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Flood Risk Assessment
Manchester Bailey Bridge

Manchester City Council

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MANCHESTER
CITY COUNCIL

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Executive Summary

Client	Manchester City Council
Site	The existing Barlow Hall Refuse Bailey Bridge, in Chorlton Water Park, Manchester, M21 7PG (NGR: SJ 82189 91660). It also includes the area within the RLB including the site compound.
Development Context and Brief	The Proposal is for a new bridge to be constructed over the River Mersey alongside enabling works to the existing river abutments which are to be extended upwards to accommodate the new bridge deck. The proposed works comprise modifying 2no existing abutments, installing and fixing the new bridge and reprofiling the approach roads on both sides of the bridge.
Flood Sources & Flood Risk	According to the EA 'Flood Map for Planning' the wider site is in a flood risk defended zone – i.e. it benefits from existing flood defences. This defended zone is an area where flood defence comprising embankments provide a minimum level of flood protection against fluvial flooding for flood events up to the 1:100-year event (1% annual exceedance probability). The risk of flooding from coastal/tidal sources is assessed to be negligible due to the inland location of the site, as well as the fact that the red-line boundary (RBL) is outside (upstream) of the normal tidal limit of the River Mersey. From further assessments undertaken in this FRA using the latest available flood model data from the Environment Agency, it was determined that in the 'present day' defended scenario (i.e., with the defences in place), the flood level from fluvial flooding at the site is **26.34mAOD** for the 1% AEP (1 in 100yr) event, and 27.74mAOD. for 0.1% AEP (1 in 1000yr) event. It should be noted that the 1%AEP level is both lower than the proposed bridge soffit level of 26.985m AOD, as well as higher than the site compound level, where the average ground level is circa 27.4m AOD. The proposed bridge soffit has a clearance of more than 0.6m above the 1% AEP flood level. For future scenarios where the effects of climate change are considered, the flood level for the 1% AEP (1 in 100yr) + 30% climate change allowance fluvial event is **26.77mAOD**. Again, the proposed design soffit level of 26.985m AOD is above this level. **NB:** the peak river flow allowances for Upper Mersey Management Catchment is 31% based on the latest EA guidance on climate change allowances recently updated in December 2024. The risk of fluvial flooding to traffic traversing the bridge structure is therefore assessed as **low** risk over its projected lifetime (assumed to be 50 years). We would normally recommend that the proposed design includes **a freeboard of 300mm,** so that the proposed design soffit level **is at a minimum level of 27.07m AOD.** However, given the stability implications and constraints of further raising the levels of the abutments plus other site constraints concerning the bridge approach levels, it would not be practicable to include this freeboard. The proposal is envisaged to also involve bank stabilisation works (soil nailing) which

	requires working in or near the channel of the main River Mersey. The risk of fluvial flooding particularly to site workers during construction is therefore assessed to be **medium risk** – i.e., prior to the implementation of relevant flood mitigation measures. However, after the implementation of flood mitigation measures during construction (see Section 4.10.1), the risk of fluvial flooding is assessed to be **low** at the site. Other sources of flood hazards assessed in this FRA are as follows. • Flooding from surface water – **low risk** • Flooding from ordinary watercourses, rhines etc. – **negligible** risk • Flooding from groundwater – **low risk** • Flooding from sewers – **low risk** • Flooding from the possible failure of existing artificial infrastructure – **low risk** Furthermore, the proposal does not have the potential to contribute additional flows into the public sewer network as there will be no increase in the development area footprint (compared to the exiting situation), or increase in impermeable areas, so the risk of flooding elsewhere (including third-party land), is assessed to be **low**. The proposal will also not have any adverse flood risk impact when the cumulative impact of the proposal with other local developments are considered, as there will be no net increase in surface runoff from the proposed development. It is the conclusion of this FRA that appropriate mitigation measures can adequately reduce flood risks where identified, thus making the development suitably safe from flooding. This report has satisfied the objectives set out in Section 1.7, demonstrating that the site is not at a significant level of flood risk from any of the sources of flood hazards assessed and that the Proposal will not increase flood risk elsewhere. Appropriate mitigation measures have been recommended for the proposed development where necessary.
Flood Risk Management Measures	It is envisaged that any short-term flood risks during the construction phase will be from River Mersey. These impacts will be mitigated by the contractor method statement to be agreed between the contractor and the regulatory bodies, and by the CEMP, a standard requirement of all major developments. The CEMP will also include a construction drainage strategy, outlining how flood risk and surface water will be managed at the site. The following recommendations and measures are proposed for the development: • All works including temporary works, formworks etc. should not increase flood risk, or cause blockage and debris build up in the channel. • If required, use localise cofferdams and flow bypass to keep turbidity and velocities manageable around works. • Contractor method statements and CEMP to include safety measures and guidance to raise awareness of the risk of flooding during construction, and

	describe specific actions required before, during and after a flood and the responsibilities of key personnel. • These documents are to include remote daily river level checks of upstream gauging stations and identify specific triggers to initiate and action procedures to secure the site and for safe evacuation off site. These should clearly detail emergency procedures for workers to evacuate the site to a safe muster point if required. • Where practicable, schedule construction, particularly bank stabilisation, in-channel, and abutment work to occur during the dry season to minimize flood risk, and erosion. • Where possible use precast bridge components off-site assembly to minimise flood risk and reduce disruption to the watercourse. CEMP and contractors' method statements to include adequate and clear provisions to safeguard against watercourse/waterbodies pollution such as provisions for accidental spillages and emergency measures, as well as for storage, containment, treatment.

1. Introduction

1.1 General

Pick Everard has been instructed by Manchester City Council to carry out a Flood Risk Assessment (FRA) for a new bridge to be constructed over the River Mersey alongside enabling works to the existing river abutments which are to be extended upwards to accommodate the new bridge deck. The proposed bridge will provide access over the river for pedestrians, horse riders, and cyclists and also provide occasional access for maintenance vehicles. The proposed development is to occur at the site of the previous Barlow Hall Refuse Bailey Bridge, Chorlton Water Park, Manchester, M21 7PG (NGR: SJ 82189 91660).

This assessment will evaluate flood risk at the site and the potential impact of the development on the local hydrology and flood risks elsewhere, including third parties. The assessment will also include recommendations, where appropriate, to mitigate or compensate for the impact of the development on flooding.

Our assessment has been carried out in accordance with the requirements of the National Planning Policy Framework (NPPF), the Environment Agency (EA) Guidance on Flood Risk and Coastal Change, BREEAM 2018. We have also referred to the Manchester City Council Strategic Flood Risk Assessment (SFRA) and Local Plan.

Pick Everard has many qualified engineers and consultants with a wealth of experience in undertaking Flood Risk Assessments, designing surface drainage systems, undertaking flow modelling and calculations, and designing flood alleviation measures.

1.2 Policy Context

The National Planning Policy Framework (NPPF) requires new development to be steered towards areas with the lowest probability of flooding. This decision-making process is referred to as the 'Sequential Test' and is closely linked to the Flood Zones (see Section 1.4), which are defined by the level of risk associated with flooding from rivers or the sea. A site located within Flood Zone 3 has a greater than 1% annual probability of flooding from these sources, while in Flood Zone 2 the annual probability of flooding is between 0.1 – 1%. All land outside Zones 2 and 3 falls into Flood Zone 1.

Development in Zones 2 & 3 is discouraged and should only be considered where there are no reasonably available sites in a lower risk zone. Certain types of development should not be permitted in higher risk flood zones, whilst others should only be allowed if certain conditions are met (known as the Exception Test). The suitability of a particular type of development for a specific flood zone will be dependent on its flood risk vulnerability classification (see Section 3.3). For example, residential housing is classed as 'more vulnerable', while commercial development is

classed as 'less vulnerable'. In terms of flood risk, there are no restrictions on the type of development which is considered appropriate for Zone 1.

Developments in Flood Zones 2 & 3 require an assessment of flood risk to support a planning application, the detail and scope of which should be proportional to the scale and vulnerability of the development.

For sites in Flood Zone 1, flood risk assessments are generally required for developments over 1ha in size to assess the potential of the development to increase flood risk elsewhere and to address the vulnerability of the site to other forms of flooding. The focus of such an assessment is generally the management of surface water run-off. Planning policy commonly requires that, as a minimum, run-off rates do not increase post development.

1.2.1 Overview of National Planning Policy Framework (NPPF)

National policy on planning and flood risk is set out in paragraphs 162 to 182 of the NPPF (December 2024) which is also supplemented by National Planning Practice Guidance (NPPG) for flood risk and coastal change, which was last updated in August 2022. The overarching aim of the NPPF is to ensure inappropriate development in areas at risk of flooding are avoided, which is achieved via application of the Sequential Test.

1.2.2 Relevant Local Planning Policy

Local planning policy provides more specific detail on development requirements based on the flood risk in the local county or borough. Although these policies will broadly be in line with national policy, where additional requirements are required, this will take precedence.

A list of relevant planning policy documents that were consulted during this FRA include:

- Manchester's Core Strategy 2012-2027 (Adopted July 2012)
- Places for Everyone Joint Development Plan (Adopted March 2024)
- Level 1 Strategic Flood Risk Assessment for Greater Manchester (March 2019)
- Manchester's Local Flood Risk Management Strategy (LFRMS) (March 2014)

1.2.2.1 Manchester's Core Strategy 2012-2027 (Adopted July 2012)

Manchester's Core Strategy was adopted on the 11 July 2012 and is the key document in the Manchester Local Plan. The core strategy sets out the long-term strategic policies for Manchester's future development. The policy related to flood risk is Policy EN14 Flood Risk (see Figure 1).

Manchester's Core Strategy was updated in March 2024, after the Places for Everyone joint development plan was adopted. The section to be replaced in CS Policy EN14 Flood Risk is the third bullet point except final sentence.

Policy EN 14

Flood Risk

- In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).
- In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.
- All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure. Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.
- The City of Manchester contains many sections of rivers which are culverted or 'hidden'; where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.

Figure 1: CS Policy EN14: Flood Risk from Manchester's Core Strategy 2012-2027

1.2.2.2 Places for Everyone Joint Development Plan (Adopted March 2024)

Places for Everyone (PfE) is a long-term plan sets out how the nine Greater Manchester districts (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford, and Wigan) should develop up until 2039 for jobs, new homes, and sustainable growth. The plan is a joint development plan of the nine districts which determines the kind of development that takes place in their boroughs, maximising the use of brownfield land and urban spaces while protecting Green Belt land from the risk of unplanned development. The policy that replaced the Manchester's Core Strategy is Policy JP-S4: Flood Risk and the Water Environment (see Figure 2).

Policy JP-S4: Flood Risk and the Water Environment

An integrated catchment-based approach will be taken to protect the quantity and quality of water bodies with reference to the North West River Basin Management Plan and managing flood risk, by:

1. Returning rivers to a more natural state, where practicable;
2. Working with natural processes and adopting a natural flood management approach to slow the speed of water drainage and intercept water pollutants;
3. Locating and designing development so as to minimise the impacts of current and future flood risk, including retrofitting or relocating existing developments, infrastructure and places to increase resilience to flooding;
4. Expecting developments to manage surface water run-off through sustainable drainage systems and as close to source as possible. Development should achieve greenfield run-off rates unless it is demonstrated to be impracticable. District local plans should consider setting more detailed surface water drainage policies to reflect local circumstances, including alternative surface water discharge rates, such as in areas with critical drainage issues;
5. Ensuring that sustainable drainage systems:
   i. Are designed to provide multifunctional benefits wherever possible, including for water quality, nature conservation and recreation;
   ii. Avoid adverse impacts on water quality and any possibility of discharging hazardous substances to ground;
   iii. Are delivered in a holistic and integrated manner, including on larger sites split into different phases; and
   iv. Are managed and maintained appropriately to ensure their proper functioning over the lifetime of the development.
6. Securing the remediation of contaminated land and the careful design of developments to minimise the potential for urban diffuse pollution to affect the water environment; and
7. As a minimum, residential development should meet the mandatory water efficiency standard of 125 litres/person/day as set out in Building Regulations. District local plans may and should consider setting a tighter water efficiency standard of 110 litres/person/day where there is a clear local need with reference to national guidance on housing optional technical standards.

Figure 2: Policy JP-S4: Flood Risk and the Water Environment from PfE Joint Development Plan

1.2.2.3 Level 1 Strategic Flood Risk Assessment for Greater Manchester (March 2019)

The Strategic Flood Risk Assessment (SFRA) for Greater Manchester provides a Level 1 overview of flood risks across the region, supporting sustainable spatial planning. It identifies areas vulnerable to river, surface water, groundwater, and reservoir flooding, highlighting the importance of climate change adaptation.

1.2.2.4 Manchester's Local Flood Risk Management Strategy (LFRMS) (March 2014)

The LFRMS's overall aim is to ensure that local flood risk is properly managed by using the full range of options in a coordinated way. This will be achieved by meeting overarching objectives for managing local flood risk:

- Reduce the likelihood, severity, and consequences of flooding from Ordinary Watercourses, from Groundwater, and from Surface Water Runoff
- Seek opportunities to improve water quality and biodiversity through flood risk management activities.

1.3 Sequential Test Process

The aim of the sequential test to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. Paragraph 23 of the NPPG states 'This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding.' If the location of the low-risk area is not suitable due to wider sustainability objectives then progressively higher risk areas (Flood Zone 2/Flood Zone 3) can be considered, provided the development will be suitably safe from flooding and does not increase flood risk in other areas.

The process for undertaking the Sequential Test is shown in Figure 3 and Figure 4. Table 1 (taken from Table 1 of NPPG) details the corresponding meaning of flood zones in relation to flood risk.

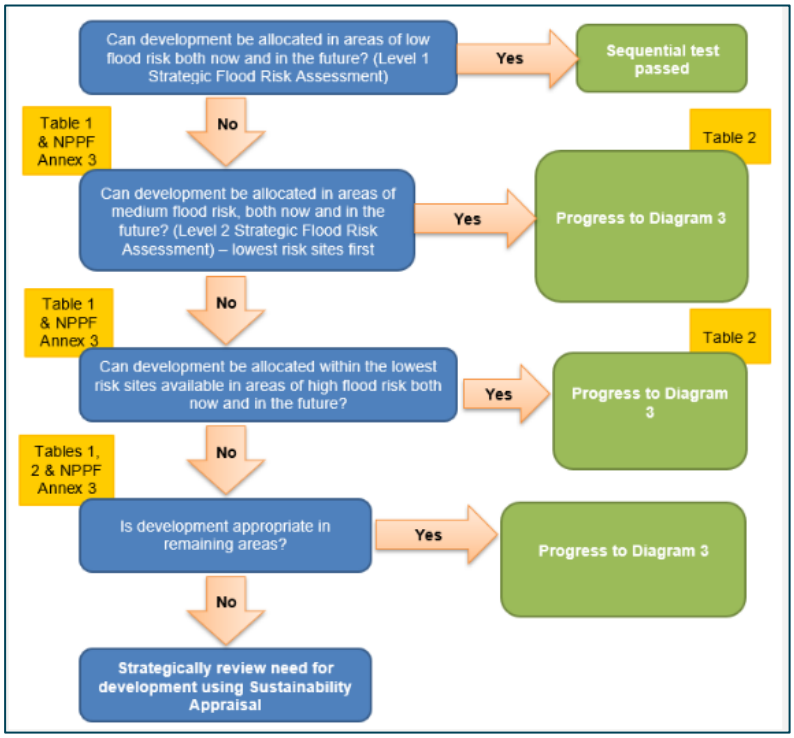


Figure 3: Process of the Sequential Test (Diagram 2 – PPG Paragraph 025)

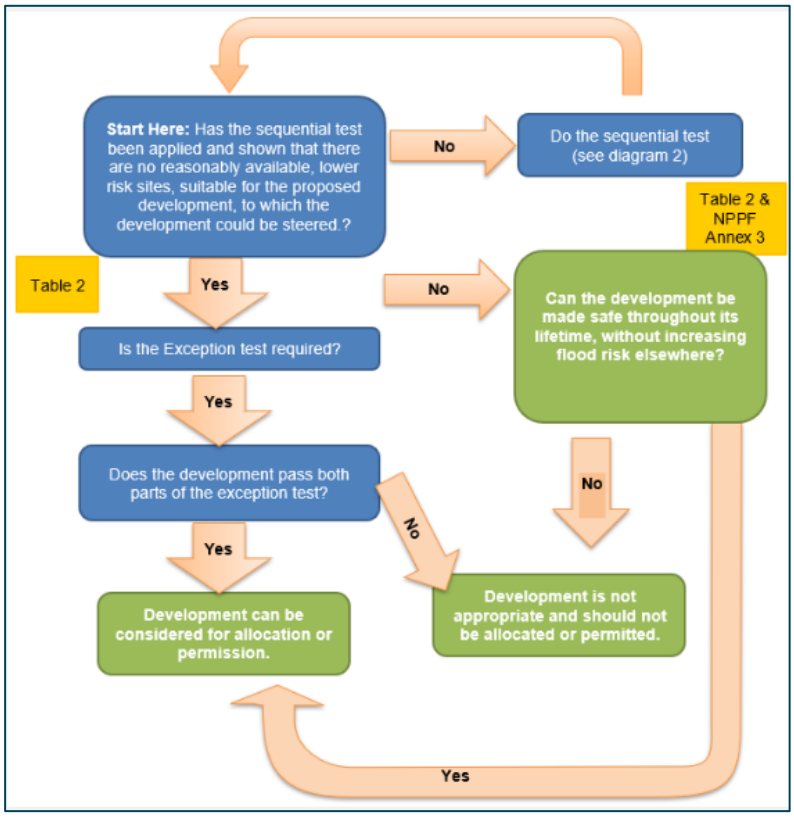


Figure 4: Process of the Sequential Test (Diagram 3 – PPG Paragraph 025)

Table 1: Definition of Flood Zones (as defined in the NPPG)

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 0.1% annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b).
Zone 2 Medium Probability	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding. (Land shown in light blue on the Flood Map).
Zone 3a High Probability	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea. (Land shown in dark blue on the Flood Map).
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea must flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).

Certain development may require an Exception Test before it is considered acceptable.

1.4 Development Vulnerability and Flood Zone Compatibility

After undertaking the Sequential Test, the vulnerability of development to flooding must be considered so that more vulnerable uses are given priority for lower risk land. Refer to Table 2 (Paragraph 079) of NPPG which shows the Flood risk vulnerability and flood zone 'incompatibility' and requirements for the Exception Test.

1.5 Design Flood Event

The development should be flooding resistant and resilient including having safe access and escape routes for the following extreme flood events, also known as the 'design flood' (taken from Paragraph 002 of NPPG):

- river flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year).

or

- tidal flooding with a 0.5% annual probability (1 in 200 chance each year); or
- surface water flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year),

plus, an appropriate allowance for climate change.

Climate change is projected to increase the likelihood of flooding from most flood sources and therefore an assessment of the effects of climate change should be considered over the estimated lifetime of the development.

The lifetime of the proposed development has been assumed to be **50** years; from baseline of **2026** (this means assessing the flood level up to **2076** or later).

1.6 Flood Risk Assessment Requirements

Footnote 63 of the NPPF states that a site-specific FRA is required for developments which:

- Are in Flood Zone 2 or 3.
- Are more than 1 hectare (ha) in Flood Zone 1.
- Are in an area which has critical drainage problems as notified by the Environment Agency.
- Land identified in a strategic flood risk assessment as being at increased flood risk in the future.
- Could be affected by sources of flooding other than rivers and the sea (e.g., surface water drains, reservoirs).
- Where a development will introduce a more vulnerable use.

The focus of FRAs for the higher risk zones is to fully assess the extent, depth, and hazard of flood waters, detail the required mitigation to manage flood risk (e.g., floor levels and access, evacuation routes, compensatory storage) and outline a surface water management plan.

FRAs for sites where the risk of flooding from rivers or the sea is classified as low (Flood Zone 1) will still need to assess all other sources of flood risk but will have a strong focus on management of surface water runoff.

1.7 Objectives

The main objectives of this FRA report, as recommended in the NPPF, are:

- To assess the site suitability in terms of the Sequential Test and, if required, the Exception Test.
- To identify the probability of flooding at the development.
- To assess the compatibility of the development with the flood risk zone.
- To identify the consequence of flooding at the development and suitable mitigation measures if required.
- Demonstrate that the development will not increase flood risk elsewhere, and where possible, will reduce flood risk.

1.8 Limitation

The information, views and conclusions drawn concerning the site are based, in part, on information supplied to Pick Everard by other parties. Pick Everard has proceeded in good faith on the assumption that this information is accurate. Pick Everard accepts no liability for any inaccurate conclusions, assumptions or actions taken resulting from any inaccurate information supplied to Pick Everard from others.

2. Site Setting

2.1 Site Description and Layout

The site consists of the existing Barlow Hall Refuse Bailey Bridge, Chorlton Water Park, Manchester, M21 7PG. It can be located by National Grid Reference (NGR) SJ 82189 91660. The site boundary can be seen in Figure 5.



Imagery ©2025 Maxar Technologies, Map data ©2025

Figure 5: Site location.

The existing structure comprises two bridge abutments on opposite side of the River Mersey; the bridge deck has been removed, leaving the abutments in situ, prior to renewal of the bridge deck. The site can be assessed through the Chorlton Water Park for the northern abutment and Kenworthy Woods for the southern abutment.

2.2 Proposed Development

The proposed development includes a new bridge superstructure replacing the exiting Barlow Hall Refuse Bailey Bridge. The existing bridge abutments were stable in their current configuration and would remain so with the addition of a replacement bridge deck. Protective measures were required to address the risk of erosion negatively

impacting the abutment stability, and soil nails with facing system to provide protection to the riverbank and shoulders to the existing abutments.

The proposed main bridge plan is attached in Appendix A.

2.3 Topography

A topographical survey weas done by Survey Solutions (5th July 2024). For the northern abutment, the elevations at the top and bottom of the bank are around 27.3mAOD and 26.36mAOD, respectively. The level of the exiting northern abutment is 26.47mAOD. For the southern abutment, the elevations at the top and bottom of the bank are around 27.5mAOD and 26.5mAOD, respectively. The level of the existing northern abutment is 26.33mAOD.

The topographical survey is attached in Appendix B.

2.4 Public Sewers and Existing Drainage

According to EA's Asset Management, there is a surface water outfall approximately 170m downstream of the southern abutment, which is maintained by the EA.

2.5 Geology and Hydrogeology

The geology of the site is shown on the 1:50,000 scale British Geological Survey (BGS) map and on the BGS website's Geology of Britain viewer. A review of the available data indicates the anticipated geology at the site can be summarised as follows:

Superficial Deposits

- Alluvium - Clay, silt, sand, and gravel.

Bedrock

- Tarporley Siltstone Formation - Siltstone, mudstone, and sandstone.

The site is above a Secondary B Bedrock aquifer overlay with a Secondary A Superficial Drift aquifer. Secondary A aquifer is defined as '*permeable layers that can support local water supplies, and may form an important source of base flow to rivers*' and Secondary B aquifer defined as '*mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers*'. Groundwater vulnerability in the RLB area as identified by DEFRA's 'Magic Map' is 'Medium – High'. The site does not fall within a Source Protection Zone (SPZ).

According to LandIS 'Soilscapes,' the entire site is underlain by 'Soilscape 20' described as '*Loamy and clayey floodplain soils with naturally high groundwater*'. Soil drainage is described as '*naturally wet*' and drains to local groundwater feeding into river.

A Ground Investigation Report produced by Pick Everard dated 24th October 2024 (Reference: MC/CHO/240960/17-2/R001) indicates groundwater struck at 7.50mbgl and rose 7.00mbgl for the borehole near the southern abutment. For the borehole near the northern abutment, groundwater was struck at 7.50mbgl and rose to 3.00mbgl. Return groundwater monitoring results indicated resting groundwater levels were recorded between 5.15mbgl and 5.45mbgl.

3. Hydrology

3.1 Catchment

According to the EA's 'Main rivers Map' and 'Catchment Data Explorer', the site is in the catchment of a main river, River Mersey (upstream of Manchester Ship Canal) and is located in the Bollin Dean Mersey Upper Operational Catchment (see Figure 6). A main river refers to those watercourses under the jurisdiction of the EA.

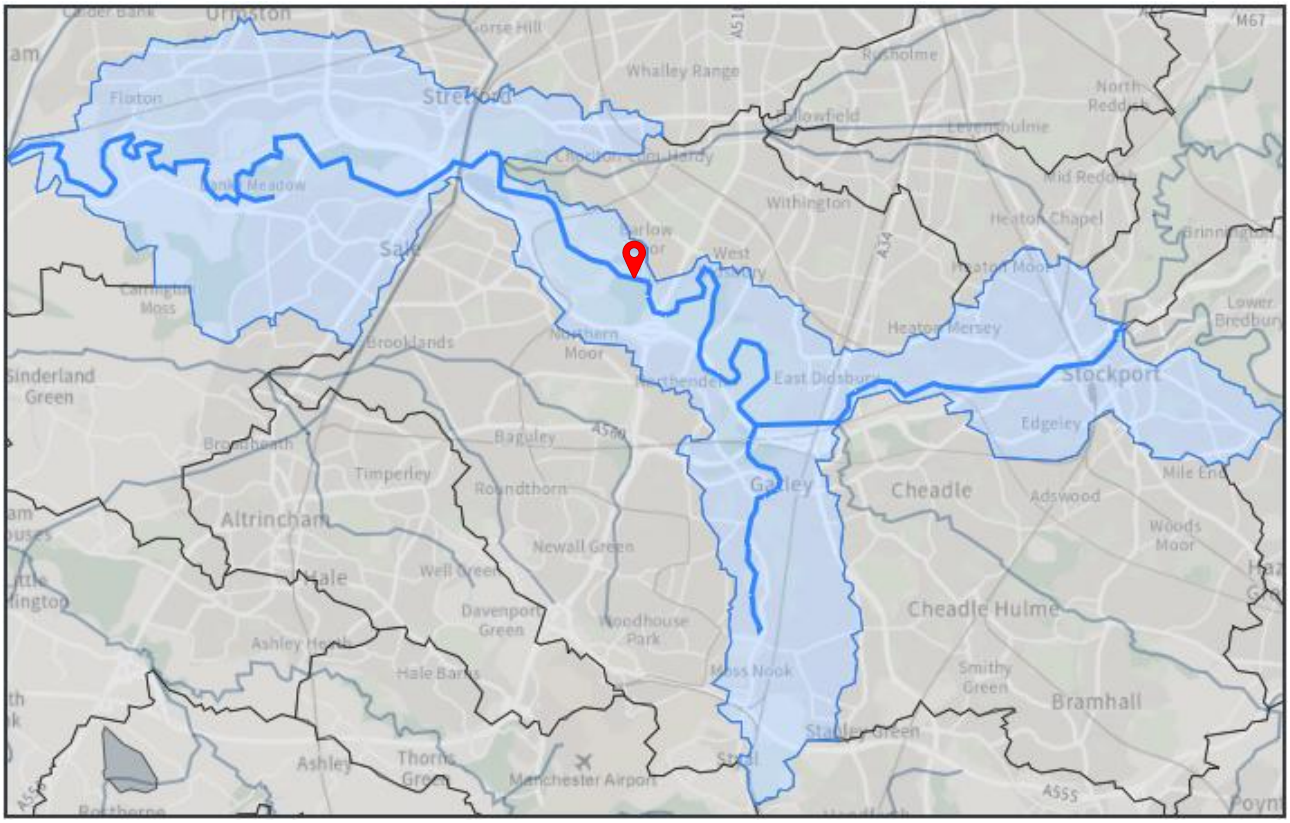


Figure 6: River Mersey and Catchment

There are no "ordinary watercourses" identified on site. Ordinary watercourses refer to those under the jurisdiction of the LLFA, which in this case is the Manchester City Council.

