

# Level 2 SFRA

North Yorkshire Council

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## Quality information

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## List of Acronyms

NYC	North Yorkshire Council
SFRA	Strategic Flood Risk Assessment
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
LPA	Local Planning Authority
SuDS	Sustainable Drainage Systems
FRA	Flood Risk Assessment
AEP	Annual Exceedance Probability
SLR	Sea Level Rise
RoFSW	Risk of Flooding from Surface Water
BGS	British Geological Survey

# 1. Introduction

## 1.1 Terms of reference

1.1.1 AECOM has been commissioned by North Yorkshire Council (NYC) to update their Level 1 and Level 2 Strategic Flood Risk Assessments (SFRA) for the Selby area. The update is required as NYC are currently preparing the New Local Plan (the Sites and Policies Local Plan) that will guide and set the vision for future development across the district. As part of this process, baseline evidence must be collated to inform key planning issues. Since the previous Selby District SFRA was published in 2015, a number of changes in planning policy have occurred. In addition to this there have been updates to flood datasets, including improvements to river models and flood mapping. As a result of these changes, both the Level 1 and Level 2 SFRA documents are to be updated.

1.1.2 The Level 1 SFRA was updated following the planning policy changes. This document presents the Level 2 SFRA update.

## 1.2 Project Background

1.2.1 The [National Planning Policy Framework](#)<sup>1</sup> (NPPF) and associated [Planning Practice Guidance](#) for Flood Risk and Coastal Change (PPG)<sup>2</sup> set out the active role Local Planning Authorities (LPAs) should take to ensure that flood risk is understood and managed effectively and sustainably throughout all stages of the planning process. The NPPF outlines that Local Plans should be supported by a SFRA and LPAs should use the findings to inform strategic land use planning. The overall approach of the NPPF to flood risk is broadly summarised Paragraph 167:

*“When determining planning applications, LPAs should ensure flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception test, as applicable) it can be demonstrated that:*

- within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- any residual risk can be safely managed; and*
- safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

## 1.3 Level 1 SFRA

1.3.1 An updated Level 1 SFRA report for NYC-Selby area is available online.. The purpose of the Level 1 SFRA was to collate and analyse the most up to date readily available flood risk information for all sources of flooding and provide an overview of flood risk issues across Selby District.

1.3.2 The Level 1 SFRA provides guidance on:

- The application of the Sequential Test by NYC when allocating future development sites to inform their Local Plan, as well as by developers promoting development on windfall sites;
- Managing and mitigating flood risk, the application of sustainable drainage systems (SuDS), and the preparation of site-specific Flood Risk Assessments (FRAs); and

<sup>1</sup> Department for Communities and Local Government. 2021. *National Planning Policy Framework*. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

<sup>2</sup> Department for Communities and Local Government. 2021. *Planning Practice Guidance: Flood Risk and Coastal Change*. Available at: <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

- Potential flood risk management objectives and policy considerations which may be developed and adopted by NYC as formal policies when developing the local plan for the Selby area.
- 1.3.3 Using the strategic flood risk information presented within the Level 1 SFRA, for the Selby area NYC have undertaken the Sequential Test to document the process whereby future development is steered towards areas of lowest flood risk. Applying guidance outlined in the Level 1 SFRA, NYC has identified the need for a Level 2 SFRA covering some of the proposed development areas within Selby area.

## 1.4 Exception Test

- 1.4.1 Where it is not possible to accommodate potential development sites outside of those areas identified to be at risk of flooding, the Exception Test may be required, as set out in Table 1-1. The purpose of the Exception Test is to ensure that in situations where it may be necessary to locate development in areas at risk of flooding, new development is only permitted in Flood Zone 2 and Flood Zone 3 when the flood risk is clearly outweighed by other sustainability factors and where the development will remain safe during its lifetime, taking climate change into account.
- 1.4.2 The NPPF states that for the Exception Test to be passed:
- Part 1 - "It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by the SFRA where one has been prepared; and
  - Part 2 - A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall."
- 1.4.3 Both elements of the test need to be passed for development to be allocated or permitted.
- 1.4.4 In order to determine Part 1 of the Exception Test, applicants should assess their scheme against the objectives set out in the LPA's Sustainability Appraisal<sup>3</sup> and information presented in Level 1 and Level 2 SFRA's. To demonstrate satisfaction of Part 2 of the Exception Test, relevant flood risk management and mitigation measures should be applied and demonstrated within a site-specific FRA. Section 9 'Site Specific Flood Risk Assessment – Guidance for Developers' and Section 10 'Managing and Mitigating Flood Risk' within the Level 1 SFRA should be referred to in order to support Part 2 of the Exception Test.

**Table 1-1 Flood risk vulnerability and Flood Zone compatibility**

Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone 1	✓	✓	✓	✓	✓
Flood Zone 2	✓	✓	Exception test required	✓	✓
Flood Zone 3a	Exception test required	✓	✗	Exception test required	✓
Flood Zone 3b (Functional Floodplain)	Exception test required	✓	✗	✗	✗

**Key**

✓ Development is appropriate.

✗ Development should not be permitted

<sup>3</sup> AECOM, January 2021, Selby Local Plan: Preferred Options Interim Sustainability Appraisal Report.  
[https://www.selby.gov.uk/sites/default/files/Documents/Interim\\_Sustainability\\_Appraisal\\_Report\\_January\\_2021.pdf](https://www.selby.gov.uk/sites/default/files/Documents/Interim_Sustainability_Appraisal_Report_January_2021.pdf)

## 2. Level 2 SFRA

### 2.1 Approach

- 2.1.1 This report comprises the Level 2 SFRA for NYC in the Selby area. Where land outside Flood Zone 2 and 3 cannot appropriately accommodate all development, the NPPF's Exception Test must be applied.
- 2.1.2 The scope of the Level 2 SFRA is to consider flood risk from all sources and the detailed nature of the flood characteristics and mechanisms within a flood zone including, where appropriate and the data is available:
- flood probability;
  - flood depth;
  - flood velocity;
  - rate of onset of flooding; and
  - duration of flood.
- 2.1.3 Three separate hydraulic models have been used to cover the wider Selby area. The following sections outline sources of information that have been obtained to inform this Level 2 SFRA.

### Climate Change Allowances

- 2.1.4 Current climate change allowances for river flow were updated on 27 July 2021 and are available at <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>. The updated climate change allowances are calculated on the scale of individual river management catchment areas, while the previous allowances had been calculated on the scale of regional river basins. The study area includes three river management catchments – the Aire and Calder, the Wharfe and Lower Ouse and Derwent and Humber. The current climate change allowances for these river management catchments are shown in Table 2-1. The central allowance should be used for assessing risk to access and egress routes, escape routes and places of refuge, except for essential infrastructure when the higher central allowance should be used. These allowances are usually used to adjust the 1 in 100 year probability, or 1 % Annual Exceedance Probability (AEP), river flow.

**Table 2-1: Flow Climate Change allowance for river flow uplifts for management catchments applicable to the Selby SFRA.**

River Management Catchment	Central 2080s Fluvial Climate Change Allowance
Aire and Calder	23 %
Derwent Humber	24 %
Wharfe and Lower Ouse	23 %

Source: <https://www.gov.uk/government/publications/peak-river-flow-climate-change-allowances-by-management-catchment>

### Sea Level Allowances

- 2.1.5 The Environment Agency states that for sea level rise (SLR), allowances based on the 70<sup>th</sup> percentile ('Higher Central'), and 95<sup>th</sup> percentile ('Upper End'), should be assessed in FRAs. The allowances in Table 2-2 account for isostatic rebound in the North of England.

**Table 2-2: Sea Level Allowances for the Humber River Basin District for Each Epoch (Based on a 1981 to 2000 Baseline)**

	2000 to 2035	2036 to 2065	2066 to 2095	2096 to 2125
Higher Central	+ 5.5 mm/year	+ 8.4 mm/year	+ 11.1 mm/year	+ 12.4 mm/year
Upper End	+ 6.7mm/year	+ 11 mm/year	+ 15.3 mm/year	+ 17.6 mm/year

Source: (Environment Agency, 2022)



- 2.1.6 These annual changes should be applied to Environment Agency present day extreme sea level data from the baseline year.
- 2.1.7 As part of the Level 2 SFRA an analysis of Higher Central and Upper End values were undertaken.

## Use of existing modelling (Proxies)

- 2.1.8 Selby has very good coverage in terms of existing flood models and associated flood extent information, including a very good range of AEP events with existing modelling and mapping data. In some areas the existing modelling information does not provide the exact AEP event or climate change allowance of interest. In those situations the closest approximation from existing data-sets was identified as a proxy, as summarised in Table 2-3.

**Table 2-3: Proxy information used where exact data was not available**

River Management Catchment	Target Central 2080s Fluvial Climate Change Allowance	Proxy Modelling output used for Fluvial Climate Change Allowance	Hydraulic Models applicable to in Selby SFRA
Aire and Calder	23 %	20 %	Lower Aire
Derwent Humber	24 %	N/A	Upper Humber
Wharfe and Lower Ouse	23 %	20 %	Lower Ouse and Wharfe Washlands

- 2.1.9 Existing modelling information was available for the Lower Ouse and Wharfe that was slightly higher than the 'Higher Central' sea level increase. This was used as a proxy for the 'Higher Central,' SLR.
- 2.1.10 For consistency in the corresponding proformas in Appendix B the AEP of interest has been referred to rather than the actual modelled output.

## 2.2 Results

### Lower Ouse and Wharfe Washlands Modelling Outputs

- 2.2.1 In 2018, the Environment Agency updated the River Ouse and River Wharfe Washlands hydraulic model to account for the latest climate change allowances at the time. However, climate change allowances have subsequently changed since this model was produced. To close this data gap, additional modelling was completed as part of this SFRA.
- 2.2.2 This model is tidally influenced, and as such the hydraulic model should be used to assess both the 'Higher Central' and 'Upper End' SLR scenarios. In addition, climate change allowance uplifts should be applied to fluvial flows. The two scenarios were represented as follows:
- **Higher Central SLR scenario:** Existing model data was used as a proxy for this scenario. The model data provided by the Environment Agency included a SLR of 1.11 m, which was considered an appropriate proxy for the 'Higher Central' SLR allowance of 1.02 m). This model included 20 % allowance for fluvial climate change, which was considered an appropriate proxy for the target climate change allowance of 23 %<sup>4</sup>.
  - **Upper End SLR Scenario:** No modelling information was available for this scenario, and it was therefore simulated as part of this SFRA update. The additional model run was completed to assess the 'Upper End' scenario with a SLR of 1.38 m. This model included a 20 % allowance for fluvial climate change, which was considered an appropriate proxy for the 23 %<sup>5</sup> climate change allowance.

<sup>4</sup> This is the 'Central' '2080s' allowances for the Swale, Ure, Nidd and Upper Ouse Management Catchment peak river flow allowances which is the biggest uplift allowance

<sup>5</sup> This is the 'Central' '2080s' allowances for the Swale, Ure, Nidd and Upper Ouse Management Catchment peak river flow allowances which is the biggest uplift allowance

- 2.2.3 Outputs showing the maximum flood depth for each scenario from the River Ouse and River Wharfe Washlands are presented within this Level 2 SFRA. It is noted that information on the rate of onset of flooding and the duration of flooding was not available for the 'Higher Central' SLR scenario therefore onset of flooding has not been used in this study.

## Lower Aire Modelling Outputs

- 2.2.4 In 2017 the Environment Agency updated the Lower River Aire hydraulic model to account for the latest climate change allowances at the time. However, climate change allowances have subsequently changed since this model was produced.
- 2.2.5 This model does not contain any tidally influenced stretches of the River Aire so no allowances for SLR were required. Existing modelling information included a fluvial 1 % AEP plus 20 % climate change allowance, this was considered an appropriate proxy for the target 23 %<sup>6</sup>. As such, no additional model runs were completed as part of this commission, and the available model simulations previously completed in 2017 were used as a proxy. The outputs from this model have been provided for use in the Level 2 SFRA for sites located within the Lower Aire floodplain.
- 2.2.6 Outputs showing the maximum flood depth and hazard rating associated with flooding from the Lower River Aire are presented within this Level 2 SFRA. It is noted that information on the rate of onset of flooding and the duration of flooding has not been made available for use in this study.

## Upper Humber Modelling Outputs

- 2.2.7 In 2016, the Environment Agency updated the Upper Humber hydraulic model to account for the climate change allowances at the time. However, climate change allowances were updated in July 2021 after this model was produced. A review of the existing modelling data was undertaken and additional modelling identified. The outputs from the additional modelling has been used in the Level 2 SFRA for sites within the Upper Humber floodplain.
- 2.2.8 As additional modelling was being undertaken the fluvial inflows were updated to represent the July 2021 climate change allowances. The climate change allowance of 24 % represents the '2080's' Central allowance for Derwent Humber.
- 2.2.9 The watercourse is tidally influenced so modelling of 'Higher Central' and 'Upper End' climate change scenarios was undertaken. Fluvial climate change uplifts were applied to both scenarios.
- 2.2.10 Three model simulations were undertaken to assess flood risk:
- Fluvially dominant, Fluvial 1 % AEP plus 24 % climate change allowance and 'Higher Central' SLR of 1.02 m
  - Fluvially dominant, Fluvial 1 % AEP plus 24 % climate change allowance and 'Upper End' SLR of 1.38 m
  - Tidally dominant, Fluvial flows with a 24 % climate change allowance and 0.5 % AEP tidal level plus a 'Upper End' SLR of 1.38 m.
- 2.2.11 Outputs showing the maximum flood depth associated with flooding from the Upper Humber are presented within this Level 2 SFRA. It is noted that information on the rate of onset of flooding was not used in this study.

## Upper Humber Breach Modelling Outputs

- 2.2.12 There is a residual risk associated with potential breaches of the flood defences. The fluvially dominant 1 % AEP with 24 % uplift on fluvial flows and a SLR of 1.02 m was used as a basis to undertake breach modelling.
- 2.2.13 Four breach locations were identified on the River Ouse and modelling was undertaken to assess the residual risk. Breach locations are shown in Figure 1.

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<sup>6</sup> This is the 'Central' '2080s' allowances for the Aire and Calder Management Catchment peak river flow allowances which is the biggest uplift allowance

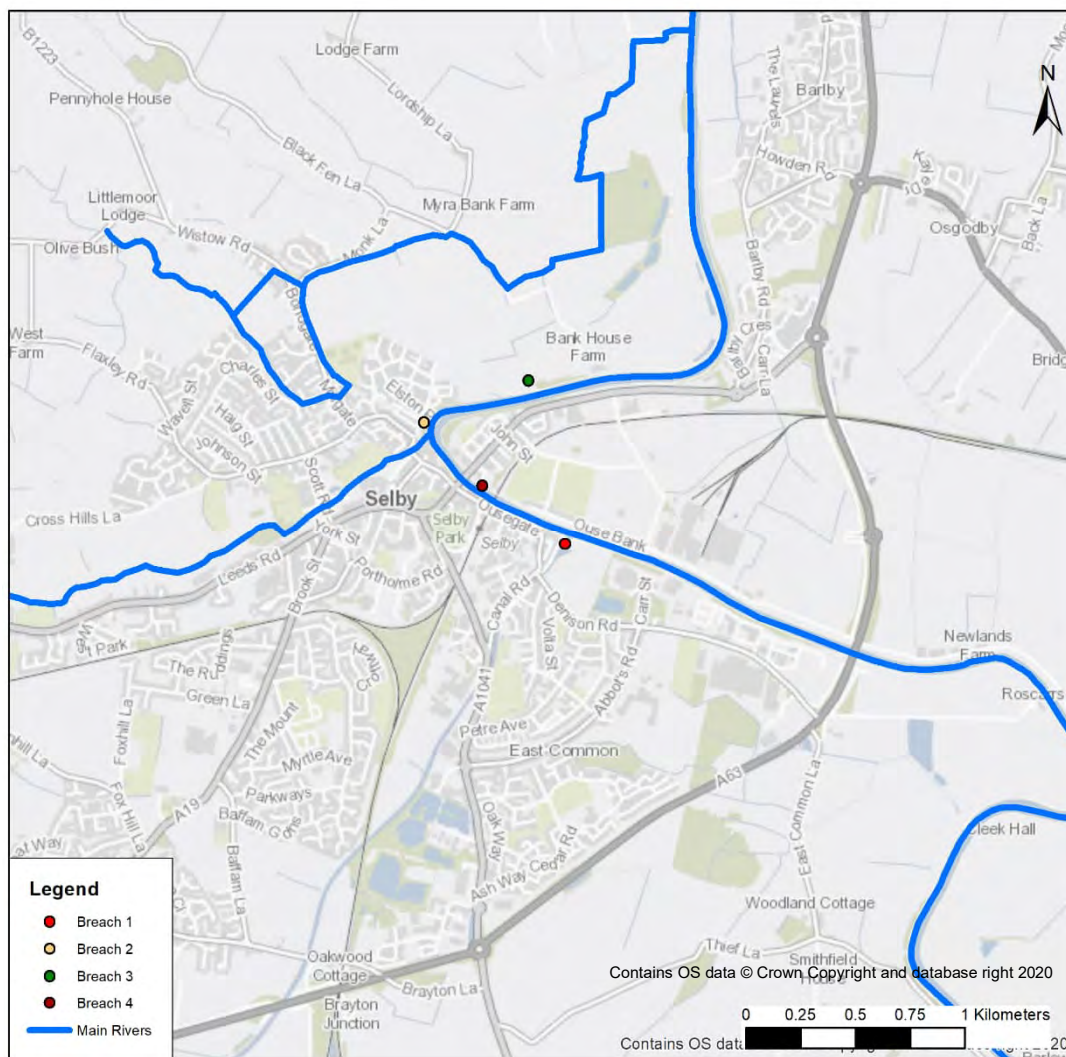


Figure 1: Breach Location 1-4

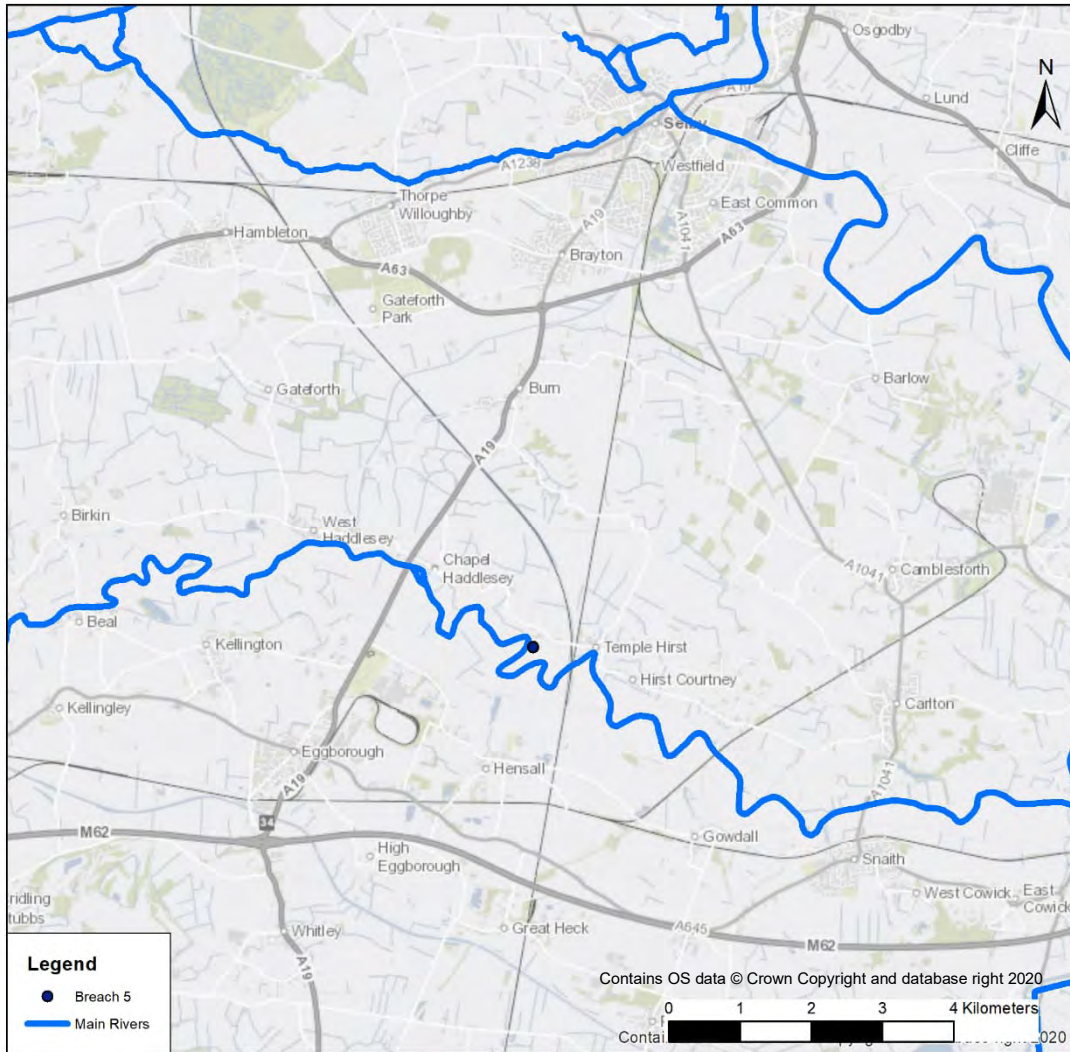
2.2.14 Table 2-4 summarises the conditions used for the breach. Breach outputs are included in the Level 2 assessment.

Table 2-4: Breach 1-4 details

Breach	Description	Length (m)	Duration (hrs)	Breach Level (mAOD)
1	Selby Canal Floodgate breach	20	30	5.67
2	Ouse breach on right bank	20	18	5.37
3	Ouse breach to embankment near meander right bank	50	30	3.48
4	Left bank breach on Ouse near Olympia Park	20	18	4

## Lower Aire Breach Modelling Outputs

2.2.15 To support the Level 2 SFRA the location of the breach was identified to assess residual risk at particular development sites. Breach modelling has been completed for one location on the River Aire using the Lower Aire model, refer to Figure 2.



**Figure 2: Breach 5 Location**

- 2.2.16 It was agreed that Breach models would use the existing 1 % AEP with 20 % climate change models as a proxy for the 1 % AEP with 23 % climate change uplift.
- 2.2.1 Table 2-5 summarises the conditions used for the breach. Breach outputs are included in the Level 2 assessment.

**Table 2-5: Breach 5 details**

Breach	Description	Length (m)	Duration (hrs)	Breach Level (mAOD)
5	Breach on Aire left bank to embankment	40	56	7

## Flood Hazard Mapping

- 2.2.2 Flood hazard mapping categorises the danger to people in different combinations of flood water depth and velocity, refer to Table 2-6 for further details. The derivation of these categories is based on the methodology set out by Defra in Flood Risk Assessment Guidance for New Development FD2320/TR2 using the following equation:

**Table 2-6: Flood Hazard Classification (top) and Classifications (bottom)**

$$\text{Flood Hazard Rating} = ((v+0.5)*D) + DF$$

Where  $v$  = velocity (m/s),  $D$  = depth (m),  $DF$  = debris factor

Flood Classification	Hazard Rating (HR)	Description
Low	$HR < 0.75$	Caution – Flood zone with shallow flowing water or deep standing water
Moderate	$0.75 \geq HR \leq 1.25$	Dangerous for some (i.e. children) – Danger: flood zone with deep or fast flowing water
Significant	$1.25 > HR \leq 2.0$	Dangerous for most people – Danger: flood zone with deep fast flowing water
Extreme	$HR > 2.0$	Dangerous for all – Extreme danger: flood zone with deep fast flowing water

## Risk of Flooding from Surface Water

- 2.2.3 The outputs of the Environment Agency's Risk of Flooding from Surface Water (RoFSW) mapping include outlines showing the extent of flooding from surface water that could result from a flood with a 3.33 %, 1 % and 0.1 % chance of happening in any given year.
- 2.2.4 It is noted that the RoFSW mapping is not to be used at property level. Due to the way they have been produced and the fact that they are indicative, the maps are 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. However, the mapping provides a useful source of information to identify the risk of surface water flooding to the wider area in which a site is located, and the general patterns of surface water flow and ponding.

## British Geological Survey (BGS) Susceptibility to Groundwater Flooding

- 2.2.5 The BGS Susceptibility to Groundwater Flooding dataset has been used to undertake a high-level screening of the sites in the Selby District.
- 2.2.6 It is noted that this dataset cannot be used on its own to indicate risk of groundwater flooding and should not be used to inform planning decisions at a site scale. It is suitable for use in conjunction with a large number of other factors, e.g. records of previous incidence of groundwater flooding, to establish relative risk of groundwater flooding.

## 2.3 Sites for Assessment

- 2.3.1 The Level 2 SFRA provides a detailed assessment of the following development sites within Selby area which have been identified by NYC as requiring the application of the Exception Test. Following their sequential testing process NYC identified the following sites for a more detailed assessment, refer to Table 2-7.

**Table 2-7: Level 2 Sites**

Site Name	Location
BURN-G	Burn Airfield;
CFAB-A	RAF Church Fenton, Church Fenton (Ulleskelf Parish)
SELB-AG	Rigid Group Ltd, Denison Road, Selby

Site Name	Location
SELB-B	Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby
SELB-BZ	Land at Cross Hills Lane, Selby
SELB-CA	Olympia Park, Barlby Road, Barlby
SELB-CR	Former Ousegate Maltings
TADC-I	Land at Mill Lane.

## 2.4 Site Proformas

- 2.4.1 A proforma has been prepared for each of the eight sites to assess the risk of flooding from all sources and provide recommendations for how development could be delivered on the site that would satisfy part 2 of the Exception Test as set out in [Planning Practice Guidance](#) for Flood Risk and Coastal Change (PPG)<sup>7</sup>: “It should be demonstrated that: -the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.”
- 2.4.2 Table 2-8 provides an overview of the datasets that have been used to populate the proformas. The majority of the datasets used in the Level 2 SFRA are described in full in the Level 1 SFRA.

**Table 2-8: Datasets and information used for Level 2 Site Proformas**

Proforma Field	Dataset / information used
<b>Site Description</b>	
Site ID	As provided by North Yorkshire Council.
Area (ha)	The area of the site in hectares.
Proposed use	As provided by North Yorkshire Council. Where this was not specified, mixed-use including residential has been assumed.
Vulnerability classification	Defined in accordance with Planning Practice Guidance Flood Risk and Coastal Change Table 1.
<b>Flood Zone and Historic Flooding</b>	
Proportion within each Flood Zone and Areas Benefitting from Defences	Flood Map for Planning (Rivers and Sea) Flood Zone 2; Flood Map for Planning (Rivers and Sea) Flood Zone 3; Flood Map for Planning (Rivers and Sea) Areas Benefitting from Defences; Flood Zone 3b Functional Floodplain outline, as defined in the Level 1 SFRA.
Flood Warning Area	Environment Agency Flood Warning Areas.
<b>River Flooding</b>	
Maximum Flood Depth Map for the River Ouse, Aire, Humber and Wharfe for the 1% AEP event including climate change	River Ouse And River Wharfe Washlands Climate Change Modelling, Mott MacDonald on behalf of the Environment Agency/ AECOM. Defended flood event information for the 1 % AEP event including 20 % increase in flow for climate change. Lower River Aire Climate Change Modelling, JBA Consulting on behalf of the Environment Agency. Defended flood event information for the 1 % AEP event including 20 % increase in flow for climate change. River Humber Climate Change Modelling, JBA Consulting, on behalf of the Environment Agency/ AECOM. Flood event information for the defended 1 % AEP event including 24 % in flow for climate change.
<b>Breach Flood Risk</b>	
Maximum depths and hazards associated with breach model runs	Upper Humber 1 % AEP +24 % increase on flows Climate Change Modelling and Lower Aire 1 % AEP + 20 % increase on flows Climate Change Modelling has been used. Produced by AECOM as part of this SFRA
<b>Surface Water Flooding</b>	
Risk of Flooding from Surface Water Map	Environment Agency dataset.

<sup>7</sup> Department for Communities and Local Government. 2022. *Planning Practice Guidance: Flood Risk and Coastal Change*. Available at: <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

Proforma Field	Dataset / information used
Groundwater Flooding	
Geology	Bedrock and superficial geology underlying the site, based on BGS mapping.
Susceptibility to Groundwater Flooding	The BGS dataset 'Susceptibility to Groundwater Flooding' is divided into four different risk bands ranging from <25 %; 25 % - <50 %, 50 % - 75 % and >75 %.
Other sources	
Risk of flooding from reservoirs	As identified on the Environment Agency Long Term Flood Risk Map <sup>8</sup> .
Summary	
A written overview of the risk of flooding to the site from all sources based on the information within the proforma.	
Site Specific Recommendations	
<p>Recommendations for how development could be delivered on the site to meet the requirements of Part 2 of the Exception Test i.e. that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall. Recommendations are made in line with the development management measures presented within the Level 1 SFRA and typically address the following:</p> <ul style="list-style-type: none"> <li>• Applying sequential approach within development site;</li> <li>• Setting back development from the edge of watercourses;</li> <li>• Finished floor levels;</li> <li>• Floodplain compensation storage;</li> <li>• Access and egress arrangements;</li> <li>• Flood Warning and Evacuation procedures;</li> <li>• Surface water management;</li> <li>• Further investigation of groundwater levels.</li> </ul>	

## 2.5 Information available for Sequential Test

### Overall Flood Risk Score

2.5.1 For sites within and in the vicinity of Selby urban area further information on categorising fluvial flood risk was required. An overall flood risk score criteria was developed that provided further granularity in terms of fluvial flood risk allowing the sites to be ranked by NYC to support the sequential test. The data-sets to be used within the scoring were agreed with the Environment Agency and the values have been adjusted based on the local flooding characteristics. There is a significant amount of modelled flood risk information covering the Selby area and flooding mechanisms are complex. The discussion with the Environment Agency included a detailed review of the proposed site allocations and a range of data-sets that are available and could be used within the overall flood risk score. The following data-sets were considered and either did not provide granularity required for the analysis or did not have sufficient coverage across the Selby urban area therefore were not included within the Overall Flood Risk Score:

- Modelled flood depths of overtopping of defences has very limited extent within Selby urban area. Therefore does not provides granularity required;
- Modelled flood velocity of overtopping of defences has very limited extent within Selby urban area. Therefore does not provides granularity required;
- Rate of onset of flooding from overtopping of defences has very limited extent within Selby urban area. Therefore does not provides granularity required;
- Modelled flood depth, velocity and rate of onset of flooding as a result of a breach of defences is only available for five specific breach locations as set out in Section 2.2. A full coverage for all of

<sup>8</sup> <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

the extensive defences is not available and the EA agreed would be too onerous for NYC to undertake.

- Risk of flooding from reservoirs, Wet-Day and Dry-Day, extensively covers the Selby urban area therefore does not provide granularity in terms of flood risk at different sites;
- The Areas Susceptible to Groundwater Flooding (AStGWF) dataset is a strategic dataset with 1km grid. Therefore is not suitable for the analysis of sites within the Selby urban area.
- Duration of flooding data was not available.

2.5.2 The criteria for the Overall flood risk score is shown below in Table 2-9.

**Table 2-9 Overall Flood Risk Score criteria**

Flood Risk	Flood Risk Score	Criteria
High	6	Greater than 25% of site in Flood Zone 3b including Flood Storage Area
	5	Greater than 30 % of site within Flood Zone 3 (outside of Risk reduction area) - not protected by defences
	4	Greater than 30 % of site 1 in 100 year plus climate change (higher central) extent – fluvial with defences scenario
	3	Greater than 30% site within Flood Zone 3 (Risk reduction area)
Medium	2	Greater than 50% of site within Flood Zone 2 or Greater than 50% within Flood Zone 2 and 3, or; Greater than 50% of site is within a Risk of Surface Water Flooding area (Low, Medium and High)
Low	1	Greater than 50% of site within Flood Zone 1

2.5.3 An overall flood risk score for each site has been calculated based on the maximum of each criteria set out in Table 2-9.

