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Flood Risk Assessment for 859 Kingsway, Didsbury, Manchester, M20 5PB

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June 2022

Report QA Number: QA22/013

INVESTOR IN PEOPLE

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1.0 Introduction

1.1 Background

Peak Associates Environmental Consultants Limited (Peak Associates) was commissioned by Caroline Franks and HENDE Building to conduct a Flood Risk Assessment (FRA) at 859 Kingsway, Manchester M20 5PB.

This report is based upon observations made on site during a walkover undertaken on 19th April 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 site, of 859 Kingsway is located in Didsbury and comprises of a two-storey, semi-detached dwelling. The proposed extension will be a single-story development consisting of a seating area and store room. The total site area is 270m^2 however, the extension is 19.25m^2 and will remove the current gate to the garden and replace the small extension that currently exists. Appendix A shows the proposed development plan developed by HENDE building services. In addition, the site photographs in Appendix D show the proposed development area and its existing state.

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 270 m^2 and is approximately 200 m North-West of the River Mersey and therefore is at risk of flooding from a fluvial flood event.

1.3 Geology

The site is located on River Terrace Deposits (undifferentiated) - Sand And Gravel. These deposits were formed up to 3 million years ago in the Quaternary Period. The local environment was dominated by rivers where the sedimentary deposits originated. In addition, the bedrock geology is Wilmslow Sandstone Formation - Sandstone. This sedimentary Bedrock was formed approximately 247 to 252 million years ago in the Triassic Period. The local environment was previously dominated by hot deserts which has shallow seas. The geology here is fluvial, lacustrine and marine in origin (Ref 11). Deposits 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); therefore, it has between than 1 in 100 and 1 in 1,000 annual probability of river or sea flooding (Ref 6). According to the online flood risk map, the property itself sits slightly higher than the surrounding land is at 'low risk' of flooding according to the Long-Term Flood Risk – probability between 0.1% and 1% (Ref 6). The site as a whole has a 0.1% to 1% probability of flooding annually. Figure 1 shows the low-risk area of flooding from the River Mersey, which is approximately 200m South-East of the property. Conversely, flooding from the river Mersey creates two areas of flood zone 3 (shaded dark blue below) the property's East and West respectively.

Figure 1 – Extent of Fluvial Flooding (Ref 6)

2.2 Surface Water

Based on the EA' Long-Term Flood Risk Map' (Ref 6) Moor Park Road site is also classified as medium risk of flooding from surface water. In addition, Kingsway has a mixture of low and medium risk. The property itself is considered very low risk. However, surface water has the potential to flow through the property, with the low risk velocity map (Figure 3) showing the surface water from Kingsway flows South through the property. This is corroborated by anecdotal evidence that the flooding in January 2021 caused surface water to flow through the garden, but around the house itself, though this was not significant enough to cause any damage. The flood maps for the site appear to be accurate.

The map highlights high risk surface water flooding approximately 170m East which corresponds to the ditch system adjacent to Parrs Wood High School sports ground. The topography of the land slopes East, therefore the higherrisk areas will not affect the site through a flooding pathway. The ditch benefits from a flood defence consisting of an embankment which will protect flooding reaching Wilmslow Road and the properties adjacent.

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 Sykes Reservoir, approximately 3.3km South-East. The provision of an extension to an existing house does not increase this risk.

2.3 Groundwater

Manchester City, Salford City and Trafford Council's Strategic Flood Risk Assessment (SFRA) (Ref 1) highlights that there is no 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 property is not marked on

the map, however, it has not be classified as at risk. The areas at risk on the opposite side of Kingsway, to the West and the previously mentioned sports fields to the East.

2.4 Tidal

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

2.1 Product 4 Data

The Environmental Agency Product 4 data provided one map illustrating the fluvial flood risk extent within the local area and identified the River Mersey, which flows from East to West. The Product 4 data 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 230m South-East of the site (Node point 3). 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

As a result of the analysis in Section 2, this FRA report will principally assess the modelled flood levels from fluvial flooding in relation to the property's elevation and flood water levels. Using 1m DTM LiDAR data (Appendix C) has been carried out for the purpose of this report to show the topographic levels of the site and surrounding area. As shown in Appendix C, the elevation on the property is 34.75mAOD with little change across the neighbouring houses.

If a scenario where flood water were to enter from node 3 is evaluated then when concerned with the 1 in 100 year flooding event (1%), the level is 33.86mAOD on the undefended model. Therefore, the site will (as experience has found) not flood in this event due to the 0.89mAOD elevation above the 1 in 100 year flood level.

The development is however 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 of 50% is required. From node point 3, the undefended model level with a 50% increase is 34.725mAOD. The property is 34.75mAOD according to Appendix C, hence the site will not flood in a 1 in 100 year (1%) flood with a 50% climate change increase due to a 0.5mAOD clearance.

However according to the 2D flood level data, the 1 in 100 year flood + 50% climate chance increase is 34.965mAOD. This is 0.215mAOD above the property elevation however, this will be later mitigated in section 4.0. This data suggests that a scenario where flood water leaves node 2 and migrates across the site to node 2 may also need to be considered.

The product 4 data confirms the 0.1% annual probability of flood levels at node point 3 in undefended and defended scenarios. The undefended flood event level is 35.12mAOD and the defended model level is 35.32mAOD. The product 4 data in Appendix B highlights the modelled 0.1% event and shows that the property will flood when this flood event occurs.

This is backed up by the fact that the site elevation is 34.75mAOD and will flood the property with 0.57m of floodwater. It must be stated that although these levels will cause flooding, the property is protected from the 1 in 100 year flood with climate change accounted for. In the unlikely event that the property will experience this level of flooding in our lifetimes, flood warning systems will be activated.

The SFRA for Greater Manchester (Ref 1) highlights the area of Didsbury is classed as a critical drainage area as seen in critical drainage map (Appendix F). This is supported by a flood storage area to the West of the property, approximately 500m West, in Fletcher Moss Park. The most recent flood to encompass this area was in January 2021 in which Storm Christoph caused large amounts of flooding across the area.

4.0 Accounting for Flooding Within the Proposed Development

The proposed development is to extend the two-story property with a single-story development consisting of a seating area and store room. The total site area is 270m^2, however, the extension is 19.25m^2. The property is located within Flood Zone 2, which generally, according to the technical guidance for planning, states that a sequential test must be carried out and developers "*should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development*" (Ref 4). As the proposed development is an extension, locating such a building within an alternative Flood Zone 1 location would not be feasible. Not only this, the development falls under the 'Minor Development' category as the footprint is less than 250m^{2,} 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.

In the area, there are multiple flood defences along the River Mersey. The embankment labelled 2 in the product 4 data (Appendix B) provides defences to the houses East of the property. Although the area is not modelled to benefit from defences, it is likely that this embankment will mitigate flood water travelling Westwards towards the property in the event of a large fluvial flood.

Fletcher Moss Park, which was previously mentioned, is one of two Flood Storage Reservoirs in Greater Manchester. Fletcher Moss Park has a capacity of 778,000cm^{3,} which works in tandem with the Sale Ees reservoir. This management scheme is used to maintain the river's maximum capacity and therefore increase the efficiency with which water is passed through the area. The excessive water that is sluiced out of the River Mersey flows down the inlet channel when the River Mersey reaches 6.9mAOD the sluice gate is operated at 150mm intervals channelling the flow into the park. The Environment Agency use this to balance the river reducing flooding to nearby areas and enabling the river to flow more easily through Didsbury.

In order to reduce the risk to the proposed development, the following recommendations are made:

- The floor level of the proposed development is recommended to be 300mm above the 1 in 100-year flood level or to match the current level of the dwelling, as per the standing advice for minor developments given by the Environment Agency (Ref 10). This will mitigate flood water level calculated with the 2D modelling of 34.965 mAOD bring the floor level to 35.05 mAOD which will defend against 1 in 100 year + 70% climate change level of 34.01 mAOD.

- Electrical sockets should be placed at a level to prevent flooding of 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 5).

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

- Any currently installed or proposed air bricks to the property should be raised to 300mm above the 1 in 100 year + 50% flood level. This is to mitigate flood water entering the property through this pathway.

- 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 a flood.

- The purchase of a SuDS Planter would make some contribution to mitigating the impact of surface water flooding as a result of climate change. This sustainable drainage system, although not essential, would add a sustainably aesthetic aspect to the property, which would reduce flood risk.

- It may be prudent to review the rest of the property re the flood resilience measures suggested above.

5.0 Conclusion

Therefore, in conclusion, the site is located in Flood Zone 2, as highlighted in the analysis throughout this FRA. This means there is a low probability of flooding from rivers (fluvial flooding) between estimated flood risk between 1 in 100 years to 1 in 1000 years or a 1% - 0.1% probability. The main risk to the site is from fluvial flooding from the River Mersey located approximately 200m South-East of the property.

From the Environment Agency Product 4 data and the online long-term flood risk mapping, it appears that the site is mainly at risk of flooding during high river levels. However, there is likely to be partial surface water flooding in the area due to increased precipitation rates. Climate change will be a deciding factor into many flooding events in the near future, although, this site will only be affected during a 1 in 1000 year (0.1%) flood event. The proposed development is protected from a 1 in 100 year + 70% increase with the use of the recommendations provided. Alongside this, the management of the flood defence schemes within the area, including the flood storage scheme, will alleviate the risk to the property. Therefore the property will not flood during a 1 in 100 year flood event and is considered suitable for development.

