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Flood Risk Assessment for the Development at 114B Errwood Road, Burnage, Manchester

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July 2022
Report QA Number: QA 22/016

INVESTOR IN PEOPLE

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1.0 Introduction

Peak Associates were commissioned to provide a Flood Risk Assessment (FRA) for proposed side and rear extensions of the property 114B Errwood Road, Burnage, Manchester, M19 1HS to support a planning application for Manchester City Council. The investigation utilises Flood Risk Assessment Data (previously known as Product 4 data) received from the Environment Agency (EA) showing fluvial flood risk, in conjunction with Flood Risk Management Strategies for Stockport and Greater Manchester.

The Flood Risk Assessment Data received is erroneously for property 114 rather than 114B on Errwood Road (two doors away, see page 1 map in Appendix 1). An attempt was made to order the correct data, however the EA service stated that none was available. The data are considered suitable for use in this FRA as the mapping produced covers the surrounding area, showing the fluvial flood risk to 114B. It is worth noting that the flood zone of 114B differs to 114 and that the 2D model data around house 114 may not be applicable to house 114B. This 2D data is a recent addition provided in Flood Risk Assessment Data, so is not essential to an FRA.

2.0 Description of the Proposed Development

The site is a house located south of Cringle Brook (NGR – SJ 87070 92980), which enters further brooks before joining the River Mersey. The total site area is approximately 325 m^2, however, the area being built upon and therefore the proposed development is only a small portion of this, around 50 m^2. It will consist of one and two storey side and rear extensions to the property. See photos from a site visit undertaken by Peak Associates June 15th 2022 in Appendix 2.

3.0 Sources of Flooding

The historic flooding scenarios have been investigated in detail and summarised in the Manchester City Council Local Flood Risk Management Strategy (LFRMS) (Ref 1), Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA (Ref 2), Greater Manchester Strategic

Flood Risk Management Framework (GM SFRMF) (Ref 3), Greater Manchester Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) (Ref 4), the North West River Basin District Draft Flood Risk Management Plan 2021 to 2027 (Ref 5) and the EA Upper Mersey Catchment Flood Management Plan (Ref 6). These provide a wealth of information categorising the risk of flooding and the hazards posed to the Manchester City area.

3.1 Fluvial Flooding

The site is located approximately 630 m south of Cringle Brook. There is a very low risk (less than 0.1% Annual Exceedance Probability (AEP)) of fluvial flooding to the site, according to the EA online long-term flood risk service (Ref 7). The proposed development area is categorised as flood zone 1 according to the online flood map for planning service (Ref 8) (less than 0.1% AEP for rivers), giving the land a less than 1 in 1,000 year probability of river flooding. The data in Appendix 1 shows house 114 as being in flood zone 2 and it is shown by the map on page 5 of Appendix 1 that house 114B is bordering flood zone 2 land, which has a higher probability of flooding (between 1 in 1,000 and 1 in 100 years, or 0.1-1% AEP).

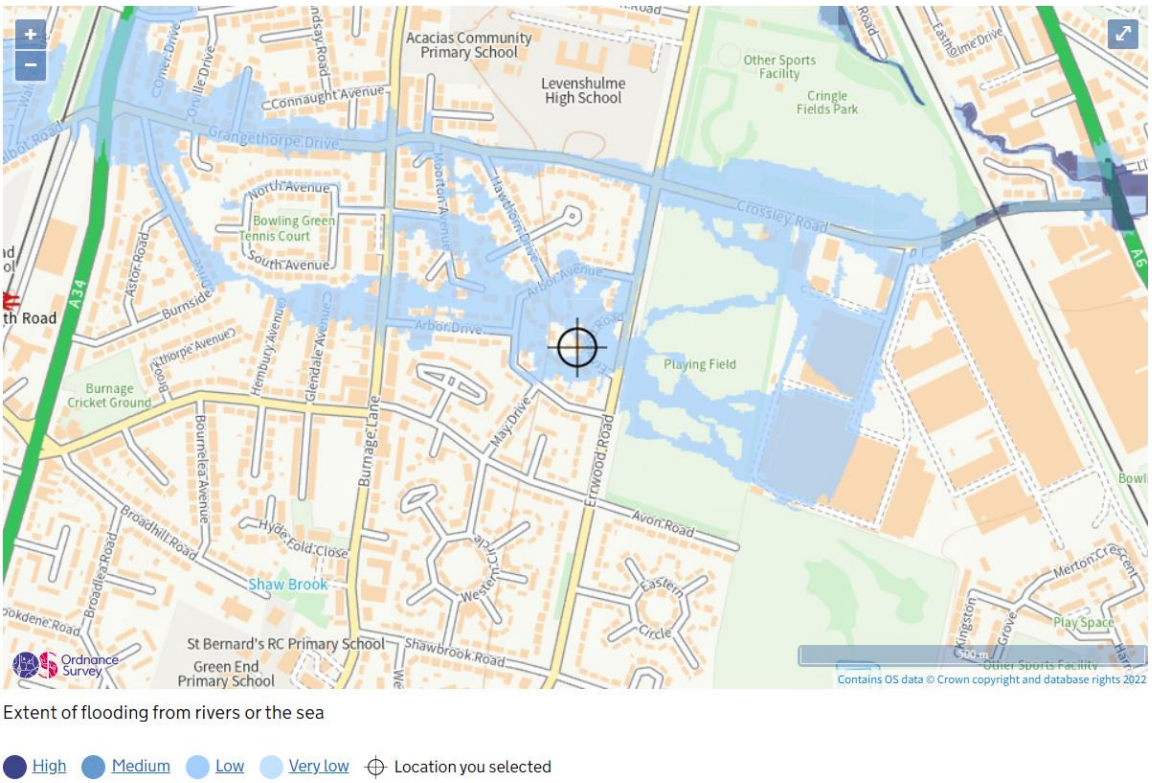


Figure 1 – Online EA Map of Extent of Flooding from Rivers

The site is in an area that, according to the EA modelling, does not benefit from the flood defences along Cringle Brook. This is shown by the defended and no defences fluvial extent maps on pages 10 and 11 of Appendix 1, as they are identical where property 114B is situated. Therefore, the flood zone mapping outlined above, which does not take flood defences into account, accurately portrays the fluvial flood risk to site. This is also shown by the fluvial extent maps in Appendix 1, where the property is shown as being on land with a less than 0.1% AEP. It is, however, surrounded by land with a 0.1% AEP which reaches the front of the house, and an area of 0.5% AEP is nearby to the north. These areas are shown below in Figure 1 by the land categorised as low flooding extent. Google earth shows the land level on Errwood Road and the front and back of the house as 49 mAOD (this is given to the nearest metre). This is only lower than the 1 in 100 year in-river water level at nodes 1 (55.25 mAOD) and 2 (51.58 mAOD), however this will not flood the house or surrounding land as shown by the mapping in Appendix 1 which accounts for the spread of floodwater. Only node 1 flooding in a 1 in 1,000 year event will reach Errwood Road (not the property itself).

