

TECHNICAL NOTE

A465 Clydach Underbridge - Scour repairs

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Client	South Wales Trunk Road Agent (SWTRA)		
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1. Introduction

1.1 Background

The Scheme location is known as the underside of the A465 River Clydach Bridge located on the A465 dual carriageway north west of Neath, and east of Skewen, Wales (NGR: SS 73800 97165). The Scheme location is presented in Figure 1. The Scheme involves works to prevent any further scour on the north west and south west piers of the River Clydach. The piers have a concrete protection panels surrounding which has been subject to scour on the underside of the pile cap, creating a void between the river bed and the pile cap. The scour has created concerns that future scour could put the pier foundations and the A465 dual carriageway bridge at risk. Photographs of the existing structure can be found in Table 3-1.

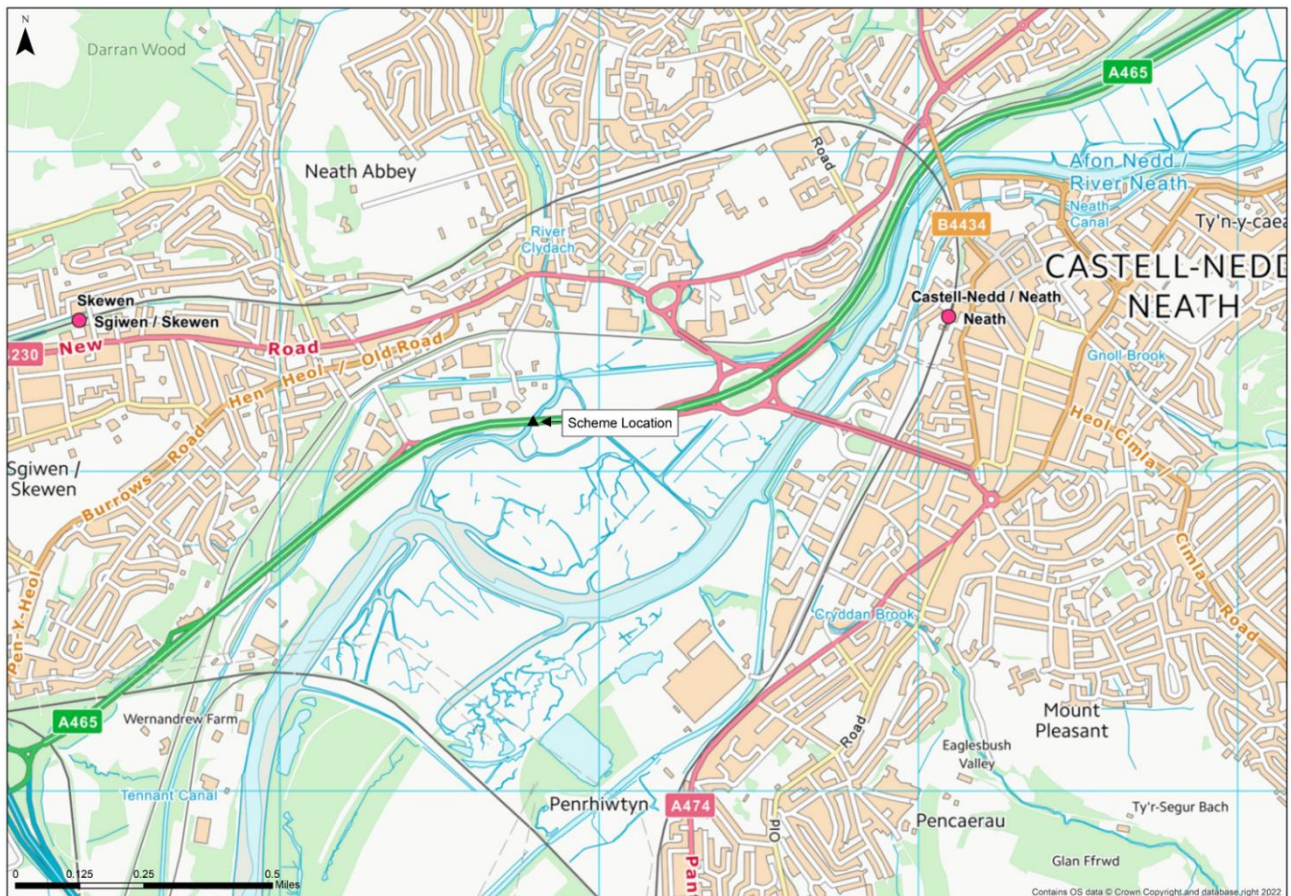


Figure 1 Scheme location

1.2 Purpose of the document

This document is a Water Framework Directive (WFD) compliance assessment for the Scheme described in Section 1.1. A compliance assessment is a statutory requirement for all new developments and schemes

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that have potential to affect the water environment. The assessment must demonstrate that the Scheme will not cause deterioration to (or prevent achievement of Good status in) the water bodies it affects. This WFD assessment has been written to support a Marine Licence Application. Further details on the Directive, and its implementation into UK legislation, can be found in Section 2 below.

2. Water Framework Directive background

2.1 Legislative Background

The Water Framework Directive 2000/60/EC is a European Directive fully transposed into UK law following Brexit. Its purpose is to establish a framework for the protection and improvement of inland surface water bodies, estuaries, coastal waters and groundwater. The framework for delivering the WFD is through River Basin Management Planning, which requires surface water bodies to achieve both Good Chemical Status (GCS) and Good Ecological Status (GES), and for groundwater bodies to achieve both Good Chemical Status (GCS) and Good Quantitative Status (GQS). The River Basin Management Plans (RBMPs) outline the actions required to enable natural water bodies to achieve this. Artificial and Heavily Modified Water Bodies (A/HMWB) are surface water bodies that may be prevented from reaching GES due to the modifications necessary to maintain their function for essential human uses, such as flood defence, navigation or drinking water supply. They are, however, required to achieve Good Ecological Potential (GEP), through the implementation of a series of mitigation measures outlined in the RBMP. The background to the WFD and required assessments is set out in Figure 2. Although the UK is no longer part of the EU, the aims and requirements of the WFD are part of UK legislation and a WFD assessment is a requirement for this Scheme.

New activities and Schemes that affect the water environment may adversely impact biological, hydromorphological, physicochemical and/or chemical quality elements (WFD quality elements), leading to a deterioration in water body status. They may also render proposed improvement measures ineffective, leading to the water body failing to meet its WFD objectives for GES/GEP. Under the WFD, activities and Schemes must not cause deterioration in water body status or prevent a water body from meeting GES/GEP by invalidating improvement measures. A summary of key WFD objectives is presented in Figure 2. **Error! Reference source not found..**

In addition to protecting and improving water bodies, the WFD also requires that a register of 'Protected Areas' is developed, which are "all areas lying within each river basin district which have been designated as requiring special protection under specific Community legislation for the protection of their surface water and groundwater or for the conservation of habitats and species directly depending on water". In the UK, these Protected Areas are:

- Areas with water-dependent habitats that are protected under the Conservation of Habitats and Species Regulations 2017, and (by Government policy) under the Ramsar Convention;
- Drinking Water Protected Areas;
- Shellfish Waters;
- Bathing Waters;
- Nutrient Sensitive Areas.

