

The Planning Inspectorate
National Infrastructure Planning
Temple Quay House
2 the Square
Bristol
BS1 6PN

Our ref: WX/2019/133441/01-L12
Your ref: TRO40011

Date: 16 February 2020

Dear Sir/Madam

**METROWEST PHASE 1 DEVELOPMENT CONSENT ORDER APPLICATION
EXAMINATION DEADLINE 5 - EXAMINING AUTHORITY'S FURTHER WRITTEN
QUESTIONS AND REQUESTS FOR INFORMATION (EXQ2)**

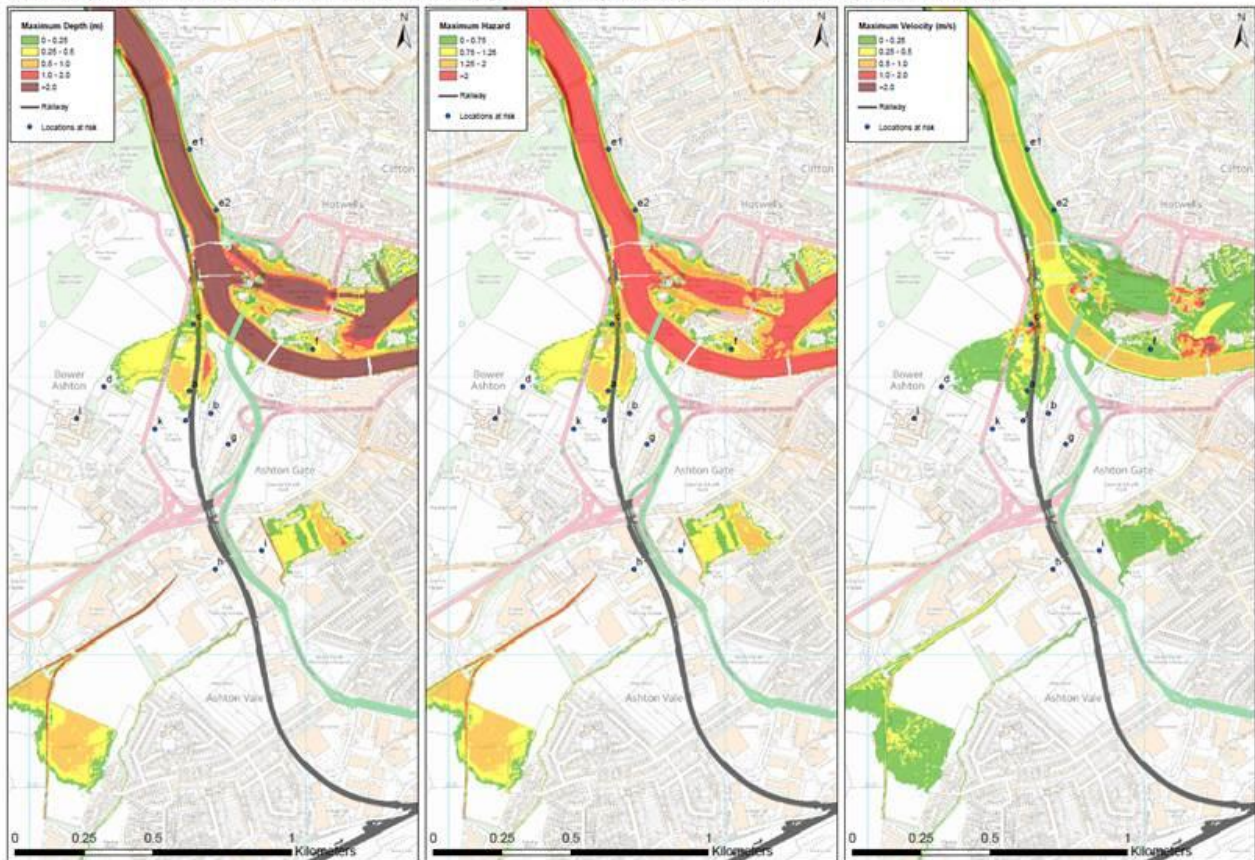
Please find hereunder the Environment Agency's responses in respect of the above:

FRD .2.1 xxi)

In accordance with the NPPF, land in flood zone 3a can be used for development purposes, provided there is no consequential loss of floodplain storage. The proposed welfare unit is permissible, subject to the finished floor level (FFL) of the unit being raised above the flood level, and appropriate floodplain compensation provided. Alternatively, the unit could be raised out of the floodplain on a supporting structure, with a void underneath the building, to allow the free passage of flood water. Any such arrangement must be appropriately maintained, to avoid the accumulation of debris etc for the lifetime of the development. The storage of materials in flood zone 3a should not be permitted, unless appropriate floodplain storage compensation is provided.

