KRYPTONSTRUCTURE
CIVIL & STRUCTURAL ENGINEERS

Flood Risk Assessment

For The Project At

485 Bradford Road, Batley, WF17 8LB

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EXECUTIVE SUMMARY

The Site would remain dry in all design flood events and would only be affected during very extreme. The consequences of flooding are acceptable, and the development would be in accordance with the requirements of the National Planning Policy Framework (NPPF). The Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of the NPPF.

The Proposed Development should not therefore be precluded on the grounds of flood risk or drainage.

1.0 INTRODUCTION

1.1 Background

This Flood Risk Assessment (FRA) has been prepared by Krypton Structure at the request of Kufic Architects to support a planning application for the change of use from a breakers yard to a car wash ("the Proposed Development") at 485 Bradford Road, Batley, WF17 8LB ("the Site"). A Drainage Strategy has been undertaken by others.

A separate Drainage Strategy has been prepared by others to address surface water and foul drainage matters associated with the Proposed Development. This FRA has been prepared to consider flood risk from all relevant sources in accordance with the NPPF, does not duplicate the scope of the Drainage Strategy, and should be read alongside it when considering surface water management.

This FRA has been carried out in accordance with guidance contained in the National Planning Policy Framework (NPPF) [1], associated Planning Practice Guidance on flood risk and coastal change [2] (PPG) and the PPG 'Site -specific flood risk assessment checklist'. This FRA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

It is recognised that developments which are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues.

1.2 National Planning Policy Framework (NPPF)

One of the key aims of the NPPF is to ensure that flood risk is taken into account at all stages of the planning process; to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk. This FRA has been prepared in accordance with the NPPF, in particular Paragraphs 170-182, which require that development:

- avoids inappropriate development in areas at risk of flooding;
- is directed to areas of lowest flood risk through the Sequential Test;
- is demonstrated to be safe for its lifetime, taking climate change into account;
- does not increase flood risk elsewhere; and
- incorporates appropriate opportunities for flood risk reduction and resilience.

The associated PPG has been used to structure this FRA and ensure that all sources of flooding, both now and in the future, have been assessed in accordance with current national policy.

[1] Ministry for Housing, Communities and Local Government (2025) National Planning Policy Framework: https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December -2024.pdf

[2] Communities and Local Government (2022) Planning Practice Guidance- Flood Risk and Coastal Change: https://www.gov.uk/guidance/flood -risk-and-coastal -change

The report findings are based upon professional judgement and are summarised below with detailed recommendations provided at the end of the report. The report includes rainfall data from the Flood Estimation Handbook (FEH) and hydrogeological information from the British Geological Survey (BGS). The assessment will summarise and refer to these datasets in the text.

1.3 Report Structure

This FRA has the following report structure:

- Section 2 describes the location and the existing and Proposed Development;
- Section 3 outlines the flood risk to the existing and Proposed Development;
- Section 4 outlines the mitigation measures used to manage the overall level of flood risk; and
- Section 5 presents a summary and conclusions

2.0 LOCATION & DEVELOPMENT DESCRIPTION

2.1 Site Location

The Site is located at 485 Bradford Road, Batley, WF17 8LB (see Figure 1). The National Grid Reference (NGR) of the Site is 424045, 424632.

Figure 1 - Site Location

2.2 Existing Development

The Site is currently previously developed (brownfield) land and is occupied by low rise commercial buildings associated with a breakers yard (see Appendix 1). The site is largely hardstanding, with buildings positioned close to the southern boundary adjacent to Carlinghow Brook.

2.3 Proposed Development

The Proposed Development is a change of use from a breakers yard to a car wash. The proposal involves redevelopment of an existing vehicle related commercial site to provide three new single storey commercial buildings with associated parking and access, retaining

employment use and without introducing residential development (see Appendix 1). No new buildings/structures will be introduced within 8m of the top of bank of the Carlinghow Brook. Further details with regard to the Proposed Development can be found in the accompanying information submitted with the planning application.

2.4 Ground Levels

The Site falls from north to south with an approximate minimum ground level of 59.51 metres Above Ordnance Datum (mAOD) to the south and an approximate maximum ground level of 60.83 to the north, as per the Ordnance Survey Terrain 50 Digital Terrain Model (DTM). The ground level at the location of the proposed buildings is approximately 60.83mAOD and the proposed building will be located on locally higher ground within the Site.

2.5 Catchment Hydrology

The Carlinghow Brook (Main River) is located immediately adjacent to the southern boundary of the Site.

2.6 Ground Conditions

The British Geological Survey (BGS) map[3] shows that the bedrock deposits at the Site consist of the Pennine Lower Coal Measures Formation - mudstone, siltstone and sandstone. These sedimentary rocks are fluvial, palustrine and shallow-marine in origin. They are detrital, forming deposits reflecting the channels, floodplains and deltas of a river in a coastal setting (with periodic inundation from the sea). The superficial deposits for the Site consist of Alluvium - clay, silt, sand and gravel. These sedimentary deposits are fluvial in origin. They are detrital, ranging from coarse- to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting).

Information from the National Soil Resources Institute[4] details the Site area being situated on slowly permeable seasonally wet acid loamy and clayey soils with impended drainage.

[3] https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.14476159.932338379.1655890995-1831306757.1655472887
[4] http://www.landis.org.uk/soilscapes/

3.0 FLOOD RISK

3.1 Sources of Flooding

All sources of flooding have been considered, these are; fluvial (river) flooding, tidal (coastal) flooding, groundwater flooding, surface water (pluvial) flooding, sewer flooding and flooding from artificial drainage systems/infrastructure failure.

3.2 Environment Agency

Information regarding the current flood risk at the application Site and local flood defences has been obtained from the Environment Agency (see Appendix 2).

3.3 Climate Change

Projections of future climate change, in the UK, indicate more frequent, short-duration, high intensity rainfall and more frequent periods of long duration rainfall. Guidance included within the NPPF recommends that the effects of climate change are incorporated into FRA's. Recommended precautionary sensitivity ranges for peak rainfall intensities and peak river flows are outlined in the flood risk assessments: climate change allowances guidance[5].

Table 1 show the peak river flow allowances by river management catchment. The flood risk assessments: climate change allowances guidance recommends that the central allowance is used to define the design flood event, with higher allowances used for sensitivity testing where appropriate over the lifetime of the development which is taken as 75 years. The fluvial design event for the Site is the 1 in 100 year (+23%) event.

Table 1 - Peak River Flow Allowances by River Catchment

River Catchment	Allowance Category	2020s	2050s	2080s
Aire and Calder Management Catchment	Upper	+24%	+31%	+51%
	Higher	+15%	+18%	+31%
	Central	+11%	+13%	+23%

3.4 Environment Agency Flood Zones

A review of the Environment Agency's Flood Zones indicates that the Site is located within Flood Zones 2 and 3 and therefore has a 'medium to high probability' of flooding, as shown in Figures 2 and 3. Flood Zone 2 has between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) in any year and Flood Zone 3 with a 1 in 100 or greater annual probability of river flooding (>1%) in any year. It should be noted that only a small area of the Site to the south, adjacent to the Carlinghow Brook, is located within Flood Zone 3.

The Site should not be designated as Flood Zone 3b 'Functional Floodplain'. The definition of Flood Zone 3b 'Functional Floodplain' as per the PPG is: *"This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise:*

- *land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or*

[5] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#high-allowances

- *land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).*

Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency."

The Site does not comprise land where water has to flow or be stored in times of flood. The Site does not perform a water conveyance flood route or a flood storage area. The Site does not provide a function of flood conveyance (i.e. free flow) or flood storage, either through natural processes, or by design (e.g. washlands and flood storage areas). The Site is already developed with commercial buildings therefore, the Site is located within Flood Zone 3a.

The Flood Zones are the current best information on the extent of the extremes of flooding from rivers or the sea that would occur without the presence of flood defences, because these can be breached, overtopped and may not be in existence for the lifetime of the development. They show the worst case scenario. The Environment Agency Flood Zones and acceptable development types are explained in Table 2. Table 2 shows that some development types are generally acceptable in Flood Zones 2 and 3a.

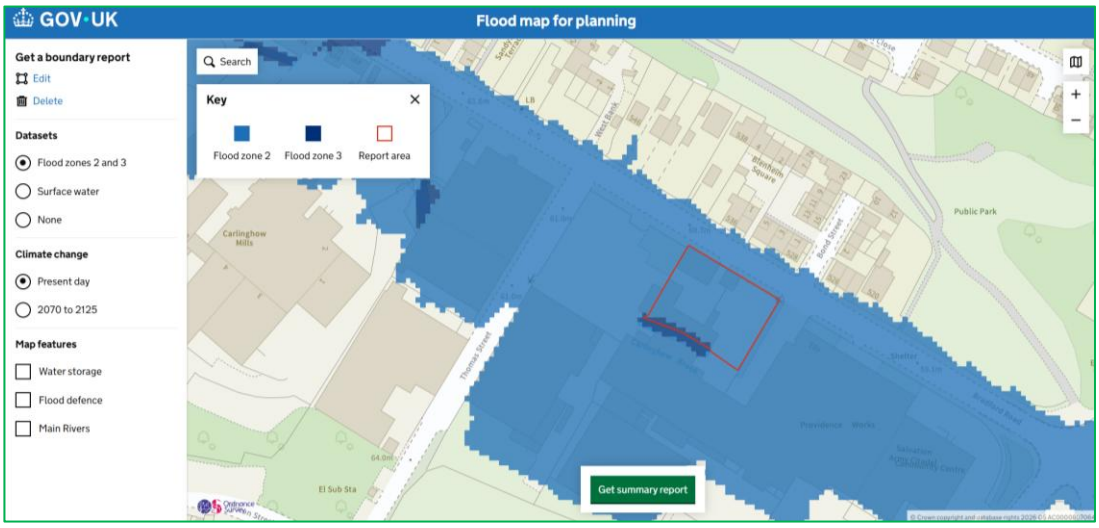

Figure 2 - Environment Agency Flood Zones: Present Day

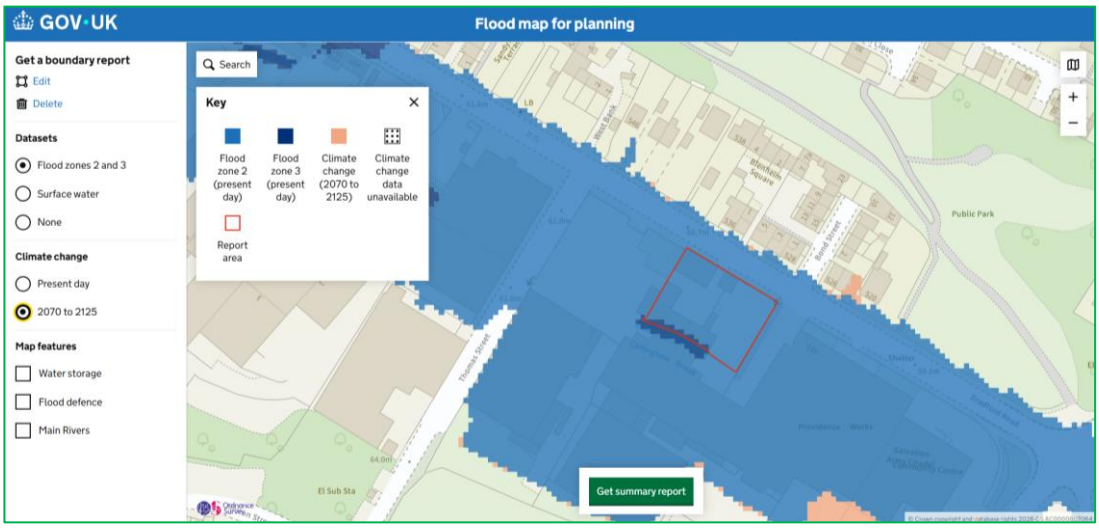

Figure 3 - Environment Agency Flood Zones: Climate Change 2070 to 2125

Table 2 - Environment Agency Flood Zones and Appropriate Land Use

Flood Zone	Probability	Explanation	Appropriate Land Use
Zone 1	Low	Less than a 1 in 1000 annual probability of river or sea flooding in any year (<0.1%)	All development types generally acceptable
Zone 2	Medium	Between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% 0.1%) in any year	Most development type are generally acceptable
Zone 3a	High	A 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year	Some development types not acceptable
Zone 3b	'Functional Floodplain'	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)	Some development types not acceptable

3.5 Flood Vulnerability

In the PPG appropriate uses have been identified for the Flood Zones. Applying the Flood Risk Vulnerability Classification in the PPG, the existing and proposed use is classified as 'less vulnerable'. The Proposed Development will not change the vulnerability of the Site to flooding and will not introduce a new 'more vulnerable' development into the floodplain. Table 3 of this report and the PPG state that 'less vulnerable' uses are appropriate within Flood Zones 2 and 3a after the completion of a satisfactory FRA.

Table 3 - Flood Risk Vulnerability and Flood Zone 'Compatibility'

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

Key: *✓: Development is appropriate, ×: Development should not be permitted.*

3.6 Historic Flooding

Environment Agency data shows that the Site has not historically flooded (see Figure 4). However, the Environment Agency has confirmed that areas within the vicinity of the Site have historically flooded due to channel capacity being exceeded but these flood events did not affect the Site.

There are no records of anecdotal information of flooding at the Site including within the British Hydrological Society "Chronology of British Hydrological Events". No other historical records of flooding for the Site have been recorded. Therefore, it has been concluded that the Site has not flooded within the recent past.

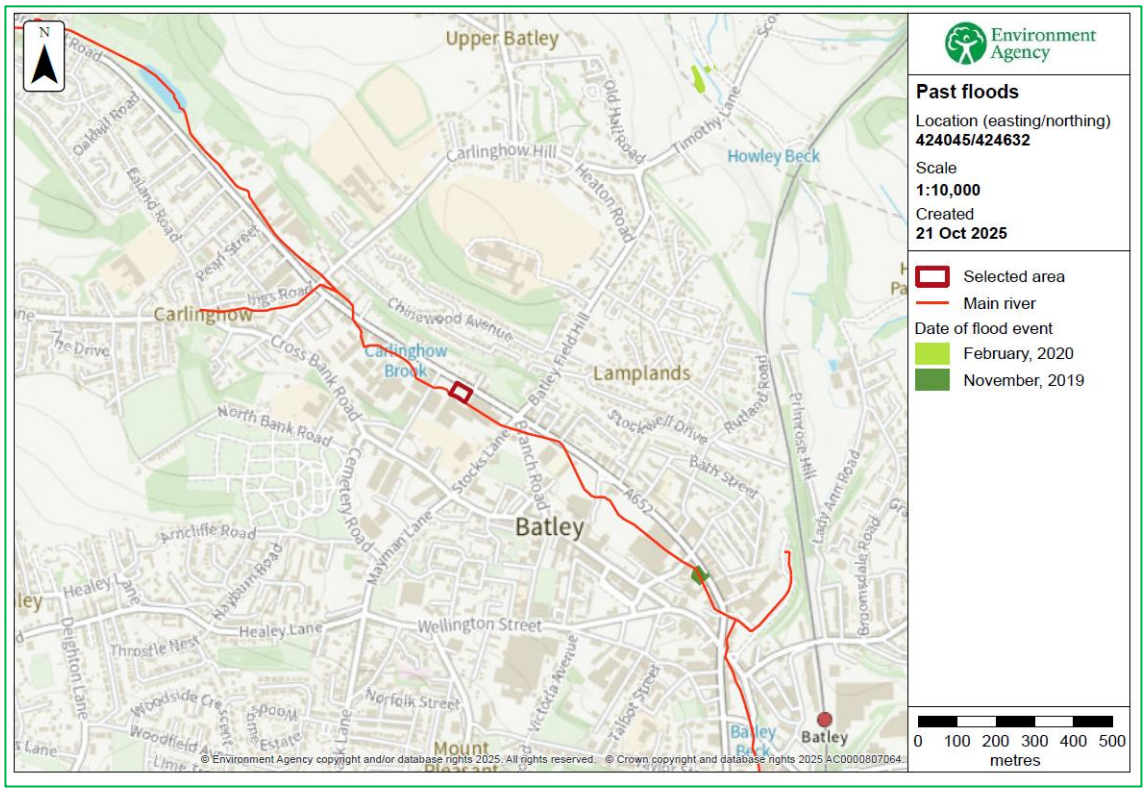

Figure 4 - Environment Agency Historic Flood Outline

3.7 Existing and Planned Flood Defence Measures

The Environment Agency data shows that there are flood defence measures within the vicinity of the Site which have a 1 in 50 year Standard of Protection (SoP) (see Table 4 and Figure 5). Further property level protection measures will be used to protect the Site from flooding these are discussed in Section 5.0.

Table 4 - Existing Flood Defences

Label	Asset ID	Asset Type	Standard of Protection (years)	Condition	Downstream actual Crest Level (mAOD)	Upstream actual Crest Level (mAOD)
1	76841	Wall	50	Good	62.71	62.44

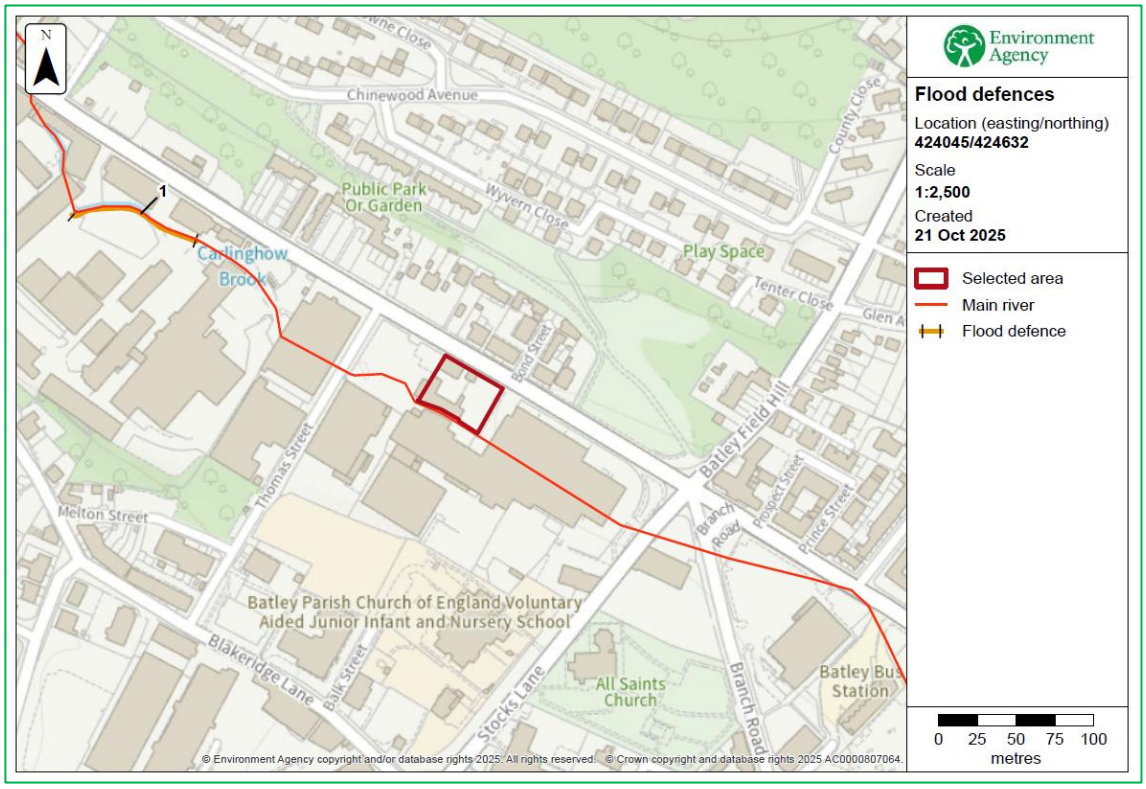

Figure 5 - Environment Agency Flood Defences Map

3.8 Fluvial (River) Flooding

The Carlinghow Brook is located adjacent to the southern boundary of the Site therefore, fluvial flooding poses the primary but unlikely flood risk to the Site. The Environment Agency has provided modelled data for the 2015 Batley Beck Mapping Study model. The modelled water levels have been compared to the ground level of the Site and areas within the vicinity of the Site to assess the flood risk in detail.

The fluvial design event for the Site is the 1 in 100 year (+23%) event, to take account of the +23% climate allowance the 1 in 100 year (+20%) event has been used in this case as a proxy for the 1 in 100 year (+23%) event due to the very small difference between the two events. The difference in predicted water levels between the +20% and +23% events at this location is

negligible (<0.05m), and therefore does not materially affect conclusions on flood risk or mitigation. This approach is conservative and does not underestimate flood risk.

Defended Scenario

Flood defence measures provide protection against fluvial flooding and reduce the flood risk posed to the Site. Figures 6 and 7 shows the defended model node locations. Tables 5 and 6 present the defended Environment Agency modelled water levels and depths for the Site while Figures 8 and 9 show the Environment Agency show the corresponding defended flood extents. The Environment Agency data shows that the Site will not be inundated with floodwater for all events up to and including the defended 1 in 100 year event.

Water levels have been modelled at 59.91mAOD during the defended 1 in 100 year (+20%) event and at 60.40mAOD during the defended 1 in 1000 year event. Accordingly, flooding of the Site may occur during these defended scenarios, with modelled depths of between 0.08m and 0.33m for the defended 1 in 100 year (+20%) event and between 0.34m and 1.16m for the defended 1 in 1000 year event. The Site is not subject to widespread inundation, with shallow flooding predicted at isolated locations only.