The potential impacts of new activities and Schemes on these WFD Protected Areas must also be considered in order to ensure compliance with the overall requirements of the WFD.

WFD Objectives

The WFD is a European Directive which sets out a strategic planning process for the purposes of managing, protecting and improving the water environment. The main objectives of the WFD are to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- Aim to achieve at least 'Good Status' for all waters by 2015 (2021 or 2027) where fully justified within an extended deadline under Article 4.4;
- Promote sustainable use of water;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Help reduce the effects of floods and droughts.

Natural Resources Wales are responsible for implementing the WFD in Wales, with the Environment Agency having joint responsibility for cross-border areas. They monitor, advise and manage many aspects of the water environment through regulating discharges, abstractions and processing environmental permits and licences. Natural Resources Wales and the Environment Agency are committed to implement environmental improvements by reducing the physical impacts of flood risk management activities within artificial or heavily modified water bodies.

WFD Classification

The WFD classification for a defined water body is produced by the assessment of a wide variety of different 'elements' which includes:

- '*biological elements*' such as fish, invertebrates, Phytobenthos (which includes plants, macro-algae, phytoplankton);
- '*supporting elements*' that include chemical measurements such as ammonia, dissolved oxygen, pH, phosphate, copper, zinc and temperature; and
- '*supporting conditions*' (sometimes referred to as hydromorphology) that assess the physical attributes of the water body such as 'quantity and dynamics of flow' and 'morphology'.

The assessment given for each element is also accompanied by a measure of certainty in the result. The status classification is published in the RBMP and provides a baseline condition against which compliance and future improvements can be measured.

WFD Compliance

There are three key objectives against which the impacts of proposed works on a water body need to be assessed to determine compliance with the overarching objectives of the WFD:

- Objective 1: The Scheme will not cause a deterioration in any element of water body classification.
- Objective 2: The Scheme will not prevent the WFD status objectives from being reached within the water body or other downstream water bodies.
- Objective 3: The Scheme will contribute to the delivery of the relevant WFD objectives. In this case, it will be what contribution the scheme can make towards the water body reaching its objective GEP through planned RBMP mitigation measures.

Objective 1 and Objective 2 must be met to avoid infringement of the WFD. The delivery of the third objective is central to the implementation of the WFD, where it can be supported through its operational activities. If it is considered that the Scheme is likely to cause deterioration in water body status or prevent a water body from meeting its ecological objectives, then an assessment would be made against the conditions listed in Article 4.7 of the WFD. Article 4.7 can be invoked if; 'new modifications' are of overriding public interest and/or the environmental and social benefits of achieving the WFD objectives are outweighed by the benefits of the new modifications to human health, safety and sustainable development; there are no significantly better environmental options that are technically feasible or not disproportionately costly; and all practicable steps for mitigation have been taken.

Figure 2 Background to WFD Assessments

2.2 Approach to the WFD Assessment

2.2.1 'Clearing the Waters for All' guidance

Natural Resources Wales (NRW) is the lead authority for the implementation of the WFD in Wales, whereas, the Environment Agency (EA) is the lead authority for the WFD in England. The EA has developed guidance to support carrying out WFD assessments for new schemes in estuarine and coastal waters - "Clearing the Waters for All"¹, published on www.gov.uk. This guidance can be utilised in WFD assessments in Wales and is applicable to activities in the marine environment up to 1 nautical mile out to sea. This guidance recommends a three-staged process to the WFD Assessment, comprising:

- **Screening** – to exclude any activities that do not need to go through the scoping or impact assessment stages;
- **Scoping** – to identify the receptors that are potentially at risk from the proposed activity and need impact assessment; and
- **Impact assessment** – considers the potential impacts of the proposed activity, identifies ways to avoid or minimise impacts, and shows if the activity may cause deterioration or jeopardise the water body achieving good status.

The guidance also recommends that all activities are considered, including each relevant stage (e.g. construction, operation and decommissioning), and that all water bodies that could both directly and indirectly be affected by the activities are included.

This WFD assessment has broadly followed the principles outlined in the 'Clearing the Waters for All' guidance.

2.2.2 Data Sources

A number of surveys and assessments have been carried out to inform the development of the Scheme. Where relevant, the details of these have been used to inform this WFD assessment. Online sources of information have also been used. The key data sources that have informed this assessment are:

- A465 Clydach Underbridge. Environmental Screening Report. South Wales Trunk Road Agent (Atkins, 2022).
- Scour Protection Works to A465 River Clydach Bridge - Construction Methodology (Kaymac, 2024)
- National Biodiversity Network (NBN) Atlas Wales.
https://wales.nbnatlas.org/?gad_source=1&gclid=EAlaIQobChMIppS-zMLdhQMvP5ZQBh2R8QynEAAAYASABEgKDuPD_BwE
- Current WFD status classification data from Water Watch Wales at <https://waterwatchwales.naturalresourceswales.gov.uk>;
- Data on WFD Protected Areas and WFD Higher and Lower Sensitivity Habitats (Natural England 2021);

¹ Environment Agency, 2016. Water Framework Directive assessment: estuarine and coastal waters. [Online]. Available from: <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

- Western Wales River Basin Management Plan 2015-2021 Summary (Natural Resources Wales, 2015);
- Wales Water Body Objectives and measures update 2017 at <https://waterwatchwales.naturalresourceswales.gov.uk/>;

3. Proposed Works and Programme

3.1 Proposed Scheme

The works will take place on the underbridge for the A465 where it crosses the River Clydach. The Scheme involves works to prevent any further scour on the north west and south west piers of the River Clydach. The piers have concrete protection panels surrounding them which has been subject to scour on the underside of the pile cap, creating a void between the riverbed and the pile cap. The scour has created concerns that future scour could put the piles and the A465 dual carriageway bridge at risk. The works will therefore include installation of rock mattresses, to prevent any further scour.

3.1.1 Existing retaining walls

Table 3-1 shows photographs of the existing north west (upstream pier) and south west (downstream pier) concrete piers with the protection panels (Photo 1). Undercutting and scour of the concrete protection panels is evident on both the south west and north west piers (Photo 2 and 3, respectively).

Table 3-1 Baseline photographs of the scheme location



Photo 1: North west (upstream) and south west (downstream) concrete piers with the protection panels.



Photo 2: South west (downstream) concrete pier with protection panels. Undercutting of the concrete protection panel.



Photo 3: North west (upstream) concrete pier with protection panels. Undercutting of the concrete protection panel.

