

AtkinsRéalis



Water Framework Directive Assessment

Pembrokeshire Coast National Park Authority
(PCNPA)

February 2026

CAREW MILL AND CAUSEWAY REPAIRS

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INTRODUCTION

1. Introduction

1.1 Overview

AtkinsRéalis was commissioned by Pembrokeshire Coast National Park Authority (PCNPA) to support the small-scale repairs to the historic causeway structure located at Carew Mill, Grid Reference - SN04170385 (Figure 1-1), herein referred to as the Proposed Works.

This document presents the Water Framework Directive (WFD) assessment for the Proposed Works. The aims of the document are to:

- Provide background information on the WFD legislation and the Proposed Works.
- Provide a high-level baseline understanding of the affected water bodies in the context of the WFD.
- Provide an assessment of the potential for the Proposed Works to cause deterioration in the WFD status of any water body directly or indirectly affected by the Proposed Works; and
- Provide an assessment of the potential impacts on water body improvement measures and the ability to meet WFD objectives, as well as to suggest mitigation measures where necessary.

1.2 The Site

The Proposed Works are located at Carew Tidal Mill also known as the French Mill (Figure 1-1). Built around 1801, it is one of the oldest corn mills still powered by tidal water in Wales. The works will be focused within the below 4 setting out points (SOP) forming the corner extents of the Site.

- SOP1 – SN 04139 03813
- SOP2 – SN 04167 03857
- SOP3 – SN 04203 03946; and
- SOP4 – SN 04221 03940

The Proposed Works are required to repair the walls of the causeway adjacent to the millpond to ensure the integrity of the causeway structure. Some of the works will be undertaken from the hardstanding surface of the causeway around the perimeter of the Mill House and the remainder of the works will be to the vertical walls of the causeway.



© <https://commons.wikimedia.org/w/index.php?curid=30367615>

Figure 1-1 - Carew Mill and Sluice Gates

1.3 Previous Consultation

Past consultation on the methodology of the Proposed Works has been undertaken with Natural Resources Wales (NRW), at a site meeting on 25/7/17 and approved in a previous marine licence CML1736 and CML2025. Another licence (CML2169) was approved in 2021; however, the Proposed Works were never carried out and the marine licence subsequently expired. A new marine licence is therefore required to undertake the works in 2026.

2. Proposed Works description

2.1 Proposed Works location

Carew Causeway is a long stone causeway that crosses the Carew River, right beside Carew Tidal Mill and Carew Castle. It sits on a tidal inlet east of Milford Haven in Pembrokeshire (Figure 2-1).



Figure 2-1 - Location of Proposed Works with the red line boundary showing the extent

2.2 Overview

The purpose of the Proposed Works is to undertake small scale repairs to the historic causeway structure at the Site. Some of the works will be undertaken from within the Mill House (Figure 2-2) and the remainder of the works will be to the vertical walls of the causeway (Figure 2-3).

Further details of the Proposed Works required, and detailed design can be found in the following drawings, which are to be submitted as part of the marine licence application:

- 5129589.016-ATK-ZZ-ZZ-DR-D-0001-P06;
- 5129589.016-ATK-ZZ-ZZ-DR-D-0002-P06; and
- 5129589.016-ATK-ZZ-ZZ-DR-D-0003-P06.

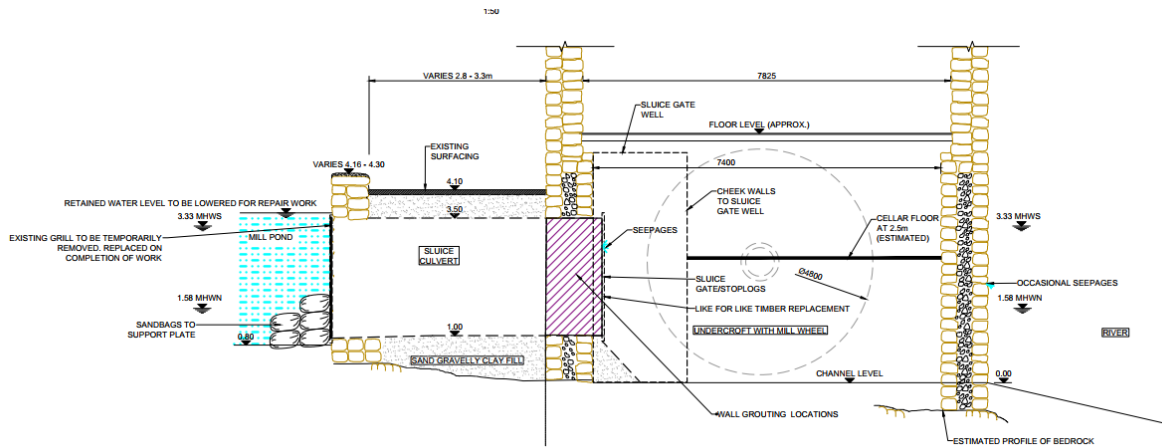


Figure 2-2 - Grouting repairs within the Mill House (Drawing 5129589.016-ATK-ZZ-ZZ-DR-D-0002-P06)

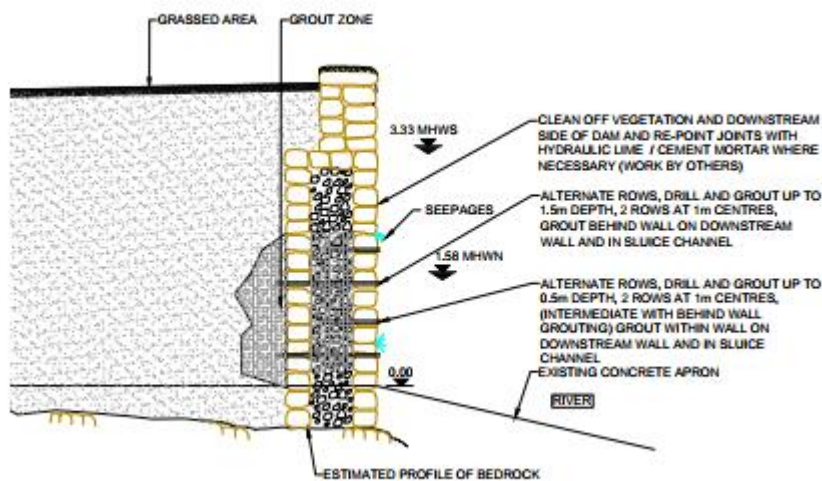


Figure 2-3 - Grouting repairs for causeway walls at the Sluice (Drawing 5129589.016-ATK-ZZ-ZZ-DR-D-0003-P06)

Work is anticipated to commence between June 2026 and September 2026 depending on marine licence approval, with works taking approximately 8 weeks. There is a need to avoid any works during the peak summer tourist periods around school holidays.

