

Bradford Level 2 Strategic Flood Risk Assessment - Appendix D

**Wharfedale Nominal Risk Site
Assessments
Draft**

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This report describes work commissioned by City of Bradford Metropolitan District Council (CBMDC) by an instruction dated 19 July 2024. The Client's representative for the contract was Jonathan Dicken of CBMDC. Laura Thompson of JBA Consulting carried out this work.

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1 Introduction

A Level 2 Strategic Flood Risk Assessment (SFRA) is required by the City of Bradford Metropolitan District Council (CBMDC) as all identified potential development sites cannot be allocated outside of areas of flood risk, as identified through the Bradford Level 1 SFRA, finalised November 2023.

The Level 1 SFRA entailed the high-level flood risk screening of 1,396 potential development sites. 260 of these sites were shown to be at some level of fluvial and/or surface water flood risk yet considered important to CBMDC's Local Plan ambitions. 98 of the 260 sites were shown to be at nominal risk of flooding yet still required brief assessment and commentary to support allocation.

This report summarises the fluvial, surface water, groundwater, reservoir, sewer and canal risk to the sites at nominal risk of flooding within the Wharfedale Local Plan sub-area. This sub-area is located within the north of Bradford district, covering the town of Ilkley and the villages of Burley in Wharfedale, Addingham, Burley Woodhead and Menston.

2 Nominal risk sites

2.1 H23

Site summary (Figure 2-1)	
Location	Main Street / Addingham Bypass (East)
Existing site use	Agriculture
Existing site vulnerability	Less vulnerable
Proposed site use	Housing
Proposed site vulnerability	More vulnerable
Site area	1.6 hectares



Figure 2-1: H23 site location boundary

2.1.1 Fluvial

The site is wholly located within Flood Zone 1 of the Environment Agency's (EA) Flood Map for Planning which indicates it as at low risk of flooding from rivers. The site is not modelled

to be at additional risk from fluvial climate change and is therefore at low risk of flooding from rivers in the future.

Marchup Beck and Town Beck are located to the north of the site, which are modelled in the River Wharfe Tribs Town Beck 2021 model.

2.1.2 Surface water

The site is predominantly at very low risk of surface water flooding, based on the EA's Risk of Flooding from Surface Water (RoFSW) map (Table 2-1). There is a surface water flow path adjacent to the north western boundary of the site in the medium risk event. Maximum depths within the site are < 0.15 m (Figure 2-2). The flow path is modelled to extend along the northwestern boundary in the medium risk event +40% climate change, although depths within the site remain low.

Based on available information, safe access and escape routes should be possible via Big Meadow Drive, however, routes may need to be raised above the existing surface water flow path along the northwestern boundary to allow surface water to flow naturally.

