

AtkinsRéalis



Water Framework Directive Assessment

Northern Divers

23 September 2024

5141061_RP_001

AFON TYWI PIPELINE PROTECTION

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INTRODUCTION

1. Introduction

1.1 Overview

This document presents a Water Framework Directive (WFD) compliance assessment for the installation of rock filter mattresses to provide cover and protection to 9.0m of exposed oil pipeline in Afon Tywi (River Towy), West Wales (henceforth referred to as the Proposed Scheme). The installation of rock filter mattresses requires a marine license from Natural Resources Wales (NRW) which, in turn, is required to demonstrate compliance with the WFD. The aims of the document are to provide:

- Background information on the Proposed Scheme and the WFD legislation.
- Screening of the activities that could impact the status of the overlapping and adjacent WFD water bodies.
- Scoping of any potential risks to these WFD water bodies.
- A compliance assessment to determine whether the scheme will have a non-temporary effect on the status of one or more WFD 'quality elements' at the water body scale.

1.2 Legislative Background

The Water Framework Directive (WFD) came into force in 2000 (Directive 2000/60/EC)¹ and was transposed into UK law in 2003 (The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003). Domestic legislation was most recently updated in The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.²

The WFD's principal aims are to protect and improve the water environment and promote the sustainable use of water. The headline environmental objectives of the WFD and its daughter directives are to:

- Prevent the deterioration of aquatic ecosystems.
- Protect, enhance and restore water bodies to Good Status; which is based on ecology (with its supporting hydromorphological and physico-chemical factors) and chemical factors for surface water, and water quantity and chemical status for groundwaters.
- Progressively reduce pollution from priority substances and phase out emissions, discharges and losses of priority hazardous substances.

1.2.1 Surface water bodies

The WFD sets a default objective for all rivers, lakes, estuaries (also called 'transitional' water bodies), and coastal water bodies (collectively termed 'surface water bodies'), as well as groundwater water bodies, to achieve Good Status by 2027 at the latest. For natural surface water bodies, Good Status is a function of both Good Chemical Status (GCS) and Good Ecological Status (GES). The River Basin Management Plans (RBMPs), published every six years by NRW through engagement with a broad spectrum of organizations and individuals, outline the pressures faced in the Welsh water environment and the actions required to enable natural water bodies to achieve these objectives. Artificial and

¹ [Directive 2000/60/EC Of The European Parliament And Of The Council Of 23 October 2000](#)

² [The Water Environment \(Water Framework Directive\) \(England and Wales\) Regulations 2017](#)

Heavily Modified Water Bodies (A/HMWBs) are considered unable to attain GES due to the modifications that are necessary to maintain their function for society (often referred to as their 'human use') as they provide important ongoing socio-economic benefits. They are, however, required to achieve Good Ecological Potential (GEP) which is, in part, achieved through the implementation of a series of Mitigation Measures outlined in the RBMP. A/HMWBs still need to attain GCS which, along with GEP, will collectively result in Good Status in these water bodies.

New activities and schemes that affect the water environment may adversely impact biological, hydromorphological, physico-chemical and/or chemical quality elements (WFD quality elements), and this could consequently result in a deterioration in the existing water body status. New activities may also preclude the implementation or effectiveness of the proposed improvement measures or Mitigation Measures, 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 precluding the delivery of any required improvement measures.

The overall ecological status of a water body is primarily based on consideration of its biological quality elements (phytoplankton, diatoms, macrophytes, phytobenthos, benthic invertebrates and fish) and is determined by the lowest scoring of these elements. These biological elements are 'supported' by the physico-chemical (water quality) and hydromorphological (hydrological or tidal regime, river continuity and morphological conditions (i.e. habitat)) quality elements. Deterioration of any quality element, including 'supporting elements' would result in non-compliance with the WFD, even where this does not result in a change in the overall water body classification. To achieve GCS, a water body must pass a separate chemical status assessment, relating to pass/fail checks on the concentrations of priority / dangerous substances.

1.2.2 Groundwater bodies

For groundwater bodies, Good Status has a quantitative and a chemical component. Both are measured on a scale of good, moderate or poor, and a confidence rating is assigned to the status assessment of high or low. Together, these criteria provide a single final classification of either good or poor status. There is also a trend objective set for groundwater water bodies where environmentally significant and sustained rising trends in pollutant concentrations need to be identified along with a definition of the starting point (percentage of level or concentration) for trend reversal. Furthermore, the daughter directive of the WFD specifically concerning groundwater (the Groundwater Directive) also requires the prevention of any input of priority substances and limiting (or control) of the input of all other substances to groundwater to prevent the deterioration of status.

1.3 Background to WFD

A summary of key WFD concepts is presented in Figure 1-1. This includes the definition of what a waterbody is in relation to this assessment. The WFD compliance assessment follows the 'Clearing the Waters for All' guidance which is specifically for estuarine and coastal waters.³ The guidance suggests that a WFD assessment can be comprised of up to three stages:

1. Screening assessment - to determine what activities associated with the Proposed Scheme require further consideration and what activities can be screened out at this stage of the process.
2. Scoping assessment - to identify risks associated with the Proposed Scheme activities on relevant water bodies and their quality elements.

³ [Water Framework Directive assessment: estuarine and coastal waters](#)

3. Impact assessment - a detailed impact assessment of the water bodies and their quality elements that are likely to be affected by the Proposed Scheme. Any potential for non-compliance would be highlighted at this stage along with a consideration of any necessary mitigation measures and enhancements that are considered necessary for the Proposed Scheme to comply with WFD objectives

All stages may not need to be completed, but this is dependent on the findings at each stage.



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. This directive was transposed into English and Welsh law in the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 and was updated in 2017. The main objectives of the original WFD legislation 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 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 is the Government's 'competent authority' for implementing the WFD in Wales; it monitors, advises and manages many aspects of the water environment through regulating discharges, abstractions and processing environmental permits and licenses. NRW is committed to implementing environmental improvements that would result in the achievement of the objectives of the WFD.

WFD Classification

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

- '*Biological elements*' such as macroalgae;
- '*Hydromorphology supporting elements*' that include hydrological regime and morphology; and
- '*Priority substances*', '*Other Pollutants*' and '*Priority hazardous substances*' that assess a wide range of elements to determine the Chemical Status of the water body.

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:

- Test 1: The proposed scheme will not cause a deterioration in any element of water body classification.
- Test 2: The proposed scheme will not prevent the WFD status objectives from being reached within the water body or other downstream water bodies.

These obligations must be met in order to ensure compliance with the WFD.. If it is considered that the proposed scheme is likely to cause deterioration in water body status or prevent a water body from meeting its ecological objectives as a result of new physical modification, then an assessment would be required against the conditions listed in Article 4.7 of the WFD. Article 4.7 can be invoked if; 'new modifications' relating to physical modification or alterations in groundwater levels 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.

