**Our Reference : T3947-FRA-01 – Rev B**
**Your Reference :**

**21 June 2024**

Tim Williams
Harrison's Engineering Ltd,
Longworth Road
Billington
BB7 9TP

Dear Tim,

## Proposed New Car Park & Storage Yard, Billington
## Flood Risk Assessment – Revised March 2024

### Preface

This FRA has been updated following comments received from the EA, subsequent to its original submission. It aims to address the EA's concerns by incorporating the additional information requested and add further detail where appropriate. Following resubmission (Rev A), we have received additional comments that appear to suggest two remaining concerns. This document (Rev B) now includes for the inclusion of a revised design flood level and also confirms that any material generated above and beyond the proposed levels shown will be removed off site.

### Introduction

PSA Design Ltd has been commissioned by Mr T Williams to prepare a Flood Risk Assessment (FRA) in support of a Planning Application for a proposed car park and storage area at Harrison's Engineering, Longworth Road in Billington

The site is located on the northern edge of the village of Billington at national grid reference 372610E, 436170N. The site location can be seen on the location plans **(Appendix A)** and Flood Maps **(Appendix B)** included at the end of this assessment.

Reference to the flood mapping shows the site is located within Flood Zones 2 and 3, albeit in an area protected by established flood defences.

**Existing Site**

The existing Harrison's Engineering facility comprises a range of industrial buildings surrounded by hard surfacing which is generally used for vehicle parking, vehicle and pedestrian circulation and storage areas. The north the existing site is bound by the River Calder, the east by a public footpath and railway viaduct and to the south by a row of terraced houses.

The topography of the land generally falls from East to West. Levels range from 43.9mAOD in the east to 42.4mAOD in the west.

The existing site plans and topo survey are included in **Appendix A**.

**Development Proposals**

As shown on the proposed site layout **(**included in **Appendix C)** the application proposes to extend the existing site onto the adjacent field to the west to provide a more suitable car parking area, to accommodate 101 staff car parking spaces and a storage area. The storage yard will be used for storage of flatbed trailers and provide a safe loading / manoeuvring area (away from pedestrianised routes) in preparation for shipment off site.

It is considered that relocating the staff car parking onto the proposed site will enable the route for HGVs around the site to be formalised and remove the majority of potential conflicts between cars and HGVs. The proposals will ensure safer and more efficient handling of goods at the facility. Visitor parking is to be retained adjacent to the building's reception area along with cycle parking.

It is confirmed that the proposed development is not anticipated to result in an increase in the number of vehicles, either cars or larger vehicles, visiting the site. The purpose of the proposals are to simply improve parking arrangements and site circulation to ensure that all visitors to the site, including pedestrians, cycles, cars, vans and HGVs can be safely accommodated within the site and can manoeuvre safely with minimal conflict between modes of travel.

Levels within the existing development itself will remain unaltered. The philosophy of the level design for the proposed parking / storage area will be to maintain levels whilst "smoothing out" any current undulations to deliver a workable platform. There are no raised kerbs proposed, all edgings will be laid flush. The proposed levels are shown (red contours) on PSA Design drawing T3947-FRA-01, within **Appendix C**. This drawing illustrates the relatively minor re-grading works required (max 200mm of fill

and 300mm of cut) to establish the working platform whilst mimicking and maintaining the existing overland flow route from east to west.

The drawing also shows pertinent section across the site and calculates the cut/fill balance. A nett **cut of 198m$^3$** is achieved.

Reference to the proposed plan (**Appendix C**) shows the storage yard will be surfaced with a "no-fines" course graded gravel. The car park will be formed from a permeable construction, likely a combination of coarse graded gravel and permeable resin bound aggregate or block paviours. The final solution will be confirmed at detailed design stage, but both the above areas will be permeable.

**Flood Risk Assessment**

It has been established that the site is shown to be located within Flood Zones 2 and 3.

Site specific flood data has been acquired from the EA and this is included as **Appendix B**. The prudent 1 in 1000yr and 1 in 100yr + climate change flood levels have been extracted and overlaid on PSA Design drawing T3497-D-01 for reference. This drawing is included as **Appendix C**. Reference to the flood model data confirms that the "flood map for planning" generally accords with the site-specific flood data, i.e. the site falls within Flood Zone 2 and 3.

Reference has also been made to RVBC Flood Map Plan (2018). Data set out within this document (pages 29/30) suggests that the site (River Calder-Whalley Area B) is located outwith an area classified as functional flood plain (Flood Zone 3b).

Therefore, for the purpose of this flood risk assessment, the proposals will be assessed against the worst case flood scenario on the site, Flood Zone 3a.

Planning Policy Guidance (PPG) has been reviewed and assessed as below.

With reference to Table 2 from PPG, the proposed "commercial car park and storage area" would fall within the "Less Vulnerable" category.

Table 3 of PPG, indicates that Less Vulnerable development is "appropriate" within Flood Zone 3a.

There will therefore be no requirement for a Sequential Test or Exception Test to be carried out for this development.

It is also important to note, that the development proposals will not increase the number of employees or visitors on site, neither will there be any new additional materials stored. The whole purpose of the application proposal is to create a more efficient and safer working environment.

PSA Design drawing T3497-FRA-03 (**Appendix C**) shows the flood depth contours based on the proposed new levels compared to two pertinent flood levels:

1. The 1 in 100yr + 15% climate change modelled flood level (approx. 43.60mAOD). This is the level provided by the EA in their Product 4 Data. The 15% CC figure is however below the current recommended allowance of 36% (Ribble Management Catchment).
2. The 0.1 % AEP event (44.60mAOD). In the absence of detailed hydraulic modelling including the 36% allowance, to provide a precautionary approach, we have shown the impacts of the 0.1% (1 in 1000yr) event as a peak river flow climate change proxy for the design flood event.

Both the above scenarios show flooding on the site, and the 36% CC allowance model would in reality be somewhere in between the two sets of data presented. However, as stated earlier in this assessment, the intended use of the application site is purely to create a more efficient and safer working environment to a cramped business that is already well established and in operation. Flood evacuation procedures are already well established and are discussed in further detail later in this report. The impacts and consequence of flood risk within this area is acknowledged by the applicant and deemed acceptable. Again, there is ZERO additional risk to life should this application be granted as its success would not generate an increase in the number of employees. During the 1 in 1000yr event, there would be far greater risk and concerns to the existing established business adjoining the application site to the east, as this whole area would be under circa 1m of water.

The flood storage displacement assessment below, sets out some positive benefits that would reduce the flood impact on the existing premises.

**Flood Storage Displacement Assessment**

It has already been established that as a direct result of the re-grading of the site there is a net reduction of 198m$^3$. This means that flood storage available on site will of course **increase**.

Notwithstanding the above, PSA Design drawing T3947-D-01 shows the proposed scheme, identifying the car park as permeable and the storage yard gravel. PSA Design drawing T3947-FRA-02 highlights these areas and makes assessment of the void (volume) created by the installation of the open graded sub-base layer. The total storage available within the sub-base layer = 705m$^3$.

Therefore, the total (additional) storage potential onsite following the construction of the proposed car park and storage yard scheme would be circa, 200m$^3$ minimum, 900m$^3$ maximum.

The additional “gained” material from the reprofiling the land and providing the proposed working platform / car park must exported off site.

The above can only serve to have a positive impact on flood risk on site and therefore, by definition, actively reduce flood risk in the immediate locality and beyond.

**Impacts on Surface Water Management**.
National Planning Policy Framework (NPPF, 2021), outlines that SuDS must be included within any proposed development scheme where it is practicable to do so. In order to demonstrate that the development will meet with the requirements, the drainage strategy should show;

- That it will be feasible to balance surface water run-off to the Greenfield run-off rate, or reduce existing run-off rate in terms of a brownfield development for all events up to the 1 in 100 year storm, including an allowance for climate change and set out how this could be achieved.

Reference to the proposed plans (T3497-D-01 and FRA-02 – **Appendix C**) shows that there will be ZERO increase in impermeable area as a result of the proposals.

There will therefore be no increase in surface water run-off from the site. It could be argued that the introduction of open graded surfacing will provide additional storage volume over the existing historically compacted clayey topsoil surface.

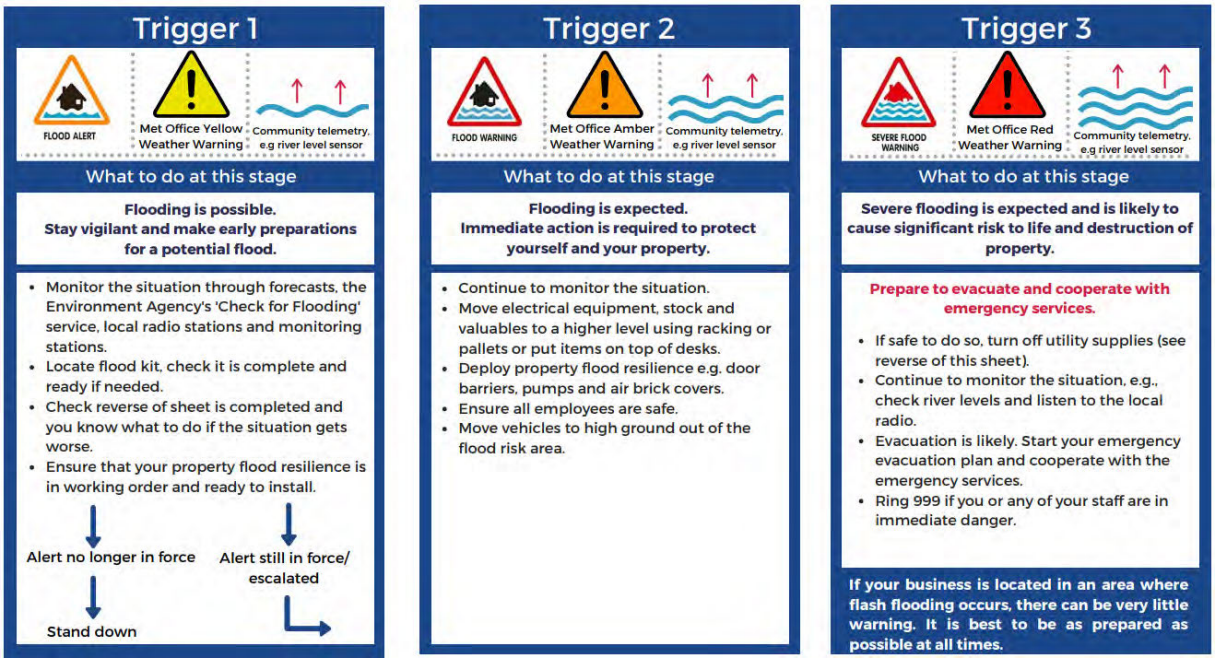
The proposals also include for extensive tree planting along the south and west boundaries which will in turn provide positive environmental benefits.

**Flood Plan Method Statement**
The existing business benefits from an established flood plan and is registered for advanced flood warnings with the Environment Agency. The evacuation plan is included as **Appendix D** for reference. It is recommended that this statement is updated to include specific reference to systematic procedures to address cars parked on the car park and members of staff / visitors on site.

The plan should provide clear instruction that sets out safe evacuation routes from the site and designated assembly locations as appropriate. The entrance to the site (and beyond) is located

outwith an area at risk of flooding, so any such evacuation route could be easily defined given the route out of the business is in affect directly away from the source of flooding.

A typical 3 stage trigger plan is illustrated below. The proposed plan should aim to provide a similar systematic strategy.




Given the topography and location, flooding in this area is unlikely to present as a sudden inundation. Moreso, it will likely slowly rise from the lowest lying areas near the culvert under the A59 to north. Given all the vehicles on site will be owned/used by staff on the site, a systematic flood plan should enable all vehicles and people to safely exit the site to areas outwith the flood zone.

The provision of a suitable updated flood evacuation plan would be drawn up in consultation with the LLFA and could, if necessary, be secured by condition.

**Working within close proximity to watercourses**

There are no works proposed within 8m from the top of the River Calder embankment (as shown on Drawing T3497-D-01 – Appendix C).

The production of a suitable construction method statement will no doubt be conditioned as part of a successful application. The method statement will ensure that the watercourse is protected at all times during the construction phase to ensure that no silts / pollutants migrate to the river.

This is likely to be addressed by the introduction of temporary bunding and/or silt fencing along the watercourse boundary.

**Conclusion**

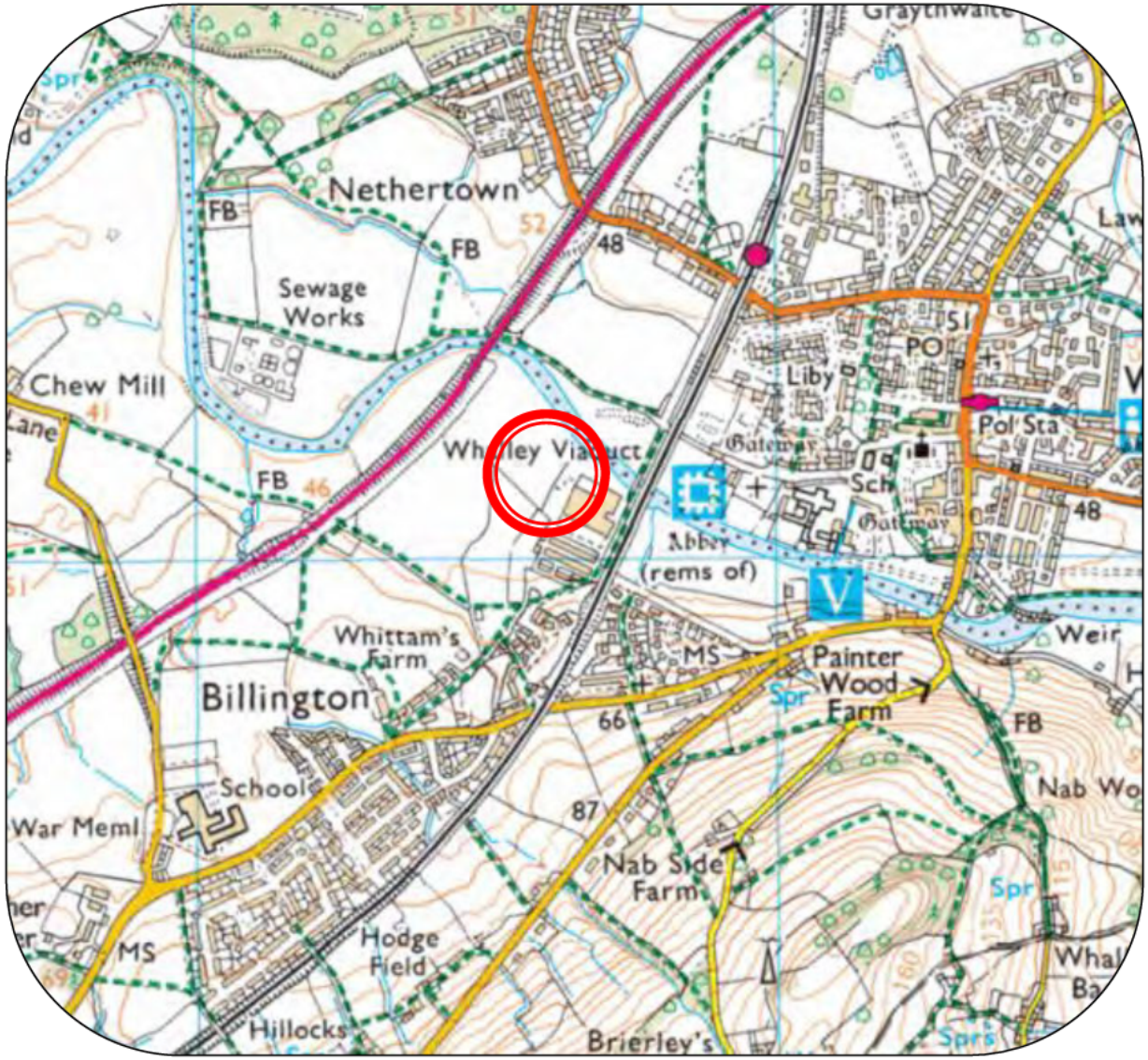
Flood risk has been assessed above and suitable recommendations have been made which conclude that the proposed development is suitable and compliant with NPPF guidance.

