



Flood Risk Assessment

PROPOSED RESIDENTIAL DEVELOPMENT

Bankgate Mills

Bank Gate

Slaithwaite

Huddersfield

HD7 5DL

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Garside Developments

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1	Dec 23	Site plan amended and report updated

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1 FRA Introduction.

Purpose of Flood Risk Assessment:

The purpose of the assessment is to inform & accompany a planning application for residential development. The proposal is for the renovation of an existing mill building and the construction of a single detached dwelling.

The area local to the development is part of the EA designated Flood Zone 2 & 3.

Reference:

National Planning Policy Framework and the Planning Practice Guidance (flood risk & coastal change notes).

EA mapping data identifies the Application Site as being in **Flood Zone 1**, refer to EA Flood Zone Map & Table 1 in the Appendix.

The Planning Practice Guidance indicates the Flood Risk Vulnerability Classification (Table 2) for the Application Site end use to be '**More Vulnerable**'. The Flood Risk 'Vulnerability' and Flood Zone 'Compatibility' matrix (Table 3) indicates that 'More Vulnerable' development is acceptable in Flood Zone 1.

2 Preliminary or Full Flood Risk Assessment:

Full to support planning application.

2.1 Plans.

2.1.1 Location Plan.

See Location Plan in Appendix showing the area features.

The Site is located to the northwest of Slaithwaite town centre on Bank Gate adjacent to Slaithwaite Reservoir. It shares its south boundary with the reservoir overflow & spillway.

The immediate local vicinity comprises the former Bank Gate Mill complex, a collection of stone built former weaving mills, accessed from Bank Gate to the east side.

The wider local area generally comprises residential dwellings.

2.1.2 Site plan.

Refer to Proposed Plans in the appendix.

The Application Site comprises a nominally 1400sqm plot of land to the west side of a current working mill complex. Access is through the adjacent mill access yard. It comprises two mill buildings (north & south sides) with a yard area between.



The building to the north is a stone built, four storey former woollen mill erected pre-1890. The building to the south side was a warehouse & garage, a later brick/stone-built addition to the site, erected somewhere between 1910 & 1930.

The Site is in an area which slopes to the south. The building entrances, and yards have been levelled historically, with ground elevation falling toward the reservoir spillway at the south side of the Site, where the boundary is retained by a stone retaining wall.

2.1.3 Proposed Site plan.

The south warehouse/garage is to be demolished and, in its place a single detached split level residential dwellings (Units 1) will be erected with private gardens overlooking the reservoir embankment.

The north mill building is to be retained and renovated into 5No. residential apartments (Apartment Units).

The yard between the buildings will be resurfaced for access and car parking.

The existing bank slope down to the reservoir boundary will be re-engineered to improve stability and provide increased parking area for the development. The partially collapsed boundary wall adjacent to the mid part of the spillway will be re-constructed back to its original form.

2.2 Derivation of Data, Surveys and Models.

2.2.1 Existing and proposed topography.

Topographic surveys of the local area have been undertaken relatively recently as well as existing Application Site levels. Pertinent levels for the proposed are set out below:

Car Parking nominal lvl:	158.80-159.50.
South building (Units 1 lower GFL)	156.25
South building (Units 1 GFL)	158.95.
South building (Units 1 1FL)	161.65.
North building (Apartment Units GFL)	160.81.
North building (Apartment Units 1FL)	163.90.
North building (Apartment Units 2FL)	166.73.
North building (Apartment Units 3FL)	169.53.

The existing Site boundary / retaining wall is nominally 159.67 at the upper end of the Site and falls to 149.96 at the lower end.

2.3 Assessments.

2.3.1 Existing fluvial & surface water system.

The local fluvial system comprises Merry Dale Cough which flows east through the local area and into Slaithwaite Reservoir. The reservoir has a bypass channel along its N edge flowing into the overflow outlet channel. There is a primary overflow cill at the NE corner flowing into a deep outlet channel excavated into the regional bedrock. This in turn flows to a spillway along the NE side of the reservoir embankment comprising a circular drop shaft serving a steep underground concrete culvert for approximately 25m before emerging and continuing down the masonry lined spillway to the southeast towards over a waterfall (masonry weir) and onto Slaithwaite centre.

The drop shaft has a downstream cill serving an overflow channel nominally 1.5 to 1.1 m deep above the culvert, presumably in case of inundation of the drop shaft.

There is a small watercourse and reservoir (sluice on the Maps) to the north side of the reservoir outlet which formerly supplied water to Bank Gate Mill, but appears to be redundant and now is assumed to outfall back into the reservoir outlet channel.

A stone culvert (presumed to serve the former mill) was observed emerging from the boundary wall to the south of the Site discharging below the waterfall area.

Planning flood maps for the local area show modelled flood outlines filling the spillways channel and overflowing onto the lower reservoir embankment. The mapping suggests some of the flooding encroaches onto the lower parts of the Site.

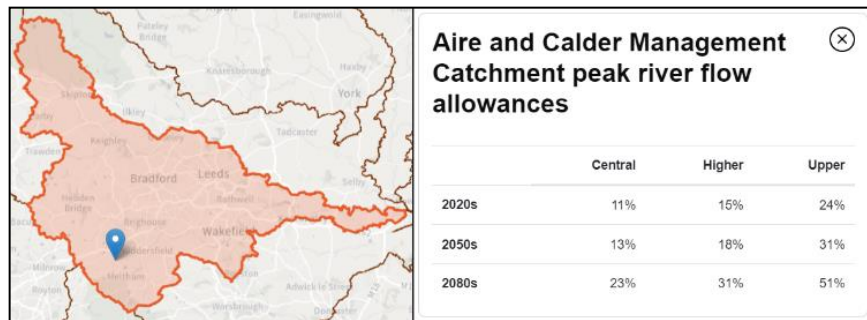
2.3.2 Proposed fluvial & surface water system.

The proposed development is similar in extent to the present Site, so will not affect the fluvial surface water system. Surface water discharges will be controlled through the planning system in accord with SUDS guidelines.

2.3.3 Climate change impacts.

As identified in Section 1, the vulnerability of the development is 'More Vulnerable'.

The Planning Flood Maps designate the Site as being within Flood Zone 1. EA guidance specifies climate change allowances by



management catchment areas; specific to the catchment the Site is within. Peak Flow River Maps have been produced which specify the climate change allowances to be used in a flood risk assessment.

The EA guidance indicates the peak flow rates that should be used for the vulnerability classification:

- essential infrastructure – use the higher central allowance
- highly vulnerable – use central allowance (development should not be permitted in flood zone 3a)
- **more vulnerable** – use the central allowance
- less vulnerable – use the central allowance
- water compatible – use the central allowance

Given the 'More Vulnerable' risk category, the central allowance climate change multiplier should be used as the basis for assessment.

Given the Site is to be used for a residential end use, and this type of development has a relatively long lifetime; the '2080s' timeline is appropriate for assessing climate change allowances.

Comparing the '2080s' timeline with the central allowance from the peak river flow allowances above, suggests a 23% climate change allowance for the Site.

2.3.4 Fluvial morphological impacts.

The proposed development will not impact or change fluvial morphology.

2.3.5 Potential sources of flooding.

The Environment Agency were contacted with regard to flood risk in the local area and a number of local models exist. However, the 2019 Slaithwaite model is the only one related to Site flood risk.

a. Fluvial flooding from main rivers.

The spillway from the reservoir is considered in the EA flood data to be part of the local fluvial system, and is part of the 2019 Slaithwaite Model (no defences).



The flood maps suggest there is no flood risk to the Site, where the spillway retaining wall to the southwest Site boundary is higher than the reservoir spillway channel bed.