A/HMWB

These water bodies cannot achieve GES due to substantial modification, e.g. for flood risk management. Instead, they are required to reach GEP. The presence or absence of a set list of Mitigation Measures is used as a proxy for biological indicators for those biological elements that are considered to be 'sensitive' to the human use in the water body that has driven the HMWB designation. All non-sensitive biological elements are required to meet the same criteria required in order to attain GES. Assuming that this is the case, and if all relevant Mitigation Measures and improvement actions have been implemented, the water body would be assigned a preliminary tag of GEP (or better). 'Moderate or worse' is used if some mitigation measures are yet to be implemented. HMWBs may therefore have an element rated 'poor' but not be considered 'poor' in overall status. HMWBs are still required to attain good overall status, through a combination of GEP and GCS.

Hydromorphology

Hydromorphology is a term used in the WFD to describe the processes operating within, and the physical form of, a water body. The term encompasses both hydrological and geomorphological characteristics that, in combination, help support a healthy ecology. Hydromorphology is a supporting condition unless a water body is classified as being of 'high' ecological status. In these cases, hydromorphological elements contribute towards status classification.

Figure 1-1 - Background to the WFD

2. Scheme Description

2.1 Scheme location

The Proposed Scheme is concerned with the protection of approximately 9m of exposed oil pipeline which crosses the Afon Tywi at National Grid Reference (NGR) SN 40112 17236. This location is approximately 4.2km downstream from Carmarthen in Carmarthenshire, in the West Wales and The Valleys region (See Figure 2-2). It lies in the section of the Afon Tywi that is part of the Tywi & Taf & Gwendraeth- Three Rivers Estuary (WFD water body GB531006013400) (henceforth referred to as Three Rivers Estuary), a semi-diurnal tidal estuary, which flows to Carmarthen Bay. The Proposed Scheme is located within the Afon Tywi Site of Special Scientific Interest (SSSI), and within the north section of the Carmarthen Bay and Estuaries Special Area of Conservation (SAC UK0020020).

2.2 Scheme details

Northern Divers Engineering Ltd., known as Northern Divers, has been contracted to carry out remediation work for a section of the exposed oil pipeline. AtkinsRéalis UK Limited is supporting Northern Divers with the assessments and procurement of the necessary permits and consents.

Previous surveys and a diving inspection carried out in 2022 had identified a section of exposed pipeline towards the Southwest riverbank, of approximately 9.0m in length. A follow up inspection and topographical survey of the full water section was carried out on the 26th of June 2024. The results confirmed that the area of pipeline exposure and minimal cover remains almost the same as that of 2022.

The proposed remediation works will take ten days to complete; eight days working below water and two days for mobilisation. Northern Divers has proposed to protect the exposed pipeline with rock filter mattresses. Rock filter mattresses are made from rock rolls and used to control erosion and provide scour protection.

The works involve the placement of 24 rock filter mattresses with each mattress unit possessing a dimension of 2.0m x 1.0m x 0.250m. The weight per unit is approximately 510kg. The stone specification is weather and frost-resistant granite 40mm to 75mm in size. The net holding the rocks is a black UV treated 3mm synthetic polyethylene braided knotted net with 32mm aperture. The remediation includes placement of the rock mattresses over the pipeline section, over 12m length x 3m wide, and securing of mattresses with ground anchors.

The works will involve the use of a modular pontoon, as a main workboat, with propulsion systems (likely to be provided by Scafffloat (contractor)). The pontoon has a small crane (Hiab) on board, which will be used to load up the mattresses and equipment at the rowing club in Carmarthen. Once loaded, the pontoon will travel to the works site, use a 4-point anchoring system to secure its position, and start operations on site. Operations on site will involve:

- Loading up mattress and mobilisation of pontoon unit in Carmarthen.
- Mobilisation of pontoon with mattresses to work site (near 'Tir-isaf' farm).
- Dive inspection of exposed pipe section.
- Infill any scour either side of pipeline if required with granular fill.
- Placement of mattresses as per sketch below.
- Securing of mattresses with ground anchors which are pushed into the bed (no piling).



- Jetting outer edges of mattresses into the riverbed. The mats will be laced together and jetted into the riverbed along the up and downstream faces. In addition, 'Duck Bill Anchors' will be set through the mattresses and driven into the riverbed.

The sketch below shows the mattresses placed across and next to the pipeline (pink horizontal tube).

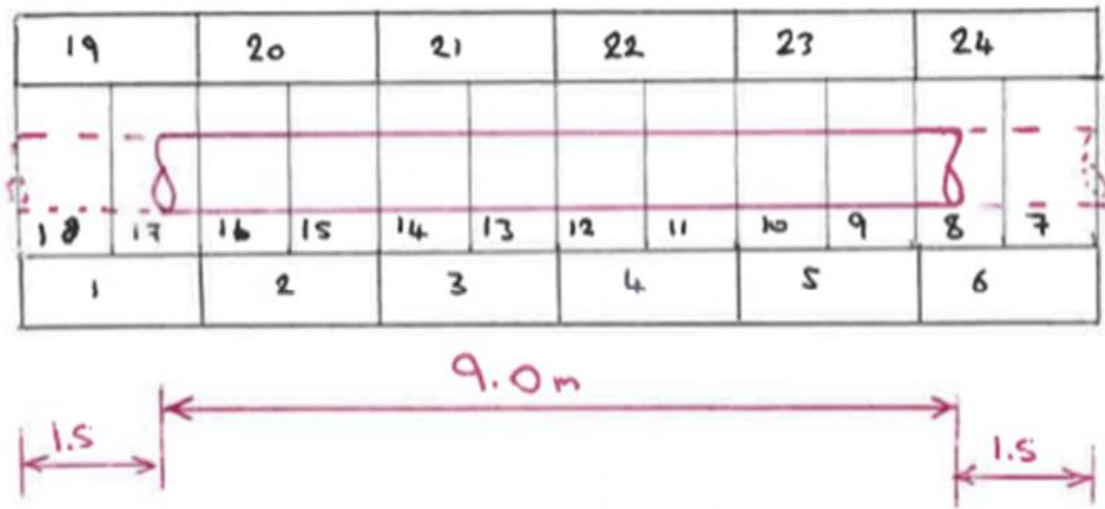


Figure 2-1 - Proposed rock mattress layout (Mats are 2.0m x 1.0m x 0.250m)

Once the mattresses have been placed. The pontoon will return to Carmarthen for the night and repeat the process listed above the next work day. There is no need for welfare facilities on site, and there will be no access and use of the shore or river banks, besides the landing site at Carmarthen rowing club.