Table 2-1: Existing surface water flood risk within H23 based on the RoFSW map

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

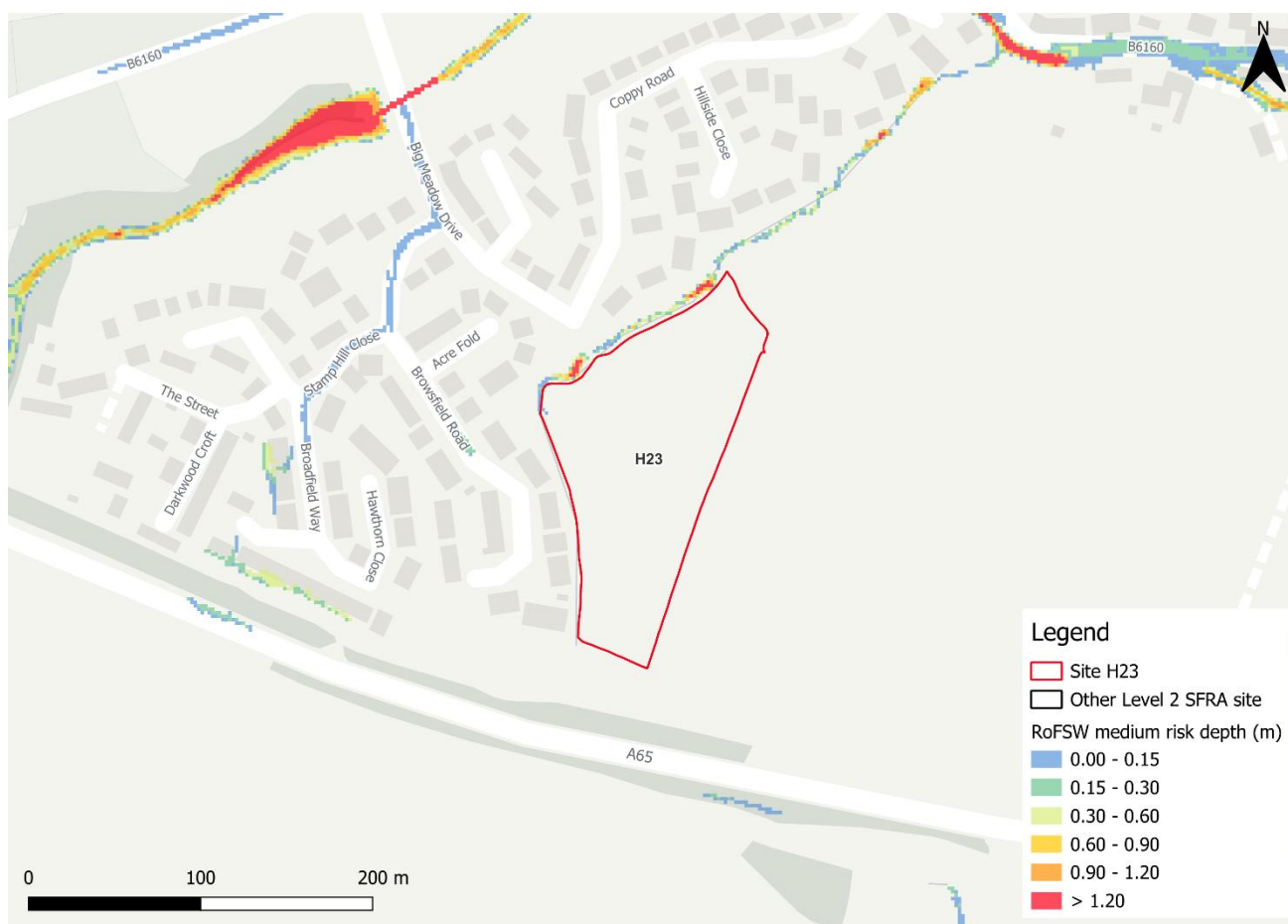


Figure 2-2: Medium risk event surface water flood depths within H23 (Risk of Flooding from Surface Water)

2.1.3 Groundwater

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.

2.1.4 Summary and recommendations

- The site is not required to pass the exception test as it is not located within Flood Zone 3a.
- 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).
- Based on available information, there is no additional risk to the site from reservoir, canal or sewer flooding.
- Development should be possible at this site given the low fluvial and very low surface water flood risk to the site.

- The site is not modelled to be at significant additional fluvial or surface water risk as a result of climate change.
- Safe access and escape routes should be investigated further as part of a site-specific FRA. Routes may need to be raised above the existing surface water flow path along the northern boundary to allow surface water to flow naturally.
- Any FRA should include for a drainage strategy which should investigate ground conditions for infiltration SuDS suitability.

2.2 H383

Site summary (Figure 2-3)	
Location	Wheatley Grove
Existing site use	Agriculture
Existing site vulnerability	Less vulnerable
Proposed site use	Housing
Proposed site vulnerability	More vulnerable
Site area	7.2 hectares