Flood data provided by the EA places a node at the culvert outlet (Node 1), with another downstream at the southeast Site corner at its lowest point (Node 2). The flood levels are tabulated below:

Flood Node	Flood Events & Levels		
	100yr	100yr+30%	1000yr
Node 1	147.81	147.91	148.02
Node 2	142.18	142.36	142.64

The topographic survey shows the Stone retaining wall at the bottom of the Site to have a top of wall level of 152.57 at the position of flood node 1, falling to 149.96 at flood node 2. Site levels increase dramatically to the Site side of the wall.

The flood levels given by the EA data, indicate there is no risk to the Site.

b. Surface Water Risk.

There is no surface water flood risk to the Site. The Environment Agency maps suggest that overland flow occurs upstream of the Site flowing into the reservoir and spillway channels upstream and bypassing the south Site boundary.

c. Fluvial flooding from minor watercourses / drainage channels.

No significant minor watercourses noted locally.

d. Artificial Watercourse/Canals.

No risk to the Site.

e. Loss of overland flow.

Overland flow routes will not be affected as part of the development.

f. Loss of Floodplain.

Loss of floodplain will not decrease as part of the development.

g. Springs and high groundwater levels.

It is likely that ground water levels are controlled primarily by river levels in the local area and therefore present no more of a risk.

h. Surcharging of local drainage & sewerage systems.

Sewers in the local area are unlikely to surcharge locally.

i. Reservoirs.

Reservoir flood contours show there is a risk locally, with much of the downstream local and wider area affected. The risk is predominantly concentrated within the valley bottom and general area around Slaithwaite centre.

The Site however is just above the reservoir flooding outline as shown by the Environment Agency reservoir flood maps. The Site is thus not affected by reservoir flood risk.



2.4 Design.

No requirement for design levels. The Site is above the floodplain.



3 Emergency Evacuation Plan

3.1 Section 1-4. Scope, Location, Risk & Mitigation

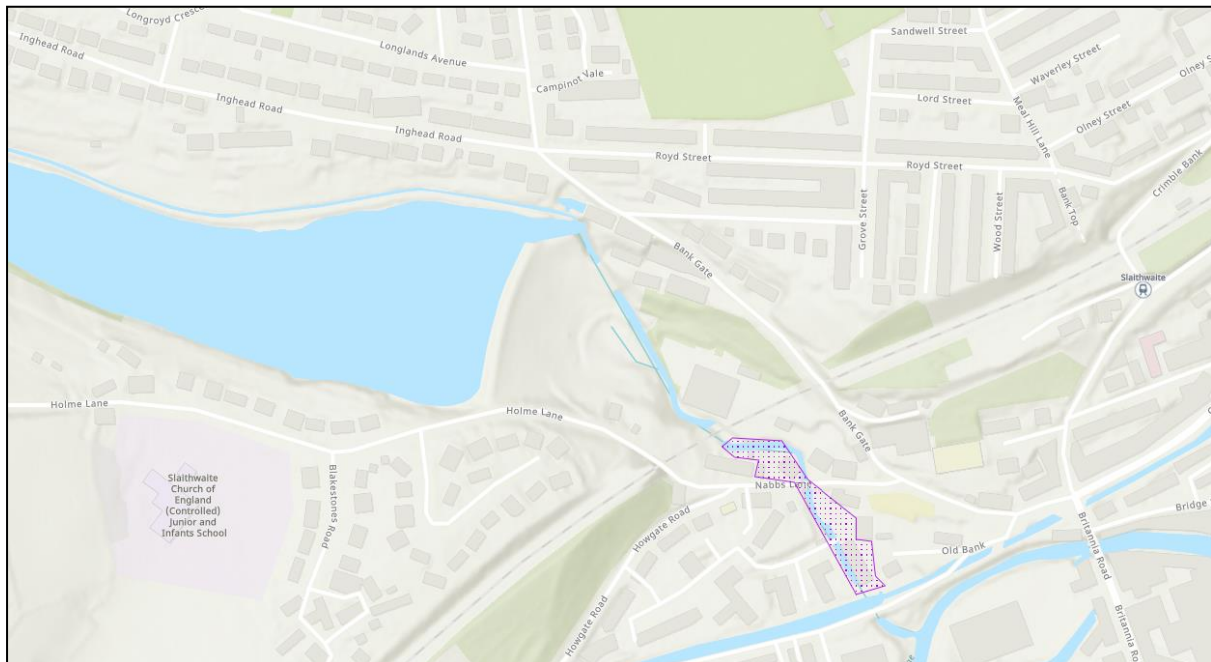
The Adept/Environment Agency guidelines indicate the requirements for flood risk emergency plans (EP) for new development. An EP would generally contain the following sub-sections:

- Section 1. Scope, Objectives and Background.
- Section 2. Location and Proposal.
- Section 3. Risk Summary.
- Section 4. Mitigation Measures.
- Section 5. Flood Warnings and Associated Actions.
- Section 6. Safe Access and Escape.
- Section 7. Temporary Refuge.
- Section 8. After the Flood.
- Section 9. List of Roles.
- Section 10. Plan Upkeep and Awareness.

The previous sections of this report have covered the information required for sub-sections 1-4 noted above required for an EP, and thus this EP section shall start at subsection 5 – Flood Warnings & Associated Actions.

3.2 Section 5. Flood Warnings and Associated Actions

The Site is not within a flood warning area, refer to associated Flood Warning Map below:



FLOOD INFORMATION SERVICE

Dwellings or businesses in England can sign up for the Environment Agency free flood alert service by phone, email, or text message, if either homes or businesses are at risk of flooding.

The Site is within the Environment Agency Flood Warning Area and it is strongly advised that the Owner/Tenant, must sign up to receive flood warnings via the Environment Agency Flood Information Service.

The current & simple to follow flood alert/warnings used by the Environment Agency, including a simple/easy to understand statement of what is required for each as follows:

Flood alert - Prepare



- prepare a bag that includes medicines and insurance documents
- check flood warnings

Flood warning - Act



- turn off gas, water and electricity
- move things upstairs or to safety
- move family, pets and car to safety

Severe flood warning - Survive



- call 999 if in immediate danger
- follow advice from emergency services
- keep yourself and your family safe

The Flood Information Service can be found on the internet using the following URL: <https://flood-warning-information.service.gov.uk/warnings>.

FLOODLINE

Alternatively, people at risk from flooding and without access to the internet can register for flood alert warnings & get in touch by calling Floodline on telephone: 0345 988 1188 OR Type talk: 0345 602 6340 (for the hard of hearing), which is a 24hr service.

For flood alerts/warnings, people will need to provide the following information:

- the address to be registered.
- a phone number for the person or people requesting the service can be contacted on 24hrs a day.
- an email address for the person or people requesting the service.

FLOOD WARDENS

Flood Wardens operate in some areas to provide alerts to the local community when flood warnings are issued. Contact Floodline on 0845 988 1188 to find out if this service is available in the area.

SIRENS/LOUDHAILERS

Sirens/loudhailers operate in some areas at risk from extreme flooding to alert residents that a flood warning is in force. Contact Floodline on 0845 988 1188 to find out if this service is available in the area.

GENERAL MEDIA

Media such as the Flood Information Service website details maps and current (up to date) area specific advice for all areas of England, including the type of flooding and flood alert/warning level in force for those areas. Other websites such as the Met Office have their own flood alert service. TV & radio news channels give warnings.

3.3 Section 6. Safe Access and Escape

In flood risk areas, safe access and exit from new developments should be in accordance with the Adept EP guidance, and that of the referenced background documentation Defra/EA R&D Technical Report FD2320/TR2; and should be in the following order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.

- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause a risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles. However, the public should not drive vehicles in floodwater.

The Site is entirely within flood Zone 1. Although the Site itself is at little risk, the Slaithwaite centre should be avoided in flood events. Refer to Evacuation plan below:



The Environment Agency guidance is clear: when a flood alert to PREPARE is issued, preparations should be enacted in case a further flood warning to ACT is given, and business owners should be ready for this scenario.

When a flood warning to ACT is issued, people should follow instructions to evacuate as per the above Emergency Evacuation Route Plan— assuming a flood event could be imminent.

