

Flood Risk Assessment

PROPOSED RESIDENTIAL Lower Town House Farm Barn Townhouse Road Littleborough OL15 9JX

Author: Daniel Slattery
Client: Mr Vernon Wharmby
Doc Ref: rep-tjba-wharmby-lwr townhouse fm-FRA-070722.docx

Revision	Date	Reason
0	July 2022	Original to support planning application.

T J Booth Associates.
20A Eastgate St,
Rochdale,
Lancs,
OL16 1DH.
Tel: 01706 868288.
Email: office@tjba.co.uk

Flood Risk Assessment

PROPOSED RESIDENTIAL Lower Town House Farm Barn Townhouse Road Littleborough OL15 9JX

Contents.

1	FRA Introduction.....	3
1.1	Plans.....	3
1.1.1	Location Plan.....	3
1.1.2	Site plan.....	3
1.2	Derivation of Data, Surveys and Models.....	4
1.2.1	Existing and proposed topography.....	4
1.3	Assessments.....	4
1.3.1	Existing fluvial & surface water system.....	4
1.3.2	Proposed fluvial & surface water system.....	5
1.3.3	Climate change impacts.....	5
1.3.4	Fluvial morphological impacts.....	5
1.3.5	Potential sources of flooding.....	5
1.4	Design.....	6
2	Emergency Evacuation Plan.....	7
2.1	Section 1-4. Scope, Location, Risk & Mitigation.....	7
2.2	Section 5. Flood Warnings and Associated Actions.....	7
2.3	Section 6. Safe Access and Escape.....	8
2.4	Section 7. Temporary Refuge.....	9
2.5	Section 8. After the Flood.....	10
2.6	Section 9. List of Roles.....	10
2.7	Section 10. Plan Upkeep and Awareness.....	10
3	Conclusion & Residual risks.....	10
4	Appendix.....	11
4.1	Location Plan.....	11
4.2	TJBA Level Survey.....	11
4.3	Existing Plans.....	11
4.4	Proposed Plans.....	12
4.5	Environment Agency Flood Zone Map.....	13
4.6	Environment Agency Flood Data.....	13
4.7	Environment Agency Flood Data (Defended).....	14
4.8	Environment Agency Fluvial Extent Flood Map.....	15
4.9	Environment Agency Historic Flood Map.....	15
4.10	Environment Agency/DEFRA Surface Water Low Risk (100-1000yr) Depth Map.....	16
4.11	Environment Agency/DEFRA Reservoir Flood Risk Map.....	16
4.12	United Utilities Sewer Plans.....	16
4.13	NPPF Planning Practice Guidance Table 1.....	17
4.14	NPPF Planning Practice Guidance Table 2.....	17
4.15	NPPF Planning Practice Guidance Table 3.....	18
4.16	Environment Agency Climate Change Allowances.....	19
4.17	BGS BH Records – Roch Flood Alleviation Scheme.....	19
4.18	References.....	19

Flood Risk Assessment

PROPOSED RESIDENTIAL Lower Town House Farm Barn Townhouse Road Littleborough OL15 9JX

1 FRA Introduction.

Purpose of Flood Risk Assessment:

The purpose of the assessment is to inform & accompany a planning application for the redevelopment of a former agricultural building into a residential development.

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

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 2, refer to EA Flood Zone Map in the Appendix. Flood Zone 2 is defined as land assessed as having between a 1:100 & 1:1000 or greater annual probability of river flooding (0.1-1%) in any year (land shown in light blue on the EA Flood Map). Flood Zone 3 is defined as land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) in any year (land shown in dark blue on the EA Flood Map).

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 both Flood Zone 2 & 3 areas subject to the Exception Test being passed.

The Exception Test as indicated by the Environment Agency, does not need to be undertaken on change of use applications.

Preliminary or Full Flood Risk Assessment:

Full to support planning application.

1.1 Plans.

1.1.1 Location Plan.

See Location Plan in Appendix showing the area features.

The Application Site is within Littleborough.

Town House Brook flows west to east through the Site which shares a confluence with the river Roch approximately 600m southeast.

There is a reservoir/former mill pond to the north.

1.1.2 Site plan.

Refer to Proposed Plans in the appendix.

The Application Site comprises a former barn within a collection of farm buildings centred around a courtyard. Town House Brook flows through the Site in an open channel predominantly.

The proposed development is for a change of use and renovation of the former barn into 2No. residential dwellings.