3.2 Construction methods

3.2.1.1 Site Access

Deliveries to the site will be via the access route shown in Figure 3 (taken from the Construction Methodology²), with the yellow dashed areas indicating where a land access agreement with The Trade Centre Wales will be required.



Figure 3 Access route for site deliveries

² Kamac. 2024. Scour Protection Works to A465 River Clydach Bridge Construction Methodology.

The location of the site compound (also used as storage and the laydown area) and the access routes (shown with the yellow dashed lines) to the works area is shown in Figure 4 below (taken from the Construction Methodology³). A land access agreement will be in place with the resident where required.

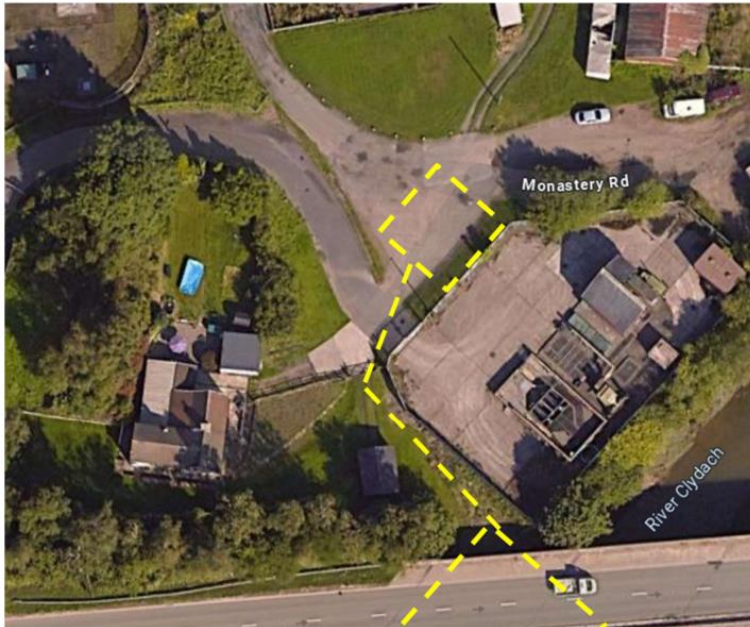


Figure 4 Construction compound and access route

3.2.1.2 Rock Mattress installation and associated works

In order to allow safe access of the 5t excavator and tracked dumper, some minor regrading of the bank is required, to create a shallower access route. Using the 5t excavator, suitable stone will be placed to form an access ramp into the river.

The works will be undertaken during low tide, to allow the area around the piers to fully dry out. While the area is dry a silt curtain will be placed around each pier as it is being worked on. Silt and loose bed material will then be removed from the scoured area from under the piers and taken to the laydown area, where possible.

The scour voids beneath the concrete panels are to be grouted. Formwork will be placed around the piers during a low tide and a grout tight seal is gained by embedding to formwork into the ground. Anti-washout grout will be used to fill the void, and will be poured at low tide to ensure that the grout will set prior to the tide coming in.

Before the rock mattresses are installed on the north west (upstream) and south west (downstream) piers of the Clydach Underbridge, some excavation of the river banks (up to a maximum depth of 1.4m) is required to provide a clean surface for the rock mattress to be placed upon, all excess spoil will be taken to the laydown area.

Rock mattresses will be placed at the edge of the existing concrete pier protection panels, starting with the upstream pier, a silt curtain will be put in place at the start of each shift (and removed at the

³ Kamac. 2024. Scour Protection Works to A465 River Clydach Bridge Construction Methodology.

end). Rock mattresses will be transported down to the works location using the 5t excavator. Embedment of the rock mattress is required on the upstream, to tie it in with the river bed.

Anchors (expected to be the Gripple Terra-Lock anchors) will be used to hold the rock mattresses in place, the anchors will be driven to a maximum depth of 1.5m below ground⁴.

Once installation of the rock mattresses is complete, the original sediment, which was excavated from the riverbanks, will be placed back on top of the rock mattresses reinstating the natural bed sediment.

This process is repeated on the downstream pier, ensuring that the rock rolls are placed against the front face of the concrete scour protection apron, as required on the south west pier design to prop up the mattress.

The void, created by scour, beneath the south west and north west concrete pier protection panels is to be grouted. Resin/grout will also be used to fill the void between the rock mattress and the rock rolls.

The regraded area under the bridge will be reinstated to the baseline gradients, including the reinstatement of the access gate at the entrance to the bridge.

The scheme design drawings are within Appendix B.

3.2.2 Outline Construction Programme

The works will take place in July and August 2024

All construction activities will be limited to daytime hours and works within the channel will be restricted to periods of low tide, to enable the construction area to dry.

3.3 Operation

Following construction, the Scheme will provide protection from erosion. Due to the replacement of the original sediment over the rock mattresses the operation of the Scheme is likely to be similar to the existing. No further works are expected once the construction works are completed.

3.4 Decommissioning

No decommissioning is required or proposed as part of the Scheme and therefore decommissioning effects have not been considered within the assessment.

⁴ <https://www.gripple.com/en-us/products/civil-construction/tl-406/#downloads>

4. Screening

4.1 Screening of WFD water bodies

This screening exercise was completed to identify water bodies that are relevant to the Clydach Underbridge Scheme. A study boundary also known as zone of influence was set for the screening, which was the surface water catchment which the Scheme area falls within, plus (for surface waters) one water body upstream and downstream of the Scheme, this was restricted to one water body upstream and downstream, as it was unexpected that there would be any influence beyond this.

For groundwater, only immediately underlying groundwater bodies are included in the screening, as individual groundwater bodies are designated as “hydraulically coherent” systems that do not have interactions with other groundwater bodies.

4.1.1 River and transitional water bodies

In the Western Wales River Basin District, the following surface water bodies are within the zone of influence:

- Neath Estuary, transitional water body (GB541005800700),
- Swansea Bay, coastal water body (GB641008260000),
- Clydach - headwaters to conf with River Neath, river water body (GB110058026390) ,

The Scheme is located within the Neath Estuary transitional water body (GB541005800700), this water body is designated as being heavily modified. In Cycle 3, 2021, the Overall Water Body status and Ecological status of the water body are Moderate due to Mitigation Assessment achieving Moderate status, and Hydrological regime achieving ‘Not High’. The Chemical status of the water body is High.

The downstream water body of the Neath Estuary is Swansea Bay (GB641008260000), a heavily modified water body with an overall moderate status. As this water body is approximately 6 km downstream of the Scheme, it is not expected to be impacted and is therefore, **screened out** of further assessment.

The Clydach - headwaters to conf with River Neath (GB110058026390) is approximately 160 m upstream of the scheme.