3.2 Nearest Watercourses

The site is located on the River Mersey.

3.3 Flood Zone

The EA 'Flood Map for Planning' shows that the site is in Flood Zone 2 and 3 (see Figure 7). For Flood Zone 2, this means, in any year, land has between a 1% and 0.1% (between 1 in 100 and 1 in 1,000) chance of flooding from rivers

and between a 0.5% and 0.1% (between 1 in 200 and 1 in 1,000) chance of flooding from the sea. For Flood Zone 3, this means, in any year, land has a 1% (1 in 100) or more chance of flooding from rivers, or a 0.5% (1 in 200) or more chance of flooding from the sea.

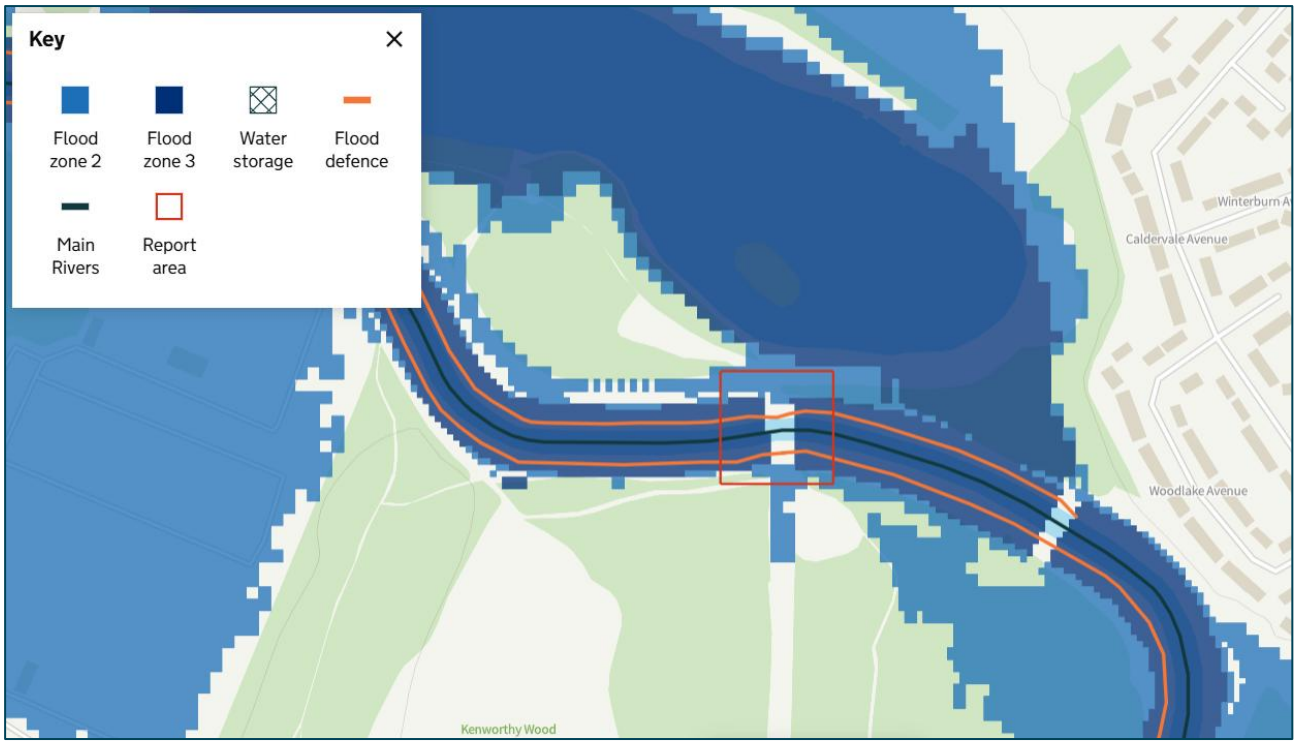


Figure 7: EA Flood Map for Planning

Flood Zone 3 is divided into Flood Zone 3a and Flood Zone 3b in the classifications in NPPG. The Flood Map for Planning does not differentiate the boundary between the two flood zones; this is decided by local planning authorities in the SFRA. The Level 1 SFRA indicated that the site is located in Flood Zone 3b (see Appendix C).

The Proposal can be classified as an 'Essential Infrastructure' development, in accordance with Paragraph 079 of the NPPG. Essential Infrastructure developments require exception test in accordance with Table 2 (taken from Table 3 of the NPPG).

This FRA is part of the evidence base to inform the exemption test.

Table 2: Flood Risk Vulnerability and Flood Zone 'Compatibility'

	Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
FZ	Zone 1	✓	✓	✓	✓	✓

Zone 2	✓	✓	Exception Test required	✓	✓
Zone 3a†	Exception Test required†	✓	×	Exception Test required	✓
Zone 3b*	Exception Test required*	✓	×	×	×

Where ✓ means Exemption Test is not required, and × means the development should not be permitted.

"†" In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

"" In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:*

- *remain operational and safe for users in times of flood.*
- *result in no net loss of floodplain storage.*
- *not impede water flows and not increase flood risk elsewhere.*

3.4 Impact of Climate Change

The NPPF states that the FRA should assess the increased risk posed by climate change over the development lifetime. The site will also be affected by the projected increased risk of fluvial surface water flooding and any mitigation for the site should make sure that they protect the site now and into the future.

EA guidance on climate change allowances to support the NPPF came into effect in February 2016 and were recently updated in December 2024.

The range of allowances is based on percentiles. The:

- central allowance is based on the 50th percentile.
- higher central allowance is based on the 70th percentile.
- upper end allowance is based on the 95th percentile.

An allowance based on the 50th percentile is exceeded by 50% of the projections in the range. At the 70th percentile it is exceeded by 30%. At the 95th percentile it is exceeded by 5%.

According to NPPG (2023) when designing safe access, escape routes and places of refuge, use the central allowance for all development types except for essential infrastructure to ensure the safety of people using the development. For essential infrastructure, the guidance says that the higher central allowance should be used.

The site is within the Upper Mersey Management Catchment with a development lifespan of 50 years. Based on NPPG guidance for 'Essential Infrastructure' development in Flood Zone 3b, the higher central allowance should be used to assess a range of allowances for fluvial flood events, as shown in Table 3.

Table 3: Peak River Flow Allowances for Upper Mersey Management Catchment

	Central	Higher	Upper
2020s	13%	17%	27%
2050s	22%	31%	51%
2080s	41%	53%	85%

Table 4 shows the recommended allowances for peak rainfall intensity for different statistical likelihoods. The upper end allowance should be used in areas where there are known flooding issues and there is highly vulnerable development in the downstream sewer network.

Table 4: Peak Rainfall Allowances for Upper Mersey Management Catchment

3.3% annual exceedance rainfall event	Central	Upper
2050s (epoch)	20%	35%
2070s (epoch)	30%	40%
1% annual exceedance rainfall event	**Central**	**Upper**
2050s (epoch)	25%	40%
2070s (epoch)	30%	45%

** Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.*

3.5 Source of Flood Risk

In accordance with British Standards report 'BS 8533', the flood risk elements that need to be considered for any site are:

- Flooding from rivers (fluvial) – occurs when the flows exceed channel capacity or due to a failure of flood defences.
- Flooding from the sea (tidal / coastal flood risk) – tidal flooding is caused by the funnelling of tides along estuaries and rivers, and coastal flooding occurs from wave action.
- Flooding from surface water/pluvial (overland flow) – occurs when intense rainfall is unable to soak into the ground and runs over the ground surface, collecting in low-lying areas which are impermeable and / or not served by adequate drainage systems.
- Flooding from groundwater – occurs when water in the ground rises above surface elevations. Bedrock flooding typically occurs in low-lying areas underlain by permeable bedrock where pore spaces in the rock allow the water

table to rise rapidly following extended periods of rainfall. Superficial deposit flooding may occur in unconsolidated deposits which lie on river floodplains following high in-bank river levels or in deposits underlain by low permeability bedrock.

- Flooding from sewers – occurs when the sewer is overwhelmed by heavy rainfall, becomes blocked, is of inadequate capacity or due to pumping station failure.
- Flooding from Artificial Structures – this is flooding from reservoirs, canals, and ponds due to infrastructure failure or breach.

3.6 Historical Flooding

The EA indicates that there have been historical flood events within the site area. Figure 8 shows a recorded fluvial flood event occurred in January 1964 at the northern bank of the site, reason unknown. There are also more recent flood records upstream of the site such as January 2025.

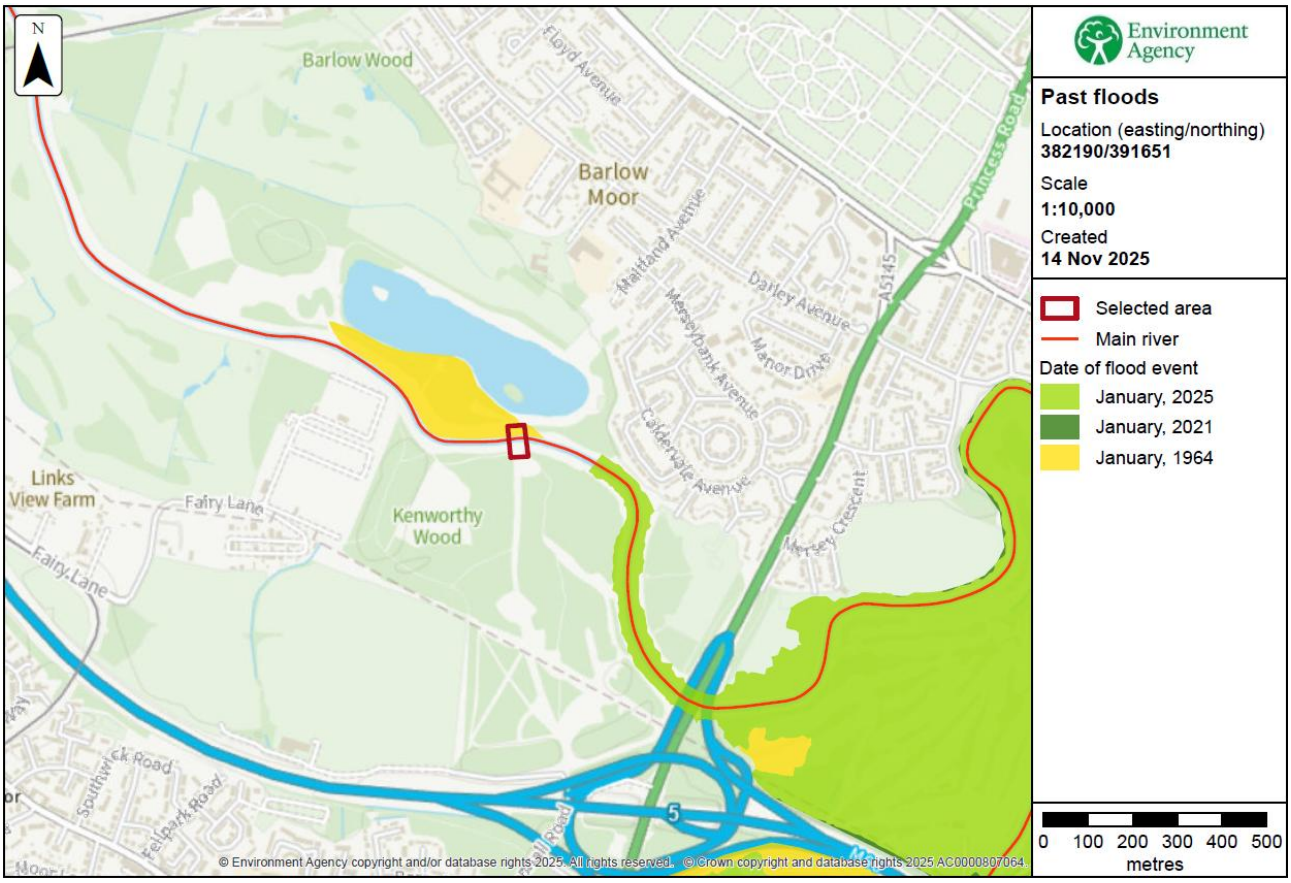


Figure 8: Historical flood outlines.

3.7 Flood Defences

As was identified by the EA 'Flood Map for Planning', the wider site is in an area benefitting from flood defences (see Figure 9). The flood defences managed by the EA and are in fair condition with a standard of protection up to 100 years. The embankments along the northern riverbank near the site have an effective crest level of 27.19mAOD upstream and 28.23mAOD downstream. The embankments along the southern riverbank have a crest level of 26.57mAOD upstream and 21.46mAOD downstream.

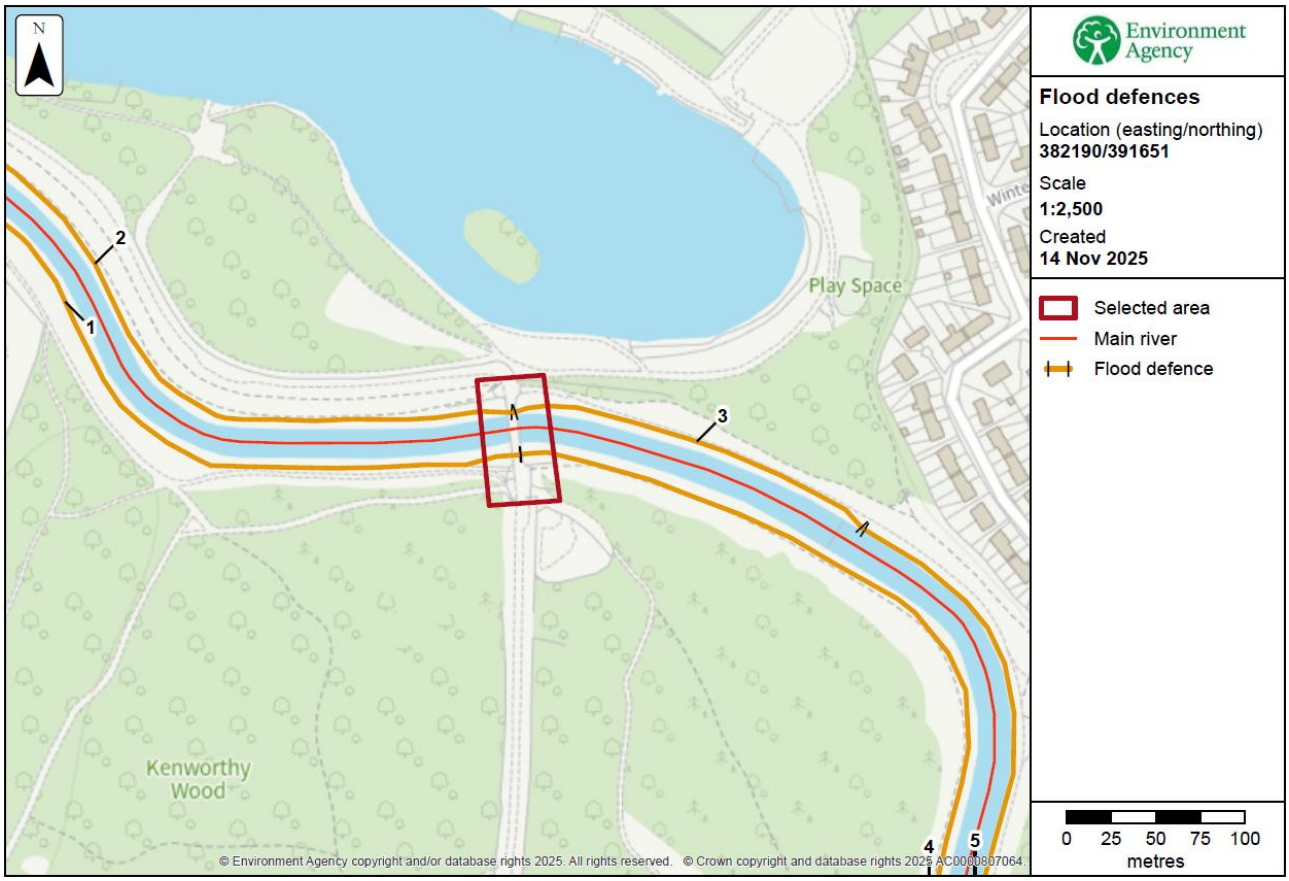


Figure 9: Flood defences at the site.

4. Flood Risk to the Site

4.1 Fluvial and Tidal Flooding

As previously mentioned, the bridge is in Flood Zone 3b which is an area at risk fluvial flooding with a 1% or more chance of flooding from rivers each year. According to the EA 'Flood Map for Planning' the access and egress of the wider site is in a flood risk defended zone – i.e. it benefits from the existing flood defences. This defended zone (which provides protection from fluvial sources of flood risk) is an area where existing flood risk management infrastructure provides a minimum standard of protection against flooding from the river for the 1:100-year event (1% annual exceedance probability).

The risk of flooding from coastal/tidal sources is assessed to be negligible due to the inland location of the site, as well as the fact that the red-line boundary (RBL) is outside (upstream) of the normal tidal limit of the River Mersey.

4.1.1 Flood Risk from EA Flood Model Data

The EA used the model Upper Mersey 2017 to produce maps which includes the following modelled scenarios (Appendix D):

- Defended modelled fluvial: risk of flooding from rivers where there are flood defences.
- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed.
- Defended climate change modelled fluvial: risk of flooding from rivers where there are flood defences, including estimated impact of climate change.
- Defences removed climate change modelled fluvial: risk of flooding from rivers where flood defences have been removed, including estimated impact of climate change.

Defended Scenario

In 'present day' scenario with defences, the flood level for the 1% AEP (1 in 100yr) event is **26.34mAOD**, and for 0.1% AEP (1 in 1000yr) event is 27.74mAOD. Figure 10 shows that the flood extent of the 1% AEP event is contained within the riverbank, while the 0.1% AEP reaches slightly over the riverbanks.

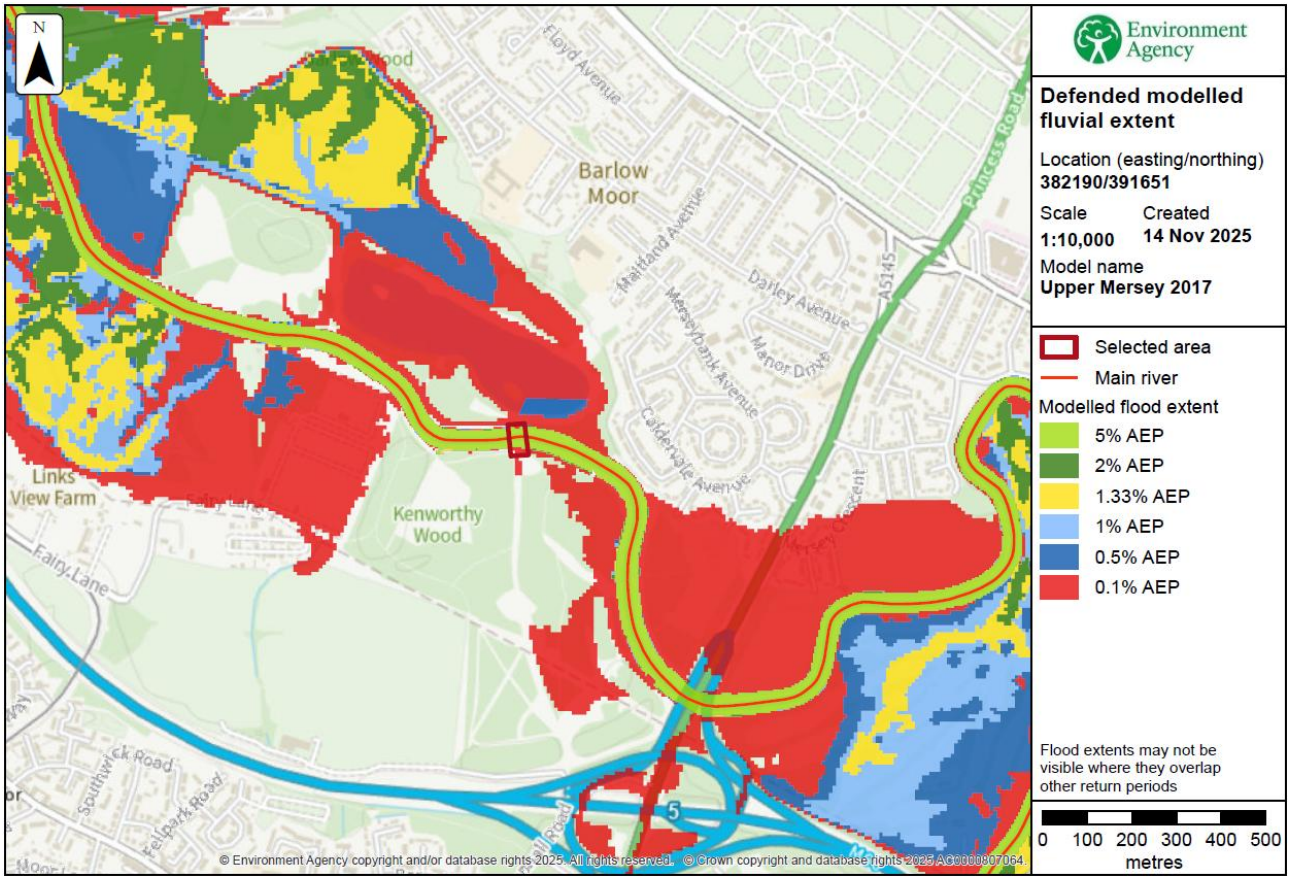


Figure 10: Defended modelled fluvial event.

Undefended Scenario – where defences are removed.

In 'present day' scenario with defences removed, the flood level for the 1% AEP (1 in 100yr) event is **25.79mAOD**, and for 0.1% AEP (1 in 1000yr) event is 26.49mAOD. Figure 11 shows that the flood extents of the above events are contained within the riverbank.

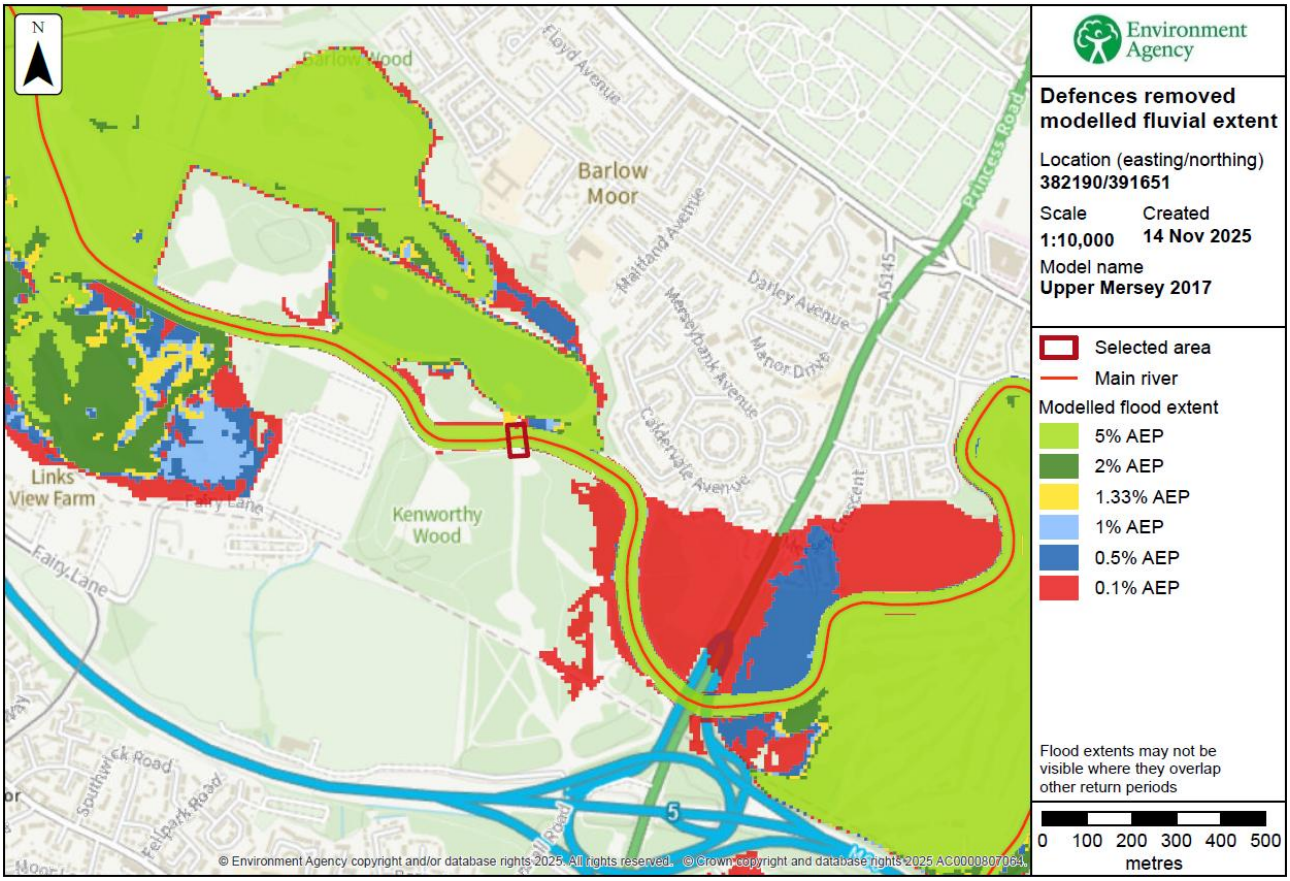


Figure 11: Defences removed modelled fluvial extent.

Defended Scenario with consideration of the future effects of climate change.