This route provides the simplest path for pedestrians, users with specific needs such as wheelchair users or those with pushchairs as well as vehicular users prior to surface flooding.

HOWEVER - DRIVING OR PEDESTRIAN MOVEMENTS SHOULD NOT BE ATTEMPTED THROUGH FLOOD WATERS.

3.4 Section 7. Temporary Refuge

The Site does not need temporary refuge being above flood levels.

If flood advice is required as an emergency, the Environment Agency has specially trained Flood Support Officers who provide information and advice during and after floods. Call Floodline (24-hour service) on 0345 988 1188 or type-talk (for the hard of hearing) on 0345 602 6340 to find out if they are active in Salford Area B.

3.5 Section 8. After the Flood

Clean-up will be required following an extreme storm event, and the following procedures should be followed:



- Contact your insurance company.
- Cleaning and repairing the property.

Specialist advice will likely be required and may need to be undertaken in accordance with insurance company requirements.

Photographs to document damage and record the flood water height.

Flood water can be hazardous and contain sewage, chemicals, and animal waste. Care should be taken with personal protective equipment.

Contact the LPA about disposing of large flood damaged items.

- Stay healthy – ensure services are running properly and potable water does not have a change in colour, taste, or smell. Ensure food touched by flood water is disposed of.
- Get help via Floodline if required.
- Get emotional support if required from family, friends, GP, or charity organisations.
- Apply for financial aid if required. Apply to the local council for eligibility.

3.6 Section 9. List of Roles

It is the Owner/Tenants responsibility to follow this EP and keep up to date with current flood warning advice.

3.7 Section 10. Plan Upkeep and Awareness

The Owner/Tenant should ensure they are familiar with the Evacuation Plan and procedures and keep up to date with latest Environment Agency Guidance.

4 Conclusion & Residual risks.

The Site is safe from all forms of flooding up to and including a 1000yr event.

No specialist design requirements due to flooding.

Access and egress routes are indicated in the attached Evacuation Plan, and are safe for all users.

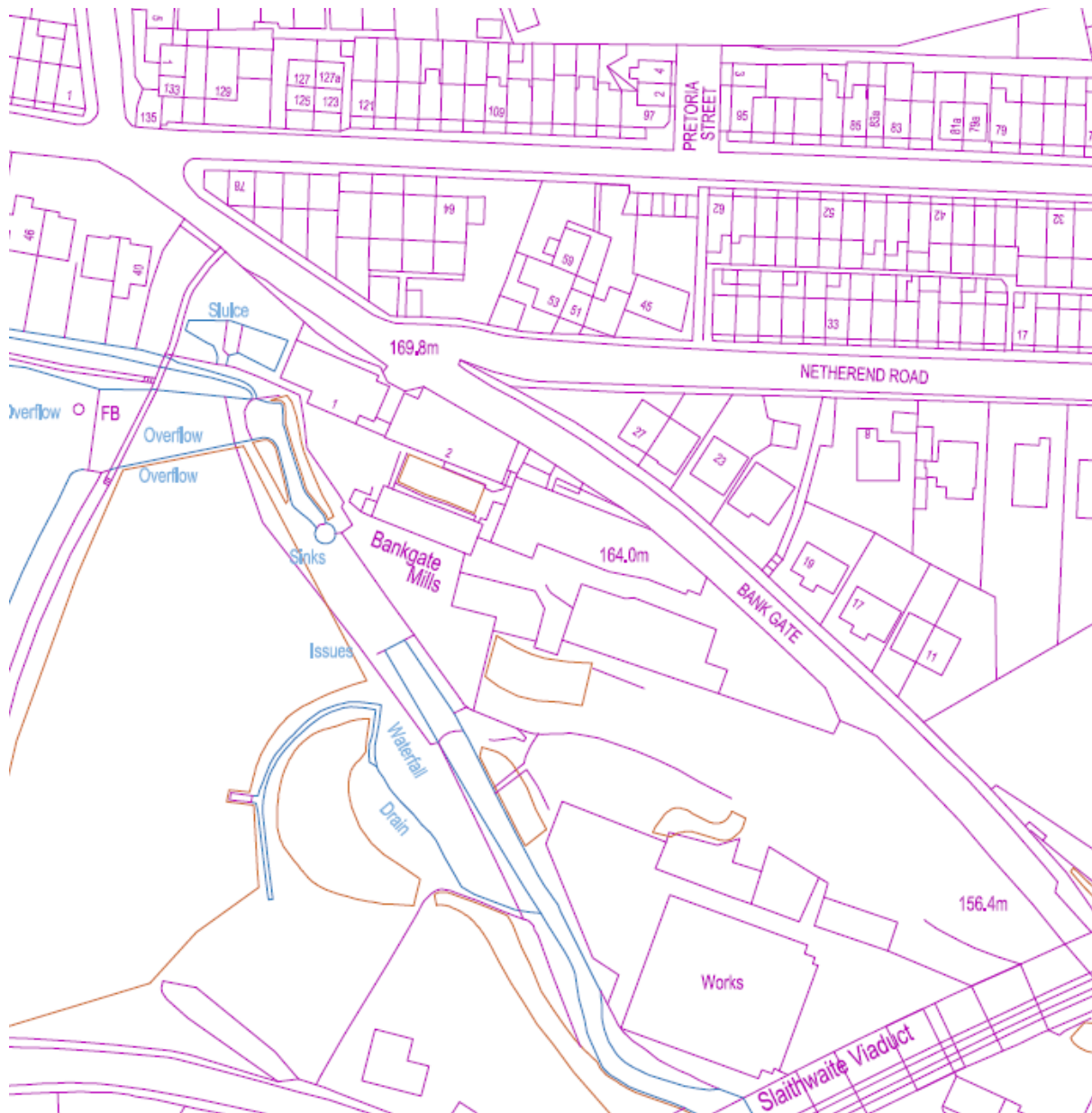
No other residual risks.

5 Appendix.

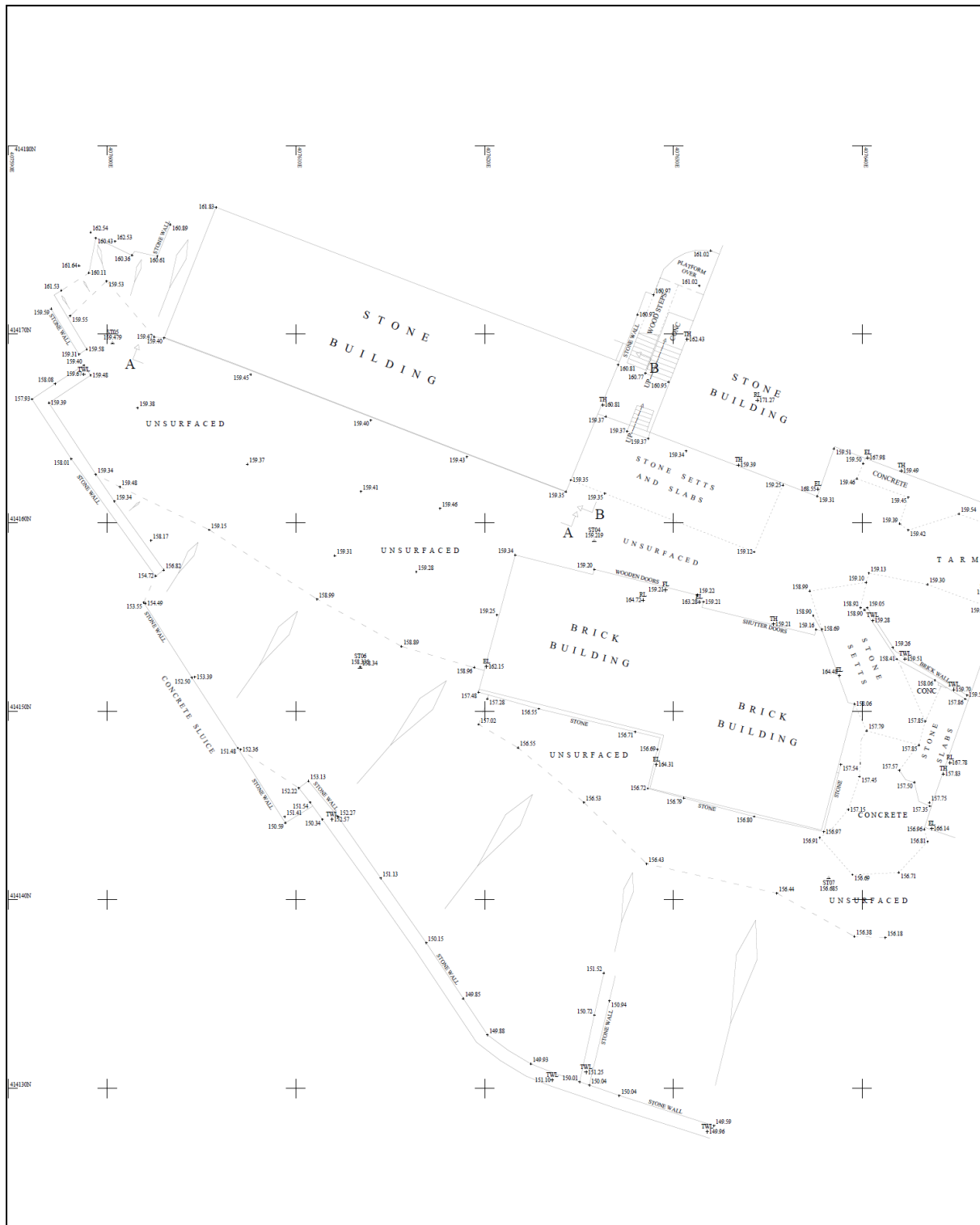
5.1 Site & Location Plan.



