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Flood Risk Assessment for 2 Moresby Drive, Didsbury, Manchester, M20 5GL



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July 2022

Report QA Number: QA22/018



INVESTOR IN PEOPLE

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1.1 Introduction and data used in this assessment

Peak Associates Environmental Consultants Limited (Peak Associates) was commissioned by Kevin Dunne to conduct a Flood Risk Assessment (FRA) at 2 Moresby Drive, Manchester M20 5GL.

This report is based upon observations made on site during a walkover undertaken on 24th June 2022 and upon data driven research. This includes the analysis of historical maps, geological, hydrogeological, and hydrological data and other relevant Third-Party environmental information, including the Environment Agency Product 4 Data (Appendix B) Peak Associates can accept no liability for any inaccuracies contained within the Third-Party information referenced. It should be noted that where screenshots of online mapping tools have been used, these contain public sector information licensed under the Open Government Licence v3.0.

1.2 Description of the Proposed Site

The proposed development is located at 2 Moresby Drive in Didsbury and currently comprises of a two-storey, semi-detached dwelling with an existing ground floor and limited second floor extension to the rear of the property (see photos). The proposed additional extension will be a second-story development consisting of an existing ground floor garage conversion into a play-room and an additional bed room on the first floor. Floor levels are therefore already established for the development.

The footprint of the existing building is around 250m² however, the extension at first floor level is only around 20 m² which will be placed above the existing garage which will be converted and essentially wrap around the original building, Appendix A shows the proposed development plan developed by DEN Architectural services. In addition, the site photographs in Appendix D show the proposed development area and its existing and proposed footprint.

Based on the Environment Agency (EA) 'Flood Map for Planning' the proposed development site is situated in Flood Zone 2 (Ref 7). The property is approximately 230m North of the River Mersey and therefore is mainly at risk of flooding from a fluvial flood event.

1.3 Geology and hydrogeology

The Didsbury area is located on Glacial till and River Terrace Deposits (undifferentiated) - Sand And Gravel. These deposits were formed up to 3 million years ago in the Quaternary Period. However, the local environment was dominated by the development of the proto-Mersey where the sedimentary deposits originated and hence the current landform is most likely to have been formed at the end of the last (Devensian) ice age period around 27,000 years ago.

The gentle rise in level to the north of the existing Mersey has in the past been linked to former bank alignments of the river in this recent glacial event.

Bedrock geology which is exposed locally along the line of the Mersey is the distinctive red Wilmslow Sandstone Formation. This sedimentary Bedrock was formed approximately 247 to 252 million years ago in the Triassic Period. The near-surface geology is such that local sand deposits and reworked top of the sandstone bedrock and the proximity of the Mersey means the shallow sands found locally can act as a minor aquifer but no reports of seepages or springs exist at the property.

2.0 Sources of Flooding

2.1 Fluvial

The site is situated within Flood Zone 2 (Ref 7). Figure 1 shows the change in flood zones across the area and the risk of flooding from the River Mersey, which is approximately 230m South of the property. Conversely, flooding from the river Mersey creates three areas of flood zone 3 (shaded dark blue below) the property's North, West and South, respectively. A more thorough analysis of this risk is considered alongside the EA product 4 data for planning purposes in section 3.

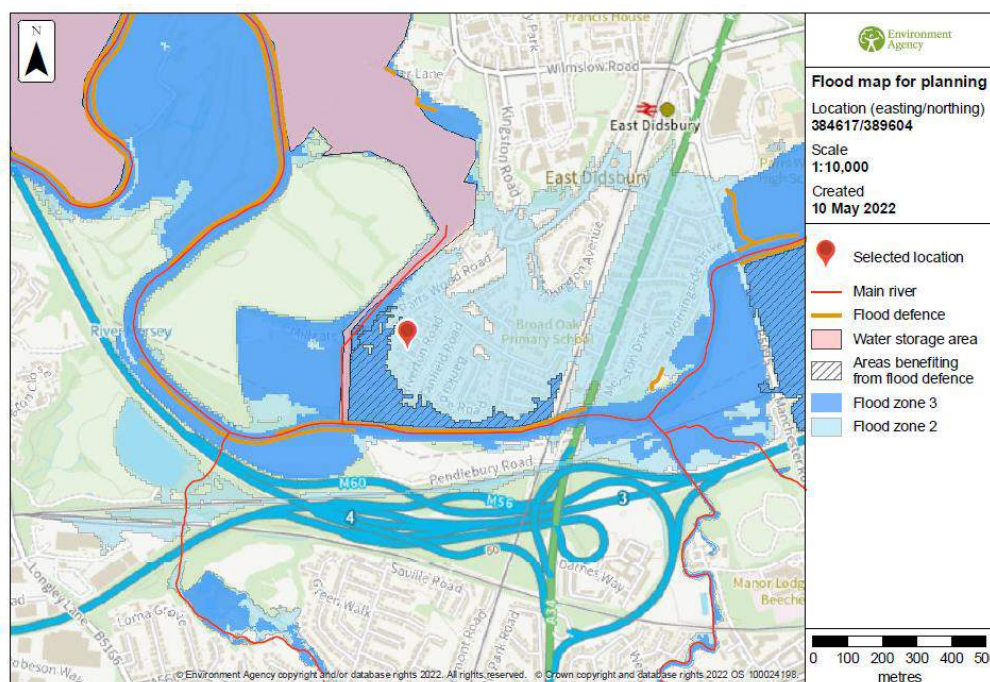


Figure 1 – Product 4 Flood Map for Planning

2.2 Surface Water

Based on the EA's 'Long-Term Flood Risk Map' (Ref 6) Moor Park Road site is also classified as medium risk of flooding from surface water. The proximity of the Mersey means, Kingsway (the main road to the west of the site) has a mixture of low and medium areas of risk. The property itself is considered very low risk as it sits on slightly higher ground.



Figure 2 – Extent of Surface Water Flooding (Ref 6)

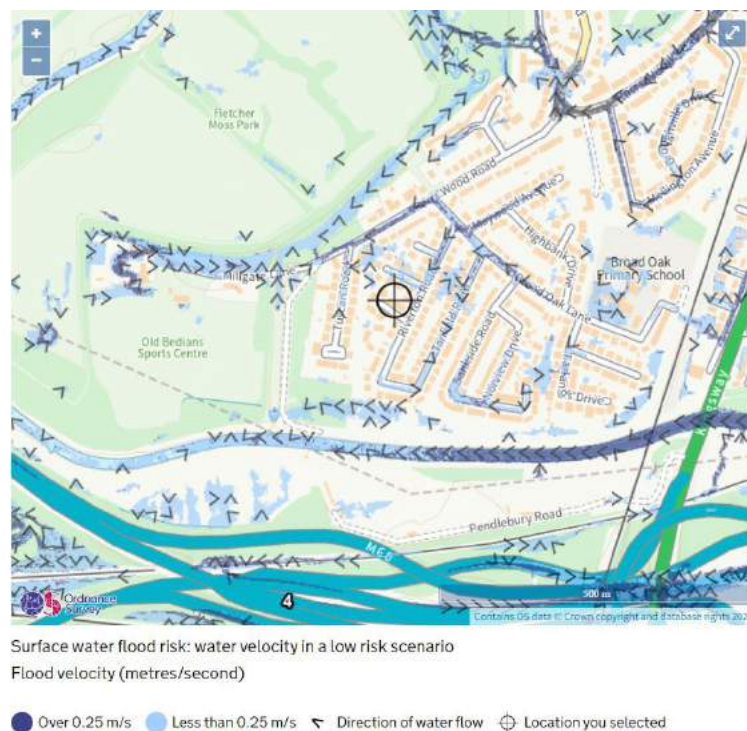


Figure 3 – Surface Water Velocity Map (Ref 6)

2.2 Reservoirs

The EA' Long-Term Flood Risk Map' identifies that the proposed development site is located in an area subject to flooding from reservoirs. The closest reservoir is the Sykes Reservoir system in Edgeley. Located close to Stockport County FC's ground these relatively low lying reservoirs are approximately 3km East of the site. The provision of a second floor extension to an existing house does not increase this very limited risk posed by this system.

2.3 Groundwater

Manchester City, Salford City and Trafford Council's Strategic Flood Risk Assessment (SFRA) (Ref 1) highlights that there is no specific risk to groundwater flooding to the property. The groundwater flooding map (Appendix E) shows the areas of Manchester that are at risk, have shallow groundwater and are at risk of groundwater rebound. The area around the property is however on that where shallow groundwater may be present and a watching brief re such groundwater should be kept if excavations are required for any services or revised drainage.

2.4 Tidal

The site is not at risk from tidal flooding and therefore, analysis is not applicable.

2.5 Analysis of EA 'Product 4' Data

The Environmental Agency Product 4 data provided in essence, confirms the proximity of the River Mersey and the fluvial flood risk extent within the local area that requires most consideration in this FRA. The Product 4 data usefully provides undefended and defended models of fluvial flooding scenarios for various annual probabilities and with climate change simulations. It should be noted that the closest 3D modelling node point is 200m South of the site (Node point 7 in the data). The data also shows 2D model levels across the property itself. Both of these will be analysed and the flood levels will be determined based on the data and the site elevations.

3.0 Confirmation of Existing Flood Risk

It is worth noting that although the site sits on Flood Zone 2 the area of Flood Zone 3 it sits above is defended by an Environment Agency flood defence scheme which also consists of one of the Agency's 'flag ship' flood storage areas along the River Mersey. The flood defence that is closest to the property forms part of the diversion channel from the River to the Didsbury Storage Basin. It is a very well maintained and well run EA scheme. Extensive modelling data for the Mersey and nearby watercourses therefore exist.

This model data, other flood defence data provided by the Agency and digital topographic data for the site provided in Appendix 2 essentially confirms the following:

- i. The site has an elevation of 32.25mAOD (plus or minus 0.05m) with the road in front of the property slightly lower at 32.00 mAOD.
- ii. The flood defence channel servicing the flood storage channel to the west of the site has an crest elevation of 30.8 mAOD at the closest point (13) to the site, around 100m west. We understand, however, flows in this channel are controlled by a sluice gate.
- iii. At the Mersey itself, the flood embankment 200m due South of the property has a height of 33.5 mAOD.
- iv. The predicted (defended) flood levels at this same location (node 7 in the modelling) for the 1:100 year return period flood event (1% AEP) is 32.87m AOD.
- v. The predicted (defended) flood level at node 7 for the 1:1000 year return event (0.1 % AEP) is 33.53m. The model is therefore predicting that the existing defences (at 33.5m) become compromised at something close to the 1:1000 year flood event.
- vi. Model runs for an undefended scenario which is useful if flood defences were for example, to fail are; 32.05 mAOD (1 %AEP) and 32.82 mAOD (0.1 % AOD).

These undefended figures are lower than the defended levels as if defences fail the flood water gains access to its natural flood plain sooner than if the defences hold. Restricting flood water to the main channel, therefore, increases the river level in the channel. This analysis essentially backs up the flood map of the area which shows the property is currently well defended by the flood defence up to flood risks of close to 1:1000 years. If the flood defences failed, it would still remain unflooded at the 1:100 year (1% AEP) flood event as the property is in effect above the natural flood level for this event.

In addition, it should be noted this is a small, essentially first-floor extension to an existing property where floor levels are already established.

In terms of assessing the likely impact of climate change, the development (as residential) is classed as a more vulnerable development as per the National Planning Policy Framework (Ref 4). Therefore, the 'central allowance' for climate change to the property is required. Using the catchment tool for the upper Mersey, this suggests that for a 2080 planning horizon an allowance of 41% is required. This is sufficiently close to the 35% model run in the product 4 data (given this is an existing plot and a small extension).

Hence, according to the 2D flood level data supplied at the end of Appendix 2 the 1 in 100 year flood + 35% addition for climate change for a defended scenario will be 32.15mAOD. This remains at a level below the crest of the existing flood defences. In fact, even with a 7% allowance, the flood defences would still not be compromised.

The existing ground floor of the property retains its 1:100 year level of protection from the current EA defences even with a 70% allowance for climate change by 2080.

4.0 The Sequential and Exception Test and Accounting for Flooding Within the Proposed Development

The proposed development is to extend the two-story property with an addition to the existing footprint at first floor level.

The development therefore falls under the 'Minor Development' category as the footprint is less than 250m², which means a sequential test is not required. The National Planning Policy Framework classifies the development as more vulnerable due to the development being a residential dwelling.

This said the property as it stands remains well protected by the Environment Agency's defences (even when allowing for climate change) and to reiterate as a second floor development, there are not really any measures required or appropriate in terms of making the property more flood resilient.