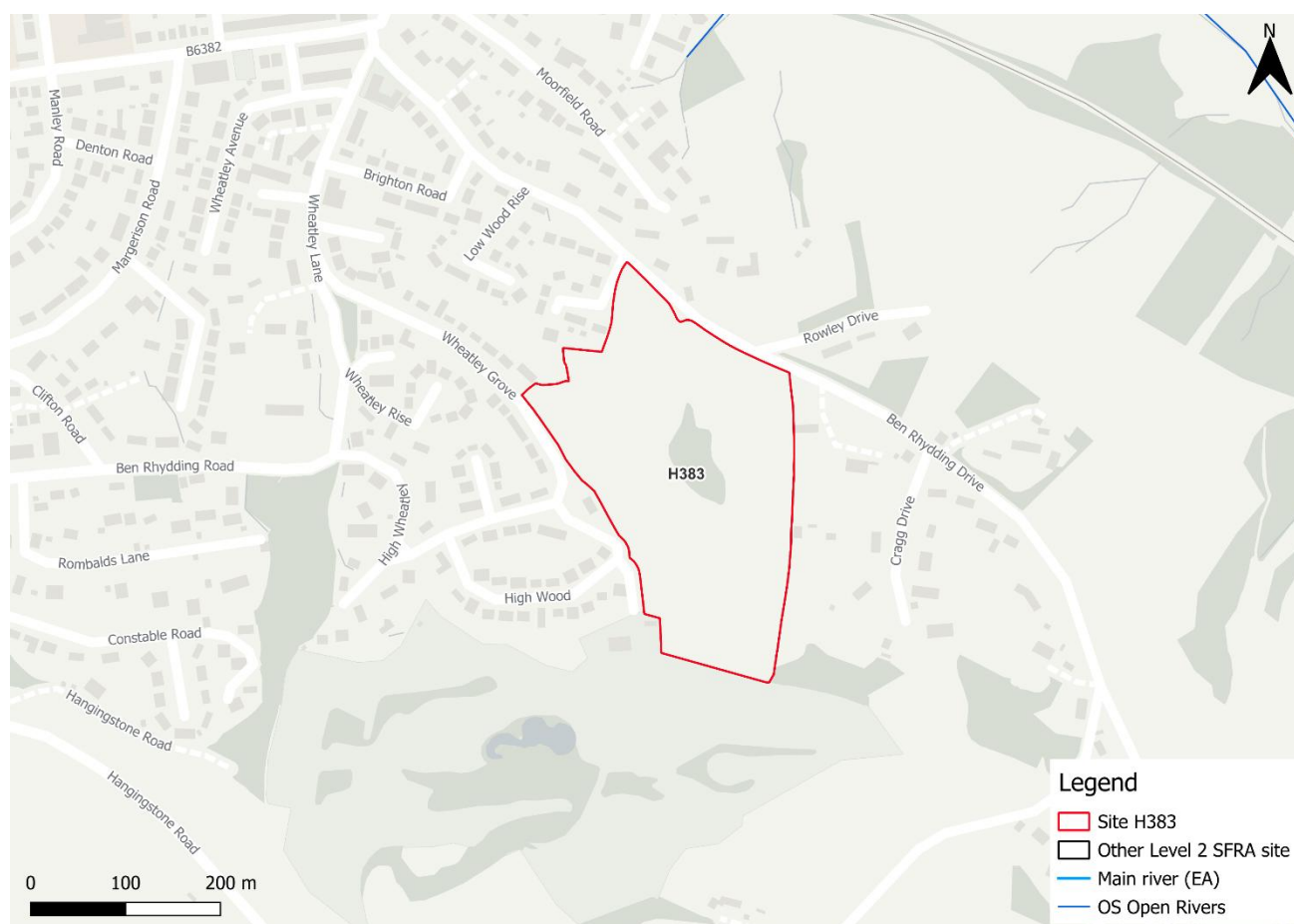


Figure 2-3: H383 site location boundary

2.2.1 Fluvial

The site is wholly located within Flood Zone 1 of the Environment Agency's (EA) Flood Map for Planning which indicates it as at low risk of flooding from rivers. The site is not modelled to be at additional risk from fluvial climate change and is therefore at low risk of flooding from rivers in the future. There is an unnamed watercourse to the north of the site.

2.2.2 Surface water

The site is predominantly at very low risk of surface water flooding, based on the EA's Risk of Flooding from Surface Water (RoFSW) map (Table 2-2). There is a surface water flow path through the centre of the site in the medium risk event. Maximum depths within the site are between 0.3 and 0.6 m (

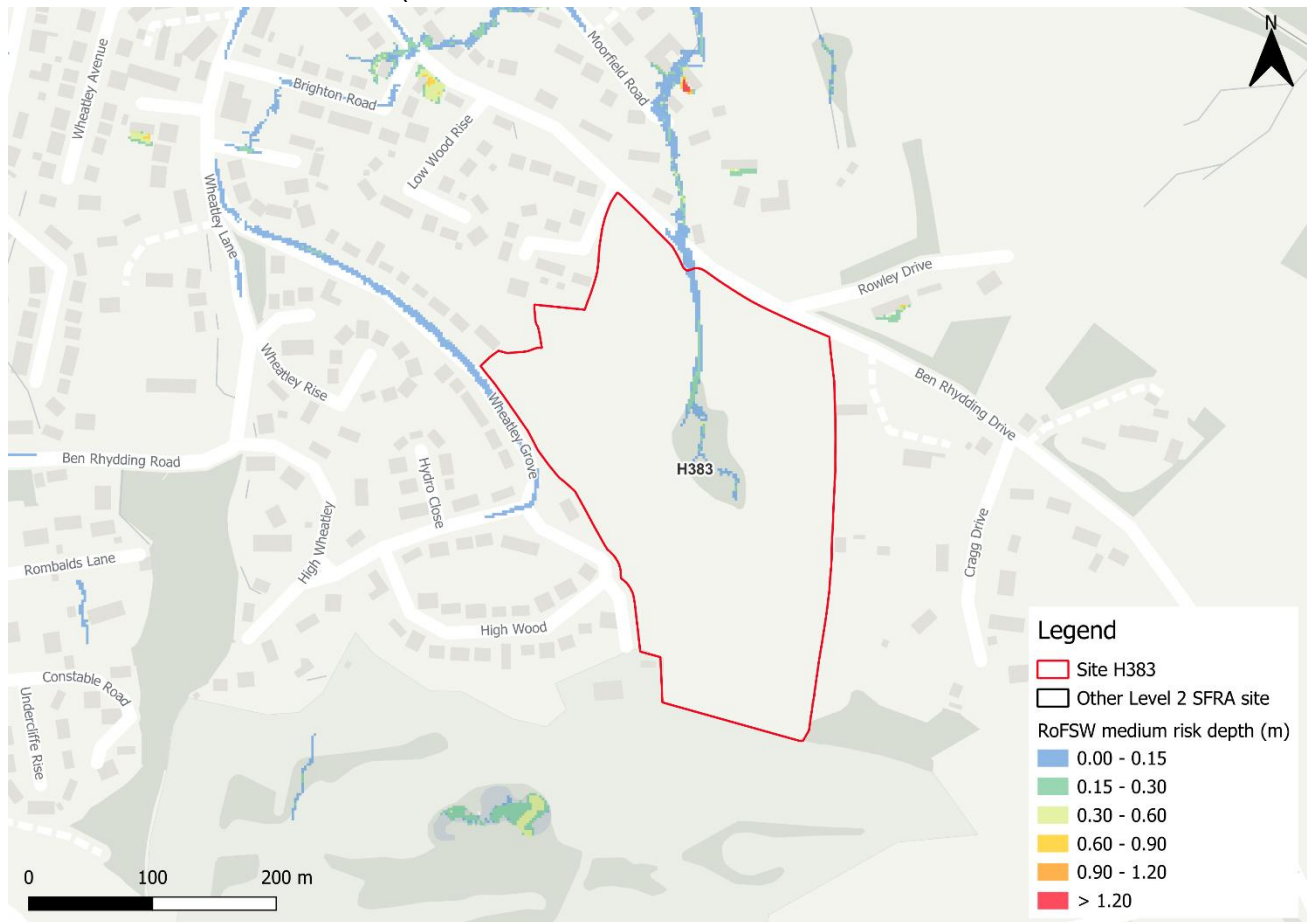


Figure 2-4). The flow path is modelled to increase in both depth and extent through the site in the medium risk event +40% climate change, however depths within the site remain low. Any existing flow paths should be maintained in site design.