FRD .2.1 xxii)

The definition of flood zone 3b, functional floodplain, is land that floods for a return period of 1 in 20 or less. The Agency's flood map does not distinguish between flood zone 3a and 3b. The map the Agency provided with its previous response was an extract of the applicant's own FRA. That map showed the extent of flooding for a 1 in 20 year tidal event, hence it represented the functional floodplain, as modelled by the applicant. The applicant's own modelling and mapping therefore identifies the site as functional floodplain. Flood zone 3a was not shown on the previously submitted map however, the map hereunder does show the area of flood zone 3a. The map below shows the extent of the 1 in 200 year flood (coloured area) pre-development, without climate change, also called flood zone 3a.



FRD .2.2 xxiii)

In order to ensure the safety of the welfare unit and its users, its FFL must be raised above the 1 in 100 year flood level, with the prescribed allowance for climate change. As detailed above, to avoid an adverse impact on third party interests, the loss of land resulting from the welfare unit, will need to be compensated, unless a void is provided and maintained underneath the unit to allow the free passage of flood water.

FRD .2.2 xxiv)

The Agency is satisfied that the elevation of the unit, as proposed, is acceptable however, details have not been provided regarding how it will be maintained for the lifetime of the development. The Agency is currently in discussion with the applicant's representatives regarding the means by which the highlighted issues will be controlled.

FRD 2.3 xxv)

Please see the attached document for historical flood events. This data corroborates the information provided by the applicant within the FRA (paragraph 4.2.12 page 4-7. Please note, the Agency is only able to record events that have been reported.

Accordingly, there could have been flooding events in the vicinity that have not been reported.

FRD .2.3 xxvi)

The applicant's model, based on the CAFRA model and made site specific by improving the ground elevation data within the model, was run for a tidal and fluvial combination, based on the FD2308 joint probability calculation spreadsheet. The condition set out in the model to represent a 1 in 20 year tidal event is a 20 year tidal design boundary return period, combined with a mean annual flow. See table 2 hereunder, extracted from Appendix N part 1 page 11

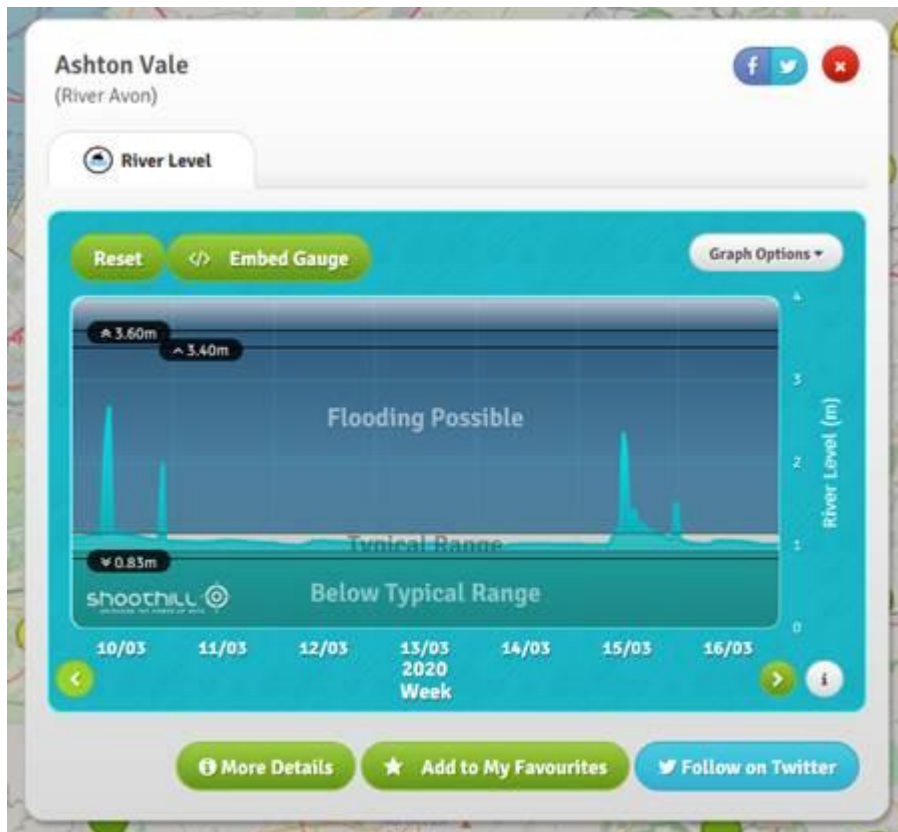
Table 2. Tidal design events – joint tidal and fluvial combinations