In future scenarios with defences, the flood level for the 1% AEP (1 in 100yr) + 35% climate change allowance event is 26.92mAOD, and for 0.1% AEP (1 in 1000yr) + 30% climate change allowance event is 28.15mAOD. shows that the flood extent of the 1% AEP event is contained within the riverbank, while the 0.1% AEP reaches slightly over the riverbanks.

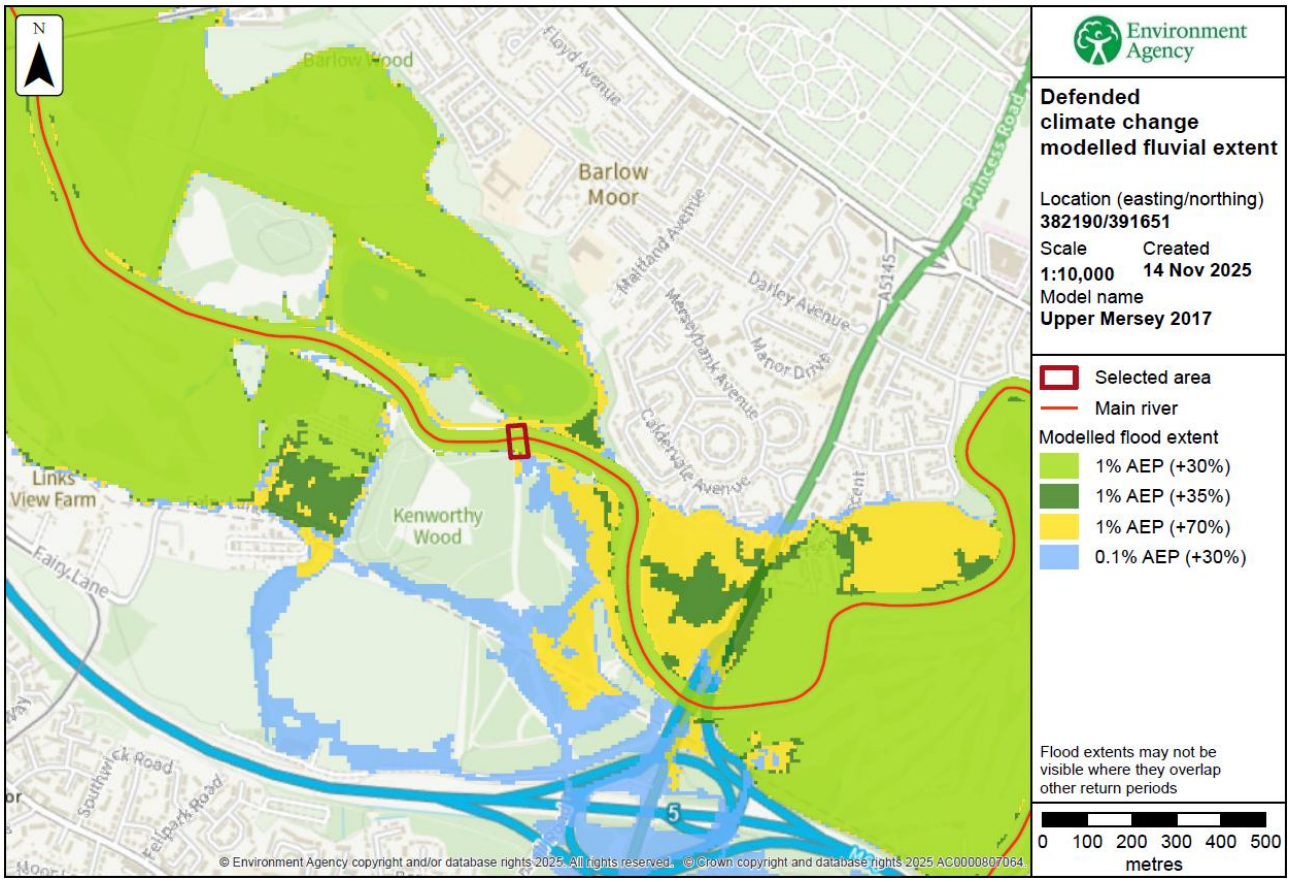


Figure 12: Defended climate change modelled fluvial extent.

Undefended Scenario with the consideration of the future effects of climate change

In future scenarios with defences removed, the flood level for the 1% AEP (1 in 100yr) + 35% climate change allowance event is **26.19mAOD**, and for 0.1% AEP (1 in 1000yr) + 30% climate change allowance event is 26.84mAOD. shows that the flood extent of the 1% AEP event is contained within the riverbank, while the 0.1% AEP reaches slightly over the riverbanks.



Figure 13: Defences removed climate change modelled fluvial extent.

4.1.1.1 Fluvial flood risk

For the 'present day' defended scenario (i.e., with the defences in place), the flood level from fluvial flooding at the site is **26.34mAOD** for the 1% AEP (1 in 100yr) event, and 27.74mAOD. for 0.1% AEP (1 in 1000yr) event. It should be noted that the 1%AEP level is both lower than the proposed bridge soffit level of 26.985m AOD, as well as higher than the site compound level, where the average ground level is circa 27.4m AOD. The proposed bridge soffit has a clearance of more than 0.6m above the 1% AEP flood level.

For future scenarios where the effects of climate change are considered, the flood level for the 1% AEP (1 in 100yr) + 30% climate change allowance fluvial event is **26.77mAOD**. Again, the proposed design soffit level of 26.985m AOD is above this level.

The risk of fluvial flooding to traffic traversing the bridge structure is therefore assessed as **low** risk over its projected lifetime (assumed to be 50 years). We would normally recommend that the proposed design includes **a freeboard of 300mm,** so that the proposed design soffit level **is at a minimum level of 27.07m AOD.** However, given the stability implications and constraints of further raising the levels of the abutments plus other site constraints concerning the bridge approach levels, it would not be practicable to include this freeboard.

4.2 Surface Water Flooding

Surface water flooding is caused by heavy rainfall events that cause significant surface runoff and ponding of accumulated water. For greenfield sites, the probability and impact of flooding is heavily dependent on the topography of a site, as well as the ground conditions and infiltration capability. For brownfield sites, surface water flooding can be impacted by the condition and or the capacity of the existing drainage system in place.

As can be seen from the EA surface water flood map (Figure 14), the site has a very low risk of surface water flooding. This represents there is less than 0.1% chance of a flood each year at the site. The area south of the site has a pocket with medium chance of surface water flooding, meaning there is between 1% and 3.3% chance of flooding each year.

The risk from surface water flooding to the site is assessed to be **low**.

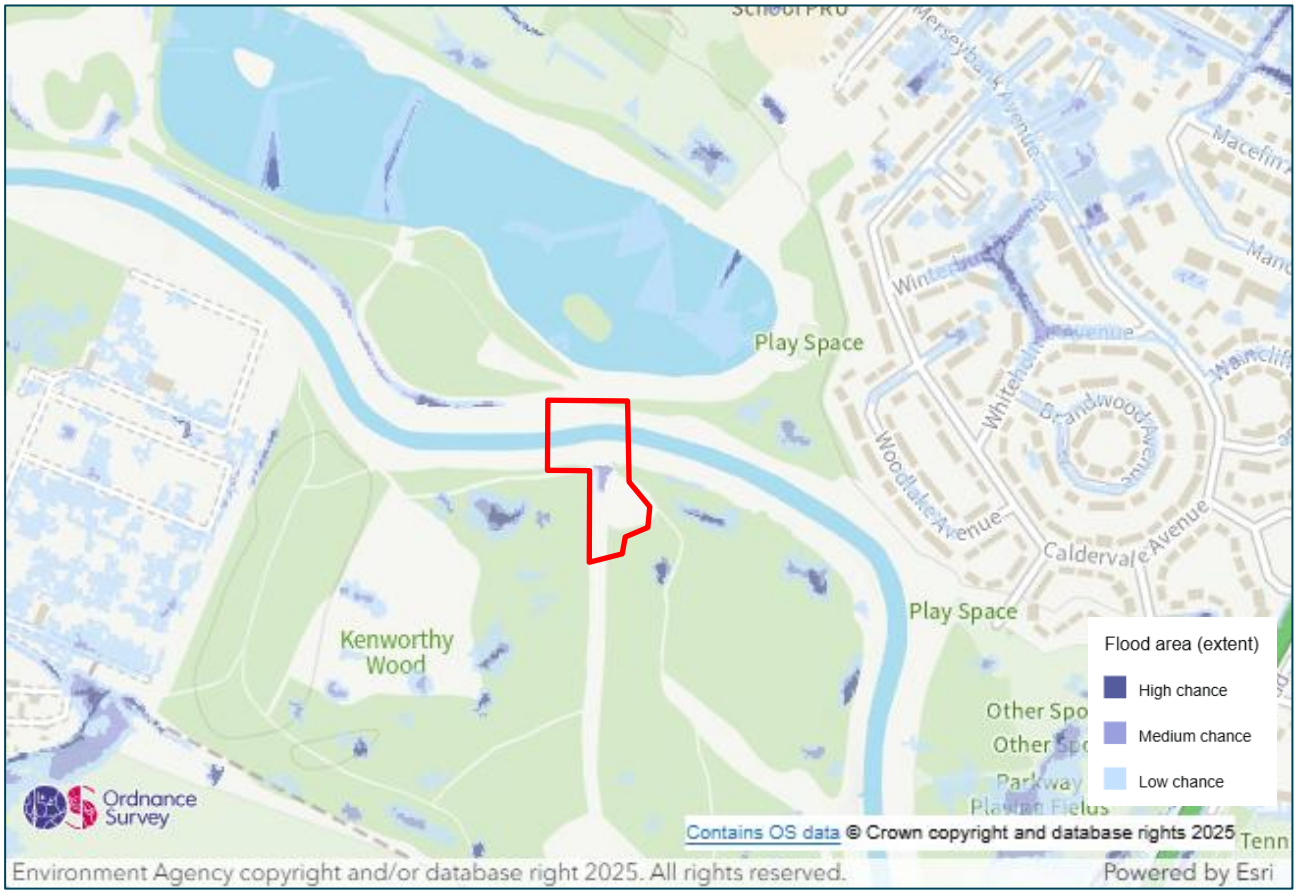


Figure 14: EA surface water flood risk map.

4.3 Ordinary Watercourse Flooding

According to EA's 'Main rivers Map', there are no ordinary watercourses located on site. Therefore, the risk of flooding from ordinary watercourses is assessed to be **negligible**.

4.4 Groundwater Flooding

Groundwater flooding typically occurs when water levels rise above surface elevations from underlying rocks or springs following prolonged rainfall. The two most common mechanisms of groundwater flooding are:

1. Bedrock Flooding – occurs following extended periods of rainfall in areas underlain by a permeable bedrock outcrop. Typically, chalk aquifers pose the greater risk, where the large pore spaces in the rock allow the water table to rise rapidly. Settlements most at risk are those in low-lying areas and at the base of steep-sided valleys at the interface between permeable and impermeable strata (where the groundwater table is naturally closer to the ground surface).

2. Superficial Deposit Flooding – occurs in permeable unconsolidated deposits (e.g., gravel) which lie on river floodplains following high in-bank river levels.

The Manchester's LFRMS indicates that the site is in an area at risk of groundwater flooding. However, a Ground Investigation Report produced by Pick Everard dated 24th October 2024 (Reference: MC/CHO/240960/17-2/R001) indicates groundwater struck at 7.50mbgl and rose 7.00mbgl for the borehole near the southern abutment. For the borehole near the northern abutment, groundwater was struck at 7.50mbgl and rose to 3.00mbgl. Return groundwater monitoring results indicated resting groundwater levels were recorded between 5.15mbgl and 5.45mbgl.

Soil nailing does not inherently impact groundwater or groundwater movement. Also, the proposed works including construction works will not materially impact groundwater given there is no foundation works and limited excavation. Therefore, given the scale of the proposed development, the risk of groundwater flooding is assessed to be **low**.

4.5 Sewer Flooding

According to the Level 1 SFRA, United Utilities (UU) provide information on historic incidents of flooding from the sewer network, due to hydraulic failure. The interactive map in Appendix C shows that there is no recorded historical sewer flooding in UU's register near the site. The risk of sewer flooding is assessed to be **low**.

4.6 Flooding from Failure of Existing Artificial Infrastructure

According to the EA 'Long Term Flood Risk Map for England', the proposed development is within an area at risk of flooding from failure of existing artificial infrastructure. It is likely that there will be little, or no warning of a reservoir breach and flooding would be almost instantaneous. Figure 15 indicates the extent of flooding, which envelops the entire site. The reservoirs that could affect the proposed route are Kinder, Brushes (Stalybridge), Dovestone, Yeoman

Hey, Errwood, Toddbrook, Valehouse, Bottoms (Longdendale), Greenfield, Swineshaw Lower (Stalybridge), Bollinhurst, Woodhead, Rhodeswood, Castleshaw Upper, Dowry, Fernilee, Arnfield Reservoir, Audenshaw No.3, Crookgate, Combs, Torside, Swineshaw Higher (Stalybridge), Castleshaw Lower, Rooden, Chew, Audenshaw No.1, Horse Coppice, Readycon Dean, Walkerwood and Audenshaw No.2 reservoirs. They are mainly owned by United Utilities PLC, and some are owned by Canal & River Trust.



Figure 15: Extent of Flooding from Reservoirs

Reservoirs in the UK have an extremely good safety record. The Environment Agency is the regulatory authority for the Reservoirs Act 1975 in England and Wales. All large reservoirs must be inspected and supervised by reservoir panel engineers on an annual basis.

Therefore, the risk of failure these reservoirs is considered to be extremely **low** owing to the strict maintenance and inspection regime enforced by law and therefore should not be regarded as an issue to constrain the proposed development. Furthermore, these areas at risk generally follow areas of fluvial flooding and hence mitigation for fluvial flood risk would also largely mitigate the very low risk from reservoir flooding.

4.7 Impact of Development on Flood Risk Elsewhere

A key requirement of this FRA, along with assessing flood risk to the site, is to adequately assess the impact of the Proposal on flood risk elsewhere. This involves determining the source of risk (e.g., changes to the site), the pathway of risk (e.g., re-direction of flow) and the receptors to the risk (e.g., nearby properties).

Although the details of specific construction techniques and temporary works to be used are not known at this stage, all construction activities should be regulated by the relevant statutory regulatory authorities and method work statements should be agreed prior to the commencement of any works.

It is envisaged that any short-term flood risks during the construction phase will be from the watercourse of interest and from an increase in surface water runoff. These impacts will be mitigated by the contractor method statement to be agreed between the contractor and the regulatory bodies, and by the CEMP, a standard requirement of all major developments. The CEMP will also include a construction drainage strategy, outlining how flood risk and surface water will be managed at the site.

The proposed construction activities are therefore assessed to not increase flood risk to third party properties and assets in the study area.

4.8 Cumulative Impact on Flood Risk

Under the new NPPF guidelines, the cumulative impact on flood risk from both the Proposal and from surrounding developments must be assessed. This should involve determining where there are common flood sources, pathways and receptors and assessing the scale and timings of any impacts likely.

According to the Manchester City Council planning portal, there are no nearby major developments, including upstream and downstream of the site. It is assessed that there are no cumulative impacts from the Proposal and other developments.

4.9 Safe Access and Egress

The SFRA stipulates that safe access, and egress should be maintained for the lifetime of the development. As the wider site including access roads benefit from existing flood defence and flood management, safe access and egress will need to be ensured. The site is also located within the EA flood warning area.

4.10 Mitigation and Management Requirements

Flood risk mitigation and management measures for the development are determined by way of the hierarchical process outlined in Section 5 of the BS 8533:2017 'Assessing and Managing Flood Risk in Development – Code of Practice'. Application of this hierarchy is as follows:

1. **Stage 1 – Assessing and understanding the flood risk:**
   A sound understanding of the sources of flood risk and how it varies over the site has been achieved.

2. **Stage 2 – Avoiding the Risk:**
   As the site automatically passes the Sequential Test, this is not required.

3. **Stage 3 – Substitution:**
   As the site automatically passes the Sequential Test, this is not required.

4. **Stage 4 – Land raising, flood control/surface water management incorporation:**
   Refer to the full list of recommendations and measures in Section 4.10.1.

5. **Stage 5 – Resistant/resilient building techniques:**
   Refer to the full list of recommendations and measures in Section 4.10.1.

6. **Stage 6 – Safety:**
   Safe access and egress are possible to and from the site over the lifetime of the development, providing that the recommendations and measures proposed for mitigating the flood risk identified are implemented (see Section 4.10.1).

4.10.1 Proposed Recommendations and Mitigation Measures

It is envisaged that any short-term flood risks during the construction phase will be from River Mersey. These impacts will be mitigated by the contractor method statement to be agreed between the contractor and the regulatory bodies, and by the CEMP, a standard requirement of all major developments. The CEMP will also include a construction drainage strategy, outlining how flood risk and surface water will be managed at the site. The following recommendations and measures are proposed for the development:

- All works including temporary works, formworks etc. should not increase flood risk, or cause blockage and debris build up in the channel.
- If required, use localise cofferdams and flow bypass to keep turbidity and velocities manageable around works.

- Contractor method statements and CEMP to include safety measures and guidance to raise awareness of the risk of flooding during construction, and describe specific actions required before, during and after a flood and the responsibilities of key personnel.
- These documents are to include remote daily river level checks of upstream gauging stations and identify specific triggers to initiate and action procedures to secure the site and for safe evacuation off site. These should clearly detail emergency procedures for workers to evacuate the site to a safe muster point if required.
- Where practicable, schedule construction, particularly bank stabilisation, in-channel, and abutment work to occur during the dry season to minimize flood risk, and erosion.
- Where possible use precast bridge components off-site assembly to minimise flood risk and reduce disruption to the watercourse.
- CEMP and contractors' method statements to include adequate and clear provisions to safeguard against watercourse/waterbodies pollution such as provisions for accidental spillages and emergency measures, as well as for storage, containment, treatment.

4.11 Summary Table

Flood Source	Current Level of Risk	Mitigation Required	Residual Risk
Tidal	Negligible	None Required	Low
Fluvial	Low but Medium during construction	See recommendations and mitigation measures proposed in Section 4.10.1.	Low
Surface water	Low	None Required	Low
Ordinary watercourse	Negligible	None Required	Negligible
Groundwater	Low	See recommendations and mitigation measures proposed in Section 4.10.1.	Low
Sewer	Low	None Required	Low
Artificial Infrastructure	Low	None Required	Low
Flood Risk to Elsewhere	Low	None Required	Low

High Risk *– Major constraint to development requiring active consideration in mitigation proposals.*
Moderate Risk *– Issue requires consideration but not a significant constraint to development.*
Low Risk *– Issue requires some consideration and is not a significant constraint to development.*
Very Low Risk *– Issue requires little to no consideration and is not a significant constraint to development.*
Negligible Risk *– No noticeable impact to site and not considered to be a constraint to development.*

6. Summary & Conclusion

According to the EA 'Flood Map for Planning' the wider site is in a flood risk defended zone – i.e. it benefits from existing flood defences. This defended zone is an area where flood defence comprising embankments provide a minimum level of flood protection against fluvial flooding for flood events up to the 1:100-year event (1% annual exceedance probability).

The risk of flooding from coastal/tidal sources is assessed to be **negligible** due to the inland location of the site, as well as the fact that the red-line boundary (RBL) is outside (upstream) of the normal tidal limit of the River Mersey.

From further assessments undertaken in this FRA using the latest available flood model data from the Environment Agency, it was determined that in the 'present day' defended scenario (i.e., with the defences in place), the flood level from fluvial flooding at the site is 26.34mAOD for the 1% AEP (1 in 100yr) event, and 27.74mAOD. for 0.1% AEP (1 in 1000yr) event. It should be noted that the 1%AEP level is both lower than the proposed bridge soffit level of 26.985m AOD, as well as higher than the site compound level, where the average ground level is circa 27.4m AOD. The proposed bridge soffit has a clearance of more than 0.6m above the 1% AEP flood level.

For future scenarios where the effects of climate change are considered, the flood level for the 1% AEP (1 in 100yr) + 30% climate change allowance fluvial event is 26.77mAOD. Again, the proposed design soffit level of 26.985m AOD is above this level. **NB:** the peak river flow allowances for Upper Mersey Management Catchment is 31% based on the latest EA guidance on climate change allowances recently updated in December 2024.

The risk of fluvial flooding to traffic traversing the bridge structure is therefore assessed as **low risk** over its projected lifetime (assumed to be 50 years). We would normally recommend that the proposed design includes **a freeboard of 300mm,** so that the proposed design soffit level **is at a minimum level of 27.07m AOD.** However, given the stability implications and constraints of further raising the levels of the abutments plus other site constraints concerning the bridge approach levels, it would not be practicable to include this freeboard.

The proposal is envisaged to also involve bank stabilisation works (soil nailing) which requires working in or near the channel of the main River Mersey. The risk of fluvial flooding particularly to site workers during construction is therefore assessed to be **medium risk** – i.e., prior to the implementation of relevant flood mitigation measures. However, after the implementation of flood mitigation measures during construction (see Section 4.10.1), the risk of fluvial flooding is assessed to be **low** at the site.

Other sources of flood hazards assessed in this FRA are as follows.

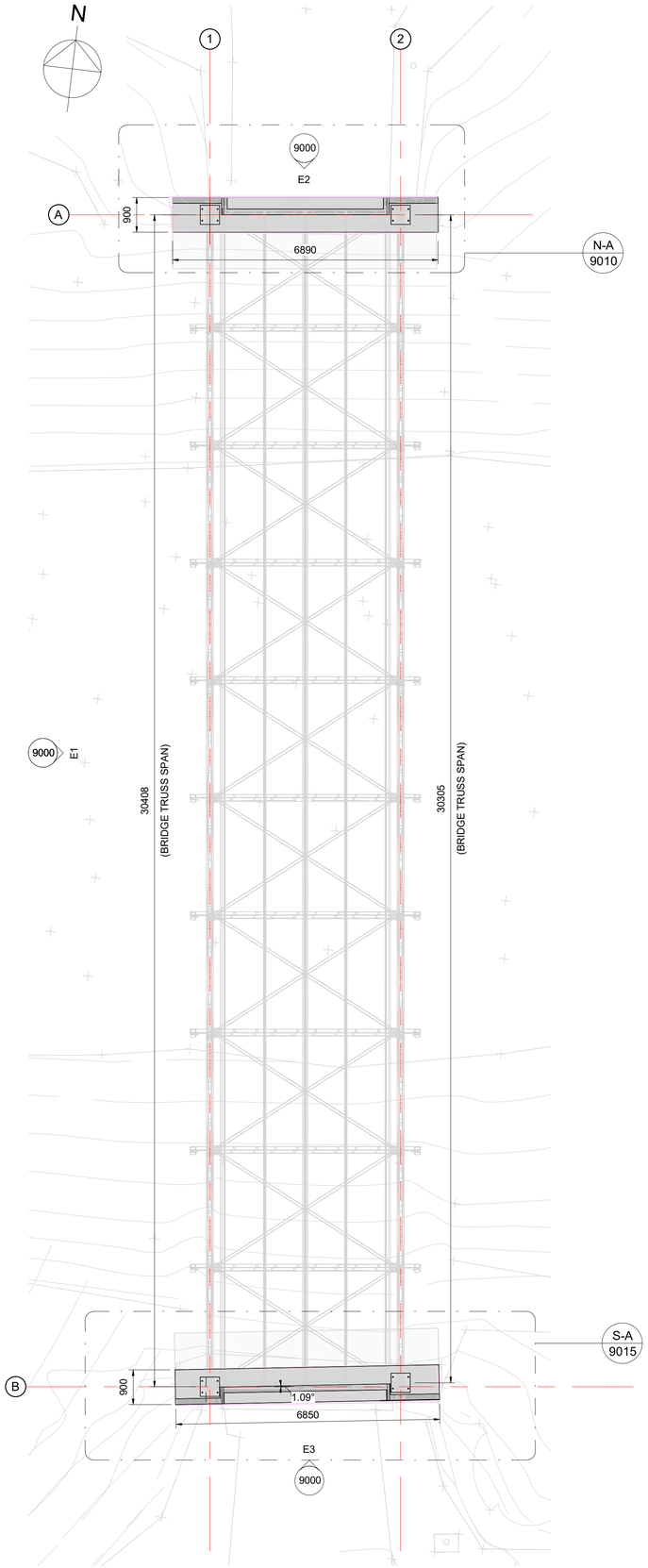
- Flooding from surface water – **low risk**
- Flooding from ordinary watercourses, rhines etc. – **negligible risk**
- Flooding from groundwater – **low risk**

- Flooding from sewers – **low risk**
- Flooding from the possible failure of existing artificial infrastructure – **low risk**

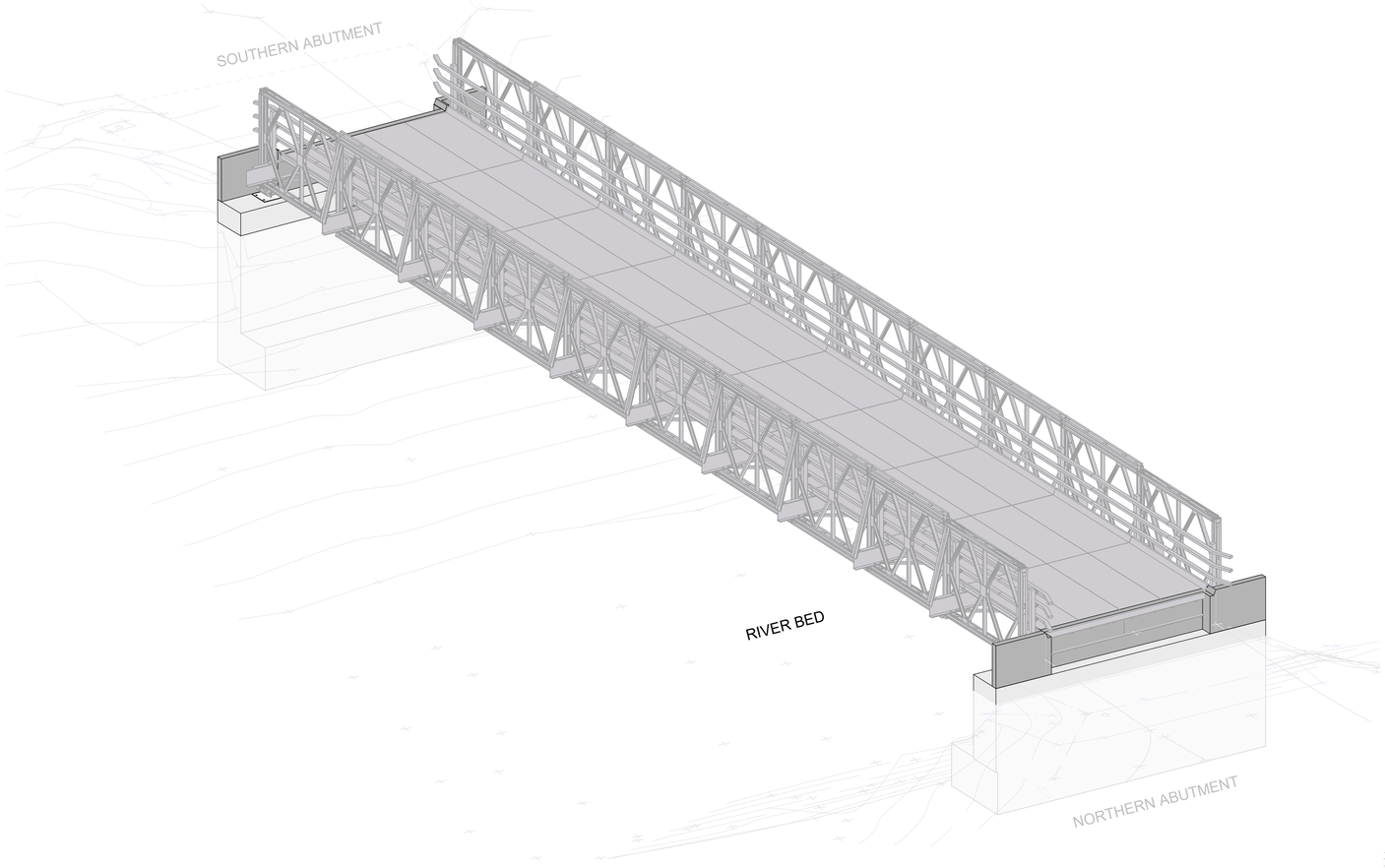
It is the conclusion of this FRA that appropriate mitigation measures can adequately reduce these flood risks where identified, thus making the development suitably safe from flooding.

