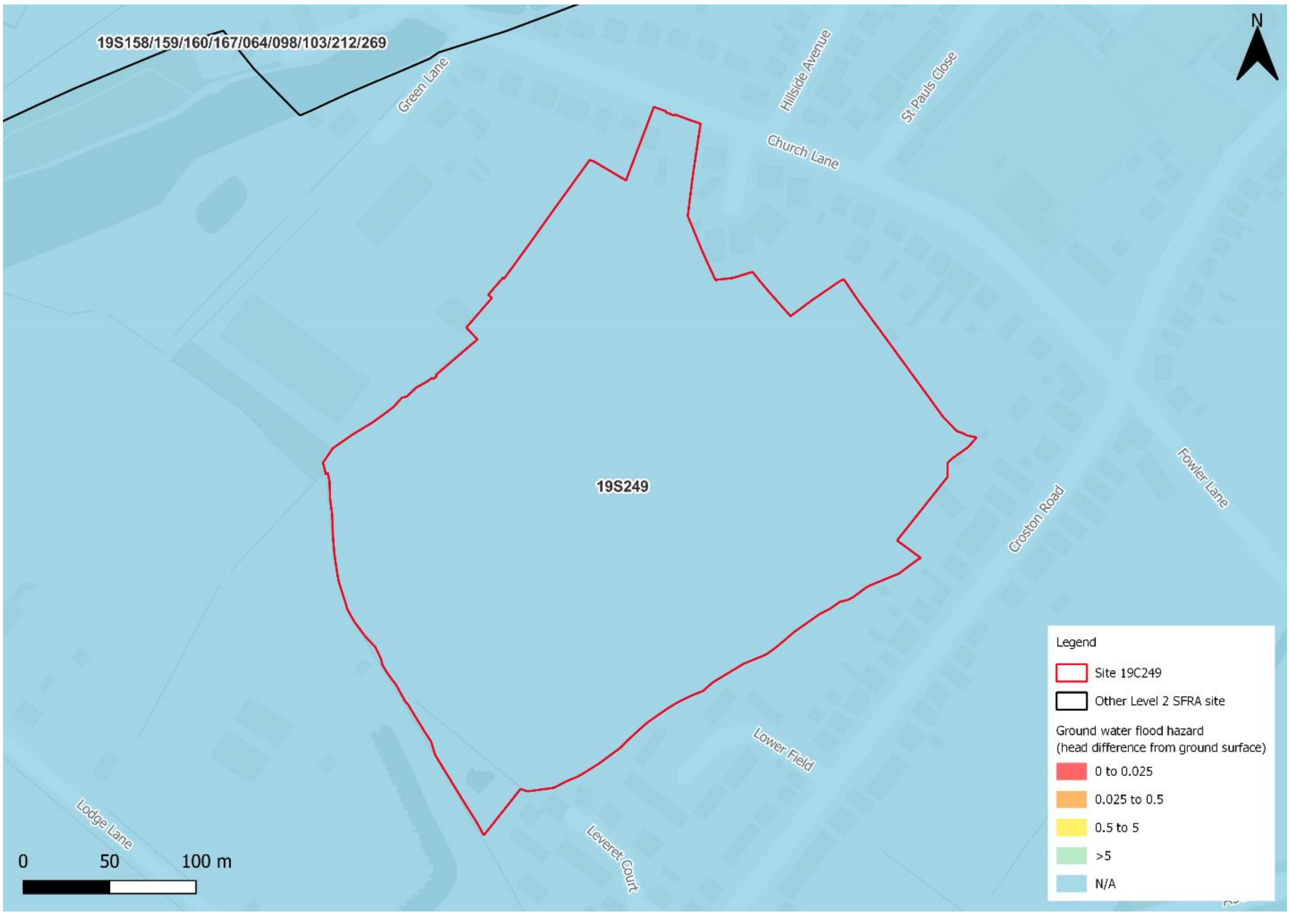

Figure 70-1: JBA 5m Groundwater Emergence Map.

39 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[40] 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:

- Based on current information, 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.
- The existing pond within the centre of the site should be included within site design and allowed to attenuate surface water runoff.
- 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.
- 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.

40 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S162

Final

February 2025

Prepared for:

Preston South Ribble Chorley Central Lancashire

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Prepared by	Laura Thompson BSc Analyst
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Acknowledgements

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73 Background

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73.1 Site 19S162

- Location: South of Factory Lane and East of the West Coast Main Line, PR1 9TE
- Existing site use: Greenfield
- Existing site use vulnerability: Water compatible
- Proposed site use: Mixed use
- Proposed site use vulnerability: More vulnerable
- Site area: 10.2 hectares
- Proposed development impermeable area: 8.7 hectares (assumed 85% impermeable area)
- EA model: Penwortham Lane 2006
- Watercourse: Unnamed watercourse
- 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

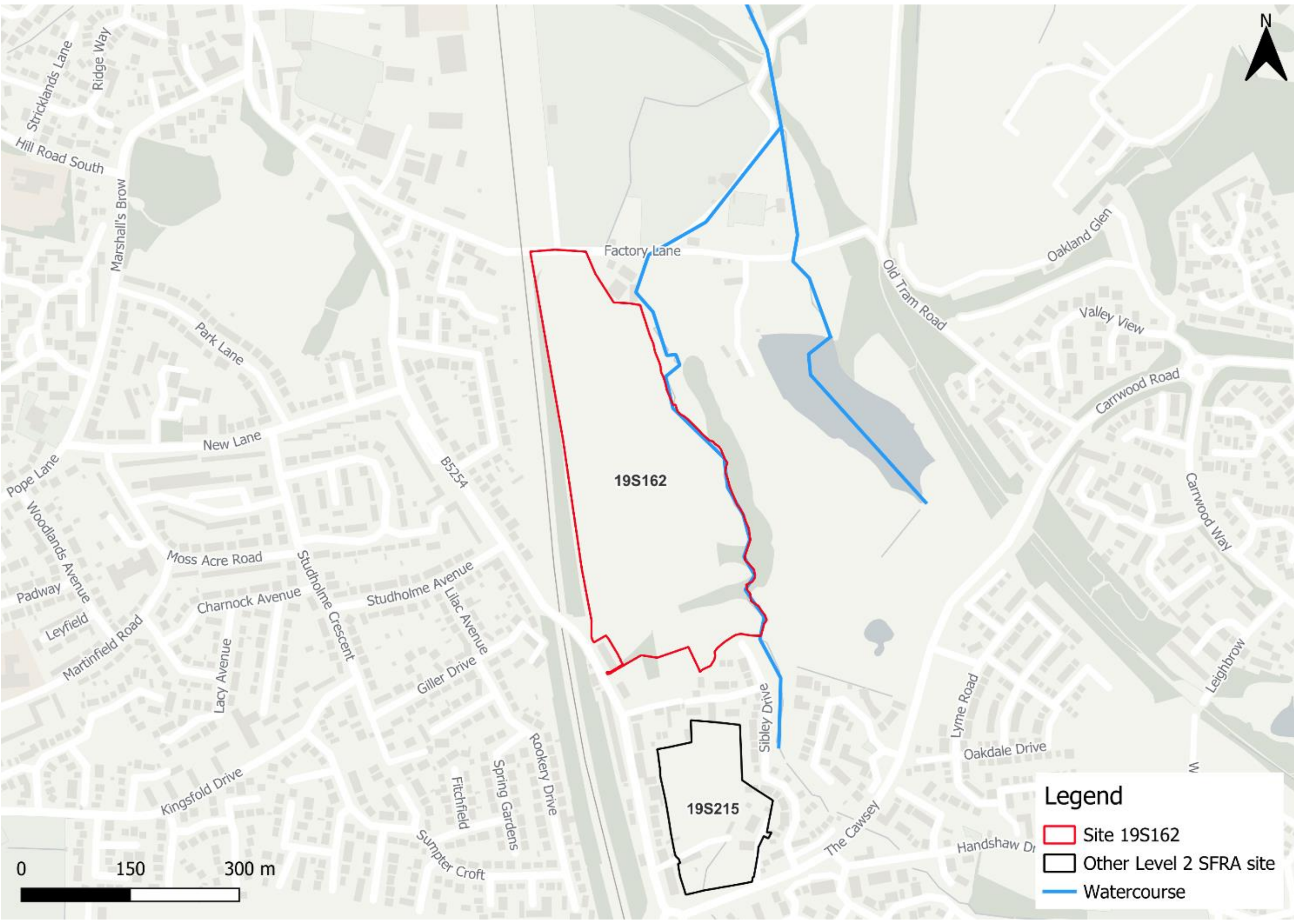

Figure 73-1: Existing site location boundary

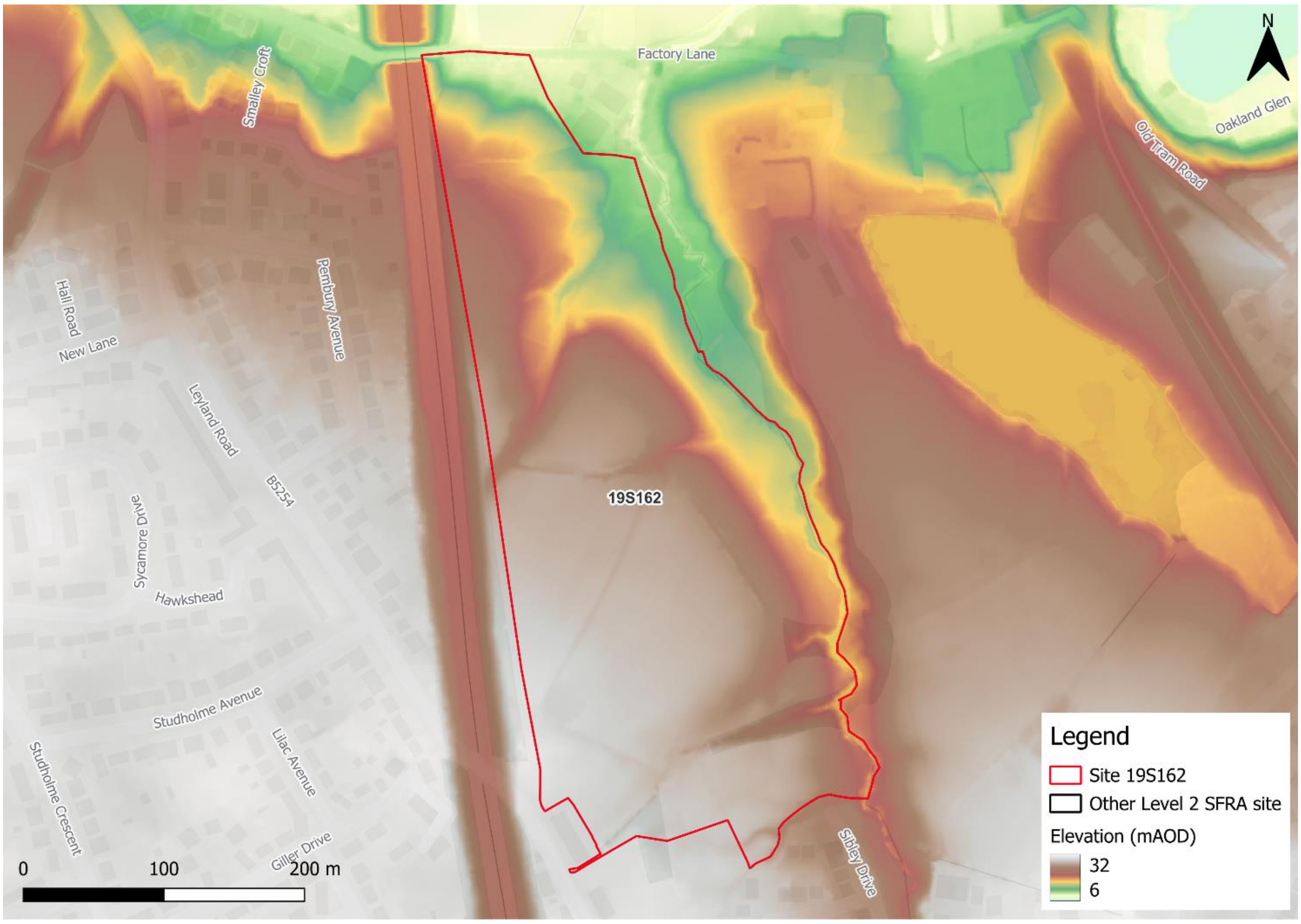

Figure 73-2: Topography

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 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) or the impacts of climate change (Section 50.2).

The area along the eastern and northern boundaries of the site is located within Flood Zone 3b. There should be no development within the functional floodplain. The functional floodplain in this location is based on the 3.3% AEP undefended event from the Penwortham Lane 2006 model. There are some additional areas of fluvial risk along the eastern boundary of the site located within Flood Zone 3a and Flood Zone 2.

Table 74-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
87	6	1	6

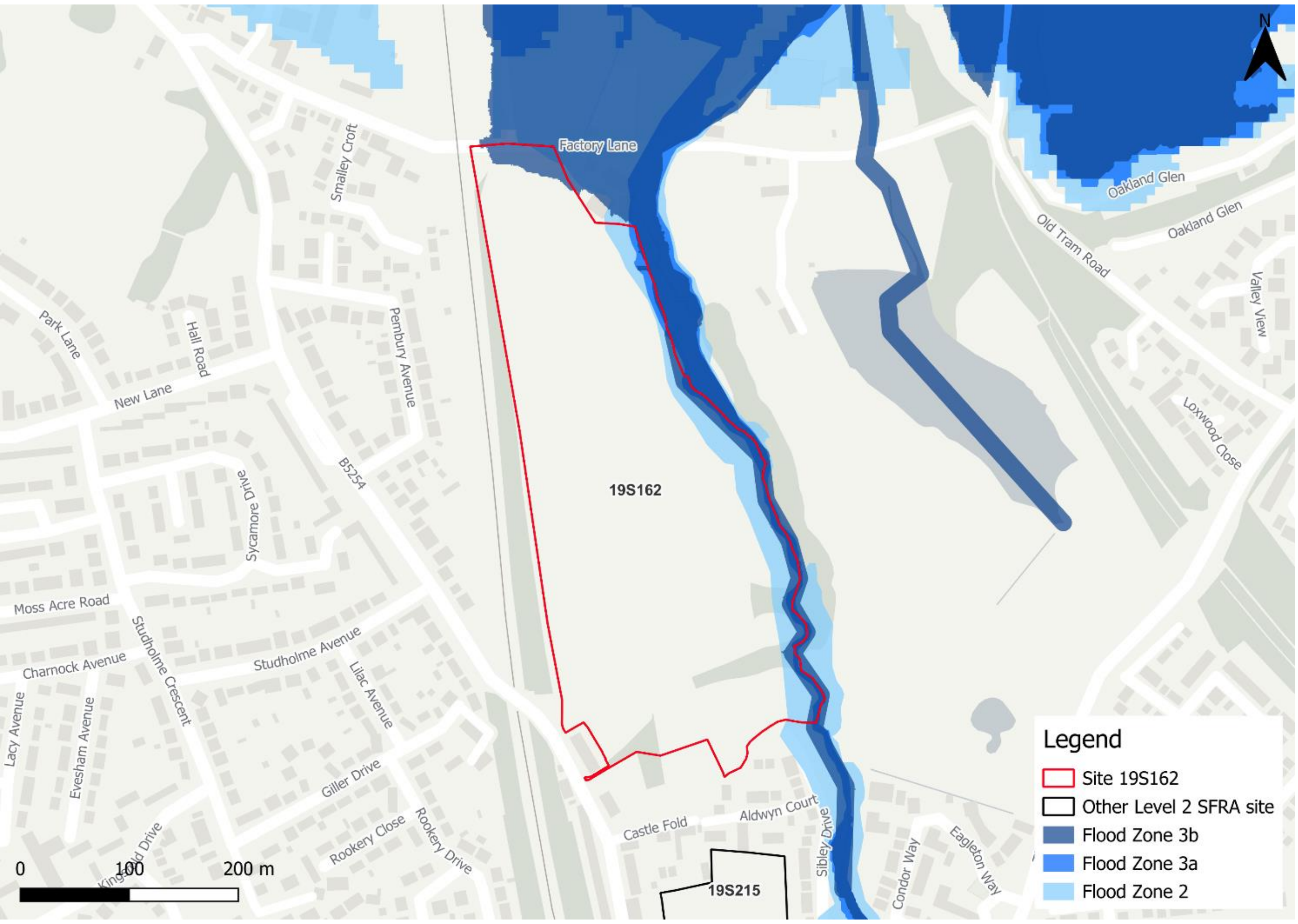

Figure 74-1: Existing risk from rivers to the site

74.1.2 Penwortham Lane 2006 model outputs

The Penwortham Lane 2006 model cannot be used to fully inform this SFRA, due to required results files not being available for consideration. The fluvial risk information to inform the suitability for allocation of this site, and all other sites in the Penwortham Lane model domain, is therefore limited. The information required for the SFRA that is not available includes:

- Flood hazard information

Flood depth information is available for present day flood events, derived through a 1D mapping process. However, this information is based on a model built in 2006 thus is likely to be based on outdated hydrology, terrain data and channel and structure survey.

Figure 74-2 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 different to Flood Zone 3 within the north of the site, however this could be a result of the 1D mapping process carried out through this Level 2 SFRA being based on more recent LIDAR. The area at risk along the eastern boundary of the site shows a similar level of risk to Flood Zone 3.

Maximum flood depths within the site are modelled to be > 1.2 m however these depths are located within the unnamed channel in the east. The greatest flood depths outside of the channel are between 0.9 m and 1.2 m. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event.

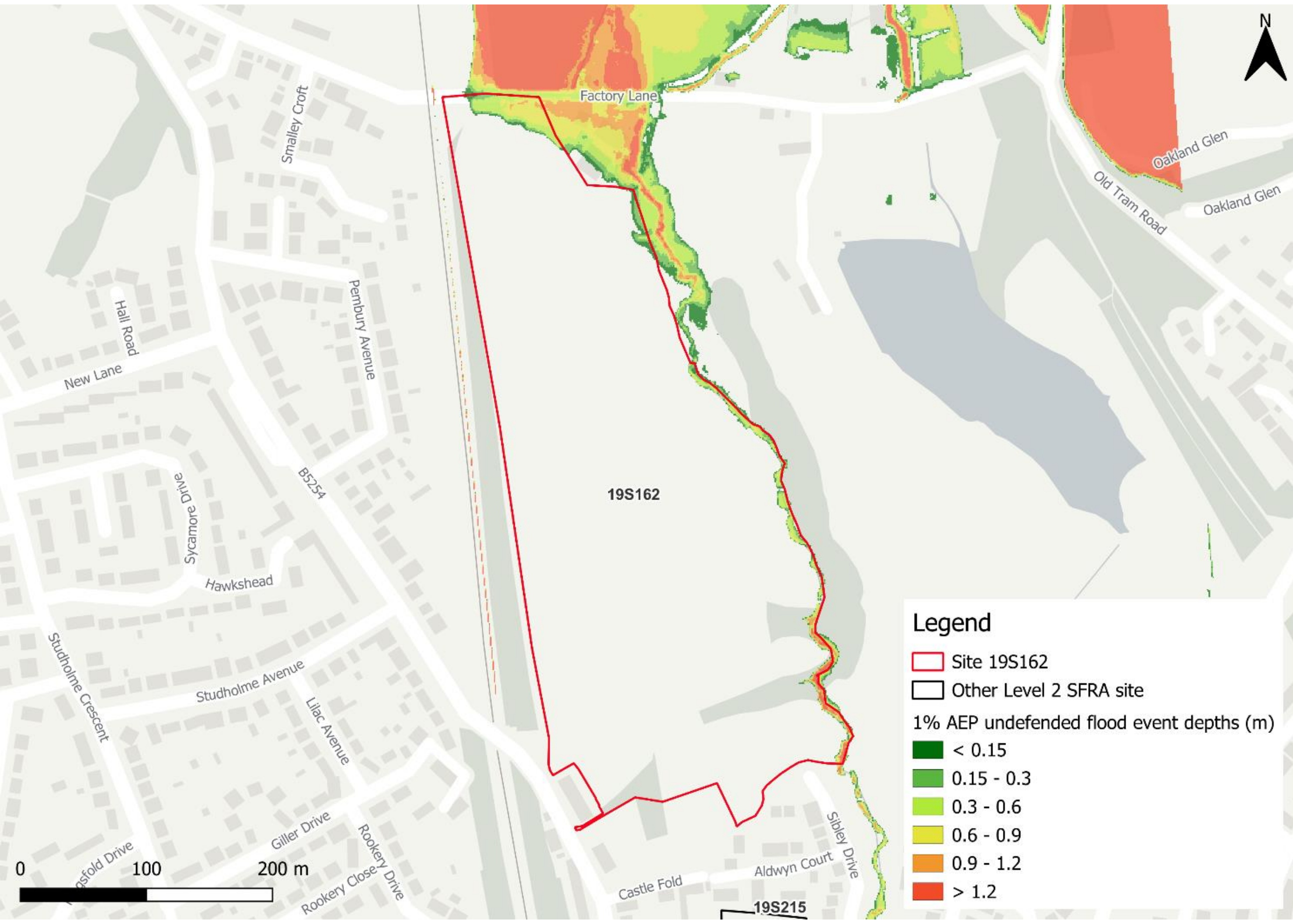

Figure 74-2: Flood depths for 1% AEP undefended flood event

74.2 Impacts from climate change

The impacts of climate change on flood risk from the unnamed watercourse 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 74-2.