Although the risk is minimal, with a probability of 0.1%, the Technical Guidance to the National Planning Policy Framework (Ref 4) defines this as a more vulnerable minor development and as such, recommendations have been made to mitigate the effects of flooding. These recommendations include: raised floor level, the use of flood resilient building materials, following best practice of mitigating potential flood water accessing the electric supply by installing plugs 600mm above floor level and elevating the current air bricks. The monitoring of government flood warnings should be undertaken by site owners to allow them to exit the property in the event of a flood event. Finally, the extra recommendation of a SuDS planter which will increase the properties resistance to surface water flooding.

References

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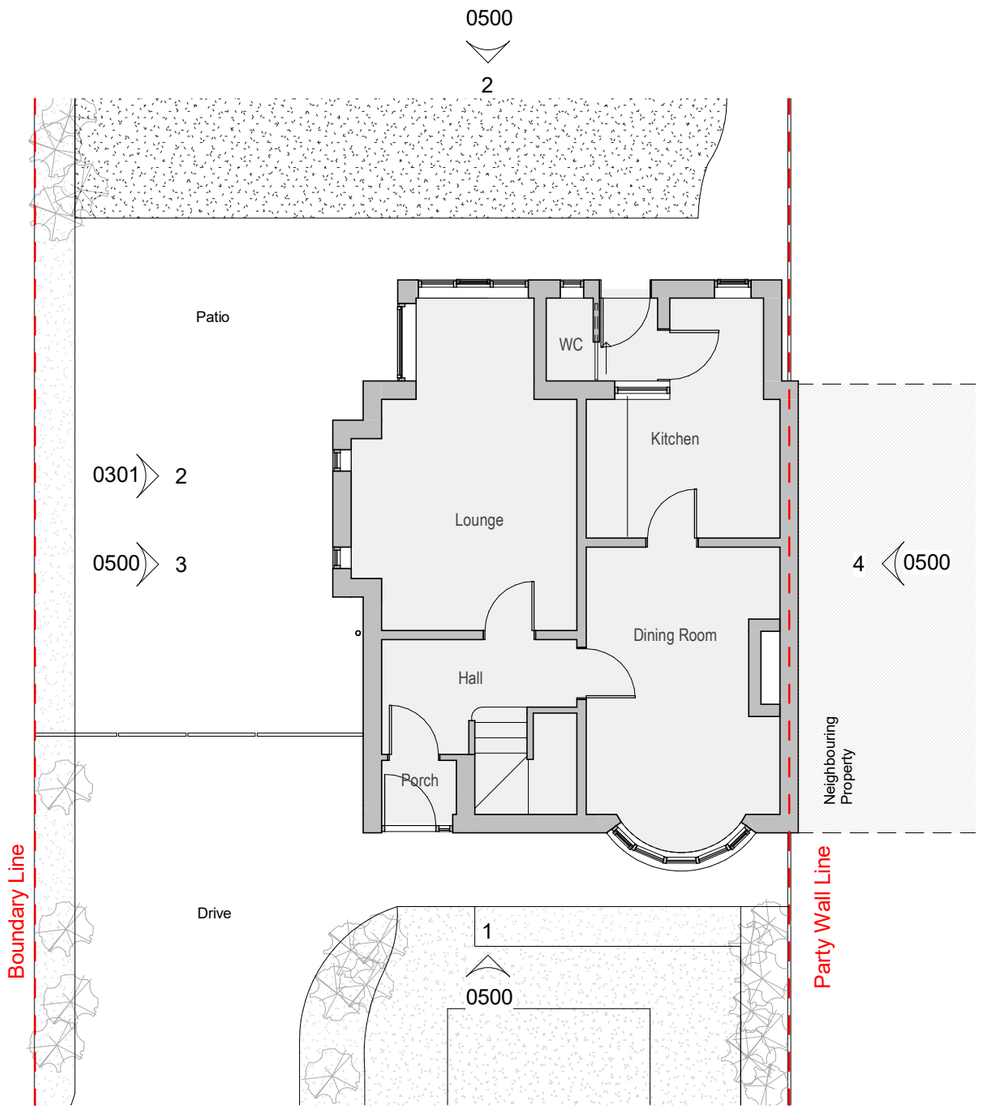
Appendix A: HENDE Plan



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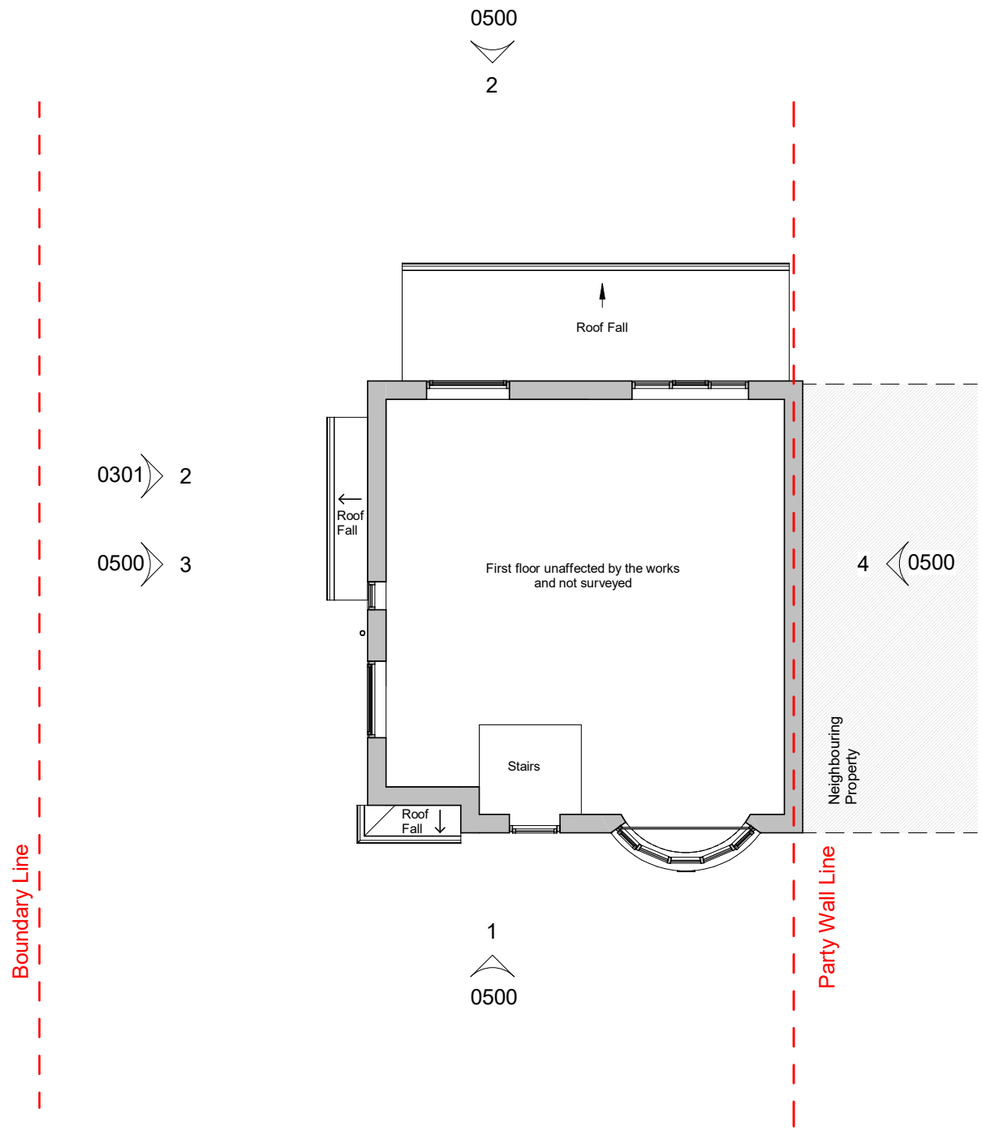

2 | Level 1_Existing
1 : 100

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0m 1m 2m 3m

KEY:

NOTES:
- Site tolerance required for all dimension and levels.
- External Levels TBC on site