3.2 Surface Water Flooding

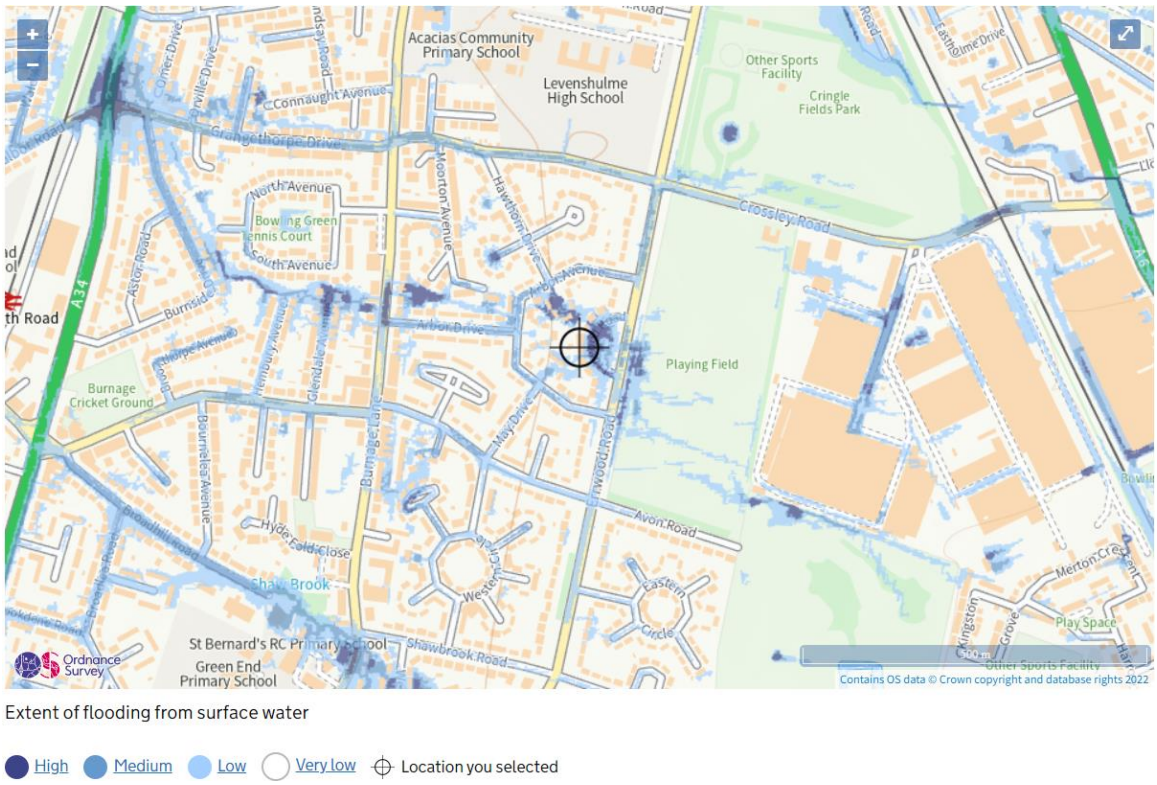


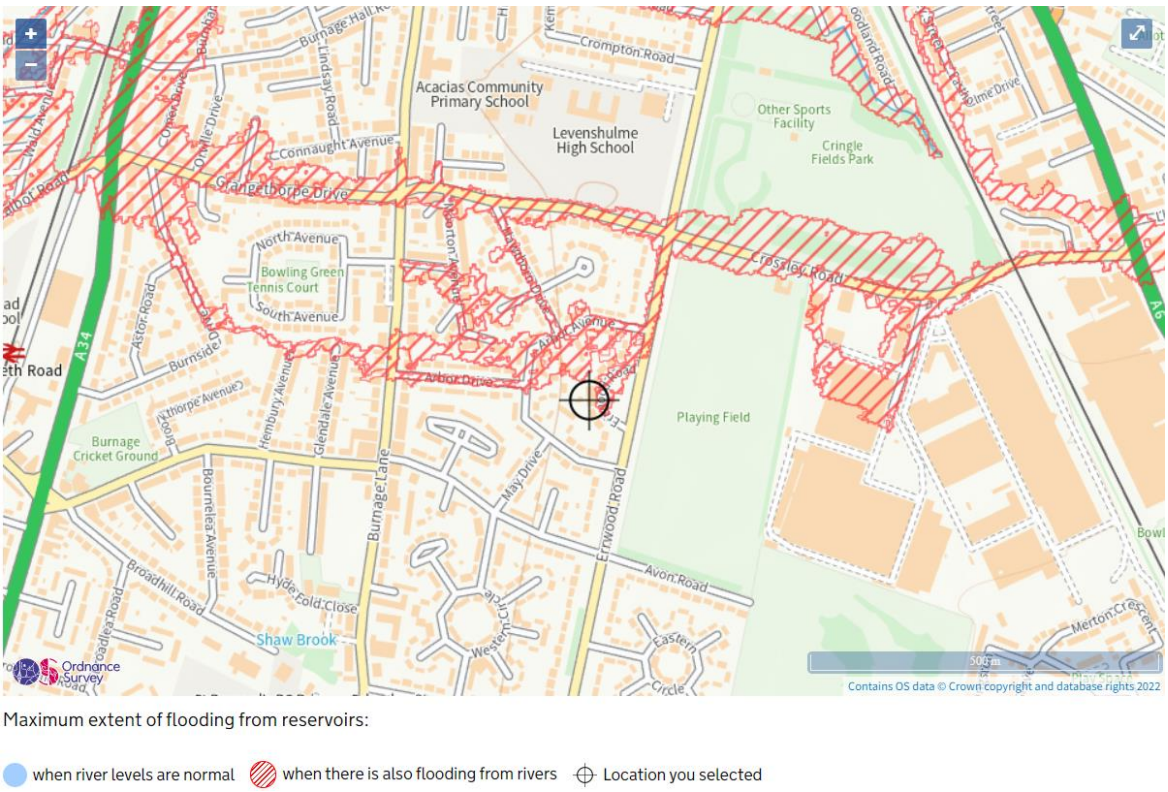
Figure 2 – Online EA Map of Extent of Flooding from Surface Water

The site has a high risk of surface water flooding (3.3% or above AEP) according to the EA online long-term flood risk service (Ref 7) (Figure 2), as it reports the highest risk within a 20 m radius of the property, Errwood Road at the front of the house being at high risk. Positively, directly in front of the house (on the driveway) and the sides are shown as low risk (0.1-1% AEP), whilst the back is very low risk (less than 0.1% AEP). Peak Associates visited site on June 15th 2022 where it was noted that Errwood Road sits at a lower level (estimated around 2 feet) than the house in question (see Photo 4 in Appendix 2), accounting for the lower chance of flooding to the house than the surrounding road.

