

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

Final

June 2025

Prepared for:



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Contract

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

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Acknowledgements

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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 19S110/165/169/SRB007. 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 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 1-1: Existing site location boundary

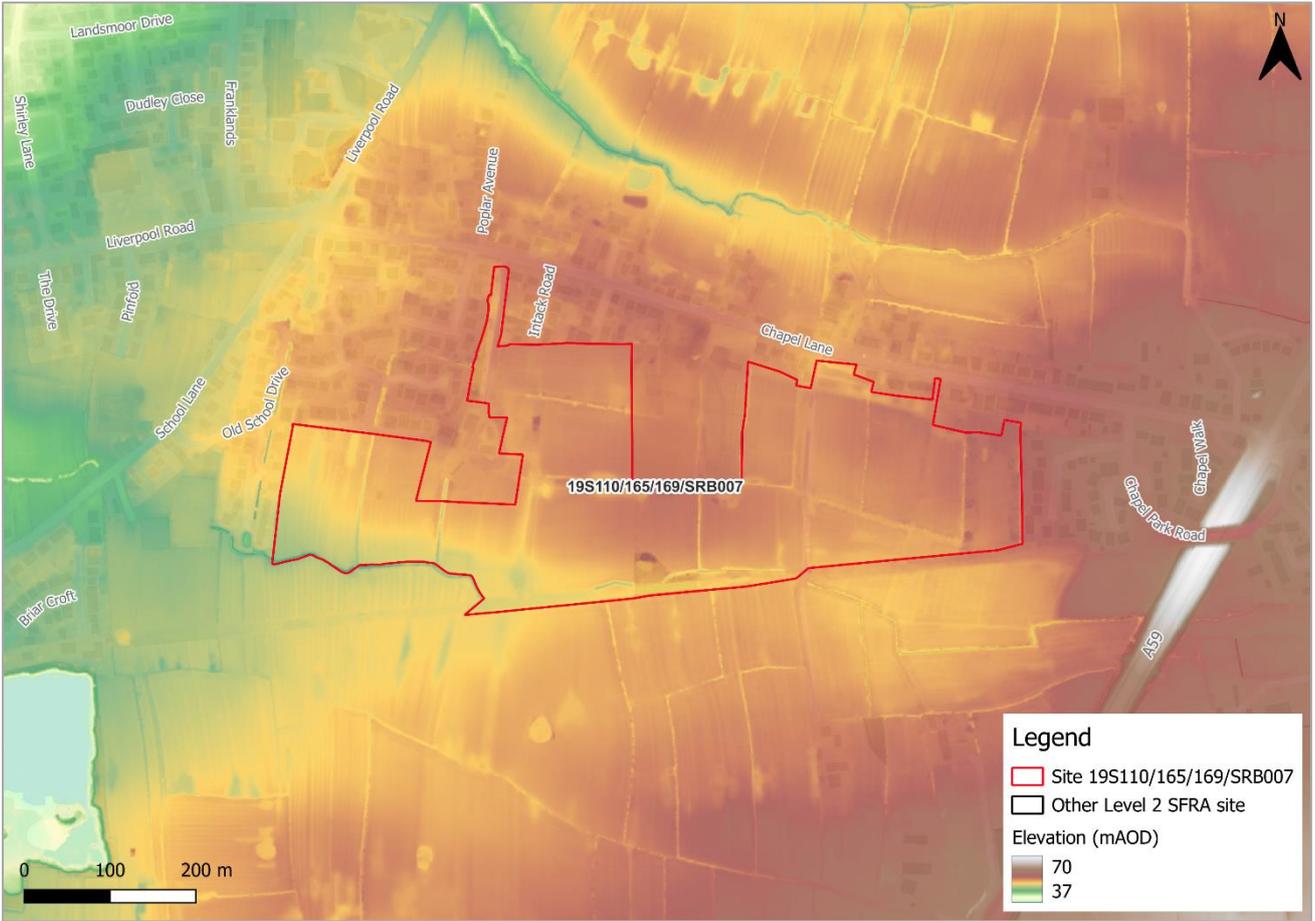


Figure 1-2: Topography

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 (accessed May 2025) 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 2-1. The Flood Map for Planning does not consider flood defence infrastructure (Section 2.3) or the impacts of climate change (Section 2.2).

The site is located within Flood Zone 3a and Flood Zone 2 along the southern boundary of the site, based on direct rainfall modelling. The remaining area of the site is located within Flood Zone 1 indicating the majority of the site is at low risk of flooding from rivers and sea.

Mapping and LiDAR (Figure 1-2) 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 2-1: Existing fluvial flood risk

Flood Zone 1 (%)	Flood Zone 2 (%)	Flood Zone 3a (%)	Flood Zone 3b (%)
94	4	2	0

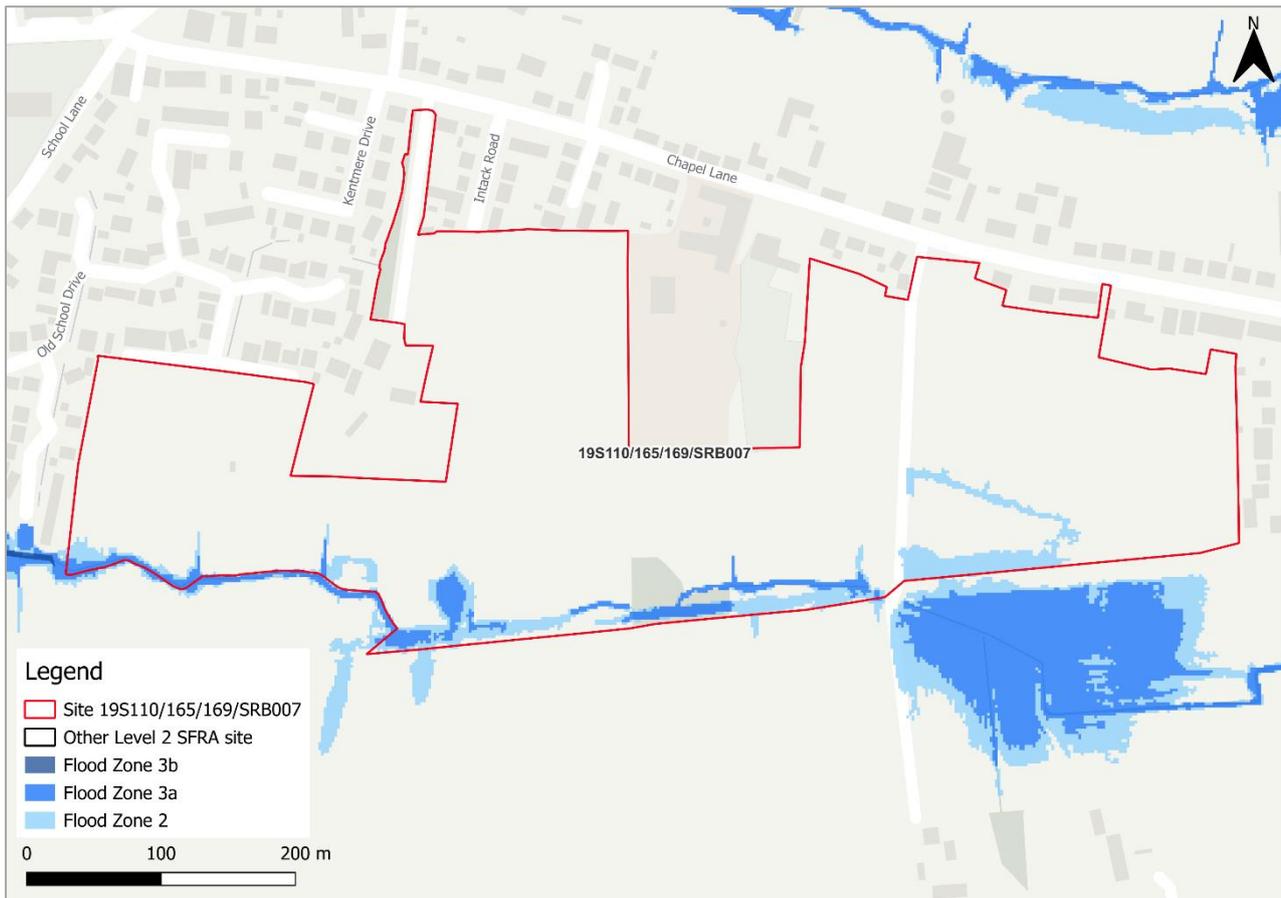


Figure 2-1: Existing risk from rivers to the site

2.2 Impacts from climate change

As the area of the site in Flood Zone 3a and Flood Zone 2 is based on direct rainfall modelling, the impact of climate change on flood risk at this site should be considered through the surface water climate change modelling documented in Section 3.2.

2.3 Flood risk management

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

2.3.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 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.

2.3.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. 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 2-2.

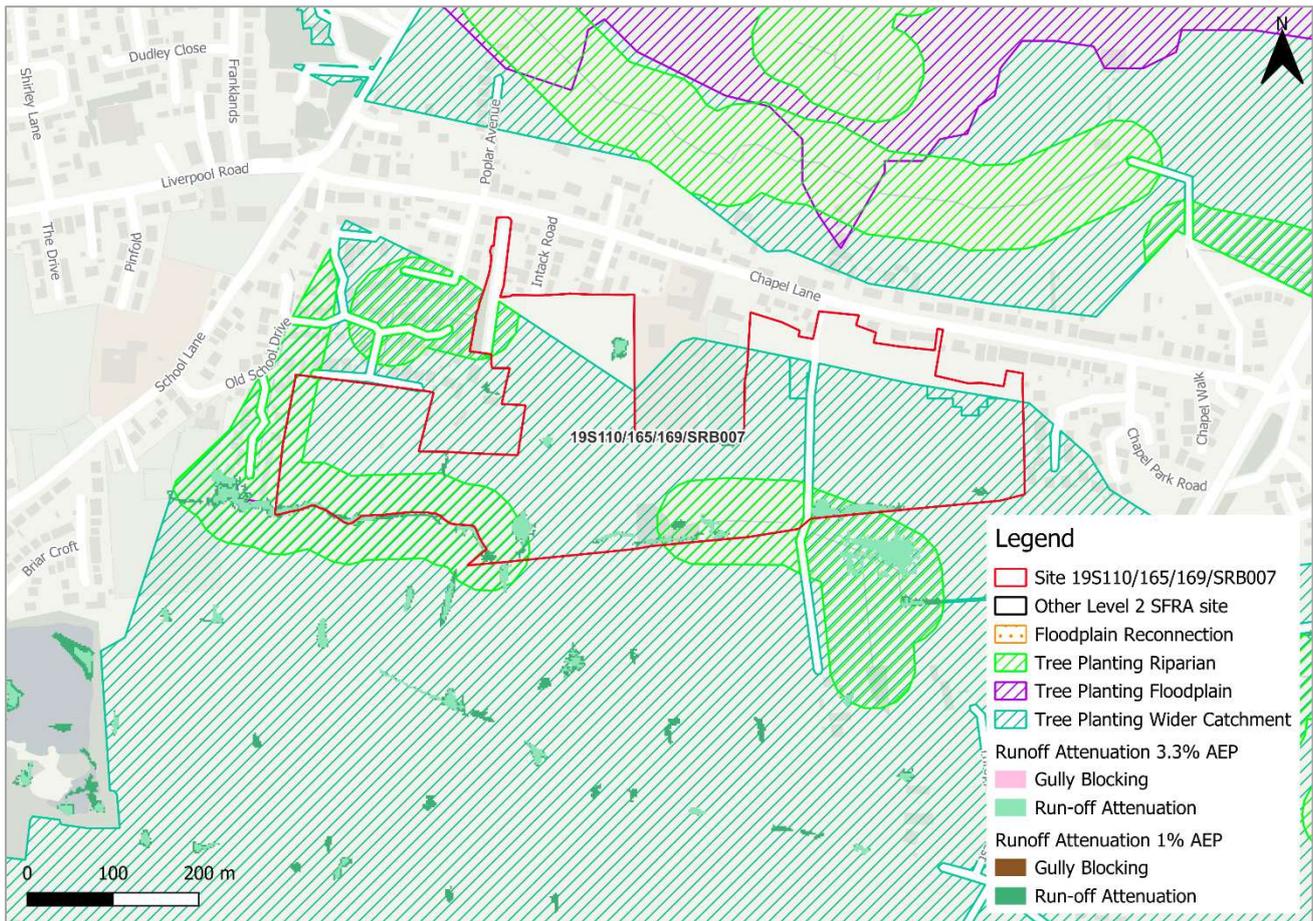


Figure 2-2: Natural Flood Management (NFM) potential mapping

2.4 Residual risk

2.4.1 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.

2.5 Historic flood incidents

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

2.6 Flood warning and access and escape routes

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.

2.7 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 majority of the site is located within Flood Zone 1 and therefore at low flood risk from rivers. There is an area along the southern boundary of the site within Flood Zone 3a and Flood Zone 2, derived from direct rainfall modelling.

3 Flood risk from surface water

3.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly 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

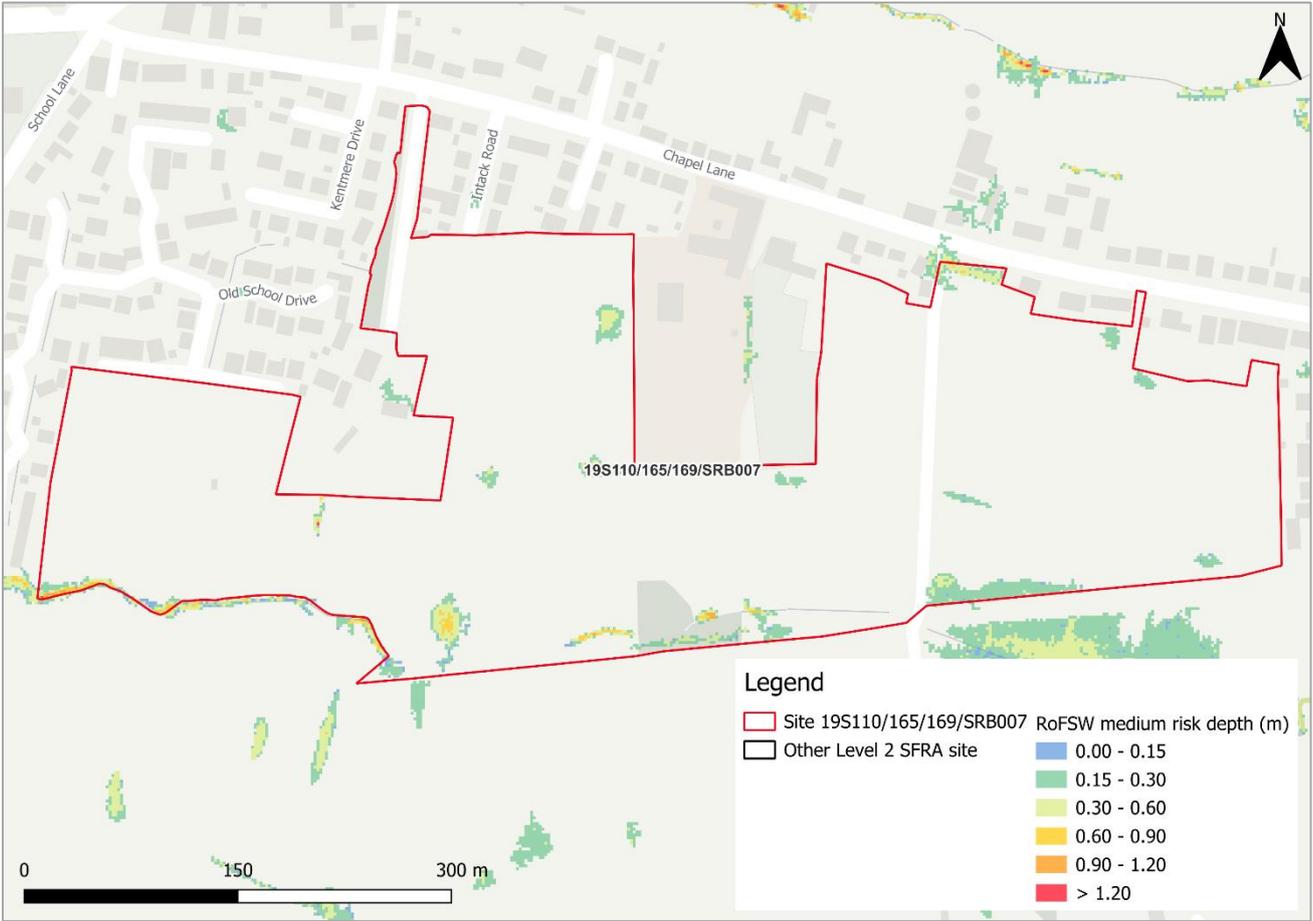


Figure 3-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

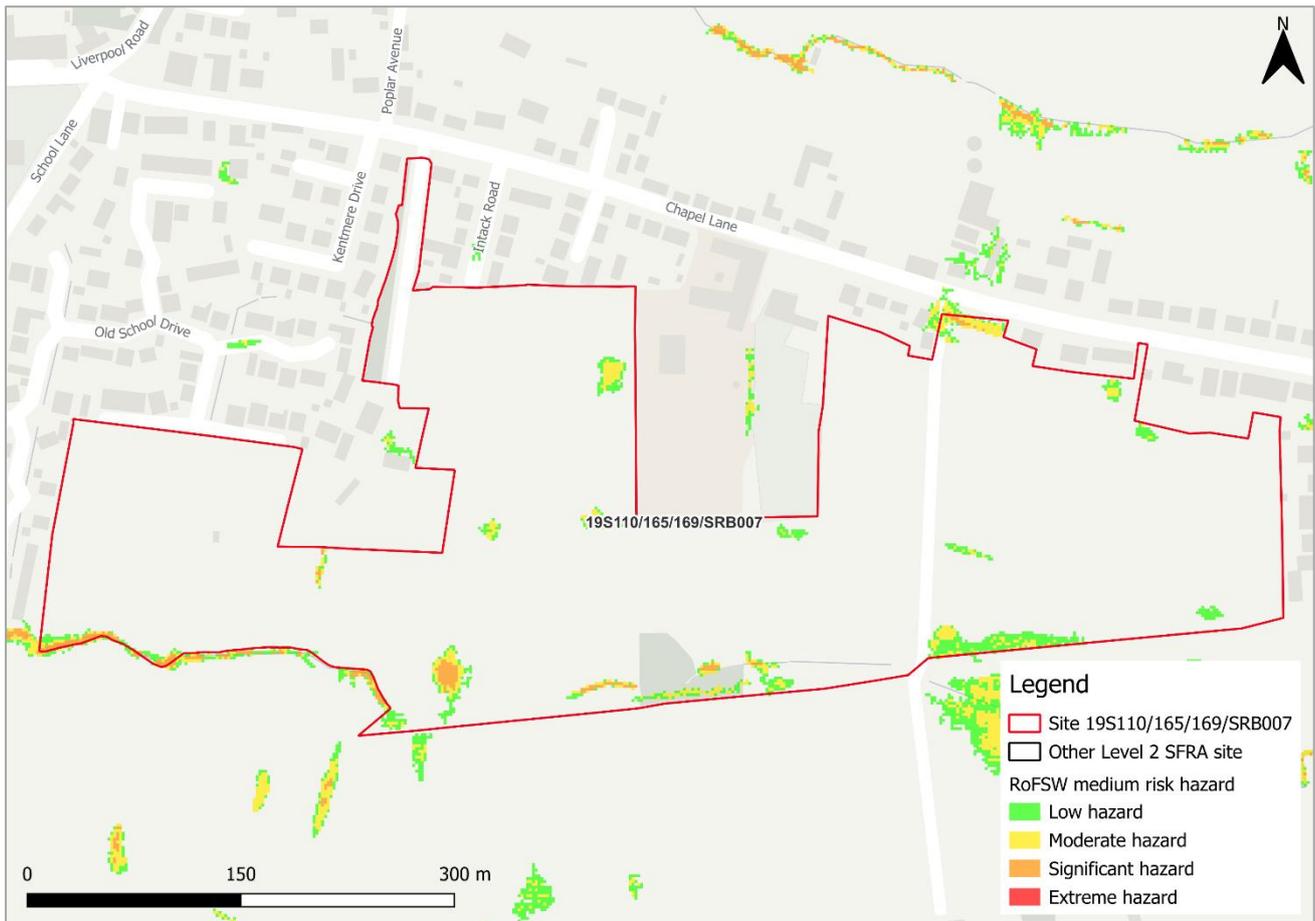


Figure 3-2: Medium risk event surface water flood hazard¹ (Risk of Flooding from Surface Water map)

3.2 Impacts from climate change

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

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

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

Figure 3-3 shows the 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

¹ 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).