Rev	Description	Date	By

Project
859 Kingsway, Didsbury

Title
Existing Floor Plans

Status
Planning

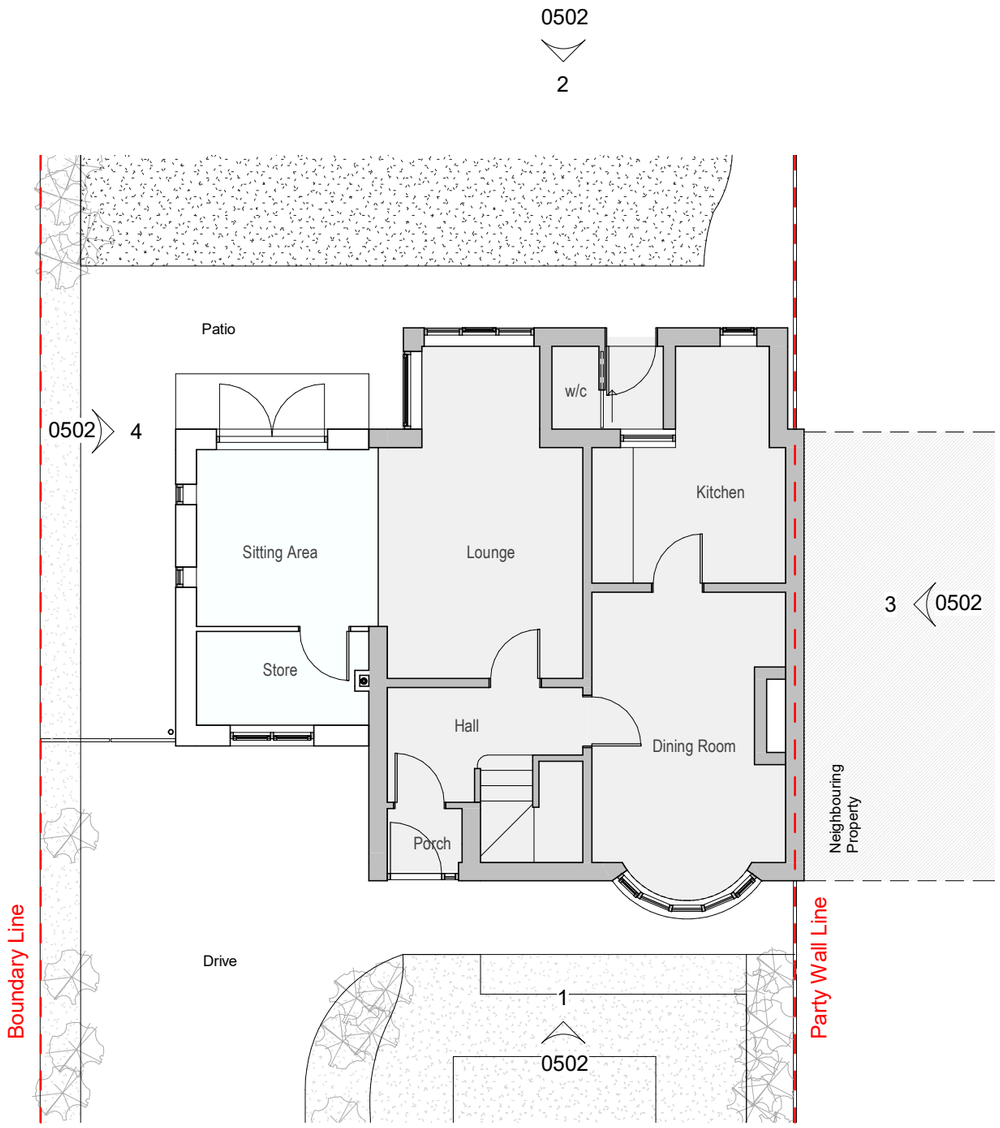
Project number: 2301
Date: Feb 2022

Drawn by: S
Checked by: M

Scale: 1 : 100@A3
Revision:

Drawing No.
2301-HENDE-DR-A-0300

05/04/2022 11:15:19



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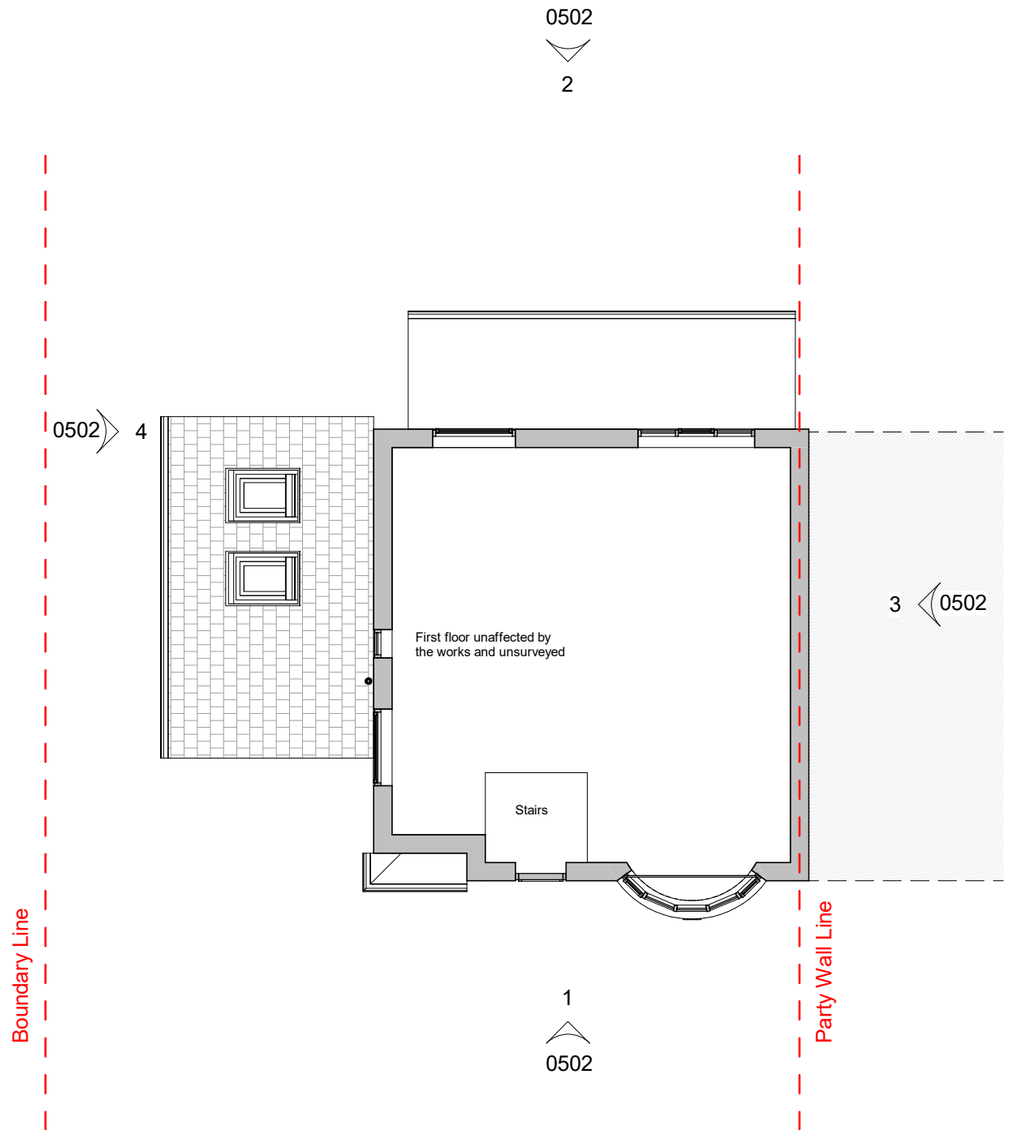

2 | Level 1_Proposed
1 : 100

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0m 1m 2m 3m

KEY:

NOTES:
- Site tolerance required for all dimension and levels.
- External Levels TBC on site

Rev	Description	Date	By

Project
859 Kingsway, Didsbury

Title
Proposed Floor Plans

Status
Planning

Project number: 2301
Date: Feb 2022

Drawn by: S
Checked by: M

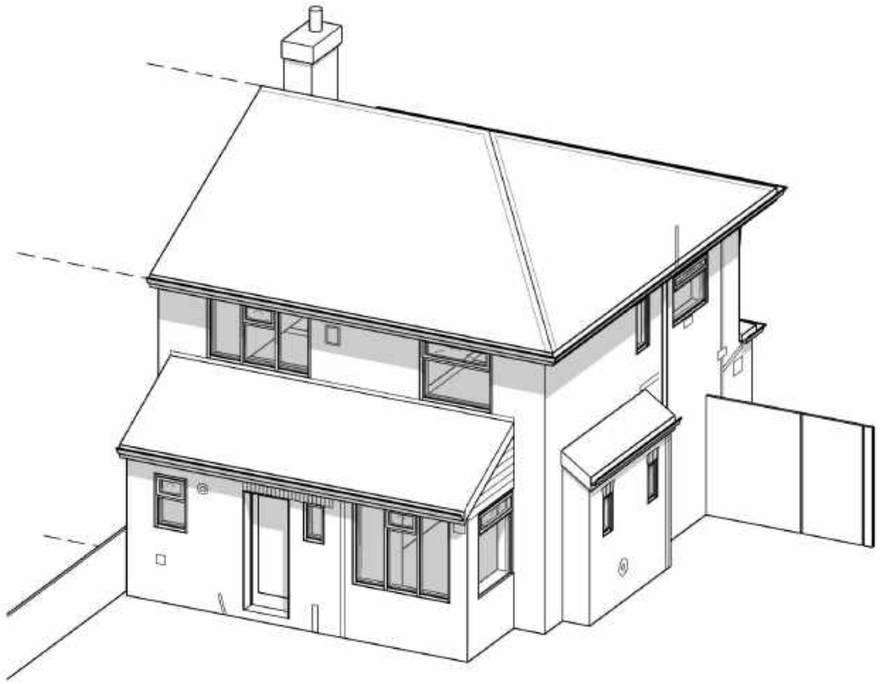
Scale: 1 : 100@A3
Revision:

Drawing No.
2301-HENDE-DR-A-0302

05/04/2022 11:15:20

1 | Existing_Front

3 | Proposed_Front



2 | Existing_Rear

4 | Proposed_Rear

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KEY:

NOTES:
- Site tolerance required for all dimension and levels.
- External Levels TBC on site

Rev	Description	Date	By

Project
859 Kingsway, Didsbury

Title
External 3D Views

Status
Planning

Project number: 2301
Date: Feb 2022

Drawn by: S
Checked by: M

Scale: @A3
Revision:

Drawing No.
2301-HENDE-DR-A-1000

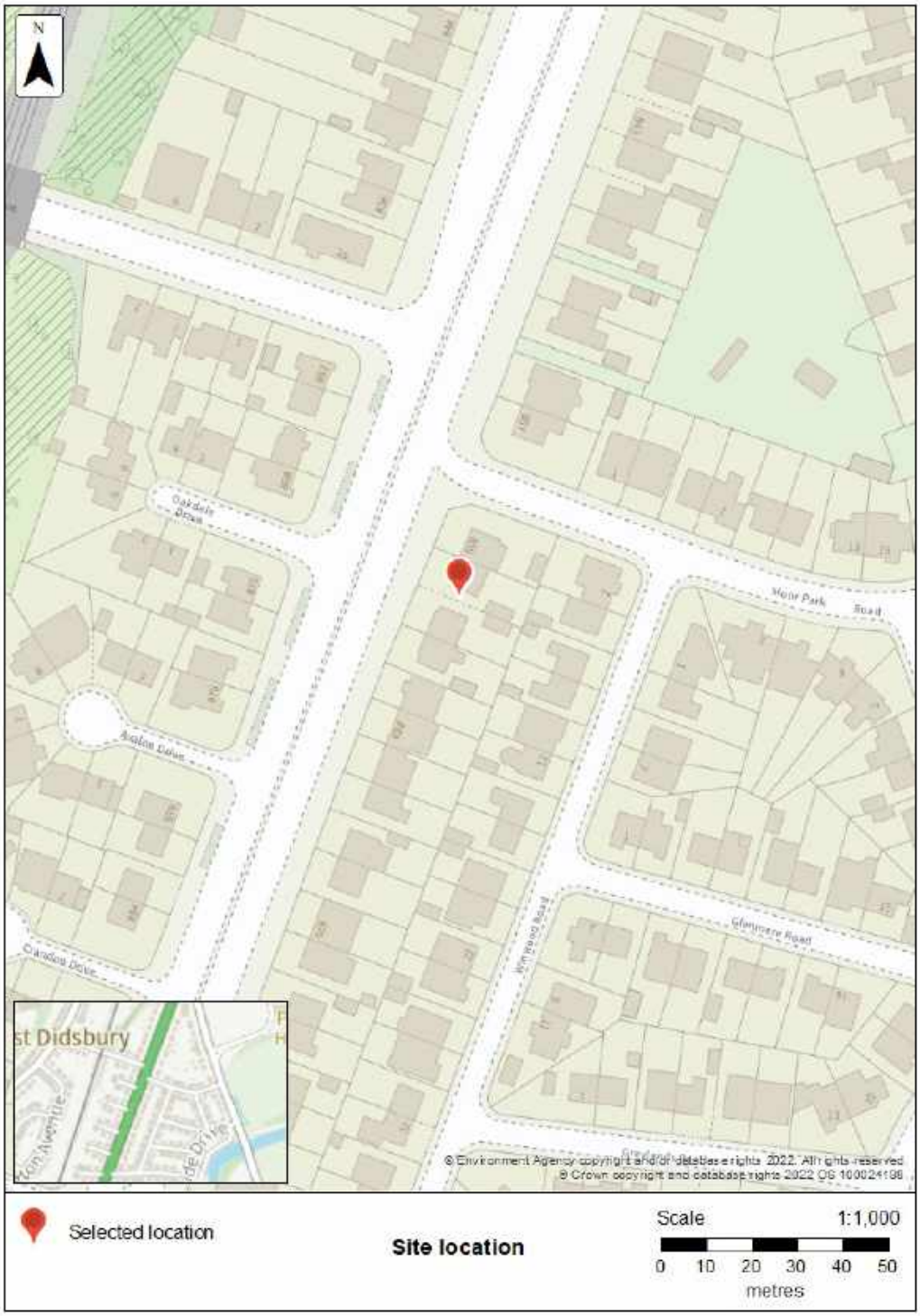
05/04/2022 11:15:22

Appendix B: Environment Agency Product 4 Data

Flood risk assessment data

Location of site: 385367 / 389984 (shown as easting and northing coordinates)
Document created on: 8 April 2022
This information was previously known as a product 4.
Customer reference number: GMMC257706AB/KK35HC7WHKKK

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

Not included in this document

This document does not include a Flood Defence Breach Hazard Map.

As your location benefits from flood defences, you need to request a Flood Defence Breach Hazard Map and information about the level of flood protection offered at your location from the Greater Manchester Merseyside and Cheshire Environment Agency team at inforequests.gmmc@environment-agency.gov.uk. This information will only be available if modelling has been carried out for breach scenarios.

Include a site location map in your request.

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.

There is not any modelled climate change data for this location. This is because detailed modelling hasn't been carried out in this area. You will need to consider the latest flood risk assessment climate change allowances and factor in the new allowances to demonstrate the

development will be safe from flooding.

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

Model name: Upper Mersey 2017 Model Update - Undefended
Scenario(s): No defences exist fluvial
Date:

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

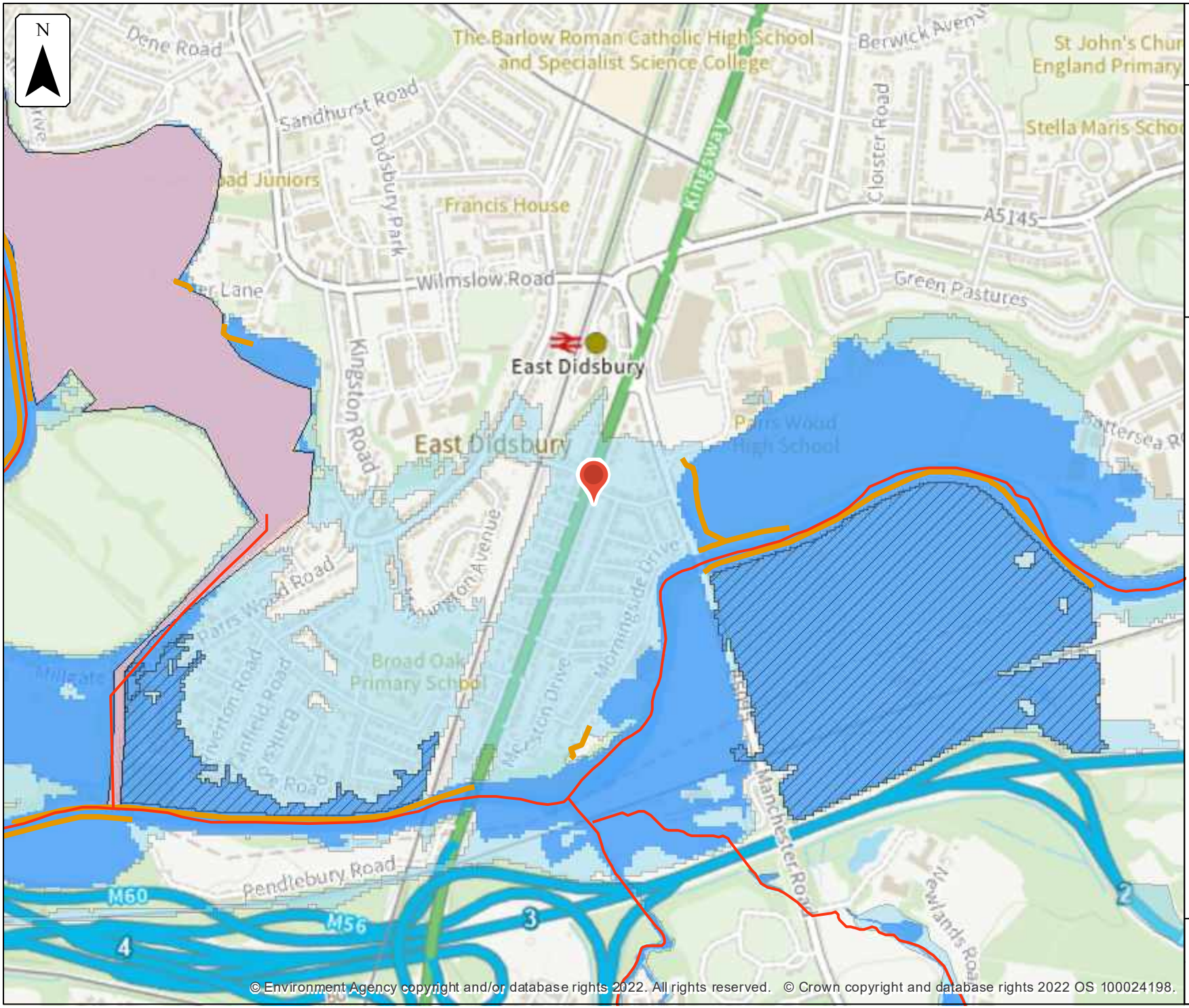
This data is updated on a quarterly basis as better data becomes available.