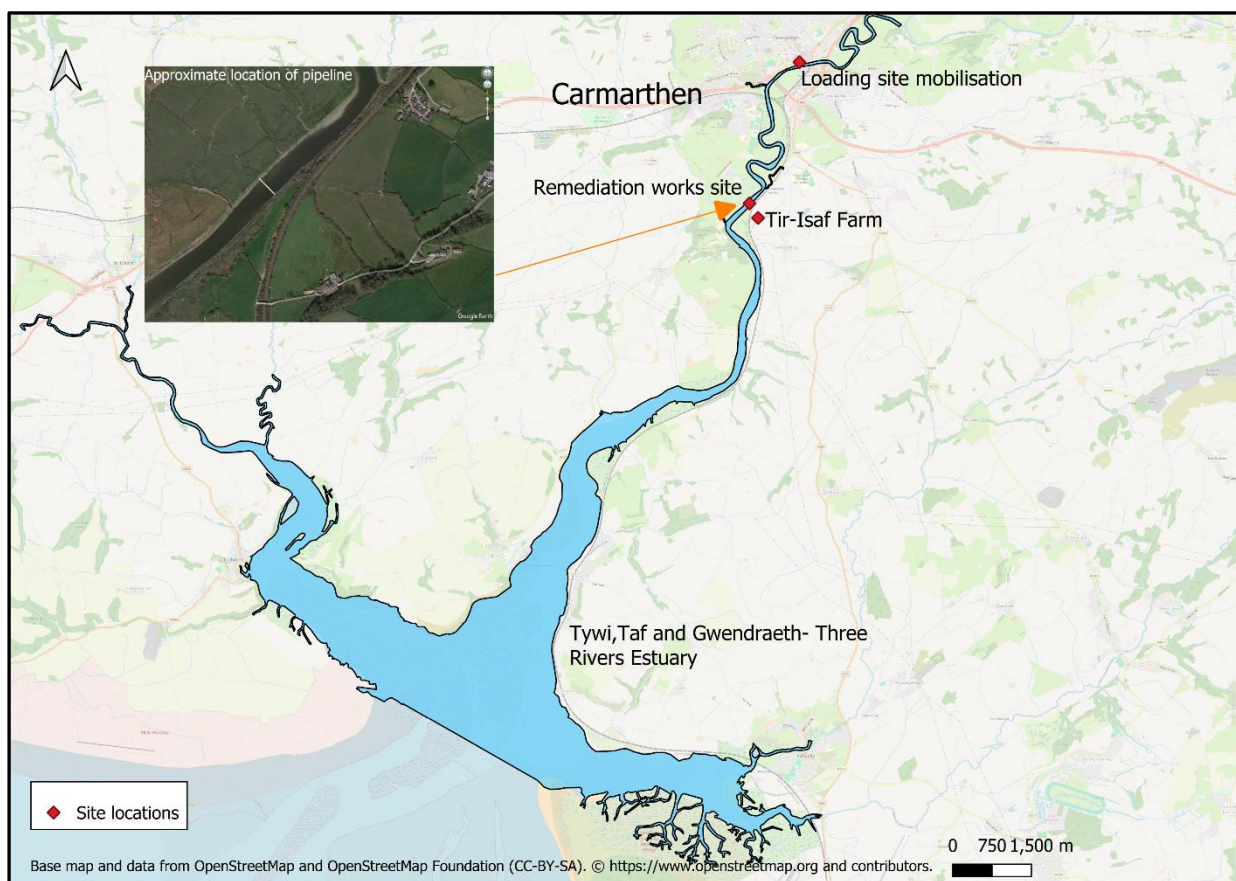


Figure 2-2 - Location of pipeline and other sites

3. Baseline

This section details the results of a desk study which was undertaken to:

- Identify WFD water bodies within and downstream of the Proposed Scheme.
- Review ecological records, hydrological data and other relevant project data sets (e.g., site photographs) to determine geomorphological and ecological baselines for the identified WFD water bodies.
- Review current WFD status for the identified WFD water bodies.

The section also details the WFD screening which was undertaken to determine those water bodies with the potential to be impacted by the Proposed Scheme which are to be taken forward for assessment.

3.1 Desk Study

A schematic of the exposed pipeline location in the Three Rivers Estuary water body can be seen in Appendix A. Other data sources include:

- Water Watch Wales⁴
- Magic Map⁵
- BGS GeoIndex⁶
- EA Ecology and Fish Data Explorer⁷

The location of the pipeline is within the Tywi & Taf & Gwendraeth- Three Rivers Estuary transitional water body (GB531006013400), which has a total area of 5,767ha.

3.1.1 Geomorphology and hydrodynamics

The Three Rivers Estuary has semi-diurnal tides, meaning two high water and two low water per lunar day. The channel moving from the north to south increases in width until it meets Carmarthen bay. The banks of the Three Rivers Estuary consist of extensive areas of saltmarsh, and intertidal substrates such as sand, shingles, mud, and rocks. The bed is dominated by intertidal mudflats consisting of soft mud and mud/gravel beds in the channel.

⁴ [Water Watch Wales](#)

⁵ [MAGiC Map](#)

⁶ [BGS GeoIndex Onshore](#)

⁷ [Ecology & Fish Data Explorer](#)

3.1.2 Aquatic Ecology

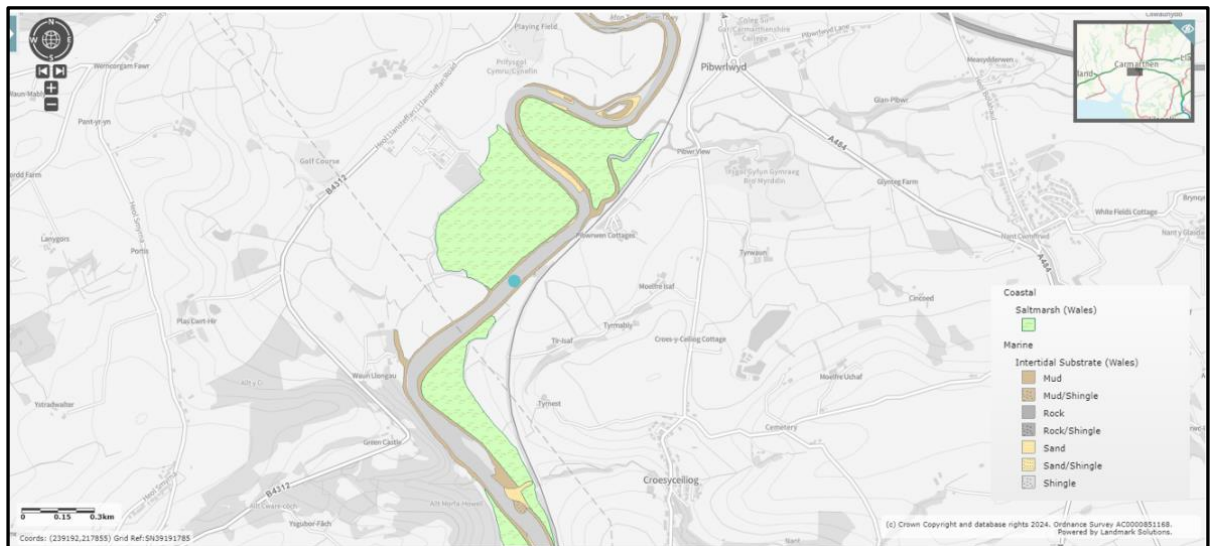
3.1.2.1 Biology- Fish

There are NRW marine fish survey records in the Three Rivers Estuary which can be found on DataMap Wales.⁸ The National Biodiversity Network Atlas Wales⁹ also holds records of fish ecology in Wales.

