Shaw Stephens
Consulting

Bridge over River Clywedog, Off Bedwell Road, Wrexham Industrial Estate Wrexham LL13 OUT

Flood Consequence Assessment

For: F I Real Estate

Job Number:	**0175**
Report Reference:	**0175-SSC-XX-XX-RP-C-001-P01**
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Written By:	**Neville Shaw**

Shaw Stephens Consulting,
Eden Point
Three Acres Lane
Cheadle Hulme
Cheadle
SK8 6RL

Tel: +44 7471 877 617

Email:neville.shaw@shaw-stephens.com

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1.0 INTRODUCTION

1.1 Shaw Stephens Consulting has been commissioned by F I Real Estate to prepare a Flood Consequence Assessment (FCA) in relation to the existing bridge over the River Clywedog, off Bedwell Road, Wrexham Industrial Estate, Wrexham LL13 OUT – refer to Appendices 1 and 2 for details.

1.2 It is recognised that the bridge has been constructed over the River Clywedog (main river) in order to link two sides of the same site ownership - this Flood Consequence Assessment forms part of a retrospective planning application in relation to the bridge.

1.3 The objective of the FCA is to summarise the assessment of risks arising from the relevant sources of flooding in line with the current National Resources Wales Flood Map for Planning.

1.4 The FCA will also address vulnerability to flooding from all relevant sources and is produced with reference to the guidance provided in the new TAN 15 document published in March 2025.

1.5 It is noted that the National Resources Wales Flood Map for Planning includes predicted future flood risk based on the 100 year central climate change estimate.

1.6 The existing use of the site adjacent to the bridge is as a light industrial facility which is classified as a Less Vulnerable use in the new TAN 15 document.

2.0 NOTES ON LIMITATIONS

2.1 Shaw Stephens Consulting has prepared this report solely for the use of F I Real Estate.

2.2 Should any third party wish to use or rely on the contents of the report, written approval must be sought from Shaw Stephens Consulting and a charge may be levied against such approval.

2.3 Shaw Stephens Consulting accepts no responsibility or liability for:

i) The consequences of this report being used for any purpose or project other than for which it was commissioned and/or

ii) The consequences of use of this document by any party with whom an agreement has not been executed.

2.4 The information and views cited in the report are based on data derived from numerous sources. Shaw Stephens Consulting do not accept any liability for the correctness or otherwise of any information provided by third parties.

2.5 It should be noted that some of the elements covered in this report may be subject to change over time. Therefore, if the development is delayed or postponed, it may be necessary to consider reviewing such matters to verify that there have been no changes either at the subject site or in relation to pertinent legislation.

2.6 Further consultations with statutory bodies will evidently be required as the project progresses. Where responses have been received from Regulators, it is noted that the nature of these responses could be subject to change in the future.

3.0 SITE CHARACTERISTICS

3.1 The bridge over the River Clywedog (classified by Natural Resources Wales as main river) is located to the north of Bedwell Link in Wrexham Industrial Estate at approximate National Grid Reference 337528, 348467. The adjacent site comprises an industrial estate containing several warehouse units used for packaging and transport services. There are warehouse buildings to either side of the River Clywedog in the vicinity of the bridge.

3.2 According to the Soilscapes soils dataset produced by the Cranfield Soil and AgriFood Institute, soil conditions in the vicinity of the bridge are described as loamy and clayey soils that are seasonally wet.

3.3 British Geological Society (BGS) geological records indicate the area in the vicinity of the bridge to be underlain by River Terrace (sand and gravel) deposits with solid deposits of Salop Formation (mudstone, sandstone and conglomerate) underlying the above noted drift deposits. A BGS borehole record immediately to the west of the site indicates fill to 0.5m depth, brown silty clay to 1.5m, loose to medium dense brown clayey gravel to 3m, brown silty clay to 4.5m and brown silty sand to 5m with water struck at 1.7m below ground level (refer to Appendix 7 for details).

4.0 FLOOD RISK CLASSIFICATION, HISTORY & ASSESSMENT

4.1 Flood Risk Classification

4.1.1 The Wales Flood Map for Planning uses the following flood zone definitions:

Flood Zone 1

Rivers: Less than 1 in 1000 (0.1%) plus climate change chance of flooding in a given year

Surface Water: Less than 1 in 1000 (0.1%) plus climate change chance of flooding in a given year

Flood Zone 2

Rivers: Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year including climate change

Surface Water: Less than 1 in 100 (1%) but greater than 1 in 1000 (0.1%) chance of flooding in a given year including climate change

Flood Zone 3

Rivers: A greater than 1 in 100 (1%) chance of flooding in a given year including climate change

Surface Water: A greater than 1 in 100 (1%) chance of flooding in a given year including climate change

4.2 Historical Flood Events

4.2.1 Appendix 6 of this report indicates that Natural Resources Wales (NRW) hold no records of any flooding events at or close to the subject site.

4.2.2 Similarly, the NRW Flood Risk Management Plan for North East Wales, the Strategic Flood Consequences Assessment for Wrexham County Borough Council (2016) and the Preliminary Flood Risk Assessment for Wrexham County Borough Council dated 2011 also indicate no history of site flooding from any source.

4.3 Assessment of Flood Risk

4.3.1 The site is not located in an area benefitting from flood defence infrastructure.

4.3.2 It is noted that no detailed hydraulic modelling is currently available for the salient stretch of the River Clywedog and the current National Resources Wales Flood Map for Planning has been derived by the application of national generalised modelling which can be inaccurate in some cases. Accordingly, it is understood that a third party consultant is currently undertaking a flood modelling study of this watercourse. In order to better understand the fluvial flood risk at the location of the bridge, it will evidently be necessary to review this information when it is available.

4.3.3 As noted above, NRW do not have any modelled levels for the stretch of the River Clywedog closest to the bridge. Therefore, comparison data was extracted following review of the flood map extents and the available site topographical data to provide the 1 in 100 year and 1 in 1000 year plus climate change levels. On this basis, the bridge is indicated to lie within Flood Zone 3 (refer to Appendix 3) pending receipt of the flood modelling study noted in clause 4.3.2 above.

4.3.4 A study of the Flood Map for Wales (present day flood levels - no climate change) mapping shows that the bridge floods in a 1 in 30 year event (refer to Appendix 8 for details).

4.3.5 **Rivers**

The detailed flood map for rivers provided by NRW indicates that the bridge lies in Flood Zone 3 (refer to Appendix 3 for details). This indicates that the risk of fluvial flooding local to the bridge is high based on the available mapping - the Flood Map for Wales indicating flooding of the bridge in a 1 in 30 year event based on this national generalised modelling.

4.3.6 **Surface Water and Small Watercourses**

The detailed flood map for surface water & small watercourses provided by NRW indicates that the area of the site local to the bridge lies in Flood Zone 1 (refer to Appendix 4 for details). Any surface water arising from the north of the wider industrial site is likely to flow towards the River Clywedog due to the slope across the land without any significant accumulation of water given the presence of the River Clywedog which will convey it away.

4.3.7 **Groundwater**

The British Geological Society has groundwater records for the study area in the form of borehole records. The records show the water table is recorded at 1.70m below ground level (refer to Appendix 7 for details). The flood risk associated with this source is however considered to be low with the natural topography causing any groundwater to shed towards the River Clywedog from the north. Furthermore, there is no history of groundwater flooding in either the Strategic Flood Consequences Assessment for Wrexham County Borough Council (2016) or the Preliminary Flood Risk Assessment for Wrexham County Borough Council dated 2011.