Simulated tidal event return period (yrs)	Tidal design boundary return period (yrs)	Fluvial design boundary return period (yrs)
Non-flood	Base	'mean' (i.e. non-flood)
1	1	'mean' (i.e. non-flood)
2	2	'mean' (i.e. non-flood)
5	5	'mean' (i.e. non-flood)
10	10	'mean' (i.e. non-flood)
20	20	'mean' (i.e. non-flood)
75	75	'mean' (i.e. non-flood)
100	100	'mean' (i.e. non-flood)
200	200	6
1000	1000	12

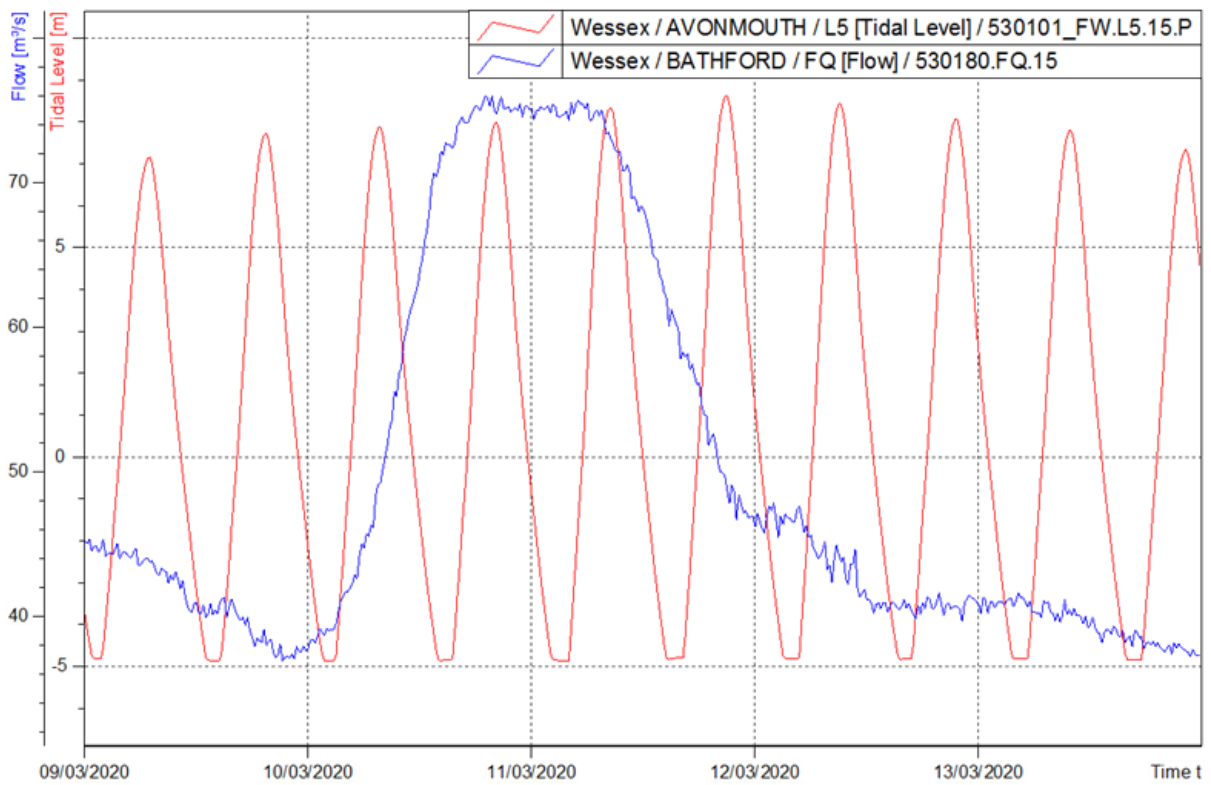
When the model is run with the above condition, it predicts 0.53 m of flooding of the railway at Bower Ashton and Clanage Road. The photos taken on the 12 March 2020 shows some flooding on the site. The Agency is surprised by the applicant's contention that the model is over-predicting flooding to that extent. The model was calibrated, and the applicant made it more site specific by adding topographic information. The model was also reviewed and validated by the Agency's National Evidence and Risk team.