## Information available to use for the sequential test

2.5.4 The sequential test compares flood risk at different potential sites to direct development to sites with the lowest flood risk. In the vicinity of the Selby urban area fluvial flood risk is complex and the following are key data-sets to complete the sequential test:

- Flood Zone 2
- Flood Zone 3
- Flood Zone 3b (including Flood Storage areas)
- Reduction in Risk of Flooding from Rivers and Sea due to Defences
- Defended 1% AEP event plus an allowance for climate change (Higher Central SLR + 23/24%)
- Risk of flooding from surface water (RoFSW);
- Other sources of flooding including reservoir and groundwater should also be considered.

Further mapping of fluvial flood risk focussed on Selby urban area is provided in Appendix A. Please note that the mapping in Appendix A and assessment of flood risk scores for sites undertaken in June 2023 is based on data downloaded in May 2023.



## 2.6 Future Updates to the SFRA

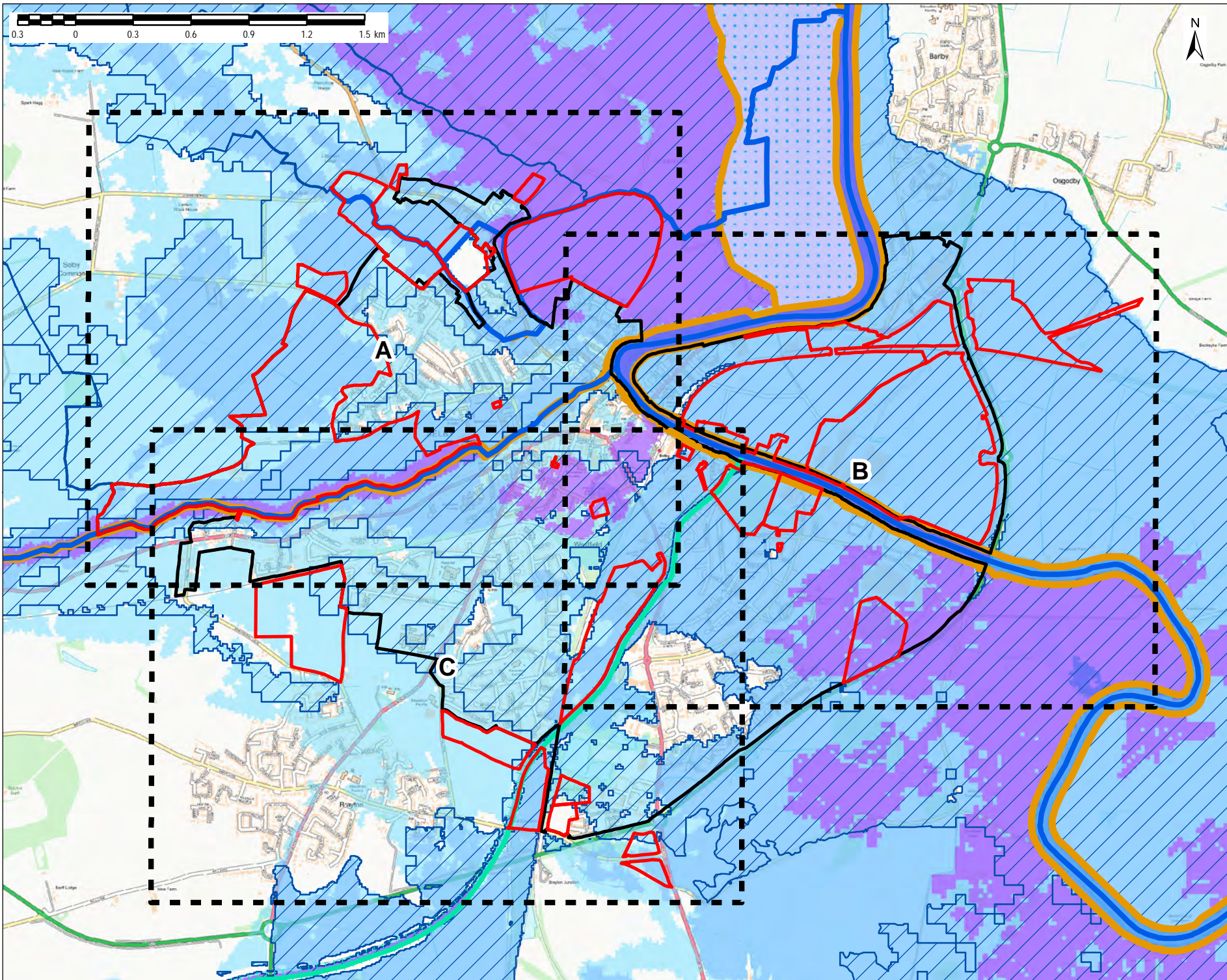
2.6.1 SFRA's are intended to be living documents that are kept up to date as information on flood risk management changes. The Environment Agency SFRA guidance<sup>9</sup> states that in order to remain up to date, it is necessary to update a SFRA to incorporate any changes to:

- the predicted impacts of climate change on flood risk;
- detailed flood modelling - from the Environment Agency or Lead Local Flood Authority;
- the local plan, spatial development strategy or relevant local development documents;
- local flood management schemes;
- flood risk management plans;
- shoreline management plans;
- local flood risk management strategies;
- national planning policy or guidance.

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<sup>9</sup> <https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment>

# Appendix A Selby Urban area fluvial flood mapping



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**LEGEND**

- Inset Maps
- Sites Of Interest
- Selby Urban Area
- Main Rivers
- Canals
- Flood Defences
- Reduction in Risk of Flooding from Defences
- Flood Storage Area
- Flood Zone 3b
- 1% AEP + HC CC
- Flood Zone 3a
- Flood Zone 2

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Client  
**NORTH YORKSHIRE COUNCIL**

Project Title  
**NORTH YORKSHIRE COUNCIL  
SELBY AREA  
LEVEL 2 STRATEGIC FLOOD RISK  
ASSESSMENT UPDATE**

Drawing Title  
**ENVIRONMENT AGENCY  
FLOOD ZONES/DEFENCES AND  
FLUVIAL 1% AEP + HC CLIMATE  
CHANGE - INSET OVERVIEW**

Drawn LL	Checked CS	Approved CS	Date 23/08/2023
AECOM Internal Project No. 60631417		Scale @ A4 1:25,500	

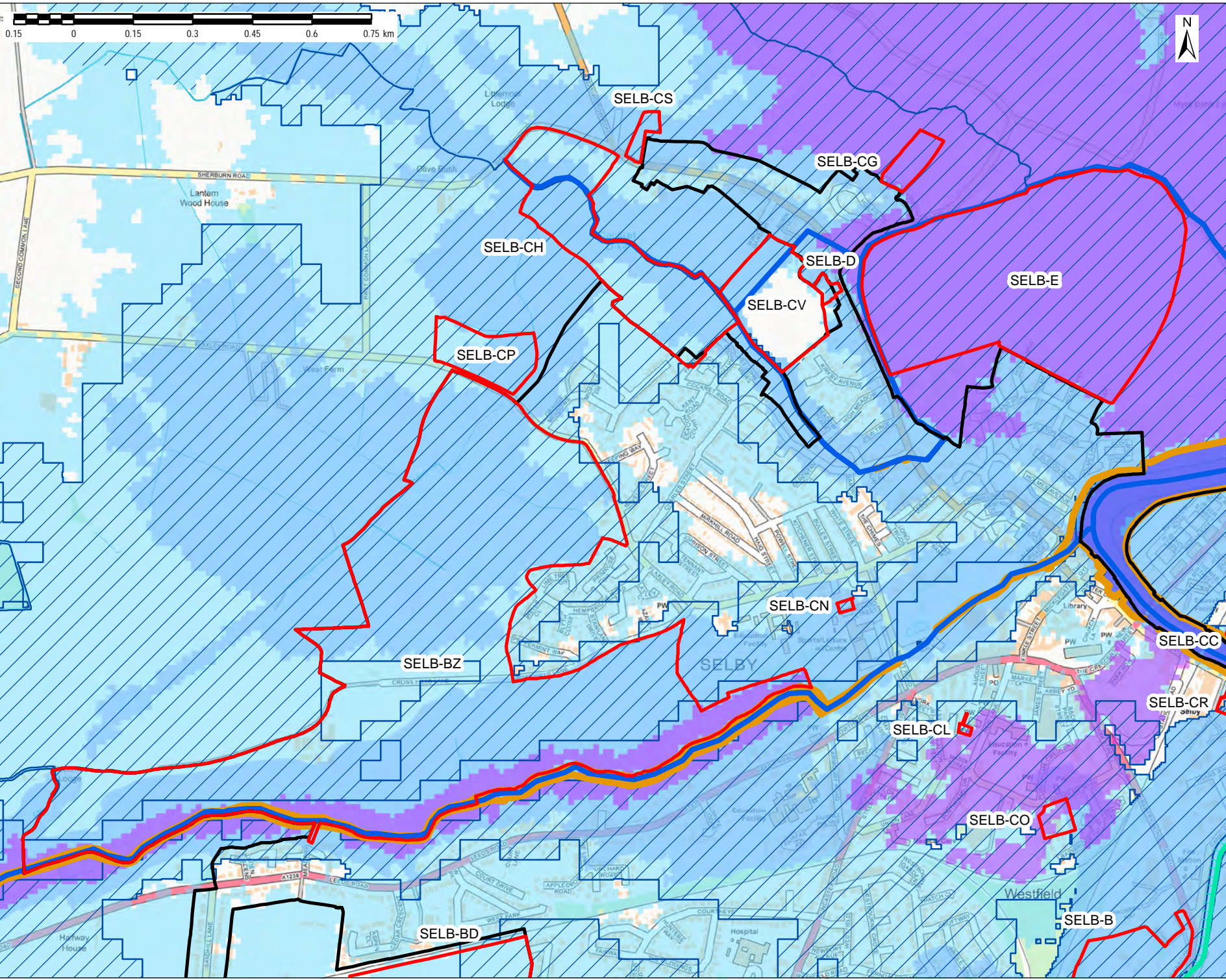
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**LEGEND**

- Sites Of Interest
- Selby Urban Area
- Main Rivers
- Canals
- Flood Defences
- Reduction in Risk of Flooding from Defences
- Flood Storage Area
- Flood Zone 3b
- 1% AEP + HC CC
- Flood Zone 3a
- Flood Zone 2

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Project Title  
**NORTH YORKSHIRE COUNCIL  
SELBY AREA  
LEVEL 2 STRATEGIC FLOOD RISK  
ASSESSMENT UPDATE**

Drawing Title  
**ENVIRONMENT AGENCY  
FLOOD ZONES/DEFENCES AND  
FLUVIAL 1% AEP + HC CLIMATE  
CHANGE - INSET A**

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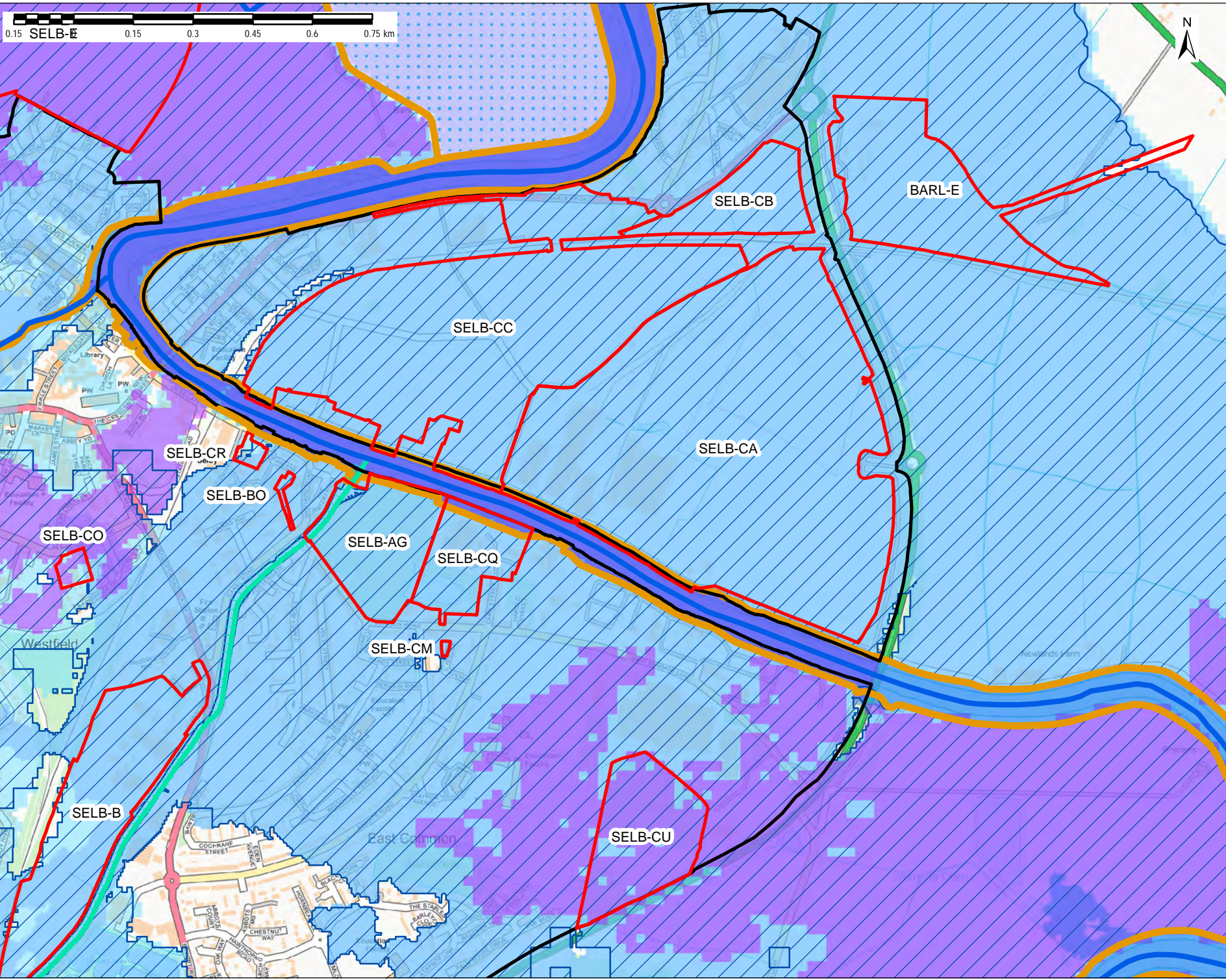
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- LEGEND**
- Sites Of Interest
  - Selby Urban Area
  - Main Rivers
  - Canals
  - Flood Defences
  - Reduction in Risk of Flooding from Defences
  - Flood Storage Area
  - Flood Zone 3b
  - 1% AEP + HC CC
  - Flood Zone 3a
  - Flood Zone 2



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LEVEL 2 STRATEGIC FLOOD RISK  
ASSESSMENT UPDATE**

Drawing Title  
**ENVIRONMENT AGENCY  
FLOOD ZONES/DEFENCES AND  
FLUVIAL 1% AEP + HC CLIMATE  
CHANGE - INSET B**

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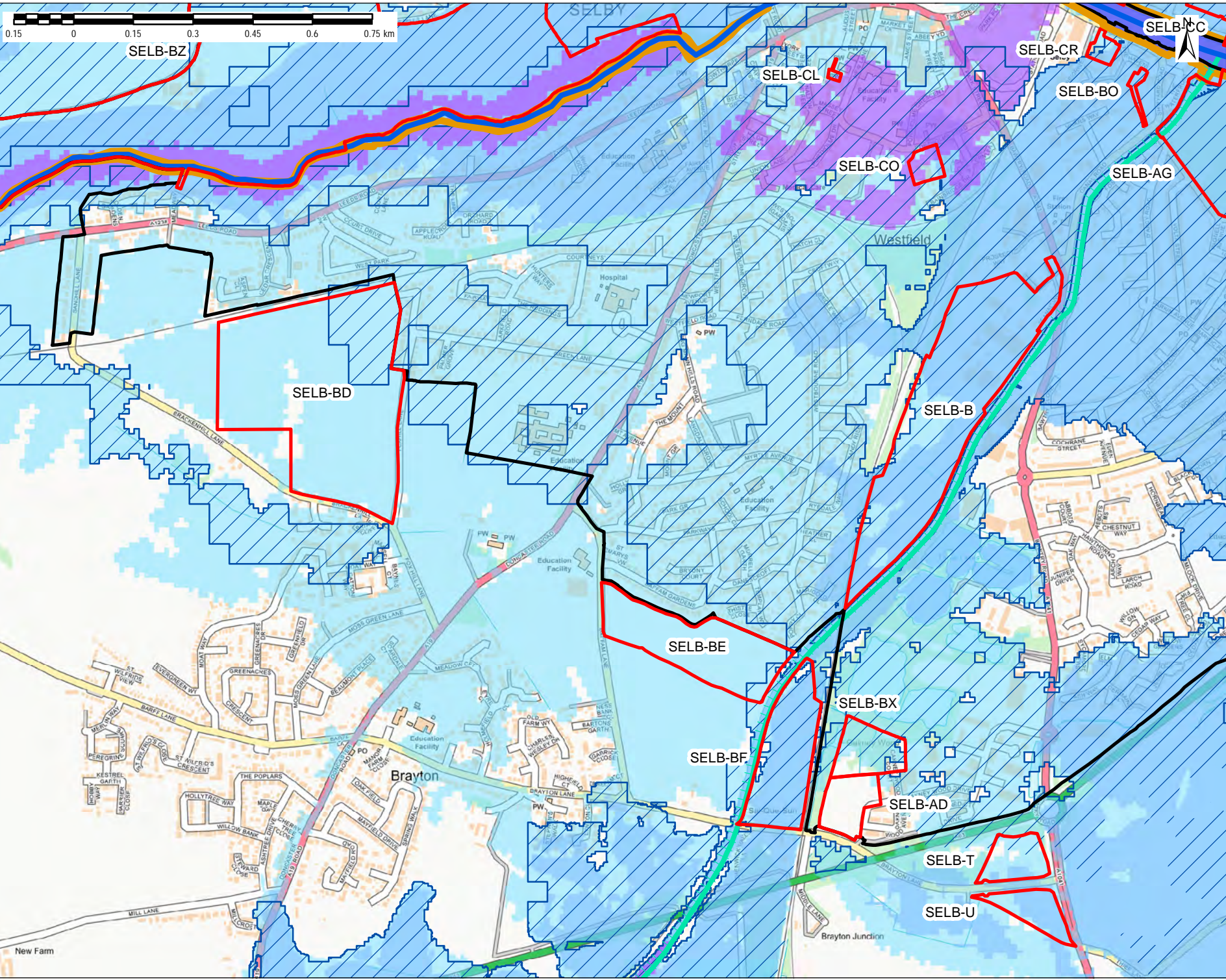
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**LEGEND**

- ▭ Sites Of Interest
- Selby Urban Area
- ▬ Main Rivers
- ▬ Canals
- ▬ Flood Defences
- Reduction in Risk of Flooding from Defences
- Flood Storage Area
- Flood Zone 3b
- 1% AEP + HC CC
- Flood Zone 3a
- Flood Zone 2

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Project Title  
 NORTH YORKSHIRE COUNCIL  
 SELBY AREA  
 LEVEL 2 STRATEGIC FLOOD RISK  
 ASSESSMENT UPDATE

Drawing Title  
 ENVIRONMENT AGENCY  
 FLOOD ZONES/DEFENCES AND  
 FLUVIAL 1% AEP + HC CLIMATE  
 CHANGE - INSET C

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# Appendix B Site Proformas

BURN-G – Burn Airfield, Burn			
Site ID:	BURN-G	Area (ha):	228.8
Proposed Use:	Mixed Use – Residential and Employment	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Aire, Selby Canal		

Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
1%	1%	98%	0%	98%

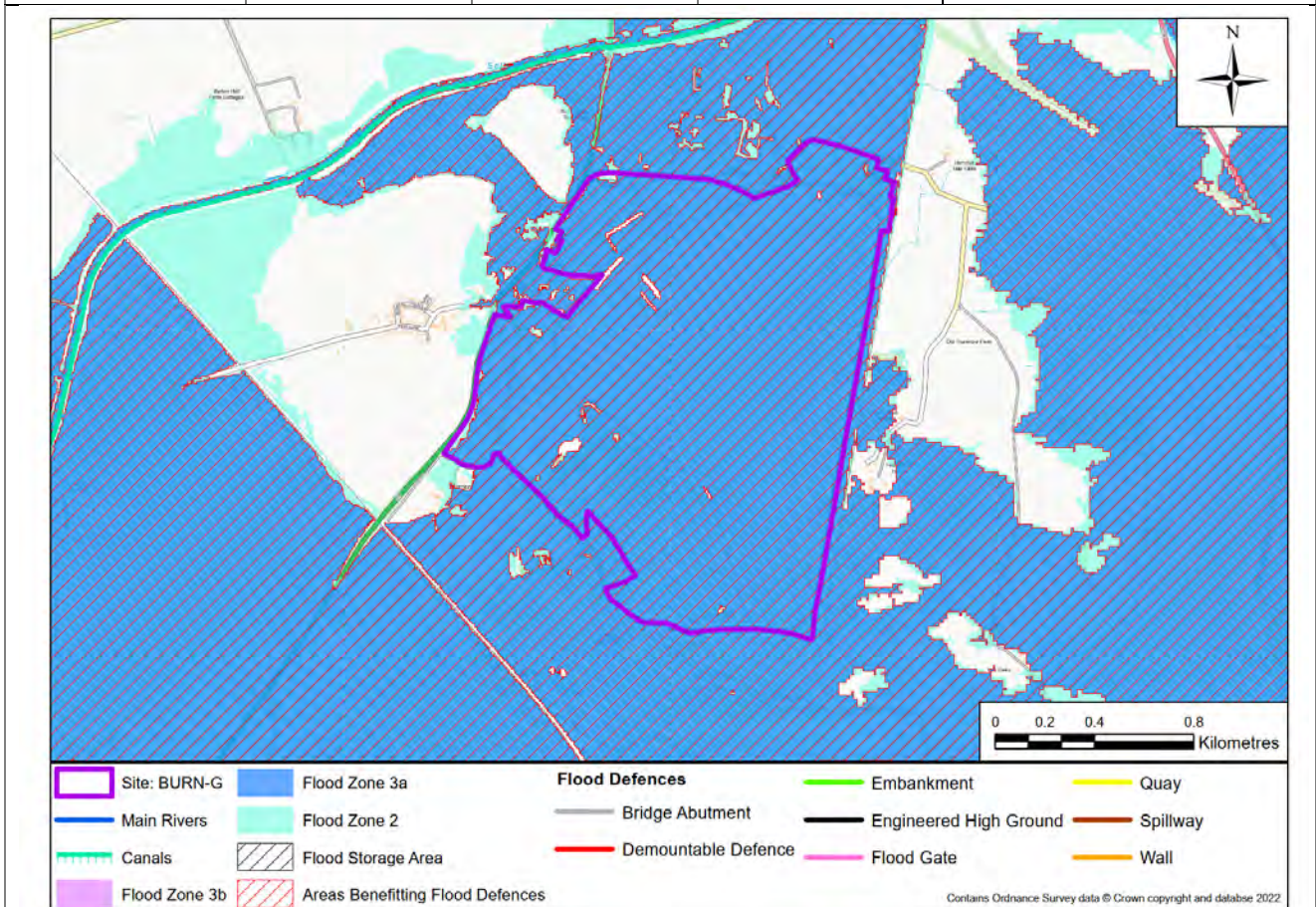


Figure A - Flood Zones

Flood Zones provide an estimate of the areas of land at risk of flooding, when the presence of flood defences are ignored. Areas designated as 'Areas Benefitting from Defences' (ABD) in the event of a fluvial flood with a 1% AEP or a tidal flood with a 0.5% AEP would be protected from flooding by the presence of flood defences. North Yorkshire Council - Selby area includes flood defences and flood storage areas. Further analysis has been undertaken that takes into account the presence of flood defences, shown in Figures below.

Flood Warning Area	N/A
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# BURN-G – Burn Airfield, Burn

## River Flooding

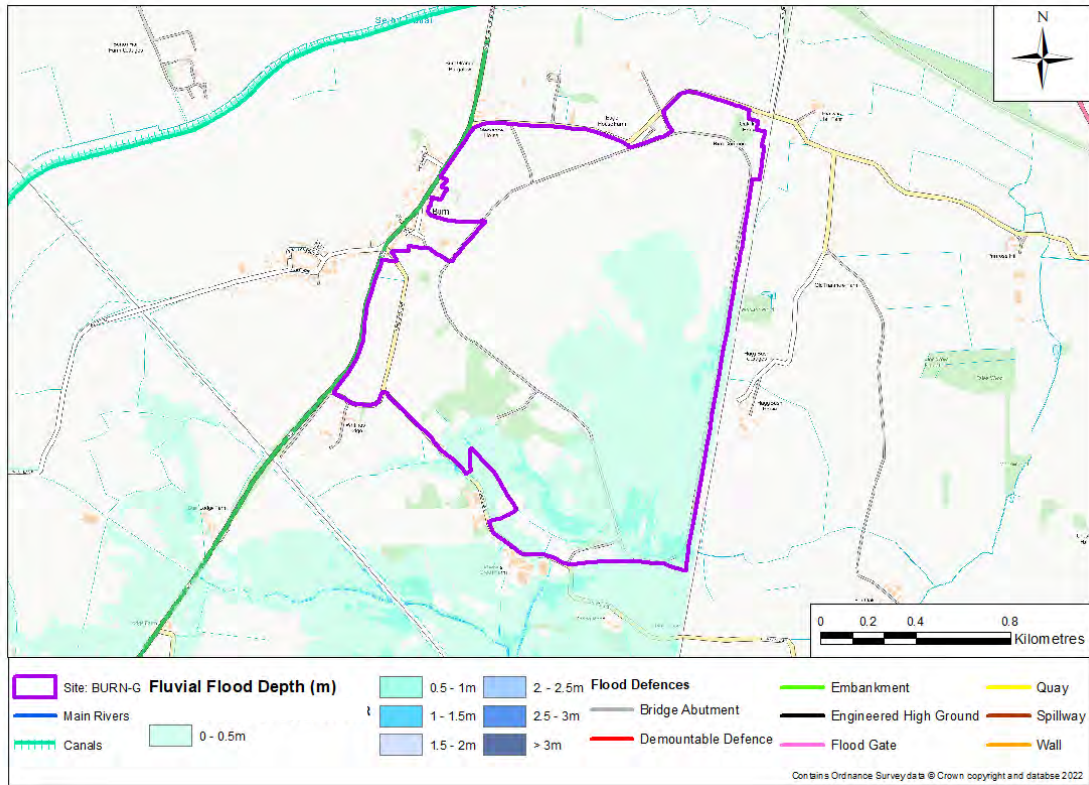


Figure B - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows, taking account of flood defences

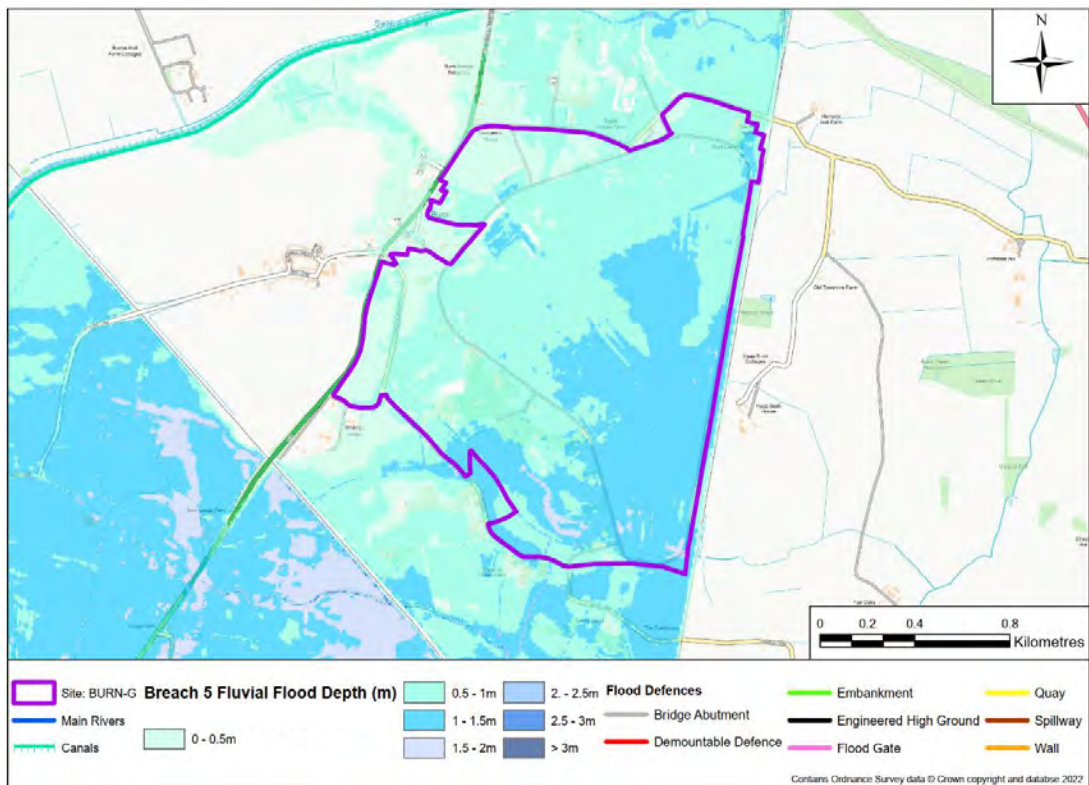


Figure C – Breach of defences (Breach 5) maximum Flood Depth 1% AEP plus 23% climate change uplift on flows, taking account of flood defences

BURN-G – Burn Airfield, Burn

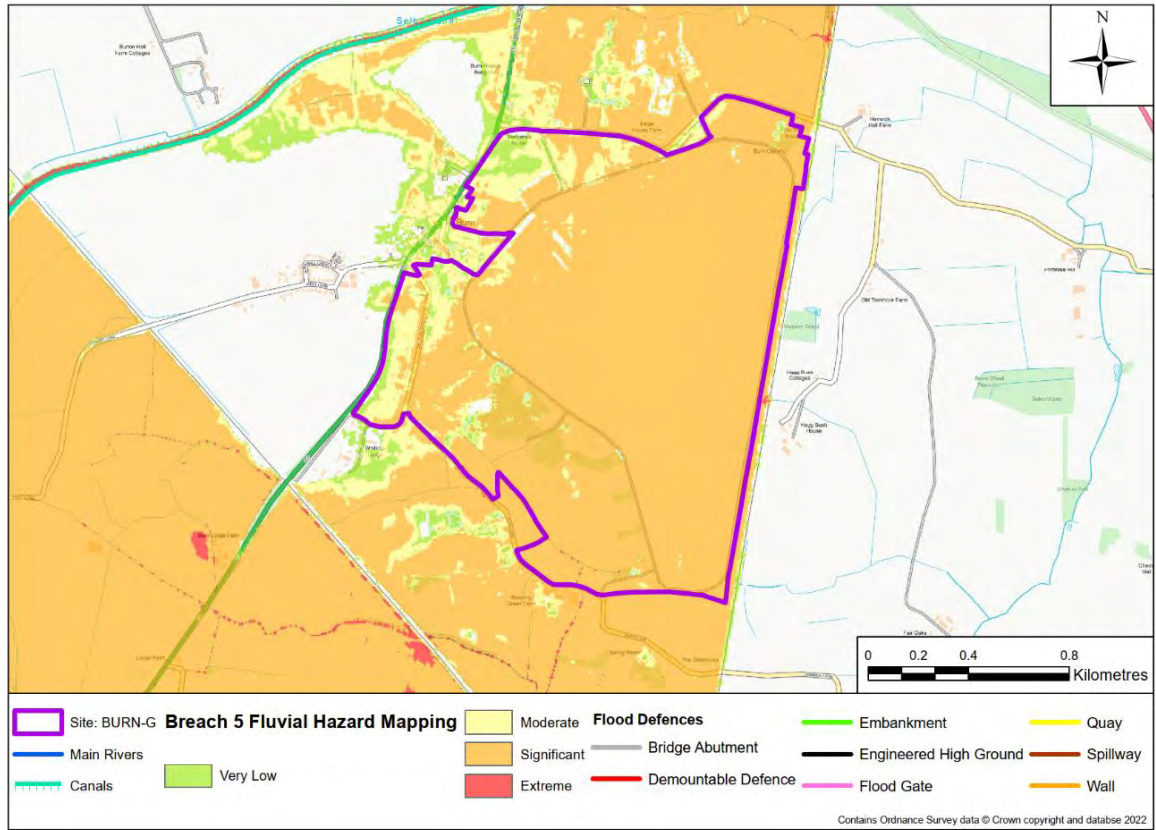


Figure D – Breach of defences (Breach 5) maximum Flood Hazard 1% AEP plus 23% climate change uplift on flows, taking account of flood defences

# BURN-G – Burn Airfield, Burn

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

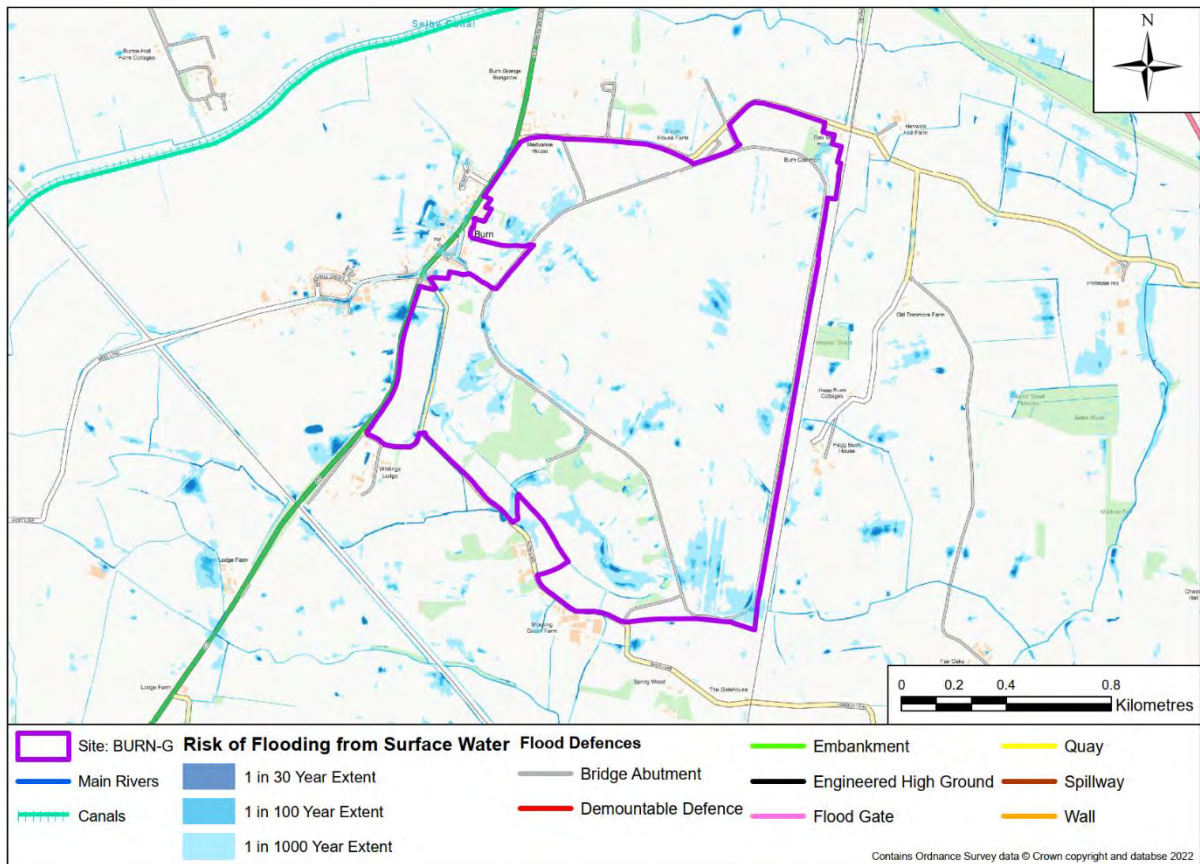


Figure E - Risk of Flooding from Surface Water (RoFSW)

## Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Silt and Sand
Susceptibility to Groundwater Flooding (BGS)		There is mixed potential for groundwater flooding to occur across the site ranging from 0% to <25%	

## Other Sources

Risk of flooding from reservoirs	The Long-Term Flood Risk Map shows that the site could be at risk of flooding in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir). Most of the Site is at risk from breach or failure of reservoir whilst river levels are normal. There are parts of the Site that are only at risk from breach or failure of reservoir during an extreme fluvial flood events.
----------------------------------	---

## Summary

The site is at risk of flooding from the River Aire which is approximately 2km from the southern end of the site. The site is also 500m south east of Selby Canal. The majority of the site (98%) is defined as Flood Zone 3a - High probability of flooding from rivers or the sea, with the remaining area being located within Flood Zone 2 - Medium probability of flooding from rivers or the sea (1%) and Flood Zone 1 - Low probability of flooding from rivers or sea and the rest of the site (1%). The site is in an area classified as benefitting from defences (98%) and a stretch of the defences along the River Aire protect the site.

