



Flood Risk Assessment

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Flood risk, water and environment

AEG0421_M21_Manchester_01

Site Address: 46 Morville Road
Manchester
M21 0TR

UK Experts in Flood Modelling, Flood Risk
Assessments, and Surface Water Drainage Strategies

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Flood risk, water and environment

Document Issue Record

Project: Flood Risk Assessment

Prepared for: Simone Fuller

Reference: AEG0421_M21_Manchester_01

Site Location: 46 Morville Road, Manchester, M21 0TR

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Summary

Development Description	Existing	Proposed
Development Type	Residential Dwelling	The proposed development is a part single storey part two storey rear extension to the current dwelling to provide additional living accommodation following demolition of existing outrigger.
EA Vulnerability Classification	More Vulnerable	More Vulnerable
Ground Floor Level	Topographic levels measured at approximately 28.46m – 28.95m AOD from 1m LiDAR.	No Change – Finished Floor Levels (FFLs) are to be set at existing In accordance with EA standing advice.
Level of Sleeping Accommodation	First Floor	First Floor
Impermeable Surface Area	N/A ¹	Development is a minor development of less than 250m ²
Surface Water Drainage	N/A ¹	Runoff could be managed by the existing system given that the proposal is a minor development. Betterment could be provided with small-scale SuDS such as rainwater planters and water butts.
Site Size	Approximately m ²	<250m ²
Risk to Development	Summary	Comment
EA Flood Zone	Flood Zone 2	
Flood Source	Fluvial	
SFRA Available	Yes - Manchester SFRA (2011)	
Management Measures	Summary	Comment
Ground floor level above extreme flood levels	N/A ²	
Safe Access/Egress Route	N/A ²	Site users should monitor local weather reports. However, access/Egress arrangements would not differ from the existing given proposal is a minor development.

Flood Resilient Design	N/A ¹	Extension should be constructed in a flood resilient manner in accordance with the CLG Report Improving the Flood Performance of New Buildings - Flood Resilient Construction (2007).
Site Drainage Plan	N/A ¹	Runoff could be managed by the existing system given that the proposal is a minor development. Betterment could be provided with small-scale SuDS such as rainwater planters and water butts.
Flood Warning & Evacuation Plan	N/A ¹	Site users should monitor local weather reports. However, access/Egress arrangements would not differ from the existing given proposal is a minor development.
Offsite Impacts	Summary	Comment
Displacement of floodwater	N/A ¹	The development is a minor development and should not lead to a displacement of flood water.
Increase in surface run-off generation	N/A ¹	Runoff could be managed by the existing system given that the proposal is a minor development. Betterment could be provided with small-scale SuDS such as rainwater planters and water butts.
Impact on hydraulic performance of channels	N/A ¹	No impact.

¹ not required for this assessment

² data not available.

1. Introduction

- 1.1. Aegaea were commissioned by Simone Fuller to undertake a Flood Risk Assessment (FRA) to facilitate a planning application for the proposed development. This FRA has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance.
- 1.2. This FRA is intended to support a full planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Site Overview

- 1.3. The site of the proposed development is 46 Morville Road, Manchester, M21 0TR. The site is currently a residential dwelling.

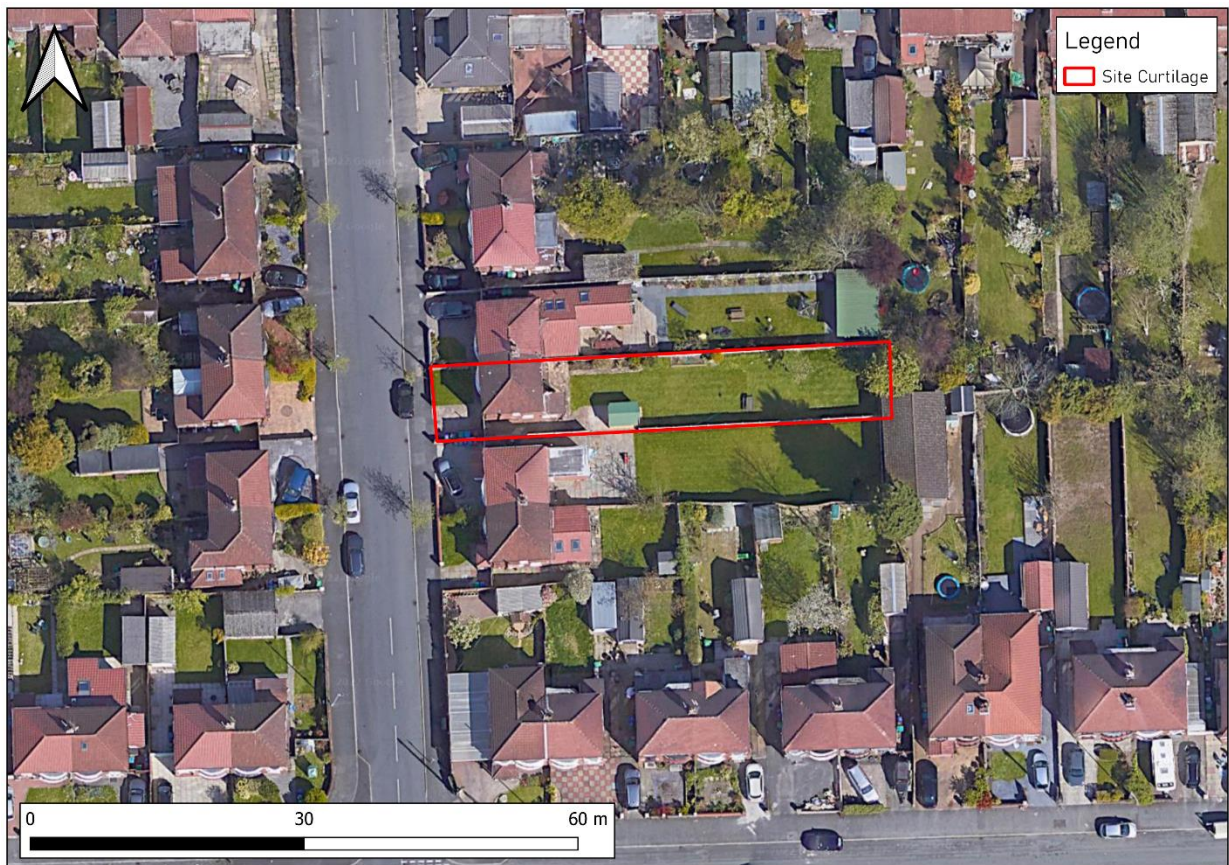


Figure 1: Site Location (Source: Google Satellite)

- 1.4. The existing site comprises of a residential dwelling, with the proposed development a residential extension of existing use.
- 1.5. In the absence of a topographical survey, Environment Agency Light Detection and Ranging (LiDAR) data Digital Terrain Model (1m resolution) has been utilised to review the topography of the site. Review of

the LiDAR has determined a minimum elevation of 28.46m AOD and a maximum elevation of 28.95m AOD on site with a slope from west to east on site.