The applicant has not provided sufficient data to review in respect of this matter, for example, it is not known which set of data the applicant is referring to. The Agency is aware that one of the gauges at Avonmouth has been damaged by a boat. Has the applicant used that gauge?

The Agency is satisfied that flooding would occur at Clanage Road, if the right combination of tidal and fluvial event is reproduced, in accordance with the conditions detailed within the model. With regard to the observed data on the 12 March 2020, the water level measured in the River Avon at Ashton Vale was within the 'Typical Range'. Please see the gauge record hereunder, which was extracted from the gauge map website for the Ashton Vale gauge.



With reference to the Agency's gauge at Avonmouth for the 12 March (the red trace on the graph hereunder) at 09:00 the tide level reached 8.44m (approximately a 10 year event based on CFB data below). At 21:30 the tide reached 8.07m (approximately 1 year event). At the same time, the river level (blue trace on the graph) in the River Avon at Bathford, upstream of Bristol, was going down. The River Avon on the 12 March was within its Typical Range. The Agency would therefore not expect a flood event under those circumstances.



Feature	Value
CFB_Extreme_Sea_Levels_2018	
Location	UK MAINLAND
(Derived)	
(Actions)	
Location	UK MAINLAND
Chainage	_380
X_BNG	348247.79999999999
Y_BNG	181063.60000000001
BASE_YEAR	2017
HAT_OD	8.20000000000
MHWS_OD	6.76000000000
T1	8.11000000000
T2	8.22000000000
T5	8.37000000000
T10	8.49000000000
T20	8.61000000000
T25	8.65000000000
T50	8.79000000000
T75	8.86000000000
T100	8.92000000000
T150	9.01000000000
T200	9.07000000000
T250	9.12000000000
T300	9.16000000000
T500	9.27000000000
T1000	9.43000000000
T10000	10.05000000000
C1 T1	8.10000000000



The Agency would therefore contend that the 12 march 2020 event was not a 1 in 20 event, which would explain why no flooding was observed at Bower Ashton/Clanage Road on the 12 March 2020. Accordingly, the Agency must disagree with the applicant's contention that the model is over-predicting flooding.

Should you require further information regarding the above issues please contact the undersigned