Based on available information, safe access and escape routes should be possible via Ben Rhydding Drive to the north of the site.

Table 2-2: Existing surface water flood risk within H383 based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
92	6	1	1

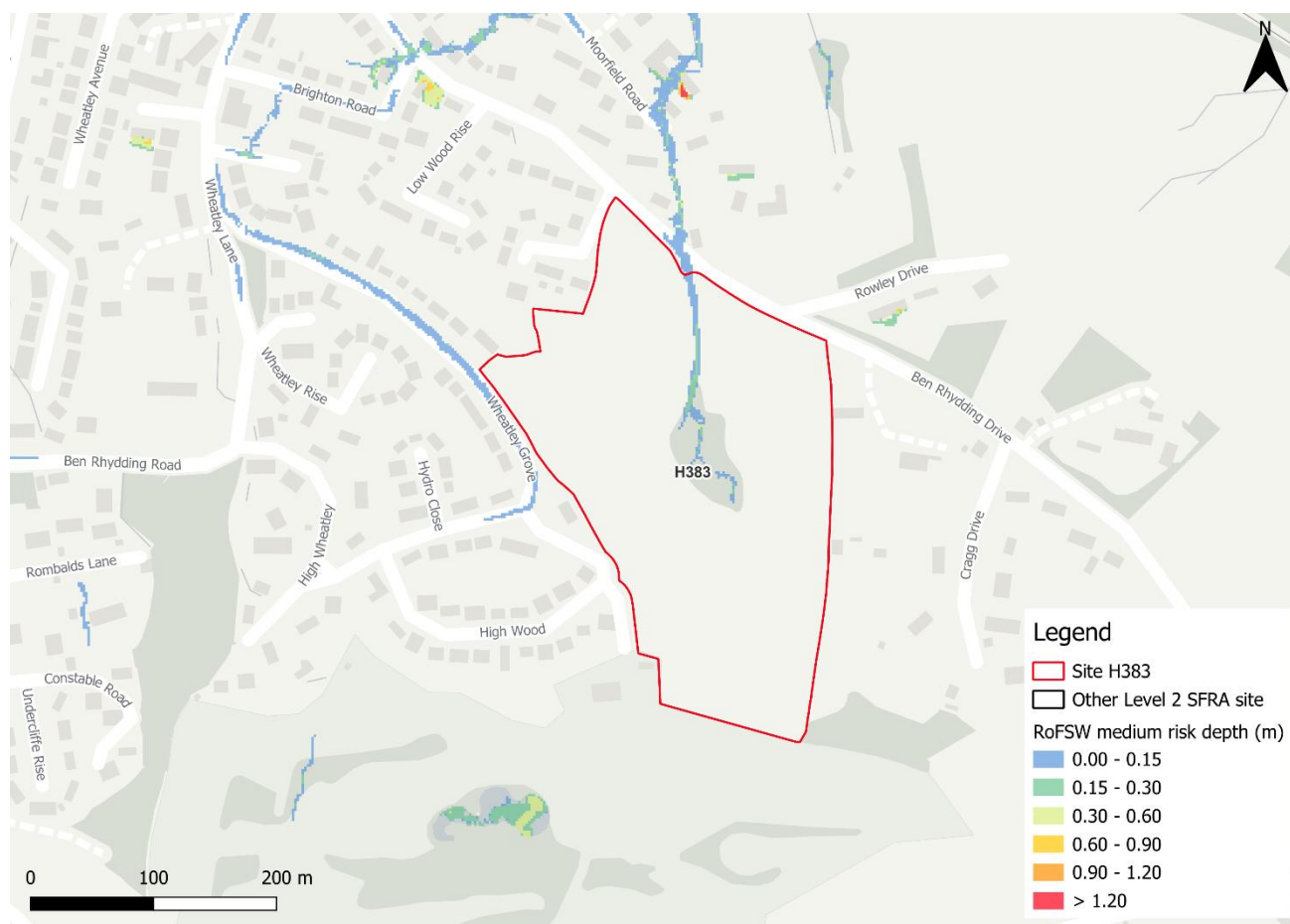


Figure 2-4: Medium risk event surface water flood depths within H383 (Risk of Flooding from Surface Water)

2.2.3 Groundwater

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

2.2.4 Summary and recommendations

- The site is not required to pass the exception test as it is not located within Flood Zone 3a.
- 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).
- Based on available information, there is no additional risk to the site from reservoir, canal or sewer flooding.

- Development should be possible at this site given the low fluvial and very low surface water flood risk to the site.
- The site is not modelled to be at significant additional fluvial or surface water risk as a result of climate change.
- Any FRA should include for a drainage strategy which should investigate ground conditions for infiltration SuDS suitability.