3.3 Groundwater Flooding

Although groundwater flooding is an issue in some areas of Manchester (Ref 3), it is not thought to be a problem at this site as it is not located within a groundwater source protection zone (SPZ) on the EA's MagicMap and our client has not experienced groundwater flooding.

3.4 Reservoir Flooding



Maximum extent of flooding from reservoirs:

when river levels are normal | when there is also flooding from rivers | Location you selected

Figure 3 – Online EA Map of Extent of Flooding from Reservoirs

Audenshaw Reservoir is around 5 km northeast of the site and is shown not to pose a flood risk to 114B Errwood Road in the event of a reservoir failure according to the EA online long-term flood risk service (Ref 7), either if river levels were normal or in flood. Figure 3 shows that floodwater is predicted to cover Errwood Road outside the property when river levels are in flood but will not reach the property itself, which is on higher land.

3.5 Tidal Flooding

The site is not located near a sea, therefore flooding from this source is also not thought to pose a risk to the site.

3.6 Geology

The site's geology is sandstone bedrock overlain by a superficial deposit of Devensian diamicton till, according to the British Geological Survey's Geology of Britain Viewer. Till permeability can vary, which will affect surface water flooding via infiltration as well as groundwater flow. Should water reach the bedrock, sandstone is relatively permeable.

4.0 Confirmation of Existing and Future Flood Risk

As a result of the analysis in section 3, this FRA report focuses on the historical flooding within the area, the management that has occurred to alleviate such flooding and analysis of the Flood Risk Assessment Data for fluvial flooding received from the EA, provided in Appendix 1. Over 2,600 residential and commercial properties are at 1% AEP for fluvial flooding in the Upper Mersey catchment, although this is predicted to rise to 2,900 as a result of climate change. The Mersey sub-area, which includes Burnage, has been "identified as being at moderate to high flood risk where we can generally take further action to reduce flood risk" (Ref 3).

The Flood Risk Assessment Data provided includes water levels for Cringle Brook, shown in a data table in Appendix 1. This shows that the water levels in the brook in various AEP scenarios decrease downstream (between nodes shown in Appendix 1). The brook may overtop its banks at various points in different AEP scenarios, however there are three locations with potential for

connection of floodwater to 114B Errwood Road. These are at the junction between Crosley Road and the A6 where the watercourse is culverted, an area close to the A34 and another area on the far side of the A34. As outlined in Section 3 above, flooding from these points is only predicted to cause floodwater to reach Errwood Road outside the property on a 1 in 1,000 year (0.1% AEP) basis and the property itself less frequently than 1 in 1,000 years, making the fluvial flood risk very low. The flood risk could increase should the culvert under the A6 at Crosley Road not be well maintained, with potential for more extreme fluvial flooding.

Surface water flooding is also a key issue for Greater Manchester, with Errwood Road located in the Levenshulme and Fallowfield Critical Drainage Area (CDA) as defined in the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA (Ref 2), demonstrating high risk of surface water flooding with potential for sewer flooding. According to the EA long term flood risk service, the water depth from surface water flooding on Errwood Road outside the property at the AEPs of greater than 3.3% and the less probable scenario of 1-3.3%, is expected to be below 300 mm, with no flooding predicted reaching the house. At an AEP of 0.1-1% the depth would increase to between 300 and 900 mm on Errwood Road, with below 300 mm floodwater at the front and side of the house.

Surface water flood risk is likely to increase alongside fluvial in the future due to the increased frequency of intense rainfall events with climate change, however, climate change effects are only modelled for fluvial flood risk (Ref 3). As the development is classified as more vulnerable, the central peak river flow allowance should be used when assessing changes in peak flow due to climate change when in flood zone 2 (note that the property is in flood zone 1 bordering flood zone 2). The Upper Mersey Management Catchment has central peak flow allowances of 13% by the 2020s, 22% by the 2050s and 41% by the 2080s, according to the online peak river flow map for the catchment (Ref 9). Since the Flood Risk Assessment Data provided by the EA does not include these percentage flow increases, the 35% increase shown in Appendix 1 is used instead to show water level changes expected by sometime between 2050 and 2080.

For each node the undefended/defended 1% AEPs for a 35% flow increase due to climate change gives a river water level just above the current 1 in 200 year (0.5% AEP) level. This essentially means that a fluvial flood which today has a 0.5% chance of occurring in a given year will have a

1% chance of occurring between 2050 and 2080. This may increase the frequency and severity of fluvial flooding to 114B Errwood Road, although the risk will likely still be low as it is currently very low. This would be seen as increased flooding via the current three connections from the watercourse to site, with potential for further connections to be made. With a 35% flow increase at 1% AEP, the water level in the river, although raised slightly by the increased flow, remains higher than Errwood Road and the front and back of the house (around 49 mAOD) only at nodes 1 (55.35 mAOD at 35%) and 2 (51.72 mAOD at 35%). The 2D model data at node 6 on Errwood Road shows that the water level is predicted at 50.2 mAOD at 1% AEP plus 35% flow increase.

The Burnage area last flooded in 2019, which affected Crosley Road under the railway line about 0.5 km northeast of 114B Errwood Road, flooding to around 1 m. Anecdotally, our client informed us that Errwood Road had very low level flooding (a few centimetres) in the road itself; therefore, the properties were unaffected. In addition, after visiting the site on June 15th 2022, the owner informed Peak Associates that house 114A (next door) has not flooded in the 10 years they have lived there.

5.0 Accounting for Flooding Within the Proposed Development

The site is located within Flood Zone 1, which according to the National Planning Policy Framework (NPPF) would not require a sequential test to be carried out, however, it would be required for flood zone 2 which the property borders. As the proposed development is merely an extension to an existing dwelling, it falls under the 'minor development' category as it is a householder development. A sequential test (and hence an exception test) is therefore not required (Ref 10). The NPPF deems the development as more vulnerable as it is a building used as a dwelling house. The property owner has informed Peak Associates that they did not experience flooding in the 2019 event in the area (Errwood Road flooded by a few centimetres, but this did not reach the houses) and they have not flooded (at 114A) in the 10 years that they have lived there. The site does not benefit from the flood defences along Cringle Brook as outlined in Section 3 above, but despite this has a very low fluvial flood risk. Surface water flood risk, however, is higher. It is also worth noting that the proposed development is a small extension (50 m^2) to the existing property, therefore, if flooding was to affect the land the

extension would displace only a small volume of floodwater. The existing household could flood irrespective of the extension, so the impact on the homeowner of the property flooding is barely increased by the extension.