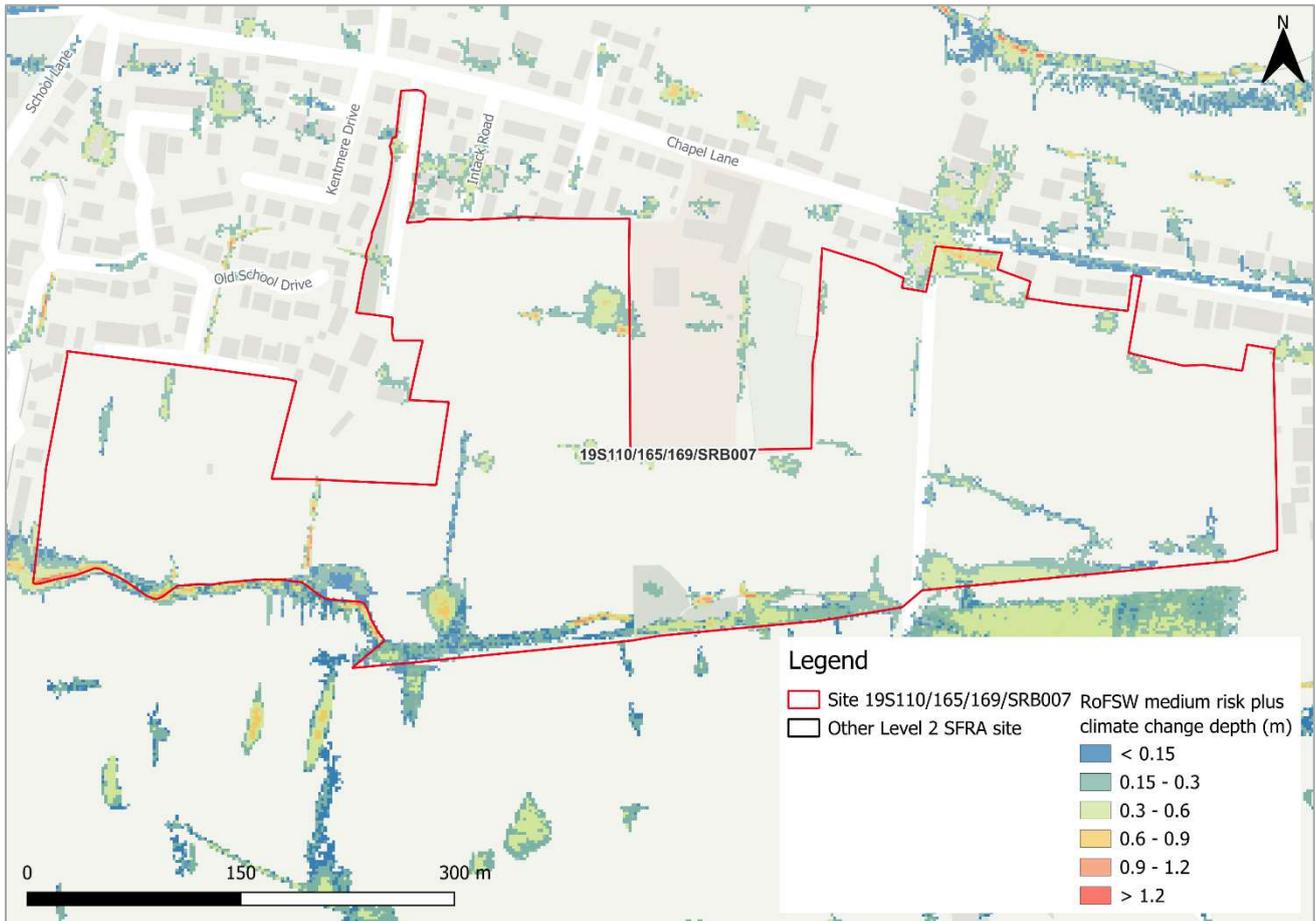


Figure 3-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

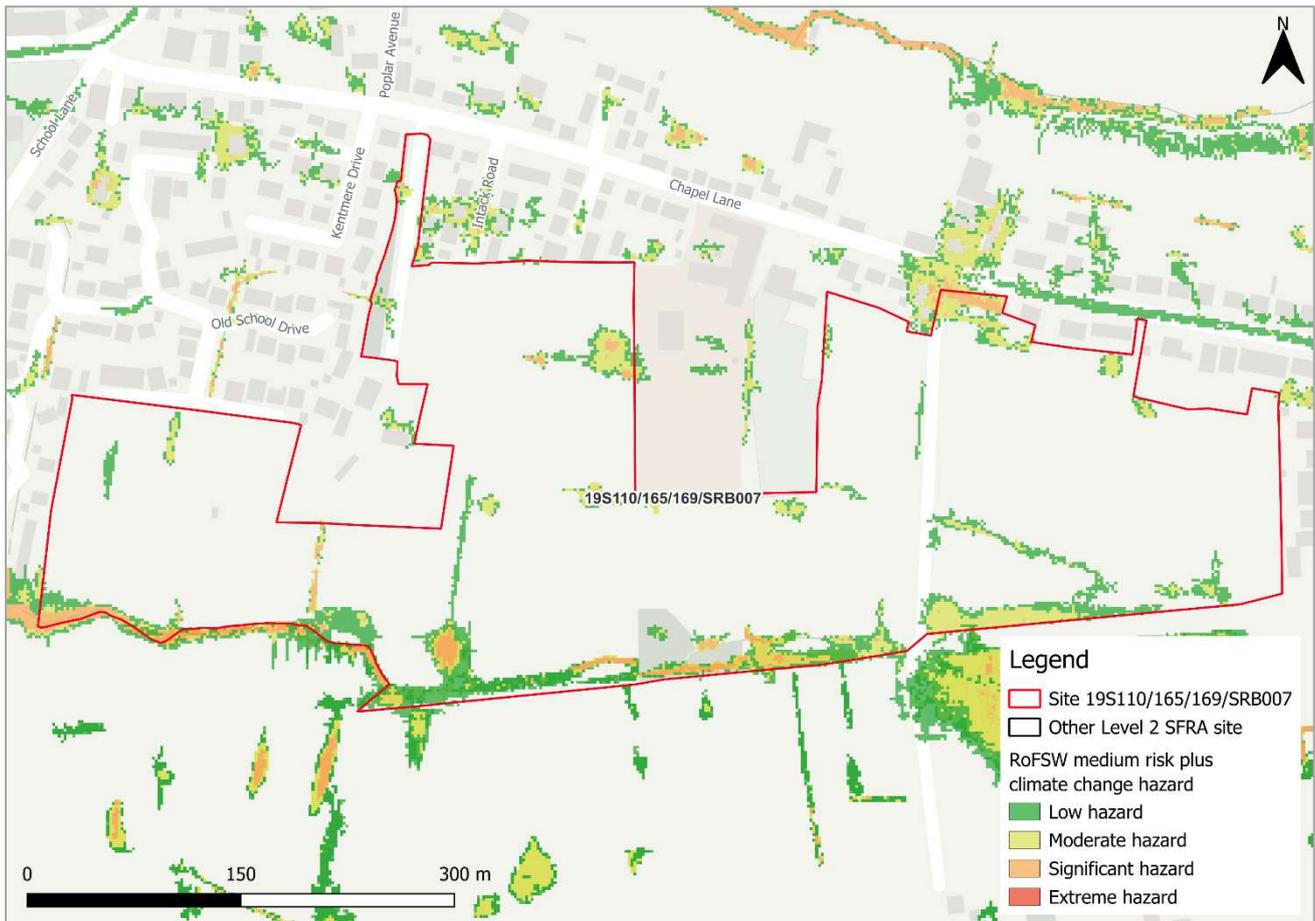


Figure 3-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

3.3 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.

4 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 Guide². 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.

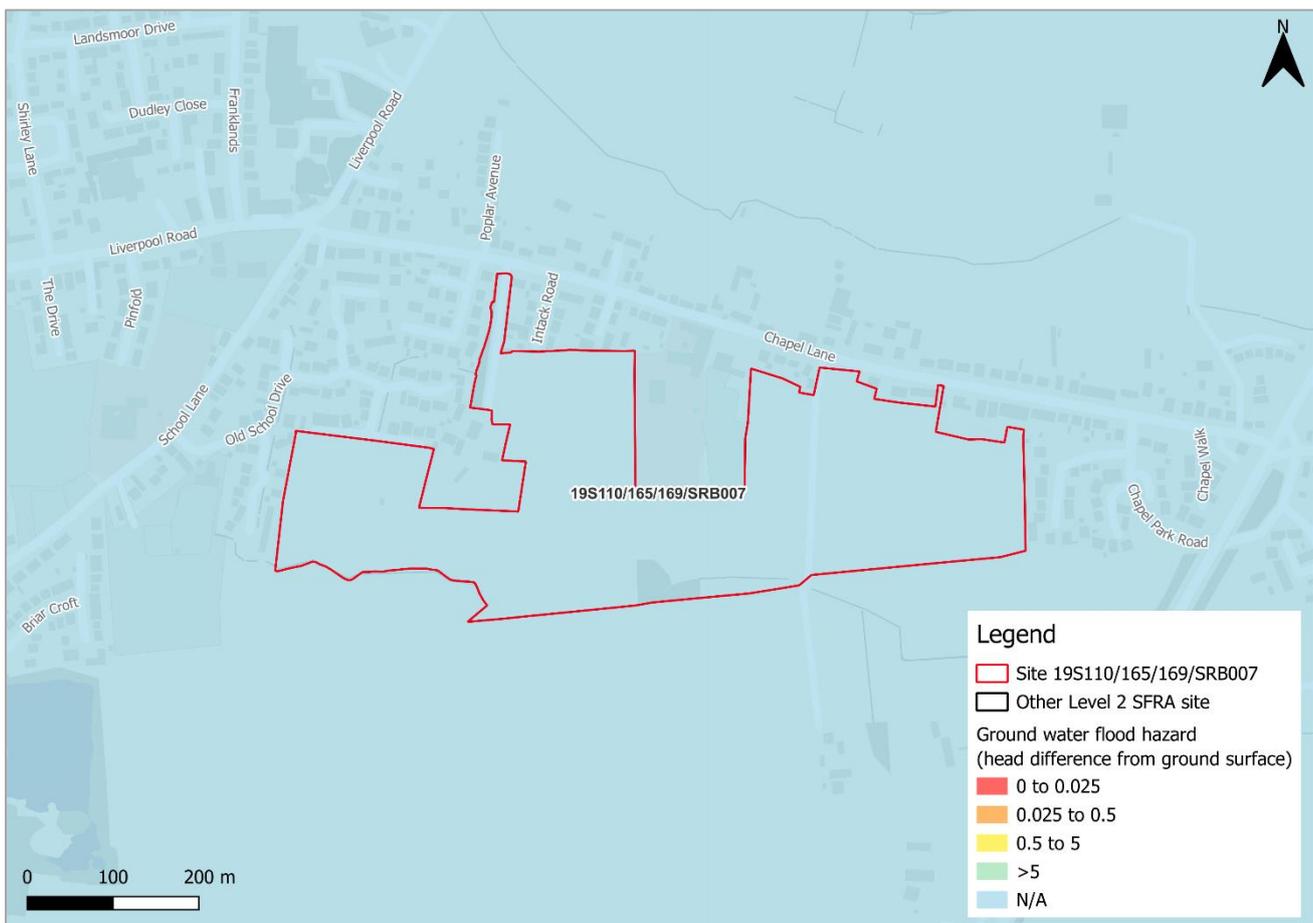


Figure 4-1: JBA 5m Groundwater Emergence Map

² [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 test³, it must be proven that the development can be safe for its lifetime, which is 100 years for residential development. This site should be able to pass the exception test if all development is directed away from the area of risk on site to 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:

- Based on the evidence in this SFRA, it should be appropriate to develop this site for more vulnerable purposes given the majority of the site being located 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.

³ Para 178 National Planning Policy Framework 2024

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

Final

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Prepared for:



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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 19S162. 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 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 1-1: Existing site location boundary

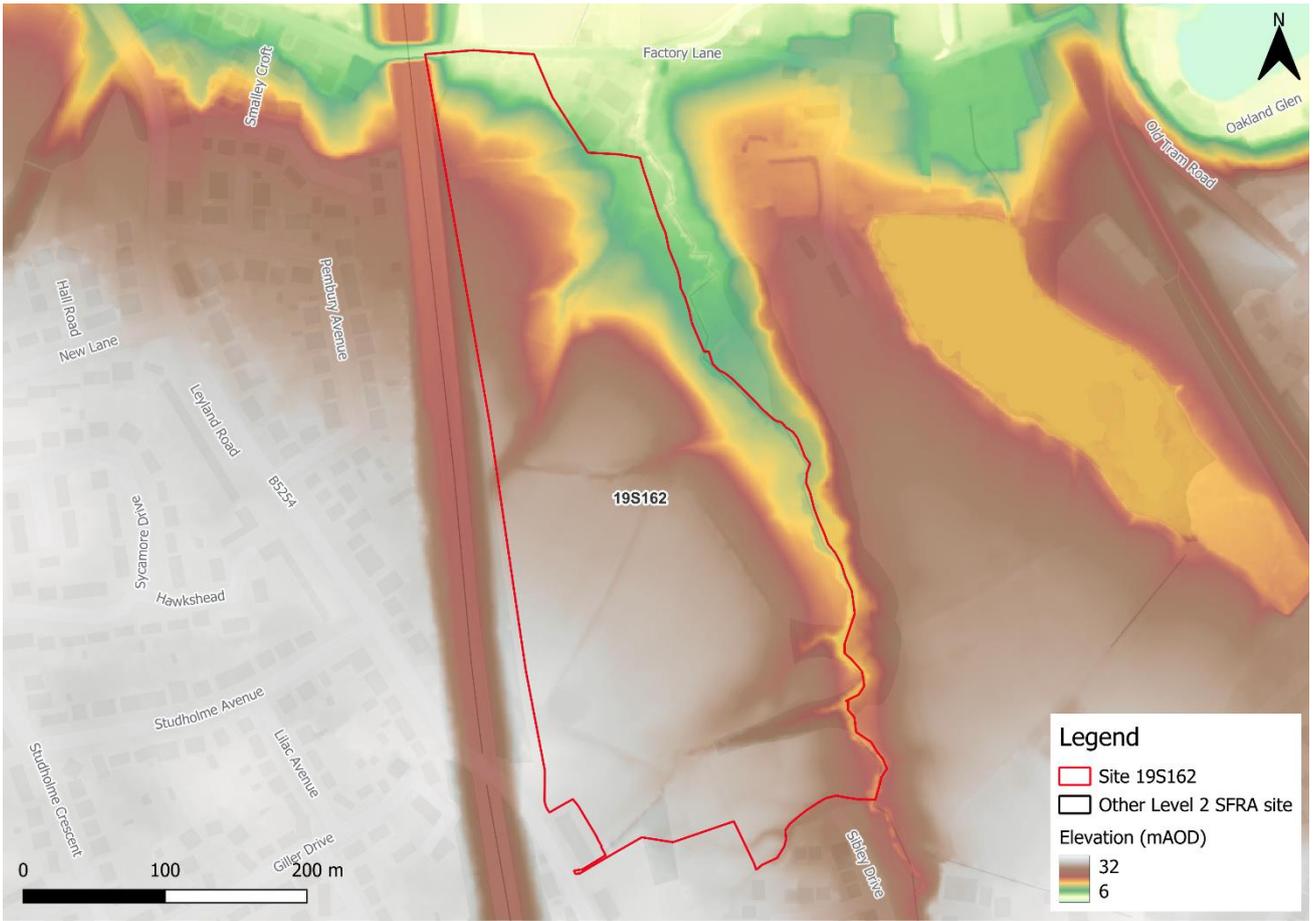


Figure 1-2: Topography

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

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. The remaining area of the site is 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 (%)
94	0	0	6

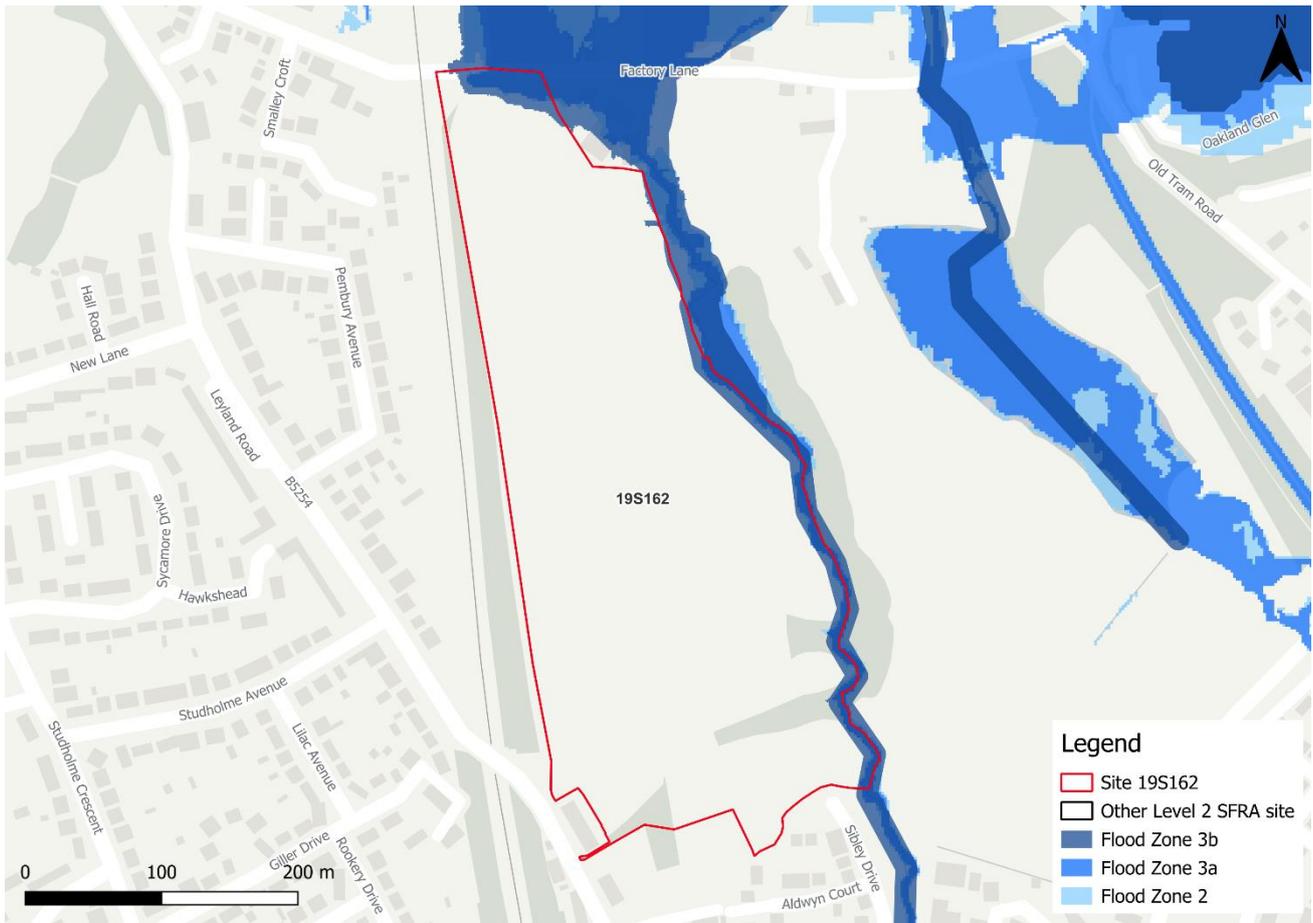


Figure 2-1: Existing risk from rivers to the site

2.1.2 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 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Modelled risk to the site is 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.