The flood defences along the River Aire that provide a degree of protection to the site are classified as being in Fair- Good condition within closest proximity of the site. The site is at residual risk of flooding despite the presence of defences. The defences consist of a series of flood storage areas and embankments. There are no defences within the site but the defences along the River Aire, as discussed, reduce the risk of flooding at the site. There is a floodgate at the northern end of Selby Canal which provides protection from flooding from the River Ouse (3.5km north of the site). There is a lock (Haddlesey Flood Lock) which links Selby Canal to the River Aire (2km south of the site). There is a residual risk associated with flooding from Selby Canal itself.

## BURN-G – Burn Airfield, Burn

Modelling shows that the site is at limited risk of flooding from the fluvially dominant 1% AEP plus 23% Climate Change uplift on flows simulation. Flood depths vary from 0.0 and 1.0m with deepest flooding in the south east portion of the site. There is low tidal flood risk in this part of the River Aire therefore no tidal scenario was modelled.

The existing flood defences protect areas of Selby, including the site, from fluvial and tidal inundation and therefore the risk of flooding to this site is a residual risk, only if the defences fail (breach). Breach modelling has been completed as part of the SFRA for 5 locations across the LLFA area. Breach number 5 is located at the eastern end of the left bank flood embankment upstream of Temple Hirst on the River Aire Selby Canal Floodgate. The Lower Aire model was used to simulate a breach 40m long and remained collapsed and open for 56 hours with a 1% AEP plus 23% Climate Change uplift on flows. The results from this assessment show that most of the site floods to a depth of between 0.5 and 2.0m. Flood water is deepest in the south eastern corner of the site. The flood hazard varies across the site from Low ('Very Low') to Significant ('Danger to Most') hazard. The majority of the site is at Significant ('Danger to Most') hazard. The eastern edge of the site has a section of Extreme ('Danger to all') hazard associated with the pond.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site. Also on the roads adjacent to the site including Burn Lane, Brick Kiln Lane, A19 and Common Lane.

There is some potential for groundwater flooding to occur across the site ranging from 0% to <25%.

### Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test can be satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding / areas of the site. Areas of the site to the north and west are suitable for sleeping accommodation, where there is a very low flood risk. Employment facilities can be situated in other parts of the site, sequentially located away from areas of the site with higher flood risk.
- There is more limited flooding in the 1% AEP plus 23% Climate Change uplift on flows due to the presence of defences results than those associated with a breach in defences. Therefore site levels should be based upon those from a breach. Finished floor levels or raised development platforms should be set 300mm above the 1% AEP flood level resulting from an additional breach of defences including an allowance for climate change. Sleeping accommodation should be set 300mm above the 1% AEP breach level including an allowance for climate change. Ground floor sleeping accommodation is unlikely to be appropriate on the site due to the proximity flood defences and the risk of rapid inundation in the event of a breach.
- The proposed development must not reduce the ability of the floodplain to store water. This should be considered in relation to the 1% AEP modelled flood event with an allowance for climate change. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis, or informed by hydraulic modelling for a range of return period events. Given that 99% of the site is classed as Flood Zone 3a, it will be challenging to achieve compensatory storage within the red line boundary of the site and off-site compensatory storage may be required. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- The Selby Canal could cause flooding of the site as the land surrounding the site is very flat. This risk will need to be investigated in more detail as part of a Flood Risk Assessment to develop the site.
- Additional breach modelling should be considered to be undertaken as part of a site specific FRA. Or an assessment should be included as to why the existing assessments are sufficient. The EA should be consulted to aid this exercise.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the extreme water level (0.1% AEP) including an allowance for climate change.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. There are IDB watercourses to the north and south of the site which could be potential discharge points. If these drains are not to be modelled a 20m buffer strip for development will be required. This should be discussed with the Internal Drainage Board (IDB) and Lead Local Flood Authority (LLFA) upon appointment.
- All major developments (10 or more dwellings and 100m<sup>2</sup> floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the IDB and the LLFA upon appointment .
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

# CFAB-A– RAF Church Fenton, Church Fenton (Ulleskelf Parish), Church Fenton Airbase

Site ID:	CFAB-A	Area (ha):	153.1
Proposed Use:	Mixed Use – Residential and Employment	Vulnerability Classification:	More Vulnerable
Watercourses near the site	Carr Dyke (ordinary watercourse), River Wharfe		

## Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
41%	59%	0%	0%	0%

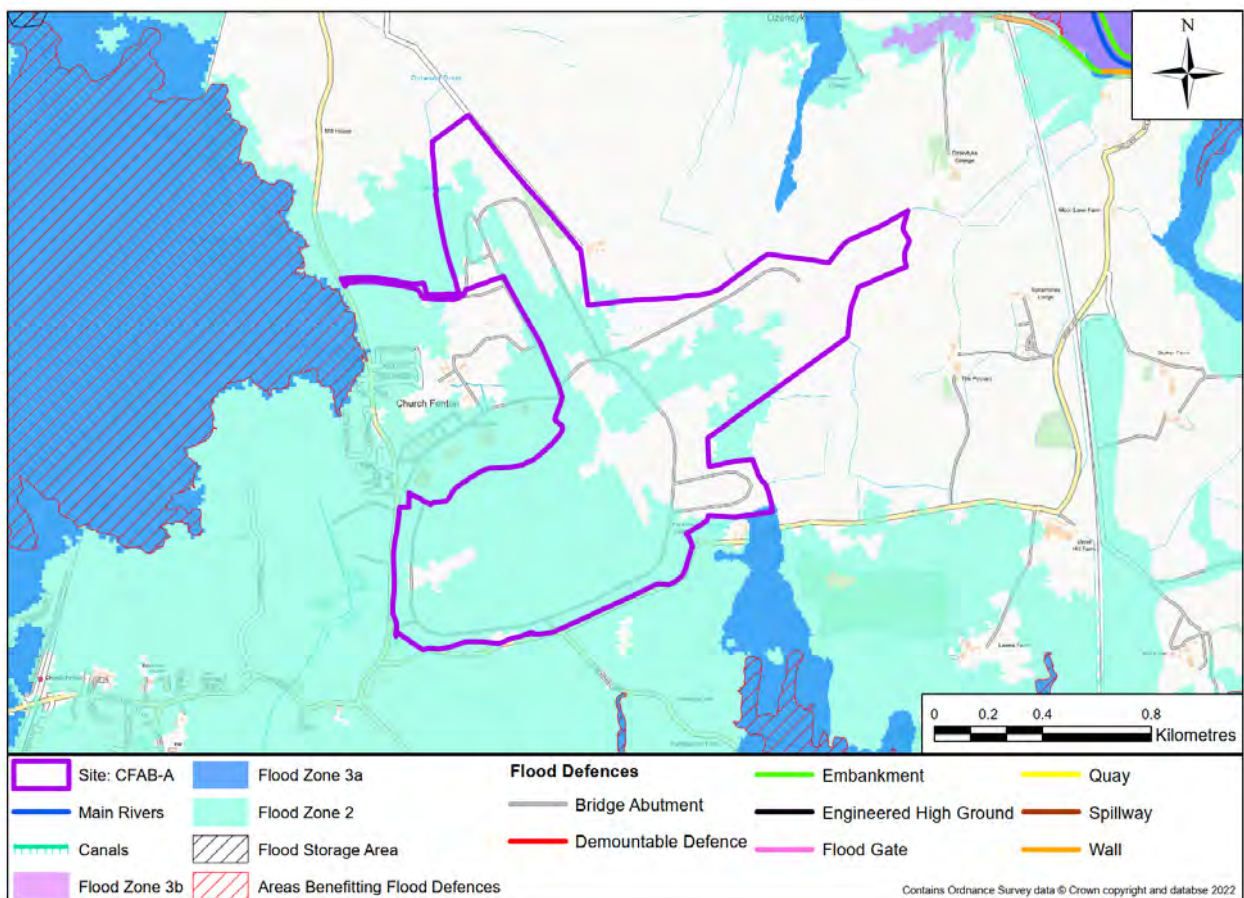


Figure A - Flood Zones

Flood Warning Area	There are no flood warnings or alerts which cover this area.
--------------------	--

CFAB-A- RAF Church Fenton, Church Fenton (Ulleskelf Parish),  
Church Fenton Airbase

River Flooding

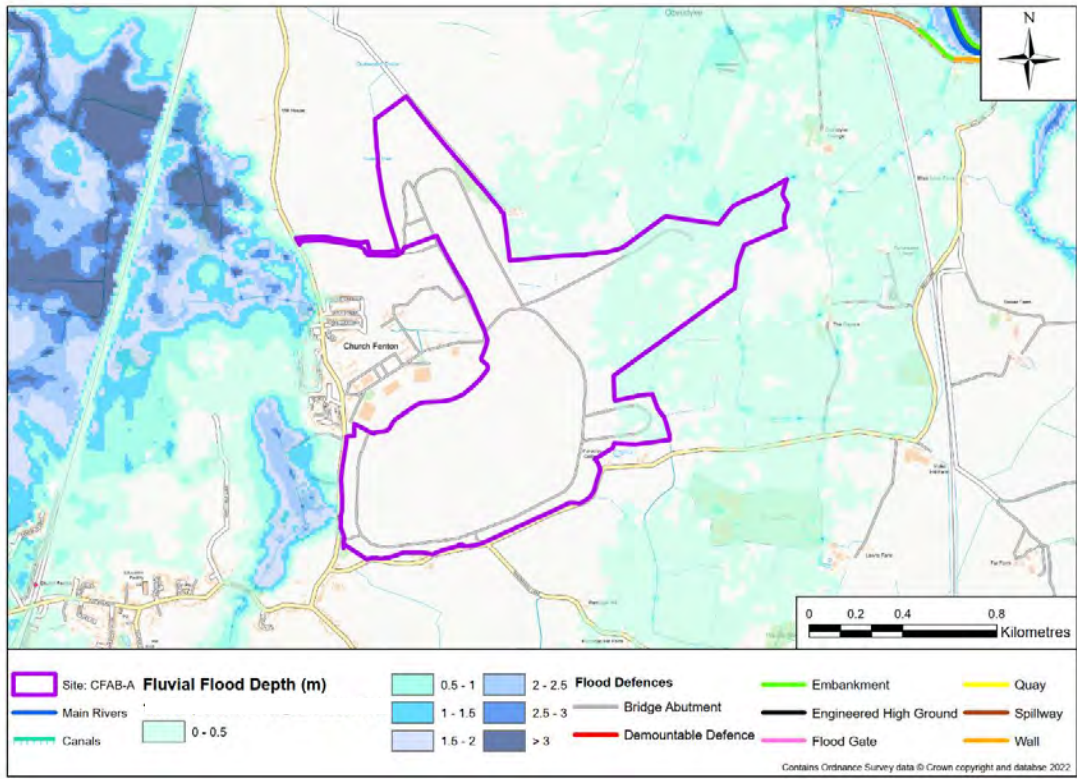


Figure B - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

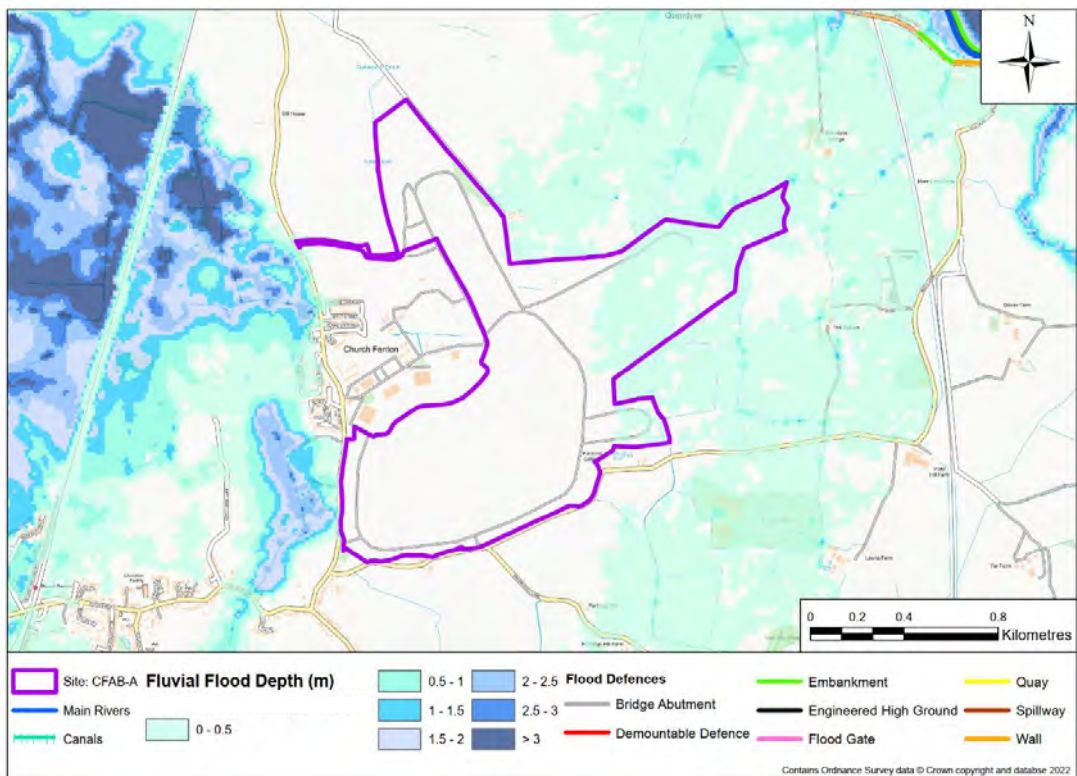


Figure C - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

# CFAB-A- RAF Church Fenton, Church Fenton (Ulleskelf Parish), Church Fenton Airbase

## Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

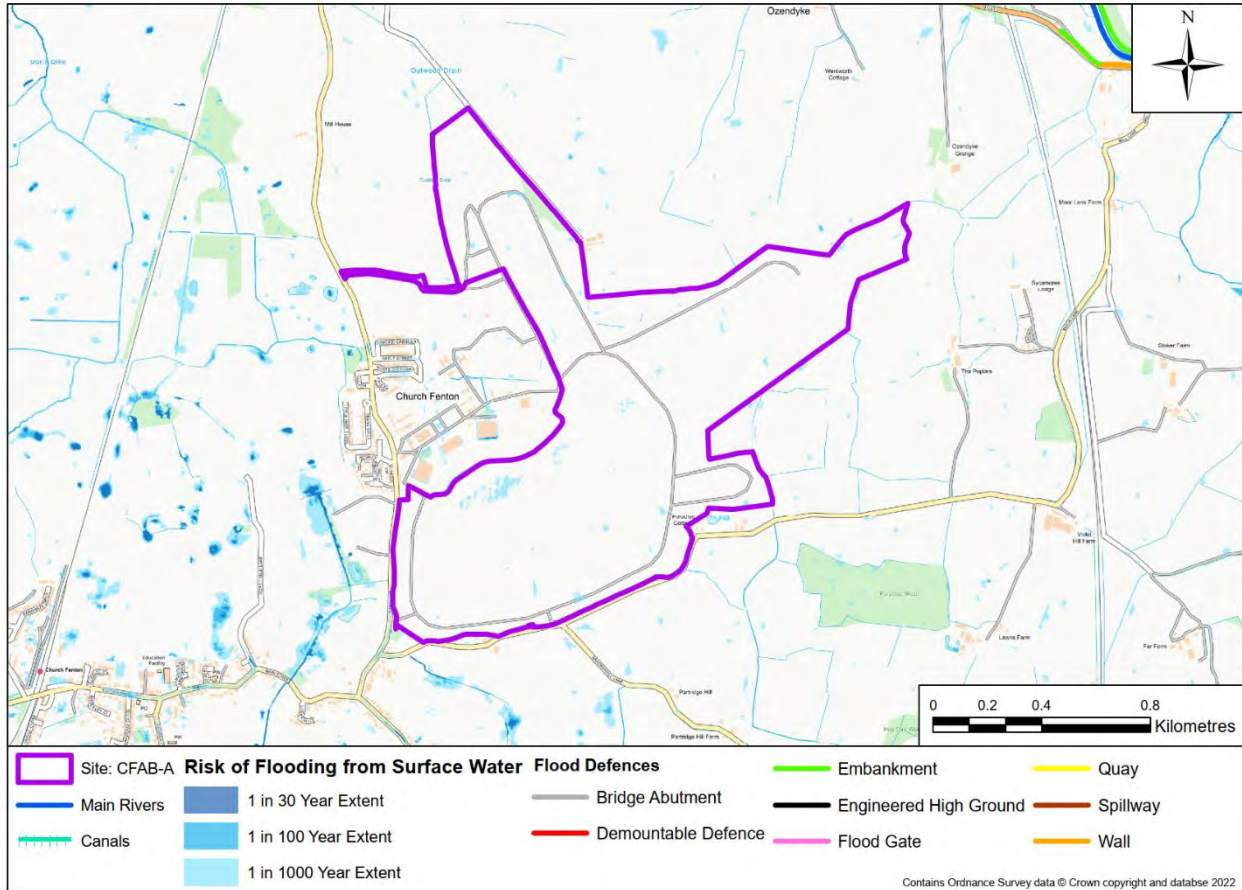


Figure D - Risk of Flooding from Surface Water (RoFSW)

## Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Sand
Susceptibility to Groundwater Flooding (BGS)		There is mixed potential for groundwater flooding to occur across the site ranging from 25% to >75%	

## Other Sources

Risk of flooding from reservoirs	The Long-Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir). The site will only flood in the event of a breach or failure of a reservoir when there is also flooding from rivers.
----------------------------------	---

## Summary

The site is at risk of flooding from the Carr Dyke (an Ordinary Watercourse) which is 200m to the west of the site and the River Wharfe which is approximately 1km north of the site. There are additional IDB watercourses on the site. The majority of the site (59%) is defined as Flood Zone 2 - Medium probability of flooding from rivers or the sea, with the remaining area (41%) located within Flood Zone - 1 Low probability of flooding from rivers or the sea.

The flood defences along the River Wharfe are classified as being in Fair- Good condition within closest proximity of the site. The defences consist of a series of flood storage areas, walls and high ground. The site is not shown as benefitting from these defences and there are no defences alongside or on the site.

## CFAB-A– RAF Church Fenton, Church Fenton (Ulleskelf Parish), Church Fenton Airbase

Modelling shows the site to be at risk of flooding when considering the impact of climate change, the risk is more significant for the 1% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR compared to the 1% AEP plus 23% Climate Change uplift on flows and 1.02m 'Higher Central' SLR scenario. Flooding is present in the north east portion of the site and varies in depth between 0.0m - 0.5m deep. Flood levels vary from 7.0– 8.5mAOD across the site for the 1% AEP plus 23% Climate Change uplift on flows and 1.02m SLR simulation results. The pattern of flooding with climate change is different to the Flood Zone 'undefended' and needs to be managed through site layout.

The existing flood defences protect the wider areas of Selby from fluvial and tidal inundation, however there is still a residual risk of flooding from overtopping or breach. Breach modelling has not been carried out for this site as part of this SFRA.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to pond within the site, there is minimal ponding across the site.

There is mixed potential for groundwater flooding to occur across the site ranging from 25% to >75%

### Site Specific Recommendations

The proposed use for the site includes residential which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test is satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding / areas of the site with a Very Low – Moderate Flood Hazard rating. Areas of the site to the west are most suitable for residential accommodation due to there being a very low flood risk associated with these areas. Employment facilities can be situated in other parts of the site, sequentially located away from areas of the site with higher flood risk.
- There are some IDB watercourses in close proximity of the site that may not have been explicitly included in existing modelling used to inform this site assessment and their associated risk should be considered when developing this site. No development can be within 20 metres of small drains unless modelling has been carried out to assess the risk. This should be agreed with the Internal Drainage Board (IDB) and the Lead Local Flood Authority (LLFA) upon appointment to complete the site specific SFRA .
- Finished floor levels or raised development platforms should be set 300mm above the 1% AEP flood level including an allowance for climate change. Sleeping accommodation should be set 300mm above the flood level for the 1% AEP event including appropriate allowance for climate change. It is likely that ground floor sleeping accommodation will be appropriate in areas of the site away from the modelled area of flooding.
- The proposed development must not reduce the ability of the floodplain to store water. This should be considered in relation to a suitable modelled flood event including climate change allowance. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. There is a IDB watercourse to the North of the site which could be potential discharge point. In addition, the site's current use is a small airport, so there may also be existing drainage that could be tapped into on site, subject to appropriate attenuation.
- All major developments (10 or more dwellings and 100m<sup>2</sup> floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the IDB and the LLFA upon appointment .
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.



## SELB-B– Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

Site ID:	SELB-B	Area (ha):	15.02
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Ouse, Selby Canal, Selby Dam		

### Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	17%	83%	0%	88%

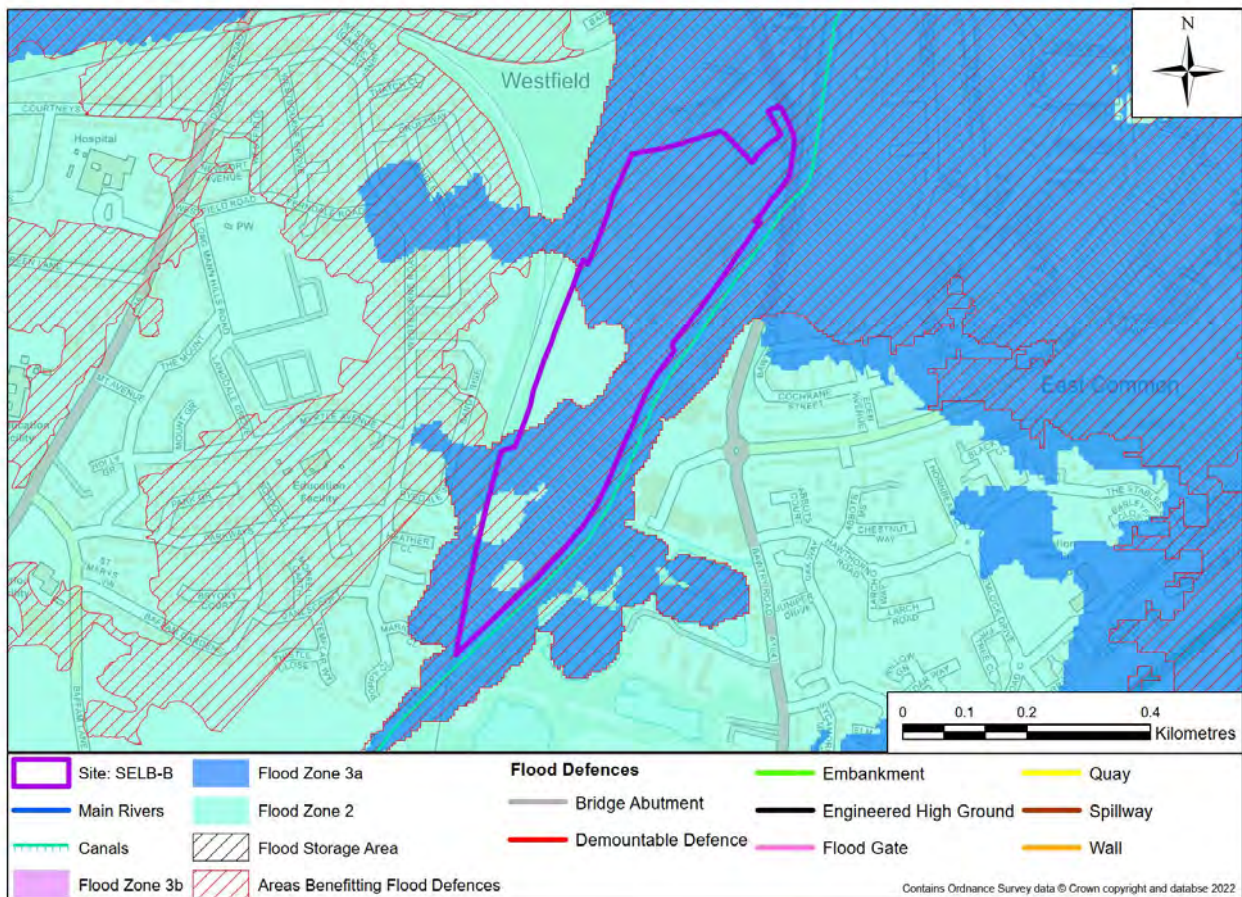


Figure A - Flood Zones

Flood Zones provide an estimate of the areas of land at risk of flooding, when the presence of flood defences are ignored. Areas designated as 'Areas Benefitting from Defences' (ABD) in the event of a fluvial flood with a 1% AEP or a tidal flood with a 0.5% AEP would be protected from flooding by the presence of flood defences. North Yorkshire Council - Selby area includes flood defences and flood storage areas. Further analysis has been undertaken that takes into account the presence of flood defences, shown in Figures below.