2.3 H384

Site summary (Figure 2-5)	
Location	Skipton Road East
Existing site use	Greenfield
Existing site vulnerability	Water compatible
Proposed site use	Housing
Proposed site vulnerability	More vulnerable
Site area	1.2 hectares



Figure 2-5: H384 site location boundary

2.3.1 Fluvial

The site is wholly located within Flood Zone 1 of the Environment Agency's (EA) Flood Map for Planning which indicates it as at low risk of flooding from rivers. The site is not modelled to be at additional risk from fluvial climate change and is therefore at low risk of flooding from rivers in the future.

2.3.2 Surface water

The site is predominantly at very low risk of surface water flooding, based on the EA's Risk of Flooding from Surface Water (RoFSW) map (Table 2-3). There is an area of surface water ponding in a topographic low spot within the centre of the site in the medium risk event. A surface water flow path is also present along the western site boundary, coincident with an existing watercourse. Maximum depths within the site are between 0.3 and 0.6 m (Figure 2-6). The area of ponding is modelled to increase in both depth and extent in the medium risk event +40% climate change. Any existing topographic depressions and flow paths should be maintained in site design.

Based on available information, safe access and escape routes should be possible via the A65 to the south of the site.

Table 2-3: Existing surface water flood risk within H384 based on the RoFSW map

Very low risk (%)	Low risk (%)	Medium risk (%)	High risk (%)
90	4	2	4

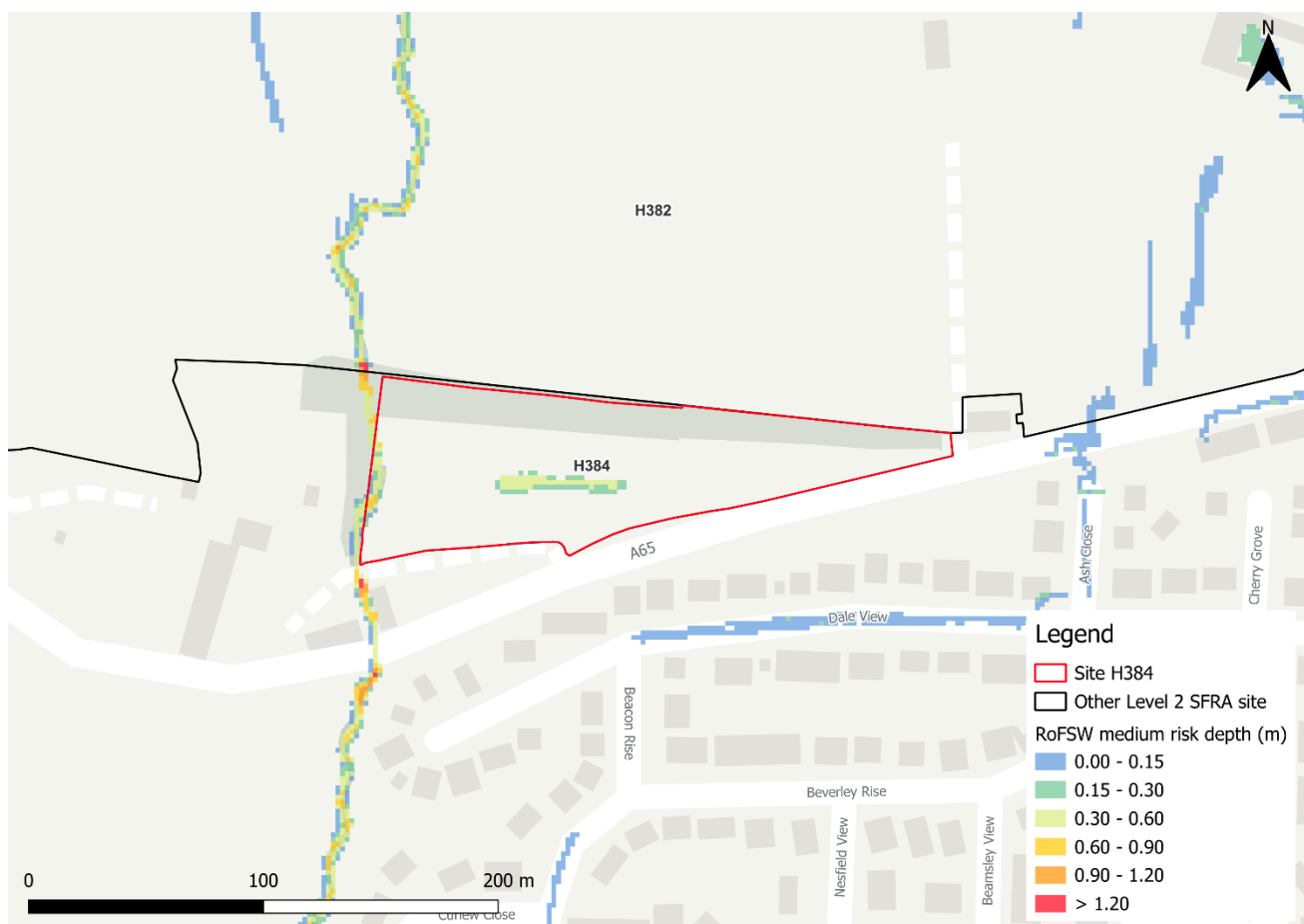


Figure 2-6: Medium risk event surface water flood depths within H384 (Risk of Flooding from Surface Water)

2.3.3 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 Panorama reservoir located within Bradford, owned and maintained by Yorkshire Water Services Ltd.