The Swansea Bay and the Clydach - headwaters to conf with River Neath water bodies are both located away from the Scheme, ~6 km downstream and ~160 m upstream of the works, respectively. Due to the nature of the works, the scale and their location, the works will not have an impact on the WFD classification of these water bodies, therefore they have both been **screened out** from further assessment.

A summary of the screened surface water bodies WFD classification is provided in Table 4-1 below using data provided at <https://waterwatchwales.naturalresourceswales.gov.uk>. The location of the Scheme in relation to screened surface water bodies is shown in Figure 5.

Table 4-1 Summary of WFD Classification for Surface Water Bodies

Name	Type	Hydro-morphological designation	Water body ID	Area (km ²)	Ecological status	Chemical status	Overall Status Cycle 3
Neath Estuary	Transitional	Heavily Modified	GB541005800700	3.56	Moderate	High	Moderate

4.1.2 Lake water bodies

There are no lake water bodies within the zone of influence for this scheme. **Therefore, lake water bodies have been screened out of further assessment.**

4.1.3 Groundwater bodies

The groundwater body underlying Clydach Underbridge is the Swansea Carboniferous Coal Measures (ID: GB41002G20100). It covers an area of 758.38km². Under the Western Wales RBD, there is a Drinking Water Protected Area (DWPA) associated with the groundwater body: Swansea Carboniferous Coal Measures which has been assessed as 'not at risk'. The overall water body status of the groundwater body has been assessed as 'Poor' driven by the 'Poor' chemical status.

BGS 1:50,000 geological mapping⁵ indicates that superficial deposits underlying the site consist of tidal flat deposits. These are designated a Secondary (undifferentiated) aquifer (insert reference to the designation mapping and a reference to the definitions). Bedrock underlying the superficial deposits at this location is mapped as the Swansea Member, part of the Warwick Group overlying the Pennine Coal Measures Group. The Swansea Member is designated a Secondary A aquifer.

The below ground works are planned to extend to a maximum of 1.5m below ground level which are not anticipated to interact with the groundwater body. Based on this, the Swansea Carboniferous Coal Measures groundwater body has been **screened out** from further assessment.

However, due to the industrial nature of the area currently and historically, there should be consideration that the soils may be contaminated within the Contractors Construction Environmental Management Plan (CEMP) and appropriate mitigation should be put in place, detailed within the CEMP, should they be found to be contaminated.

4.1.4 Canal water bodies

The Tennant Canal (ID: GB71010013), is likely to be hydraulically connected to the River Clydach approximately 160m upstream of the scheme and approximately 2.6km downstream, although this has not been confirmed. The River Neath does not look to provide flows to the canal within the vicinity of the scheme. The canal is designated under the WFD as a WFD canal. The scheme has a very localised footprint and involves works to the River Clydach, therefore impacts to the upstream canal are not anticipated.

The Neath Canal (GB71010012) flows along the north of the Neath valley, on the right bank of the River Neath. Although it has not been confirmed, it is assumed that the canal and the River Neath are hydrologically connected, approximately 2.5km downstream of the works. The canal is designated

⁵ https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.123643596.658846116.1713950349-1555749094.1713950349

under the WFD as a WFD canal. The River Neath does not look to provide flows to the canal within the vicinity of the scheme. As the Scheme has a very localised footprint and involves localised works to the River Clydach, impacts to the Canal are not anticipated.

Therefore, impacts to WFD **canal water bodies** are **screened out of further assessment**.

4.1.5 Screening assessment summary

The following WFD water bodies were screened in for further assessment:

- Neath Estuary (GB541005800700), a transitional water body; and

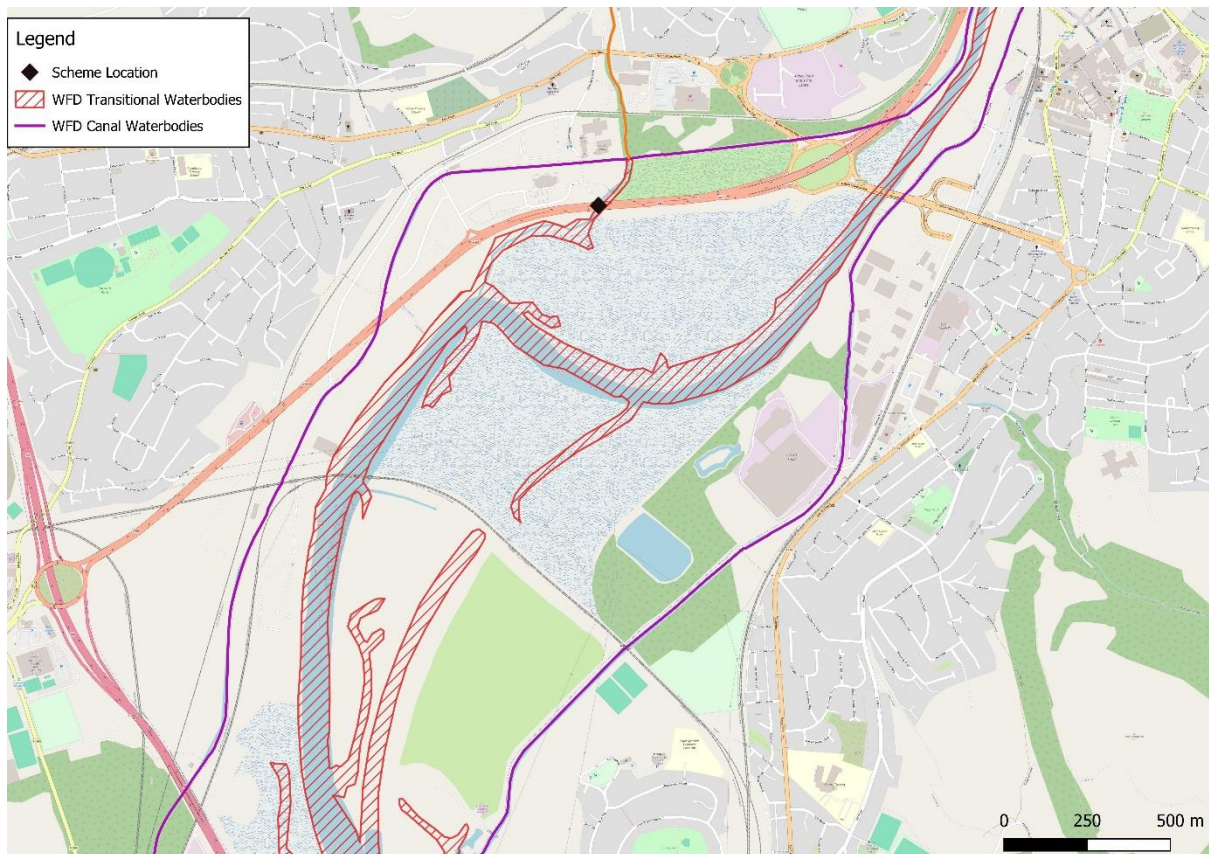


Figure 5 WFD water canal and transitional water bodies

4.2 Screening of Relevant Scheme Activities

For the one water body screened in for further assessment, activities that could impact on the status of the water body were identified for construction and operational stages. The activities that should be screened in for further assessment are detailed in Table 4-3 to Table 4-5.