The site does, however lie within a Critical Drainage Area and although the positively drained footprint of roofs and yard area is not changing, the provision of a SUDS planter(s) into which surface water can be directed is an option. This would be a contribution the owner could make to reducing flood derived run-off impacting other areas downstream on the Mersey. Such planters can also be attractive garden/yard features and so help reduce flooding downstream.

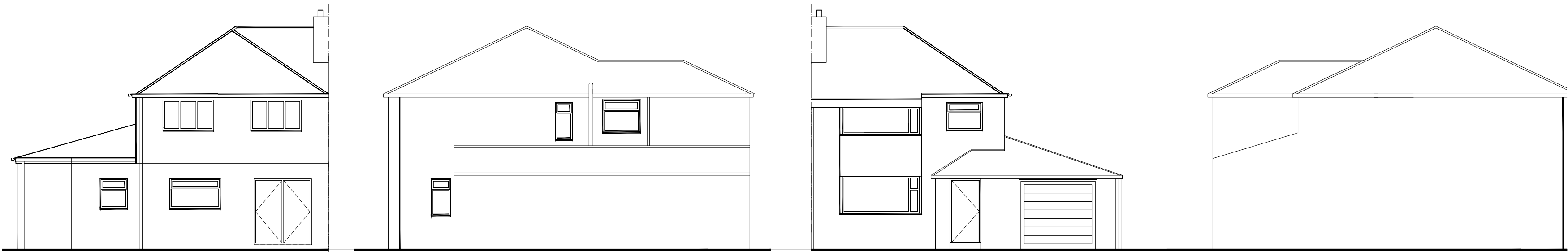
The property owners should monitor flood warnings for the area to ensure that all occupants have time to safely exit the property in the event of an extreme flood of more than a 1:1000 year return period.

References

- 1 JBA Consulting on behalf of Greater Manchester Combined Authority. (2018). *Greater Manchester Strategic Flood Risk Management Framework*.
- 2 JBA Consulting on behalf of Greater Manchester Combined Authority. (2020). *Greater Manchester Level 2 Hybrid Strategic Flood Risk Assessment – Main Report*.
- 3 Environment Agency. (2021). *North West River Basin District Draft Flood Risk Management Plan 2021 to 2027*.
- 4 Ministry of Housing , Communities & Local Government. (2021). *National Planning Policy Framework*.
- 5 Communities and Local Government. (2007). *Improving the Flood Performance of New Buildings: Flood Resilient Construction*.
- 6 Government website. *Check the long term flood risk for an area in England*. Online at: <https://www.gov.uk/check-long-term-flood-risk>
- 7 Government website. *Flood Map for Planning*. Online at: <https://flood-map-for-planning.service.gov.uk/flood-zone-results?easting=385340&northing=389908&location=M20%20PB&fullName=%20&recipientemail=%20>
- 8 Environment Agency, DEFRA website. *Asset Management*. Online at: <https://environment.data.gov.uk/asset-management/index.html>
- 9 DEFRA website. *Climate Change Allowances*. Online at: <https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow>
- 10 Gov website. *Preparing a flood risk assessment: Standing advice*. Online at: <https://www.gov.uk/guidance/flood-risk-assessment-standing-advice>
- 11 British Geological Survey (Geology of Britain). Available At: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

Appendix A: Proposed Floor Plan For The Development (DEN Architects)

notes:



EXISTING REAR
ELEVATION @ 1:100

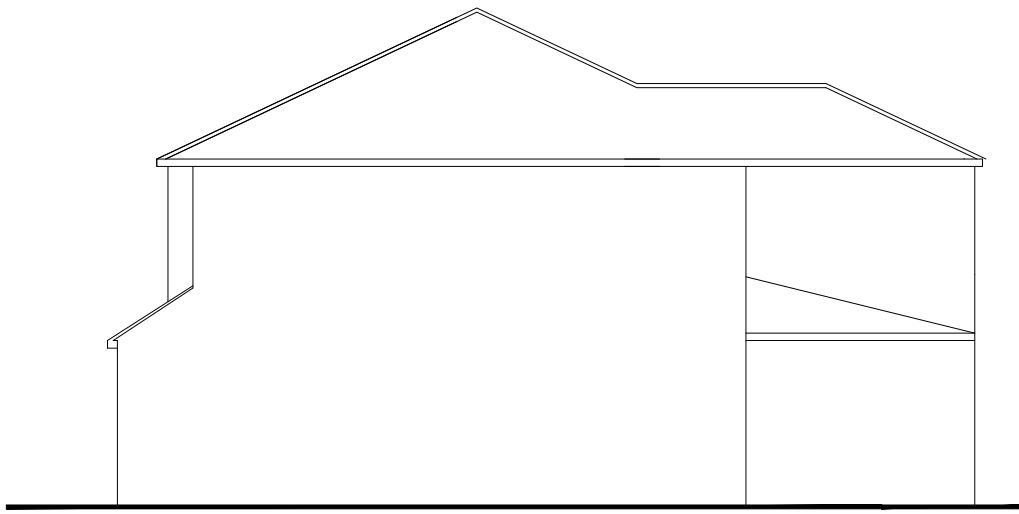
EXISTING SIDE
ELEVATION @ 1:100

EXISTING FRONT
ELEVATION @ 1:100

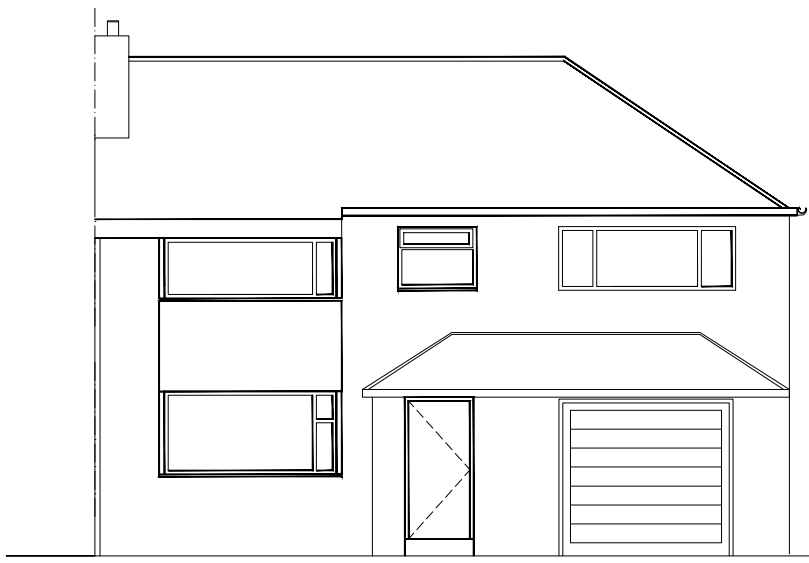
EXISTING SIDE
ELEVATION @ 1:100



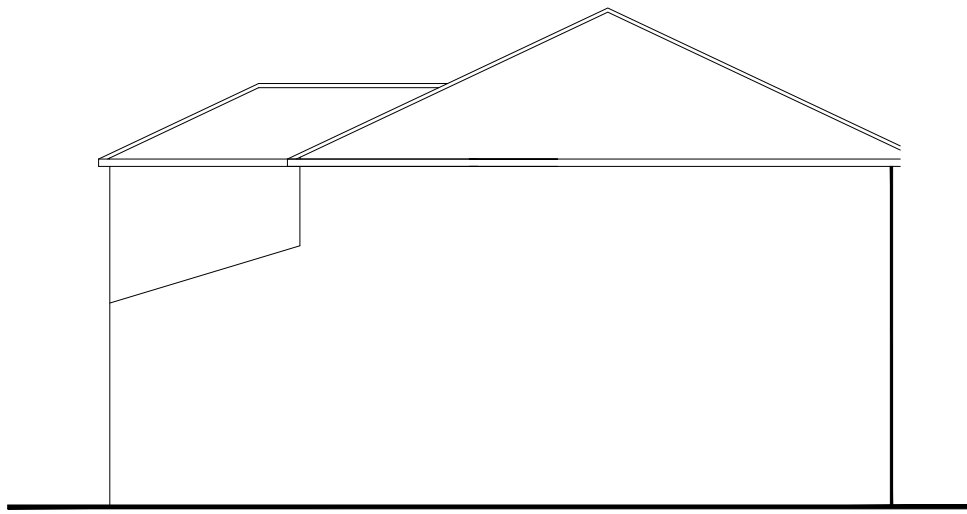
PROPOSED REAR
ELEVATION @ 1:100



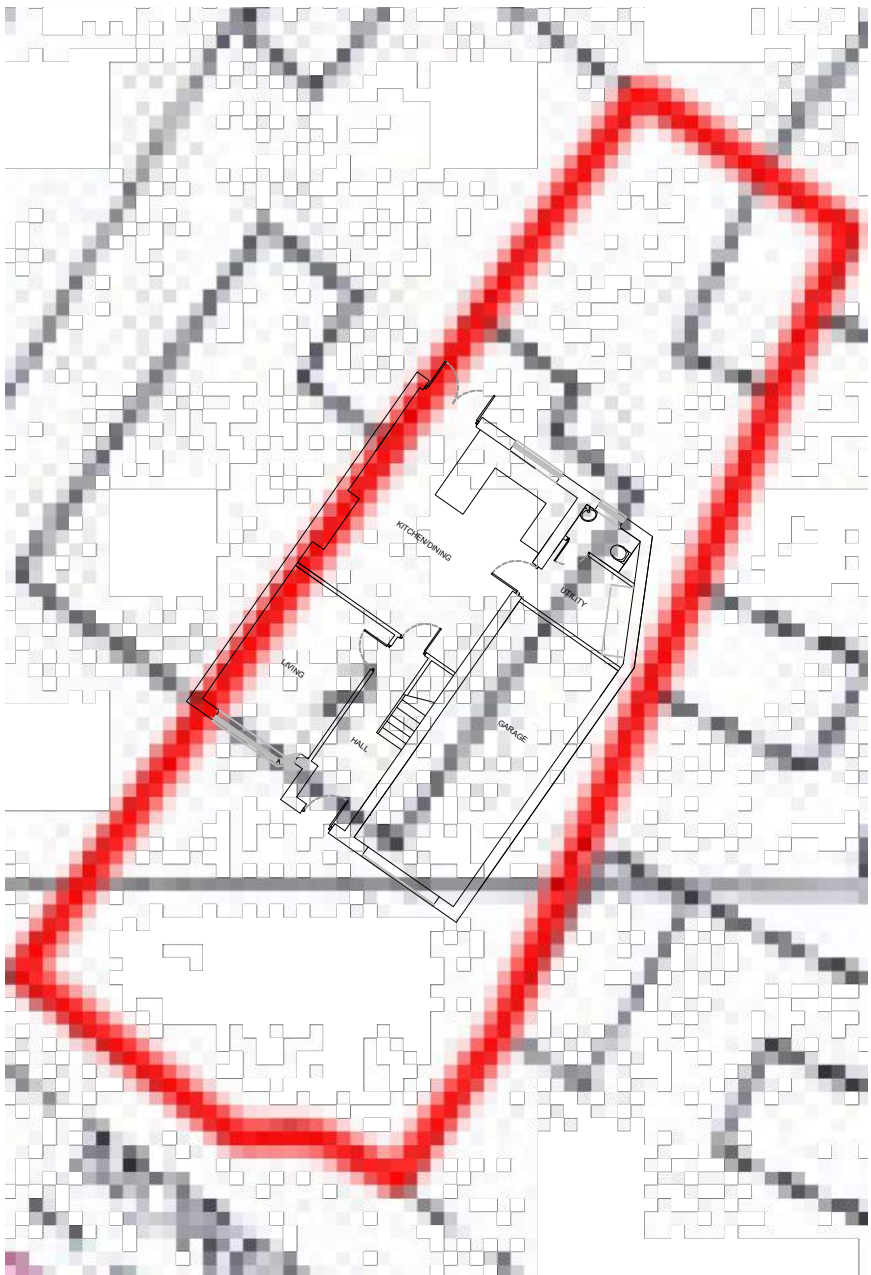
PROPOSED SIDE
ELEVATION @ 1:100



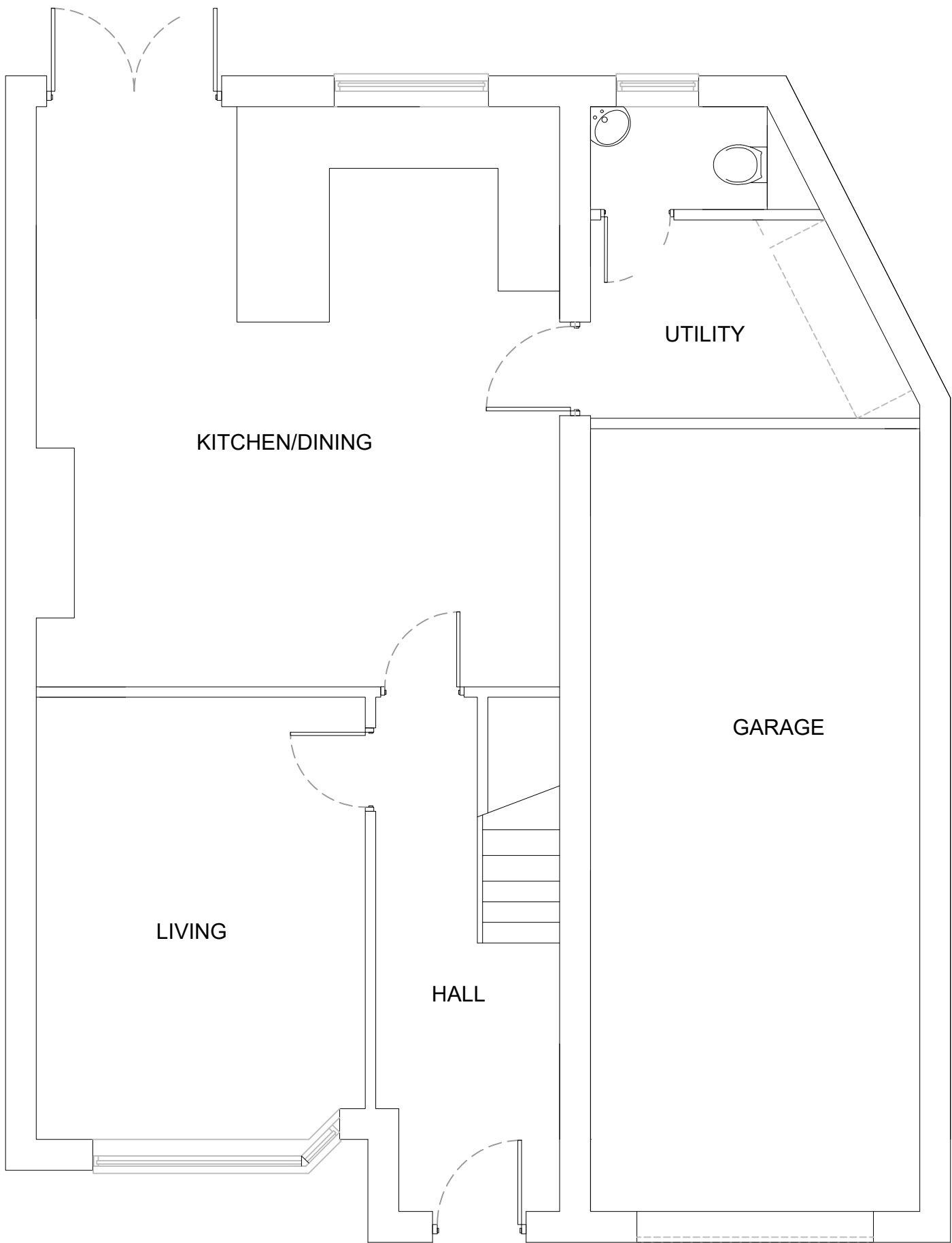