This report has satisfied the objectives set out in Section 1.7, demonstrating that the site is not at a significant level of flood risk from any of the sources of flood hazards assessed and that the Proposal will not increase flood risk elsewhere. Appropriate mitigation and flood management measures have been recommended for the proposed development.

Appendix A – Main Bridge Plan



MAIN PLAN
1 : 75



3D FULL BRIDGE ISOMETRIC VIEW

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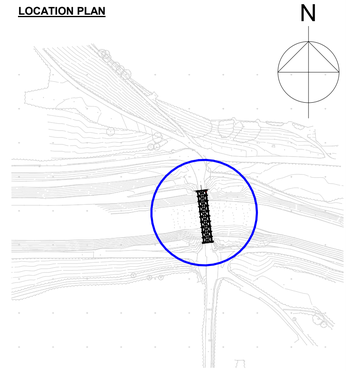
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4. The contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.
5. All workmanship and materials are to be to current British Standards or Eurocodes. All construction products incl. structural steelwork should be CE marked in accordance with current legislation.
6. All local services are to be located and protected as necessary by the contractor prior to the commencement of the works.

CONCRETE NOTES

For concrete notes refer to drawing
(240960-PEV-XX-ZZ-DR-S-9010)

LOCATION PLAN



Revision	Date	Drn	Chk
P02 BOTH ABUTMENTS AMENDED AND BASEPLATE DETAILS UPDATED	21.11.2025	LG	LMG
P01 FOR INFORMATION	01.10.2025	LG	LMG

This document references the following files:-

Reference Name	Status	Revision
	XX	P01.01

Client: MANCHESTER CITY COUNCIL

Project: **BARLOW HALL BRIDGE**

Drawing Title: **MAIN BRIDGE PLAN**

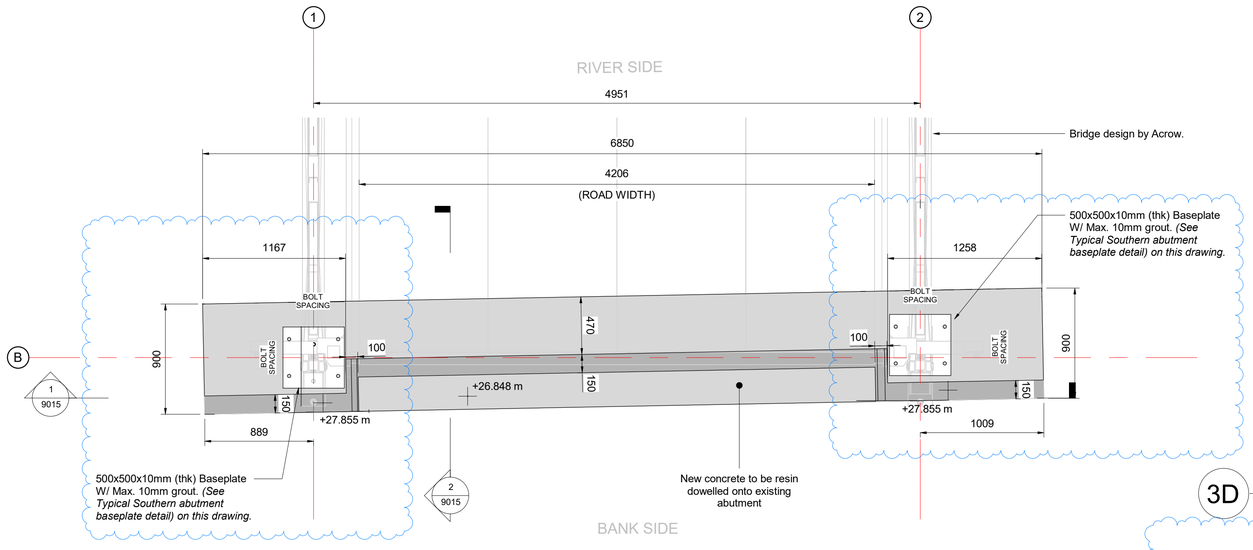
Suitability Status
S2 Information suitable for information/reference by other task teams within a delivery team

Job No.	Scale	Size	Rev
240960	**As indicated**	**@ A1**	**P02**

Author	Reviewer	Approver	Original Issue Date
LG	**LMG**	**JC**	**01.10.2025**

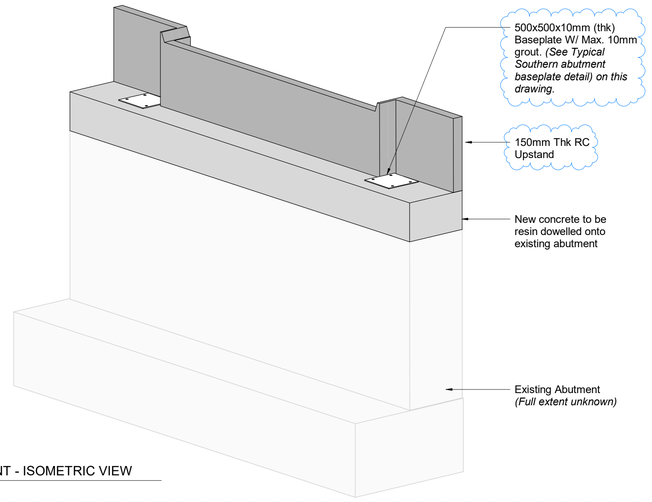
Drawing Number
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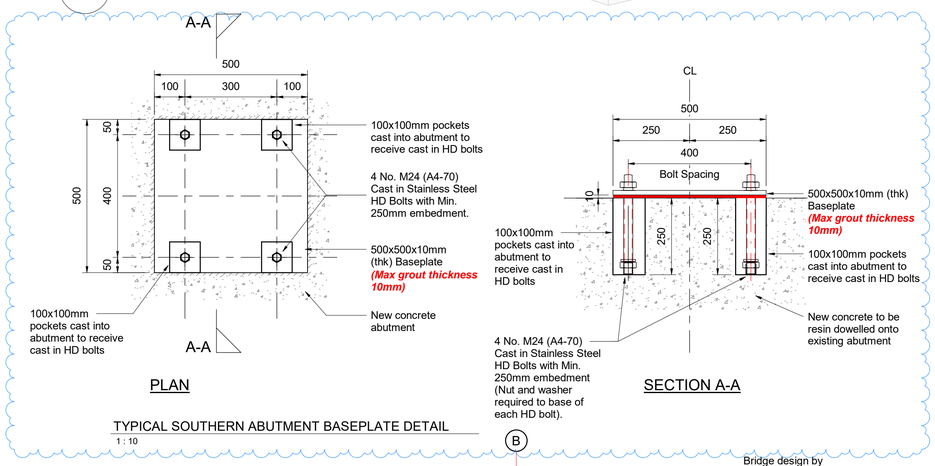


S-A SOUTHERN ABUTMENT - PLAN
1 : 25

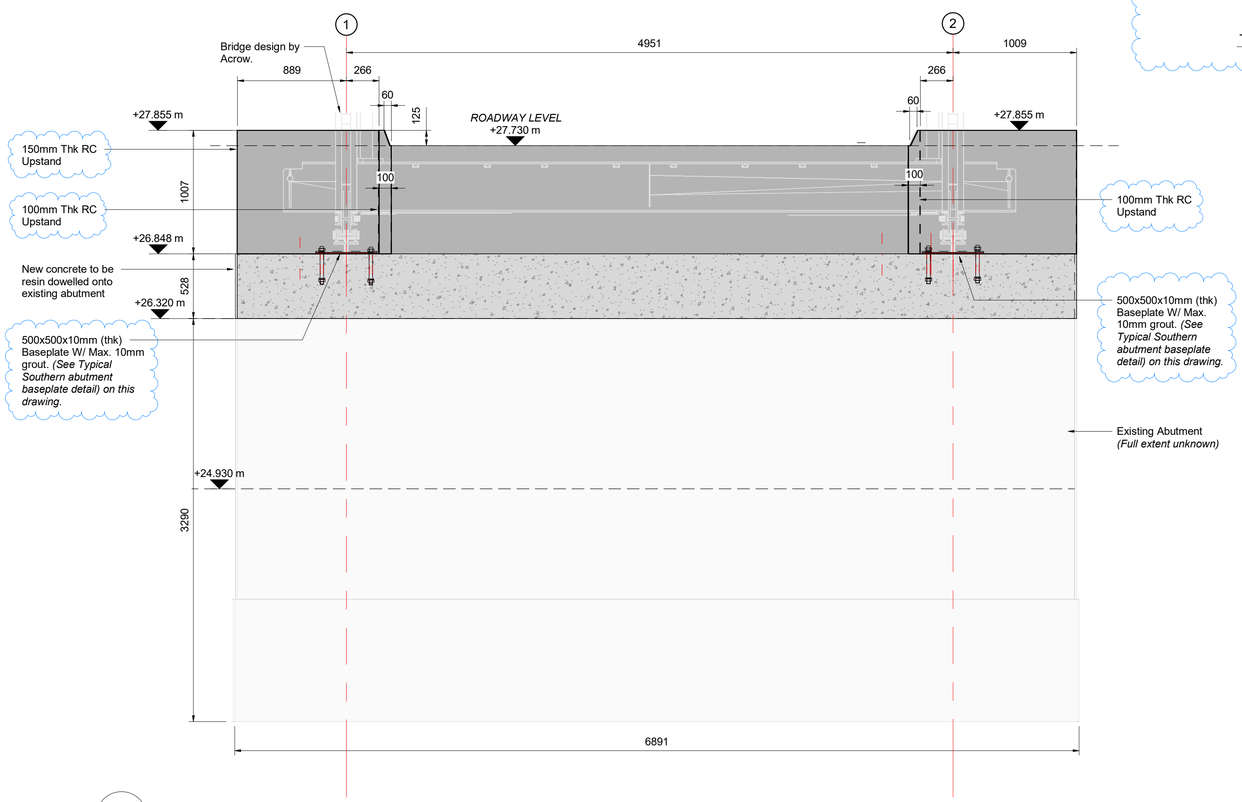
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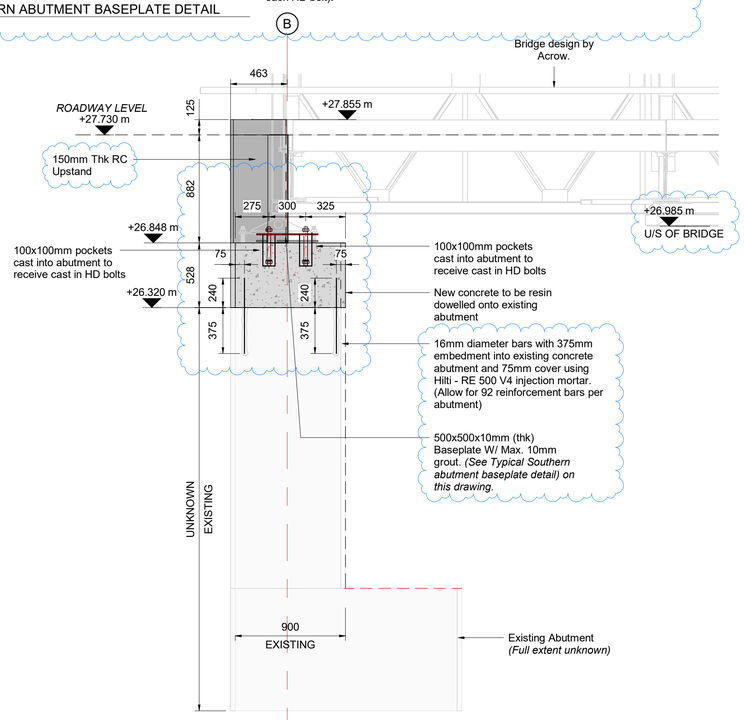
3D SOUTHERN ABUTMENT - ISOMETRIC VIEW



TYPICAL SOUTHERN ABUTMENT BASEPLATE DETAIL
1 : 10



1 SOUTHERN ABUTMENT - SECTION 1
1 : 25



2 SOUTHERN ABUTMENT - SECTION 2
1 : 25

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6. All local services are to be located and protected as necessary by the contractor prior to the commencement of the works.

CONCRETE NOTES

For concrete notes refer to drawing *(240960-PEV-XX-ZZ-DR-S-9010)*

CONNECTION NOTES

For connection notes refer to drawing *(240960-PEV-XX-ZZ-DR-S-9010)*

KEY

	Denotes existing areas of concrete to the northern and southern abutments.
	Denotes elevation areas of proposed concrete infill to be cast into the existing northern and southern abutments.
	Denotes sections cut through proposed areas of concrete infill to be cast into the existing northern and southern abutments.
VARIES	Denotes location of Upstand. To be **'Pour 02'** *(Post bridge installation)*

NOTE:

An allowance of **125kg/m³** should be made for reinforcement within each abutment.

Revision	Date	Drn	Chk
P02 BOTH ABUTMENTS AMENDED AND BASEPLATE DETAILS UPDATED	21.11.2025	LG	LMG
P01 FOR INFORMATION	01.10.2025	LG	LMG

This document references the following files:-

Reference Name	Status	Revision
	XX	P01.01

Client: MANCHESTER CITY COUNCIL

Project: **BARLOW HALL BRIDGE**

Drawing Title: **SOUTHERN ABUTMENT DETAILS**

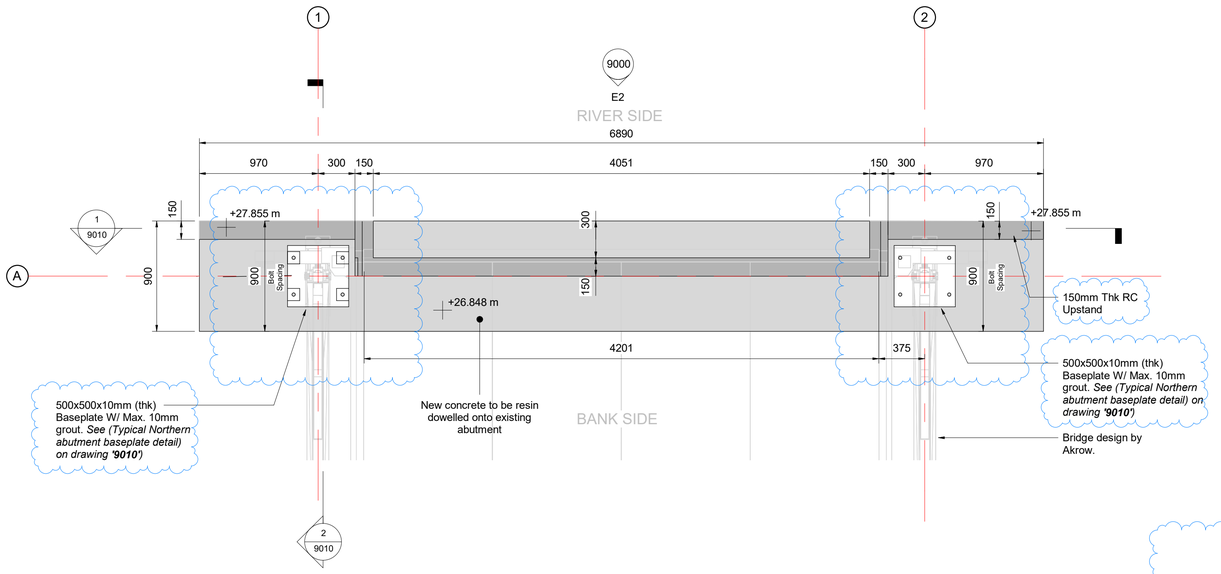
Suitability Status: **S2** Information suitable for information/reference by other task teams within a delivery team

Job No.	Scale	Size	Rev
240960	As indicated	@ A1	P02

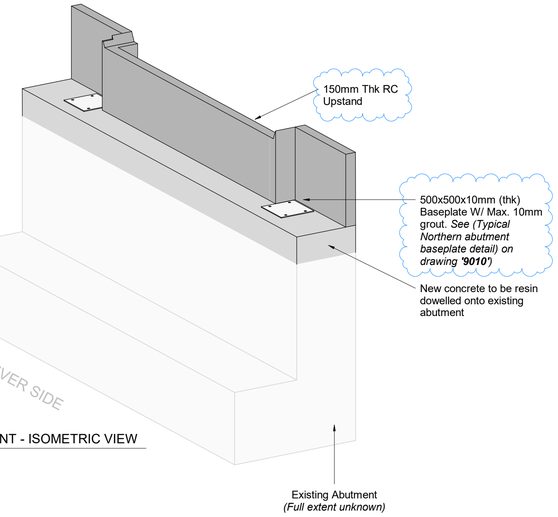
Author	Reviewer	Approver	Original Issue Date
LG	LMG	JC	01.10.2025

Drawing Number: **240960-PEV-XX-ZZ-DR-S-9015**
Project Code - Originator - Zone - Level - Type - Role - Number

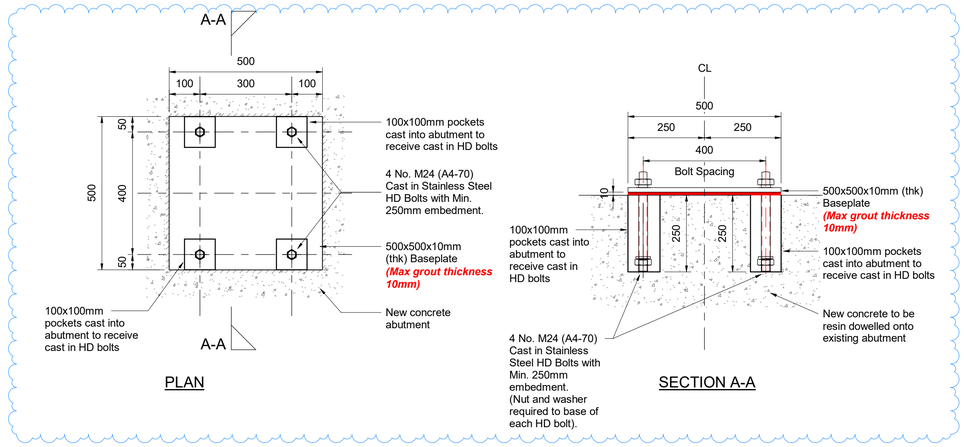
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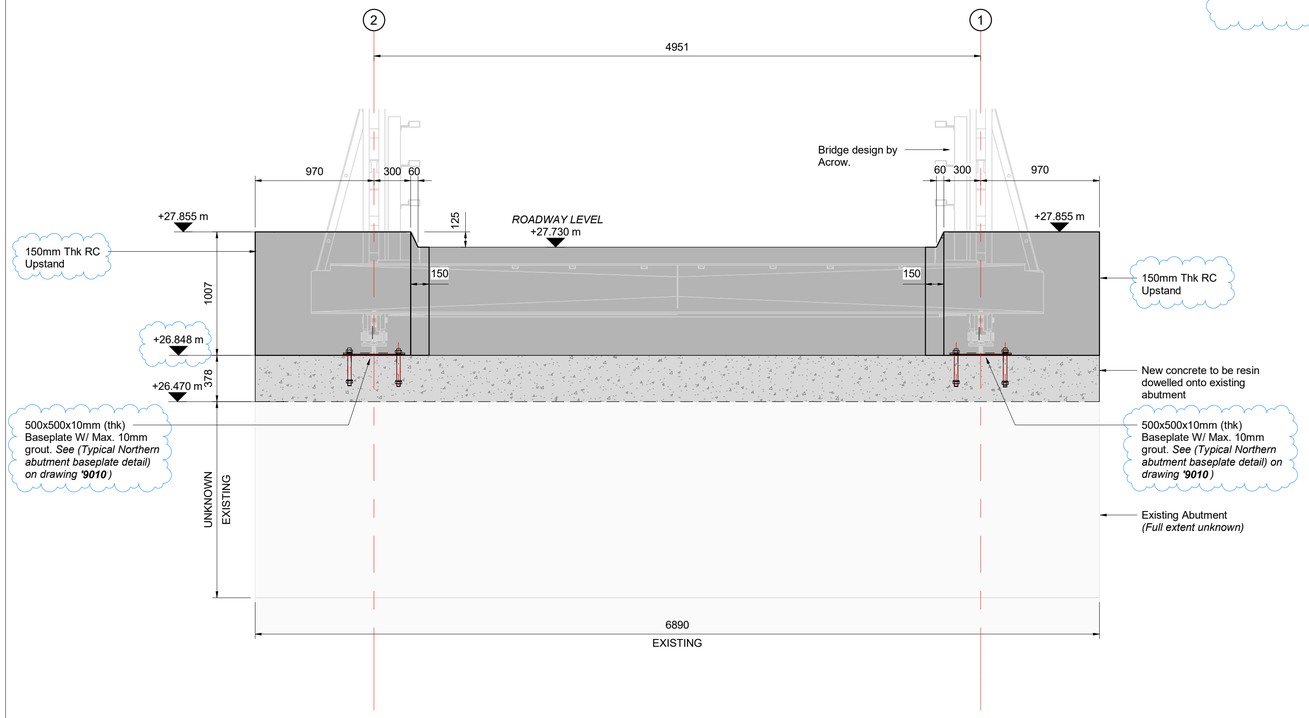
N-A NORTHERN ABUTMENT - PLAN
1 : 25



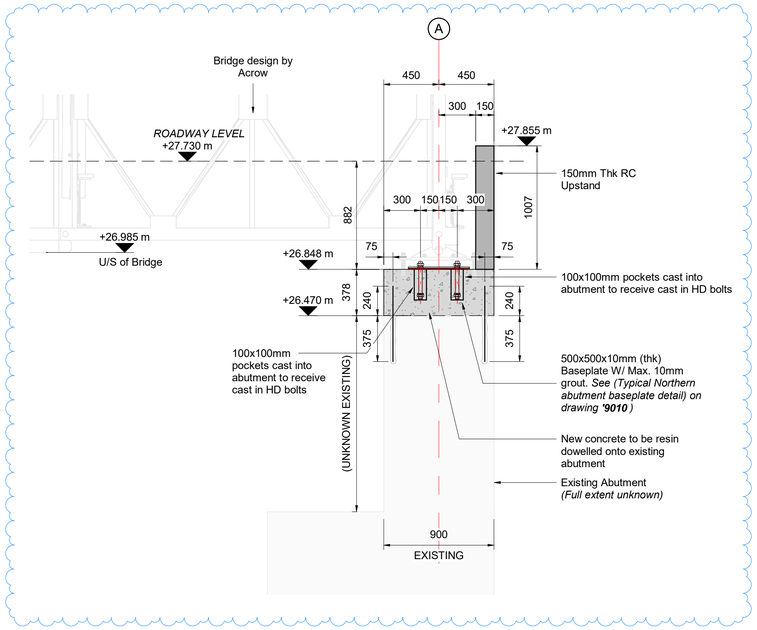
3D NORTHERN ABUTMENT - ISOMETRIC VIEW



TYPICAL NORTHERN ABUTMENT BASEPLATE DETAIL
1 : 10



1 NORTHERN ABUTMENT - SECTION 1
1 : 25



2 NORTHERN ABUTMENT - SECTION 2
1 : 25

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No dimensions to be scaled from this drawing.

CDM - Residual Hazards: The following are considered to be significant risks relevant to this drawing, which could not be fully mitigated or removed through design:

GENERAL NOTES

1. Do not scale this drawing or model. All dimensions are in millimetres unless noted otherwise. Any discrepancies are to be recorded and reported to the engineers immediately.
2. This drawing is to be read in conjunction with all other engineers drawings and relevant specification.
3. All work is to be to the satisfaction of the engineer and local authority building control.
4. The contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.
5. All workmanship and materials are to be to current British Standards or Eurocodes. All construction products incl. structural steelwork should be CE marked in accordance with current legislation.
6. All local services are to be located and protected as necessary by the contractor prior to the commencement of the works.

CONCRETE NOTES

1. All workmanship & materials are to be in accordance with current British & European Standards & codes of practice. All work is to be to the satisfaction of the engineer and local authority building control.
2. Reinforced concrete to be designated mix RC40/50XF.
3. The contractor is responsible for the design, support and erection of any shuttering/formwork required and must take all necessary precautions to ensure the stability of the works during construction.
4.All concrete to be ready mixed. Designated mixes to BS8500-1:2023 obtained from a depot accredited by Quality Scheme for Ready Mixed Concrete.
5. All Grades: Nominal max aggregate size 20mm, workability slump class S3, chloride class Cl 0,30
6. Buried concrete designed in accordance with DS-2, AC-1 requirements.
7. All concrete mix certificates and the cube testing programme shall be approved by the Engineer prior to the commencement of the works on site

CONNECTION NOTES

1. Refer to Acrow drawing (25539-27564-AGL-COM-001-DR-CD-201) for details on baseplates, all fixings to be as specified.
2. Grout for beneath baseplates shall have a have a to have a minimum compressive strength of 50N/mm²
3. Grout under baseplates to be a maximum of 10mm unless otherwise stated.
4. 4. All stainless steel washers are to be combined with isolation washers when in contact with dissimilar metals

KEY

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VARIES	Denotes location of Upstand. To be **'Pour 02'** *(Post bridge installation)*

NOTE:

An allowance of **125kg/m³** should be made for reinforcement within each abutment.