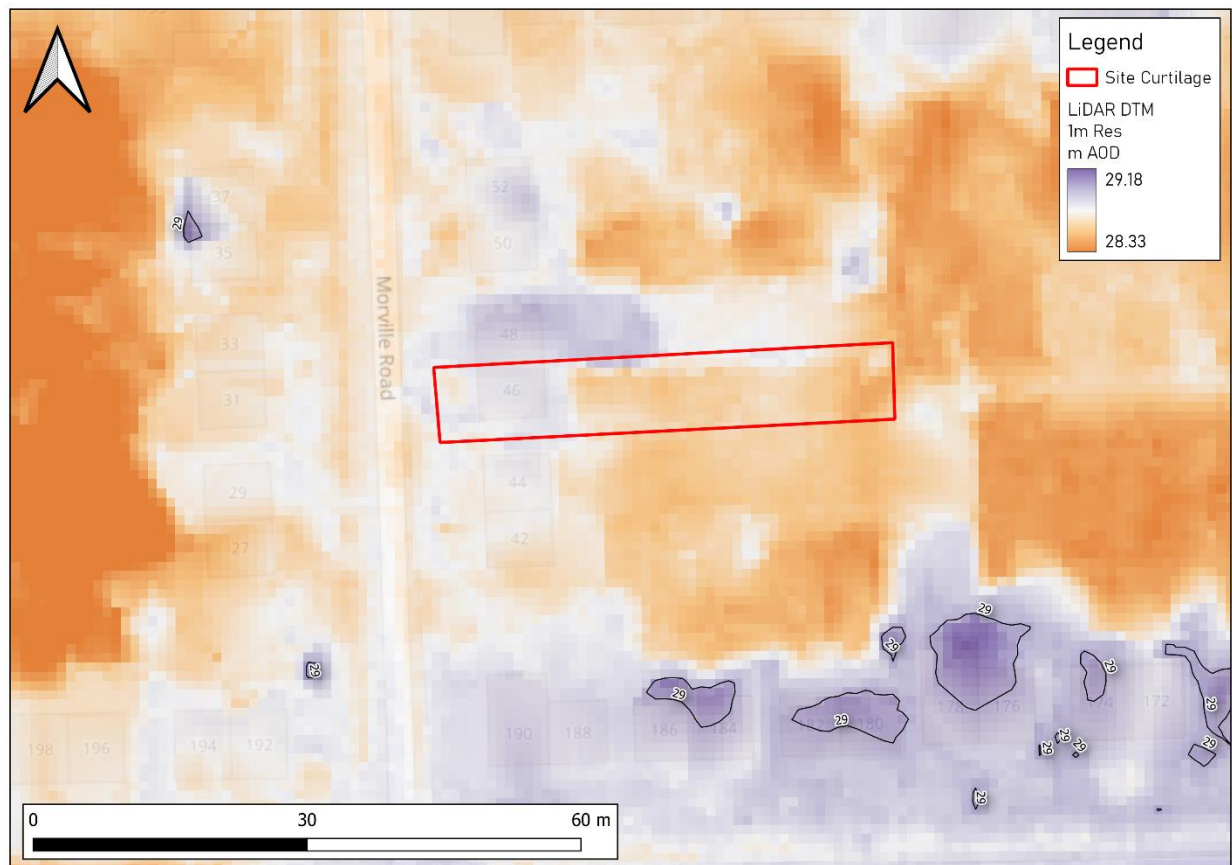


Figure 2: Site Topography (Source: Google Satellite and (c) Environment Agency copyright and/or database right 2021)

- 1.6. Manchester City Council is the Local Planning Authority (LPA) for the site, and also the designated Lead Local Flood Authority (LLFA). The site sits within the Environment Agency's Greater Manchester Merseyside and Cheshire region.

Planning Policy and Guidance

1.7. UK government planning guidance states¹ that an FRA is required for sites which are:

- *In Flood Zone 2 or 3 including minor development and change of use,*
- *More than 1 hectare in Flood Zone 1,*
- *Less than 1 ha in Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than river and the sea (for example surface water drains or reservoirs),*
- *In an area within Flood Zone 1 which has critical drainage problems as notified by the Environment Agency.*

1.8. The site is located within Flood Zone 2. According to NPPF Footnote 55 an FRA is required.

1.9. The objective of this FRA is to demonstrate that the proposals are acceptable in terms of flood risk. This report summarises the findings of the study and specifically addresses the following issues in the context of the current legislative regime:

- Fluvial flood risk
- Surface water flood risk
- Risk of flooding from other sources.

¹ <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-you-need-an-assessment>

2. National Planning Policy Framework

- 2.1. The potential consequences of inappropriate development in a flood risk area for occupiers, either of the development or elsewhere, pose significant risks in terms of personal safety and damage to property. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional, and local planning policy and associated guidance. The following section summarises the key policies and guidance relevant to the proposed development.
- 2.2. The National Planning Policy Framework² (NPPF) (DCLG, 2021) includes Government policy on development and flood risk stating that:

“159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;*
- b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;*
- c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;*
- d) any residual risk can be safely managed; and*
- e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.*

168. Applications for some minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 55. “

² <https://www.gov.uk/guidance/national-planning-policy-framework>, last updated July 2021

2.3. Footnote 55 of the NPPF states:

“A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.”

2.4. Flood Zones in England are defined in Table 1³ as follows:

Table 1: Flood Zone Definitions

Flood Zone	Definition
Zone 1 Low Probability	Land having less than 1 in 1,000 annual probability of river or sea flooding. (Shown as ‘clear’ on the Flood Map – all land outside Zone 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)

2.5. An FRA should be appropriate to the scale, nature and location of the development and should identify and assess the risk from all sources of flooding to and from the development and demonstrate how any flood risks will be managed over the lifetime of the development.

2.6. An assessment of any hydrological impacts should be assessed including an assessment of impacts on surface water runoff and impacts to the drainage network to demonstrate how flood risk to others will be managed following development and taking climate change into account.

³ <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

- 2.7. The Planning Practice Guidance (substantially revised in March 2015 in relation to drainage) requires that sustainable drainage systems should be considered and included where practicable, in line with DEFRA Technical Standards⁴.

Local Plan

- 2.8. The Local Plan prepared by the Local Planning Authority, Manchester, sets out the policies for development in the local area.
- 2.9. Policy 57 Flood Risk Management outlines the requirements for new development within the Manchester area. It suggests the following:
- Developments should be considered against the NPPF
 - Careful consideration should be given to developments within Flood Zones 2 and 3
 - The SFRA should be consulted on remaining non-fluvial flood risks and consideration appropriately given to any other identified sources of flooding.

Sequential and Exception Tests

- 2.10. The Sequential and Exception Tests are applied in specific cases defined by UK Government policy. Their purpose is to drive development to areas of low flood risk and to support developments which improve flood risk for developments in areas at risk of flooding.

Sequential Test

- 2.11. Under the NPPF all new planning applications should undergo a Sequential Test unless a minor household development or a change of use application in accordance with paragraph 168 and footnotes 55 and 56. This test should be implemented by local planning authorities with a view to location particularly vulnerable new developments outside of the flood plain.
- 2.12. As the proposed construction constitutes a minor development, the proposed development does not require the Sequential Test in accordance with Paragraph 168 of the NPPF.

Exception Test

- 2.13. The Exception Test is applied to sites based on the Flood Zone and the nature of the development. As the proposed development consists of residential development buildings it would be classed as “more vulnerable” in line with government development use classes.

4 Technical Standards Accessed Online

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

- 2.14. The Flood Risk Vulnerability Classification table⁵, provided below in Table 2 shows which vulnerabilities are appropriate in each Flood Zone.
- 2.15. The proposed development sits wholly within Flood Zone 2 and the proposed development is “more vulnerable”. Table 2 shows Flood Zone 2 is an appropriate location for “more vulnerable” uses without the need for an Exception Test.

Table 2: Flood Risk Vulnerability Classification Table

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	✓

Summary

- 2.16. This flood risk assessment has been prepared with due consideration to the above local and national policy.

⁵

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/575184/Table_3_-_Flood_risk_vulnerability_and_flood_zone_compatibility.pdf

3. Consultation and Review

Sources of Information

Consultation

- 3.1. The site is within the remit of Manchester City Council as Lead Local Flood Authority (LLFA). Consultation has been undertaken with Manchester and the EA Greater Manchester Merseyside and Cheshire region as well as United Utilities to obtain information in relation to historic sewer flooding within and around the site's vicinity.
- 3.2. A Product 4 data request was obtained for the site from the EA Greater Manchester Region. This is included in Appendix B and has been utilised in analysis of fluvial flood risk on site.

Documents

- 3.3. Local Governments and Lead Local Flood Authorities provide documents which contain data and policies on flood risk and new development in their areas. These documents are introduced and briefly summarised below. For the purposes of this FRA, these documents have been reviewed for relevant information and any relevant data is discussed within the appropriate sub heading of this report.
- 3.4. The following sources of information have been reviewed for this assessment:
 - The Interactive Flood Risk Mapping available on the Environment Agency (EA) website⁶.
 - The National Planning Policy Framework (NPPF) technical guide (Communities and Local Government, 2019).
 - British Geological Survey - Geology of Britain Viewer (British Geological Society, 2017).
 - Manchester Local Plan ⁷ (2012).
 - Manchester Preliminary Flood Risk Assessment⁸ (PFRA), (2011).
 - Manchester Strategic Flood Risk Assessment⁹ (SFRA) (2011).

⁶ Environment Agency, Flood Map for Planning, <https://flood-map-for-planning.service.gov.uk/>, 2017

⁷ Manchester Local Plan, https://www.manchester.gov.uk/info/200074/planning/6573/core_strategy_2012-2027, 2012

⁸ Manchester Borough Council, Preliminary Flood Risk Assessment, https://www.manchester.gov.uk/egov_downloads/MCC_PFRA.pdf, 2011

⁹ Manchester Borough Council, Strategic Flood Risk Assessment, https://www.manchester.gov.uk/info/500207/planning_and_regeneration/4700/strategic_flood_risk_assessment, 2015

Preliminary Flood Risk Assessment (PFRA)

- 3.5. The PFRA, adopted in 2011, is a high-level appraisal of flood risk across Lead Local Flood Authority Manchester. The flood risk from all sources, including fluvial, surface water, groundwater and surcharged sewers is evaluated. It is the basis upon which the Local Flood Risk Management Strategy (described below) is produced.
- 3.6. The PFRA summarises historical flood incidents in Manchester. The site is not recorded as having been affected by any historical flood event.

