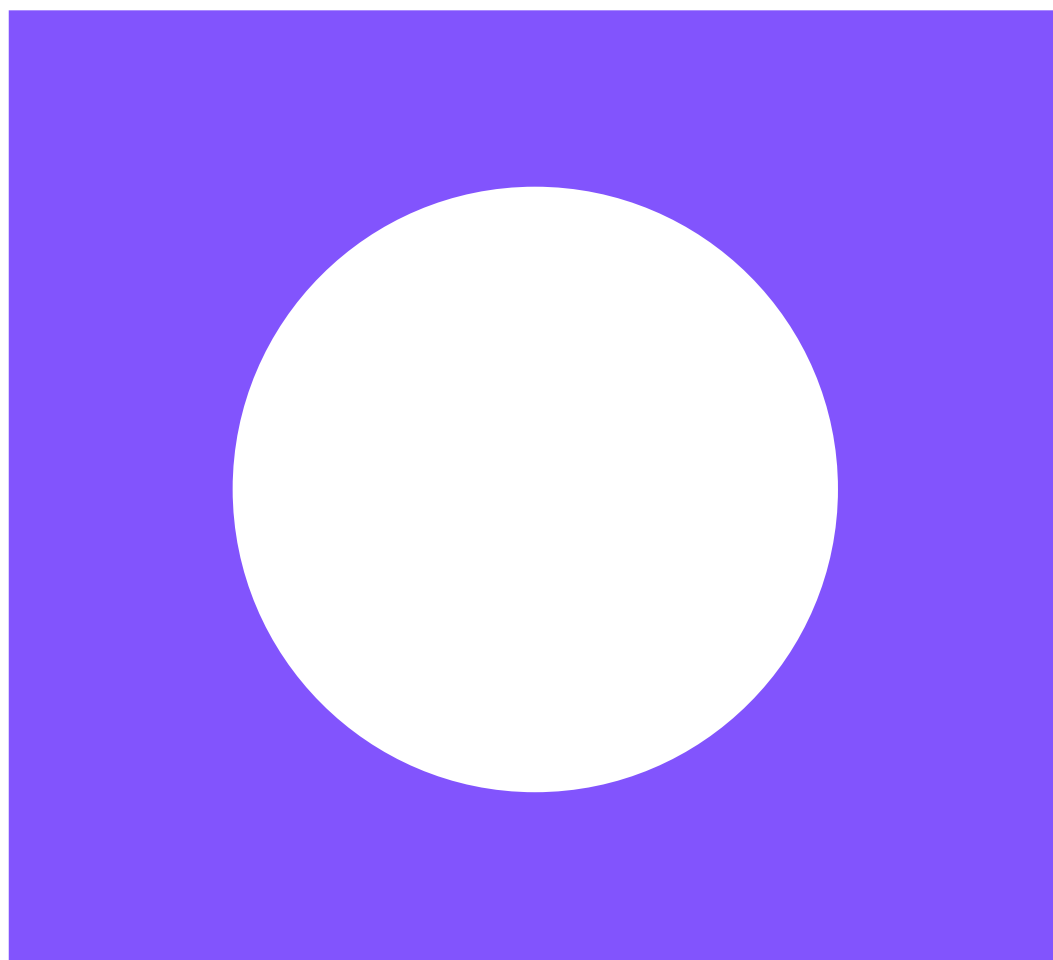




Bassaleg Bridge

Water Framework Directive (WFD) Impact
Assessment

September 2025

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Water Framework Directive (WFD) Impact Assessment

September 2025

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Executive summary

The works to connect Forge Mews to Bassaleg will involve the construction of a new bridge upstream from the existing, decommissioned Bassaleg Bridge, which will be demolished. A flood wall south of the bridge will also be constructed. The works will hereafter be referred to as 'the Scheme'. The constraints at the site necessitate in-river works. These include blockstone scour protection on both banks, rip-rap scour protection on the river bed, and placement of bridge abutments in the river bank zone. The construction and ongoing presence of permanent bridge abutments and modification to bank profiles could impact existing habitats and flow dynamics. An assessment of the Scheme has been undertaken to determine if the Scheme is compliant with the objectives of the Water Framework Directive (WFD). As Bassaleg Bridge will be demolished, the impacts of the permanent presence of the new bridge on the watercourse will be largely similar to the baseline conditions.

WFD screening assessment

The screening identified one WFD surface water body and one WFD groundwater body as potentially impacted: 'Ebbw R - conf Ebbw Fach R to Maes-glas' (GB109056026910), and 'SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' (GB40902G201500). Water bodies which were screened exclusively for construction impacts include the 'Severn Estuary (Wales)' protected area, the 'USK' (GB530905415404) transitional and coastal (TraC) water body, and the 'SEVERN LOWER' (GB530905415401) TraC water body.

The Scheme activities that were considered to pose a risk to WFD status include scour protection, the location of an abutment within the riverbank zone, and the presence of the new bridge crossing itself. Groundwater was not determined to be at risk.

WFD scoping assessment

The scoping assessment concluded that construction activities could be scoped out of further assessment for all screened in receptors, when considering permanent impacts on WFD compliance. The construction phase is not considered to be a risk to WFD classification or objectives at a water body scale, assuming compliance with stated mitigation and reasonable assumptions made about construction activities.

A Construction Environmental Management Plan (CEMP), or equivalent, will be produced prior to the commencement of works to determine how to safeguard wildlife and avoid polluting the surrounding environment.

Operational (permanent) activities taken forwards for further assessment include the bridge itself, the abutment extending into the right bank, and scour protection, including blockstone across both banks and rip-rap along the riverbed. These activities were only determined to constitute a risk to the 'Ebbw R – conf Ebbw Fach R to Maes-glas' (GB109056026910) surface water body which directly intersects the Scheme.

WFD compliance assessment

The Scheme does not pose a risk of deterioration for any WFD water bodies, provided embedded mitigation is delivered. For hydromorphological, physico-chemical and biological quality elements, impacts are assessed to be localised and minor. After demolition of the existing Bassaleg Bridge, the permanent presence of the new bridge will be similar to the baseline. The Scheme is therefore deemed to be compliant with WFD requirements.

1 Introduction

1.1 Purpose of this report

Mott Macdonald has been commissioned to undertake a Water Framework Directive (WFD) assessment on behalf of Newport City Council, to assess the potential impacts of the planned Bassaleg Bridge Replacement (hereafter referred to as 'the Scheme'). The Scheme was initiated following the conclusion of a Structural Assessment of the old Bassaleg Bridge in January 2023, which established the bridge did not meet the requirements for vehicle live load on the structure. An Options Selection Report¹ published in December 2023 outlined six options for reconnecting traffic, and proposed an online replacement bridge to accommodate pedestrians, vehicular traffic, and existing services.

This report comprises screening, scoping, and impact assessment, to identify which elements within WFD water bodies may be affected by the Scheme. The aim of the report is to understand if the Scheme is compliant with the WFD or whether any further assessment is required.

The WFD assessment specifically aims to:

- Identify potentially affected WFD surface and groundwater bodies and outline their current baseline status
- Assess potential effects of the project on the WFD status of relevant water bodies
- Determine if further assessment is required to ensure the project and associated works are compliant with the WFD
- Identify any necessary mitigation that should be implemented to ensure the proposals do not compromise meeting WFD objectives for relevant water bodies.

The proposed development will be WFD compliant if the following criteria are met:

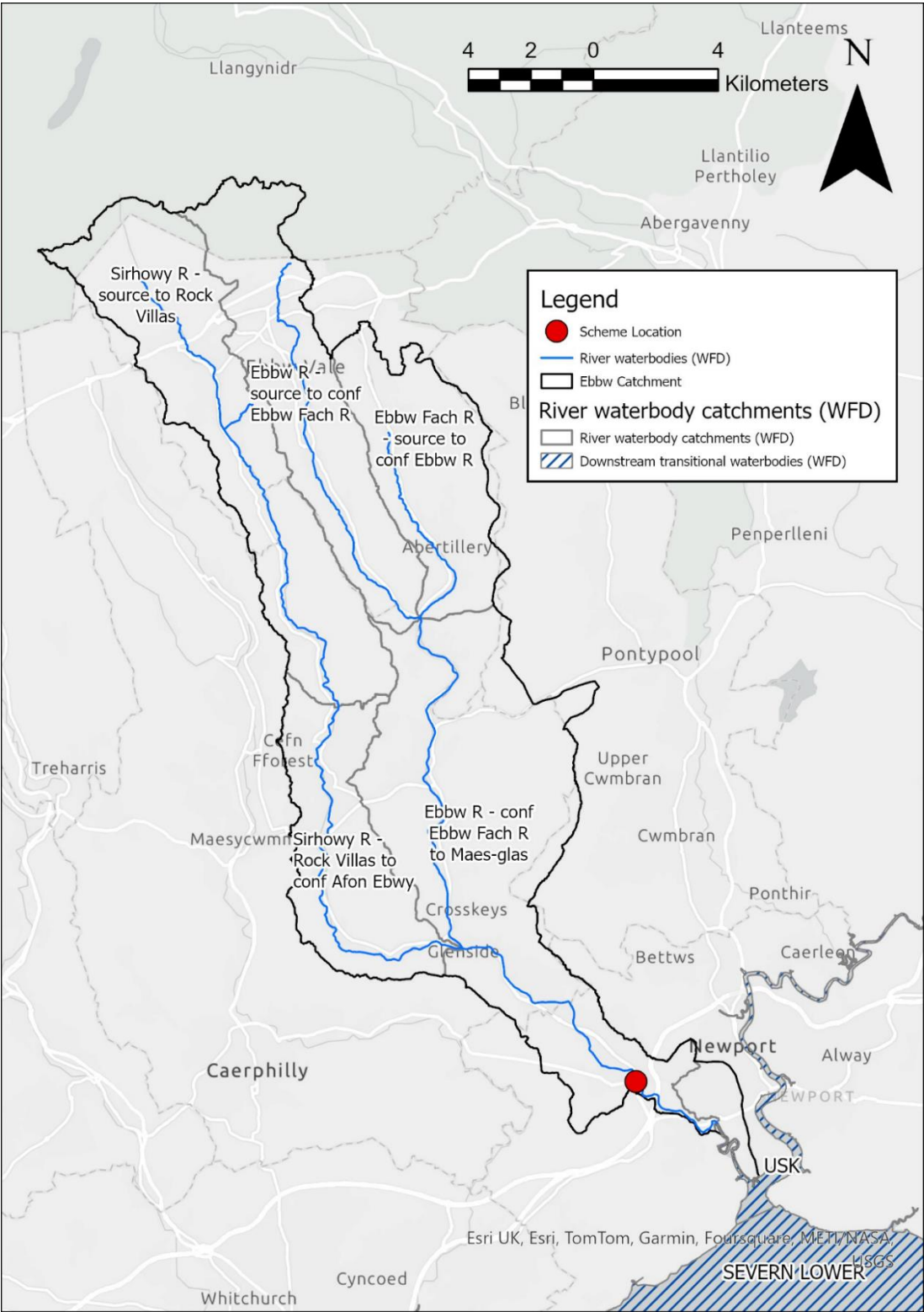
- No predicted deterioration in water body status
- The proposed development will not prevent the future achievement of Good overall status of the water body.

The WFD assessment summarises key aspects of the site location, existing geomorphology, baseline WFD status of relevant water bodies and identifies water quality elements within these water bodies which may be affected as a result of the Scheme.

1.2 Site background

The Scheme comprises works at Bassaleg, South Wales, through which the River Ebbw flows. The old bridge and the proposed replacement both cross the main channel of the Ebbw. The location of the Scheme relative to the Ebbw catchment is shown in Figure 1.1, and a description of the design, including the proposed method of construction, is provided in Section 4.2. The design includes a bridge replacement 22m upstream from the existing Bassaleg Bridge to facilitate the passage of road and pedestrian traffic. The demolition of the existing road bridge is proposed, as well as construction of a flood bund south of the bridge.

Figure 1.1: Catchment of the River Ebbw, divided into WFD surface water bodies



Source: Mott MacDonald, 2025. Source: NRW, 2025¹. Contains Natural Resources Wales information © Natural Resources Wales and Database Right. All rights Reserved.

¹ NRW, 2025, Water Watch Wales [online] Available at: <https://waterwatchwales-nrw.hub.arcgis.com/> [Accessed: 21/03/2025]

2 Legislation and assessment methodology

2.1 Legislative context

The WFD is originally European legislation which aims to protect and improve the water environment within member states (Table 2:1). Following Britain's exit from the European Union (EU), the WFD was transposed into UK law and therefore continues to apply under new legislation. The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 revoke and replace the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. Natural Resources Wales (NRW) is the statutory body responsible for implementing the WFD in Wales.

The WFD requires that objectives for protecting and improving 'water bodies' are identified and set. Water bodies include rivers, streams, lakes, reservoirs, estuaries, coastal waters, canals and groundwaters. The standard objective is to achieve 'Good status', or 'Good potential' (if the water body is artificial or heavily modified). Further to this, in implementation of the WFD, all water bodies must be prevented from deterioration in status. The original target date for all water bodies to achieve 'Good status' was 2015; however, this can be extended to either 2021 or 2027. Good 'status' or 'potential' is designated based on the assessment of ecological and chemical components in surface waters. Ecological status consists of biological quality elements, physico-chemical supporting elements, and hydromorphological supporting conditions. For groundwater, status consists of quantitative and qualitative elements.

Table 2:1: WFD regulations

Objectives (from Regulation 13 of WFD)	Reference and Description
Surface water	a) Prevent deterioration of status of each surface water b) Protect, enhance and restore each body of surface water (other than an artificial or heavily modified water body) with the aim of achieving good ecological status and good surface water chemical status, if not already achieved, by 22 December 2021 c) Protect and enhance each artificial or heavily modified water body with the aim of achieving good ecological potential and (subject to paragraph, if not already achieved, by 22 December 2021 or 22 December 2027) d) Aim progressively to reduce pollution from priority substances and aim to cease or phase out emissions, discharges and losses of priority hazardous substance
Groundwater	(a) Prevent deterioration of the status of each body of groundwater (b) Prevent or limit the input of pollutants into groundwater (c) Protect, enhance and restore each body of groundwater, and ensure a balance between abstraction and recharge of groundwater, with the aim of achieving good groundwater chemical status and good groundwater quantitative status, if not already achieved, by 22 December 2021 (d) Reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order to progressively reduce pollution of groundwater.

Source: The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017²

²Legislation.gov.uk (ND) The Water Environment (WFD) (England and Wales) Regulations 2017 [online] Available at: <https://www.legislation.gov.uk/uksi/2017/407/regulation/13/made> [Accessed February 2025]

River Basin Management Plans (RBMPs) set out how organisations, stakeholders and communities will work together to improve the water environment. RBMPs report the baseline status of water bodies within each River Basin District (RBD), corresponding to WFD reporting cycles. WFD Cycle 3 Classifications were published in 2019 and have been utilised in this assessment to reflect the status of surface and groundwater WFD water bodies in Cycle 3².

2.2 Assessment methodology

2.2.1 WFD Scoping and Screening

A high-level screening was used to identify WFD water bodies at risk of being impacted by the Scheme. The study area comprised 2km upstream and 10km downstream of the Scheme to account for the potential for impacts in hydraulically connected areas, especially as the River Ebbw discharges into the protected Severn Estuary. Water bodies and protected areas have been screened in or out based on distance from the Scheme and the potential for WFD impacts.

The scoping process outlines if various Scheme activities would affect the screened-in water bodies and pose a risk to the delivery of WFD objectives. If a risk to WFD objectives is identified, the water body is scoped in for further assessment to ensure the works are compliant. If no activities are determined to pose a risk to the water body, it is scoped out.

The scoped in water bodies and activities were assessed in a WFD impact assessment. The assessment considers the types of activities occurring during construction and operation and whether they may pose a risk to the delivery of the WFD objectives, including potential degradation of water body status and inhibiting the delivery of future objectives.

The WFD assessment includes:

- Surface water bodies
- Groundwater water bodies
- Protected areas.

2.2.2 Ecology

For the aquatic ecology baseline assessment (linked to WFD biological quality elements), a desk study has been undertaken using open source data collected from NRW³ and NBN Atlas Wales⁴ online record systems. The search consisted of macroinvertebrate, macrophyte (aquatic plant) and fish data within a 2km buffer of the Scheme plus an additional search within a 10km buffer to identify any migratory fish species, protected aquatic species and invasive non-native species (INNS) which may be present in the area. Records from within the last 10 years (2015-2025) were considered most representative of present populations; however, to account for any delay in the updating of online record databases, records from 2014 were also considered relevant.

A specific aquatic habitat walkover survey has not been undertaken at the time of writing. Site visits were conducted on 5 August 2024 and 24 October 2024 by an ecologist and a civil engineer. From these survey photographs, inference on aquatic habitats likely present within the survey area were made. Information on channel characteristics and substrates were taken from the Geomorphological Report included in Appendix C.

³ NRW, 2025. DataMapWales [online] Available at: <<https://datamap.gov.wales/>> [Accessed 14 February 2025].

⁴ NBN Trust (2025) The National Biodiversity Network (NBN) Atlas. <https://ror.org/00mcxye41>. [Accessed 17 February 2025].

2.2.3 Sources of information

The following public sources of information were utilised in this study:

- National River Flow Archive (NRFA)⁵
- Water Watch Wales Map Gallery¹
- Water Watch Wales 2024 WFD C3 Classification Data⁶
- OS Maps⁷
- National Library of Scotland Historic Maps⁸
- The British Geological Survey (BGS) Geology of Britain Viewer⁹
- Department for Environment Flood & Rural Affairs (DEFRA) Magic Map¹⁰
- Flood and Coastal Erosion Maps¹¹
- Soilscales Viewer¹²
- National Biodiversity Network (NBN) Atlas¹³
- NBN Atlas Wales⁴

2.2.4 Limitations and assumptions

This assessment has been completed as per design information and construction assumptions from August 2025. Any significant changes would require an update to the assessment.

No 'Construction Environmental Management Plan' (CEMP) is currently available. It is assumed a CEMP will be produced closer to the commencement of construction works, when more detailed construction methodology is available.

No specific aquatic ecology surveys have been undertaken; given the information available, this is considered sufficient to understand potential impacts from the Scheme as it relates to this WFD assessment.

2.2.5 Report structure

The report is split into the following sections supported by appendices.

- Section 1: Introduction – explains the purpose of the report and the scope of works.

⁵ UK Centre for Ecology & Hydrology (ND) Western Cleddau at Prendergast Mill – 61001. [online] Available at: <https://nrfa.ceh.ac.uk/data/station/spatial/56002> [Accessed: September 2024].

⁶ Water Watch Wales 2024 C3 Classification WWW, [online] Available at: <https://cyfoethnaturiolcymru.sharefile.eu/share/view/s0f606be458db4ae9a7888a7d2af29c45> [Accessed January 2025]

⁷ OS Maps, 2024. Bing OS Maps. [online] Available at: <https://www.bing.com/maps?q=maps&FORM=HDRSC7&cp=51.900323%7E-4.958071&lvl=14.4&style=s>. [Accessed: September 2024].

⁸ National Library of Scotland Georeferenced Maps [online] Available at: <https://maps.nls.uk/geo/explore/> [Accessed July 2024]

⁹ British Geological Survey. (2023). [online] Available at: Geology of Britain Viewer. Online Source: <https://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html>. [Accessed: September 2024].

¹⁰ Department of Environment, Food and Rural Affairs (Defra), 2023. [online] Available at: <https://magic.defra.gov.uk/MagicMap.aspx>. [Accessed: September 2024].

¹¹ NRW, 2020. Flood and Coastal Erosion Risk Maps. [online] Available at: <https://flood-risk-maps.naturalresources.wales/?locale=en>. [Accessed: September 2024].

¹² LandIS, 2023. Soilscales Viewer. [online] Available at: <https://www.landis.org.uk/soilscales/>. [Accessed: September 2024]

¹³ NBN Trusts, 2023. [online] Available at: <https://nbnatlas.org/> [Accessed February 2025].

- Section 2: Legislation and assessment methodology – explains the legislative framework for the WFD and the methodology used for the WFD assessment.
- Section 3: Baseline Assessment – summary of the ecological and hydromorphological baseline condition of the catchment. Also includes water bodies screened into the WFD assessment and their baseline conditions.
- Section 4: WFD Scoping – high-level assessment of how Scheme activities will affect WFD objectives, including the need for mitigation and further assessment.
- Section 4.4: WFD Impact Assessment – outlines potential impacts of the Scheme, the proposed mitigation and risks to water bodies that could result in WFD deterioration.
- Section 6: Conclusions – summary of the WFD assessment and final conclusions
- Appendix A: Aquatic ecology supporting information
- Appendix B: Heavily modified water body mitigation measures
- Appendix C: Geomorphology Report

3 Baseline assessment

3.1 Overview

The River Ebbw is a WFD watercourse that originates in Bannau Brycheiniog and flows through the valley towns of Ebbw Vale, Abertillery, and Newbridge before reaching Newport where it joins the tidally influenced reach for the River Usk. The Scheme lies within the 'Ebbw River – conf Ebbw Fach River to Maes-glas' (GB109056026910) WFD water body, which is labelled in Figure 1.1.

3.1.1 Catchment context and land-use

The 'Ebbw R - conf Ebbw Fach R to Maes-glas' WFD water body catchment is 196 km² and is characterised by mixed land use with upland heath in the northern elevated regions and grasslands and urban developments in the valleys¹⁴.

The urban developments in the valleys follow the river pathway and form a mostly continuous urban/suburban land use surrounding the River Ebbw and its tributaries. The urban areas are surrounded and occasionally separated by moors and heathland, broad-leaved forest and coniferous forest⁷. The land use has been heavily influenced by the industrial revolution with the opening of the Ebbw Vale Steelworks and the associated coal mining in the surrounding valleys. Large areas have been redeveloped following the decline of the mining and steel industries, but the industrial past still has an important impact on the landscape⁸.

3.1.2 Geology and soils

British Geological Survey (BGS)⁴ data indicates that the bedrock geology of the lower catchment mainly comprises very low permeability sedimentary bedrock (Devonian mudstones and sandstones). Conversely, the catchment upstream from Risca at ST2342391128 primarily comprises Carboniferous sandstones, mudstones, and siltstones which are recorded as having moderate permeability. Included within these rocks are a number of coal measures, which were extensively mined from the 18th to 20th centuries.

Superficial deposits within the lower catchment mostly include Quaternary alluvium (clay, silt, and gravel) adjacent to the river. Quaternary head (clay, silt, and gravel) and glaciofluvial (sand and gravel) deposits become more prevalent upstream. Devensian till (diamicton) occurs away from the river corridor. The superficial aquifer designation below the site is classified as unproductive, while the bedrock aquifer is classified as Secondary A.

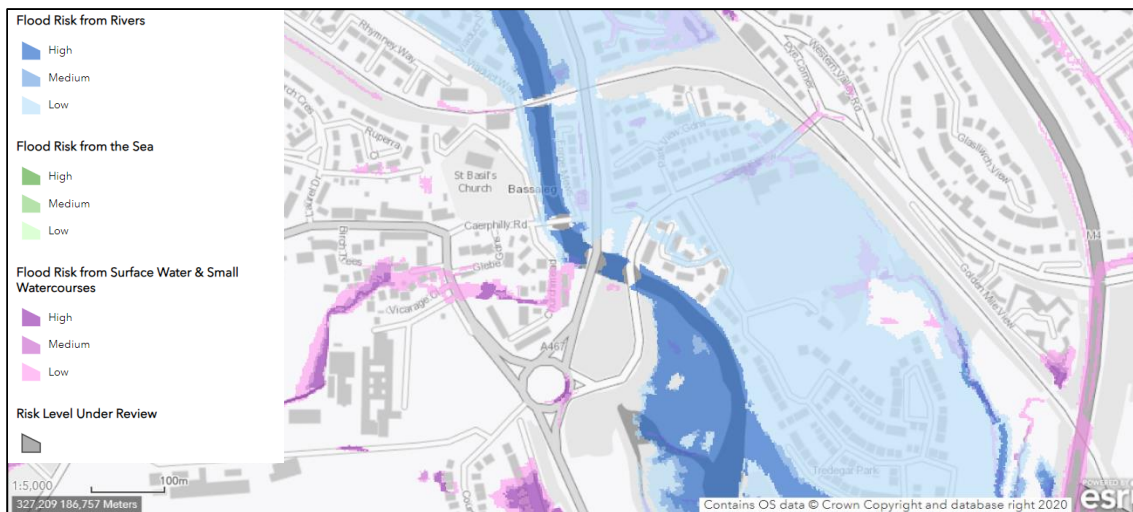
The Soilscales Viewer¹² illustrates that the predominant soil type upstream and downstream are freely draining floodplains, which graduate into slightly acid loamy and clayey soils with impeded drainage in the surrounding areas.

3.1.3 Flood risk

The Scheme lies in a 'high' fluvial flood risk zone¹¹ which extends ~15m from the River Ebbw. The area is at risk of flooding primarily from the Ebbw, with some risk from draining tributaries. A 'high' flood risk means that the area has a chance of flooding greater than 3.3% each year. Flood risk areas are shown in Figure 3.1.

¹⁴ NRFA Station Data for 56002 – Ebbw at Rhiwderin [online] Available at: <https://nrfa.ceh.ac.uk/data/station/info/56002> [Accessed July 2024]

Figure 3.1: Flood Risk zones adjacent to the study area



Source: NRW, 2025¹¹. Data sources are listed inset.

3.1.4 Hydrology

The nearest NRFA station at Rhiwderin lies 3.06km upstream of the scheme and records a catchment 216km² in size. The base flow index (BFI) of 0.55 indicates a moderate-to-high base flow component. The river's median annual flood flow (QMED) is 106m³/s, with a mean flow of 7.416m³/s, and a Q95 of 1.324m³/s. The largest recorded flow event in the digital archive was on 16 February 2020, where the flow reached 197.6m³/s, with a stage of 3.089m.

3.1.5 Geomorphology

A Geomorphology Report (Appendix C) was undertaken to support the replacement bridge optioneering. The geomorphology of the River Ebbw 500m upstream and downstream was assessed during a site visit to the area on 14 October 2024.

Following the site visit, the River Ebbw was characterised as naturally being an active meandering river, but now heavily confined and constrained by recent and historic development within the study area. The river faces continued anthropogenic pressure due to floodplain disconnection and pollution. The study area is in a straightened reach where the surrounding floodplain has been built upon and disconnected from the river itself. The channel appears to have been narrowed, possibly associated with the road on the right bank. This reduces right bank flooding while concentrating the stream energy through the confined section at the bridge crossing, potentially contributing to the existing bridge's instability.

Bank/bed protection is visible along the river reaches assessed, including rip-rap, walls, and concrete beds. There is also a historic weir immediately downstream of the bridge, that looks to be in poor condition.

The historic weir acts as a grade control reducing bed gradient upstream. This causes some upstream impoundment but also reduces stream energy and helps to moderate scour and erosion through the bridge, mitigating some of the impacts of the confinement and straightening. However, the extensive bed/bank protection and reduced longitudinal connectivity may be limiting sediment supply and risks of sediment starvation and channel incision are particularly heightened near the bridge proposed under the Scheme.

3.1.6 Ecology

3.1.6.1 Aquatic habitats – site observations

A specific aquatic habitat walkover survey has not been undertaken at the time of writing. Site visits were conducted on 5 August 2024 and 24 October 2024 by an ecologist and a civil engineer. From these survey photographs, inference on aquatic habitats present within the survey area were made by a freshwater ecologist. Information surrounding channel characteristics and substrate is taken from the Geomorphological Report (Appendix C). Details are of features relevant to aquatic ecology are presented in Table 3.1 below.

Table 3.1: Details of aquatic habitats within survey area

Feature ID	Feature type	NGR	Description and ecological significance	Photograph
1	Modification	ST 27800 87223	Downstream view of River Ebbw. Large arched bridge present with supports in-channel, reinforced banks, and concrete on the bed below the bridge. Modification may locally reduce habitat availability for aquatic communities.	
2	Habitat feature	ST 27806 87207	Woody debris noted within the channel. Where woody debris is present in-channel this may create flow diversity that supports fish community diversity.	
3	General character	ST 27807 87194	The substrate was observed to be a mixture of sand and silt with some pebble and cobble. The flow type was mostly glide. Riparian vegetation includes grassland and scrub on both banks. The invasive species Japanese knotweed (<i>Fallopia japonica</i>) and Himalayan balsam (<i>Impatiens glandulifera</i>) were noted.	
4	Modification	ST 27813 87117	Modified stone banks noted on both eastern and western extent of the channel. Overhanging vegetation was present, which may provide cover for fish.	