P02	BOTH ABUTMENTS AMENDED AND BASEPLATE DETAILS UPDATED	21.11.2025	LG	LMG
P01	FOR INFORMATION	01.10.2025	LG	LMG
Revision		**Date**	**Drn**	**Chk**

This document references the following files:-

Reference Name	Status	Revision
	XX	P01.01

Client: MANCHESTER CITY COUNCIL

Project: **BARLOW HALL BRIDGE**

Drawing Title: **NORTHERN ABUTMENT DETAILS**

Suitability Status: **S2** Information suitable for information/reference by other task teams within a delivery team

Job No.	Scale	Size	Rev
240960	**As indicated**	**@ A1**	**P02**

Author	Reviewer	Approver	Original Issue Date
LG	**LMG**	**JC**	**01.10.2025**

Drawing Number: **240960-PEV-XX-ZZ-DR-S-9010**
Project Code - Originator - Zone - Level - Type - Role - Number

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No dimensions to be scaled from this drawing.

CDM - Residual Hazards: The following are considered to be significant risks relevant to this drawing, which could not be fully mitigated or removed through design:

GENERAL NOTES

1. Do not scale this drawing or model. All dimensions are in millimetres unless noted otherwise. Any discrepancies are to be recorded and reported to the engineers immediately.
2. This drawing is to be read in conjunction with all other engineers drawings and relevant specification.
3. All work is to be to the satisfaction of the engineer and local authority building control.
4. The contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.
5. All workmanship and materials are to be to current British Standards or Eurocodes. All construction products incl. structural steelwork should be CE marked in accordance with current legislation.
6. All local services are to be located and protected as necessary by the contractor prior to the commencement of the works.

CONCRETE NOTES

For concrete notes refer to drawing *(240960-PEV-XX-ZZ-DR-S-9010)*

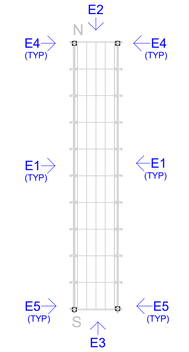
CONNECTION NOTES

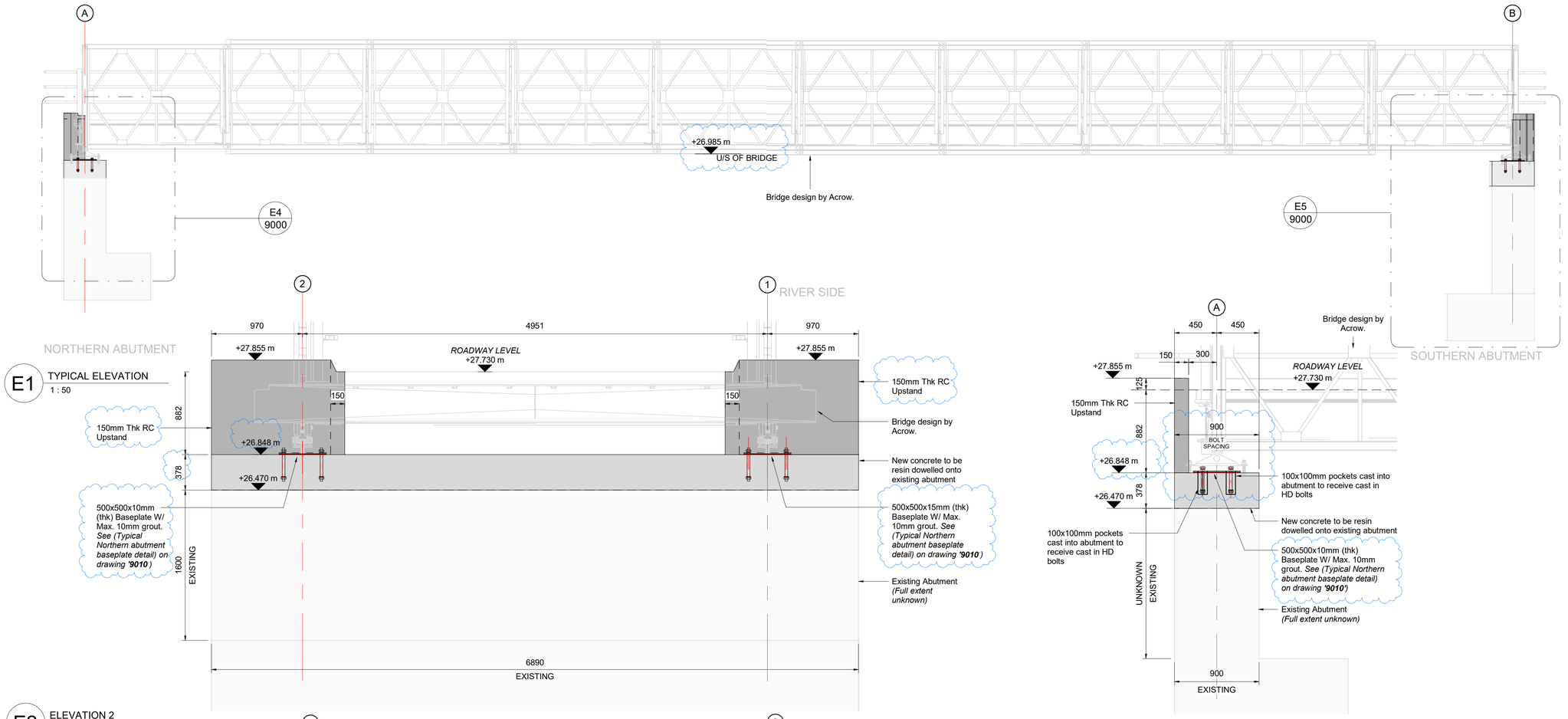
For connection notes refer to drawing *(240960-PEV-XX-ZZ-DR-S-9010)*

KEY

	Denotes existing areas of concrete to the northern and southern abutments.
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ELEVATION KEY



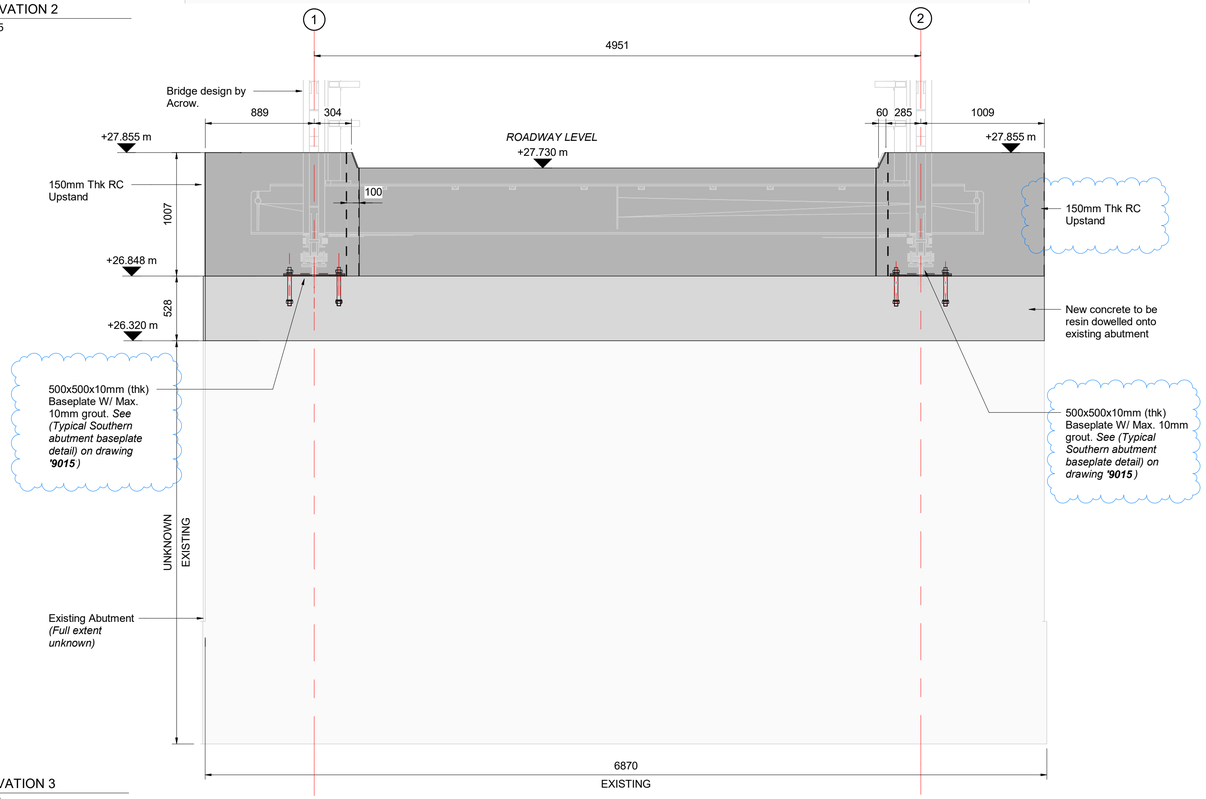


E1 TYPICAL ELEVATION

1 : 50

E2 ELEVATION 2

1 : 25

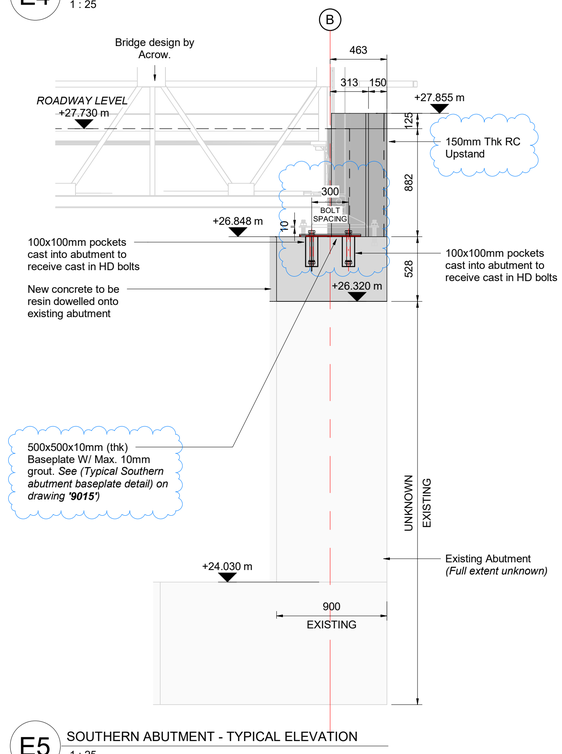


E3 ELEVATION 3

1 : 25

E4 NORTHERN ABUTMENT - TYPICAL ELEVATION

1 : 25



E5 SOUTHERN ABUTMENT - TYPICAL ELEVATION

1 : 25

Revision	Date	Drn	Chk
P02 BOTH ABUTMENTS AMENDED AND BASEPLATE DETAILS UPDATED	24.11.2025	LG	LMG
P01 FOR INFORMATION	01.10.2025	LG	LMG

This document references the following files:-

Reference Name	Status	Revision
	XX	P01.01

Client: MANCHESTER CITY COUNCIL

Project: **BARLOW HALL BRIDGE**

Drawing Title: **ELEVATIONS (SHEET 1)**

Suitability Status: **S2** Information suitable for information/reference by other task teams within a delivery team

Job No.	Scale	Size	Rev
240960	As indicated	@ A1	P02

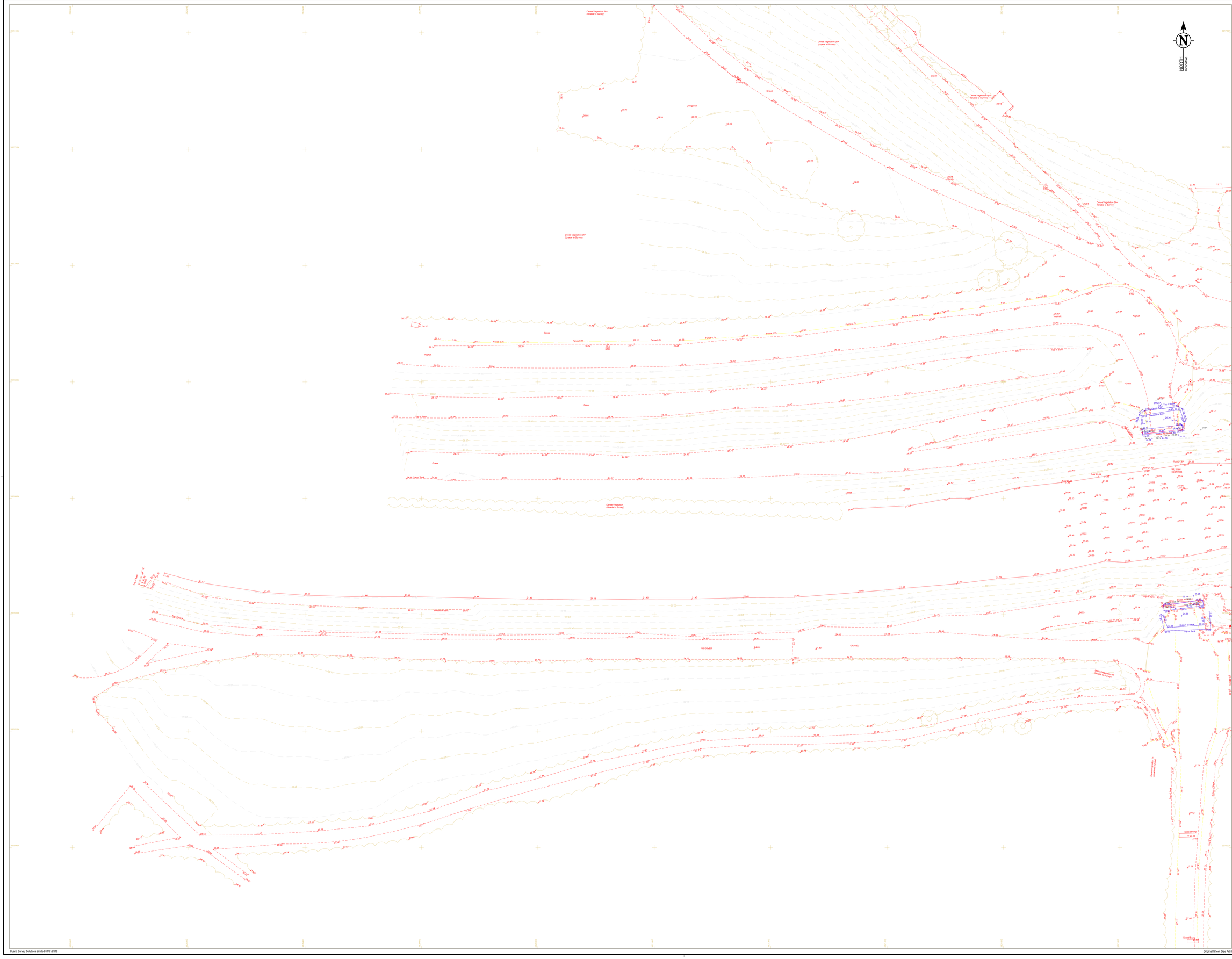
Author	Reviewer	Approver	Original Issue Date
LG	LMG	JC	01.10.2025

Drawing Number: **240960-PEV-XX-ZZ-D-S-9000**

Project Code - Originator - Zone - Level - Type - Role - Number

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Appendix B – Topographical Survey



TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

ABBREVIATIONS & SYMBOLS

AH	Arch Head Level	ET	EP+Transformer	RSD	Roller Shutter Door
AB	Air Brick	FB	Flower Bed	RSJ	Rolled Steel Joist
AR	Assumed Route	FCL/+/-	False Ceiling Level	SI	Sign Post
AV	Air Valve	FBD	Floor Board Direction	SL	Window Sill Level
BB	Belisha Beacon	FH	Fire Hydrant	SP	Arch Spring Point Level
BH	Bore Hole	FL	Floor Level	SV	Stop Valve
BL	Bed Level	FW	Foul Manhole	SW	Soil Vent Pipe
BOL	Bollard	FW	Foul Water	SY	Cattle Grid
BS	Bus Stop	GG	Gully Grate	Tac	Tactile Paving
BU	Bush	GV	Gas Valve	TC	Telecom Cover
B/W	Barbed Wire Fence	HL	Window Head Level	TH	Trial Pit
BX	Box (Utilities)	IC	Inspection Cover	THL	Threshold Level
C/B	Close Board Fence	IL	Invert Level	TL	Traffic Light
CL	Cover Level	IR	Iron Railings	ToF	Top of Fence
CL	Chain Link Fence	KO	Kerb Outlet	ToW	Top of Wall
C-Lev	Ceiling Level	LP	Lamp Post	TP	Telegraph Pole
Col.	Column	MH	Manhole	TS	Traffic Signal Cover
C/P	Chestnut Paling Fence	MP	Marker Post	TV	Cable TV Cover
CR	Cable Riser	NB	Name Board	UC	Unknown Cover
C/W	Chicken Wire	OHL	Overhead Line (approx)	Uk	Unknown Tree
DC	Drainage Channel	Pan	Panel Fence	UMG	Unmade Ground
DL	Dilapidated	PB	Post Box	USB	Under Side Beam
DL	Door Level	PM	Parking Meter	UTL	Unable To Lift
DP	Down Pipe	PO	Post	UTS	Unable To Survey
DR	Drain	P/R	Post & Rail Fence	VP	Vent Pipe
EBx	Electric Box	P/W	Post & Wire Fence	WB	Waste Bin
EC	Electric Supply Cover	RE	Roofing Eye	WH	Weep Hole
EL	Eaves Level	RL	Ridge Level	WL	Water Level
EP	Electric Pole	RP	Reflector Post	WM	Water Meter
ER	Earth Rod	RS	Road Sign	WO	Wash Out
				△	Survey Control Station

DRAWING NOTES

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Surveyed physical features may not necessarily represent the legal boundary line.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

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This drawing should only be scaled using digital methods.

SURVEY STATIONS

Name	Easting	Northing	Height
ST01	382192.107	391680.029	27.188
ST02	382182.037	391695.641	26.798
ST03	382176.901	391679.887	26.648
ST04	382167.280	391713.696	25.484
ST05	382114.463	391731.985	29.745
ST06	382262.963	391693.443	25.619
ST07	382092.027	391686.170	26.114

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies within the survey, adding to the survey or setting out points from the survey, any coordinated data must be directly derived from the original survey control. Survey Solutions are not responsible for any third-party adding survey data to the existing information.

REV	DESCRIPTION	DRAWN	APPR	DATE
A	Re-survey of abutments	SR	SR	July 2025

SURVEY SOLUTIONS

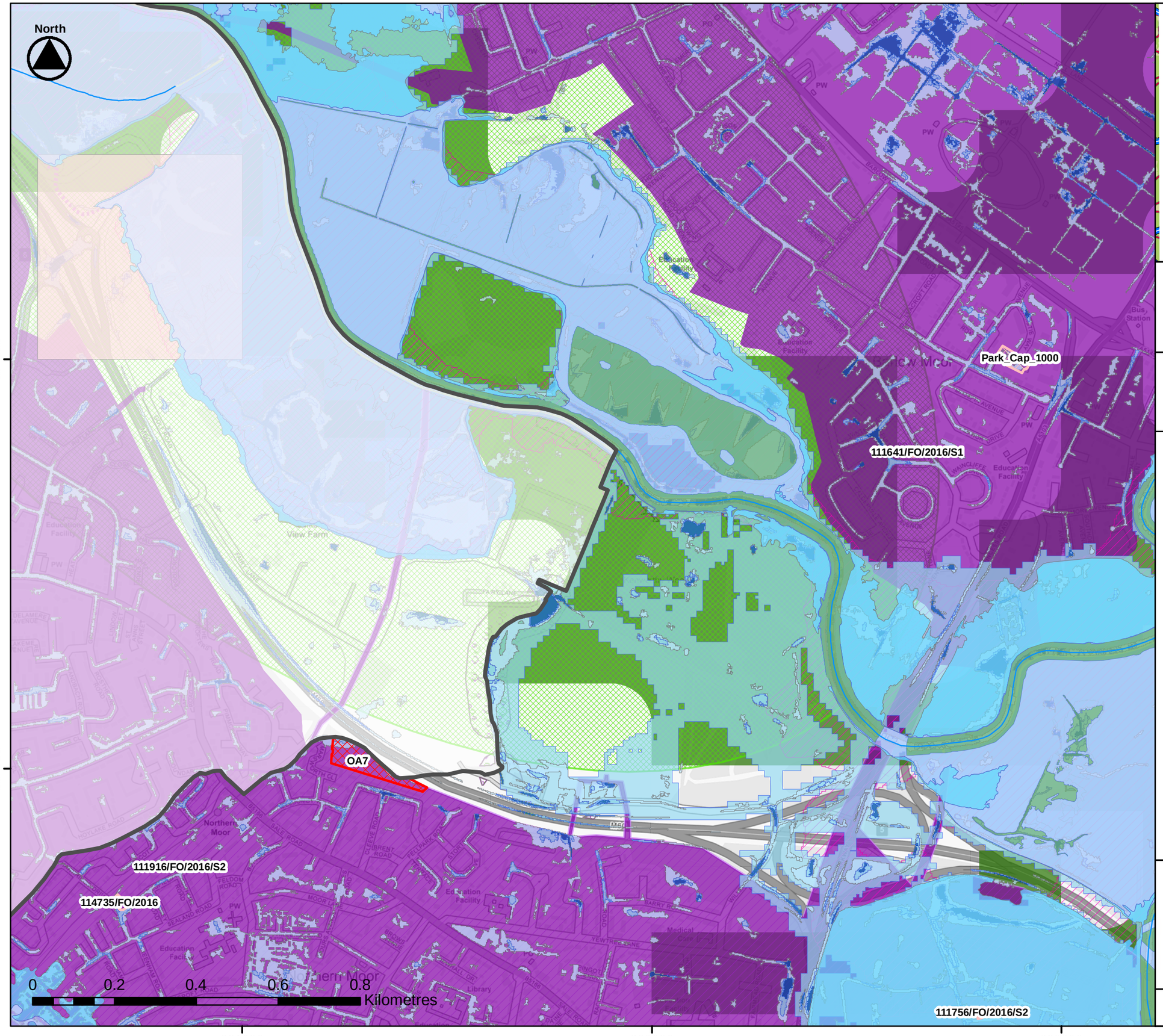
LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

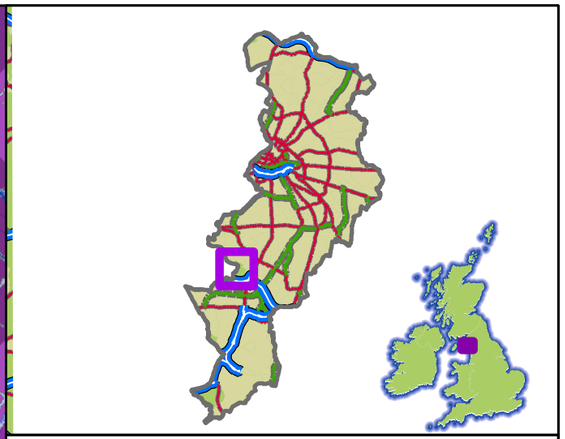
0845 040 5969
survey-solutions.co.uk

IPSWICH BEDFORD BIRMINGHAM BRISTOL COVENTRY CRAWLEY GLASGOW
LONDON-CENTRAL LONDON-EAST MANCHESTER NORWICH NOTTINGHAM THAMES VALLEY

PROJECT TITLE: Barlow Hall Refuse, Bailey Bridge, Chorlton Water Park, M21					
DRAWING DETAIL: TOPOGRAPHICAL SURVEY, Sheet 2 of 7					
CLIENT: Pick Everard				SCALE: 1:200	
SURVEYOR: AL TV	SURVEY DATE: 25/06/2024	CHECKED BY: SR	APPROVED BY: SR	DWG STATUS: FINAL	
DRAWING NUMBER: 67713MCLS-01			REVISION:	ISSUE DATE: 05/07/2024	

Appendix C – Level 1 SFRA Interactive Map





LEVEL 1
STRATEGIC FLOOD RISK ASSESSMENT
For
MANCHESTER CITY COUNCIL

Please select a data type from the dropdown menu below that you wish to view:

Flood Zones

Watercourse

Proposed Development Sites

GMSF 2019 Strategic Locations

2018 GMSF Call for Sites

2018 Baseline Land Supply

Residential

Industry / Warehousing

Offices

2019 GMSF Allocations

Residential

Industry / Warehousing

Mixed Use

River Network Infrastructure (2018)

Runoff Attenuation Features 1% AEP

Runoff Attenuation Features 3.3% AEP

Show Site Reference Labels

JBA consulting

MANCHESTER CITY COUNCIL

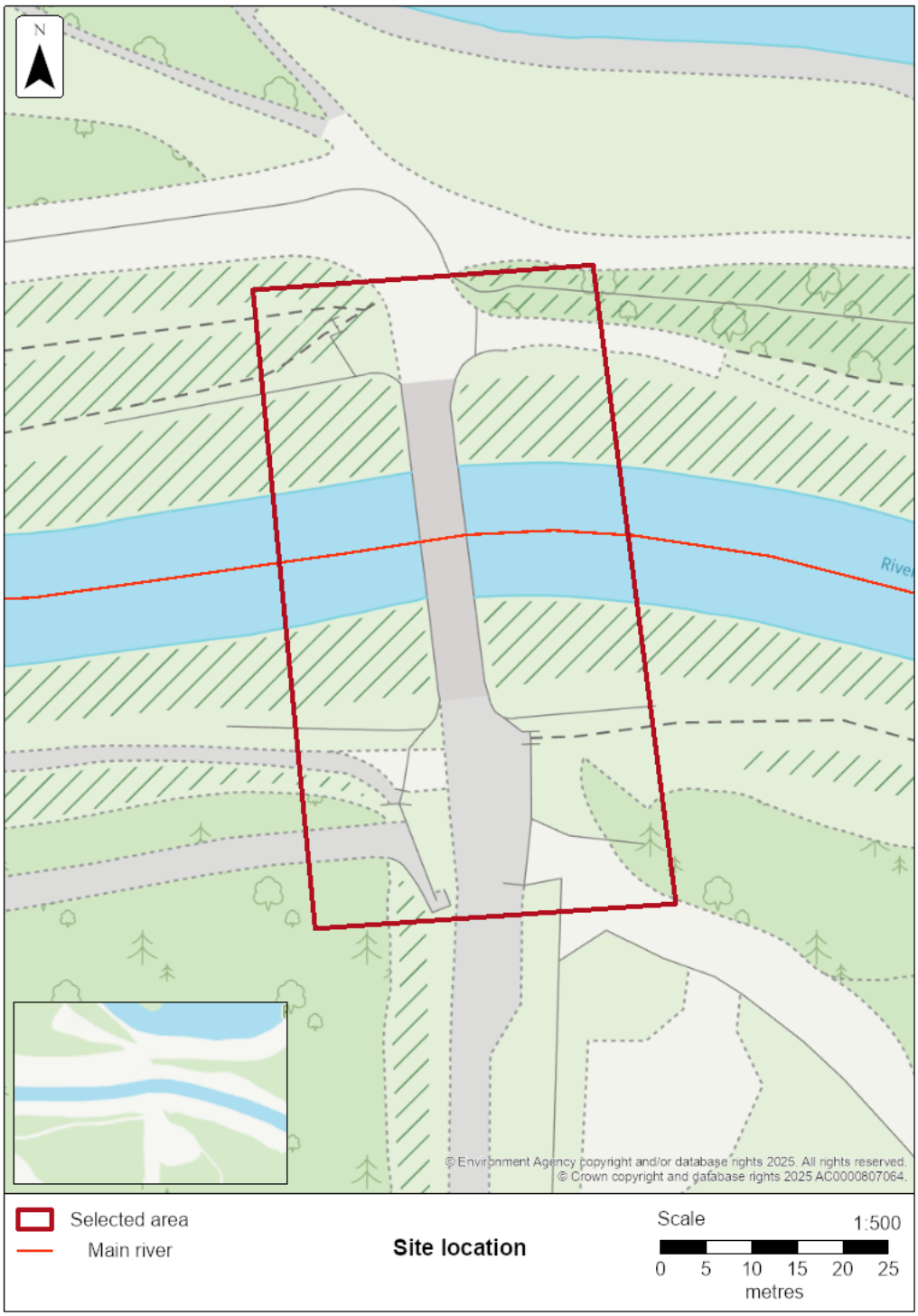
Contains OS data © Crown copyright and database right 2019, All rights reserved. Licence number 100037229

Appendix D – EA Product 4

Flood risk assessment data

Location of site: 382190 / 391651 (shown as easting and northing coordinates)
Document created on: 14 November 2025
This information was previously known as a product 4.
Customer reference number: 12EV9RRNHXEP

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)
- past floods
- flood defences and attributes
- information to help you assess if there is a reduced flood risk from rivers and the sea because of defences
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Surface water and other sources of flooding

When using the surface water map on the check your long term flood risk service the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- reservoir flood risk
- groundwater flood risk - you could use the British Geological Survey groundwater flooding data, groundwater: current status and flood risk and the guide on mining and groundwater constraints for development - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Manchester District.