Strategic Flood Risk Assessment (SFRA)

- 3.7. The SFRA, adopted in 2012, provides the evidence base for the Local Planning Authority Manchester Local Plan and guidance for consideration when determining planning applications. The SFRA seeks to place new development into areas of lower flood risk, taking into account current flood risk, future flood risk and the effect a proposed development would have on the risk of flooding.

4. Sources of Flood Risk

Fluvial Flood Risk

- 4.1. Flooding from watercourses arises when flows exceed the capacity of the channel, or where a restrictive structure is encountered, resulting in water overtopping the banks into the floodplain.
- 4.2. The site is located within Flood Zone 2. Flood Zone 2 denotes a risk of flooding from fluvial sources between a 1 in 200 (0.5%) and 1 in 1,000 (0.1%).
- 4.3. A Product 4 data request was obtained from the EA Greater Manchester Region for the site (Shown in Appendix B). This included scenarios from the Chop 2012 defended fluvial model and the Corn Brook 2017 fluvial model.
- 4.4. Within the Chop 2012 model, the site has been shown to be unaffected within the 0.1% AEP, 1% AEP and the 1.33% AEP defended fluvial flood events.
- 4.5. Within the Corn Brook 2017 model, the site has been shown to be impacted within the 0.1% AEP fluvial undefended flood event. Sample nodes were taken on site with the nodes 14, 15 and 16 being within the site boundary, with node 16 being on top of the property, node 14 within the central garden area and node 15 being at the rear of the garden. The flood levels and depths for these sample node points are displayed in Table 3.
- 4.6. The site is only shown to flood within the 0.1% AEP fluvial flood event with the property experiencing depths of 0.44m, and the garden experiencing depths of between 0.24m-0.31m. As such the risk from fluvial flooding can be considered medium from present day events.

Table 3: Corn Brook (2017) Modelled Flood Levels

	Modelled Flood Level (m AOD)	
	1% AEP	0.1% AEP
Node 14	N/A	28.84
Node 15	N/A	28.85
Node 16	N/A	28.60
	Modelled Flood Depth (m)	
	1% AEP	0.1% AEP
Node 14	N/A	0.31
Node 15	N/A	0.24
Node 16	N/A	0.44



Figure 3: EA Flood Mapping for Planning (Source: Google Satellite and (c) Environment Agency copyright and/or database right)

Climate Change

- 4.7. The site is located within the Irwell Management Catchment which has the following peak river flow allowances for the Central Allowances; 12% for the 2020s, 19% for the 2050s, and 35% for the 2080s. These allowances are required in the analysis of impact of climate change on developments. As this development is a residential development, the central allowance for the 2080s is to be utilised in analysis.
- 4.8. The results from the Corn Brook Model include a 100 year + 30% climate change allowance scenario. This is a 5% underestimation of the updated allowances however it is still able to provide guidance for the development. The resulting flood depths and levels for the property nodes are displayed in Table 4.
- 4.9. The property itself is shown to be impacted by modelled flood depths of 0.51m while the garden area is shown to be impacted by depths of between 0.31m and 0.37m. As such, the property should be constructed in a flood resilient manner as it has been demonstrated to be high risk from flooding due to it being affected by climate change.

Table 4: Corn Brook Model (2017) Modelled Flood Levels for Climate Change

	Modelled Flood Level (m AOD)
	1 + 30%% AEP
Node 14	28.91
Node 15	28.92
Node 16	28.67
	Modelled Flood Depth (m)
	1 + 30%% AEP
Node 14	0.37
Node 15	0.31
Node 16	0.51

Main Rivers

- 4.10. There are no main rivers in the vicinity of the site. The nearest EA Main River is located 1km to the south of the site and is named the Chorlton Brook.

Ordinary Watercourses

- 4.11. There are no other watercourses in the vicinity of the site.

Historic Flooding

- 4.12. Review of the EA Recorded Flood Outlines has determined that there is no Historical Flood Events detected within the vicinity of the site. The nearest historical flood event occurred approximately 2.75km to the south of the site.

Coastal Flooding

- 4.13. The site is not at risk of coastal flooding.

Canals

- 4.14. The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders and boreholes and manages water levels by transferring it within the canal system.
- 4.15. Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising it will reach the level of the storm weirs. The control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.
- 4.16. Flooding can also occur where a canal is impounded above surrounding ground levels and the retaining structure fails.
- 4.17. There are no canals within the vicinity of the site and as such flood risk from this source can be considered low.

Pluvial Flood Risk

- 4.18. Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.
- 4.19. Examination of EA Risk of Flooding from Surface Flooding Data for the 3.3% (high risk), 1% (medium risk) and 0.1% (low risk) AEP flood events shows that the site is affected only within the 0.1% (low risk) pluvial flood event. Within this event, the site is shown to be impacted within the garden area with depths of less than 600mm. It is unlikely that this will affect the development as the pluvial flood extents appear to be focussed away from the property.
- 4.20. As such, the risk to the development can be considered low.



Figure 4: EA Risk of Flooding from Surface Water Mapping (Source: Google Satellite and (c) Environment Agency copyright)



Figure 5: 1 in 1000 Year Pluvial Flood Event Depths (Source: Google Satellite and (c) Environment Agency copyright)

Reservoirs

- 4.21. Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain water in times of flood. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 4.22. According to EA flood risk from reservoirs mapping the site is at risk of flooding in the event of a breach at the Audenshaw No.1, Audenshaw No.2, Audenshaw No.3, Gorton Lower, and Gorton Upper reservoirs.
- 4.23. As reservoirs are highly managed the maximum flood extent provided in the EA Risk of Flooding from Reservoir mapping is considered a worst case scenario. Therefore, given these criteria the site is deemed at a low risk of flooding from this source. Although to be precautionary, flood resilient design and building practices could be implemented to further reduce risk.

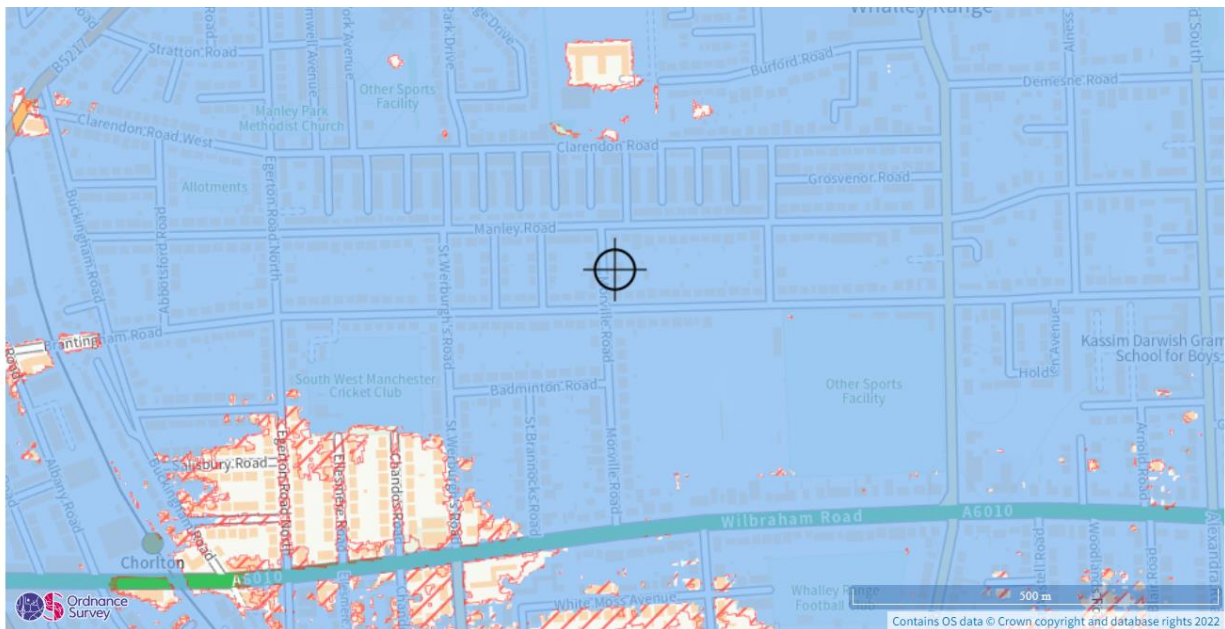


Figure 6: EA Reservoir Flood Risk Mapping

Groundwater

- 4.24. Groundwater flooding occurs in areas where underlying geology is permeable, and water can rise within the strata sufficiently to breach the surface.
- 4.25. The British Geological Survey's (BGS) mapping shows the site to be underlain by bed rock of Wilmslow Sandstone Formation – Sandstone and superficial deposits of Glaciofluvial Sheet Deposits, Devensian - Sand And Gravel. These are defined as rock layers of estuary/delta deposits with low permeability.