However, Afon Tywi is home to twaite shad *Alosa fallax* and allis shad *Alosa alosa*, and it is one of four rivers in England and Wales known to date, to breed the *Alosa fallax*. The river also supports a thriving population of sea trout *Salmo trutta trutta* and it also supports brown trout *Salmo trutta fario* and bullhead *Cottus gobio* which are non-migratory fish. Other migratory fish in the river include Atlantic salmon *Salmo salar*, eel *Anguilla anguilla*, river lamprey *Lampetra fluviatilis*, and sea lamprey *Petromyzon marinus*.

3.1.2.2 Biology- Habitat

High sensitivity habitat 'Saltmarsh' is present on the majority of the margins of the Afon Tywi. Lower sensitivity habitat Intertidal Substrate (Mud, Mud/Shingle, Sand, and Rock) extends along the banks of Afon Tywi at the Proposed Scheme location. The full suite of lower and higher sensitivity habitats adjacent to the Proposed Scheme is presented in Figure 3-1 below.



*Note: This is from the habitats coastal: saltmarsh (Wales) data and the Marine: Intertidal Substrate (Wales) data in MAGiC map.

Figure 3-1 - WFD habitats of higher and lower sensitivity in Three Rivers Estuary (taken from Magic Map).⁵ The blue point indicates the location of the pipe.

3.1.3 Geology

According to the British Geological Survey (BGS) GeoIndex Onshore, the bedrock geology of Afon Tywi (River Towy) is underlain by various formations. However, the Proposed Scheme is underlain by Peltura Punctata Beds. This formation has dark blue-grey mudstones with subordinate beds of conglomerate

⁸ [DataMap Wales](https://data.wales.gov.uk/)

⁹ <https://wales.nbnatlas.org/>

and sandstone. The AfonTywi has a wide floodplain with a composition of alluvium, glacial sands and gravels.

3.1.4 Environmental designations

AfonTywi and Glan Pibwr Stream section are designated as Sites of Special Scientific Interest (SSSI). Afon Tywi is also designated as a Special Area of Conservation (SAC) (Carmarthen Bay and Estuaries). The Afon Tywi SSSI runs downstream from Llandovery to the confluence with the Afon Taf and Pembrey Coast SSSI in Carmarthen Bay.

Afon Tywi has been designated as an SSSI because it is an actively eroding river which has resulted in extensive shingle banks. These shingle banks are crucial habitats for birds and invertebrate, and the river itself is notable for its fish species, otters, and in the lower reaches, saltmarsh vegetation.

Carmarthen Bay and Estuaries is designated as an SAC because it supports some of the habitats and species listed in the EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora. The key habitats and species present include: sandbanks, mudflats, sandflats, salicornia, Atlantic salt meadows, and large shallow inlets and bays, as well as *petromyzon marius lampetra fluviatillis*, *alosa alosa*, *alosa fallax*, and *lutra lutra*.

Glan Pibwr Stream section is designated as an SSSI as it has exposures of early Ordovician sedimentary rocks belonging to the Arenig Series. These rocks are important because they define the characteristics of the Ordovician period, including its deposits, fossils, and the relative ages of its formations. This site is located approximately 2,200m upstream from the Proposed Scheme, on a small tributary of the Afon Tywi, the Nant Pibwr.

3.2 Screening

3.2.1 Activity screening

The construction (installation) and operation (presence) of the rock filter mattresses have the potential to impact the water environment of the Afon Tywi and Carmarthen Bay and Estuaries and are therefore screened in.

3.2.2 Water body screening

The site lies within the Tywi & Taf & Gwendraeth- Three Rivers Estuary WFD transitional water body (GB531006013400) as shown in **Figure 3-2**. Adjacent water bodies are also displayed on the map. The river Nant Pibwr - headwaters to tidal limit (GB110060029260) is a tributary of the Afon Tywi located upstream and northeast of the Proposed Scheme at a distance of approximately 1.13km. Tywi, Taf and Gwendraeths groundwater body (GB41002G200500) underlies the Tywi & Taf & Gwendraeth- Three Rivers Estuary transitional water body. A number of other WFD water bodies that flow into, or surround, the waterbodies directly adjacent to Afon Tywi are also shown in **Figure 3-2**. The outcome of the waterbody screening is presented in **Table 3-1**.