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

About the models used

Model name: Upper Mersey 2017
Scenario(s): Defended fluvial, defences removed fluvial, defended climate change fluvial, defences removed climate change fluvial
Date: 14 April 2022

This model contains 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 selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

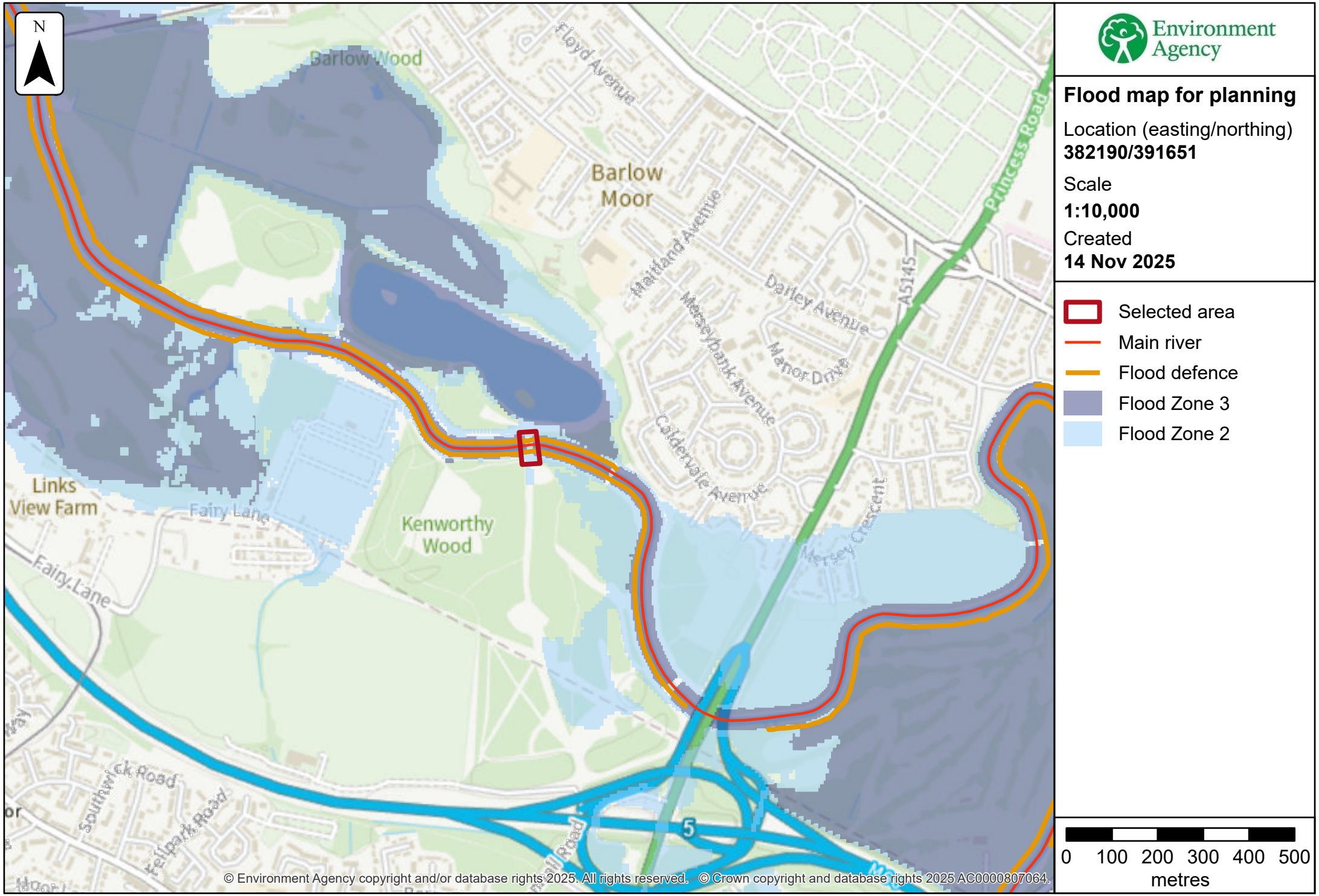
- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

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


N
Barlow Wood
Floyd Avenue
Barlow Moor
Maitland Avenue
Princess Road
A5145
Darley Avenue
Merseybank Avenue
Manor Drive
Calderwale Avenue
Mersey Crescent
Links View Farm
Fairy Lane
Kenworthy Wood
Fairy Lane
Southwick Road
Kelpark Road
5
Environment Agency
Flood map for planning
Location (easting/northing)
382190/391651
Scale
1:10,000
Created
14 Nov 2025
Selected area
Main river
Flood defence
Flood Zone 3
Flood Zone 2
0 100 200 300 400 500
metres
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Past floods

Past flood events included in this document

The recorded flood outlines included in this document are for areas of land local to your site location that have been flooded by any of these sources:

- ephemeral water
- main rivers
- ordinary watercourses
- the sea
- unknown

Data limitations

The outlines do not include flooding from:

- drainage where rainfall has led to surface water ponding or overland runoff
- artificial, water-bearing sewer, water supply and wastewater treatment pipelines

Changes to flood defences

The defences (also known as assets) that were in place may also have changed. For example, assets may have been built more recently than the last recorded flood outline.

What the recorded flood outlines dataset is

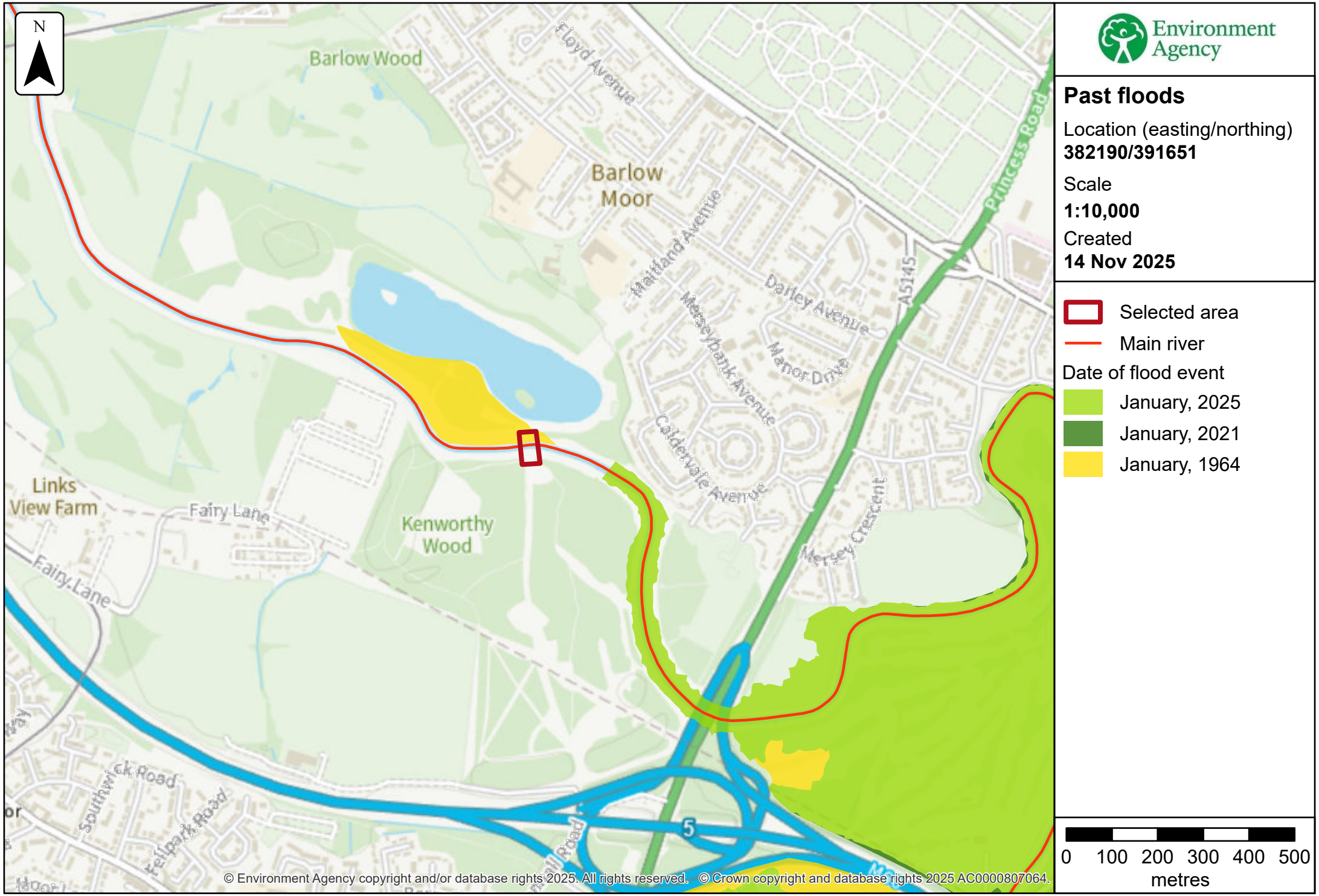
The recorded flood outlines are a geographical information system (GIS) data layer that show our verified records of areas that have flooded in the past from:

- rivers
- the sea
- groundwater
- surface water

Download the complete recorded flood outlines dataset, which includes data quality flags for outlines recorded after April 2020. This indicates the confidence we have in an outline.

Get flood information from other organisations

Contact Manchester District Lead Local Flood Authority (LLFA) and your drainage board to get information about past flooding caused by surface water or drainage systems.



Environment Agency

Past floods

Location (easting/northing)
382190/391651

Scale
1:10,000

Created
14 Nov 2025

- Selected area
- Main river

Date of flood event

- January, 2025
- January, 2021
- January, 1964

0 100 200 300 400 500
metres

Data on past flood events

Start date	End date	Source of flood	Cause of flood	Affects location
1 January 2025	1 January 2025	main river	overtopping of defences	No
20 January 2021	20 January 2021	main river	other	No
1 January 1964	2 January 1964	unknown	unknown	Yes

Flood defences and attributes

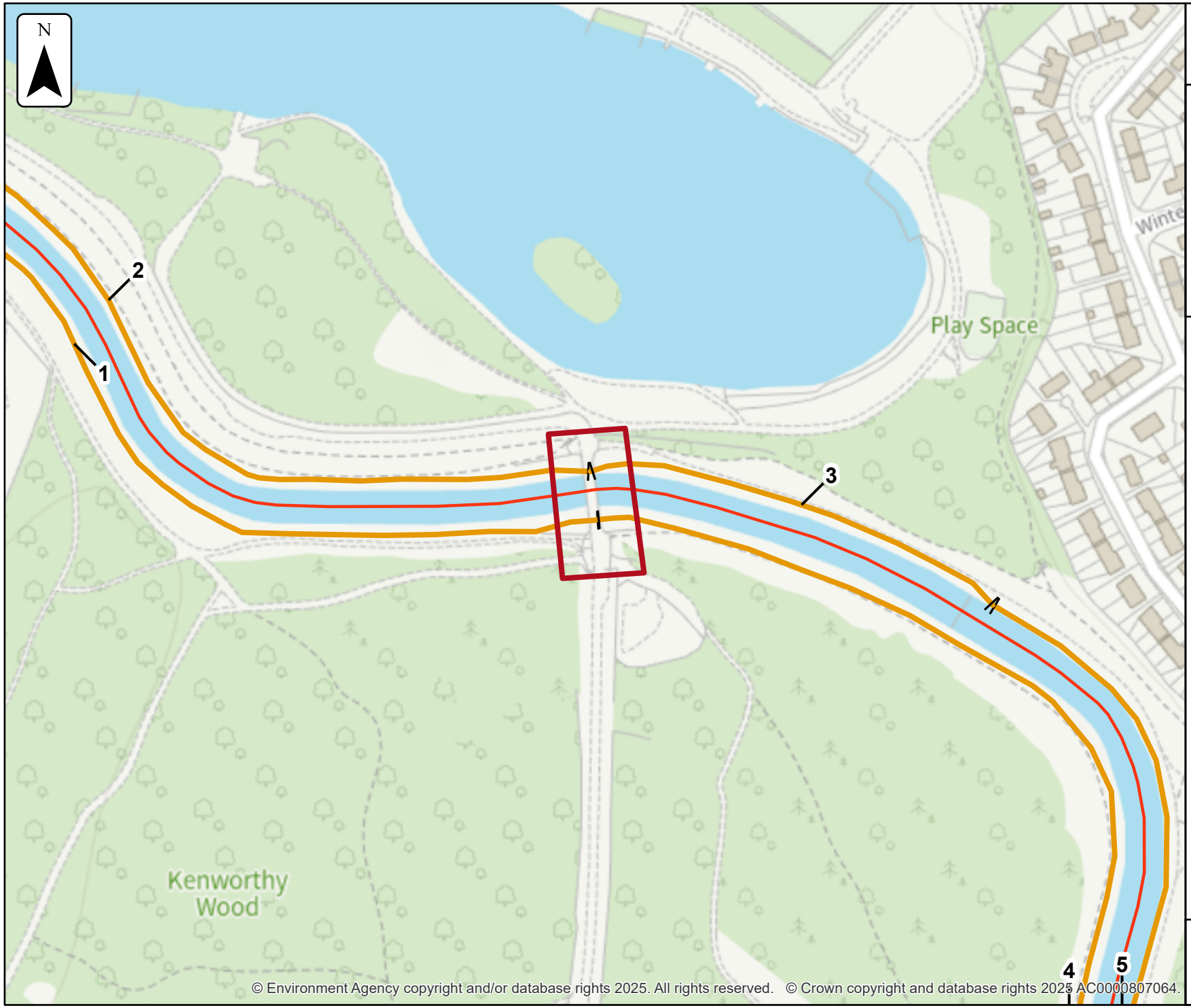
The flood defences map shows the location of the flood defences present.

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.

Use this information:

- to help you assess if there is a reduced flood risk for this location because of defences
- with any information in the modelled data section to find out the impact of defences on flood risk



Environment Agency

Flood defences

Location (easting/northing)
382190/391651

Scale
1:2,500

Created
14 Nov 2025

Selected area
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	121961	Embankment	100	Fair	26.92	21.46	
2	121962	Embankment	100	Fair	26.51	28.23	
3	121964	Embankment	100	Fair	27.19	28.11	
4	121963	Embankment	20	Fair	26.57	28.93	
5	120549	Engineered High Ground	100	Fair	30.22	28.50	

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
- 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
- Defences removed modelled fluvial: risk of flooding from rivers where flood defences have been removed
- Defended climate change modelled fluvial: risk of flooding from rivers where there are flood defences, including estimated impact of climate change
- Defences removed climate change modelled fluvial: risk of flooding from rivers where flood defences have been removed, including estimated impact of climate change



Environment Agency

Defences removed climate change modelled fluvial extent

Location (easting/northing)
382190/391651

Scale
1:10,000

Created
14 Nov 2025

Model name
Upper Mersey 2017

- Selected area
- Main river

Modelled flood extent

- 1% AEP (+30%)
- 1% AEP (+35%)
- 1% AEP (+70%)
- 0.1% AEP (+30%)

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

0 100 200 300 400 500
metres



Environment Agency

Defences removed modelled fluvial extent

Location (easting/northing)
382190/391651

Scale
1:10,000

Created
14 Nov 2025

Model name
Upper Mersey 2017

- Selected area
- 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



Environment Agency

Defended climate change modelled fluvial extent

Location (easting/northing)
382190/391651

Scale
1:10,000

Created
14 Nov 2025

Model name
Upper Mersey 2017

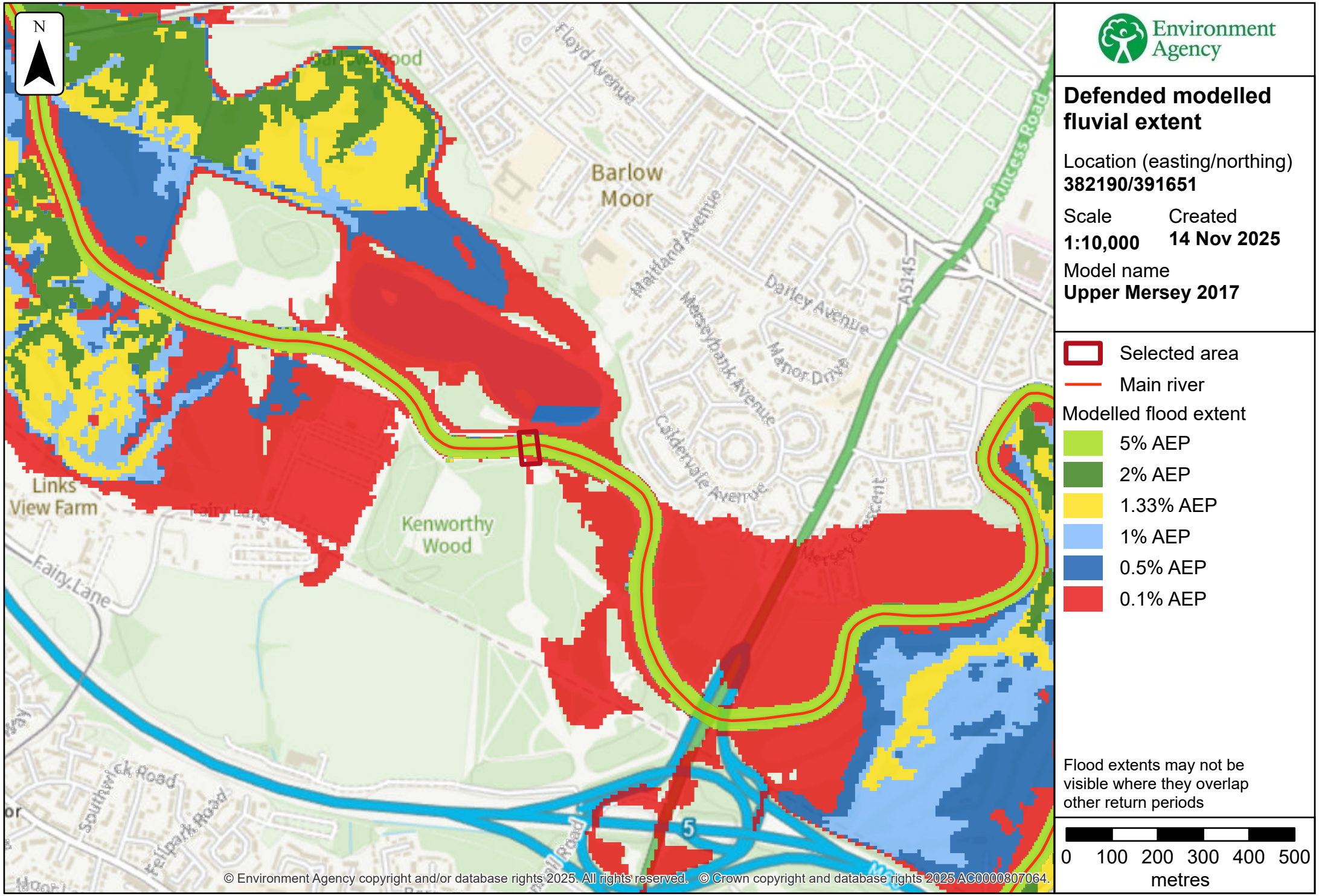
- Selected area
- Main river

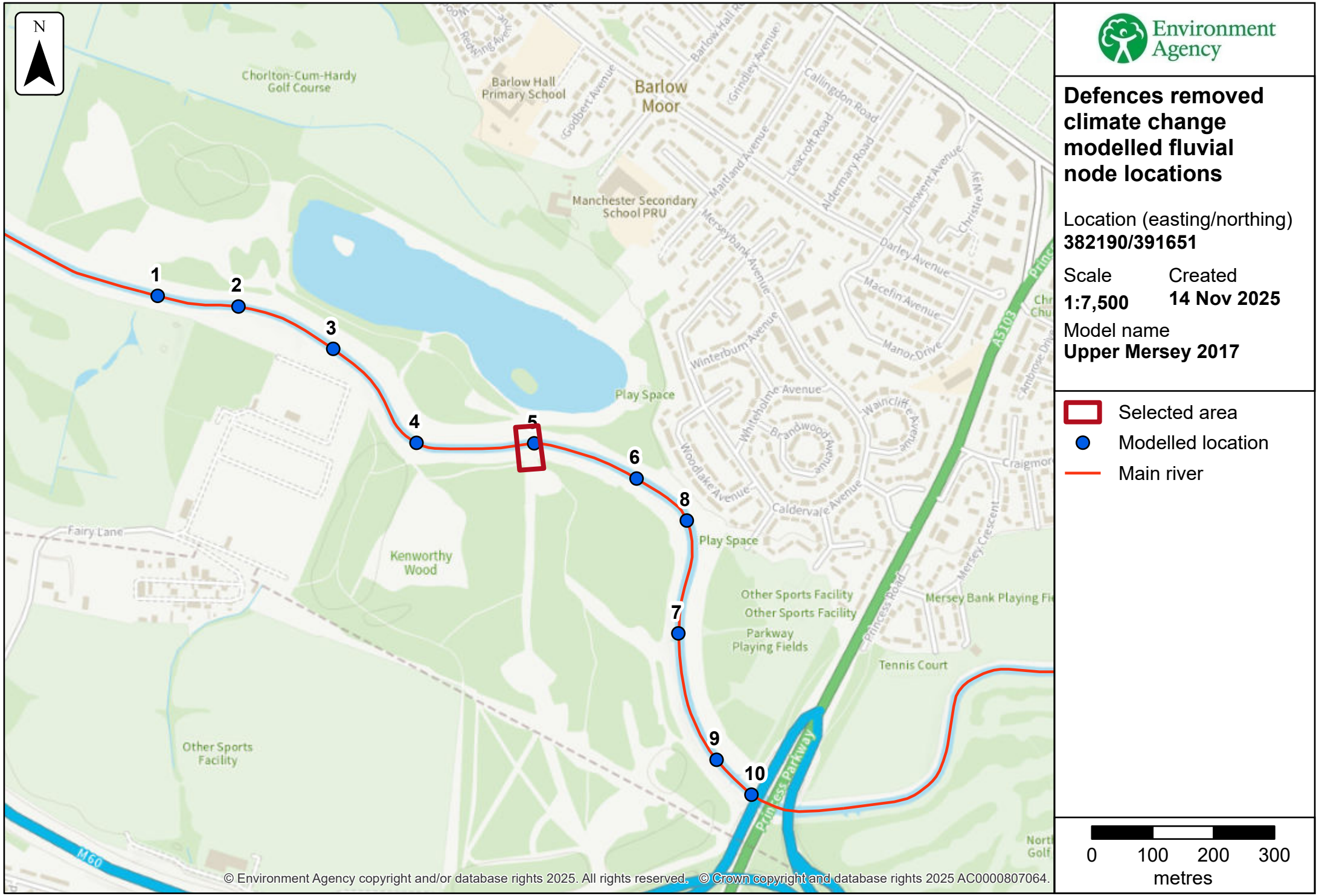
Modelled flood extent

- 1% AEP (+30%)
- 1% AEP (+35%)
- 1% AEP (+70%)
- 0.1% AEP (+30%)

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

0 100 200 300 400 500
metres


N
Barlow Moor
Floyd Avenue
Maitland Avenue
Merseybank Avenue
Manor Drive
Dailey Avenue
Caldervale Avenue
Princess Road
A5145
Mersey Crescent
Links View Farm
Fairy Lane
Kenworthy Wood
Southwick Road
Telpark Road
5
Environment Agency
Defended modelled fluvial extent
Location (easting/northing)
382190/391651
Scale
1:10,000
Created
14 Nov 2025
Model name
Upper Mersey 2017
Selected area
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