Table 74-2: 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%

As mentioned in Section 74.1.2, the Penwortham Lane 2006 model cannot be used to fully inform the impact of climate change to Site 19S162 as part of this SFRA as flood hazard information is not available for the Penwortham Lane 2006 model. Figure 74-3 shows the onsite modelled flood depths for the 1% AEP undefended event plus higher central climate change allowance. Risk is modelled to be greater than the existing Flood Zone 3, however this could also be a result of the 1D mapping process carried out through this Level 2 SFRA being based on more recent LIDAR.

Maximum flood depths are modelled to be > 1.2 m however these depths are located within the unnamed channel in the east. The greatest flood depths outside of the channel are between 0.9 m and 1.2 m. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event plus higher central climate change allowance. The functional floodplain is modelled to increase in extent slightly along the northern boundary of the site.

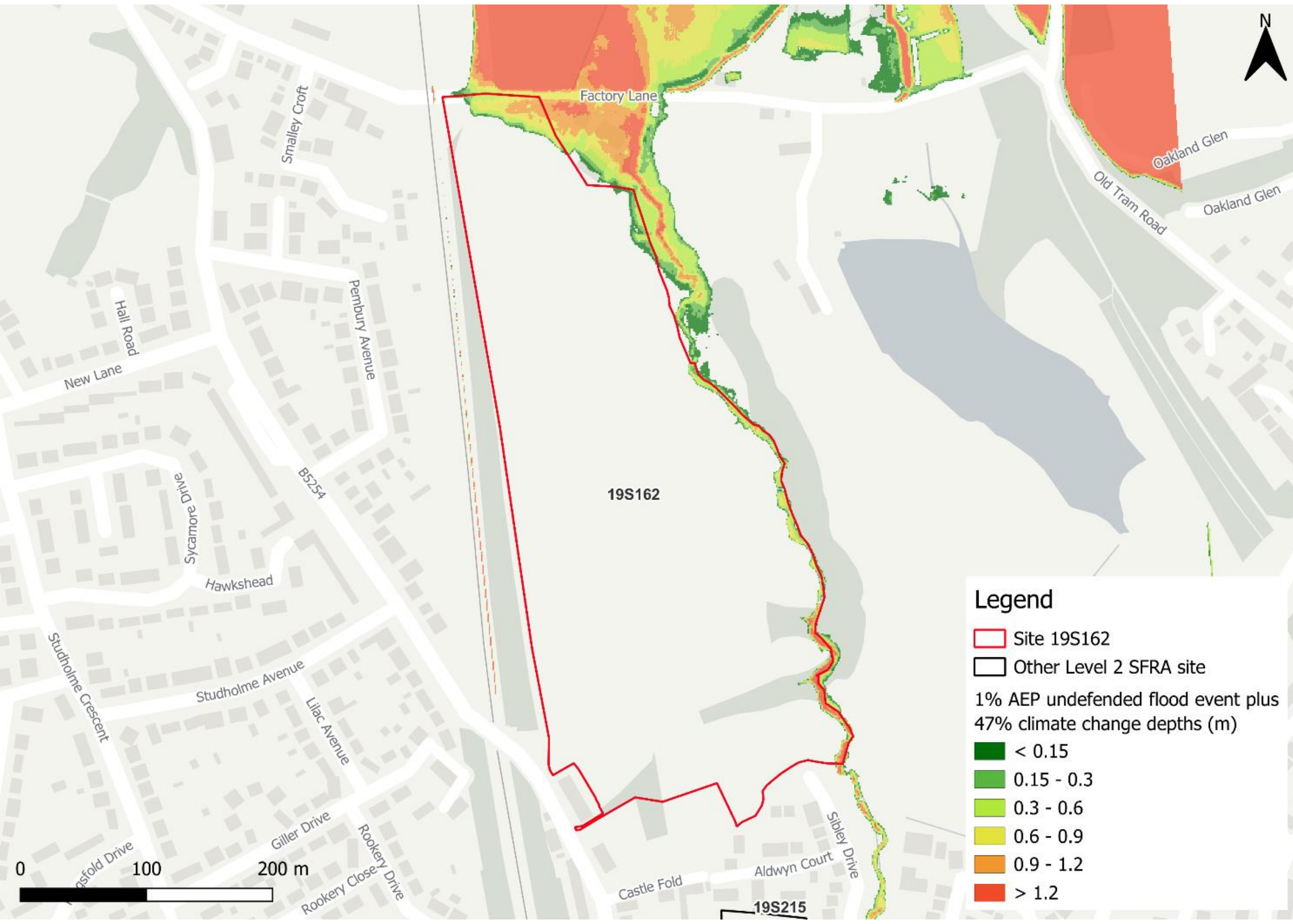

Figure 74-3: Flood depths for 1% AEP undefended flood event +47% (higher central climate change allowance)

74.3 Flood risk management

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

74.3.1 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 19S162 is located within one catchment, namely; Coastal Catchment 175. 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.

74.3.2 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 and upstream of the site, there is significant potential for tree 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 on Figure 74-4.

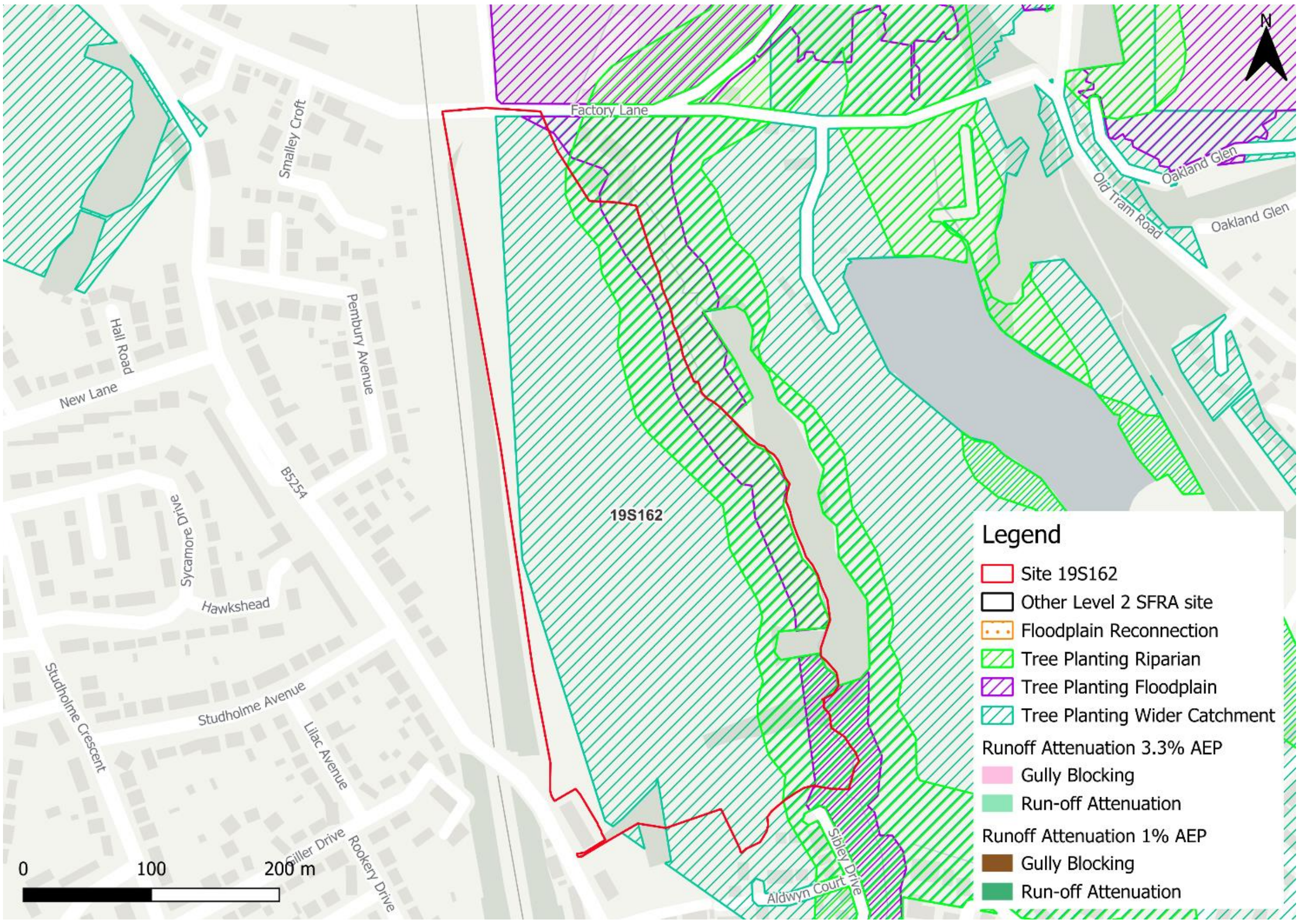

Figure 74-4: Natural Flood Management (NFM) potential mapping

74.4 Residual risk

74.4.1 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. The site is not modelled to be at risk from reservoir flooding.

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 12 reservoirs, eight of which are located within Lancashire and four located within Blackburn with Darwen. Eleven reservoirs with the potential to impact the site are operated by United Utilities. The remaining one reservoir, namely Penwortham Mill Lodge, is operated by South Ribble Borough Council.

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, the reservoir undertaker 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.

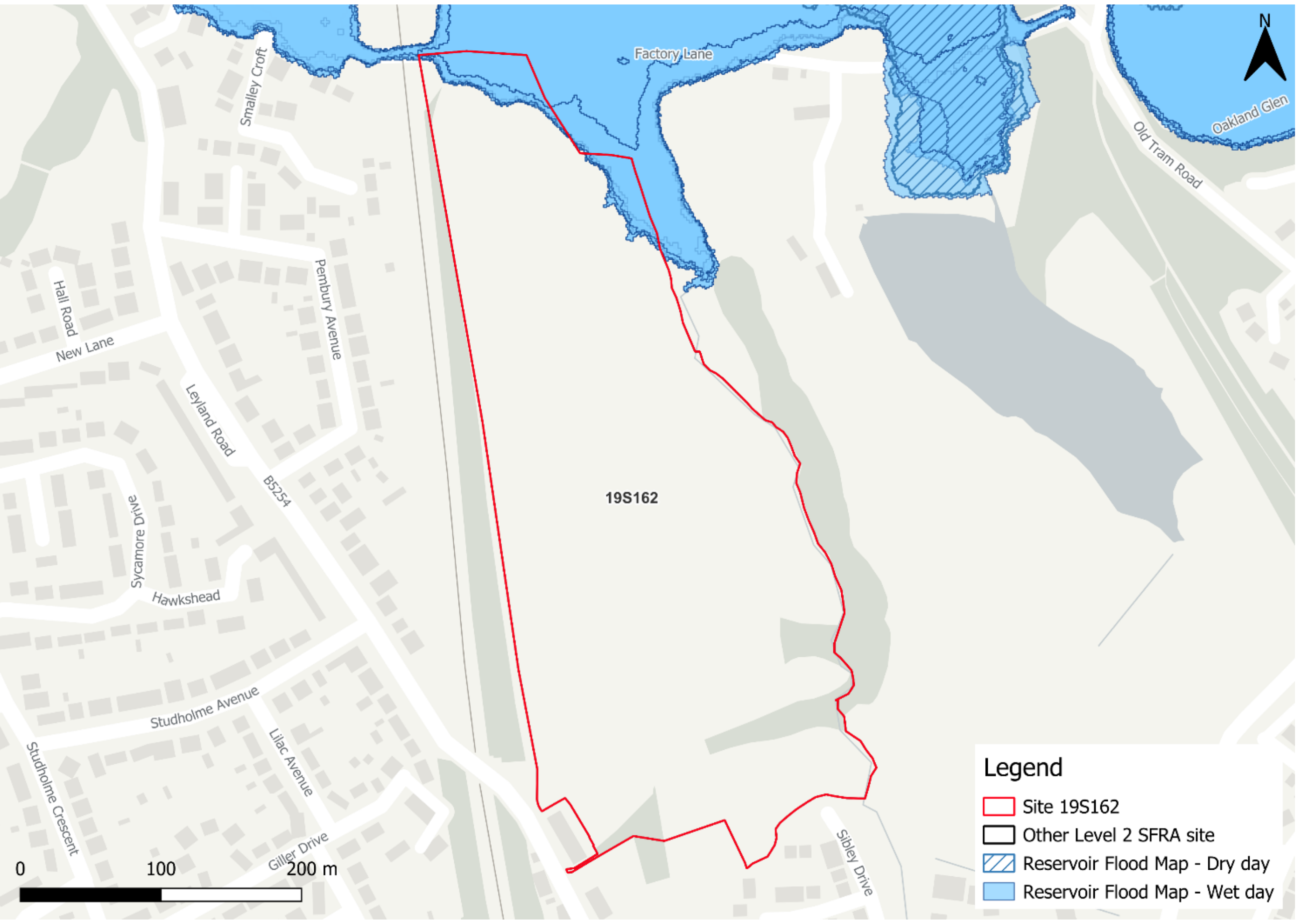

Figure 74-5: Flood risk from reservoirs

74.5 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.

74.6 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 19S162 is partially located within a FWA, namely; 012FWFL6C - River Ribble at Walton-le-Dale, comprising areas around Frenchwood and Capitol Centre.

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; 012WAFLR - Lower River Ribble and Darwen.

Based on available information, safe access and escape routes could likely be achieved during a flood event via the B5254 to the south of the site.

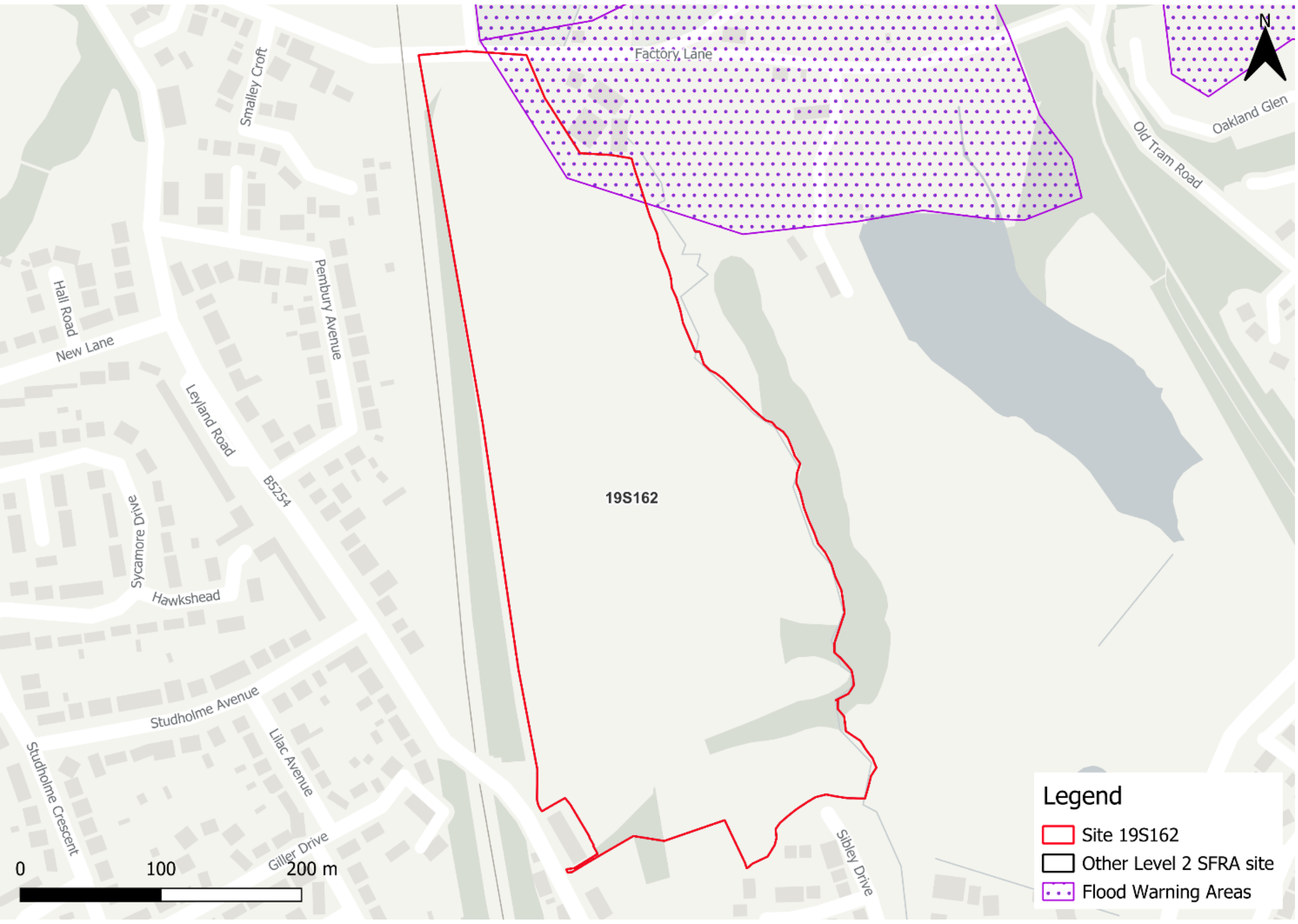

Figure 74-6: EA Flood Warning Areas

74.7 Observations, mitigation options and site suitability - fluvial

- The site is modelled to be partially within the functional floodplain along the eastern, adjacent to the unnamed watercourse, and northern boundaries of the site. Development is not permitted within the functional floodplain. However, the functional floodplain is based on 1D mapping of the Penwortham Lane 2006 model and may therefore be subject to limitations such as outdated hydrology, terrain data and channel and structure survey.
- A flood risk activity permit may be required if development is planned within 8m of the riverbank. 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.
- The site is modelled to be at risk in the 1% AEP undefended extent to a greater degree than Flood Zone 3, however the potential reasons for this have been documented. Modelled risk from climate change slightly increases the undefended risk to the site and surrounding areas.
- Safe access and escape should be possible via the B5254 to the south of the site based on available information.