Flood Warning Area	The site is partially covered by River Ouse at Selby and Barlby Flood Warning Area and the Tidal River Ouse from Naburn Lock to Selby Flood Warning Area.
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# SELB-B- Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

## River Flooding

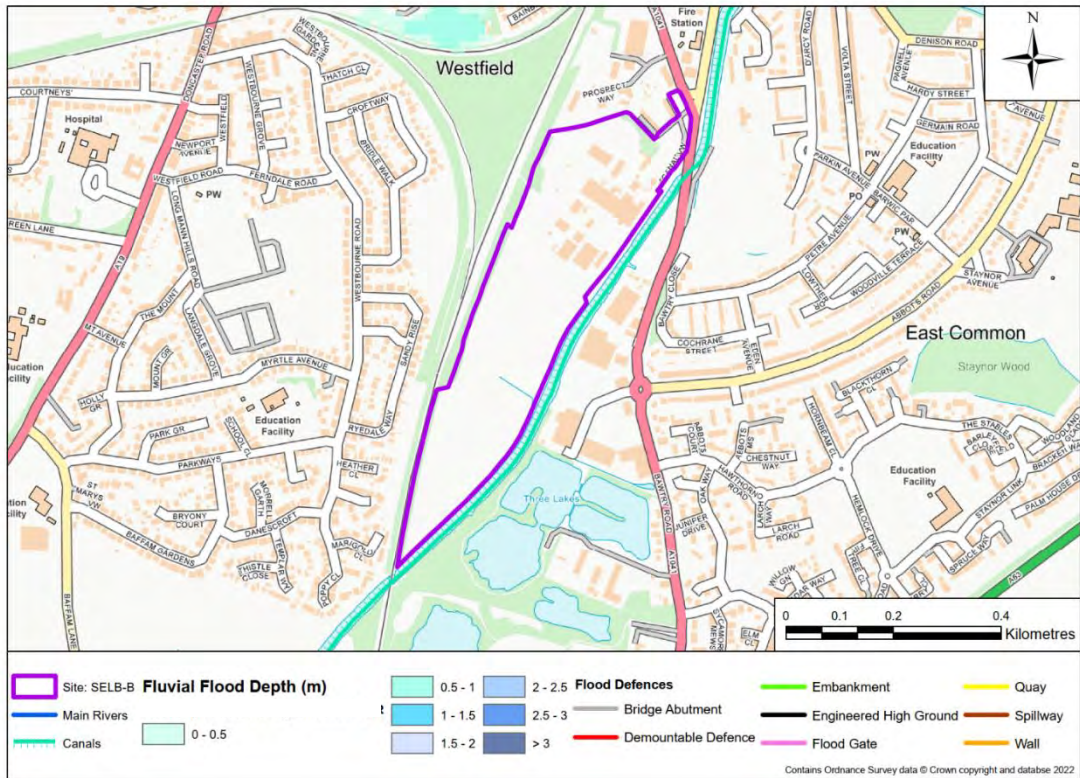


Figure B - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

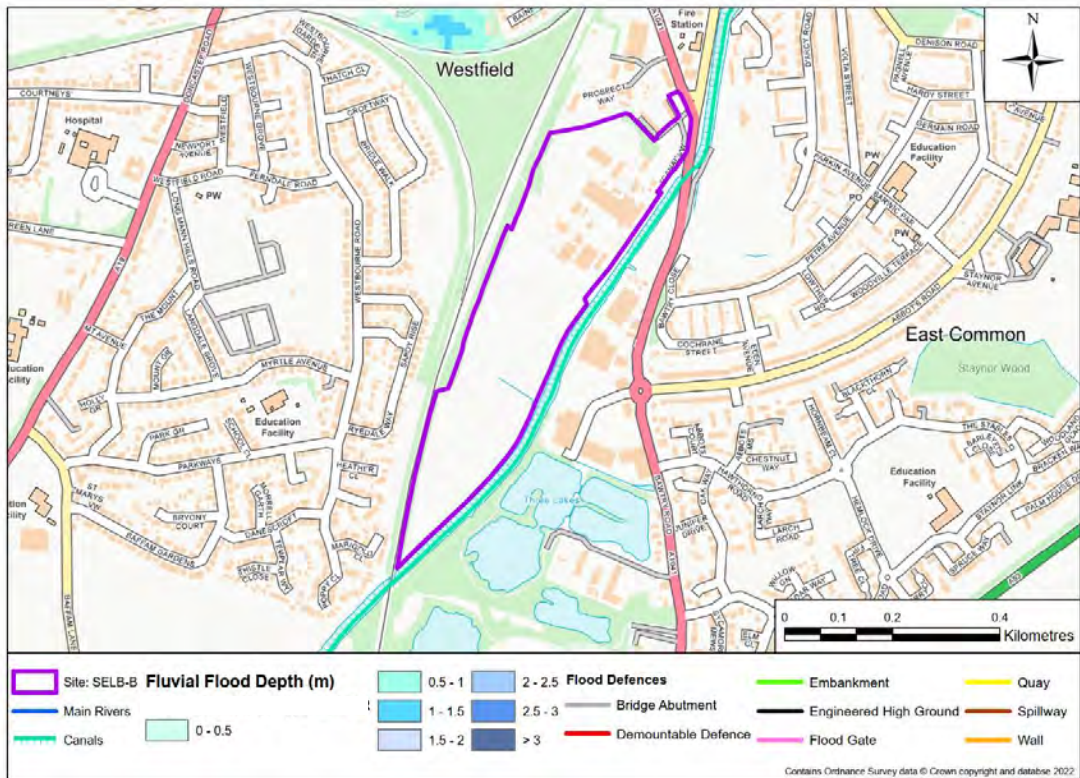


Figure C - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

# SELB-B- Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

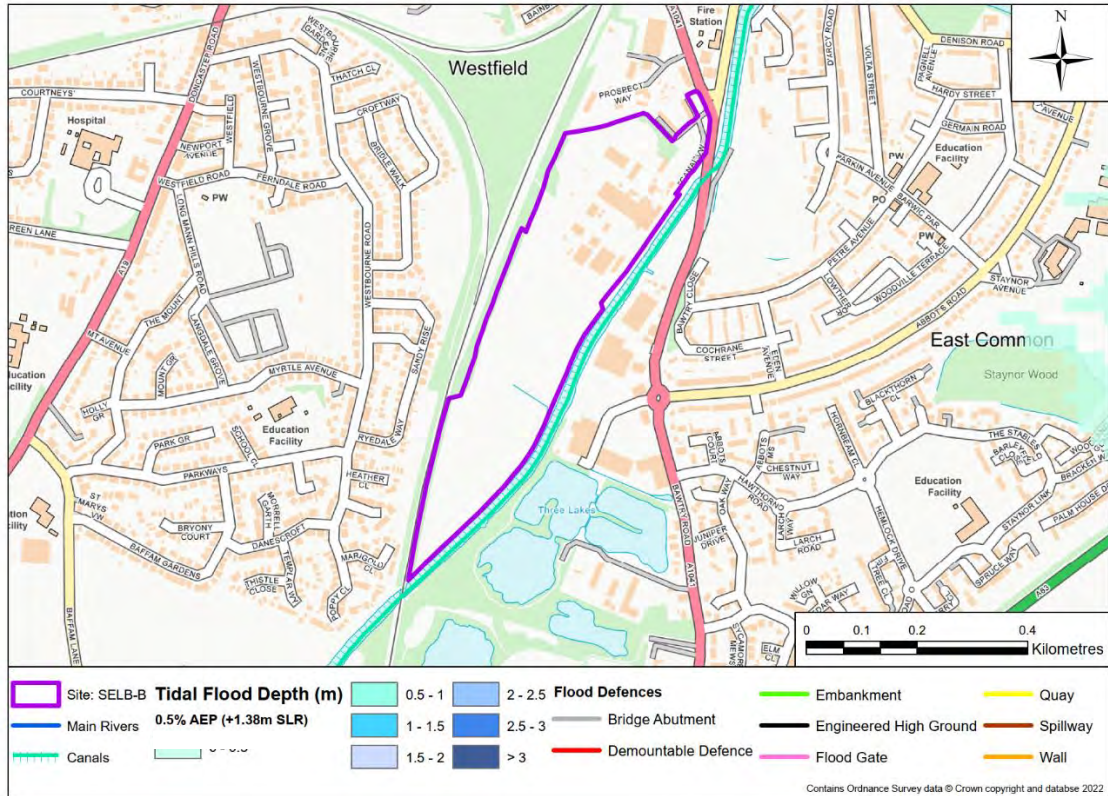


Figure D - Maximum Flood Depth 0.5% AEP tidal dominant event plus 23% climate change uplift on flows with 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

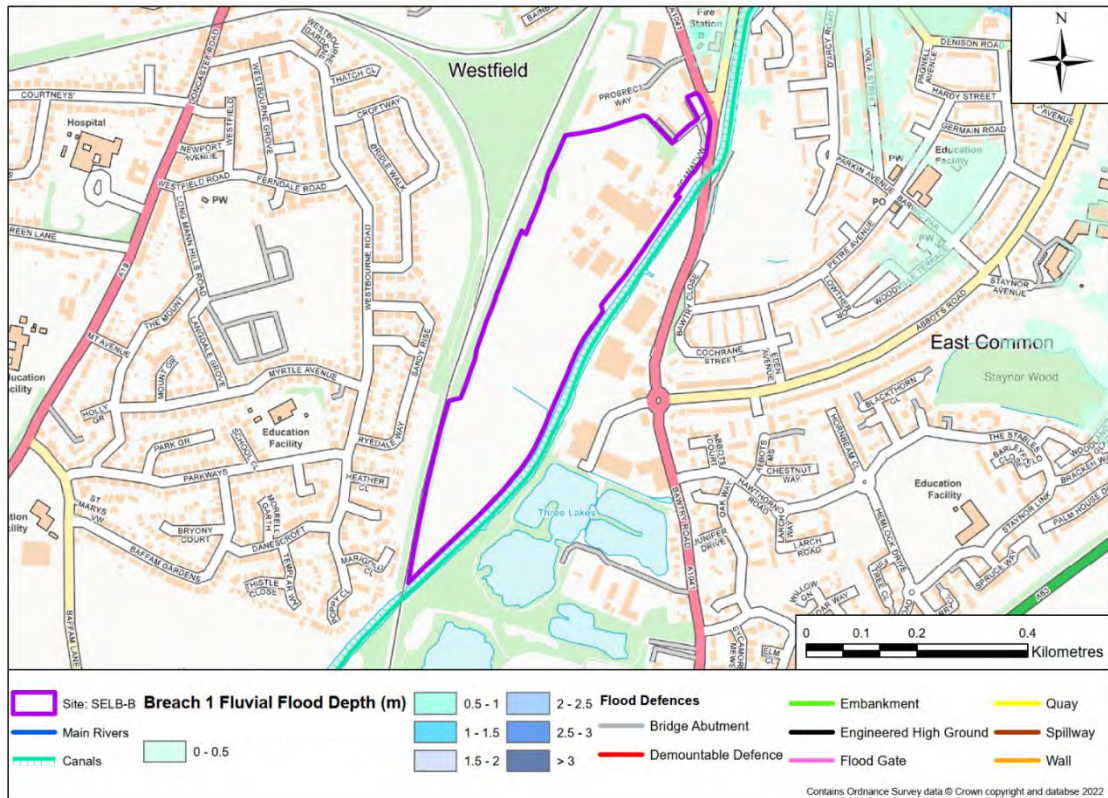


Figure E – Breach of defences (Breach 1) maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

# SELB-B- Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

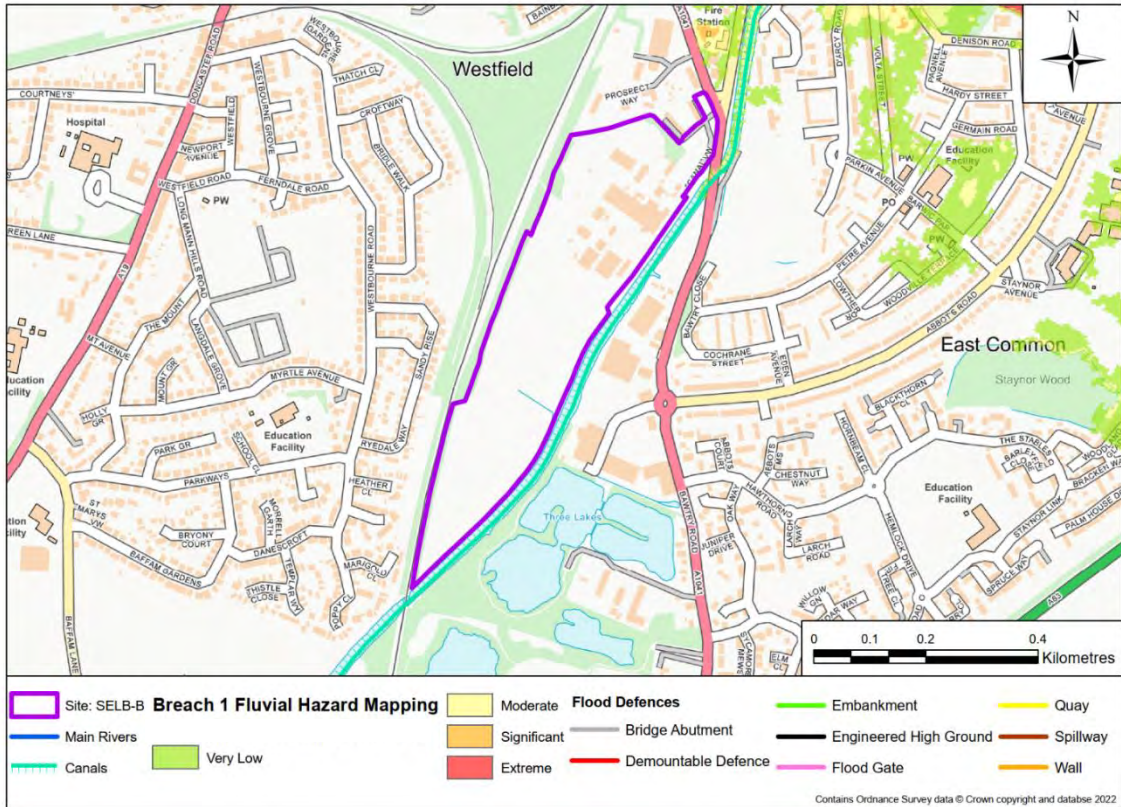


Figure F – Breach of defences (Breach 1) maximum Flood Hazard 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

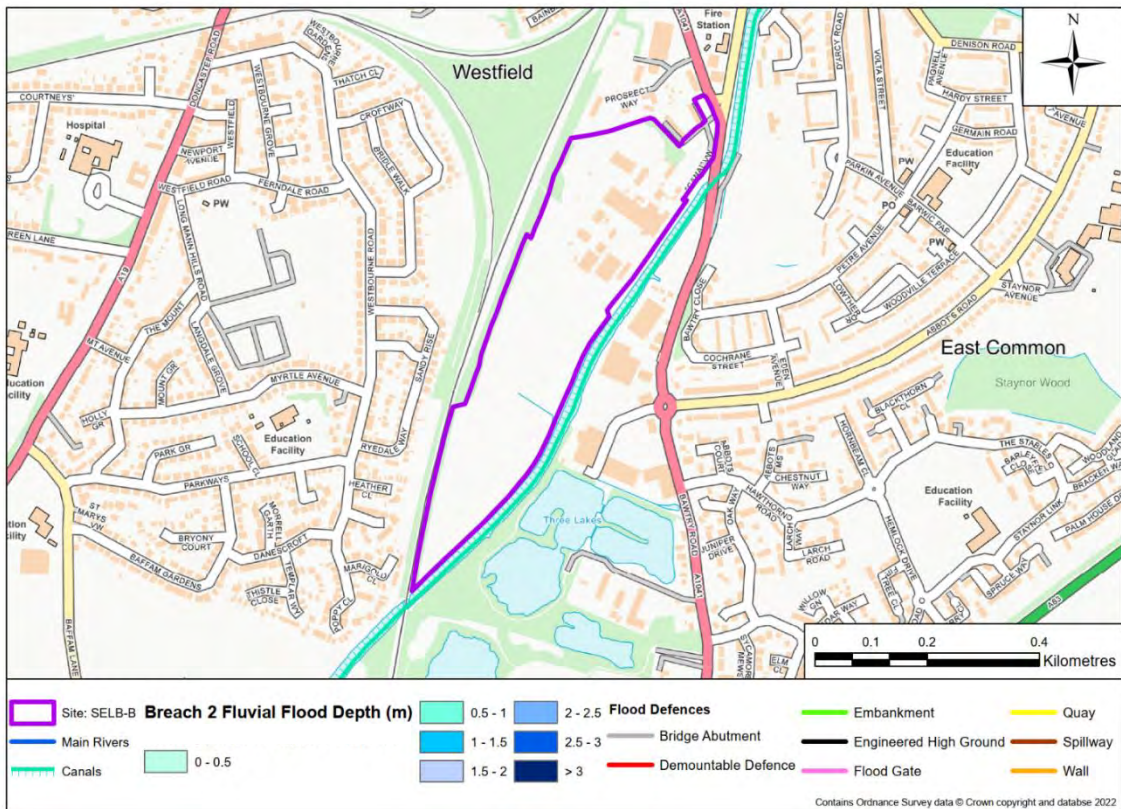


Figure G – Breach of defences (Breach 2) maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

# SELB-B- Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

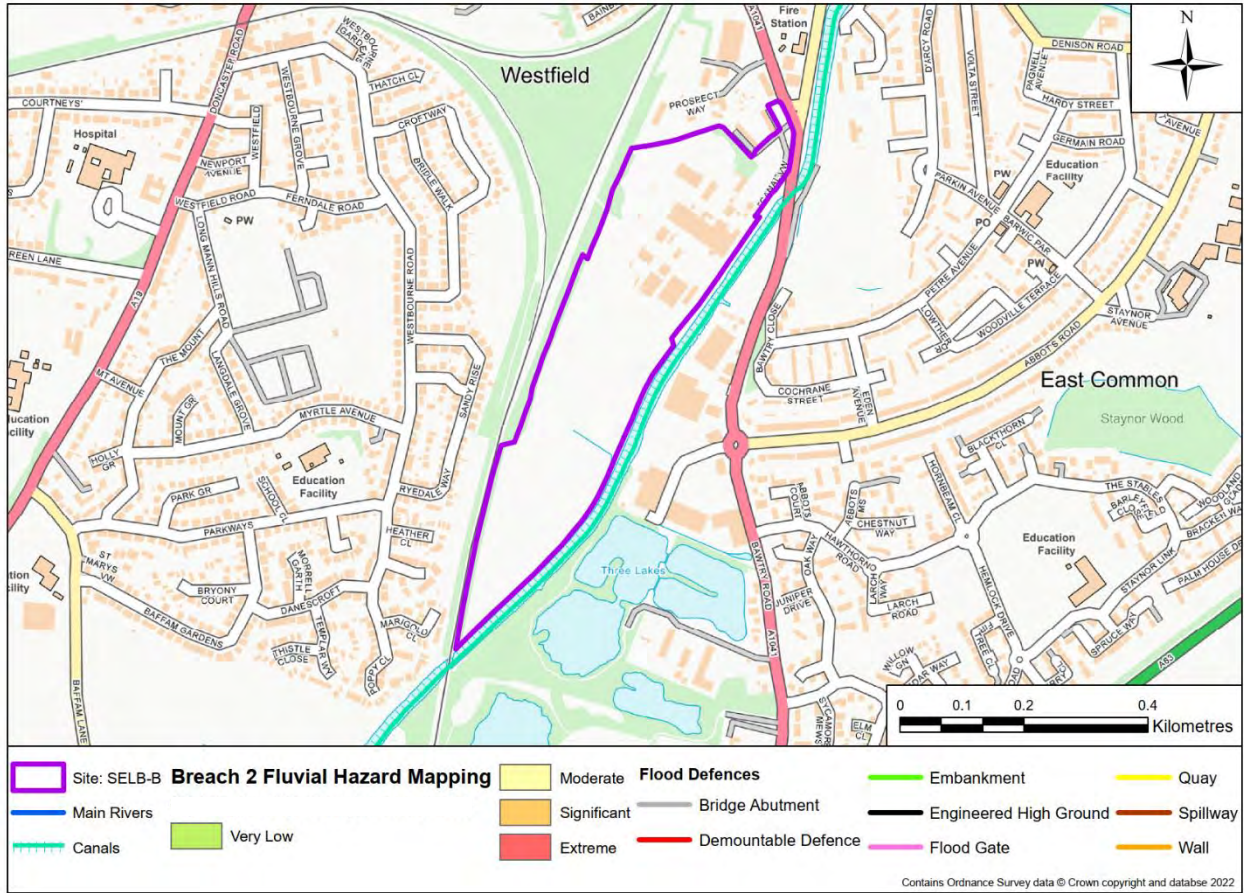


Figure H – Breach of defences (Breach 2) maximum Flood Hazard 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences.

# SELB-B- Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

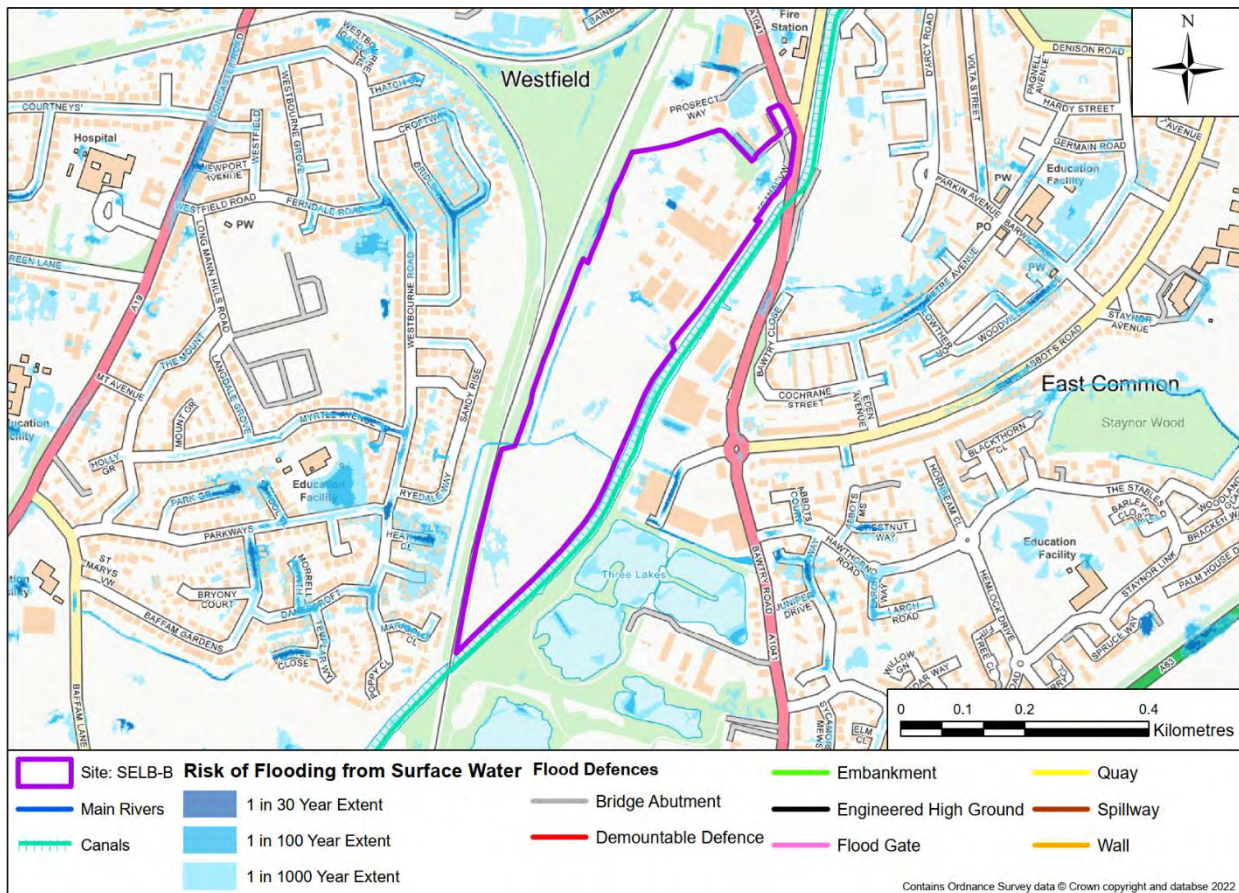


Figure 1 - Risk of Flooding from Surface Water (RoFSW)

## Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Sand, Clay, and Silt
Susceptibility to Groundwater Flooding (BGS)		<25%	

## Other Sources

Risk of flooding from reservoirs	The Long-Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir). Most of the Site is at risk when river levels are normal but there are parts of the Site which would only flood in the event of a breach or failure of a reservoir when there is also flooding from rivers.
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## Summary

The Selby Canal flows southwards along the eastern perimeter of the site and is at or below the level of the site. The River Ouse is approximately 400m to the north of the site and Selby Dam is located approximately 700m to the north west of the site. The majority of the site (83%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, the rest of the site is within (17%) Flood Zone 2 Medium probability of flooding from rivers or sea. Due to the presence of defences along the River Ouse and the flood gate on Selby Canal that reduce the risk of flooding the majority of the site (88%) is located in an area shown as benefitting from flood defences.

The flood defences along the River Ouse are classified as being in Fair- Good condition within closest proximity of the site. The defences consist of a series of flood walls, a bridge abutment and some flood gates connected to the River Ouse and Selby Canal. There is a floodgate which opens on to Selby Canal and there is residual risk of flooding from the Canal itself. The defences protect the site from flooding, but there is still a residual risk of the site flooding if the defences were to be breached or the defences are overtopped.

Modelling shows that the site is not at risk a flooding from the fluviially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.02m 'Higher Central' SLR scenario, or the fluviially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR scenario. There is also no flooding to the site associated with the tidally dominant 0.5% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR event.

## SELB-B– Industrial Chemicals Ltd, Canal View, Bawtry Road, Selby

The existing flood defences reduce the risk of flooding in Selby, including the site, from fluvial and tidal inundation and therefore the risk of flooding to this site is a residual risk, only if the defences fail (breach). Breach modelling has been completed as part of the SFRA for 5 locations across the LLFA area. Breach number 1 is located at the Selby Canal Floodgate and was modelled as 20m long and remained collapsed and open for 30 hours. This used the Upper Humber model with a 1% AEP climate change event (including a 23% uplift on flows and 1.02m 'Higher Central' SLR). These modelling results show that there is no flooding across the site associated with this breach. Breach number 2 is located on the right edge of the meander, upstream of the confluence of Selby Dam with the River Ouse and was modelled as 20m long and remained collapsed and open for 18 hours. This used the Upper Humber model with a 1% AEP climate change event (including a 23% uplift on flows and 1.02m 'Higher Central' SLR) and. The modelling results show that there is no flooding across the site associated with this breach.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site. Most ponding is largely associated with the drains flowing through the site.

Broadscale mapping identifies that there is <25% susceptibility for groundwater flooding to occur across the site

### Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test is satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site. Residential accommodation should not be placed directly behind the defences on the River Ouse or directly next to the Selby Canal due to residual risk associated if either were breached. Residential Properties should be sequentially placed in areas of lower flood water depth, and should be preferably placed in the northeast portion of the site.
- Additional breach modelling should be undertaken as part of a site specific FRA. Or an assessment should be included as to why the existing assessments are sufficient. The EA should be consulted to aid this exercise.
- Due to the presence of defences there is no flooding in the fluvially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.02m 'Higher Central' SLR scenario, the fluvially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR scenario or the 0.5% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR tidal dominant run. Therefore site levels should be based upon those from a breach. However, there is also no flooding associated with the selected breach analysis completed to date. Finished floor levels or raised development platforms should be set 300mm above the 1% AEP flood level resulting from an additional breach of defences including an allowance for climate change. Sleeping accommodation should be set 300mm above the 1% AEP breach level including an allowance for climate change. Ground floor sleeping accommodation is unlikely to be appropriate on the site due to the proximity flood defences and the risk of rapid inundation in the event of a breach.
- The Canal and River Trust should be consulted to understand the operation and maintenance of the canal and associated assets, and the potential impact on flood risk to the site.
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level (1% AEP) including an allowance for climate change. The analysis of additional breach runs should be completed as part of a site specific FRA.
- The site is located partially within the Flood Warning Area for River Ouse at Selby and Barlby and Tidal River Ouse from Naburn Lock to Selby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The Selby Canal skirts the perimeter the site which could be potential discharge point, subject to agreement with the Canal and River Trust.
- All major developments (10 or more dwellings and 100m<sup>2</sup> floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Canal and Rivers Trust upon appointment .
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

## SELB-BZ– Land at Cross Hills Lane, Selby

Site ID:	SELB-BZ	Area (ha):	78.9
Proposed Use:	Mixed Use	Vulnerability Classification:	More Vulnerable
Watercourses near the site	Selby Dam, Cockret Dike		

### Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	13%	87%	0%	77%

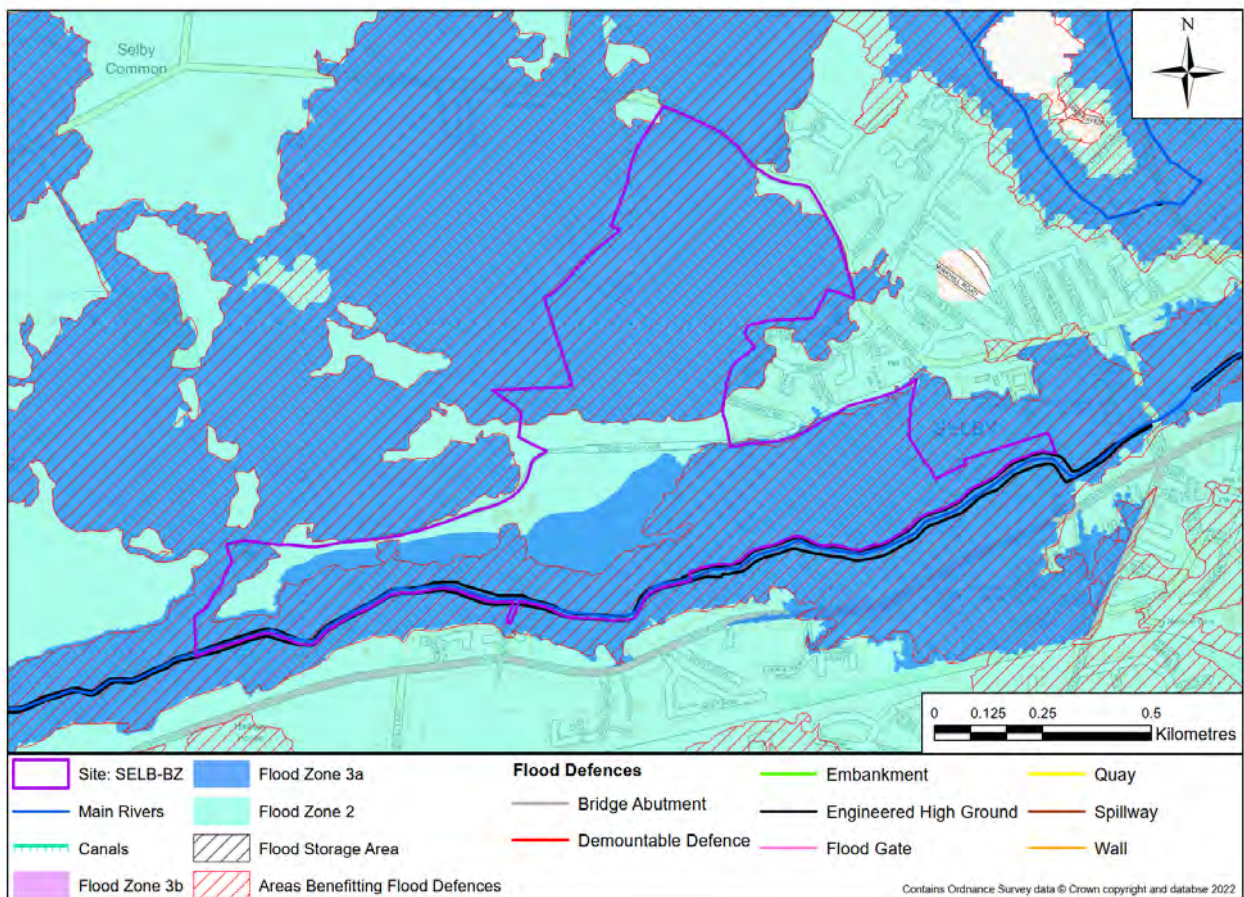


Figure A - Flood Zones

Flood Zones provide an estimate of the areas of land at risk of flooding, when the presence of flood defences are ignored. Areas designated as 'Areas Benefitting from Defences' (ABD) in the event of a fluvial flood with a 1% AEP or a tidal flood with a 0.5% AEP would be protected from flooding by the presence of flood defences. North Yorkshire Council - Selby area includes flood defences and flood storage areas. Further analysis has been undertaken that takes into account the presence of flood defences, shown in Figures below.