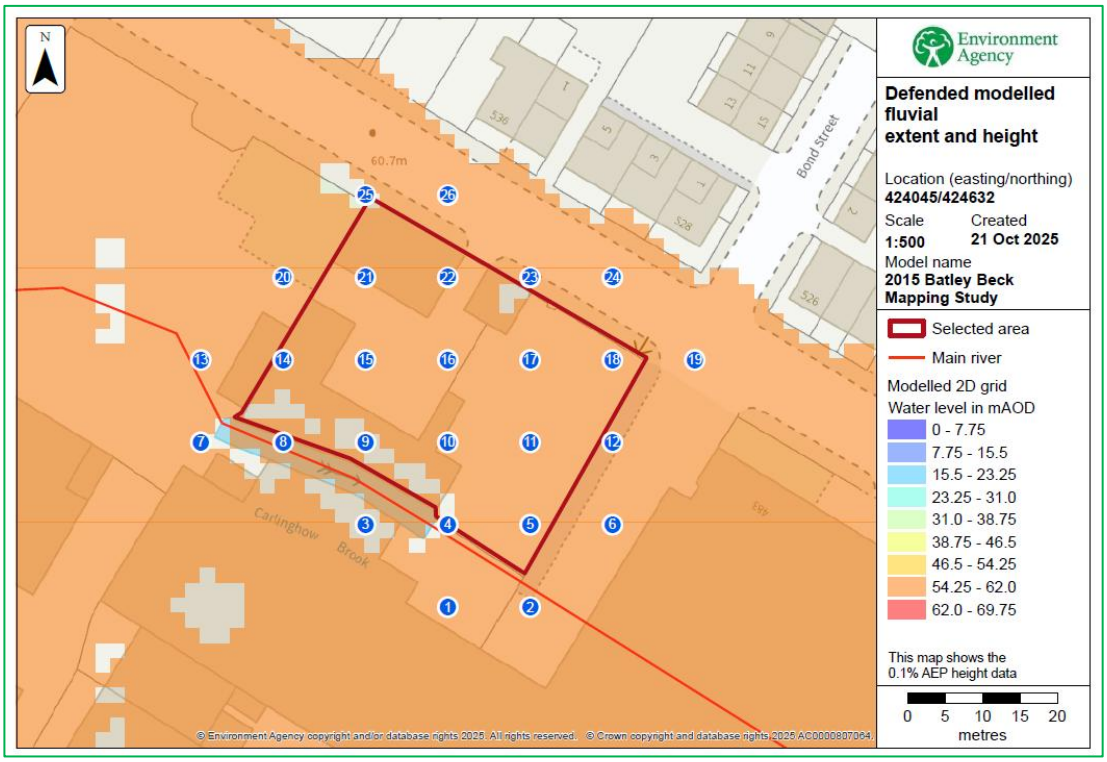

Figure 6 - Environment Agency Defended Modelled Nodes Location Map

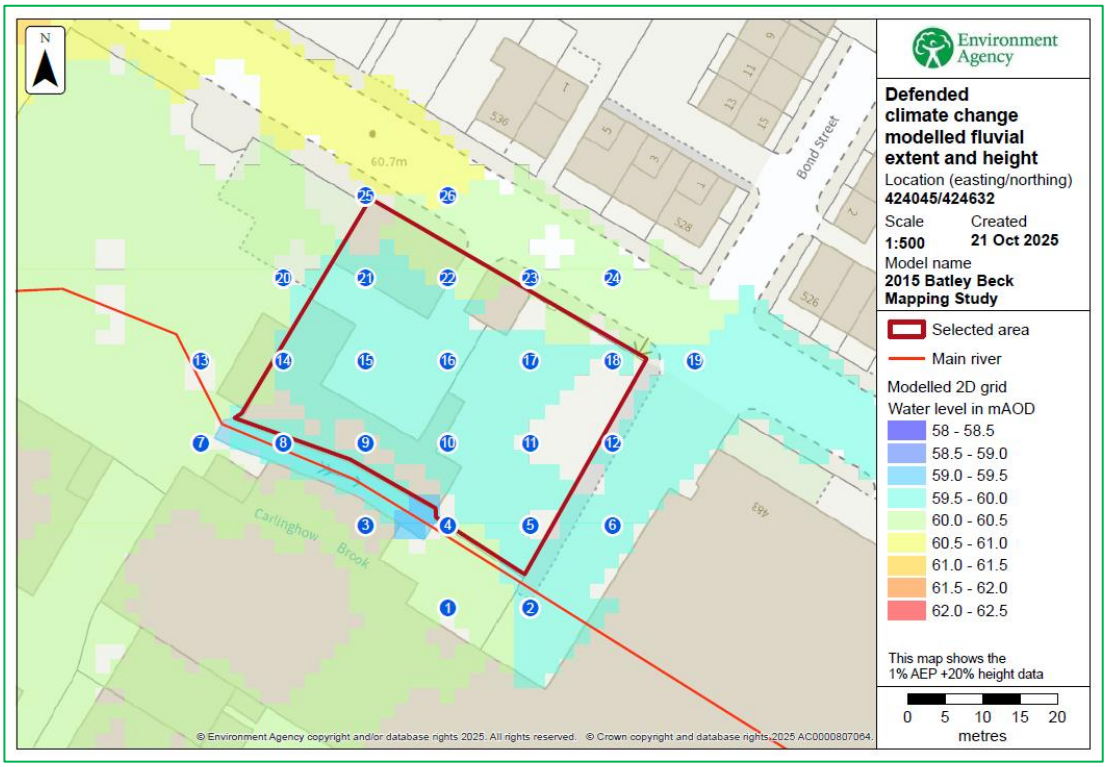

Figure 7 - Environment Agency Defended Modelled Climate Change Nodes Location Map

Table 5 - Environment Agency Defended Modelled Water Levels (mAOD)

Node Label	Easting	Northing	Return Period (years)			
			100	100 (+20%)	200	1000
5	424056	424613	NoData	NoData	NoData	60.32
9	424034	424624	NoData	NoData	NoData	NoData
10	424045	424624	NoData	59.91	59.87	60.38
11	424056	424624	NoData	NoData	NoData	60.35
14	424023	424635	NoData	59.98	59.97	60.40
15	424034	424635	NoData	59.91	59.87	60.39
16	424045	424635	NoData	59.91	59.87	60.38
17	424056	424635	NoData	59.91	59.88	60.34
18	424067	424635	NoData	NoData	NoData	60.28
21	424034	424646	NoData	59.91	59.87	60.39
22	424045	424646	NoData	60.07	60.06	60.39

*Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Table 6 - Environment Agency Defended Modelled Water Depths (m)

Node Label	Easting	Northing	Return Period (years)			
			100	100 (+20%)	200	1000
5	424056	424613	NoData	NoData	NoData	0.49
9	424034	424624	NoData	NoData	NoData	NoData
10	424045	424624	NoData	0.33	0.29	0.80
11	424056	424624	NoData	NoData	NoData	0.49
14	424023	424635	NoData	0.06	0.05	0.39
15	424034	424635	NoData	0.68	0.65	1.16
16	424045	424635	NoData	0.53	0.50	1.01
17	424056	424635	NoData	0.16	0.13	0.61
18	424067	424635	NoData	NoData	NoData	0.34
21	424034	424646	NoData	0.45	0.42	0.93
22	424045	424646	NoData	0.08	0.07	0.39

*Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

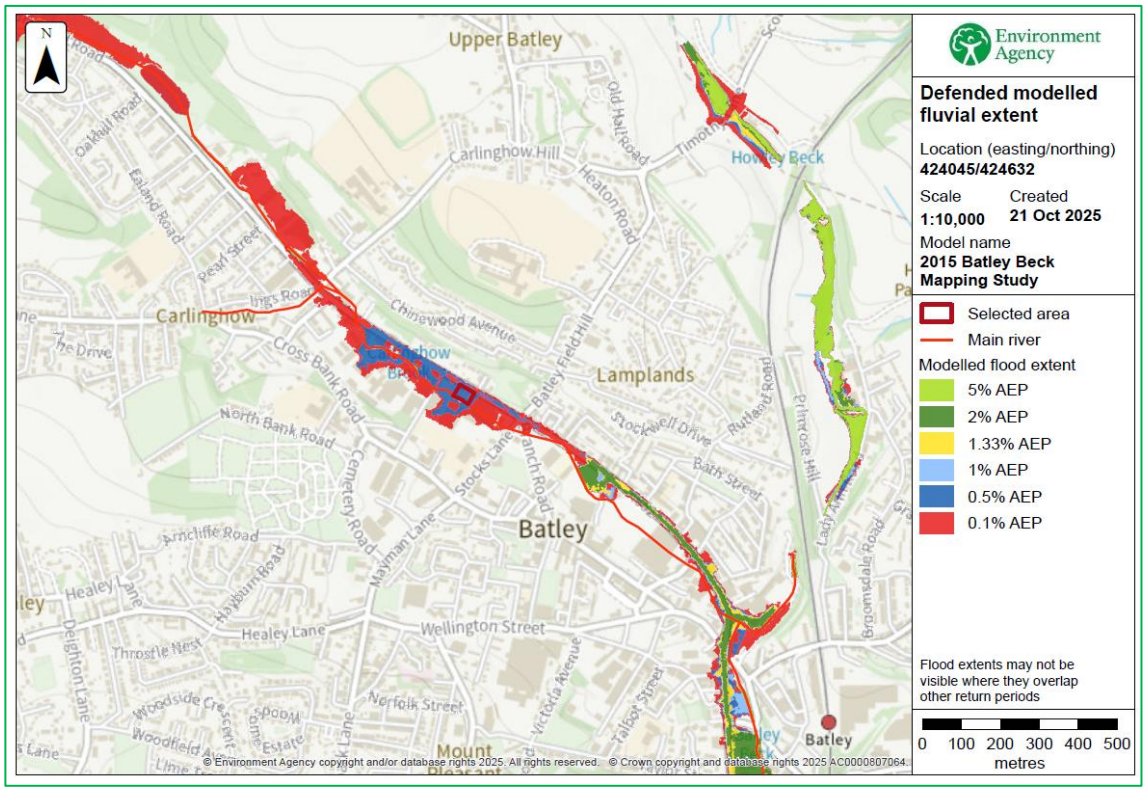

Figure 8 - Environment Agency Defended Modelled Flood Outlines

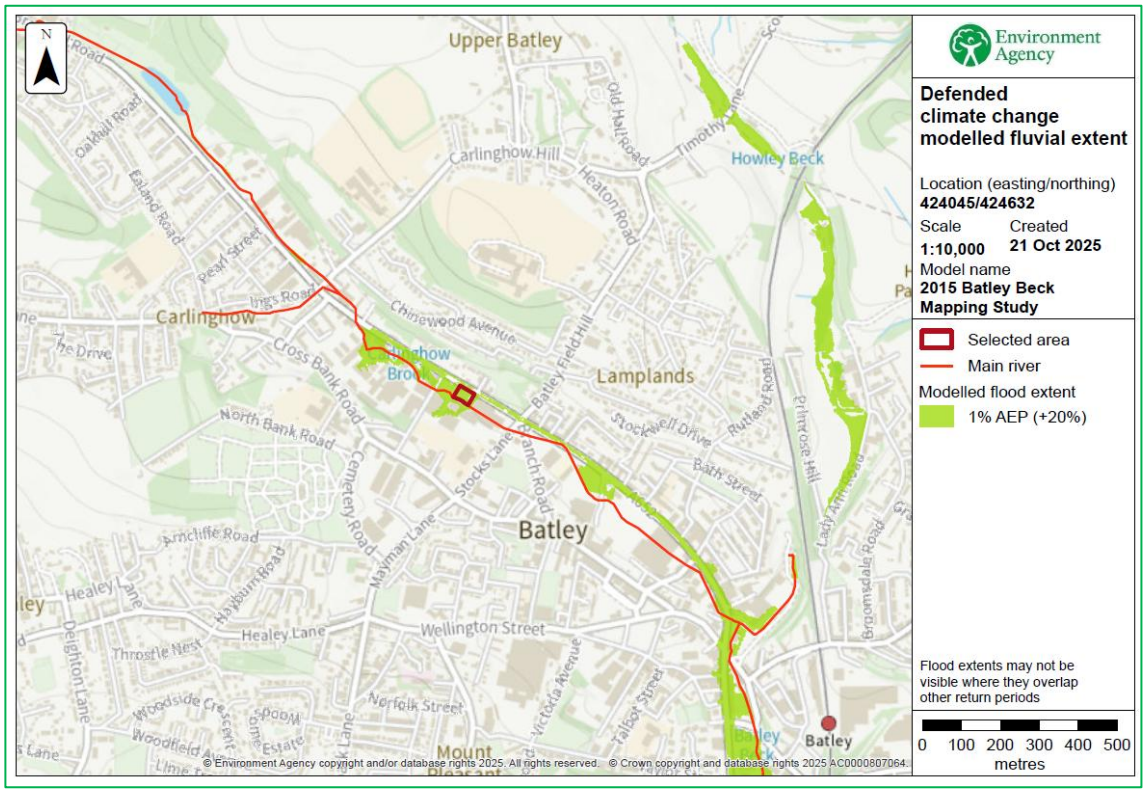

Figure 9 - Environment Agency Defended Modelled Climate Change Flood Outlines

Undefended Scenario

Considerable investment has been made in the provision of the flood defences to protect the Site from fluvial flooding. However, the flood defences can only protect up to a point, they may malfunction, can be breached and have a finite structure life. Therefore, there is a residual risk of fluvial flooding. The condition of the defences is fair therefore; it is unlikely that a breach in the flood defences would occur.

If the flood defences were not there, the area would be flooded. However, an area of land may benefit from the presence of flood defences even if the flood defences are overtopped, the presence of the flood defences means that the floodwater does not extend as far as it would if the flood defences were not there.

Figures 10 and 11 shows the undefended model node locations. Tables 7 and 8 present the undefended Environment Agency modelled water levels and depths for the Site while Figures 12 and 13 show the Environment Agency show the corresponding undefended flood extents. The Environment Agency data shows that the Site will not be inundated with floodwater for all events up to and including the undefended 1 in 100 year and 1 in 1000 year events.

Water levels have been modelled at 59.95mAOD during the undefended 1 in 100 year (+20%) event. Accordingly, flooding of the Site may occur during this undefended scenario, with modelled depths of between 0.03m and 0.47m for the undefended 1 in 100 year (+20%) event. The Site is not subject to widespread inundation, with shallow flooding predicted at isolated locations only.

Table 7 - Environment Agency Undefended Modelled Water Levels (mAOD)

Node Label	Easting	Northing	Return Period (years)			
			100	100 (+20%)	200	1000
5	424056	424613	NoData	NoData	NoData	NoData
9	424034	424624	NoData	NoData	NoData	NoData
10	424045	424624	NoData	59.69	NoData	NoData
11	424056	424624	NoData	NoData	NoData	NoData
14	424023	424635	NoData	59.95	NoData	NoData
15	424034	424635	NoData	59.69	NoData	NoData
16	424045	424635	NoData	59.69	NoData	NoData
17	424056	424635	NoData	NoData	NoData	NoData
18	424067	424635	NoData	NoData	NoData	NoData
21	424034	424646	NoData	59.70	NoData	NoData
22	424045	424646	NoData	NoData	NoData	NoData

*Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Table 8 - Environment Agency Undefended Modelled Water Depths (m)

Node Label	Easting	Northing	Return Period (years)			
			100	100 (+20%)	200	1000
5	424056	424613	NoData	NoData	NoData	NoData
9	424034	424624	NoData	NoData	NoData	NoData
10	424045	424624	NoData	0.12	NoData	NoData
11	424056	424624	NoData	NoData	NoData	NoData
14	424023	424635	NoData	0.03	NoData	NoData
15	424034	424635	NoData	0.47	NoData	NoData
16	424045	424635	NoData	0.32	NoData	NoData
17	424056	424635	NoData	NoData	NoData	NoData
18	424067	424635	NoData	NoData	NoData	NoData
21	424034	424646	NoData	0.24	NoData	NoData
22	424045	424646	NoData	NoData	NoData	NoData

*Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

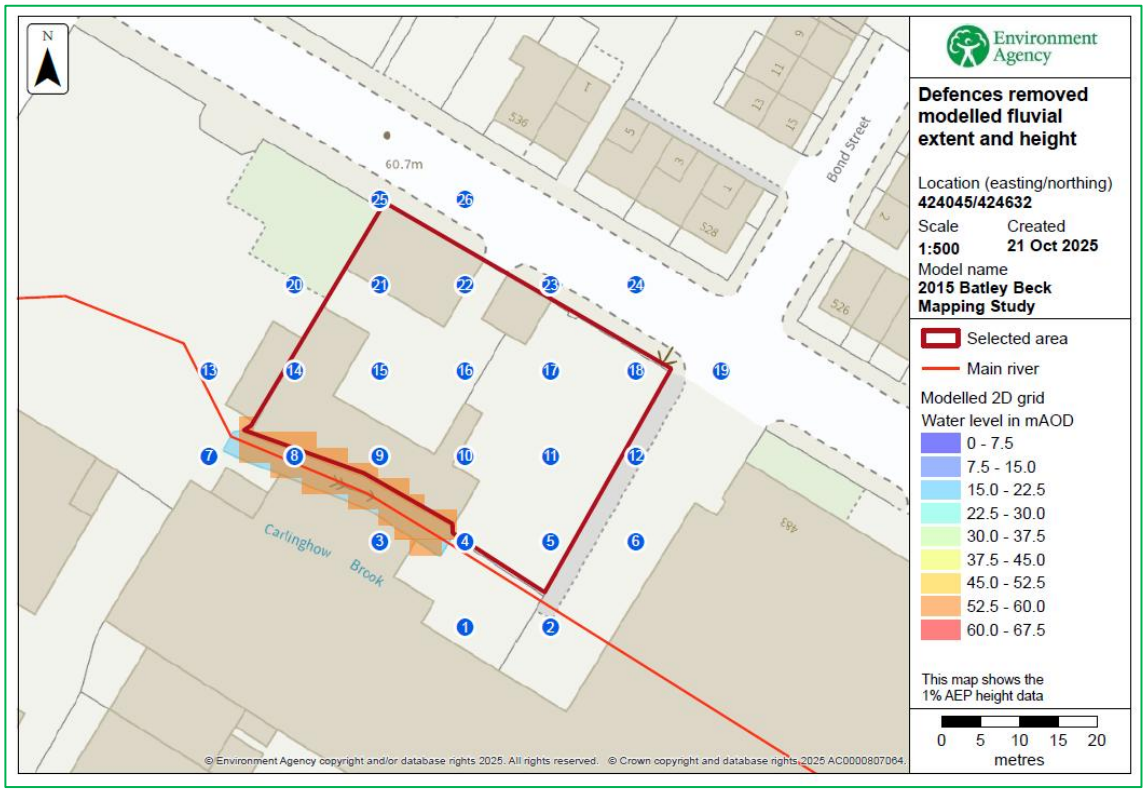

Figure 10 - Environment Agency Undefended Modelled Nodes Location Map

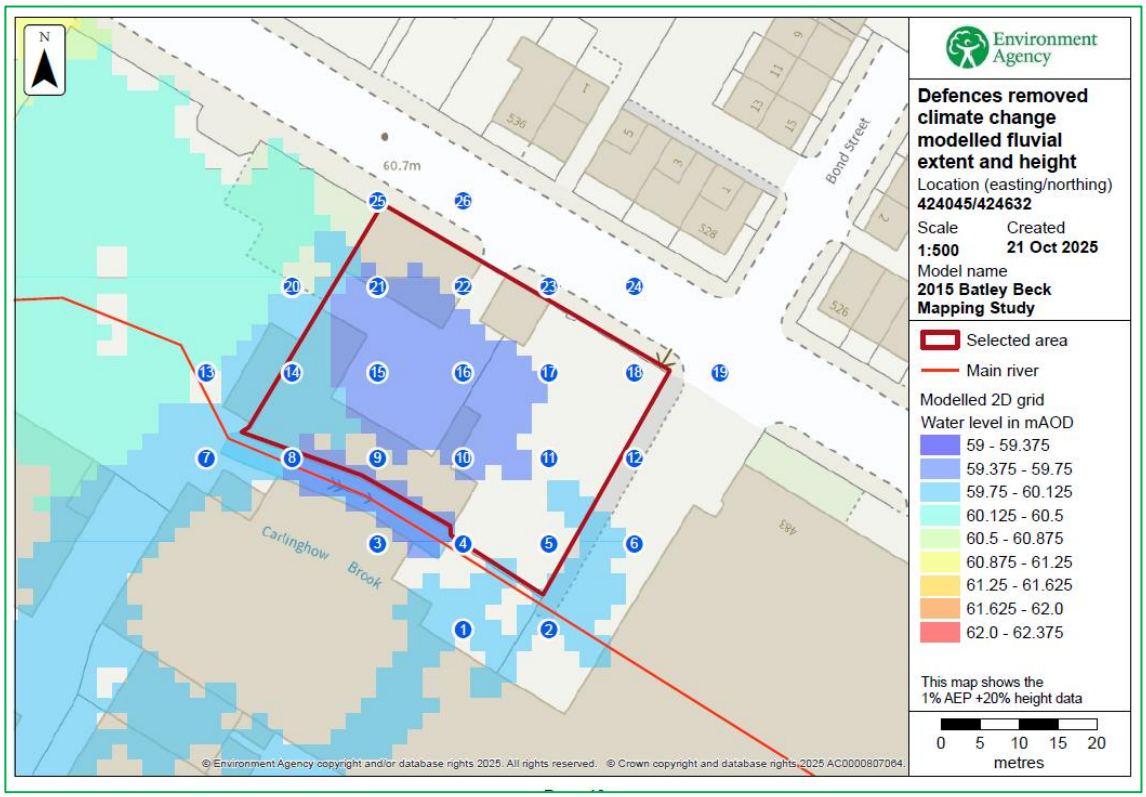

Figure 11 - Environment Agency Undefended Modelled Climate Change Nodes Location Map