2.3 Outline construction method

2.3.1 Activity 1 – Inspection and cleaning

The walls (3-4m height) will be cleaned by hand so that the joints in the masonry can be inspected and any voids identified for infilling. Any loose material or weeds growing in the joints of the wall will be placed in buckets and removed to a skip located at the site compound. Waste materials will be removed to an appropriate licensed waste disposal site.

2.3.2 Activity 2 – Hand infilling of voids

Voids or any loose masonry identified during inspection will be hand repaired with like for like lime-mortar material.

The sequence of works is as follows:

- Mix lime mortar materials on the causeway (above mean high water springs (MHWS)) by hand in small quantities and place into buckets.
- Place a 1m strip of plastic sheeting on the riverbed, to catch falling mortar materials used in repointing. Plastic sheeting and waste materials will be removed at the end of each working day and placed in the skip. There is no requirement for any cofferdams or sandbags, the water will lower naturally through the tidal variation. Works to be undertaken outside of the water column at low tide. The plastic sheeting is a measure to reduce any falling mortar materials from entering the millpond.
- Hand-fill voids with lime mortar.
- All unused lime mortar will be removed from site and disposed of to the skip in the site compound. Hand tools and equipment will be collected and taken to the site compound to be cleaned.

2.3.3 Activity 3 – Grouting repairs - Causeway

Any identified larger voids will be infilled by pressure grouting. Holes of 35mm will be drilled into the existing masonry to reach the voids in the walls. Tubes will be placed into the drilled holes and concrete grout pumped under moderate pressure to infill the voids and stabilise the walls.

The sequence of works is as follows:

- Drill horizontal holes using a hand drill of 35mm diameter and up to ~400mm depth in mortar joints (avoiding stone) for placing horizontal grout pipes.
- Place tubes into the drilled holes.
- Pump lime-based grout through grout pipes to fill voids in wall. The grout materials will be discharged from the causeway above through a grouting pipeline (35mm size pipe) under controlled pressure using a compressor.
- The process of using plastic sheeting as discussed in Section 4.3.2 will be applied here whilst larger voids are filled. Leakage of grout is rare in these circumstances, however, if leakage occurs all grout pumping will stop, and leaks plugged with hand applied mortar. The mortar will be allowed to set before further attempts at grouting are made. Grout pipes will be removed on completion.

2.3.4 Activity 4 – Grouting repairs – Mill House

To increase available access to repair the mill sluices, the gates will be propped open to allow the mill pond of the River Carew to vary naturally with the tide and not impound water at low tide. Works will take place at low tide.

Twice daily (on high tides) water re-enters the millpond and will naturally fill which will allow the pond mud to gain some moisture and protect benthic habitats. Draining/refilling of the pond in this way does not result in the mud drying and in addition there is always some residual water inflows from the upstream River Carew.

Similar to the process in Activity 3, concrete grout will be pumped into voids behind the existing masonry to stabilise the sluice channels.

The sequence of works is as follows:

1. Drill horizontal holes by hand of 35mm diameter in mortar joints (avoiding stone) for placing horizontal grout pipes.
2. Place tubes into the drilled holes.
3. Pump grout through grout pipes to fill voids in wall. The grout materials will be discharged from the causeway above through a grouting pipeline (35mm size pipe) under low pressure.

2.4 Plant, machinery and vessels

No vessels are required for the works; all work will be undertaken using land-based machinery. The works will be undertaken using medium or small sized construction equipment, in addition to manual labour for handling materials and repointing works. All works are to take place out of the water column and will occur at low tide.

2.5 Site Access

The main access to the Site will be via Castle Lane, which is connected to the A4075.

A site compound will be located in the small PCNPA depot in Castle Lane. This will reduce the number of vehicles required to drive down to the mill itself. Deliveries will be to the site compound.

2.6 Operation

Operation of the Proposed Works will commence as soon as the works are completed. No further works are expected once the Site is in operation.

2.7 Decommissioning

There are no plans to decommission the Proposed Works. They are permanent works required to maintain the Carew Causeway, Mill and the millpond.

3. Methodology

3.1 Legislative Background

The European Union (EU) Water Framework Directive (Council Directive 2000/60/EC)¹ aims to protect and enhance the quality of the water environment across all EU member states. Whilst the United Kingdom is no longer a member of the EU (as of 31 January 2020), the WFD is transposed into English and Welsh law through The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017² which revoke and replace The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 and its amendments.

The main objectives of the WFD are to:

- Prevent the deterioration of aquatic ecosystems.
- Protect, enhance and restore waterbodies 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.

3.1.1 WFD classification

Each WFD water body is provided a classification, which outlines the current condition of the water body. For transitional water bodies, this is comprised of two statuses:

- Ecological Status – including Biological Quality Elements, Physico-Chemical Quality Elements, Specific Pollutants, and Hydromorphological Supporting elements; and
- Chemical Status – including Priority Substances, Priority Hazardous Substances, and Other Pollutants.

A transitional water body is a body of water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters, but which are substantially influenced by freshwater flows.

The WFD requires all natural transitional waterbodies to achieve both Good Chemical Status (GCS) and Good Ecological Status (GES).

Artificial and Heavily Modified Water Bodies (A/HMWB) are considered unable to attain GES due to the modifications necessary to maintain their 'human use' (e.g. flood risk management, navigation).

¹ Directive 2000/60/EC of the European Parliament and of the council of 23 October 2000 establishing a framework for community action in the field of water policy. Official Journal of the European Communities. Available at: [resource.html](#) [Accessed 23rd Jan 2026]

² The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. Available at: [The Water Environment \(Water Framework Directive\) \(England and Wales\) Regulations 2017](#). [Accessed 23rd Jan 2026]

Accordingly, they are required to achieve Good Ecological Potential (GEP), through the implementation of a series of mitigation measures that would improve the ecology of these waterbodies without compromising their human use. These measures are identified through Mitigation Measures Assessment (MMA), outlined in the relevant River Basin Management Plan (RBMP).