4.3.8 **Sewers**

There is no history of sewer flooding in either the Strategic Flood Consequences Assessment for Wrexham County Borough Council (2016) or the Preliminary Flood Risk Assessment for Wrexham County Borough Council dated 2011. Accordingly, the flood risk associated with this source is considered to be low.

4.3.9 **Reservoirs**

With regard to reservoir flooding, the shading on the flood maps in the vicinity of the bridge (refer to Appendix 5 for details) shows the worst case scenario for the area that could be flooded if a large reservoir (>10,000m3) were to fail and release the water it holds. This is considered to be extremely unlikely to happen as there has been no loss of life from reservoir flooding since 1925 and accordingly the flood risk associated with this source is considered to be very low.

5.0 EXISTING SITUATION AND CONSIDERATIONS

5.1 Existing Situation

5.1.1 Section 4 of this FCA demonstrates that the bridge lies in Flood Zone 3 with respect to fluvial flooding and in Flood Zone 1 with respect to surface water flooding.

5.1.2 It is noted that no detailed hydraulic modelling is available for the salient stretch of the River Clywedog and the current National Resources Wales Flood Map for Planning has been derived by the application of national generalised modelling which can be inaccurate in some cases. It is understood that a third party consultant is currently undertaking a flood modelling study of this watercourse with a view to subsequently advising on design flood risk levels at the bridge location.

5.2 Existing Considerations

5.2.1 Given the existing situation as briefly summarised above (refer to section 4 of this report and the NRW Flood Map for Planning in the report appendices for further details), it is essential that the site owner / operator is aware of the flood risks and consequences. Unfortunately, the bridge does not lie in an area where the NRW flood warning / flood alert systems are in operation.

5.2.3 A flood emergency evacuation plan should be produced for the site buildings that lie in elevated flood zones immediately to the north of the bridge. As there is clearly significantly higher ground further to the north of the bridge, the key aim of any evacuation plan will be for people to be directed to decant to the higher ground further to the north of the bridge in an extreme storm event.

5.2.3 Emergency evacuation plans for the buildings directly to the north of the bridge should be re-assessed once the detailed flood modelling study referred to in clause 5.1.2 is completed as it will then be possible to understand and review flood depths in extreme storm events at and immediately adjacent to the bridge.

6.0 SUMMARY AND RECOMMENDATIONS

6.1 An assessment of flood risk from all identified potential sources of flooding has been undertaken at the bridge location using the currently available data.

6.2 The assessment indicates that the dominant risk of flooding to the bridge, which will determine the bridge design criteria, is fluvial.

6.3 It is noted that no detailed hydraulic modelling is available for the salient stretch of the River Clywedog and the current National Resources Wales Flood Map for Planning has been derived by the application of national generalised modelling which can be inaccurate in some cases.

6.4 It is understood that a third party consultant is currently undertaking a flood modelling study of this watercourse with a view to subsequently advising on design flood risk levels at the bridge location.

6.5 A retrospective Flood Risk Activity Permit will need to be applied for through Natural Resources Wales – this will involve addressing potential environmental impacts, especially those concerning any protected species and habitats. This permit will ensure that the bridge will not increase flood risk elsewhere.

6.6 The key mitigation measures for the bridge are noted below:

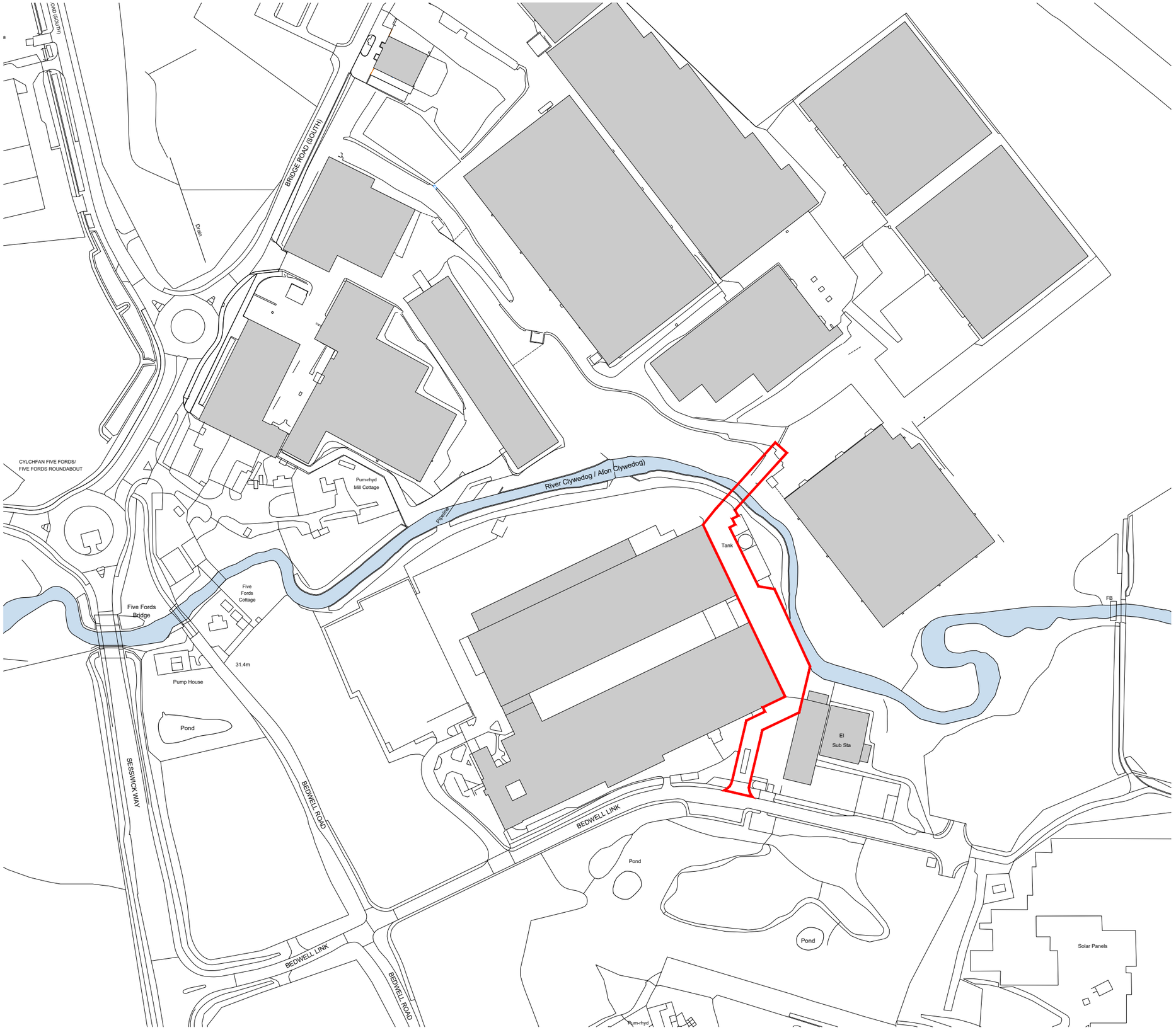
- Bridge abutments to be set back beyond existing banking in order to prevent disturbance of the channel bed and banks;
- Bridge soffit level to be set at 1 in 100 year plus climate change plus 600mm min level – this minimum soffit level is to be determined by the third party consultant flood modelling study noted in clause 6.4 above.