The EA's SFRA guidance states that where a proposed development site is at flood risk from a reservoir, then an assessment into whether the reservoir design or maintenance schedule needs improving should be carried out. Expert advice may be required from an all-reservoirs panel engineer. The Council should consult with Yorkshire Water Services Ltd 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.

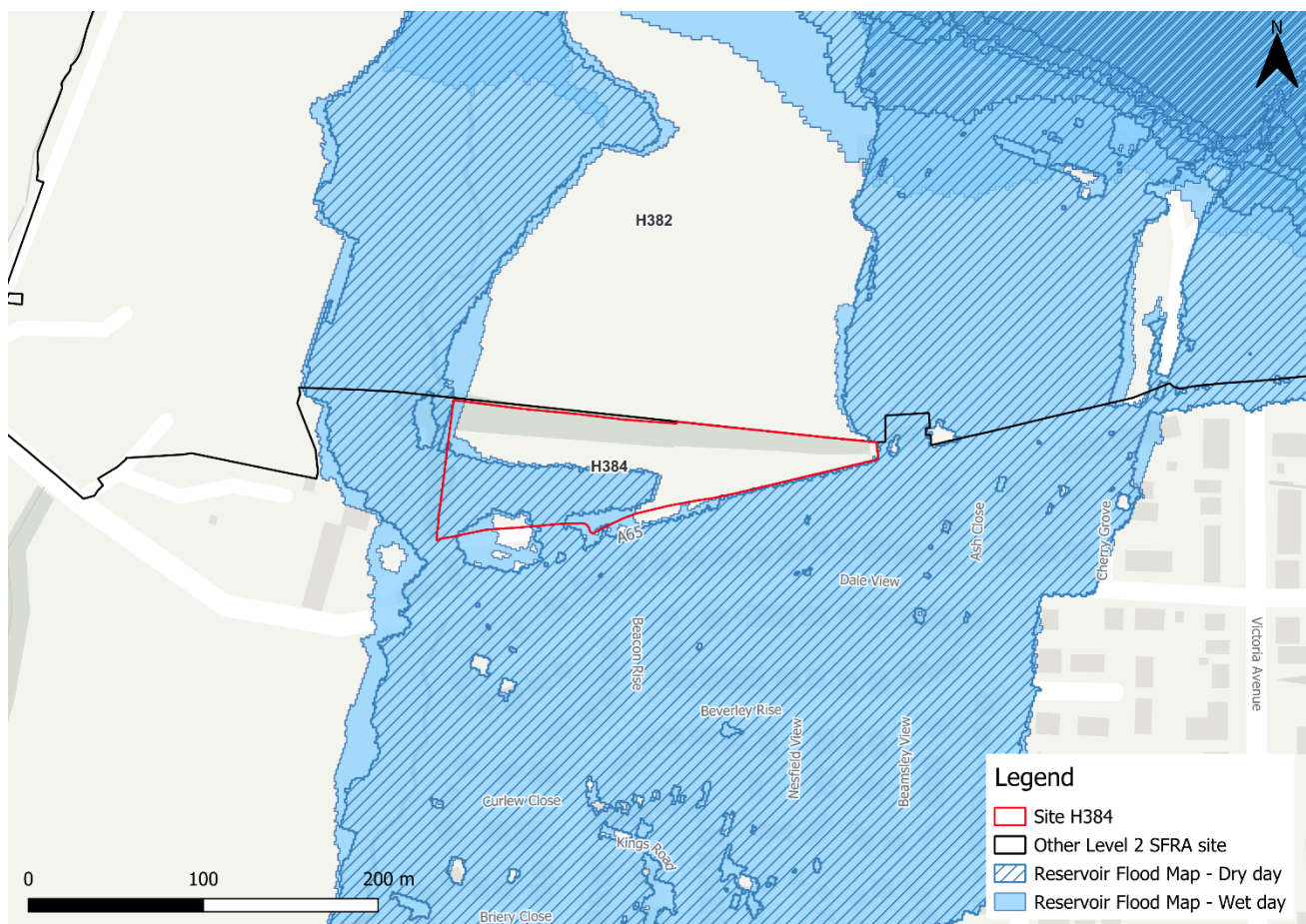


Figure 2-7: Flood risk from reservoirs within H384

2.3.4 Groundwater

Within the west of the site, there is a risk of groundwater emergence to both surface and subsurface assets (Figure 2-8). Across the remaining area of the site there is no risk of groundwater emergence. Groundwater conditions may therefore be suited to infiltration SuDS within some areas.