Yours sincerely,

**Graham Sanderson**
PSA Design Ltd.

# Appendix A

Site Location Plans & Existing Site







| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PSA DESIGN | PSA Design<br>The Old Bank House<br>6 Berry Lane, Longridge<br>Preston, PR3 3JA<br>Tel. 01772 786066 | Client | Harrisions Engineering | Drawn | HP | Date | March 2023 | Drawing No. Figure 1 |
| | | Job | Proposed New Car Park & Storage Yard, Billington | Checked | DLW | | | |
| | | Title | Site Location Plan (indicative site boundaries shown) | Approved | DLW | Scale | NTS | Rev |


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PSA DESIGN | PSA Design<br>The Old Bank House<br>6 Berry Lane, Longridge<br>Preston, PR3 3JA<br>Tel. 01772 786066 | Client | **Harrisions Engineering** | Drawn | HP | Date | **March 2023** |
| | | Job | **Proposed New Car Park & Storage Yard, Billington** | Checked | DLW | | |
| | | Title | **Site Area Plan** | Approved | DLW | Scale | **NTS** |

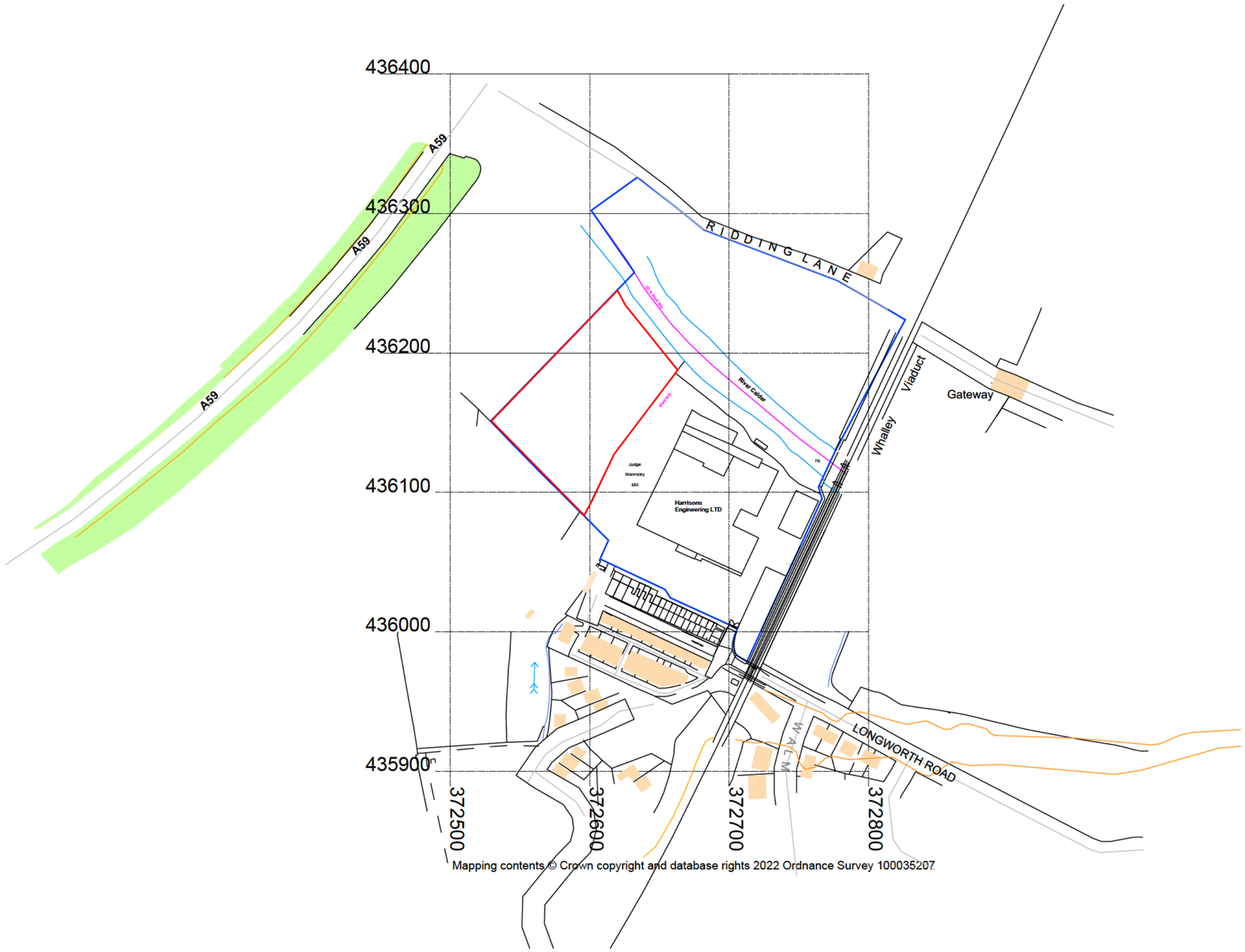
Drawing No. **Figure 2**

Rev

N

0 50m 100m 150m 200m

1:2500 Scale




rev date/intls description

project
Harrisons Engineering LTD

Client
Harrisons Engineering LTD
Judge Walmesley Mill
Longworth road
Billington
BB7 9TP

dwg purpose
OS Plan

Harrison Architecture LTD
38 Salthill Road
Clitheroe
Lancashire
BB7 1NU
Email: Craig_leigh_harrison@yahoo.co.uk
Mobile: 07539 302831

scale 1:2500
@ sheet size A2

1010 job number | 003 drawing number | . revision

N

0 10m 20m 30m 40m

1:500 Scale

External Fabrications in Progress 1

External Fabrications in Progress 2

Car Park (46no.)

Van Parking / External Fabrications

Car Park (24no.)

Van Parking 9no.

130030

94903

ED & Ward Bdy

River Calder

FB

Hedge / vegetation

Hedge / vegetation (to be removed / relocated)

Storage Area

Storage racks

1 way vehicle access no turning areas.

Car Park (5no.)

Car Park (7no.)

Car Park (8no.)

Loading door

Loading door (restricted external access space for loading completed fabrications)

Leylandii to boundary

Van Parking (9no.)

Hedge

Car Park (24no.)

Car Park (46no.)

Entrance gates

HGVs waiting loading space.

Longworth Road

**Existing Parking Areas Total**
**90 Cars**
**9 vans**
**Bicycle 4 no. adjacent to offices**
**HGV's no designated areas.**

rev date/intls description

project
Harrisons Engineering LTD

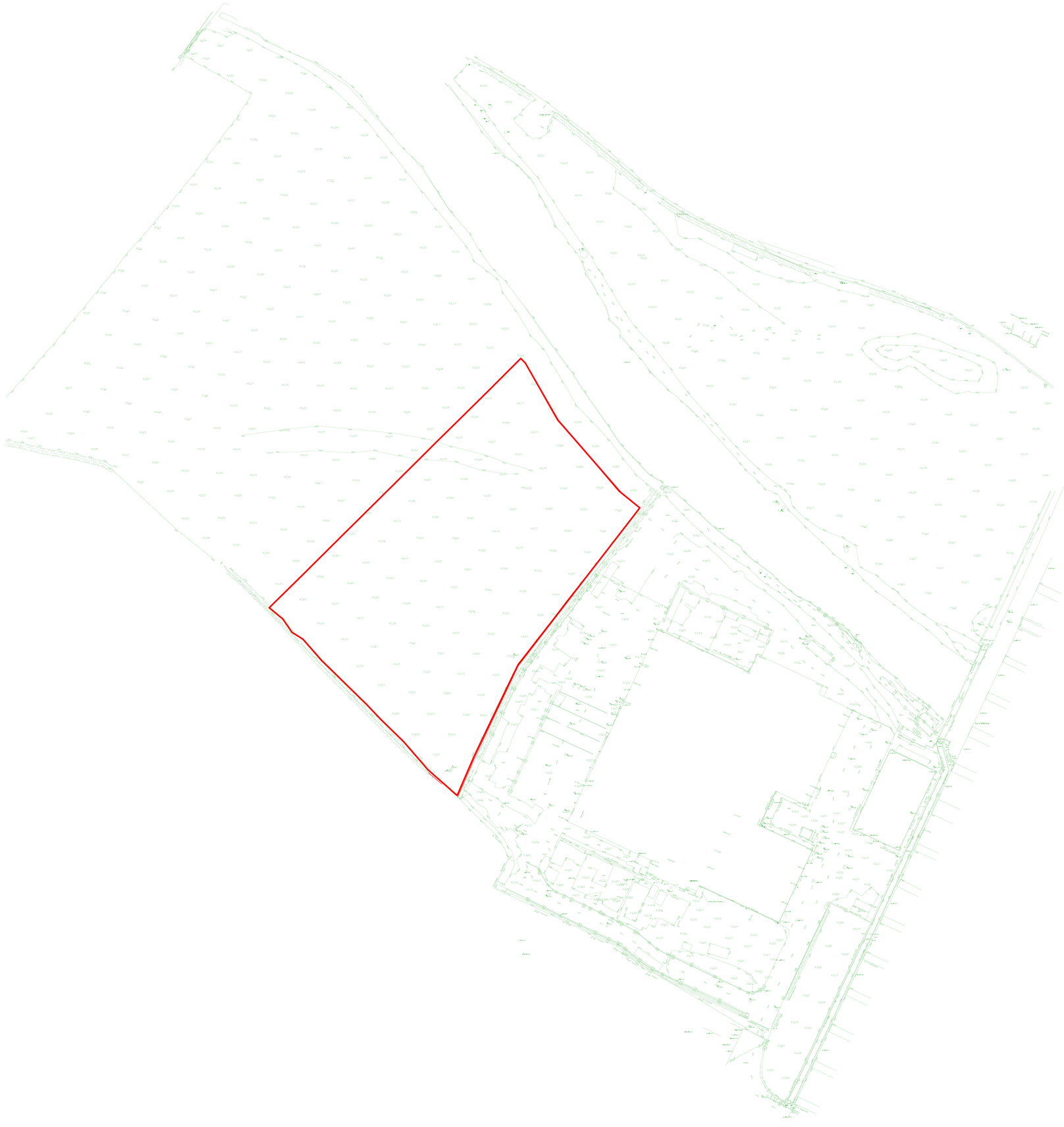
Client
Harrisons Engineering LTD
Judge Walmesley Mill
Longworth road
Billington
BB7 9TP

dwg purpose
Existing Site Plan

Harrison Architecture LTD
38 Salthill Road
Clitheroe
Lancashire
BB7 1NU
Email: Craig_leigh_harrison@yahoo.co.uk
Mobile: 07539 302831

scale 1:500
sheet size A1

1010 job number | 001 drawing number | B revision



| REV | DATE | AMENDMENT DETAILS | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| P1 | 06/05/24 | Preliminary for Comment | GS | DLW | GS |

**Harrison's Engineering Ltd**

**Proposed New Car Park & Storage Yard, Billington**

**Existing Topo Survey**

Drwg No. **TOPO** | Rev. **P1**

Scale **1:500** | Sheet Size **A0**

Date **06/05/24**

Drawn | Checked | Approved

**PSA Design Ltd**
The Old Bank House, 6 Berry Lane,
Longridge, Preston, PR3 3JA
Tel. 01772 786066
www.psadesign.co.uk
mail@psadesign.co.uk

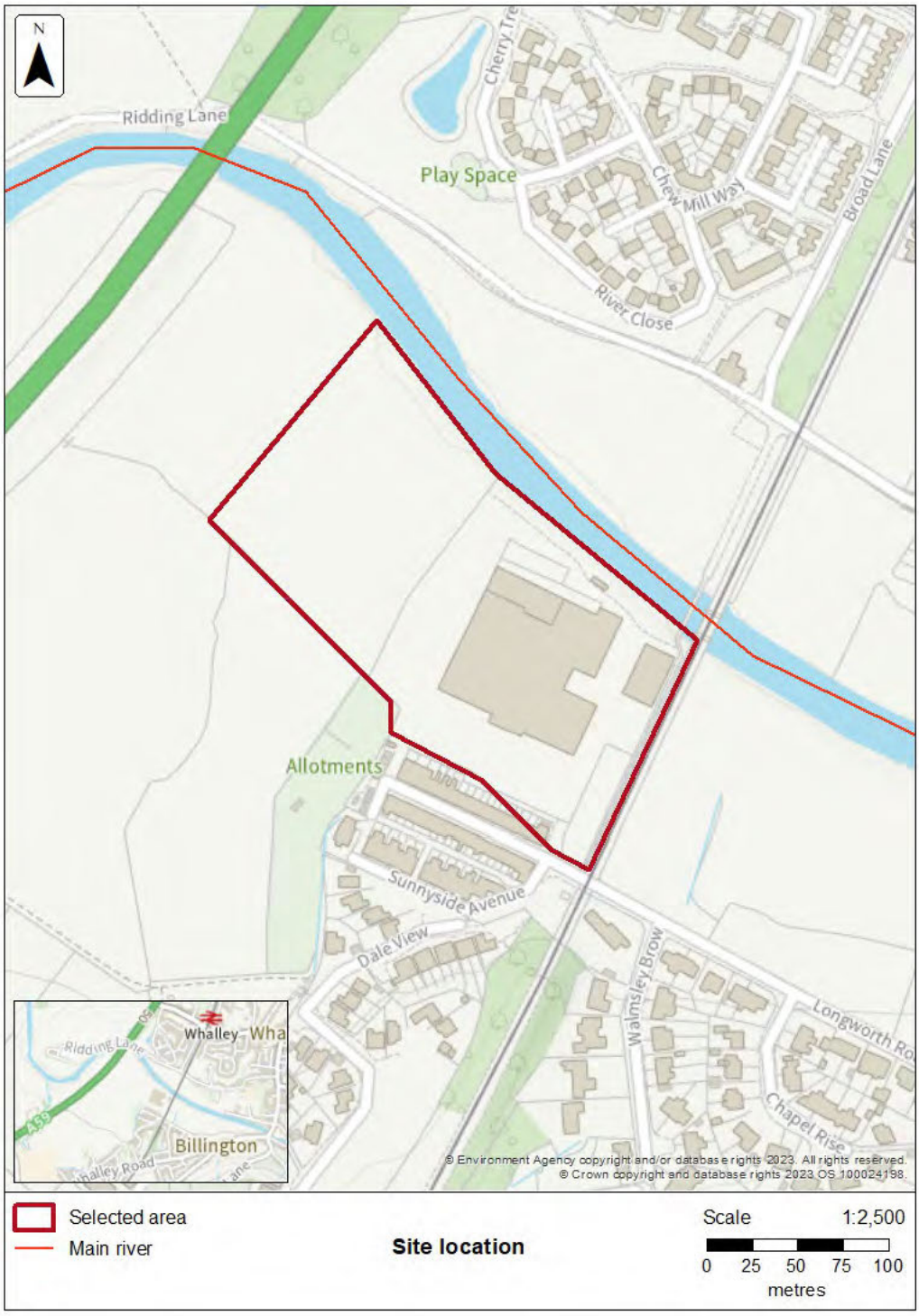
# Appendix B

EA Flood Mapping

# Flood risk assessment data

**Location of site:** 372645 / 436126 (shown as easting and northing coordinates)
**Document created on:** 20 March 2023
**This information was previously known as a product 4.**
**Customer reference number:** 7Y9B1KFADYCH

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)
- historic flooding
- 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
- climate change modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

## Not included in this document

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

If your location has a reduced flood risk from rivers and sea because of defences, you need to request a Flood Defence Breach Hazard Map and information about the level of flood protection offered at your location from the Cumbria and Lancashire Environment Agency team at inforequests.cmblnc@environment-agency.gov.uk. This information will only be available if modelling has been carried out for breach scenarios.

Include a site location map in your request.

## Surface water and other sources of flooding

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

- surface water
- ordinary watercourses
- reservoirs

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

## About the models used

Model name: Whalley 2017
Scenario(s): Defended fluvial, defences removed fluvial, defended climate change fluvial, defences removed climate change fluvial
Date: 11 August 2017

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

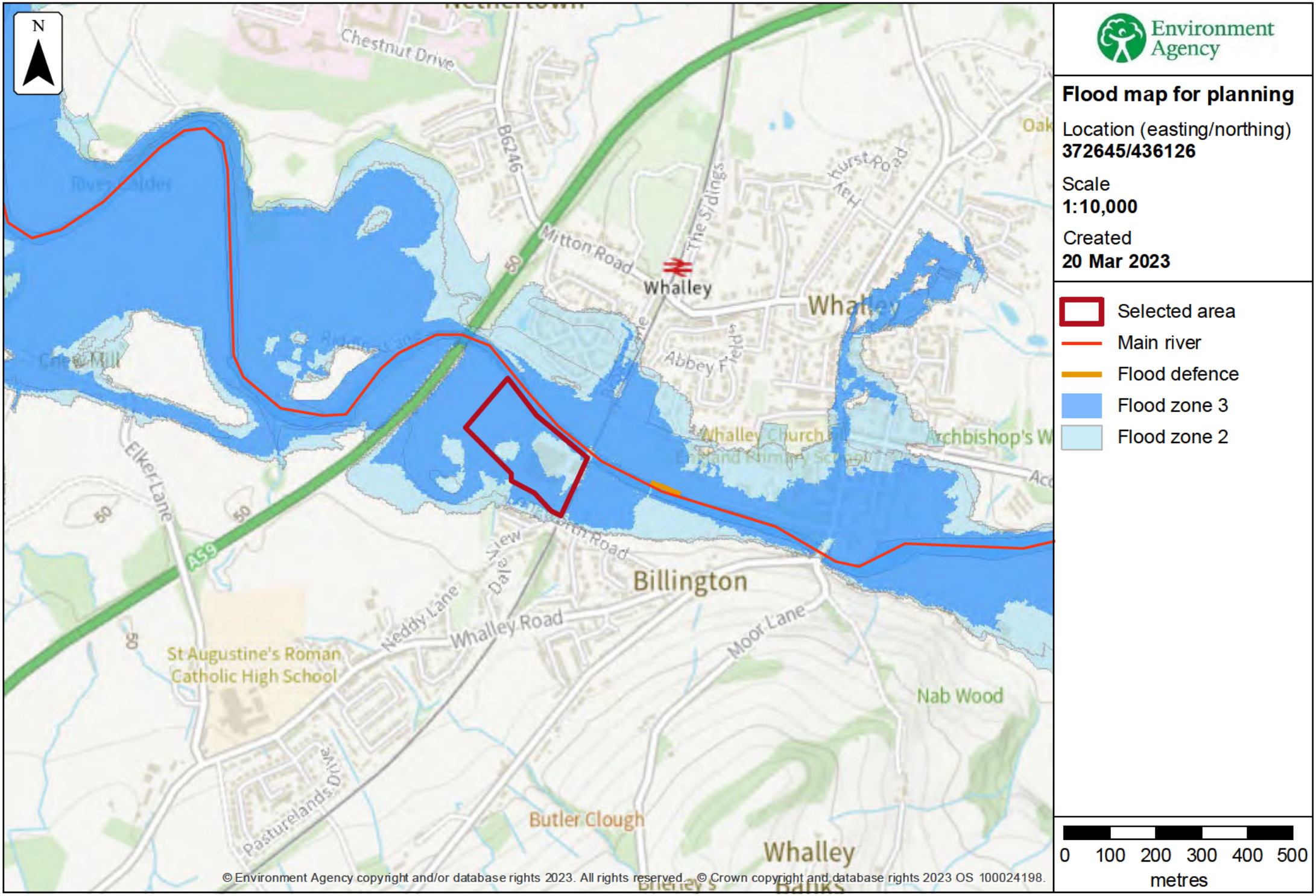
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- 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

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


N
Chestnut Drive
B6246
Mitton Road
Whalley
The Sidings
Hurst Road
Abbey Fields
Whalley Church
Elker Lane
A59
50
Billington
Dale View
Neddy Lane
Whalley Road
Moor Lane
St Augustine's Roman Catholic High School
Nab Wood
Pasturelands Drive
Butler Clough
Whalley
Environment Agency
Flood map for planning
Location (easting/northing)
372645/436126
Scale
1:10,000
Created
20 Mar 2023
Selected area
Main river
Flood defence
Flood zone 3
Flood zone 2
0 100 200 300 400 500
metres
© Environment Agency copyright and/or database rights 2023. All rights reserved. © Crown copyright and database rights 2023 OS 100024198.