Historic BGS boreholes within the vicinity of the site confirm that the site is underlain by sand and gravel. The available boreholes do not include groundwater water levels.

- 4.26. The SFRA states that there are no known historic groundwater flood events within the region. It does state that areas of Trafford appear to suffer from a high water table and there are some issues with waterlogged ground within Salford.
- 4.27. As such, the risk from groundwater flooding can be considered low.

Surface Water Sewer Flooding

- 4.28. Surface water sewers can be a cause of flooding where the drainage network has become overwhelmed, either by blockage or due to local development beyond the designed capabilities of the drainage system.
- 4.29. Detailed DG5 records to Manchester were not available at the time of writing of the SFRA and as such there was no available records of past sewer flooding incidents.
- 4.30. The SFRA does state that other SFRAs and authorities have identified sewer flooding concerns within the large urban areas of the borough. In Manchester, sewer and drainage problems have been identified during rainfall events, with issues in Northenden, Didsbury, Fallowfield and in the city centre. Sewer flooding is known to have occurred in Salford where up to 1,000 properties are at risk of localised flooding from surface water, sewers and smaller watercourses. Flood risk data has been provided by Salford City Council which identifies sewer flooding hotspots in Walkden, Worsley, Peel Green, Swinton and Boothstown. In Trafford, sewer flooding is known to be a problem within the areas of Flixton, Altrincham and Sale. The site is not located within any of these regions.
- 4.31. The development is therefore considered to be at low risk of flooding from sewers.

5. Flood Risk Mitigation

Fluvial and Canals

- 5.1. According to national guidelines a residential dwelling is considered appropriate for a location within Flood Zone 2. Flood risk mitigation measures are recommended as the development is considered at high risk from fluvial flooding.
- 5.2. The proposal is a Minor Development and can adhere to the EA Standing Advice for Minor Developments. The Finished Floor Levels (FFLs) of the proposed extension will be set no lower than those of the existing dwelling. Furthermore, the extension should be constructed in a flood resilient manner in accordance with the CLG Report Improving the Flood Performance of New Buildings - Flood Resilient Construction (2007), including measures such as the below:
- Solid (i.e. concrete floors) with waterproof screed.
 - Raised wiring and power outlets at ground level.
 - Waterproof plasterboard used at ground floor.
 - Air brick covers to be installed.
 - Non-return valves should be installed on all new drainage.
 - All new plumbing insulation to be of closed cell design.
 - Damp Proof Membranes (d.p.m.) should be included in any design to minimise the passage of water through ground floors.
 - Patio doors may be susceptible to ingress of flood water. Any PVC window/door sills should be adequately sealed. Double glazing should be used to provide resistance against external flood water pressure.

Pluvial

- 5.3. The site is shown to be at low risk from pluvial flooding, and as such no mitigation above and beyond what is recommended for fluvial flooding is required.

Reservoirs, Groundwater and Sewers

- 5.4. Flood risk from other sources is deemed to be low – medium. Mitigation above and beyond what is presented for fluvial flooding is not required.

Increase to Flood Risk Elsewhere

- 5.5. The proposed development is for a minor extension to the existing dwelling on site. As such, the proposal constitutes a Minor Development under the NPPF.
- 5.6. Paragraph 047 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) states:

Minor developments are unlikely to raise significant flood risk issues unless:

- they would have an adverse effect on a watercourse, floodplain or its flood defences;
- they would impede access to flood defence and management facilities, or;
- where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.

5.7. As such, the proposed development in isolation should have a negligible impact on flood risk elsewhere.

6. Conclusions

- 6.1. This FRA has been undertaken with reference to the requirements of NPPF and Planning Practice Guidance with respect to the development at 46 Morville Road, Manchester, M21 0TR. It has been written to support a planning application and has been prepared with due consideration to the nature of the proposed development to provide the appropriate level of detail.
- 6.2. The FRA supports the planning application and demonstrates that there is an acceptable level of flood risk to the site if the mitigation strategies recommended are implemented in the scheme. The development does not increase flood risk off site or to the wider area.

Source of Flooding	Flood Risk Summary
Fluvial (and Canals)	The site is located within Flood Zone 2 and is at medium risk from fluvial flooding, however it's proposed vulnerability according to government guidelines ("More Vulnerable"), is considered appropriate for the Flood Zone. The site is shown to flood within the 0.1% AEP fluvial flood event with the property experiencing depths of 0.44m, and the garden experiencing depths of between 0.24m-0.31m. The property is further demonstrated to be affected by the 1% AEP + 30% climate change scenario with depths of 0.51m likely.
Pluvial	The site is shown to be at low risk from pluvial sources.
Reservoirs Groundwater Sewers	The site is considered to be at low risk from all other sources of flooding.

- 6.3. The following conclusions can be drawn from this level 1 FRA:
- This FRA has identified no prohibitive constraints in developing the proposed site for the proposed usage.
 - The Site is in Flood Zone 2 and therefore at medium risk of flooding from fluvial sources, however the post-development use is to be "more vulnerable" which is deemed appropriate for location within this Flood Zone, according to national guidelines.
 - The site is at low risk of pluvial flooding.
 - The site is considered to be at low risk from all other sources of flooding. The proposal is a Minor Development and can adhere to the EA Standing Advice for Minor Developments.
- 6.4. This Flood Risk Assessment should be submitted as part of the planning application to satisfy the requirements under NPPF.

Appendix A – EA Product 4 Data

Flood risk assessment data

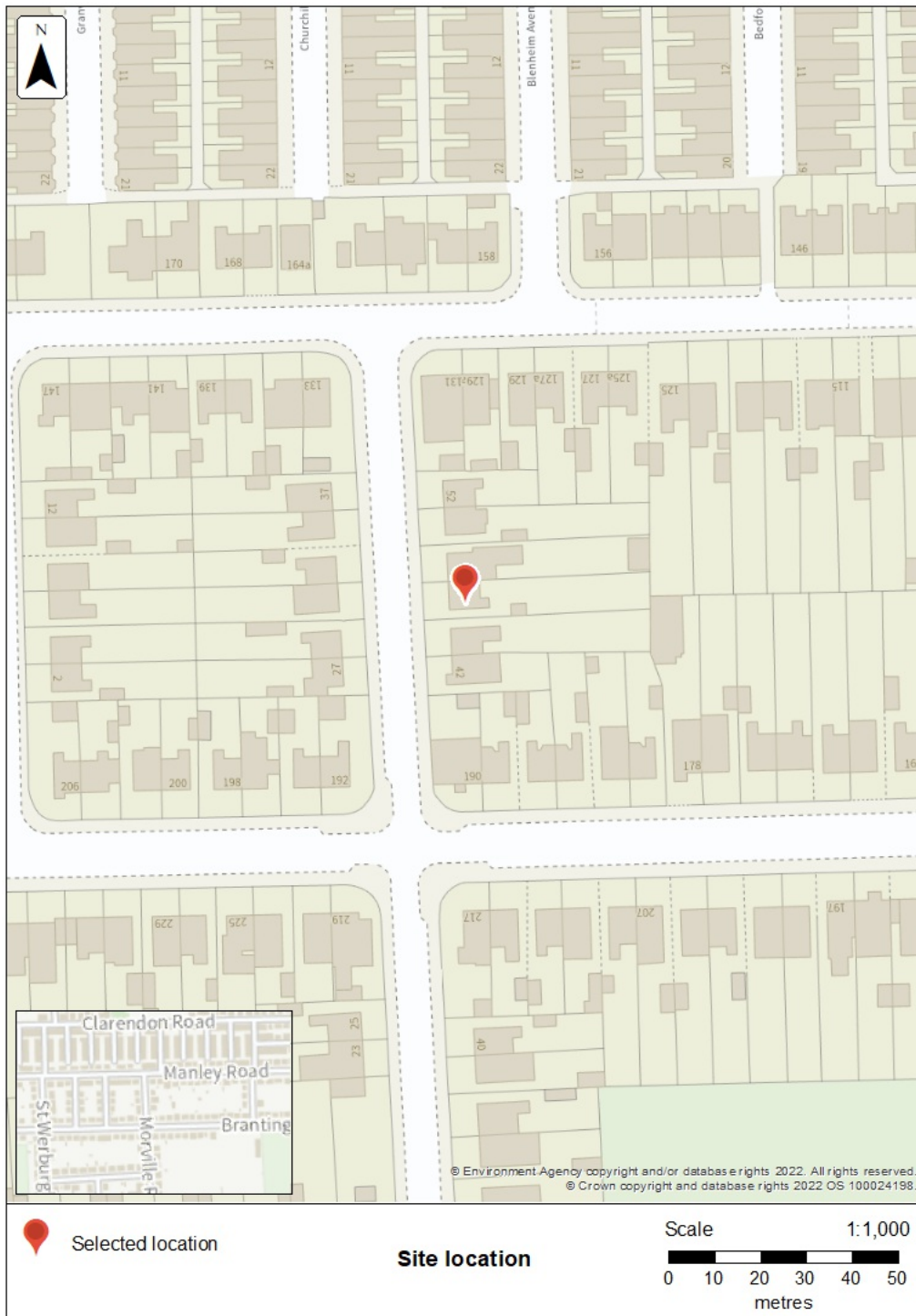
Location of site: 382558 / 394431 (shown as easting and northing coordinates)

Document created on: 13 April 2022

This information was previously known as a product 4.