1.2 Derivation of Data, Surveys and Models.

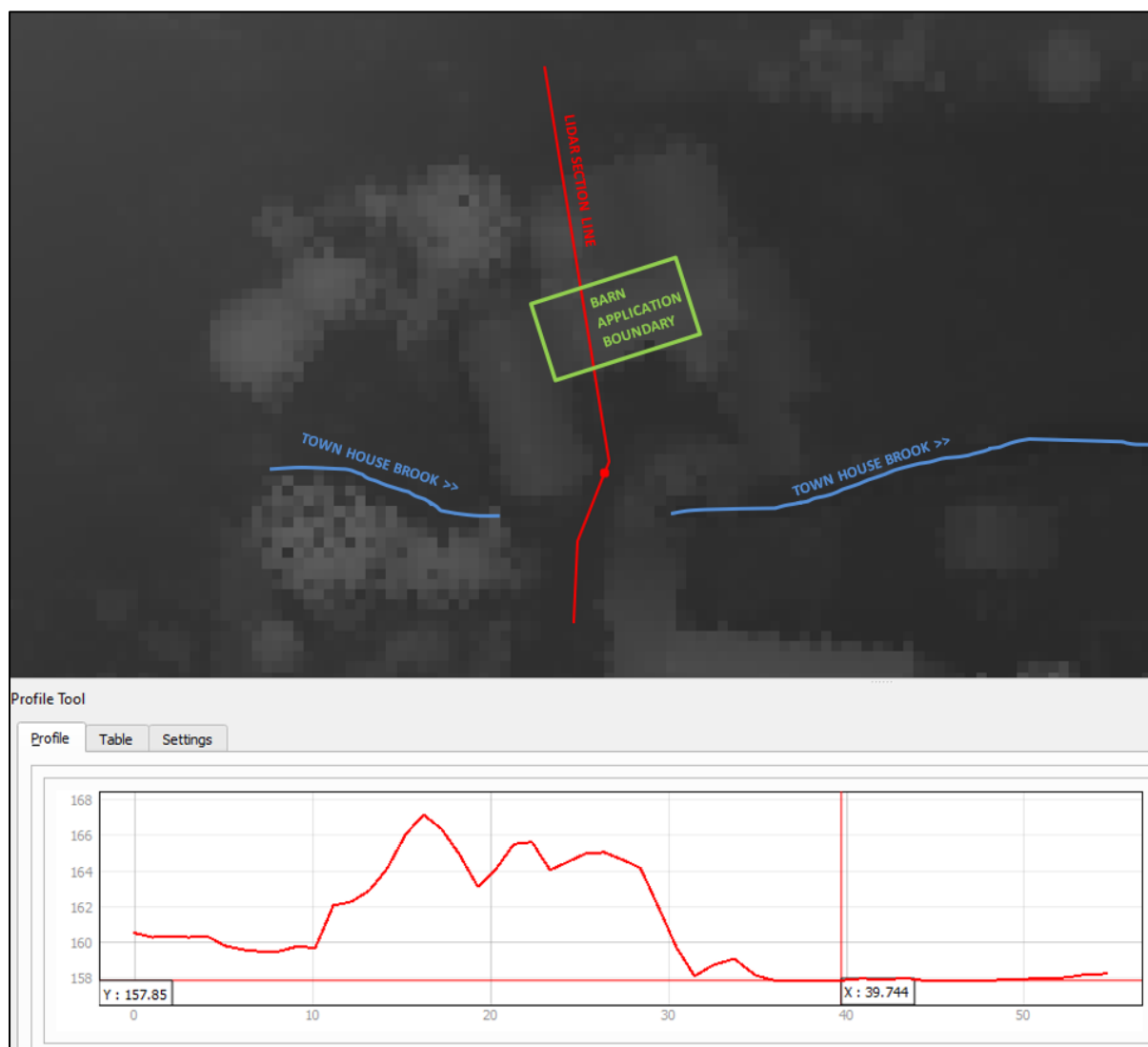
1.2.1 Existing and proposed topography.

No topographic survey of the Site has been undertaken.

A lidar map (1m DSM) was obtained for the local area and run through a GIS land profiling tool.

The results are illustrated below with the courtyard central to the farmhouses nominally at a level of 157.85maOD. The proposed barn renovation is outlined green.

FFL of the barn is estimated to be nominally 150mm above courtyard level at 158.00maOD.



1.3 Assessments.

1.3.1 Existing fluvial & surface water system.

The local fluvial system comprises Town House Brook, flowing east through the local area.

It is partially culverted to the west of the area between Calderbrook Road and becomes an open watercourse prior to being culverted again for a short distance under the Application Site entrance access road. It is then an open watercourse again flowing to further to the east towards Todmorden Road.

There are two former mill ponds in the local area, filled by local tributaries to Townhouse Brook. The mill ponds appear to have served mills in the local area historically, and historic maps shows sluices presumably discharging back to Town House Brook.

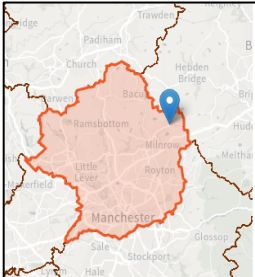
1.3.2 Proposed fluvial & surface water system.

The proposal is for a change of use to an existing barn, and there are no changes to the surface water or fluvial systems as a result.

1.3.3 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 2. There are some flood one 3 areas to the south side of Town House Brook. 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.



Irwell Management Catchment peak river flow allowances

	Central	Higher	Upper
2020s	12%	15%	24%
2050s	19%	26%	43%
2080s	35%	46%	75%

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. With the development proposal for a residential end use, the 2080s timeline is appropriate, which indicates a 35% climate change allowance should be used on peak river flows as a minimum.

The Environment Agency have provided data with a 35% increase for climate change allowance on the 100yr return period event.

1.3.4 Fluvial morphological impacts.

The proposed development will not impact or change fluvial morphology.

1.3.5 Potential sources of flooding.

Flood risk maps and flow/level data were obtained from the Environment Agency, (refer to appendix).

- Fluvial flooding from main rivers.

External areas to the courtyard in front of the property are nominally 157.85m aOD.

The building is estimated at nominally 158.00m aOD.

Flooding in Littleborough Centre is caused by the capacity of the Roch bridge/culverts in the centre beneath Halifax Road becoming exceeded in extreme flood events.

However, the effects of this are felt as far upstream of the Site and beyond up to Calderbrook Road, due to the capacity of Town House Brook & Clough Brook breaching their banks. Local to the Site, the flood maps suggest Town House Brook breaches its southern bank only leading to flooding to the south of the area. The flood maps suggest the Application Site remain dry.

The Flood Defence Map provided by the Environment Agency shows asset 101501 on the north bank of Town House Brook through the Site. The asset is described as engineered high ground, and has a standard of protection of a 100yr event with a level of 157.84m aOD.