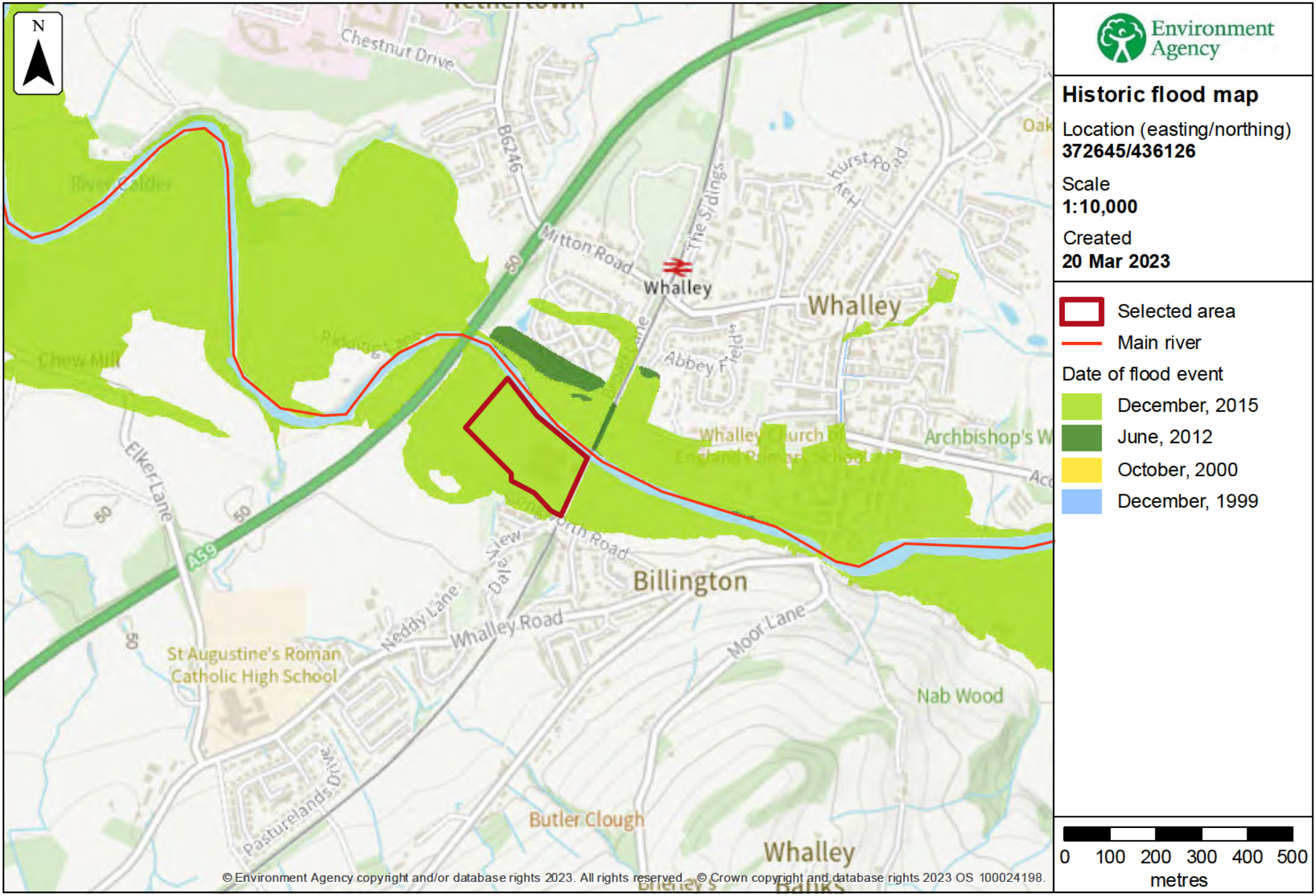
## Historic flooding

This map is an indicative outline of areas that have previously flooded. Remember that:

- our records are incomplete, so the information here is based on the best available data
- it is possible not all properties within this area will have flooded
- other flooding may have occurred that we do not have records for
- flooding can come from a range of different sources - we can only supply flood risk data relating to flooding from rivers or the sea

You can also contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

Download recorded flood outlines in GIS format


N
Chestnut Drive
B6246
Mitton Road
The Sidings
Whalley
Whalley
Abbey Fields
Whalley Church of England Primary School
Archbishop's W
Elker Lane
A59
50
Billington
Whalley Road
Neddy Lane
Dale View
Moor Lane
St Augustine's Roman Catholic High School
Nab Wood
Pasturelands Drive
Butler Clough
Whalley
Chew Mill
River Calder
Environment Agency
Historic flood map
Location (easting/northing)
372645/436126
Scale
1:10,000
Created
20 Mar 2023
Selected area
Main river
Date of flood event
December, 2015
June, 2012
October, 2000
December, 1999
0 100 200 300 400 500
metres
© Environment Agency copyright and/or database rights 2023. All rights reserved. © Crown copyright and database rights 2023 OS 100024198.

## Historic flood event data

| Start date | End date | Source of flood | Cause of flood | Affects location |
|---|---|---|---|---|
| 26 December 2015 | 27 December 2015 | main river | channel capacity exceeded (no raised defences) | Yes |
| 22 June 2012 | 23 June 2012 | main river | channel capacity exceeded (no raised defences) | No |
| 26 October 2000 | 27 October 2000 | main river | channel capacity exceeded (no raised defences) | No |
| 11 December 1999 | 12 December 1999 | ordinary watercourse | obstruction/blockage - debris screen | No |

## Flood defences and attributes

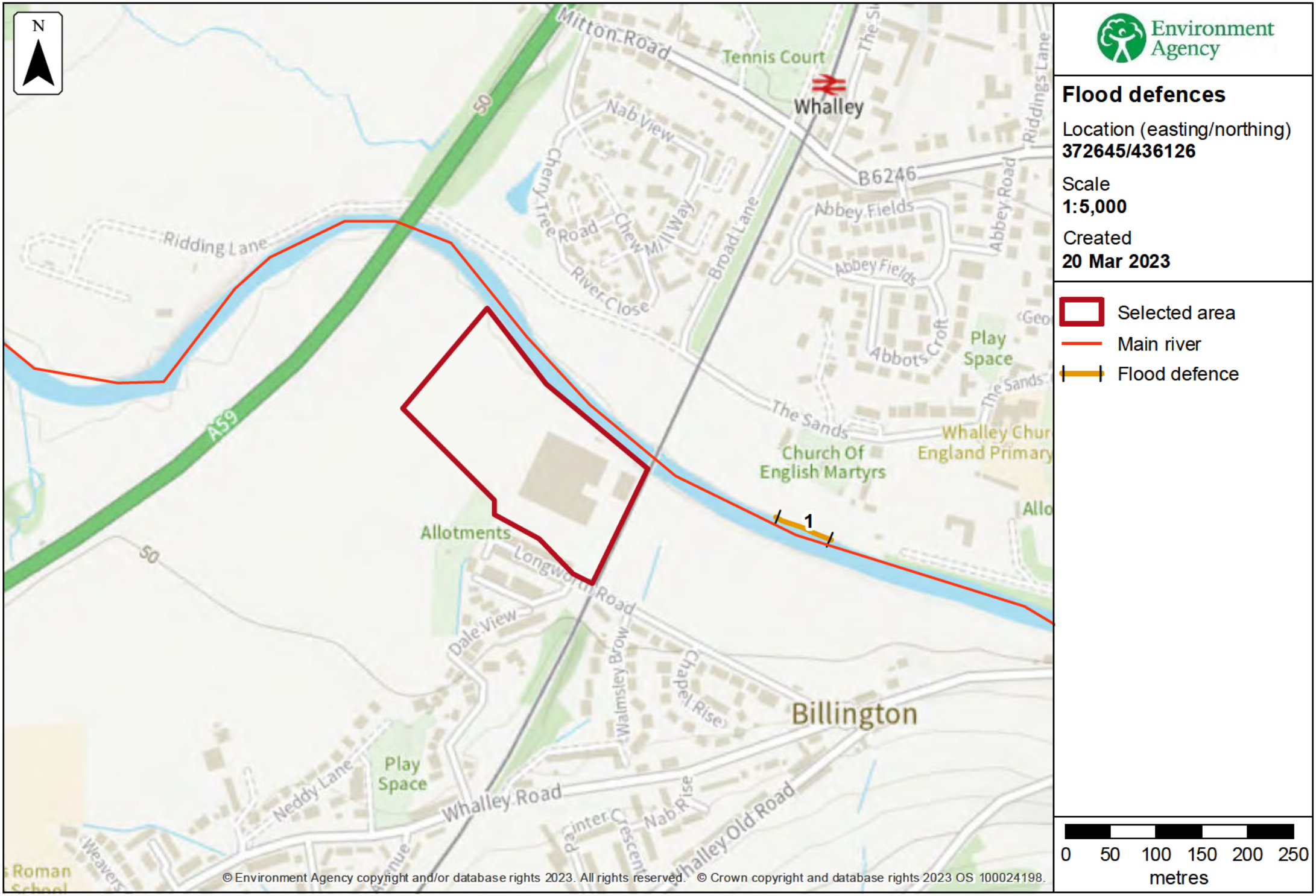
The flood defences map shows the location of the flood defences present.

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)
**372645/436126**

Scale
**1:5,000**

Created
**20 Mar 2023**

- Selected area
- Main river
- Flood defence

0 50 100 150 200 250
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 | 64827 | Embankment | 5 | Poor | 43.90 | 43.90 | 43.90 |

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

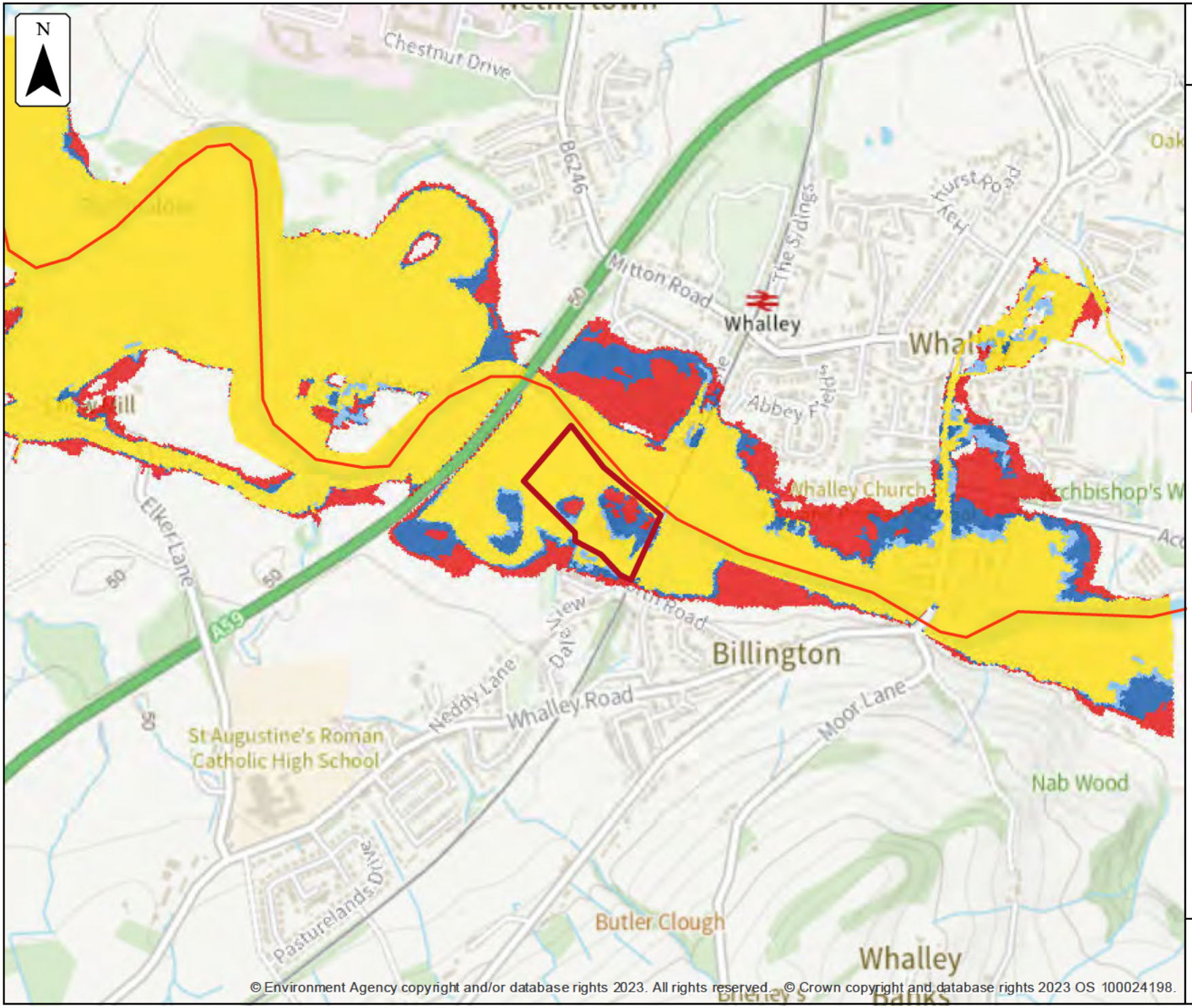
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