6.7 The site owner / occupier should ensure that all users of the existing development site served by the bridge are aware of the flood risks and consequences. Escape / evacuation routes are to be shown by the operator to be operational under all conditions. Flood emergency plans and procedures produced by the site operator must be in place.

APPENDIX

APPENDIX 1

SITE LOCATION PLAN / EXISTING SITE PLAN



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Scale Bar:

0 20 50 100

1:2500

North Point:

N

Revision	Date	Description	Checked

DOMUS architecture

One Campbell Street
Leeds
LS28 6DP

T: 0113 518 1010
E: info@domusarchitecture.co.uk
W: domusarchitecture.co.uk

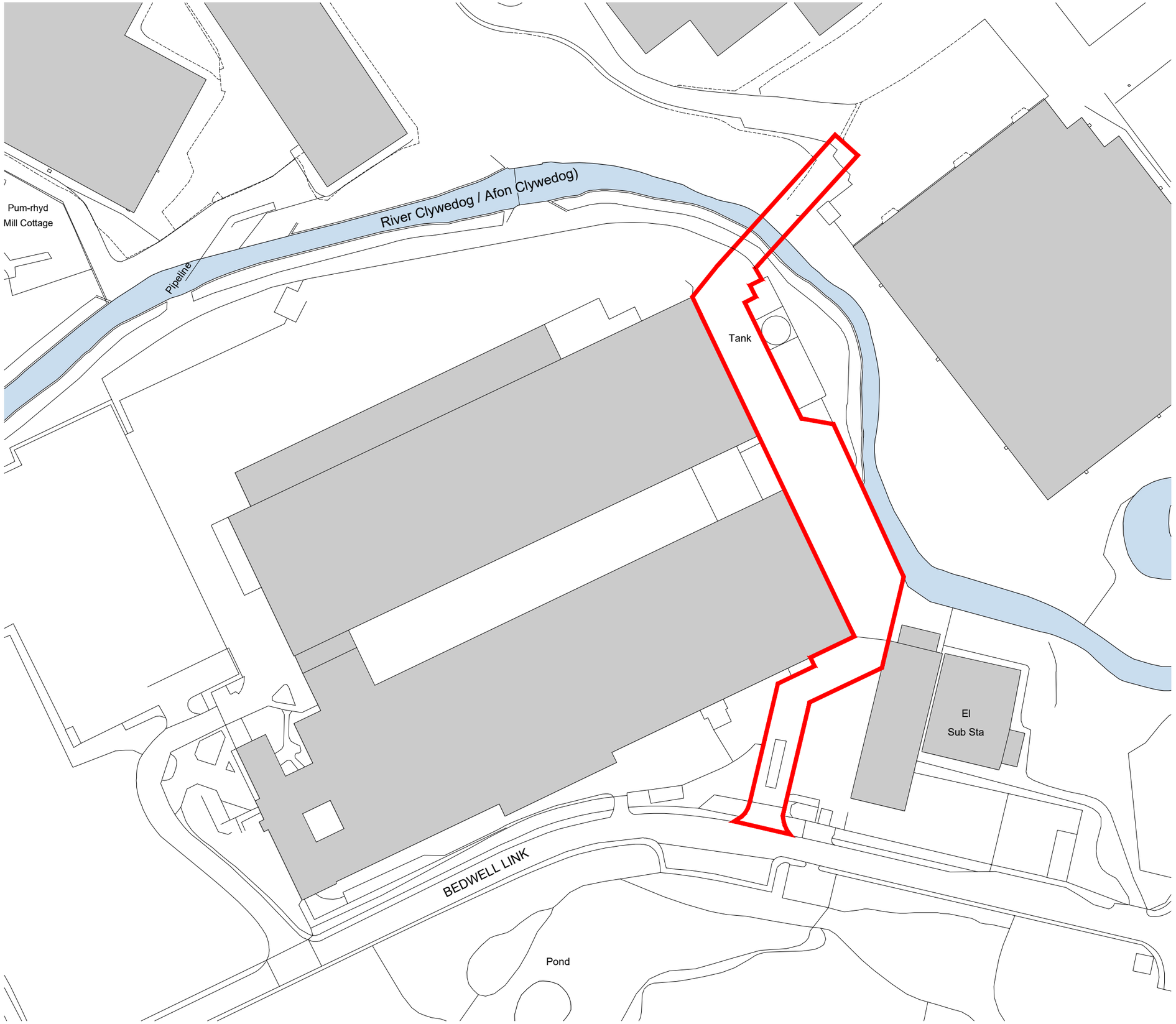
Project:
Retrospective Application for Bridge

Site Address:
Wrexham Industrial Estate, Bridge Road South,
Wrexham LL13 9SQ

Client:
FI Real Estate Management Ltd

Title:
Location Plan

Date:	Scale:	Checked:
October 2025	1:2500 @ A3	JT
Project: 2153	Dwg No: A1-01	Revision: -



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1:1250

North Point:

N

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One Campbell Street
Leeds
LS28 6DP