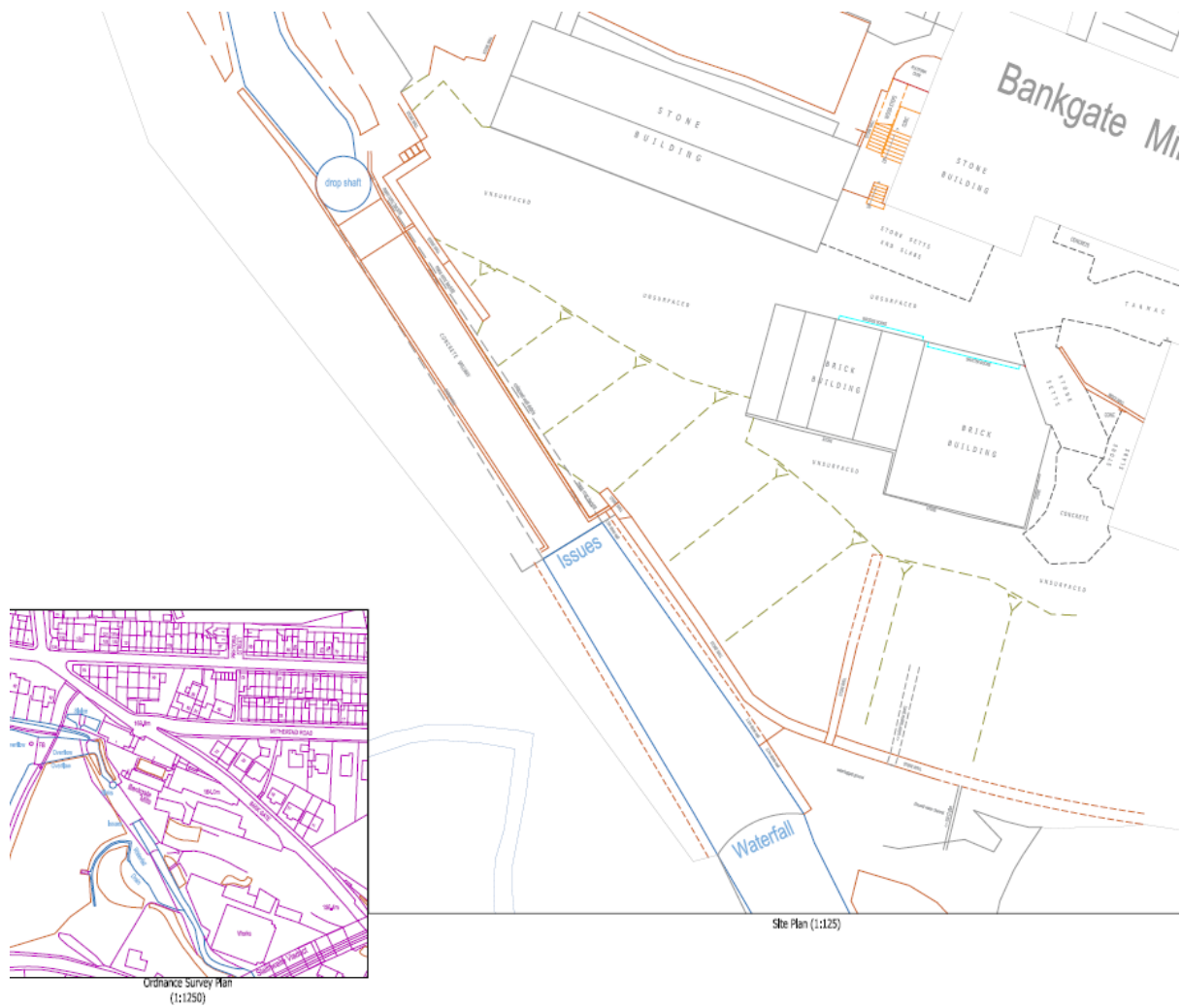
5.2 Ordnance Survey Plan.