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

## Defended modelled fluvial extent

Location (easting/northing)
**372645/436126**

Scale
**1:10,000**

Created
**20 Mar 2023**

Model name
**Whalley 2017**

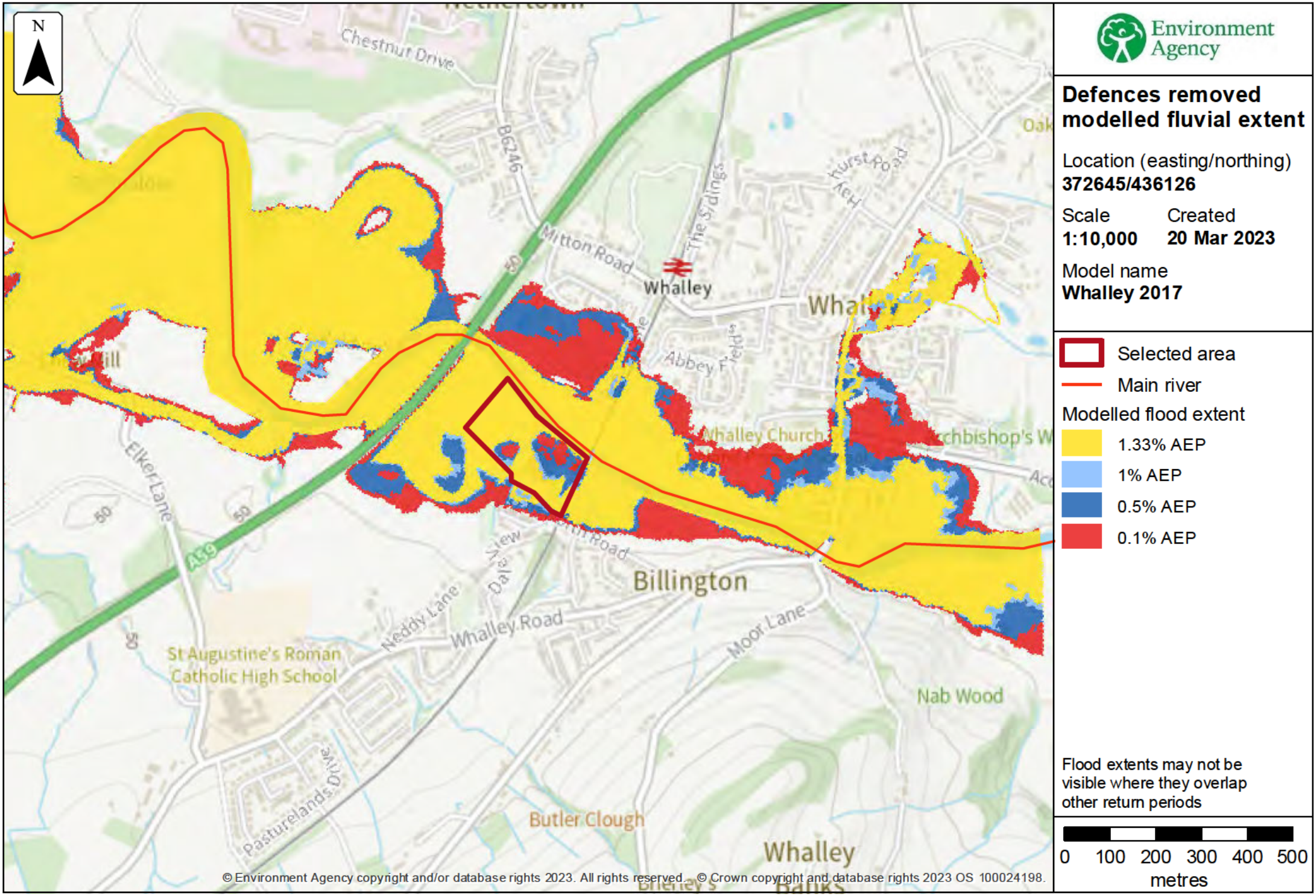
- Selected area
- Main river

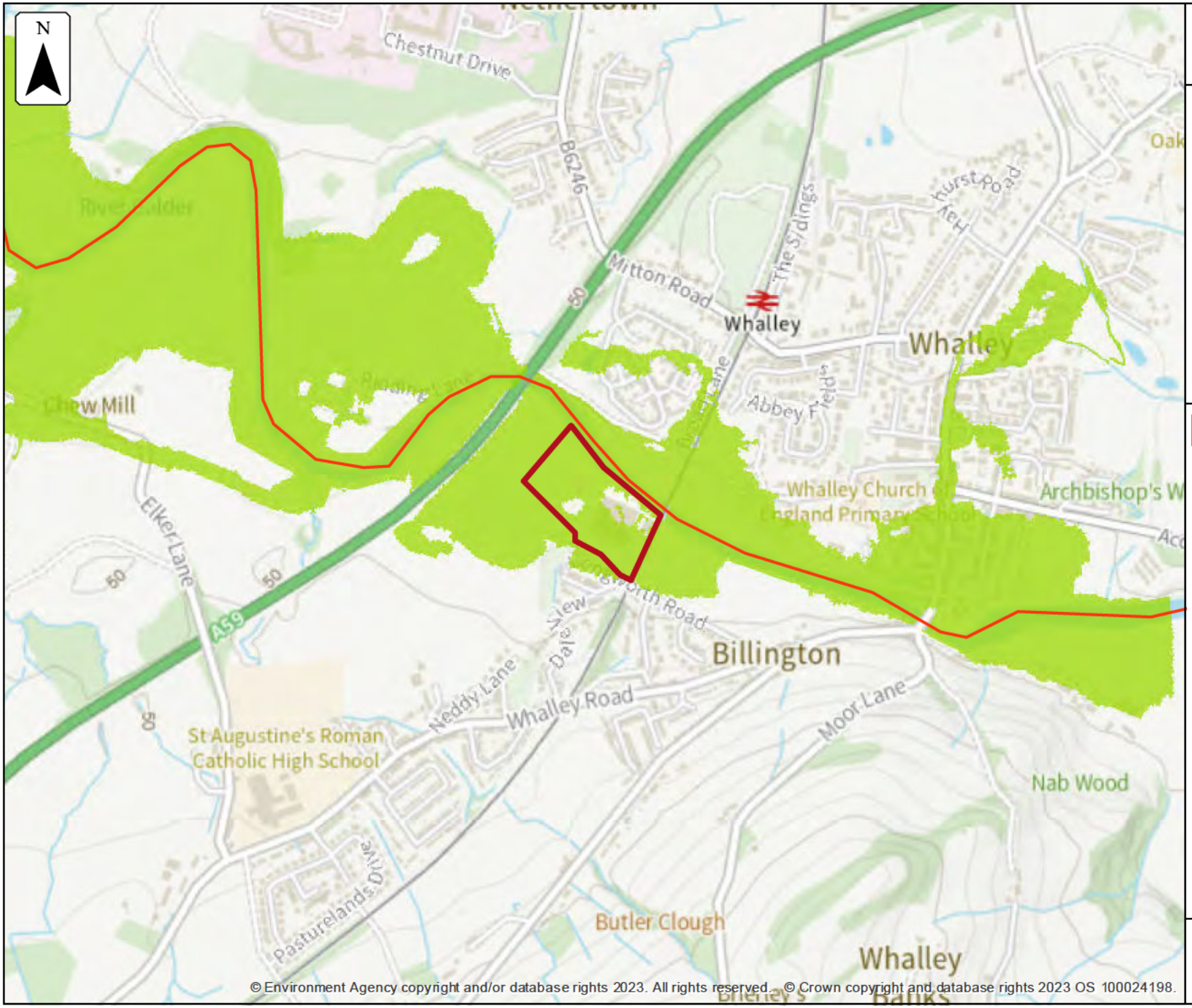
Modelled flood extent

- 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


N
Chestnut Drive
B6246
Mitton Road
The Sidings
Whalley
Abbey Fields
Whalley Church
Elker Lane
A59
Billington
Dale View
Whalley Road
Neddy Lane
Moor Lane
St Augustine's Roman Catholic High School
Nab Wood
Pasturelands Drive
Butler Clough
Whalley
Environment Agency
Defences removed modelled fluvial extent
Location (easting/northing)
372645/436126
Scale
1:10,000
Created
20 Mar 2023
Model name
Whalley 2017
Selected area
Main river
Modelled flood extent
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 copyright and/or database rights 2023. All rights reserved. © Crown copyright and database rights 2023 OS 100024198.




Environment Agency

**Defended climate change modelled fluvial extent**

Location (easting/northing)
**372645/436126**

Scale
**1:10,000**

Created
**20 Mar 2023**

Model name
**Whalley 2017**

Selected area

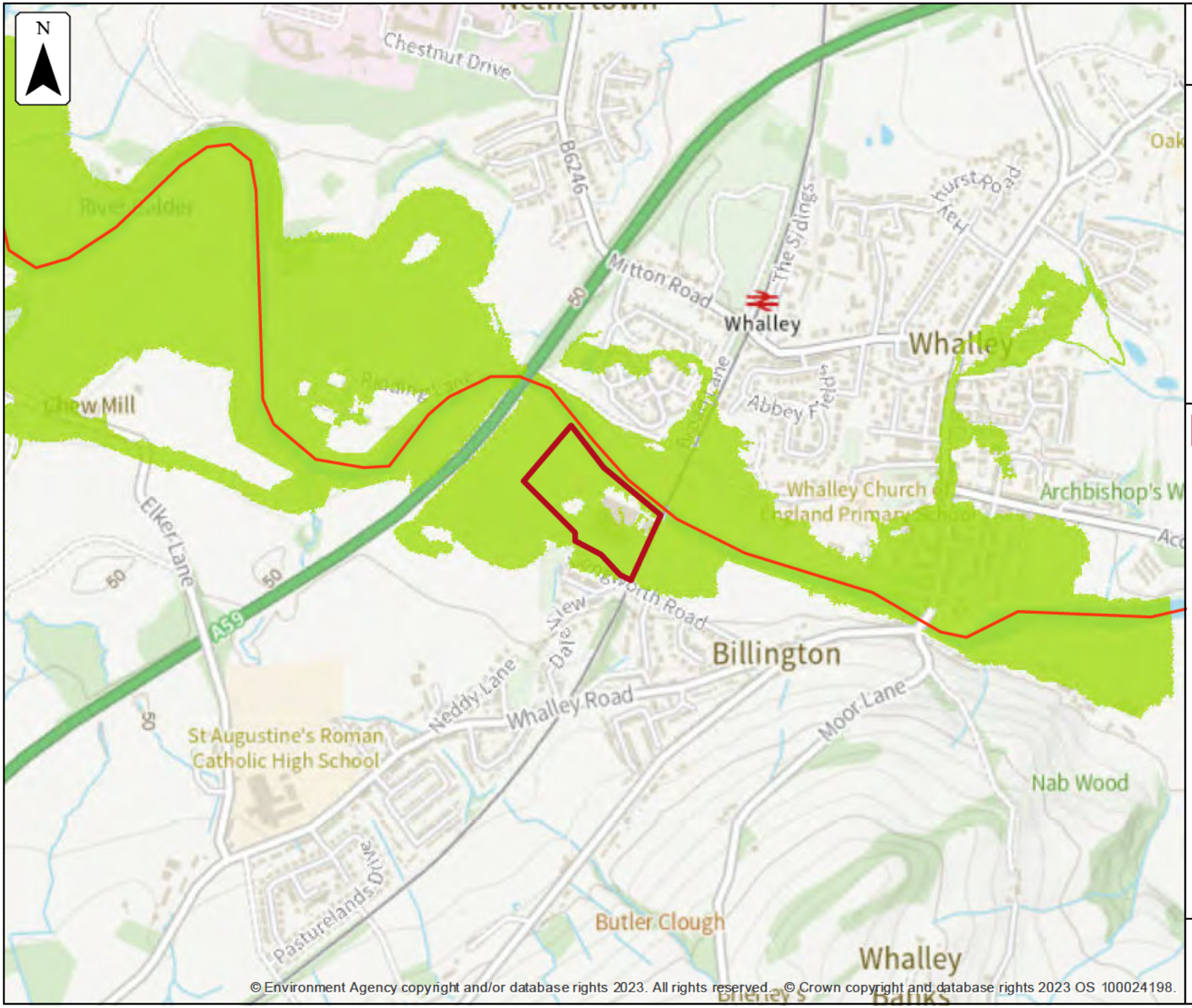
Main river

Modelled flood extent

1.0% AEP (+15%)

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

0 100 200 300 400 500
metres




Environment Agency

**Defences removed climate change modelled fluvial extent**

Location (easting/northing)
**372645/436126**

Scale
**1:10,000**

Created
**20 Mar 2023**

Model name
**Whalley 2017**

Selected area

Main river

Modelled flood extent

1.0% AEP (+15%)

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

0 100 200 300 400 500
metres


Environment Agency

# Defended modelled fluvial node locations

Location (easting/northing)
**372645/436126**

Scale
**1:2,500**

Created
**20 Mar 2023**

Model name
**Whalley 2017**

Selected area
Modelled location
Main river

0 25 50 75 100
metres

# Modelled node locations data

## Defended

| Label | Modelled location ID | Easting | Northing | 4% AEP | | 2% AEP | | 1.33% AEP | | 1% AEP | | 0.5% AEP | | 0.1% AEP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Level | Flow | Level | Flow | Level | Flow | Level | Flow | Level | Flow | Level | Flow |
| 1 | 931667 | 372525 | 436365 | 42.67 | 289.05 | | | 42.87 | 343.47 | 42.93 | 359.38 | 43.04 | 423.13 | 43.37 | 645.89 |
| 2 | 931630 | 372560 | 436344 | 42.78 | 283.52 | | | 43.04 | 325.85 | 43.13 | 336.42 | 43.36 | 379.80 | 44.27 | 494.19 |
| 3 | 931624 | 372596 | 436312 | 42.90 | 278.79 | | | 43.20 | 309.30 | 43.29 | 316.64 | 43.56 | 348.14 | 44.49 | 431.24 |
| 4 | 931606 | 372619 | 436280 | 42.96 | 280.28 | | | 43.27 | 308.21 | 43.35 | 315.0 | 43.63 | 343.36 | 44.55 | 416.94 |
| 5 | 931628 | 372642 | 436246 | 43.04 | 279.30 | | | 43.32 | 309.66 | 43.40 | 316.28 | 43.67 | 344.15 | 44.57 | 414.85 |
| 6 | 931621 | 372711 | 436167 | 43.26 | 273.90 | | | 43.53 | 299.29 | 43.60 | 307.02 | 43.83 | 337.79 | 44.65 | 413.01 |
| 7 | 931660 | 372763 | 436126 | 43.59 | 276.69 | | | 43.84 | 308.74 | 43.91 | 317.68 | 44.13 | 353.75 | 44.82 | 458.82 |
| 8 | 931645 | 372770 | 436122 | 43.59 | 276.69 | | | 43.84 | 308.74 | 43.91 | 317.68 | 44.13 | 353.75 | 44.82 | 458.82 |
| 9 | 931641 | 372780 | 436111 | 43.61 | 276.28 | | | 43.86 | 307.84 | 43.93 | 316.98 | 44.15 | 355.25 | 44.82 | 465.26 |
| 10 | 931684 | 372859 | 436064 | 43.73 | 284.70 | | | 43.95 | 325.06 | 44.02 | 335.55 | 44.22 | 379.38 | 44.86 | 502.93 |

Data in this table comes from the Whalley 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

# Defences removed modelled fluvial node locations

Location (easting/northing)
**372645/436126**

Scale
**1:2,500**

Created
**20 Mar 2023**

Model name
**Whalley 2017**

Selected area
Modelled location
Main river

0 25 50 75 100
metres

# Modelled node locations data

## Defences removed

| Label | Modelled location ID | Easting | Northing | 4% AEP | | 2% AEP | | 1.33% AEP | | 1% AEP | | 0.5% AEP | | 0.1% AEP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Level | Flow | Level | Flow | Level | Flow | Level | Flow | Level | Flow | Level | Flow |
| 1 | 931667 | 372525 | 436365 | 42.67 | 289.06 | | | 42.87 | 343.48 | 42.93 | 359.41 | 43.04 | 423.17 | 43.37 | 645.52 |
| 2 | 931630 | 372560 | 436344 | 42.78 | 283.52 | | | 43.04 | 325.86 | 43.13 | 336.44 | 43.36 | 379.87 | 44.27 | 494.38 |
| 3 | 931624 | 372596 | 436312 | 42.90 | 278.78 | | | 43.20 | 309.31 | 43.29 | 316.69 | 43.56 | 348.26 | 44.49 | 431.08 |
| 4 | 931606 | 372619 | 436280 | 42.96 | 280.29 | | | 43.27 | 308.23 | 43.35 | 315.07 | 43.63 | 343.53 | 44.55 | 416.83 |
| 5 | 931628 | 372642 | 436246 | 43.04 | 279.30 | | | 43.32 | 309.67 | 43.40 | 316.35 | 43.67 | 344.35 | 44.57 | 414.81 |
| 6 | 931621 | 372711 | 436167 | 43.26 | 273.92 | | | 43.53 | 299.34 | 43.60 | 307.09 | 43.83 | 337.99 | 44.65 | 413.11 |
| 7 | 931660 | 372763 | 436126 | 43.59 | 276.71 | | | 43.84 | 308.84 | 43.91 | 317.83 | 44.13 | 354.14 | 44.82 | 458.94 |
| 8 | 931645 | 372770 | 436122 | 43.59 | 276.71 | | | 43.84 | 308.84 | 43.91 | 317.83 | 44.13 | 354.14 | 44.82 | 458.94 |
| 9 | 931641 | 372780 | 436111 | 43.61 | 276.29 | | | 43.86 | 307.96 | 43.93 | 317.16 | 44.15 | 355.66 | 44.82 | 465.33 |
| 10 | 931684 | 372859 | 436064 | 43.73 | 284.73 | | | 43.95 | 325.30 | 44.02 | 335.86 | 44.22 | 380.13 | 44.86 | 502.98 |

Data in this table comes from the Whalley 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)
**372645/436126**

Scale
**1:2,500**

Created
**20 Mar 2023**

Model name
**Whalley 2017**

Selected area
Modelled location
Main river

0 25 50 75 100
metres

# Modelled node locations data

## Defended climate change

| Label | Modelled location ID | Easting | Northing | 1.0% AEP (+15%) | |
|---|---|---|---|---|---|
| | | | | Level | Flow |
| 1 | 931667 | 372525 | 436365 | 43.03 | 413.07 |
| 2 | 931630 | 372560 | 436344 | 43.33 | 372.88 |
| 3 | 931624 | 372596 | 436312 | 43.52 | 343.20 |
| 4 | 931606 | 372619 | 436280 | 43.59 | 338.90 |
| 5 | 931628 | 372642 | 436246 | 43.63 | 339.71 |
| 6 | 931621 | 372711 | 436167 | 43.80 | 332.88 |
| 7 | 931660 | 372763 | 436126 | 44.10 | 348.33 |
| 8 | 931645 | 372770 | 436122 | 44.10 | 348.33 |
| 9 | 931641 | 372780 | 436111 | 44.12 | 349.19 |
| 10 | 931684 | 372859 | 436064 | 44.19 | 372.26 |

Data in this table comes from the Whalley 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