Feature ID	Feature type	NGR	Description and ecological significance	Photograph
5	Modification	ST 27857 87057	Large arched bridge was present over the channel, with reinforced banks that constrict flow. This likely creates a flow increase that affects habitat diversity in this area.	
6	Modification	ST 27830 87036	Pipe present, running adjacent to bridge (feature 5) and into the ground, with channel banks heavily modified (reducing riparian habitat diversity).	
7	Modification	ST 27854 86993	Large concrete weir with fast flows. Both banks reinforced with concrete. The weir may restrict fish passage upstream. Outfall pipe noted on the eastern bank which may be a potential source of pollution/runoff into the channel.	
8	Modification	ST 27933 86965	Large bridge was present with reinforced banks constricting flow. Banks approximately 6m high. The substrate was observed to be cobble with occasional larger boulders.	
9	General character	ST 27946 86961	Channel was wider and substrate was predominantly cobble and pebble with some boulders. Overhanging vegetation was present along the banksides. Substrate diversity may support spawning fish.	
10	Modification	ST 28390 86670	Bridge with pipe running adjacent. In-river bridge supports present which may affect flow types and habitats present.	

Feature ID	Feature type	NGR	Description and ecological significance	Photograph
11	General character	ST 28435 86634	Modified stone banks on the western bank. Cobble and pebble substrate was observed, with some boulders present. Habitats include riffle, runs, glides and pools. Flow diversity likely provides suitable fish habitat. Motorway bridge present downstream.	

Source: Mott MacDonald, (2024; 100119581-MG01), and Mott MacDonald, 2025.

3.1.6.2 Aquatic ecology desk study

Fish

Two NRW fish monitoring sites were identified within the study area. Details of these are presented in Table A.5.

The fish community identified within the catchment comprised bullhead (*Cottus gobio*), European eel (*Anguilla anguilla*), brown/sea trout (*Salmo trutta*), lamprey (*Lampetra* sp.) and Atlantic salmon (*Salmo salar*). This community is indicative of a fast-flowing river community which includes species that spawn on a coarse substrate (such as gravel). An overview of protected fish species identified within the study area are presented within in Table A.6. In addition to the protected species shown, two records of stone loach (*Barbatula barbatula*) were also returned within the last 10 years. Therefore, the fish community is considered a predominantly salmonid¹⁵ community, with additional migratory species and smaller species also present. Impact pathways to migratory fish species have been considered within the Habitat Regulations Assessment (HRA)¹⁶.

Macroinvertebrates

No records of protected or notable aquatic macroinvertebrates were identified within the study area.

Macrophytes and phytobenthos

No records of protected or notable aquatic macrophyte and phytobenthos species were identified within the study area.

Invasive species

Twelve INNS were identified within 2km of the Scheme boundary. Of these, six were WFD UKTAG High Impact species, including water fern (*Azolla filiculoides*) and Japanese knotweed (*Reynoutria/Fallopia japonica*). Details of INNS recorded within the study area are presented in Table A.7.

¹⁵ Fish of the family Salmonidae, such as brown/sea trout (*Salmo trutta*), which typically require coarse substrate for spawning and high dissolved oxygen for survival of eggs and fry.

¹⁶ Mott MacDonald (2025). Bassaleg Bridge Habitats Regulations Assessment. 100119581-MMD-XX-XX-RP-EC-0002

3.2 WFD Screening

3.2.1 Surface water bodies

The WFD screening assessment's study area considers water bodies 10km downstream from the Scheme, and water bodies 2km upstream. The 'Ebbw R - conf Ebbw Fach R to Maes-glas' intersects the Scheme. The 'USK' transitional water body, which includes the tidal area of the River Ebbw, lies 4.5km downstream from the Scheme. The 'SEVERN LOWER' is 7.4km downstream from the Scheme. A summary of the WFD baseline status for these water bodies is provided in Table 3.2, with the WFD screening decisions outlined in Table 3.3. For water bodies that are considered Heavily Modified Water Bodies (HMWB) due to human modifications to the river, ecological potential is assessed instead of ecological status. No lakes or canals were proximal to the Scheme.

WFD water bodies are presented in Figure 1.1.

Table 3.2: WFD baseline summary of surface water bodies within the study area

WFD water body	Water body category	Distance from the site	Overall status	Ecological potential	Chemical status	Heavily modified designation
Ebbw R - conf Ebbw Fach R to Maes-glas GB109056026910	River	Intersecting	Moderate	Moderate	Moderate	HMWB
USK GB530905415404	TrAC	4.5km downstream	Moderate	Moderate	High	HMWB
SEVERN LOWER GB530905415401	TrAC	7.4km downstream	Moderate	Moderate	Moderate	HMWB

Source: NRW, 2025⁶

Table 3.3: WFD screening assessment of surface water bodies

Water body name	Classification	Location	Screened-in/out?
Ebbw R - conf Ebbw Fach R to Maes-glas GB109056026910	WFD classified river	The Scheme directly intersects the Ebbw in Bassaleg.	In – The Scheme directly intersects the River Ebbw. Therefore, the Scheme could impact this water body.
USK GB530905415404	WFD TrAC	The confluence of the River Ebbw and Usk is approximately 4.5km downstream from the Scheme.	In (construction only) – It is not anticipated that the operation of the Scheme will directly impact this water body. However, impacts during construction may have the potential to impact it.
SEVERN LOWER GB530905415401	WFD TrAC	This transitional water body begins 7.4km downstream of the Scheme.	In (construction only) – It is not anticipated that the operation of the Scheme will directly impact this water body. However, impacts during construction may have the potential to impact it.

Source: NRW, 2025⁶

3.2.2 Groundwater bodies

The baseline classifications for the WFD ground water bodies within the study area are displayed in Table 3.4. Given the pathway to potential effect through underground impermeable inhibitors to groundwater flow, the SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone water body was initially screened in.

Table 3.4: WFD baseline summary of intersecting groundwater bodies

WFD water body	Distance from the site	Overall status	Quantitative Status	Chemical status	Screened-in/out?
SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone GB40902G201500	Intersecting	Good	Good	Good	In – The Scheme may require some excavation or other below ground work. The groundwater body is therefore screened-in due to the potential for the Scheme to impact this groundwater body.

Source: NRW, 2025⁶

3.2.3 Protected Areas

There are no protected areas directly within the Scheme boundary, this includes Nitrate Vulnerable Zones (NVZs), Drinking Water Protected Areas (DWPAs), Special Protection Areas (SPAs), Sites of Special Scientific Interest (SSSIs), RAMSAR Sites, and Special Areas of Conservation (SACs).

Within the wider study area, the downstream transitional water bodies, USK and SEVERN, lie within the Severn Estuary (Wales) SAC, SPA and Ramsar designated areas. This area is heavily protected, and as migratory fish will spawn upstream from these protected areas, this constitutes a potential pathway for effect. It is not anticipated that the permanent presence of the Scheme will impact this water body. However, impacts during construction may have the potential to impact designated receptors associated with these sites.

3.3 WFD Baseline

This section outlines the baseline conditions for screened-in water bodies.

3.3.1 Classifications

The 2024 Cycle 3 baseline status for the 'Ebbw R - conf Ebbw Fach R to Maes-glas' (GB109056026910) is outlined in Table A.1 within Appendix A.1. The data indicates that the overall baseline ecological potential for this WFD water body is 'Moderate'. The water body is identified as a HMWB and has a target to achieve Good Ecological Potential (GEP) by 2027. The Mitigation measures element is currently classified as 'Moderate or Less'. The hydrological regime and chemical Priority hazardous substances elements are also classified as Moderate.

The 2021 Cycle 3 baseline status for the 'SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' is outlined in Table A.2. Data within Table A.2 indicates that the overall baseline overall status for this WFD water body is 'Good'.

The baseline classifications for the 'USK' and 'SEVERN LOWER' are presented in Table A.3 and Table A.4. The overall and ecological classifications of both water bodies are 'Moderate' status; the 'USK' has a 'Good' chemical status compared to the 'Moderate' status of the 'SEVERN LOWER'. While the 'USK' only achieves less than 'Good' for the mitigation measures assessment, the 'SEVERN LOWER' achieves less than good in the mitigation measures assessment, invertebrates, mercury, and polyaromatic hydrocarbons.

3.3.2 Reasons for not achieving good status (RNAG)

The RNAGs for the water bodies within the study area are listed in Table A.8 in Appendix A.3. Anthropogenic influences on the hydrological regime currently prevent the River Ebbw from achieving an overall classification of Good. Despite RNAGs and classification years both being labelled as 2021, disparity exists between the classification elements assigned RNAGs, and the classification elements with a 'less than Good' classification in the 2021 Cycle 3 assessment.

3.3.3 HMWB mitigation measures

The 'Ebbw R - conf Ebbw Fach R to Maes-glas' is a Heavily Modified Water Body (HMWB) because of flood protection and urbanisation. This indicates the water body is required to achieve Good Ecological Potential rather than Good ecological status under WFD.

Accordingly, there are several mitigation measures assigned to the water body by NRW. Currently (under RBMP Cycle 3, 2021), HMWB mitigation measures assessment is classified to be 'Moderate'.

4 WFD Scoping

4.1 Overview

The Scheme (as described in Section 1.2) comprises direct works to the River Ebbw. The Scheme activities therefore pose a potential risk to water bodies and require WFD assessment.

Section 3 identified the water bodies that could potentially be impacted by the Scheme. This section assesses if any works would result in effects to the screened in water bodies and pose a risk to delivery of the WFD objectives.

4.2 Scheme activities

The Scheme includes an upstream bridge replacement approximately 22m upstream of the old, decommissioned Bassaleg Bridge. The scheme is currently at the detailed design stage and all design details are taken from the design information and construction assumptions from August 2025, and planning drawings completed in June 2025 and appended in Appendix D.

4.2.1 Construction

The proposed construction activities relevant to the WFD assessment are summarised as follows:

- Installation of cofferdams on the River Ebbw for a dry working area.
- Excavation and disturbance of river bed and banks.
- Use of plant equipment within the river channel and riparian zone.
- Use of temporary structures within the river channel including pilling, cofferdams, scaffolding
- Abstraction and/or dewatering.
- Demolition of the existing Bassaleg Bridge.

A summary of the activities and their potential impacts, mitigation assumed for the Scheme and overall risk to WFD objectives are detailed in Table 4.1.

Further detail concerning the construction methodology does not yet exist to avoid constraining the contractor.

4.2.2 Permanent features of the Scheme

The permanent presence of the Scheme consists of a new single-span reinforced concrete bridge to replace the existing Bassaleg Bridge. Drawings displaying the location and general arrangement are located in Appendix D.

The new bridge will be more 'open' than the existing bridge with a wider cross-sectional span and height. The aperture of the new bridge (70m²) is larger than the existing bridge (48m²). The abutment's encroachment is approximately 2.5m, and the resultant span will still be greater than what currently exists. The new bridge will have a similar transverse width (12.8m) to the existing bridge (13.2m).

Bed scour protection (riprap) will be installed across a ~50m total stretch of the River Ebbw upstream and downstream of the Scheme, with the riverbed reinstated above. There will be blockstone bank protection stretching ~48m on the right bank and ~30m on the left bank. The blockstone will largely replace existing blockstone upstream from the Scheme, and replace the site of the old, decommissioned bridge downstream from the bridge.

Some riparian vegetation will be permanently removed as a result of the Scheme. Five intersecint the bridge proposed under the Scheme will need to be removed. Also, the blockstone that will be replaced includes established vegetation that may require removal. There will also be limited new blockstone where there is currently natural bank.

A floodwall will be installed south of the bridge near the existing weir to protect the local residential area. It will be set back from the river, c.5m at its closest point, for a length of c.40m with backfill. It is designed to withstand up to a 1-in-200-year event.

The assessment presumed the demolition of the old, decommissioned bridge.

4.3 WFD scoping assessment

4.3.1 Construction phase scoping assessment

The proposed construction activities are outlined in Section 4.2.1. These include activities directly within existing watercourses with pathways to surface water, protected areas, and groundwater bodies. These risks are outlined in Table 4.1, alongside the decision to scope each activity in or out.

Limited construction stage methodology currently exists, particularly surrounding the demolition of the existing bridge. The scoping assessment and subsequent mitigation considers all feasible impacts as a result of the high-level details provided. Production of a CEMP when more details are available, will assess the detailed construction methodology to minimize the risk of releasing pollutants or adversely affecting local receptors in particular fish.

During construction, it is anticipated for the capable contractor to manage their work according to best practice measures including:

- EA Pollution Prevention Guidance (PPG), specifically PPG5 'Works and maintenance in or near water' and 'PPG6 'Working at Construction and Demolition Sites' (Note: The EA PPGs were formally withdrawn on 17 December 2015 but represent good practice advice).
- CIRIA Environmental good practice on site guide (C741)¹⁷.
- A Construction Environmental Management Plan (CEMP) and/or method statement will be in place to appropriately manage the risks stated above.
- An Invasive Non-Native Species Management Plan will be developed to prevent the spread of invasive species as a result of the Scheme.

Specific groundwater mitigation required during the construction phase will include:

- CIRIA Groundwater control: design and practice (CIRIA, 2016)¹⁸
- EA groundwater protection technical guidance¹⁹
- CIRIA The design and construction of sheet-piled cofferdams (CIRIA, 1993)²⁰

¹⁷ CIRIA, Environmental good practise on site [online] Available at:
https://www.ciria.org/CIRIA/Training/Training_courses/Environmental_good_practice_on_site.aspx,
[Accessed November 2024]

¹⁸ CIRIA, Groundwater control: design and practice (second edition) (C750) [online] Available at:
https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductcode=C750&Category=BOOK [Accessed August 2024]

¹⁹ Environment Agency, Groundwater protection technical guidance [online] Available at:
<https://www.gov.uk/government/publications/groundwater-protection-technical-guidance> [Accessed August 2024]

²⁰ CIRIA, The design and construction of sheet-piled cofferdams,
<https://www.ciria.org/ItemDetail?iProductCode=SP95&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91> [Accessed June 2025]

Table 4.1: WFD construction phase scoping assessment

Construction phase activity	Receptors affected	Potential impact	Mitigation	Overall WFD Risk
Contaminants from construction activities entering surface watercourses through excavation, deposition of soils, sediments, or other construction material. Spillage of fuels or other contaminating liquids. Mobilisation of contamination following disturbance of ground or groundwater, or through uncontrolled surface runoff.	– Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910) – Severn Estuary (Wales) – USK GB530905415404 – SEVERN LOWER GB530905415401 – SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone (GB40902G201500)	Potential minor, localised effects on physico-chemical quality elements. Temporary deterioration in surface water quality and channel substrate. Potential minor, localised effects on biological quality elements. Invertebrate, macrophyte, and fish habitat may also be affected, Potential localised effects on chemical status elements (GW). Potential contamination into groundwater may adversely affect groundwater chemical status.	No discharge of contaminated water will be permitted. An environment permit will be sought from the NRW before construction commences. Contaminated water that cannot be treated on site will, if necessary, be pumped to a suitably licensed tanker before being exported offsite for treatment at an appropriately permitted facility. To prevent debris being transported downstream in-case of any accidental spillage of contaminated water, silt curtains will be used in-channel. An Ecological Clerk of Works (ECoW) should be present on-site during construction to oversee the management of any new risks and ensure mitigation measures are followed. Follow best practice as outlined in 4.3.1.	No further mitigation measures will be required for other aspects of the construction methodology provided best practice mitigation is implemented at the construction stage. Potential impacts on physico-chemical quality elements are expected to be minor, localised, and temporary.
Excavation and disturbance of river bed and banks including construction noise, vibration, dust, lighting, temporary access to walls, use of sandbags and construction of scaffolding.	– Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910) – SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone (GB40902G201500)	Potential minor, localised effects on hydromorphological supporting elements. Localised changes to groundwater flow paths and/or quantities. Potential localised effects on biological quality elements. Temporary disturbance to fish migration and in-channel bedforms and habitat. Temporary, localised disruption to flow dynamics	Ensure that in-channel dewatering and construction work avoid the spawning period of salmonids, lamprey, and bullhead (October to May inclusive). Other works liable to cause disturbance to migrating salmonids through noise/vibration must avoid the salmonid migration/spawning season (September to March inclusive). A slow-start up period should be included for any noisy works likely to disturb fish, to allow fish to move away from the area. Dewatering activities are likely to require a fish rescue by trained surveyors. During construction works a navigable channel for fish must be maintained at all times. Two-thirds of the channel must be maintained and up to one-third can be blocked at any time. Ensure any disturbed bed and bank material is reinstated following construction, allowing for regeneration and	No further mitigation measures will be required for other aspects of the construction methodology provided best practice mitigation is implemented at the construction stage.

Construction phase activity	Receptors affected	Potential impact	Mitigation	Overall WFD Risk
		and deterioration in surface water quality. Localised temporary loss of habitat for fish, macroinvertebrates, and macrophytes. Disruption of possible fish-spawning habitat	recolonisation of aquatic habitats. This material must be an equivalent size to present. An ECoW should be present on-site during construction to oversee the management of any new risks and ensure mitigatory measures are followed. Follow best practice as outlined in Section 4.3.1.	
Movement of plant equipment within the riparian zone.	– Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910) – Severn Estuary (Wales) – USK GB530905415404 – SEVERN LOWER GB530905415401	Potential minor, localised effects on hydromorphological supporting elements. Potential temporary disruption to flow on immediate floodplain during out-of-bank flood conditions deriving from disruption to riparian vegetation, including trees. This is expected to be very localised and rare. Potential minor, localised effects on physico-chemical quality elements. Temporary deterioration in surface water quality and changes to channel substrate deriving from disruption to riparian vegetation, including trees.	Tree protection measures including installation of temporary protective barrier, plywood boxes to physically protect tree trunks, and ground protection will be required to protect retained trees in close proximity to construction operations.	No further mitigation measures will be required for other aspects of the construction methodology provided best practice mitigation is implemented at the construction stage.
Use of plant machinery within the river channel.	– Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910) – Severn Estuary (Wales) – USK GB530905415404 – SEVERN LOWER GB530905415401	Potential minor, localised effects on hydromorphological supporting elements. Temporary deterioration of in-channel bedforms. Temporary, localised disruption to flow dynamics.	Ensure that in-channel dewatering and construction work avoid the spawning period of salmonids, lamprey, and bullhead (October to May inclusive). During construction works a navigable channel for fish must be maintained at all times. Two-thirds of the channel must be maintained and up to one-third can be blocked at any time.	No further mitigation measures will be required for other aspects of the construction methodology provided best

Construction phase activity	Receptors affected	Potential impact	Mitigation	Overall WFD Risk
		Potential minor, localised effects on physico-chemical quality elements. Temporary deterioration in surface water quality.	An ECoW should be present on-site during construction to oversee the management of any new risks and ensure mitigatory measures are followed. Dewatering activities are likely to require a fish rescue by trained surveyors.	practice mitigation is implemented at the construction stage.
		Potential minor, localised effects on biological quality elements. Potential temporary disturbance to fish passage and spawning.		
Temporary channel diversion with cofferdams to facilitate construction.	– Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910)	Potential minor, localised effects on hydromorphological supporting elements. Temporary change to the hydromorphological regime as channel is narrowed by sheet pile cofferdam. See section 5.1.1 for a summary of hydraulic modelling results. Risk will be localised with all change in velocity limited to the area surrounding the bridge for any design event, and changes at the bridge are not determined to pose a risk to WFD objectives. Potential minor, localised effects on physico-chemical quality elements. Sediment release from engineering works affecting physico-chemical quality elements and hydromorphological regime.	To minimise changes in flow patterns, reduction in channel capacity, and increases in velocity, cofferdams on the right and left bank will be sequenced to not occur concurrently. Cofferdams should be installed during summer where average flows will be lower. Silt management measures will include silt curtains to prevent the transport of silt downstream. The work area must never be de-watered directly into the River Ebbw or other surface water. Ensure that in-channel dewatering and construction work avoid the spawning period of salmonids, lamprey, and bullhead (October to May inclusive). During construction works a navigable channel for fish must be maintained at all times. Two-thirds of the channel must be maintained and up to one-third can be blocked at any time. An ECoW should be present on-site during construction to oversee the management of any new risks and ensure mitigatory measures are followed. Dewatering activities are likely to require a fish rescue by trained surveyors.	No further mitigation measures will be required for other aspects of the construction methodology provided best practice mitigation is implemented at the construction stage. Effects on the hydromorphological regime and dynamics of flow have been shown to be minor, localised, and temporary. Provided all proportional mitigation and best practice

Construction phase activity	Receptors affected	Potential impact	Mitigation	Overall WFD Risk
		Potential minor, localised effects on biological quality elements. The temporary disturbance to the channel substrate associated with excavation and diversion using cofferdams, has the potential to be a detriment to fish and spawning activity. There is potential for temporary, minor, localised impacts on macroinvertebrates, macrophytes and phytobenthos however only limited sedimentation impact is expected. Therefore, there it is considered unlikely that the scheme would impact these elements, if appropriate mitigation and best practice measures are followed. Works have the potential to spread INNS, if present within the work area. No mechanism for the scheme to impact these if appropriate biosecurity measures are in place.		measures are adhered to, it is anticipated that the Scheme would be WFD compliant.
Dewatering and rewatering cofferdams	Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910)	Potential minor, localised effects on hydromorphological supporting elements. Sudden dewatering and rewatering may have the	The area must be re-watered before removal of the cofferdam to minimise the erosion caused by the sudden influx of water. Ensure that in-channel dewatering and construction work avoid the spawning period of salmonids, lamprey, and bullhead (October to May inclusive).	No further mitigation measures will be required for other aspects of the construction

Construction phase activity	Receptors affected	Potential impact	Mitigation	Overall WFD Risk
		potential to mobilize sediment and cause erosion. Potential minor, localised effects on biological quality elements. Wildlife may pass through the pump used for rewatering, constituting a detriment to fish, macroinvertebrates, macrophytes, and phytobenthos.	During construction works a navigable channel for fish must be maintained at all times. Two-thirds of the channel must be maintained and up to one-third can be blocked at any time. Pumps must be screened with a mesh to ensure that fish are not entrained in the pump. Dewatering activities are likely to require a fish rescue by trained surveyors.	methodology provided best practice mitigation is implemented at the construction stage. Effects on the hydromorphological regime and biological classification elements have been shown to be minor, localised, and temporary. Provided all proportional mitigation and best practice measures are adhered to, it is anticipated that the Scheme would be WFD compliant.
Bridge demolition	– Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910)	Potential minor, localised effects on hydromorphological supporting elements. Depending on the methodology used to deconstruct Bassaleg Bridge, there may be alterations to the hydrological regime, particularly if temporary in-river structures are required	The construction methodology will ensure no debris or pollution will enter the water as a result of the Scheme, and there will be no night-time lighting above existing levels. Silt-curtains downstream of the river, and adherence to EA PPG5 'Works and maintenance in or near water' and 'PPG6 'Working at Construction and Demolition Sites' will minimize the risk of particulate matter entering the river. Ensure that in-channel dewatering and construction work avoid the spawning period of salmonids, lamprey, and bullhead (October to May inclusive).	No further mitigation measures will be required for other aspects of the construction methodology provided best practice mitigation is implemented at

Construction phase activity	Receptors affected	Potential impact	Mitigation	Overall WFD Risk
		to support the bridge demolition. Potential minor, localised effects on physico-chemical quality elements. Demolition methodology may mobilise sediment or otherwise impact physico-chemical quality elements. Concrete particulate matter may be discharged into the River Ebbw during construction of the bridge, adversely impacting the physico-chemical status of the river. Potential minor, localised effects on biological quality elements. Potential impact on local vegetation and ecology depending on demolition methodology.	During construction works a navigable channel for fish must be maintained at all times. Two-thirds of the channel must be maintained and up to one-third can be blocked at any time. In addition, a fish rescue is likely to be required when dewatering any watercourse. During works, pollution prevention measures must be used to avoid any surface run-off reaching the river channel, which may negatively impact protected species through water quality changes. Measures must prevent any release of sediment which could smother coarse substrates and reduce the suitability of these habitats for spawning fish and macroinvertebrate species, drawing on best practice pollution prevention guidance and avoiding working during periods of high flow. Biosecurity measures must be implemented during works and as part of the Scheme design and construction, in order to prevent any introductions or spread of INNS or aquatic pathogens from contaminated equipment.	the construction stage. Effects on the hydromorphological regime and dynamics of flow have been shown to be minor, localised, and temporary. Provided all proportional mitigation and best practice measures are adhered to, it is anticipated that the Scheme would be WFD compliant.

The potential construction impacts on the 'Ebbw R - conf Ebbw Fach R to Maes-glas', USK, SEVERN LOWER, SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone and Severn Estuary protected areas are expected to be limited through adherence to best practice mitigation. Assuming the implementation of mitigation, construction activities will have no permanent impacts at the water body scale on any screened in receptors. Construction impacts are therefore scoped out of further WFD compliance assessment.

4.3.2 Operational phase scoping assessment

Table 4.2, and Table 4.3 include the WFD scoping assessment of the Scheme's operational (permanent) impacts on all surface water and groundwater receptors.

The Scheme activities with the potential to impact the screened in receptors are:

- Bridge drainage.
- Scour protection.
- The bridge.
- The abutment on the right bank.
- Existing bridge no longer existing.

Due to negligible potential impacts, permanent effects on groundwater have been scoped out.

Table 4.2: WFD scoping assessment for the Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910) surface water body

Activity	Potential effects to any WFD quality elements?	Mitigation	Overall WFD risk?
Bridge drainage	Potential minor, localised effects on physico-chemical quality elements. Road drainage has the capacity to increase the load of sediment, copper, and zinc into the river due to draining impermeable area that receives traffic. The flow of the river, the small area of impermeable drainage, and negligible traffic means such impacts will likely be negligible.	Mitigation of road drainage for the new bridge is not necessary given the negligible risk.	Potential impacts on physico-chemical quality elements are expected to be minor and localised. The operational impact of bridge drainage is not scoped in for further assessment.
Scour protection	Potential minor, localised effects on hydromorphological supporting elements. The Scheme will involve the construction of new scour protection as described in 4.2.2. Scour protection will alter the structure and condition of the riparian zone such that it will become more artificial. This may alter the sediment regime and depending on the nature and dimensions of the scour protection that are currently undetermined, represent a permanent change to the hydromorphology. Potential minor, localised effects on biological quality elements. Artificial banks created to aid scour protection may harm bankside habitat may risk biological quality elements. The bankside blockstone and riprap along the bed will require the permanent removal of some vegetation coverage. This creates a permanent minor, localised risk towards biological quality elements if substrate is not replaced.	Limiting the extent to the smallest area acceptable will limit the effects. It will also minimally encroach into the banks. Downstream remediation surrounding the future decommissioned bridge, which is currently unvegetated and artificial may also offset any localised negative impact. Blockstone will enable vegetation growth to mitigate for the loss of existing vegetation. Substrate overlying riprap will resemble baseline conditions in size.	Further assessment undertaken to determine if there could be any effects on the surface water body which could prevent the achievement of future WFD objectives. To confirm the detail and specific effects of scour protection on hydromorphological elements, further analysis is required as outlined within the impact assessment.
Bridge	Potential localised effects on hydromorphological supporting elements. The cross section of the bridge will begin to constrain flow under a 1 in 30 year event. As well as potentially exacerbating flood risk	The bridge has been designed with the best practice principles to limit the effect on hydromorphological supporting elements. It is clear span with a larger aperture than the existing bridge. The aperture of the new	Further assessment undertaken to determine if there could be any effects on the surface water body which could prevent the achievement of future objectives.