Yours faithfully

Dave Pring

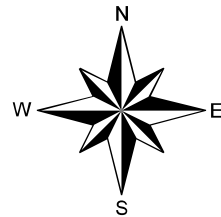
Planning Specialist

Direct e-mail nwx.sp@environment-agency.gov.uk

Historic flood events centred on ST5656472050 - created 09/02/2021










Scale:1:10,000 At A3



Legend

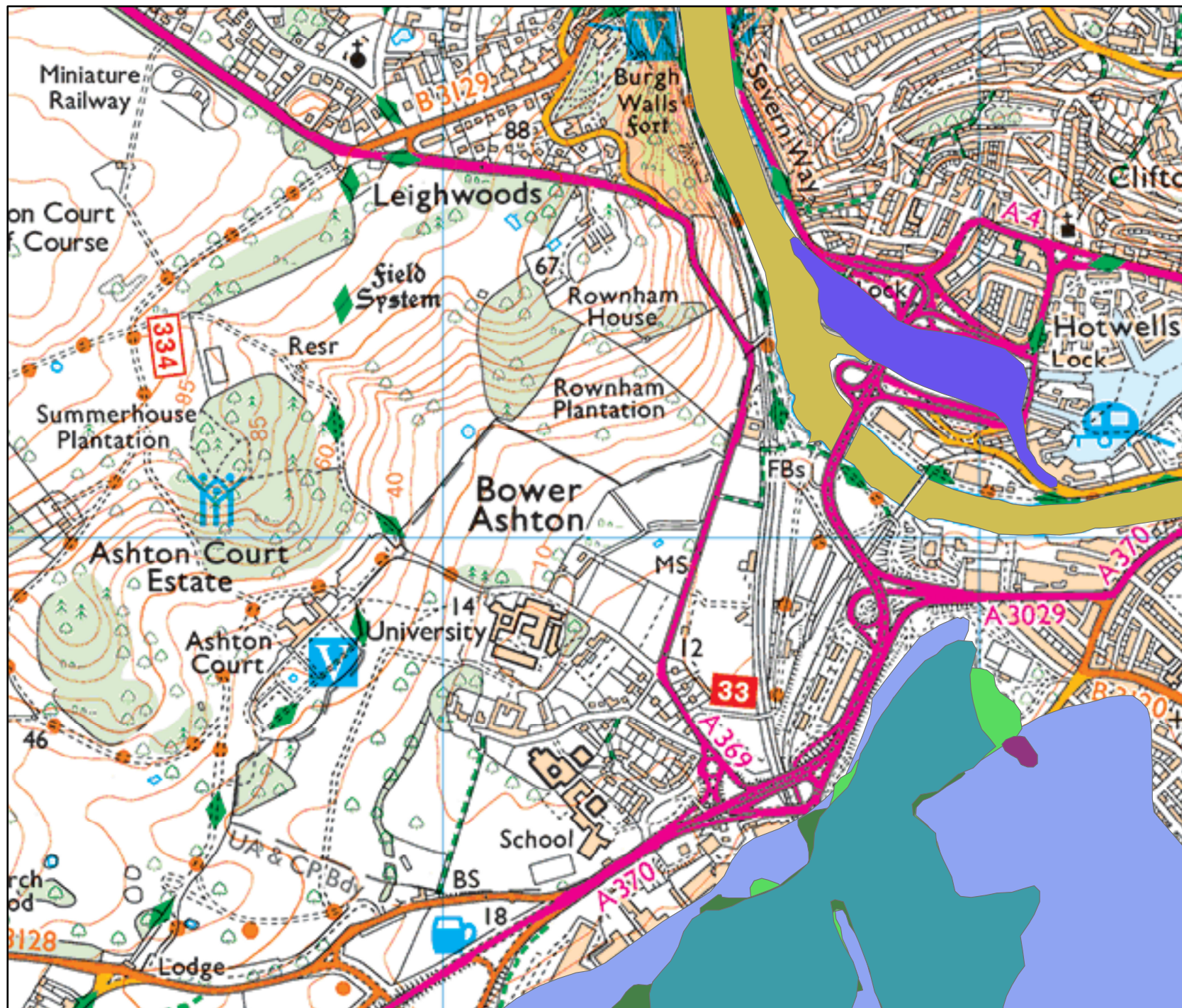
START_DATE

	01/01/1958
	04/12/1960
	10/07/1968
	11/06/1954
	12/03/1935
	18/12/1965
	24/12/1999