Although not requiring the two tests above, in order to reduce the flood risk to the proposed development the following recommendations are made:

- The floor level of the development to be the same as the existing property, which is 255 mm at the front of the house and 190 mm at the back. This is because no surface water flooding (the highest risk flood type to the property) is predicted at the back of the house, no flooding is predicted at the front of the house at 1-3.3% AEP and below 300 mm flooding is predicted at the front of the house at 0.1-1% AEP. If above this level, the alternative recommendation would be to build to 50.2 mAOD, as this will protect the extension from floodwater ingress in the 1% AEP (1 in 100 year) plus 35% flow increase fluvial flood event, 50.2 mAOD being the predicted water level on Errwood Road in this scenario.

- A topographical survey could be undertaken to provide reassurance to the property owner on the building level, as this would provide the ground levels at the property, although it is recognised that the proposed is only an extension to an existing property and topographical surveys can be costly.

- Electrical sockets should be placed at a level to prevent damage to the electricity supply in the event of a flood, a minimum of 600 mm above ground level would be recommended on the same basis as above (Ref 11).

- Flood resilient building material should be considered for the building to reduce flood damage, such as built-up doorsteps, rendered brick walls and temporary covers for any vents and airbricks.

- Installing any proposed airbricks to a minimum of 600 mm above ground level should be considered to mitigate floodwater entering through them.

- Change to a permeable driveway (from concrete, see Photos 3 and 4 in Appendix 2) such as a resin should be considered to mitigate floodwater at the front of the house and a soakaway could be considered.

6.0 Conclusions

The risks of flooding derived from modelling information suggest the site is primarily at risk from pluvial-derived surface water, with a lower risk from fluvial (river) flooding from the nearby brook. The site is located within flood zone 1 as highlighted in the analysis throughout this FRA, boarding flood zone 2 land. This means there is an AEP of less than 0.1% (less than 1 in 1,000 years) for fluvial flooding, with the flood zone 2 land reaching the front of the house shown in the Flood Risk Assessment Data to be at 0.1% AEP. The mechanism for fluvial flooding to Errwood Road, if it were to occur, is expected to be overtopping of the banks of Cringle Brook at the junction between Crosley Road and the A6 where the watercourse is culverted, in an area close to the A34 or in another area on the far side of the A34. The fluvial flood risk could increase should the culvert under the A6 at Crosley Road not be well maintained.

The front and sides of 114B Errwood Road have a low risk of 0.1-1% AEP (1 in 1,000 to 1 in 100 years) of surface water flooding, whilst the back is at very low risk with a less than 0.1% AEP. This is a positive when assessing the risk to the side and rear extension. It should be noted, however, that Errwood Road itself has a high risk of surface water flooding with an AEP of 3.3% or above (greater than 1 in 30 years), although the road sits around 2 feet lower than the house.

In terms of historic flooding, Burnage last experienced flooding in 2019 due to a heavy rainfall event. Although Errwood Road is noted to have had a few centimetres of flooding, this was contained within the road itself so did not flood the properties. The owner of property 114B has informed that 114A (next door) has not flooded in the 10 years they have lived there. This lack of flooding, particularly during a large flood event, in conjunction with the model data highlights the lack of risk to the development.

Both surface water and fluvial flood risks are likely to increase in the future due to climate change increasing rainfall frequency and intensity. Climate change is expected to increase the frequency and severity of fluvial flooding from Cringle Brook to 114B Errwood Road, although the risk will likely still be low as it is currently very low. This would be seen as increased flooding via the current three connections from the watercourse to site (the banks overtopping at the junction between Crosley Road and the A6 where the watercourse is culverted, in an area close to the A34 and in another area on the far side of the A34) with potential for further connections to be made.

As the proposed development is an extension to an existing dwelling it falls under the 'minor development' category as it is a householder development, meaning a sequential test (and therefore also the exception test) is not required (Ref 10). Several recommendations have been provided for consideration to mitigate flood risk to the proposed extension, particularly considering the surface water flood risk expected flood depth; these include whichever is higher of matching the current properties floor level or building to 50.2 mAOD, raising electrical sockets and airbricks to at least 600 mm above ground, using flood resilient building materials and considering increasing ground permeability such as changing to a resin driveway.

7.0 References

1 Manchester City Council. (2014). *Local Flood Risk Management Startegy*.

2 JBA Consulting. (2011). *Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA.*

3 JBA Consulting. (2018). *Geater Manchester Strategic Flood Risk Management Framework.*

4 JBA Consulting. (2020). *Greater Manchester Level 2 Hybrid Stategic Flood Risk Assessment – Main Report.*

5 Environment Agency. (2021). *North West River Basin District Draft Flood Risk Management Plan 2021 to 2027.*

6 Environment Agency. (2009). *Upper Mersey Catchment Flood Management Plan*.

7 Government website. *Check your long term flood risk.* Online at: https://www.gov.uk/check long-term-flood-risk

8 Government website. *Flood map for planning*. Online at: https://flood-map-for-planning.service.gov.uk/

9 DEFRA website. *Climate Change Allowances*. Online at: https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow

10 Ministry of Housing , Communities & Local Government. (2021). *National Planning Policy Framework*.

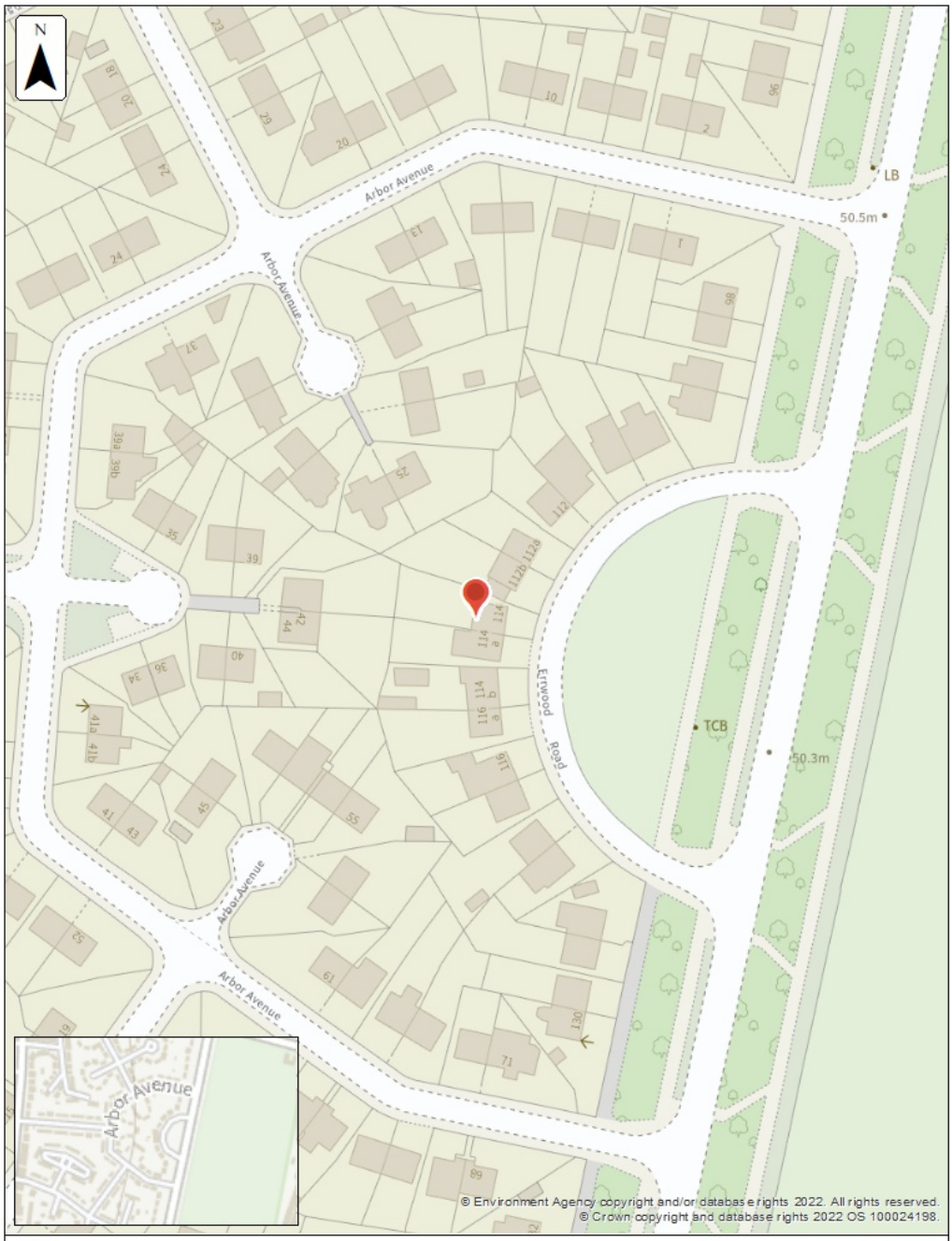
11 Communities and Local Government. (2007). *Improving the Flood Performance of New Buildings: Flood Resilient Construction*.