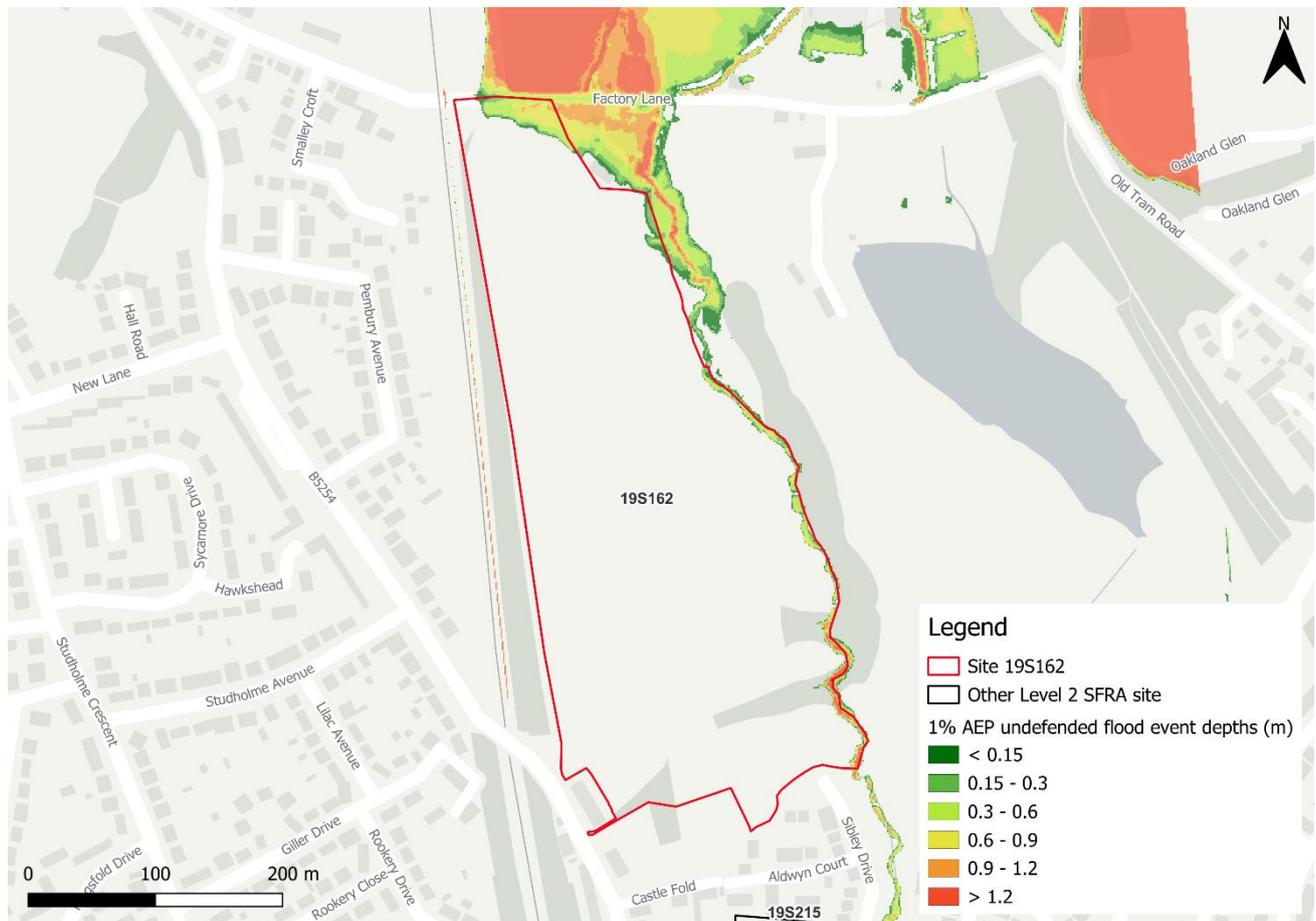


Figure 2-2: Flood depths for 1% AEP undefended flood event

2.2 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 2-2.

Table 2-2: Modelled climate change allowances for peak river flows for the Douglas Management Catchment

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

As mentioned in Section 2.1.2, 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 2-3 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.

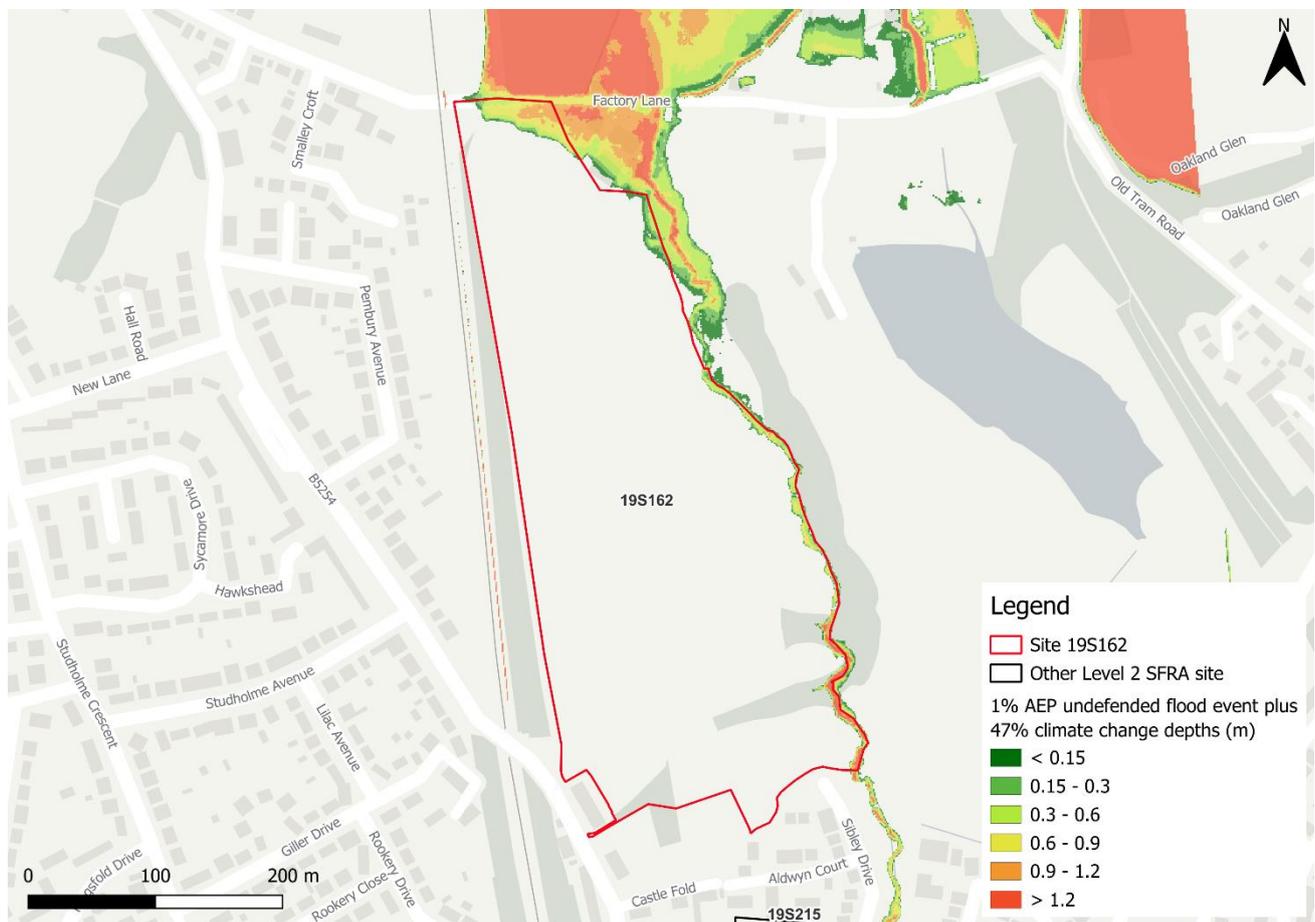


Figure 2-3: Flood depths for 1% AEP undefended flood event +47% (higher central climate change allowance)

2.3 Flood risk management

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

2.3.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 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.

2.3.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. 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 2-4.

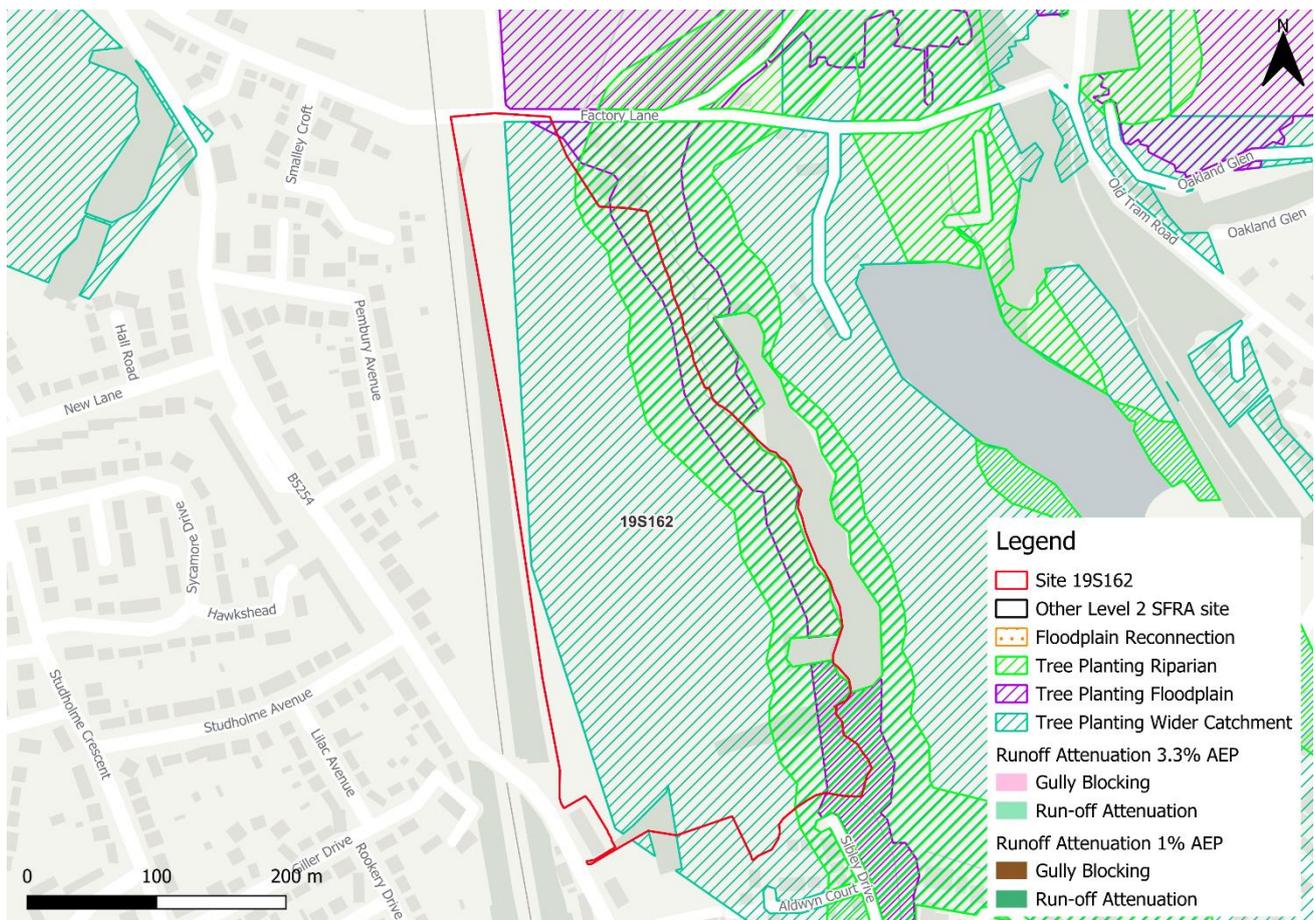


Figure 2-4: Natural Flood Management (NFM) potential mapping

2.4 Residual risk

2.4.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. Figure 2-5 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, its design category or how it is operated. The council, as category 1 responders, can access more detailed information about reservoir risk and reservoir owners using the [Resilience Direct](#) system.

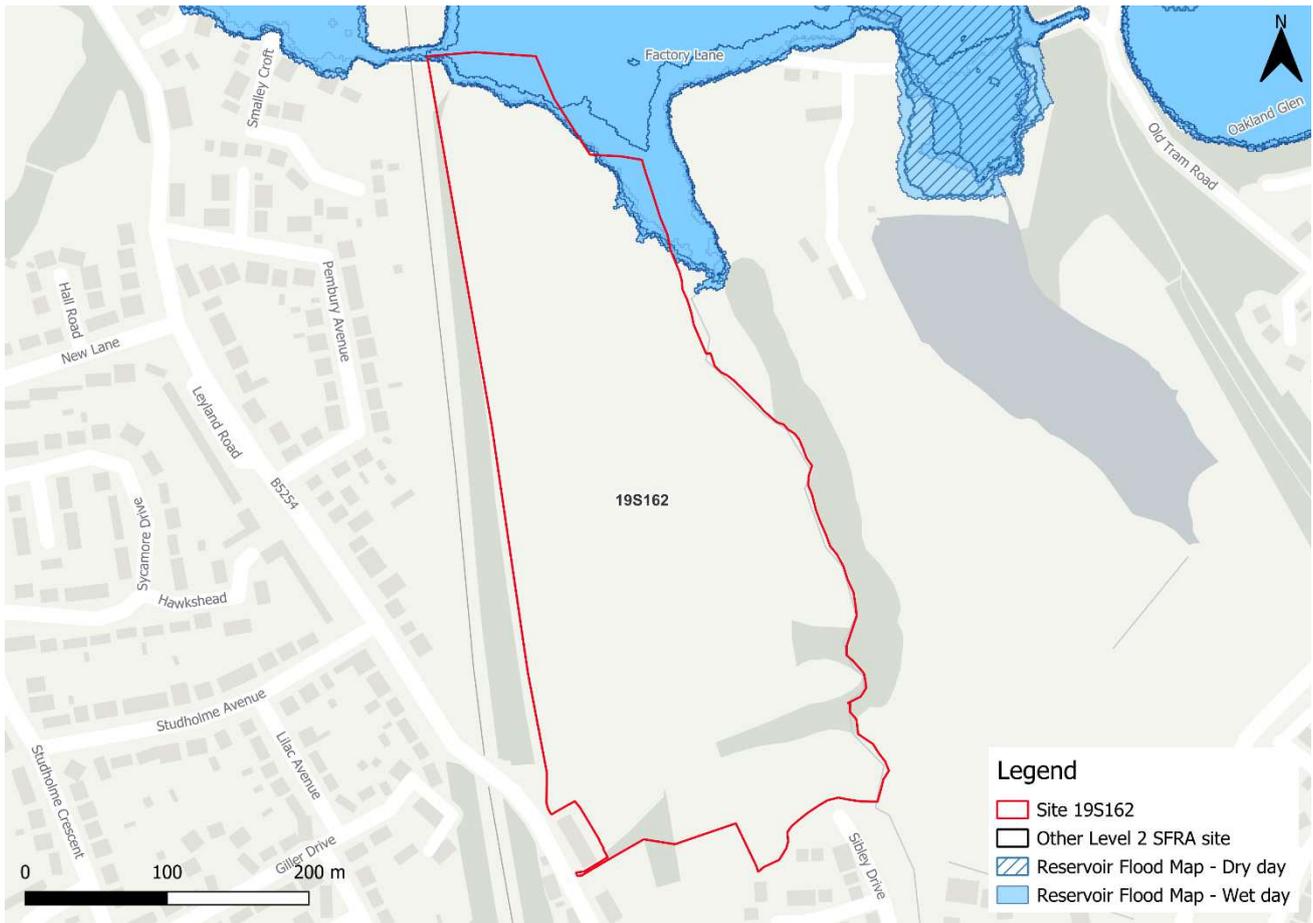


Figure 2-5: Flood risk from reservoirs

2.5 Historic flood incidents

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

2.6 Flood warning and access and escape routes

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. Site 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.

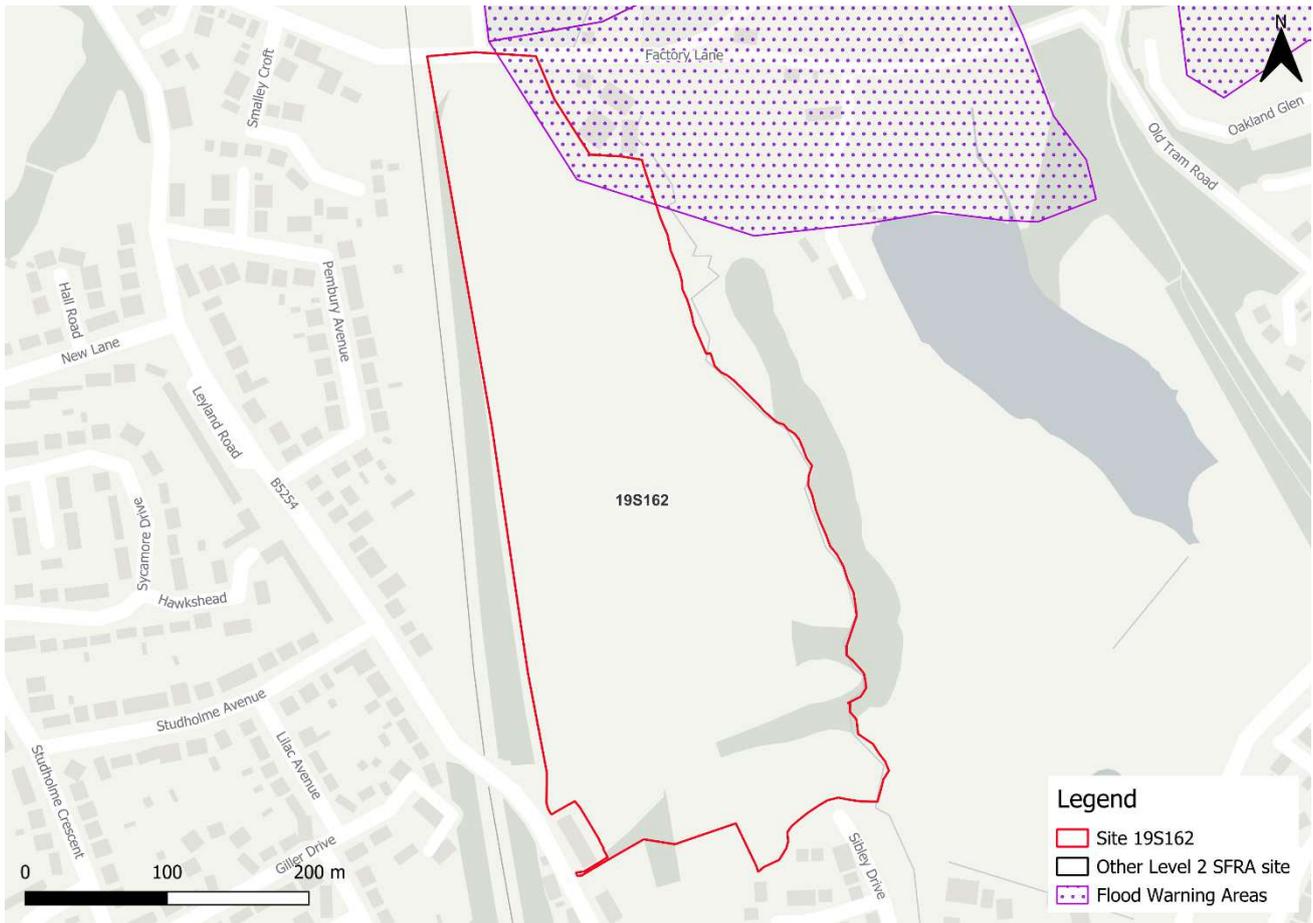


Figure 2-6: EA Flood Warning Areas

2.7 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 consider¹:
 - 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.

¹ [Reservoir flood maps: when and how to use them | Environment Agency | 2021](#)

3 Flood risk from surface water

3.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly 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 3-1.