Flood Warning Area	A small portion of the site is within the River Ouse at Selby Dam Flood Warning Area and the Tidal River Ouse from Naburn Lock to Selby Flood Warning Area.
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# SELB-BZ– Land at Cross Hills Lane, Selby

## River Flooding

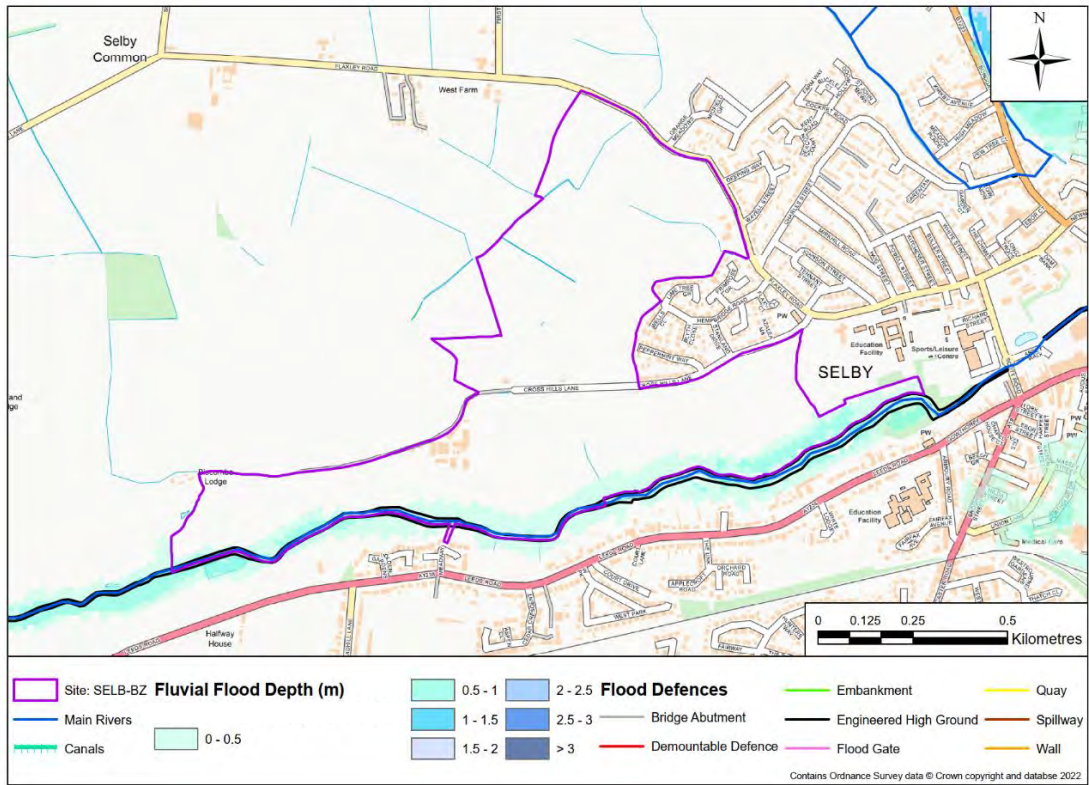


Figure B - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

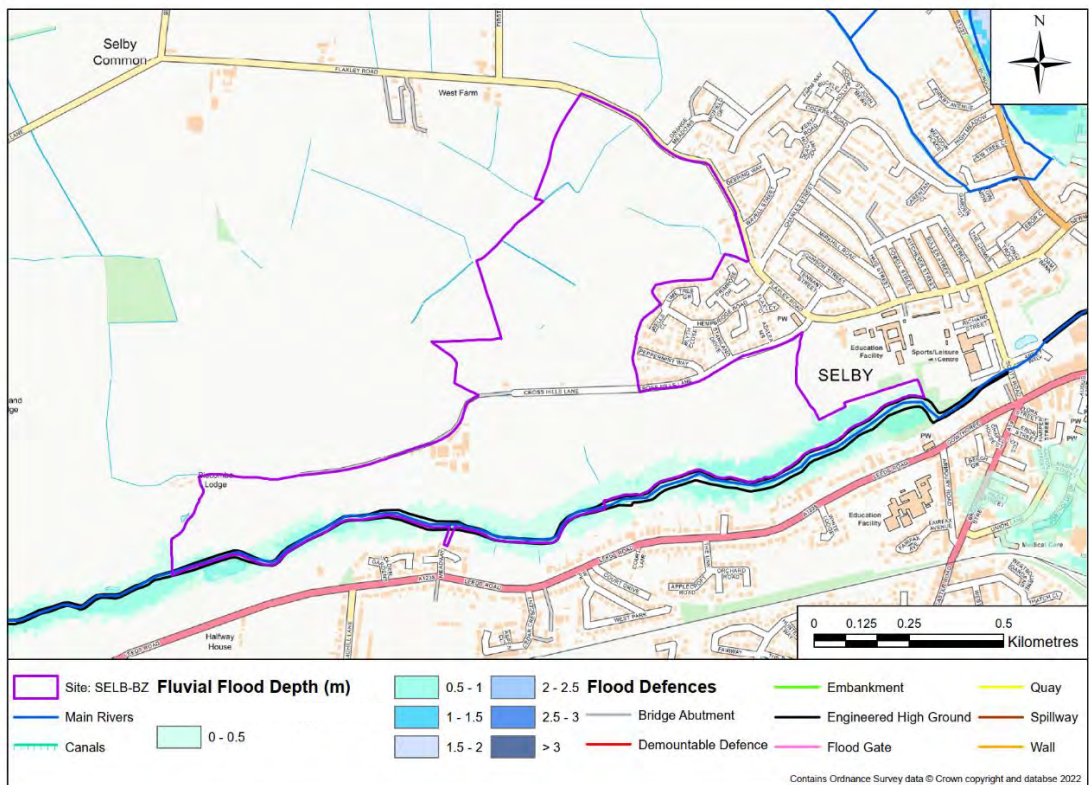


Figure C - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

SELB-BZ– Land at Cross Hills Lane, Selby

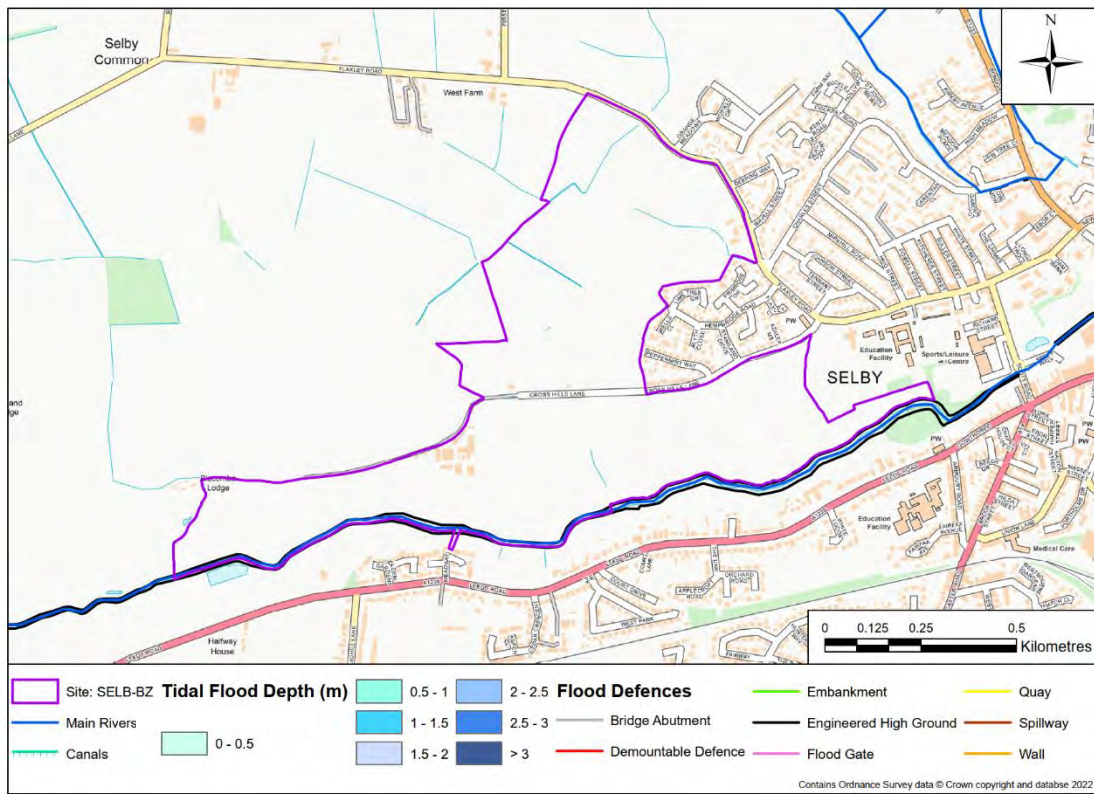


Figure D - Maximum Flood Depth 0.5% AEP tidal dominant event plus 23% climate change uplift on flows with 1.38m ('Upper End') Sea Level Rise, taking account of flood defences.

(Figure D represents normal flow within the river and an extreme tidal dominant event. Model results indicate no flooding at the site in this scenario.)

SELB-BZ– Land at Cross Hills Lane, Selby

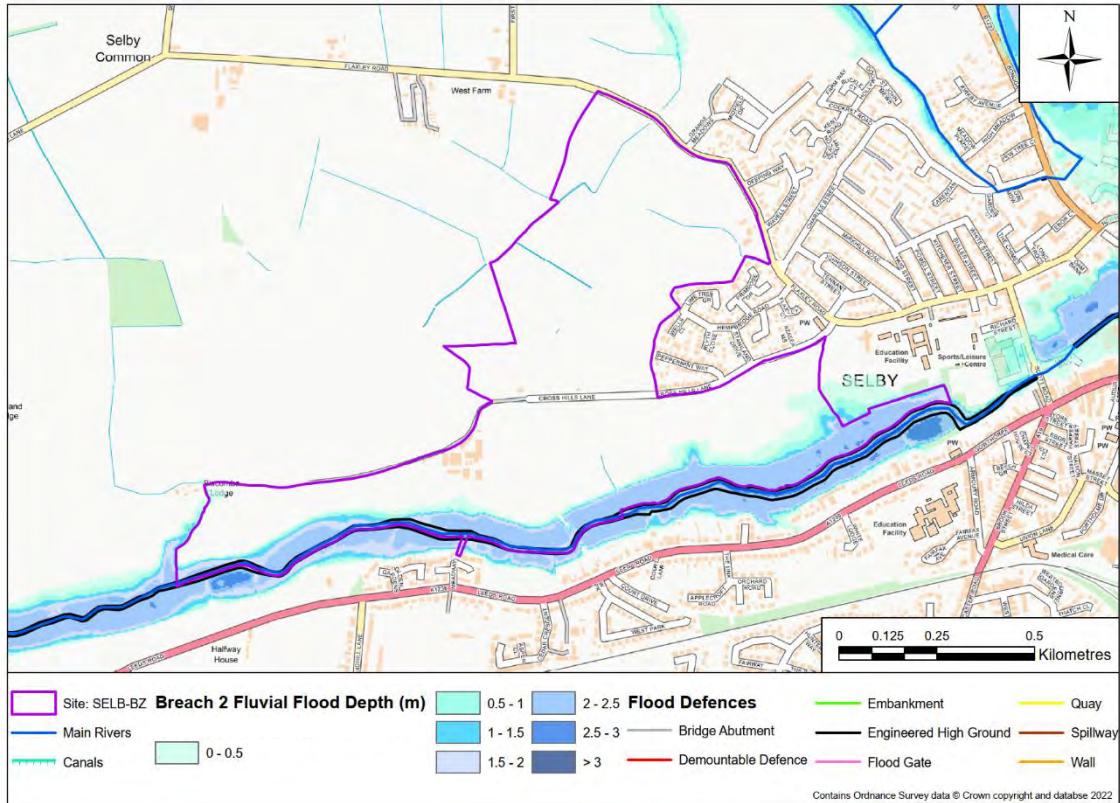


Figure E – Breach of defences (Breach 2) maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

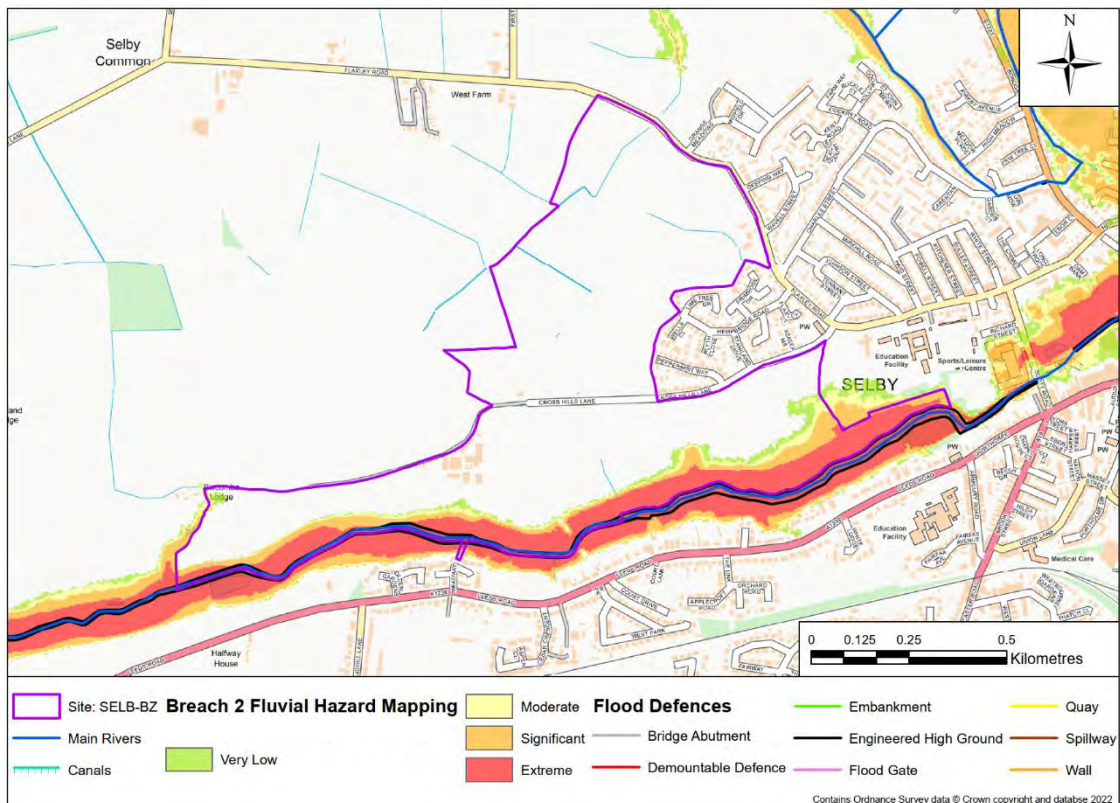


Figure F– Breach of defences (Breach 2) maximum Flood Hazard 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

SELB-BZ– Land at Cross Hills Lane, Selby

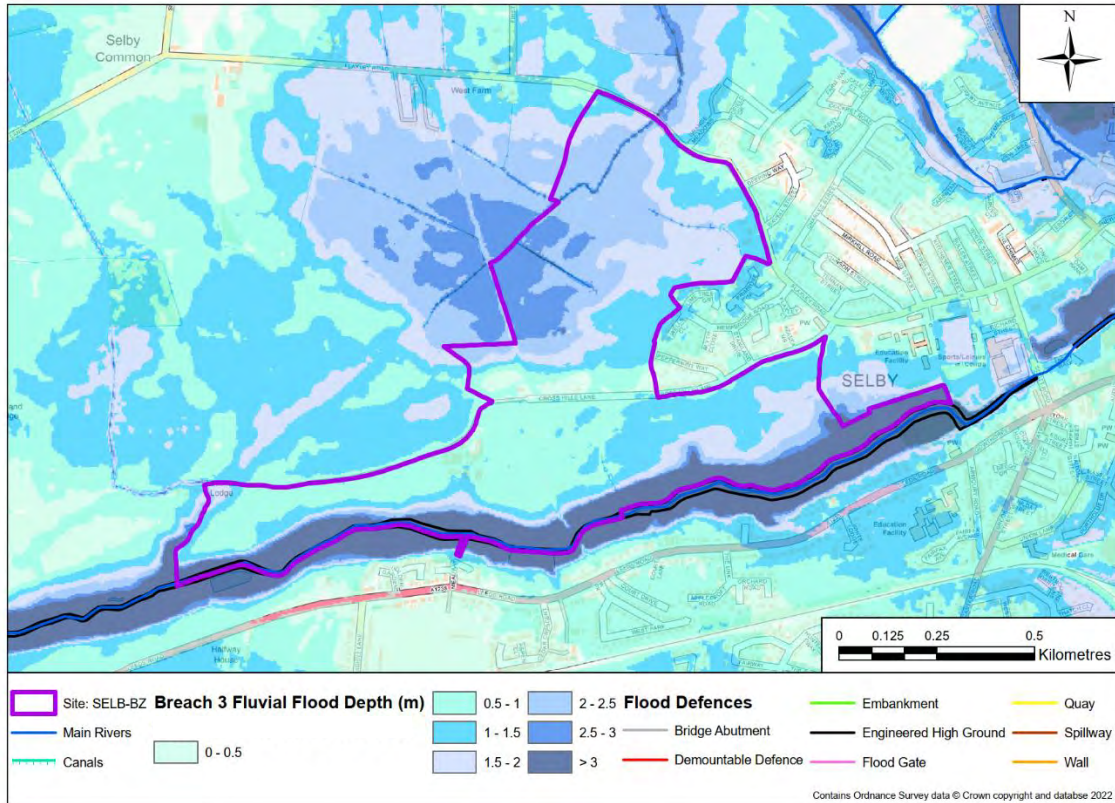


Figure G – Breach of defences (Breach 3) maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

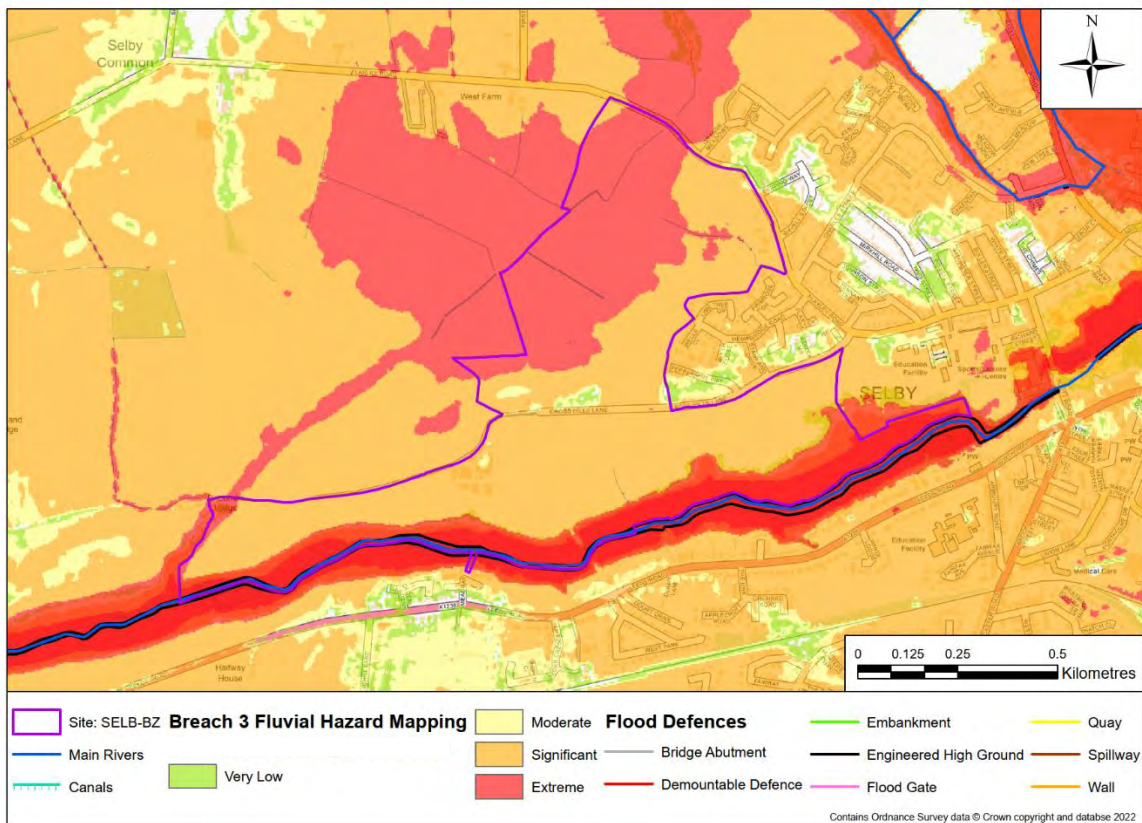


Figure H – Breach of defences (Breach 3) maximum Flood Hazard 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

# SELB-BZ– Land at Cross Hills Lane, Selby

## Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

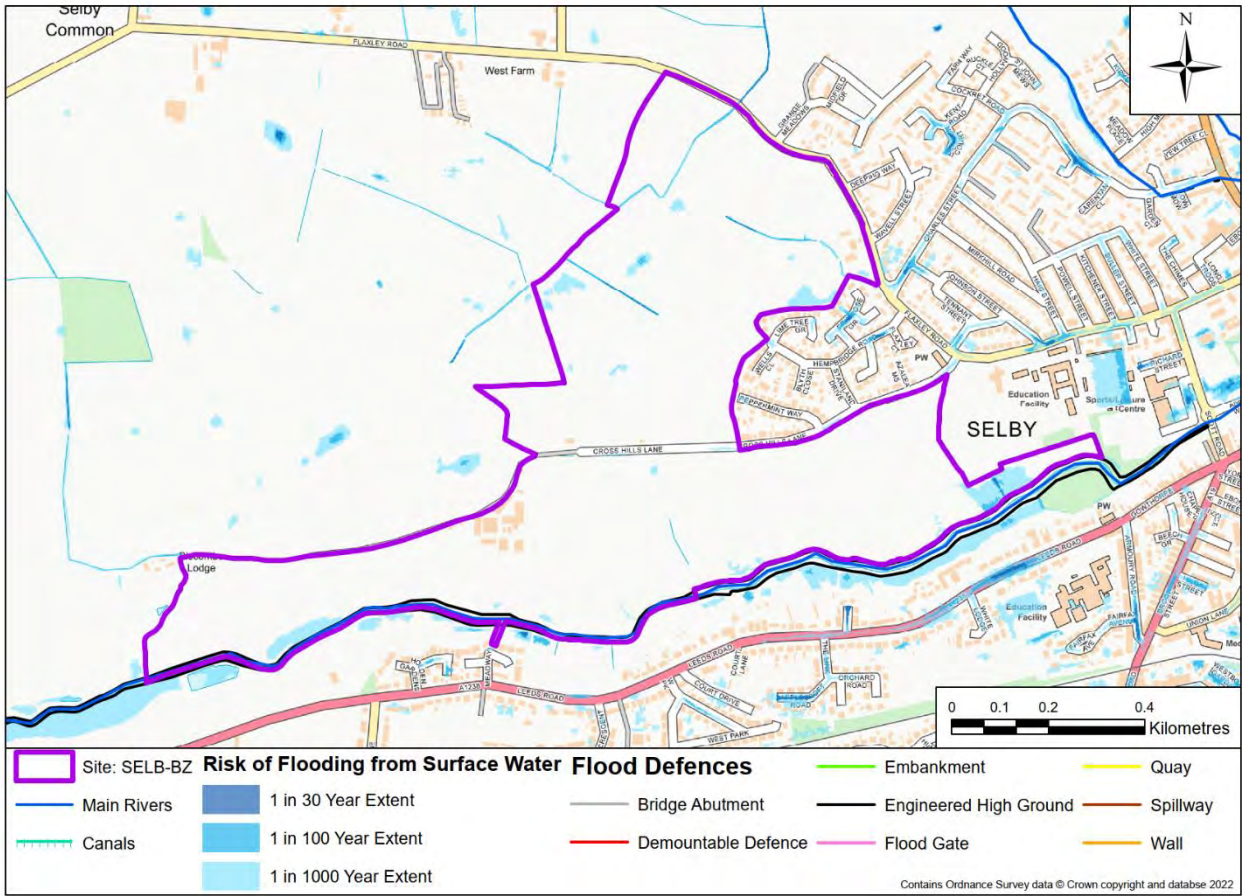


Figure K - Risk of Flooding from Surface Water (RoFSW)

## Groundwater Flooding

Bedrock Geology

Sherwood Sandstone Group - Sandstone

Superficial Geology

Sand, Clay, Peat and Silt

Susceptibility to Groundwater Flooding (BGS)

There is mixed potential for groundwater flooding to occur across the site. The site has predominantly <25% susceptibility but a small portion is classified as 25% - <50%.

## Other Sources

Risk of flooding from reservoirs

The Long-Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir). Most of the Site is at risk when river levels are normal but there are parts of the Site which would only flood in the event of a breach or failure of a reservoir when there is also flooding from rivers.

## SELB-BZ– Land at Cross Hills Lane, Selby

### Summary

The Selby Dam watercourse flows east along the southern edge of the site. The majority of the site (87%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, with a small area (13%) of Flood Zone 2 Medium probability of flooding from rivers or the sea and no Flood Zone 1 Low probability of flooding from rivers or the sea. The site is located in an area shown as benefitting from flood defences and based on analysis of flooding mechanisms the site benefits from Ouse flood defences.

There is high ground along parts of Selby Dam and Cockret Dike (EA Main River) which act as informal flood defences. The high ground is not continuous and does not cover the full length of the watercourses upstream (where they are not classified as EA Main Rivers). Selby Dam flows into the River Ouse via a pumping station which is utilised when the level on the River Ouse is high, the impact of this should be investigated further in the site specific FRA for the site. Cockret Dike flows through the Cawood/ Wistow Reservoir before discharging into the River Ouse. There are flood walls and embankments along the River Ouse which vary in condition from Fair-Good which reduce flood risk to the site. The site specific FRA should consider the multiple flood sources for this site.

Modelling shows that the site is at risk of flooding from the fluvially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.02m 'Higher Central' SLR scenario, and the fluvially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR scenario along Selby Dam. The model results indicate flood depths along Selby Dam are between 0-1m deep and the majority of the site not flooded in the fluvial dominant flood events. Model results show there is no flooding associated with the tidally dominant 0.5% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR event.

The existing flood defences reduce the risk of flooding to Selby, including the site, from fluvial and tidal inundation and therefore the risk of flooding to this site is a residual risk associated with breach of defences. Breach modelling has been completed as part of the SFRA for 5 locations across the LLFA area. The results show that the site is not at risk of flooding if defences breach at location of Breach 1. Breach number 2 is located on the right edge of the meander, upstream of the confluence of Selby Dam with the River Ouse and was modelled as 20m long and remained collapsed and open for 18 hours. The analysis used the Upper Humber model with a 1% AEP climate change event (including a 23% uplift on fluvial flows and 1.02m 'Higher Central' SLR). The results show that site floods along its southern border and the flooding is connected to Selby Dam. Flood depths vary from 0.5m - 2.5m within this corridor. The flood hazard associated with Breach 2 varies across the site from Low ('Very Low') to Extreme ('Danger to all'), the Extreme ('Danger to all') is contained within the Selby Dam corridor. Breach number 3 is located on the right bank of the Ouse, 400m upstream of the confluence of Selby Dam with the River Ouse. Breach 3 on the right edge of the meander, upstream of the confluence of Selby Dam with the River Ouse and was modelled as 50m long and remained collapsed and open for 30 hours. The analysis used the Upper Humber model with a 1% AEP climate change event (including a 23% uplift on flows and 1.02m 'Higher Central' SLR). The results show that the whole site floods and depths vary from 0.5m - >3m with the deepest flooding concentrated in the south and north west of the site. The flood hazard associated with Breach 3 varies across the site from Significant ('Danger to most) to Extreme ('Danger to all'). Flood levels are approximately 3.0 mAOD across the site for the 1% AEP plus 23% climate change 1.02m 'Higher Central' SLR for the areas along Selby Dam which flood.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site. Most ponding is largely associated with the drains and Selby Dam flowing through the site.

Broadscale mapping identifies that there is mixed potential for groundwater flooding to occur across the site. The site has predominantly <25% susceptibility but a small portion is classified as 25% - <50%.

### Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test can be satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding areas of the site.
- Additional breach modelling should be undertaken as part of a site specific FRA. Or an assessment should be included as to why the existing assessments are sufficient. The EA should be consulted to aid this exercise.
- There is isolated shallow flooding in the southern part of the site (along Selby Dam) for the 1% AEP plus 23% climate change uplift on flows (for both Higher Central and Upper End SLR scenarios) due to the presence of defences varying from 0-1m deep. There is no flooding of the site within the tidally dominant 0.5% AEP plus 23% climate change uplift on flows and 1.38m 'Upper End' SLR scenario. Model results show flooding of parts of the site in Breach 2 scenario, more extensive and deeper flooding in Breach 3. Finished floor levels should be set 300mm above the 1% AEP flood level resulting from a breach of defences including an allowance for climate change. Sleeping accommodation should be set 300mm above the flood level for the 1% AEP breach event including appropriate allowance for climate change. It is unlikely that ground floor sleeping accommodation will be appropriate, even in the sections of the site where there is no risk of flooding for the 1% AEP event including appropriate allowance for climate change.
- The proposed development must not reduce the ability of the floodplain to store water. There is some flooding present on the site for the 1% AEP plus 23% climate change uplift on flows (for both Higher Central and Upper End SLR scenarios). Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.

## SELB-BZ– Land at Cross Hills Lane, Selby

- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an appropriate allowance for climate change.
- Part of the site is located within the Flood Warning Area for River Ouse at Selby Dam and Tidal River Ouse from Naburn Lock to Selby. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. Selby Dam flows through the site and this is a potential discharge point for SuDs.
- All major developments (10 or more dwellings and 100m<sup>2</sup> floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) and the Internal Drainage Board (IDB) upon appointment.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.

## SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

Site ID:	SELB-CA	Area (ha):	60.4
Proposed Use:	Employment	Vulnerability Classification:	Less Vulnerable
Watercourses near the site	River Ouse		

### Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	0%	99%	1%	99%

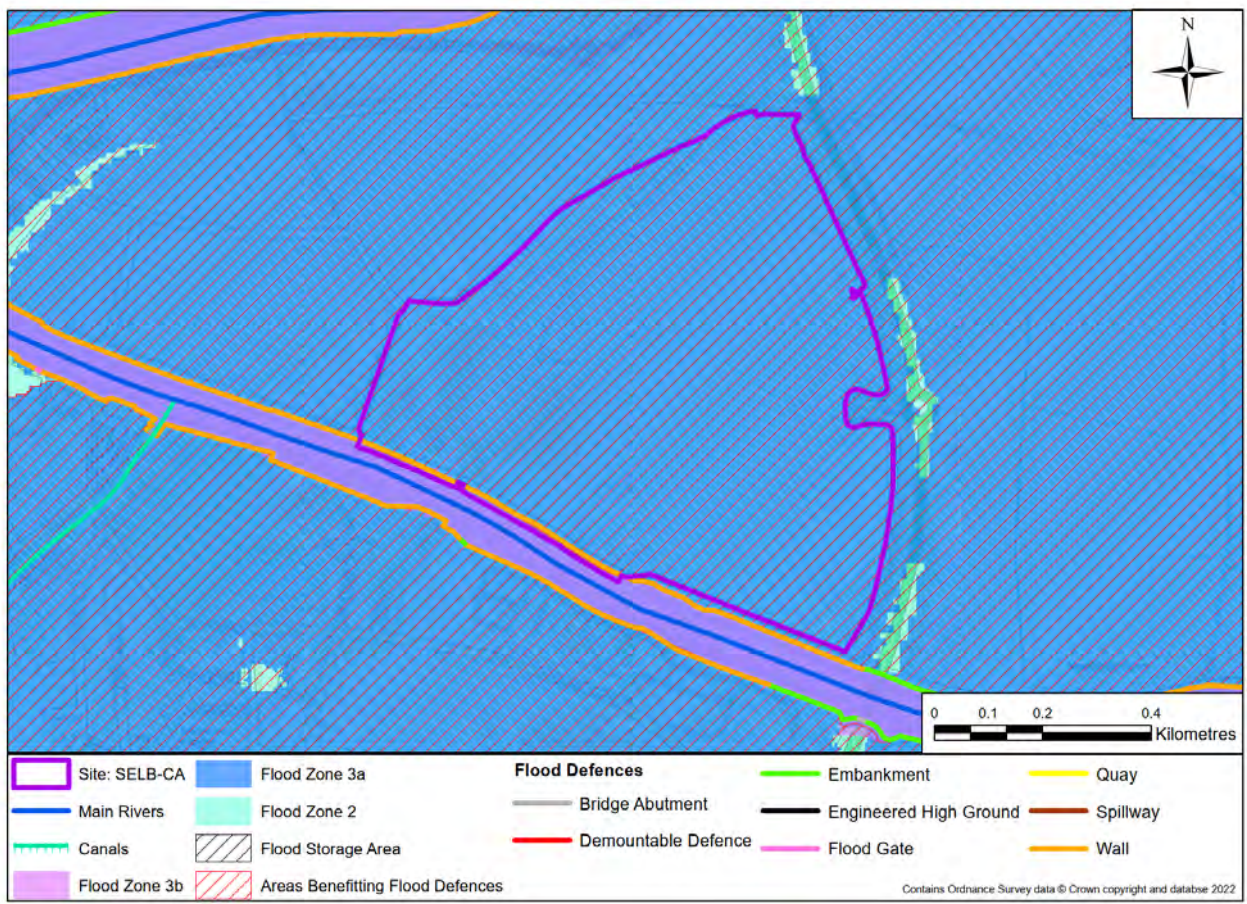


Figure A - Flood Zones

Flood Zones provide an estimate of the areas of land at risk of flooding, when the presence of flood defences are ignored. Areas designated as 'Areas Benefitting from Defences' (ABD) in the event of a fluvial flood with a 1% AEP or a tidal flood with a 0.5% AEP would be protected from flooding by the presence of flood defences. North Yorkshire Council - Selby area includes flood defences and flood storage areas. Further analysis has been undertaken that takes into account the presence of flood defences, shown in Figures below.