Activity	Potential effects to any WFD quality elements?	Mitigation	Overall WFD risk?
	under such conditions, the continuity of sediment and morphology will also be impacted. Conditions will be similar to the baseline scenario, with flow being slightly less constricted. Five riparian trees will be lost as they will directly intersect the footprint of the bridge. This will create a localised impact. Potential minor, localised effects on biological quality elements. Shading from the new bridge may introduce a minor impact to fish passage and overall habitat. However, the overall risk will likely not increase as the overall length of shaded area will not increase after the decommissioned bridge is demolished.	bridge (70m²) is larger than the existing bridge (48m²), indicating a possible net benefit after the existing bridge is demolished. Site constraints mean some impact to the hydrological regime is unavoidable during high flow events. A 3:1 replanting ratio for removed trees has been established. Whether these trees will be planted on or off site has not yet been decided. If offsite, there will be a minor, localised impact due to the local loss of vegetation. A worst-case scenario of replanting off-site has therefore been assumed.	Further assessment is required to confirm the impact of the bridge on habitat and flow regime, and to assess to loss of riparian vegetation.
Bridge abutment extending into river from right bank	Potential localised effects on hydromorphological supporting elements. The abutment extending into the river will potentially constrict flow. The already straightened and modified nature of the channel immediately downstream due to the weir reduces the sensitivity to changes in hydromorphological regime.	Despite the right bank intrusion, the Scheme will maintain a larger clear span than the existing bridge.	Further assessment undertaken to determine if there could be any effects on the surface water body which could prevent the achievement of future objectives. Further assessment is required to confirm the impact of the intruding abutment and determine suitable mitigation.
Existing bridge removed	Potential localised benefit on hydromorphological supporting elements. The constraints of the current bridge on the hydromorphological regime, including piers set into the river and possible constraints during high flows, will be negated after the bridge's removal. This will create a more natural flow regime, resulting in a localised benefit for the hydromorphological supporting elements. Potential minor, localised benefit on biological quality elements.	The permanent removal of the old bridge is expected to be beneficial, and no mitigation is therefore required.	Potential impacts are expected to be minor and localised. The permanent impacts of existing bridge removal are expected to be beneficial, therefore no further assessment required.

Activity	Potential effects to any WFD quality elements?	Mitigation	Overall WFD risk?
	The impact of shading of the river and artificial banks at the bridge will be negated after its removal.		
Flood Wall	Potential negligible, localised effects on hydromorphological supporting elements. The 40.8m floodwall will disconnected the river from part of its floodplain as part of the Scheme. This is an essential function and cannot be entirely mitigated. The extent of disconnection will be minor, however. The riparian zone may also be impacted by the presence of the wall. The wall will be set back from the river at Churchmead Road, approximately 5m from the River Ebbw at its closest point. This will limit the scale of disconnection. The removal of riparian trees will not be necessary.	Due to the negligible nature of the impact, no further mitigation is deemed necessary.	Potential impacts are expected to be minor and localised. As the extent of disconnection is negligible, no further assessment is necessary to determine potential water body effects.

Table 4.3: WFD operational phase scoping assessment for the SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone water body

Activity	Potential effects to any WFD quality elements?	Mitigation	Overall WFD risk?
Bridge	Potential minor, localised effects on quantitative elements. Bridge piles along the east and west wing walls and abutments will reach a maximum depth of 4.5m. Abutment piles lengths will be 17m long each, while wing wall lengths will be 15m long each. These impermeable piles may negligibly inhibit groundwater flow paths. Due to the small size of the component, however, no impacts are anticipated at a groundwater body scale.	A ground investigation will be undertaken prior to commencement of works below ground to find the minimum viable depth for piles.	Negligible water body effects predicted. No further WFD assessment required.

Activity	Potential effects to any WFD quality elements?	Mitigation	Overall WFD risk?
Scour protection	No potential adverse effects on groundwater quality elements. The blockstone scour protection is largely above ground and will not affect groundwater flows.		No water body effects predicted. No further WFD assessment required.
Flood Wall	Potential minor, localised effects on quantitative elements. An impermeable wall will extend 0.68m below ground level with a length of 40.8m. These intrusive ground works may present a risk of localised changes to groundwater flow paths. Due to the small size of the component relative to the size of the groundwater body, however, no impacts are anticipated on a water body scale.	A ground investigation will be undertaken prior to commencement of works below ground.	Negligible water body effects predicted. No further WFD assessment required.

4.4 Scoping summary

Permanent impacts scoped in for further assessment are detailed below, along with the classification elements.

Table 4.4: Summary of WFD Scoping assessment on the ‘Ebbw R - conf Ebbw Fach R to Maes-glas’ (GB109056026910) surface water body

Design Component	WFD Classification		
	Hydromorphological supporting elements	Physico-chemical quality elements	Biological quality elements
Bridge drainage	Scoped out	Scoped out	Scoped out
Scour protection	Scoped in	Scoped out	Scoped in
Bridge	Scoped in	Scoped out	Scoped in
Bridge abutment extending into river from right bank	Scoped in	Scoped out	Scoped out
Existing bridge no longer existing	Scoped out	Scoped out	Scoped out
Flood Wall	Scoped out	Scoped out	Scoped out

No construction phase activities are scoped in for further assessment. No permanent risk to WFD classification or objectives was identified for the screened-in receptors due to construction activities, assuming full compliance with stated mitigation by the contractor in particular around protection of fish migration.

Activities affecting groundwater were also scoped out, due to localised, minor impacts relative to the size of the groundwater body.

5 WFD Impact Assessment

5.1 Additional assessment

5.1.1 Hydraulic modelling

A review of baseline and scheme hydraulic models of the study area under 50%, 1% and 0.1% AEP scenarios has been undertaken in the Geomorphology Report (Appendix C). All scenarios result in decreased velocities leading up to the bridge and increased velocities downstream. There are minimal predicted changes to river level, peak flow, and velocity further from the bridge, and the impact is localised.

A more detailed review of the changes from the baseline to scheme scenario under three flood events is presented in sections 5.1.1.1 and 5.1.1.2. To summarise, it changes to flows will be localised to the location of the Scheme itself, with the existing constriction caused by the bridge in high flows moving upstream towards the existing bridge. It is not anticipated that this will cause any residual adverse effect.

5.1.1.1 Operational Phase Hydraulic Modelling

With the new bridge in place and old one demolished, flow will become constricted by the bridge during flow above a 1-in-30 year event.

Three design events were analysed in the Geomorphology Report. A summary of the changes from the baseline to scheme is as follows:

- The 1-in-2 year event will result in negligible changes to the hydraulic regime, with <200mm decreases in depth and <0.2m/s modelled changes in velocity that are limited to the direct footprint of the new and old bridges. Such changes are unlikely to affect geomorphological processes.
- The 1-in-100 year event results suggest larger changes in water level, with a decrease in peak water level of almost 1m upstream of the bridge due to reduced constriction of flow. Water levels then return to similar level downstream of the bridge. Slight increase in velocity is expected upstream of the bridge (2.6m/s to 2.9m/s) and downstream (2.1m/s to 2.3m/s).
- In the 1-in-1000 year flood event, flow would be constricted in both scenarios. Water levels decrease sooner downstream in the Scheme scenario, with 1.2m difference in flow depth at the site of the old Bassaleg Bridge that equalises downstream. Velocity immediately downstream from the new bridge will increase more significantly (from 2.9m/s to 3.8m), with velocities downstream of the old bridge equalising with a smaller increase of from 3.5m/s to 3.7m/s. It is worth noting that flow will overtop the river bank in the 1-in-1000 year event for the. The flow constriction caused by the existing bridge will move upstream to the new bridge constructed under the Scheme.

5.1.1.2 Construction Phase Hydraulic Modelling

Three design events were analysed in the Geomorphology Report located in Appendix C. A summary of the changes from the baseline to scheme is as follows:

- The 1-in-2 year event will result in negligible changes to the hydraulic regime, with <0.05m changes in depth, no modelled change in velocity, and a <0.1m³/s (<0.1%) change in flows.
- The 1-in-100 year event experiences larger changes in water level, with an increase of 0.69m upstream of the bridge, with negligible changes downstream from the bridge. This is compounded with a decrease in velocity upstream from the bridge (3.7m/s to 3.2m/s),

although there is negligible changes to velocity downstream from the bridge. There are no changes to flow.

- In the 1-in-1000 year flood event, water levels will increase by 0.63m upstream from the bridge, with a 0.21m decrease downstream. Velocity upstream from the bridge will decrease from 3.7m/s to 3.2m/s, with velocities downstream being unchanged. Changes to flow are negligible. It is worth noting that a substantial proportion of the flow will overtop the riverbank, bridge, and wall in this scenario.

5.1.2 Fluvial geomorphology assessment

The Geomorphology Report attached in Appendix C determined that the River Ebbw is a naturally dynamic river constrained by recent and historic development, and it also faces other pressures due to floodplain disconnection and pollution. Extensive bank protection limits sediment supply, shown by erosion in areas where protection does not exist. Combined with the weir limiting downstream connectivity, risks of sediment starvation and channel incision are present near the bridge. The study area is in a straightened reach where the surrounding floodplain has been built upon and disconnected from the river itself. This reduces flooding while concentrating the stream energy through the confined section at the bridge crossing, potentially contributing to erosion of the river bed.

The historic weir acts as a localised grade (bed level) control and reduces the potential for erosion and scour. During high flows that may overtop the weir, this effect is likely lessened. It is likely that higher flow events caused the scour evident under the existing bridge piers. Scour protection is therefore likely to be required to protect the new bridge from ongoing scour and change in river bed level.

An analysis of the geomorphology of the area and hydraulic modelling results has found that the project's impact on the flow regime is likely to be minor and localised, especially after the demolition of the existing bridge.

5.2 WFD impact assessment

An impact assessment of the scoped in activities on hydromorphological, physico-chemical, and biological quality elements for the Ebbw R - conf Ebbw Fach R to Maes-glas' (GB109056026910) surface water body is shown in Table 5.1.

5.2.1 Operational impacts

The operational phase impact assessment found that the Scheme was not a risk to the WFD objectives of the Ebbw R - conf Ebbw Fach R to Maes-glas' surface water body. As well as the minor and localised nature of all impacts due to the Scheme, many impacts will be mitigated by the removal of the existing bridge and will reinstate conditions closely resembling the current baseline.

Table 5.1: WFD Impact Assessment table for the Scheme on the Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910) surface water body

WFD quality element	Scheme activities	Potential impact	Mitigation	Significant impact predicted?
Hydromorphological supporting elements: - Hydrological regime - Quantity and dynamics of flow - Connection to groundwater - River continuity - Morphological conditions - Structure / condition of riparian zone	Bridge	See section 5.1.1 for a summary of hydraulic modelling results. Overall, the risk will be localised with all change in velocity limited to the area surrounding the bridge for any design event, and changes at the bridge are not determined to pose a risk to WFD objectives. Five riparian trees will be lost as they intersect the direct footprint of the bridge. A 3:1 replanting ratio of trees exists, although it has not yet been decided whether these will be on site or within the riparian zone.	The aperture of the new bridge is larger than the existing bridge, and no piers extend into the river itself. This represents and improvement over the existing bridge and is the most open span design possible under the site constraints. If riparian vegetation is reinstated after the demolition of the old bridge on site and within the riparian zone, there will likely be no net loss in overall riparian vegetation coverage.	Effects on the hydromorphological regime and dynamics of flow have been shown to be minor and localised. Provided all proportional mitigation and best practice measures are adhered to, it is anticipated that the Scheme would be WFD compliant. Regarding the loss of riparian vegetation, a worst-case scenario has therefore been assumed where trees will be replanted off site, resulting in a minor, localised adverse effect. However, this will not result in the deterioration of WFD status on a water-body scale, and the Scheme is therefore considered WFD compliant.
	Scour protection	The Scheme will involve the construction of new scour protection as described in 4.2.2. The overall footprint of scour protection will increase compared to the baseline. This may impact the hydromorphological regime, and constitute a threat to bankside habitat which could potentially be lost by the Scheme. Some blockstone with established vegetation will be replaced, leading to a loss in bankside vegetation. The hydraulic model analysis included in the Geomorphology Report (Appendix C) shows that changes to velocity and depth will be negligible outside the immediate footprint of the Scheme.	Embedded mitigation has been implemented to offset new hard bank, where possible. Gaps between blockstone will allow vegetation to reinstate and lessen impacts to bankside habitat. Rip-rap will be buried under a reinstated bed that resembles baseline conditions. Further from the bridge is smaller in diameter than rip-rap directly underneath, creating reducing the disparity between artificial and natural bed.	

WFD quality element	Scheme activities	Potential impact	Mitigation	Significant impact predicted?
	Bridge abutment extending into river from right bank	The right bank bridge abutment will protrude from the right bank of the river. This may impact flow by constricting the cross-sectional area and shortening the bank and bed width. The hydraulic model analysis included in the Geomorphology Report (Appendix C) shows that changes to velocity and depth will be negligible outside the immediate footprint of the Scheme.	The design (not including the encroaching wing wall) will maintain a larger clear span (22.0m) than the existing bridge (17.1m). The encroachment itself is approximately 2.5m, and the resultant span will therefore be greater than what currently exists.	
Biological quality elements ● Fish ● Invertebrates ● Macrophytes and phytobenthos combined	Bridge	Shading from the bridge may lead to deterioration of habitat by altering the aquatic flora present in the bank and bed. Fish passage along the river corridor may also be impaired due to new shaded area, although this is unlikely due to the short width of 12.8m, which is shorter than the width of the old bridge at 13.2m. See section 5.1.1 for a summary of hydraulic modelling results. Overall, the risk will be localised with all change in velocity limited to the area surrounding the bridge for any design event, and changes at the bridge are not determined to pose a risk to WFD objectives.	An equal area will be unshaded from the permanent removal of the existing bridge, creating no overall net loss of open river.	Provided all proportional mitigation and best practice measures are adhered to, it is anticipated that the Scheme would be WFD compliant.
	Scour protection	A portion of the natural bank will be lost as scour protection will create a hard bank. This may	Embedded mitigation includes gaps in the blockstone to allow the establishment of vegetation.	

WFD quality element	Scheme activities	Potential impact	Mitigation	Significant impact predicted?
		adversely affect riparian and bed morphology and vegetation, and by extension impairing habitat for macroinvertebrates or fish. Bankside vegetation exists in blockstone that will be replaced. This may lead to an overall net loss in vegetation cover if it cannot reestablish. Riprap scour protection may disrupt the bed substrate, aquatic habitat, and possible fish spawning zones.	A natural bed above the bed riprap that resembles the baseline conditions will also mitigate impacts deriving from changes to the riverbed. This will allow for the regeneration of aquatic habitats.	
Physico-chemical quality elements	Bridge	Shading from the bridge may cause localised decrease in river temperatures. As the shaded width will decrease from 13.24m to 12.81m upon demolition of the old bridge, the scheme may cause a negligible benefit to temperature. The loss of five riparian trees may also lead to decreased shading and affect temperatures.	The new bridge is narrower than the old, leading to less overall shading upon the demolition of the new bridge. While the effect deriving from tree loss will not be mitigated if planted off-site, the impact will be negligible.	Change in temperature is local to be minor and localised. Also, the demolition of the existing bridge will cause an overall small decrease in shading. Provided all proportional mitigation and best practice measures are adhered to, it is anticipated that the Scheme would be WFD compliant.

5.2.2 Mitigation and enhancement

Mitigation is embedded into the bridge design itself, with an aperture larger than the present bridge to reduce the constriction of flow. This will ensure any impacts are minor and localised, and upon the demolition of the existing bridge, it is likely there will be an overall benefit to the river conditions.

The existing bridge currently shades a part of the watercourse that will be opened upon its demolition, presenting an opportunity to rehabilitate the riparian and in-channel habitat. The existing bank in the shaded area is unvegetated, with evident of historic scour. The riparian zone can be re-vegetated from the largely existing bare bank.

The scour protection over the left and right bank will comprise blockstone, with rip-rap along the riverbed as described in Section 4.2.2. Gaps will exist between blockstone bricks to facilitate some vegetation growth and establishment on the bank and mitigate the effect of removed established vegetation existing amongst blockstone bank protection in the riparian zone.

Rip-rap will be buried under a reinstated bed of sediment. While extreme flood events have the capacity to cause bed scour and impact flow conveyance, sediment size will be adjusted to be as close as possible to current conditions. This will help maintain a natural bed profile supporting geomorphological conditions and suitable habitat for fish and aquatic invertebrates.

There are further opportunities for environmental enhancements in the area (i.e. measures which would improve the hydromorphological and/or ecological condition of a watercourse/catchment). For example, weir removal may reinstate more natural conditions to the reach, although the weir may also degrade over time. The scheme could deliver additional localised enhancements, subject to the availability of additional funding. Given the limited scale of the project, however, there may be limited capacity for such interventions.

Construction impacts were scoped out from further WFD assessment under the assumption that mitigation measures during in-channel works will be completed to ensure no debris or pollution will enter the river. Construction measures to achieve this include silt curtains, avoiding fish migration and spawning seasons, and maintaining a sufficient flow channel during coffer damming. Further measures are included in Table 4.1. Closer to the commencement of the construction phase, when more details concerning the construction methodology are available, a CEMP will be required to assess the more detailed method, and ensure mitigation is integrated – with this in place there are expected to be no adverse effects on local biological quality elements.

5.3 Summary of WFD impact assessment

Key findings of the WFD impact assessment for the 'Ebbw R - conf Ebbw Fach R to Maes-glas' water body are as follows:

- Effects on hydromorphological supporting elements are expected to be minor and localised. The bridge abutment, scour protection, and bridge itself will locally alter the river cross-section and the hydrological regime, however, this change is localised to the short section of river beneath the bridge, a maximum of 50m. Scour protection will remove some existing bankside vegetation, however, new blockstone with gaps will allow establishment of vegetation and not cause a detrimental effect at a water body scale.
- Physico chemical quality elements will only be affected by potential localised changes in temperature due to in-channel shading. Given the existing bridge will be demolished as part of the scheme, the overall change will be a negligible net gain in unshaded area, leading to no overall effect at a water body scale.

- Biological quality elements are also anticipated to be affected by shading from the bridge, potentially affecting aquatic flora and fish passage. The overall shaded area will not significantly change compared to the baseline, however, leading to no overall effect. Scour protection, and the associated loss of natural bank and bed may constitute localised adverse effects on habitat, although the establishment of vegetation within blockstone and covering of bed scour protection with natural material will mitigate this. There is considered to be no overall effect at a water body scale.

Overall, no water body scale effects are predicted for all WFD quality elements on the 'Ebbw R - conf Ebbw Fach R to Maes-glas'. Any effects are anticipated to be minor and localised.

5.4 Heavily Modified Water Body mitigation measures

The 'Ebbw R - conf Ebbw Fach R to Maes-glas' is designated as a HMWB. For this reason, this water body has been defined specific WFD HMWB mitigation measures that need to be met, to achieve GEP. A review against GEP and HMWB mitigation measures for the Scheme has been undertaken for the WFD assessment in Appendix B (Table B.1). The Scheme should deliver or seek to enable future delivery of HMWB mitigation measures for the WFD water body. Where measures are 'Not in place', the Scheme must not prevent these measures from being delivered in the future. One of the reasons the water body is at 'Moderate' status is because the HMWB mitigation measures assessments is at 'Moderate or less' as of RBMP Cycle 3 (2021). Many of the outstanding measures relate to flood protection, indicating that flood protection in the area imposes significant pressures on the water body which compromise its ecological condition.

The review of HMWB mitigation measures is provided in Table B.1 for the 'Ebbw R - conf Ebbw Fach R to Maes-glas'. All mitigation measures were found to be neutral, not being delivered or prevented by the Scheme.

5.5 In combination effects

5.5.1 Planned developments

For WFD compliance, it is important to consider other 'committed developments' within the same water body, to consider whether combined impacts from different sources could be significant at the water body scale. Schemes considered comprise committed developments identified on the Newport Council planning portal. For the purpose of this assessment, 'committed developments' are considered to be major developments that have not been implemented but have planning permission or are considered to be coming forward in the reasonably foreseeable future, and where adequate information is known about the project in order to assess the potential cumulative effects.

No committed developments were found within 500m of the Scheme. As no committed developments existed, no further assessment was necessary for developments planned in the future.

6 Conclusions

6.1 Conclusion

Receptors screened into the WFD assessment included the 'Ebbw R - conf Ebbw Fach R to Maes-glas' (GB109056026910) water body, the 'SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone' (GB40902G201500). Receptors exclusively screened into the construction assessment include the 'Severn Estuary (Wales)' protected area, the 'USK' (GB530905415404) TrAC water body, and the 'SEVERN LOWER' (GB530905415401) TRaC water body.

The scoping assessment demonstrated that construction impacts will not pose a WFD compliance risk, with mitigation detailed in Section 4.2.1 and the assumption that a capable, competent contractor will ensure construction follows best practise. Noting this, the installation of cofferdams and the demolition of the existing bridge are substantial in-channel works that could impact water quality, hydromorphology and habitat for aquatic species. The mitigation and assumptions stated in this assessment should be incorporated into the development of the construction methodology, programme and CEMP.

Groundwater impacts were scoped out from further consideration.

Impacts on the 'Ebbw R - conf Ebbw Fach R to Maes-glas' water body were scoped in for further assessment, specifically the impact of the bridge, bridge abutment, and scour protection.

The impact assessment determined that the Scheme is WFD compliant. None of the proposed Scheme activities were determined to risk deterioration of the water body status or prevention of the achievement of WFD objectives at a water body scale, and some good practice design will also reduce localised impacts to WFD elements.

Table 6.1 summarises the outcomes of the WFD compliance assessment. It identifies the scheme will not impede the implementation of WFD objectives for the 'Ebbw R – conf Ebbw Fach R to Maes-glas' water body.

Table 6.1: Summary of WFD compliance

WFD objectives	Ebbw R - conf Ebbw Fach R to Maes-glas (GB109056026910)
No deterioration from current status/potential	Highly unlikely to cause deterioration, provided embedded mitigation is delivered as part of the scheme.
Ability to meet future objectives	Unlikely to prevent the achievement of 'Good' ecological status.
No impact on WFD objectives or other water bodies	No anticipated permanent impacts in adjacent water bodies.
Compliant with other relevant legislation	No anticipated significant impacts are expected.

6.2 Recommendations

It is anticipated that, based on the proposed design (as outlined in Section 4.2) and proposed mitigation for the construction and operational phases of the Scheme (as outlined in Section 5.2.2), there will be no significant change to hydrodynamics from the baseline. There are therefore no further recommendations regarding the current design.

It is recommended that geomorphology input into the design is continued as the construction methodology is developed, and for any amendments to the design. If hydraulic modelling of the

preferred option is revised at any future stage, it is recommended that revised geomorphological analysis of hydraulic modelling results be undertaken. Should the revised analysis suggest significant change in hydrodynamics, or should the proposed design change significantly at detailed design, this assessment will need to be updated.

If any amendments to timing restrictions for works are made, this assessment will need to be reviewed; further aquatic ecology surveys may be required to further understand the habitats and species which may be affected.

A. Biological quality elements

A.1 Classifications

Table A.1: WFD baseline status for the ‘Ebbw R - conf Ebbw Fach R to Maes-glas’ (GB109056026910) water body

WFD Water quality element	Overall Cycle 3 (2021) status	Objective
Overall status	Moderate	Good by 2027
Ecological	Moderate	Good by 2027
Ecological: Biological quality elements		
Invertebrates	High	-
Macrophytes and phytobenthos combined:	High - Macrophytes: High - Phytobenthos: Moderate	-
Fish	Not assessed	
Ecological: Physico chemical quality elements		
Acid Neutralising Capacity	High	-
Ammonia (Phys-Chem)	High	-
Dissolved oxygen	High	-
Phosphate	Good	-
Temperature	High	-
pH	High	-
Ecological: Hydromorphological supporting elements		
Hydrological Regime	Moderate	Good by 2027
Ecological: Supporting elements (surface water)		
Mitigation Measures Assessment	Moderate	Good by 2027
Ecological: Specific pollutants		
Arsenic	High	-
Copper	High	-
Dimethoate	High	-
Iron	High	-
Manganese	High	-
Phenol	High	-
Toluene	High	-
Zinc	High	-
Chemical: Priority hazardous substances		
Anthracene, Cadmium, Endosulfate, Hexachlorocyclohexane, Nonylphenol, Pentachlorobenzene, Polyaromatic hydrocarbons (PAH), Tributyltin Compounds	Moderate (overall)	Good by 2027
Chemical: Priority substances		
Aclonifen, Alachlor, Atrazine, Benzene, 1,2-dichloroethane, Dichloromethane, Dichlorvos, Lead, Napthalene, Nickel, Octylphenol,	High	-

WFD Water quality element	Overall Cycle 3 (2021) status	Objective
Pentachlorophenol, Simazine, Trichlorobenzenes		
Chemical: Other Pollutants		
DDT Total, Aldrin, Dieldrin, Endrin & Isodrin, para-para DDT, Tetrachloride, Trichloroethylene	High	-

Source: NRW, 2025⁶

Table A.2: WFD baseline status for the ‘SE Valleys Southern Devonian Old Red Sandstone & Triassic Mercia Mudstone’ (GB40902G201500) water body

WFD Water quality element	Overall Cycle 3 (2021) status	Objective
Overall status	Good	Moderate by 2015
Quantitative		
Quantitative Groundwater Dependent Terrestrial Ecosystems test	Good	Moderate by 2021
Quantitative Dependent Surface Water Body Status	Good	-
Quantitative Saline Intrusion	Good	-
Quantitative Water Balance	Good	-
Chemical		
Chemical Drinking Water Protected Area	Good	Good by 2015
General Chemical Test	Good	Good by 2015
Chemical Groundwater Dependent Terrestrial Ecosystems test	Good	Supports good by 2015
Chemical Dependent Surface Water Body Status	Good	Good by 2027 – Low confidence
Chemical Saline Intrusion	Good	High by 2015
Trend Assessment - Groundwater supporting element	High	-

Source: NRW, 2025⁶

Table A.3: WFD baseline status for the ‘USK’ (GB530905415404) water body

WFD Water quality element	Overall Cycle 3 (2021) status	Objective
Overall status	Moderate	Good by 2027
Ecological	Good	-
Ecological: Biological quality elements		
Fish	Good	-
Invertebrates	Moderate	-
Infaunal quality index	Good	-
Imposex	High	-
Phytoplankton	Good	-
Angiosperm	Moderate	-
Salt marsh	Moderate	-
Opportunistic macroalgae	High	-
Ecological: Physico chemical quality elements		
Dissolved inorganic nitrogen	Good	-
Dissolved oxygen	High	-

WFD Water quality element	Overall Cycle 3 (2021) status	Objective
Ecological: Hydromorphological supporting elements		
Hydrological Regime	Not Assessed	-
Ecological: Supporting elements (surface water)		
Mitigation Measures Assessment	Moderate	Good by 2027
Ecological: Specific pollutants		
Arsenic	High	-
Chromium VI	High	-
Copper	High	-
Manganese	High	-
Phenol	High	-
Zinc	High	-
Chemical: Priority hazardous substances		
Cadmium, Nonylphenol, Pentachlorobenzene, Tributyltin Compounds	High	Good by 2027
Chemical: Priority substances		
Benzene, Lead, Naphthalene, Nickel, Octylphenol, Pentachlorophenol, Trichlorobenzenes	High	-
Chemical: Other Pollutants		
Trichloroethylene	High	-

Source: NRW, 2025⁶

Table A.4: WFD baseline status for the 'SEVERN LOWER' (GB530905415401) water body

WFD Water quality element	Overall Cycle 3 (2021) status	Objective
Overall status	Moderate	Good by 2027
Ecological	Good	-
Ecological: Biological quality elements		
Invertebrates	High	-
Infaunal quality index	Good	-
Angiosperm	High	-
Salt marsh	High	-
Macroalgae	High	-
Opportunistic macroalgae	High	-
Ecological: Physico chemical quality elements		
Dissolved inorganic nitrogen	Good	-
Dissolved oxygen	High	-
Ecological: Hydromorphological supporting elements		
Hydrological Regime	Not High	Good by 2027
Ecological: Supporting elements (surface water)		
Mitigation Measures Assessment	Moderate	Good by 2027
Ecological: Specific pollutants		
Arsenic	High	-
Chromium VI	High	-
Copper	High	-
Phenol	High	-
Manganese	High	-

WFD Water quality element	Overall Cycle 3 (2021) status	Objective
Phenol	High	-
Zinc	High	-
Chemical: Priority hazardous substances		
Anthracene, Cadmium, Mercury, Nonylphenol, Polyaromatic hydrocarbons (PAH), Pentachlorobenzene, Tributyltin Compounds	Moderate (overall)	Good by 2027
Chemical: Priority substances		
Dichloromethane, Lead, Naphthalene, Nickel, Octylphenol	High	-
Chemical: Other Pollutants		
None	Not Assessed	-

Source: NRW, 2025⁶

A.2 Biological Quality Elements

Table A.5: NRW fish monitoring sites identified within the study area

Sample site name	Water body	River catchment	NGR	Distance from Scheme boundary
S014	Afon Ebbw	Ebbw	ST 27820 87168	Within Scheme boundary
S016	Afon Ebbw	Ebbw	ST 28000 86700	Within Scheme boundary

Source: NRW, 2025

Table A.6: Protected and notable fish species recorded within the 2km buffer and migratory fish within 10km buffer.