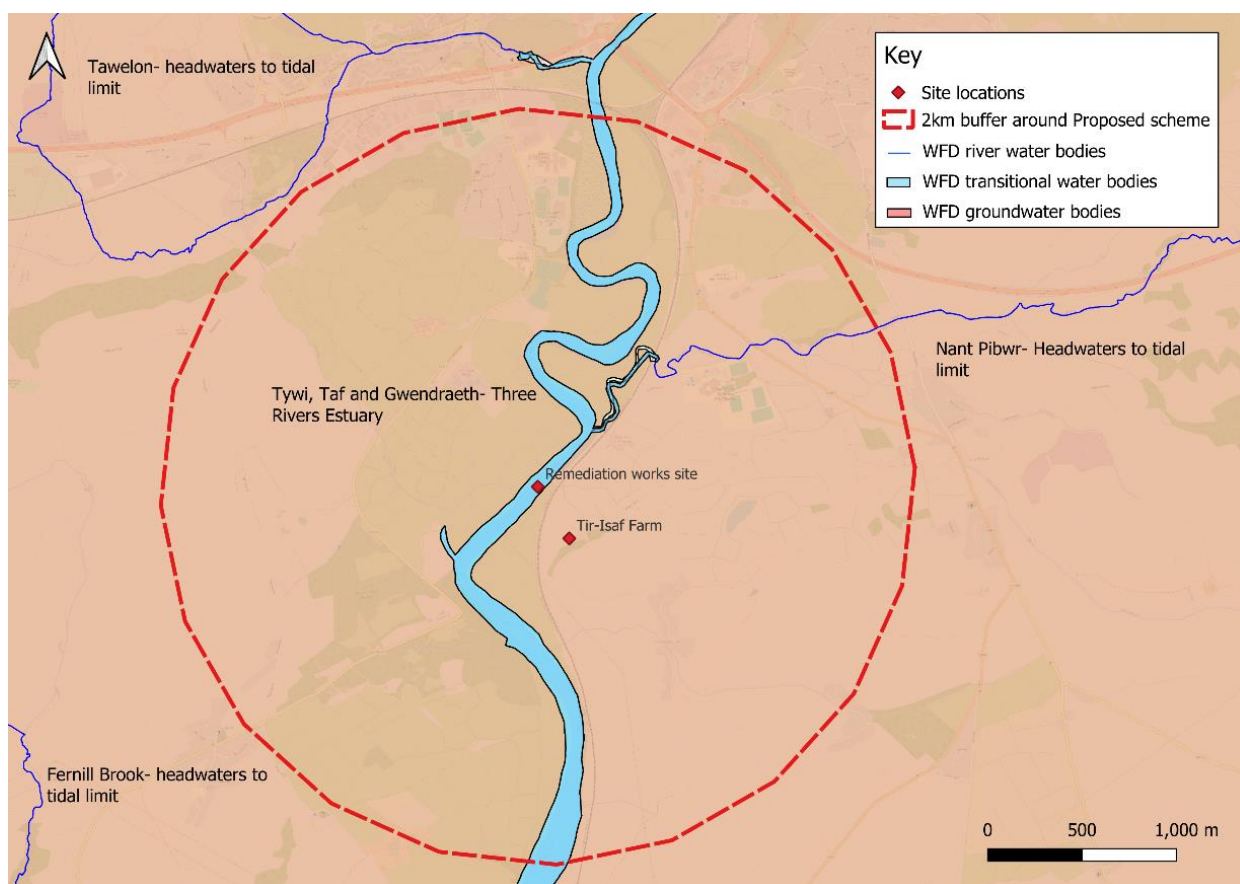


Figure 3-2 - Location of the site and WFD water bodies in the vicinity

Table 3-1 - Screening outcome for the waterbodies surrounding the works

Water body name	Screen in or out	Explanation for screening outcome
Tywi & Taf & Gwendraeth- Three Rivers Estuary WFD transitional water body (GB531006013400)	In	The pipeline, and the works, lie within this water body and therefore it will be taken forward for the scoping exercise.
River Nant Pibwr - headwaters to tidal limit (GB110060029260)	Out	Although the river Nant Pibwr is in direct hydrological connectivity with the works, it sits ~1.13km upstream with any localised impact of the works not flowing in the direction of the water body; it is therefore screened out from any further assessment.
Tywi, Taf and Gwendraeths groundwater body (GB41002G200500)	Out	Although the surface-groundwater pathways in the area are unknown, the hydrology of the estuary is dominated by the tidal regime, with any localised impact likely to be diluted quickly due to the footprints of the works and the size of the estuary; this water body is therefore screened out from any further assessment.

3.3 Existing baseline and water body descriptions

3.3.1 Tywi & Taf & Gwendraeth- Three Rivers Estuary transitional water body

Table 3-2 provides information from the 2021 Cycle 3 WFD assessment of the Three Rivers Estuary transitional water body. The water body is designated as a Natural Water body and is therefore expected to reach GES. The water body is currently at Moderate status with the Ecological status achieving Moderate and the Chemical status achieving High.

These data were extracted from Watch Water Wales⁴ (2022).

Table 3-2 - Tywi & Taf & Gwendraeth-Three Rivers Estuary WFD transitional water body classification

Water body name	Tywi & Taf & Gwendraeth-Three Rivers Estuary	
Waterbody ID	GB531006013400	
River Basin District	Western Wales	
Management Catchment	Carmarthen Bay and the Gower TraC	
Operational Catchment	Tywi & Taf & Gwendraeth-Three Rivers Estuary	
Artificial or HMWB	Natural	
Classification	2021 Cycle 3	Confidence
Overall water body	Moderate	
Ecological	Moderate	
Biological quality elements	Moderate	
Angiosperms	High	Quite Certain
Invertebrates	Good	Uncertain
Macroalgae	High	
Opportunistic macroalgae	High	
Phytoplankton	Moderate	Quite Certain
Infaunal Quality Index (IQI)	Good	Uncertain
Saltmarsh	High	Quite Certain
General	Moderate	
Dissolved Inorganic Nitrogen (DIN)	Moderate	Very Certain
Dissolved Oxygen	High	Very Certain
Hydromorphology	Not High	
Morphology	Not High	Quite Certain
Chemical	High	

Specific Pollutants	High	
Arsenic	High	Very Certain
Copper	High	Very Certain
Iron	High	Very Certain
Toluene	High	Very Certain
Un-ionised ammonia	High	Very Certain
Zinc	High	Very Certain
Priority Hazardous Substances	High	
Cadmium	High	Very Certain
Hexachlorobutadiene	High	Very Certain
Nonylphenol	High	Very Certain
Priority Substances	High	
Benzene	High	Very Certain
1,2-dichloroethane	High	Very Certain
Dichloromethane	High	Very Certain
Lead	High	Very Certain
Nickel	High	Very Certain
Trichloromethane	High	Very Certain
Other pollutants	High	
Carbon Tetrachloride	High	Very Certain
DDT total	High	Very Certain
Aldrin, Dieldrin, Endrin & Isodrin	High	Very Certain
Para - para DDT	High	Very Certain
Tetrachloroethylene	High	Very Certain
Trichloroethylene	High	Very Certain

3.4 Relevant local improvement measures

There has been focus on implementing localised and coordinated actions to enhance the environment in WFD water bodies and protected areas, including those designated for water habitats and species.¹⁰ Some measures to encourage water body enhancement based on Reasons for Not Achieving Good status (RNAGs), and protected area requirements include:

- Sustainable access and recreation management.

¹⁰ [Western Wales River Basin Management Plan 2015-2021](#)

- Specific habitat and feature works.
- Manage invasive non-native species.
- Dredging and silt management.
- Reduce impacts of other physical modifications.

The Carmarthen Bay and Gower Management Catchment Summary¹¹ outlines more measures and partnership opportunities that could support meeting the WFD goals.