- Given the potential reservoir risk to the site, developers should consider[41]:
    - 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 19S215 and the fact that the unnamed watercourse flows adjacent to 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.

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

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 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 3% is at low surface water risk, as shown in Table 75-1.

In the high risk event, surface water risk is largely confined to the eastern boundary of the site adjacent to the unnamed watercourse, with some additional areas of ponding in topographic low spots. The medium risk event is similar in extent to the high risk event, with an additional flow path emerging through the centre of the site. In the low risk event, there are three distinct flow paths developing through the site.

Maximum flood depths in the high risk event are > 1.2 m however these are located within the unnamed channel present within the site boundary. Greatest flood depths outside of the channel are between 0.15 and 0.3 m (Figure 3-1) with areas of low hazard (Figure 3-2). Safe access and escape routes should be possible via the B5254 to the south of the site 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 (%)
95	3	1	1

- 

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

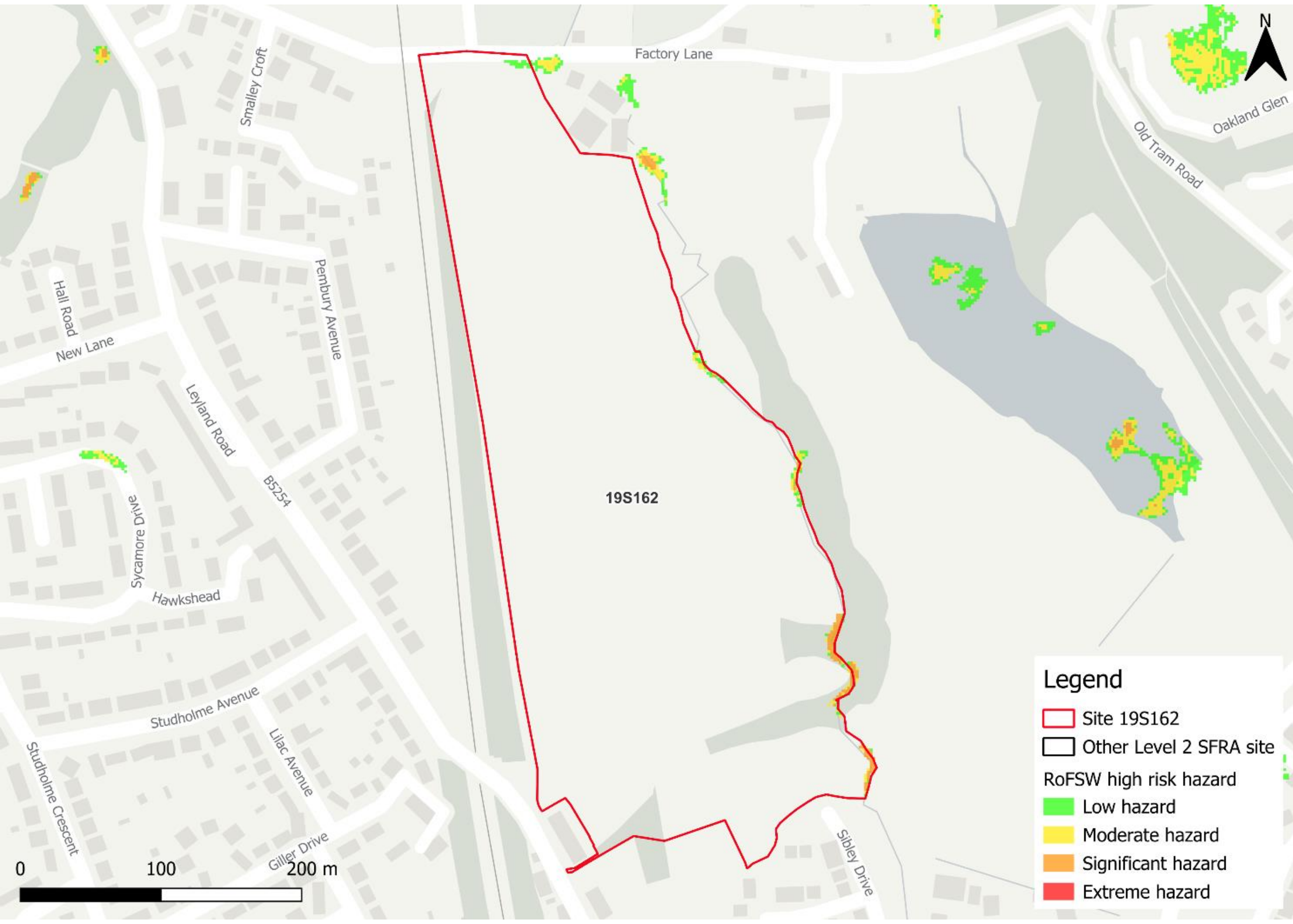

Figure 75-2: High risk event surface water flood hazard[42] (Risk of Flooding from Surface Water map)

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% (high risk)	30%	40%
1% (medium risk)	35%	45%

Figure 3-3 shows the modelled surface water flood depths for the high risk event +40% climate change. Risk is modelled to be greater than for present day conditions, with the high risk climate change event showing a similar level of risk to the medium risk present

42 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

day event. Maximum depths are between 0.3 and 0.6 m with some areas of significant hazard (Figure 3-4).

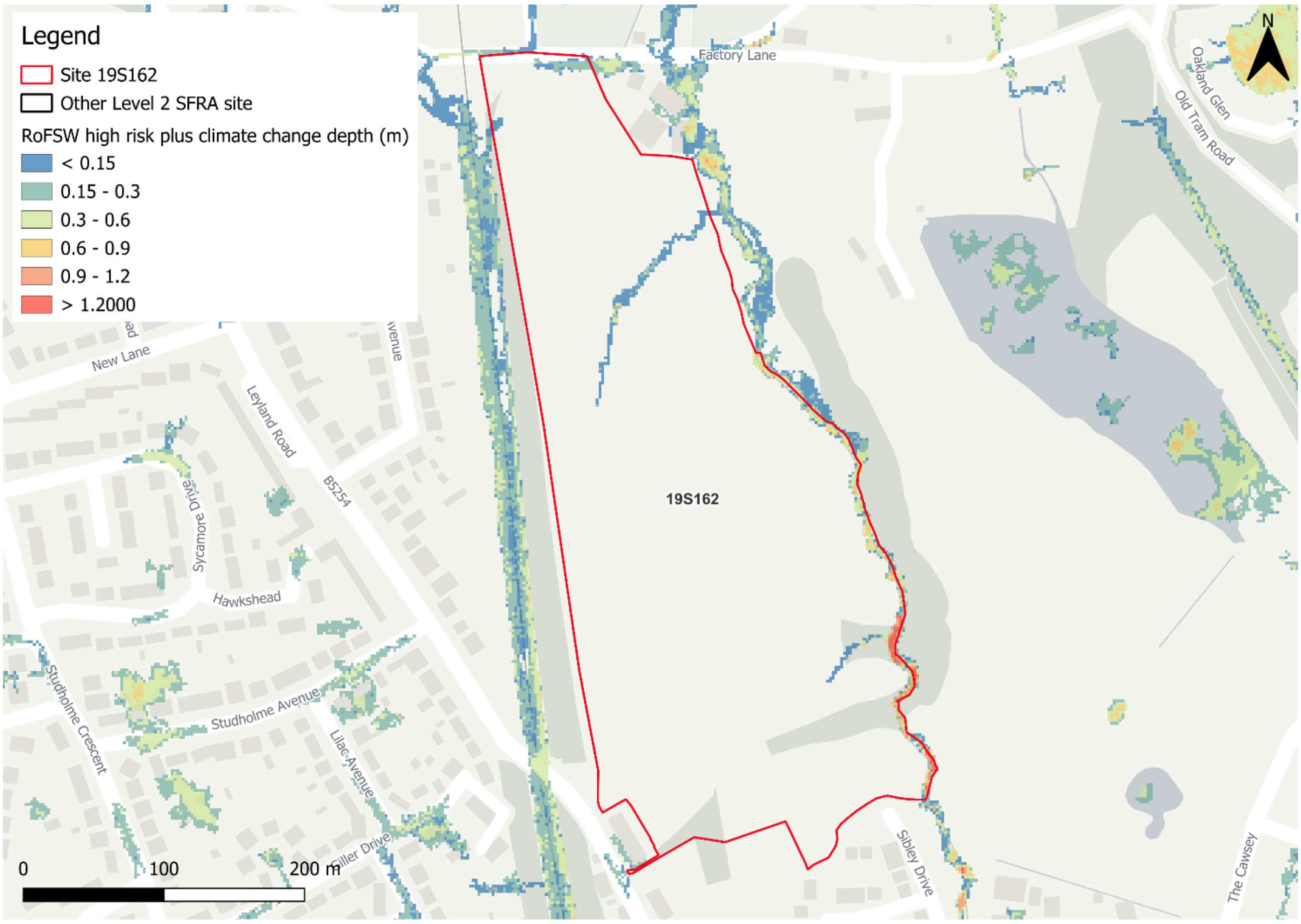

Figure 75-3: High risk event surface water flood depths plus 40% climate change (based on Risk of Flooding from Surface Water map)

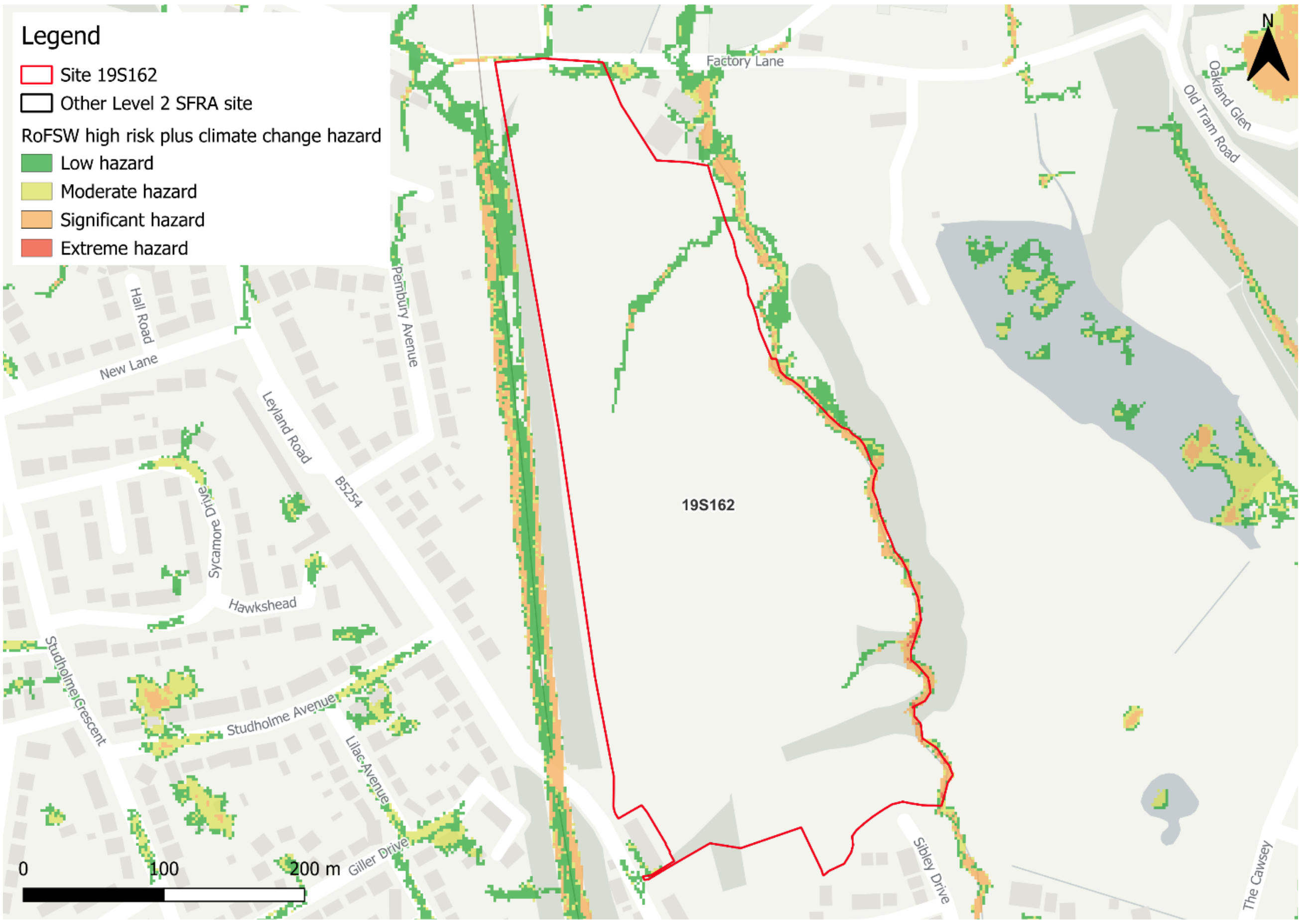

Figure 75-4: High risk event surface water flood hazards plus 40% climate change (based on Risk of Flooding from Surface Water map)

75.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is very low, with approximately 95% of the site being at very low risk. Surface water risk in the high risk event is present along the eastern boundary of the site, with an area of ponding to the north. A flow path is present through the centre of the site in the medium risk event. Any existing flow paths and topographic depressions should be maintained in site design.
- The modelled climate change outputs indicate a greater risk across the site, although depths and hazards remain low.
- Safe access and escape routes should be achievable via the B5254 to the south of the site in all events.
- 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.

- Site runoff should be maintained at current greenfield rates and, where possible, betterment should be achieved.
- 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

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[43]. Figure 4-1 shows the map for Site 19S162 and the surrounding areas and Table 76-1 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 76-1: JBA 5m Groundwater Emergence Map

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

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?

To pass part b) of the exception test[44], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development. The 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.

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 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.

77.2 Recommendation, 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 the area at modelled fluvial risk along the eastern boundary of the site.
- An update to the Penwortham Lane 2006 model 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 the surrounding areas. This should be based on up to date hydrology, terrain data and channel and structure survey to inform on safe site design and layout.
- 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 the unnamed watercourse adjacent to the eastern boundary of the site. 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 given the large area of this site being converted from open space to development. The use of infiltration SuDS should be investigated.

44 Para 178 National Planning Policy Framework 2024

- 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 19S250

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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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. Georgina Williams 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.

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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Acknowledgements

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

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Contents

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79 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for the Central Lancashire Local Plan Site 19S250. 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.

79.1 Site 19S250

- Location: Land off Emnie Lane, Leyland
- Existing site use: Agriculture
- Existing site use vulnerability: Less vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 20.2 hectares
- Proposed development impermeable area: 17.2 hectares (assumed 85% impermeable area)
- EA model: Lostock SOC 2020
- 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
    - 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

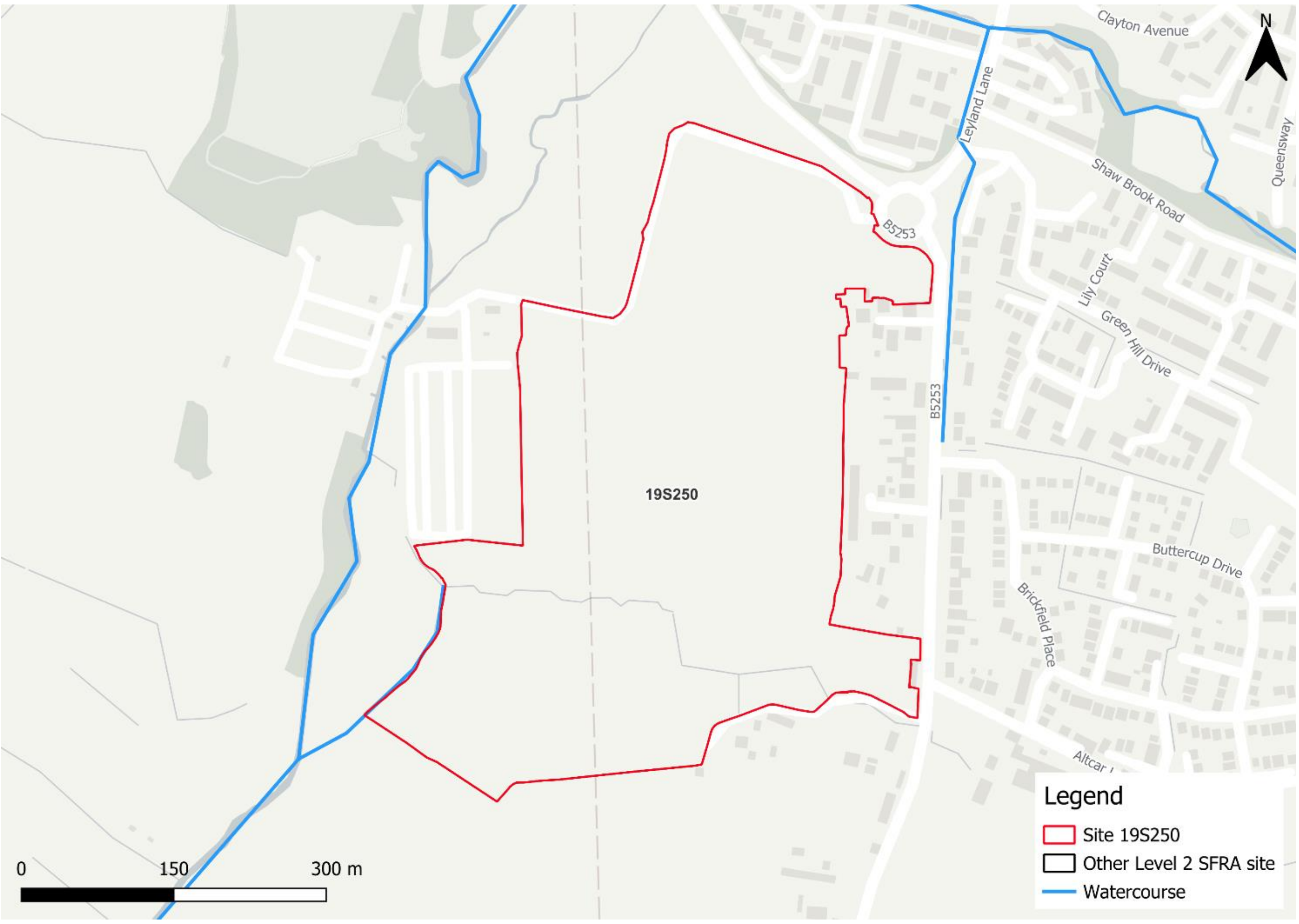

Figure 79-1: Existing site location boundary

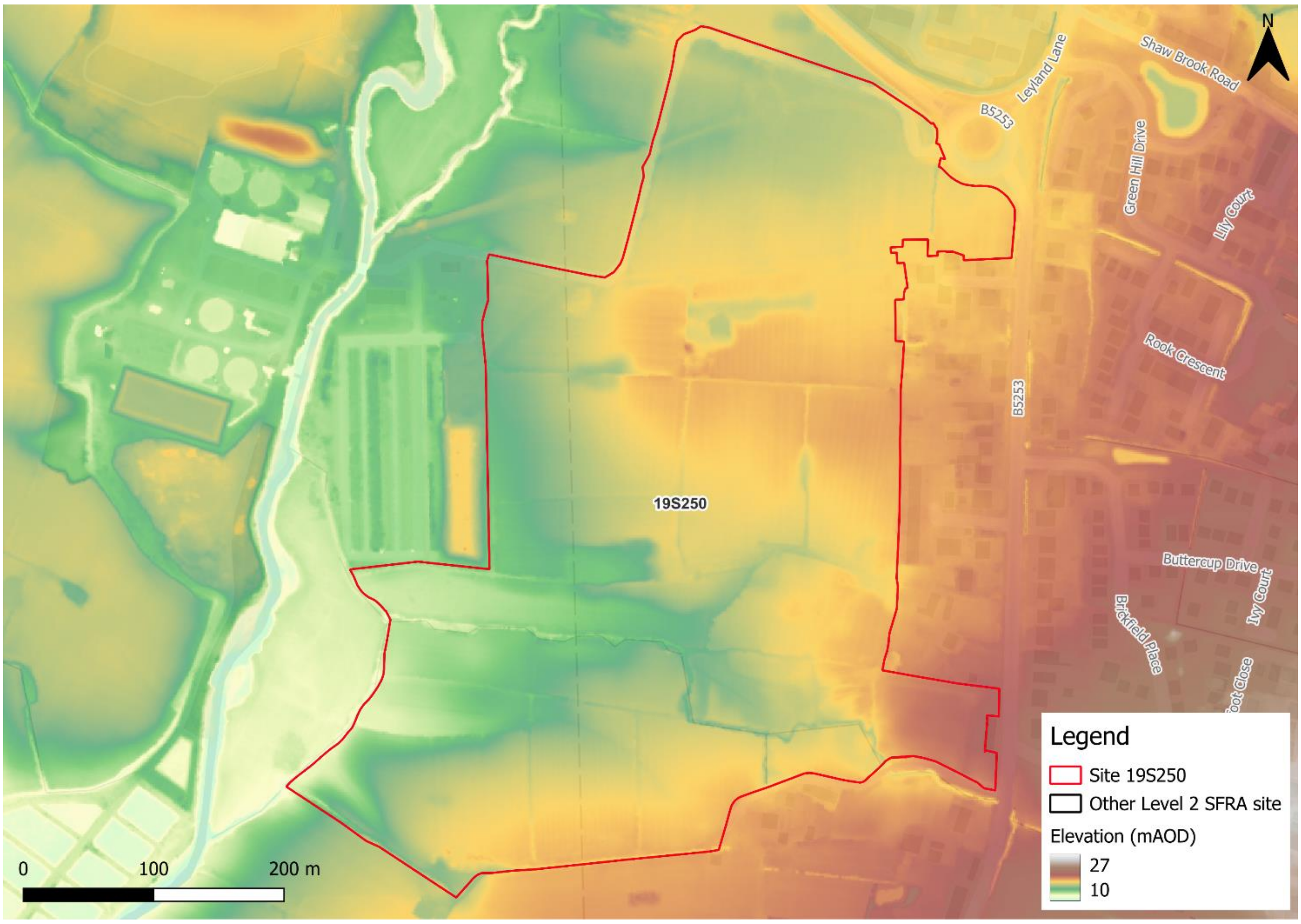

Figure 79-2: Topography

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 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 0) or the impacts of climate change (Section 50.2).