Species name	Taxon group	Data source	Water body	Most recent record	Closest NGR	Status
Bullhead (<i>Cottus gobio</i>)	Fish	NBN ²¹ NRW	River Ebbw	2023	ST 27850 87150 (within the Scheme boundary)	Habitats Directive Annex II species of community interest
European eel (<i>Anguilla anguilla</i>)	Fish	NBN ^{21 22} NRW	River Ebbw	2023	ST2780087100 (within the Scheme boundary)	Environment (Wales) Act 2016 Section 7
		NBN ²¹ NRW	River Ebbw	2023	ST2780087100 (within the Scheme boundary)	IUCN Red List – Critically Endangered OSPAR
		NBN ²¹ NRW	River Rhymney	2017	ST 23100 84400 (5.16km from the Scheme boundary)	The Eels (England and Wales) Regulations 2009
		NBN ²¹ NRW	Bettws Brook	2017	ST 28339 90293 (2.94km from the Scheme boundary)	
		NBN ²¹ NRW	Dowlais Brook	2017	ST 30909 92834 (6.1km from the Scheme boundary)	
		NBN ²¹ NRW	Candwr Brook	2017	ST 33038 92835 (7.4km from the Scheme boundary)	
Atlantic salmon (<i>Salmo salar</i>)	Fish	NBN ²¹ NRW	Sor Brook	2017	ST3493893525 (9.24km from the Scheme boundary)	
		NRW	River Ebbw	2023	ST 27800 87100 (within the Scheme boundary)	Bern Convention Appendix III Habitats Directive Annex II species of community interest OSPAR
		NBN ²¹ NRW	River Rhymney	2017	ST 23150 84450 (5.07km from the Scheme boundary)	
		NRW	Bettws Brook	2019	ST 28339 90293 (2.94km from the Scheme boundary)	Conservation of Habitats and Species Regulations Schedule 4

²¹ Records provided by NRW, accessed through NBN Atlas website.

²² Records provided by Biological Records Centre, accessed through NBN Atlas website.

Species name	Taxon group	Data source	Water body	Most recent record	Closest NGR	Status
		NRW	Dowlais Brook	2019	ST 30909 92834 (6.1km from the Scheme boundary)	Salmon and Freshwater Fisheries Act 1975
		NRW	Candwr Brook	2019	ST 33038 92835 (7.4km from the Scheme boundary)	Environment (Wales) Act 2016 Section 7
		NRW	Sor Brook	2017	ST3493893525 (9.24km from the Scheme boundary)	
Brown/sea trout (<i>Salmo trutta</i>)	Fish	NRW	River Ebbw	2023	ST2780087100 (within the Scheme boundary)	Environment (Wales) Act 2016 Section 7
		NBN ²¹ NRW	Llanishem Reservoir	2023	ST 18650 82250 (10.0km from the Scheme boundary)	Salmon and Freshwater Fisheries Act 1975
		NBN ²¹ NRW	Bettws Brook	2019	ST 28339 90293 (2.94km from the Scheme boundary)	
		NBN ²¹ NRW	Dowlais Brook	2019	ST 30909 92834 (6.1km from the Scheme boundary)	
		NBN ²¹ NRW	Candwr Brook	2018	ST 33038 92835 (7.4km from the Scheme boundary)	
		NBN ²¹ NRW	Sor Brook	2017	ST3493893525 (9.24km from the Scheme boundary)	
Lamprey (<i>Lampetra</i> sp.)	Fish	NRW	River Rhymney	2023	ST 23100 84400 (5.17km from the Scheme boundary)	Bern Convention Appendix III
		NRW	Fawr Brook	2023	ST2255284429 (5.62km from the Scheme boundary)	Habitats Directive Annex II species of community interest
		NRW	Candwr Brook	2017	ST3303892835 (7.41km from the Scheme boundary)	Conservation of Habitats and Species Regulations Schedule 4 (<i>Lampetra fluviatilis</i>)
		NRW	Sor Brook	2017	ST3493893525 (9.24km from the Scheme boundary)	Environment (Wales) Act 2016 Section 7 (<i>Lampetra fluviatilis</i>)

Source: NBN Wales Trust (2025)²³, DataMapWales (2025)²⁴, Bern Convention A3²⁵, Wildlife and Countryside Act 1981²⁶, Habitats Directive Annex 2²⁷, Habitats Directive Annex 5²⁸, Environment (Wales) Act 2016 Section 7²⁹, OSPAR³⁰, Habitat Regulations Schedule 4³¹, and Mott MacDonald, 2025

²³ NBN Atlas Wales, 2025. [online] Available at: <<https://wales.nbnatlas.org/>> [Accessed April 2025].

²⁴ Natural Resources Wales, 2024. DataMapWales [online] Available at: <<https://datamap.gov.wales/>> [Accessed April 2025].

²⁵ Council of Europe. 2017. Appendices of the Convention and Amendments to the Appendices. Bern Convention. [online] Available at: <<https://www.coe.int/en/web/bern-convention/appendices>> [Accessed April 2025].

²⁶ Wildlife and Countryside Act, 1981. [online] Available at: <<https://www.legislation.gov.uk/ukpga/1981/69/contents>> [Accessed April 2025].

²⁷ European Council, 2007a. Annex II: animal and plant species of community interest whose conservation requires the designation of special areas of conservation. [online] Available at: <https://eunis.eea.europa.eu/references/2325/species> [Accessed April 2025]

²⁸ European Council, 2007b. Annex V: animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures. [online] Available at: <<https://eunis.eea.europa.eu/references/2327/species>> [Accessed April 2025]

²⁹ Wales Biodiversity Partnership, 2016. [online]. Available at: [Wales Biodiversity Partnership, 2016. [online]. Available at: <<https://www.biodiversitywales.org.uk/Section-7>>

³⁰ OSPAR Commission, 2023. List of Threatened and/or Declining Species & Habitats [online]. Available at: <<https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats>> [Accessed April 2025]

³¹ The Conservation of Habitats and Species Regulations, 2017. [online] Available at: <https://www.legislation.gov.uk/uksi/2009/3344/made> [Accessed April 2025]

Table A.7: Invasive non-native species within study area

Species name	Taxon group	Data source	Water body	Most recent record	Closest NGR	Status
Water fern (<i>Azolla filiculoides</i>)	Aquatic Plant	NBN ³²	Monmouthshire and Brecon Canal	2019	ST 28500 88500 (1.27km from the Scheme boundary)	WFD-UKTAG High impact, Wildlife and Countryside Act 1981 Schedule 9
Nuttall's pondweed (<i>Elodea nuttallii</i>)	Aquatic Plant	NBN ³²	Nant-y-moor Reen	2019	ST 27500 84500 (1.80km from the Scheme boundary)	WFD-UKTAG High impact
Curly waterweed (<i>Lagarosiphon major</i>)	Aquatic plant	NBN ³²	Malpas brook	2014	ST 29000 89000 (1.90km from the Scheme boundary)	WFD-UKTAG High impact, Wildlife and Countryside Act 1981 Schedule 9
Canadian waterweed (<i>Elodea canadensis</i>)	Aquatic plant	NBN ³³	Tredegar House Lake	2019	ST 28500 85500 (0.97km from the Scheme boundary)	WFD-UKTAG Moderate impact, Wildlife and Countryside Act 1981 Schedule 9
		NBN ³²	Ynysfro Reservoir	2014	ST 29000 89000 (1.94km from the Scheme boundary)	
Japanese knotweed (<i>Fallopia japonica</i>)	Riparian plant	NBN ³²	River Ebbw	2019	ST 28053 86806 (within Scheme boundary)	WFD-UKTAG High impact, Wildlife and Countryside Act 1981 Schedule 9
		NBN ³²	Monmouthshire and Brecon Canal	2018	ST 2862 988258 (1.08km from the Scheme boundary)	
		NBN ³²	Tredegar House Lake	2018	ST 28601 85762 (0.74km from the Scheme boundary)	
		NBN ³²	Tredegar Reen	2018	ST29451852 93 (1.65km from the Scheme boundary)	
		NBN ³²	Coch Brook	2018	(0.76km from the Scheme boundary)	

³² SEWBRc ([2025]). INNS Data: All Taxa (South East Wales). Occurrence dataset on the NBN Atlas

³³ Records provided by South East Wales Biodiversity Records Centre, accessed through NBN Atlas website.

Species name	Taxon group	Data source	Water body	Most recent record	Closest NGR	Status
Giant hogweed (<i>Heracleum mantegazzianum</i>)	Riparian plant	NBN ³⁴	River Ebbw	2015	ST 30272 85738 (1.92km from the Scheme boundary)	WFD-UKTAG High impact, Wildlife and Countryside Act 1981 Schedule 9
Himalayan balsam (<i>Impatiens glandulifera</i>)	Riparian plant	NBN ³⁵	River Ebbw	2024	ST 28535 86605 (within Scheme boundary)	WFD-UKTAG High impact, Wildlife and Countryside Act 1981 Schedule 9
		NBN ³²	Monmouthshire and Brecon Canal	2020	ST 28677 86504 (1.16km from the Scheme boundary)	
		NBN ³⁶	Tredegar House Lake	2017	ST 28601 85762 (0.74km from the Scheme boundary)	
Northern River/Florida crangonyctid (<i>Crangonyx</i> sp.) ³⁷	Invertebrate	NBN ²¹	River Ebbw	2018	ST 27775 87310 (within the Scheme boundary)	WFD-UKTAG Low impact
Freshwater tricolour (<i>Planaria torva</i>)	Invertebrate	NBN ²¹	River Ebbw	2019	ST 29109 86091 (0.8km from the Scheme boundary)	WFD-UKTAG Unknown impact
Bladder snail (<i>Physella acuta</i>)	Invertebrate	NBN ²²	Monmouthshire and Brecon Canal	2019	ST 26950 89150 (1.9km from the Scheme boundary)	WFD-UKTAG Unknown impact
Tadpole physa (<i>Physella gyrina</i>)	Invertebrate	NBN ²²	Monmouthshire and Brecon Canal	2019	(1.27km from the Scheme boundary)	WFD-UKTAG Unknown impact
Least Duckweed (<i>Lemna minuta</i>)	Invertebrate	NBN ³²	Monmouthshire and Brecon Canal	2022	ST 27950 88650 (1.21km from the Scheme boundary)	WFD-UKTAG Moderate impact

Source: Environment Agency (2021), NBN Trust (2025), WFD-UKTAG (2021), Wildlife and Countryside Act 1981, Invasive Non-Native Species (Amendment etc.) (EU Exit) Regulations, Invasive Alien Species (Enforcement and Permitting) Order 2019, and Mott MacDonald, 2025

³⁴ Records provided by Botanical Society of Britain & Ireland, accessed through NBN Atlas website.

³⁵ Records provided by INNS Mapper, accessed through NBN Atlas website.

³⁶ Botanical Society of Britain and Ireland. [17 February 2025.] Vascular plant records verified via iRecord.

³⁷ *C. pseudogracilis* is listed at Low impact (Water Framework Directive UK-TAG, 2021); however, although non-native, *C. floridianus* is not currently listed. *C. floridianus* is grouped with *C. pseudogracilis* when determination to species level has not been recorded.

A.3 Reasons for Not Achieving Good (RNAGS)

Table A.8: WFD RNAGs for screened in water bodies

Water body	SWMI	Activity	Category	Classification Element
Ebbw R - conf Ebbw Fach R to Maes-glas	Flow	Surface water abstraction	Other (not in list)	Fish
	Physical modification	Others (not in list, must add details in comments)	Water industry	Fish
	Flow	Surface water abstraction		Hydrological Regime
USK	Unknown (pending investigation)	Unknown (pending investigation)	Unknown (pending investigation)	Invertebrates
SEVERN LOWER	Diffuse source	Contaminated water body bed sediments	Industry, Manufacturing and other Business	Brominated diphenylether (BDPE) Calc
	Point source	Sewage discharge (continuous)	Water Industry	
	Unknown (pending investigation)	Unknown (pending investigation)	Unknown (pending investigation)	Angiosperms
	Diffuse source	Atmospheric deposition	Other (not in list)	Mercury and Its Compounds
		Contaminated water body bed sediments	Industry, Manufacturing and other Business	

Source: Source: NRW, 2025³⁸

A.4 HMWB mitigation measures

Table A.9: WFD RNAGs for screened in water bodies

Water body	SWMI	Activity	Category	Classification Element
Ebbw R - conf Ebbw Fach R to Maes-glas	Flow	Surface water abstraction	Other (not in list)	Fish
	Physical modification	Others (not in list, must add details in comments)	Water industry	Fish
	Flow	Surface water abstraction		Hydrological Regime
USK	Unknown (pending investigation)	Unknown (pending investigation)	Unknown (pending investigation)	Invertebrates
SEVERN LOWER	Diffuse source	Contaminated water body bed sediments	Industry, Manufacturing and other Business	Brominated diphenylether (BDPE) Calc

³⁸ NRW, Water Watch Wales - Reason for no achieving good Cycle 3 [online] Available at: [sharehttps://cyfoethnaturiolcymru.sharefile.eu/share/view/s11466c27806c4fccb29ba4c6900cc3a1](https://cyfoethnaturiolcymru.sharefile.eu/share/view/s11466c27806c4fccb29ba4c6900cc3a1) [Accessed January 2025]

Water body	SWMI	Activity	Category	Classification Element
	Point source	Sewage discharge (continuous)	Water Industry	
	Unknown (pending investigation)	Unknown (pending investigation)	Unknown (pending investigation)	Angiosperms
	Diffuse source	Atmospheric deposition	Other (not in list)	Mercury and Its Compounds
		Contaminated water body bed sediments	Industry, Manufacturing and other Business	

Source: Source: NRW, 2025³⁹

³⁹ NRW, Water Watch Wales – Havily Modified Uses and Mitigation Measures July 2022 [online] Available at: <https://cyfoethnaturiolcymru.sharefile.eu/share/view/sdde43d782ae54702ad52b189cadcd827> [Accessed January 2025]

B. Heavily modified water body mitigation measures

Table B.1: Heavily Modified Water Body mitigation measures for the ‘Ebbw R - conf Ebbw Fach R to Maes-glas’ (GB109056026910) WFD water body (GB109056026910)

HMD Use	Mitigation Measures (tier 1)	Mitigation Measures (tier 2)	Comment
Flood protection	Education	54. Educate landowners	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Flood protection	Operations and maintenance	33. Selective vegetation control	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the scour protection may reduce vegetation on the right bank depending on the extent of protection, and materials used.
Flood protection	Operations and maintenance	34. Vegetation control	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the scour protection may reduce vegetation on the right bank depending on the extent of protection, and materials used. The bridge will not be affected by vegetation and should not require additional vegetation removal to operate.
Flood protection	Operations and maintenance	35. Vegetation control timing	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the scour protection may reduce vegetation on the right bank depending on the extent of protection, and materials used.
Flood protection	Operations and maintenance	36. Invasive species techniques	Not in place – The demolition of the existing bridge will leave a clear riparian zone that may be colonised by invasive species. The current presence of Himalayan Balsam and Japanese Knotweed across the catchment means that any colonisation would represent a negligible increase in the proportion of coverage in the catchment. Care should nonetheless be taken to ensure the area is planted with native vegetation following bridge demolition.
Flood protection	Operations and maintenance	37. Retain habitats	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the blockstone and rip-rap scour protection may reduce vegetation coverage, which can be providing space between the blocks for vegetation to establish.
Flood protection	Structural modification	38. Sediment management strategy	Not in place – The bed rip-rap may slightly alter local sediment dynamics, but the small, localised changes to river velocity and levels are small and localised. There will therefore be no water-body scale effect. The mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.

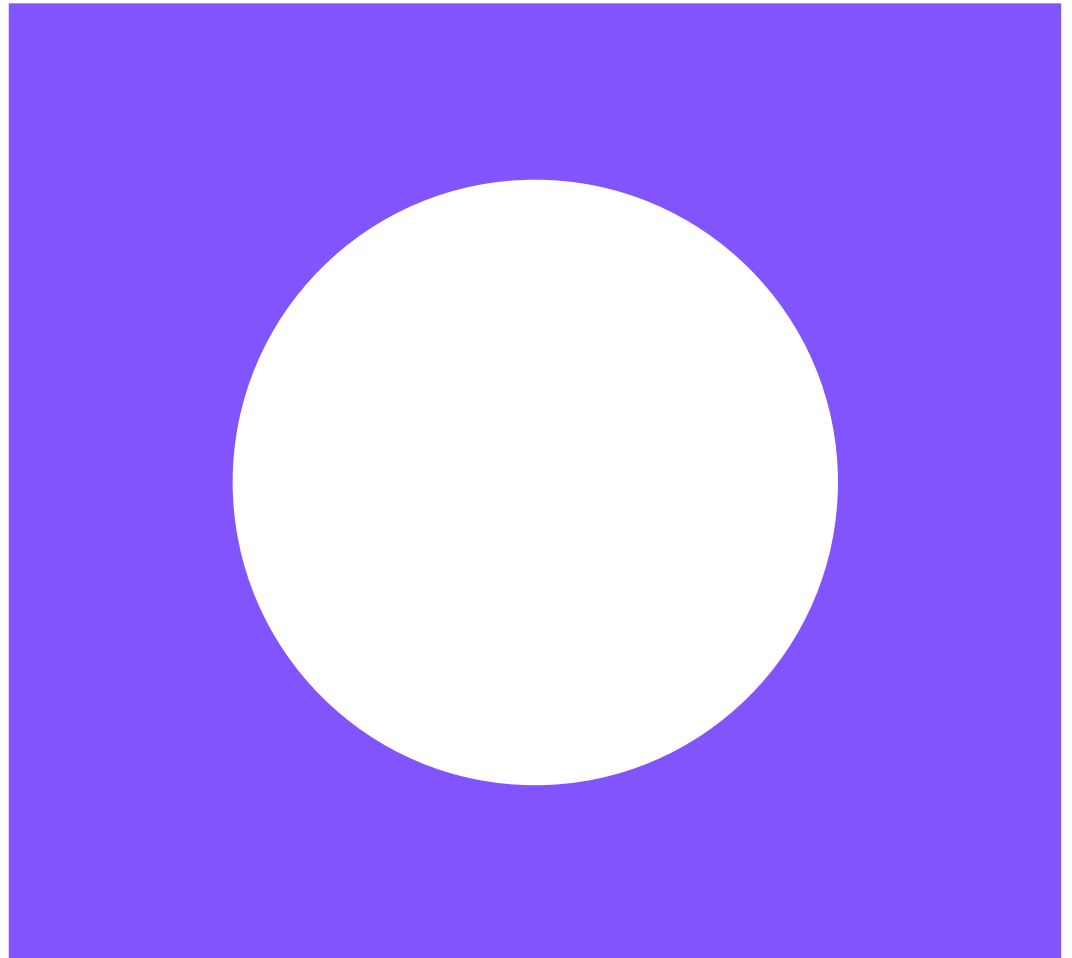
HMD Use	Mitigation Measures (tier 1)	Mitigation Measures (tier 2)	Comment
Flood protection	Structural modification	39. Maintenance – prevent sediment transfer	Not in place – The bed rip-rap may slightly alter local sediment dynamics, but the small, localised changes to river velocity and levels are small and localised. There will therefore be no water-body scale effect. The mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Flood protection	Water management	40. Maintenance – minimise habitat impact	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the scour protection may reduce vegetation on the right bank depending on the extent of protection, and materials used.
Flood protection	Working with physical form and function	41. Water level management	Not in place – The bridge will constrict flow under a 1 in 30 year flood event and raise downstream water levels. This represents no overall change compared to the existing bridge.
Flood protection	Working with physical form and function	16. Fish passes	Not in place – The Scheme will not prevent the delivery of fish passes.
Flood protection	Working with physical form and function	18. Reduce fish entrainment	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Flood protection	Working with physical form and function	19. Enhance ecology	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the rip-rap scour protection may reduce vegetation on the right bank depending on the extent of protection, and materials used. Planting at the existing bridge site may cause a small benefit for local ecology/biodiversity.
Flood protection	Working with physical form and function	20. Changes to locks etc	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Flood protection	Working with physical form and function	47. Align and attenuate flow	Not in place – The bridge will have a greater clear span compared to the existing bridge. While the bridge will constrict flow under a 1 in 30 year flood event and raise downstream water levels, this is likely less than constriction from the existing bridge. Following demolition of the existing bridge, flow will likely be less constricted overall. While there may be less overall attenuation, the difference will be small and improve downstream floodplain connectivity where there are no receptors vulnerable to flooding.
Flood protection	Working with physical form and function	10. Flood bunds	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Flood protection	Working with physical form and function	11. Set-back embankments	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Urbanisation	Education	12. Floodplain connectivity	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Urbanisation	Operations and maintenance	2. Remove obsolete structure	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.

HMD Use	Mitigation Measures (tier 1)	Mitigation Measures (tier 2)	Comment
Urbanisation	Operations and maintenance	4. Remove or soften hard bank	Not in place – However, the blockstone scour protection will create a hard bank, which may be mitigated by gaps between blocks that can facilitate the establishment of vegetation. Through the removal of the piers on the existing bridge that impair bankside morphology, some bank may be softened. Overall, mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Urbanisation	Operations and maintenance	5. Preserve or restore habitats	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the scour protection may reduce vegetation on the right bank depending on the extent of protection, and materials used.
Urbanisation	Operations and maintenance	6. In-channel morph diversity	Not in place – The channel will be clear span, potentially allowing a more natural in-channel morphology despite 12.81m of shading. The demolition of the existing bridge will remove two large piers and 13.24m of shading, resulting in an overall net benefit. This area following bridge removal can be managed to promote morphological diversity. The new bridge construction may also promote limited flow diversity due to changing channel widths.
Urbanisation	Operations and maintenance	8. Re-opening culverts	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Urbanisation	Structural modification	9. Alter culvert channel bed	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Urbanisation	Structural modification	54. Educate landowners	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Urbanisation	Water management	33. Selective vegetation control	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the scour protection may reduce vegetation on the bank depending on the extent of protection, and materials used.
Urbanisation	Working with physical form and function	34. Vegetation control	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the scour protection may reduce vegetation on the bank depending on the extent of protection, and materials used.
Urbanisation	Working with physical form and function	35. Vegetation control timing	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the scour protection may reduce vegetation on the bank depending on the extent of protection, and materials used.
Urbanisation	Working with physical form and function	36. Invasive species techniques	Not in place – The demolition of the existing bridge will leave a clear riparian zone that may be colonised by invasive species.
Urbanisation	Working with physical form and function	37. Retain habitats	Not in place – The bridge will supersede the existing vegetated riparian zone for a span of 12.81m. The existing bridge's span is 13.24m, meaning there will be an overall reduction in shading. However, the blockstone and rip-rap scour protection may reduce vegetation coverage, which can be providing space between the blocks for vegetation to establish.

HMD Use	Mitigation Measures (tier 1)	Mitigation Measures (tier 2)	Comment
Urbanisation	Working with physical form and function	38. Sediment management strategy	Not in place – The bed rip-rap may slightly alter local sediment dynamics, but the small, localised changes to river velocity and levels are small and localised. There will therefore be no water-body scale effect. The mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Urbanisation	Working with physical form and function	39. Maintenance – prevent sediment transfer	Not in place – The bed rip-rap may slightly alter local sediment dynamics, but the small, localised changes to river velocity and levels are small and localised. There will therefore be no water-body scale effect. The mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Urbanisation	Working with physical form and function	40. Maintenance – minimise habitat impact	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.
Urbanisation	Working with physical form and function	41. Water level management	Not in place – Mitigation measures will not be delivered, nor will its delivery be constrained by the Scheme.

Source: NRW, 2025³⁹

C. Geomorphology Report



Bassaleg Bridge Optioneering and Design

Geomorphology Report

August 2025

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Bassaleg Bridge Optioneering and Design

Geomorphology Report

August 2025

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Executive summary

Mott MacDonald has been commissioned by Newport City Council to undertake a geomorphological assessment of the planned Bassaleg Bridge replacement crossing of the River Ebbw (hereafter referred to as the Scheme). The Scheme was initiated following a structural assessment of Bassaleg Bridge and optioneering process that proposed an online replacement bridge to accommodate pedestrians, vehicular traffic, and existing services. This report provides a commentary on the geomorphological context of the River Ebbw, surrounding the planned new bridge and accompanying works.

The Scheme includes the bridge itself, a supporting abutment intruding into the right bank of the River Ebbw, associated scour protection along the bed and banks, and a flood wall to the south. The geomorphological appraisal includes a desk study, a site walkover and an appraisal of past river processes. The report also includes an impact assessment of the Scheme that analyses the hydraulic modelling results of the Scheme to understand the potential impacts to the geomorphology of the River Ebbw.

The River Ebbw is naturally dynamic but constrained by recent and historic development. Floodplain disconnection, pollution, and extensive bank protection have been identified as pressures. The Scheme is located in a straightened reach of the river where the floodplain has been built upon and disconnected from the river. The channel appears to have been narrowed and deepened, confining it over time. This acts to concentrate river energy through the confined section at the bridge crossing, over time potentially contributing to the existing bridge's instability.

The impact assessment has found that the Scheme's impact on flows during the operational and construction phases will be minor and localised to the footprint of the Scheme itself. The aperture of the bridge proposed under the Scheme will increase, and overall constriction of flow will decrease, with negligible effect on flows. Scour protection along the bed will mitigate any erosion risks and include an overlying substrate resembling baseline conditions, and scour protection along the bank will largely replace existing hard banks and maintain the capacity for vegetation to establish.

1 Introduction

1.1 Background

Mott MacDonald has been commissioned by Newport City Council to undertake a geomorphological assessment of the planned Bassaleg Bridge replacement crossing of the River Ebbw (hereafter referred to as the Scheme). The Scheme was initiated following the conclusion of a Structural Assessment Report¹ of the old Bassaleg Bridge in January 2023. An Options Selection Report² published in December 2023 outlined six options for the Scheme, and proposed an online replacement bridge to accommodate pedestrians, vehicular traffic, and existing services.

The aim of this study is to characterise the baseline geomorphology of the River Ebbw at the study site and surrounding area, determine potential impacts of the Scheme on the river hydromorphology, make recommendations for the design and identify suitable mitigation for potential impacts.

The report discusses the context of the site, with a desk study of its geomorphological character, the results of a site walkover visit, identifies past and potential future changes, and an impact assessment of the Scheme.

1.2 Site location

The old Bassaleg Bridge, as seen in Figure 1.1, is located on the River Ebbw at OS Grid Reference ST278870, off Caerphilly Road (Figure 1.2). The proposed bridge is located immediately upstream at ST278870.

Figure 1.1: Image of the old Bassaleg Bridge.