¹¹ [Carmarthen Bay and Gower Management Catchment Summary](#)

4. Scoping assessment

The WFD impact assessment of the Tywi & Taf & Gwendraeth- Three Rivers Estuary WFD transitional water body follows the UK Government guidance 'Clearing the Waters for All'.¹²

In line with this guidance, a scoping exercise was undertaken to identify the potential risks that the activity may pose to the WFD receptors within the Tywi & Taf & Gwendraeth- Three Rivers Estuary WFD transitional water body. The scoping exercise is facilitated by a number of questions that are required to be answered in order to determine if the activity is compliant or whether an impact assessment is required. This is undertaken for each of the WFD receptors' for the water body. These WFD receptors are defined in the guidance as the following:

- Hydromorphology
- Biology – habitats
- Biology – fish
- Water quality
- Protected areas

Besides these receptors, which are based on the water body's quality elements, and in line with the Government guidance, the scoping exercise also considered the potential risk of introducing and / or spreading:

- Invasive non-native species (INNS)

The construction and operation of the rock filter mattresses were assessed against the Tywi & Taf & Gwendraeth- Three Rivers Estuary WFD transitional water body, based on the scoping template of the Environment Agency: 'WFD scoping template', available in Appendix B.

To support this assessment, the relevant information in Table 3-2 was used to establish the status of the water body and its elements. Magic maps⁵ was used to derive information about the location and size of the WFD habitats and protected areas.

For full details of the assessment please refer to Appendix B

4.1 Tywi & Taf & Gwendraeth- Three Rivers Estuary scoping assessment

The potential risks to the Tywi & Taf & Gwendraeth- Three Rivers Estuary WFD transitional water body identified in the scoping stage are summarised in Table 4-1.

¹² <https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters>

Table 4-1 - Potential risks to the Three Rivers Estuary WFD receptors

WFD receptors	Potential risk to receptor	Issues for impact assessment
Hydromorphology	No	The overall water body status is not classified as High, the activity is unlikely to have a significant impact on the hydromorphology of the water body, and the HMWB designation is Natural.
Biology: habitats	Yes	The works are within 500m of a higher sensitivity habitat.
Biology: fish	No	Installation of rock filter mattresses provide erosion protection systems. The rock filter mattresses will only cover < 0.0001% of the total water body area. As a result, the rock filter mattresses will not impinge or change the behaviour of fish migration within the estuary. The short duration (8 days of work in the water, during day time only), and small footprint of the works on one side of the channel, is unlikely to impact the natural range of fish movement and influence its capability for migration or spawning.
Water quality	Yes	The phytoplankton status of the water body is Moderate, and includes opportunistic macroalgae.
Protected areas	Yes	There is a WFD protected area, Carmarthen Bay and Estuaries SAC, within 2km of the Proposed Scheme.
Invasive non-native species	Yes	Possible risk of spread of INNS from diving equipment and tools used by the crew.

5. Impact Assessment

5.1 Tywi & Taf & Gwendraeth- Three Rivers Estuary impact assessment

Table 5-1 below shows the impact of the scheme on the WFD receptors identified as potentially at risk in the scoping stage for the Three Rivers Estuary transitional water body.

Table 5-1 - Level of impact on the WFD receptors for the Three Rivers Estuary

WFD Receptor	Level of Impact
Biology – habitats <i>Questions:</i> <i>Consider if the footprint of your activity is:</i> - 0.5km² or larger - 1% or more of the water body's area - Within 500m of any higher sensitivity habitat - 1% or more of any lower sensitivity habitat	There is higher sensitivity habitat present on the margins of most of the estuary. Although there is saltmarsh within approximately 20-40m of where the rock filter mattresses are to be installed, the mattresses will be placed using a pontoon which will not rest on the river bed at any time, and will not come into contact with the river margins, thus avoiding any risk of smothering habitats or increasing turbidity. This means that there will be no interaction with the saltmarsh to gain entry to the pipeline location section or to carry out installation. The total area of the scheme will be 36m² which represent less than 0.0001% of the total water body area (approximately 5,767 ha or 58km²). As a result, the impact to the habitat is negligible and the activity is therefore not expected to result in permanent deterioration at the water body scale.
Water quality <i>Questions:</i> <i>Consider if the footprint of your activity:</i> - Could affect water clarity, temperature, salinity, oxygen levels, nutrients or microbial patterns continuously for longer than a spring neap tidal cycle (about 14 days) - Is in a water body with a phytoplankton status of moderate, poor or bad	The installation of the rock filter mattresses will create some localised, short-term turbidity. However, these will be placed slowly and carefully on the bed, for safety measures and accuracy, which will also minimise disturbance of sediments. The short duration and timing of the works (March – April) is unlikely to support the growth of opportunistic macroalgae. The water body has a moderate phytoplankton status, which together with dissolved inorganic nitrogen, seem to be the 'drivers' for the water body status, as per NRW data¹³, but this unlikely to be affected by the works.

¹³ [Natural Resources Wales - Citrix FileShare \(sharefile.eu\)](#)

- Is in a water body with a history of harmful algae	
WFD protected area <i>Questions:</i> <i>Consider if your activity is:</i> <i>Within 2km of any WFD protected area</i>	The Proposed Scheme is within a WFD protected area, Carmarthen Bay and Estuaries SAC. The localised, short-term turbidity created by the installation of the mats is likely to be visible to the crew carrying out the work, but unlikely to increase turbidity levels and duration beyond the natural range of the river, in a way that would impact the features of the protected area. The installation of the mats will result in localised noise, which could temporarily disturb species in the vicinity of the works. However, there will be limited underwater noise, besides the usual noise from vessel engines, and the placement of the mats. The anchors will be pushed into the riverbed, and the overall duration of noise will be short and interrupted (i.e. not continuous). The short duration (8 days of work in the water, during day time only), and small footprint of the works on one side of the channel, while capable of temporarily disturb fish, is unlikely to impact its capability for migration or spawning. As a result, the impact to the protected area is negligible and the activity is therefore not expected to result in permanent deterioration at the water body scale.
Invasive non-native species <i>Questions:</i> <i>Consider if your activity could:</i> <i>Introduce or spread INNS</i>	While the new rock filter mattresses and anchors are sterile, the diving equipment and tools of the crew will be washed before entering the estuary and a check-clean-dry policy will be implemented following each working day. As a result, the impact to the spread of INNS is negligible and fully controlled through the implementation of this mitigation measure.

In summary, embedded mitigation will be implemented and adhered to during installation of the rock filter mattresses and with this, there is no anticipated impact of the scheme on the Three Rivers Estuary transitional water body.

5.2 Temporary impacts

Specific actions are presented below that will have a mitigating effect on any potential temporary impact during installation:



- Access to the site will avoid saltmarsh areas and the vessel will not moor on this habitat.
- Works will take place during day time hours only.
- The risk of pollution incidents will be managed and reduced through good practice measures including adherence to emergency response protocols (e.g. stop leak, notify authorities, etc.).
- All materials introduced to the estuarine environment are from licensed sources, and the equipment will be operated in accordance with good practice.
- The short period of installation of the mats (~10 days).
- Placement of mats will be as slow as possible. This will minimise resuspension of sediment.