Functional floodplain is present in the south west of the site adjacent to the short, unnamed tributary to the River Lostock. The functional floodplain in this location is based on the Lostock SOC 2020 3.3% AEP undefended event. There should be no development within the functional floodplain. There is a small area in the south of the site within Flood Zone 3a and the south western corner of the site is within Flood Zone 2 of the Flood Map for Planning.

OS mapping and LIDAR imagery (Figure 79-2) indicates an unnamed tributary of the River Lostock flowing through the south of the site. This watercourse is not modelled and therefore is not included in the Flood Map for Planning.

Table 80-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
95	3	1	1

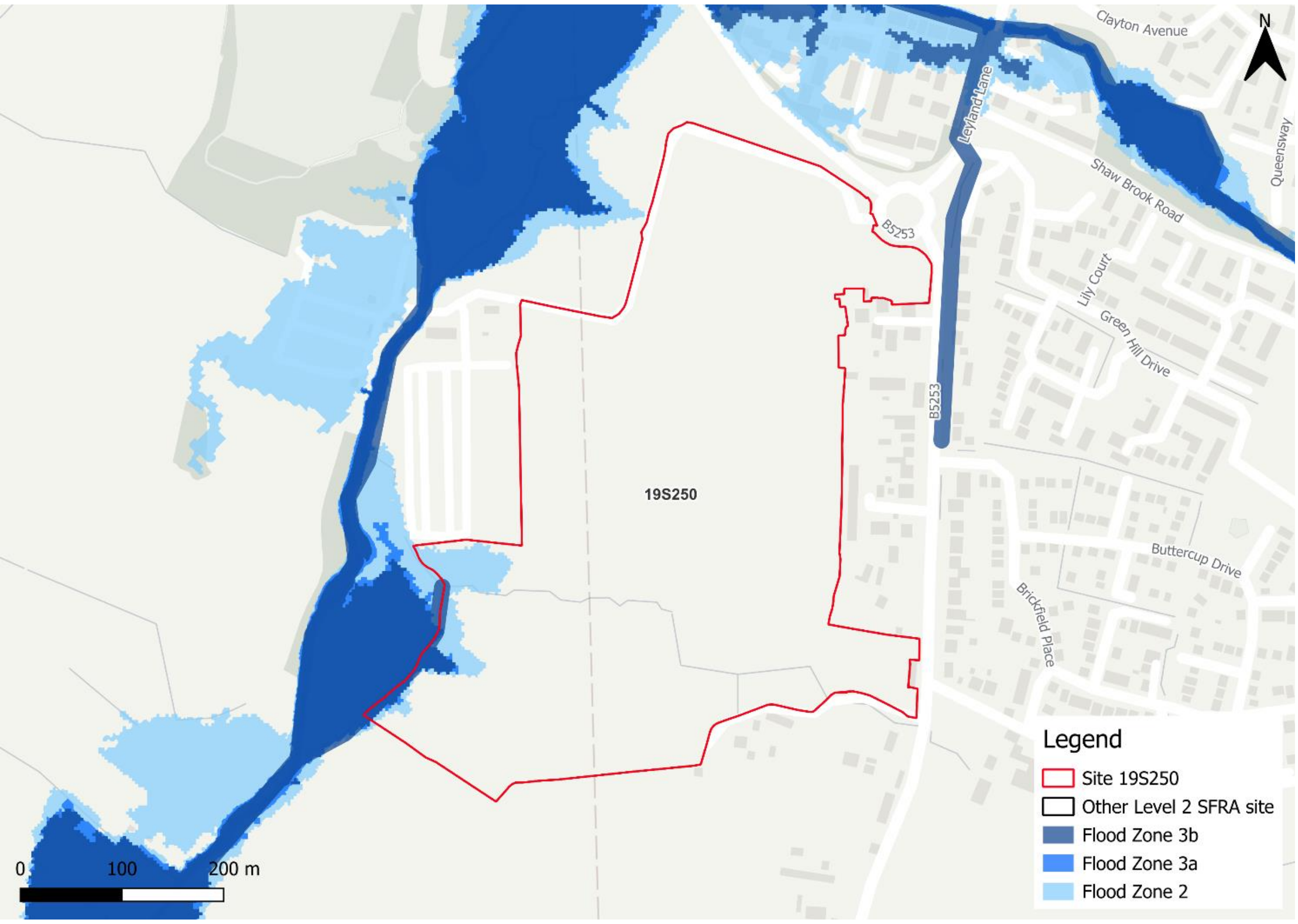

Figure 80-1: Existing risk from rivers to the site

80.1.2 Lostock SOC 2020 model outputs

Figure 74-2 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 southwest of the site. Maximum flood depths within the area at risk are modelled to be between 0.6 and 0.9 m. Figure 80-3 shows the modelled flood hazard ratings for the 1% AEP undefended event. The greatest modelled flood hazard rating is 'Danger for some'. There is no modelled flood risk to the rest of the site in the 1% AEP undefended event.

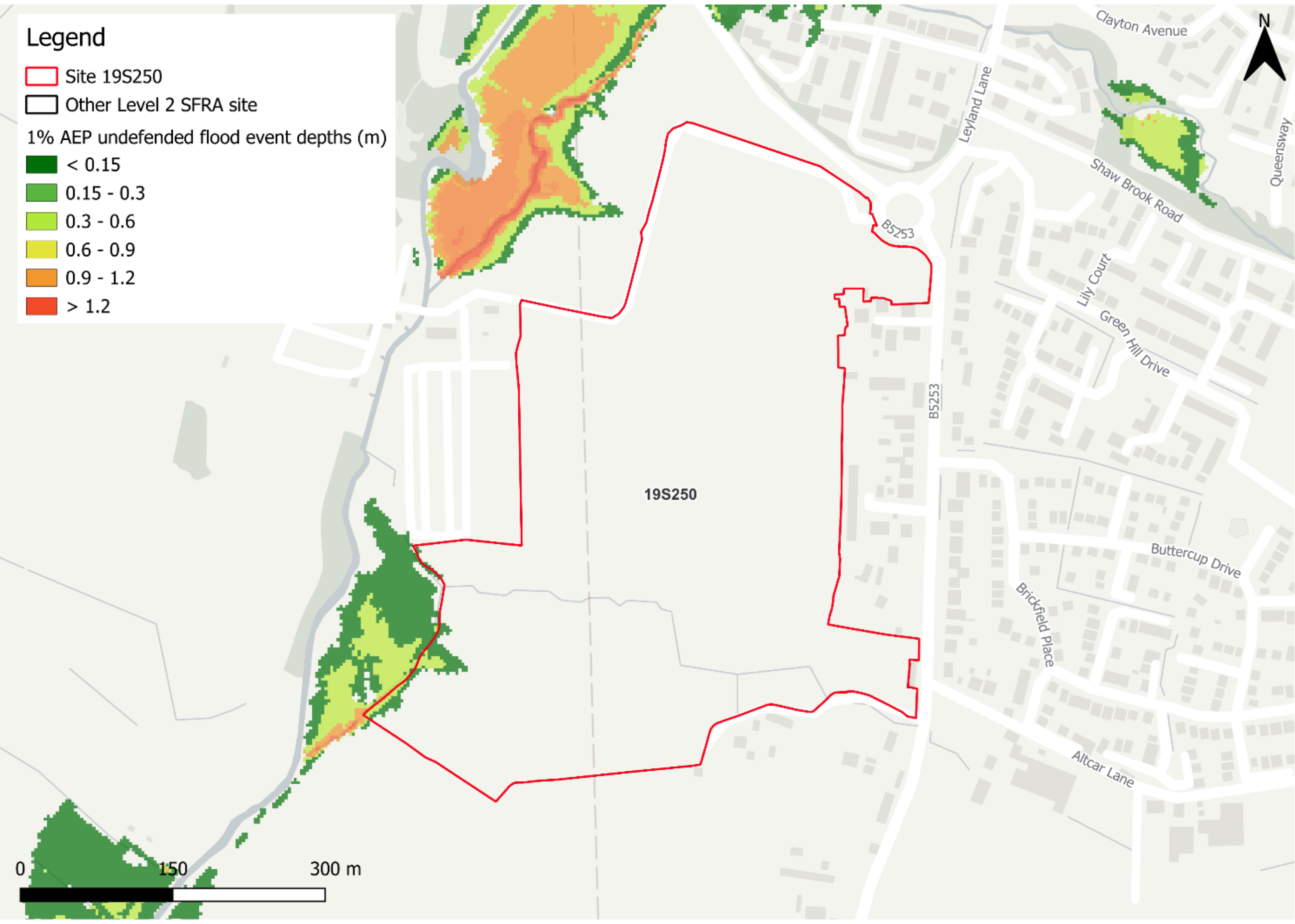

Figure 80-2: Flood depths for 1% AEP undefended flood event

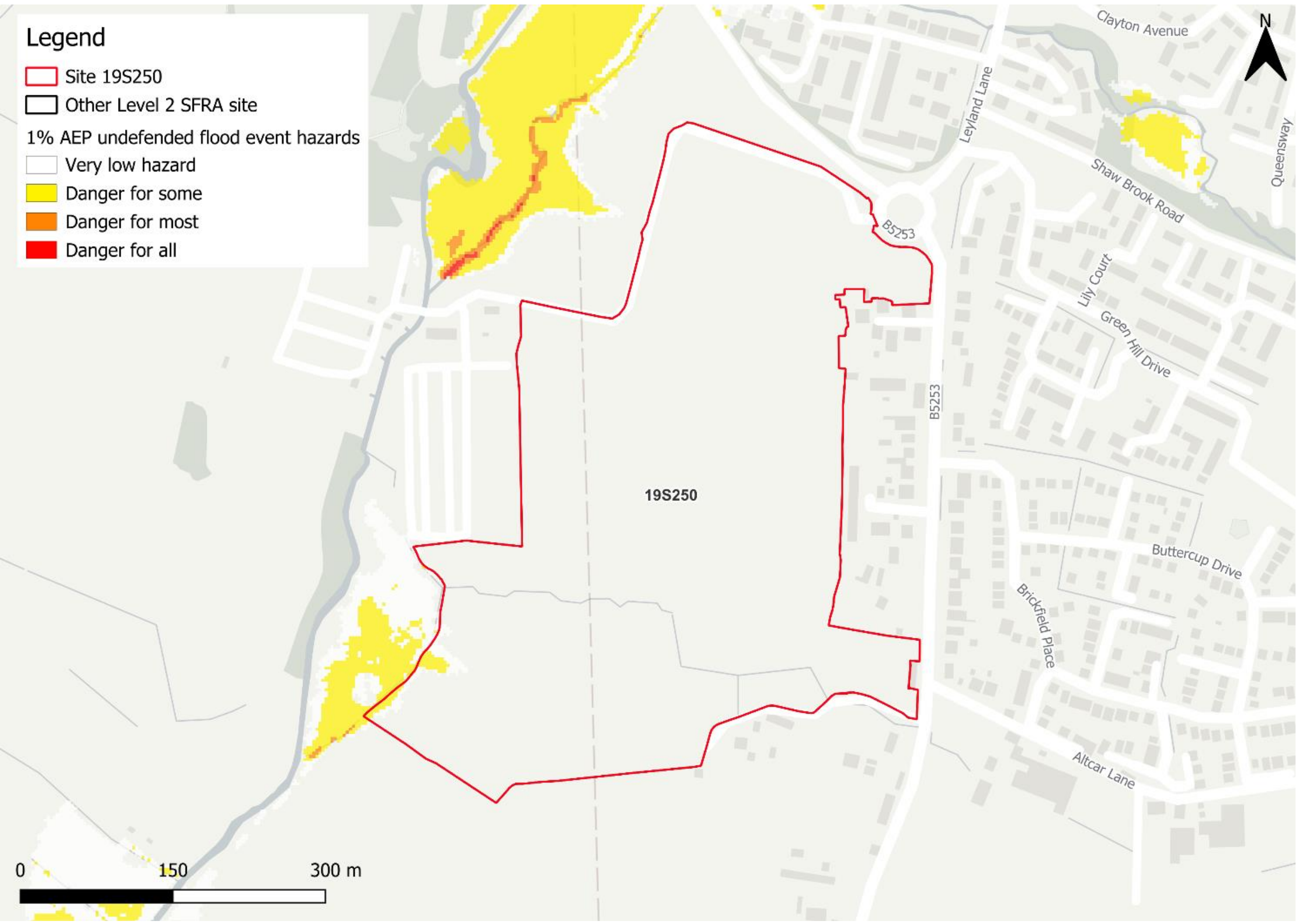

Figure 80-3: Flood hazard[45] for 1% AEP undefended flood event

80.2 Impacts from climate change

The impacts of climate change on flood risk from the River Lostock 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 74-2.

Table 80-2: 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%

45 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 greater risk along the southwestern boundary. Figure 74-3 shows the modelled flood depths during the 1% AEP undefended flood event +47% climate change allowance. Flood depths within the site are greater than in the present day 1% AEP event, with maximum depths between 0.9 and 1.2 m within the area at risk. Figure 80-5 shows the modelled flood hazard rating during the 1% AEP undefended flood event +47% climate change allowance. Flood hazard is largely categorised as 'Danger for some', with some small areas of 'Danger for most'.

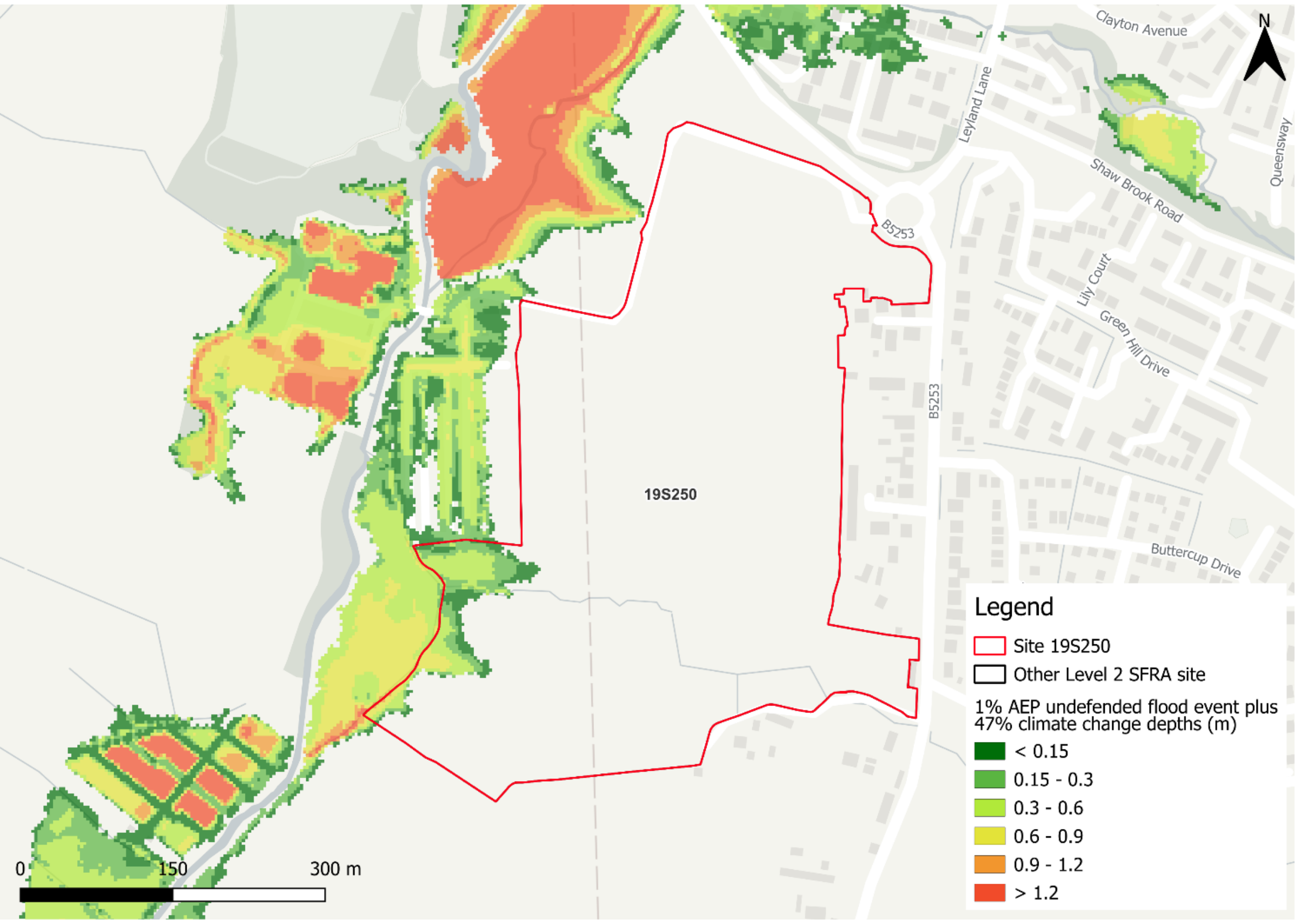

Figure 80-4: Flood depths for 1% AEP undefended flood event +47% (higher central climate change allowance)