PROPOSED FRONT
ELEVATION @ 1:100



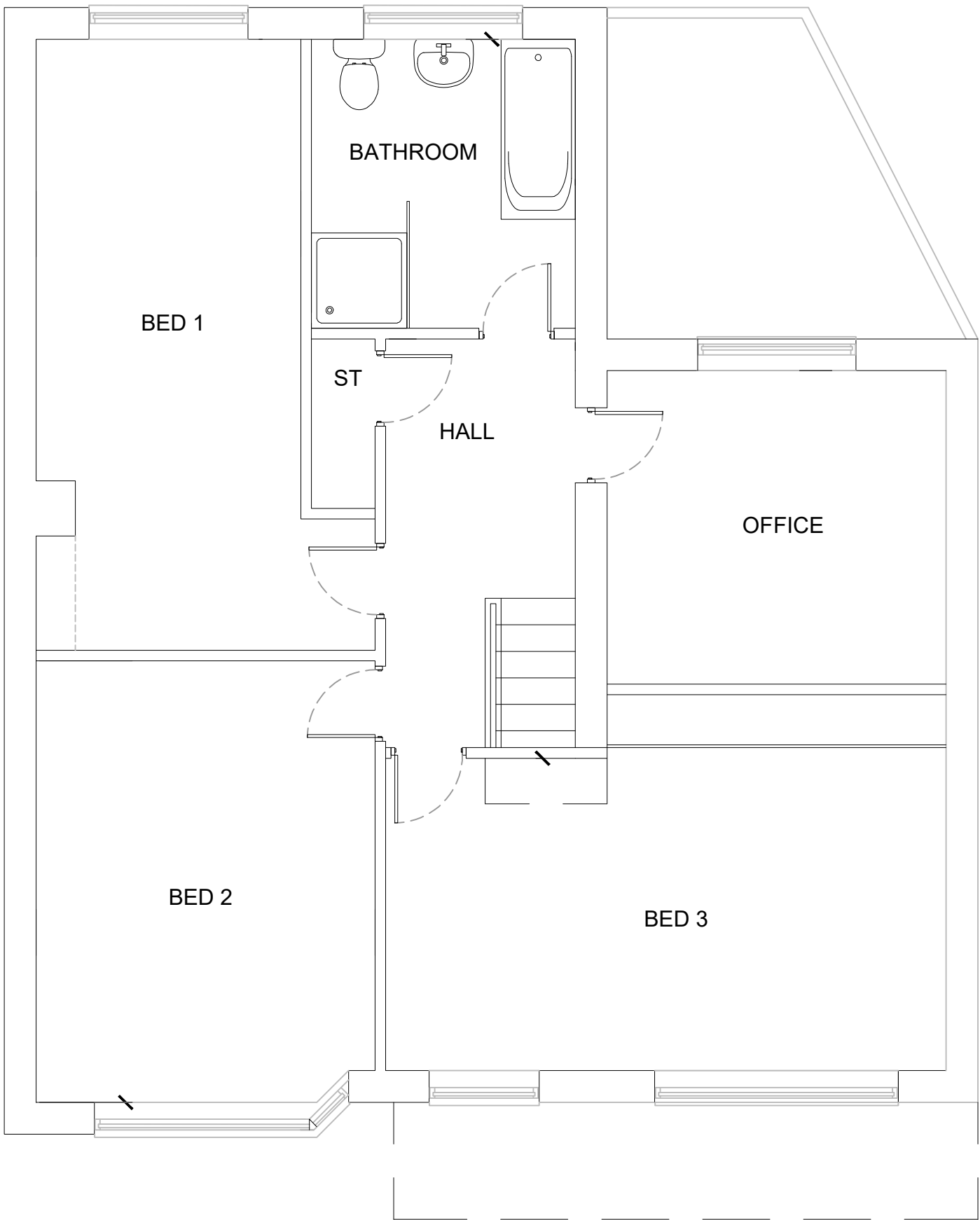
PROPOSED SIDE
ELEVATION @ 1:100



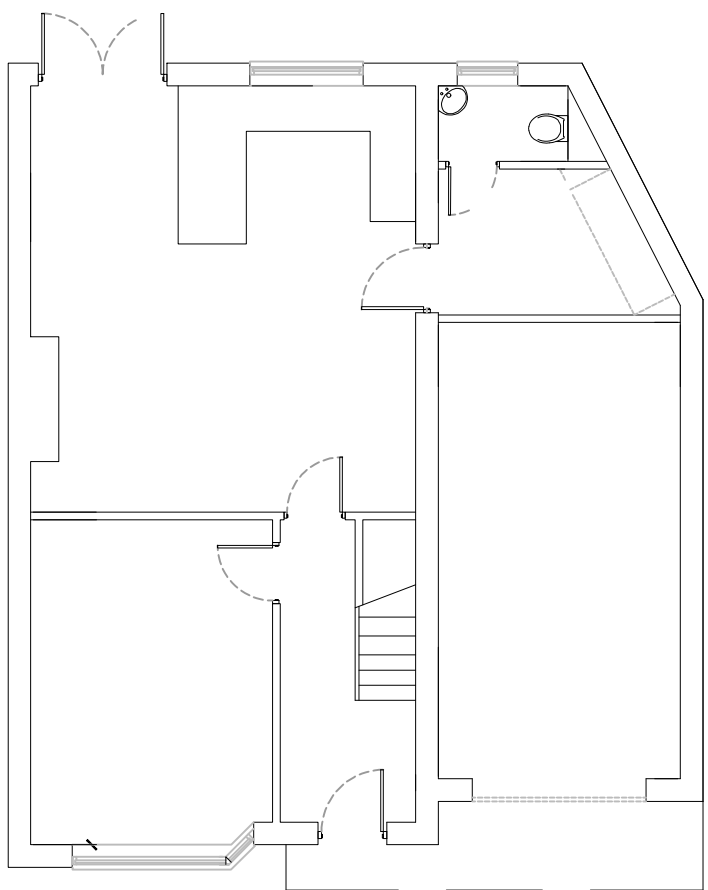
SITE PLAN
PLAN @ 1:200



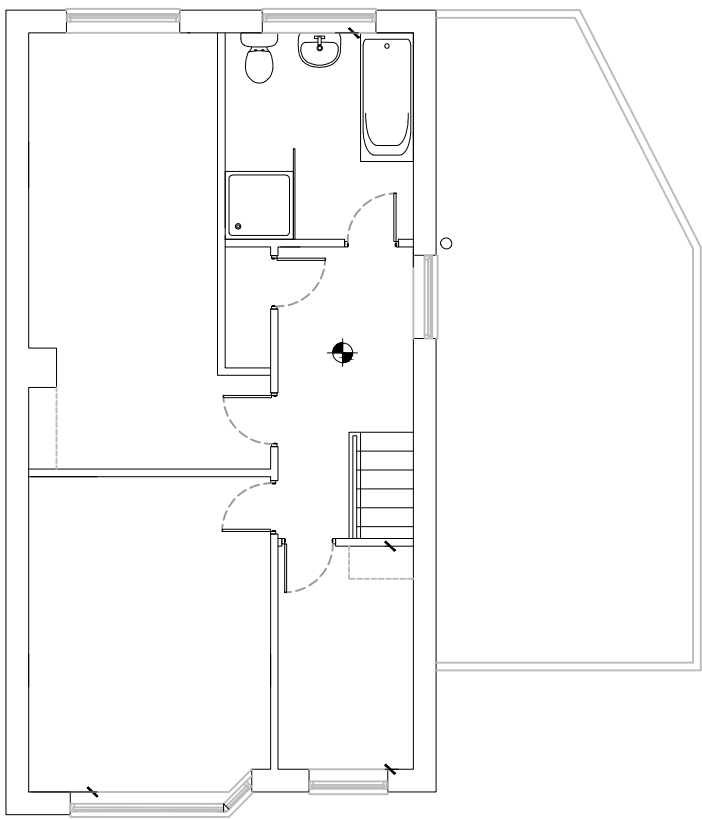
PROPOSED GROUND FLOOR PLAN @ 1:50



PROPOSED FIRST FLOOR PLAN @ 1:50



EXISTING GROUND FLOOR
PLAN @ 1:100



EXISTING FIRST FLOOR
PLAN @ 1:100

rev: date: comment(s): name: check:



status: **PLANNING**

client: KEVIN DUNNE

job: 2 MORESBY DRIVE, DIDSBURY

title: EXISTING / PROPOSED DETAILS

drawn: DD date: FEB 2022 scale: AS SHOWN

job no: 241/B drg no: RESI-01

Appendix B: Environment Agency Product 4 Data

Flood risk assessment data

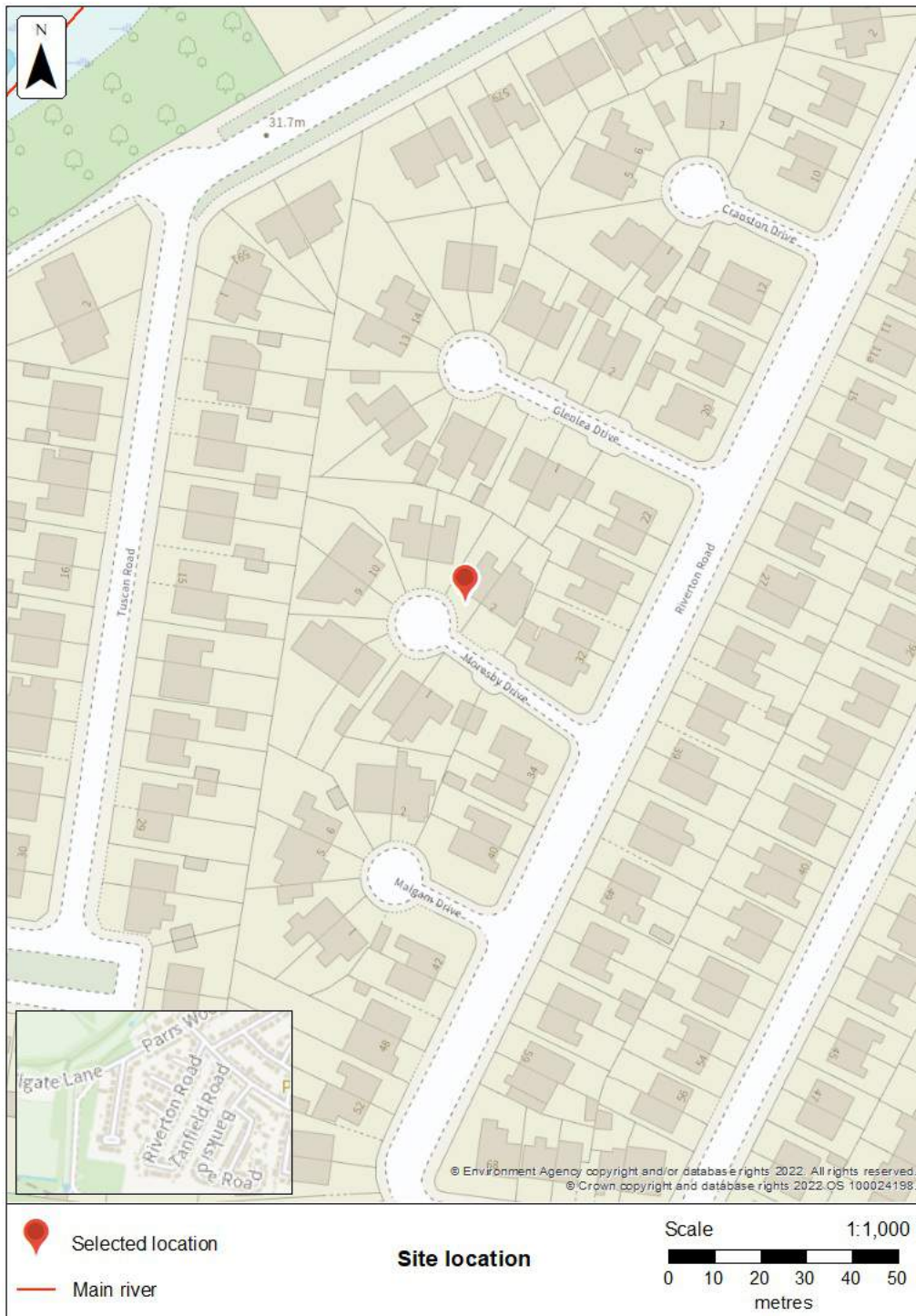
Location of site: 384617 / 389604 (shown as easting and northing coordinates)

Document created on: 08 June 2022

This information was previously known as a product 4.

Customer reference number: GMMC261797SPW

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)
- areas benefiting from defences
- 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: GatleyBrook_2009_U
Scenario(s): No defences exist fluvial
Date: 25 February 2009

Model name: Micker Brook Modelled Flood Group
Scenario(s): No defences exist fluvial
Date: 27 December 2005

Model name: MickerBrook_2008_U
Scenario(s): No defences exist fluvial
Date: 1 April 2008

Model name: Upper Mersey Model Update - Defended
Scenario(s): Defended fluvial
Date: 2017

Model name: Upper Mersey Model Update - Undefined
Scenario(s): No defences exist fluvial
Date: 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 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

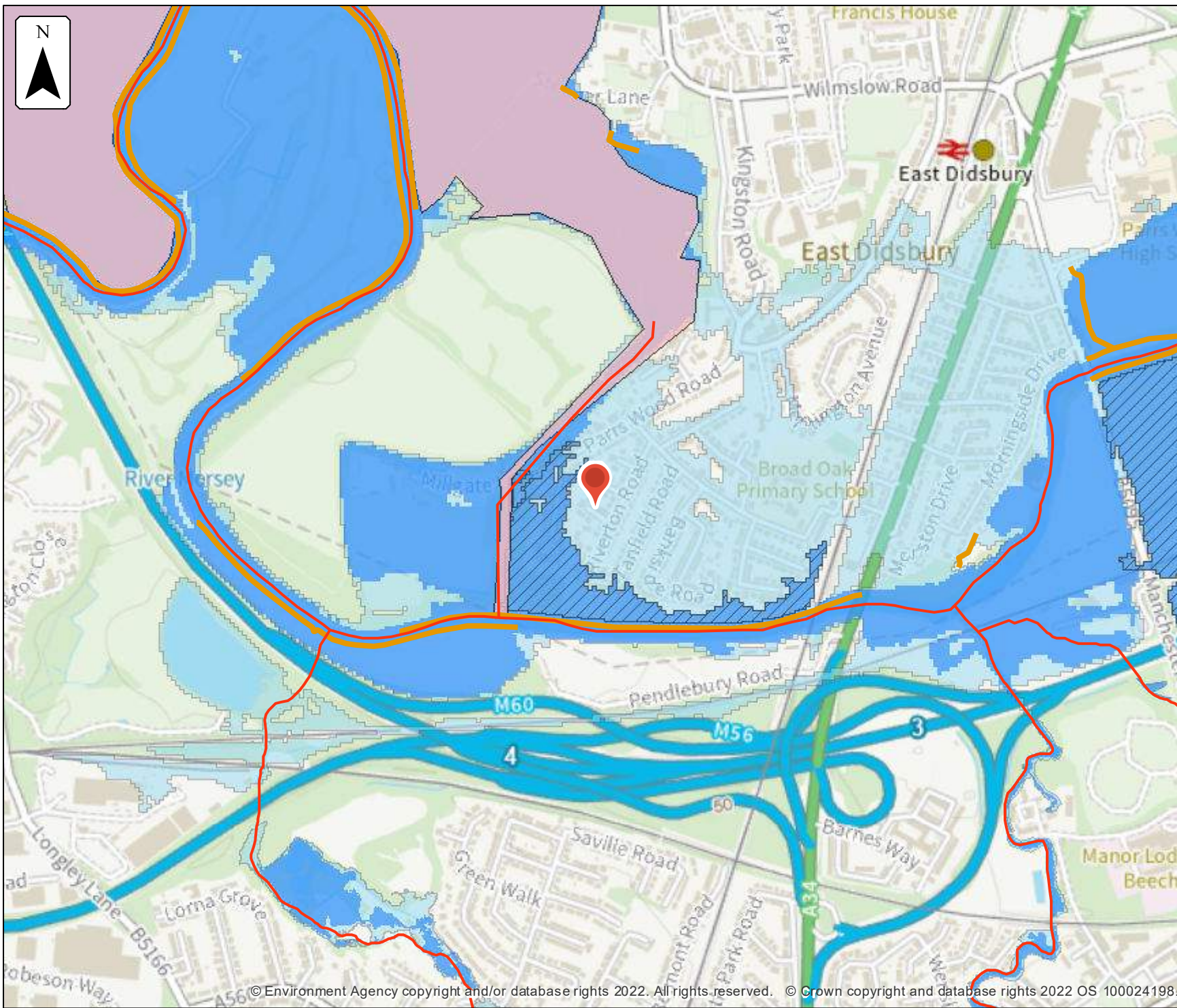
This data is updated on a quarterly basis as better data becomes available.

Areas benefiting from defences

This map shows the areas benefiting from defences for 2 possible events:

- fluvial (river flooding) event that has a 1% annual exceedance probability (AEP), this means a 1% chance of occurring in any one year
- tidal or coastal event that has a 0.5% annual exceedance probability (AEP), this means a 0.5% chance of occurring in any one year

[Download the GIS dataset for areas benefiting from defences](#)



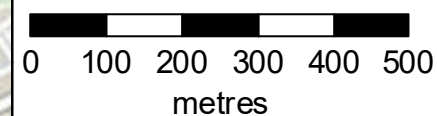
Flood map for planning

Location (easting/northing)
384617/389604

Scale
1:10,000

Created
10 May 2022

-  Selected location
-  Main river
-  Flood defence
-  Water storage area
-  Areas benefiting from flood defence
-  Flood zone 3
-  Flood zone 2



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.



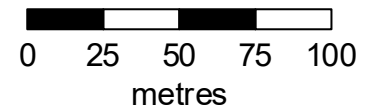
Flood defences

Location (easting/northing)
384617/389604

Scale
1:2,500

Created
10 May 2022

-  Selected location
-  Main river
-  Flood defence



Flood defences data

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
1	58974	Embankment	100		32.82	32.85	
2	122153	Embankment	100	Fair	32.29	32.84	
3	144884	Engineered High Ground	75		33.17	33.17	
4	144885	Engineered High Ground	75		33.17	33.17	
5	144886	Engineered High Ground	75		33.17	31.30	
6	144887	Engineered High Ground	75		30.67	31.30	
7	146508	Wall	100		32.81	32.81	
8	146503	Engineered High Ground	75		33.17	33.17	
9	146504	Engineered High Ground	75		33.17	31.25	
10	146502	Engineered High Ground	75		33.17	33.17	
11	144888	Engineered High Ground	75		32.70	30.67	
12	183314	Engineered High Ground	75		30.63	31.25	
13	173224	Embankment	75		30.92	30.73	
14	173225	Engineered High Ground	75		30.52	30.34	
15	71380	Engineered High Ground	75		29.63	30.52	
16	121960	Engineered High Ground	100	Fair	29.63	29.76	
17	144889	Engineered High Ground	75		30.33	32.70	
18	146505	Engineered High Ground	75		29.22	29.63	

Label	Asset ID	Asset Type	Standard of protection (years)	Current condition	Downstream actual crest level (mAOD)	Upstream actual crest level (mAOD)	Effective crest level (mAOD)
19	144890	Engineered High Ground	75		30.49	30.33	
20	146506	Engineered High Ground	75		30.40	29.22	
21	122331	Embankment	50	Fair	32.93	34.03	

Any blank cells show where a particular value has not been recorded for an asset.

Modelled data

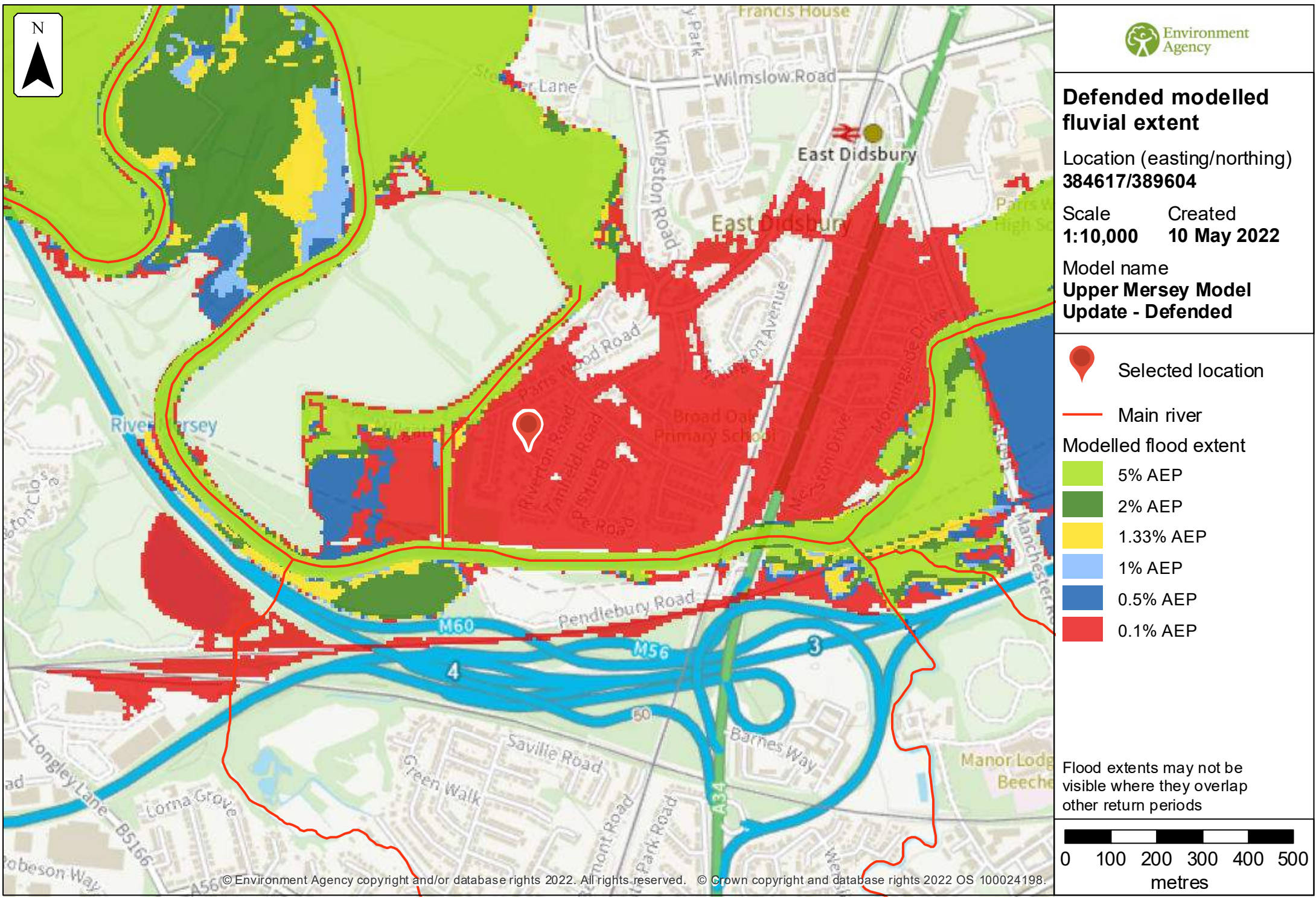
This section provides details of different scenarios we have modelled and includes the following (where available):