Table 4-2 Screening of Scheme Activities: Construction Stage

Scheme element	Activity	Screening rationale
Site establishment and demobilisation	Creation and demobilisation of temporary compound	Screened out – The development of a temporary compound will be located on a hard surface behind the buildings at the end of Monastery Rd and away from the surface water bodies. The buildings are situated in between the site compound and the River Clydach. There will be no direct pathways for any of the site compound activities to affect the surface water bodies. Access to the river will be via a crush and run (gravel) access path, which will be remove once site works cease. No deterioration or impacts to water bodies are expected from the site compound. Best practice guidelines will be followed by the Contractor for the storage and use of all fuels and chemicals, including the use of welfare facilities.
Installation of Rock Mattresses	Excavation, placement of rock mattresses and rock rolls, installation of pins (anchors), resin and grout, movement of plant and machinery along the banks. Silt and loose bed material will be removed from the scoured area under the piers, where possible.	Screened in – activities associated with the installation of the rock mattresses have the potential to impact WFD water bodies
Bank regrading for plant access to the river	Due to the current clearance to the bridge deck only being 2.6m, some minor regrading of the bank will be required to allow safe access for the 5t excavator and tracked dumper. The regraded area under the bridge will be reinstated how it was found once works are complete.	Screened in – this activity has the potential to impact hydromorphology and surface water quality elements.

Table 4-3 Screening of Scheme Activities: Operation Stage

Scheme element	Activity	Screening rationale
Hard bank protection	Rock mattresses	Screened out – The Rock mattresses will be overlain with sediments which have been excavated from the site and therefore will be a like for like replacement of the existing bank.

Table 4-4 Screening of Scheme Activities: Decommissioning Stage

Scheme element	Activity	Screening rationale
None	None	Screened out - The Scheme does not include any decommissioning activity.

5. WFD scoping assessment

5.1 Water body baseline data

5.1.1 Neath Estuary baseline

A summary of the baseline classification for Neath Estuary is provided in Section 4.1.1 **Error! Reference source not found.** with more detail on the WFD status provided in Table 5-1. Based on the 2021 Cycle 3 data, Neath Estuary overall WFD classification is 'moderate' with ecological status also classified as 'moderate'. The mitigation assessment have been determined as the elements driving the ecological status.

Table 5-1 - WFD Status (Cycle 3) - Neath Estuary

Water body: Neath Estuary		
Overall status: Moderate		
Ecological status: Moderate		
Chemical status: High		
Mitigation measures: Assessed		
Biological quality elements:	Physico-chemical quality elements:	Hydromorphological supporting elements:
Fish: Not Assessed	Temperature: Not Assessed	Hydrological Regime: Not High
Invertebrates: High	pH: Not Assessed	Morphology: Not Assessed
Macroalgae: High	Dissolved oxygen: High	HMWB: Yes
Phytoplankton: Not Assessed	Dissolved Inorganic: Good	AWB: No
All metal assessed: High		

5.1.2 Protected Areas and Sensitive Habitats

The WFD Protected Areas and WFD sensitive habitats within a 2 km proximity to the site (as per the EA recommendation⁶) are summarised in Table 5-2. The majority of the information provided on Sensitive Habitats has been sourced from Natural England's interactive MAGIC online mapping service⁷.

Table 5-2 Summary of WFD Protected Areas and Sensitive Habitats

WFD Protected Areas	Location in relation to the Scheme
Special Area of Conservation (SAC)	There are no SACs within 2 km of the scheme.
Special Protection Area (SPA)	There are no SPAs within 2 km of the scheme.
Drinking Water Protected Area	Groundwater drinking water protected area - Swansea Carboniferous Coal Measures intersects the site
Bathing Waters	There are no designated bathing waters within 2 km of the scheme.
Shellfish Water Protected Area	There are no shellfish water protected areas within 2km of the scheme. The closest Shellfish Water Protected Area is approximately 5 km downstream of the scheme (Swansea Bay East) ⁸ .
Nitrate Vulnerable Zones ⁹	There are no nitrate vulnerable zones within 2km of the scheme.
WFD Sensitive Habitats	Location in relation to the Scheme
Saltmarsh (Higher Sensitivity)	Sections of saltmarsh along the sides of the River Neath and the River Clydach, including near the A465 at the Clydach Underbridge.
Intertidal Soft Sediments – sand, mud and mixed (Lower Sensitivity)	Intertidal soft sediments are present along the sides of the River Neath and the River Clydach, including near the A465 at the Clydach Underbridge.
Rocky Shore – intertidal rock (Lower Sensitivity)	Patches of rocky shore are present along the River Neath and the River Clydach, including near the A465 at the Clydach Underbridge.

⁶ Environment Agency. 2016. Water Framework Directive assessment: estuarine and coastal waters. [Online]. Available from: <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

⁷ Natural England. 2024. MAGIC. Available from: <https://magic.defra.gov.uk/>

⁸ <https://cdn.cyfoethnaturiol.cymru/media/676244/shellfish-water-protected-areas-wales-2016-8-feb-002.pdf?mode=pad&rnd=131596369415670000>

⁹ https://datamap.gov.wales/maps/new?layer=inspire-nrw:NRW_Nitrate_Vulnerable_Zones_2013#/

5.1.3 Scoping of scheme activities

A Scoping exercise has been undertaken to identify the potential risks of each Scheme activity that was screened in for further assessment. The Scoping process has followed the Clearing the Waters for All guidance, and has considered the risks of the Scheme activities during the construction and operation stages (as screened in in Section 4) to the following receptors for surface water bodies:

- Hydromorphology;
- Biology – habitats;
- Biology – fish;
- Water quality (physico-chemical); and
- Protected Areas.

The Scoping exercise is documented in Appendix A. Table 5-2 presents the summary results of the identified risks and receptors that have been taken forward to the assessment stage for the Neath Estuary transitional water body.

Table 5-3 presents the summary results of the identified risks and receptors that have been taken forward to the assessment stage for the Neath Estuary.