Customer reference number: GMMC257279SPW

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



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)
- modelled data
- climate change 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
- flood defences and attributes

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.

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

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: CHOP_2012_D
Scenario(s): Defended fluvial
Date: 16 March 2012

Model name: Corn Brook 2017
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 31 December 2017

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 occurring 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 1.

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

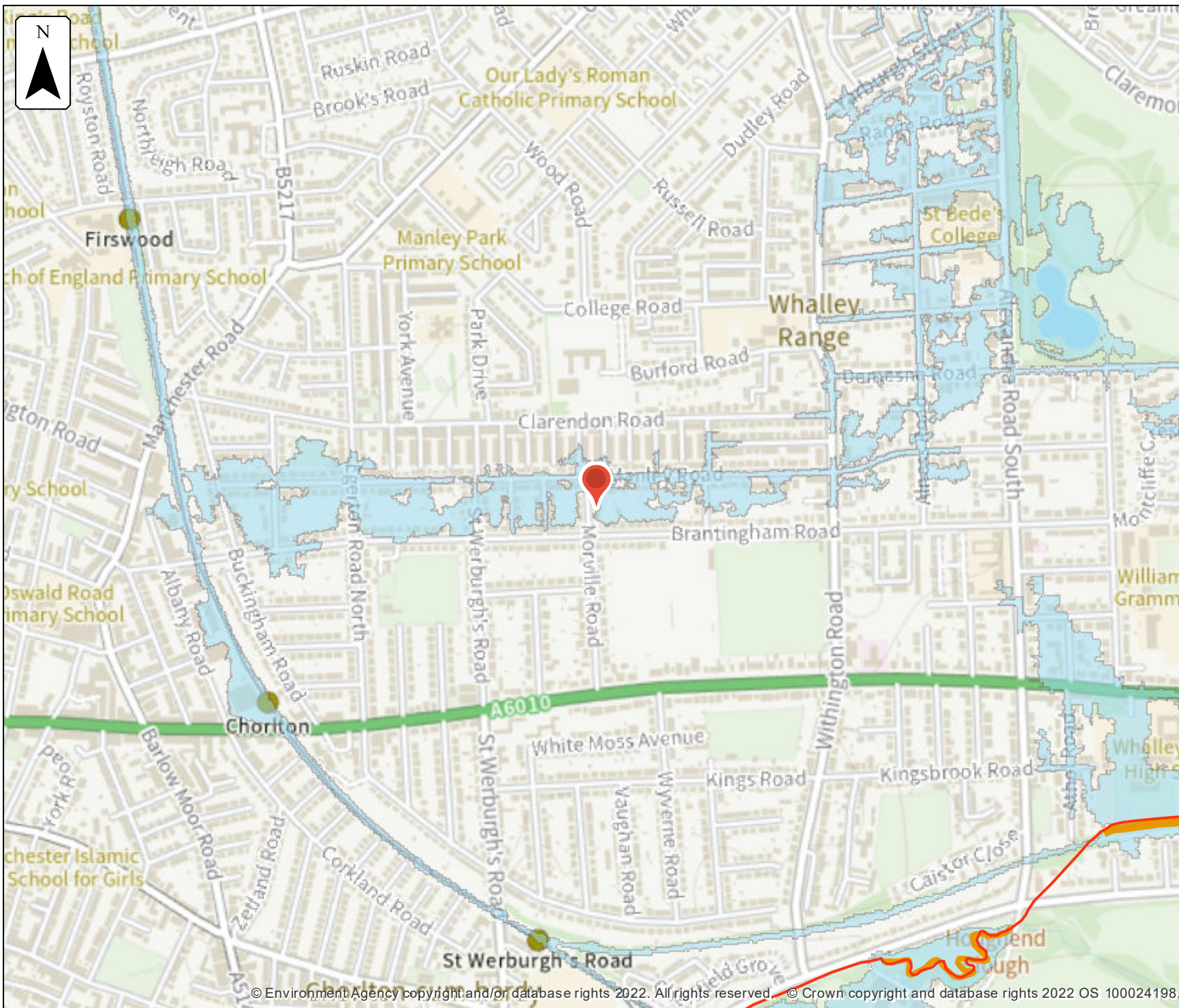
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- 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.



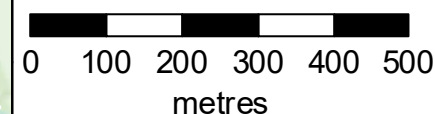
Flood map for planning

Location (easting/northing)
382558/394431

Scale
1:10,000

Created
13 Apr 2022

-  Selected location
-  Main river
-  Flood defence
-  Flood zone 2



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
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

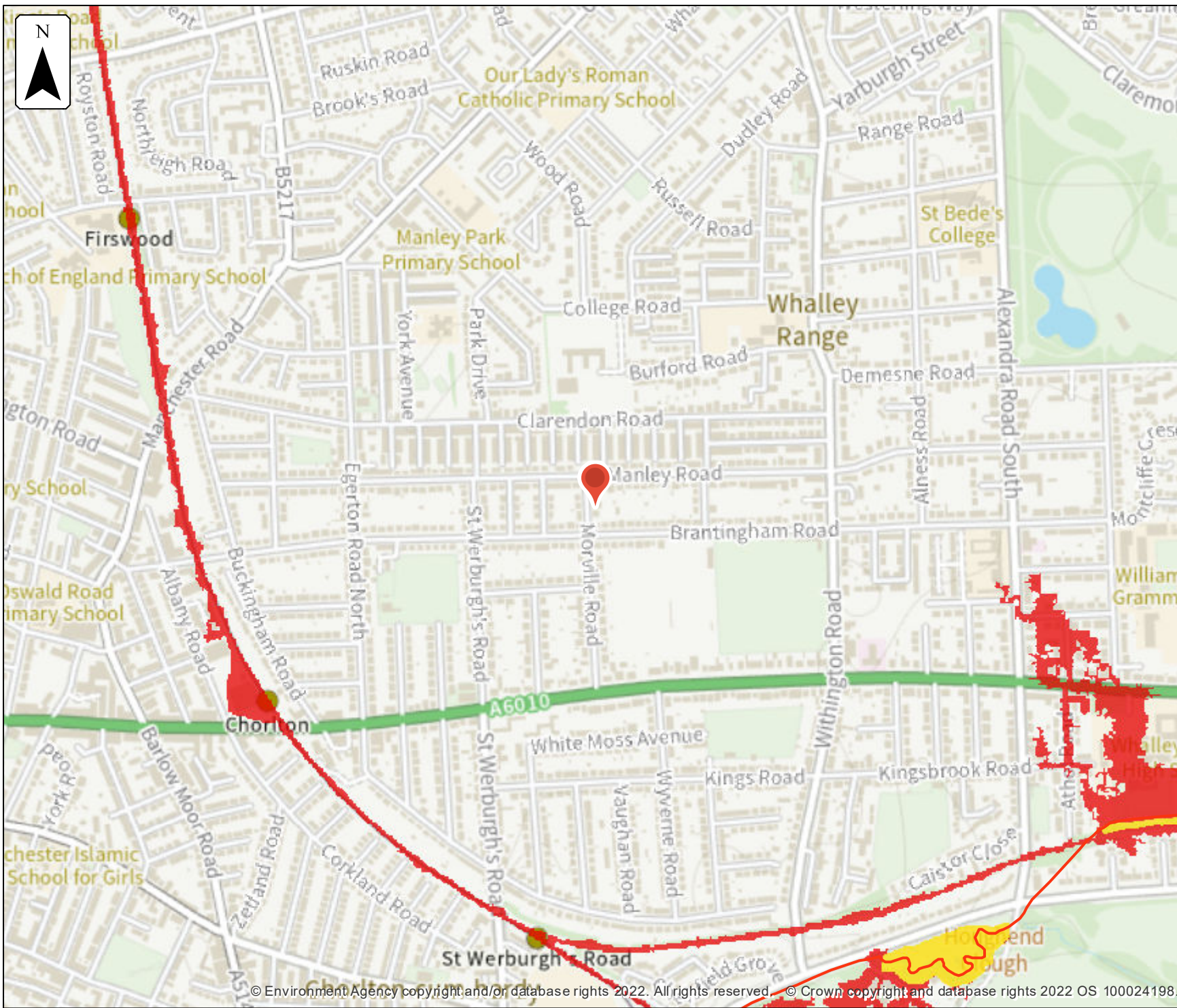
The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