T: 0113 518 1010
E: info@domusarchitecture.co.uk
W: domusarchitecture.co.uk

Project:
Retrospective Application for Bridge

Site Address:
Wrexham Industrial Estate, Bridge Road South,
Wrexham LL13 9SQ

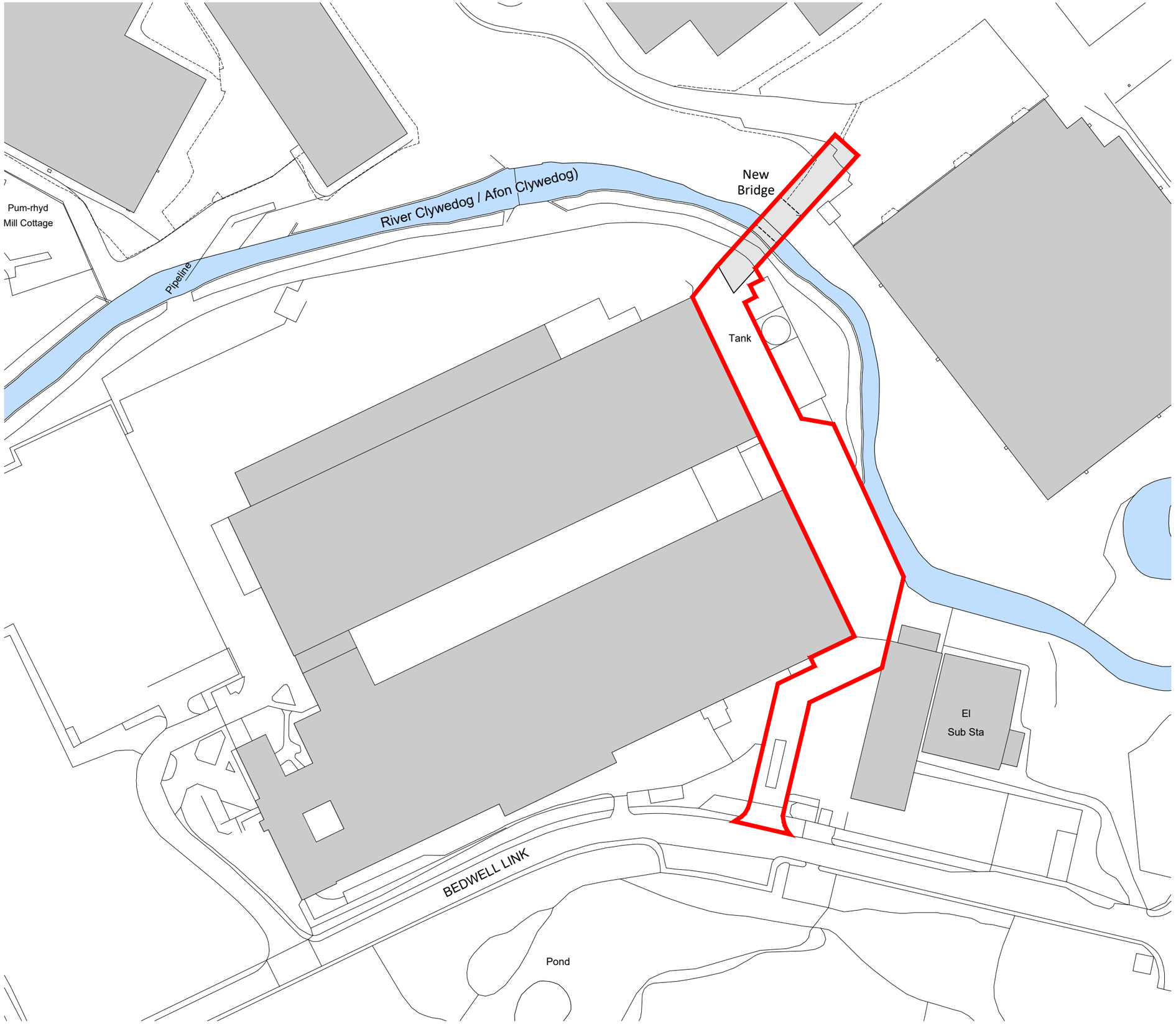
Client:
FI Real Estate Management Ltd

Title:
Site Layout As Existing

Date:	Scale:	Checked:
October 2025	1:1250 @ A3	JT
Project:	**Dwg No:**	**Revision:**
2153	A1-02	-

APPENDIX 2

PROPOSED SITE PLAN



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1:1250

North Point:

N

Revision	Date	Description	Checked

DOMUS architecture

One Campbell Street
Leeds
LS28 6DP

T: 0113 518 1010
E: info@domusarchitecture.co.uk
W: domusarchitecture.co.uk

Project:
Retrospective Application for Bridge

Site Address:
Wrexham Industrial Estate, Bridge Road South,
Wrexham LL13 9SQ

Client:
FI Real Estate Management Ltd

Title:
Site Layout As Proposed

Date:	Scale:	Checked:
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Project:	**Dwg No:**	**Revision:**
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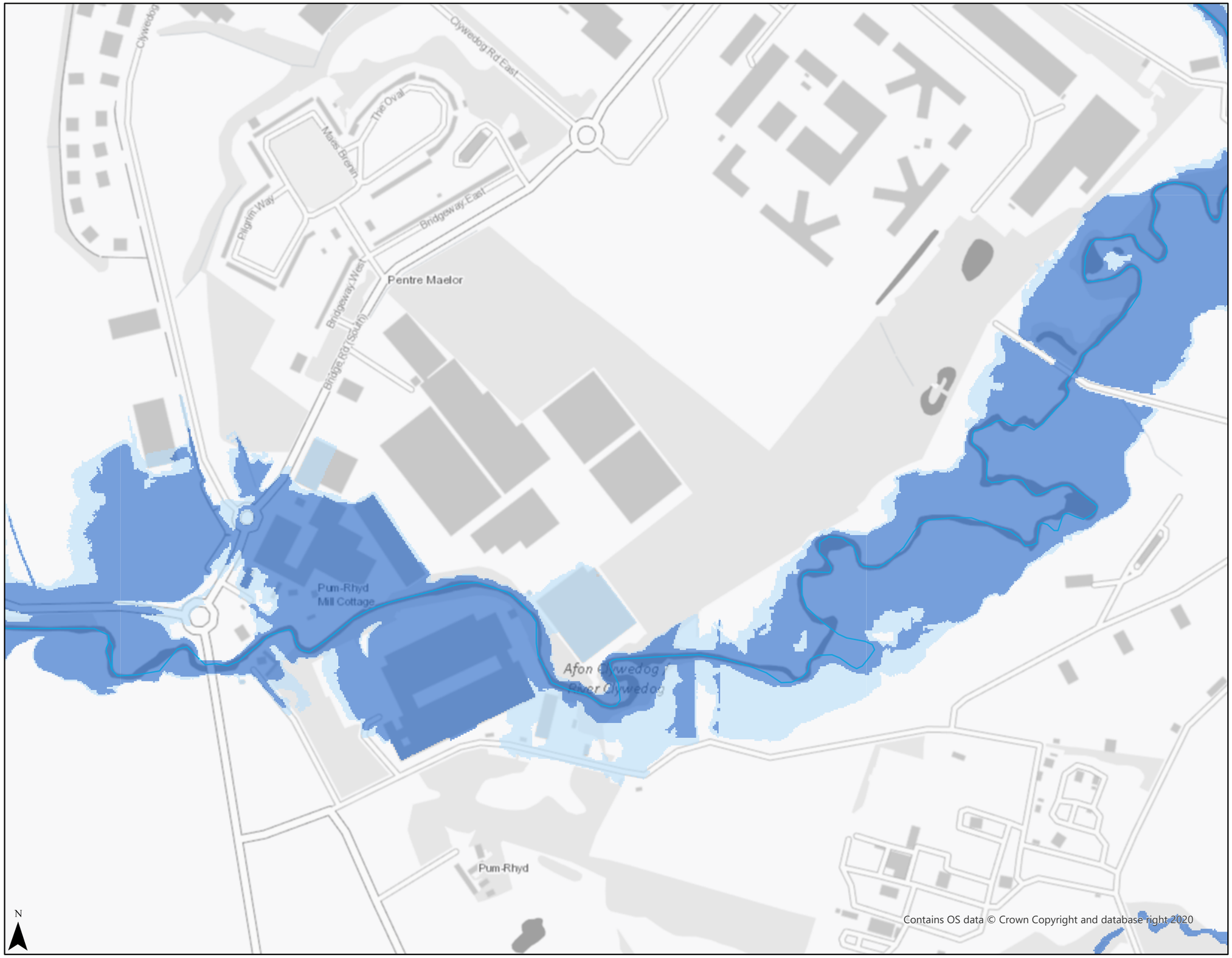
APPENDIX 3

FLOOD MAP FOR PLANNING - RIVERS

Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Map for Planning - Detail

Flood Map for Rivers



Legend

Rivers

- Flood Zone 3
- Flood Zone 2
- Main Rivers

Scale at A3: 1:5,000

Date: 16/08/2025

0.2 0.1 0 0.2

km

British National Grid

Disclaimer

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APPENDIX 4

FLOOD MAP FOR PLANNING –
SURFACE WATER & SMALL WATERCOURSES

Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Map for Planning - Detail

Flood Map for Planning (SW)