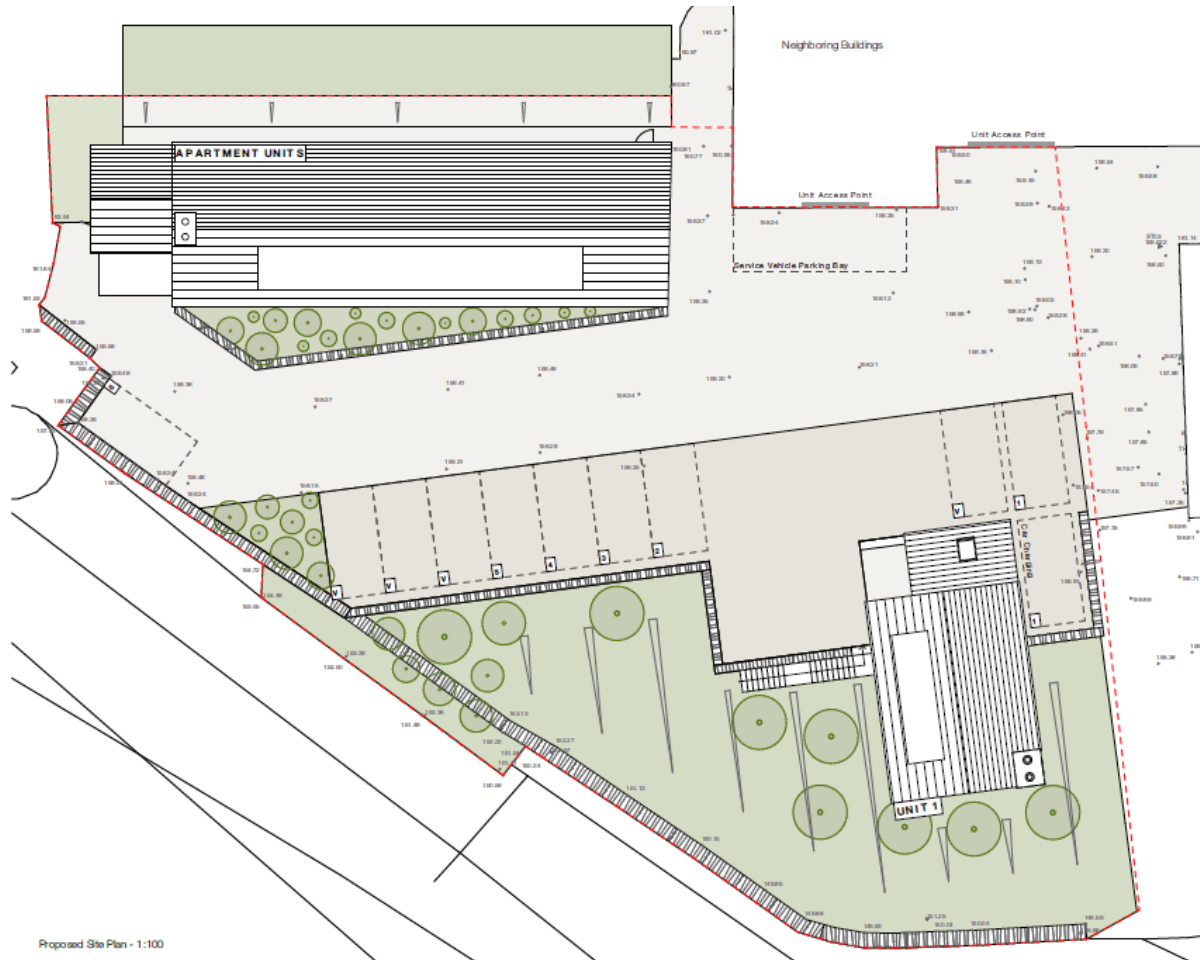
Ordnance Survey Plan



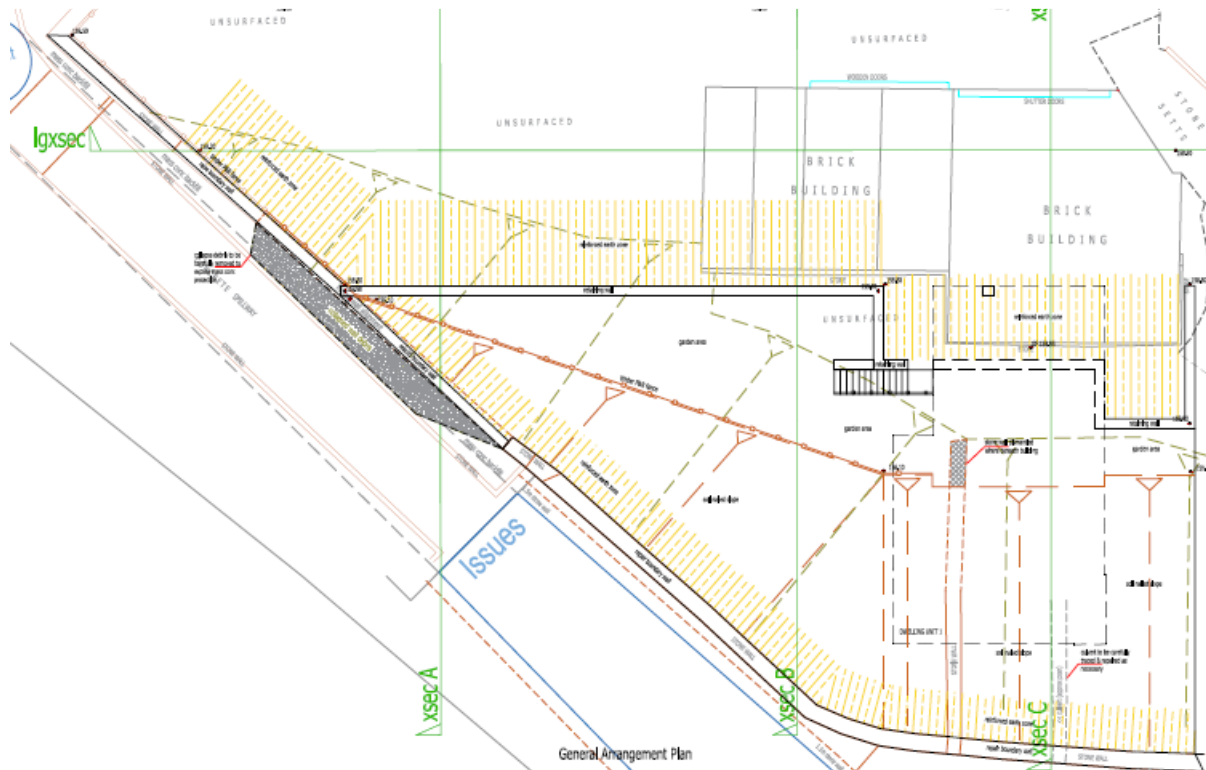
5.4 Existing Site Plan.



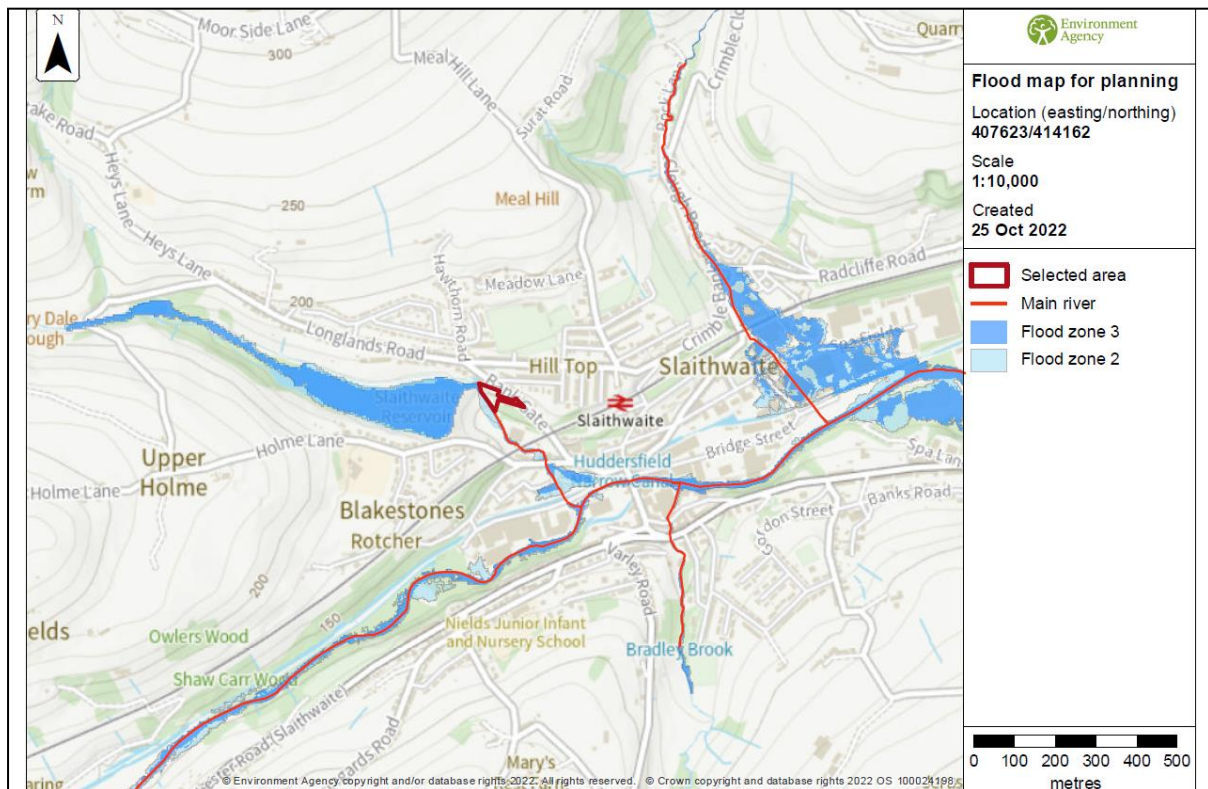
5.5 Proposed Site Plan.