Table 5-3 Summary of Scoping for Neath Estuary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	Yes	Construction: There is a potential impact on the hydromorphology of the water body as there is a physical interface between the works and the bed/ banks (i.e. regrading of the bank and the installation of the rock mattresses). Operation: No impact during operation as the river bank is restored to its original condition pre-construction and the original sediment from the river is placed back on top of the rock mattress.
Biology: habitats	Yes	Construction: Potential impact to the sensitive habitat such as saltmarsh, rocky shore and intertidal soft sediment during excavation. Operation: Unlikely to be an impact during operation.
Biology: fish	No	Construction: No impacts during operation as the works are taking place at low tide, in July/ August, so there are no 'in-channel works' Operation: No impacts likely as the impacts are localised, there are no barriers for fish movement and the works are laid over fine sandy sediments which are not ideal fish spawning areas.
Water quality	Yes	Construction: Potential disturbance and re-mobilisation of contaminated sediments and/ or soils during construction activities; increased turbidity; risk of debris falling in the water; spills and leaks from machinery. Operation: Unlikely to be an impact during operation.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Protected areas	No	There is a Groundwater Drinking Water Protected Area within 2km of the scheme however, impacts are not expected as there are no significant below ground works and no new pollution sources as part of the scheme. Therefore, no impact assessment is required. There are no further WFD protected areas within 2km of the scheme.
Invasive non-native species (INNS)	Yes	Construction: High impact INNS (Japanese knotweed) have been recorded on site visits and within the National Biodiversity Network (NBN) Atlas therefore, they have been scoped in for further assessment.

5.1.4 Scoping assessment summary

There are potential impacts to the Neath Estuary from construction activities on/ around the north west and south west piers resulting in a potential impact on the following receptors; hydromorphology, biology (habitats), water quality and invasive non-native species.

There are potential operational impacts to hydromorphology as a result of the bank regrading to allow rock mattress installation.

5.2 WFD impact assessment

The likely construction and operational effects of the Scheme on the Neath Estuary, transitional water body (GB541005800700) are summarised in Table 5-4. Within this impact assessment impacts are categorised as follows:

- **Minor** - significance of impact which is insufficient to cause a change to the elements status at the water body scale
- **Localised** - limited to the direct vicinity of the proposed works.
- **Temporary** – short lived and reversible.

Table 5-4 WFD impact assessment of construction and operational effects on the Neath Estuary

WFD Quality Element	Construction	Operation
Hydromorphology	In order to allow safe access of plant to the river, some minor regrading of the bank is required. Once construction is done, the banks will be reinstated to their baseline condition. Therefore, any impacts on hydromorphology are expected to be temporary, minor and localised in respect to this element of the construction. Bank regrading and excavation of the river banks is likely to require vegetation removal from the banks. Most of the river bank where the rock mattress will be installed is not currently vegetated, small areas of vegetation are present in close proximity to the works (as shown in Photo 2 and 3 in Table 3-1), which may need to be removed. Although small areas of vegetation removal may be required this is a small extent and likely to have a negligible impact on the sediment and flow dynamics. Bank regrading has the potential to cause a small, localised impact on sediment and flow dynamics. It is expected that this impact will be minor and temporary (in the case of the bank	The rock mattresses will be embedded into the riverbank and bed at the upstream extent of the rock mattresses, to allow the rock mattresses to tie into the existing river bank/ river bed. The original sediment which was excavated to allow installation of the rock mattress, will also be placed back on top of the rock mattress, reinstating the natural bed sediment. There is expected to be no impact on flows or sediment dynamics. The installation of rock mattresses, to protect the south west and north west piers of the Clydach Underbridge from future scour, will give future stability to the A465 which is a major highway and will have a no impact on the hydromorphological regime of the watercourse. During operation there will be no impact on hydromorphological elements.

WFD Quality Element	Construction	Operation
	regrading for access). The impact to the hydromorphological supporting elements are expected to be minor and localised. Sediment retention methods will be implemented throughout construction to mitigate any increases in sediment loads within the downstream water body. This will include only working during low tides (dry site) and a silt curtain will be placed around the area of works at the start of each shift to capture any sediment produced during construction. The potential impacts as a result of construction are, at worst likely to have a minor, localised and temporary impact on hydromorphological elements and will not cause deterioration at the water body scale. The impacts are unlikely to prevent future attainment of water body objectives.	
Water Quality (physico-chemical and chemical)	The minor regrading of the bank to allow plant to access the river may have a minor, temporary impact on the physico-chemical properties, due to the exposed banks and the potential for increased sediments. Works associated with grouting, to fill the scour voids beneath the concrete panels, will be conducted at low tide (dry), with an adequate amount of time left for the grout to dry before the tide comes in, to reduce the risk of washout. Therefore, there is low a risk of washout of grout impacting the physico-chemical status of the water body. Potential for increased sediment volumes during construction could have an impact on physico-chemical elements. However, these will be negligible as construction will only take place at low tide, when the site is dry, and a silt curtain will be placed	The operation of the Scheme is considered to have no effect on these quality elements because it will not change the physico-chemical composition of the water body.

WFD Quality Element	Construction	Operation
	around the area of works at the start of each shift to mitigate impacts as a result of sedimentation. Historical and present-day maps indicate that the scheme is located in an industrial area. There should be consideration that the soils may be contaminated within the Contractors, Construction Environmental Management Plan (CEMP), and appropriate mitigation in place should they be found to be contaminated. With this mitigation in place, there is a low risk of contaminated soils impacting the physico-chemical elements. The potential impacts as a result of construction are, at worst likely to have a minor, localised and temporary impact on physico-chemical elements and will not cause deterioration at the water body scale.	
Biological	The works include excavation of the river banks for installation of rock mattresses. Excavation will be limited to the area of rock mattress installation and a maximum depth of 1.5m. The sediment removed will be retained and laid on top of the rock mattresses upon completion of the works. The works could reduce invertebrate communities and bed vegetation. This is likely to cause a minor, temporary, localised impact on biological quality elements. Regrading of the banks to allow plant to access the river, may have a minor, localised, temporary impact on the biological (habitat) quality elements. As the regrading is likely to involve vegetation clearance, this may reduce existing invertebrate habitats and reduce vegetation diversity within the riparian zone. This impact is unlikely to be significant as the regrading is	Rock mattresses will be embedded into the existing river banks and bed and the sediment which will be excavated to allow rock mattress installation will be laid on top of the rock mattresses upon completion, replacing the natural sediment. The impacts during operation are likely to be negligible. This Scheme is likely to have a negligible impact on biological quality elements due to the similar nature of the Scheme and the baseline. As the bridge deck currently shares the site, any vegetation clearance is unlikely to have an impact on available habitats within the watercourse.

WFD Quality Element	Construction	Operation
	localised and once construction is complete the bank will be reinstated to how it was originally found. The potential impacts as a result of construction are likely to have a minor, localised and temporary impact on biological quality elements and will not cause deterioration at the water body scale.	During operation, there will be negligible impacts on the biological quality elements, relative to the existing conditions.
INNS	There is potential for the spread of invasive non-native species, notably Japanese knotweed. The spread of INNs during construction which will be mitigated through best practice bio-security measures/ methods of work (detailed in the Environmental Management Plan) are unlikely to cause a permanent impact the biological quality elements.	No impacts are expected as part of the Schemes operation.