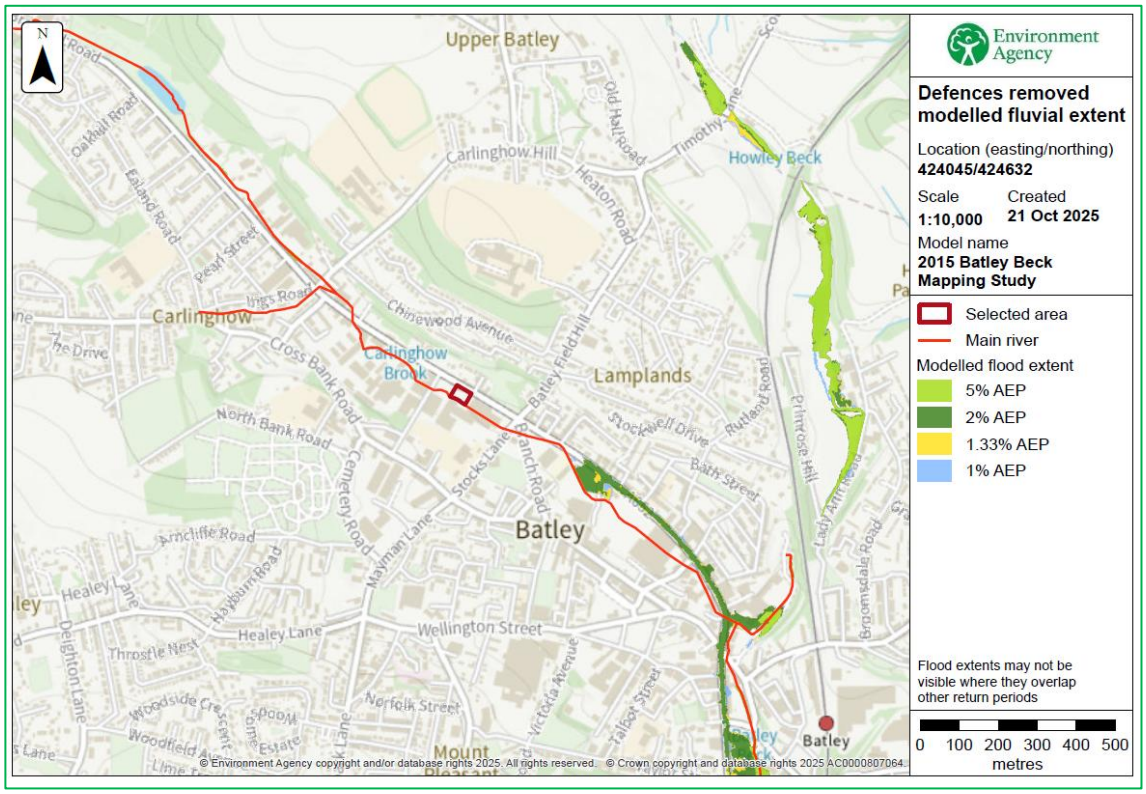

Figure 12 - Environment Agency Undefended Modelled Flood Outlines

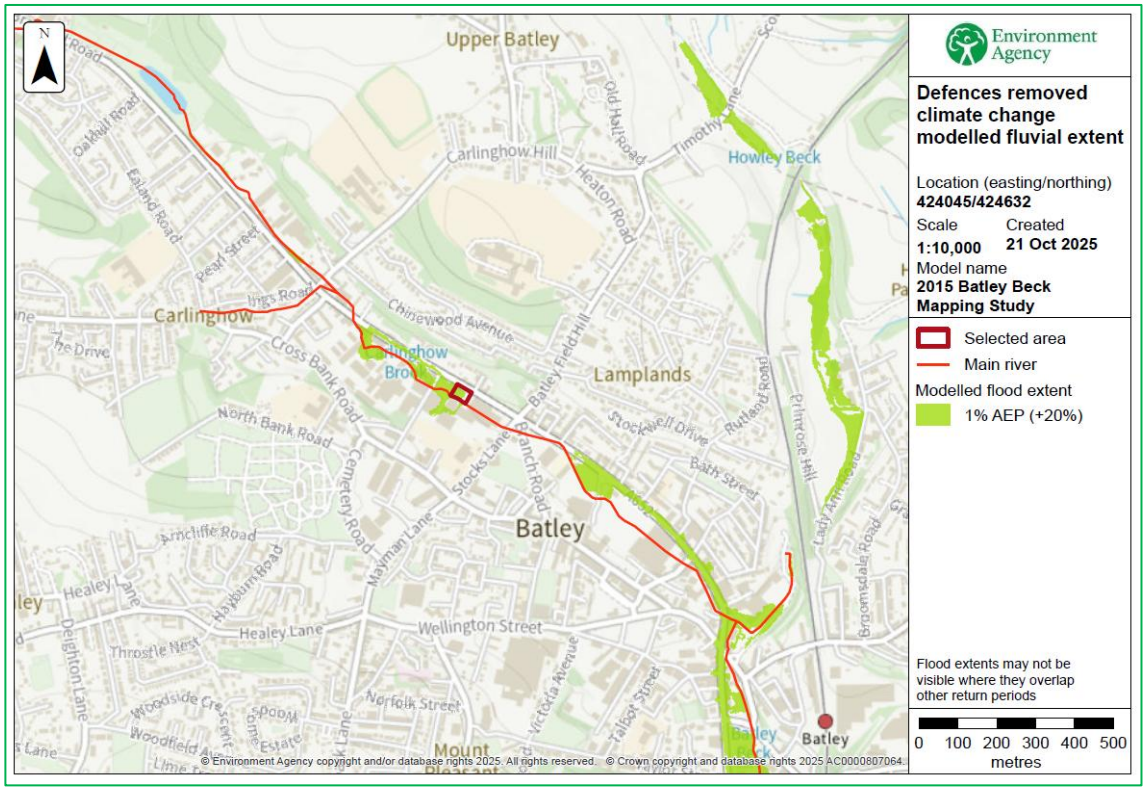

Figure 13 - Environment Agency Undefended Modelled Climate Change Flood Outlines

The mechanism for flooding at this location is generally prolonged episodes of high rainfall, which affords good time for flood warnings to be issued. The likelihood of a rapid water level rise and possible rapid inundation of urban areas posing a risk to life is considered to be minimal with a forewarning of two (2) days of a pending flood event. The Environment Agency, aims to provide forewarning of two (2) days of a pending flood event with the Met Office, providing a forewarning of up to seven (7) days prior to a severe rainfall event.

The Site is located within a low risk area where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2. The speed of inundation and rate of floodwater rise would be low.

The Site is at such a ground level that it would only flood in the most extreme flood events; the Site will remain flood free for the vast majority of flood events during the lifetime of the Proposed Development.

Given the scale and nature of the Proposed Development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a low flood risk to the Site. Therefore, the risk of fluvial flooding is considered to be of low significance. The risk from fluvial sources will be further managed and mitigated by using a number of property level protection measures to manage and reduce the overall flood risk at the Site (see Section 4.0).

3.9 Tidal (Coastal) Flooding

The Site is not located within the vicinity of tidal flooding sources and the risk of tidal flooding is considered to be not significant.

3.10 Groundwater Flooding

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

Groundwater flooding tends to occur sporadically in both location and time. When groundwater flooding does occur, it tends to mostly affect low-lying areas, below surface infrastructure and buildings (for example, tunnels, basements and car parks) underlain by permeable rocks (aquifers). Site ground conditions suggest a low potential for groundwater flooding. Environment Agency data shows that flooding from groundwater is unlikely in this area. The risk of flooding from groundwater flooding is considered to be not significant.

3.11 Surface Water (Pluvial) Flooding

The local catchment is relatively small, and surface water flow pathways are shallow and limited in extent. The Site surroundings are relatively flat and there are no large catchments that would tend to generate surface water runoff towards the Site. Surface water flow flooding tends to occur sporadically in both location and time such surface water flows would tend to be confined to the streets around the development.

The Environment Agency Surface Water flood map shows that the Site has a low to high risk of surface water flooding with annual probability of flooding of 1 in 1000 (0.1%) to greater than 1 in 30 (3.3%) years (see Figures 14 to 16). The effect of climate change on surface water flooding is shown in Figure 17. The surface water depths maps show that the Site may experience water depths of up to 0.30m to 0.60m during the 1 in 100 year (+30%) event (see Figures 18 to 19).

The flooding will only inundate the Site to a relatively low water depth and water velocity, will only last a short period of time, in very extreme cases. Mapping indicates that any surface water

flooding is shallow, short-duration and limited to extreme events. The Site is at such a ground level that it would only flood in the most extreme flood events; the Site will remain flood free for the vast majority of flood events during the lifetime of the Proposed Development.

Given the scale and nature of the Proposed Development and the size and location of the surface water sources it has been concluded that surface water flooding poses a low flood risk to the Site. Therefore, the risk of surface water flooding is considered to be of low significance. The risk of surface water flooding will be further managed and mitigated by using a number of property level protection measures to manage and reduce the overall flood risk at the Site (see Section 4.0).

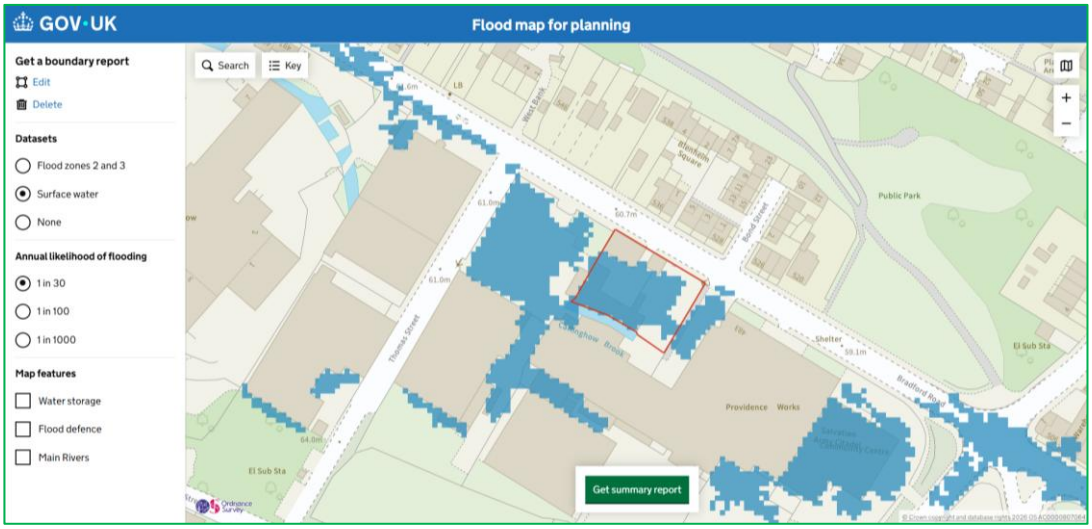

Figure 14 - Environment Agency Surface Water Flood Map: High Risk 1 in 30 Year Event

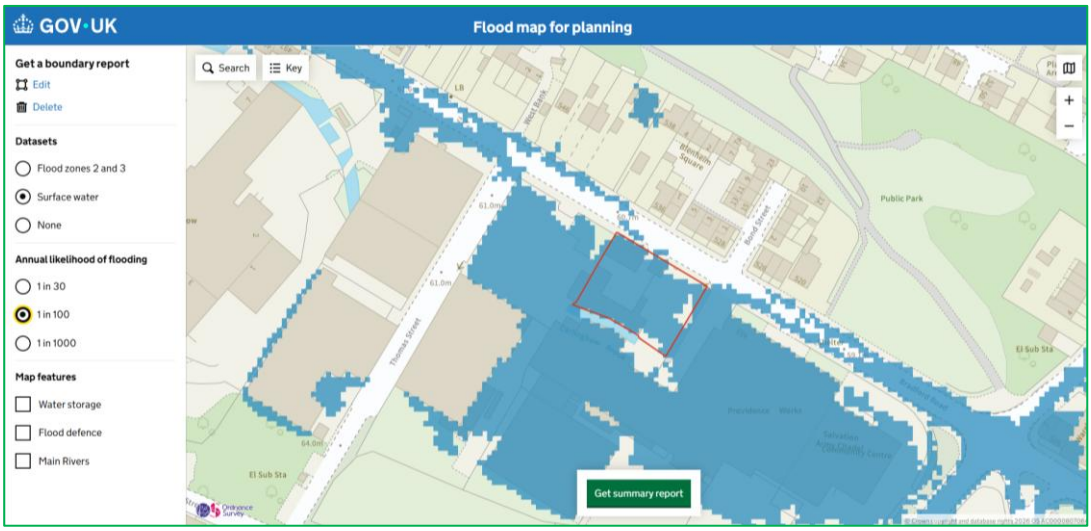

Figure 15 - Environment Agency Surface Water Flood Map: Medium Risk 1 in 100 Year Event

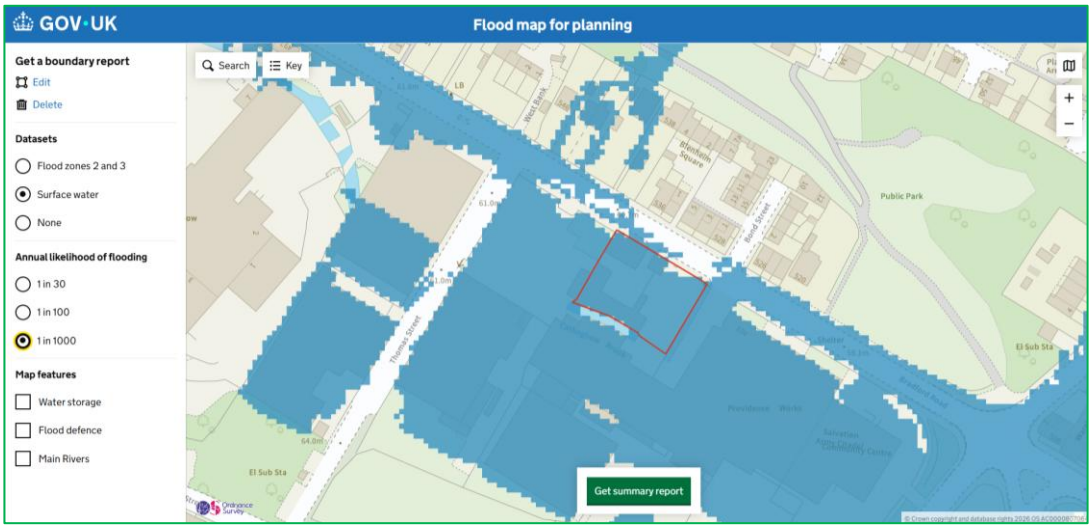

Figure 16 - Environment Agency Surface Water Flood Map: Low Risk 1 in 1000 Year Event

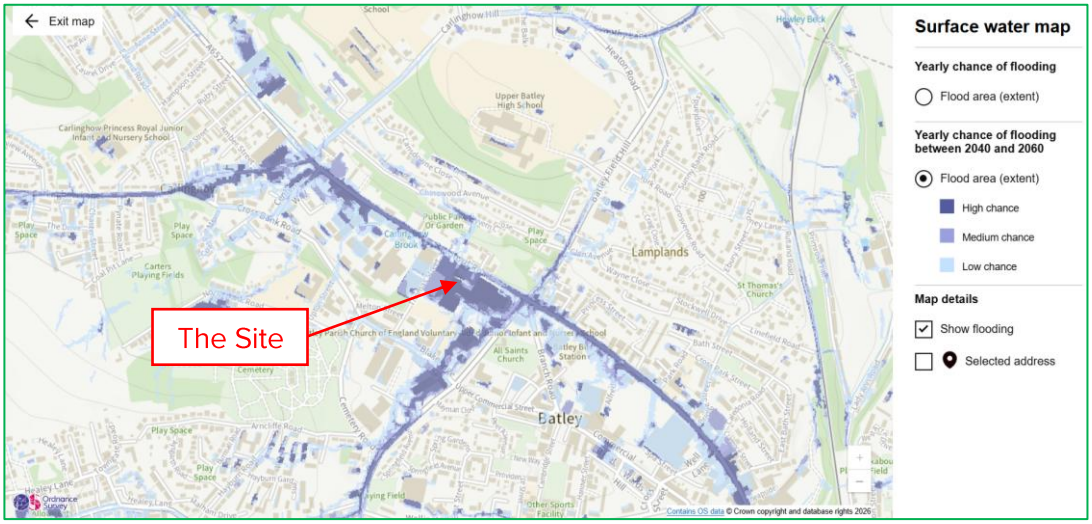

Figure 17 - Environment Agency Surface Water Flood Map: 2040 to 2060

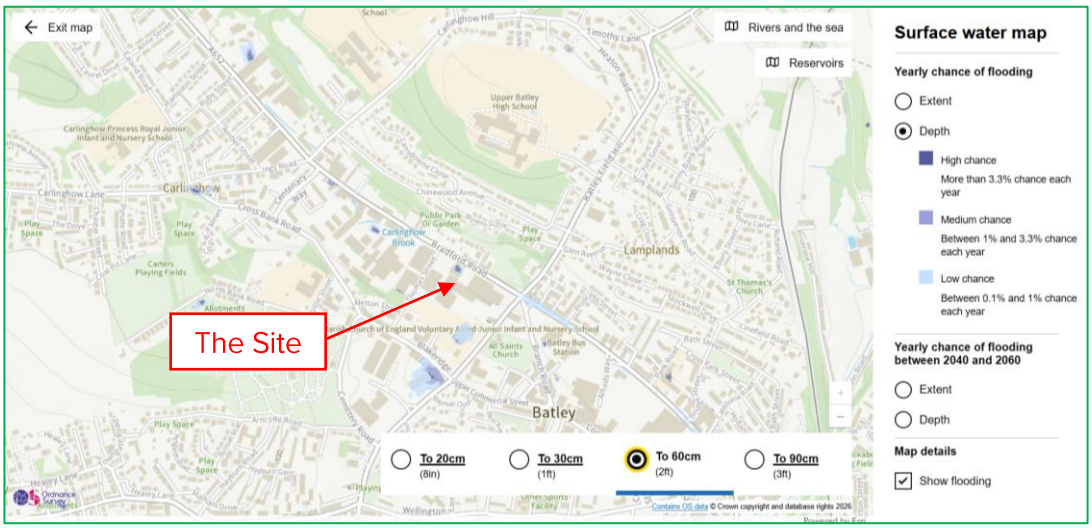

Figure 18 - Environment Agency Surface Water Flood Map: Present Day Water Depths

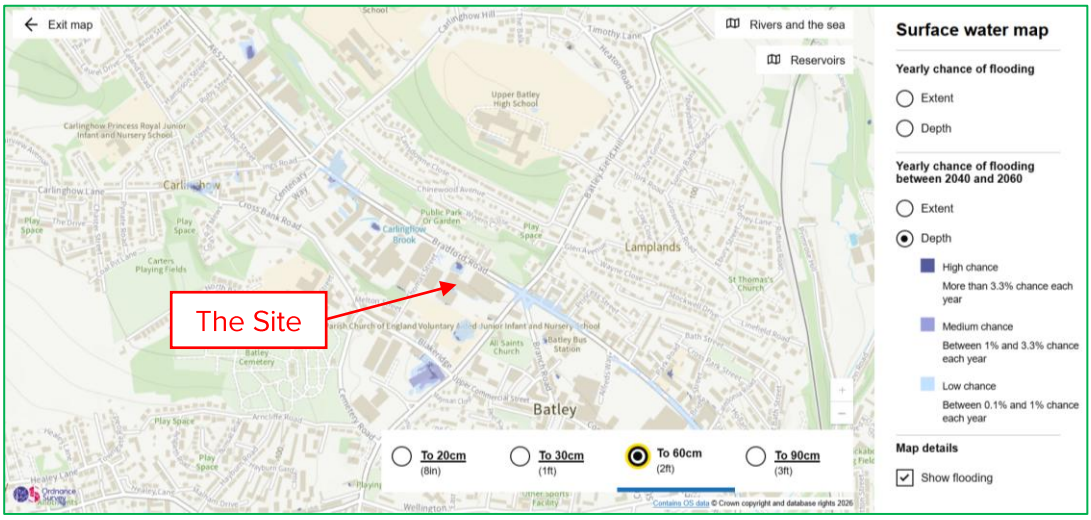

Figure 19 - Environment Agency Surface Water Flood Map: Climate Change Water Depths

3.12 Sewer Flooding

Sewer flooding occurs when urban drainage networks become overwhelmed and maximum capacity is reached. This can occur if there is a blockage in the network causing water to back up behind it or if the sheer volume of water draining into the system is too great to be handled. Sewer flooding tends to occur sporadically in both location and time such flood flows would tend to be confined to the streets around the development.

There are existing sewers located within the vicinity of the Site and these will inevitably have a limited capacity so in extreme conditions there would be surcharges, which may in turn cause flooding. Flood flows could also be generated by burst water mains, but these would tend to be of a restricted and much lower volume than weather generated events and so can be discounted for the purposes of this assessment.

Given the design parameters normally used for drainage design in recent times and allowing for some deterioration in the performance of the installed systems, which are likely to have been in place for many years, an appropriate flood risk probability from this source could be assumed to have a return period in the order of 1 in 10 to 1 in 20 years.

The provision of adequate level difference between the ground floors and adjacent ground level would reduce the annual probability of damage to property from this source to 1 in 100 years or less. There are no records of sewer flooding in the vicinity of the Site, and in the absence of confirmed DG5 entries, sewer flood risk is considered. Therefore, the risk of flooding from sewer flooding is considered to be not significant.

3.13 Flooding from Artificial Drainage Systems/Infrastructure Failure

There are no other nearby artificial water bodies, reservoirs, water channels and artificial drainage systems that could be considered a flood risk to the Site. The Environment Agency Reservoir flood map shows that the Site is not at risk of reservoir flooding (see Figure 20). The risk of flooding from artificial drainage systems/infrastructure failure is considered to be not significant.