Flood Warning Area	The site is covered by River Ouse at Selby and Barlby Flood Warning Area and the Tidal River Ouse from Naburn Lock to Selby Flood Warning Area.
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# SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

## River Flooding

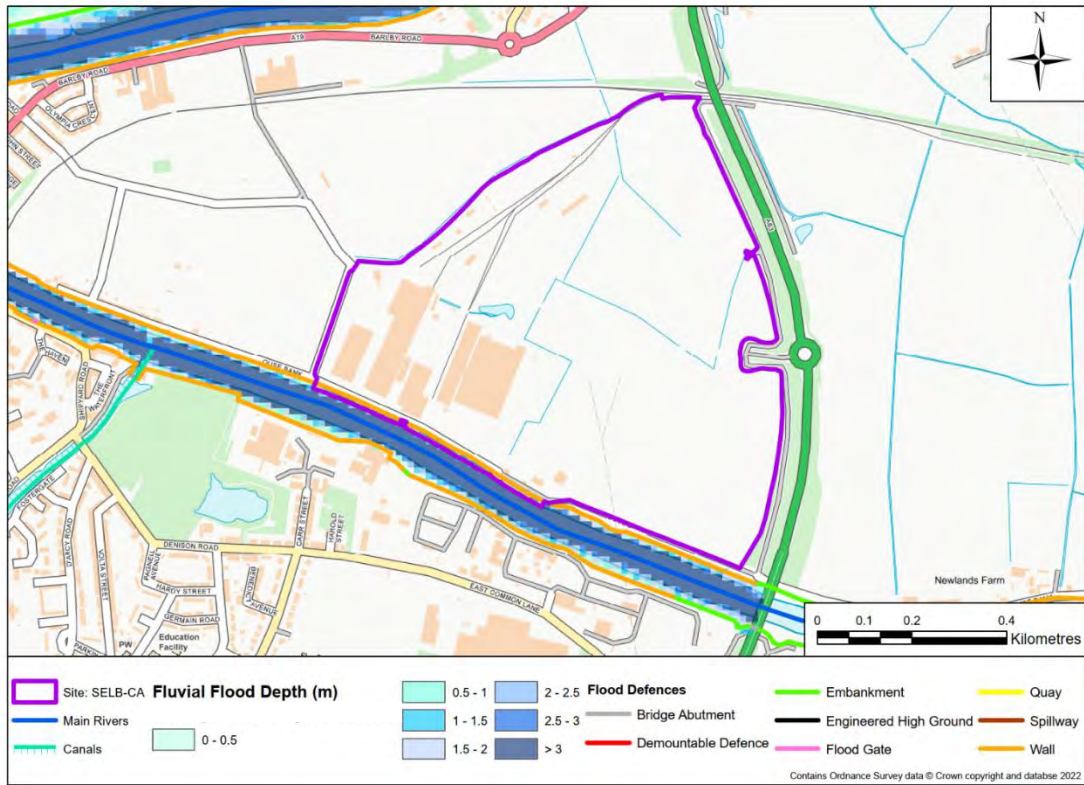


Figure B - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

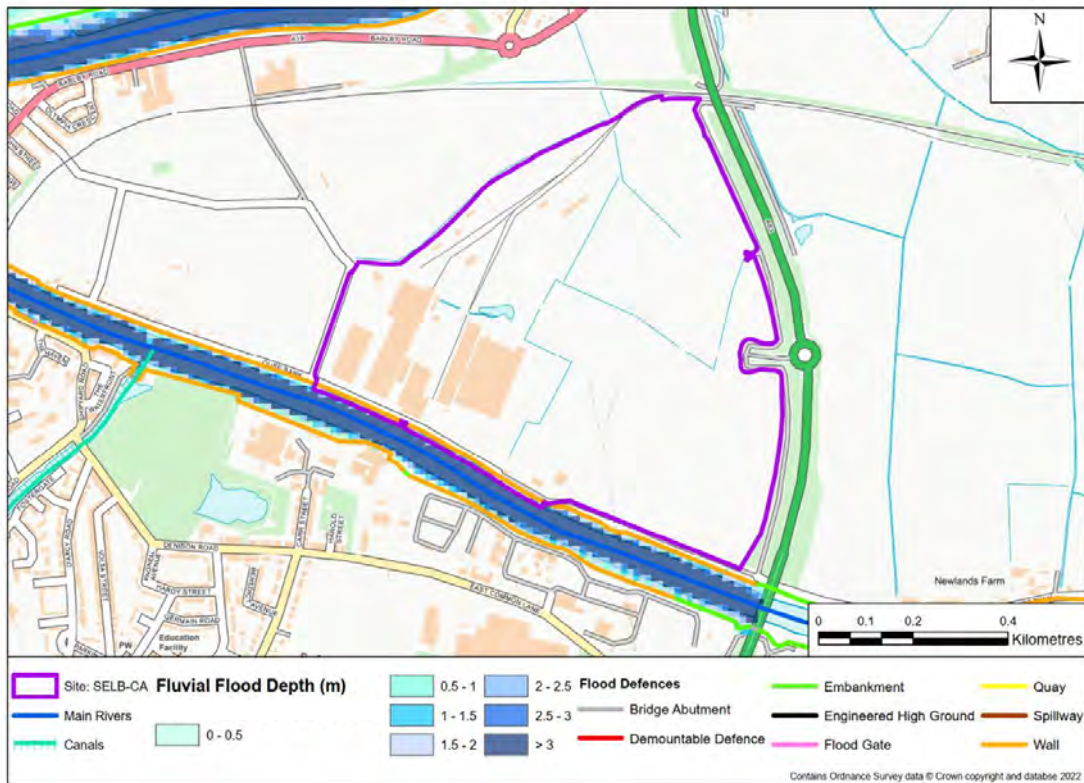


Figure C - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

SELB-CA- Olympia Park, Barlby Road, Barlby, Selby

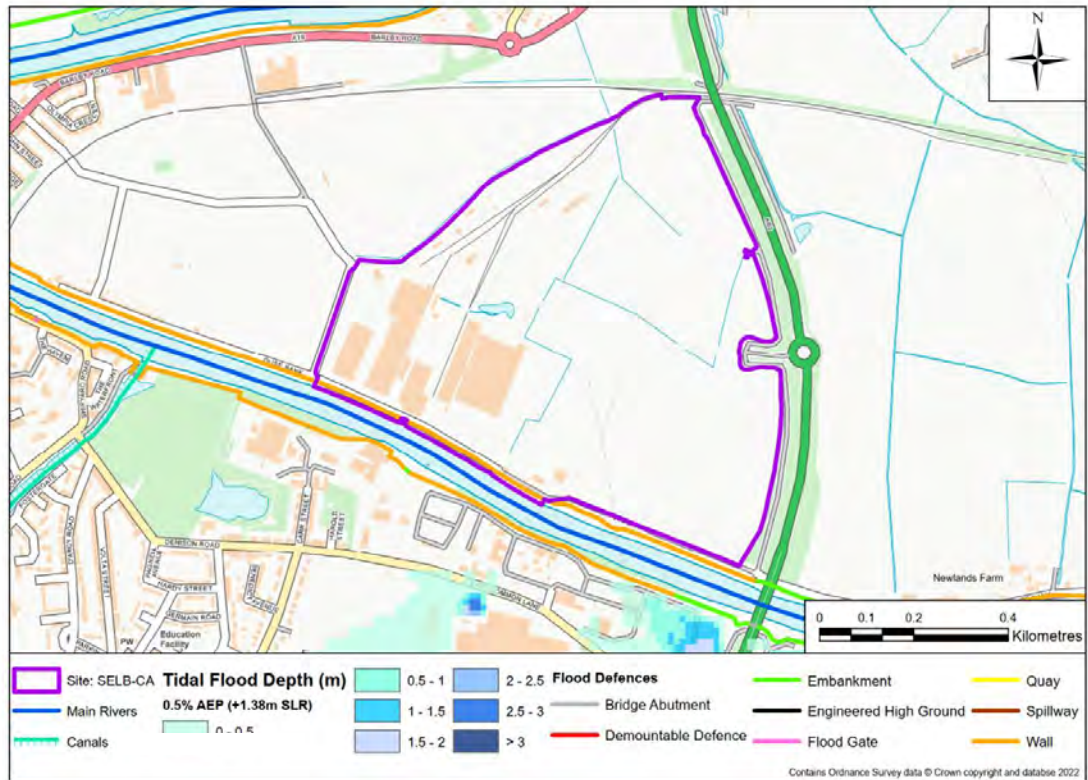


Figure D - Maximum Flood Depth 0.5% AEP tidal dominant event plus 23% climate change uplift on flows with 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

(Figure D represents normal flow within the river and an extreme tidal dominant event. Model results indicate no flooding at the site in this scenario.)

Breach Flooding

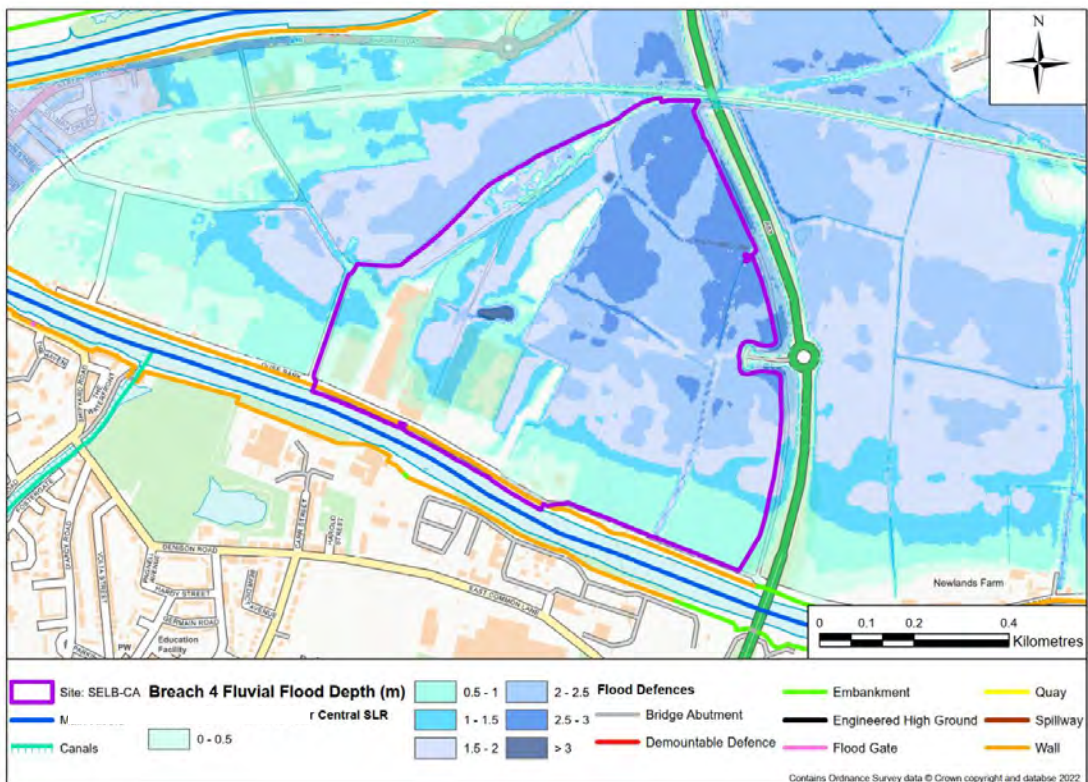


Figure E – Breach of defences (Breach 4) maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

SELB-CA- Olympia Park, Barlby Road, Barlby, Selby

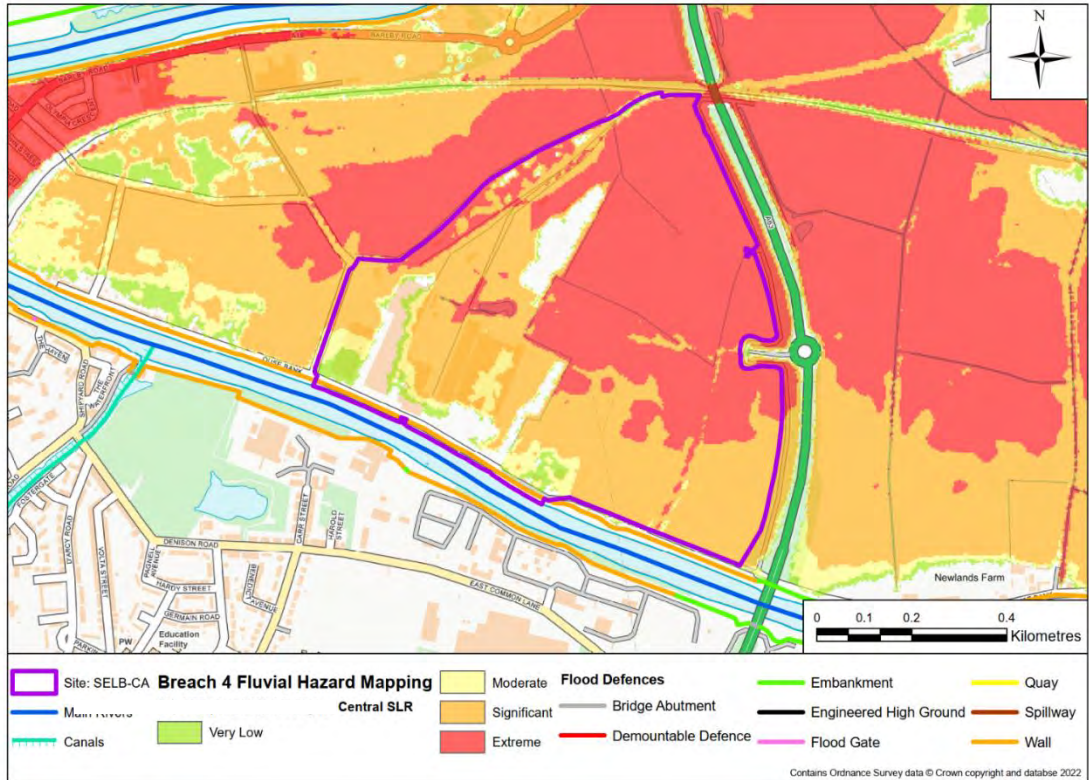


Figure F - Breach of defences (Breach 4) maximum Flood Hazard 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

# SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

## Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

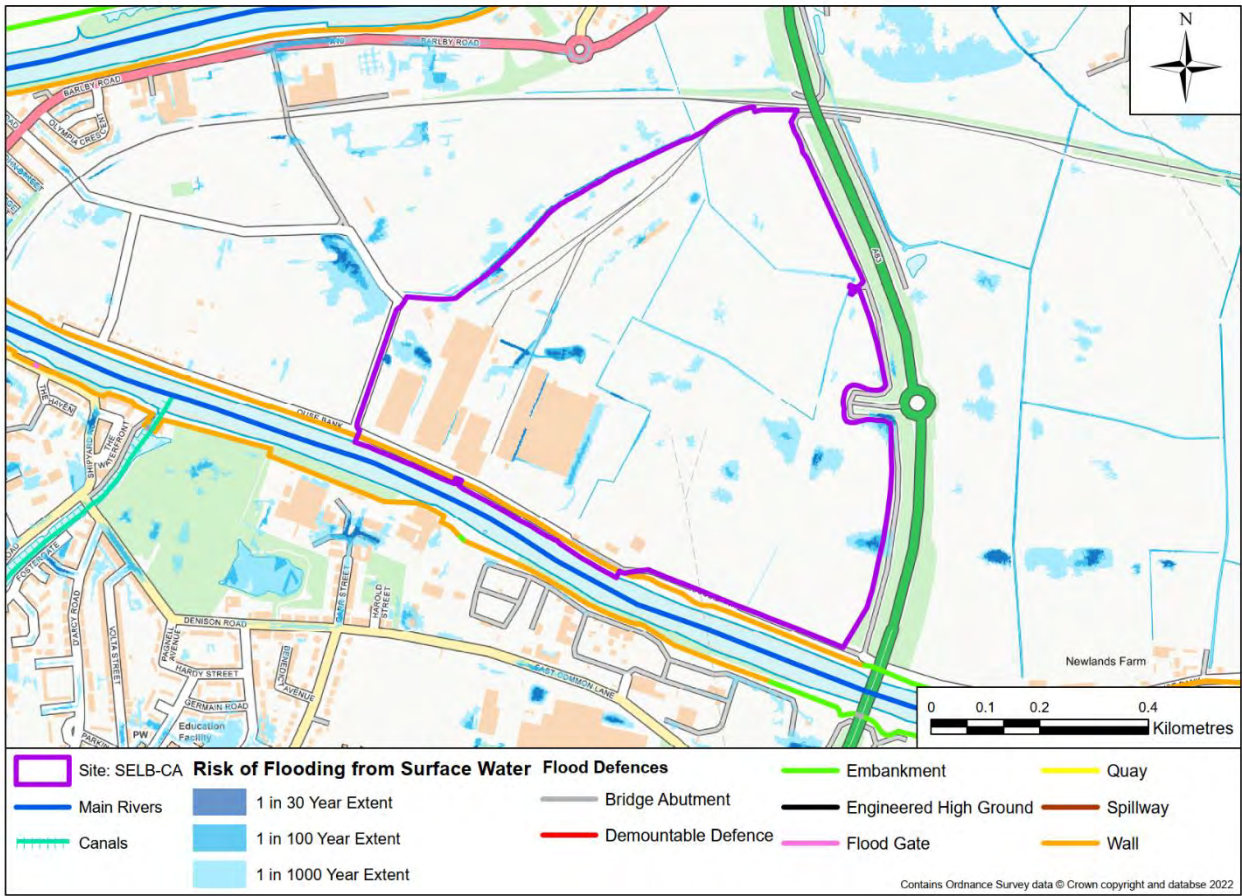


Figure G - Risk of Flooding from Surface Water (RoFSW)

## Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Peat and Silt
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Susceptibility to Groundwater Flooding (BGS)	There is mixed potential for groundwater flooding to occur across the site. The site has predominantly <75% susceptibility but a small portion is classified as 25% - <50%.
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## Other Sources

Risk of flooding from reservoirs	The Long-Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir). Most of the Site is at risk when river levels are normal but there parts of the Site which would only flood in the event of a breach or failure of a reservoir when there is also flooding from rivers.
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## Summary

The majority of the site (99%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea, with a small area (1%) of Flood Zone 3b Functional Floodplain. The majority of the site (99%) is located in an Area Benefiting from Defences.

Flood defences (walls) border the site to the South which protect the site from flooding from the River Ouse. There is still a residual risk of the site flooding, if the walls are overtopped or breached. The walls are classified as being in Fair - Good condition.

Modelling shows that the site is not at risk a flooding from the fluviially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.02m 'Higher Central' SLR scenario, or the fluviially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR scenario. There is also no flooding associated with the tidally dominant 0.5% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR event.

## SELB-CA– Olympia Park, Barlby Road, Barlby, Selby

The existing flood defences reduce the risk of fluvial and tidal flooding to areas of Selby, including the site. Therefore the risk of flooding to this site is a residual risk, only if the defences fail (breach). Breach modelling has been completed as part of the SFRA for 5 locations across the LLFA area. Breach number 4 is located on the left bank of the meander of the Ouse in Selby between the A19 road bridge and rail bridge. It was modelled as 20m long and remained collapsed and open for 18 hours. The analysis used the Upper Humber model with a 1% AEP event (including a 23% uplift on flows and 1.02m 'Higher Central' SLR). The results show that most of the site floods to a depth of between 0 and 3m with the deepest flood depths in the north eastern corner of the site. The flood hazard varies across the Site from Significant ('Danger to Most) to Extreme ('Danger to All'). Flood levels are 6.0 mAOD in the southern corner of the site, which borders the River Ouse across the site for the 1% AEP plus 23% climate change uplift on flows and 1.02m 'Higher Central' SLR.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site and is largely associated with drains flowing through the site.

Broadscale mapping identifies that there is mixed potential for groundwater flooding to occur across the site. The site has predominantly <75% susceptibility but a small portion is classified as 25% - <50%.

### Site Specific Recommendations

The proposed use for the site includes employment which is defined as Less Vulnerable. These sites have been considered due to the interest in developing these sites to provide additional information for developers.

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site. Infrastructure should be sequentially placed in areas of lower flood water depth and should be preferably placed in the centre of the site, on the highest ground.
- Additional breach modelling could be undertaken as part of a site specific FRA. Or an assessment should be included as to why the existing assessments are sufficient. The EA should be consulted to aid this exercise.
- Finished floor levels should be set 300mm above the River Ouse 1% AEP flood level resulting from a breach of defences including an appropriate allowance for climate change (to be discussed with the Environment Agency upon appointment to confirm if the Climate Change uplifts used in this report are appropriate). There is low risk of flooding in the 1% AEP plus 23% climate change uplift on flows (for both Higher Central and Upper End SLR scenarios) due to the presence of defences, therefore site levels should be based upon those from a breach assessment (as discussed above).
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby and the Tidal River Ouse from Naburn Lock to Selby Flood Warning Area. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The River Ouse is within close proximity to the site and it could be used as a potential discharge point.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.
- All major developments (10 or more dwellings and 100m<sup>2</sup> floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.
- Developments are not appropriate within the functional floodplain 3b unless it is water compatible.

## SELB-CR– Former Ousegate Maltings, Selby

Site ID:	SELB-CR	Area (ha):	0.4
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Ouse, Selby Canal		

### Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	55%	45%	0%	45%

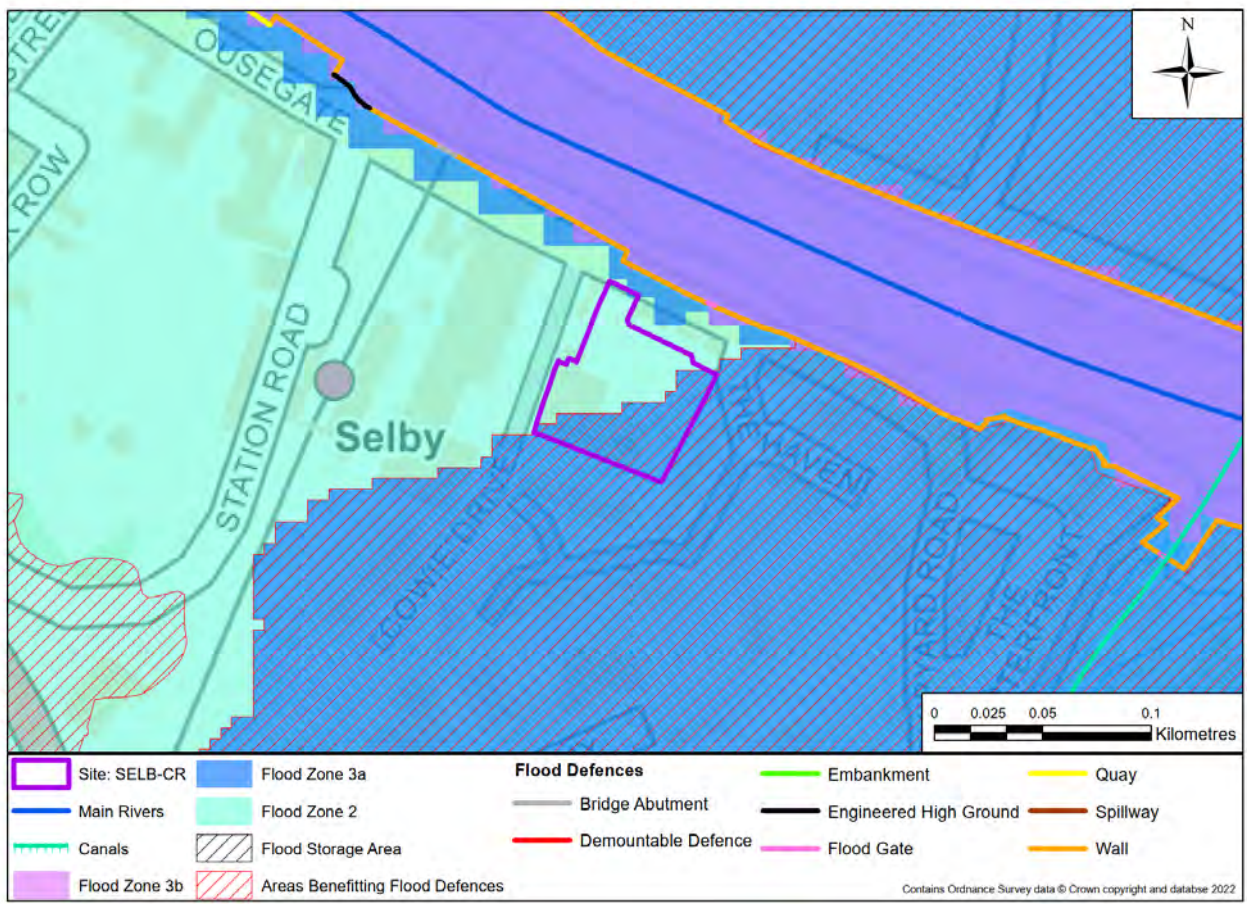


Figure A - Flood Zones

Flood Zones provide an estimate of the areas of land at risk of flooding, when the presence of flood defences are ignored. Areas designated as 'Areas Benefitting from Defences' (ABD) in the event of a fluvial flood with a 1% AEP or a tidal flood with a 0.5% AEP would be protected from flooding by the presence of flood defences. North Yorkshire Council - Selby area includes flood defences and flood storage areas. Further analysis has been undertaken that takes into account the presence of flood defences, shown in Figures below.

Flood Warning Area	The site is covered by River Ouse at Selby and Barlby Flood Warning Area and the Tidal River Ouse from Naburn Lock to Selby Flood Warning Area.
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# SELB-CR- Former Ousegate Maltings, Selby

## River Flooding

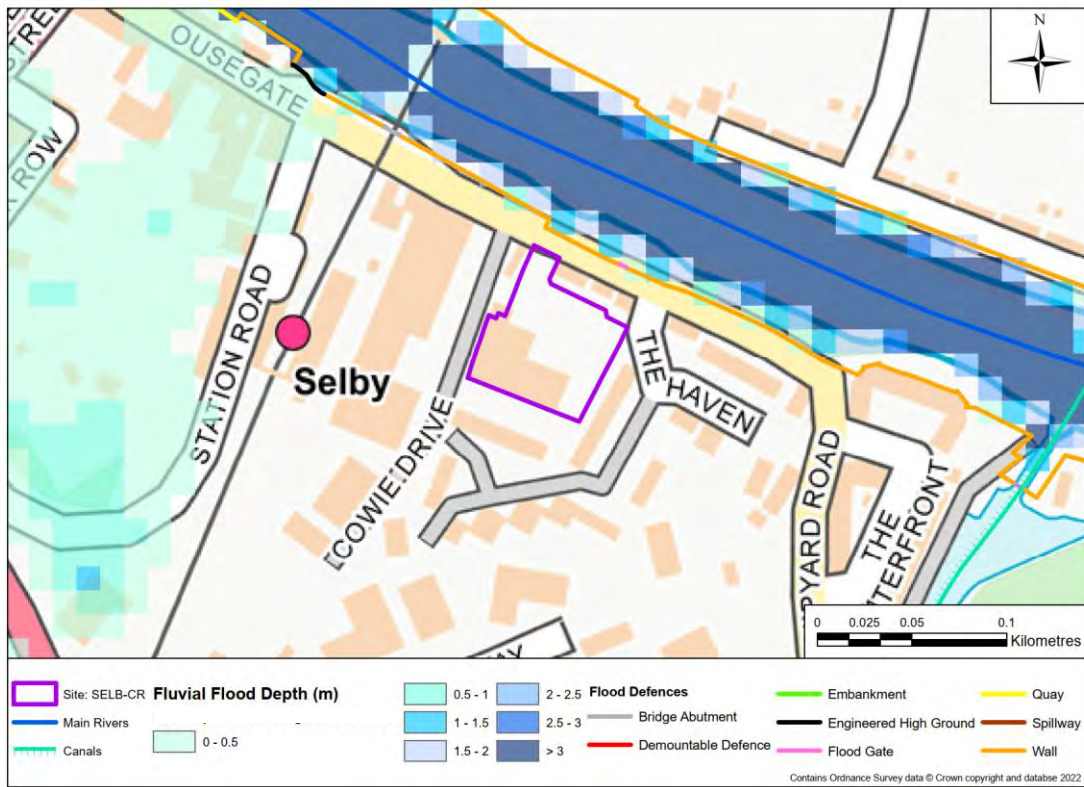


Figure B - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

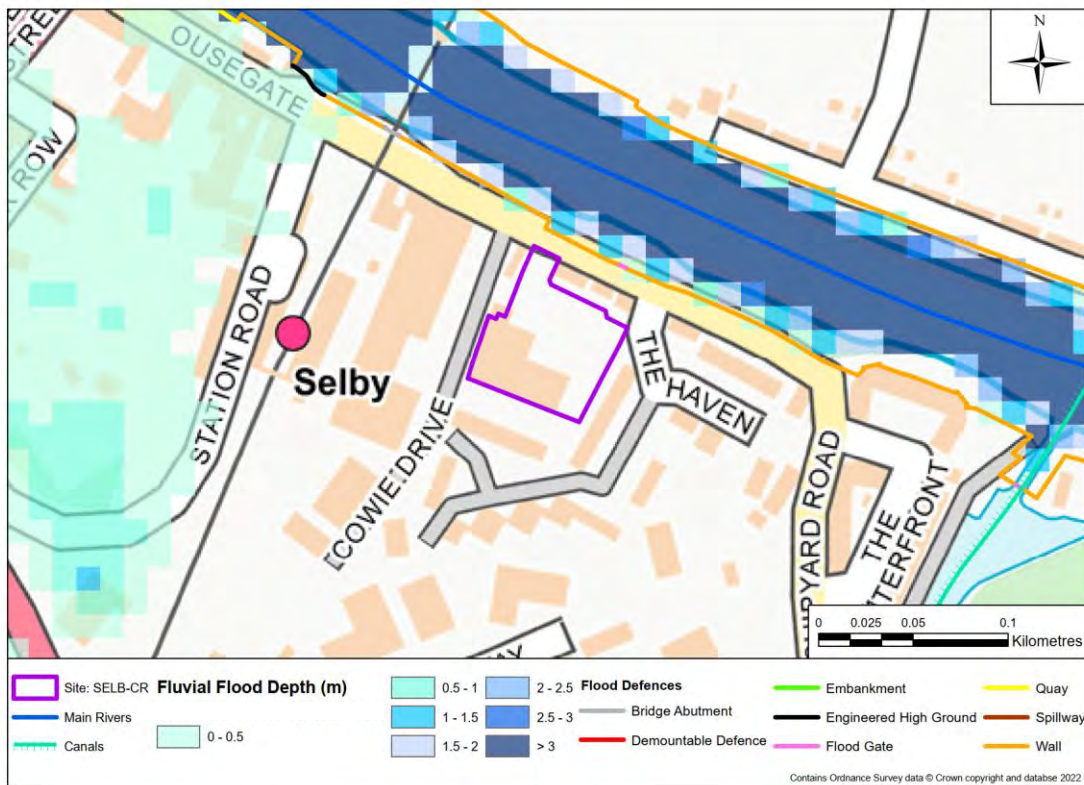


Figure C - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.38m 'Upper End' Sea Level Rise, taking account of flood defences

SELB-CR- Former Ousegate Maltings, Selby

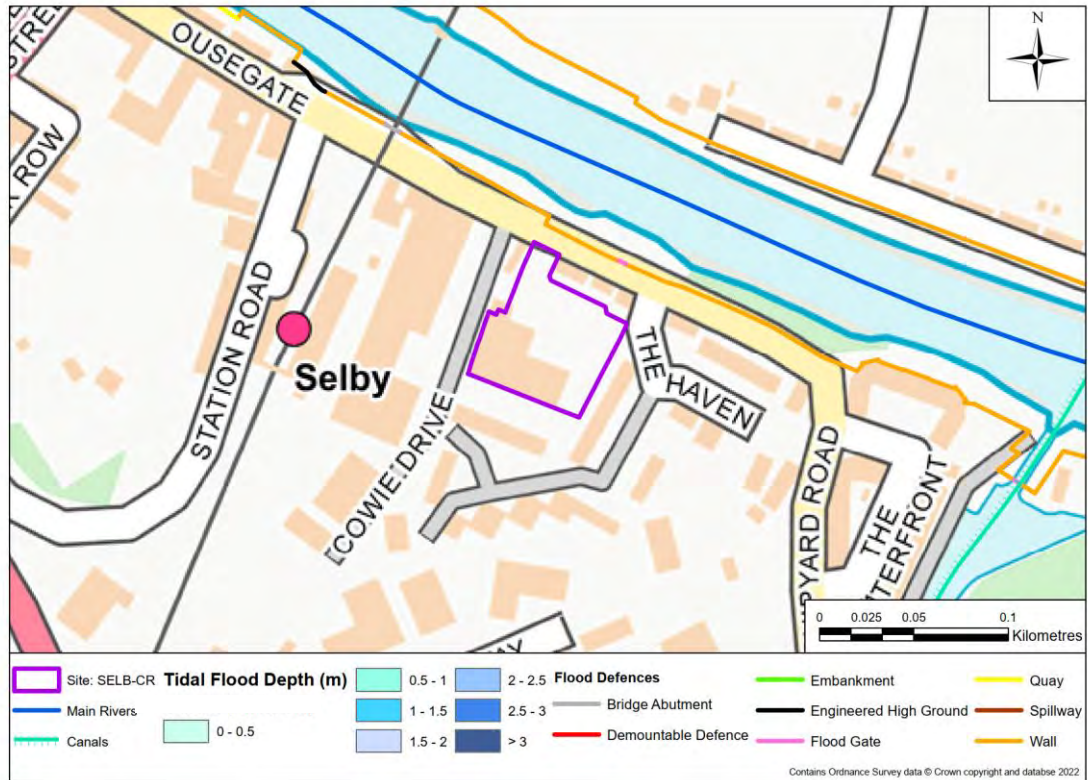


Figure D - Maximum Flood Depth 0.5% AEP tidal dominant event plus 23% climate change uplift on flows with 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

(Figure D represents normal flow within the river and an extreme tidal dominant event. Model results indicate no flooding at the site in this scenario.)