Defences removed climate change modelled fluvial node locations

Location (easting/northing)
382190/391651

Scale
1:7,500

Created
14 Nov 2025

Model name
Upper Mersey 2017

- Selected area
- Modelled location
- Main river

0 100 200 300
metres

Modelled node locations data

Defences removed climate change

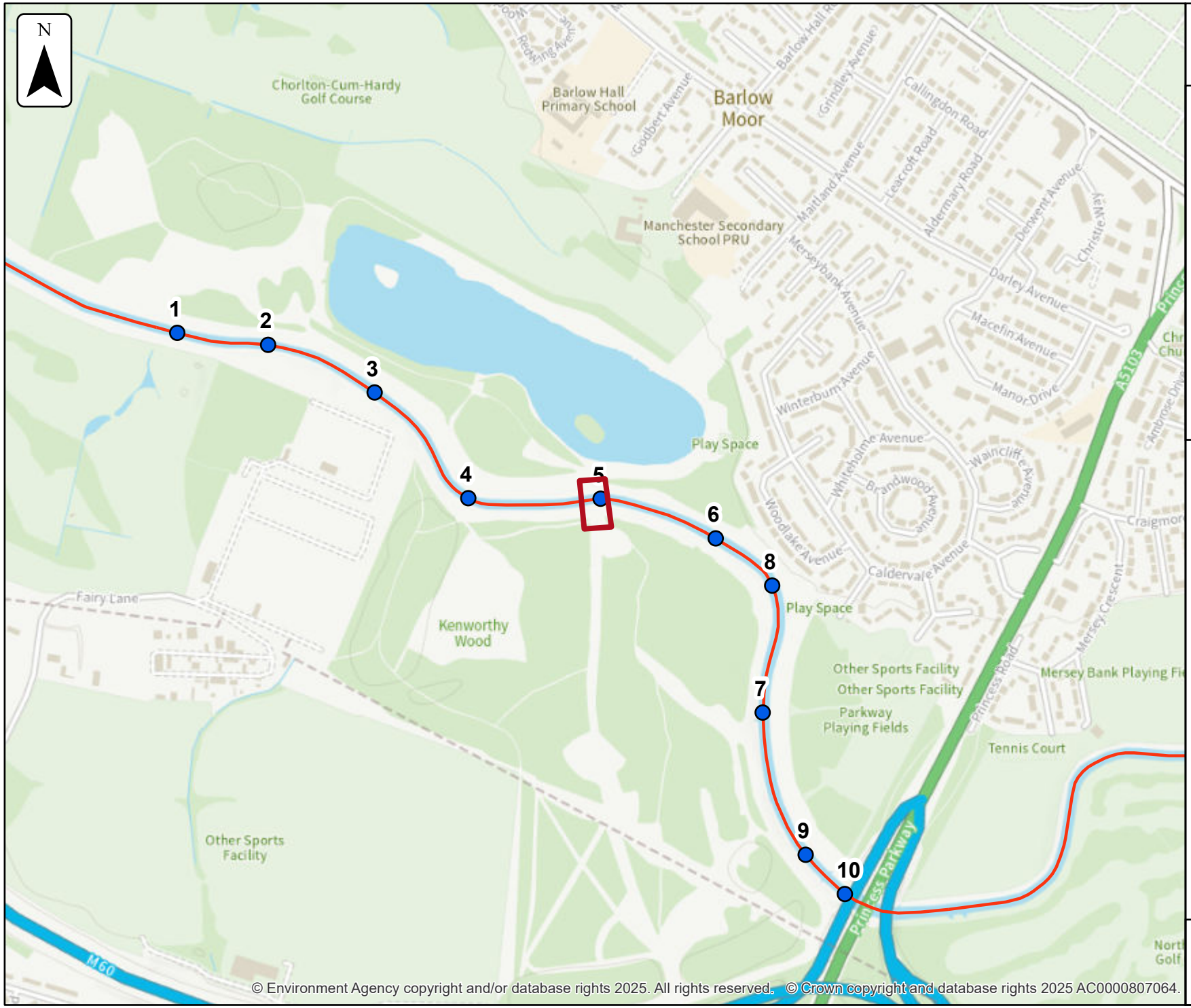
Label	Modelled location ID	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
				Level	Level	Level	Level
1	1290661	381580	391901	24.84	24.86	25.11	26.0
2	1290783	381713	391883	25.20	25.22	25.45	26.18
3	1290805	381868	391814	25.71	25.76	25.99	26.30
4	1290626	382005	391659	25.79	25.82	26.02	26.32
5	1290752	382198	391659	26.15	26.19	26.45	26.84
6	1290688	382366	391601	26.28	26.29	26.34	26.39
7	1290673	382435	391346	27.33	27.44	28.14	29.19
8	1290514	382449	391532	27.13	27.23	27.79	28.58
9	1290530	382498	391139	27.56	27.68	28.46	29.44
10	1290773	382555	391081	27.74	27.84	28.41	29.12

Data in this table comes from the Upper Mersey 2017 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.

Defences removed climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
				Flow	Flow	Flow	Flow
1	1290661	381580	391901	471.57	484.48	560.41	629.49
2	1290783	381713	391883	471.54	484.32	560.25	628.16
3	1290805	381868	391814	436.41	445.44	514.11	607.95
4	1290626	382005	391659	483.29	496.50	579.94	692.90
5	1290752	382198	391659	483.26	496.56	579.92	693.08
6	1290688	382366	391601	534.81	554.95	681.93	862.04
7	1290673	382435	391346	534.42	549.97	626.79	646.91
8	1290514	382449	391532	534.81	554.95	679.64	820.91
9	1290530	382498	391139	534.44	546.62	569.68	580.0
10	1290773	382555	391081	485.88	496.95	520.12	530.79

Data in this table comes from the Upper Mersey 2017 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.



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Environment Agency

Defences removed modelled fluvial node locations

Location (easting/northing)
382190/391651

Scale
1:7,500

Created
14 Nov 2025

Model name
Upper Mersey 2017

- Selected area
- Modelled location
- Main river

0 100 200 300
metres

Modelled node locations data

Defences removed

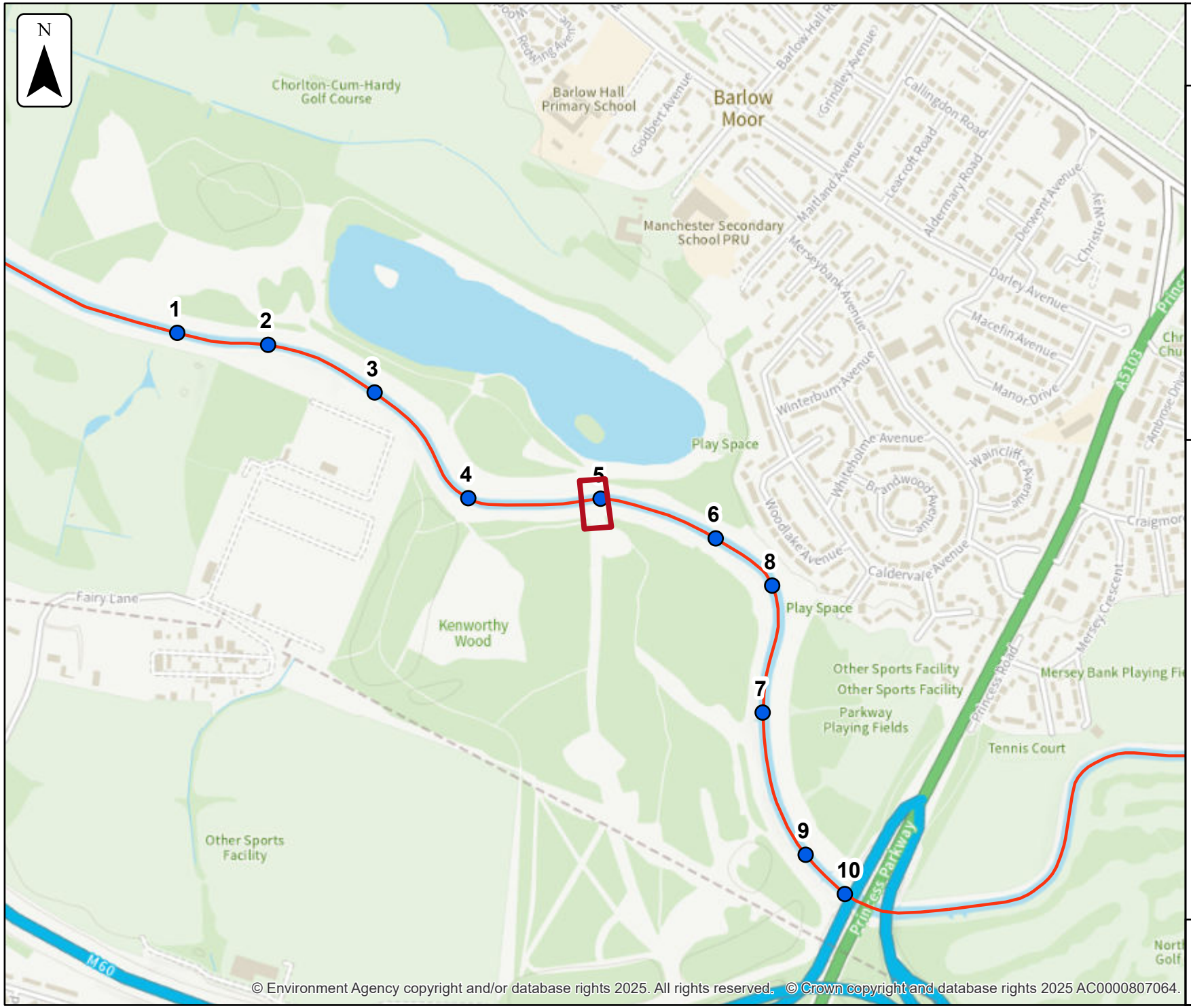
Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	1290661	381580	391901	23.93	24.20	24.34	24.45	24.48	24.50	24.59	24.64	24.67	24.75	25.23
2	1290783	381713	391883	24.08	24.38	24.55	24.68	24.72	24.75	24.85	24.91	24.96	25.07	25.54
3	1290805	381868	391814	24.27	24.60	24.79	24.91	24.94	24.97	25.11	25.21	25.28	25.46	26.04
4	1290626	382005	391659	24.46	24.83	25.03	25.16	25.20	25.23	25.34	25.42	25.47	25.60	26.06
5	1290752	382198	391659	24.65	25.04	25.26	25.43	25.48	25.51	25.64	25.73	25.79	25.94	26.49
6	1290688	382366	391601	24.84	25.27	25.52	25.71	25.76	25.80	25.92	26.0	26.06	26.17	26.35
7	1290673	382435	391346	25.25	25.72	26.0	26.22	26.29	26.34	26.50	26.62	26.70	26.92	28.30
8	1290514	382449	391532	25.13	25.59	25.86	26.08	26.15	26.19	26.34	26.45	26.53	26.74	27.91
9	1290530	382498	391139	25.42	25.90	26.19	26.42	26.50	26.55	26.71	26.84	26.92	27.16	28.63
10	1290773	382555	391081	25.50	25.98	26.27	26.52	26.60	26.67	26.84	26.98	27.07	27.33	28.54

Data in this table comes from the Upper Mersey 2017 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.

Defences removed

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	1290661	381580	391901	186.70	240.12	275.91	304.34	313.30	320.30	345.91	366.22	380.55	416.73	573.26
2	1290783	381713	391883	186.71	240.12	275.91	304.35	313.29	320.30	345.92	366.27	380.55	416.73	573.14
3	1290805	381868	391814	186.72	240.12	276.55	308.96	319.88	328.68	350.34	364.0	374.88	399.49	529.25
4	1290626	382005	391659	186.73	240.39	279.20	314.87	327.09	337.02	362.65	382.80	397.32	432.27	598.74
5	1290752	382198	391659	186.74	240.39	279.20	314.86	327.09	336.96	362.75	382.81	397.34	432.27	599.21
6	1290688	382366	391601	186.75	240.40	279.20	315.50	328.43	338.94	368.16	392.20	410.02	456.73	711.36
7	1290673	382435	391346	186.76	240.40	279.22	315.50	328.44	338.95	368.22	392.21	410.03	456.73	640.39
8	1290514	382449	391532	186.76	240.40	279.21	315.50	328.44	338.95	368.17	392.21	410.03	456.73	708.04
9	1290530	382498	391139	186.77	240.41	279.23	315.51	328.44	338.95	368.26	392.23	410.09	456.74	572.40
10	1290773	382555	391081	169.80	218.56	253.84	286.83	298.59	308.14	334.80	356.58	372.82	415.22	523.52

Data in this table comes from the Upper Mersey 2017 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.



Environment Agency

Defended climate change modelled fluvial node locations

Location (easting/northing)
382190/391651

Scale
1:7,500

Created
14 Nov 2025

Model name
Upper Mersey 2017

- Selected area
- Modelled location
- Main river

0 100 200 300
metres

Modelled node locations data

Defended climate change

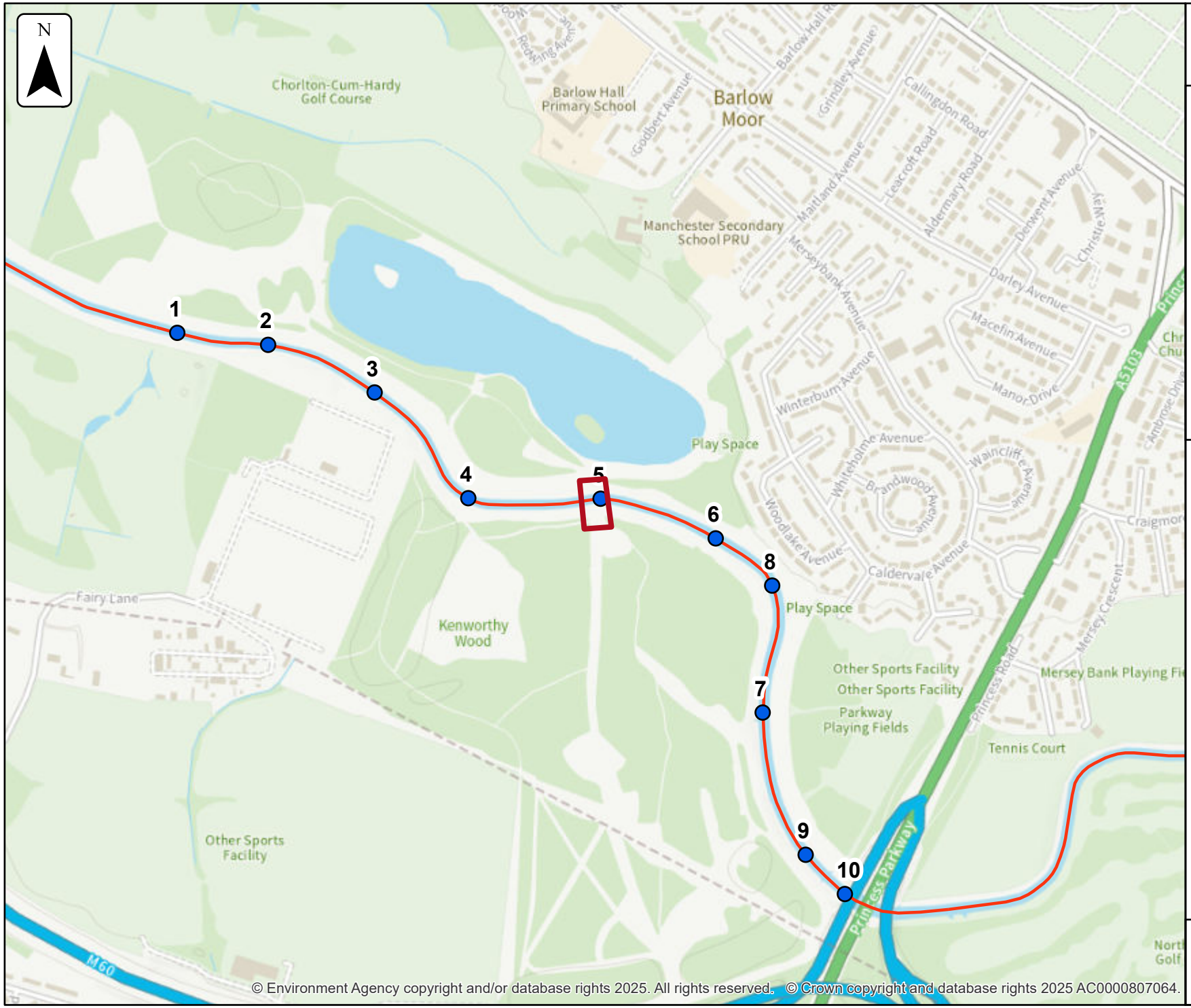
Label	Modelled location ID	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
				Level	Level	Level	Level
1	1290661	381580	391901	26.06	26.10	26.21	26.36
2	1290783	381713	391883	26.19	26.24	26.39	26.52
3	1290805	381868	391814	26.35	26.42	26.63	26.77
4	1290626	382005	391659	26.55	26.64	26.93	27.08
5	1290752	382198	391659	26.77	26.92	27.62	28.15
6	1290688	382366	391601	27.0	27.16	27.69	27.77
7	1290673	382435	391346	27.47	27.66	28.51	29.33
8	1290514	382449	391532	27.33	27.51	28.17	28.71
9	1290530	382498	391139	27.63	27.82	28.79	29.57
10	1290773	382555	391081	27.69	27.89	28.64	29.22

Data in this table comes from the Upper Mersey 2017 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.

Defended climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
				Flow	Flow	Flow	Flow
1	1290661	381580	391901	475.71	513.62	635.49	685.82
2	1290783	381713	391883	478.83	518.84	645.60	698.71
3	1290805	381868	391814	478.84	518.85	646.0	699.92
4	1290626	382005	391659	478.82	518.83	645.83	700.55
5	1290752	382198	391659	478.82	518.85	638.50	687.10
6	1290688	382366	391601	478.83	518.86	696.83	887.96
7	1290673	382435	391346	478.82	518.86	614.20	624.65
8	1290514	382449	391532	478.82	518.86	688.04	834.96
9	1290530	382498	391139	478.83	518.88	561.06	574.52
10	1290773	382555	391081	435.33	471.78	513.58	527.07

Data in this table comes from the Upper Mersey 2017 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.



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Environment Agency

Defended modelled fluvial node locations

Location (easting/northing)
382190/391651

Scale
1:7,500

Created
14 Nov 2025

Model name
Upper Mersey 2017

- Selected area
- Modelled location
- Main river

0 100 200 300
metres

Modelled node locations data

Defended

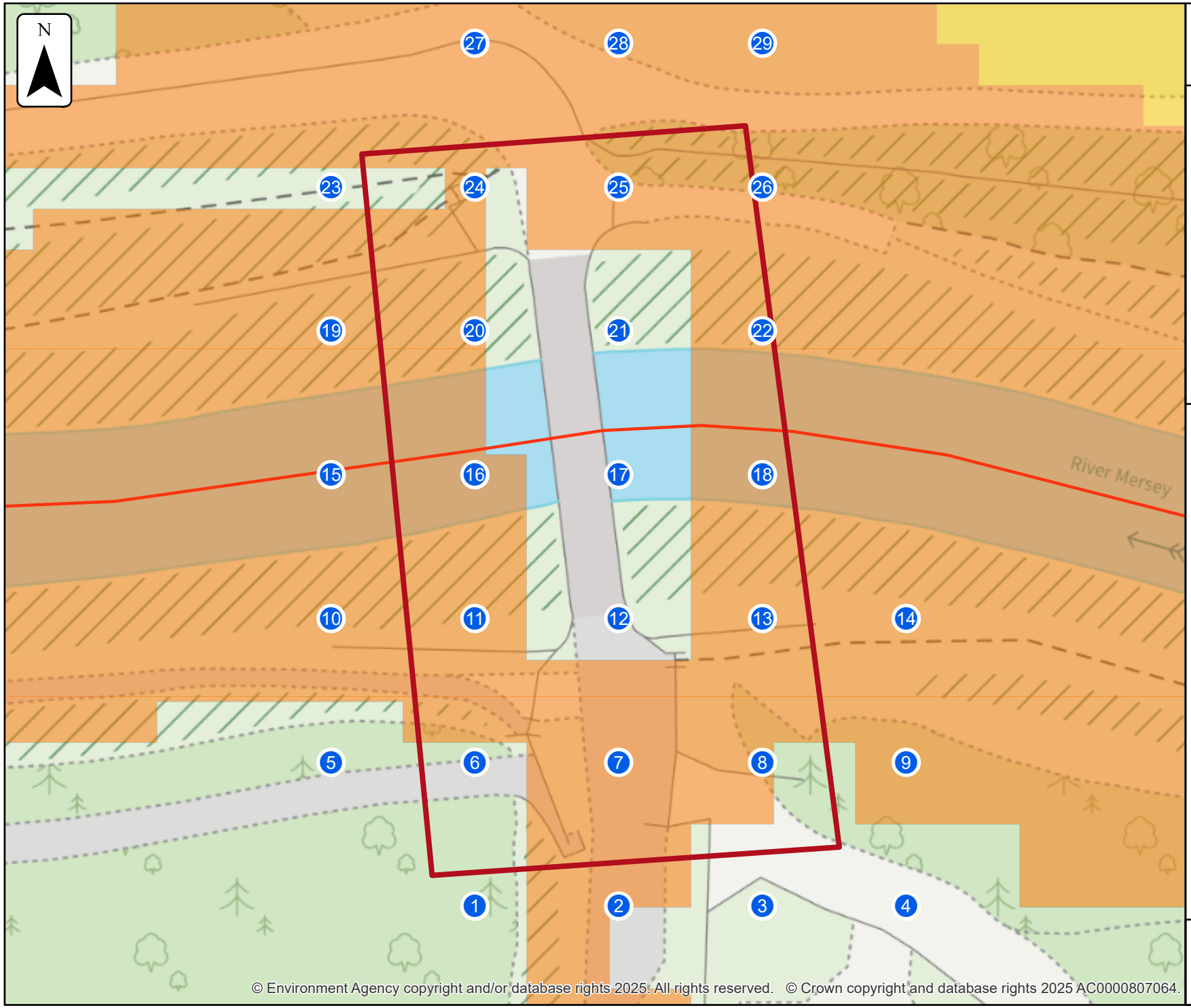
Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	1290661	381580	391901	24.78	25.19	25.30	25.63	25.69	25.73	25.79	25.82	25.88	25.90	26.22
2	1290783	381713	391883	24.86	25.27	25.38	25.71	25.78	25.81	25.87	25.91	25.97	25.99	26.40
3	1290805	381868	391814	24.95	25.37	25.48	25.80	25.87	25.91	25.96	26.0	26.07	26.10	26.66
4	1290626	382005	391659	25.06	25.49	25.60	25.93	25.99	26.03	26.09	26.13	26.20	26.23	26.96
5	1290752	382198	391659	25.18	25.62	25.73	26.05	26.12	26.16	26.21	26.26	26.34	26.38	27.74
6	1290688	382366	391601	25.33	25.79	25.90	26.22	26.29	26.32	26.38	26.43	26.52	26.56	27.73
7	1290673	382435	391346	25.64	26.12	26.24	26.56	26.62	26.66	26.73	26.77	26.88	26.93	28.68
8	1290514	382449	391532	25.55	26.02	26.14	26.46	26.52	26.56	26.62	26.67	26.77	26.81	28.27
9	1290530	382498	391139	25.78	26.26	26.39	26.70	26.76	26.80	26.87	26.91	27.02	27.07	28.98
10	1290773	382555	391081	25.79	26.27	26.39	26.69	26.76	26.79	26.86	26.91	27.02	27.08	28.77

Data in this table comes from the Upper Mersey 2017 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.

Defended

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	1290661	381580	391901	202.08	256.60	271.57	307.82	315.51	320.60	329.75	336.89	355.42	365.19	651.94
2	1290783	381713	391883	202.08	256.61	271.58	307.86	315.52	320.61	329.76	336.90	355.42	365.21	662.76
3	1290805	381868	391814	202.13	256.60	271.61	307.87	315.54	320.63	329.75	336.91	355.42	365.21	662.95
4	1290626	382005	391659	202.13	256.60	271.62	307.90	315.56	320.63	329.76	336.91	355.42	365.21	663.09
5	1290752	382198	391659	202.17	256.62	271.65	307.92	315.58	320.65	329.76	336.95	355.42	365.22	653.50
6	1290688	382366	391601	202.20	256.59	271.68	307.97	315.61	320.66	329.76	336.97	355.42	365.21	739.62
7	1290673	382435	391346	202.21	256.56	271.72	307.99	315.65	320.69	329.77	337.02	355.45	365.21	618.47
8	1290514	382449	391532	202.18	256.55	271.70	307.97	315.63	320.68	329.76	336.98	355.43	365.21	725.64
9	1290530	382498	391139	202.28	256.56	271.76	308.05	315.67	320.71	329.77	337.02	355.48	365.23	565.47
10	1290773	382555	391081	183.83	233.25	247.04	280.03	287.0	291.57	299.80	306.41	323.17	332.03	517.35

Data in this table comes from the Upper Mersey 2017 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.