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

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



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



Figure 3-2: High risk event surface water flood hazard² (Risk of Flooding from Surface Water map)

3.2 Impacts from climate change

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

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

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

Figure 3-3 shows the 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

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

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

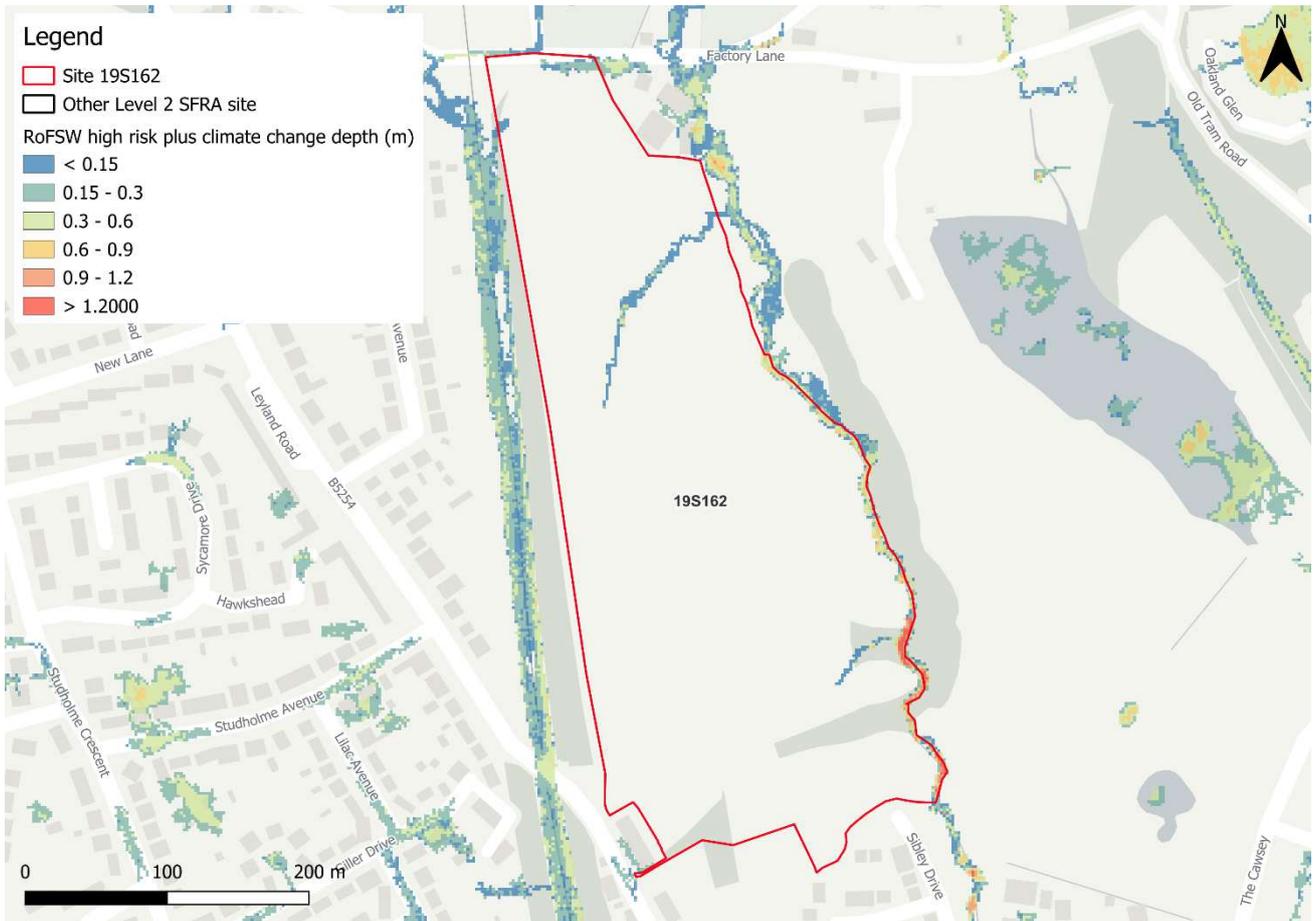


Figure 3-3: High risk event surface water flood depths plus 40% climate change (based on Risk of Flooding from Surface Water map)

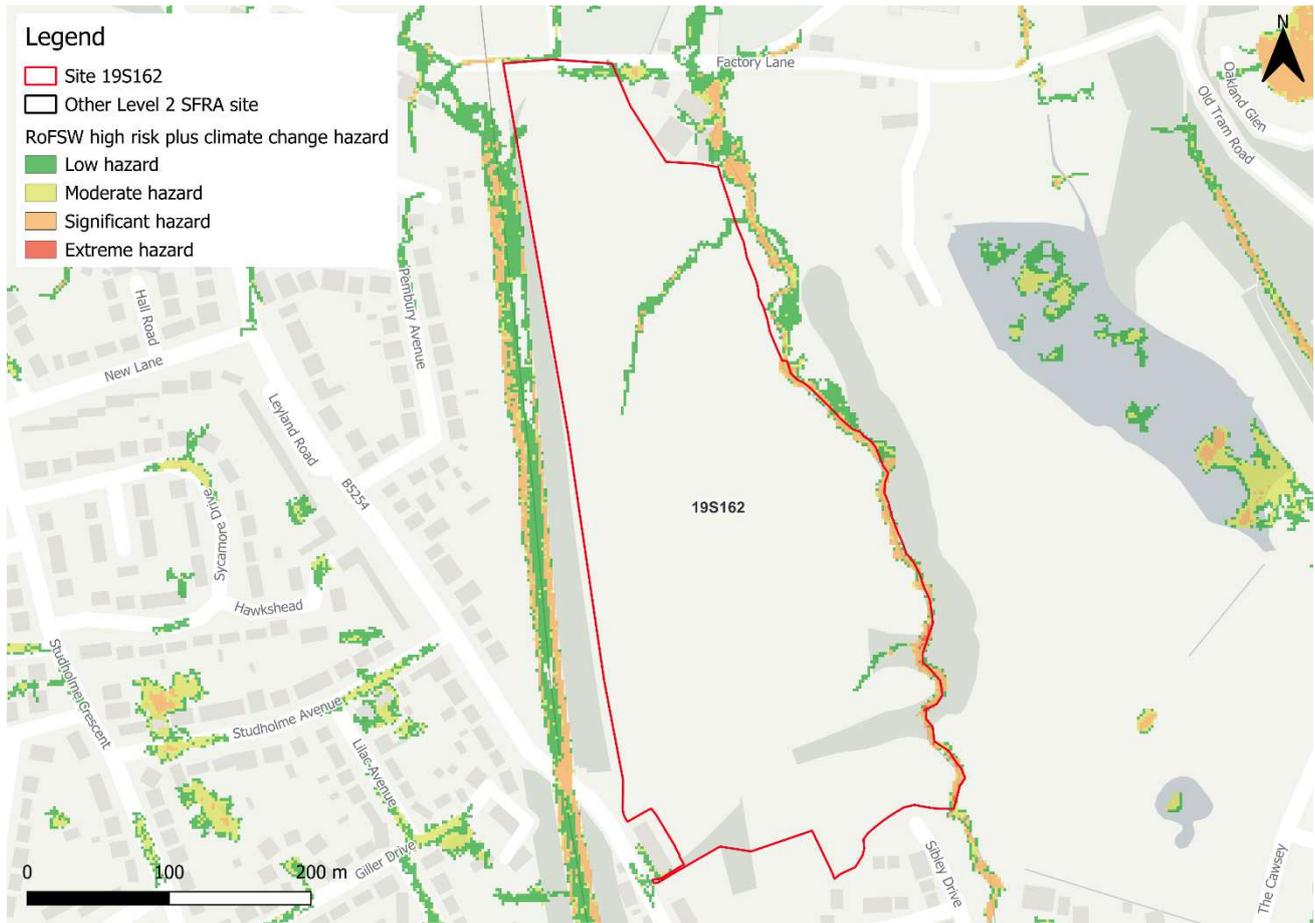


Figure 3-4: High risk event surface water flood hazards plus 40% climate change (based on Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is 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.

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 Guide³. Figure 4-1 shows the map for Site 19S162 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 groundwater risk. Groundwater conditions may therefore be suited to infiltration SuDS.



Figure 4-1: JBA 5m Groundwater Emergence 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?

This site is not required to pass part b) of the exception test⁴ 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.

5.2 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.
- 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.
- 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.
- 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.

⁴ Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S221/039/304

Final

June 2025

Prepared for:



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. Freya Nation of JBA Consulting carried out this work.

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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 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.

1.1 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

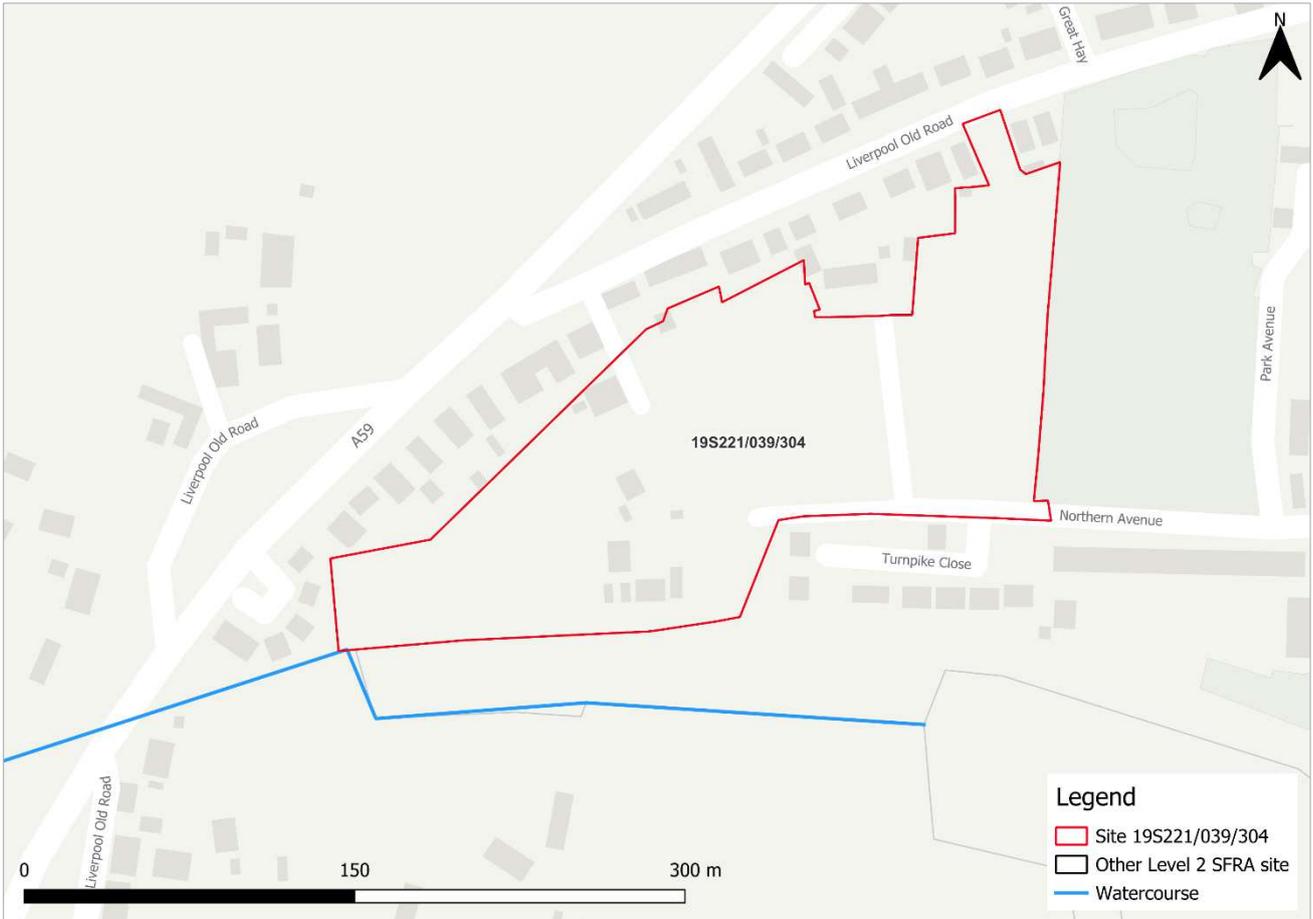


Figure 1-1: Existing site location boundary

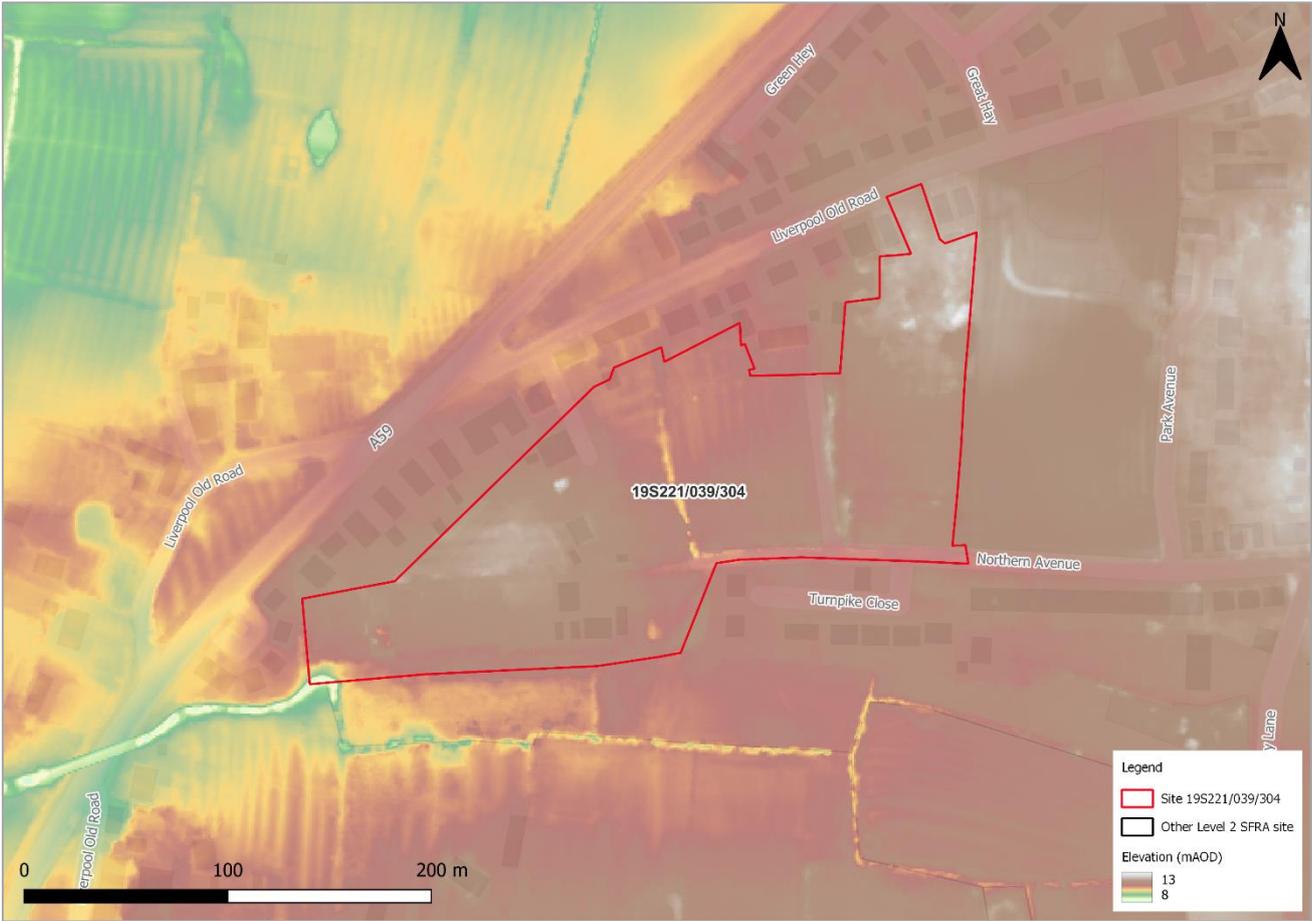


Figure 1-2: Topography

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

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. There are also very small areas of both Flood Zone 3a and Flood Zone 2 in the southern corner of the site, based on direct rainfall modelling, however this amounts to < 1% of the total site area.

Table 2-1: Existing fluvial flood risk

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

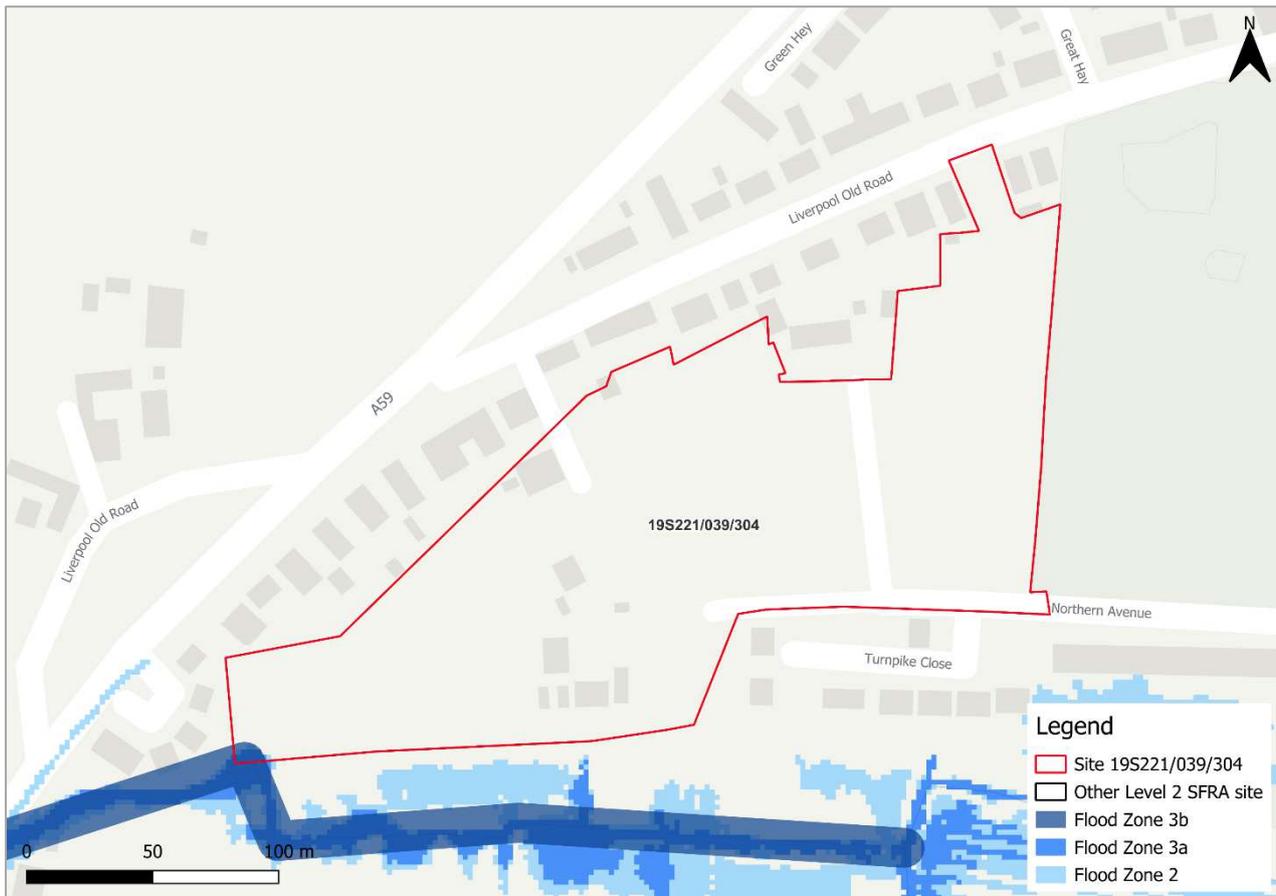


Figure 2-1: Existing risk from rivers to the site

2.2 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 impact of climate change on flood risk at this site should be considered through the surface water climate change modelling documented in Section **Error! Reference source not found.**

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.

2.3 Flood risk management

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

2.3.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of

development. Site 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.

2.3.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. 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 2-2. However, the WwNP dataset is indicative and further investigation into suitability of the site for tree planting should be carried out.

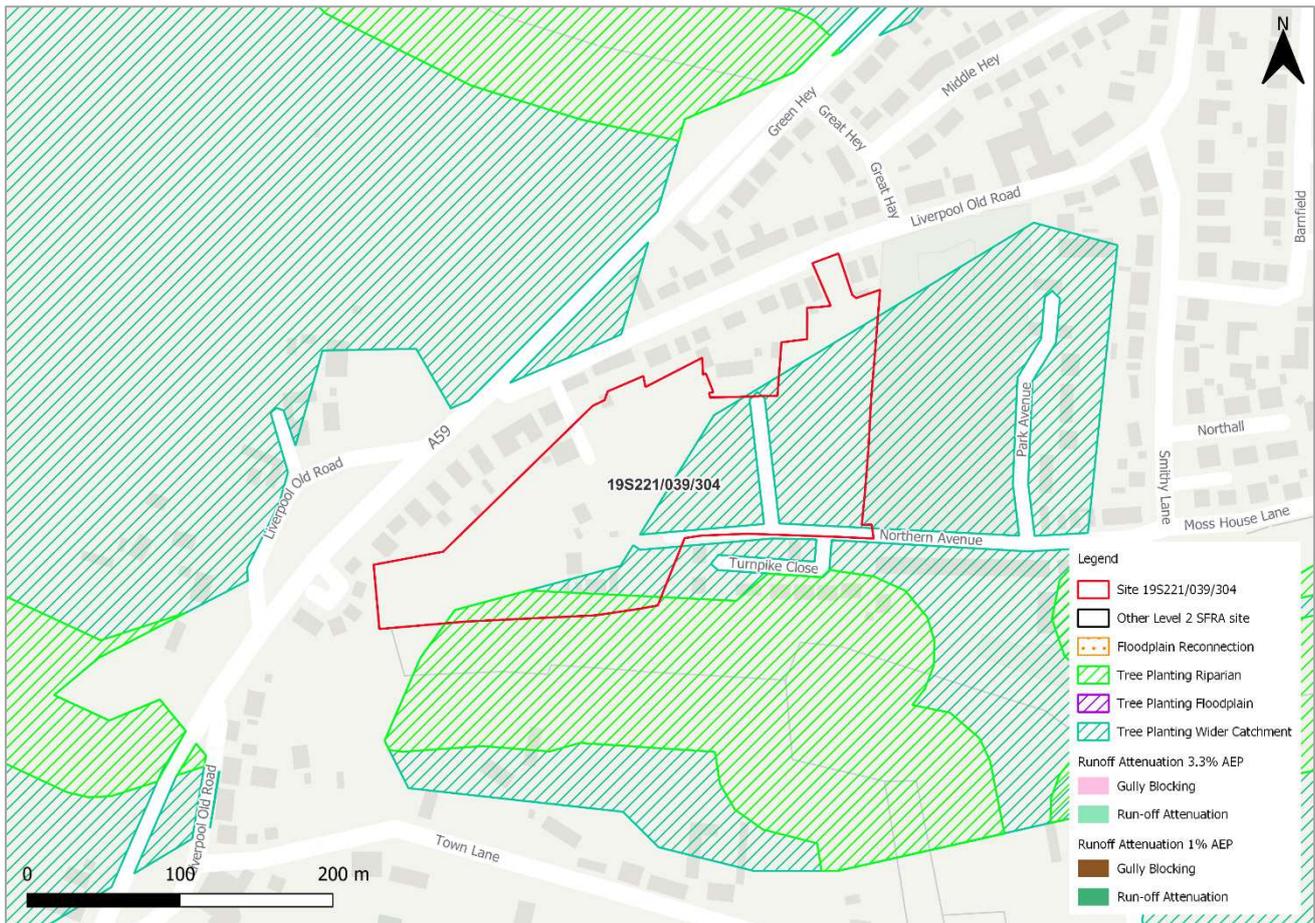


Figure 2-2: Natural Flood Management (NFM) potential mapping

2.4 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 2-3). 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.