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
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



Defended modelled fluvial extent

Location (easting/northing)
382558/394431

Scale Created
1:10,000 13 Apr 2022

Model name
CHOP 2012 D

 Selected location

 Main river

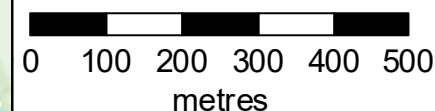
Modelled flood extent

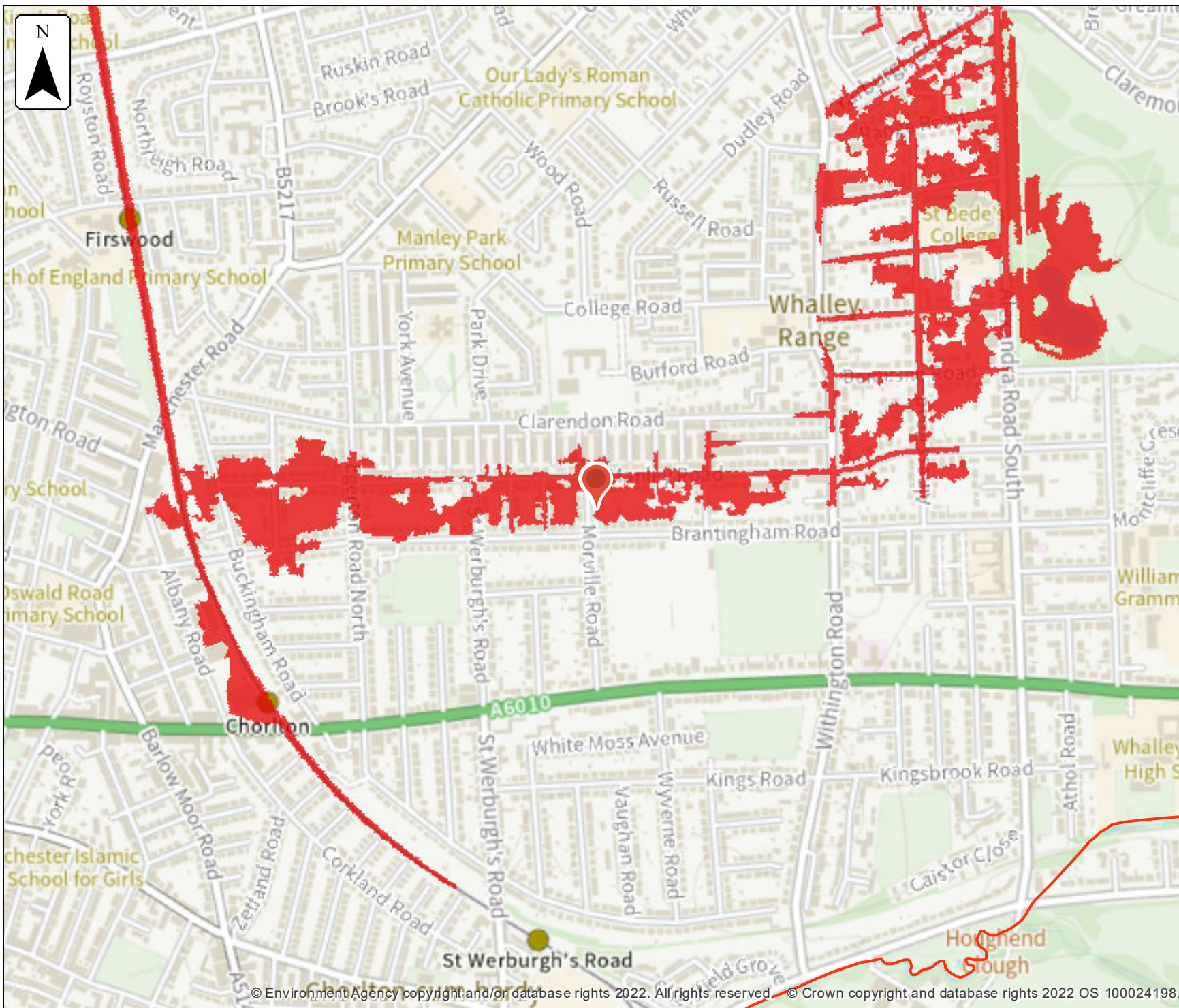
 1.33% AEP

 1% AEP

 0.1% AEP

Flood extents may not be
visible where they overlap
other return periods





No defences exist modelled fluvial extent

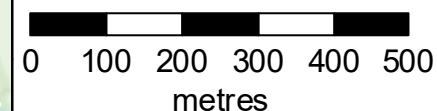
Location (easting/northing)
382558/394431