As the Site is defended by the engineered bank, the "Defended Flood Model" was used for the assessment, and which had marginally higher flood levels so is considered conservative.

Node 2 just upstream of the Site suggests levels can get to 158.29m aOD for 100yr+35% flood event, but due to local ground levels, overspill is directed to the south away from the Site, which is reflected in the Fluvial Extent Flood Map.

Flood Node 3 was immediately south of the Site, within the Site boundary, and gives a good representation of the brook levels at the Site. For the extreme event, an allowance of 35% has been added & provided by the EA in accordance with the climate change allowances set out earlier in the report.

NODE Location	20yr	50yr	75yr	100yr	200yr	100yr+35%	1000yr
No. 3 On Site	157.05	n/a	157.13	157.14	157.15	157.17	157.19

Flood levels in the brook are well below the Site and this is reflected in the updated flood maps.

b. Surface Water Risk.

The main risk of flooding in the local area is from fluvial flooding. The EA/DEFRA Surface Water Flood Map in the Appendix shows some surface water overflow from the reservoir in a low risk (100-1000yr) flood event, but this is downstream of the Site.

c. Fluvial flooding from minor watercourses / drainage channels.

Included in the above fluvial flood risk model data.

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.

It is unlikely that in extreme flooding events that the local sewers will flood.

i. Reservoirs.

No risk of main reservoir flooding in the local area. The former mill pond immediately to the north of the Site is shown as not inundating the Site in extreme surface water flood events.

1.4 Design.

No special measures required apart from a Flood Evacuation Plan as parts of the local area to the south of the Site as well as access in and out of the area do become inundated in extreme flood events.

2 Emergency Evacuation Plan

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

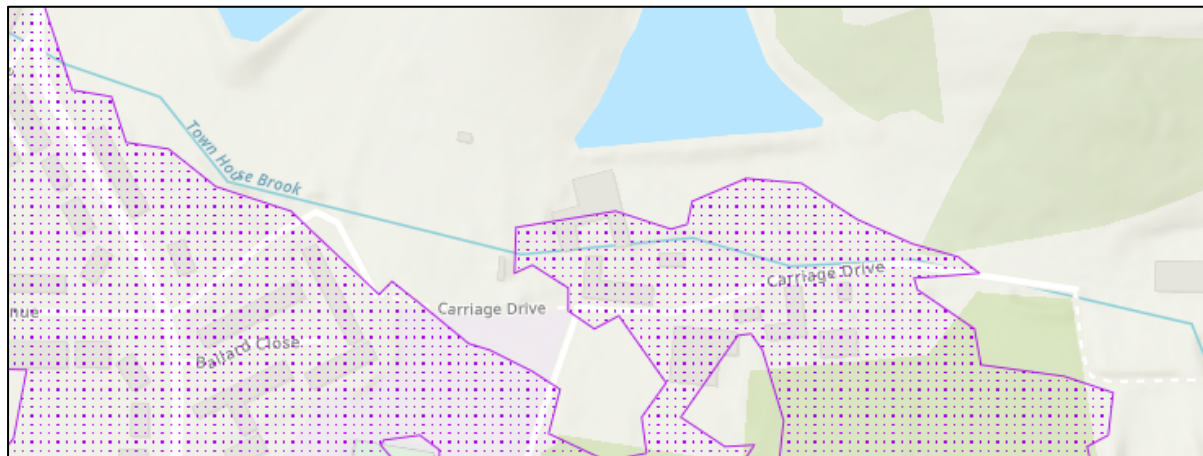
The Adept/Environment Agency guidelines indicate the requirements for flood risk emergency plans (EP) for new development. An EP would generally contain the following sub-sections:

- 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.

2.2 Section 5. Flood Warnings and Associated Actions

The Site is within a flood risk warning area, refer to flood alert 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.