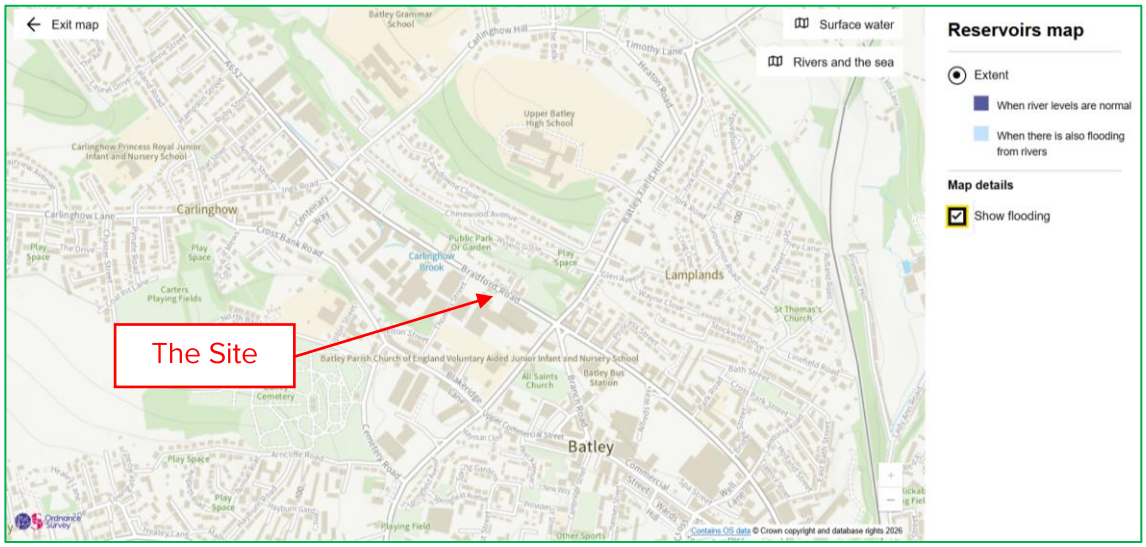

Figure 20 - Environment Agency Reservoir Flood Map

3.14 The Effect of the Development on Flood Risk

No land raising will occur within the Site therefore, the Proposed Development will have no impact on flood risk and the overall direction of the movement of water will be maintained within the developed Site and surrounding area. There will no net loss in flood storage capacity. The conveyance routes (flow paths) will not be blocked or obstructed.

There will be no detriment to the flood storage capacity of the Site. There will be no increase in the flood water levels due to the Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.

3.15 Summary of Site Specific Flood Risk

A summary of the sources of flooding and a review of the risk posed by each source at the Site is shown in Table 9.

Table 9 - Risk Posed by Flooding Sources

Sources of Flooding	Potential Flood Risk	Potential Source	Probability/Significance
Fluvial Flooding	Yes	Carlinghow Brook	Low
Tidal Flooding	No	None Reported	None
Groundwater Flooding	No	None Reported	None
Surface Water Flooding	Yes	Low Spots	Low
Sewer Flooding	No	None Reported	None
Flooding from Artificial Drainage Systems/Infrastructure Failure	No	None Reported	None

Fluvial flooding from the Carlinghow Brook poses the primary but unlikely flood risk to the Site. The Site is located within Flood Zones 2 and 3a and therefore has a 'medium to high probability' of flooding, Flood Zone 2 has between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) in any year and Flood Zone 3 with a 1 in 100 or greater annual probability of river flooding (>1%) in any year. It should be noted that only a small area of the Site to the south, adjacent to the Carlinghow Brook, is located within Flood Zone 3a.

The Site also has no history of flooding and the Environment Agency data shows that there are flood defence measures within the vicinity of the Site which have a 1 in 50 SoP. The existing and proposed use is classified as 'less vulnerable'. The Proposed Development will not change the vulnerability of the Site to flooding and will not introduce a new 'more vulnerable' development into the floodplain. 'Less vulnerable' uses are appropriate within Flood Zones 2 and 3a after the completion of a satisfactory FRA.

Defended Scenario

The Environment Agency data shows that the Site will not be inundated with floodwater for all events up to and including the defended 1 in 100 year event. Water levels have been modelled at 59.91mAOD during the defended 1 in 100 year (+20%) event and at 60.40mAOD during the defended 1 in 1000 year event. Accordingly, flooding of the Site may occur during these defended scenarios, with modelled depths of between 0.08m and 0.33m for the defended 1 in 100 year (+20%) event and between 0.34m and 1.16m for the defended 1 in 1000 year event. The Site is not subject to widespread inundation, with shallow flooding predicted at isolated locations only.

Undefended Scenario

The Environment Agency data shows that the Site will not be inundated with floodwater for all events up to and including the undefended 1 in 100 year and 1 in 1000 year events. Water levels have been modelled at 59.95mAOD during the undefended 1 in 100 year (+20%) event. Accordingly, flooding of the Site may occur during this undefended scenario, with modelled depths of between 0.03m and 0.47m for the undefended 1 in 100 year (+20%) event. The Site is not subject to widespread inundation, with shallow flooding predicted at isolated locations only.

Summary

The mechanism for flooding at this location is generally prolonged episodes of high rainfall, which affords good time for flood warnings to be issued. The likelihood of a rapid water level rise and possible rapid inundation of urban areas posing a risk to life is considered to be minimal with a forewarning of two (2) days of a pending flood event. The Environment Agency, aims to provide forewarning of two (2) days of a pending flood event with the Met Office, providing a forewarning of up to seven (7) days prior to a severe rainfall event.

The Site is located within a low risk area where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2. The speed of inundation and rate of floodwater rise would be low.

The Site is at such a ground level that it would only flood in the most extreme flood events; the Site will remain flood free for the vast majority of flood events during the lifetime of the Proposed Development.

Given the scale and nature of the Proposed Development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a low flood risk to the Site and the risk of surface water flooding is considered to be of low significance. A secondary flooding source has been identified which may pose a low significant risk to the Site. This is:

- Surface Water Flooding

The risk of flooding from all sources will be further managed and mitigated by using a number of property level protection measures to manage and reduce the overall flood risk at the Site (see Section 4.0).

No land raising will occur within the Site therefore, the Proposed Development will have no impact on flood risk and the overall direction of the movement of water will be maintained within the developed Site and surrounding area. There will no net loss in flood storage capacity. The conveyance routes (flow paths) will not be blocked or obstructed.

There will be no detriment to the flood storage capacity of the Site. There will be no increase in the flood water levels due to the Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.

4.0 RISK MANAGEMENT

4.1 Introduction

The flood risk at this location is considered suitable for the Proposed Development within the NPPF. In this flood zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development and the use of flood mitigation measures.

The flooding sources will be mitigated on the Site by using a number of techniques, and mitigation strategies to manage and reduce the overall flood risk at the Site. This will ensure the development will be safe and there is:

- Minimal risk to life;
- Minimal disruption to people living and working in the area;
- Minimal potential damage to property;
- Minimal impact of the Proposed Development on flood risk generally; and;
- Minimal disruption to natural heritage.

The flood risk at the Site will be reduced by mitigation measures; these are discussed in more detail below.

4.2 Sequential Arrangement

The sequential approach has been applied within the Site by locating the most vulnerable elements of the development in the lowest risk areas. The most vulnerable use, the proposed buildings, have been situated on locally higher ground within the Site. The ground level at the location of the proposed buildings is approximately 60.83mAOD.

4.3 Finished Floor Levels

The water level for the 1 in 100 year (+20%) event is 59.95mAOD at label 14. Finished floor levels will be set to provide a minimum freeboard of at least 300mm above the design flood event for the Site, defined as the undefended 1 in 100 year (+23%) event.

Based on the Environment Agency modelled flood levels, this equates to a finished floor level of approximately 60.25mAOD. Final finished floor levels will be confirmed at detailed design stage once site levels are tied to Ordnance Datum.

Topographical survey information indicates that the proposed building platforms are located on locally higher ground relative to Bradford Road, and therefore finished floor levels will sit comfortably above adjacent external ground levels.

Further raising finished floor levels beyond this standard is not considered practicable due to site constraints, streetscene considerations, access requirements and Building Regulations compliance. Flood risk is instead managed through an appropriate combination of finished floor levels, internal safe refuge, flood warning registration and property-level resistance and resilience measures.

A combination of resistance (proofing) and resilience measures will be incorporated to provide further protection, as discussed below.

4.4 Flood Resilience and Resistance

The development of the layout should always consider that the site is potentially at risk from an extreme event and as such the implementation of flood resilience and resistance methods should be assessed.

To make the buildings more resistant to seepage the following measures will be incorporated. Sealant will be used around external doors and windows. All windows will be located above the ground levels. All external doors and windows will be constructed from robust materials. External walls will be of robust construction appropriate to a flood resilient design.

To improve the buildings resilience to flooding the following measures will be incorporated. All electrical wiring, switches, sockets, socket outlets, electrical, and gas meters etc. will be located a minimum of 450mm above the finished floor levels. Also sloping landscaping away from the buildings will be incorporated into the Site.

4.5 Flood Warning

The Site is located in a flood risk area therefore; the Site will participate in the Environment Agency flood warning telephone service. The Site will register contact details with the Environment Agency's Flood Warnings Service (Floodline 0845 988 1188) in order to receive Flood Warnings. The Environment Agency operate a free flood warning service providing alerts by phone, text or email when flooding is anticipated providing an opportunity for home owners to take necessary precautions, giving enough time for the building to be safely evacuated and mitigation measures to be put in place.

All occupants/visitors of the Site will be made aware of the Environment Agency Floodline telephone number (Call Floodline on 0345 988 1188 or 0845 988 1188 to get more information) and the three Flood Warning Codes and their meaning. The owner of the Site will carry out the role of Flood Warden for the Site and ensure they have an understanding of the flood mechanisms of the Site and will ensure that the safety of the occupants and visitors will not be compromised.

The Environment Agency uses three Flood Warnings Codes. They can be issued in any order, usually ending with an 'all clear'. They are issued by the Environment Agency through their website and Floodline Warning Service. The flood warning will be passed onto the occupier/visitors of the Site verbally, by telephone and/or in person. It will be ensured that everyone receives the flood warnings when required.

4.6 Flood Plan

A Flood Plan outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed. Sensible precautions would include raising electrical items, moving valuable items off the ground or where possible moving them to a higher floor, rolling up carpets and rugs and turning off utilities. In addition, consider what actions you would take should the property need to be evacuated including access and egress routes and preparing a flood kit in advance containing warm clothing, medication, a torch, food and wellingtons.

The Flood Plan is a 'living' document and therefore should be periodically reviewed and updated to provide advice and guidance to occupants in the event of an extreme flood. The Flood Plan will therefore reduce the vulnerability of the occupants to flooding and makes them aware of the mechanisms of flooding at the Site.

4.7 Safe Access and Egress Route

The NPPF requires that, where required, safe access and escape is available to/from new developments in flood risk areas. Access routes should be such that occupants can safely access and exit buildings in design flood conditions. These routes must also provide the emergency services with access to the development during a flood event and enable flood defence authorities to carry out any necessary duties during the period of flood.

A safe access and egress route, including emergency access can be maintained for vehicles and/or by foot via the Site along Bradford Road to the southeast and then northeast along Baily Field Hill. The Safe Access and Egress Route shown in Figure 21 indicates the exit route that all people (i.e. occupants and visitors) on the Site should follow once a flood warning has been received. People should make their way to areas outside of the flood zone.

The likelihood of a rapid river level rise and possible rapid inundation of urban areas posing a risk to life is considered to be minimal. In the event of a Flood Warning, vital belongings, including waterproof clothing, necessary medication and essentials will be collected. It should be ensured that all occupiers and visitors to the Site are accounted for, and then exit the Site using the route shown in Figure 21.

Facilities such as community centres, shops etc. are located to the north of the Site which may be used in the event of a flood event. There may also be large areas than those shown in Figure 2 that are flood free located nearer and within the vicinity of the Site. Therefore, safe access and egress can be maintained in accordance with the NPPF and Environment Agency Guidance.

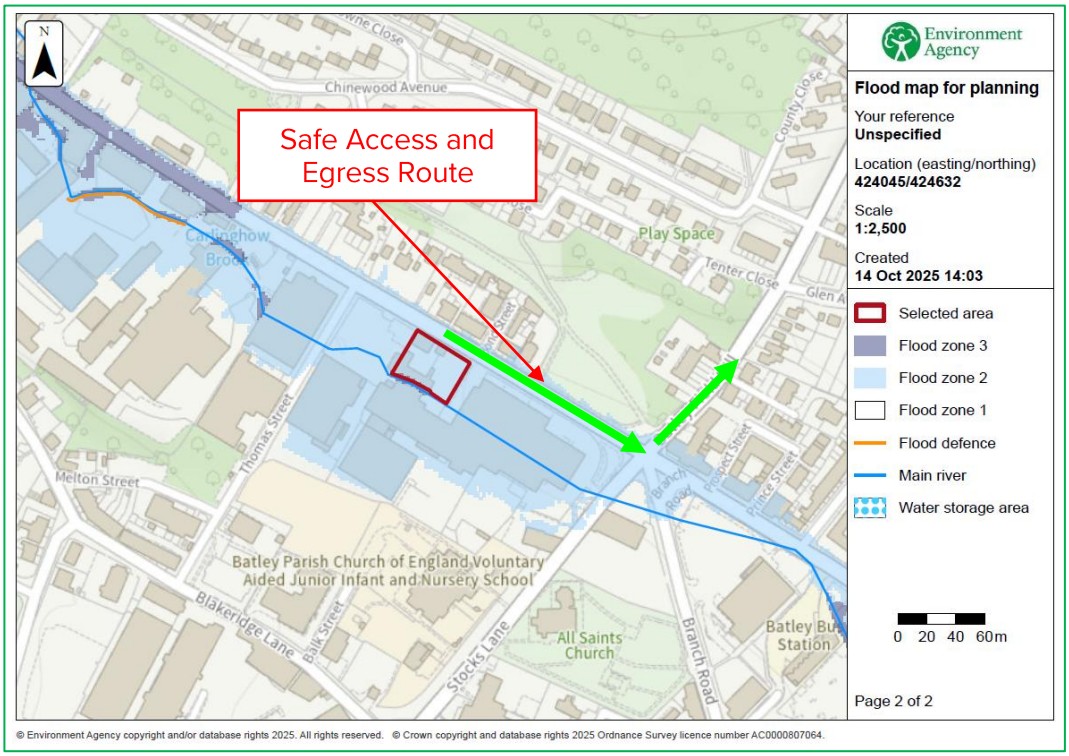

Figure 21 - Safe Access and Egress Route

4.8 Exceedance Flows

In exceedance events, overland flows would follow existing site gradients. Exceedance flows would be shallow, routed away from buildings and across hardstanding areas, and would not

increase flood risk to buildings or adjacent land. The exceedance routes reflect existing ground levels and do not rely on formal conveyance features or site management interventions.

4.9 Buffer Strip

No new buildings/structures will be introduced within 8m of the top of bank of the Carlinghow Brook.

4.10 Flooding Consequences

The mitigation measures detailed above show that the flood risk can be effectively managed and therefore the consequences of flooding are acceptable. The Site is unlikely to flood except in extreme conditions. This takes into account the property level protection measures.

5.0 SUMMARY AND CONCLUSIONS

5.1 Introduction

This report presents a FRA in accordance with the NPPF for the Proposed Development at 485 Bradford Road, Batley, WF17 8LB.

This FRA identifies and assesses the risks of all forms of flooding to and from the development and demonstrates how these flood risks will be managed so that the development remains safe throughout the lifetime, taking climate change into account.

5.2 Flood Risk

Fluvial flooding from the Carlinghow Brook poses the primary but unlikely flood risk to the Site. The Site is located within Flood Zones 2 and 3a and therefore has a 'medium to high probability' of flooding, Flood Zone 2 has between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) in any year and Flood Zone 3 with a 1 in 100 or greater annual probability of river flooding (>1%) in any year. It should be noted that only a small area of the Site to the south, adjacent to the Carlinghow Brook, is located within Flood Zone 3a.

The Site also has no history of flooding and the Environment Agency data shows that there are flood defence measures within the vicinity of the Site which have a 1 in 50 SoP. The existing and proposed use is classified as 'less vulnerable'. The Proposed Development will not change the vulnerability of the Site to flooding and will not introduce a new 'more vulnerable' development into the floodplain. 'Less vulnerable' uses are appropriate within Flood Zones 2 and 3a after the completion of a satisfactory FRA.

Defended Scenario

The Environment Agency data shows that the Site will not be inundated with floodwater for all events up to and including the defended 1 in 100 year event. Water levels have been modelled at 59.91mAOD during the defended 1 in 100 year (+20%) event and at 60.40mAOD during the defended 1 in 1000 year event. Accordingly, flooding of the Site may occur during these defended scenarios, with modelled depths of between 0.08m and 0.33m for the defended 1 in 100 year (+20%) event and between 0.34m and 1.16m for the defended 1 in 1000 year event. The Site is not subject to widespread inundation, with shallow flooding predicted at isolated locations only.

Undefended Scenario

The Environment Agency data shows that the Site will not be inundated with floodwater for all events up to and including the undefended 1 in 100 year and 1 in 1000 year events. Water levels have been modelled at 59.95mAOD during the undefended 1 in 100 year (+20%) event. Accordingly, flooding of the Site may occur during this undefended scenario, with modelled depths of between 0.03m and 0.47m for the undefended 1 in 100 year (+20%) event. The Site is not subject to widespread inundation, with shallow flooding predicted at isolated locations only.

Summary

The mechanism for flooding at this location is generally prolonged episodes of high rainfall, which affords good time for flood warnings to be issued. The likelihood of a rapid water level rise and possible rapid inundation of urban areas posing a risk to life is considered to be minimal with a forewarning of two (2) days of a pending flood event. The Environment Agency, aims to

provide forewarning of two (2) days of a pending flood event with the Met Office, providing a forewarning of up to seven (7) days prior to a severe rainfall event.

The Site is located within a low risk area where the onset of flooding is very gradual (many hours) as per Flood Risk Assessment Guidance for New Development Phase 2, R&D Technical Report FD2320/TR2. The speed of inundation and rate of floodwater rise would be low.

The Site is at such a ground level that it would only flood in the most extreme flood events; the Site will remain flood free for the vast majority of flood events during the lifetime of the Proposed Development.

Given the scale and nature of the Proposed Development and the size and location of the fluvial flooding sources it has been concluded that fluvial flooding poses a low flood risk to the Site and the risk of surface water flooding is considered to be of low significance. A secondary flooding source has been identified which may pose a low significant risk to the Site. This is:

- Surface Water Flooding

The risk of flooding from all sources will be further managed and mitigated by using a number of property level protection measures to manage and reduce the overall flood risk at the Site.

No land raising will occur within the Site therefore, the Proposed Development will have no impact on flood risk and the overall direction of the movement of water will be maintained within the developed Site and surrounding area. There will no net loss in flood storage capacity. The conveyance routes (flow paths) will not be blocked or obstructed.

There will be no detriment to the flood storage capacity of the Site. There will be no increase in the flood water levels due to the Proposed Development. There will be no loss in flood storage capacity and no change in the on-site and off-site flood risk.

5.3 Risk Management

The flood risk at the Site will be reduced by mitigation measures, discussed below.

Sequential Arrangement: The sequential approach has been applied within the Site by locating the most vulnerable elements of the development in the lowest risk areas. The most vulnerable use, the proposed buildings, have been situated on locally higher ground within the Site. The ground level at the location of the proposed buildings is approximately 60.83mAOD.

Finished Floor Levels: The water level for the 1 in 100 year (+20%) event is 59.95mAOD at label 14. Finished floor levels will be set to provide a minimum freeboard of at least 300mm above the design flood event for the Site, defined as the undefended 1 in 100 year (+23%) event.

Based on the Environment Agency modelled flood levels, this equates to a finished floor level of approximately 60.25mAOD. Final finished floor levels will be confirmed at detailed design stage once site levels are tied to Ordnance Datum.

Topographical survey information indicates that the proposed building platforms are located on locally higher ground relative to Bradford Road, and therefore finished floor levels will sit comfortably above adjacent external ground levels.

Further raising finished floor levels beyond this standard is not considered practicable due to site constraints, street scene considerations, access requirements and Building Regulations compliance. Flood risk is instead managed through an appropriate combination of finished floor levels, internal safe refuge, flood warning registration and property-level resistance and resilience measures.

A combination of resistance (proofing) and resilience measures will be incorporated to provide further protection, as discussed below.

Flood Resilience and Resistance: To make the buildings more resistant to seepage the following measures will be incorporated. Sealant will be used around external doors and windows. All windows will be located above the ground levels. All external doors and windows will be constructed from robust materials. External walls will be of robust construction appropriate to a flood resilient design.

To improve the buildings resilience to flooding the following measures will be incorporated. All electrical wiring, switches, sockets, socket outlets, electrical, and gas meters etc. will be located a minimum of 450mm above the finished floor levels. Also sloping landscaping away from the buildings will be incorporated into the Site.

Flood Warning: The Site is located in a flood risk area therefore; the Site will participate in the Environment Agency flood warning telephone service. The Site will register contact details with the Environment Agency's Flood Warnings Service (Floodline 0845 988 1188) in order to receive Flood Warnings.

Flood Plan: A Flood Plan outlining the precautions and actions you should take when a flood event is anticipated to help reduce the impact and damage flooding may cause will be developed.

Safe Access and Egress Route: A safe access and egress route, including emergency access can be maintained for vehicles and/or by foot via the Site access along Bradford Road to the southeast and then northeast along Baily Field Hill. The Safe Access and Egress Route indicates the exit route that all people (i.e. occupants and visitors) on the Site should follow once a flood warning has been received. People should make their way to areas outside of the flood zone.