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



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Environment Agency

Flood map for planning

Location (easting/northing)
385367/389984

Scale
1:10,000

Created
8 Apr 2022

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

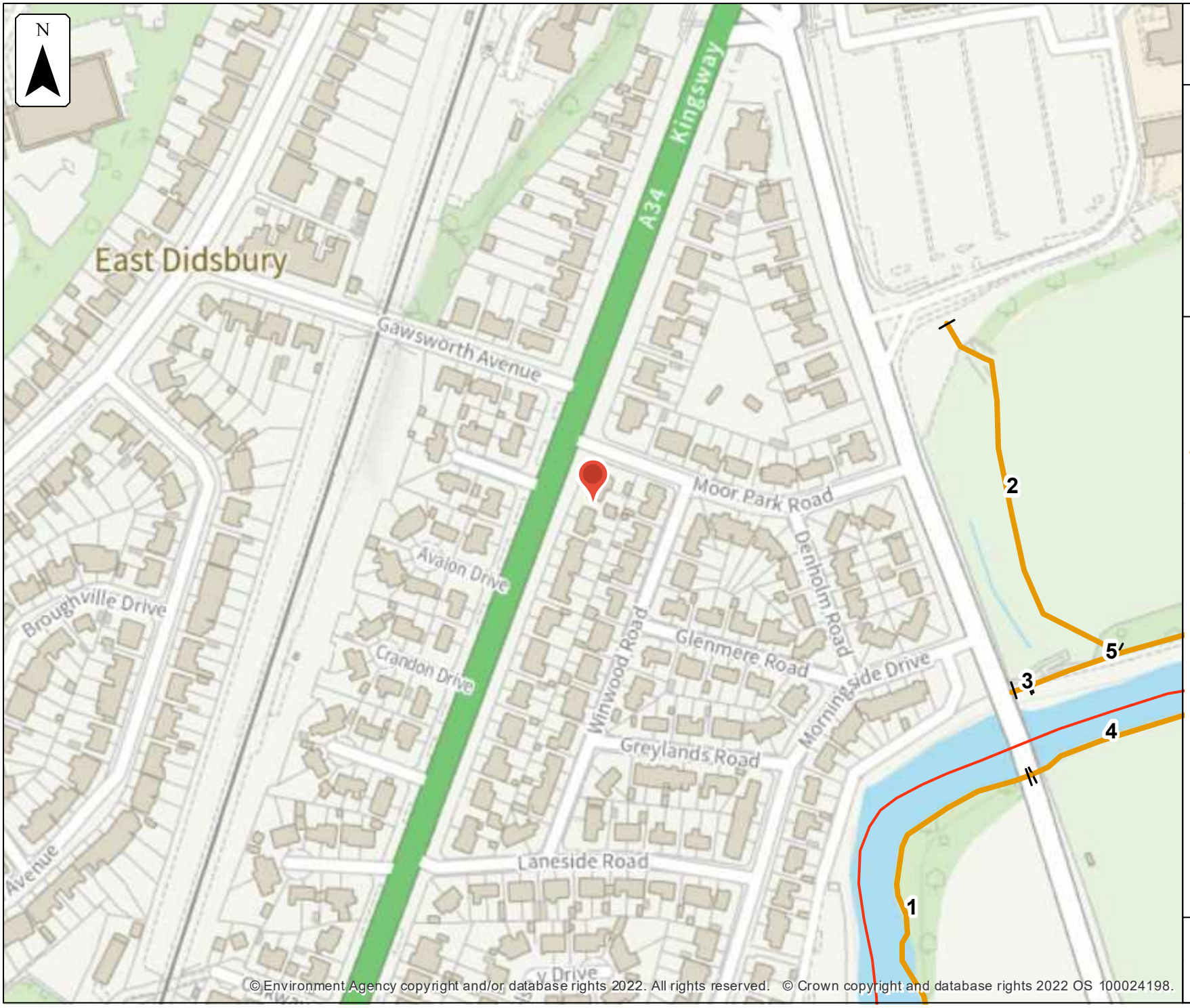
0 100 200 300 400 500
metres

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.



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Environment Agency

Flood defences

Location (easting/northing)
385367/389984

Scale
1:2,500

Created
8 Apr 2022

Selected location

Main river

Flood defence

0 25 50 75 100
metres

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	112017	Engineered High Ground	50	Fair	34.99	32.81	
2	37538	Embankment	50	Fair	35.82	35.63	
3	37537	Wall	50	Fair	35.64	35.73	
4	112016	Embankment	50		34.82	35.83	
5	59337	Embankment	50	Good	33.28	33.14	

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

Modelled data

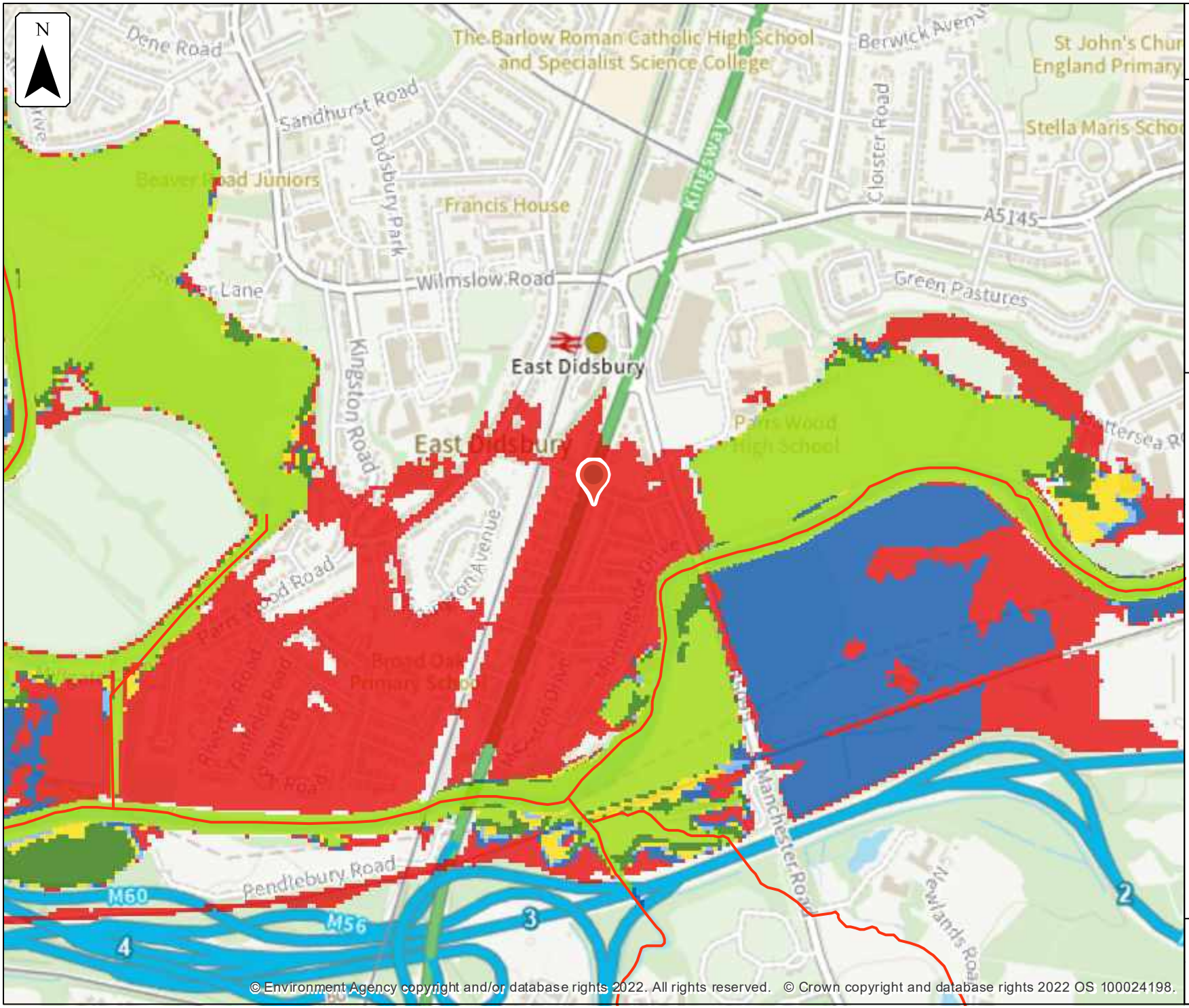
This section provides details of different scenarios we have modelled and includes the following (where available):

- 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



Environment Agency

Defended modelled fluvial extent

Location (easting/northing)
385367/389984

Scale
1:10,000

Created
8 Apr 2022

Model name
Upper Mersey Model Update - Defended

Selected location

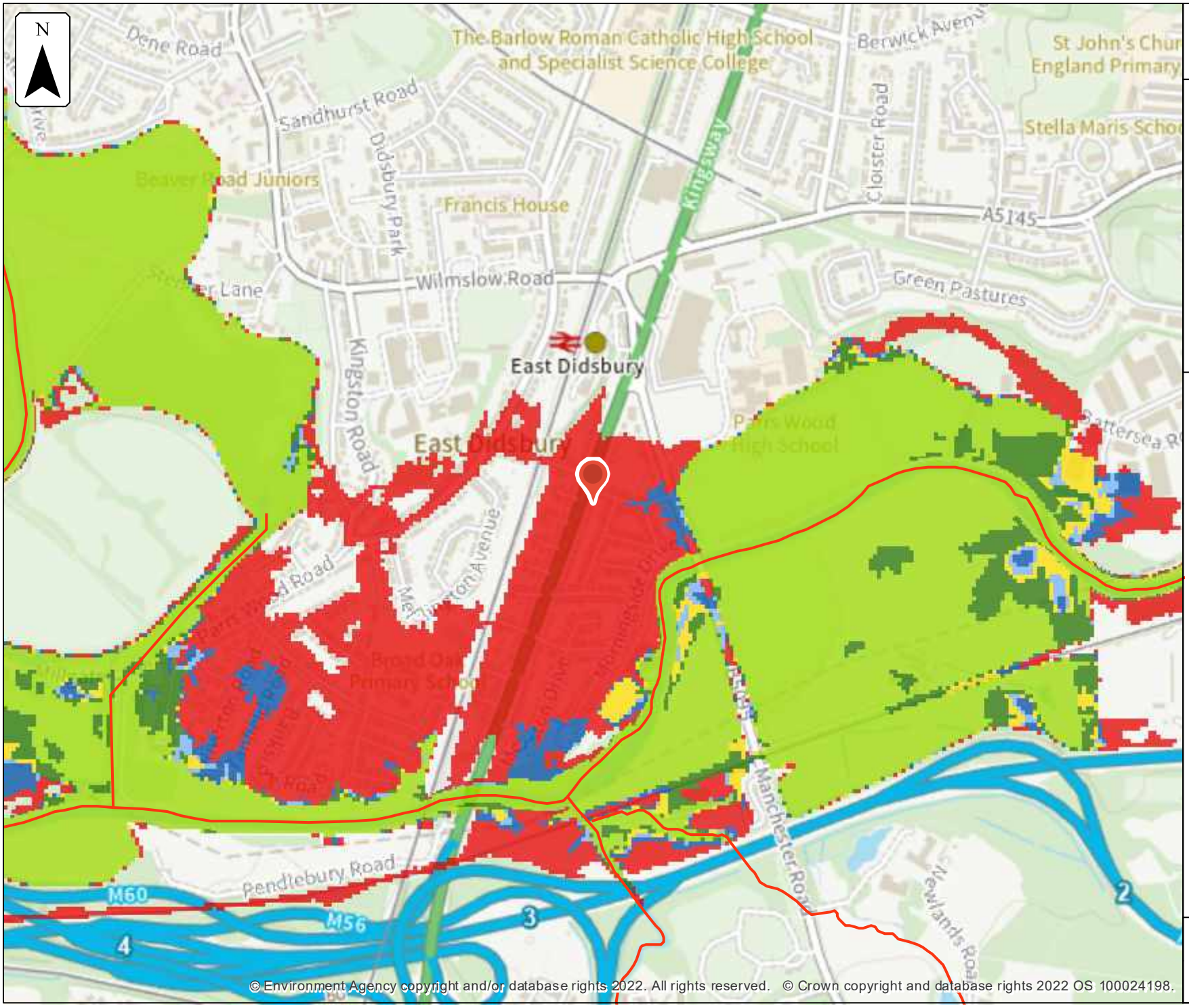
Main river

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

0 100 200 300 400 500
metres



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Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
385367/389984