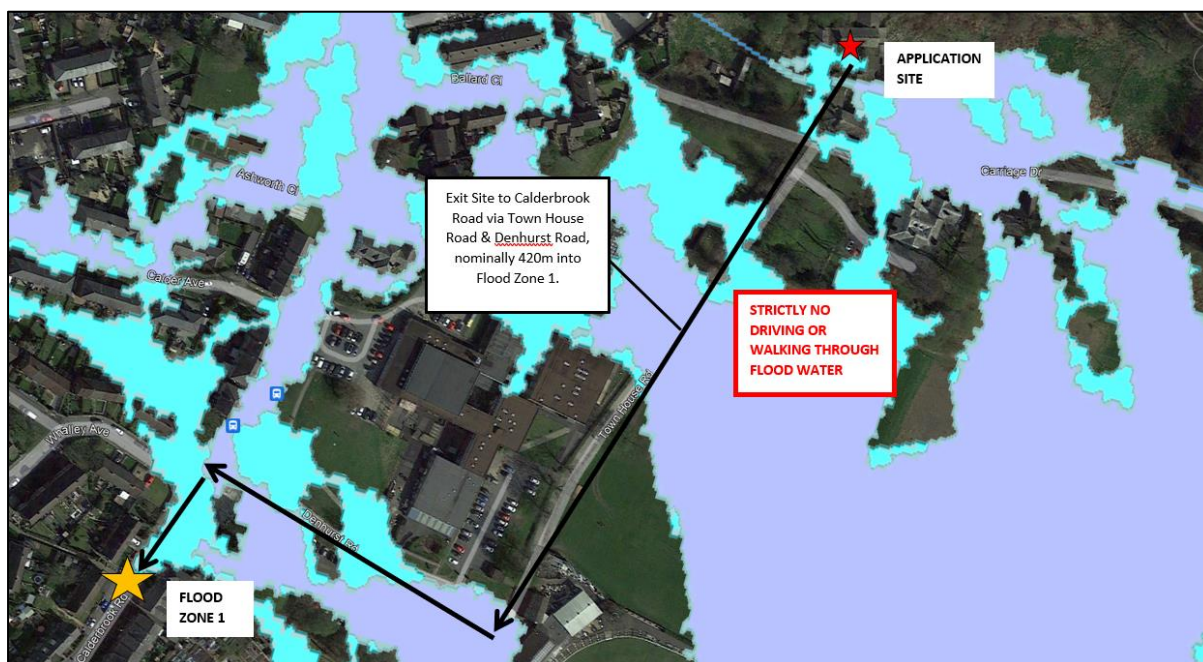
2.3 Section 6. Safe Access and Escape

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 areas surrounding the Site to the north, east and west are within a Flood Zone 1 area. The areas to the south of the Site around Townhouse Brook are generally Flood Zones 1 & 2, occasionally Flood Zone 3 in localised areas. However, roads would be cut off by Flood Zone 2 & 3 in the wider area, so to escape the entire wider area flood zone, the evacuation plan should be followed to Flood Zone 1.



The EA/DEFRA surface water flood maps indicate the local flood Surface Water Flood Maps indicate the local flood depth to be <300mm for the 100-1000yr flood event.

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 THOROUGH FLOOD WATERS.

2.4 Section 7. Temporary Refuge

The Site is suitable for temporary refuge in an extreme storm event. The building and surrounding areas are considered to be in Flood Zone 1.

The Site should be evacuated prior to a flood event when instructed to ACT by the Flood Warning Service.

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.

2.5 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 Rochdale Council for eligibility.

2.6 Section 9. List of Roles

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

2.7 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.

3 Conclusion & Residual risks.

The Site is considered to be safe in extreme flood event.

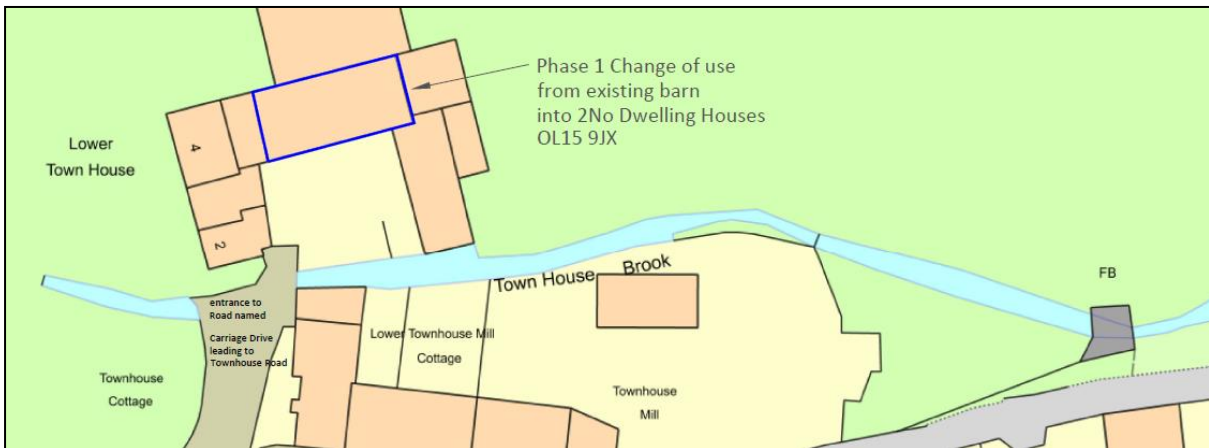
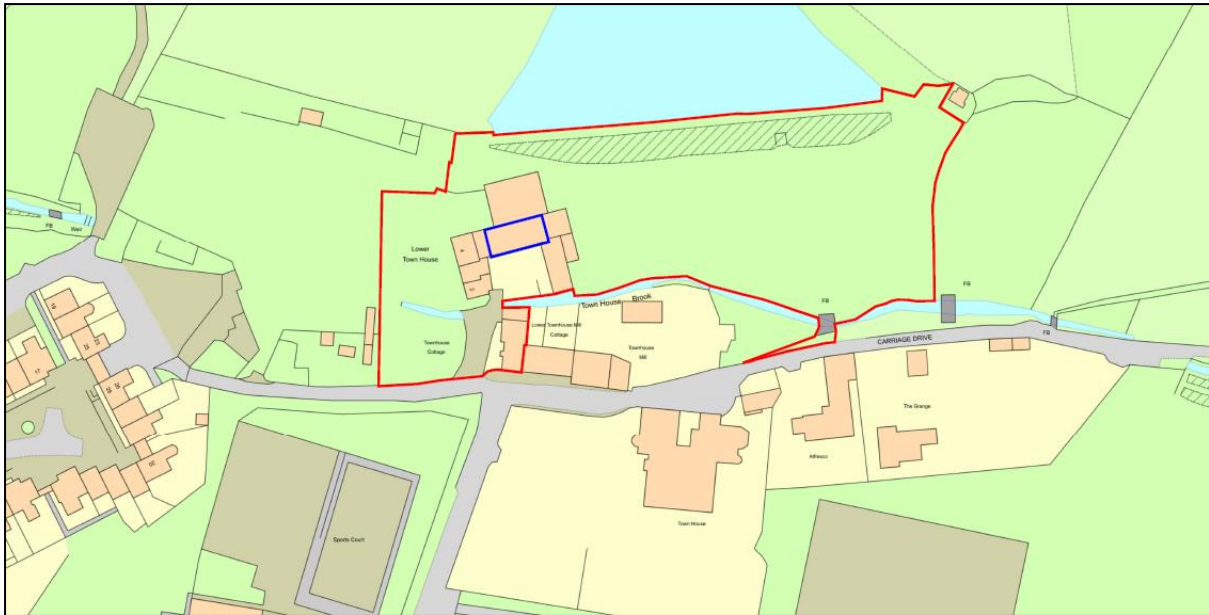
However, the local area floods to the south of the Site, and while residents will remain safe in the property, evacuation routes if needed will be compromised in extreme flood events.