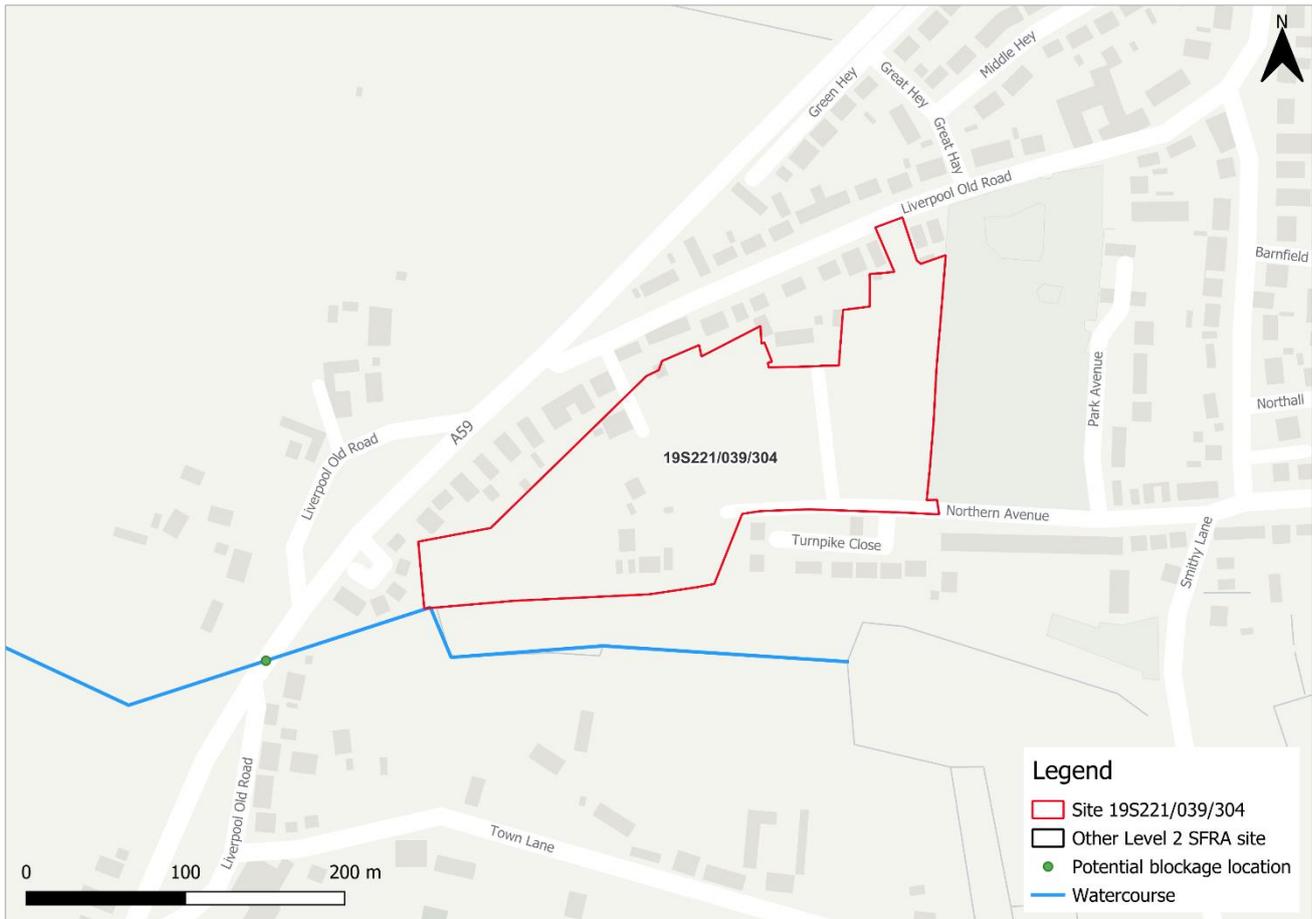


Figure 2-3: Potential blockage locations

2.4.1 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.

2.5 Historic flood incidents

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

2.6 Flood warning and access and escape routes

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. Site 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.

2.7 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.

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 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 3-1.

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

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

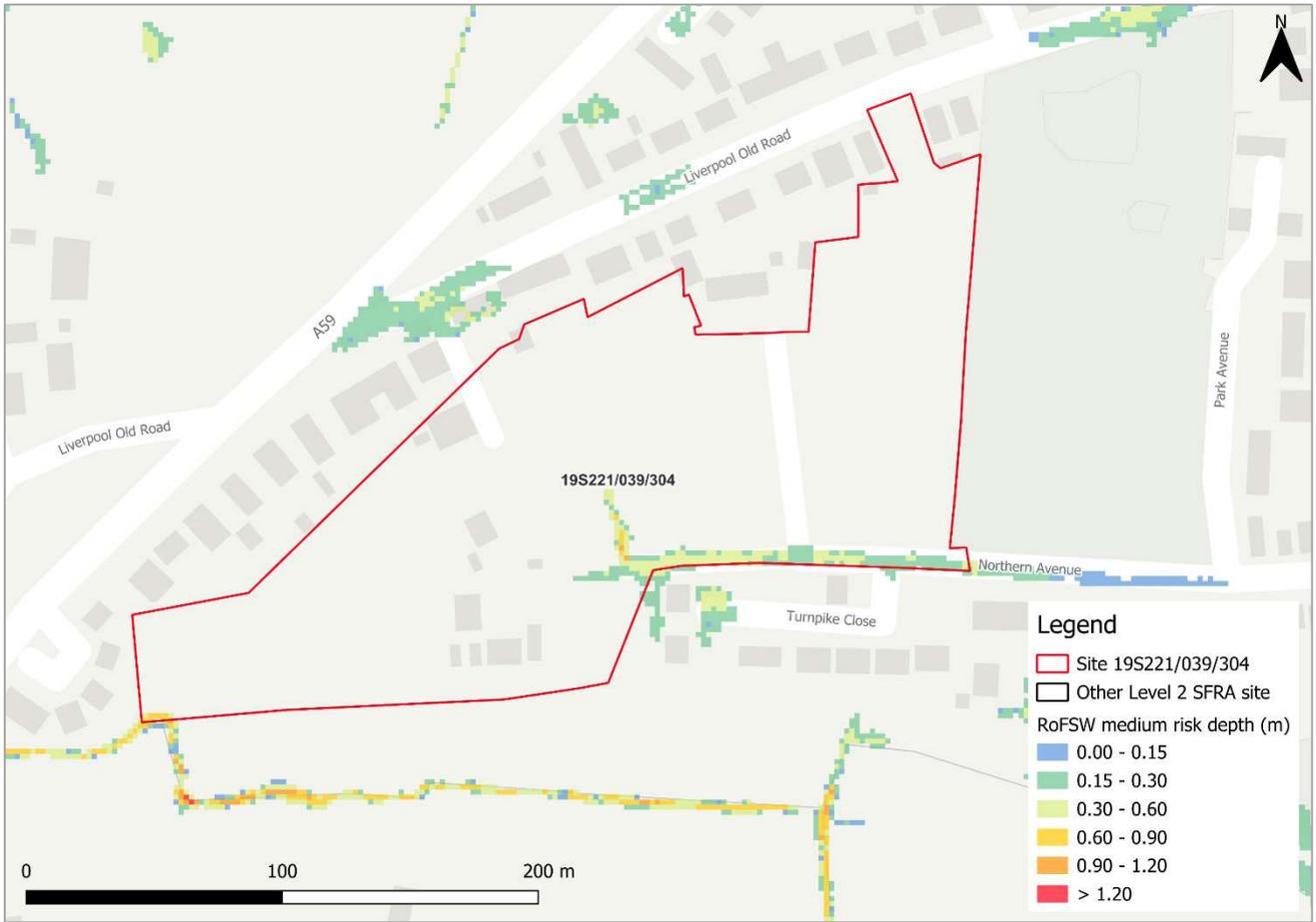


Figure 3-1: Medium risk event surface water flood depths (Risk of Flooding from Surface Water map)

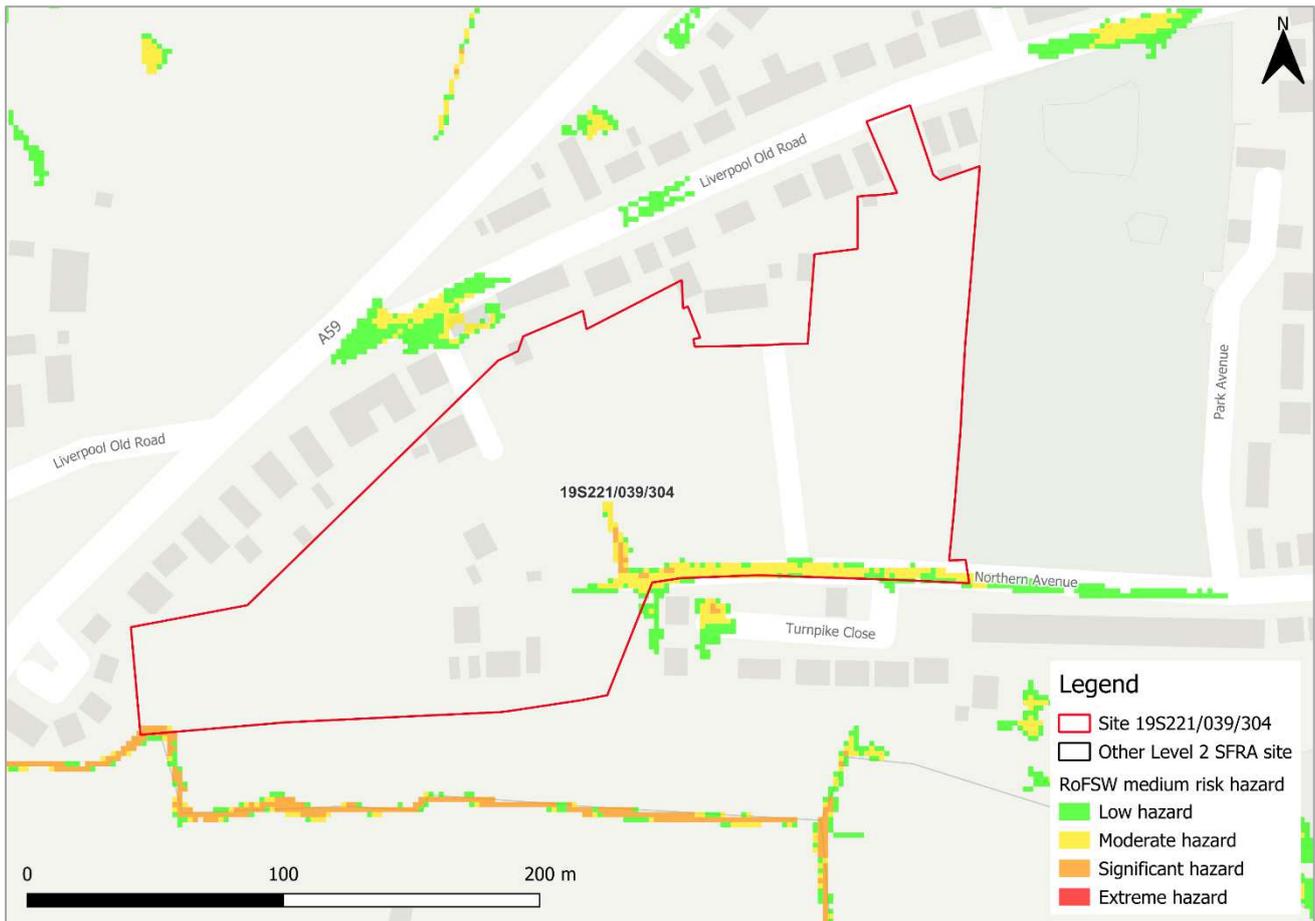


Figure 3-2: Medium risk event surface water flood hazard¹ (Risk of Flooding from Surface Water map)

3.2 Impacts from climate change

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

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

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

Figure 3-3 shows the 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

¹ 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.

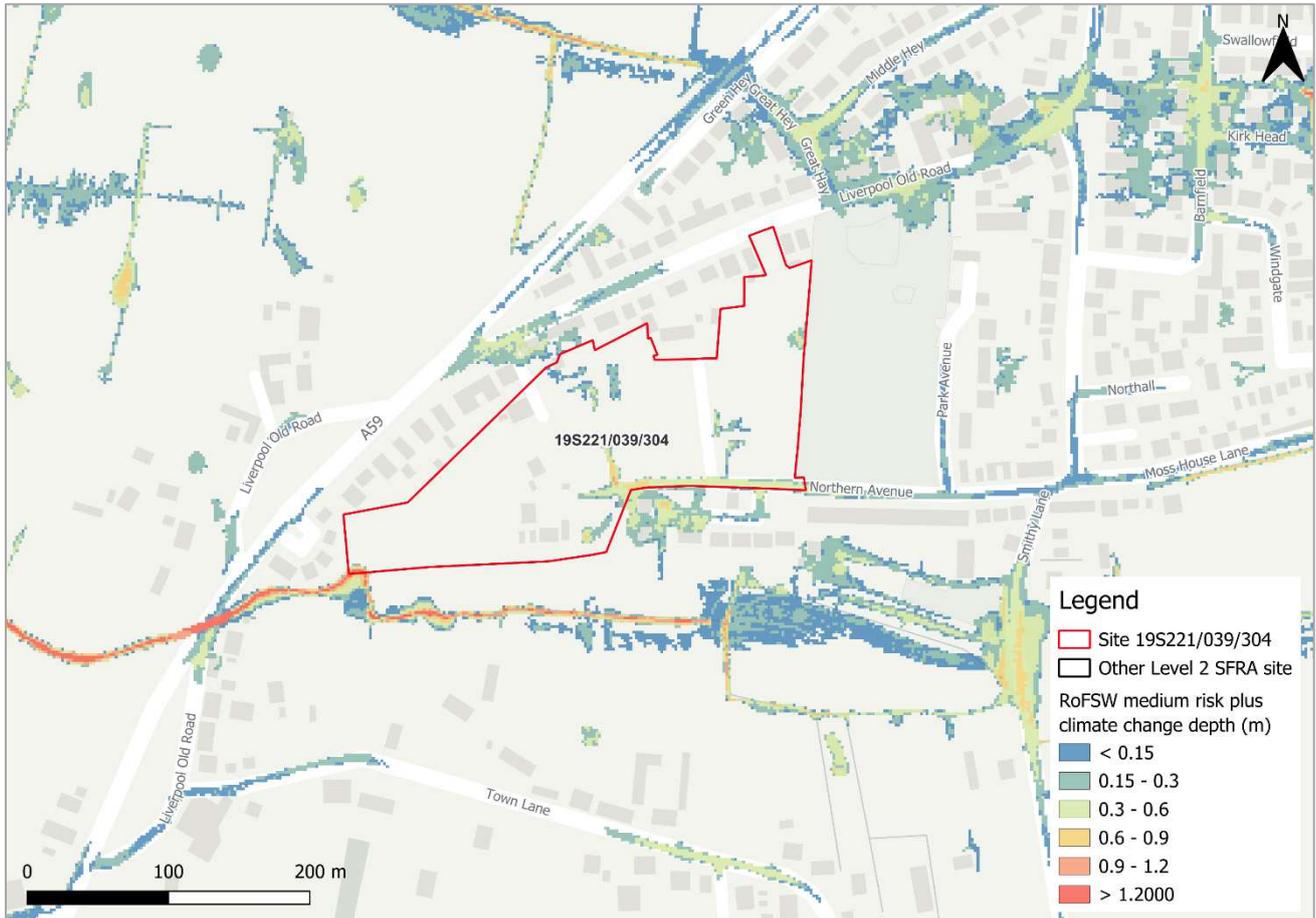


Figure 3-3: Medium risk event surface water flood depths plus 45% climate change (based on Risk of Flooding from Surface Water map)

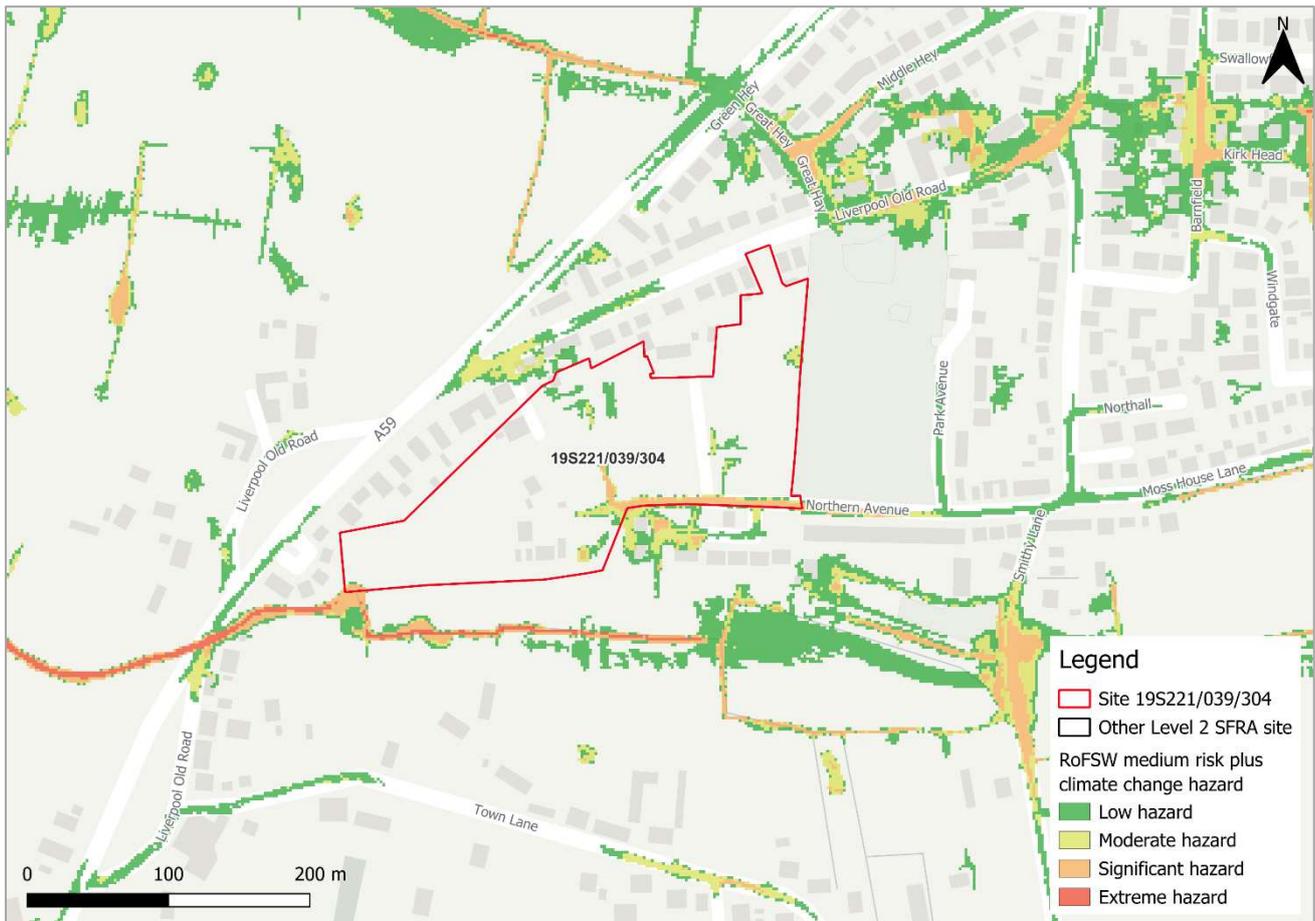


Figure 3-4: Medium risk event surface water flood hazards plus 45% climate change (based on Risk of Flooding from Surface Water map)

3.3 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.