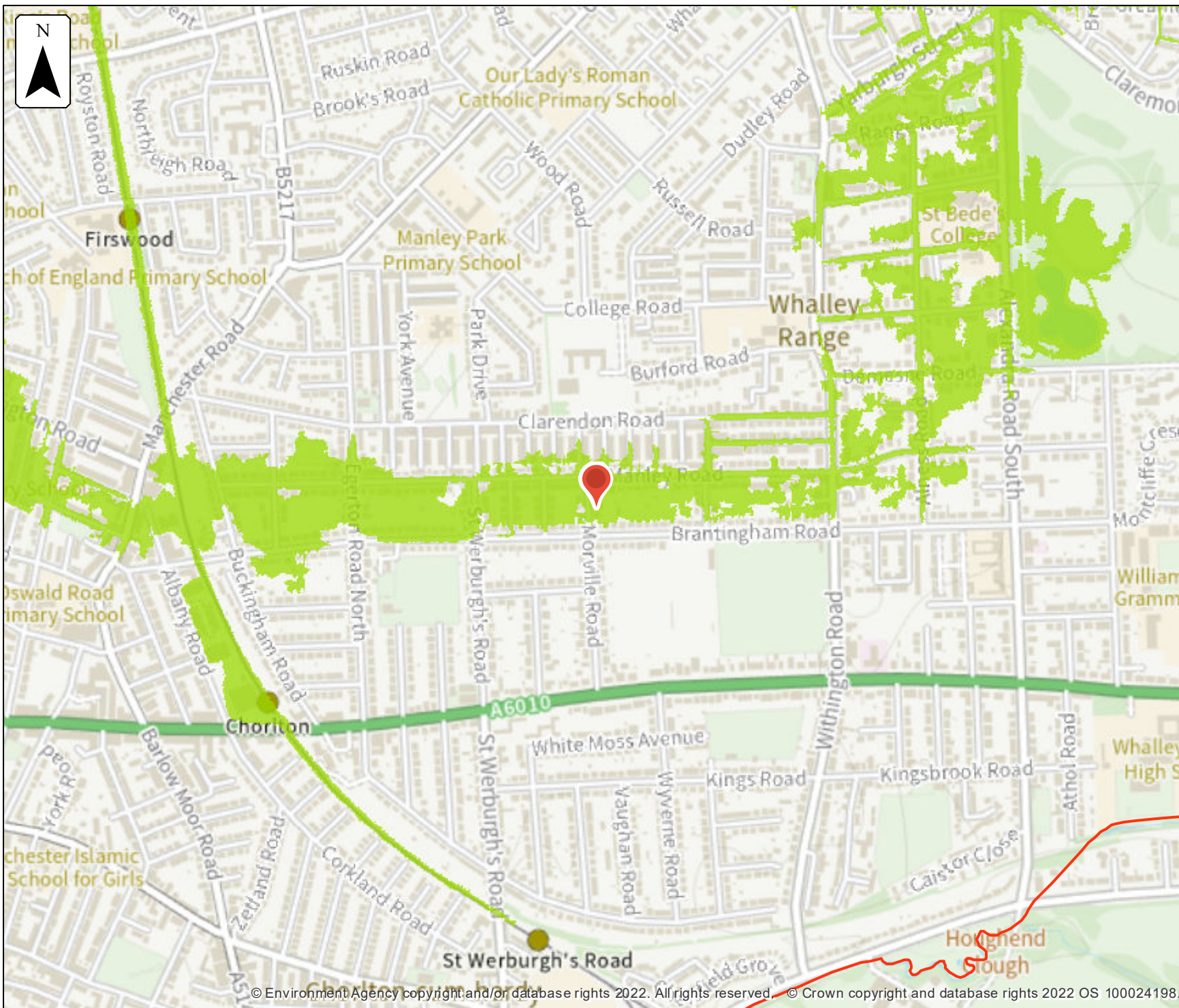
Scale Created
1:10,000 13 Apr 2022

Model name
Corn Brook 2017

-  Selected location
-  Main river
- Modelled flood extent
 -  0.1% AEP

Flood extents may not be
visible where they overlap
other return periods





No defences exist climate change modelled fluvial extent

Location (easting/northing)
382558/394431

Scale Created
1:10,000 13 Apr 2022

Model name
Corn Brook 2017

 Selected location

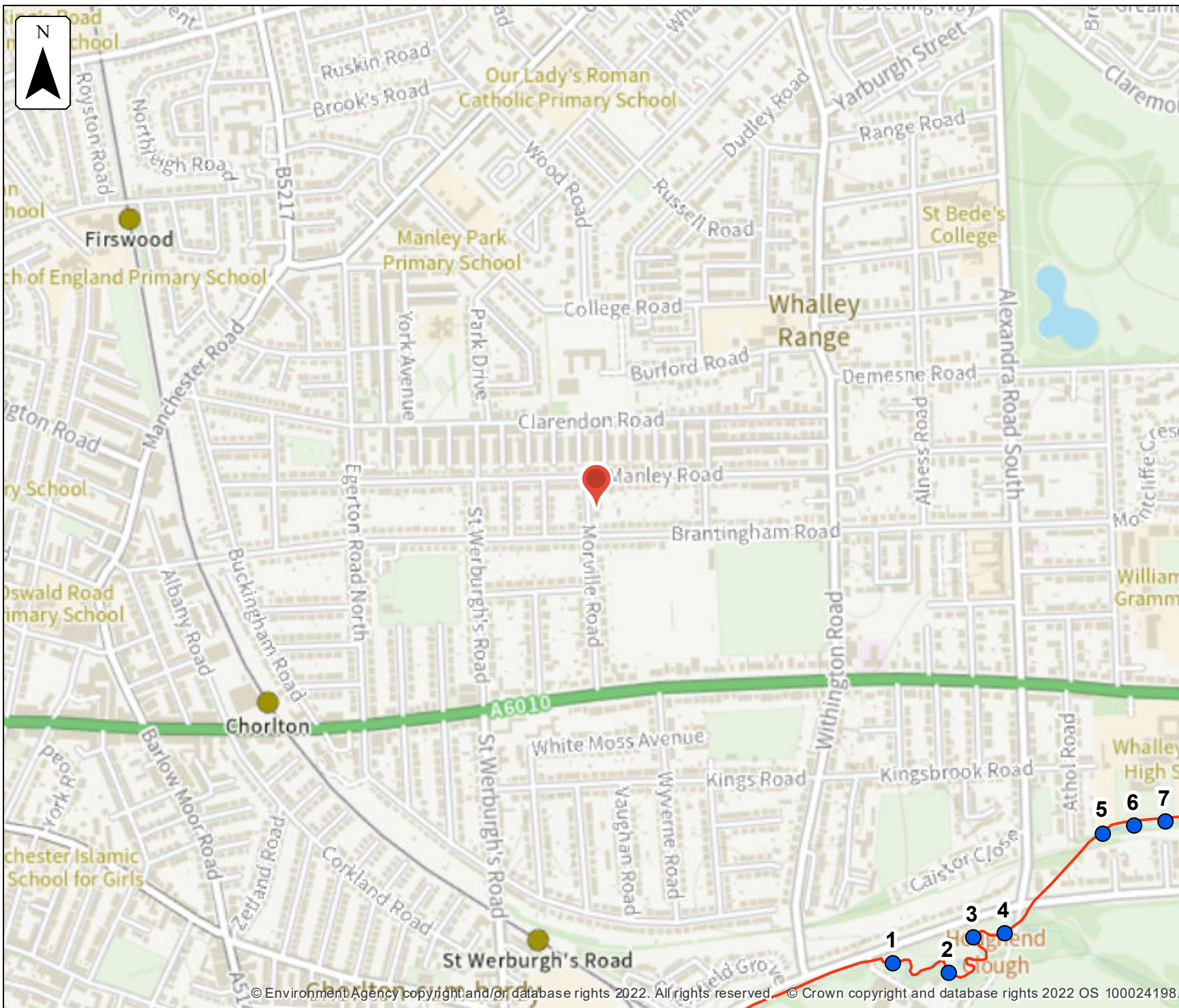
 Main river

Modelled flood extent

 0.1% AEP (+30%)

Flood extents may not be
visible where they overlap
other return periods


0 100 200 300 400 500
metres



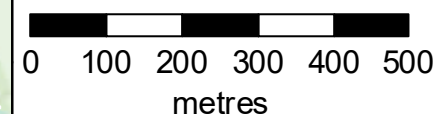
Defended modelled fluvial node locations

Location (easting/northing)
382558/394431

Scale Created
1:10,000 13 Apr 2022

Model name
CHOP 2012 D

-  Selected location
-  Modelled location
-  Main river



Modelled node locations data

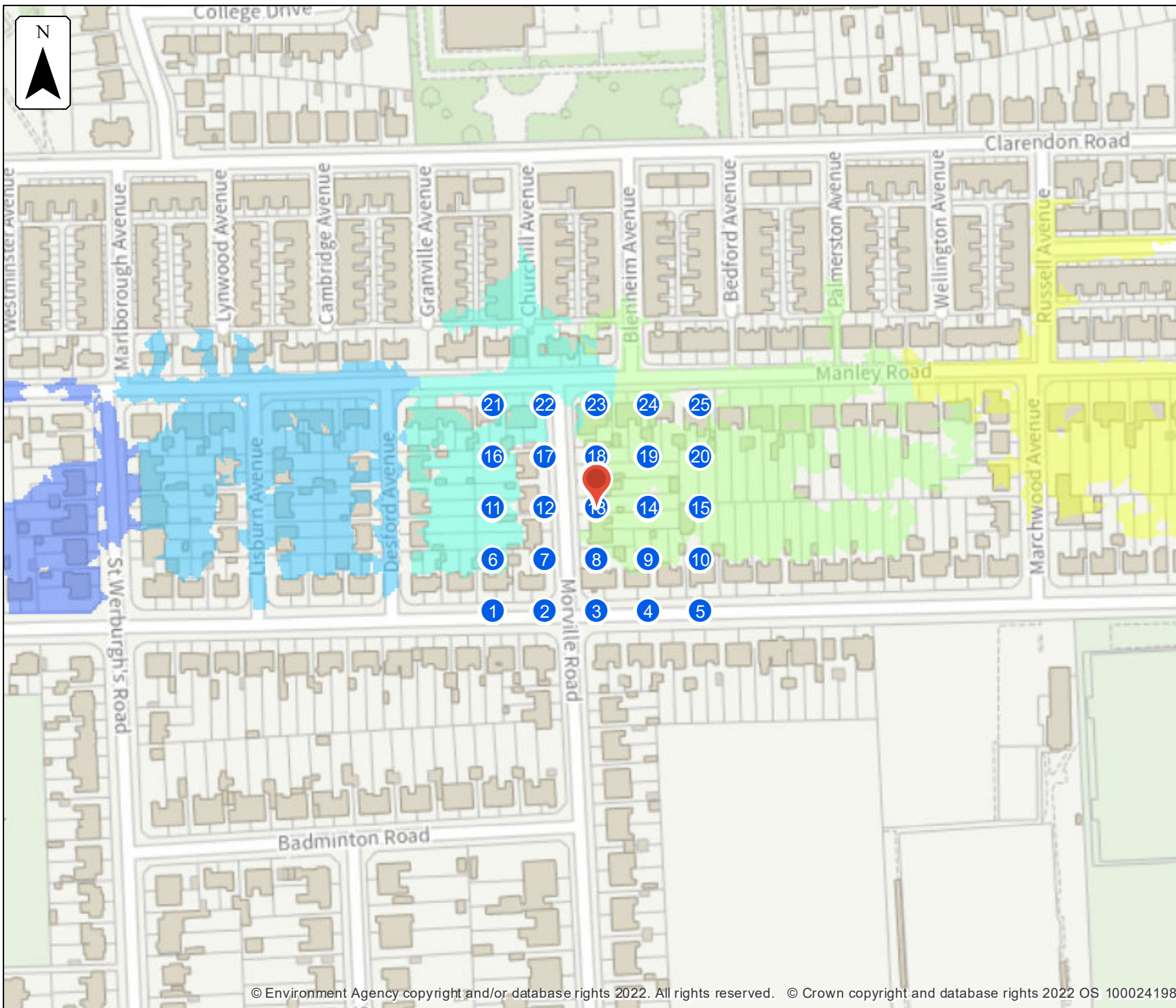
Defended

Label	Modelled location ID	Easting	Northing	4% 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	234295	383135	393546	27.54	13.38			28.23	16.02	28.39	16.58			29.78	22.06
2	73841	383242	393526	27.58	13.65			28.27	16.56	28.43	17.21			29.78	23.41
3	226614	383291	393597	27.62	14.69			28.28	18.37	28.43	19.16			29.79	24.77
4	186750	383351	393605	27.63	14.78			28.28	18.55	28.43	19.34			29.78	25.23
5	53750	383543	393798	28.07	13.69			28.88	17.03	29.09	17.73			31.03	22.41
6	51209	383603	393813	28.68	13.66			28.97	17.02	29.15	17.74			31.03	24.66
7	169589	383663	393819	29.63	13.67			29.79	17.03	29.82	17.75			31.07	24.72

Data in this table comes from the CHOP 2012 D 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.