Facilities such as community centres, shops etc. are located to the north of the Site which may be used in the event of a flood event. Therefore, safe access and egress can be maintained in accordance with the NPPF and Environment Agency Guidance.

Exceedance Flows: In exceedance events, overland flows would follow existing site gradients. Exceedance flows would be shallow, routed away from buildings and across hardstanding areas, and would not increase flood risk to buildings or adjacent land. The exceedance routes reflect existing ground levels and do not rely on formal conveyance features or site management interventions.

Buffer Strip: No new buildings/structures will be introduced within 8m of the top of bank of the Carlinghow Brook.

5.4 Conclusion

In conclusion, the Proposed Development, would be expected to remain dry in all but the most extreme conditions. Providing the recommendations made in this FRA are instigated, flood risk from all sources would be minimised, the consequences of flooding are acceptable and the development would be in accordance with the requirements of the NPPF.

This FRA demonstrates that the Proposed Development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of the NPPF. The development should not therefore be precluded on the grounds of flood risk.

APPENDICES

APPENDIX 1 – Existing and Proposed Site Layout

EXISTING SITE PLAN
1:500 @ A3

SITE PLAN
1:500@A3

PROPOSED SITE PLAN
1:500 @ A3

Use figured dimensions only. DO NOT SCALE.
All dimensions are in millimetres unless noted otherwise.
All levels are in metres above ordnance datum unless noted otherwise.
This drawing must be read in conjunction with all other relevant drawings and specifications from the Architect and other consultants.

NOTES:

KEY

- EXISTING
- PROPOSED
- DEMOLITION
- SITE BOUNDARY

HARD LANDSCAPING WORKS

- TARMACADAM
- BLOCK PAVING

BOUNDARY TREATMENT

- 375MM HIGH BRICK WALL
- 1.8M TIMBER FENCE

SOFT LANDSCAPING WORKS

- PROPOSED SEMI-MATURE TREE
- EXISTING TREES TO BE RETAINED
- LAWN AREAS

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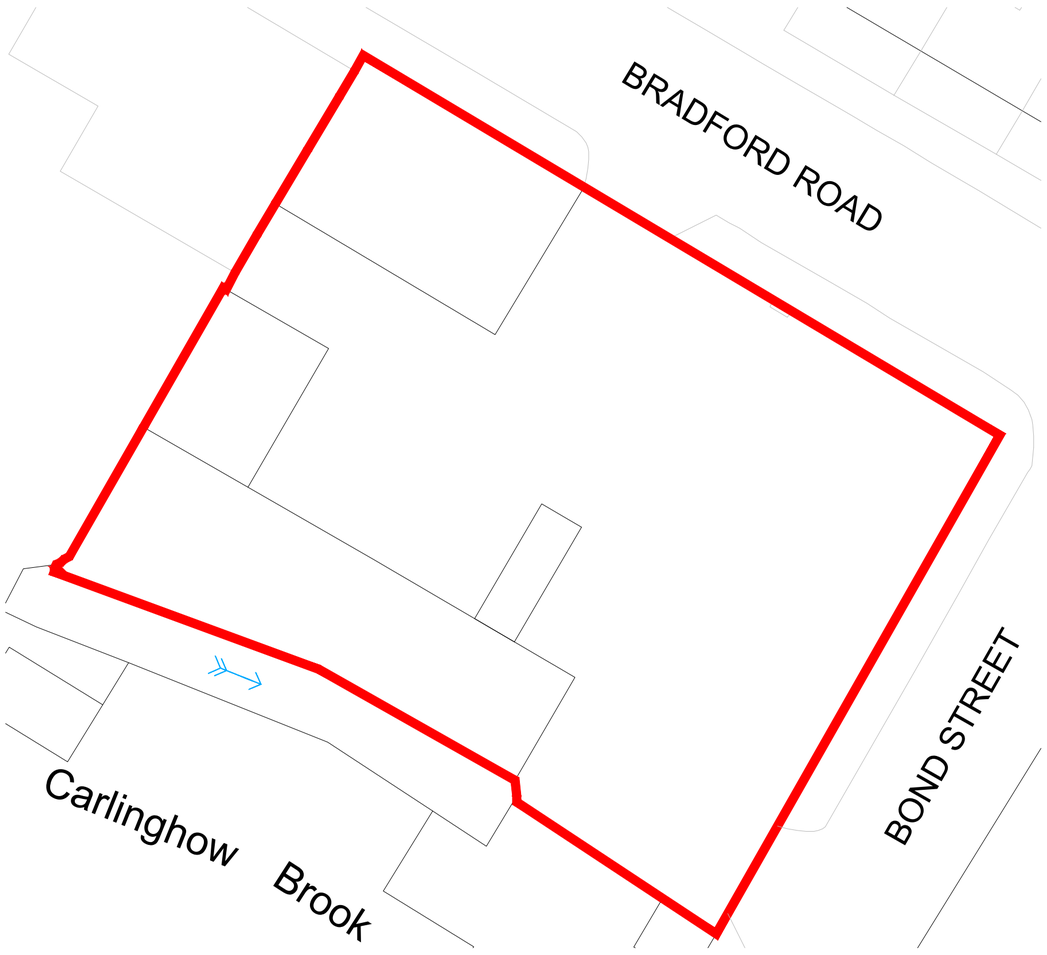
PROJECT:
485 BRADFORD ROAD, BATLEY
WF17 8LB

DRAWING TITLE:
SITE PLAN

DATE: 3/10/25 SCALE: VARIES @ A3 DRWN BY: HD

DRAWING REF: 25336-**D02** REV: A



EXISTING SITE PLAN
1:250 @ A1

PROPOSED SITE PLAN
1:250 @ A1

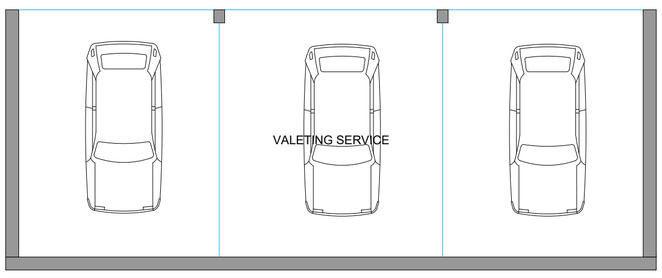
Use figured dimensions only. DO NOT SCALE.
All dimensions are in millimetres unless noted otherwise.
All levels are in metres above ordnance datum unless noted otherwise.
This drawing must be read in conjunction with all other relevant drawings and specifications from the Architect and other consultants.

NOTES:

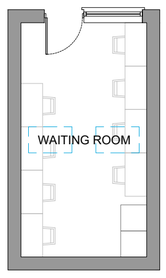
PLAN KEY -

- DEMOLITION
- EXISTING WALL
- PROPOSED WALL

BUILDING A PLAN
1:100 @ A1

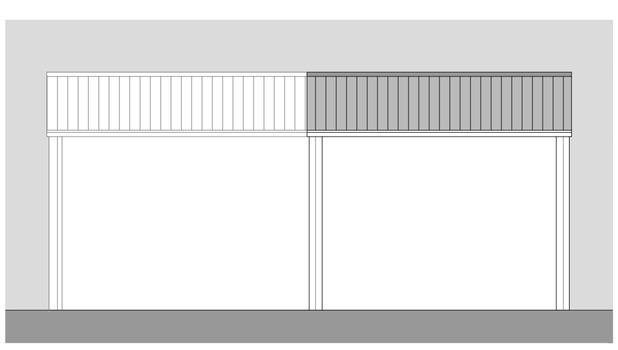


BUILDING B PLAN
1:100 @ A1

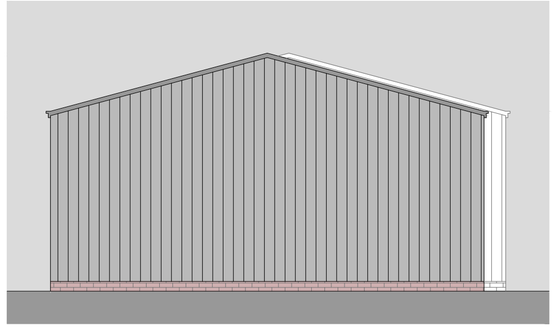


BUILDING C PLAN
1:100 @ A1

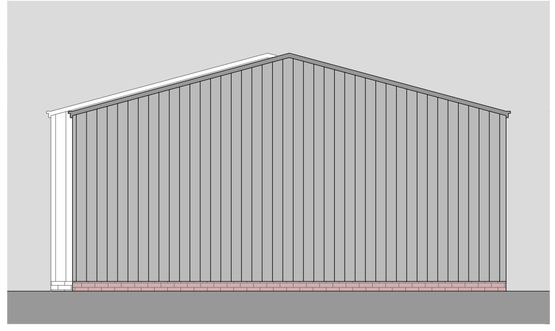
BUILDING A



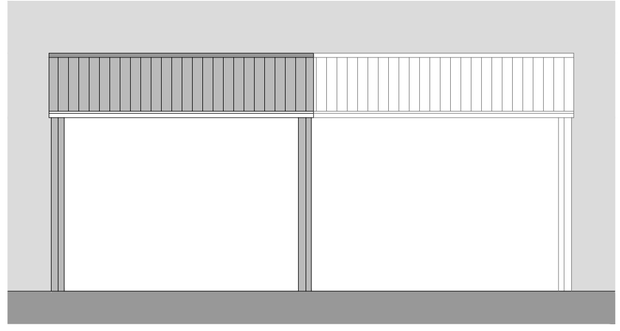
PROPOSED FRONT ELEVATION
1:100 @ A1



PROPOSED SIDE ELEVATION
1:100 @ A1

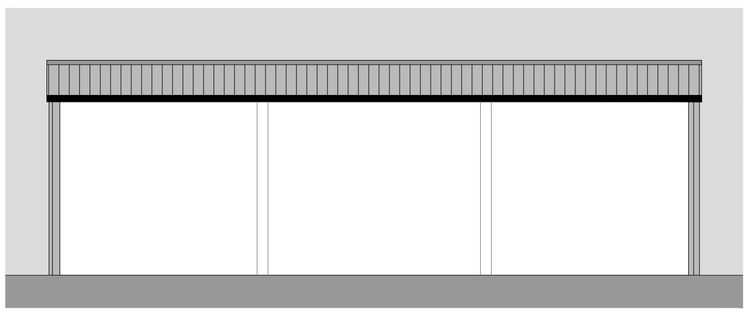


PROPOSED OTHER SIDE ELEVATION
1:100 @ A1

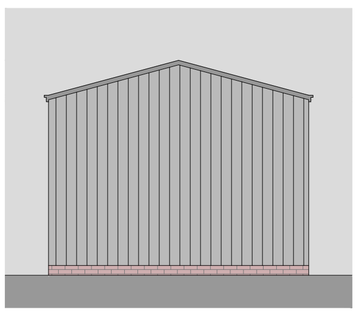


PROPOSED REAR ELEVATION
1:100 @ A1

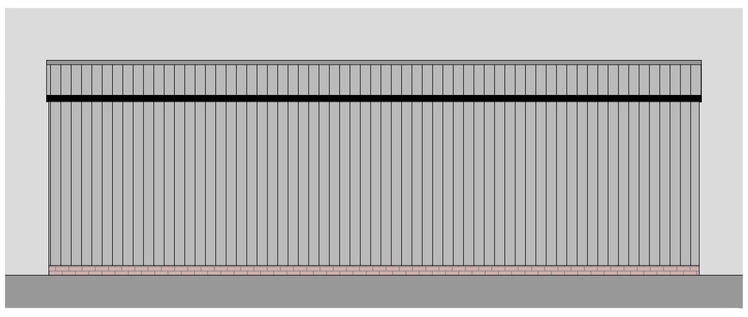
BUILDING B



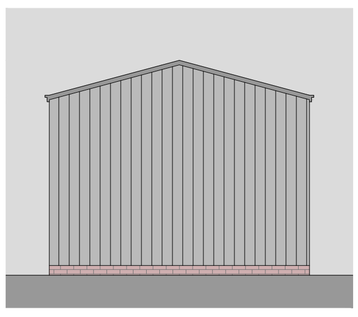
PROPOSED FRONT ELEVATION
1:100 @ A1



PROPOSED SIDE ELEVATION
1:100 @ A1

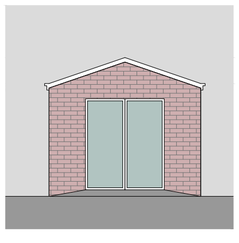


PROPOSED REAR ELEVATION
1:100 @ A1

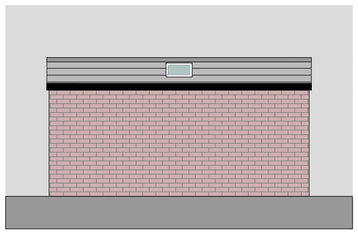


PROPOSED OTHER SIDE ELEVATION
1:100 @ A1

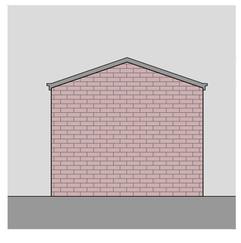
BUILDING C



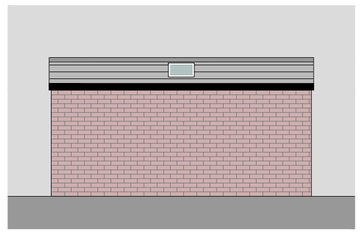
PROPOSED FRONT ELEVATION
1:100 @ A1



PROPOSED SIDE ELEVATION
1:100 @ A1



PROPOSED REAR ELEVATION
1:100 @ A1



PROPOSED OTHER SIDE ELEVATION
1:100 @ A1

KUFIC.
ARCHITECTS

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PROJECT:
485 BRADFORD ROAD, BATLEY
WF17 8LB

DRAWING TITLE:
GROUPED PLANS AND
ELEVATIONS

DATE: 3/10/25 SCALE: VARIES @ A3 DRWN BY: HD

DRAWING REF: 25336-**D03**

REV: A

APPENDIX 2 – Environment Agency Data

Flood risk assessment data

Location of site: 424045 / 424632 (shown as easting and northing coordinates)
Document created on: 21 October 2025
This information was previously known as a product 4.
Customer reference number: CPFW748K9JAE

Map showing the location that flood risk assessment data has been requested for.

How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- past floods
- flood defences and attributes
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Surface water and other sources of flooding

When using the surface water map on the check your long term flood risk service the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- reservoir flood risk
- groundwater flood risk - you could use the British Geological Survey groundwater flooding data, groundwater: current status and flood risk and the guide on mining and groundwater constraints for development - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Kirklees District.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: 2015 Batley Beck Mapping Study
Scenario(s): Defended fluvial, defences removed fluvial, defended climate change fluvial, defences removed climate change fluvial
Date: 30 November 2015

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occuring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change


N
Upper Batley
Carlinghow Hill
Howley Beck
Carlinghow
Lamplands
Batley
Healey Lane
Wellington Street
Mount Pleasant
Batley
Oakhill Road
Leland Road
Pearl Street
Cross Bank Road
Chirnewood Avenue
Carlinghow Beck
Batley Field Hill
Heaton Road
Old Hall Road
Timothy Lane
North Bank Road
Cemetery Road
Stocks Lane
Branch Road
Stockwell Drive
Rutland Road
Primrose Hill
Bath Street
Broomsdale Road
Armcliffe Road
Mayman Lane
Haybum Road
Deighton Lane
Throstle Nest
Woodside Crescent
Woodfield Avenue
Norfolk Street
Victoria Avenue
Talbot Street
Barley Beck
Environment Agency
Flood map for planning
Location (easting/northing)
424045/424632
Scale
1:10,000
Created
21 Oct 2025
Selected area
Main river
Flood defence
Flood Zone 3
Flood Zone 2
0 100 200 300 400 500
metres
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Past floods

Past flood events included in this document

The recorded flood outlines included in this document are for areas of land local to your site location that have been flooded by any of these sources:

- ephemeral water
- main rivers
- ordinary watercourses
- the sea
- unknown

Data limitations

The outlines do not include flooding from:

- drainage where rainfall has led to surface water ponding or overland runoff
- artificial, water-bearing sewer, water supply and wastewater treatment pipelines

Changes to flood defences

The defences (also known as assets) that were in place may also have changed. For example, assets may have been built more recently than the last recorded flood outline.

What the recorded flood outlines dataset is

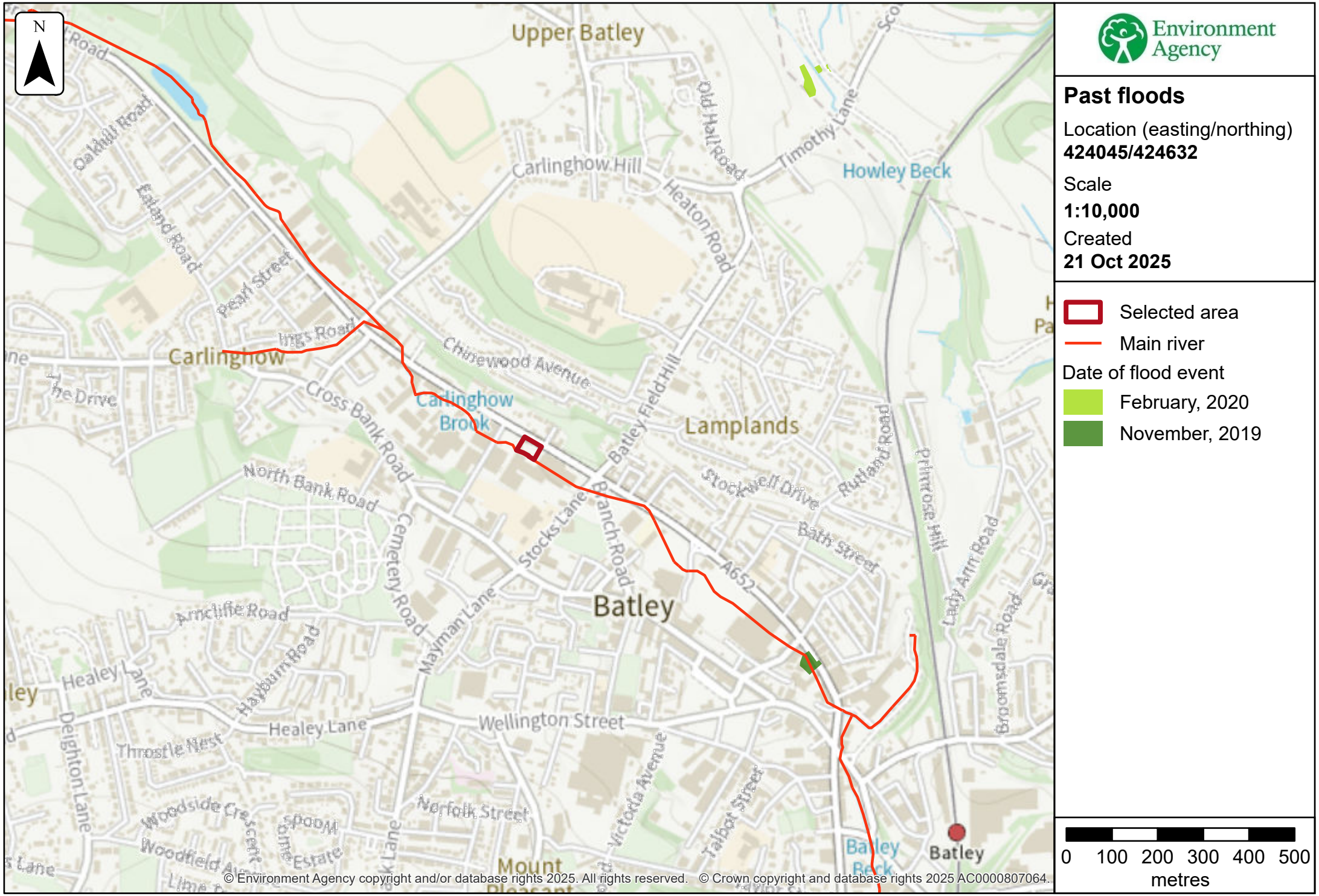
The recorded flood outlines are a geographical information system (GIS) data layer that show our verified records of areas that have flooded in the past from:

- rivers
- the sea
- groundwater
- surface water

Download the complete recorded flood outlines dataset, which includes data quality flags for outlines recorded after April 2020. This indicates the confidence we have in an outline.

Get flood information from other organisations

Contact Kirklees District Lead Local Flood Authority (LLFA) and your drainage board to get information about past flooding caused by surface water or drainage systems.


N
Upper Batley
Carlinghow Hill
Howley Beck
Carlinghow
Carlinghow Brook
Lamplands
Batley
Cross Bank Road
North Bank Road
Cemetery Road
Stocks Lane
Branch Road
Batley Field Hill
Heaton Road
Old Hall Road
Timothy Lane
Chinewood Avenue
Stockwell Drive
Bath Street
Primrose Hill
Lady Ann Road
Broomsdale Road
Rutland Road
A652
Mayman Lane
Healey Lane
Wellington Street
Norfolk Street
Talbot Street
Victoria Avenue
Deighton Lane
Throstle Nest
Armcliffe Road
Haybum Road
Pearl Street
Oakhill Road
Batley
Batley Beck
Mount Pleasant
Environment Agency
Past floods
Location (easting/northing)
424045/424632
Scale
1:10,000
Created
21 Oct 2025
Selected area
Main river
Date of flood event
February, 2020
November, 2019
0 100 200 300 400 500
metres
© Environment Agency copyright and/or database rights 2025. All rights reserved. © Crown copyright and database rights 2025 AC0000807064.