- 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



Defended modelled fluvial extent

Location (easting/northing)
384617/389604

Scale Created
1:10,000 10 May 2022

Model name
**Upper Mersey Model
Update - Defended**

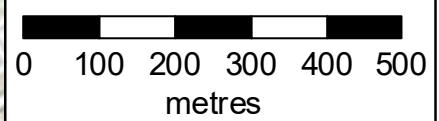
 Selected location

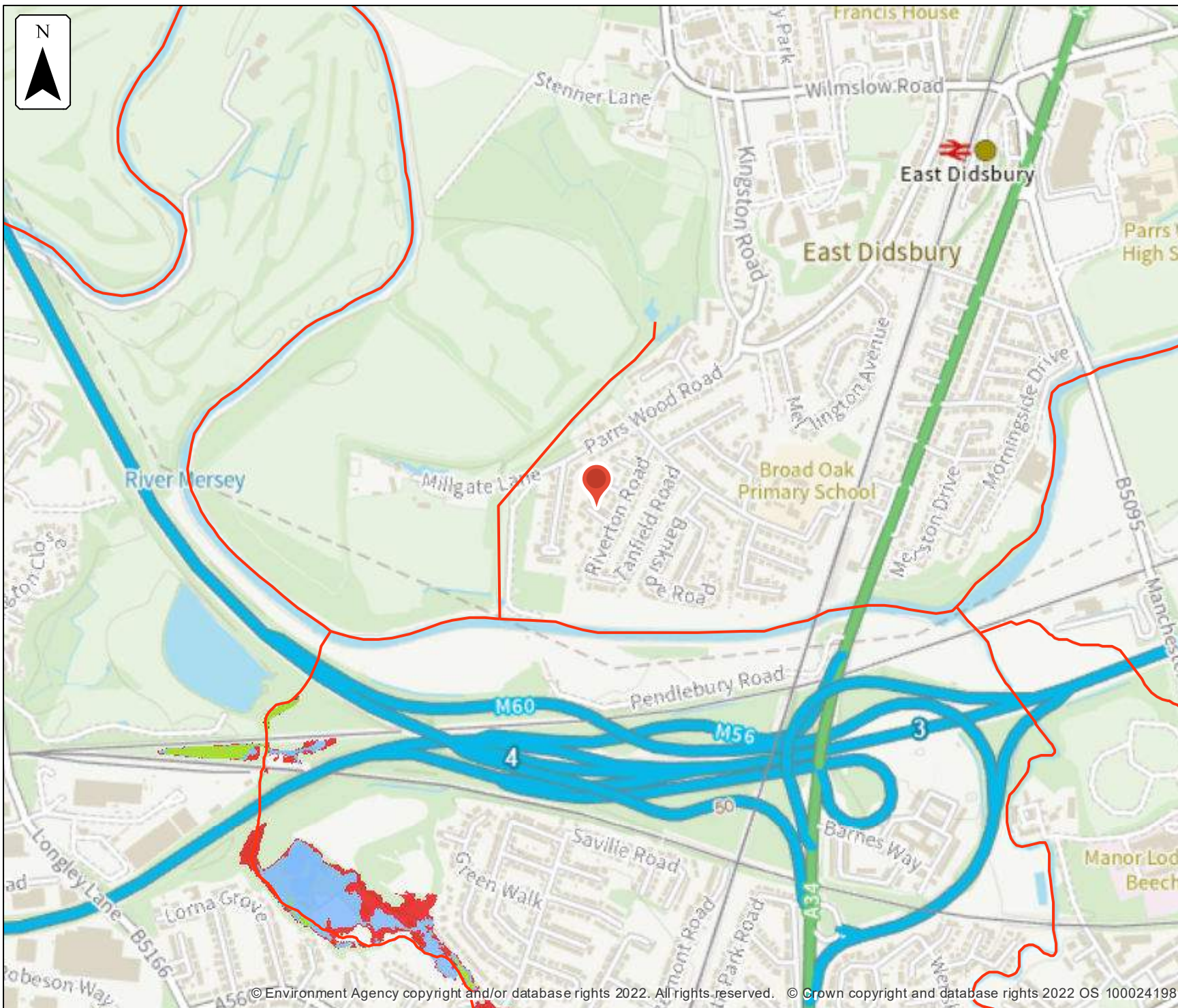
 Main river

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





No defences exist modelled fluvial extent

Location (easting/northing)
384617/389604

Scale Created
1:10,000 10 May 2022

Model name
GatleyBrook 2009 U

 Selected location

 Main river

Modelled flood extent

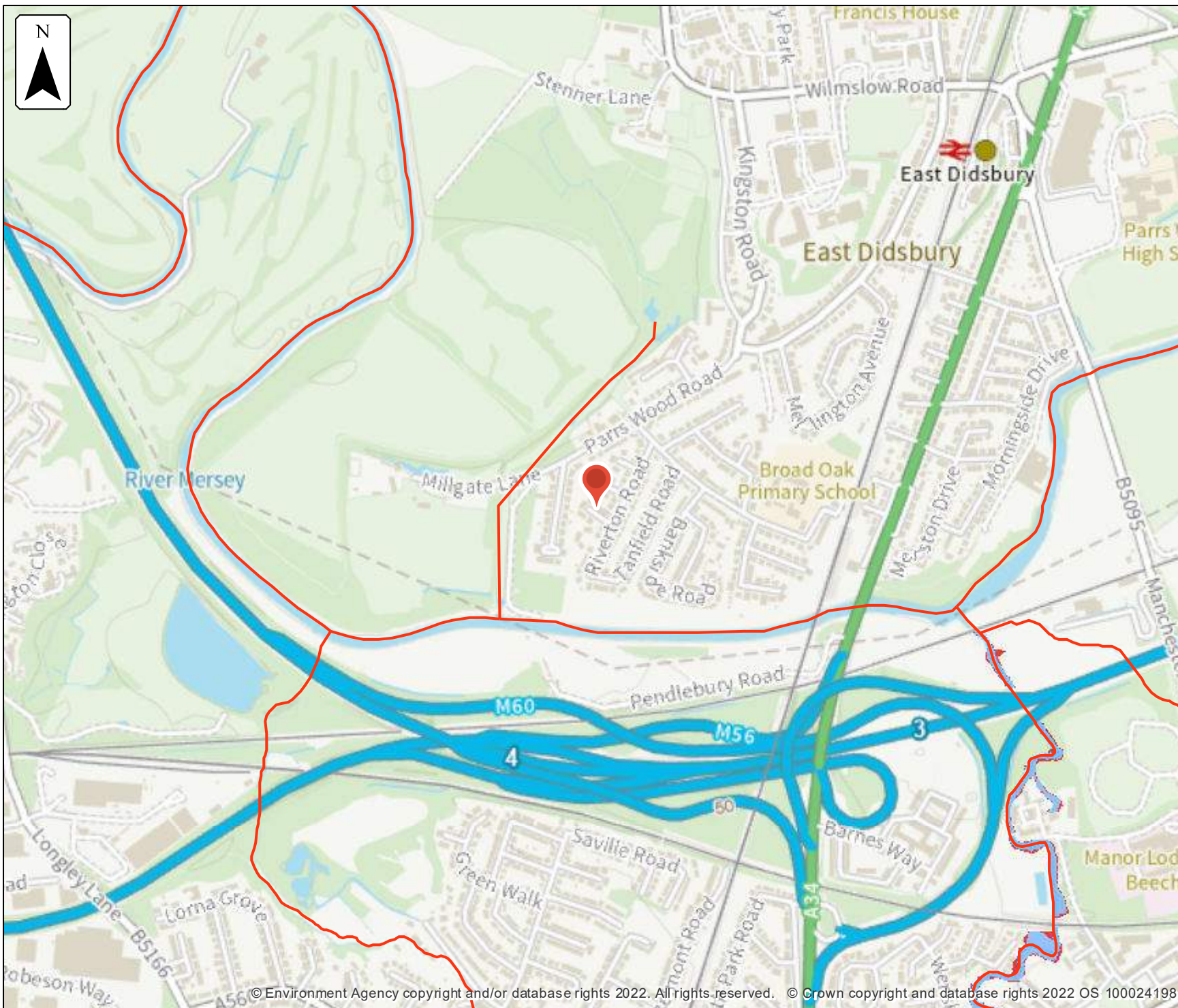
 5% AEP

 1% AEP

 0.1% AEP

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


0 100 200 300 400 500
metres



No defences exist modelled fluvial extent

Location (easting/northing)
384617/389604

Scale Created
1:10,000 10 May 2022

Model name
MickerBrook 2008 U

 Selected location

 Main river

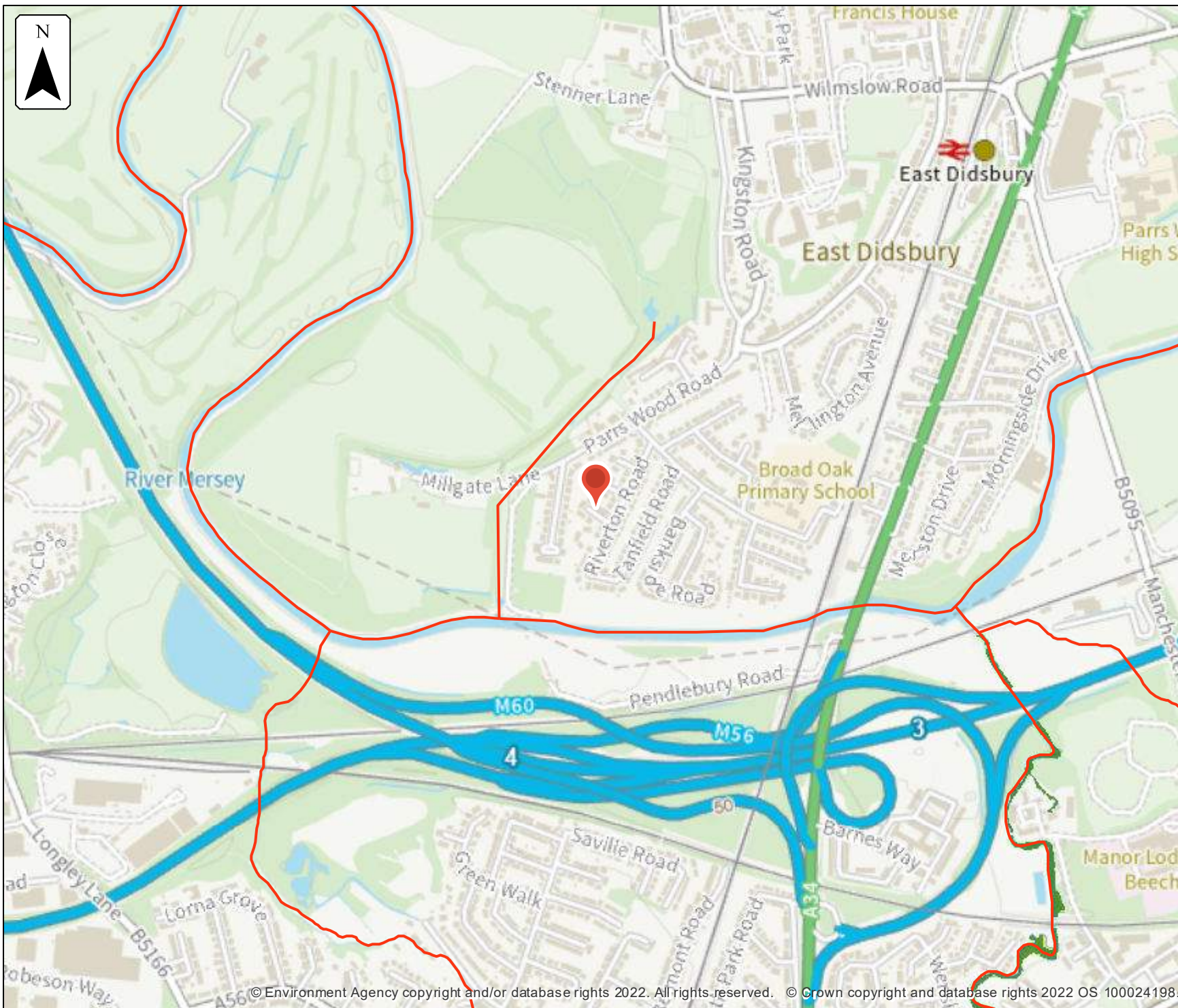
Modelled flood extent

 1% AEP

 0.1% AEP

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


0 100 200 300 400 500
metres



No defences exist modelled fluvial extent

Location (easting/northing)
384617/389604

Scale Created
1:10,000 10 May 2022

Model name
**Micker Brook Flood
Group**

 Selected location

 Main river

Modelled flood extent

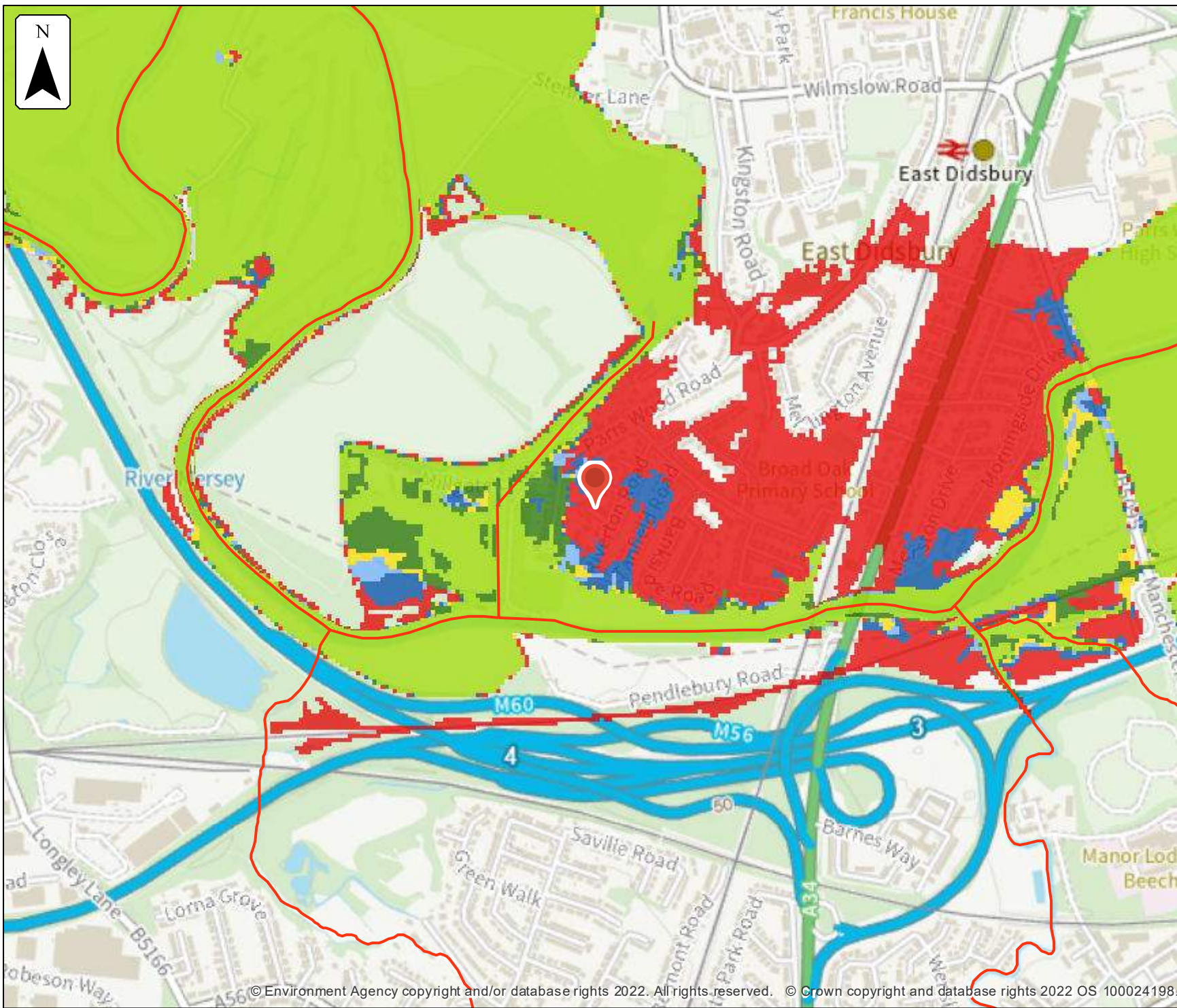
 2% AEP

 1.33% AEP

 1% AEP

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


0 100 200 300 400 500
metres



No defences exist modelled fluvial extent

Location (easting/northing)
384617/389604

Scale Created
1:10,000 10 May 2022

Model name
**Upper Mersey Model
Update - Undefended**

 Selected location

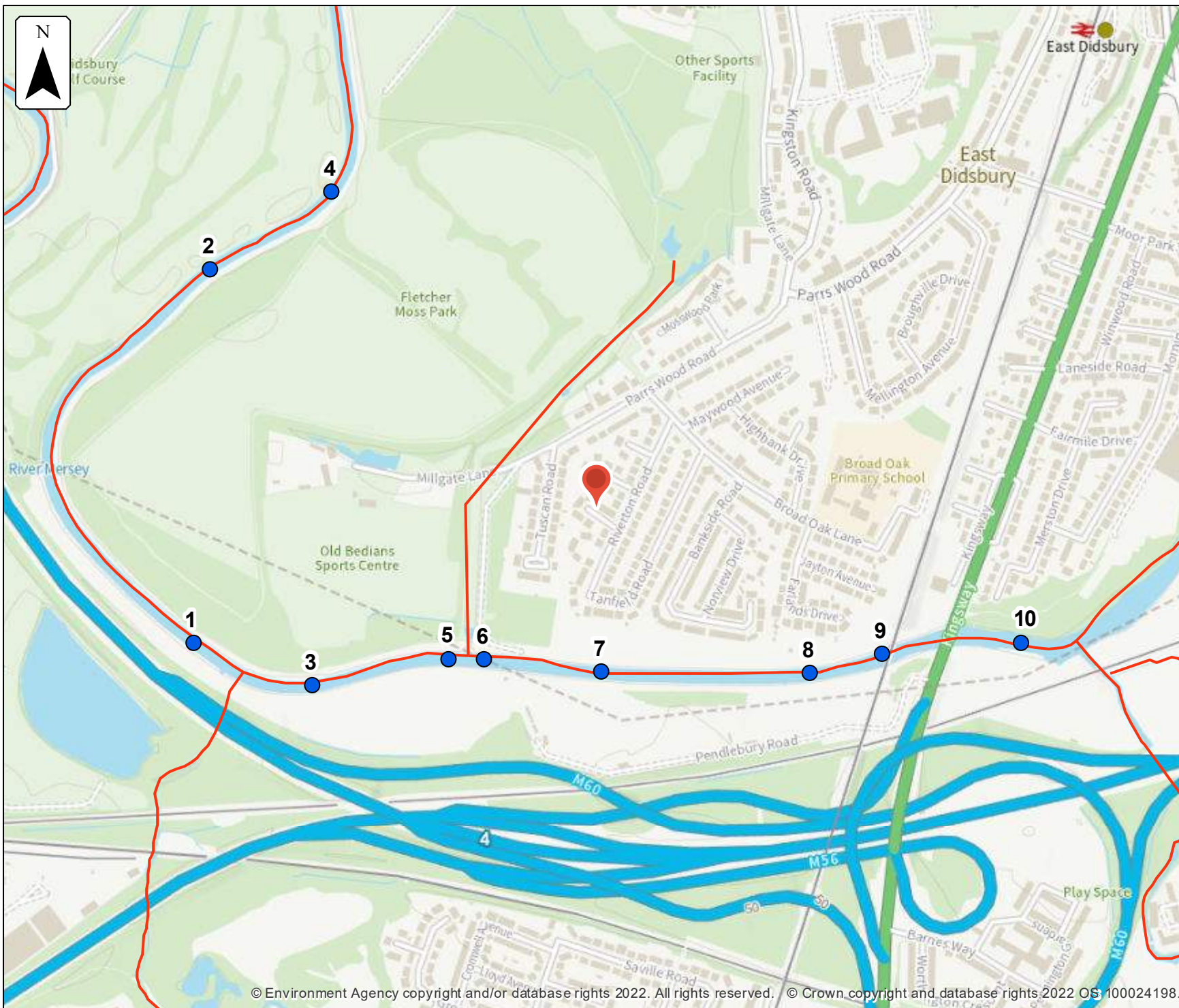
 Main river

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



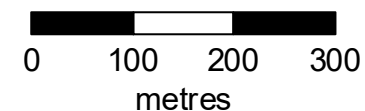
Defended modelled fluvial node locations

