

**Existing buildings
rear of 21 King Street
Whalley**

**Replacement with
3 new cottages**

Flood risk assessment

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1.0 Introduction

Three new cottages are proposed at the rear of 21 King Street, Whalley. The land at the rear of 21 King Street is currently occupied by two industrial buildings and access is from King Street via a roadway between 35 and 37 King Street. The area is historic with Whalley Abbey and the Abbey corn mill nearby.

2.0 Executive summary

The existing site is two industrial buildings in the centre of Whalley near to the Calder. These are to be demolished and three new cottages are to be built. The site is floodzone 2 and new slab levels will be set as high as is feasible consistent with planning requirements and preferably at 1 in 1000 year risk level. New drainage will be separate system and a new connection will be needed plus surface water storage and a vortex flow controller.

Whalley has a flood warning service and all occupants will sign up for the Environment Agency flood warning service and be aware that if a warning is received they can walk to higher ground to the north.

3.0 Existing site

The existing site consists of two industrial buildings at the rear of 21 King Street, Whalley which is to the south of Whalley centre and near to the river Calder. Existing site levels are approx 45 to 45.2 and the site area is approx 400m². King Street road bridge over the Calder is a historic 3 arch stone road bridge and approx 150m upstream is a river weir which was built to enable a waterfeed to the corn mill waterwheel to provide power. The mill stream has a penstock marked on the OS mapping and the feedwater channel flows towards King Street, flows under King Street in culvert, and then to the mill building in open channel with an outfall back into the Calder downstream of the 3 arch road bridge. King Street has a road low point at Abbey Mews where the mill stream passes under.

4.0 River system and risk level data

The Calder flows at the southern edge of Whalley and has a catchment area of 317 km². BFIHOST is 0.395 indicating a less absorbent catchment on average, annual rainfall is 1232 mm, and the storm time length that produces a peak flow at Whalley is approx 9.7 hours. The river has a weir just upstream of the King Street three arch road bridge and this has an outlet to the corn mill. The road bridge has an OS road level of 48.

Environment Agency data sent to us consists of 3 nodes, 2 above the weir and 1 below the road bridge and interpretation of risk levels for the King Street site is affected by two factors:-

1. How much flow passes through the three arches and what the afflux is through the arches in terms of water head drop.
2. What flows spill towards King Street from above the weir- King Street has a low point at Abbey Mews and any spill flows that collect here will pond subject to the overall waterpath back into the Calder downstream of the road bridge.

We estimate the bridge afflux to be approx 0.4m to 0.5m and the weir head drop at high flows to be 0.3m to 0.6m. -based on this we estimate risk levels to be :-

Flow frequency	Node 293	downstream of the road bridge	upstream of the road bridge	downstream of the weir	node 727
1 in 100 year	43.98	44.4	44.6	44.74	45.34
1 in 1000 year	45.78	45.7	46	46.19	46.69

Downstream of the road bridge is the appropriate risk level 'set' for the site subject to any further detailed model data the Agency may have.

5.0 Proposals and drainage

The existing industrial buildings are to be demolished and the three new cottages will have parking bays at the front and gardens to the rear. This will reduce the existing surface water runoff rates from the site. The existing site gross area is approx 390m² and this is all currently hard area which produces surface water runoff. The new hard area will be approx 270m².

The proposal is in floodzone 2. A 1 in 100 year risk level is 44.4, the existing roadway at the cottages is 44.95 to 45.27 and a 1 in 1000 year risk level is 45.7. The slab levels of the new cottages should be set as high as is consistent with planning requirements and we advise a minimum slab level of 45.63 bearing in mind that all front and back door frames are approx 75mm height above slab level. Setting the slabs at 45.7 will give the properties protection against a 1 in 1000 year risk level.

The new drainage will be separate system with separate foul and surface water drains to the last manhole prior to a connection to the public combined drainage system. Application to United Utilities for a new connection is likely to produce the response that a new surface water flow rate of no more than 5 l/sec can be discharged and surface water storage of approx 1 to 2m³ will be needed which can be placed to the rear of the units. This can be cellular storage such as Polystorm units plus a vortex flow controller.

Ground data is not available as yet. The three cottages will each have a rainwater butt and if the rear garden areas are suitable for soakage into the ground then part or all of the roofwater runoff will be discharged to soakaways.

6.0 National Planning Policy Framework and Technical Guidance

The proposed use as a house is classed as 'more vulnerable' in table 2 and this use is 'appropriate' in floodzone 2 as per table 3.

Types of flooding that could affect the site are:-

1. River- the site is in floodzone 2 from the river Calder
1. Sea- no tidal influence
2. Land- no undrained land slopes towards the site.
3. Groundwater- the site is to be investigated, there are no springs or wet areas visible on site.
4. Sewers- no local internet reports of sewer surcharge
5. Reservoirs canals- Dean Clough reservoir approx 4km away to the southwest
6. Pluvial risk- see below and EA mapping.

Environment Agency mapping is as follows:-

Flood map for Planning- the site is in floodzone 2 above any local 1 in 100 year risk levels.

Risk of flooding from rivers and sea- this shows the effect of any flood defences.

Flood warning- there is a flood warning scheme for the southern part of Whalley

Groundwater- the site is not in a groundwater protection zone.

Risk of flooding from reservoirs- this shows reservoir risk- all utility company reservoirs are maintained to a 1 in 10,000 year risk standard under the Reservoirs legislation and this is a very rare and unlikely risk. Dean Clough reservoir is approx 4km away to the southwest.

Risk of flooding from surface water- this mapping shows surface water flood risk. Pluvial mapping is the subject of a separate EA paper made public in November 2013 and is useful in locating possible ground low points and depressions. We quote- 'the conveyance effect of ordinary watercourses or drainage channels is not explicitly modelled'- so whilst the EA mapping shows pathways this takes no account of the existing drainage and in practice there is a very low risk.

7.0 Attachments

Attachment	Number	Size
Location plans	1, 2	A4
Location plan	3	A3
Public sewer records	4, 5	A3
Existing site	6	A3
Survey	7	A3
Proposals	8, 9	A3
OS mapping	10	A3
EA data	11 to 13	A3
3 arch bridge	14	A4
Corn mill/ hydro scheme	15 to 18	A4
FEH data	19 to 24	A4
Knight Samuels	25 to 27	A4
EA mapping	28 to 34	A3

This report is copyright. Attachments are scanned as A4 and A3 sets and can be put in order using the pencil top numbering. Should you need further data please email floodriskengineer@gmail.com

Email files
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