3.1.2 WFD compliance

New activities and schemes that affect the water environment may adversely impact biological, hydromorphological, physico-chemical and/or chemical quality elements (WFD quality elements), leading to a deterioration in water body status. 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 Project will not cause a deterioration in any quality element that contributes directly or indirectly to the water body classification.
- Objective 2: The Project will not prevent measures being implemented that would deliver the WFD status objectives within the water body or other downstream water bodies.
- Objective 3: The Project will contribute, where practicable, to the delivery of the relevant WFD objectives.

If it is considered that the Project is likely to cause deterioration in water body status (Objective 1) or prevent a water body from meeting its ecological objectives (Objective 2), 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”, specifically in respect to physical modification, 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.

3.2 Methodology of WFD assessment

In Wales, Natural Resources Wales is the regulatory body responsible for the implementation of the WFD and is also responsible for classifying the current condition of surface water and groundwater bodies and setting a series of objectives for maintaining or improving their condition. This WFD compliance assessment follows the ‘Complying with the WFD Regulations 2017: Screening³, Scoping⁴ and Detailed Assessment⁵’ guidance as well as the Environment Agency’s ‘Clearing the Waters for All⁶’ guidance.

The guidance suggests that a WFD assessment be comprised of three key components:

³ Natural Resources Wales (2024) Complying with the WFD Regulations 2017: Screening [Accessed 23rd Jan 2026]

⁴ Natural Resources Wales (2024) Complying with the WFD Regulations 2017: Scoping [Accessed 23rd Jan 2026]

⁵ Natural Resources Wales (2024) Complying with the WFD Regulations 2017: Detailed Assessment [Accessed 23rd Jan 2026]

⁶ Water Framework Directive assessment: estuaries and coastal waters. Available at: [Water Framework Directive assessment: estuarine and coastal waters - GOV.UK](#) [Accessed 23rd Jan 2026]

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 waterbodies and their quality elements, and if a WFD Impact assessment (described below) is required.
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 the WFD objectives.

4. Data sources used

Monitoring information for relevant WFD waterbodies and recent fish monitoring reports for the River Carew have been extracted from online sources. The key data sources that have informed this assessment are:

- Water Watch Wales⁷;
- DEFRA Magic Map⁸;
- BGS GeoIndex⁹; and
- Data Map Wales¹⁰.

⁷ Water_Watch Wales (2021). Available at: [Water Watch Wales](#) [Accessed January 2026]

⁸ Multi-Agency Geographic Information for the Countryside (2026). Available at: [MAGIC](#) [Accessed January 2026]

⁹ British Geological Survey (2026) Geindex Onshore. Available at: [GeoIndex - British Geological Survey](#) [Accessed January 2026]

¹⁰ Data Map Wales (2026) NRW Marine Fish Surveys. Available at: [NRW Marine Fish Surveys | DataMapWales](#) [Accessed January 2026]

5. Stage 1 - Screening

The Proposed Works are in the Carew River, Milford Haven. They are located within the Milford Haven Inner (ID: GB531006114100) transitional water body and the Pembrokeshire Carboniferous Limestone (GB41002G206000) groundwater body. Within 2km of the Proposed Works is the Carew - HW to conf with Carew Tidal millpond (ID: GB110061031210) river water body located approximately 1km upstream of the Site. The closest coastal waterbody is the Milford Haven Outer (ID: GB641008220000) located approximately 10km downstream of the site

The outcome of the water body screening is presented in Table 5-1. This screening used information on WFD water bodies collected by Water Watch Wales⁷.

Table 5-1 - Screening assessment for WFD water bodies

Water body name	Screen in or out	Explanation for screening outcome
Milford Haven Inner (ID: GB531006114100)	In	The Proposed Works lie directly in the boundary of this water body and therefore it has been screened in for further assessment.
Pembrokeshire Carboniferous Limestone (GB41002G206000)	Out	Groundwater is present at very shallow depths, or immediately below the ground surface, and is expected to be tidally influenced. However, as none of the Proposed Works includes dredging or depositing of sediment, or piling into the riverbed, which may cause disturbance to the riverbed, it is deemed unlikely that there will be any impact to the groundwater body and therefore it has been screened out from further assessment.
Carew - HW to conf with Carew Tidal Millpond (ID: GB110061031210)	Out	The extents of the water body does not include the millpond within the Site boundary and is also not tidally influenced. Due to this, the distance from the Proposed Works (600m upstream) and the localised nature of the works, it is deemed unlikely that there will be any impacts on this water body and therefore, it has been screened out from further assessment.
Milford Haven Outer (ID: GB641008220000)	Out	The Milford Haven Outer waterbody is located 10km away. Due to the distance from the Proposed Works and the localised nature of the works, it is

deemed unlikely that there will be any impacts on this water body and therefore it has been **screened out** from further assessment.



5.1 Site baseline

5.1.1 Geomorphology and hydrodynamics

The Carew River is subject to tidal influence and experiences a semi-diurnal tidal cycle, with two high tides and two low tides occurring each lunar day. The estuary is characterised by extensive intertidal habitats composed primarily of sand and mud substrates, which are exposed and submerged with the changing tides.

5.1.2 Aquatic Ecology

5.1.2.1 Biology- Fish/invertebrates

The nearest fish data available on DataMapWales¹⁰ was at two sampling points approximately 750m downstream. Fish species recorded include European seabass (*Dicentrarchus labrax*), golden grey mullet (*Liza aurat*), sand smelt (*Atherina presbyter*) and grey mullet (*Mugilidae sp.*).

During previous consultations with NRW, it was noted that the tentacled lagoon worm (*Alkmaria romijni*) is present within the millpond.

5.1.2.2 Biology- Habitat

The intertidal substrate habitat extends across the tidal reaches of the River Carew. These intertidal areas are primarily composed of mud, as well as mixed mud-and-shingle substrates, which are exposed and submerged with the changing tides.