No defences exist modelled fluvial extent and height

Location (easting/northing)
382558/394431

Scale Created
1:2,500 13 Apr 2022

Model name
Corn Brook 2017

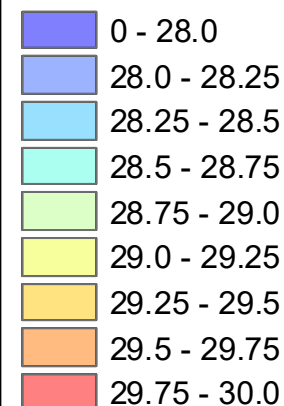


Selected location

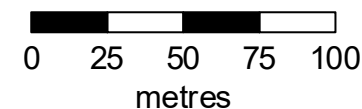
— Main river

Modelled 2D grid

Water level in mAOD



This map shows the
0.1% AEP height data



Sample point data

No defences exist

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	382508	394381											NoData	NoData
2	382533	394381											NoData	NoData
3	382558	394381											NoData	NoData
4	382583	394381											NoData	NoData
5	382608	394381											NoData	NoData
6	382508	394406											0.30	28.60
7	382533	394406											NoData	NoData
8	382558	394406											NoData	NoData
9	382583	394406											0.12	28.84
10	382608	394406											NoData	NoData
11	382508	394431											0.40	28.60
12	382533	394431											NoData	NoData
13	382558	394431											NoData	NoData
14	382583	394431											0.31	28.84
15	382608	394431											0.24	28.85
16	382508	394456											0.44	28.60

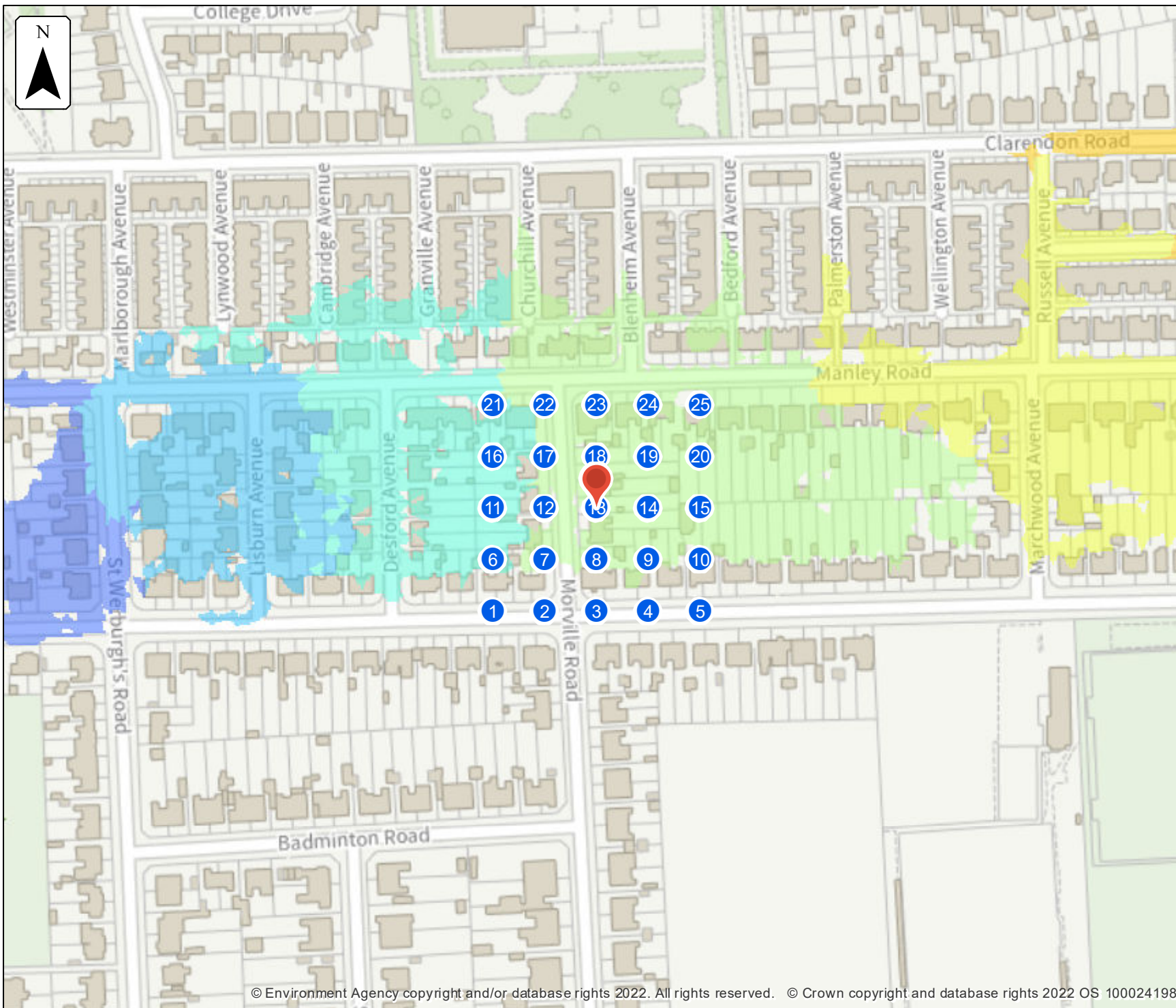
Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	382533	394456											NoData	NoData
18	382558	394456											0.13	28.81
19	382583	394456											0.30	28.84
20	382608	394456											0.38	28.85
21	382508	394481											0.14	28.69
22	382533	394481											0.10	28.72
23	382558	394481											0.19	28.76
24	382583	394481											0.17	28.81
25	382608	394481											NoData	NoData

Data in this table comes from the Corn Brook 2017 model.

Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.



No defences exist climate change modelled fluvial extent and height

Location (easting/northing)
382558/394431

Scale Created
1:2,500 13 Apr 2022

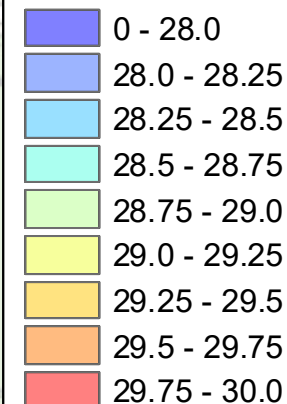
Model name
Corn Brook 2017



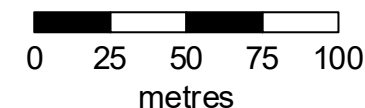
Selected location

— Main river

Modelled 2D grid
Water level in mAOD



This map shows the
0.1% AEP +30% height data



Sample point data

No defences exist climate change

Label	Easting	Northing	0.1% AEP (+30%)	
			Depth	Height
1	382508	394381	NoData	NoData
2	382533	394381	NoData	NoData
3	382558	394381	NoData	NoData
4	382583	394381	NoData	NoData
5	382608	394381	NoData	NoData
6	382508	394406	0.41	28.66
7	382533	394406	NoData	NoData
8	382558	394406	NoData	NoData
9	382583	394406	0.18	28.91
10	382608	394406	NoData	NoData
11	382508	394431	0.47	28.66
12	382533	394431	NoData	NoData
13	382558	394431	NoData	NoData
14	382583	394431	0.37	28.91
15	382608	394431	0.31	28.92
16	382508	394456	0.51	28.67

Label	Easting	Northing	0.1% AEP (+30%)	
			Depth	Height
17	382533	394456	0.18	28.79
18	382558	394456	0.18	28.86
19	382583	394456	0.36	28.90
20	382608	394456	0.45	28.92
21	382508	394481	0.19	28.75
22	382533	394481	0.16	28.78
23	382558	394481	0.24	28.82
24	382583	394481	0.18	28.88
25	382608	394481	NoData	NoData

Data in this table comes from the Corn Brook 2017 model.

Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

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