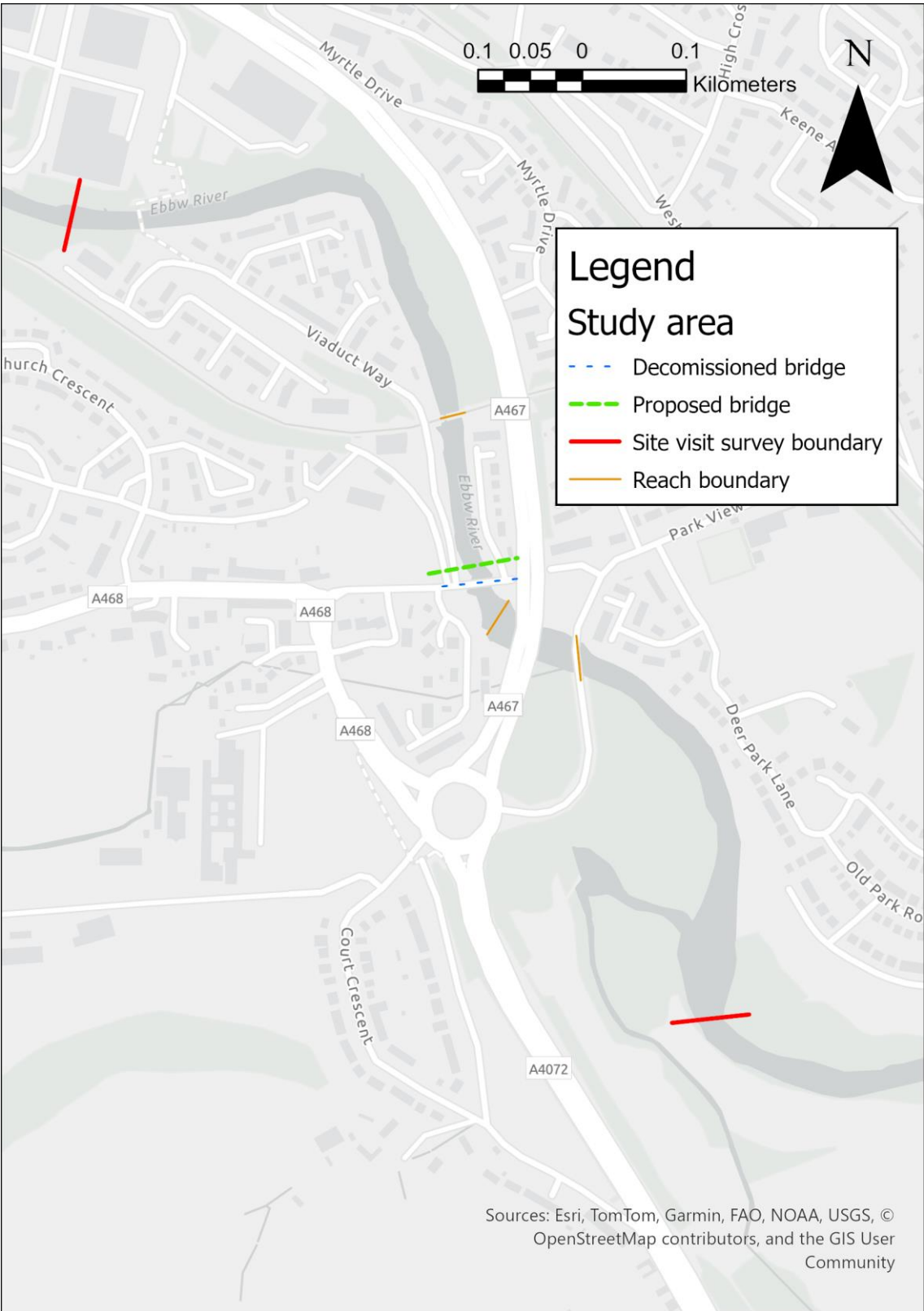


Source: Mott MacDonald, 2024

¹ Structural Assessment Report, Old Bassaleg Bridge, January 2023, Mott MacDonald

² Option Selection Report – Final, Old Bassaleg Bridge, December 2023, Mott MacDonald

Figure 1.2: Outline of survey reaches and location of the Scheme.



Source: Source: MottMacDonald, 2024

2 Methodology

To assess the baseline characteristics of the watercourse, a desk-based appraisal and site walkover survey were undertaken. Initial desk-based analysis covered an approximate 10km length to assess wider reach-scale forms and processes within the River Ebbw. This included a review of the planform, hydrology, underlying geology, land use and Water Framework Directive (WFD) baseline data. Historical channel changes were determined through analysis of historic maps, air photos and LiDAR data.

The geomorphological walkover survey covered 500m upstream and downstream of the existing Bassaleg Bridge crossing. This was conducted to assess the planform and flow characteristics, bank and substrate conditions, any depositional features, riparian and in-channel vegetation, and anthropogenic features.

Data from desk-based analysis and the site walkover were used to conduct a baseline geomorphology appraisal that established the current geomorphological processes occurring within the river, and the natural and anthropogenic drivers for change operating within the system. No previous studies on the fluvial geomorphology of the River Ebbw were available for this assessment.

Once the baseline conditions were characterised the potential impacts of the proposed Scheme were established. This included hydraulic analysis to determine the impacts of potential alterations to flow on river morphology and sediment transport. Finally, mitigation measures that may reduce the impact of the proposed Scheme on the fluvial geomorphology of the watercourse were identified.

2.1 Sources of information

The technical note has been informed by a desk-based analysis of publicly available information using sources:

- National LiDAR Programme³
- National River Flow Archive (NRFA) station 56002 – Ebbw at Rhiwderin⁴
- Ordnance Survey (OS) Mapping⁵
- British Geological Survey (BGS) 50k geology map viewer⁶
- Water Watch Wales WFD data⁷
- National Library of Scotland Historic Maps⁸

³ National LiDAR Programme, <https://www.data.gov.uk/dataset/f0db0249-f17b-4036-9e65-309148c97ce4/national-lidar-programme>, accessed Sep 2-24

⁴ NRFA Station Data for 56002 – Ebbw at Rhiwderin, <https://nrfa.ceh.ac.uk/data/station/info/56002>, accessed July 2024

⁵ Bing maps, Bing Maps - Directions, trip planning, traffic cameras and more, <https://www.bing.com/maps/>, accessed July 2024

⁶ British Geological Survey (BGS) Geology of Britain Viewer, Geology of Britain viewer - British Geological Survey, <https://geologyviewer.bgs.ac.uk/>, accessed July 2024

⁷ Water Watch Wales, naturalresourceswales.gov.uk, accessed July 2024

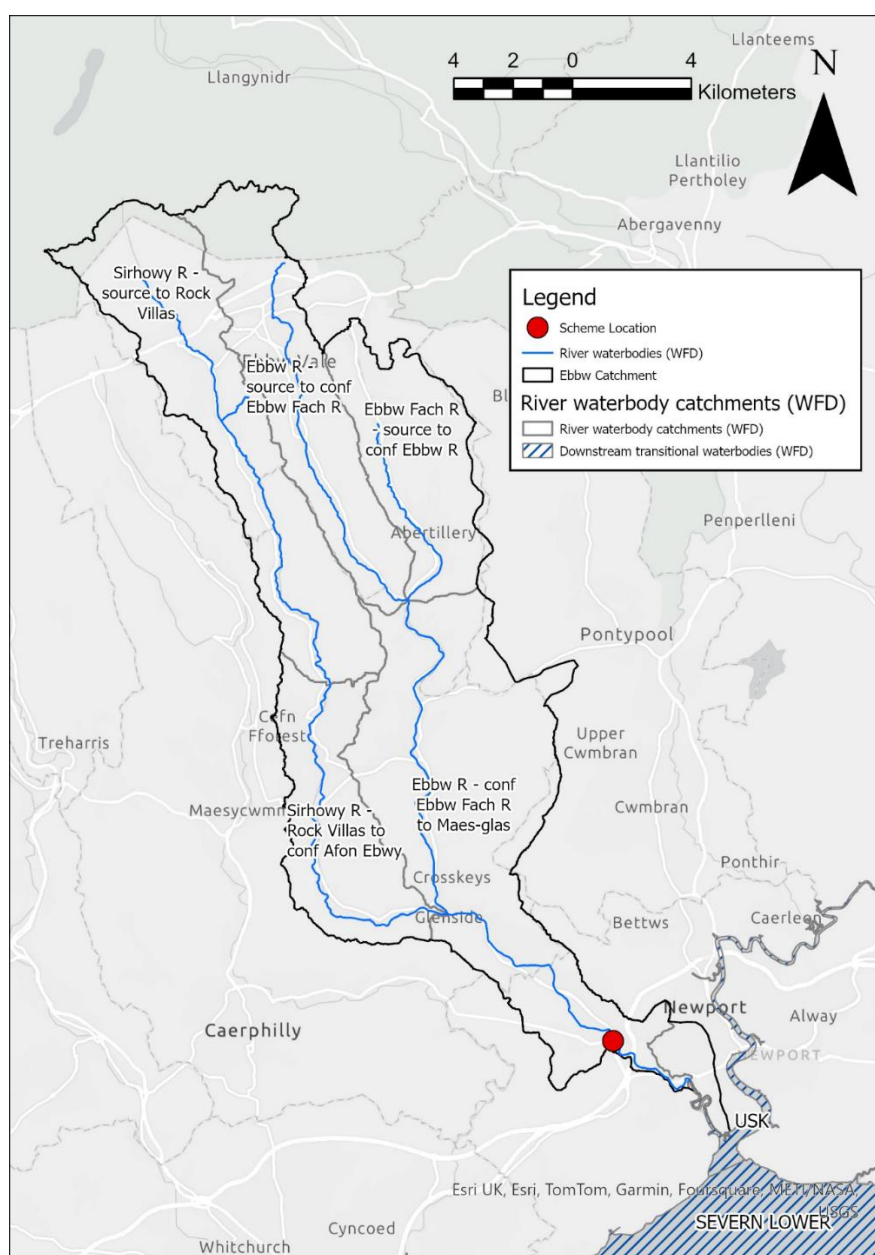
⁸ National Library of Scotland Georeferenced Maps, <https://maps.nls.uk/geo/explore/>, accessed July 2024

3 Catchment context

3.1 Watercourse

The River Ebbw catchment extends from the upland Bannau Brycheiniog National Park (557mAOD) to Newport. The river originates at the confluence between two smaller river headwaters, Ebbw Fach (Mynydd Llangynidr), and Ebbw Fawr, (Mynydd Llangattwg)⁴. The river flows through several urban areas, such as Ebbw Vale, Abertillery and Newbridge, before reaching Newport where it joins the tidally influenced reach of the River Usk (6.5km downstream) that flows into the lower Severn Estuary, a further 1.2km downstream.

Figure 3.1: Catchment of the River Ebbw, divided into WFD surface water bodies.



Source: MottMacDonald, 2024, Water Watch Wales⁷

3.2 Hydrology

The nearest NRFA station at Rhiwderin⁴ lies 3.1km upstream of the Scheme and records a catchment 216km² in size.

The river's median annual flood flow (QMED) is 106m³/s, with a mean flow of 7.416m³/s, and a Q95 of 1.324m³/s. The largest recorded flow event in the digital archive was on 16 February 2020, where the flow reached 197.6m³/s, with a stage of 3.089m.

The base flow index (BFI) of 0.55 indicates a moderate-to-high base flow component.

3.3 Geology

British Geological Survey (BGS)⁶ data indicates that the bedrock geology of the lower catchment mainly comprises very low permeability sedimentary bedrock (Devonian mudstones and sandstones). Conversely, the catchment upstream from Risca primarily comprises Carboniferous sandstones, mudstones, and siltstones, with moderate permeability. These rocks include a number of coal measures, which were extensively mined during the 18th to 20th centuries.

Superficial deposits within the lower catchment include Quaternary alluvium (clay, silt, and gravel) adjacent to the river. Quaternary head (clay, silt, and gravel) and glaciofluvial (sand and gravel) deposits are more prevalent upstream. Devensian till (diamicton) occurs away from the river corridor.

3.4 Land use

Land use within the catchment is mixed. The upper parts of the catchment are rural, incorporating parts of the Bannau Brycheiniog National Park. These areas comprise mostly heath grassland with increasing grassland and woodland further downstream.

The river flows through some significant urban areas, including Risca, Cwmcarn, Abarcarn, Newbridge forming a semi-continuous urban/suburban land use surrounding the River Ebbw and its tributaries within the valleys. Urban areas are surrounded by moors and heathland, broad-leaved forest and coniferous forest.

The region has a notably significant industrial past, with the whole region transformed during the Industrial Revolution with the opening of the Ebbw Vale Steelworks and associated coal mining in the surrounding valleys. Large areas have been re-developed following the decline of mining and steel industries, but the industrial past retains an important impact on the landscape.

Land use directly at the study area is largely suburban with smaller areas of woodland and agriculture.

The site of the former Castle Steel Works is located 600m upstream of the study site. Much of the area has been redeveloped into housing.

3.5 Water Framework Directive

The WFD status of water bodies 10km downstream from the Scheme, and 2km upstream have been identified. This includes the River Ebbw 'Ebbw R - conf Ebbw Fach R to Maes-glas' (GB109056026910) which intersects the Scheme, and the 'Usk' transitional (GB530905415404) water body which also includes the tidal area of the River Ebbw 3.9km downstream from the

Scheme. Table 2.1 displays baseline information for both water bodies from the Cycle 3 classification data⁷. The WFD assessment is provided in a separate report⁹.

Table 3.1: WFD baseline summary of nearby water bodies.

WFD waterbody	Distance from the site	Overall status	Ecological status	Chemical status	Heavily modified designation
Ebbw R - conf Ebbw Fach R to Maes-glas GB109056026910	Within	Moderate	Moderate	Moderate	Heavily modified
USK GB530905415404	3.9km	Moderate	Moderate	High	Heavily modified

Source: NRW, 2025⁷

⁹ Bassaleg Bridge WFD Assessment | 100119581-MMD-XX-XX-RP-GM-0002

4 Site walkover

A site walkover of the River Ebbw was undertaken by two fluvial geomorphologists from Mott MacDonald on the 12th August 2024. The weather at the time was dry, there had been no significant rainfall and flow was low. The site walkover was undertaken along the River Ebbw approximately 500m upstream and approximately 500m downstream from the site of the old bridge. More detail of the site walkover, including images, is included in Appendix A.

From the site walkover, the river was determined to have a sinuous platform, with a notably straight section at the bridge. The river throughout the walkover was constrained by reinforcements including rip-rap, blockstone walls, and concrete beds.

The river can be delineated into four reaches, as shown in Figure 4.1.

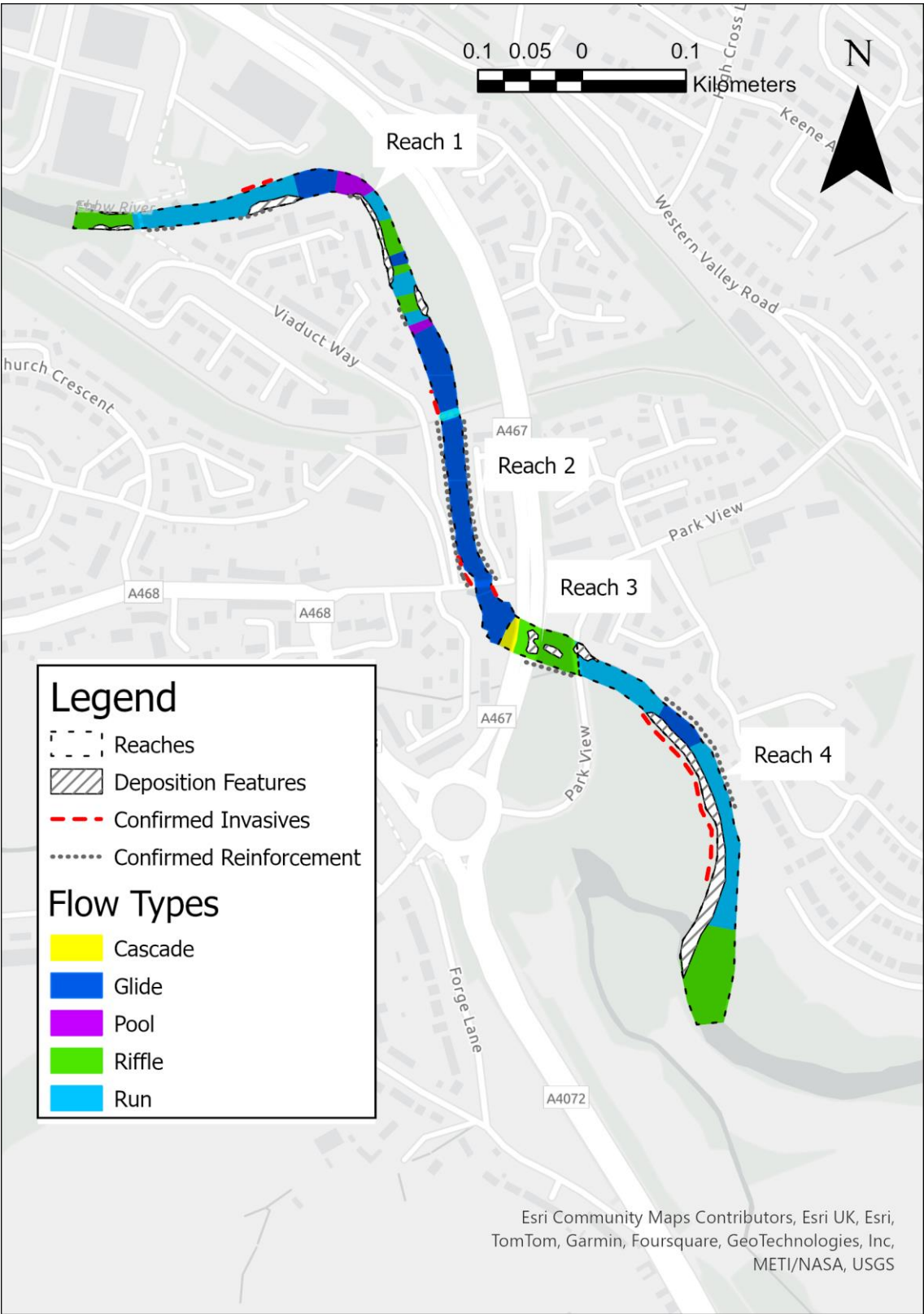
- Reach 1 = upstream of the footbridge to the railway viaduct
- Reach 2 = viaduct to the weir
- Reach 3 = weir to motorway bridge, and;
- Reach 4 = motorway bridge to the downstream meander at the study area boundary.

The geomorphological characteristics of the study reaches are summarised in Table 4.1. Much of the river corridor is urban, with occasional pockets of deciduous woodland. The river had a gravel bed and was mostly dominated by pool-riffle type morphology. Reach 2 (where the Scheme is located), has a much lower flow diversity compared to the other reaches, and at the time of survey was impounded by the downstream weir.

Table 4.1: Summary of reach scale geomorphology based on walkover survey.

Table Parameter		Reach 1	Reach 2	Reach 3	Reach 4
Channel gradient		Moderate	Low	Moderate	Low
Representative channel dimensions (m)	Bankfull width	20.0	20.0	34.0	34.0
	Bankfull depth	3.0	4.0	6.0	1.0
	Wetted width	15.0	17.0	20.0	15.0
	Wetted depth	0.2	1.5	0.5	0.3
Adjacent land use type	Left bank	Deciduous woodland	Urban	Urban	Urban
	Right bank	Urban	Urban	Deciduous woodland	Deciduous woodland
Dominant flow type		Run	Glide	Riffle	Glide
Dominant substrate		Cobble	Gravel	Cobble	Cobble
Lateral bars present		Yes	No	Yes	Yes
Mid channel bars present		No	No	Yes	No
Bars – dominant material		Cobble	N/A	Cobble	Cobble
Planform		Passive meandering	Passive meandering	Passive meandering	Passive meandering
Riparian vegetation		Deciduous woodland and shrub	Improved grassland and shrub	None	Deciduous woodland and scrub

Figure 4.1: Map of river flow types and features from site walkover



Source: MottMacDonald, 2024

5 Baseline geomorphological appraisal

5.1 Planform and morphology

Understanding the geomorphological conditions is a critical part of ensuring the long-term stability of the new bridge. To understand the mutual impacts between the watercourse form and function, and bridge stability, an understanding of the baseline geomorphology is important. Scour behind the right pier of the old, decommissioned bridge shows the potential for fluvial processes to undermine bridge stability.

The River Ebbw within the study area is currently a passive meandering river. The overall gradient of the river is relatively high, at about 0.010 (Figure 5.1) dropping from c.400m AOD to around 30mAOD. The study area is located within the lower end of the river system, where the gradient decreases to about 0.005. Channel sinuosity within the study area is relatively low, with the sinuosity index (SI) at around 1.17. Figure 5.2 shows the watercourse profile within proximity of the study area.

The drainage configuration is strongly controlled by the underlying geology, forming a trellis pattern in the upper parts of the catchment. The river is naturally confined by relatively steep valley sides for most of its length, however valley bottoms are typically alluvial, with floodplains well-developed. From Newport to Brynmawr, the river corridor is mostly urban, which has increased confinement and constrained the river along most of its length. The study area is at the lower end of the river system, where gradient decreases and the river valley widens prior to discharge in the Usk and ultimately the Severn Estuary. At the study site, the natural floodplain is about 600m wide.

The river is relatively high energy and pool-riffle sequences are well-developed along most of the river, the notable exception being impounded areas such as upstream of the weir crossing. Depositional features include gravel bars, mostly associated with meander bends and downstream of tributaries, and riffles. These features suggest active sediment transport of coarse material.

Figure 5.1: Elevation of the river from Dock's Way (ST3043885720) to the Carno Reservoir (SO1653212920) according to National LiDAR Programme data³.

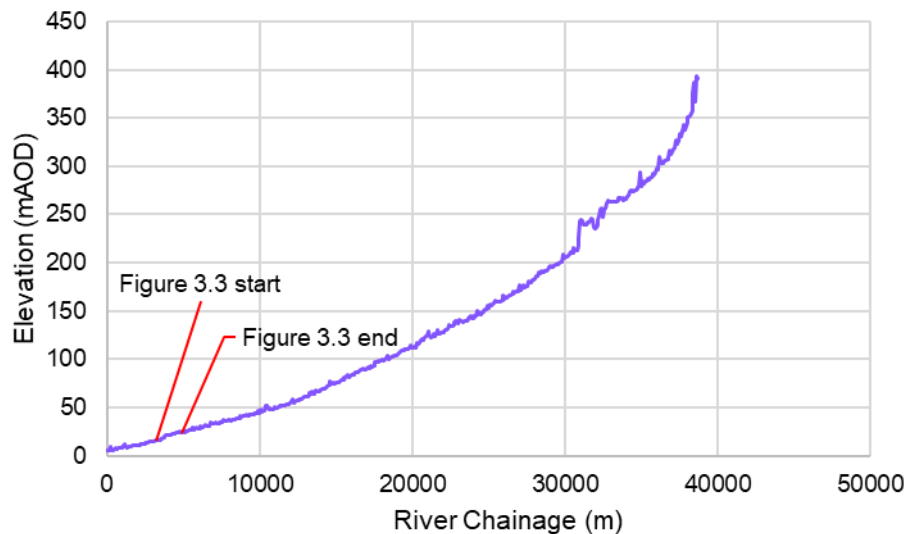
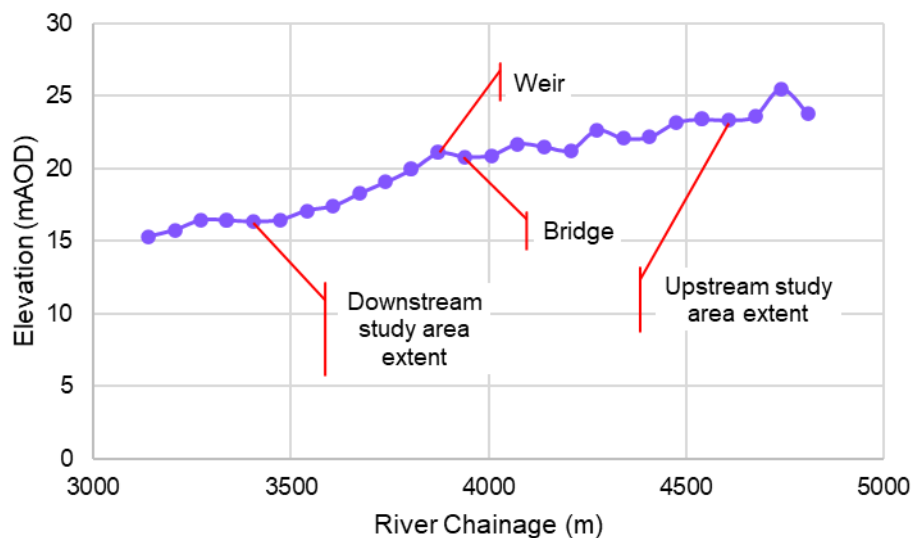


Figure 5.2: Elevation of the river from extents shown in Figure 3.2 according to National LiDAR programme data³.



5.2 Long-term geomorphological drivers

The Newport area was glaciated during the Quaternary glaciations, which likely sculpted river valleys, setting the framework for the modern drainage distribution. These glaciations left behind a thick layer of till, forming the valley sides. The current level of the River Ebbw and surrounding borehole information suggests the river has likely progressively incised down through these deposits, reaching the underlying bedrock at times, probably during times of sea level (and consequently base level) fall. Dominant trends were likely erosional, and the remnants of previous interglacial periods are seen through the occurrence of stepped Quaternary fluvial terraces, the nearest being 600m downstream from the study area at Tredegar Park.

The Holocene floodplain is about 300m wide in the study area, widening to about 500m past Pye Corner. Borehole data suggests the valley floor is filled with about 8m depth of Holocene alluvium (mostly gravel). This suggests Holocene trends were primarily aggradational. The River Ebbw was likely very dynamic, with active meandering across the floodplain. This would have progressively infilled the valley floor to the present level, probably through the progressive migration of point bars. This natural floodplain development and river adjustment has likely been halted by historical modification of the river corridor and current river management as well as reduced sediment supply.

5.3 River modification and management

Until the 18th century, the catchment and river corridor were sparsely populated. Direct modifications to the river and river corridor were probably limited to reclamation of floodplain areas for agriculture, and damming of the channel and tributaries for watermills. However, the catchment was transformed during the Industrial Revolution when the area became an important industrial centre for the iron and coal industry.

The underlying geology of the catchment includes a number of coal measures and forms part of the South Wales Coal Measures Group. These units were extensively quarried during the 18th-20th Centuries¹⁰. The proximity to coal brought significant industry to the region, most notably steelworks. The steep topography meant such industry was typically situated on valley bottoms along the natural river corridor. An extensive network of roads and railway lines were constructed, mostly adjacent to the River Ebbw and its tributaries. The course of the river was likely modified and extensive bank protection has effectively fixed the river to a set planform. Spoil and other colliery waste was distributed along the river corridor¹¹, which probably raised the floodplain levels, further reducing lateral connectivity. Leaching of pollutants from this waste continue to be a source of pollution for the river.¹²

At the study site, the river corridor is almost entirely urbanised upstream of the weir. The floodplain has been developed for housing, and ground levels have likely been altered to reduce flood risk to those receptors. The river appears to have been straightened for the construction of Forge Mews. In addition, a housing estate was constructed in 2004 on the right bank upstream of the viaduct. The construction of Viaduct Way, the access road for this development, appears to have further narrowed the channel. The river is now disconnected from its former floodplain at the Scheme site, and the channel is constrained by extensive bank protection that prevents natural bank migration and could encourage erosion of the bed to occur.

Downstream of the weir, the channel displays a somewhat more natural alignment; however, the river is crossed by several major roads which have created fixed points, preventing natural channel migration. At Tredegar Park, whilst the right bank remains somewhat natural, the left bank floodplain has been developed for housing in 2016. The river is now embanked on this side and channel migration is prevented by rock revetment and gabion baskets.

5.4 Recent channel changes

Recent channel changes within the study area have been investigated through historical map analysis by comparing OS maps⁸ from 1892 to 1914 mapping with present day satellite imagery. Aside from possible channel narrowing relating to the recent housing developments (outlined in Section 5.3 above) channel changes are restricted to areas immediately

¹⁰ Coal Mines - Wales - Northern Mine Research Society (nmrs.org.uk), accessed 15/09/24

¹¹ [View map | DataMapWales \(gov.wales\)](#), accessed 15/09/24

¹² NRW (2016). South East Valleys Management Catchment Summary. Available at: https://cdn.naturalresources.wales/media/679387/2016_updated-south-east_valleys_catchment_summary_nrw.pdf, accessed 15/09/24

downstream of the old bridge crossing at Tredegar Park. Imagery suggests some lateral channel migration of the right bank and a slight increase in sinuosity (Figure 5.3). The distribution of bars and in-channel islands has changed over time.