Scale
1:10,000

Created
8 Apr 2022

Model name
Upper Mersey Model Update - Undefended

Selected location

Main river

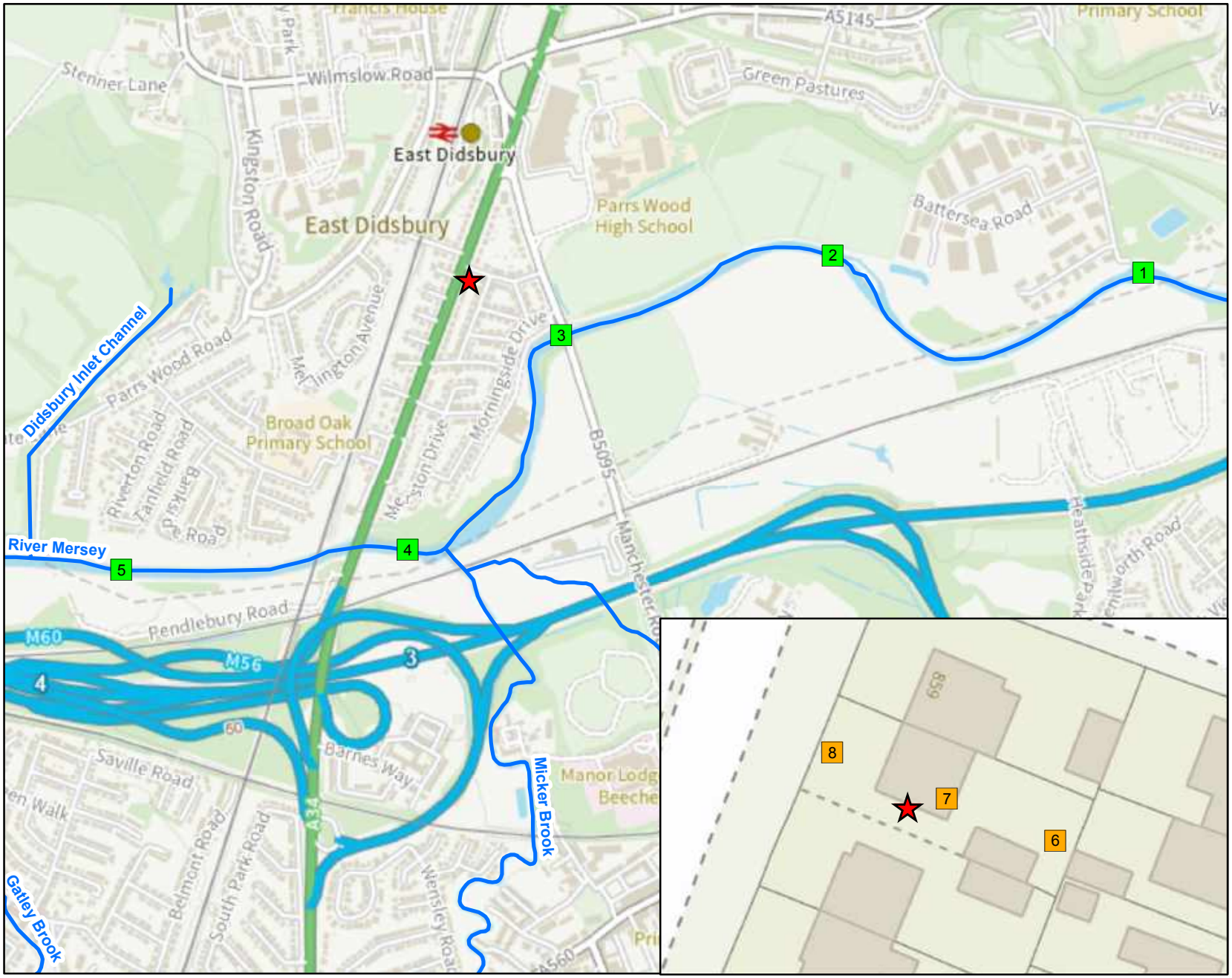
Modelled flood extent

- 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

Model Measurement Map – Upper Mersey 2017



Environment Agency

1:12,000

N

Legend

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

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					Undefended														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	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_0243_MERSD4_6494u	386809	390000	Modelled Water Level (m aodN)	34.18	34.73	35.01	35.28	35.36	35.61	35.75	35.98	36.46	36.55	37.12	36.08	37.28	38.10	34.20	34.81	35.12	35.40	35.49	35.76	35.90	36.02	36.87	36.76	37.20	36.30	37.35	38.10
				Modelled Flow (cumecs)	168.60	218.64	254.16	288.93	300.39	335.33	355.35	370.87	477.37	494.64	591.28	407.58	628.90	776.48	168.95	220.09	254.08	288.89	300.52	335.38	354.80	370.21	479.21	495.78	591.33	407.36	628.51	776.83
2	ea013_0243_MERSD4_5690	386145	390037	Modelled Water Level (m aodN)	33.12	33.60	33.79	33.98	34.05	34.34	34.51	34.62	35.16	35.21	35.46	34.81	35.53	35.94	33.17	33.61	34.07	34.26	34.35	34.60	34.74	34.90	35.35	35.38	35.63	35.16	35.67	36.22
				Modelled Flow (cumecs)	168.61	219.45	246.05	266.75	273.18	293.36	301.02	306.12	359.27	368.65	493.02	320.47	521.99	657.36	169.24	220.18	253.82	267.87	296.28	317.00	327.05	334.58	419.57	434.74	519.73	356.79	546.05	692.29
3	ea013_0243_MERSD4_5068	385565	389966	**Modelled Water Level (m aodN)**	**32.41**	**32.84**	**33.13**	**33.33**	**33.40**	**33.65**	**33.78**	**33.86**	**34.44**	**34.55**	**35.01**	**34.00**	**35.12**	**35.78**	**32.51**	**33.06**	**33.32**	**33.67**	**33.76**	**33.95**	**34.04**	**34.12**	**34.72**	**34.84**	**35.21**	**34.27**	**35.32**	**35.89**
				Modelled Flow (cumecs)	**167.16**	**213.02**	**248.50**	**275.18**	**286.47**	**319.94**	**337.07**	**350.98**	**370.67**	**370.89**	**379.23**	**375.78**	**383.16**	**381.80**	**169.13**	**222.67**	**250.86**	**286.44**	**297.98**	**333.70**	**351.52**	**366.64**	**401.27**	**402.91**	**488.57**	**403.87**	**425.33**
4	ea013_0243_MERSD4_4453d	385236	389407	Modelled Water Level (m aodN)	31.83	32.20	32.44	32.61	32.66	32.87	32.99	33.08	33.72	33.86	34.50	33.31	34.64	35.42	32.00	32.54	32.76	33.09	33.20	33.47	33.60	33.69	34.26	34.34	34.86	33.88	35.00	35.62
				Modelled Flow (cumecs)	183.96	232.24	269.29	299.79	308.37	347.22	369.66	388.78	490.81	497.59	515.09	435.19	516.87	529.77	184.07	242.17	271.74	310.99	323.15	361.89	382.37	396.88	467.96	485.42	520.73	416.15	521.46	543.04
5	ea013_0243_MERSD4_3784	384625	389365	Modelled Water Level (m aodN)	31.29	31.80	31.74	31.84	31.86	31.96	32.02	32.06	32.32	32.39	32.75	32.15	32.84	33.30	31.54	32.04	32.18	32.50	32.58	32.81	32.90	32.97	33.34	33.37	33.50	33.14	33.53	33.69
				Modelled Flow (cumecs)	179.53	217.86	249.07	274.69	282.15	315.05	332.85	348.88	443.78	457.27	523.03	388.92	537.56	644.42	184.13	243.20	271.68	309.44	323.54	361.93	381.06	396.79	488.87	508.13	589.18	422.81	611.28	738.07

					Undefended						Defended		
Map Reference	Model Node Reference	Easting	Northing	Data	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	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow	1 % AEP (1 in 100 year) + 70% increase in flow	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow
6	2D Measurements	385381	389982	Modelled Water Level (m aodN)	34.82	34.87	35.06	35.13	35.72	35.01	35.15	35.83
7		385371	389986	Modelled Water Level (m aodN)	34.82	34.86	35.06	35.13	35.72	35.01	35.15	35.83
8		385361	389990	Modelled Water Level (m aodN)	34.82	34.86	35.05	35.12	35.71	35.01	35.15	35.83

Model data taken from Upper Mersey 2017 Study

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.