5.2.1 Impact assessment summary

The Scheme has been assessed as WFD-compliant as all impacts are expected to be, at worst, minor, localised and temporary, as outlined above.

The works are not expected to cause any deterioration in quality elements or prevent the water body from achieving objectives.

A mitigation measure identified within the above tables is as follows: due to the industrial nature of the area currently and historically, there should be consideration that soils may be contaminated within the Contractors Construction Environmental Management Plan (CEMP) and appropriate mitigation should be put in place, detailed within the CEMP, should they be found to be contaminated.

6. Conclusion

The Scheme consists of the installation of rock mattresses, to prevent any further scour on the north west and south west piers of the A465 River Clydach Bridge.

The screening assessment identified one transitional water body which was potentially impacted by the Scheme: Neath Estuary (GB541005800700), a transitional water body). No other water bodies were screened into the assessment.

The Scoping assessment identified construction and operational activities which had the potential to impact on the WFD quality elements and the programme of measures for the water body.

The Impact assessment has assessed the Scheme against the biological, physico-chemical and hydromorphological quality elements of Neath Estuary (GB541005800700) transitional water body.

The Scheme will not result in deterioration to any of the elements for the water body assessed, providing the mitigation measures reported within the method of works (construction methodology) and this report are implemented.

Appendices

Appendix A. Scoping of Scheme Activities

A.1 Scheme Information

Table 6-1 Scheme information

Your activity	Description, notes or more information
Name of activity	Clydach Underbridge scour protection works
Brief description of activity	Enhanced defence against scour/ undercutting of the concrete protection panels on the south west and north west piers, on the A465 crossing of the River Clydach.
Location of activity (central point XY coordinates or national grid reference)	Central National Grid Reference SS 73800 97165
Footprint of activity (ha)	~0.04
Timings of activity (including start and finish dates)	The works will take place in July and August 2024
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	The activity covers the footprint area of ~0.04 ha. This is an overestimate to include the whole area of where the works are likely to take place in these areas e.g. activities taking place on banks will not cover the entire area. There will be no outputs or regular discharges in either construction or operation.
Use or release of chemicals (state which ones)	No chemicals will be used in construction or released from the site in operation.

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A.2 Scoping: Neath Estuary

Table 6-2 Scoping table for the Neath Estuary

Water body	Description, notes or more information
WFD water body name	Neath Estuary
Water body ID	GB541005800700
River basin district name	Western Wales
Water body type (estuarine or coastal)	Estuarine
Water body total area (ha)	355.54
Overall water body status (2021)	Moderate
Ecological status	Moderate
Chemical status	High
Target water body status and deadline	Good by 2027
Hydromorphology status of water body	Not High
Heavily modified water body and for what use	Heavily Modified (use not stated)
Higher sensitivity habitats present	Yes, saltmarsh
Lower sensitivity habitats present	Yes, Intertidal Soft Sediments – sand, mud and mixed and Rocky Shore – intertidal rock
Phytoplankton status	Not assessed
History of harmful algae	Not assessed
WFD protected areas within 2km	Yes (Drinking Water Protected Area)

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A.3 Specific risk information

The potential risks of the Scheme on each of the following receptors has been considered: hydromorphology, biology (habitats and fish), water quality, protected areas and invasive non-native species (INNS).

A.3.1 Section 1: Hydromorphology

Table 6-3– Potential risks of the Scheme to Hydromorphology

Consider if your activity:	Yes	No	Hydromorphology risk issue(s)
Could impact on the hydromorphology (for example morphology or tidal patterns) of a water body at high status	Requires impact assessment	Impact assessment not required	No – This is a water body classified as a HMWB, with a Moderate WFD status
Could significantly impact the hydromorphology of any water body	Requires impact assessment	Impact assessment not required	Yes – Although this is classified as a HMWB, with a Moderate WFD status, there may be an impact on the hydromorphology of the water body as there is a physical interface between the works and the bed/ banks (i.e. regrading of the bank and the installation of the rock mattresses). Also there will be temporary regrading of the bank during construction to allow access to the river for plant. During operation there is unlikely to be an impact as the river bank is restored to its original condition pre construction and the original sediment from the river is placed back on top of the rock mattress.
Is in a water body that is heavily modified for the same use as your activity	Requires impact assessment	Impact assessment not required	Yes - This water body is designated as a HMWB. The works will not impact the heavily modified status. Welsh data does not classify the use of heavily modified water bodies however English data classifies them by these three things coastal

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protection, flood protection or navigation, ports or harbours, which these works will not impact.

A.3.2 Section 2: Biology

A.3.2.1 Habitats

Habitats of sensitivity that have been considered include the following.

Table 6-4 – Habitats of sensitivity

Higher sensitivity habitats	Lower sensitivity habitats
Saltmarsh	cobbles, gravel and shingle
clam, cockle and oyster beds	intertidal soft sediments like sand and mud
intertidal seagrass	rocky shore
maerl	subtidal boulder fields
mussel beds, including blue and horse mussel	subtidal rocky reef
polychaete reef	subtidal soft sediments like sand and mud
saltmarsh	
subtidal kelp beds	
subtidal seagrass	

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Table 6-5- Potential risks of the Scheme to Habitats

Consider if the footprint of your activity is:	Yes	No	Biology habitats risk issue(s)
0.5km ² or larger	Yes, to one or more – requires impact assessment	No to all – impact assessment not required	No – Footprint of activity is approximately 0.0004 km ² .
1% or more of the water body's area			No – Footprint of activity is ~0.01% of the water body's area.
Within 500m of any higher sensitivity habitat			Yes – the works are directly upstream of saltmarsh higher sensitivity habitat. Potential risks associated during construction stages. Saltmarsh is located immediately downstream of the A465 crossing at Clydach Underbridge. They are at risk from the construction of the Rock Mattresses as the construction involves excavation.
1% or more of any lower sensitivity habitat			No – Rocky shore and intertidal soft sediment (sand, mud & mixed) is present directly downstream of the A465 crossing at Clydach Underbridge. The footprint of any activities likely to impact on lower sensitivity habitat is less than 1%.

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A.3.2.2 Fish

Table 6-6 - Potential risks of the Scheme to Fish

Consider if your activity:	Yes	No	Biology fish risk issue(s)
Is in an estuary and could affect fish in the estuary, outside the estuary but could delay or prevent fish entering it or could affect fish migrating through the estuary	Continue with questions	Go to next section	No, fish movement will not be impacted as the works are small localised works, which will be taken place when the works area is dry during low tide. Works will take place between July and August. There are no barriers for fish movement and the works are laid over fine sandy sediments which are not ideal fish spawning areas.
Could impact on normal fish behaviour like movement, migration or spawning (for example creating a physical barrier, noise, chemical change or a change in depth or flow)	Requires impact assessment	Impact assessment not required	No, the works are localised, there are no barriers for fish movement as the works are taking place at low tide (July/August) and the works are laid over fine sandy sediments which are not ideal fish spawning areas.
Could cause entrainment or impingement of fish	Requires impact assessment	Impact assessment not required	No, the works are unlikely to cause entrainment or impingement of fish.