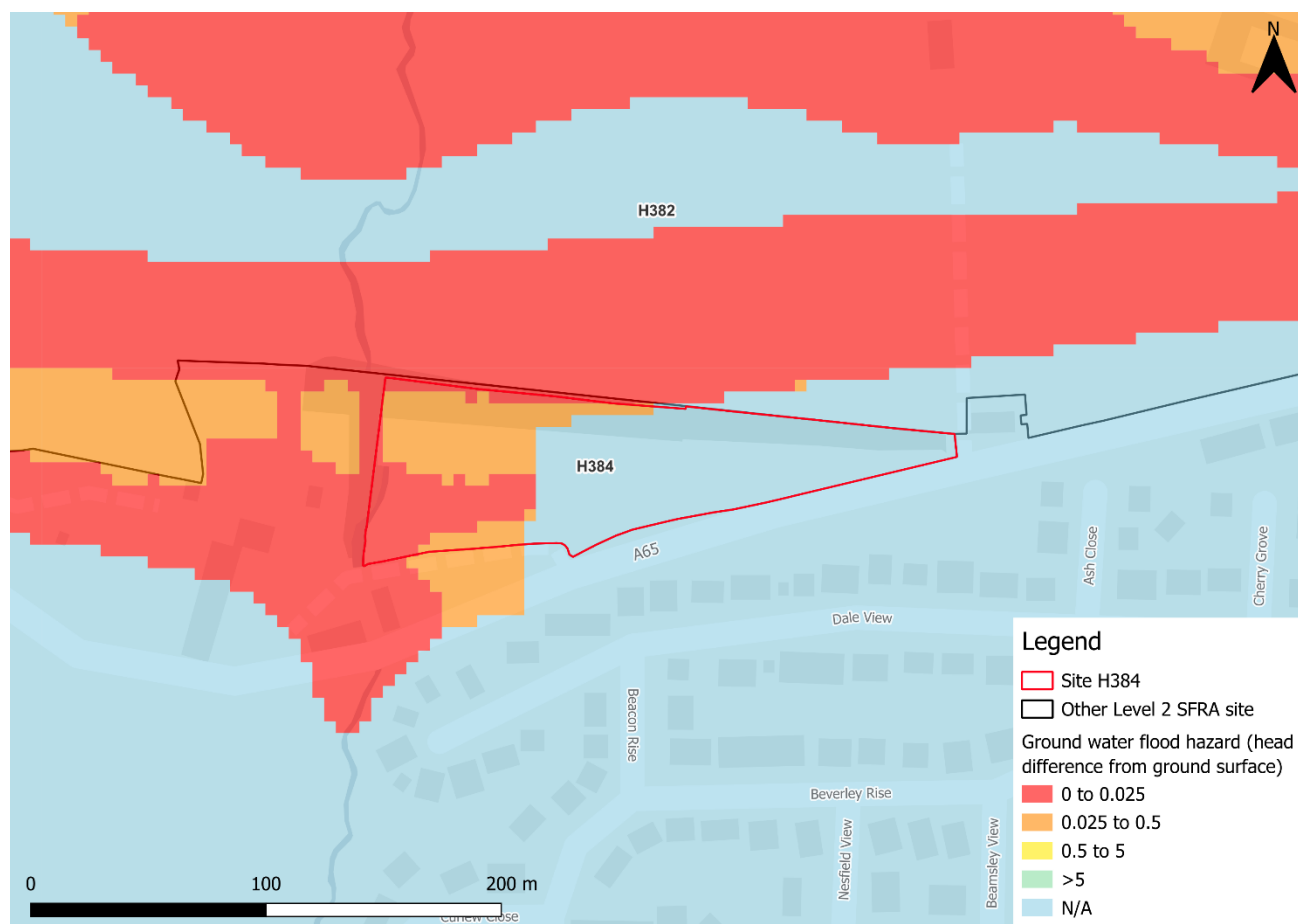


Figure 2-8: JBA 5m Groundwater Emergence Map (H384)

2.3.5 Summary and recommendations

- The site is not required to pass the exception test as it is not located within Flood Zone 3a.
- The proposed development would see a change in the risk classification from water compatible to more vulnerable, according to the NPPF.
- Given the change in use and therefore vulnerability of the site, the FRA must show that the development can be designed to be safe and that there is adequate emergency planning provision (para 014 FRCC-PPG).
- Based on available information, there is no additional risk to the site from canal or sewer flooding.
- Development should be possible at this site given the low fluvial and very low surface water flood risk to the site.

- The site is not modelled to be at significant additional fluvial or surface water risk as a result of climate change.
- Any FRA should include for a drainage strategy which includes the ponded area and flow path in site design and investigate ground conditions for infiltration SuDS suitability.
- The Council should contact Yorkshire Water Services Ltd regarding the potential reservoir risk.

2.4 H1347

Site summary (Figure 2-9)	
Location	Scalebor House, Moor Lane
Existing site use	Agriculture
Existing site vulnerability	Less vulnerable
Proposed site use	Housing
Proposed site vulnerability	More vulnerable
Site area	3.4 hectares



Figure 2-9: H1347 site location boundary

2.4.1 Fluvial

The site is wholly located within Flood Zone 1 of the Environment Agency's (EA) Flood Map for Planning which indicates it as at low risk of flooding from rivers. The site is not modelled to be at additional risk from fluvial climate change and is therefore at low risk of flooding from rivers in the future.

Rushy Beck to the south of the site is unmodelled. There is unlikely to be risk to the site if this watercourse was modelled given the site is located approximately 5m above the level of the watercourse.