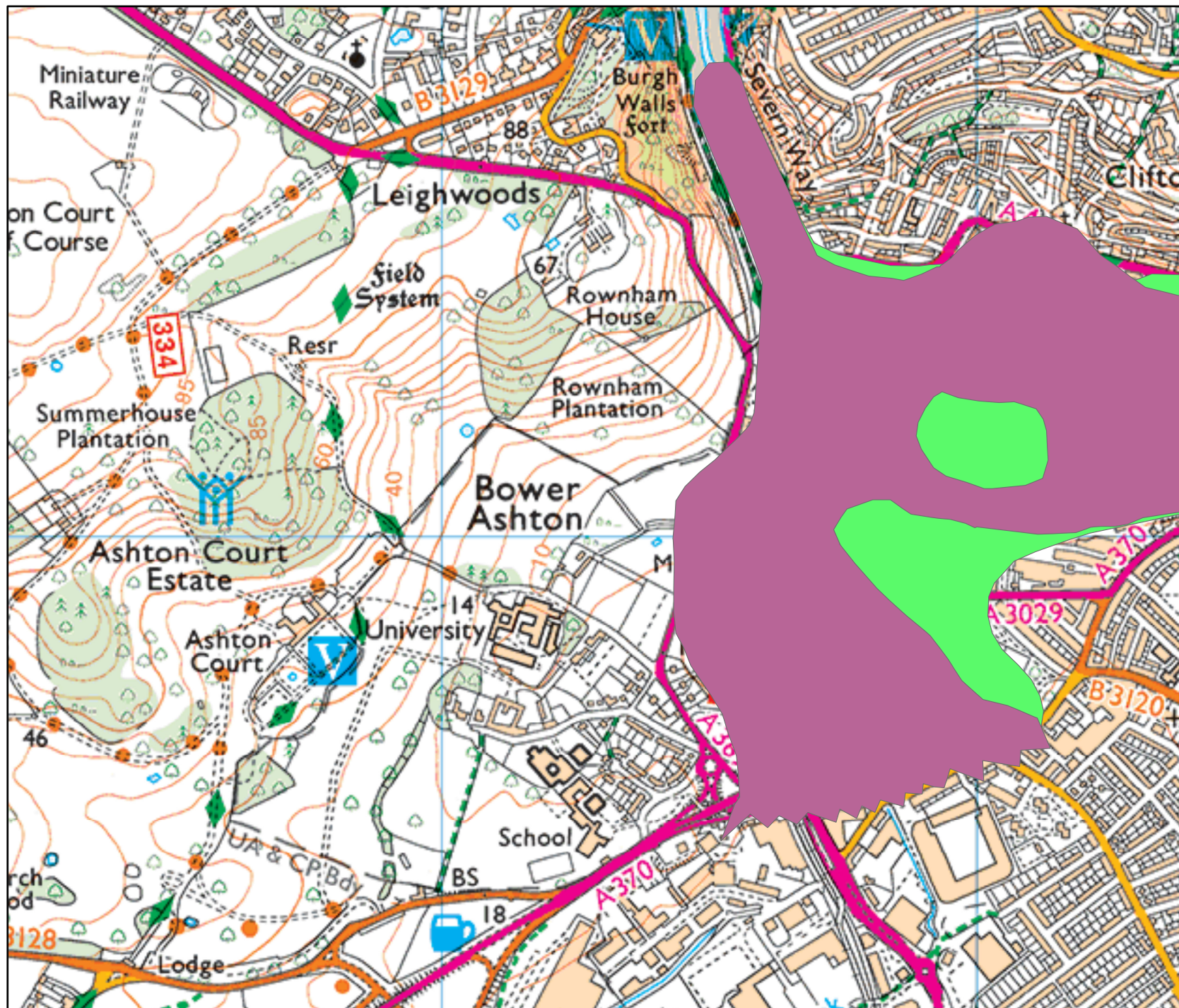
Historic Flood Events

Please see the attached sheet for more information on the individual flood events, such as: dates, source and cause of flooding.

These events and outlines are taken from our Historic Flood Records. We cannot guarantee that it is an exhaustive list of all past flood events in this location.

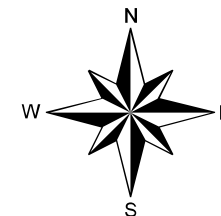


Historic flood events centred on ST5656472050 - created 09/02/2021





Environment
Agency

Scale:1:10,000 At A3



Legend

START_DATE

	07/10/1896
	13/11/1703

Historic Flood Events

Please see the attached sheet for more information on the individual flood events, such as: dates, source and cause of flooding.

These events and outlines are taken from our Historic Flood Records. We cannot guarantee that it is an exhaustive list of all past flood events in this location.

117892-WX - historic data

Start Date	End Date	Name	Comments	Source of Flooding	Cause of Flooding
11/06/1954	11/06/1954	EA112_CollitersBrook_AshtonVale_Bristol	surveyed - Agency	main river	channel capacity exceeded (no raised defences)
01/01/1958	01/01/1958	EA112_CollitersBrook_AshtonVale_Bristol	surveyed - Agency	main river	channel capacity exceeded (no raised defences)
04/12/1960	05/12/1960	EA112_Colliters Brook_Ashton Vale_1960	visual	main river	channel capacity exceeded (no raised defences)
04/12/1960	05/12/1960	EA112_Avon_Clifton_to Ashton Avenue Bridge	visual	main river	channel capacity exceeded (no raised defences)
04/12/1960	05/12/1960	EA112_Avon_Foot_Br_Ashton_Ave_Br_Bristol	surveyed - Agency	main river	channel capacity exceeded (no raised defences)
18/12/1965	19/12/1965	EA112_CollitersBrook_Ashton_Vale_Bristol	surveyed - Agency	main river	channel capacity exceeded (no raised defences)
10/07/1968	10/07/1968	EA112_CollitersBrook_Ashton_Vale_Bristol	surveyed - Agency	main river	channel capacity exceeded (no raised defences)
24/12/1999	24/12/1999	EA112_Bristol, Cumberland 1999	surveyed - consultants	main river	overtopping of defences
1703/11/13	1703/11/14	EA112_Bristol - November 1703	visual	main river	channel capacity exceeded (no raised defences)
1896/10/07	1896/10/07	EA112_Bristol _ Bedminster_St Philips_1896	other	main river	channel capacity exceeded (no raised defences)