Site users should be aware of the evacuation routes available, and potential flooding along these in extreme events.

No residual risks.

4 Appendix.

4.1 Location Plan.



4.2 TJBA Level Survey.

N/A.

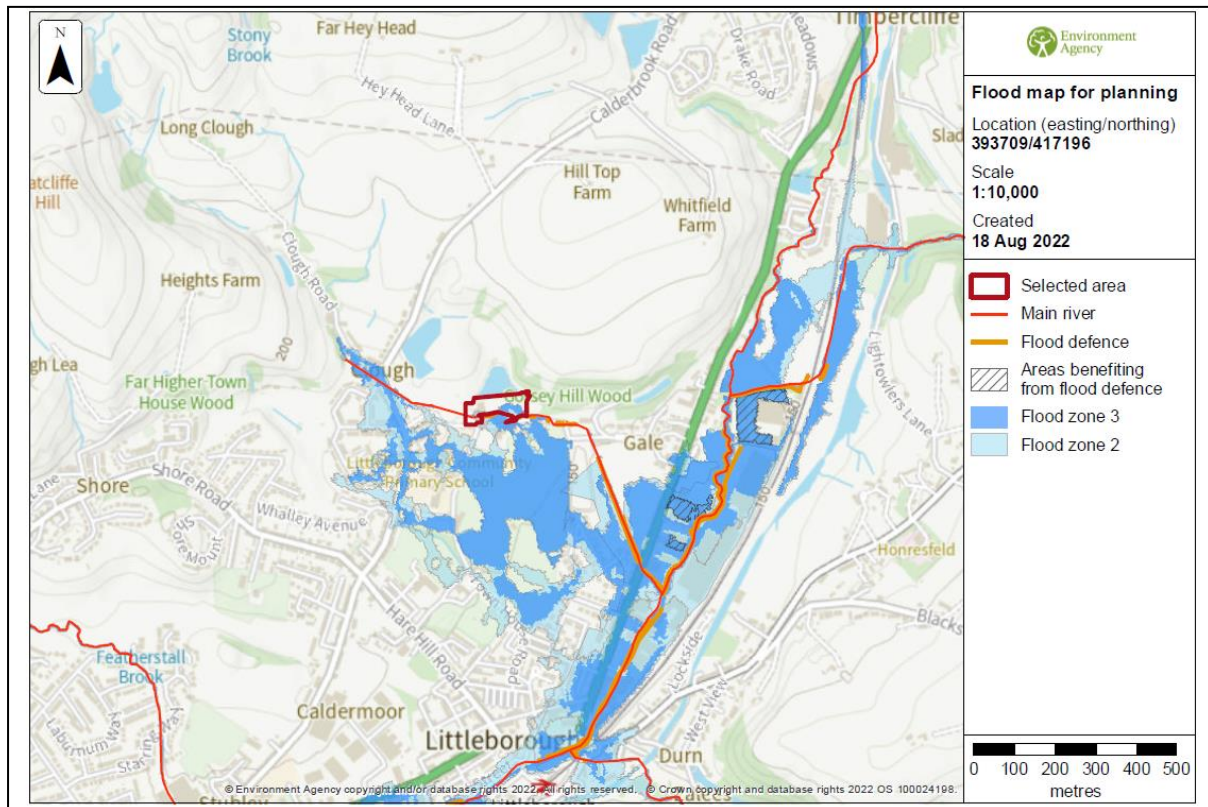
4.3 Existing Plans.

N/A.