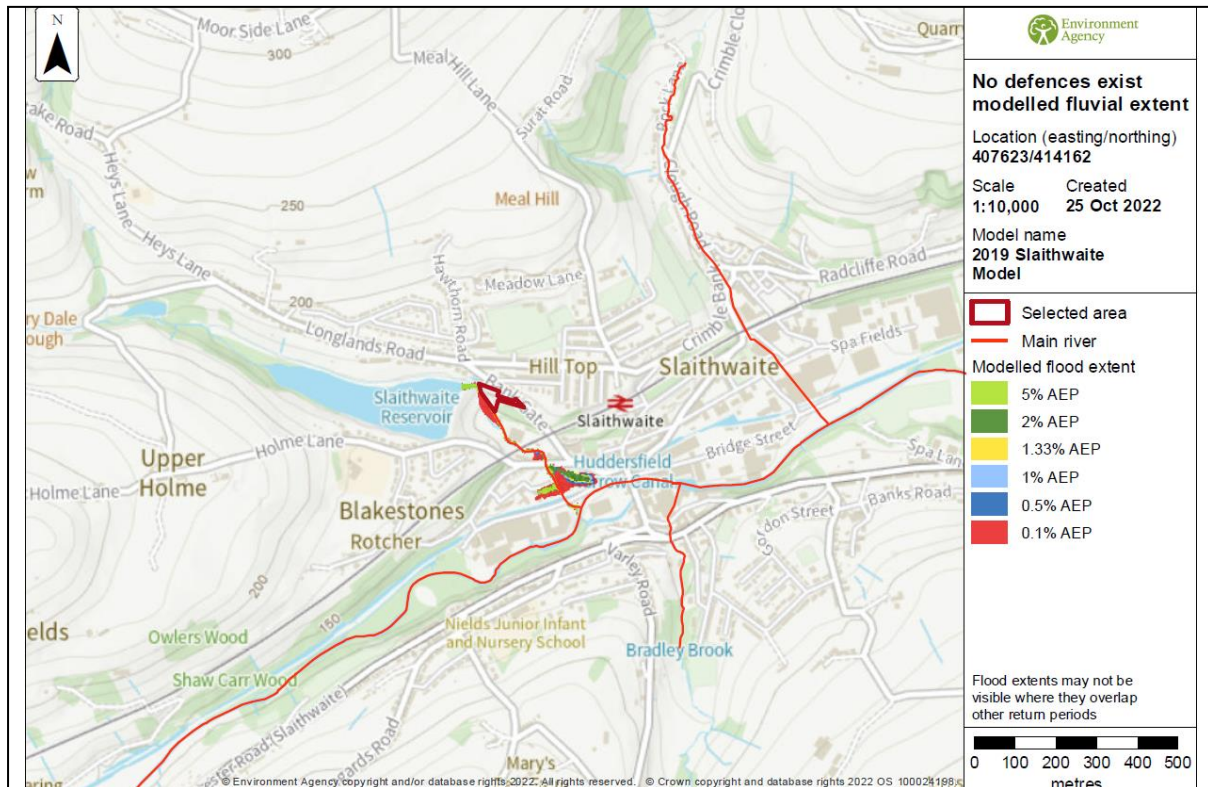
5.6 Proposed Site Earthworks Plan.



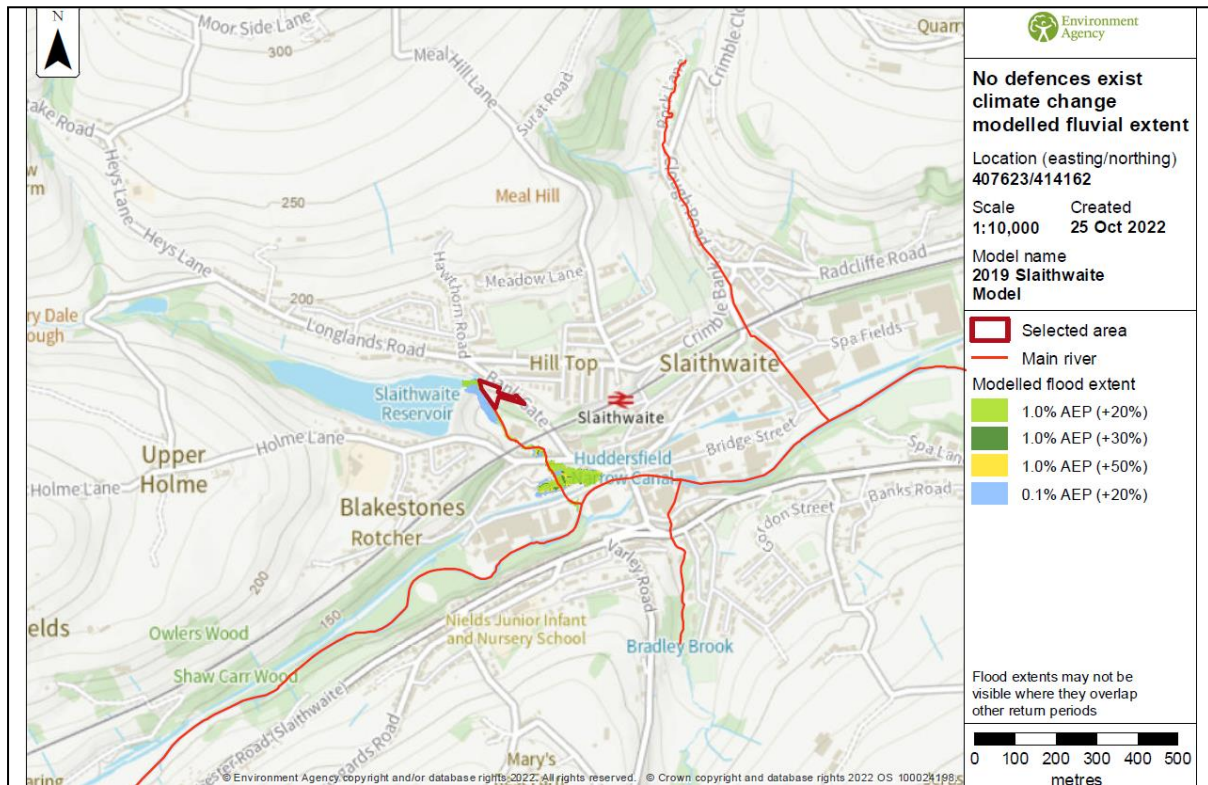
5.7 Environment Agency Flood Zone Map (Planning).