# SELB-CR– Former Ousegate Maltings, Selby

## Breach Flooding

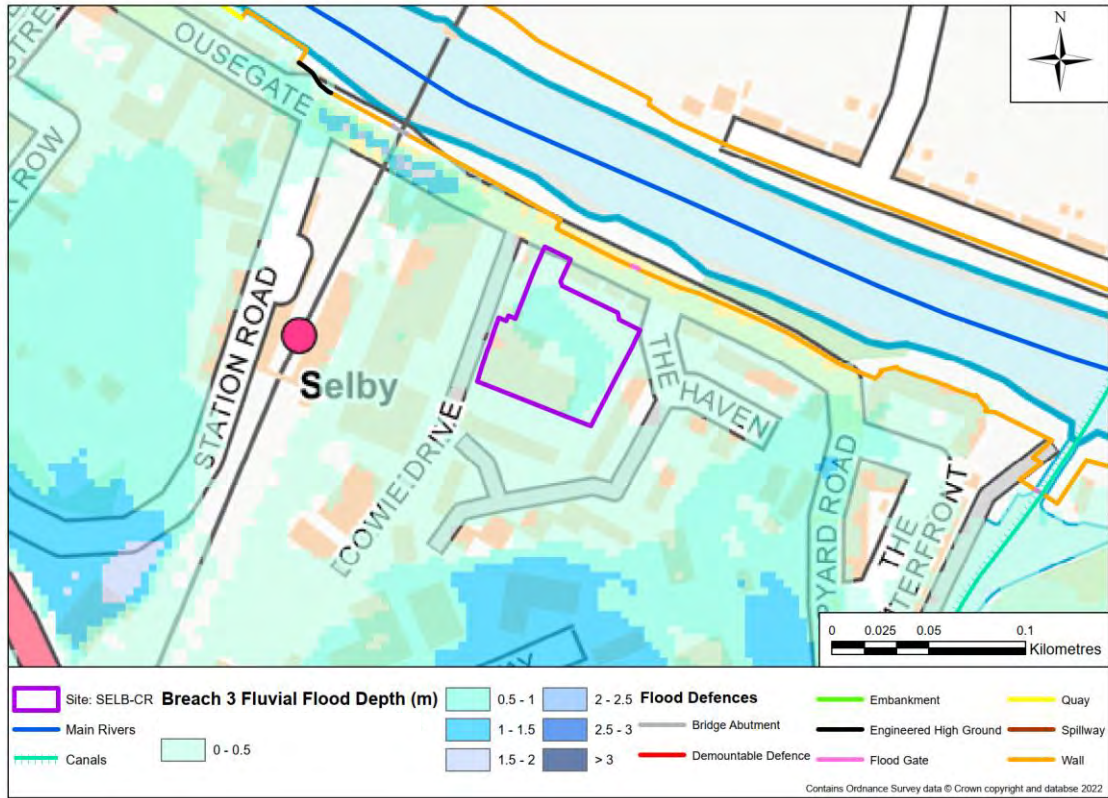


Figure E – Breach of defences (Breach 3) maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

SELB-CR- Former Ousegate Maltings, Selby

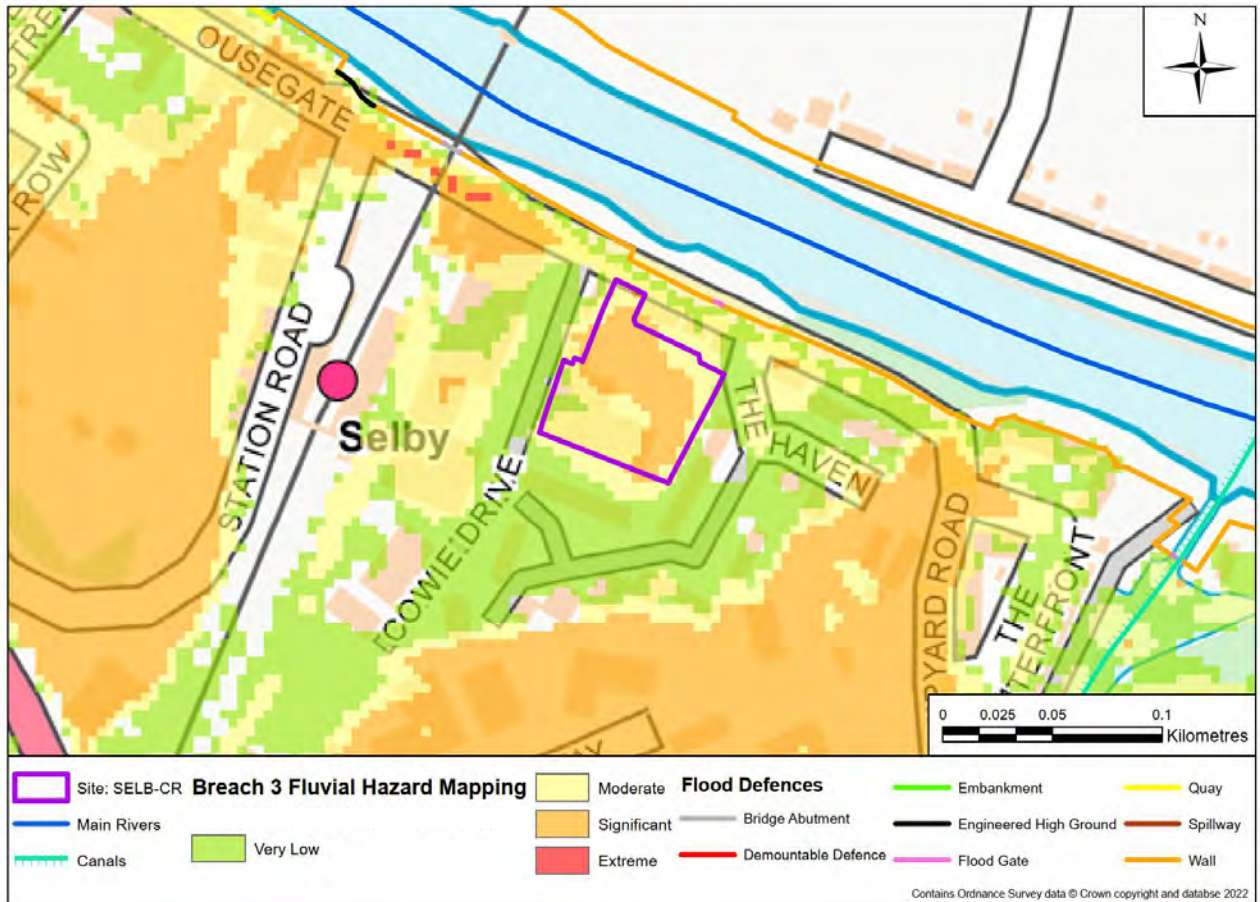


Figure F - Breach of defences (Breach 3) maximum Flood Hazard 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

# SELB-CR– Former Ousegate Maltings, Selby

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

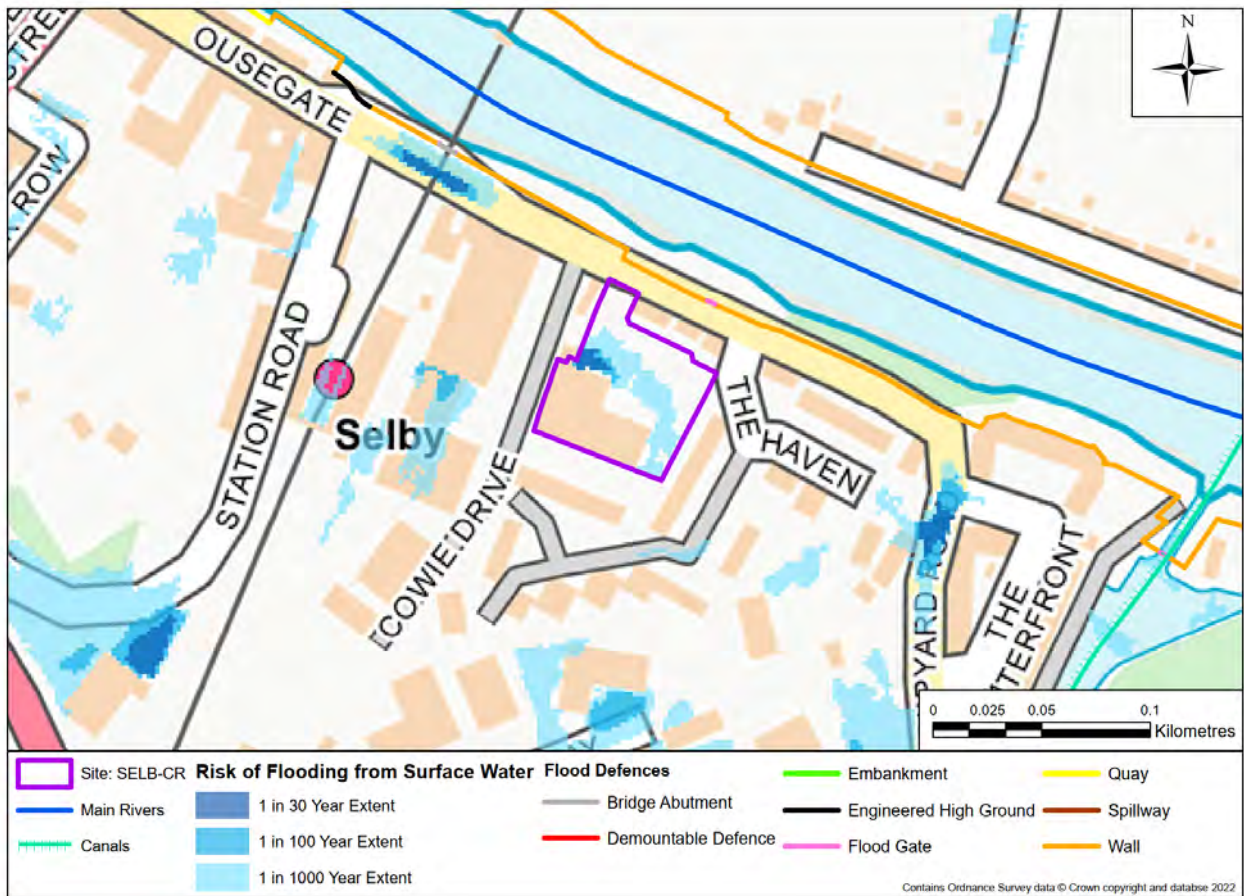


Figure G - Risk of Flooding from Surface Water (RoFSW)

## Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Peat and Silt
Susceptibility to Groundwater Flooding (BGS)		There is mixed potential for groundwater flooding to occur across the site ranging from 25% to 50%	

## Other Sources

Risk of flooding from reservoirs	The Long-Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir). Most of the site would only flood in the event of a breach or failure of a reservoir when there is also flooding from rivers but parts of the site are at risk when river levels are normal.
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## Summary

The River Ouse flows eastwards along the northern border of the site. Selby Canal is approximately 200m to the east of the site. Most of the site (55%) is defined as Flood Zone 2 Medium probability of flooding from rivers or sea and the rest of the site (45%) is defined as Flood Zone 3a High probability of flooding from rivers or the sea. Approximately half of the site (45%) is in an Area Benefiting from Defences. This is due to the presence of defences along the River Ouse and the flood gate on Selby Canal that protect the site.

The flood defences along the River Ouse are classified as being in Fair- Good condition within closest proximity of the site. The defences consist of a series of flood walls and some flood gates connected to the River Ouse and Selby Canal. There is a floodgate which opens on to Selby Canal and there is residual risk of flooding from the Canal itself. The defences reduce the risk of the site flooding, but there is still a residual risk of the site flooding if the defences were to be breached or the defences overtopped.

Modelling shows that the site is not at risk of flooding from the fluviually dominant 1% AEP plus 23% Climate Change uplift on flows and 1.02m 'Higher Central' SLR scenario, or the fluviually dominant 1% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR scenario. There

## SELB-CR– Former Ousegate Maltings, Selby

is also no flooding to the site associated with the tidally dominant 0.5% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR event.

The existing flood defences reduce fluvial and tidal flood risk in areas of Selby, including the site, therefore the risk of flooding to this site is a residual risk if the defences breach. Breach modelling has been completed as part of the SFRA for 5 locations across the LLFA area. Breach number 2 is located on the right edge of the meander, upstream of the confluence of Selby Dam with the River Ouse. Breach 2 analysis show that there is no flooding across the site associated with this breach. Breach number 3 is located on the right bank of the Ouse, 400m upstream of the confluence of Selby Dam with the River Ouse. Breach 3 on the right edge of the meander, upstream of the confluence of Selby Dam with the River Ouse and was modelled as 50m long and remained collapsed and open for 30 hours. The analysis used the Upper Humber model with a 1% AEP event (including a climate change 23% uplift on flows and 1.02m 'Higher Central' SLR). The results from this assessment show that the whole site floods and depths vary from 0.5m - 1m with the deepest flooding concentrated in the south and northwest of the site. The flood hazard associated with Breach 3 varies across the site from Moderate ('Danger to some') to Significant ('Danger to most') across the site.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site and ponds within the centre of the site.

Broadscale mapping identifies that there is mixed potential for groundwater flooding to occur across the site. The site has 25% - <50% associated susceptibility.

### Site Specific Recommendations

The proposed use for the site includes residential which is defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test can be satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site. Infrastructure should be sequentially placed in areas of lower flood water depth.
- Additional breach modelling should be undertaken as part of a site specific FRA. Or an assessment should be included as to why the existing assessments are sufficient. The EA should be consulted to aid this exercise.
- Finished floor levels should be set 300mm above the River Ouse 1% AEP flood level resulting from a breach of defences including an appropriate allowance for climate change. Modelling results indicate that no flooding occurs in the 1% AEP plus 23% climate change uplift on flows (for both Higher Central and Upper End SLR scenarios) or the tidally dominant 0.5% AEP plus 23% climate change uplift on flows with a 1.38m 'Upper End' SLR due to the presence of defences, therefore site levels should be based upon those from a breach assessment (as discussed above).
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby and the Tidal River Ouse from Naburn Lock to Selby Flood Warning Area. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The River Ouse is within close proximity to the site and it could be used as a potential discharge point.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.
- All major developments (10 or more dwellings and 100m<sup>2</sup> floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.
- Developments are not appropriate within the functional floodplain 3b unless it is water compatible.

## SELB-CT – Land south of Coupland Mews, Selby

Site ID:	SELB-CT	Area (ha):	0.2
Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Watercourses near the site	River Ouse, Cockret Dike, Selby Dam		

### Area of site within each Flood Zones and associated mapping

Flood Zone 1 (<0.1% AEP):	Flood Zone 2 (0.1% AEP):	Flood Zone 3a (1% AEP):	Flood Zone 3b (5% AEP):	Area Benefiting from Defences:
0%	1%	99%	0%	100%

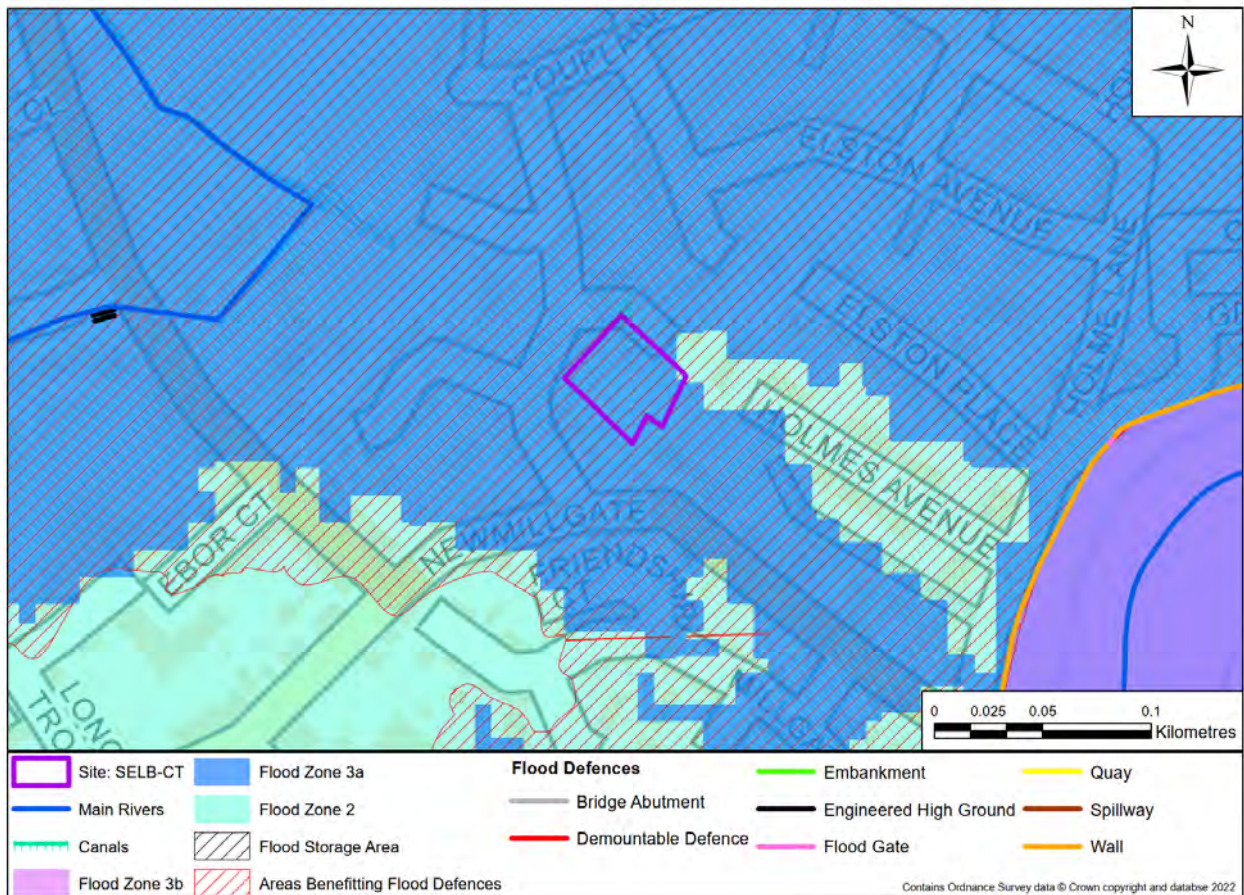


Figure A - Flood Zones

Flood Zones provide an estimate of the areas of land at risk of flooding, when the presence of flood defences are ignored. Areas designated as 'Areas Benefitting from Defences' (ABD) in the event of a fluvial flood with a 1% AEP or a tidal flood with a 0.5% AEP would be protected from flooding by the presence of flood defences. North Yorkshire Council - Selby area includes flood defences and flood storage areas. Further analysis has been undertaken that takes into account the presence of flood defences, shown in Figures below.

Flood Warning Area	The site is covered by River Ouse at Selby and Barlby Flood Warning Area and the Tidal River Ouse from Naburn Lock to Selby Flood Warning Area.
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# SELB-CT– Land south of Coupland Mews, Selby

## River Flooding

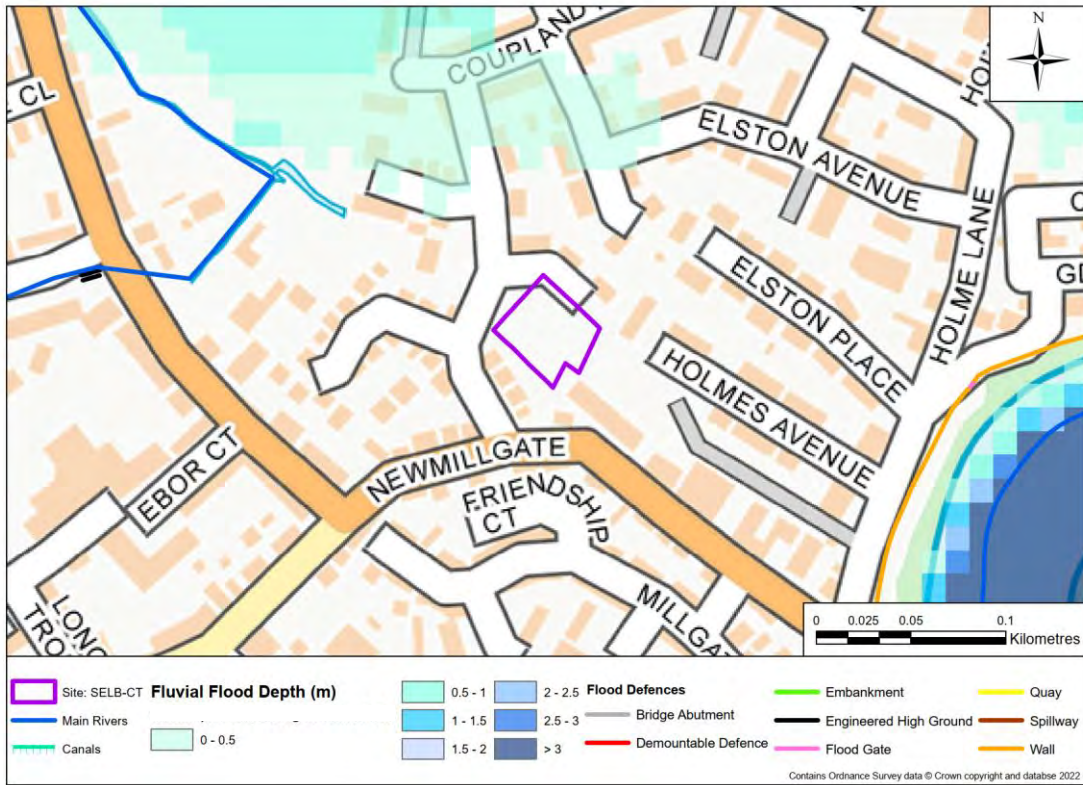


Figure B - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

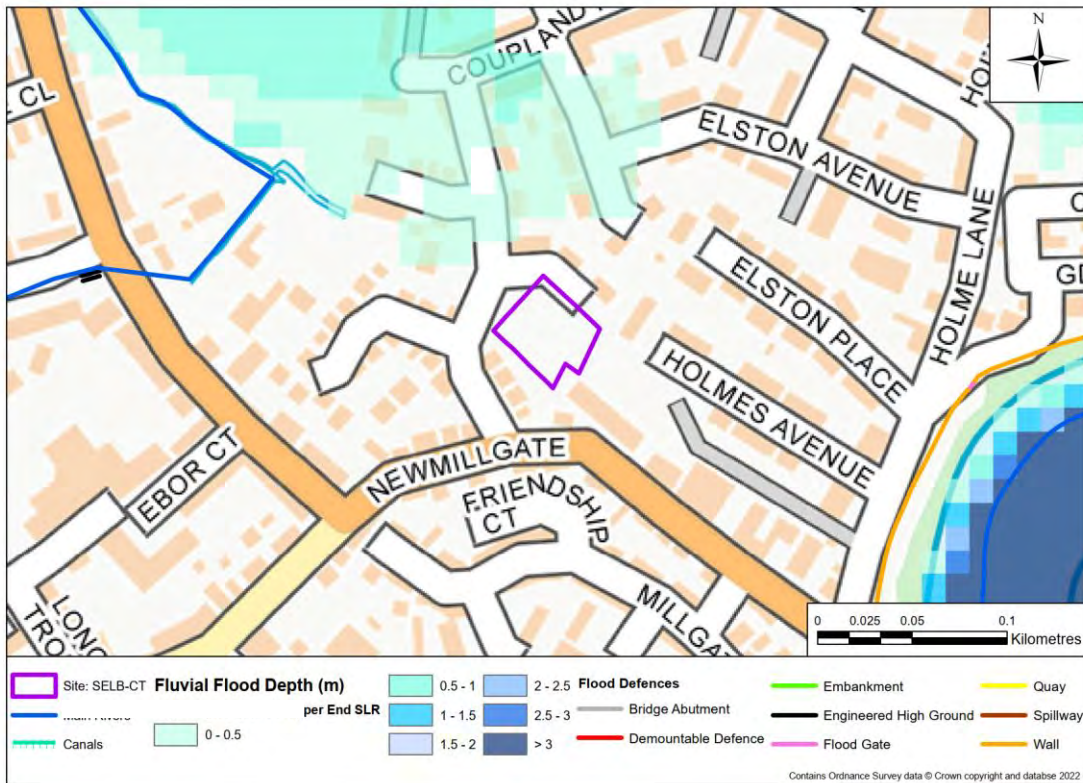


Figure C - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

SELB-CT– Land south of Coupland Mews, Selby

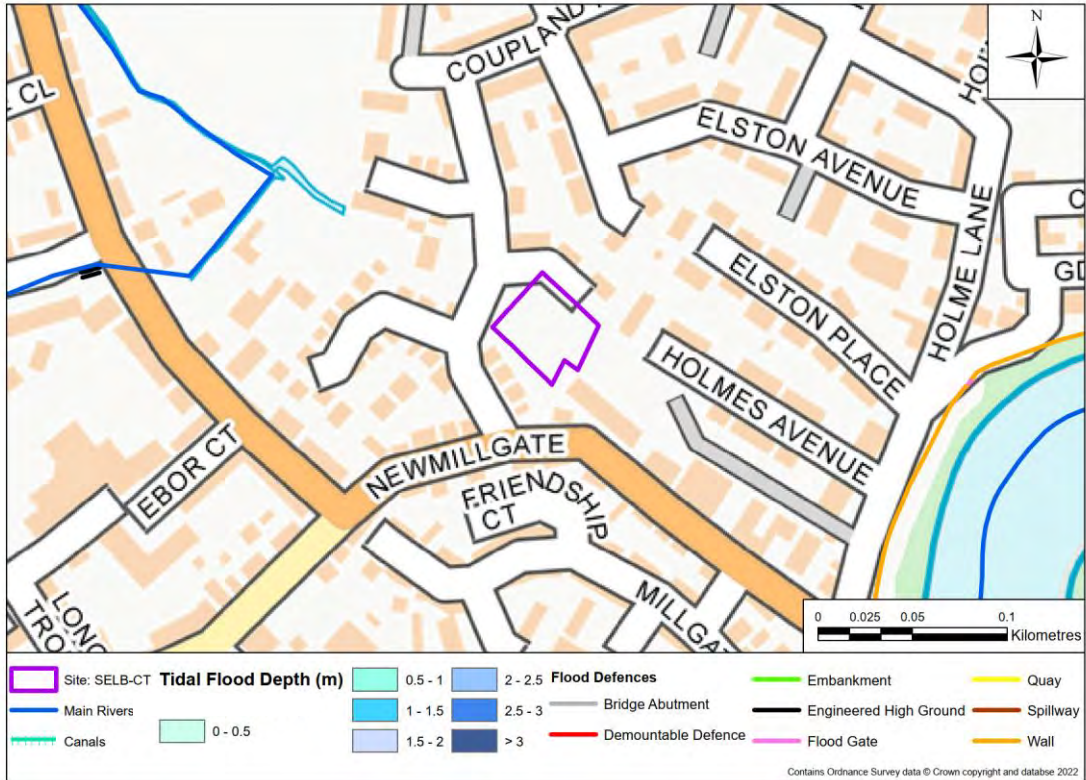


Figure D - Maximum Flood Depth 0.5% AEP tidal dominant event plus 23% climate change uplift on flows with 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

(Figure D represents normal flow within the river and an extreme tidal dominant event. Model results indicate no flooding at the site in this scenario.)