Legend

Surface Water and Small Watercourses

- Flood Zone 3
- Flood Zone 2
- Main Rivers

Scale at A3: 1:5,000

Date: 16/08/2025

N

0.2 0.1 0 0.2
km

British National Grid

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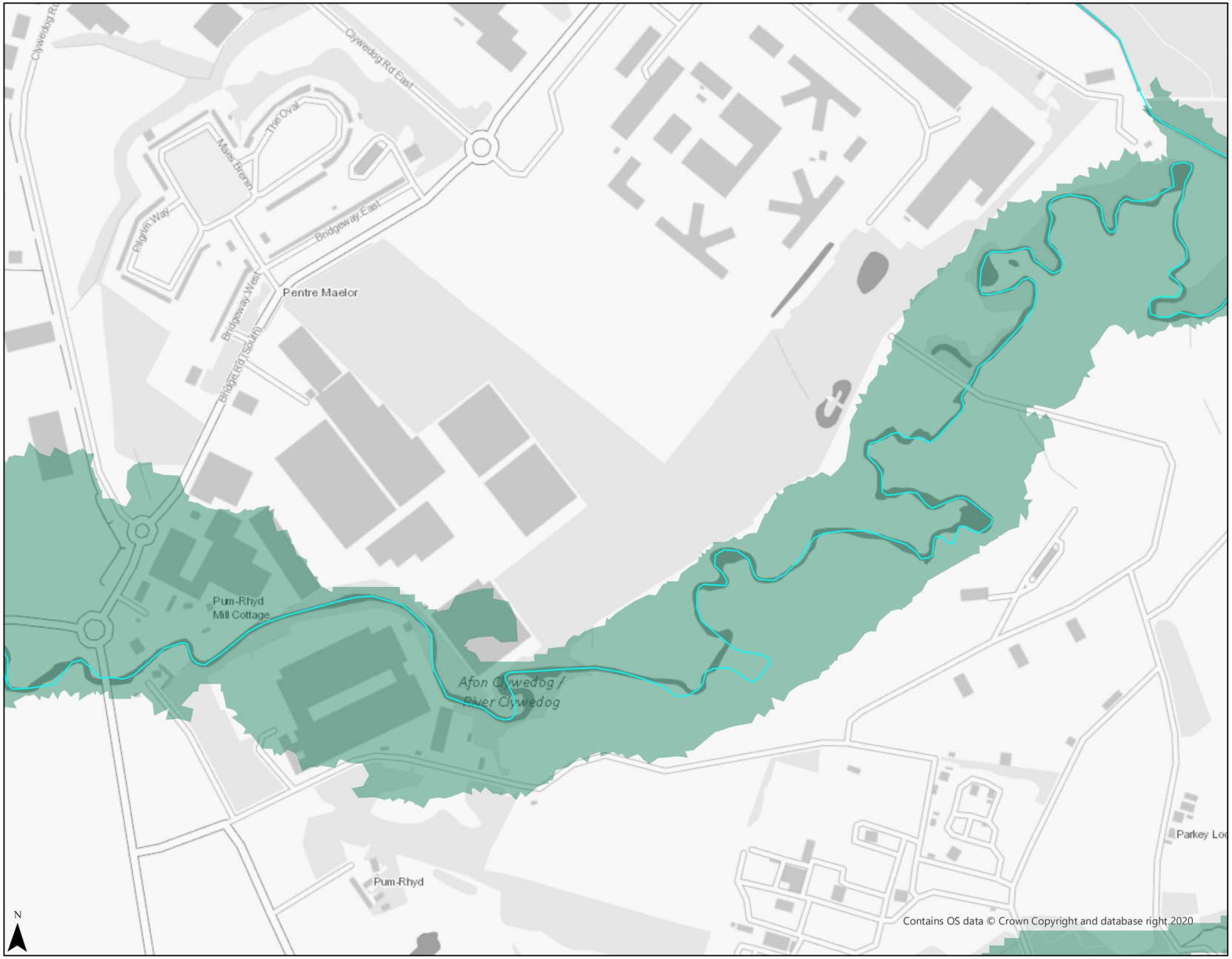
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APPENDIX 5

FLOOD MAP FOR PLANNING - RESERVOIRS



Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Map for Planning - Detail

Enter title (max 35 characters)

Legend

- Main Rivers
- Flood Risk from Reservoirs

Scale at A3: 1:5,000

Date: 16/08/2025

0.2 0.1 0 0.2

km

British National Grid

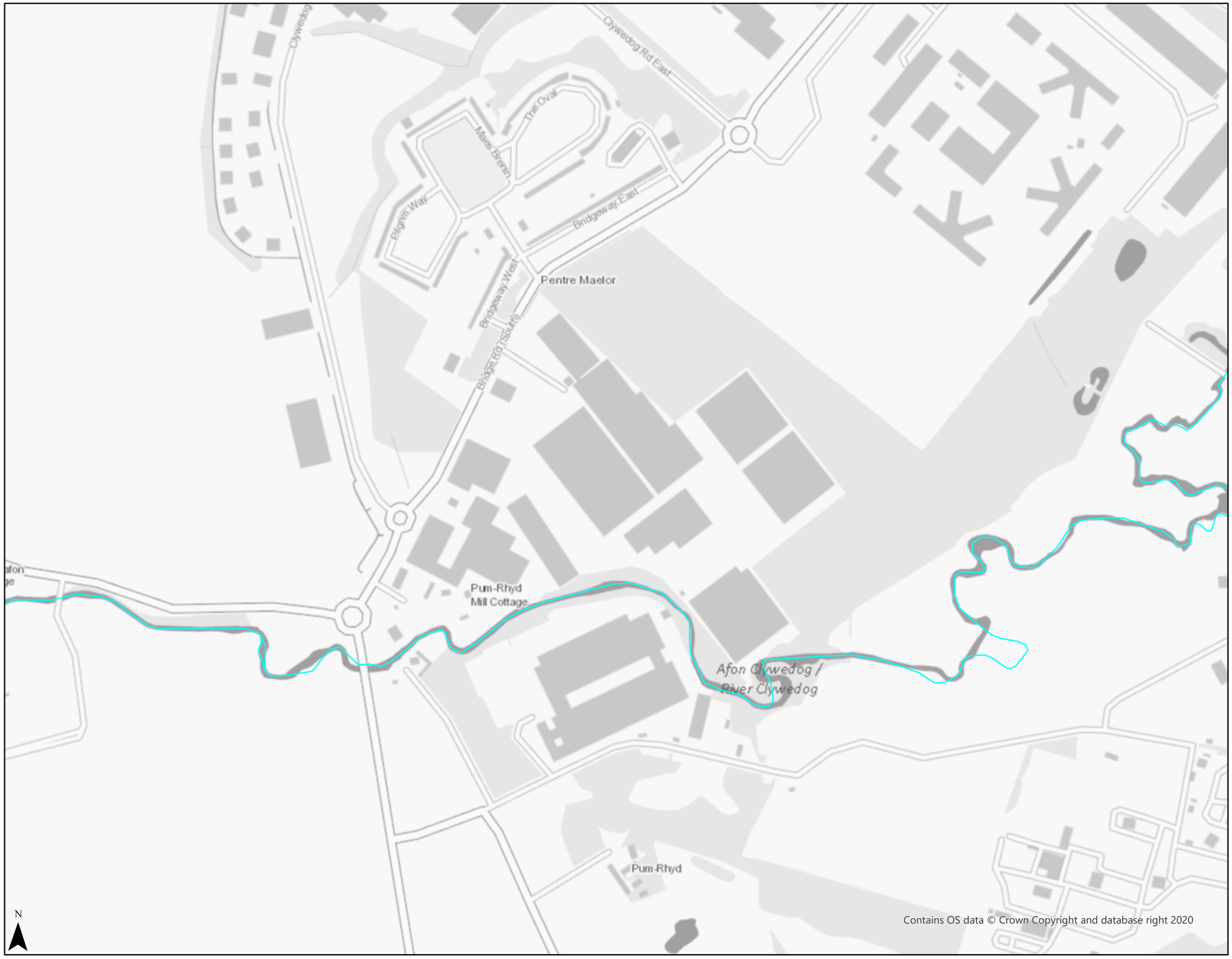
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APPENDIX 6