Data on past flood events

Start date	End date	Source of flood	Cause of flood	Affects location
15 February 2020	19 March 2020	ordinary watercourse	channel capacity exceeded (no raised defences)	No
7 November 2019	8 November 2019	main river	channel capacity exceeded (no raised defences)	No

Flood defences and attributes

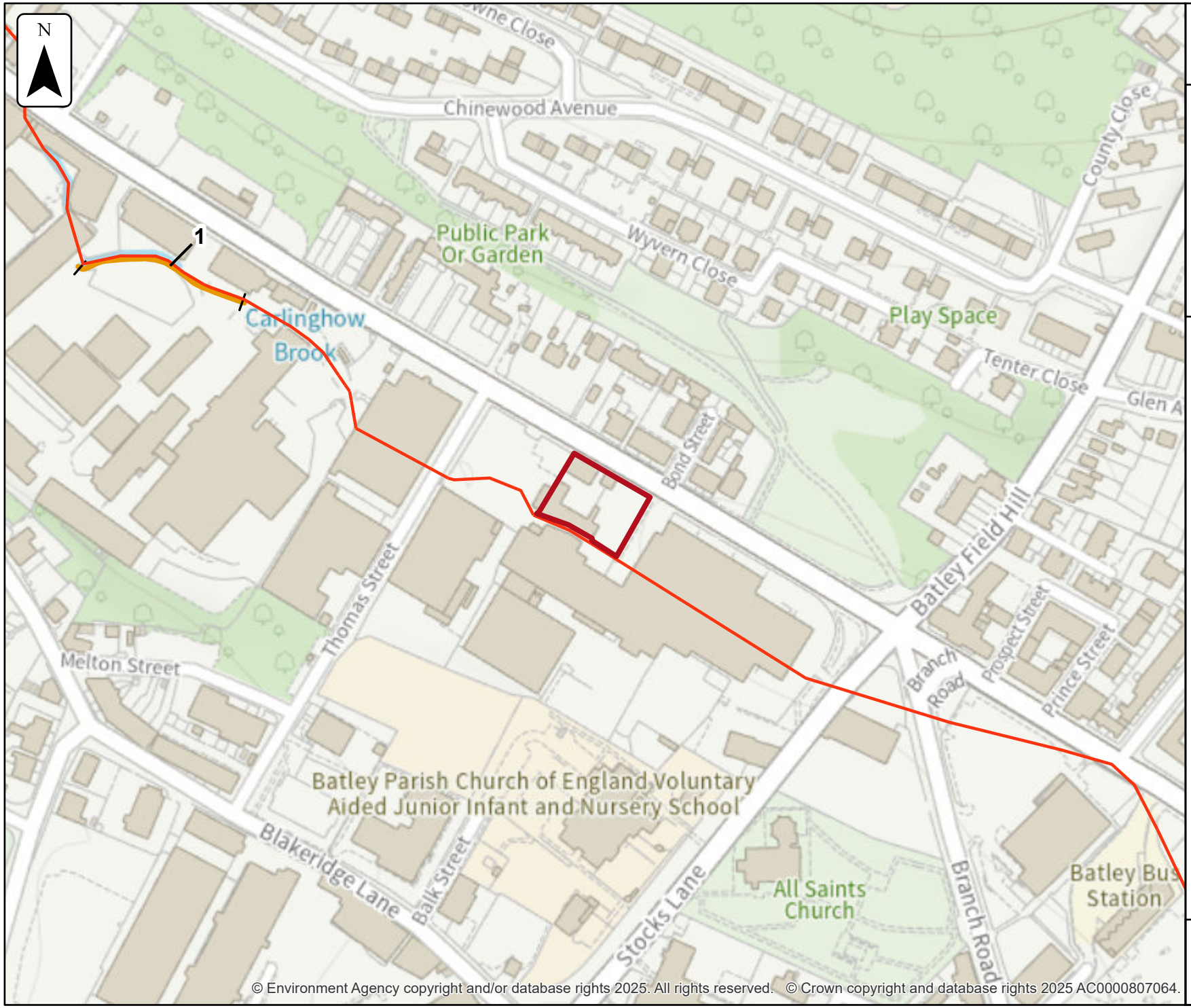
The flood defences map shows the location of the flood defences present.

The flood defences data table shows the type of defences, their condition and the standard of protection. It shows the height above sea level of the top of the flood defence (crest level). The height is In mAOD which is the metres above the mean sea level at Newlyn, Cornwall.

It's important to remember that flood defence data may not be updated on a regular basis. The information here is based on the best available data.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



Environment Agency

Flood defences

Location (easting/northing)
424045/424632

Scale
1:2,500

Created
21 Oct 2025

- Selected area
- Main river
- Flood defence

0 25 50 75 100
metres

Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	76841	Wall	50	Good	62.71	62.44	

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

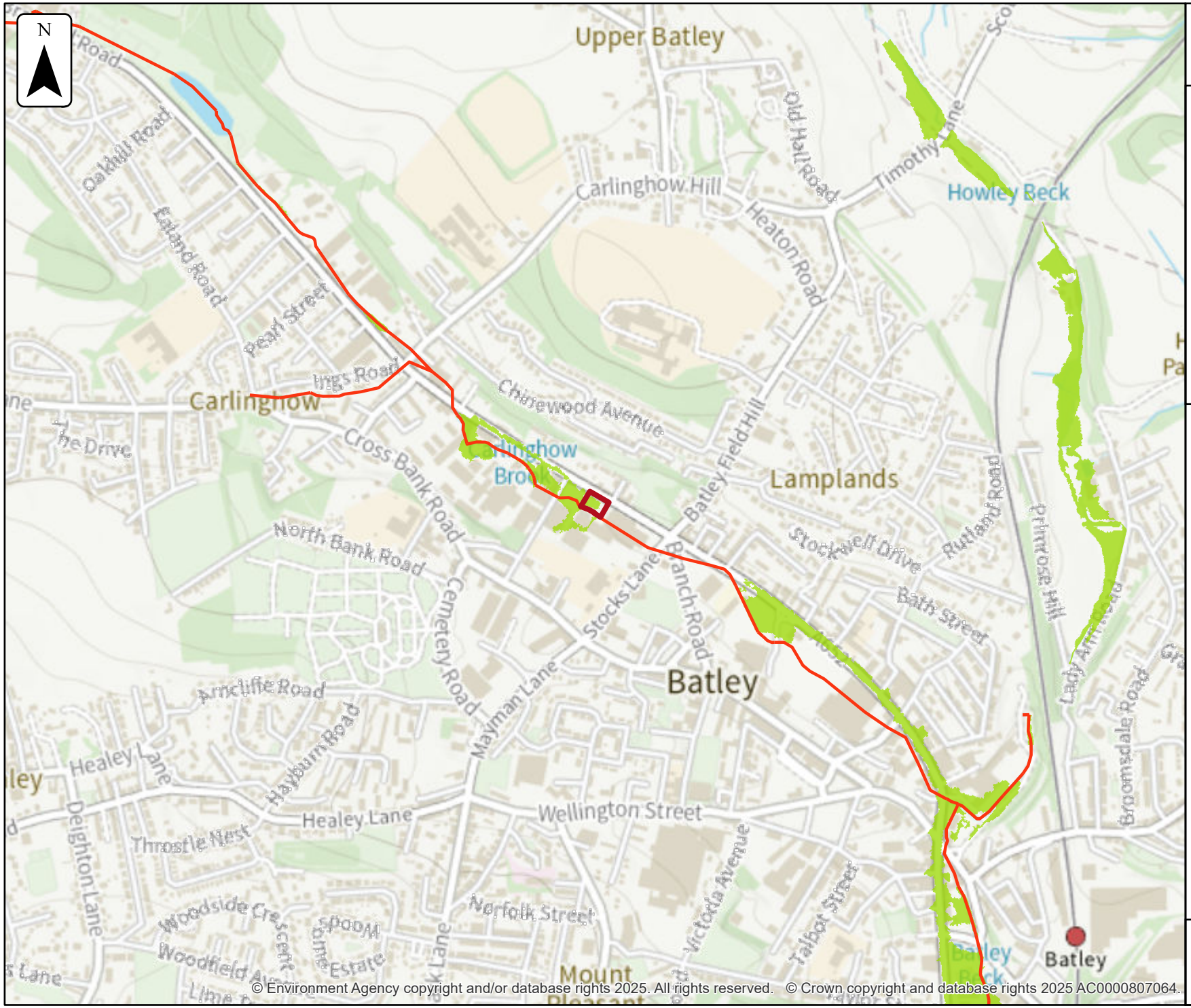
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

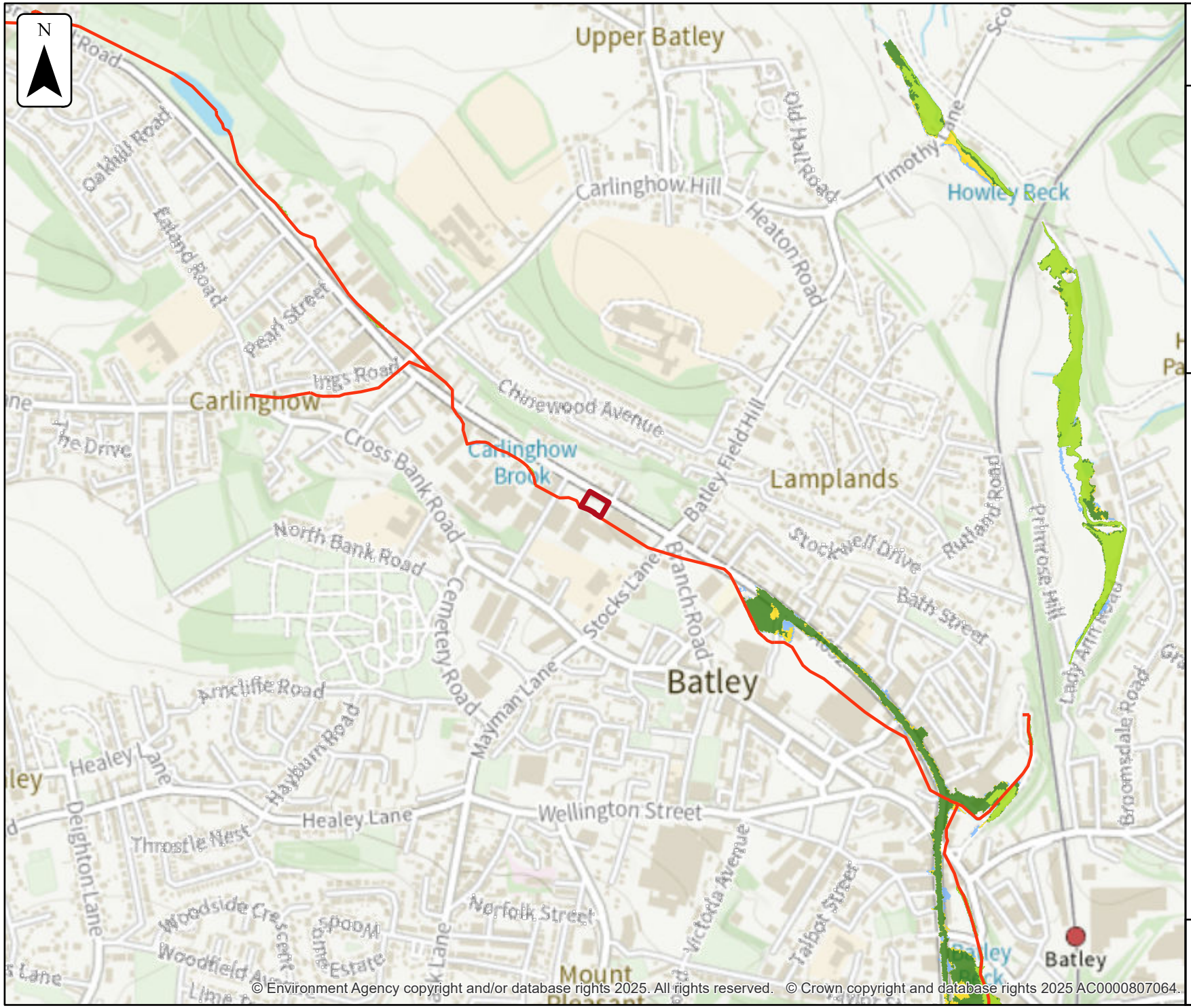
The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- Defended modelled fluvial: risk of flooding from rivers where there are flood defences
- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed
- Defended climate change modelled fluvial: risk of flooding from rivers where there are flood defences, including estimated impact of climate change
- Defences removed climate change modelled fluvial: risk of flooding from rivers where flood defences have been removed, including estimated impact of climate change





Environment Agency

Defences removed modelled fluvial extent

Location (easting/northing)
424045/424632

Scale
1:10,000

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

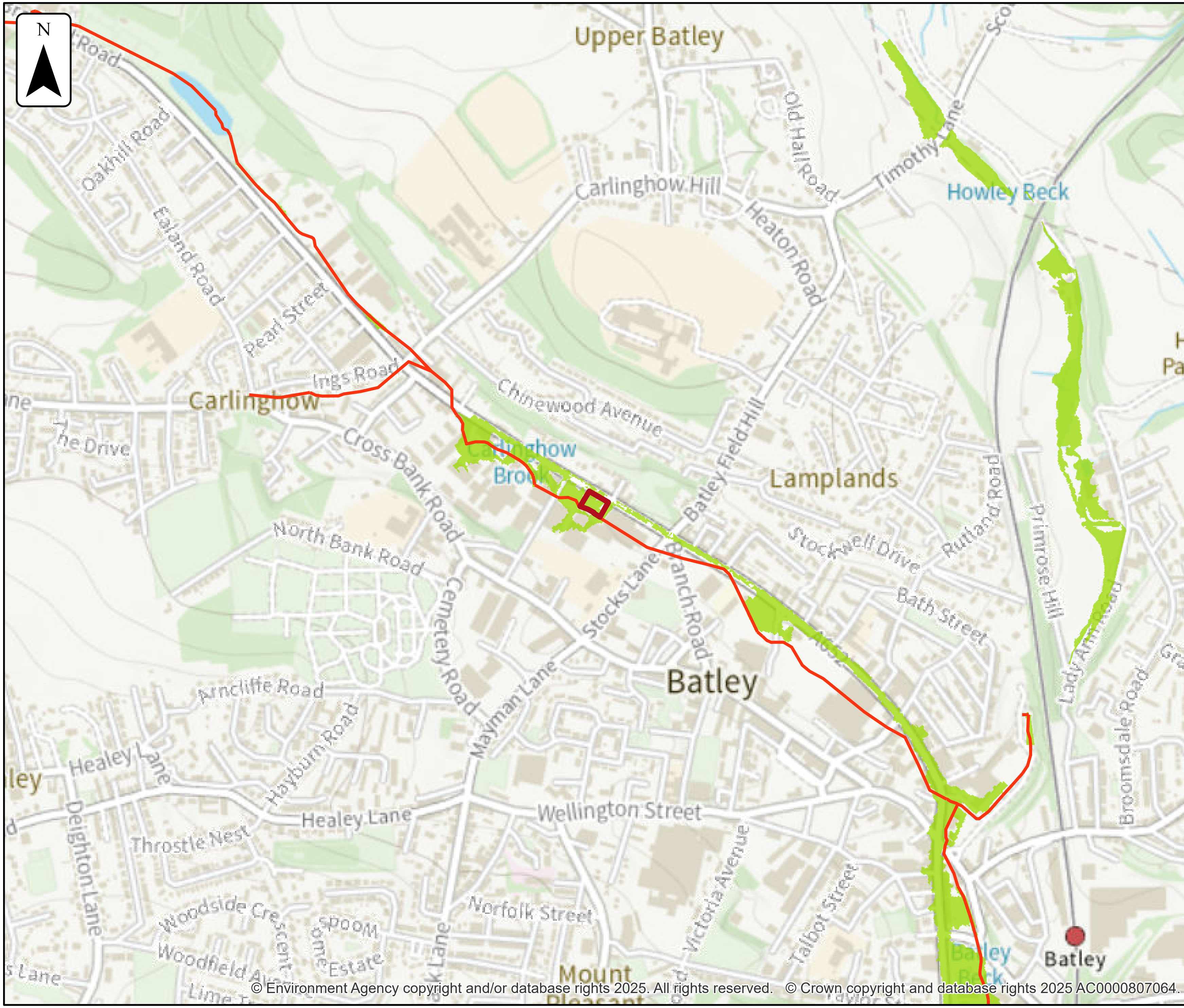
- Selected area
- Main river

Modelled flood extent

- 5% AEP
- 2% AEP
- 1.33% AEP
- 1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

Defended climate change modelled fluvial extent

Location (easting/northing)
424045/424632

Scale **1:10,000**

Created **21 Oct 2025**

Model name
2015 Batley Beck Mapping Study

Selected area

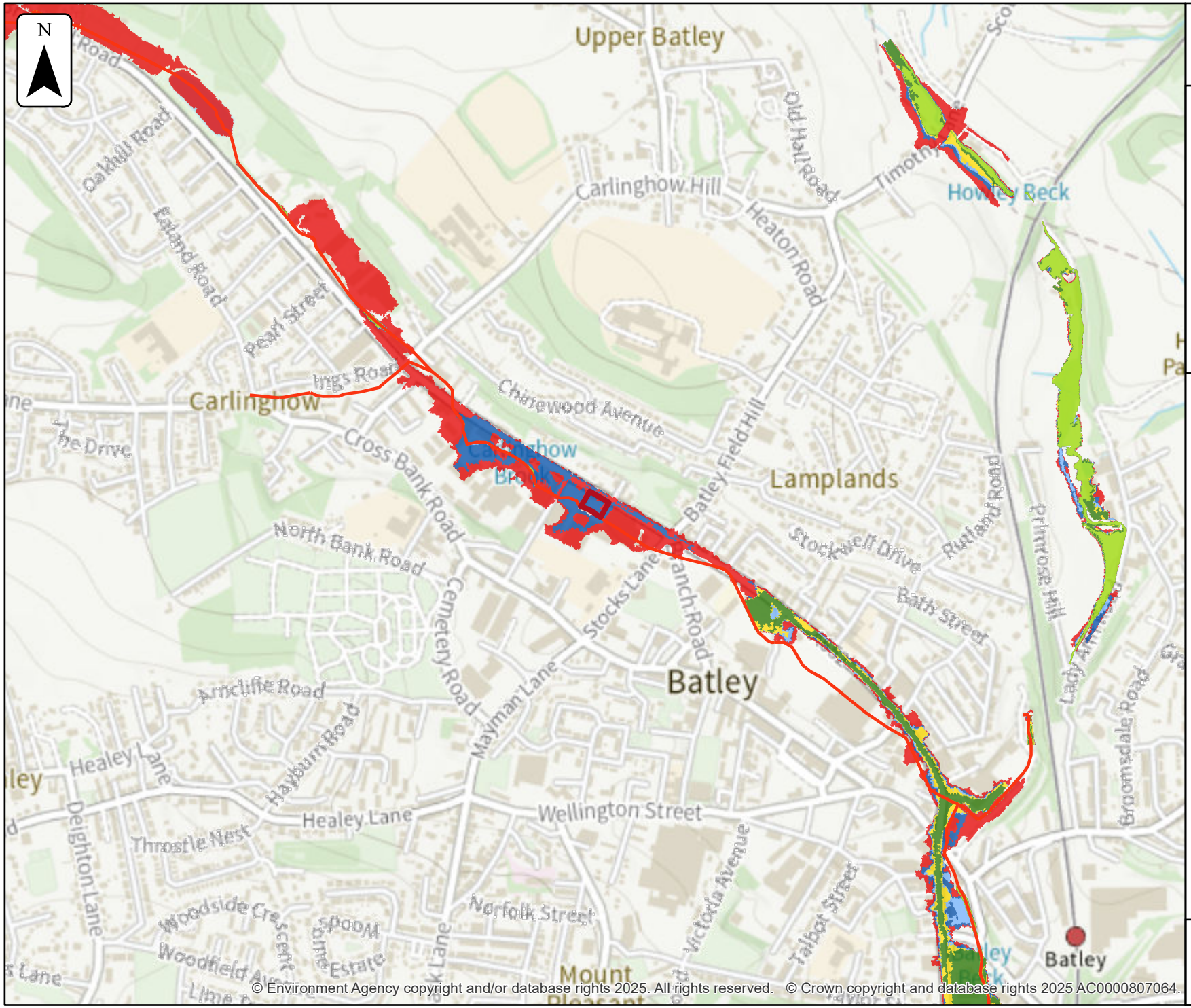
Main river

Modelled flood extent

1% AEP (+20%)