# Defences removed climate change modelled fluvial node locations

Location (easting/northing)
**372645/436126**

Scale
**1:2,500**

Created
**20 Mar 2023**

Model name
**Whalley 2017**

Selected area
Modelled location
Main river

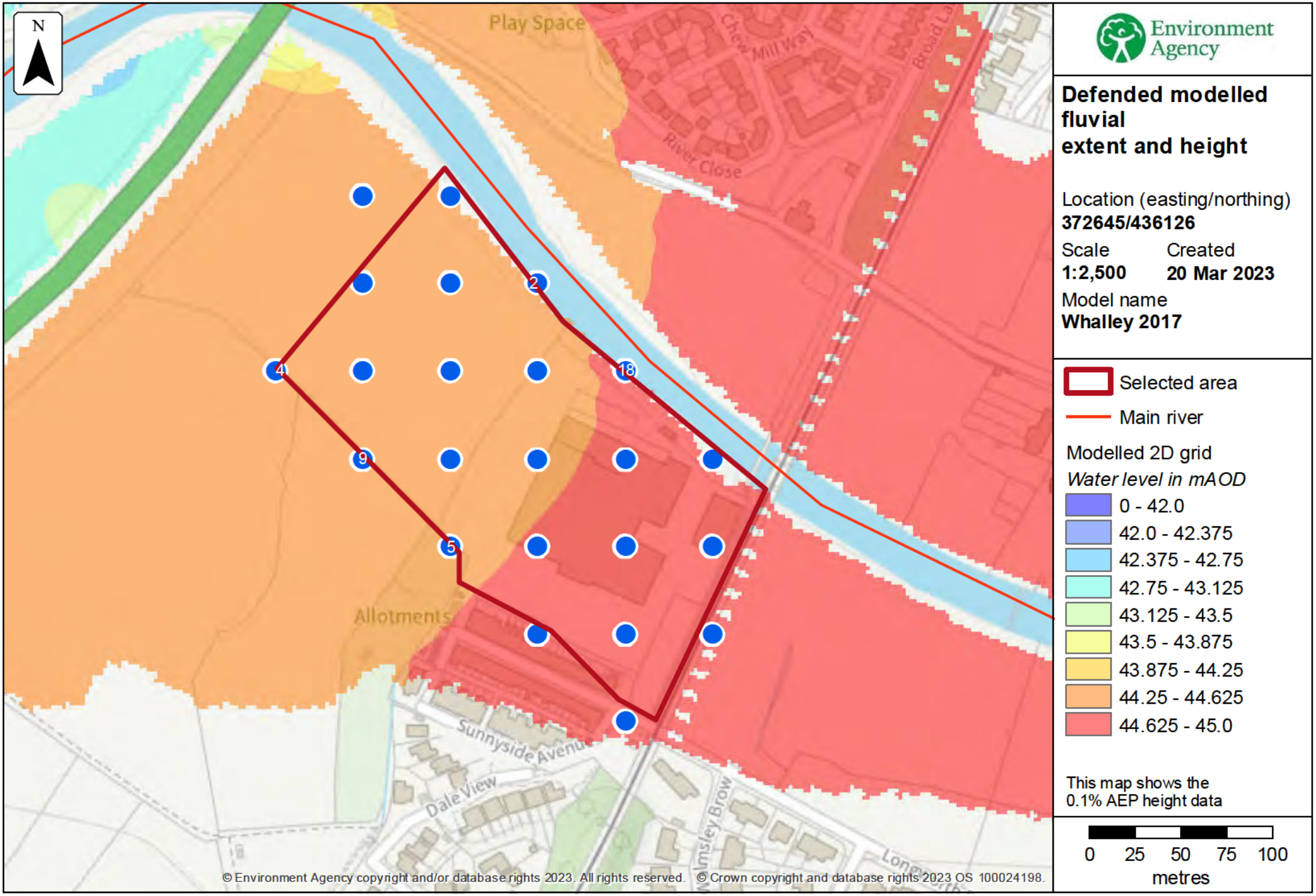
0 25 50 75 100
metres

# Modelled node locations data

## Defences removed climate change

| Label | Modelled location ID | Easting | Northing | 1.0% AEP (+15%) | |
|---|---|---|---|---|---|
| | | | | Level | Flow |
| 1 | 931667 | 372525 | 436365 | 43.03 | 413.10 |
| 2 | 931630 | 372560 | 436344 | 43.33 | 372.93 |
| 3 | 931624 | 372596 | 436312 | 43.52 | 343.34 |
| 4 | 931606 | 372619 | 436280 | 43.59 | 339.09 |
| 5 | 931628 | 372642 | 436246 | 43.63 | 339.93 |
| 6 | 931621 | 372711 | 436167 | 43.80 | 333.08 |
| 7 | 931660 | 372763 | 436126 | 44.10 | 348.85 |
| 8 | 931645 | 372770 | 436122 | 44.10 | 348.85 |
| 9 | 931641 | 372780 | 436111 | 44.12 | 349.72 |
| 10 | 931684 | 372859 | 436064 | 44.19 | 373.24 |

Data in this table comes from the Whalley 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.


N
Play Space
Chew Mill Way
Broad La
River Close
Allotments
Sunnyside Avenue
Dale View
Wimsley Brow
2
4
18
9
5
Environment Agency
Defended modelled fluvial extent and height
Location (easting/northing)
372645/436126
Scale
1:2,500
Created
20 Mar 2023
Model name
Whalley 2017
Selected area
Main river
Modelled 2D grid
Water level in mAOD
0 - 42.0
42.0 - 42.375
42.375 - 42.75
42.75 - 43.125
43.125 - 43.5
43.5 - 43.875
43.875 - 44.25
44.25 - 44.625
44.625 - 45.0
This map shows the 0.1% AEP height data
0 25 50 75 100
metres
© Environment Agency copyright and/or database rights 2023. All rights reserved. © Crown copyright and database rights 2023 OS 100024198.

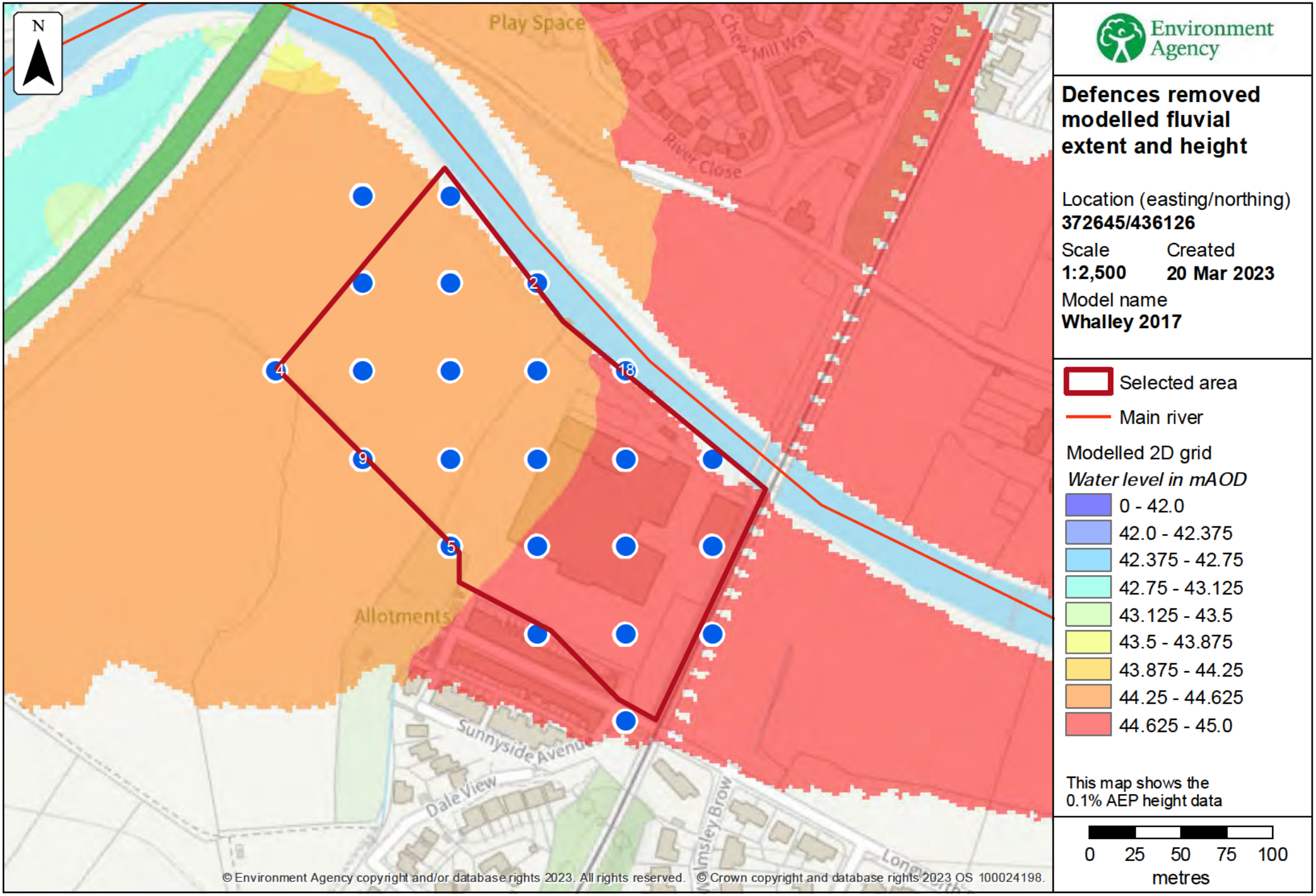
# Sample point data

## Defended

| Label | Easting | Northing | 5% AEP | | 2% AEP | | 1.33% AEP | | 1% AEP | | 0.5% AEP | | 0.1% AEP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height |
| 1 | 372699 | 435976 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | 0.50 | 44.79 |
| 2 | 372651 | 436024 | | | | | 0.07 | 43.82 | 0.13 | 43.88 | 0.32 | 44.07 | 0.95 | 44.70 |
| 3 | 372699 | 436024 | | | | | 0.26 | 43.87 | 0.33 | 43.93 | 0.52 | 44.12 | 1.17 | 44.78 |
| 4 | 372747 | 436024 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 5 | 372603 | 436072 | | | | | 0.07 | 43.59 | 0.14 | 43.67 | 0.27 | 43.79 | 1.07 | 44.60 |
| 6 | 372651 | 436072 | | | | | 0.27 | 43.78 | 0.35 | 43.85 | 0.52 | 44.02 | 1.15 | 44.65 |
| 7 | 372699 | 436072 | | | | | NoData | NoData | NoData | NoData | 0.07 | 44.09 | 0.75 | 44.78 |
| 8 | 372747 | 436072 | | | | | NoData | NoData | NoData | NoData | 0.02 | 44.19 | 0.65 | 44.83 |
| 9 | 372555 | 436120 | | | | | 0.36 | 43.25 | 0.46 | 43.35 | 0.75 | 43.64 | 1.69 | 44.59 |
| 10 | 372603 | 436120 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | 0.59 | 44.59 |
| 11 | 372651 | 436120 | | | | | 0.04 | 43.66 | 0.10 | 43.73 | 0.18 | 43.81 | 0.97 | 44.60 |
| 12 | 372699 | 436120 | | | | | NoData | NoData | NoData | NoData | 0.02 | 44.00 | 0.66 | 44.64 |
| 13 | 372747 | 436120 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 14 | 372507 | 436168 | | | | | 0.76 | 43.25 | 0.86 | 43.34 | 1.15 | 43.63 | 2.09 | 44.58 |
| 15 | 372555 | 436168 | | | | | 0.75 | 43.25 | 0.85 | 43.35 | 1.14 | 43.64 | 2.08 | 44.58 |
| 16 | 372603 | 436168 | | | | | 0.60 | 43.27 | 0.70 | 43.37 | 0.99 | 43.66 | 1.92 | 44.59 |

| Label | Easting | Northing | 5% AEP | | 2% AEP | | 1.33% AEP | | 1% AEP | | 0.5% AEP | | 0.1% AEP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height |
| 17 | 372651 | 436168 | | | | | 0.23 | 43.38 | 0.29 | 43.44 | 0.56 | 43.71 | 1.45 | 44.60 |
| 18 | 372699 | 436168 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 19 | 372555 | 436216 | | | | | 0.92 | 43.25 | 1.02 | 43.34 | 1.31 | 43.63 | 2.25 | 44.57 |
| 20 | 372603 | 436216 | | | | | 0.67 | 43.28 | 0.76 | 43.37 | 1.04 | 43.65 | 1.97 | 44.57 |
| 21 | 372651 | 436216 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 22 | 372555 | 436264 | | | | | 0.71 | 43.23 | 0.81 | 43.32 | 1.09 | 43.60 | 2.02 | 44.53 |
| 23 | 372603 | 436264 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |

Data in this table comes from the Whalley 2017 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.


N
Play Space
Chew Mill Way
Broad La
River Close
Allotments
Sunnyside Avenue
Dale View
Wimsley Brow
2
4
18
9
5
Environment Agency
Defences removed modelled fluvial extent and height
Location (easting/northing)
372645/436126
Scale
1:2,500
Created
20 Mar 2023
Model name
Whalley 2017
Selected area
Main river
Modelled 2D grid
Water level in mAOD
0 - 42.0
42.0 - 42.375
42.375 - 42.75
42.75 - 43.125
43.125 - 43.5
43.5 - 43.875
43.875 - 44.25
44.25 - 44.625
44.625 - 45.0
This map shows the 0.1% AEP height data
0 25 50 75 100
metres
© Environment Agency copyright and/or database rights 2023. All rights reserved. © Crown copyright and database rights 2023 OS 100024198.

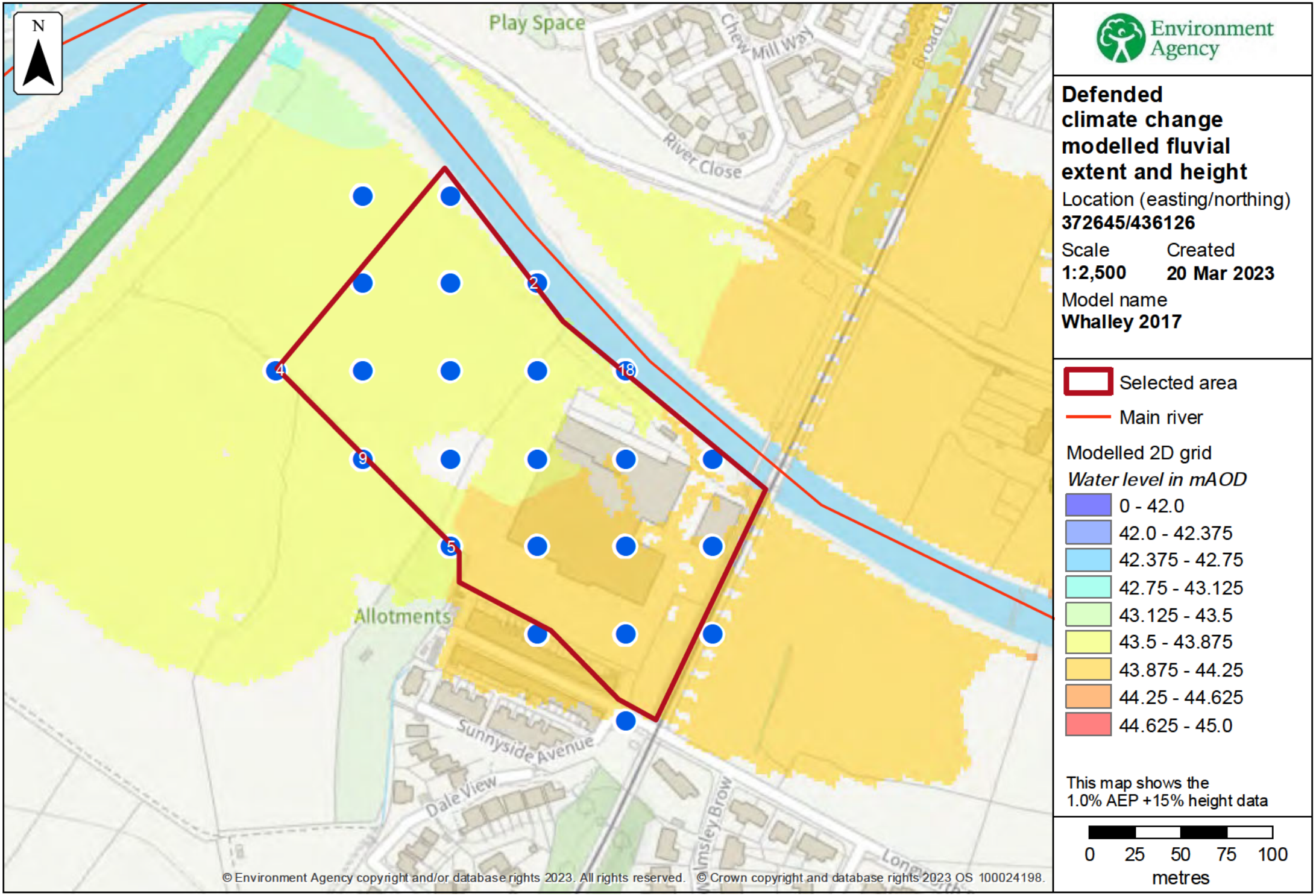
# Sample point data

## Defences removed

| Label | Easting | Northing | 5% AEP | | 2% AEP | | 1.33% AEP | | 1% AEP | | 0.5% AEP | | 0.1% AEP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height |
| 1 | 372699 | 435976 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | 0.50 | 44.79 |
| 2 | 372651 | 436024 | | | | | 0.07 | 43.81 | 0.13 | 43.88 | 0.32 | 44.07 | 0.95 | 44.70 |
| 3 | 372699 | 436024 | | | | | 0.26 | 43.87 | 0.33 | 43.93 | 0.52 | 44.12 | 1.17 | 44.78 |
| 4 | 372747 | 436024 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 5 | 372603 | 436072 | | | | | 0.07 | 43.59 | 0.14 | 43.67 | 0.27 | 43.79 | 1.07 | 44.60 |
| 6 | 372651 | 436072 | | | | | 0.27 | 43.78 | 0.35 | 43.85 | 0.52 | 44.02 | 1.15 | 44.65 |
| 7 | 372699 | 436072 | | | | | NoData | NoData | NoData | NoData | 0.07 | 44.09 | 0.75 | 44.78 |
| 8 | 372747 | 436072 | | | | | NoData | NoData | NoData | NoData | 0.02 | 44.18 | 0.65 | 44.83 |
| 9 | 372555 | 436120 | | | | | 0.36 | 43.25 | 0.46 | 43.35 | 0.75 | 43.64 | 1.69 | 44.59 |
| 10 | 372603 | 436120 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | 0.59 | 44.59 |
| 11 | 372651 | 436120 | | | | | 0.04 | 43.66 | 0.10 | 43.73 | 0.18 | 43.81 | 0.97 | 44.60 |
| 12 | 372699 | 436120 | | | | | NoData | NoData | NoData | NoData | 0.02 | 44.00 | 0.66 | 44.64 |
| 13 | 372747 | 436120 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 14 | 372507 | 436168 | | | | | 0.76 | 43.25 | 0.86 | 43.34 | 1.15 | 43.63 | 2.09 | 44.58 |
| 15 | 372555 | 436168 | | | | | 0.75 | 43.25 | 0.85 | 43.35 | 1.14 | 43.64 | 2.08 | 44.58 |
| 16 | 372603 | 436168 | | | | | 0.60 | 43.27 | 0.70 | 43.37 | 0.99 | 43.66 | 1.92 | 44.59 |