Appendix 1:
Flood Risk Assessment Data

Flood risk assessment data

Location of site: 387069 / 392994 (shown as easting and northing coordinates)
Document created on: 13 April 2022
This information was previously known as a product 4.
Customer reference number: GMMC258157SW/MG1B5AM9U1UM

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



Selected location

Site location

Scale 1:1,000

0 10 20 30 40 50
metres

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)
- flood defences and attributes
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- historic flooding

We do not have historic flooding data for this location. You can contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

Surface water and other sources of flooding

Use the long term flood risk service to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

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

About the models used

Model name: Cringle Brook
Scenario(s): Defended fluvial, no defences exist fluvial
Date: 17 May 2018

These models contain 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 development is in flood zone 2.

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

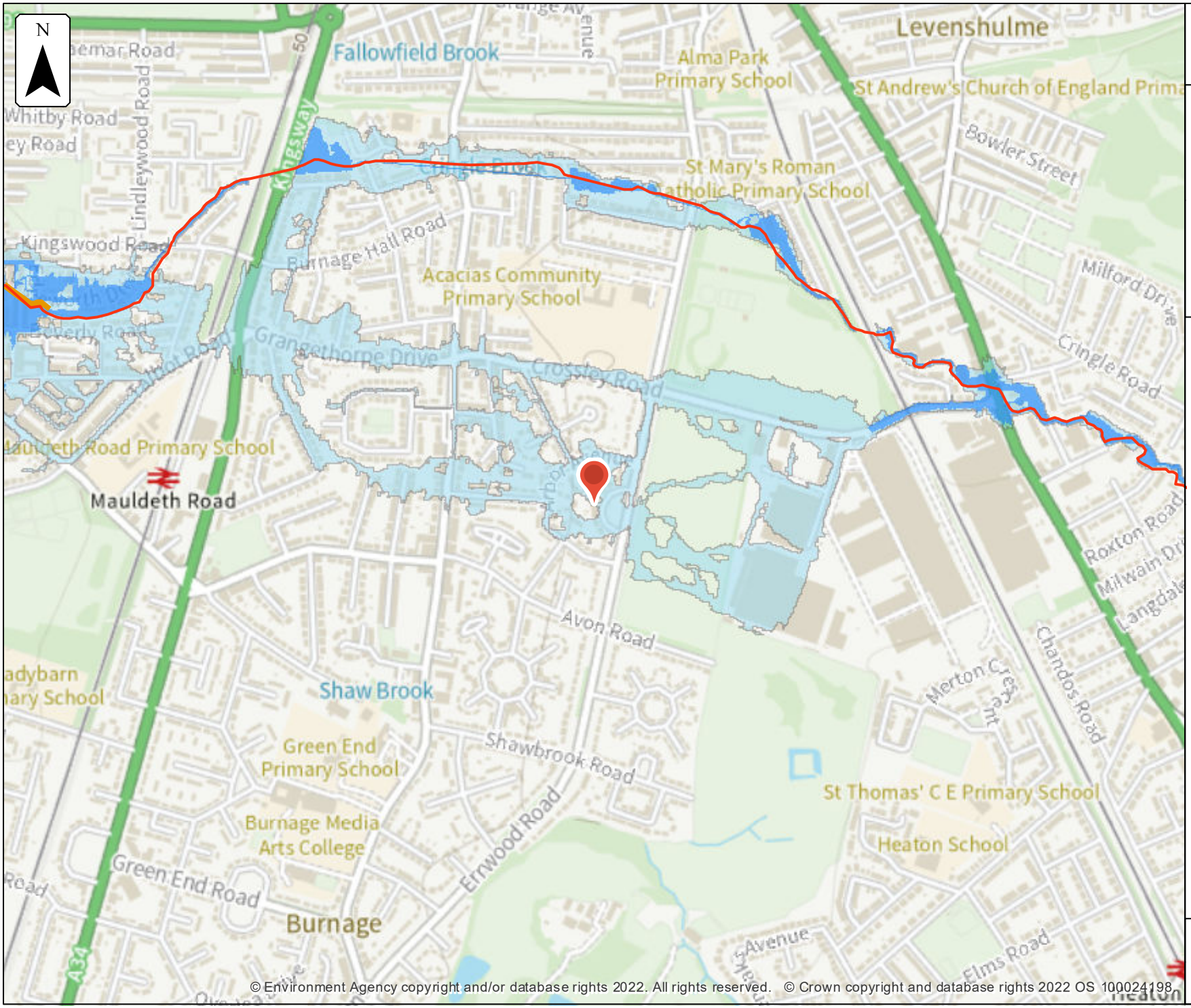
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- 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

This data is updated on a quarterly basis as better data becomes available.