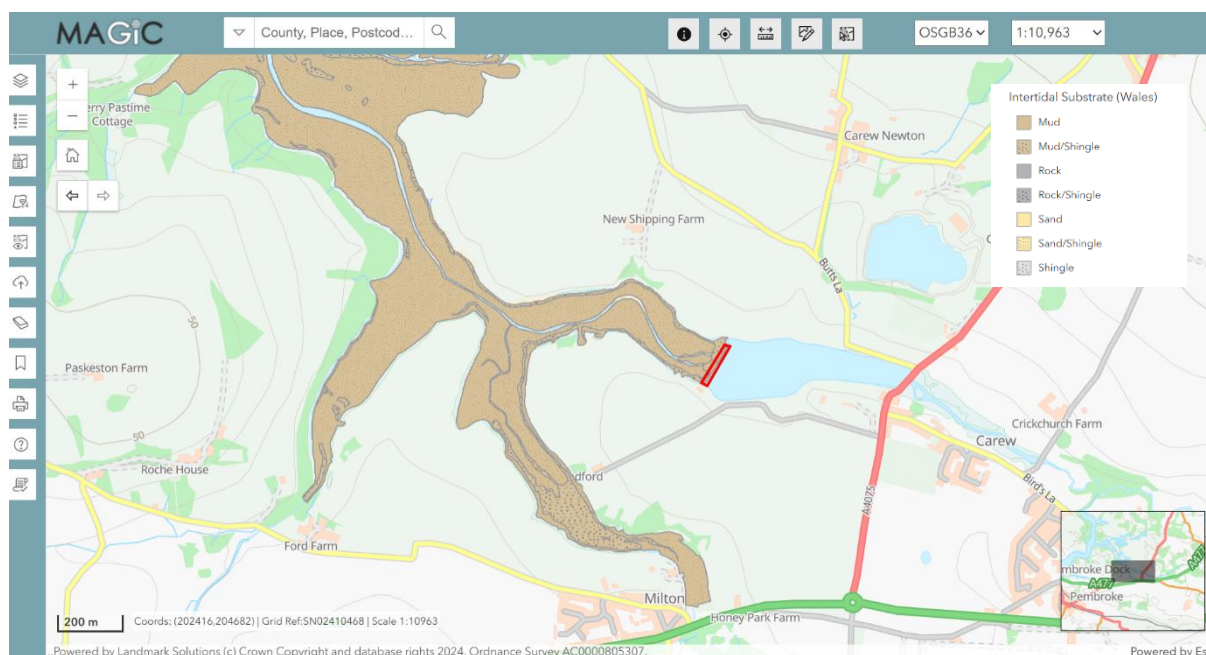


Figure 5-1 - Intertidal Substrate (Wales) map from MAGIC⁸

There are both WFD higher-sensitivity and lower-sensitivity habitats located downstream within 500m of the Proposed Works. Higher-sensitivity habitats include areas of saltmarsh within the millpond, while lower-sensitivity habitats comprise intertidal soft sediment and rocky shore habitats. The full range of both higher- and lower-sensitivity habitat types is illustrated in Figures 5-2 and 5-3.

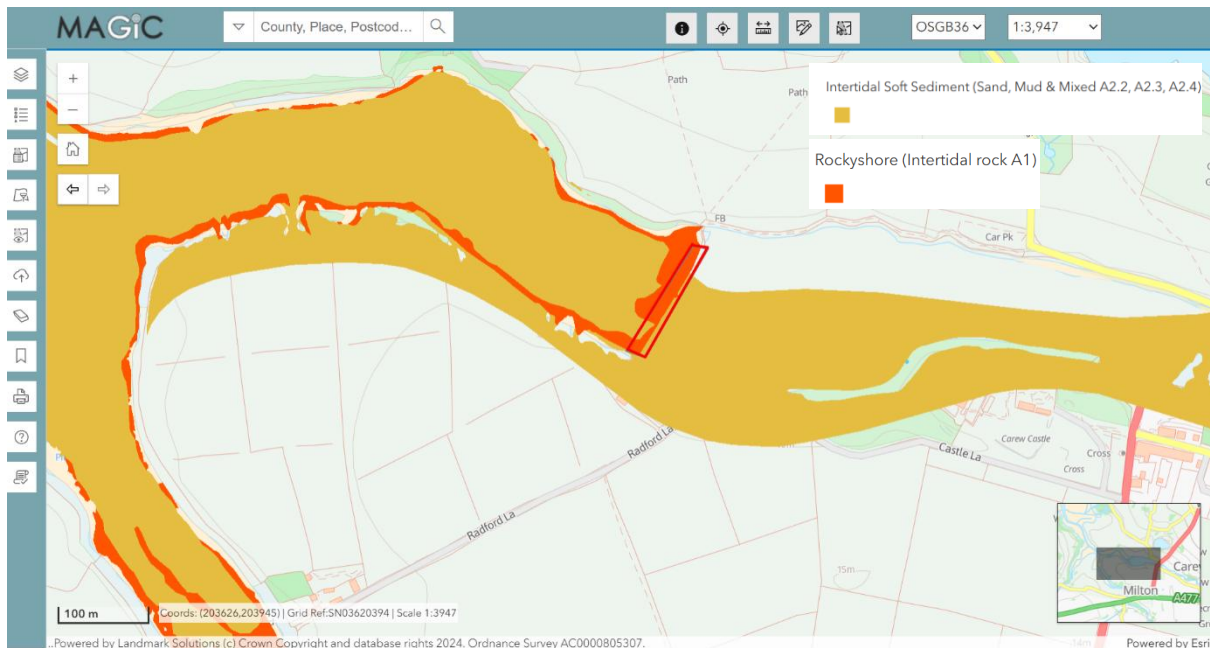


Figure 5-2 – Location of lower-sensitivity habitats within proximity to the Proposed Works, based on habitat layers sourced from MAGIC⁸.