An eroding bank indicating active channel migration was observed on the site walkover on the right bank at Tredegar Park. However, natural channel migration is largely restructured due to extensive bank protection.

5.5 Future directory of change

A full analysis of the future directory of change is not possible without a full fluvial audit of the catchment. However, from the investigations undertaken as part of this study it is likely that the extensive anthropogenic alteration is likely having an impact on the future direction of change within the river system.

The river is naturally dynamic, but the extensive urbanisation and associated channel management and modification has meant that large parts of the river are now fixed, and the planform largely passive. Whilst historic coal mining and associated activities probably increased sediment supply to the river, the extensive urbanisation of the river corridor and prevalence of bank protection is likely currently restricting sediment supply.

The development of the river corridor and raising of floodplain levels has significantly reduced floodplain connectivity. High flows, which would naturally spill on to the floodplain are now confined to channels, resulting in higher flow velocities and increased stream power than would naturally be present.

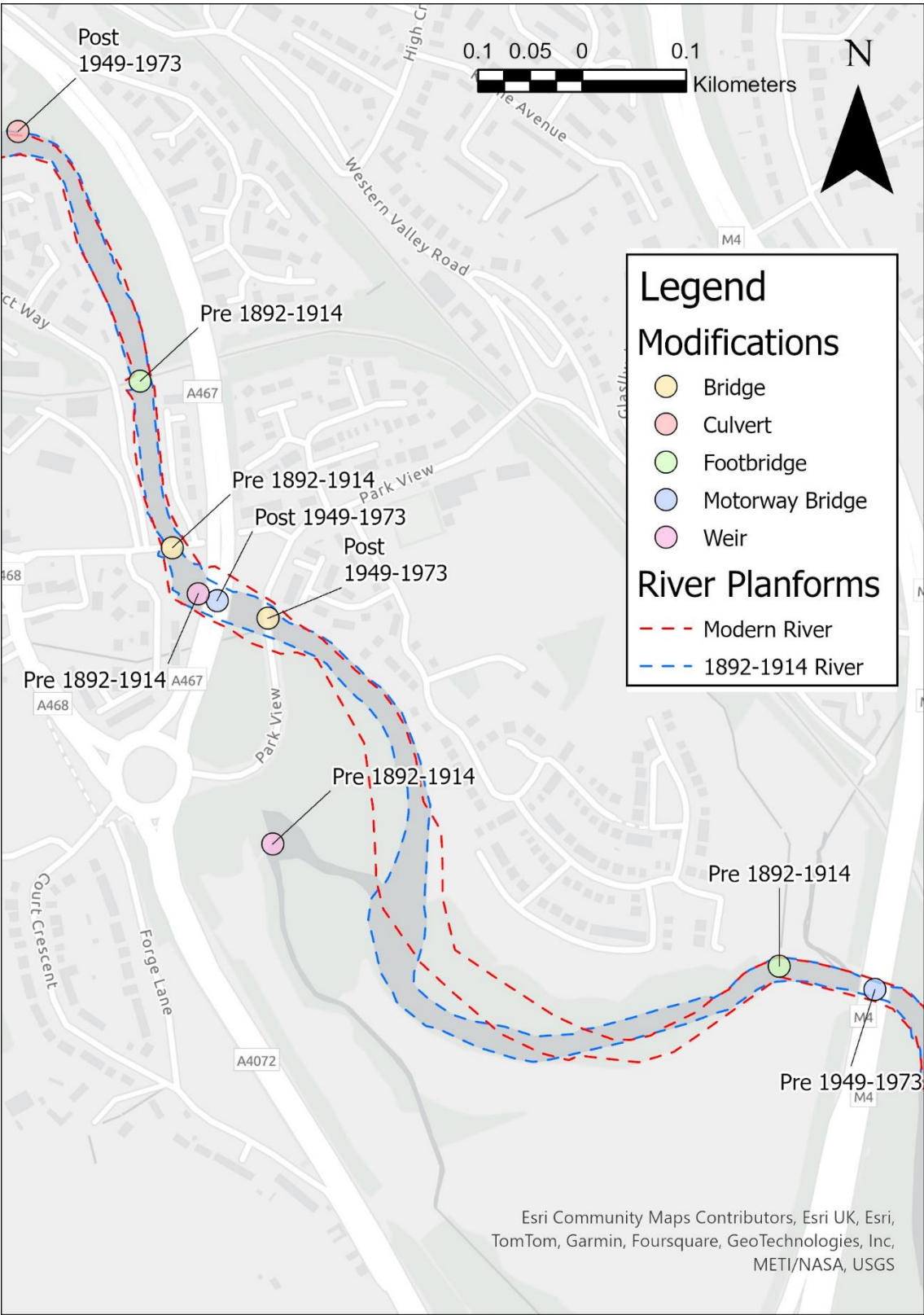
Considering the above, it is likely that natural channel adjustment in response to future pressures such as climate change has been highly restricted. Furthermore, it is likely that the river at the study site will be prone to ongoing incision (bed erosion) given the hard bank protection. The downstream weir is currently in poor condition, and its ongoing failure could result in a rapid change in patterns of erosion and deposition at the proposed bridge location. These risks should be taken into consideration during the design of the replacement bridge structure.

5.6 Recommendations for the design

Given the evidence of existing and potential continuing bed erosion in the reach located by Bassaleg Bridge, and the deterioration of the weir influencing the bed level, the design should account for the risk of continued scour in this reach of the River Ebbw. The following recommendations are made for the replacement bridge structure;

- Disconnection from the floodplain means overland flow is probably absent, and erosion protection should be designed to accommodate flows for large in-channel events;
- Channel bed modification should be avoided as far as possible, to maintain natural bed substrate and transport. If channel bed modification is unavoidable, the design could consider the use of flow deflectors and cross vanes to guide flow through the structure and reduce the potential for scour at any abutments (if required) and improve geomorphological diversity along the impounded reach.
- The structure should ideally be single span, and have as large an opening as feasible to minimize the potential for flow contraction and scour between abutments;
- The design of the bridge should consider the potential implications of weir failure (or future weir removal);
- Green engineering solutions could be considered in the design but may not to be suitable due to the land use constraints and expected high stream power within the river;

Figure 5.3: Historic channel position from 1892-1914 compared to present day, and the type and date of installation for nearby artificial structures.



Source: Digitised from National Library of Scotland Georeferenced Maps⁸

6 Geomorphological Impact assessment

6.1 Proposed scheme

A new bridge is proposed shortly upstream from the decommissioned bridge in Bassaleg. The new bridge will be 12.8m wide, with a clear span of 21m. By comparison, the existing bridge has a clear span of 17.1m and a width of 13.24m. The old bridge also includes a 10.85m undercut section behind the abutment on the left bank that is partially wetted, formed by historic scour. A wall will form scour protection along the right bank of the proposed bridge. The design of the proposed bridge and old decommissioned bridge is outlined in the Bassaleg Bridge Detailed Design Planning Drawings Site Layout Plan¹³.

The existing Bassaleg Bridge will be demolished following construction of the replacement structure. The extent of the existing sub-structure to be retained remains to be determined and is subject to flood risk assessment, ecological mitigation requirements, demolition feasibility, and the outcomes of this geomorphological assessment.

Scour protection will be installed across a ~50m total stretch of the River Ebbw, with bed protection 25m upstream and 25m downstream of the proposed bridge, and bank protection stretching ~48m on the right bank and ~30m on the left bank. Rip-rap will form the bed scour protection. The rip-rap size will vary from a D_{n50} of 0.75m upstream and downstream of the bridge, and a D_{n50} of 1m underneath the bridge itself. Rip-rap will be buried underneath ~60cm of bed material that will resemble baseline substrate. Bank scour protection will be provided by blockstone.

A floodwall will be installed south of the bridge near the weir to protect the local residential area. It will be set back from the river by at least 5m for a length of c.40m with backfill. It is designed to withstand up to a 1-in-200-year event.

Construction phase activities with the capacity to alter the hydromorphological regime include two cofferdams placed sequentially on either side of the proposed bridge, the methodology used to excavate the riverbed to install rip-rap, and the methodology used during the demolition of the bridge itself. At the time of writing this report, further details regarding these activities are unavailable.

6.2 Hydraulic modelling results

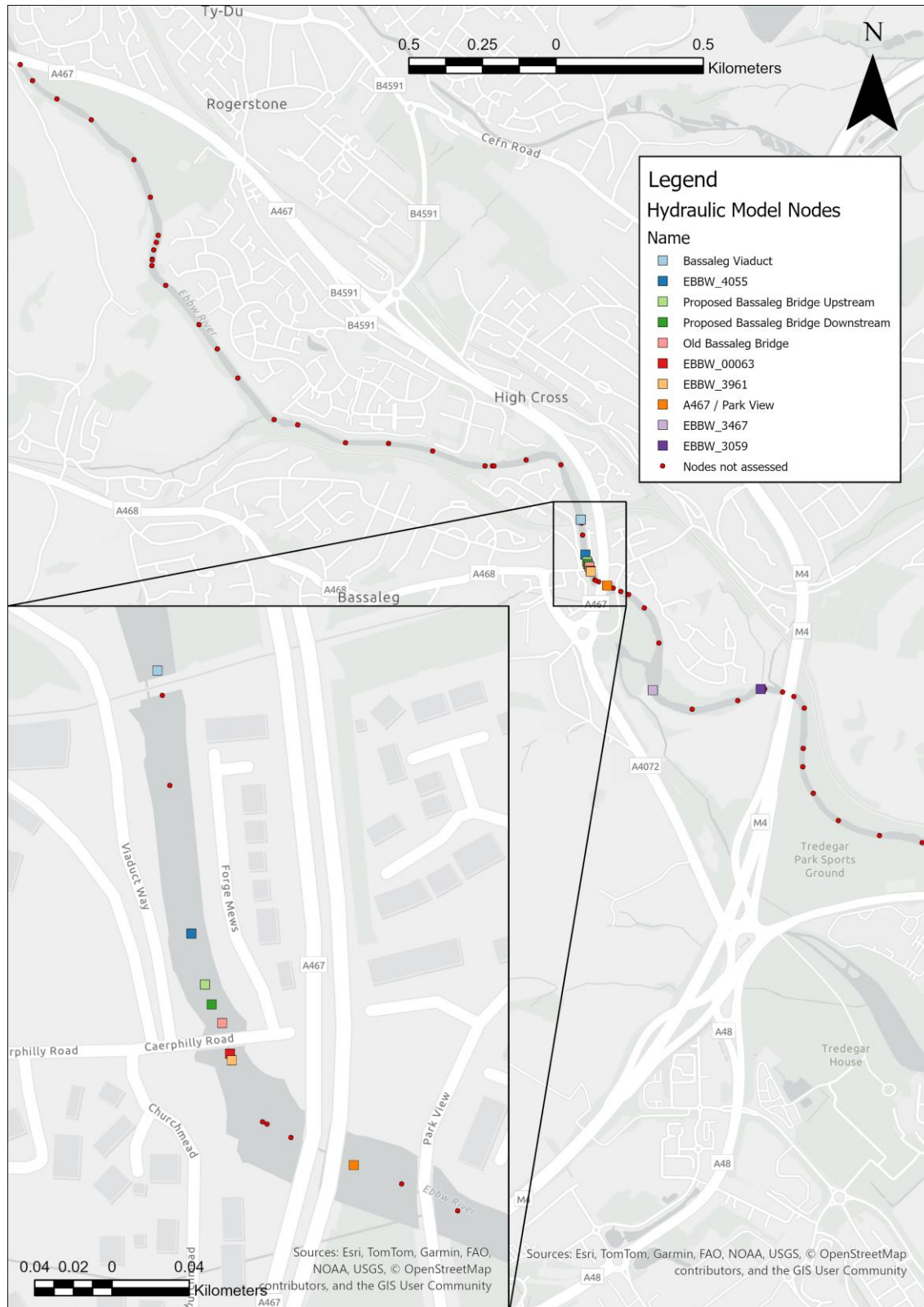
Hydraulic modelling results have been assessed to determine how changes in the river hydraulics may increase risks of erosion or deposition. The main factors considered are the magnitude of changes to water level and velocity. As identified in Section 4, various vulnerabilities exist, including active erosion downstream of the Scheme and a weir showing signs of damage. Changes to water level and flow velocity in these areas may heighten risk of erosion or weir failure, and risks to the new bridge.

Nodes from the hydraulic model were selected for assessment based on proximity to the Scheme, vulnerability of the watercourse to change (based on the walkover survey), and a potential pathway for effect. Selected nodes are outlined in Figure 5.3. The Bassaleg Viaduct node was chosen to identify upstream changes to the flow regime at the bridge. The nodes EBBW_3467 and EBBW_3059 were chosen due to the more geomorphologically sensitive nature of the area due to the presence of complex depositional features.

¹³ Bassaleg Bridge Detailed Design Planning Drawings Site Layout Plan | 100119581-MMD-XX-XX-DR-PL-1201

Hydraulic modelling results indicate that the temporary (construction phase) and permanent structure (operation phase) of the Scheme are anticipated to result in minor and localised changes to the hydraulic regime. Further analysis is presented below.

Figure 6.1: Hydraulic model nodes used for geomorphological assessment



6.2.1 Operational Phase Hydraulic Modelling

Velocity, stage (level), and flow results have been assessed for a range of flow events, comparing the Scheme scenario with the baseline. This allows assessment of the potential permanent changes with the new bridge in place and existing bridge structure removed. The results are outlined in Appendix B, specifically Table B.1, Table B.2, and Table B.3. Compared to the baseline, velocities are largely unchanged, but could be slightly higher within the immediate vicinity of the new bridge. This, combined with lower Scheme-scenario water levels in the same location, implies less constriction from the new bridge. These changes are localised to the bridge with negligible changes to both parameters further downstream. The same trend exists within the 1-in-100-year event, albeit with a greater magnitude as the drop in elevation and increase in velocity downstream from the bridge increases.

In all scenarios, the effects are highly localised to the nodes immediately surrounding the bridge, with any changes further downstream being largely negligible.

The elevation of the proposed bridge soffit varies from 21.9m on the right bank to 21.2m on the left bank. A 1-in-2-year event will not be constricted at all by the deck of the bridge itself, although events at or larger than the 1-in-100 will be.

6.2.2 Construction stage (temporary works) hydraulic model data

Velocity, stage, and flow results have been assessed, comparing the Scheme scenario during construction with the baseline. This includes proposed cofferdams to facilitate dry working areas for construction. The results of this analysis are outlined in Table B.4, Table B.5, and Table B.6. There are no expected changes during the 1-in-2-year flood event. During the 1-in-100 and 1-in-1000-year flood events, velocities will decrease, and water levels will increase as a result of the constriction caused by the cofferdam as the Ebbw will become more likely to overtop the banks. Such changes are localised in the 1-in-100-year flood event model however, and changes to velocity and water level further downstream or upstream are negligible. Very small downstream changes to level in the 1-in-1000-year flood event model, although changes are still minor and it is unlikely such an event will occur during the relatively short construction phase.

6.3 Potential geomorphology impacts

The aperture of the new bridge is larger than the existing bridge, and no abutment extend into the river itself. This represents an improvement over the existing bridge layout which does have abutments intruding into the banks, and is the most open span design possible under the site constraints. Compared to the baseline conditions, the river will be less constricted, particularly during flood events.

The impact of blockstone bank scour protection will be limited by the existence of hard banks upstream from the Scheme, and the fact that bank and bed scour protection will not extend past the existing bridge. The existing upstream bank, includes blockstone and a setback concrete wall. While the established vegetation within existing blockstone will be removed, this will be able to re-establish with time as gaps will be included in new scour protection. There will therefore be negligible long-term detriment.

The bed scour protection, including rip-rap 25m upstream and downstream of the Scheme, will present a new detriment, potentially affecting sediment continuity through the presence of large sediment. To mitigate this, rip-rap will be buried under approximately 60cm of sediment resembling the baseline conditions. It is anticipated that any changes will be minor and localised.

The bridge will cause 12.8m of shading across the River Ebbw. This is very similar to the existing bridge so just changes slightly the location of shading, with a highly localised effect on river temperature and local habitat.

The lack of water level or velocity change outside the immediate vicinity of the bridge, particularly in areas identified as vulnerable, such as eroding river banks and the damaged weir, indicates that there will be no overall increase in risk due to the new bridge. It is notable that the weir downstream from the Scheme is in a state of disrepair with a section of the downstream edge undercut and incised. Concerns exist over future deterioration of the weir, and possible risk to the integrity of the new bridge based on potential weir failure. Geomorphological analysis of the existing models has showed no change to the hydrological conditions surrounding the weir, although more detailed analysis of scour at this location would be required to eliminate risk of exacerbating the weir's degradation.

During the construction phase, cofferdams will be used to facilitate temporary channel diversion to create dry working areas, which may constrict flow and be more likely to mobilise sediment in the affected area. Similarly to the operational phase, changes are localised within the immediate vicinity of the bridge. Limited changes are identified for a 1-in-1000 year event, although the small changes and low likelihood of such as event occurring during the construction process make this a low risk.

6.4 Mitigation

The design of the new bridge should consider the geomorphological conditions of the study area outlined in this report and key standards from the Design Manual for Roads and Bridges¹⁴ and SEPA Engineering in the water environment good practice guide River Crossings¹⁵. Best practice should be adhered to including:

- Construct the bridge perpendicular to river flow;
- Ensure walls or abutments are set back from the river banks, as far as feasible;
- Minimise hard engineering where possible while balancing the need to protect essential infrastructure;
- Bury the foundations of abutments below ground/bed level;
- Scour protection cannot be entirely avoided due to the site constraints, including utilities and the necessity of maintenance access. The impact of this scour protection can nonetheless be mitigated, such as planting ledges or gaps within the blockstone to facilitate plant growth.

Best practice should be considered in collaboration with other disciplines during optioneering and design development.

¹⁴ Highways England (2020) Design Manual for Roads and Bridges LA113 Road drainage and the water environment

¹⁵ SEPA (2010) Engineering in the water environment: good practice guide – River crossings

7 Conclusions

The River Ebbw is a naturally dynamic river constrained by recent and historic development, and it also faces other pressures due to floodplain disconnection and pollution. Extensive bank protection may limit current sediment supply, which is demonstrated by some evidence of riverbed incision and bank erosion in areas where protection does not exist.

The study area is in a straightened reach where the surrounding floodplain has been built upon and disconnected from the river. The channel appears to have been narrowed and deepened, confining it over time. This acts to concentrate river energy through the confined section at the bridge crossing, over time potentially contributing to the existing bridge's instability. An open section behind the right bank abutment that was not present on the original bridge design drawings indicate active erosion in this area has occurred overtime. Scour may therefore have contributed to the bridge instability.

While the existing weir impoundment limits stream power in the reach upstream within the location of the existing and new bridge, and therefore capacity for erosion, this effect is less during high flows when the weir is likely drowned out. It is likely that such high flow events caused the scour evident under the existing bridge piers, particularly where the bridge abutment footprint was narrowing the river channel.

An analysis of the geomorphology of the area and hydraulic modelling results has found that the proposed bridge replacement's impact on the flow regime is likely to be minor and localised, especially after demolition of the existing bridge. It is mainly a 'like for like' type replacement in a slightly different location and with a wider span which should have a positive effect of constraining high flows less than the existing.

During the operational phase, changes to velocity, and depth are negligible outside of the immediate footprint of the Scheme and very minor (less than 0.2m/s change within immediate vicinity of the bridge). During the Construction phase, the use of a cofferdam to create dry working area may result in localised changes but this is considered a low risk to the river geomorphology and should be managed by consideration of the timing of works to avoid high flow periods.

A. Site Walkover Notes

A.1 Reach 1

A.1.1 Planform and flow characteristics

Reach 1 can be characterised as a medium gradient of ~ 0.0035 based on LiDAR data³ and confined by steep banks (Figure A.1). The river typology is currently passively meandering. Flow diversity was high with various glide, riffle, and pool sections, showing an overall pool-riffle type morphology (Figure A.2). Flow generally appears to have relatively high energy, compared to downstream reaches. The channel cross-section varies, average bankfull width is $\sim 20\text{m}$, wetted width $\sim 15\text{m}$, bankfull depth $\sim 3\text{m}$, and wetted depth is $\sim 0.2\text{m}$.

Figure A.1: Downstream facing view of Reach 1



Figure A.2: Side view of upstream end of Reach 1



A.1.2 Bank and substrate conditions

Bankfull depth was 1.5-2m, and the river appeared somewhat incised and disconnected from the floodplain. The bed substrate was mostly cobble-sized (Figure A.3). Bank material was variable, comprising a mixture of cobble, gravel, sand and silt (Figure A.4). Fluvial bank erosion was visible on the outside bends of meanders, with bare earth and exposed tree roots. Banks were undercut, indicating erosion through hydraulic action. Full bank erosion and lateral migration have been largely prevented by the presence of rock revetments. Banks were predominantly vegetated, with dense coverage of deciduous woodland and scrub on both sides.

Figure A.3: View of Reach 1 substrate at downstream extent.



Figure A.4: View of bank and substrate towards upstream end of Reach 1.



A.1.3 Depositional features

Depositional features included a series of unvegetated lateral bars as seen in Figure A.5 and Figure A.6. These mostly occurred on the inside bends of meanders and comprised gravel-pebble to cobble-sized clasts.

Figure A.5: Downstream view of large bar on right bank.



Figure A.6: Example of a smaller bar on left bank.



A.1.4 Riparian and in-channel vegetation

Riparian vegetation was dominated by scrubs and deciduous woodland, with many overhanging trees (Figure A.7 and Figure A.8). No 'in-channel' aquatic vegetation was observed.

Invasive species included Japanese Knotweed which predominantly populated the left bank and Himalayan Balsam which was observed on both banks.

Figure A.7: View of right bank vegetation.



Figure A.8: View of left bank vegetation.



A.1.5 Anthropogenic features

Physical modification along Reach 1 included two crossings, various outfalls, and bed/bank protection. A pedestrian footbridge (Figure A.10) is located at the upstream extent and a historic railway viaduct is observed at the downstream extent of the reach. The remains of an old, deconstructed bridge were also visible. Outfalls along the reach were likely road drainage, although this could not be confirmed. A perched outfall is shown in Figure A.9, which may indicate historic incision of the channel. Bank protection and artificial stabilisation was extensive along the reach, comprising mostly of rock revetment and gabion baskets, some of which had failed (e.g. Figure A.11). Bed protection was observed at the railway viaduct comprising concrete (Figure A.12).

Figure A.9: View of perched outfall indicating channel degradation.



Figure A.10: View of footbridge at the upstream extent.



Figure A.11: View of failed gabion baskets on left bank.



Figure A.12: View of concreted river bed below railway bridge.



A.2 Reach 2

A.2.1 Planform and flow characteristics

Reach 2 had a relatively low-gradient, with water levels controlled by a weir at the downstream extent (Figure A.13). The channel was over-deep (Figure A.14) and lacked natural flow diversity. The planform appeared artificially straight. Flow was mostly relatively slow and dominated by glides. The channel has a bankfull width of ~20m, a wetted width of ~17m, a bankfull depth of 4m and a wetted depth of 1.5m.

Figure A.13: Upstream facing view of Reach 2.



Figure A.14: Downstream facing view from upstream end of Reach 2.



A.2.2 Bank and substrate conditions

Banks were relatively high (bankfull height of ~4m) and as such the river is notably disconnected from the surrounding floodplain, which has been developed for housing. Banks were composed of a composite mixture of silt, sand, gravel and cobble (Figure A.15). There were less visible instances of erosion on this reach compared to others, largely due to the extensive bank protection and impounded flow. The notable exception to this is at the old bridge where the right bank had experienced visible scour undercutting the right pier and undercutting near a footpath at the upstream end. Substrate was less visible, with cobble and gravel where visible (Figure A.16).

Figure A.15: View of Reach 2 bank materials near eroded area.



Figure A.16: View of substrate at downstream end of Reach 2.



A.2.3 Depositional features

In contrast to other reaches, depositional features were notably absent.

A.2.4 Riparian and in-channel vegetation

Riparian vegetation comprised improved grassland and scrub on both banks with sparse tree cover. No in-channel vegetation was visible. Invasive species were prevalent along both banks (Figure A.17 and Figure A.18).

Figure A.17: View of right bank vegetation, including Himalayan Balsam.



Figure A.18: View of left bank vegetation, including Japanese Knotweed.



A.2.5 Anthropogenic features

This reach is constrained by many physical modifications, including bank protection, outfalls, bridges, and the impoundment caused by a downstream weir (Figure A.20). Natural flow diversity has been significantly reduced by the occurrence of the weir which has artificially raised the river level, causing upstream impoundment. One outfall was observed, presumably related to road drainage. The old Bassaleg Bridge shades the channel, with the right bank pier appearing to have undergone scour (Figure A.19; Figure A.21). Bank protection and stabilisation is extensive, and the river is confined by riprap and concrete walls which line both banks (Figure A.22).

Figure A.19: View of the existing Bassaleg Bridge.



Figure A.20: View of drainage outfall.



Figure A.21: View of gabion baskets beneath Bassaleg Bridge.



Figure A.22: View of blockstone reinforcing both banks



A.3 Reach 3

A.3.1 Planform and flow characteristics

Reach 3 begins at the weir where there is an artificial cascade which drops the bed level by about 1.5m. This passes into a moderate gradient section with high flow diversity (Figure A.23). The planform is straight and confined by walls, but a range of flow types were recorded including riffles, runs, and pools (Figure A.24). Due to the high walls forming the bank, bankfull depth was ~6m compared to the 0.5m wetted depth.

Figure A.23: Upstream facing view of Reach 3.



Figure A.24: Downstream facing view from upstream end of Reach 3.



A.3.2 Bank and substrate conditions

Reach 3 was entirely disconnected from the floodplain by the ~6m high artificial concrete banks that line both banks (Figure A.25). Given the artificial nature of these banks, there were no signs of bank erosion, and the river was entirely constrained. The substrate was mostly composed of cobbles, with some larger boulders.

Figure A.25: View of Reach 3 concrete banks and substrate.



A.3.3 Depositional features

Depositional features included a lateral bar and two mid-channel bars (Figure A.26; Figure A.27). These were partially vegetated and created flow diversity within the channel, forming regions of pools and riffles.

Figure A.26: Upstream view showing both mid-channel bars.



Figure A.27: Example of a smaller bar on left bank.



A.3.4 Riparian and in-channel vegetation

Given the artificial nature of the banks, no bank vegetation was observed. However, some trees were overhanging over the banks. Vegetation was also absent from the channel, with the exception of the intermittent vegetation on the bars. Large woody debris was present on some bars, creating additional flow and morphological diversity.

A.3.5 Anthropogenic features

Anthropogenic features included the weir, which has the effect of impounding flow upstream, and adding a flow diversity downstream (Figure A.28; Figure A.30). The weir appeared to be in a poor state of repair, partly undermined at the toe (Figure A.29). Other modification included the concrete embankments, which confine flow to the channel, and a large motorway bridge which shades the channel (Figure A.31). A road drainage outfall (Figure A.28) was also observed.

Figure A.28: View of drainage outfall near the weir.



Figure A.29: Upstream view of weir, including apparent erosion damage.



Figure A.30: Downstream view of weir.



Figure A.31: View of motorway bridge.



A.4 Reach 4

A.4.1 Planform and flow characteristics

Reach 4 is characterised by a wider channel with relatively high flow diversity, moderate gradient, and a return to a more sinuous planform (Figure A.32). Geomorphological features were more natural and pool riffle sequences were observed. These provide flow diversity, including runs, glides and riffles and pools (Figure A.33). Flow appeared to be relatively energy in places but at the time of survey, turbidity appeared to be low. Bankfull width is notably wider at c.34m. The wetted channel width is c.15m, bankfull depth c.1m, and wetted depth c.0.3m.

Figure A.32: Upstream facing view from upstream end of Reach 4.



Figure A.33: Downstream facing view from downstream stream end of Reach 2.



A.4.2 Bank and substrate conditions

Reach 4 appeared connected to its floodplain on the right bank, which is not substantially raised above the water level. The left bank is comparatively disconnected due to the presence of rip-rap and gabion baskets protecting a housing estate (Figure A.34). Active fluvial bank erosion was observed on the right bank on the outside bend of a meander (Figure A.35). Substrate was mostly composed of cobble-sized clasts.