Environment Agency

Flood map for planning

Location (easting/northing)
387069/392994

Scale
1:10,000

Created
13 Apr 2022

Selected location

Main river

Flood defence

Flood zone 3

Flood zone 2

0 100 200 300 400 500
metres

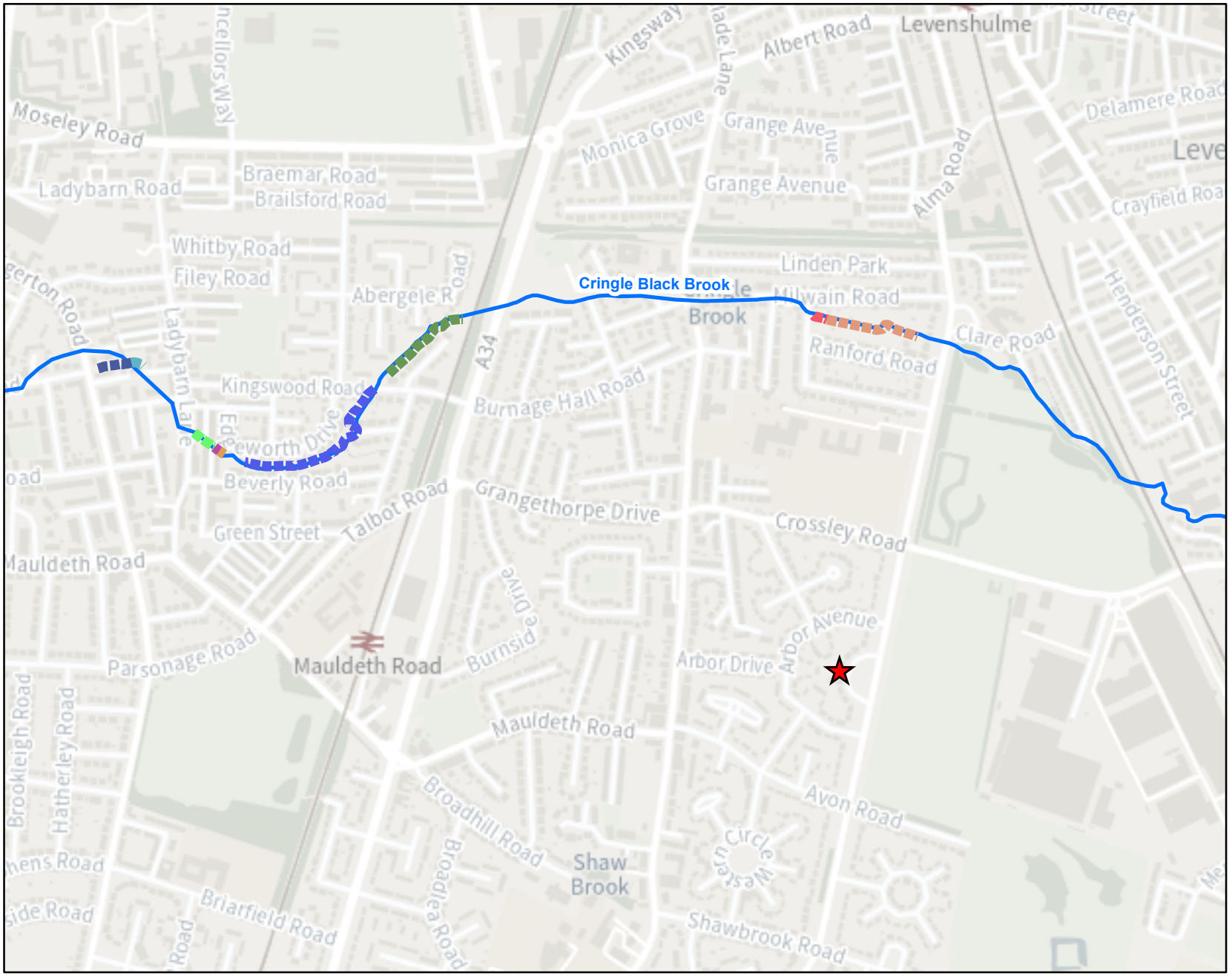
Flood defences and attributes

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.

Flood Defences



Environment Agency

1:10,001

N

Legend

Site Location

Defences

Asset ID

- 7430
- 8871
- 32270
- 32271
- 32357
- 32358
- 71686
- 8870
- 9636
- Main River

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Flood Defences

Start Date	Asset Type	Asset ID	Standard of Protection	Upstream Actual Crest Level (m aod)	Downstream Actual Crest Level (m aod)
01/01/2004	Natural High Ground	7430	100	47.830002	50.400002
01/01/2004	Natural High Ground	8871	100	41.169998	39.560001
01/01/2004	Wall	32270	100	39.209999	39.279999
01/01/2004	Wall	32271	100	39.400002	39.73
01/01/2004	Wall	32357	100	40.669998	40.970001
01/01/2004	Wall	32358	100	40.720001	40.709999
01/01/2004	Engineered High Ground	71686	100	47.889999	48.709999
01/01/2004	Wall	8870	100	39.84	39.830002
01/01/2004	Engineered High Ground	9636	100	43.830002	41.259998