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

					Undefended					Defended		
Map Reference	Model Node Reference	Easting	Northing	Data	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	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow	1 % AEP (1 in 100 year) + 70% increase in flow	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow
6	2D Measurements	385384	389991	Modelled Water Level (m aodN)	34.85	34.88	35.08	35.14	35.73	35.01	35.15	35.84
7		385365	389998	Modelled Water Level (m aodN)	34.84	34.88	35.07	35.14	35.72	35.01	35.15	35.84

Model data taken from: Upper Mersey 2017 Study

AEP - Annual Exceedence Probability

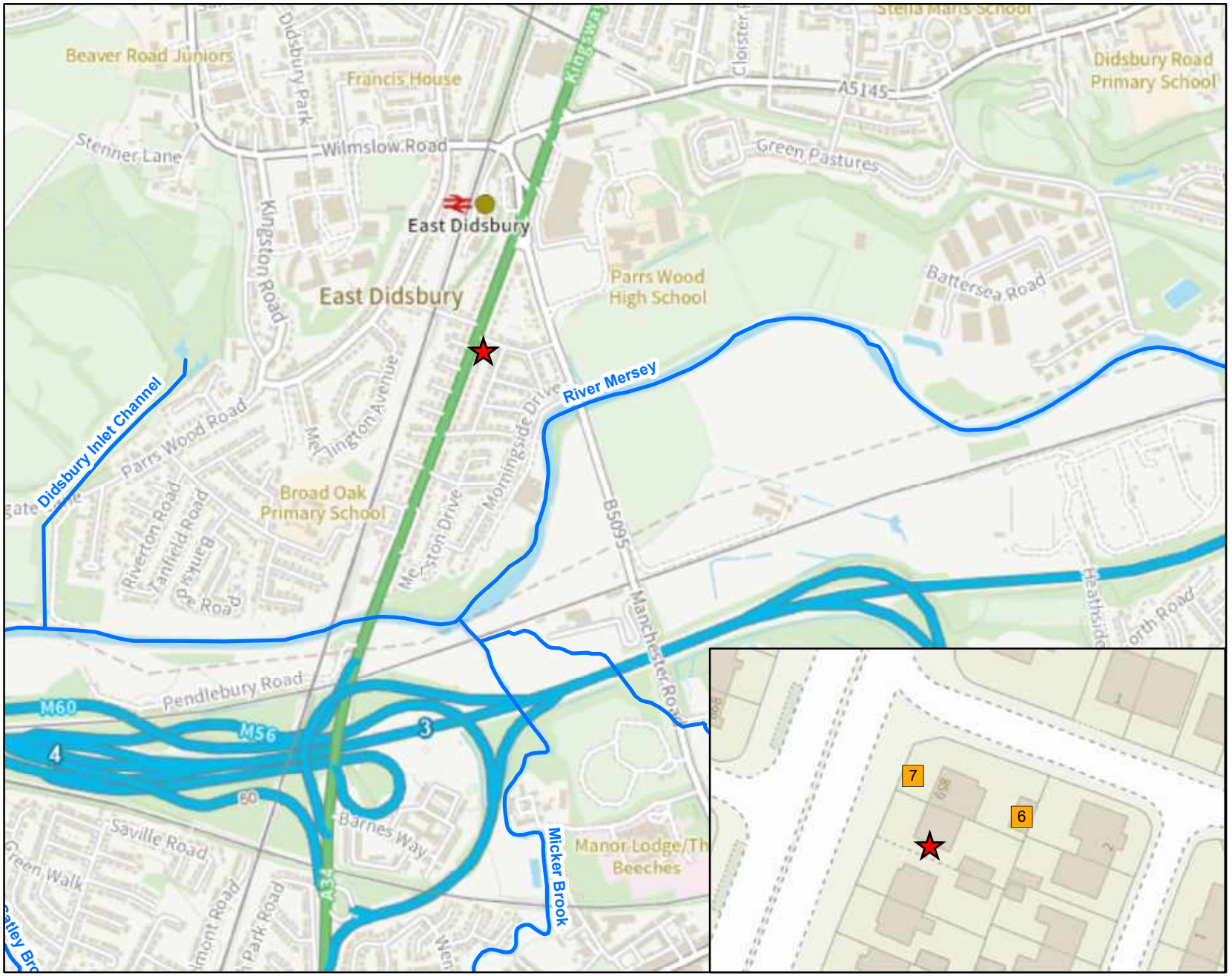
m aodN - metres above ordnance datum Newlyn

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.

Detailed Flood Map centred on Kingsway, Manchester, M20 5PB.
Created on 23/05/2022 [GMMC257706AB/KK35HC7WHKKK]



Environment Agency

1:12,000

N

Legend

- Site Location
- 2D Measurements
- Main River

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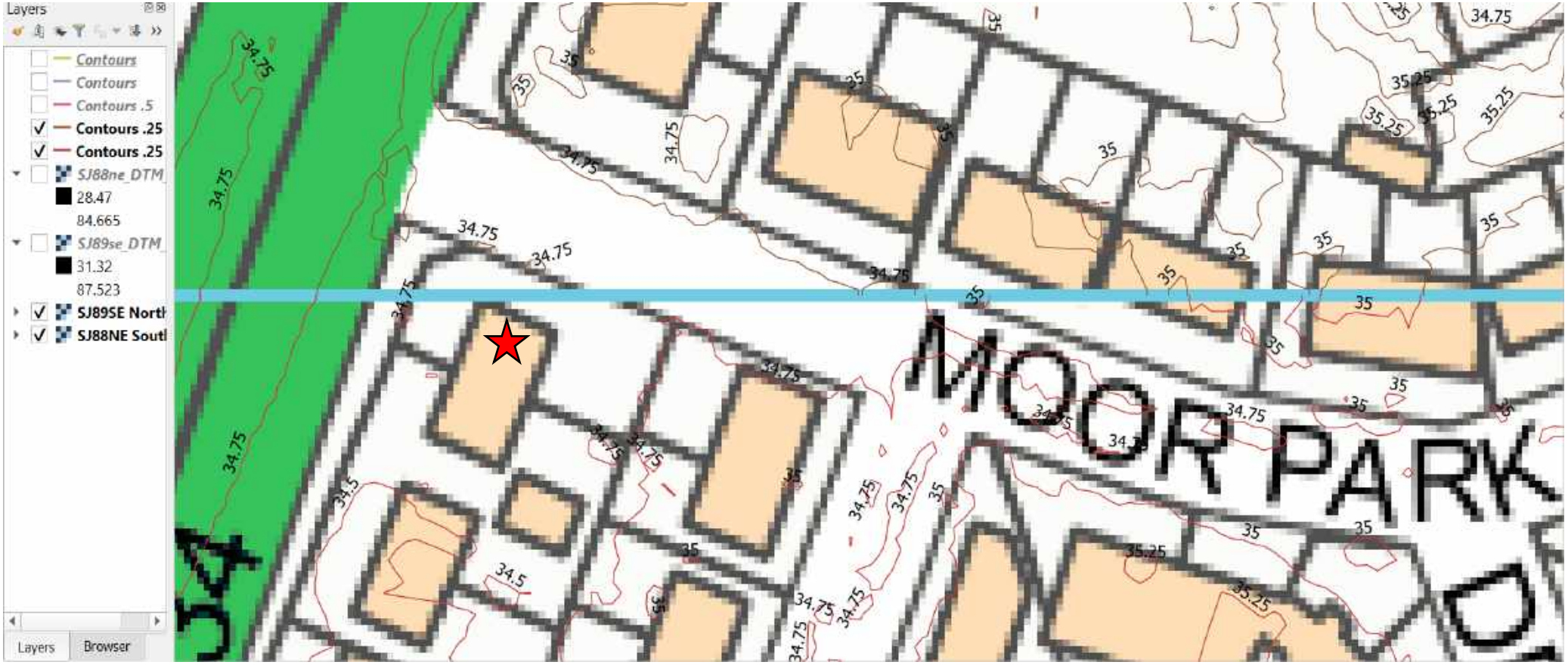
Appendix C – QGIS Contour Map



Appendix D: Key Site Photographs

Photo 1 – Front Door of 859 Kingsway

Photo 2 – Area of Proposed Development

Photo 3 – Current Air brick to be removed

Photo 4 – Current Extension to be replaced

Photo 5 – View of the property back garden

Photo 6 – Area of Proposed development view of Northern Fence

Photo 7 – Area of proposed development from drive way (Gate to be removed)