5.3 Cumulative effects

There are no other works, to the best of our knowledge, that would result in a cumulative impact on the Three Rivers Estuary water body.

6. Requirements and Recommendations

The design and construction team will follow good practice guidance for preventing pollution and the spread of invasive non-native species with the embedded mitigation measures below:

- **Pollution Prevention**
 - A guidance document on pollution prevention methods, 'Works and maintenance in or near water: GPP5¹⁴', can be found on NetRegs website¹⁵ which was created by Natural Resources Wales, Northern Ireland Environment Agency and Scottish Environment Protection Agency (2017). The updated version, V 1.2, was published in February 2018. GPP5 is an updated version of the pollution prevention guideline PPG5¹⁶ created by the Environment Agency which was withdrawn in 2015. The GPP5 is readily available and should be followed for all works and maintenance in or near water.
- **Invasive Non-Native Species**
 - Construction activities that involve the use of vessels and equipment that has been used in other water bodies significantly increase the risk of the spread of INNS associated with aquatic and riparian habitats, if not prevention measures are undertaken. Risks will be managed effectively during the construction period through the implementation of biosecurity control measures, such as check-clean-dry procedures for plant, equipment and the workforce. The GB non-native species secretariat website¹⁷ provides a key source of information for the identification of risks, appropriate control and management systems and disposal, which will be reviewed before the start of the works.

¹⁴ [Guidance for Pollution Prevention- Works and maintenance in or near water: GPP 5](#)

¹⁵ <https://www.netregs.org.uk/>

¹⁶ <https://www.gov.uk/government/publications/works-in-near-or-over-watercourses-ppg5-prevent-pollution>

¹⁷ <https://www.nonnativespecies.org/>

7. Conclusion

This assessment has concluded that the installation of rock filter mattresses in Afon Tywi, due to its very short duration, nature and small footprint, will not result in a permanent impact on any WFD quality elements at a water body scale. As such, the Proposed Scheme is not considered to have the potential to cause a deterioration to the WFD quality elements or the overall WFD status of the Tywi & Taf & Gwendraeth - Three Rivers Estuary transitional water body.

There may be some localised temporary impacts during construction, however these will be managed to an acceptable (WFD compliant) level by following the mitigation outlined in the Impact Assessment (Section 5) and Requirements and Recommendations (Section 6) of this report.

Due to the small footprint and localised activity of the works, the Proposed Scheme will not preclude the delivery of any other improvement objectives for the water body.

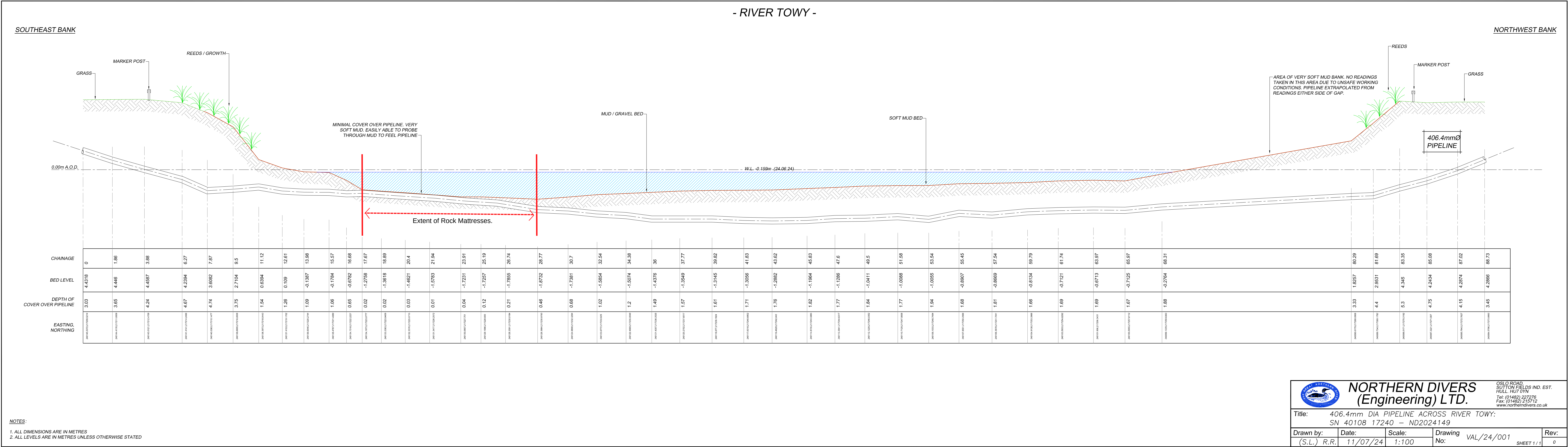
There is no other scheme nor activity taking place, to the best of our current knowledge, that would result in a cumulative impact or act in-combination with this scheme.

This assessment concludes that the Proposed Scheme is WFD compliant. As a result, WFD compliance does not present any risk in respect to the discharge of a Marine Licence.



APPENDICES

Appendix A - Schematic of exposed pipeline



Appendix B. Scoping stage: Transitional water body assessment

Water Framework Directive assessment: scoping template for activities in estuarine and coastal waters

Use this template to record the findings of the scoping stage of your Water Framework Directive (WFD) assessment for an activity in an estuary or coastal water.

If your activity will:

- take place in or affect more than one water body, complete a template for each water body
- include several different activities or stages as part of a larger project, complete a template for each activity as part of your overall WFD assessment

The [WFD assessment guidance for estuarine and coastal waters](#) will help you complete the table.

Your activity	Description, notes or more information
Applicant name	Northern Divers (Engineering) Limited
Application reference number (where applicable)	N/A
Name of activity	Afon Tywi pipeline protection
Brief description of activity	The project consists of remediation works to protect a section (approx. 9m) of exposed oil pipeline running under the Afon Tywi; located 4.2km downstream from Carmarthen, in Carmarthenshire. The remediation includes placement of rock mattresses over the pipeline section and securing of mattresses with ground anchors. The works will take 10 days to complete.
Location of activity (central point XY coordinates or national grid reference)	SN 40112 17236
Footprint of activity (ha)	0.0036 (36m²)
Timings of activity (including start and finish dates)	Duration of works is 10 days to be carried out in March/April 2025
Extent of activity (for example size, scale frequency, expected volumes of output or discharge)	Remediation involves the placement of 24 rock mattresses over the pipeline section, over 12m length x 3m wide, to ensure the exposed pipeline (~9m in June 2024) is suitably protected and securing the mattresses with ground anchors. Each mattress unit has the following dimensions: 2.0m x 1.0m x 0.250m. The weight per unit is approximately 510kg.
Use or release of chemicals (state which ones)	No

Water body ¹	Description, notes or more information
WFD water body name	Tywi & Taf & Gwendraeth - Three Rivers Estuary
Water body ID	GB531006013400
River basin district name	Western Wales
Water body type (estuarine or coastal)	Transitional
Water body total area (ha)	5767.2147
Overall water body status (2015)	Moderate
Ecological status	Moderate
Chemical status	High
Target water body status and deadline	Good status by 2027
Hydromorphology status of water body	Not High
Heavily modified water body and for what use	Designated as Natural
Higher sensitivity habitats present	Saltmarsh
Lower sensitivity habitats present	Intertidal Substrate (Mud, Mud/Shingle, Sand, and Rock)
Phytoplankton status	Moderate
History of harmful algae	Yes – status of opportunistic macroalgae in the water body is high
WFD protected areas within 2km	Yes - Carmarthen Bay and Estuaries SAC.