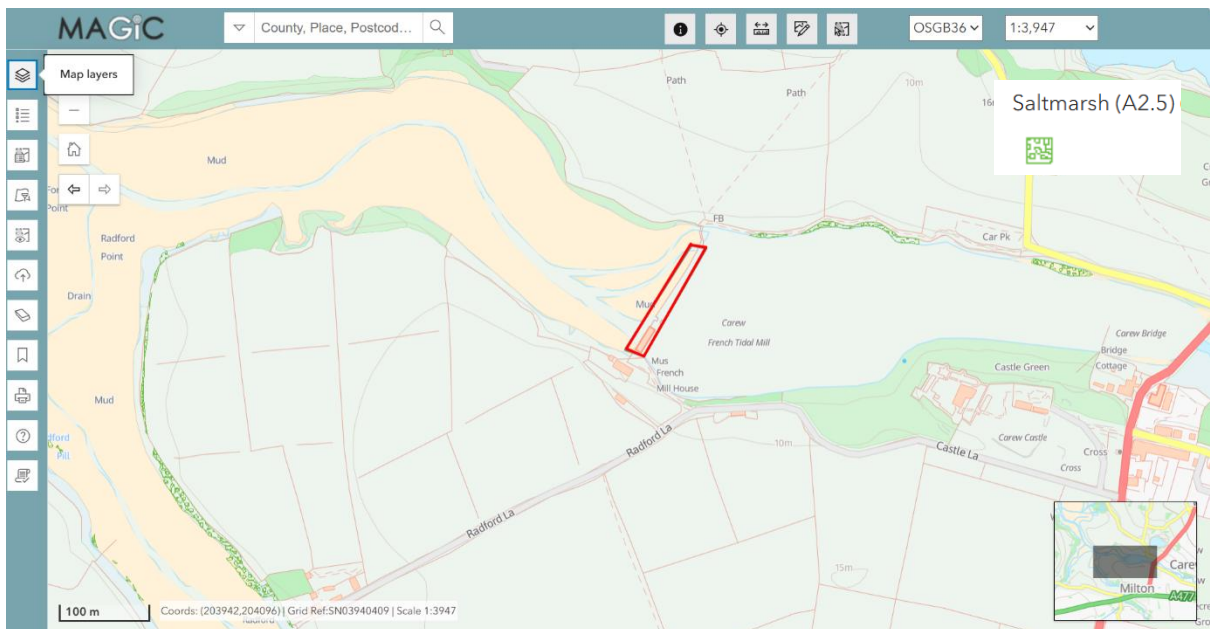


Figure 5-3 – Location of higher-sensitivity habitats within proximity to the Proposed Works, based on habitat layers sourced from MAGIC⁸.

5.1.3 Protected Areas

The following statutory designations are located in a 2km radius of the Proposed Works.



- Pembrokeshire Marine / Sir Benfro Forol Special Area of Conservation (SAC);
- Pembrokeshire Bat Sites and Bosherton Lakes / Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherton SAC;
- Milford Haven Water Site of Special Scientific Interest (SSSI); and
- Carew Castle SSSI.

5.1.4 Milford Haven Inner baseline

Table 5-4 provides information from the 2021 Cycle 3 WFD assessment of the Milford Haven Inner transitional water body. The water body is designated as a natural water body and is currently classified as moderate overall status.

Table 5-2 - Baseline for Milford Haven Inner WFD data

Water body name	Milford Haven Inner
Water body ID	GB531006114100
River Basin District	Western Wales
Management Catchment	Western Wales TraC
Operational Catchment	Milford Haven
Classification	2021 Cycle 3
Overall water body	Moderate
Chemical	Moderate
Copper	High
Zinc	High
Arsenic	High
Iron	High
Dissolved Inorganic Nitrogen (DIN)	Moderate
Dissolved Oxygen	High
Ecological	Moderate
Biological quality elements	Moderate
Angiosperms	Good
Invertebrates	Good
Macroalgae	Moderate
Opportunistic macroalgae	Moderate
Infaunal Quality Index (IQI)	Good
Saltmarsh	High
Hydro morphology	Not High
Artificial or HMWB	Natural

5.2 Screening Summary

The outcomes of the WFD Stage 1 – Screening is as follows:

- The Milford Haven Inner water body will be **screened in** as the Proposed Works are located within this water body.
- Pembrokeshire Carboniferous Limestone will be **screened out** as there will be no impact to the ground waterbody from the Proposed Works.
- Carew - HW to conf with Carew Tidal millpond and Milford Haven Outer will be **screened out** due to the distance and localised nature of the Proposed Works.
- There are several higher and lower sensitivity habitats and WFD protected areas within 2km of the proposed scheme.
- All elements of the Proposed Works have been **screened in** for the construction phase.
- The operation of the Proposed Works has been **screened out** of further assessment, as the Proposed Works will behave passively, with no further works proposed at this stage.

6. Scoping assessment

6.1 Scoping assessment

The scoping exercise looks to determine the risks associated with the Proposed Works activities on relevant water bodies and their quality elements to determine whether a WFD impact assessment is required. This is undertaken for each of the WFD quality elements for the water body, defined in the guidance as the following:

- Hydromorphology;
- Biology – habitats;
- Biology – fish, invertebrates;
- Water quality;
- Protected areas;
- Invasive non-native species (INNS).

For full details of the scoping assessment please refer to Appendix B.

Table 6-1 - Scoping Assessment for the Milford Haven Inner transitional Water body

WFD receptors	Potential risk to receptor	Scoping assessment
Hydromorphology	No	<p>The Proposed Works are not anticipated to result in any changes to the hydromorphological supporting elements of the waterbody. All activities will be undertaken at low tide, with no works occurring within the water column. The works comprise repairs to the Carew Causeway wall. To facilitate access for these repairs, the sluice gates will be propped open, allowing the millpond of the River Carew to fluctuate naturally with the tide rather than impounding water at low tide. Any hydromorphological changes will therefore be temporary and will cease once the sluice gates are closed following completion of the works.</p> <p>Overall, the potential impacts of the Proposed Works on hydromorphology quality elements are considered negligible.</p>
Biology: habitats	No	<p>The Proposed Works are small-scale and localised in nature, with a project footprint of less than 0.5 km². There is no saltmarsh or higher sensitivity habitats within the red-line boundary, and the methodology has been refined to ensure effective and regular flooding of the mudflats. The pond naturally refills twice daily on the high tides, allowing the mudflats to regain moisture and maintain suitable conditions for lagoon worm habitat. This draining and refilling cycle prevents the mud from drying out, and there is also a continual residual inflow from the upstream River Carew.</p> <p>All works will take place at low tide and outside the water column; therefore, no direct or indirect effects on these habitats are anticipated.</p> <p>Overall, the potential impacts of the Proposed Works on habitat quality elements are considered negligible.</p>