Location (easting/northing)
384617/389604

Scale Created
1:7,500 10 May 2022

Model name
**Upper Mersey Model
Update - Defended**

-  Selected location
-  Modelled location
-  Main river

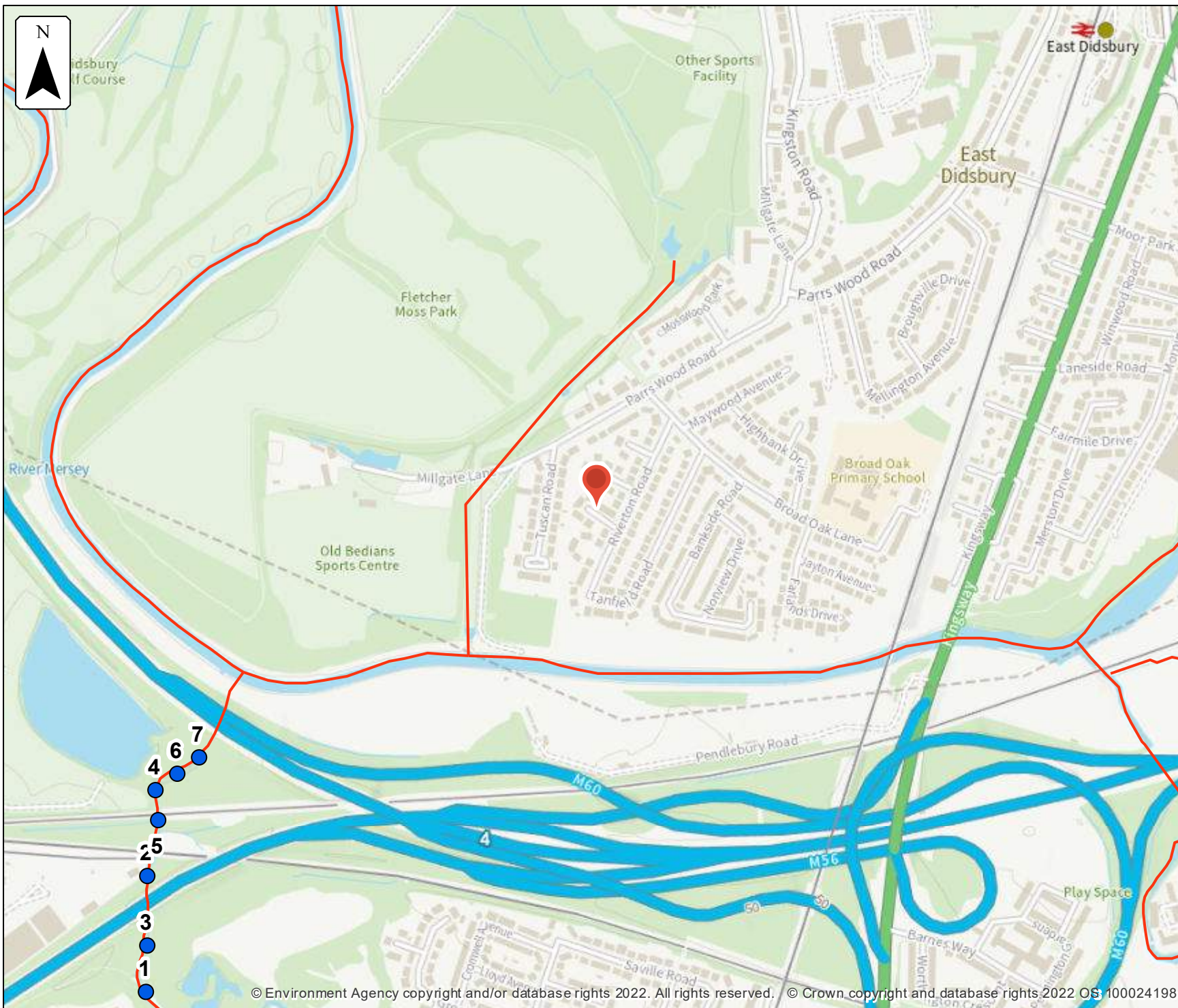


Modelled node locations data

Defended

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	954238	384030	389406	31.98	285.74	32.27	332.92	32.35	351.18	32.40	364.23	32.69	384.86	33.27	496.98
2	954150	384054	389949	31.29	278.88	31.48	324.41	31.53	341.02	31.55	353.04	31.63	393.77	31.81	517.71
3	954151	384204	389344	32.14	281.88	32.43	331.69	32.52	348.88	32.58	362.76	32.85	391.08	33.43	501.02
4	954255	384232	390062	31.13	284.18	31.28	333.37	31.31	348.01	31.33	357.99	31.40	395.05	31.54	499.74
5	954400	384402	389383	32.33	284.01	32.64	332.64	32.73	352.96	32.78	367.91	32.98	409.48	33.43	576.81
6	954220	384454	389382	32.33	311.28	32.64	361.93	32.73	382.77	32.78	398.08	32.98	422.72	33.43	576.81
7	954304	384624	389364	32.50	309.44	32.80	361.93	32.90	381.06	32.97	396.79	33.14	422.81	33.53	611.28
8	954246	384929	389361	32.73	311.25	33.06	361.90	33.16	382.82	33.23	398.06	33.38	423.25	33.94	611.99
9	954109	385034	389390	32.86	309.75	33.19	362.02	33.30	381.11	33.38	396.60	33.52	421.93	34.23	586.75
10	954301	385235	389407	33.09	310.99	33.47	361.89	33.59	382.37	33.69	395.88	33.88	416.15	35.0	521.46

Data in this table comes from the Upper Mersey Model Update - Defended 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.



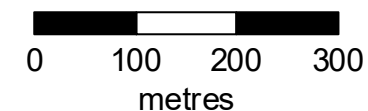
No defences exist modelled fluvial node locations

Location (easting/northing)
384617/389604

Scale Created
1:7,500 10 May 2022

Model name
GatleyBrook 2009 U

-  Selected location
-  Modelled location
-  Main river



Modelled node locations data

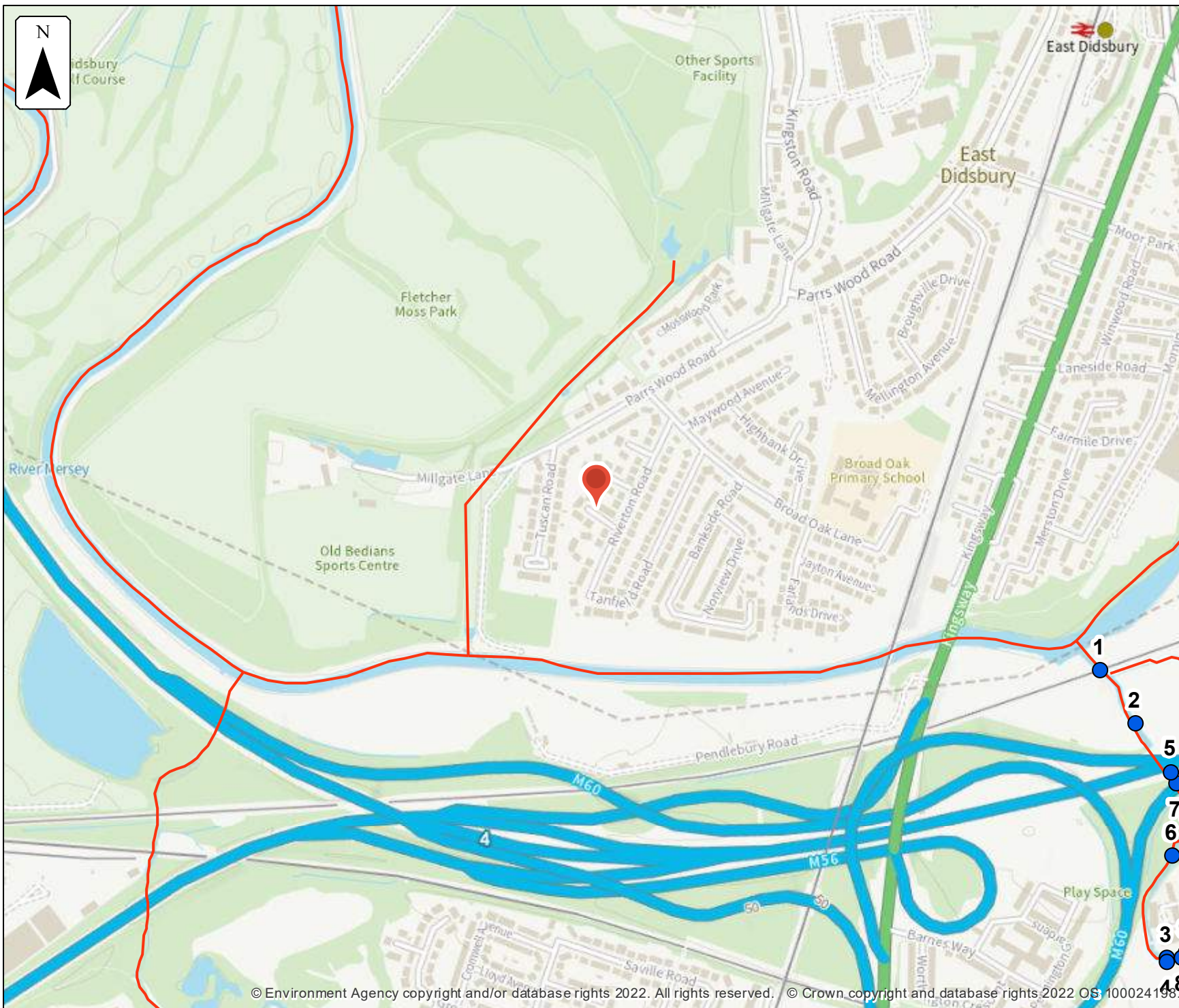
No defences exist

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	70326	383961	388898	31.10	5.04					31.39	7.15			31.85	10.60
2	329086	383963	389067	30.71	5.06					30.97	7.04			31.43	10.41
3	1328	383964	388965	30.86	5.03					31.15	7.02			31.62	10.23
4	122982	383977	389191	30.44	3.87					30.56	5.37			30.80	8.01
5	245062	383979	389148	30.58	4.96					30.78	6.92			31.14	10.10
6	68958	384007	389216	30.44	3.68					30.56	4.86			30.79	7.05
7	84403	384039	389240	30.39	4.96					30.46	6.86			30.60	9.93

Data in this table comes from the GatleyBrook 2009 U 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.



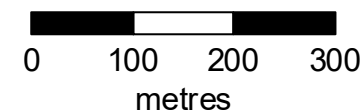
No defences exist modelled fluvial node locations

Location (easting/northing)
384617/389604

Scale Created
1:7,500 10 May 2022

Model name
MickerBrook 2008 U

-  Selected location
-  Modelled location
-  Main river



Modelled node locations data

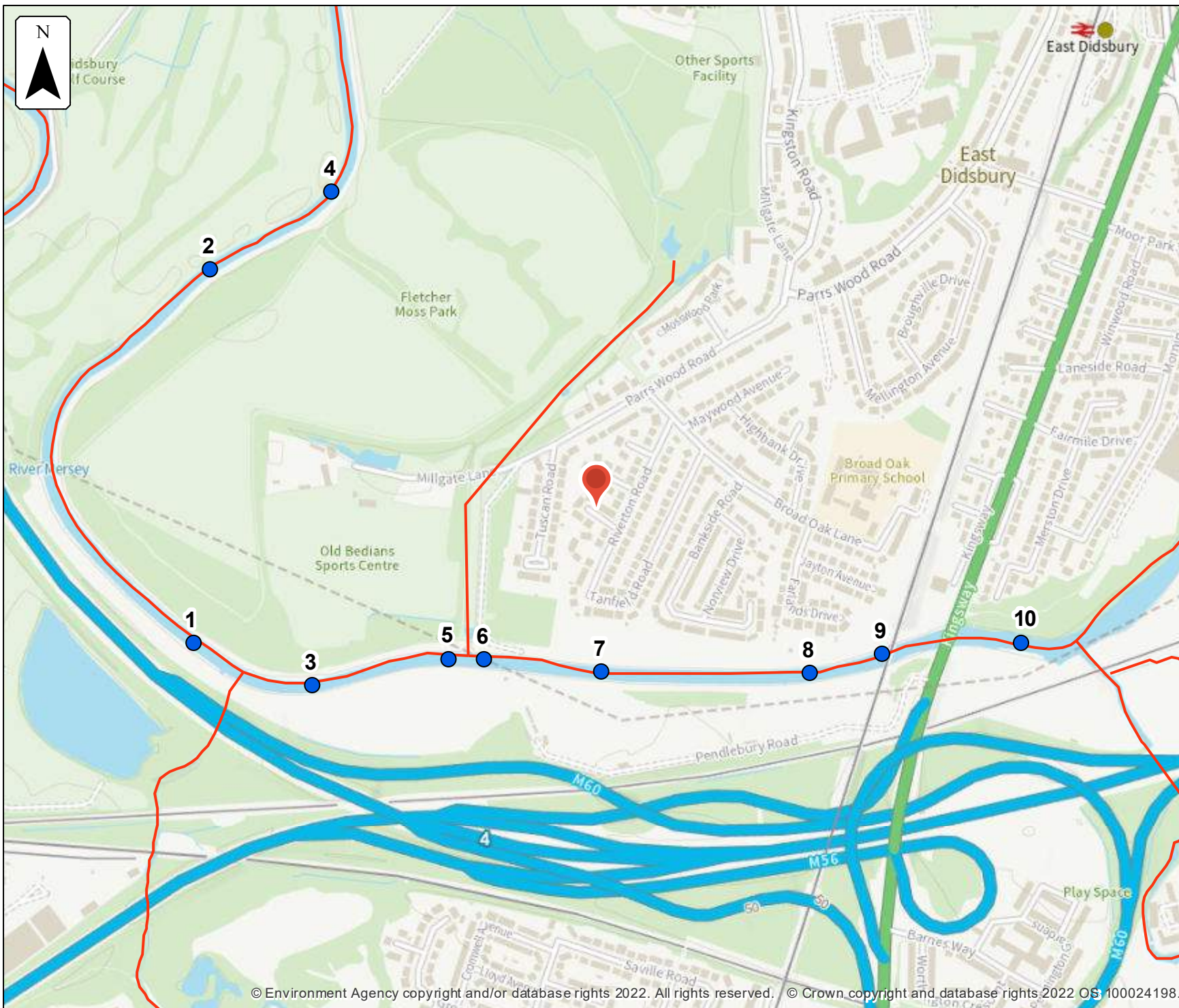
No defences exist

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	273369	385351	389366							31.08	34.55			31.56	47.43
2	341956	385403	389289							31.73	34.52			32.30	47.39
3	5445	385448	388948							33.66	34.49			34.19	47.36
4	316155	385448	388943							33.63	34.48			34.17	47.36
5	143825	385455	389219							31.83	34.52			32.44	47.39
6	267231	385456	389096							32.21	34.52			32.87	47.40
7	97738	385463	389203							31.83	34.52			32.49	47.39
8	285281	385471	388949							35.56	34.48			35.90	47.36
9	59098	385476	388956							35.65	34.48			35.98	47.36
10	75122	385478	389184							31.95	34.52			32.62	47.39

Data in this table comes from the MickerBrook 2008 U 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.