FLOOD MAP FOR PLANNING – RECORDED FLOOD EVENTS



Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Map for Planning - Detail

Recorded Flood Events

Legend

- Recorded Flood Extents
- Main Rivers

Scale at A3: 1:5,000

Date: 16/08/2025

0.2 0.1 0 0.2

km

British National Grid

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APPENDIX 7

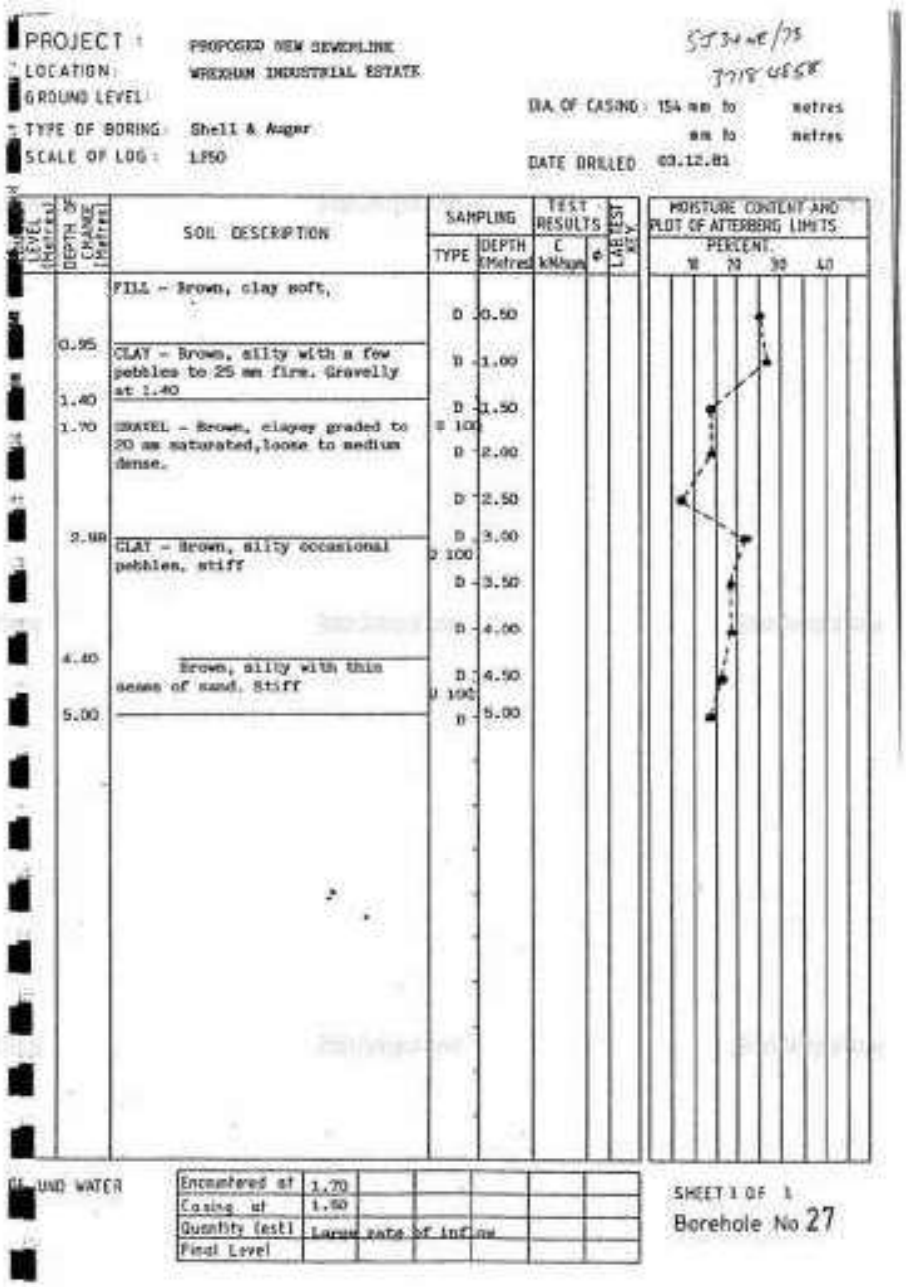
BGS BOREHOLE LOG

British Geological Survey

Version 2.0.6.7

BGS ID: 153243 : BGS Reference: SJ34NE73
British National Grid (27700) : 337180,348580

Report an issue with this borehole



PROJECT : PROPOSED NEW SEWERLINE
LOCATION : WREXHAM INDUSTRIAL ESTATE
GROUND LEVEL :
TYPE OF BORING : Shell & Auger
SCALE OF LOG : 1:50
DIA OF CASING : 154 mm to metres
mm to metres
DATE DRILLED 03.12.81

SJ34 NE/73
3718 0858

GROUND LEVEL (Metres)	DEPTH OF CHANGE (Metres)	SOIL DESCRIPTION	SAMPLING TYPE	SAMPLING DEPTH (Metres)	TEST RESULTS C kN/sqm	TEST RESULTS φ	LAB TEST KEY
		FILL - Brown, clay soft,	D	0.50			
	0.95	CLAY - Brown, silty with a few pebbles to 25 mm firm. Gravelly at 1.40	D	1.00			
	1.40		D	1.50			
	1.70	GRAVEL - Brown, clayey graded to 20 mm saturated, loose to medium dense.	B 100				
			D	2.00			
			D	2.50			
	2.90	CLAY - Brown, silty occasional pebbles, stiff	D	3.00			
			B 100				
			D	3.50			
			D	4.00			
	4.40	Brown, silty with thin seams of sand. Stiff	D	4.50			
			U 100				
	5.00		D	5.00			

MOISTURE CONTENT AND PLOT OF ATTERBERG LIMITS
PERCENT
10 20 30 40

GROUND WATER

Encountered at	1.70						
Casing at	1.50						
Quantity (est)	Large rate of inflow						
Final Level							