Biology: fish and invertebrates	No	<p>During previous consultation with NRW, concerns were raised regarding the tentacled lagoon worm (<i>Alkmaria romijni</i>), and the potential drying out of the mudflats. NRW reported the millpond as having patchily dense oligochaete worms, including low population numbers of the tentacled lagoon worm (NRW, 2018). The method of works has since been refined to ensure effective and regular flooding of the mudflats. The pond naturally refills twice daily on the high tides, allowing the mudflats to regain moisture and maintain suitable conditions for the lagoon worm habitat. This draining and refilling cycle does not result in the mud drying out, and there is also a continual residual inflow from the upstream River Carew.</p> <p>All works will be undertaken at low tide and outside the water column. The plastic sheeting placed on the riverbed is intended to prevent any falling mortar material from entering the millpond. As a result, the risk to fish within the water column is considered negligible.</p> <p>All repair activities will be undertaken outside of the water column at low tide. Given the restricted pathways between the works and the waterbody, no impacts on biological elements are anticipated. The potential impacts of the Proposed Works on biological quality elements (fish and invertebrates) are therefore considered negligible.</p>
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Water quality	No	<p>The Proposed Works are not expected to mobilise any dormant contaminants into the water column, as no dredging or sediment-disturbing activities are proposed. All works will be undertaken at low tide and outside the water column. The only activity occurring on the riverbed is the placement of plastic sheeting, which serves as a protective measure to prevent any falling mortar material from entering the millpond. Any disturbance to the riverbed will be minimal, and once the tide begins to rise, any effects on the mudflats will remain negligible. The works are not anticipated to affect turbidity levels. There is a potential risk of pollutants such as fuel, oil, or concrete residues reaching the mudflats during construction. However, standard good-practice measures will be implemented on site which include:</p> <ul style="list-style-type: none"> • Use of bio-degradable fuels, well-maintained equipment and spill kits provided for fuel/oil leaks. • Plant and machinery will be switched off when not in use. • No materials to be stored in the intertidal area. • General measures to avoid or alleviate negative impacts on ecological receptors such as following the Pollution Prevention Guidelines, and the Construction Industry Research and Information Association (CIRIA) guidance on the control of water pollution from construction sites. • All equipment and materials used will be in a clean condition prior to their arrival on site, and on removal from site, to minimise risk of introducing INNS into the marine environment. <p>The potential impacts of the Proposed Works on water quality elements are therefore considered negligible.</p>
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Protected areas	No	<p>No bathing or drinking water protected areas were identified within the 2 km buffer of the Site.</p> <p>Several designated sites lie in proximity to the works. Carew Tidal Mill is situated at one of the most upstream extents of the Pembrokeshire Marine SAC. The primary potential impact associated with the works relates to the temporary draining of the millpond. However, most qualifying features of the Pembrokeshire Marine SAC are highly unlikely to occur within the millpond environment. A separate HRA has been carried out on the impacts to Pembrokeshire Marine SAC.</p> <p>Past site visits have determined no otter holts (dens) in the area, and no disturbance to the embankments is expected, as works are confined to the walls and causeway.</p> <p>Additionally, the following mitigation measures will be followed to reduce any impact on protected areas. These include:</p> <ul style="list-style-type: none"> • Use of bio-degradable fuels, well-maintained equipment and spill kits provided for fuel/oil leaks. Plant and machinery will be switched off when not in use. • No materials to be stored in the intertidal area. • General measures to avoid or alleviate negative impacts on ecological receptors such as following the Pollution Prevention Guidelines, and the Construction Industry Research and Information Association (CIRIA) guidance on the control of water pollution from construction sites. • All equipment and materials used will be in a clean condition prior to their arrival on site, and on removal from site, to minimise risk of introducing INNS into the marine environment. <p>Overall, the potential impacts of the Proposed Works on protected site quality elements are considered negligible</p>
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Invasive non-native species	No	All equipment and materials will be cleaned prior to arrival on site and again on removal, minimising the risk of introducing INNS into the marine environment. Therefore, the potential impacts of INNS quality elements from the Proposed Works are considered negligible.
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7. Summary


This WFD Assessment has evaluated the potential effects of the Proposed Works on the Milford Haven Inner waterbody (ID: GB531006114100), against the biological, physicochemical and hydro-morphological quality elements of the WFD and potential impacts on the surrounding protected areas and WFD sensitive habitats. Based on the information available and considering the mitigation measures which will be employed throughout the Proposed Works, the works are expected to have a negligible impact on the biological, physicochemical and hydro-morphological quality and supporting elements of the WFD waterbody. The Proposed Works are therefore WFD compliant.

The Proposed Works will prevent further deterioration to the Carew Tidal Mill wall and sluice gates, supporting the ongoing operation and recreational use of a unique historic site.

APPENDICES

a. Stage 1: Screening

i. Stage 1 step 1: proposal details.

Project reference number	N/A
Proposal	<p>The purpose of the project is to undertake small scale repairs to the historic causeway structure at the Site. Some of the works will be undertaken from the surface of the causeway around the perimeter of the Mill House and the remainder of the works will be to the vertical walls of the causeway.</p> <p>The following work activities are required:</p> <ul style="list-style-type: none"> • Activity 1 – Inspection and cleaning. • Activity 2 – Hand infilling of voids; • Activity 3 – Grouting repairs - Causeway; • Activity 4 – Grouting repairs – Mill House.
List all permissions that may be required where known	<ul style="list-style-type: none"> • Marine licence • HRA
Location (include map where appropriate)	
Timing of works	Between June and September 2026
Name of the person completing the assessment	Abbie Jenkins - AtkinsRéalis

ii. Stage 1, step 2 : Collate baseline information on all water bodies at risk from the proposal.

Date of classification information: **Cycle 3 2021 classification**

Water body name and ID	Water body type	HMWB	Overall water body status	Relevance to the proposal
Milford Haven Inner (GB531006114100)	Estuary/transitional	No	Moderate	Project site within water body – direct risk

*where there is no information, or a null value then assume it is at good status for morphology (or hydromorphology for TraC water bodies) or, if the water body is designated HMWB the morphological status is **not applicable (please be aware that these water bodies are still sensitive to physical modifications)**.