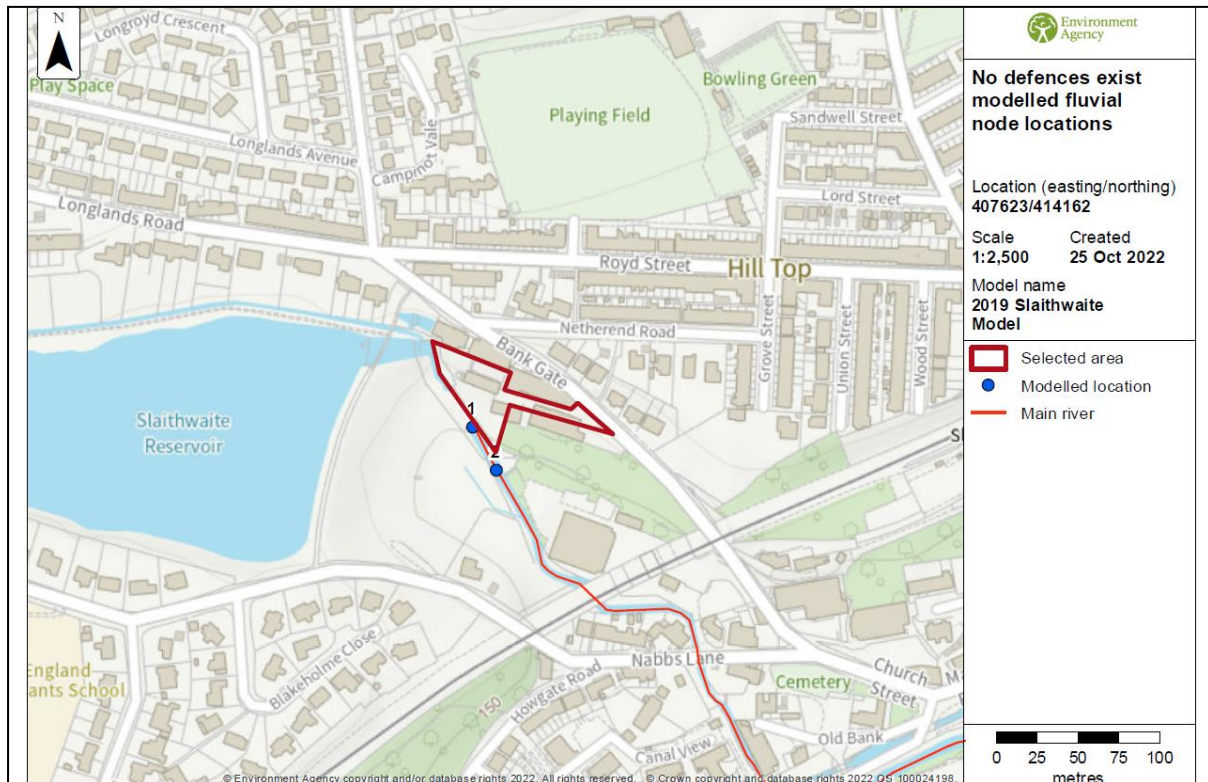


5.8 Bradford LLFA/Bradford Beck Flood Outlines 20yr.



5.9 Bradford LLFA/Bradford Beck Flood Outlines 100yr.

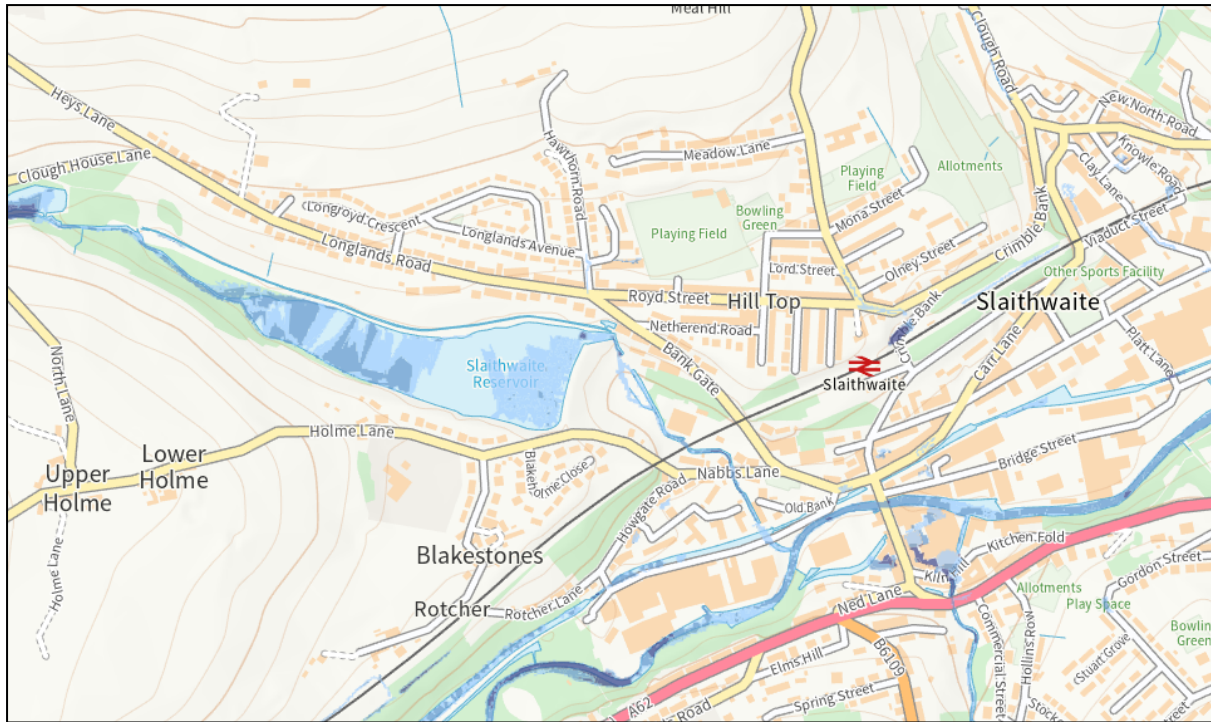


5.10 Bradford LLFA/Bradford Beck Flood Outlines 100yr+30%CC.**5.11 Bradford LLFA/Bradford Beck Flood Outlines 1000yr.****Modelled node locations data****No defences exist**

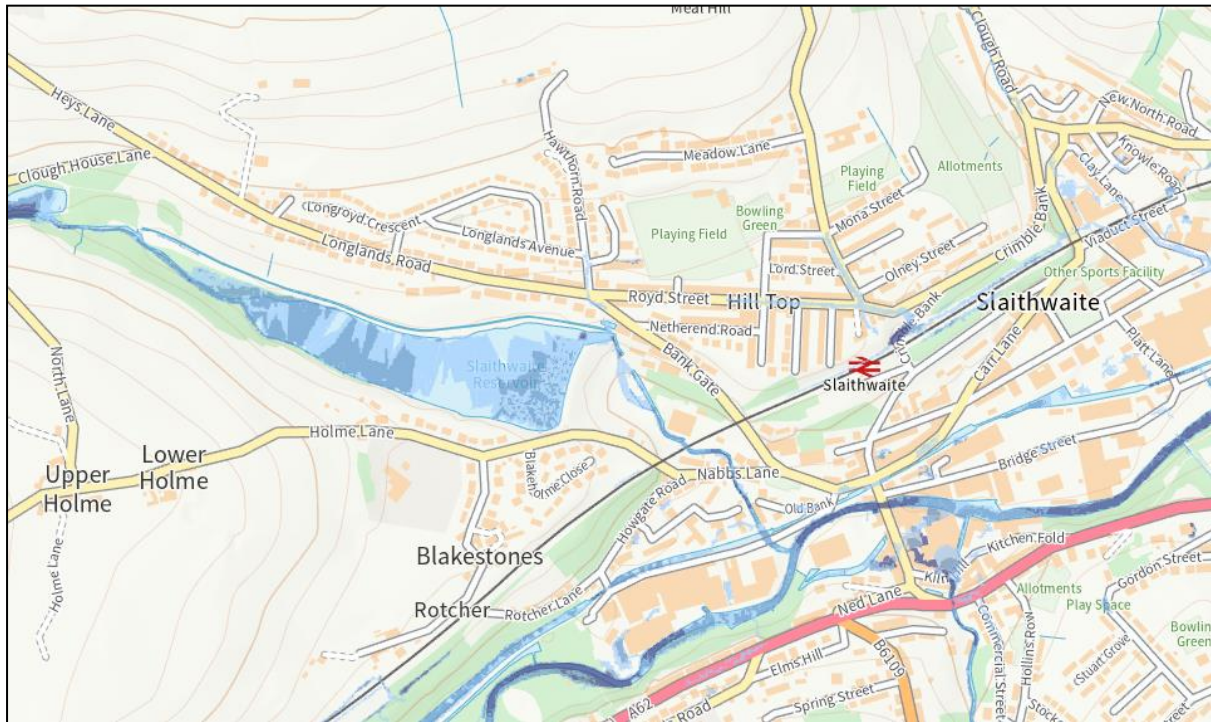
Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	1199884	407609	414141	147.69	7.43	147.76	9.29	147.79	10.22	147.81	10.97	147.88	13.17	148.02	19.13
2	1199885	407624	414115	141.93	7.45	142.06	9.33	142.13	10.27	142.18	11.01	142.31	13.23	142.64	21.32

Data in this table comes from the 2019 Slaithwaite Model 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.