SHEET 1 OF 1
Borehole No 27

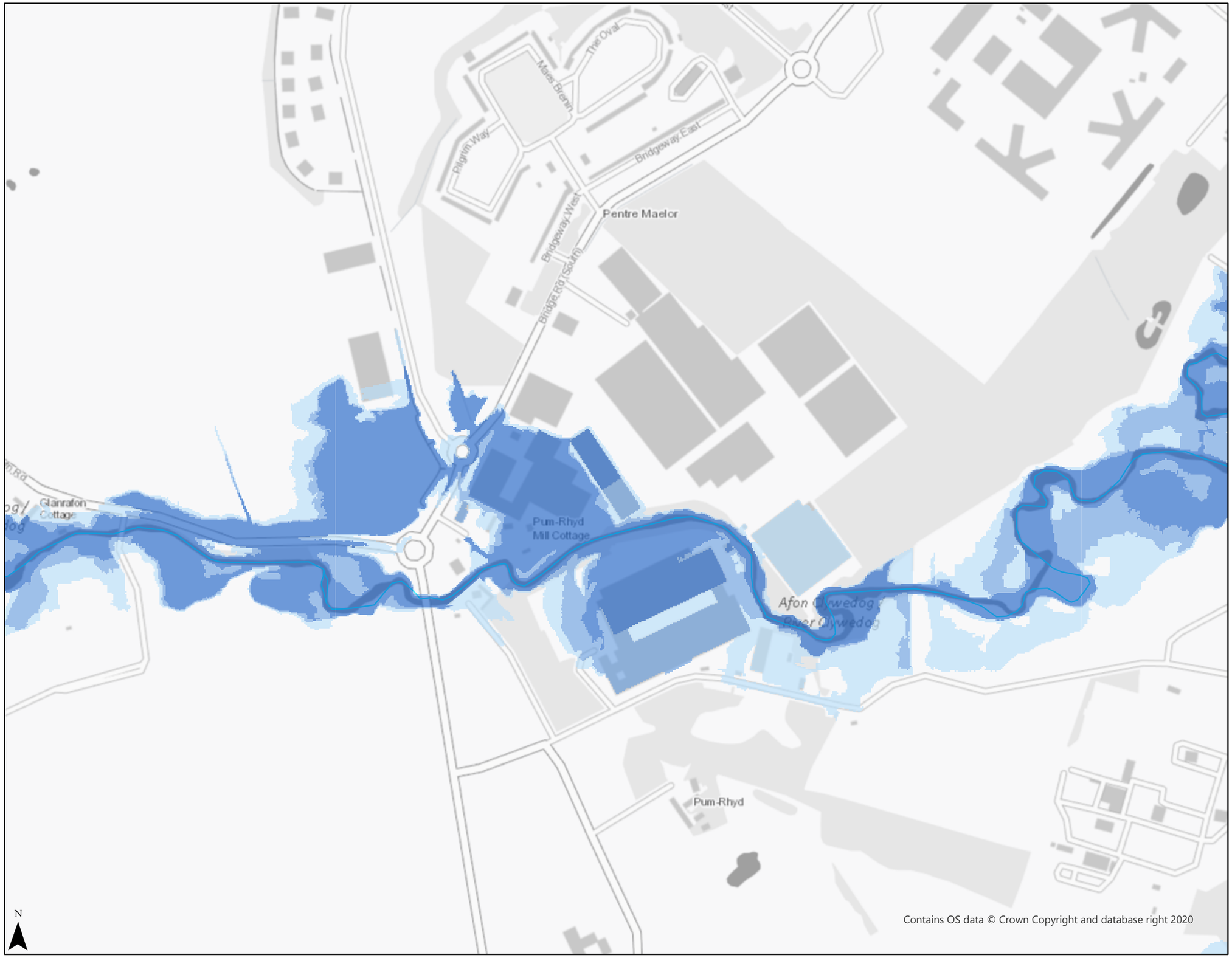
APPENDIX 8

FLOOD RISK ASSESSMENT WALES MAPPING

Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Risk Maps

Fluvial



Legend

Flood Risk from Rivers

- High
- Medium
- Low
- Risk Level Under Review
- Main Rivers

Scale at A3: 1:5,000

Date: 19/08/2025

0.2 0.1 0 0.2

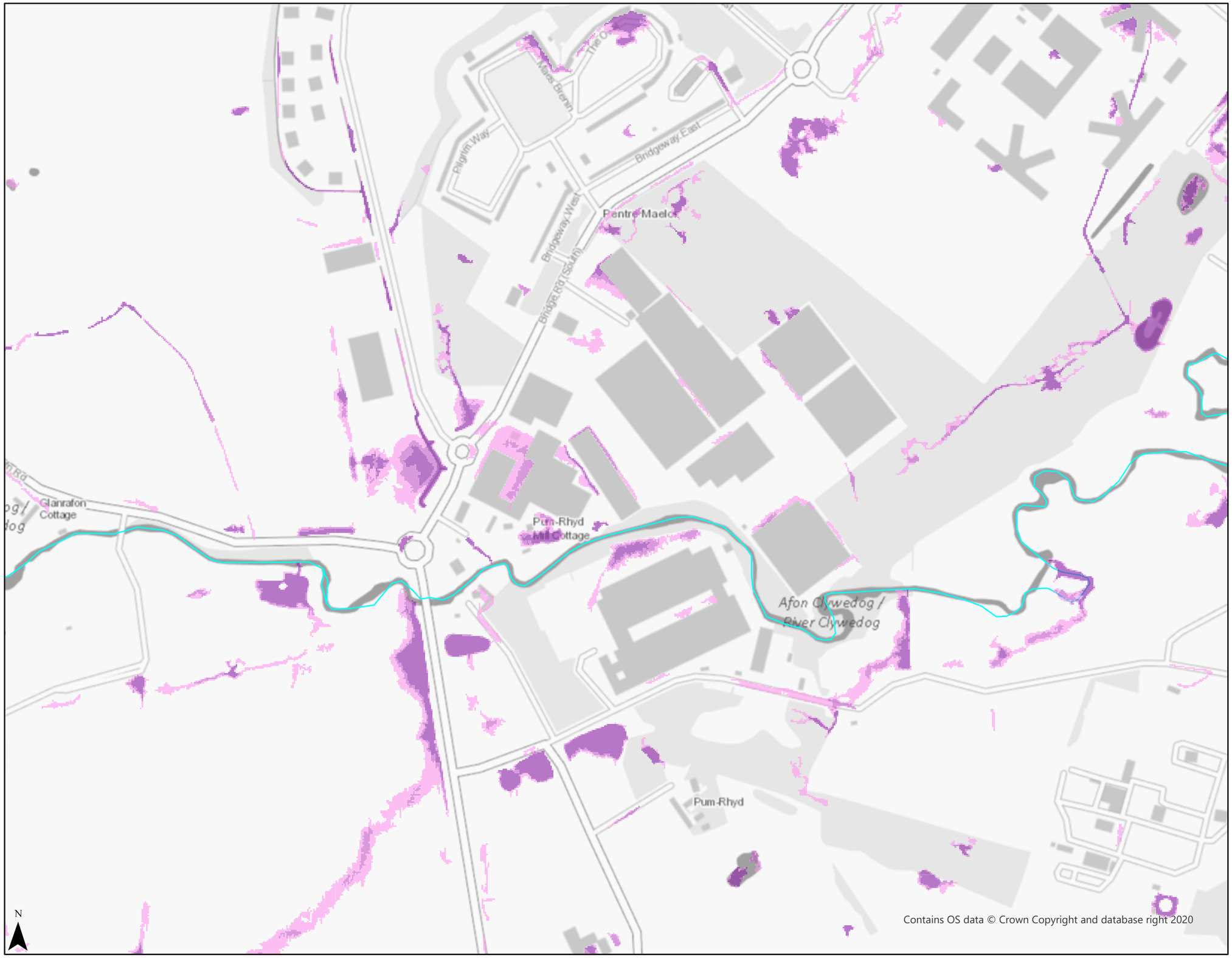
km

British National Grid

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Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Risk Maps