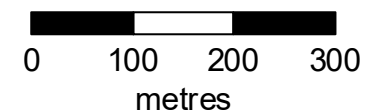
No defences exist modelled fluvial node locations

Location (easting/northing)
384617/389604

Scale Created
1:7,500 10 May 2022

Model name
**Upper Mersey Model
Update - Undefended**

-  Selected location
-  Modelled location
-  Main river



Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	954238	384030	389406	31.31	256.27	31.52	274.46	31.61	283.31	31.65	294.84	31.80	314.39	32.63	411.23
2	954150	384054	389949	29.60	236.45	29.70	257.90	29.74	266.46	29.78	274.23	29.86	293.69	30.56	424.04
3	954151	384204	389344	31.61	232.58	31.80	250.95	31.88	261.62	31.94	270.85	32.07	292.97	32.80	412.28
4	954255	384232	390062	29.53	192.80	29.65	207.02	29.71	213.71	29.75	219.69	29.84	236.22	30.47	361.83
5	954400	384402	389383	31.82	239.75	31.96	272.05	32.01	291.12	32.05	304.42	32.16	337.69	32.82	482.21
6	954220	384454	389382	31.82	239.75	31.96	272.05	32.01	291.12	32.05	304.42	32.16	337.69	32.82	482.21
7	954304	384624	389364	31.84	274.69	31.96	315.05	32.02	332.85	32.06	348.88	32.15	388.92	32.84	537.56
8	954246	384929	389361	32.10	299.21	32.25	345.05	32.32	366.64	32.37	384.95	32.49	430.07	33.11	604.94
9	954109	385034	389390	32.29	299.71	32.46	346.94	32.53	369.67	32.59	388.66	32.73	435.49	33.36	619.66
10	954301	385235	389407	32.61	299.79	32.87	347.22	32.99	369.66	33.08	388.78	33.31	435.19	34.64	516.87

Data in this table comes from the Upper Mersey Model Update - Undefended 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.

Map Reference	Model Node Reference	Data	Undefended				Defended			
			1 % AEP (1 in 100 year) + 30% Increase flow	1 % AEP (1 in 100 year) + 35% Increase flow	1 % AEP (1 in 100 year) + 70% Increase flow	0.1 % AEP (1 in 1000 year) + 30% Increase flow	1 % AEP (1 in 100 year) + 30% Increase flow	1 % AEP (1 in 100 year) + 35% Increase flow	1 % AEP (1 in 100 year) + 70% Increase flow	0.1 % AEP (1 in 1000 year) + 30% Increase flow
8	ea013_0243_MERS04_4089	Modelled Water Level (m aodN)	32.67	32.73	33.04	33.52	33.65	33.69	33.89	34.21
		Modelled Flow (cumecs)	494.96	510.93	587.49	728.95	488.83	508.46	589.81	744.14
7	ea013_0243_MERS04_3784	Modelled Water Level (m aodN)	32.32	32.39	32.75	33.30	33.34	33.37	33.50	33.69
		Modelled Flow (cumecs)	443.78	457.27	523.03	644.42	488.97	508.13	589.18	738.07
3	ea013_0243_MERS04_3358	Modelled Water Level (m aodN)	32.28	32.35	32.72	33.26	33.16	33.20	33.39	33.62
		Modelled Flow (cumecs)	330.39	340.90	398.39	506.71	420.14	432.46	485.39	597.23

Model data taken from Upper Mersey 2017

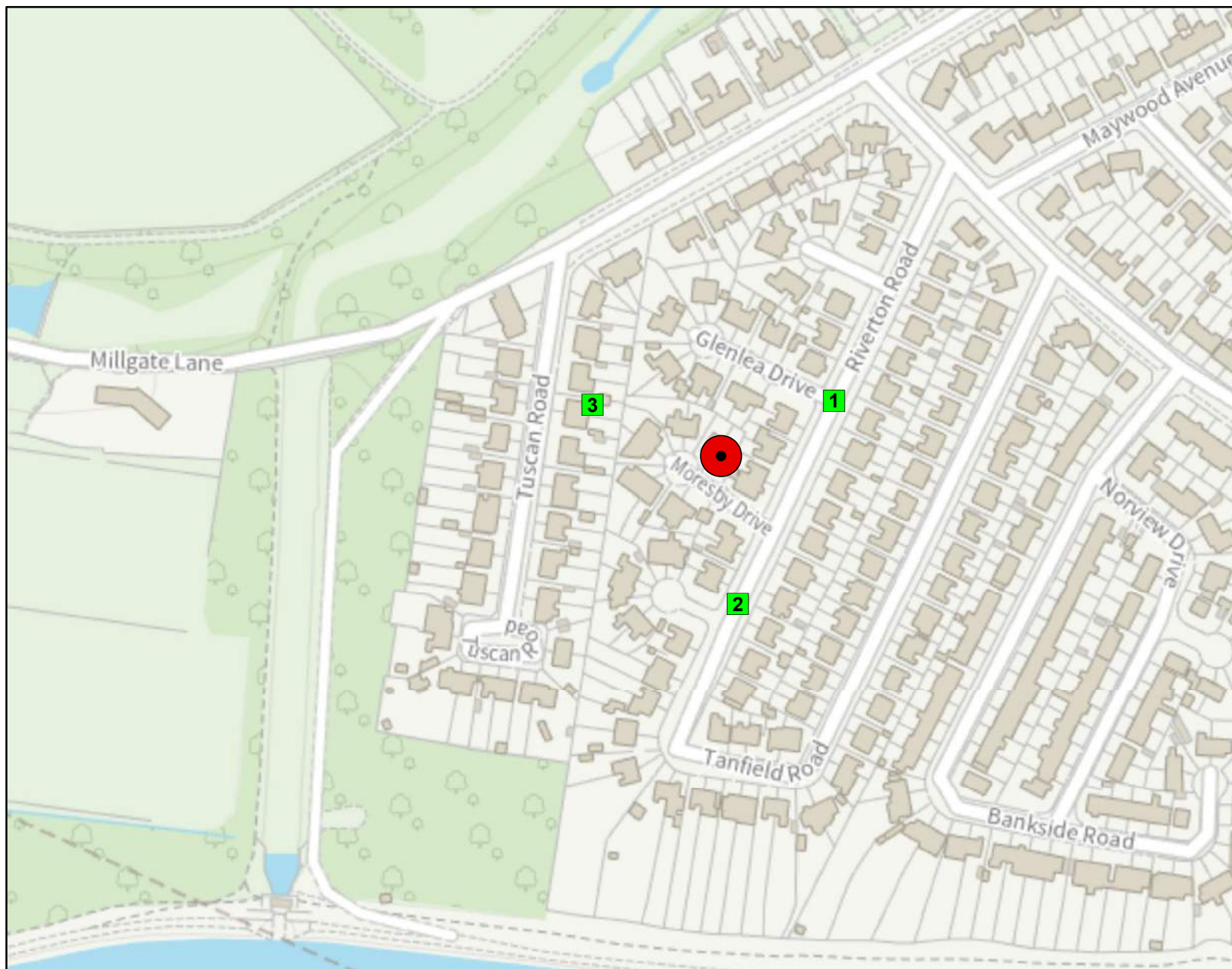
AEP - Annual Exceedence Probability

m aodN - 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.

2D Model measurement map - Upper Mersey 2017



1:2,500



Legend

-  2D Measurement
-  Selected location

			Undefended			Defended		
Map Reference	Model Node Reference	Data	1 % AEP (1 in 100 year) + 30% Increase flow	1 % AEP (1 in 100 year) + 35% Increase flow	1 % AEP (1 in 100 year) + 70% Increase flow	1 % AEP (1 in 100 year) + 30% Increase flow	1 % AEP (1 in 100 year) + 35% Increase flow	1 % AEP (1 in 100 year) + 70% Increase flow
1	2D measure	Modelled Water Level (m aodN)	32.18	32.22	32.63		32.15	32.36
2		Modelled Water Level (m aodN)	32.29	32.34	32.69		32.15	32.32
3		Modelled Water Level (m aodN)	32.06	32.15	32.61			31.98

2D measure

Model data taken from Upper Mersey 2017

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

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.

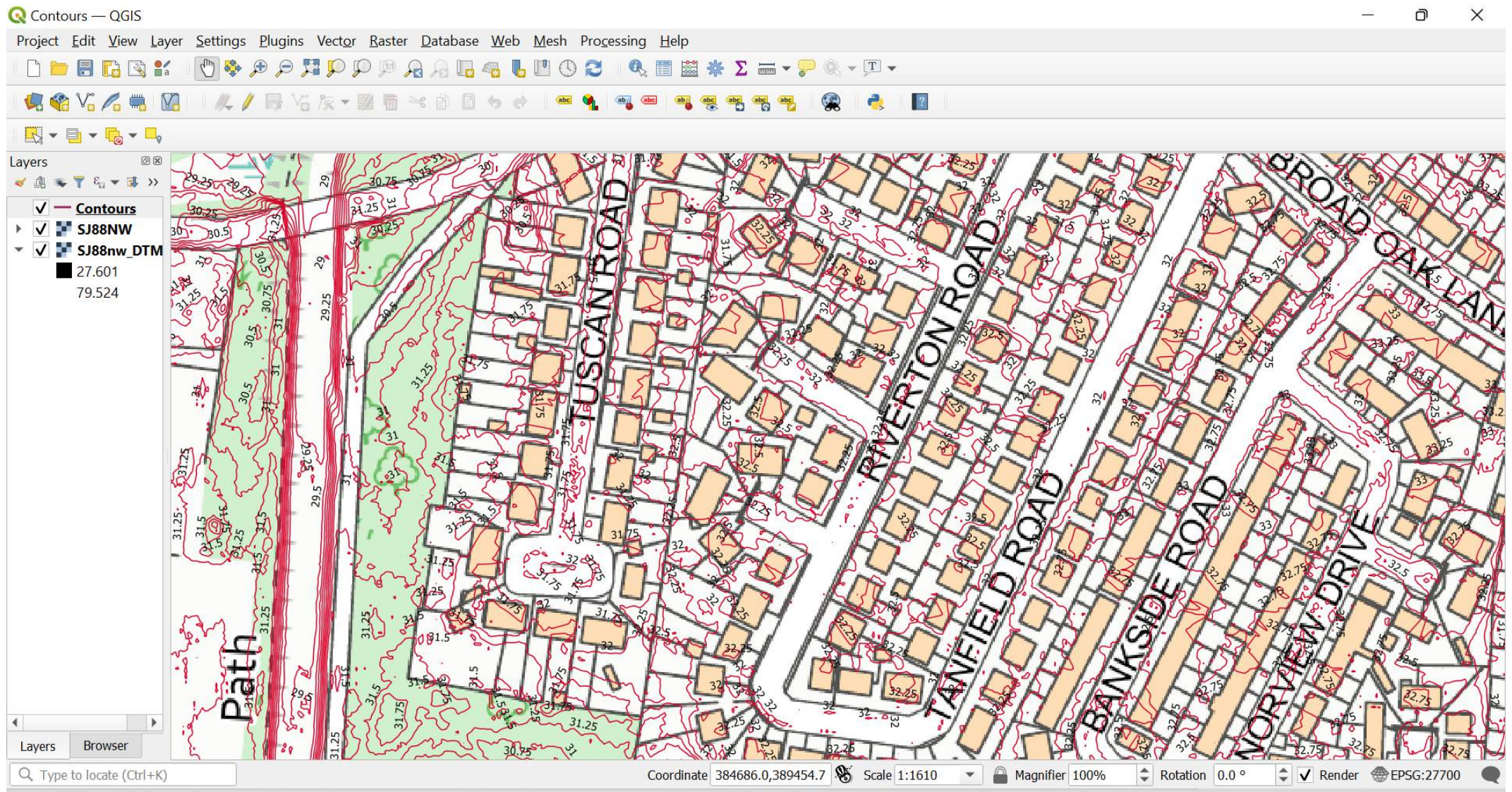
[Find out more about flood risk activity permits](#)

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 C: QGIS Contour Map



Appendix D: Key Site Photographs



Photo 1 – View of the front of the property



Photo 2 – View of side of the property



Photo 3 – View at the rear of the property



Photo 4 – View of footpath towards the sluice channel



Photo 5 – Footpath near sluice channel



Photo 6 – View of sluice



Photo 7 – Warning sign



Photo 8 – View of sluice gate



Photo 9 – View of River Mersey above Sluice gate



Photo 10 – Debris screen and River Mersey Sluice gate