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A.3.3 Section 3: Water quality

Table 6-7 - Potential risks of the Scheme to Water Quality

Consider if your activity:	Yes	No	Water quality risk issue(s)
Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days)	Requires impact assessment	Impact assessment not required	Yes - Construction activities particularly those that require excavation have the potential to re-mobilise contaminated sediments. There is also a risk of turbidity and debris falling into the water, as well as chemical leaks and spills. Construction will take place on a low tide, so that the works area is dry, construction is expected to take place in July/ August 2024 Due to the rock mattresses being embedded into the river bed there are unlikely to be any operational impacts.
Is in a water body with a phytoplankton status of moderate, poor or bad	Requires impact assessment	Impact assessment not required	Not assessed for this water body.
Is in a water body with a history of harmful algae	Requires impact assessment	Impact assessment not required	Not yet assessed for this water body.

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Table 6-8- Potential risks of the Scheme to Water Quality

If your activity uses or releases chemicals (for example through sediment disturbance or building works) consider if:	Yes	No	Water quality risk issue(s)
The chemicals are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment	Impact assessment not required	Yes. Although where excavation is taking place, this is only shallow excavation to a maximum depth of 1.4m, the scheme is located in a historically (and current) industrial area, therefore there may be a risk that the soils are contaminated.
It disturbs sediment with contaminants above Cefas Action Level 1	Requires impact assessment	Impact assessment not required	Yes. Although where excavation is taking place, this is only shallow excavation to a maximum depth of 1.4m, the scheme is located in a historically (and current) industrial area, therefore there may be a risk that the soils are contaminated.

Table 6-9 - Potential risks of the Scheme to Water Quality

If your activity has a mixing zone (like a discharge pipeline or outfall) consider if:	Yes	No	Water quality risk issue(s)
The chemicals released are on the Environmental Quality Standards Directive (EQSD) list	Requires impact assessment ⁵	Impact assessment not required	No chemicals are to be released during construction or operation.

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A.3.4 Section 4: WFD protected areas

Protected area types considered include the presence of the following.

- special areas of conservation (SAC)
- special protection areas (SPA)
- shellfish waters
- bathing waters
- nutrient sensitive areas

Table 6-10 - Potential risks of the Scheme to WFD protected areas

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area	Requires impact assessment	Impact assessment not required	Yes – There is a Groundwater Drinking Water Protected Area within 2km of the scheme however, impacts are not expected as there are no significant below ground works (rock anchors extending to 1.5m below ground and river bed excavations extending to a maximum of 1.4m below ground) and no new pollution sources as part of the scheme. Therefore, no impact assessment is required. There are no further WFD protected areas within 2km of the scheme.

A.3.5 Section 5: Invasive non-native species (INNS)

Risks of introducing or spreading INNS include:

- materials or equipment that have come from, had use in or travelled through other water bodies
- activities that help spread existing INNS, either within the immediate water body or other water bodies

Table 6-11- Potential risks of the Scheme to INNS

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS	Requires impact assessment	Impact assessment not required	Yes – INNPS (Invasive Non-Native Plant Species) recorded on the site visit included stands of <i>Fallopia japonica</i> (Japanese knotweed) were recorded adjacent to the Site on the right bank approximately 10 m upstream from the Structure (central Ordnance Survey grid reference: SS73799717) and approximately 50 m downstream from the Structure (central Ordnance Survey grid reference: SS73739711)¹⁰. INNS species such as <i>Fallopia japonica</i> (Japanese Knotweed) and <i>Austrominius modestus</i> have been recorded in the NBN datasets¹¹, there are records of species directly upstream, and within close proximity to the works on the River Clydach. <i>Fallopia japonica</i> (Japanese Knotweed) is classified as a high impact species within the WFD UK TAG guidance¹² whereas <i>Austrominius modestus</i> is not

¹⁰ A465 Clydach Underbridge. Environmental Screening Report. South Wales Trunk Road Agent. April 2022.

¹¹ [https://spatial.nbnatlas.org/?q=species_list_uid%3AAdr2350&fq=-occurrence_status%3A%22absent%22&qc=\(state%3AWales%20OR%20cl104%3A%22Wales%2020km%20terrestrial%20buffer%22\)](https://spatial.nbnatlas.org/?q=species_list_uid%3AAdr2350&fq=-occurrence_status%3A%22absent%22&qc=(state%3AWales%20OR%20cl104%3A%22Wales%2020km%20terrestrial%20buffer%22))

¹² <https://www.wfd.uk/sites/default/files/Media/Assessing%20the%20status%20of%20the%20water%20environment/UKTAG%20classification%20of%20alien%20species%20working%20paper%20v7.6.pdf>

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listed in the WFD UK TAG guidance therefore, can be assumed to be low impact.

Construction activities will be managed through on-site 'toolbox' talks and bio-security measures to avoid the introduction or spread of INNS via plant and machinery used in other locations or coming from overseas. No impacts are expected as part of the Schemes operation.

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A.3.6 Summary

Table 6-12 – Summary of Scoping for Neath Estuary

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	Yes	Construction: There is a potential impact on the hydromorphology of the water body as there is a physical interface between the works and the bed/ banks (i.e. regrading of the bank and the installation of the rock mattresses). Operation: No impact during operation as the river bank is restored to its original condition pre-construction and the original sediment from the river is placed back on top of the rock mattress.
Biology: habitats	Yes	Construction: Potential impact to the sensitive habitat such as saltmarsh, rocky shore and intertidal soft sediment during excavation. Operation: Unlikely to be an impact during operation.
Biology: fish	No	Construction: No impacts during operation as the works are taking place at low tide, in July/ August, so there are no 'in-channel works' Operation: No impacts likely as the impacts are localised, there are no barriers for fish movement and the works are laid over fine sandy sediments which are not ideal fish spawning areas.
Water quality	Yes	Construction: Potential disturbance and re-mobilisation of contaminated sediments and/ or soils during construction activities; increased turbidity; risk of debris falling in the water; spills and leaks from machinery. Operation: Unlikely to be an impact during operation.
Protected areas	No	There is a Groundwater Drinking Water Protected Area within 2km of the scheme however, impacts are not expected as there are no significant below ground works and no new pollution sources as part of the scheme. Therefore, no impact assessment is required. There are no further WFD protected areas within 2km of the scheme.

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Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Invasive non-native species (INNS)	Yes	Construction: High impact INNS (Japanese knotweed) have been recorded on site visits and within the National Biodiversity Network (NBN) Atlas therefore, they have been scoped in for further assessment.

Appendix B. Scheme designs

Files provided separately