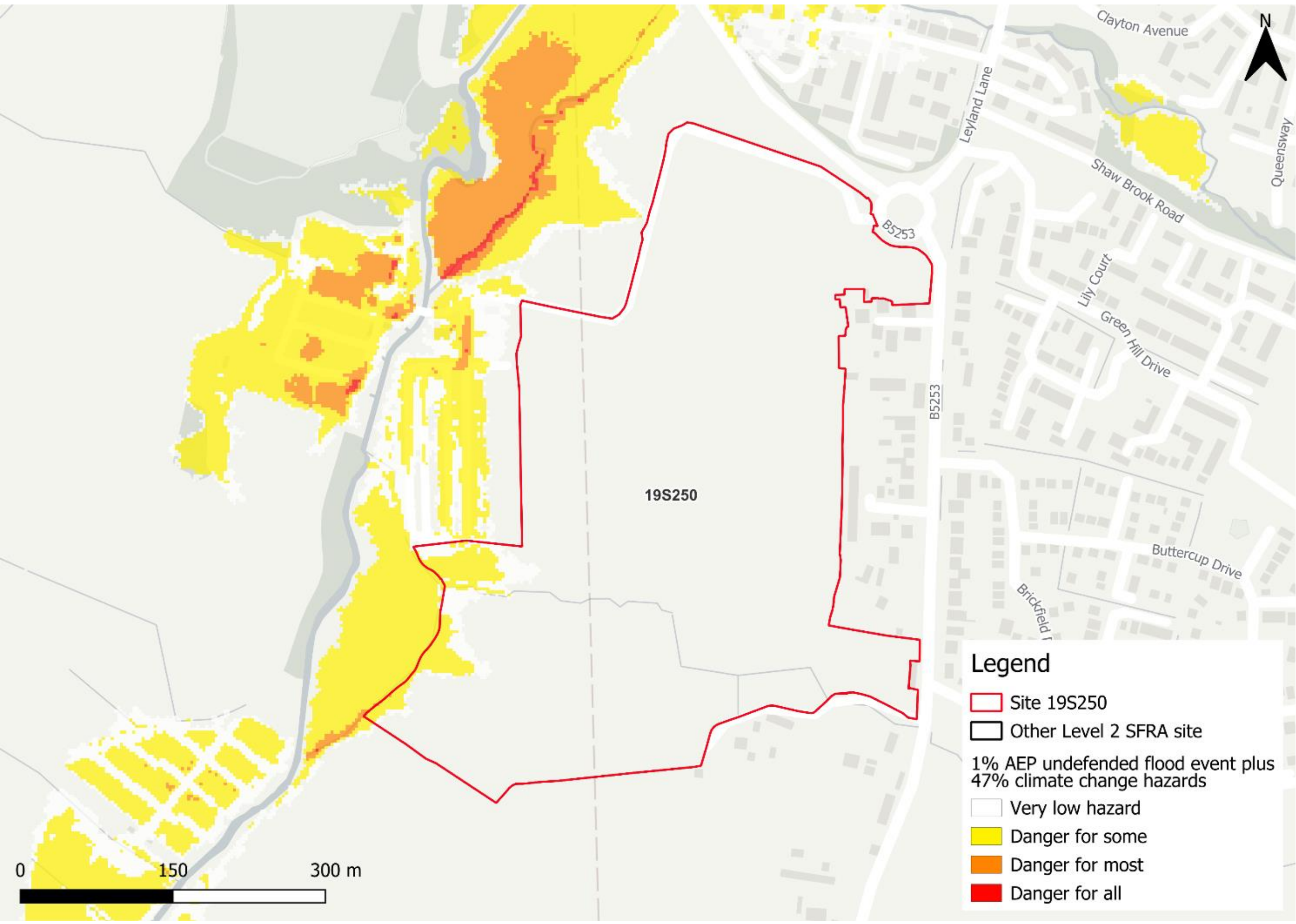

Figure 80-5: Flood hazard for 1% AEP undefended flood event +47% (higher central climate change allowance)

80.3 Flood risk management

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

80.3.1 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 19S250 is located within one catchment, namely; Lostock DS Farington Weir. This is ranked as a high sensitivity catchment. 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[46] and volumes[47] in their post-development state, to counter cumulative impacts of development within the catchment.
- A Surface Water Drainage Strategy should be required for all developments in these catchments, regardless of development size. This would mean that a site-specific Flood Risk Assessment would be required for all developments, regardless of their size.

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

80.3.2 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 to reduce runoff. There are also areas throughout the site for runoff attenuation features. West of the site there is opportunity for floodplain reconnection of the River Lostock. However, this is located at the site of Leyland Wastewater Treatment Works so likely would not be achievable. 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 80-6.

46 For the 1 in 1 year rainfall event and the 1 in 100 year rainfall event
47 For the 1 in 100 year, 6 hour rainfall event

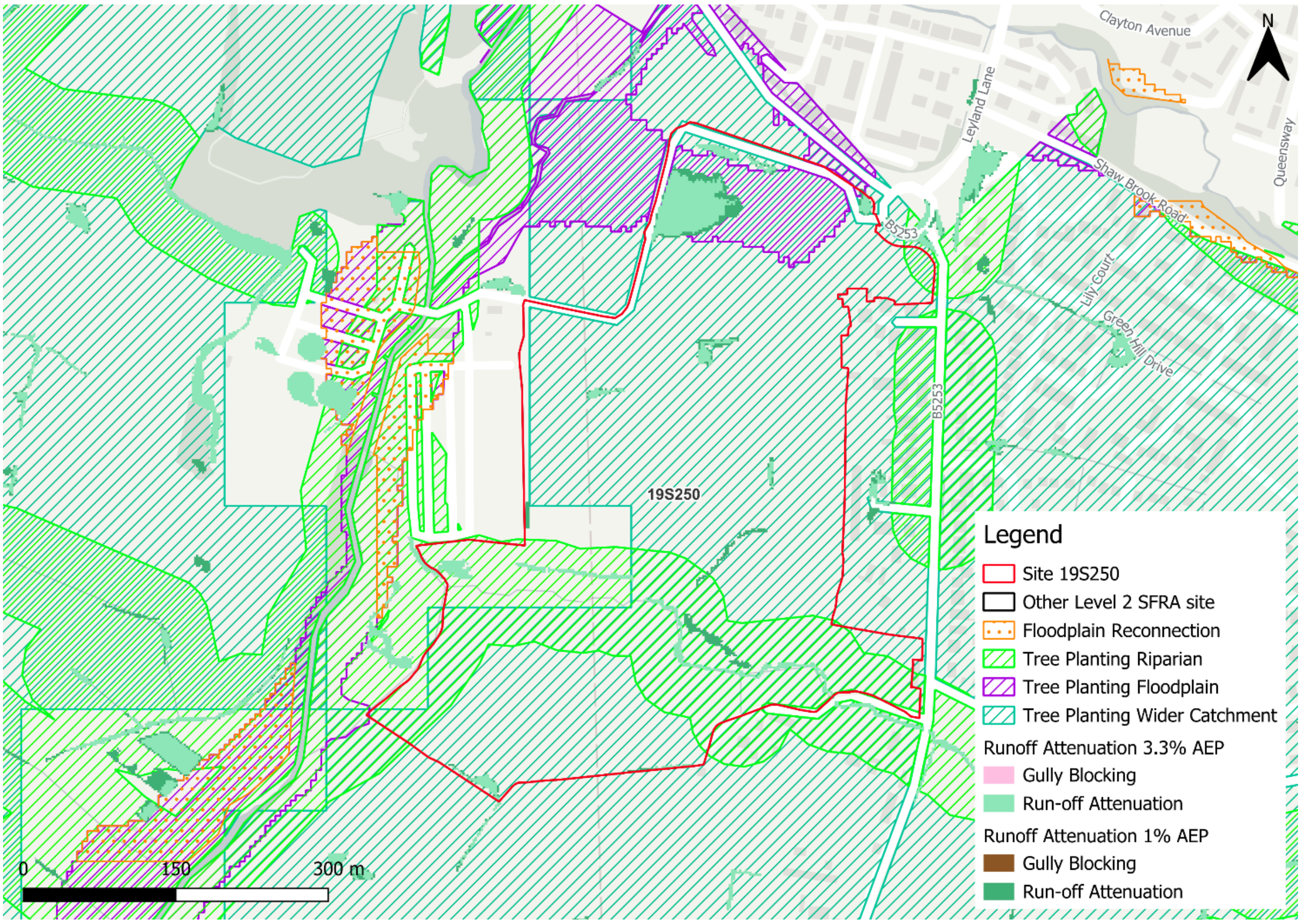

Figure 80-6: Natural Flood Management (NFM) potential mapping

80.4 Residual risk

80.4.1 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. The site is not modelled to be at risk from reservoir flooding.

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, High Bullough and Yarrow reservoirs, all of which are located within Lancashire and 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. At the FRA stage, United Utilities, 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.

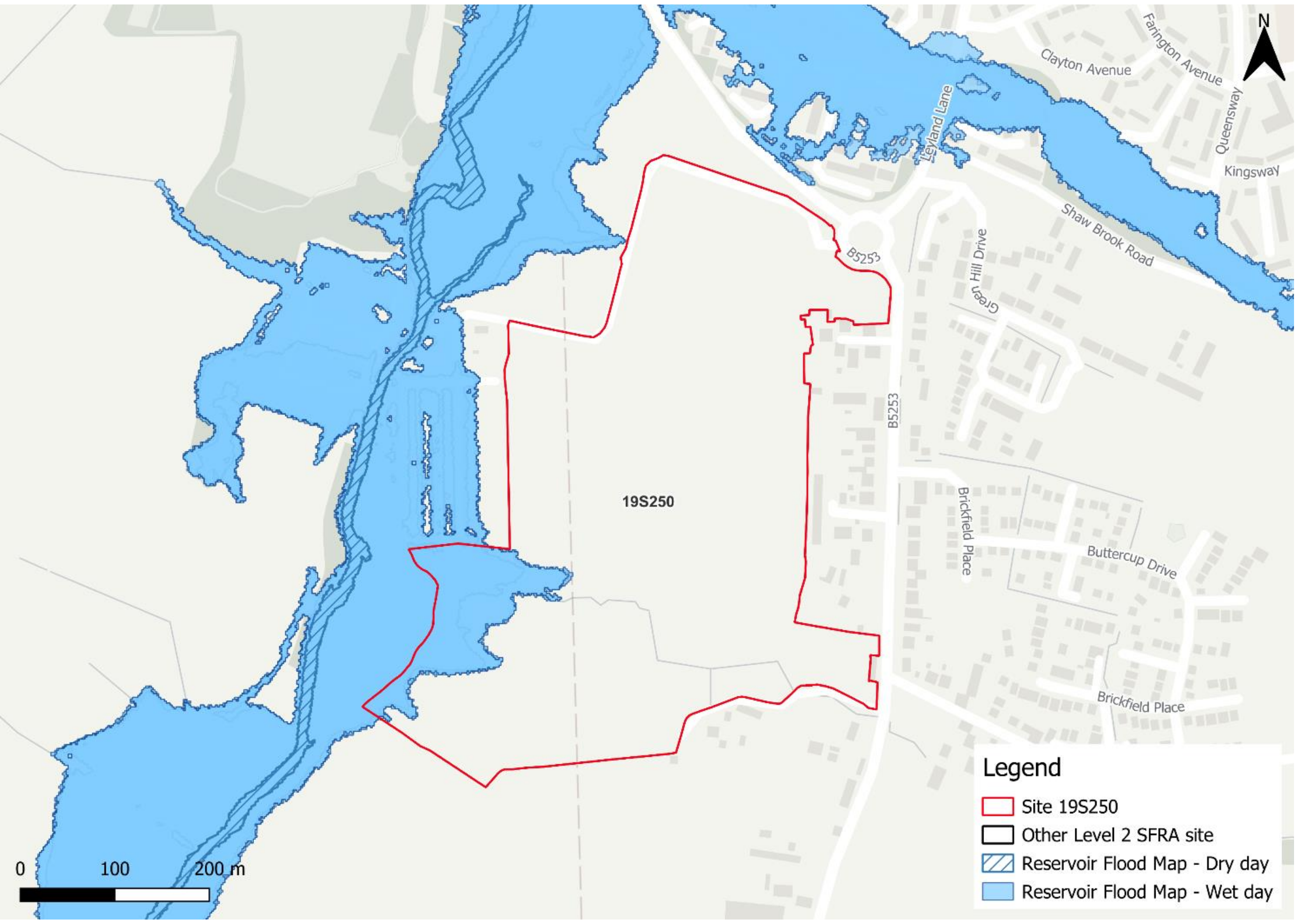

Figure 80-7: Flood risk from reservoirs

80.5 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.

80.6 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 19S250 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. Part of the site is 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 B5253 to the east of the site.

80.7 Observations, mitigation options and site suitability - fluvial

- The site is modelled to be within the functional floodplain in the southwestern corner of the site, adjacent to the unnamed tributary of the River Lostock. Development is not permitted within the functional floodplain.
- 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 River Lostock 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 than the present day 1% undefended event outputs with flood extent, depth and hazard increasing within the south western corner of the site.
- More vulnerable development should be directed away from the area of the site modelled to be at risk during the 1% AEP undefended event +47% climate change allowance.
- Risk from the unnamed watercourse must be quantified through appropriate modelling. This watercourse should be allowed to flow unobstructed and should be included in a blue / green corridor.
- Safe access and escape routes should be possible via the B5253 located east of the site, based on available information.
- Given the potential reservoir risk to the site, developers should consider[48]:
    - 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

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

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 3% 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 81-1.

In **the high risk event, surface water risk is largely confined to areas of surface water ponding within topographic low spots. There is a large area of ponding within the northwestern corner of the site. A flow path is also present within the south of the site, coincident with the path of the unnamed watercourse. In the medium and low risk events, flood depths increase and flow paths through the site increase in extent and depth. There are also some additional areas of surface water ponding.**

Greatest surface water flood depths in the high risk event are between 0.6 m and 0.9 m (Figure 3-1) with some areas of significant hazard (Figure 3-2). Safe access and escape routes should be possible via the B5253 to the east of the site in the high and medium risk events. There are some areas of shallow depths along the B5253 in the low risk event which should be considered.

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

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
85	9	3	3

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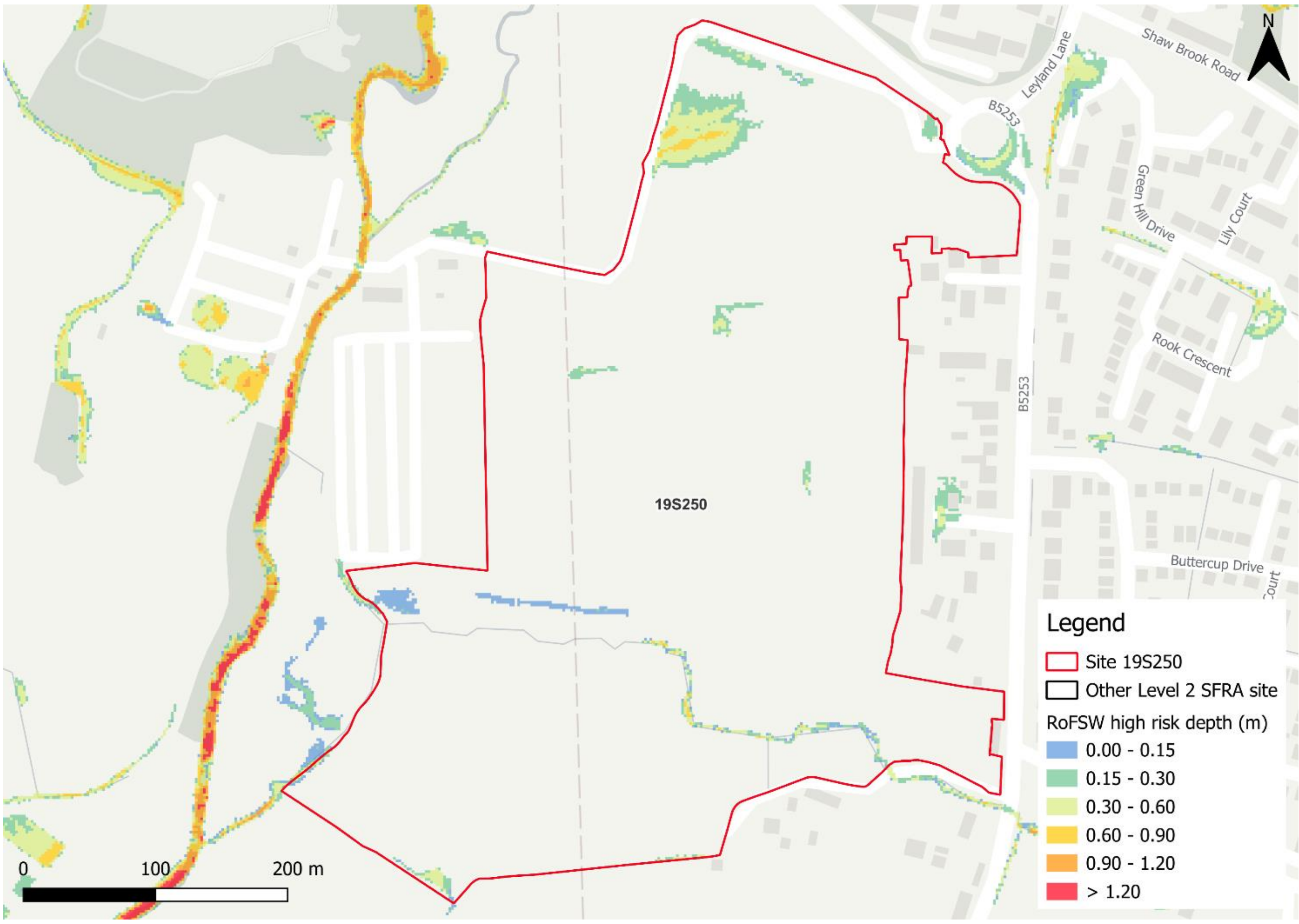

Figure 81-1: High risk event surface water flood depths (Risk of Flooding from Surface Water map)

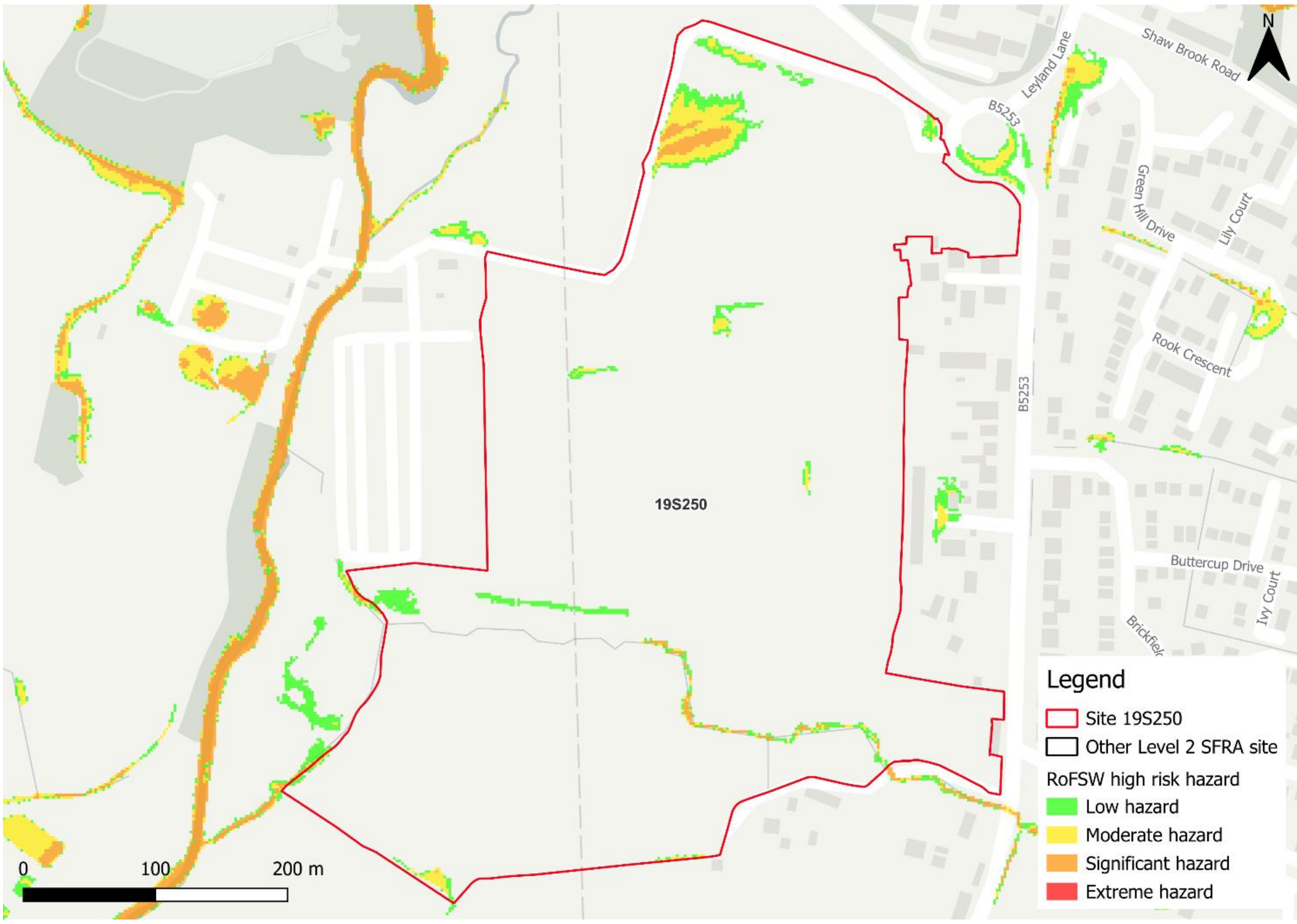

Figure 81-2: High risk event surface water flood hazard[49] (Risk of Flooding from Surface Water map)

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% (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 than the present day high surface water risk flood extent with larger areas of ponding and additional flow paths at the south of the site, similar to the present day

49 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

low risk event. Maximum flood depths are modelled to be between 0.6 m and 0.9 m, with some areas of significant hazard (Figure 3-4).