| Label | Easting | Northing | 5% AEP | | 2% AEP | | 1.33% AEP | | 1% AEP | | 0.5% AEP | | 0.1% AEP | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height | Depth | Height |
| 17 | 372651 | 436168 | | | | | 0.23 | 43.38 | 0.29 | 43.44 | 0.56 | 43.71 | 1.45 | 44.60 |
| 18 | 372699 | 436168 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 19 | 372555 | 436216 | | | | | 0.92 | 43.25 | 1.02 | 43.34 | 1.31 | 43.63 | 2.25 | 44.57 |
| 20 | 372603 | 436216 | | | | | 0.67 | 43.28 | 0.76 | 43.37 | 1.04 | 43.65 | 1.97 | 44.57 |
| 21 | 372651 | 436216 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |
| 22 | 372555 | 436264 | | | | | 0.71 | 43.23 | 0.81 | 43.32 | 1.09 | 43.60 | 2.02 | 44.53 |
| 23 | 372603 | 436264 | | | | | NoData | NoData | NoData | NoData | NoData | NoData | NoData | NoData |

Data in this table comes from the Whalley 2017 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.




Environment Agency

**Defended climate change modelled fluvial extent and height**

Location (easting/northing)
**372645/436126**

Scale
**1:2,500**

Created
**20 Mar 2023**

Model name
**Whalley 2017**

Selected area

Main river

Modelled 2D grid
*Water level in mAOD*

- 0 - 42.0
- 42.0 - 42.375
- 42.375 - 42.75
- 42.75 - 43.125
- 43.125 - 43.5
- 43.5 - 43.875
- 43.875 - 44.25
- 44.25 - 44.625
- 44.625 - 45.0

This map shows the 1.0% AEP +15% height data

0 25 50 75 100
metres

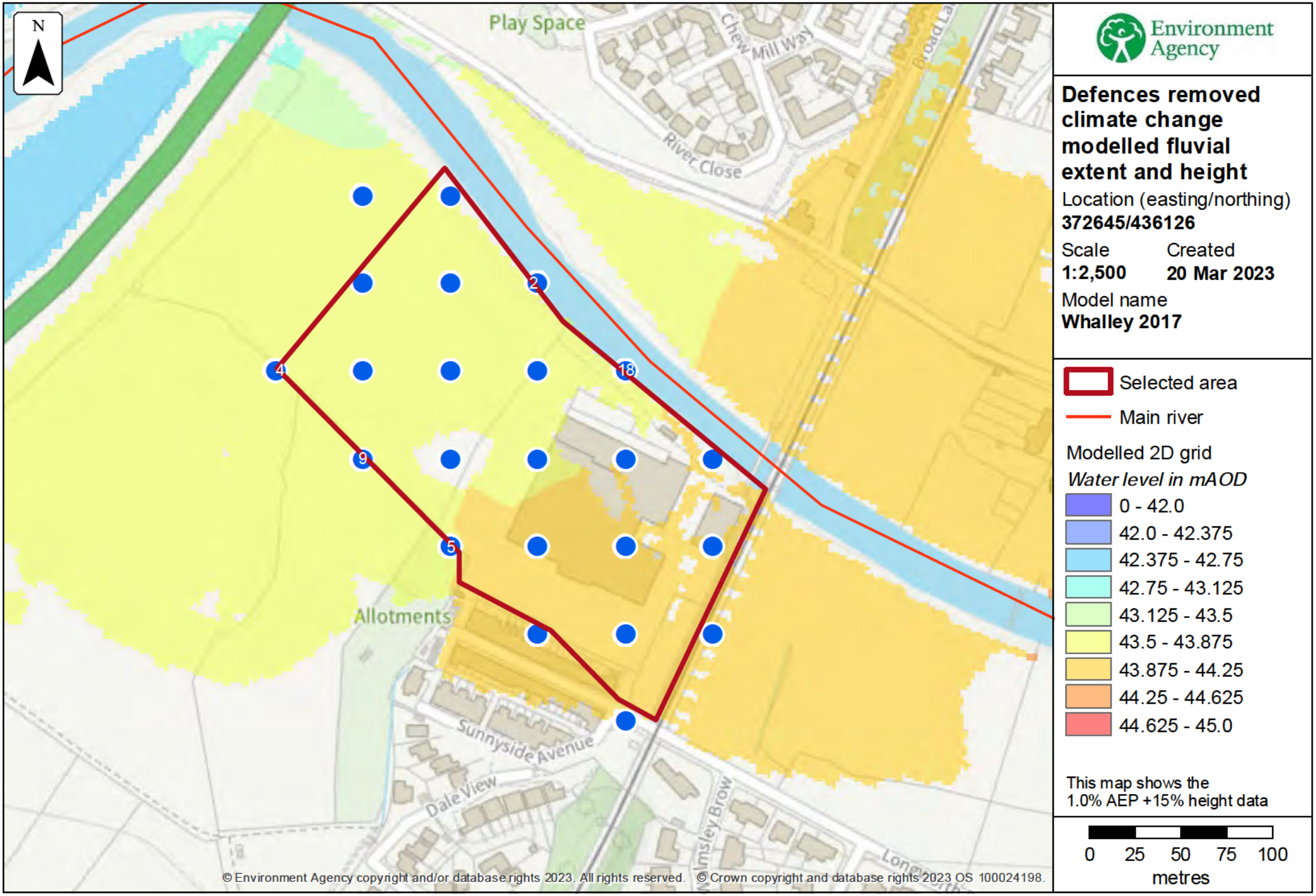
# Sample point data

## Defended climate change

| Label | Easting | Northing | 1% AEP (+15%) | |
|---|---|---|---|---|
| | | | Depth | Height |
| 1 | 372699 | 435976 | NoData | NoData |
| 2 | 372651 | 436024 | 0.29 | 44.04 |
| 3 | 372699 | 436024 | 0.49 | 44.09 |
| 4 | 372747 | 436024 | NoData | NoData |
| 5 | 372603 | 436072 | 0.24 | 43.76 |
| 6 | 372651 | 436072 | 0.49 | 44.00 |
| 7 | 372699 | 436072 | 0.04 | 44.07 |
| 8 | 372747 | 436072 | NoData | NoData |
| 9 | 372555 | 436120 | 0.71 | 43.60 |
| 10 | 372603 | 436120 | NoData | NoData |
| 11 | 372651 | 436120 | 0.17 | 43.80 |
| 12 | 372699 | 436120 | NoData | NoData |
| 13 | 372747 | 436120 | NoData | NoData |
| 14 | 372507 | 436168 | 1.10 | 43.59 |
| 15 | 372555 | 436168 | 1.10 | 43.60 |
| 16 | 372603 | 436168 | 0.95 | 43.62 |

| Label | Easting | Northing | 1% AEP (+15%) | |
|---|---|---|---|---|
| | | | Depth | Height |
| 17 | 372651 | 436168 | 0.52 | 43.67 |
| 18 | 372699 | 436168 | NoData | NoData |
| 19 | 372555 | 436216 | 1.27 | 43.59 |
| 20 | 372603 | 436216 | 1.00 | 43.61 |
| 21 | 372651 | 436216 | NoData | NoData |
| 22 | 372555 | 436264 | 1.05 | 43.56 |
| 23 | 372603 | 436264 | NoData | NoData |

Data in this table comes from the Whalley 2017 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.


N
Play Space
Chew Mill Way
River Close
Broad La
Allotments
Sunnyside Avenue
Dale View
Wimsley Brow
2
4
18
9
5
Environment Agency
Defences removed climate change modelled fluvial extent and height
Location (easting/northing)
372645/436126
Scale
1:2,500
Created
20 Mar 2023
Model name
Whalley 2017
Selected area
Main river
Modelled 2D grid
Water level in mAOD
0 - 42.0
42.0 - 42.375
42.375 - 42.75
42.75 - 43.125
43.125 - 43.5
43.5 - 43.875
43.875 - 44.25
44.25 - 44.625
44.625 - 45.0
This map shows the 1.0% AEP +15% height data
0 25 50 75 100
metres
© Environment Agency copyright and/or database rights 2023. All rights reserved. © Crown copyright and database rights 2023 OS 100024198.

## Sample point data

### Defences removed climate change

| Label | Easting | Northing | 1% AEP (+15%) | |
|---|---|---|---|---|
| | | | Depth | Height |
| 1 | 372699 | 435976 | NoData | NoData |
| 2 | 372651 | 436024 | 0.29 | 44.04 |
| 3 | 372699 | 436024 | 0.49 | 44.09 |
| 4 | 372747 | 436024 | NoData | NoData |
| 5 | 372603 | 436072 | 0.24 | 43.76 |
| 6 | 372651 | 436072 | 0.49 | 44.00 |
| 7 | 372699 | 436072 | 0.04 | 44.07 |
| 8 | 372747 | 436072 | NoData | NoData |
| 9 | 372555 | 436120 | 0.71 | 43.60 |
| 10 | 372603 | 436120 | NoData | NoData |
| 11 | 372651 | 436120 | 0.17 | 43.80 |
| 12 | 372699 | 436120 | NoData | NoData |
| 13 | 372747 | 436120 | NoData | NoData |
| 14 | 372507 | 436168 | 1.10 | 43.59 |
| 15 | 372555 | 436168 | 1.10 | 43.60 |
| 16 | 372603 | 436168 | 0.95 | 43.62 |

| Label | Easting | Northing | 1% AEP (+15%) | |
|---|---|---|---|---|
| | | | Depth | Height |
| 17 | 372651 | 436168 | 0.52 | 43.67 |
| 18 | 372699 | 436168 | NoData | NoData |
| 19 | 372555 | 436216 | 1.26 | 43.59 |
| 20 | 372603 | 436216 | 1.00 | 43.61 |
| 21 | 372651 | 436216 | NoData | NoData |
| 22 | 372555 | 436264 | 1.05 | 43.56 |
| 23 | 372603 | 436264 | NoData | NoData |

Data in this table comes from the Whalley 2017 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

## Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

## About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

## Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

Find out more about flood risk activity permits

## Help and advice

Contact the Cumbria and Lancashire Environment Agency team at inforequests.cmblnc@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for

# Appendix C

PSA Design Drawings

N

8m

8m

River Calder

19 1 in 1000 - 44.57
1 in 100+CC - 43.59

20 1 in 1000 - 44.57
1 in 100+CC - 43.61

Trees planted to boundary
to provide screening

Trees planted to boundary
to provide screening

Storage Yard

Permeable gravel
finish to storage yard.

15 1 in 1000 - 44.58
1 in 100+CC - 43.60

16 1 in 1000 - 44.59
1 in 100+CC - 43.62

17 1 in 1000 - 44.60
1 in 100+CC - 43.67

Proposed Car Park
(101no. Spaces)
Permeable Pavement

Hedge / vegetation to remain

Trees planted to boundary
to provide screening

HGV loading
area.

1 in 1000 - 44.59
1 in 100+CC - 43.60 9

10 1 in 1000 - 44.59
1 in 100+CC - No Flood

11 1 in 1000 - 44.60
1 in 100+CC - 43.80

Hedge / vegetation to remain

Footpath to entrance

EA node ref — 0.1% (FZ1) Event Level

11 1 in 1000 - 44.60
1 in 100+CC - 43.80

1% + Climate Change Event Level

Proposed plan duplicated from Harrison Architecture Ltd - Drawing 002

| REV | DATE | AMENDMENT DETAILS | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| P1 | 01/08/23 | Preliminary for Comment | GS | DLW | GS |

Harrison's Engineering Ltd

**Proposed New Car Park & Storage Yard, Longworth Road, Billington**

**Proposed Plan with EA Flood Levels**

Drwg No. T3947-D-01 | Rev. P1

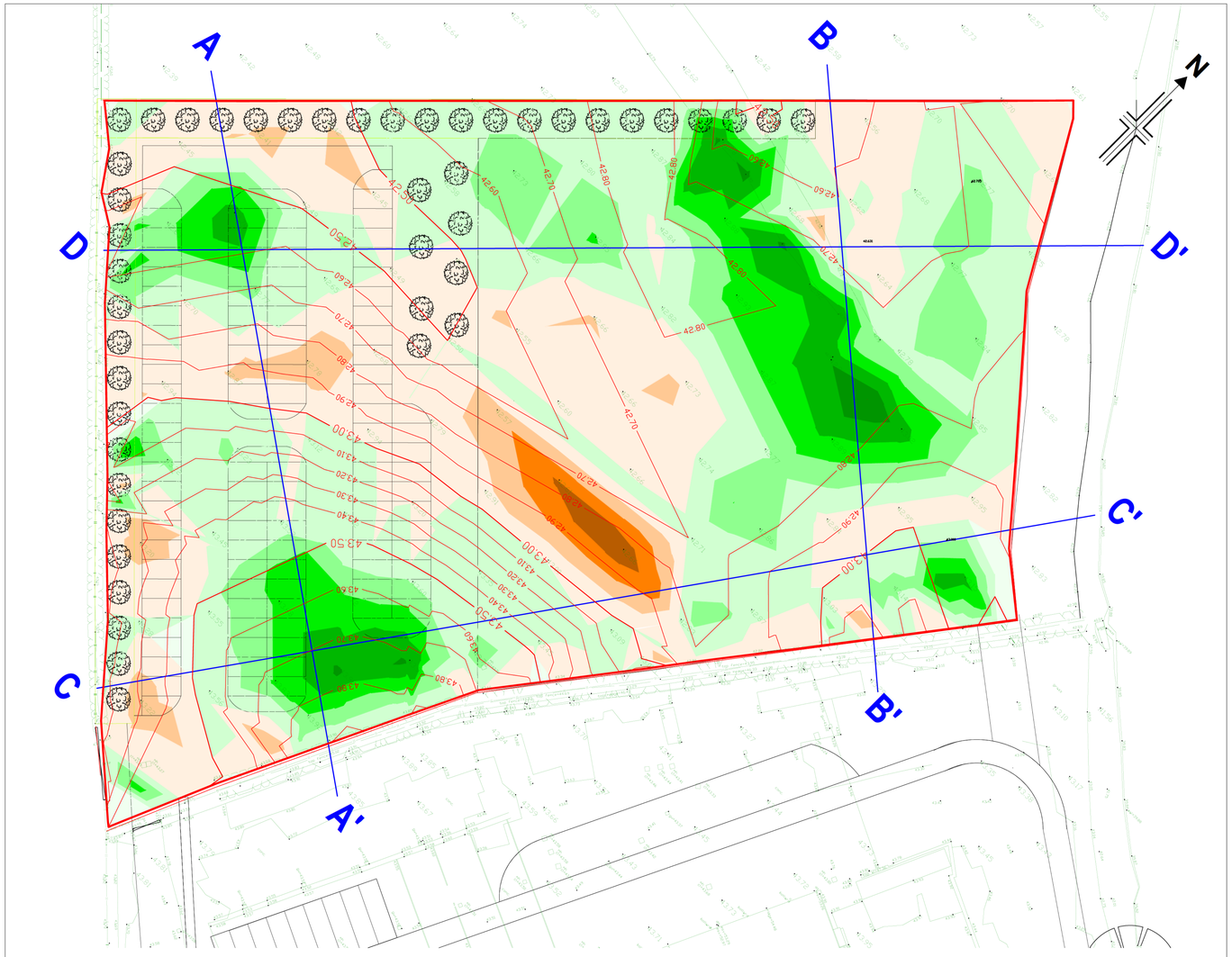
Scale: Not to Scale | Sheet Size: A1

Date: 01 August 2023

Drawn: GS | Checked | Approved

PSA DESIGN
PSA Design Ltd
The Old Bank House, 6 Berry Lane,
Longridge, Preston, PR3 3JA
Tel. 01772 786066
www.psadesign.co.uk
mail@psadesign.co.uk