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 Guide². Figure 4-1 shows the map for Site 19S221/039/304 and the surrounding areas and Table 4-1 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.

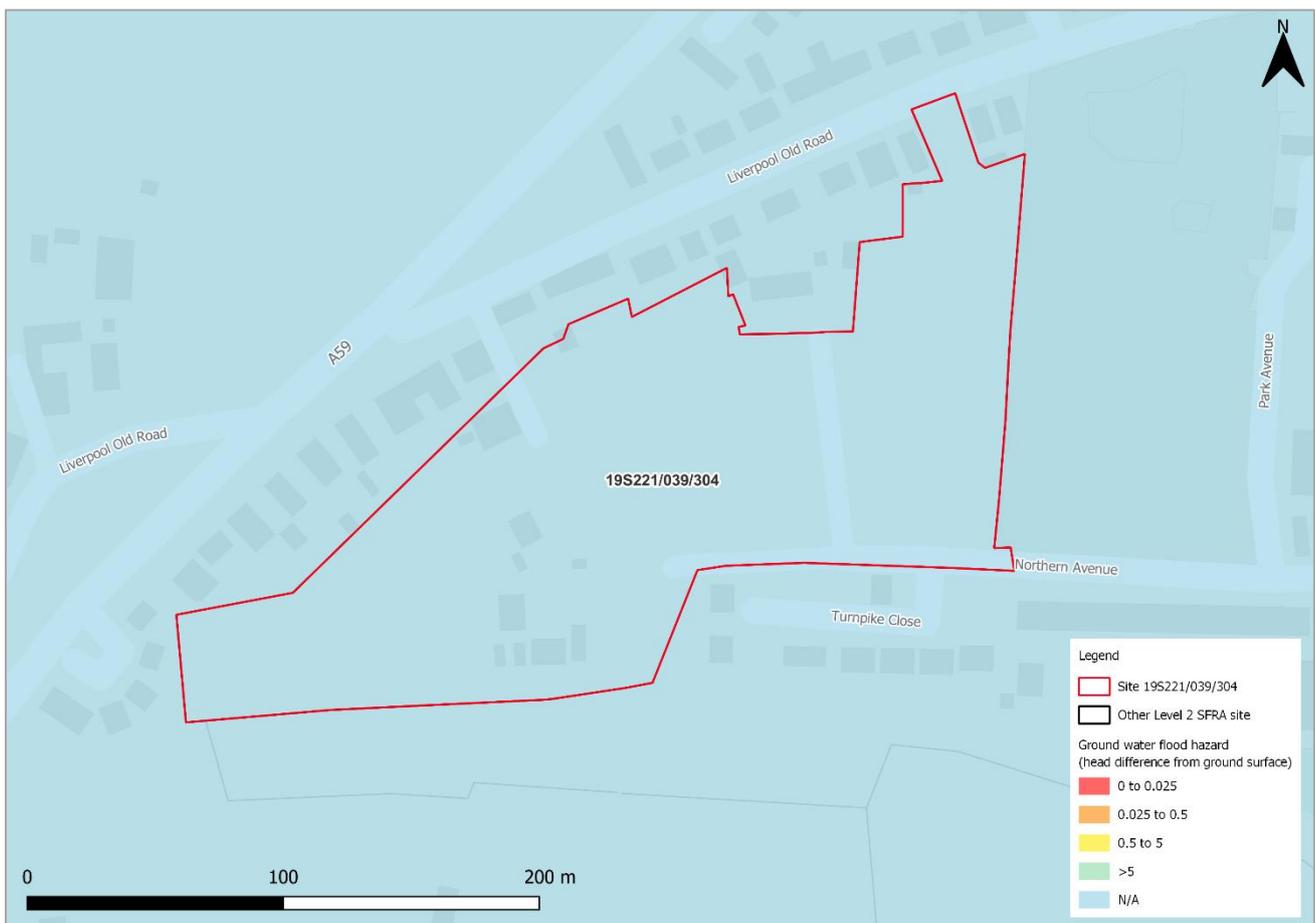


Figure 4-1: JBA 5m Groundwater Flood Map

² [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 test³, it must 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.

5.2 Recommendations, FRA requirements and further work

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

- There should be no 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.
- 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.

³ Para 178 National Planning Policy Framework 2024

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Central Lancashire Level 2 Strategic Flood Risk Assessment - Site 19S250

Final

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Contract

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

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1 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.

1.1 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

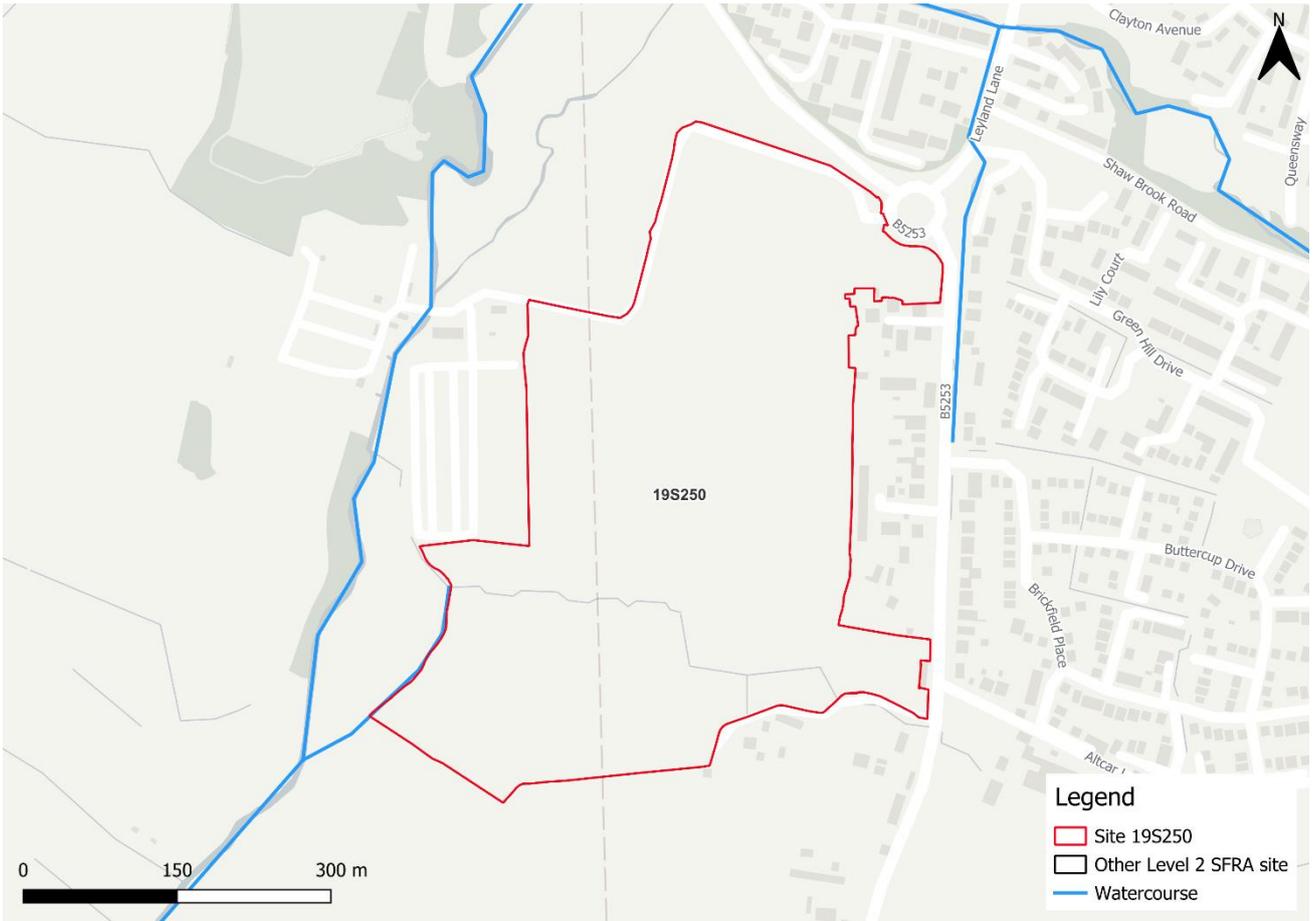


Figure 1-1: Existing site location boundary

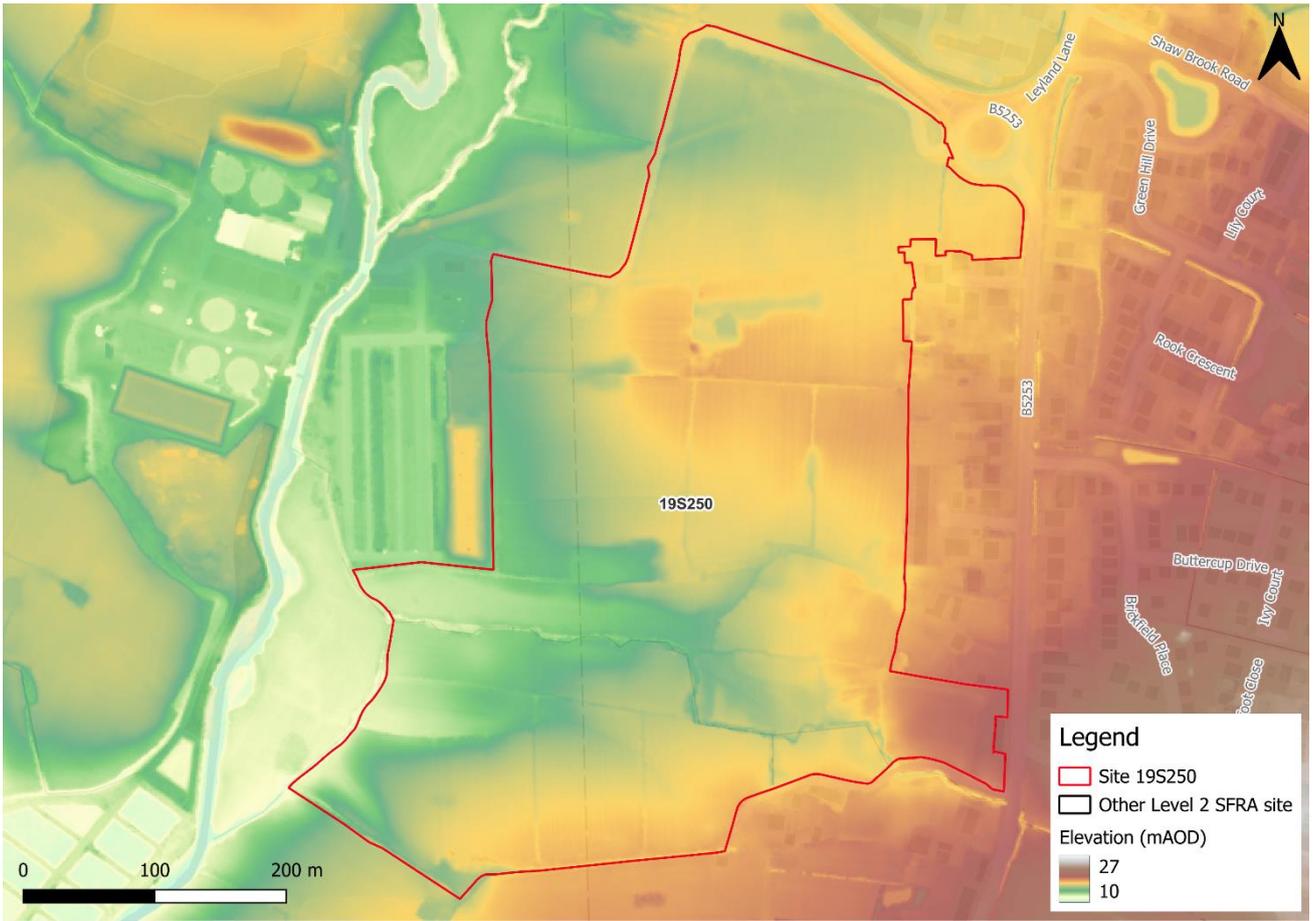


Figure 1-2: Topography

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

Functional floodplain is present 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 1-2) 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 2-1: Existing fluvial flood risk

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

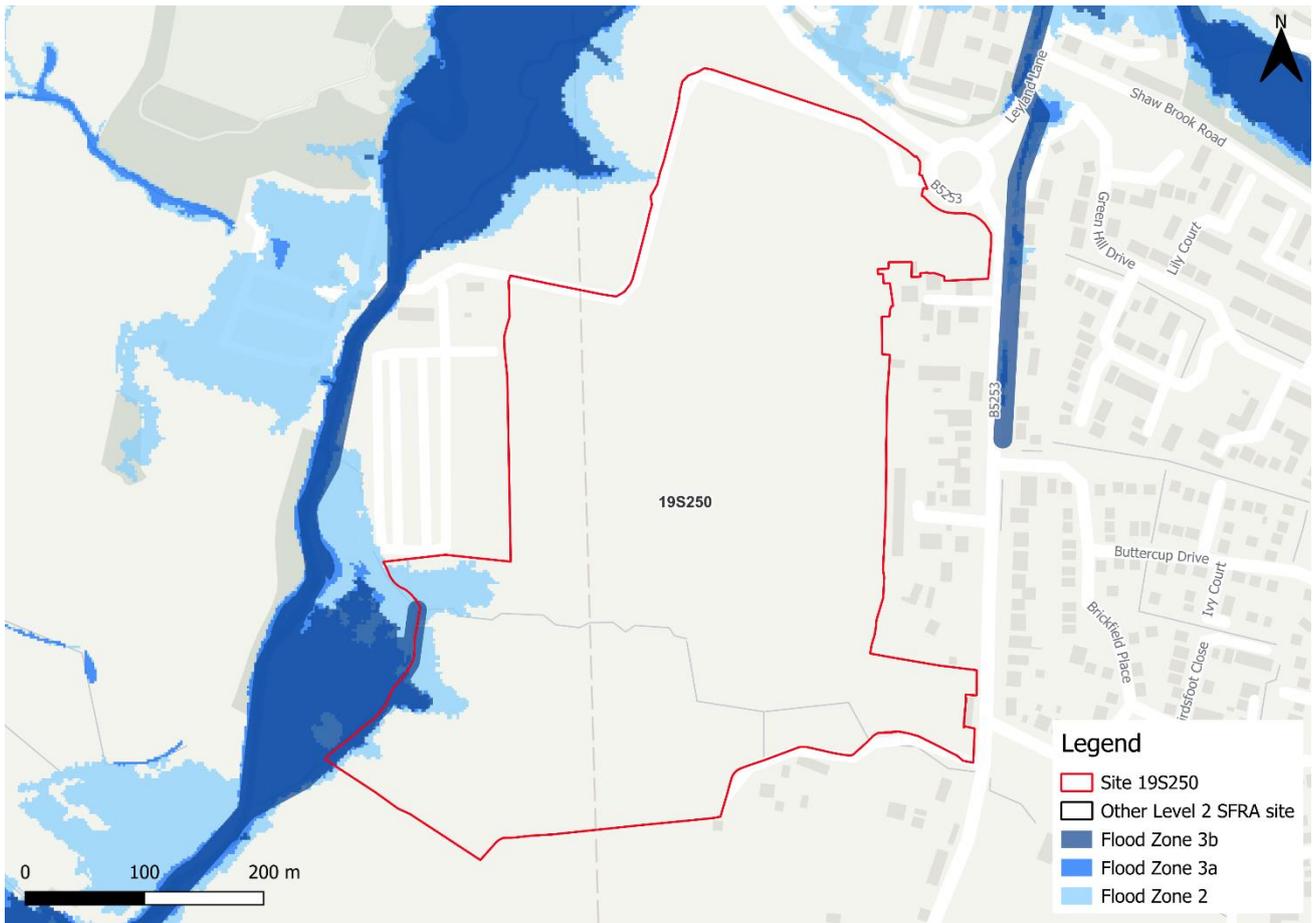


Figure 2-1: Existing risk from rivers to the site

2.1.2 Lostock SOC 2020 model outputs

Figure 2-2 shows the modelled flood depths for the 1% AEP undefended event which is the event Flood Zone 3 of the Flood Map for Planning is based on. Modelled risk to the site is confined to the southwest of the site. Maximum flood depths within the area at risk are modelled to be between 0.6 and 0.9 m. Figure 2-3 shows the modelled flood hazard ratings for the 1% AEP undefended event. 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.