Modelled data

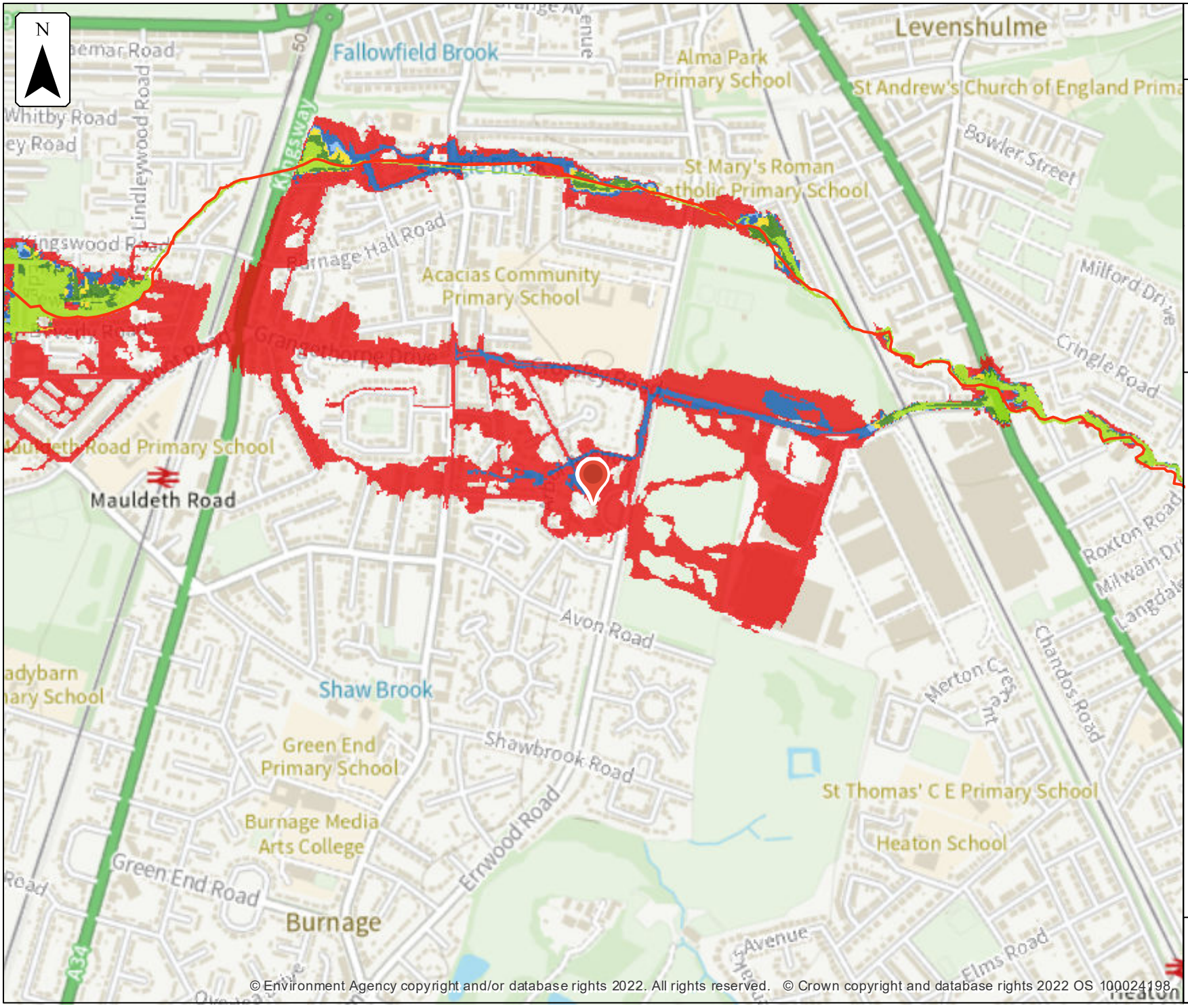
This section provides details of different scenarios we have modelled and includes the following (where available):

- 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

Modelled scenarios

The following scenarios are included:

- Defended modelled fluvial: risk of flooding from rivers where there are flood defences
- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences



Environment Agency

Defended modelled fluvial extent

Location (easting/northing)
387069/392994

Scale
1:10,000

Created
13 Apr 2022

Model name
Cringle Brook

Selected location

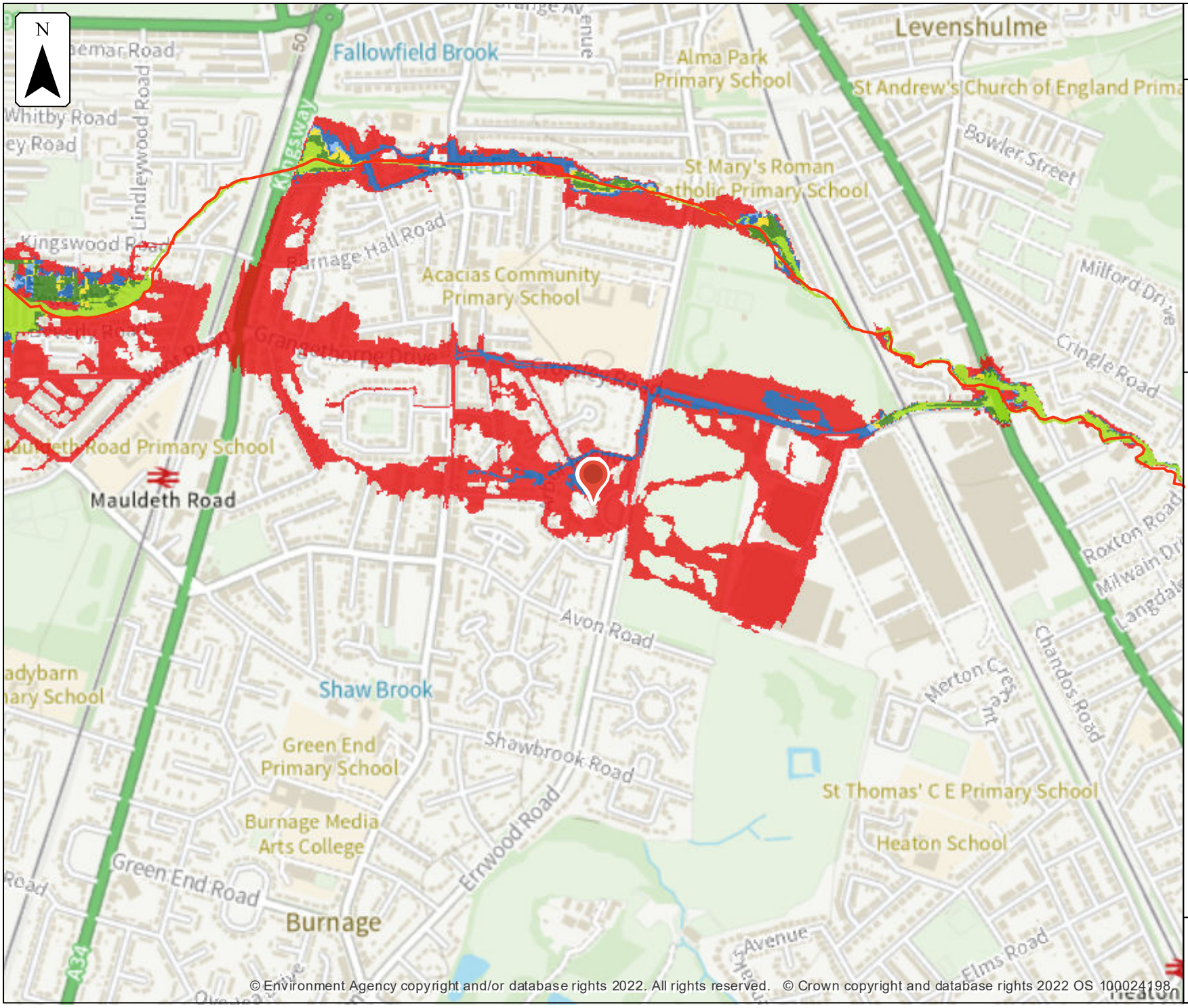
Main river

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



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Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
387069/392994