The potential for the proposal to affect the following water bodies was also initially considered, but can be ruled out without further consideration:

- Pembrokeshire Carboniferous Limestone (GB41002G206000) – Although the Proposed Scheme is within this groundwater body, as none of the proposed works includes dredging or depositing of sediment, or piling operations, which may cause disturbance to the river or lagoon bed, it is deemed unlikely that there will be any impact to the groundwater body and therefore it has been **screened out** from further assessment.
- Carew - HW to conf with Carew Tidal Millpond (GB110061031210) – Located 1km upstream of the Proposed Scheme, due to the distance from the Site and the localised nature of the Proposed Works, it is deemed unlikely that there will be any impacts on this water body and therefore, it has been **screened out** from further assessment.
- Milford Haven Outer (GB641008220000) - The Milford Haven Outer water body is located 10km downstream. Due to the distance from the Site and the localised nature of the Proposed Works, it is deemed unlikely that there will be any impacts on this water body and therefore, it has been **screened out** from further assessment.

Stage 1, Step 3: Risk Screening

complete a risk screening table for each water body listed above that has **potential risk of impact from the proposal**

Water body name: Milford Haven Inner			
Water body ID: GB531006114100			
Question number	Risk screening questions	Name of activity	Screening decision – delete as appropriate
Q1.1	Is the proposal in a water body at high status or high status for morphology or hydromorphology?	N/A	No – go to Q1.2
Q1.2	Is the proposed activity listed a low risk activity? Complete new row for each activity	Pointing repairs to masonry walls.	No – complete Stage 2 scoping assessment for each water body
		Grouting repairs to masonry walls	No – complete Stage 2 scoping assessment for each water body
Q1.3	Are there any potential cumulative/in combination impacts?		No

b. Stage 2: Scoping

Stage 2, step 1 – Relate activity to receptors

Scoping table for transitional and coastal water bodies			
Water body name: Milford Haven Inner			
Water body ID: GB531006114100			
Elements	Applicable	Potential Impact (include direct and indirect potential impacts)	Avoidance measures included in the proposal
Transitional and Coastal water bodies	Choose one of the following: Direct – risk of direct impact Indirect – risk of indirect impact N/A – no impact pathway	Further detail on potential impacts. Where N/A is included then provide detail to explain.	Briefly describe any measure included within the proposal at this point that will ensure the potential effects are avoided. Where impacts can be avoided through measures already included in the scheme then add Scoped Out. Or where further assessment is required add Scoped In

	N/A – other – include additional text to explain		
<p>Hydromorphology – hydromorphology constitutes both 'hydrology' and 'geomorphology' and describes the physical characteristics and processes of a water body.</p> <p>Could the proposal lead to changes in:</p>			
<ul style="list-style-type: none"> morphological conditions, for example depth variation, the seabed and intertidal zone structure tidal patterns, for example, dominant currents freshwater flow wave exposure 	Direct – risk of direct impact	The Proposed Works are limited to repairs on an existing wall and within the Carew mill and are therefore expected to result in only minimal impacts on hydromorphology. As the works do not involve any alteration to the footprint, alignment, or function of the existing structure, no changes to the overall morphology or physical processes of the water body are anticipated. The works are to take place out of the water at low tide.	N/A
Is the proposal in a HMWB?		No	If yes then scope in for detailed assessment
<p>Water quality</p> <p>An activity can modify the flow of water, introduce artificial materials or remove sediment and/or vegetation. These can all affect the water quality – particularly physico-chemical aspects of water quality - such as levels of dissolved oxygen, nutrients and ammonia.</p> <p>Include water quality in the detailed assessment if the activity could affect:</p>			
<ul style="list-style-type: none"> water clarity (turbidity or suspended particulate matter concentration) thermal conditions (including shading) oxygen levels – dissolved oxygen conditions nutrients - dissolved inorganic nitrogen microbial patterns salinity/conductivity is in a water body with a phytoplankton or opportunistic macroalgae status of moderate, poor or bad is in a water body with a history of harmful algae (where there is an existing designation for the area, information should be available; however, local water quality officers will be able to help). 	Direct – risk of direct impact	There is potential for pollutants such as fuel/oil from machinery and concrete to leak onto the mudflats during the works.	<p>However standard good practice measures have been considered in the Mitigation Measures section to reduce these impacts including the use of bio-degradable fuel, spill kits no fuelling allowed alongside the Mill. All appropriate mitigation measures will be in place and deployed during the Works to minimise any pollution risks.</p> <p>Mitigation measures include the following:</p> <ul style="list-style-type: none"> Working during low tide / areas from which the tide has been excluded and outside busy summer months. A toolbox talk will be given to contractors prior to the start date in order to inform contractors of the sensitive habitat and the limitations on access and working areas within the Millpond. Use of bio-degradable fuels, well-maintained equipment and spill kits provided for fuel/oil leaks. Plant and machinery will be switched off when not in use; No materials to be stored in the intertidal area. General measures to avoid or alleviate negative impacts on ecological receptors such as following the Pollution Prevention Guidelines, and the Construction Industry Research and Information Association (CIRIA) guidance on the control of water pollution from construction sites; All equipment and materials used will be in a clean condition prior to their arrival on site, and on removal from site, to minimise risk of introducing INNS into the marine environment. Raise awareness of the potential presence of otters in the area of the Proposed Works (no holt in vicinity). <p>With these mitigation measures, the impact of the works to water quality are considered negligible and therefore scoped out of further assessment.</p>
<p>Chemicals - A detailed assessment will also be required if the activity uses or releases chemicals, for example, through sediment disturbance or building works. This is necessary when either the:</p>			
<ul style="list-style-type: none"> chemicals are on the Environmental Quality Standards Directive (EQSD) list activity disturbs sediment with contaminants (for estuarine and coastal above Cefas Action Level 1). <p>or, if the activity releases chemicals on the EQSD list and has a mixing zone, like a discharge pipeline or outfall, follow the Environment Agency's surface water pollution risk assessment guidance. This is part of the Environmental Permitting Regulations guidance.</p>	Indirect – risk of indirect impact	Works are not expected to disturb any dormant contaminants.	<p>The Proposed Works are not expected to mobilise any dormant contaminants into the water column, as no dredging or sediment-disturbing activities are proposed. All works will be undertaken at low tide and outside the water column. The only activity occurring on the riverbed is the placement of plastic sheeting, which serves as a protective measure to prevent any falling mortar material from entering the millpond. Any disturbance to the riverbed will be minimal, and once the tide begins to rise, any effects on the mudflats will remain negligible. The works are not anticipated to affect turbidity levels</p> <p>The impact of the Proposed Works to chemicals are considered negligible and therefore scoped out of further assessment.</p>