P:\Jobs\Traffic & Transportation\T3947 - Harrisons Engineering, Billington\CAD\Drawings\T3947-D-01 - Proposed Layout and Flood Levels.dwg




**Plan Showing Proposed Contours (Red) and Cut / Fill Isopachytes**
(Scale 1 to 250)

## CUT

- 0 to 50mm
- 50 to 100mm
- 100 to 150mm
- 150 to 200mm
- 200 to 250mm
- 250 to 300mm

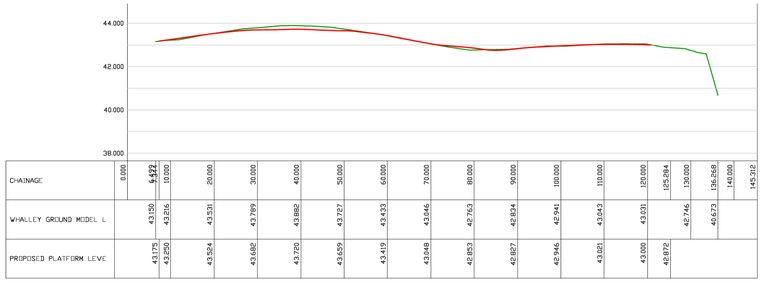
## FILL

- 0 to 50mm
- 50 to 100mm
- 100 to 150mm
- 150 to 200mm

## BALANCE

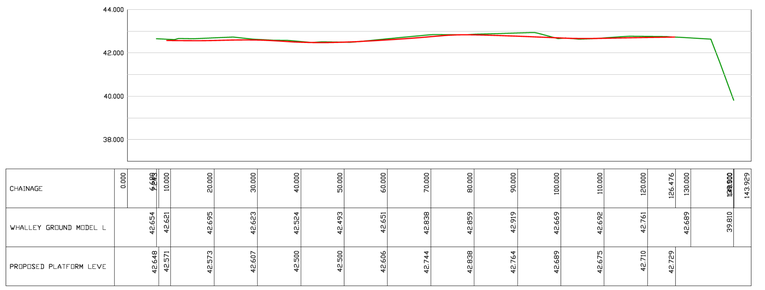
| | Cut | Fill |
|---|---|---|
| Gross: | 294.9 | 96.9 |

Nett: **198.0** ($m^3$)



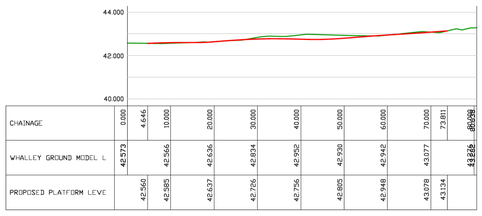

| CHAINAGE | 0.000 | 4.422 | 10.000 | 20.000 | 30.000 | 40.000 | 50.000 | 60.000 | 70.000 | 80.000 | 90.000 | 100.000 | 110.000 | 120.000 | 125.284 | 130.000 | 136.268 | 140.000 | 145.312 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WHALLEY GROUND MODEL L | | 43.150 | 43.216 | 43.531 | 43.789 | 43.882 | 43.727 | 43.433 | 43.046 | 42.763 | 42.834 | 42.941 | 43.043 | 43.031 | | 42.746 | 46.673 | | |
| PROPOSED PLATFORM LEVE | | 43.175 | 43.250 | 43.584 | 43.682 | 43.720 | 43.659 | 43.419 | 43.048 | 42.853 | 42.827 | 42.946 | 43.081 | 43.000 | 43.872 | | | | |

**Section D-D'**



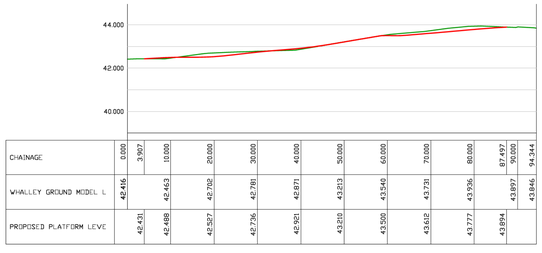

| CHAINAGE | 0.000 | 9.588 | 10.000 | 20.000 | 30.000 | 40.000 | 50.000 | 60.000 | 70.000 | 80.000 | 90.000 | 100.000 | 110.000 | 120.000 | 126.476 | 130.000 | 135.550 | 143.909 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WHALLEY GROUND MODEL L | | 42.654 | 42.681 | 42.695 | 42.623 | 42.524 | 42.493 | 42.451 | 42.838 | 42.859 | 42.919 | 42.669 | 42.692 | 42.761 | | 42.689 | 39.810 | |
| PROPOSED PLATFORM LEVE | | 42.648 | 42.571 | 42.573 | 42.607 | 42.560 | 42.560 | 42.606 | 42.744 | 42.839 | 42.764 | 42.689 | 42.675 | 42.710 | 42.729 | | | |

**Section C-C'**




| CHAINAGE | 0.000 | 4.644 | 10.000 | 20.000 | 30.000 | 40.000 | 50.000 | 60.000 | 70.000 | 73.811 | 80.000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| WHALLEY GROUND MODEL L | 42.573 | | 42.566 | 42.636 | 42.834 | 42.952 | 42.930 | 42.942 | 43.077 | 43.156 | 43.156 |
| PROPOSED PLATFORM LEVE | | 42.560 | 42.585 | 42.637 | 42.726 | 42.756 | 42.805 | 42.948 | 43.078 | 43.134 | |

**Section B-B'**




| CHAINAGE | 0.000 | 3.907 | 10.000 | 20.000 | 30.000 | 40.000 | 50.000 | 60.000 | 70.000 | 80.000 | 87.497 | 90.000 | 94.344 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WHALLEY GROUND MODEL L | 42.416 | | 42.463 | 42.782 | 42.781 | 42.871 | 43.213 | 43.540 | 43.731 | 43.936 | 43.897 | 43.846 | |
| PROPOSED PLATFORM LEVE | | 42.431 | 42.488 | 42.527 | 42.736 | 42.921 | 43.210 | 43.500 | 43.612 | 43.777 | 43.894 | | |

**Section A-A'**

**Scale**
**1 to 500 Horizontal**
**1 to 100 Vertical**

Existing Ground
Proposed Ground

| REV | DATE | AMENDMENT DETAILS | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| P1 | 06/05/24 | Preliminary for Comment | GS | DLW | GS |

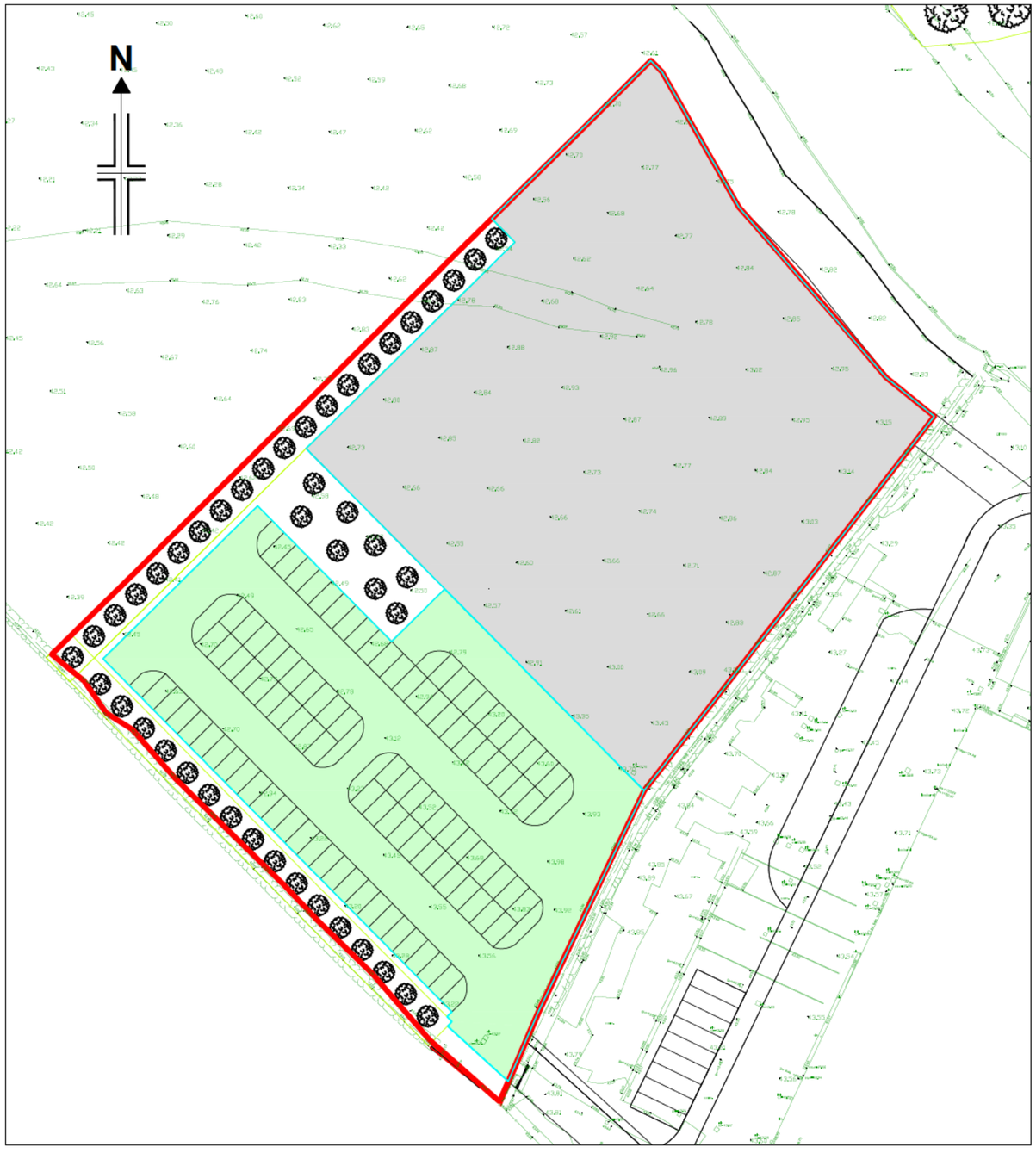
**Harrison's Engineering Ltd**

**Proposed New Car Park & Storage Yard, Billington**

**Proposed Levels and Cut / Fill Volumetrics**

Drwg No. **T3947-FRA-01** | Rev. **P1**
Scale **As Shown** | Sheet Size **A0**
Date **06/05/24**
Drawn **GS** | Checked | Approved

PSA DESIGN
PSA Design Ltd
The Old Bank House, 6 Barry Lane,
Longridge, Preston, PR3 3JA
Tel. 01772 786066
www.psadesign.co.uk
mail@psadesign.co.uk




## Surfacing

Permeable Car Park, minimum 300mm deep Type 3 Sub-base with combination of tarmac/resin bound aggregate / block paved surfacing

Total Area = 3050m$^2$
**Volume Potential - 3050 x 0.3 x 30% void = 275m$^3$**

Permeable Storage Yard, minimum 450mm deep, consisting of , 150mm capping, geotextile membrane, 150mm Type 3 Sub-base with 150mm hydraulically bound Type 3 sub-base (open textured surface)

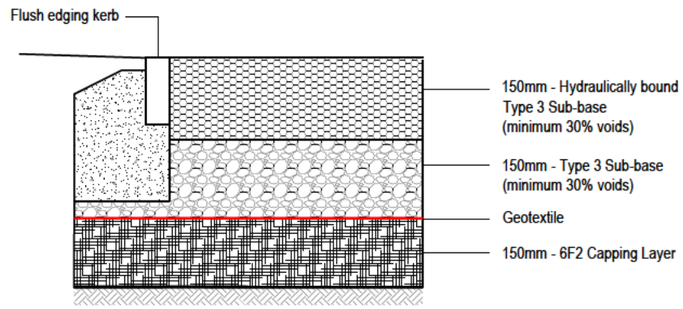
Total Area = 4810m$^2$
**Volume Potential - 4810 x 0.3 x 30% void = 430m$^3$**

## Volume

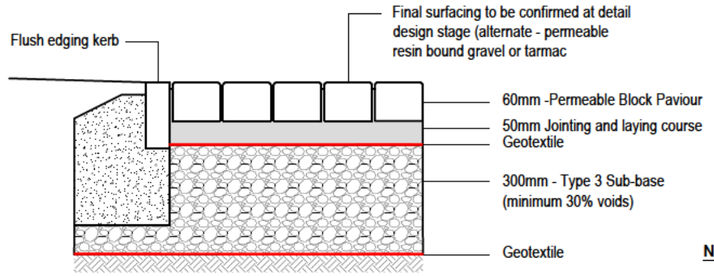
Total Volume Storage gain =

200m$^3$ - Cut from Re-grading Site
275m$^3$ - Car Park - Sub-base
430m$^3$ - Storage Yard - Sub-base

**Therefore, total (additional) Storage Potential 200m$^3$ minimum, 905m$^3$ maximum**




**Storage Yard**
(typical detail)




**Permeable Car Park**
(typical detail)

**Notes :**

Pavement thickness above subject to detailed design once ground investigation and CBR testing has been undertaken

All edge restraints should be flush.

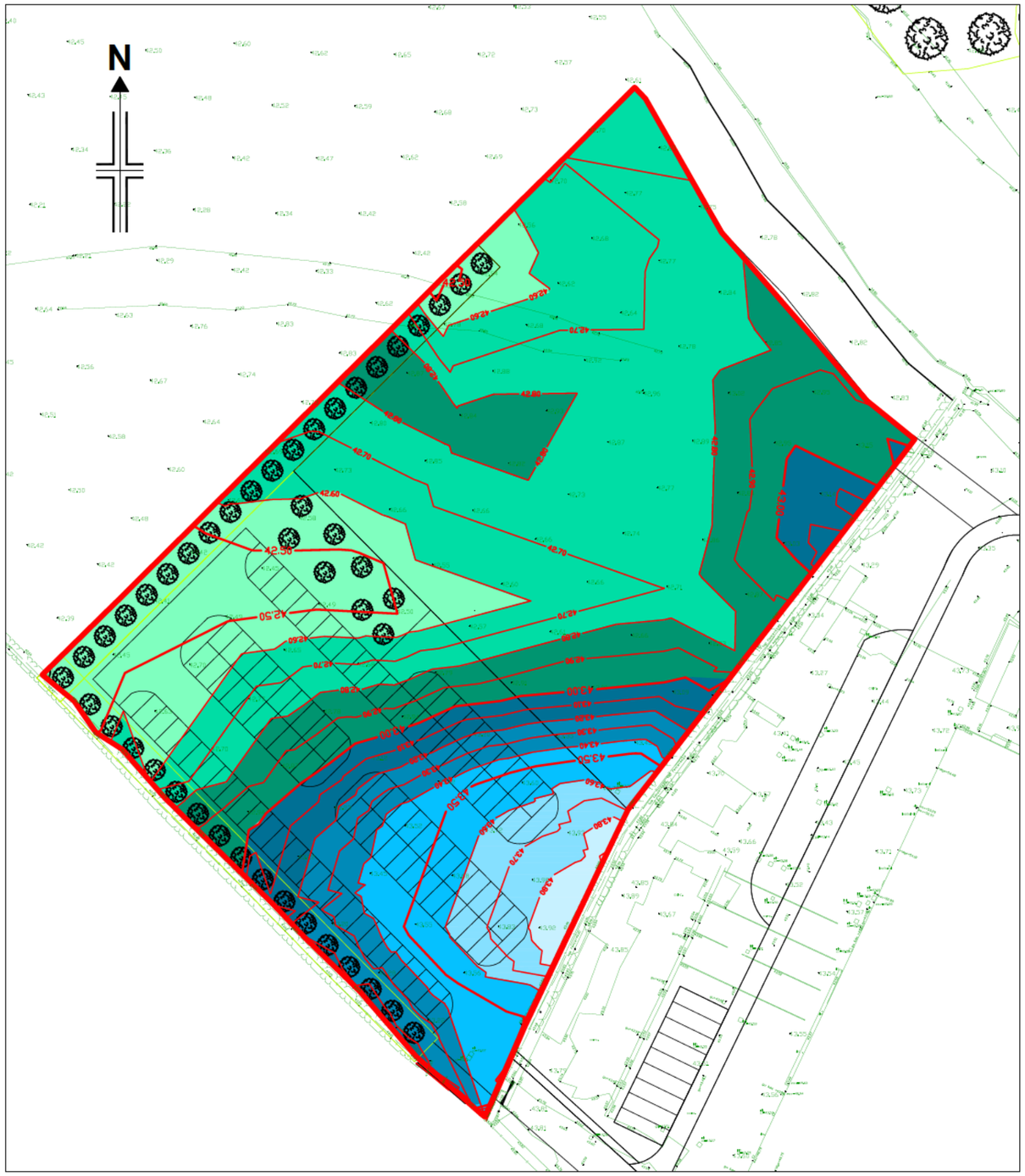
All planting to be at existing ground levels

| REV | DATE | AMENDMENT DETAILS | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| P1 | 06/05/24 | Preliminary for Comment | GS | DLW | GS |