Scale
1:10,000

Created
13 Apr 2022

Model name
Cringle Brook

Selected location

Main river

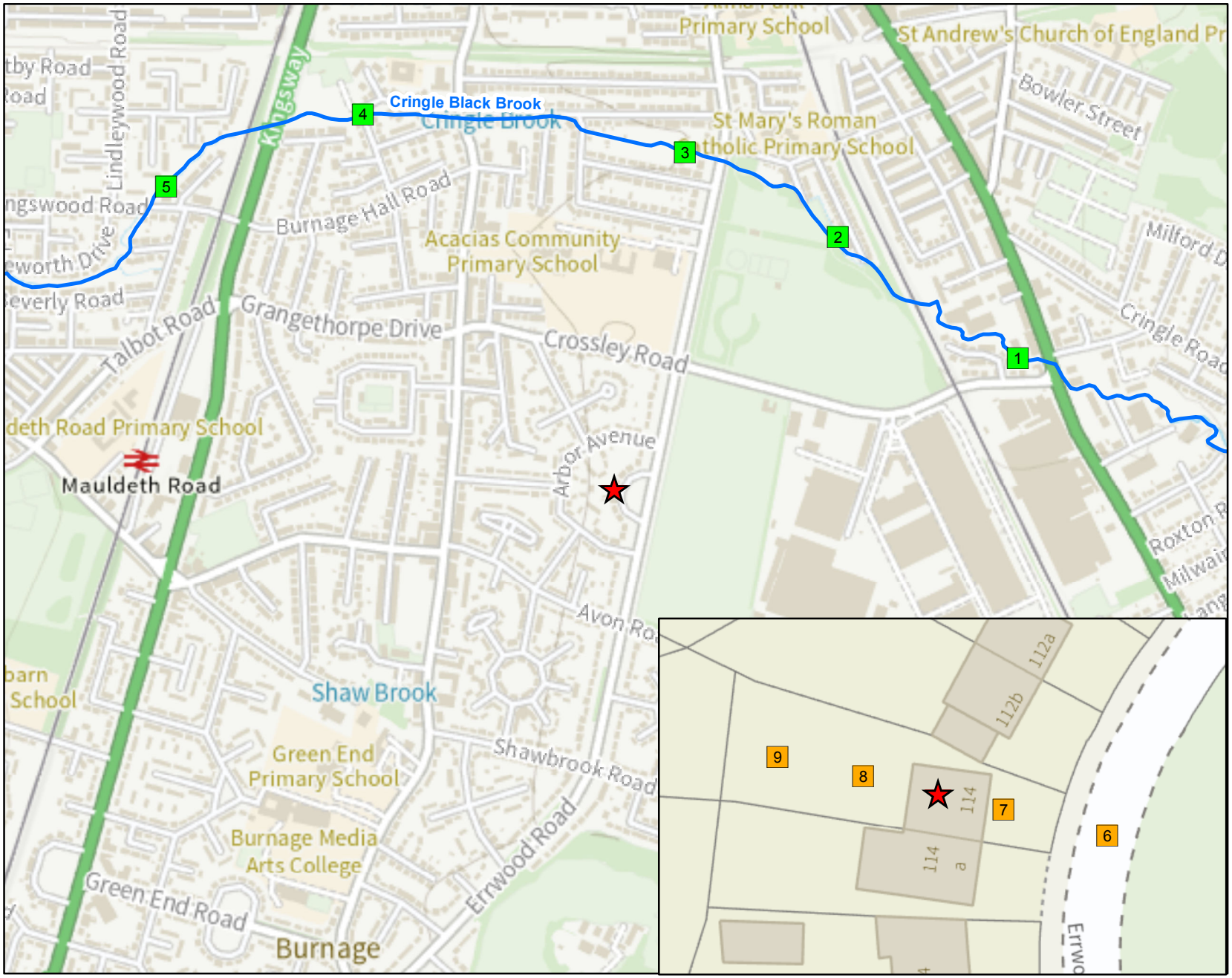
Modelled flood extent

- 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

Model Measurement Map - Cringle Brook 2017



Environment Agency

1:10,001

N

Legend

- Site Location
- Model Measurements
- 2D Measurements
- Main River

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					Defended																															
Map Reference	Model Node Reference	Easting	Northing	Data	50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% Increase in flow	1 % AEP (1 in 100 year) + 35% Increase in flow	1 % AEP (1 in 100 year) + 70% Increase in flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% Increase in flow
1	ea013_0238_CRINO1_4135	387791	393226	Modelled Water Level (m asdh)	54.88	54.97	55.04	55.10	55.12	55.19	55.22	55.25	55.34	55.35	55.42	55.30	55.45	55.56
				Modelled Flow (cumecs)	1.60	1.95	2.27	2.58	2.68	3.10	3.28	3.47	4.11	4.21	4.80	3.85	5.04	6.08
2	ea013_0238_CRINO1_3633	387470	393444	Modelled Water Level (m asdh)	50.79	50.96	51.13	51.30	51.37	51.55	51.57	51.58	51.72	51.72	51.77	51.69	51.80	51.84
				Modelled Flow (cumecs)	1.67	2.17	2.63	2.98	3.07	3.56	3.72	3.90	4.60	4.70	5.33	4.32	5.68	6.45
3	ea013_0238_CRINO1_3259	387198	393594	Modelled Water Level (m asdh)	48.33	48.42	48.51	48.58	48.58	48.68	48.69	48.70	48.80	48.80	48.84	48.76	48.91	48.98
				Modelled Flow (cumecs)	1.77	2.29	2.82	3.20	3.31	3.85	4.11	4.30	5.15	5.27	5.78	4.86	5.98	6.19
4	ea013_0238_CRINO1_2672d	386624	393662	Modelled Water Level (m asdh)	43.05	43.17	43.44	43.64	43.69	43.94	44.09	44.18	44.59	44.65	44.87	44.42	45.00	45.13
				Modelled Flow (cumecs)	1.87	2.41	3.01	3.41	3.49	3.91	4.18	4.34	4.81	4.85	5.03	4.68	5.12	5.16
5	ea013_0238_CRINO1_2272i	386273	393533	Modelled Water Level (m asdh)	40.55	40.64	40.80	40.88	40.90	40.96	40.99	41.01	41.09	41.11	41.18	41.06	41.31	41.37
				Modelled Flow (cumecs)	2.01	2.56	3.23	3.55	3.62	3.91	4.08	4.16	4.53	4.58	4.77	4.37	4.87	4.97

					Undefended																															
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6	2D Measurements	387086	392991	Modelled Water Level (m asdh)	50.16	50.20	50.28	50.34	50.36	50.16	50.20	50.28	50.34	50.36
7		387077	392994	Modelled Water Level (m asdh)			50.28	50.34	50.36			50.28	50.34	50.36
8		387064	392997	Modelled Water Level (m asdh)				49.80	49.80				49.80	49.80
9		387057	392998	Modelled Water Level (m asdh)					49.43					49.43

Model data taken from Cringle Brook 2017 Study

AEP - Annual Exceedence Probability

m asdh - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes: Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080's (2070 - 2115). Please see https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

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

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 Greater Manchester Merseyside and Cheshire Environment Agency team at inforequests.gmmc@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

Appendix 2:
Photos 1-5

Photo 1 – Rear of the property

Photo 2 – Back yard of the property sloped away from the house

Photo 3 – Front of the property

Photo 4 – Side of the property and slope up towards the house front from Errwood Road

Photo 5 – Errwood Road outside the property