Breach Flooding

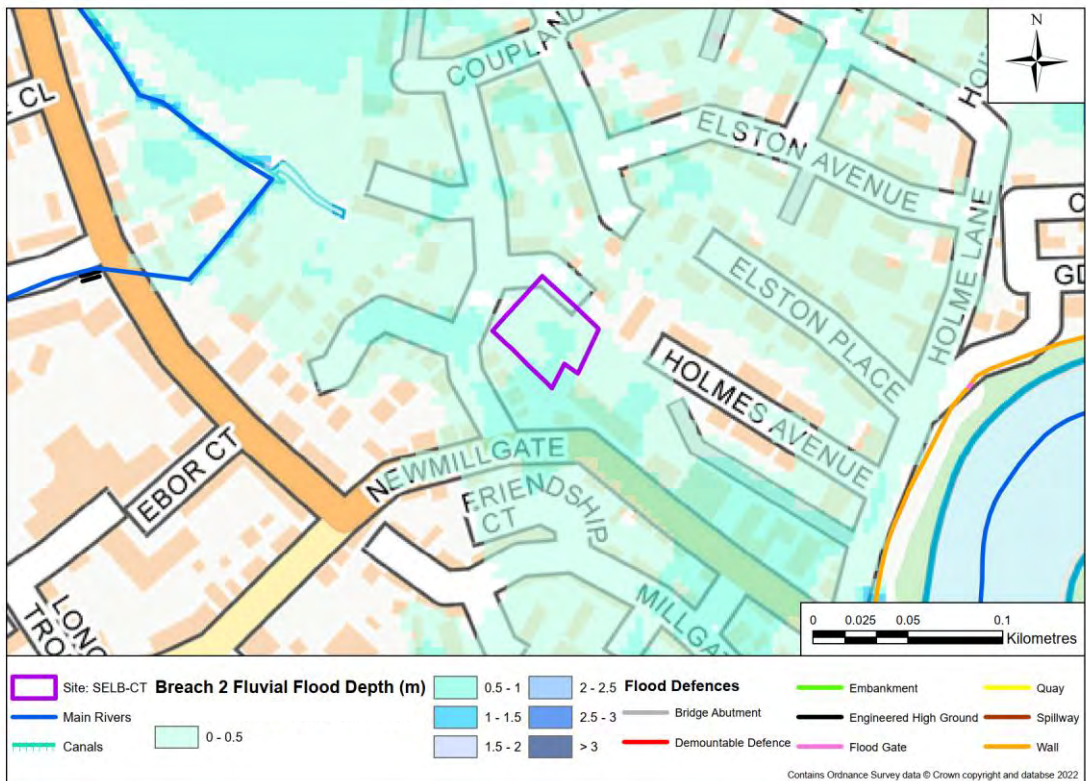


Figure E – Breach of defences (Breach 2) maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

SELB-CT– Land south of Coupland Mews, Selby

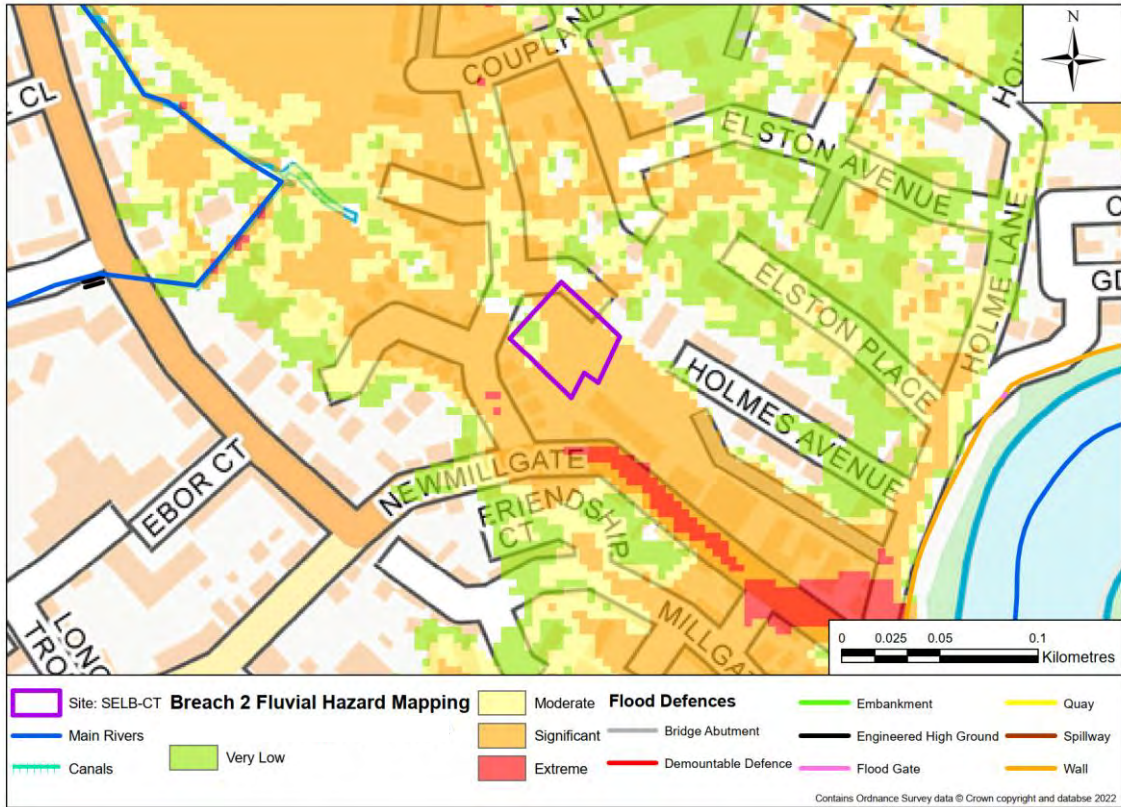


Figure F - Breach of defences (Breach 2) maximum Flood Hazard 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

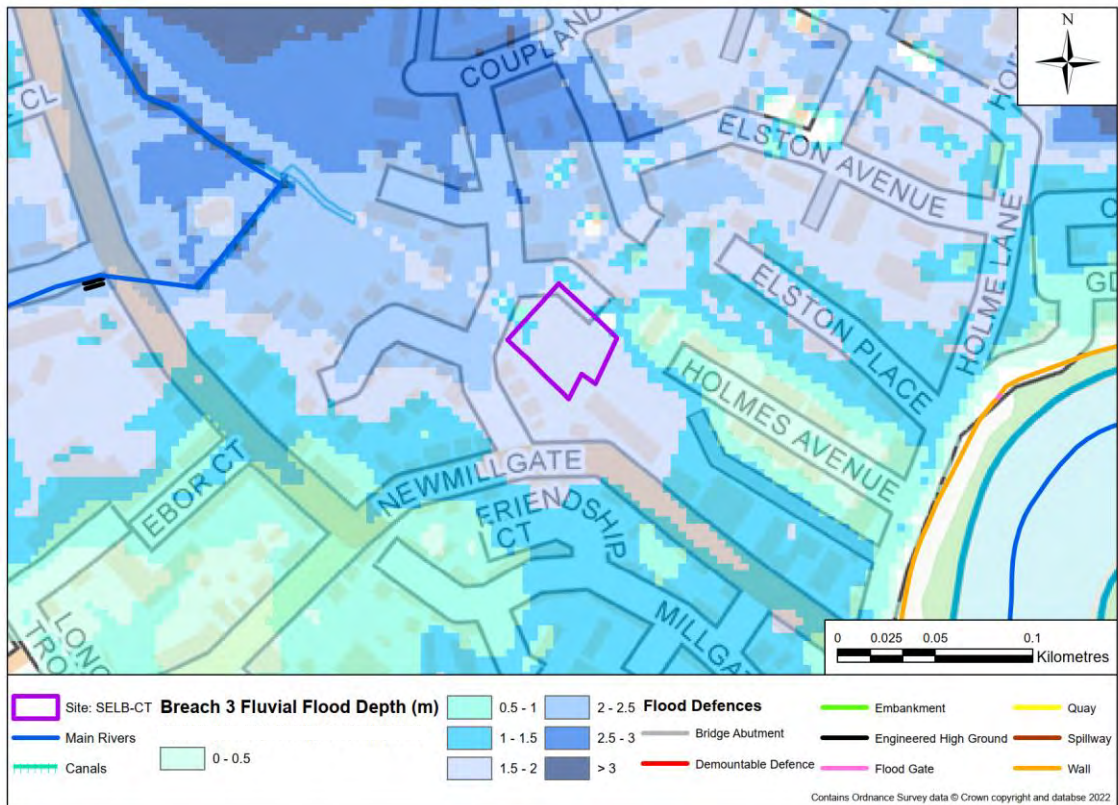


Figure G – Breach of defences (Breach 3) maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences



SELB-CT– Land south of Coupland Mews, Selby

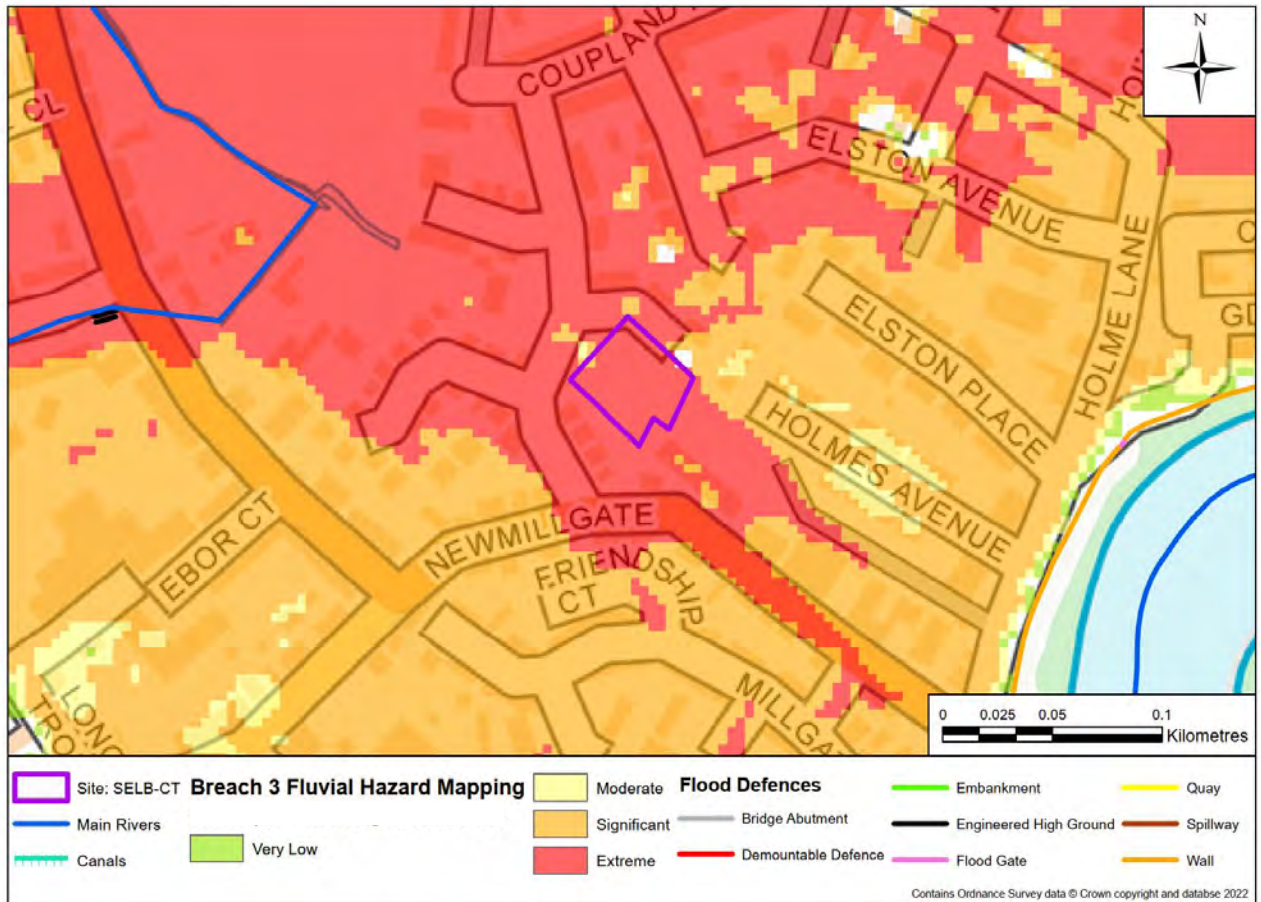


Figure H - Breach of defences (Breach 3) maximum Flood Hazard 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

# SELB-CT– Land south of Coupland Mews, Selby

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

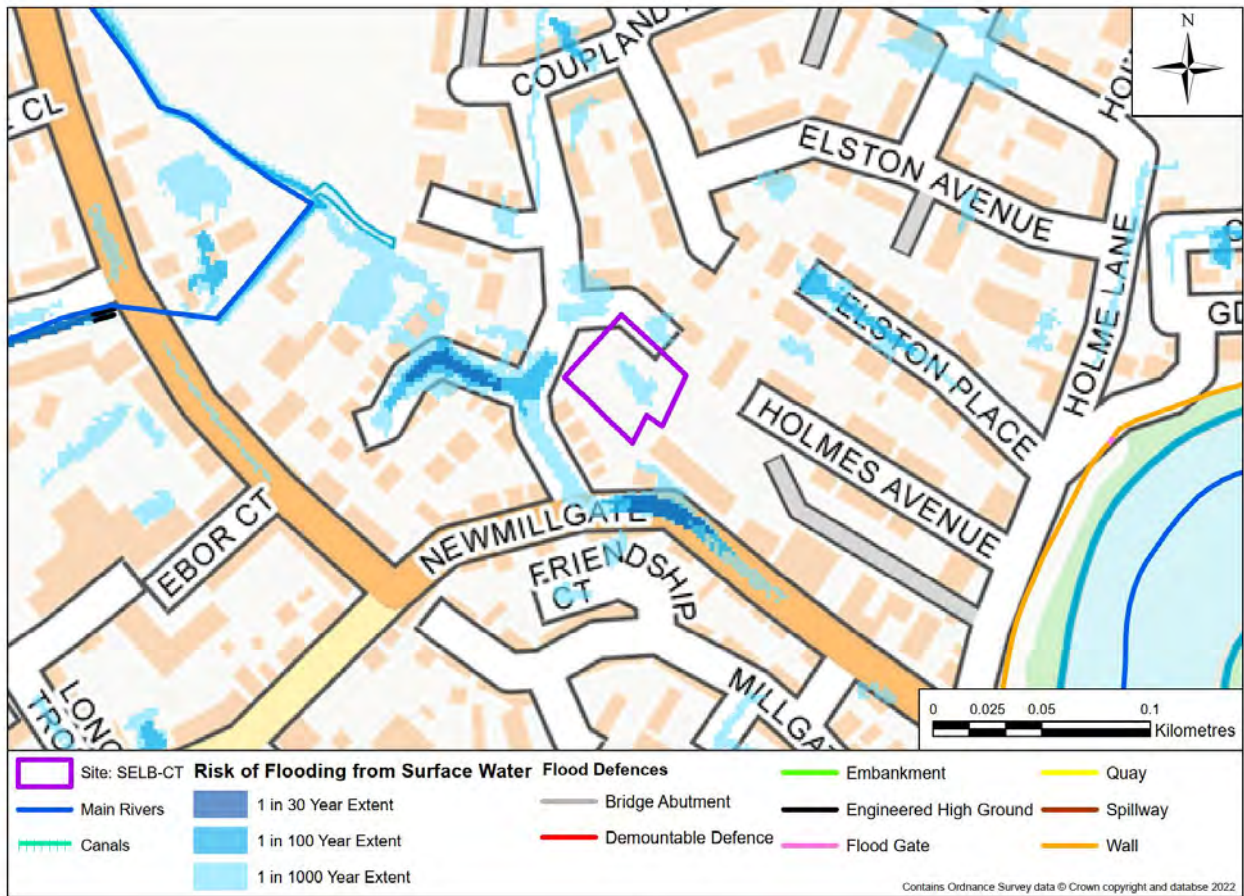


Figure I - Risk of Flooding from Surface Water (RoFSW)

## Groundwater Flooding

Bedrock Geology	Sherwood Sandstone Group - Sandstone	Superficial Geology	Clay, Peat and Silt
Susceptibility to Groundwater Flooding (BGS)		There is mixed potential for groundwater flooding to occur across the site ranging from 25% to 50%	

## Other Sources

Risk of flooding from reservoirs	The Long-Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir). Mapping indicates that the site would flood when river levels are normal in the event of a breach or failure of a reservoir.
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## Summary

The River Ouse flows southwards and is approximately 200m to the southeast of the site. The site is approximately 150m northwest of Cockret Dike and 200m north of Selby Dam. The majority of the site (99%) is located in Flood Zone 3a High probability of flooding from rivers or sea, and the rest of the site (1%) is defined as Flood Zone 2 Medium probability of flooding from rivers or sea. All of the site (100%) is in an Area Benefiting from Defences. This is due to the presence of defences along the River Ouse and the pumping station/ flood gates on Selby Dam that protect the site.

The flood defences along the River Ouse are classified as being in Fair- Good condition within closest proximity of the site. The defences consist of a series of flood walls and pumping station/flood gates connected to the River Ouse and Selby Dam. There is natural/engineered high ground which surrounds Cockret Dike and Selby Dam which whilst not being included in the Flood Map for Planning, does provide a degree of protection to the site. The defences reduce the risk of flooding, but there is still a residual risk of the site flooding if the defences were to be breached or the defences are overtopped.

Modelling shows that the site is not at risk a flooding from the fluviially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.02m 'Higher Central' SLR scenario, or the fluviially dominant 1% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR scenario. There is also no flooding to the site associated with the tidally dominant 0.5% AEP plus 23% Climate Change uplift on flows and 1.38m 'Upper End' SLR event.

## SELB-CT– Land south of Coupland Mews, Selby

The existing flood defences reduce fluvial and tidal risk in areas of Selby, including the site, therefore the risk of flooding to this site is a residual risk, if the defences breach. Breach modelling has been completed as part of the SFRA for 5 locations across the LLFA area. Breach number 2 is located on the right edge of the meander, upstream of the confluence of Selby Dam with the River Ouse and was modelled as 20m long and remained collapsed and open for 18 hours. The analysis used the Upper Humber model with a 1% AEP event (including a 23% uplift on flows and 1.02m 'Higher Central' SLR). The results show that the whole site floods and depths vary from 0.5m - 1m. The flood hazard associated with Breach 2 varies across the site from Very Low ('Very Low hazard') to Significant ('Danger to most') across the site. Breach number 3 is located on the right bank of the Ouse, 400m upstream of the confluence of Selby Dam with the River Ouse. Breach 3 on the right edge of the meander, upstream of the confluence of Selby Dam with the River Ouse was modelled as 50m long and remained collapsed and open for 30 hours. The analysis used the Upper Humber model with a 1% AEP event (including a 23% uplift on flows and 1.02m 'Higher Central' SLR). The results show that the whole site floods and depths vary from 1m - 2m. The flood hazard associated with Breach 3 is consistently Extreme ('Danger to all') across the site.

The Risk of Flooding from Surface Water mapping identifies the potential for surface water to flow and pond within the site and ponds within the centre of the site.

Broadscale mapping identifies that there is mixed potential for groundwater flooding to occur across the site. The site has 25% - <50% associated susceptibility.

### Site Specific Recommendations

The proposed use for the site includes residential which is defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test can be satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site. Infrastructure should be sequentially placed in areas of lower flood water depth.
- Additional breach modelling should be undertaken as part of a site specific FRA. Or an assessment should be included as to why the existing assessments are sufficient. The EA should be consulted to aid this exercise.
- Finished floor levels should be set 300mm above the River Ouse 1% AEP flood level resulting from a breach of defences including an appropriate allowance for climate change. Modelling results indicate that no flooding occurs in the 1% AEP plus 23% climate change uplift on flows (for both Higher Central and Upper End SLR scenarios) or the tidally dominant 0.5% AEP plus 23% climate change uplift on flows with a 1.38m 'Upper End' SLR due to the presence of defences, therefore site levels should be based upon those from a breach assessment (as discussed above).
- In the event of a breach in the flood defences, dry access/egress may not be possible. In line with the requirements for sleeping accommodation, safe refuge should be provided above the breach water level 1% AEP including an allowance for climate change.
- The site is located within the Flood Warning Area for River Ouse at Selby and Barlby and the Tidal River Ouse from Naburn Lock to Selby Flood Warning Area. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is not located within a Source Protection Zone which means either attenuation or infiltration based SuDs are likely to be permitted on the site. The River Ouse is within close proximity to the site and it could be used as a potential discharge point.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.
- All major developments (10 or more dwellings and 100m<sup>2</sup> floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.
- Developments are not appropriate within the functional floodplain 3b unless it is water compatible.



# TADC-I- Land at Mill Lane, Tadcaster

## River Flooding

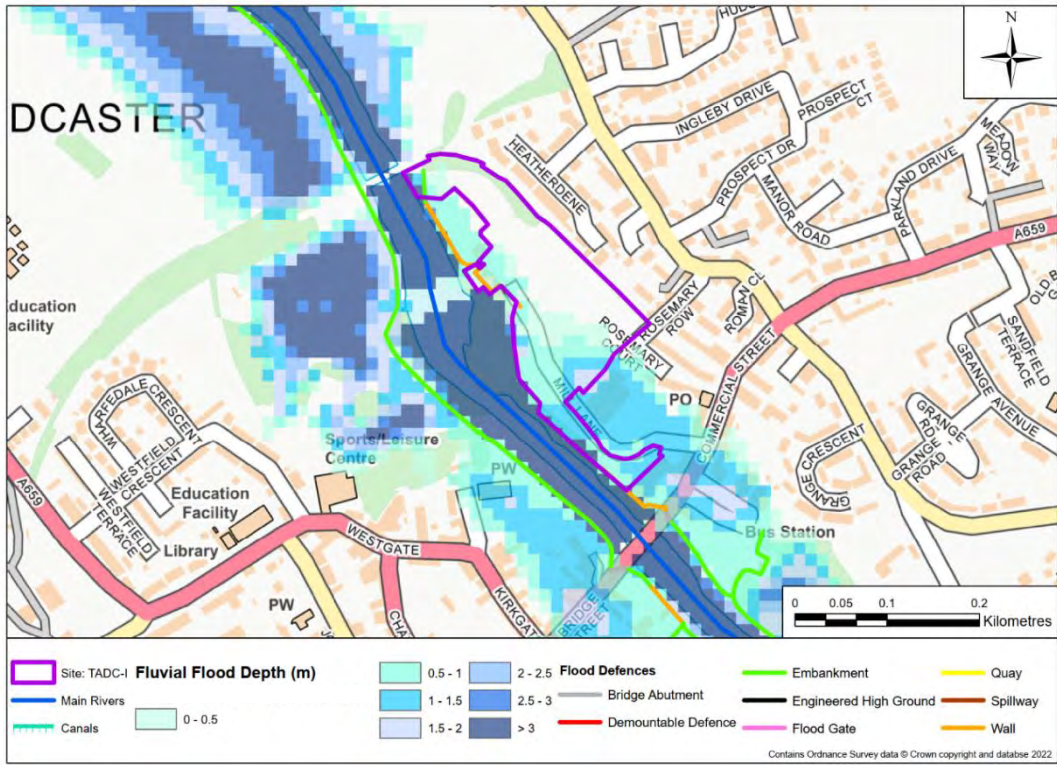


Figure B - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.02m ('Higher Central') Sea Level Rise, taking account of flood defences

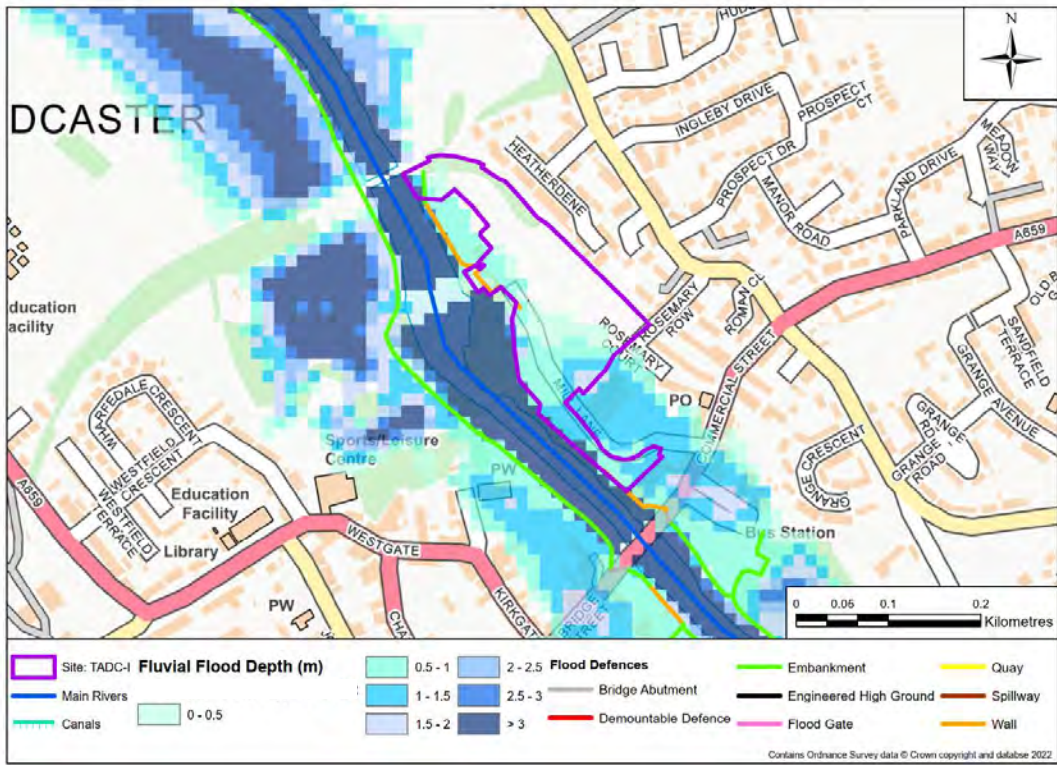


Figure C - Maximum Flood Depth 1% AEP plus 23% climate change uplift on flows and 1.38m ('Upper End') Sea Level Rise, taking account of flood defences

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## Surface Water Flooding

Risk of Flooding from Surface Water (RoFSW)

Low, Medium, High

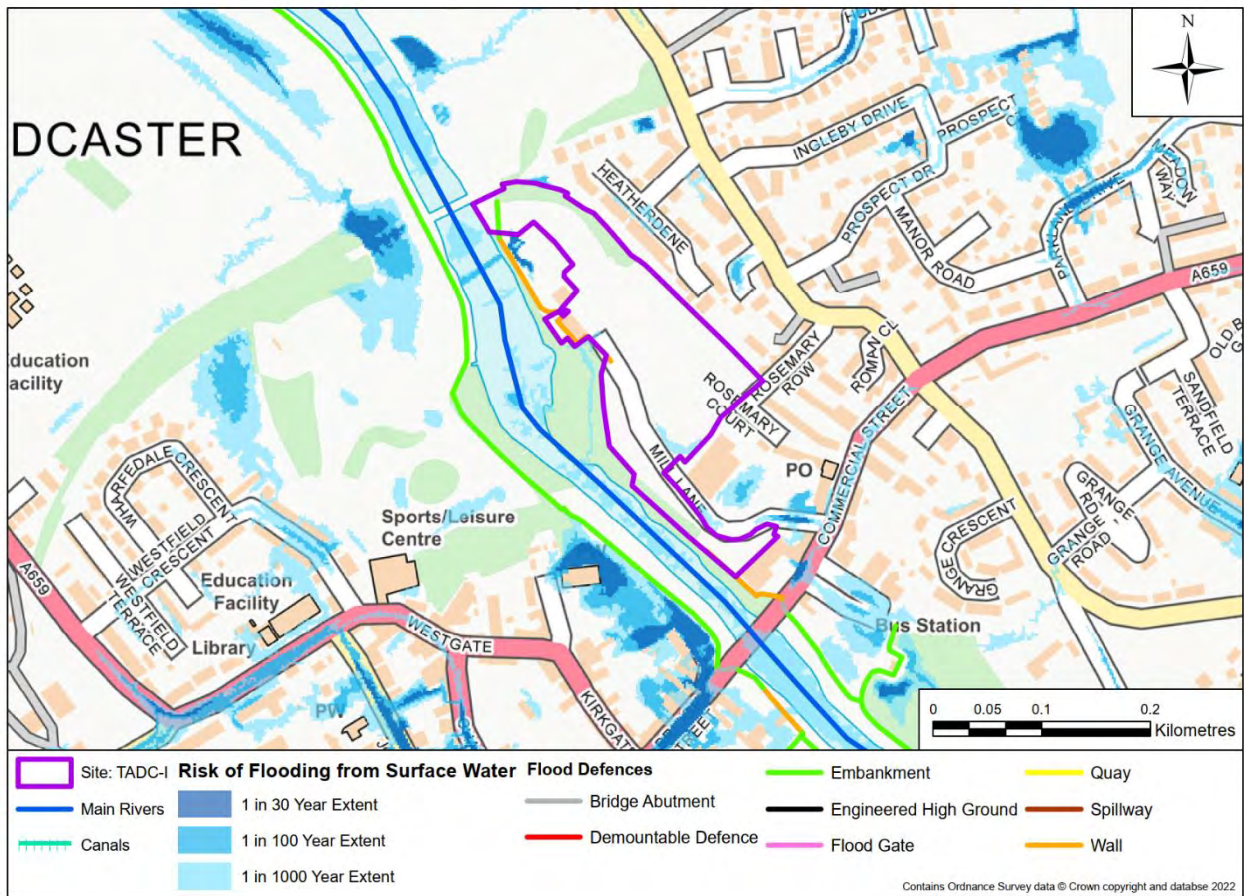


Figure D - Risk of Flooding from Surface Water (RoFSW)

## Groundwater Flooding

Bedrock Geology	Brotherton Formation - Limestone, Dolomitic	Superficial Geology	Clay, Sand and Gravel
Susceptibility to Groundwater Flooding (BGS)		25 - <50%	

## Other Sources

Risk of flooding from reservoirs	The Long-Term Flood Risk Map shows that the site could be at risk of flooding, in the event of a breach or failure of a reservoir (it is not possible to determine which reservoir). Most of the Site is at risk when river levels are normal but there is some of the Site which would only flood in the event of a breach or failure of a reservoir when there is also flooding from rivers.
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## Summary

The River Wharfe flows south alongside the western boundary of the site. The site is divided between Flood Zone 3a High probability of flooding from Rivers or sea (42%), (9%) Flood Zone 3b Functional Floodplain, (6%) Flood Zone 2 Medium probability of flooding from Rivers or sea and (43%) Flood Zone 1 Low probability of flooding from Rivers or sea.

Defences are present along the western perimeter of the site. They vary from embankments and flood walls which vary in condition from an unknown condition to Good. There is also some high ground that partially protects the site, but this is not classified as a formal defence, despite providing a degree of protection to the site. The current SoP of defences which adjacent to the site has a 1 in 25 year Standard of Protection (SoP) or 4% AEP which means that Flood Zone 3b is not relevant and is classified as Flood Zone 3a.

Modelling shows the site to be at risk of flooding from the River Wharfe when considering the impact of climate change, for the 1% AEP plus 23% climate change uplift on flows (for both the 1.02m 'Higher Central' SLR and 1.38m 'Upper End' SLR scenarios). The risk does not vary across the two different scenarios. Modelling results indicate that there is no flooding out of the main channel associated with the tidal scenario as the tidal

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influence of the Ouse/ Humber has no influence this far up the catchment. Flood depths vary from 0.5m – 2.5m on the site to the south west. Flood levels vary from 10.5– 11.0m AOD across the site for the 1% AEP plus 23% climate change uplift on flows with 1.02m 'Higher Central' SLR.

The northern portion of the site is raised much higher than the watercourse and therefore is not liable to flood. The Standard of Protection of the defences is <1 % AEP therefore breach analysis is not required. Development should be steered away from areas of higher flood risk (southern portion of the site). It is recommended that the EA are consulted before any modelling is completed to confirm that this assessment is necessary and to confirm the approach (if required).

The Risk of Flooding from Surface Water mapping identifies there is low risk of surface water to flow and pond within most of the site, apart from the south-eastern corner. There is high risk for surface water to pond on Mill Lane, adjacent to the site.

Broadscale mapping identifies that there is 25% - <50% susceptibility for groundwater flooding to occur across the site.

### Site Specific Recommendations

The proposed use for the site includes residential uses which are defined as More Vulnerable. More Vulnerable development is only permitted on this site where it can be demonstrated that the Exception Test can be satisfied. In order to satisfy the requirements of the Exception Test, the following recommendations are made:

- A sequential approach should be applied within the site, steering development towards those areas at lower risk of river and surface water flooding/ areas of the site. Residential accommodation should be placed in the northern eastern part of the site on higher ground, as this area is at a lower risk of flooding.
- Developments are not appropriate within the functional floodplain 3b unless it is water compatible. The Standard of Protection of flood defences on the River Wharfe is 4% AEP and therefore the site is not considered to be in the functional floodplain. This should be confirmed as part of a site-specific FRA.
- Finished floor levels should be set 300mm above the River Wharfe 1% AEP flood level including an allowance for climate change. Sleeping accommodation should be set 300mm above the flood level for the 1% AEP event including appropriate allowance for climate change. It is likely that ground floor sleeping accommodation will be appropriate in the sections of the site where there is very low risk of flooding outside the extent of 1% AEP event including appropriate allowance for climate change.
- The proposed development must not reduce the ability of the floodplain to store water. This should be considered in relation to the 1% AEP modelled flood event including an appropriate allowance for climate change. Floodplain compensation storage must be provided on a level-for-level and volume-for-volume basis. Further guidance on the provision of compensatory flood storage is provided in section A3.3.10 of the CIRIA document C624.
- Breach modelling is not required to be undertaken as part of a site specific FRA as the standard of protection of flood defences on the River Wharfe is <1 % AEP. This should however, be discussed and confirmed with the Environment Agency as part authoring the site specific FRA.
- The site is located within the Flood Warning Area for River Wharfe at Tadcaster. Occupants of the site should sign up to receive the Flood Warning Service.
- A Flood Warning and Evacuation Plan should be prepared by occupants of the site demonstrating what actions site users will take before, during and after a flood event to ensure their safety, and to demonstrate their development will not impact on the ability of the local authority and the emergency services to safeguard the current population.
- The natural surface water flow patterns on the site should be considered when preparing the surface water drainage strategy for the site to ensure that the risk to neighbouring areas is reduced.
- The natural surface water flow paths should be utilised (where possible) for implementing SuDs on the site. The site is located within a Source Protection Zone which means only attenuation based SuDs are likely to be permitted on the site. The River Wharfe is within close proximity to the site and it could be used as a potential discharge point.
- The risk of groundwater flooding and groundwater levels should be further assessed during a Site Investigation.
- All major developments (10 or more dwellings and 100m<sup>2</sup> floor space or equivalent non-residential or mixed development) should not result in an increase in surface water runoff, and where possible, should demonstrate betterment in terms of rate and volumes of surface water runoff. The peak runoff rate should be agreed with the Lead Local Flood Authority (LLFA) upon appointment.

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