Environment Agency

Defended modelled fluvial extent and height

Location (easting/northing)
382190/391651

Scale
1:500

Created
14 Nov 2025

Model name
Upper Mersey 2017

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 3.75
- 3.75 - 7.5
- 7.5 - 11.25
- 11.25 - 15.0
- 15.0 - 18.75
- 18.75 - 22.5
- 22.5 - 26.25
- 26.25 - 30.0
- 30.0 - 33.75

This map shows the 0.1% AEP height data

0 5 10 15 20
metres

Sample point data

Defended

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
1	382178	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	382192	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	27.75
3	382206	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	382220	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	382164	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	382178	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	382192	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	27.74
8	382206	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	27.75
9	382220	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	27.75
10	382164	391640	25.17	25.61	25.72	26.04	26.10	26.14	26.20	26.24	26.32	26.36	27.26
11	382178	391640	25.17	25.61	25.73	26.05	26.11	26.15	26.21	26.25	26.33	26.37	27.28
12	382192	391640	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
13	382206	391640	25.18	25.63	25.74	26.06	26.12	26.16	26.22	26.26	26.34	26.38	27.74
14	382220	391640	25.20	25.64	25.76	26.08	26.14	26.18	26.24	26.28	26.36	26.40	27.74
15	382164	391654	25.17	25.61	25.72	26.04	26.11	26.14	26.20	26.24	26.32	26.36	27.26
16	382178	391654	25.17	25.62	25.73	26.05	26.11	26.15	26.21	26.25	26.33	26.37	27.28
17	382192	391654	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	382206	391654	25.18	25.63	25.74	26.06	26.12	26.16	26.22	26.26	26.34	26.38	27.74
19	382164	391668	25.17	25.61	25.72	26.04	26.11	26.15	26.20	26.25	26.33	26.36	27.26
20	382178	391668	25.17	25.62	25.73	26.05	26.12	26.15	26.21	26.25	26.33	26.37	27.29
21	382192	391668	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	382206	391668	25.18	25.63	25.74	26.06	26.12	26.16	26.22	26.26	26.34	26.38	27.74
23	382164	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	382178	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	27.29

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
25	382192	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	27.68
26	382206	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	26.38	27.74
27	382178	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	26.97
28	382192	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	26.89
29	382206	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	26.98
Max value in selected area:			25.19	25.63	25.75	26.06	26.13	26.17	26.23	26.27	26.35	26.39	27.75

Data in this table comes from the Upper Mersey 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.
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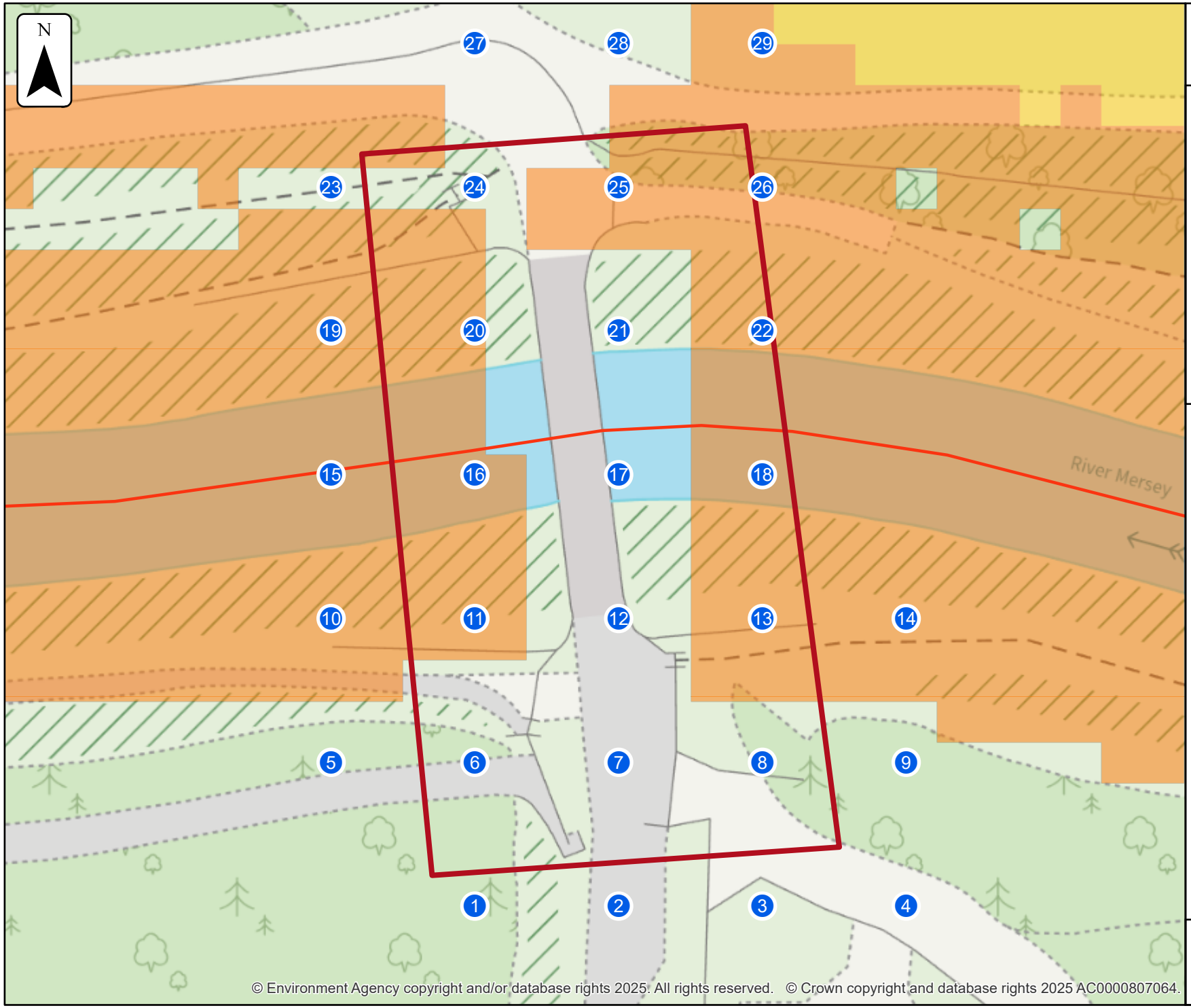
Defended

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
1	382178	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	382192	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.81
3	382206	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	382220	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	382164	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	382178	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	382192	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.92
8	382206	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.60
9	382220	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.63
10	382164	391640	0.86	1.30	1.42	1.74	1.80	1.84	1.90	1.94	2.02	2.06	3.01
11	382178	391640	0.72	1.16	1.28	1.60	1.66	1.70	1.76	1.80	1.88	1.92	2.82
12	382192	391640	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
13	382206	391640	0.37	0.82	0.93	1.25	1.31	1.35	1.41	1.45	1.53	1.57	2.93
14	382220	391640	0.85	1.29	1.41	1.73	1.79	1.83	1.89	1.93	2.01	2.05	3.39
15	382164	391654	6.10	6.54	6.65	6.97	7.04	7.07	7.13	7.17	7.25	7.29	8.19
16	382178	391654	5.37	5.82	5.93	6.25	6.31	6.35	6.41	6.45	6.53	6.57	7.48
17	382192	391654	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	382206	391654	4.80	5.24	5.35	5.67	5.74	5.78	5.83	5.88	5.96	6.00	7.36
19	382164	391668	0.73	1.17	1.29	1.61	1.67	1.71	1.77	1.81	1.89	1.93	2.86
20	382178	391668	1.33	1.77	1.88	2.20	2.27	2.31	2.37	2.41	2.49	2.53	3.49
21	382192	391668	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	382206	391668	1.87	2.31	2.43	2.75	2.81	2.85	2.91	2.95	3.03	3.07	4.43
23	382164	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	382178	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.05

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
25	382192	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.51
26	382206	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.01	1.02
27	382178	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.35
28	382192	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.06
29	382206	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.27
Max value in selected area:			6.25	6.69	6.80	7.12	7.19	7.23	7.29	7.33	7.41	7.45	8.81

Data in this table comes from the Upper Mersey 2017 model. Height values are shown in mAOD, and depth values are shown in metres.
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'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defences removed modelled fluvial extent and height

Location (easting/northing)
382190/391651

Scale
1:500

Created
14 Nov 2025

Model name
Upper Mersey 2017

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 3.75
- 3.75 - 7.5
- 7.5 - 11.25
- 11.25 - 15.0
- 15.0 - 18.75
- 18.75 - 22.5
- 22.5 - 26.25
- 26.25 - 30.0
- 30.0 - 33.75

This map shows the 0.1% AEP height data

0 5 10 15 20
metres

Sample point data

Defences removed

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
1	382178	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	382192	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	382206	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	382220	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	382164	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	382178	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	382192	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	382206	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	382220	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	382164	391640	24.63	25.02	25.24	25.40	25.45	25.49	25.61	25.70	25.76	25.91	26.45
11	382178	391640	24.64	25.03	25.25	25.42	25.46	25.50	25.63	25.72	25.78	25.93	26.48
12	382192	391640	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
13	382206	391640	24.66	25.05	25.27	25.44	25.49	25.52	25.65	25.74	25.80	25.95	26.49
14	382220	391640	24.68	25.07	25.30	25.47	25.52	25.55	25.68	25.77	25.83	25.97	26.48
15	382164	391654	24.63	25.02	25.24	25.40	25.45	25.49	25.61	25.70	25.76	25.91	26.46
16	382178	391654	24.65	25.03	25.26	25.42	25.47	25.51	25.63	25.72	25.78	25.93	26.49
17	382192	391654	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	382206	391654	24.66	25.05	25.27	25.44	25.49	25.52	25.65	25.74	25.80	25.95	26.49
19	382164	391668	24.64	25.02	25.24	25.41	25.45	25.49	25.61	25.71	25.77	25.91	26.46
20	382178	391668	24.65	25.04	25.26	25.42	25.47	25.51	25.64	25.73	25.79	25.94	26.49
21	382192	391668	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	382206	391668	24.66	25.05	25.27	25.44	25.49	25.52	25.65	25.74	25.80	25.95	26.49
23	382164	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	382178	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Height	Height	Height	Height	Height	Height	Height	Height	Height	Height	Height
25	382192	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	26.50
26	382206	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	26.49
27	382178	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
28	382192	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
29	382206	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	26.30
Max value in selected area:			24.66	25.05	25.28	25.45	25.50	25.53	25.66	25.75	25.81	25.96	26.50

Data in this table comes from the Upper Mersey 2017 model. Height values are shown in mAOD, and depth values are shown in metres.
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'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

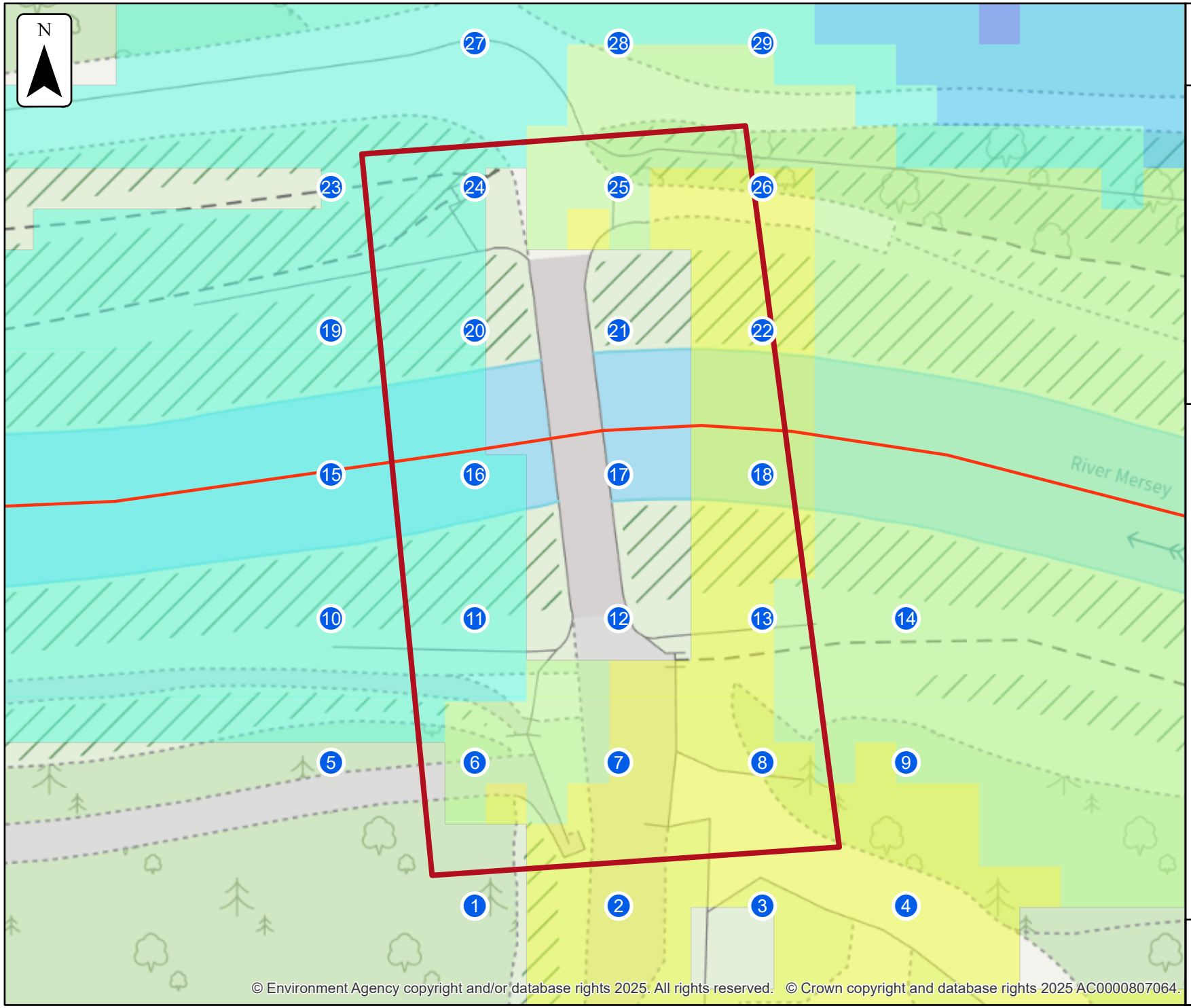
Defences removed

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
1	382178	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
2	382192	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
3	382206	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
4	382220	391612	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
5	382164	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
6	382178	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
7	382192	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
8	382206	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	382220	391626	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	382164	391640	0.35	0.71	0.93	1.09	1.14	1.18	1.30	1.39	1.46	1.60	2.21
11	382178	391640	0.24	0.58	0.80	0.97	1.01	1.05	1.18	1.27	1.33	1.48	2.02
12	382192	391640	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
13	382206	391640	0.02	0.24	0.46	0.63	0.68	0.71	0.84	0.93	0.99	1.14	1.68
14	382220	391640	0.33	0.72	0.95	1.11	1.17	1.20	1.33	1.42	1.48	1.62	2.12
15	382164	391654	5.56	5.95	6.17	6.33	6.38	6.42	6.54	6.63	6.69	6.84	7.39
16	382178	391654	4.85	5.23	5.46	5.62	5.67	5.71	5.83	5.92	5.98	6.13	6.69
17	382192	391654	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
18	382206	391654	4.27	4.66	4.89	5.05	5.10	5.14	5.26	5.36	5.42	5.56	6.11
19	382164	391668	0.24	0.59	0.81	0.97	1.02	1.06	1.18	1.27	1.33	1.48	2.06
20	382178	391668	0.80	1.19	1.41	1.57	1.62	1.66	1.79	1.88	1.94	2.09	2.70
21	382192	391668	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	382206	391668	1.35	1.74	1.96	2.12	2.17	2.21	2.34	2.43	2.49	2.64	3.18
23	382164	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	382178	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Label	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
			Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth
25	382192	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.15
26	382206	391682	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.07
27	382178	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
28	382192	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
29	382206	391696	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.05
Max value in selected area:			5.72	6.11	6.34	6.50	6.55	6.59	6.71	6.80	6.87	7.01	7.56

Data in this table comes from the Upper Mersey 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.
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'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defended climate change modelled fluvial extent and height

Location (easting/northing)
382190/391651

Scale
1:500

Created
14 Nov 2025

Model name
Upper Mersey 2017

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 25 - 25.625
- 25.625 - 26.25
- 26.25 - 26.875
- 26.875 - 27.5
- 27.5 - 28.125
- 28.125 - 28.75
- 28.75 - 29.375
- 29.375 - 30.0
- 30.0 - 30.625

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

0 5 10 15 20
metres

Sample point data

Defended climate change

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Height	Height	Height	Height
1	382178	391612	NoData	NoData	NoData	NoData
2	382192	391612	NoData	NoData	27.63	28.14
3	382206	391612	NoData	NoData	NoData	28.32
4	382220	391612	NoData	NoData	NoData	28.33
5	382164	391626	NoData	NoData	NoData	NoData
6	382178	391626	NoData	NoData	NoData	27.86
7	382192	391626	NoData	26.93	27.62	28.14
8	382206	391626	NoData	NoData	27.63	28.13
9	382220	391626	NoData	NoData	27.64	28.09
10	382164	391640	26.73	26.84	27.21	27.39
11	382178	391640	26.74	26.85	27.23	27.42
12	382192	391640	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Height	Height	Height	Height
13	382206	391640	26.78	26.93	27.62	28.14
14	382220	391640	26.81	26.96	27.63	28.09
15	382164	391654	26.73	26.84	27.21	27.40
16	382178	391654	26.74	26.86	27.23	27.42
17	382192	391654	NoData	NoData	NoData	NoData
18	382206	391654	26.78	26.93	27.62	28.14
19	382164	391668	26.73	26.84	27.22	27.40
20	382178	391668	26.75	26.86	27.24	27.42
21	382192	391668	NoData	NoData	NoData	NoData
22	382206	391668	26.78	26.93	27.62	28.14
23	382164	391682	NoData	NoData	NoData	27.40
24	382178	391682	26.75	26.86	27.24	27.43

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Height	Height	Height	Height
25	382192	391682	NoData	NoData	27.57	28.07
26	382206	391682	26.78	26.93	27.62	28.14
27	382178	391696	NoData	NoData	26.89	27.14
28	382192	391696	NoData	NoData	26.83	27.07
29	382206	391696	NoData	NoData	26.93	27.13
Max value in selected area:			26.79	26.94	27.63	28.29

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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.
'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.

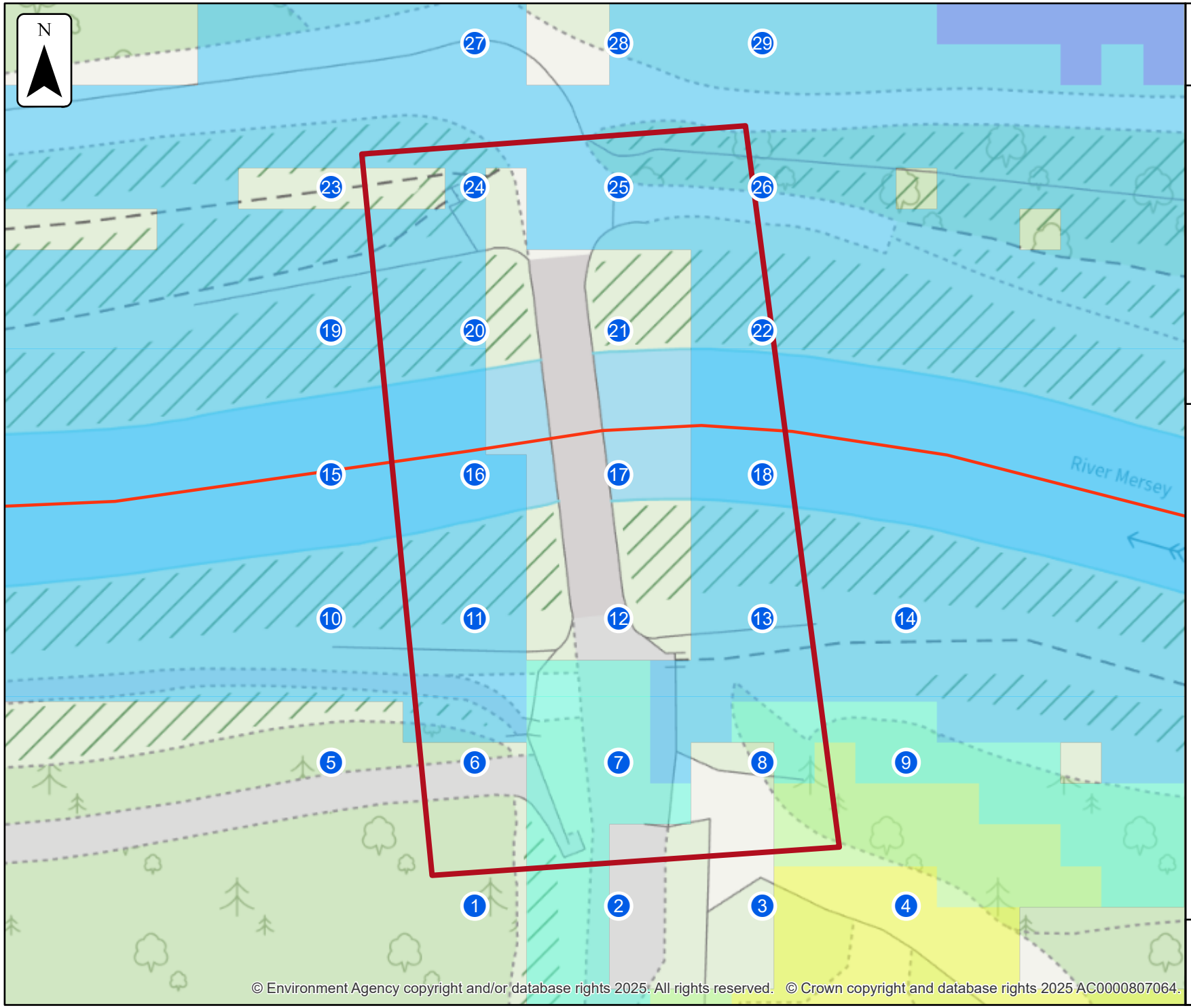
Defended climate change

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Depth	Depth	Depth	Depth
1	382178	391612	NoData	NoData	NoData	NoData
2	382192	391612	NoData	NoData	0.69	1.21
3	382206	391612	NoData	NoData	NoData	0.05
4	382220	391612	NoData	NoData	NoData	0.42
5	382164	391626	NoData	NoData	NoData	NoData
6	382178	391626	NoData	NoData	NoData	0.80
7	382192	391626	NoData	0.11	0.81	1.32
8	382206	391626	NoData	NoData	0.48	0.99
9	382220	391626	NoData	NoData	0.52	0.97
10	382164	391640	2.42	2.60	2.97	3.15
11	382178	391640	2.29	2.39	2.77	2.96
12	382192	391640	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Depth	Depth	Depth	Depth
13	382206	391640	1.97	2.12	2.81	3.32
14	382220	391640	2.45	2.61	3.28	3.74
15	382164	391654	7.66	7.77	8.15	8.33
16	382178	391654	6.94	7.06	7.44	7.62
17	382192	391654	NoData	NoData	NoData	NoData
18	382206	391654	6.40	6.55	7.24	7.75
19	382164	391668	2.30	2.44	2.81	3.00
20	382178	391668	2.90	3.06	3.44	3.63
21	382192	391668	NoData	NoData	NoData	NoData
22	382206	391668	3.47	3.62	4.31	4.82
23	382164	391682	NoData	NoData	NoData	0.00
24	382178	391682	0.00	0.01	0.05	0.08

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Depth	Depth	Depth	Depth
25	382192	391682	NoData	NoData	0.40	0.89
26	382206	391682	0.23	0.31	0.90	1.42
27	382178	391696	NoData	NoData	0.27	0.52
28	382192	391696	NoData	NoData	0.04	0.14
29	382206	391696	NoData	NoData	0.23	0.42
Max value in selected area:			7.85	8.00	8.69	9.20

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'Max value in selected area' is the deepest depth or highest height at any location within your drawn boundary.



Environment Agency

Defences removed climate change modelled fluvial extent and height

Location (easting/northing)
382190/391651

Scale
1:500

Created
14 Nov 2025

Model name
Upper Mersey 2017

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 25 - 25.625
- 25.625 - 26.25
- 26.25 - 26.875
- 26.875 - 27.5
- 27.5 - 28.125
- 28.125 - 28.75
- 28.75 - 29.375
- 29.375 - 30.0
- 30.0 - 30.625

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

0 5 10 15 20
metres

Sample point data

Defences removed climate change

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Height	Height	Height	Height
1	382178	391612	NoData	NoData	NoData	NoData
2	382192	391612	NoData	NoData	NoData	NoData
3	382206	391612	NoData	NoData	NoData	NoData
4	382220	391612	NoData	NoData	NoData	28.21
5	382164	391626	NoData	NoData	NoData	NoData
6	382178	391626	NoData	NoData	NoData	NoData
7	382192	391626	NoData	NoData	NoData	26.96
8	382206	391626	NoData	NoData	NoData	NoData
9	382220	391626	NoData	NoData	NoData	27.31
10	382164	391640	26.11	26.16	26.41	26.72
11	382178	391640	26.14	26.18	26.43	26.75
12	382192	391640	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Height	Height	Height	Height
13	382206	391640	26.16	26.20	26.44	26.82
14	382220	391640	26.17	26.21	26.43	26.78
15	382164	391654	26.12	26.16	26.41	26.73
16	382178	391654	26.14	26.18	26.44	26.76
17	382192	391654	NoData	NoData	NoData	NoData
18	382206	391654	26.16	26.20	26.44	26.82
19	382164	391668	26.12	26.16	26.41	26.73
20	382178	391668	26.15	26.19	26.44	26.76
21	382192	391668	NoData	NoData	NoData	NoData
22	382206	391668	26.16	26.20	26.44	26.83
23	382164	391682	NoData	NoData	NoData	NoData
24	382178	391682	NoData	NoData	NoData	26.77

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Height	Height	Height	Height
25	382192	391682	NoData	26.20	26.45	26.83
26	382206	391682	NoData	NoData	26.44	26.83
27	382178	391696	NoData	NoData	NoData	26.74
28	382192	391696	NoData	NoData	NoData	26.58
29	382206	391696	NoData	NoData	26.27	26.55
Max value in selected area:			26.16	26.20	26.45	28.09

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Defences removed climate change

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Depth	Depth	Depth	Depth
1	382178	391612	NoData	NoData	NoData	NoData
2	382192	391612	NoData	NoData	NoData	NoData
3	382206	391612	NoData	NoData	NoData	NoData
4	382220	391612	NoData	NoData	NoData	0.30
5	382164	391626	NoData	NoData	NoData	NoData
6	382178	391626	NoData	NoData	NoData	NoData
7	382192	391626	NoData	NoData	NoData	0.14
8	382206	391626	NoData	NoData	NoData	NoData
9	382220	391626	NoData	NoData	NoData	0.19
10	382164	391640	1.87	1.91	2.16	2.48
11	382178	391640	1.68	1.72	1.97	2.29
12	382192	391640	NoData	NoData	NoData	NoData

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Depth	Depth	Depth	Depth
13	382206	391640	1.34	1.39	1.63	2.01
14	382220	391640	1.82	1.86	2.08	2.42
15	382164	391654	7.05	7.09	7.34	7.66
16	382178	391654	6.34	6.39	6.64	6.96
17	382192	391654	NoData	NoData	NoData	NoData
18	382206	391654	5.77	5.81	6.06	6.44
19	382164	391668	1.72	1.76	2.01	2.33
20	382178	391668	2.35	2.39	2.65	2.97
21	382192	391668	NoData	NoData	NoData	NoData
22	382206	391668	2.84	2.88	3.13	3.51
23	382164	391682	NoData	NoData	NoData	NoData
24	382178	391682	NoData	NoData	NoData	0.00

Label	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
			Depth	Depth	Depth	Depth
25	382192	391682	NoData	0.01	0.10	0.49
26	382206	391682	NoData	NoData	0.04	0.24
27	382178	391696	NoData	NoData	NoData	0.12
28	382192	391696	NoData	NoData	NoData	0.04
29	382206	391696	NoData	NoData	0.04	0.24
Max value in selected area:			7.22	7.26	7.51	7.89

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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

Your Lead Local Flood Authority is Manchester District.

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

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