¹ Water body information can be found in the Environment Agency’s catchment data explorer and the water body summary table. Magic maps provide additional information on habitats and protected areas. Links to these information sources can be found in the WFD assessment guidance for estuarine and coastal waters.



Specific risk information

Consider the potential risks of your activity to each of these receptors: hydromorphology, biology (habitats and fish), water quality and protected areas. Also consider invasive non-native species (INNS).

Section 1: Hydromorphology

Consider if hydromorphology is at risk from your activity.

Use the water body summary table to find out the hydromorphology status of the water body, if it is classed as heavily modified and for what use.

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 - the water body is not classified as High
Could significantly impact the hydromorphology of any water body	Requires impact assessment	Impact assessment not required	No - the activity is unlikely to have a significant impact on the hydromorphology of the water body. The maximum additional height the mats will create on the riverbed is ~300mm and the footprint of the works is a maximum of 36m ² , this makes up a total of less than < 0.0001% of the total water body area. In addition, the Proposed Scheme does not involve major hydromorphology pressures such as channelisation, abstraction, hard engineering works and/or removal of natural features.
Is in a water body that is heavily modified for the same use as your activity	Requires impact assessment	Impact assessment not required	No - the water body is designated Natural. In addition, this activity involves pipeline protection only.

Record the findings for hydromorphology and go to section 2: biology.

Section 2: Biology

Habitats

Consider if habitats are at risk from your activity.

Use the water body summary table and Magic maps, or other sources of information if available, to find the location and size of these habitats.

Higher sensitivity habitats ²	Lower sensitivity habitats ³
chalk reef	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	

² Higher sensitivity habitats have a low resistance to, and recovery rate, from human pressures.

³ Lower sensitivity habitats have a medium to high resistance to, and recovery rate from, human pressures.

Consider if the footprint ⁴ 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 - the footprint of the works is a maximum of 36m ²
1% or more of the water body’s area			No - The footprint of the work is 36m ² and the water body is almost 58 km ² , this equates to < 0.0001%
Within 500m of any higher sensitivity habitat			Yes - Saltmarsh is located within 500m of the works.
1% or more of any lower sensitivity habitat			The area of the scheme, 36m ² makes up less than 0.0001% of the total water body area (approximately 5,767 ha).

⁴ Note that a footprint may also be a temperature or sediment plume. For dredging activity, a footprint is 1.5 times the dredge area.

Fish

Consider if fish are at risk from your activity, but only if your activity is in an estuary or could affect fish in or entering an estuary.

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
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 short duration (8 days of work in the water, during day time only), and small footprint of the works on one side of the channel, is unlikely to impact fish migration or spawning pattern.
Could cause entrainment or impingement of fish	Requires impact assessment	Impact assessment not required	No

Record the findings for biology habitats and fish and go to section 3: water quality.



Section 3: Water quality

Consider if water quality is at risk from your activity.

Use the water body summary table to find information on phytoplankton status and harmful algae.

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	No
Is in a water body with a phytoplankton status of moderate, poor or bad	Requires impact assessment	Impact assessment not required	Yes- The phytoplankton status of the water body is Moderate
Is in a water body with a history of harmful algae	Requires impact assessment	Impact assessment not required	Yes – status of opportunistic macroalgae in the water body is high.

Consider if water quality is at risk from your activity through the use, release or disturbance of chemicals.

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	No - No chemicals are released.
It disturbs sediment with contaminants above Cefas Action Level 1	Requires impact assessment	Impact assessment not required	No - No chemicals are released. The slow and careful placement of the mats will minimise disturbance of bed surface sediments, which are unlikely to contain high levels of pollutants embedded in them, given the historically rural character of this section of the river (where the works will take place).



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 - No chemicals are released.

⁵ Carry out your impact assessment using the Environment Agency’s surface water pollution risk assessment guidance, part of Environmental Permitting Regulations guidance.

Record the findings for water quality go on to section 4: WFD protected areas.

Section 4: WFD protected areas

Consider if WFD protected areas are at risk from your activity. These include:

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

Use Magic maps to find information on the location of protected areas in your water body (and adjacent water bodies) within 2km of your activity.

Consider if your activity is:	Yes	No	Protected areas risk issue(s)
Within 2km of any WFD protected area ⁶	Requires impact assessment	Impact assessment not required	Yes - there is one WFD protected site, Carmarthen Bay and Estuaries SAC, within 2km of the Proposed Scheme.

⁶ Note that a regulator can extend the 2km boundary if your activity has an especially high environmental risk.

Record the findings for WFD protected areas and go to section 5: invasive non-native species.

Section 5: Invasive non-native species (INNS)

Consider if there is a risk your activity could introduce or spread 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

Consider if your activity could:	Yes	No	INNS risk issue(s)
Introduce or spread INNS	Requires impact assessment	Impact assessment not required	Yes - Works could potentially facilitate the local spread of INNS

Record the findings for INNS and go to the summary section.

Summary

Summarise the results of scoping here.

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	
Biology: habitats	Yes	Yes - The works are within 500m of a higher sensitivity habitat
Biology: fish	No	
Water quality	Yes	Yes- The phytoplankton status of the water body is Moderate, and the status of opportunistic macroalgae is high.
Protected areas	Yes	Yes - There is one WFD protected site, Carmarthen Bay and Estuaries SAC, within 2km of the Proposed Scheme.
Invasive non-native species	Yes	Yes - Works could potentially promote the spread of INNS

If you haven’t identified any receptors at risk during scoping, you don’t need to continue to the impact assessment stage and your WFD assessment is complete.

If you’ve identified one or more receptors at risk during scoping, you should continue to the impact assessment stage.

Include your scoping results in the WFD assessment document you send to your activity’s regulator as part of your application for permission to carry out the activity.



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