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

Defended modelled fluvial extent

Location (easting/northing)
424045/424632

Scale
1:10,000

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

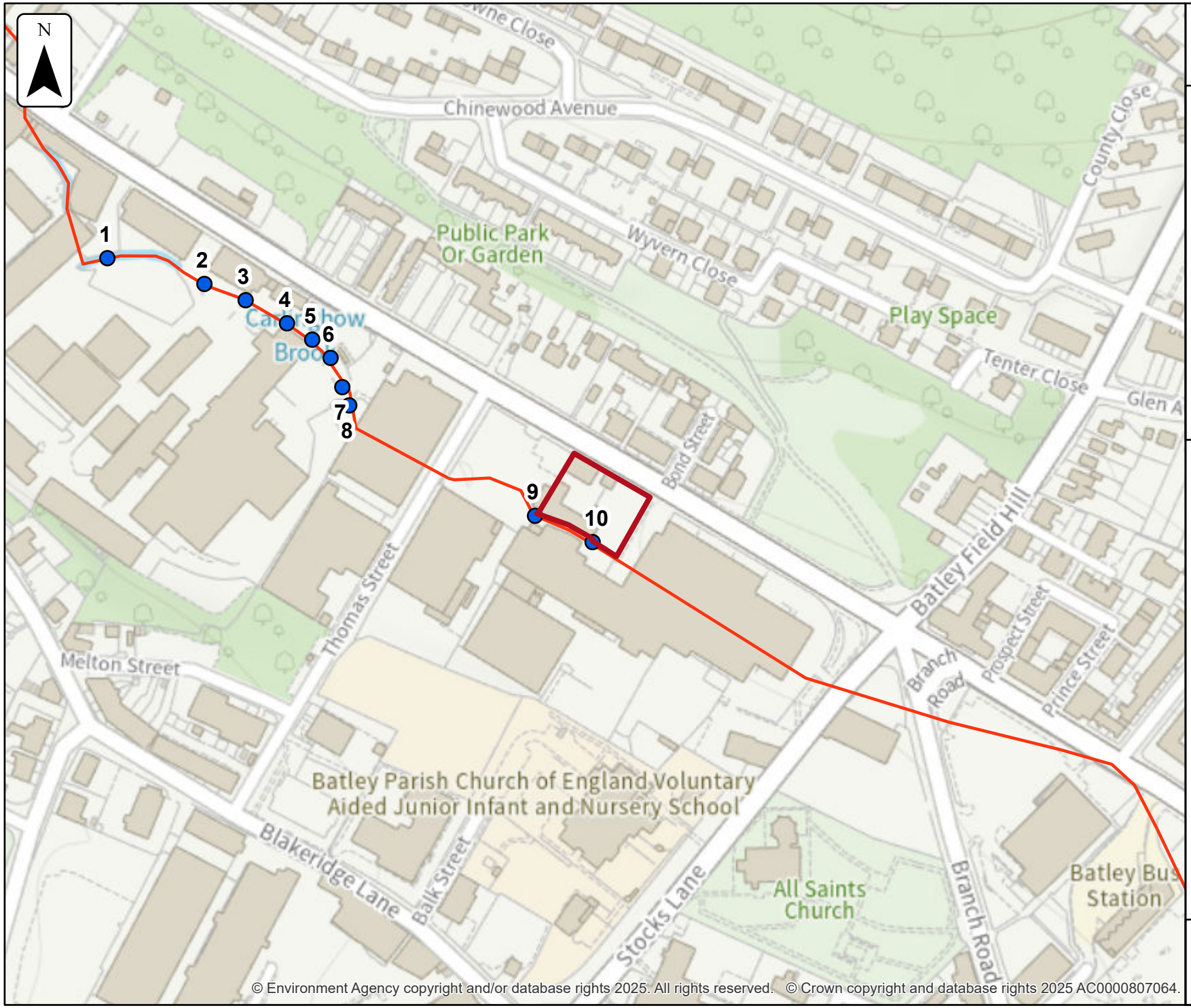
- Selected area
- Main river

Modelled flood extent

- 5% AEP
- 2% AEP
- 1.33% AEP
- 1% AEP
- 0.5% AEP
- 0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

Defences removed climate change modelled fluvial node locations

Location (easting/northing)
424045/424632

Scale
1:2,500

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

- Selected area
- Modelled location
- Main river

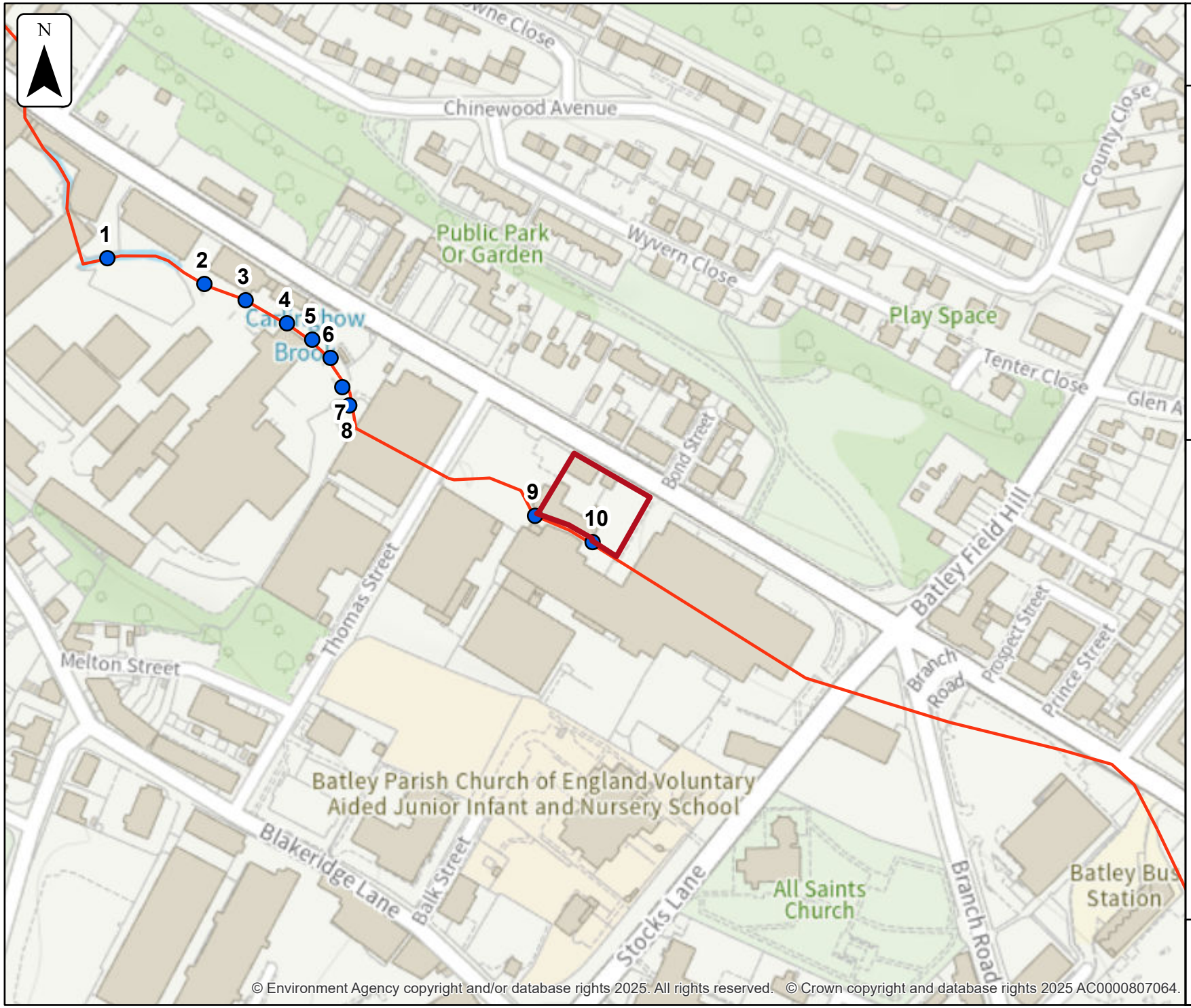
0 25 50 75 100
metres

Modelled node locations data

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
				Level	Flow
1	977842	423807	424751	62.15	12.98
2	978045	423854	424739	62.02	13.47
3	978046	423874	424731	61.96	13.46
4	977810	423895	424720	61.66	13.46
5	977850	423907	424712	61.77	13.46
6	977901	423916	424703	61.77	13.44
7	977996	423921	424689	61.68	13.44
8	977839	423925	424680	61.48	16.62
9	977910	424015	424626	59.84	16.95
10	977960	424043	424613	59.47	17.14

Data in this table comes from the 2015 Batley Beck Mapping Study model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defences removed modelled fluvial node locations

Location (easting/northing)
424045/424632

Scale
1:2,500

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

Defences removed

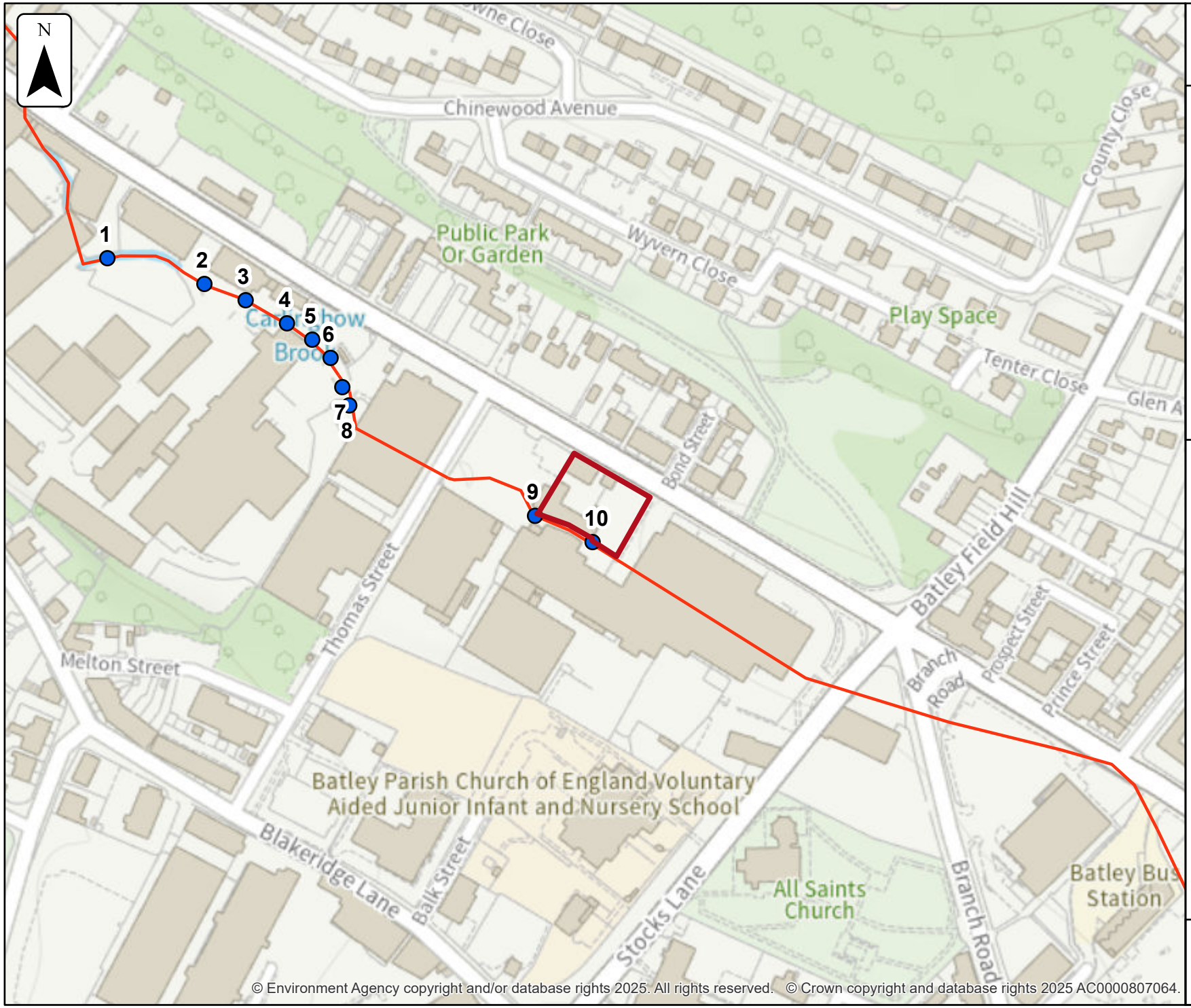
Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level
1	977842	423807	424751	60.0	60.23	60.42	60.64	60.77	60.91	61.19	61.48
2	978045	423854	424739	59.82	60.04	60.21	60.43	60.54	60.68	61.02	61.42
3	978046	423874	424731	59.59	59.78	59.95	60.13	60.26	60.42	60.88	61.33
4	977810	423895	424720	59.39	59.56	59.72	59.89	60.06	60.30	60.72	61.12
5	977850	423907	424712	59.45	59.61	59.77	60.06	60.29	60.51	60.87	61.24
6	977901	423916	424703	59.47	59.65	59.81	60.09	60.32	60.53	60.88	61.24
7	977996	423921	424689	59.39	59.57	59.71	59.96	60.18	60.39	60.76	61.16
8	977839	423925	424680	59.40	59.58	59.72	59.97	60.20	60.41	60.71	60.96
9	977910	424015	424626	58.80	58.99	59.12	59.28	59.40	59.50	59.60	59.68
10	977960	424043	424613	58.46	58.66	58.80	58.96	59.07	59.17	59.27	59.34

Data in this table comes from the 2015 Batley Beck Mapping Study model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

Defences removed

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	977842	423807	424751	4.44	5.89	7.55	8.69	9.63	10.69	11.41	12.24
2	978045	423854	424739	4.43	5.89	7.40	8.69	9.62	10.68	11.38	12.75
3	978046	423874	424731	4.43	5.89	7.36	8.69	9.62	10.68	11.36	12.54
4	977810	423895	424720	4.43	5.88	7.32	8.68	9.61	10.67	11.36	12.54
5	977850	423907	424712	4.43	5.88	7.34	8.68	9.60	10.67	11.35	12.54
6	977901	423916	424703	4.43	5.88	7.34	8.68	9.60	10.66	11.34	12.48
7	977996	423921	424689	4.43	5.88	7.25	8.67	9.59	10.66	11.33	12.36
8	977839	423925	424680	5.29	7.02	8.50	10.24	11.31	12.43	13.78	14.87
9	977910	424015	424626	5.42	7.22	8.70	10.54	11.65	12.80	14.05	15.11
10	977960	424043	424613	5.42	7.22	8.70	10.54	11.65	12.80	14.05	15.11

Data in this table comes from the 2015 Batley Beck Mapping Study model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defended climate change modelled fluvial node locations

Location (easting/northing)
424045/424632

Scale
1:2,500

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

- Selected area
- Modelled location
- Main river

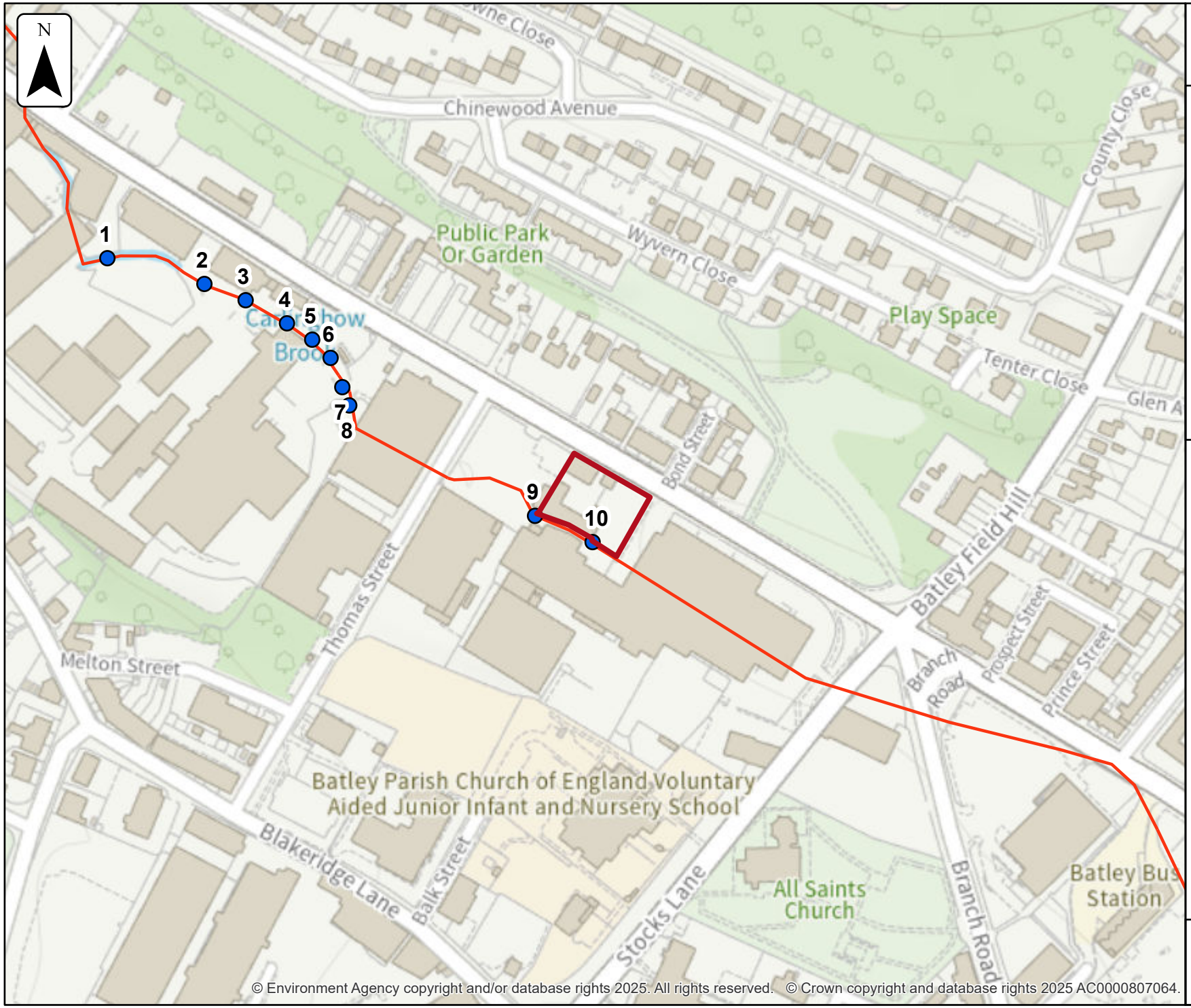
0 25 50 75 100
metres

Modelled node locations data

Defended climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
				Level	Flow
1	977842	423807	424751	62.01	12.91
2	978045	423854	424739	61.91	13.31
3	978046	423874	424731	61.84	13.04
4	977810	423895	424720	61.58	13.04
5	977850	423907	424712	61.68	13.0
6	977901	423916	424703	61.68	12.84
7	977996	423921	424689	61.60	12.68
8	977839	423925	424680	61.40	16.50
9	977910	424015	424626	59.78	16.76
10	977960	424043	424613	59.45	16.76

Data in this table comes from the 2015 Batley Beck Mapping Study model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defended modelled fluvial node locations

Location (easting/northing)
424045/424632

Scale
1:2,500

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

Modelled node locations data

Defended

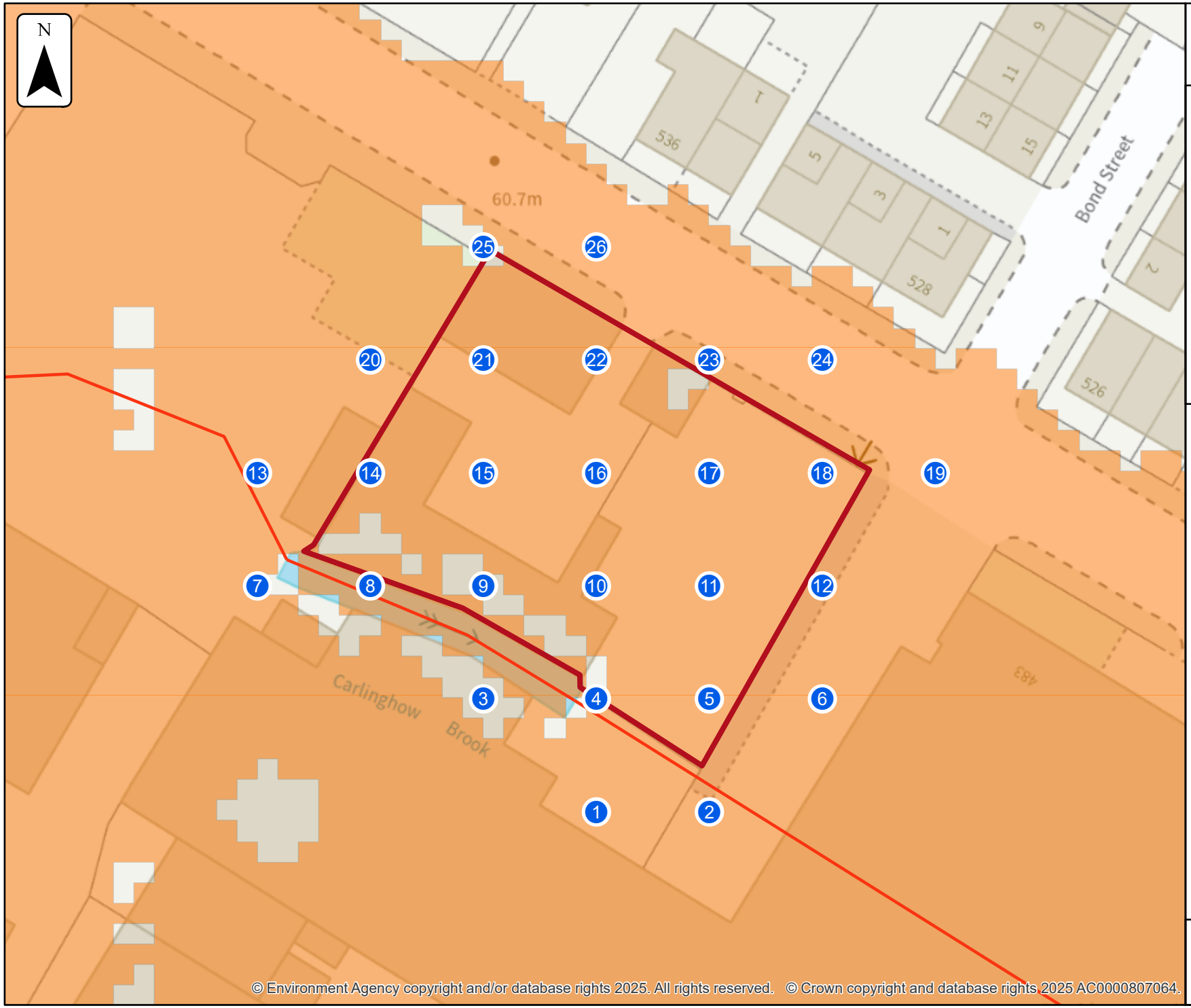
Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	977842	423807	424751	60.0	60.24	60.42	60.64	60.77	60.91	61.32	61.56	62.0	62.38
2	978045	423854	424739	59.82	60.04	60.21	60.43	60.54	60.68	61.16	61.51	61.90	62.24
3	978046	423874	424731	59.59	59.78	59.95	60.13	60.26	60.42	61.04	61.42	61.83	62.16
4	977810	423895	424720	59.39	59.56	59.72	59.89	60.06	60.30	60.87	61.19	61.57	61.82
5	977850	423907	424712	59.45	59.62	59.77	60.06	60.29	60.51	61.0	61.31	61.67	61.93
6	977901	423916	424703	59.47	59.65	59.81	60.09	60.32	60.53	61.01	61.32	61.67	61.94
7	977996	423921	424689	59.39	59.57	59.71	59.96	60.18	60.39	60.93	61.22	61.59	61.87
8	977839	423925	424680	59.40	59.58	59.72	59.97	60.20	60.41	60.75	61.02	61.38	61.74
9	977910	424015	424626	58.80	58.99	59.12	59.28	59.40	59.50	59.61	59.69	59.78	59.86
10	977960	424043	424613	58.46	58.66	58.80	58.96	59.07	59.17	59.28	59.36	59.44	59.52

Data in this table comes from the 2015 Batley Beck Mapping Study model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.