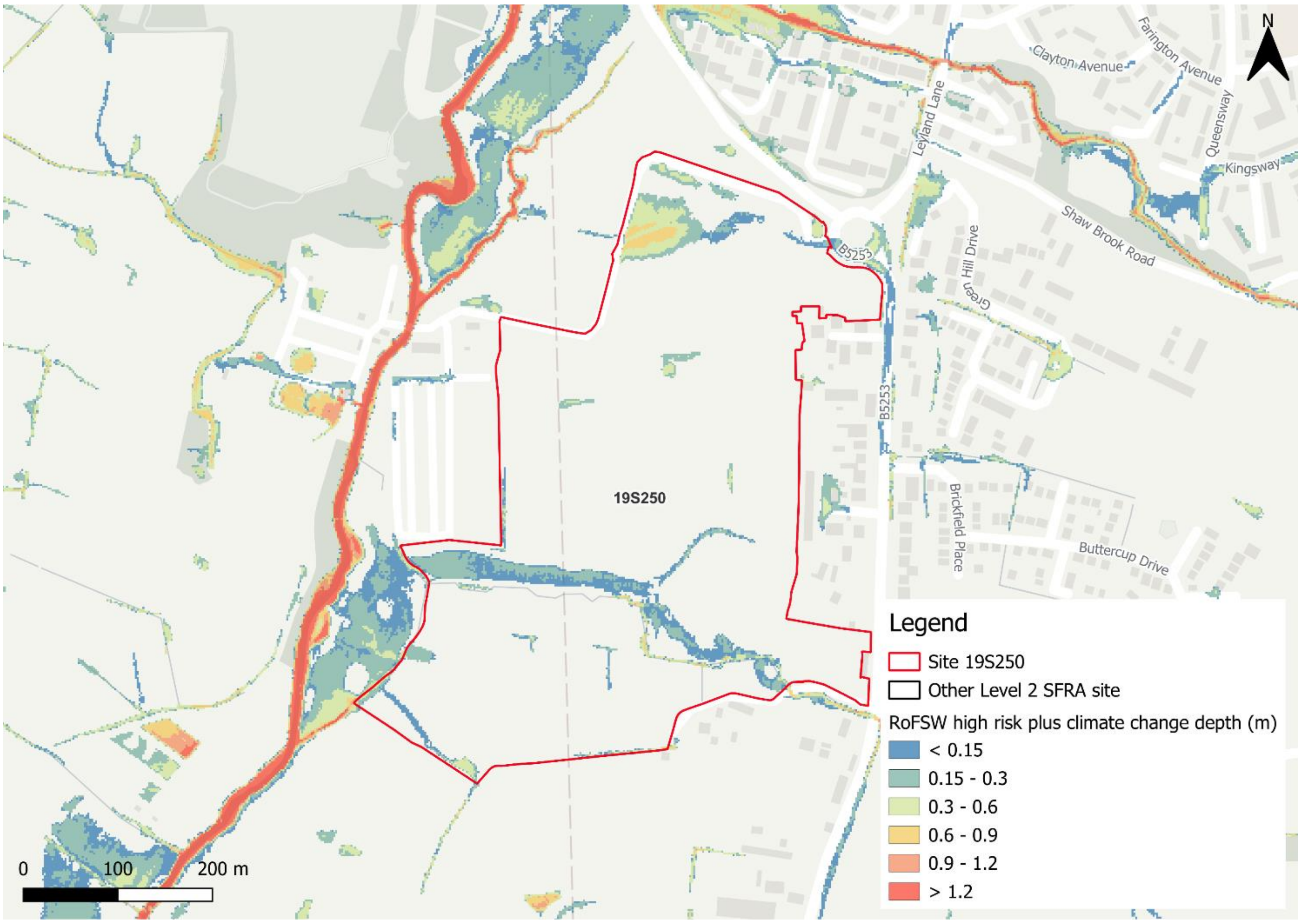

Figure 81-3: High risk event surface water flood depths plus 40% climate change (based on Risk of Flooding from Surface Water map)

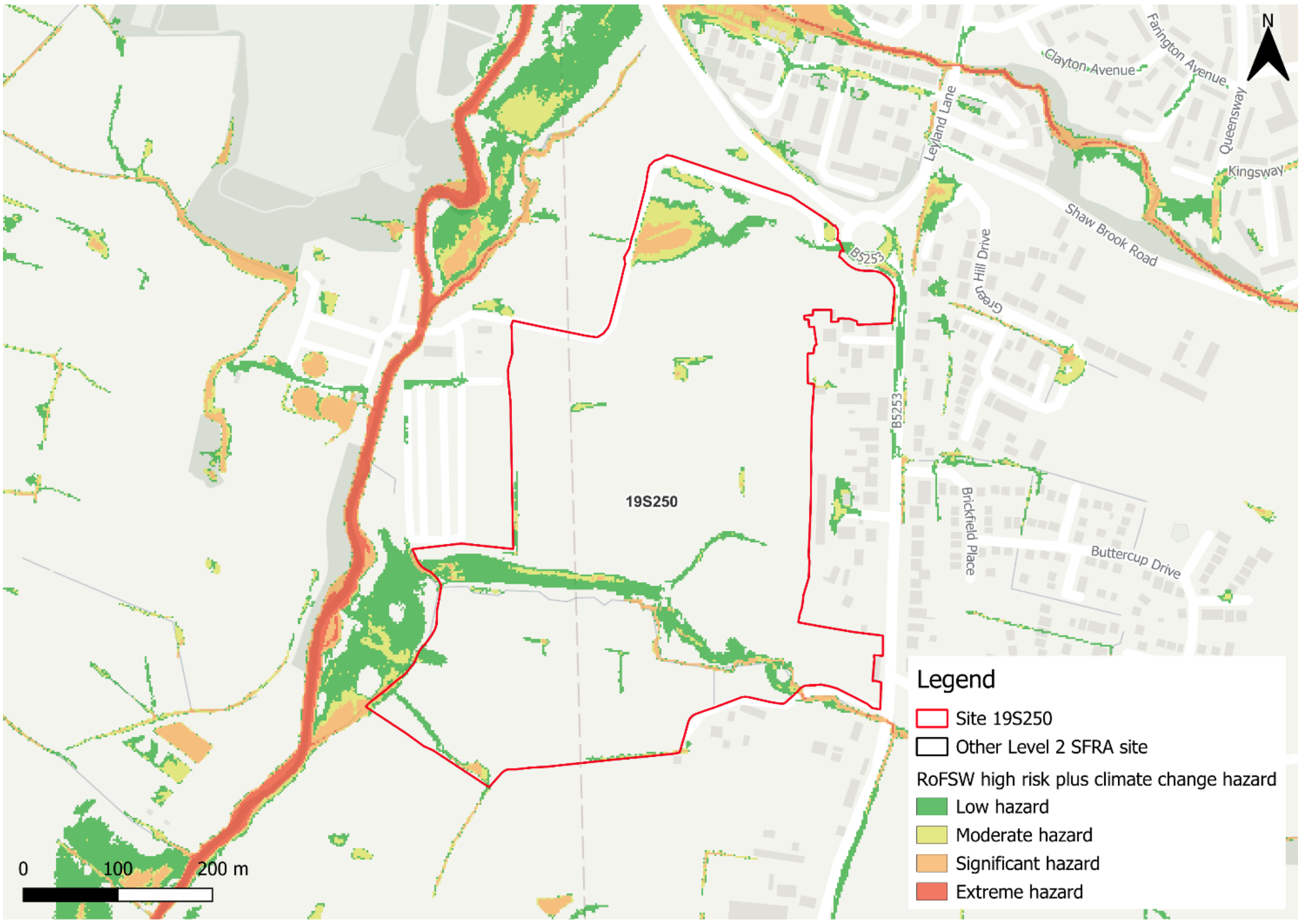

Figure 81-4: High risk event surface water flood hazards plus 40% climate change (based on Risk of Flooding from Surface Water map)

81.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with 85% of the site being at very low surface water flood risk. Surface water flooding in all three events consists of scattered ponding in topographic low spots and flow paths within the south and north of the site. Any existing flow paths and topographic depressions should be maintained in site design.
- Safe access and escape routes should be achievable via the B5253 in the high and medium events, though in the low risk event there are shallow surface water depths on the road which should be considered.
- 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 the high risk present day event, with extents and depths similar to the present day low risk event.
- 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.
- 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.

- Site runoff should be maintained at current greenfield rates and, where possible, betterment should be achieved.
- 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

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[50]. Figure 4-1 show the map for Site 19S250 and the surrounding areas and Table 82-1 explains the risk classifications.

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

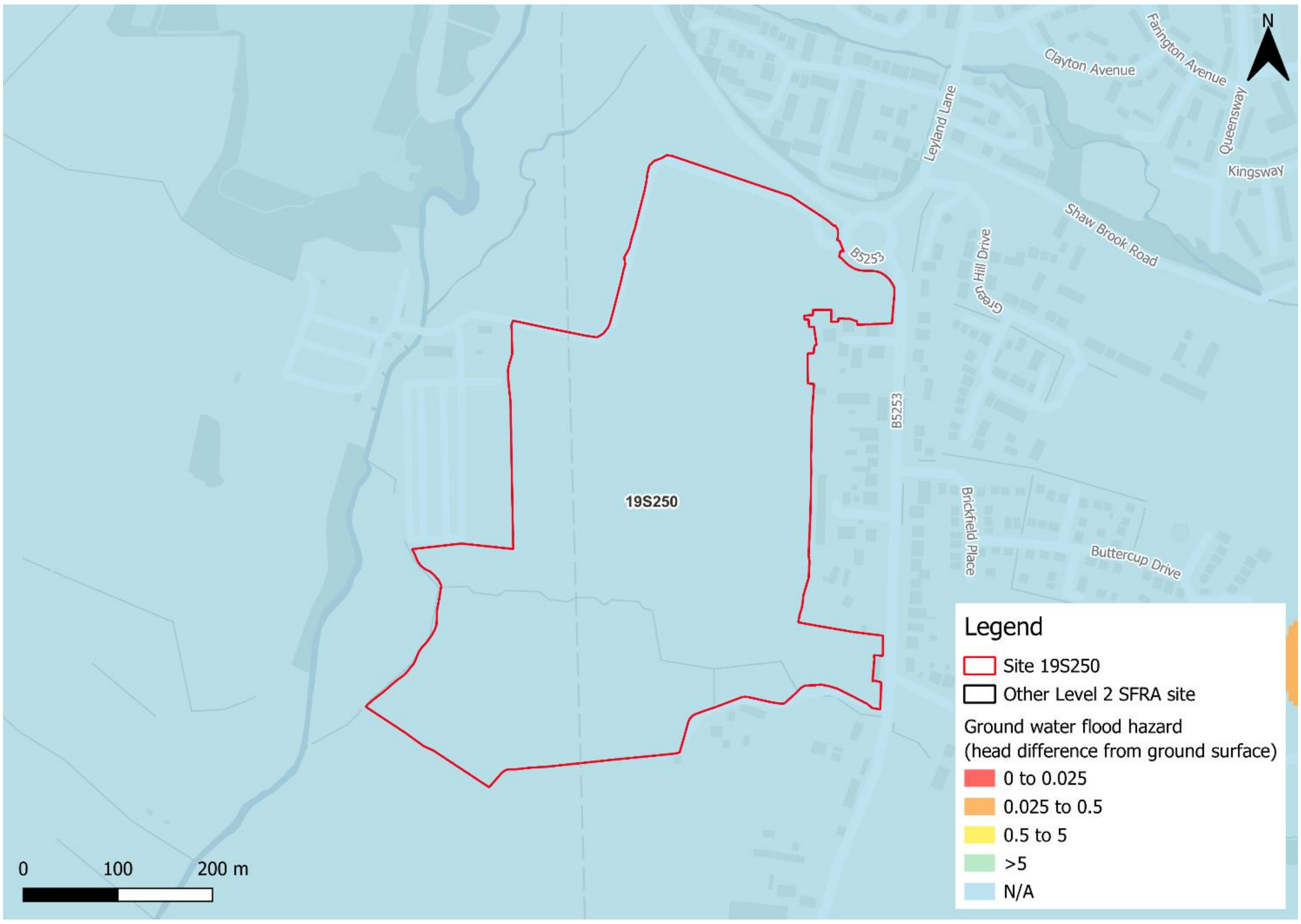

Figure 82-1: JBA 5m Groundwater Emergence Map

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

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?

To pass part b) of the exception test[51], it must be proven that the development can be safe for its lifetime, which is 100 years for residential development. The 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.

The areas of flood risk along the unnamed watercourse cannot be developed until the required information detailed in this SFRA on existing and future flood risk 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.

83.2 Recommendations, FRA requirements and further works

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 also be no development within 8m of the unnamed tributary of the River Lostock adjacent to the western boundary of the site. This should be converted to a blue / green corridor to provide ecological, amenity and social value.
- Based on current information, this site could be allocated if more vulnerable development is directed away from the area of the site modelled to be at risk in the 1% AEP undefended event plus higher central climate change, to ensure that development can be safe for its lifetime.
- A detailed drainage strategy will be required given the large area of this site being converted from open space to 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.
- 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.

51 Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S158/159/160/167/064/098/103/212/269

Final

February 2025

Prepared for:

Preston
South Ribble
Chorley
Central Lancashire

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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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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

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 19S158/159/160/167/064/098/103/212/269. 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 19S158/159/160/167/064/098/103/212/269

- Location: Southern area of the major development site at Pickering's Farm
- Existing site use: Mixed use
- Existing site use vulnerability: More vulnerable
- Proposed site use: Housing
- Proposed site use vulnerability: More vulnerable
- Site area: 52.7 hectares
- Proposed development impermeable area: 44.8 hectares (assumed 85% impermeable area)
- Watercourse: Mill 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