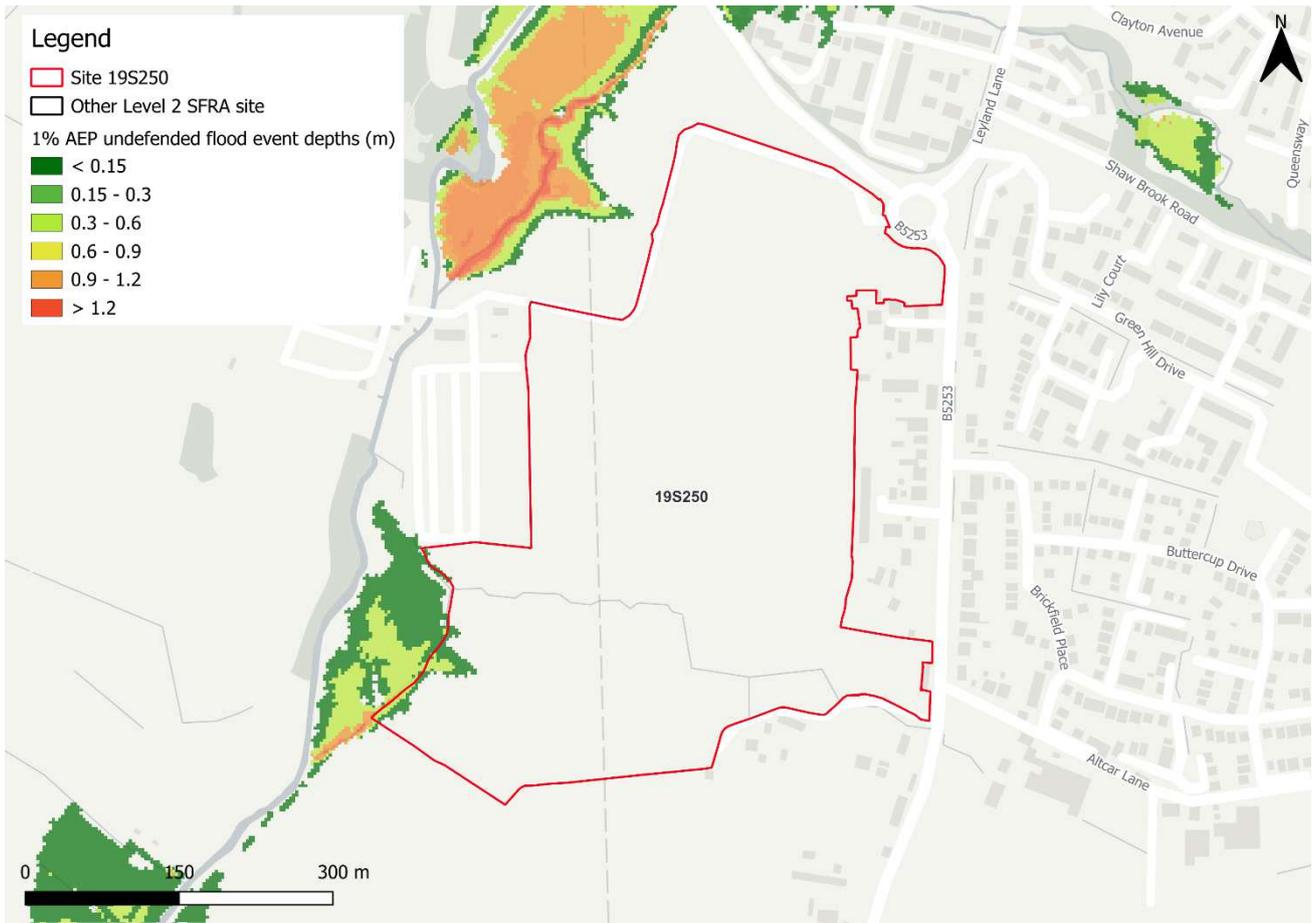


Figure 2-2: Flood depths for 1% AEP undefended flood event

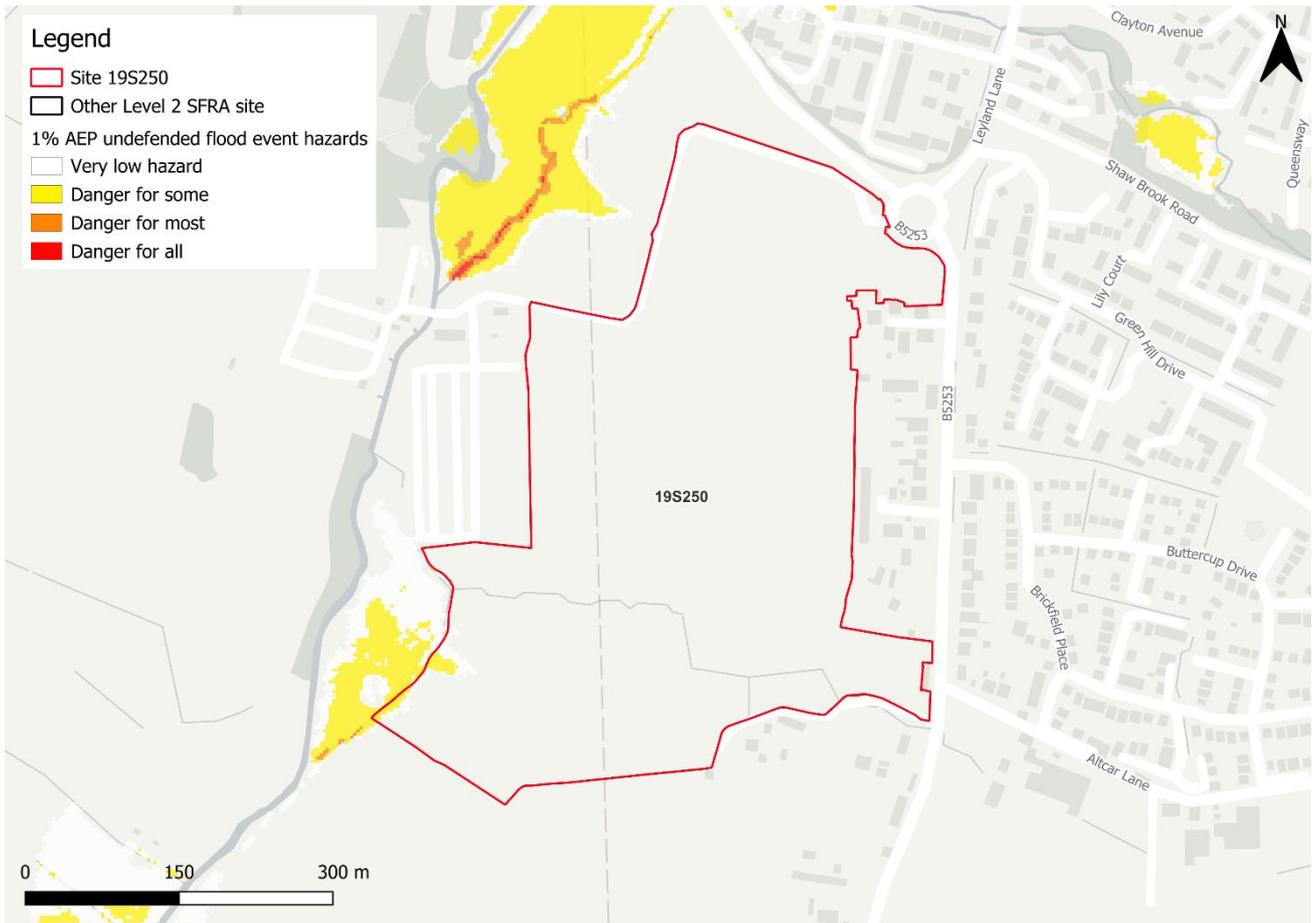


Figure 2-3: Flood hazard¹ for 1% AEP undefended flood event

2.2 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 2-2.

Table 2-2: Modelled climate change allowances for peak river flows for the Douglas Management Catchment

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

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

In the climate change event, the site is modelled to be at greater risk along the southwestern boundary. Figure 2-4 shows the modelled flood depths during the 1% AEP undefended flood event +47% climate change allowance. Flood depths within the site are 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 2-5 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'.

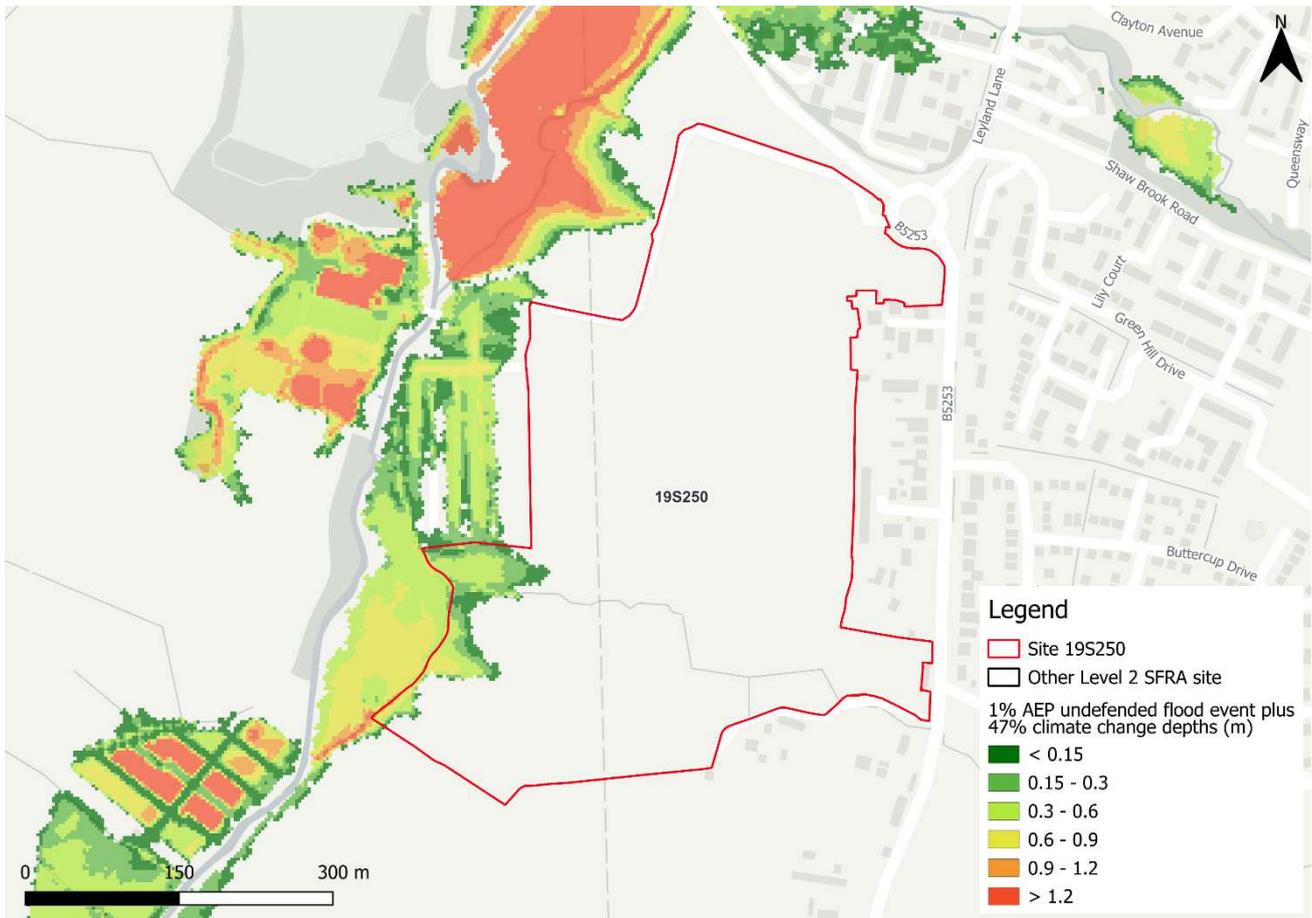


Figure 2-4: Flood depths for 1% AEP undefended flood event +47% (higher central climate change allowance)

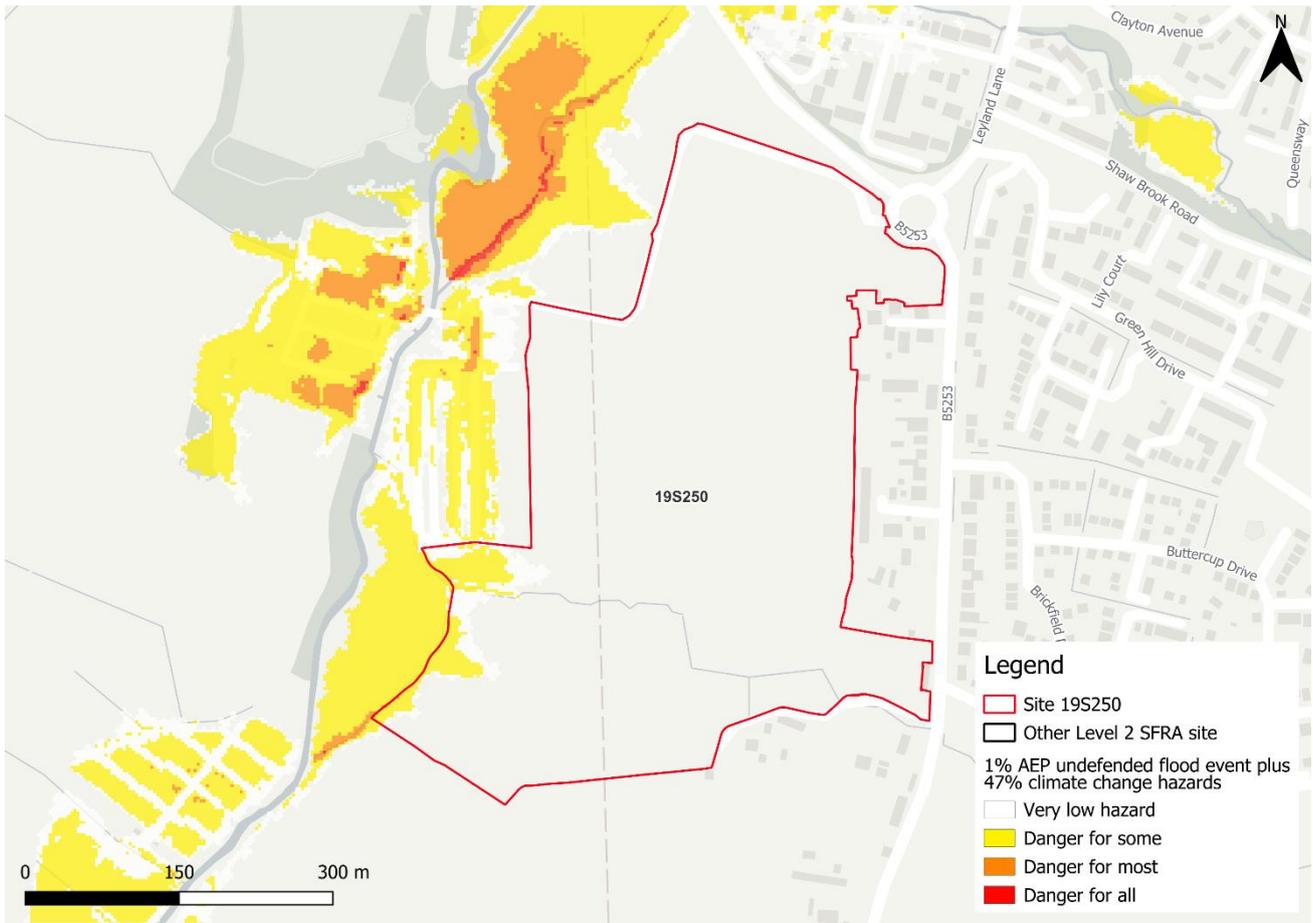


Figure 2-5: Flood hazard for 1% AEP undefended flood event +47% (higher central climate change allowance)

2.3 Flood risk management

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

2.3.1 Cumulative impacts

A cumulative impact assessment was completed through the Central Lancashire Level 1 SFRA (2025), which aimed to identify catchments sensitive to the cumulative impact of development. Site 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 flows² and volumes³ 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.

2.3.2 Working with Natural Processes

The EA's Working with Natural Processes (WwNP) dataset has been interrogated to identify opportunities for Natural Flood Management (NFM) to reduce flood risk to the site and surrounding areas. 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 2-6.

2 For the 1 in 1 year rainfall event and the 1 in 100 year rainfall event

3 For the 1 in 100 year, 6 hour rainfall event

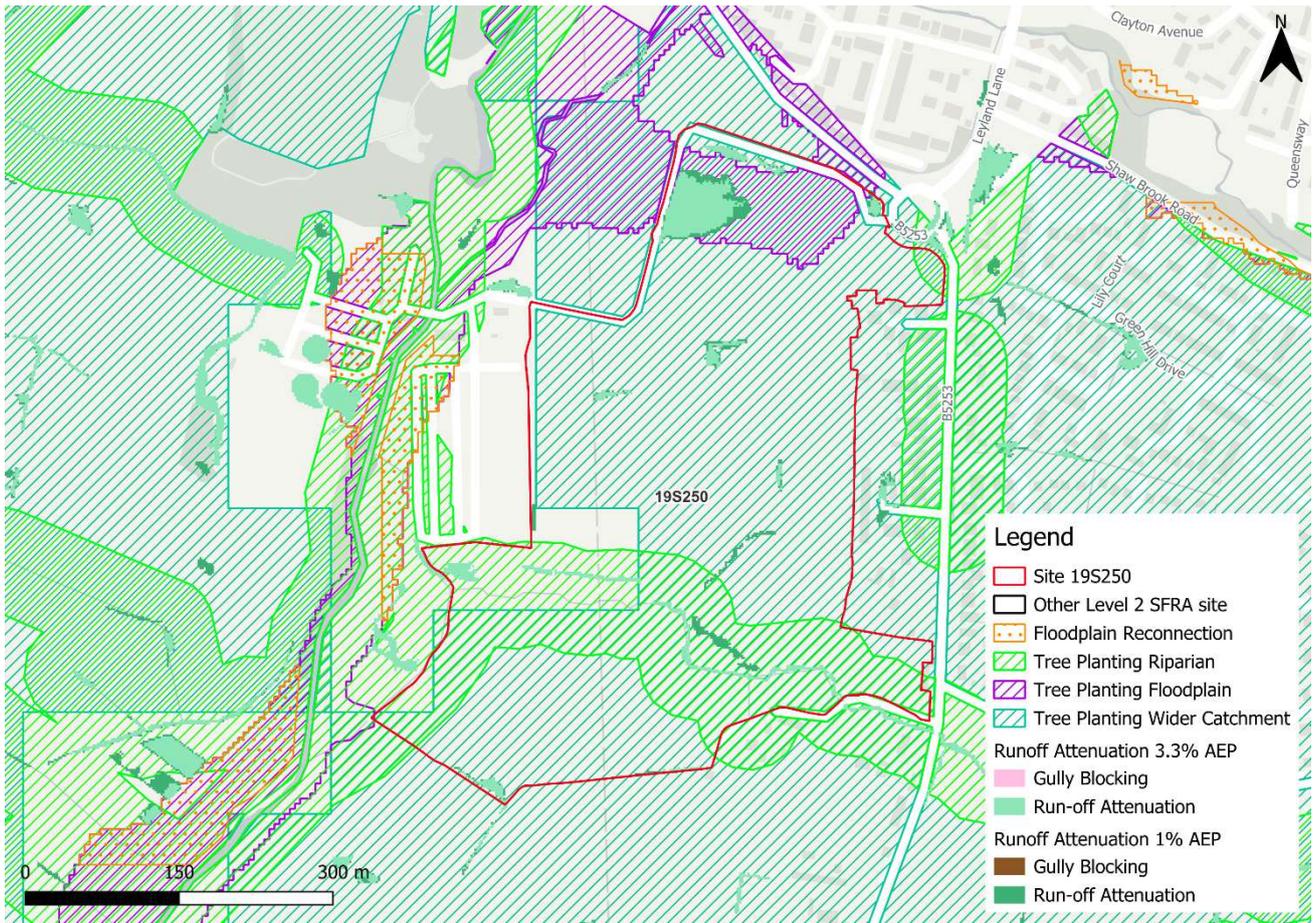


Figure 2-6: Natural Flood Management (NFM) potential mapping

2.4 Residual risk

2.4.1 Flood risk from reservoirs

The EA's Reservoir Flood Maps (RFM) (2021) show where water may go in the unlikely event of a reservoir or dam failure. Figure 2-7 shows the RFM in a 'dry day' and 'wet day' scenario. A 'dry day' scenario assumes that the water level in the reservoir is the same as the spillway level or the underside of the roof for a service reservoir and the watercourses upstream and downstream of the reservoir are at a normal level. A 'wet day' scenario assumes a worst-case scenario where a reservoir releases water held on a 'wet day' when local rivers have already overflowed their banks.

The site is potentially at risk from Anglezarke, 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.

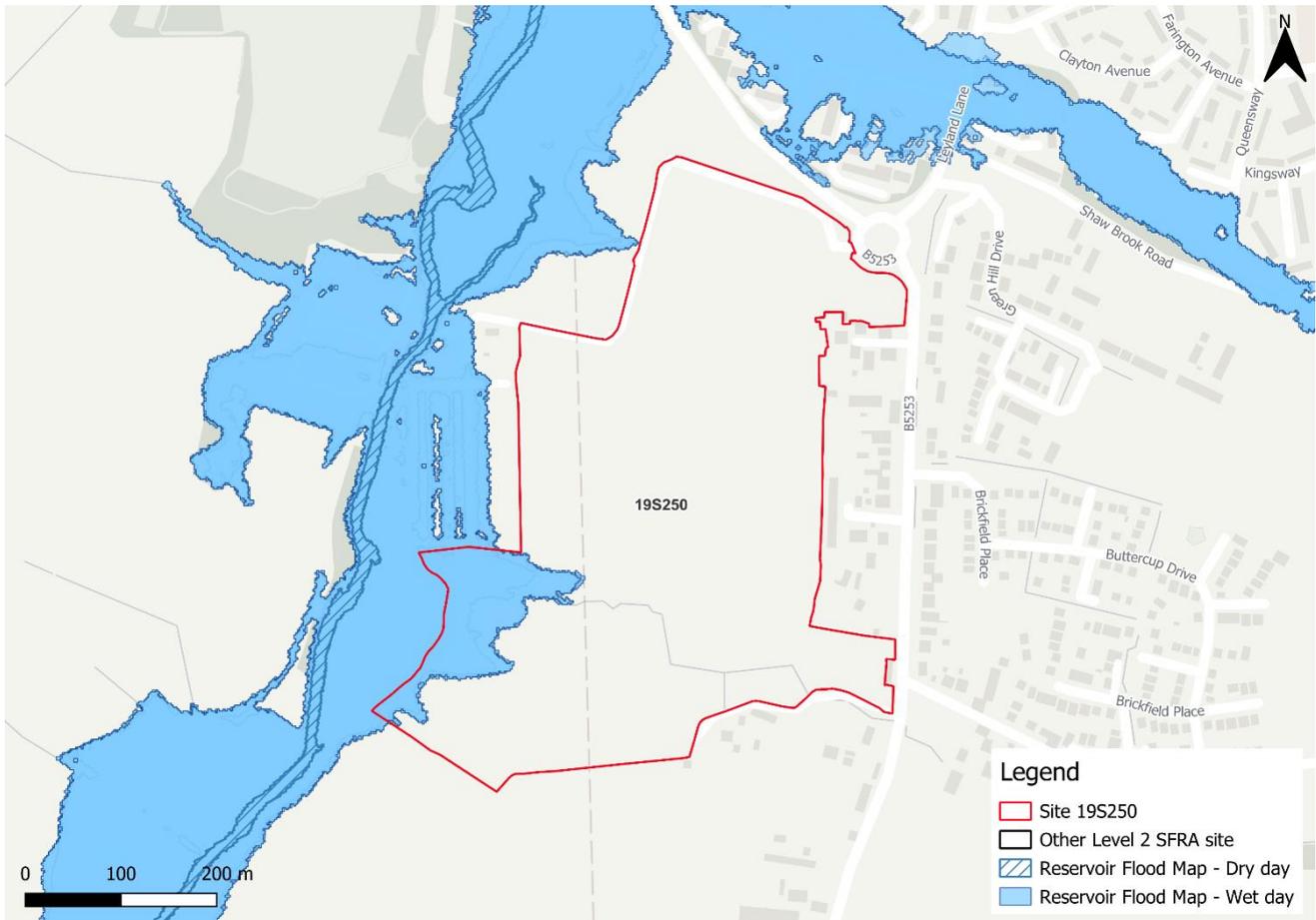


Figure 2-7: Flood risk from reservoirs

2.5 Historic flood incidents

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

2.6 Flood warning and access and escape routes

The EA operates a Flood Warning Service for properties located within a Flood Warning Area (FWA) for when a flood event is expected to occur. Site 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.