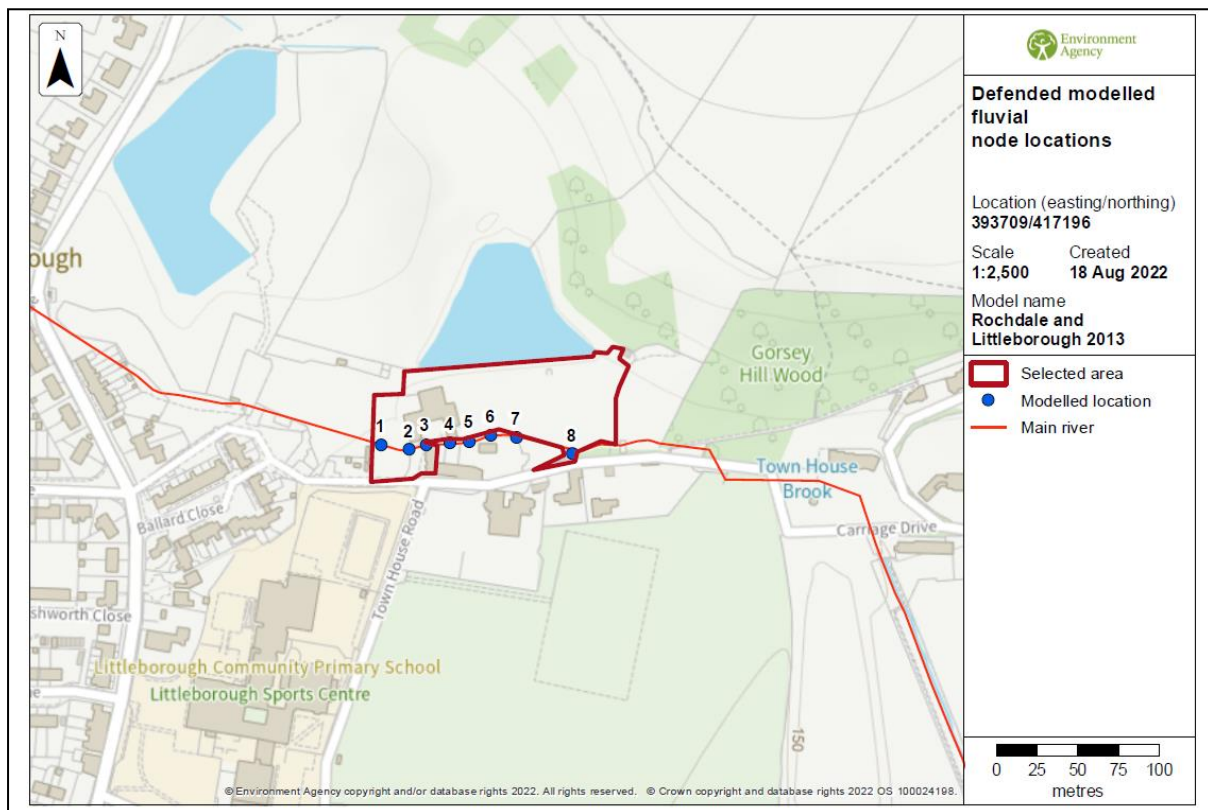
4.4 Proposed Plans.



4.5 Environment Agency Flood Zone Map.



4.6 Environment Agency Flood Data.



4.7 Environment Agency Flood Data (Defended).

Modelled node locations data

Defended

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	3212	393639	417174	158.02	2.35			158.24	3.06	158.26	3.14	158.30	3.27	158.42	3.73
2	46651	393655	417171	157.85	2.35			158.11	3.06	158.14	3.14	158.19	3.27	158.39	3.73
3	253383	393666	417174	157.05	2.35			157.13	3.06	157.14	3.14	157.15	3.27	157.19	3.73
4	250847	393681	417175	156.73	2.35			156.82	3.06	156.83	3.14	156.84	3.27	156.88	3.73
5	92934	393693	417176	156.68	2.46			156.77	3.22	156.77	3.31	156.77	3.46	156.78	4.0
6	156149	393706	417179	156.69	2.46			156.79	3.22	156.79	3.31	156.80	3.46	156.81	4.0
7	327744	393722	417178	156.70	2.33			156.82	2.34	156.83	2.35	156.84	2.36	156.86	2.37
8	206152	393756	417168	155.34	2.33			155.44	2.34	155.45	2.35	155.46	2.36	155.50	2.37

Data in this table comes from the Rochdale and Littleborough 2013 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.