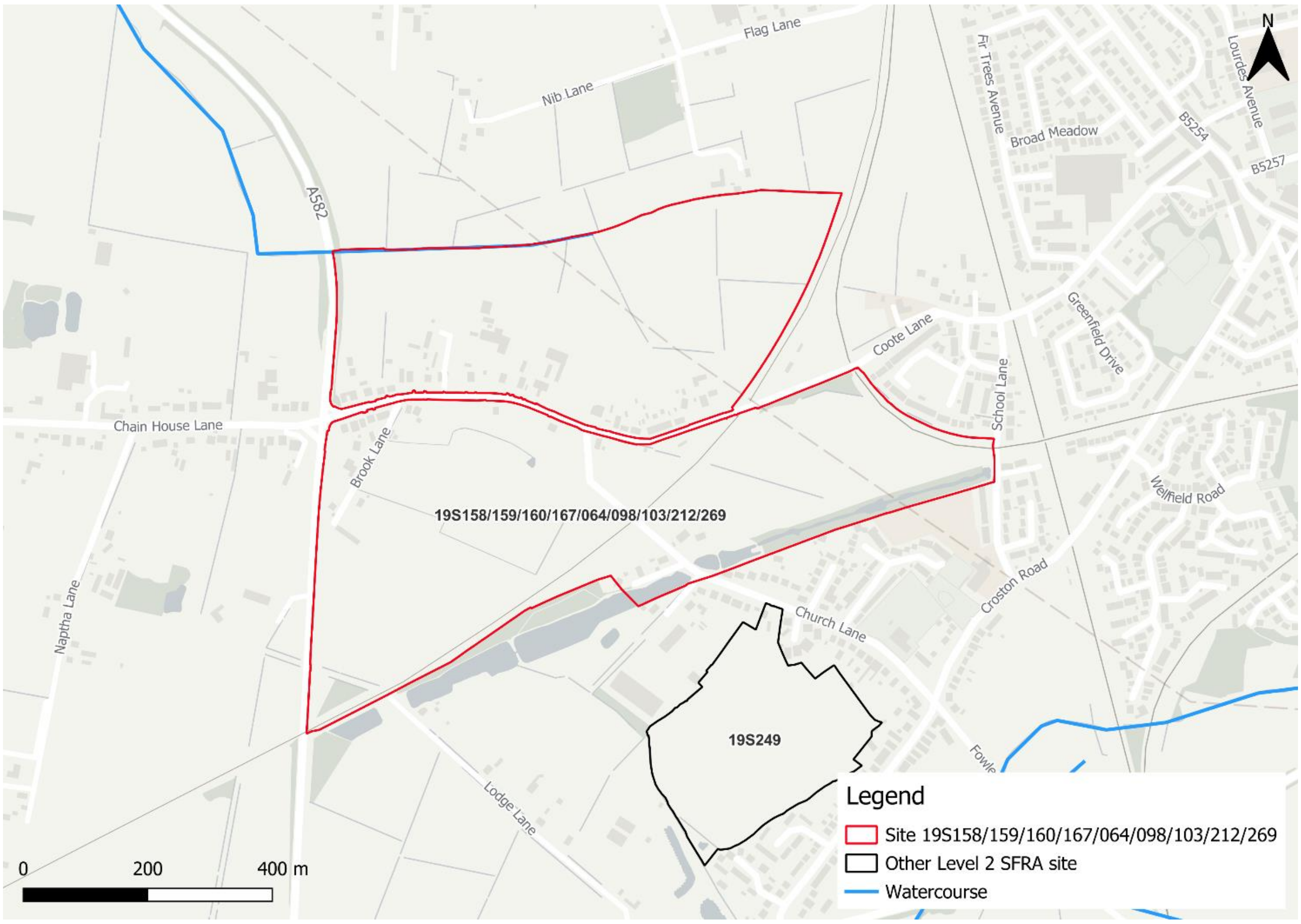

Figure 85-1: Existing site location boundary

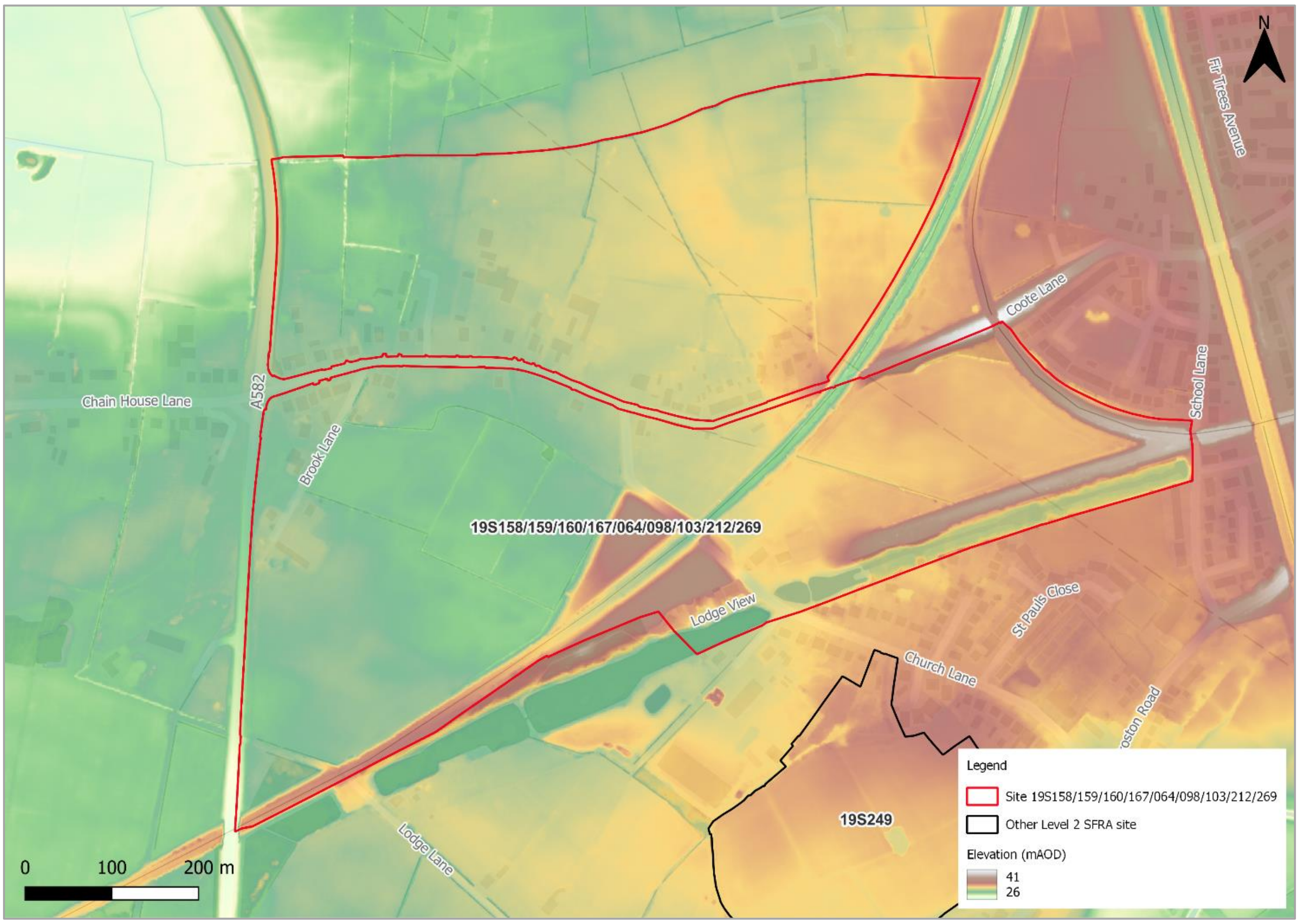

Figure 85-2: Topography

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 14-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 86.3) or the impacts of climate change (Section 50.2).

Approximately 1% of the site is within Flood Zone 3b which is the channel of Mill Brook flowing along the northwestern boundary of 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.

There are several drainage ditches throughout the site which serve as field drains for the agricultural land. The functional floodplain does not cover these drainage ditches as they are not included within the OS Open Rivers dataset which is used in the functional floodplain delineation process. All drainage ditches should remain free of any development with 8m no development buffers applied.

Modelling of Mill Brook may be required to fully ascertain the risk from this watercourse to the northwestern area of the site. It also appears that Mill Brook is culverted under the A582 road which may cause residual risk to the site.

Table 86-1: Existing fluvial flood risk

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

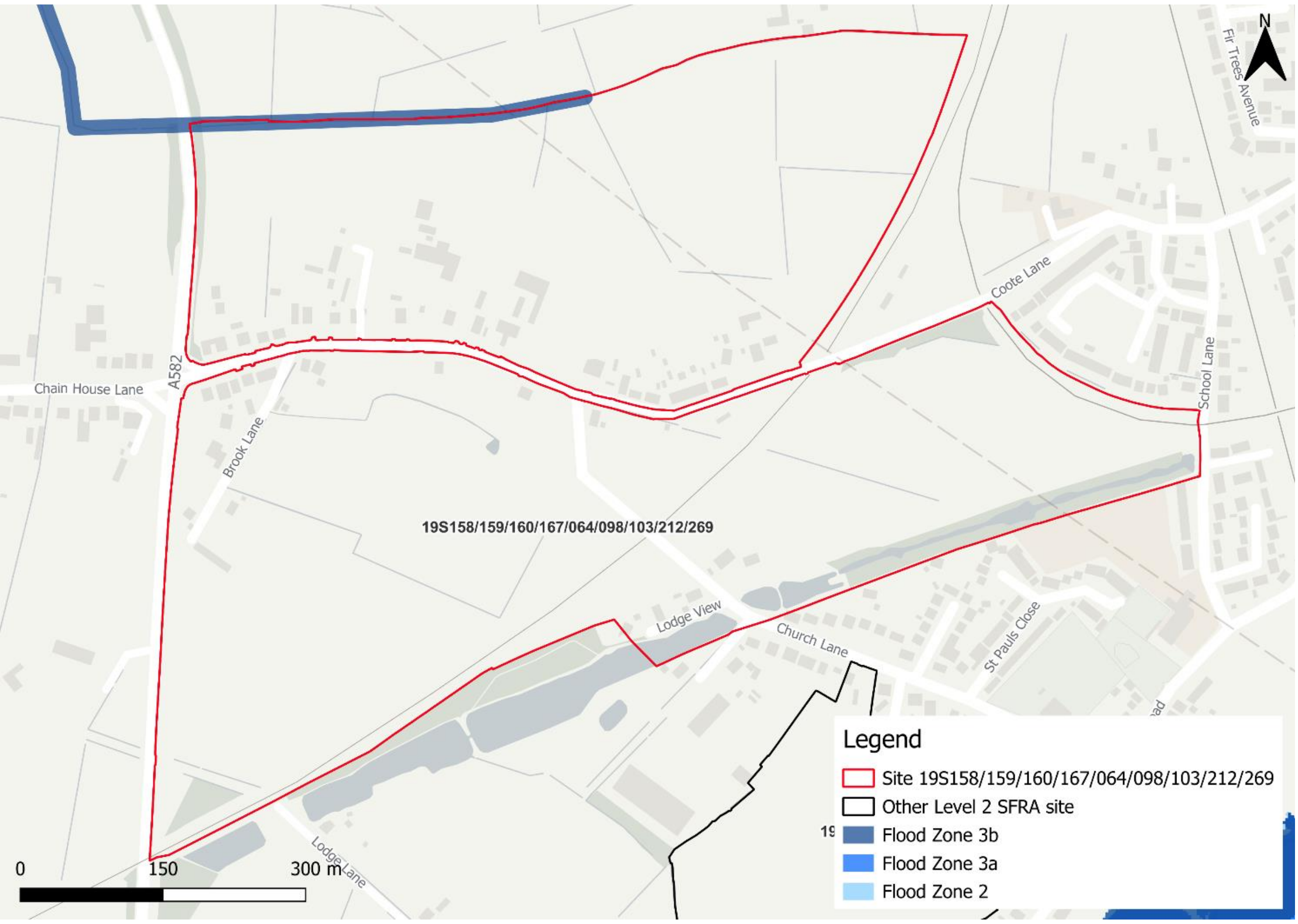

Figure 86-1: Existing risk from rivers to the site

86.2 Impacts from climate change

The impacts of climate change on flood risk from Mill Brook have not been modelled for this SFRA due to the unavailability of modelling for this section of the watercourse.

The impacts of climate change should be modelled using the EA's latest allowances for peak river flows to inform on future flood risk to the site. Therefore, any updates to this Level 2 SFRA and/or any FRA should produce a model of Mill Brook and include for the most up to date climate change allowances.

86.3 Flood risk management

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

86.3.1 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. This site is located within two catchments, namely; Coastal Catchment 175 and Lostock DS Farington Weir. Coastal Catchment 175 is ranked as a low sensitivity catchment while Lostock DS Farington Weir is ranked as a high sensitivity catchment.

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.

86.3.2 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 riparian and wider catchment tree planting. Tree planting can intercept, slow, store and filter water, reducing runoff downstream. These areas are shown in Figure 86-2. However, the WwNP dataset is indicative and further investigation into suitability of the site for tree planting should be carried out.

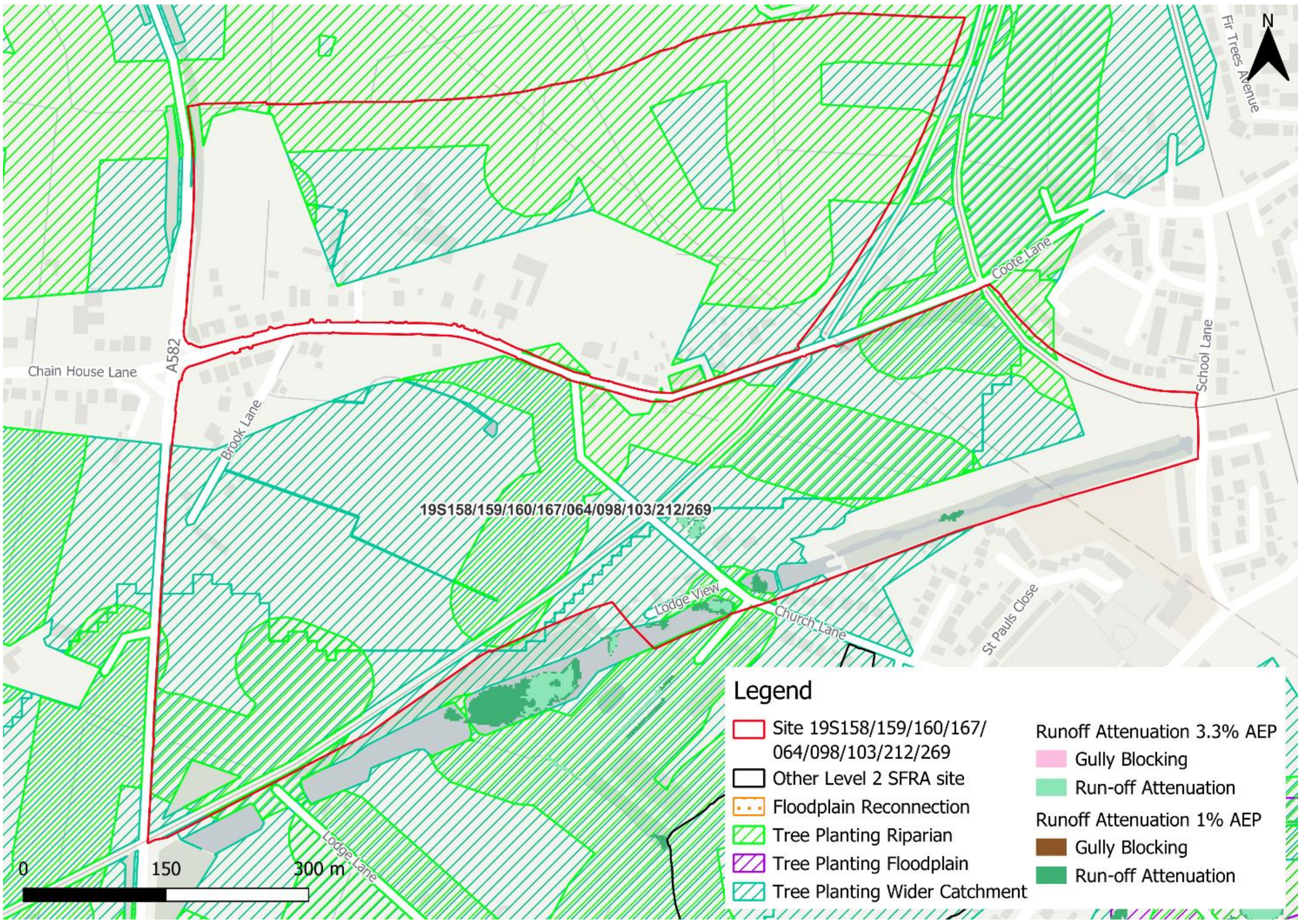

Figure 86-2: Natural Flood Management (NFM) potential mapping

86.4 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.

There is potential residual risk from possible blockage of the culverted Mill Brook beneath the A582 (Figure 86-3). The impact of a culvert blockage has not been modelled as part of this Level 2 SFRA given the absence of an existing flood model for Mill Brook. It is recommended that the impact of a blockage of this culvert should be assessed in order to inform on residual flood risk to the site.

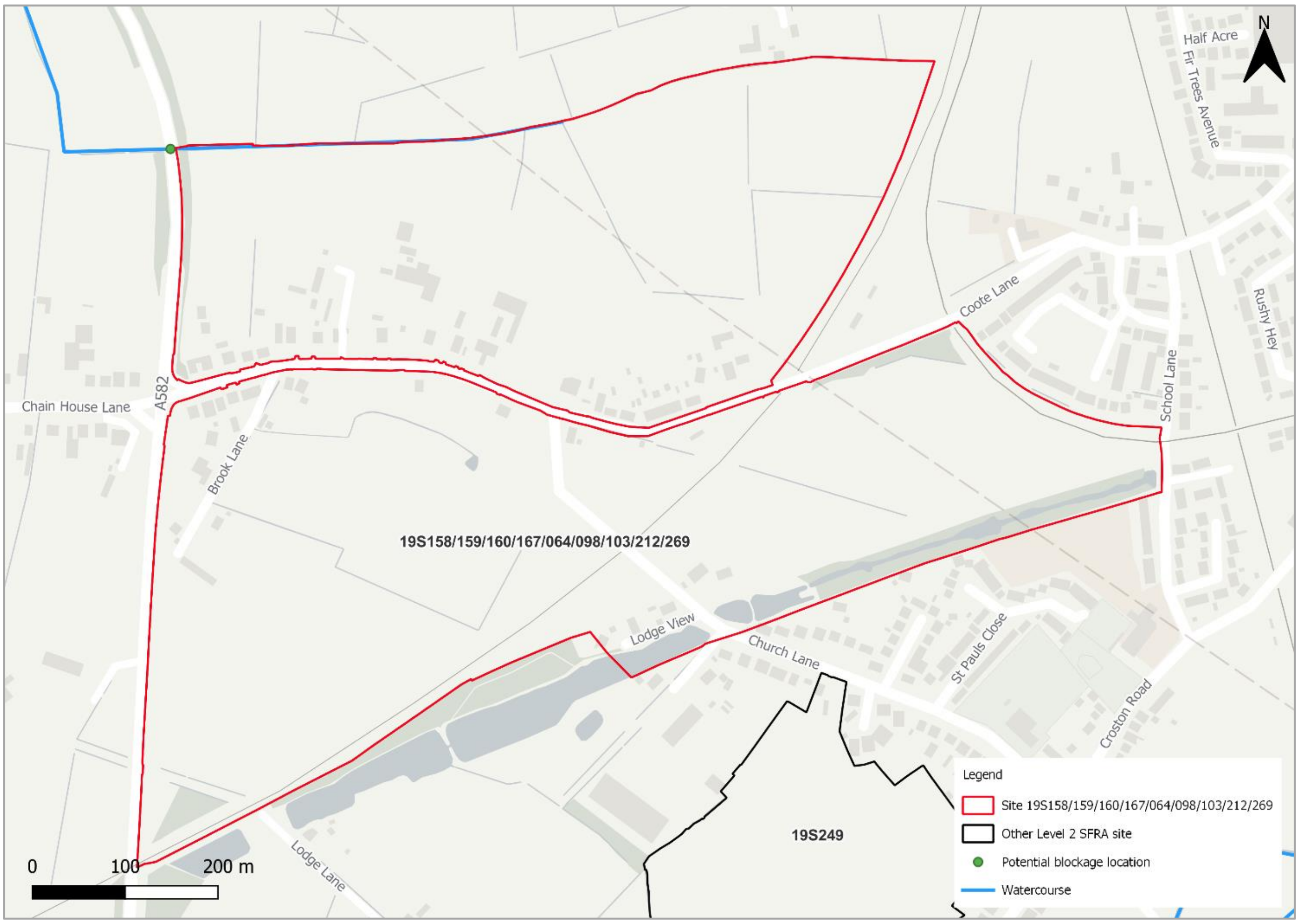

Figure 86-3: Potential blockage location

86.4.1 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.

86.5 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.

86.6 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 should be achievable via multiple locations surrounding the site.

86.7 Observations, mitigation options and site suitability - fluvial

- Mill Brook is unmodelled and culverted under the A582 road. 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 from Mill Brook 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 Mill Brook should be built to fully ascertain risk from this watercourse to the northwestern area of the site.
- Mill Brook should be allowed to flow unobstructed and should be included in site design. No development should take place within 8 metres of the watercourse.
- There is potential residual risk to the site from a possible blockage of the culverted Mill Brook beneath the A582. It is recommended that the site-specific FRA considers the impact of a blockage of this culvert on residual flood risk to the site.
- Safe access and escape routes could likely be achieved via multiple routes surrounding the site, based on available information.

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 flood risk to the site is predominantly very low. Approximately 1% of the site is within the high risk surface water zone. A further 2% is at medium surface water risk and a further 9% is at low surface water risk as shown in Table 87-1.

In the high risk event, surface water risk is scattered across the site within areas of ponding in topographic low spots. In the medium risk event, these areas of ponding increase in extent and depth. In the low risk event, the extent of surface water ponding increases further, with a large proportion of the southern site parcel modelled to be at risk. There is also a flow path extending along the railway line through the southern site parcel.

Greatest flood depths in the medium risk event are between 0.6 and 0.9 m (Figure 3-1), with areas of hazard classified as significant (Figure 3-2). Safe access and escape routes should be achievable via the A582 to the west of the site in all events.

Given the sporadic nature of the risk across a significantly large site, a detailed drainage strategy will be required for this this site.