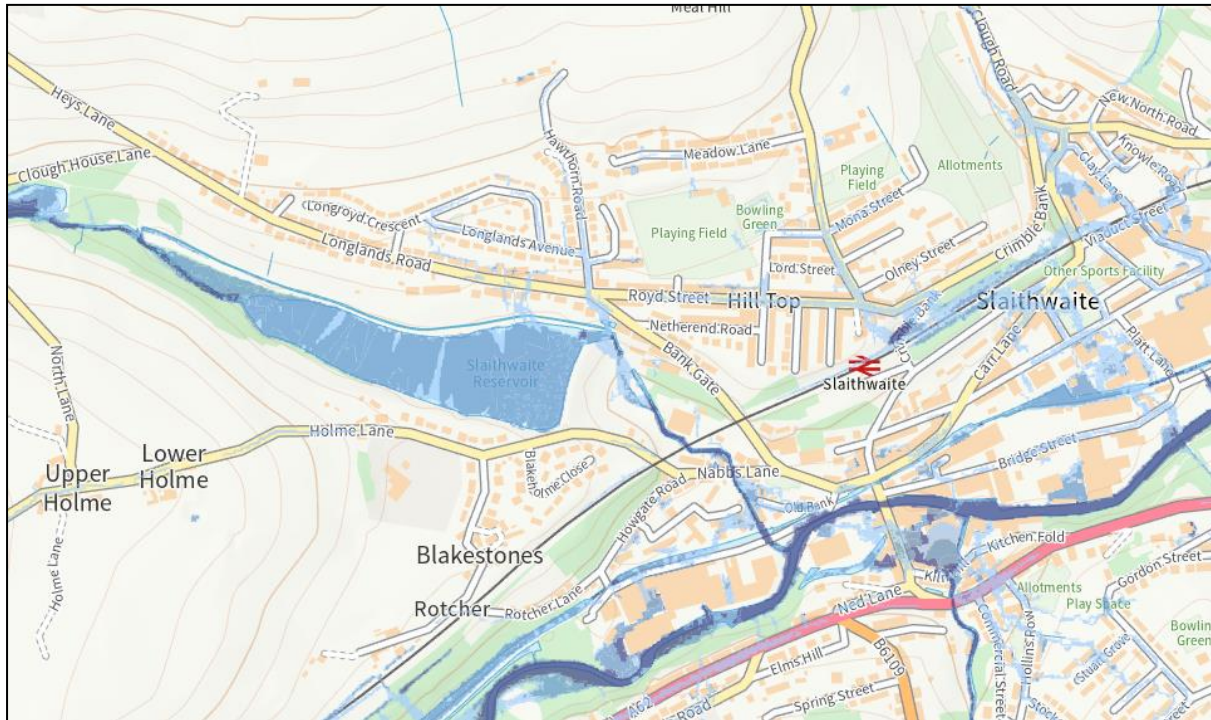
5.12 Environment Agency Surface Water Flood Risk Map (High Risk 30yr).



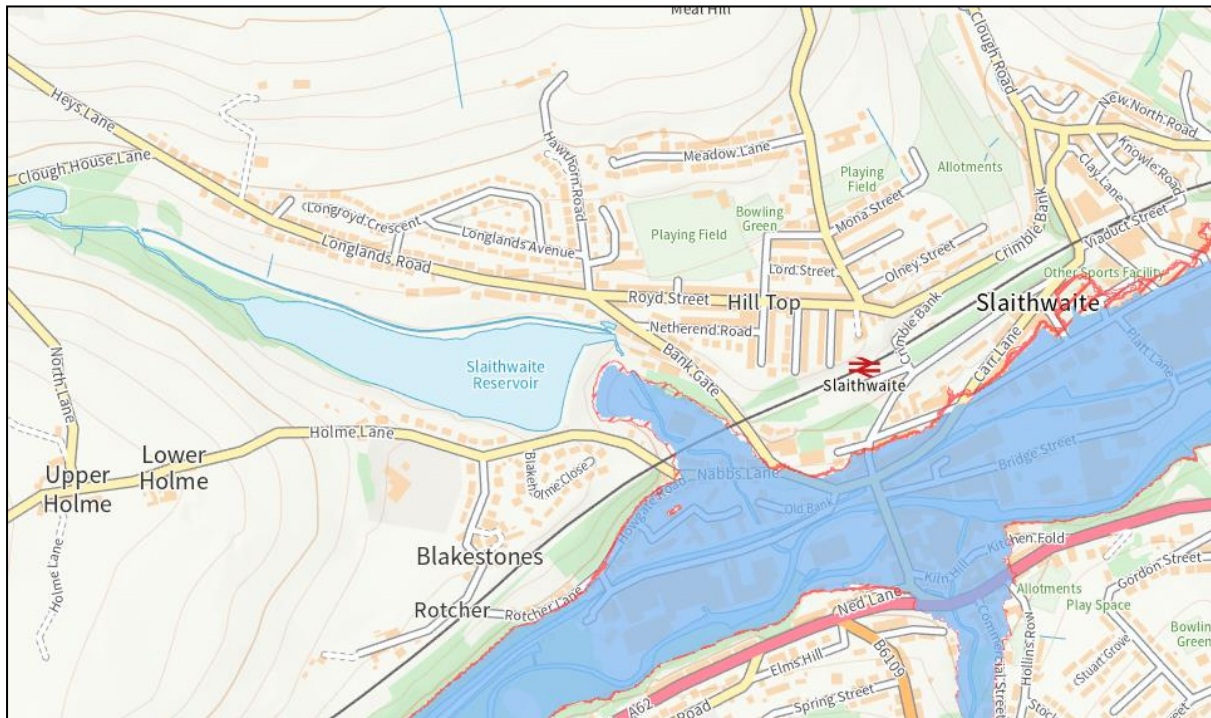
5.13 Environment Agency Surface Water Flood Risk Map (Med Risk 30-100yr).



5.14 Environment Agency Surface Water Flood Risk Map (High Risk 100-1000yr).



5.15 Environment Agency Reservoir Flood Risk Map.



5.16 Yorkshire Water Sewer Plans.

N/A – not required for assessment.

5.17 NPPF Planning Practice Guidance Table 1.**Table 1: Flood Zones**

These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's [Flood Map for Planning \(Rivers and Sea\)](#), available on the Environment Agency's web site, as indicated in the table below.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. 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)

5.18 NPPF Planning Practice Guidance Table 2.**More vulnerable**

- Hospitals
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill* and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

5.19 NPPF Planning Practice Guidance Table 3.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Notes to table 3:

- This table does not show the application of the **Sequential Test** which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and **Exception Tests** do not need to be applied to **minor developments** and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.



5.20 Environment Agency Climate Change Allowances.

Table 1 peak river flow allowances by river basin district (use 1961 to 1990 baseline)

River basin district	Allowance category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
North West	Upper end	20%	35%	70%
	Higher central	20%	30%	35%
	Central	15%	25%	30%

In flood zone 2

- essential infrastructure – use the higher central and upper end to assess a range of allowances
- highly vulnerable – use the higher central and upper end to assess a range of allowances
- more vulnerable – use the central and higher central to assess a range of allowances
- less vulnerable – use the central allowance
- water compatible – use none of the allowances

In flood zone 3a

- essential infrastructure – use the upper end allowance
- highly vulnerable – development should not be permitted
- more vulnerable – use the higher central and upper end to assess a range of allowances
- less vulnerable – use the central and higher central to assess a range of allowances
- water compatible – use the central allowance

5.21 BGS BH Records – Roch Flood Alleviation Scheme.

N/A.

5.22 References.

- Environment Agency Flood Maps.
- Environment Agency Flood & Flow Data.
- Government Planning Practice Guidance.
- EA/DEFRA - Flood Risk Assessment: Standing Advice.