2.4.2 Surface water

The site is predominantly at very low risk of surface water flooding, based on the EA's Risk of Flooding from Surface Water (RoFSW) map (Table 2-4). There is a small area of surface water ponding in a topographic low spot within the south of the site in the medium risk event. A short, shallow surface water flow path is also present along the northern site boundary. Maximum depths within the site are between 0.6 and 0.9 m (Figure 2-10). The area of ponding is modelled to increase slightly in extent in the medium risk event +40% climate change. The flow path within the north of the site is also modelled to increase in both extent and depth. Any existing topographic depressions and flow paths should be maintained in site design.

Based on available information, safe access and escape routes should be possible via Scalebor Park Close to the south of the site.

Table 2-4: Existing surface water flood risk within H1347 based on the RoFSW map

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

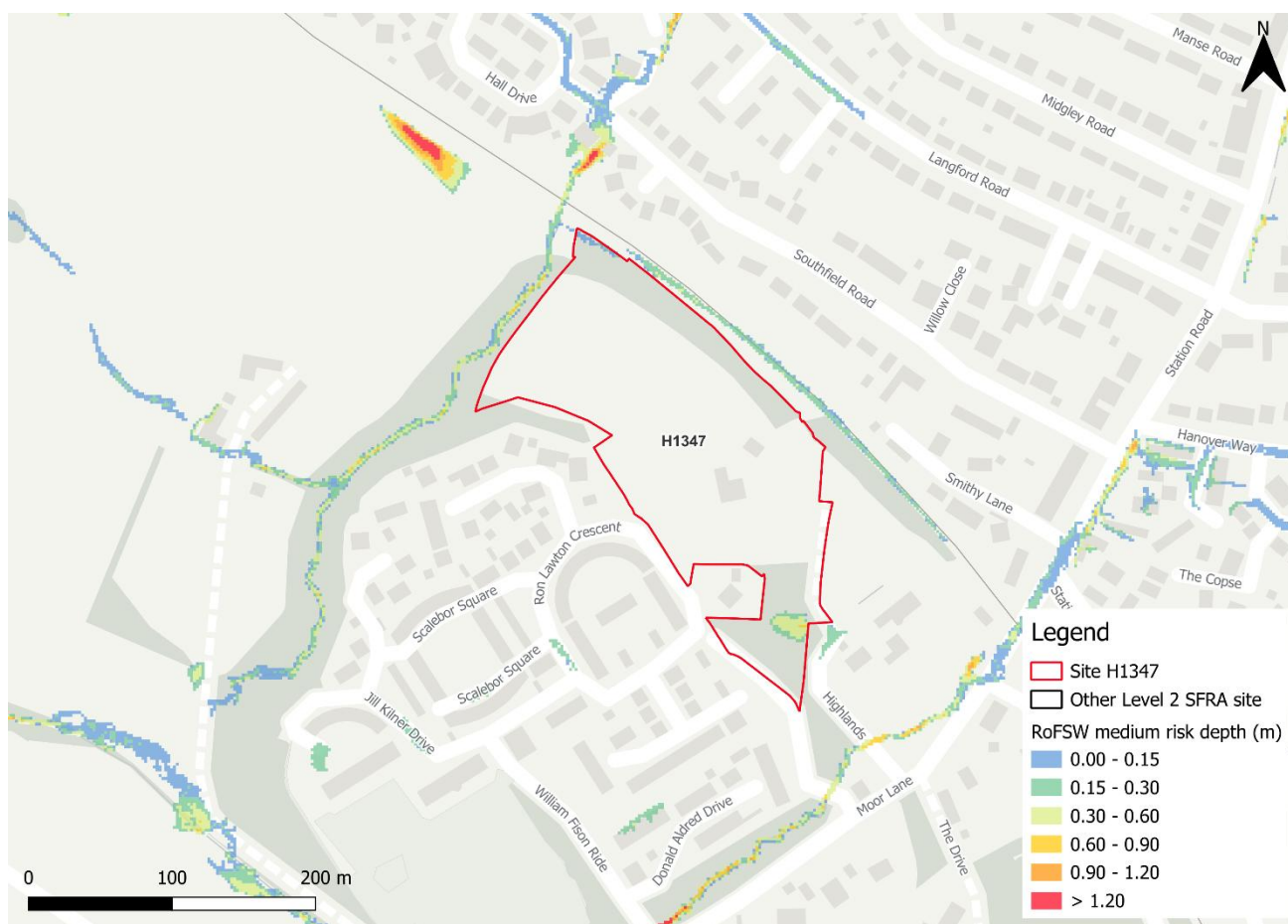


Figure 2-10: Medium risk event surface water flood depths within H1347 (Risk of Flooding from Surface Water)

2.4.3 Groundwater

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

2.4.4 Summary and recommendations

- The site is not required to pass the exception test as it is not located within Flood Zone 3a.
- 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).
- Based on available information, there is no additional risk to the site from reservoir, canal or sewer flooding.
- Development should be possible at this site given the low fluvial and very low surface water flood risk to the site.

- The site is not modelled to be at significant additional fluvial or surface water risk as a result of climate change.
- Any FRA should include for a drainage strategy which includes the ponded area and flow path in site design and investigate ground conditions for infiltration SuDS suitability.

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