PSA DESIGN
**PSA Design Ltd**
The Old Bank House, 6 Berry Lane
Longridge, Preston, PR3 3JA
Tel. 01772 786066
www.psadesign.co.uk
mail@psadesign.co.uk

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Client | **Harrison's Engineering Ltd** | Drawn | **GS** | Date | Scale | Sheet Size | Drwg No. / Rev. |
| Job | **Proposed New Car Park & Storage Yard, Billington** | Check | | **06/05/24** | **N.T.S.** | **A3** | **T3947-FRA-02** / **P1** |
| Title | **Impacts on storage volumes available post construction** | Appr. | | | | | |

P:\Jobs\Traffic & Transportation\T3947 - Harrisons Engineering, Billington\CAD\Drawings\MODEL EXPORT.dwg




# Flood Depths

| | |
|---|---|
| | 0.6m to 0.8m |
| | 0.8m to 1.0m |
| 0m to 0.2m | 1.0m to 2.0m |
| 0.2m to 0.4m | 1.2m to 1.4m |
| 0.4m to 0.6m | 1.4m to 1.6m |
| 0.6m to 0.8m | 1.6m to 1.8m |
| 0.8m to 1.0m | 1.8m to 2.0m |
| 1.0m to 1.2m | 2.0m to 2.2m |

Flood depths based on 1 in 100yr + 15% CC event (circa 43.60mAOD) compared to proposed levels (proposed contours shown in red)

Flood depths based on 1 in 1000yr event (circa 44.60mAOD) compared to proposed levels (proposed contours shown in red)

| REV | DATE | AMENDMENT DETAILS | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| P2 | 21/06/24 | 1 in 1000yr event added | GS | DLW | GS |
| P1 | 06/05/24 | Preliminary for Comment | GS | DLW | GS |

PSA DESIGN

**PSA Design Ltd**
The Old Bank House, 6 Berry Lane
Longridge, Preston, PR3 3JA
Tel. 01772 786066
www.psadesign.co.uk
mail@psadesign.co.uk

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Client | **Harrison's Engineering Ltd** | Drawn | **GS** | Date | Scale | Sheet Size | Drwg No. | Rev. |
| Job | **Proposed New Car Park & Storage Yard, Billington** | Check | | **21/06/24** | **N.T.S.** | **A3** | **T3947-FRA-03** | **P2** |
| Title | **Flood Depths - Proposed to 1 in 100yr + CC event and 1 in 1000yr event** | Appr. | | | | | | |

P:\Jobs\Traffic & Transportation\T3947 - Harrisons Engineering, Billington\CAD\Drawings\FRA Drawings.dwg

# Appendix D

Existing Flood Plan Method Statement

# HARRISONS ENGINEERING (LANCASHIRE) LTD.

Judge Walmesley Mill, Longworth Road, Billington, Clitheroe, Lancashire. BB7 9TP
Tel: 01254 823993 Fax: 01254 824222

# FLOOD PLAN METHOD STATEMENT

| | | | | | |
|---|---|---|---|---|---|
| **Flood Plan Details:** | EMERGENCY PROCEDURE IF THE RIVER CALDER IS DEEMED TO BREAK ITS BANKS. | | | **Ref. #** | |
| **Prepared by:** | I Sutherland | **Position:** | Manager | **Signed:** | I Sut |
| **Approved by:** | T Williams | **Position:** | Managing Director | **Signed:** | |
| **Task/Activity:** | To advise on a list of procedures should the premises flood. | | | | |
| **Contact Details:** | T Williams | **Position:** | MD | **Tel:** | **01254 828985** |
| **Site Address:** | Harrisons Engineering,<br>Judge Walmsley Mill,<br>Longworth Rd,<br>Clitheroe, Lancashire, BB79TP | | | **Environment agency flood plan completed:** | 05/02/2021 |
| | | | | **Important contact list:** | **Located In the EA flood plan folder.** |

| | **Name** | **Role** |
|---|---|---|
| **Flood Wardens:** | T Williams | Team Leader. |
| | S Dickinson | Deputy Team Leader. |
| | D Smith | Flood Assessment Manager. |
| | R Howson | Electrical Engineer / Utilities Isolator. |
| | | |
| | | |

| | | | |
|---|---|---|---|
| **Site Supervisor:** | T Williams | **Tel:** | 01254 828985 |

**Action Plan**

**Key Plant And Tools To Be Moved To Our Designated Safe Zones In This Order:**

1. Sandbags to be taken out of the stores and located inside at all entrance doors.
2. All vans and company vehicles to be parked on the front yard area (the highest point on the site). All spare keys for the vehicles are kept in the safe in the main office.
3. All office electrical equipment, computers, printers etc to be moved to upper floors including any important documentation.
4. All Welding machines and plant to be taken to the stores warehouse
5. All forklift trucks to be re-located into the stores warehouse.
6. General 110V hand tools, i.e. Grinders etc. Should be stored at bench height, if not to place on benches.
7. Sandbag all entrance doors.
8. When all items have been re-located to safe zones ISOLATE ALL UTILITIES. (IF THE BUILDING IS ALREADY UNDER WATER ISOLATE ALL UTILITIES FIRST AND FOLLOW THE ABOVE PROCEDURE STEP 1-8).

**Flood Defence Materials And additional personnel :**

All PPE equipment for the flood wardens located in the stores warehouse.

Flood defence equipment located in the stores warehouse. (sandbags).

Should the team leader require further assistance with personnel / we have several other volunteers available if needed.

**Flood defence Equipment distribution:**

When Electrical and Mechanical company equipment is safeguarded sandbag all doorways to minimise water ingress.

# Personal flood plan

**Name** HARRISONS ENGINEERING

Environment Agency

**Are you signed up to receive flood warnings?** ✓
If not call Floodline on 0345 988 1188 to see if your area receives free flood warnings.

**Let us know** when you've completed your flood plan by calling Floodline on **0345 988 1188.** This will help us learn more about how people are preparing for flooding.

| General contact list | Company name | Contact name | Telephone |
|---|---|---|---|
| Floodline | Environment Agency | | 0345 988 1188 |
| Electricity provider | TOTAL GAS AND POWER. | — | 0333 003 7874 |
| Gas provider | BRITISH GAS | — | 0800 111 999 |
| Water company | WATER PLUS | — | 0345 072 6072 |
| Telephone provider | VWI - TEL | — | 0330 124 7118 |
| Insurance company and policy number | HCC VIA MILES SMITH PI DC AOC 0910 | SIMON WHITTAKER | 01282 858250 |
| Local council | RIBBLE VALLEY COUNCIL | — | 01200 425111 |
| Local radio station | RIBBLE VALLEY FM | — | 01200 407373 |
| Travel/weather info | BBC | — | — |

**Key locations**

| Service cut-off | Description of location |
|---|---|
| Electricity | FRONT HIGH BAY 5 |
| Gas | FRONT HIGH BAY 5 |
| Water | FRONT HIGH BAY 5 |

} SEE ATTACHED MAP

**Who can help/who can you help?**

| Relationship | Name | Contact details | How can they/you help? |
|---|---|---|---|
| Relative | | | |
| Friend or neighbour | | | |

Be prepared for flooding. Act now

# Personal flood plan

## What can I do NOW?

Environment Agency

- Put important documents out of flood risk and protect in polythene ✓
- Check your insurance covers you for flooding ✓
- Look at the best way of stopping floodwater entering your property ✓
- Make a flood plan and prepare a flood kit ✓
- Find out where you can get sandbags ✓
- Identify who can help you/ who you can help ✓
- Identify what you would need to take with you if you had to leave your home ✓
- Understand the flood warning codes ✓

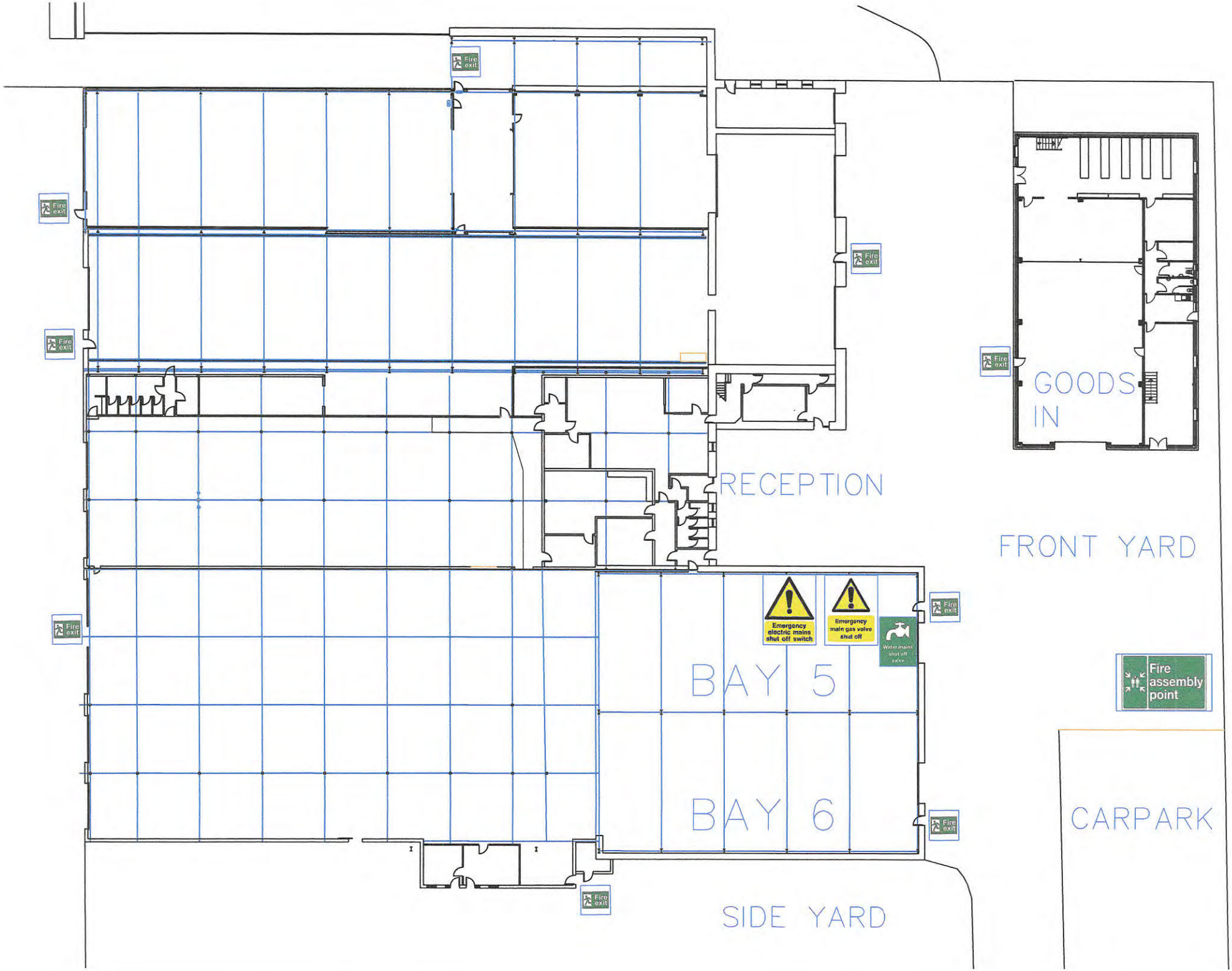
**What can you do if a flood is expected in your area?**

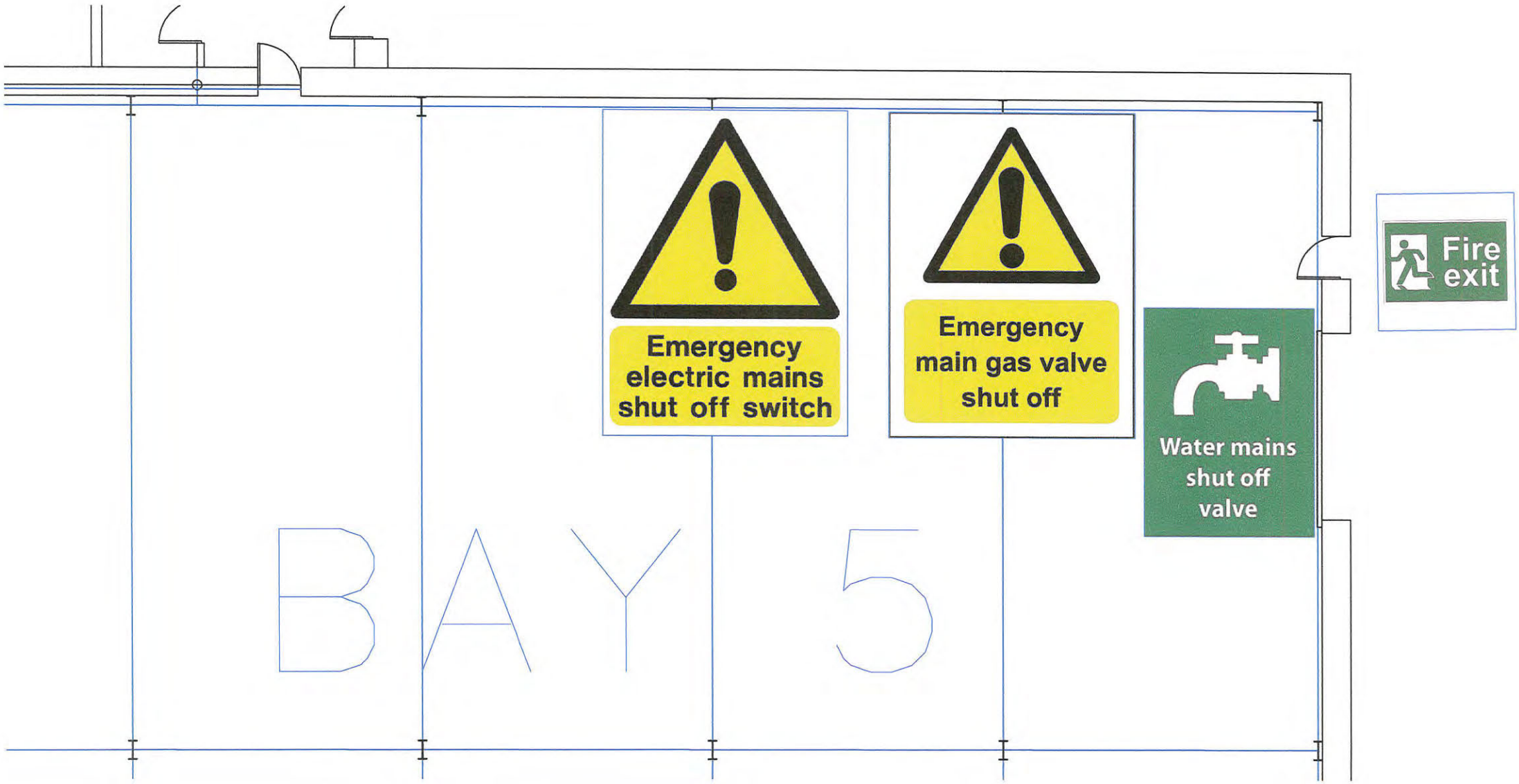
| Actions | Location |
|---|---|
| **Home** | |
| • Move furniture and electrical items to safety | — |
| • Put flood boards, polythene and sandbags in place | — |
| • Make a list now of what you can move away from the risk | — |
| • Turn off electricity, water and gas supplies | — |
| • Roll up carpets and rugs | — |
| • Unless you have time to remove them hang curtains over rods | — |
| • Move sentimental items to safety | — |
| • Put important documents in polythene bags and move to safety | — |
| **Garden and outside** | |
| • Move your car out of the flood risk area | — |
| • Move any large or loose items or weigh them down | — |
| **Business** | |
| • Move important documents, computers and stock | SECOND FLOOR OF THE OFFICE BUILDING |
| • Alert staff and request their help | FLOOD ACTION TEAM |
| • Farmers move animals and livestock to safety | — |
| **Evacuation - Prepare a flood kit in advance** | FLOOD DEFENCE TEAM TO CO-ORDINATE FLOOD PLAN |
| • Inform your family or friends that you may need to leave your home | |
| • Get your flood kit together and include a torch, warm and waterproof clothing, water, food, medication, toys for children and pets, rubber gloves and wellingtons | FLOOD PPE TO BE KEPT IN THE WAREHOUSE NEXT TO THE FRONT STORE. |

There are a range of flood protection products on the market to help you protect your property from flood damage. A directory of these is available from the **National Flood Forum** at **www.bluepages.org.uk**

**Be prepared for flooding. Act now**

GEHO0709BQPU-E-E


Fire exit
Fire exit
Fire exit
Fire exit
Fire exit
Fire exit
Fire exit
Fire exit
GOODS IN
RECEPTION
FRONT YARD
Emergency electric mains shut off switch
Emergency main gas valve shut off
Water mains shut off valve
BAY 5
BAY 6
Fire assembly point
CARPARK
SIDE YARD


Emergency electric mains shut off switch
Emergency main gas valve shut off
Water mains shut off valve
Fire exit
BAY 5