<p>Biology</p> <p>Identify if the activity or project could impact on the abundance or composition of the biological elements listed below:</p> <p>Biological elements for transitional (T) and coastal (C) waters under the directive are:</p> <ul style="list-style-type: none"> • Benthic invertebrates (T, C) • Fish (T) • Phytoplankton (T, C) • Macroalgae (T, C) • Angiosperms (T, C) <p>Could the proposal lead to:</p>			
<input type="checkbox"/> changes to the composition and abundance of aquatic flora <input type="checkbox"/> changes to the composition and abundance of benthic invertebrate fauna	Direct – risk of direct impact	intertidal and subtidal soft sediments like mud	Project footprint localised. Area of disturbance less than 0.5km ² and less than 1% of water body area. Therefore, the impact on these habitats is negligible and scoped out of further assessment.
<p>For TraC water bodies - scope in if the footprint (where footprint can be direct or a plume i.e. chemical or thermal; for dredging multiply the area by 1.5x) of your activity is:</p>			
<input type="checkbox"/> 0.5km ² or larger <input type="checkbox"/> 1% or more of the water body's area <input type="checkbox"/> Within 500m of any higher sensitivity habitat (see table below) <input type="checkbox"/> 1% or more of any lower sensitivity habitat (see table below)	Indirect – risk of indirect impact	Indirect risk to higher sensitivity habitats. Saltmarsh is present within 500 m of the Proposed Scheme.	Small, isolated sections of saltmarsh are within 500m of the Proposed Works within the Mill Pond. As the works are confined to repairs on the existing wall, do not take place within the water column and are small scale in nature. No direct or indirect effects on these habitats are anticipated and therefore scoped out of further assessment.
<p>Fish fauna (Transitional water bodies only): could the proposal lead to:</p>			
<input type="checkbox"/> changes to the composition, abundance and age structure of fish fauna <input type="checkbox"/> an 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) <input type="checkbox"/> entrainment or impingement of fish <input type="checkbox"/> refuge/predation areas <p>Or: is the proposal in an estuary and could affect fish in the estuary; is outside the estuary but could delay or prevent fish entering it; or, could affect fish migrating through the estuary</p>	Direct – risk of direct impact	Potential minor risk to fish within the water column and to the tentacled lagoon worm in the Millpond.	<p>During previous consultation assessment of impacts were raised regarding the tentacled lagoon worm (<i>Alkmaria romijni</i>), and the potential drying out of the mudflats. NRW reported the Mill Pond as having patchily dense oligochaete worms, including low population numbers of the tentacled lagoon worm (NRW, 2018). The method of works has been updated to ensure efficient flooding of the mudflats including spill over during Spring tides so that the Millpond will only be left dry for a maximum of, up to 7 days, allowing sufficient hydration for the Tentacled Lagoon Worm communities.</p> <p>Works to be undertaken outside of the water column at low tide. The plastic sheeting is a measure to reduce any falling mortar materials from entering the millpond. Therefore, the risk to fish in the water column is considered negligible. Additionally, the following mitigation measures will be followed to reduce any impact. These include:</p> <ul style="list-style-type: none"> • Working during daylight hours, during low tide / areas from which the tide has been excluded and outside busy summer months. • A toolbox talk will be given to contractors prior to the start date in order to inform contractors of the sensitive habitat and the limitations on access and working areas within the Millpond. • Use of bio-degradable fuels, well-maintained equipment and spill kits provided for fuel/oil leaks. Plant and machinery will be switched off when not in use; • No materials to be stored in the intertidal area. • General measures to avoid or alleviate negative impacts on ecological receptors such as following the Pollution Prevention Guidelines, and the Construction Industry Research and Information Association (CIRIA) guidance on the control of water pollution from construction sites; • All equipment and materials used will be in a clean condition prior to their arrival on site, and on removal from site, to minimise risk of introducing INNS into the marine environment. • Raise awareness of the presence of otters (no holt in vicinity). <p>Therefore, as there are limited pathways between the Works and the waterbody when the works are proposed to take place, and the impact is considered negligible and scoped out of further assessment.</p>

Info for TraC water bodies

Higher and lower sensitivity habitats for TraC water bodies



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

Section 4: WFD protected areas

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

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

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
Within 2km of any WFD protected area ⁶	Requires impact assessment	Impact assessment not required	<p>No bathing or drinking water protected areas were identified within the 2 km buffer of the Site.</p> <p>Several designated sites lie in proximity to the works. Carew Tidal Mill is situated at one of the most upstream extents of the Pembrokeshire Marine SAC. A HRA has been completed as part of the application. Additionally, the following mitigation measures will be followed to reduce any impact on protected areas. These include:</p> <ul style="list-style-type: none"> • Use of bio-degradable fuels, well-maintained equipment and spill kits provided for fuel/oil leaks. Plant and machinery will be switched off when not in use. • No materials to be stored in the intertidal area. • General measures to avoid or alleviate negative impacts on ecological receptors such as following the Pollution Prevention Guidelines, and the Construction Industry Research and Information Association (CIRIA) guidance on the control of water pollution from construction sites. • All equipment and materials used will be in a clean condition prior to their arrival on site, and on removal from site, to minimise risk of introducing INNS into the marine environment. <p>The impact on WFD protected sites is negligible and therefore scoped out of further assessment.</p>

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

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	All equipment and materials used will be in a clean condition prior to their arrival on site, and on removal from site, to minimise risk of introducing INNS into the marine environment. Therefore, the impact of the Proposed Works to INNS is considered negligible and scoped out of further assessment.

Summary

Issues for impact assessment Milford Haven Inner

Receptor	Potential risk to receptor?	Note the risk issue(s) for impact assessment
Hydromorphology	No	Negligible impacts to hydromorphology
Biology: habitats	No	Negligible impacts to Biology habitats with mitigation measures in place.
Biology: fish	No	Negligible impacts to Biology fish with mitigation measures in place.
Water quality	No	Negligible impacts to water quality with mitigation measures in place.
Protected areas	No	Within a WFD protected area, however negligible impacts. A separate HRA has been produced outlining no adverse effects to site integrity.
Invasive non-native species	No	Negligible impacts to INNS with mitigation measures in place.

AtkinsRéalis



AtkinsRéalis UK Limited
West Glamorgan House
12 Orchard Street
Swansea
SA1 5AD

Tel: +44 (0)1792 641172
Fax: +44 (0)1792 472019

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