2.7 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 consider⁴:
 - 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

⁴ [Reservoir flood maps: when and how to use them | Environment Agency | 2021](#)

3 Flood risk from surface water

3.1 Existing risk

Based on the EA's national scale Risk of Flooding from Surface Water (RoFSW) map, surface water risk to the site is predominantly 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 3-1.

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

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

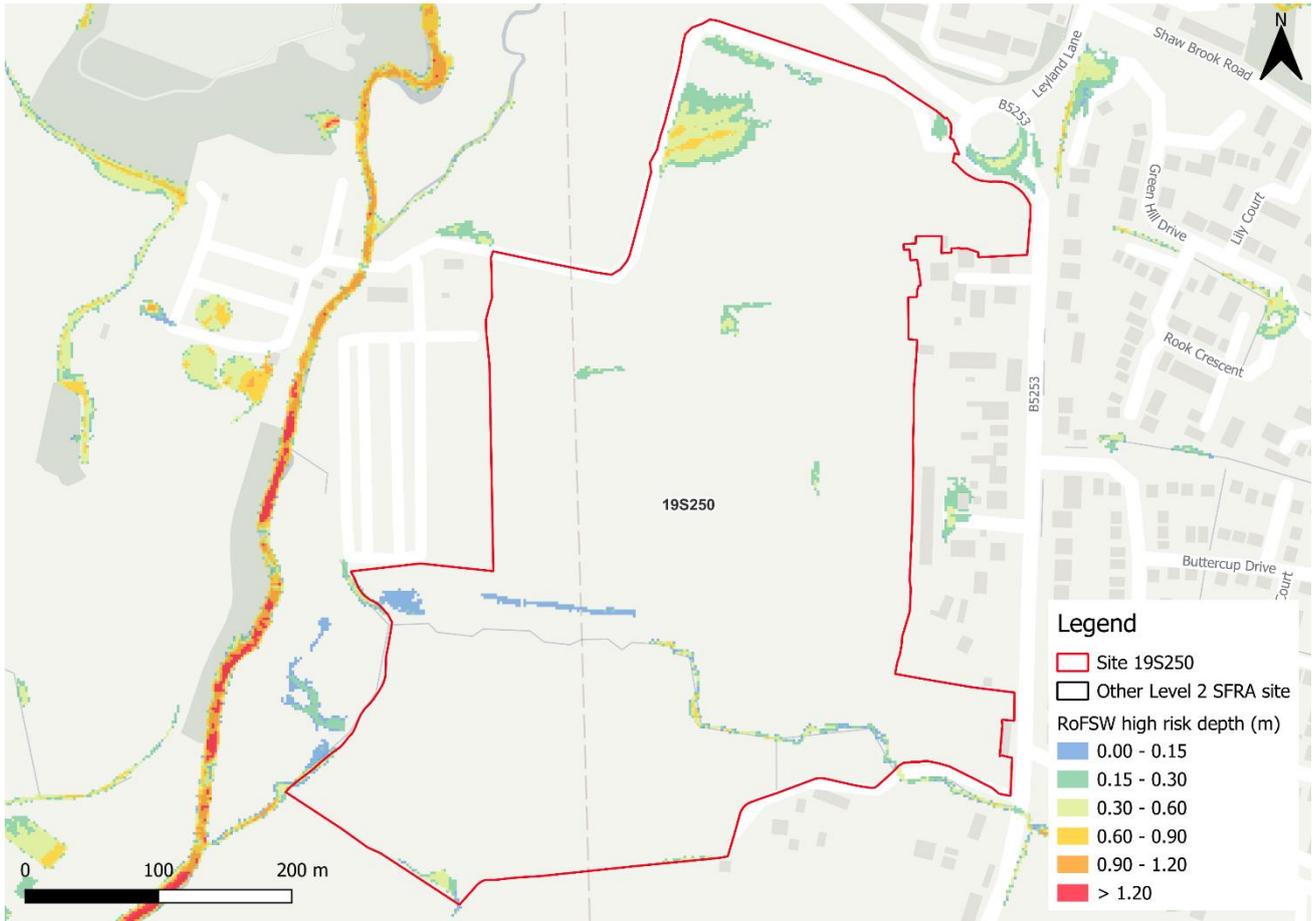


Figure 3-1: High risk event surface water flood depths (Risk of Flooding from Surface Water map)

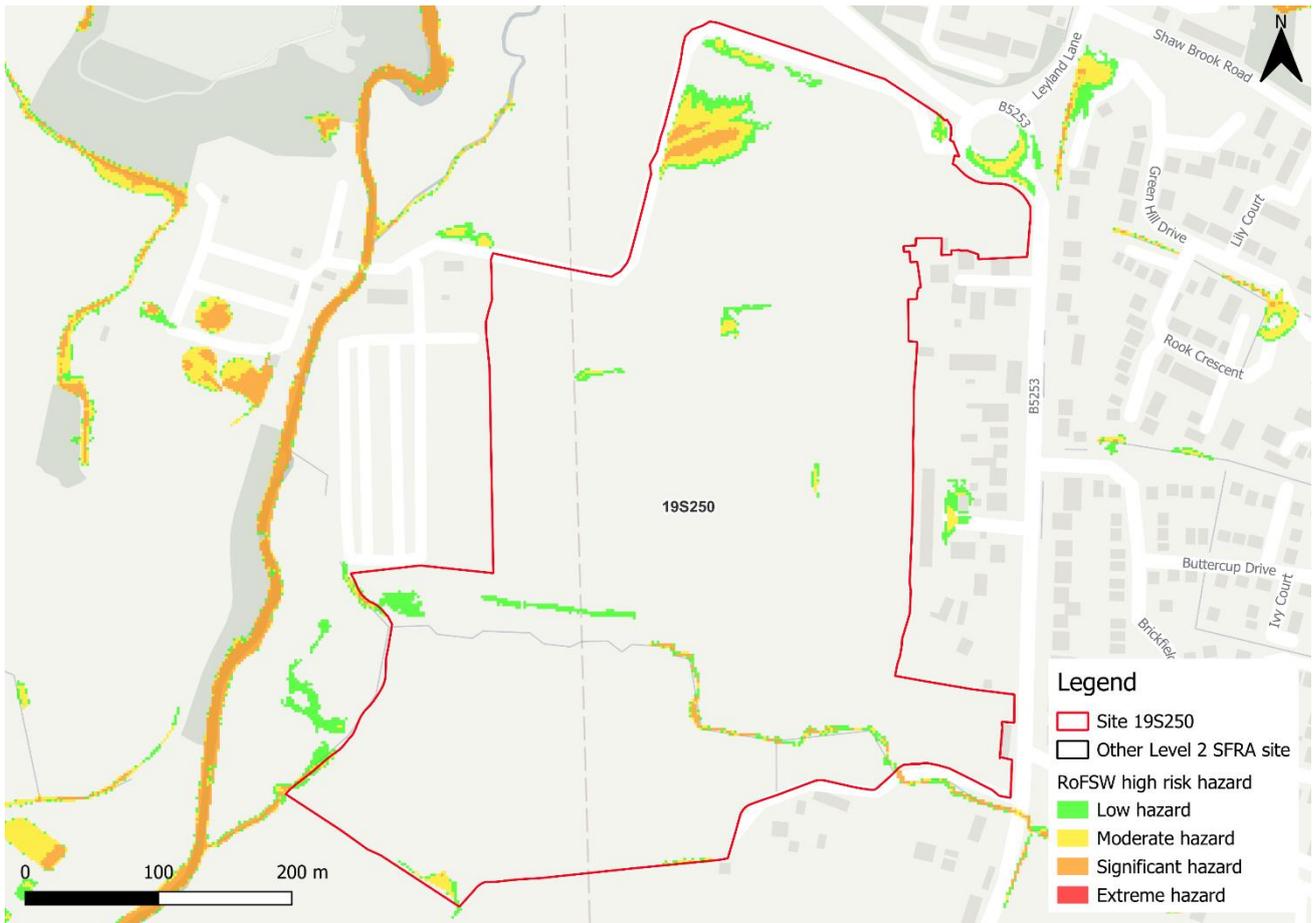


Figure 3-2: High risk event surface water flood hazard⁵ (Risk of Flooding from Surface Water map)

3.2 Impacts from climate change

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

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

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

Figure 3-3 shows the high risk surface water flood depths plus 40% climate change. Risk is modelled to be greater 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

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

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).

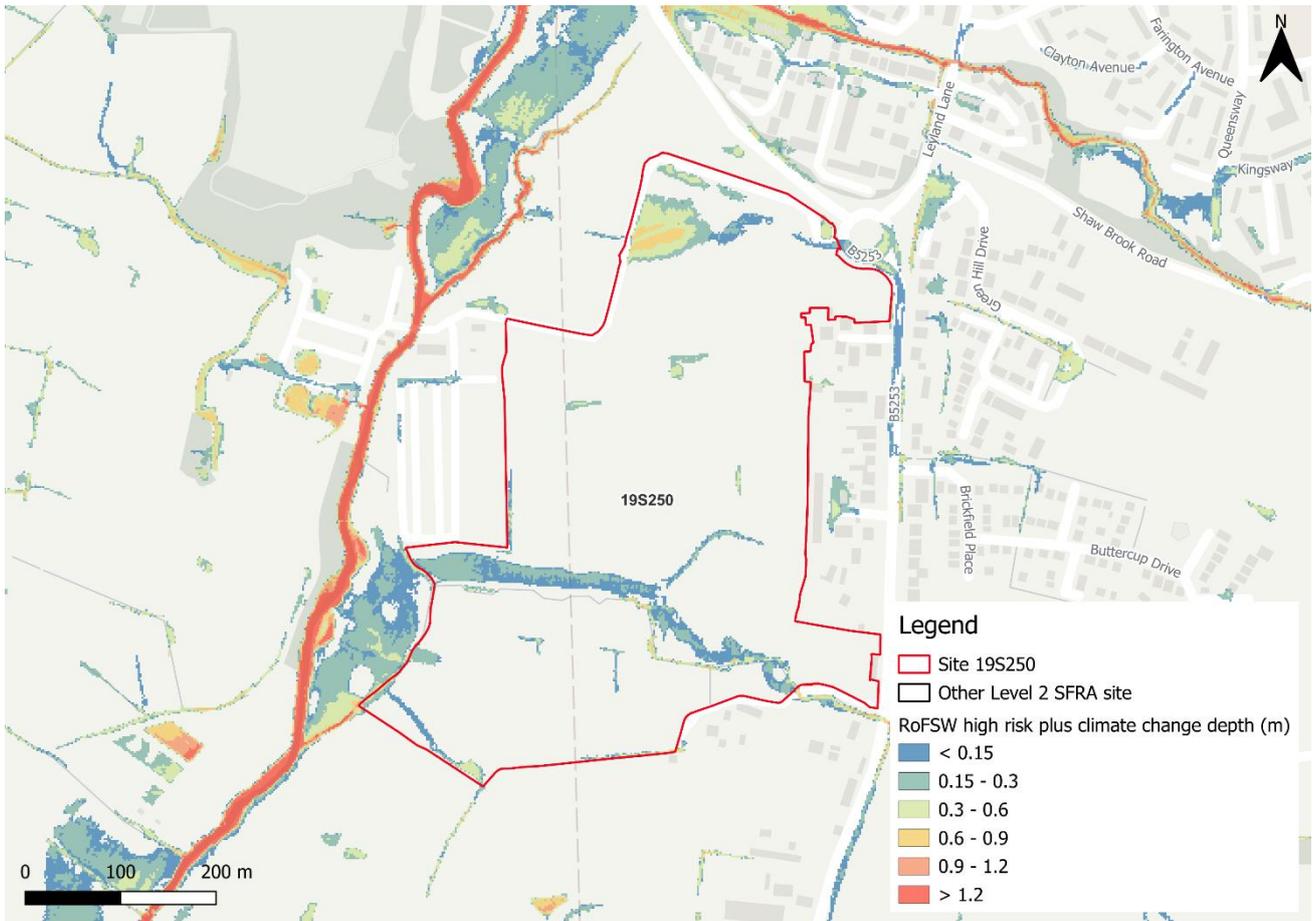


Figure 3-3: High risk event surface water flood depths plus 40% climate change (based on Risk of Flooding from Surface Water map)

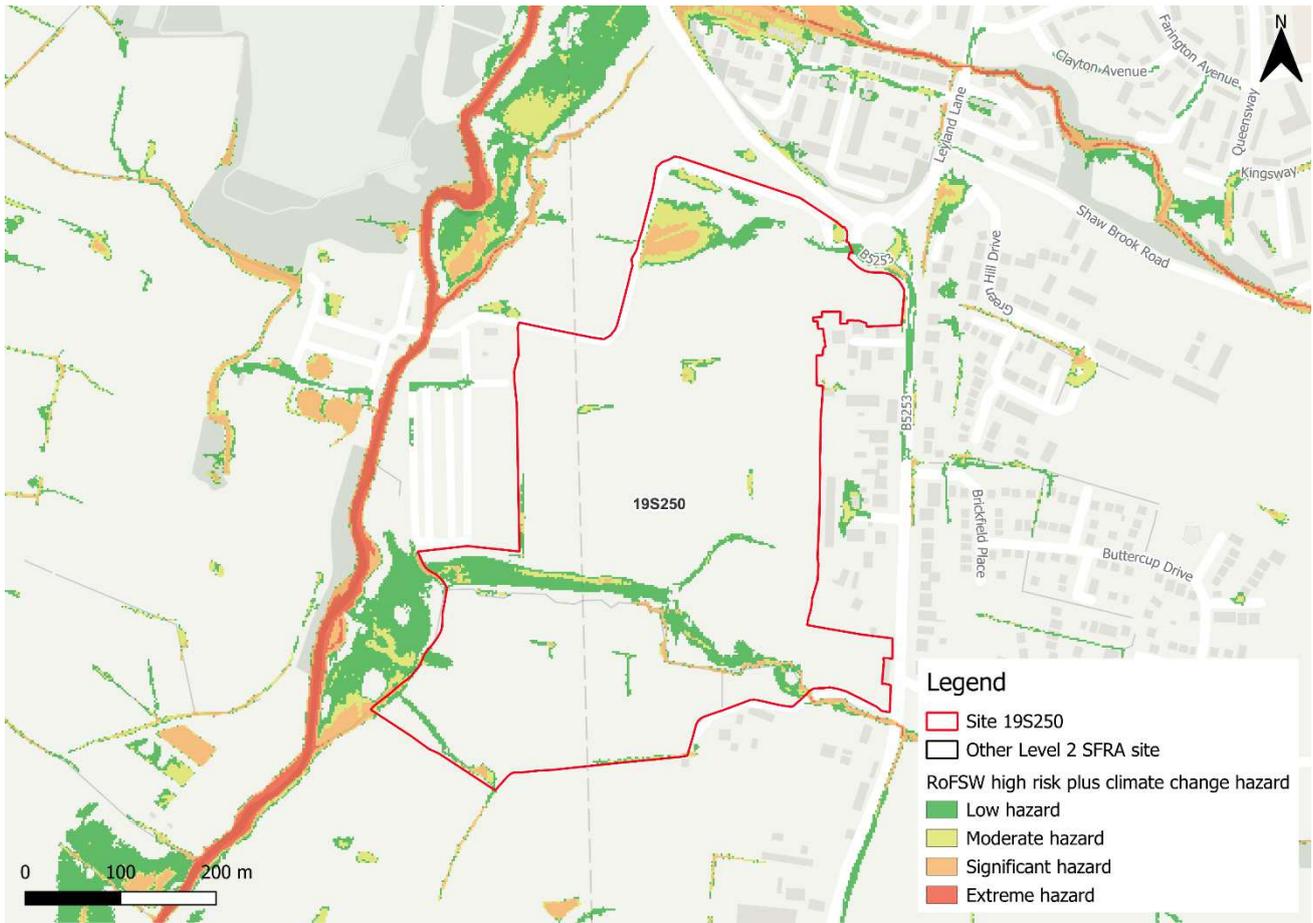


Figure 3-4: High risk event surface water flood hazards plus 40% climate change (based on Risk of Flooding from Surface Water map)

3.3 Observations, mitigation options and site suitability - surface water

- Current risk to the site is largely very low, with 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.

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 Guide⁶. Figure 4-1 show the map for Site 19S250 and the surrounding areas and Table 4-1 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.

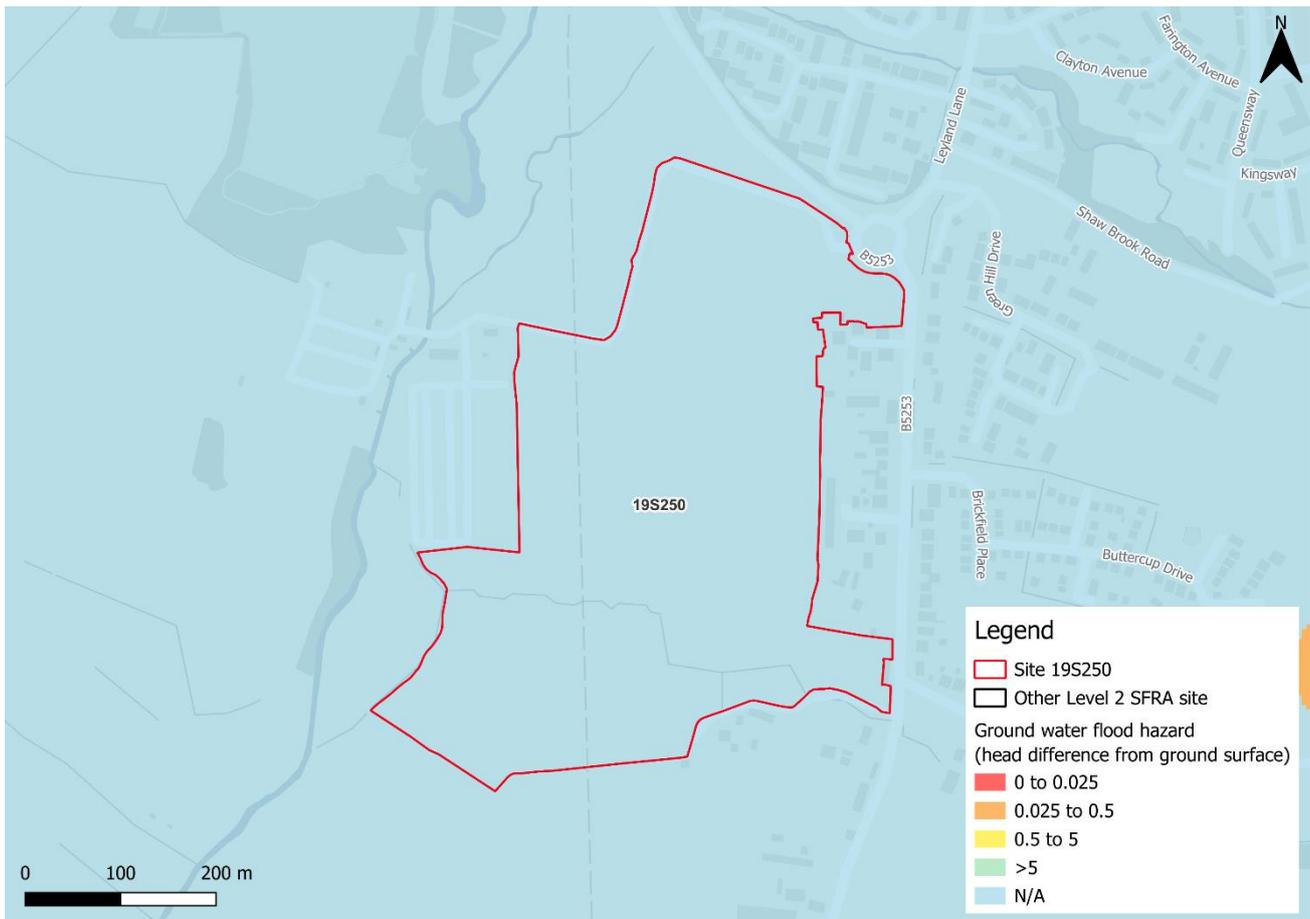


Figure 4-1: JBA 5m Groundwater Emergence Map

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.	

5 Overall site assessment

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

To pass part b) of the exception test⁷, 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.

5.2 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.

⁷ Para 178 National Planning Policy Framework 2024

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