Photo 8 – Bridge over the River Mersey, Wilmslow Road

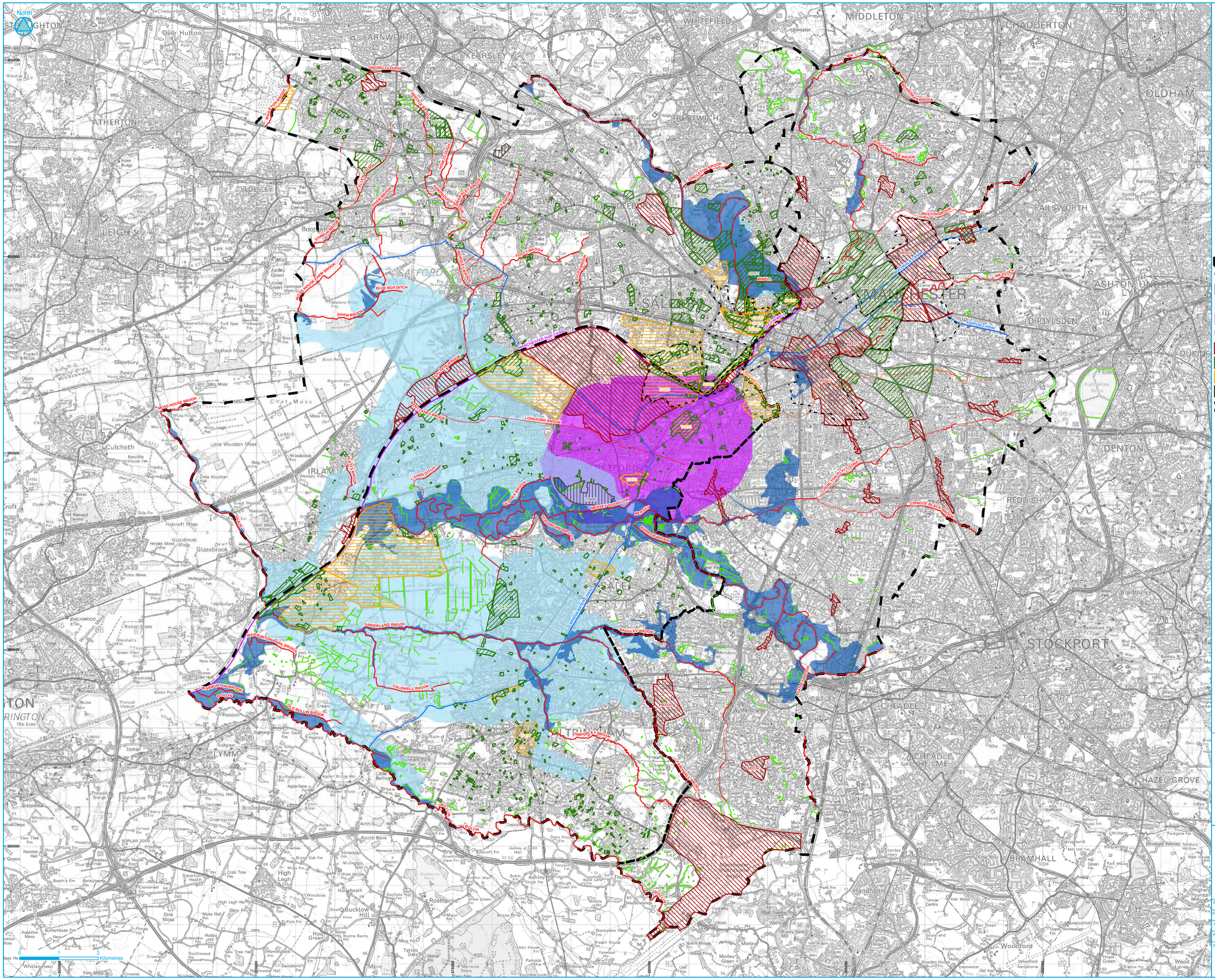
Photo 9 – River Mersey, Upstream of Bridge

Photo 10 – Embankment (Referred to in P4 Data as ‘2’)

Photo 11 – View of Bridge and Downstream flow of the River Mersey

Photo 12 – Evidence of previous flooding from debris on branches

Appendix E: Groundwater Flooding Map



Council Boundary

Groundwater Issue

- Areas at risk of GW Flooding
- Areas of shallow GW
- Areas at risk of GW rebound

Potential Development Sites / Locations

- Employment
- Housing
- Mixed Use
- Other
- Regional Centre Boundary

- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Irwell
- Other Waterbodies

Main Rivers (V8.0)

- Culverted
- Open

Digitised River Lines

- Culverted
- Open

The map has been produced in accordance with PPS25: Development and Flood Risk and its Practice Guide. This map shows areas that are potentially at risk from groundwater flooding and should be used to scope suitable mitigation measures in a site specific Flood Risk Assessment.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The information on the map is based on Environment Agency potential groundwater rebound areas, data from the Coal Authority, BGS drift geology mapping and Defra Groundwater Emergence Maps.

The River Irwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

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Other offices at Atherstone, Doncaster, Edinburgh, Haywards Heath, Limerick, Newcastle upon Tyne, Newport, Northallerton, Saltaire, Skipton, Tadcaster & Wallingford

for

Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Groundwater Flooding

Drawn by:	J Cheetham	Date:	08/03/2011
Checked by:	J Dimelow	Date:	01/02/2011
Approved by:	J Cooper	Date:	01/02/2011
File Name:	...ArcView\Mapping\Level 1\MST_GroundwaterFlooding_V1.3.mxd		
Drawing Number:	GW_2.1	Status:	FINAL
Scale:	1:45,000		

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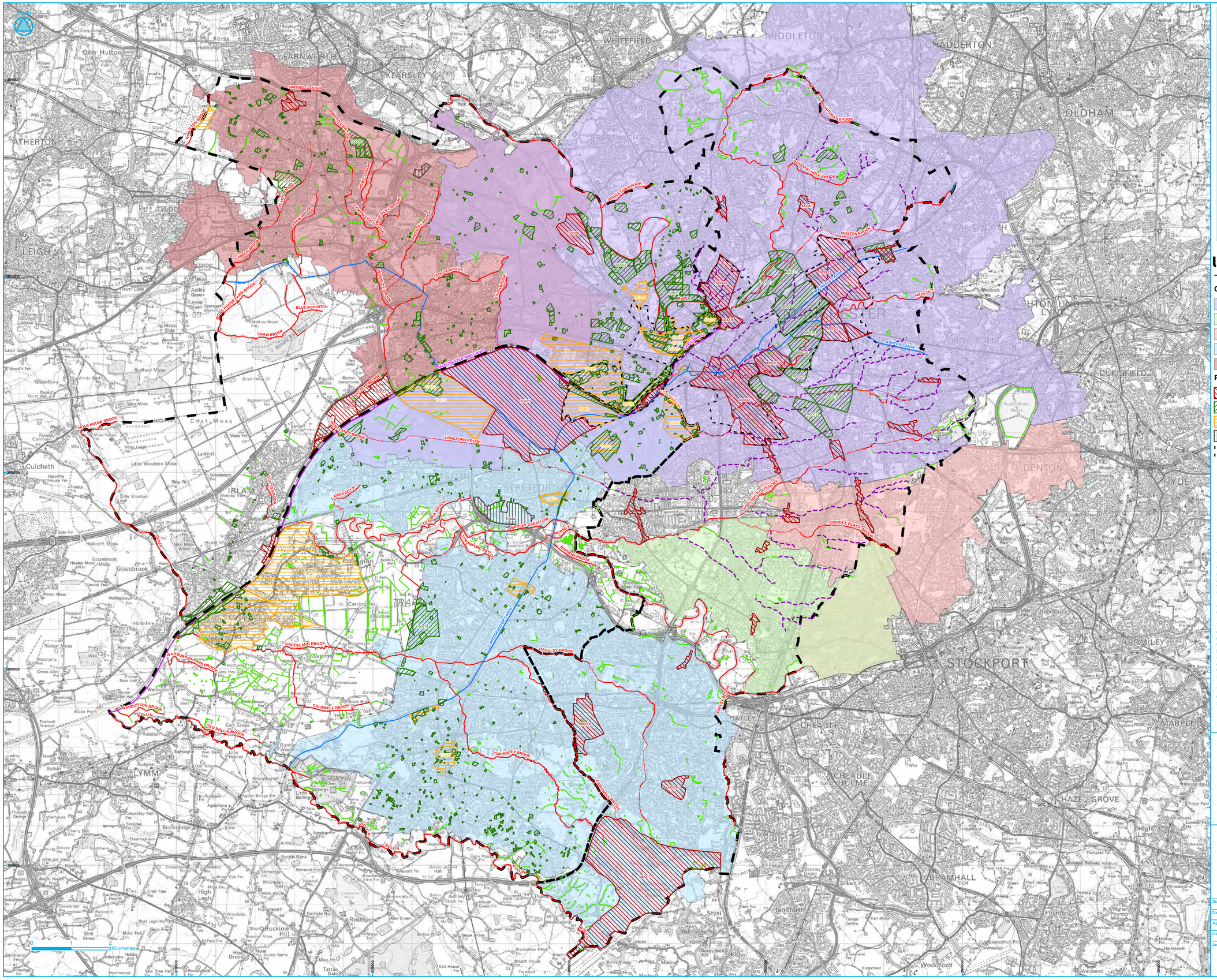
Appendix F: Critical Drainage Area Map



Council Boundary

Lost Watercourses

Critical Drainage Areas

- Conurbation Core
- Didsbury
- Levenshulme and Fallowfield
- Manchester and Trafford South
- Salford North West

Potential Development Sites / Locations

- Employment
- Housing
- Mixed Use
- Other
- Regional Centre Boundary

Ashton, Bridgewater and Rochdale Canals

Manchester Ship Canal / Grey Irwell

Other Waterbodies

Main Rivers (V8.0)

- Culverted
- Open

Digitised River Lines

- Culverted
- Open

This map has been produced in accordance with PPS25: Development and Flood Risk.

Certain locations are particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development. There are generally known local flooding problems associated with these areas. These areas have been defined as Critical Drainage Areas in the SFRA. Specific drainage requirements are required in these areas to help reduce local flood risk.

Chapter 5 of the Level 2 SFRA covers the flooding from surface water and sewers and how Critical Drainage Areas have been defined.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Irwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

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for

Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Critical Drainage Areas

Drawn by:	J Cheetham	Date:	16/03/2011
Checked by:	J Dimelow	Date:	01/02/2011
Approved by:	J Cooper	Date:	01/02/2011
File Name:	...ArcView\Mapping\Level2\MST_CDA_Current_V1.2.mxd		
Drawing Number:	SS_4.5	Status:	FINAL
Scale:	1:45,000		

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