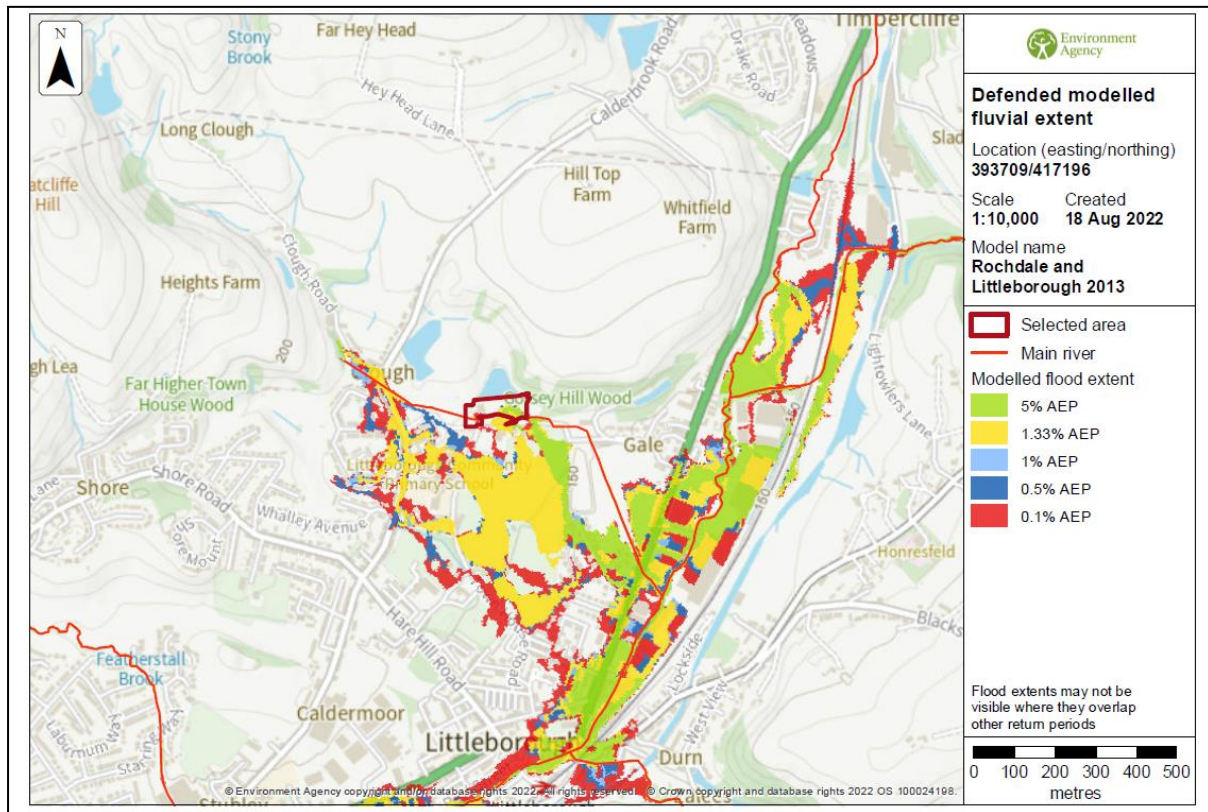
Modelled node locations data

Defended climate change

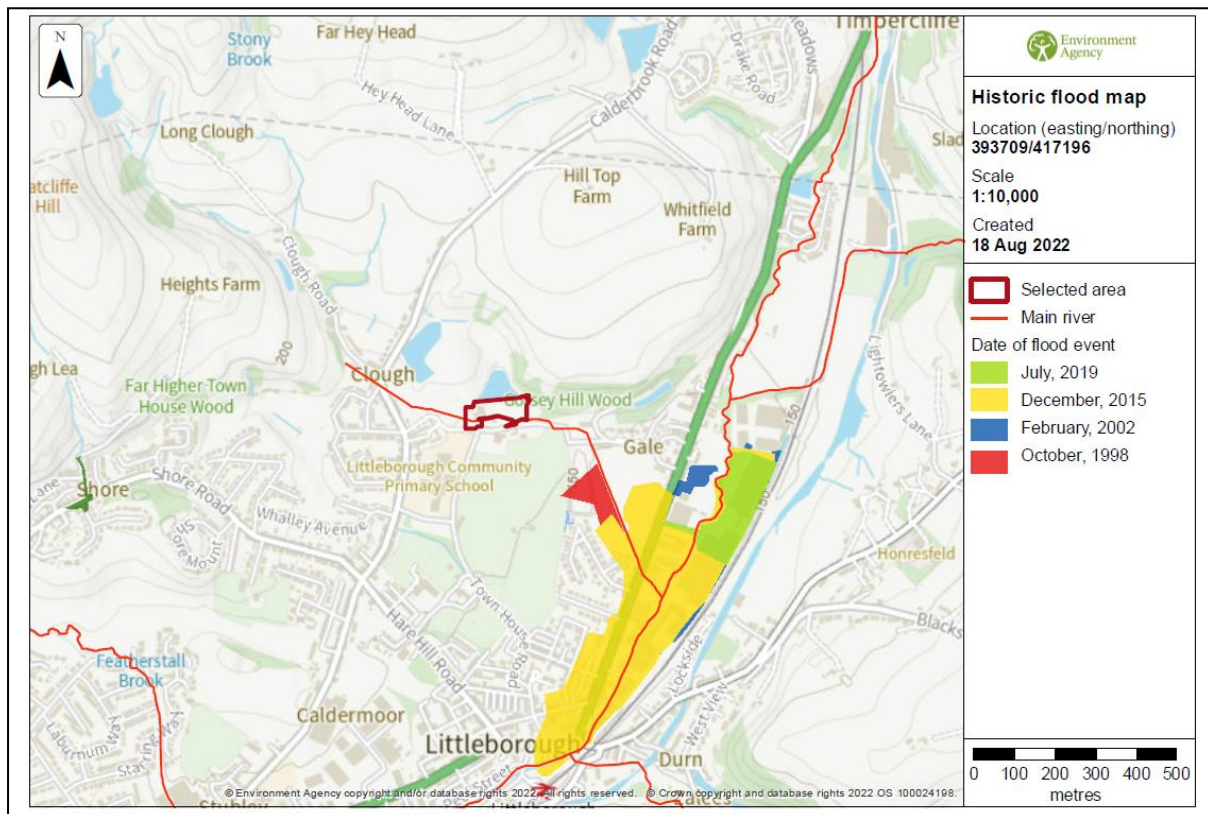
Label	Modelled location ID	Easting	Northing	1.0% AEP (+20%)		1.0% AEP (+35%)		1.0% AEP (+70%)	
				Level	Flow	Level	Flow	Level	Flow
1	3212	393639	417174	158.30	3.28	158.36	3.52	158.47	3.96
2	46651	393655	417171	158.20	3.28	158.29	3.52	158.47	3.91
3	253383	393666	417174	157.15	3.28	157.17	3.52	157.21	3.91
4	250847	393681	417175	156.84	3.28	156.87	3.52	156.90	3.91
5	92934	393693	417176	156.77	3.47	156.78	3.74	156.79	4.20
6	156149	393706	417179	156.80	3.47	156.81	3.74	156.82	4.20
7	327744	393722	417178	156.84	2.35	156.86	2.36	156.88	2.37
8	206152	393756	417168	155.46	2.35	155.47	2.36	155.50	2.37

Data in this table comes from the Rochdale and Littleborough 2013 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.