Surface Water

Legend

Flood Risk from Surface Water & Small Watercourses

- High
- Medium
- Low
- Risk Level Under Review
- Main Rivers

Scale at A3: 1:5,000

Date: 19/08/2025

0.2 0.1 0 0.2

km

British National Grid

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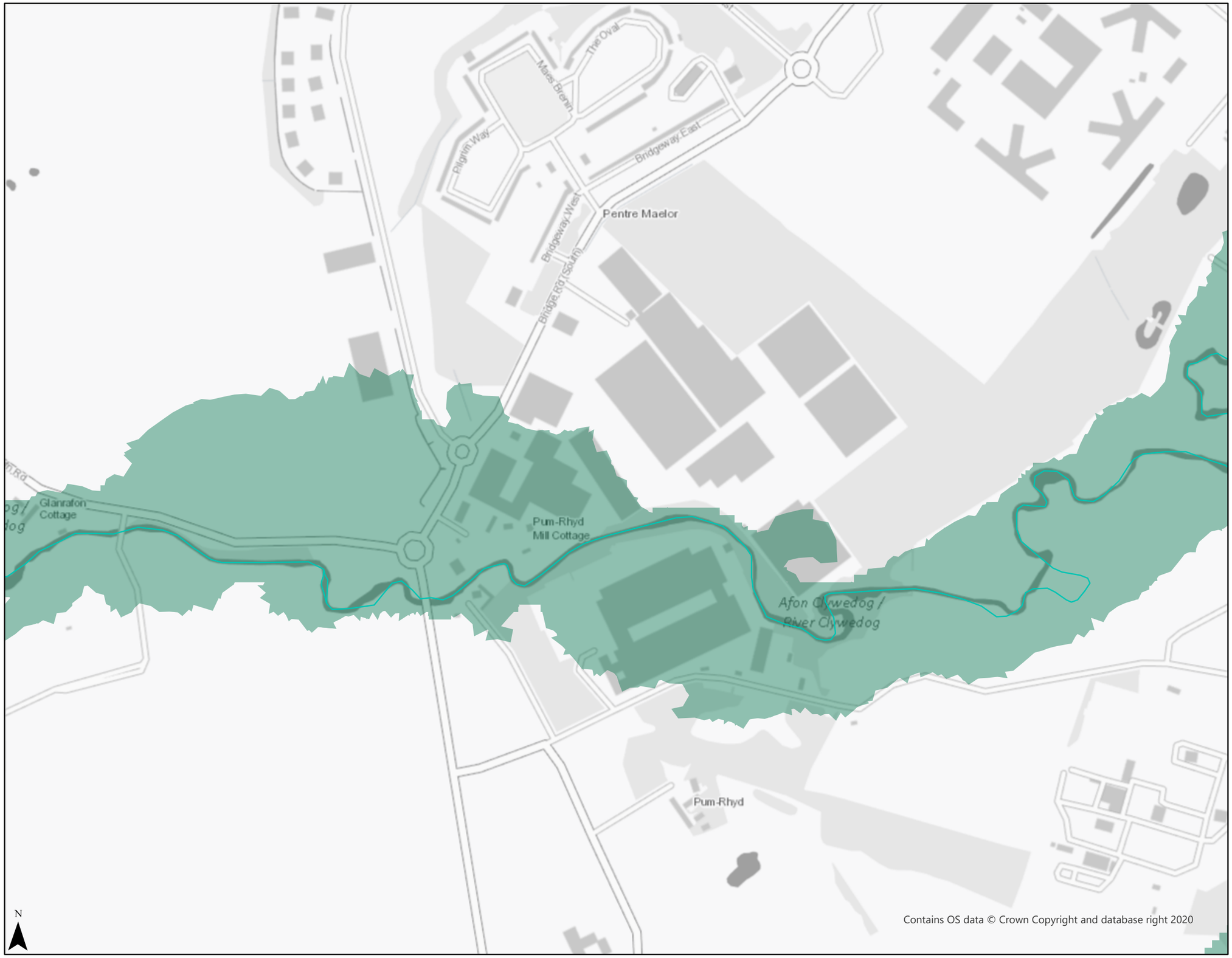
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Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Risk Maps

Reservoir



Legend

- Risk Level Under Review
- Flood Risk from Reservoirs
- Main Rivers

Scale at A3: 1:5,000

Date: 19/08/2025

0.2 0.1 0 0.2

km

British National Grid

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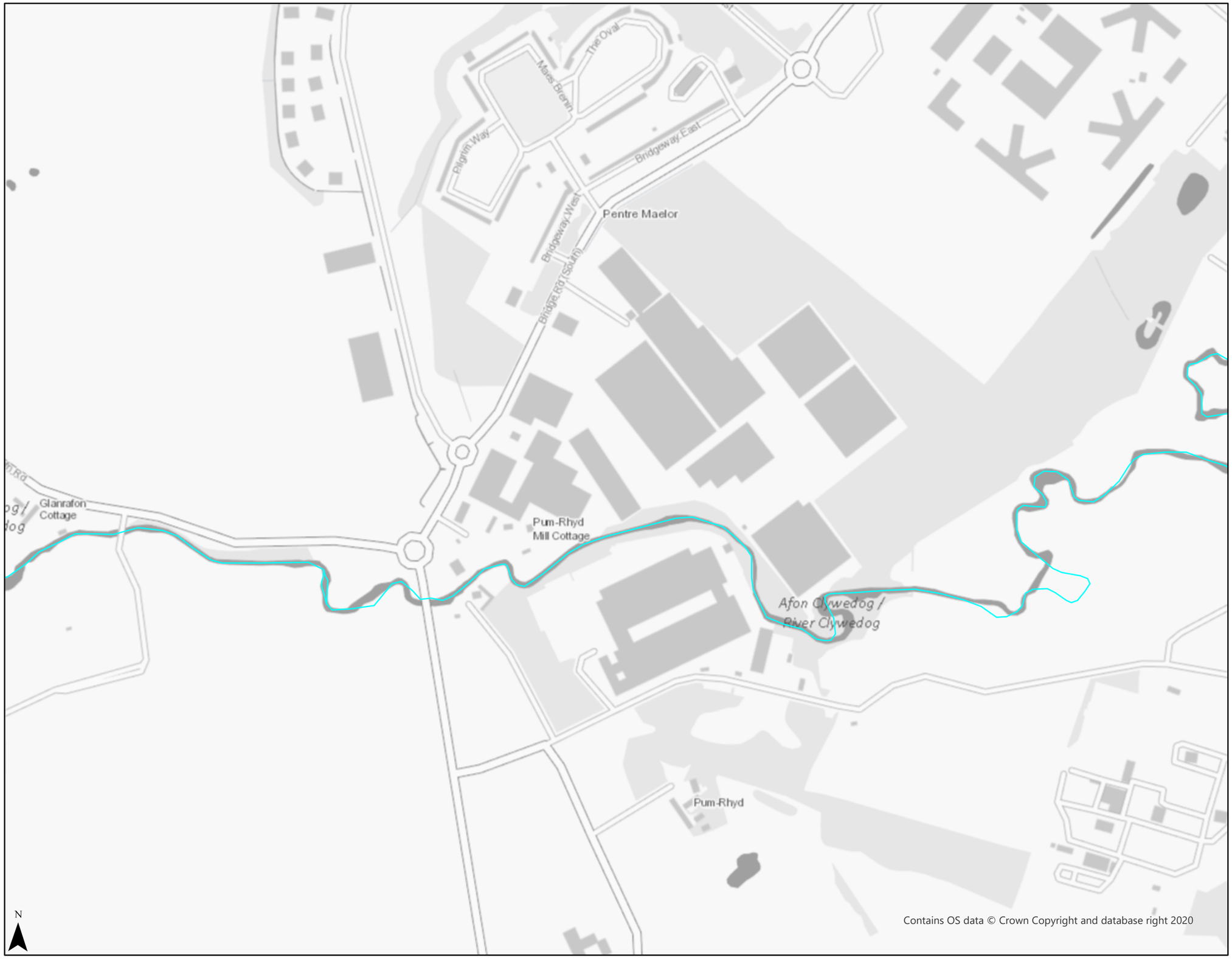
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Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Risk Maps

Recorded Flood Events



Legend

- Risk Level Under Review
- Recorded Flood Extents
- Main Rivers

Scale at A3: 1:5,000

Date: 19/08/2025

0.2 0.1 0 0.2
km

British National Grid

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