Figure A.34: View of Reach 4 substrate midway through reach.



Figure A.35: Example of eroded bank at unprotected downstream area of Reach 4.



A.4.3 Depositional features

Depositional features included a large lateral bar occurring on the right bank (Figure A.36). This joins up with a confluence bar downstream, marking the confluence of a small tributary. Bars were partially vegetated with small plants (Figure A.37).

Figure A.36: Downstream view of large bar on right bank.



Figure A.37: Closer view of bar strata and vegetation.



A.4.4 Riparian and in-channel vegetation

Riparian vegetation mostly comprised scrub, with deciduous woodland lining the right bank, which extends into a large woodland area. Notably, this area had a very large amount of Himalayan balsam near the banks, as well as on the floodplain (Figure A.39). Japanese knotweed was also visible on the right bank (Figure A.38). No in-channel vegetation was visible.

Figure A.38: View of right bank vegetation, including Himalayan balsam and Japanese knotweed.



Figure A.39: View of left bank vegetation.



A.4.5 Anthropogenic features

The main modification on Reach 4 was the bank protection lining much of the left bank (Figure A.40; Figure A.41). This included rip-rap along the housing estate itself, and gabion baskets along the less populated section of the reach.

Figure A.40: View of gabion baskets further downstream on left bank.



Figure A.41: View of rip-rap on left bank.



B. Hydraulic Modelling Results

Table B.1: Results of the 1-in-2 year event model comparing the baseline and operational phase model.

Location	Peak Water Level (mAOD)		Peak Velocity (m/s)	
	Baseline	Scheme	Baseline	Scheme
Bassaleg Viaduct	21.69	21.66	1.7	1.7
EBBW_4055	20.98	20.87	2.5	2.7
Proposed Bassaleg Bridge upstream	20.86	20.68	2.6	2.9
Proposed Bassaleg Bridge	-	20.68	-	1.8
Proposed Bassaleg Bridge downstream	20.75	20.68	3.3	3.2
Old Bassaleg Bridge	20.81	20.75	2.1	2.3
EBBW_00063	20.81	20.81	2.4	2.4
EBBW_3961	20.75	20.74	2.1	2.1
A467 / Park View	19.36	19.36	1.7	1.7
EBBW_3467	17.14	17.14	2.8	2.8
EBBW_3059	15.57	15.57	1.6	1.6

Table B.2: Results of the 1-in-100 year event model comparing the baseline and operational phase model.

Location	Peak Water Level (mAOD)		Peak Velocity (m/s)	
	Baseline	Scheme	Baseline	Scheme
Bassaleg Viaduct	23.30	23.03	2.1	2.2
EBBW_4055	22.59	21.80	3.3	3.9
Proposed Bassaleg Bridge upstream	22.48	21.59	3.7	4.2
Proposed Bassaleg Bridge	-	21.59	-	1.8
Proposed Bassaleg Bridge downstream	22.24	21.50	4.0	4.6
Old Bassaleg Bridge	22.69	21.44	2.9	3.7
EBBW_00063	21.66	21.59	2.8	2.9
EBBW_3961	21.41	21.40	3.5	3.5
A467 / Park View	20.33	20.33	2.5	2.5
EBBW_3467	17.51	17.51	3.1	3.1
EBBW_3059	16.65	16.65	2.2	2.2

Table B.3: Results of the 1-in-1000 year event mode comparing the baseline and operational phase model.

Location	Peak Water Level (mAOD)		Peak Velocity (m/s)	
	Baseline	Scheme	Baseline	Scheme
Bassaleg Viaduct	24.05	24.05	2.2	2.2
EBBW_4055	23.19	23.15	3.3	3.9
Proposed Bassaleg Bridge upstream	23.14	23.27	3.7	4.2

Location	Peak Water Level (mAOD)		Peak Velocity (m/s)	
	Baseline	Scheme	Baseline	Scheme
Proposed Bassaleg Bridge	-	23.27	-	1.8
Proposed Bassaleg Bridge downstream	23.12	22.14	4.0	4.7
Old Bassaleg Bridge	23.52	22.33	2.9	3.8
EBBW_00063	22.31	22.42	2.8	3.0
EBBW_3961	22.05	22.12	3.5	3.7
A467 / Park View	20.52	20.55	3.3	3.5
EBBW_3467	18.22	18.23	3.1	3.1
EBBW_3059	17.70	17.68	2.5	2.6

Table B.4: Results of the 1-in-2 year event model comparing the baseline and temporary construction stage model.

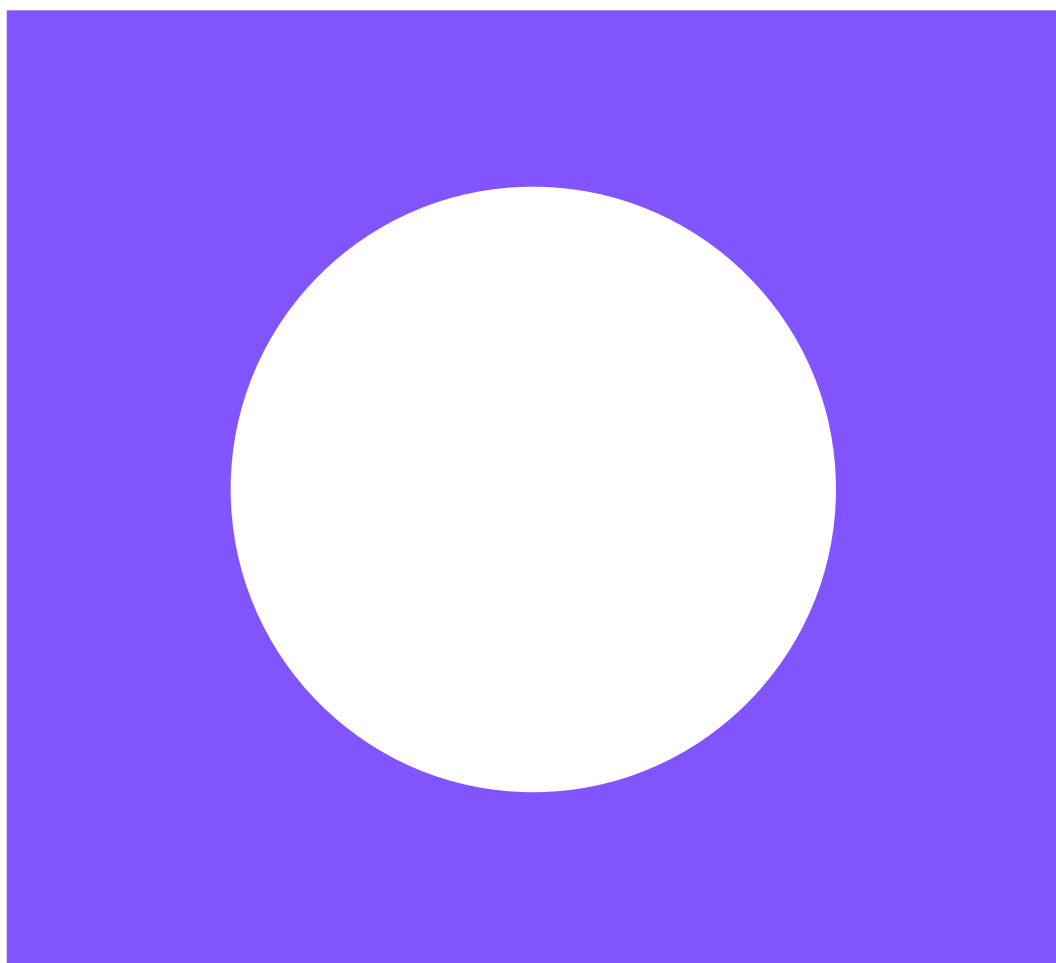
Location	Peak Water Level (mAOD)		Peak Velocity (m/s)	
	Baseline	Construction	Baseline	Construction
Bassaleg Viaduct	21.69	21.67	1.7	1.7
EBBW_4055	20.98	20.88	2.5	2.7
Proposed Bassaleg Bridge upstream	20.86	20.70	2.6	2.9
Proposed Bassaleg Bridge	-	20.70	-	1.8
Proposed Bassaleg Bridge downstream	20.75	20.69	3.3	3.2
Old Bassaleg Bridge	20.81	20.81	2.1	2.1
EBBW_00063	20.81	20.81	2.4	2.4
EBBW_3961	20.75	20.75	2.1	2.1
A467 / Park View	19.36	19.36	1.7	1.7
EBBW_3467	17.14	17.14	2.8	2.8
EBBW_3059	15.57	15.57	1.6	1.6

Table B.5: Results of the 1-in-100 year event model comparing the baseline and construction phase model.

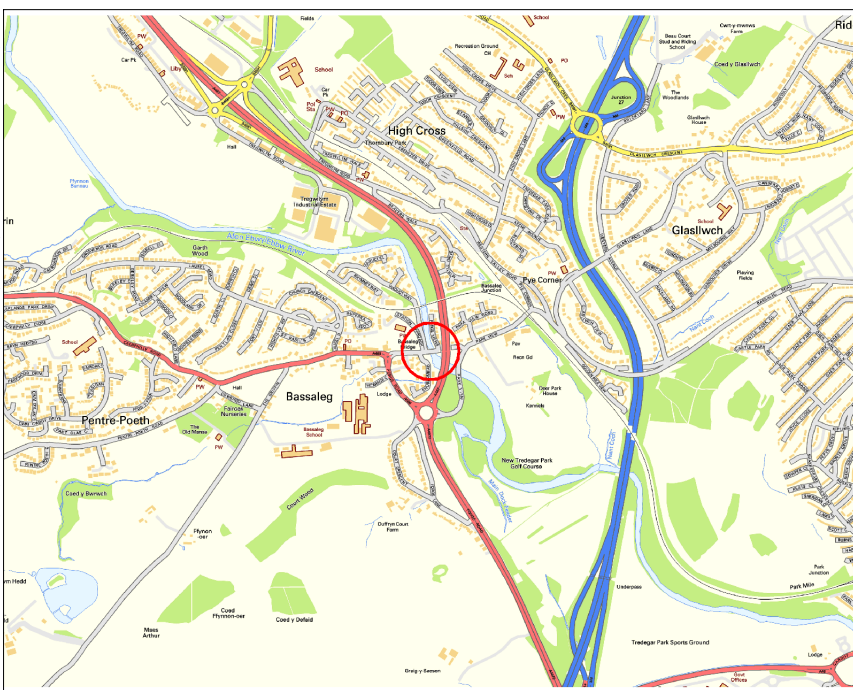
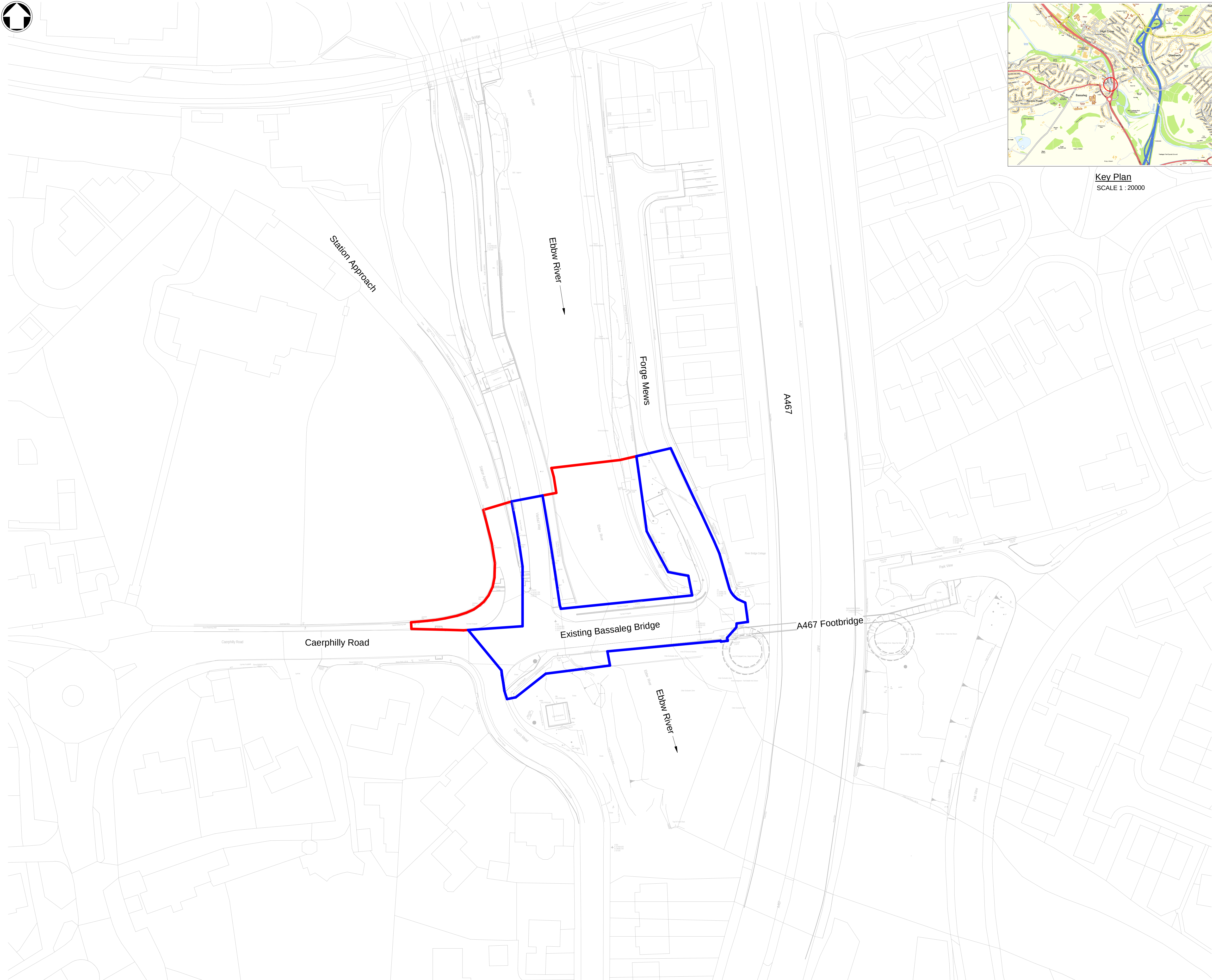
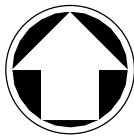
Location	Peak Water Level (mAOD)		Peak Velocity (m/s)	
	Baseline	Construction	Baseline	Construction
Bassaleg Viaduct	23.30	23.48	2.1	2.2
EBBW_4055	22.59	23.02	3.3	3.4
Proposed Bassaleg Bridge upstream	22.48	22.98	3.7	3.8
Proposed Bassaleg Bridge	-	22.98	-	1.8
Proposed Bassaleg Bridge downstream	22.41	22.39	4.0	4.1
Old Bassaleg Bridge	22.69	22.67	2.9	2.9
EBBW_00063	21.66	21.78	2.8	2.7
EBBW_3961	21.41	21.54	3.4	3.3
A467 / Park View	20.33	20.33	2.5	2.5
EBBW_3467	17.51	17.51	3.1	3.1
EBBW_3059	16.65	16.65	2.2	2.2

Table B.6: Results of the 1-in-1000 year event model comparing the baseline and construction phase model.

Location	Peak Water Level (mAOD)		Peak Velocity (m/s)	
	Baseline	Construction	Baseline	Construction
Bassaleg Viaduct	24.05	24.07	2.2	2.2
EBBW_4055	23.19	23.16	3.3	3.4
Proposed Bassaleg Bridge upstream	23.14	23.71	3.7	3.8
Proposed Bassaleg Bridge	-	23.71	-	1.8
Proposed Bassaleg Bridge downstream	23.12	22.95	4.0	4.1
Old Bassaleg Bridge	23.52	23.19	2.9	2.9
EBBW_00063	22.31	22.29	2.8	2.7
EBBW_3961	22.05	22.10	3.5	3.3
A467 / Park View	20.52	20.49	3.3	3.0
EBBW_3467	18.22	18.19	3.1	3.1
EBBW_3059	17.70	17.75	2.5	2.4



D. Design Drawings



Key Plan

SCALE 1 : 20000

- Notes
1. Do not scale from this drawing.
 2. Drawing is to be read in colour.
 3. This drawing is to be read in conjunction with all relevant project drawings.

Key to symbols

- Site extents boundary
- NCC adopted land within site extents

Reference drawings

100119581-MMD-XX-XX-DR-PL-1001 - Existing Plan & Elevation
100119581-MMD-XX-XX-DR-PL-1002 - Demolition Plan & Elevation
100119581-MMD-XX-XX-DR-PL-1201 - Site Layout Plan
100119581-MMD-XX-XX-DR-PL-1301 - Proposed Elevations
100119581-MMD-XX-XX-DR-PL-1302 - Proposed Sections
100119581-MMD-XX-XX-DR-HW-0101 - Highways GA
100119581-MMD-XX-XX-DR-UT-5001 - Existing Utilities

P02	04/09/2025	SS	Addressed Client Comments	OJ	KL
P01	06/06/2025	SS	For Comment	OJ	KL
Rev	Date	Drawn	Description	Ch'k'd	App'd

Status Stamp

Preliminary Issue

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Title

Bassaleg Bridge Detailed Design
Planning Drawing
Location plan

Designed	S Sahoo	SS	Eng. Check	O Jefferies	OJ
Drawn	S Sahoo	SS	Coordination	V Hughes	VH
Dwg. Check	A Rawat	AR	Approved	K Lee	KL

MMD Project Number	Scale at A1	Security
100119581	As indicated	STD

Suitability Description	Suit. Code
Submitted for Planning Approval	S4

Drawing Number	Rev
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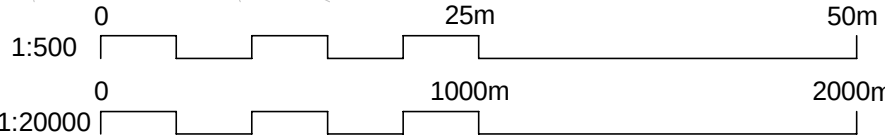
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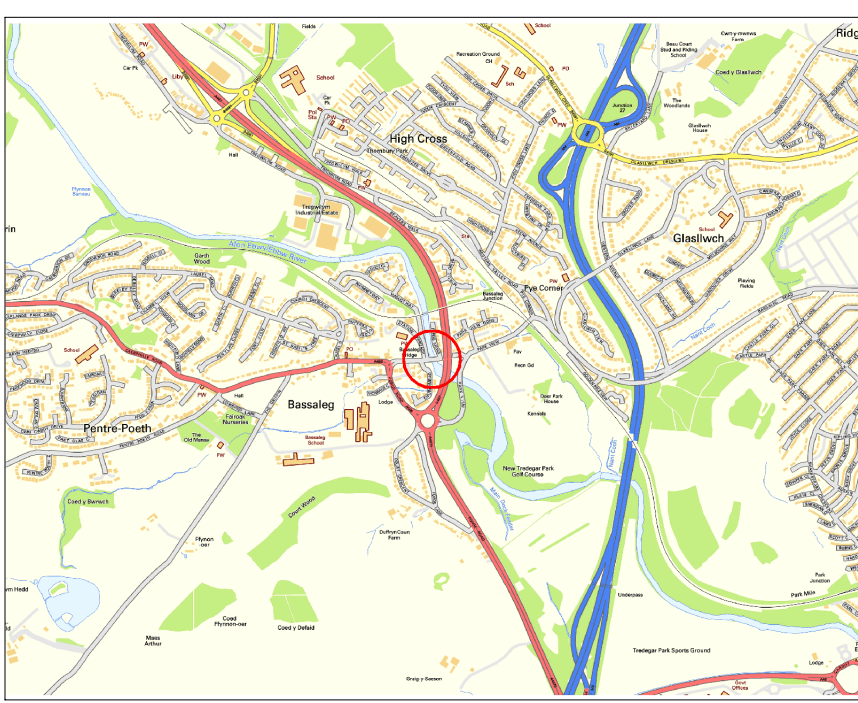
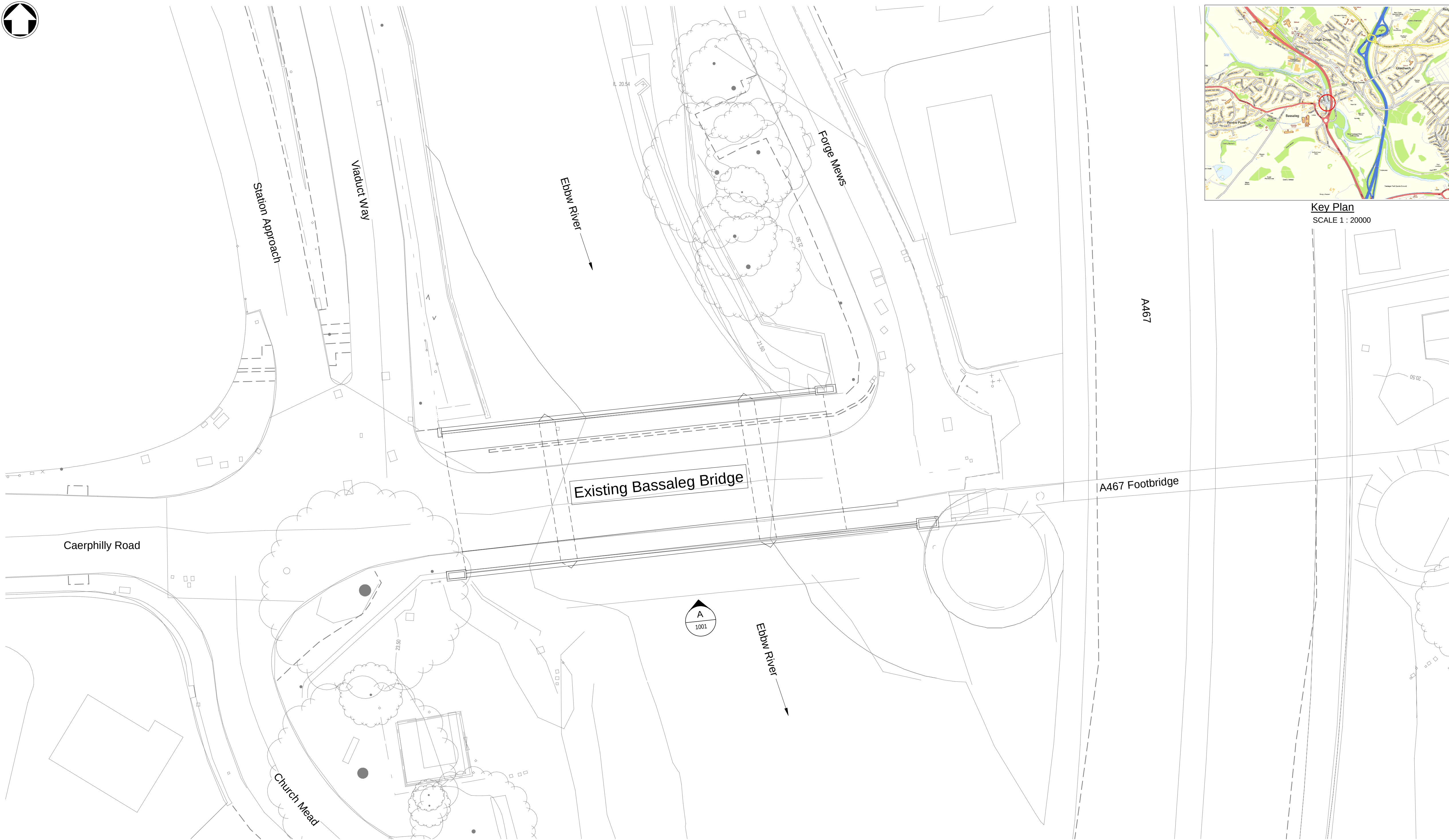
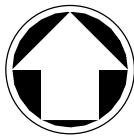
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Location Plan

SCALE 1 : 500





- Notes
1. Drawing is to be read in colour.
 2. Do not scale from this drawing.
 3. All levels are in metres above ordinance datum unless otherwise stated.
 4. Existing plan and elevation are based on a topographical survey undertaken on behalf of Mott MacDonald by Infomap in November 2024 and OS Mastermap layer.