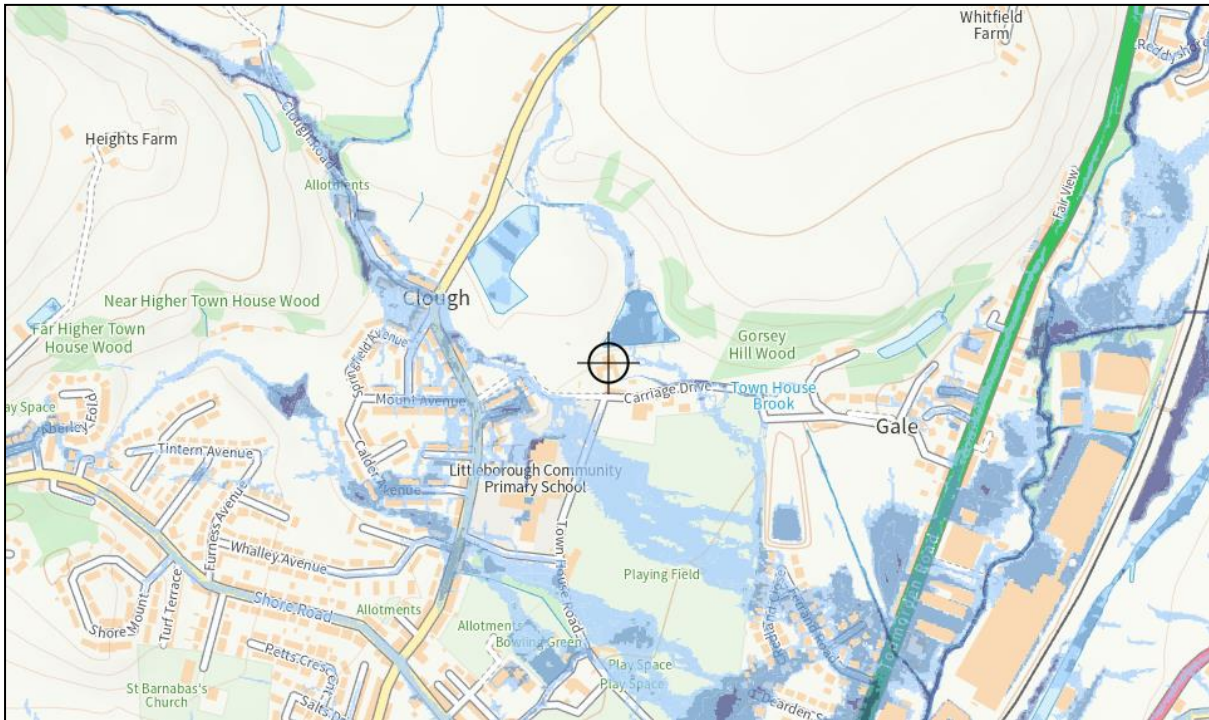
4.8 Environment Agency Fluvial Extent Flood Map.



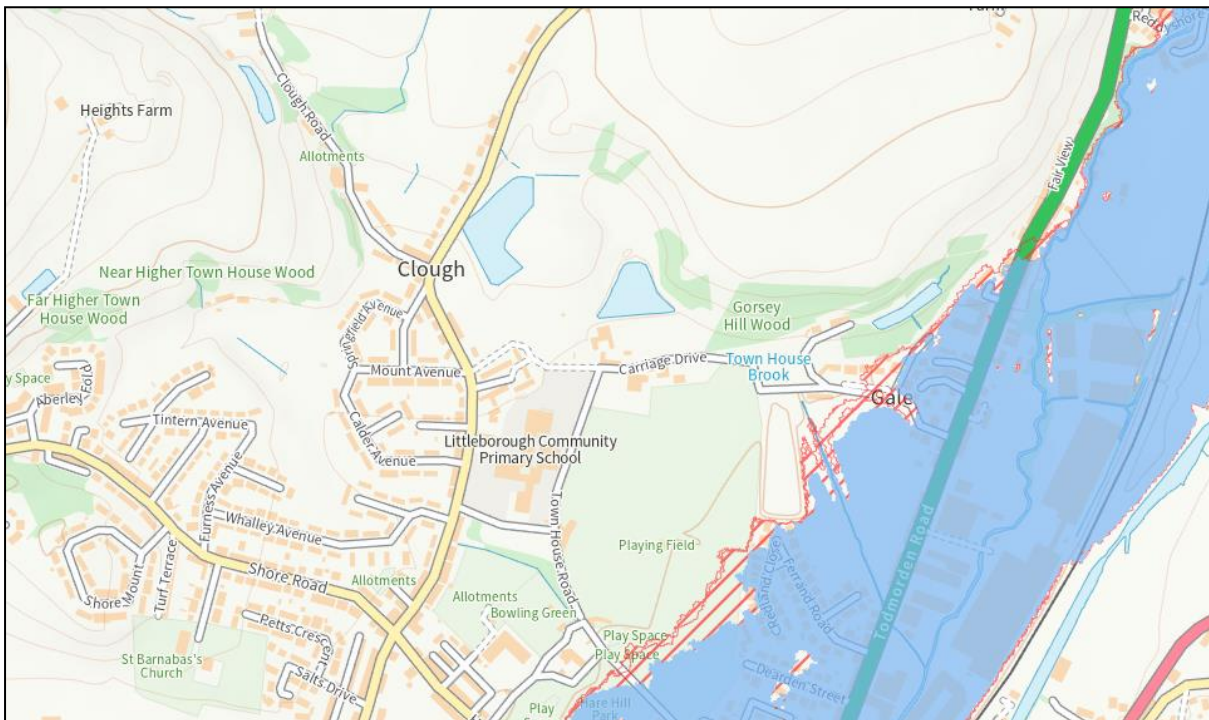
4.9 Environment Agency Historic Flood Map.



4.10 Environment Agency/DEFRA Surface Water Low Risk (100-1000yr) Depth Map.



4.11 Environment Agency/DEFRA Reservoir Flood Risk Map.



4.12 United Utilities Sewer Plans.

N/A.

4.13 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)

4.14 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.

4.15 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 †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

Key:

✓ Development is appropriate

X 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.

4.16 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

4.17 BGS BH Records – Roch Flood Alleviation Scheme.

N/A.

4.18 References.

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