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

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
88	9	2	1

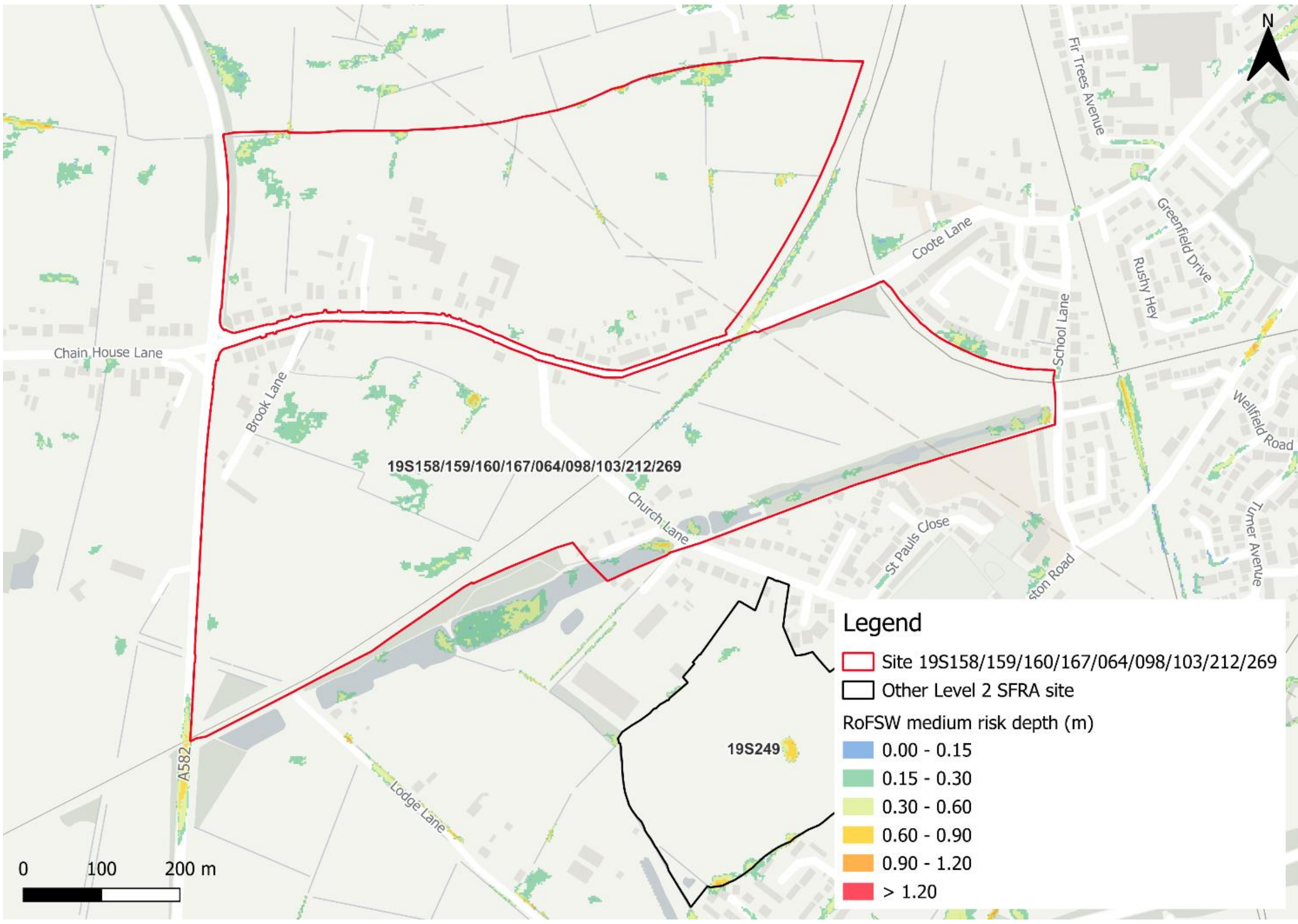

Figure 87-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

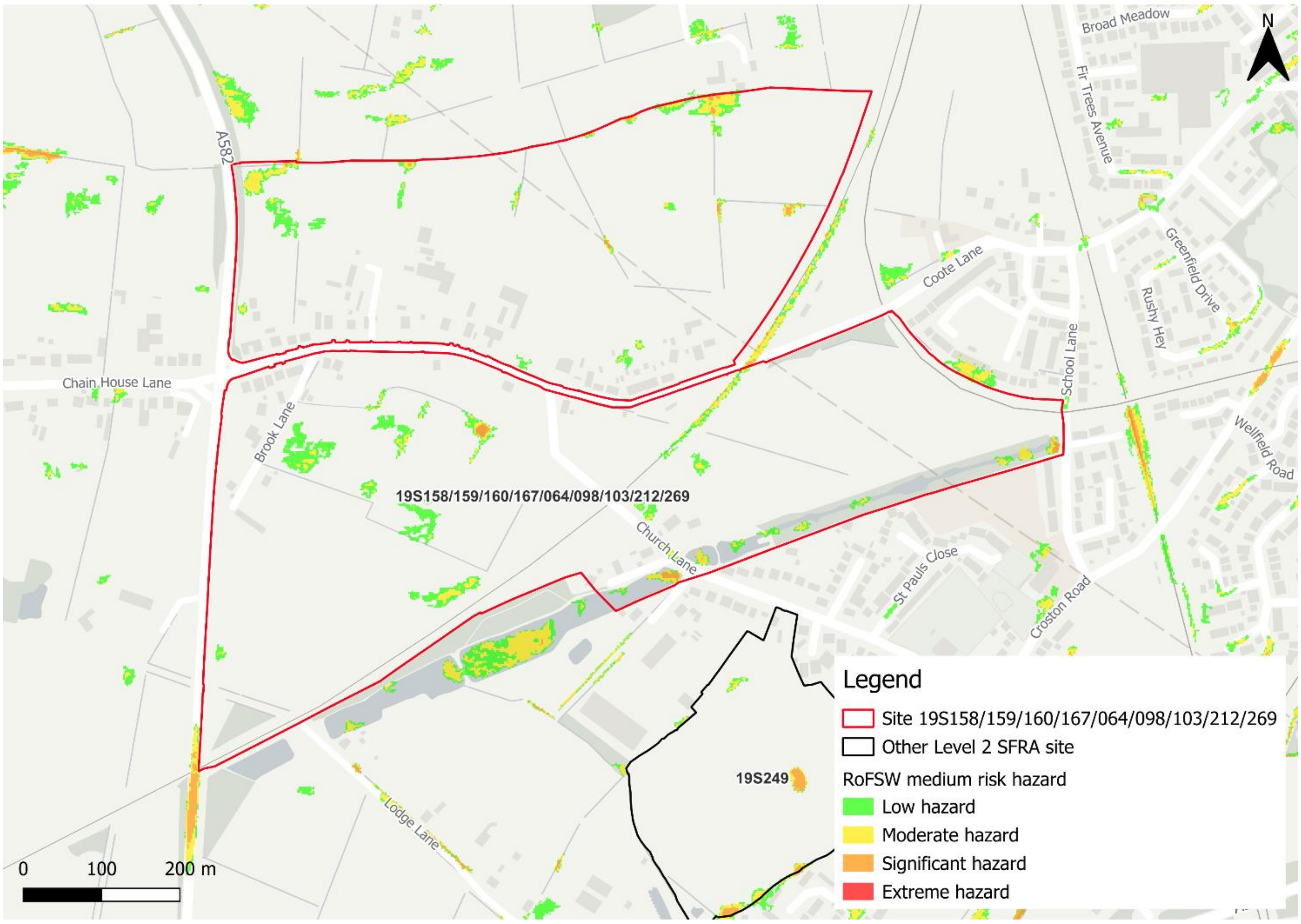

Figure 87-2: Medium risk event surface water flood hazard[52] (Risk of Flooding from Surface Water map)

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 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

52 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. The sporadic nature of the risk across the site means that surface water flood risk could be considered significant.

Greatest flood depths are modelled to remain between 0.6 and 0.9 m (Figure 3-3). Flood hazard largely remains low to moderate, though there are some areas with a significant flood hazard rating (Figure 3-4).

Safe access and escape routes should remain achievable via the A582 to the west of the site.

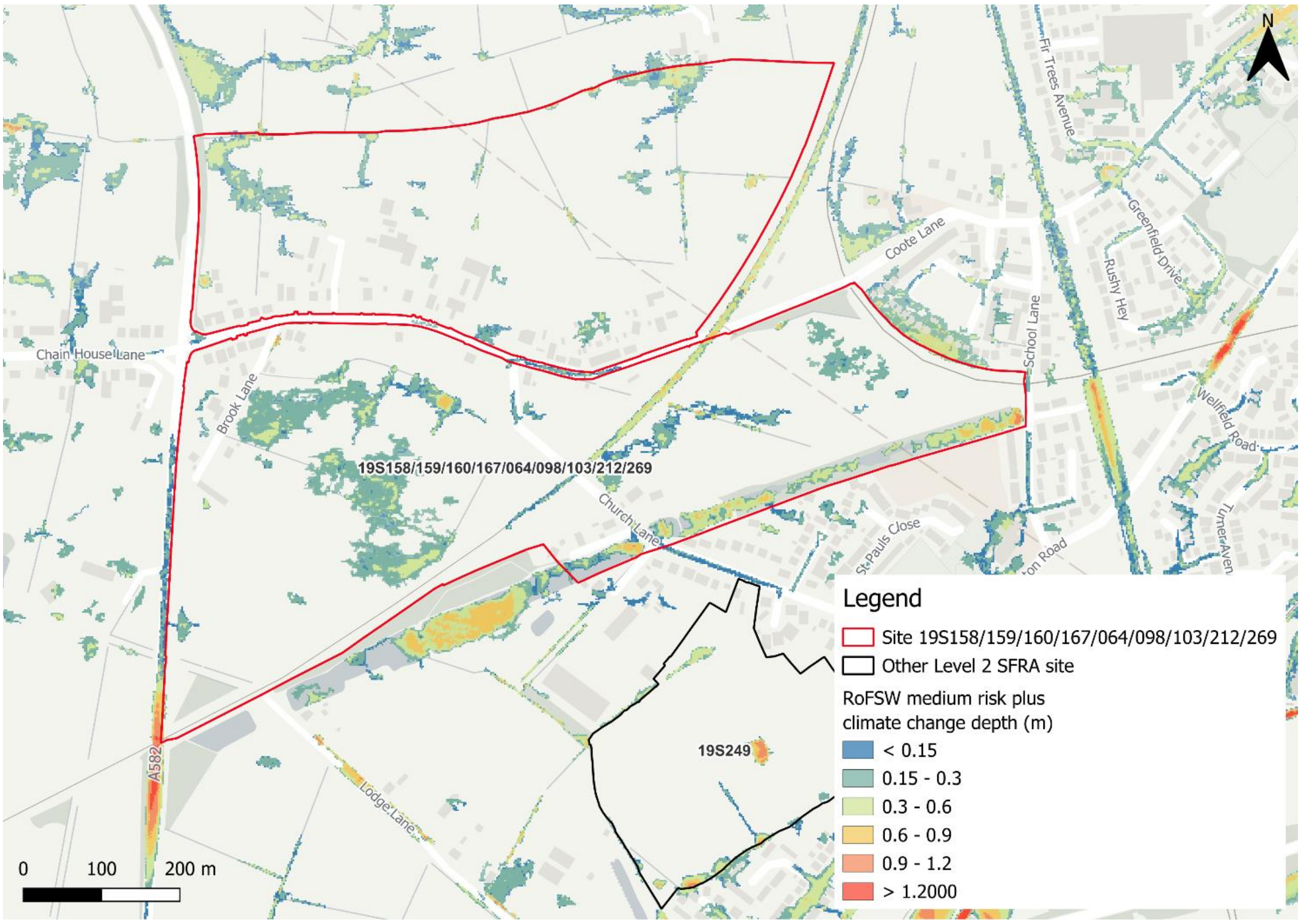

Figure 87-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

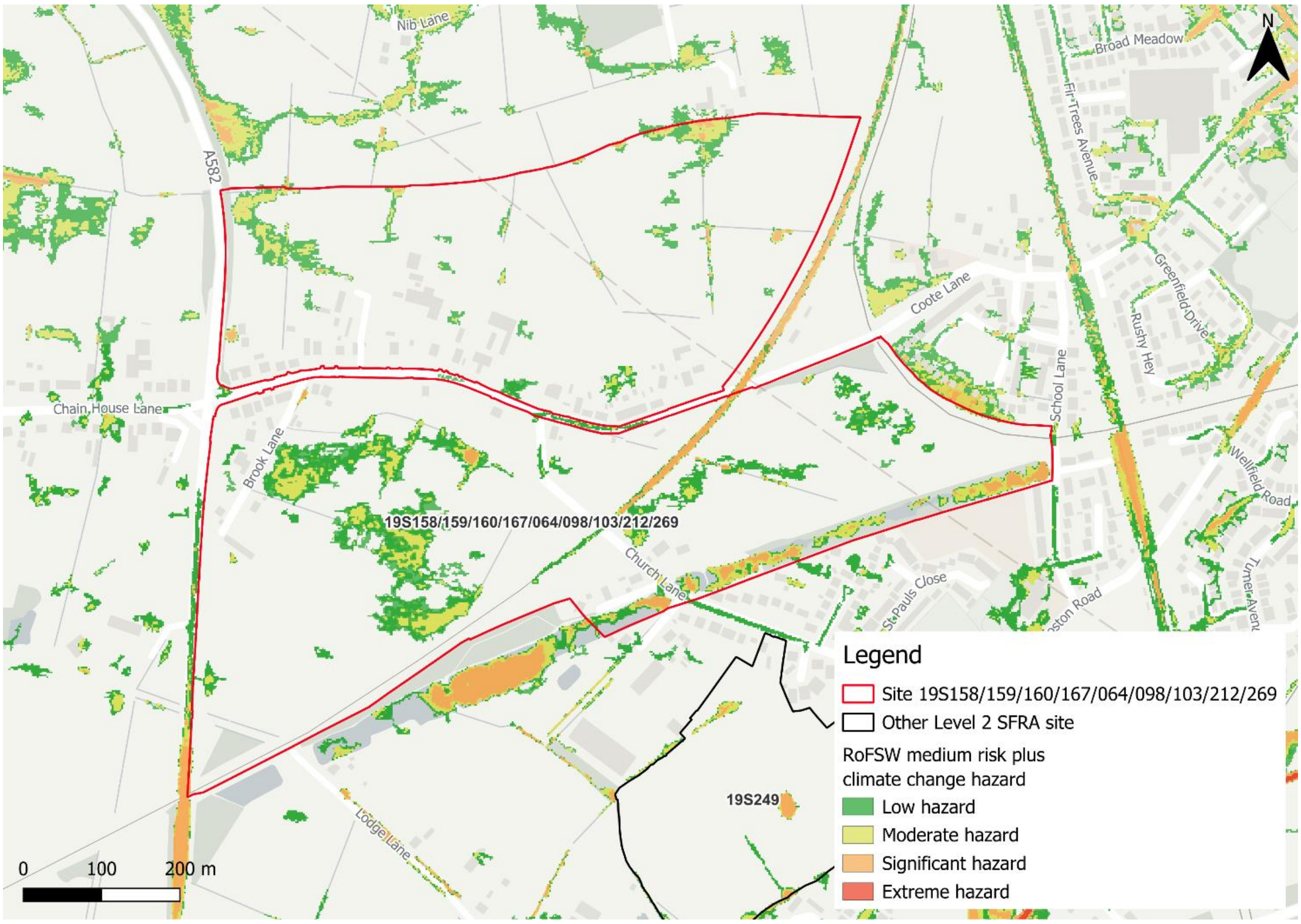

Figure 87-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

87.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is predominantly very low, with approximately 88% of the site being at very low risk. Surface water risk in the high risk event is scattered across the site within areas of ponding in topographic low spots. In the medium and low risk events, these areas of ponding increase in both extent and depth.
- The modelled medium risk surface water event plus climate change outputs indicate a similar risk to the present day low risk event. Safe access and escape routes should site be achievable via the A582 to the west of the site in all events.
- The sporadic nature of the risk means 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. This will require detailed 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.
- 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.

- Assessment of any 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.
- 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[53]. Figure 4-1 shows the map for this 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.

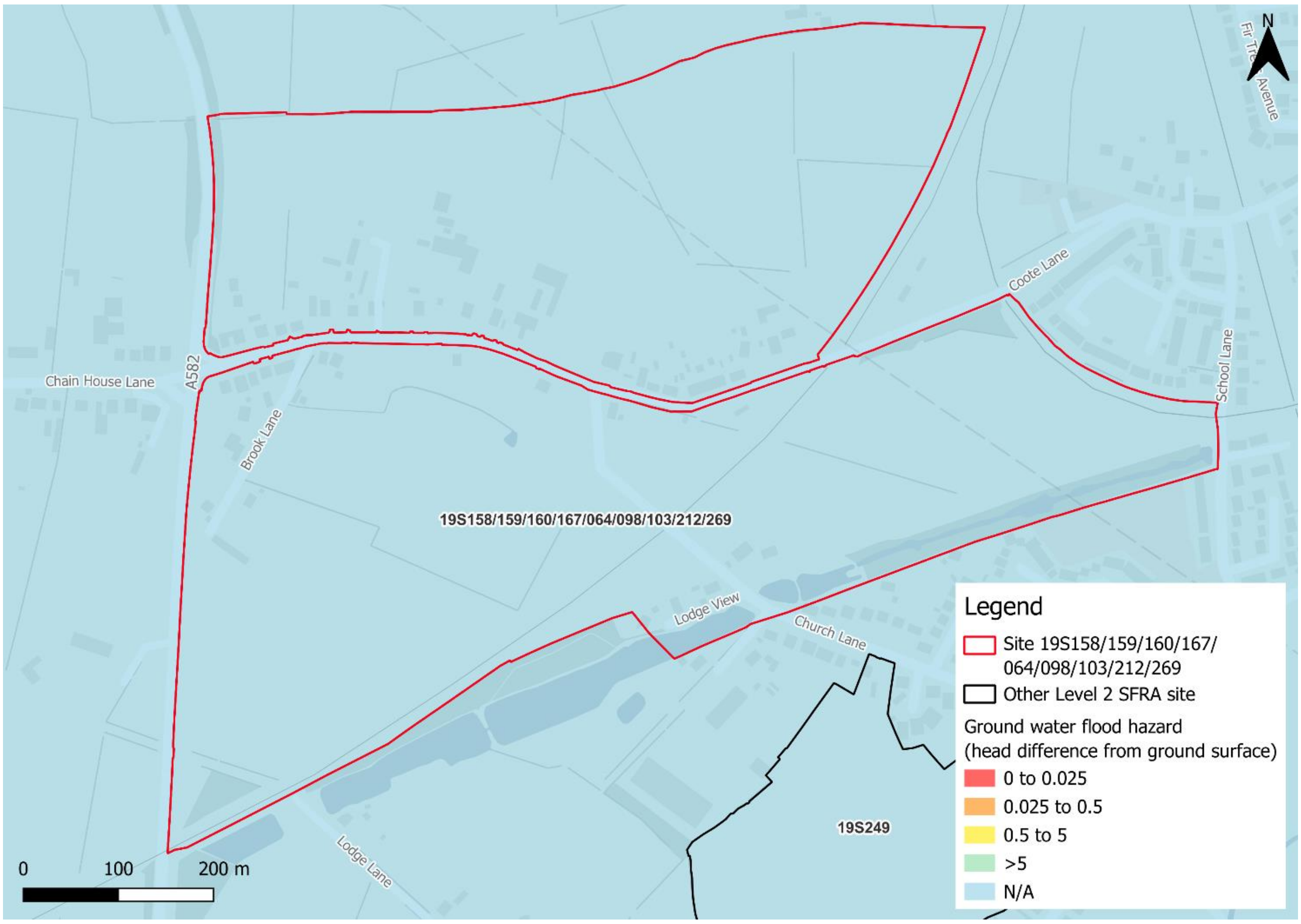

Figure 88-1: JBA 5m Groundwater Emergence Map

53 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[54] 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 Mill 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.

89.2 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 for the impacts of climate change of Mill Brook should be carried out to ascertain the fluvial flood risk to the northwestern area of the site. However, it should be possible to allocate the site.
- The impact of a blockage of the culvert along Mill Brook should be investigated as part of the modelling.
- 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 and the sporadic nature of the risk. 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 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.

54 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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