Key to symbols

Water Level

Reference drawings

100119581-MMD-XX-XX-DR-CE-0001 - Location Plan
100119581-MMD-XX-XX-DR-PL-1002 - Demolition Plan & Elevation
100119581-MMD-XX-XX-DR-PL-1201 - Site Layout Plan
100119581-MMD-XX-XX-DR-PL-1301 - Proposed Elevations
100119581-MMD-XX-XX-DR-PL-1302 - Proposed Sections
100119581-MMD-XX-XX-DR-HW-0101 - Highways GA
100119581-MMD-XX-XX-DR-UT-5001 - Existing Utilities

Rev	Date	Drawn	Description	Ch'k'd	App'd
P02	04/09/2025	SS	Addressed Client Comments	OJ	KL
P01	06/06/2025	SS	For Comment	OJ	KL

Status Stamp

Preliminary Issue

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Title

Bassaleg Bridge Detailed Design
Planning Drawing
Existing Plan & Elevation

Designed	S Sahoo	SS	Eng. Check	O Jefferies	OJ
Drawn	S Sahoo	SS	Coordination	V Hughes	VH
Dwg. Check	A Rawat	AR	Approved	K Lee	KL

MMD Project Number	Scale at A1	Security
100119581	As indicated	STD

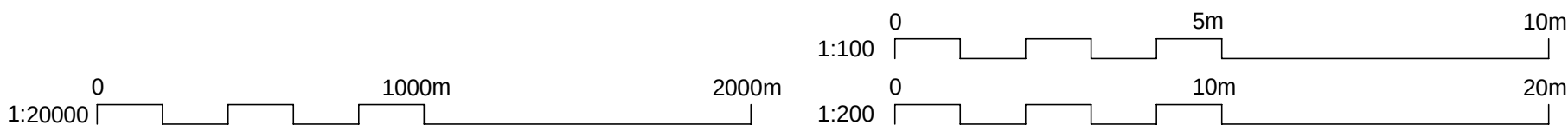
Suitability Description	Suit. Code
Submitted for Planning Approval	S4

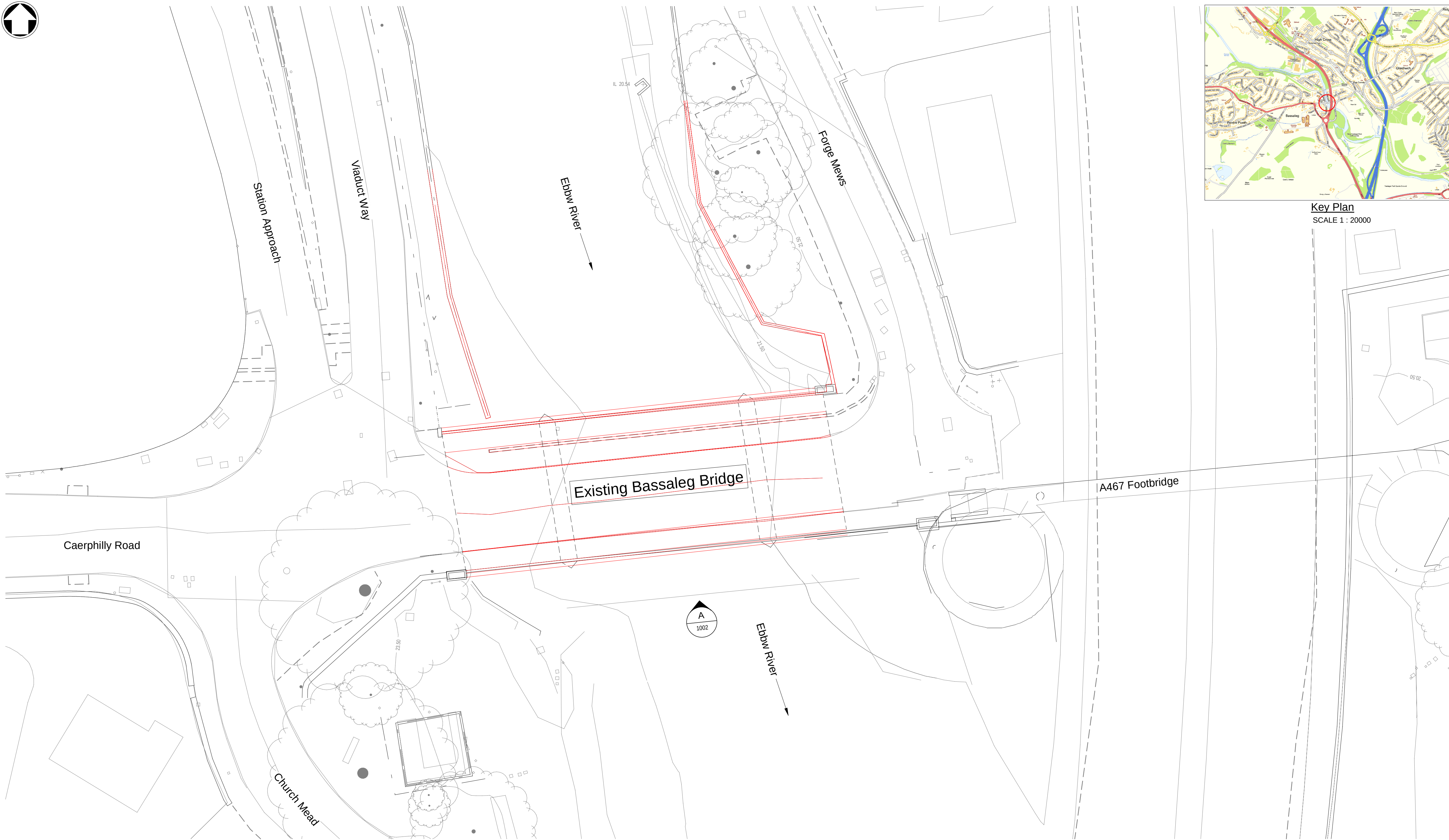
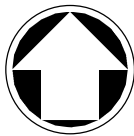
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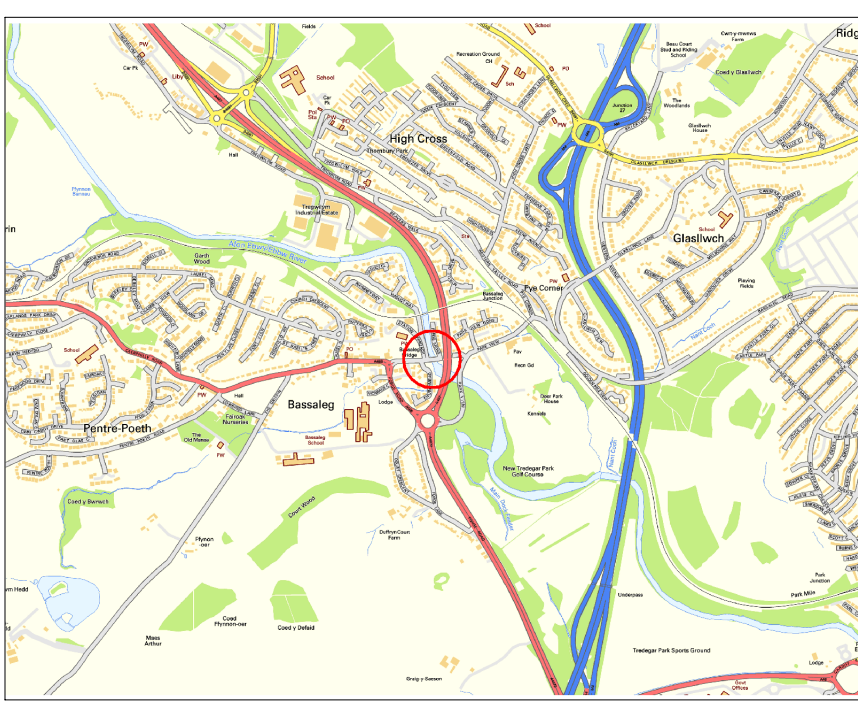
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Existing Plan
SCALE 1 : 200



Key Plan
SCALE 1 : 20000

- Notes
1. Drawing is to be read in colour.
 2. Do not scale from this drawing.
 3. All levels are in metres above ordnance datum unless otherwise stated.
 4. Existing plan and elevation are based on a topographical survey undertaken on behalf of Mott MacDonald by Infomap in November 2024 and OS Mastermap layer.

Key to symbols

	Water Level
	Existing - To be demolished/removed
	Existing - To be demolished/removed

Reference drawings

100119581-MMD-XX-XX-DR-CE-0001 - Location Plan
100119581-MMD-XX-XX-DR-PL-1001 - Existing Plan & Elevation
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P02	04/09/2025	SS	Addressed Client Comments	OJ	KL
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Rev	Date	Drawn	Description	Ch'k'd	App'd

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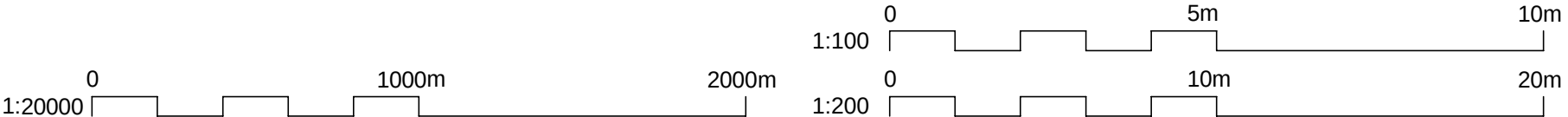
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NP20 4UR

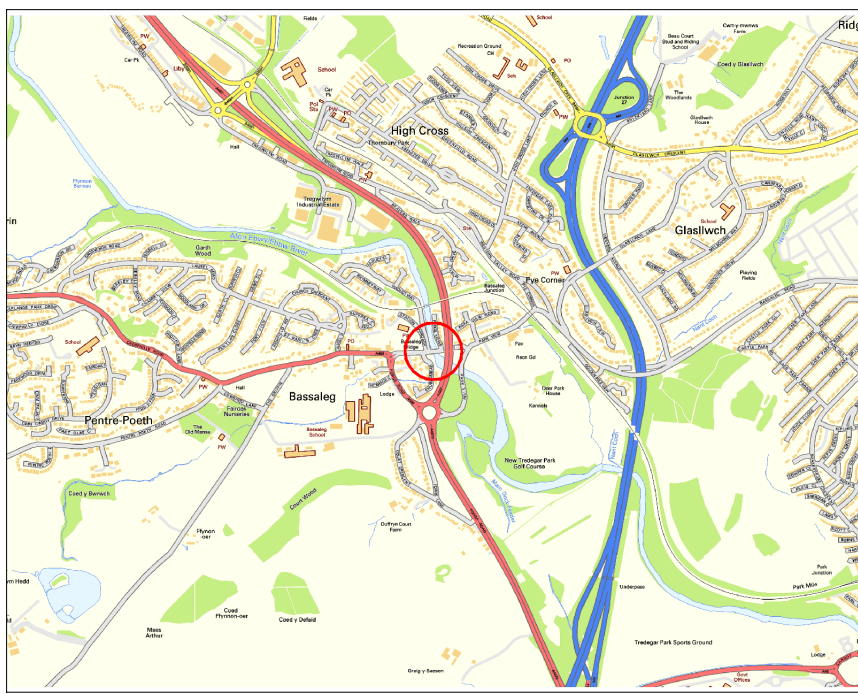
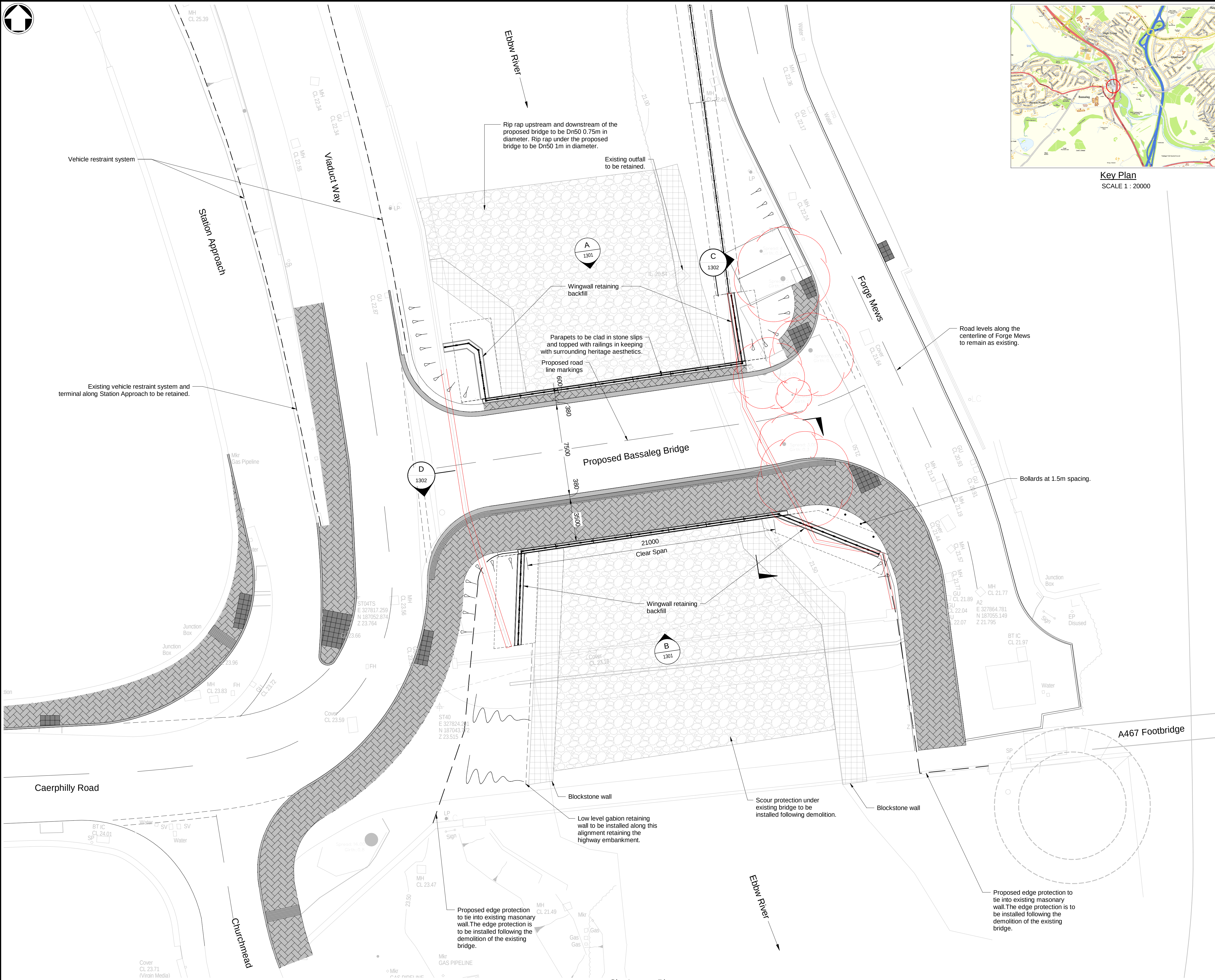


Title

Bassaleg Bridge Detailed Design
Planning Drawing
Demolition Plan & Elevation

Designed	S Sahoo	SS	Eng. Check	O Jefferies	OJ
Drawn	S Sahoo	SS	Coordination	V Hughes	VH
Dwg. Check	A Rawat	AR	Approved	K Lee	KL
MMD Project Number	100119581	Scale at A1	As indicated	Security	STD
Suitability Description	Submitted for Planning Approval				Suit. Code S4
Drawing Number	100119581-MMD-XX-XX-DR-PL-1002				Rev P02





- Notes
1. Drawing is to be read in colour.
 2. Do not scale from this drawing.
 3. This drawing is to be read in conjunction with all relevant project drawings.
 4. Arrangement is based on a topographical survey undertaken on behalf of Mott MacDonald by Infomap in November 2024.
 5. The existing Bassaleg Bridge is to be demolished following the construction of the proposed new bridge.
 6. Street lighting design to be undertaken by Newport County Council.

Key to symbols

	Existing - To be demolished/removed
	Tree - To be removed in RED
	Topographic Survey (Infomap, November 2024)
	Riprap scour protection
	Pavement
	Blockstone
	Indicative slope of ground level
	Hazard warning surface

Reference drawings

100119581-MMD-XX-XX-DR-CE-0001 - Location Plan
100119581-MMD-XX-XX-DR-PL-1001 - Existing Plan & Elevation
100119581-MMD-XX-XX-DR-PL-1002 - Demolition Plan & Elevation
100119581-MMD-XX-XX-DR-PL-1301 - Proposed Elevations
100119581-MMD-XX-XX-DR-PL-1302 - Proposed Sections
100119581-MMD-XX-XX-DR-HW-0101 - Highways GA
100119581-MMD-XX-XX-DR-UT-5001 - Existing Utilities

P02	04/09/2025	SS	Addressed Client Comments	OJ	KL
P01	06/06/2025	SS	For Comment	OJ	KL
Rev	Date	Drawn	Description	Ch'k'd	App'd

Status Stamp

Preliminary Issue

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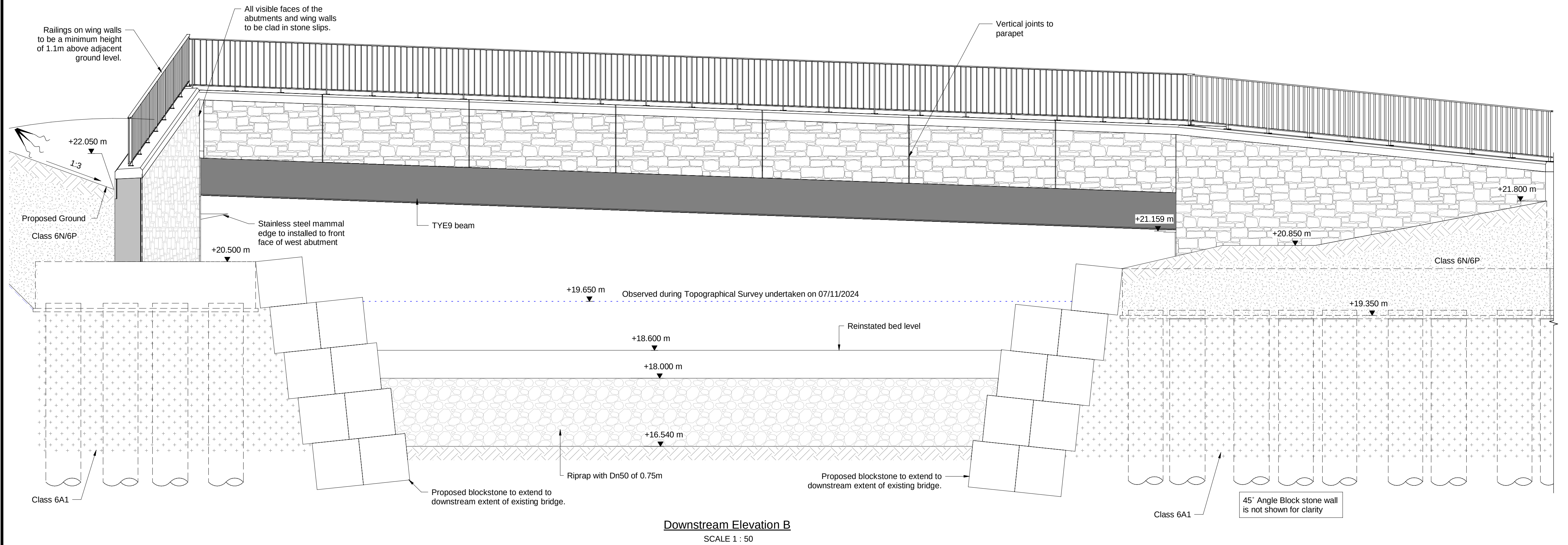
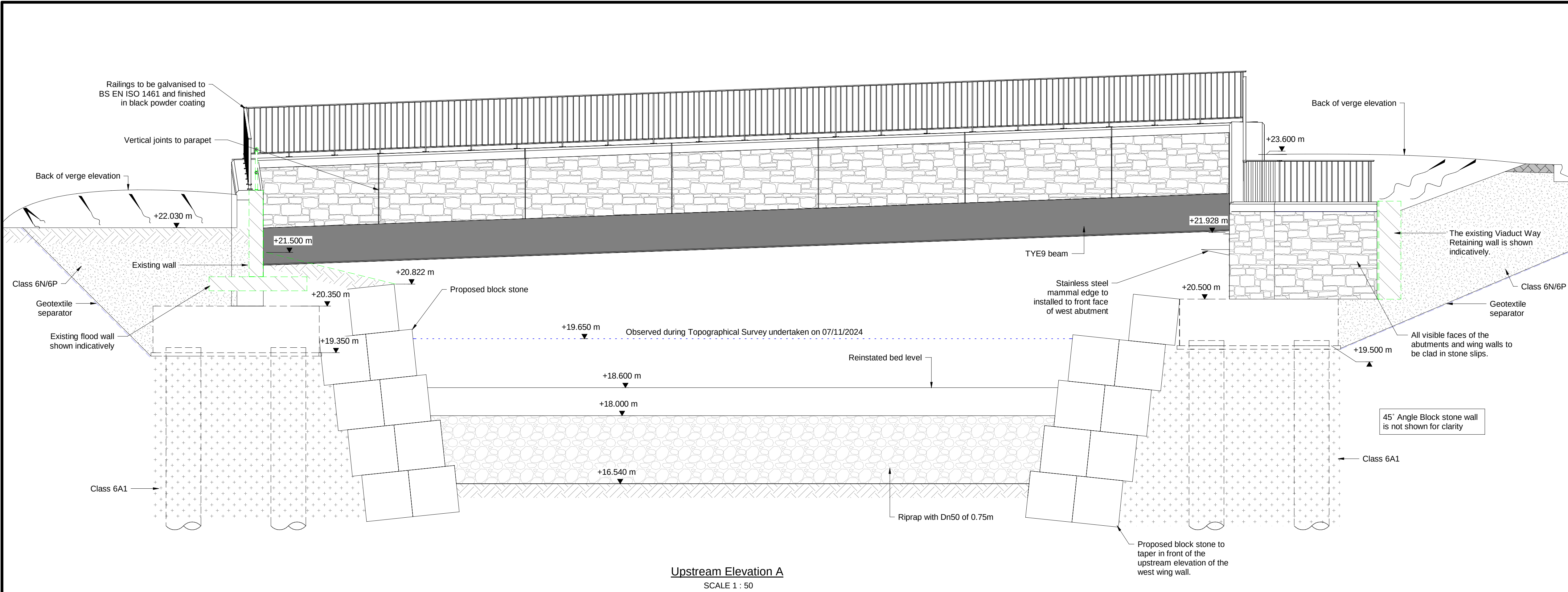
Newport City Council
Civic Centre
Newport
South Wales
NP20 4UR



Title

Bassaleg Bridge Detailed Design
Planning Drawings
Site Layout Plan

Designed	N Bergeson	NB	Eng. Check	O Jefferies	OJ
Drawn	S Sahoo	SS	Coordination	V Hughes	VH
Dwg. Check	A Rawat	AR	Approved	K Lee	KL
MMD Project Number	100119581	Scale at A1	As indicated	Security	STD
Suitability Description	Submitted for Planning Approval				Suit. Code S4
Drawing Number	100119581-MMD-XX-XX-DR-PL-1201				Rev P02



Notes

- All dimensions are in millimetres unless stated otherwise.
- All levels are in metres AOD, unless stated otherwise.
- Do not scale from this drawing.
- Drawing is to be read in colour.
- The location and construction form of existing structures are shown indicatively using best judgement from all available information. The position and form of these structures should not be relied upon nor considered accurate. Topographical surveys undertaken only record above ground features. Drawings provided for flood walls are design drawings rather than as-built and so cannot be relied upon. No drawings are available for the Viaduct Way retaining walls and the form and extent of their foundations are unknown.
- Dimensions are based on a topographical survey undertaken on behalf of Mott MacDonald by Infomap in November 2024.

Key to symbols

- Water level
- Existing structure
- Proposed buried elements
- Geotextile separator
- Natural Welsh Stone slip cladding in random facing stone pattern. Callow sandstone slips are suggested as the colour tones, deep red/brown to pink, with occasional grey seams, are similar those to the adjacent graveyard walls.
- Pavement
- Precast
- Class 6N/6P
- Class 6A1

Reference drawings

100119581-MMD-XX-XX-DR-CE-0001 - Location Plan
100119581-MMD-XX-XX-DR-PL-1001 - Existing Plan & Elevation
100119581-MMD-XX-XX-DR-PL-1002 - Demolition Plan & Elevation
100119581-MMD-XX-XX-DR-PL-1201 - Site Layout Plan
100119581-MMD-XX-XX-DR-PL-1302 - Proposed Sections
100119581-MMD-XX-XX-DR-HW-0101 - Highways GA
100119581-MMD-XX-XX-DR-UT-5001 - Existing Utilities

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NEWPORT
CITY COUNCIL
CYNGOR DINAS
CASNEWYDD

Title

Bassaleg Bridge Detailed Design
Planning Drawing
Proposed Elevations

Designed	J Rees	JR	Eng. Check	O Jefferies	OJ
Drawn	S Sahoo	SS	Coordination	V Hughes	VH
Dwg. Check	A Rawat	AR	Approved	K Lee	KL

MMD Project Number

100119581

Scale at A1

As indicated

Security

STD

Suitability Description

Submitted for Planning Approval

Suit. Code

S4

Drawing Number

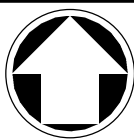
100119581-MMD-XX-XX-DR-PL-1301

Rev

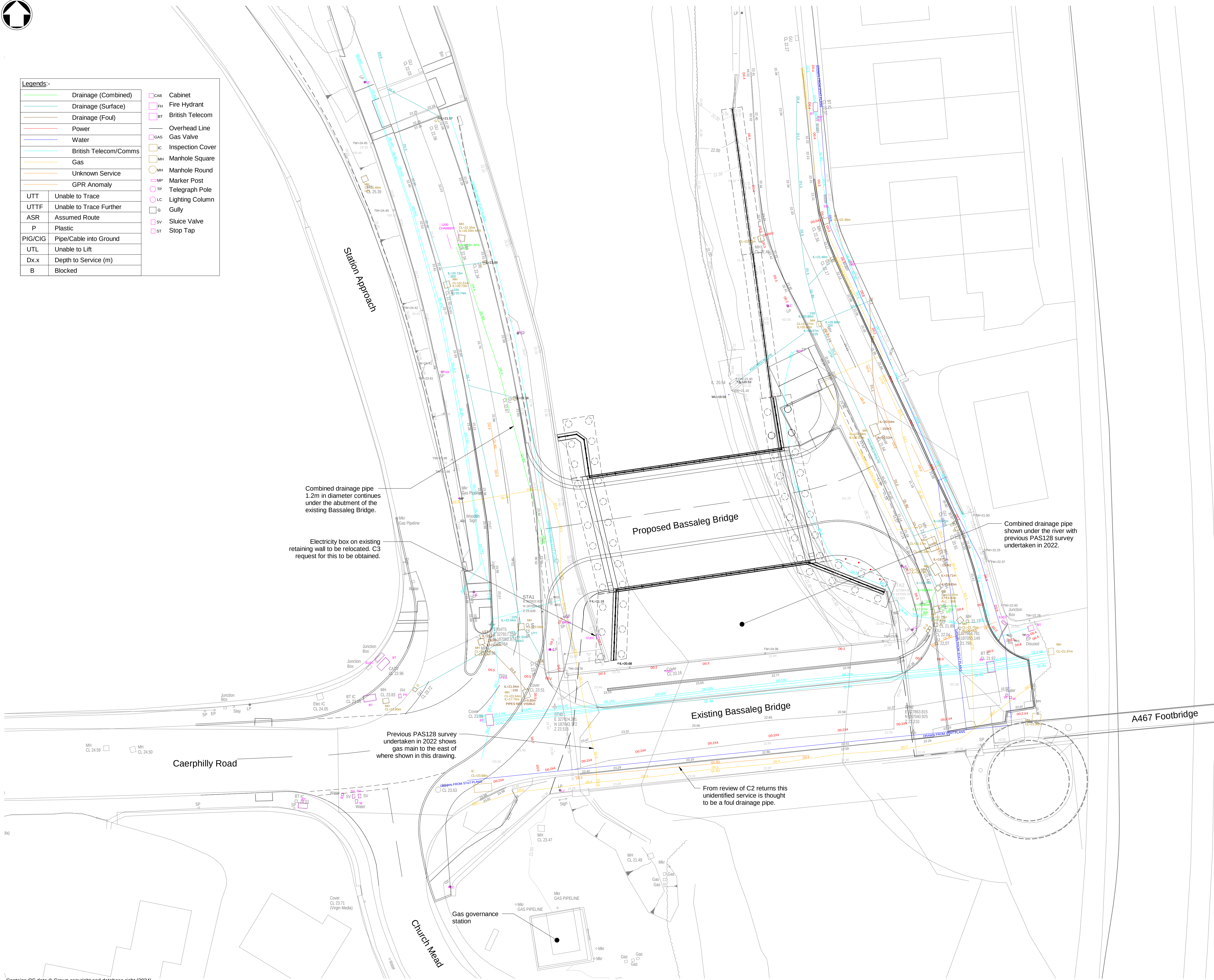
P02

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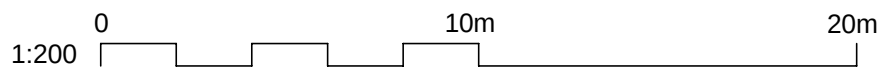


Legends:-	
—	Drainage (Combined)
—	Drainage (Surface)
—	Drainage (Foul)
—	Power
—	Water
—	British Telecom/Comms
—	Gas
—	Unknown Service
—	GPR Anomaly
UTT	Unable to Trace
UTTf	Unable to Trace Further
ASR	Assumed Route
P	Plastic
PIG/CIG	Pipe/Cable into Ground
UTL	Unable to Lift
Dx.x	Depth to Service (m)
B	Blocked
□	CAB Cabinet
□	FH Fire Hydrant
□	BT British Telecom
—	Overhead Line
□	GAS Gas Valve
□	IC Inspection Cover
□	MH Manhole Square
□	MH Manhole Round
□	MP Marker Post
□	TP Telegraph Pole
□	LC Lighting Column
□	G Gully
□	SV Sluice Valve
□	ST Stop Tap



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Existing Utilities
SCALE 1 : 200



- Notes
- All levels and depths are in metres AOD, unless otherwise specified.
 - Do not scale from this drawing.
 - Drawing is to be read in colour.
 - The position of the utilities shown are directly taken from a PAS128 survey undertaken by Coombs Land Surveys on behalf of Newport City Council. Although every effort has been made to trace underground services using radio detection, no guarantee can be given that all utilities have been found. Due to their non-conductivity it may not have been possible to trace certain types of plastic service pipes, e.g. Gas & Water. Service trial holes are recommended prior to excavation.
 - In the absence of evidence to the contrary the routes of confirmed manhole connections are assumed to be direct and straight.
 - Underground service information should be read in conjunction with latest statutory drawings.
 - The material surrounding and particularly above buried services can effect whether the services can be located using GPR. Reinforced concrete, buried metallic objects, the presence of moisture or clay, and changes in the material construction can lead to poor data resolution. As no information is available with respect to the material overlaying ANY services the GPR method can only give a guaranteed accuracy of 50%. Depth results using GPR are typically accurate to within 10% with a horizontal accuracy of 150mm. These figures will vary as the velocity of the ground is assumed at 80m/s. The results of the GPR survey should be treated with caution as there is no guarantee that any service shown actually exists, only a possibility that something can be seen on the records.

Reference drawings

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100119581-MMD-XX-XX-DR-PL-1001 - Existing Plan & Elevation
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Title
Bassaleg Bridge Detailed Design
Planning Drawings
Existing Utilities

Designed	B Duncan	BD	Eng. Check	O Jefferies	OJ
Drawn	S Sahoo	SS	Coordination	V Hughes	VH
Dwg. Check	A Rawat	AR	Approved	K Lee	KL
MMD Project Number	100119581	Scale at A1	As indicated	Security	STD
Suitability Description	Submitted for Planning Approval				Suit. Code S4
Drawing Number	100119581-MMD-XX-XX-DR-UT-5001				Rev P02