Defended

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	977842	423807	424751	4.43	5.90	7.57	8.70	9.62	10.70	11.60	12.56	12.98	12.90
2	978045	423854	424739	4.43	5.89	7.41	8.70	9.62	10.69	11.56	13.06	13.38	13.54
3	978046	423874	424731	4.43	5.89	7.37	8.70	9.62	10.69	11.54	12.83	13.11	14.20
4	977810	423895	424720	4.43	5.89	7.32	8.70	9.61	10.68	11.53	12.83	13.11	14.20
5	977850	423907	424712	4.42	5.89	7.35	8.69	9.60	10.68	11.56	12.82	13.07	14.29
6	977901	423916	424703	4.42	5.89	7.35	8.69	9.59	10.67	11.56	12.68	12.92	13.16
7	977996	423921	424689	4.42	5.89	7.26	8.68	9.59	10.66	11.90	12.52	12.75	13.17
8	977839	423925	424680	5.28	7.03	8.50	10.24	11.31	12.43	13.90	14.97	16.47	17.24
9	977910	424015	424626	5.41	7.23	8.70	10.55	11.65	12.80	14.24	15.33	16.71	18.01
10	977960	424043	424613	5.41	7.23	8.70	10.55	11.65	12.80	14.24	15.33	16.71	18.01

Data in this table comes from the 2015 Batley Beck Mapping Study model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



Environment Agency

Defended modelled fluvial extent and height

Location (easting/northing)
424045/424632

Scale
1:500

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 7.75
- 7.75 - 15.5
- 15.5 - 23.25
- 23.25 - 31.0
- 31.0 - 38.75
- 38.75 - 46.5
- 46.5 - 54.25
- 54.25 - 62.0
- 62.0 - 69.75

This map shows the 0.1% AEP height data

0 5 10 15 20
metres

Sample point data

Defended

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
1	424045	424602	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.03	60.34
2	424056	424602	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.97	60.32
3	424034	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	424045	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.02	60.35
5	424056	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.32
6	424067	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.88	60.29
7	424012	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	424023	424624	58.72	58.91	59.04	59.20	59.32	59.42	59.53	59.60	59.70	59.78
9	424034	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	424045	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.87	60.38
11	424056	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.35
12	424067	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.88	60.28

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
13	424012	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.44
14	424023	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.97	60.40
15	424034	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.87	60.39
16	424045	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.87	60.38
17	424056	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.88	60.36
18	424067	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.28
19	424078	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.93	60.21
20	424023	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.08	60.40
21	424034	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	59.87	60.39
22	424045	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.06	60.39
23	424056	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.29	60.35
24	424067	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.22	60.28

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
25	424034	424657	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	424045	424657	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	60.50	60.54
Max value in selected area:			58.74	58.93	59.07	59.23	59.35	59.45	59.55	59.63	60.39	60.48

Data in this table comes from the 2015 Batley Beck Mapping Study model. Height values are shown in mAOD, and depth values are shown in metres.
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Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

Defended

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
1	424045	424602	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.04	0.36
2	424056	424602	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.02	0.37
3	424034	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	424045	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.00	0.06
5	424056	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.49
6	424067	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.10	0.50
7	424012	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	424023	424624	0.85	0.99	1.09	1.21	1.30	1.37	1.45	1.51	1.58	1.64
9	424034	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	424045	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.29	0.80
11	424056	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.49
12	424067	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.01	0.35

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
13	424012	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.32
14	424023	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.05	0.39
15	424034	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.65	1.16
16	424045	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.50	1.01
17	424056	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.13	0.61
18	424067	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.34
19	424078	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.02	0.30
20	424023	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.03	0.33
21	424034	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.42	0.93
22	424045	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.07	0.39
23	424056	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.02	0.03
24	424067	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.01	0.05

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
25	424034	424657	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	424045	424657	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.06	0.10
Max value in selected area:			0.50	0.59	0.66	0.74	0.79	0.84	0.89	0.92	0.97	1.19

Data in this table comes from the 2015 Batley Beck Mapping Study model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
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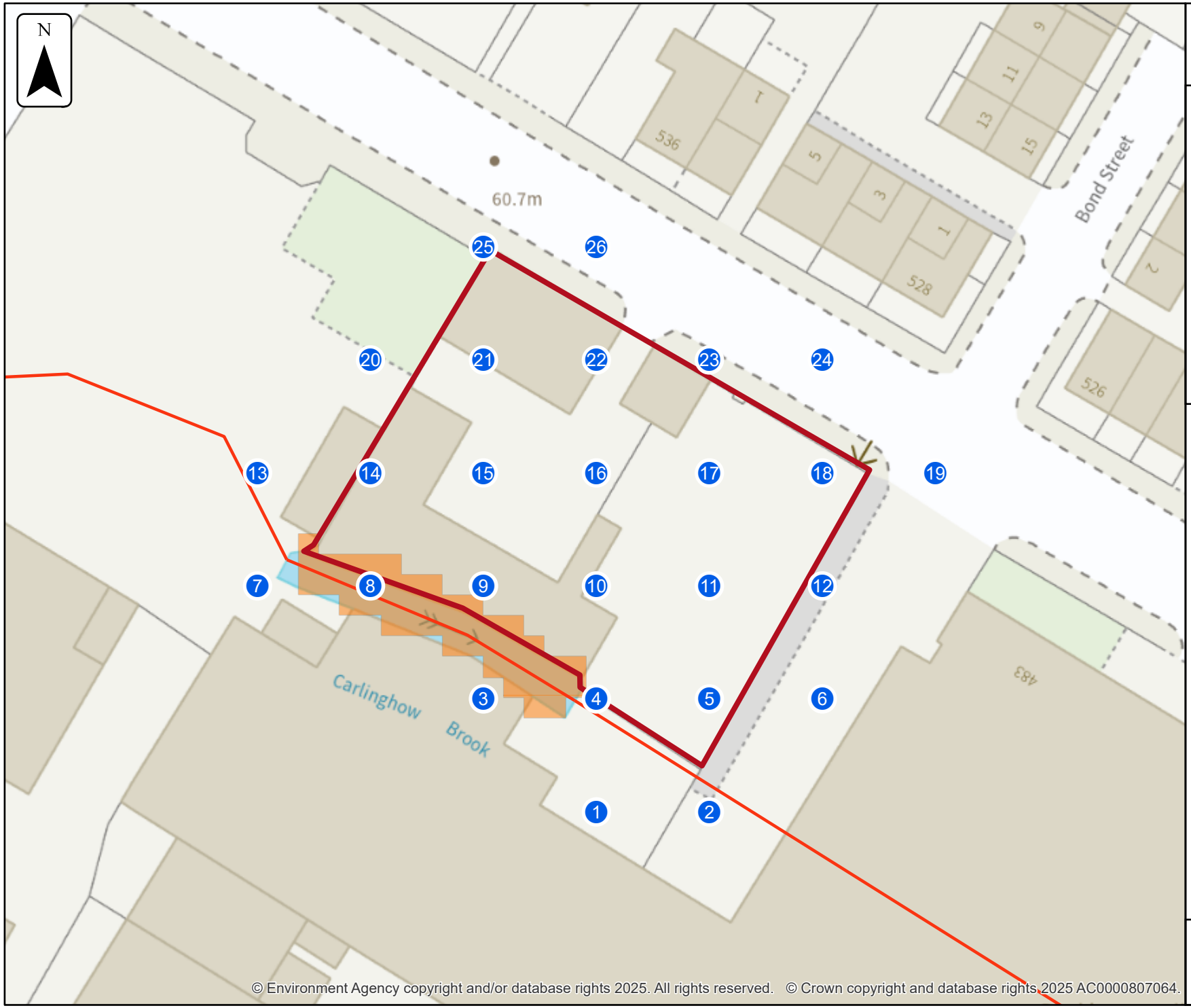
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defences removed modelled fluvial extent and height

Location (easting/northing)
424045/424632

Scale
1:500

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 7.5
- 7.5 - 15.0
- 15.0 - 22.5
- 22.5 - 30.0
- 30.0 - 37.5
- 37.5 - 45.0
- 45.0 - 52.5
- 52.5 - 60.0
- 60.0 - 67.5

This map shows the 1% AEP height data

0 5 10 15 20
metres

Sample point data

Defences removed

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height
1	424045	424602	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	424056	424602	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	424034	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	424045	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	424056	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	424067	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	424012	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	424023	424624	58.72	58.91	59.04	59.20	59.32	59.42	59.52	59.59
9	424034	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	424045	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	424056	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	424067	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height
13	424012	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	424023	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	424034	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	424045	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
17	424056	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	424067	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	424078	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	424023	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	424034	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	424045	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	424056	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	424067	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height
25	424034	424657	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	424045	424657	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			58.75	58.93	59.06	59.23	59.35	59.45	59.55	59.62

Data in this table comes from the 2015 Batley Beck Mapping Study model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

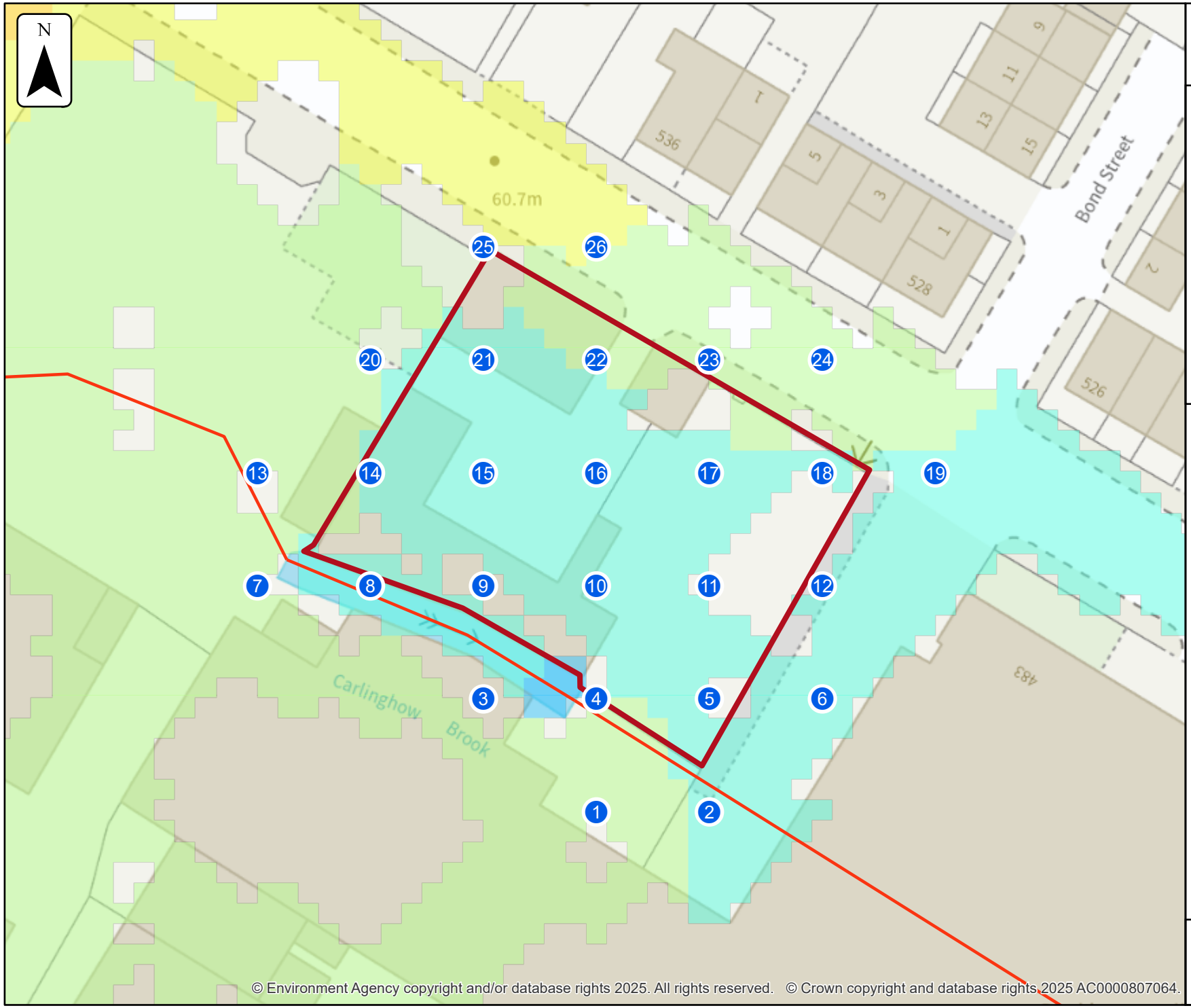
Defences removed

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
1	424045	424602	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	424056	424602	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	424034	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	424045	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	424056	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	424067	424613	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	424012	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	424023	424624	0.86	0.99	1.09	1.21	1.30	1.37	1.45	1.50
9	424034	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	424045	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
11	424056	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
12	424067	424624	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
13	424012	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	424023	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	424034	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	424045	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
17	424056	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	424067	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	424078	424635	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	424023	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	424034	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	424045	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
23	424056	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	424067	424646	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
25	424034	424657	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
26	424045	424657	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
Max value in selected area:			0.50	0.59	0.66	0.74	0.79	0.84	0.88	0.92

Data in this table comes from the 2015 Batley Beck Mapping Study model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defended climate change modelled fluvial extent and height

Location (easting/northing)
424045/424632

Scale
1:500

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 58 - 58.5
- 58.5 - 59.0
- 59.0 - 59.5
- 59.5 - 60.0
- 60.0 - 60.5
- 60.5 - 61.0
- 61.0 - 61.5
- 61.5 - 62.0
- 62.0 - 62.5

This map shows the 1% AEP +20% height data

0 5 10 15 20
metres

Sample point data

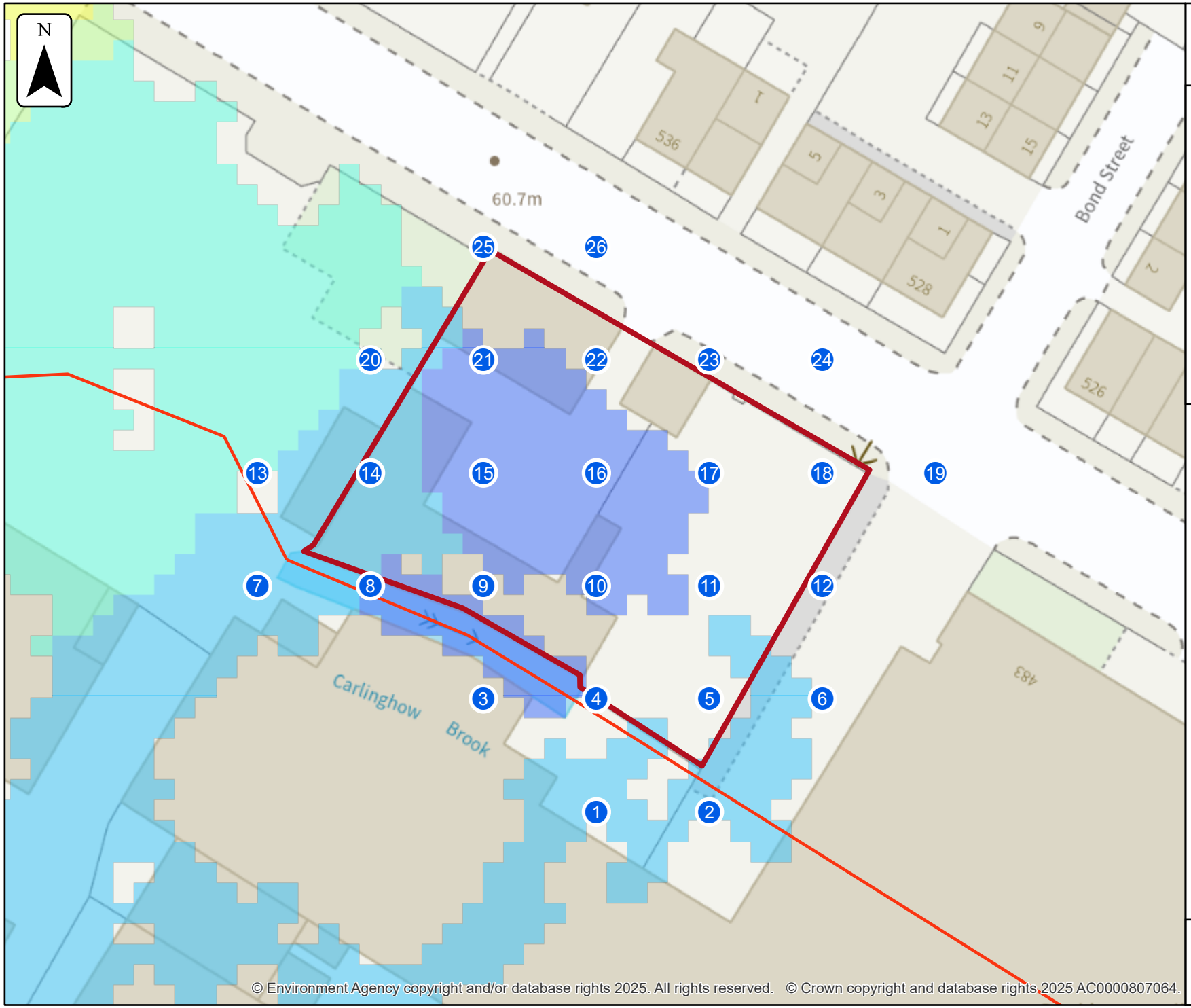
Defended climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Height	Depth
1	424045	424602	60.03	0.05
2	424056	424602	59.97	0.02
3	424034	424613	NoData	NoData
4	424045	424613	60.02	0.00
5	424056	424613	NoData	NoData
6	424067	424613	59.90	0.12
7	424012	424624	NoData	NoData
8	424023	424624	59.70	1.58
9	424034	424624	NoData	NoData
10	424045	424624	59.91	0.33
11	424056	424624	NoData	NoData
12	424067	424624	59.90	0.02

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Height	Depth
13	424012	424635	NoData	NoData
14	424023	424635	59.98	0.06
15	424034	424635	59.91	0.68
16	424045	424635	59.91	0.53
17	424056	424635	59.91	0.16
18	424067	424635	NoData	NoData
19	424078	424635	59.93	0.02
20	424023	424646	60.10	0.04
21	424034	424646	59.91	0.45
22	424045	424646	60.07	0.08
23	424056	424646	60.30	0.02
24	424067	424646	60.22	0.01

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Height	Depth
25	424034	424657	NoData	NoData
26	424045	424657	60.50	0.06
Max value in selected area:			60.39	0.97

Data in this table comes from the 2015 Batley Beck Mapping Study model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defences removed climate change modelled fluvial extent and height

Location (easting/northing)
424045/424632

Scale
1:500

Created
21 Oct 2025

Model name
2015 Batley Beck Mapping Study

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 59 - 59.375
- 59.375 - 59.75
- 59.75 - 60.125
- 60.125 - 60.5
- 60.5 - 60.875
- 60.875 - 61.25
- 61.25 - 61.625
- 61.625 - 62.0
- 62.0 - 62.375

This map shows the
1% AEP +20% height data

0 5 10 15 20
metres

Sample point data

Defences removed climate change

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Height	Depth
1	424045	424602	59.99	0.01
2	424056	424602	59.96	0.00
3	424034	424613	NoData	NoData
4	424045	424613	NoData	NoData
5	424056	424613	NoData	NoData
6	424067	424613	NoData	NoData
7	424012	424624	60.03	0.11
8	424023	424624	59.75	1.62
9	424034	424624	NoData	NoData
10	424045	424624	59.69	0.12
11	424056	424624	NoData	NoData
12	424067	424624	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Height	Depth
13	424012	424635	NoData	NoData
14	424023	424635	59.95	0.03
15	424034	424635	59.69	0.47
16	424045	424635	59.69	0.32
17	424056	424635	NoData	NoData
18	424067	424635	NoData	NoData
19	424078	424635	NoData	NoData
20	424023	424646	60.07	0.04
21	424034	424646	59.70	0.24
22	424045	424646	NoData	NoData
23	424056	424646	NoData	NoData
24	424067	424646	NoData	NoData

Label	Easting	Northing	1% AEP (+20%)	1% AEP (+20%)
			Height	Depth
25	424034	424657	NoData	NoData
26	424045	424657	NoData	NoData
Max value in selected area:			60.04	0.98

Data in this table comes from the 2015 Batley Beck Mapping Study model. Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Kirklees District.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

Find out more about flood risk activity permits

Help and advice

Contact the Yorkshire Environment Agency team at neyorkshire@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for